PennEngineering®

CE

OPERATION AND MAINTENANCE MANUAL FOR PEMSERTER®
824e E-drive Hardware insertion machine

OPERATION AND MAINTENANCE MANUAL

PEMSERTER® Hardware insertion machine

MODEL: 824e

SERIAL NUMBER:

PennEngineering®

Haeger by PEM

50459 Central Industrial Dr

Shelby Township, MI 48315

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Preface

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目录

Read Manual Before Operating Machine!

SECTION 1
INTRODUCTION

Use:

- This equipment is used for the riveting of some PEM screws, nuts and studs fastening products.
- This equipment is composed of a touch screen, a safety punch, a feeding system, a tooling fixture and an electrical system. The product to be riveted can be sent to the tooling fixture through the feeding system as required, and the product to be riveted can be riveted through the safety punch Press to the workpiece to complete the riveting process, the above process can also be done manually.
- According to different processes and workpieces, the tooling fixtures corresponding to different products can be replaced to achieve the purpose of riveting and connecting different products.

Features:

- Unique precise pressure riveting force and energy-saving riveting power consumption.
- Computer control system with touch screen interface.
- The riveting algorithm is intelligent, can display the pressure-position curve, and has the function of parameter memory and curve memory.
- Provide simple and precise control for operators. The design of the machine setting, operation, maintenance and fault diagnosis is simple and easy to use.

Specifications:

• Riveting Force	8~80kN (220-17984lbs)
• Control System	Servo motor system
• Repeatability	±0.5% pressure accuracy ±0.02mm position accuracy
• Air requirements	6~7bar Φ12 mm dia. minimum line flow
• Long	1740mm
• Width	915mm
• Hight	2240mm
• Weight	1500kg
• Electrical	AC400V（+/- AC 23 V）, 50/60Hz
• Short-Circuit Rating	6kA
• Air Consumption	approx. 2 liters/sec air at 1 Atm (15 Scfm) 6 insertions per minute
• Electrical Power Consumption	5.3kW
• Ambient Temperature	5°C~40°C （41°F ~ 104°F）
• 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	30% ~ 95% (Not reflective of inlet air)

• Installation Altitude	Max 1000m
• Installation requires	horizontal installation on load-bearing ground
• EMC requires	Do not allow a lot of electromagnetic interference around
• Light requires	adequate illumination at the operating points and areas

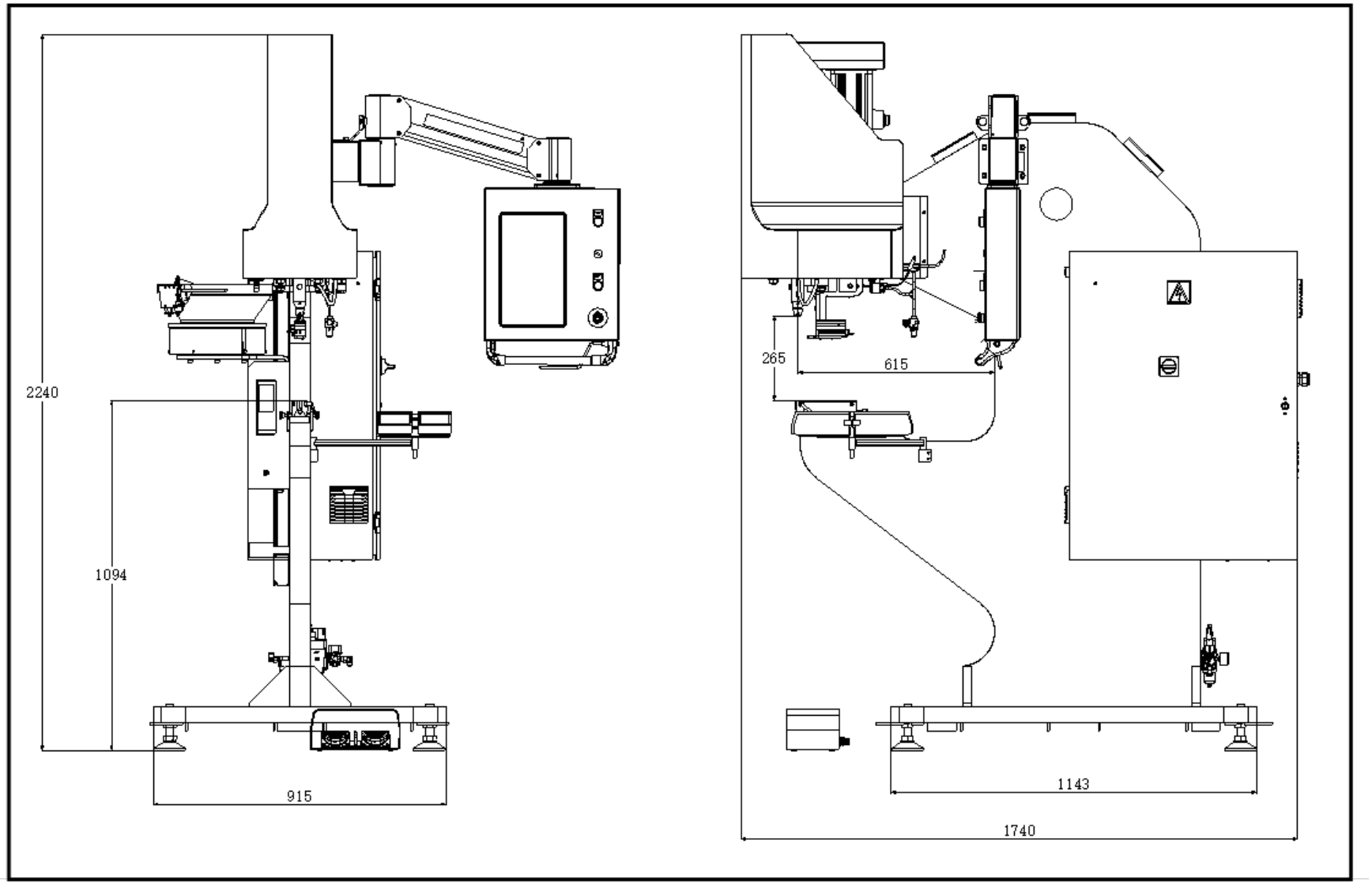


FIGURE 1-1

Dimensions of 824e E-drive Hardware insertion machine

SAFETY

The Rivet Installation Machine 8E240005 was designed to conform to applicable ISO, ANSI, OSHA, CEN and CSA safety standards.
The Rivet Installation Machine 8E240005 is compliant to applicable European Union (EU) directives and bears the CE Mark.
The Rivet Installation Machine 8E240005 conforms to the essential requirements of the following directives:

Machinery Directive: 2006/42/EC
Electromagnetic Compatibility (EMC) Directive: 2014/30/EU
Low Voltage Directive: 2014/35/EU

MEASURES TO PREVENT MISOPERATION

- The equipment shall be provided with a permanent, clear and easily identifiable mark or signage. The signs or signs shall have the main characteristics required for safe use of equipment, such as rated parameters, connection mode, grounding mark, danger mark, special operation method and operation conditions, etc.

- Electrical control circuit with emergency stop button specified in safety requirements to prevent the occurrence of misoperation. At the same time, the device is equipped with interlock or limit protection device, safety grating, etc.

- Through the above safety device, if there is any wrong operation, the equipment will stop running in an emergency and send an alarm message the equipment can operate normally only after the warning information is processed.

- Riveting nuts approved by PEM shall be used in this equipment, and riveting workpiece on this equipment shall also be approved by PEM.PEM shall not be liable for any operation accident or loss caused using rivet and rivet pressure parts not approved by PEM.

Please read and follow the safety precautions listed as below.

SAFETY PRECAUTIONS

- Always use safety goggles when operating or maintaining the rivet installation machine.
- Ear Protection is recommended.
- Always shut off the electrical power and remove the power cord before servicing the Hardware insertion machine.
- Before using the Hardware insertion machine, 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 rivet installation machine can be shut off in an emergency. Make sure that surge protection is installed in the electrical supply to the rivet installation machine.
- 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 airline 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 pull riveting machine, be sure these instructions are readily available.
- Do not use the Hardware insertion machine in any way, other than for its intended purposes.

- Do not modify the Hardware insertion machine in any way.
- Fasteners are blown at a high velocity. Tubing must always be secured before machine is operated. Check integrity of tubing before use.
- Non-professionals are prohibited from disassembling this equipment.
- All personnel operating this equipment must be trained and qualified before they can take up the post of operation.
- All personnel operating this equipment must be trained and qualified before they can take up the post of operation.

WARNING: Immediately upon receipt of your hardware insertion machine, establish a "Maintenance Code" for your supervisor/maintenance personnel only, as it is possible, however difficult, to operate the rivet installation machine 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.
	Eye Protection Label – Eye protection must be worn when operating the press.
	Ear Protection Label – Ear protection must be worn when operating the pull riveting machine.
	Fastener Mandrel Point Label – Keep hands away from area.
	Electrical Shock/Electrocution Warning Label –Electrical shock hazard. Do not touch

OPTIONAL

Label	Definition
	**Class 1 laser product.** **Per EN 60825-1:** Class 1 laser products that are safe during use, including long-term direct intrabeam viewing, even when exposure occurs while using telescopic optics.

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 rivet installation machine, contact the PennEngineering® Service Department. Toll-free telephone number +86(512) 5726-9310.

Set-up, Training and Repair Service is available to you if you own your rivet installation machine. Free telephone instruction and Service is available for the lifetime of your rivet installation machine by calling the PennEngineering® Service Department.

SECTION 2
MAJOR COMPONENTS OF HARDWARE INSERTION MACHINE

Dentify the main components of the Hardware Insertion Machine.

This chapter introduces users to some of the main components of the Hardware Insertion Machine.

Main Frame

The frame is the structure of the hardware insertion machine. The main part of the frame consists of a solid steel structure with welded components forming the foundation, and other supporting parts. All components are directly or insightly installed on the frame.

Electric cylinder

The riveting force of the hardware insertion machine is applied by the electric cylinder, which is directly installed on the frame. The electric cylinder is equipped with a pressure sensor to determine whether the electric cylinder has reached the set pressure during the riveting process. The end of the piston rod of the electric cylinder is connected with a safety punch assembly, which will be described in Chapter 3.

Operator control

Except for the foot switch and the power switch on the electric cabinet, the operator's main operations are on the control panel connected to the rocker arm. These control components include a touch screen, an emergency stop button, a power on button, and a spring reset button.

- **Touch screen-**This is the main interface of the hardware insertion machine control system (Programmable Automation Controller (PAC)). The touch screen is used for system operation, control, parameter setting and automatic feeding adjustment and configuration, user feedback and fault diagnosis. The touch screen can display text and graphic information, and enables the operator to make selections by touching the buttons on different parts of the screen. The program has set the touch screen to automatically enter the screen saver mode when it is idle every 10 minutes and clear the content displayed on the screen. To resume the operation of the screen, just touch anywhere on the screen. In Chapter 6 of this manual, the screen display in various situations is explained in detail.

- **Emergency stop button-**Press this button to disconnect the power supply to the quick exhaust/air supply valve (see the air supply input system on page 8). When the pressure is exhausted, all pneumatic actions are stopped. In an emergency stop condition, all outputs are shut down. The control system remains online and detects the emergency stop signal.

- **Power ON/OFF knob switch**- This knob switch can be used to turn on/off the power to the press control system, if the press power is on, then the green light of the electrical cabinet is on. If the power is cut off, it will also cut off the power of all moving elements including the quick exhaust/air supply valve.

- **RESET button**- Initializes the press, including applying pressure to the press and moving the ram to its retracted “home” position.

- **Foot switch**-The foot switch is a switch used by the operator to control the working cycle of the riveting machine. It frees the hands of the operator and can be used for the operation of the workpiece.

Electrical cabinet

Including different types of electrical components and power distribution terminals. The power switch and the foot switch are connected with the electrical cabinet. Electrical cabinet door latch with a key, is an electrical switch cabinet side. The electrical switch must be turned on (ON) before the riveting machine can be started. Once this switch is turned off, all power to the riveting machine is cut off. The plug of the power cord is inserted next to the switch. By unplugging the power cord, all power supplies of the riveting machine can be shut off during maintenance.

Vibration feeding system (Optional)

The vibrating feed system on the left side of the hardware insertion machine is used for the automatic feeding of fastened riveting parts. It is an electric drive device that can hold and move different types of fastening products. Connected to the vibrating plate are various types of tools so that the fastening rivets sent out of the hopper have their own directions of movement.

• Vibrating feeding controller-the amplitude or frequency of the vibrating plate is controlled by the vibrating feeding controller. The adjustment of amplitude and frequency is used to control the feeding rate and carry out the automatic feeding process.

Multi-Shuttle (Optional)

The air cylinder sliding assembly installed under the oil cylinder of the frame is used to support the multi-shuttle assembly. It can be matched with PEM standard screw, nut and stud multi-carrier platform tooling and vibration feeding system to send the products to be riveted to the riveting bar to complete the automatic riveting action.

Multi-Shuttle tooling (Optional)

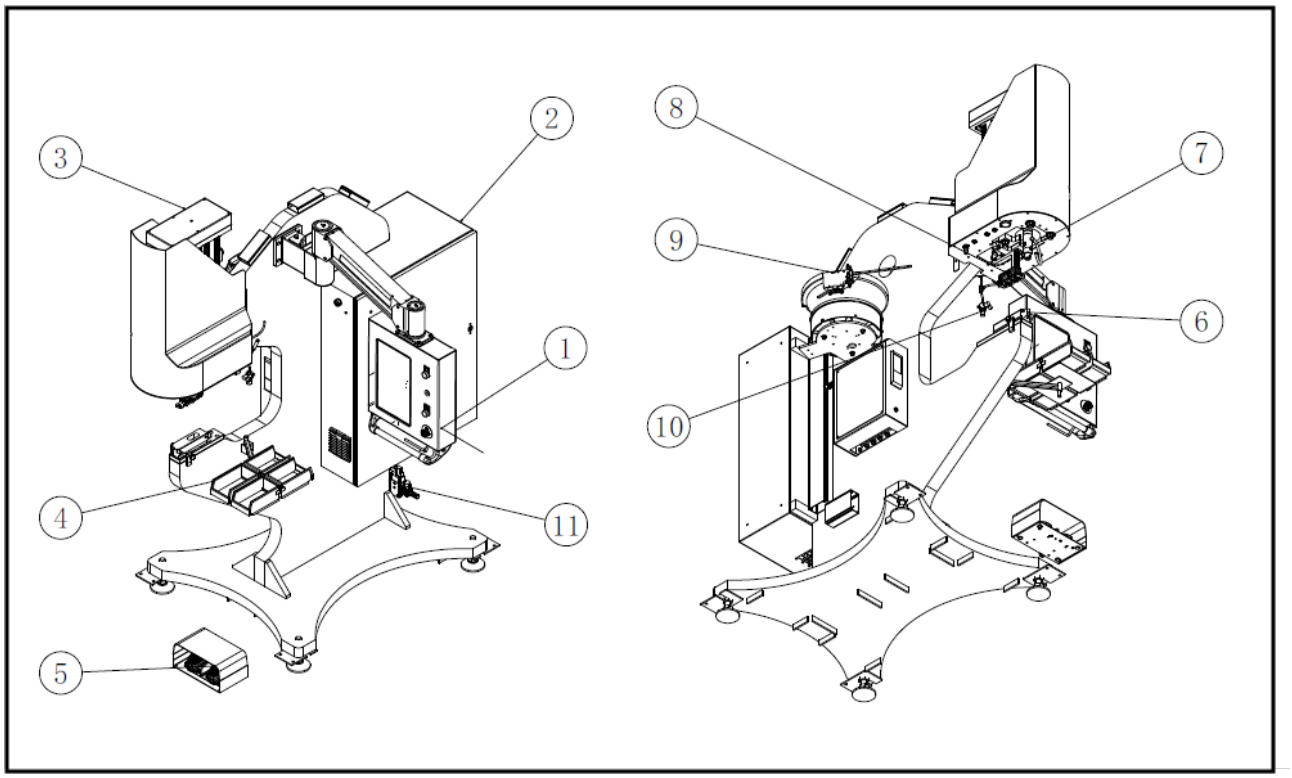
It is composed of vacuum anvil, lower tool, multi-module, flight pipe, tube connector and shuttle. Different types of PEM standard products correspond to different carrier platform tooling, and are used in conjunction with the feeding system and multi-carrier platform.

Air supply input system (Optional)

The compressed air is input to the riveting machine through a system behind the machine. The system includes an air combination element (including a residual pressure relief three-way valve, a Soft Start-up Valve, a filter pressure reducing valve and an oil mist separator). The filter regulator pressure provided manually to control the pressure of the gas supply line. Open the residual pressure release three-way valve and Soft Start-up Valve to provide air source for the riveting machine. When the residual pressure release three-way valve or Soft Start-up Valve is closed, all the compressed air downstream of the riveting machine is quickly discharged.

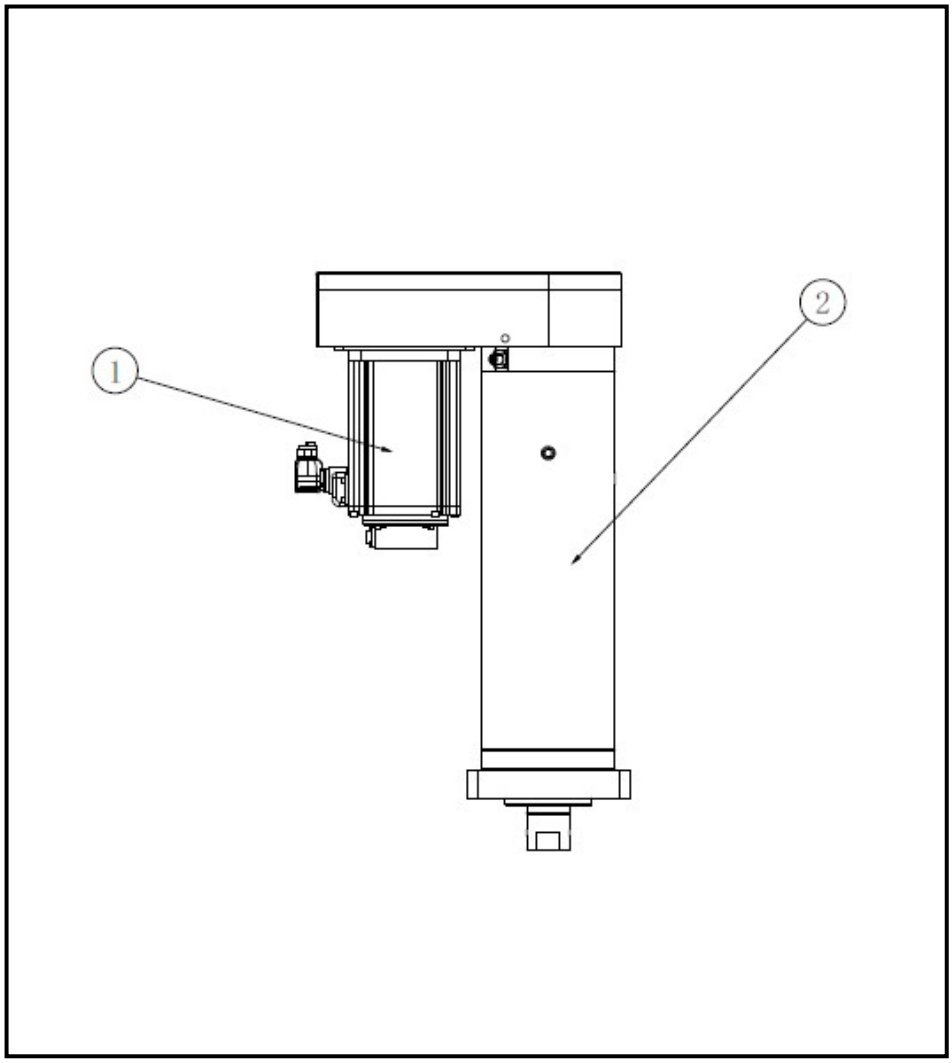
Laser Part Locating Light (Optional)

Provides a highly visible, easy-to-read, red beam of light over the lower tool to aid the operator in locating holes on larger parts. Increases productivity and decreases operator fatigue.



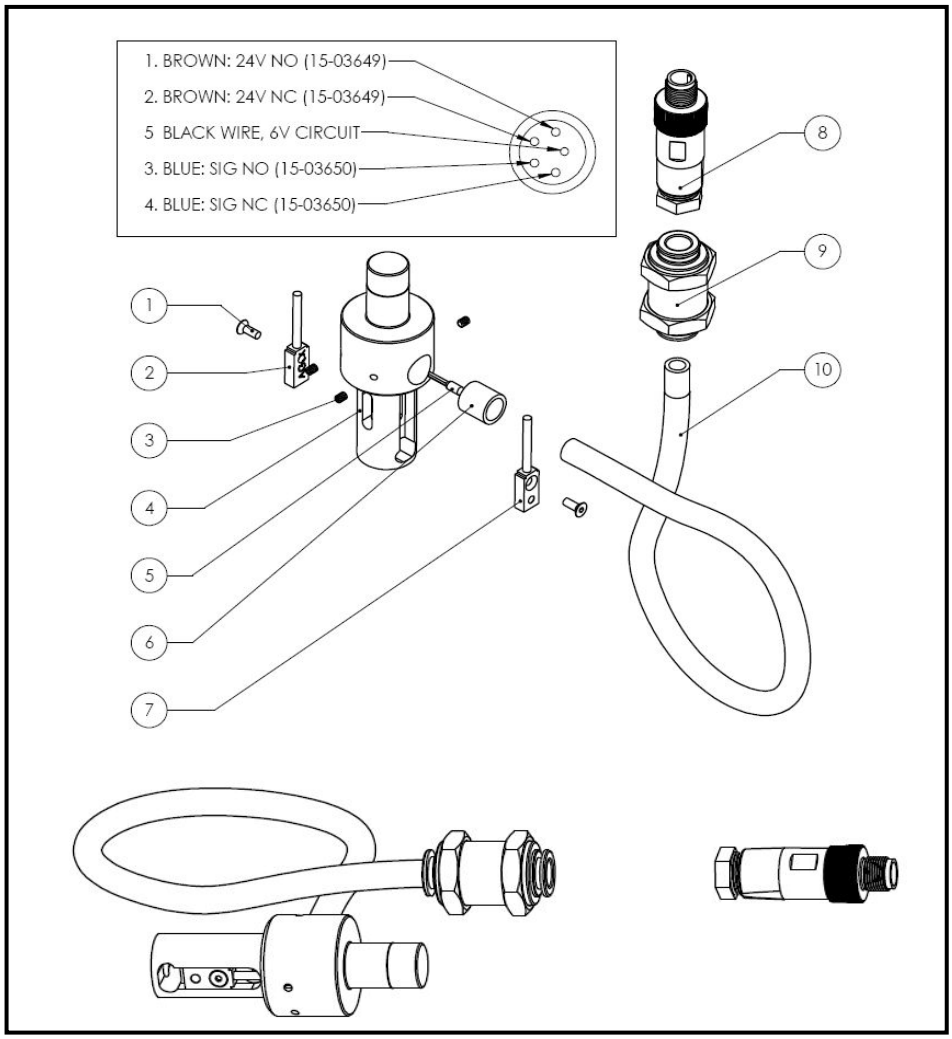
NO.	PARTS NUMBER	DESCRIPTION
1	MDS180120024	Rocker
2	MDS184530044	Electrical cabinet
3	MDS012330002	80KN Electric Cylinder
4	15-01299	Material box tray assembly
5	H-1111	Foot switch
6	H-166-8	Standard Lower Tool Holder
7	MDS101220007	Dual Safety Sensor Assembly
8	15-03624	ASSY, Multi-Shuttle (Optional)
9	MDS100620002	Vibration feeding system components (Optional)
10	PS210819	Assembly of Vacuum Ejector (Optional)
11	MDS011820001	Modular F.R.L Units (Optional)

FIGURE 2-1
The components of 824e E-drive Hardware insertion machine

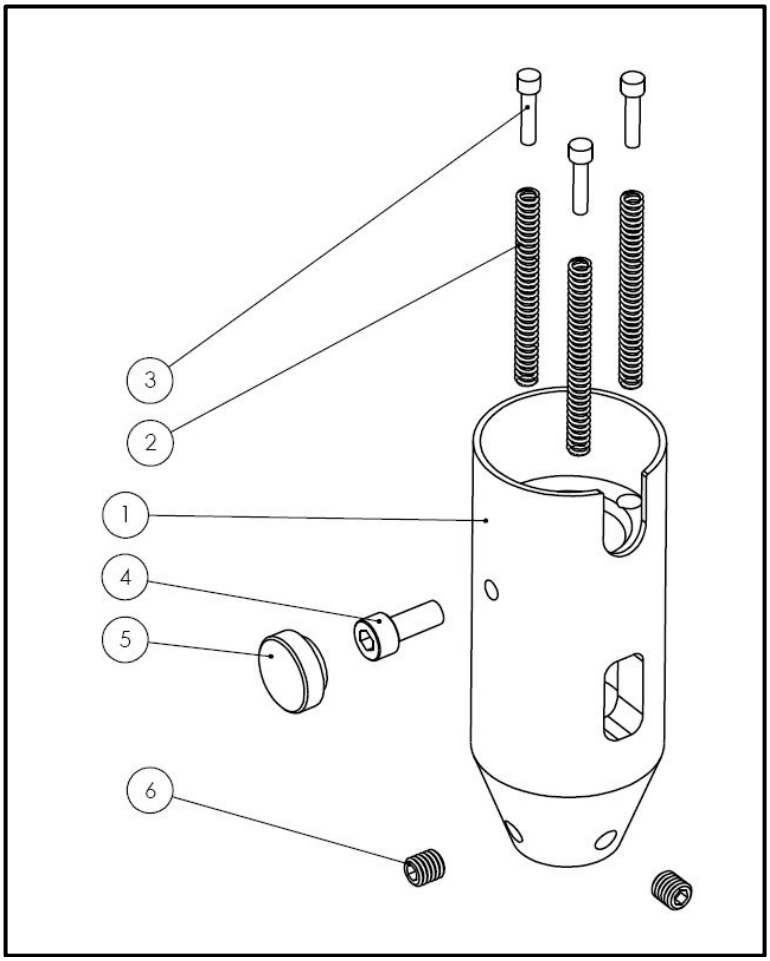


序号	零件号	描述
1	MDS025330071	5kW Servo Motro
2	MDS012330002	Electric Cylinder 8T(200mm)

图 2-2
Electric Cylinder 8T (200mm) with motor（MDS182330007）

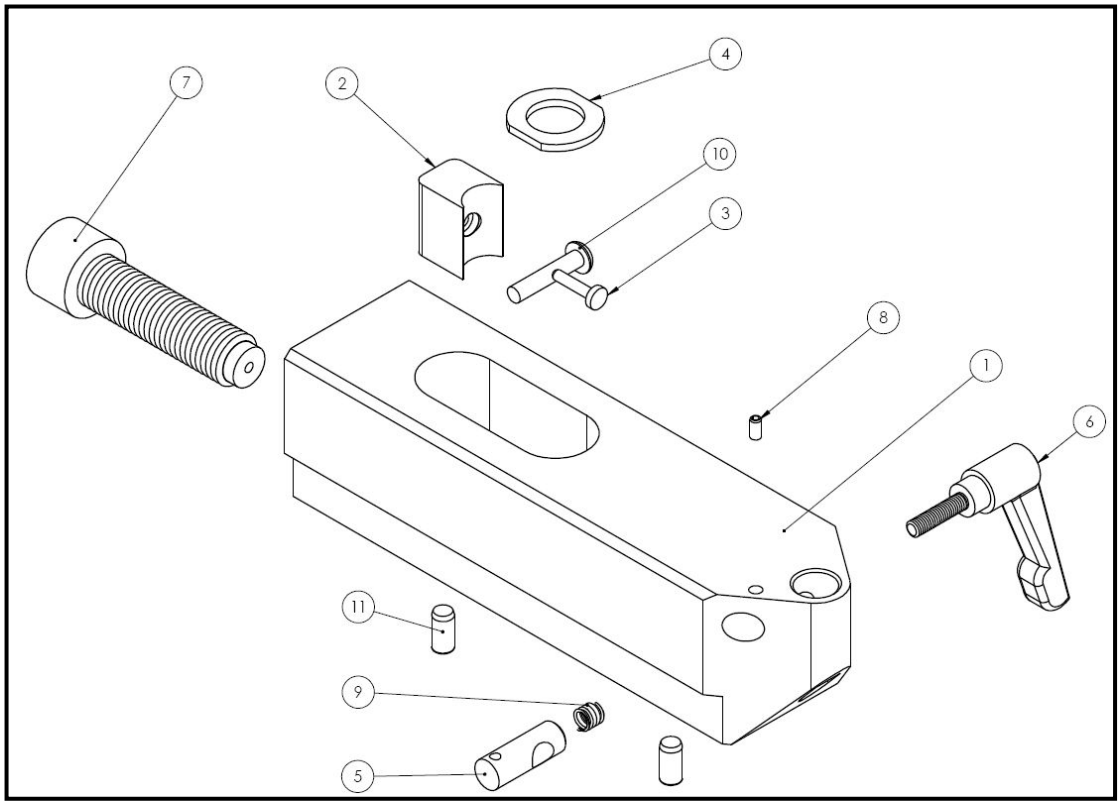


NO.	PARTS NUMBER	DESCRIPTION
1	15-01708	FHCS, M3×0.5×10MM
2	PS210815	SAFETY SENSOR of LEFT, TURCK, NO
3	H-3892	SHSS, M3×0.5×4MM, BLACK OXIDE
4	PS210799	RAM ADAPTER, SAFETY SENSOR, 2nd GEN
5	10-00765	FERRULE, 18 GA, YELLOW
6	PS210801	BUSHING, 3/8" ID×1/2" OD
7	PS210815	SAFETY SENSOR of RIGHT, TURCK, NO
8	15-01450	CONNECTOR, 5 PIN, MALE
9	15-03209	FITTING, 3/8", BULKHEAD UNION
10	15-03208	HOSE, 3/8", AIR
FIGURE 2-3 **Dual Safety Sensor Assembly (MDS101220002)**		



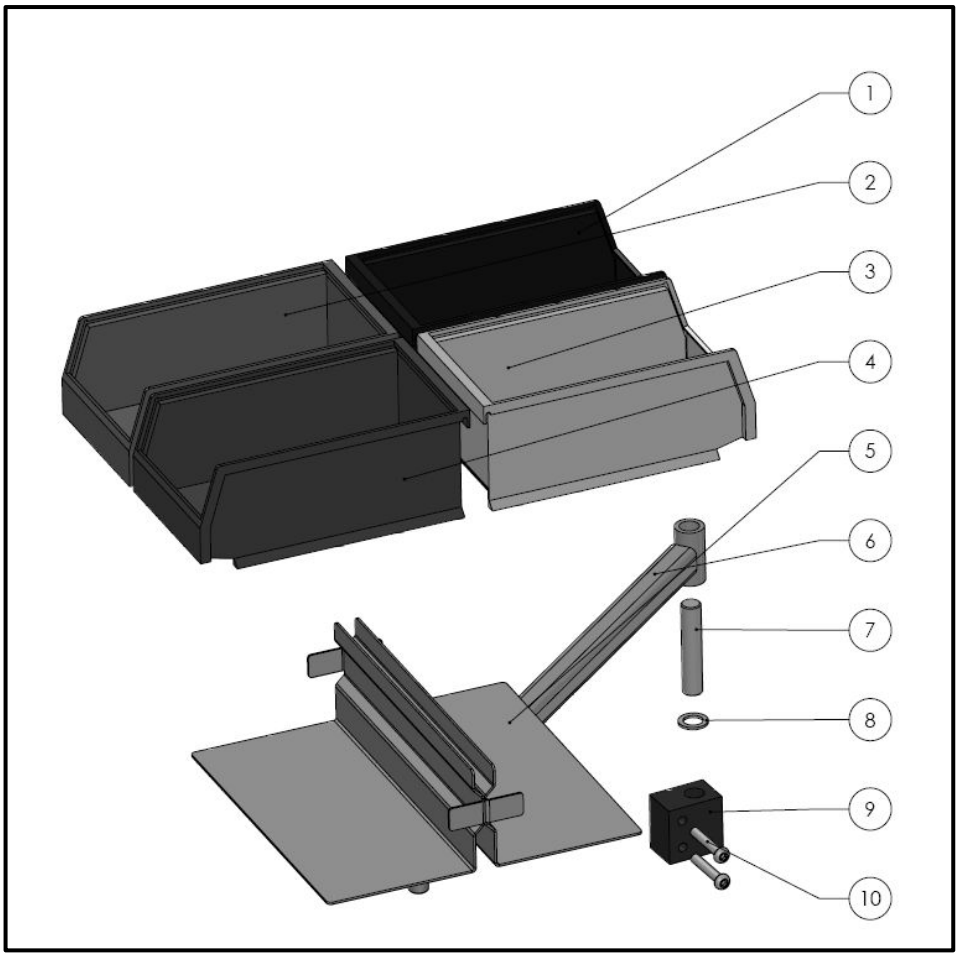
NO.	PARTS NUMBER	DESCRIPTION
1	MDS101230001	BODY, UPPER TOOL HOLDER, SAFETY SENSOR
2	15-03206	CONTINUITY SPRING, 1 ¾" UNIVERSAL
3	11-00016	CONTINUITY GUIDE PIN
4	H-3738	SHCS, M5×0.8×12MM, BLACK OXIDE
5	11-00241	THUMB SCREW CAP
6	11-00242	SHSS, M6×1.0×6, BLACK OXIDE

FIGURE 2-4
Upper Tool Holder Assembly(MDS101220005)

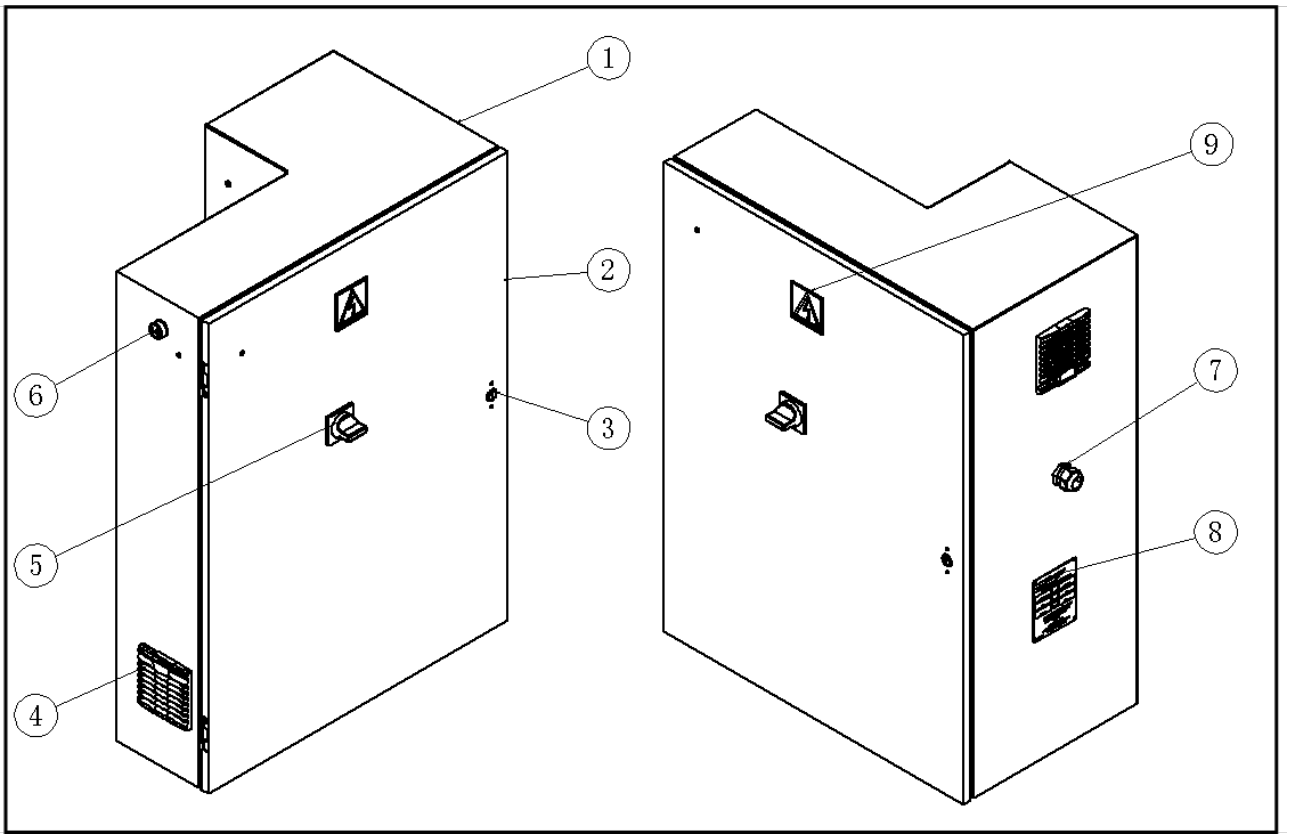


NO.	PARTS NUMBER	DESCRIPTION
1	H-166-9	BODY, COMMON LOWER TOOL HOLDER
2	H-169-4	Shoe For Lower Tool Holder
3	H-169-5	Pin For Lower Tool Holder
4	H-169-6	Lower Tool Washer
5	1-00041	Lock Cylinder
6	1-00042	Black Locking Lever SERVICE ONLY
7	11-00191	SHCS, M16 Modified
8	11-00199	Pin, Spring, Slotted, 1/8" x 1/4", Steel, Zinc Plated
9	11-00212	Lock Cylinder Spring Music Wire
10	H-3731	BHSCS, M5×0.8×25mm, Steel, Black Oxide
11	15-01754	Pin, Dowel, 1/4" x 1/2", Steel, Hardened

FIGURE 2-5
Standard Lower Tool Holder(H-166-8)

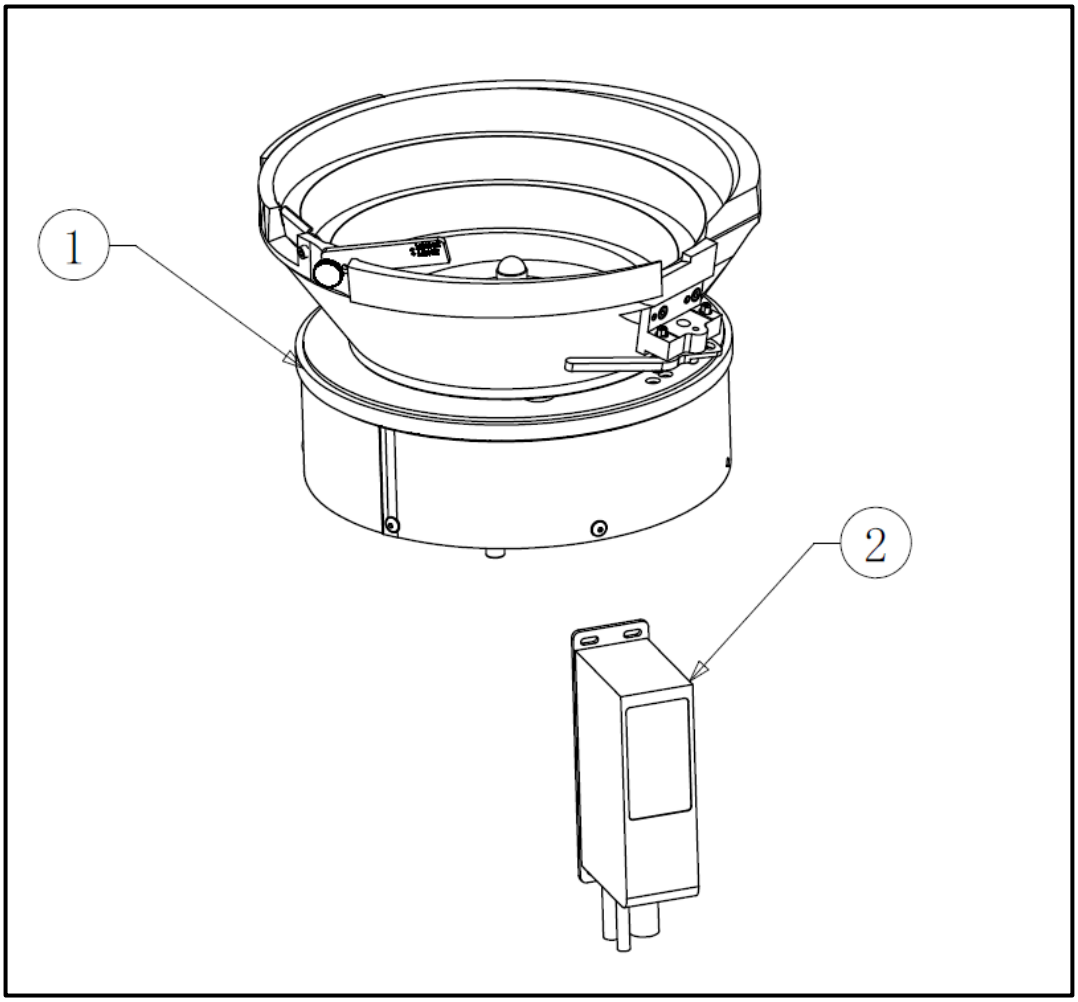


NO.	PARTS NUMBER	DESCRIPTION
1	15-01291	PART BIN 7×4 DARK BLUE FOR TIS ONLY
2	15-01292	PART BIN 7×4 MEDIUM GREEN FOR TIS ONLY
3	15-01294	PART BIN, 7×4, (YELLOW)
4	15-01293	PART BIN 7×4 RED
5	15-01299	WELDMENT, TIS BIN BRACKET
6	10-00152	618/618×1 Service Tray Arm
7	10-00159	1/2×2 1/2 Dowel Pin
8	10-00160	Bearing, Thrust, ID.507×OD.750×THK 1/16, Bronze
9	10-00153	618 Service Tray Bracket
10	11-00192	BHSCS, M6×1.0×35mm, Stainless Steel
FIGURE 2-6 **Service Tray Assembly**		



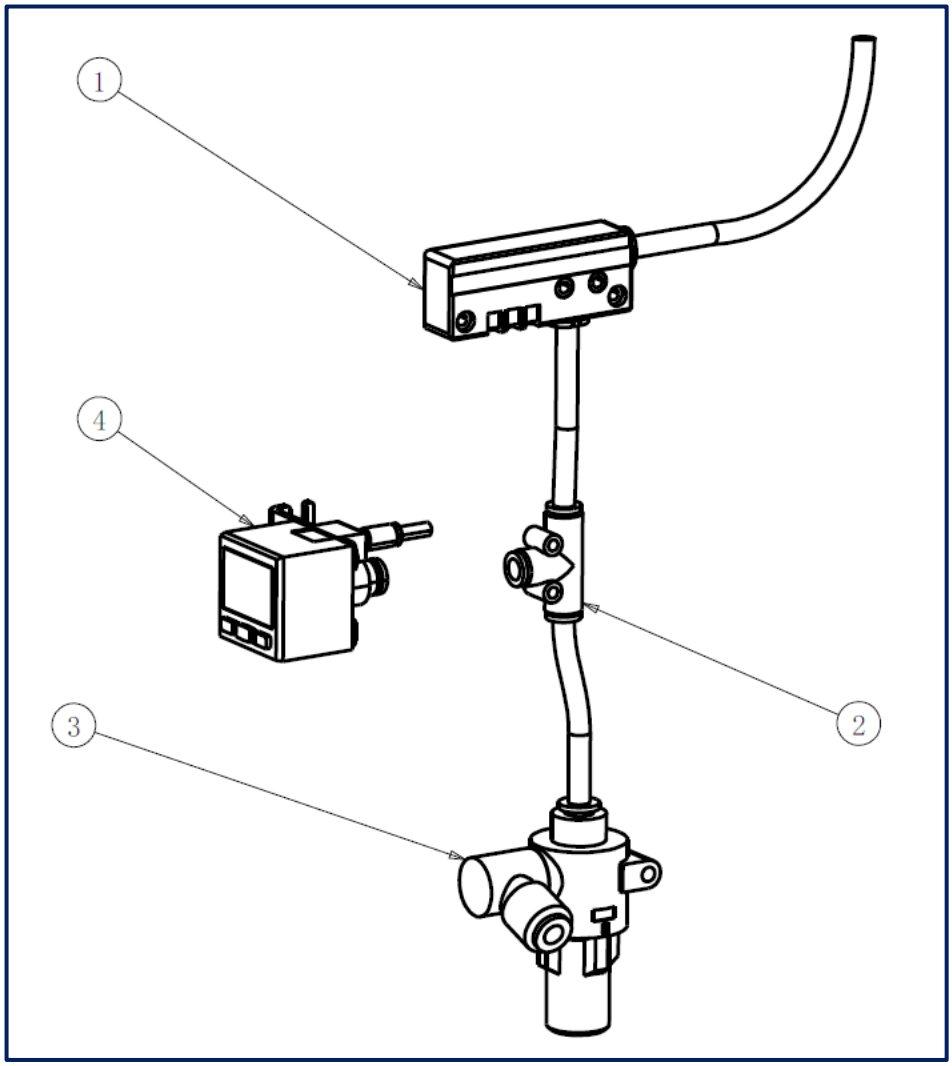
NO.	PARTS NUMBER	DESCRIPTION
1	MDS184530044	Electric control cabinet
2	MDS184530045	Electric control box door panel
3	8000173	Lock
4	PS210808	Filter fan
5	MDS026030087	Main power switch
6	MDS026130004	buzzer
7	PS210586+MDS013830004	Waterproof connector
8	10-01359	Nameplate
9	C-16-00180	Electric shock hazard warning label

FIGURE 2-7
Assembly of electric control cabinet (MDS184530048)



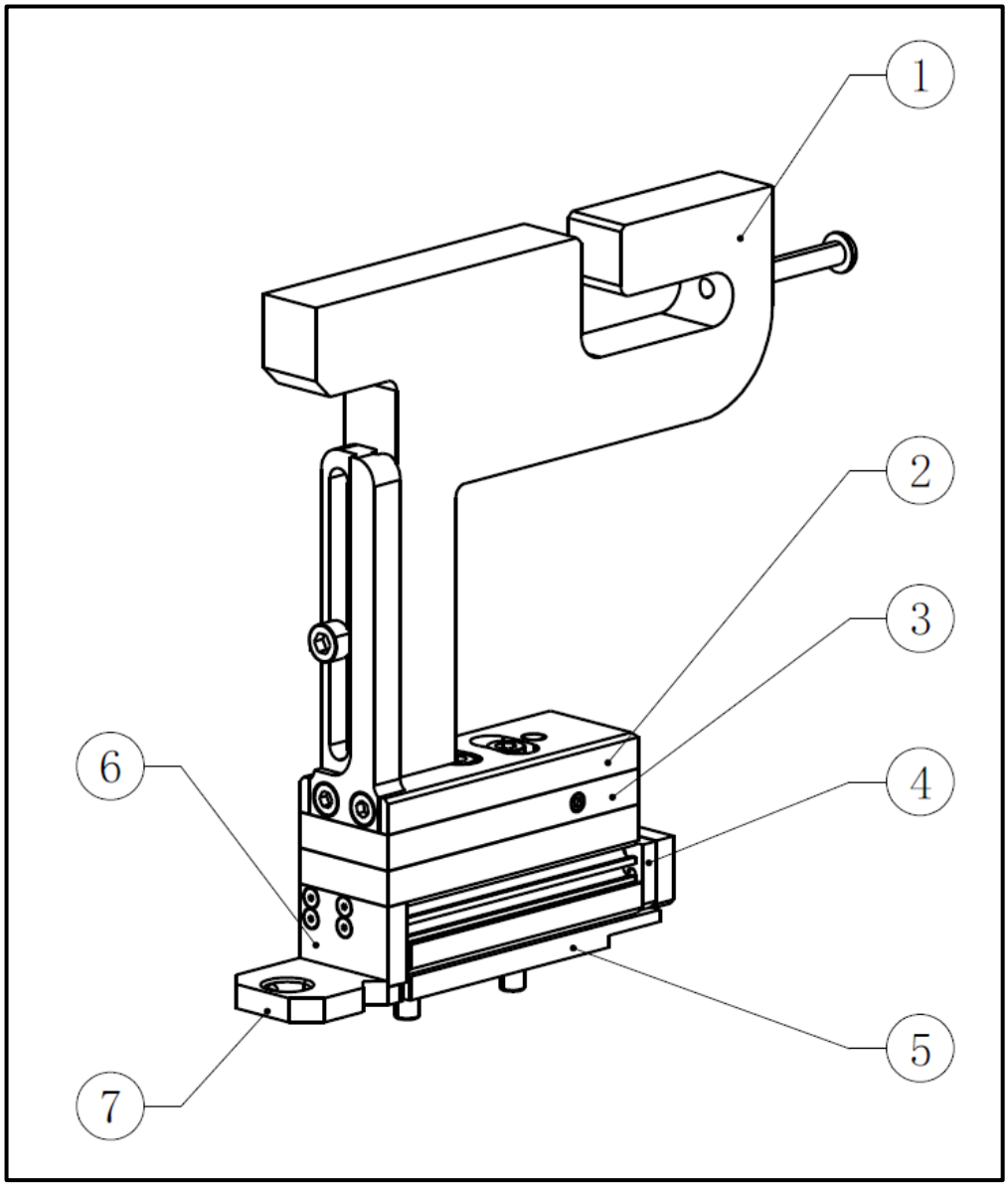
NO.	PARTS NUMBER	DESCRIPTION
1	15-40015	Assy, MAS 350
2	MDS010630001	Voltage and frequency modulation feeding controller

FIGURE 2-8
MAS 350 automatic feeding assembly (Optional) MDS100620002



NO.	PARTS NUMBER	DESCRIPTION
1	PS200039	Box Type (Built-in Silencer) Vacuum Ejector
2	PS191293	Union Tee
3	PS193152	Air Suction Filter with one-touch Fitting
4	MDS011830038	2-color Display High-Precision Digital Pressure Switch (for Low Pressure)

FIGURE 2-9
Assembly of Vacuum Ejector (Optional) PS210819



NO.	PARTS NUMBER	DESCRIPTION
1	13569-15	CUSTOM EXTENDED T-BRACKET
2	15-02882	MOUNTING PLATE, MULTISHUTTLE 2
3	15-02881	Alignment Plate, Multishuttle
4	15-01870	SLIDE TABLE, MULTISHUTTLE, MXS
5	15-01852	MODULE PLATE, MULTISHUTTLE
6	15-01546	TUBE CONNECTOR MOUNT, MULTISHUTTLE
7	15-01557	MOUNT, TUBE CONNECTOR
FIGURE 2-10 ASSY, Multi-Shuttle (Optional) 15-03624		

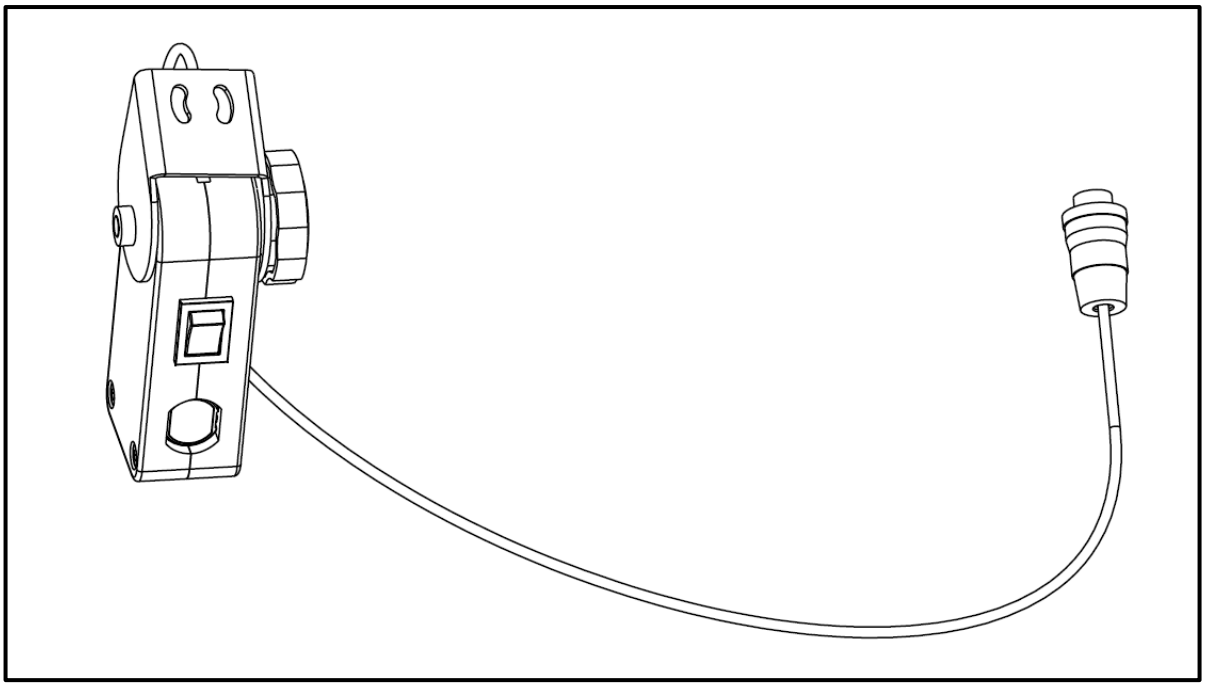


FIGURE 2-11
Laser Part Locating Light (Optional)

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 pull riveting machine.

3.1 SYSTEM SAFETY FEATURES

1. Turning 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 rivet installation machine. WITHOUT ANY CONTAINED PRESSURE, ALL PNEUMATIC MOTION STOPS.
2. The electrical cabinet has been locked with a key to prevent unauthorized personnel from opening it.
3. Has a first-level password protection measure for safe access.

3.2 SECURITY OF USAGE MODE

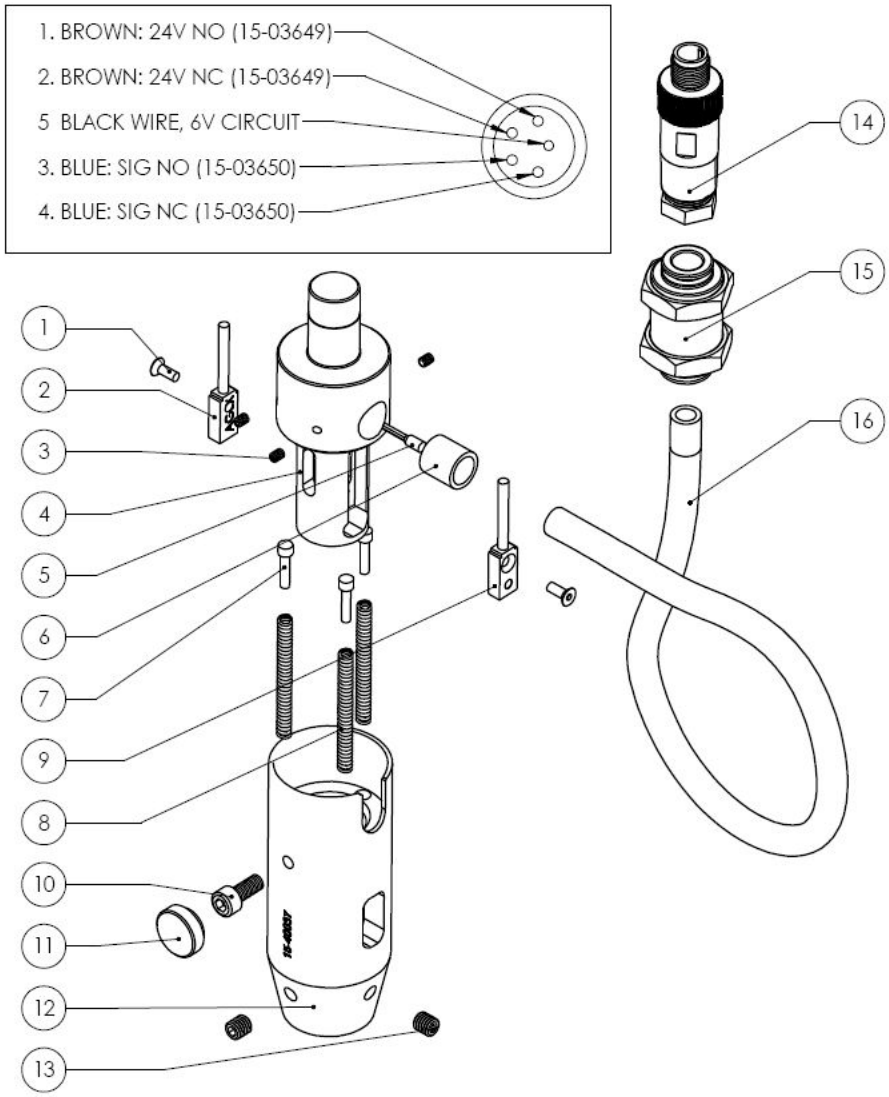
The Upper Tool's downward motion stops when any parts that exceed the safe thickness setting is placed between the Upper and LowerTools. If the Down Footswitch is depressed a second time after the Upper Tool has stopped, the machine continues the hardware insertion cycle. It applies the machine's set down force to the material. The Upper Tool then returns to its Up position.

In safty mode, the Safety System relies on the Dual Safety Sensor inside the Cylinder Ram Adapter, and position monitoring fulfilled by the Tooling Protection System (TPS). The Upper Tool Holder Retainer Screw secures the Upper Tool Holder to the Cylinder Rod. There is a black serrated knob on this Retainer Screw. It enables the Upper Tool Holder to move up on the Electric Cylinder Ram Adapter .45 in/11.4 mm. To move up, the Upper Tool Holder must overcome the light force of the Continuity Spring.

If the Upper Tool Holder moves up .015 in/0.4 mm to 0.02 in/0.5 mm, the Safety Sensor will lose the target in the upper tool holder. Sensors should change state simultaneous otherwise the machine will bring the ram up.

Before each cycle the state of the 2 sensors in the ram adapter are monitored by the dedicated Safety Controller to ensure the upper tool holder is installed, and in released state.

In operation, when the Safety Sensors is actuated in Conductive Mode and a non-conductive material is between the Upper and Lower Tools, the Upper Tool Holder's downward motion is reversed immediately and returns to its Up position. If the Safety Sensors is actuated and a conductive material is between the Upper and Lower Tools, the machine will continue the hardware insertion cycle if inside the TPS window. The machine will apply the set down force to the conductive material between the Upper and Lower Tools and then return to its Up position.



Risk of crushing-A high risk crushing hazard is created by the Upper Tool and Lower Tooling.

Warning-Safety of the operator in safty access operation must remain accessible only to trained and authorized personnel that are experienced in appropriate machinery operating conduct.
Do not operate this machine while wearing any metal objects (i.e., rings, watches, bracelets, etc.) that may come into contact with the Upper Tool,Lower Tool or work piece.

WARNING: Immediately upon receipt of your hardware insertion machine., 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 rivet installation machine. or operator safety.

3.3 Safety System Tests

Step 1: Safety Switch Test Procedure

WARNING: Experience d personnel must test the Safety System at the beginning of each work shift. See the Safety System Test in this section of this manual. Depending on the ambient shop temperature, you may need to warm up your Hardware Insertion Machine before beginning any operations. To do this, turn it on and let it run for about ten minutes.

1. Turn the *Main Disconnect Switch to* the *On* position. The Main Disconnect Switch is located on the electrical cabinet to the right side of the machine.
2. Start the machine by pressing the On Switch on the touch screen control panel. The green light in the switch will be displayed and the motor will start. If the machine doesn't turn on, twist the Off/E-Stop Switch(s) clockwise until it pops out and try pressing the On Switch again. Using the touch screen controls, select the Conductive operation.

Except for the Down Footswitch and the *Off/E-Stop Switch*, all the other operating controls referred to in the rest of this procedure are on the Touchscreen Panel. The Touchscreen Panel is located on the front of the machine cover.

3. Set the Up Travel distance to 40% by touching the touch screen containing the Up Travel value and then choosing 40 from the entry screen. You can also use the +/- buttons.
4. Keep your hands away from the Tool Holder area. Use the Footswitches to lower or raise the Upper Tool Holder until it is about 4 in. /100 mm above the Lower Tool Holder. Remove your foot from the Footswitches and keep your feet away from it.
5. Carefully grasp the sides of the Upper Tool Holder and push it upwards. This upward movement should actuate the Safety Sensors and the Upper Tool Holder should move up. The movement will continue until the RAM reaches top of stroke. Remove your hand from the Upper Tool Holder as soon as the movement starts.
6. If the RAM moves up, the Safety System Sensors are operating.
7. If the Upper Tool Holder does not move up, the Safety System has failed!

Immediately turn the machine off by depressing the *E-Stop* button and turning the Main Disconnect Switch to the *Off* position. Contact your Supervisor. The machine's Main Disconnect Switch must be locked in the *Off* position until repairs are begun and follow Lock-out/Tag-out procedures. Do not operate this machine until qualified personnel have repaired the machine and the Safety System Sensors has been properly tested.

WARNING: There are two (2) Steps in this testing procedure. Do not skip or ignore any of them!

Step 2: Safty Mode Test

1. If you have just completed Step:

   a) The machine is On and the green light in the On Switch is still illuminated. If not, return to Step 1 Safety Sensors test procedure and restart the machine .
   b) The machine's Force has been set to deliver 13KN.
   c) Verify the 1 in/25 mm Flat Anvils are installed in both the Upper and Lower Tool Holders.

2. Keep your hands away from the tooling area. Depress the Down Footswitch. The Upper Tool Holder should move down, the flat Anvils will contact, and the Upper Tool Holder should stop immediately. If this machine completes the above sequence correctly, go to Instruction 4.

WARNING: When operating this Hardware Insertion Machine in the Safty Mode, be very careful! Do not depress the Down Footswitch a second time after the Upper Tool Holder has stopped on the down stroke with any part of your body near the tooling area.

   a) If the machine does not complete the above sequence correctly, check the touch screen settings. If they are not correct, reset them and repeat the test. If the machine performs correctly, go to Instruction 3.
   b) If the machine does not complete the above sequence correctly, there is a failure in the machine's control circuit and it must be corrected by qualified personnel. Immediately turning the machine Off by pressing the red Off Switch and turn the Main Disconnect Switch to the Off position. The machine's Main Disconnect Switch must be locked in the Off position until repairs are begun. Do not operate this machine until qualified personnel have repaired the machine and the Non- Conductive Mode has been properly tested.

3. Remove your foot from the Foot pedal switch box.
4. Carefully grasp the sides of the Upper Tool Holder and raise it until a positive stop position is reached. With a calibrated measuring instrument (Digital calipers are best), measure the vertical distance between the upper and lower Anvils. If this measurement is **at least a minimum of** 1/4 in. /6 mm, go to Instruction 6.

   a) If this dimension is less than 1/4 in. /6 mm, **the Safety System has failed!**

      Immediately turn the machine off by pressing the red Off Switch and turning the Main Disconnect Switch to the Off position. The machine's Main Disconnect Switch must be locked in the Off position until repairs are begun and follow Lock-out/Tag-out procedures. Do not operate this machine until qualified personnel have repaired the machine and the Non-Conductive Mode has been properly tested.

5. Next keep your hands away from the tooling area. Turn machine back "ON" and depress the Down Foot pedal switch a second time. The machine should exert the pre-set 13KN force to both upper and lower Anvils and then return to its Up position.

If this machine completes the above sequence correctly, the test of the Safety Sensors and Safety System is complete and operating properly.

SECTION 4
INSTALLATION OF HARDWARE INSERTION MANCHINE

Transportation of thehardware insertion manchine

- 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 hardware insertion machine. (See Fig 4-1)

WARNING: Unbalanced loading of the hardware insertion machine or sudden stops may lead to toppling of the hardware insertion machine.

Locating the Hardware Insertion Machine

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

Leveling the Rivet Installation Machine

- The hardware insertion machine 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 36mm wrenches (See Fig 4-2). 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 the hardware insertion machine. However, be sure to comply with any national or regional safety codes that may dictate otherwise. We do recommend that you at least leave enough space around the hardware insertion machine 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 hardware insertion machine verify the continuity of the protective bonding circuit (TN-System) in accordance with EN 60204-1 Clause 18.2.2 standards.

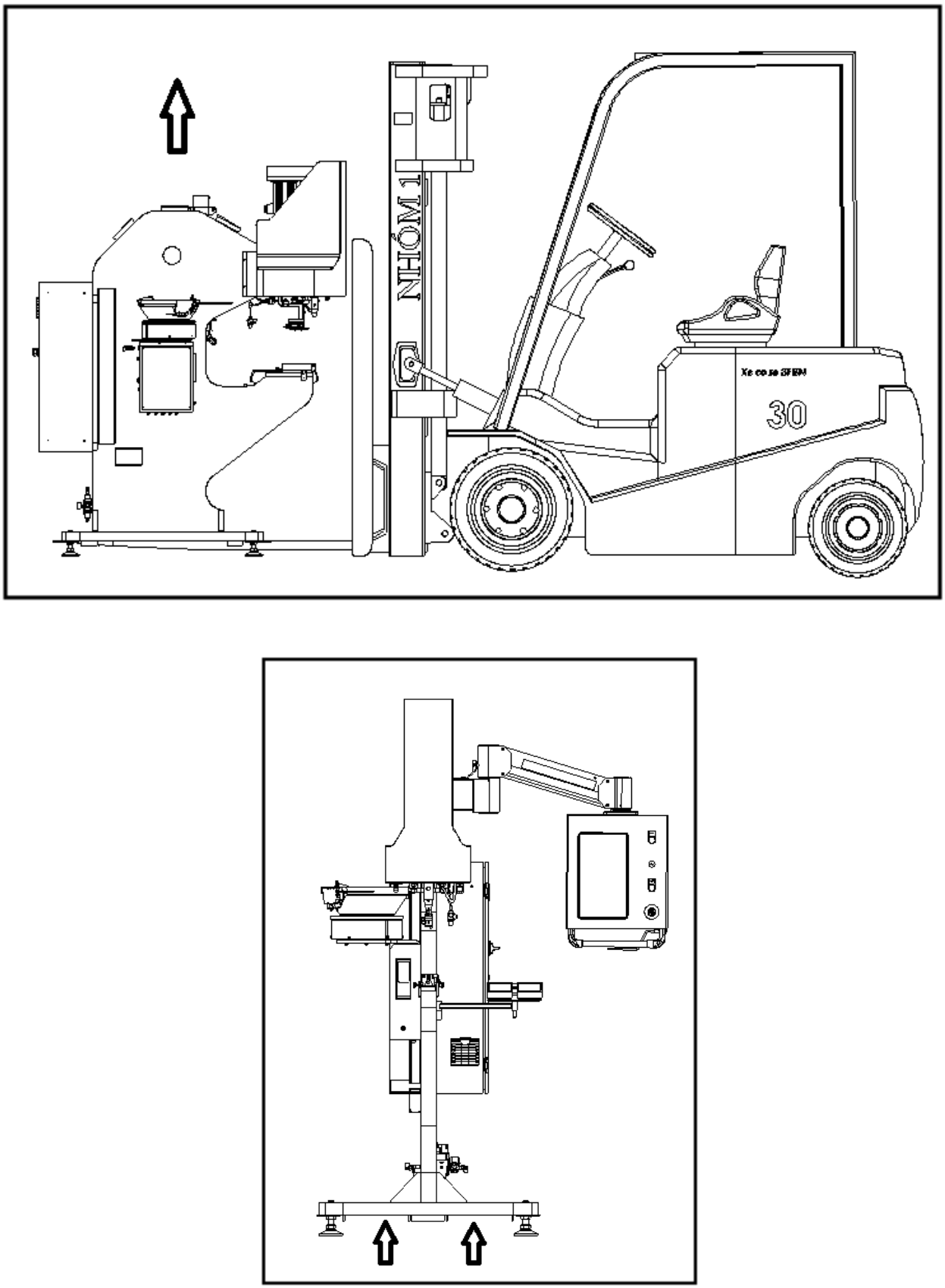


FIGURE 4-1
Move Location Diagram

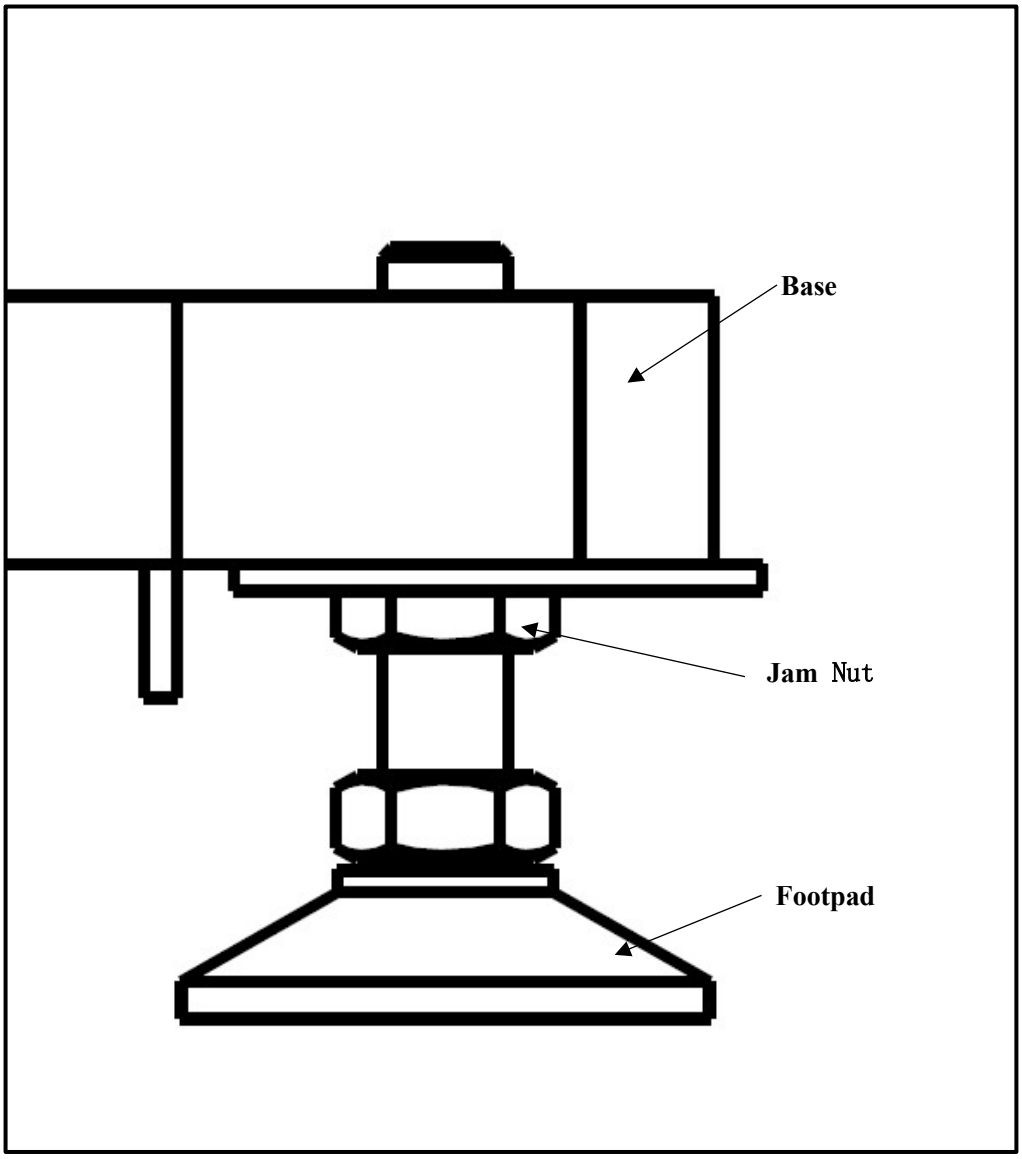


FIGURE 4-2
Adjustable Footpad

Recommended Air Supply Hook-Up Arrangement

Proper air supply is very important to the performance and maintenance of the hardware insertion machine. Following these simple guidelines will ensure good machine 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 machine performance and maintenance problems.
- **Air Supply Flow** - Use a minimum 12mm diameter line and fittings from the compressed air source to the rivet installation machine. Shop pressure ranging between 6 to 7 bar (90 psi to 100 psi) is acceptable. Inadequate air flow will affect machine performance.
- **Air Consumption -** Air consumption in automatic mode is about 2.5 liters of compressed air per cycle. Average air consumption running at 6 insertions per minute is about 0.3 liters/sec at 1 atm.
- **Piping Installation** – Proper piping hookup will help achieve the above requirements. See Figure 4-3 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 machine.
- Connect to that drop with your supply fitting for a 12mm 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.

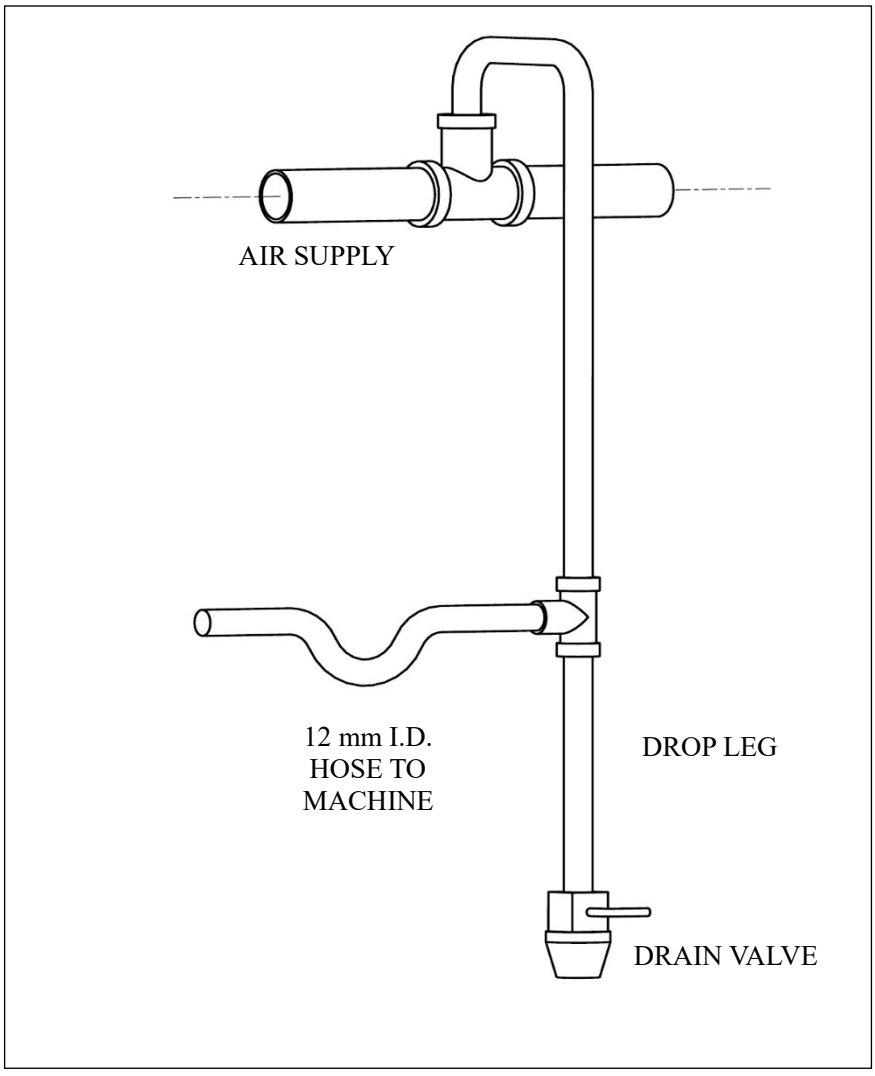


FIGURE 4-3
AIR SUPPLY

SECTION 5
GENERAL FUNCTION DESCRIPTIONS

System Function:

The function of **824e Hardware Insertion Machine** is to safely, quickly and consistently install riveting screws, nuts or studs for various types of plates. In order to achieve this function, the riveting machine adopts the following technologies and devices:

- Precise computer-controlled pressure riveting force and pressure riveting position.
- The automatic feeding system and Multi-Shuttle platform tooling can be selected according to the needs, and the product to be riveted can be positioned on the Vacuum Anvil (upper die), so that the operator can be released and can operate the workpiece freely.

Setting up the Hardware Insertion Machine:

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

Step 1: Choice of tooling

The selection of tooling includes selecting suitable tooling for the delivered products and workpieces to be pressure riveted, including the tooling used for pressure riveting tooling and feeding control. The specific tooling type can be inquired through the website https://www.haeger.com/ATW or Haeger Wizard APP or consult the PEMSerter technical department.

Step 2: Select the Setup for the Tooling and Riveting Fastener on the Touchscreen.

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

- **Choice of tooling**-Choose tooling mode, riveting fastener size and types
- **Call pre-stored pressure riveting parameters**- Select from a previously programmed Job stored in the rivet installation machine.
- **Call the parameters of the last pressure riveting**-Call the same operating program that the riveting machine just ran last time, even after the shift is selected, the Hardware Insertion Machine will automatically set the operating variables and continue to perform security settings.
- **Manually set the pressure riveting parameters**-according to the needs of the product, manually set the pressure riveting parameters

Step 3: Safety Setup

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

In the step of security setting, the Hardware Insertion machine needs to set the trigger position of the "safety trigger point" in the "Tooling Protection System (TPS)". The operator places the workpiece and the product to be riveted, but the riveting machine does not perform the actual operation of the product to be riveted. Step on the foot switch to

make the hydraulic cylinder move slowly down. When the safety punch assembly touches the workpiece to be riveted, press the riveting product and trigger the safety punch assembly. At this time, the machine will record the position. This contact point is the correct trigger position and pressure position obtained by the riveting machine. At this point, the riveting machine is ready for pressure riveting operation.

Riveting Automatic Feed Functions:

The automatic feeding function is completed by the vibrating feeding system and the storage system sending the products to be riveted into the multi-carrier platform tooling through the feeding tube. Take the following steps:

- The vibrating feed system moves the riveting product to the edge of the vibrating tray and transmits it to the Multi-Module.

- The direction of the riveting products is determined in the multi-module dislocation mechanism and sent to the Multi-Shuttle through the Tube. The riveting products to be riveted will be taken away by The Vacuum Anvil (Upper mold) through vacuum adsorption, and then be pressed into the workpiece. In the vibrating feeding system, the rest of the tightened riveting products with incorrect postures are blown out of the Multi-Module by compressed air and returned to the storage vibrating tray.

Pressure riveting process:

- When the riveting product contacts the workpiece, the riveting machine judges the position of the "safety trigger point". Only when the safety trigger point is within a certain deviation range, can the pressure riveting process continue.

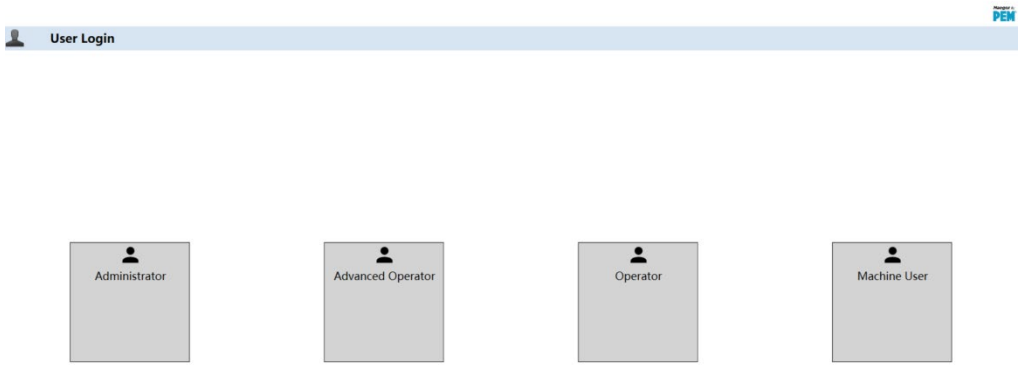
- If the safety trigger point is correct, apply pressure riveting force to the riveting product, and then the Anvil exits and returns to the origin.

SECTION 6
TOUCH-SCREEN CONTROLS

A programmable Automation Controller (PAC) controls the functions of the Device. The operator sends commands to the PAC and reads data from the PAC through a system of menus and information displayed on its 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 Hardware Insertion Machine for operation, operate special functions and maintain and troubleshoot the machine.

6.1 Login Screen



When the system starts, you will see the current login page.

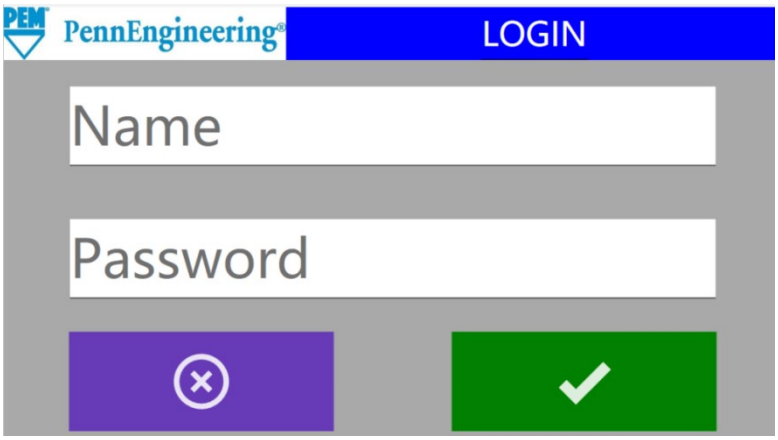
[]: Enter the software as an administrator.
→To→6.1.1 Login Page

[]: Enter the software as an advanced operator.
→To→6.1.1 Login Page

[]: Enter the software as an operator.
→To→6.1.1 Login Page

[]: Enter the software as a machine user.
→To→6.1.1 Login Page

6.1.1 Login Page



[Name]: Login name.

[Password]: Login password.

[OK]: Enter.

6.1.2 Main Page

6.1.3 Language Switch

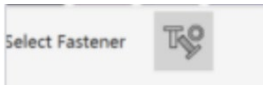
Click on the national flag and select the language you need.

6.2 Quick Run

[Station] station selection.→

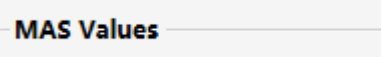
 [Speed] Speed setting.
→To→6.5.9.2 Feed Page

 [Alarm] Alarm message.
→To→6.7 Alarm Show

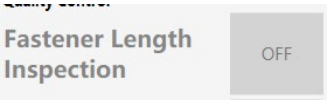


[Select] Select fastener.
→To→6.2.1 Select Fastener Page

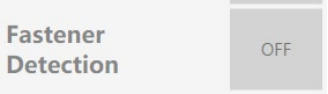
[Tooling] Tooling control.
→To→6.4.1 Adjust Fastener Data Page



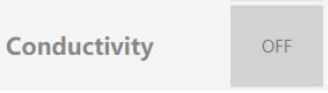
→To→6.4.1 Adjust Fastener Data Page



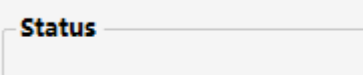
[Length] Open or close fastener length check.



[Tooling] Open or close fastener detection.



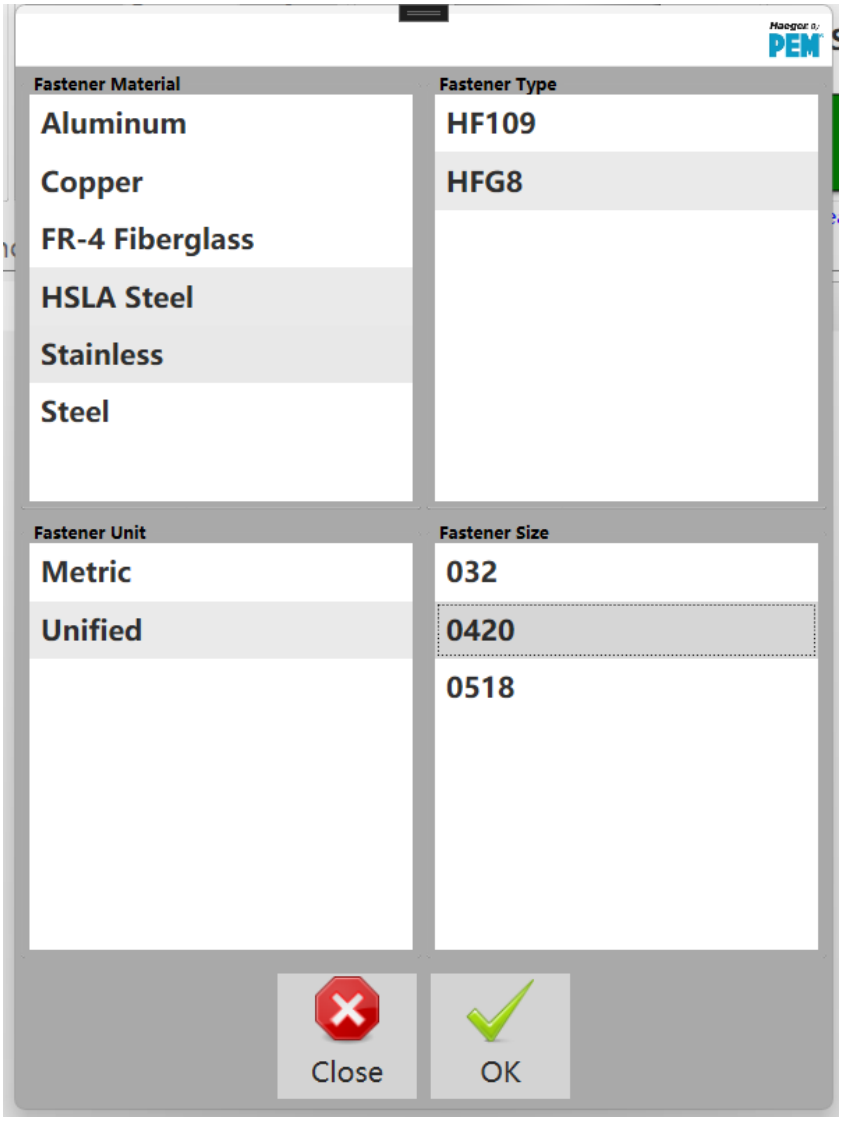
[Conductivity] Open or close conductivity.



→To→6.4 Start Production

→To→6.5.11 Press Logging Page

6.2.1 Select Fastener Page



Fastener Material [Material] Material selection for fasteners.

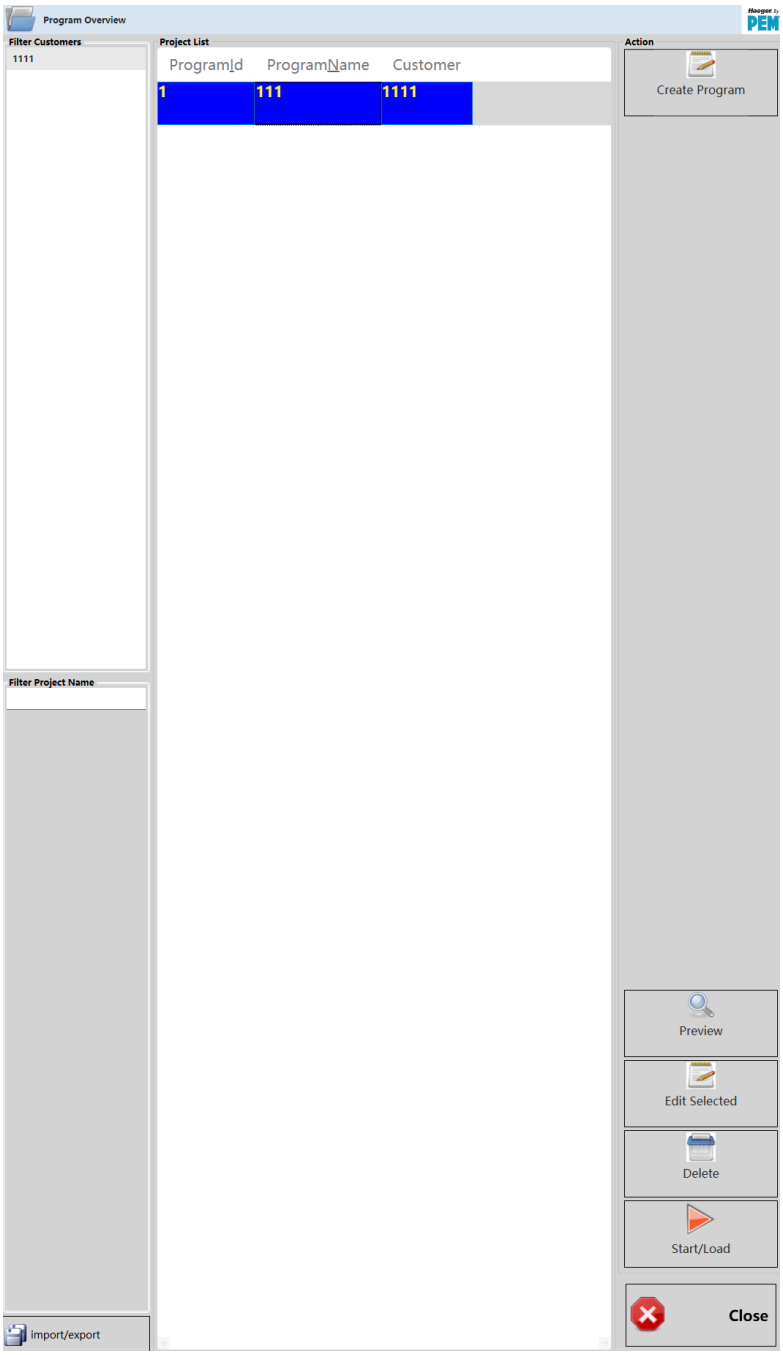
Fastener Type [Type] Selection of fastener types.

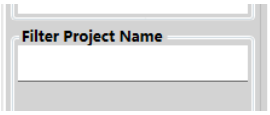
Fastener Unit [Unit] Selection of fastener units.

Fastener Size [Size] Selection of fastener size.

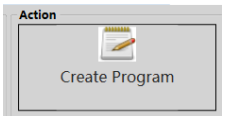
6.3 Programs

6.3.1 Program Page

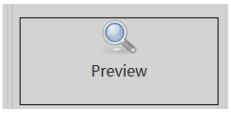




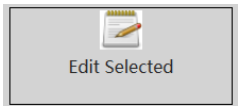
[Filter Project Name] Enter the corresponding program name to search for the program (fuzzy query).When refreshing the program list, simply change the search criteria to empty.



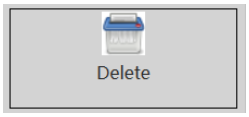
[Create Program] Create a new program.
→To→6.3.2 Create Insertion Program Wizard Page.



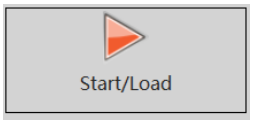
[Preview] Select the data in the row where the program is located and preview the relevant parameters.
→To→6.3.3 Program Preview Page



[Edit Selected] Select the data in the row where the program is located and edit the relevant parameters.
→To→6.3.2 Create Insertion Program Wizard Page

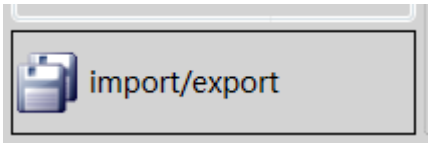


[Delete] Select the data in the row where the program is located and delete the currently selected program.



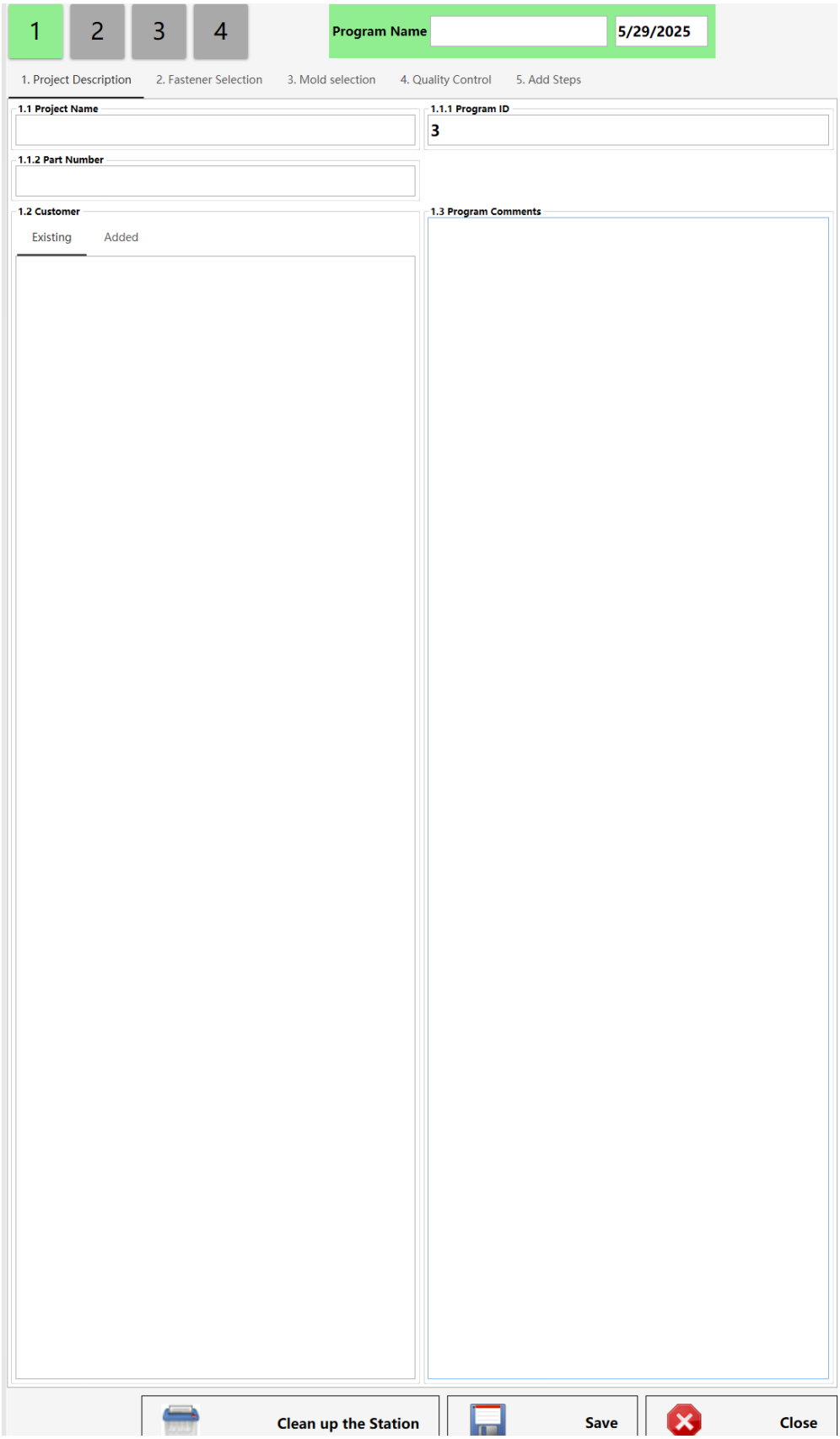
[Start/Load]
→To→6.3.4 Production Run Page

[Close] Close the current Page.

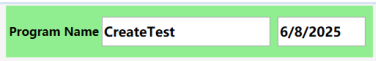


[Import/Export] External file import or export program.

6.3.2 Create Insertion Program Wizard Page

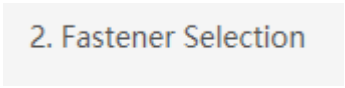


[Station] Select the current station information to be created.



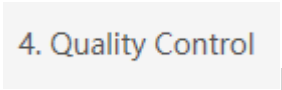
[Program Name] Fill in the program name and creation time.

[Project Description] Fill in project description information.
→To→6.3.2.1 Project Description Page

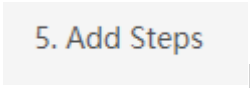


[Fastener Selection] Select fastener type.
→To→6.3.2.2 Project Description Page

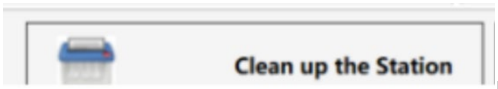
[Mold Selection] Select mold.
→To→6.3.2.3 Project Description Page



[Quality Control]
→To→6.2.2.4 Project Description Page



[Add Steps]
→To→6.3.2.5 Project Description Page

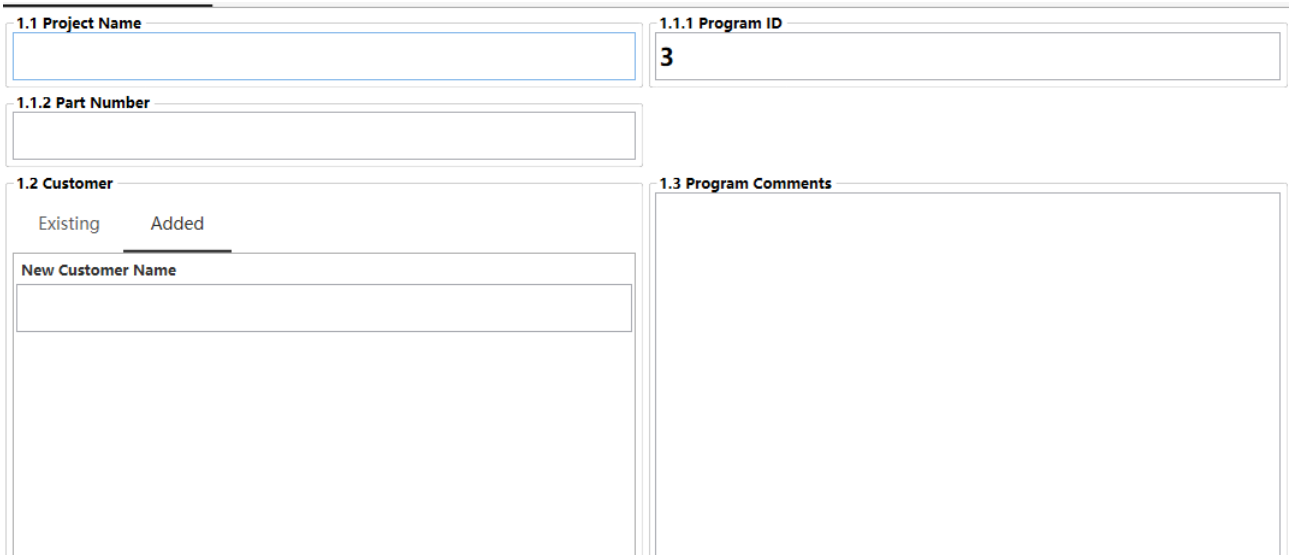


[Clean] Clear the currently edited station information.

[Save] Save the editing and close the page.

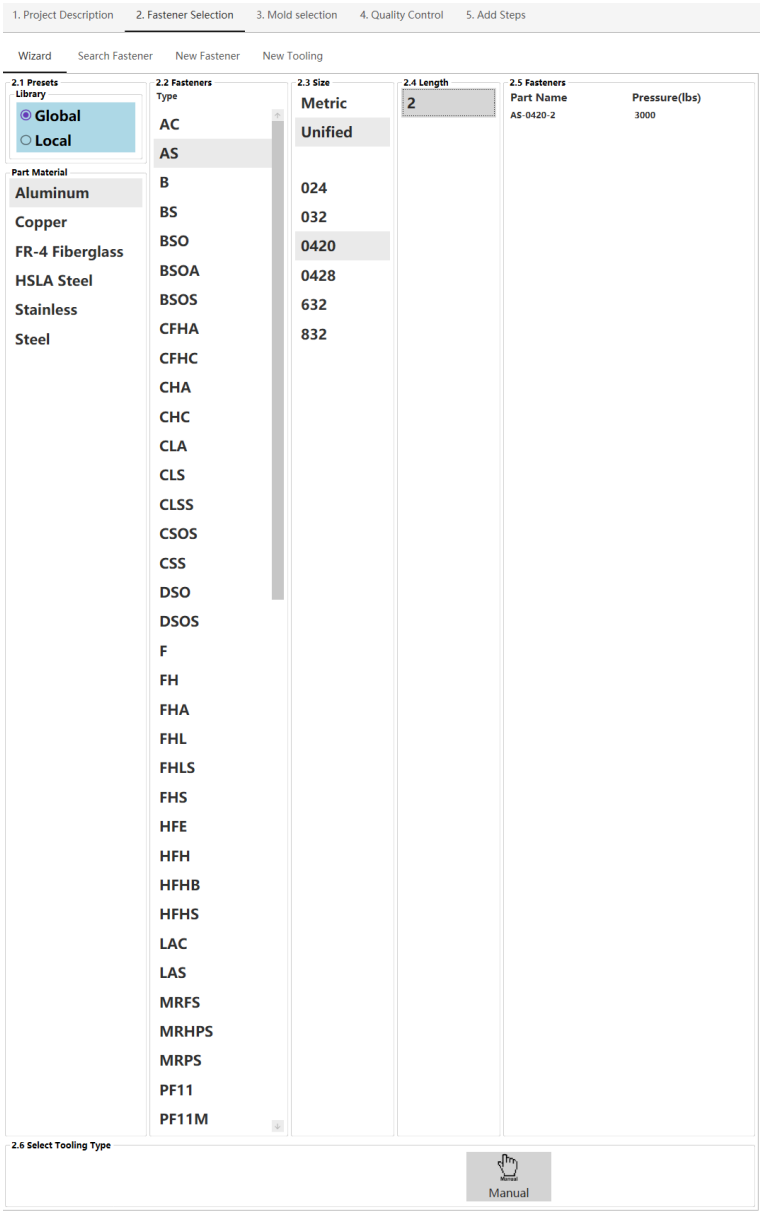
[Close] Cancel editing and close the page.

6.3.2.1 Project Description Page



Fill in basic information.

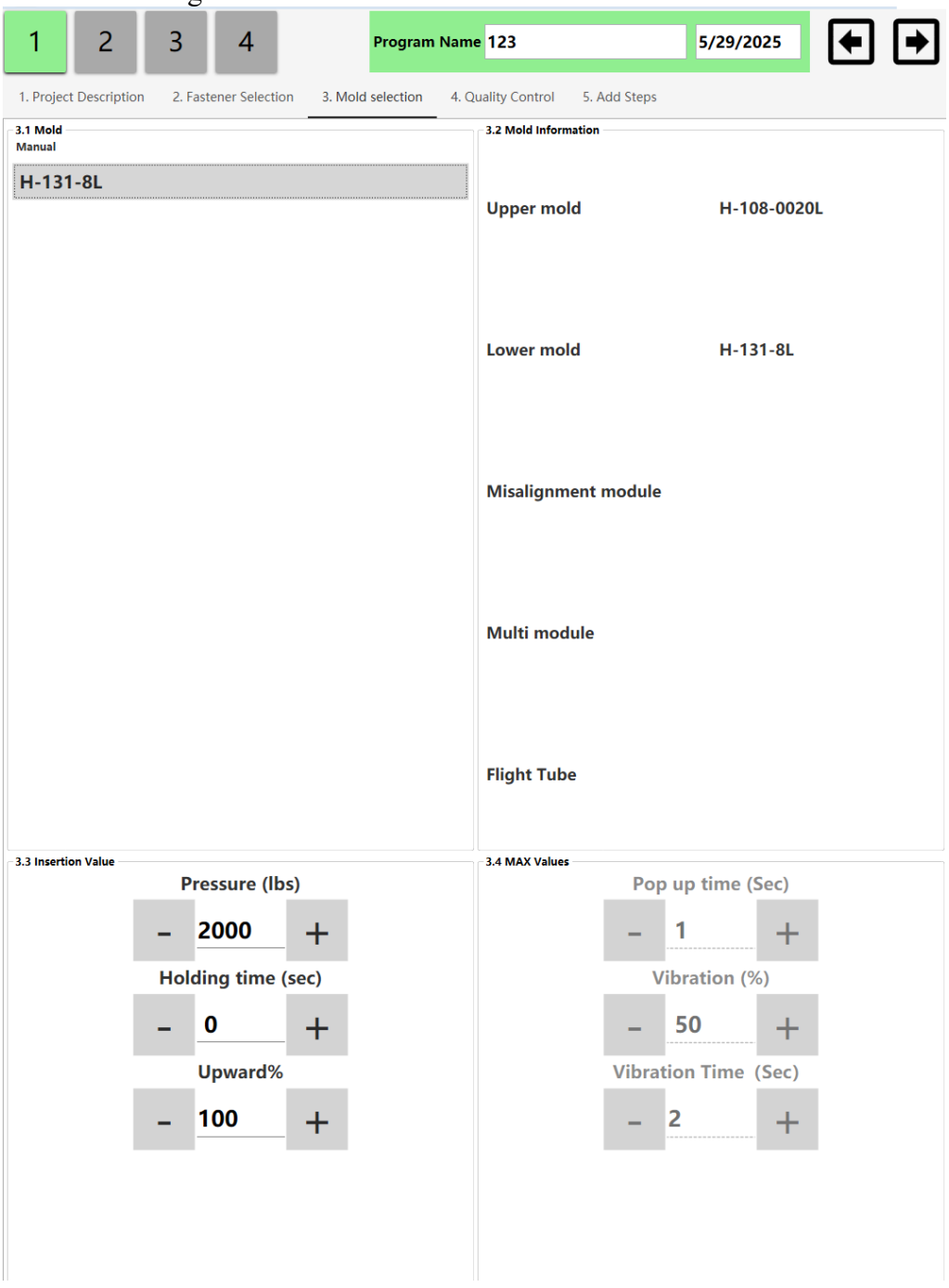
6.3.2.2 Fastener Selection Page



[Wizard] Create fasteners for the station step by step according to the guidance method.

[Select Tooling Type]
→To→6.3.2.3 Mold Selection Page

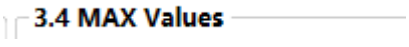
6.3.2.3 Mold Selection Page



[Mold] Automatically generated tools.

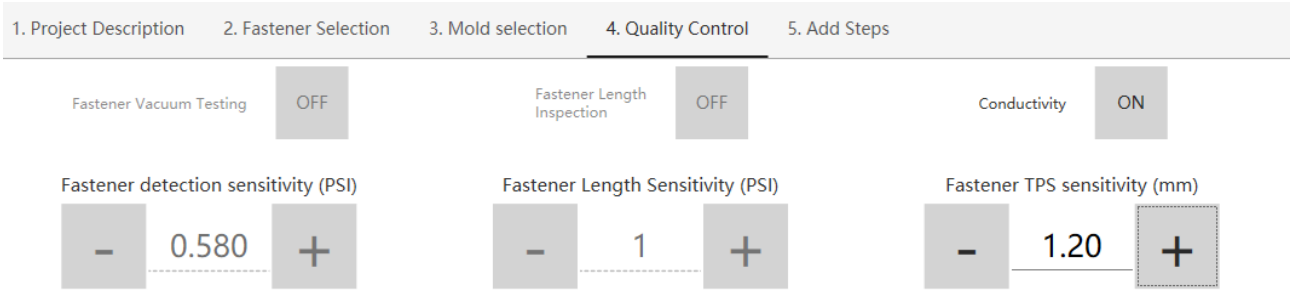
[Mold Information] Automatically generated tool information.

[Insertion Value] Click on the addition and subtraction symbols to adjust the pressure, holding time, and up.



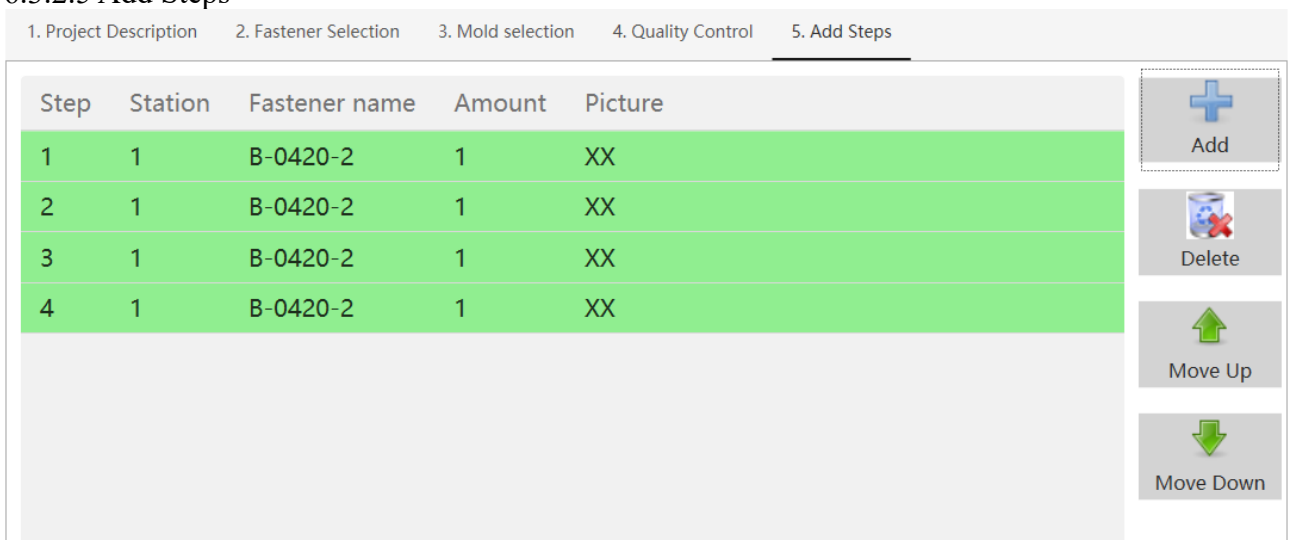
[Max values] Automatically generate parameters based on the tool.

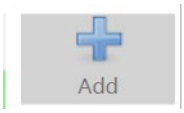
6.3.2.4 Quality Control



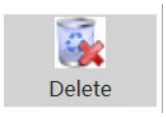
Quality control parameter adjustment.

6.3.2.5 Add Steps





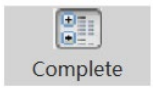
[Add] Add a step based on the currently edited station.



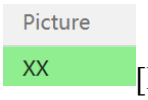
[Delete] Delete the currently selected row data.

[Move Up] Adjust the order upwards.

[Move Down] Adjust the order downwards.

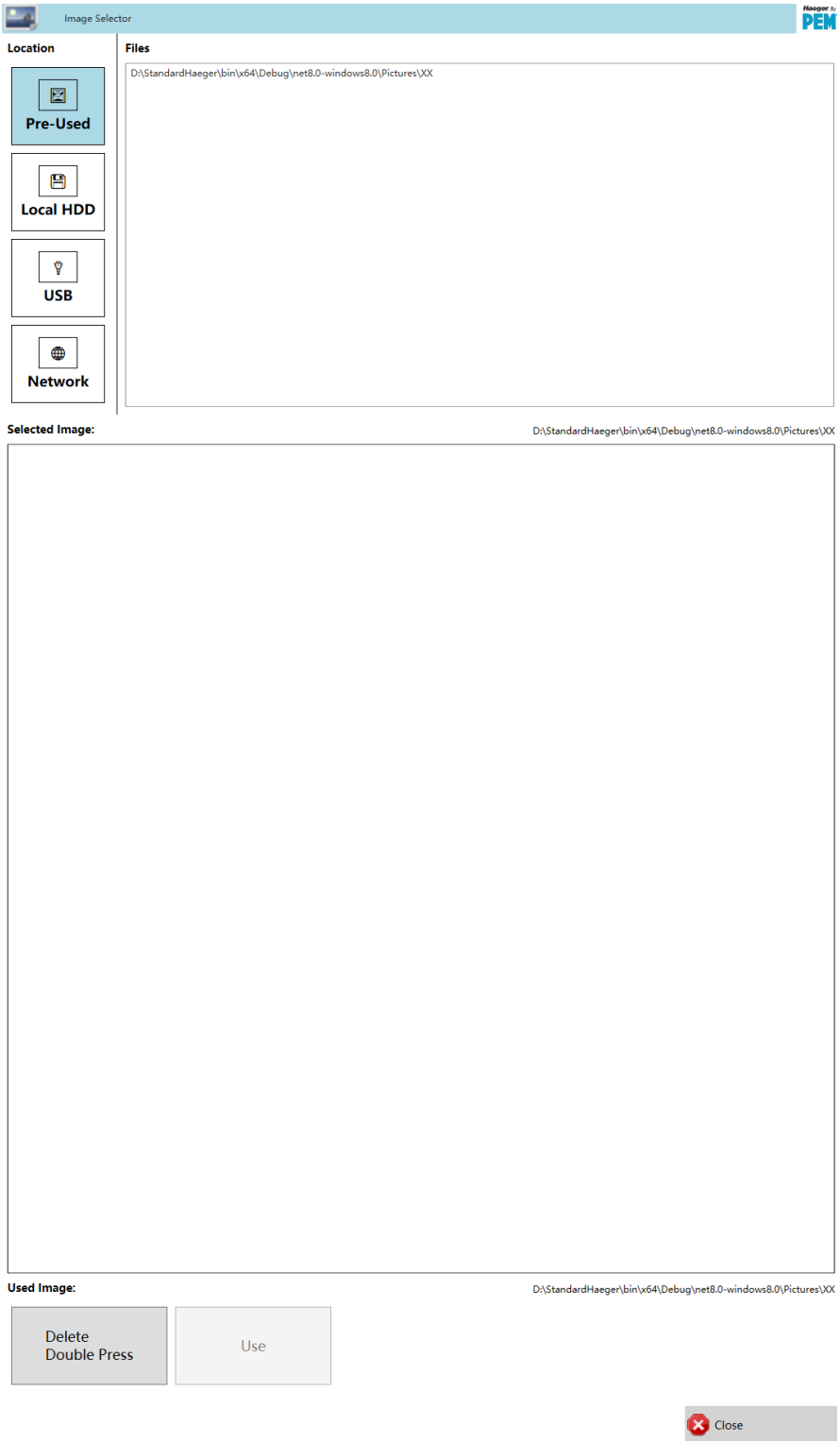


[Complete] Complete modifications.

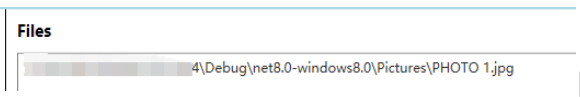


[Image Selector]
→To→6.3.2.6 Image Selector Page

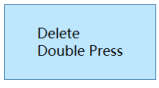
6.3.2.6 Image Selector



[Local] Select local material inventory.



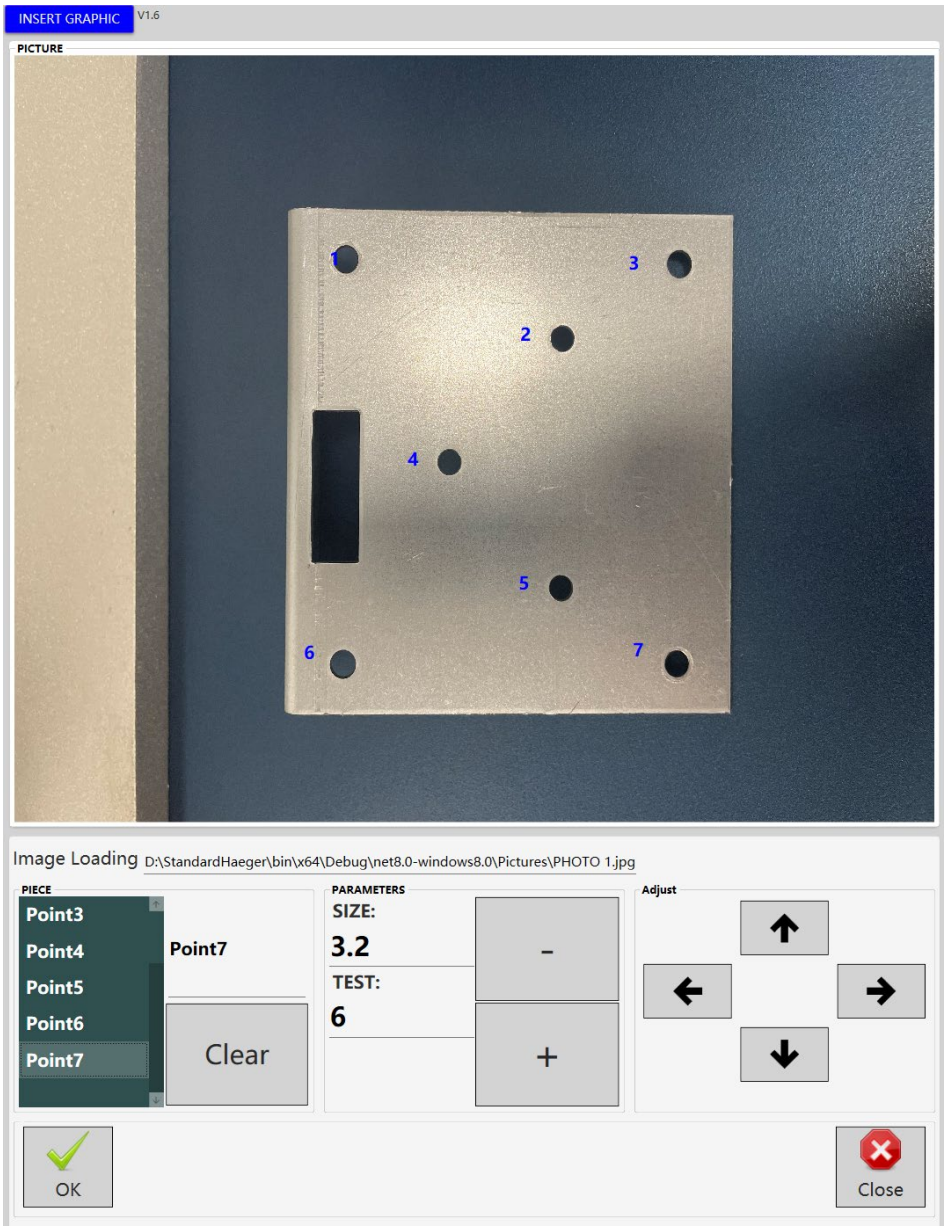
[Path] Storage path.



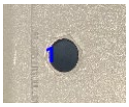
[Double Click] Double click to delete the current image from the local material library.

[USE] Select the current image and go to the editing page.
→To→6.3.2.7 Image Setting Page

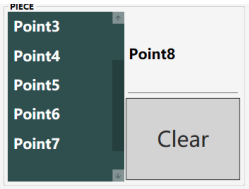
6.3.2.7 Image Setting Page



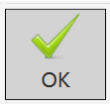
[Local] Select local material inventory.


[Click] Click on the hole position.→ 

→Select OK.



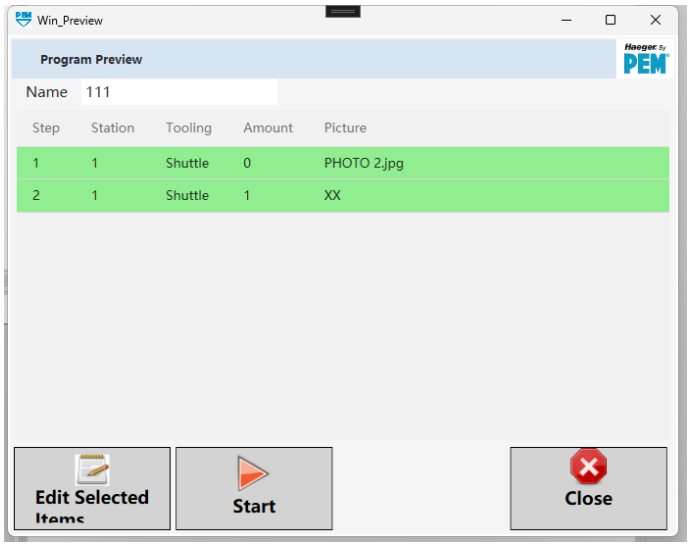
[PIECE] Sheet metal hole position information.

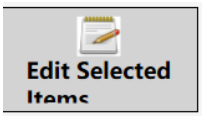


[OK] Complete editing.

[Close] Cancel editing and close the page.

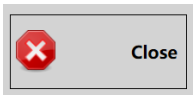
6.3.3 Program Preview Page





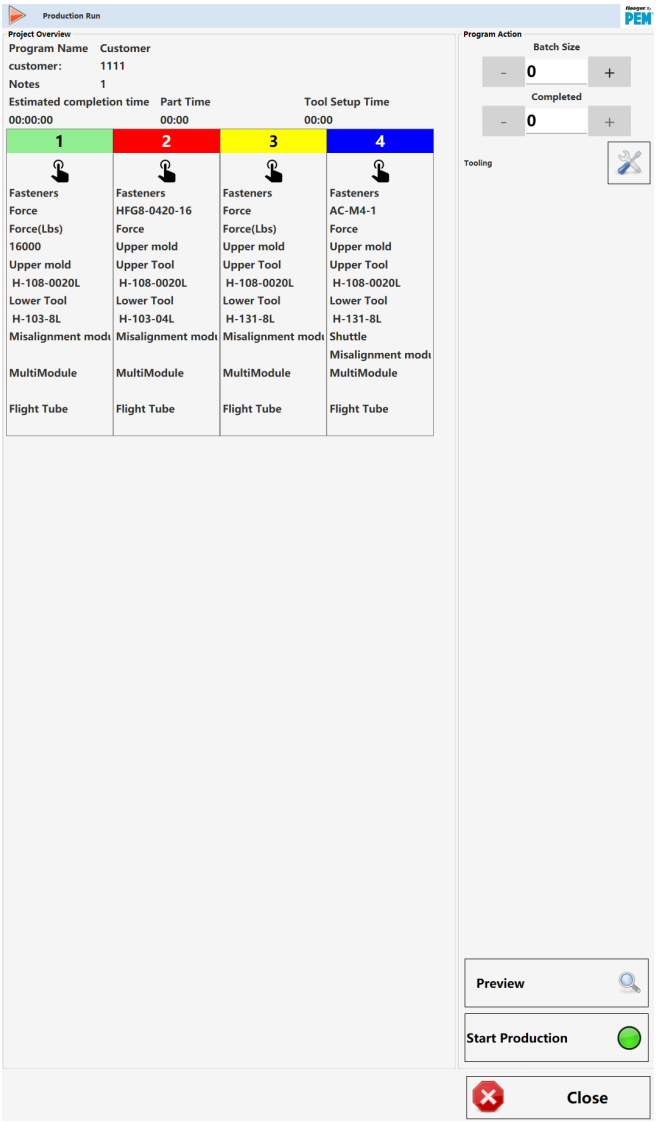
[Edit] Directly carry the current program information and jump to the program creation navigation page for re modification.
→To→6.3.2 Create Insertion Program Wizard Page

[Start] Directly carry the current program information to jump to the running page.
→To→6.3.4 Production Run Page



[Close] Close the current Page.

6.3.4 Production Run Page



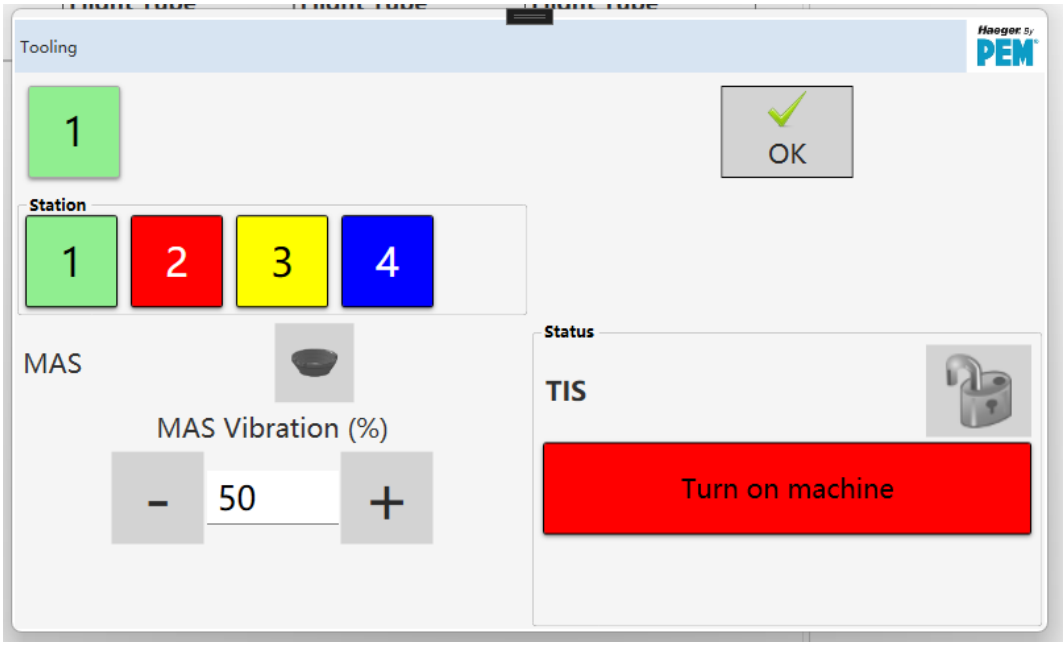
 [Tooling] Directly carry the current program information to jump to the running page.
→To→6.3.4.1 Tooling Page

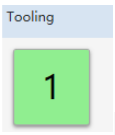
[Preview] Carry the current program information to the preview page.
→To→6.3.2.5 Add Steps Page

[Start] Start Production.
→To→6.4 Start Production Page

[Close] Close the current Page.

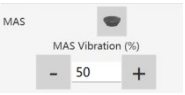
6.3.4.1 Tooling Page





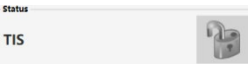
[Station] The currently selected station.

[Station] Choose different stations.



[MAS] Vibration Disk Settings.

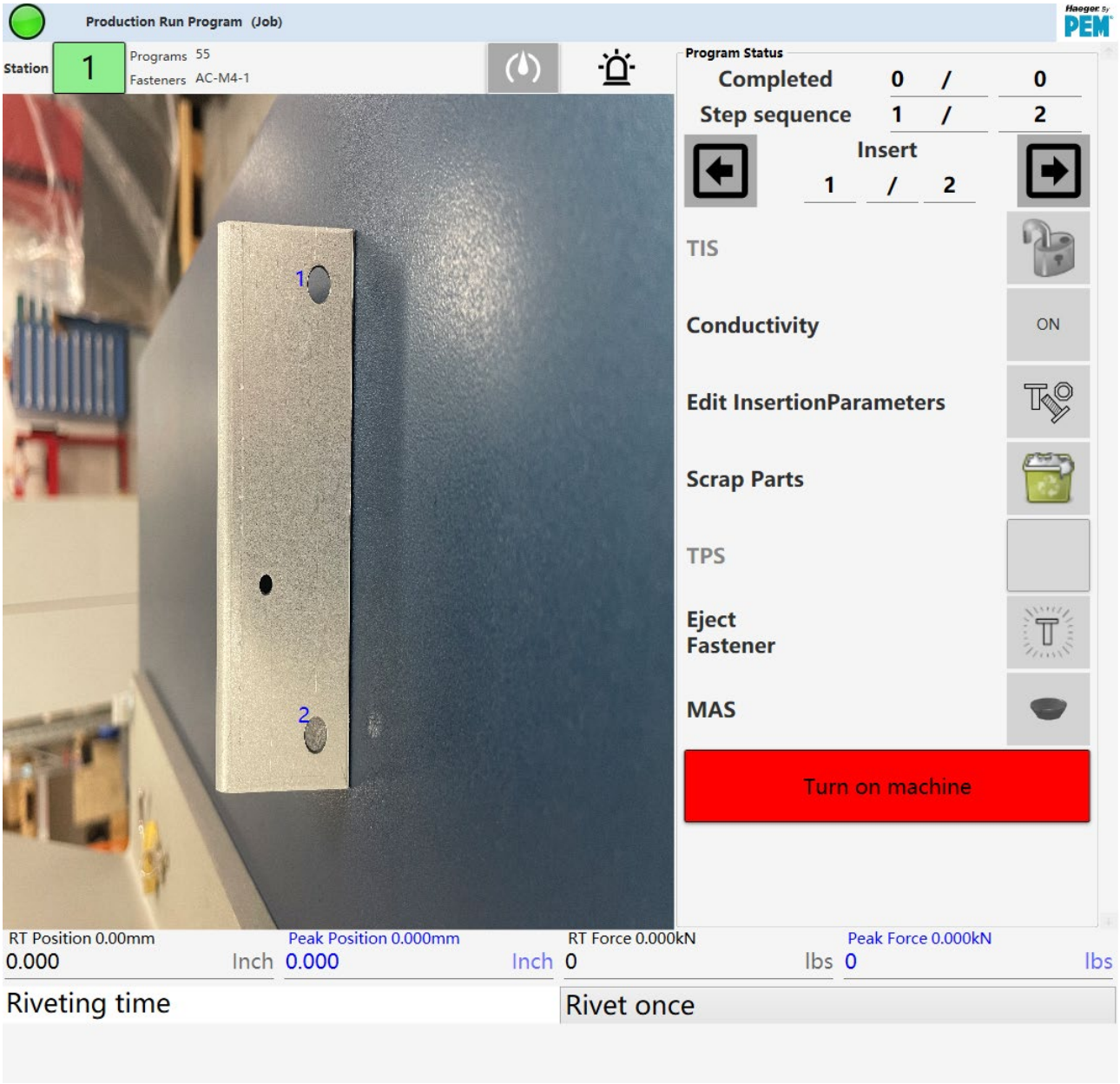
[OK] Click the button to save the settings.



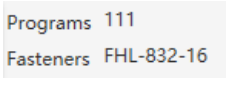
[TIS] TIS status.

[Machine] Device start stop.

6.4 Start Production



[Station] Current station information being executed.

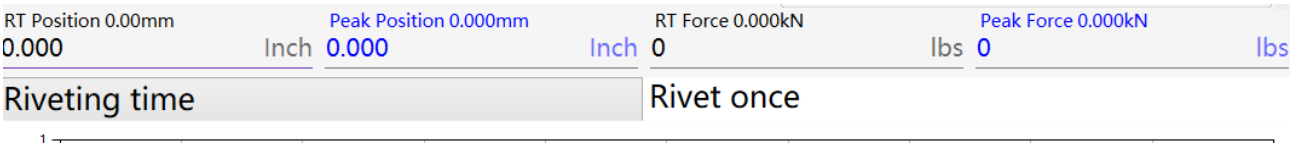


[Detail] The current program number and corresponding fasteners being executed.

[Speed] Speed setting.
→To→6.5.9.2 Feed Page

[Alarm] Alarm Message.

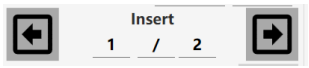
→To→6.7 Alarm Show



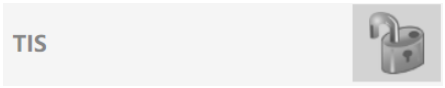
[Real time] Real time data and real-time charts.
→To→6.5.11 Press Logging Page

[Completed] Completion status.

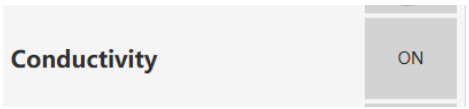
[Step] Step Sequence.



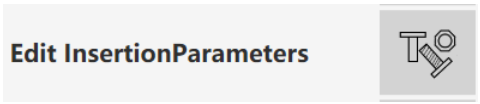
[Skip] Skip this fastener insertion and proceed to the next or previous insertion.



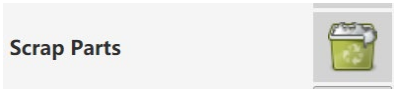
[TIS] TIS opening and closing.



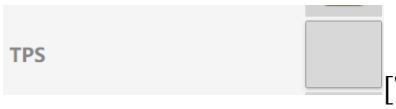
[Conductivity] Conductivity opening and closing.
→To→6.4.1 Adjust Fastener Data Page



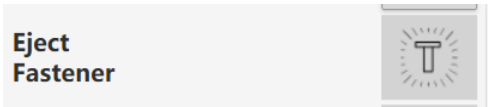
[Edit] Edit insertion parameters.



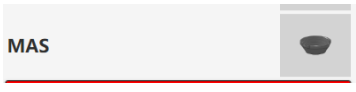
[Scrap] Scrapped parts.



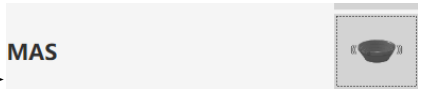
[TPS] Set TPS.
→To→6.4.2 Set TPS Page



[Eject] Eject Fastener.

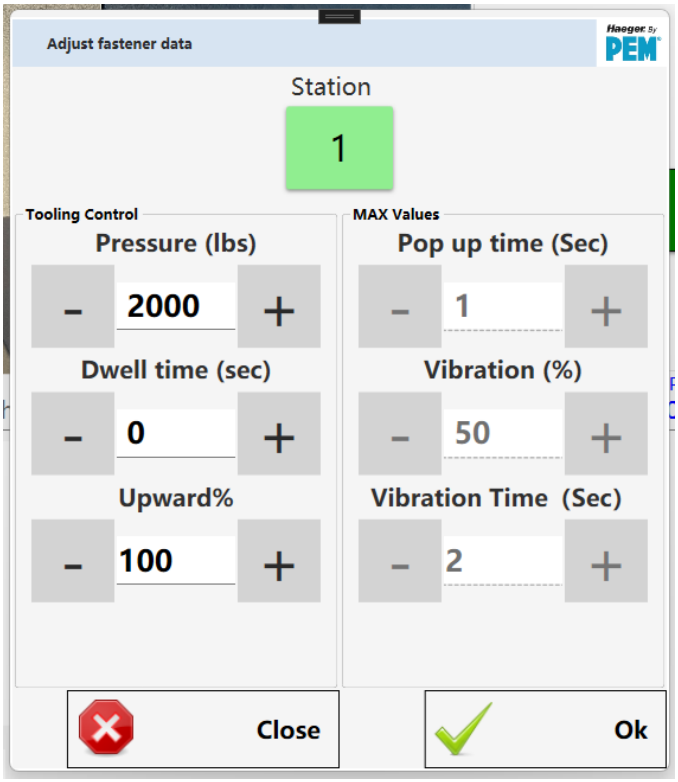


[Real time] Vibration disk vibration.→



[Machine] Machine on/off.

6.4.1 Adjust Fastener Data Page



[Station] This Station.

[Pressure] Pressure adjustment.

[Dwell] Pressure holding time adjustment.

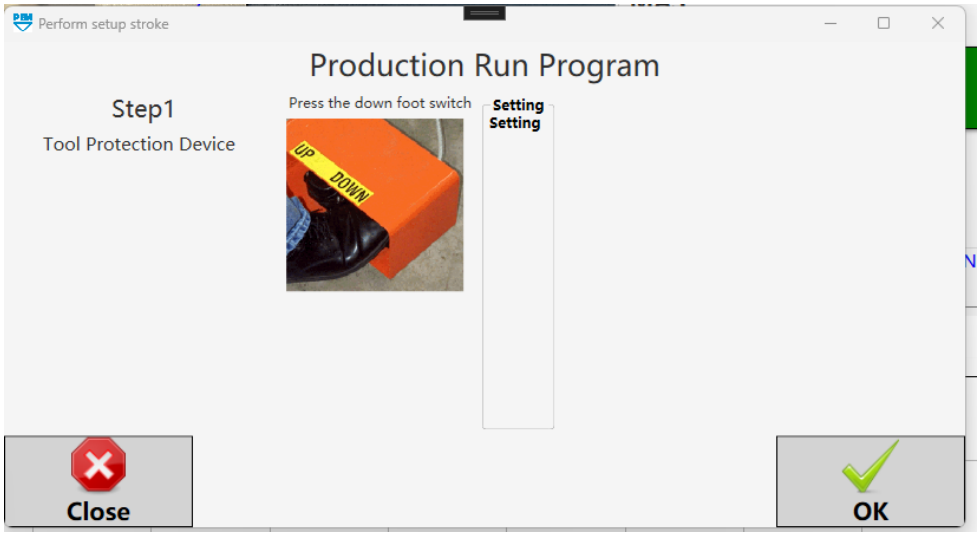
[Upward] Up itinerary adjustment.

[Popup Time] Popup time adjustment.

[Vibration] Vibration adjustment.

[Vibration Time] Vibration time adjustment.

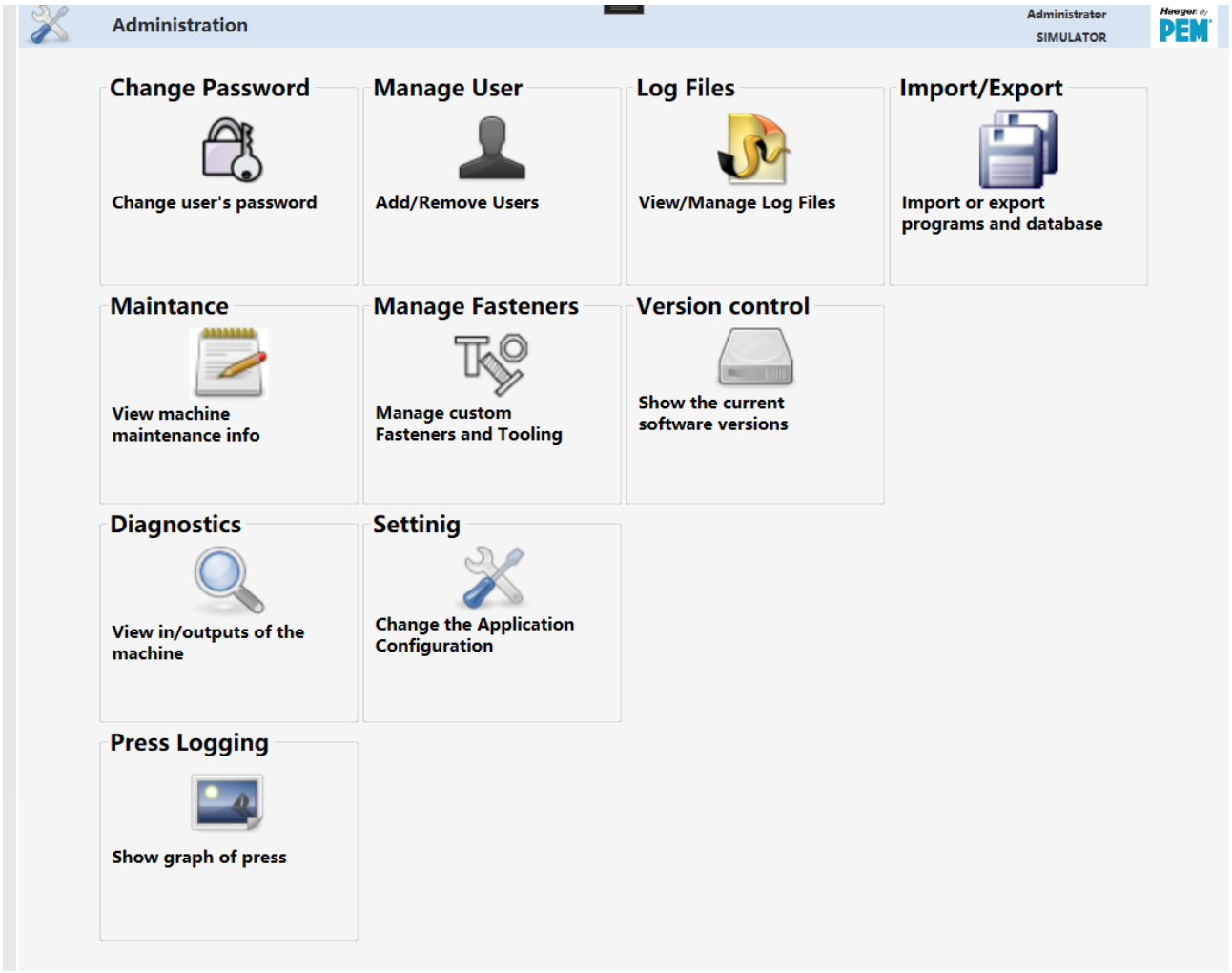
6.4.2 Set TPS Page

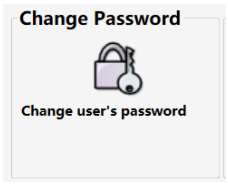


[TPS] Click this button to pop up a pop-up window and select OK to automatically set TPS.

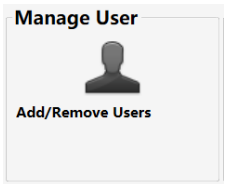
6.5 Admin

6.5.1 Admin homepage

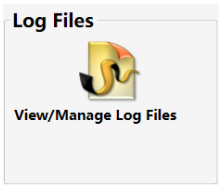




[Change Password] Change use's password.
→To→6.5.2 Change Password Page



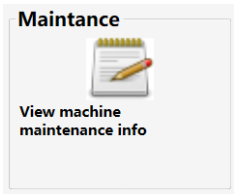
[Manage User] Add/Remove Users.
→To→6.5.3 Manage User Page



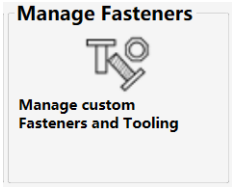
[Log Files] View/Manage Files.

→To→6.5.4 Log Files Page

[Import/Export] Import or export programs and database.
→To→6.5.5 Import/Export Page

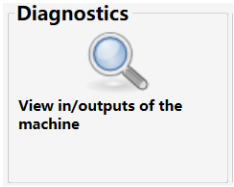


[Maintenance] View machine maintenance info.
→To→6.5.6 Maintenance Page

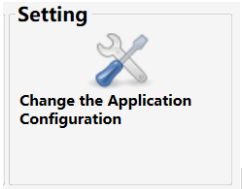


[Manage Fasteners] Manage custom Fasteners and Tooling.
→To→6.5.7 Mange Fasteners Page

[Version Control] Show the current software versions.
→To→6.5.8 Version Control Page



[Diagnostics] View in/outputs of the machine.
→To→6.5.9 Diagnostics Page

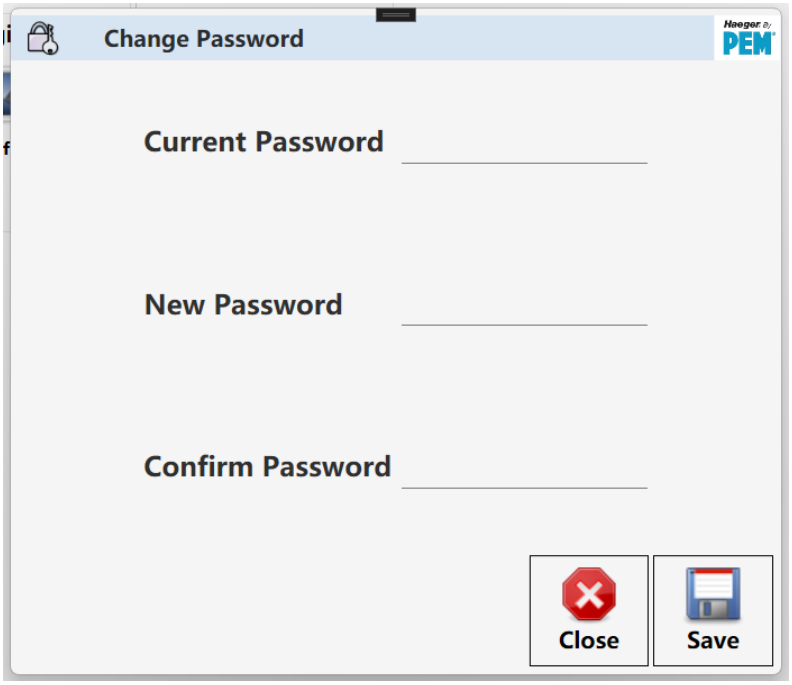


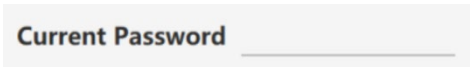
[Setting] View in/outputs of the machine.
→To→6.5.10 Setting Page

[Press Logging] Show graph of press.

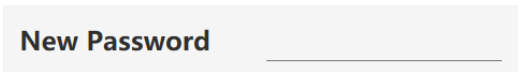
→To→6.5.11 Press Logging Page

6.5.2 Change Password Page

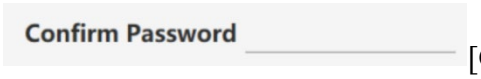




[Current Password] Enter the current password.



[New Password] Enter the new password.

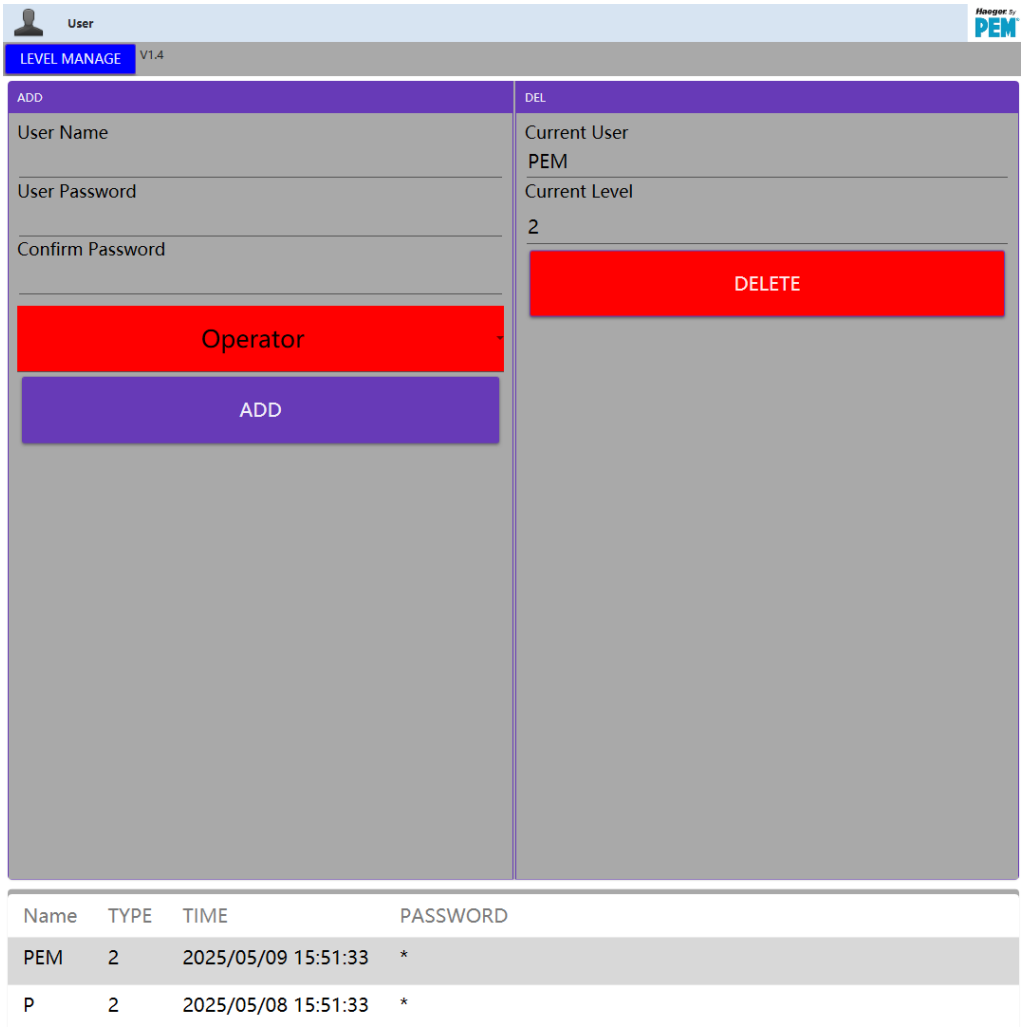


[Confirm Password] Enter the confirm password.

[Close] Cancel modifications and close the current window.

[Save] Save changes and close the current window.

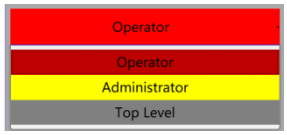
6.5.3 Manage User Page



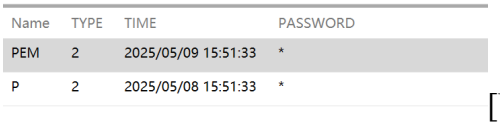
[User Name] Enter the newly added username.

[User Password] Enter the newly added password.

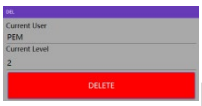
[Confirm Password] Enter confirmation password.

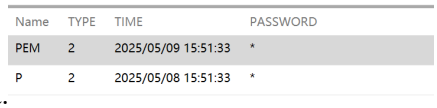


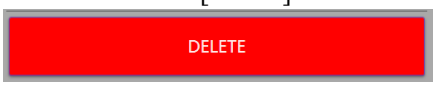
[Role] Select personnel permissions from the drop-down list.



[User] Existing personnel.



[Delete]Select existing data.




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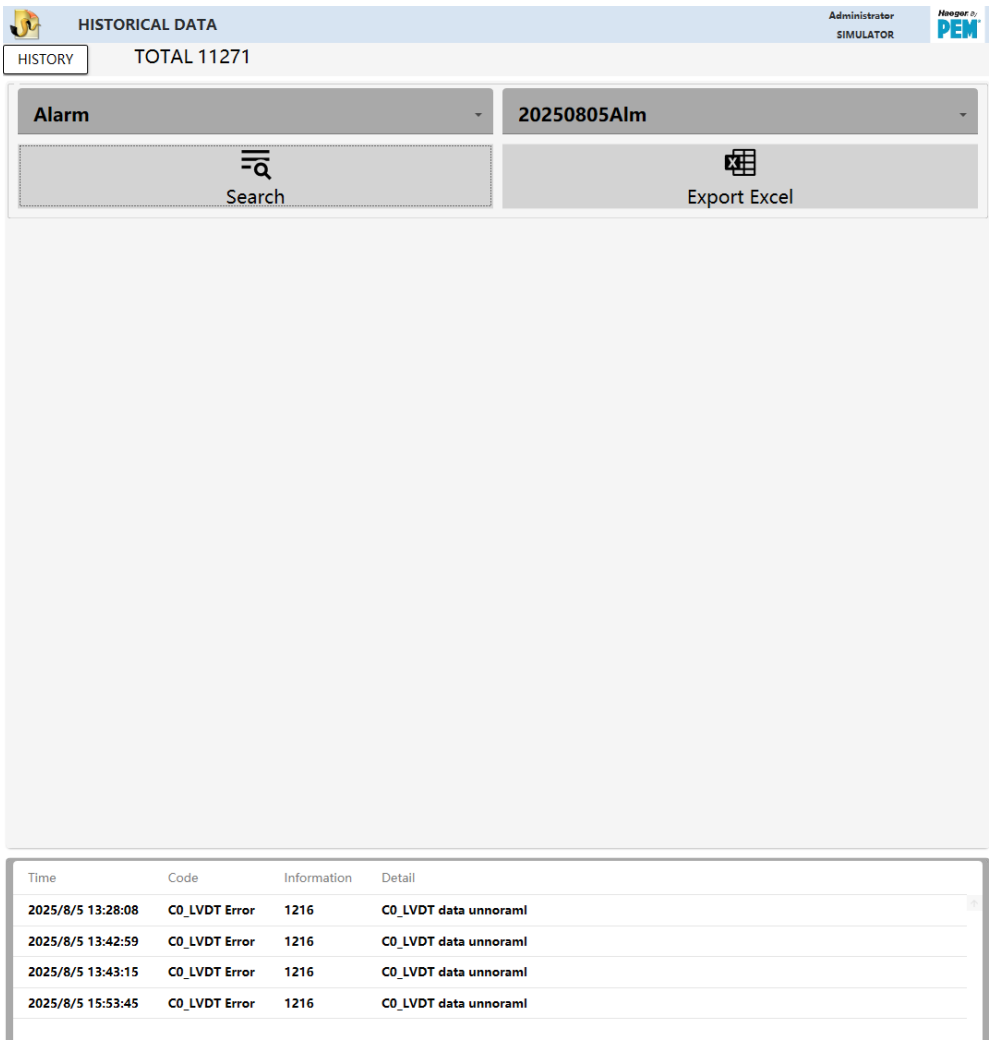
6.5.4 Log Files Page

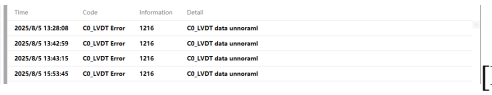


[Total] Total amount of historical data.

[Data type] Select data type.

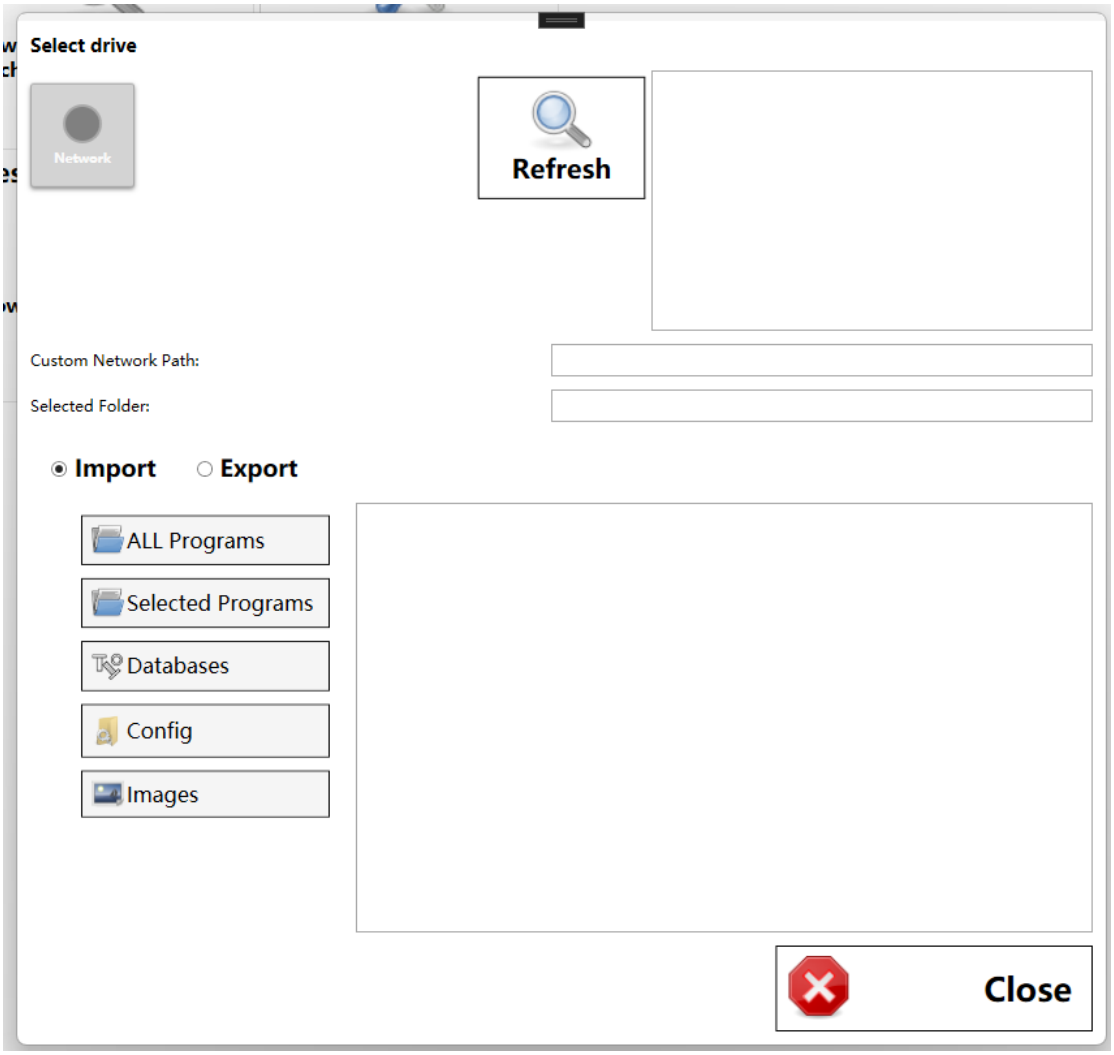
[File] Select a Data File.

[Search] Obtain data based on query criteria.

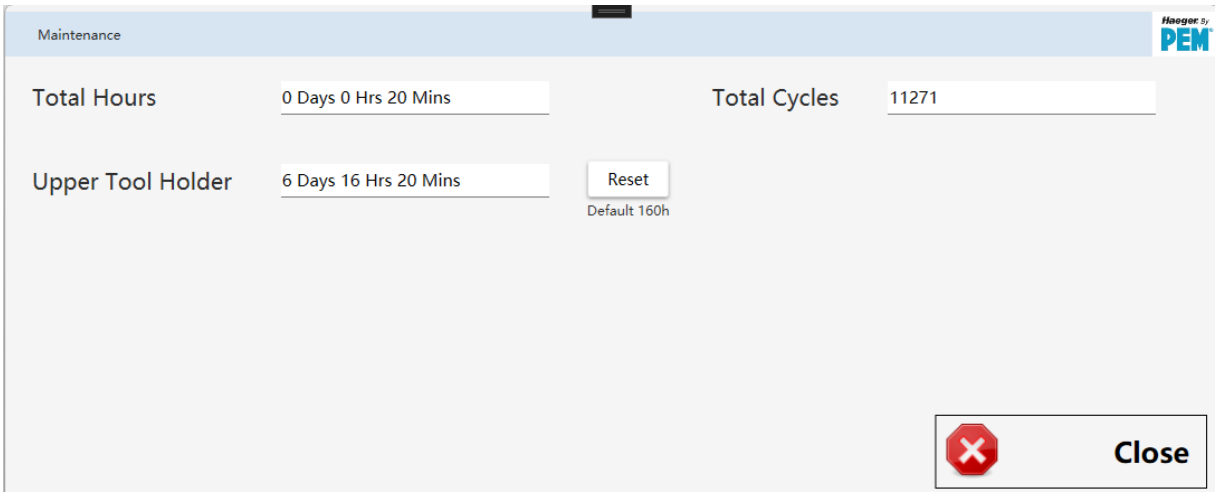

[Result] Query results.

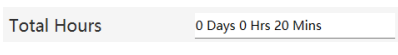
[Export] Export current query data.

6.5.5 Import/Export Page



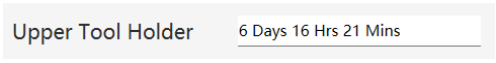
6.5.6 Maintenance Page



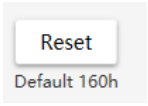


[Running Time] Software startup and runtime duration.

[Cycles] The total number of cycles of the device.



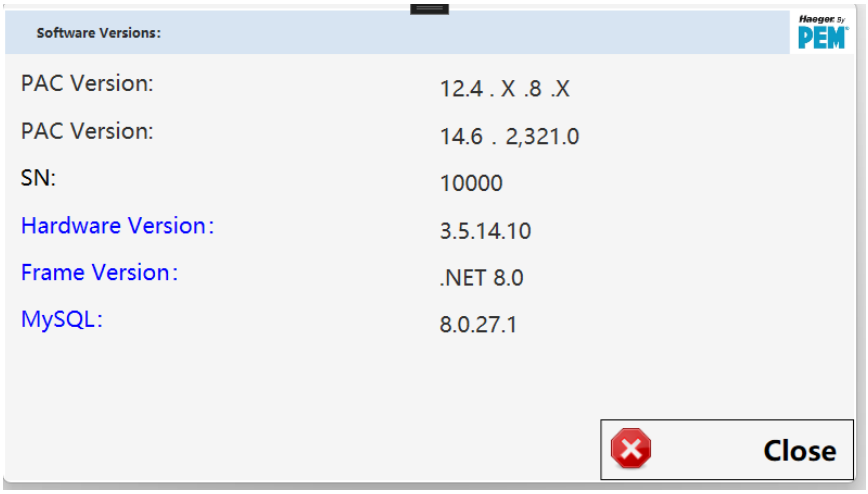
[Gripper] Duration of use of upper mold gripper.



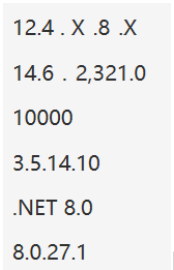
[Reset] reset.

6.5.7 Mange Fasteners Page

6.5.8 Version Control Page



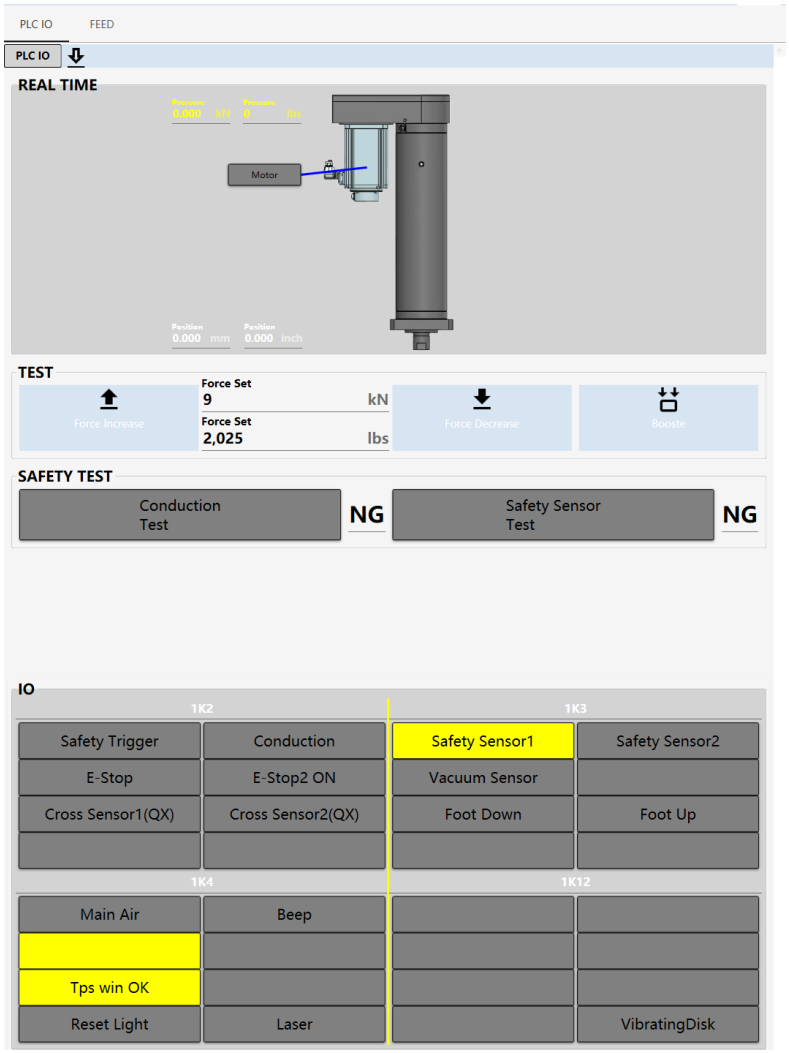
[Version] release note.



[Version Number] Corresponding version number.

6.5.9 Diagnostics Page

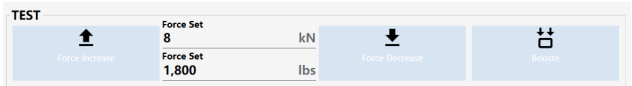
6.5.9.1 PLC IO Page



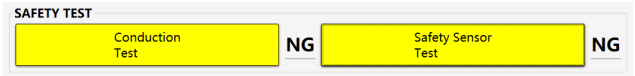
[REAL TIME] Implementation status data.

[Pressure] Real time pressure.

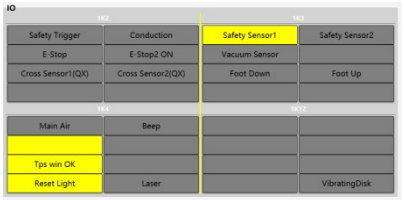
[Position] Real time position.



[Pressure Test] pressure test.

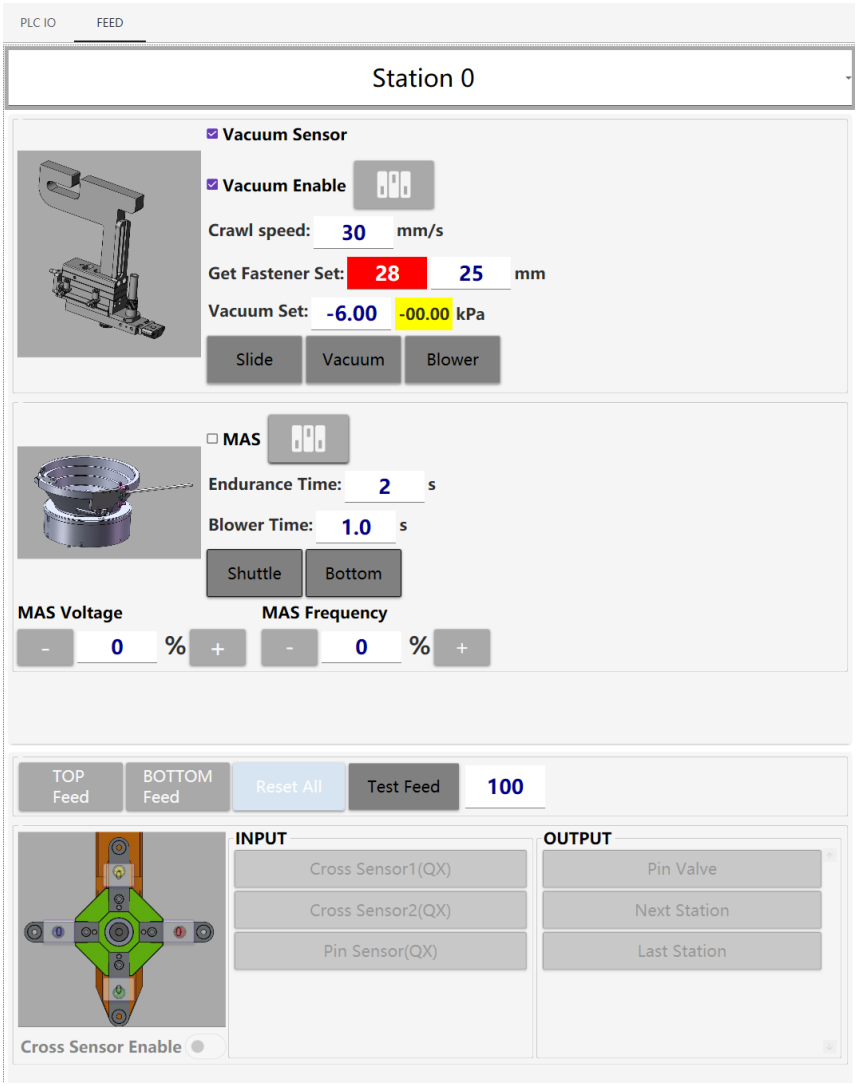


[Test] Safety signal testing.

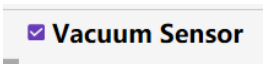


[Signal] Real time signal of current device.

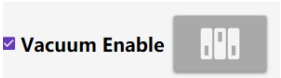
6.5.9.2 Feed Page



[Station] Select station.



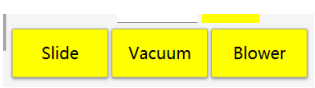
[Sensor] Vacuum suction signal.



[Enable] Click on the icon to control whether it is enabled or not.

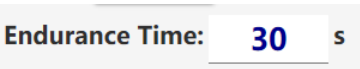
[Speed] Speed setting.

[Value] Vacuum value setting.



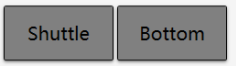
[Control] State control.

[MAS] Vibration disk activation control.

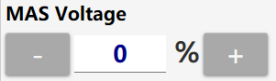


[Time] Vibration duration setting.

[Time] Blowing time setting.

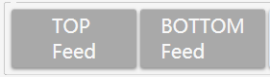


[Time] Blowing time setting.



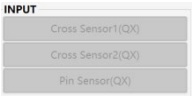
[Voltage] Vibration disk voltage setting.

[Frequency] Vibration disk frequency setting.



[Feed] Top feeding or bottom feeding once.

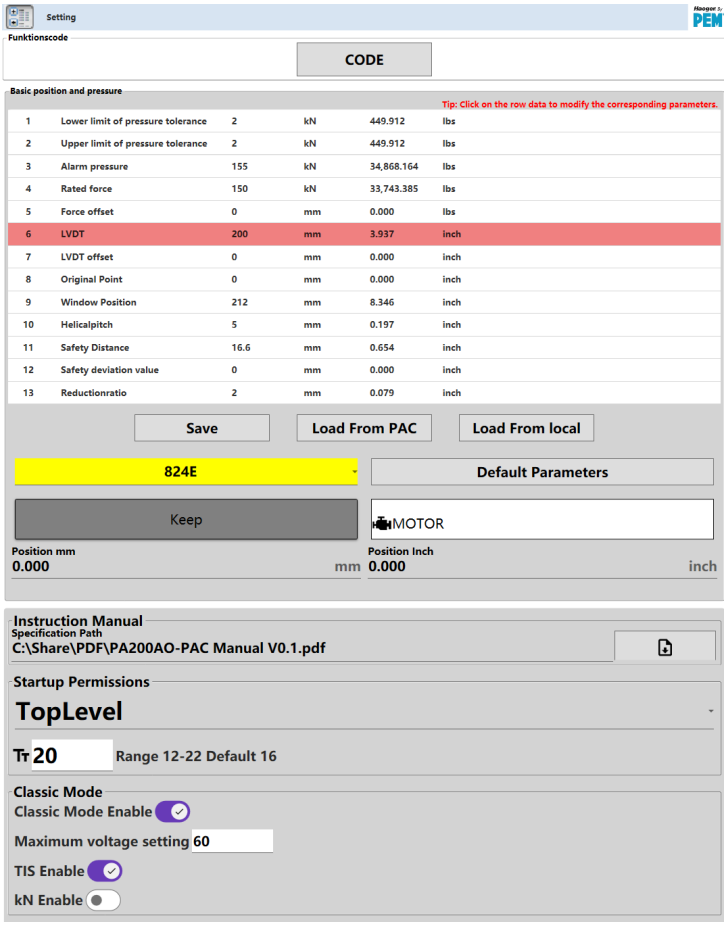
[Feed] Top feeding or bottom feeding once.



[Input] Input signal status display.

[Output] Output signal status display.

6.5.10 Setting Page



6.5.10.1 CODE

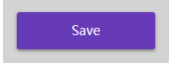
[CODE] Click on the button.→ 

Enter the corresponding function code.

6.5.10.2 Basic position and pressure

[Modify] Click to modify row data.→ 

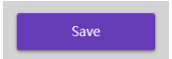
Enter the value that needs to be modified.→ 

If there is a change in the value after modification, the background color of the changed line will change.→ 

Click Save to save the modifications locally and write them to PAC at the same time.

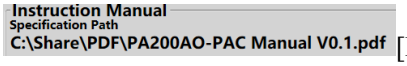
[Device Type] Select Device Type.→

Preview the custom parameters of the current device.→



[Position] Real time location display.

6.5.10.3 Instruction Manual



[Path] The path where the instruction manual is located.


[Download] Download the manual.

[Level] When logging in with the highest privilege, the default level for the next login can be set.

[Font Size] Set system font size.

6.5.10.4 Classic Mode

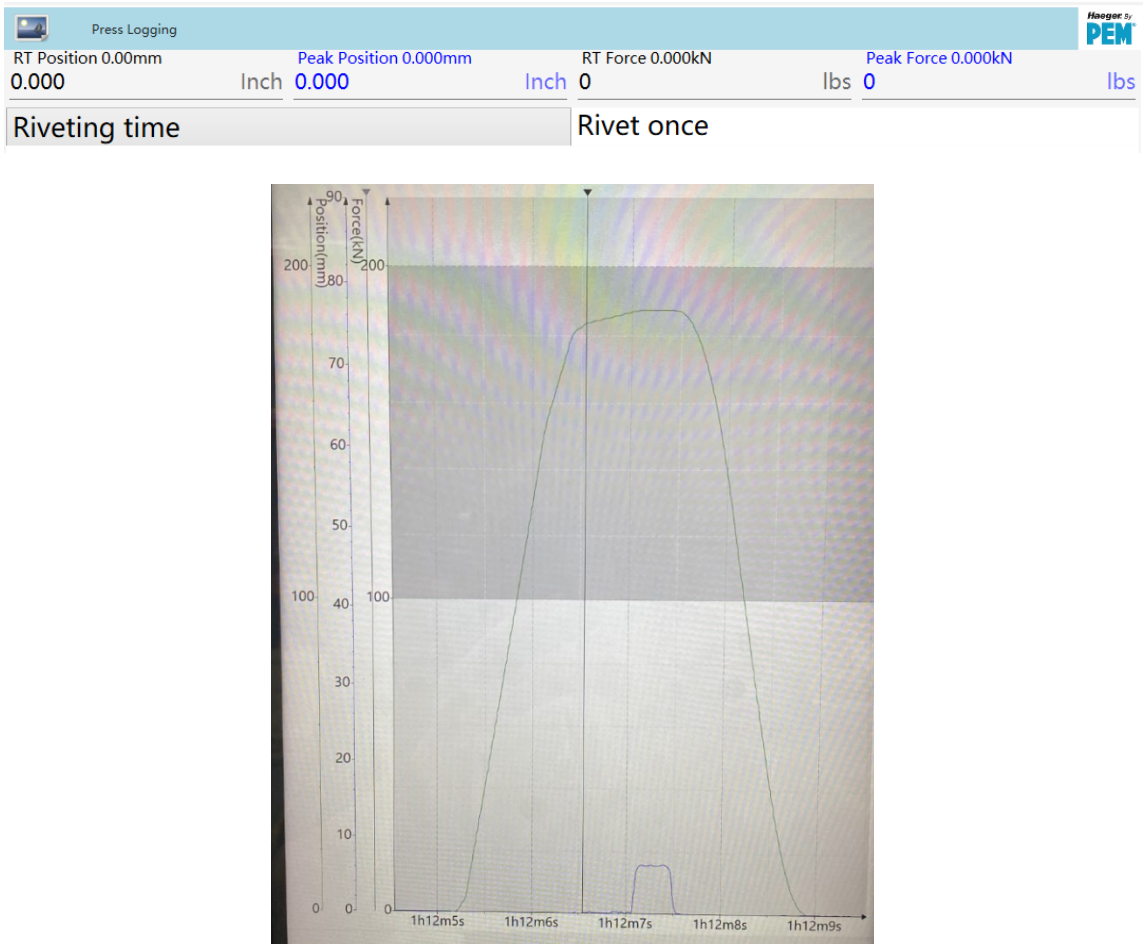
[Mode] Whether to enable classic mode.

[Voltage] Maximum voltage setting.

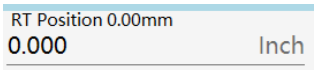
[TIS] Is TIS enabled.

[UNIT] KN unit activated.

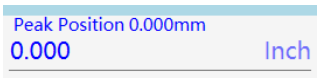
6.5.11 Press Logging Page



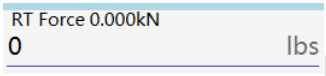
Time-Pressure-Displacement.



[Position] Real time location display.



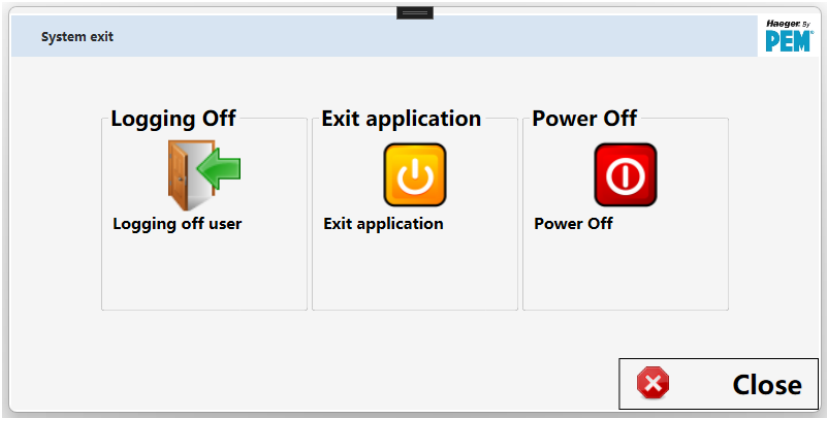
[Position] Peak position display.



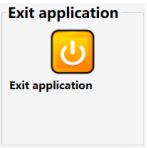
[Force] Real time force display.

[Position] Peak force display.

6.6 Exit



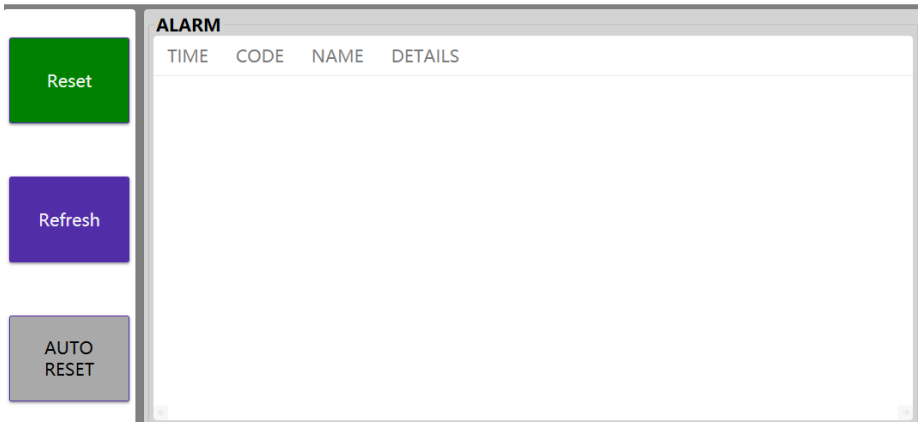
[Logging Off] Log out of the current logged in person and revoke permissions.

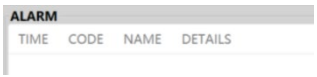


[Exit Application] Exit the program.

[Power Off] Exit the program and shut down the computer.

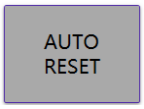
6.7 Alarm Show





[Data] Display current alarm data.

[Reset] Manual reset button.



[AUTO RESET] When the alarm can be reset, it will automatically reset. There is no need to manually click reset when the alarm is triggered, and the system will automatically reset.

ALARM

Number	Alarm Information	Code	Reason	Solve
1	RT Safety position above set	1181	Current safety trigger above set position	Reset and try again
2	RT Safety position below set	1182	Current safety trigger below set position	Reset and try again
3	Over maximum force	1183	Current force above the system maximun force set	Reset and check the hardware or force sensor
4	Home search error	1184	After power on or home search triggered, Cylinder won't arrvie the target position in a period time	Reset and try again, Or check the pump system and servo
5	Safety position set error	1185	During TPS set no contact the anvil or fastener vacuum lost	Reset and try again
6	Safety sensor error	1187	Not at run mode and position < 50mm, Two sensors signals not synchronization or keep triggering	Check the safety sensors Check Input Module Check SSR relays
7	EMERGENCY STOP! ! !	1188	E-Stop Button on	Check safety button status Check safety module E-stop input
8	Move error	1189	After trigger move command and can't arrive target position within 10 seconds	Reset and try again Check servo status Check valves status
9	Job done	1190	The workpiece counter > set workpiece	Reset
10	No vacuum checked	1193	Vacuum lost or no fastener on tooling	Reset and try again Check vacuum valve display Check air supply
11	No ram contact	1195	The tooling move down but not contact anvil within a period time	Reset and try again
12	Safety sensor 1 lost	1196	Sensor 1 not work ok	Check safety structure Check sensors
13	Safety sensor 2 lost	1197	Sensor 2 not work ok	Check safety structure Check sensors
14	Press sensor error	1199	If pressure A > 380bar or pressure B >380bar	Check pressure sensor
15	Servo error	1200	Servo error	Servo power off then power on Restart the press
16	Oil temperature high	1201	Oil temperature above set temperature	Cooling down the oil
17	Vacuum Err Please check and clean	1208	During cylinder return home the vacuum sensor triggered	Check vacuum tube
18	Safety trigger when return	1211	Trigger the safety sensor when cylinder return home	Reset
19	Current force above set force	1212	Peak force above set force	Reset
20	Current force below set force	1213	Peak force below set force	Reset
21	Position Sensor Error	1214	After home position check ok and the LVDT out of range	Check LVDT
22	Press NG	1215	Position or force not arrive the target set	Reset and try again
23	LVDT Error	1216	LVDT out of range for 0.5 second	Reset and check LVDT
24	Press Pos Above Set	1217	Under force mode the position above set(not necessary)	Reset
25	Press Pos Below Set	1218	Under force mode the position below set(not necessary)	Reset
26	Cylinder move unnormal	1219	The Cylinder moved without any move command	Reset and check LVDT
27	Conduction Failed	1221	Safety triggered but no conductive	Reset check SSR relay or conduction voltage
28	Fastener Length Err	1222	The conduction position out of safety set range	Reset and try again
29	TPS Error	1223	Conduction position error	Reset
30	Safety Light curtain Triggered	1224	Please remove from light curtain	Reset
31	Rotating Failed	1225	Can't move to target station	Check the rotating moto and sensors

SECTION 7
PNEUMATIC SYSTEM

A. The initial pressure input of the pneumatic system

• 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.

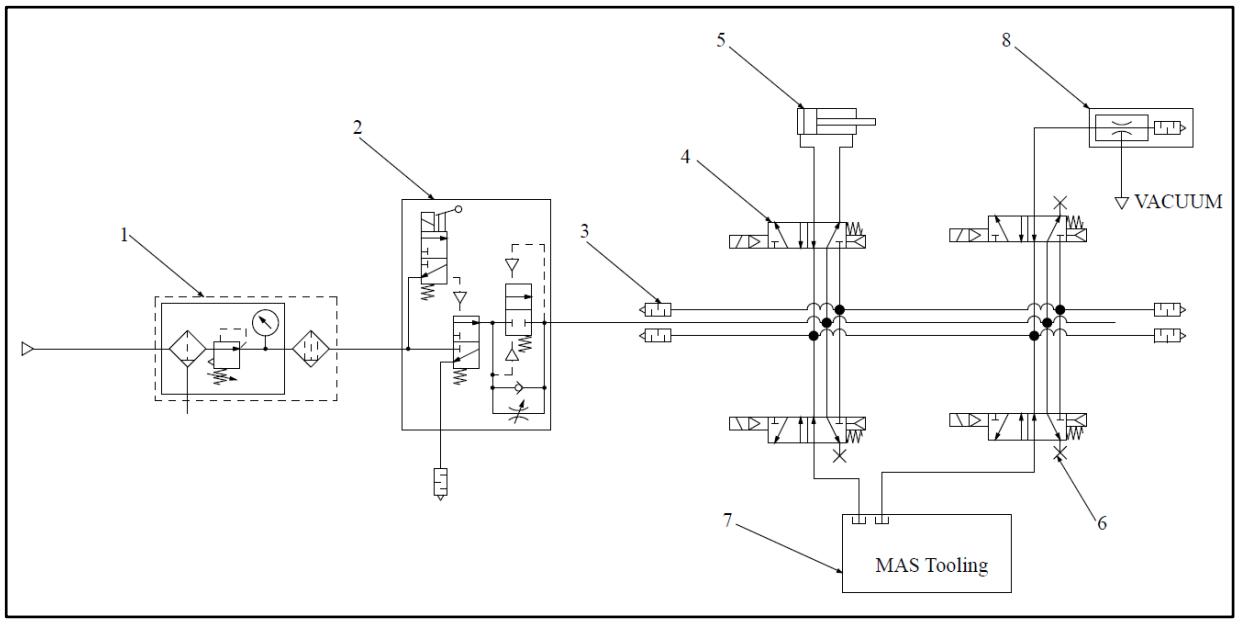
• Factory compressed air, set between 6 and 7 bar (90 to 100 psi), enters the system through a manually adjusted filter/regulator.

After flowing through the air filter pressure reducing valve, connect the Φ10 pipe to the pneumatic valve assembly plate:

1) Two Φ4 pipes are led out through different air valves on the valve plate, which are connected to the Multi-Module, One is used for single-acting cylinders to realize the dislocation function and blowing and feeding function; the other one is used to make the posture incorrect the riveting product is blown back into the vibrating feed tray.
2) Two Φ1/4 pipe pipelines are led out through the same valve on the valve plate, which are used for the pneumatic sliding table of the Multi-Shuttle;
3) One Φ6 pipe line is led out through the valve plate to supply air to the Vacuum Ejector.

B. Air discharge

Both sides of the pneumatic valve assembly plate are equipped with exhaust holes and are equipped with silencers. According to the action logic needs, the air is discharged from this.



NO.	DESCRIPTION	NO.	DESCRIPTION
1	Modular F.R.L Units	**5**	Pneumatic Sliding Table
2	Soft Start-up Valve	**6**	Plug
3	Silencer	**7**	Multi-Module
4	Single control Solenoid Valve	**8**	Vacuum Ejector

FIGURE 7-1
Pneumatic Schematic

SECTION 8
ELECTRICAL SYSTEM

WARNING: Device uses high voltage electrical power. Only trained and authorized personnel may attempt to maintain, service, or repair its electrically powered subsystems, components or parts.

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.

Please refer to the drawing description for details.

AC Power Distribution:
The device is protected by a four-pole main circuit breaker. The orange line means there is still power after the power is off.

The inline AC power entering the device is routed to the following 2 areas:
- AC power supply
- Maintenance electricity.

DC Power Distribution:
- DC power supply from the main power supply for the programmable controller. Through different sub-circuits, it also supplies power to sensors and other input signals, touch screens, and programmable controllers that are used to control output drive cards for different load (output) switches.
- Light power.
- Motor, driver, Relay, Cylinder.

ELECTRICAL/ELECTRONIC IO

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

Input		Output	
PAC LOCAL INPUT		PAC LOCAL OUTPUT	
0	Touchpad sensing	0	
1		1	
2		2	
3		3	
4		4	
5		5	
6		6	
7		7	
1K2_1K3 CT-121F 16DI		1K4_1K12 CT-222F 16DO	
0		0	主气源 MainAir
1		1	蜂鸣器 Buzzer
2	本体急停按钮 EmergencyStop	2	
3	第二急停信号 ON 触发 EmergencyStop2	3	
4		4	
5		5	
6		6	复位按钮灯 Reset Light
7		7	激光器 Laser
8	安全感应 1 SafetySensor1	8	
9	安全感应 2 SafetySensor2	9	
10	真空感应 VacuumSensor	10	底部送料 BottemFeed
11		11	吹气阀 Blower
12	脚踏开关下 FootSwitchDn	12	错位气缸 Shuttle
13	脚踏开关上 FootSwitchUp	13	伸出气缸 Slide
14		14	真空阀 Vacuum
15		15	振动盘控制 BowlControl
1K9 CT-3238 AII 15bit 8CH			
0	压力传感器 Pressure Sensor		
1			
2			
3	吸真空模拟量信号 Vacuum Analog		
4			
5			
6			
7			

SECTION 9
MAINTENANCE

The most important element of maintaining your PEMSERTER® rivet installation machine is to ensure that the compressed air supply is clean and dry. Do not use lubricated air. It is necessary to ensure the cleanness of the liquid drawing oil, do not open the filling port, and check the fastness of each pipe joint regularly.

Following the maintenance schedule below will also help maintain your hardware insertion machine in good running order.

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

Daily Inspection

• Safety punch system components.	• Perform safety system check procedures using “Testing the Safety System”.
• Upper Tool Holder.	• Replace Risk of Crushing label if peeling or damaged.
• Check the Multi-Module.	• Check whether there are impurities in the Multi-Module of the vibrating feeding system and whether it needs cleaning.
• Check air pressure.	• Check inlet pressure of 0.6MPa.
• Check the sound of the device working.	• Check the device is running without sound.

Weekly Inspection

• Check the press core mounting seat	Check the concentricity of the lower mold core mounting seat with the upper mold.

Monthly Inspection

• Upper Tool Holder	• Upper Tool Holder. • Small amount of lithium grease (white) between upper tool holder & cylinder rod.

Six months Inspection

• Safety sensor components.	• Check the condition of the photoelectric sensor and replace it if it fails.
• Grease the cylinder	• Inject a certain amount of Shell Gadus S2 V2202 grease into the cylinder.

Annual Maintenance

• Clean Air Valves (optional)	• If contaminant build up occurs, clean the pneumatic valves annually. • If wear is serious, replace the pneumatic valve.
• Check the condition of the cylinder	• Make sure the connections are tight and the wires are not frayed or broken, which could affect the proper functioning of the electric cylinder.

3 Year Maintenance

• Check PAC status and clean the PAC. • Replace the button battery of touch screen PC.	• Checking the PAC and replacing the button battery of touch screen PC can avoid an accidental loss of the program. When clean the PAC and replace the button battery of touch screen PC, the machine should be powered off.

SECTION 10
TROUBLESHOOTING

Note: If an internal PAC problem should develop, call a PennEngineering® service technician, please call +86 (512) 5726-9310.		
SYMPTOMS	**DIAGNOSTICS & PROBABLE CAUSE(S)**	**PROBABLE SOLUTION(S)**
A. Whole System Malfunctions		
1. The machine will not start. (OFF light not lit) The machine will not start. (ON light is lit)	a. Electrical disconnect turned off. b. No power to the machine. c. DC Power Supply failure.	a. Turn on the power. b. Check main fuses. c. Check DC Power supply, replace if faulty.
	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 the wiring continuity, replace if faulty.
2. The machine will not cycle.	a. Safety sensor inputs are on. b. Start button is not making the proper PAC input.	a. Check the wiring of the sensor b. Check the wiring of the start button. If it is faulty, it should be replaced.

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. The circuit breaker is open.	a. Analyze and repair the touch screen related circuitry then replace the fuse. b. Replace the touch screen if faulty.
2. The lights of the programmable controller are not on.	a. Check to see if the PAC power supply is receiving 24 volts. b. Check the fuse in the PAC power supply. c. Check to see if the PAC power supply has failed.	a. If not receiving power check breaker. b. Replace the breaker in the power supply. c. Replace the power supply.
3. The sensors are not functioning.	a. Check to see if breaker 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 DC power supply is not functioning.	a. Check the main power breaker. 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.
5. The machine will not power-up.	a. Check to see if there is in-coming 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.
7. The machine will not power-down.	a. Check to see if the OFF button is faulty. b. check MCR's /wiring.	a. Replace if faulty.
8. There is no voltage at the solenoid valve.	a. Check for a shorted coil. b. Check the related PAC output voltage.	a. Repair or replace. b. Replace the output card if faulty.

SYMPTOMS	DIAGNOSTICS & PROBABLE CAUSE(S)	PROBABLE SOLUTION(S)
C. Pneumatic System Malfunctions		
1. The air pressure does not reach the set value.	a. Check for leaks.	a. Repair any leaks.
D. Tooling Malfunctions		
1. The Multi-Module is jammed.	a. A fastener is jammed.	a. Clear the fastener.
2. Fastening and riveting products are not normally sucked out from the Multi-Shuttle tooling by the vacuum pressure rod.	a. Multi-Shuttle tooling uncalibrated center。	a. Recalibrate Multi-Shuttle tooling.
3. The long lengths of studs are jamming in the tube.	a. Bends in tube are too tight.	a. Redress tube to bend toward the frame and then through the tube clips on the frame.
E. Vibratory Bowl System Malfunction		
The bowl does not vibrate.	a. Check whether the circuit breaker of the vibrating plate drive controller is intact. b. Check whether the output signal light of the programmable controller is on. c. Check whether the internal circuit of the feeding drive controller is normal.	a. Check whether the solenoid coils at both ends are short-circuited. If there is a short-circuit, replace the coil, and then replace the circuit breaker of the feeding drive controller. b. If a failure occurs, replace and reprogram the programmable controller. c. If necessary, parts or controllers should be replaced.

SECTION 11
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 machine.)				
Safety Punch System assembly	MDS101220001	1 Set	PEM	
8T electric cylinder with motor	MDS182330007	1	PEM	
Standard filter mat	MDS024730003	2 PCS	RITTAL	3321.700 or 3321.705
Modular F.R.L Units (Optional)	MDS011830001	1	SMC	AC20D-02G-V1-A
Spacer (AC20-A&B) (Optional)	MDS012030027	1	SMC	Y200-A
Soft Start-up Valve (Optional)	MDS011830012	1	SMC	AV2000-02-5DZB-A
Base Mounted Valve/For Manifold Mounting (CE-compliant) (Optional)	PS201239	6	SMC	SY5140-5LZD-Q
Slide Table (Optional)	15-01870	1	SMC	
Box Type (Built-in Silencer) Vacuum Ejector (Optional)	PS200039	1	SMC	ZH10BSA-06-06
Air Suction Filter with one-touch Fitting ZFB series (Optional)	PS193152	1	SMC	ZFB200-06
2-color Display High-Precision Digital Pressure Switch (Optional)	PS210784	1	SMC	ZSE30AF-C6H-P-GA1

PART DESCRIPTION	PFT PART NUMBER	QTY	MANUFACTURER	MANUFACTURER'S PART NUMBER
Level Two Spare Parts (Add these items to the spare parts in inventory when no downtime can be tolerated.)				
.PAC standard bus controller	MDS024830012	1	Hcfa	Q1-1200-D3
15.6 touch PC	MDS025030005	1	珩图	HTPC6000-4G-SSD128G-8145U-2E
EtherCAT Coupler	MDS024830013	1	Odot	CN-8033
16-channel digital input	MDS024830014	1	Odot	24VDC/PNP CT-121F
16-channel digital output	MDS024830015	1	Odot	24VDC/PNP CT-222F
8-channel analog input	MDS024830016	1	Odot	CT-3238
Solid State Relays	PS190445	2	Phoenix	2905293
24V double contact relay head with test button	PS193070	2	Phoenix	1032526

Appendix
Electrical Schematic

See corresponding drawings for details