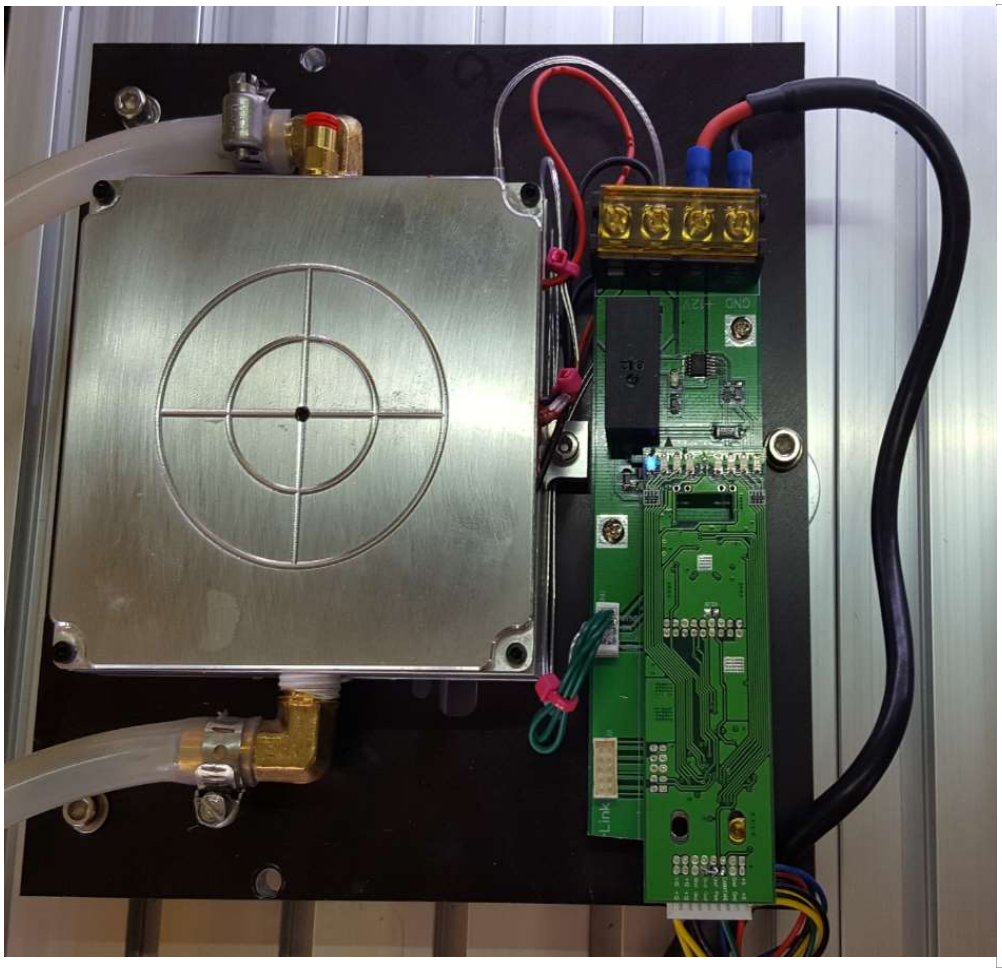
Water Cooled Hot/Cold Build Plate

Compatible with: ■ HYDRA Floor Model ■ HYDRA Bench Model ■ Engine HD

Specifications:

Temperature range -10c +100c
Water flow, 1 liter per minute,
Interface, CanBus or TTL



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https://www.youtube.com/watch?v=tLHpaePTP-k&feature=youtu.be

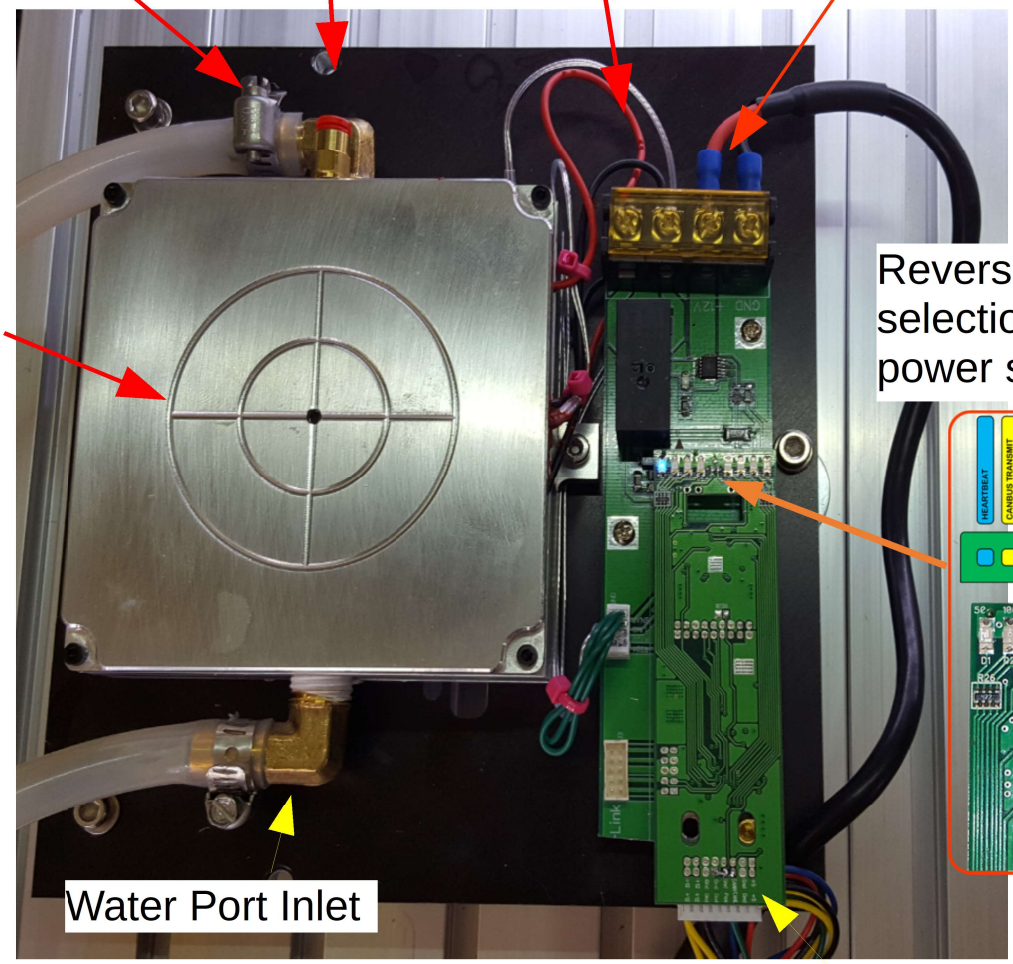
Water Port outlet

Vacuum Port

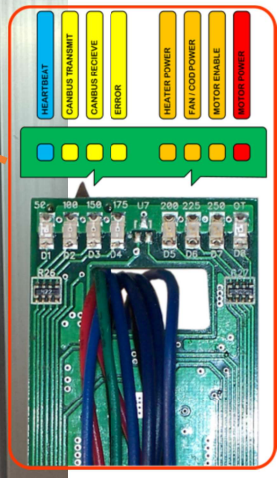
Peltier HookUp

24V@10 amps

Hot/Cold Bed with Vacuum port



Reverse Polarity selection and power switch.



Water Port Inlet

Smart controller Can_Bus Interface, goes to Tablet interface pcb, Can1

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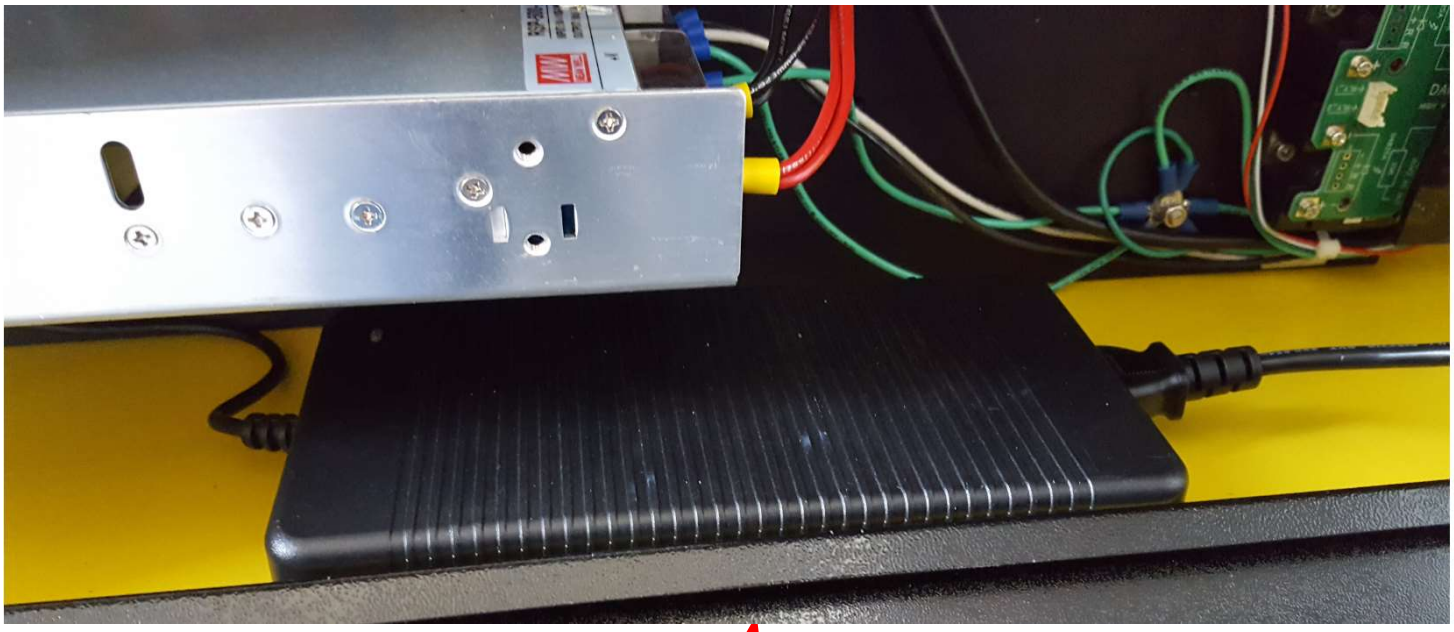
NOTE: THE HCPB_100 is a Water cooled Heated chilled print bed capable of reaching temperatures from -10c to 100c.

Power Supply:

The HCBP uses (2) 12 Volt Peltier thermal electric Coolers wired in series and a water cooled heat exchanger. This draws about 6-8 amps when cooling.
The temperature is programmable without rewiring the unit.
It can switch automatically between cooling and heating.
Th HCBP uses its own power supply to prevent overloading of the motor driver power supply.



24V@10 amps

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Theory of Operation:

Peltier Thermal electric modules have been around for over a 100 years.
They basically move the thermal energy with the flow of the electrons.
They cause one side of a crystal to be hot and another side to be colder.
TEC modules have become cheaper and more reliable now that they are used for CPU cooling applications.

When 2 ceramic (alumina) plates are attached, you get a good differential temperature between them as long as the electrons keep flowing. You end up with a Hot and Cold side, which side is hot or cold depends on the direction the Electrons are flowing.
It is allowed to reverse the current, and thus change quickly from heating to cooling.

Our typical unit comes with 2 peltier modules wired in series, this keeps the Current down below 10 amps at 24 volts.
The control electronics have a programmable double pole double throw relay that allows the polarity to be reversed on the TEC modules to heat or cool with no wiring changes required.

We have tested the full assembly and achieved -10c and 100c consistently.

There is a vacuum port on the side with a hole bored to the center of the cold chuck. This is ideal for Silicon wafers to be held for precision printing applications.

The temperature is set by Repetrel sending commands to the HCBP controller via the can-bus. The Address of the HCBP controller is 92, where as the standard hotbed is 91. The User control for the HCBP will register on the second control tab labeled heads 6-10.

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TAM Settings:
Used to manage control of the head.

Live Temperature:
In Celsius.

Heater:
On/Off and default value.

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Head Model:

Model:
Type of head.
HotColdBed

RTD TYpe:
For proper temperature table.
should have 1K_PLAT selected.

Motor Current:
N/A.

Step Mode:
N/A.

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Offsets:

Soap String:
To store and read values.

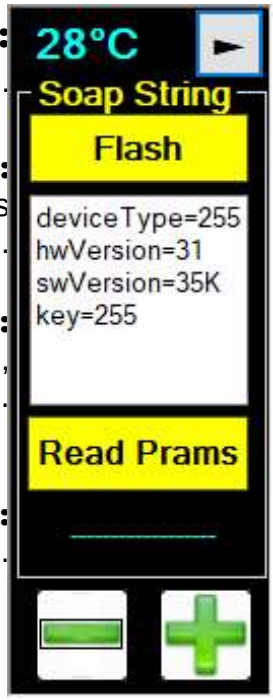
Flash:
Right-click to store current values as defaults on this head.

Pin

Com Window :
For diagnostics, advanced status, and firmware version.

Read :
Returns firmware version info.

C



Please note:

These values are all initial, default values.

Your gcode will overwrite some of these values, and *can, if you specify,* explicitly declare most of them.

The printer will keep the last value for each variable persistently in memory.

If a mouse click or a gcode entry subsequently provides a new value, *that new value* will be persistent until *another, newer* value is set for that parameter on that head.

For current default parameters for Hot Flow heads, see
http://hyrel3d.net/wiki/index.php/Hot_Flow

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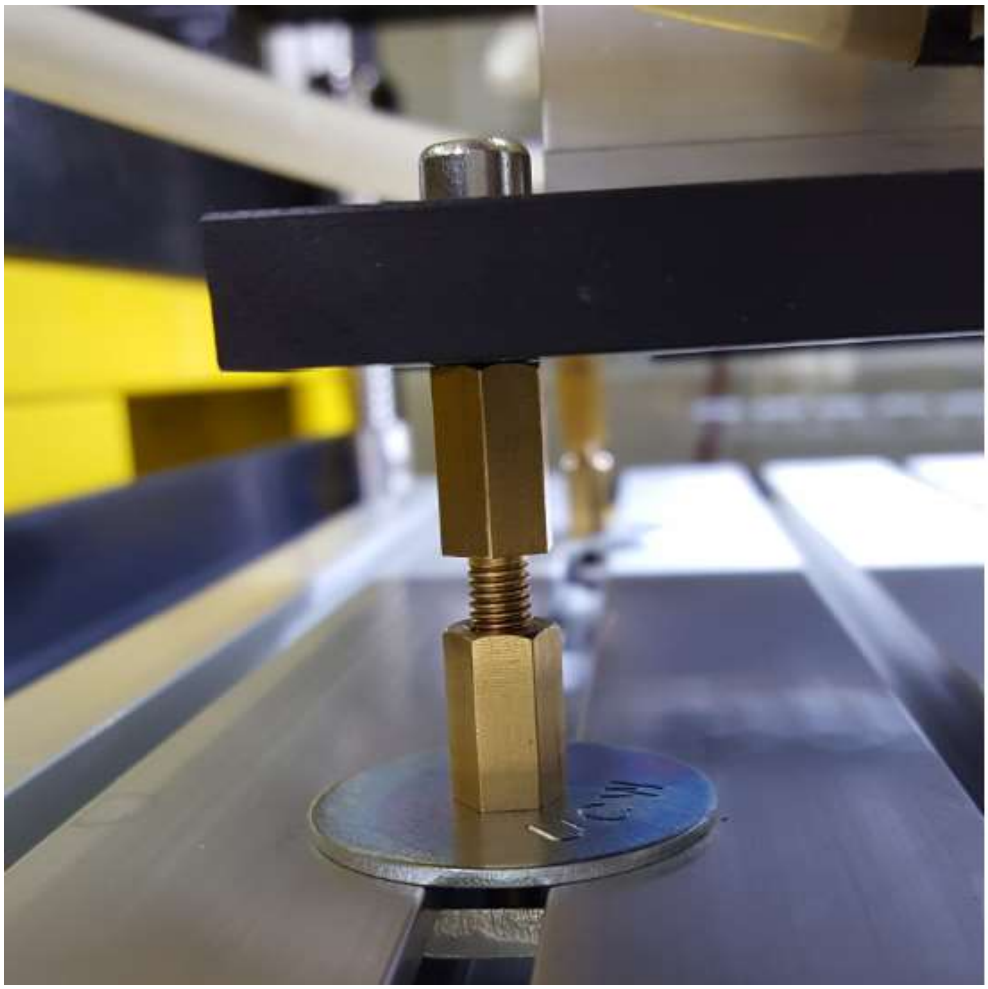
Using the HCPB_100:

To use the Heated Chilled Print Bed,
Press the big EMO button to disable the voltage in the system.

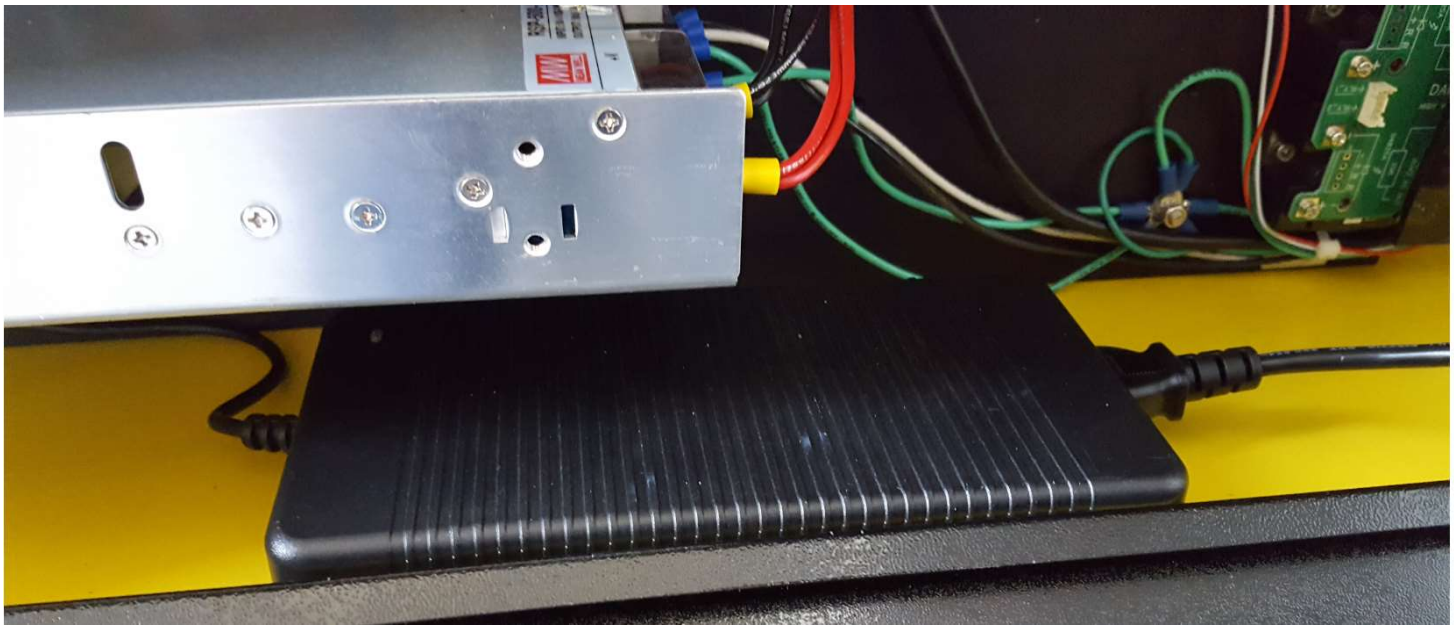
Install HCPB plate on the T-slot mounting plate so that it does NOT interfere with your normal print bed.
If there is a vertical interference, you will need to remove your standard hotbed first, however this is seldom the case.

and

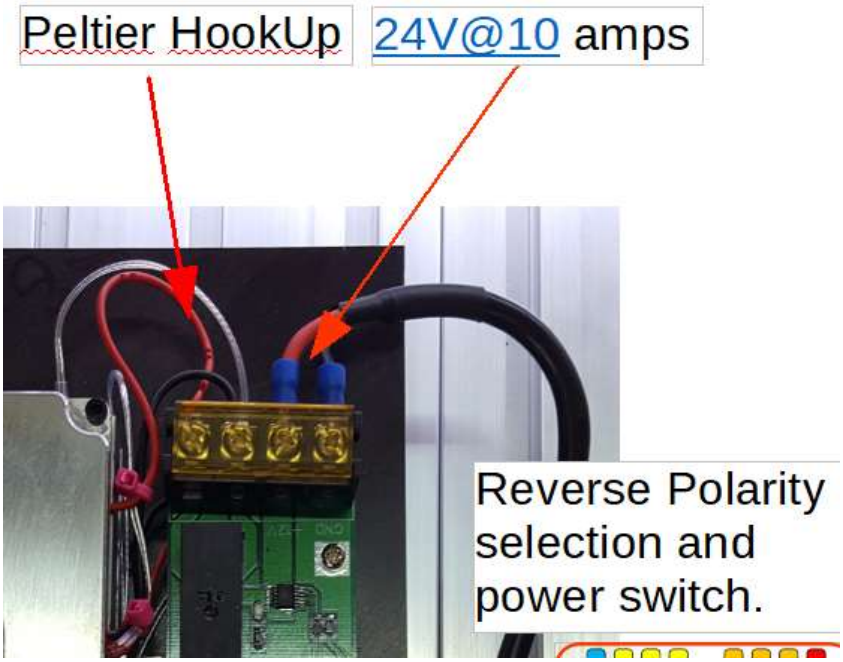


After installing your HCPB, use a tramming gauge level the unit.

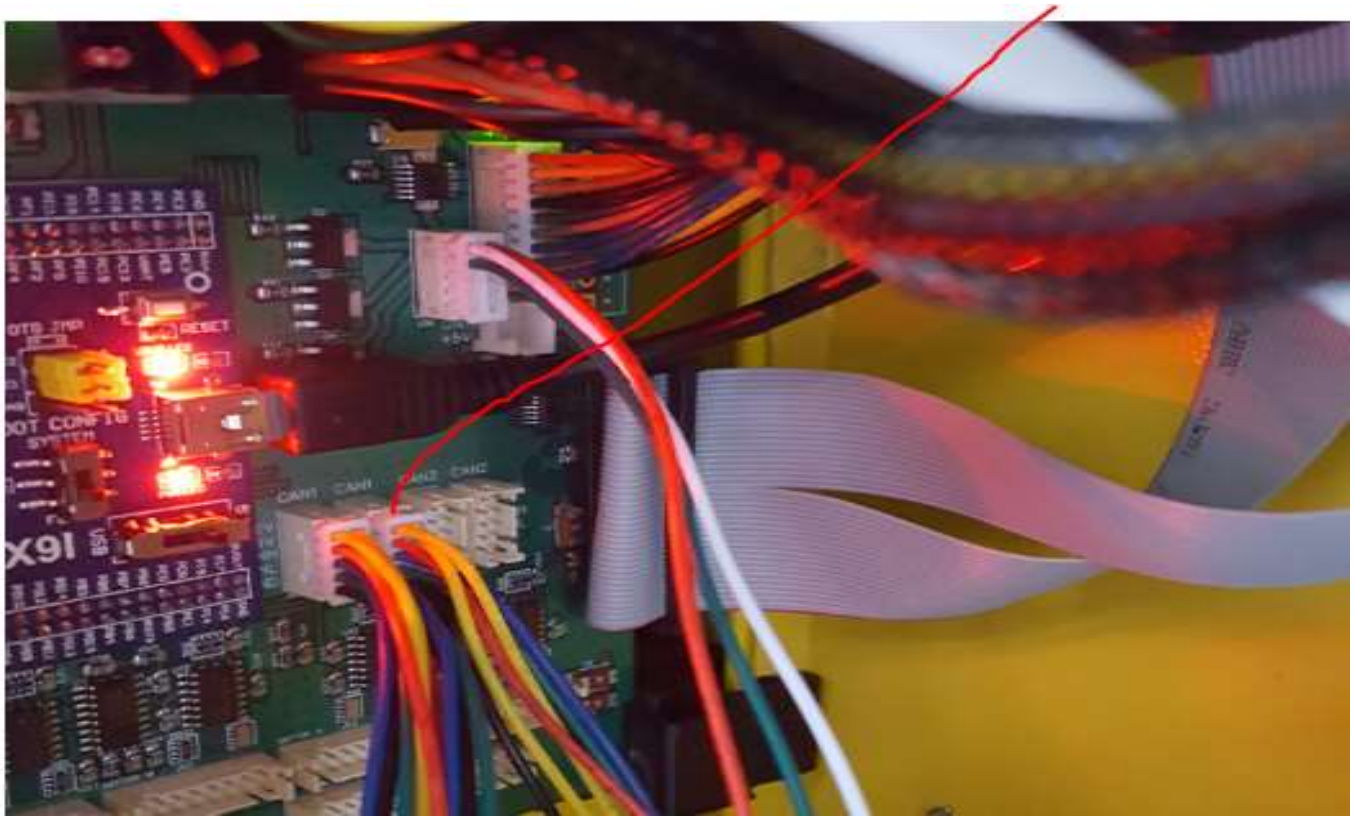
Install the 24 volt 10 amp power supply.



With the power off, please hook up the +24 Volts according to the pictures.



Next hook up the can bus control cable, it will go to one of the two Canbus 1 connectors on the tablet interface board located insides the electronics bay.



Release the EMO button

Additional Help:

Check our **YouTube** channel
https://www.youtube.com/channel/UCT-48K-0Y4xoTvbJCjyDFXA/videos
and look for key words;
“Hyrel”, “Chilled”

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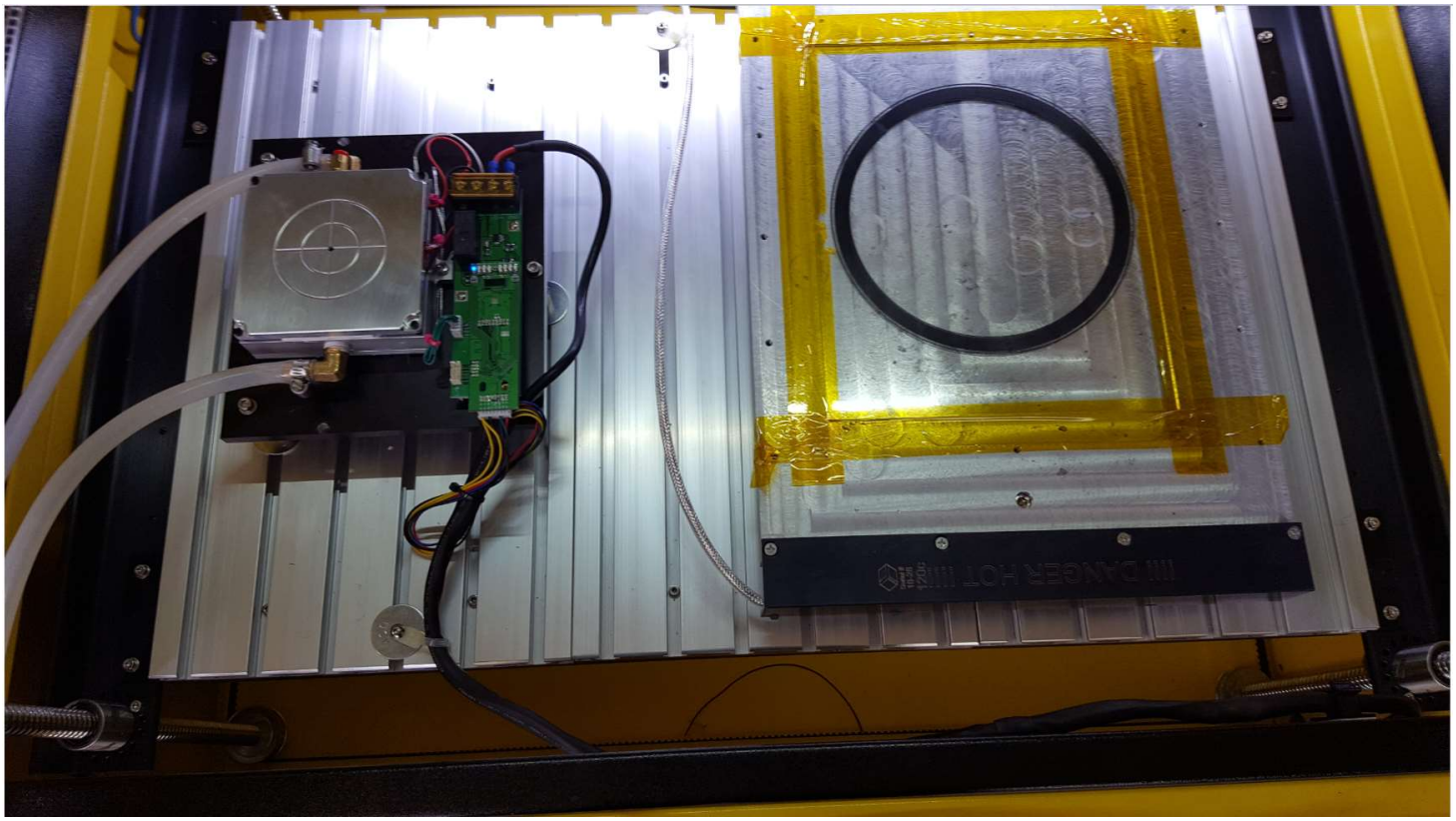

Finished Installation should look like this.

Please note the routing and strain relief for the cables.

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TIPS:

Be careful not to put big scratches in the build surface,
it will degrade the quality of the vacuum seal.

NEVER run your vacuum plate above 150c, it will destroy the TEC modules.

Maintenance:

Keep your HCBP clean, do not allow material to build up on the surface.

CLEAN with alcohol and cloth.
CAUTION the Chuck can be EITHER HOT or COLD,
be very careful not to get burned.

DISCLAIMER:

!!!Use at your own risk.!!!

No warranty or guarantee is offered for the application of this product, the user agrees to be ENTIRELY responsible for safe operation of this product.

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To Turn on the heat/ cooling, Use M104 T92 Sxxx where Sxxx is the desired temperature.

IF RTD2 is reading a temperature greater than the desired temperature.

It interprets this as being in COOLING MODE and will turn on or off the DPDT relay.

To turn off ALL POWER to the build plate, Use M104 T92 S0

Since 0 degrees turns off the plate, if you desire a temperature of zero, SImply use .1Degrees.

Heated/Chilled Build Plate Block diagram