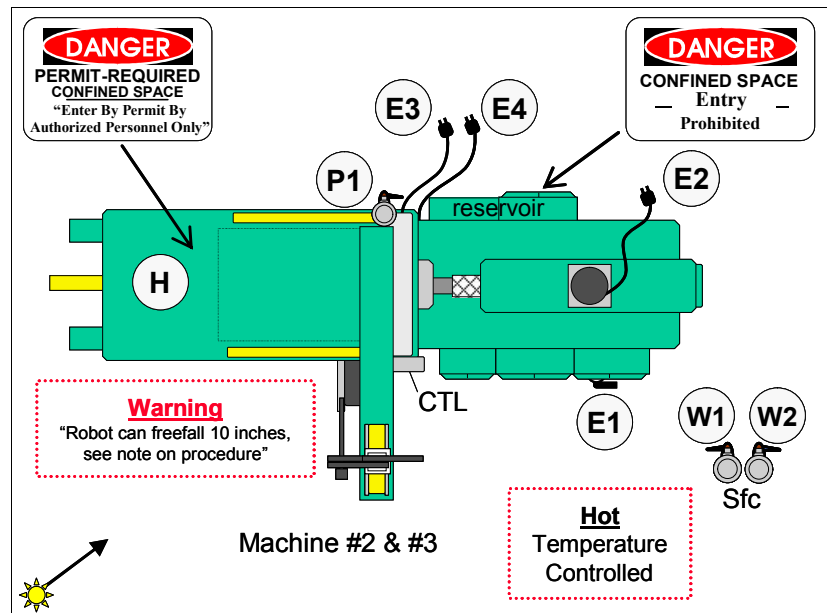


FOLLOW MANUFACTURES SHUT DOWN PROCEDURE

FOLLOW MANUFACTURES START UP PROCEDURE



**Note:** Refer to the Material Safety Data Sheet (MSDS) for information regarding the physical and chemical hazards and personal protective equipment requirements for this machine.

<u>Department</u>	<u>Reference #</u>	<u>Date</u>
Production	103	February 2013

<u>Hazardous Energy Sources</u>		
<u>Type</u>	<u>Magnitude</u>	
E1 Electrical	480	volts
E2 Electrical	24	volts
E3/E4 Electrical	220	volts
P1 Pneumatic Pressure	100	psi
W1/W2 Water Pressure	90	psi
Temperature	2500	degrees (F)
Hydraulic Pressure	1500	psi

<u>Required Safety Equipment</u>	
Tagout Tag(s)	(7)
Interlocking Hasp(s)	(7)
Padlock(s)	(7)
Ball Valve Lockout(s)	(2)
Cord Plug Canister(s)	(3)

“SERVICING OR MAINTENANCE IS NOT PERMITTED UNLESS THIS EQUIPMENT IS ISOLATED FROM ALL HAZARDOUS ENERGY SOURCES. THIS IS THE EXCLUSIVE RESPONSIBILITY OF ‘DESIGNATED’ AUTHORIZED EMPLOYEES WHO MUST FOLLOW THE COMPLETE LOCKOUT/TAGOUT PROCEDURE AS PUBLISHED BY THOMAS & TURNER CORPORATION, ATLANTA, GEORGIA.”

**I. SHUT DOWN PROCEDURES - (See Established Shutdown Procedure)**  
Notify all affected employees that a lockout or tagout system is going to be utilized and the reason for its application. The authorized employee shall know the type and magnitude of energy that the machine or equipment utilizes and shall understand the associated hazards. Review the Lock, Tag & Verify (LTV) Procedural Guide, and the JSA (if applicable).

**Warning:** “When removing electrical power and pneumatics from the robot, the robot head will free fall approximately two feet” “Robot handset is supplied with 24 volt power. Ensure this is isolated and locked out prior to continuing with this LTV procedure”

**Electrical:** Press the "Emergency STOP" button to completely de-energize the machine.

**Mechanical:** **Caution:** Allow the machine’s components to come to a complete stop before continuing.



FOLLOW MANUFACTURES SHUT DOWN PROCEDURE

FOLLOW MANUFACTURES SHUT DOWN PROCEDURE

**II. ENERGY ISOLATION PROCEDURES**

**E1 Electrical:** Located to the right front of the machine. Rotate the main service disconnect to "OFF" to isolate the electrical POWER.

**E2 Electrical:** Located to the rear of the machine in the robot compartment. Unplug the electrical service cord to isolate the electrical POWER.

**E3 Electrical:** Located to the rear of the machine in the robot compartment. Unplug the electrical service cord to isolate the electrical POWER.

**E4 Electrical:** Located to the right side of the material loader. Unplug the electrical service cord to isolate the electrical POWER.

**P1 Pneumatic:** Located to the rear of the machine by the robot compartment. Rotate the main air valve to the "CLOSED" position to block the air service.

**W1/W2 Water:** Located right front of the machine & suspended from the ceiling. Rotate the water supply & return valves to the "CLOSED" position to block the water service.

**Temperature:**  
Allow the heat cylinder to cool within limits.

**Hydraulics:** Hydraulics is a self-contained system within the injection mould machine

**III. LOCKOUT/TAGOUT PROCEDURES**

Lockout the main disconnect using an interlocking hasp, padlock, and tagout tag. After the main disconnect is locked out in the "OFF" position, "Try" the disconnect to ensure it cannot be moved to the "ON" position. Lockout the robot 24 volt electrical supply cord with a cord plug canister, interlocking hasp, padlock, and tagout tag.

Lockout the robot 220 volt electrical supply cord with a cord plug canister, interlocking hasp, padlock, and tagout tag.

Lockout the material loader 220 volt electrical supply cord with a cord plug canister, interlocking hasp, padlock, and tagout tag.

Lockout the air service valve using a ball valve lockout, interlocking hasp, padlock, and tagout tag. After the air service valve is locked out in the "CLOSED" position, "Try" the valve to ensure it cannot be moved to the "OPEN" position.

Lockout the water service pressure and return valves using ball valve lockouts, interlocking hasps, padlocks, and tagout tags. After each water service valve is locked out in the "CLOSED" position, "Try" the valve to ensure it cannot be moved to the "OPEN" position.

**Note:** Hydraulic pressure automatically bleeds down when POWER is removed.

**IV. VERIFICATION PROCEDURES**

"Try" the machine start controls (e.g. by switching the "ON/OFF" switch to the "ON" or "START" position and observing that the machine does not operate) after lockout/tagout to make sure the correct isolation device has been secured and that the device is in the open or safe position. Switch the "ON/OFF" or "START" switch to the "OFF" position. "IF" electrically qualified and authorized to do so, verify isolation of the electrical service by conducting voltage checks across the service disconnect.

Verify isolation and dissipation of the air service by observing the air pressure gauge indicates "ZERO".

Verify blockage of the water service by observing the water pressure gauge indicates "ZERO".

Verify cool down of the unit by observing the temperature gauge or probe indicates a lowering of the temperature to safe levels.

Verify isolation and dissipation of the hydraulic service by observing the hydraulic pressure gauge indicates "ZERO".

**V. RETURNING TO SERVICE – (See Established Restart Procedure)**

Check the Engel 450 machine and the immediate area around the machine to ensure that nonessential items have been removed and that the machine components are operationally intact.

Check the work area to ensure that all employees have been safely positioned or removed from the work area.

**P1:** Remove the ball valve lockout, interlocking hasp, tag and padlock from the robot air service line and rotate the main air service valve to the "OPEN" position.

**W1/W2:** Remove the ball valve lockouts, interlocking hasps, tags, and padlocks from the supply and return water line valves and rotate the valves to the "OPEN" position.

**E4:** Remove the padlock, interlocking hasp, tag and plug canister from the 24-volt robot electrical control cord and plug the cord into the service outlet.

**E3:** Remove the padlock, interlocking hasp, and plug canister from the 220-volt robot electrical control cord and plug the cord into the service outlet.

**E2:** Remove the padlock, interlocking hasp, and plug canister from the 220-volt material loader electrical control cord and plug the cord into the service outlet.

**E1:** Remove the padlock, interlocking hasp and tag from the main disconnect for machine #2 and turn the isolator to the "ON" position.

Notify affected employees that the maintenance is completed and the Engel 450 machine is ready for production.