

**OPERATION AND
MAINTENANCE
MANUAL FOR THE
PEMSERTER® SERIES 2000®
BASE PRESS
(Original instruction)**

PennEngineering®



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OPERATION AND MAINTENANCE MANUAL

PEMSERTER® SERIES 2000® PRESS

MODEL SERIES 2000

FASTENER INSTALLATION PRESS

SERIAL NUMBER 2010B OR 2110B-0001&UP

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PEMSERTER® SERIES 2000® FASTENER INSTALLATION PRESS

OPERATION AND MAINTENANCE MANUAL

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Read Manual Before Operating Press!

SECTION 1

INTRODUCTION

The PEMserter® Series 2000® Fastener Installation Press is available in three configurations: Manual, Automatic, and as TRU-Motion® systems integrated with material handling systems such as assembly conveyors, X-Y positioning tables, and robotic arms. This manual describes the standard Manual version of the Series 2000 press. The Manual version of the Series 2000® operates the same as the Automatic version with the similar control software, except that the autofeed hardware is not available.

Features:

- Safety and Protection System, sensitive down to 0.4 mm (0.015")
- Unique high speed ram approach with energy efficient power stroke.
- Computer control system with touch screen interface. Provides simple and precise controls for the operator. Designed for easy set-up, operation, maintenance and diagnostics.
- Quick Set-up/change-over manual tooling. Provides an extensive selection of tooling for different fasteners.

Specifications:

- | | |
|---------------------------------------|--|
| • Ram Force | 1.8 to 71.2 KN (400 to 16,000 lbs) |
| • Pressure System Type | Air-Over-Oil |
| • Air Requirements | 6 to 7 BAR (90 to 100 PSI)
12 mm (1/2") dia. minimum line flow |
| • Throat Depth | 61 cm (24") |
| • Height | 193 cm (76") |
| • Width | 92 cm (36") |
| • Depth | 126 cm (49.5") |
| • Weight | 1,135 kg (2,500 lbs.) |
| • Electrical (North America) | 120VAC(+/-12 VAC), 60 Hz(+/-1 Hz), 5A, 1φ |
| • Electrical (Europe and Pacific Rim) | 230VAC(+/-23 VAC), 50 Hz(+/-1 Hz), 3A, 1φ |
| • Air Consumption | approx. 5 liters/sec air at 1 Atm (15 Scfm)
20 insertions per minute at 20 KN (4500 Lbf) |
| • Ambient Temperature | 32° F to 104° F (0° C to 40° C) |
| • Transport / Storage Temperature | -13°F to +130°F (-25°C to +55°C) and for short periods not to exceed 24 hours up to 160°F (70°C) |
| • Ambient Humidity | 0% to 100% (Not reflective of inlet air) |
| • Installation Altitude | Max 1000m |

SAFETY

The Series 2000® was designed to conform to applicable ISO, ANSI, OSHA, CEN and CSA safety standards.

The Series 2000® is compliant to applicable European Union (EU) directives and bears the CE Mark.

The Series 2000® conforms to the essential requirements of the following directives:

Machinery Directive 2006/42/EC.

Electromagnetic Compatibility (EMC) Directive 2004/108/EC

Low Voltage Directive 2006/95/EC

Applicable Standards:

EN 12100:2010, EN60204-1:2006+A1:2009

EN ISO 13849-1:2008+AC:2009

Please read and follow the safety precautions listed below.



SAFETY PRECAUTIONS

- ◆ Always use safety goggles when operating or maintaining the press
- ◆ Ear Protection is recommended.
- ◆ Always shut off the electrical power and remove the power cord before servicing the press.
- ◆ Before using the press, make sure that a shutoff device has been fitted on the air supply line and the location is easily accessible, so that the air supply to the press can be shut off in an emergency. Make sure that surge protection is installed in the electrical supply to the press.
- ◆ Check the air hose and fittings regularly for wear.
- ◆ Use only approved parts for maintenance and repairs.
- ◆ Do not use chipped, cracked or damaged accessories and tools.
- ◆ Attach air line securely.
- ◆ Keep body parts away from moving parts.
- ◆ Never wear jewelry, loose clothing or anything that could get caught in moving parts.
- ◆ If a new user is operating the press, be sure these instructions are readily available.
- ◆ Do not use the press in any way, other than for its intended purposes.
- ◆ Do not modify the press in any way.
- ◆ Press contains hydraulic fluid. See enclosed Material Safety Data Sheet for proper handling. Follow all applicable local safety standards.

The sound emission values (acoustic pressure level) at the operator position is 92.3dB(A)
Within the scope of 1 meter ,The sound emission values (sound power level) is 96.8 dB(A)
Within the scope of 1 meter , uncertainty K=2dB(A) .







However , If the machine is operated in a room with other machines ,the sound emission level (rated level) can be over 82.5dB(A) .

If this is the case, improve the acoustics in the room. If you do not, the hearing of the operators may be damaged.



WARNING: Immediately upon receipt of your press, establish a “Maintenance Code” for your supervisor/maintenance personnel only, as it is possible, however

difficult, to operate the press without the standard safeguards in place in the Maintenance Mode. Only trained personnel should use the Maintenance Mode. PennEngineering® is not responsible for improper maintenance mode procedures, which result in a loss of operation of the press or operator safety.

Label	Definition
	General Warning Label – There are items that require attention. These are specified in the operator’s manual.
 <div> CAUTION Laser radiation. DO NOT STARE INTO BEAM Class 2 laser product. </div>	CAUTION: Laser Radiation. Do not stare into beam. Class 2 laser product. Per EN 60825 and ANSI Z136.1: Class 2 lasers are low power devices emitting visible radiation in the wavelength range 400nm to 700nm. Momentary viewing is not considered hazardous since the upper radiant power limit on this type of device is less than the MPE (Maximum Permissible Exposure) for momentary exposure of 0.25 second or less. Intentional extended viewing, however, is considered hazardous. Never aim the spotting light anywhere except at the workpiece.
	Eye Protection Label – Eye protection must be worn when operating the press.
	Hot Surface Label – Hot Surface. Do not touch.
	Pinch Point Label – Keep hands away from area.
	Electrical Shock/Electrocution Warning Label –Electrical shock hazard. Do not touch

WARRANTY

PennEngineering® warrants that this product, when correctly used according to directions and under normal operating conditions, will be free from defects in material and workmanship for a period of one (1) year from the date of purchase.

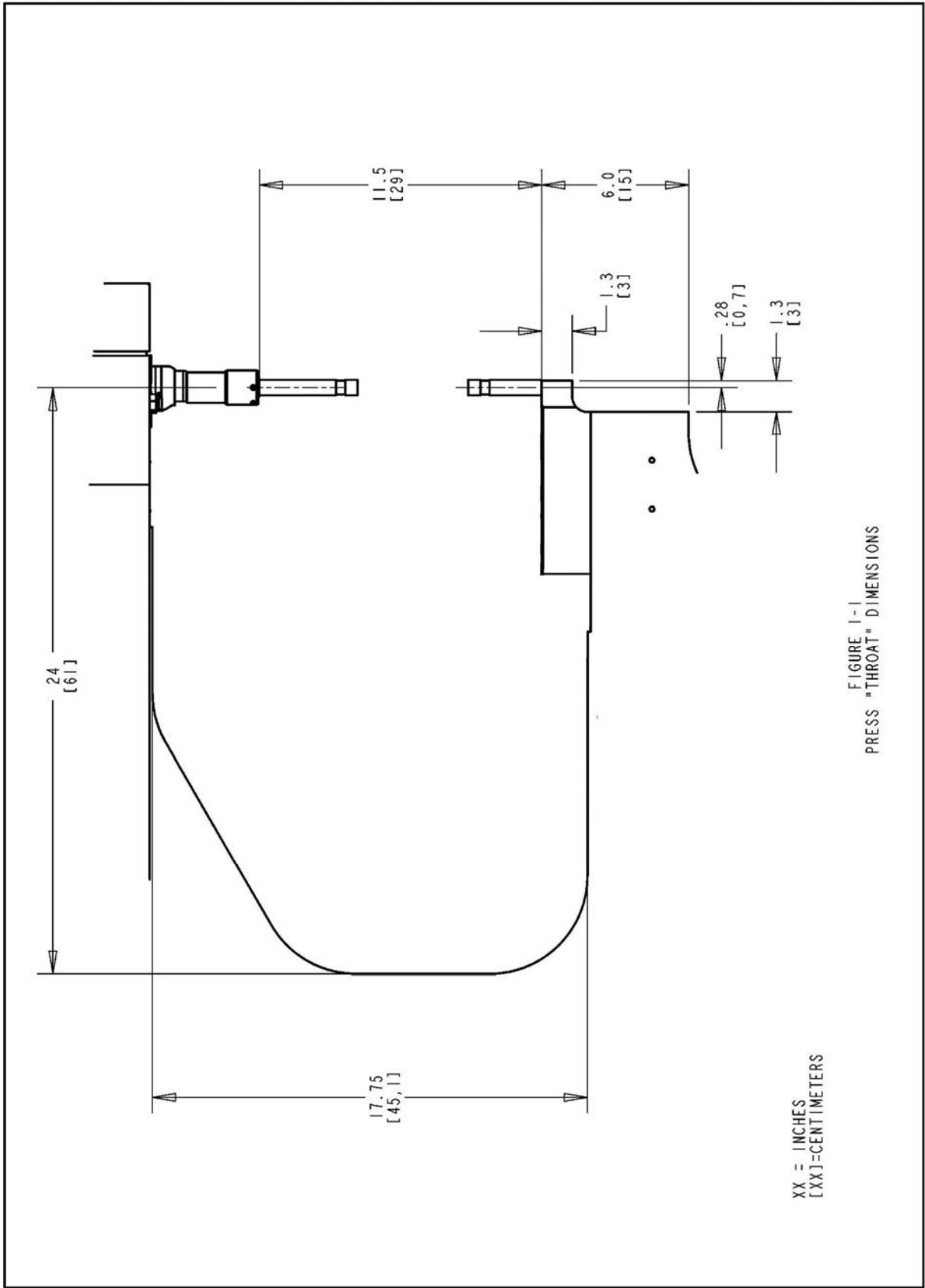
This warranty shall not apply to any product which has been altered, changed or repaired, normal maintenance excluded, except as authorized by PennEngineering®. This warranty shall not apply to any product that has been subject to misuse, negligence or accident.

The purchaser's exclusive and sole remedy shall be limited to repair, modification or replacement at the discretion of PennEngineering®. In no event shall PennEngineering® be liable for the cost of any indirect or consequential damage. In no case shall PennEngineering® liability exceed the purchase price of the product.

This warranty is exclusive and in lieu of all other warranties. No oral or written information by PennEngineering®, its employees, representatives, distributors or agents shall increase the scope of the above warranty or create any new warranty.

Should any questions or problems arise concerning your Series 2000 press, contact the PennEngineering® Service Department. **Toll-free telephone number 1-800-523-5321 (in North America) or 215-766-8853.**

Set-up, Training and Repair Service is available to you as long as you own your press. Free telephone instruction and Service is available for the lifetime of your press by calling the PennEngineering® Service Department.



SECTION 2

IDENTIFYING AND LOCATING MAJOR COMPONENTS OF THE PRESS

Identifying Major Components of the Press

This section introduces the user to the major components of the press.

Frame

The frame is the structure of the press. The main section is made of solid steel with welded components that form the base and the other support sections. All parts are directly or indirectly mounted onto the frame.

Main Cylinder/Ram

The ram force of the press is exerted by a hydraulic cylinder called the Main Cylinder. It is mounted directly onto the frame surrounded by the front enclosure. Attached to the main cylinder, at the back end, is a sensor probe called a Linear Transducer, which reads the location of the main cylinder piston. Attached to the end of the main cylinder rod is the safety assembly, described in Section 3. The main cylinder rod is referred to as the Ram.

Operator Controls

All the operator controls are located on the door of the Front Enclosure except the foot pedal. These include the Touch Screen, the E-Stop button, the Power ON button, the Power OFF button, the Audible Beeper, and the Spotting Light button.

- **Touch Screen** - This is the primary interface to the press control system (the PLC). It is used for installation and tooling setup and configuration, feedback to the user and diagnostics. The screen displays text and graphical information and allows the operator to make selections by touching different parts of the screen as indicated by what is displayed on the screen. The touch screen is programmed with an automatic screen save mode that blanks the screen when not in use after 10 minutes. To reactivate the screen, just touch anywhere on the screen. Detailed explanations of each screen are provided in Section 6 of this manual.
- **E-Stop Button** - Pressing this button disconnects power to the quick exhaust/supply valve (see air supply inlet system on page 19). When pressure is exhausted, all pneumatic motion stops. During an E-Stop condition all outputs are turned off. The control system remains on-line and detects the E-stop.

- **Power ON Button** - If the press is on, this button is lit green. When the press is off, pressing this button will provide power to the press control system which will initialize the press, including pressurizing the press and moving the Ram to it's retracted "home" position.
- **Power OFF Button** – This button is lit amber if there is electricity connected to the press but the press is off. When the press is on, the amber light will be off. Press this button to turn the press off, power will be switched off from the control system and all moving components including the quick exhaust/supply valve.
- **Audible Beeper** - This beeper is controlled by the PLC and is used to indicate to the operator when the press or operation requires special attention. The volume can be adjusted by turning the outer ring and adjusting the aperture of the beeper.
- **Spotting Light Push Button** – Push this button to turn the spotting light on and off. This button is lit when the laser spotting light is on. Never aim the spotting light anywhere except at the workpiece and, never look directly into the spotting light.
- **Foot Pedal** - The foot pedal is used by the operator to control the start of a press cycle. It frees the operator to use his hands to manipulate the workpiece.

Pneumatic/Hydraulic Enclosure

The Pneumatic/Hydraulic Enclosure on the right side of the press houses all the major components of the Air-Oil System that control the main cylinder. These components include the computer controlled pressure regulator system, the ram valve assembly which includes the ram valve and the booster valve, the Air-over-Oil tanks, the Air-Oil booster, and the hydraulic safety valves.

Electrical Enclosure

The Electrical Enclosure, under the Pneumatic/Hydraulic Enclosure, houses the computer control system (PLC) and various electrical components and distribution terminals. Electric Power and the Foot Pedal connect to this enclosure. The door is key-locked and located on the back is the electrical on-off switch. This switch must be ON for the press to be powered on. Turning off this switch removes all power to the press. The electrical power cord plugs in next to the switch. Removing the power cord can be used to lock out all power to press when performing maintenance.

Anvil holder

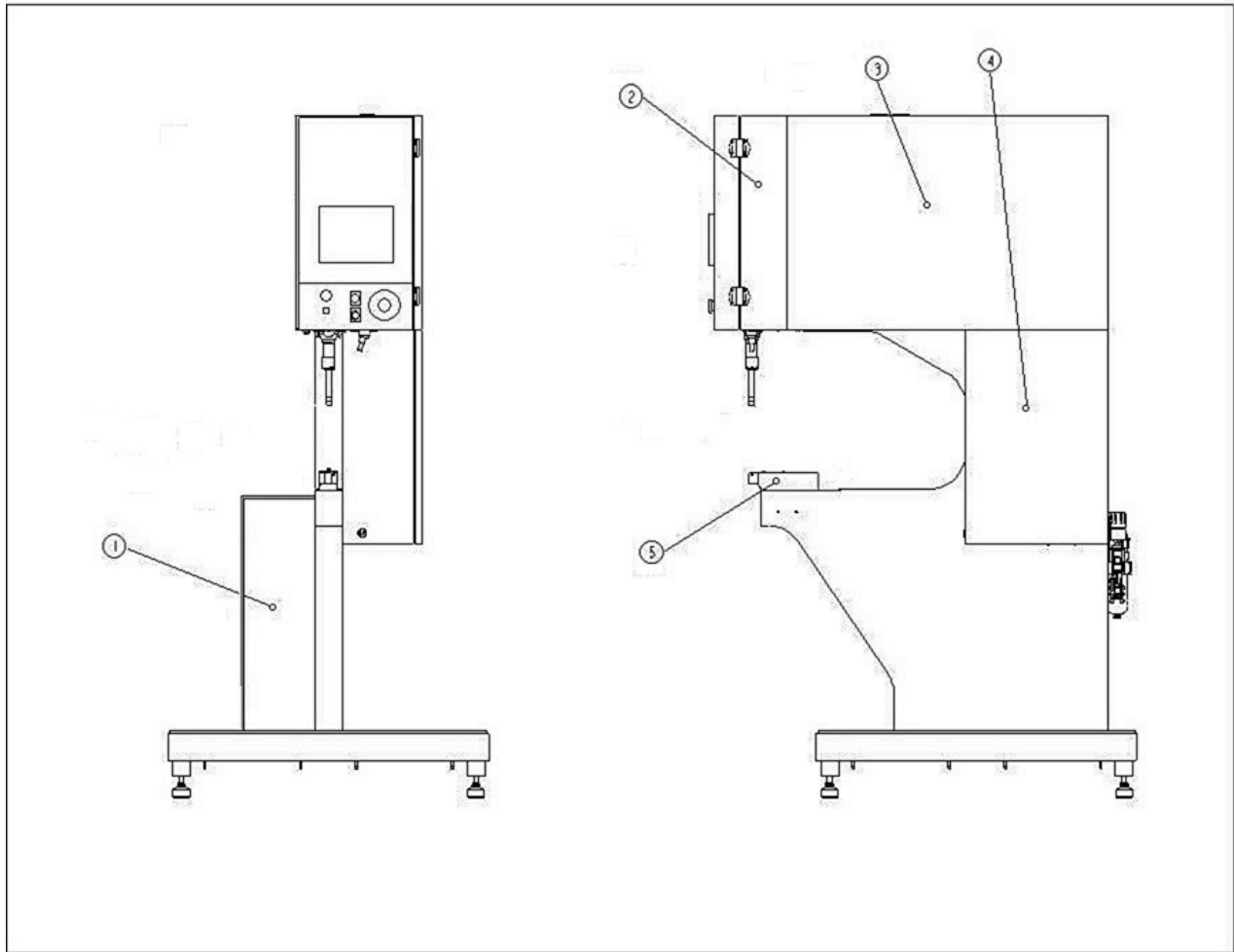
The Anvil Holder mounted to the bottom of the frame throat is used to hold the anvil tooling components.

Air Accumulation Tank

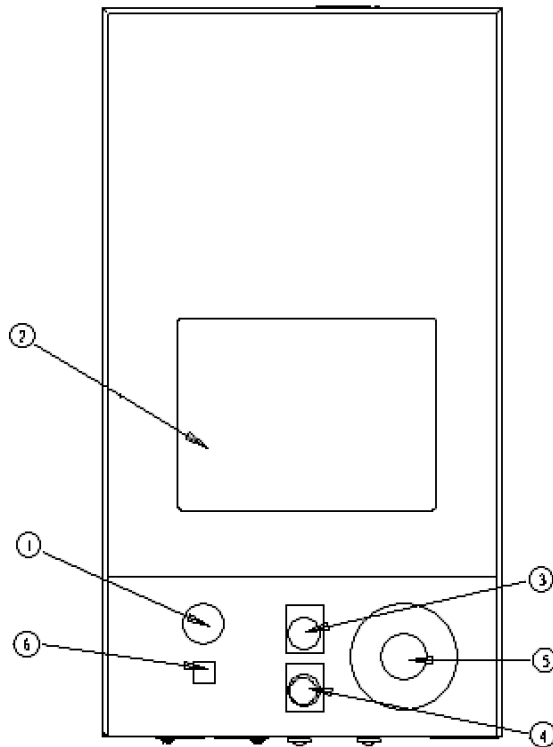
The Air accumulation tank is located on the lower left side of the press. It provides a steady supply of compressed air to the main valves.

Air Supply Inlet System

The supply of compressed air enters the press in the back through a system, which includes a filter/regulator and an electrically controlled quick exhaust/supply valve. The regulator is manually set to control the supply line pressure. Turning on the quick exhaust/supply valve supplies air to the press. When the quick exhaust/supply valve is turned off the valve closes and exhausts all downstream compressed air in the press quickly.



ITEM	DESCRIPTION
1	AIR ACCUMULATION TANK
2	MAIN CYLINDER ENCLOSURE
3	PNEUMATIC / HYDRAULIC ENCLOSURE
4	ELECTRICAL ENCLOSURE
5	ANVIL HOLDER ASSEMBLY
FIGURE 2-1 SERIES 2000 MANUAL BASE PRESS	



ITEM	DESCRIPTION
1	AUDIBLE BEEPER
2	TOUCH SCREEN
3	POWER "OFF" BUTTON
4	POWER "ON" BUTTON
5	E-STOP BUTTON
6	SPOTTING LIGHT ON/OFF BUTTON
FIGURE 2-2	
OPERATOR CONTROLS	

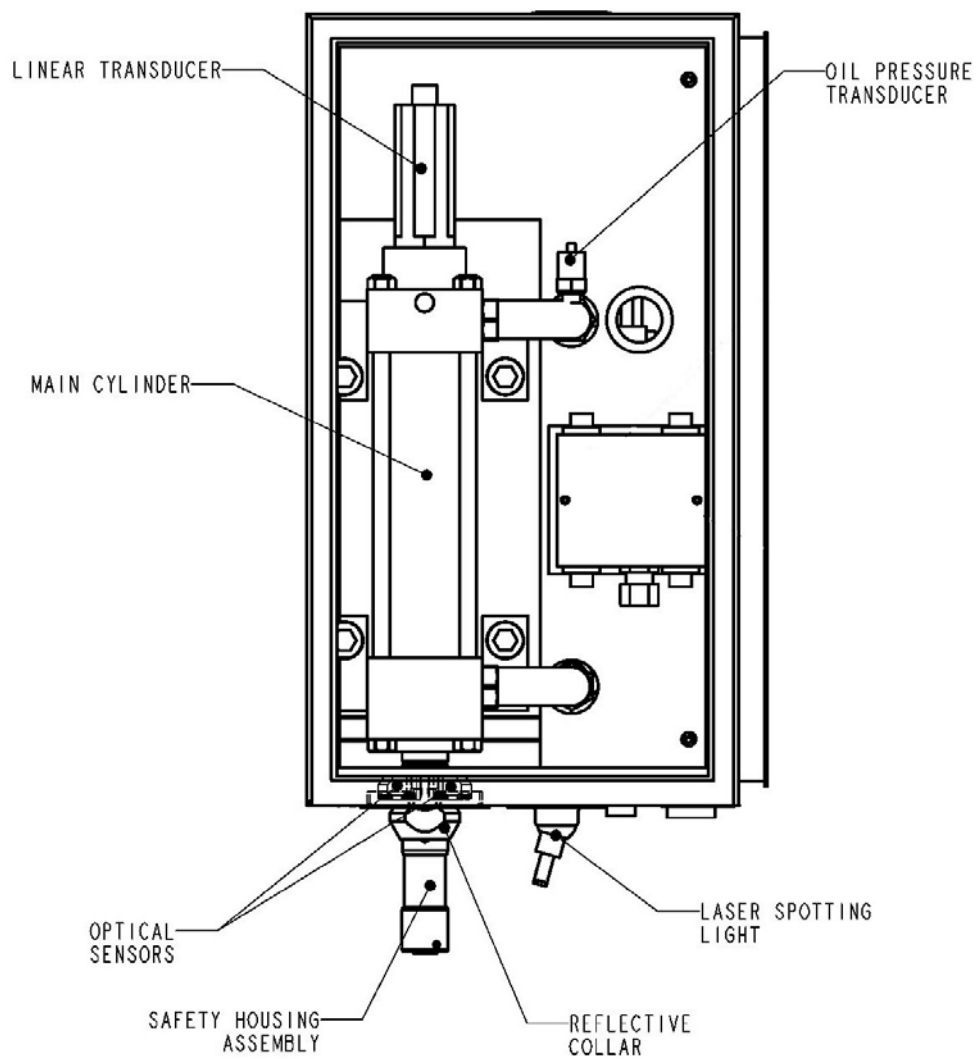


FIGURE 2-3
MAIN CYLINDER ENCLOSURE

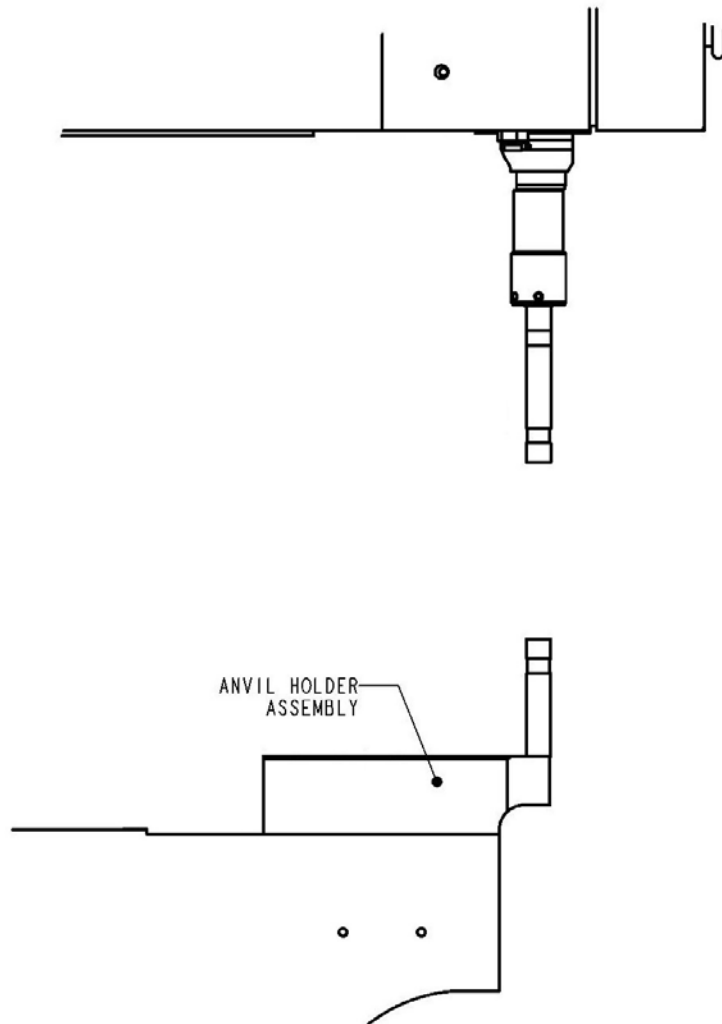
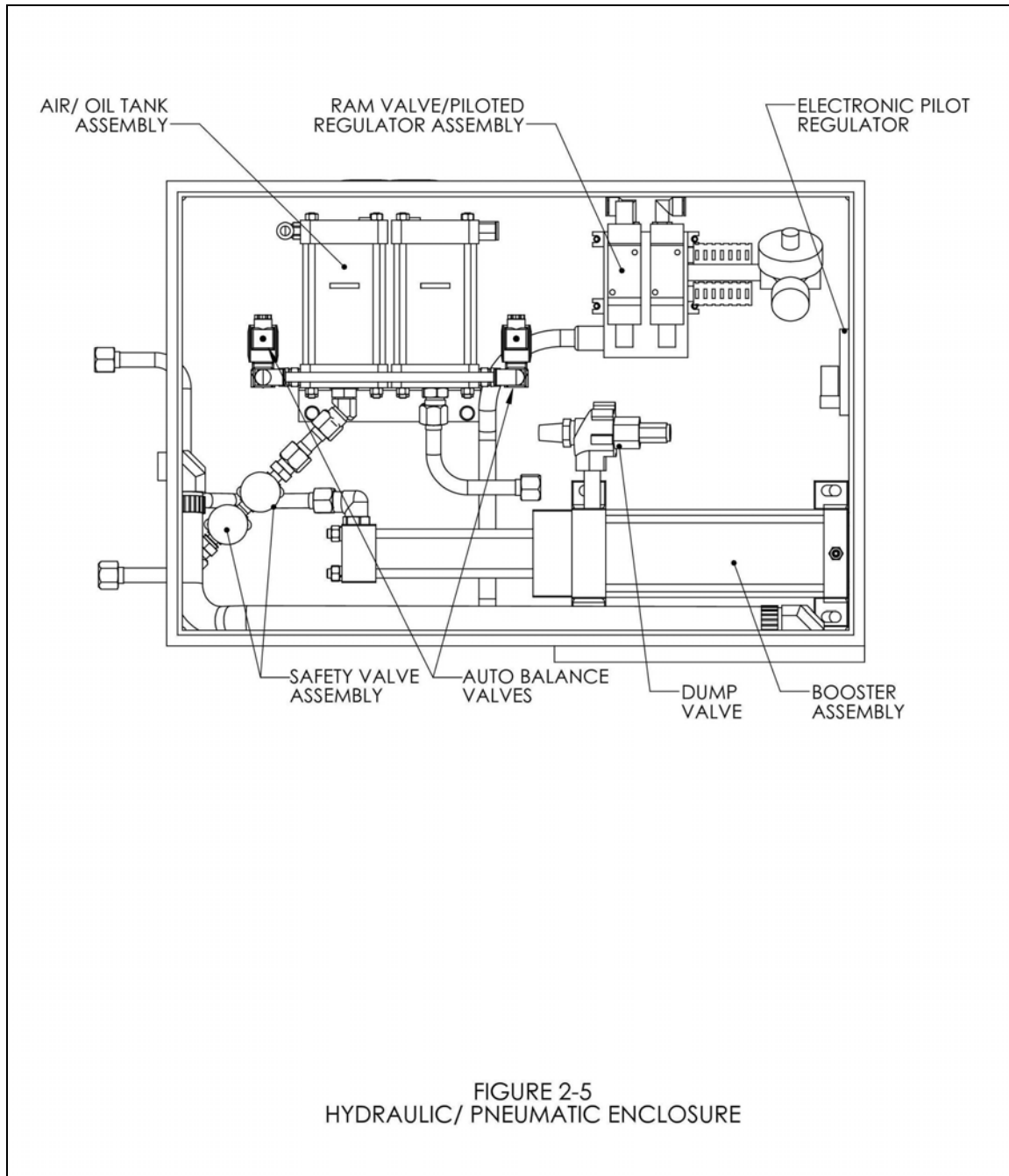


FIGURE 2-4
PUNCH AND ANVIL AREA DETAIL



SECTION 3

SAFETY SYSTEM OPERATION



WARNINGS - To avoid injury:

1. Always shut off the electrical power, and remove the power cord, before servicing this machine.
2. Only authorized and trained personnel should maintain, repair, setup, or operate this equipment.
3. Always use eye protection when operating or maintaining the press.

SYSTEM SAFETY FEATURES

1. Shutting off the electrical power, with either the “OFF” push-button, the ON / OFF switch, or pushing the E-Stop button, will cause the electric quick exhaust/supply valve to exhaust all air pressure in the press. **WITHOUT ANY CONTAINED PRESSURE, ALL PNEUMATIC MOTION STOPS.**
2. The electrical cabinet door is key-locked to discourage unauthorized access.
3. The patented safety system can distinguish between a work piece properly set-up between the ram and the anvil, and a foreign object placed between the ram and the anvil. The safety system operates as follows:
 - A sensor called a linear transducer is installed on the top of the main cylinder. The linear transducer senses the position of the main cylinder piston and transmits that information back to the PLC.
 - A device called the "safety assembly" is installed in the bottom of the ram. The assembly consists of a fixed section called the housing and a compressible spring-loaded section called the adapter. The adapter holds the punch tooling. When the ram extends and the adapter or punch tooling contacts an object, the safety assembly compresses.
 - Two redundant pairs of optical thru-beam sensors are located inside the front enclosure, under the main cylinder. Each pair of sensors maintains an individual optical beam path that is reflected through one of two holes in the ram by the "reflective collar". When the safety assembly is compressed, part of the safety assembly inside the ram, blocks both beam paths and the sensors are triggered.
 - When the sensors are triggered, because, either the safety assembly is compressed, the reflective collar is moved, or the beam path is blocked in some other way, the PLC immediately senses the change.

- During a Setup Cycle, the PLC uses this system to "learn" where the fastener and workpiece location is by moving the ram down, compressing the safety assembly, sensing the contact and reading the Linear Transducer. The data of the contact location is saved and used for a comparison during each press/run cycle.
- During Press Cycling, the PLC determines each time it senses that the safety assembly/punch has contacted something, whether it is "legitimate" or "not legitimate". A "safety window" is used to allow for minor variations with workpiece or operator precision.
- Only if BOTH redundant signals agree and the latest contact point is within the "safety window", does the PLC allow the safety assembly to fully compress and for the air-oil system to apply the predetermined high force needed for fastener installation.

4. Three levels of access security are available, each with a different four digit pass code



WARNING: Immediately upon receipt of your press, establish a “Maintenance Code” for your supervisor/maintenance personnel only, as it is possible, however difficult, to operate the press without the standard safeguards in place in the Maintenance Mode. Only trained personnel should use the Maintenance Mode the PennEngineering® is not responsible for improper maintenance mode procedures which result in a loss of operation of the press or operator safety.

5. If the Linear Transducer or either of the ram safety sensors should develop an open or a shortfault, the entire system, including the ram, will come to an immediate stop, And not operate further, until repairs are made.

SECTION 4

PRESS INSTALLATION

Moving The Press

- When using a forklift or pallet jack be sure that the forks are properly located between the fork guide tabs under the base of the press. When hoisting from above, be sure to balance the chain or strap between the two eyebolts to prevent swinging.



WARNING: unbalanced loading of the press or sudden stops may lead to toppling of the press.

Locating The Press

- Select a well-lit clean area with a (relatively) level floor. The floor must be able to support the weight of the press.

Leveling The Press

- The press should be leveled and stabilized after it has been located. This is done by adjusting the height of each footpad then locking each footpad in position by tightening a jam nut. This task requires two 3/4" wrenches (See Fig 4-1). An adjustable wrench may also be used. Adjust the foot pad while reading the level at the tooling nut gate adapter. The universal escapement adapter must sit level for proper functioning of the feed systems.

Open Space Requirements

- PennEngineering® has no specific requirements for providing open space around the perimeter of a press. However, be sure to comply with any national or regional safety codes that may dictate otherwise. For example, In the US the National Electrical Code requires that there be at least thirty-six inches of clearance in front of the electrical enclosure. We do recommend that you at least leave enough space around the press so the various storage and maintenance enclosures can be opened fully and so the largest workpieces can be accommodated.

Original Installation Requirements

After the final installation of the press verify the continuity of the protective bonding circuit (TN-System) in accordance with EN 60204-1 Clause 18.2.2 standards.

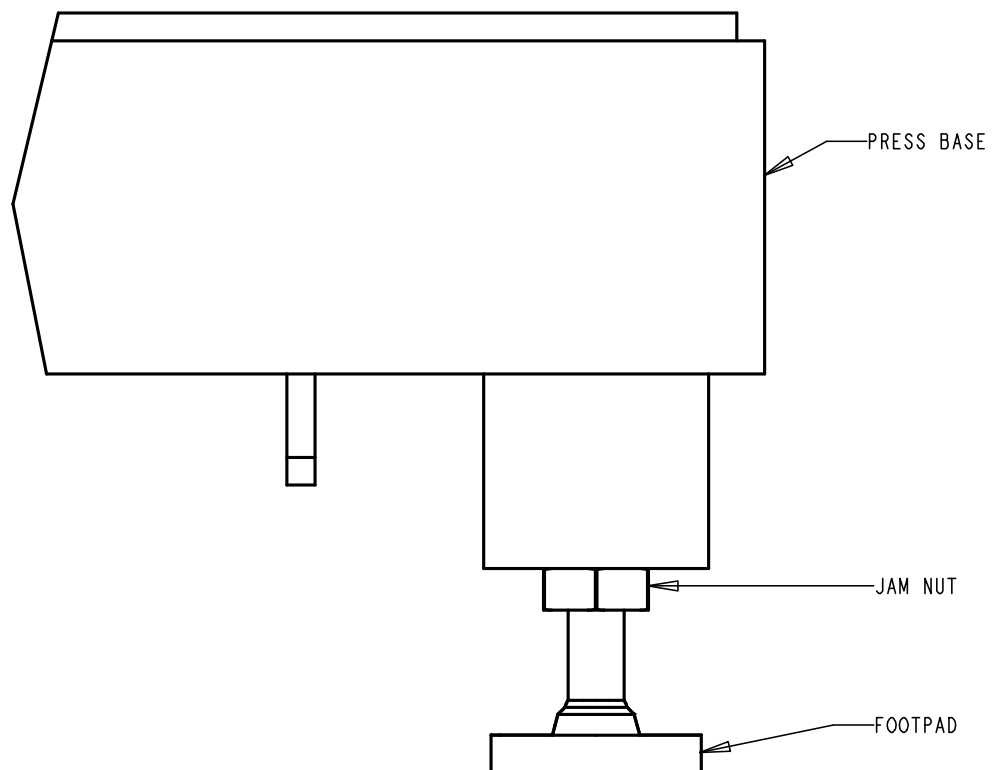


FIGURE 4-1
ADJUSTABLE FOOTPAD

Recommended Air Supply Hook-Up Arrangement

Proper air supply is very important to the performance and maintenance of the press. Following these simple guidelines will ensure good press performance.

- **Air Quality** - The quality of the air supply is very important. The air must be clean and dry. Moisture and debris will contaminate the oil and valve systems and lead to press performance and maintenance problems.
- **Air Supply Flow** - Use a minimum 12mm (1/2") inside diameter line and fittings from the compressed air source to the press. Shop pressure ranging between 6 to 7 BAR (90 psi to 100 psi) is acceptable. Inadequate air flow will affect press performance.
- **Air Consumption** - Air consumption is about 4.5 liters of compressed air per cycle. Average air consumption running at 20 KN (4500 Lbf) at 20 insertions per minute is about 5 liters/sec at 1 atm. (15 Scfm). Air Supply Flow requirements are higher than these values as air is only being consumed for half the time of each cycle.
- **Piping Installation** – Proper piping hookup will help achieve the above requirements. See figure 4-2 on the next page.
Connect to your supply line with a pipe pointing upwards that curves over and down. This arrangement will help prevent water and compressor oil from entering the press.
Connect to that drop with your supply fitting for a 12mm (1/2") or larger hose.
Continue the end of the drop to a drain valve. This will help collect additional water and oil and allow the system to be purged.
If your factory air supply falls short of the above recommendations, an air reservoir tank of an appropriate size for your location can be used.
An auxiliary filter/separator installed immediately outside the machine is recommended.

Install An Appropriate Power Cord.

- The press is equipped with a Male IEC 320/CEE22 Universal Connector for power. Outside North America, unless special arrangements have been made, a customer supplied power cord must be installed. No other electrical system modifications are necessary. Connection should be in accordance with your local electrical code.

Install The Foot Switch

- Plug the foot switch into the receptacle located at the lower left corner of the front of the electrical enclosure.

Check The Hydraulic Fluid Level In Both Air-Oil Tanks

- Check to be sure the hydraulic fluid is level with, but not over, the fill lines on the air-oil tanks. If the fluid level is too high or too low correct the problem by following the procedures provided in Maintenance section eleven of this manual.

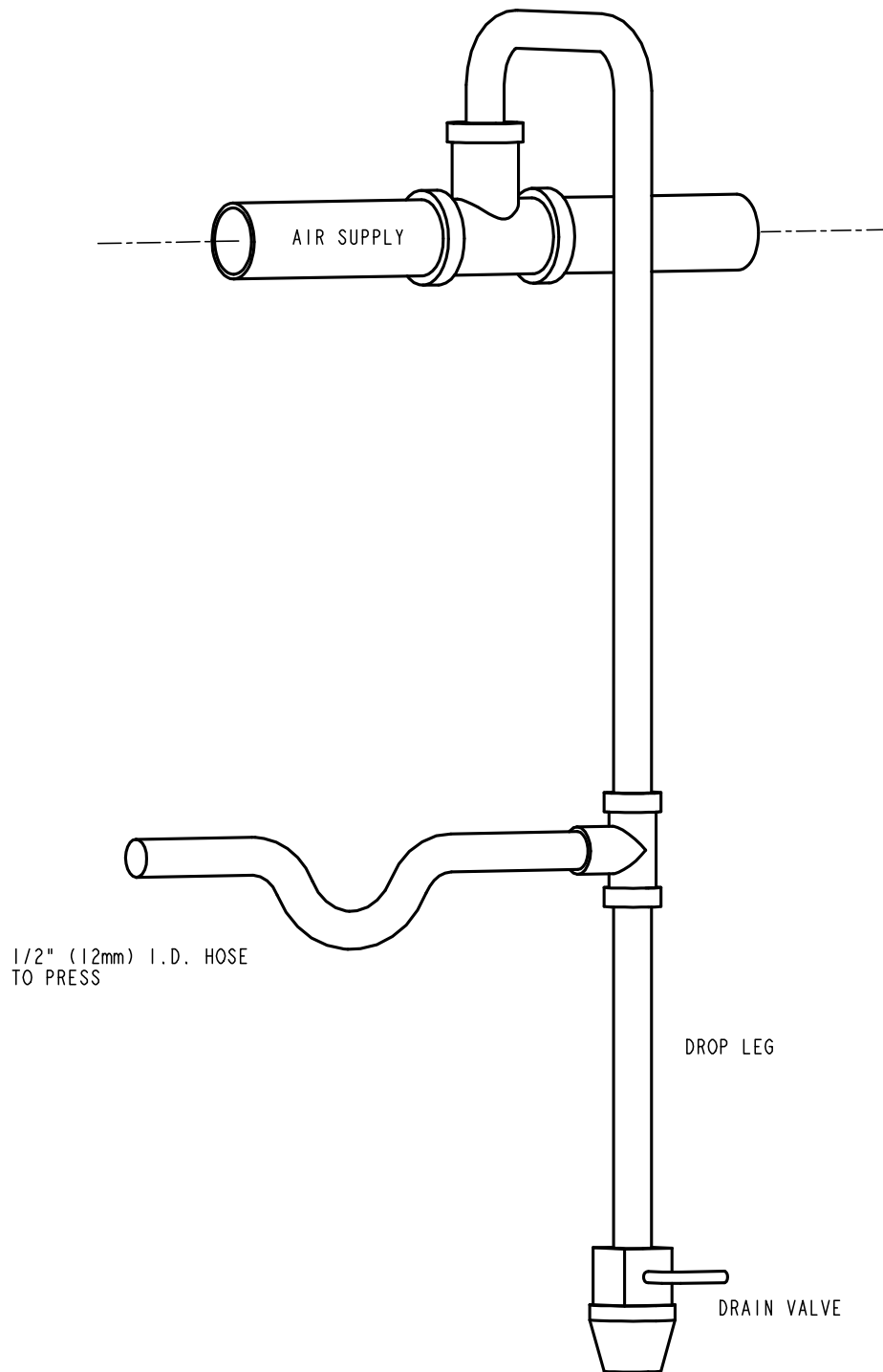


FIGURE 4-2
AIR SUPPLY

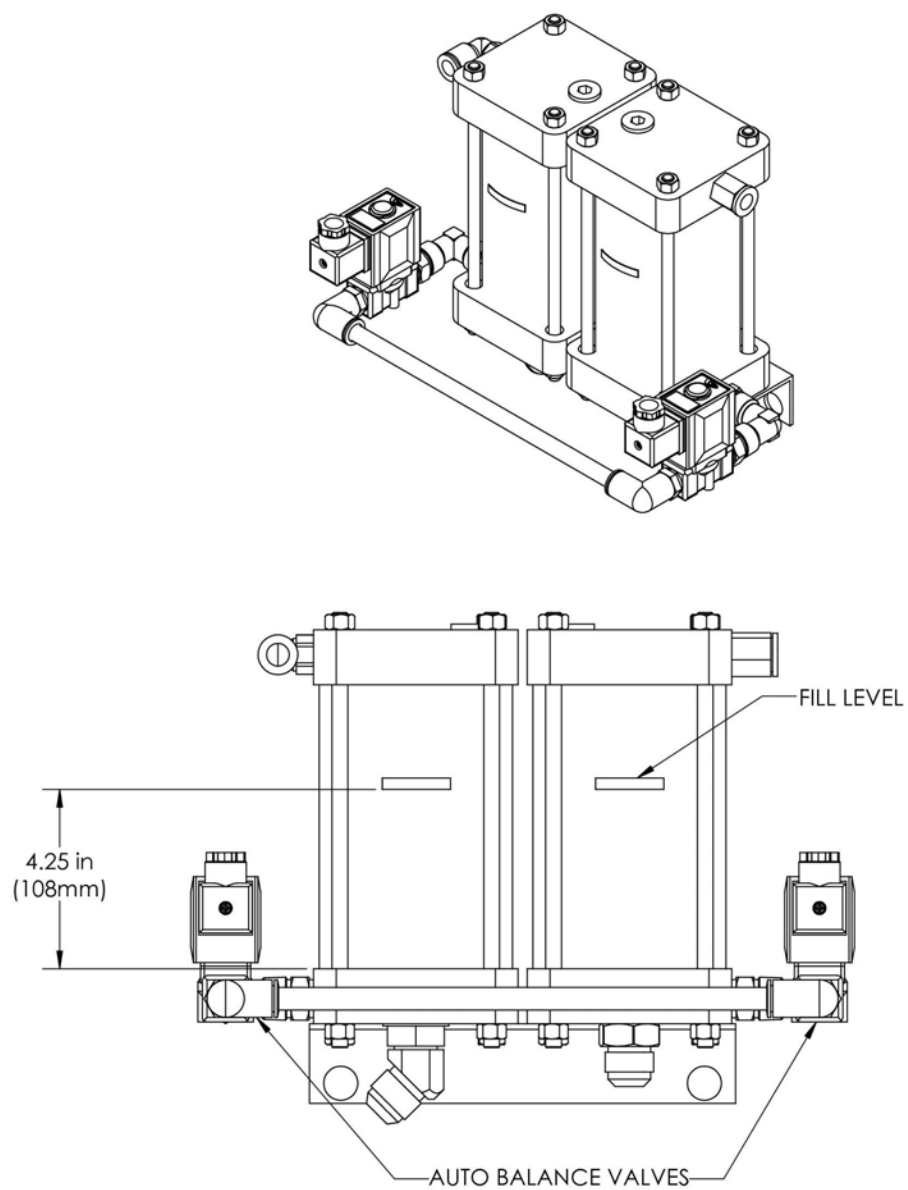


FIGURE 4-3
FILL LEVEL FOR AIR / OIL TANKS

SECTION 5

GENERAL FUNCTION DESCRIPTIONS

System Function:

The function of a **PEMSERTER® SERIES 2000® FASTENER INSTALLATION PRESS** is to safely, quickly and consistently install PEM® brand self-clinching fasteners in various types of sheet material. To do this the press uses:

- A patented point-of-operation safety system that controls the descent of the ram and does not allow the ram to descend if it contacts any object other than the intended fastener and workpiece.
- Air-oil-booster system that provides quick ram travel with high installation forces at the point of insertion.
- Precise installation tools and computer controlled installation forces.
- The Air/Oil tanks will self-balance when the press is powered on but not currently operating.

Self-clinching Fastener Installations:

PEM® self-clinching fasteners are installed into punched or drilled holes in ductile sheet material. To install a PEM® self-clinching fastener:

- The shank of the fastener is placed into the installation hole until the part of the fastener that is larger than the hole called the displacer (such as the knurls for nuts, or the head for standoffs) sits on the edge of the hole.
- A parallel squeezing force is applied to press the displacer (overhanging part) of the fastener into the sheet material.
- The force causes the sheet material to cold flow into the undercut of the fastener that is between the displacer and the shank. This traps the fastener within the sheet metal.

Setting up the Press:

The following section of the manual describes the setup process in general. For details on setting up and operating the press see the appropriate section in the manual.

Step 1 - Setup Tooling

Tooling setup consists of selecting appropriate tooling for the fastener being fed and the workpiece, installing the tooling on the press and adjusting the feed controls.

Different types of tooling that feed the same size fastener are selected for accessing different shapes and sizes of work pieces.

See the Tooling Section of this manual on selecting the right tooling.

Step 2 - Select the Setup for the Tooling and Fastener on the Touchscreen

Once the tooling is installed, the next step is to setup the press by using the touchscreen. The touchscreen setup is simple and can be done one of three ways.

- **New Tool Set-up** – Choose tooling mode, fastener size and workpiece material.
- **Recall A Job** – Select from a previously programmed Job stored in the press
- **Recall Last Job** – Run the same Job that was just run, the press remembers, even if it is turned off between jobs.

See the Touchscreen Controls section of this manual on choosing the right selections for setup.

When the selections are complete, the press automatically sets the values for operation and moves onto safety setup.

Step 3 - Safety Setup

The next step is very quick and simple but very important.

Safety Setup is the step where the press learns the position of installation called the Safety Set point. The operator positions the materials for an installation, but the press does not actually install the fastener. The ram extends and touches the fastener and workpiece. The touch point teaches the press where the proper installation point should be. The Press is ready to install fasteners.

Installation Process:

- When the foot pedal is depressed, the ram extends down quickly bringing the punch to the workpiece.
- When the fastener contacts the workpiece the safety sensors are tripped. The Press Control System checks that the position called the insertion point, is at the same position as the learned position at setup, the safety set point. Only if the insertion point is within a certain range of the safety set point, does the installation proceed.
- If the insertion point is good then the high installation force is applied to install the fastener and the ram returns up.

Special Features and Conditions:

- **Dwell/Force Verification (Quality Assurance System)** – Dwell time is the period of time from when the press control system starts the high force cycle to when the high force cycle ends. The Dwell software system monitors pressure feedback signals throughout the cycle to assure a quality installation.
- **Soft Touch Mode** – When running in Soft Touch Mode the press will slow down just before contacting the workpiece and fastener. This mode is slightly slower, but can insure against damage to soft and brittle work pieces.
- **Interrupted Mode** – When running in Interrupted Mode the press will slow down and stop upon contacting the workpiece and fastener. This mode is the ultimate in assurance just before installation that a workpiece or layers of work pieces are properly aligned.
- **Setpoint Tolerance** – Can be selected for Standard Tolerance or Narrow Tolerance. Narrow Set point Tolerance sets a smaller range for the allowed deviation of each installation from the Safety Set point. Narrow Tolerance is used for smaller fasteners and more precise operations to assure proper installation in the workpiece hole. This mode is less tolerant of work pieces not held level and poor hole quality or hole debris.
- **Start at Minimum Setup** – This mode changes the setup sequence. Instead of pre-selecting a force at setup, the press interrupts the dwell time of the first installation and allows the operator to adjust the force as the fastener is being installed. This function allows for the most precise installation force setup. Once the installation force is established, it can be saved within one of the Recall Job memory locations.
- **Safety Fault Error** - If the difference between the insertion point and the safety set point is outside the range of the set point tolerance then a safety fault error condition occurs. When a safety fault occurs the redundant safety valves close, immediately stopping downward ram motion. The ram reverses direction and retracts the punch. The safety assembly on the end of the ram never fully compresses and the boost cycle is never initiated.

SECTION 6

TOUCH-SCREEN CONTROLS

A programmable logic controller (PLC) controls the functions of the Series 2000M™. The operator sends commands to the PLC and reads data from the PLC through a system of menus and information displayed on the touch screen. An operator need only touch the buttons displayed on the touch screen to make a selection.

The touch screen controls allow the operator to setup the press for operation, operate special functions and maintain and troubleshoot the press.

The following sections describe the information and functions available on each of the screens. Below each screen is a description of the information and functions available on the screen. Each button that leads to a different screen is listed with the section of this document that describes the next screen.

Number Entries (Pop-Up Key Pad Function)

In several of the screens where a number must be entered, a special feature is used, called a pop-up keypad. Each digit of the number is entered by pressing the specific number button. The Number Entry is not accepted until an Enter button is pressed. Where decimal points are a part of the number, the placement is established.

HELP Screens

Help Screens are available throughout the touchscreen system of menus. They offer immediate explanations of the functions on the screens like the ones in this document.

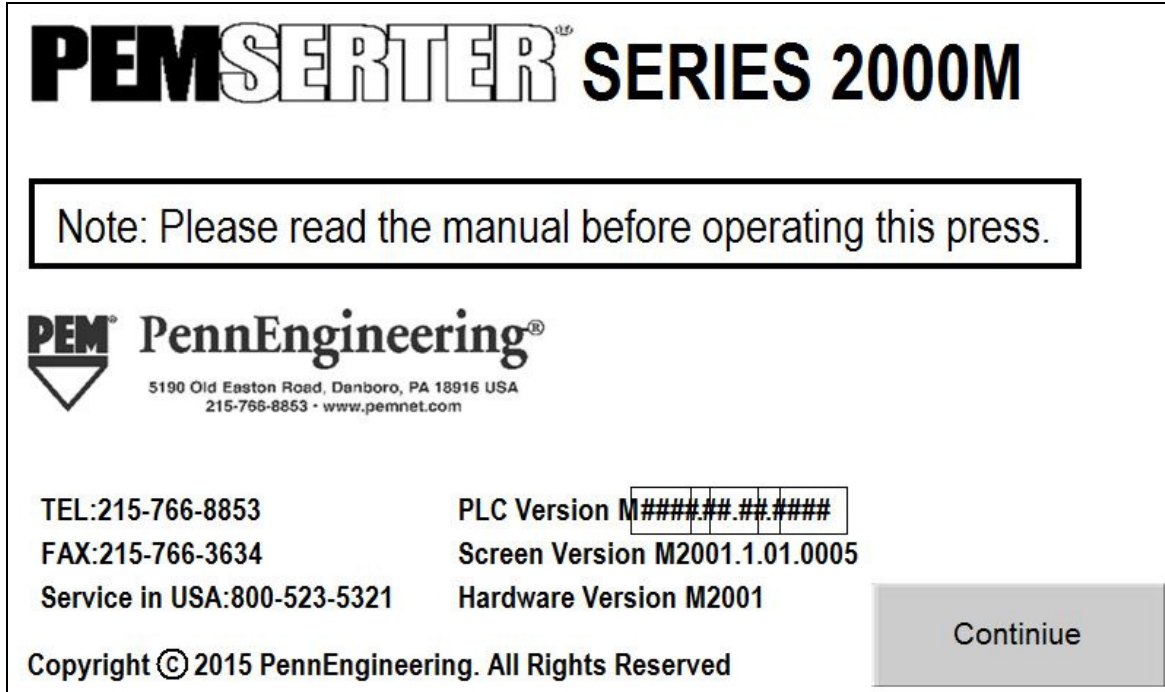
The Help Screens are online documentation. Actual pictures of the Help screens are not included in this documentation. The buttons on the Help screens all function in the same way.

[BACK] – Returns the touch screen control back to the screen where the Help Screen was originally called from.

[NEXT] – Proceeds to the next Help Screen available on the same topic. Some help buttons may have more than one page of information.

[EXIT] – Returns to Alarm Screen.

6.1 Title Screen



PEMSERTER® SERIES 2000M

Note: Please read the manual before operating this press.

PEM® PennEngineering®
5190 Old Easton Road, Danboro, PA 18916 USA
215-766-8853 • www.pemnet.com

TEL:215-766-8853 PLC Version M#####
FAX:215-766-3634 Screen Version M2001.1.01.0005
Service in USA:800-523-5321 Hardware Version M2001

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Continue

When the system is powered up, “Connecting to Host” appears for one second, before displaying the “PEMSERTER®” title screen. The Touch Screen’s “Host” is the PLC. Here you may find the PennEngineering® and our Sales Representative's addresses and phone numbers.

“PLC Version” is the version number of the PLC software.

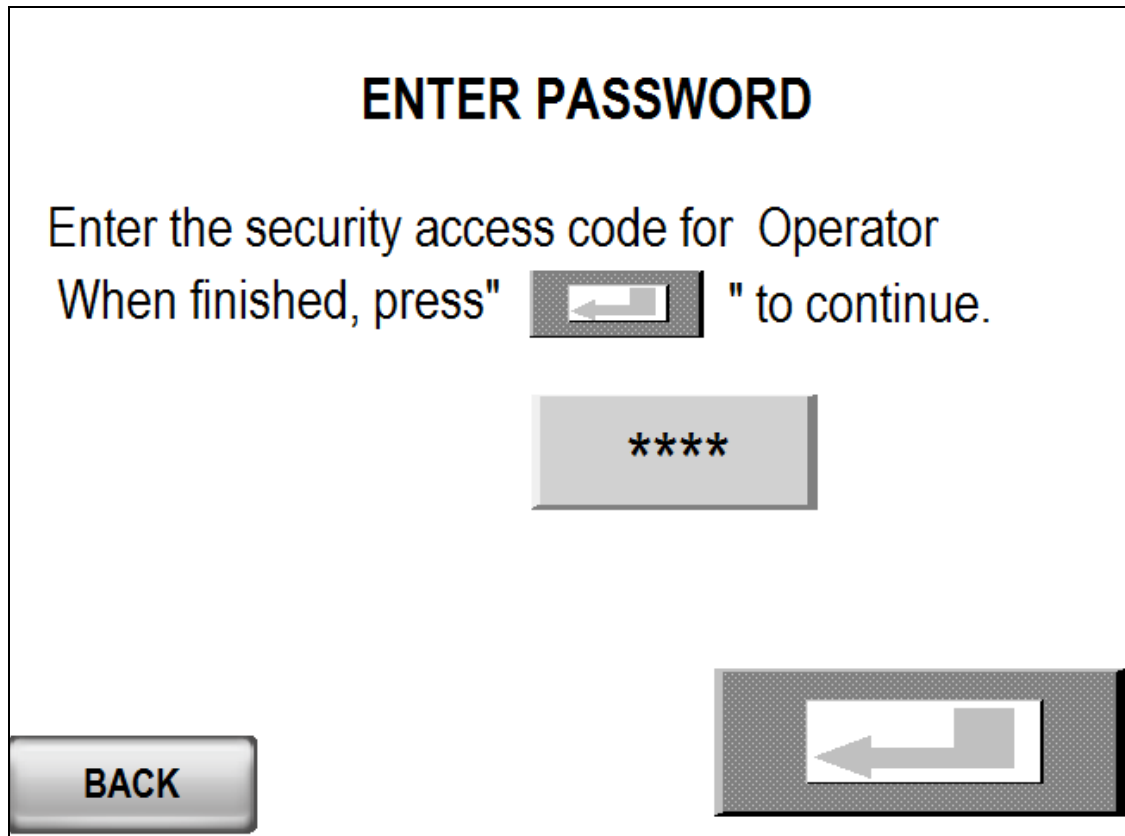
“Screen Version” is the version number of the Screen software.

“Hardware Version” is the model number of the press.

[CONTINUE] → to → 6.2 Access Code Screen

Dual Language Option: PEMSERTER® Presses are sold worldwide. The touchscreen menus can be ordered in different available languages. Also a single press can be equipped with touchscreen software that can display text in one of two languages by selecting on screen. If the press is equipped with a Dual Language Option, there will be two CONTINUE buttons, one for each language. The press will function identically; independent of what language the screen is displaying.

6.2 Access Code Screen



This screen appears and limits access to different levels of functions depending on which access codes have been established. See 6.13 Access Code Setup Screen. If the access code is set to 0000 then this screen will be bypassed and the touchscreen menu will proceed to the next function. This same screen appears in different places for Operator Access, Setup Access and Maintenance Access.

To proceed to the next screen:

Enter the Correct 4-digit Access Code.

[↵] – Proceeds to the appropriate screen

If in Operator Access Screen – Proceeds to Mode Selection

→ to → **6.3 Mode Selection Screen**

If in Setup Access Screen - Proceeds to Run Value Change screens

→ to → **6.x Force, Dwell, Blower, or Run Parameters Screen**

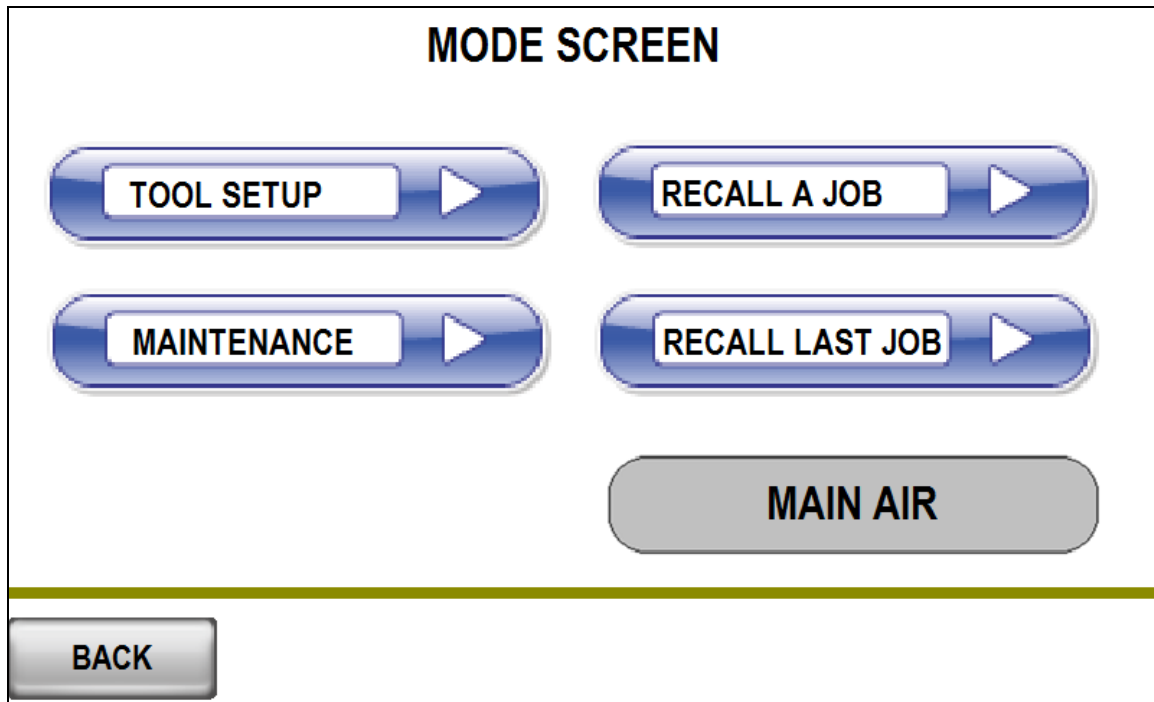
If in Maintenance Access Screen - Proceeds to Maintenance Menu Screen

→ to → **6.11 Maintenance Menu Screen**

If the code is entered incorrectly, an audible alarm is sounded.

If the access code is forgotten, call your PennEngineering® Service Representative.

6.3 Mode Screen



This screen allows you to enter into a selected type of installation setup procedure or maintenance mode, and to toggle certain operations.

[TOOL SET-UP] – Proceeds to a setup process, which allows the operator to select the installation mode, fastener size, material type and to change the installation force.

→ to → **6.4 Tooling Selection screen**

[RECALL A JOB] – Proceeds to a menu of previously setup jobs.

→ to → **6.10 Recall Job screen**

[RECALL LAST JOB] – Proceeds directly to safety setup of press using the values defined in the last setup, even if the press had been turned off.

→ to → **6.7 Safety Setup Procedure screen**

[MAINTENANCE] –

If the Maintenance access code has been set this button proceeds to the Maintenance Access Screen

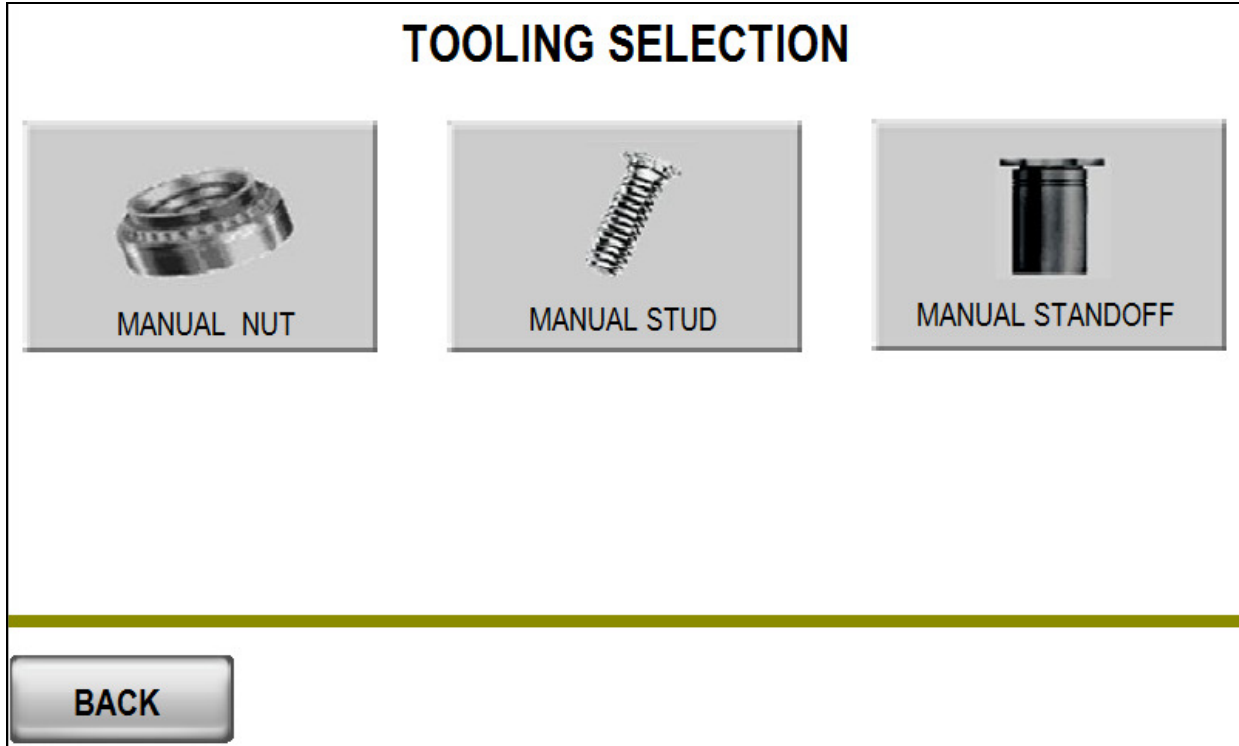
→ to → **6.2 Access Code screen**

If the Maintenance access code has been set to 0000 this button proceeds to the Maintenance Menu Screen directly

→ to → **6.11 Maintenance Menu screen**

[MAIN AIR] – Turns the main air on and off.

6.4 Tooling Selection Screen



It is very important to select the correct tooling mode to match the installation tools and fastener that is being installed. Selecting a different tooling mode will cause the press to operate differently. After selecting a tooling mode the control screen will automatically proceed to the proper setup screen.

[MANUAL NUT] or [MANUAL STUD] or [MANUAL STANDOFF]– Manual Mode means that the operator must manually place a fastener. Fastener and workpiece must be manually placed together between the tooling. Selecting Nut or Stud or Standoff? mode changes the recommended installation forces and the safety window tolerances.

→ to → 6.5 Size and Material screen

[BACK] – Back to mode screen

→ to → 6.3 Mode Screens

6.5 Size and Material Selection Screen

SELECT FASTENER SIZE & MATERIAL			
M2.5 #2	M3 #4	M3.5 #6	M4 #8
Back to Tooling Selection			
M5 #10	M6 1/4	M8 5/16	M10 3/8
ALUM/COPPER	COLD-ROLLD.STL	STAINLS.STL	

This screen allows the operator to select the fastener size being installed and workpiece material it is being installed into. Based on the operators selections, the Series 2000:

- 1) Limits the maximum installation force for operator safety.
- 2) Presets a suggested installation force

[ANY SIZE] + [ANY MATERIAL] – Select a size or material, after selecting one, the operator can change the selection just by pressing a different selection. As soon as BOTH a size and a material is selected the setup process will move onto the Ram Force Adjustment Screen.

→ to → **6.6 Ram Force Adjustment Screen**

[BACK to Tooling Select] – Returns to Tooling Selection Screen

→ to → **6.4 Tooling Selection Screen**

6.6 Ram Force Adjustment Screen

+

SETUP PASSWORD

-

MODE

kN
lbs

71.17
16000

53.82
12100

36.47
8200

19.13
4300

1.78
400

RUN SETTINGS

ADJUST RAM FORCE

To preset the force, check the PEM Fasteners catalog and use the "UP" AND "DOWN" buttons to adjust. Then press the "Continue" button.

To start the force at minimum (1.8 kN or 400 lbs) and set the force at the 1st installation, press the "Start @ Minimum" button and this screen will appear at the 1st installation.

Material: ALUM/COPPER

Size: M2.5 - #2

Mode:

START @MINIMUM

####0lbs

##.##kN

CONTINUE

When this screen appears a recommended installation force will be preset. The operator can continue with the recommended setting, or adjust the value and then continue or select Start @ Minimum mode.

[+] – Increases Force Setting up to limit imposed by fastener size and workpiece material setting.

[-] – Decreases Force Setting down to minimum

[SETUP PASSWORD] –If Setup password is required, enter the password to adjust the force. And in less than one minute without enter a password.

[MODE] – Returns to mode screen.

→ to → **6.3 Mode Screen**

[START @ MIN.] – Proceeds to the Safety Setup Screen in Start at Minimum Force mode. In this mode, at the first installation stroke ONLY, the ram will remain down. The press will display this Force Selection screen again, with the force at minimum. Using the arrows, the operator can adjust the actual installation force being applied gradually. The operator can observe the installation process and stop at the minimum force necessary for delicate operations. After the Force is set the next installation will proceed normally. The operator will still be allowed to readjust that force value from the Run Mode screen.

→ to → **6.7 Safety Setup Procedure Screens**

[CONTINUE] – Continues Setup Process or Returns to Run Mode if done setting the force at Start @ Minimum Mode.

If in Continuing with Setup the next screen will be safety setup.

→ to → 6.7 Safety Setup Procedure Screens

If in making a force adjustment from Run Mode or START @ Minimum the screen will return to run mode.

→ to → 6.8 Run Mode Screen

6.7 Safety Setup Procedure Screens

SAFETY SET UP PROCEDURE: <input type="text"/>			
<p>1. Place the workpiece on the anvil with the fastener in the mounting hole.</p> <p>2. Press the foot pedal.</p> <p>The ram will descend, contact the fastener and the workpiece, and return. The safety setpoint will be established and the system will automatically advance to the run screen. Repeat the safety setup procedure if the Attention screen appears.</p>			
Dwell Time: <input type="text" value="#.##s"/>	Force S/P: <input type="text" value="###.###kN"/> (<input)<="" td="" type="text" value="#####lbf"/> <td>FasterPieces: <input type="text" value="####"/></td> <td>WorkPieces: <input type="text" value="####"/></td>	FasterPieces: <input type="text" value="####"/>	WorkPieces: <input type="text" value="####"/>
Material: <input type="text" value="ALUM/COPPER"/>	Mode: <input type="text"/>	Size: <input type="text" value="M2.5 - #2"/>	
<div>MODE</div>			

This screen directs the operator to check that the fastener and workpiece is properly setup for the safety position learn sequence and directs the operator to initiate the sequence. The instructional text may differ, depending on the tooling mode selected.



It is very important that the fastener and workpiece be held flat to the top of the anvil. (see Section 10)

The last step of each every sequence directs the operator to Depress The Footpedal. The Ram will extend down and touch the fastener and workpiece and return back up, without installing the fastener. The PLC uses this step to learn the position at which it is safe to install, called the Safety Setpoint.



It is very important that, at the bottom of the ram stroke when the ram contacted the fastener and the work piece, that the fastener was fully in the workpiece hole and both were flat to the anvil. If this did not occur, use the Re-setup function on the run screen to repeat the process. See 6.9 Run Mode Screen for Re-Setup details. (see Section 10)

[MODE] – Returns to mode screen.




→ to → 6.3 Mode Screen

(Successful Learn Sequence) – After the operator performs a successful safety setup operation the screen will automatically move onto the Run Mode, ready to install the fastener.

→ to → 6.8 Run Mode Screen

6.8 Run Mode Screen

RUN MODE

<div style="text-align: center;">↑</div> <div style="text-align: center;"> <div style="background-color: blue; width: 20px; height: 100px; margin: 0 auto;"></div> <div style="background-color: white; width: 20px; height: 100px; margin: 0 auto;"></div> </div> <div style="text-align: center;">↓</div>	<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <div>Safety SetPoint #.###In</div> <div>Insertion Distance #.###In</div> <div>Safety Setpoint Re-Setup</div> <div>Abort Cycle</div> </div> <div style="width: 45%;"> <div>Force Feedback #####0lbs</div> <div>Dwell Time #.seconds</div> <div>Sec.Per.Cycle ##.seconds</div> <div>FasterPieces #####</div> <div>WorkPieces #####</div> </div> </div> <div style="display: flex; justify-content: space-between; margin-top: 10px;"> <div style="width: 45%;"> <div>Set Number ####</div> <div>Set Number ####</div> </div> <div style="width: 45%; text-align: center;"> <div>-1</div> </div> </div>	<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center; margin: 0;">Run Mode Parameters</p> <div style="display: flex; justify-content: space-between;"> <div>SoftTouch:</div> <div></div> </div> <div style="display: flex; justify-content: space-between;"> <div>Interrupted Mode:</div> <div></div> </div> <div style="display: flex; justify-content: space-between;"> <div>Narrow Mode:</div> <div></div> </div> </div> <div style="text-align: center; margin-top: 10px;"> <div>Save A Job</div> </div>
---	---	---

Material: ALUM/COPPER

Mode:

Size: M2.5 - #2

ForceSet: #####0lbs

MODE

This screen functions as a main control panel while the press is operating in production mode. Various buttons and displays on the screen perform the following functions:

SAFETY SETPOINT – Displays the current value of the learned touch position for a safe installation.

INSERTION POINT – Displays the value of the touch position of the last attempted installation, successful or not

[SAFETY SETPOINT RE-SETUP] - Enables the press to learn a new Safety Setpoint, without leaving RUN mode. Touch this button and the button flashes. Depress the foot pedal and the press will perform a learn sequence and reset the Safety Setpoint to the new position. The press **WILL NOT** perform an insertion. (See 6.7 Safety Setup Procedure Screen)

[ABORT CYCLE] - Cancels an Interrupted Cycle at the wait point and allows the operator to start over again.

Ram Position Display Bars –

Left Display Bar – Indicates the adjusted return position of the ram. The dark bar represents the amount of extension of the ram. A white bar indicates that the ram will fully retract. A half-dark and half-white bar indicates that the ram will retract half way. The lowest setting for the return position is approximately 25mm (1 inch) above the safety setpoint. The arrow buttons on either end of the bar display are used to change the return position of the ram. This function can be used to reduce the stroke in certain modes and increase cycle rate. The two arrow buttons are dark when they are enabled and light when they are disabled.

[↑] – Raises the return position of the ram.

[↓] – Lowers the return position of the ram.

Right Display Bar – Indicates real-time position of the ram. Use this for diagnostic purposes.

[FORCE FEEDBACK] – Button/Display, Displays the actual insertion force calculated from the hydraulic ram pressure. This value resets to zero at the beginning of an insertion attempt and displays the insertion force during insertion. The value at the end of insertion is locked until the next insertion attempt. Touch this button to go to the screen to adjust the preset force.

to → 6.6 Ram Force Adjustment Screen

[DWELL] – Button/Display, displays set total insertion dwell time. Touch this button to go to the screen to adjust the dwell time.

[RUN MODE PARAMETERS] – Press the Run the Mode Parameters windows. **Button/Display** displays job setup information, including mode selections. The dark filled circles indicate the mode is activated. Touch this button to go to the run mode parameter screen.

→ to → 6.9 Run Mode Parameters Screen

[SAVE JOB] – Allows the operator to save the current settings of the Run Mode into a preset memory location for Recall with the Recall Job function. The Save function will save the following settings:

Tooling Mode	Workpiece Complete Notify Setting
Fastener Size Selection	Soft Touch Mode Setting
Workpiece Material Selection	Cycle Mode (Continuous/Interrupted)
Preset Force	Setpoint Tolerance (Standard/Narrow)
Dwell Time	
Fasteners/Workpiece Count	

A summary of some of this information is displayed on the screen.

Current Workpiece and Fastener Counts and Workpieces/Batch WILL NOT be saved.

Any adjustments made to the recommended values will be saved with the job. If Fasteners/Workpiece Count is set, when the job is recalled, the count will be set to zero but will be enabled and start counting. If it is desired for the counter not to be enabled for every job, set the counter to zero.

→ to → **6.10 Store/Recall Job Screen**

[FASTENERS] – Display/Button, The first larger number is the current number of fasteners installed in the current workpiece. Touch and hold this button to reset the count to 0. The second smaller number is the number of fasteners per workpiece, set at the counters screen, see below. When the first number reaches the second number the workpiece will be complete and the fastener count will automatically reset to zero. The second number does not change during run.

[WORKPIECES] – Display/Button, The first, larger number is the current number of workpieces completed since the last reset of this counter. Touch and hold this button to reset the current count to 0. The second smaller number is the number of workpieces per batch, set at the counters screen, see below. When the first number reaches the second number the batch will be complete and the workpiece count will automatically reset to zero. The second number does not change during run.

[-1] – Shift Decrement Button, Touch this button and touch either the Workpieces Button or the Fasteners Button to decrement the current count by 1.

[Set Number] - Allows the Workpiece and Fastener Counters to be set. Touch this button to set the counters.

[MODE] – Returns to mode selection screen.

→ to → **6.3 Mode Screen**

6.9 Run Mode Parameter Screen

RUN MODE PARAMETER

Cycle Mode: <div style="display: flex; justify-content: space-around;">ContinuousInterrupted</div>	Run Screen Unit: <div style="display: flex; justify-content: space-around;">UNIFIEDMETRIC</div>
Set Point Tolerance: <div style="display: flex; justify-content: space-around;">StandardNarrow</div>	Workpiece Complete Notification <div style="display: flex; justify-content: space-around;">AUTOMANUALOFF</div>
<div style="display: flex; justify-content: space-around;"><div style="border: 1px solid black; padding: 2px; text-align: center;">Disabled Soft Touch</div><div style="border: 1px solid black; padding: 2px; text-align: center;">Disabled Safety Fault Auto Reset</div></div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"><div style="border: 1px solid black; padding: 2px; text-align: center;">Disabled Increased Boost Stroke</div><div style="border: 1px solid black; padding: 2px; text-align: center;">SETUP PASSWORD ****</div></div>	
<div style="display: flex; justify-content: space-between;">Material: ALUM/COPPERMode: Size: M2.5 #2</div>	
<div style="border: 1px solid black; padding: 10px; width: 150px; margin: 0 auto; background-color: #cccccc;">BACK</div>	

This screen functions as the main Parameter Screen while the press is in operation in production mode. Various buttons and displays on the screen perform the following functions:

[SETUP PASSWORD] –If Setup password is required, enter the password to adjust the force. And in less than one minute without enter a password..

[CONTINUOUS/ INTERRUPTED CYCLE] – Button/Display, Displays what mode the press is operating in Continuous Cycle Mode or Interrupted Cycle Mode. Touch this button to toggle between the two modes.

Continuous Cycle Mode – When the operator depresses the foot pedal, the ram will complete a full insertion cycle, extend, insert the fastener and return.

Interrupted Cycle Mode – When the operator depresses the foot pedal, the ram will extend, STOP and WAIT. When the operator depresses the foot pedal again, the ram will insert the fastener and return. This provides for some specialized applications, the opportunity to examine or adjust the fastener/workpiece positions just before the actual insertion.

[STANDARD/NARROW SETPOINT TOLERANCE] – Toggles the Setpoint Tolerance window from Standard to Narrow. Standard tolerance allows for normal variations of workpiece and fastener dimensions and operator handling of the workpiece. Narrow tolerance requires more precise dimensions and operator handling. A narrow tolerance is typically used for the most delicate workpieces with consistent thickness.

[ENABLE SOFT TOUCH] – This button will turn the Soft Touch mode on and off. With Soft-Touch mode ON the ram will decelerate before contacting the fastener/workpiece and coast to a stop immediately before collapsing the safety housing (note that all of the safety features are still operational during this mode). Once the ram has come to a stop, the booster turns on to complete the high force installation process. Soft Touch mode is suggested when installing into soft materials (i.e. PCBs) or during applications where hard installation marks are detrimental to the workpiece.

[ENABLE INCREASED BOOST STROKE] – The press is equipped with preprogrammed limitations for safe operation. For most application the default power stroke distance of approximately .100 in (2.5 mm) is sufficient to properly install and seat a vast array of fasteners. In some application, particularly non-fastener application, a longer power stroke distance may be required. For this purpose, the press is equipped with an Extended Boost function.

Enabling this function increases the power stroke of the ram from its default setting of approximately .100 in (2.5 mm) to .400 in (10 mm). If the preset force is not achieved within .400 in (10 mm) of power stroke the press will fault displaying error code (73) "FORCE STROKE BEYOND SAFETY LIMIT."

This function is enabled / disabled through the enable / disable button located on the tool testing screen accessed through the maintenance screen. Once enabled this function will stay enabled until one of the following occurs:

1. The function is turned off by disabling the function with the enable/ disable button located on the tool testing screen accessed through the maintenance screen.
2. The main power to the press is turned off.



CAUTION - Enabling this function allows an extended high force stroke. Care should be taken to ensure that the tooling and setup are appropriate for the force set. Extended Boost stroke at high forces can create a side loading condition which could damage tooling or cause a hazardous condition. Never use extended boost with tooling or setups not specifically design for this function. Never run the press in extended boost mode when it is not needed.

[METRIC/UNIFIED RUN SCREEN UNITS] – Touch this button to change the display to either metric or unified units. The unit selected is displayed in dark.

Workpiece Complete Warning Screen Selection Buttons

[AUTO] – Toggles Workpiece Complete Warning Screen to automatically return to run screen after a brief flash and audio warning.

[MANUAL] – Toggles Workpiece Complete Warning Screen to require the operator to touch the reset button on the screen, when the Workpiece Complete Warning Message Screen appears. There is an audio warning when the screen appears.

[OFF] – Toggles Workpiece Complete Warning Screen to not appear. There is only an audible warning.

[ENABLE SAFETY FAULT AUTO RESET] – This button turns Auto Reset function on and off. In Auto Reset mode, if a safety fault occurs, the operator is not required to touch the screen to reset. These two safety faults are automatically reset:

Safety Sensors tripped ABOVE setpoint, during Run mode, the ram contacted something before it reached the minimum allowable insertion distance.

Safety Sensor tripped BELOW setpoint, during Run mode, the ram did not contact anything before it reached the maximum allowable insertion distance.

[BACK] – Returns to Run Mode screen.

→ to → 6.8 Run Mode Screen

6.10 Store/Recall Job Screen

STORE/RECAL A JOB	
<div>Job No. ##</div> <div>CLEAR</div>	<div>RECALL</div> <div>SETUP PASSWORD</div> <div>****</div>
<div>Select Job No you will see the detail about current job Recall: Recall current JobNo Store: Save the current Msg to the current Job No</div>	
<div>Mode: <input type="text"/></div> <div>Material: <input type="text" value="ALUM/COPPER"/></div> <div>Size: <input type="text" value="M2.5 - #2"/></div> <div>Force: <input type="text" value="####0lbs"/> <input type="text" value="##.##kN"/></div> <div><input type="text" value="####"/> Fasteners/Workpiece</div> <div><input type="text" value="####"/> Fasteners/Workpiece</div> <div>Dwell Time: <input type="text" value="## S"/></div>	
<div>BACK</div>	

This screen allows the operator to recall preset job settings or save preset job settings depending on whether this screen was accessed from the Mode Selection Screen or the Run Mode Screen.

Job Summary Box – Displays the important setup values that are stored with each job. When storing a job from Run Mode this summary will display the values that the operator was currently running, including any adjustments made at Run Mode. When recalling a job from the Mode Selection screen, the saved values for a job will appear, as the operator selects a numbered job. Dwell Times are also stored and recalled.

Tooling Mode
Fastener Size Selection
Workpiece Material Selection
Preset Force
Safety Fault Auto Reset Mode
Dwell Time
Fasteners/Workpiece Count

Workpiece Complete Notify Setting
Soft Touch Mode Setting
Cycle Mode (Continuous/Interrupted)
Setpoint Tolerance (Standard/Narrow)

Job No. – Displays and allows input of a job no. from 1 to 99. To Store a job, press Job No. and enter a job no. using the pop-up keypad, then press [STORE]. A blinking message will appear: “Save Successful”. Current job parameters will be saved.

NOTE: It is possible to overwrite an existing job.

To Recall a Job, press Job No. and enter a job no. using the pop-up keypad, then press [RECALL]. A blinking message will appear “Recall Successful” and force adjustment screen appears.

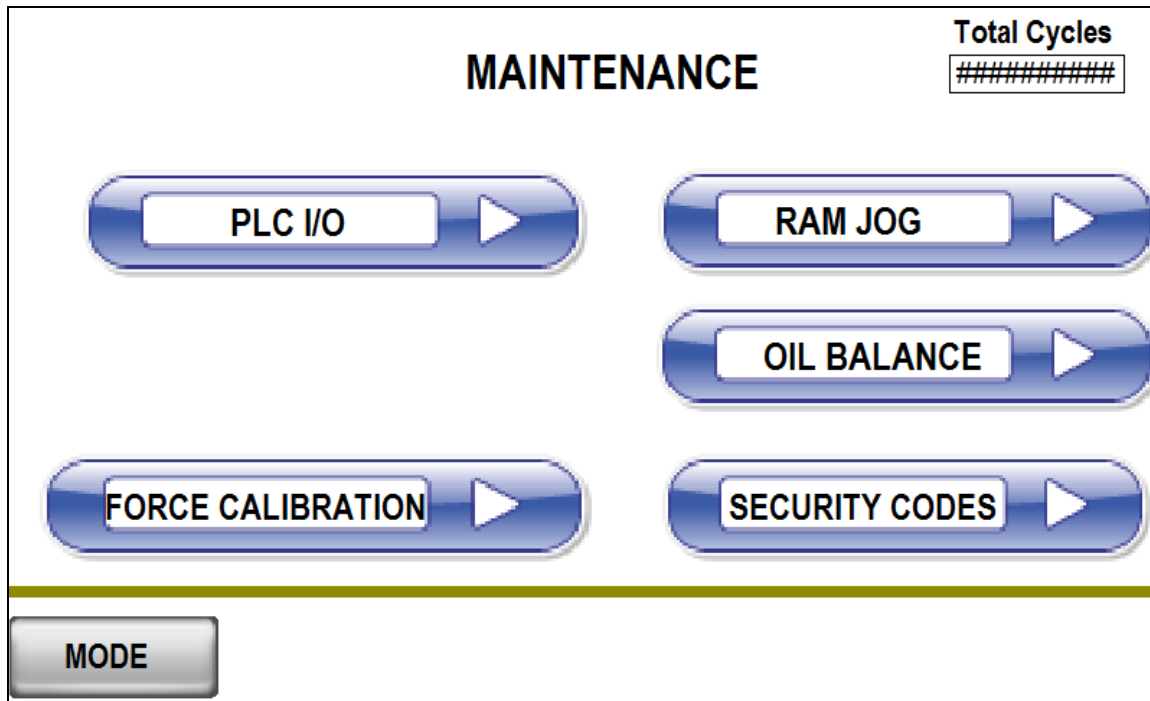
→ to → 6.6 Ram Force Adjustment Screen

[CLEAR] – This function will clear all data associated with a job no. After entering Job No. to be cleared, press the [CLEAR] button. A message will appear: “Empty” and all associated stored data will be deleted.

[SETUP PASSWORD] –If Setup password is required, enter the password to adjust the force. And in less than one minute without enter a password.

[BACK] – Returns to up screen.

6.11 Maintenance Menu Screen



This screen allows the operator to access the maintenance functions. Here the operator can access certain setup screens and a maintenance control screen.

[PLC I/O] – Proceed to PLC Inputs/Outputs Control Screen, which allows maintenance personnel to independently control PLC Input/Output signals for diagnostic purposes.

→ to → **6.14 PLC Input/Output Control Screen**

[FORCE CALIBRATION] – Proceeds to Force Calibration Screen, which allows maintenance personnel to check and calibrate force settings.

→ to → **6.12 Force Calibration Screen**

[RAM JOG] – Proceeds to Jog Screen, allows operator to control ram position at various speeds for setup purposes.

→ to → **6.15 Ram Jog Screen**

[OIL BALANCE] – Set Oil balance valves parameters and control them.

→ to → **6.17 Oil Balance Screen**

[SECURITY CODES] – Allows the Access and Maintenance Access Codes to be enabled and changed.

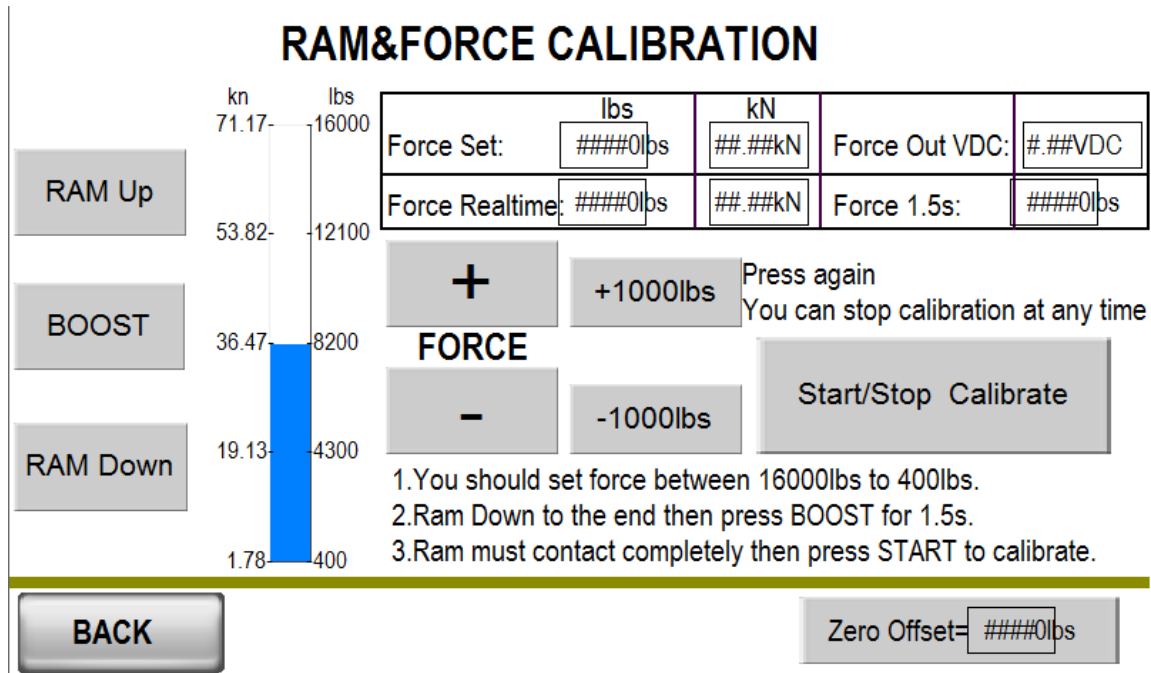
→ to → **6.13 Access Code Setup Screen**

Total Cycles - Displays a permanent cycle counter for machine.

[MODE] – Returns to mode selection screen.

→ to → **6.3 Mode Screen**

6.12 Force Calibration Screen



This screen allows maintenance personnel to check the calibration of the electronic pressure regulator for force and the hydraulic pressure sensor feedback. Maintenance personnel can move the ram up and down, adjust the force setting, boost to high force and check the readings.

[RAM UP] – Touch and hold this button to move the Ram Up.

[RAM DOWN] – Touch and hold this button to move the Ram Down.

[FORCE BAR] – Displays the ram force % of full force setting. This is the same adjustment available on the run screen. This is the force setting used when the boost button is touched.

[+] – Increases Ram Force **[-]** – Decreases Ram Force

[+1000] – Increases 1000lbs Ram Force **[-1000]** – Decreases 1000lbs Ram Force

[BOOST] – Hold this button to compress the safety assembly and turn ON the booster.



WARNING: Use the BOOST button with care. The press will go into high force on any object between the punch and the anvil. For safety reasons, this button must be held for 1 second before it will operate.

Force Display – This display area shows the settings and actual sensor readings for the force control and feedback system.

Force Set – Display the current force. writing in kilonewtons and pounds-force as you read.

Force Realtime – This is the real-time Force reading in kilonewtons and pounds-force converted from the sensor reading.

Force Out VDC – This is a voltage control the Electronic Regulator. Its range from 0-10V. The force gets higher and the voltage gets the same. The VDC box shows the analog signal in volts from the hydraulic pressure sensor to the PLC.

Force 1.5 seconds – This is an instantaneous Force reading in kilonewtons converted from the sensor reading taken after the BOOST button has been held for 1.5 seconds. This reading provides a steady number that is more similar to an actual installation cycle.

[Zero Offset] – This button is used to perform a “zero” calibration of the hydraulic pressure sensor. When this button is touched. The press will automatically run steps to exhaust all air from the press, wait, and take a reading of the hydraulic pressure sensor at 0 (zero) pressure. The press will then save a new offset value for the sensor reading so that at real 0 (zero) pressure the analog signal in will be converted as 0 (zero) force.

Start/Stop Calibrate – First you need to set a force. Second make sure that Punch and Anvil contact totally(Press Ram Down to the end and keep press BOOST if you do not do this step the calibrate can’t be started). Third press Start/Stop to start calibrate. When calibrating it can be paused in any time through press Start/Stop button again. Also you can continue by press it again

For example:

First you can press + or +1000lbs to set force to 16000lbs. Then press Ram Down and BOOST to make sure Punch and Anvil contact totally. After that press Start/Stop Calibrate. When the force finish 16000lbs it will auto minus 100lbs to calibrate 15900lbs until 400lbs for the minimum pressure. When finish all it will come out a attention.

[BACK] – Returns to Maintenance Menu screen.

→ to → **6.11 Maintenance Menu Screen**

6.13 Security Code Setup Screen

ENTER NEW SECURITY CODES

This screen is used to enter new passwords for the 2 security levels. The current password is displayed within each access button below. To modify a password, enter a number via pop-up keypad below and then press one of the 2 access buttons. Set the password to 0000 in order to remove that level of security.

#####

####

OPERATOR
ACCESS

####

MAINTENANCE
ACCESS

####

SETUP
ACCESS

Operator Access - The operator will not be allowed to advance past the logo screen without this password.
Maintenance Access - The operator will not be allowed to access the maintenance screens without this password.
Setup Access - The operator will not be allowed to change the default parameters without this password

BACK

This screen allows the operator to enter and change the operator access, setup access and maintenance access codes. The initial settings of the three are zero, disabling each access screen. **IMPORTANT: Upon receipt of the Series 2000 Press, immediately establish a Maintenance Access Code. The maintenance access screens allow operation of the press without the standard safeguards in place. Only trained personnel should use the functions accessible on the Maintenance Menu Screen.**

Code Pop-Up Keypad – The operator uses the pop-up keypad to set the value of each digit for either code. The code can be any 4-digit number from 0000 to 9999.

[OPERATOR ACCESS CODE] – Touch this button to activate the pop-up keypad to display the Operator Access Code. If this is set to zero, the access screen will be disabled. If this code is set to any other value, the access screen will be enabled and the code will have to be entered to operate the press.

[SETUP ACCESS CODE] –Touch this button to activate the pop-up keypad to display the Setup Access Code. If this is set to any other value, the setup access screen will be enabled and the code will have to be entered to change the setup parameters in Run mode. The Setup Access code will be needed to change the following run mode functions:

Run Mode Parameters Screen:

- Soft Touch (Enable/Disable)
- Cycle Mode (Continuous/Interrupted)
- Setpoint Tolerance (Standard/Narrow)
- Safety Fault Auto Reset (Enable/Disable)
- Run Screen Units (Metric/Unified)
- Workpiece Complete Notification(Auto/Manual/Off)

Save a Job

Note: after the Setup Access Code is entered once, it is active until run mode is exited or the “Clear Setup Password” button is touched. The access keep time is 1minute after that you need repeat.

[MAINTENANCE CODE] – Touch this button to activate the pop-up keypad to display the Maintenance Code. If this is set to zero, the maintenance access screen will be disabled. If this code is set to any other value, the maintenance access screen will be enabled and the code will have to be entered to access the maintenance functions. Access is given to the following maintenance screens:

Maintenance Menu

- PLC I/O
- Ram & Force Calibration
- Ram Jog
- Security Codes
- Oil Balance

Note: Anyone who has access to Security codes screen (Maintenance password required) will therefore have access and can change all of the security passwords.

[MODE] – Returns to Mode Screen.

→ to → 6.3 Mode Screen

6.14 PLC Input/Output Control Screen

SPEED		INPUT		OUTPUT	
###0%	Faster	0.00	0.07 Safety Relay On	100.00 Safety Validate	100.06 Buzzer
	Slower	0.01 Safety Sensor1	0.08 Validate Relay On	100.01	100.07 Main Air
		0.02 Safety Sensor2	0.09 Foot Switch	100.02 RAM Down	101.00
###%	FORCE+	0.03 E-Stop	0.10	100.03 RAM BOOST	101.01 R. Bal Val
	FORCE-	0.04 Safety Interrupt	0.11 Sensor1 Plug In	100.04 RAM Up	101.02 L. Bal Val
		0.05 Main Air Not E-Stop	1.00 Sensor2 Plug In	100.05	101.03
		0.06	1.01		
Force Set: ###0lbs Force Realtime: ###0lbs RAM LDT: #.###In		Force Set: ##.##kN Force Realtime: ##.##kN RAM LDT: ###.##mm		Force Realtime: #.###VDC LVDT: #.###VDC	
<div>BACK</div>					

This screen allows the operator to view the status of all input signals to the PLC and control all of the output signals from the PLC. Each output button allows an output control signal to be turned on and off. The small numbers inside each display and button correspond to the wired location on the PLC. Ram Jog Speed and Force can also be adjusted from this screen. There are also display readings for the various analog signals also.

[0.00-1.01 INPUT SIGNALS] – Each Display shows the status of one input, if the button is dark, the input signal is ON.

[100.00-101.03 OUTPUT SIGNALS] – Each Button controls one output, if the button is dark, the output signal is ON. Some buttons are interlocked to function safely and properly. Also, some buttons are momentary and some are hold types for the same reason. Touch a light button to turn an output ON. Touch a dark button to turn an output OFF.



WARNING: Use Button [100.03 Ram Boost], with care. The press will go into high force on any object between the punch and the anvil. Hold this button to compress the safety and turn ON the booster. For safety reasons, this button must be held for 1 second before it will operate.

SPEED % - Displays the ram speed % of full speed setting. This is a coarse adjustment available to reduce the rate of descent of the ram. The speed percentage is used to control the speed of the ram when using the [100.02 RAM DOWN] button.

[Faster] – Increases Jog Speed

[Slower] – Decreases Jog Speed

FORCE % – Displays the ram force % of full force setting. This is the same adjustment available on the run screen. This is the force setting used when the [100.03 Ram Boost] button is used.

[FORCE+] – Increases Ram Force **[FORCE-]** – Decreases Ram Force

LVDT (Analog Input 1) – This display area shows the sensor reading for the Position of the piston in the main cylinder in millimeters and inches from the top. The VDC reading shows the analog signal in volts from the linear transducer to the PLC.

Ram LDT – This display area shows the real-time position in inches or millimeters. The travel range is between 0-8 inches (0-203.3mm).

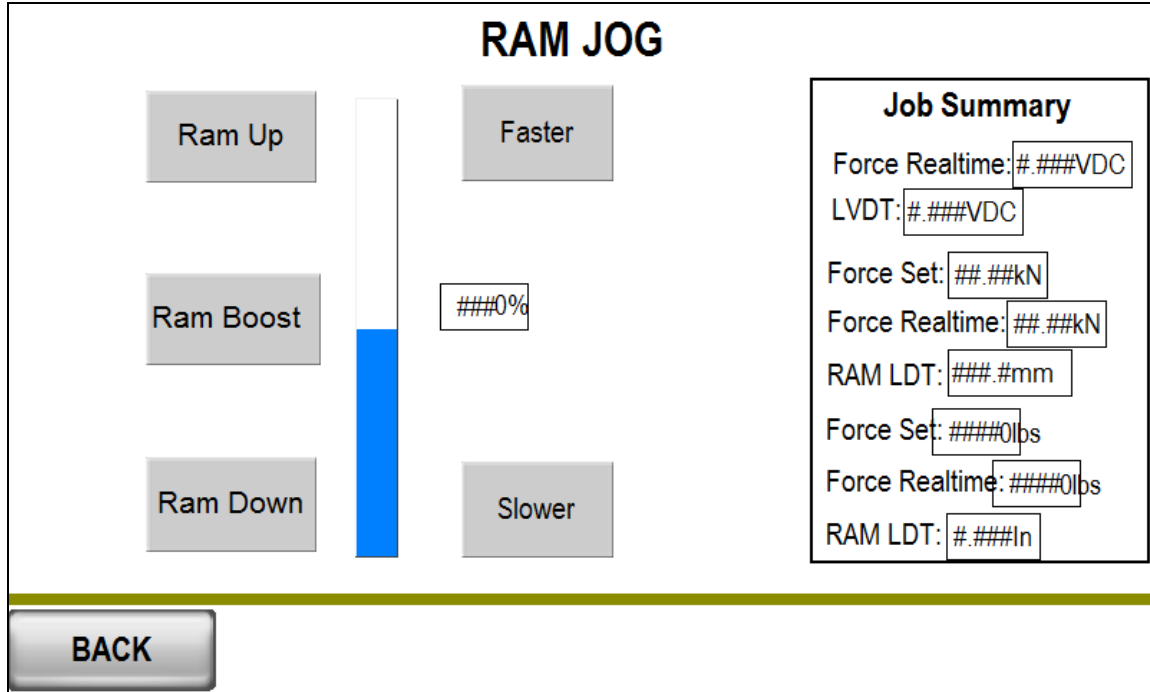
Force Set – This display area shows the Force setting in kilonewtons and pounds-force.

Force Realtime – This display area shows the real-time Force reading in kilonewtons and pounds-force converted from the sensor reading. The VDC reading shows the analog signal in volts from the hydraulic pressure sensor to the PLC.

[BACK] – Returns to Maintenance Menu screen.

→ to → **6.11 Maintenance Menu Screen**

6.15 Ram Jog Screen



This screen allows the operator to jog the ram up and down and reduce the speed. It is used for maintenance procedures.

[RAM UP] – Touch and hold this button to move the Ram Up.

[RAM DOWN] – Touch and hold this button to move the Ram Down.

[RAM BOOST] – Hold this button to compress the safety assembly and turn ON the booster.



WARNING: Use the BOOST button with care. The press will go into high force on any object between the punch and the anvil. For safety reasons, this button must be held for 1.5 seconds before it will operate.

[SLOWER] – Touch this button to reduce the speed of the Ram

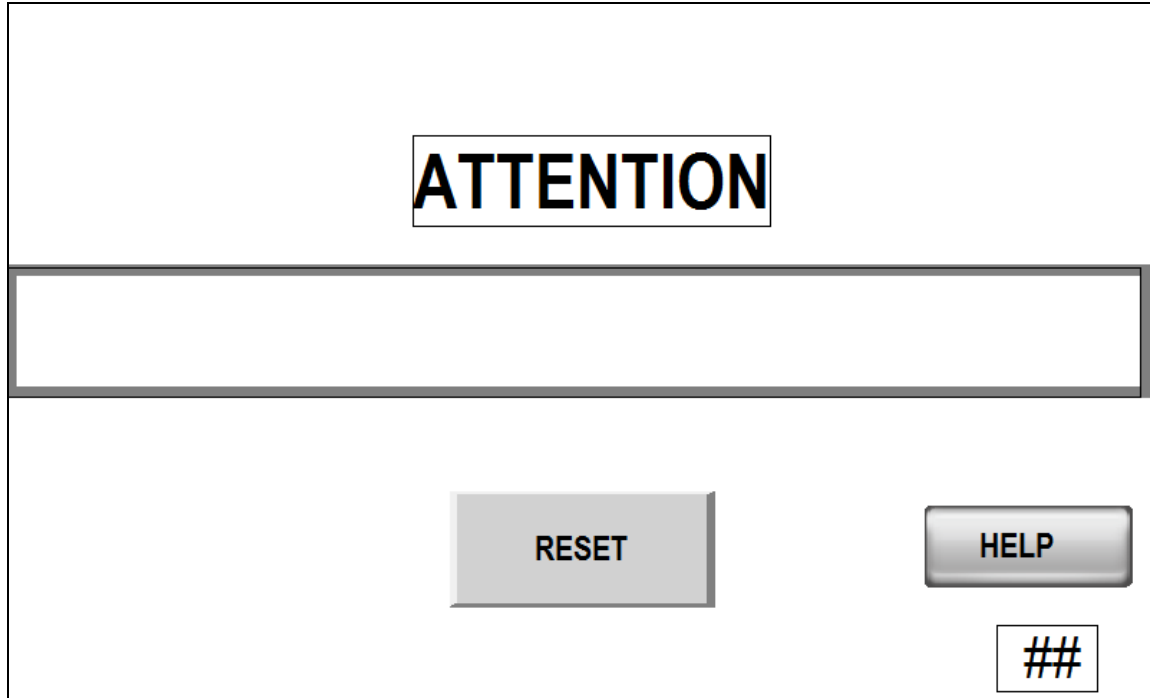
[FASTER] – Touch this button to increase the speed of the Ram

[BACK] – Returns to Maintenance Menu screen.

[JOB SUMMARY] – It shows the state of the LVDT and Pressure Sensor.

→ to → 6.11 Maintenance Menu Screen

6.16 Attention: Message Display Screen



This screen automatically displays when the control system detects a situation that requires the attention of the operator. The appropriate diagnostic messages are displayed on the screen. Listed below are the diagnostic messages and an explanation of each situation.

[HELP] – Attention Screen Help Screen – displays listing of messages and explanations
→ to → **Help Screen**

[RESET] – Clears Attention Screen – returns to previous screen.
Two common messages can be set to automatically reset. They are:
Safety Sensor Trip outside of Window
Workpiece Complete

Attention Messages .

Safety Sensors Tripped ABOVE Setpoint (#2)

Safety Sensors Tripped BELOW Setpoint (#1) – The safety sensors detected that the ram contacted an object outside the allowable window set around the Safety Setpoint.

PLC Battery Low (#4) – You must change battery in one week or some data will be lost.

Safety Circuit Error (#7) – Signal error. Record fault number and contact your service representative to report the problem and receive further assistance.

Safety Setpoint Too High (#11)

Safety Setpoint Too Low (#12) - During the Safety Setup Procedure the learned safety setpoint was outside the allowable range. The ram must travel at least 63.5 mm (2.5 inches) and no more than 178 mm (7.0 inches). If in Top Mount Anvil Mode the minimum travel is 38 mm (1.5 inches).

Force Too Low (#13) – The booster was on for the maximum boost time and the required pressure was not achieved.

Force Too High (#14) – The hydraulic pressure sensor detected a pressure that exceeded the preset force and the limits set by the fastener size selection.

Lt.StreamErr3-Safety Sensor Tripped (#15) – One of the safety sensors tripped while the ram was in the “Home” position.

Lt.StreamErr2-Collar Became Dislodged (#17) – One of the safety sensors tripped while the ram was going up and was above the top safety window setpoint.

Ram Position Error (#18) – Occurs at Mode selection, if Ram position is NOT measured as “Home” when a Setup is attempted

Sensors Unplugged / F3 Blown (#19) – The System does not detect the loopback signal from the Safety Sensors, Fuse 3 may be blown.

Safety Valve Control Error (#20) – The system detected a loss of power to the safety valves when the valves should be ON.

Pressure Sensor Error (#21) - Check the pressure sensor to verify its voltage range is from 1V to 5V. Zero offset should be less than 150lbs.

LVDT Error (#22) –Check voltage of LVDT when it is in home position. If the voltage is below 0.97 VDC, LVDT needs to be replaced.

Main Air Not Stop error (#23) – Check the input 0.05 When Emergency Stop Not On.

No Ram Contact (#24) – The ram did not contact anything within a certain allowable time. Make sure the punch and anvil are installed, and that the air pressure at the back of the press is adequate

Force Stroke Beyond Safety Limit (#25) – During boost, the ram traveled more than the maximum allowable insertion distance.

Ram Up Speed Error (#26) – During Auto Run Mode, If the ram is going up and not reach the top safety window setpoint. within 1s.

6.17 OIL BALANCE Screen

OIL BALANCE

When you leave this screen the oil balance valves will automatically close

Left balance Valve **AUTO** **Right balance Valve**

Auto-Balance On-Delay Timer Auto-Balance On Timer
###S ###S

AUTO-BALANCE ON TIMER
Sets and displays the amount of time the Air/oil Tanks will Self-Balance

AUTO-BALANCE ON-DELAY TIMER
Sets and displays the amount of time the press must sit idle (with ram at home)
before the Air/Oil tanks will begin to Self-Balance.

BACK

[Left balance Valve] – Press this button to open Left balance Valve.

[Left balance Valve] – Press this button to open Right balance Valve.

[AUTO] –Auto Mode will automatically turn off the balance valves after the Auto-Balance On Timer has expired. In Manual Mode the balance valves will automatically turn off when leaving the screen and will revert to Automatic Function.

[Auto-Balance On-Delay Timer] –Sets and displays the amount of time the press must sit idle (with ram at home) before the Air/Oil tanks will begin to Self-Balance.

[AUTO-BALANCE ON TIMER] –Sets and displays the amount of time the Air/oil Tanks will Self-Balance.

NOTE: Maintenance Mode will not auto balance must open valve by manual.

[BACK] –Return to maintenance screen.

SECTION 7

PNEUMATIC-HYDRAULIC SYSTEM

A. THE PNEUMATIC SYSTEM

Initial Air Entry

- Your factory air supply should be clean, dry and, ideally, have a high flow capability. Airline feeds smaller than 12mm (1/2") will increase cycle time.
- Factory compressed air, set between 6 and 7 BAR (90 to 100 psi), enters the system through a manually adjusted filter/regulator which is mounted on the back of the machine.
- After passing through the filter/ regulator, the air is distributed into two areas.
- 1) The 1/2" (12mm) line which leaves the manifold first supplies a piloted pressure regulator. With this regulator the operator or setup person can adjust the fastener insertion force from the touch screen.
- From the regulator, the air is routed to the right valve of the "Ram Valve" assembly, a two position, four way valve, which switches it to move the Booster cylinder. It is sometimes referred to as the "high pressure" valve because the pneumatic energy is converted into mechanical energy which is used to create the ram's high pressure squeezing force.
- 2) The 1/2" (12mm) line then supplies the left valve of the Ram Valve assembly. This 3-position, 4-way valve switches the air to both Air-Oil tanks. The *upper* coil, when energized (note indicator light), supplies the left tank, causing the ram to retract (up). The *lower* coil supplies the right tank, causing the ram to extend (down). When neither coil is energized, the valve exhausts both tanks, relieving the oil system of residual pressure.

Air Exit

- Air exiting the air-oil tanks is routed to an air/oil separator, which is located at the bottom rear of the press.
- The purpose of the separator is to collect any oil vapor suspended in the air stream. Oil collects in the reservoir, which is emptied as necessary.

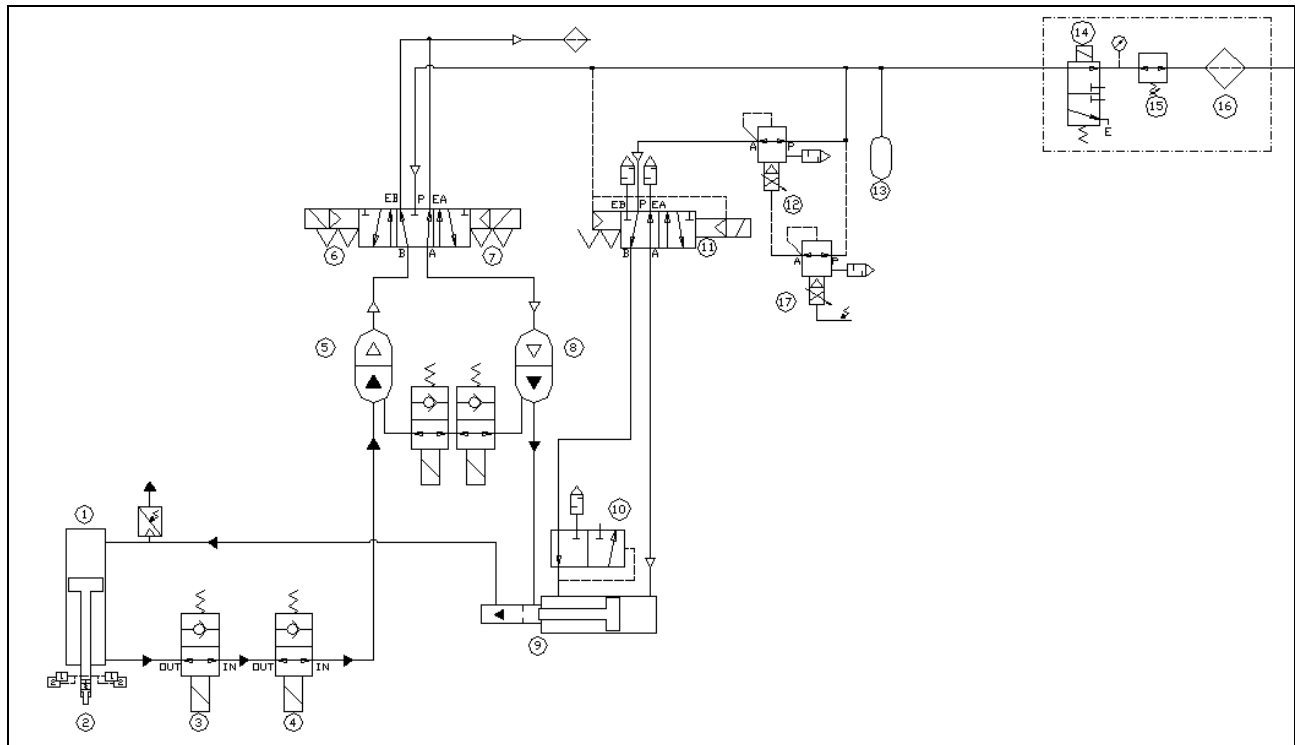
B. THE HYDRAULIC SYSTEM

Pushing the Ram Down

- As pressurized air flows into the right (extend) tank, it causes hydraulic fluid, at air pressure, to flow into the top of the ram cylinder, forcing the ram down.
- As the ram comes down it forces the unpressurized hydraulic fluid below the ram back into the left (retract) tank.
- With the ram *safely* in the down position, the hydraulic pressure, which forced the piston (ram) down, is increased by the air-powered booster to provide the insertion force.

Pushing The Ram Up

- Booster (air) pressure is removed by the right hand Ram valve assembly (high pressure booster valve), and the booster retracts.
- As pressurized air flows from the left Ram valve, into the left (retract) tank, it causes hydraulic fluid, at air pressure, to flow into the bottom of the ram cylinder, forcing the ram up.
- The left valve on the Ram valve assembly also exhausts the air pressure from the extend tank, thereby allowing the hydraulic fluid on top of the ram to become unpressurized. As the ram comes up, this unpressurized fluid is pushed back into the tank.



ITEM	DESCRIPTION	ITEM	DESCRIPTION
1	RAM	9	BOOSTER
2	SAFETY SENSOR	10	QUICK EXHAUST
3	SAFETY VALVE A	11	BOOST
4	SAFETY VALVE B	12	ELECTRONIC REGULATOR
5	AIR-OIL TANK UP	13	ACCUMULATION TANK
6	RAM UP	14	“DUMP” VALVE
7	RAM DOWN	15	REGULATOR
8	AIR-OIL TANK DOWN	16	FILTER

**FIGURE7-1
HYDRAULIC / PNEUMATIC DIAGRAM**

SECTION 8

ELECTRICAL SYSTEM



WARNING: The **PEMSERTER® SERIES 2000® FASTENER INSTALLATION PRESS** uses high voltage electrical power. Only trained and authorized personnel may attempt to maintain, service, or repair its electrically powered subsystems, components or parts.

When performing maintenance on the machine, the hydraulic door should be closed before opening the electrical enclosure.

After powering the press down using the off button, be aware that shock dangers still exists due to the power filter is still electrified.

The electrical panel enclosure requires a special key to open. The purpose of this feature is to protect the machine from unauthorized persons tampering with the system and to help prevent unauthorized and untrained personnel from receiving an electrical shock. We suggest the key be kept by a manager/supervisor who will properly control its use.

AC Power Distribution:

The press is protected by a two-pole main circuit breaker.

The inline AC power entering the press is routed to the following 2 areas:

- The 24VDC Power Supply and 5VDC POWER.

DC Power Distribution:

- The DC power from the power supply feeds the power supply serving the PLC. Through various sub-circuits, it also feeds the sensors and other inputs, the Touch Screen, and the output card of the PLC which uses the power to turn various loads (outputs) on and off.
- The controller of the press electronics system is the PLC. The PLC receives input from sensors located throughout the machine which tell it the status of operations at any point. The PLC controls air valves which, in turn, control most of the machine's activities, including the tooling which transports and positions the fasteners.
- There are 3 DC fuses. They protect (1) the Touch Screen, (2) the sensors, and (3) the air pressure regulator.

ELECTRICAL/ELECTRONIC COMPONENTS

(Note: Most of the items mentioned below are illustrated in section two of this manual.)

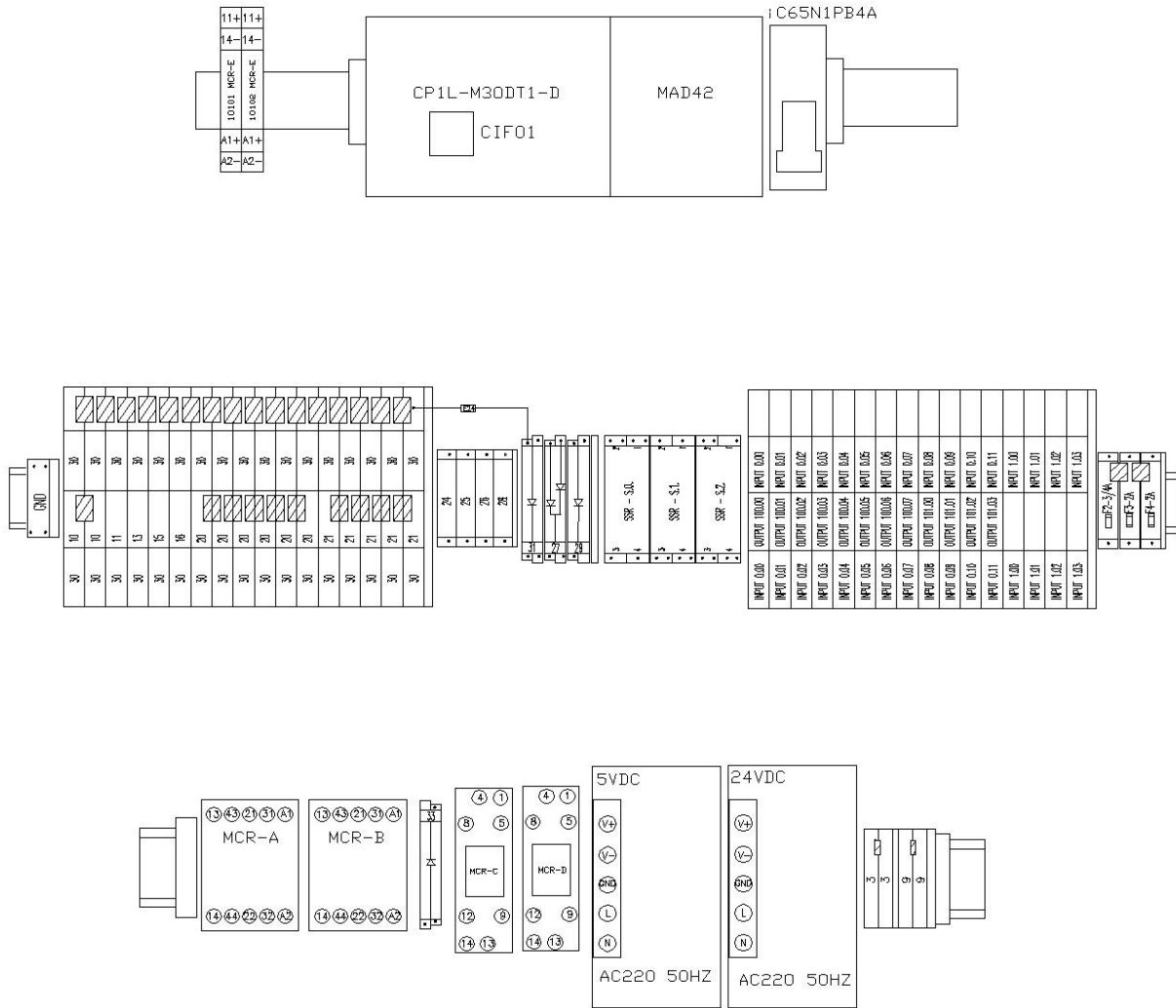
Name	Location	Purpose
PLC INPUTS:		
Emergency Stop (Input 0.03)	Emergency Stop Circuit	Detects that the Emergency Stop button has been pressed and stops the program.
Safety Sensor 1 (Input 0.01)	Left side of ram, under cylinder inside front enclosure.	An optical beam sensor which tells the PLC when the ram's "safety" has made contact with an object. Depending upon where, along the ram's travel, contact was made, the PLC will "decide" whether to proceed, or to stop and retract the Ram.
Safety Sensor 2 (Input 0.02)	Right side of ram under cylinder inside front enclosure.	Another optical beam sensor which tells the PLC when the ram's "safety" has made contact with an object. (For redundancy)
Main air not E-stop (Input 0.05)	Emergency Stop No.27 And Dump Valve"1"	Both Physical loop and PLC IO control the main air.
Safety Relays ON (Input 0.07)	Electrical Enclosure	Checks that DC power is ON to hold the safety valves open when the safety sensors are clear and ON. Checks that DC power is OFF to close the safety valves when the safety sensors are blocked and OFF.
Validate Relay ON (Input 0.08)	Electrical Enclosure	Checks that DC power is ON to hold the safety valves open during a valid installation. Checks that DC power is OFF to close the safety valves during a safety fault.
Foot Switch (Input 0.09)	Floor	When pressed, the foot switch initiates an insertion cycle.

Name	Location	Purpose
PLC INPUTS: (Continued)		
Sensor 1 Plugged In (Input 0.11)	Sensor 1 Plug/ Front Enclosure	Loopback verifies that Safety Sensor 1 is plugged in.
Sensor 2 Plugged In (Input 1.00)	Sensor 2 Plug/Front Enclosure	Loopback verifies that Safety Sensor 2 is plugged in.
PLC OUTPUTS:		
Safety Validate (Output 100.00)	Amongst a group of 4 safety-related relays under the PLC.	Enhances redundancy of control of safety valves.
Safety Primary (Output 100.01)	In the hydraulic enclosure between the left air / oil tank and the main ram cylinder	Always held open allowing hydraulic fluid to flow to the top of the main cylinder and move the ram down. In case of a safety fault, the valves close very rapidly to shut off the oil flow, causing the ram to stop its downward movement.
Ram Valve Down Solenoid (Output 100.2)	In the hydraulic enclosure, at the lower left side of the Ram valve assembly.	A solenoid that flows air into the down tank (the right side hydraulic fluid reservoir). This forces oil from the tank, through the booster, through the safety valve, to the main ram cylinder to move the piston/ram down.
Ram Valve Booster Solenoid (Output 100.3)	In the hydraulic enclosure, on the right side of the Ram valve assembly.	A solenoid which allows air from the electric pressure regulator to flow to the booster cylinder. The air in the booster creates the ram's high "squeezing" force.
Ram Valve Up Solenoid (Output 100.4)	In the hydraulic enclosure, at the top left side of the Ram valve assembly.	A solenoid that flows air into the up tank (the left side hydraulic fluid reservoir). This forces the oil from the tank, under the main cylinder's piston. This action, in turn, pushes the piston/ram up.
Audio Beeper (Output 100.6)	Located under the touchscreen.	The adjustable audio signal is used to inform the operator that a work piece is finished and/or that a batch has been completed, or of a Safety Fault.
Main Air (Output 100.7)	Part of air inlet system at rear of press.	Exhausts any air pressure, capable of causing any motion of the Ram.

Name	Location	Purpose
PLC OUTPUTS (Continued):		
Right Balance Valve	Under right oil tank	Controls right oil tank open/close. For balancing oil between two tanks or release oil from the tank.
Left Balance Valve	Under left oil tank	Controls left oil tank open/close. For balancing oil between two tanks or release oil from the tank.
ELECTRICAL COMPONENTS :		
Linear Transducer Input Module	In the electrical enclosure, a module installed on the PLC rack.	An analog to digital converter which accepts current (4-20 mA) from the Linear Transducer. It is used to read the ram cylinder position.
Twelve Point Output Module	In the electrical enclosure, PLC rack.	A module with twelve discrete 24 VDC outputs. The outputs are used to turn various (see schematic) 24 VDC loads Off and ON.
CPU / Analog I / O / Input Module	In the electrical enclosure, PLC rack.	The CPU (Central Processing Unit). It incorporates sixteen inputs for sensors, and other switches. It also accepts analog data from the linear transducer and oil pressure transducer, as well as provide variable analog output control of air pressure (for insertion force)
Linear Transducer	Top of ram cylinder.	A device which constantly monitors and provides the PLC data on the Ram position.
Oil Pressure Transducer	Extend (Inlet) port at top of main cylinder	An analog device which continuously reads and converts oil pressure into a signal for the PLC to calculate Ram Force.

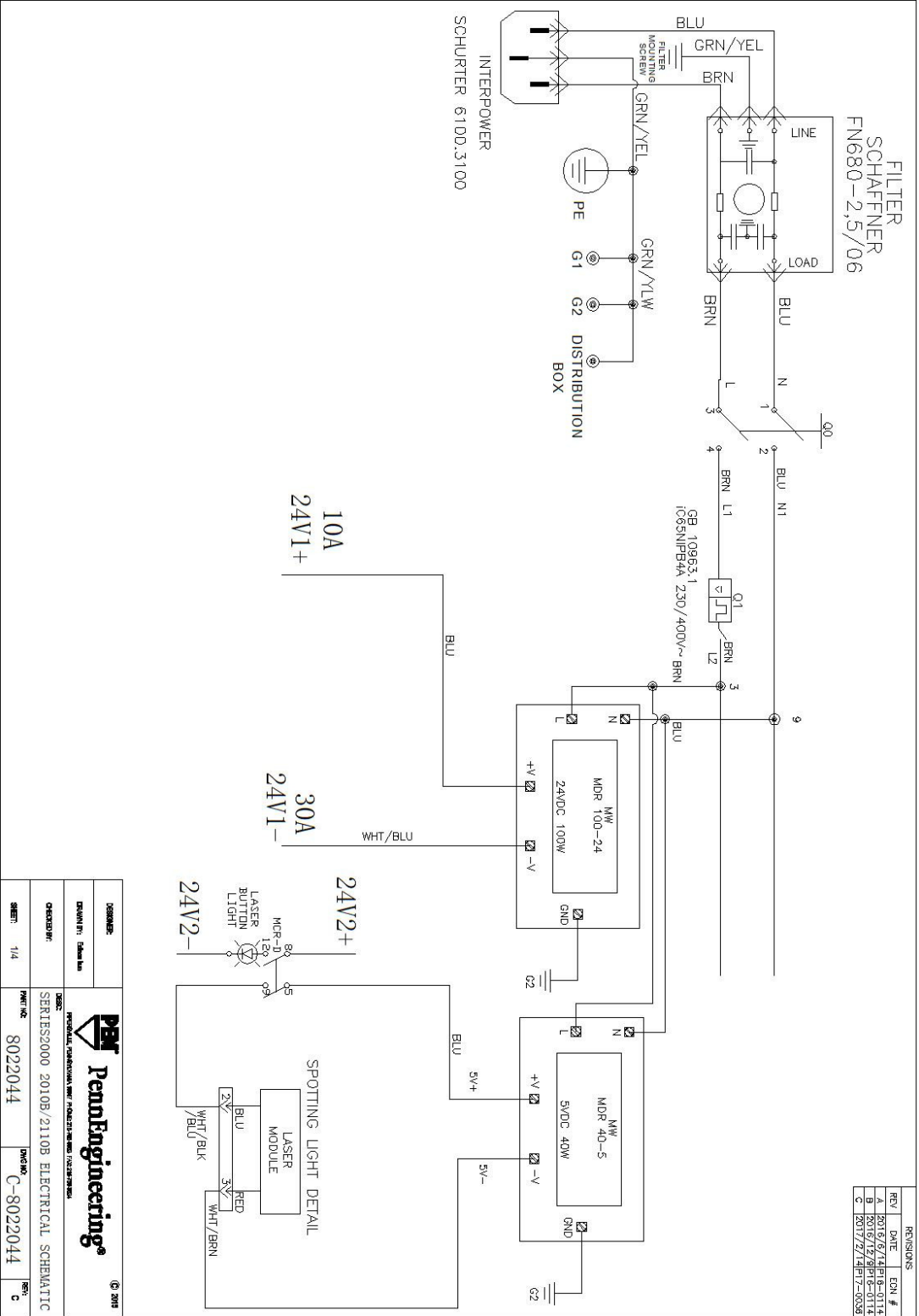
PEMSERTER SERIES2000 2010B/2110B WIRING DIAGRAM

REV	DATE	EDN
1	2018/07/10	0110
2	2018/10/10	0110
3	2017/12/14	0110



DESIGNER	PennEngineering®	© 2018
DESIGNED BY	WESLEY	
DESIGNED BY	SERIES2000 2010B/2110B WIRING DIAGRAM	
DATE	8022045	C-8022045

LAYOUT OF THE ELECTRICAL ENCLOSE SERIES 2000 MODEL 2010B/2110B



Electrical Schematic with Supply Power

[illegible]

SECTION 9

TOOLING SET-UP

Tooling

The PEMserter® Series 2000® Fastener Installation Press can be equipped with interchangeable tooling in order to properly install numerous types of PEM® fasteners. Series 2000™ Tooling refers to components that are installed onto the press that are specific to automatically feed and install different types of fasteners in different ways.

Manual Tooling

Manual tooling refers typically to the punch and anvil set that is used to install the fasteners. Placement of each fastener into the workpiece hole is done by the operator. Only moving the ram down and the installation stroke is controlled by the press.

The two tooling components that exert the installation squeezing force are called the Punch and Anvil. Typically the punch is the moving element, installed in the end of the safety adapter at the end of the ram. The anvil is the stationary element installed in the anvil holder at the bottom of the press throat. In a typical installation, the punch pushes the displacer into the workpiece and the anvil supports the other side of the workpiece and provides the reaction force.

Different Punches and Anvils are selected for different types, sizes and materials of fasteners. The shape of the punch and anvil differ to account for the different shapes in fasteners. However, for many fastener applications a flat surface punch is used. Anvils are more varied. For instance, for studs, an anvil with a hole in the middle is used to accept the long body of the stud. An anvil with a different diameter hole is needed for each different size of the stud in order to support the material properly.

Specific tooling is sometimes required to accommodate different sizes and shapes of workpieces. There are different length punches and anvils to reach or accommodate workpieces. There are different diameter or special featured punches and anvils to accommodate different workpiece material and thickness.

Tooling Mode Selection on the Touch Screen

During the setup selection process of the press, the tooling mode must be selected on the touch screen. The tooling modes available are:

- [MANUAL NUT]
- [MANUAL STUD]
- [MANUAL STANDOFF]
- [J-ANVIL NUT]
- [J-ANVIL STUD]

SECTION 10

PRESS OPERATION



Before running the press:

- **Install the tooling** (See Tooling Section 9).
- **Check air supply** – be sure it is connected and that the pressure is between 6 and 7 BAR (90 to 100 psi)
- **Check electrical power supply** – be sure the ON/OFF switch in the back is in the ON position. (indicated by red illuminated “off” button on the front of the press)
- **Always wear eye protection when operating the press.**
- **Always keep all body parts as far away from moving parts as possible.**
- **Test the safety system every day**



Testing the Safety System:

- **Install Tooling** - any punch and anvil set can be used. Standard flat punch and anvil for a Series 2000 are 16mm (.625”) in diameter and 102mm (4.0”) long.
- **Turn On the Press** – push the green ON button.
- **Access the Setup** – press [CONTINUE] on the touchscreen.
- **Select Setup Type** – press [TOOL SETUP]
- **Select Tooling Type** – select a [Manual] tooling mode
- **Select Fastener Size and Workpiece Material** – select any size and material
- **Select Force** – press [CONTINUE] to accept the default force.
- **Perform Safety Setup** – With NO fastener or workpiece between the punch and the anvil. Step on the foot pedal, the ram will extend and the punch and anvil will touch and "learn" the safety setup position. The ram will return up and the run screen will appear.
- **Test Safety System** - Test that the safety system is functioning properly. Use the following test:
 - a) After completing the safety setup step with nothing between the punch and the anvil. Place a wooden lead pencil on the anvil.
 - b) Wear eye protection, keep body parts away from moving parts, as far as possible.
 - c) Step on the footpedal.
 - d) The ram will extend, the punch will contact the pencil and the press will indicate a safety fault.
 - e) If the wood of the pencil is broken, the press has failed the safety test.
 - Turn the press off.
 - Remove and Lock out the power and air supply.
 - Contact your service representative.

Wood Lead Pencil - 6.3mm-7.6mm (.250-.300”) flat-to-flat hexagon (6-sided) cross section.

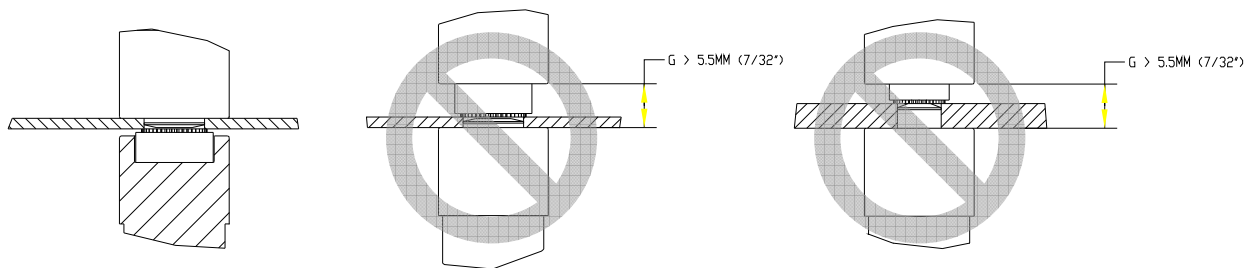
Running the press:

(The instructions given are for a standard new job setup. For the different options see Section 6 Touchscreen Controls.)

- **Turn On the Press** – push the green ON button.
- **Access the Setup** – press [CONTINUE] on the touchscreen.
- **Select Setup Type** – press either
[TOOL SETUP] – to setup a new job
[RECALL A JOB] – to select a job from a pre-saved list
[RECALL LAST JOB] – to select the same job that was last run, even if the press was turned off.
- **Select Tooling Type** – press selection
- **Select Fastener Size and Workpiece Material** – press selections
- **Select Force** – adjust force or accept default then press [CONTINUE]
- **Perform Safety Setup** - Follow the instructions on the screen. Position the workpiece properly, flat on the anvil or fastener. Step on the foot pedal, the ram will extend and touch the fastener and workpiece and "learn" the safety setup position. The fastener will not be installed.



IMPORTANT: The ram must contact the fastener fully in the workpiece (but not installed) and both the fastener and workpiece must be flat to the punch and anvil. The gap between the punch and the anvil must not exceed 5.5mm (7/32") to conform to internationally recognized safety standards. This means that the stacked height of the fastener and the workpiece before installation must not exceed 5.5mm (7/32").

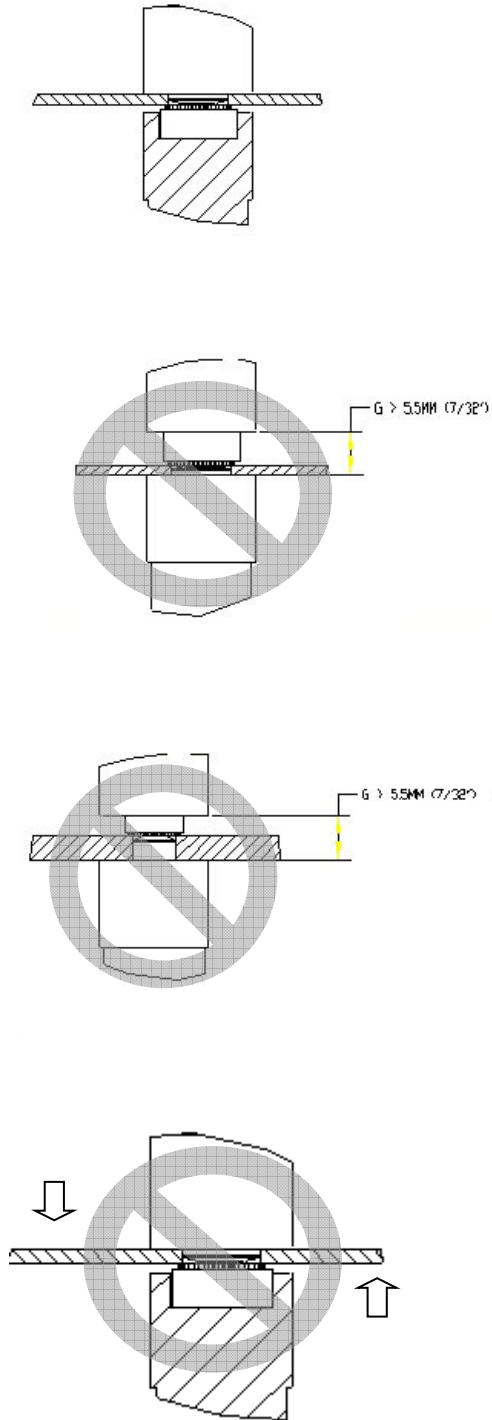


See drawings on next page for examples of proper and improper setup.

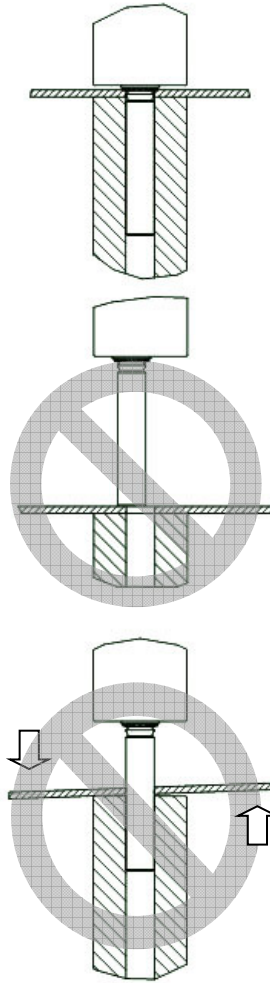
- **Install Fastener** – Position the workpiece properly, flat on the anvil or fastener. Step on the foot pedal. The ram will extend and install the fastener. The press will then get ready to install the next fastener.

EXAMPLES:

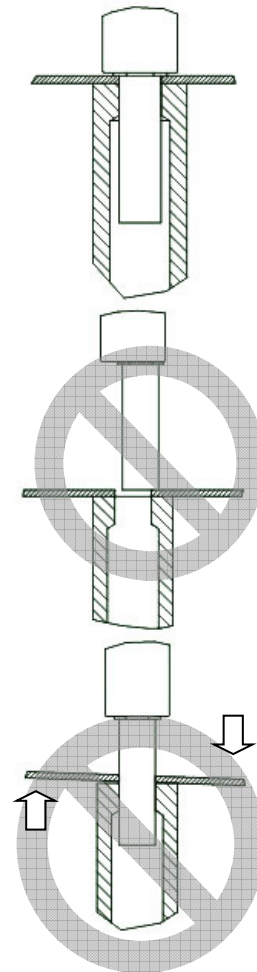
Manual install Nut Setup



Manual install Stud Setup



Manual install Standoff Setup



SECTION 11

MAINTENANCE

The most important element of maintaining your PEMSERTER® Series 2000® Press is to ensure that the compressed air supply is clean and dry. Do not use lubricated air.

Following the maintenance schedule below will also help maintain your press in good running order.



IMPORTANT: Only qualified individuals should perform maintenance procedures. Unless otherwise specified, perform all maintenance with the press disconnected from air and power. Follow safe practices and obey all local safety regulations.

Maintenance Schedule – PEMSERTER® MODEL SERIES 2000/Serial 2010B-XXXX or 2110B-XXXX

Daily Inspection

<ul style="list-style-type: none">• Check oil condition and level in air/oil tanks.	<ul style="list-style-type: none">• If the oil is foamy or pink in color, there is excessive air or water contamination. Follow air bleed procedures and recheck. If the oil continues to foam or stays pink, it is contaminated and must be changed. The source of the contamination must be eliminated to avoid reoccurrence of the problem.• If the oil level is off the marks, the oil must be leveled. Follow air bleed procedures and recheck. If the oil is still out of level, balance tanks and add oil as necessary.
<ul style="list-style-type: none">• Check tooling	<ul style="list-style-type: none">• DO NOT USE tooling that is cracked, chipped or otherwise damaged.• Check that all retracting pins move freely.
<ul style="list-style-type: none">• Check footpedal cord	<ul style="list-style-type: none">• Repair or replaced any broken, frayed or otherwise damaged cord.
<ul style="list-style-type: none">• Check Safety Stop Distance	<ul style="list-style-type: none">• Perform Safety Stop Distance Check Procedure (“Pencil Test”)

Weekly Inspection

<ul style="list-style-type: none">• Check all filters and mufflers<ul style="list-style-type: none">• Reclassifier/muffler• Electronic regulator filter• Booster valve mufflers	<ul style="list-style-type: none">• Some oil at the reclassifier/muffler in back is normal, empty or change filter as oil collects. If reclassifier/muffler is excessively wet, there may be oil problems. Recheck oil and observe tanks while the press is running. Look for foaming. If oil rises to the top of the tank, it may be blowing out through the valves. Follow air bleed procedures, recheck and change oil if required.• Change electronic regulator filter as needed. If filter becomes dirty quickly, it may indicate contaminants in the air that need to be eliminated, because it may lead to other problems.• If mufflers become dirty quickly, it may indicate contaminants in the air that need to be eliminated, because it may lead to other problems.• If mufflers show red oil, it may indicate a leak in the booster system. Call PennEngineering® Service.
<ul style="list-style-type: none">• Check Lightstream Collar	<ul style="list-style-type: none">• If plastic lens is dirty, clean with optical cleaning solution and soft cloth.
<ul style="list-style-type: none">• Clean Press	<ul style="list-style-type: none">• Wipe clean any build up of possible grime, oil mist or other material from room air. This will assist in detecting actual problems with the press systems.

Monthly Inspection and Maintenance

<ul style="list-style-type: none">• Check Tooling Alignment	<ul style="list-style-type: none">• Check Punch and Anvil alignment
<ul style="list-style-type: none">• Check Lightstream operation	<ul style="list-style-type: none">• Remove any punch and anvil tooling and in Maintenance Mode on the Touchscreen, jog the ram all the way down to the end of its stroke. Check to make sure that the Safety Sensor LED's do not change or flicker along the entire stroke.
<ul style="list-style-type: none">• Check Safety Assembly Operation	<ul style="list-style-type: none">• Push on the Punch Adapter of the Safety Assembly by hand and make sure that it moves freely and smoothly along the entire spring-loaded stroke.

Annual Maintenance

<ul style="list-style-type: none">• Clean Air Valves (optional)	<ul style="list-style-type: none">• If contaminant build up occurs, clean the pneumatic valves annually.
<ul style="list-style-type: none">• Change Oil (optional)	<ul style="list-style-type: none">• If contaminants enter the oil system, flush and change the oil annually.
<ul style="list-style-type: none">• Check Air Accumulation Tank	<ul style="list-style-type: none">• Be sure air and power is disconnected. Pull the tubing from the air accumulation tank and check for water or other contaminants. If Tank is installed with fittings at the top, remove and reinstall with fitting on the bottom. Longer replacement tubing may be required.

3 Year Maintenance

<ul style="list-style-type: none">• Rebuild Cylinder and Booster (optional)	<ul style="list-style-type: none">• Contact PennEngineering® Service Department.
<ul style="list-style-type: none">• Replace PLC Battery	<ul style="list-style-type: none">• A low battery indicator function exists in the software. Changing the battery can avoid an accidental loss of the program. When changing the battery the press should be powered on to make sure the program is not lost.

PEMSERTER® Series 2000®, Model SERIES 2000 /Serial 2010B-XXXX or 2110B-XXXX Maintenance Procedures

Testing the Safety Stop Distance (“Pencil Test”)

Purpose: To check that the safety system is operating properly.

Why: The safety system of the press is the most important system. It is designed to be self-diagnosing and so no single component fault will compromise the system. However, a check should always be done as a final test of the system.

How Often: Perform Daily

Tools Needed: Wooden Lead Pencil

(Any standard pencil will do but the one commonly used is a wooded lead pencil with a 6.3mm-7.6mm (.250-.300”) flat-to-flat hexagon (6-sided) cross section.)

- **Install Tooling** - any punch and anvil set can be used. Standard flat punch and anvil for a Series 2000 are 16mm (.625”) in diameter and 102mm (4.0”) long.
- **Turn On the Press** – push the green ON button.
- **Access the Setup** – press [CONTINUE] on the touchscreen.
- **Select Setup Type** – press [TOOL SETUP]
- **Select Tooling Type** – select a [Manual] tooling mode
- **Select Fastener Size and Workpiece Material** – select M2.5/#2 size and Aluminum
- **Select Force** – press [CONTINUE] to accept the default force.
- **Perform Safety Setup** – With NO fastener or workpiece between the punch and the anvil. Step on the foot pedal, the ram will extend and the punch and anvil will touch and "learn" the safety setup position. The ram will return up and the run screen will appear.
- **Test Safety System** - Test that the safety system is functioning properly. Use the following test:
 - a) After completing the safety setup step with nothing between the punch and the anvil. Place a wooden lead pencil on the anvil.
 - b) Wear eye protection, keep body parts away from moving parts, as far as possible.
 - c) Step on the footpedal.
 - d) The ram will extend, the punch will contact the pencil and the press will indicate a safety fault.
 - e) If the wood of the pencil is broken, the press has failed the safety test.
 - Turn the press off.
 - Remove and Lock out the power and air supply.
 - Contact your service representative.

Bleeding Air from the Oil System

Purpose: To remove air from the oil system.

Why: Air in the main cylinder above the piston will increase the dwell time of the installation. Excessive air in the main cylinder below the piston will affect the Safety Stopping Distance.

How Often: Check Daily, Perform as needed.

Tools Needed: 46mm or 1-7/8" open end wrench or large enough adjustable wrench.

Rag or towel to catch and clean some oil.

- Before performing procedure allow press to sit for at least an hour after last cycle.
- Remove Punch and Anvil Tooling.
- In Maintenance Mode on the Touchscreen, Jog the Ram Done at 100% Speed. Observe the Left Tank, check for bubbles or foam.
- If bubbles or foam observed, allow the press to sit powered on but idle until the oil in the left tank is clear and dark.
- With the ram still down, turn the press off and disconnect power and air from the press.
- Disconnect the linear transducer from the electrical connection box in the front enclosure. Run the cable out the top of the enclosure so that it can twist freely.
- Loosen the linear transducer probe, do not begin to unscrew it.
- Slowly unscrew the linear transducer ½ turn and stop. Check for oil at the connection wait for 10 seconds.
- Repeat ½ turns to unscrew the linear transducer until a steady ring of oil is seen around the connection, then quickly reinstall the transducer.
- If no oil comes out and the transducer is entirely unscrewed, then there is not enough oil in the system. Reinstall the transducer one turn in. Open the balancing valves between the two tanks. Oil will move from the Left Tank to the Right Tank and out the transducer port. Watch carefully and finish installing the transducer as soon as oil is seen at the connection. Close the balancing valves between the two tanks.



IMPORTANT: The balance valves can't be opened without power. If you want to open them. You must turn on the power and press the oil balance button on.

- Tighten the linear transducer, maximum 9.6 N·m (70 ft-lbs) and, reconnect the transducer.
- Reconnect power and air to the press.
- Turn on the press and in Maintenance Mode, Jog the Ram back up.
- Run the Ram Up and Down and observe the tanks for air bubbles and foam. If Air persists, repeat the process for the tank with the air. If there is air in the left tank, continue to run the ram all the way down and allow the press to settle. If there is air in the right tank repeat the bleed process at the transducer port.

Leveling the Oil in the Tanks

Purpose: To maintain the optimum levels of oil in the tanks.

Why: If the oil levels are too low or too high, the oil may approach too close to the tops or bottoms of the tanks and either exhaust oil into the air system or collect air in the oil.

How Often: Check Daily, Perform as needed.

Tools Needed: none

- Before performing procedure allow press to sit for at least an hour after last cycle.
- Remove Punch and Anvil Tooling
- Check for Air in the oil in the left tank, under the piston side.
In Maintenance Mode on the Touchscreen, with the ram already in the up position:
 - Press the Ram Up button on the PLC I/O Screen and hold.
 - While observing, the oil level in the left tank, release the Ram Up button.
 - If the oil level rises, that is an indication of air being compressed and uncompressing on that side of the system.
 - If the level movement observed is more than 3mm (1/8 in.) then follow bleed procedure.
- Check for Air in the oil in the right tank, above the piston side.
In Maintenance Mode on the Touchscreen.
 - Press the Ram Down button on the PLC I/O Screen until the ram is fully extended and hold.
 - While observing the oil level in the right tank, release the Ram Down button.
 - If the oil level rises, that is an indication of air being compressed and uncompressing on that side of the system.
 - If the level movement observed is more than 3mm (1/8 in.) then follow bleed procedure.
- After completing the air checks, return the ram to the top.
- Turn the press off and disconnect power and air.
- Open the balancing valves between the tanks.
 - Press the Left balance Valve button on the OIL BALANCE Screen .
 - Press the Left balance Valve button on the OIL BALANCE Screen .



IMPORTANT: The balance valves can't be opened without air. If you want to open them you must turn on the power and press the oil balance button on.

- When the levels of both tanks are equal or the Keep time has been reached the set time ,the balancing valves was shut (300s).
- Check that the levels are at the marked levels on the tanks. The marks should be at 108 mm (4.25 in.) from the bottom. Add oil from the top if necessary.
- Check that the balance valves are closed and the fill ports are secure.
- Reconnect air to the press.

When the Ram is at home and after auto turn on time, the oil tanks will balance automatically. After keep time the oil balance valves will auto close and also close the auto oil balance screen.

Adding Hydraulic Fluid to the System

Purpose: To maintain the optimum levels of oil in the tanks.

Why: If the oil levels are too low, the oil may approach too close to the bottoms of the tanks and collect air in the oil.

How Often: Check Daily, Perform as needed.

Tools Needed: 5/16" Hex Wrench, Ladder, ATF Oil

- Make sure the ram is in the fully retracted position
- Disconnect air and power from the press.
- Remove the caps on top of the pneumatic/hydraulic system enclosure over the air-oil tanks.
- Remove the fill plugs on top of the air-oil tanks needing the additional fluid.
- Using a funnel with a filter, such as one used for paint, pour ATF fluid into the top of the air-oil tanks up to the fill lines. The optimum level of oil for both tanks is 108 mm (4.25 in.) from the bottom.
- Use Automatic Transmission Fluid – ATF

PennEngineering® recommends WOLF'S HEAD® ATF

It is a multi-functional fluid, which meets or exceeds the following performance requirements or manufacturers' specifications:

- DEXRON® -III (GM 6297-M)
- MERCON® (Ford M2C185A)
- Allison Type C-4
- Caterpillar TO-2

It also passed Foam Test ASTM D-892-74 No Foam (0-0-0)

- Replace the fill plugs on top of the air-oil tanks and fully tighten.
- Replace the caps on top of the pneumatic/hydraulic system enclosure.



Pennzoil Products Company
a subsidiary of Pennzoil Company

MATERIAL SAFETY DATA SHEET



1. PRODUCT IDENTIFICATION

MANUFACTURER'S NAME: WOLF'S HEAD OIL COMPANY

CAS NUMBER: MIXTURE

MSDS CODE: 006068

ADDRESS: ALLEGHENY AVE.
RENO, PA 16343

NFPA HAZARD IDENTIFICATION
DEGREE OF HAZARD HAZARD RATINGS
HEALTH: 1 0-LEAST
FIRE: 1 1-SLIGHT
REACTIVITY: 0 2-MODERATE
 3-HIGH
 4-EXTREME

EMERGENCY TELEPHONE NO.: (800) 546-6040

TRADE NAME: WOLF'S HEAD ATF AUTOMATIC TRANSMISSION FLUID

SYNONYMS: WOLF'S HEAD AUTOMATIC TRANSMISSION FLUID DEXRON III

BY: HEALTH SERVICES
(800) 546-6227

EFFECTIVE DATE: DECEMBER 23, 1998
SUPERSEDES DATE: APRIL 09, 1997

2. INGREDIENTS

COMPONENT NAME CAS NUMBER	HAZARDOUS	PERCENTAGE			COMPONENT		UNIT
	IN BLEND	MIN		MAX	EXPOSURE	LIMIT	

BASE LUBRICATING OILS							
MIXTURE	NO	80	TO	90	OSHA PEL		NO LIMIT
					ACGIH TLV		NO LIMIT
DETERGENT/INHIBITOR SYSTEM							
MIXTURE	NO	10	TO	20	OSHA PEL		NO LIMIT
					ACGIH TLV		NO LIMIT
DYE							
MIXTURE	NO		<	1	OSHA PEL		NO LIMIT
					ACGIH TLV		NO LIMIT

3. HEALTH INFORMATION AND PROTECTION

EYE CONTACT: THIS PRODUCT IS PRACTICALLY NON-IRRITATING TO THE EYES UPON DIRECT CONTACT. BASED ON TESTING OF SIMILAR PRODUCTS AND/OR COMPONENTS.

SKIN CONTACT: AVOID SKIN CONTACT. THIS PRODUCT MAY CAUSE SLIGHT SKIN IRRITATION UPON DIRECT CONTACT. BASED ON TESTING OF SIMILAR PRODUCTS AND/OR COMPONENTS.

PROLONGED OR REPEATED CONTACT MAY RESULT IN CONTACT DERMATITIS WHICH IS CHARACTERIZED BY DRYNESS, CHAPPING, AND REDDENING. THIS CONDITION MAY MAKE THE SKIN MORE SUSCEPTIBLE TO OTHER IRRITANTS, SENSITIZERS, AND DISEASE. PROLONGED OR REPEATED CONTACT MAY RESULT IN OIL ACNE WHICH IS CHARACTERIZED BY BLACKHEADS WITH POSSIBLE SECONDARY INFECTION. SEE HEALTH DATA SECTION BELOW.

INHALATION: THIS PRODUCT HAS A LOW VAPOR PRESSURE AND IS NOT EXPECTED TO PRESENT AN INHALATION HAZARD AT AMBIENT CONDITIONS. CAUTION SHOULD BE TAKEN TO PREVENT AEROSOLIZATION OR MISTING OF THIS PRODUCT. THE PERMISSABLE EXPOSURE LIMIT (PEL) AND THRESHOLD LIMIT VALUE (TLV) FOR THIS PRODUCT AS OIL MIST IS 5 MG/M3. EXPOSURES BELOW 5 MG/M3 APPEAR TO BE WITHOUT SIGNIFICANT HEALTH RISK. THE SHORT-TERM EXPOSURE LIMIT FOR THIS PRODUCT AS AN OIL MIST IS 10 MG/M3.

INGESTION: DO NOT INGEST. THIS PRODUCT IS RELATIVELY NON-TOXIC BY INGESTION. THIS PRODUCT HAS LAXATIVE PROPERTIES AND MAY RESULT IN ABDOMINAL CRAMPS AND DIARRHEA. SEE HEALTH DATA SECTION BELOW.

HEALTH DATA: ON RARE OCCASIONS, PROLONGED AND REPEATED EXPOSURE TO OIL MIST POSES A RISK OF PULMONARY DISEASE SUCH AS CHRONIC LUNG INFLAMMATION. THIS CONDITION IS USUALLY ASYMPTOMATIC AS A RESULT OF REPEATED SMALL ASPIRATIONS. SHORTNESS OF BREATH AND COUGH ARE THE MOST COMMON SYMPTOMS.

THE INTERNATIONAL AGENCY FOR RESEARCH ON CANCER HAS CONCLUDED THAT HIGHLY REFINED MINERAL OILS ARE GROUP 3 SUBSTANCES, "NOT CLASSIFIABLE AS TO THEIR CARCINOGENICITY TO HUMANS," BASED ON INADEQUATE HUMAN AND INADEQUATE ANIMAL EVIDENCE. THIS SUBSTANCE IS NOT CARCINOGENIC ACCORDING TO THE OSHA HAZARD COMMUNICATION STANDARD.

4. EMERGENCY & FIRST AID PROCEDURES

EYE CONTACT: IMMEDIATELY FLUSH EYES WITH LARGE AMOUNTS OF WATER AND CONTINUE FLUSHING UNTIL IRRITATION SUBSIDES. IF MATERIAL IS HOT, TREAT FOR THERMAL BURNS AND TAKE VICTIM TO HOSPITAL IMMEDIATELY.

SKIN CONTACT: REMOVE CONTAMINATED CLOTHING. WASH CONTAMINATED AREA THOROUGHLY WITH SOAP AND WATER. IF REDNESS OR IRRITATION OCCURS, SEEK MEDICAL ATTENTION. IF MATERIAL IS HOT, SUBMERGE INJURED AREA IN COLD WATER. IF VICTIM IS SEVERELY BURNED, REMOVE TO A HOSPITAL IMMEDIATELY.

INHALATION: THIS MATERIAL HAS A LOW VAPOR PRESSURE AND IS NOT EXPECTED TO PRESENT AN INHALATION EXPOSURE AT AMBIENT CONDITIONS.

INGESTION: DO NOT INDUCE VOMITING. SEEK MEDICAL ATTENTION.

5. PERSONAL HEALTH PROTECTION INFORMATION

EYE PROTECTION: EYE PROTECTION IS NOT REQUIRED UNDER CONDITIONS OF NORMAL USE. IF MATERIAL IS HANDLED SUCH THAT IT COULD BE SPLASHED INTO EYES, WEAR PLASTIC FACE SHIELD OR SPLASH-PROOF SAFETY GOGGLES.

SKIN PROTECTION: NO SKIN PROTECTION IS REQUIRED FOR SINGLE, SHORT DURATION EXPOSURES. FOR

PROLONGED OR REPEATED EXPOSURES, USE IMPERVIOUS CLOTHING (BOOTS, GLOVES, APRONS, ETC.) OVER PARTS OF THE BODY SUBJECT TO EXPOSURE. IF HANDLING HOT MATERIAL, USE INSULATED PROTECTIVE CLOTHING (BOOTS, GLOVES, APRONS, ETC.). LAUNDER SOILED CLOTHES. PROPERLY DISPOSE OF CONTAMINATED LEATHER ARTICLES INCLUDING SHOES, WHICH CANNOT BE DECONTAMINATED.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION IS NOT REQUIRED UNDER CONDITIONS OF NORMAL USE. IF VAPOR OR MIST IS GENERATED WHEN THE MATERIAL IS HEATED OR HANDLED, USE AN ORGANIC VAPOR RESPIRATOR WITH A DUST AND MIST FILTER. ALL RESPIRATORS MUST BE NIOSH CERTIFIED. DO NOT USE COMPRESSED OXYGEN IN HYDROCARBON ATMOSPHERES.

VENTILATION: IF VAPOR OR MIST IS GENERATED WHEN THE MATERIAL IS HEATED OR HANDLED, ADEQUATE VENTILATION IN ACCORDANCE WITH GOOD ENGINEERING PRACTICE MUST BE PROVIDED TO MAINTAIN CONCENTRATIONS BELOW THE SPECIFIED EXPOSURE OR FLAMMABLE LIMITS.

OTHER: CONSUMPTION OF FOOD AND BEVERAGE SHOULD BE AVOIDED IN WORK AREAS WHERE HYDROCARBONS ARE PRESENT. ALWAYS WASH HANDS AND FACE WITH SOAP AND WATER BEFORE EATING, DRINKING, OR SMOKING.

6. FIRE PROTECTION INFORMATION

FLASH POINT: < 320 F

TEST METHOD: C.O.C.

AUTOIGNITION TEMPERATURE: NO DATA

TEST METHOD: NO DATA

FLAMMABLE LIMITS IN AIR % BY VOLUME

LOWER: NO DATA

UPPER: NO DATA

EXTINGUISHING MEDIA: USE DRY CHEMICAL, FOAM, OR CARBON DIOXIDE.

SPECIAL FIRE FIGHTING PROCEDURES: WATER MAY BE INEFFECTIVE BUT CAN BE USED TO COOL CONTAINERS EXPOSED TO HEAT OR FLAME. CAUTION SHOULD BE EXERCISED WHEN USING WATER OR FOAM AS FROTHING MAY OCCUR, ESPECIALLY IF SPRAYED INTO CONTAINERS OF HOT, BURNING LIQUID.

UNUSUAL FIRE AND EXPLOSIVE CONDITIONS: DENSE SMOKE MAY BE GENERATED WHILE BURNING. CARBON MONOXIDE, CARBON DIOXIDE, AND OTHER OXIDES MAY BE GENERATED AS PRODUCTS OF COMBUSTION.

7. REACTIVITY DATA

STABILITY (THERMAL, LIGHT, ETC.): STABLE

CONDITIONS TO AVOID: NONE

HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: NONE

INCOMPATIBILITY MATERIALS TO AVOID: MAY REACT WITH STRONG OXIDIZING AGENTS

HAZARDOUS DECOMPOSITION PRODUCTS: NONE

8. ENVIRONMENTAL PRECAUTIONS

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:	CONSULT HEALTH EFFECT INFORMATION IN SECTION III, PERSONAL HEALTH PROTECTION INFORMATION IN SECTION V, FIRE PROTECTION INFORMATION IN SECTION VI, AND REACTIVITY DATA IN SECTION VII. NOTIFY APPROPRIATE AUTHORITIES OF SPILL. CONTAIN SPILL IMMEDIATELY. DO NOT ALLOW SPILL TO ENTER SEWERS OR WATERCOURSES. REMOVE ALL SOURCES OF IGNITION. ABSORB WITH APPROPRIATE INERT MATERIAL SUCH AS SAND, CLAY, ETC. LARGE SPILLS MAY BE PICKED UP USING VACUUM PUMPS, SHOVELS, BUCKETS, OR OTHER MEANS AND PLACED IN DRUMS OR OTHER SUITABLE CONTAINERS.
WASTE DISPOSAL METHOD:	ALL DISPOSALS MUST COMPLY WITH FEDERAL, STATE, AND LOCAL REGULATIONS. THE MATERIAL, IF SPILLED OR DISCARDED, MAY BE A REGULATED WASTE. REFER TO STATE AND LOCAL REGULATIONS. CAUTION! IF REGULATED SOLVENTS ARE USED TO CLEAN UP SPILLED MATERIAL, THE RESULTING WASTE MIXTURE MAY BE REGULATED. DEPARTMENT OF TRANSPORTATION (DOT) REGULATIONS MAY APPLY FOR TRANSPORTING THIS MATERIAL WHEN SPILLED. WASTE MATERIAL MAY BE LANDFILLED OR INCINERATED AT AN APPROVED FACILITY. MATERIALS SHOULD BE RECYCLED IF POSSIBLE.

9. MISCELLANEOUS

HANDLING AND STORAGE REQUIREMENTS:	DO NOT TRANSFER TO UNMARKED CONTAINERS. STORE IN CLOSED CONTAINERS AWAY FROM HEAT, SPARKS, OPEN FLAME, OR OXIDIZING MATERIALS. THIS PRODUCT IS NOT CLASSIFIED AS HAZARDOUS UNDER DOT REGULATIONS. FIRE EXTINGUISHERS SHOULD BE KEPT READILY AVAILABLE. SEE NFPA 30 AND OSHA 1910.106--FLAMMABLE AND COMBUSTIBLE LIQUIDS.
ADDITIONAL INFORMATION:	<p>THIS MIXTURE MAY BE FORMULATED IN PART WITH COMPONENTS PURCHASED FROM OTHER COMPANIES. IN MANY INSTANCES, ESPECIALLY WHEN PROPRIETARY OR TRADE SECRET MATERIALS ARE USED, PENNZOIL COMPANY MUST RELY UPON THE HAZARD EVALUATION OF SUCH COMPONENTS SUBMITTED TO PENNZOIL BY THAT PRODUCT'S MANUFACTURER OR IMPORTER.</p> <p>THIS PRODUCT IS NOT KNOWN TO CONTAIN ANY SARA TITLE III, SECTION 313 REPORTABLE CHEMICALS AT OR GREATER THAN 1.0% (0.1% FOR CARCINOGENS).</p>

ALL INGREDIENTS OF THIS PRODUCT ARE LISTED ON THE TOXIC SUBSTANCES CONTROL ACT (TSCA) INVENTORY.

DOT: NOT REGULATED.

10. PHYSICAL PROPERTIES

BOILING POINT:	NO DATA AVAILABLE	PERCENT VOLATILE:	NO DATA
MELTING POINT:	NOT APPLICABLE	VAPOR DENSITY	
		(AIR=1):	NO DATA
APPEARANCE:	OPAQUE, RED	EVAPORATION RATE	
		(EE=1):	NO DATA
ODOR:	MILD PETROLEUM ODOR	SPECIFIC GRAVITY:	0.88
VAPOR PRESSURE:	NO DATA AVAILABLE	MOLECULAR WEIGHT:	VARIES
SOLUBILITY:	INSOLUBLE IN WATER, SOLUBLE IN HYDROCARBONS		

DISCLAIMER OF WARRANTY:

THE INFORMATION CONTAINED HEREIN IS BASED UPON DATA AVAILABLE TO US, AND REFLECTS OUR BEST PROFESSIONAL JUDGEMENT. HOWEVER, NO WARRANTY OF MERCHANTABILITY, FITNESS FOR ANY USE, OR ANY OTHER WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF SUCH DATA, THE RESULTS TO BE OBTAINED FROM THE USE THEREOF, OR THAT ANY SUCH USE DOES NOT INFRINGE ANY PATENT. SINCE THE INFORMATION CONTAINED HEREIN MAY BE APPLIED UNDER CONDITIONS OF USE BEYOND OUR CONTROL AND WITH WHICH WE MAY BE UNFAMILIAR, WE DO NOT ASSUME ANY RESPONSIBILITY FOR THE RESULTS OF SUCH APPLICATION. THIS INFORMATION IS FURNISHED UPON THE CONDITION THAT THE PERSON RECEIVING IT SHALL MAKE HIS OWN DETERMINATION OF THE SUITABILITY OF THE MATERIAL FOR HIS PARTICULAR PURPOSE.

SECTION 12

TROUBLESHOOTING

Note: If an internal PLC problem should develop, call a PennEngineering® service technician. Clients in the USA, please call 800-523-5321. International clients, please call (215) 766-3801.		
SYMPTOMS	DIAGNOSTICS & PROBABLE CAUSE(S)	PROBABLE SOLUTION(S)
A. Whole System Malfunctions		
1. The press will not start. (OFF light not lit)	a. Electrical disconnect turned off. b. No power to the press. c. DC Power Supply failure.	a. Turn on. b. Check main fuses. c. Check DC Power supply, replace if faulty.
The press will not start (ON light is lit)	a. OFF button is “open”. b. ON button is not closing. c. MCR(Main Control Relay) system failure.	a. Check button, replace if faulty. b. Check button, replace if faulty. c. Check the wiring continuity, replace if faulty.
2. The press will not cycle.	a. Safety sensor inputs 1 & 2 are on. b. Footpedal is not making the proper PLC input.	a. The reflector is not in proper position for “lightstream” process. b. Check the footpedal & wiring. Replace if faulty.
3. SAFETY FAULTS: Sensors tripping above/ below the safety window.	a. Misalignment of punch/anvil. b. Safety housing spring damaged.	a. Check alignment. b. Check spring/replace if faulty.

SYMPTOMS	DIAGNOSTICS & PROBABLE CAUSE(S)	PROBABLE SOLUTION(S)
B. Electrical/Electronic Malfunctions		
1. The touch screen will not work but the power button is lit.	a. Fuse F2 is open.	a. Analyze and repair the touch screen related circuitry then replace the fuse. b. Replace the touch screen if faulty.
2. None of the PLC lights come on.	a. Check to see if the PLC power supply is receiving 24 volts. b. Check the fuse in the PLC power supply. c. Check to see if the PLC power supply has failed.	a. If not receiving power check fuse F2 b. Replace the fuse in the power supply. c. Replace the power supply.
3. The sensors are not functioning.	a. Check to see if fuse F3 is open. b. Check all sensors to see if one has a “short.” c. Check the DC input module.	a. If open, investigate the circuitry and replace fuse three. b. Repair the “short” problem and/or replace the sensor. c. If faulty, replace the DC input module.
4. The pilot regulator is not functioning. (Power is on, but no pressure is on the gauge at the ram valves.)	a. Check to see if fuse F4 is open. b. Check pilot pressure at the regulator.	a. If open, investigate the electrical regulator and relevant circuitry, then replace the fuse. b. If there is pilot pressure replace the regulator. If not replace electronic regulator.
5. The DC power supply is not functioning.	a. Check the main power fuses. b. Check for line voltage at the supply terminals.	a. Replace if blown. b. Check the wiring between the power inlet module and the supply. c. Replace the power supply.
6. The press will not power-up.	a. Check to see if there is incoming power. b. Check to see if the main disconnect is shut off. c. Check MCR’s wiring.	a. Provide the power. b. Turn to the ON position.

SYMPTOMS	DIAGNOSTICS & PROBABLE CAUSE(S)	PROBABLE SOLUTION(S)
7. The press will not power-down.	a. Check to see if the OFF button is faulty. b. check MCR's /wiring.	a. Replace if faulty.
8. No voltage at a particular solenoid.	a. Check for a shorted coil. b. Check the related PLC output voltage.	a. Repair or replace. b. Replace the output card if faulty.
C. Ram Malfunctions		
1. The ram does not move up and down smoothly.	a. Check the main cylinder assembly. b. A Safety valve is dirty/sticking/damaged	a. Replace the main cylinder assembly if faulty. b. Clean, rebuild, or replace if faulty.
2. Oil is leaking out of the main cylinder.	a. The main cylinder assembly is faulty.	a. Replace the main cylinder assembly.
3. The ram will not go down.	a. Check to see if either safety valve is stuck in the closed position. b. Check to see if output lights one and two are on. c. Check to see if either safety sensor has opened. d. Check to see if the Linear Transducer has failed.	a. Clean, rebuild, or replace if faulty. b. The PLC has determined that the Linear Transducer /Safety states are not right. Fix conditions. c. Replace if faulty. d. Replace if faulty.
4. The ram will not go up.	a. Check to see if output light 1&2 have gone off and if output light 4 is on. b. Check to see if output light 3 is off, then see if the booster has retracted.	a. The PLC has determined that the conditions are not right. Fix conditions. b. Repair or replace the booster if faulty.
5. The ram will not stop quickly.	a. Air trapped in the bottom of the main cylinder b. Check both safety valves.	a. Remove the punch and anvil from the ram, and cycle the ram full stroke, down and up, waiting for air to rise out of the oil, between strokes. b. Clean, rebuild, or replace if faulty.
6. The safety assembly tip is wobbly.	a. Check the set screws holding the punch.	a. Tighten the set screws.

SYMPTOMS	DIAGNOSTICS & PROBABLE CAUSE(S)	PROBABLE SOLUTION(S)
7. There is insufficient insertion force.	a. Check to see if the force level was set too low. b. Check the electric regulator for air pressure level. c. Check to see if the booster is stuck in the retracted position.	a. Reset the force level via the touch screens. b. Reset the electric regulator. c. Repair or replace the booster.
D. Pneumatic/Hydraulic System Malfunctions		
1. White foam and/or sludge has collected in the air-oil tanks.	a. Water has gotten into the system because of “dirty” air entering the press.	a. If a small amount of foam and/or sludge is in the tanks, clean out the tanks. If a large amount of foam and/or sludge is in the tanks, dismantle and thoroughly clean every pneumatic/hydraulic components, then replace the hydraulic fluid (oil).
2. Hydraulic fluid (oil) does not come up to the fill lines on the tanks.	a. Check for fluid leaks.	a. Repair any leaks then see Section 11 for system refilling and balancing instructions.
4. No air is entering the press.	a. Check to see if the manually operated regulator is closed. b. Check the quick exhaust/supply valve.	a. Open the regulator. Replace if faulty. b. Replace if faulty.
5. No compressed air “dumping” noise is heard when the press is shut down.	a. Check the quick exhaust/supply valve for incoming pressure.	a. Replace if faulty.

SECTION 13 SPARE PARTS

PART DESCRIPTION	PFT PART NUMBER	QTY	MANUFACTURER	MANUFACTURER'S PART NUMBER
Level One Spare Parts (Maintain this minimum inventory of parts for standard mechanical wear items on the press.)				
Auto Transmission Fluid-Dextron II	9800391484	4 QTS		
SAFETY VALVE ASSEMBLY	8004636T	1	PennEngineering®	
VALVE, BOOSTER CYLINDER	8002228	1	SMC	NVFR3100R-5FZ
VALVE, MAIN CYLINDER	8002229	1	SMC	NVFR3400-5FZ
SENSOR, SAFETY	8009715	1	OMRON	E3Z-T81

Level Two Spare Parts (Add these items to the spare parts in inventory when no downtime can be tolerated.)				
CPU	8022028	1	OMRON	CP1L-M30DT1-D
ANALOG LVDT INPUT	8022029	1	OMRON	CP1W-MAD42
POWER SUPPLY, 24V, 100W	8022027	1	MINGWEI	ESP20-100-24
POWER SUPPLY, 5V, 40W	8022031	1	MINGWEI	ESP20-40-5
ELECTRONIC PILOT REGULATOR KIT	8018522	1	MARSH-BELLOFRAM	110TE0G100D0000R
OMRON CP 232 COMMUNICATION BOARD	8022030	1	OMRON	CP1W-CIF01