

TECHNICAL DOCUMENT

PCNC 440 AUTOMATIC TOOL CHANGER

Product Identification: Automatic Tool Changer for PCNC 440 (PN 35900)

Purpose: This document details the installation and use of the Automatic Tool Changer on a PCNC 440 mill.

Qty.	PCNC 440 Automatic Tool Changer	PN
2	Adjustable Standoff Assembly	35833
1	ATC Assembly	—
1	Fixed Standoff Assembly	35832
1	PCNC 440 Coolant Relocation Bracket Kit	37260
10	Plastic Screw	32173
1	Tilt Standoff Assembly	35911



NOTE: If any of these 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 Items and Tools

- 1-2-3 Block Set (PN 31950)
- 8 inch dowel for Tormach Tooling System (TTS)[®] tool holder

NOTE: The dowel cannot be longer than 8 inches.

- Adjustable wrench
- FRL Filter-Regulator-Lubricator (PN 32457) or similar
- Metric hex wrench set
- Phillips screwdriver
- PCNC 440 Power Drawbar (PN 35927)

NOTE: You must install the PCNC 440 Power Drawbar on your machine before installing the PCNC 440 Automatic Tool Changer (ATC). Do not install the power drawbar button; tool changes are completed with the ATC.

- Small, flat-head screwdriver
- Snips
- Socket wrench and a 13 mm socket
- TTS[®] tool holder



TECHNICAL DOCUMENT


Air Requirements

Use a FRL Filter-Regulator-Lubricator (PN 32457) or similar to make sure your setup meets the following air requirements:

- **Air Supply.** The required operating range is 90-120 psi. If the air supply exceeds 120 psi, you must use a regulator.
- **Dry Air.** To make sure the air is dry, we recommend you use a filter, desiccator, or compressed air dryer between the air compressor and the ATC.
- **Lubricated Air.** You must lubricate the air with air tool oil.

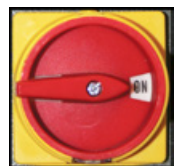
Before You Begin

1. From the PathPilot® interface, reference the mill by clicking *Ref Z*, *Ref X*, and *Ref Y*.
2. Slowly jog the Z-axis down 1-1/2 inches.
3. Power off the mill. Refer to the *Power Off/On Procedure* detailed below.

 **WARNING! Electrical Shock Hazard:** Be sure to power off the machine before making any electrical modifications. Failure to do so could 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, click <i>Exit</i> ; when prompted, click <i>OK</i> to power off
	3. Turn the PathPilot controller power strip off
	4. Turn the Main Disconnect to the <i>Off</i> position
Power On	1. Turn the PathPilot controller power strip on
	2. After PathPilot loads, turn the Main Disconnect to the <i>On</i> position
	3. Turn the red E-stop button clockwise to release
	4. Press the green Start button
	5. From the PathPilot interface, click <i>Reset</i>



Partially Disassemble

Before installation, the following items require relocation, disassembly, or partial disassembly:

- **Coolant Hose.** If your mill has a coolant hose installed on the side of the spindle head, you must relocate it: go to the *Coolant Hose* section.

TECHNICAL DOCUMENT

- **Power Drawbar Button.** If your mill has a power drawbar button installed on the spindle head, you must disassemble it: go to the *Power Drawbar Button* section.
- **Enclosure.** If your mill has a full enclosure, you must partially disassemble it: go to the *Enclosure* section.

If you do not have the previous (optional) accessories, go to the *Mill* section.

Coolant Hose

To relocate the coolant hose, use the included PCNC 440 Coolant Relocation Bracket Kit.

1. If your mill's serial number is 80075 or below, you must first drill and tap one hole; go to Step 2. If your mill's serial number is above 80075, go to Step 4.
2. Behind the spindle, flush with the right edge of the spindle head casting, use the relocation bracket as a template to mark the mounting location (see **Figure 1**).
3. On the marked mounting location, drill and tap for a 6 mm screw.
4. Uninstall the coolant hose from the mill's spindle head.
5. Attach the coolant hose to the relocation bracket.
6. On the spindle head casting, in the location identified in Step 2, use the hardware included with the PCNC 440 Coolant Relocation Bracket Kit to attach the relocation bracket.



Figure 1

Power Drawbar Button

1. Power off the air compressor and disconnect all air lines from the power drawbar button.
Set the air lines to the power drawbar cylinder and the air compressor aside. Air lines to the ATC are installed later in this document.
2. From the power drawbar button assembly, on the bracket, remove the M6 x 12 mm socket head cap screw securing the button to the spindle motor cover (see **Figure 2**).
Set the screw aside.



Figure 2

TECHNICAL DOCUMENT

3. Uninstall the power drawbar button from the mill's spindle head.
4. On the spindle motor cover, replace the M6 x 12 mm socket head cap screw set aside in Step 2.

Enclosure

1. From the enclosure's Left Back Panel, use a Phillips screwdriver to remove nine 10-32 x 3/8" Phillips screws. The screws secure the Left Back Panel to the machine column and the left side panel of the enclosure (see **Figure 3**).

Set aside the screws and the Left Back Panel.

2. From the enclosure's top panel, on the three gibs, loosen nine 10-32 x 3/8" Phillips screws.
3. Slide the Top Window out of the three gibs.
Set aside the window.

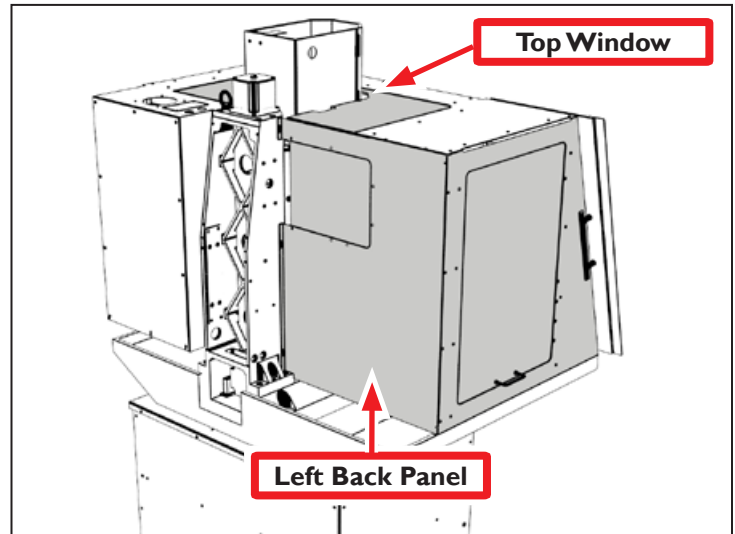


Figure 3

Mill

1. From the back of the mill, on the electrical cabinet, use a 3 mm hex wrench to remove 10 socket head cap screws (see **Figure 4**).

Set aside the screws and the electrical cabinet cover.

2. On the Z-column, use a 3 mm hex wrench to remove eight button head cap screws (see **Figure 4**).

Set aside the screws and the Z-column cover.

3. Use a 4 mm hex wrench to remove four set screws from the side of the Z-column (see **Figure 4**).

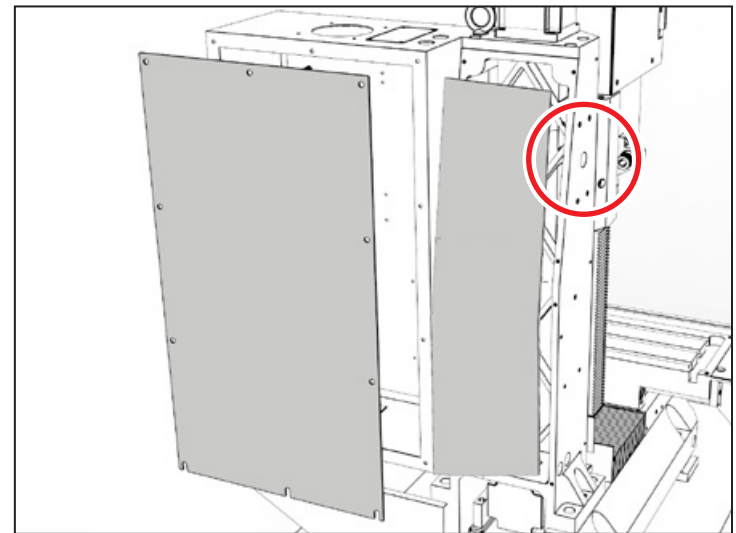


Figure 4

Mount the Automatic Tool Changer

1. Identify four standoffs included with this kit (see **Figure 5**):

- One fixed standoff

NOTE: The fixed standoff uses a threadlocker to hold the nut in place.

- One tilt standoff
- Two adjustable standoffs

The standoffs mount the ATC to the mill's Z-column.

2. Arrange the four standoffs next to each other (see **Figure 5**).
3. Loosen or tighten the nut on the two adjustable standoffs until they are the same length as the fixed standoff (see **Figure 5**).
4. On the mill's Z-column, use an adjustable wrench to install the four standoffs in the order shown in **Figure 6**. Securely tighten the standoffs to the mill's Z-column.
5. From each standoff, remove the flange nut and the washer (see **Figure 7**). Set aside all flange nuts and washers.

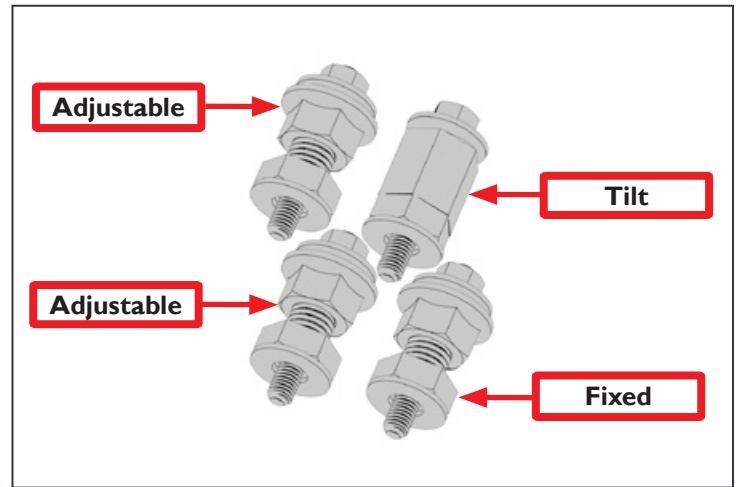


Figure 5

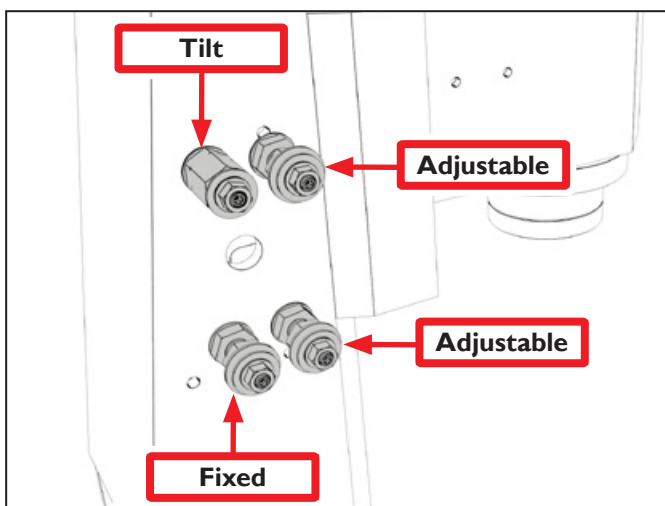


Figure 6

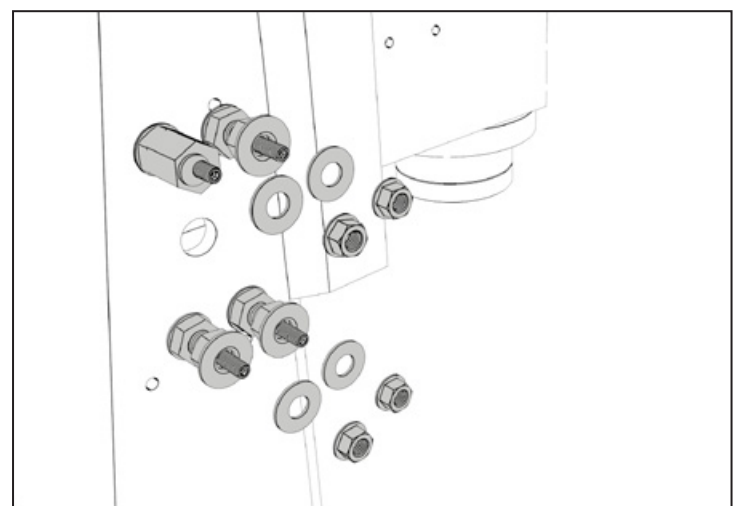


Figure 7

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6. From the ATC's motor enclosure, on the access plate, use a Phillips screwdriver to remove four M4 x 6 mm screws (see **Figure 8**).

Set aside the screws and the access plate.

7. On the ATC's wires, use a snips to cut the cable ties.



CAUTION! Heavy Object: Use two people to lift and install the ATC on the mill's Z-column. Failure to do so could result in serious injury and/or machine damage.

8. On the mill's Z-column, hold the oil line above the four standoffs and put all ATC wires through the Z-column's access slot.

Continue to hold the oil line above the four standoffs.

9. Temporarily rest the ATC on the standoffs (see **Figure 9**) and release the oil line.

The oil line is clear of interference.

10. On the top right standoff, re-install the washer and flange nut removed in Step 5 (see **Figure 10**).

NOTE: Tighten the washers and flange nuts finger-tight. Adjustments are made later in this document.

11. On the remaining three standoffs, re-install the washers and flange nuts set aside in Step 5.

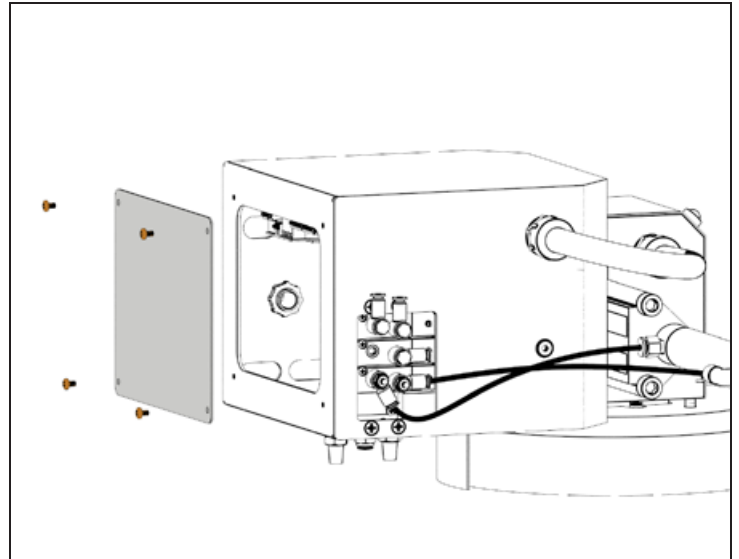


Figure 8

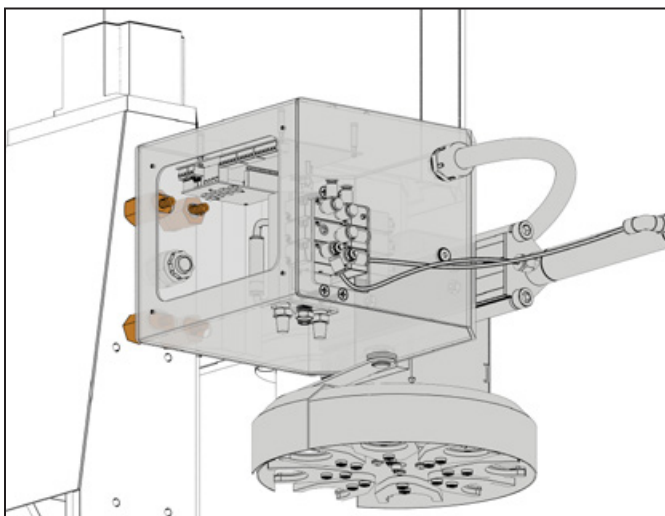


Figure 9

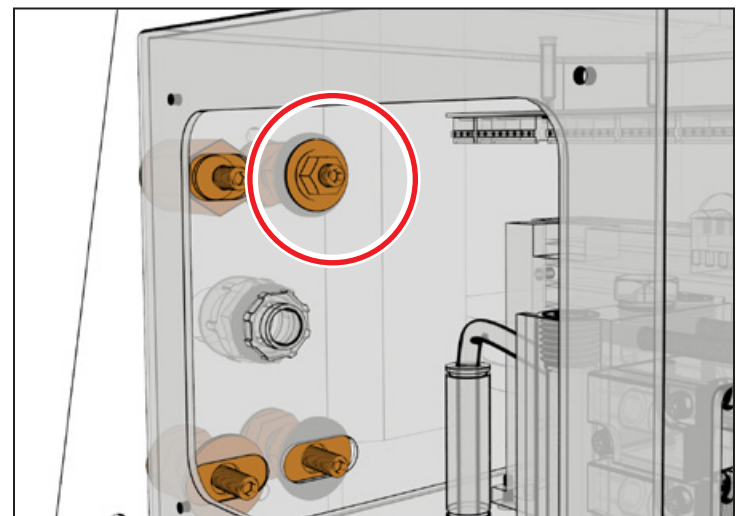


Figure 10

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Make Air Connections

1. Manually slide the tool tray toward the spindle.
2. On the left side of the motor enclosure, identify the Bottom Solenoid (see **Figure 11**).
3. On the Bottom Solenoid (see **Figure 11**), use a small, flat-head screwdriver to push in the screw and turn it clockwise.

The screw locks in place to hold the ATC in the tray load position.

4. From the power drawbar cylinder, identify two 5/32" plastic tubes and connect the loose ends to the ATC as follows:
 - a. From the bottom push-to-connect elbow on the power drawbar cylinder, connect the Retract airline to the left push-to-connect elbow on the ATC's top solenoid (see **Figure 12**).
 - b. From the T-connector on the power drawbar cylinder, connect the Advance airline to the right push-to-connect elbow on the ATC's top solenoid (see **Figure 12**).

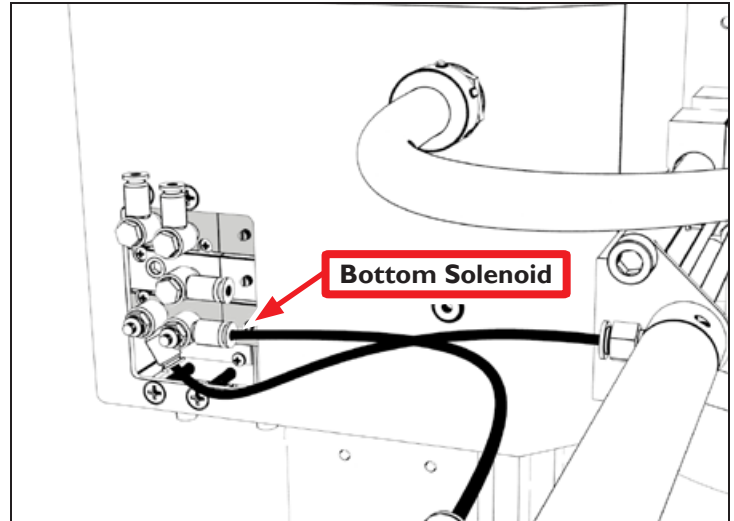


Figure 11

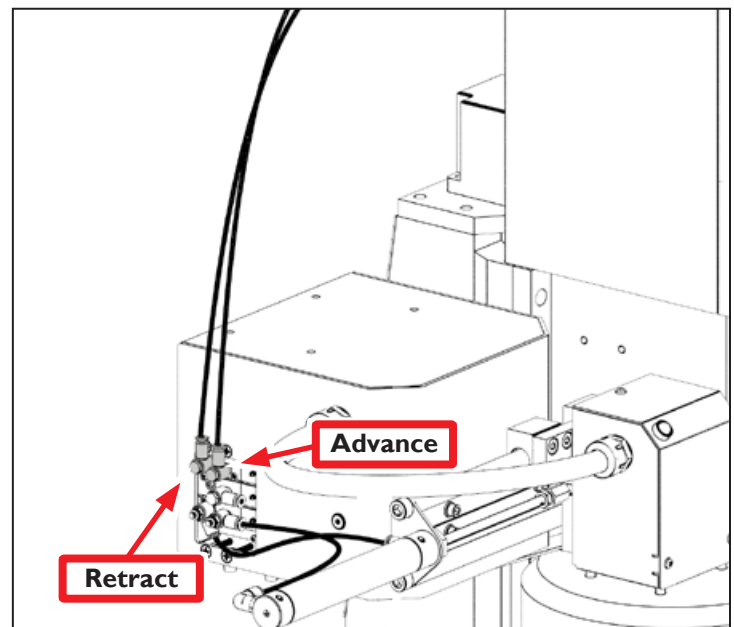


Figure 12

TECHNICAL DOCUMENT

5. From the air compressor, identify the 1/4" plastic tube and connect the loose end to the Air In valve on the underside of the motor enclosure (see **Figure 13**).
6. If you have an (optional) pressure sensor, go to *Install the Optional Pressure Sensor*.
If you have an (optional) filter-regulator-lubricator, go to *Install the Optional FRL Filter-Regulator-Lubricator*.
If you do not have either a pressure sensor or a filter-regulator-lubricator, power on the air compressor.

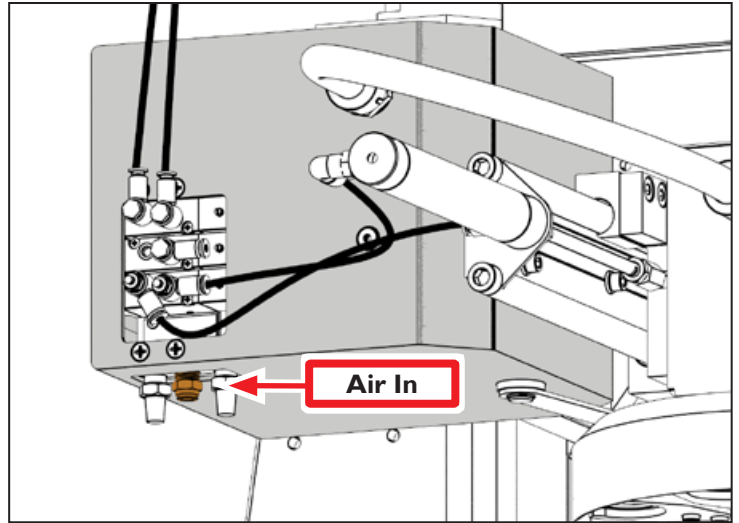


Figure 13

Install the Optional Pressure Sensor

The ATC Pressure Sensor (PN 32329) is an optional accessory for the ATC that stops the carousel from starting during a condition of low air supply pressure.

1. Splice the 1/4 inch main air supply line from the ATC.
2. Insert the spliced air lines into either end of the Pressure Sensor.
3. Plug the electrical connector into the jack on the bottom of the ATC.
4. Power on the air compressor.

Install the Optional FRL Filter-Regulator-Lubricator

The FRL Filter-Regulator-Lubricator (PN 32457) is an optional accessory for the ATC that lubricates the air with air tool oil. Refer to the documentation that ships with the FRL for information on installation and use.

Level the Automatic Tool Changer

This section details the procedure required to roughly align the ATC on the mill. More adjustments are made later in this document.

1. From the right side of the machine, make sure the ATC's carousel door opening is approximately equal in distance on all sides of the spindle. If it is not:
 - a. On the adjustable standoffs, use an adjustable wrench to loosen or tighten the nut.
 - b. Move the ATC assembly in the Y direction.

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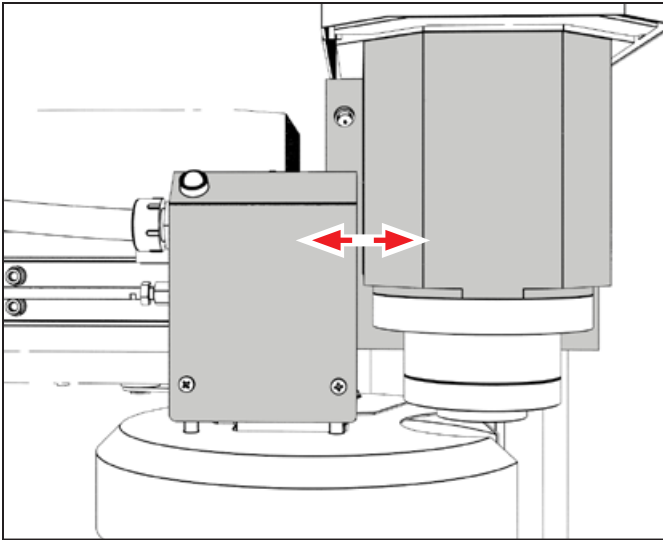


Figure 14

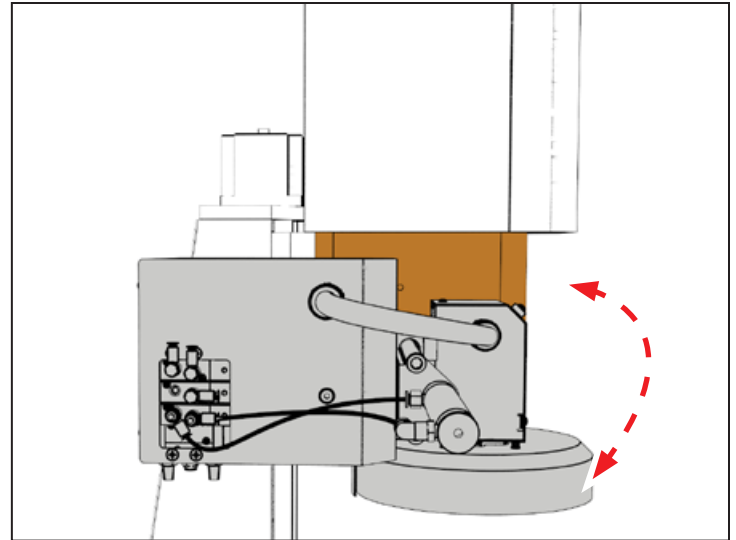


Figure 15

2. From the front of the machine, make sure the motor enclosure is approximately 1/8 inch from the mill's spindle head (see **Figure 14**). If it is not:
 - a. On the adjustable standoffs, use an adjustable wrench to loosen or tighten the nut.
 - b. Move the ATC assembly in the X direction.
3. On the tilt standoff, use an adjustable wrench to turn the nut until the front side of the motor enclosure is approximately parallel with the mill's spindle head (see **Figure 15**).
4. From the four standoffs, securely tighten four flange nuts.
5. From inside the motor enclosure, tighten the plastic wire plug against the mill's Z-column (see **Figure 16**).
6. From the left side of the motor enclosure, on the Bottom Solenoid (see **Figure 11**), use a small flat-head screwdriver to turn the screw on counterclockwise.

The tool tray retracts.

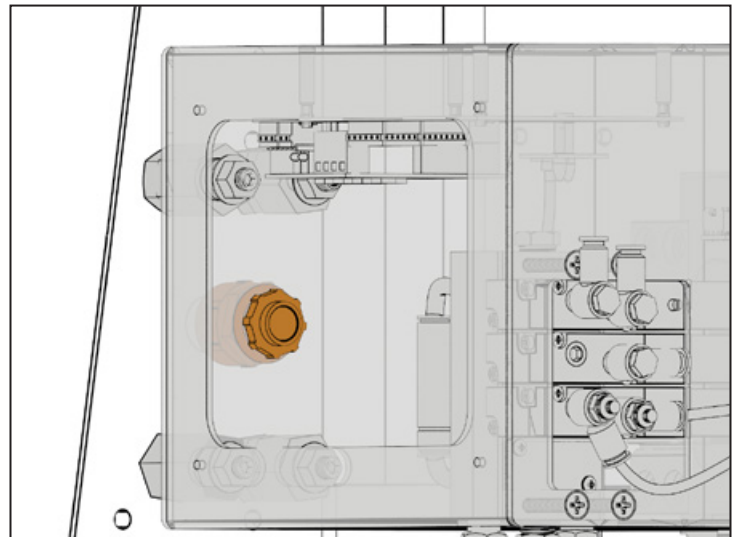


Figure 16

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Make Electrical Connections

An illustration of ATC wire routing is shown in **Figure 17**. The following steps detail the connections shown below.

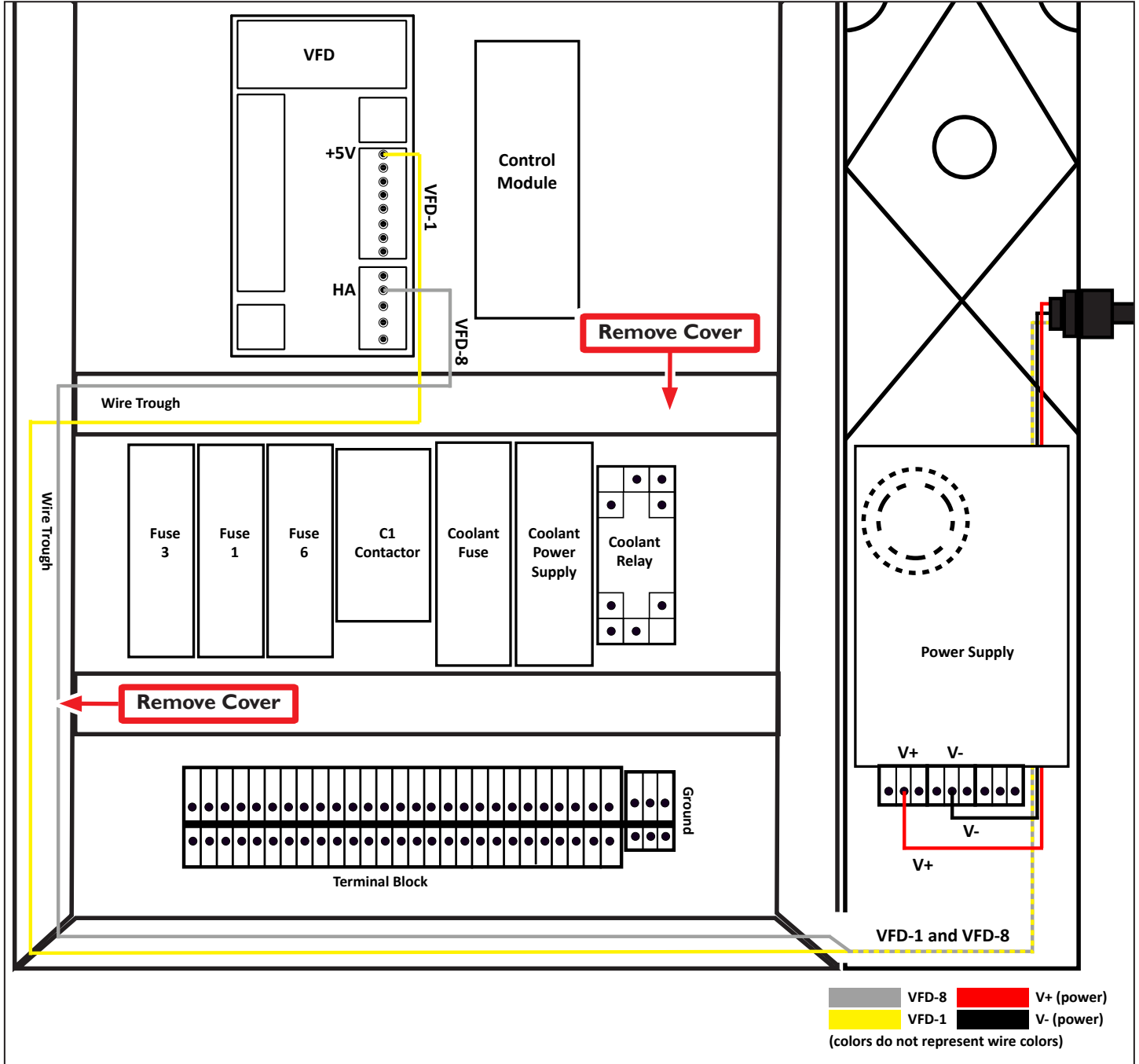


Figure 17

TECHNICAL DOCUMENT

1. Put wire V+ and V- (red and black power wires) through the Z-column toward the power supply (see **Figure 17**).
2. On the power supply, use a Phillips screwdriver to make the following power connections (see **Figure 17**):
 - Insert wire V+ (red) to V+
 - Insert wire V- (black) to V-
3. Put wire VFD-1 and VFD-8 (yellow and white spindle wires) through the access hole in the bottom of the Z-column toward the electrical cabinet (see **Figure 17**).
4. From the electrical cabinet, remove two wire trough covers as shown in **Figure 17**.
5. Put wire VFD-1 and VFD-8 (yellow and white spindle wires) through the wire troughs together toward the variable frequency drive (VFD) as shown in **Figure 17**.
6. On the VFD, use a small, flat-head screwdriver to make the following spindle connections (see **Figure 17**):
 - Insert wire VFD-1 (yellow) to pin 1 (+5v)
 - Insert wire VFD-8 (white) to pin 2 of the lower connector (HA)
7. Replace the wire trough covers inside the electrical cabinet.
8. Re-install the electrical cabinet cover to the back of the mill using 10 socket head cap screws set aside earlier.
9. Put the USB cable through the access hole in the bottom of the Z-column toward the back of the stand. Put the USB cable through the access hole in the back of the stand toward the controller.
10. On the controller, insert the USB cable into any open USB port.
11. Re-install the Z-column cover to the back of the mill using eight button head cap screws set aside earlier.
12. Re-install the motor enclosure's access plate using four M4 x 6 mm screws set aside earlier.

Validate the Installation

1. Power on the mill following *Power Off/On Procedure* detailed earlier in this document.
2. From the PathPilot interface, on the *Settings* tab, select the *ATC* radio button (see **Figure 18**).

The *ATC* tab appears in the PathPilot interface.

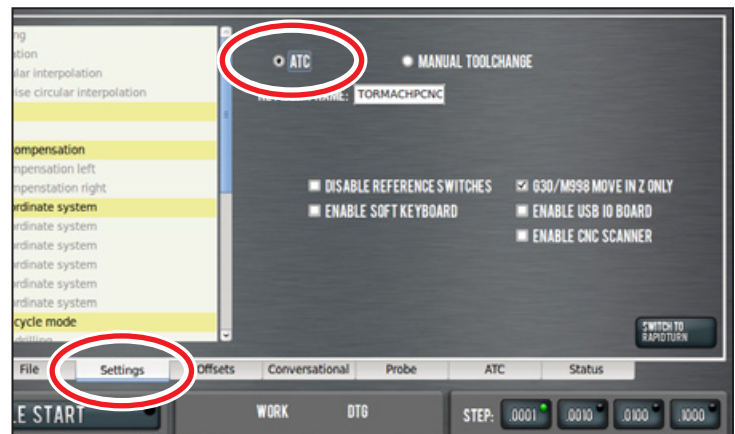


Figure 18

TECHNICAL DOCUMENT

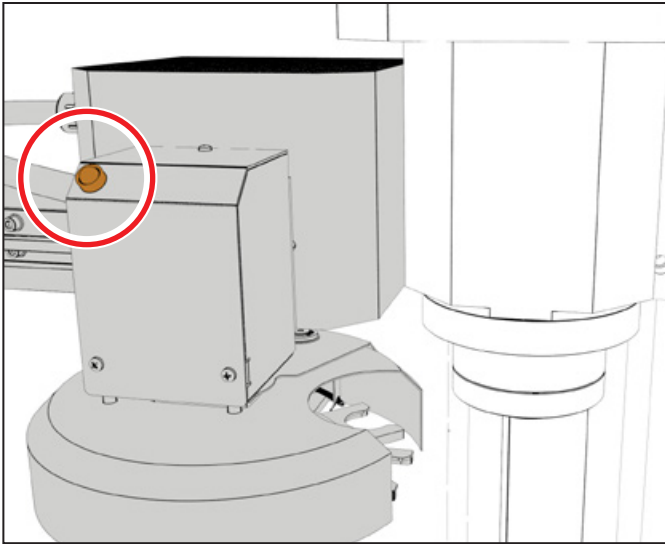


Figure 19



Figure 20

3. From the *Main* tab, reference the machine by clicking *Ref Z*, *Ref X*, and *Ref Y*.
4. On the ATC, insert a tool into the spindle as follows:
 - a. Push and hold the button (see **Figure 19**).
The collet opens.
 - b. Insert a tool into the spindle.
 - c. Release the button.
The collet closes.
5. From the PathPilot interface, on the *Main* tab, type *1000* into the *RPM DRO* field and click the *FWD* button.
The spindle starts.
6. From the *Status* tab, make sure that the *VFD Running* green light comes on (see **Figure 20**).
7. Click *Stop*.
The spindle stops.
If the *VFD Running* light did not come on in Step 6:
 - a. Remove the tool from the spindle.
 - b. Power off the mill following the *Power Off/On Procedure* detailed earlier in this document.
 - c. From the electrical cabinet, on the VFD, examine the wire connections. Make sure both wires are properly connected and repeat the steps in this section.
8. Use the button on the ATC to remove the tool from the spindle.

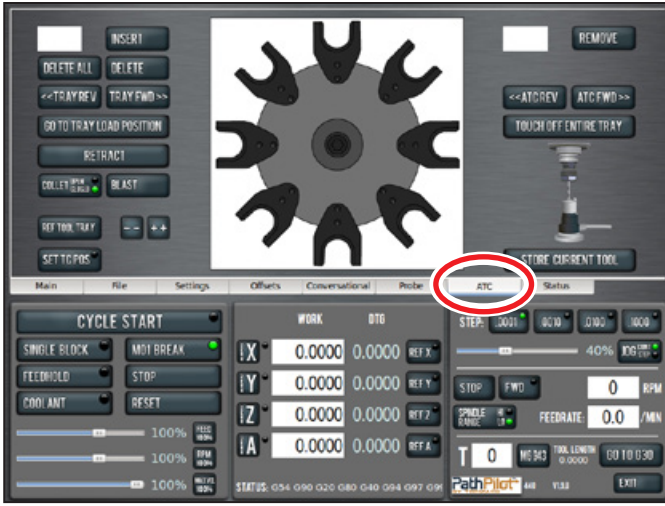


Figure 21

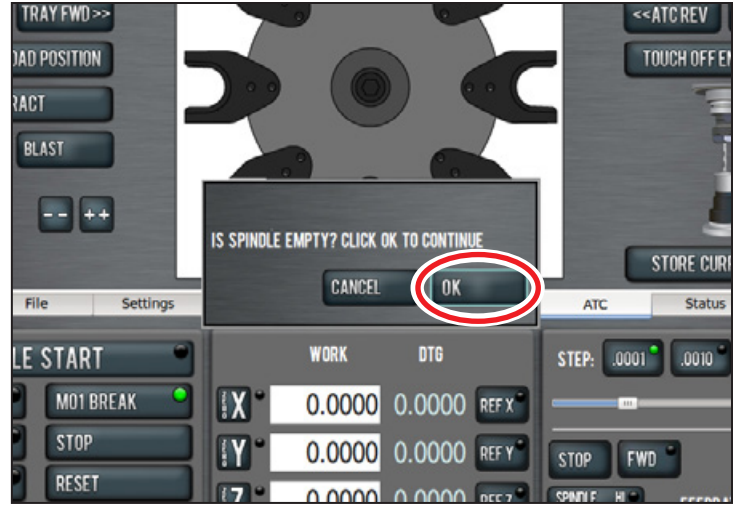


Figure 22

Align Tool Tray and Tool Slots

1. Make sure there is no tool in the spindle.
2. From the PathPilot interface, on the ATC tab, click the *Ref Tool Tray* button (see **Figure 21**).

The tool tray spins.

NOTE: You are only required to reference the tool tray once — unlike the mill axes' referencing procedure.

3. Click the *Go to Tray Load Position* button (see **Figure 21**).
4. When prompted, click **OK** (see **Figure 22**).

The tool tray moves forward.

5. Make sure the spindle is centered over the ATC's fork (see **Figure 23**).

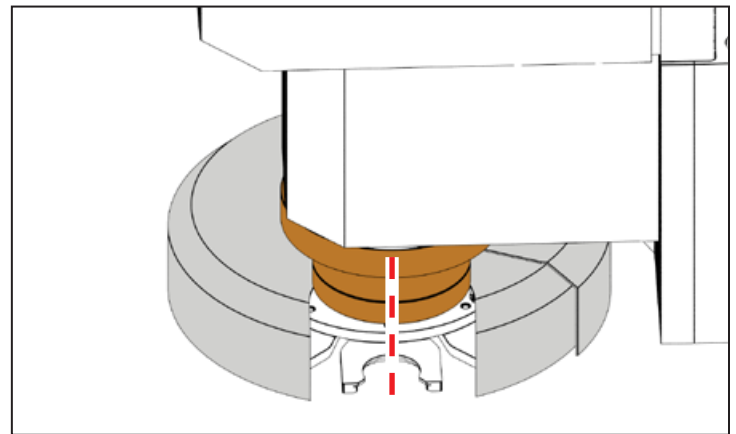


Figure 23

Adjusting the Tool Tray Load Position

If the spindle is not centered over the fork in the X direction, you must manually adjust the position of the ATC assembly on the linear rails.

1. From the ATC's linear rail, loosen the jam nut (see **Figure 24**).
2. Slide the coupler to bring the ATC assembly closer to the spindle head or further away from the spindle head (see **Figure 24**).
3. After the ATC's carousel door opening is positioned correctly with the spindle, re-tighten the jam nut.

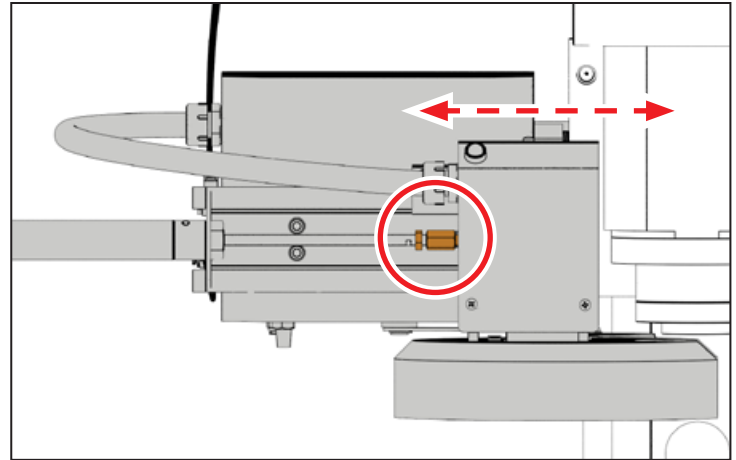


Figure 24

Adjusting the Tilt of the ATC

1. Insert a dowel — no more than 8 inches long — into a TTS tool holder.
2. Insert the tool holder into the fork (see **Figure 25**). Make sure the groove in the tool holder slides along the shoulder on the fork.

NOTE: Do not rest the tool holder on top of the fork.

3. From the PathPilot interface, on the ATC tab, type 1 in the *Tool Number* DRO field (see **Figure 26**).
4. Click the *Insert* button (see **Figure 26**).

The tool number entered appears on the diagram of the ATC'S carousel.

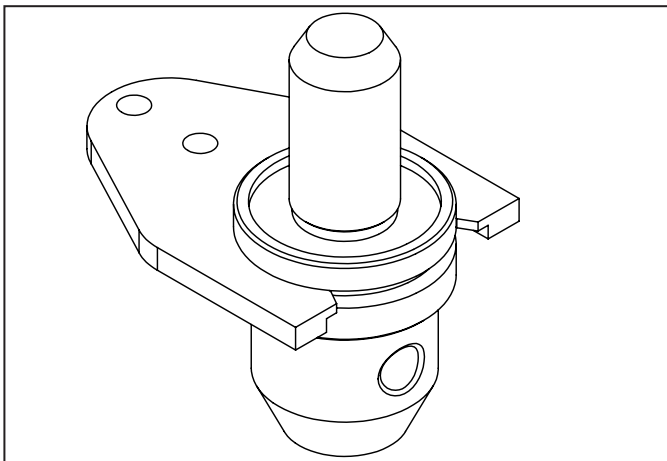


Figure 25

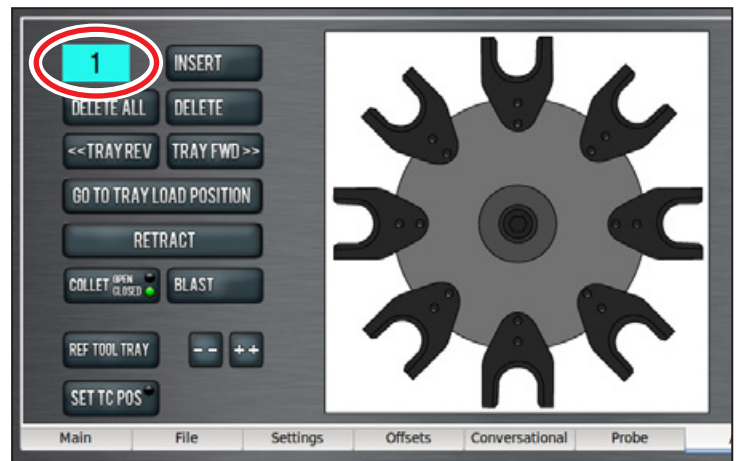


Figure 26

TECHNICAL DOCUMENT

5. Place a 1-2-3 block on the machine table (see **Figure 27**). Make sure the dowel is parallel with the 1-2-3 block in both the Y and X direction.

If the dowel is not parallel, do one of the following:

- a. From the ATC's linear rail, loosen two 5 mm socket head cap screws (see **Figure 28**) and slowly pivot the ATC assembly until the dowel is parallel with the 1-2-3 block; re-tighten 5 mm socket head cap screws.
- b. Re-check the alignment of the dowel in both the Y and X direction.

or

- a. From the tilt standoff, use an adjustable wrench to turn the nut and slowly pivot the ATC assembly until the dowel is parallel with the 1-2-3 block (see **Figure 29**).
- b. Re-check the alignment of dowel in both the Y and X direction.

Repeat Step 5 until the dowel is parallel with the 1-2-3 block.

6. Remove the 1-2-3 block from the machine table.



Figure 27

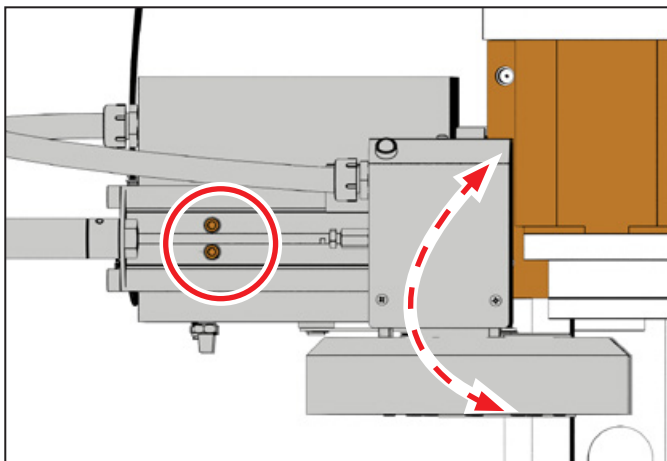


Figure 28

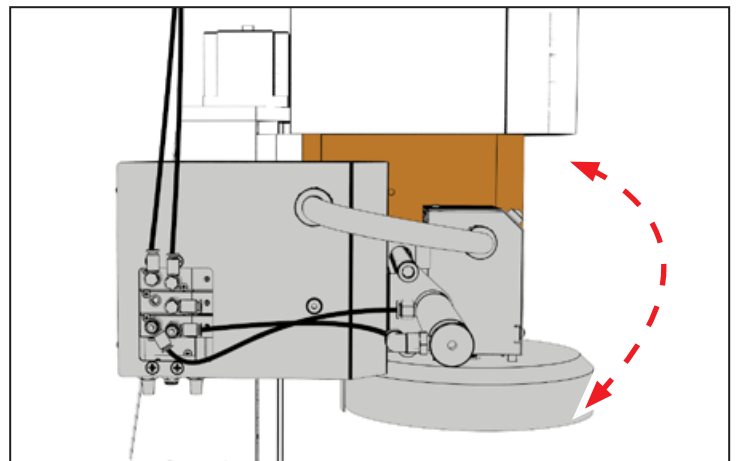


Figure 29

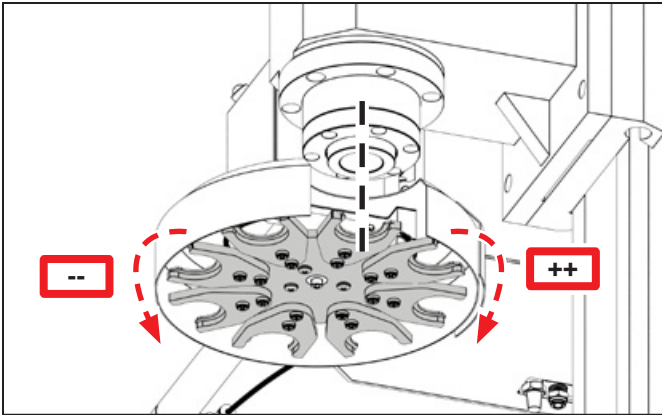


Figure 30

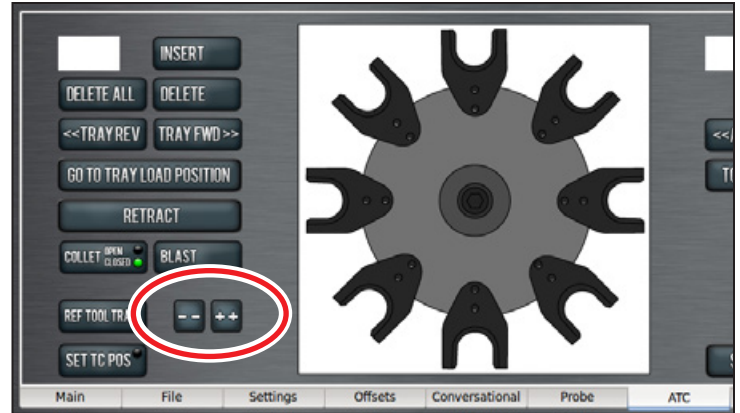


Figure 31

Adjusting the Tool Tray Rotation

1. From the PathPilot interface, slowly jog the Z-axis down to bring the spindle nose toward the tool in the ATC's tool tray.
2. Make sure the tool's shank is in line with the collet in the spindle.
3. Examine the alignment of the spindle's centerline to the tool slot's centerline (see **Figure 30**). Determine if the tray must move clockwise or counterclockwise.
4. From the PathPilot interface, in the ATC tab, do one of the following (see **Figure 31**):
 - Click the -- button to step the tool tray counterclockwise
 - Click the ++ button to step the tool tray clockwise

Validate the Automatic Tool Changer Alignment

1. From the PathPilot interface, slowly jog the Z-axis down over the tool's shank.
2. Make sure the tool's shank moves freely in the collet.

If it does not, this indicates that the ATC is misaligned and you must repeat the steps in the *Align Tool Tray and Tool Slots* section.

Setting Tool Change Height

1. From the PathPilot interface, slowly jog the Z-axis down over the tool; stop jogging when the spindle nose just makes contact with the shoulder of the tool holder.

TECHNICAL DOCUMENT

2. On the *ATC* tab, click the *Set TC POS* button (see **Figure 32**).

The tool change position is set.

Adjust for Rotational Play

There is a small amount of rotational play built into the ATC carousel. This play allows for some misalignment during tool changes, and must be adjusted for in both directions. The taper on the tool shank also helps align the tool during a tool change.

1. From the PathPilot interface, on the *ATC* tab, click the *Tray FWD* button to rotate the tray clockwise (forward) one full tool slot.
2. Click the *Tray REV* button to rotate the tray counterclockwise (backward) one full tool slot.
3. Make sure the tool's shank is in line with the collet in the spindle. If it is not, repeat *Adjusting the Tool Tray Rotation* section.

Re-assemble

1. From the enclosure's left back panel, remove the ATC Cover (see **Figure 33**).
2. Use nine 10-32 x 3/8" Phillips screws set aside earlier in this document to re-install the enclosure's left back panel to both the machine column and the enclosure's left side panel.
3. Slide the top window back in place on the enclosure's top panel and tighten nine 10-32 x 3/8" Phillips screws.

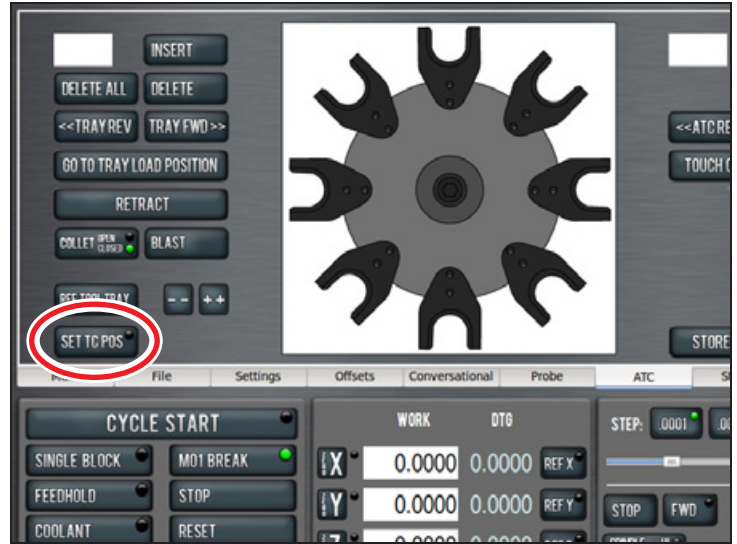


Figure 32

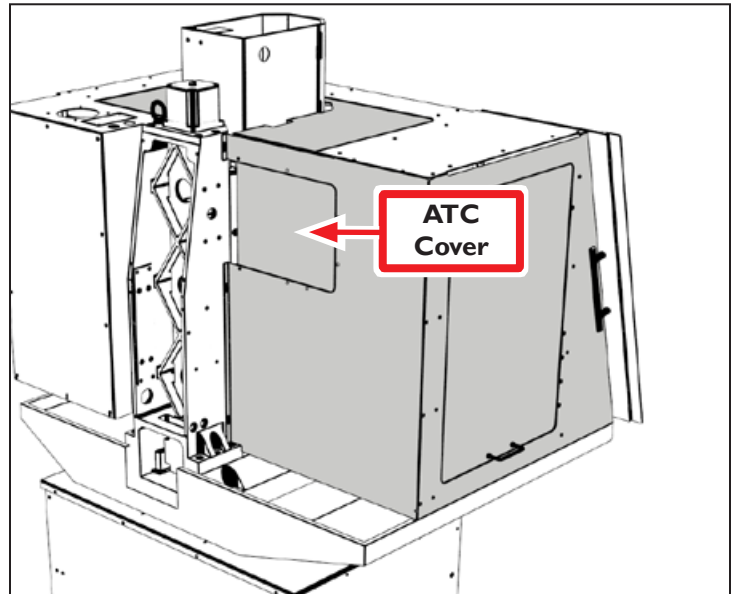


Figure 33

TECHNICAL DOCUMENT

Operate the Automatic Tool Changer

The PCNC 440 Automatic Tool Changer holds up to eight tools in a single tray. If your program requires nine or more tools, the ATC changes tools automatically for all tools assigned to the tray, and pauses for a manual tool change for all tools not assigned to the tray.

NOTE: Make sure there is always a TTS tool holder in the collet while the machine is not in use. Retracting the power drawbar to the clamped position with no tool holder in the collet will eventually fatigue the collet, and may shorten its service life. For more information, refer to the documentation that ships with the Power Drawbar (PN 35927).

Assigning Tool Numbers

Use any tool number from 1-256 to assign a position in the tool tray. You are not restricted to tool numbers 1-8.

Loading and Unloading a Tool into the Tool Tray

There are two ways to load and unload the tool tray:

1. Automatic
2. Manual

TO AUTOMATICALLY LOAD A TOOL INTO THE TRAY

1. Load a tool into the spindle.
2. From the PathPilot interface, on the ATC tab, type the tool number in the *Tool DRO* field (see **Figure 34**). Press *ENTER* on the keyboard.
3. Click the *Store Current Tool* button.

The ATC assigns the tool to the nearest open slot, fetches the tool from the spindle, and stores the tool in the tray. The tool number is displayed on the tray image in the center of the screen (see **Figure 34**).

4. Click the *Retract* button (see **Figure 34**). The tray returns to machining position.

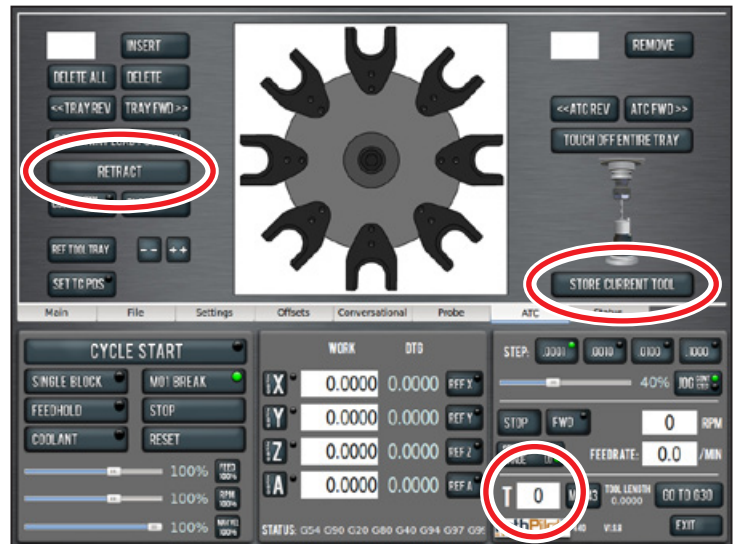


Figure 34

TO MANUALLY LOAD A TOOL INTO THE TRAY

1. From the PathPilot interface, on the *ATC* tab, click the *Go To Tray Load Position* button (see **Figure 35**).

The spindle head moves up and the ATC moves into the door open position.

2. Insert a tool into an open fork on the tray.
3. From the *ATC* tab, type the tool number into the *Insert* DRO field (see **Figure 35**). Press *ENTER* on the keyboard.

4. Click the *Insert* button (see **Figure 35**).

The tool is assigned to the exposed tray slot.

5. Click the *Tray FWD* button or the *Tray REV* button (see **Figure 35**).

The tray advances to the next slot location.

6. Click the *Retract* button (see **Figure 35**).

The tray returns to machining position.

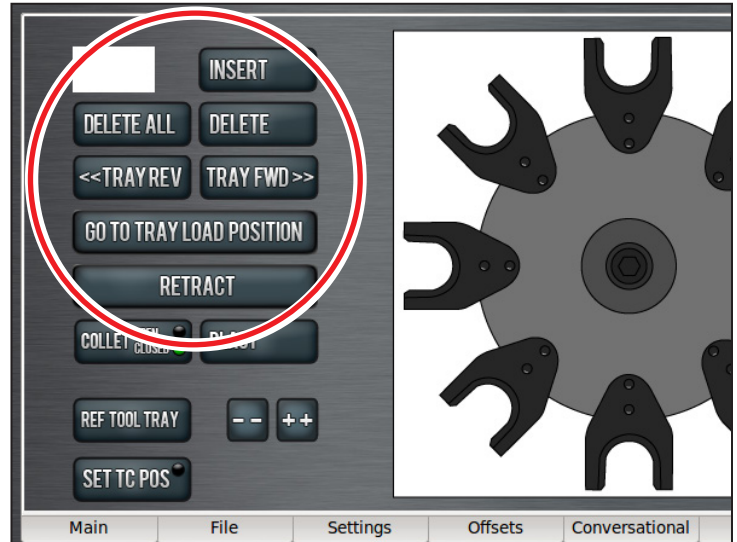


Figure 35

TO AUTOMATICALLY UNLOAD A TOOL FROM THE TRAY

NOTE: Typing a new tool number in the *Tool DRO* does not remove the tool from its tray assignment.

1. From the PathPilot interface, on the *ATC* tab, type the tool number in the *Remove* DRO field (see **Figure 36**). Press *Enter* on the keyboard.

2. Click the *Remove* button (see **Figure 36**).

The ATC fetches the tool from the tray.

3. Remove the tool from the spindle.

4. From the *ATC* tab, click the *ATC FWD* button or the *ATC REV* button (see **Figure 36**).

The tray advances to the next location and fetches another tool.

5. Click the *Retract* button.

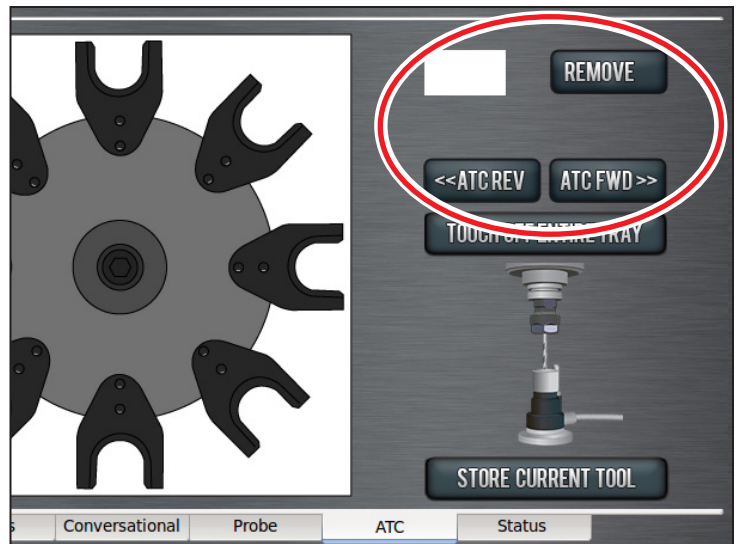


Figure 36

The tray returns to machining position.

TO MANUALLY UNLOAD A TOOL FROM THE TRAY

1. From the PathPilot interface, on the *ATC* tab, type the tool number into the *Insert* DRO field (see **Figure 37**). Press *ENTER* on the keyboard.
2. Click the *Go To Tray Load Position* button (see **Figure 37**).

The spindle head moves up and the ATC moves into the door open position.

3. Click the *Delete* button (see **Figure 37**).

The tool is unassigned from the tray and the tray moves to that tool.

4. Click the *Tray FWD* button or the *Tray REV* button (see **Figure 37**).

The tray advances to the next slot location.

5. Click the *Retract* button (see **Figure 37**).

The tray returns to machining position.

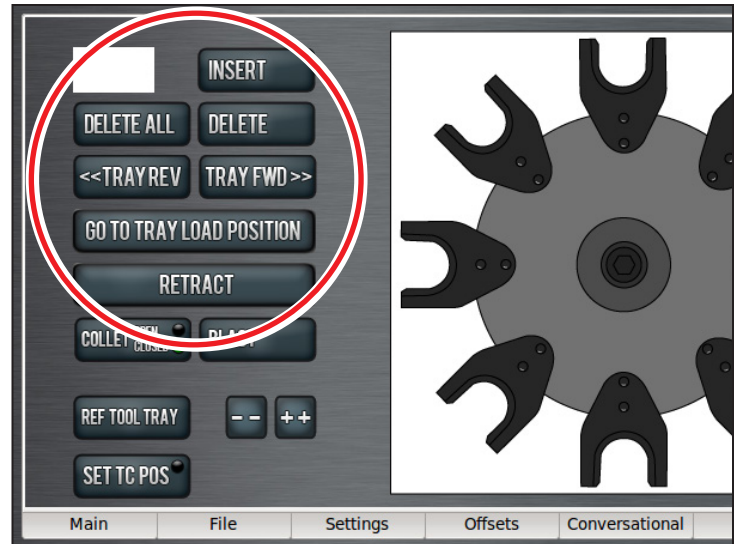


Figure 37

Retrieving a Tool from the Tool Tray

Depending on your workflow, do one of the following:

- Type $T_{xx} M6$ in the MDI Line field, with xx as the tool number.
- Type the tool number in the *Tool* DRO field and press *ENTER* on the keyboard.

Switching to Manual Tool Changes

From the PathPilot interface, on the *Settings* tab, click the *Manual Tool Change* radio button. The ATC is prevented from making tool changes.

Maintenance

Lubricating the Linear Rails

The linear rails are self-lubricating. If, after initial installation, you hear chatter from the linear rails, apply a thin layer of way oil to the linear rails.

Replacing the Plastic Screws on a Fork

The plastic screws that hold the fork to the tool tray are designed to fail under greater-than-normal loads: when a tool crashes, the plastic screws snap to prevent damage to the ATC.

If the plastic screws that hold the fork to the tool tray break, do the following:

1. From the fork, remove the broken screws.
2. Use two included Plastic Screws to secure the fork to the tool tray.

Make sure the groove on the fork faces the machine table (see **Figure 38**).

IMPORTANT! Do not use metal screws to replace broken screws on an ATC's fork. Failure to do so could cause machine damage.

3. Repeat the *Adjusting the Tool Tray Rotation* section.

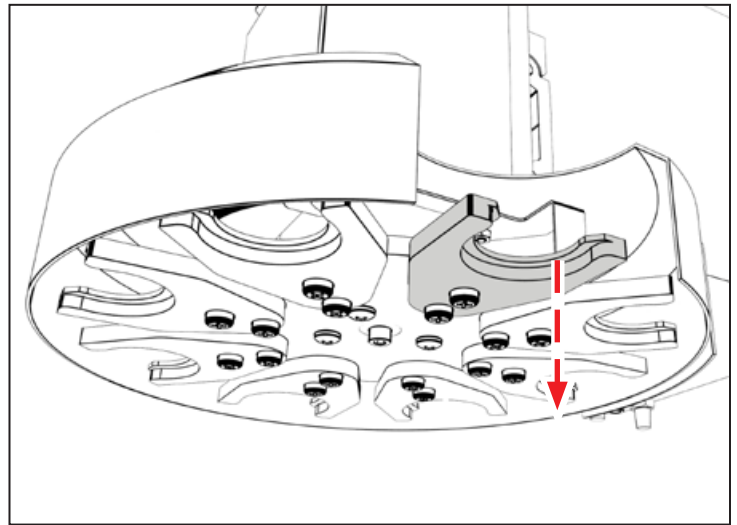
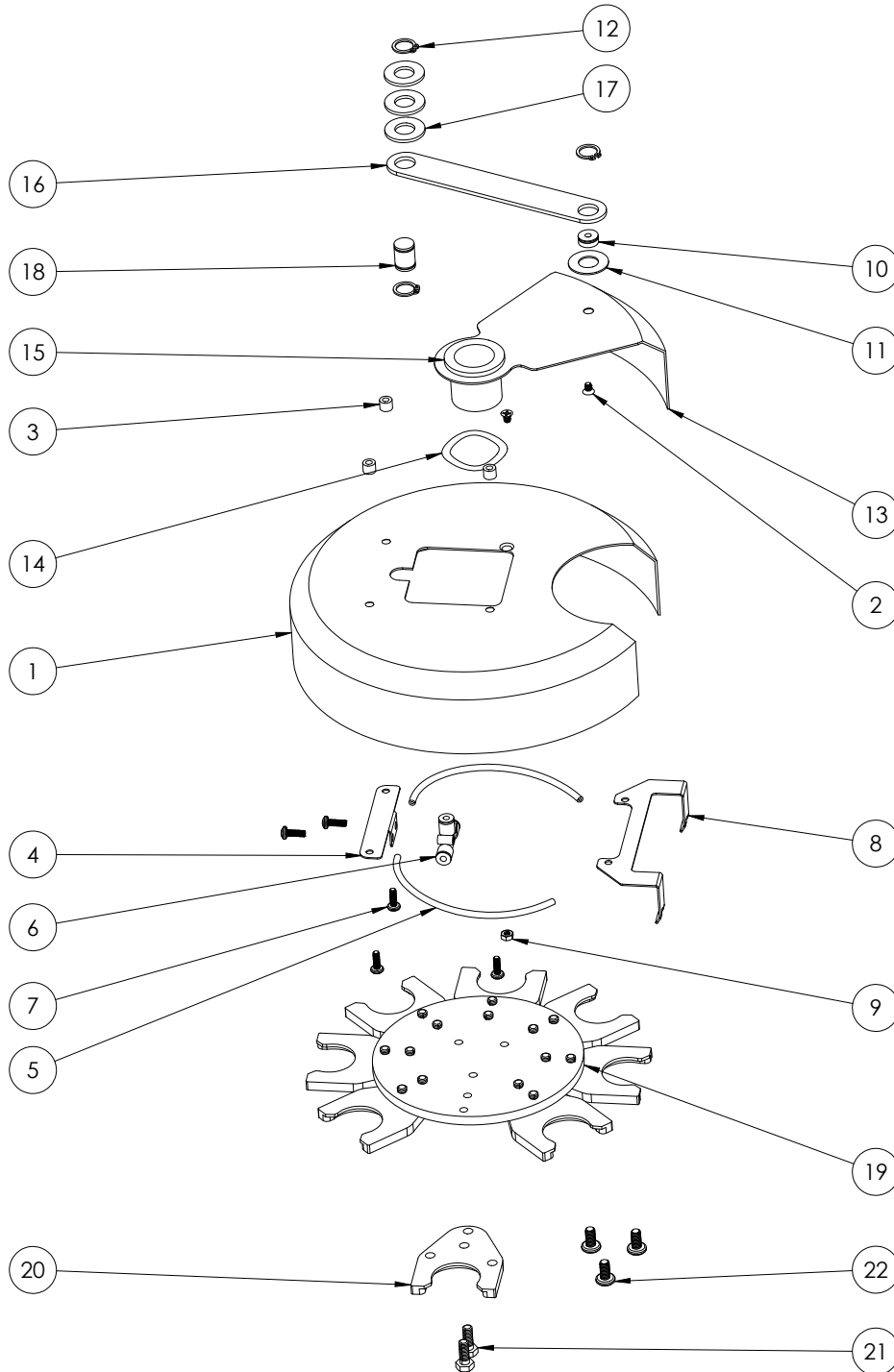


Figure 38

TECHNICAL DOCUMENT

Exploded Views and Parts Lists

Carousel Assembly Exploded View



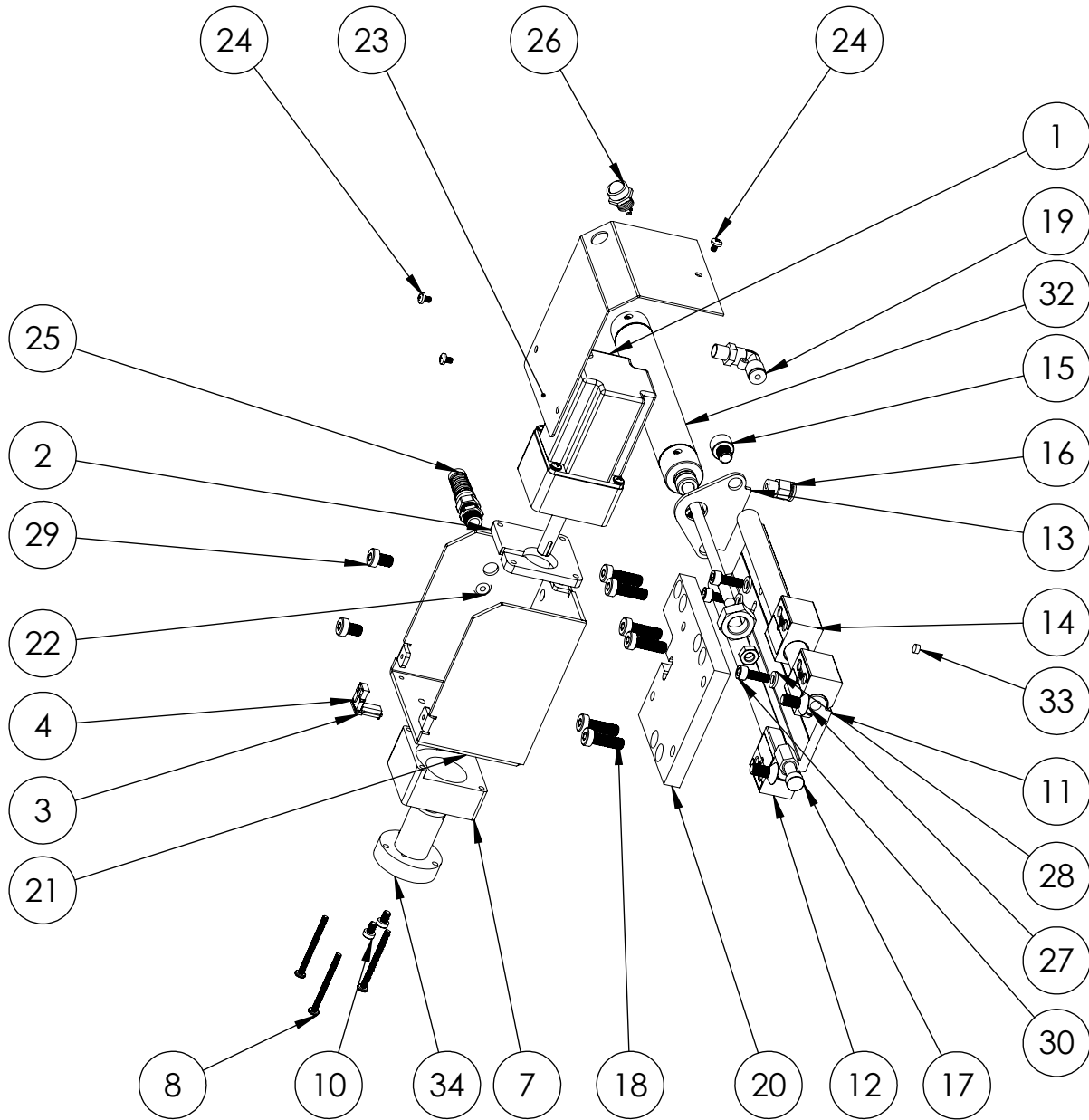
TECHNICAL DOCUMENT

Carousel Assembly Exploded Parts List

Item #	PN	Description
1	35834	8-Tool Cowling
2	35909	M6 × 4 mm Phillips
3	35837	8 mm Nylon Standoff
4	35838	Blaster Tee Mount
5	35918	5-32 Air Blast Hose
6	35839	5-32 Tee
7	35842	M4 × 12mm Pan
8	35841	Blaster Guide
9	35889	M4 Hex Nut
10	32133	Tray Arm Pin – Front
11	35919	Lever Arm Bearing
12	35844	12.5 mm C-Clip
13	35845	8-Tool Chip Door
14	35843	Chip Door Wave Spring
15	35835	Door Flange Bearing
16	35910	Chip Door Lever
17	35920	Lever Arm Thrust Bearing
18	32132	Tray Arm Pin – Rear
19	35862	Tool Tray Platter
20	38485	ATC Fork (Plastic)
21	32269	M6 × 16 mm Nylon Hex Bolt
22	35856	M5 × 12 mm Pan Head

TECHNICAL DOCUMENT

Motor and Actuator Exploded View



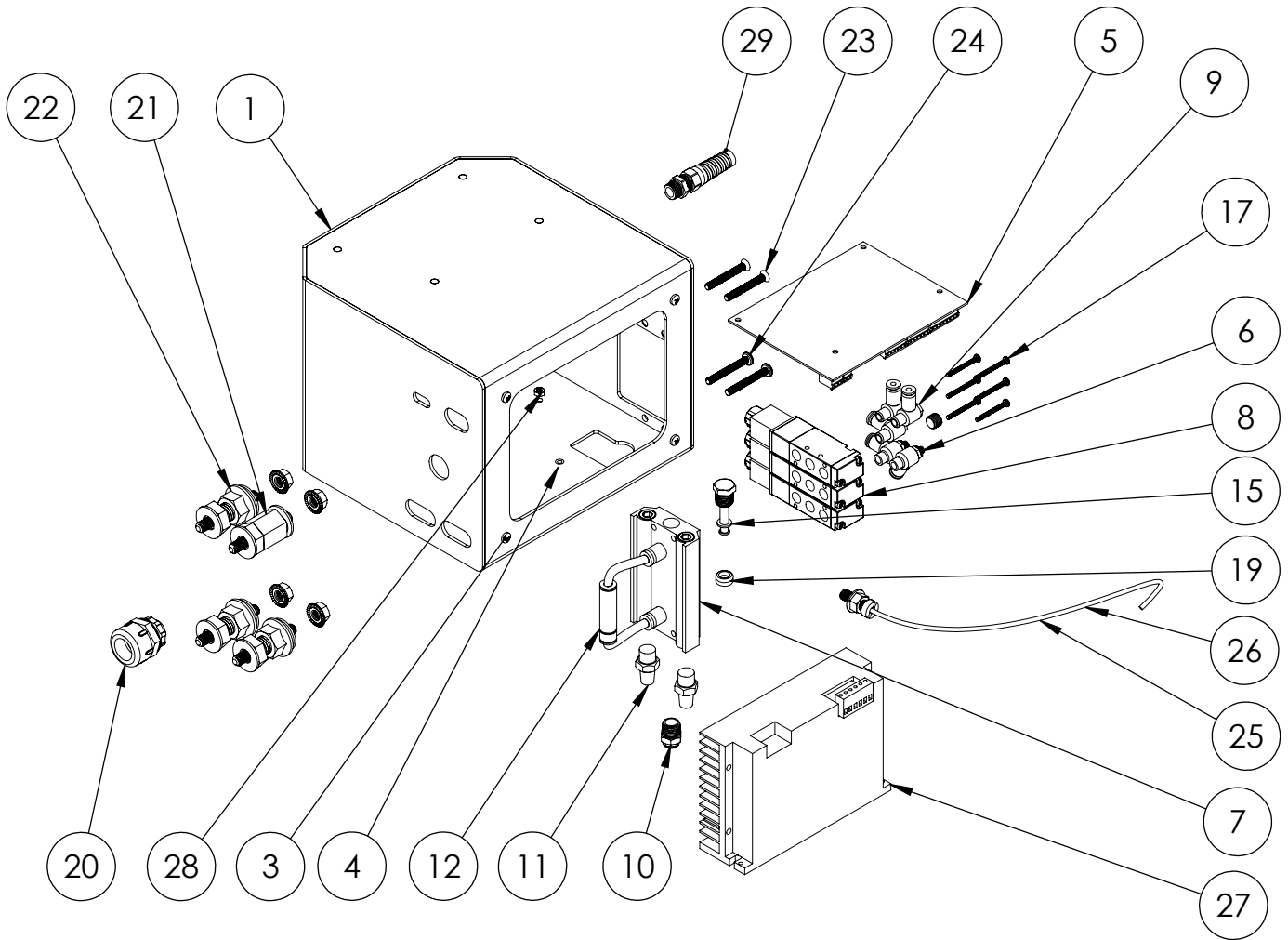
TECHNICAL DOCUMENT

Motor and Actuator Exploded View Parts List

Item #	PN	Description
1	35847	NEMA 23 Gear Head Motor
2	35848	Motor Spacer
3	35899	Hall Effect Sensor Module
4	35904	3-Pin Molex Connector
5	35851	1-8 Magnet
6	35852	Gear Motor Thrust Bearing
7	35853	Hub Bearing Housing
8	35857	M4 × 50 mm Pan Head Screw
9	35842	M4 × 12mm Pan Pan Head Screw
10	35836	M5 × 8mm Low-Profile Socket Head Cap Screw
11	35858	16 mm Rail
12	35859	16 mm Shuttle
13	35860	Cylinder Mounting Plate
14	35881	Magnetized Shuttle
15	35861	M10 × 10 mm Socket Head Cap Screw
16	35863	5-32 × 1-8 NPT Male Connector
17	35864	Air Cylinder Rod Coupling
18	35865	M8 × 25 mm Socket Head Cap Screw
19	35905	5-32 × 1-8 NPT Elbow
20	35868	Motor Chassis Slide Plate
21	35869	Motor Housing
22	35855	5-32 Grommet
23	35873	Motor Housing Cover
24	35871	M4 × 6 mm Pan Head Screw
25	32139	Flex Cable Retainer – 1/4 NPT
26	35870	Waterproof Button
27	35872	M8 × 18 mm Flat-Head Cap Screw
28	35874	M6 Washer
29	35875	M8 × 12 mm Low-Head Socket Head Cap Screw
30	35876	M6 × 18 mm Socket Head Cap Screw
31	35877	M4 × 18 mm Flat-Head
32	35902	Air Cylinder
33	35854	1-4 magnet
34	35850	Taper Lock Hub

TECHNICAL DOCUMENT

Mount and Control Exploded View



TECHNICAL DOCUMENT

Mount and Control Exploded View Parts List

Item #	PN	Description
1	35879	Mounting Box
2	35880	Back Plate
3	35871	M4 × 6 mm Pan Head Screw
4	35907	3.5 mm Mono Jack
5	35901	ATC Control Board
6	35883	Meter Out Elbow 5-32 × 1-8 NPT
7	35884	Air Manifold
8	35885	Double Acting Solenoid 1-8 NPT
9	35886	5-32 × 1-8 NPT Elbow
10	35887	5-32 × 1-8 NPT Male Connector
11	35888	Muffler
12	32226	Check Valve In Line
13	32169	10-32 × 1/4 Push Connector
14	35890	1-4 NPT Hex Plug
15	35891	Air Isolator Baffle
16	35892	1-8 NPT Hex Plug
17	35895	M3 × 30 mm Pan Head Screw
18	35903	M3 × 4 mm Pan Head Screw
19	35914	O-Ring
20	35896	3-8 NPT Conduit Terminator
21	35911	Cam Tilt Adjuster Standoff
22	35833	Length Adjuster Standoff
23	35917	M5 × 40mm Flat-Head Screw
24	35846	M5 × 40 mm Pan Head Screw
25	35867	Hall Effect Sensor Assembly, 10 mm Serial #0 - 60
26	35866	Hall Effect Sensor Assembly, 8 mm Serial #61+
27	32793	Stepper Driver
28	35889	M4 Hex Nut
29	32139	Flex Cable Retainer – 1/4 NPT
30	—	M4 × 12 mm Flat-Head Screw

TECHNICAL DOCUMENT

Wiring Diagram

