

TECHNICAL DOCUMENT

QUICK-CHANGE MOTOR CONNECTION KIT INSTALLATION

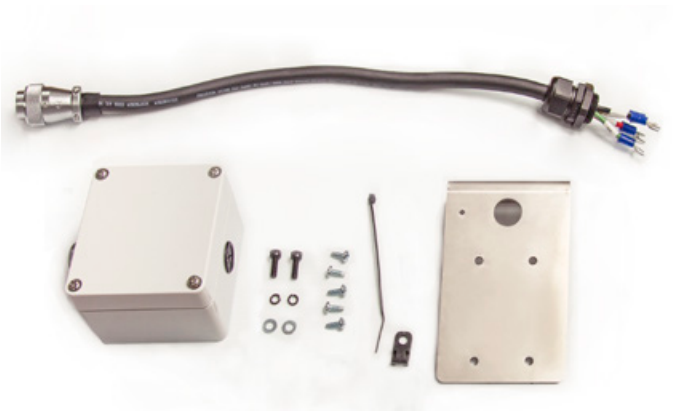
Product Identification: Quick-Change Motor Connection Kit (PN 35167)

Purpose: This document gives instructions to install a Quick-Change Motor Connection Kit on a PCNC 1100 or PCNC 770 mill to facilitate use of a High-speed Spindle (PN 35178).

NOTE: Complete this installation prior to installing High-speed Spindle Kit or RapidTurn.

| Qty. | Quick-Change Motor Connection Kit | PN |
|------|-----------------------------------|-------|
| 5 | 6-32 Thread Cutting Screw | 35438 |
| 1 | Cable Tie | 31719 |
| 2 | M4 Flat Washer | 31087 |
| 2 | M4 Lock Washer | 35446 |
| 2 | M4 x 12 mm Socket Head Cap Screw | 35445 |
| 1 | Mounting Bracket | 35160 |
| 1 | Plastic Mounting Tab | 31460 |
| 1 | Quick-Connect Cable | 35173 |
| 1 | Quick-Disconnect Junction Box | 35176 |

NOTE: If any of these items are missing, contact Tormach Customer Service for a replacement at (608) 849-8381.



Required Tools:

- 3 mm Hex Wrench
- 8 mm Hex Extension
- 8 mm Wrench
- #1 Phillips Screwdriver
- #2 Phillips Screwdriver
- Ratchet
- Ratchet Extension


NOTE: This document shows installation of the Quick Change Motor Connection Kit on a PCNC 1100 mill; installation on a PCNC 770 mill is similar.



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Motor Junction Box Re-wiring

1. Power off the machine following the *Power Off/On Procedure* below.

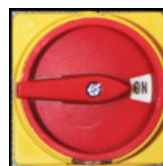
 **WARNING! Electrical Shock Hazard:** Be sure to power off machine before making any electrical modifications. Failure to do so may result in serious injury or death.

Power Off/On Procedure

| | |
|------------------|---|
| Power Off | 1. Push in the red Emergency Stop button. |
| | 2. From the PathPilot interface, select <i>Exit</i> ; when prompted, select <i>OK</i> to power off. |
| | 3. Turn the Main Disconnect <i>Off</i> (see image at right). |



| | |
|-----------------|--|
| Power On | 1. Turn the Main Disconnect <i>On</i> (see image at right). |
| | 2. After PathPilot loads, turn the red Emergency Stop clockwise to release it. |
| | 3. Press the green Start button. |
| | 4. From the PathPilot interface, select <i>Reset</i> . |



2. Remove the spindle door and set it aside (see **Figure 1**).



Figure 1

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3. Unlock the Spindle Motor Pivot Plate with the Pivot Plate Clamp Handle (see **Figure 2**).

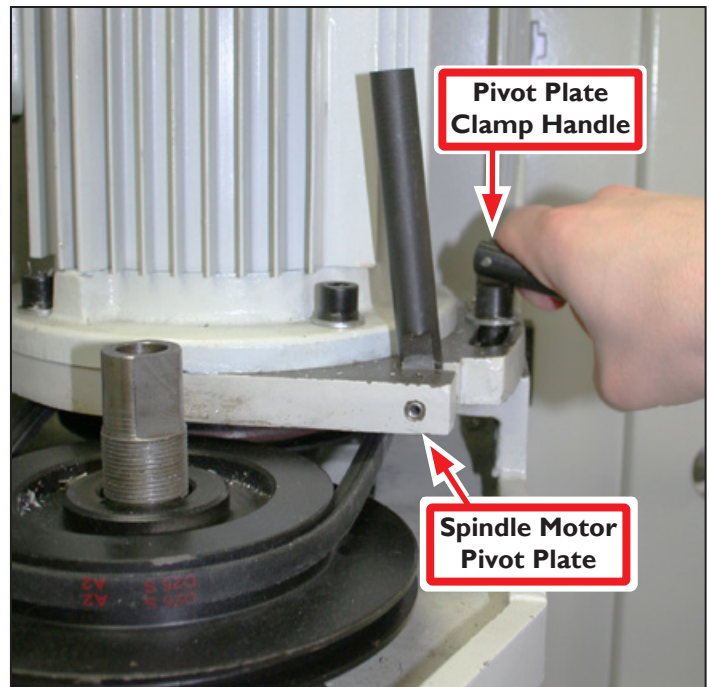


Figure 2

4. Pull the motor forward with the Spindle Motor Handle. When the Spindle Belt slackens, disengage it from the Spindle Pulley (see **Figure 3**).

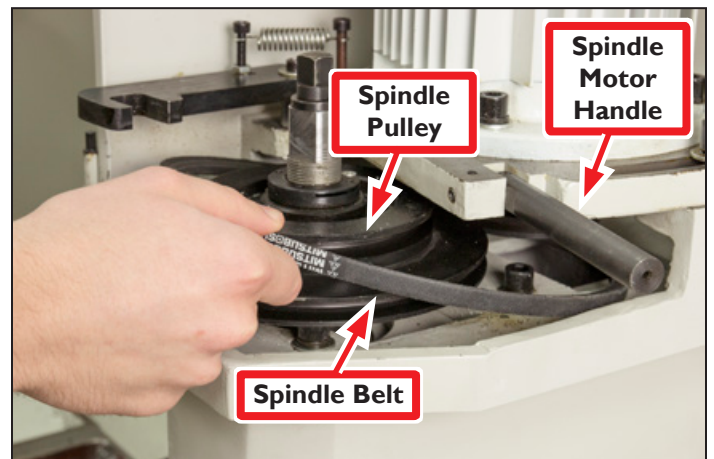


Figure 3

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5. To access Motor Junction Box, you must first reposition the Spindle Motor. Loosen and remove the four Motor Mount Screws from the base of Spindle Motor with an 8 mm hex extension, a ratchet extension, and a ratchet (see **Figure 4**).

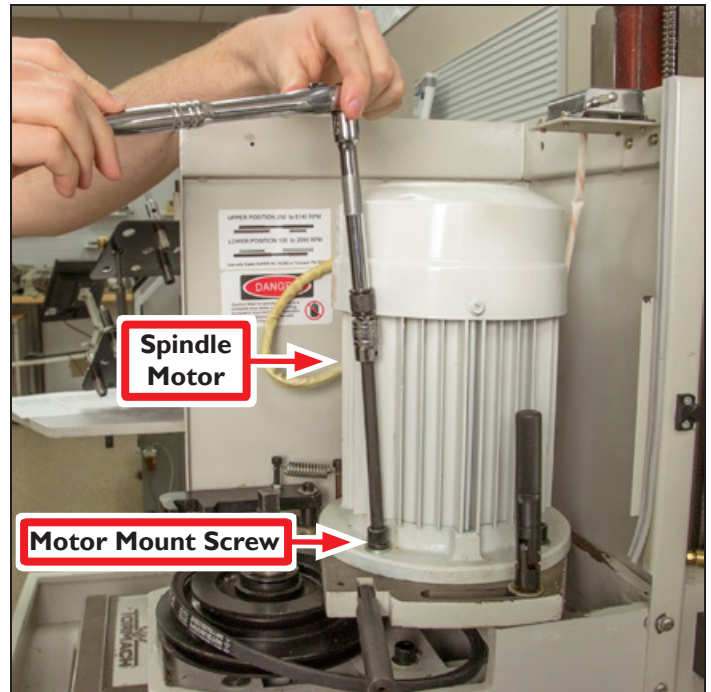


Figure 4

6. Rotate the Spindle Motor counterclockwise to access Motor Junction Box as shown in **Figure 5**.
7. Temporarily tighten the four Motor Mount Screws to the base of the Spindle Motor with the Motor Junction Box facing forward.
8. Loosen and remove four Phillips Head Fasteners with a #2 Phillips screwdriver; set aside (see **Figure 5**).
9. Remove the Cover Plate from the Motor Junction Box (see **Figure 5**) and set it aside.



Figure 5

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10. Inside the Motor Junction Box, identify the wires from the VFD Power Cable on the right (labeled 400, 401, and 402).

NOTE: Wires may not be in numerical order.

IMPORTANT! Don't move or modify any wires in the Motor Junction Box other than those shown in **Figure 6**.

11. In the spaces on **Figure 6**, write down the wire numbers that you identified in Step 10. You'll use the wire numbers later in this procedure.
12. Remove the three Power Wires (labeled 400, 401, and 402) that you identified in Step 10 with an 8 mm wrench (see **Figure 7**). Temporarily push the wires aside (see **Figure 8**).
13. Remove the spindle motor Ground Wire (labeled PE) from Mounting Screw with a #2 Phillips screwdriver (see **Figure 8**).

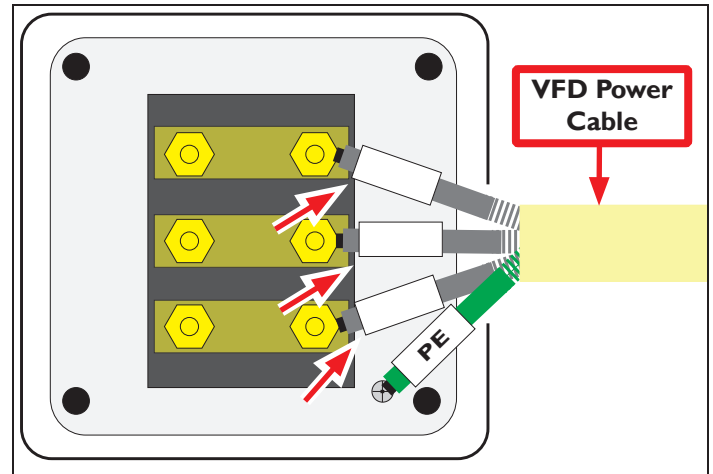


Figure 6

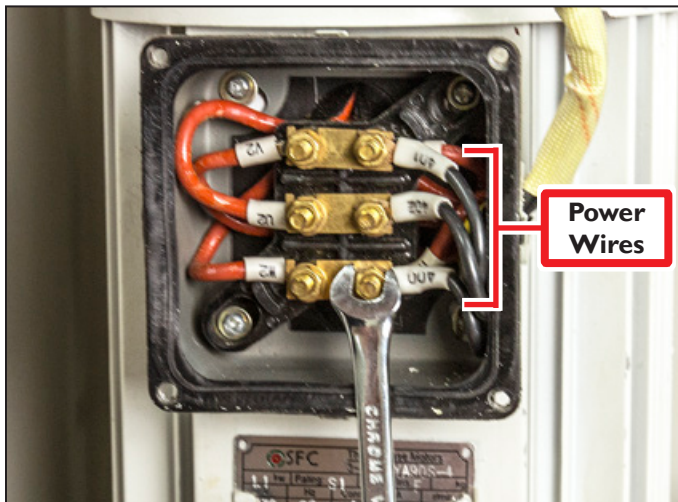


Figure 7

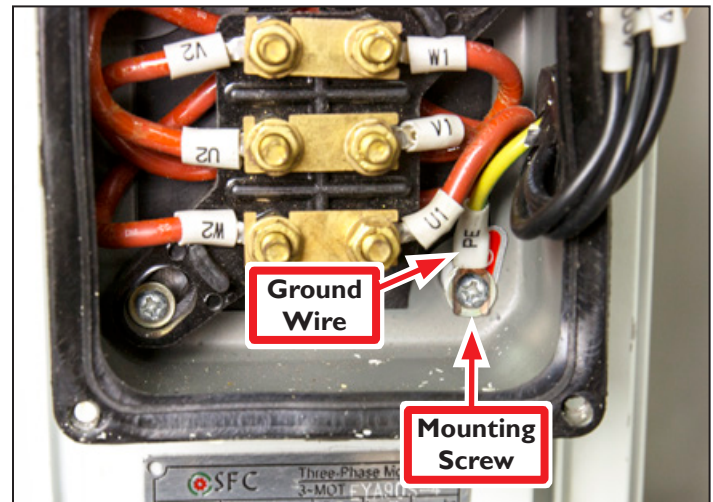


Figure 8



Figure 9

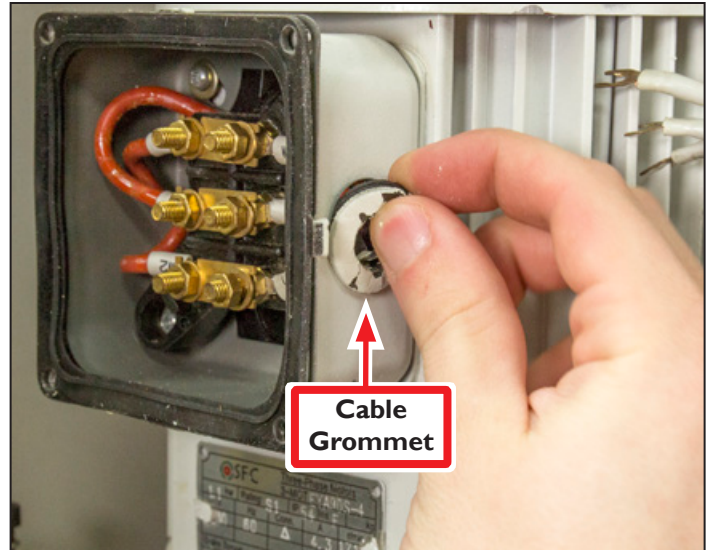


Figure 10

14. Pull the four loose wires out of the Motor Junction Box (see **Figure 9**).
15. Remove the Cable Grommet from the Motor Junction Box (see **Figure 10**). Then, discard it.

16. Identify the Quick-Connect Cable (provided); it replaces the VFD Power Cable in the Motor Junction Box and connects to the previously used terminals.
17. Remove Plastic Nut (provided) from the liquid-tight cord grip on one end of Quick-Connect Cable.
18. Put the four loose wires into the Motor Junction Box (see **Figure 11**).
19. Slip the Plastic Nut over the loose wires, and then screw it on to the cord grip (see **Figure 11**).

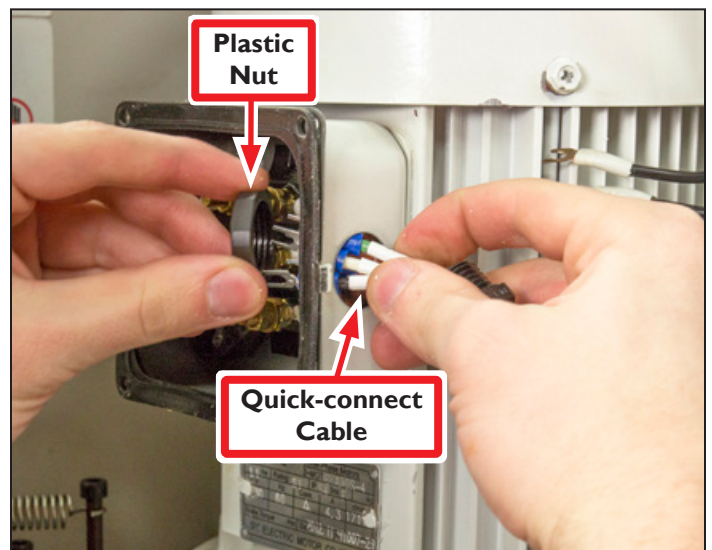


Figure 11

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NOTE: The O-ring of the liquid-tight cord grip must be on the outside of the Motor Junction Box, as shown in **Figure 12**.



Figure 12

20. Match the spade terminals on the Quick-Connect Cable (wires U, V, and W) to their corresponding wire numbers (400, 401, or 402) as recorded in Step 11. Refer to the table below for specific connections:

| Power Wires | Quick-connect Cable |
|-------------|---------------------|
| 400 | U |
| 401 | V |
| 402 | W |

21. Attach and tighten the three spade terminals with an 8 mm wrench (**Figure 13**).
22. Attach and tighten the ground terminal with a #2 Phillips screwdriver.
23. Put the Cover Plate back on the Motor Junction Box with the four Phillips Head fasteners that you set aside earlier.

NOTE: Don't put the spindle motor back in its original position yet.



Figure 13

Quick-Disconnect Junction Box Installation

1. Remove the Bracket from the back of the spindle motor cover with a #2 Phillips screwdriver (see **Figure 14**).

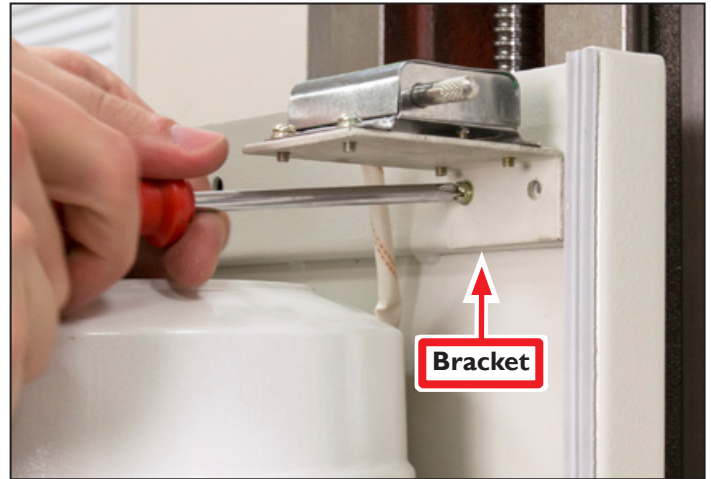


Figure 14

2. Separate the Door Switch from the Bracket with a #2 Phillips screwdriver (see **Figure 15**). Then, discard the old bracket and its fasteners.

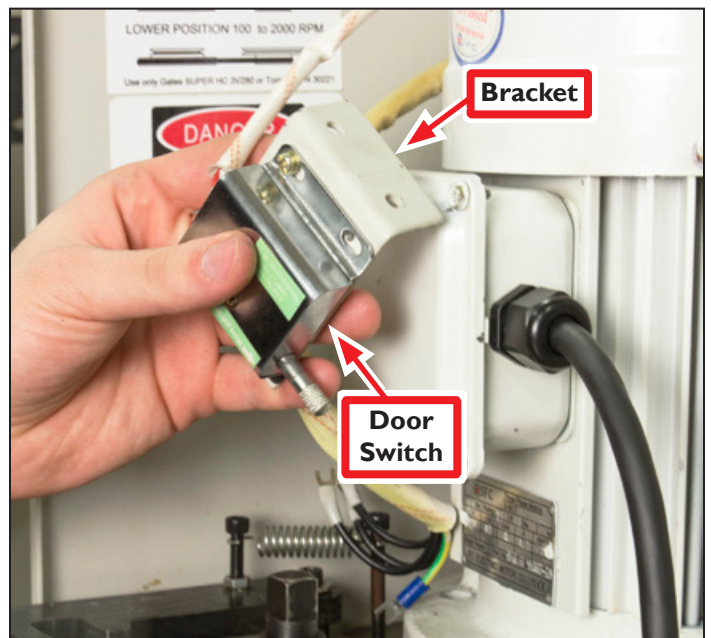


Figure 15

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3. Remove the cover plate from the provided Quick-Disconnect Junction box with a #2 Phillips screwdriver (see **Figure 16**).
4. Find the VFD Power Cable that you removed from the Motor Junction Box earlier (see **Figure 16**).
5. Put the VFD Power Cable through the Flexible Grommet in the Quick-Disconnect Junction Box (see **Figure 16** and **Figure 17**).

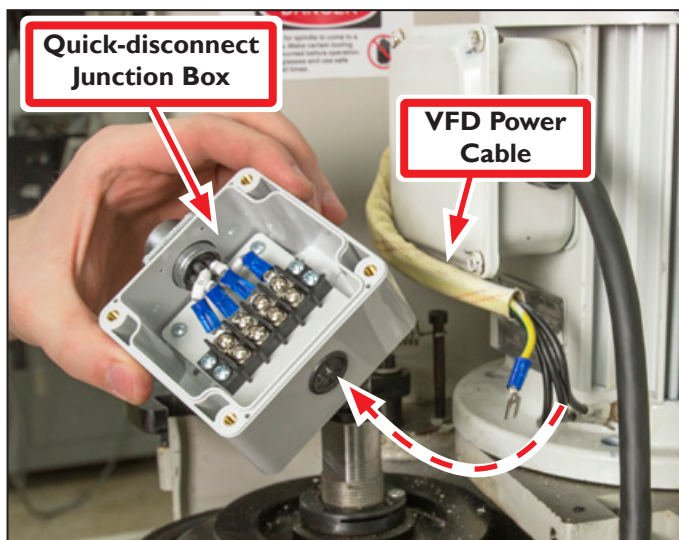


Figure 16

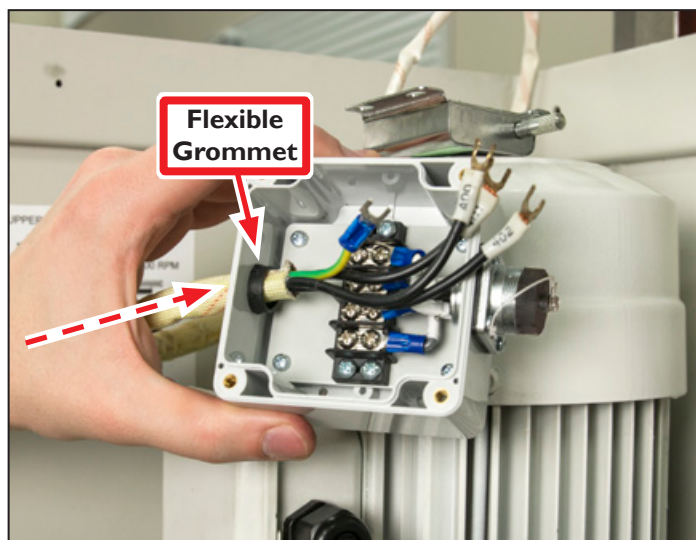


Figure 17

6. Connect the spade terminals from the VFD Power Cable to the Quick-Disconnect Junction Box as indicated in the table below (see **Figure 18**).

| | VFD Power Cable | Quick-disconnect Junction Box |
|------|-----------------|-------------------------------|
| Wire | 400 | U |
| | 401 | V |
| | 402 | W |
| | PE/GND | GND |

7. Put the cover plate back on the Quick-Disconnect Junction Box. Then, turn the box over.

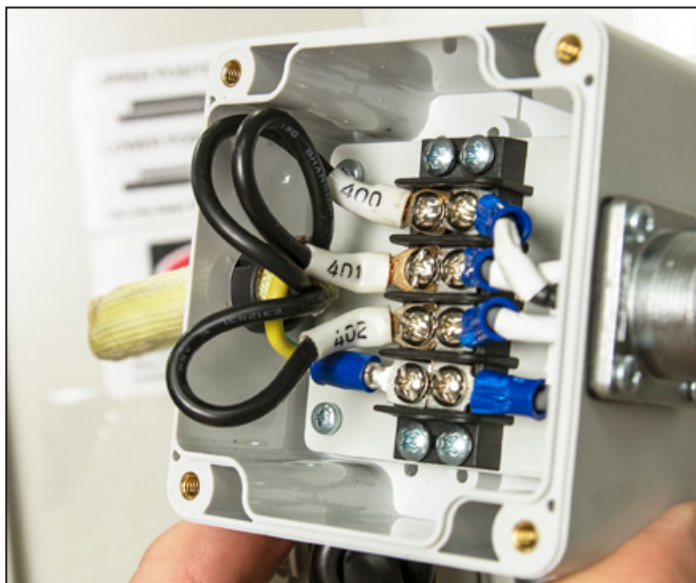


Figure 18

- Align the four pilot holes in the Quick-Disconnect Junction Box with the holes in the Mounting Bracket (provided) and the Door Switch.

NOTE: Verify that the Spindle Door Switch is positioned as shown in **Figure 19** and **Figure 20**.

- Connect the assembly together with four 6-32 Thread Cutting Screws (provided) as shown in **Figure 19**.

Mounting Bracket Assembly

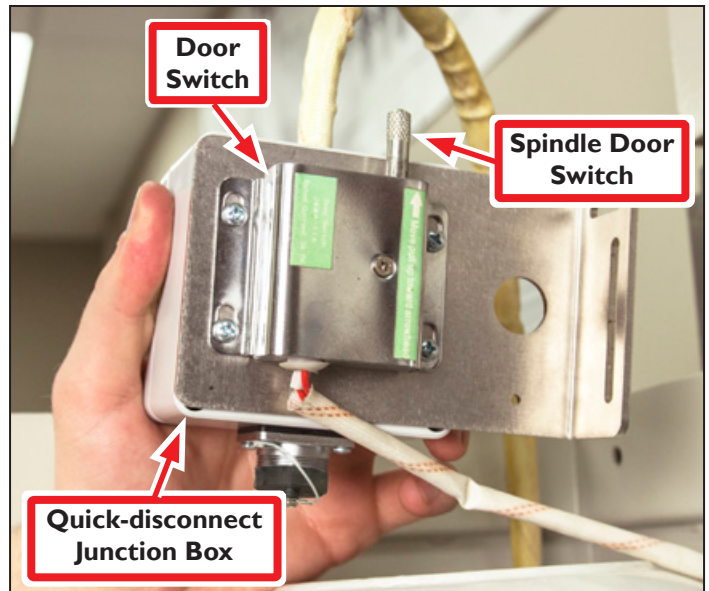


Figure 19

- Install the Mounting Bracket Assembly in place of the discarded bracket with two M4 × 12 mm Socket Head Cap Screws, two M4 Flat Washers, and two M4 Lock Washers (provided) (see **Figure 19** and **Figure 20**).
- Secure the Plastic Mounting Tab with one 6-32 Thread Cutting Screw (provided) to the Mounting Bracket.
- Secure the VFD Power Cable to the Plastic Mounting Tab from the Quick-Disconnect Junction Box with a Cable Tie (provided) as shown in **Figure 21**.



Figure 20

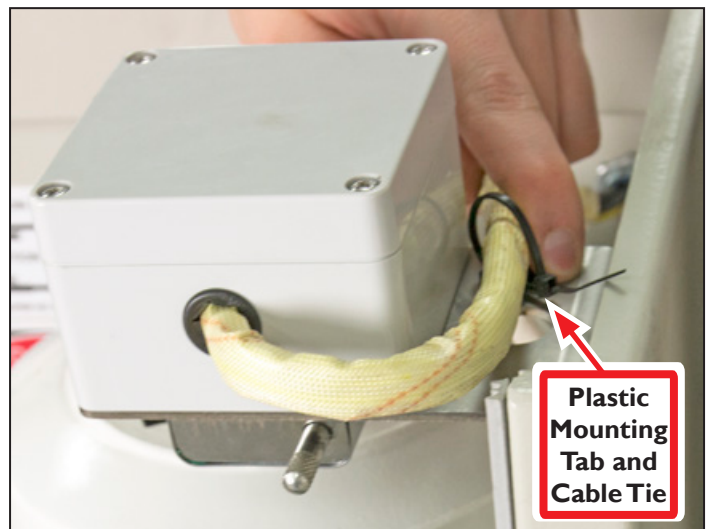


Figure 21

13. Twist the Dust Cover off of the Quick-Disconnect Junction Box (see **Figure 22**).



Figure 22

14. Route the Quick-Connect Cable to the Quick-Disconnect Junction Box, and then screw down threaded connector (see **Figure 23**).

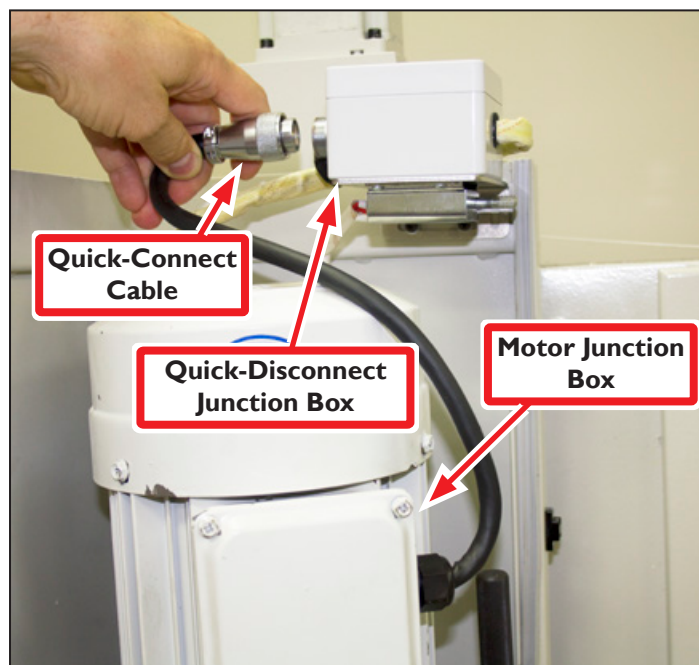


Figure 23

Motor Direction Confirmation

Test for proper motor rotation direction as detailed below.

1. Engage the Spindle Belt with the Spindle Pulley. For more information, refer to Steps 3 through 5 in the *Motor Junction Box Re-Wiring* section.
2. Push the motor back with the Spindle Motor Handle, and lock the Spindle Motor Pivot Plate in place with Pivot Plate Clamp Handle.
3. Put back the spindle Door that you set aside earlier (see **Figure 24**); close the Door.
4. Adjust Spindle Door Switch horizontally as necessary to until it properly actuates. For more information, refer to Steps 8 through 9 in the *Quick-Disconnect Junction Box Installation* section.
5. Temporarily power on the machine following the *Power Off/On Procedure* detailed earlier in this document.
6. From the PathPilot interface, command 500 RPM spindle speed.
7. Confirm the direction of spindle motor rotation. For a forward (M3) spindle command, the spindle should rotate in the direction shown in **Figure 25**.

NOTE: If the spindle is operating correctly, go to the *Final Re-Assembly* section.

8. If the spindle is spinning in the opposite direction shown in **Figure 25**, power off the machine following the *Power Off/On Procedure* detailed earlier in this document.
9. Remove the cover plate on the Motor Junction Box with a #2 Phillips screwdriver.
10. Inside the Motor Junction Box, identify the wires from Quick-Connect Cable (labeled U, V, and W).

NOTE: Wires may not be in alphabetical order.



Figure 24

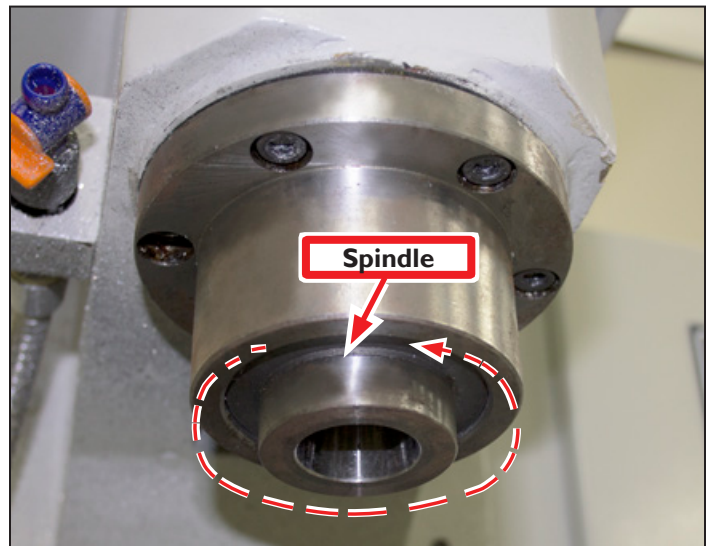


Figure 25

11. Swap wires U and V of the Quick-Connect Cable. For more information, refer to the *Motor Junction Box Re-Wiring* section.
12. Put back the Motor Junction Box cover plate.
13. Repeat Steps 4 through 6 to test the direction of the spindle motor rotation.

Final Re-Assembly

1. Power off the machine following the *Power Off/ On Procedure* detailed earlier in this document.
2. Loosen and remove the four Motor Mount Screws from the base of the Spindle Motor with an 8 mm hex extension, a ratchet extension, and a ratchet.
3. Rotate the Spindle Motor clockwise so that the Motor Junction Box faces the left side of the machine, as shown in **Figure 26**.
4. Secure the Spindle Motor with four Motor Mount Screws (see **Figure 26**).

NOTE: For information on installing High-speed Spindle Kit (PN 35178) or RapidTurn (PN 32901), refer to documentation that ships with the product.

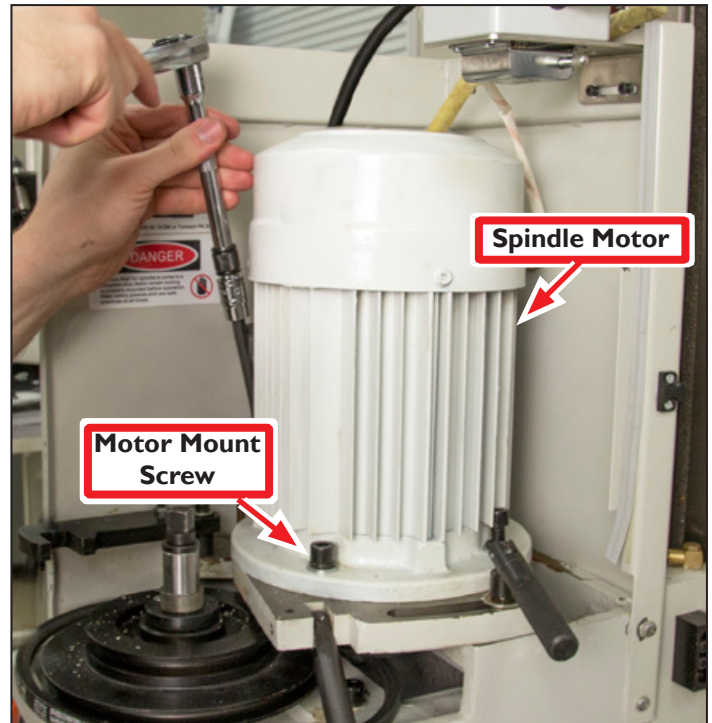


Figure 26