

VERSABUILT ROBOTICS



Automation System Installation Manual

Software Version 1.3.0 Copyright VersaBuilt 2026
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Use this manual and the installation checklist as a guide for new system setup and testing

Automation System Manuals are available at <https://www.versabuilt.com/resources/>

Use the latest available PDF copies and search for topics

Safety Warnings

DANGER: VersaBuilt makes industrial machine tool automation components designed to be operated by trained personnel only. Machine tool automation components may move suddenly and without warning. Serious or fatal crushing injuries can occur from contact with the robot, gripper or vises.

Before deploying VersaBuilt industrial machine tool automation components, a safety risk assessment must be completed in accordance with local, state and/or federal requirements.

VersaBuilt industrial machine tool automation components should only be used by trained operators.

Read and understand the VersaBuilt Automation System Safety Manual before proceeding

Automation System Overview

Section 2

Manuals

1. **Read Me First**
2. **Safety Manual**
3. **Installation Manual**
4. **Electrical, I/O, Ethernet and Pneumatics Manual**
 - a. Electrical Schematics
 - b. Inputs and Outputs (I/O)
 - c. VSC to CNC Cable Connections
 - d. Networking
 - e. Pneumatics
5. **VSC/CNC Communication, G-Code and Programming Manual**
6. **Calibration Manual**
 - a. VersaCart Infeed
 - b. Vises
 - c. Chucks
 - d. Regrip Station
 - e. ZPS
7. **VSC User Interface Manuals**
 - a. VSC User Interface Manual
 - b. MultiGrip Mill U/I Manual
 - c. DuoGrip Mill U/I Manual
 - d. DuoGrip Lathe U/I Manual (Puck & Shaft)
 - e. ZPS Mill U/I Manual
 - f. Robot Home Positions
9. **Robot and Gripper Installation**
 - a. Robot Installation
 - b. Gripper Valve Kit (UR)
 - c. Power Up and Configuration of Robots
 - d. Gripper Installation manuals (MultiGrip, DuoGrip, ZPS)
10. **Electrical , I/O, Network, and Pneumatics Manuals**
 - a. VSC 1.0
 - b. VSC 2.0
11. **MultiGrip Workholding Manuals**
 - a. The MultiGrip Method
 - b. MultiGrip Vise Overview
 - c. MultiGrip Jaw Overview and Installation
 - d. Universal Jaws Manual
 - e. MultiGrip Workholding Design & Best Practices
 - f. MultiGrip Vise Sensor Installation
12. **VersaCart Accessories**
 - a. VersaWash Installation and Operation
 - b. VersaCart Anchor Kit
 - c. VersaCart Refrip Station
 - d. Safety Scanner Installation Manual
13. **Automation System Calibration Manual**
14. **Part Configuration / Parametric Programming**
 - a. Part Configuration & Parametric Programming Overview
 - b. MultiGrip Part & Jaw Configuration
 - c. DuoGrip Puck Configuration
 - d. DuoGrip Shaft Configuration
 - e. Robot Home Positions
 - f. Chuck Considerations
 - g. Fundamentals of Successful Automation
15. **Troubleshooting & Maintenance**
 - a. Entering and Exiting Freedrive
 - b. Preventative Maintenance Manual
 - c. Troubleshooting Manual
 - d. Spare Parts Manual
16. **VersaDoor Manuals**

Automation System Manuals are available at <https://www.versabuilt.com/resources/>
Use the latest available PDF copies and search for topics

Installation Preparation and Checklists

Prepare for installation with the “Expectations and Pre-Installation Checklist”

During installation, use the “Installation Checklist”

Documents available at <https://www.versabuilt.com/resources/>

MANUALS

— Automation System - Installation & U/I Manuals
Installation & U/I Manuals
◦ Read Me First ◦ Safety Manual ◦ Pre-Installation & Install Prep Checklist ◦ Installation Checklist & Manual Map ◦ Installation Overview ◦ VSC User Interface (U/I) Connection Manual ◦ VSC / CNC Communication Manual ◦ Calibration Manual ◦ MultiGrip Mill System U/I Manual ◦ DuoGrip Mill System U/I Manual ◦ DuoGrip Lathe System U/I Manual Puck / Shaft
<i>*See sections below for category-specific manuals</i>
+ Automation System - Robot and Gripper Installation Manuals
+ Automation System - Electrical, I/O, Network, and Pneumatics
+ MultiGrip Workholding Manuals
+ Automation System - Accessory Manuals
+ Maintenance/Troubleshooting/Spare Parts

DATA SHEETS & GUIDES

Datasheets

[Mill Automation System w/ MultiGrip](#)
[VBX-160 Upgrade to Mill Automation](#)
[Mill Automation System w/ DuoGrip](#)
[Mill Automation System w/ Zero-Point-Systems](#)
[Lathe Automation System w/DuoGrip](#)
[MultiGrip Vise](#)
[MultiGrip Jaws](#)
[MultiGrip Gripper](#)
[DuoGrip Gripper](#)
[VersaCart](#)
[VersaDoor](#)
[Robot2CNC Basic Edition](#)
[Robot2CNC Advanced Edition](#)

Guides & Tools for Mill and Lathe Systems

[Cycle Time and Infeed Capacity Calculator](#)
[Site Acceptance Test Form \(Mill System\)](#)
[Site Acceptance Test Form \(Lathe System\)](#)

Guides & Tools for Build-Your-Own Systems

[CNC Automation Checklist & Guide](#)

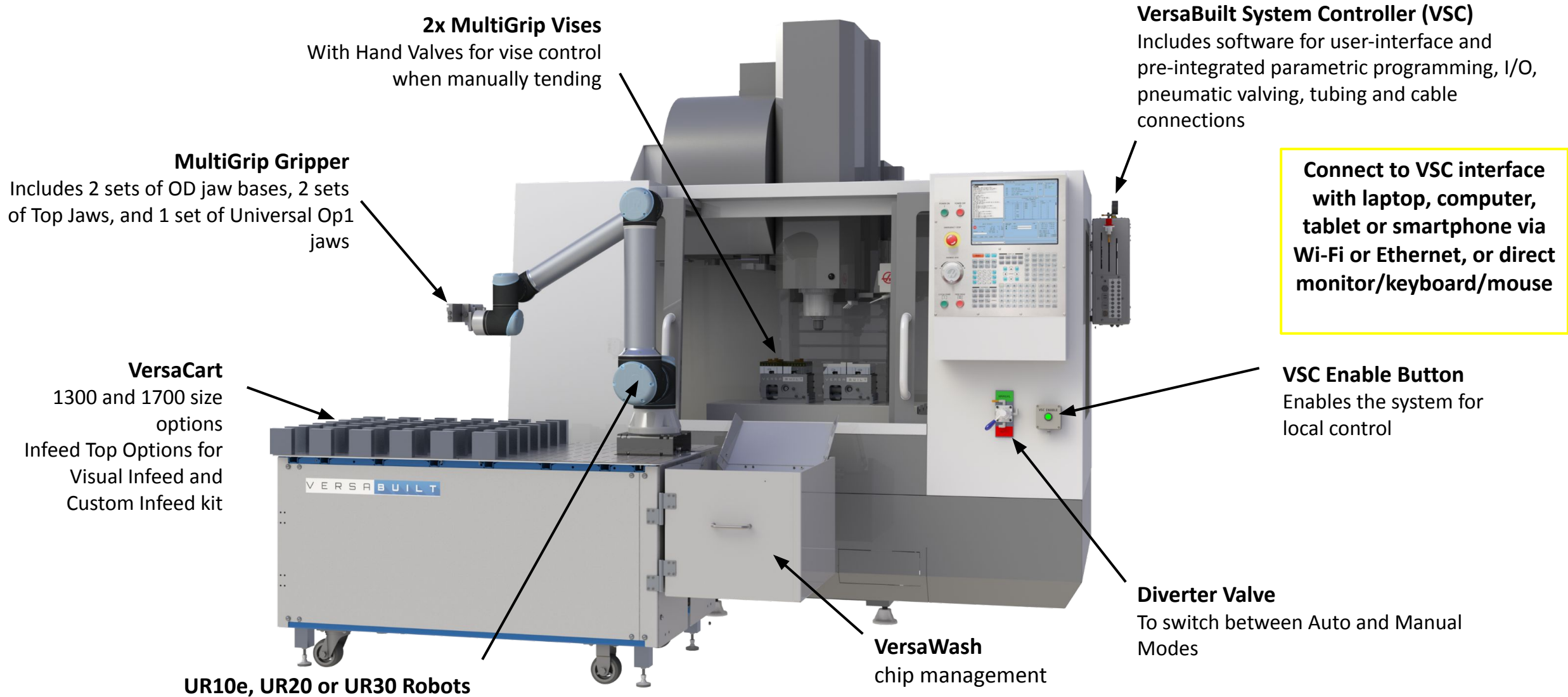
3D MODELS

[Mill Automation System Example Applications](#)
[Lathe Automation System Example Applications](#)
[VersaCart and VersaCart Accessories](#)
[MultiGrip Gripper](#)
[MultiGrip Calibration Jaws](#)
[DuoGrip Gripper 400](#)
[DuoGrip Gripper 2000](#)

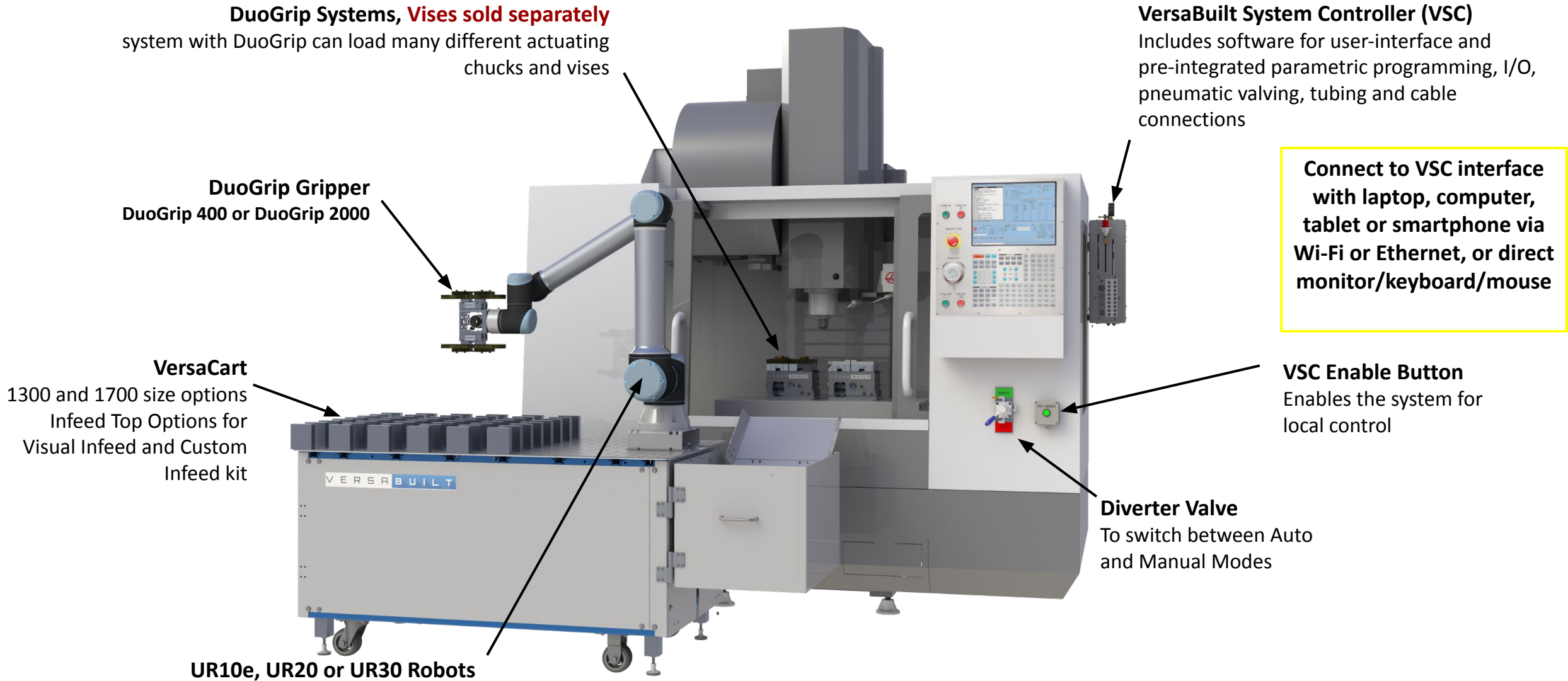
Automation System contents

- | | |
|---|---|
| 1. VersaCart (1300 or 1700) | 6. VersaWash Assembly* |
| 2. MultiGrip Gripper* | 7. MultiGrip Vise Sensor Kit for 2 MultiGrip Vises* |
| 3. DuoGrip Gripper (400 or 2000)** | 8. MultiGrip Calibration Plate* |
| 4. ZPS Gripper*** | 9. Gripper Valve Kit |
| 5. VersaBuilt System Controller (VSC) | 10. Hand Valve Kit for MultiGrip or ZPS Systems |
| 6. 2x MultiGrip Vises (2000 or 4000 sizes)* | 11. Tubing Kit |
| 7. 2x MultiGrip Base Jaws (substitutions available)* | |
| 8. 2x MultiGrip Top Jaws (substitutions available)* | |
| 9. Universal Top Jaws w/ 4x VersaBites (substitutions available)* | |
- *MultiGrip Systems only
**DuoGrip Mill and Lathe Systems only
***ZPS Systems only

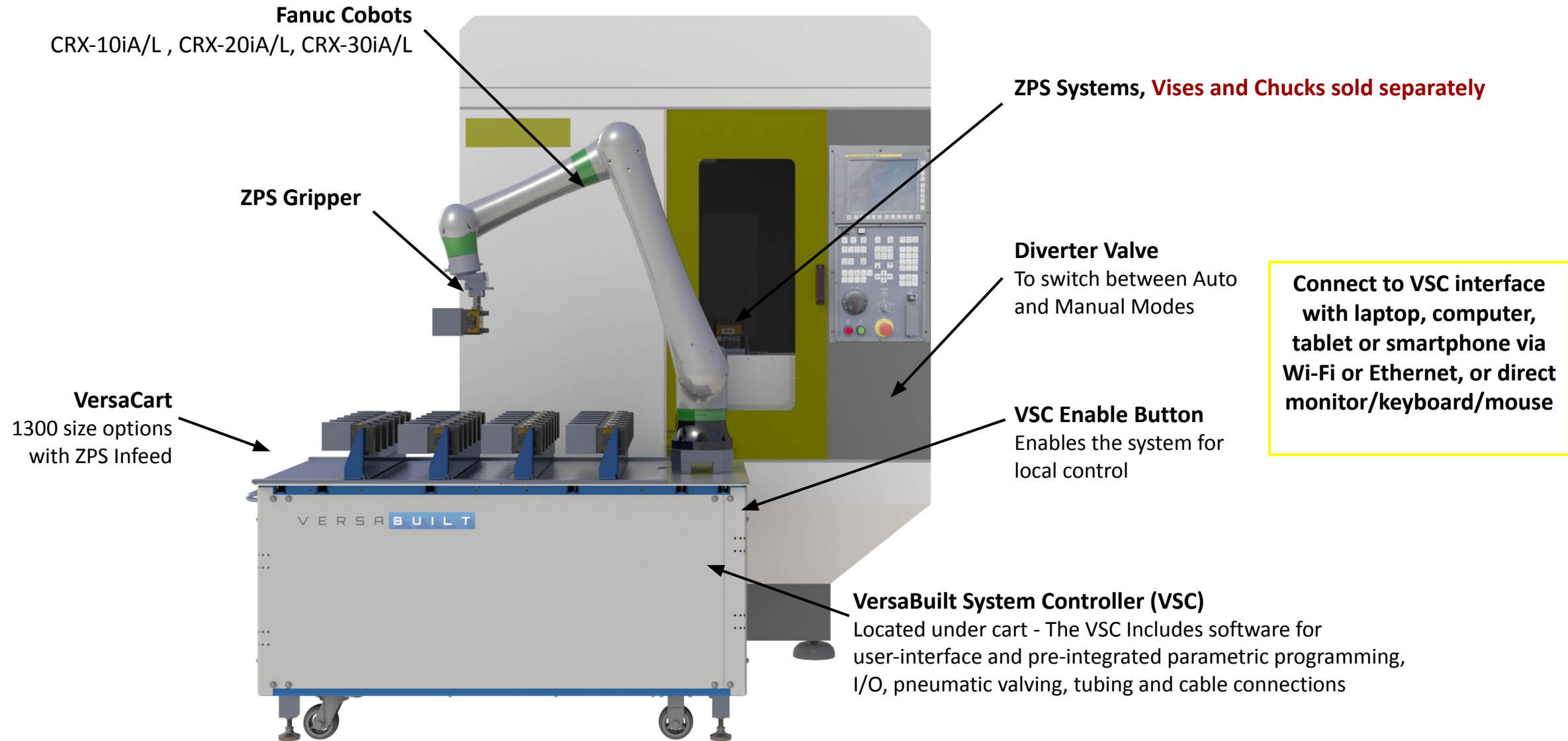
Mill Automation System w/ MultiGrip overview



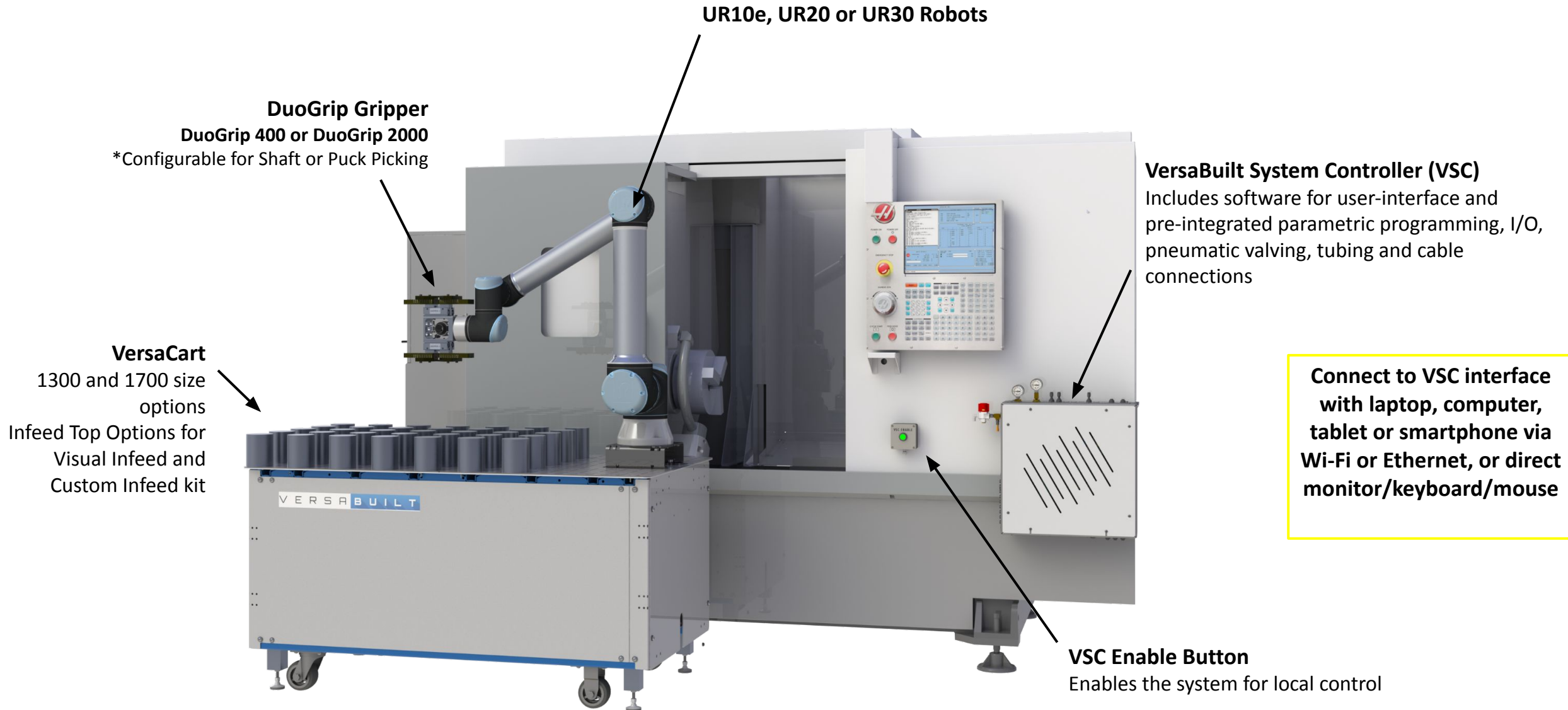
Mill Automation System w/ DuoGrip overview



Mill Automation System w/ ZPS overview



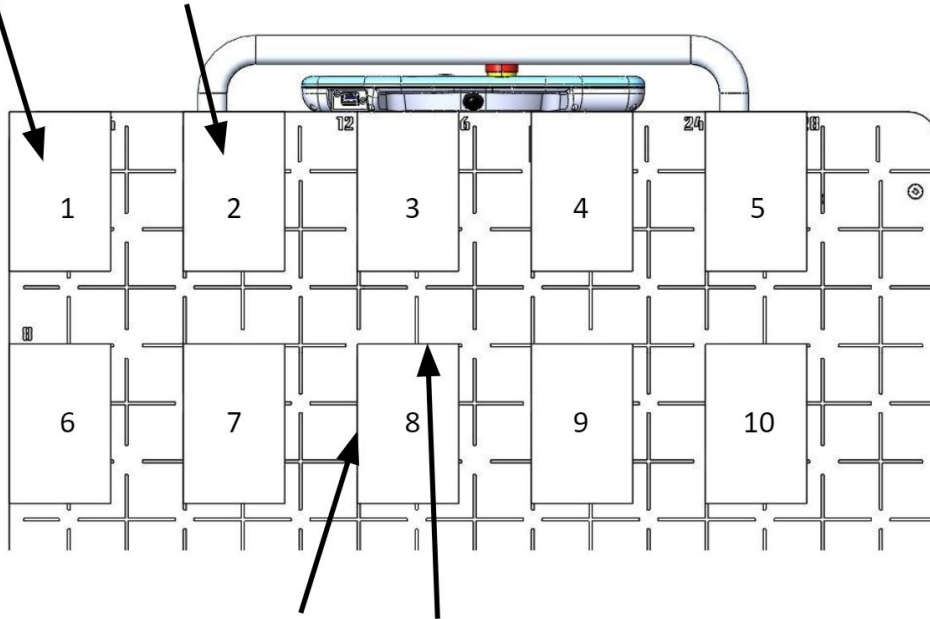
Lathe Automation System w/ DuoGrip Overview



VersaCart (1300 and 1700 sizes available)

Visual Infeed:

First Part Second Part



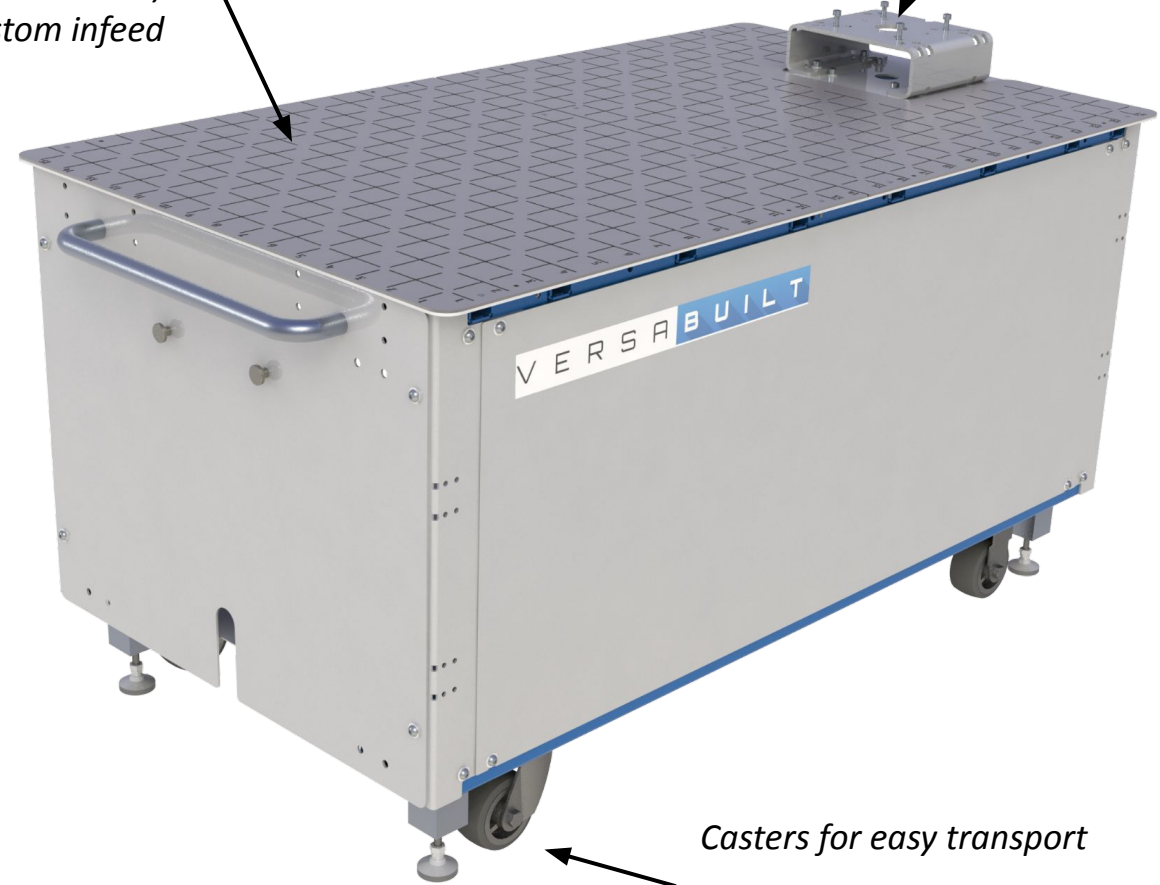
Align part left and top edges to the
cart grid lines specified

Infeed Top Options:

Standard Stainless Steel
Oversized Stainless Steel Top
Optional Custom Infeed Ready-Kit

Cart Top:
Stainless Steel visual Infeed
(standard and oversized)
or custom infeed

Mounting options for UR10,
UR20 & UR30



Accessory Options:

Safety Scanners mounted on opposing corners
Anchor kit to secure cart with concrete anchors

Casters for easy transport

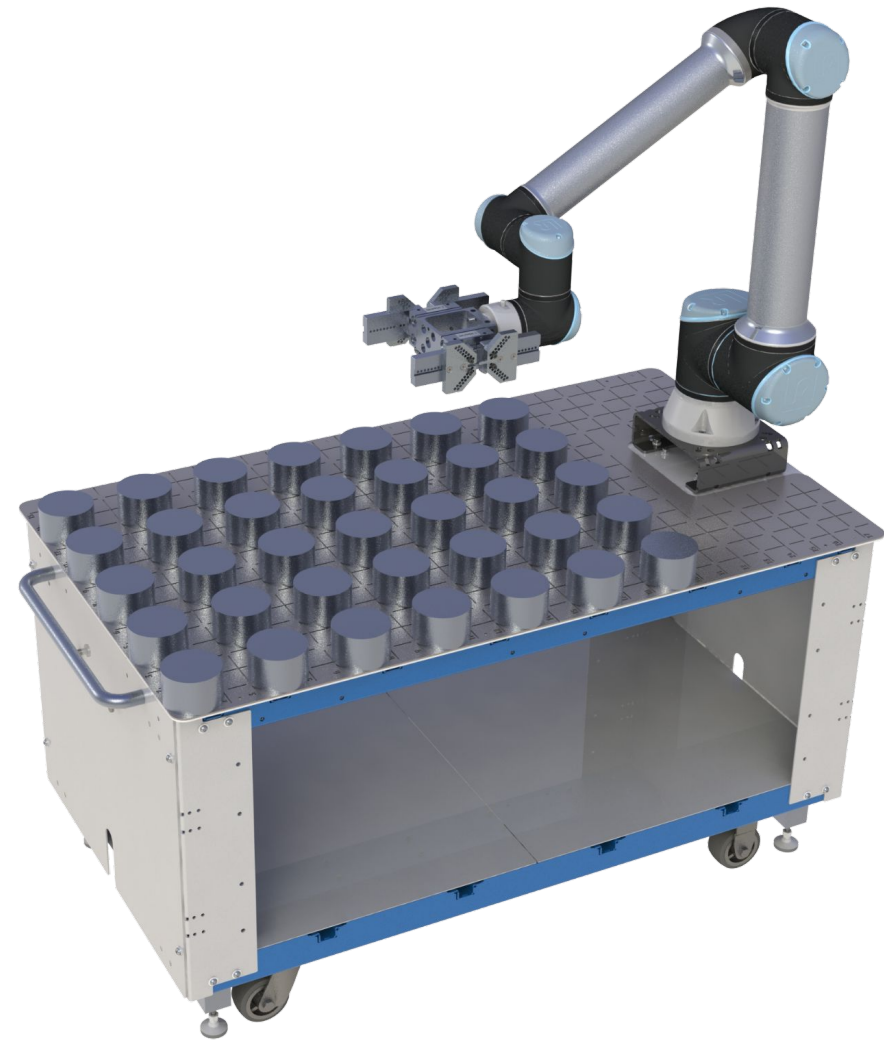
Foot pads to lock cart in
place

VersaCart - Visual Infeed

VersaCart Infeed:

- Parts lay flat on VersaCart table
- Parts are located on visual infeed
- Refer to VSC interface to show layout of parts, after part configuration is complete (with length/width = diameter)

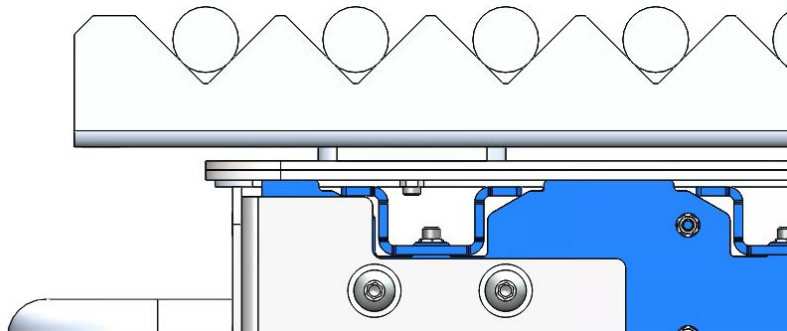
For DuoGrip Systems, this is referred to as “Puck” Picking



VersaCart - DuoGrip Shaft Infeed **optional accessory*

VersaCart Shaft Infeed:

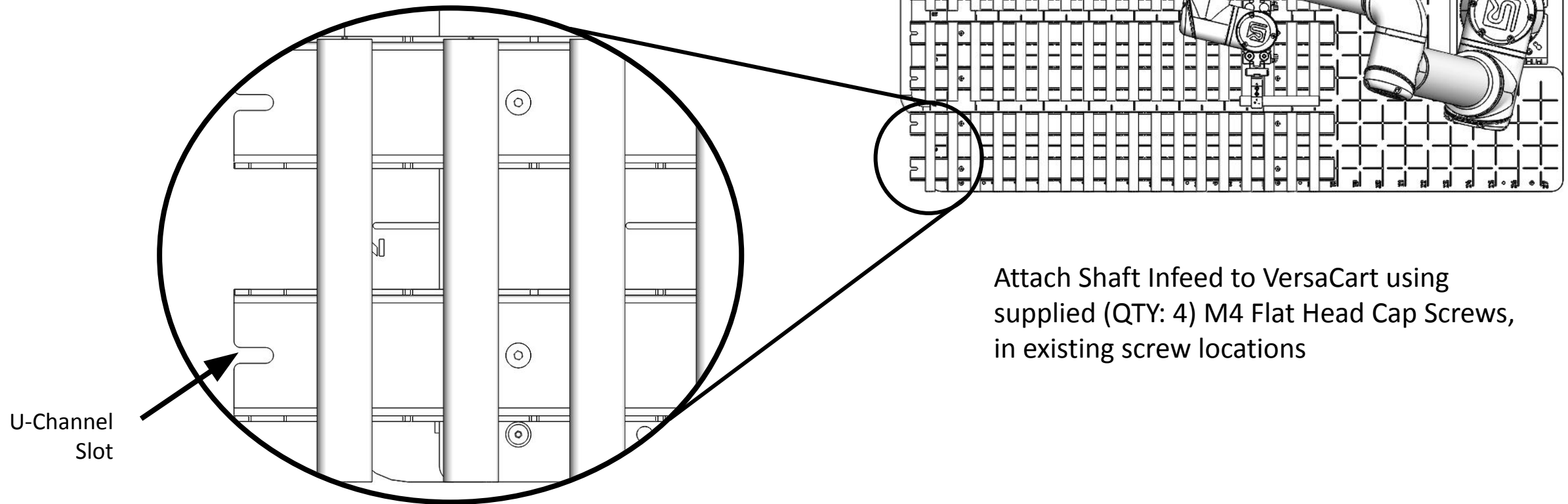
- Used with DuoGrip Grippers with Shaft Fingers
- Fasten to visual infeed
- 8x U-Channels with V profile for locating round shafts/shafts
- Locate shafts from 0.25" to 3" diameter
- Refer to Configuration Manual for guidance and VSC interface to show layout of parts, after part configuration is complete



VersaCart - DuoGrip Shaft Infeed **optional accessory*

VersaCart Shaft Infeed Orientation:

- Each U-Channel has a slot indicating orientation relative to the robot.
- Insure each U-Channel is oriented with the slot on the opposite side of the robot.

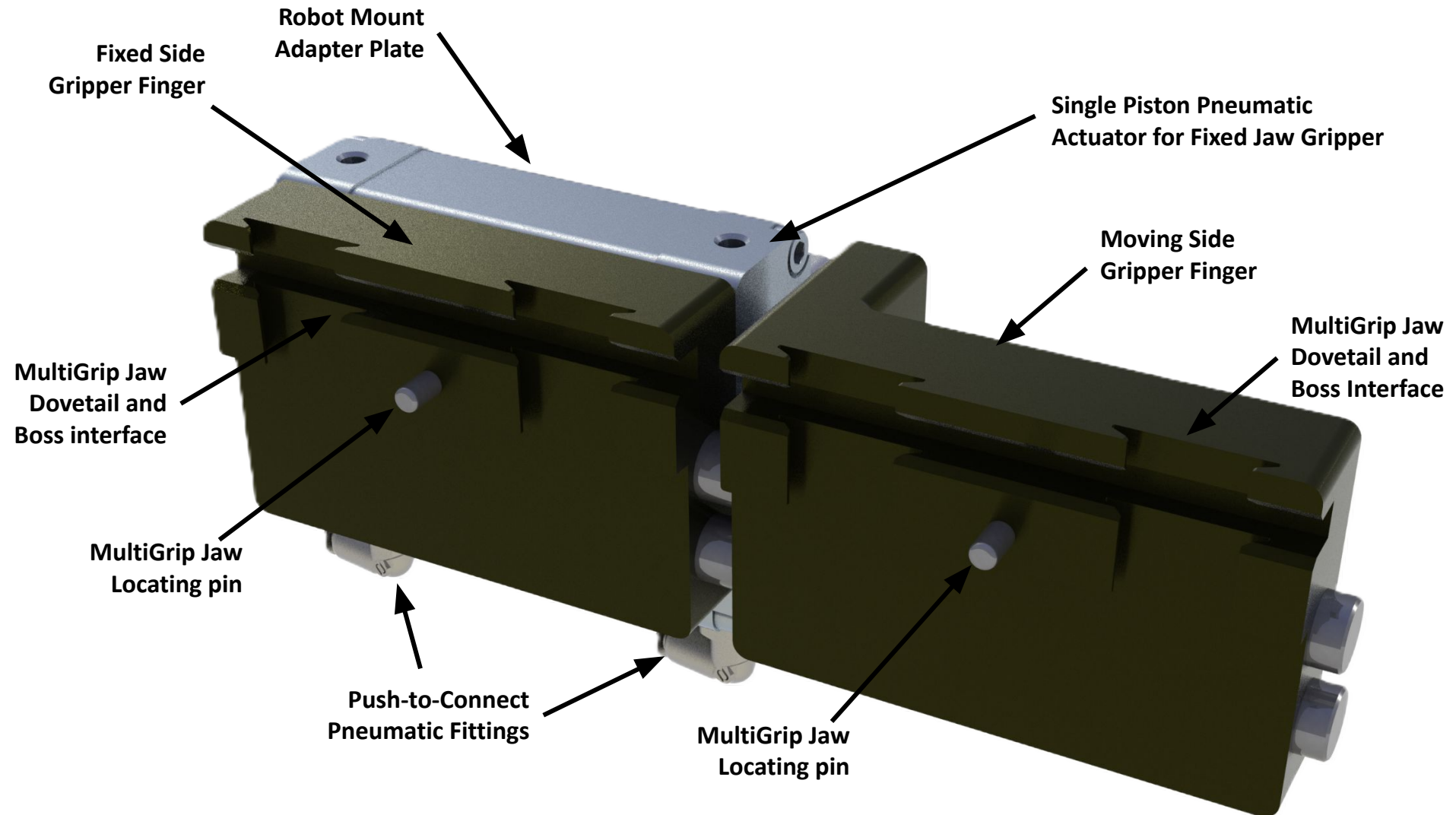


VersaCart - ZPS Infeed



MultiGrip Gripper

- Pneumatic Fixed Jaw Gripper
- Gripper Fingers with features to pick and place MultiGrip Jaws
- Adapter Plate to attach to ISO Standard Robot Mount
- 5/32" Tubing to connect to supply from gripper valve
- Zip Ties for tube routing on Robot arm

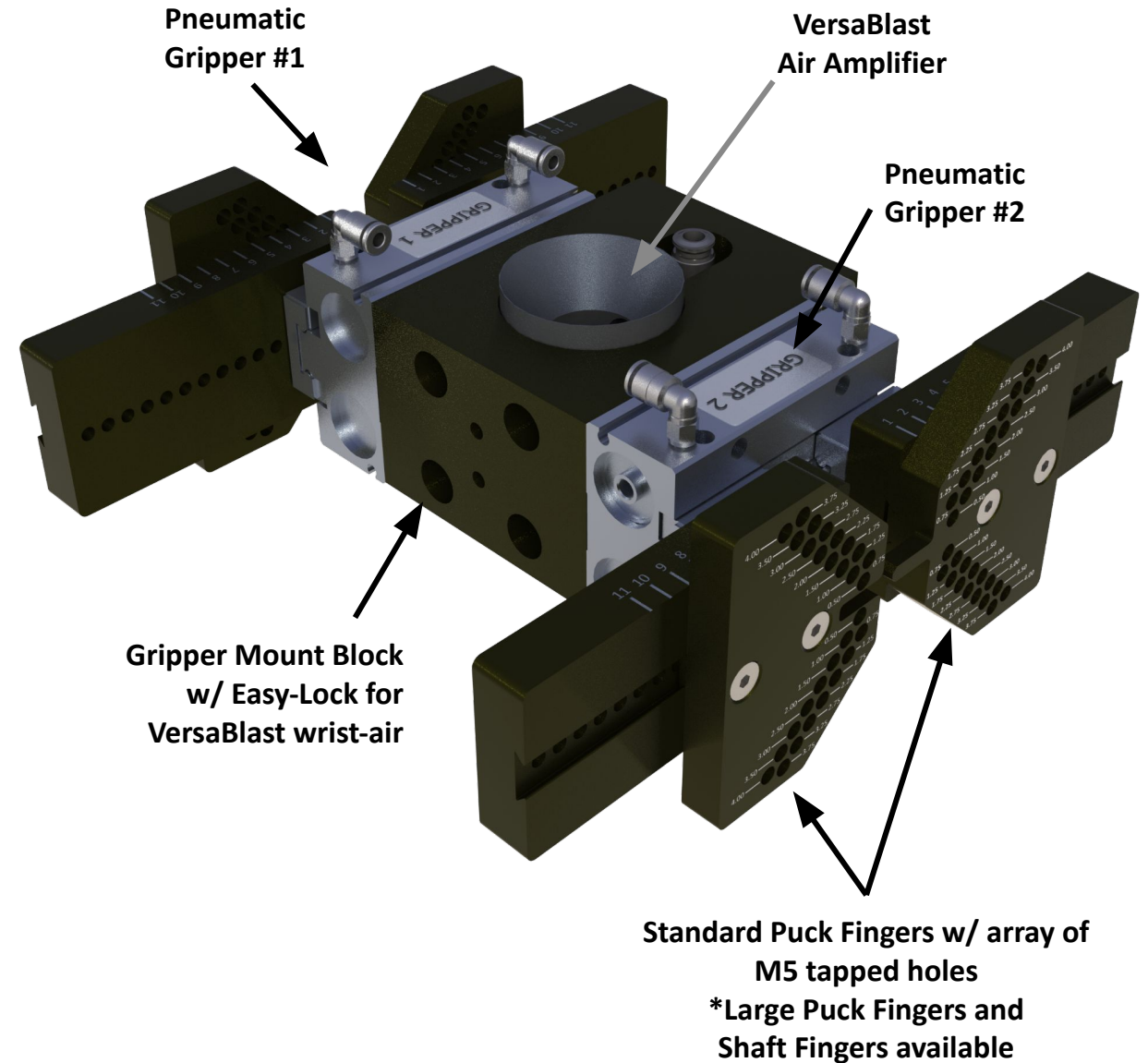


DuoGrip 400 Gripper

- Max Part Weight = 10 lbs @ 110 psi
- 2x Pneumatic Grippers mounted 180° apart, with hardware for shaft picking* and puck picking**
- Adapter Plate to attach to Robot conforming to ISO 9409-1-50-4-M6, with available adapter for UR20 and UR30 robots
- 5/32" Tubing to connect to supply from gripper valve in robot controller
- Tube Routing Kit provided for tube routing on Robot arm

*shaft picking for parts with length much greater than diameter (shaft, shaft, etc) - picked and placed from the side. shaft fingers for diameter ranges 0.25 to 3.0" available.

**Puck picking for round parts that can stand up. Diameter ranges from 0.50" to 4" standard and optional up to 8"

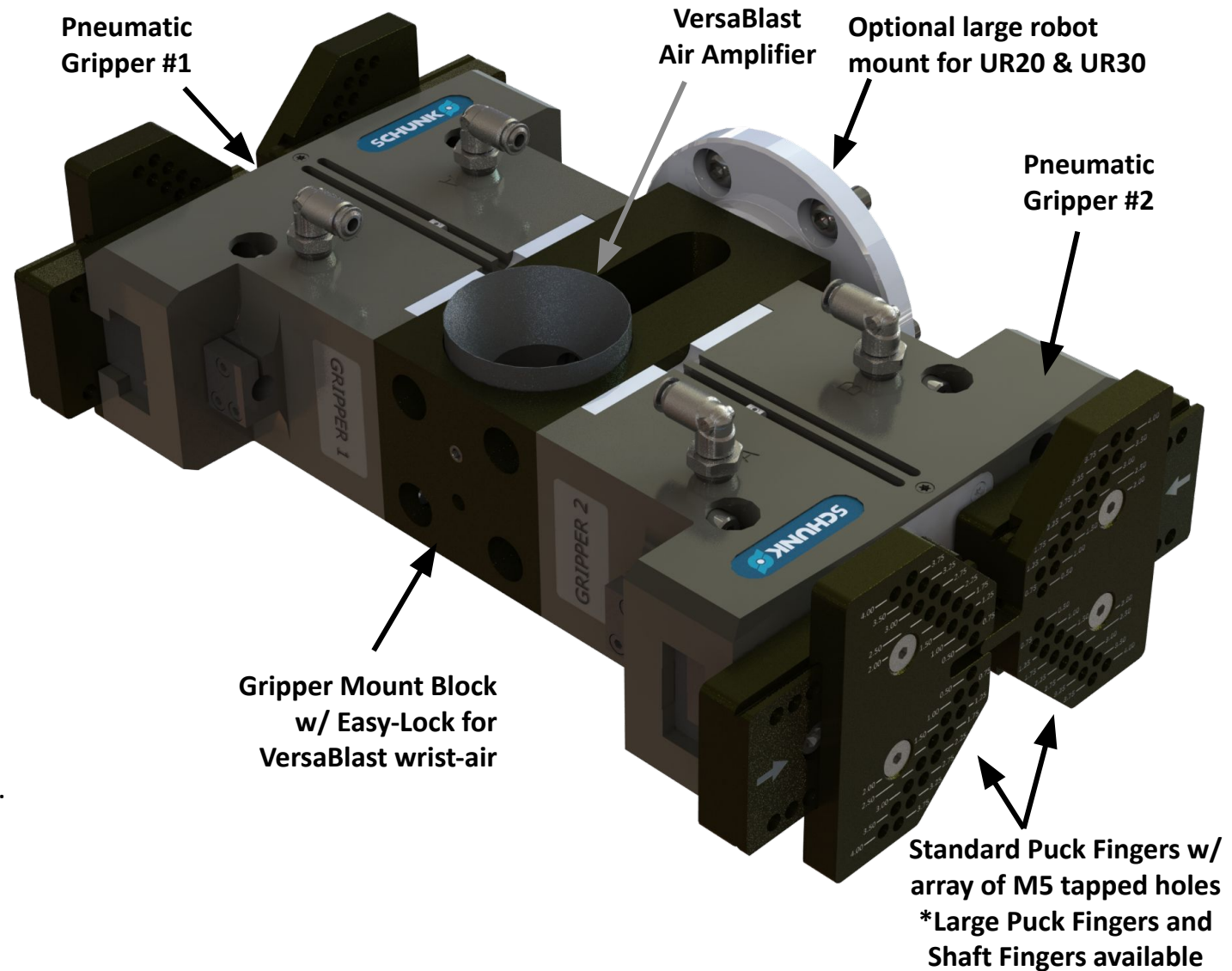


DuoGrip 2000 Gripper

- Max Part Weight = 45 lbs @ 110 psi
- 2x Pneumatic Grippers mounted 180° apart, with hardware for shaft picking* and puck picking**
- Adapter Plate to attach to Robot conforming to ISO 9409-1-50-4-M6, with available adapter for UR20 and UR30 robots
- 5/32" Tubing to connect to supply from gripper valve in robot controller
- Tube Routing Kit provided for tube routing on Robot arm

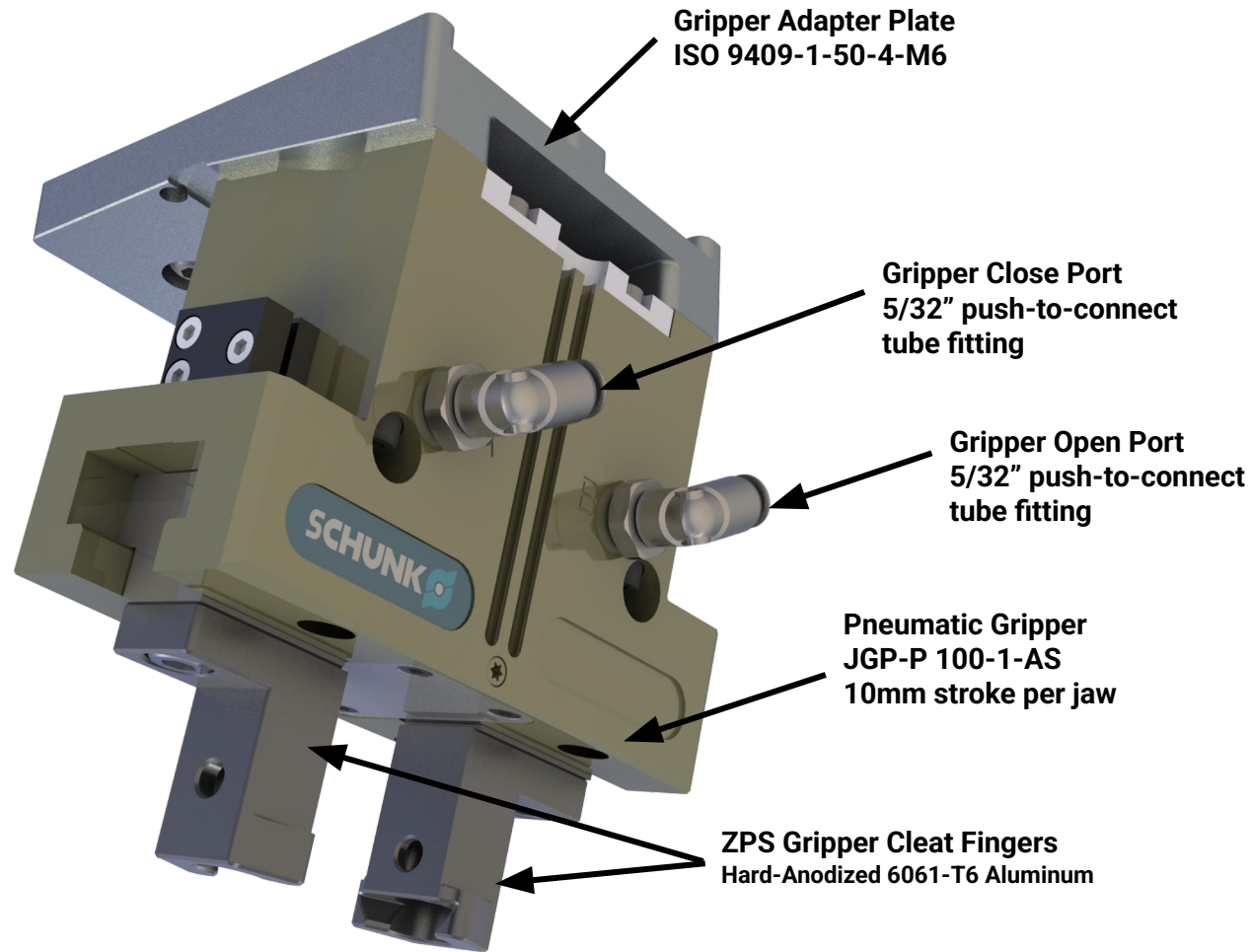
*shaft picking for parts with length much greater than diameter (shaft, shaft, etc) - picked and placed from the side. shaft fingers for diameter ranges 0.25 to 3.0" available.

**Puck picking for round parts that can stand up. Diameter ranges from 0.50" to 4" standard and optional up to 8"

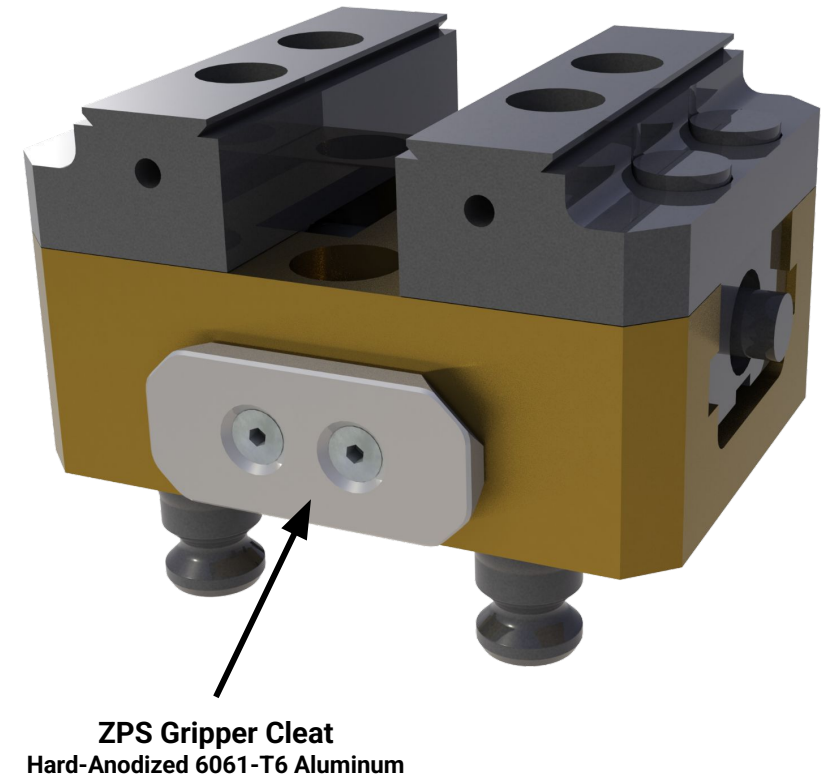


ZPS Gripper

ZPS Gripper

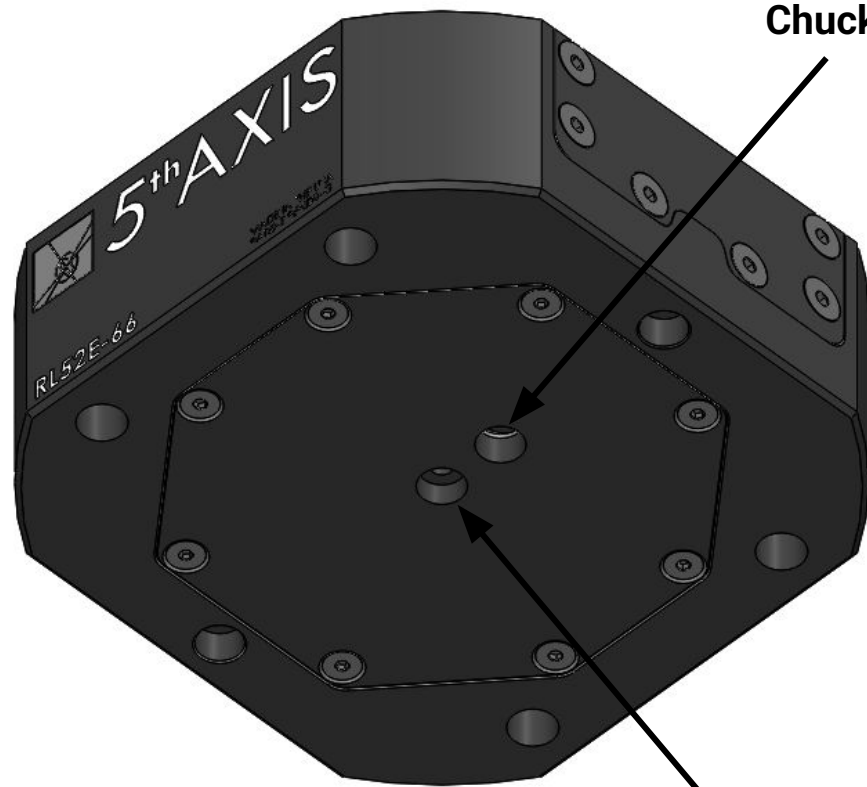


ZPS Cleat



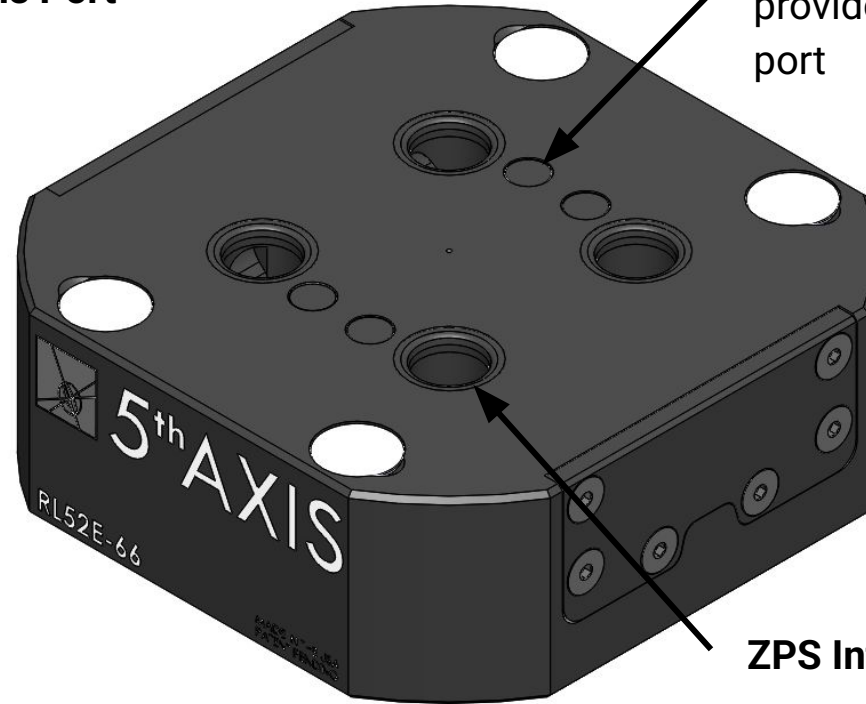
Max Part + Vise/Pallet Weight = CRX Robot Type payload limits

ZPS Chuck



Chuck Release Pins Port

Chuck Blow-off Port



Chuck Release Pins

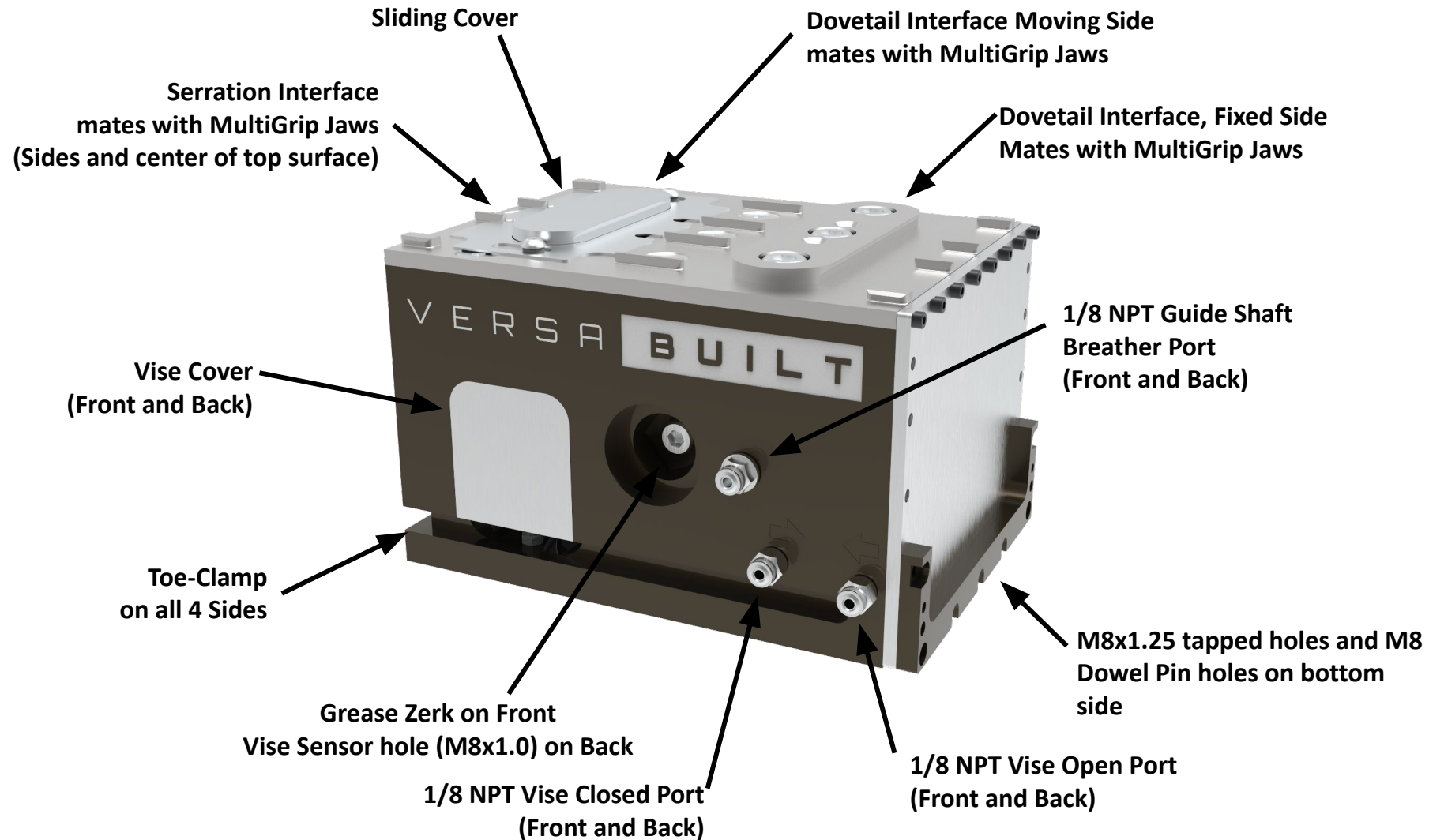
Pins lift up when air is provided to the Chuck Release port

ZPS Interface & Blow-off

Mating feature for ZPS Pin pull-down. When air is provided to the Chuck Blow-off port, air is blown out of these features

MultiGrip Vises

- Pneumatic Fixed Jaw Vise
- Interfaces with MultiGrip Jaws for quick-exchange manual tending and automation
- Available in 2 sizes
 - MultiGrip Vise 2000
 - MultiGrip Vise 4000
- Optional Steel Top



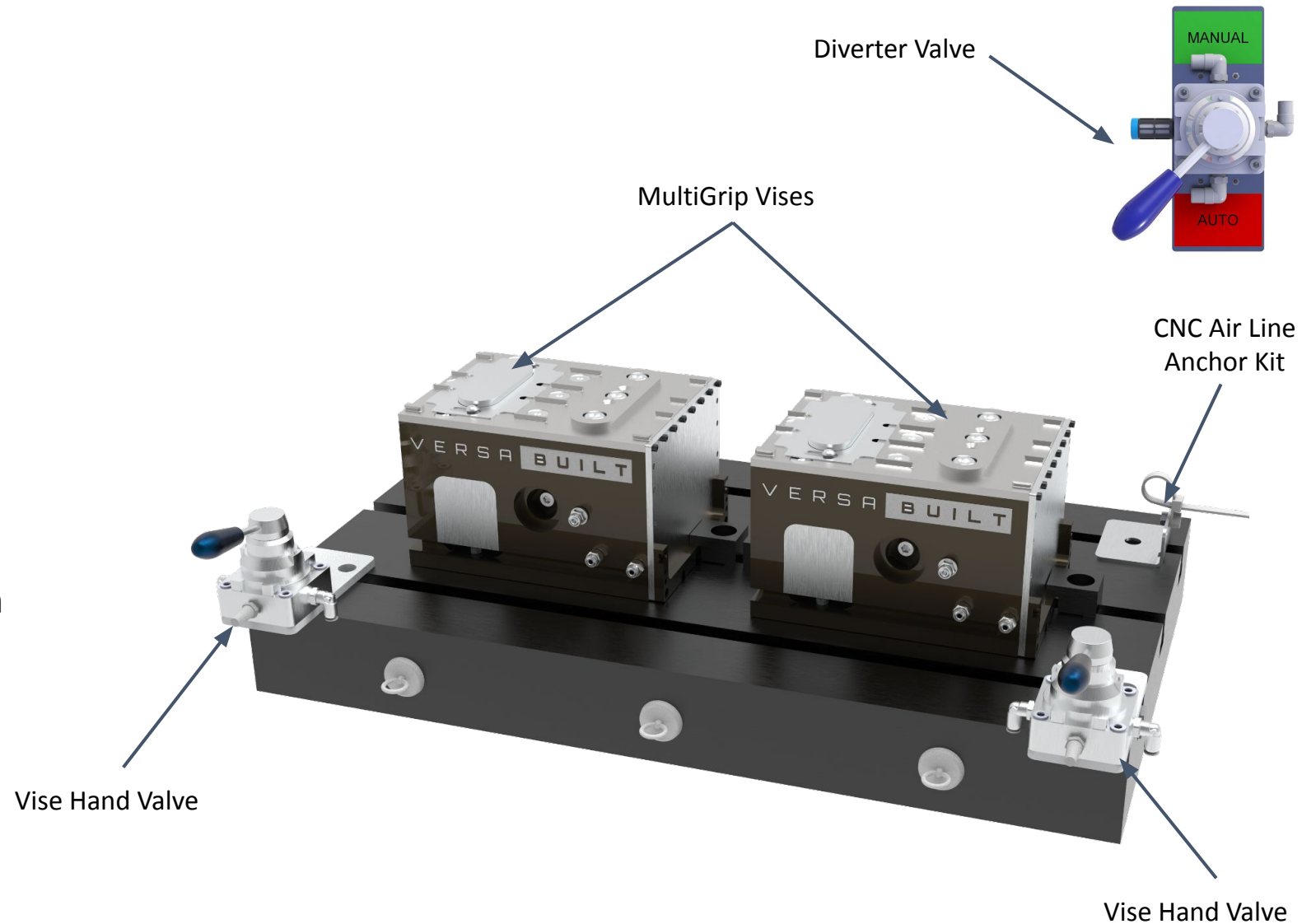
Hand Valves and Vise Accessories

Mill Automation w/ MultiGrip:

- 2 x Vise Hand Valves for Manual Loading
- Diverter Valve to switch between “Auto” mode and “Manual” Mode
- CNC Air Line Anchor Kit
- Vise Sensor Kit

Automation Systems with DuoGrip:

- Diverter Valve to switch between “Auto” mode and “Manual” Mode
- Hand Valves optional for operation with selected vises for the application



VersaWash

Primary purpose:

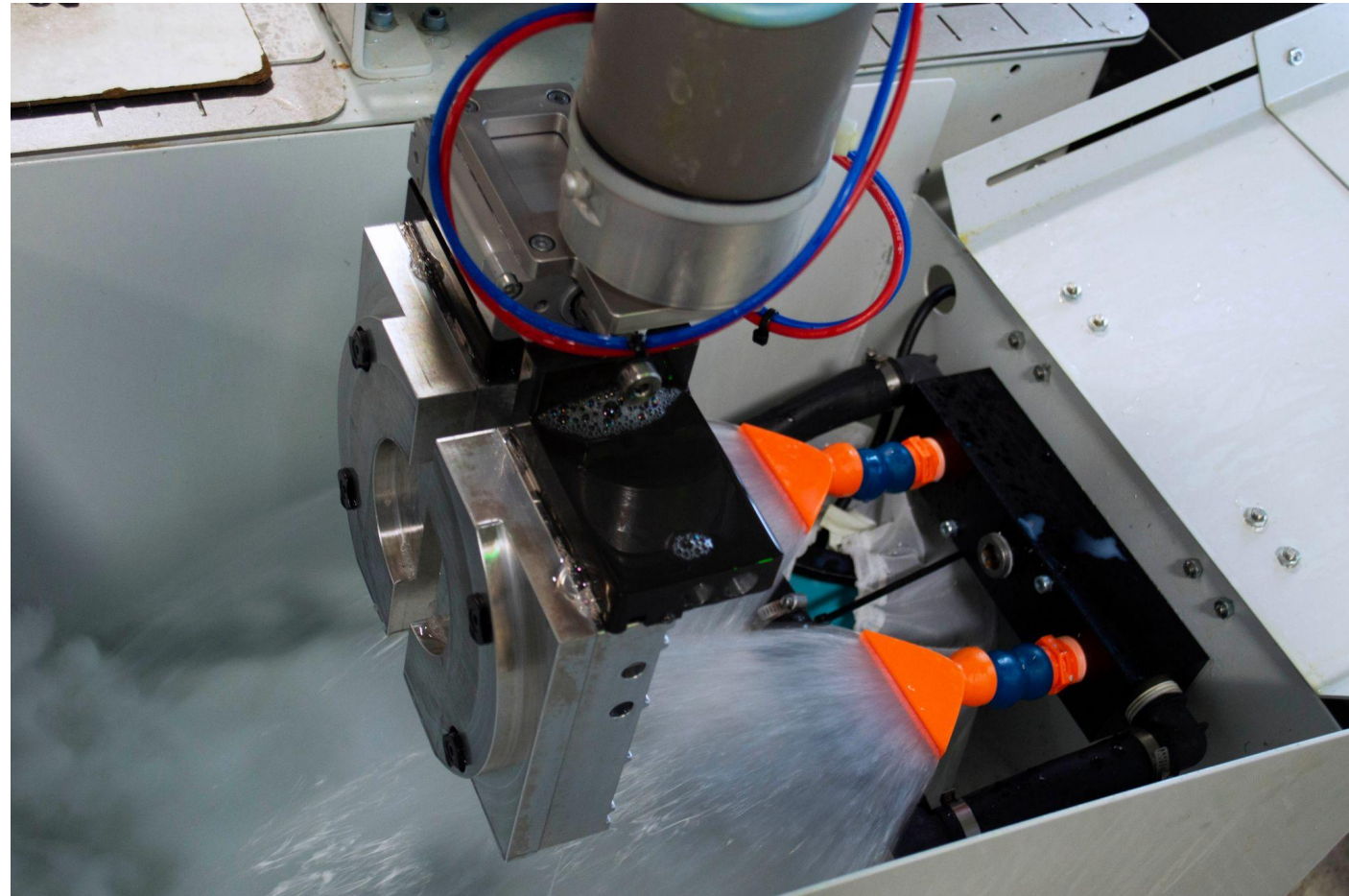
To remove chips from the top and bottom sides of MultiGrip Jaws before and after machining operations, providing efficiency with jaw cleaning outside the CNC

Includes:

- Water tank with Pump, Manifold and Spray Nozzles

Note:

- Max 5 Gallons of water
- Clean daily



VersaBuilt System Controller (VSC)

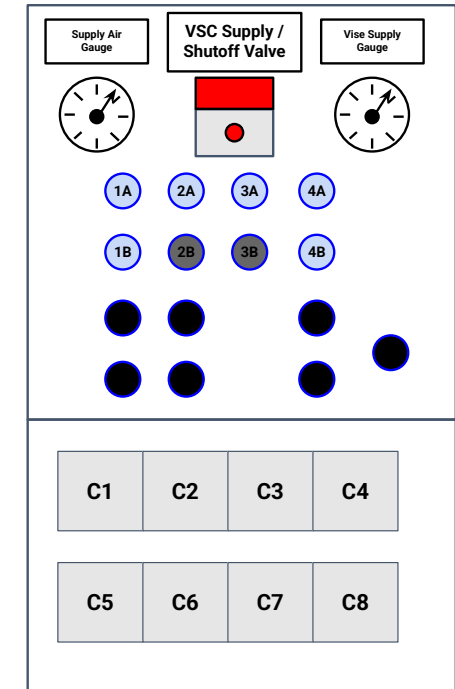
- Computer, I/O, Pneumatic and Electrical
- Ethernet:
 - 5-Port Ethernet Switch, facilitating communication between VSC, Robot, CNC and Router
 - Router for WiFi Tablet communication and connection to corporate network
- 24VDC Solenoid Valves
- Digital Outputs, Digital Inputs
 - VSC 1.0 = 16 DO, 16 DI *Solenoid Valves used DO Signals
 - VSC 2.0 = 8 DO, 16 DI *Solenoid Valves do not use DO Signals
- HDMI and USB ports for direct monitor/keyboard connection to user interface
- RS232 DB9 connection to CNC for Haas Legacy controls

VSC 1.0



Electrical Enclosure

VSC 2.0



**Incorporated into the
VersaCart**

VSC Enable Button

VSC Enable Button:

- VSC Enable Button enables control of moveable peripherals of the automation system, confirming user control of the system with a preset timer verifying an operator is present at the machine. The VSC Enable Button is utilized in system recovery and the start of a new job. The timer starts after the last user input to the system and requires the button to be pressed if a selection is not made within the timer limits. The time interval can be edit in advanced system settings.
- The VSC Enable Button is magnetically mounted on the CNC or any ferrous surface. Place in a convenient location for operator reach.
- Connect the VSC Enable Cable to the VSC as shown.



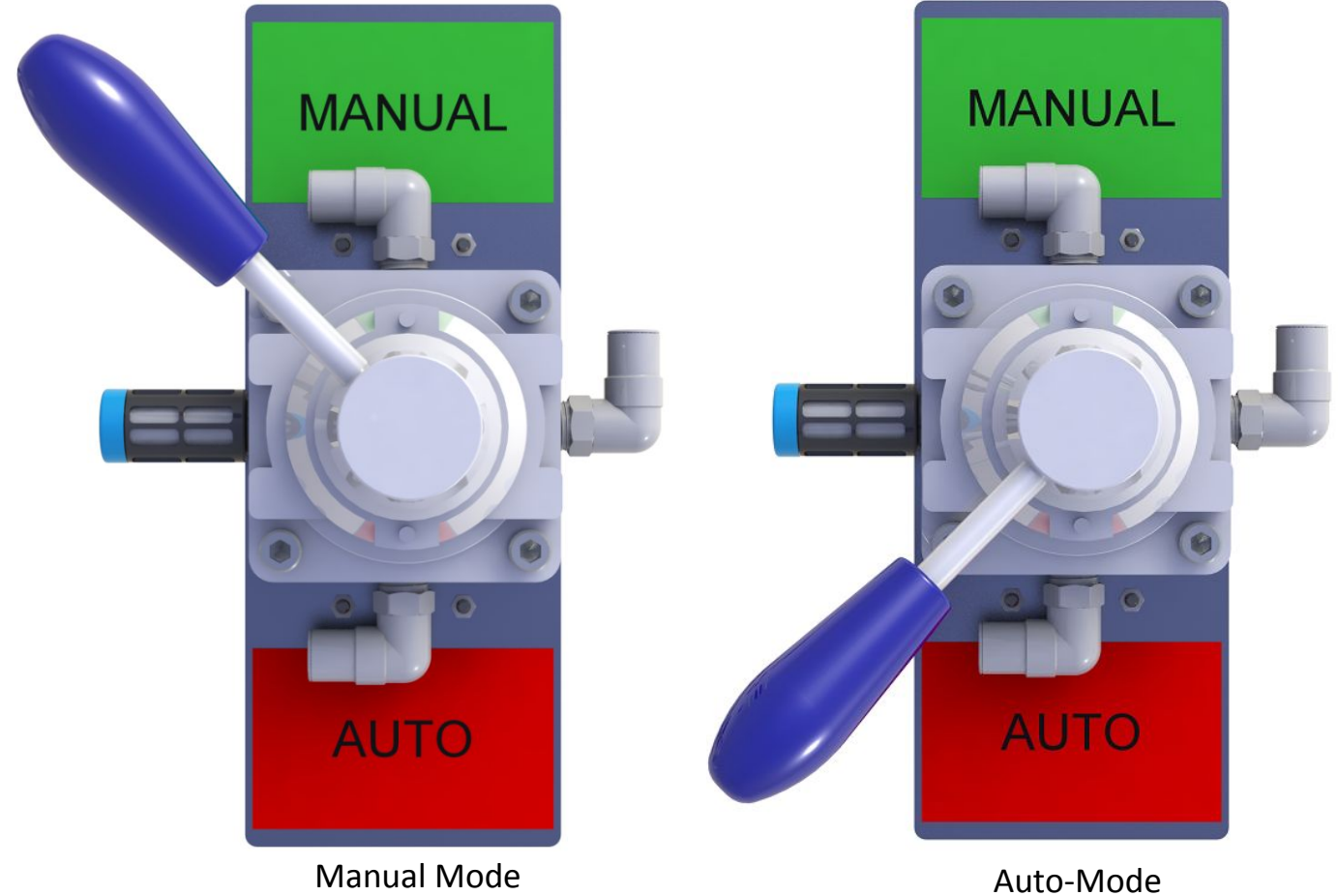
Connection B2 on VSC 1.0

Pre-wired on VSC 2.0

Refer to the “Automation System VSC Inputs/Outputs Manual” for more information about connections to the VSC

Diverter Valve (Manual / Auto Valve)

- Used with Mill Systems, supplying air to the VSC in Auto Mode or to the Vise Hand Valves in Manual Mode
- The Diverter Valve is mounted on an aluminum plate with 2 x Magnets. Find a convenient operator accessible location for the Diverter Valve, typically on the front of the CNC to the right of the door frame below the CNC controller.

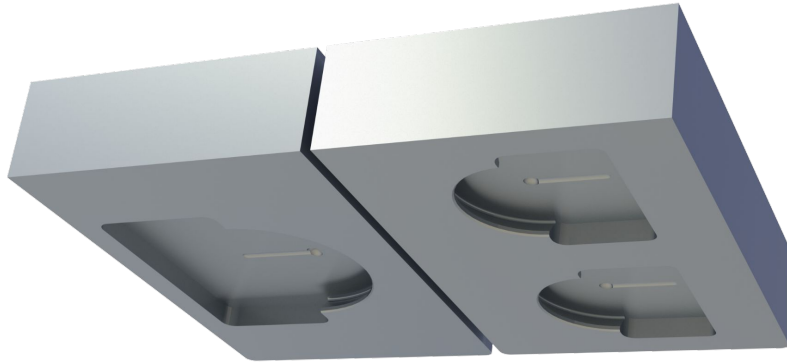


MultiGrip Jaws

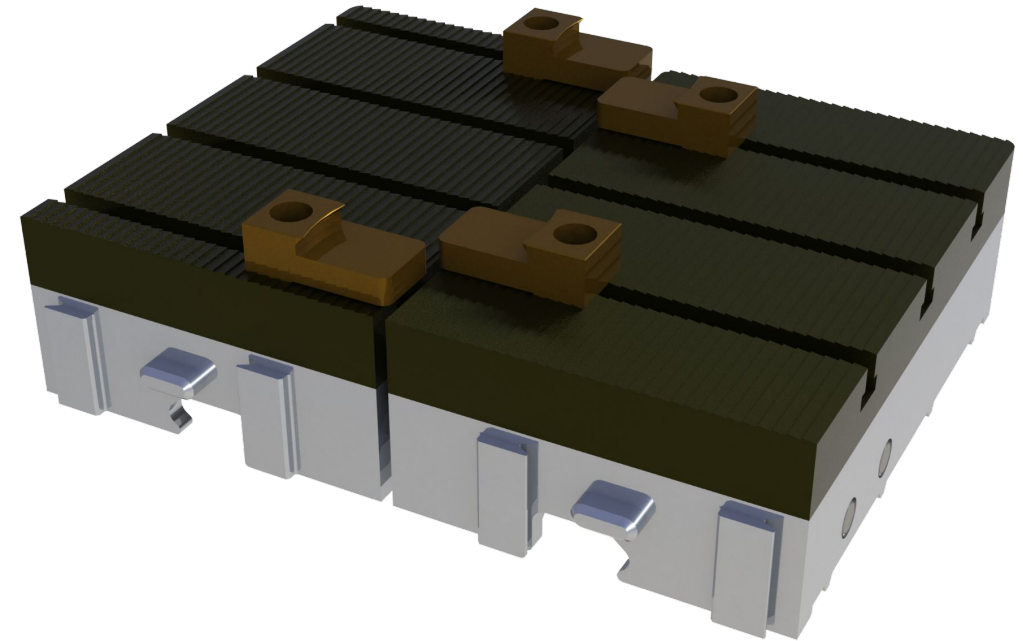
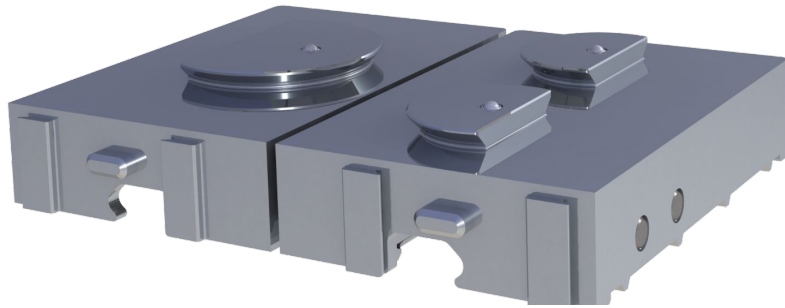
Included by default with MultiGrip Mill Automation System ****substitutions and additions are available***

- 2 x MultiGrip OD Jaw Bases
- 2 x MultiGrip OD Top Plates (1.5" Height)
- 1 x Universal Top Jaws w/ 4x VersaBites (1/8" z-height)

MultiGrip Top
Jaws



MultiGrip
Base Jaws

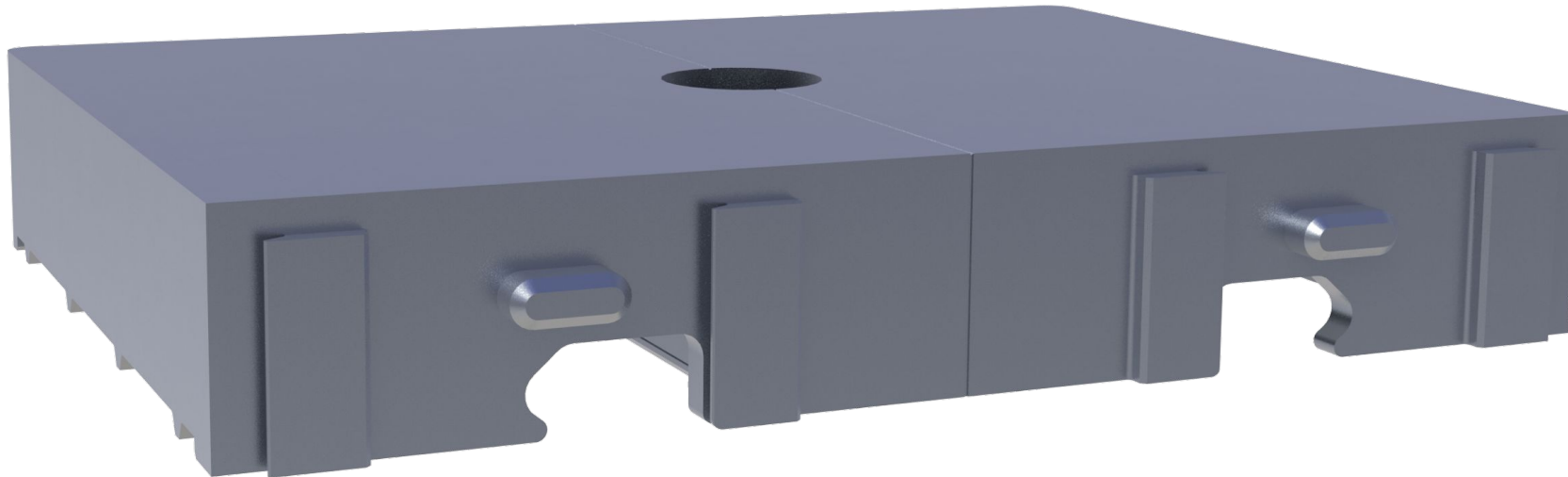


MultiGrip Base Jaws with Universal Top Jaws and VersaBites

MultiGrip Calibration Jaws

MultiGrip Calibration Jaws are included by default with the Mill Automation System w/ MultiGrip:

- Used during the VersaCart and MultiGrip Vise calibration process
- Include features for vise clamping, and alignment with cart edges
- Can be used for testing vise calibration, by picking and placing the calibration jaws



Pneumatics

All air fittings are “push-to-connect” (PTC), allowing quick and easy connectivity

Incoming Air is the main air supply and should be less than 115 psi and conditioned air that meets ISO 8573-1:2010 [7:4:4] standard. Maximum system air consumption is 15-20 SCFM.

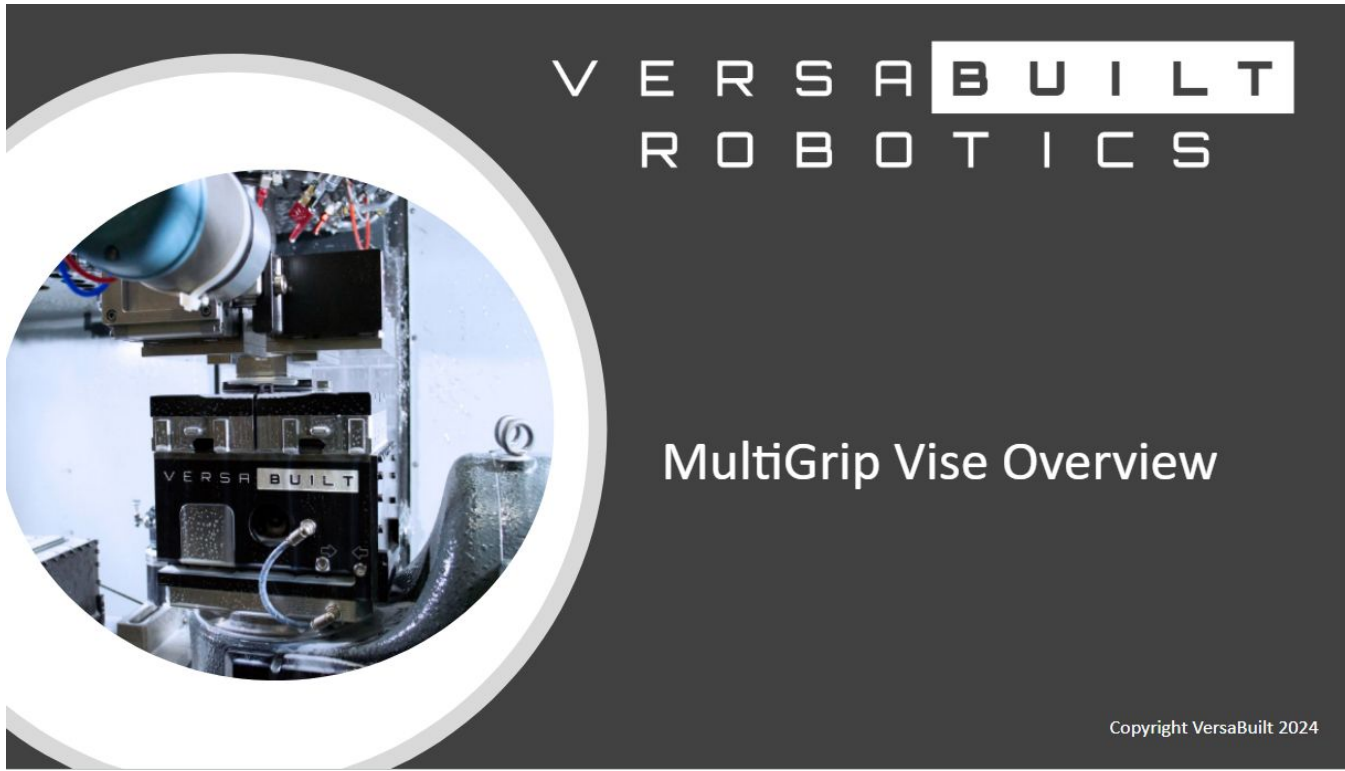
Refer to the Pneumatics Manual for further information

Mill Workholding Installation

Section 3

MultiGrip Mill Automation: Install Vises

Refer to the “MultiGrip Vise Overview Manual” on the procedures for mounting the MultiGrip Vises to the CNC table. The manual also includes vise specifications, setup steps, and example applications. Available on the VersaBuilt website, resources page, <https://www.versabuilt.com/resources/>.



ZPS Mill Automation: Install ZPS Chuck

ZPS Chuck Mounting Options

The 5th Axis chuck can be mounted directly to the CNC table or it can be mounted to the CNC table using VersaBuilt ZPS Chuck Subplate. VersaBuilt's ZPS Chuck Subplate makes it easier to install the ZPS Chuck on center for 5-axis applications and supports a wider range of T-slot spacing.

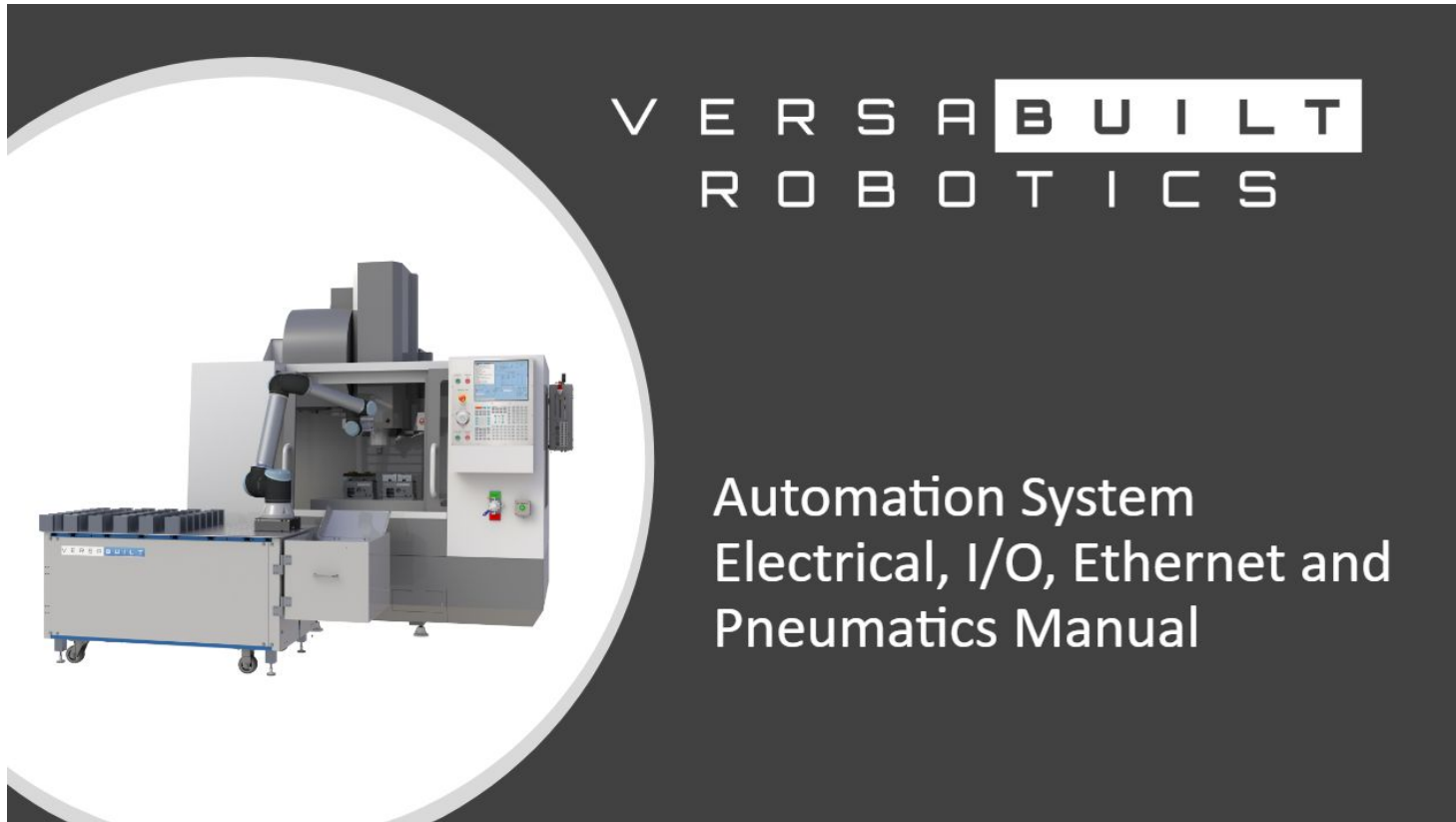
Position ZPS Chuck, Find and Store Center Location

Once the ZPS Chuck is mounted, in the CNC, position the ZPS Chuck as needed. Tram and center the ZPS Chuck as required by your application. Torque the ZPS Chuck mounting bolts to the CNC table.

Once the ZPS Chuck is properly positioned, find the center of the ZPS Chuck and store the location in a CNC work offset.

Route Air Lines for Mill Workholding

Refer to the “Automation System Pneumatics Manual” for air line routing for the Mill Workholding, available on the VersaBuilt website, resources page, <https://www.versabuilt.com/resources/>.



For manual tending, before introduction of automation or the VSC, plumb with plugs in ports/fittings, so the vises can be operated for manual tending to prove out processes.

Install MultiGrip Vise Sensors*

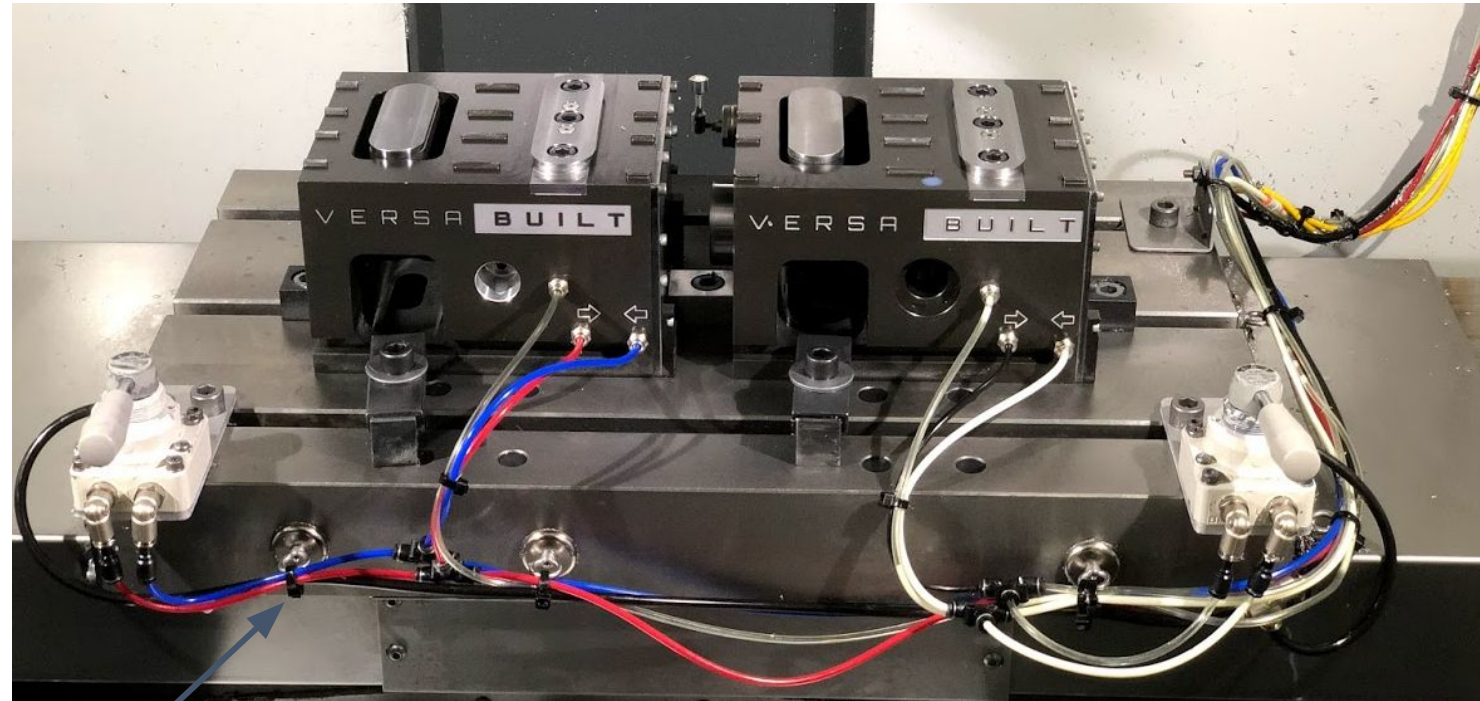
*For applications appropriate for Vise sensors, 3-axis and 4th axis trunnion,
Refer to the MultiGrip Vise Sensor Installation Manual

For Rotary applications, utilize spindle probes for part and jaw positional
verification at the start of each machining program

Route Air Lines and Vise Sensor Cable

- If included in the setup, connect the vise sensor cable, from vise sensor kit, to pre-installed vise sensor on the back of each vise.
- Air lines that attach to the CNC table should be long enough to allow full travel of the CNC table without strain on the air lines
- Anchoring the CNC table air lines and sensor cable to the corner of the CNC table will help prevent damage from strain - use the included CNC Air Line Anchor kit
- Use included cable-ties to anchor air lines to prevent rubbing or chafing
- Delay trimming and final securing of air lines that go to the CNC Table until all air lines have been routed and strain has been verified by positioning CNC table to its extents

Do not close cable tie on anchor line kit until after connecting cables to Vise Sensors and connecting all tubing to vises and hand valves



Magnetic loops are provided to aid tube and cable routing

Image shown above includes tubing routed from VersaBuilt System Controller (VSC)

MultiGrip - Prep Jaws and Manually Prove out CNC Process

- Refer to the MultiGrip Manual for guidance on implementation of MultiGrip Jaws
- Provided with the Mill Automation System*
 - QTY: 1 - Universal Op1 Jaws
 - QTY: 2 - MultiGrip OD Base Jaws
 - QTY: 2 - MultiGrip OD Top Jaws
- Machine pockets for jaws, mindful of the application as workholding as well as robot pick and place tool - see Mill Automation System - Machinist Manual
- Consider the jaw stroke and nominal clamp positions during pick. The gap between left and right jaws are:
 - OD jaws nominal machining gap = 0.125"
 - OD jaws max opening = 0.75" (~20mm)
 - ID jaws nominal clamp = 0.394" (10mm)

Proving out machining by manual loading is a critical first step to prove out workholding.

Once manual machining is proven, implement robot tending. This 2 step process separates variables and enables easier troubleshooting of issues that may arise.

Prior to installation of automation equipment, disconnect lines to plant pressure and discharge trapped air by toggling the manual vise valves until all air is exhausted.

***alternative jaws are available for substitution or addition to system**

Robot & Gripper Installation

Section 4

Install Robot & MultiGrip Gripper

Installation steps for setup and configuration of the following can be found in the Robot Installation Manual, Gripper Installation Manuals, Pneumatics Manual, and Robot Tubing Installation Manual, available on the VersaBuilt website, resources page, <https://www.versabuilt.com/resources/>:

- Robot
- Robot Controller
- Gripper
- Gripper tube routing

Note: Verify that the correct bolt lengths are being used to attach the Gripper. Bolts that are too long can damage the robot joint, e.g., UR Force-Torque-Sensor damage can occur. The length of the bolt extending out of the gripper adapter plate should be approximately equal to the diameter (e.g., depth of M6 bolt into robot arm = 6 to 8mm). Specified bolts for gripper attachments are:

MultiGrip Gripper - M6 SHCS x 10mm L
DuoGrip 400 - M6 SHCS x 40mm L
DuoGrip 2000 - M8 BHCS x 14mm L
ZPS Gripper - M6 SHCS x 14mm L

V E R S A **B U I L T**

ABOUT US

FAQs

PRODUCTS

IP/LICENSING

VIDEOS

RESOURCES

SUPPORT

PRICE SHEET

BLOG

MANUALS

+ Automation System - Installation Overview Manuals

— Automation System - Robot and Gripper Installation Manuals

- [Robot Installation on VersaCart](#)
- [Gripper Valve Kit Installation](#)
- [Robot Power-Up and Configuration](#)
- [Robot Gripper Tube Routing Manual](#)
- [MultiGrip Gripper Overview & Robot Installation Manual](#)
- [DuoGrip Gripper Overview & Robot Installation Manual](#)

VSC Installation & Configuration

Section 5

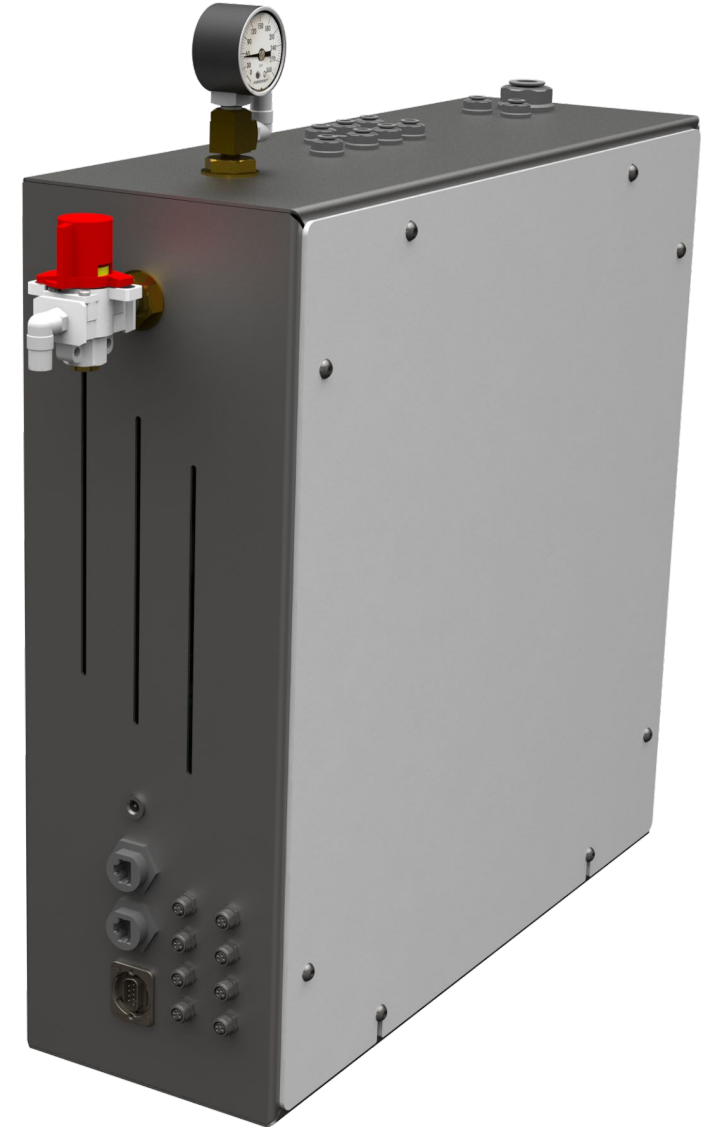
VSC 1.0 Installation

Parts:

- VersaBuilt System Controller (VSC)
- 5 Port Ethernet Switch
- Router
- 110 VAC to 24VDC Power Cable
- Cycle Start Cable
- 1-Foot Ethernet Cable
- 2 x 20-foot Ethernet Cables
- Shut-off valve assembly
- Supply Pressure Gauge
- Vise Pressure Gauge
- DIN Rail with mounting hardware
- Adhesive-back Rubber Pad
- 4 x 1/4" to 5/32" reducer fittings
- VSC Enable Button with magnetic mount and I/O cable (connecting to B2)

Tools:

- Tape Measure
- Level
- Hand Drill
- 0.22" (7/32") or equivalent drill bit
- 3mm Hex Allen Key
- 8mm open-end wrench
- 9/16" open-end wrench
- 7/8" open-end wrench



VSC 1.0 Installation

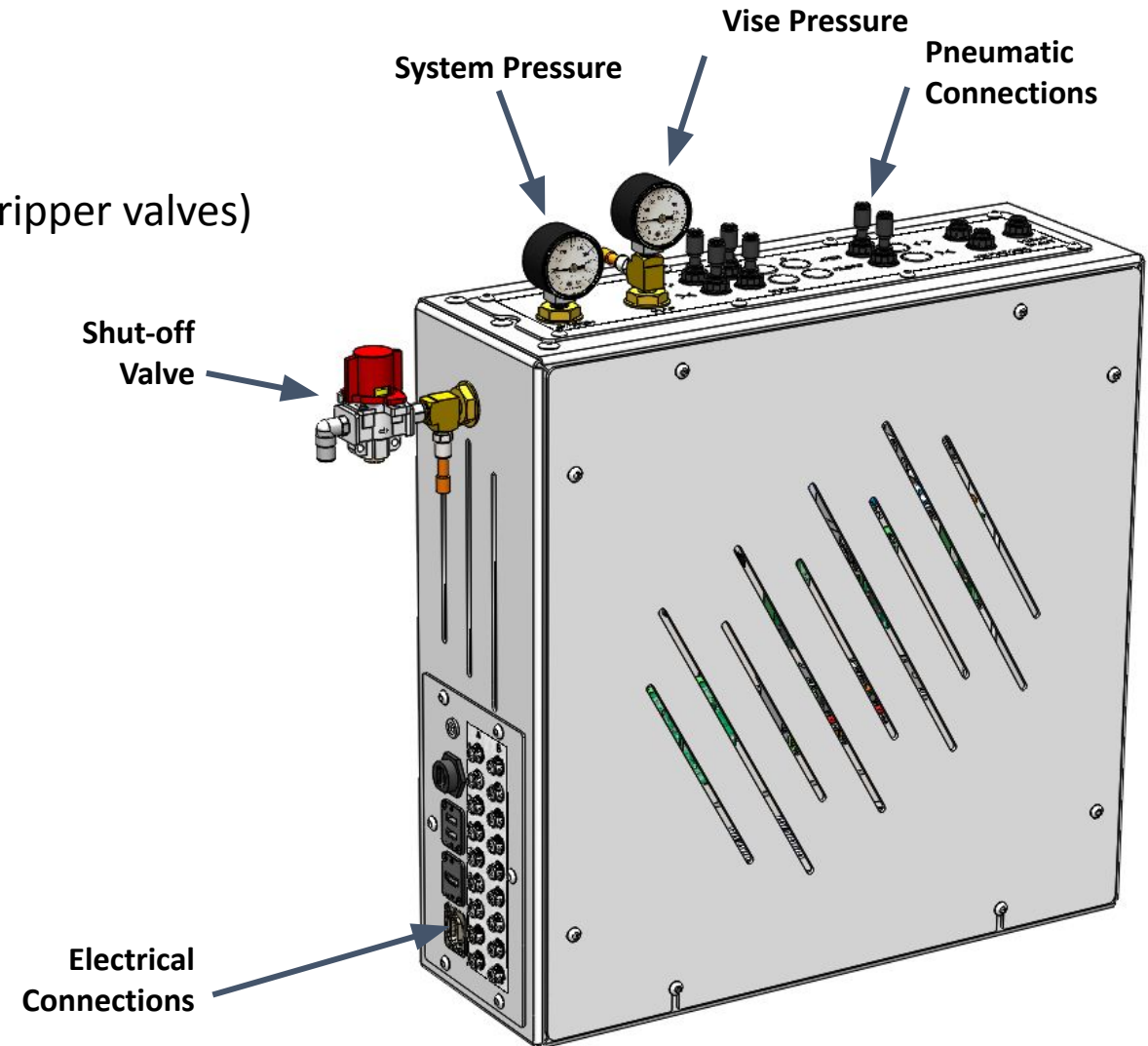
Steps:

1. Familiarize yourself with the connections
 - Air input to shut-off valve
 - Bypass air connection to supply air to UR controller (Gripper valves)
 - Electrical connections
 - Pneumatic connections

All tubing and cables for the application are pre-connected and wrapped on VSC prior to shipment, ready to unwrap and connect to peripheral devices

Refer to the **Electrical, I/O, Network, and Pneumatics Manuals** for Electrical connector map

VSC's are built for both Mill and Lathe applications. For Lathes, the Vise Pressure and Vise outputs are not used.



VSC 1.0 Installation

Steps:

2. Determine Mounting locator for panel
 - On or inside the VersaCart
 - Side of CNC
 - Top of CNC
 - Wall or Racks near CNC

Optimal location is near the right side of the CNC within 10 feet of front of CNC, allowing supplied tubing and cables to reach the peripheral devices



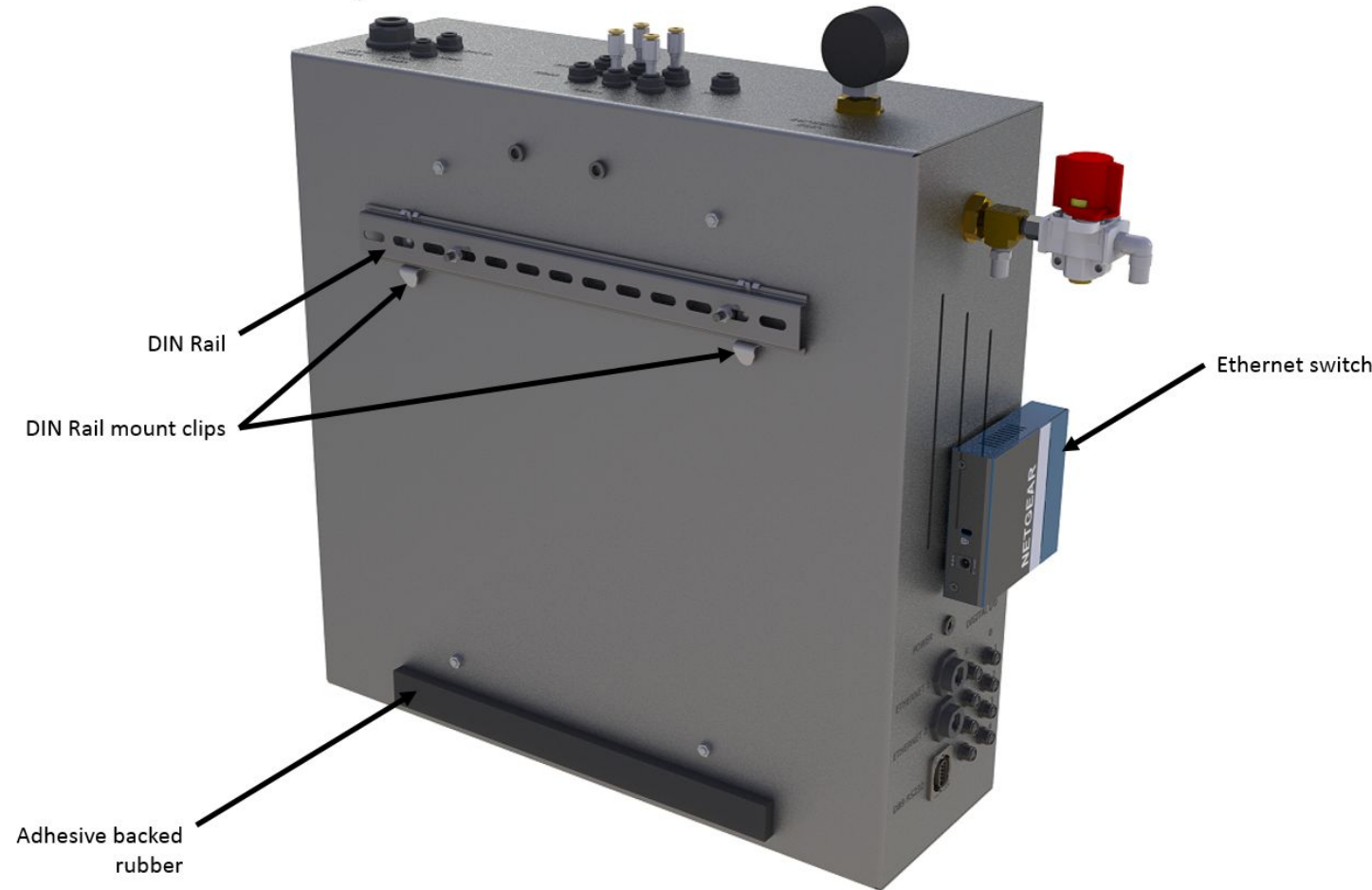
VSC 1.0 Installation

Steps:

3. **For wall mounts** - Install DIN rail with supplied M5 screws or #10 Sheet Metal Screws thru clearance slots, 0.23" wide. Attach adhesive backed rubber, with most common location shown in image to the right. Secure VSC to DIN Rail with DIN Rail Clips pre-installed on panel

Attach VersaBuilt System Controller to DIN Rail
**verify solid attachment*

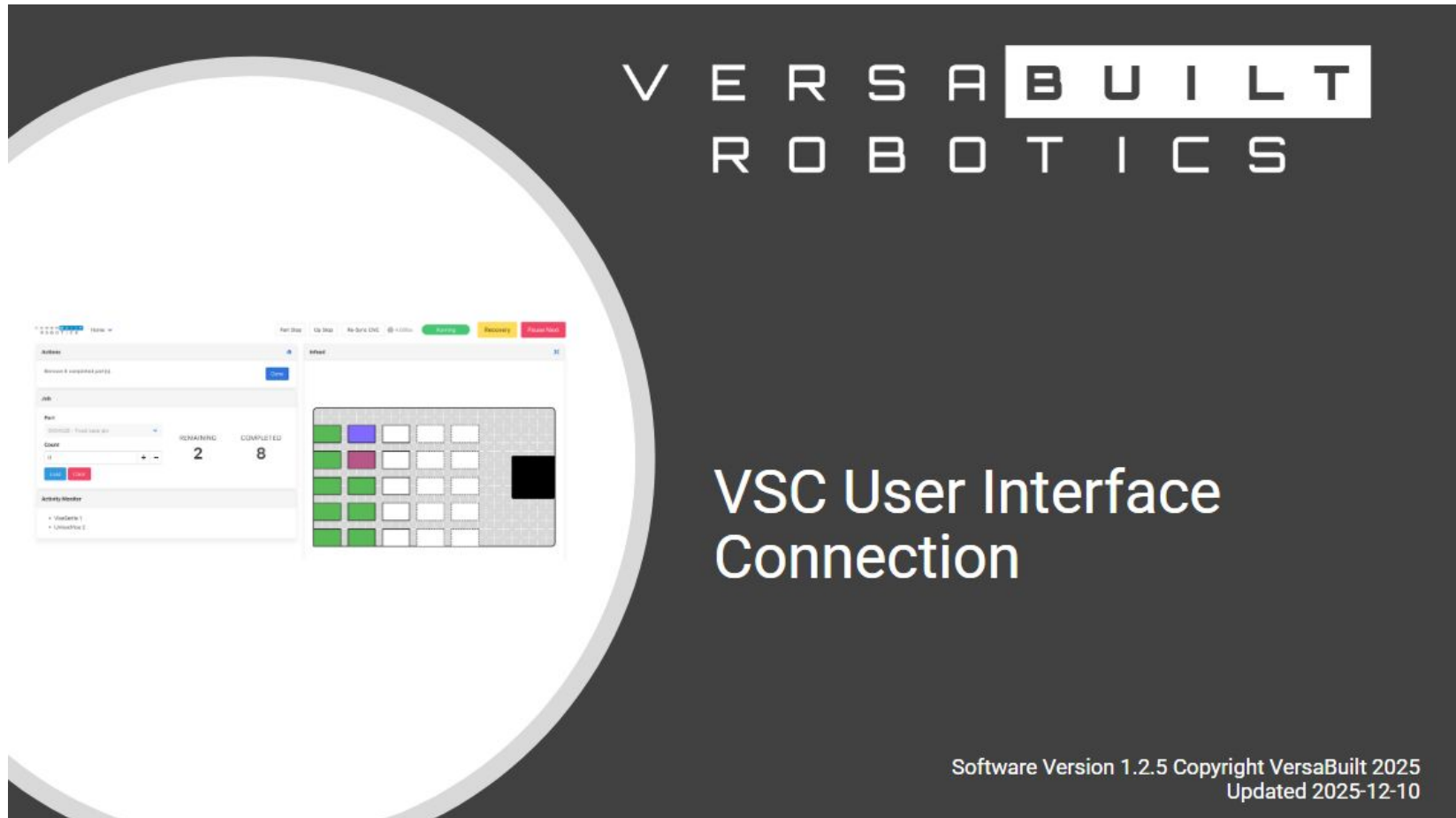
4. With adhesive backed velcro, attach Ethernet switch and router to the side of the VSC



Refer to the Pneumatics Manual for tube routing connections

VSC User Interface and CNC Connections

To setup the User Interface and setup communication with the CNC, refer to the
“VSC User Interface Manual”



VersaCart Accessory Installation

*for systems including VersaWash, Anchor Kits, Safety Scanners, or Regrip Stations

Section 6

VersaCart Accessory Installation

Refer to the individual manuals for accessories:

- **VersaWash**
- **Anchor Kits**
- **Safety Scanners**
- **Regrip Stations**

VersaCart to CNC Installation

Section 7

Position VersaCart in front of CNC*

Tools:

- 7/8-inch Wrench
- Level
- Tape Measure
- Steel Square or equivalent

*The following pages include general guidance provided for VersaCart positioning relative to the CNC.

VersaCart position should be convenient for user access to the CNC, VersaCart Infeed, and within functional reach for robot pick/place/transfer to/from vises.

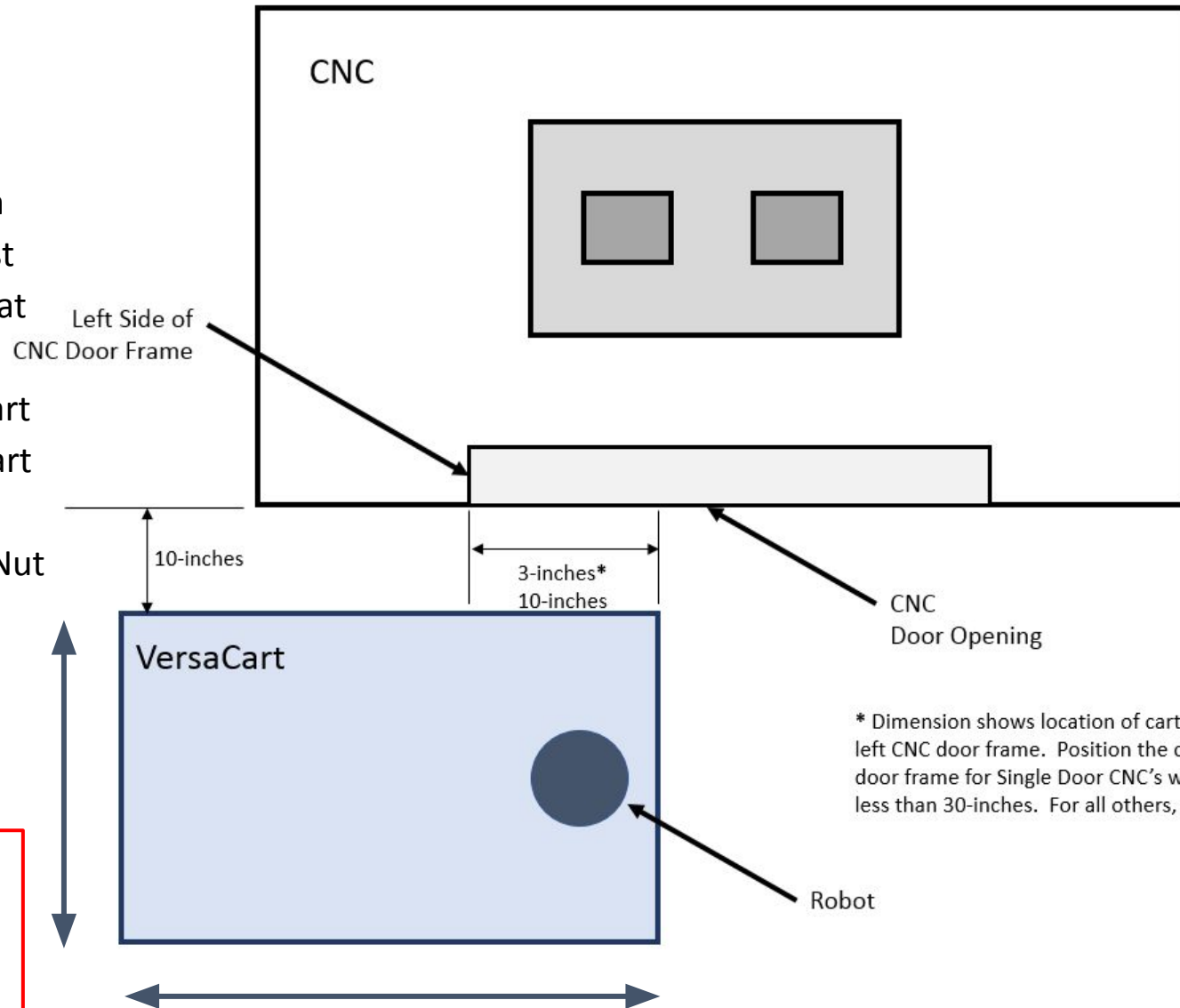
Dimensions shown on the following pages are recommended positions for 1300mm reach robots. Location of the cart relative to the CNC can vary on installation based on need, user access, and robot reach.



Position VersaCart in front of CNC*

Steps:

- Position VersaCart in front of CNC as shown on the right and following pages
- Using a 7/8-inch Open End Wrench, turn each of the leveling feet until the nearest castoring wheel is raised off the ground at least $\frac{1}{8}$ "
- Place the level on the top of the VersaCart
- Adjust the leveling feet until the VersaCart is level front-to-back and side-to-side
- Lock leveling feet in place with the Hex Nut

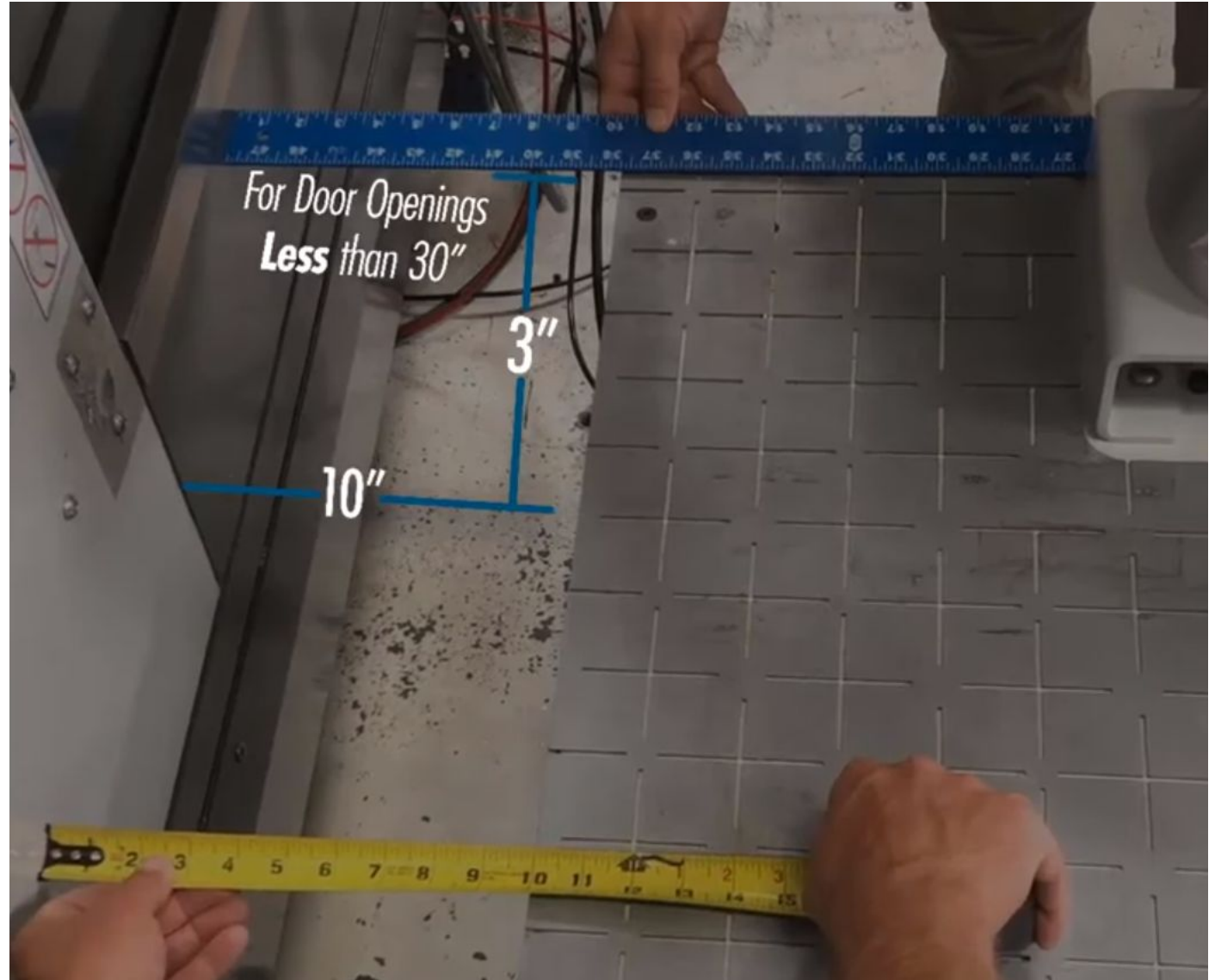


*Dimensions shown are recommended positions for 1300mm reach robots. Location of the cart relative to the CNC can vary on installation based on need, user access, and robot reach

* Dimension shows location of cart relative to inside of left CNC door frame. Position the cart 3-inches from door frame for Single Door CNC's with door openings less than 30-inches. For all others, position 10-inches.

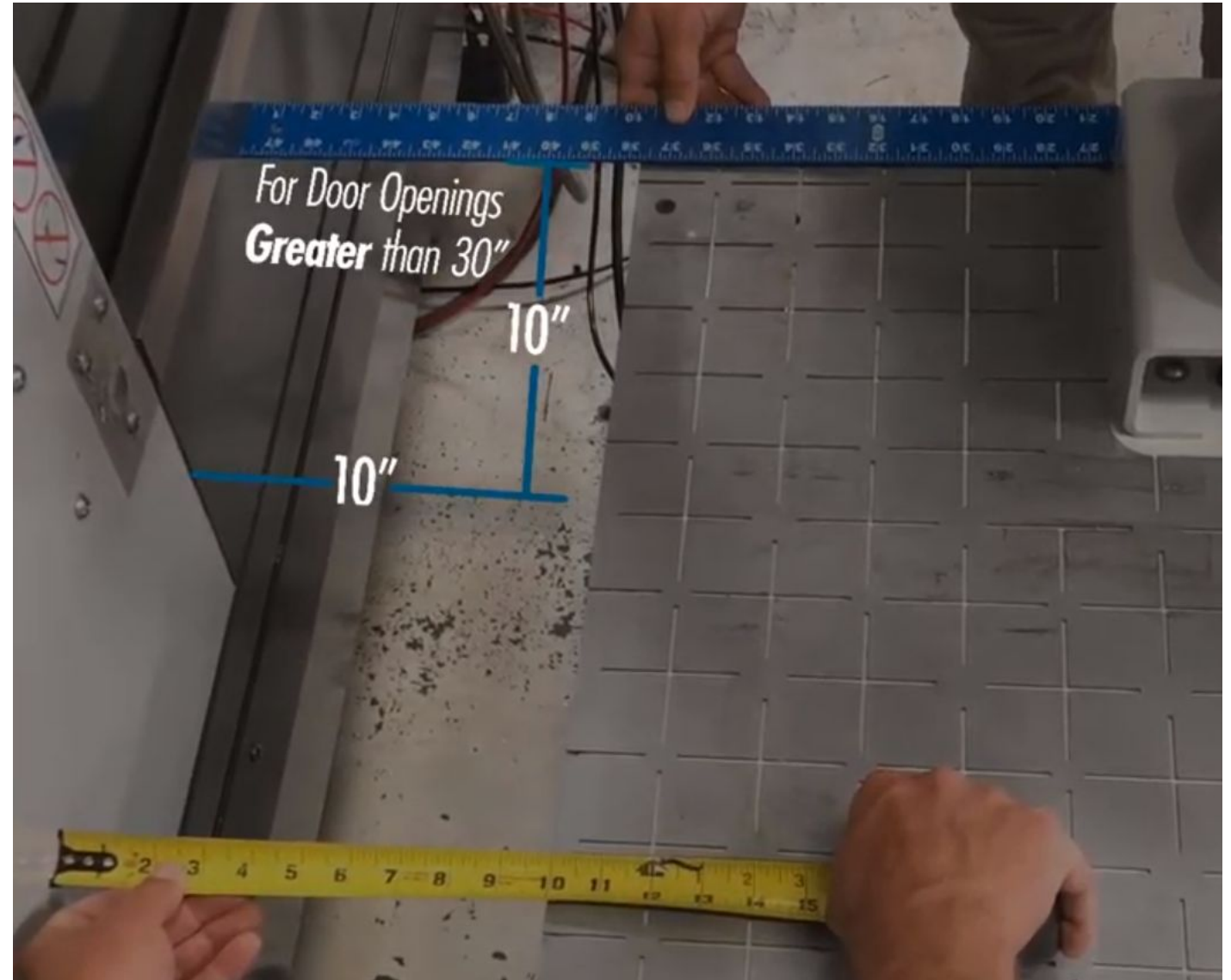
Position VersaCart in front of CNC* - *Narrow Doors*

*Dimensions shown are recommended positions for 1300mm reach robots. Location of the cart relative to the CNC can vary on installation based on need, user access, and robot reach



Position VersaCart in front of CNC* - *Wide Doors*

*Dimensions shown are recommended positions for 1300mm reach robots. Location of the cart relative to the CNC can vary on installation based on need, user access, and robot reach



Position & Lock VersaCart in front of CNC



- Use a wrench to turn the nuts closest to the footpad to lower the foot pad and raise the VersaCart
- Make sure each wheel of the VersaCart is off the ground, the VersaCart is level and all 4 foot pads are firmly on the ground
- Tighten the lock nuts against the aluminum block to keep the foot pads in place

Connect and Route Tubing and Cabling

Section 8

Tubing & Routing

A complete list of tubing is detailed in Section 2

**All air fittings are “push-to-connect” (PTC), allowing quick and easy connectivity*

***Incoming Air is the main air supply and should be conditioned air that meets ISO 8573-1:2010 [7:4:4] standard*

****Refer to Appendix A for complete Pneumatics Schematics*

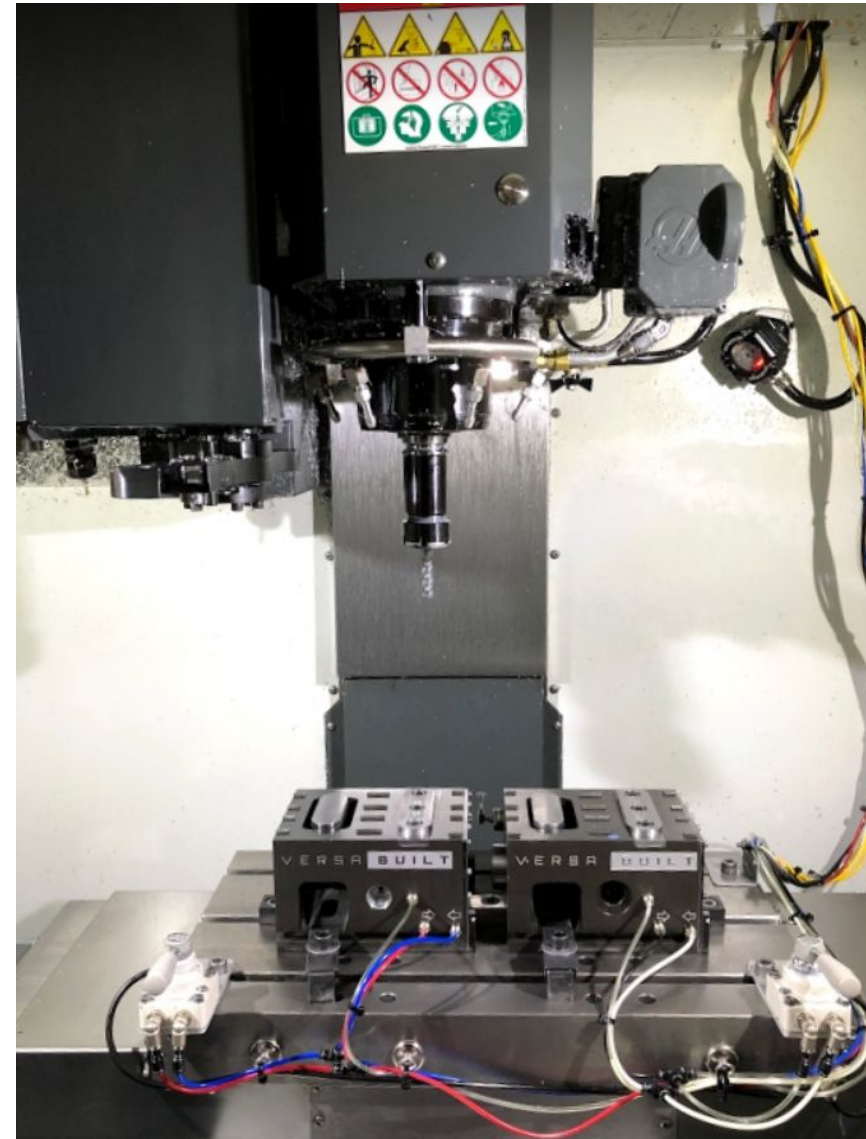
For Electrical, Network and Pneumatic Connections, refer to the individual manuals for

- Electrical
- Inputs and Outputs (I/O)
- VSC to CNC Cable Connections
- Networking
- Pneumatics

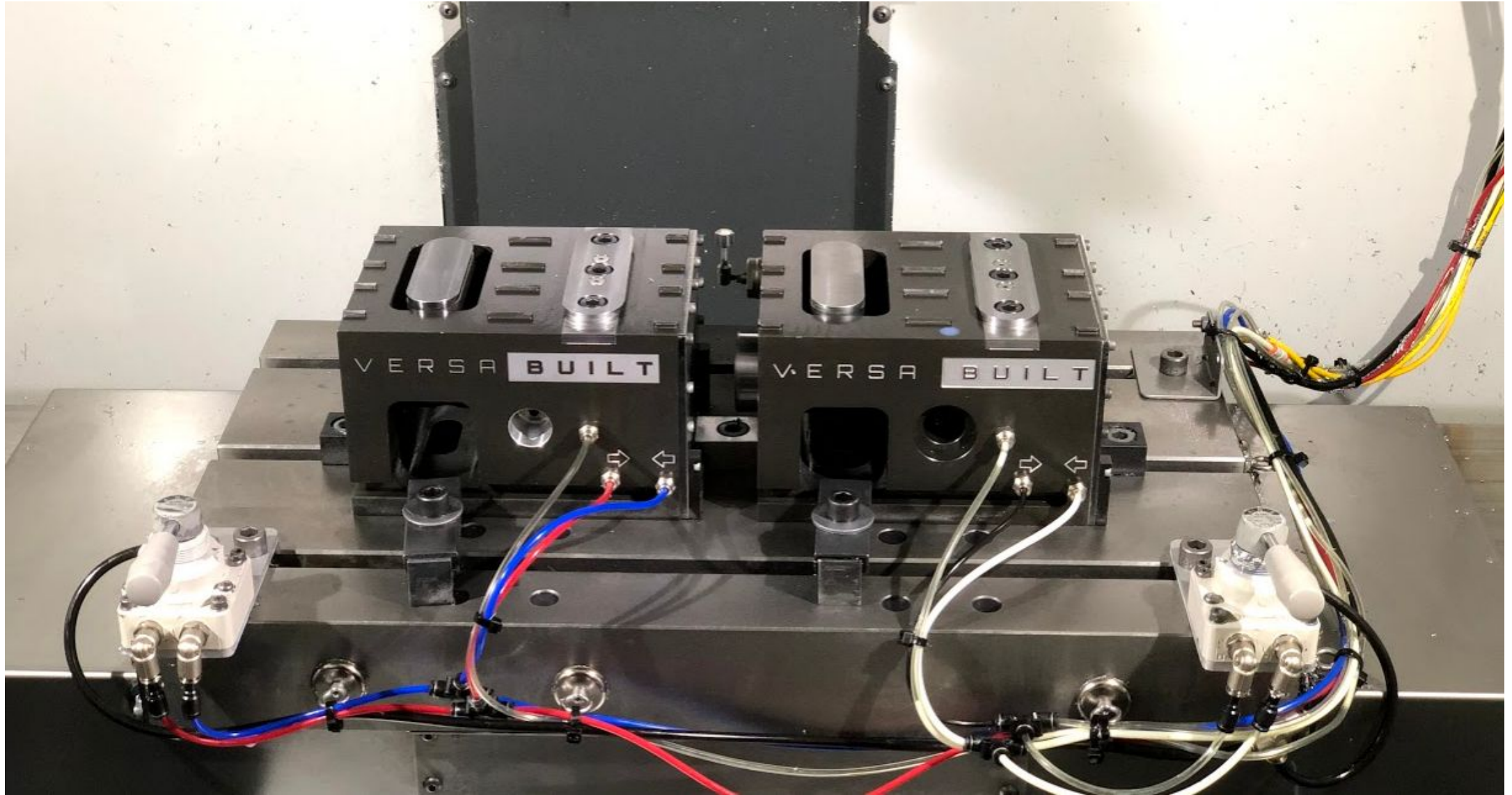
Vise Air Routing In/Out of CNC

Refer to the image to the right and on the following page for guidance on tube and cable routing inside the CNC.

- Use provided magnets with loops and cable-ties to route air-lines along the front and side of the CNC table.
- Anchor tubing and cables on the back corner of the table with the provided CNC Air Line Anchor Kit (aluminum angle, fasteners and cable-ties).
- Route air and cable lines out the top of the CNC, with lines and cables bundled and held together with cable-ties.

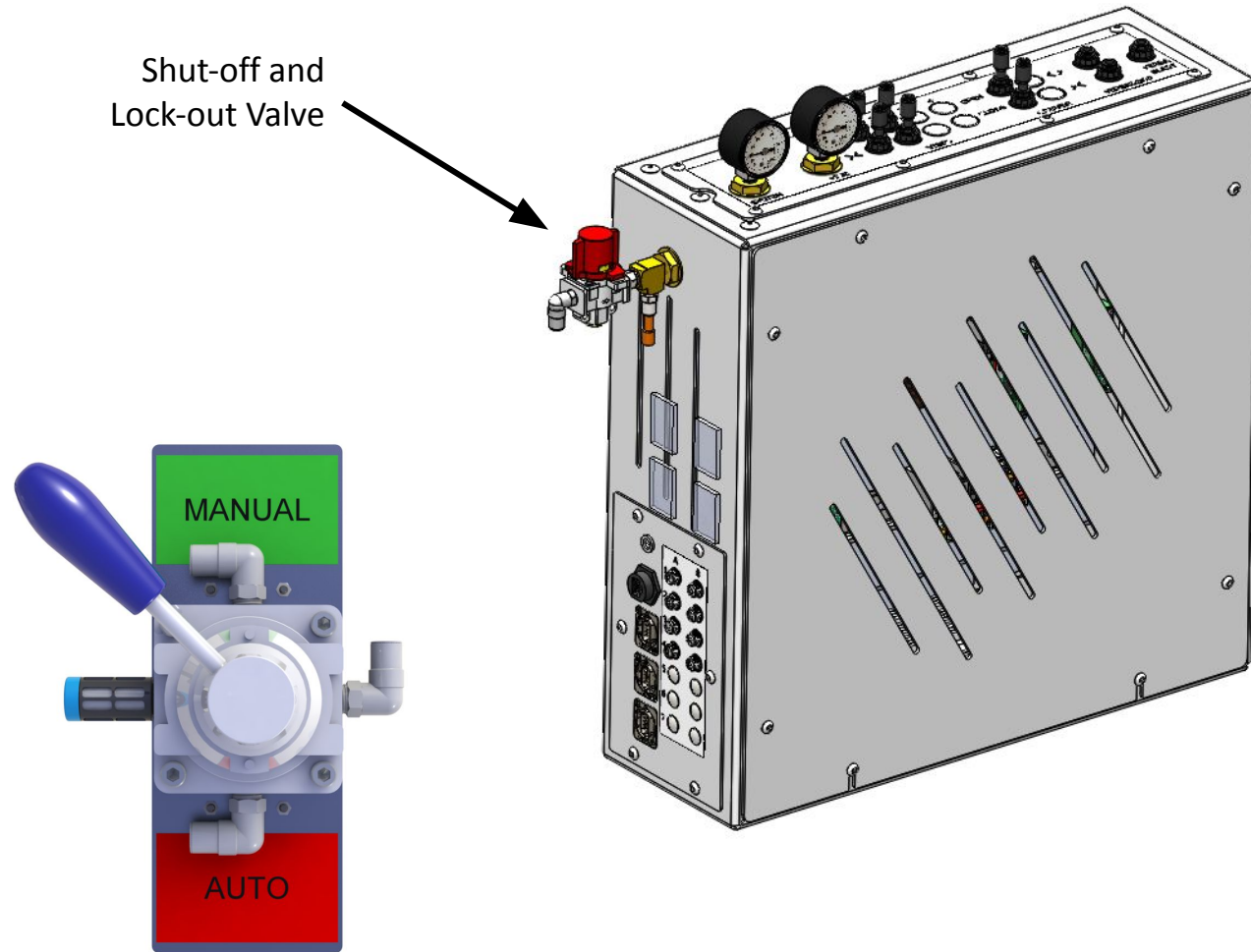


Vise Air Routing In/Out of CNC



Diverter Valve and Shut-off Valve *Mill Systems

- The Diverter Valve provides the user with the ability to shut off air to the 24VDC solenoid valves, used in automatic operation in the VSC, diverting air to manual valves in the CNC for hand loading
- To switch between Auto and Manual modes, depress the button on the valve handle and position to the labeled ends of the valve assembly
- When in Manual mode, the air gauge on the VSC should be at 0 psi, with all pressure on the automatic side relieved.
- To lock out or prevent supply of air to components, exhaust and lock-out with the Red Shut-off Valve



Connect Supply Air and Test

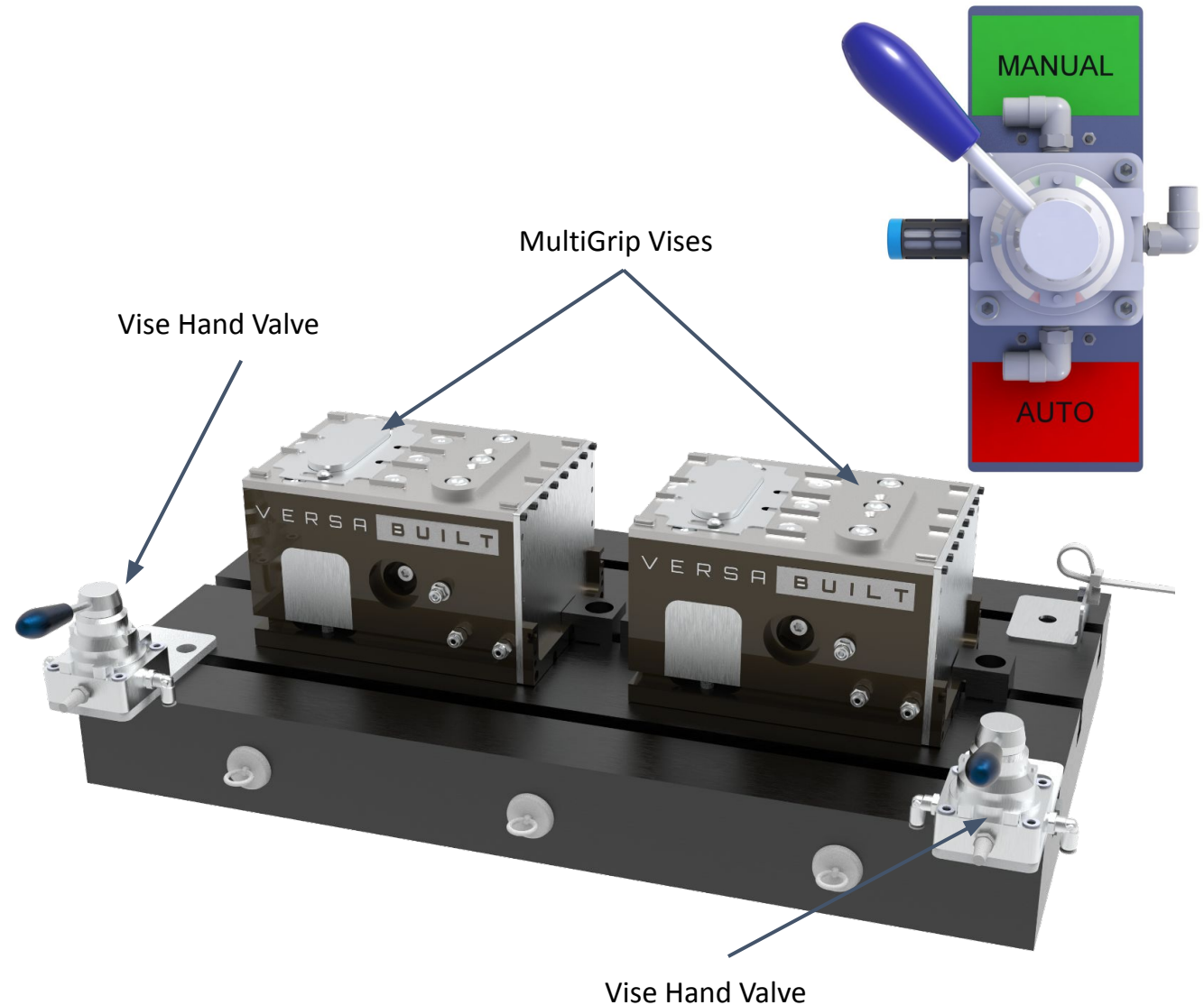
- Before connecting to Supply Air, make sure no person is in contact with the Gripper, Vises, or VersaDoor as it may close suddenly during this step.
- Ensure the Diverter Valve is set to the Green/Manual position, the CNC door is closed and that no person will come in contact with the Vises or Gripper
- Connect Supply Air, as shown in the diagram on previous pages
- Check for leaks, loose connections and fix as needed

Refer to the “Pneumatics Manual” to verify proper tube routing

Refer to the Inputs/Outputs Manual for testing and troubleshooting

Connect Supply Air and Test *Mill Systems

- With Diverter Valve in Manual Position, Test operation of Hand Valves inside CNC:
 - Verify plant air supply to the diverter valve is connected
 - Toggle the Hand Valves in the CNC and verify open/close
 - Return the Hand Valves to the Center Position
- Testing of devices can be completed with the user interface via:
 - Home Page - Recovery Panel
 - Calibration Page - Recovery Panel
 - I/O Panel Page
 - Refer to the “Electrical, I/O and Pneumatics Manual” for guidance of complete testing of components with the I/O Panel Page



Routing cables and tubing

- Secure cables and tubing to Air Line Anchor Kit (for MultiGrip Vise applications), leaving slack in all lines to prevent strain and undue stress during table movements
- Bundle lines together with cable ties and route lines out of the top of the CNC thru an access hole
- Test tube and cable length by moving the CNC table to the furthest and closest table positions relative to the access hole
- Adjust lengths to avoid tight lines at the furthest position and snags on the shortest position



Routing cables and tubing

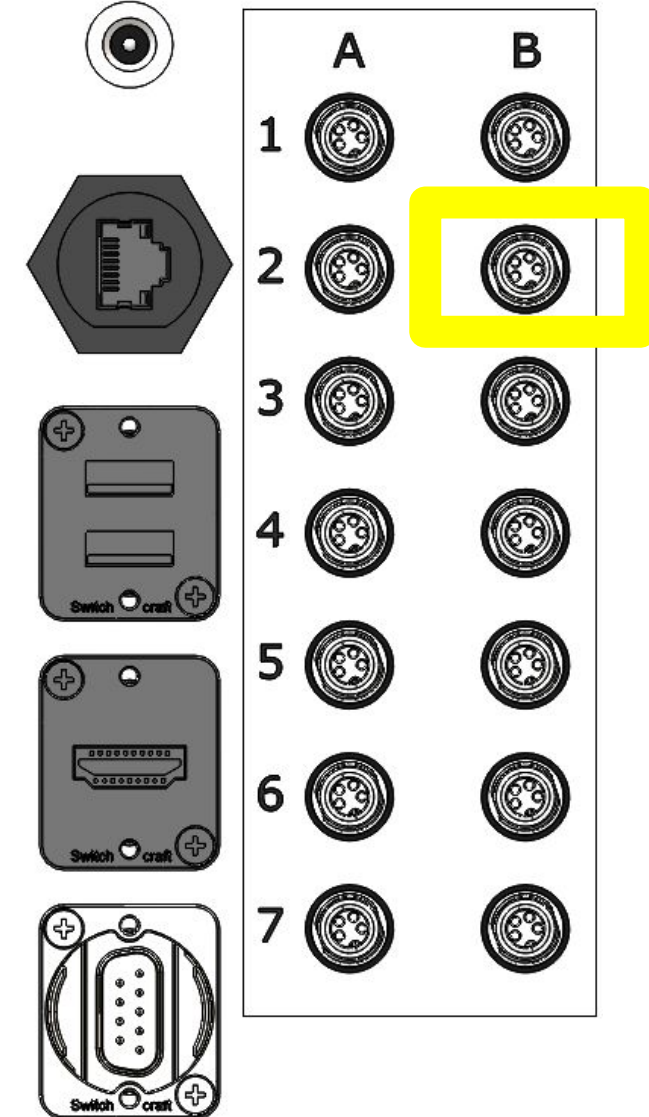
- Included with the Tubing Kit are Magnets with anchoring loops
- Use cable ties and magnets to organize and route cables and tubing on, in, and around the CNC



VSC Enable Button Installation

Installation of VSC Enable Button:

- Connect the VSC Enable Cable to Digital I/O B2 on the VSC 1.0.
- The VSC Enable Button needs to be selected within a predefined time to enable user interface selections, such as open/close of devices, Cycle Start, etc. The time interval can be edit in advanced user settings.



Refer to the “Automation System VSC Inputs/Outputs Manual” for troubleshooting

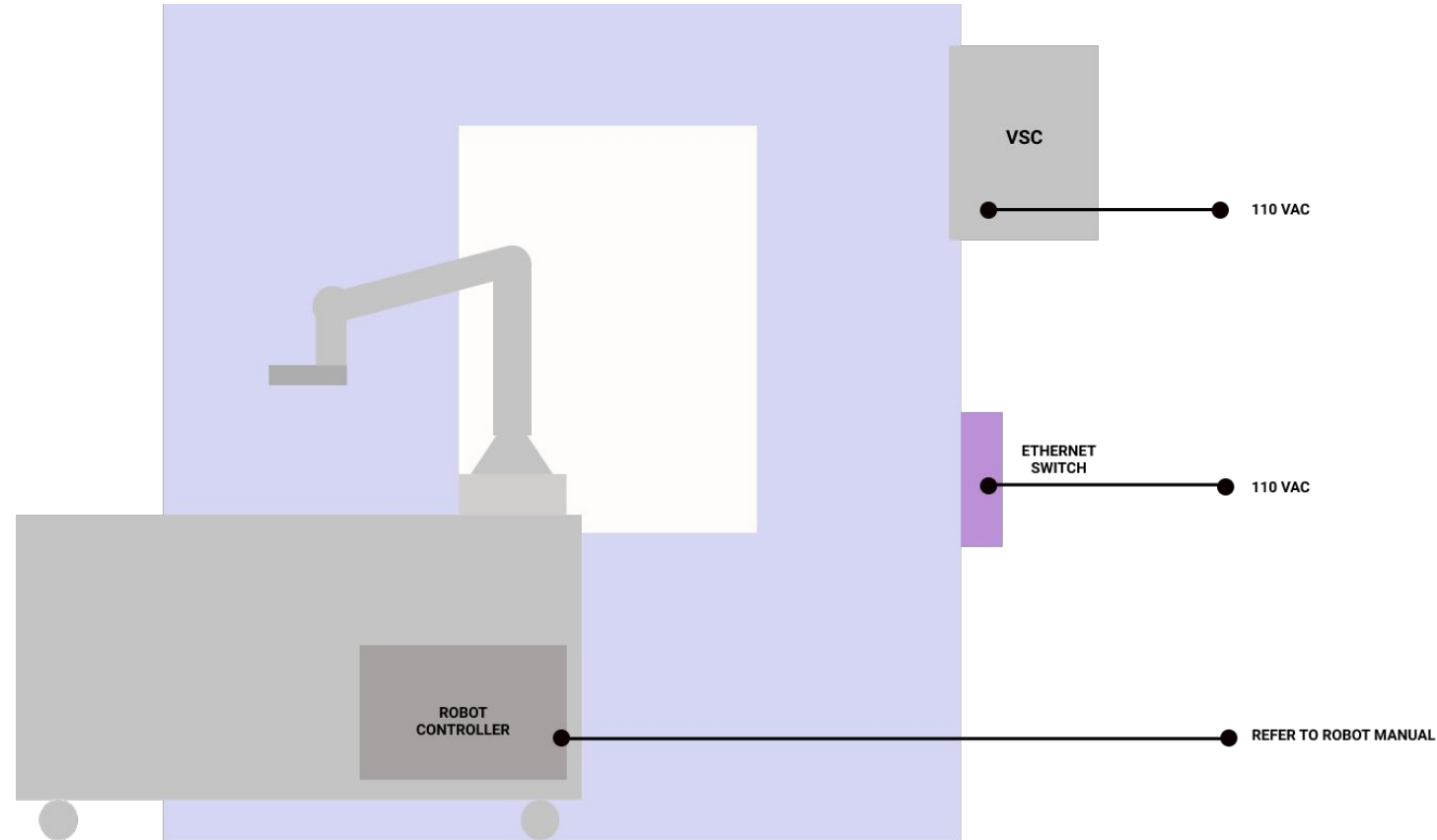
CNC Cable & Communication Connections

Connect to CNC

- Refer to the “VSC to CNC Cable Connections Manual” for:
 - Cycle Start
 - Cycle End *for non-Haas or non-Fanuc Focas 2.0 controls
 - Chuck Actuation *Lathe or Foot pedal options
 - Door Interlock Override *if applicable
 - Pallet Ready *if applicable

Connect Electrical Power

- Before connecting electrical power to the system, make sure no person within 6 feet of the robot, gripper, vises, door opener or any other mechanism capable of movement or actuation.
- Refer to the Automation System Electrical Manual
- Connect to 110 VAC for:
 - VersaBuilt System Controller (VSC)
 - Ethernet Switch
 - Ethernet Router
 - VersaWash Pump Power supply
 - Robot Controller *unless otherwise specified by the robot manufacturer



Do not use power from the CNC, as this can cause system interruptions.
Connect automation system components to separate supply.

Find and Store CNC Vise Locations

Mill Applications

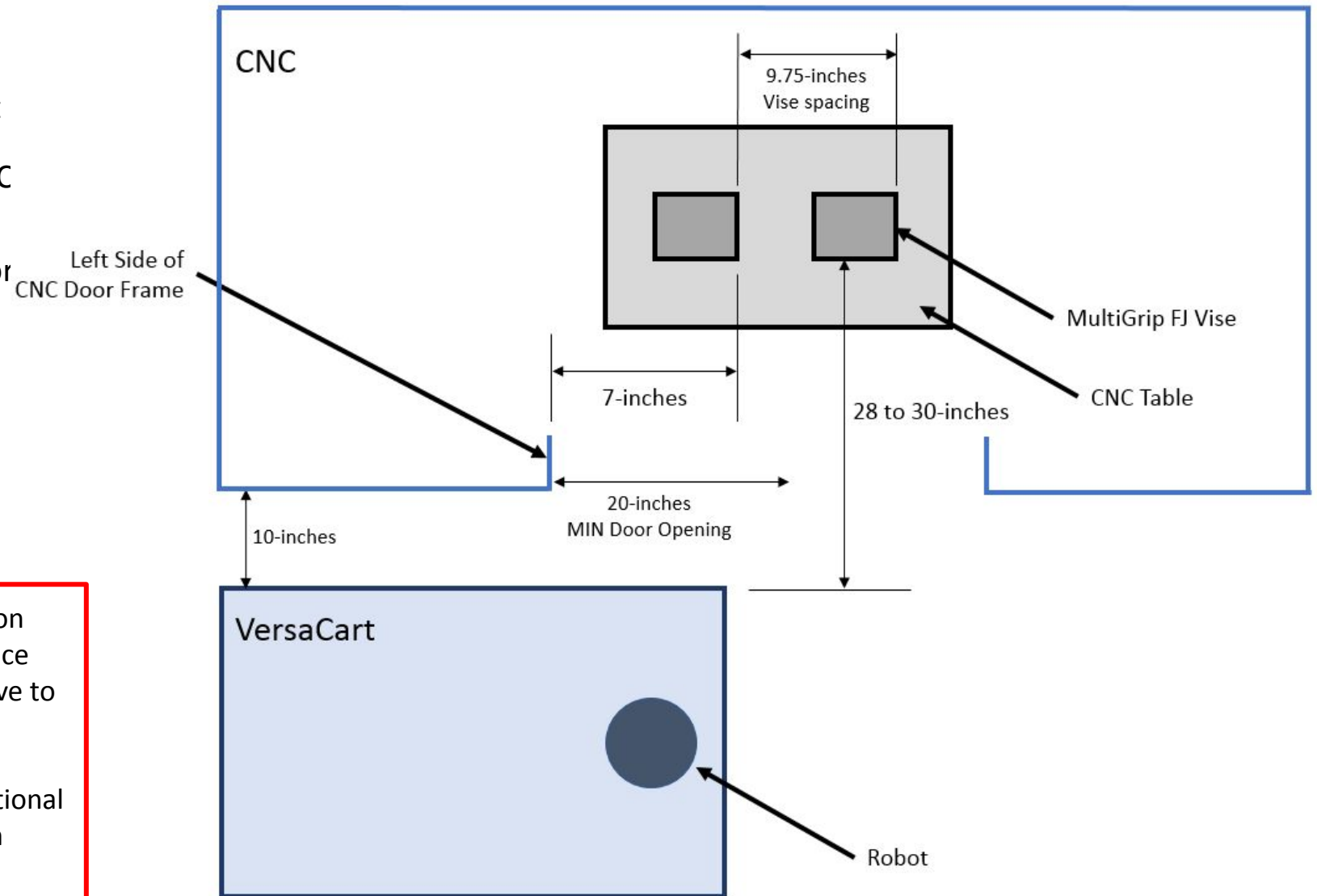
Section 9

Set CNC Table Load Position

- Open the CNC Door and move the CNC table to a table load position according to the diagram at the right
- Save the Table Load Position as a CNC home location in the CNC control, VersaBuilt recommends using G53 for the Table Load Position
- The Table Load position will be used in Section 12 when editing the table load program

The procedure above and to the right and on the following page provides general guidance provided for the location of the vises relative to the VersaCart/CNC door opening.

Table Load Positions should be within functional reach for robot pick/place/transfer to/from vises.



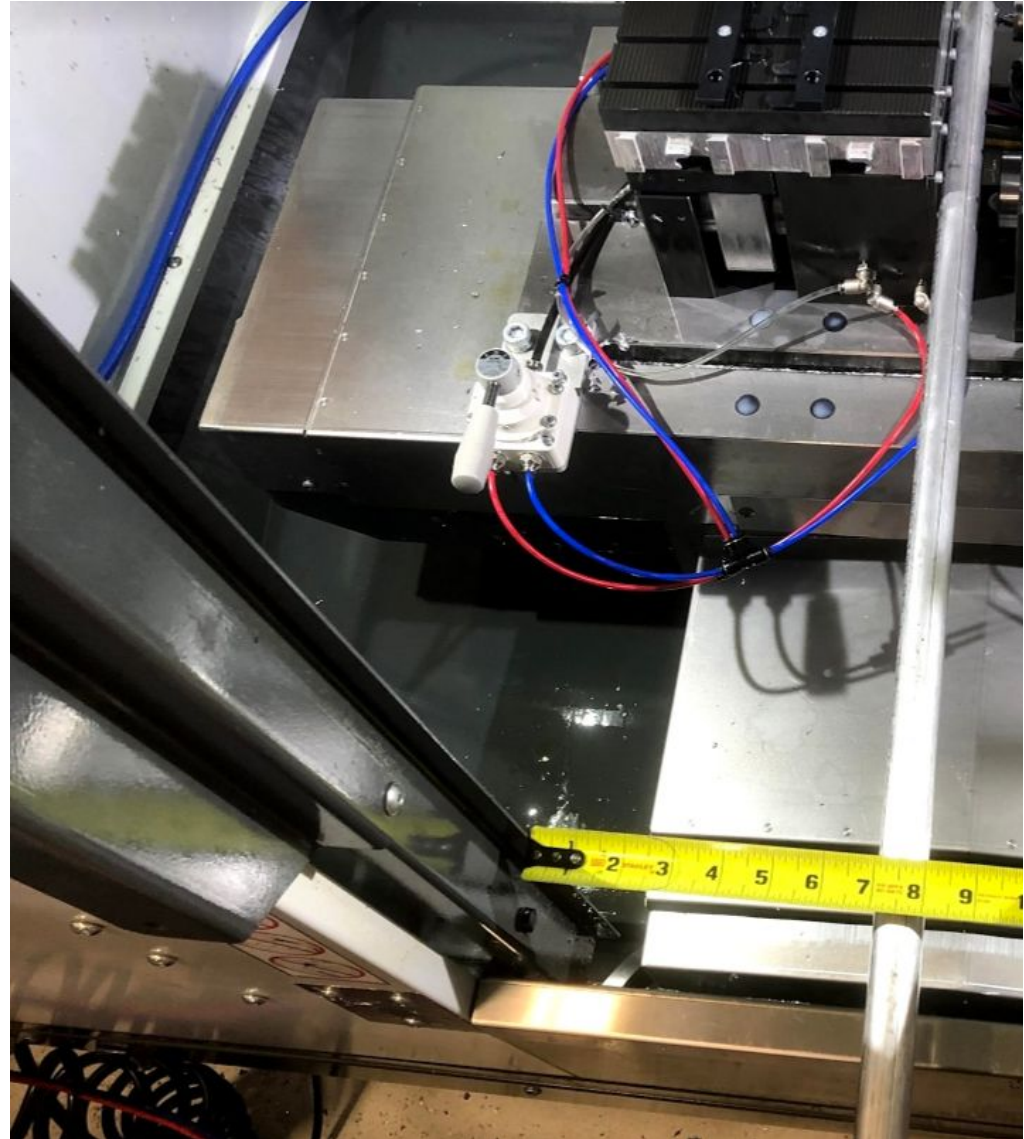
Set CNC Table Load Position

To set position of CNC Table, relative to doorway:

- Open CNC Door
- Place bar across side of Vise #1
- Measure from inside edge of the door or door frame to the inside of the bar
- The Table Load position needs to be 7-inches, as shown in the image to the right

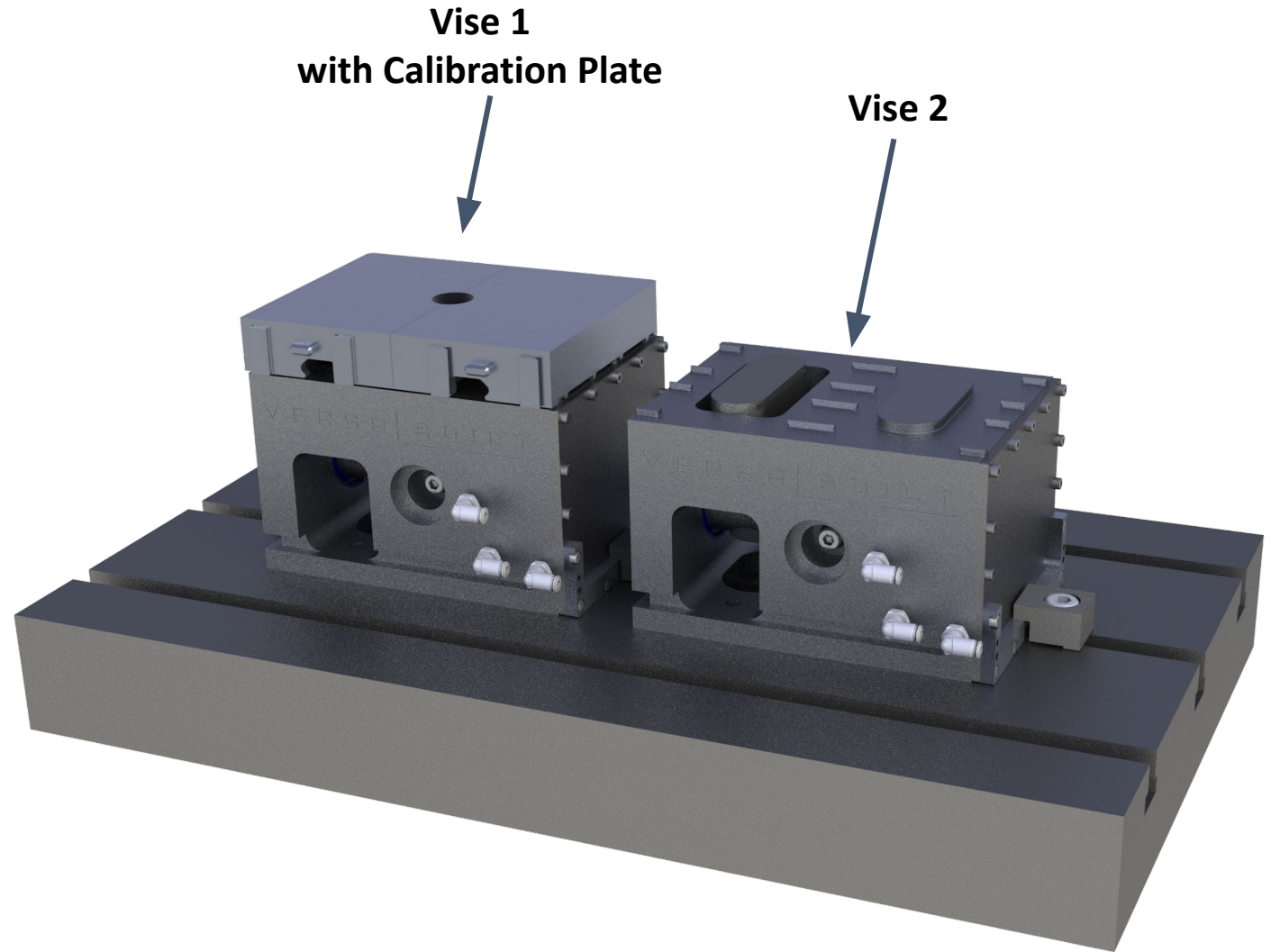
The procedure above and to the right and on the following page provides general guidance provided for the location of the vises relative to the VersaCart/CNC door opening.

Table Load Positions should be within functional reach for robot pick/place/transfer to/from vises.



Find and Store Vise Home Locations

- Place Calibration Plate on Vise:
 - With vises open, place the Calibration Plate onto Vise #1 and use the hand valve to close the vise and secure the Calibration Plate
 - Verify the Calibration Plate is fully seated on the Vise Serrations
- Use a spindle probe or indicator to find the center of the hole for XY
- Repeat the process for the second vise
- Store each vise home location in the CNC control
- The vise home locations will be used in the Vise Wash program in Section 12



Calibrate and Validate System

Section 10

Calibrate and Validate System

Calibration

- Refer to the Automation System Calibration Manual
 - VersaCart with MultiGrip
 - VersaCart with DuoGrip
 - Vise with MultiGrip
 - Chuck with DuoGrip
 - InCNC position
 - Bin Drop position
 - DuoGrip Regrip
 - ZPS Infeed and Chuck Calibration

Part specific calibration, completed in the Part Configuration step for Shaft processing or custom pick and place positions for DuoGrip Pucks and Shafts is detailed in the Configuration Manual



VERSABUILT ROBOTICS