



Z-axis ... Auto-Focus

Rabbit Laser USA is always looking to improve our laser machines. We try to get better quality components, additional features, supporting software, product designs...and more. The auto focus device has recently been added to many of our laser machines that use the 6535 controller. We like the auto-focus feature and plan to include this feature on all future laser machines.

The worktable can use the auto-focus by two methods. 1) at the computer 2) at the laser operator pad. Both methods will move the worktable up/down to adjust the z-axis height. This should be done to move the top surface of your material to the focal point of your laser beam...under the focal lens. The automatic method is to place your materials under the touch sensor and then activate the auto-focus routine. The worktable will move up until the touch sensor contacts the top surface of the material. The worktable will then move down at a preset distance. Note: The upward motion will also stop if the worktable has travelled to the upper limit switch.

Using the Operator Pad at the laser machine:

To utilize the z-axis auto-focus, press the "Z" button on the operator pad. The operator pad display will show "Z-Axis Operate". Press the up arrow to move the worktable up. Press the down arrow to move the worktable down. Regarding the auto-focus feature, make sure the engrave/cut material is placed under the touch sensor, then press the "Datum" button to start the auto-focus routine.

Using the software buttons within LaserCut 5.3:

The laser machine can be controlled from inside the computer software. Most any feature of the operator pad can also be done from the LaserCut 5.3 application. The software must be running, the USB cable must be connected, USB software dongle must be inserted to a USB port, the device drivers must be installed. Using the LaserCut 5.3 application should be a normal function of using the laser machine. Start the LaserCut application. Notice the top-right section of the software window. You should see UP and DOWN arrows..and a "Z Datum" symbol. These three buttons will activate the z-axis to move up, down, and auto-datum. It is not recommended to use the software for controlling the laser machine because it can be difficult to see the computer software and ensure safe movement inside the laser machine.

Adjusting the Z-axis height/datum sensor:

The Z-axis height/datum sensor should be positioned such that it is at the highest location possible to be triggered without any materials also hitting the air nozzle or other parts of the focal head. The intention is to allow maximum clearances between the engraved materials and any moving parts of the laser.

*Some focal head configurations mount the red dot pointer such that part of the bracket extends below the air nozzle. This such configuration would need to be changed.

*The sensor should be very sensitive, low weight, and produce a repeatable location. The sensor should not be delicate or otherwise easy to damage. A damaged sensor will likely cause a z-datum routine to damage the

laser machine.

*The sensor must be kept clean. A dirty sensor will result in improper height measurement. Dirt could also be transferred to the engrave surface.

*Non-contact sensors (inductive proximity detector) are not recommended because they required a metal target. Non-contact sensor (capacitive proximity detector) are not recommended because they rely on the target material properties and will give a wide range of detection distances.

*Touch sensors that actually contact the material surface should have a flat bottom such that the sensor's tip will not dimple or push into the material surface.

*The touch sensor should be easy to actuate with very little pressure. The sensor probe should be able to be pushed about 1mm to be actuated and also be able to continue motion for another 2mm. This gives the motion control the time/space needed to react to the electrical signal.

Adjusting the focus length for different focal lens:

The auto-datum feature is the automatic way of allowing the laser controller to move the laser machine components for you. The worktable moves up, the touch sensor is activated, the worktable moves down a preset distance. This preset distance is a machine parameter in your software and then transferred to your laser machine configuration.

The z-axis datum distance is set inside the "Machine Options" configuration of your LaserCut 5.3 software. The parameter is found as the "Offset Distance" on the "Feeding" tab. This sets how far the z-axis will travel down after being triggered by the touch sensor. If you change this parameter, you must download the configuration to the laser machine using the "Stand Alone File Manager" and pressing the "Download CFG" button. Why would I need to change the z-axis distance? 1) The z-axis distance needs to be changed if a different focal length lens is installed in the laser machine. 2) The focal head touch sensor is modified or damaged. 3) You are attempting to get a smaller focal spot size. 4) You are doing the initial configuration of the laser machine.

Details about laser focal length:

The laser light is created inside the laser tube. The light exits the laser tube as an unfocused beam similar to a dowel rod. This beam of light travels inside the laser machine by bouncing off the mirrors. After bouncing down through the laser head, the laser light hits the lens. The laser beam uses the focal lens like a funnel to condense the laser light into the smallest spot size possible. The distance from the lens to the small spot is the focal length. This focal length can be thought of as the length of the funnel. But not all funnels are made the same and not all laser lenses are the same. Different applications of our laser industry will perform better with different laser lenses. What lens works the best will depend on the properties of the material that we engrave or cut.

38 mm ... Engraving only.. Very small spot size

50.8 mm ... Engraving and cutting up to 8 mm thick. Small spot size

63.5 mm ... More cutting than engraving. Cut up to 10mm thick. Small spot

75 mm ... Mostly cutting. Not small spot size

100 mm ... Not good for engraving .. Spot size too large.