VERSABUILT ROBOTICS


# Automation System
# VSC to CNC Connections


2025-12-11

# VSC to CNC Connections

The following sections include connections for VSC to:

- Cycle Start
- Door Interlock* for CNC's that require an operator push a button before opening or closing the CNC door
- Pallet Ready** for CNC's with pallets (e.g., HMC's) require an operator push a button acknowledging the pallet is in the correct position
- Ethernet or RS-232 connections for VSC Macro Communication
- Cycle End (for handshake communication, rather than VSC Macro)* for a 24VDC signal from the CNC, typically M-Code output
- Lathe Chuck foot pedal connections *to toggle the signal, where the system does not know the position of the chuck (open or closed), but toggles. The system will need to be placed in a state with the chuck in the "un-clamped" state prior to starting a job.

**Note**: with exception to the Ethernet and RS-232 cables, the signals from the VSC to the CNC are relay outputs, closing a 24VDC contact. The signals for Cycle Start, Door Interlock, Pallet Ready, and Lathe Chuck foot pedals do not send 24VDC. The relay contact closure mimics the contact closure when the button is pushed or the pedal is depressed.

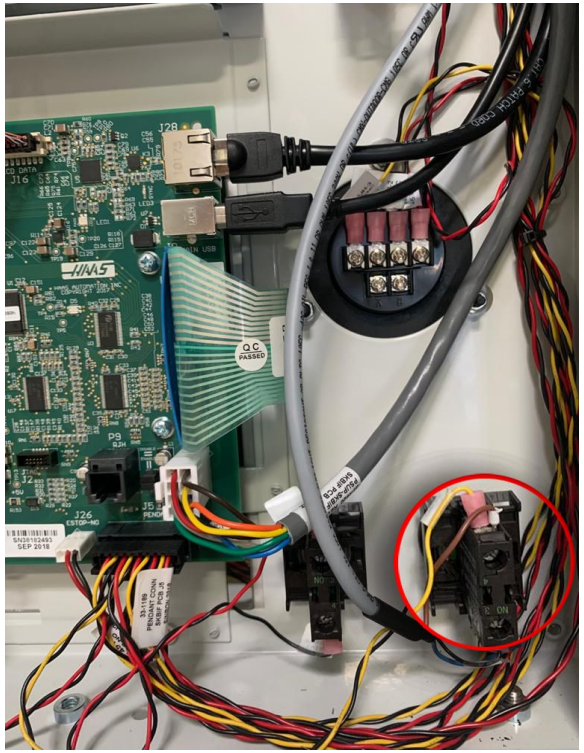
**Note: Refer to the Automation System Electrical Schematics Manual for further details on signals and cable connections**

# Cycle Start Cable

Installation instructions for Cycle Start wiring is CNC make/model/year dependent, with the following instructions provided as a guideline only

- Verify proper Cycle Start wiring installation carefully, consult with a properly trained CNC repair technician if necessary
- Remove the back panel of the CNC control
- The Cycle Start button is generally located in the back right corner of the control; trace the location of the cycle start button by locating the cycle start button on the front of the control and then looking for it in the back of the control

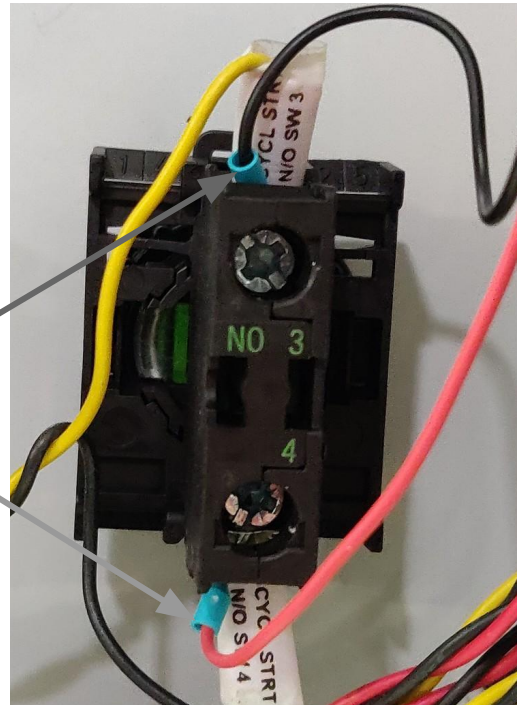
Back of CNC



Back of Cycle Start Button

# Cycle Start Cable

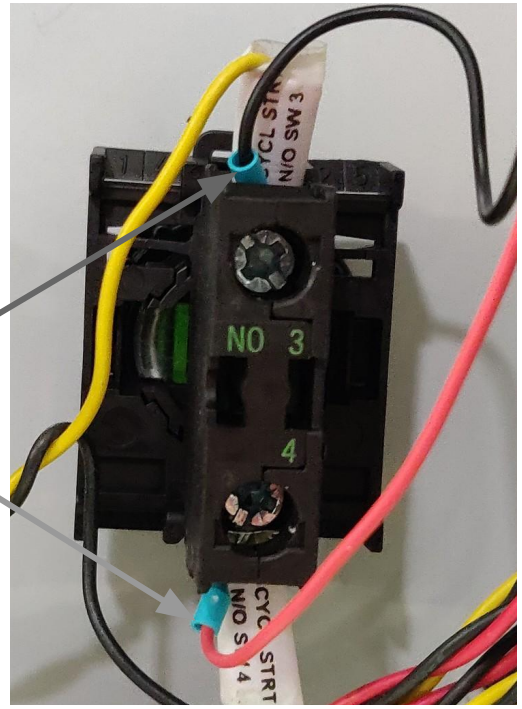
- The Cycle Start Cable includes two wires that must be attached to the Cycle Start terminals
- The Cycle Start button should have two terminals that connect with 24VDC when the button is depressed. Loosen the terminal screw and attach one of the Cycle Start Cable wires to each terminal. As needed, use a Multimeter to determine the correct terminals.
- Polarity of the wires does not matter




**Refer to the Electrical & I/O Manual for connection details to VSC and cable diagrams**

# Pallet Ready cable*

- The Pallet Ready Cable includes two wires that must be attached to the Cycle Start terminals
- The Pallet Ready button should have two terminals that connect with 24VDC when the button is depressed., loosen the terminal screw and attach one of the Cycle Start Cable wires to each terminal. As needed, use a Multimeter to determine the correct terminals.
- Polarity of the wires does not matter



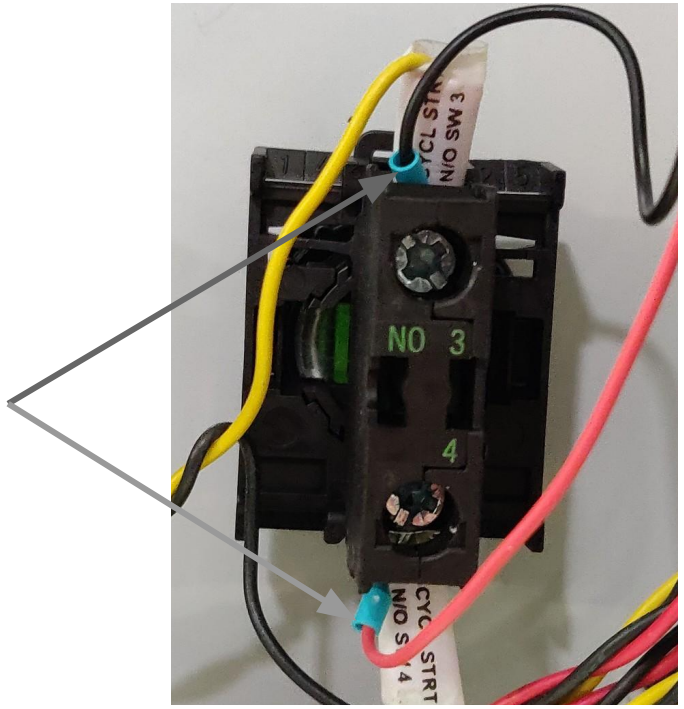

*if needed on CNC

**Refer to the Electrical & I/O Manual for connection details to VSC and cable diagrams**

# Door Interlock Override cable*

- The Door Interlock Override Cable includes two wires that must be attached to the Cycle Start terminals
- The Door Interlock Override button should have two terminals that connect with 24VDC when the button is depressed., loosen the terminal screw and attach one of the Cycle Start Cable wires to each terminal.  As needed, use a Multimeter to determine the correct terminals.
- Polarity of the wires does not matter

*if needed on CNC




**Refer to the Electrical & I/O Manual for connection details to VSC and cable diagrams**

# CNC Communication Cable

**Haas Legacy**

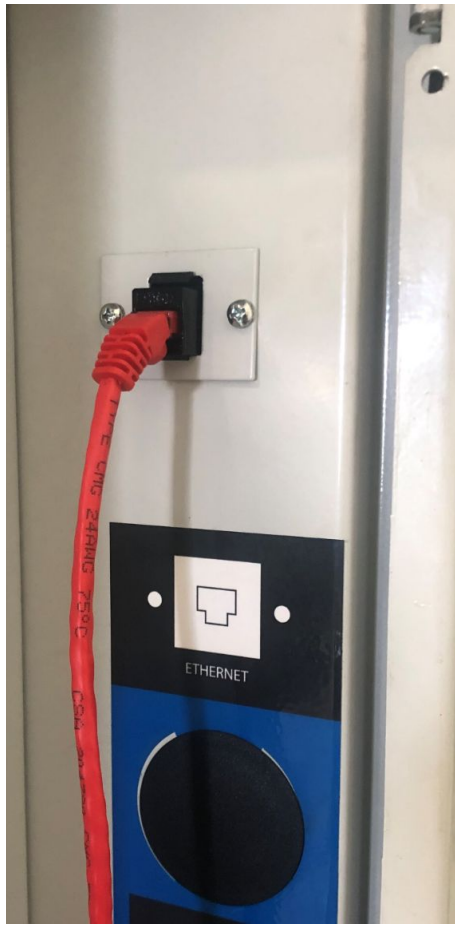
Plug the 25-pin end of the provided serial cable into the CNC, plug the 9-pin end of the cable into the VersaBuilt System Controller (VSC).

**Haas NGC, Fanuc Focus 2.0**

Location of the user Ethernet port is machine builder dependent. Review the documentation provided with your CNC to determine the location.

Plug one end of the provided Ethernet cable into the CNC Ethernet port and the other end into the Ethernet switch mounted on the VSC.

***Route cables so they are protected from coolant and chips, anchor as needed using included cable-ties and magnetic loops*

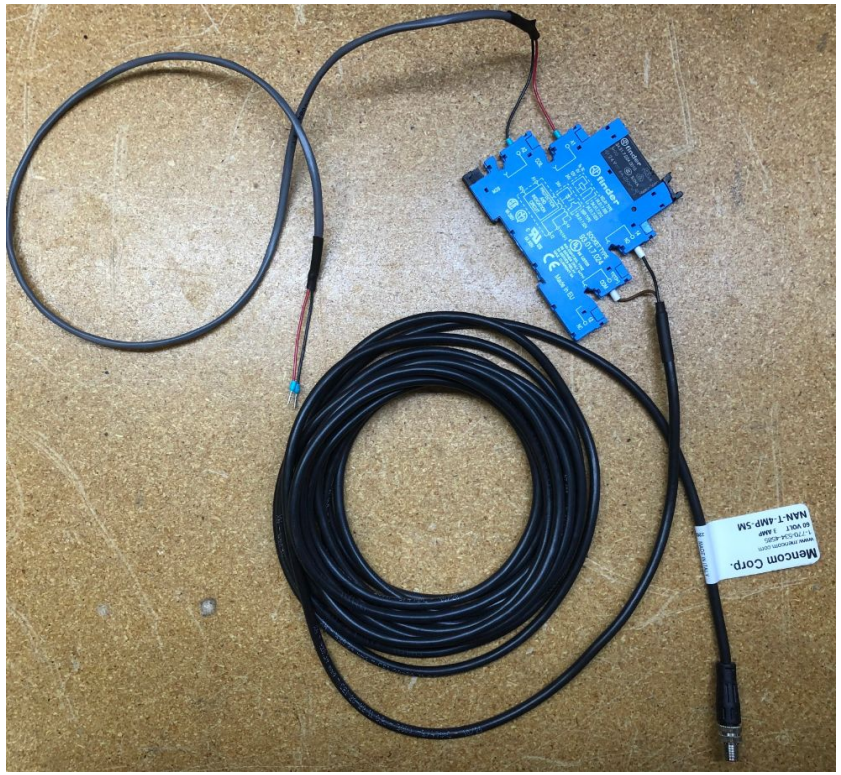



Ethernet Cable


Serial Cable

**Refer to the Electrical & I/O Manual for connection details to VSC and Network Diagrams**
**Refer to the VSC / CNC Communication Manual for CNC Settings and Controller Types**

# CNC Driver Cycle End Cable




Note: A relay supplied with the VersaBuilt Cycle End cable assembly for CNC 24VDC output signals. For M-code relay outputs, the supplied relay is not required and the Brown/Black wires from the M8 4-pin cable can be connected directly to the CNC m-code terminals.

**Identify CNC End of Cycle Signal on CNC**

For Generic Driver applications, the VersaBuilt System Controller (VSC) requires a 24 volt input signal when the CNC cycle is complete. Most CNCs provide one or more m-codes that are tied to a 24 volt output signal. These can be used as a user defined m-code pair for turning signals on and off. When one m-code is executed, a 24 volt output is triggered, when the other m-code is executed, the 24 volt output is reset. Most CNCs provide terminal blocks in the control cabinet to connect the provided Cycle End cable. Check your CNC documentation or your CNC dealer for more information.

**Cycle End Cable**

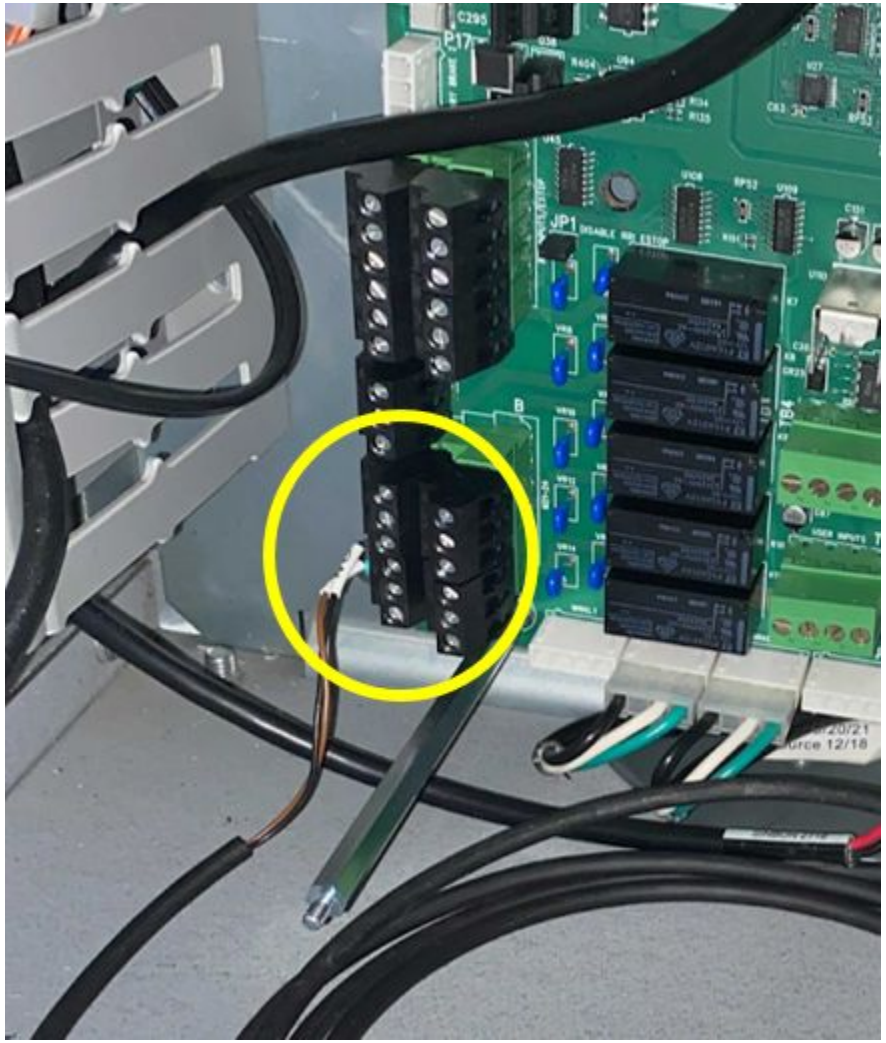
A Cycle End cable is available from VersaBuilt for Generic Driver applications (see image to the left). Connect the flying leads to an available 24VDC M-Code output. One wire to a 24vdc signal M-code, the other to 0vdc.

**WARNING**

Verify the voltage and the polarity of the CNC cycle end signal before connecting the Cycle End cable. Failure to do so could result in damage to the VSC or the CNC.

**Refer to the Electrical & I/O Manual for connection details to VSC and cable diagrams**

# CNC Driver Cycle End Cable

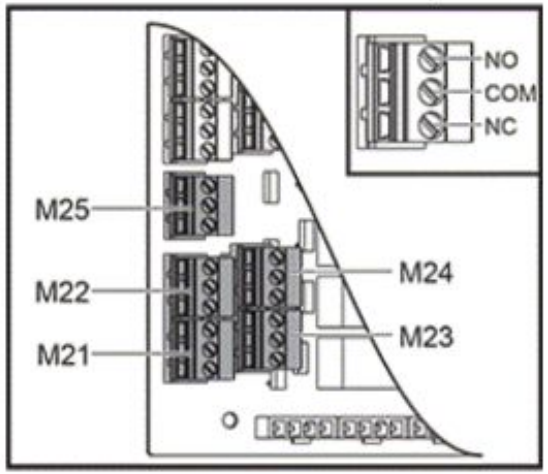


M-Code Connection Example
Haas Relay, M-code controlled

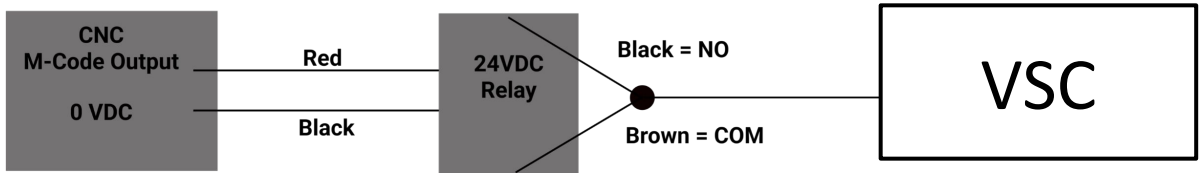
**Connect Cable From M-Code connection to VSC**

After connecting to M-code terminals at CNC, connect M8 Cable to VSC. To test and/or troubleshoot M-code signalling, set the M-code with the CNC while reviewing the VSC I/O Panel screen, input named “CYCLE_COMPLETE”. The input will display as “ON” when the M-code signal is on, the “OFF” when the signal is reset.

Main I/O PCB M-code Relays.




**Refer to the Electrical & I/O Manual for connection details to VSC and cable diagrams**



# Lathe Chuck Cable Installation

Lathe Chuck / Foot Pedal Cables are intended to be tied into either existing foot pedal(s) at the CNC for a “toggle signal”, opening or closing depending on the state of the chuck.

The following pages provide installation instructions for installing the cable. Note for Haas NGC controllers, the preferred chuck actuation method is the Haas NGC Macro control configured in the Settings page.

*Legacy VSC 1.0 systems are connected to A1 and A2, then A7 and B7*

**Refer to the Electrical & I/O Manual for connection details to VSC and cable diagrams**

# Lathe Chuck Cable Installation

**Installation of Chuck Open/Close Cable to Foot Pedal:**

Chuck Open/Close cable connects to the CNC by way of the Chuck Foot Pedal Switch or a connector in the CNC electrical cabinet. Contact your CNC maker to determine if a chuck control connector is available in the CNC electrical cabinet and how to connect to it.

If no chuck control connector is available, the Chuck Open/Close Cable will be wired into the CNC foot pedal switch.

The following pages include images and instructions for connecting the cable to a foot pedal

**Refer to the Electrical & I/O Manual for connection details to VSC and cable diagrams**

# Lathe Chuck Cable Installation

**Foot Pedal Wiring Installation:**

Unscrew  the fasteners securing the cover to the foot pedal, exposing wire connections.

Unscrew foot pedal cover

**Refer to the Electrical & I/O Manual for connection details to VSC and cable diagrams**

# Lathe Chuck Cable Installation

**Foot Pedal Wiring Installation:**

Some foot pedals will include a cable gland that will allow the Chuck Open/Close Cable to pass through; if a cable gland is available, use it to pass the cable through.

If a cable gland is not available, a hole can typically be drilled into the foot pedal and a cable gland added.

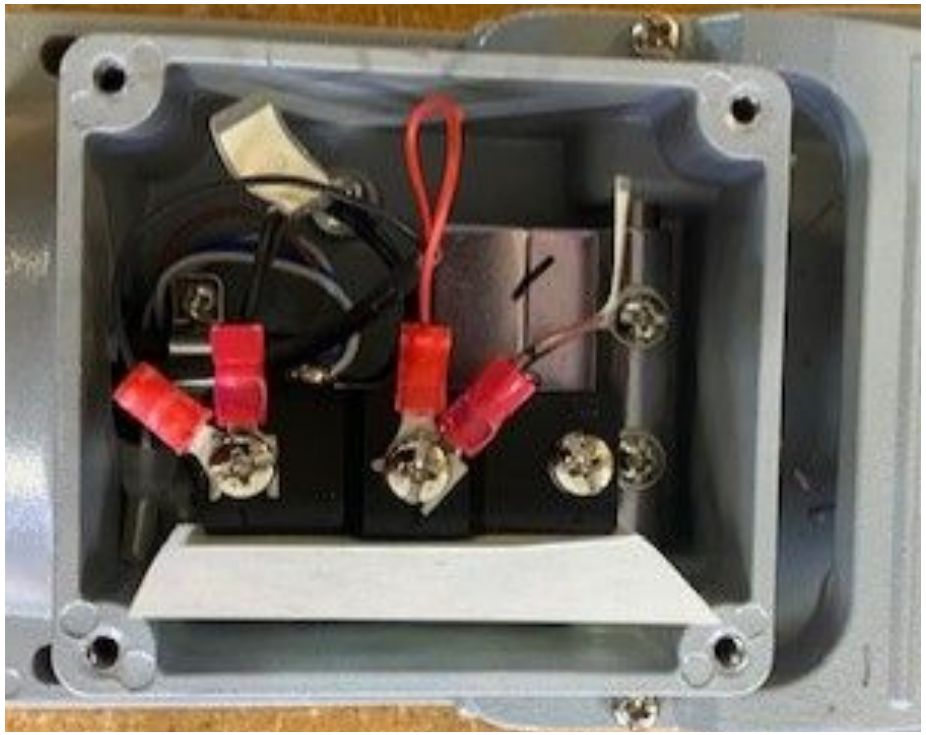
Add spade connectors (crimp in place) to ends of flying leads of cable.

**Refer to the Electrical & I/O Manual for connection details to VSC and cable diagrams**

# Lathe Chuck Cable Installation

**Foot Pedal Wiring Installation:**

Most foot pedals will have two terminal connections for a contact switch or a 2-wire proximity switch. If your foot pedal has a different configuration, contact VersaBuilt for further instructions.



Loosen screws attaching the 2 terminals with existing wire connections. Add 2 wires from Chuck Open/Close cable and screw into terminals. **Polarity does not matter.** For toggle signals of the Chuck, **connect Brown and White wires,** cut and wrap extra wires (Black and Blue wires are not used in foot pedal wiring). Reattach foot pedal cover.

**Refer to the Electrical & I/O Manual for connection details to VSC and cable diagrams**

VERSABUILT ROBOTICS