



Automation System Order Expectations and Pre-Installation Checklist

The following document is intended to provide an overview of VersaBuilt Automation Systems, in preparation for system installation. VersaBuilt aims to delight each customer by exceeding expectations for each purchase and installation. This document includes sections listed below to communicate lead-time, a review of the system specifications, how to prepare for installation and automation ramp-up, and review of installation steps.

- [Lead-time](#)
- [Automation System Overview - How the system works](#)
- [Pre-Installation Guide - Bringing up new automation](#)
- [Pre-Installation Checklist - Items for customer to complete prior to installation](#)
- [System installation steps](#)

Lead-time

- Average 2-3 weeks after receipt of order
- If order includes customization, such as oversized infeed, jaw design, etc., lead time may be extended
- Freight transit time – Average 1-week, depending on location

VersaBuilt Automation System Overview

VersaBuilt Automation Systems are flexible robotic solutions allowing for fast and easy setup for both single part and high-part-mix environments. Each Mill Automation and Lathe Automation System is a standard product, with optional accessories and/or configuration (e.g., Jaw type for Mill, number of Vises, Shaft processing for Lathe, VersaDoor, and customer-specific part processing requests). The user interface is an intuitive, user-friendly application using a customer-provided tablet, phone, laptop, or computer connected to the system *typically via Wi-Fi.

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The systems utilize “parametric” programming, where the user inputs parameters (such as part height, weight, CNC program number, number of operations, etc.) rather than programming each part with traditional teach pendant programming. Part parameters are saved as individual “part configurations” in the VersaBuilt System Controller (VSC), allowing for all of your part’s “programs” to be saved without the need to re-setup or re-program when switching between parts.

For each part configuration, a “script” is selected for the part process. Standard scripts are included with each system, such as: 1, 2, and 3 operation parts, Part Stacking at the VersaCart infeed, and Shaft or Puck processing for Lathes. Optional scripts are available for a quote, such as Part unload only (e.g., Lathe bar feed application), and custom scripts to optimize part processing. Scripts can be edited or added by advanced users or with guidance from VersaBuilt technical support.

The robot moves between pre-programmed robot home positions and calibrated positions (calibrated at the time of installation) while communicating with CNC to initialize cycle start or wait for a cycle end signal from the CNC. Haas and Fanuc Focus 2.0 Controls allow for dynamic CNC program communication from the VSC to the CNC and G-Code communication from the CNC to the VSC. Other controllers utilize a handshake between the CNC and VSC, where the VSC sends a Cycle Start to initial CNC control and the CNC sends a Cycle End signal to hand control of the process back to the robot. Lathe Chuck actuation is controlled by either wiring into the existing foot pedal or to the CNC I/O. Wiring for Cycle Start, Cycle End, and Lathe Chucks, please consult your CNC dealer and maintenance team on proper connections.

VersaBuilt Automation Systems are pre-configured to ship with standardized cables and pneumatic tubing at predefined lengths. Tubing is multicolor to enable ease of installation and troubleshooting. Cable ties and magnet loops are used for cable and tube routing. If your application requires a change to the cable or tubing type and/or requires cable/tubing routing with hardware outside of the description above, please contact VersaBuilt for quoting and specification.

Bringing up New Automation

- Each installation of a Mill or Lathe Automation System has unique applications (CNC Make/Model, Vise/Chuck Arrangement, Unique Part Geometry and Machining Strategies), requiring process development and refinement

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- VersaBuilt Automation Systems installation will validate core functionality. This includes Pick/Place, Calibration, Motion and communication between the robot and the CNC.
- There is an automation ramp-up process during initial use of all new installations, which requires system monitoring and typically adjustments will be needed before highly reliable processing is achieved. Items to monitor and refine include:
 - Chip Management
 - CNC movement
 - VersaCart movement
 - Sensors requiring adjustment
 - New part introduction part picking issues
 - New part payload accuracy
 - MultiGrip Jaw design (Mill only)
 - Shaft of Puck Finger position or design (Lathe only)
- Process Monitoring and Daily Maintenance of equipment is critical for optimal performance of equipment
- VersaBuilt will continue to work with you for a successful implementation. A resource for troubleshooting can be found here - <https://www.versabuilt.com/about-2/>

Pre-installation Checklist

Customer Checklist Items to complete prior to installation	Completion/Notes
1. Identify a point of contact for installation and user training <ul style="list-style-type: none"> a. For training prior to shipment b. To provide dedicated personnel to be available during installation c. For training upon completion of installation 	
2. Network information for remote support? <ul style="list-style-type: none"> a. Wi-Fi name and password b. IT contact if using company network 	
3. What PPE is required on-site for an installer?	
4. Customer has user interface (Tablet, laptop, or computer *typically connected to the system via Wi-Fi & not included with system) Recommend Apple iPad (9th Generation)	
5. Space available for VersaCart <ul style="list-style-type: none"> a. 32" W x 55" L x 30" H Cart b. Mounted in front of the machine with space to access for manual operation c. 6-10" from CNC front face to allow full access to complete cart infeed 	
6. Mounting location for Versabuilt System Controller (VSC)	

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<ul style="list-style-type: none"> a. Within 15-ft of VersaCart b. Mounted on included DIN rail 																	
<p>7. Electrical Prep Complete</p> <ul style="list-style-type: none"> a. Power: 120 VAC Single Phase / 20A total b. Connections/Receptacles for: <ul style="list-style-type: none"> i. Robot ii. VSC iii. Ethernet Switch iv. VersaWash XT <i>*if included with system</i> <table border="1" data-bbox="214 701 1178 867"> <tr> <td>Robot</td> <td>120VAC 1 Phase</td> <td>50/60Hz</td> <td>Full Load 10A</td> </tr> <tr> <td>VSC</td> <td>120VAC 1 Phase</td> <td>50/60Hz</td> <td>Full Load 5A</td> </tr> <tr> <td>Ethernet</td> <td>120VAC 1 Phase</td> <td>50/60Hz</td> <td>Full Load 1A</td> </tr> <tr> <td>VersaWash Pump</td> <td>120VAC 1 Phase</td> <td>50/60Hz</td> <td>Full Load 2A</td> </tr> </table>	Robot	120VAC 1 Phase	50/60Hz	Full Load 10A	VSC	120VAC 1 Phase	50/60Hz	Full Load 5A	Ethernet	120VAC 1 Phase	50/60Hz	Full Load 1A	VersaWash Pump	120VAC 1 Phase	50/60Hz	Full Load 2A	
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<p>8. Does customer have scale to weigh parts?</p> <ul style="list-style-type: none"> a. A scale is needed to weigh parts and jaws (e.g., raw material, finished parts, Op1 Jaws, Op2 Jaws) b. Accuracy within ± 0.25 lbs. 																	
<p>9. Compressed Air Ready:</p> <ul style="list-style-type: none"> a. Shop air conditioned to meet ISO 8573-1:2010 [7:4:4] standard (air filters and moisture separators) <i>*if needed VersaBuilt can quote filter system</i> b. Pressure: 90-120 psi c. Air Consumption: 15-20 scfm d. $\frac{1}{4}$" Quick Disconnect 																	

<p>10. For systems with VersaBuilt CNC AutoDoor (VersaDoor)</p> <ul style="list-style-type: none"> a. CNC will need to be modified (holes drilled for mounting) b. Actuator body and rod is mounted with ball joints to prevent loading on cylinder rod. Modifications to cylinder or mounting outside recommendations in VersaDoor installation manual can result in failure of components and/or performance/reliability issues. 	
<p>11. CNC setup ready:</p> <ul style="list-style-type: none"> a. What is CNC Make/Model? b. What is CNC controller? c. CNC Door Interlock must be installed d. Cycle Start connection review e. Cycle End connection review f. Chuck actuation (foot pedal or I/O) review *Lathe only g. Recommended CNC tools: <ul style="list-style-type: none"> i. Tool Probe (Mill) ii. Spindle Probe (Mill) h. Macros-Enabled (Haas Machines) i. For non-Haas or non-Fanuc Focus 2.0 controls (Generic Driver): <ul style="list-style-type: none"> i. User-definable M-codes ii. Cycle Start & Cycle End connection 	
<p>12. Parts and processes intended for initial use of System</p> <ul style="list-style-type: none"> a. Part Dimensions/Drawings/Models b. Cycle Times <i>*refer to Cycle time calculator or review approximate cycle time of system with robot overhead for expectations at installation</i> 	

<p>13. Determine preferred cable & tube route in/out/around CNC</p>	
<p>14. For Lathe System</p> <ul style="list-style-type: none"> a. Review workholding clearances for part loading - Minimum requirement for clearance = 0.030-inch radial clearance from clearance + lead-in chamfer, e.g., <ul style="list-style-type: none"> i. 0.015-inch radial clearance ii. 0.015-inch x 45° lead-in chamfer b. CNC Z-Push Tool is required for parts with tolerances less than ~0.030". This can be mounted in Turret or Tail Stock. c. For accurate calibration of Pucks loaded into the Chuck, a jaw setup for 3-inch diameter or greater is preferred. 	
<p>15. Hand load & make good parts with workholding before Install on CNC in which installation will be complete.</p> <ul style="list-style-type: none"> a. Install vises and hand valves *Mill System b. Install Automation System files from USB *or from website www.versabuilt.com/resources c. 9000 programs for Robot2CNC communication d. 8000 is the table load position program, set during robot vise calibration *Mill System e. 8001 is the table wash program. Example program provided needs to be validated by machinist f. Prove out machining via hand loading <p>Note: *G-Code Program Numbers above can be changed if needed*</p>	

System Installation Steps *refer to Site Acceptance Test documents for Lathe and Mill Systems

1. Install automation equipment

- a. Install Robot on VersaCart
- b. Install Gripper on Robot
- c. Install VersaBuilt System Controller (VSC)
- d. Install VersaWash *if included with order
- e. Install VersaDoor *if included with order
- f. Install Cycle Start cable
- g. Connect cables and tubing as shown in manual

2. Power Up and Connect to User Interface

- a. Connect power to VSC, Robot, Ethernet switch, and VersaWash Power-unit **if included in order*
- b. Connect to user interface *Customer-provided Tablet, Laptop, or Phone, connect via Wi-Fi (vsc00xxx, password: versabuilt)

3. Test automation equipment

- a. Individually test digital outputs of the system, verifying devices function as intended
 - i. Vise Open/Close
 - ii. Chuck Open/Close
 - iii. Gripper Open/Close
 - iv. Door Open/Close *if VersaDoor is included
 - v. Cycle Start
- b. Individually test digital inputs of the system, verifying devices function as intended
 - i. Vise sensors *if included
 - ii. Door sensors *if included
 - iii. VSC enable button
 - iv. Door panel buttons *if included
 - v. Cycle Complete/Cycle End *if included

- c. Verify WiFi connection from VSC to local WiFi
- d. Verify Remote Support connectivity

4. Calibrate System – Training customer during calibration

- a. VersaCart
- b. Vises/Chucks
- c. InCNC Position *if applicable
- d. Bin Drop *if applicable

5. Test pick and place

- a. VersaCart
- b. Load/Unload all vises/chucks
- c. Vise transfer from each vise *Mill only

6. Run Sample Part w/out machining (e.g., 1 Op process using customer Op1 Jaws, picking then placing entire table)

- a. Configure part
- b. Configure jaws (for Mill System)
- c. Run process, calling Table Wash, ending in Table Load position, as the CNC programs (for Mill System)
- d. Complete table load of sample part

7. Machine Parts with Robot Tending

- a. Depending on the availability of raw material, tooling, and machining prove-out
- b. May require load/unload prove-out without machining if the customer is not ready

8. Train customer

- a. Home screen during operation and recovery
- b. Configuration Screen
- c. Configure jaws
- d. Configure part
- e. Settings Screen – show options (restart VSC when changes are made)
- f. Network Settings
- g. Connect to company WiFi
- h. About page



- i. Restart VSC
- j. Enable Remote Support
- k. Training Customer - Troubleshooting Guide, using I/O Panel, Sensor locations, Switching from Manual to Auto modes, Calibration Overview

9. Support

- a. VersaBuilt continues to provide ongoing support for your automation system (support@versabuilt.com)
- b. Each system includes a 1-year warranty
- c. For best results, enable remote support and email support@versabuilt.com