VERSA BUILT ROBOTICS

Mill Automation System Safety Manual

Safety Warnings

Validity and Responsibility

The information in this manual does not cover all equipment that can influence the safety of the complete system. The complete system must be designed and installed in accordance with the safety requirements set forth in the standards and regulations of the country where the system is installed. The integrator of VersaBuilt products are responsible for ensuring that the applicable safety laws and regulations in the country concerned are observed and that any significant hazards in the complete application are eliminated. This includes, but is not limited to:

- Performing a risk assessment for the complete system
- Interfacing other machines and additional safety devices if defined by the risk assessment
- Setting up the appropriate safety settings in the software
- Ensuring that the user will not modify any safety measures
- Validating that the total system is designed and installed correctly
- Specifying instructions for use
- Marking the system installation with relevant signs and contact information of the integrator
- Collecting all documentation in a technical file; including the risk assessment and this manual

**Before implementation and use of system, read and understand the Universal Robot manuals.*

Limitation of Liability

Any safety information provided in this manual must not be construed as a warranty, by VersaBuilt, that the system will not cause injury or damage, even if the system complies with all safety instructions.

Safety Warnings

DANGER: The VersaBuilt Mill Automation System is an industrial machine tool designed to be operated by trained personnel only. Devices within the Mill Automation System may move suddenly and without warning. Serious or fatal crushing injuries can occur from contact with the robot, gripper or vises.

Before deploying the VersaBuilt Mill Automation System, a safety risk assessment must be completed in accordance with local, state and/or federal requirements.

The Mill Automation System should only be used by trained operators.

Safety Warnings

The information, materials, and opinions contained in this content are for general information purposes only and are not intended to constitute legal or other professional advice and should not be relied upon on or treated as a substitute for specific advice relevant to particular circumstances.

VersaBuilt makes no warranties, representations or guarantees, whether express or implied, with respect to the contents of this Safety Manual including, without limitation, as to the quality, accuracy, reliability, currency, completeness, or fitness for any particular purpose of such content. To the maximum extent permitted by law, VersaBuilt expressly disclaims any and all liability arising from your use of the System.

This document is is not meant to be a substitute for the content available in the ISO documents. The ISO standards can be found here: https://www.iso.org/

UR Robot Safety Settings

DANGER: Do not operate the Mill Automation System without first reviewing and validating the safety settings stored in the UR Robot.

Running the Mill Automation System with the UR Robot safety configuration without sufficient safety limitations may create dangerous conditions for operators that may come into contact with the system.

Specifications

MultiGrip Gripper, Clamping Force

Air Pressure (psi)	Gripper Clamp Force (lbf)	Gripper Clamp Force (Newtons)
20	33	145
30	49	218
40	65	291
50	82	364
60	98	437
70	115	509
80	131	582
90	147	655
100	164	728
110	180	801
120	196	844

Specifications

Electrical Requirements

Device	Voltage	Full Load Max Amp Draw
Robot	120 VAC 1 phase 50/60 Hz	5
VSC	120 VAC 1 phase 50/60 Hz	1
Ethernet Switch	120 VAC 1 phase 50/60 Hz	1
VersaWash Pump	120 VAC 1 phase 50/60 Hz	2

Electrical circuit breaker(s) should be adequately sized for the application. For the above devices a 10A or 15A breaker for all is recommended.

Specifications

MultiGrip Vise, Clamping Force

Air Pressure (psi)	Gripper Clamp Force (lbf)	Gripper Clamp Force (Newtons)
20	707	3143
30	1060	4715
40	1413	6287
50	1767	7859
60	2120	9430
70	2473	11002
80	2827	12573
90	3180	14145
100	3533	15717
110	3887	17289
120	4240	18861

**The clamping force shown in the table above is the arithmetic sum of the individual forces, per industry norms*

Risk Mitigation

VersaBuilt System Controller

The VersaBuilt System Controller includes electronically actuated pneumatic valves for controlling vises, in-CNC air blow-off and optionally a pneumatic door. The VersaBuilt System Controller IOs are not safety rated and may actuate pneumatics unexpectedly. A pneumatic supply valve with lockout provision is provided to remove pneumatic energy from the VersaBuilt System Controller.

MultiGrip Gripper

The VersaBuilt System Controller includes pre-programmed sequences such that when gripping outside the CNC, the default programming commands the gripper to close, then open, then close again to pick up parts. This close/open/close sequence may allow the operator to escape if accidentally clamped by the MultiGrip Gripper. The MultiGrip Gripper is controlled by the Robot IO signals. The pneumatic configuration of the Mill Automation System includes an option to remove pneumatic energy from the gripper using the VersaBuilt System Controller pneumatic supply valve.

MultiGrip Vise

In “Automatic Mode”, the MultiGrip Vises are controlled by the VersaBuilt System Controller. During manual operation of vises, for handloading, the Diverter Valve can be switched to “Manual Mode”, diverting air from the supply to the VersaBuilt System Controller to the Vise Hand Valves mounted to the CNC table. In this configuration, vises can only open or close by way of direct operator access to the hand valves.

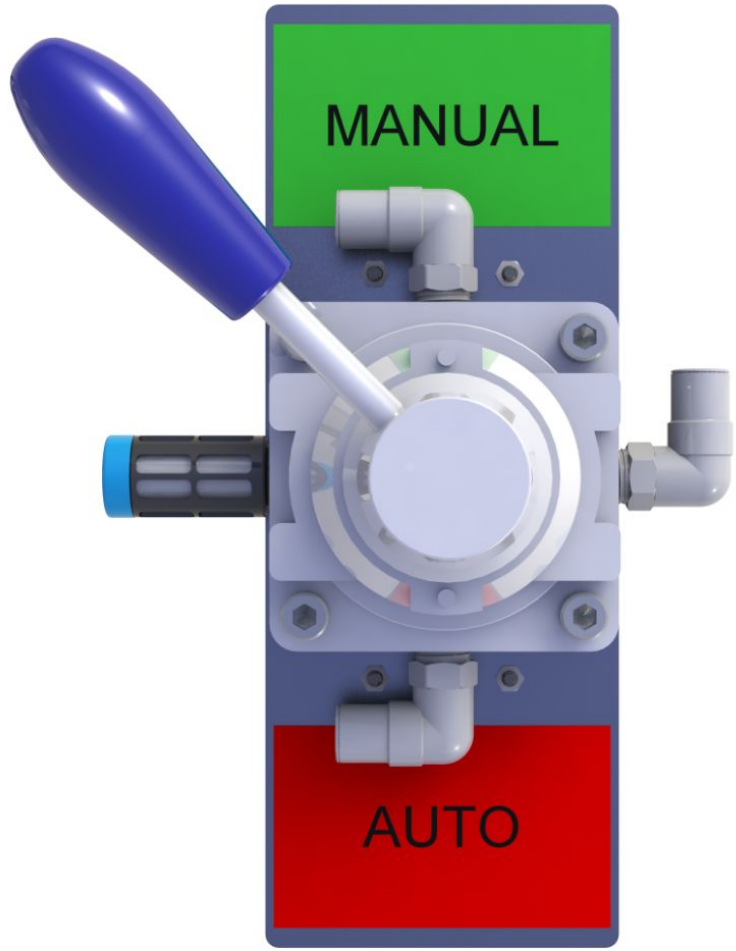
Risk Mitigation

CNC Door Interlock

A CNC Door Interlock is required for the system to operate safely and without risk of damage to equipment and personnel. Insure proper functionality of interlock before installation of automation.

Safety Warnings

When the UR Mill Automation System is not in use, remove the power to the VersaBuilt System Controller (VSC) and switch the diverter valve to manual mode to prevent accidental automatic actuation of a MultiGrip Vise.

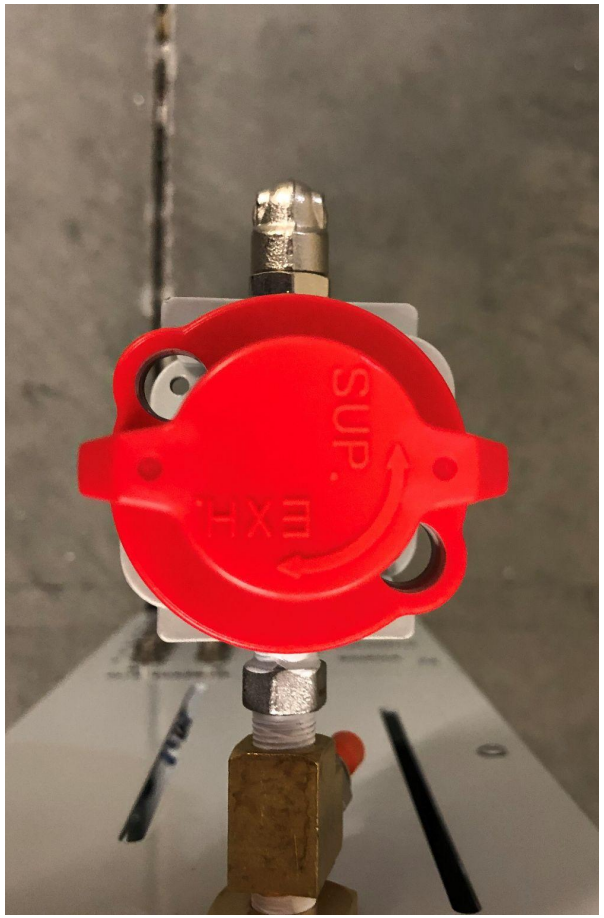


Safety Warnings

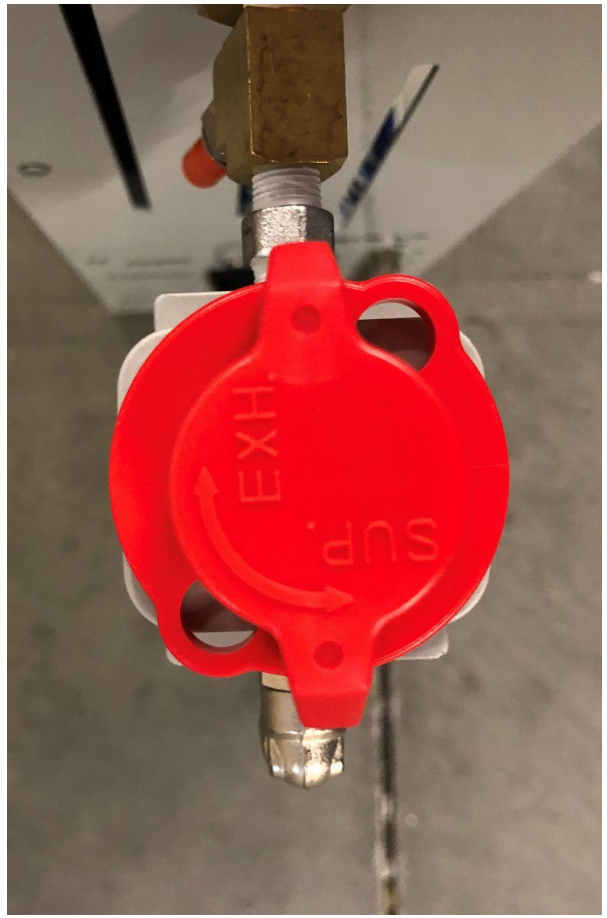
The pneumatic supply valve should be turned to the off position when the system is not in use

Lock-Out-Tag-Out procedure:

In the OFF position, the lock holes will line up in order to allow operator to lock pneumatic supply valve closed. We suggest cycling the vise via hand valves until all compressed air is expressed after closing the valve.



OFF Position



ON Position