VERSABUILT ROBOTICS

VBX-160
OPERATORS MANUAL

DOCUMENT #D10079
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TABLE OF CONTENTS

TABLE OF FIGURES

QUICK START GUIDE

Status/Control Buttons Key

The Control Buttons appear in the upper right corner of the VBX-160 (VBXC). The Control Button display will change based on the current state of the VBXC. The Control Buttons are operable independent of other activities on the screen except when specific dialogs are displayed.

Cycle Start	**Cycle Start:** This button is visible when the system is in the Feed Hold state. It is used to start or continue processing.	Recovery	**Recovery:** This button is available when the system is in the Feed Hold state. The operator uses this button to manually initiate recovery mode to clear the current processing state of the VBXC. It will cause parts and MultiGrip vise jaws, held by the robot or in vises, to be canceled. Recovery resets communication with the Robot and CNC. and will reset the robot should it become unresponsive.
Cycle Start	**Cycle Start (Grayed Out):** If the VBXC is not able to cycle start the robot, the Cycle Start button will be a light green color. The typical cause of the Cycle Start button being disabled is an open door or a pivoted VBX-160.	Reset	**Reset:** This button appears in Recovery mode. Clicking this button will clear any pending robot motions and resets the robot back to a starting state.
Feed Hold	**Feed Hold:** This button is visible when the system is processing and used to pause processing. When Feed Hold is initiated, the VBXC will stop sending actions to the robot and CNC. The CNC will complete the current action before stopping.	Enable	**Enable:** This button appears in Recovery Mode. This button will enable robot and CNC commands. When Enable is clicked, the button will change to Pause.
Pause	**Pause:** This button appears in recovery mode after the enable button has been clicked. Clicking on pause will pause the robot and CNC commands. When Pause is clicked, the button will change to Enable.	Enable	**Enable (Grayed Out):** This button appears in Recovery mode and is an indicator that the robot cannot be started. Possible causes are: safety switches or doors are not closed.

Status Icon Key

The status icons appear at the top of the screen to the left of the control buttons. Status icons communicate the status of the VBX-160.

	**Op-Stop Disabled:** Continuous mode. Click icon to cycle through Op-stop modes. Robot will run jobs and parts until job completes.		**Error Action:** An error has occurred. Refer to the Action Panel for tasks related to the error.
	**Op-Stop Enabled:** Single Op enabled. The VBXC will feed hold itself when a milling Op has finished processing. Click icon to cycle through Op-stop modes.		**Running:** The system is processing parts. This icon will be present when the VBXC is processing parts from the rack. It remains present in the feed hold state.
	**Op-Stop-Part Stop:** Part Stop enabled. The VBXC will feed hold itself when a part finishes processing.		**Robot Speed:** Shows current speed of the robot.
	**Rack Light On/Off:** Click on the light bulb to turn the rack lights on or off, Black light bulb indicates that light is turned off. White light bulb indicates that the light is on.		**Vise Pressure:** Shows the current pressure for the vises. The vise pressure for each operation can be adjusted in part configuration. When the system is in an idle state, the vise pressure can also be adjusted by double-clicking this icon.
	**Safety Circuit Closed:** The VBX-160 safety circuit is closed. This status is required to move the robot or cycle start VBX-160.		**Safety Circuit Open:** The VBX-160 safety circuit is open. This is caused by VBX-160's door or pivot sensors being activated. The VBX-160 cannot begin processing until the safety circuit is closed.

Shelf Slot Color Key

Red - Error Slot has an error	**Blue - Transferring** Part is on the shelf waiting for Op-to-Op transfer.
Blue Violet - Waiting Slot has a part or MultiGrip vise jaws on the shelf waiting for processing	**Green - Part Done** Part is complete, on the shelf waiting to be unloaded
Purple - Holding The part or MultiGrip vise jaws is held by the robot	**Yellow - Canceled** Part is canceled and held by the robot
Bright Pink - Milling The part or Multigrip vise jaws from the slot is currently milling	**White - Empty** Slot is empty
Mauve - In-Vise A part is in the vise	

Stack Light Status Key

The stack light on the roof of the VBX-160 indicates job status as follows:

Illuminated Green: Running	Illuminated Red and Flashing: Error has occurred
Illuminated Green and Blinking: Running, but in feed hold	Not illuminated: Idle

THE VBX CONTROLLER

The VBX Controller (VBXC) is the operator interface for controlling the VBX-160 system and the CNC. The VBXC has five primary screens: Operation, Configuration, Support, Logs, and About. The operator works primarily with the Operation Screen to enter and run jobs.

Tool Tips: Hover the mouse pointer over the various symbols and sections of the screen, and a pop-up tip appears and describes the element.

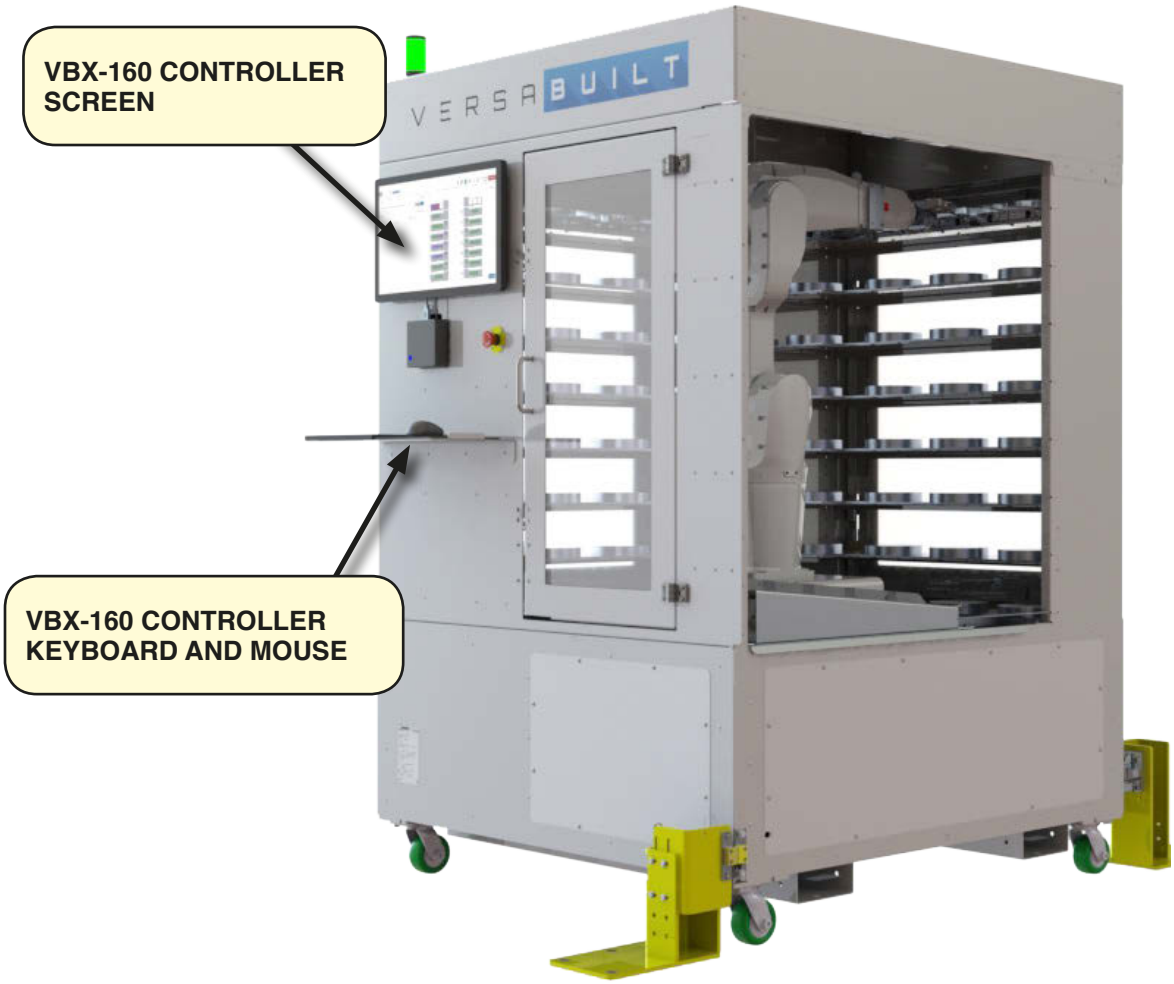

FIGURE 1. VBX-160

VBXC OPERATION SCREEN OVERVIEW

The primary screen used by the operator is the Operation Screen. Using this screen, the operator manages jobs and controls processing with the VBX-160. The Operation Screen is accessed via the screen selection menu. The Screen contains 4 panels: Status/Control, Actions, Active Jobs, and Racks.

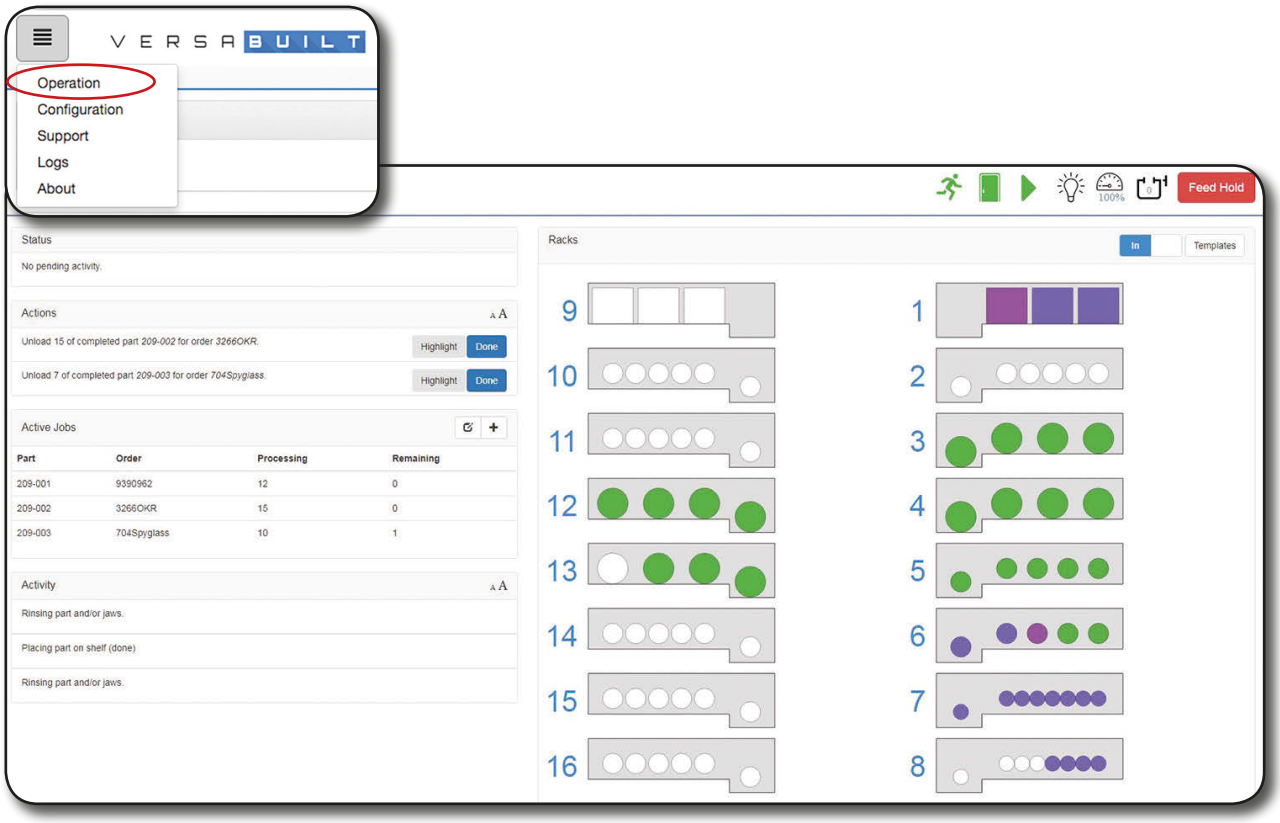

FIGURE 2. OPERATIONS SCREEN

Status/Control Panel

The Status/Control Panel appears at the top of all VBXC screens. The buttons that appear may change based on the current state of processing. The figures below show an example of the Status/Control panel buttons in various states of processing.

Note: Refer to Quick Start Guide (Page 3) for a complete description of the Status/Control Panel buttons

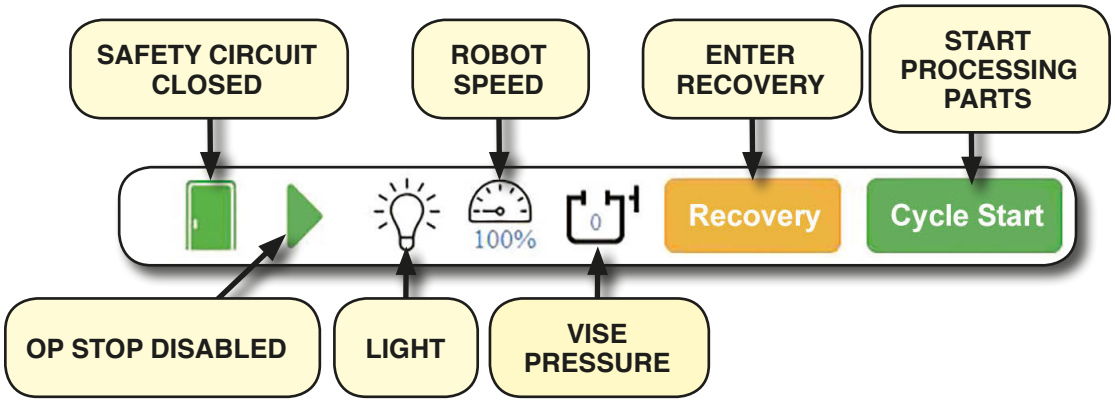

FIGURE 3. CONTROL PANEL

Racks Panel

The Racks Panel displays the current configuration of each shelf and each slot of each shelf in the VBX-160 racks. The Racks Panel allows the configuration of each shelf's pick template to be changed and the view of the rack to be changed. Click on the Templates button to brings up the Shelf Template Selection dialog. Pressing the In or Out button changes the view of the racks. The In view shows shelves from the inside of the VBX-160 looking outwards. The Out view shows shelves from the outside of the VBX-160 inward.

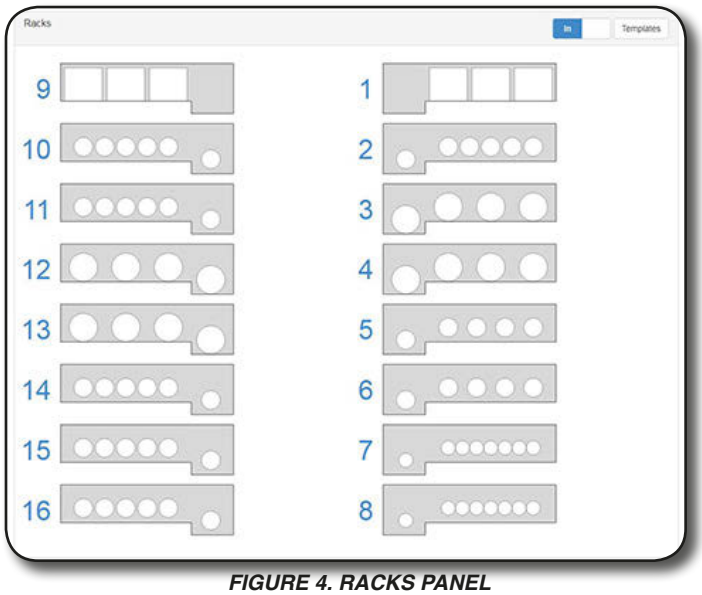

FIGURE 4. RACKS PANEL

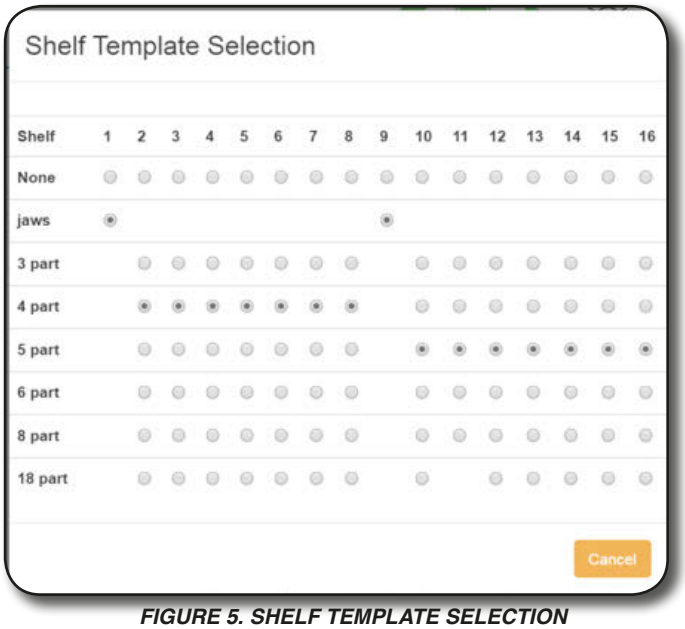

FIGURE 5. SHELF TEMPLATE SELECTION

The VBXC uses symbols and colors to show the status. of each slot in the Racks Panel, including the current location of MultiGrip vise jaws and parts.

MultiGrip vise jaw slots: represented by rectangles on shelves 1 and 9	Part slots: represented by circles on shelves 2-8 and 10-16
• MultiGrip soft jaws in vise: Mauve • MultiGrip soft jaws on shelf: Violet • MultiGrip soft jaws in gripper: Purple • MultiGrip soft jaw slot is empty: White • MultiGrip soft jaw transferring: Blue • MultiGrip soft jaw error: Red • MultiGrip soft jaw canceled: Yellow	• Part waiting in slot: Violet • Part is milling: Pink • Part on shelf ready to unload: Green • Part slot is empty: White • Part held by robot: Purple • Shelf transfer: Blue • Part error: Red • Part canceled: Yellow

FIGURE 6. VISE JAW SLOTS

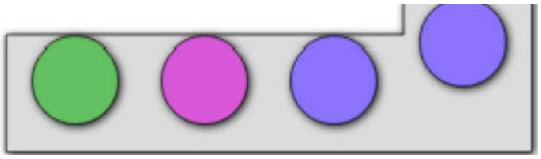

FIGURE 7. PARTS SLOTS

Actions Panel

The Actions Panel displays a list of actions for the operator to perform in order to keep the VBX-160 processing. Actions appear as tasks, and the tasks are color coded to indicate their urgency.

- A task highlighted in red (Figure 9) in the Actions Panel stops production until the red task is completed
- A task with a white background in the Actions Panel needs to be done, but it is not urgent, a white task will not stop the processing
- A task highlighted in yellow is not urgent and will not immediately stop the processing, but it could cause processing to stop if it is not addressed soon
- When the task is complete, selecting the Done button next to the task will remove the task from the list and inform the VBXC that the task is complete
- If a task references shelf slots, clicking on the Highlight button will put a blue highlight in the Racks Panel around the slots or symbols that are associated with that particular task
- Change the size of text by clicking on the AA button

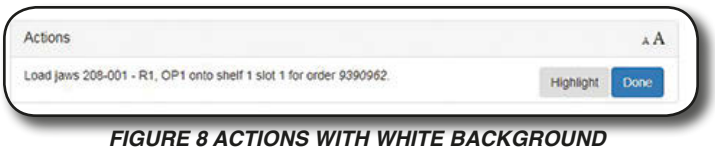

FIGURE 8 ACTIONS WITH WHITE BACKGROUND

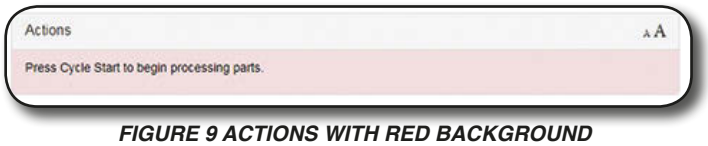

FIGURE 9 ACTIONS WITH RED BACKGROUND

Active Jobs Panel

The VBXC lists and manages jobs in the Active Jobs Panel. The operator can enter new jobs, cancel jobs and review current jobs in the Active Jobs Panel. Jobs are processed in the order that they are entered in the VBXC.

The following information is entered or displayed in the Active Jobs Panel:

- Order: an identifier for the job
- Part: identifies the part number of the part being processed
- Processing: identifies the number of parts that are currently running in the VBX-160
- Remaining: identifies the number of parts that are waiting to be loaded into the VBX-160

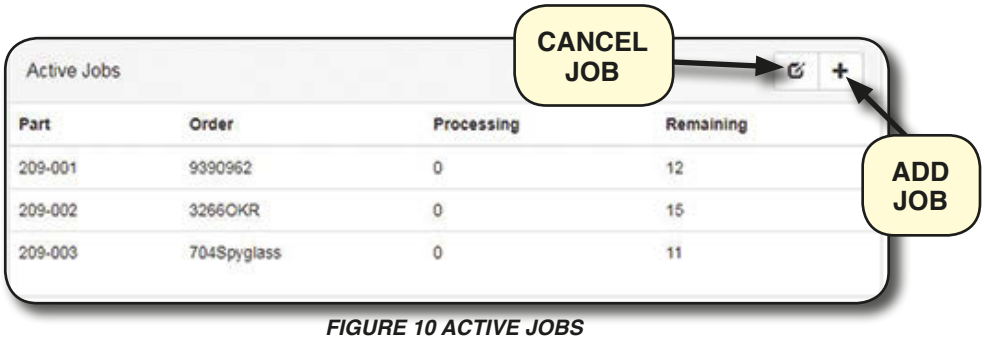

FIGURE 10 ACTIVE JOBS

VBX-160 JOB PROCESSING

The VBXC is designed to make it easy for the operator to schedule new jobs for processing. The VBXC part configuration database keeps track of each part's requirements for processing in the VBX-160 and allocates space in the VBX-160 for the part's MultiGrip vise jaws and raw materials. The VBXC is capable of processing multiple parts simultaneously and will automatically switch between jobs without operator intervention unless the operator is needed to load or unload parts, raw material or MultiGrip vise jaws in the system.

The VBXC keeps track of the following data for each part configured in the system:

1. MultiGrip vise jaws used to process the part
2. Part processing configuration information:
   a. Raw material description
   b. Number of operations to process the part
   c. Height of part at the start of each operation
   d. CNC programs used to process the part
   e. Job processing options, including part wash and dry, part load error checking and part settling options

> Note: Part configuration data is created in the Configuration Screen of the VBXC. The part configuration process is described in the VBX-160 Machinist Manual (VersaBuilt Document #D10008).

The VBXC does not track all data or verify all parts in the system are configured correctly to successfully process a part in the VBX-160. The VBXC does not track CNC tool requirements for each part configuration. The operator must manage tool dependencies for each part and schedule jobs in the VBXC accordingly. The operator will need to verify and configure the following to successfully process each part in the system:

1. CNC cutting tools required for the part are installed, measured and have adequate tool life
2. CNC programs required to process the part are loaded into the CNC

> Note: While one job is processing in the VBX-160, do not schedule another job for processing that requires tools to be changed in the CNC. If the job requiring a CNC tool change is scheduled in the CNC, the VBX-160 will begin processing the new job without the correct tools installed in the CNC potentially causing damage to the CNC or VBX-160.

Steps to take prior to processing parts with the VBX-160:

1. Read the VBX-160 Safety Manual (VersaBuilt Document #D10002)
2. Read the VBX-160 System and Maintenance Manual (VersaBuilt Document #D10013)
3. Verify that the rinse tank is filled properly with clean solution and is free of chips
4. Verify that the MultiGrip vise, the MultiGrip vise jaws and the MultiGrippers are free of chips and do not show signs of wear
5. CNC door pathway is free of chip build up
6. Interior of CNC is free of excessive chips that could affect the processing of the system
7. Chip outfeed systems are enabled and have sufficient capacity to handle the parts to be processed
8. Make sure there is sufficient CNC consumables, such as coolant, to process parts
9. VBX-160 is in the locked position
10. The VBX-160, the VBXC and the CNC are powered on and ready to run
11. The VBX-160 has air supply and the air supply is in automatic mode
12. Be prepared with specific job information, including:
    a. Order ID
    b. Part #
    c. Part quantity

Job Processing Steps

The processing of new jobs in the system consists of the following steps:

1. Ensure the CNC is loaded with the necessary tools and programs to process the job
2. Add the new job to the VBXC
3. Complete all required VBXC Actions and press Cycle Start to begin processing parts
4. Unload completed parts and MultiGrip vise jaws when prompted by the VBXC in the Actions Panel

CNC Communication

Dispatcher Standard Driver

For proper operation of the VBXC, verify the CNC Dispatcher is communicating with the VBXC.

The standard CNC driver (a machine specific driver as in Figure 11) allows full functionality of the VBXC. The VBXC will automatically switch between CNC programs, load different jobs, and machine different material without the aid of an Operator.

Generic CNC Driver / Dispatcher

If your VBXC is using Generic CNC Driver, the VBXC will not be able to automatically switch between different parts. A different CNC Dispatcher Program will need to be selected by an operator when changing parts.

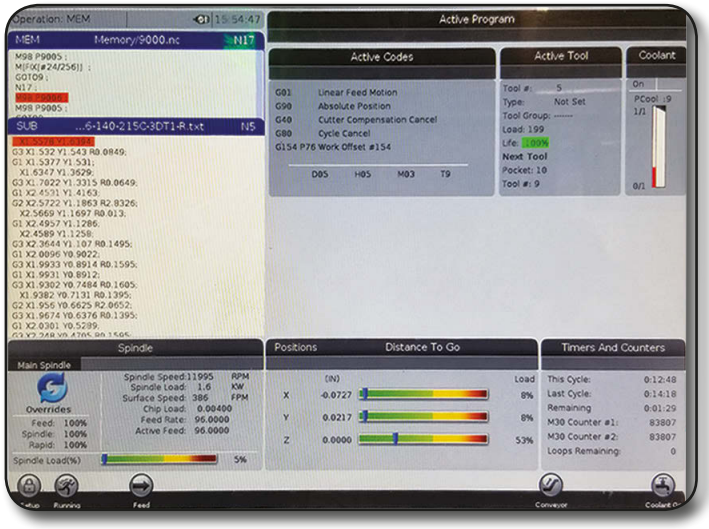

FIGURE 11 HAAS CNC RUNNING DISPATCHER

DNC Sync for Legacy Systems

1. To process jobs, the VBX-160 needs to communicate with and control the CNC. By establishing a DNC connection with the CNC, the VBXC is able to command the CNC to execute machining programs or position the CNC table for robot load or unload. When a DNC connection is required for job processing, a message will appear in the Actions Panel.
2. To complete the DNC process, DNC mode must be initiated on the CNC control. Instructions for how to initiate DNC mode can be found in the documentation included with the CNC.
3. Press the Cycle Start button on the CNC as instructed in the actions panel. If the operation is successful, the DNC Connected icon will appear in the Status control panel.
4. If an error message appears in the Actions Panel after pressing the Cycle Start button on the CNC, the DNC connection was not successful and the communication cable between the VBX and the CNC is connected. Ensure that the CNC has been properly initiated into DNC mode. Press the Retry button to initiate the sequence again. If trouble persists, contact support by email helpdesk@versabuilt.com or call (208) 629-5914.

Add a New Job to The VBXC

Press the plus button in the Active Jobs Panel and enter the following information:

1. Order: Enter the order identifier. This information is only used to track the job through the system
2. Quantity: Enter the number of parts to be processed
3. Part: Select the part to process. Parts in this list must have been previously configured. Part configuration is described in the Machinists Manual
4. Press the Save button to save the job

Note:	Additional jobs can be entered at this step or at any time the VBXC is processing. Any steps required to process the job will be displayed in the Actions Panel as those steps become available to perform.

Configuration Changes to an In-Process Job

Changing the configuration of an in-process job requires the in-process job to be canceled and restarted. Only then will the In-process job update with the new configuration change. In-process jobs will not update automatically.

Required VBXC Actions

The actions, the operator must take, to begin job processing are listed in the Actions Panel once the job is configured and saved. All of the actions highlighted in red must be completed before job processing will begin. The following actions may be required to begin processing the job:

Load Jaws

The MultiGrip vise jaws required to process the job must be loaded into the VBX-160. The VBXC lists where the soft jaws are to be loaded. To visually see in the Racks Panel the location of where the jaws are to be loaded, press the Highlight button. After the jaws have been loaded, press Done to move onto the next step.

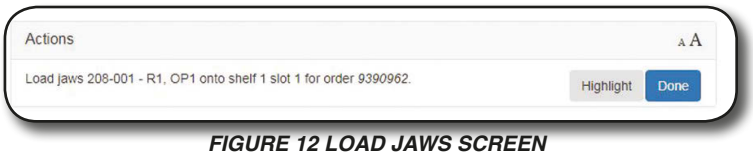

FIGURE 12 LOAD JAWS SCREEN

Load Parts

Next, the material for the job must be loaded into the VBX-160 for processing. Again, press the Highlight button to visually see in the Racks Panel where to load the parts. It is not necessary to load parts in sequence. Operators may designate any slot on a rack to start a job. If no slot is designated, by default, the VBXC will pick the next sequential slot. To designate a specific slot right click "Load Point" to load part(s) select the slot, then click Run Next.

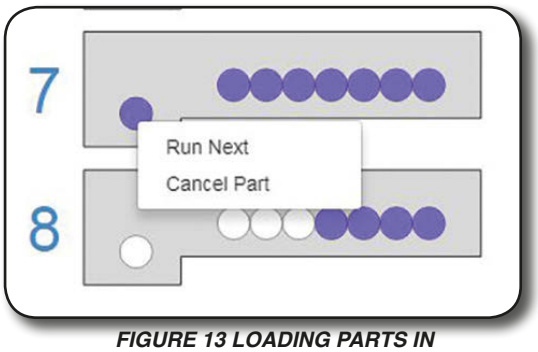

FIGURE 13 LOADING PARTS IN THE RACKS PANEL

Press Cycle Start

Before pressing the Cycle Start button, ensure that the CNC is ready to process all parts for the job including:

1. Having the CNC programs in memory
2. Cutting tools required for the job are loaded in the CNC
3. System has adequate resources to process all parts.

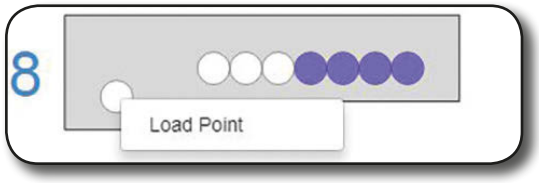

FIGURE 14 DESIGNATE LOAD POINT

Once the CNC is ready, press the Cycle Start key to begin processing parts.

Unload Completed Parts and MultiGrip Vise Jaws

As the VBX-160 completes processing, the VBXC will display in the Actions Panel a list of parts that can be removed from the VBX-160. When the operator removes those parts and acknowledges the Action by clicking the Done button, the VBXC can allocate more parts for processing to those slots. When a job is complete and there are no other jobs pending that use the MultiGrip vise jaws for the job, the VBXC will prompt the operator to remove the vise jaws.

FIGURE 15 UNLOAD JOBS SCREEN

Important Notes:

FIGURE 16 AVAILABLE RACK TEMPLATE ERROR

1. Actions that can be performed due to available resources will be listed in the Actions Panel. For example: if a new job requires space in the racks for jaws or parts and that space is currently occupied by the resources of another job, those actions will not be shown in the Actions Panel until the resources become available. To make resources available, the operator must remove the parts or soft jaws from the VBX-160 when prompted and click the Done button.
2. The Racks panel must have at least one part shelf configured for the part's pick configuration. If a job is added to the VBXC and there are no shelves currently configured for that pick template, an error message will be displayed in the Actions Panel. To enable processing for the job, edit the Shelf Template configuration by pressing the Templates button in the upper right corner of the Racks Panel and selecting the template required by the part configuration for at least one shelf in the VBX.

Canceling a Job

To cancel an existing job use the Edit Job List button in the Active Jobs Panel. You can cancel a job any time after it has been saved. The elements of a saved job cannot be edited. If the elements need to be changed, the job must be canceled and then re-entered with the updated changes.

Note:	When a job is canceled while a part is held by the robot or a part is in a vise, the VBXC enters Recovery mode. This enables the system to be restored to a normal state and the job re-entered if desired. If there are no parts currently held or in a vise, then the job is simply canceled and normal processing continues for other active jobs in the VBXC. To stop a part from processing, click the Op Stop button to access the Part Stop button. Click the Part Stop button to stop the part from processing. Click it again to resume processing. The button then becomes the Op Stop button again.

1. Click the Edit Job List button in the top right corner of the Active Jobs Panel. The VBXC displays a list of all active jobs.
2. Find the job that you need to cancel, then click the Cancel button next to the job. To exit the edit mode without canceling a job, click the Done button in the top right corner of the Active Jobs Panel.
3. Refer to the Actions Panel for tasks associated with canceling a job. Tasks may include unloading parts or unloading jaws. The slots of canceled parts are yellow in the rack panel. Additional tasks may be Recovery related and involve actions such as removing items from the gripper and/or vise and moving the robot arm to Home. Refer to the Recovery section for information related to these types of tasks if the VBXC enters recovery mode after a job is canceled.

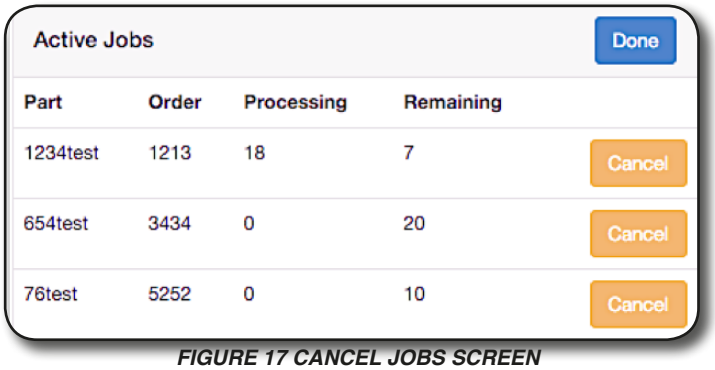

FIGURE 17 CANCEL JOBS SCREEN

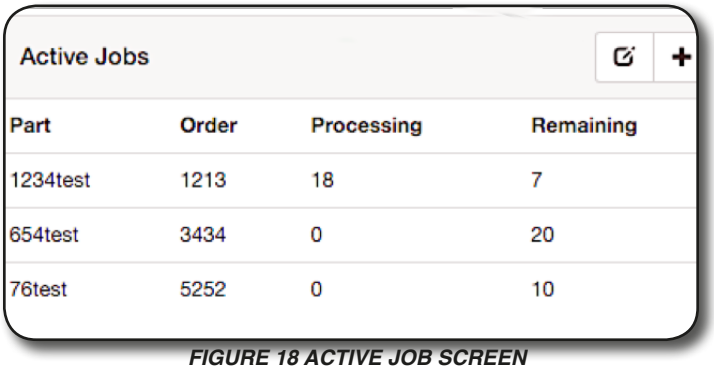

FIGURE 18 ACTIVE JOB SCREEN

RECOVERY

Initiating Recovery

Recovery occurs when the robot stops processing in response to an error. An operator can initiate Recovery by either clicking the Recovery button or canceling a job that is currently processing. The Recovery button is visible on the Status/Control Panel when the system is in a Feed Hold state.

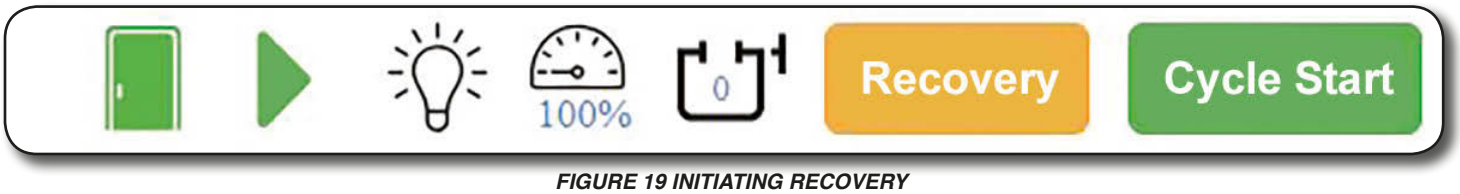

FIGURE 19 INITIATING RECOVERY

Once recovery is initiated, the actions for recovery are displayed in the Actions Panel. All recovery related actions must be completed before processing can begin again. Initiating the recovery state clears the current processing state of the VBXC. The Recovery mode cancels all parts and MultiGrip vise jaws that are held by the robot or in the vises. Communication with the robot and CNC is reset.

Robot Errors That Initiate Recovery

When the VBX-160 robot encounters an error, that it cannot recover from automatically, the VBXC will enter Recovery mode. Most robot errors that initiate Recovery mode are caused by the robot unexpectedly colliding with something. To prevent further errors, understanding the cause of the collision is important. Before executing the Recovery actions, investigate why the robot encountered the error and take the necessary steps to prevent future errors.

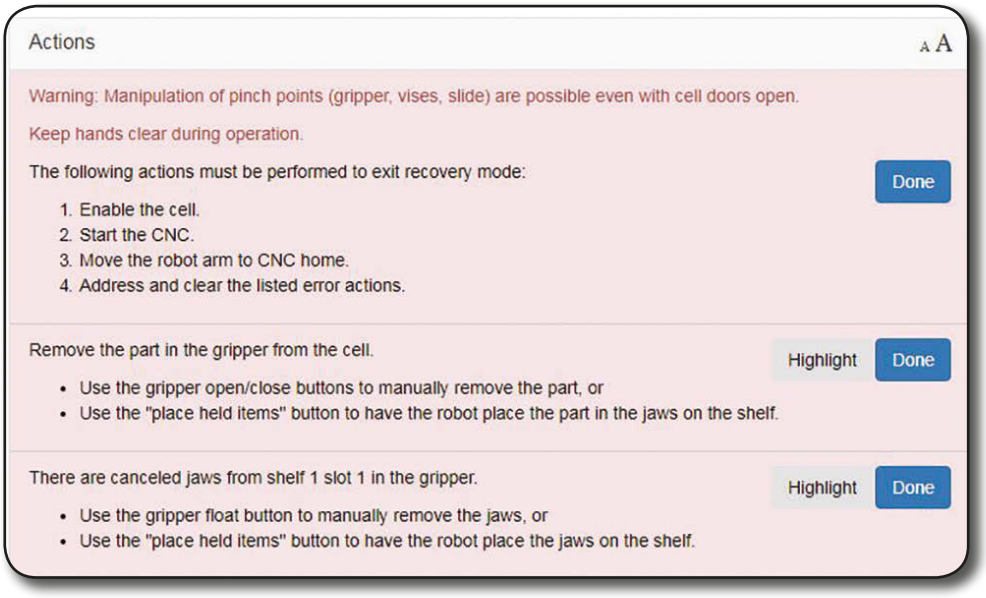

FIGURE 20 EXIT RECOVERY ACTIONS

The Recovery Panel

When Recovery is initiated, a Recovery Panel appears in the Operations Screen.

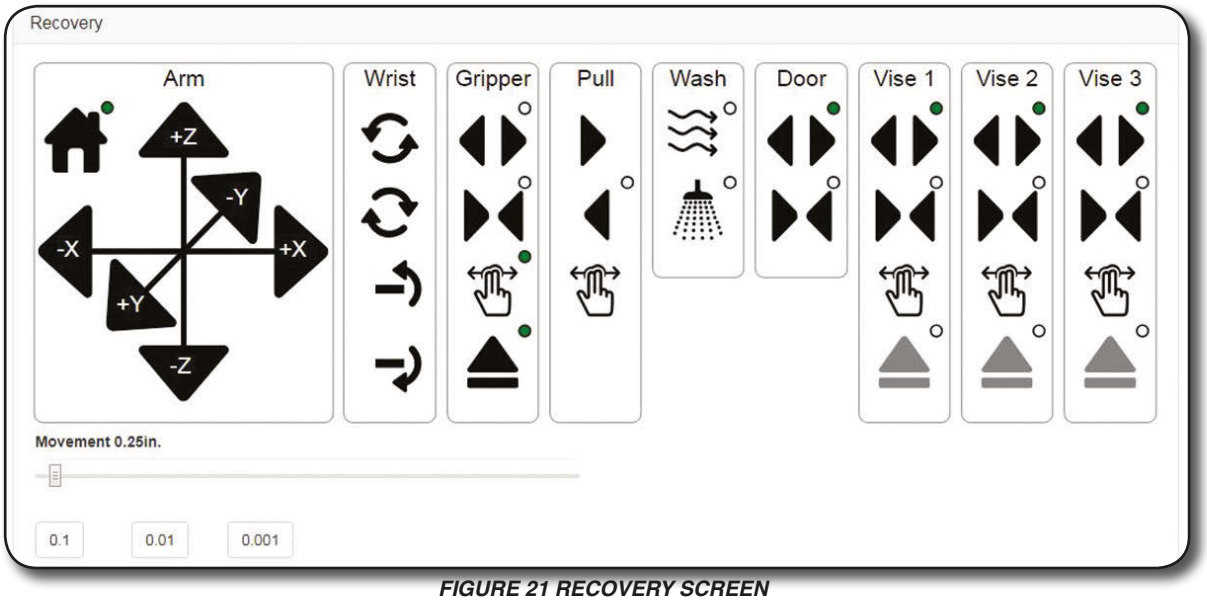

FIGURE 21 RECOVERY SCREEN

Operator Initiated Recovery

In some cases, it may be desirable to initiate Recovery.
For example: if a part is damaged during CNC processing, the part will need to be canceled and the VBX-160 returned to a state where it can begin processing parts again. The Recovery screen can also be used to manually turn on the rinse pump making it easy for the operator to empty the rinse tank using the diverter valve.

To initiate Recovery, perform the following steps:

1. Click the Feed Hold button to stop processing of the current job.
2. Click the Recovery button to enter the recovery screen.
3. The VBXC will ask you to confirm that you wish to continue to Recovery. Click OK. The system will now enter Recovery mode.

Note:	The part that is currently processing is canceled when the system goes into the Recovery mode. After the Recovery mode is initiated by either the operator or the VBXC, the operator must complete the Recovery actions to exit Recovery so that part processing can resume.

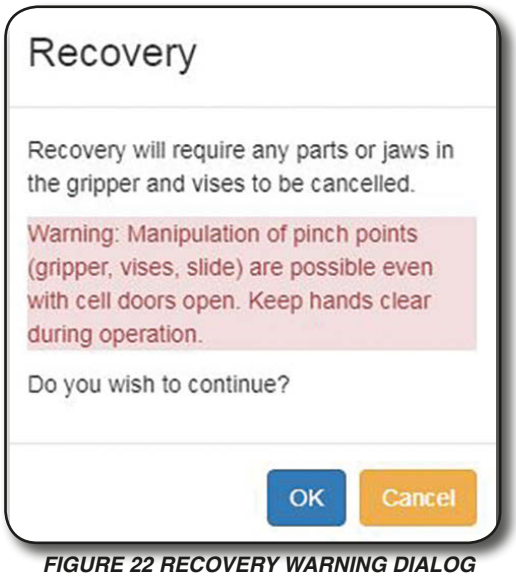

FIGURE 22 RECOVERY WARNING DIALOG

Exiting Recovery Mode

To exit Recovery mode, complete the tasks in the Actions Panel. The Actions Panel lists out the 4 primary steps that need to be completed to exit recovery mode.

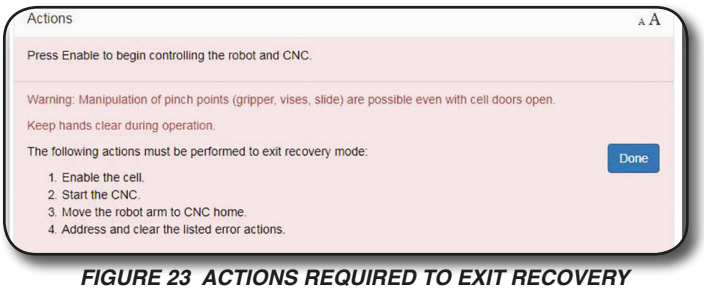

FIGURE 23 ACTIONS REQUIRED TO EXIT RECOVERY

1. Enable the VBX-160 by clicking on the Enable button. This allows robot to move.

Note:	Use the Pause button if there is a need to pause the movement of the robot. The operator can toggle between Enable and Pause as needed while in Recovery mode. Only the gripper open/close buttons are operable when the system is paused. The Recovery Panel buttons appear gray when they are not currently operable.

2. Return the robot to the home position. To send the robot to the home position, press the Home icon in the Recovery Panel. Clicking on the Home icon will command the robot to attempt to find its home location. When the robot has reached its home location, the dot in the upper right corner of the home icon will turn green.

Note:	In some cases, the robot will not be able to reach its home location on its own. If the robot does not reach its home location after pressing the Home icon, please contact helpdesk@versabuilt.com or call (208) 629-5914 for further assistance.

3. Address and clear the listed errors. Put away anything held in the gripper and/or vise. There are two ways to do this:
   a. Physically remove anything held by the gripper or vise by first using the gripper and vise controls to open, close or float the gripper or vise and then manually removing the items
   b. Using the Eject button for the gripper or vise. The Eject button will have a green dot by it if it is available for use. When the Eject button is used, the robot puts the MultiGrip vise jaws and parts back on the shelf.

Note:	VersaBuilt Robotics recommends using the Eject button in Recovery mode to return MultiGrip jaws and parts to the shelf. Using the manual controls to open, close or float the gripper or vise can result in parts and or jaws being dropped potentially causing damage.

4. As each action is completed in the Recovery mode, press the Done button on the message in the Action list. Once all the steps in the Recovery mode are complete and the Done button pressed for each step, the VBXC will exit Recovery mode.

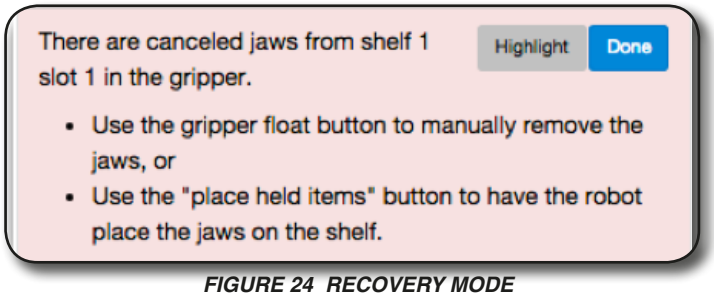

FIGURE 24 RECOVERY MODE

CONFIGURATION SCREEN

The Configuration Screen consists of three data panels: Data Import, Jaw Definitions and Part Definitions. Each data panel is independent of the other data panels. It is possible to be working in all three panels simultaneously. For example, editing a Jaw Definition while also editing a Part Definition.

The Status/Control Panel is displayed along the top of the Configuration screen and remains operable during configuration. This allows continued management and monitoring of jobs that are currently processing. Use the menu selection button to toggle between the configuration screen and the operation screen if needed. Prior to leaving the configuration screen, saving any completed entries by clicking on the save button ensures that information is saved. For detailed instructions on how to use the Configuration function of the VBXC, please refer to the VBX-160 Machinist Manual (VersaBuilt Document #D10008).

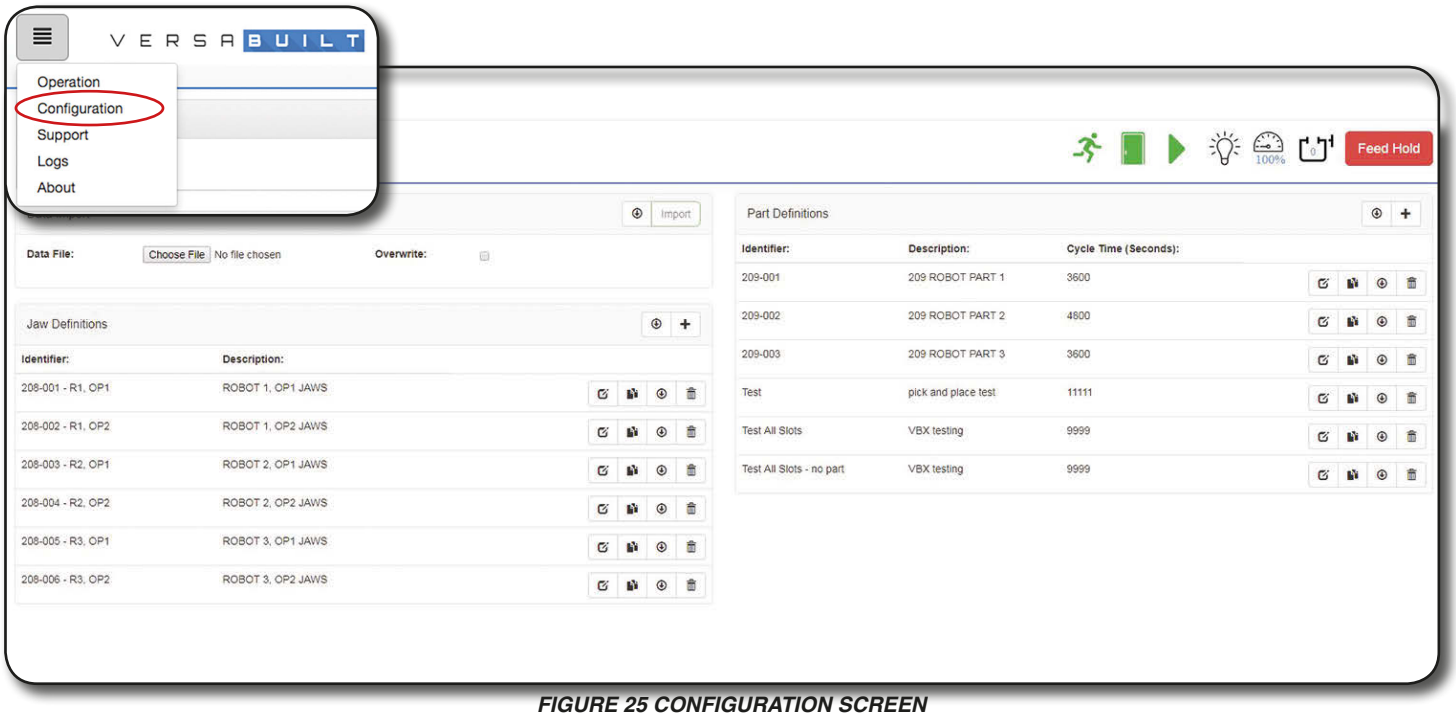

FIGURE 25 CONFIGURATION SCREEN

SUPPORT SCREEN

The Support Screen gives an operator direct access to Technical Help at VersaBuilt Robotics.

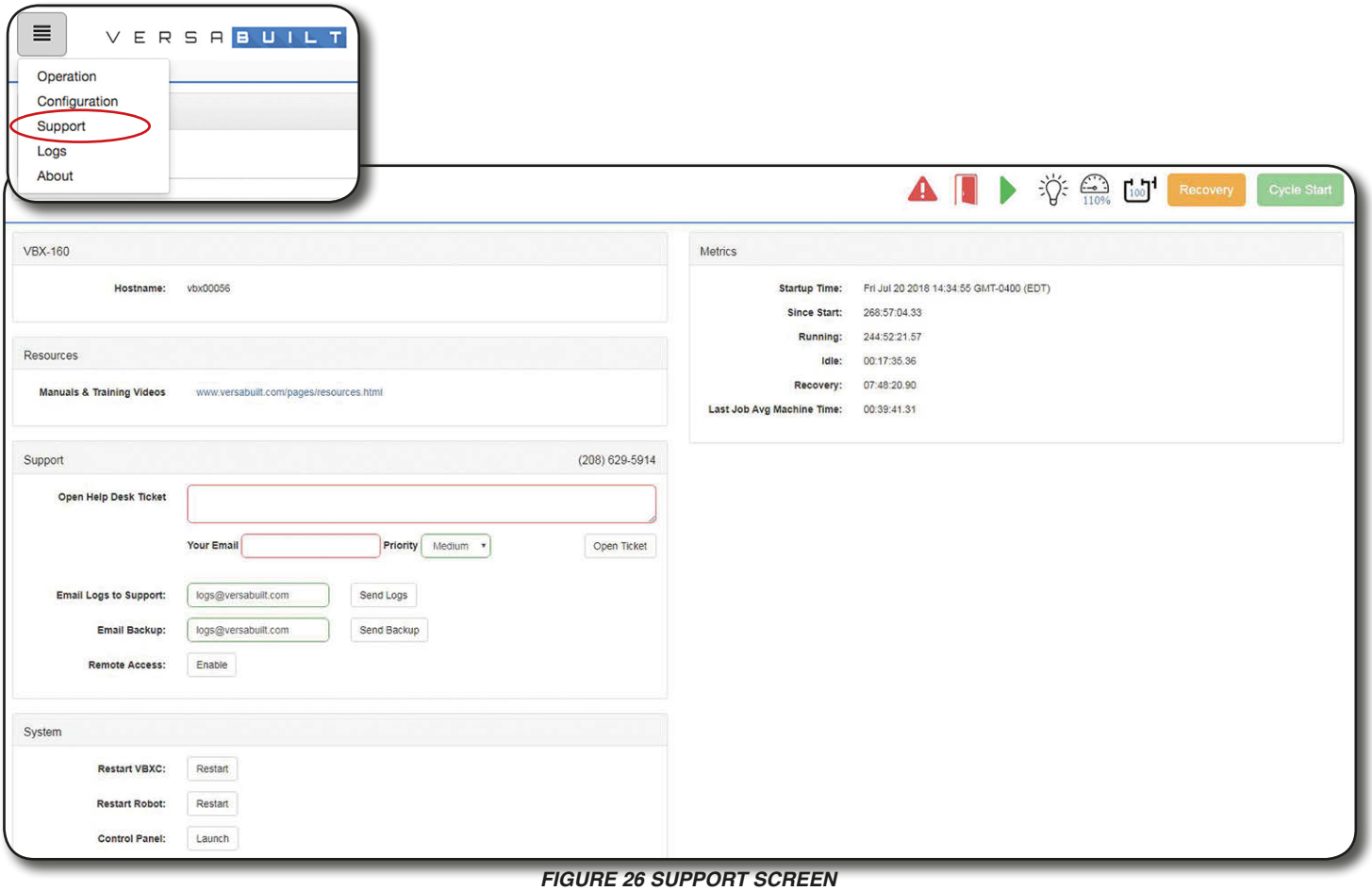

FIGURE 26 SUPPORT SCREEN

LOGS SCREEN

The Logs Screen gives a running history of all of the actions of the VBX-160. You can use this screen to determine if your VBX-160 made need maintenance, track progress, track errors, etc.

FIGURE 27 LOGS SCREEN

ABOUT SCREEN

The about screen provides software version, software copyright information, and open source software information.

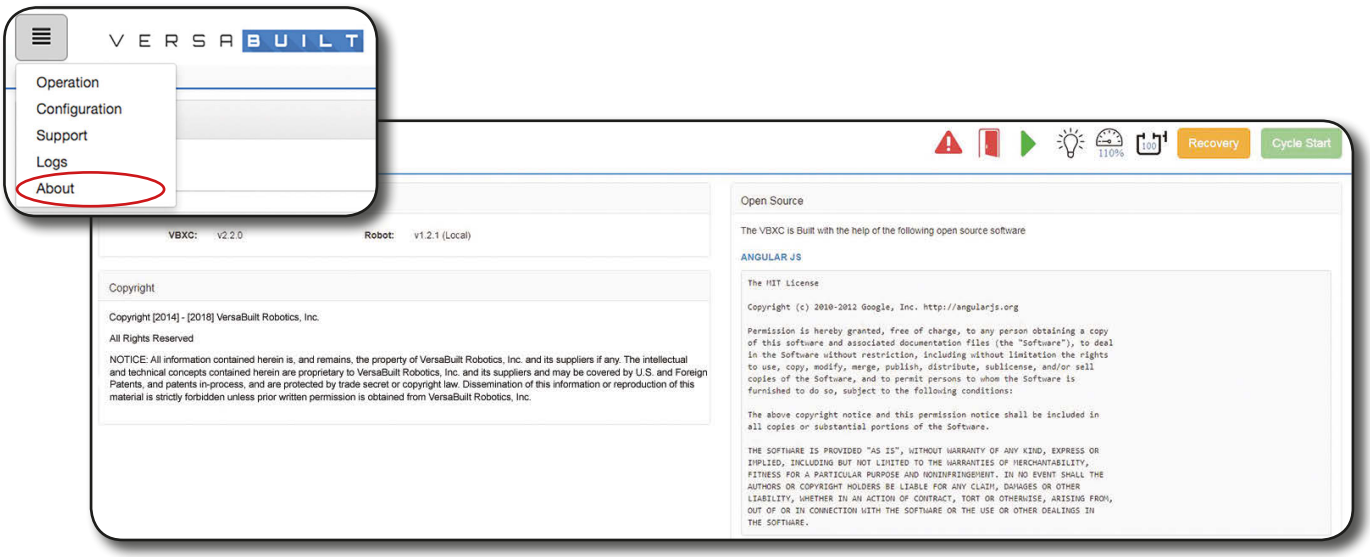

FIGURE 28 ABOUT SCREEN

GLOSSARY

Action List: A list of actions for the operator to perform to address issues and keep the VBX-160 processing.

Active Job List: A list of jobs that are currently active in the VBX-160 system.

Air/Electrical Panel: Supplies air and power to the VBX-160 and the door vise control circuit.

Air Knife: blows air on the finished part to clean and dry.

Brake Release: A button on the back side of the robot. When this button is activated it releases or deactivates the brakes on each robot axis, causing the robot to move freely.

Note:	Pressing this button will cause the robot to collapse under its own weight. The robot's weight and joints can pinch an operators limb causing serious injury. This button should only be pressed by qualified service personnel.

CNC Pneumatic Door Control: Opens and closes CNC door to allow robot access.

Configuration Screen: This is where the system and parts are configured. Accessed via the screen selection menu.

Cycle Start Button: Visible when the system is in a Feed Hold state. It is used to start or continue processing.

Dispatcher: VersaBuilt CNC program used to communicate between VBX-160 and CNC machine.

DNC Cable: A cable that connects the VBXC to the CNC for communication.

DNC Sync Button: This button is used to tell the VBXC that the DNC connection to the CNC has been interrupted. For example: when the CNC is reset. Using this button will activate the DNC synchronization process.

Door Open/Close Sensors: Allow the VBX-160 to determine if the door is in the open or close position.

Drip Tray: A tray that is located in front of the robot to catch dripping coolant.

Feed Hold Button: Visible when the system is processing. It is used to pause processing.

Gate Post: The post that locks the VBX-160 in position for processing.

Grease Zerk: Fitting for adding grease to the MultiGrip vise.

Gripper: The part of the robot that engages the MultiGrip vise jaws or pallets.

Gripper Float Button: If the robot is holding MultiGrip vise jaws, when this button is activated it will allow gripper to be actuated by hand.

Gripper Interface: The side of the MultiGrip jaws that the robot's MultiGripper interfaces to.

Gripper Sensors: Sensors on the gripper that help the robot identify if MultiGrip soft jaws are attached and if a part is being held.

Intermediate Jaws: Intermediate jaws are bolted to the vise and interface with MultiGrip jaws or pallets.

IO Access Panel: Located on the CNC side of the VBX-160, provides access to robot IO wiring panel for service.

Job: The processing of one or more pre-configured parts in the VBX-160.

Jobs Screen: The main screen on VBXC that allows operators to manage jobs and control the VBX-160. Accessed via the screen selection menu.

Machinable Face: The top portion of the MultiGrip jaws or pallet that will be machined to hold a part.

Manual Vise Valve: A handle valve that allows the vise to be opened or closed manually.

> Note: Handle must be returned to center position to allow the robot to control the vise.

Motor's On Light: A light on the upper robot arm. When this light is illuminated the robot motor is on, and the robot can move at any time.

MultiGrip Jaws or Vise Jaws: Machinable jaws for holding a part. MultiGrip jaws come in two versions, one for outer diameter (OD) clamping and one for inner diameter (ID) clamping.

MultiGrip Vise: A vise with MultiGrip intermediate jaws for clamping MultiGrip jaws or pallets.

MultiGripper: The mechanism attached to the end of the robot's arm that interfaces with MultiGrip jaws.

Operator: A person trained to load, operate and maintain CNC machines and VBX-160s.

Pallet: A one piece version of the MultiGrip jaw used for fixturing multiple parts or parts that cannot be reliably picked from the shelf. Requires the operator to secure the part to the pallet.

Part Family: A group of similar parts that can be processed with the same MultiGrip soft jaws, pallets and tooling.

Part: Generally referring to material to be processed.

Part Locator: A sheet with cutouts, attached to a shelf, to easily locate a specific part size and shape accurately on the shelf.

Pivot Pin: A pin that connects the VBX-160 to the pivot post.

Pivot Post: The hinge where the VBX-160 rotates from the CNC.

Pivoted: When the VBX-160 is pivoted away from the CNC to allow access to the CNC or robot.

Power Cable: A black cable that supplies power to the VBX-160.

Pre-Op: An operation to cut probing features for a subsequent operation, for example, a dovetail feature.

Probing: Using a spindle probe to measure the location of a part in the CNC or the size or shape of a machined feature of the part.

Recovery Button: This button is used by the operator to manually initiate Recovery mode to clear the current processing state of the controller, typically after an error has occurred.

Rack System: The racks contained in the VBX-160. The VBX-160 contains two racks with anywhere from 4 to 9 shelves on each rack depending on part size.

Recovery Mode: An operating mode of the VBXC designed to bring the system back to a starting state after an error occurs or when the operator wants to bring the system back to a starting state and is ready to continue processing.

Red Task: A task highlighted in red in the Actions Panel; it is urgent. The robot will stop processing until the red task is completed

Rinse Bucket: A bucket that holds a cleaning solution and a pump for washing the finished part.

Robot Communication Cable: A cable that allows the VBXC to communicate with the robot controller.

Robot Controller Access Panel: For VBX-160s that incorporate a robot controller stored in the VBX-160, a removable panel on the operator side of the VBX-160 that provides access to the robot controller.

Safety Sensor: The VBX-160 has 4 sensors, one on each door and one on the gate post. If the Safety Sensor detects that a door is open or the VBX-160 is pivoted, the robot will immediately stop and will not be able to Cycle Start until the door is closed or the VBX-160 is pivoted.

Safety Stop: When a door is opened or if the robot has a hard collision, the robot will enter a safety stop state. In the safety stop state, the robot is unable to move and the motors on light will be off. The safety stop state will need to be cleared by the operator to continue processing.

Screen Selection Menu: Located in the upper left hand corner of all screens. The menu has a drop down list to select one of the following screens: jobs, configuration.

Shelf: Each shelf can hold parts or jaws. Shelves are part of a rack in the VBX-160.

Shelf Slot: The location on a shelf where the robot will pick a part or pallet.

Shelf Template: A sheet engraved with graduated markings to show where to center the material to be processed for robot picking.

Signal Cable: A cable that connects low voltage signals between VBX-160 and air/electrical panel.

Vise Sensors: Used to determine if the vise is holding a part.

VBX-160 : The enclosure of the robot and all of its components.

VBX Controller: Also known as the VBXC, the operator interface for controlling the CNC.

White Task: A task highlighted in white in the Actions Panel, needs to be done, but it is not urgent. A white task will not stop the robot.

Yellow Task: A task highlighted in yellow is not urgent and will not immediately stop the processing, but it could cause processing to stop if it is not addressed soon.