

# p400 water cooled laser & Flyer 3D System Quick Start Guide

SYNRAD

## Important Note:



See the Flyer 3D Marking Head and the p400 Laser Operators Manual for complete installation details and instructions. A PDF version is available on-line at: [http://www.synrad.com/Manuals/manuals\\_laser.htm](http://www.synrad.com/Manuals/manuals_laser.htm).

Read all ⚠️ Danger, ⚠️ Warning, ⚠️ Caution terms, symbols, and instructions located in the (Laser Safety Hazard information) sections in the Flyer 3D Marking Head and p400 Laser Operation Manuals.

## Marking Head Unpacking:

### Attention:



For complete details, refer to the Getting Started (System Inventory and Mounting) Sections in the p400 and Flyer 3D Marking Head Operator's Manual.

1. Lift the Flyer 3D Marking Head out of the box only by the middle; **do not use housing, coolant fittings, or anything else on the sides to lift.**



Correct



- 1.1 Lifting the **Marking Head** correctly by holding in the middle.



Caution



- 1.2 Avoid mis-alignment risk. **Do not** use housing fitting or fan (as shown) or anything on the side to lift.

# p400 water cooled laser & Flyer 3D System Quick Start Guide

SYNRAD

2. Locate the shipping **components for the Marking Head** at the bottom of the box **under** the Marking Head.

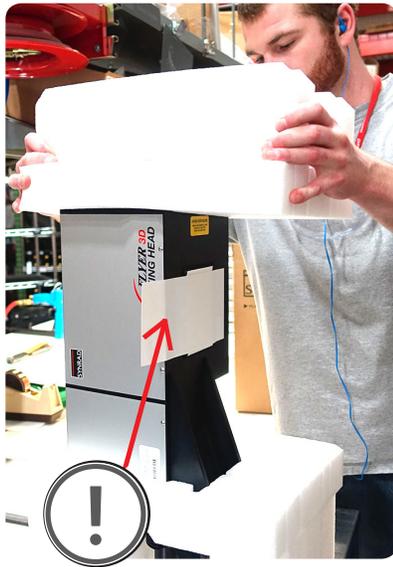
2.1 Remove the marking head from the box.



2.2 Retrieve the components from the bottom of the box.



3. Don't forget to **save all shipping container(s) and inserts** for use when shipping or relocating either the laser or the marking head to another location. Packaging is specially designed to protect your laser.



**Remove protective cover after final mounting.**



3.1 Remove and retain the marking head foam.



# p400 water cooled laser & Flyer 3D System Quick Start Guide

SYNRAD

## Unpacking:

**Attention: !** Two people required to lift the laser out of the box using the lifting hand holds provided at either end of the box!



**4.1** Cut the straps, lift the lid.



**4.2** Lift the laser out of the box.

**4.** Have two people squarely place their feet at either end of the box as shown in the figures above. Lift the laser out of the box.



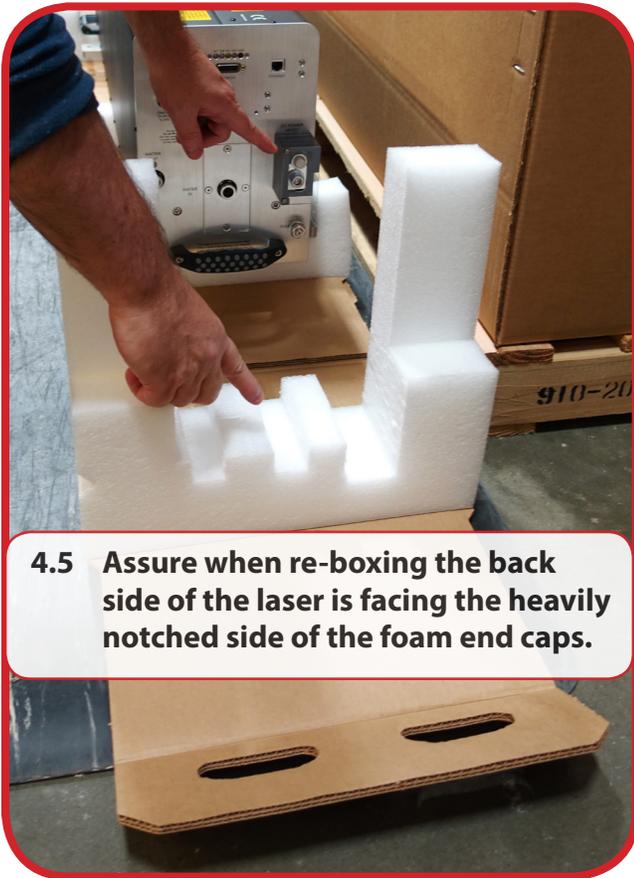
**4.3** Lift the laser out of the box.



**4.4** Locate the wire harness inside the box pocket.

# p400 water cooled laser & Flyer 3D System Quick Start Guide

SYNRAD



**4.5** Assure when re-boxing the back side of the laser is facing the heavily notched side of the foam end caps.



**4.6** Notch-less foam end is for the front end of the laser.

## Important Note:



**Keep All Foam and Packaging,** you will need to re-use it when moving your laser. Refer to this guide and the Getting Started/Technical Reference chapters in the laser's Operation Manual when re-packaging for shipping and/or relocation.

**Caution! To assure safety and proper equipment packing for relocation or shipment, Refer to these figures! All box components must be stowed in the end compartment.**

# p400 water cooled laser & Flyer 3D System Quick Start Guide

SYNRAD

## Mounting the Laser to the Rail:

**Attention:** For further details, please refer to the Getting Started (System Inventory and Mounting) Sections in the p400 Laser and Flyer 3D Marking Head Operator's Manual.

**5.2** Remove the rail from the packaging. **Assure the notch is facing down and to the right. Important! Otherwise re-work required because the head will be mounted incorrectly.**



**6.1** Install the long laser bolts after the laser is mounted to the rail.



**6.2** There are 8 total.

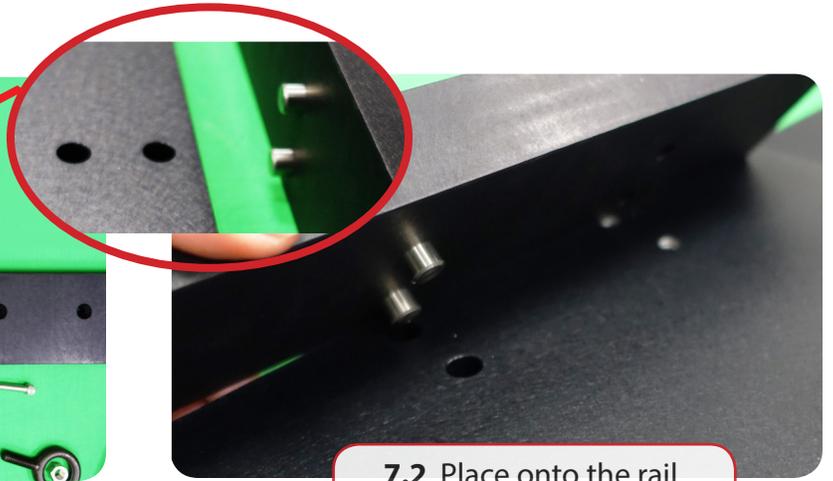
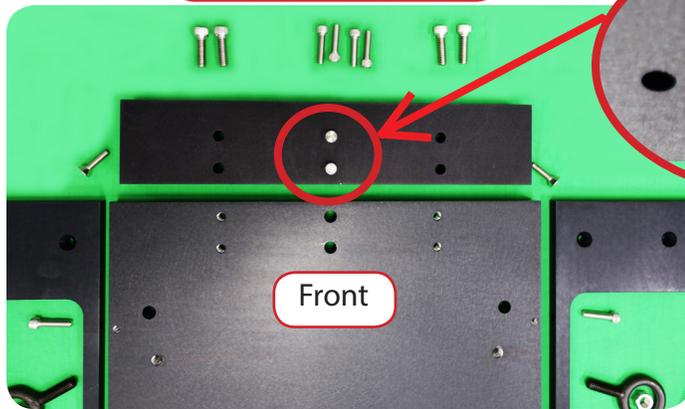
5. Locate the **Mounting Hardware Kit** (  ) Marking Head Safety tube, clamp, and Allen screws, and the Laser mounting feet.
6. When attaching the Laser to the rail, **make sure the notch is as shown in the figure(s) above before going on to the next step.**

# p400 water cooled laser & Flyer 3D System Quick Start Guide

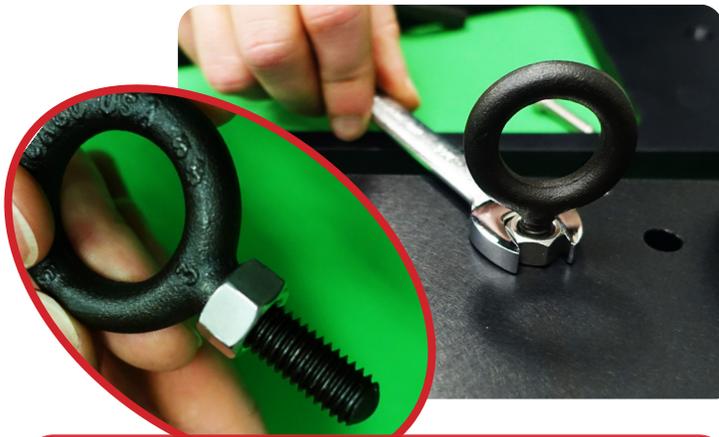
SYNRAD

## Mounting the Laser to the Rail:

7.1 Insert the pegs.



7.2 Place onto the rail.

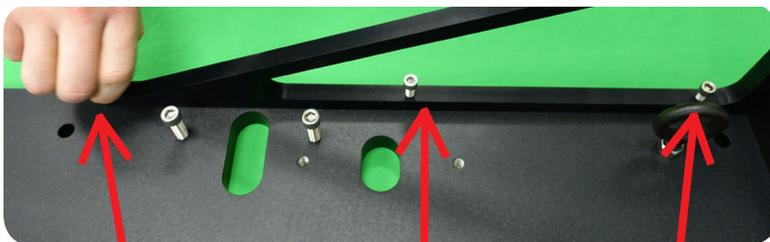


7.3 Place the nut on the eye bolt. Secure to the rail, then snug the nut down to the rail.



7.4 Then place the two eyebolts with nuts onto the front end of the rail as shown.

7.6 The fourth triangle bolts affixing the spars to the rail is located on the outer corner.



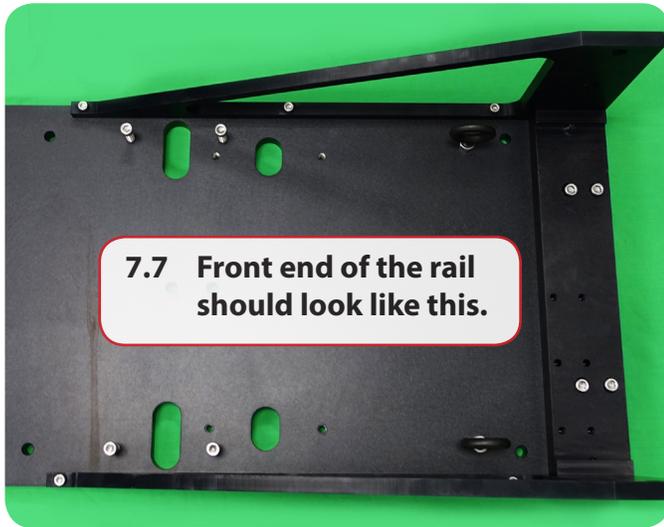
7.5 Attach the four (4) triangle bolts affixing the spars to the rail.



7. Assembling the **front** end of the rail, **make sure the notch is not at the front end of the laser. See the figure(s) above before going on to the next step.**

# p400 water cooled laser & Flyer 3D System Quick Start Guide

SYNRAD

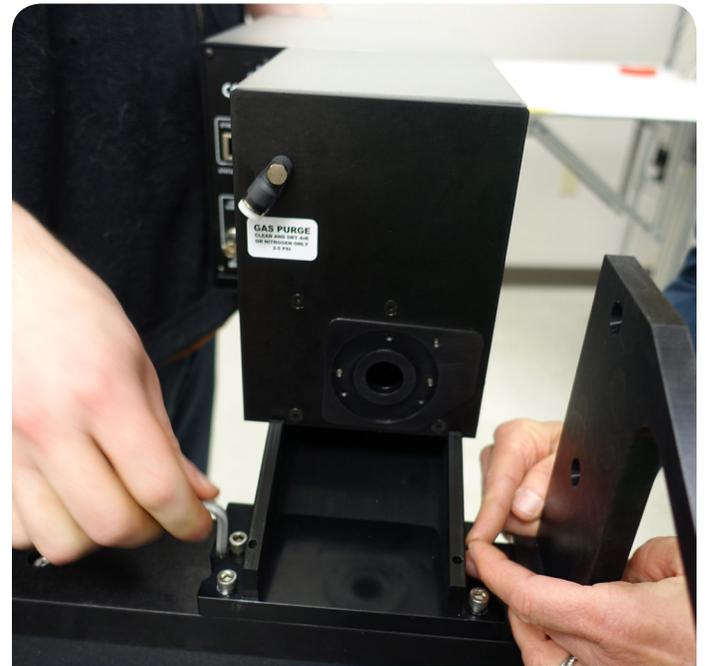


8.1 Place the remaining two (2) eyebolts onto the rail.

8. Assembling the **back** end of the rail, **make sure the notch is at the back end of the laser. See the figure(s) in this step before going forward.**
9. Place the laser onto the rail, Affix laser with the long bolts.
10. Affix the **Marking Head** to the front end of the rail.



**Important Note:** The notched end of the rail should align with the rear interface side of the laser.



10.1 May take two (2) people, one to hold the Marking Head onto the rail, the other to tighten four (4) mounting bolts.

# p400 water cooled laser & Flyer 3D System Quick Start Guide

SYNRAD

## Mounting the Marking Head to the Rail Continued:

### Attention:



Remove the laser aperture self-adhesive film before mounting to the rail. Don't tighten the Allen screws on the clamp till the laser is mounted to the rail.

**Failure to remove seal can damage the laser.**



**11.1 Remove the aperture seal.**



**11.2 Place the wavy gasket into the assembly as shown above.**



**11.3 Slide the tube assembly together like the above figure.**



**11.4 Use mild compression to put the tube assembly into place as shown above.**



**11.5 Tighten the ball head screws securing the tube assembly to the Marking Head.**

### Note:

Finger tighten the tube assembly to the **Laser** first (see above), then follow with an Allen Wrench **after** the laser is firmly mounted to the rail.

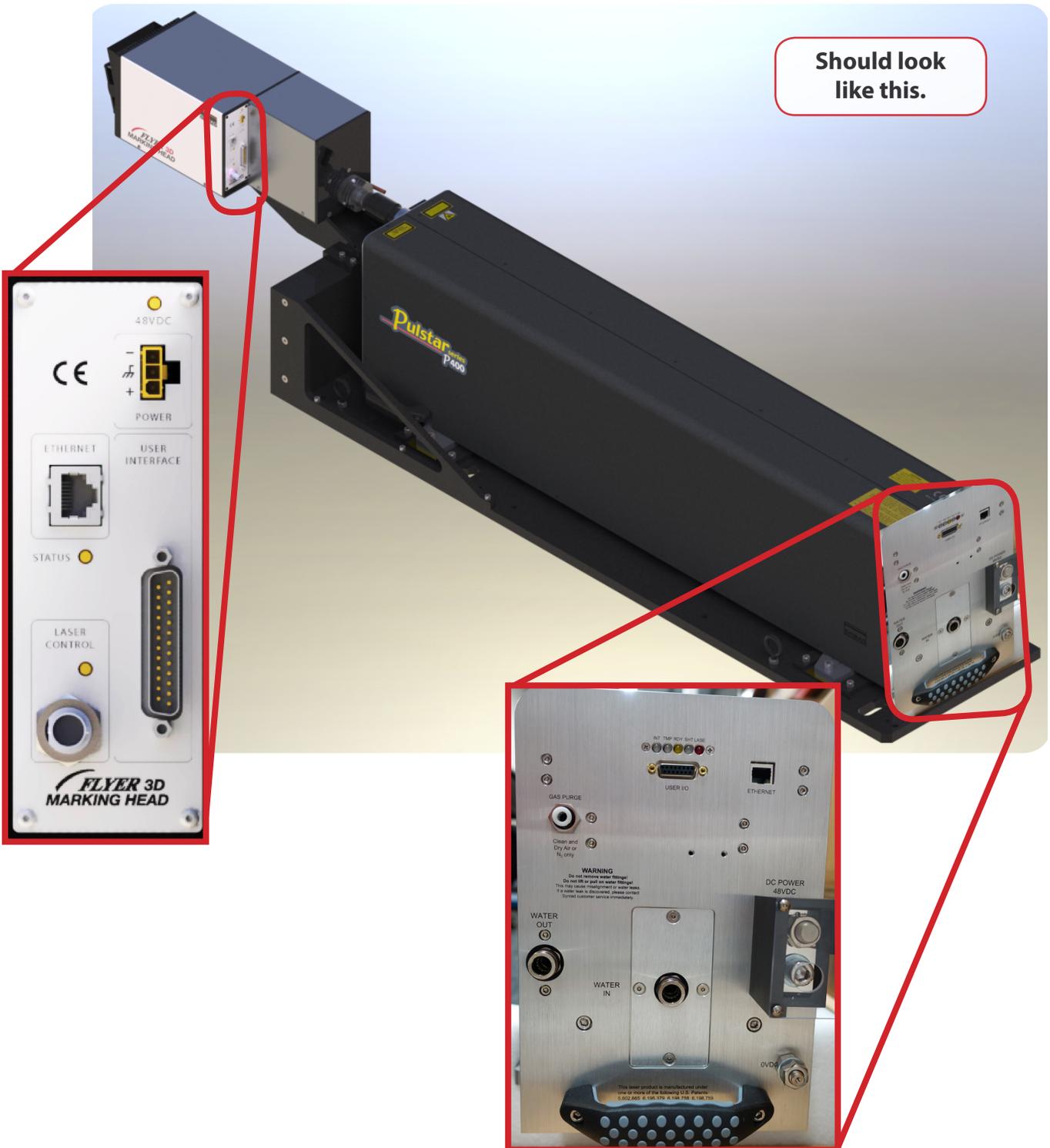
**11. Before** mounting the Marking Head to the rail, assure the **aperture seal is removed**, assemble the **tube first**, then slide the **wavy gasket** inside the **tube** as shown in the figure above (**don't tighten the clamp's Allen screws affixing the tube to the laser until after the laser is mounted to the rail**).

# p400 water cooled laser & Flyer 3D System Quick Start Guide

SYNRAD

## Mounting:

12. Final Marking Head & p400 water cooled laser mounted to the rail.



# p400 water cooled laser & Flyer 3D System Quick Start Guide

SYNRAD

## Cooling:

### Attention:



For further details, please see the Getting Started (Cooling Connections, Cooling Tubing Connections, see the Quick Start Plug Note) in the p400 Laser Operator's Manual. Also see the Flyer 3D connections in the following sections for Facilities/Utilities (Air Drop or Gas Purge).

13. Locate the **Ship Kit** ( 12 mm Cooling Tubing  ) Cooling fittings and 12mm polyethylene tubing.

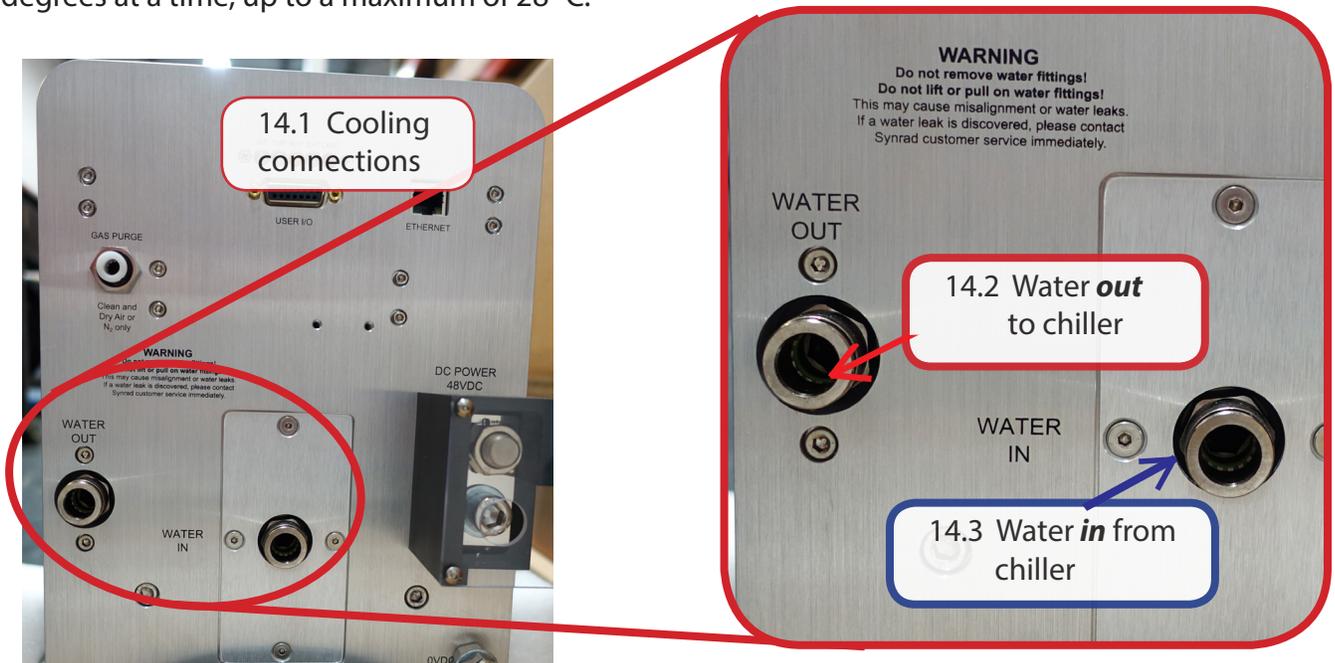
### Important

Use distilled water as the coolant. If glycol is necessary, add no more than 10% by volume.

### Note:



14. Set coolant temperature between 18–22 °C. If condensation occurs, increase coolant temperature a few degrees at a time, up to a maximum of 28 °C.



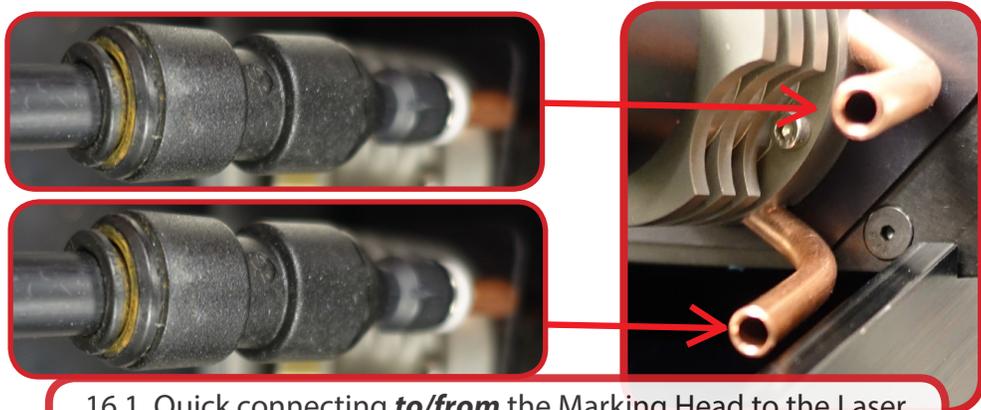
### Note:

**Bottom** port is for **water out from Laser to chiller**. See the **top** port for **water in from the chiller**.

15. Connect the Laser's lines to and from the chiller. Repeat for the Marking Head.

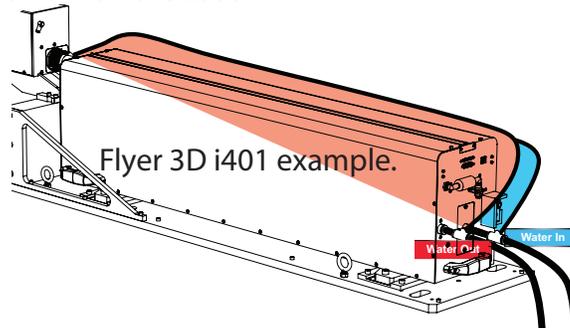
# p400 water cooled laser & Flyer 3D System Quick Start Guide

SYNRAD



16.1 Quick connecting **to/from** the Marking Head to the Laser.

16. Attach two quick connects the Marking Head cooling inlet/outlets. Assure the line **out** to chiller, from the head is connected to the '**Water Out**' port line on the Laser. Assure the line **in** from chiller, from the head connects to the '**Water In**' on the Laser.



**Note:** Assure the port for water out from Marking Head is connected to the water out from Laser to chiller. Same is true for the water in from the chiller to the Marking Head/Laser.

# p400 water cooled laser & Flyer 3D System Quick Start Guide

SYNRAD

## Electrical:

### Attention:

! For further details, please see the Getting Started (Connecting-DC power supply connections) section in the p400 Laser Operator's Manual and Getting Started (Connecting-DC power cable) section in the 3D Marking Head Operator's Manual.



18.1 Attach positive DC power.

(+) Red DC Cable

(-) Black DC Cable

17.1 Attach negative DC power.



16.1 Nut order on attaching the power cable.

### Warning:



Use the **Quick Start Plug** *only* for initial testing or when troubleshooting. **Remove DC power** before installing or removing the **Quick Start Plug**. Please refer to the Getting Started (Connecting-laser connections & the following Quick Start Plug) sections in the p400 Operator's Manual.

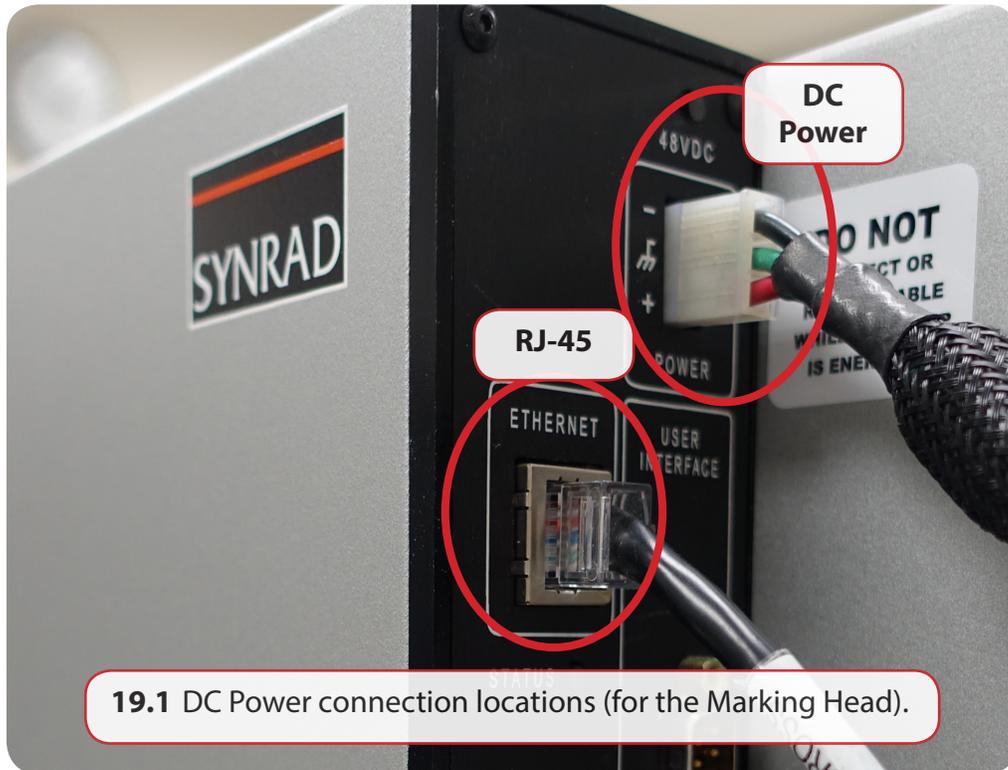
16. Connect the Laser VDC power cables to +,- connectors on the power supply.
17. Negative (**black**) DC power cable – tighten the M10 bolt fastening the black cable to the laser's GND terminal.
18. Positive (**red**) DC power cable – carefully tighten the M10 bolt fastening the red cable to the laser's 48 VDC Power terminal.

# p400 water cooled laser & Flyer 3D System Quick Start Guide

SYNRAD

## Control Connections:

19. Connect the Marking Head **DC power VDC** and **Ethernet** (RJ-45) cable into the **Marking Head's power** supply and PC respectively.



### Caution:



The **Quick Start Plug** bypasses the laser's safety interlock function, potentially exposing personnel to hazardous **invisible** laser radiation.



### 20.2 DB-15 Connector



20.1 Quick Start Plug (DB-15 only) connection locations for the Laser.

**Note:** The quick start plug is optional!

## Control Connections:

21. Connect the **Marking Head's** and **BNC** (laser control) interface. The ferrite bead, located at the end of the cable, should be connected to the Flyer 3D.



### Warning:



The Quick Start Plug bypasses the laser's safety interlock function potentially exposing personnel to hazardous invisible infrared laser radiation.

### Note:



Configure the Flyer 3D per the 3D Marking Head Operator's Manual. See the (Getting Started section) for the following Ethernet configuration.

22. Assure the connections are correct (See the figure on the following page). The ferrite bead, located at the end of the cable, should be connected to the Flyer 3D as shown in the previous figure.

# p400 water cooled laser & Flyer 3D System Quick Start Guide

SYNRAD

## 23. Mounting complete!

