

INSTALLATION GUIDE

TTS TO BT30 ATC CONVERSION KIT, 770M

PURPOSE

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This document gives instructions on installing the TTS to BT30 ATC Conversion Kit, 770M.

PRODUCT INFORMATION

Product: TTS to BT30 ATC Conversion Kit, 770M (PN 50394)

Quantity	Description
1	BT30 ATC Carousel Assembly
1	Spindle Brake Solenoid



Note: If any items are missing, we can help. Create a support ticket with Tormach Technical Support at tormach.atlassian.net/servicedesk for guidance on how to proceed.

REQUIRED TOOLS

This procedure requires the following tools. Collect them before you begin.

- 5/16 in. drill bit
- Electric drill
- Flat-blade screwdriver
- Metric hex wrench set

INSTALLATION

Complete the following steps in the order listed:

Prepare the Machine	3
Remove the Existing Carousel (TTS)	3
Install the New Carousel (BT30)	4

Prepare the Machine

1. Power off the machine and the PathPilot controller.
 - a. Push in the machine's red Emergency Stop button, which removes power to motion control.
 - b. From the PathPilot interface, select **Exit**.
 - c. Turn the Main Disconnect switch to **OFF** on the side of the electrical cabinet.
2. Disconnect the air to the machine.
3. Remove the access panel from the left rear panel of the enclosure:
 - a. Remove 11 M5 flange screws with a 3 mm hex wrench. Set the screws aside.

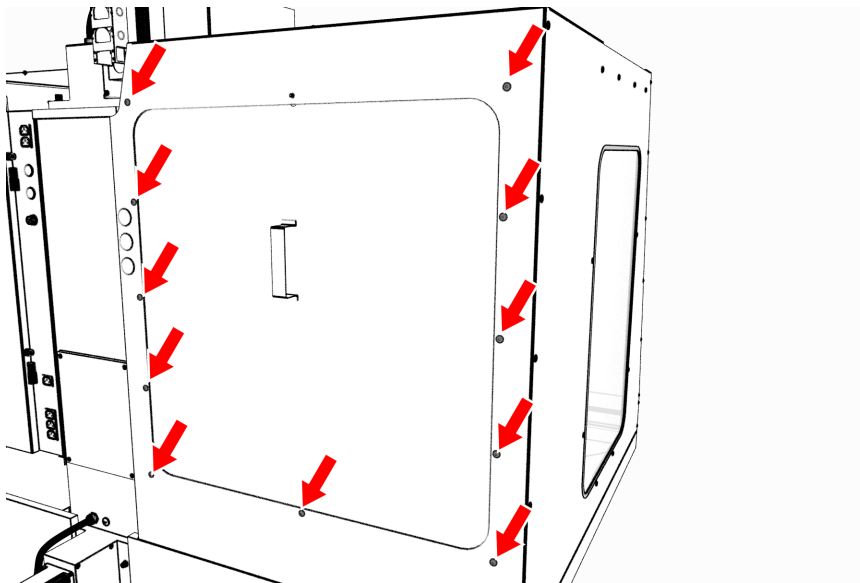


Figure 1: Access panel attached to the left rear panel.

- b. Move the access panel off of the M5 flange screw (inside the enclosure), and tilt it toward you to move it through the opening on the left rear panel.
- c. Set the access panel aside.

Remove the Existing Carousel (TTS)

1. Using a 3 mm hex wrench, remove the three M5 flange screws on the Automatic Tool Changer (ATC) front cover plate. Set the screws aside, and discard the cover plate.
2. Disconnect the three sets of wires inside the stepper housing, and then slide the entire cable up and out of the notch on the left side.
3. Remove the 1/4 in. air line from the push-to-connect fitting on the left side of the stepper housing.

- Using a 5 mm hex wrench, loosen the top two bolts securing the ATC carousel assembly to the actuator plate approximately 1/4 in. Then, remove the bottom two bolts, and set them aside.

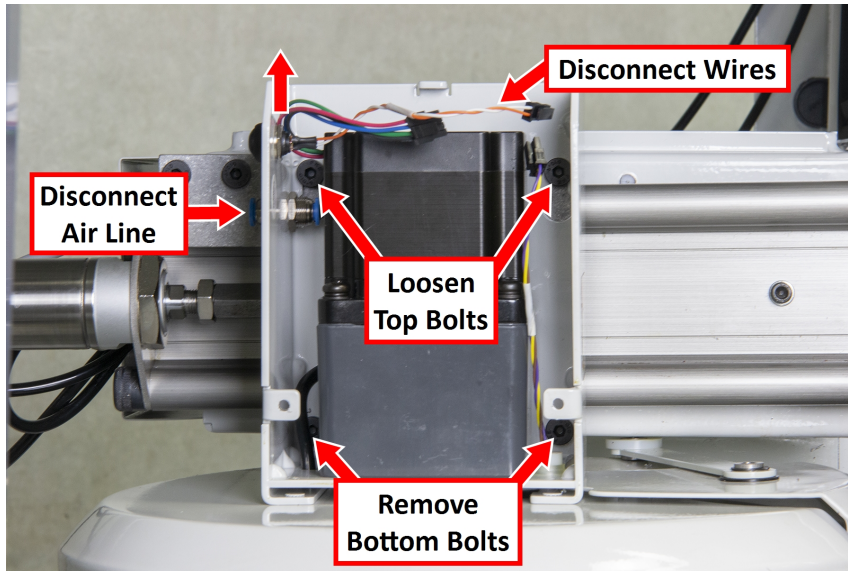


Figure 2: ATC carousel disassembly.

- From inside the ATC electrical box, disconnect the chip door arm with a 4 mm hex wrench.
- Lift the ATC carousel assembly from the two bolts.

Install the New Carousel (BT30)

- Find the provided BT30 ATC carousel assembly. Remove the three M5 flange screws from its front cover plate with a 3 mm hex wrench, and set the cover plate aside.
- Tipping the top of the ATC carousel assembly forward, hang it on the two bolts of the actuator plate.



Figure 3: Hanging the ATC onto the actuator plate.

- Tighten the top two bolts, and then install the bottom two bolts that you set aside in "Remove the Existing Carousel (TTS)" (on the previous page).

INSTALLATION

4. Reconnect the three sets of wires inside the stepper housing, and then slide the entire cable into the notch on the left side.
5. Put the 1/4 in. air line back into the push-to-connect fitting on the left side of the stepper housing.
6. Reinstall the front cover plate (that you set aside in Step 1) onto the ATC.
7. Using the provided connector and a small piece of tape to hold it in place, attach the chip door arm and the main cable inside the motor box.
8. From the back of the ATC electrical box, remove two M5 flange screws with a 3 mm hex wrench.
9. Using the template (provided) and an electric drill, mark and drill a 5/16 in. hole on the back of the ATC electrical box (for the spindle brake solenoid).
10. Find the grommet (provided), and install it in the hole that you just drilled.
11. Using the two M5 flange screws that you set aside in Step 8, install the spindle brake on the back of the ATC electrical box with a 3 mm hex wrench.
12. One at a time, route the spindle brake solenoid's wires through the grommet and into the ATC electrical box. Make the electrical connections as referenced in "Electrical Schematic" (page 10).
13. Identify the air hose that goes to the top of the power drawbar. Then, cut the air hose so that it's long enough to connect from:
 - a. The power drawbar to the spindle brake solenoid's left push-to-connect fitting.
 - b. The ATC to the brake solenoid's right push-to-connect fitting.
14. Reconnect the air to the machine.
15. Replace the access panel onto the rear left panel of the enclosure:
 - a. Find the access panel that you set aside in "Prepare the Machine" (page 3).
 - b. Tilt the access panel toward you, and move it through the opening on the left rear panel and onto the M5 flange screw (inside the enclosure).
 - c. Reinstall the 11 M5 flange screws that secure the access panel to the enclosure with a 3 mm hex wrench.

ALIGNMENT

In this section, you'll adjust the tool alignment and set the tool tray height and encoder position.

1. From the PathPilot interface, on the **ATC** tab, select **Ref Tool Tray**.



Figure 1: Ref Tool Tray button on the ATC tab.

The tool tray spins.



Note: You're only required to reference the tool tray once, unlike the mill axes' referencing procedure.

2. If you haven't already done so, load a tool into the spindle.
3. Manually rotate the spindle two revolutions by hand.
The encoder has now been oriented.
4. Disconnect the air from the machine.
5. While manually advancing the tool tray toward the spindle, align the fork with the tool. Complete the following steps in the order listed:
 - a. Slowly jog the Z-axis up or down until the groove in the fork aligns with the groove in the tool holder.
 - b. Determine if the tray must move clockwise or counterclockwise to align the fork with the tool holder. From the PathPilot interface, in the **ATC** tab, either select **--** to step the tool tray counterclockwise or **++** to step the tool tray clockwise.
 - c. Fully seat the ATC to its tray load position, verifying that the tool and its drive dog slots are fully inserted into the fork.
6. Verify that, from the **Status** tab, the **ATC Tray In** LED is still illuminated.
If the LED isn't illuminated, examine the tool tray. It may have exceeded the Tray In sensor during adjustments in the previous step.

7. On the **ATC** tab, select **Set TC POS**.



Figure 2: Set TC POS button on the ATC tab.

The tool change position has now been set.

8. Select **Set TC M19**. Then, in the dialog box that displays, select **OK**.

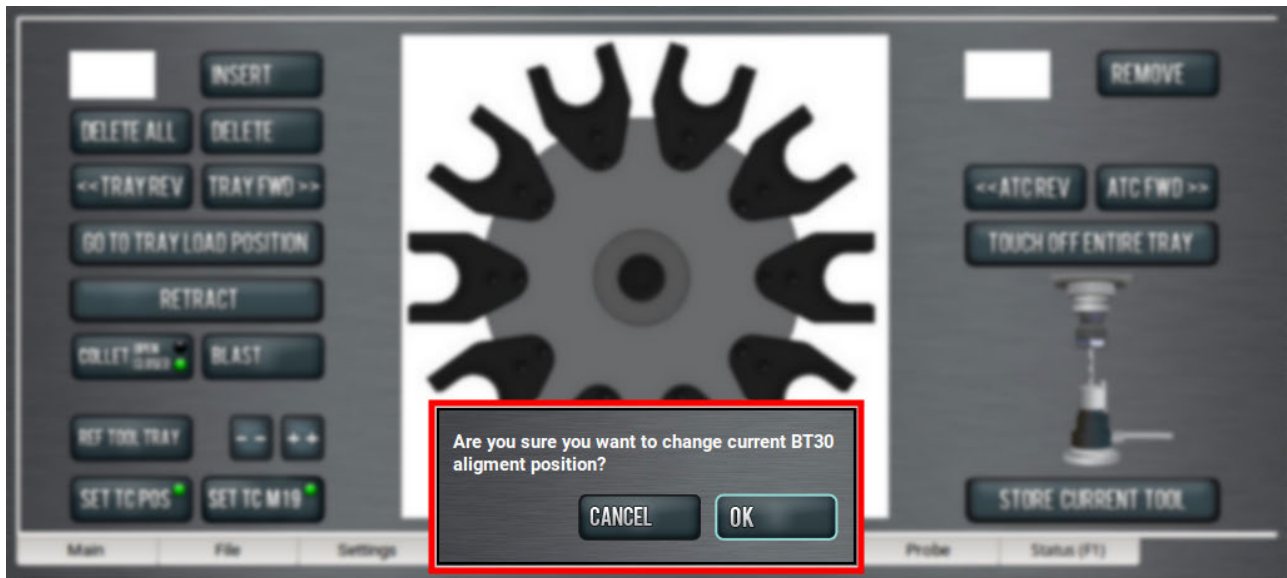


Figure 3: Confirmation dialog box to change the spindle's alignment position.

9. Follow the on-screen instructions to set the spindle's tool change rotation position:
 - a. Rotate the spindle clockwise in the fork by hand. Then, select **OK**.
 - b. Rotate the spindle counterclockwise in the fork by hand. Then, select **OK**.
The tool change rotation position has now been set. In the dialog box that displays, select **OK**.
10. Manually move the ATC back to the retracted position.

⚠ WARNING! Crush Hazard: If the ATC isn't completely retracted, it could move once the air is reconnected. When you reconnect the air, you must keep your hands away from the ATC.

ALIGNMENT

11. Reconnect the air.
12. Remove the tool from the spindle.
13. Move the Z-axis up: in the **MDI Line** DRO field, type `G20 G53 G1 Z0 F20`. Then select the **Enter** key.
14. On the **ATC** tab, select **Go To Tray Load Position**. Then, manually load a tool into the fork.
15. Orient the spindle: from the PathPilot interface, in the **MDI Line** DRO field, type `M19 R0 Q10`. Then select the **Enter** key.
16. Open the drawbar: on the ATC tab, select **Collet**, and wait until the LED toggles from **Closed** to **Open**.



Note: You must verify that the drawbar is open (and not just that the brake is engaged) before you continue.

17. Verify that the spindle is concentric with the tool: slowly jog the Z-axis down and, depending on the result, do one of the following:
 - **If the Spindle is Concentric with the Tool** You've completed the alignments.
 - **If Adjustments are Required** Go to Step 18.
18. Determine if the tray must move left or right. Use two wrenches to loosen the jam nut on the end of the cylinder rod, making sure that you don't spin the rod end when adjusting the jam nut. Then, either turn the rod end one-half turn further on to the cylinder rod to move the tool tray to the left, or turn it one-half turn off of the cylinder rod to move the tool tray to the right. Once finished, tighten the jam nut.

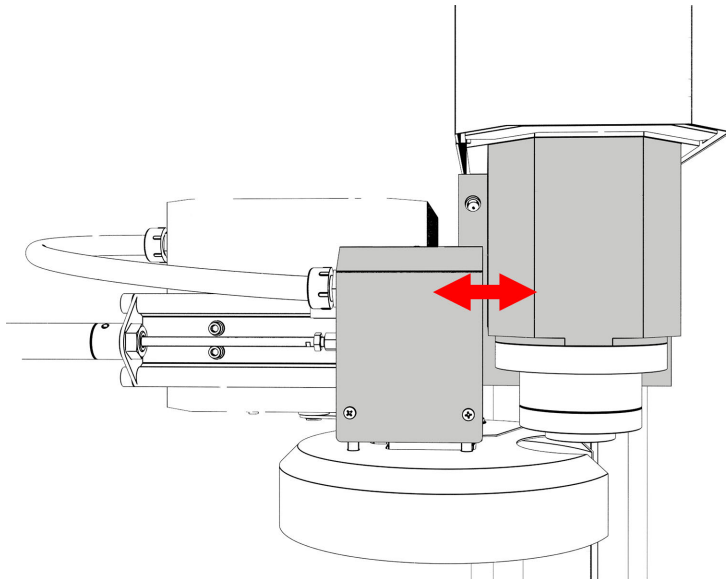


Figure 4: Moving the tool tray left or right.



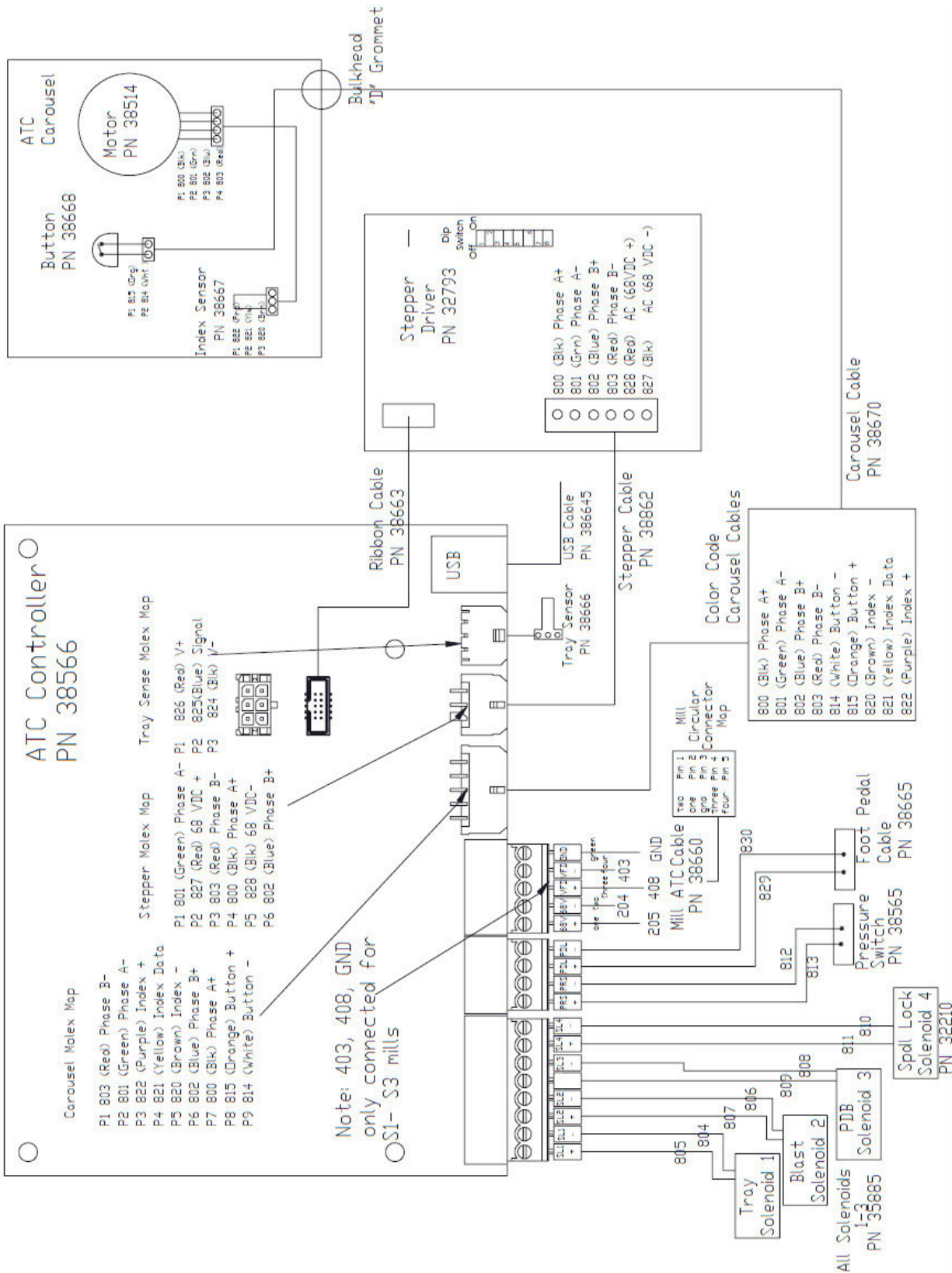
Note: Don't move the tool tray more than 0.100 in. in either direction (left or right). If you do, the tool tray will exceed the Tray In sensor, which affects how ATC operations are communicated to PathPilot.

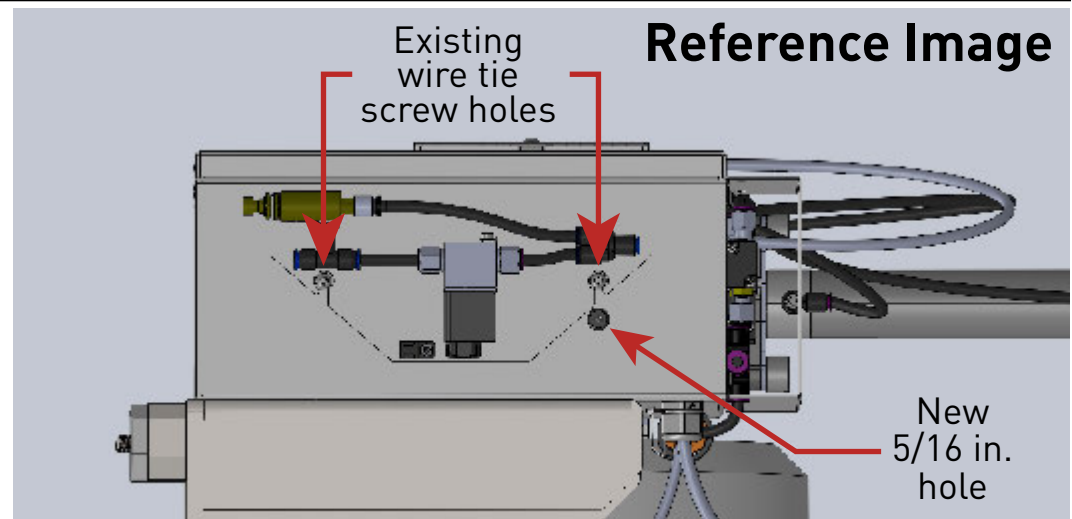
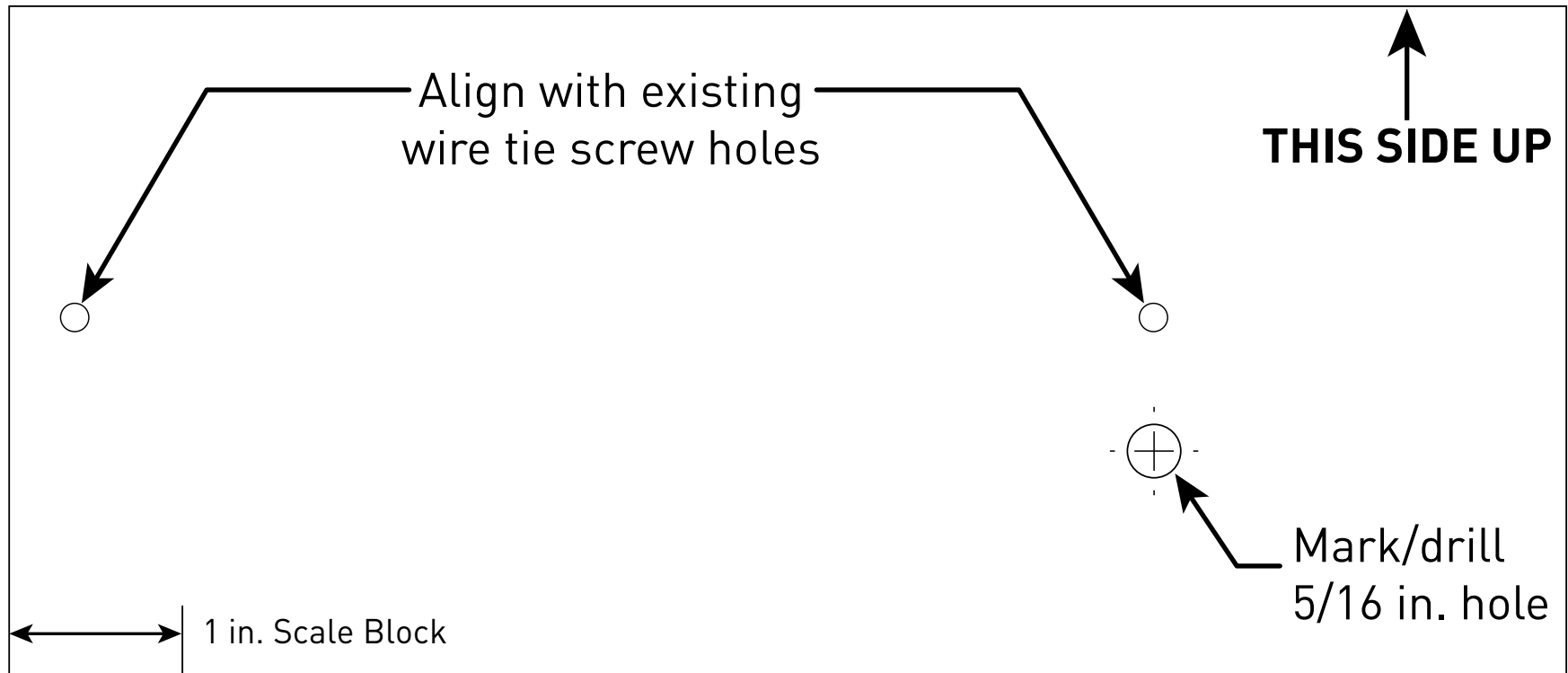
ALIGNMENT

19. Adjust for the ATC's backlash: apply light pressure forward and backward on the carousel; then, from the PathPilot interface, on the **ATC** tab, select **++** or **--** until there's equal space on the front and the back of the BT30 taper.
20. Verify that, from the **Status** tab, the **ATC Tray In** LED is still illuminated. If the LED isn't illuminated, examine the tool tray. It may have exceeded the Tray In sensor during adjustments in the previous step.
21. Repeat adjustments until the tool's shank is concentric with the spindle.
22. Move the Z-axis up: in the **MDI Line** DRO field, type `G20 G53 G1 Z0 F20`. Then select the **Enter** key.
23. Remove the tool from the ATC. Then, select **Retract**.

RESOURCES

Electrical Schematic





BT30 ATC Upgrade Kit Drill Template

To download/print this template, go to tormach.com/docs