Operating the EOT-2 Oscillating Tangential Module
Supplement to the WinCNC Operations Manual

5/12/2015
Laguna Tools

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ELECTRIC OSCILLATING TANGENTIAL TOOL (EOT-2)

EOT-2 OVERVIEW AND WORK FLOW

The EOT-2 is a processing unit for CNC-machines that is generally designed to cut various materials such as cardboard, sealing material, foils, corrugated cardboard, carbon fiber prepreg material, leather, rigid foam and many others. Nevertheless it´s finally up to the user to test the cut ability of respective materials.

Below is a work flow diagram that captures the steps required to execute a program. The following sections outline each step in more detail.
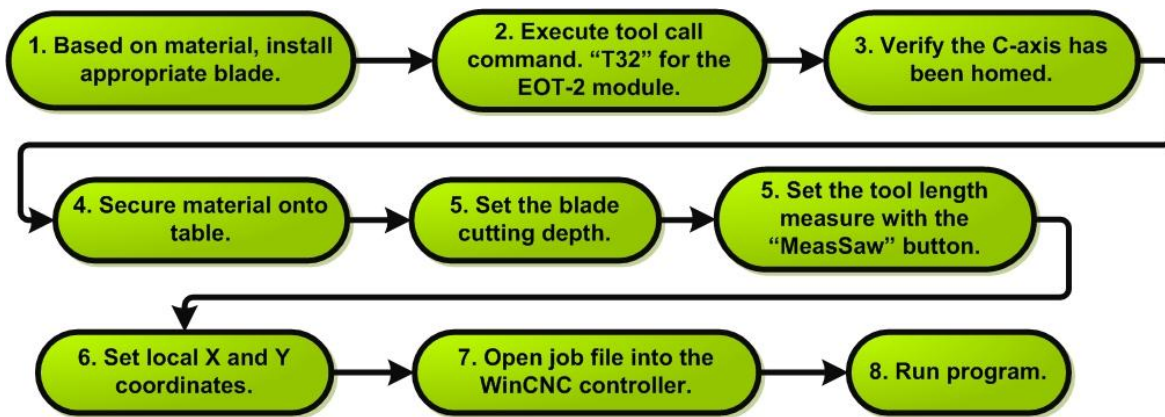

Figure 1. Oscillating tangential (EOT-2) work flow diagram

EOT-2 BLADE SELECTION AND BLADE CHANGE

When selecting a blade it is important to consider material thickness and tensile strength. Different carbide metal blades with a shank diameter of 6mm are available for various cutting applications. The table below presents a selection of the most commonly used blades.

Table 1. Carbide blades.

Blade ID	Cutting Edge	Length of Cutting Edge	Total length	Typical Applications
E12	2	12 mm	25 mm	Universal blade for various materials such as cardboard, gasket material, foam rubber, cork, useable on both sides
E18	1	13.5 mm	25 mm	Universal blade for various materials such as cardboard, gasket material, foam rubber, cork, one-sided blade for fine lines
E25	1	25 mm	39 mm	Universal blade for various materials such as cardboard, gasket material, foam rubber, cork, one-sided blade for fine lines
E28	1	30 mm	45 mm	Universal blade for various materials such as cardboard, gasket material, foam rubber, cork, one-sided blade for fine lines
E30	1	2.5 mm	25 mm	Special blade for TCM module; Wedge blade for normal foils and writings
E50	1	3.5 mm	25 mm	Special blade for TCM module; Wedge blade for flock textile foils, felt, cardboard
E70	1	8 mm	25 mm	Special blade for TCM module; Wedge blade for textile foils, felt, cardboard, rubber
E85	1	50 mm	65 mm	Special blade for EOT module; e.g. for soft polyurethane foam panels
E87	1	70mm	83mm	Special blade for EOT module; e.g. for soft polyurethane foam panels
E92	1	120mm	133mm	Special blade for EOT module; e.g. for soft polyurethane foam panels

INSTALLING BLADE

1. To change blades use a 2.5mm hex key to loosen the torque screw.
2. Insert blade with the weldon surface facing the torque screw.
3. Torque down the set screw against the weldon surface.
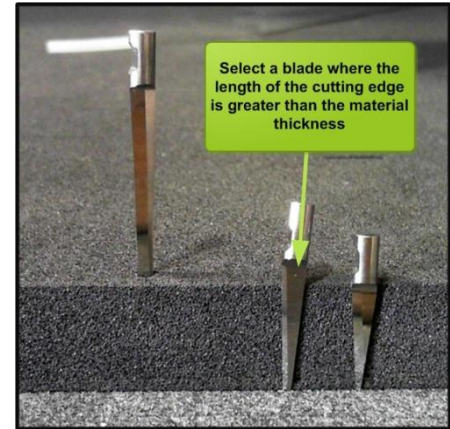
Figure 3. Changing blades on an EOT-2 module.

Figure 2. Selecting a blade based on cutting edge length.

HOMING THE C-AXIS

The C-axis refers to any axis rotating around the Z-axis, such as the TCM-3 and EOT-2 modules. It is necessary to home the C-axis prior to using the modules. This will ensure blade direction is accurate. If the C-axis is not homed, the blade may be in the incorrect position during a cut, most likely leading to a broken blade.

The C-axis automatically homes when either modules tool number is called. One of the two modules will home during the overall machine homing sequence, depending on the last state the machine was in.
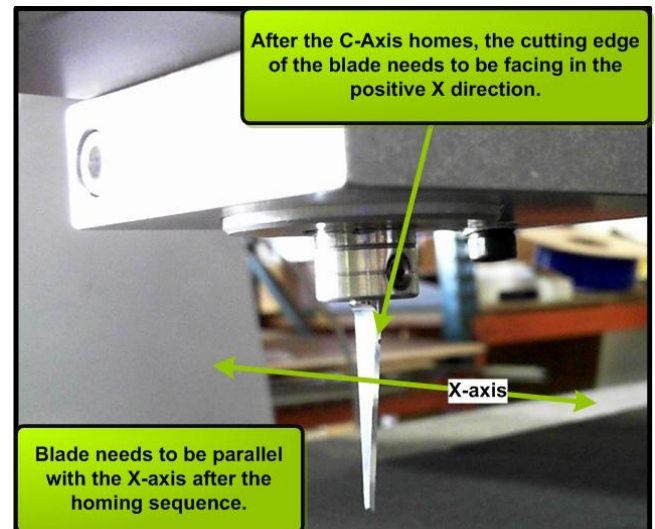

Figure 4. Blade position after homing sequence is complete.

TURNING OSCILLATION ON AND OFF

Oscillation will be activated when a T32 tool call command is executed. Oscillation can also be manually activated through the controller interface.
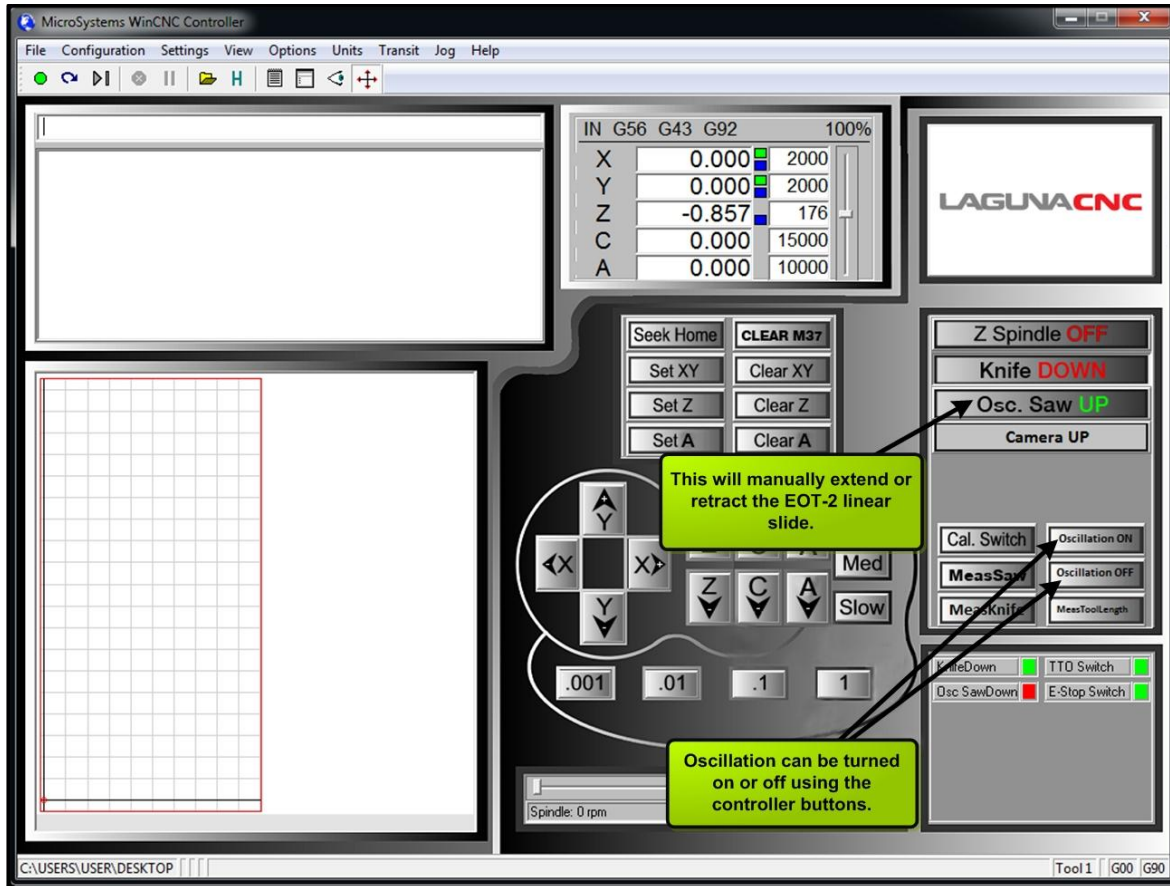

Figure 5. Controller overview of EOT-2 controls.

EOT-2 SETTING KNIFE LENGTH (TOOL LENGTH OFFSET)

The purpose of setting a tool length offset is to store a point in the Z-axis in which the knife will lower to prior to cutting. The buttons "MeasKnife" and "MeasSaw" are used to store this value. When a tool length offset is active there will be a blue next to the corresponding axis. G43 mode will also be active.

STEPS TO STORE A TOOL LENGTH MEASURE

1. Select the EOT-2 tool by executing a tool call command. For the EOT-2 module the tool command is T32.
    1.1. The EOT-2 module will extend and all other modules will retract
    1.2. Blue boxes will appear next to the X, Y, and Z axes.
    1.3. The head will shift along the X-axis the corresponding offset.

2. Lower the oscillating blade down until it will cut through a sheet of paper. This will ensure the blade is low enough to cut all the way through a material, with minimal wear to the cutting mat.

3. Once desired height is obtained press the "MeasSaw" button as show in the figure below. A Blue box will appear next to the Z-Axis. This represents the stored tool length offset.
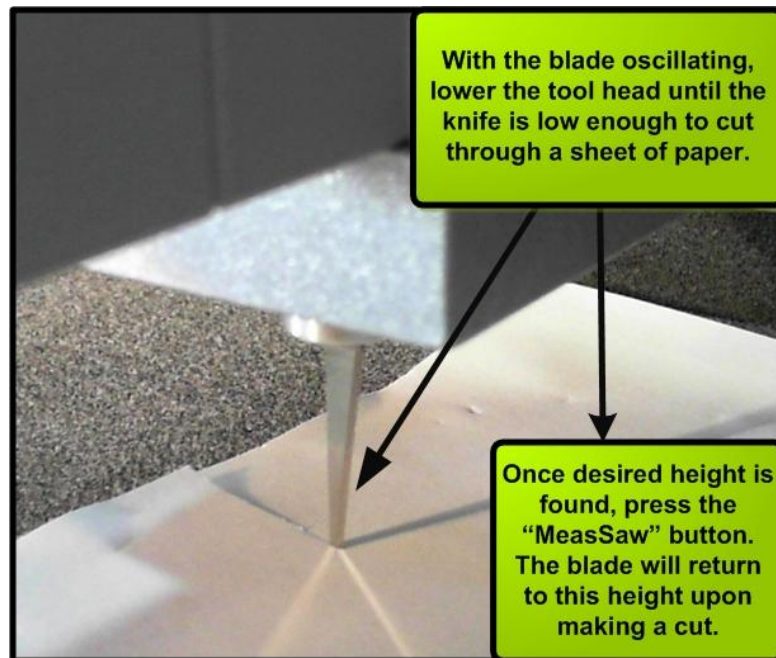

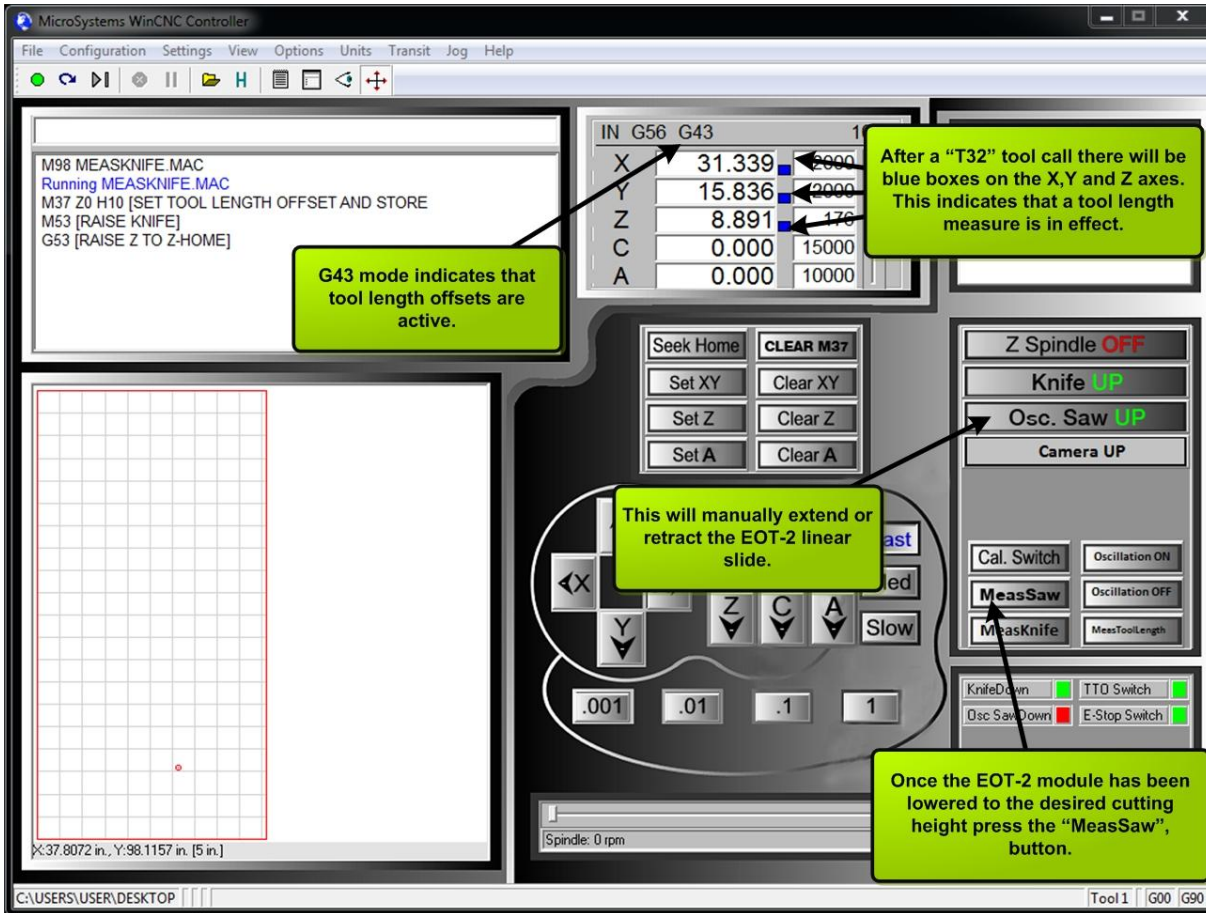**Figure 6. Methodology to setting tool length for the EOT-2 module.**

Figure 7. Controller overview with respect to the EOT-2 module.

EOT-2 SETTING WORK COORDINATES

Work coordinates refer to the point in the XY plane that represents the origin of the work piece. Typically the X=0, Y=0 location is the bottom left hand corner of the material. This point is DEPENDENT on where it is declared in the CAD software.

For clarification, the X and Y work coordinates may be referred to by a multitude of names. For instance, work coordinates, XY origin, XY Datum position, local zeros, G54, temporary home, G92, etc., are all synonymous.

STEPS TO SET WORK COORDINATES

1. Manually jog the tool head until the knife point is at the desired XY origin point.
2. Press the "Set XY" button. Green boxes will appear next to the X and Y axes.

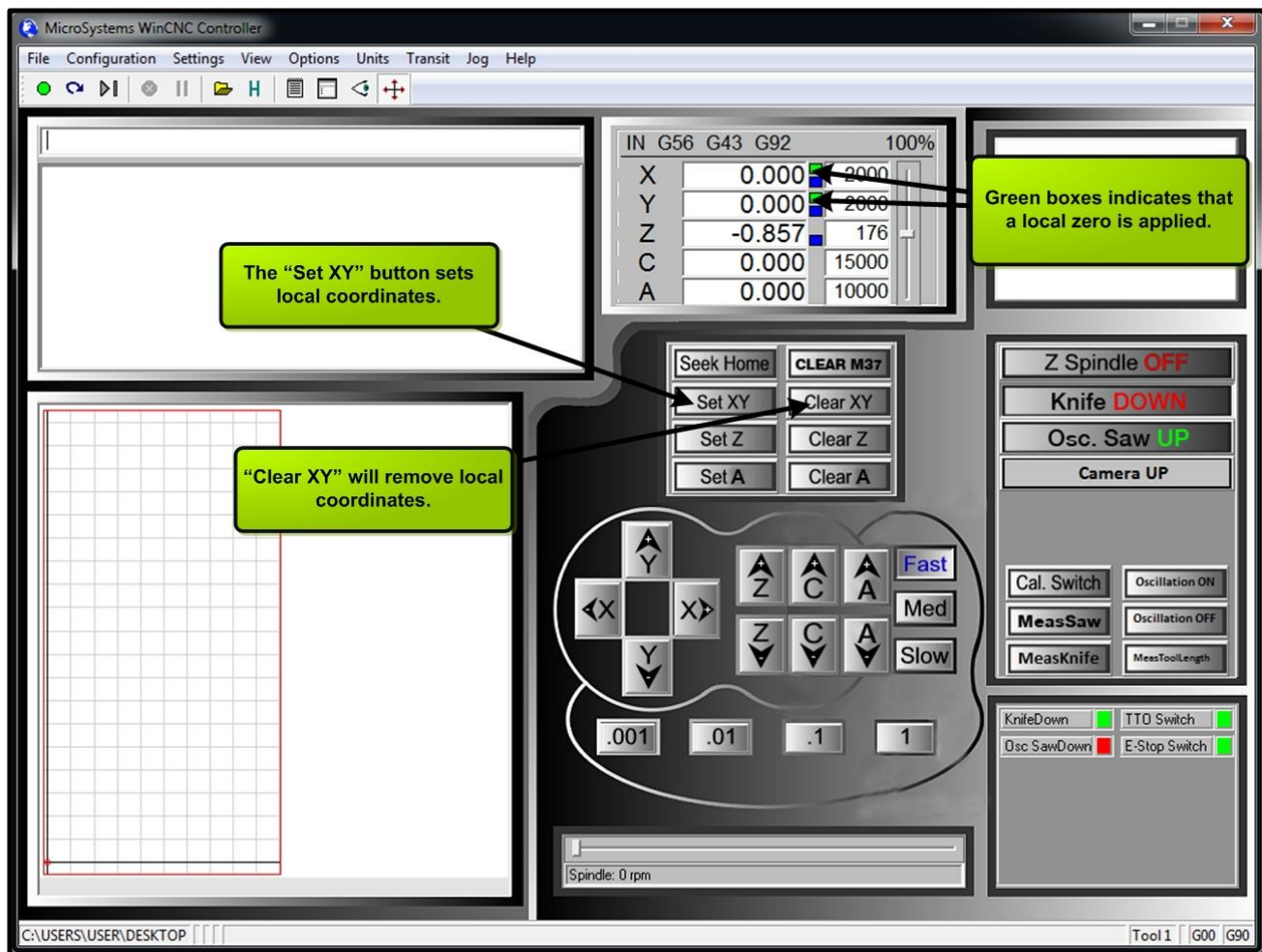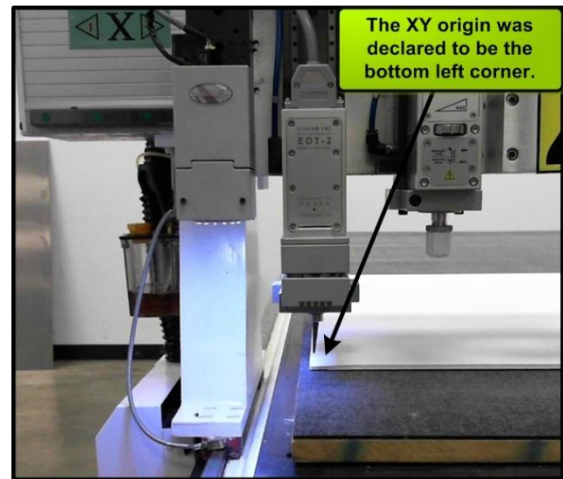**Figure 8. Positioning the EOT-2 module to set local coordinates.**

The XY origin was declared to be the bottom left corner.

Figure 9. Controller overview of setting and removing local coordinates.

LOADING A PROGRAM AND EXECUTING CODE

Once the previously discussed steps are completed G-code can then be executed. Import a program file using the drop down menu File --> Open. Select the desired file.

The program can be previewed in the viewer window by clicking the View button on the tool bar.

Execute the program by clicking on the green start button or pressing "Enter" on the keyboard. The file path must be in the command line in order for the program to execute.

PRELIMINARY CHECKS

The cutting blades are tungsten carbide, which means they stay sharper longer. But carbide is also brittle, and can break easily if stress is applied in the wrong place. That is why doing a test cut in the air is an important optional preliminary step to avoid breaking a blade.

Things to look for are

- Positions in the cutpath where the blade makes sharp turns without lifting.
- Cutting edge of the blade not facing the correct direction.
- Cutting speed.

To Execute a cut in the air

- Partly lower the knife so that there is ample clearance for the knife to safely execute the program without crashing into any obstructions.
- Press the "MeasKnife" or "MeasSaw".
- Load program into wincnc. File --> Open, select program. Click on the "view" icon in the tool bar. This will display the cutpath in the viewer window.
- Execute the program.

POST PROCESSOR

The Post Processor will require commands unique to the WinCNC control system. Post processors can be found at the wincnc.net website. See the "CNC swift series with WinCNC Manual" for more details on locating and implementing new post processors.

If using the program Aspire made by Vectric, the post processor is WinCNCKnife.pp.

ADVANCED SETTINGS

ADJUSTING LIFT

When cutting material, like 2" foam, it is important to be aware of the lift height. Each time the oscillating blade lifts out of the material it must lift high enough before rotating.

This value can also be adjusted directly in the g-code. This value is only declared once at the beginning of the file.
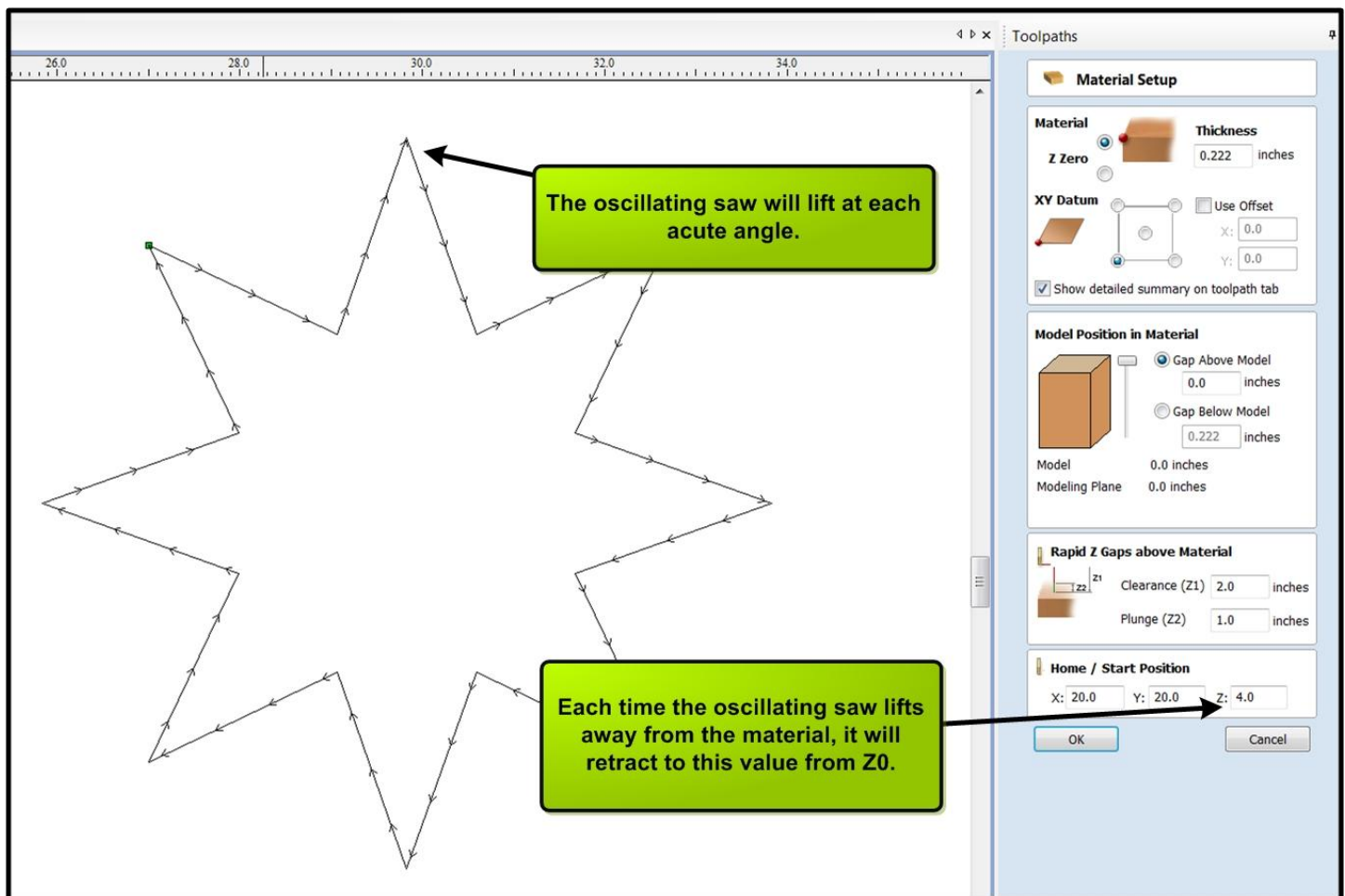

Figure 10. Adjusting lift height in Vectric's Aspire.