

DESENVOLVIDO POR:

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Warning!

Risk of electric shock.

The installation of this equipment must only be carried out by qualified and authorized persons (technical knowledge).

Incorrect installation of this equipment will cause malfunctions, in addition to the risk of damaging the equipment, and may void the equipment warranty.

Do not install the equipment without the correct use of PPE's, use gloves suitable for the job and correct tools.

Terms of use:

By installing and using this product, you fully understand and agree that Macrol Tecnologia and its distributors are not responsible for any incident or event that resulted in direct, indirect loss, damage to you or others, damage to property or loss or damage of any kind. The end user assumes all risks.

If you do not fully agree with these terms, request a refund.

If you have any questions or are not sure what is in this manual, immediately contact a reseller or Macrol Tecnologia support.

Equipment Information:

THC.HWII was developed to serve the national/internacional market, offering a product manufactured entirely in Brazil.

THC.HWII has a microprocessor with an internal firmware capable of performing calculations and logical operations for its correct functioning. It has a high resolution analog to digital converter, so that it is possible to sample the read signal, ensuring greater precision in cutting and height control.

Operating information:

The moment the torch is activated, an HV and HF circuit is activated at the plasma source so that the gas is ionized, and the plasma is formed, after a few milliseconds a DC voltage appears in the torch, and is the from it we can maintain a uniform and adequate cut depending on the type of plate. THC.HWII can be connected directly to the torch cables (Electrode (-) and claw (+)), as it has an HV / HF filter capable of withstanding high voltage levels at high frequency, after this "start" the THC.HWII reads the DC voltage of the plasma source and if there is a change in this voltage the THC.HWII will "inform" the equipment's software or hardware to

compensate for the height, thus ensuring a totally uniform cut.

Simplified operating block diagram:

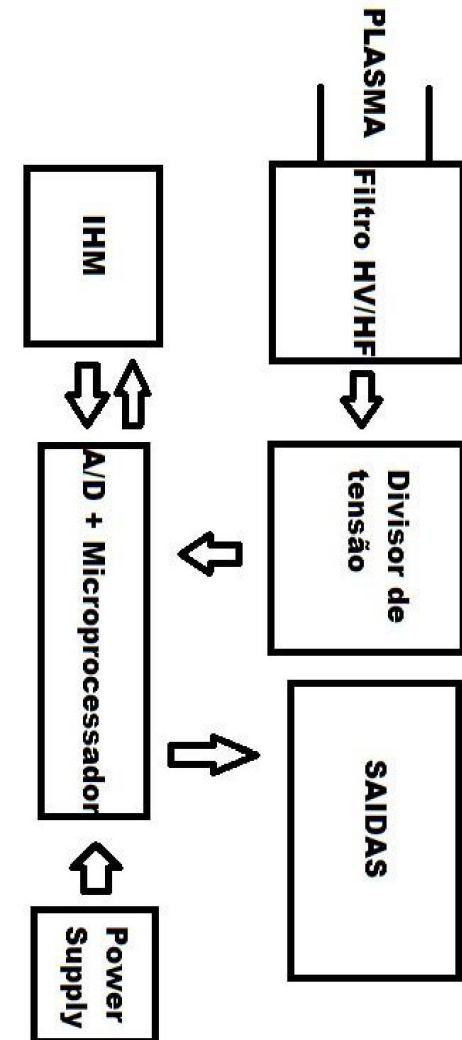


Figura 1 – Diagrama em blocos

HV / HF filter: This block is responsible for suppressing the initial plasma arc.

Voltage divider: This is the block that divides the input voltage to a lower level for the A / D converter to be able to read.

A / D + Microprocessor: This block is responsible for converting the analog signal to digital, and from there make the calculations, and send the information on the display and signals to the output.

Power Supply: This block is the internal source of the equipment, internally it has another SMPS source to isolate all possible connections, so the source input is galvanically isolated from the cable input that comes from the torch and the output signals.

Outputs: This block is responsible for signaling the software / hardware about the actions that must be taken, the equipment has solid state relays, thus increasing the life of the equipment even more, since it is not mechanical relays and there are no wears ourselves.

Parameters:

POWER:	VALUE:
Supply:	12~24V DC
Current:	60mA DC
SIGNAL INPUT / OUTPUT:	
Max DC Voltage	750V DC
Filter HF/HV 55KV AC	>95Khz
Duty cycle (%) DC	100%
Duty Cycle HV/HF (%)	100%
Current max output	35mA @ 50V DC
CASE:	
Protection	IP20
Support	DIN35
Dimensions (C * L * H) [mm]	90x106x80

Connections:

[See last pages](#)

Power supply:

THC.HWII can be powered from 12V to 24V with direct current, must be provided with a switched or linear source, properly filtered.

Do not use the power of the motor drivers, because in this line there are many voltage peaks and interference that can damage

and even hinder the operation of the height controller.

Tip: For equipment where they have a connector for "remote control", look for the "work" pin and the "electrode" pin, usually pins 5 and 6, these pins can also be read, the only difference is that by this connector only "passes" the DC voltage of the source, so it is possible to extend the distance between the source and the THC, since high voltage is disabled in this connector.

Work is the positive sign.

Electrode is the negative sign.

Software interface:

The outputs are activated through optocouplers, and support insulation for up to 1000V.

As there are currently several interfaces for cnc's, this THC was designed to be able to work on all of them, so the optocoupler output was made available directly on the terminals, as the interface was activated.

NOTE: Avoid making a jumper on the output terminals of the negative or positive signals of the THC source, doing so the internal galvanic isolation of the THC.HWII is impaired, only do this if you are sure / need of what you are doing.

HMI - Human Machine Interface

THC.HWII has a simple and easy to operate menu.

When the THC.HWII is switched on, a message is shown on the screen, informing the make and model of the THC.

After the THC.HWII initialization, the display already starts showing the voltage that it is "reading" from the source. The THC algorithm only enables operation when the arc appears, otherwise the outputs are disabled.

SETPOINT setting:

To adjust the THC setpoint, just press the "∧" keys to increase the setpoint and the "∨" key to decrease the setpoint, note that when you click on any of these keys the display already shows the current value of the setpoint, showing which is in edit mode, to accept the parameters, just set the desired voltage and wait for it to automatically save in memory or press the "menu" key.

The figure below shows an example of a setpoint configured for 120V.

```
Ajuste Setpoint.  
Setpoint: 1200
```

Menu:

To enter the THC menu, just press the "menu" key on the controller and the display will show the menus available in the version, they are:

```
Config:  
> DELAY ARC
```

```
Config:  
> HISTERESE
```

```
Config:  
> SUPRESSAO
```

```
Config:  
> MODO TESTE
```

To switch them, just press the up or down keys. and to adjust any parameter just press menu so you can edit it.

- DELAY ARC:

This parameter adjusts the delay of the activation of the outputs after the opening of the arc, with this it is possible to avoid the instability of the arc voltage at the start of the same. To exit press "menu".

```
Config Delay Arc  
Delay: 1.0 Seg
```

- HISTERESE:

This parameter adjusts the difference and limit of the nominal voltage read for height correction, for example, the setpoint selected was 120V and the hysteresis was 5V, so if the voltage of the plasma source is between 125V and 115V the equipment will not inform the software to compensate for the height.

```
Config Histerese  
Histerese: 100
```

To exit this parameter, press the "menu" key.

- SUPRESSÃO:

This parameter sets the minimum limit to enable the operation of THC.HWII.



To exit this parameter, press the “menu” key.

- MODO TESTE:

This parameter is used to test the height correction outputs of the THC.HWII, it is very useful when configuring the THC on the machine.



To activate an output, simply press the up or down keys.

When the display is clicked up, the following message appears and activates the respective output or generating the pulses at the STEP and DIR output (HWII Z version).



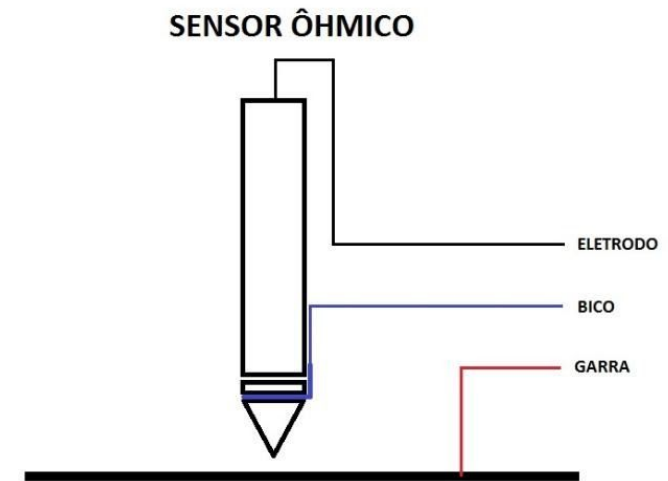
When the display is clicked down, the following message appears and activates the respective output and inverting the DIR signal (HWII Z version).



To exit, just press “menu” and wait.

OHMIC SENSOR:

THC.HWII already has the ohmic sensor internally, making installation on plasma machines even easier.



Its ohmic sensor is capable of filtering electrical torch discharges, arc voltage and also totally immune to any external source, be it electrical or magnetic.

ELECTRODE = Plasma source negative

BICO = “BICO” connector on the height controller

GARRA = Plasma source positive

When in operation and the torch touches the cutting plate to reference, the PROBE output is turned off to inform the software / hardware that the touch has occurred.

NOTE: When the nozzle touches the plate, the PROBE output turns off its output, and when in normal mode, in this case, without the nozzle touching the plate, the output is activated. So in your software or control settings don't forget to leave it as LOW ACTIVE!

- VELOCIDADE DE CORREÇÃO (only HWII Z Version):

This parameter is used to adjust the frequency of the STEP sent to the driver for height correction.

When selected, you can change your values, in Hertz, the higher the frequency value, the faster the correction, and the lower the value, the slower the height correction will become.

By default, both are set to **400Hz**, but can be modified as needed.

We do not recommend very high values for very low driver resolutions, as height correction can be very fast, preventing a stable cutting height.

- INVERSÃO DIR (only HWII Z Version):

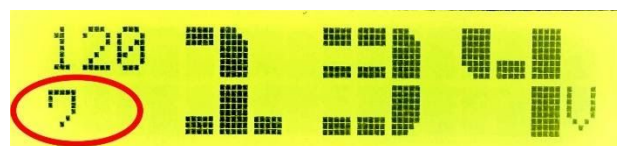
THC.HWII has this function to invert the polarity of the DIR output signal, if you are having problems in the correction direction (going up instead of going down and vice versa) use this function to correct.

- 1 - normal output
- 0 - reverse DIR polarity

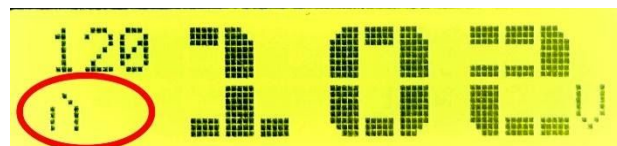
HEIGHT CORRECTION:

If all parameters are correct, the controller will be able to start correcting the torch height, the display shows when the controller has the torch lowered or raised, as shown in the figures below.

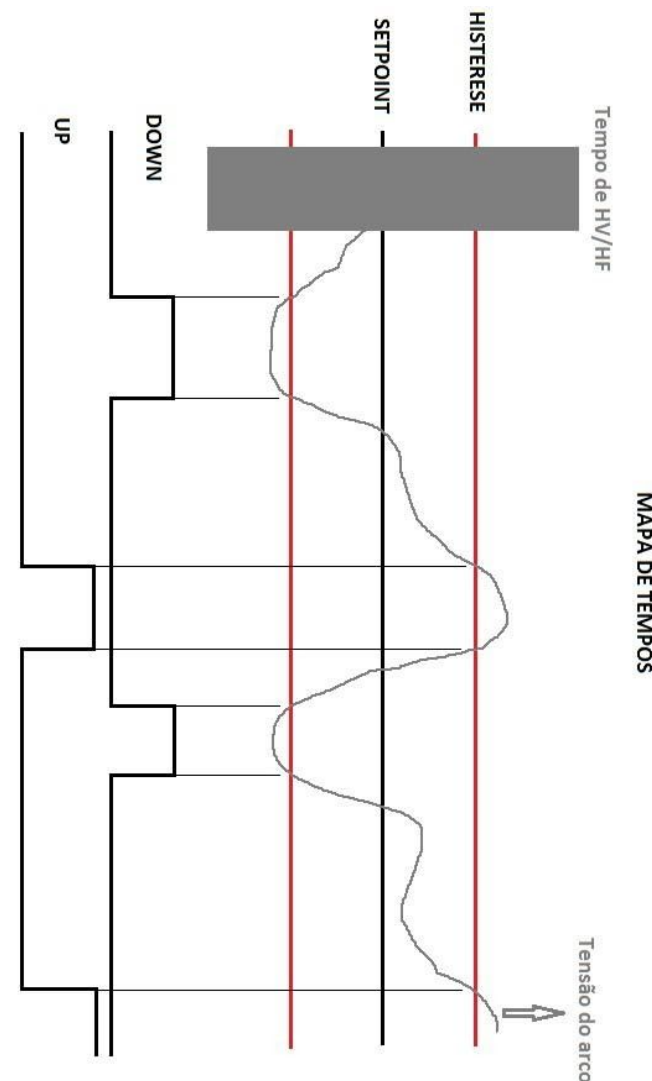
When it tells you to lower the torch



When it says to raise the torch



TIME MAP:



REMARKS AND TIPS:

- When pressing the “menu” key on the controller, and there is no interaction with it, the controller exits the parameters and returns to operating normally.
- The controller must be supplied with direct current voltage and a nominal voltage of 12 to 24 volts.
- The controller has an internal fuse for protection, when there is a surge in the controller supply and it will act, there is no need to replace the fuse, it is “reset” after a few seconds and the controller is intact, if so do not call, contact Macrol Tecnologia.
- Avoid overloading the controller output optocouplers, they have limited current and this must be respected for the equipment to function properly.

- To find the ideal cutting tension, after complete installation, position the plate, try to make it flat with the table, leave the torch at the height of your preference, disconnect the THC outlet with its interface, make a cut that last in the range of about 5 seconds, and observe the tension shown in the THC, stop the cut, and set the SETPOINT to the tension observed previously, thus ensuring that the THC controls the height based on that tension.

Software configuration (MACH3)

For THC.HWII that has UP / DOWN outputs, configure the inputs in the software as you connected on your interface card, map the pins in the “ports and pins” configurations, below you have examples of connection for cards via LPT and a screen screenshot where it maps the THC UP and THC DOWN pins.

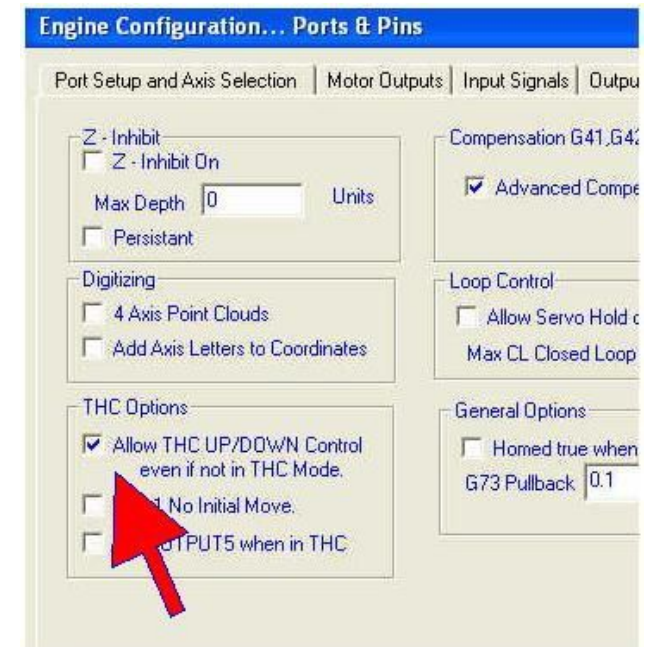
Engine Configuration... Ports & Pins

Port Setup and Axis Selection | Motor Outputs | Input Signals | Output Signals | Encoder

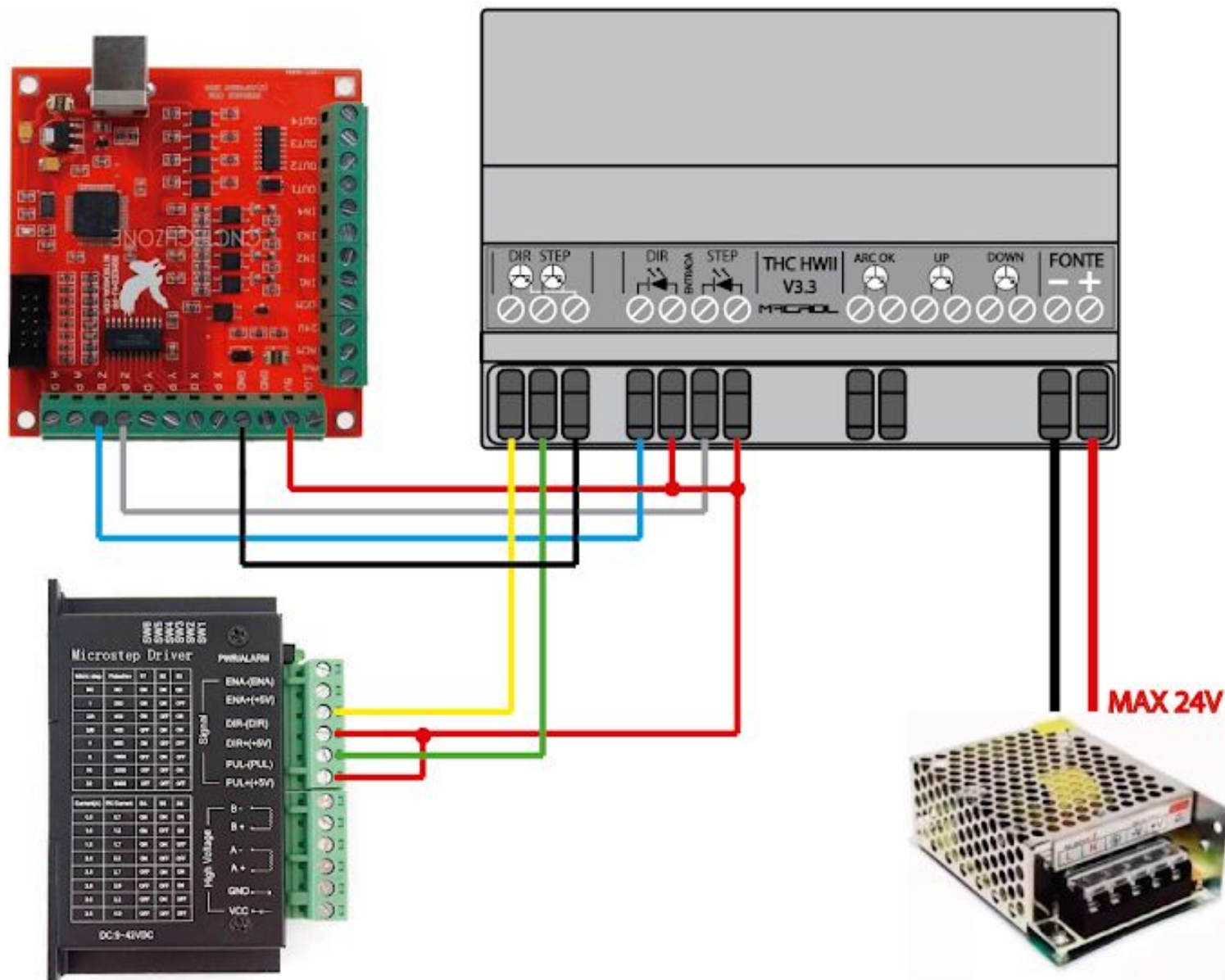
Signal	Enabled	Port #	Pin Number	Active Low
Index	<input type="checkbox"/>	0	0	<input checked="" type="checkbox"/>
Limit Ovrd	<input type="checkbox"/>	0	0	<input checked="" type="checkbox"/>
EStop	<input checked="" type="checkbox"/>	0	0	<input checked="" type="checkbox"/>
THC On	<input checked="" type="checkbox"/>	3	2	<input checked="" type="checkbox"/>
THC Up	<input checked="" type="checkbox"/>	3	3	<input checked="" type="checkbox"/>
THC Down	<input checked="" type="checkbox"/>	3	4	<input checked="" type="checkbox"/>
OEM Trig #1	<input type="checkbox"/>	0	0	<input checked="" type="checkbox"/>
OEM Trig #2	<input type="checkbox"/>	0	0	<input checked="" type="checkbox"/>
OEM Trig #3	<input type="checkbox"/>	0	0	<input checked="" type="checkbox"/>

Pins 10-13 and 15 are inputs. Only these 5 pin numbers may be used on

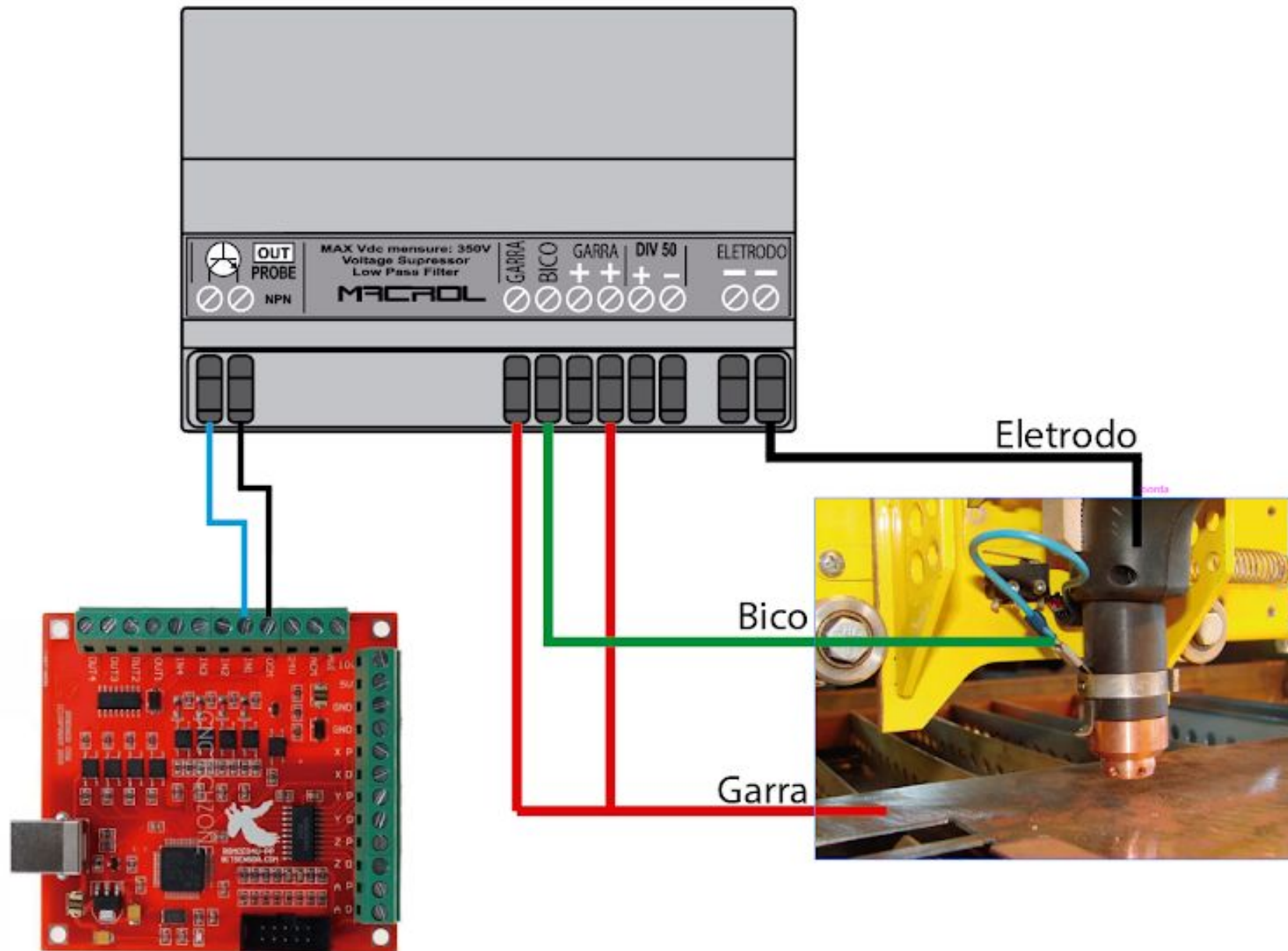
In the “Mill options” tab locate and check the function “Allow THC UP / DOWN control even if not in THC mode”



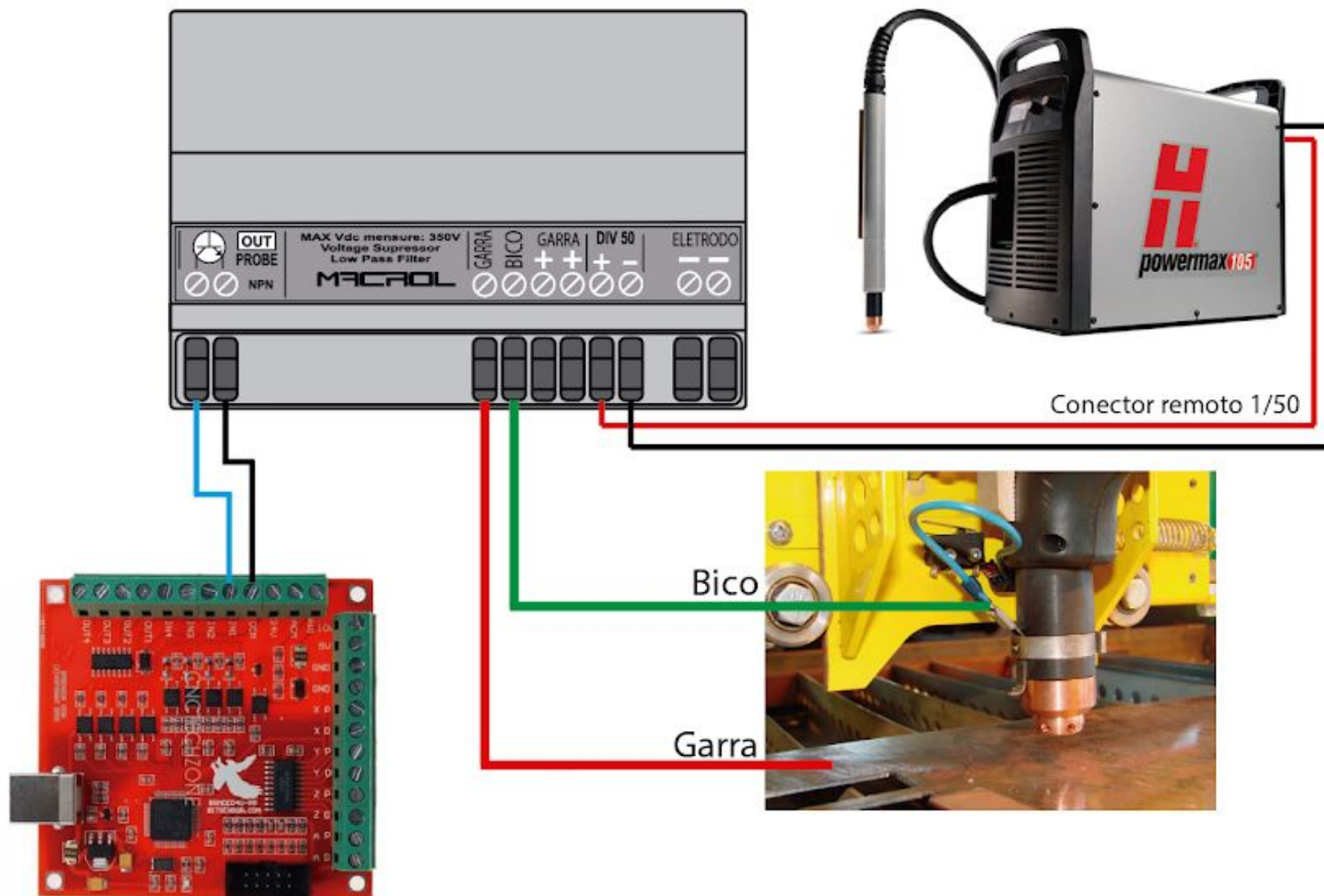
Example of USB interface connection and driver (only HWII Z Version):



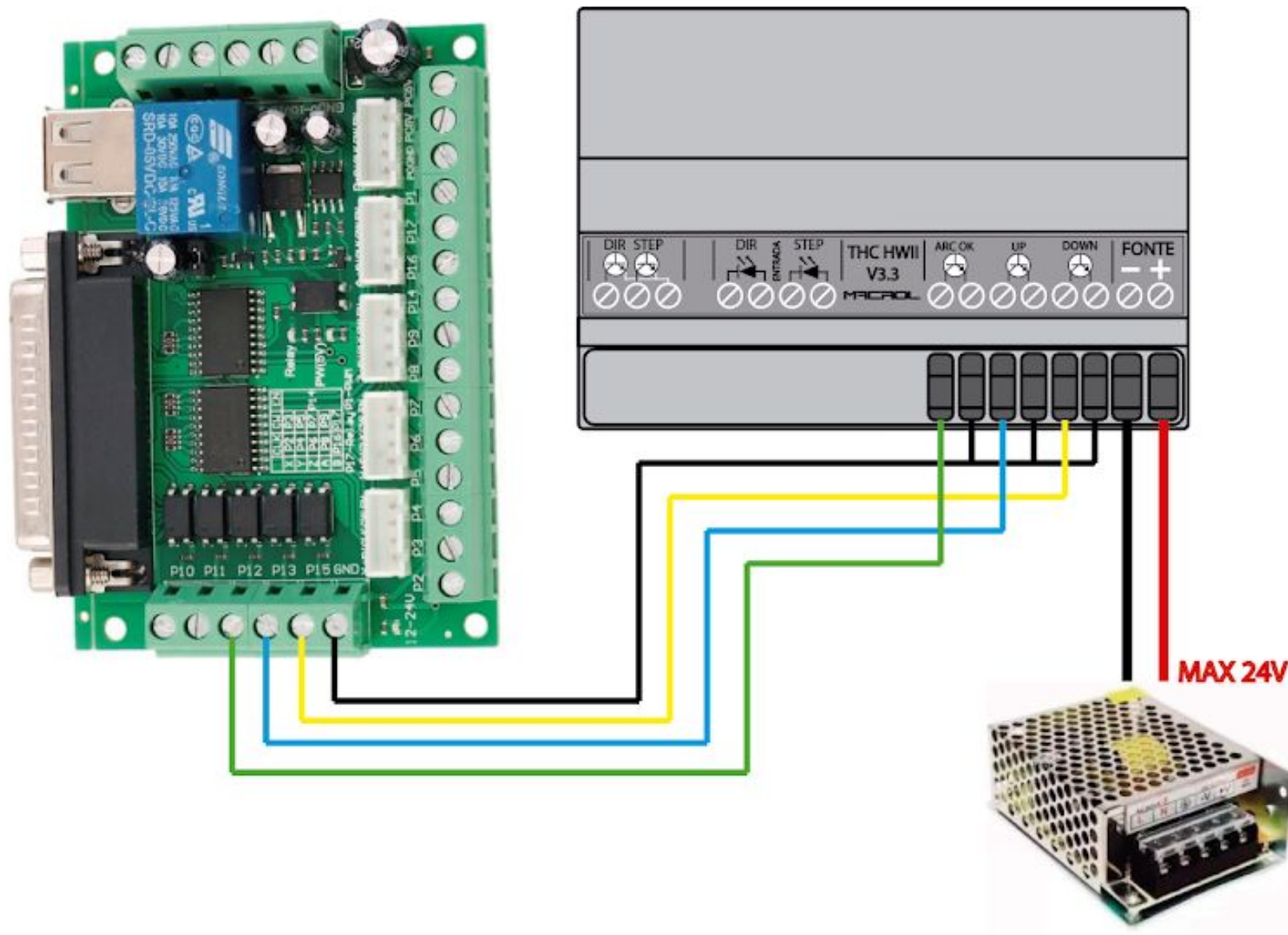
Example of connection of the ohmic sensor and connection with the torch without voltage divider:



Example of connection of the ohmic sensor and connection with the torch with voltage divider 1/50:



Example of connecting the UP /
DOWN outputs to the LPT board:



Example of connecting the ohmic sensor output to the LPT board:

