

618 MSP^e

Operation Manual



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SECTION 1 - INTRODUCTION

Congratulations!

You are using a genuine Haeger Hardware Insertion Machine - the industry standard for dependable fastener insertion.

Haeger, Inc. is widely recognized as the industry leader in the development and implementation of innovative self-clinching fastener installation technologies. For over thirty years, Haeger engineers have been designing and building flexible systems for installing practically every kind of self-clinching fastener into practically every kind of work piece - creating new technologies to help Haeger owners get just about any job done productively and profitably.

Over the years, Haeger's innovative tooling and patented quick-change automatic fastener feeding systems have revolutionized the way the world's fabricators and manufacturers install hardware. So whenever your operation faces an insertion challenge, turn to the manufacturer with the most experience in developing self-clinching fastener insertion solutions. Turn to Haeger.

Haeger Locations Worldwide

<p style="text-align: center;"><i>Haeger, Inc.</i> 811 Wakefield Drive Oakdale, CA 95361 USA Toll Free: (800) 878-4343 Phone: (209) 848-4000 Fax: (209) 847-6553</p>	<p style="text-align: center;"><i>Haeger Europe</i> Textielstraat 18 7575 CA Oldenzaal The Netherlands Phone: +31 541 530 230 Fax: +31 541 532 400</p>	<p style="text-align: center;"><i>Haeger China</i> No.2, Lane 55, Fenggong Rd. Malu Town, Jiading District 201801 Shanghai, PRC Phone: +86 21 5695 4988 Fax: +86 21 5695 4388</p>
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EC Declaration of Conformity of the Machinery

Declaration according to Directive 2006/42/EC, as amended (hereafter called Machinery Directive).
This language version of the declaration is verified by the authorized representative (original declaration).

We (authorized representative):

Business name: Haeger Europe
Address: Textielstraat 18B, 7575 CA OLDENZAAL
Country: The Netherlands

mandated in writing by the manufacturer:

Business name: Haeger Inc.
Address: 811 Wakefield Drive, Oakdale, California 95361
Country: United States of America

declare for the product described below:

Generic denomination: Fastener Insertion System
Commercial name: 618MSPe
Model: 618MSPe
Function: Automatic Insertion of fastener in metal plating by hydraulic pressing.

that all the relevant provisions of the (following version of the) Machinery Directive are fulfilled:

- 2006/42/EC | Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EC.

that the product also complies with the provisions of the following European Directives:

- 2014/30/EU | Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014
- on the harmonisation of the laws of the Member States relating to electromagnetic compatibility (recast)

that the following harmonized standards have been used:

- EN ISO 12100:2010 | Safety of machinery — General principles for design — Risk assessment and risk reduction [ISO 12100:2010].
- EN 349:1994+A1:2008 | Safety of machinery — Minimum gaps to avoid crushing of parts of the human body.
- EN 693:2001+A2:2011 | Machine tools - Safety - Hydraulic presses.
- EN 894-1:1997+A1:2008 | Safety of machinery — Ergonomics requirements for the design of displays and control actuators —
 - o Part 1: General principles for human interactions with displays and control actuators.
- EN ISO 13857:2008 | Safety of machinery — Safety distances to prevent hazard zones being reached by upper and lower limbs [ISO 13857:2008].
- EN ISO 14120: 2015 | Safety of machinery — Guards — General requirements for the design and construction of fixed and movable guards [ISO 14120:2015].
- EN ISO 14119:2013 | Safety of machinery — Interlocking devices associated with guards — Principles for design and selection [ISO 14119:2013].
- EN 60204-1:2006+A1:2009+C11:2011 | Safety of machinery — Electrical equipment of machines — Part 1: General requirements [IEC 60204-1:2005 (Modified)].
- EN ISO 4413:2010 | Hydraulic fluid power — General rules and safety requirements for systems and their components [ISO 4413:2010].
- EN 1037:1996+A1:2008 | Safety of machinery — Prevention of unexpected start-up.
- EN ISO 13849-1:2016 | Safety of machinery — Safety-related parts of control systems — Part 1: General principles for design [ISO 13849-1:2016].
- EN ISO 13849-2:2012 | Safety of machinery — Safety-related parts of control systems — Part 2: Validation [ISO 13849-2:2012].
- EN ISO 13850:2015 | Safety of machinery — Emergency stop — Principles for design [ISO 13850:2015].
- EN 61000-6-2:2005 | Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments [IEC 61000-6-2:2005].
- EN 61000-6-4:2007 | Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments [IEC 61000-6-4:2007].

and that the following natural or legal person established in the Community is authorized to compile the technical file:

Business name: Haeger Europe
Name and position: Rob Kelder, Technical Engineer
Address: Textielstraat 18B, 7575 CA Oldenzaal
Country: The Netherlands

Oldenzaal, NL August 2017



Wouter Kleizen
President, Haeger Europe

Statement of Foreseen Use

Your Machine is intended for use in an indoor commercial or industrial environment. Factory-authorized training is made available for operators at the time of installation. The Insertion Logic technology and all Haeger machines are designed to operate at voltages ranging between 208-480V and at 50/60Hz with no additional power requirements. Haeger systems do not produce thermal, biological, fire or radiation hazards etc. Again, Haeger machines are not intended or designed to be used in hazardous or explosive environments, exposure to outside elements of weather such as freezing, wet, extreme high temperatures or extreme dusty environments. See your local representative or visit www.haeger.com for more details.

Safety Information

This manual contains details on safety when using your new machine. Cautions and warnings are used throughout this manual to draw your attention to the different safety precautions. The Haeger Safety System section of this manual, explains the safety features built into the machine that minimizes the

dangers of pinching or crushing while operating the machine.



It is recommended that in addition the safety details in this Haeger insertion machine manual, all customers, create, implement and maintain their own individual safety codes, policies and procedures.

Customer Service

If your machine malfunctions and you are unable to resolve the problem, field service technicians can be dispatched to your site to conduct repairs. Service visits are paid for by the customer, either under a maintenance agreement, by purchase order or prepayment. Time and material rates are charged for any service not covered under a maintenance agreement. Before calling to report a problem, gather as much information about the problem as possible and have it ready to provide to your customer care center. The more information you can provide initially, the more quickly the problem can be corrected.

Responsibilities of the Operator

The machine operator must be properly trained. Haeger provides training for the operator in the use of the machine and software at the time of installation. It is the customer's responsibility to ensure that only properly trained personnel operate the machine. Operators must be fully versed in its operation. For any operator unfamiliar with its operation, training is required. Training is available; contact your Haeger representative. The customer must also ensure that all operators are aware of the safety issues described in this manual. The operator or other trained personnel are expected to handle all user maintenance as detailed in the User Manual. If your site has a technician in charge of machine maintenance, that person is the optimal candidate. While any trained operator may perform routine maintenance, the best maintenance results from familiarity with the machines internal operation and history. The machine requires daily maintenance to ensure the highest insertion quality and longer life for the machine. The machine design provides you easy access to perform this simple task and it is essential that machine maintenance is performed as described in the **“Maintenance Schedule”** section of this manual. It is the responsibility of the operator to try to eliminate simple problems before calling a service representative. But knowing when to call for service is also important. An untrained operator must not attempt to service the machine as this may cause further damage. When you have determined that a service call is required, call as soon as possible. See the Troubleshooting and Maintenance sections for more details.

Responsibilities of the Service Technician

Field service technicians must have the Model of Machine and InsertionLogic® (if applicable) service training. The service technician is responsible for all repairs, upgrading and modification requested by the customer or mandated by the Haeger Service and Support Group. The service technician who installs the machine will also provide training for the operator that covers all of the basic skills and safety practices required to operate the machine. Service personnel must be furnished with proper tools for the installation and maintenance of the machine.

Quality of Parts and Fasteners

Your machine is designed and engineered for high volume installation of self-clinching fasteners of all types and sizes. As a rule, the “quality” of parts and fasteners is very important to getting the most out of your Haeger Insertion Machine. The next two paragraphs are general in nature but critical to maximizing productivity, quality and profit potential.

Fastener Quality Basics: In general, self-clinching fasteners are designed with an annular recess in the shank that allows the softer metal of your part (work piece) to cold form in and around it and permanently lock the fastener in place. Inspecting the fasteners on a regular basis and verifying they are constructed within design tolerances is very important. With studs and stand-offs, this is especially critical as they increase in length. We highly recommend coordination between yourself and the fastener supplier to determine the acceptable dimensional tolerances and force requirements for your particular application in an effort to achieve consistent quality.

Part Quality Basics: Take special care in inspecting all parts in which the fasteners will be inserted. Verify the holes in the part meet the required specifications and tolerances. In addition, visually inspect each part, looking for burrs and irregularities around each hole. Holes out of tolerance, burrs and irregularities will degrade the fastener’s performance and may cause difficulties during the insertion process. We also recommend developing a consistent method of handling or holding the part (work piece) during the insertion process to ensure quality and increase fastener performance long term.



Self-clinching fasteners should be tested to be sure they meet manufacturer’s published performance data or specifications specific to the application.

Basic Data Sheet

Your Machine Model 618MSPe

Serial Number:	<input style="width: 95%;" type="text"/>	Year Manufactured:	<input style="width: 95%;" type="text"/>
Voltage:	<input style="width: 95%;" type="text"/>	Amperes:	<input style="width: 95%;" type="text"/>
Hertz (Machine):	50/60	Hertz (MAS):	50/60
Phase:	3		

618MSPe Machine Matrix			
Voltage	208/220	380/480	575
Amperage	8	4	3
Hertz	50 or 60	50 or 60	50 or 60
Phase	3	3	3

Noise Measurement Summary	
	Maximum Measured Value
Emissions Noise Sensitivity	In normal operation
A weighted pressure level	87dB
C weighted pressure level	87dB
For all locations, noise protection is always recommended	

Fluids & Pressure	
Hydraulic Oil:*	Hydraulic Oil, ISO 32 Viscosity Grade
ISO Viscosity:	32
Capacity:	10 gallons/38 liters
Max. Operating Pressure:	2,950 psi/203 bar
* Equivalent hydraulic oils may be used. It is the machine owner's responsibility to determine which hydraulic oils in their area are equivalent to ISO 32.	

Dimensions	
Height:	84 in./2,134 mm
Width:	33 in./838 mm
Depth:	43 in./1,092 mm
Weight:	1,225 lb./556 kg

Illustrations of Safety Notes

Safety notes are identified by a pictogram and a signal word. The signal word describes the severity of the risk at hand.



Warning possible dangerous situation that could cause minor physical injuries.



Risk of electrical voltage possible dangerous situation that could cause serious physical injuries.



Risk of crush injuries possible dangerous situation that could cause serious physical injuries.



Risk of pinching injuries possible dangerous situation that could cause serious physical injuries.



Important for a special behavior or activity for the safe handling of the machinery.



Application tips and particularly useful information.



Stop! Contact your Haeger Representative for instructions on how to proceed.



Eye protection must be worn when operating this machine



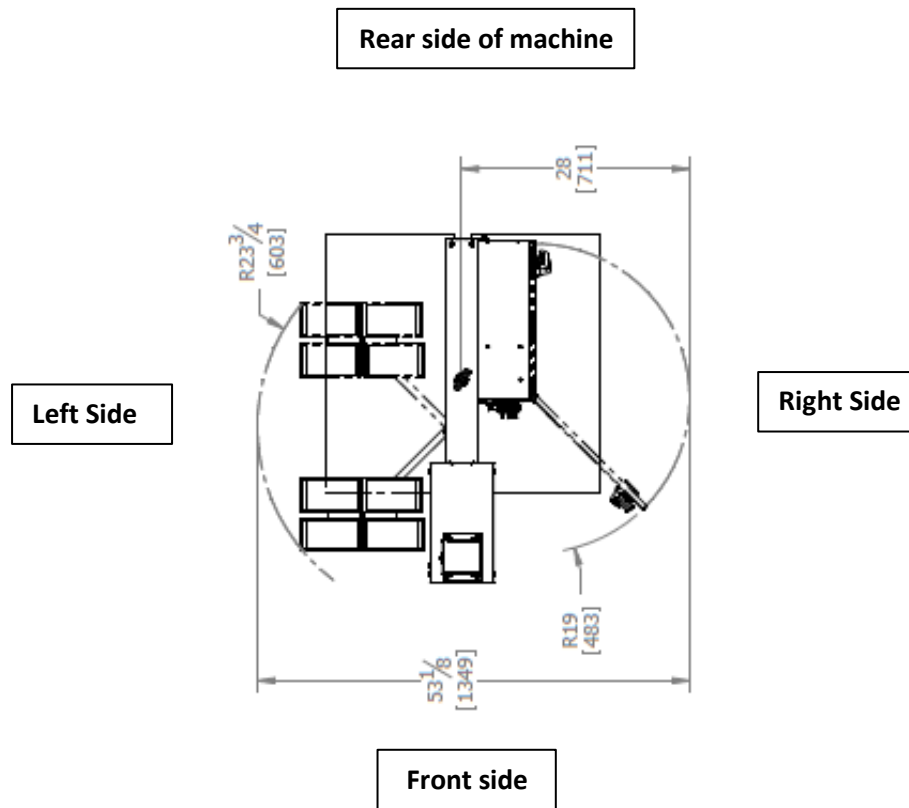
Read First! Read instructions first before operating this machine. Make sure that you read and understand all of the descriptions, instructions and notes contained in this section. Follow all of the Warnings and Cautions in this manual. **Your safety and productivity depend on it.**



Your machine was designed to conform to applicable CE, ANSI, OSHA, and CSA safety standards. It is the user's responsibility to understand any specific local safety codes that may require additional guarding and conform to those standards.

Details of Location in the Documentation

All information in these instructions concerning direction and location refer to the workplace of the operator.



In this manual, the use of the terms left and right refers to the machine operator's left and right when they are standing in front of the machine, facing the work area between the Upper Tool



Eye protection must be worn when operating this machine

Safety Precautions and Warnings



Never

Operate this Haeger Hardware Insertion Machine without proper instructions. Read and thoroughly understand this manual before attempting to operate this machine.



Never

Tamper with any part of this machine's electrical system unless you are a trained electrician and thoroughly understand this machine's electrical schematic.



Never

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.



Never

Attempt to test or demonstrate this machine's Safety System by placing any portion of your hand or body between the Upper and Lower tools. Always use the test procedure outlined in Section 4 of this manual.



Never

Exceed the maximum force of 9,000 pounds on the J- Frame, Square Tip Tool Holder, or Positive Stop.



Never

Attempt to run any irregular shaped sheet metal part that could contact the *Upper* and *Lower Tools* **before** these tools insert the fastener into the part. This applies to both the *Conductive* and *Non-Conductive Modes* of operation.



Never

Press the *Down Footswitch* a second time in the *Non-Conductive Mode* when your hands are in the area of the tooling.



Never

Operate this Machine without wearing the proper eye protection



Eye protection must be worn when operating this machine



The Safety System's retractable electrical cord is very durable; however caution should be taken when working close to the edge of deep boxes or cans. Operating with the Safety System's electrical cord too close to sharp metal edges may damage the cord.



Lubricate the *Upper Tool Holder* with a small amount of lithium (white) grease. Any other lubricant may interfere with the Safety System's operation and will void your machine warrant

SECTION 2 - INSTALLATION

Handling

The Haeger Hardware Insertion Machine is designed to provide the operator with a comfortable working height and to allow freedom of movement when positioning work pieces in the tooling area. Because of these features, the machine is **top heavy when unloading**.



- Handle with **extreme caution!**
- **Never** attempt to move the machine with a forklift positioned in **front of or on either side** of the machine.
- **Always** position the forklift or pallet truck to the **rear** of the machine when moving the machine with a forklift or pallet truck.



NEVER lift machine from the **FRONT** or the **SIDE**, either **IN OR OUT OF THE BOX**.



ALWAYS position the forklift to **REAR** of the machine.

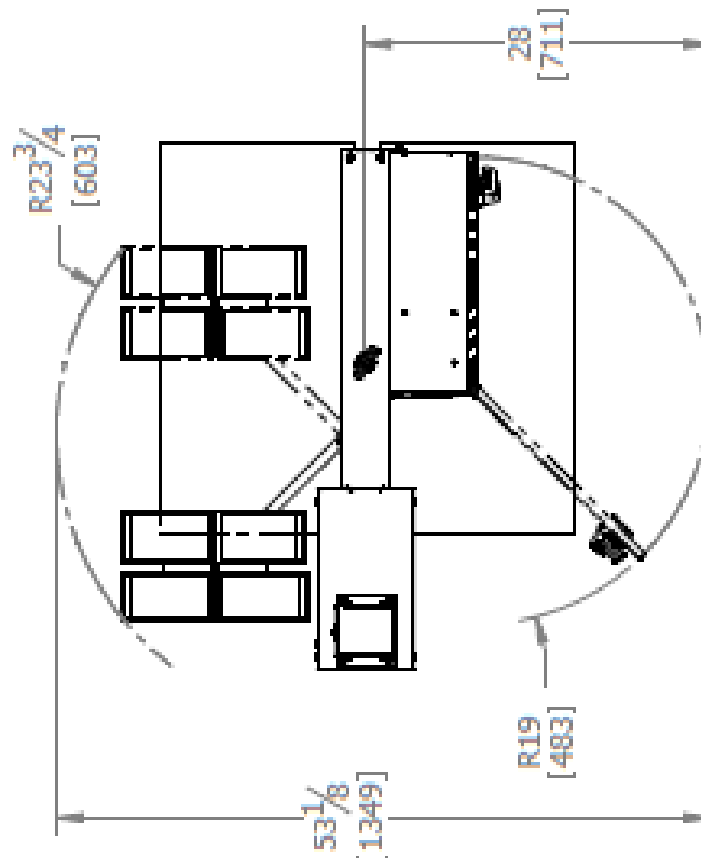


Machine is **HEAVY** in **REAR** and will tilt back when lifted with strap



Recommended Safe Work Zone

It is recommended that prior to delivery, the customer layout an area in their facility that allows the operator and maintenance personal, ample space to work or service the machine. The distances shown below are recommendations. It is the customer’s responsibility to adjust the “Safe Work Zone” based on their own individual needs to optimize operator and service technician safety. We also recommend that the customer and/or operator inform facility visitors of the “SAFE WORK ZONE” around the machine to minimize or eliminate the possibility of accidental bumping of the operator while the machine is in operation.



RECOMMENDED MINIMUM SAFE WORK ZONE

* The overall Safe Work Zone Dimensions will vary depending on the size of the part or work piece you are producing. It is generally recommended to have a 3’ (1 m) to 4’ (1.22 m) minimum safe zone beyond the operator and work piece to maneuver the part into position ready for insertion(s). In addition, the Safe Work Zone provides ample space for the service technician to service the machine.

Skid Removal



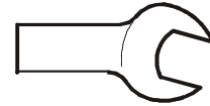
- The feet are already installed on the machine.
- You will need to lift the machine to remove the skids.
- You will need to open three wrenches to adjust the feet.

Skid Bolt: 9/16 in/13mm socket



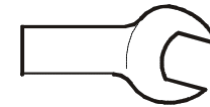
9/16"/13mm socket wrench

Foot: 7/8 in/22 mm open end wrench



7/8 in/22 mm

15/16 in/24 mm open end wrench



15/16 in/24 mm

1. Uncrate the machine.
2. Remove the (8) lag screws that hold the machine base to the shipping skid (2 on each plate).
3. Use the strap on the top of the machine frame and an appropriate sling for the weight of this machine and lift it until it clears the skids.

The weight of the Haeger Hardware Insertion Machine and skids are as follows:		
Machine	Pounds	Kilograms
618MSPe	1,225 lb.	556 kg.

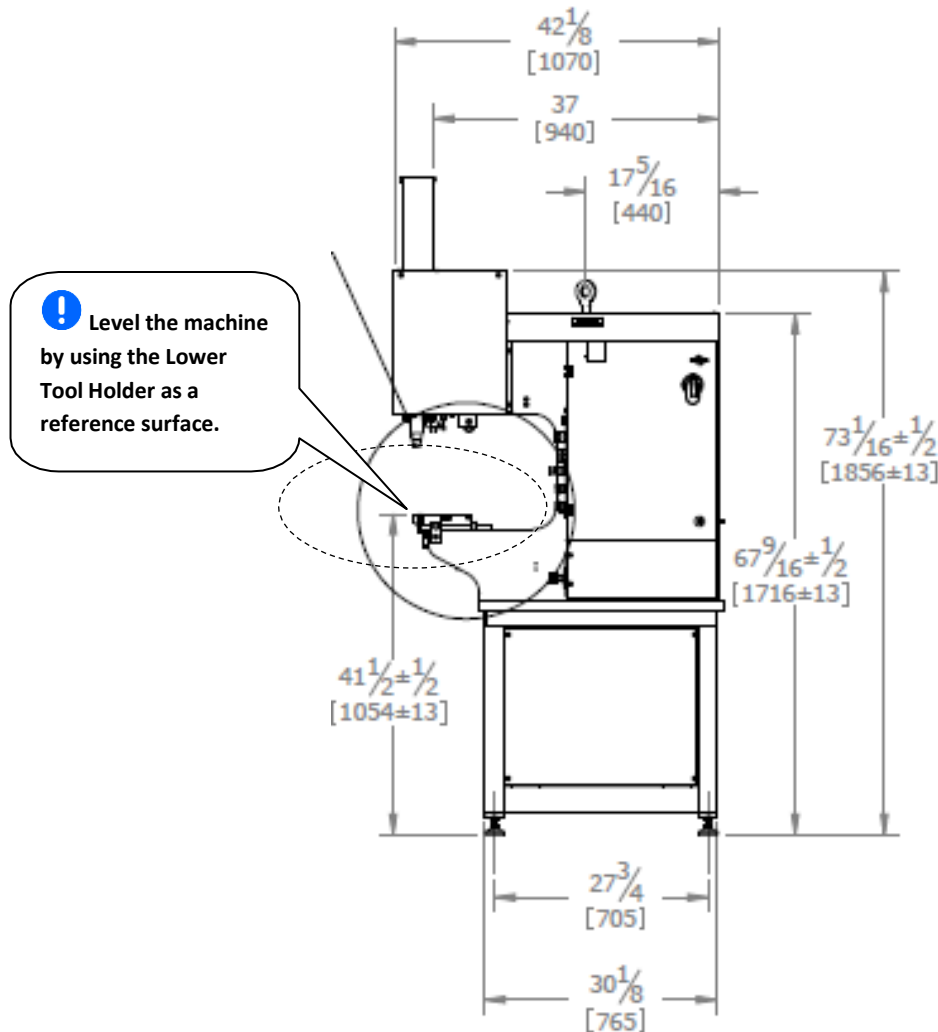
4. Carefully move the machine away from the skids (or move the skids). Lower the machine onto the floor.
5. Lower the nut on the foot and remove the plate.
6. Tighten the foot nut until it is flush with the bottom of the machine's base.

Machine Setup

1. Carefully locate the machine in the shop on a flat and preferably level hard surface such able to with withstand the weight of the machine as described it the “Basic Data” paragraph of this manual. If there is any question on the ability of the sub-surface to support the weight of the machine, check with a structural engineer. As of this publication there are no know requirements for fixing or anchoring the machine to the sub-surface, check with your local building code official, agency or structural engineer in your area to verify.

2. Level it front to back and left to right using the top surface of the Lower Tool Holder as a reference surface (see Figure below) Using a 7/8 in/22 mm wrench to adjust the feet, level the machine left to right and front to back. Make sure that all of the machine’s feet are securely resting on the shop floor.

3. Without changing the height adjustment of the feet, tighten the lock nut on each foot using a 15/16in/24mm wrench.



Machine Setup (Continued)

4. For the Model Machines with Modular Auto Feed System (MAS) installed, air must be connected to the fitting on the black hose which extends down from the bottom of the MAS. Connect an air-line that is capable of delivering of clean, dry air. For further instructions, reference the Modular Auto Feeder Operation Maintenance Manual Section of this manual.

Air Flow	Air Pressure
3 ft.³/min - 85 l/min	90 psi/6 Bar

5. If the machine is not yet filled with oil, remove the sides of the machine. Fill the machine with AW Exxon Humble Hydraulic H or equivalent premium hydraulic oil. Replace the sides when finished.

Fill the reservoir of the machine with the amount of hydraulic oil listed below:		
Machine	Gallons	Liters
618MSPe	10	38



Right side and left side panels can be removed to access Hydraulics.

Main Power Setup



- The electrical connections required in this section must be made by a qualified electrician.
- Check to make sure that the electrical power supply for this machine has been disconnected at the supply source before doing any work on the machine's electrical system.

1. Check the voltage on the Machine Nameplate, located on the rear of the machine's Main Electrical Cabinet (see Figure 2.3)
 - ! **MAKE SURE** the machine's incoming shop voltage is the same as the voltage the machine has been wired for. If the voltages do not match
 - 🛑 **STOP!** Contact your Haeger Representative for instructions on how to proceed.
2. Ensure that the machine's electrical power supply has been disconnected at the supply source. Turn the machine's Main Disconnect Switch to the Off position. Using the special key, open the door of the Main Electrical Control Cabinet (see Figure 2.4).
3. Wire the incoming three phase electrical power to the three connectors on the Main Disconnect Switch terminals labeled L1, L2 and L3. Make sure the machine is properly grounded by connecting the incoming ground wire to the top terminal of the green and yellow terminal block on the right side of the Main Disconnect Switch.
4. After all electrical connections have been properly made, we recommend installing service loops and/or an angle bracket (not included) on the main power cord coming in through the rear of the machine. Service loops provide a means of securing the main power cord to the electrical cabinet. In addition, it provides strain relief and unnecessary wire chafing.
5. Close and latch the Main Electrical Control Cabinet door using the special key.
6. Install the computer into the front of the computer cabinet and secure with fasteners supplied.



Figure 2.4
Open the door of the Main Electrical Control Cabinet.

Machine Name Plate

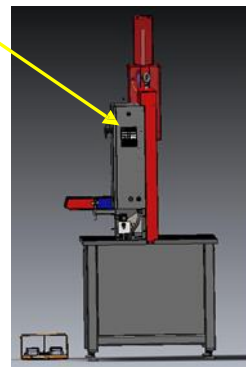


Figure 2.3
Check the voltage on the Machine Nameplate

Machine Operator Basic Controls

All the operator controls are located within the HMI Touch Screen, except the foot pedal, the E-Stop button.



Touch Screen Control Panel

This is the primary interface to the operation control system. It is used for most of the machine's settings and functions. You will use the touch screen to enter information. The screen displays text and graphical information and allows the operator to make selections by touching different parts of the screen as indicated by what is displayed on the screen.



E-Stop Push Button

The **E-Stop Push Button** switch is used to shut the machine off in all situations. It is a two position switch with a red mushroom button. When pushed in, it latches, turns the machine's controls off and shuts down the machine's motor. **In the In position, the machine cannot be restarted.** To restart the machine, twist the red mushroom button clockwise. There is an arrow showing the direction on the mushroom button. The mushroom button will snap out and the machine can be restarted.



Machine Power ON / Off Switch

The On Switch is located on the touch screen. When the On/Off Switch is touched, the machine's controls are turned on and the motor starts. The switch then will also have a green indicator on the screen showing the machine is turned on. When the indicator is red, the machine's controls are off and the motor is stopped.



The Foot Pedal

Switches are used by the operator to control the start of an insertion.



Main Disconnect Switch

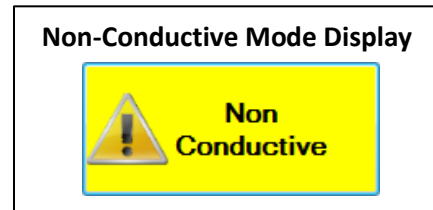
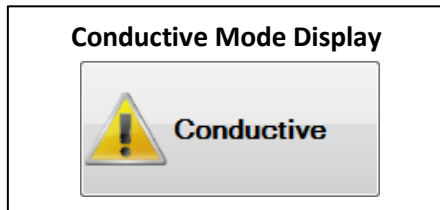
This switch controls power for all machine components (including the touch screen). Rotate clockwise to switch **ON** and counterclockwise to switch **OFF**.

Down/Up Footswitch



The Down/Up Footswitch is shielded and connected to the Haeger Hardware Insertion Machine by a heavy duty cable. It contains both the Down and Up Footswitches.

When the Down Footswitch is depressed, the Upper Tool Holder moves down. If you remove your foot from the Down Footswitch, the Upper Tool Holder will stop. If you depress the Down Footswitch again, the downward motion will start again.



In **Conductive Mode**, the Hardware Insertion Machine will complete one normal cycle of the insertion process when the Down Footswitch is depressed and held down. Hold the Down Footswitch until the Upper Tool Holder starts to go up again.

In the **Non-Conductive Mode**, when the Down Footswitch is depressed, the Hardware Insertion Machine will lower the Upper Tool until it contacts the work piece and then stop. The Down Footswitch must then be released. When the Down Footswitch is **depressed a second time**, the Hardware Insertion Machine **will exert the preset force** and then return to its Up position. Once the upward travel starts, release the Down Footswitch.

When the Up Footswitch is depressed, the Upper Tool Holder moves up. If you remove your foot from the Up Footswitch, the Upper Tool Holder will stop. If you depress the Up Footswitch again, the upward motion will start again.



Make sure you read and understand the Warning and Safety Instructions in the Introduction section of this manual and follow the instructions for testing the Safety System in the Safety System section before attempting to operate this Hardware Insertion Machine.



Never depress the down footswitch a second time in Non-Conductive Mode when your Hands are in the tooling area.

Testing of the Electrical Setup



The Machine Setup must be completed before testing the electrical setup.

1. Turn the machine's Main Disconnect Switch to the On position



2. Twist the Red Mushroom Button clockwise to unlatch the off switch.



3. Using the touch screen Press the *On/Off* Button. The On switch in the up position will turn on the machine's motor.
4. If the motor rotates the same direction as the arrow, install the Side Panels on the Machine Base. The machine is now ready for use go to the *Upper Tool Holder* section.



If the motor **did not turn in the same direction as the arrow**, follow to the next series of steps.

Testing of the Electrical Setup (Continued)



- NEVER tamper with any part of this machine's electrical system unless you are a trained electrician and thoroughly understand this machine's electrical schematic.
- Check to make sure that the electrical power supply for this machine has been disconnected at the supply source before doing any work on the machine's electrical system.

Adjusting the Wiring if the Previous Step Failed

1. Disconnect the machine from its electrical power supply at the supply source.
2. After disconnecting the machine from its electrical power supply at the supply source, turn the machine's Main Disconnect Switch to the *Off* position.
3. Using the special Electrical latch key, open the door of the Main Electrical Control Cabinet.
4. **Reverse the incoming electrical leads on terminals L2 and L3 of the Main Disconnect Switch (see electrical schematic)**
5. Close and latch the door using the special key.
6. Turn the machine's Main Disconnect Switch to the *On* position.
7. Have someone watch the motor in the base of the machine when you turn the machine on. The motor has an orange arrow indicating the correct motor rotation. Press the *On* Button. The green light in the switch will turn on and the machine's motor will start.
8. If the motor turned the same direction as the arrow, install the Side Panels on the Machine Base. The machine is now ready for use.
9. If the motor **did not turn in the same direction as the arrow** contact your Haeger Representative for instructions.



Do not operate the machine without both the Upper and Lower Tools properly locked in place with the correct set screws and/or Quick Change Lever.



In this manual, the use of the terms left and right refers to the machine operator's left and right when they are standing in front of the machine, facing the work area between the Upper Tool Holder and Lower Tool Holder.

Upper Tool Holder

The *Upper Tool Holder* is secured to the machine's cylinder rod by the black serrated knob on its right side. You can usually leave this Upper Tool Holder in the machine. If you do remove it, be very careful. There are continuity springs and guide pins inside the Upper Tool Holder. These items are **very important** part of the Haeger Safety System and **must not** be removed. If they are lost, do not operate the machine until they have been replaced.

Large tools, such as the One Touch vacuum anvil, are secured in the Upper Tool Holder by a M6 x 6 SHSS (Socket Head Set Screw) located on the right side of the Upper Tool Holder.

For smaller tools, such as the standard Manual Tooling line, a Standard Tool Adapter may be installed in the Upper Tool Holder using the same M6 x 6 SHSS. The smaller tools are held in the Standard Tool Adapter by another M6 x 6 SHSS also located on the right side of the Standard Tool Adapter.

When installing any tool or the Standard Tool Adapter, always make sure that it is pushed in as far as possible and is securely held by the M6 screw(s).



Important: If this thumb screw is lost, DO NOT replace it with just any length 5mm screw. Using too long of a screw will damage the Ram Adapter.

– Haeger replacement part numbers:

11-00241, THUMB SCREW CAP

H-3738, SHCS, M5 x 0.8 x 12mm, BLACK OXIDE



Steps to Install an Upper Tool

1. Loosen the M5 set screw in the Tool Holder or Adapter.
2. Insert the tool into the Tool Holder or Adapter.
3. Tighten the M6 set screw until the tool is locked securely in place.



The Safety System's heavy duty electrical cable conduit is very durable; however, caution should be taken when working close to the edge of deep boxes or cans. Operating with the Safety System's electrical cord too close to sharp metal edges may damage the cord.

Lower Tool Holder

The *Lower Tool Holder* is secured to the lower arm of the machine's frame by a M16 X 50 SHCS (Socket Head Cap Screw). When this cap screw is loosened, the lower tool may be aligned to the upper tool. All Standard Haeger Lower Tools fit in the *Lower Tool Holder* without the need for any adapters.

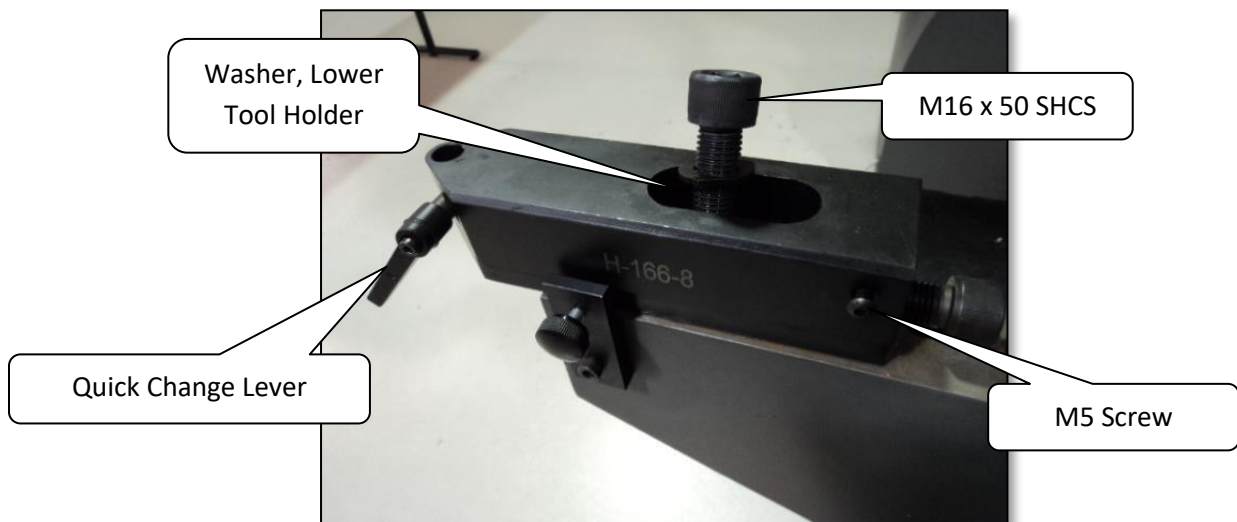
Steps to Install a Lower Tool

1. Loosen the Quick Change Tool Lever by turning it counter-clockwise when viewed from the right side of the machine.
2. Place the tool into the Lower Tool Holder.
3. Lock the tool into place in the Lower Tool Holder by turning the Quick Change Tool Lever clockwise until the tool is locked securely in place

If the Quick Change Tool Lever comes in contact with any part of a workpiece during its production, it will **interfere** with the proper operation of the machine's Safety System and **must** be removed.

To remove the Quick Change Tool Lever:

1. Unscrew the Quick Change Lever (turn it counterclockwise when viewed from the right side of the machine) from the Lower Tool Holder.
2. Remove the M5 screw on the rear right side of the Lower Tool Holder.
3. Install the M5 screw in place of the Quick Change Tool Lever and tighten securely with an allen wrench.
4. The Quick Change Tool Lever may be stored by screwing it into the hole on the rear right side of the Lower Tool Holder where the M5 screw was stored. Make sure it does not come in contact with any part of the workpiece during its production.



Conductive Mode Setup Procedure



This procedure assumes that you are thoroughly familiar with this machine's controls as described in the first part of this section. If you are **not** familiar with these controls, **STOP**. Return to the beginning of this section and review any controls you are not thoroughly familiar with **before** continuing. If you have any questions, contact your Haeger Representative.



Depending on the ambient shop temperature, you may need to warm up your Haeger Hardware Insertion Machine before beginning any operations. To do this, turn it on and let it run for about ten minutes.

Getting started – Before you turn on the machine

1. Determine the installation force required to properly install the hardware you are going to insert. Refer to the technical specifications provided by the hardware manufacturer for this insertion force.
2. Select the proper tools for this application and install them in the Upper and Lower Tool Holders.

Setting the machine

1. Turn the Main Disconnect Switch to the *On* position.
2. Start the machine by pressing the *On* Switch.
3. Select the Conductive Mode operation using the touchscreen, in Conductive Mode, the icon will display a clear box, indicating its mode status.
4. Adjust the Ram up travel to 50% of the upscale from the HMI display.
5. Adjust the Force to the fastener/part required force specification.

Checking the up travel & insertion

1. Keep your hands away from the tooling area. **Without** positioning the hardware or workpiece for insertion, depress the Down Footswitch and complete one stroke of the machine.
2. Check the position where the Upper Tool stopped. Is it adequate to permit the workpiece to be positioned easily while fasteners are installed? If not, adjust the Ram Up travel control accordingly. If an adjustment is necessary, check the new setting by cycling the machine again.
3. Keep your hands away from the tooling area. Insert the first piece of hardware into the workpiece.
4. Examine the insertion. Is the hardware properly seated? Is the workpiece deformed? Adjust the insertion force accordingly and insert another fastener.
5. Once the hardware is properly inserted, start the production run.

Conductive Mode Setup Procedure (Continued)



Experienced personnel must test the Safety System at the beginning of each work shift. See the Safety System Test in this section of this manual.



Never attempt to test or demonstrate this machine's Safety System by placing any portion of your hand or body between the Upper and Lower tools. Always use the test procedure outlined in Step 3 of this manual.



Eye protection must be worn when operating this machine

Non-Conductive Mode Setup Procedure



This procedure assumes that you are thoroughly familiar with this machine's controls as described in the first part of this section. If you are **not** familiar with these controls, **STOP**. Return to the beginning of this section and review any controls you are not thoroughly familiar with **before** continuing. If you have any questions, contact your Haeger Representative.



Depending on the ambient shop temperature, you may need to warm up your Haeger Hardware Insertion Machine before beginning any operations. To do this, turn it on and let it run for about ten minutes.

Getting started – Before you turn on the machine

1. Determine the installation force that you will need to properly install the hardware you are going to insert. Refer to the technical specifications provided by the hardware manufacturer for this insertion force.
2. Select the proper tools for this application and install them in the Upper and Lower Tool Holders.
3. Have your Supervisor use their access code to set the Conductive/Non-Conductive mode to the Non-Conductive position.
 - a. Select the Non-Conductive Mode operation using the touch screen, in Non-Conductive Mode, the icon will display a clear box, indicating its mode status.

Setting the machine

1. Turn the Main Disconnect Switch to the *On* position.
2. Start the machine by pressing the On Switch. The green *On* light in the switch display will turn on and the motor will start.
3. Verify Run Mode is selected.
4. Adjust the Ram up travel control to about 50% up the scale.
5. Adjust the Force to the fastener/part required force specification.

Checking the up travel & insertion

1. Keep your hands away from the tooling area. Without positioning the hardware or workpiece for insertion, depress the Down Footswitch and complete one stroke of the machine.



Never leave your foot on or above the Down Footswitch after you have completed a cycle of the machine. Remove it from the Down Footswitch. Keep your feet away from the Down Footswitch until your hands are clear of the tooling area

Non-Conductive Mode Setup Procedure (Continued)

Experienced personnel must test the Safety System at the beginning of each work shift. See the Safety System Test in this section of this manual.



NEVER press the Down Footswitch a second time in Non-Conductive Mode when your hands are in the tooling area.

Never leave your foot on or above the Down Footswitch after you have completed a cycle of the machine. Remove it from the Down Footswitch. Keep your feet away from the Down Footswitch until your hands are clear of the tooling area.



Never attempt to test or demonstrate this machine's Safety System by placing any portion of your hand or body between the Upper and Lower tools. Always use the test procedure outlined in Step 3 of this manual.



Eye protection must be worn when operating this machine

SECTION 3 – HAEGER SAFETY SYSTEM

Safety Precautions and Warnings



Never

Operate this Haeger Hardware Insertion Machine without proper instructions. Read and thoroughly understand this manual before attempting to operate this machine.



Never

Tamper with any part of this machine's electrical system unless you are a trained electrician and thoroughly understand this machine's electrical schematic.



Never

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.



Never

Attempt to test or demonstrate this machine's Safety System by placing any portion of your hand or body between the Upper and Lower tools. Always use the test procedure outlined in Section 4 of this manual.



Never

Exceed the maximum force of 9,000 pounds on the J- Frame, Square Tip Tool Holder, or Positive Stop.



Never

Attempt to run any irregular shaped sheet metal part that could contact the *Upper* and *Lower Tools* **before** these tools insert the fastener into the part. This applies to both the *Conductive* and *Non-Conductive Modes* of operation.



Never

Press the *Down Footswitch* a second time in the *Non-Conductive Mode* when your hands are in the area of the tooling.



Never

Operate this Machine without wearing the proper eye protection



Eye protection must be worn when operating this machine



The Safety System's retractable electrical cord is very durable; however caution should be taken when working close to the edge of deep boxes or cans. Operating with the Safety System's electrical cord too close to sharp metal edges may damage the cord.



Lubricate the *Upper Tool Holder* with a small amount of lithium (white) grease. Any other lubricant may interfere with the Safety System's operation and will void your machine warrant

Safety System Description

The Haeger Hardware Insertion Machine is equipped with a unique, reliable *Safety System*.

Conductive Mode

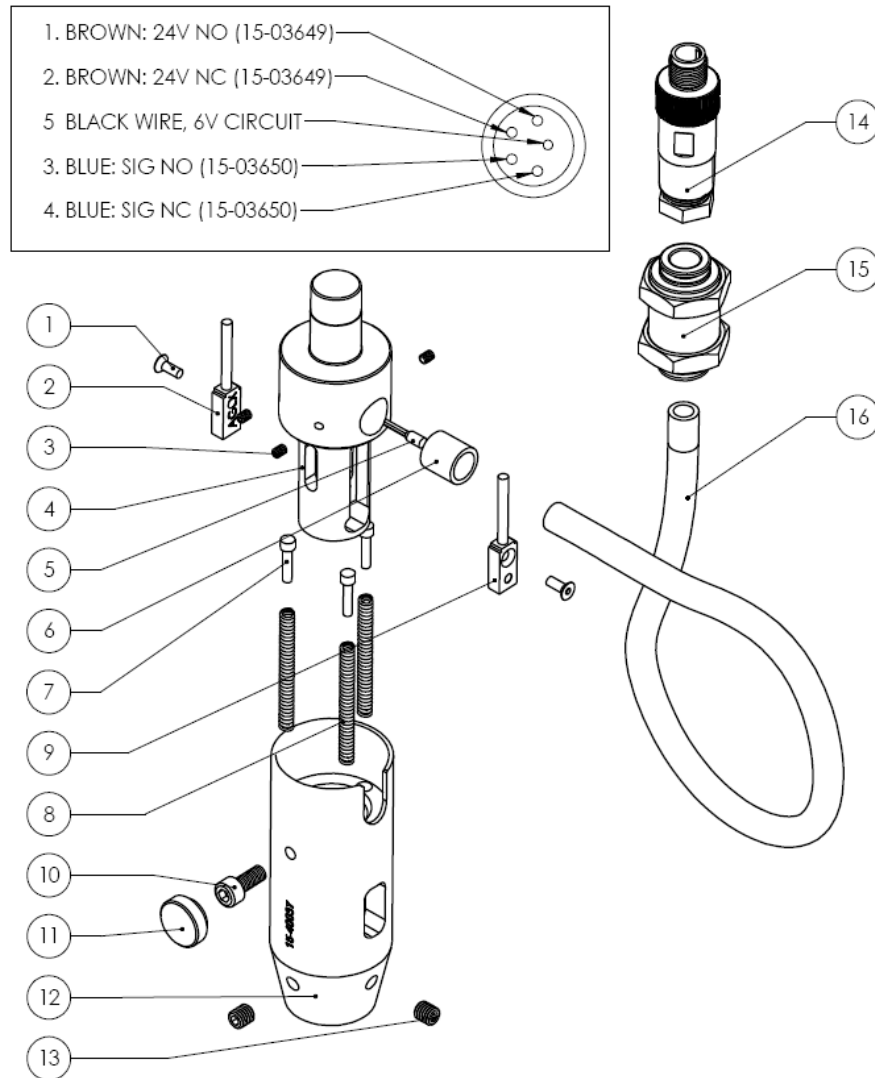
When the Safety System detects a non-conductive material between the Upper and Lower Tools, the Upper Tool's downward motion reverses immediately and returns to its' Up position.

Non-Conductive Mode

The Upper Tool's downward motion stops when **any** material is placed between the Upper and Lower Tools. 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.

How the Safety System Works

In both “Conductive” and “Non-Conductive” modes, 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 Cylinder Ram Adapter .45 in/11.4 mm. To move up, the Upper Tool Holder must overcome the light force of the Continuity Spring.



How the Safety System Works (Continued)



- Do not tamper with any part of the Safety System. The Haeger Hardware Insertion Machine will not operate properly if any part of the Safety System is removed or damaged.

- The heavy-duty, retractable Safety Electrical Cord is very durable, but caution should be taken when working close to the edges of deep cans. Operating with the Safety System Electrical cord too close to sharp metal edges may cut or shear the cord off.

- Test the Safety System every day **before** you use the machine. See the Safety System Test in this section of this manual.



- Never test or demonstrate the Safety System by placing any portion of your body between the Upper and Lower Tools.

- When operating the machine in the Non-Conductive Mode, be very careful. Do not press the Down Footswitch a second time with any portion of your body near the tooling.



- Always wear the proper eye protection when operating this Machine.

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. In order to continue in the down motion of the ram the following conditions must be met in conductive mode:

- Conductivity detected between the upper and lower tool
- Within safe position set by the TPS.

Or in non-conductive mode:

- Foot pedal must be released and pressed a second time
- Within safe position set by the TPS.

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.

Lockout - Tagout

Lockout-Tagout (LOTO) or **lock and tag** is a safety procedure which is used ensure that malfunctioning machines are properly shut off and not started up again prior to the completion of maintenance or servicing work. It requires that hazardous power sources be "isolated and rendered inoperative" before any repair procedure is started. "Lock and tag" works in conjunction with a *lock* usually locking the device or the power source and placing it in such a position that no hazardous power sources can be turned on. The procedure requires that a *tag* be affixed to the locked device indicating that it should not be turned on.



- Main Power Switch
- Rotate to OFF Position



- User finger
- Push to expose holes
- Insert Lock



LOCKOUT

TAGOUT



DANGER:

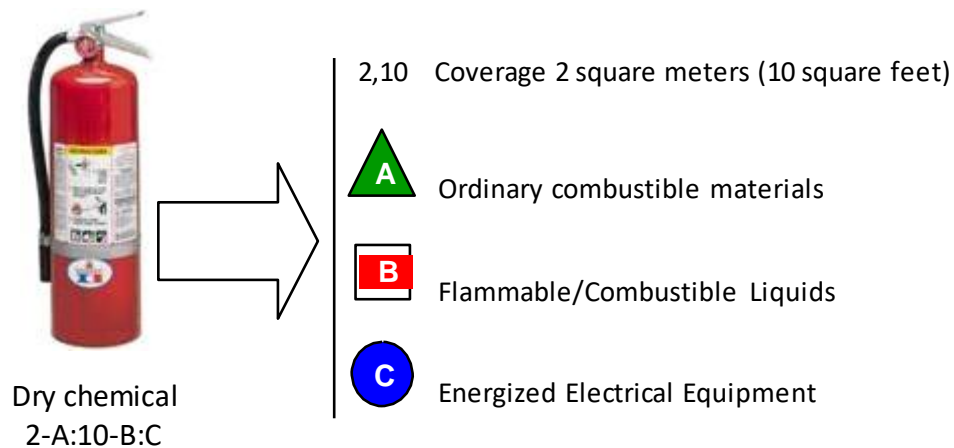
**THIS TAG & LOCK TO BE
REMOVED ONLY BY
PERSON SHOWN ON
BACK!
DO NOT REMOVE THIS
TAG!**

Fire Safety Equipment

Haeger systems do not produce thermal, biological, fire or radiation hazards etc., however if in the event of a fire, having a Multi-Class rated fire extinguisher within a reasonable distance of the machine operator(s) is a sound safety practice and is recommended. Your fire extinguisher (or fire extinguishers) should be able to extinguish fires involving ordinary combustible materials, flammable/combustible liquids and energized electrical equipment.

The following is an example of a fire extinguisher with a Multi-Class rating.

Multi-Class Rated Fire Extinguisher



Fire Safety Note: All fires are grouped into classes, according to the type of materials that are burning. The classes of fire for the UK, Europe, Asia etc., are different to those used in the USA and Australia so remember to always read labels carefully and consult a trained fire professional.

Safety Awareness & Residual Risks

Introduction

This section contains two sets of principles that must be followed to assure maximum safety when operating your Haeger Hardware Insertion Machine. The 1st explains situations and actions to avoid and behavior and conduct in an effort to avoid or prevent injury. The 2nd principle describes the residual risks that are inherent in the operation of the Hardware Insertion Machine. These are situations or physical aspects of the machine that may present a potential danger to the operator or machine maintenance person, but would compromise the capabilities of the machine if changed. Therefore, they are pointed out as a precaution the operator and trained maintenance person must be aware of when using the machine.

Situations and Actions to Avoid

The Haeger safety system ensures up to a certain level the discrimination between human body and part to be processed. Despite this safety system the safety of the operator still depends from operator appropriate behavior and respect of the procedure. Human behavior is still important in non-conductive mode. The safety system may be partly inefficient when machine is used in conductive mode (contact of a simple metallic ring on the operator's finger with upper tool may validate the down stroke). In short, don't get distracted while operating or maintaining the machine, **always be aware** of what you are doing!

Residual Safety Risks

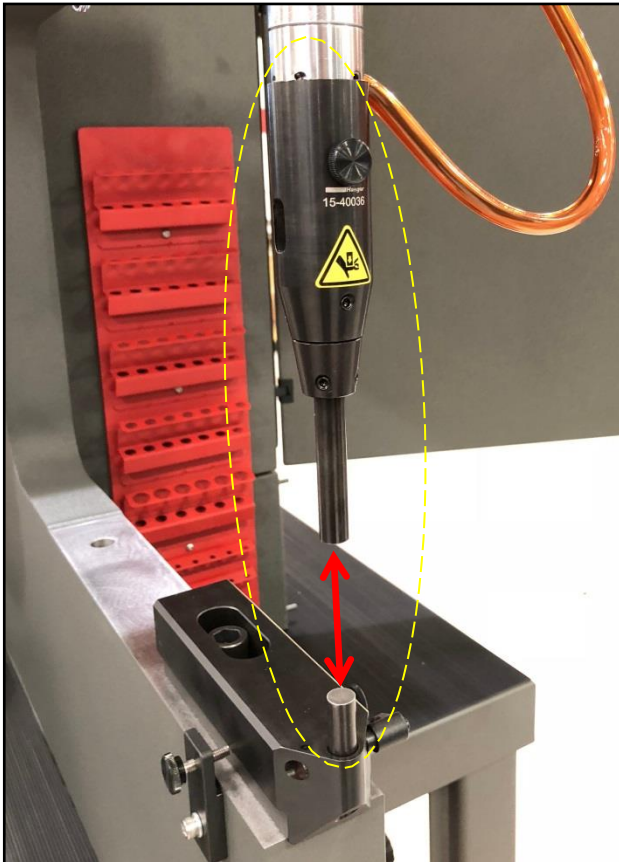
Your Haeger Hardware Insertion Machine is engineered to minimize machine components and operating procedures that may compromise operator safety. However, in order to maintain some machine operations and functionality, certain compromises are required. The following table documents some of these residual hazards. By making the operator aware of the potential risks, we hope to ensure maximum safety in the operation of this machine.



Attention: The photos in the following table illustrate situations that must be avoided when operating your machine.

Safety Awareness & Residual Risks (Continued)

Operator Safety Awareness & Residual Risks



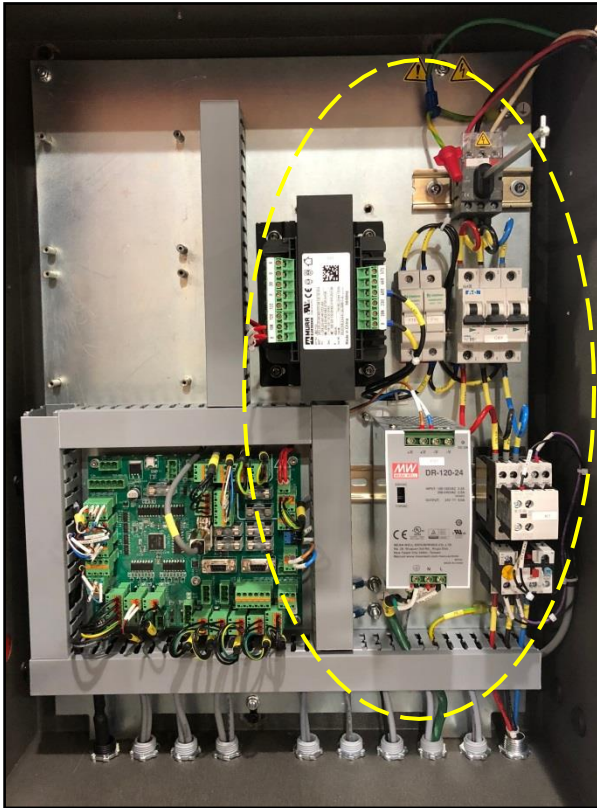
Risk of crushing: A high risk crushing hazard is created by the Upper Tool and Lower Tooling.



Safety of the operator in **non-conductive** 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.

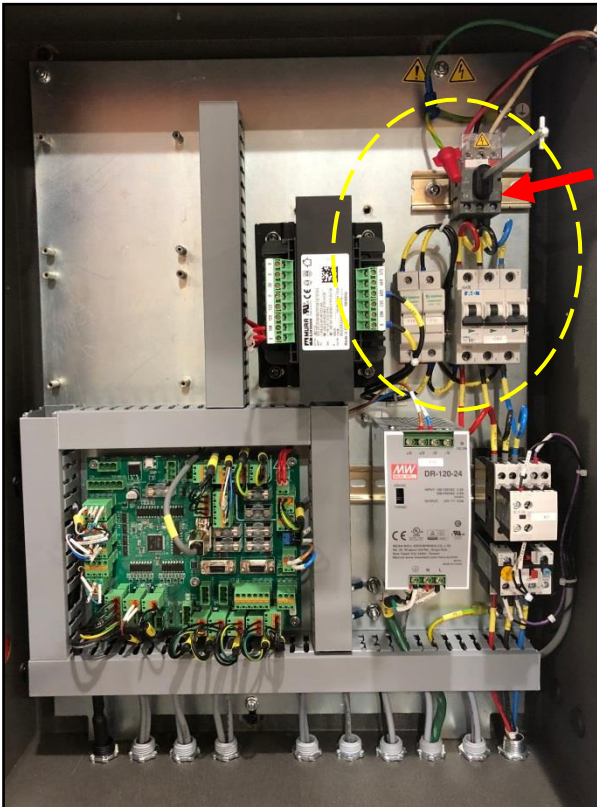


3.



Risk of Electrical Shock: A high risk electrical shock while working on the **RIGHT HALF** of the electrical cabinet.

See Section 7 Electrical Cabinet Assembly to identify High and Low voltage components.



4.



Risk of Electrical Shock: A high risk electrical shock while working here.



High Voltage hazard is **ALWAYS** present in this location, until **INCOMING (MAIN)** power is shut OFF.

Safety System Tests

Step 1: Safety Switch Test Procedure



Experienced 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 Haeger 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 30 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. Go to **Step 2, "Conductive Mode Test Procedure."**

Step 1: Safety Switch Test Procedure (Continued)

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.



There are three (3) Steps in this testing procedure.
Do not skip or ignore any of them!

Step 2: Conductive Mode Test



Never attempt to test or demonstrate this machine's Safety System by placing any portion of your hand or body between the Upper and Lower tools. Always use the test procedure outlined in Step 3 of this manual.



Never operate this machine without the proper tooling installed. If no material and fasteners is used, you must use two flat anvils.

1. Following the Upper and Lower Tool installation instructions, install the 1 in/25mm Flat Anvils in both the Upper Tool Holder and the Lower Tool Holder.
 2. If you have just completed Step 1: "Safety Switch Test Procedure,"
 - a. The machine is *On* and the green light in the *On* Switch is still illuminated. If not, return to Step 1 and restart the machine by following instructions 1 and 2.
 - b. The Conductive/Non-Conductive selection is in the *Conductive* display. If not, select *Conductive*.
 3. Set the machine to Setup mode by touching the box next to the words "Setup Mode" on the screen. The Setup Mode icon will display the downward arrow. This represents the motion of the ram movement.
4. Change the machine's force to 3,000 lbs. (13KN) by touching the box next to "Force", entering 3000 and touching the Enter button. You can also use the +/- buttons.
 5. Raise the Upper Tool Holder about 4 in/100 mm by depressing the Up Footswitch.
 6. Keep your hands away from the tooling area.
- a. Depress the *Down* Footswitch. The RAM should move down, the Anvils will contact, the machine will apply the set force to the Lower Anvil and the Upper Tool Holder will return to the Up position.
 - b. If this machine completes the above sequence correctly, go to Instruction 8.
- c. If the machine does not complete the above sequence correctly, check the screen settings. If they are not correct, reset them and repeat the test. If the machine performs **correctly**, go to Instruction 8.
7. If the machine **does not** complete the above sequence correctly, there is a failure in the machine's control circuit.



8. *Trained personnel must correct it.* 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 Conductive Mode has been properly tested.

Step 2: Conductive Mode Test (Continued)

9. Next, place a small non-conductive material (e.g., plastic or paper) on top of the Lower Anvil, making sure the object completely covers the top of the Anvil. Keep your hands away from the tooling area. Depress and hold the Down Footswitch. The Upper Tool Holder should move down, the Anvil will contact the non-conductive object and, **without applying the pre-set force**, return to the Up position.

- a. This part of Safety System is operating correctly in Conductive Mode. After confirming that **no force** was applied to the non-conductive object, go to **Step 3, “Non-Conductive Mode Test Procedure.”**

10. If the force was applied to the non- conductive object, **the Safety System has failed!**



- a. 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 Conductive Mode has been properly tested.



There are three (3) Steps in this testing procedure.
Do not skip or ignore any of them!

Step 3: Non-Conductive Mode Test

1. If you have just completed Step 2:
 - 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 by following Instruction in *Steps 1 and 2*.
 - b. The Conductive/Non-Conductive mode is displayed in the *Conductive selection*. Select *Non-Conductive* from the touchscreen display.
 - d. The machine's Force has been set to deliver 3,000 lbs. /13 Kn. If this has been changed, repeat the instructions in Step 2, Instruction 4.
 - e. 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.



When operating this Hardware Insertion Machine in the Non-Conductive 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.



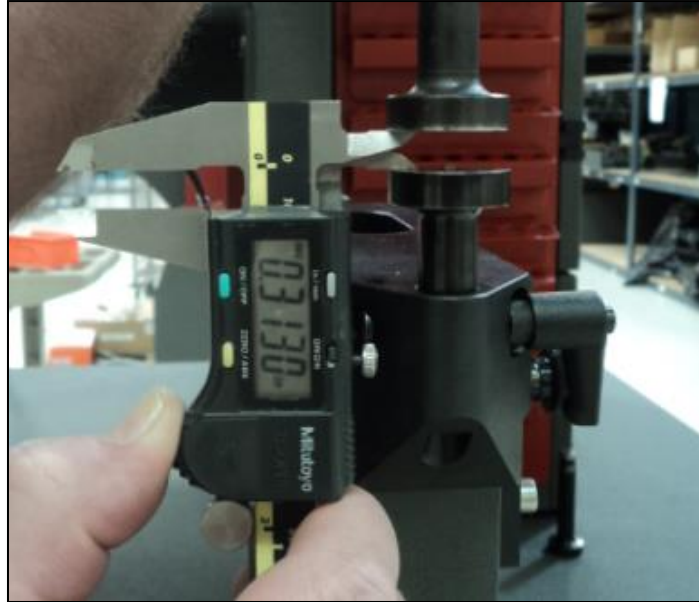
Turn the machine off, Press the "STOP" button



There are three (3) Steps in this testing procedure. Do not skip or ignore any of them!

Step 3: Non-Conductive Mode (Continued)

5. 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.



6. 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 3,000 lb. /13 Kn 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.



There are three (3) Steps in this testing procedure.
Do not skip or ignore any of them!

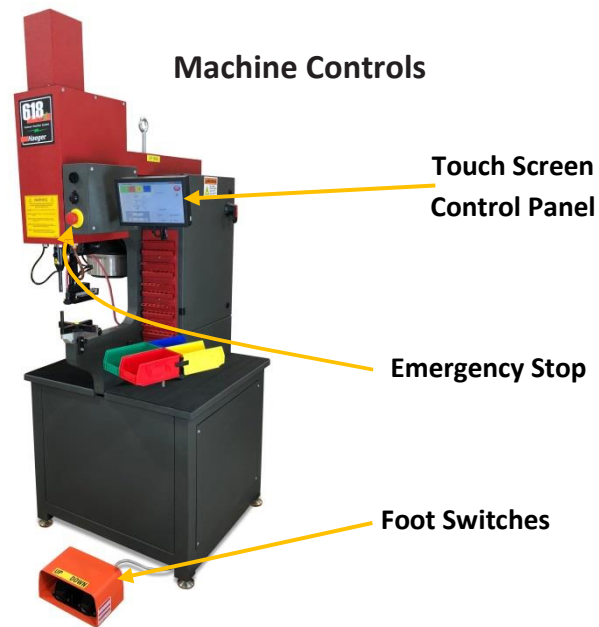
SECTION 4 – TOUCH SCREEN OPERATION

Introduction

This section provides you, the operator, with all the information that you need to operate the Haeger safely and productively.

Make sure that you read and understand all of the descriptions, instructions and notes contained in this section. Heed all of the Warnings and Cautions in this manual.

Your **safety** and productivity depend on it.

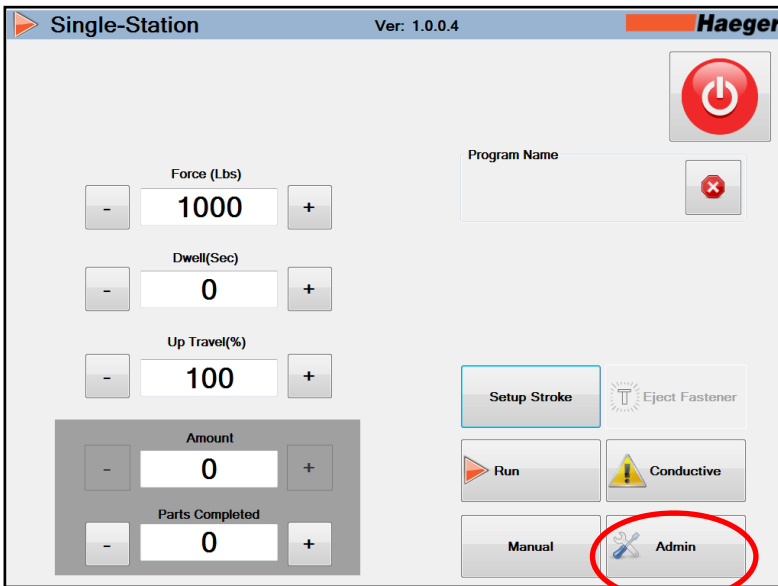


- Read and understand all Warnings and Cautions in this manual and follow the instructions for testing the Safety System in the Safety System section before attempting to operate this machine
- NEVER wear anything metallic that may come into contact with the Upper Tool, Lower Tool or workpiece (watches, rings, bracelets, etc.).
- Never leave your foot on or above the Down footswitch after you have completed a cycle of the machine. Remove it from the Down footswitch. Keep your feet away from the Down footswitch until your hands are clear of the tooling area and you intend to lower or raise the Upper Tool Holder or insert hardware.
- **NEVER Operate this Machine without wearing the proper eye protection!**

Main Screen

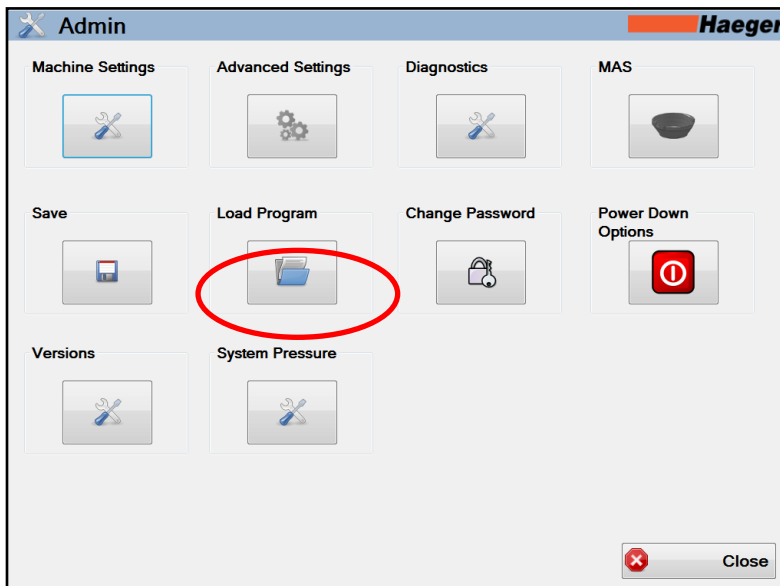


Touch the MSPe logo to reach the Main Screen



From the main screen, press the *Admin* button to reach the Administration screen.

Administration

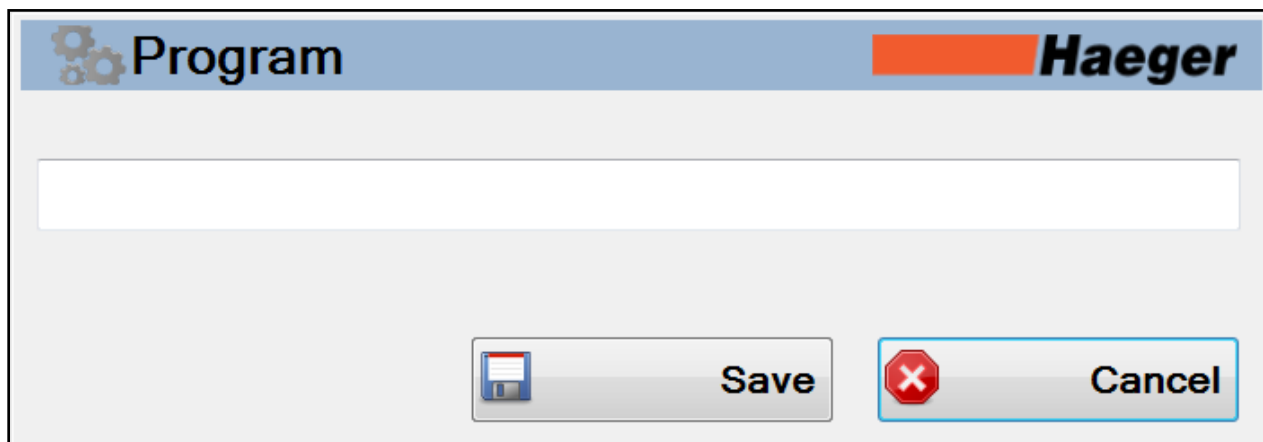


Programs: This is where all programs can be saved, stored and loaded to and from.

“Save” allows for the program that has been configured to be saved into the machine’s load list and stored.

“Load” allows for the operator to load any programs that have been previously saved into the memory of the machine. (For more information, see page 44)

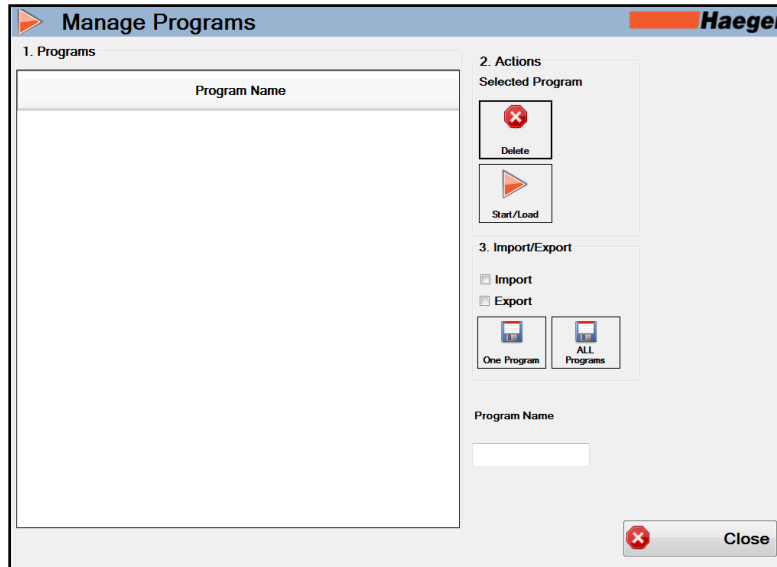
Save



Save: The Save screen appears after selecting “Save” in the Administration screen. The Save screen allows the operator to save the settings that are currently in use for each station. By pressing on the white label, a touch type keypad allows for the naming of the program.

The Save button: After naming the program, the program can then be saved into the machine’s memory by touching the “Save” button on the screen.

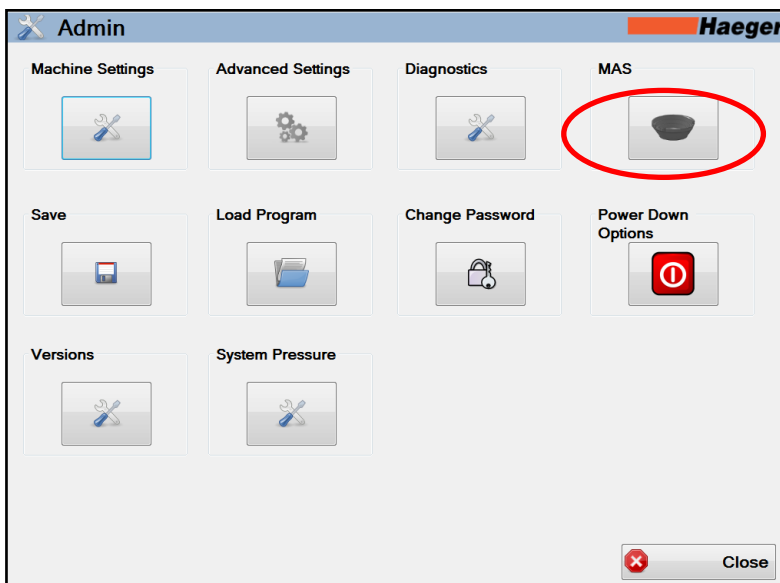
Load Programs



This screen appears after selecting “Load Program” in the Administration screen. This is the location where all of the saved programs are stored. There are 25 program slots per page, and there are 4 pages of slots giving the capability of storing a total of 100 programs.

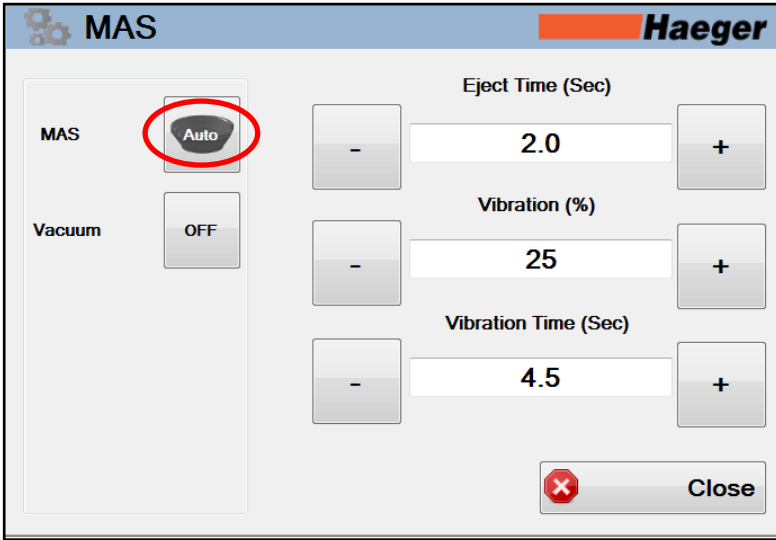
Once a program has been selected and becomes highlighted, the operator can then either press “Load” to load the program or “Delete” to delete the program.

MAS (Modular Autofeed System)

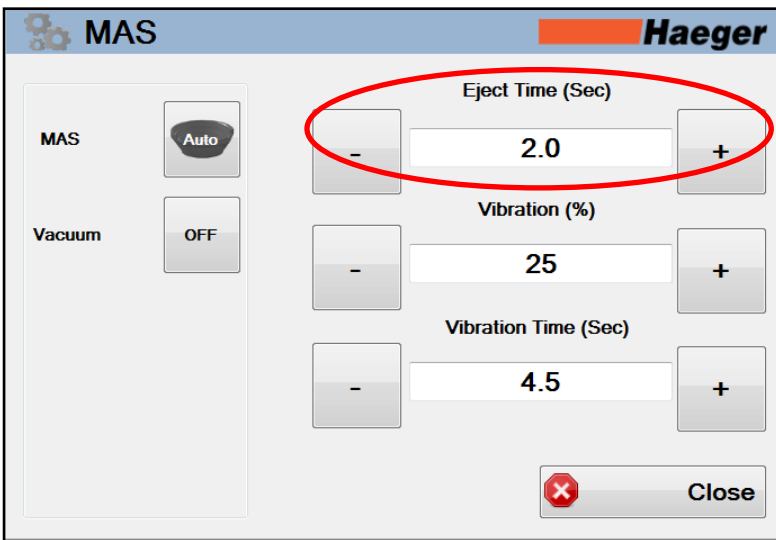


MAS: MAS refers to the Modular Auto-feed System. (For more information, see page 44)

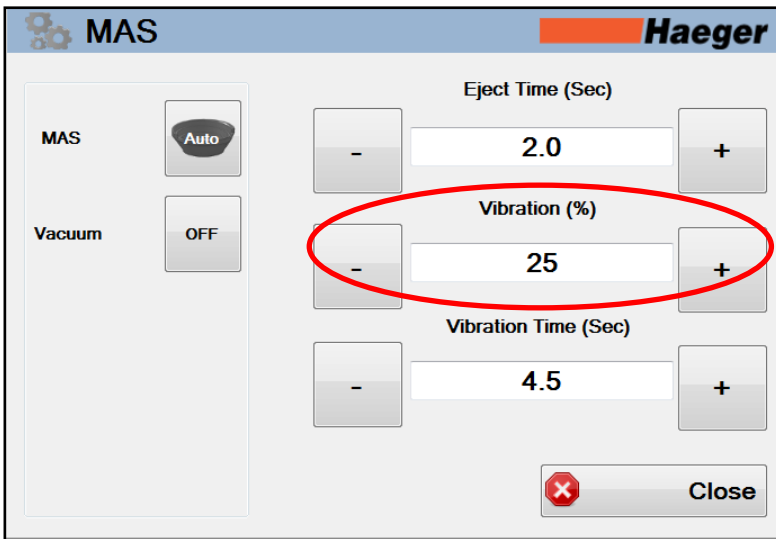
MAS (Continued)



MAS Auto/MAS On: This button allows the operator to run the MAS bowl full time or intermittently.

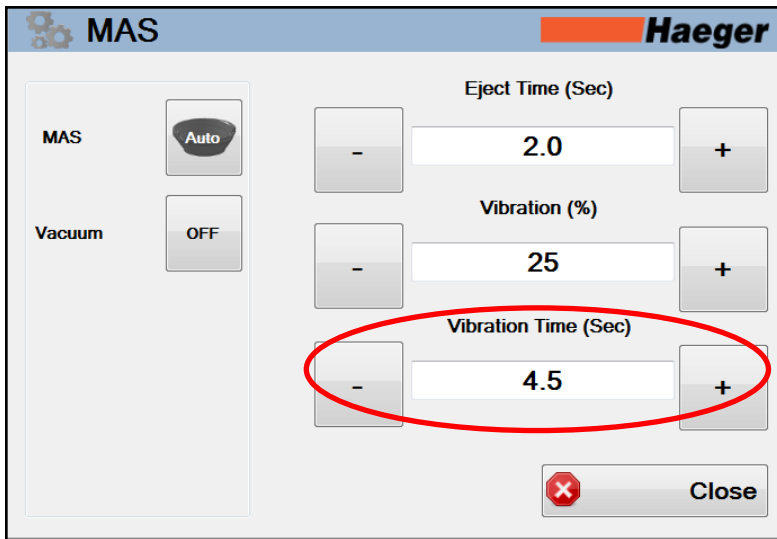


Eject Time (sec): The Eject Time controls how long of an air blast the fastener will receive when traveling through the flight tube to the shuttle jaws. The Eject Time can range from 0 to 20 seconds. This value can be increased or decreased by touching the + or – symbols on either side of the value or by touching the value box and typing in a new value.



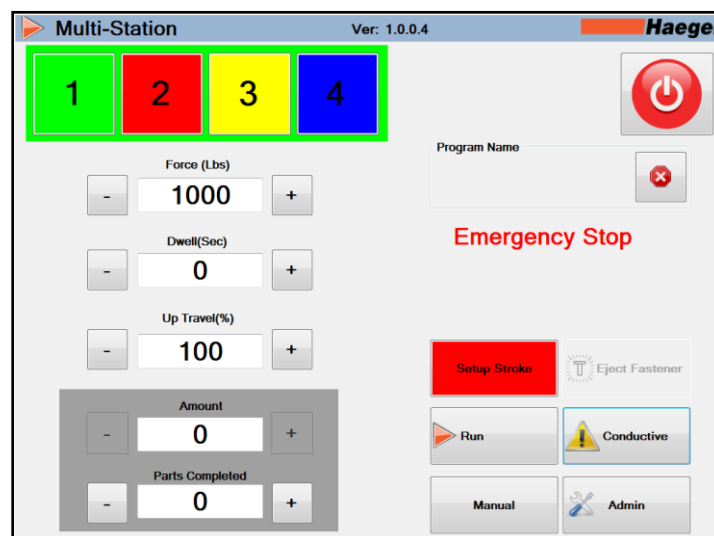
Vibration (%): The Vibration controls the amount of vibration needed to move the fasteners through the MAS bowl. This value can be increased or decreased by touching the + or – symbols on either side of the value or by touching the value box and typing in a new value.

MAS (Continued)



Vibration Time (sec): The Vibration Time controls how long the MAS bowl will vibrate when the MAS is in the intermittent mode. (See 1. MAS Auto/MAS On). This value can be increased or decreased by touching the + or – symbols on either side of the value or by touching the value box and typing in a new value.

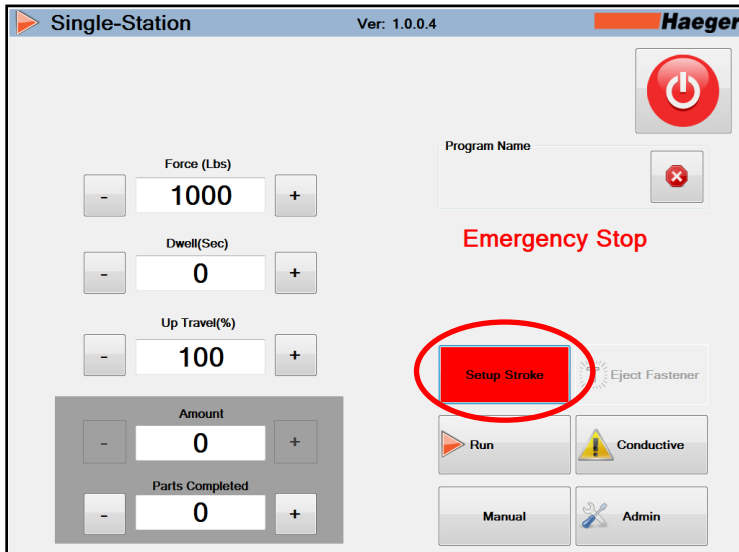
Multi-Station



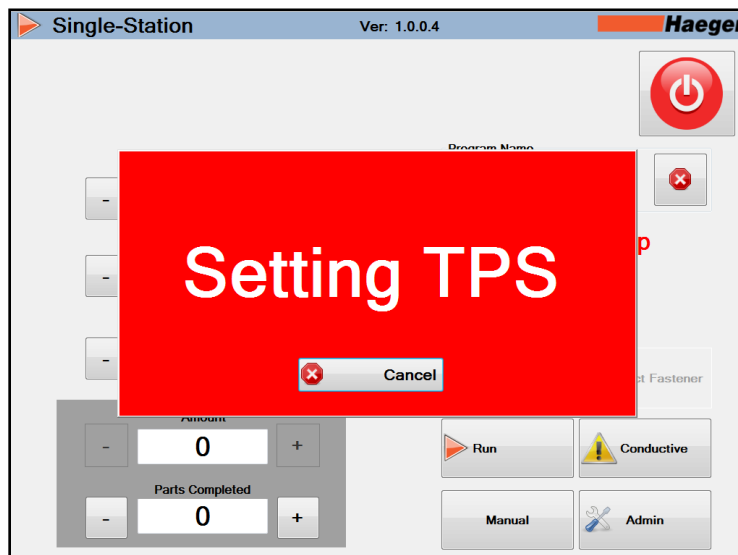
Multi-Station: Multi-Station is an option that allows the operator to insert more than one fastener in a program. The maximum number of fasteners in an individual program is 4. Each station can be selected by pressing on the color coded numbers at the top of the screen. *Note: only station 1 can be used for manual tooling, Shuttle style tooling and ABFT style tooling.

Each station can be configured to have its own individual Force, Dwell Time, Up Travel, number of fasteners to be inserted and its own separate TPS settings if required. Furthermore, all of these settings can be saved together in one separate program.

Setting the TPS

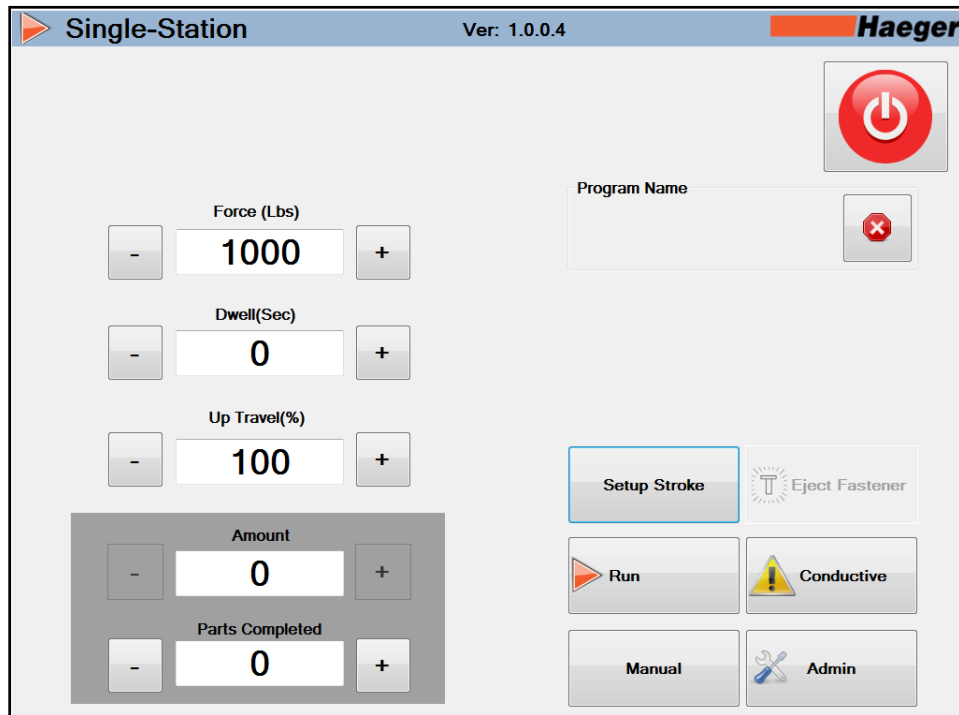


Setting the TPS: The Tool Protection System (TPS) allows for the operator to do a first stroke setup of the tooling. This is done to ensure the safety of the operator and the tooling by allowing only the correct length of fastener to be inserted.



1. Select the "Setup Stroke" button from the main screen. This will be followed by a red "Setting TPS" message.
2. Place the part and fastener to be inserted on the lower tool.
3. Depress the down foot pedal. The ram will move down and come into contact with the lower tool. The machine will record that information.
4. Depress the foot pedal again to complete the insertion cycle.
5. The fastener insertion is complete. The upper tool holder will now move upward to its resting place.
6. Sample cycle test. Depress the foot pedal again, verify the setup is complete. If not, make the adjustments to the settings and continue to normal production operations.

Single Station Settings

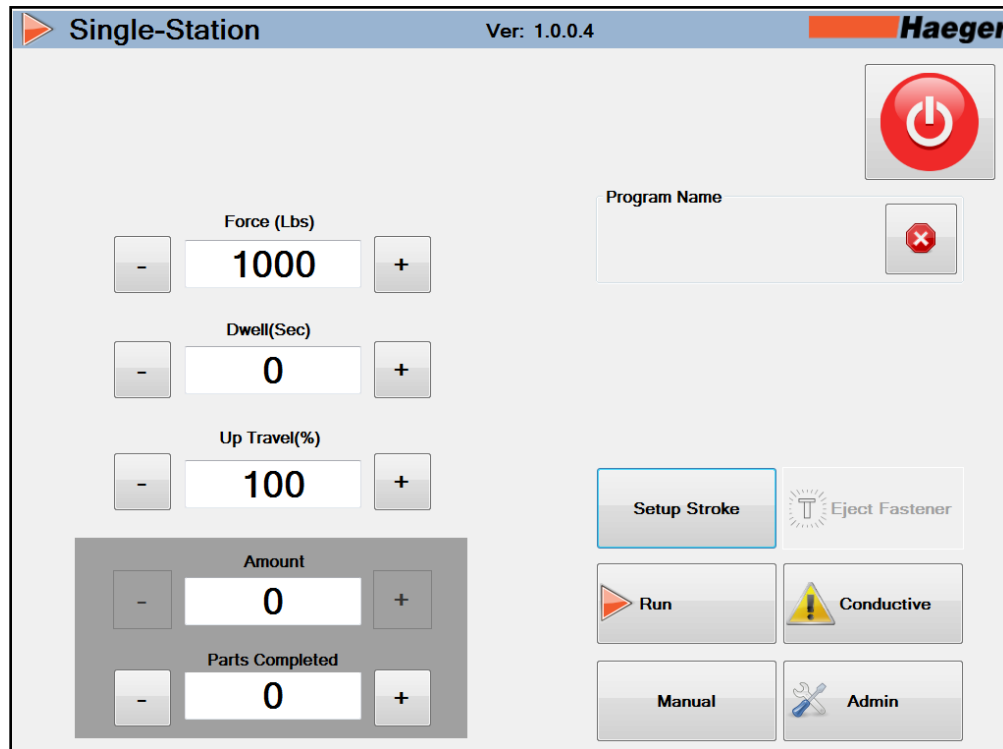


1. Turn on the machine by turning the main disconnect switch to the on position. The main disconnect switch is located in the upper right hand corner of the electric panel door.
2. Touch the MSPe screen once it is loaded.
3. Touch the red Power button in the upper right corner of the screen. That button will turn green when machine is on and running.

To program the operation, use the following steps;

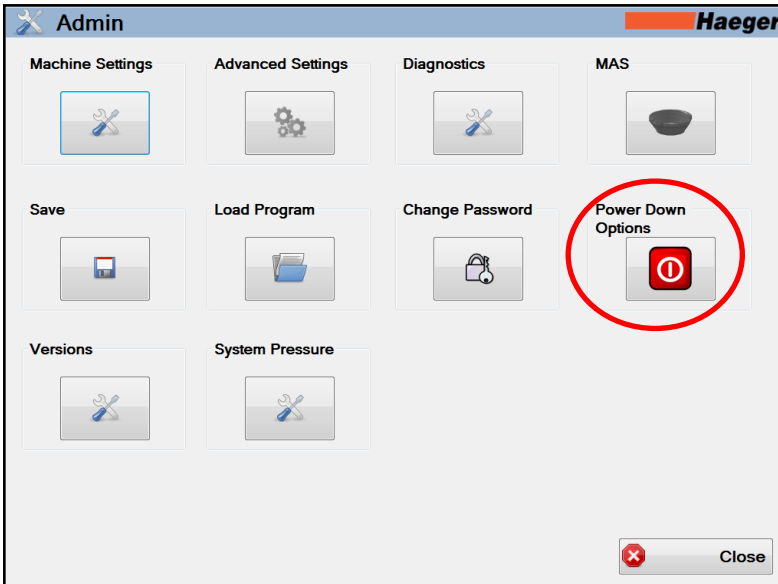
4. **Force:** Force is the amount pounds of force that will be applied between the upper and lower tools when the fastener is being inserted. The amount of force ranges from 800 lbs. to 12,000 lbs.
5. **Dwell:** The dwell is the length of time that the force is applied between the upper and lower tools when inserting a fastener. The length of time can range from 0.0 seconds up to 3.0 seconds. If the dwell time is set at 0.0 seconds, the ram will come down, apply force and immediately retract and go back up to its original position
6. **Up Travel:** The Up Travel controls the up position of the upper tool. This is the position that the upper tool returns to after an insertion is completed. The up value is measured as a percentage of the cylinder's total stroke. If the up value is set to 0%, the ram will press and return to its minimum height. If the value set between 70 and 100 % the ram will return to its highest point possible.
7. **Fasteners to Insert:** This is where the operator inserts the number of fasteners to be inserted for the station. This value can be increased or decreased by touching the + or – symbols on either side of the value or by touching the value box and typing in a new value.

Single Station Settings (Continued)

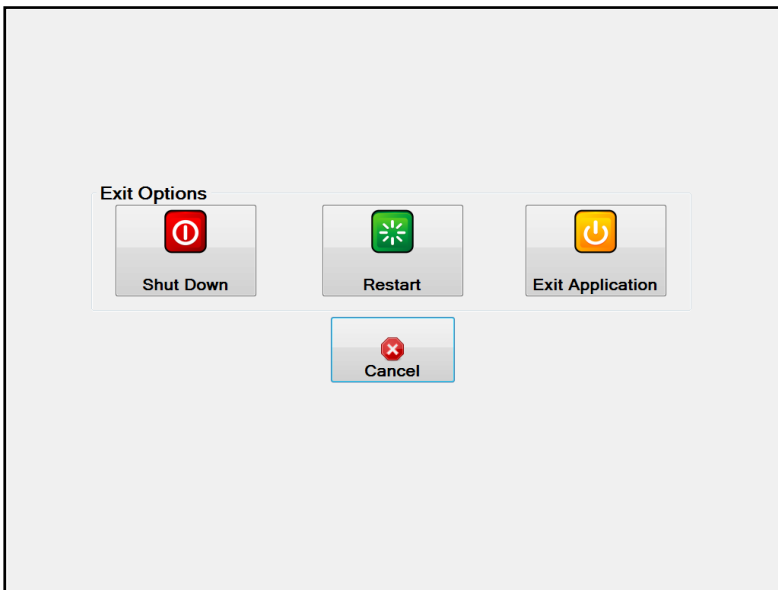


8. **Parts Completed:** This feature functions as a batch counter; it keeps track of the number of parts completed within a program. This value can be changed by the operator at any time. This value can be increased or decreased by touching the + or – symbols on either side of the value or by touching the value box and typing in a new value.
9. **Set up TPS:** This button is selected to set the Tooling Protection System. (For more information, see page 46).
10. **Auto Run/Off:** The Auto Run button allows for the operator to choose to operate the machine in a manual counting mode or an automatic counting mode in order to keep track of the number of parts completed.
11. **Run Mode/Set up Mode:** This button allows for the operator to run the machine for insertion purposes. By touching the button, the machine will then go into what is called the Setup Mode. This allows the operator to set up and inspect his insertion. The ram will now come down slowly until the insertion is made and the operator has to depress the up side of the foot pedal to move the ram back up to its home position.
12. **Manual/ABFT/Shuttle:** This button allows the operator to choose between the three different types of tools to be used for each station.
13. **Eject:** This button allows the operator to manually eject a fastener from the MAS. *Note; the eject button is only available for the ABFT and the Shuttle tooling. For manual tooling, it is greyed out.
14. **Conductive/Non-Conductive:** This button allows the operator to select the material type. Once selected, it places the machine in the correct mode for the safety of the operator.
15. **Admin:** Selecting the Admin button will take the operator to the Administration screen.

Shut Down Procedure



Power Down Options: Select the Power Down Options button to shut down the machine.



1. **Shut Down:** This option will shut down both the machine and HMI computer.
2. **Restart:** This option will shut down the machine and restart the HMI Computer.
3. **Exit Application:** This option will close the MSPe software running on the HMI Computer and return the user to the Windows Desktop.
4. **Cancel:** This option will close the Exit Options menu.

SECTION 5 – OPTIONS



Laser Part Locating Light

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



MAS 350

Modular Autofeed System (MAS)

Automating delivery and positioning of hardware at the insertion tool to increase productivity.



MAS 9

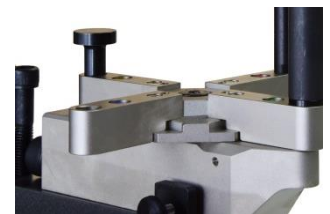


Vacuum Generator

The vacuum system is used to deliver hardware during the installation process with a wide variety of Haeger's Automatic Tooling.

Turret Insertion Tool

Allows for the insertion of 4 different fasteners in a single part handling



Universal Crank Assembly

For use with positive stop cylinder. Includes digital readout. Enables repeat jobs to be set up quickly and accurately.

Multishuttle

Shuttle system to accommodate studs, standoffs and nuts



Positive Stop System

The Positive Stop System provides an easily adjustable method of precisely maintaining the stopping point of the machine cylinder. The system is particularly well suited for improving uniformity on soft delicate work pieces. It is also effective when inserting small hardware.

In addition to aluminum, the system also provide excellent insertion results on a wide variety of softer materials such as fiberglass printed circuit boards and many plastic or composite materials.

When using this system, the machine is set up to exert a Force/Pressure which is about 20% above the normal insertion force specified by the manufacturer of the hardware. The accurate stopping point of the machine's stroke is controlled by a precision machined nut in the Nut Tube, and screwed on to a threaded rod extending up from the top of the machine's cylinder. When the nut contacts the Stop Tube, the machine exerts the insertion Force/Pressure on the Nut Tube, not the hardware or workpiece. The machine then reverses and returns to the setup Travel position in the same manner as any other stroke.



During the Setup Procedure, the machine's Force on the Control Panel must be set to a force of 500 pounds (2200N) higher than the force the manufacturer recommends to insert the hardware.

The Nut Tub is pinned to the Stop Tube so that the stopping point can be adjusted by rotating the Tube Assembly, that is, either the Nut Tube or the Stop Tube.

1. Turning the Tube Assembly counter-clockwise positions the Nut Tube lower (this shortens the machine's stroke.)
2. Turning the Tube Assembly clockwise positions the Nut Tube higher (this lengthens the machine's stroke.)

The pitch of the thread on the Threaded Shaft is 14 threads per inch (25.4mm).

1. One complete revolution of the Tube Assembly will increase or decrease the machine's stroke by 0.07 inches (1.8mm.)
2. The stroke of the machine can be adjusted from 0.375 inches (10mm) to 8.5 inches (216mm.) with this range the Positive Stop System can be used with all Haeger Tooling Setups, including the J-Frame.

The Lock Knob on the right side is used to lock the Tube Assembly in position once they have been properly set.

1. Turning the Lock Knob clockwise will lock the Tube Assembly.
2. Turning the Lock Knob counter-clockwise will unlock the Tube Assembly.

Positive Stop System (Continued)

This Setup Procedure can be used for production runs in the Conductive and Non-Conductive Modes of operations.



This setup procedure assumes that you are thoroughly familiar with this machine's Operating Controls, Safety System Testing Procedure, Conductive Mode Setup Procedure and the Non-Conductive Mode Setup Procedure.



If you are not familiar with these sections of this manual, **STOP!** Go to these sections and become familiar with all of them before continuing.



Keep your hands away from the tooling area.

Getting Started:


1. From the right side of the CYLINDER FRONT COVER.
2. Loosen the LOCKING KNOB.
3. Turn the Tube Assembly clockwise or counter-clockwise to move the Nut Tube up or down, respectively.
4. Position the Tube Assembly such that the Upper and Lower Tools will make contact when the Down Footswitch is depressed.
5. Go to the Non-Conductive Mode Set-Up Procedure and follow the steps along with these,
 - a. Select and install the proper tooling.
 - b. Set the required insertion Force/Pressure.
 - c. Set an adequate Up Travel Position.
6. Set the Conductive/Non-Conductive Switch to the Non-Conductive position.
7. Set the Run/Setup Switch to the Setup position.
8. Raise the Upper Tool to a position where the hardware and work piece can be easily placed in the machine by depressing the Up Footswitch.
9. You will have to make adjustments for the hardware and work piece. Place the hardware that will be inserted in the work piece into the tooling.
10. Place the work piece in the proper position to insert the hardware.
11. Depress the Down Footswitch. The upper Tool will move down and make contact with the work piece and stop.
12. Turn the Tube Assembly counter-clockwise (left) this will move the Nut Tube down by Hand.
13. Raise the Upper Tool to a position where the hardware and work piece can be easily removed or placed on the Lower Tool by depressing the Up Footswitch.
14. Remove the work piece and if necessary, the hardware from the machine.
15. Turn the Tube Assembly clockwise (right) approximately two revolutions. This will move the Nut Tube up to lengthen the stroke.
16. Check your settings. Replace the hardware into the tooling.

Positive Stop System (Continued)

17. Replace the workpiece in the proper position to insert the hardware.
18. Depress the Down Footswitch. The Upper Tool will move down, contact the work piece, and stop.
19. Depress the Down Footswitch a second time, the machine will insert the hardware, and stop.
20. Depress the Up Footswitch until the Upper Tool is in a position such that you can remove the hardware and work piece easily.
21. Examine the hardware to ensure it has been inserted properly.
22. If the hardware has not been completely inserted, lengthen the stroke by turning the Tube Assembly clockwise,
 - a. 1/8 of a revolution will equal 0.01 inches (0.25mm) increase in stroke length.
 - b. 1/4 of a revolution will equal 0.02 inches (0.50mm) increase in stroke length.
23. If the hardware has been over-inserted (inserted too far or damaged), shorten the stroke by turning the Tube Assembly counter-clockwise,
 - a. 1/8 of a revolution will equal 0.01 inches (0.25mm) decrease in stroke length.
 - b. 1/4 of a revolution will equal 0.02 inches (0.50mm) decrease in stroke length.
24. Repeat Steps 17 through 24 until the hardware has been properly inserted.
25. Lock the Tube Assembly in position by tightening the LOCKING KNOB.
26. Replace the ACCESS PANEL.
27. To start production, set the Run/Setup Switch to the Run position.
28. If you are not going to use the Non-Conductive Mode in this production run, have your supervisor use their key to select the Conductive Mode of operation.



SECTION 6 – MACHINE MAINTENANCE

This maintenance schedule is applicable for standard machine shop operating conditions. When operating under severe conditions such as heavy dust and dirt, increase the schedule to reflect such conditions.



DO NOT lubricate the Upper Tool Holder with any lubricant other than a small amount of white lithium grease. ** Other products may interfere with the Safety System.

Maintenance Schedule

Component	Area	Maintenance	Schedule
Safety System	Upper Ram	Perform safety system check procedures using “Testing the Safety System”	Daily
Upper Tool Holder	Upper Ram	Inspect Continuity Springs and Pins	Once a month (160 hrs)
Upper Tool Holder (See warning above)	Upper Ram	Small amount of lithium grease (white)** between upper tool holder & cylinder rod Check this label	Once a month (160 hrs)
Upper Tool Holder	Upper Ram	 Replace Risk of Crushing label if peeling or damaged	Daily
Shuttle Tooling	Shuttle Jaws	Inspect Springs and change out if they appear weak	Every 6 months (960 hrs)
Tooling Components	Flight Tubes	Inspect and change out if damaged	Every 6 months (960 hrs)
Hydraulic System Filter	Lower Hardware Insertion Machine Motor Compartment	Remove and replace cartridge Haeger Part No. 15-00888	Once a year (2000 hrs)
Hydraulic Fluid and Suction Filters	Lower Hardware Insertion Machine Motor Compartment	Drain fluid and change suction filters located inside the tank. Haeger part# 15-01131 Qty 2, refill fluid using AW Exxon Humble Hydraulic. H or equivalent Hydraulic Oil, ISO 32 Viscosity Grade.  Contact your local recycling center or governing agency for proper disposal of the old hydraulic fluid.	Once every 2 years (4000 hrs)

***Hydraulic Fluid**

Equivalent hydraulic oils, ISO 32 Viscosity Grade may be used. It is the machine owner’s responsibility to determine which hydraulic oils in their area are equivalent to Exxon Humble Hydraulic H AW-32.

**** Lithium Grease**

Each Haeger machine is shipped with a tube of Lubriplate 630-AA, produced by Fiske Brothers Refining Company. In Europe, Fiske Brothers is represented by Total Deutschland GmbH.

Capacity Chart

Machine	Gallons	Liters
618MSPe	10	38

Weekly Care and Maintenance

This maintenance schedule is applicable for standard machine shop operating conditions. When operating in severe conditions such as heavy dust or dirt or 24 hour running. Increase the schedule to reflect such conditions.



- It is recommended to inspect the upper tool holder and its contacts weekly or more frequently based on usage.



- **DO NOT** use silicon spray to lube inside of holder.
- If necessary, denatured alcohol can be applied to a clean cloth to remove dirt and grease.

Upper Tool Holder



DO NOT use rubbing alcohol, WD-40, diesel, gas, etc., to clean contacts or any part of the holder!



- 1st: Turn round thumb screw counter clockwise to allow tool holder to slide off.



- 2nd: Inspect springs and contacts and wipe off with clean dry cloth.



- 3rd: Wipe off **all** metallic areas with clean dry cloth.

- 4th: Wipe inside of tool holder with clean dry cloth.



- 5th: Apply a **THIN FILM** of white lithium grease on metallic areas only.



- 6th: Re-install springs with metal contactors in body of tool holder, slide body over sensor and tighten thumb screw.

MAS (Optional) Care and Maintenance



Dirt, grease, and debris builds up over time in the bowl.

To avoid getting debris in the bowl, lift, rather than pour, the hardware into the bowl

1st: Remove all fasteners from bowl.



2nd: Use dry compressed air to blow out debris.



Eye protection must be worn.



3rd: Wipe bowl clean with dry cloth.

If dirt or grease is present, use acetone



with gloves and a clean cloth to wipe off build up.



Read all warnings on cleaning solution container & follow recommendations for safe handling and storage.



DO NOT use rubbing alcohol, WD-40, diesel, gas, etc., to clean MAS 350 composite bowls!

Flight Tube (With MAS) Care and Maintenance



- Dirt, grease, debris builds up over time in the tubes.
- It is recommended to blow out flight tube after each tool change.
- 1st: Detach tube(s) from MAS 350 Module and upper tool changer.



- 2nd: Use dry compressed air to blow out debris.



- **Eye protection** must be worn.

- 3rd: Rinse inside of tube with Denatured Alcohol and air dry.



- Read all warnings on cleaning solution container & follow recommendations for safe handling and storage.



DO NOT use rubbing alcohol, WD-40, diesel, gas, etc., to clean MAS 350 composite bowls!

DO NOT use Silicone Spray as a lubricant on this machine.

Schematics and Diagrams

Schematics and Diagrams are customized to accurately depict your machine and will not be bound in this operations manual. They will be delivered separately on large format paper in an effort make them legible and easy to read.

Typical Drawing List:

- Hydraulics Schematic
- Pneumatic Schematic
- Electrical System
- Safety System

Customer Service



Haeger is proud of its reputation for providing you with first-class support. Our mission is to offer you cutting edge technology machines that will provide your organization with world-class performance and value. Contact us today.

NEED SERVICE? A service tech will contact you within 24 hours

Call your Haeger Representative. Our contact information is the front of this manual.

To save time, please be prepared to give your area Haeger Representative the following information:

1. Your name
2. Your company's name, location and telephone number
3. The Model Number of your Haeger machine
4. The Serial Number of your Haeger machine
5. A very detailed description of the problem
6. What steps you have already taken to resolve your problem
1. How the machine responded to each of the steps
8. Visit our web site at www.haeger.com and check out our service web page Custom Support/service

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Malu Town, Jiading District
201801 Shanghai, PRC

Phone: +86 21 5695 4988

Fax: +86 21 5695 4388

Warranty

Limited Warranty

1. **EXCLUSIVE WARRANTY:** This warranty is exclusive and in lieu of all other express or implied warranties including, without limitation, the implied warranties or merchantability and fitness for a particular purpose.
2. **EFFECTIVE DATE:** The warranty period starts from the date of installation by Distributor or Haeger Factory Technician, or from date of receipt if self-installed by the customer.
3. **PRODUCTS:** As to products, any defects in materials will be corrected without charge for parts or labor for a period of one year from warranty effective date. Products include the Haeger Insertion Machine, Modular Autofeed System (MAS), and Factory Installed Accessories.
4. **TOOLING:** As to tooling, any defects in materials or workmanship will be corrected without charge for labor or parts for a period of one year from the date of receipt. Tooling includes all Automatic Tooling, all Standard Manual Tooling, and all Special Manufactured Tooling.
5. **PROCEDURE:** You, the customer must notify Haeger, Incorporated promptly of any breach of this Limited Warranty by calling or writing to:

<p style="text-align: center;">Haeger, Inc.</p> <p style="text-align: center;">811 Wakefield Drive Oakdale, CA 95361 USA</p> <p>Toll Free: (800) 878-4343 Phone: (209) 848-4000 Fax: (209) 847-6553</p>	<p style="text-align: center;">Haeger Europe</p> <p style="text-align: center;">Textielstraat 18 7575 CA Oldenzaal The Netherlands</p> <p style="text-align: center;">Phone: +31 541 530 230 Fax: +31 541 532 400</p>	<p style="text-align: center;">Haeger China</p> <p style="text-align: center;">No.2, Lane 55, Fenggong Rd. Malu Town, Jiading District 201801 Shanghai, PRC</p> <p style="text-align: center;">Phone: +86 21 5695 4988 Fax: +86 21 5695 4388</p>
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Haeger, Incorporated, at its option, may elect to replace or repair the machine or part of the machine either in the field or may direct you to ship it to back, freight prepaid.

6. **LIMITATIONS:** Haeger, Incorporated, will not be liable in any event for incidental or consequential damages or for failure due to wear and tear, abuse, improper operation or maintenance, repair or modification by personnel not authorized by Haeger, Incorporated or other circumstances beyond the control of Haeger, Incorporated.

SECTION 7 – PARTS LIST

Description

The **Parts** in this section of the manual are listed by **Item Number**, **Part Number**, **Description** and **Quantity**.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	XX-XXXXX	XXXXXXXXXX	X

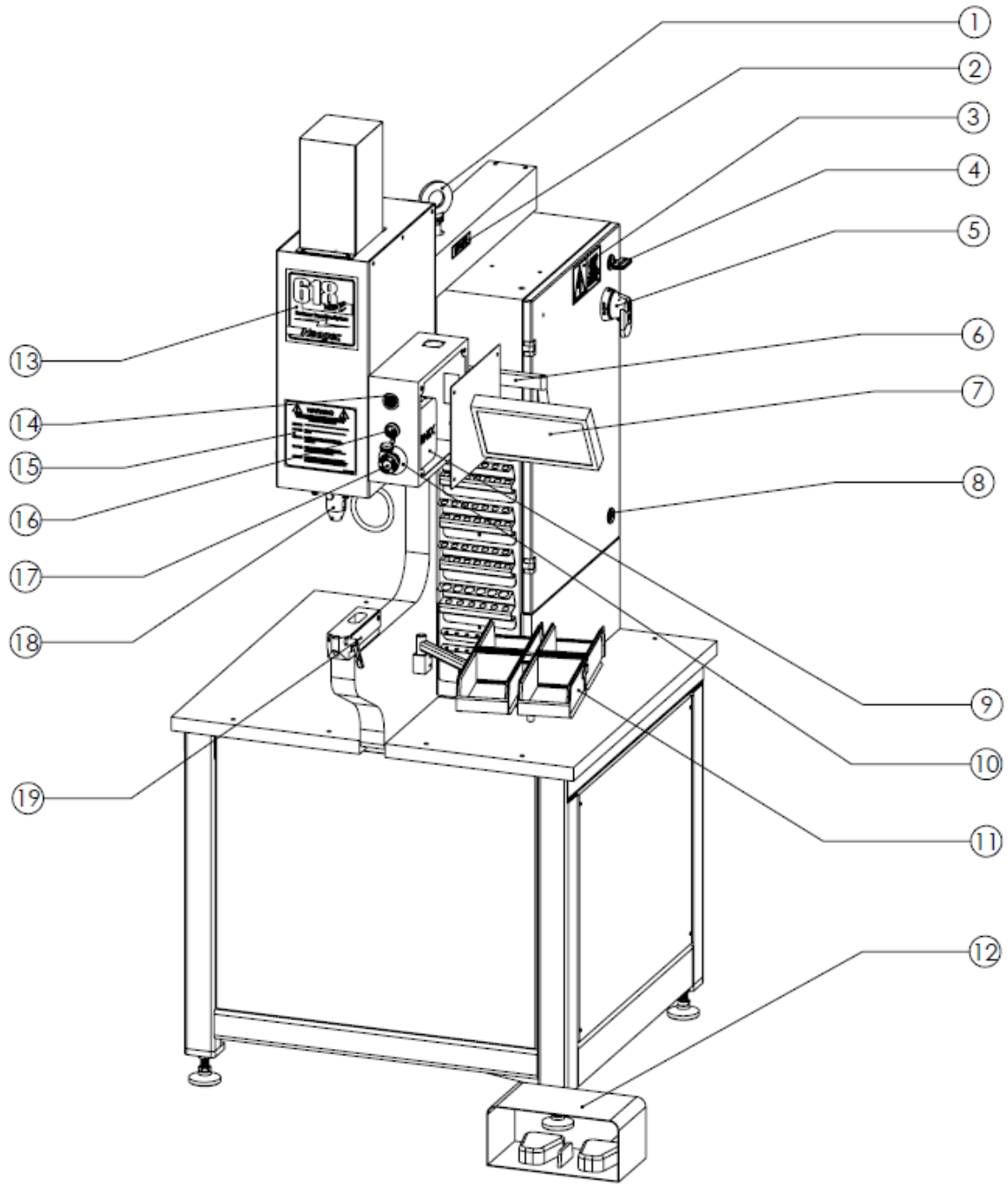
Item Numbers 1: Are depicted with in a circle with an arrow pointing to the specific **part** or **assembly**.

Part Number: This is the most important number on the page. It identifies a specific item in Haeger’s inventory. To avoid delays when ordering parts, be very sure the **Part Number** and **Quantity** are stated correctly!

Description: This is Haeger’s brief description of the part. For purchased parts, it may also include the manufacturer and their part number.

Quantity: This represents the total quantity of the particular **Part** which is used in the complete assembly. When ordering **Parts**, it may not always be necessary to order the number of parts listed. Order only the quantity that is required to make the repairs.

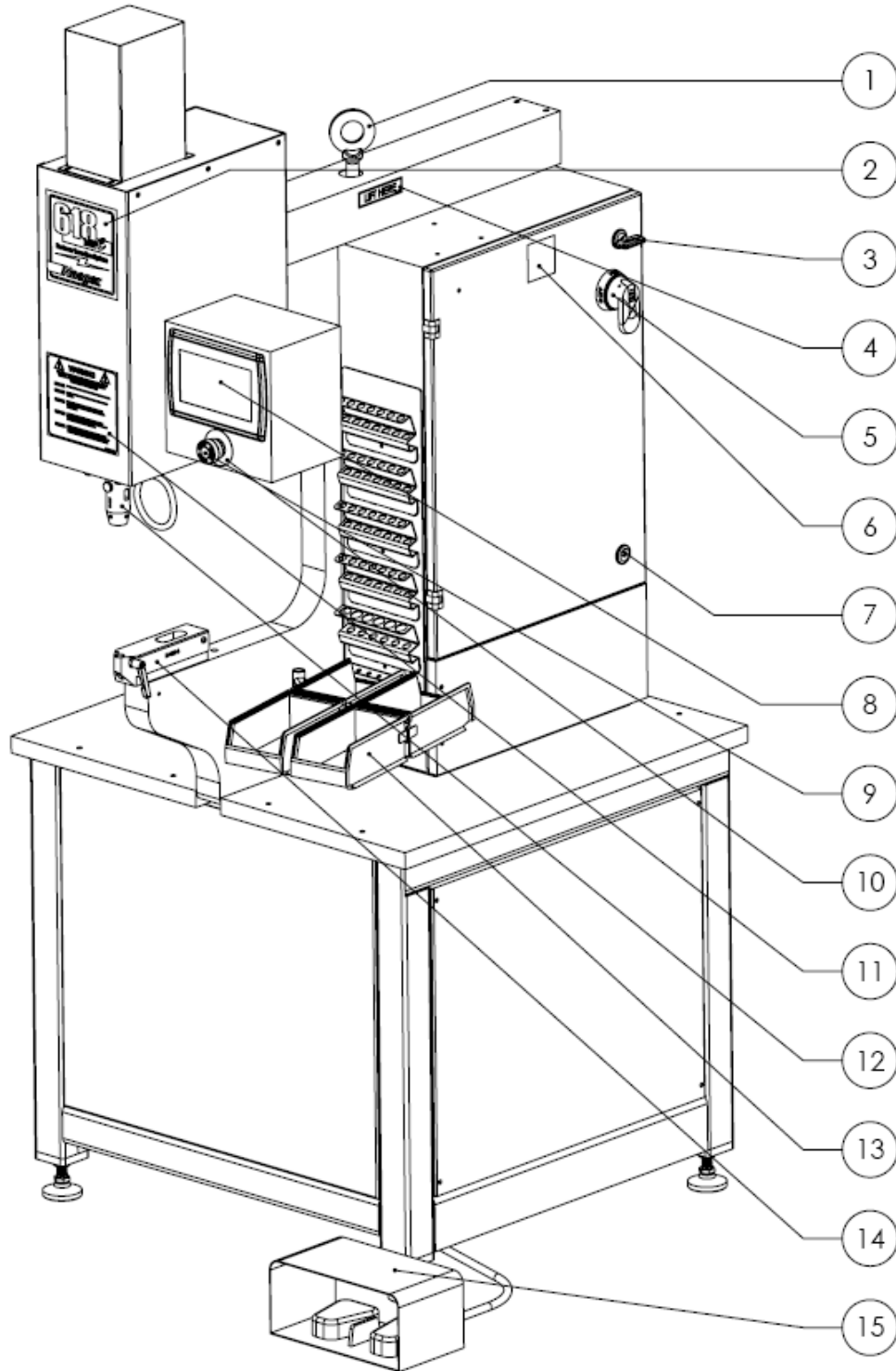
Main Assembly (Serial # 6MSPe2000 and Higher)



Main Assembly Cont. (Serial # 6MSPe2000 and Higher)

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	11-00186	3/4-10 X 6 Galv. Eyebolt W/ Shoulder	1
2	11-00515	Lift Here Label- English WITH WEATHERPROOF ADHESIVE	2
3	16-00134	LABEL: ELECTRIC SHOCK WARNING W/ CSA LOCKOUT WARNING	1
4	11-00233	Latch Key- 824	1
5	15-00220	DISCONNECT HANDLE (PISTOL GRIP)	1
6	15-03816	HMI Arm (HDMI Arm, ML10BA1, VESA 100/72, MSPe machines)	1
7	15-03814	HMI screen (HDMI, VSL102-HW 10.2in, MSPe machines)	1
8	11-00232	Door Latch ALL MACHINES	2
9	15-03813	Computer (Computer, MINIX, Neo z83-4, MSPe machines)	1
10	15-03538	Label, E-Stop Legend, Yellow Blank	1
11	15-01293	PART BIN 7X4 RED	4
12	15-42133	Assy, Footswitch Dual Pedal, all OT/WT-4, CE	1
13	10-01406	Label, Machine Logo, 6x6, 618MSPe	1
14	H-1071	Electrical, Buzzer	1
15	11-00361-EN	Label, Haeger Warning, English (Never, Never)	1
16	15-02827	USB Connector w/Cap	1
17	15-03067	Idec E-STOP Button	1
18	15-40185	Upper Tool Holder Assembly	1
19	H-166-8	618/824 Lower Tool Holder Assy Replaces H-166-7	1

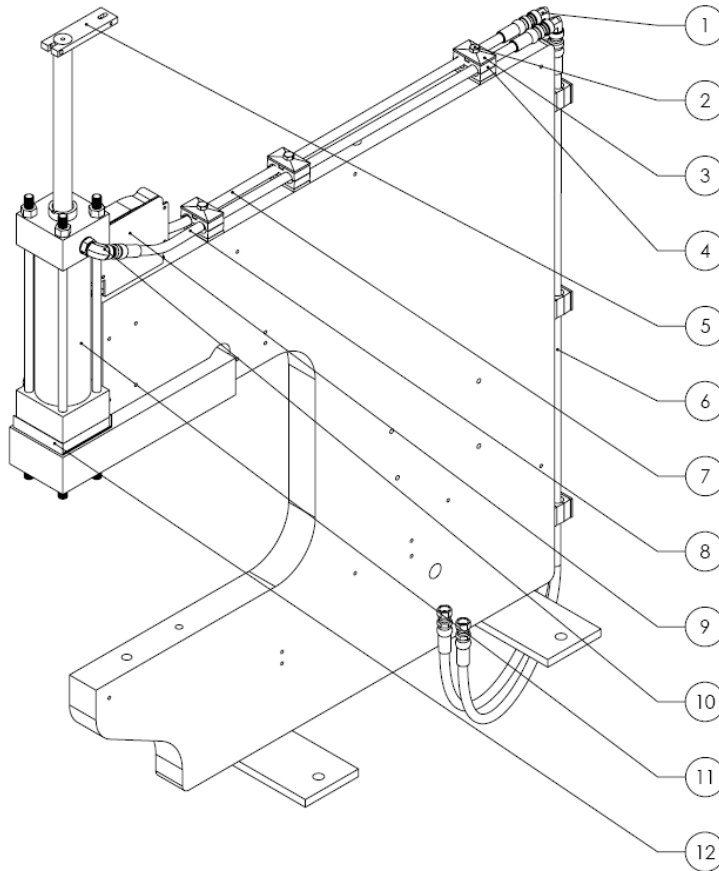
Main Assembly (Serial # 6MSPe1999 and Lower)



Main Assembly Cont. (Serial # 6MSPe1999 and Lower)

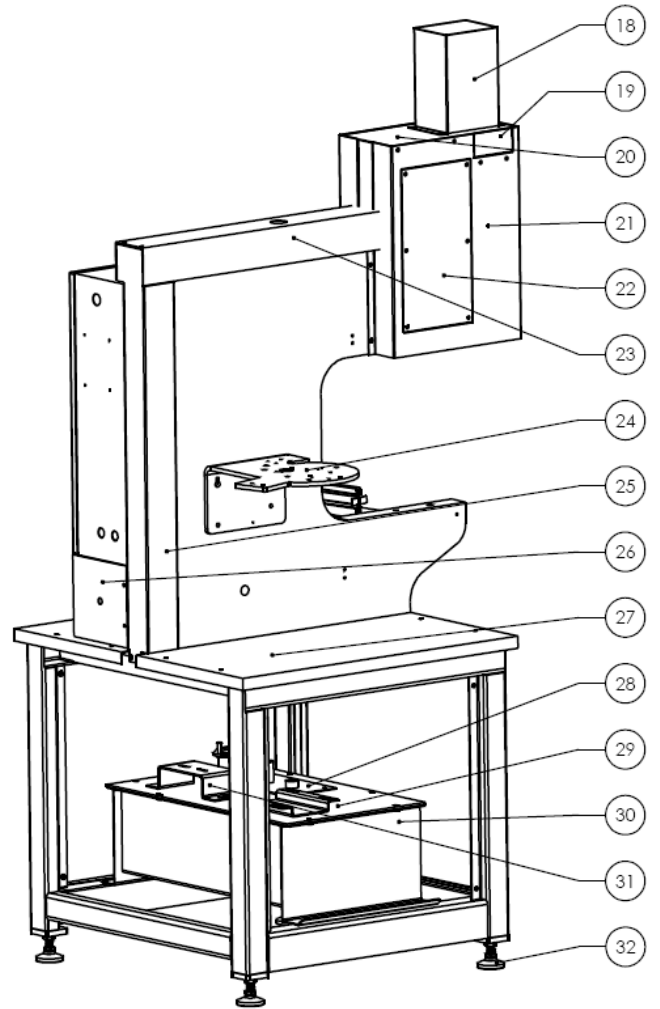
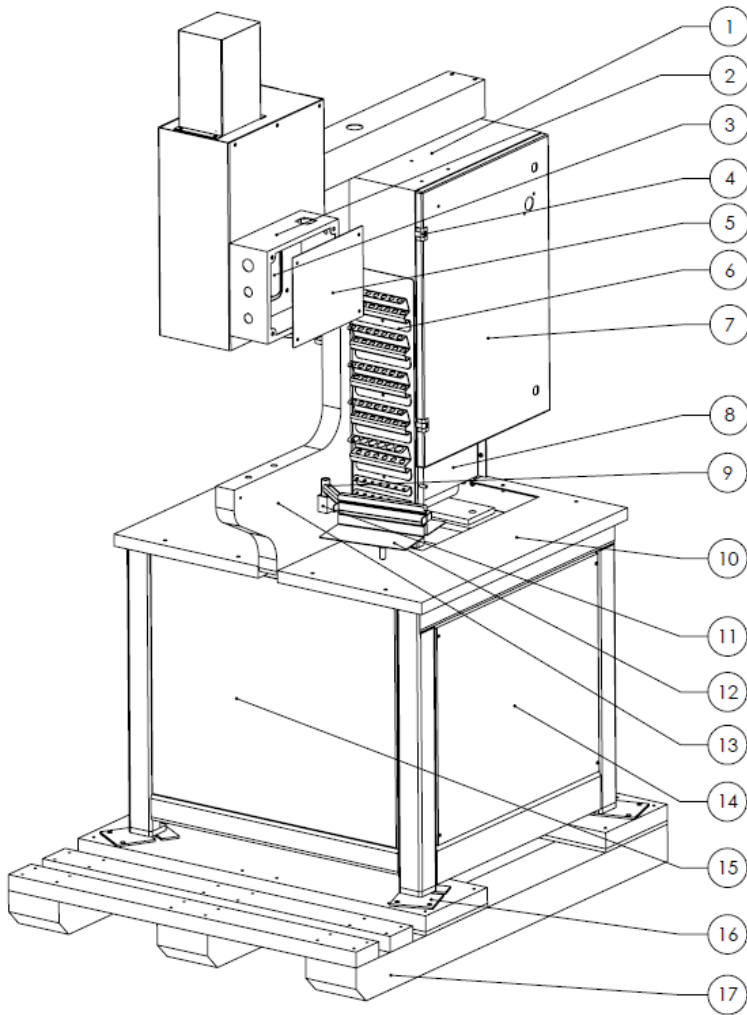
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	11-00186	3/4-10 X 6 Galv. Eyebolt W/ Shoulder	1
2	10-01406	Label, Machine Logo, 6x6, 618MSPe	1
3	11-00233	Latch Key- 824	1
4	11-00515	Lift Here Label- English WITH WEATHERPROOF ADHESIVE	2
5	15-00220	DISCONNECT HANDLE (PISTOL GRIP)	1
6	16-00134	LABEL: ELECTRIC SHOCK WARNING W/ CSA LOCKOUT WARNING	1
7	11-00232	Door Latch ALL MACHINES	2
8	15-03485	HMI, 7in, LECE	1
9	15-03067	Idec E-STOP Button	1
10	15-03538	Label, E-Stop Legend, Yellow Blank	1
11	11-00361-EN	Label, Haeger Warning, English (Never, Never)	1
12	15-40185	Upper Tool Holder Assembly	1
13	15-01293	PART BIN 7X4 RED	4
14	H-166-8	618/824 Lower Tool Holder Assy Replaces H-166-7	1
15	15-42133	Assy, Footswitch Dual Pedal, all OT/WT-4, CE	1

Hydraulic Cylinder Main Assembly



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	10-00137	3/8 Jic X 3/8 Jic 90 Deg. Elbow	2
2	10-01326	HHCS, M8 x 1.25 x 35mm	6
3	10-00517	Cover Plate For Weld Clamp	6
4	10-00516	Clamp Half (2/Set)	6
5	10-01427	CET CONNECTING BAR, 618+	1
6	10-00146	3/8 100r8 Hose @ 60" S8E06-HY0606FJ-06FJ-60	2
7	10-00150	3/8" 100r8 Hose @ 39 1/4" S8E06-HY0606FJ-06FJ-39.25	1
8	10-00149	3/8" 100r8 Hose @ 37" S8E06-HY0606FJ-06FJ-37	1
9	15-03461	Cable-Actuated Sensor, 10"	1
10	10-00138	Fitting, 1/2 Oring X 3/8 Jic 90 Deg El	2
11	10-00119	Hydraulic Cylinder, 618+	1
12	10-00021	618 Cyl. Insulation Shoe	1

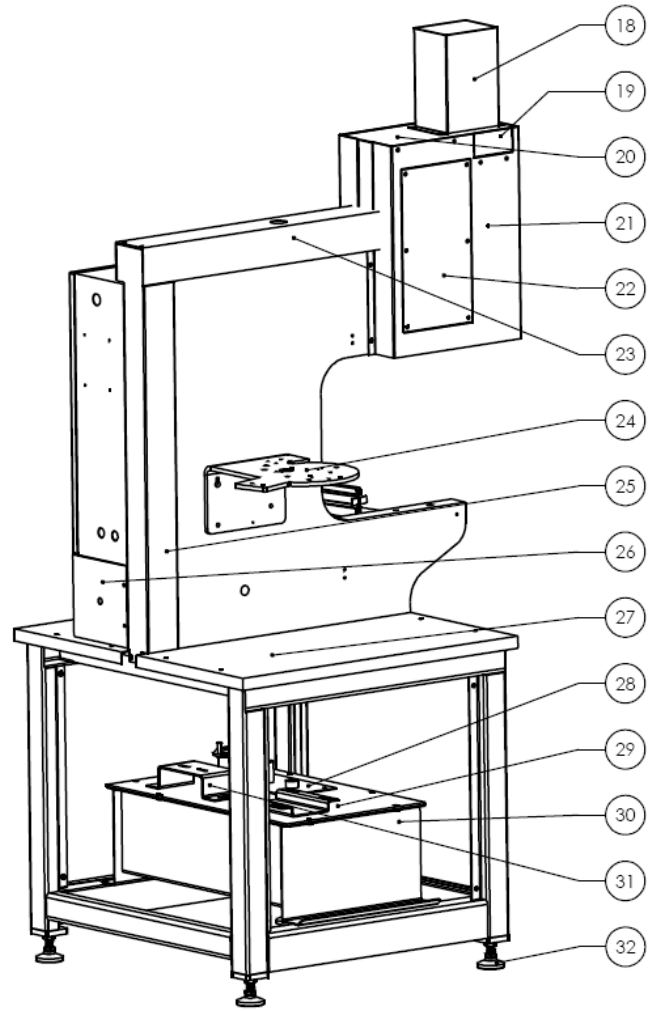
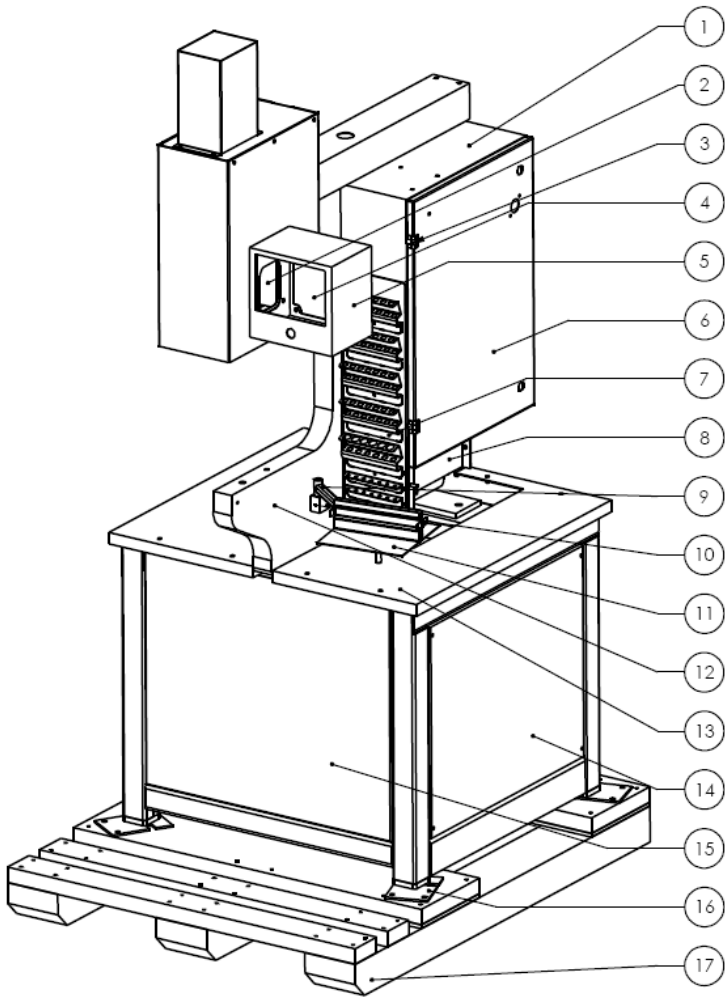
Sheet Metal (Serial # 6MSPe2000 and Higher)



Sheet Metal Cont. (Serial # 6MSPe2000 and Higher)

ITEM NO.	PART	DESCRIPTION	QTY.
1	10-01232	WELDMENT ELECT. CABINET 618+	1
2	15-03811	Computer Enclosure (HMI & Arm Mount, 618/824 MSPe)	1
3	10-01457	Assy, HMI Bracket, MSPe	1
4	10-00059	180 Degr Black Hinge W/ Zinc Pin (3 Part Kit)(use 11-00232)	2
5	15-03812	Computer Enclosure Access Panel (HMI & Arm Mount, 618/824 MSPe)	1
6	10-01421	Tool Rack, 618 & 824	1
7	10-00936	Universal Elec. Cabinet Door	1
8	10-00036	618 Hyd Cabinet	1
9	10-00152	618/618xl Service Tray Arm	1
10	10-00025	618/618xl Right Top Panel	1
11	10-00153	618 Service Tray Bracket	1
12	15-01299	PART BIN HOLDER	1
13	10-00125	618 MAIN FRAME WELDMENT	1
14	10-00124	618/618xl Lt & Rt Side Covers	2
15	10-00113	618/618xl Base Frame	1
16	15-00076	Machine Tie Down Plate	4
17	15-03284	Pallet, Universal, 416/618, International	1
18	10-01455	CET Cable Cover, 618MSPe	1
19	10-01454	Assy, Cover, Crank Assembly, 618MSPe	1
20	10-01452	Assy, Top Cylinder Cover, 618MSPe	1
21	10-01453	Assy, Cylinder Cover, 618MSPe	1
22	15-03038	Maintenance Cover, Cylinder Panel, WT4e	1
23	10-00030	618/618xl Top Cover	1
24	10-01456	Universal MAS Bracket, MAS-9 & MAS-350, MSPe	1
25	10-00032	618/618xl Back Cover	1
26	10-00048	618/618xl Hyd Cab Door	1
27	10-00024	618/618xl Left Top Panel	1
28	10-01243	PLATE, SUCTION ACCESS 618+	1
29	10-01414	Reservoir Top Plate 618+	1
30	10-01260	RESERVOIR WELDMENT 618 PLUS	1
31	10-01420	Manifold Bracket, 618+ CE	1
32	15-01160	LEVELING FOOT M16	4

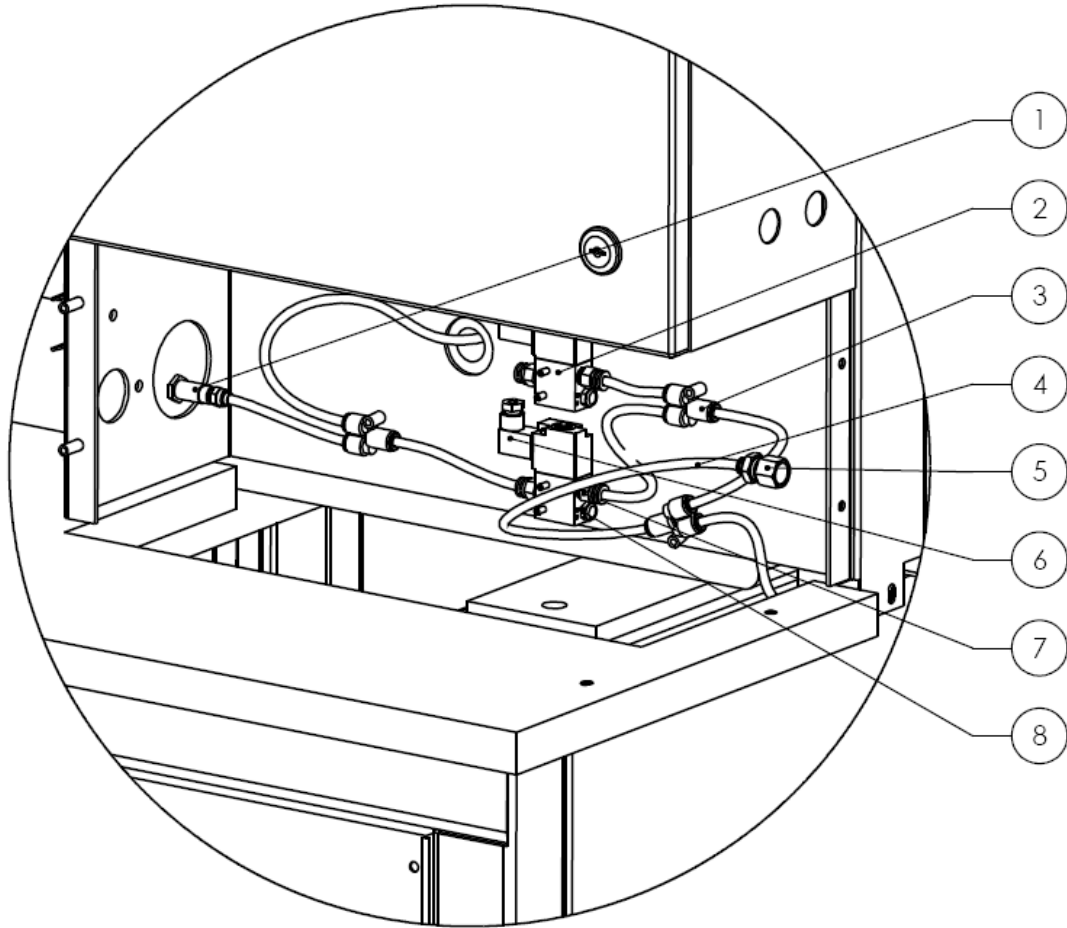
Sheet Metal (Serial # 6MSPe1999 and Lower)



Sheet Metal Cont. (Serial # 6MSPe1999 and Lower)

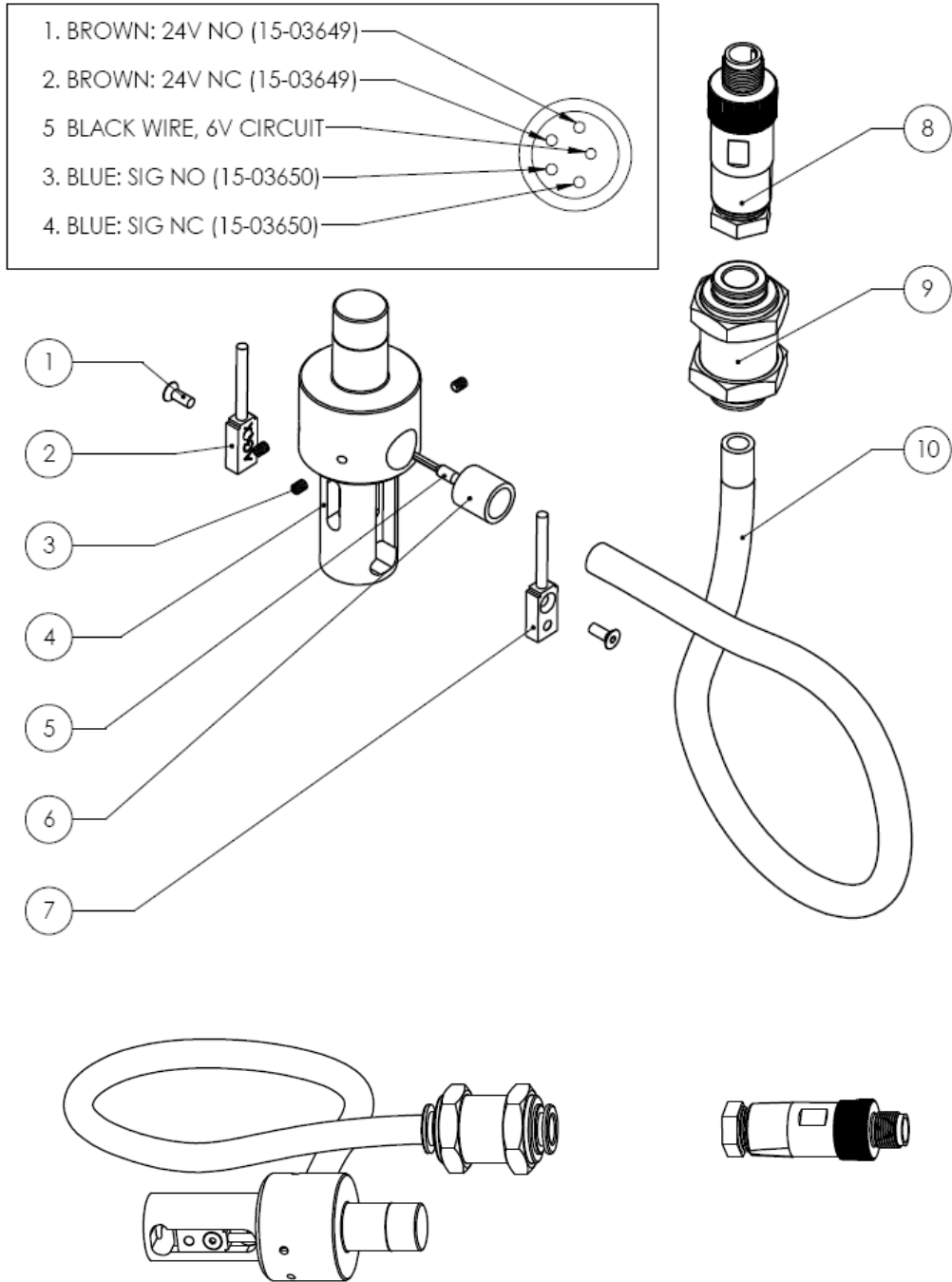
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	10-01232	WELDMENT ELECT. CABINET 618+	1
2	10-01457	Assy, HMI Bracket, MSPe	1
3	10-00059	180 Degr Black Hinge W/ Zinc Pin (3 Part Kit)(use 11-00232)	2
4	15-03460	Back Panel, Enclosure, Levi 777 HMI, 618 & 824	1
5	15-03459	Enclosure, Levi 777 HMI, 618 & 824	1
6	10-00936	Universal Elec. Cabinet Door	1
7	10-01421	Tool Rack, 618 & 824	1
8	10-00036	618 Hyd Cabinet	1
9	10-00152	618/618xl Service Tray Arm	1
10	10-00153	618 Service Tray Bracket	1
11	15-01299	PART BIN HOLDER	1
12	10-00125	618 MAIN FRAME WELDMENT	1
13	10-00025	618/618xl Right Top Panel	1
14	10-00124	618/618xl Lt & Rt Side Covers	2
15	10-00113	618/618xl Base Frame	1
16	15-00076	Machine Tie Down Plate	4
17	15-03284	Pallet, Universal, 416/618, International	1
18	10-01455	CET Cable Cover, 618MSPe	1
19	10-01454	Assy, Cover, Crank Assembly, 618MSPe	1
20	10-01452	Assy, Top Cylinder Cover, 618MSPe	1
21	10-01453	Assy, Cylinder Cover, 618MSPe	1
22	15-03038	Maintenance Cover, Cylinder Panel, WT4e	1
23	10-00030	618/618xl Top Cover	1
24	10-01456	Universal MAS Bracket, MAS-9 & MAS-350, MSPe	1
25	10-00032	618/618xl Back Cover	1
26	10-00048	618/618xl Hyd Cab Door	1
27	10-00024	618/618xl Left Top Panel	1
28	10-01243	PLATE, SUCTION ACCESS 618+	1
29	10-01414	Reservoir Top Plate 618+	1
30	10-01260	RESERVOIR WELDMENT 618 PLUS	1
31	10-01420	Manifold Bracket, 618+ CE	1
32	15-01160	LEVELING FOOT M16	4

Air Supply



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	H-2545	BULKHEAD, FEMALE QUICK DISCONNECT, 1/4"	1
2	11-00587	24V SOLENOID VALVE	2
3	15-00275	FITTING, 1/4" Y, AIR	3
4	15-00285	AIR TUBE, 1/4" DIA	20 FT.
5	15-01893	FITTING, BULKHEAD 1/4 TUBE X 1/4 NPT	1
6	11-00590	SOLENOID CONNECTOR	2
7	14-00638	AIR FITTINGS	4
8	10-00210	BRASS BREATHER, 1/8"	2

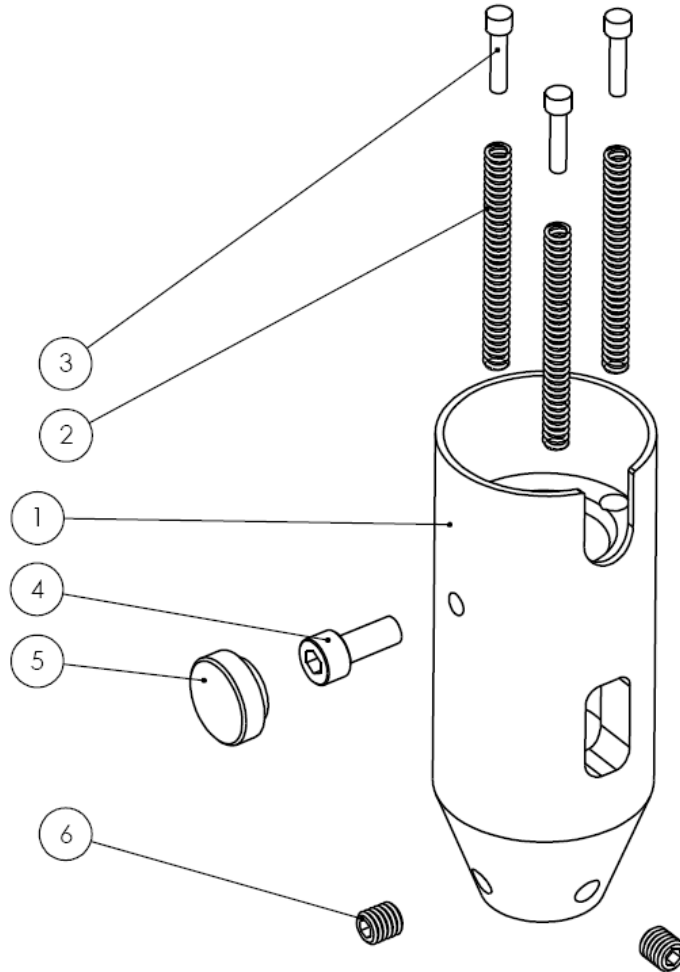
Dual Safety Sensor Assembly



Dual Safety Sensor Assembly (Cont.)

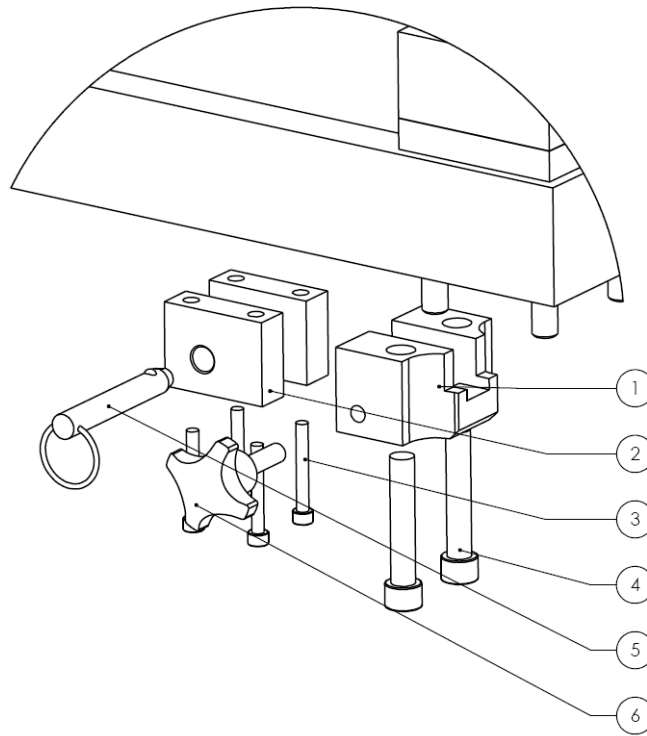
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	15-01708	FHCS, M3 X 0.5 X 10MM	2
2	15-03649	SAFETY SENSOR, TURCK, NO	1
3	H-3892	SHSS, M3 x 0.5 x 4MM, BLACK OXIDE	3
4	15-03647	RAM ADAPTER, SAFETY SENSOR, 2nd GEN	1
5	10-00765	FERRULE, 18 GA, YELLOW	1
6	15-03207	BUSHING, 3/8" ID X 1/2" OD	1
7	15-03650	SAFETY SENSOR, TURCK, NC	1
8	15-01450	CONNECTOR, 5 PIN, MALE	1
9	15-03209	FITTING, 3/8", BULKHEAD UNION	1
10	15-03208	HOSE, 3/8", AIR	1

Upper Tool Holder Assembly



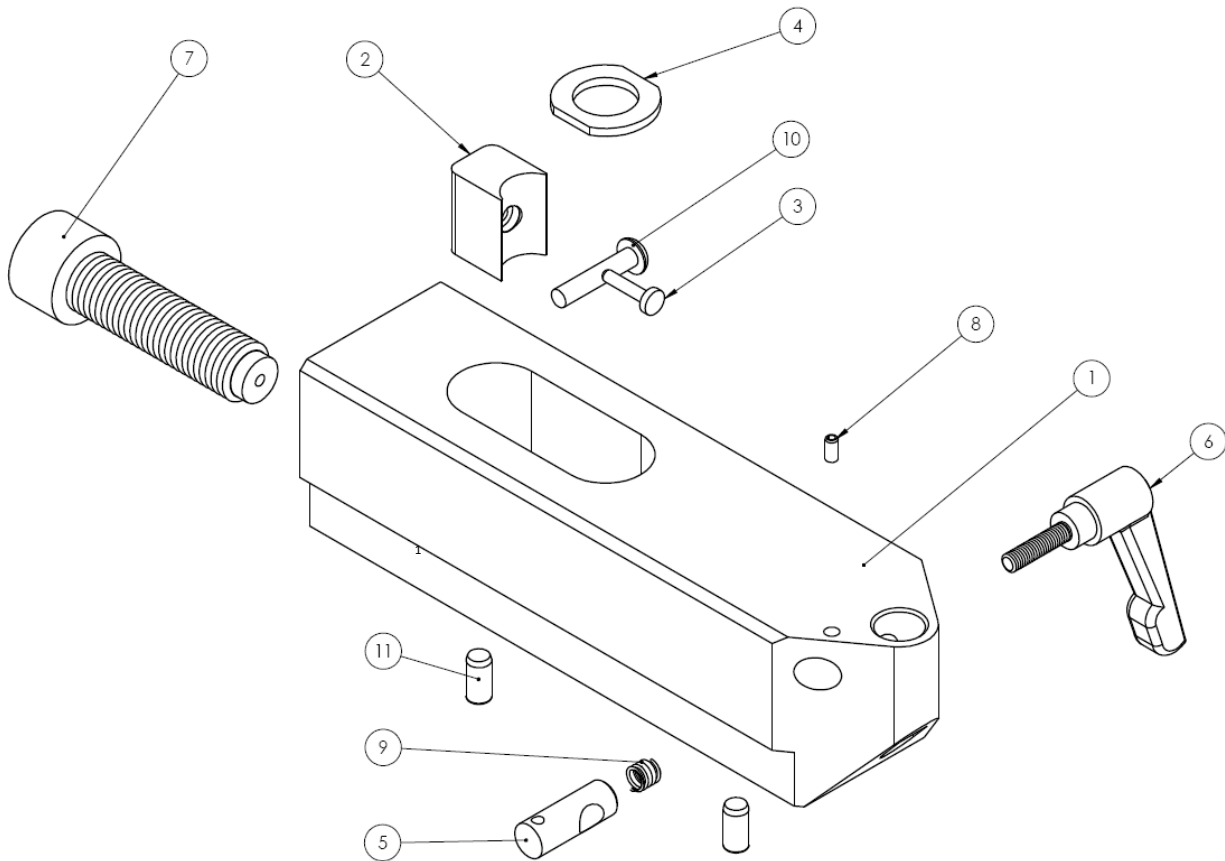
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	15-03664	BODY, UPPER TOOL HOLDER, SAFETY SENSOR	1
2	15-03206	CONTINUITY SPRING, 1 3/4" UNIVERSAL	3
3	11-00016	CONTINUITY GUIDE PIN	3
4	H-3738	SHCS, M5 X 0.8 X 12MM, BLACK OXIDE	1
5	11-00241	THUMB SCREW CAP	1
6	11-00242	SHSS, M6X1.0 X 6, BLACK OXIDE	2

J-Frame Mount Assembly



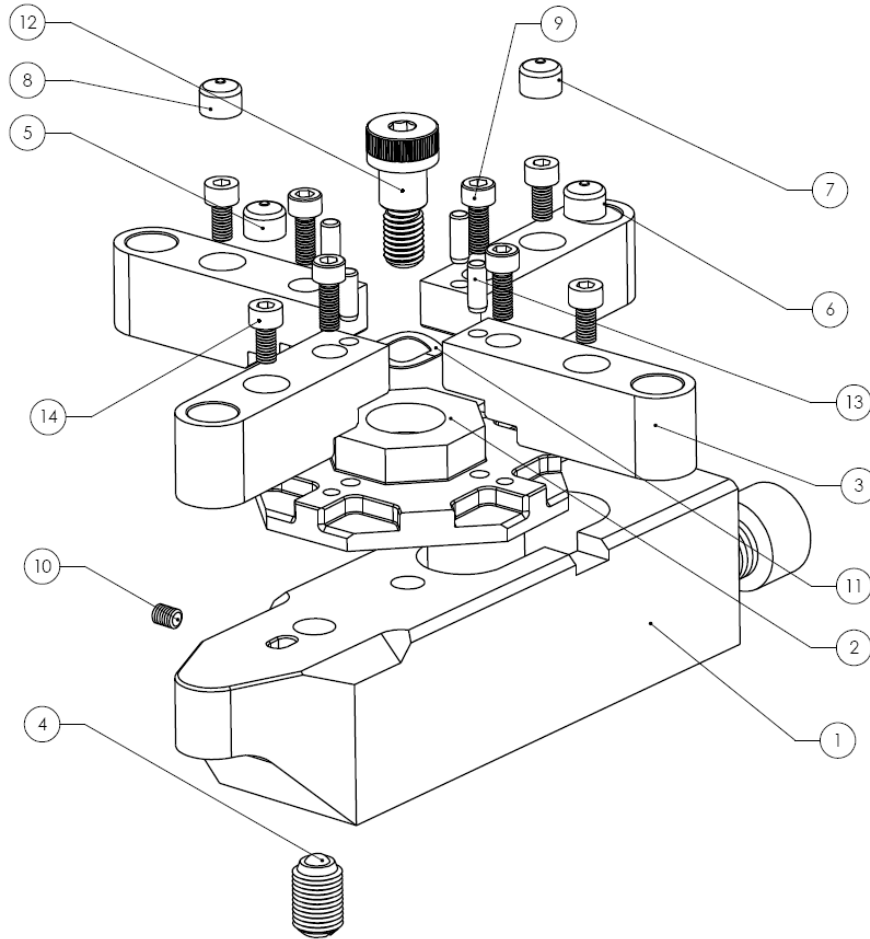
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	10-00003	618/618xl Front J-Frame Mtg. Bracket	1
2	10-00002	618/618xl Rear J-Frame Mtg. Block	2
3	10-01180	SHCS, M6 x 1.0 x 45mm, Stainless Steel	4
4	10-01325	SHCS, M12 x 1.75 x 65mm	2
5	11-00581	Quick Release Pin 1/2 X 2 1/2"	1
6	11-00580	M10 x 35mm Star Knob	1

Standard Lower Tool Holder



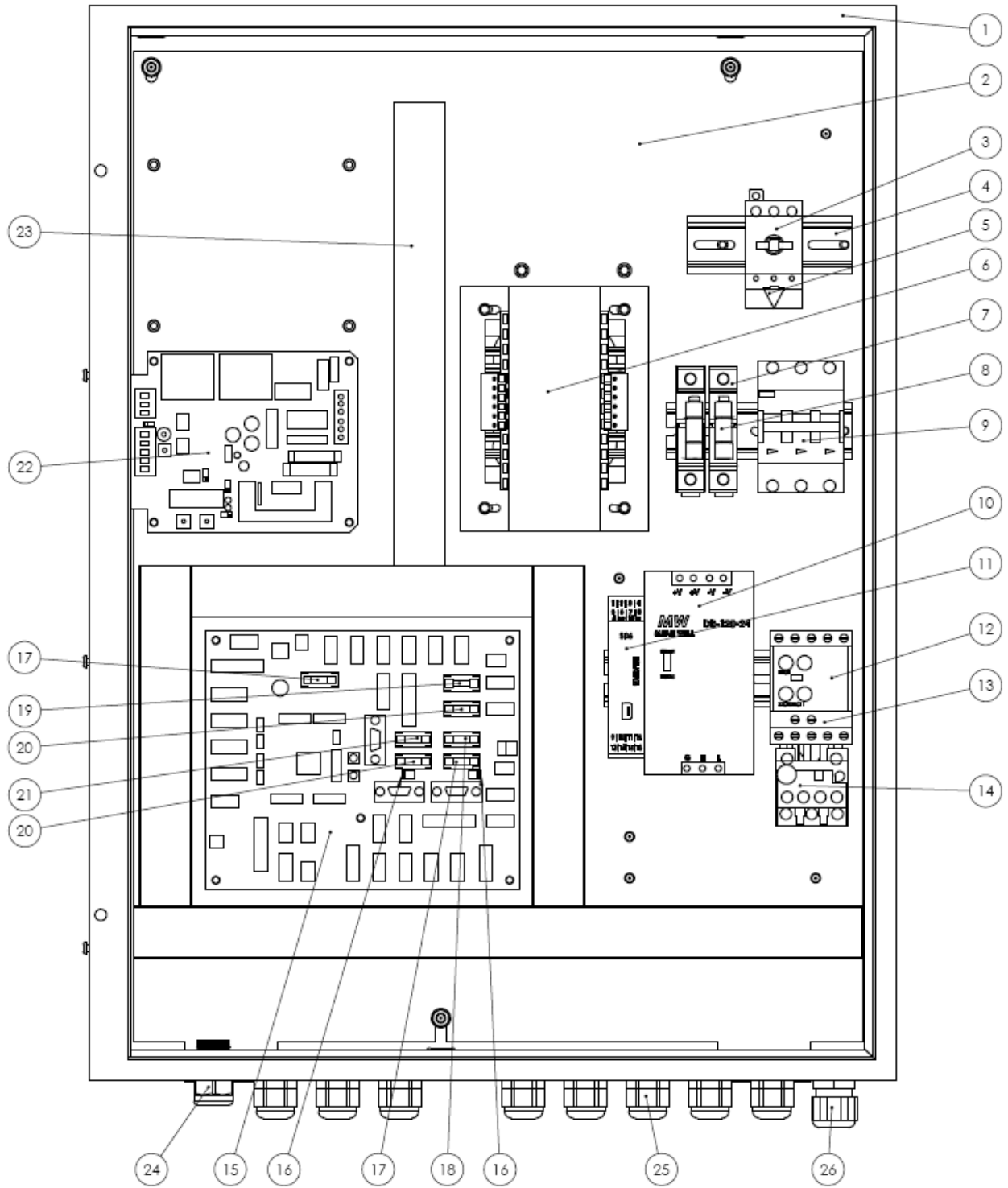
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	H-166-9	BODY, COMMON LOWER TOOL HOLDER	1
2	H-169-4	Shoe For Lower Tool Holder	1
3	H-169-5	Pin For Lower Tool Holder	1
4	H-169-6	Lower Tool Washer	1
5	11-00041	Lock Cylinder	1
6	11-00042	Black Locking Lever SERVICE ONLY	1
7	11-00191	SHCS, M16 Modified	1
8	11-00199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

Turret Insertion Tool



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	15-01307	TIS Lower Tool Holder Assembly	1
2	15-01287	TIS-1, Center Hub	1
3	15-01288	TIS -1, Lower Tool Arm	4
4	15-01306	SPRING PLUNGER W/OUT NYLOCK 1/2-13 .75L .072 P .281 B Dia	1
5	15-01296	ROUND VINYL CAP GREEN 23 .320 X 1/16"	1
6	15-01297	ROUND VINYL CAP RED .320 X 1/16"	1
7	15-01298	ROUND VINYL CAP YELLOW .320 X 1/16"	1
8	15-01295	ROUND VINYL CAP BLUE 40 .320 X 1/16"	1
9	15-00450	SHCS, M5 x 0.8 x 14mm, Stainless Steel	4
10	11-00238	SSSCPP, M5 x 0.8 x 6mm, Steel, Black Oxide	1
11	15-01305	Washer, Wave, 1/2" (.51"x.76"x.02"), Steel, Plain	1
12	15-01304	SHOULDER SCREW 12MM HD DIA 18mm HT 8mm M10 16mm LG	1
13	15-01310	Pin, Dowel, Oversized, 3/16" (+.001") x 1/2", Steel, Plain	4
14	15-00482	SHCS, M5 x 0.8 x 10mm, Stainless Steel	4

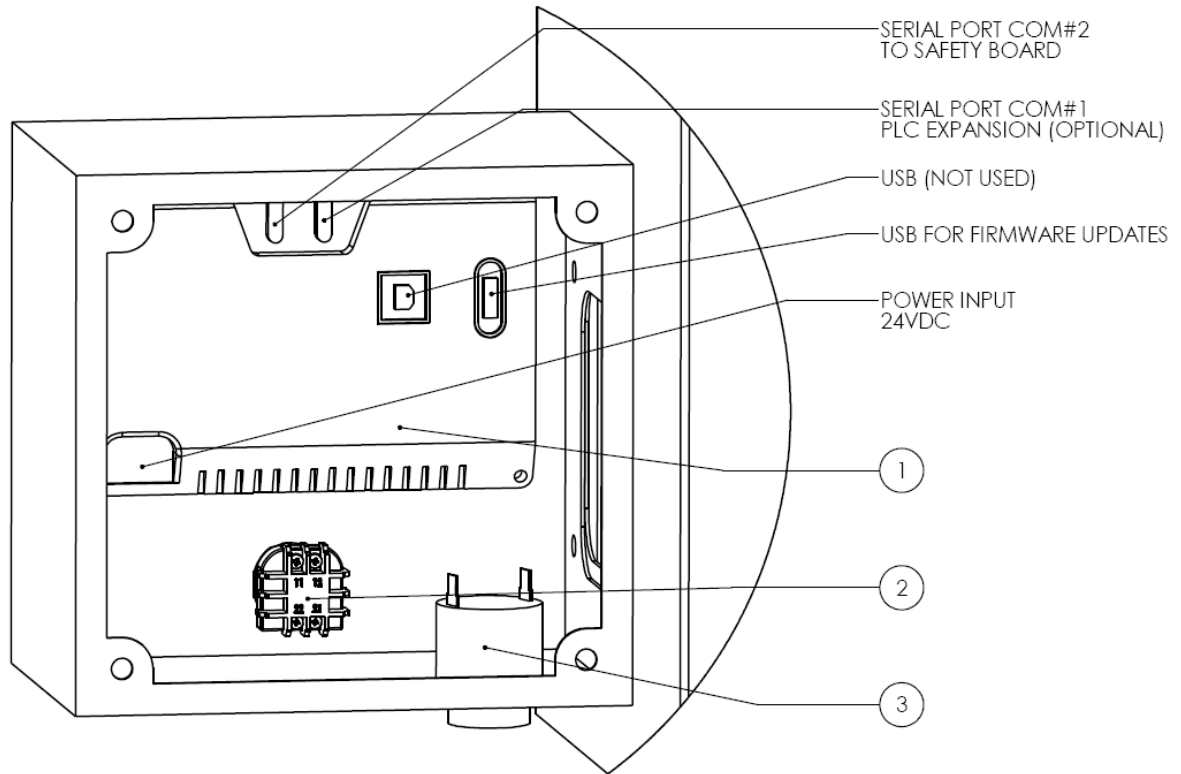
Electrical Cabinet



Electrical Cabinet (Cont.)

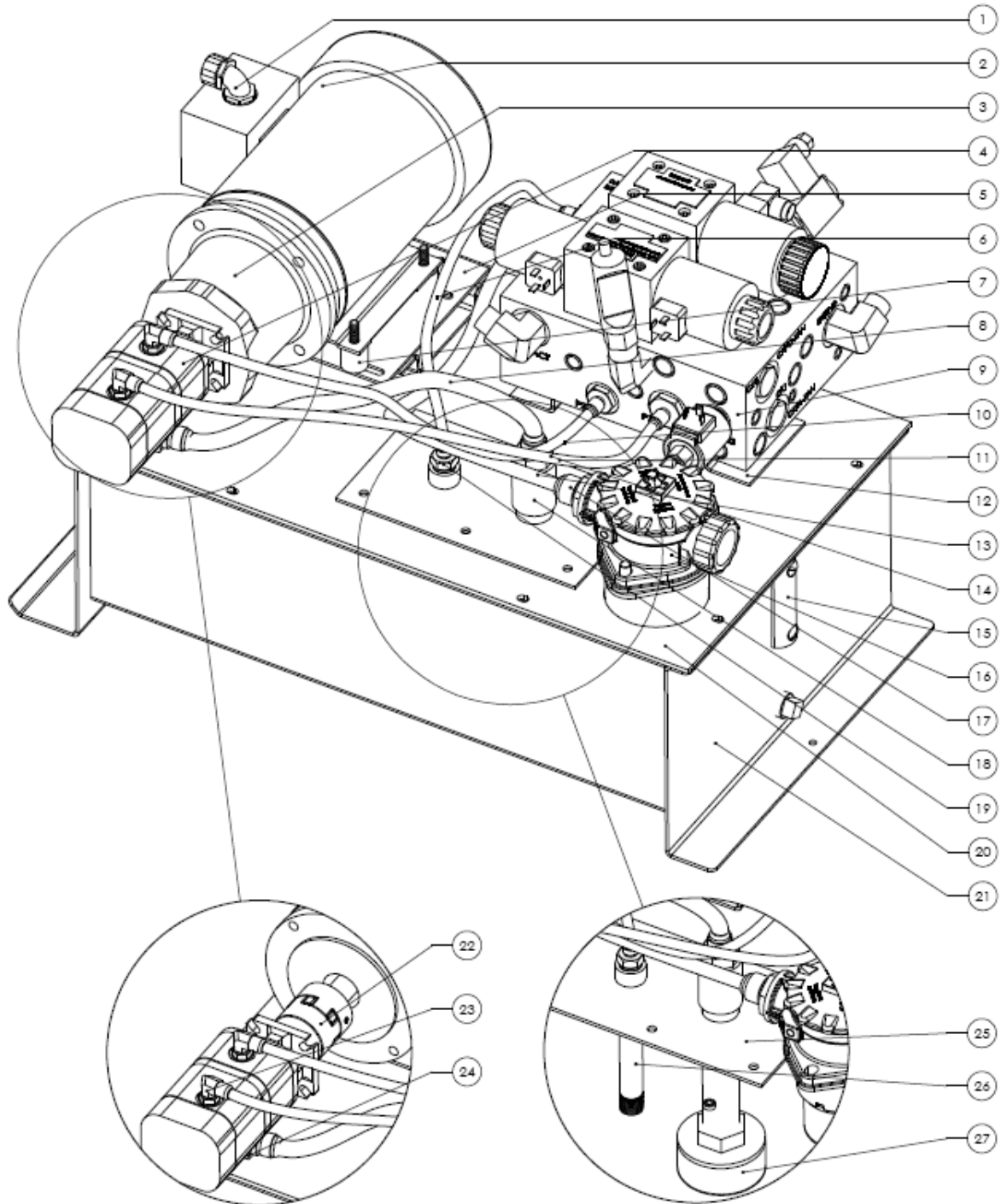
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	10-01232	CABINET, ELECTRICAL, 618 (PLUS)	1
2	10-01418	ELECTRICAL PANEL, 618+ CE	1
3	15-00219	DISCONNECT SWITCH	1
4	11-00382	35mm Din Rail	1
5	15-03092	GUARD, DISCONNECT SWITCH	1
6	10-00891	LOW VOLTAGE TRANSFORMER	1
7	10-01145	Fuse Holder 600V 30A DIN Mount	2
8	15-02981	FUSE, 2.25 AMP, CLASS CC, High Voltage	2
	15-02980	Fuse, 3.5AMP, Class CC, Low Voltage	2
9	10-01153	Breaker, 3 Pole 8 AMP, High Voltage	1
	10-01154	Breaker, 3 Pole 16 AMP, Low Voltage	1
10	15-01719	POWER SUPPLY 120W 5A 24VDC	1
*11	15-01128	**AMPLIFIER, PROPORTIONAL (Serial # 6MSPe1999 & Lower Only)	1
12	15-03064	Auxiliary contact, 1NO-1NC	1
13	10-00766	MAGNETIC STARTER	1
14	10-00669	3.5-5 Amp Overload Relay - High Voltage	1
	11-00325	7.5 - 11 Amp Overload Relay - Low Voltage	1
*15	15-03452	*ASSY, SAFETY BOARD (Serial # 6MSPe1999 & Lower)	1
	15-42376	*ASSY, SAFETY BOARD (Serial # 6MSPe2000 & Higher)	
16	15-03204	JUMPER, 2X1, 0.100" PITCH	2
17	15-00129	FUSE, 4A, 24V	2
18	15-00152	FUSE, 4A, 24V	1
19	11-00375	FUSE, 4A, 24V	1
20	11-00376	FUSE, 2A, 6V	2
21	15-00451	FUSE, 4A, 24V	1
22	15-02773	CONTROLLER MAS 350	1
23	10-00019	PANDUIT WIRING DUCT	1
24	10-00166	1/2 NPT STRAIN RELIEF	1
25	10-00166	1/2 NPT STRAINRELIEF	8
26	H-1028	LIQUITITE FLEX CONNECTOR 3/8"	1

HMI Assembly (Serial # 6MSPe1999 and Lower)



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	15-03485	HMI, 7IN, MSPe	1
2	15-03065	BUTTON, E-STOP, PUSH	1
3	H-1071	ELECTRICAL BUZZER	1

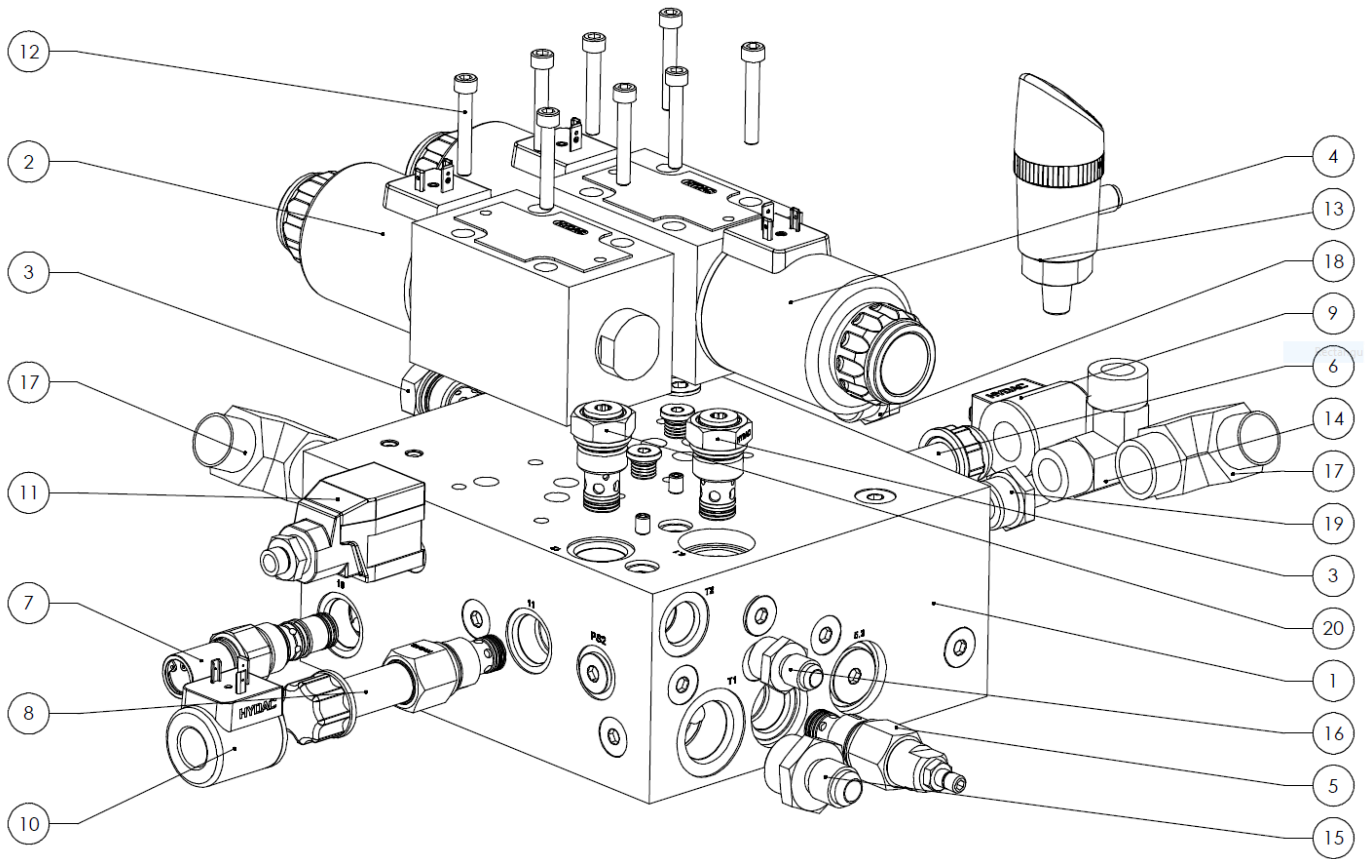
Hydraulic Reservoir Assembly



Hydraulic Reservoir Assembly (Cont.)

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	H-1029	3/8" to 1/2" Pipe EL	1
2	10-001445	MOTOR, 2 HP, 3600 RPM, 208/230/406 V, 50/60 HZ	1
3	10-00022	MOTOR PUMP ADAPTER	1
4	10-01229	PUMP, HYDRAULIC 618+	1
5	10-01419	MOTOR MOUNT ADAPTER, 618+ CE	1
6	10-01432	HOSE, RETURN 3/8" X 18.5" 6FJ-6FJ90	1
7	15-00079	MOTOR STOCK MOUNTS M8 X 1	4
8	10-01435	HOSE, SUCTION 5/8" X 16.5" 10FJ-10FJ90	1
9	SEE PAGE 79	824 HYDRAULIC MANIFOLD SUBASSEMBLY	1
10	10-01434	HOSE, PRESSURE 3/8" X 19.5" 6FJ-6FJ90	1
11	10-01433	HOSE, PRESSURE 3/8" X 24" 6FJ-6FJ90	1
12	10-01420	MANIFOLD BRACKET, 618+ CE	1
13	10-01436	HOSE, RETURN 1/2" X 22.5" 8FJ90-10FJ	1
14	10-01426	FITTING, MJ-MP-10-16	1
15	15-00226	LEVEL GAUGE WITHOUT THEMOMETER	1
16	15-00758	FILTER ASSY RETURN	1
17	12-02144	FITTING, MB-MJ-16-12	1
18	10-01245	FITTING, 1" PIPE COUPLING BLK	1
19	10-01257	FITTING, 1/2 MALE PIPE TO 3/8 MALE JIC	1
20	10-01414	618PL RESERVOIR TOP (ABB MTR TYPE M2BA 090)	1
21	10-01260	RESERVOIR WELDMENT, 618 (PLUS)	1
22	10-00023	SPIDER COUPLING	1
23	15-00058	FITTING, MB-MJ90 6-6	2
24	15-00062	FITTING, 5/8XJICX5/8 O-RING 90 DEGREE	1
25	10-01243	SUCTION ACCESS PLATE	1
26	10-01256	FITTING, PIPE NIPPLE 1/2" X 6"	1
27	15-01131	STRAINER, 1" NUT STYLE	1

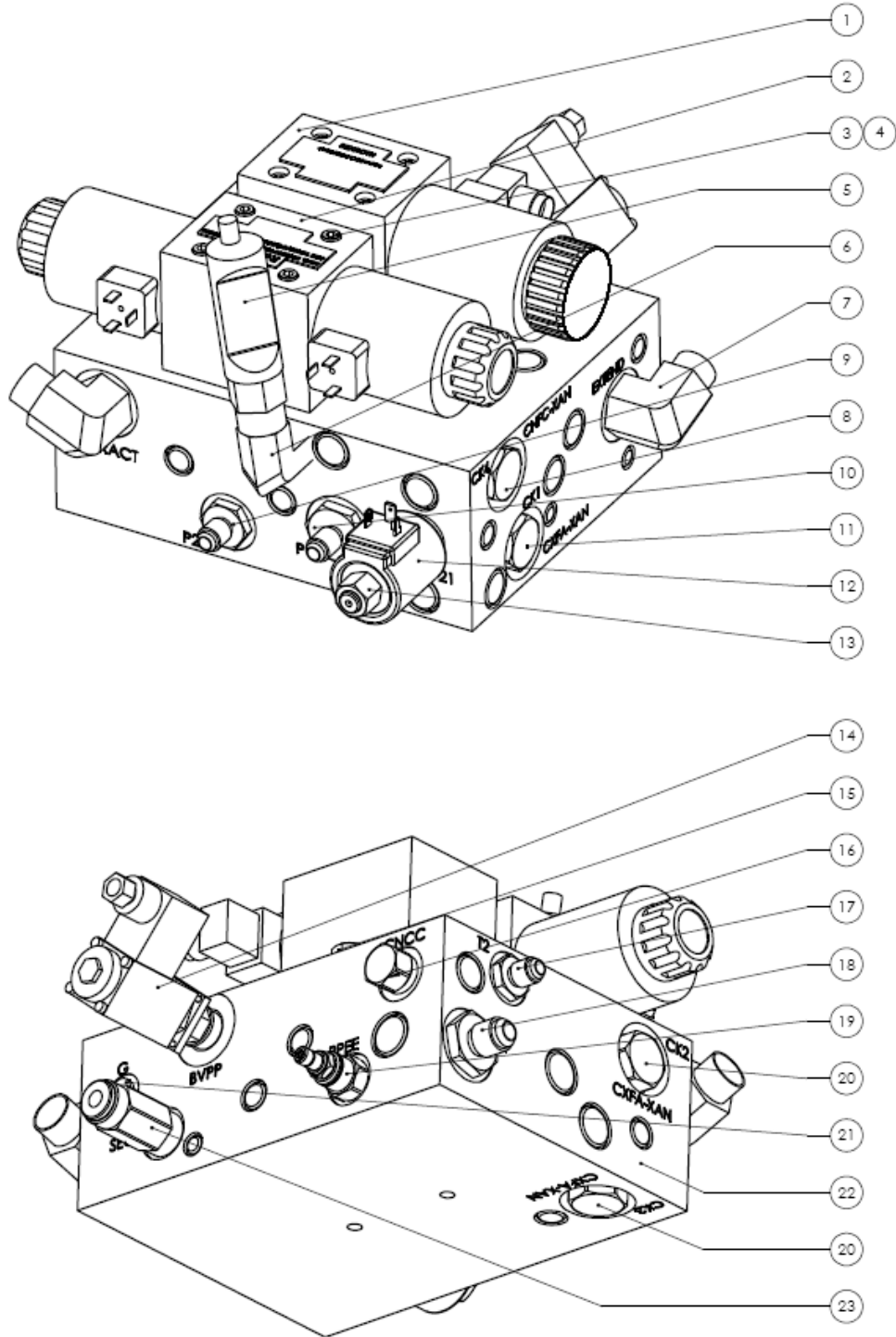
Hydraulic Manifold Subassembly (Serial # 6MSPe2000 & Higher)



Hydraulic Manifold Subassembly Cont. (Serial # 6MSPe2000 & Higher)

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	15-03785	MANIFOLD, HYDRAULICS, UNIVERSAL, HYDAC	1
2	15-03407	Valve, Directional, 3-way, 2 position	1
3	15-03778	CHECK VALVE, 5PSI, FC10-2	2
4	15-01120	Valve, 4-WAY H CENTER 24 VDC	1
5	15-03783	PRESSURE RELIEF VALVE, 0-3300 PSI, FC10-2	1
6	15-03787	BYPASS VALVE, DIRECTIONAL POPPET, N/O 2-WAY, FC10-2	1
7	15-01112	VALVE, SEQUENCE	1
8	15-03782	PROPORTIONAL RELIEF VALVE, 0-3300 PSI, FC10-2	1
9	15-03781	COIL, BYPASS, DIRECTIONAL POPPET	1
10	15-03788	COIL, PROPORTIONAL RELIEF VALVE	1
11	15-03784	PLUG AMPLIFIER, PROP RELIEF VALVE, 0-10V	1
12	15-01197	SHCS, M6 x 1.0 x 40mm, STAINLESS STEEL	8
13	15-03411	Pressure Transducer, Electronic, HYDAC	1
14	10-01430	FITTING, MB-FP90-6-4	1
15	10-01425	FITTING, MB-MJ-12-8	1
16	16-00071	FITTING, MB-MJ-8-6	1
17	10-01424	FITTING, MB-MJ90-12-6	2
18	10-01422	FITTING, MB-MJ-12-6	1
19	10-01423	FITTING, MB-MJ-10-6	1
20	15-03779	CHECK VALVE, 30PSI, FC10-2	1

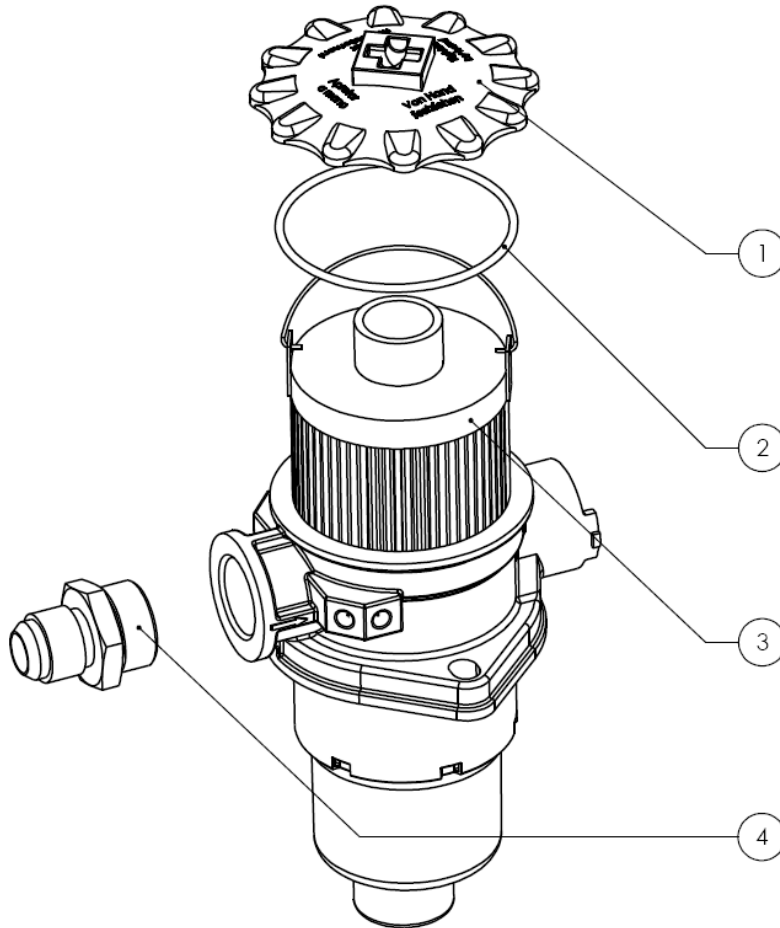
Hydraulic Manifold Subassembly (Serial # 6MSPe1999 & Lower)



Hydraulic Manifold Subassembly Cont. (Serial # 6MSPe1999 & Lower)

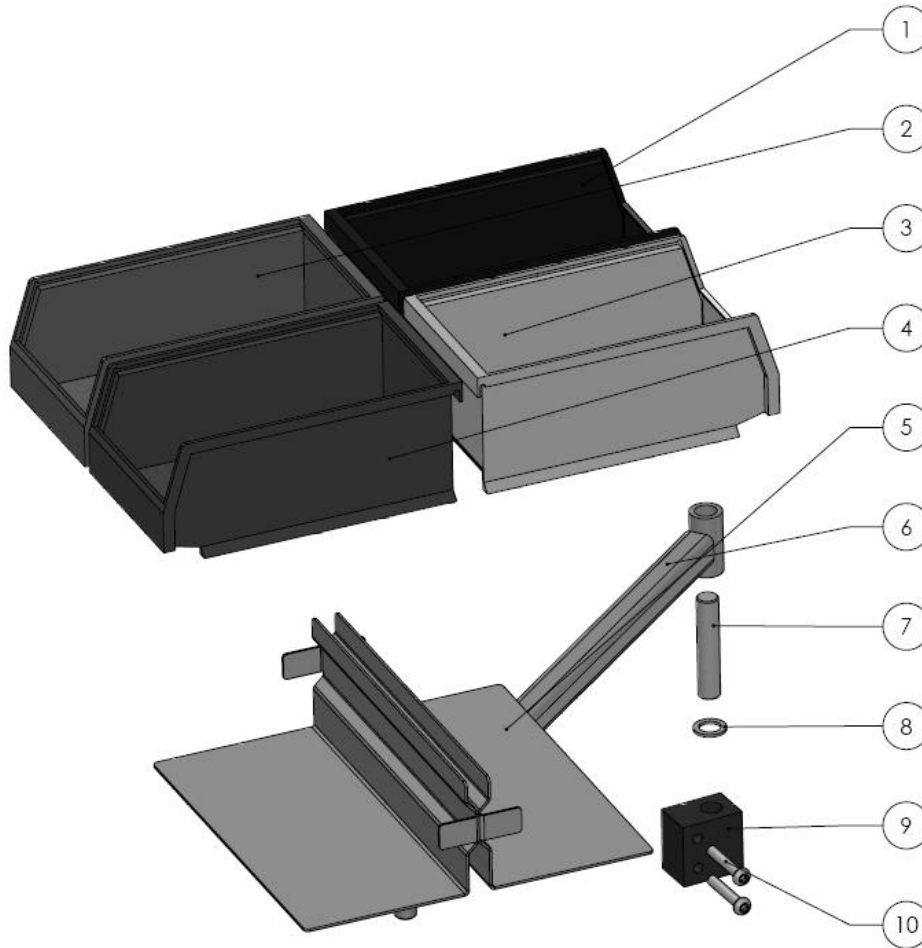
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	15-03407	Valve, Directional, 3-way, 2 position	1
2	15-01120	Valve, 4-WAY H CENTER 24 VDC	1
3	15-01197	SHCS, M6 x 1.0 x 40mm, STAINLESS STEEL	8
4	15-00371	LOCK WASHER, M6, STEEL	8
5	15-03486	PRESSURE TRANSDUCER, 0-3000PSI, 1DO, 1AO	1
6	10-01430	FITTING, MB-FP90-6-4	1
7	10-01424	FITTING, MB-MJ90-12-6	2
8	10-01446	CHECK VALVE, CNFC-XCN-.080	1
9	10-01423	FITTING, MB-MJ-10-6	1
10	10-01422	FITTING, MB-MJ-12-6	1
11	15-01113	CHECK VALVE T-5A 4 PSI SPRING CXFA XAN (CK1) *NB*	1
12	15-01117	Solenoid Coil, 24VDC DIN CONN	1
13	15-01116	Solenoid Valve Normally Open Unloader	1
14	15-01118	VALVE, PROP. RELIEF BVPPM22-200-G24/HB4.5-Z11	1
15	15-00054	3/8" O-RING PLUG	1
16	15-01119	CHECK VALVE, SUN HYDRALICS P/N: CNCC XAN 080 IN	1
17	16-00071	FITTING, MB-MJ-8-6	1
18	10-01425	FITTING, MB-MJ-12-8	1
19	15-01122	RELIEF VALVE, T-10A 100-3000 PSI	1
20	15-02656	CAVITY PLUG	2
21	15-03431	FITTING, MB-4, PLUG	1
22	15-03408	Hydraulic Manifold, CE	1
23	15-01112	VALVE, SEQUENCE	1

Return Filter Assembly



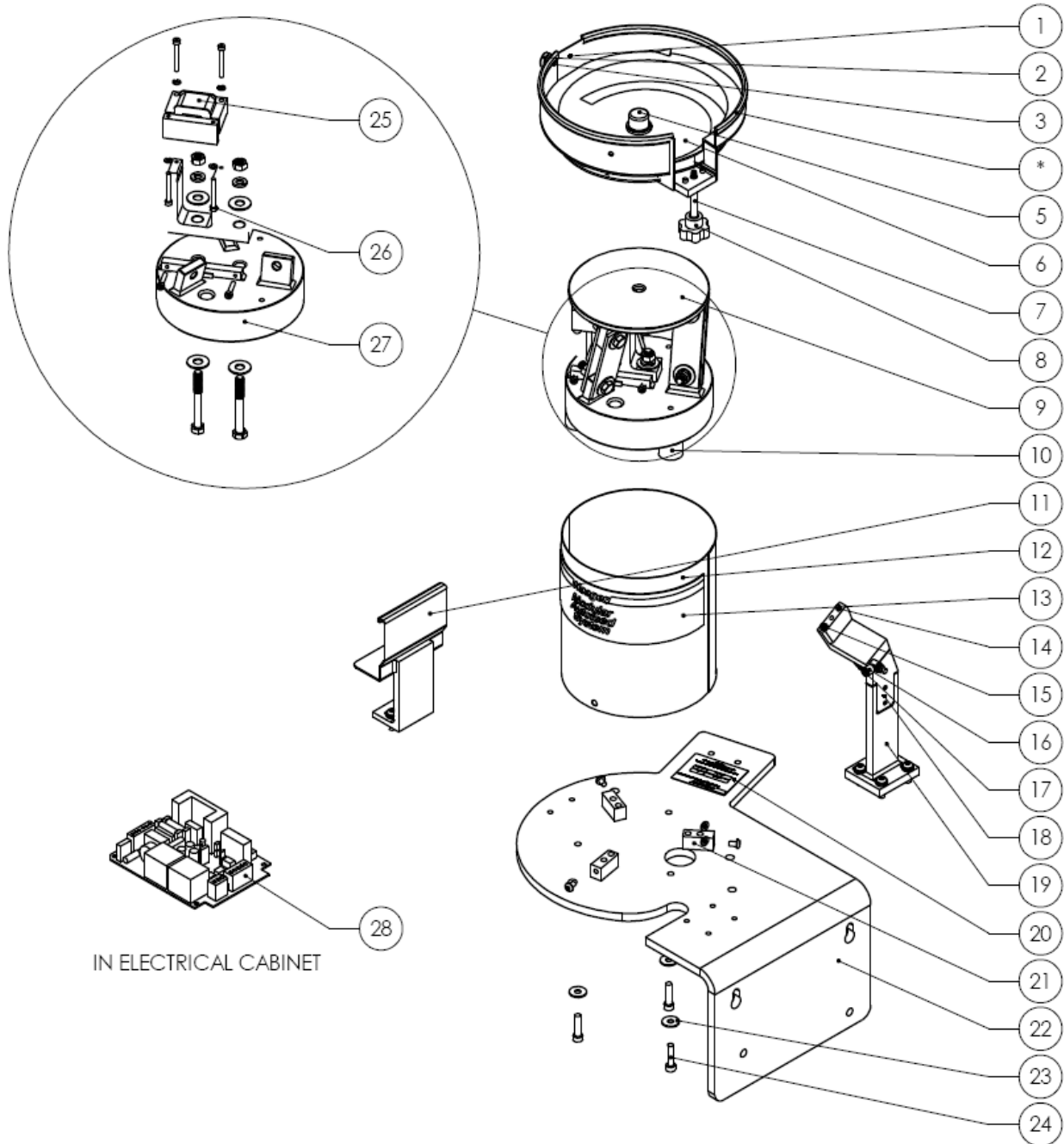
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	15-02715	Cap, Filter Assy Return, 618+ & 824	1
2	15-02714	Ring, Filter Assy Return Cap, 618+ & 824	1
3	15-00888	HYDAC FILTER ELEMENT	1
4	15-02144	FITTING, MB-MJ-16-10	1

Service Tray Assembly



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	15-01291	PART BIN 7X4 DARK BLUE FOR TIS ONLY	1
2	15-01292	PART BIN 7X4 MEDIUM GREEN FOR TIS ONLY	1
3	15-01294	PART BIN, 7 X 4, (YELLOW)	1
4	15-01293	PART BIN 7X4 RED	1
5	15-01299	WELDMENT, TIS BIN BRACKET	1
6	10-00152	618/618xl Service Tray Arm	1
7	10-00159	1/2 X 2 1/2 Dowel Pin	1
8	10-00160	Bearing, Thrust, ID.507 x OD.750 x THK 1/16, Bronze	1
9	10-00153	618 Service Tray Bracket	1
10	11-00192	BHSCS, M6 x 1.0 x 35mm, Stainless Steel	2

MAS-9 Autofeed (Optional)

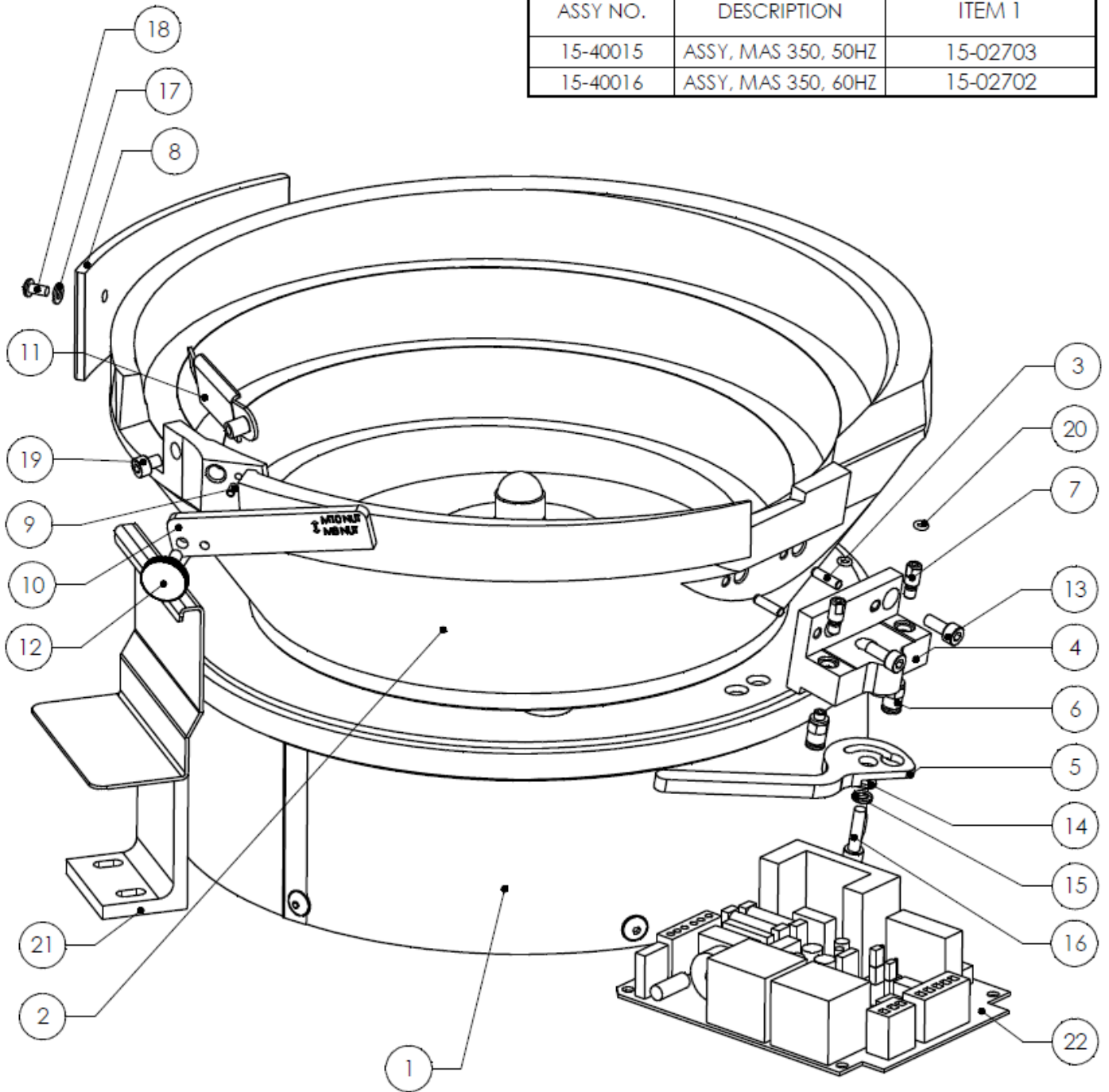


MAS-9 Autofeed (Cont.)

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	15-01380-1	EXIT GATE FOR 9" BOWL WELDMENT, MAS	1
2	11-00241	THUMB SCREW CAP	1
3	15-02427	SHCS, M5 x 0.8 x 6MM, STEEL, BLACK	1
4	H-3844	EDGE MOLDING	1
5	11-00414	FINISHING CAP, BLACK	1
6	H-3333	MAS AUTO-FEED BOWL 9" WELDMENT	1
7	15-01353	MAS ORIENTATION SCREW SPACER	1
8	15-01320	SIX LOBE KNOB W/55MM SCREW	1
9	H-5050	BOWL BASE WELDMENT	1
10	H-5001-M	ISOLATION FOOT, M6X.1, 60 DURO	3
11	H-3343	EXIT TRAY BRACKET WELDMENT	1
12	H-3349	MOTOR COVER	1
13	10-00256	MODULAR AUTOFEED SYSTEM LOGO (2.5" X 11")	1
14	H-3355-1	SINGULATION PIN W/O HOLE	1
15	H-3355	SINGULATION PIN W/ HOLE	1
16	H-2539	FLOW CONTROL ELBOW, 10-32 X 5/32, METER OUT	1
17	H-2615	STRAIGHT FITTING, 1/4" TUBE. X 1/8 NPT	1
18	H-3357-3	UPPER SINGULATION BRKT	1
19	H-3357-1	LOWER SINGULATION BRACKET	1
20	H-3621	LABEL, SERIAL # FOR MAS	1
21	15-03662	MAS-9 Cover Adapter, MSPe	3
22	10-01456	UNIVERSAL MAS BRACKET, MAS-9 & MAS350, MSPe	1
23	15-01601	FLAT WASHER, M6 X18, STEEL, ZINC PLATED	3
24	H-8505-2	SHCS, M6 x 1.0 x 25mm, STAINLESS STEEL	3
25	10-01178	MAS MOTOR. 50/60HZ W/ ARMATURE	1
26	H-5057	MOTOR MOUNT BRACKET	1
27	H-5055	MAIN BASE WELDMENT	1
28	15-02773	CONTROLLER MAS 350	1

MAS 350 Autofeed (Optional)

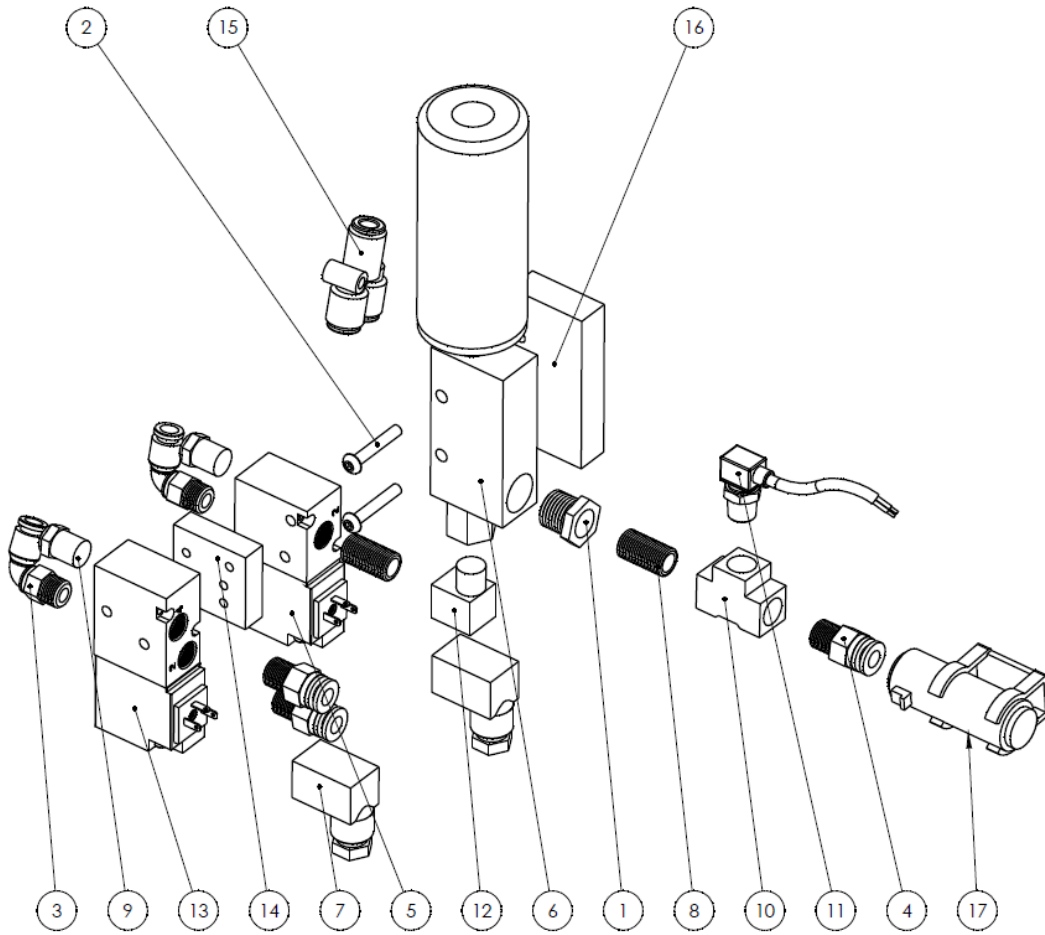
ASSY NO.	DESCRIPTION	ITEM 1
15-40015	ASSY, MAS 350, 50HZ	15-02703
15-40016	ASSY, MAS 350, 60HZ	15-02702



MAS 350 Autofeed (Cont.)

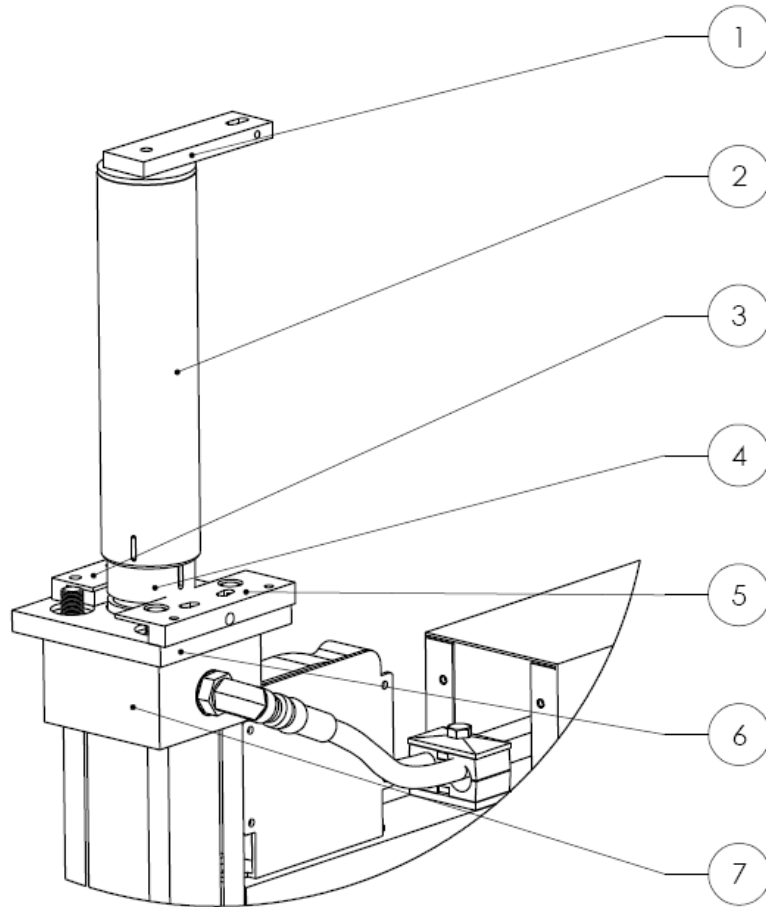
ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	SEE LIST	Drive, MAS 350	1
2	15-03088	BOWL, MAS 350	1
3	15-00858	Dowel Pin, 4MM x 14MM, Hardened Steel	2
4	15-03739	Block, MAS 350 Mounting	1
5	15-02924	Lever, Locking, MAS 350	1
6	15-00273	¼" Tube Straight Fitting	2
7	15-03735	MAS 350 Mount Block Pin	2
8	15-02921	Weight, Counter, MAS 350	1
9	15-00857	Dowel Pin, 3MM x 8MM	1
10	15-02922	Wiper, M8, M10 Nut, MAS 350	1
11	15-02914	Door, Gate, MAS 350	1
12	15-03039	Screw, M5x0.8 x 10MM, Thumb w/Shoulder, Stainless	1
13	H-3738	SHCS, M5 x 0.8 x 12MM, Black Oxide	2
14	11-00495	Flat Washer, M5, Steel	1
15	15-01392	Lock Washer, M5, Steel, Zinc Plated	1
16	15-00484	SHCS, M5 x 0.8 x 20MM, Stainless Steel	2
17	H-3899	Flat Washer, M4, Steel	2
18	H-3745	BHCS, M4 x 0.7 x 8MM, Stainless Steel	2
19	15-02427	SHCS, M5 x 0.8 x 6MM, Steel, Black	1
20	H-3712	O-Ring, 1/8" x 1/16"	2
21	H-3343	Exit Tray Bracket Weldment	1
22	15-02773	Controller MAS 350	1

Vacuum Generator Assembly (Optional)



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	15-01325	FITTING: BUSHING BRASS 1/4 MALE NPT X 18 FEMALE NPT	1
2	15-00890	BHCS, M4 x 0.7 x 25mm, ZINC PLATED	2
3	H-5020	SWIVEL ELBOW, 90 DEG, 1/8 NPT X 1/4 TUBE	2
4	14-00638	AIR FITTINGS	3
5	11-00587	24V SOLENOID VALVE	1
6	11-00589	VACUUM GENERATOR W/	1
7	11-00590	SOLENOID CONNECTOR	2
8	10-00209	1/8" BRAS CL. NIPPLE	2
9	10-00210	BRASS BREATHER, 1/8"	2
10	10-00211	1/8" BRASS TEE	1
11	10-01396	VACUUM SWITCH, COMPACT, ANALOG ONLY	1
12	H-5021	STREET ELBOW, 1/8" NPT FEMALE TO 1/8" NPT FEMALE	1
13	15-03612	4 WAY VALVE, 24V, PNEUMATIC	1
14	15-03606	ADAPTER, 3-WAY TO 4-WAY VALVE, VACUUM GEN.	1
15	15-00275	FITTING, 1/4" Y, AIR	1
16	15-03611	ADAPTER, VACUUM GENERATOR, MSPe	1
17	15-03703	Air Filter, Vacuum Generator, MSPe & WT/OT-4e	1

Positive Stop Assembly (Optional)



ITEM	PART	DESCRIPTION	QTY.
1	10-014729	CET CONNECTING BAR	1
2	10-00749	WELDMENT, NUT TUBE	1
3	15-00115	POSITIVE STOP CLAMP PLATE	1
4	10-00750	ROTATING LOWER STOP TUBE	1
5	15-03227	MOUNTING BLOCK, CRANK ASSEMBLY	1
6	10-01458	BASE PLATE, POSITIVE STOP, 618MSPe	1
7	10-00119	HYDRAULIC CYLINDER	1