



PlasmaSens user's manual v1.2



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Description

PlasmaSens is a torch height sensor for using with plasma cutter equipment. In a combination with a PoKeys57CNC [controller](#), PlasmaSens is reliable [torch height controller](#) (THC).

PlasmaSens provides an accurate arc voltage measurement based on modern microprocessor's technology. Efficient and precise cutting of material depends on torch distance from a workpiece and appropriate plasma arc. The arc voltage is proportional to the distance between the torch and the workpiece and should stay as equal as possible across the entire cutting surface. Therefore plasma's voltage data is important for a Z-axis position update.

With a mains AC power supply built-in and a total optical output isolation, PlasmaSens is very simple for physical installation and safe to use. The device offers two arc voltage level inputs. High voltage input up to 350 VDC or low voltage input (without 1:50 internal divider) up to 10 VDC. Optical output also solves possible electromagnetic disturbance issues, caused by plasma cutter's arc. Use of PlasmaSens increases operation reliability of CNC equipment.

If you are not using PoKeys57CNC controller you can use our universal PlasmaSensOut device at receiver side. With programmable output signals: Up, Down and Arc OK, it's compatible with the most CNC controller boards on the market. More information you can find on our website.



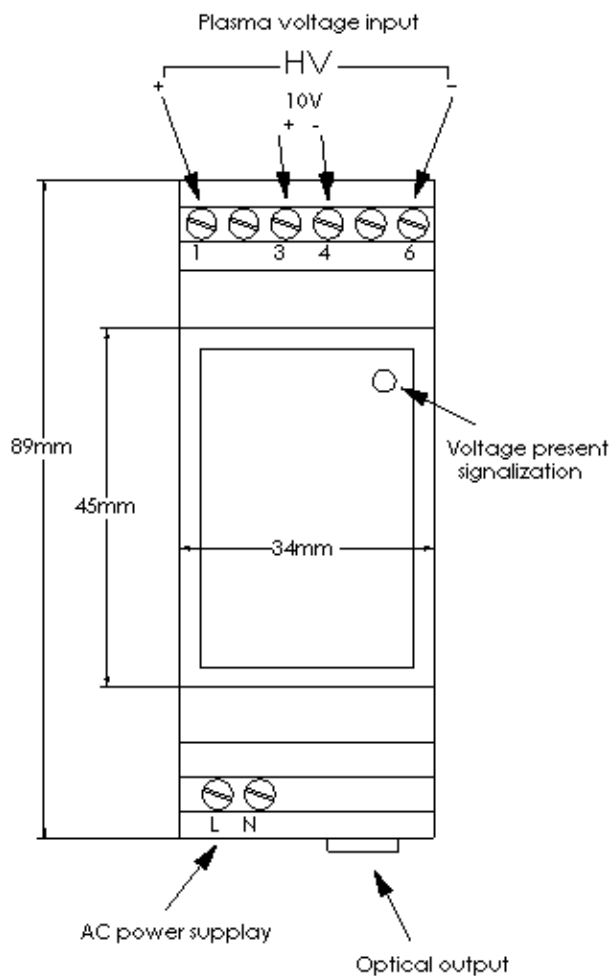
Features

- Plasma voltage measurement up to 350 V
- Main AC power supply (110 VAC-230 VAC/50-60 Hz)
- Additional input for divided plasma voltage (1:50) up to 10 V
- Plasma voltage present signalization
- Full optical output isolation; transmitter and receiver connected over an optical fiber cable
- Plugin support Mach3 and Mach4
- DIN-rail mountable housing



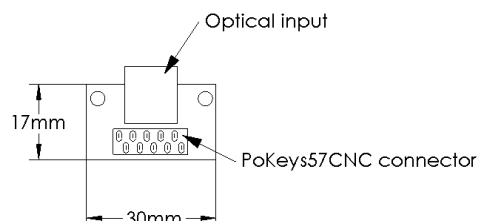
Connectors and pinout

PlasmaSens device:



Terminal pin	Function
L	AC Power supply (95 VAC -260 VAC @50 Hz-60 Hz)
N	
1	+ HV input from plasma cutter equipment (350 V max)
3	+ divided voltage from plasma cutter equipment (10 V max)
4	- divided voltage from plasma cutter equipment
6	- HV input from plasma cutter equipment
Optical output	Optical fiber cable -TOSLINK connector (included)

PlasmaSens receiver adapter board for PoKeys57CNC:



Connection to PoKeys57CNC

The PlasmaSens device already comes with the receiver board, an optical fiber cable and a flat cable for connection to PoKeys57CNC. Just connect transmitter and receiver using fiber cable and plug receiver to the red connector (PoExtension2) on PoKeys57CNC board.

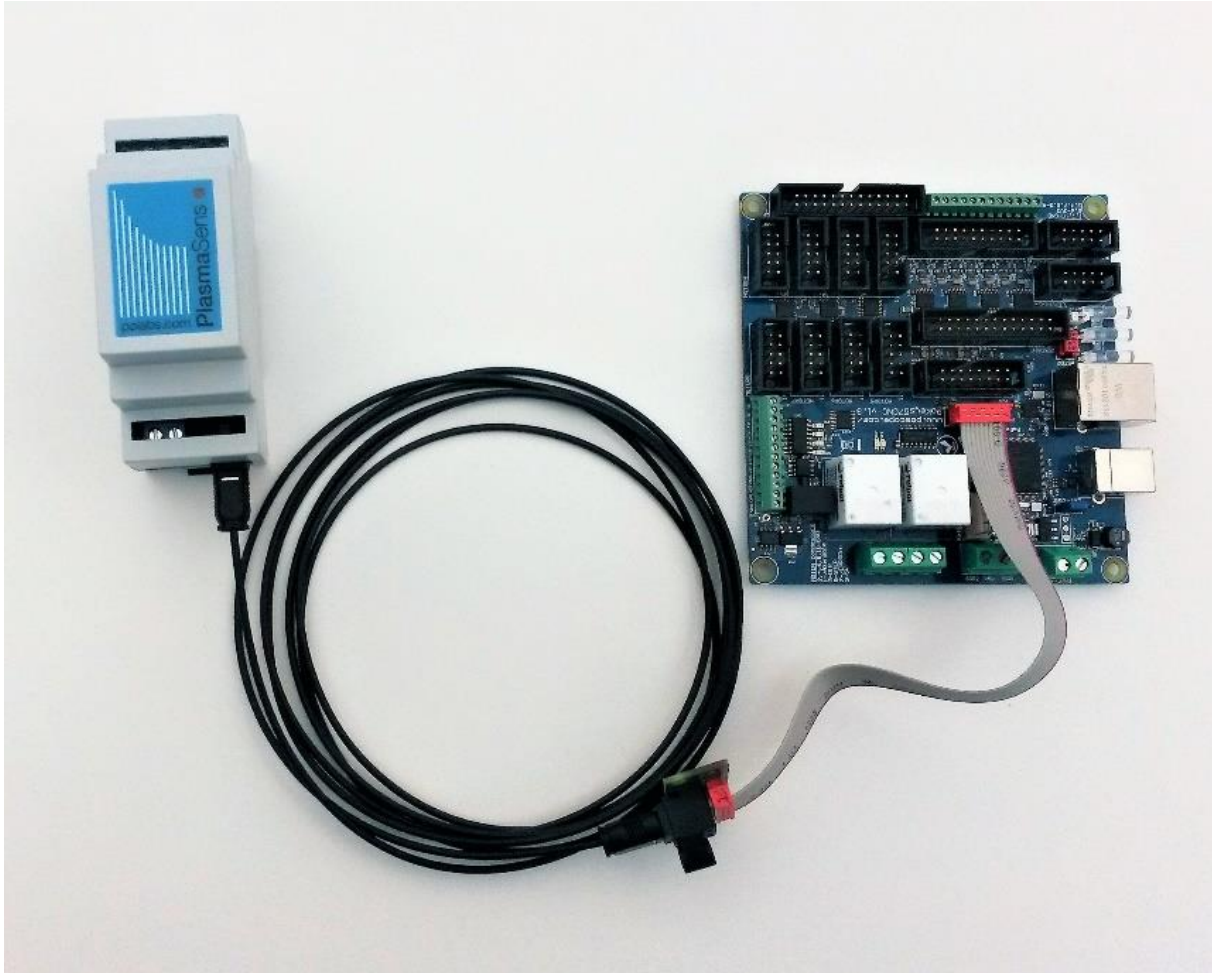


Figure 1: Connection PlasmaSens to PoKeys57CNC board



Connection to the plasma cutter equipment

The PlasmaSens device is prepared for two possible connection to the plasma cutter equipment.

A 300 V input for direct connection and 10 V input for connection using divided plasma cutter output.

Only one input can be used at a time!

1. Direct connection

In case your plasma cutter does not support voltage divided output, you should connect it directly to HV input as shown in Figure 2.

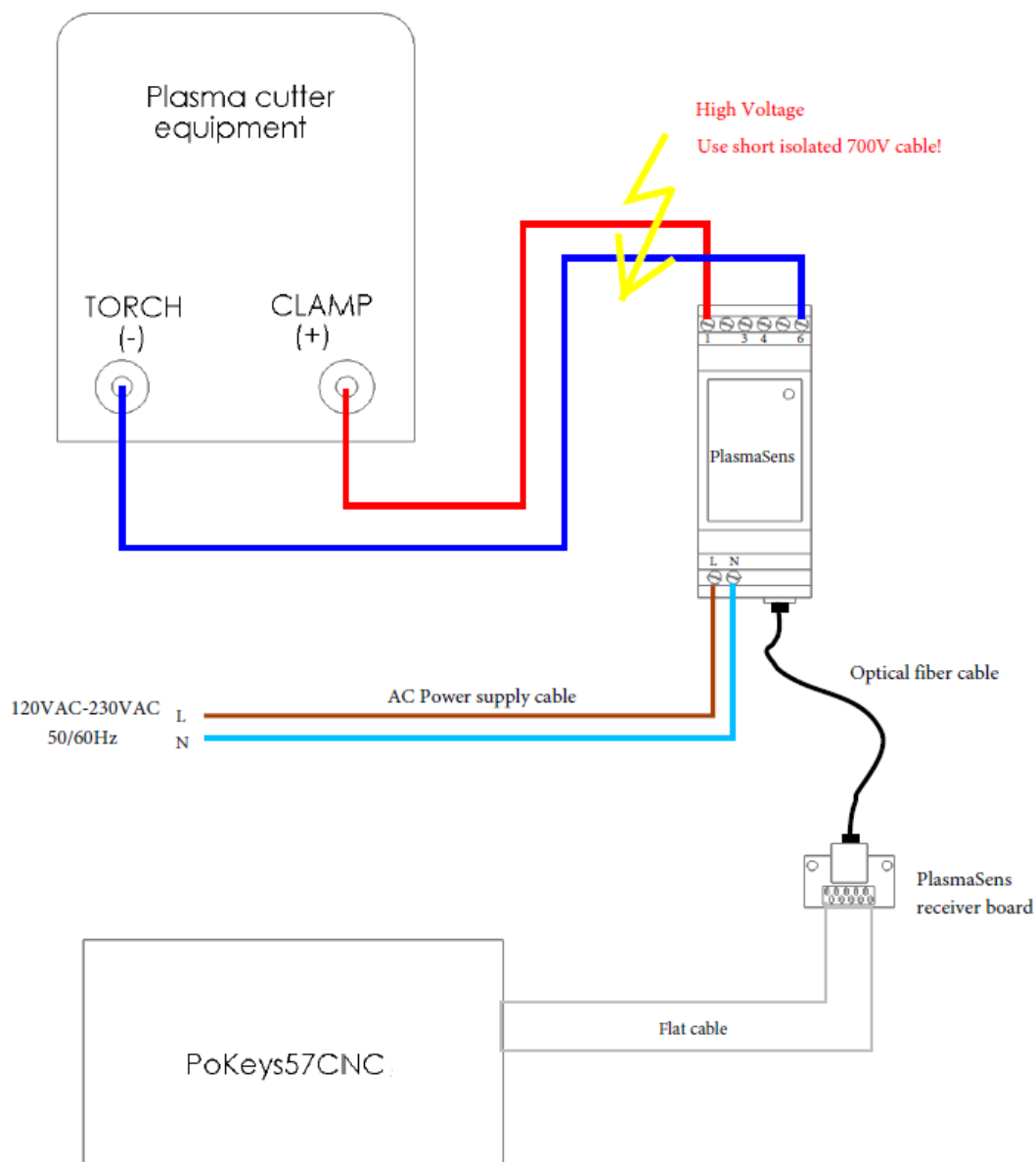


Figure 2: Connection PlasmaSens to Plasma cutter equipment - directly

2. Divided voltage connection

For connection using divided voltage output note the following instruction (Figure 3).

Please refer to your plasma cutter owner's manual for detailed information about divided output voltage and connector pinout. Remember PlasmaSens 10 V input is prepared for voltage divider 1:50 and so it will only measure correct input voltage for that ratio. In case of a different divider ratio, reference high parameter should be calculated as plasma cutter voltage divided by plasma cutter voltage output ratio multiplied by 50.

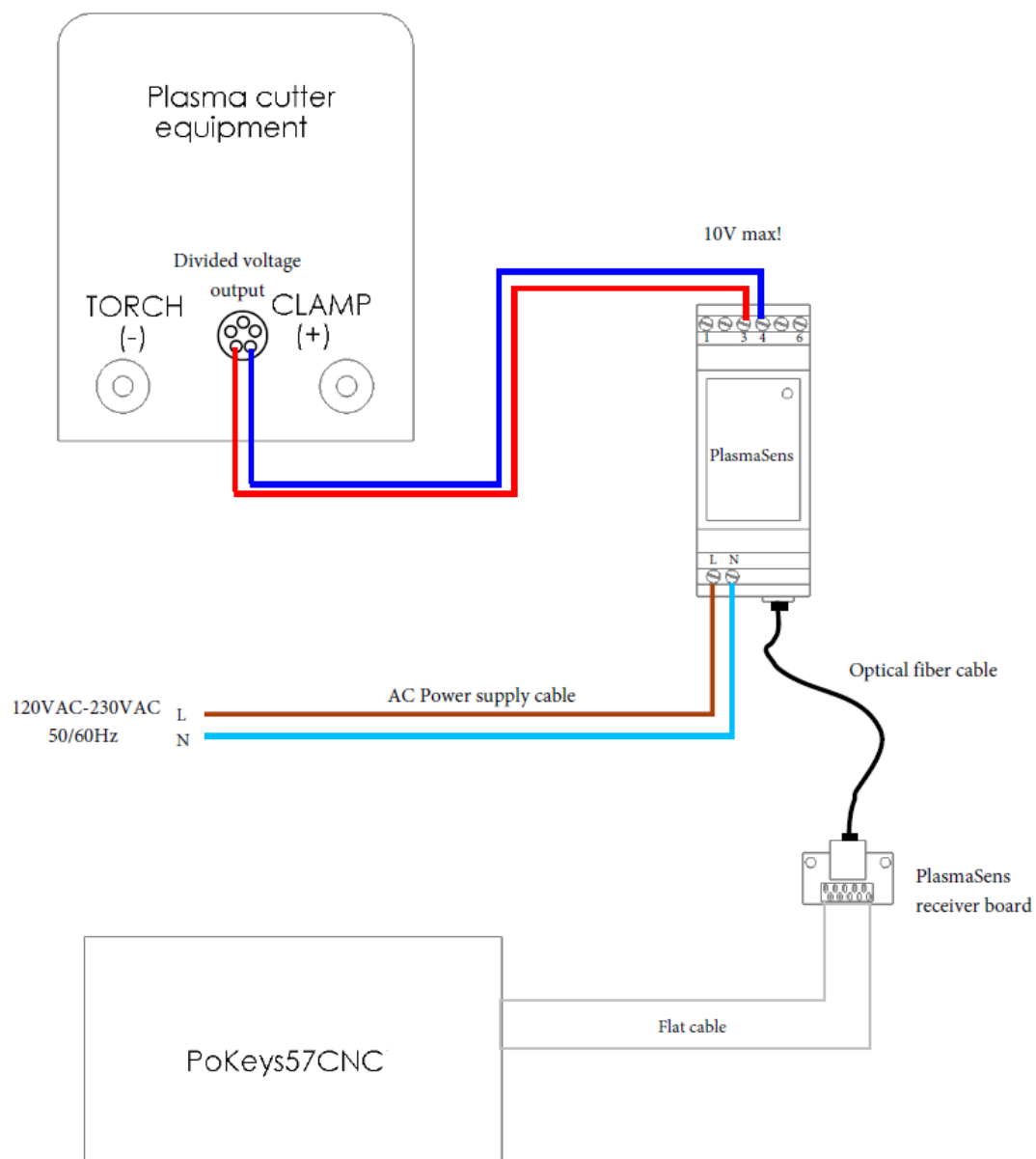


Figure 3: Connection PlasmaSens to Plasma cutter equipment using divided voltage output

Mach3 - PlasmaSens configuration

Download and install the latest PoKeys Mach3 plugin from www.poscope.com. Look for PoKeys setup package, which also includes Mach3 plugin.

Power on PlasmaSens and PoKeys57CNC controller. Run Mach3 software. The PlasmaSens configuration and default THC settings will be configured automatically.

In Mach3 software under *Plugin Control->Configure PoKeys57CNC->Device settings* you will find *Pulse engine settings* tab. You can change following parameters:

Reference Height – desired arc voltage (please refer to your plasma cutter owner's manual)

Deadband – voltage hysteresis (voltage frame around reference height, a range where the position of the Z-axis is kept stationary)

Gain – correcting motion gain (reduce the gain if the torch height is oscillating)

Arc OK range – voltage range where THC is enabled (reference height $\pm$ arc OK range)

Anti-dive limit – arc voltage that disables THC. If voltage goes higher than Anti-dive limit, the Z-axis position will not be updated. The parameter's value must be higher than Reference height. This functionality can be enabled or disabled by checking or unchecking the parameter.

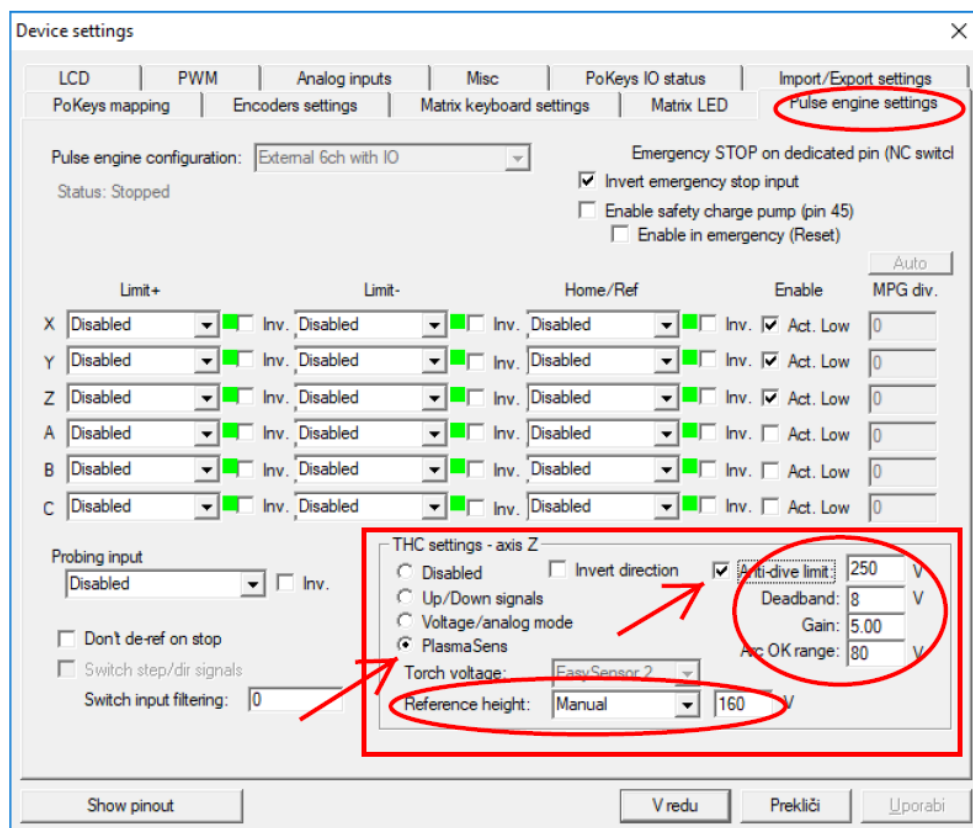


Figure 4: PoKeys Mach3 plugin setup window

Mach4 - PlasmaSens configuration

Download and install the latest PoKeys Mach4 plugin from www.poscope.com. Unzip and copy files: Mach4PoKeysPlugin.m4pw and Mach4PoKeysPlugin.sig to "Mach4\Plugins" folder.

Run Mach4 (Plasma profile)

- Go to *Configure* → *Control...* → **Axis Mapping** tab and enable axis X (0), Y (1), Z (2) and OB1 (6)

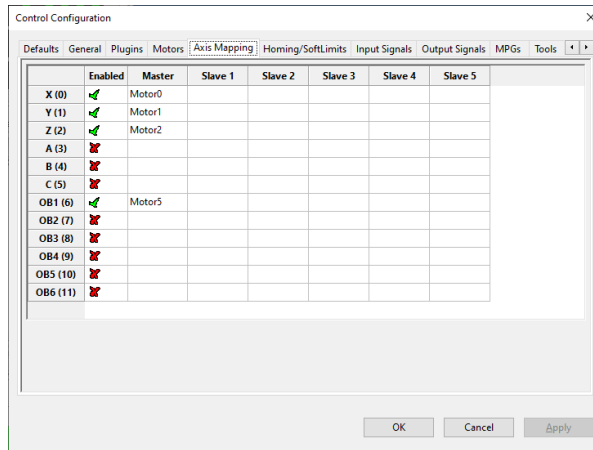


Figure 5: Mach4 Axis Mapping

- Under **Motors** tab enable Motors for X (0), Y (1), Z (2), and OB1 (6). The motor tuning settings for Motor5 (OB1 (6)) must match those of Motor 2 (Z)!

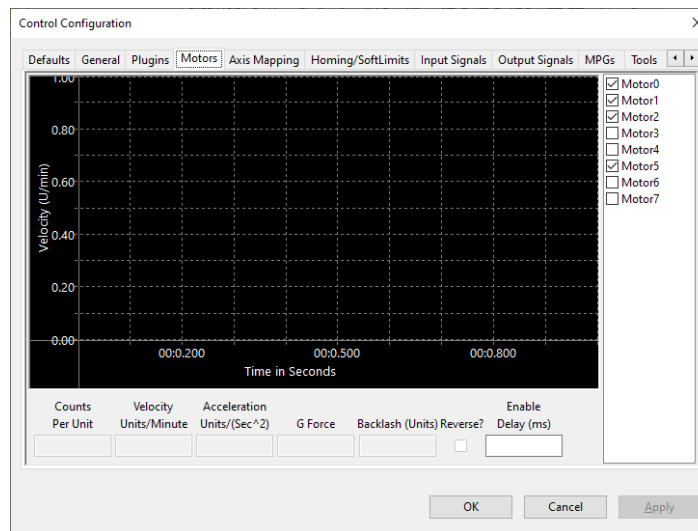


Figure 6: Mach4 Motors assigning

Please read also Mach4 user's documentation located in Mach4 folder Docs\Plasma_Configuration.pdf

- Configure* → *PlasmaScreenConfiguration*
 - Set Default THC mode: **Analog**; THC Axis: **6**
 - Set Analog voltage input register: PoKeys_XXXXX/PlasmaSens HV

- Check “Use Analog Voltage for Arc OK” and set the Arc OK signal active frame (Min/Max Voltage)

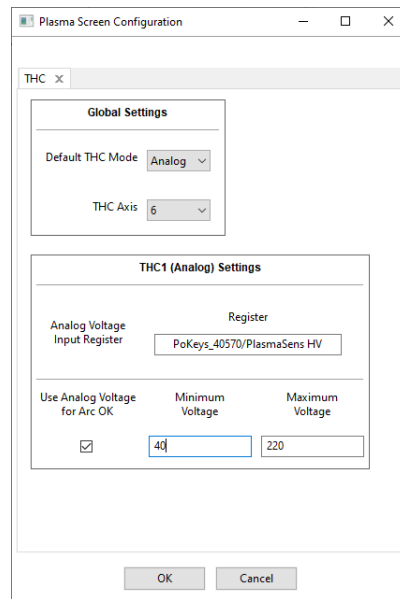


Figure 7: Mach4 Plasma Screen Configuration

- Use Mach4 **THC Cut Start Settings** and **THC** tab to set-up cutting parameters. If “Touchoff” is included the Probe input must be mapped! (Configure → Control... → Input signals tab)

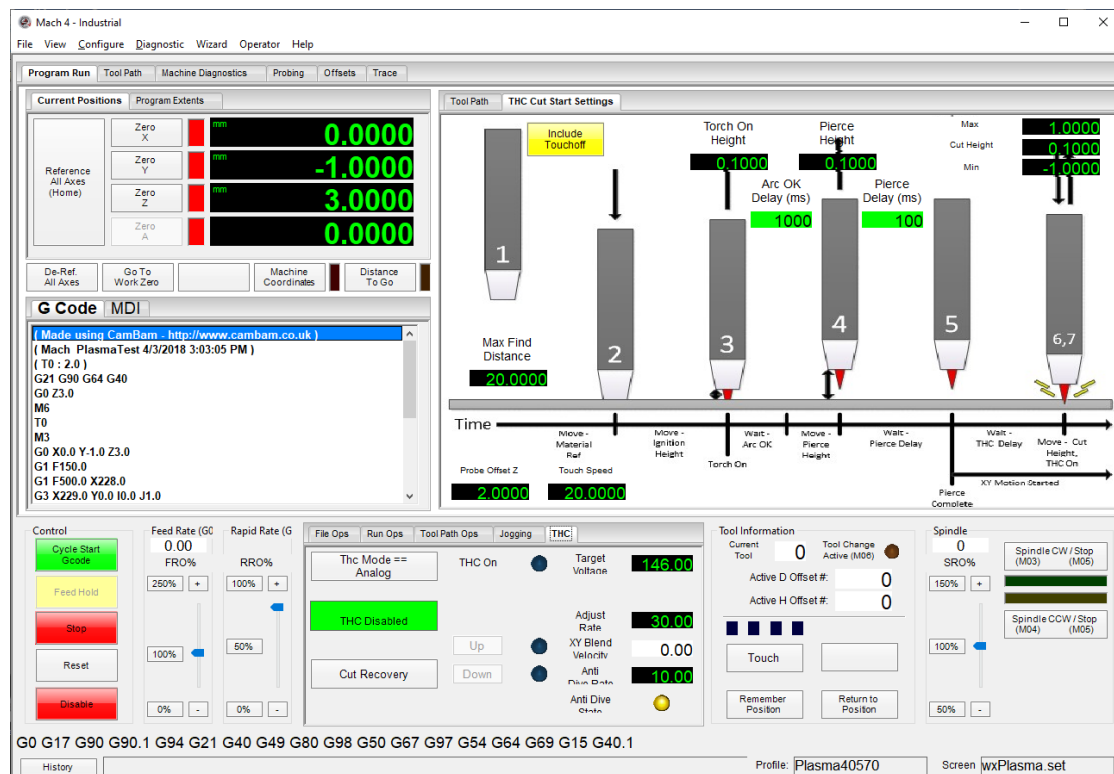


Figure 8: Mach4 THC settings

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