VMC Auto Front Door Installation Procedure

Auto Front Door Option. Mechanical and electrical installation of the VMC Automatic Front Door

Written By: Phillip Brown



INTRODUCTION

Trak Machine Tools has started offering a series of automation options on our VMCsi series machines, one of them being an automatic front door. With this procedure and drawings 36000-1 (7/10 Series), and 36000-3 (12/14 Series) you will be able to complete the mechanical and electrical installation and alignment of the Automatic Front door option on the above series machines. The Programing and testing is covered in the Auto Door Programing Guide: https://southwesternindustries.dozuki.co...

TOOLS:

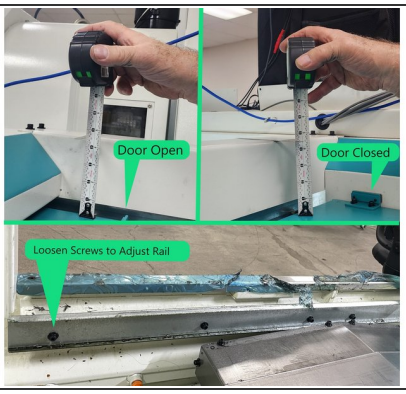
- Electric Hand Drill (1)
- #19 Drill Bit (1)
- 7mm Drill Bit (1)
- M5-0.8 Tap (1)
- 28mm Greenlee Punch (1)
- 50 lb Fish Scale (1)
- Bando Belt Tension Meter (1)
- 5mm Drill Bit (1)
- M6-1.0 Tap (1)
- Torx Tamper Proof Bit T20H (1)
- 8mm open end wrench (1)

PARTS:

- SWI-TOOL-065 (1)
- SWI-TOOL-068 (1)
- SWI-TOOL-069-1 (1)
- SWI-TOOL-069-2 (1)
- SWI-TOOL-069-3 (1)
- SWI-TOOL-070 (1)
- SWI-TOOL-073 (1)

Step 1 — Front Door Alignment







Before starting the Auto Front Door Option installation you want to align the front door so that it tracks straight and level. The next couple of bullet points will show you how to measure and adjust the door to achieve the proper alignment.

- First you want to align the the upper door rail to the upper door support sheet metal. Measure the rail on the right and left side of the door opening from the rail to the front of the door support sheet metal with a Caliper when the door is in the open position. See Photo 1.
- Loosen the screws on the upper rail leaving one end tight to pivot from and measure and record that end. Verify that it is 5/8"(0.625) ±1/8"(0.125). With that measurement adjust the other end to match that measurement to within ±1/32"(0.0312). See Photo 1.
- Next measure the height of the door to the top of the upper door support with the door in the open position, record that measurement. Repeat with the door closed. Loosen the screws on the lower door rail leaving one tight to pivot from and adjust the height of the door closed to match the door open height to within 1\16"(0.062). See Photo 2
- Once the door has been aligned reverse the male end of the door open latch as shown in Photo 3.

Step 2 — Measure force to Open and Close the Door

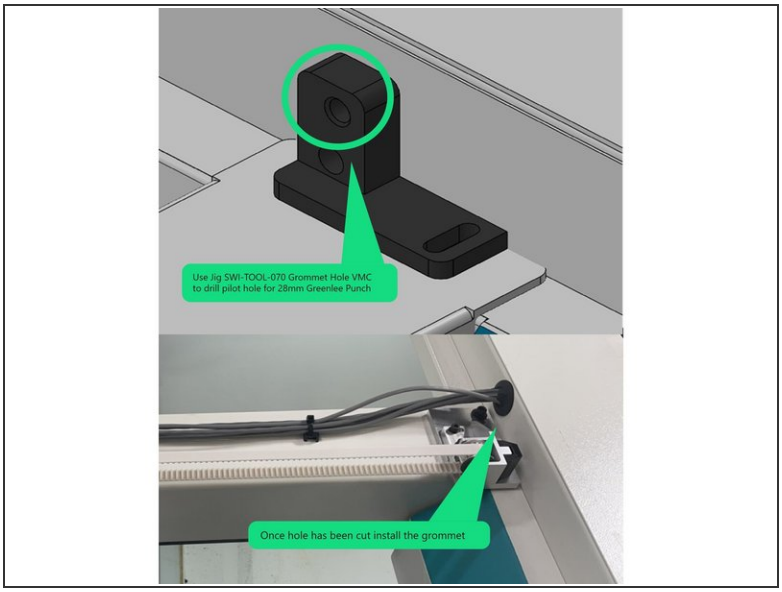


- Once the door has been aligned you want to measure the force required to release the door from the lock at the closed end of the door (Breakaway Torque), and the force required to move the door to the full open position (Rolling Torque). We use a fish scale to make these measurements.
  - To close the door from the open door position it should require no more than 10lbs of force to start moving, and no more than 8lbs of force to move to the closed latch. To open the door it should require no more than 12lbs of force to breakaway from the closed lock and no more than 8lbs of force to move to the full open position.

ⓘ ***These values will be used as a baseline. If these values change once the auto door is installed, that may mean that there is a mechanical misalignment problem.***

Step 3 — Add Cable Grommet and Door Bracket Holes

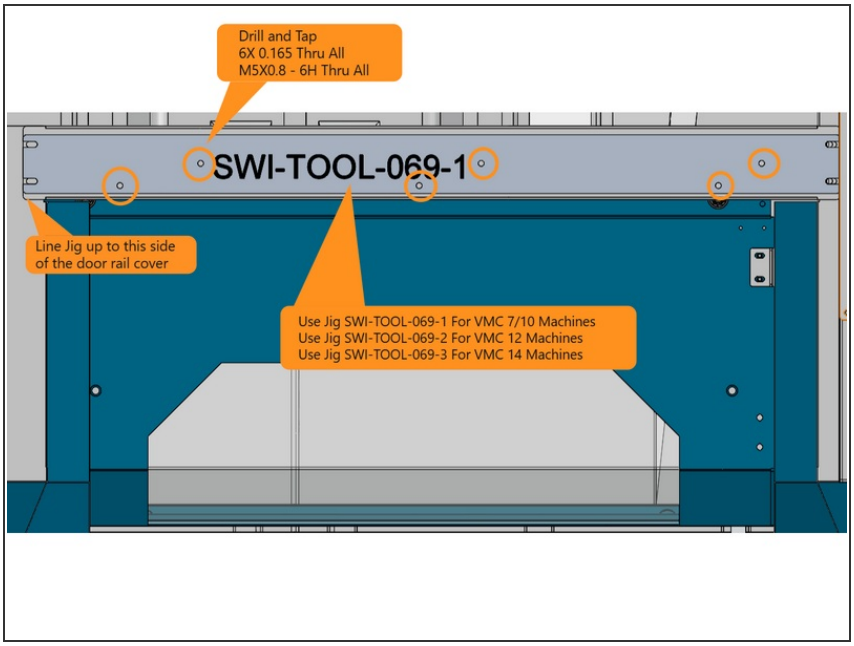




- To get started with the Auto Front Door Installation, remove the cover from the wire channel on the upper right side of the cabinet so the wiring for the motor and Home/Limit switch can be routed back to the electrical cabinet.
- Using Jig SWI-TOOL-070 Mark the pilot hole for the Greenlee punch or similar device to make the grommet hole in the wire channel on the upper right side of the main cabinet. Use a 28 mm (1.102")Greenlee punch or similar device to make the hole. Install the 28mm grommet(26779-5) that the motor and home switch cables route through. See Photo 2.

ⓘ ***Use existing hardware to mount Jig SWI-TOOL-070 to mark hole in wire channel.***

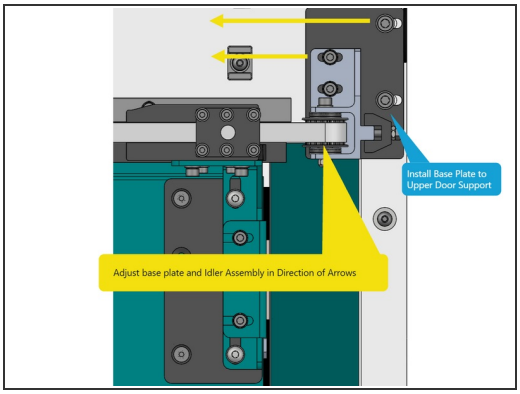
Step 4 — Drill Mounting Holes for Cable Tie Holders, and Brush

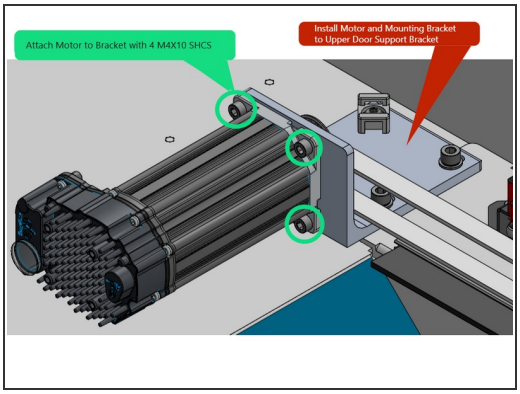


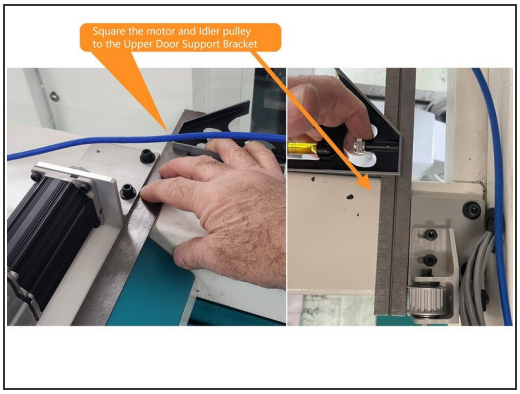
- Next using Jig SWI-TOOL-069-1 for VMC 7/10, SWI-TOOL-069-2 for VMC12, or SWI-TOOL-069-3 for VMC 14 machines, drill and tap the 3 holes used to mount the brush, and the 3 holes for mounting the cable tie holders for the motor and switch cables. Drill all holes 0.165" and tap M5. See photo 1

ⓘ ***Use existing hardware to mount Jig SWI-TOOL-069- 1, -2 or -3 to mark holes in upper door support bracket. Line Jig up to the left side of the door rail cover***

Step 5 — Install Idler Pulley and Motor Assemblies

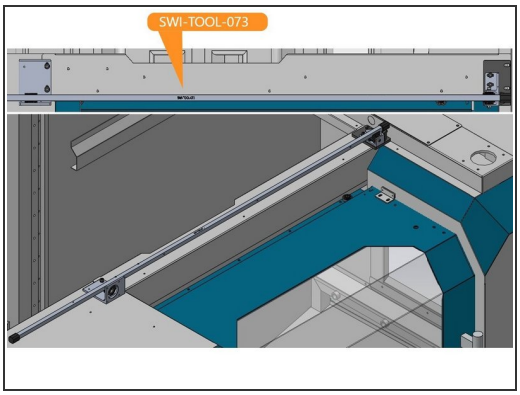


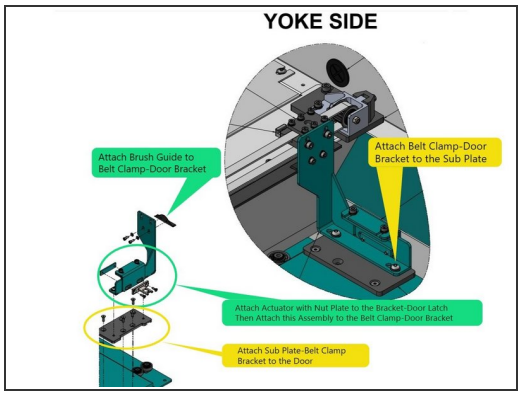


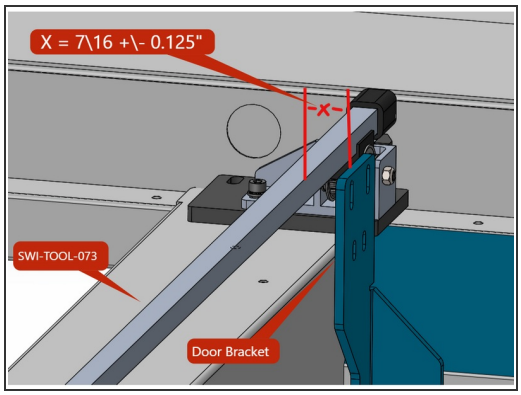


- Attach the base plate and idler pulley assembly to the enclosure on the right side of the upper door support bracket with (2) **M6X20** SHCS with flat and serrated washers (remove existing screws and replace with above hardware). See Photo 1.
- Adjust the idler and base plate assembly on the slots of the M6 screws all the way to the left (in direction of arrows in photo), do the same with the idler pulley bracket on the M5 screws. See photo 1.
- Locate the motor mounting bracket P/N 36144 and install the motor to it with four(4) **M4X10** SHCS, then install the key and pulley to the motor shaft. Tighten the 2 set screws in the pulley to the flats on the motor shaft. See Photo 2
- Next install the motor assembly to the machine enclosure on the left side of the door support bracket with two(2) **M6X20** SHCS with flat and serrated washers (remove existing screws and replace with above hardware). See Photo 2
- Using a T-Square, Square both the motor and idler pulley to the Upper Door Support Bracket and tighten the screws. See Photo 3

Step 6 — Align Motor and Pulleys

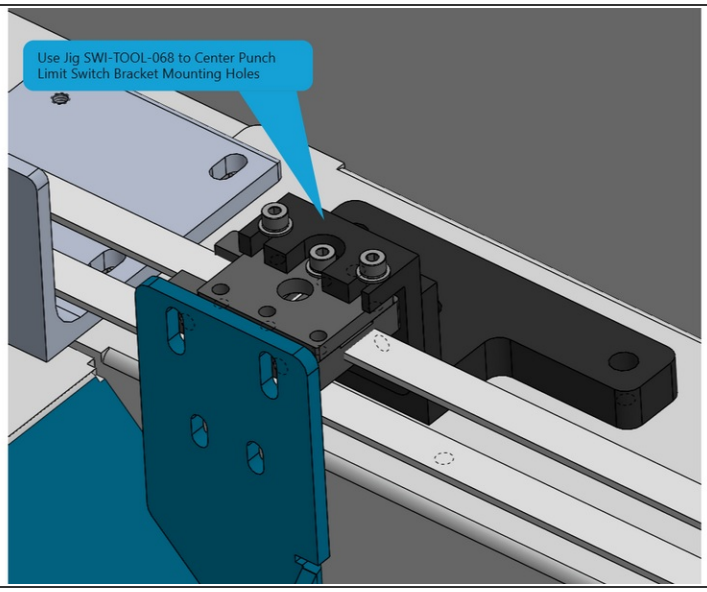


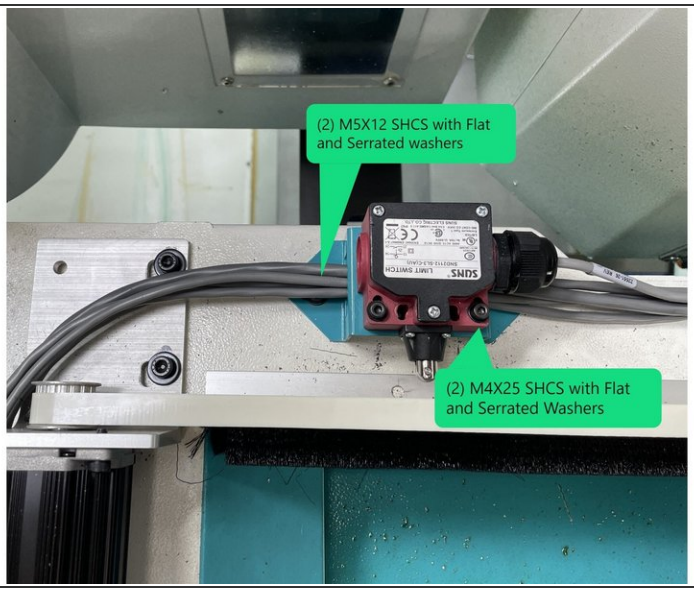




- Install SWI-TOOL-073 Pulley Alignment Jig to the pulleys as shown in Photo 2. Loosen the screws on the motor and the idler pulley and snug the idler pulley screws using the idler pulley as a pivot point.
- Install Door Bracket to Door.
  - Before you install the Belt Clamp-Door Bracket 36148-4 to the door attach the Brush Guide 36149 to the Door Bracket with two(2) M4X10 SHCS with flat washers. Then install the Actuator 26717-5 to the Bracket-Door Latch 36154 with (2) M4X10 FHCS (26B) and Nut Plate 3264093280. Next attach this assembly to the Belt Clamp-Door Bracket. See Photo 2
  - Attach the Sub Plate-Belt Clamp Bracket 36150-1 using two(2) M5X14 FHCS(26B). Then attach the Belt Clamp-Door Bracket 36148-4 to the Sub Plate using (2) M6X10 BHCS(27B). See Photo 2
- With the door closed, align the door bracket to the Pulley Alignment Jig, SWI-TOOL-073, to 7/16" (0.4375") ±1/8" (0.125"), where 7\16" is X in photo 3. Record that number.
- Then open the door and adjust the motor so that the distance from the Jig to the Door Bracket matches the number you recorded on the idler pulley side. You may need to go back and forth a few times to get the numbers to match within 0.030".

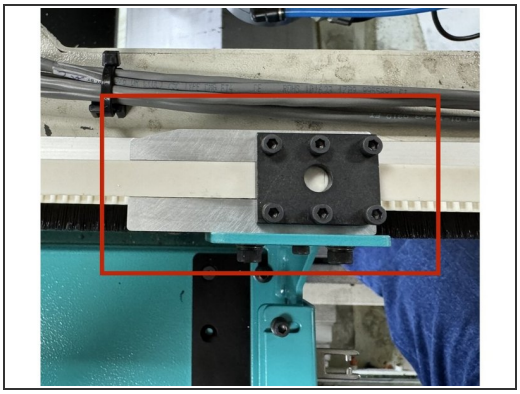
Step 7 — Install Door Home/Limit Switch

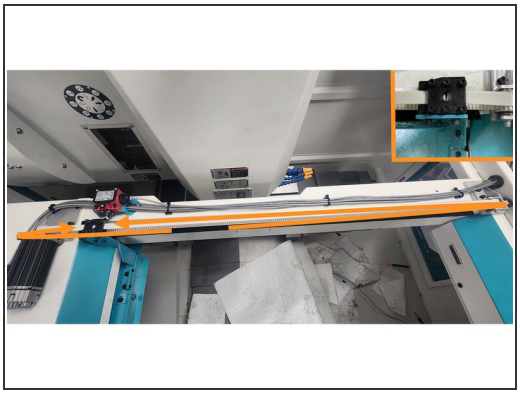


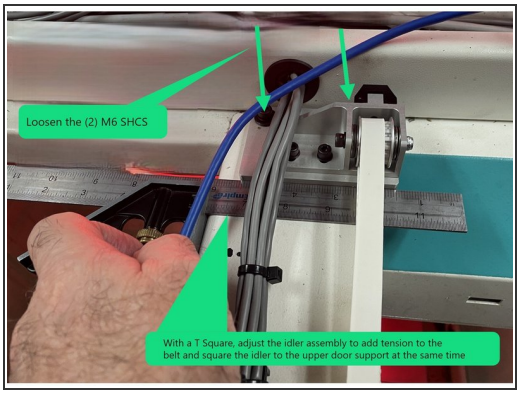


- Next you need to install the Home/Limit switch. Using Jig P/N SWI-TOOL-068, open the door all the way and install the Jig to the door bracket. Now with a center punch mark the hole locations through the bushings in the Jig. Finally drill and tap the holes for an M5X0.8 6H thread.
- Install Home/Limit Switch P/N 22551-26 to the Home/Limit Switch Bracket P/N 36167 with (2) M4X25 SHCS and flat washers. Then attach the switch and bracket to the Upper Door Support Sheet Metal using (2) M5X12 SHCS with serrated and flat washers as shown in Photo 2.

Step 8 — Install Belt

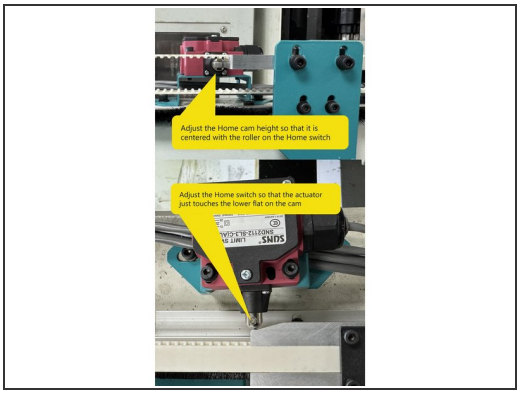


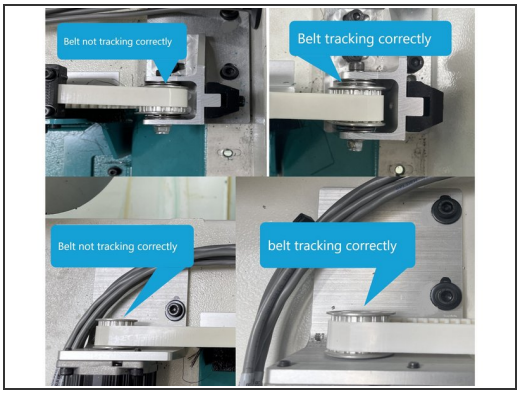


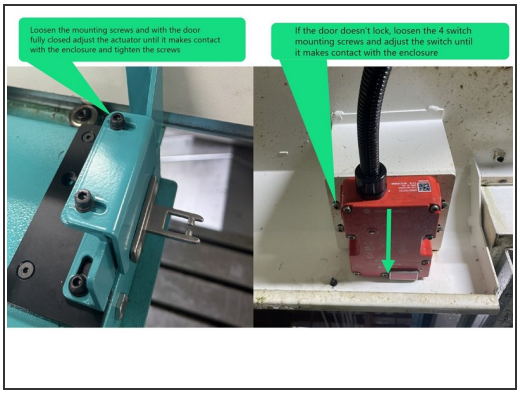


- Install Clamp-Base-Belt (36142) to the belt bracket and mount the Plate-Belt Clamp-XL (33309) to it with (6) M4-0.7X16 (25B) SHCS. See Photo 1
- Feed the belt through the idler pulley, around the motor pulley and back to the belt clamp. Belt clamp should attach to the belt on the upper side of the pulley. Pull the belt snug in the clamp and tighten the **M4** screws. You may need to cut one or two teeth from the belt to minimize the slack in the belt when installed. See Photo 2
- Loosen the 2 M6X16 SHCS in the idler base plate assembly. Using a T Square push the idler base plate to the right to remove any slack in the belt and square the Idler base assembly to the upper door support sheet metal at the same time . See photo 3.

Step 9 — Belt Alignment and Door Lock Adjustment







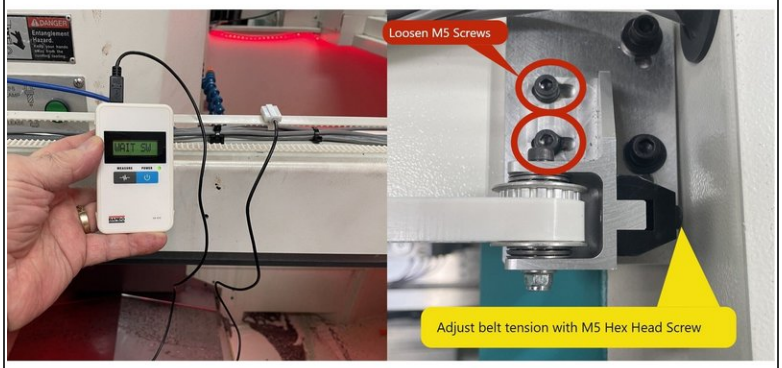
- To align the belt, move the door to where the Home cam is close to the home switch. Adjust the height of the cam so that it is centered with the roller on the Home switch. See Photo 1
- Adjust the home switch so that the actuator just touches the lower flat on the cam. See Photo 1
- Next open and close the door a few times to see if the belt is tracking in the center of the pulleys. If not loosen the motor bracket screws and adjust the motor bracket so that the belt is centered in both pulleys when opening and closing the door.

ⓘ ***You may need to go back and forth a few times to get the belt to track in the center of the pulleys.***

ⓘ ***You may also need to loosen the (6) M4 screws that clamp the belt if the belt isn't held straight in the belt clamp, straighten the belt and and then tighten the screws.***

- Open and close the door a few times to verify the belt is tracking correctly, if it is verify the belt clamp bracket screws, idler pulley screws and motor screws are tight.
- Next adjust the Actuator for the door lock. First close the door, then loosen the screws on the actuator mounting bracket. With the door fully closed move the actuator towards the Sheet metal enclosure until it touches it. Tighten the screws, you shouldn't be able to open the door without it being unlocked.
- If the door opens, loosen the four (4) mounting screws and adjust the switch so that it is making contact with the sheet metal of the enclosure.

Step 10 — Adjust the belt tension

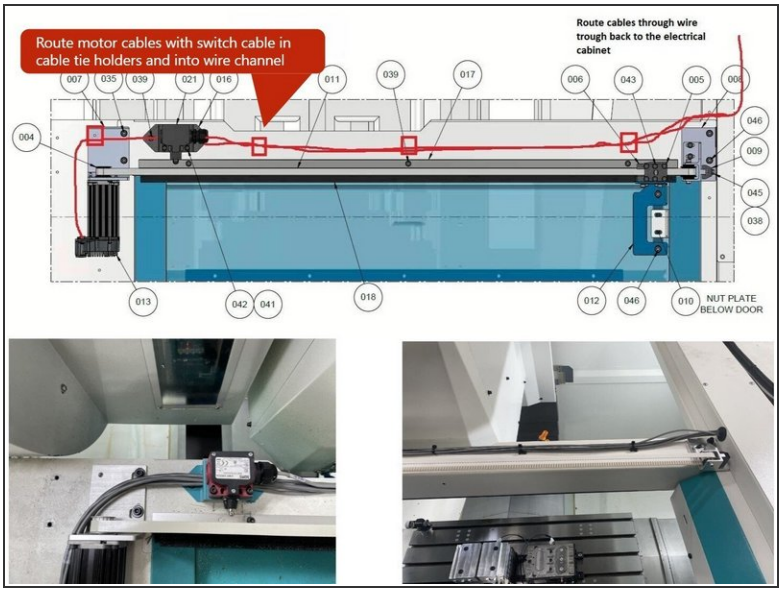


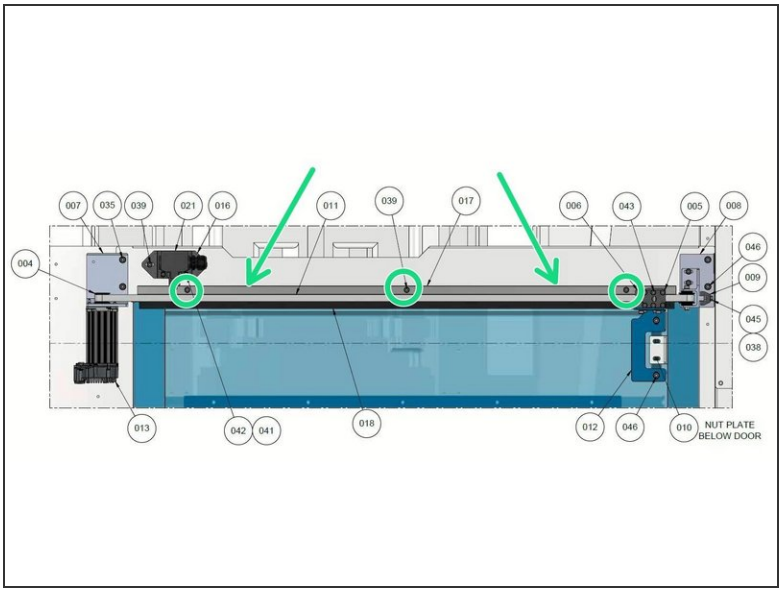


- The belt now needs to be tensioned. To do this loosen the two(2) M5 screws that mount the idler pulley assy to the base plate and then lightly snug them. Next attach the sensor from the Bando Belt Tension Meter to the belt halfway between the (2) pulleys with the door in the open position. See Photo 1.
- Using an 8mm open end wrench tighten the belt adjustment screw (M5 Hex Head) with an 8mm open end wrench until the belt tension reads 50Hz ±2Hz on the Bando Meter when the belt is plucked. Then tighten the two(2) M5 socket head cap screws.
- Now that the Auto Front Door Option has been installed and the belt aligned and tensioned we once again measure the force required to open and close the door using a fish scale.
- The force to move the door from the open/closed positions should be about the same as after the door was aligned in step 1, 10-12lbs of force to start moving (breakaway) and no more than 8lbs to open/close the rest of the way (rolling torque).

ⓘ *If the door requires more than the above breakaway or rolling torque values, verify the motor is square to the Upper Door Mounting Bracket, check the Door Bracket alignment, and the belt tension.*

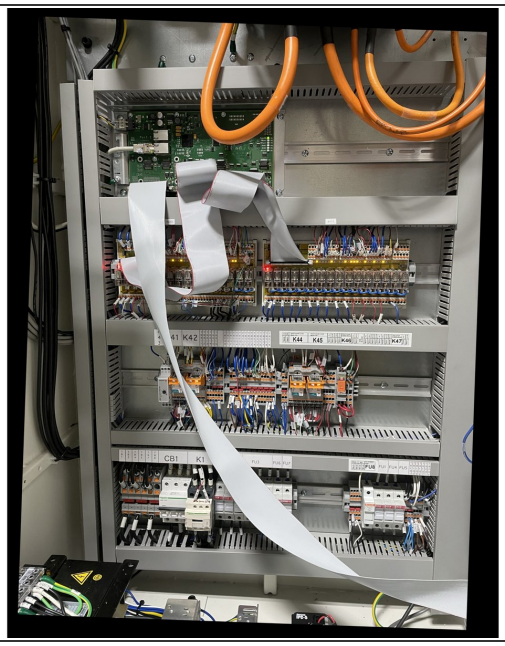
Step 11 — Route Door Motor and Switch Cables to Electrical Cabinet





- Next connect the Motor Power and Signal cables to the motor. Route through the limit switch bracket and join them with the Home/Limit switch cable and tie them all into the cable tie holders and run them back to the wire channel and into the electrical cabinet. See Diagram 1.
- Next install the Brush P/N 36169 and Brush Holder P/N 36168-1 to the machine with (3) M5-0.8X12 SHCS so that the brush is under the door drive belt. (Locations circled in green in Photo 2)

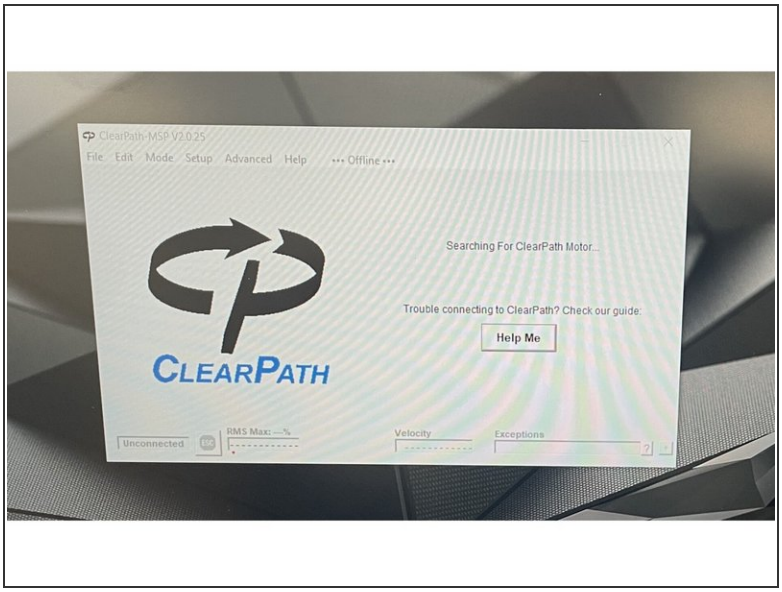
Step 12 — Electrical Wiring Installation

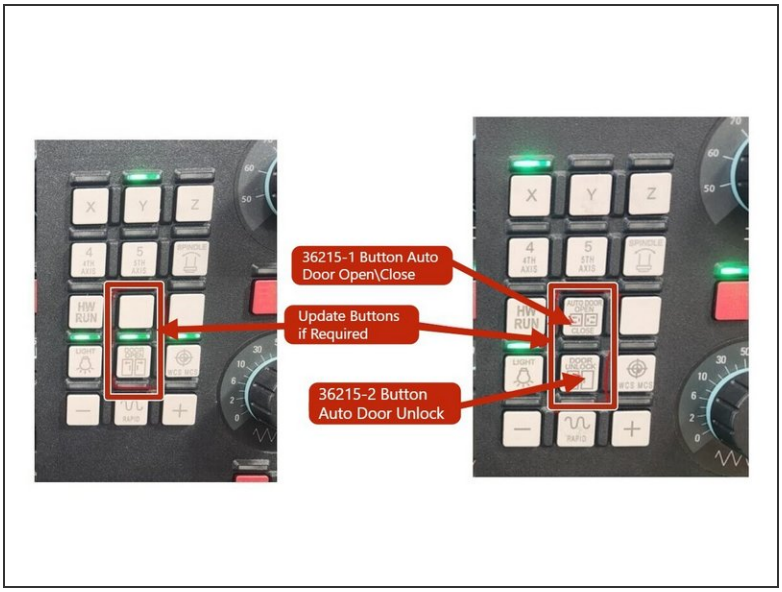


⚠ ***Before you start any wiring of the Auto Front Door Option shut off the main power and lock the power out for safety.***

- To install the electrical wiring refer to Drawing 36000-1 for VMCsi 7/10 machines and 36000-3 for VMCsi 12/14 machines.

Step 13 — Auto Door Programming



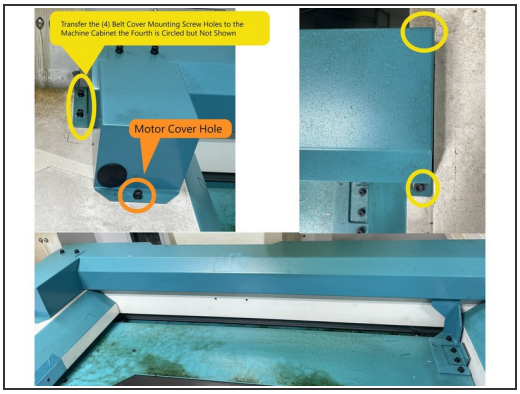


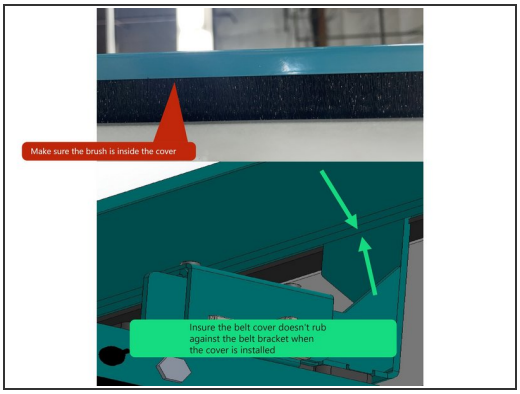
- Before the door can be used in automatic mode it needs to be programed.

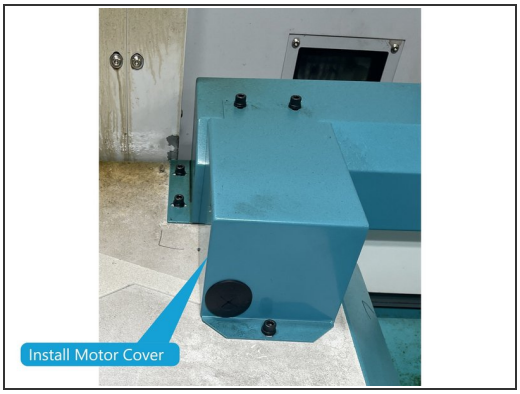
ⓘ ***Before programming the Auto Door the PLC needs to be updated to 05.04.84 or newer for the door to open to the correct position.***

- Use the link below to load the Auto Front and Side Door Programing Procedure to assist you in programing the servo drive and motor.
  - Auto Door Programing Guide: https://southwesternindustries.dozuki.co...
- Once the Auto Door has been programmed you need to test it. Use the following test procedure to test the auto door.
  - Use this link for the Auto Door Test Procedure: https://southwesternindustriesinc.sharep...
- Once the programming is done update the MCP buttons on the control panel. Remove the existing buttons and install the new ones as shown in Photo 2.
- Once the programing and testing is complete open and close the door a few times and verify you can unlock and open and close the door with the MCP buttons.

Step 14 — Install Belt Cover







- Install the belt cover and transfer the mounting hole locations from the cover to the top of the machine sheet metal. Then remove the cover and drill and tap the holes M5X0.8 6H. See Photo 1
- Next install the motor cover and transfer the one hole and drill and tap it M5X0.8 6H. See Photo 1
- Now install the belt cover and verify that the end of the brush is inside of the cover, if not remove the cover, adjust the brush and reinstall the cover. See Photo 2
- Verify the belt cover doesn't rub against the door bracket when installed. When the cover is aligned correctly tighten the screws. See Photo 2.
- Finally install the motor cover, and clean machine. This completes the Auto Front Door installation.