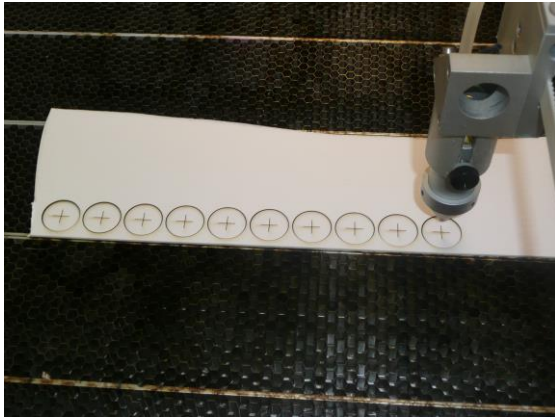
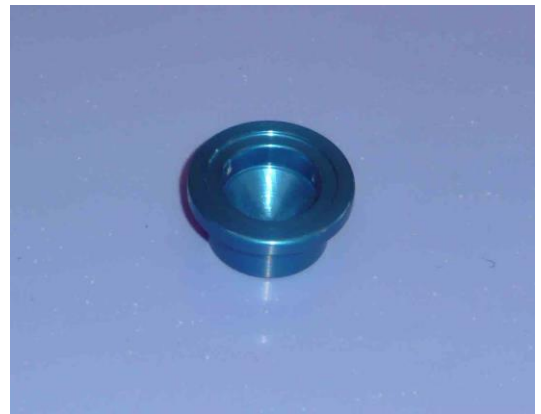


Checking and adjusting Alignment

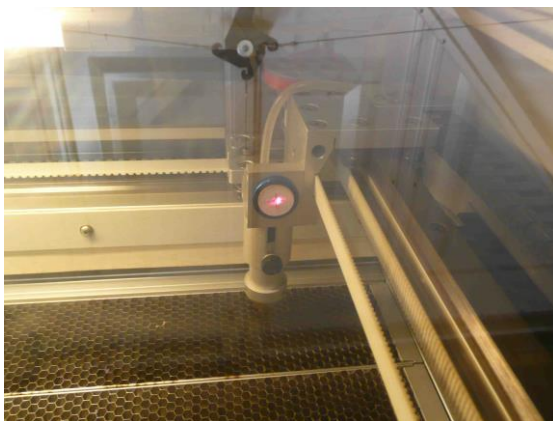
From time to time your machine may see a drop in cutting performance. The usual culprit is the machine being knocked out of alignment. This can happen for a variety of reasons, the machine being moved or the cutter head being knocked when removing materials for instance. Checking the alignment of the laser beam is a simple process and should be done periodically to ensure that you are getting the most out of your laser.



You should first make sure you have some targets made up. You can use your own laser cutter to cut these out. These should be 20mm in diameter and made from thick card about 1mm or more. Do not use paper.



These targets will fit into the recess of your target holder which is supplied in your tool kit. The target holder should be inserted into the recess where the beam passes through on the cutter head. Targets should not be placed into the recess housing the mirrors.



When the lid is closed you will see the red light of the pointer on the target. Be aware that the red light is just a pointer and not the actual beam. The laser beam itself is white light so the beam is invisible. It will burn the target and it is only that that we are interested in. We must fire the laser at the target to produce the burn mark. Only by doing this can we ascertain exactly where the laser beam is in relation to the red pointer. We can then adjust the alignment so

that the beam hits the centre of the target all around the bed.

To fire the beam the machine must be placed "Offline" using the Hand symbol on the keypad. Once the screen says "Offline" you should press the number 3 button. This will bring up a menu asking you if you wish to fire the laser. To manoeuvre the cutter head to the correct location you should select number 2 for "No" and then use the direction pad to move the cutter head to the desired location. Once you need to burn the target press 3 again to bring up the menu and select number 1 before pressing the direction pad



to send a pulse to the laser. The longer you press the pad the longer the burn will be. You only need to leave a mark to see where the beam is hitting the target. The cutter head must be moving for the laser to fire so move away from the walls.

The machine is equipped with three mirrors. A Primary located under the left hand side pod. The Secondary which is the one that moves left and right along the front rail on the front X rail carriage. Finally there is the Tertiary which sits in the cutter head just above the lens. Adjustment of these mirrors is through the use of the three bolts on the

rear of the mirror housing. Bottom left will move the beam up and down while the top right bolt will move the beam left and right. You can gauge how much you are moving it by watching the red light. Remember, you are aligning the burn marks made by the white light laser beam, the red dot pointer is there to be used as a guide only.

When checking alignment you should start by checking the primary. Start at the bottom left of the bed with the cutter head just in front of the secondary mirror (indicated by the red star in the image). This effectively isolates the primary so that any errors in the secondary mirror set up will not affect our testing of the primary. Using the method outlined above fire the laser at the target and work your way along



the front of the machine in increments of 200mm or so. If the beam wanders at this point you will need to remove the left hand side pod to gain access to the primary mirror for adjustment. Once you reach the right hand side of the bed (indicated by the orange star) if the beam hits the target in the same place as it does at the bottom left then you know the primary mirror is correctly aligned.

We then need to check the alignment of the secondary mirror, often referred to as the traveling mirror. Move the cutter head up to the top left of the machine (blue star) using the same method on the keypad. Fire the laser as before and adjust the secondary mirror until the burns are hitting the centre of the target.

Moving across to the top right of the bed area (green star) means that the beam will be travelling the furthest distance in the machine. It can highlight any slight discrepancies in the primary mirror setup so you can try and adjust them out at this point. If you are unable to hit the target in the same place at all four corners of the bed then you may have an issue with the X rails and you should consult an engineer.

You can check the alignment of the tertiary mirror using a slightly different method. In this method the target sits in another target holder which fits onto the lens carrier tube in the place of the nozzle. You will find this target holder in your toolbox with the rest of the maintenance kit. The laser is fired in exactly the same way and as long as the previous steps have been carried out beforehand, you



only need to fire it in one place. A quicker method than fitting the vertical target holder is to lower the nozzle to just below the bed surface and simply cut a line onto a sheet grey card or MDF. If you then look down the line you can see whether the line is to the left or right of the point of the nozzle. Do this in the X and the Y axis and adjust using the small black screws on the top of the cutter head around the mirror housing. By using grey card or MDF you will notice that the smoke stains the surface of the material. The side of the line that the smoke stains the most is the side where the beam is out so adjust it so that the smoke is on both sides of the line indicating that the beam is central.

If when firing the beam you have too much power hitting the target, it may be because the settings on the keypad have been changed. The settings on the keypad bear no relation to the amount of power the laser uses when ordered to by the software. The settings on the keypad are strictly for maintenance purposes only and should not be changed unless needed for maintenance. Press the Menu



button and then select User Config by pressing the Return button. The Max Power setting should be 20% for 30 Watt lasers and 10% to 15% for 50 Watt lasers. If running a 100 Watt machine with a selector switch, run the test in the 50 Watt setting. If not available then just run the test at 10% power setting but don't fire the laser as long. After changing the setting you must press Return to make the new value stick.

The next setting on from Max Power is the Power Band. This setting should be at 0 for all models. Power Band affects how quickly the keypad fires the laser when pressed. Selecting 0 means that the laser will fire instantly.