

Automation

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ATC adjustment for Excel 510

The proper procedure to adjust an ATC is to mechanically align it then adjust the electronics. Move the Z-axis to tool change position. Remove power from the machine and lock out the electrical disconnect.

Mechanical alignment

Remove the air pressure and release the lock pin holding the magazine.

Spin the ATC by hand while manually engaging the lock pin.

Restore air pressure. Verify that the magazine does not move.

Break the ATC loose on the shaft so that it can be spun by hand.

Remove the 4 bolts holding it to the horizontal cylinder.

Slide the ATC in by hand onto the spindle without a tool.

Mark the spindle location with a paint marker.

Tighten the ATC to the shaft while it is aligned with the spindle.

Tighten the 4 bolts attaching the ATC to the horizontal cylinder.

Note the pocket location.

Encoder alignment

Diagnostic #20 bits 0-5 hold a binary value of the tool number. Diagnostic #21 bit 7 must be high. This is the encoder alignment center point that fires the locking pin. Adjust this by scribing a mark onto the encoder. Verify that the diagnostics for tool pocket and encoder position are correct. Move the encoder slowly CW until 21 bit 7 goes low. Scribe a mark on the machine matching the encoder mark. Now repeat this process going CCW. Tighten the encoder down mid-way between these marks. This will ensure that the encoder is properly aligned.

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Tool change height

When the encoder is aligned, place a tool into the spindle and adjust the tool change height and spindle alignment. From MDI mode issue an M19 command to orientate the spindle. Verify that the mark you previously placed on the spindle is still aligned. If not, adjust the positioning pot on the lower right corner of the spindle orient card until the marks line up. If they do not contact me.

Remove the 4 bolts from the ATC horizontal cylinder and sliding the magazine onto the tool with the spindle orientated. USE CAUTION. SINCE THE HEAD DOESN'T KNOW THE CARROSSEL IS UNDER THE SPINDLE THE Z-AXIS CAN MOVE DOWN AND CRUSH IT. Carefully adjust the Z-axis height so that the magazine slides onto the tool without placing a load on the spindle. Note the machine position and modify the proper parameters. This may be G28 (home) position or G30 (second reference). For G28 adjust parameter 510. For G30 Adjust parameter 737. If you are not familiar with how to adjust the parameters on a 0 control contact me or Fanuc for assistance. A value of 1mm = 1000 in the parameter settings. Please remember to account for the + or - direction when adding this value. Tighten the magazine back to the horizontal cylinder. Rotate the magazine 180 degrees. Verify that the magazine is not bent on the shaft by checking the alignment again.

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Horizontal cylinder adjustment

Mark a tool holder and operate the ATC manually moving the tool in and out of the spindle several times. Look to see if the tool is striking the spindle. If so, adjust the stroke of the horizontal cylinder by adjusting the stop nut that holds the bracket from which you previously removed the 4 bolts. This is a slow process so be patient. Be careful to remove the set screw before turning the stop nut. After adjusting the nut it may be necessary to adjust the limit switches on the horizontal cylinder. This is not always easy due to the location of the switches. The cylinder retracted diagnostic is X16.2 the cylinder extended to spindle diagnostic is X16.3.

Adjust the flow controls

Adjust the flow regulators on the in and out stroke of the horizontal cylinder so that they are even. When the cylinder retracts it should not bounce at the end of travel. If it does adjust the cushion on the end of the cylinder. Many older cylinders do not have any adjustment left and must be replaced. That is a whole different story all together. Problems with this cylinder are usually caused by water in the air supply

Adjust the cushion on the up and down stroke so that they are even with no bounce.

Ring cone motor

Some machines use a ring-cone motor to drive the magazine. The stop pin pushes a lever that engages the clutch on this motor. If the magazine rotates to short or to far you can adjust the set screw that determines the stroke of the cylinder. This will adjust the engagement of the clutch. If this does not help, you can loosen the nut and screw holding the linkage to the shaft of the motor. Adjust the linkage position to obtain more or less force on the clutch. Make very small changes to the position. When the clutch is not engaged you should be able to free spin the fan on the back of the ring cone-motor.

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Testing

Run the ATC in automatic mode testing all tool pockets. Call the tools in a random order to test forward/reverse rotation and single/multiple pocket rotation. Place a dwell between the tool numbers called to prevent the ring cone motor from over heating. Run the ATC through one hundred tool changes. Watch and listen for smooth motion.

Limit Switches

X17.3	Tool clamp Limit
X18.2	Magazine Descent Limit
X18.3	Magazine Ascent Limit
X20.0-5	Encoder output for tool position
X21.0	Orientation Completion
X21.7	Encoder alignment
X16.2	ATC Left
X16.3	ATC Right