

# VersaBuilt VBX-160

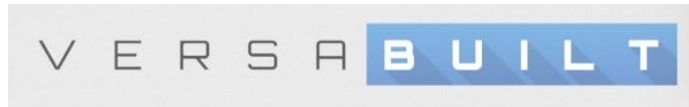
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## Safety Manual

### VBX-160 Overview

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The VersaBuilt VBX-160 is a robotic machine tending system. This is a flexible system designed to automatically load and unload parts for processing in a CNC machine. The VBX-160 consists of a cell with a rack system, a robot that is located in the cell, a VBX Controller (VBXC) that



interfaces with the robot and CNC, and a rinse and dry system to clean parts. The VBX-160 also utilizes MultiGrip vises and MultiGrip soft jaws (MGSJ) to hold and transfer parts.

#### ***Safety Warning***

**DANGER:** The VBX-160 should only be operated by trained personnel. The VBX-160 operates on high voltage. Working with high voltage equipment entails a possible lethal hazard. To avoid injuries or death, read, understand and follow all safety instructions included with the VBX-160 including this manual, and the Robot manufacture manuals included with the VBX-160

**DANGER:** The VBX-160 uses a high-speed 6-axis industrial robot. The robot can move suddenly, quickly and with force sufficient to cause serious or fatal injuries. Before operation, ensure that all VBX-160 and CNC safety systems are performing properly and that guarding sufficient to prevent any part of an operator's body from entering into the path of the robot's movement are securely in place.

## ***Intended use of VBX-160***

The VersaBuilt VBX-160 is intended to be used only by trained personnel in a professional machine shop environment.

## ***General Safety Precautions***

Only authorized and trained personnel should operate this equipment. You must act in accordance with the operator manual, safety decals and instructions for safe machine operation. Read and understand all referenced safety manuals before operating equipment. Users must use appropriate eye and ear protection while operating the equipment.

## ***Electrical Supply***

The electrical power supplying the VBX-160 must meet the following specifications:

### **For ABB IRB-140 with Compact Controller**

**Voltage: 208-240VAC/Single Phase, 50/60Hz**

- Full load: 15 Amps
- Largest load: 10 Amps

### **For ABB IRB-140 with Single Cabinet Controller**

**Voltage: 208-240VAC/3 Phase, 50/60Hz**

- Full load: 15 Amps
- Largest load: 10 Amps

### **For ABB IRB-1200 with Single Cabinet Controller**

**Voltage: 208-240VAC/3 Phase, 50/60Hz**

- Full load: 15 Amps
- Largest load: 10 Amps

- Attempting to run the machine from any other source can damage the equipment and void the warranty
- The electrical supply must meet the rating of the robot as well as other devices.
- Do not reset a circuit breaker until the reason for the fault is identified and remedied

## Electric Service Panels

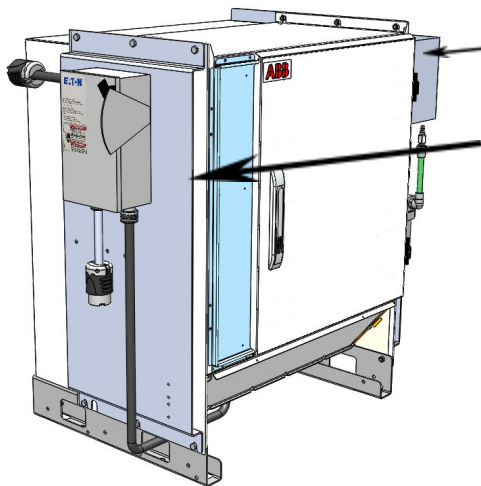
High voltage power is present in the following locations of the VBX-160:



**Electrical Service Disconnection (High Voltage):** The source of power for the VBX-160. To disconnect power from the VBX-160, move the lever to the OFF position.



**VBX-160 Electrical Access Panels (High Voltage)**



**VBX-160 Pneumatic and IO Panel (Low Voltage)**

**Robot Cabinet Controller (High Voltage)**

# Operator Safety

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## General Safety Information

- Never disable any safety circuit associated with the VBX-160 or the CNC
- Do not operate the VBX-160 unless the doors are closed and the safety circuit is functioning properly
- Do not operate the VBX-160 without proper training
- Clearly understand the different control requirements for operating the equipment; these include the safety circuit, Cycle Start, Feed Hold, DNC Sync, Part Stop and Op Stop
- Do not attempt to alter the safety circuit sensors
- Operator should locate the Electrical Service Disconnection and be familiar with the operation of this switch
- Use appropriate eye and ear protection while operating the VBX-160. ANSI-approved impact safety goggles and OSHA-approved ear protection are recommended
- Use extreme caution when moving the VBX-160 cell, risks to personnel may include crushing, pinching, and severing as well as other bodily injury
- Check for damage to parts prior to operating the VBX-160. Do not operate the VBX-160 if any of the components are not functioning correctly
- Read and understand all safety information provided in this manual
- Read and understand all relevant user manuals before operating the VBX-160, including manuals for Robot safety and operation of the CNC and additional components.
- Pneumatic vises are a severe pinch point and can cause loss of limb or other bodily harm.

## VBX-160 Emergency Stop

The VBX-160 Emergency Stop button is located adjacent to the VBX Controller computer. Pushing the button in will immediately stop the VBX-160 robot movement. Opening any door on the VBX-160 or pivoting the VBX-160 away from the CNC will also immediately stop the VBX-160 robot movement.

**NOTE: Pushing the VBX-160 emergency stop button will not stop the CNC. Pushing the CNC emergency stop button will not stop the VBX-160 robot.**

## VBX-160/CNC Door Interlock

The VBX-160 and the CNC machine each have safety circuits that are intended to protect humans while allowing necessary communications to occur between the two systems for robotic processing.

The VBX-160 has a safety circuit that connects sensors on the VBX doors and gate post where the VBX-160 can be pivoted away from the CNC. If any of these sensors are interrupted, the 'motors on' light on the robot arm will go out and robot motion will be stopped.

Most CNC machines have a door interlock safety circuit that prevents the CNC from operating when the CNC door is open. When the CNC is processing, the CNC door is locked to prevent it from being inadvertently opened.

When the VBX-160 is secured to the gate post, the VBX-160 disables the CNC door interlock safety circuit so the VBX-160 can command the CNC to open the CNC door to load and unload parts. When the VBX-160 is pivoted away from the CNC, the CNC door safety circuit is re-enabled.

NOTE: Pivoting the VBX-160 away from the gate post will affect the CNC door safety interlock. Opening a VBX-160 rack door will not affect the CNC door safety interlock.

WARNING: When the vises and robot grippers can be opened and closed at any time regardless of the door interlock.

# Robot Safety

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**Important!** All personnel who are working within the range of the robot arm must also read the Safety Instructions provided by the robot manufacture and included with the VBX-160 before working in the range of the robot. These manuals contain important safety information specific to the robot.

## **Robot Dangers/Risks may include:**

- Any moving manipulator is a potentially lethal machine
- Robot movements are performed with great force and may seriously injure personnel/and or equipment located within the working range of the robot arm
- Risks to personnel may include: crushing, entanglement, pinching, and severing as well as other bodily injury

## **Robot precautions:**

- Light on robot arm indicates motors are on and robot can move at any time; avoid being between the robot arm and other objects
- Robot moves can be unexpected
- Gravity may cause any parts or objects held by the robot to drop
- Opening any cell door stops robot motion
- The robot brake release located on the back side of the robot should only be pressed by qualified service personnel or in an emergency
- When the brake release button is activated it releases or deactivates the brakes on each robot axis, causing the robot to move freely

**Warning: this can cause the robot to collapse under its own weight.**

- The Robot Communication Cable allows the VBX controller to communicate with the robot controller

**Warning:** the robot communication cable should never be plugged into an ethernet hub connected to a LAN with other computers attached

## ***Modifications to Equipment***

- **DO NOT** modify or alter the VBX-160 in any way
- Modifications of the equipment without authorization from VersaBuilt could lead to personal injury and equipment damage
- Modifications of the equipment without authorization from VersaBuilt will void the equipment warranty