MCT Cutter Beam Squaring

Beam Squaring Overview

The most common intervention maintenance required of MCT Cutter operators is beam squaring; a simple process to ensure the beam (or gantry) is square to the cutting table. If the beam is out of square, meaning the X1 and X2 motors are not correctly aligned, it will cause undue wear on the machine and produce cuts that are not true (square). This happens most commonly from excessive emergency-stopping the machine while in motion and infrequently from the beam over-traveling and hitting hard stops, or hard 'knocks' produced from poor file construction.

The beam is attached to the X-motor carriages with eight (8) bolts on both the datum and non-datum side and is adjusted mechanically, assisted by TigerVision software. Each X-motor carriage has a switch below the motor, which allows the software to know the location of the motors (and beam) after homing the machine and whether or not they are square. The limit ramps, which trigger the switches, are attached to the extrusions on the front of the machine below the gear racks are adjusted upon install and should, under **NO** circumstances, be adjusted without service intervention.

Diagnosing Beam Squareness

Easily diagnose beam squareness by following these simple steps:

1) While the machine is idle, click the drop-down arrow next to the red stop button at the bottom center of TigerVision and select 'Reset Controller'. (Figure 1)

2) Click the drop-down arrow next to the green start button at the bottom center of TigerVision and select 'Force Complete Home'. (Figure 2)

3) After the machine moves completely to home and displays 'Ready' in the upper status bar of TigerVision, jog the beam back slightly.

4) Hover the mouse cursor over the blue X encoder value in the upper left of TigerVision to display the X1 and X2 values. (Figure 3) These values are displayed in millimeters and should be equal, prior to the tenth (1/10th) millimeter.

5) With the machine idle, press the emergency stop on the work station to disengage the motors.

6) Re-check the X1 and X2 values. (Figure 3) If the values have a difference greater than 2mm*, re-square the beam following the instructions on Page 2.

*2mm is a rule of thumb. Depending on how far out of square the beam is determines how far off the cuts will be. If the beam is 2mm out of square, a square cut would be off by 1mm corner to corner. If your cuts require more precision, re-square the beam at a lower variable such as 1mm.
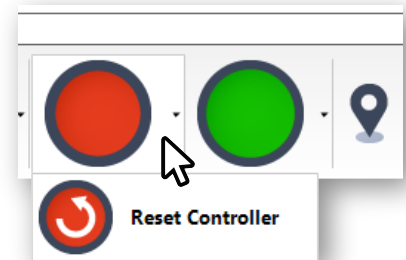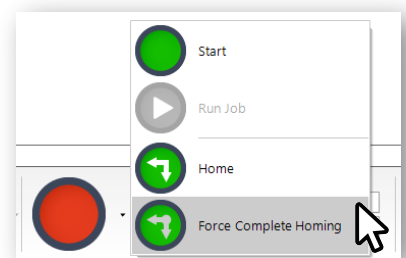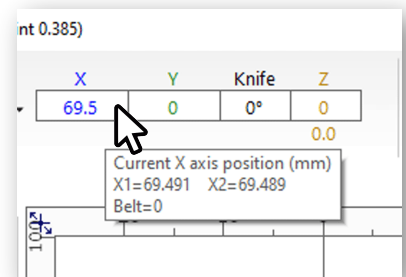

Figure 1

Figure 2

Figure 3

Squaring the Beam

Once you have diagnosed that the beam is not square as outlined on Page 1, position the beam somewhere the operator can access both sides of the beam's bump guards easily.

Required Tools, found in MCT Tool Box:
4mm Allen wrench, 10mm Allen socket, ratchet.

1) Using the 4mm Allen wrench, remove the two (2) bolts on either side of both of the bump guards and set aside. (Figure 4)

2) The bump guard cover will pull off straight back. Set the covers aside, but not on top of the machine.

3) Inside the beam are eight (8) socket cap bolts holding the beam to the X-motor carriage. Using the 10mm socket and ratchet, loosen all eight (8) bolts on either side to finger-tight or so the split washer visibly opens. (Figure 5)

4) Return to TigerVision and complete steps 1-5 from Page 1, making sure that the X values are now equal prior to the tenth (1/10th) of a millimeter. (Figure 3)

5) Re-engage the motors by clicking the green 'Initialize' button in TigerVision. The machine should home in place rather than moving to home to zero.

6) With the machine in a "Ready" state, tighten all eight (8) bolts on each side of the beam, re-install the bump guard covers, and resume production.

What the steps above accomplishes is a mechanical squaring procedure in which both 'loose' X carriages allow the beam to twist on them slightly. The X carriages have homed and the switches have triggered the correct position both mechanically and in TigerVision, resulting in a square beam.
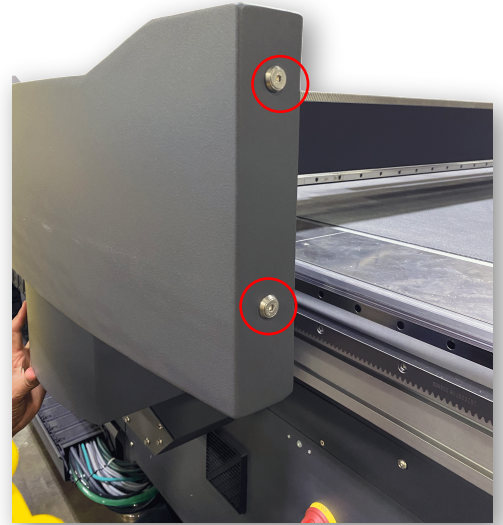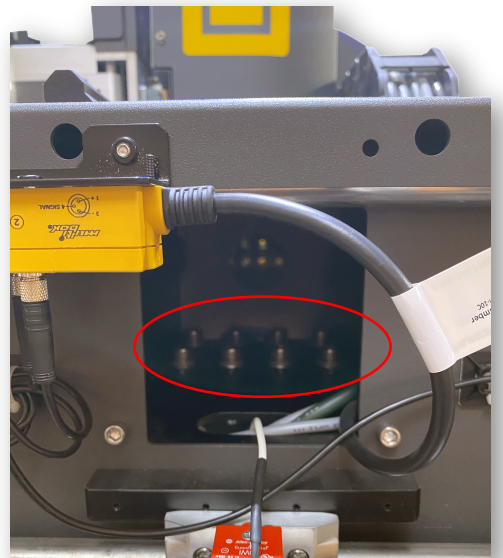

Figure 4

Figure 5

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