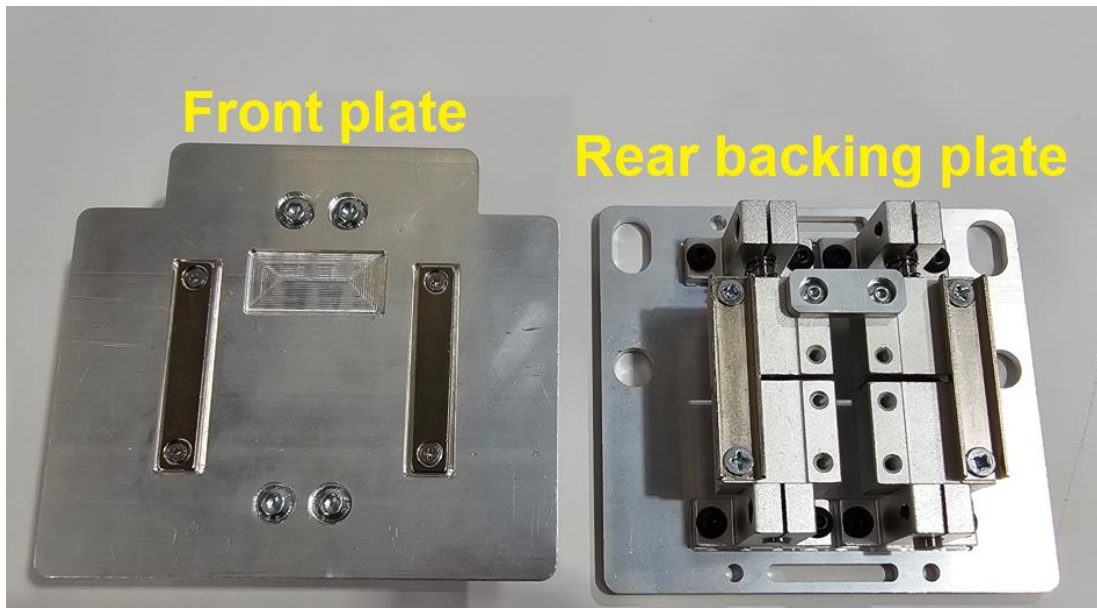


**CNC 3D
PLASMA
ASSEMBLY**

User guide

Parts included with this assembly

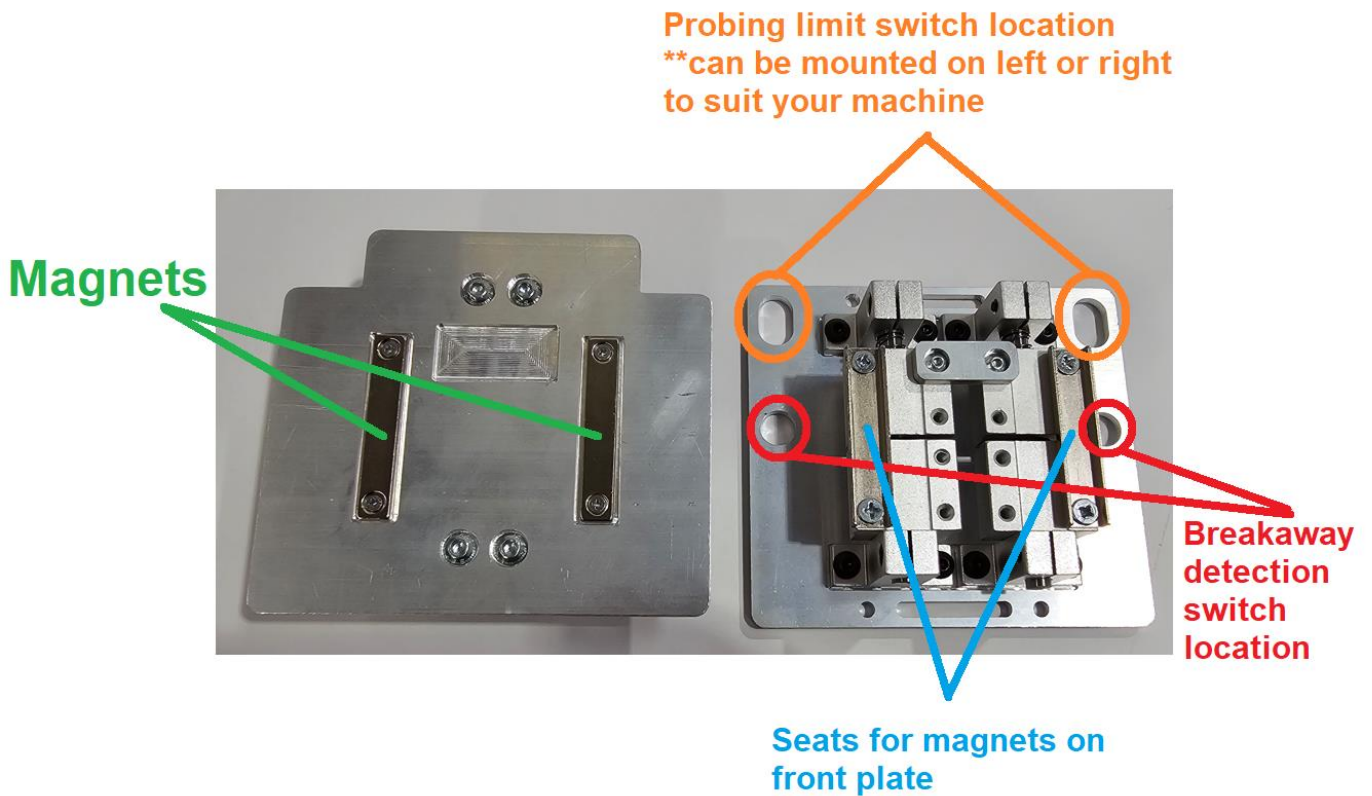


IMPORTANT!!

The system uses powerful rare earth magnets for holding the front plate to the rear plate. If you are attaching your front plate to the rear plate, carefully place the front plate in position and angle it onto the magnet holding cups. NEVER allow the magnets to bang into the metal cups as this may chip or shatter the brittle rare earth magnets.

Once attached, give the front plate a slight wiggle up and down until it is seated into the metal cups securely. There is a slight play in this design for intolerances but this is less than 1mm.

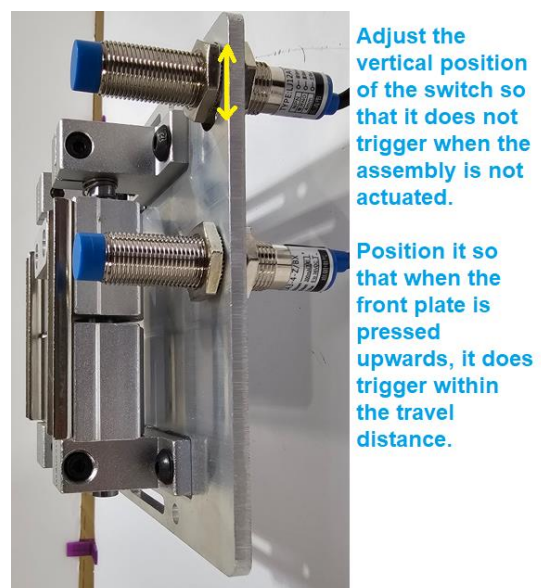
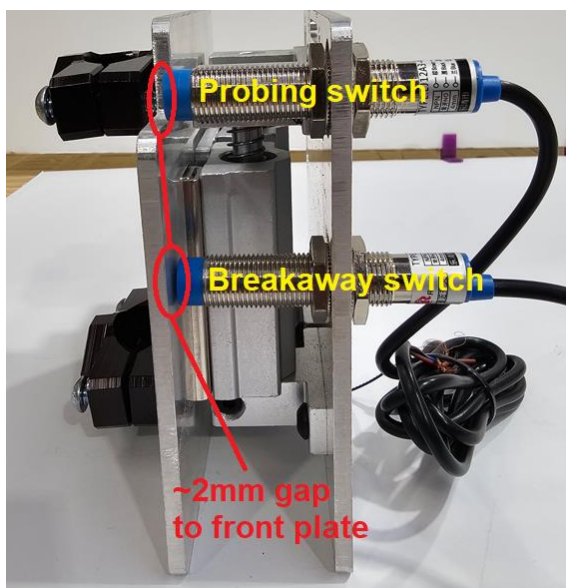
Basic overview of setup



Installing limit switches

Decide which side of the plasma assembly you would like your limit switches on. It is important to choose a side that will not collide with the machines homing position, existing limit switches or max travels.

Unthread the nut on the limit switch closest to the blue tip. Insert the switch onto the respective hole you need the switch on (breakaway detection OR probing switch). Unthread the rear nut (closest to the wires until the switch is within proximity range of the front plate. ~2mm will be fine.



Wiring of switches

The inductive switches used for probing and Estop detection are fairly standard and follow the same principles as all other inductive limit switches. They require a voltage of 6-30V DC to work and have the option of normally open and normally closed contacts on each switch.

Brown: 6-30V DC

Blue: GND

White: Normally closed

Black: Normally open

Breakaway switch wiring

The Breakaway switch is recommended to be wired to the E-stop signal pin on your controller ensuring that if the torch breaks off, the controller will terminate the job and also extinguish your plasma torch. Generally, most E-Stop signals to controllers require a Normally Open contact (including our Nighthawk controller) but check your controller manual to confirm which wires to use (white or black).

****This assumes you have provided power to the switch as well.**

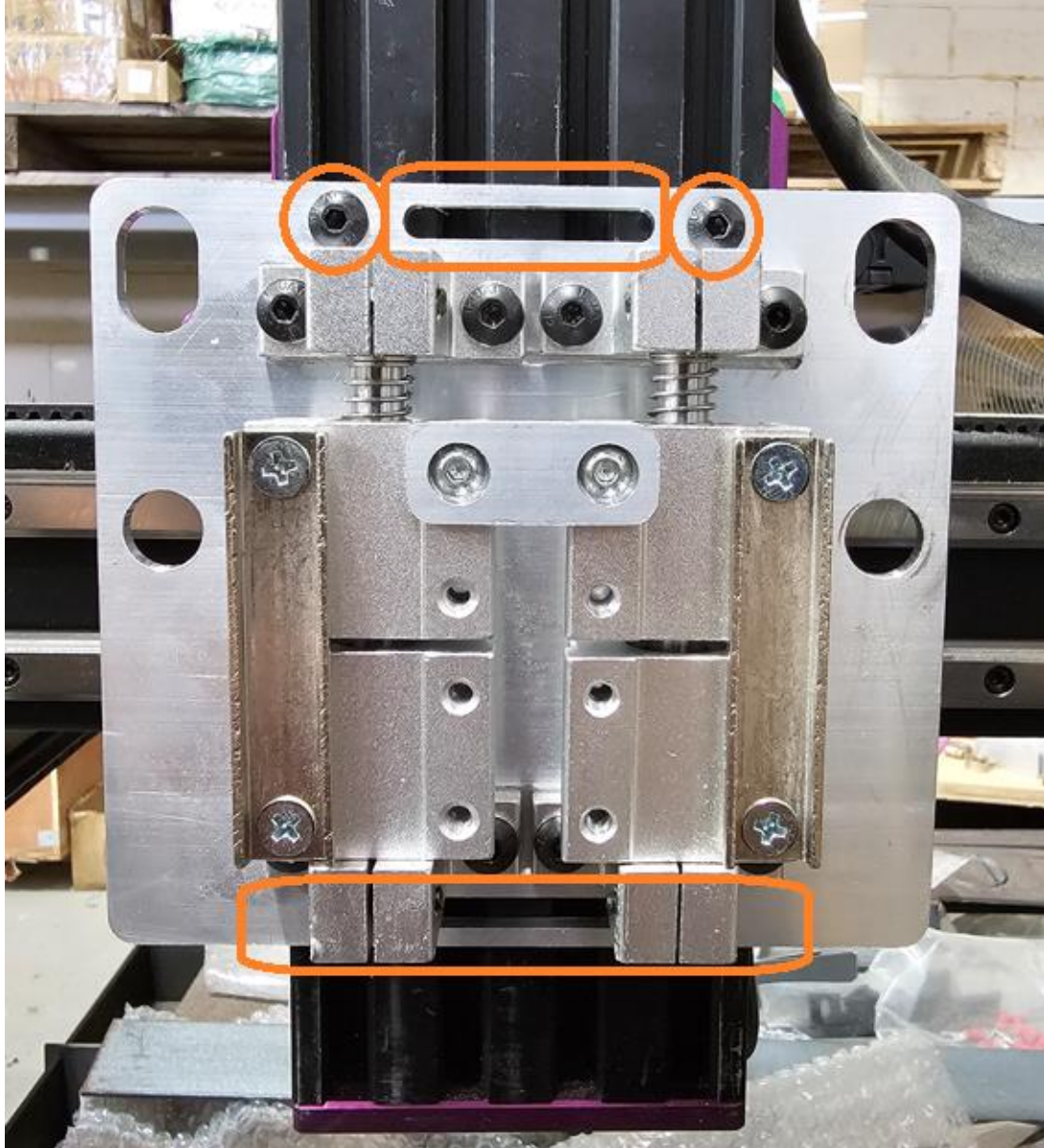
Probing switch wiring

The probing switch on the plasma assembly should be fed into the probing port on your controller. Confirm if you require Normally open or Normally closed contacts for this.

*****This assumes you have provided power to both of the switches as well on the Blue and Brown wires!***

Mounting the assembly to your Z axis

Both the top and the bottom of the rear assembly plate have 2 x 5.5mm holes, spaced 60mm apart from center to center to suit 20 series extrusion like 8020 extrusion or 8040 C-Beam, there is also 2 slots top and bottom for custom installation. The slot is 5.5mm high to suit M5 bolts.



Calculating your probing offset

Once the system is installed, it uses the probing limit switch to determine that the torch has touched your material. It is a good idea to install your torch and lower it very carefully so that a piece of paper just rubs between the tip of the torch and the material below it. Once there is a very small gap between the tip of the torch and material below it then you can very carefully jog your Z axis downwards in very low increments (0.1-0.5mm) until the red LED indicator on the probe lights up or your software detects a probe trigger.

It is important to keep track of how far your had to travel to get it to activate the probing switch, it may be easier to perform the paper test first, then zero your Z job coordinate plane and then try lowering down very carefully. Once the switch triggers, take note of the value in the Z job coordinate plane. This will be your probing offset value. Record this number somewhere you will remember it!

Configuring your CAM software

To take full advantage of your plasma probing setup, between arc ignitions a probing routine needs to occur that will set the zero of your Z so that a perfect pierce height is achieved.

Most plasma CAM programs have the ability to do a probing routine between arc ignitions. See below an example of when the probing routine occurs BEFORE an arc ON command it sent. This is a general example:

```
M5 ;Torch off
G0 Z[Safeheight] ;Move to safe height
G0 X100 Y100 ;Moving to next cut position
G38.1 Z[-Maxtravel] ;Probe Z downwards to a maximum travel of 50mm
G90 G10 L20 P0 Z[Probingoffset] ;Set the Z job zero with the probing offset value to accurately set the height.
G0 Z[Pierceheight] ;normal pierce height to start torch ignition
M3 ; Torch on!
```

This manual is a work in progress and any feedback is welcomed! 😊