VERSABUILT ROBOTICS

LOCKOUT TAGOUT SAFETY GUIDANCE

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Parts and Tools Required

Tools

1. Multimeter
2. Tags
3. Locks
4. Cable Clamshell

FIGURE 1. TAGS, LOCKS AND CLAMSHELL

Summary

VersaBuilt Robotics recommends that all owners of a VBX-160 follow the guidelines presented in this procedure to perform Lockout-Tagout when servicing or maintaining the VBX-160.

Please reference the OSHA standard for "The Control of Hazardous Energy (Lockout/Tagout) (29 CFR 1910.147)" for general industry, outlines specific action and procedures for addressing and controlling hazardous energy during servicing and maintenance of machines and equipment.

OSHA's Lockout/Tagout Fact Sheet describes the practices and procedures necessary to disable machinery or equipment to prevent the release of hazardous energy.

Sources of Energy

Air Pressure Supply and/or Boosted Pressure

1. Typical Plant Pressure = 120 psi
2. Approximate Boosted Max Pressure = 240 psi

Affected Devices

1. Robot Gripper
2. Vises
3. Chucks
4. Door Opener

FIGURE 2. CENTRAL AIR DELIVERY QUICK RELEASE VALVE

Electrical

Supply Power = 230 VAC, Single-Phase and 3-Phase

Affected Devices

1. Robot
2. Pump
3. Monitor
4. Computer
5. Power Disconnect
6. Power Distribution
7. Peripheral 24VDC devices (lights, sensors, I/O)

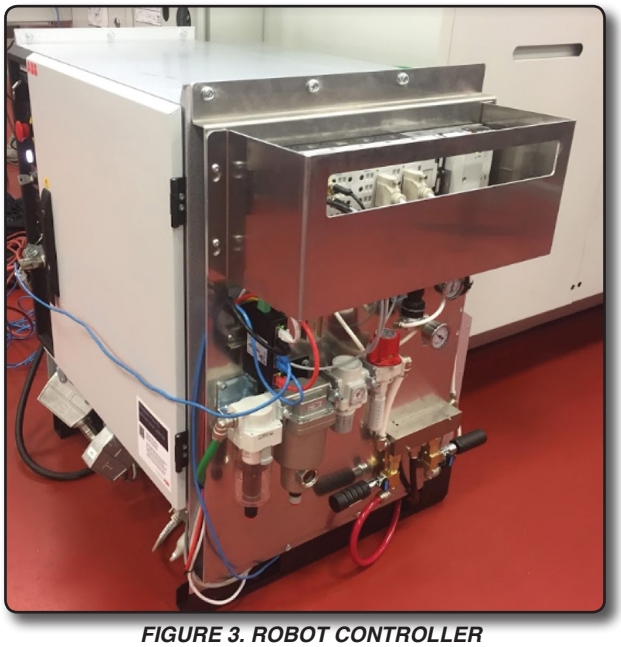

FIGURE 3. ROBOT CONTROLLER

Lockout Tagout Steps for all Devices

Remove jaws and parts from Robot Gripper and then dissipate all pneumatic energy and then switch off all electrical energy. It is important to shut off all energy in the order provided.

Dissipate Pneumatic Energy

1. Release the Pneumatic Shut-Off Valve (Figure 4).
2. For systems built prior to May 2018, exhaust air by opening valves on Air Input panel.
3. If system includes Air Booster, relieve pressure by opening relief valve.

Test All Air Devices

1. Attempt to actuate all devices, via VBXC interface or Operator Pendant.
2. Make sure all devices do not move and all gauges are at 0 psi.
3. Open and close vises with manual valve until all air is dissipated and vises do not move.
4. Test pneumatic systems to make sure nothing actuates.
5. **Gripper**
   a. Lockout the air at the PLC air stack plumbed to the vises then dissipate.
   b. After locking out the air from the PLC, actuate robot gripper, by hand or by VBXC interface (Figure 5) until all air is dissipated and gripper does not move.

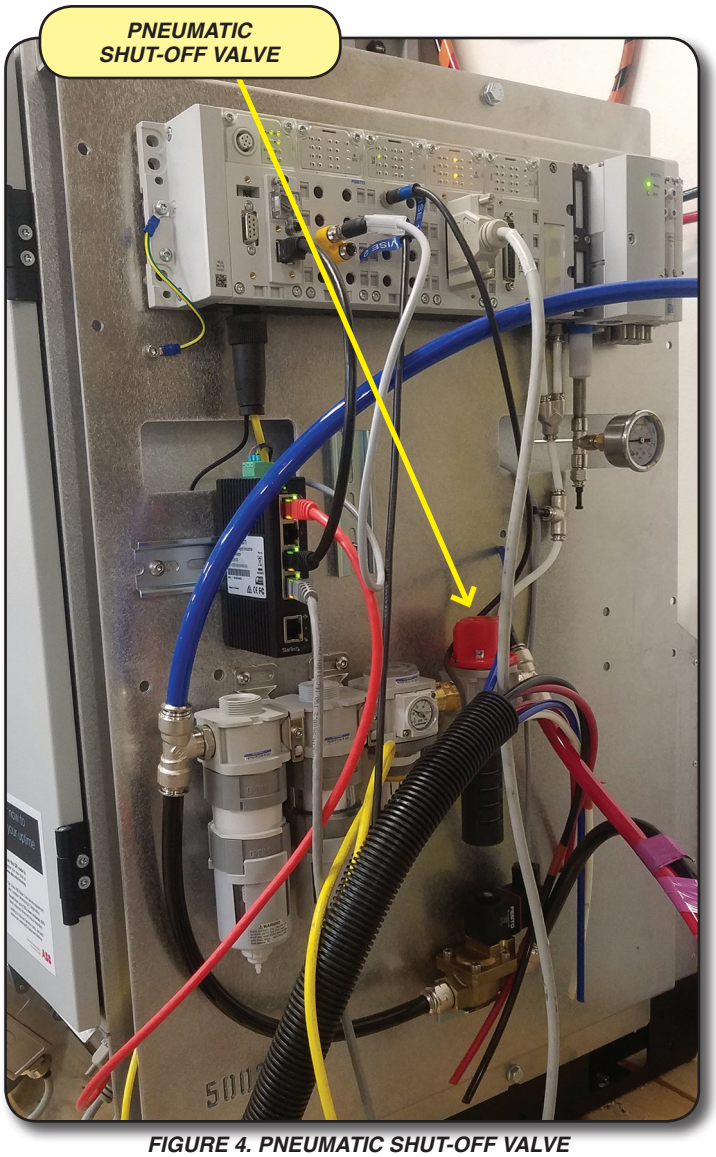

FIGURE 4. PNEUMATIC SHUT-OFF VALVE

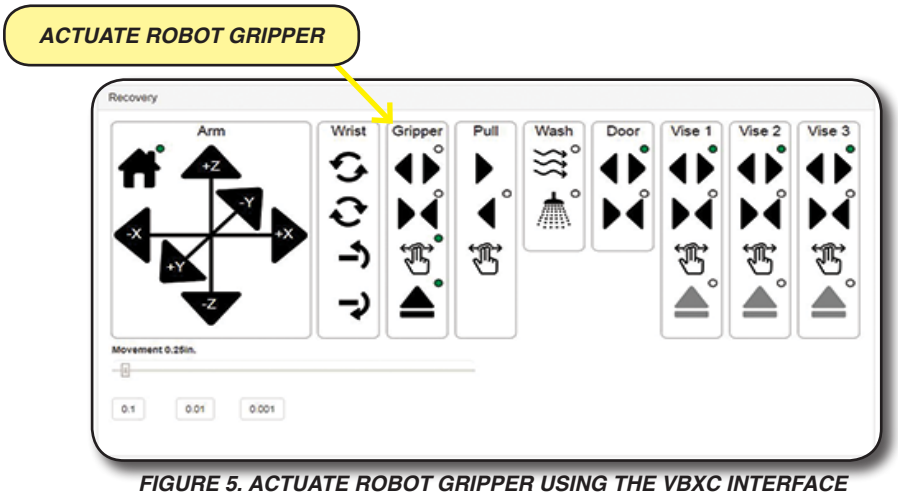

FIGURE 5. ACTUATE ROBOT GRIPPER USING THE VBXC INTERFACE

6. **Vises**
   a. Lockout the air at the PLC supply plumbed to the vises (Figure 4) then dissipate.
   b. The Air Bleed valves at the bottom of the Robot Controller panel to dissipate trapped air in the system.
   c. Air between the booster and the vises in the Air Booster System will be trapped and air must be dissipated with a bleed off valve, (located inside the air electrical panel or on the side of the robot controller).
7. Door Openers

Remove Electrical Energy

1. Turn off Power at Robot Controller.
2. Turn off Electrical Panel.
3. Unplug the VBX-160 from Receptacle, then lock electrical cord end for receptacle in approved LOTO clamshell.

Test Electrical Components

1. Check VBXC screen is not operational.
2. Light on robot is off.
3. Verify with multimeter or other electrical testing equipment before working on an electrical signal, wire or connection.

Tag

Tag all equipment to ensure no one operates machinery until maintenance is complete.

FIGURE 6 ELECTRICAL SWITCH

Note: Make sure to return all valves to the closed position when returning the system to normal operation.