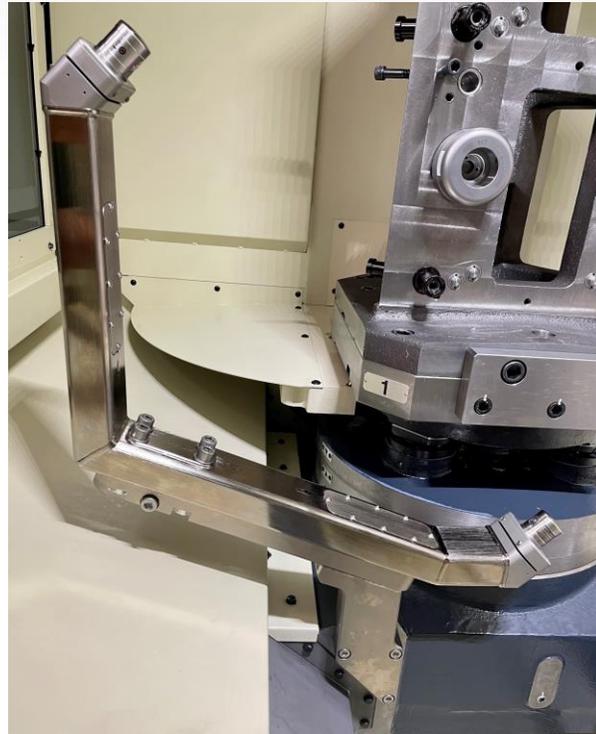


Non-Contact Tool Setting NC4S



This presentation will give you step by step instructions on (re)aligning and (re)calibrating your laser tool setting system

Table of Content:



- Horizontal Machines:

- Head Alignment page 4
- Bracket Alignment page 7
- Laser Calibration page 10

Maintenance:

- Troubleshooting..... page 11

Horizontal Alignment



Red = no signal



Amber = some signal



Green = good signal

- If you make any adjustments to your laser bracket or laser heads you **must** run O8060 (alignment cycle) then O8061 (calibration cycle)
- When to align the beam:
 - You hit the laser bracket with substantial force and change the status of the LEDs.
 - You hit one of the laser heads and change the status of the LEDs.
 - A change in the machines Grid Shift or Spindle
- If your LEDs are Amber or Red you should Adjust The laser Heads. (page 5)
- If your LEDs are Green you can adjustment the bracket (page 7).



Fig. 1



Fig. 3



Fig. 2

- To start the adjustment process place your Voltage Cap on one of the laser heads (Figure 1)
 - This should turn on the number display
- Then go into the electrical panel and find the laser interface (Figure 2)
- Flip the second switch from the top to the right (Figure 3)
- Now your Voltage Cap is displaying your lasers communication voltage
 - This number **must** be above 2
 - Ideally, we want this number to be around 4 (or above)

Fig. 1



Fig. 2

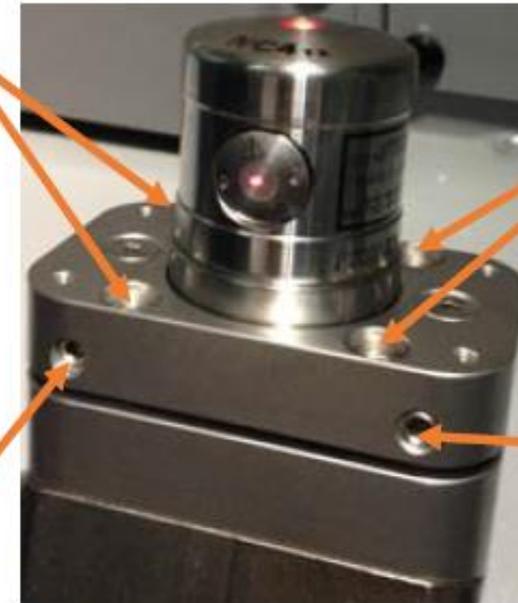
Fig. 3 (The beam is **not** centered)



Cap Screw
Up/Down

Fig. 4 (The beam is centered)

Set Screw
Right



Cap Screw
Up/Down

Set Screw
Left

- If you need to adjust the laser heads, remove the cover plates with the (4) Philips screws (Figure 1)
- Adjust TX laser head (figure 2) to get beam to shine back into the center of the RX head. Adjust the 4 cap screws on top for up/down adjustment and the 2 set screws in front for right/left adjustment. (Figure 4)
- Now Adjust RX laser head to achieve the best signal.
 - You may have to repeat these steps to achieve the highest achievable number (around 4 or above)
 - Remove voltage cap and make sure all screws are snug
 - Screw the cover plate back on
 - You **MUST** Flip Switch 2 back on the laser interface in the electrical cabinet

Bracket Alignment

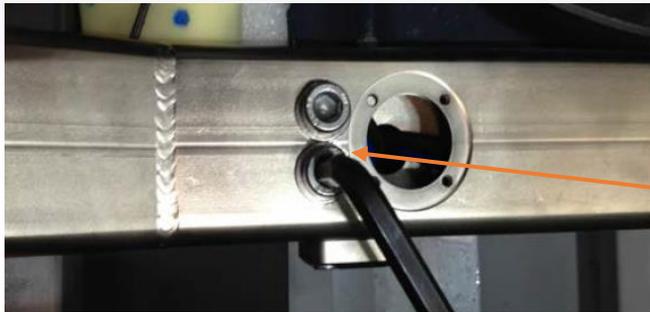


- Run the alignment program O8060 with the Master Cal Tool. Some tools will vary depending on the machine. Make sure that the values etched on the tool match what is in the program.
 - K=Length, R=Reference Diameter
- The program will put the tool at the rough X and Y position. You will then jog the tool to break the beam (Red LED) and then back out (green LED)
- Go back to memory and re-start program. The program will come to a M00 and you will check Macro Var #102. If Var #102 is too large, then you will need to adjust the bracket.

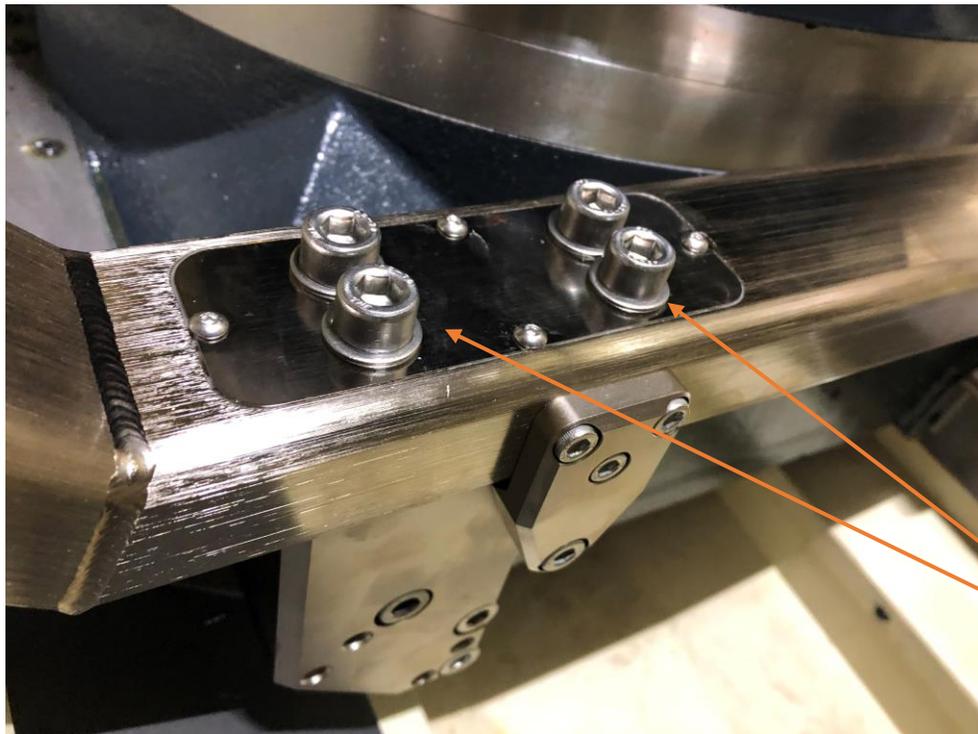
- Macro #102 should be under .0005 in

- If Variable #102 is greater than .001 in, then there will need to be an adjustment made to the bracket.





2 top bolts



4 top bolts

- Some brackets are different than others.
- There should be a sequence of bolts on the top holding the bracket that will have to be loosened **first**.
- Loosen these evenly so the bracket tension is released correctly
- Then the adjustment will be made by either loosen/tighten a cap screw and set screw combo or there will be a "JACK" screw to adjust.



- You Do Not need to fully remove the top bolts!
- After you **loosen** the top bolts make small changes to the adjustment bolt(s)
 - Using Variable #102, Make small adjustments to your Jack Screw style
 - For cap/ set screw style loosen the set screw and tighten the cap screw
 - make your adjustment then evenly tighten your top bolts
 - You should return to your original LED color after tightening
- This alignment program is set in a loop. It will run and then stop and let you view Var #102.
- Make your adjustments and then run until you are happy with the value in Var #102.
- Once satisfied with your alignment you must run O8061 with the master tool

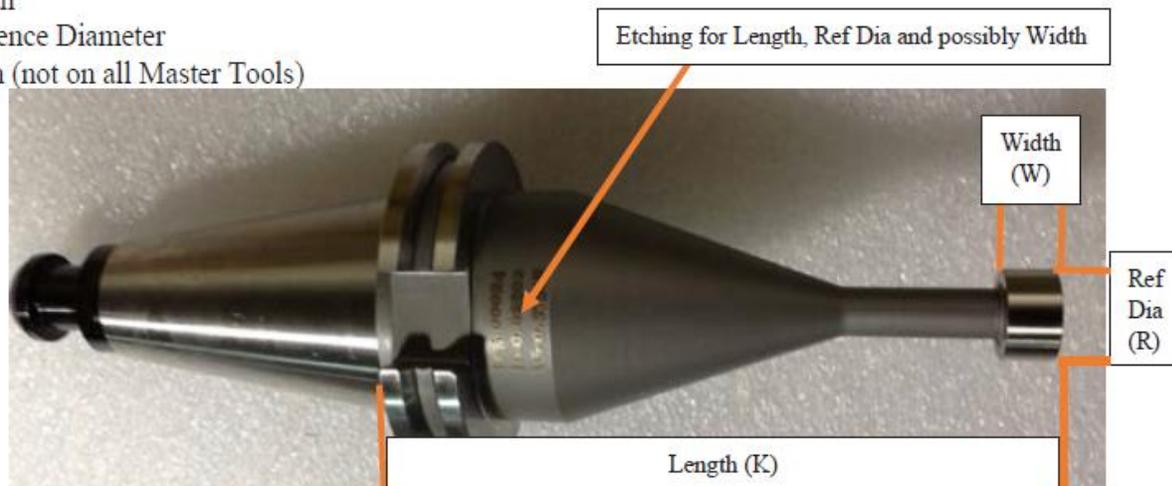
Calibration



- Double check that all values match your master tool exactly:
 - K (tool length)
 - R (reference tool diameter)
 - W (tool width)
 - Y (tool radius – .055 in)
- Run O8061
- After calibration Var #520-#531 are populated (This depends on the O9460 or O9760 settings program. The program number will depend on the age of Renishaw software.

- O9760 = TSM1(push in measurement)
or
- O9460 = TSM2(pull out measurement)) will be updated with the Laser Calibration values.
 - #120=520(BASE NUMBER)
- Do **NOT** overwrite the values in these macro variables with your own cycles.
- Now your laser is ready to use.

K= Length
R= Reference Diameter
W=Width (not on all Master Tools)



(LASER CALIBRATION)

```
G91G28Z0  
G90G80G49G40G0  
G65P9861B1.T1K5.00012R.62543Z.15  
G65P9861B1.T1K5.00012R.62543Z.15Y.272W.37436  
M30
```

***NEWER SOFTWARE VERSIONS ONLY REQUIRES ONE 9861 LINE
(LASER CALIBRATION)

```
G91G28Z0  
G90G80G49G40G0  
G65P9861B1.T1K5.00012R.62543Z.15Y.272W.37436  
M30
```

Basic Troubleshooting



- If you have Red LED status
 - Check to see machine air is ON and air is coming out of laser heads
 - Check to see if Transmitting laser is hitting the Receiving head on center
- Amber LEDs
 - Re-align and Re-Calibrate laser
- Green / Amber rapidly flashing LEDs
 - Switch the set-up Switch 2 on the laser interface (page 6) for 5 seconds and then switch back.
- Is the laser-beam a 'shotgun pattern' not a 'pin-point'
 - Clean laser heads
- LEDs on laser won't turn on
 - Contact PQI
 - Office: 763-249-7149
 - Toll Free: 800-772-0620