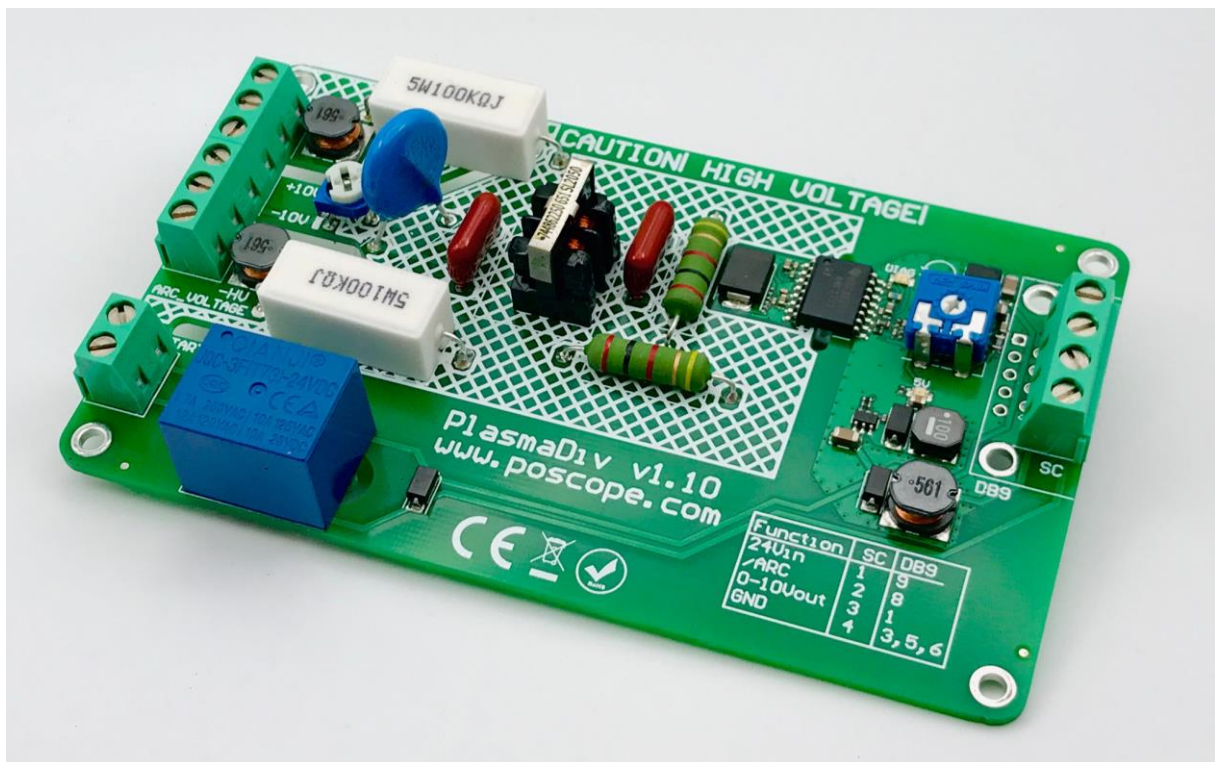




PlasmaDiv user's manual v1.0



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Description

PlasmaDiv is a galvanically isolated plasma voltage divider 50:1. The isolated start signal can be used to safely interface the THC system with the plasma cutter.

PlasmaDiv is developed to be used as independent device and is compatible with most [CNC controller](#) boards on the market and plasma cutters.

Divider offers a noise free arc voltage values attenuated to a safe voltage level, which can be interfaced with standard electronic such as A/D converters and microprocessors.

The input stage provides high-frequency filtering. High-voltage terminals were designed for input voltages of up to 500 VDC.

Additionally, isolated 10 V input with no attenuation (1:1) is also available.

Electrical specifications

- HV input operating range: 0-500 V,
- HV input divider ratio: 50:1,
- HV filtering cut-off frequency: 1 kHz
- LV input (10V) divider ratio: 1:1,
- Isolated output voltage: 0-10 V,
- Isolation voltage (RMS): up to 1200 V,
- Isolation voltage (transients): up to 6000 V,
- Power supply voltage: 24 V,
- Start output signal – relay output.

LED signalization“5 V” green LED power on

“DIAG” red LED indicates malfunction of the isolation circuit.

- The low-side does not receive data from the high-side (example: because of a loss of power on the high side). Please disconnect power and plugin again.
- The high-side DC/DC output voltage (plasma voltage) or the high-side LDO output voltage drop below their respective undervoltage detection. In this case, the low-side may still receive data from the high side but the data may not be valid.
- During normal operation, the DIAG pin is in a high-impedance state. Connect the DIAG pin to a pull-up supply through a resistor or leave open if not used.



Terminals and pinout

ARC_VOLTAGE terminal:

Pin	Input
1	+HV
2	NC
3	+10
4	-10V
5	NC
6	-HV

SC terminal:

Pin	Function
4	GND
3	0-10 V output
2	ARC_START (apply GND to activate)
1	+24 Vdc

Pay attention – correct connection on terminals!

ARC_START terminal – connect to start input of the plasma cutter:

Pin	Function
1	Relay – NO (normally open) relay contact
2	Relay – common terminal

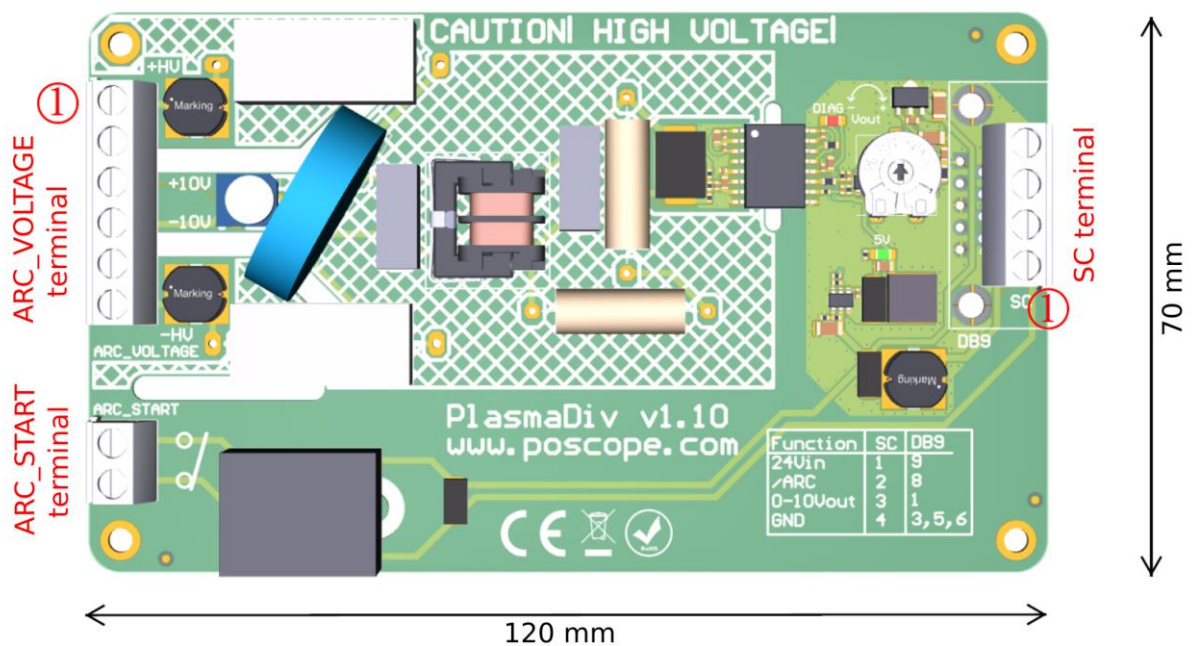


Figure 1: PlasmaDiv terminals layout and dimensions

Connection to the PoKeys57CNC and plasma cutter equipment

The PlasmaDiv device is prepared for two possible connections to the plasma cutter equipment.

A max 500 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.

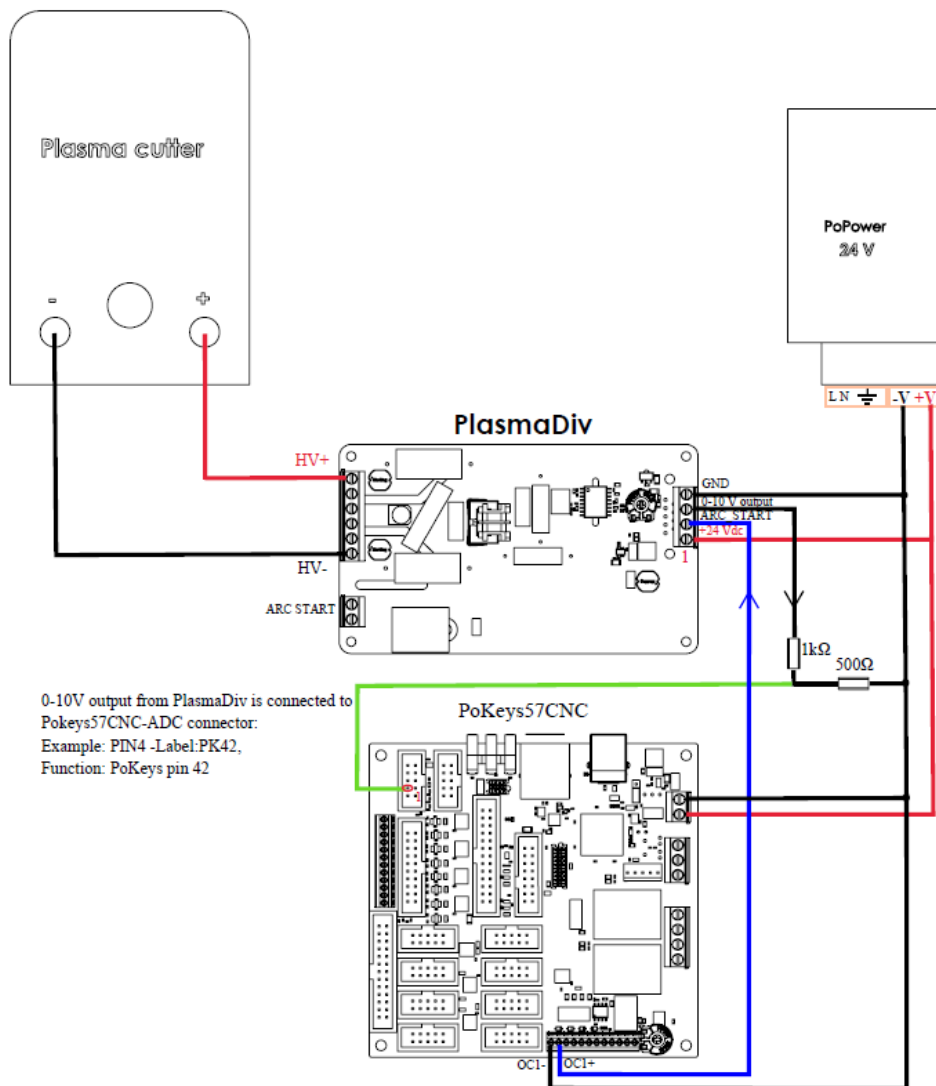


Figure 2: Connection PlasmaDiv to PoKeys57CNC and plasma cutter equipment

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 PlasmaDiv has 10 V input isolation 1:1. PlasmaDiv 0-10 V output connection to PoKeys must implement resistant divider (shown in connection diagram below), because PoKeys ADC connector inputs works 0 - 3.3 V. Pay attention to the resistor voltage divider, it is the users responsibility to implement correctly.

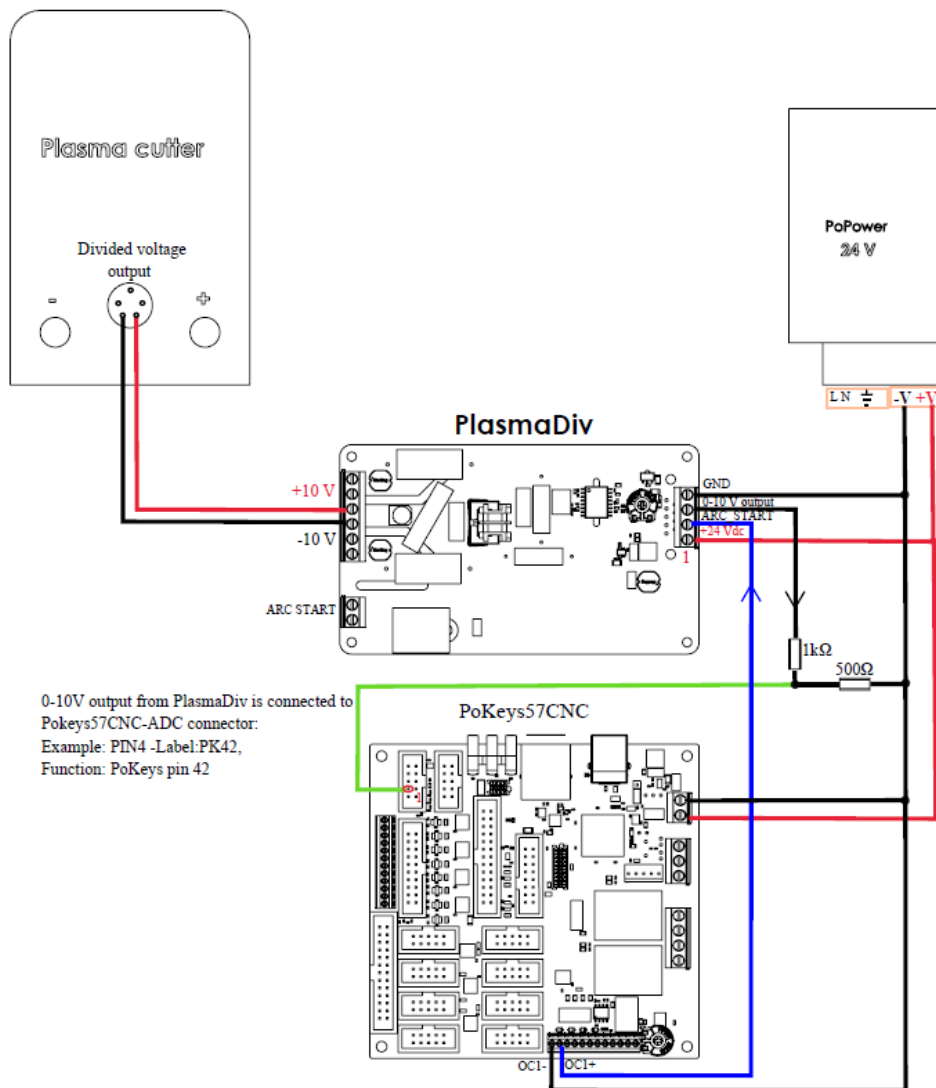


Figure 3: Connection PlasmaDiv to PoKeys57CNC and plasma cutter equipment



Mach3 – PlasmaDiv 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 PlasmaDiv and PoKeys57CNC controller. Run Mach3 software.

In Mach3 software under Plugin Control-> Configure PoKeys57CNC->Device settings you will find Pulse engine settings tab.

Note that all voltages have divider factor of 30 applied (1:10 by the PlasmaDiv and additional 1:3 by the resistor voltage divider). Enter all voltages in range between 0 and 3.3 V.

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 above the 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.

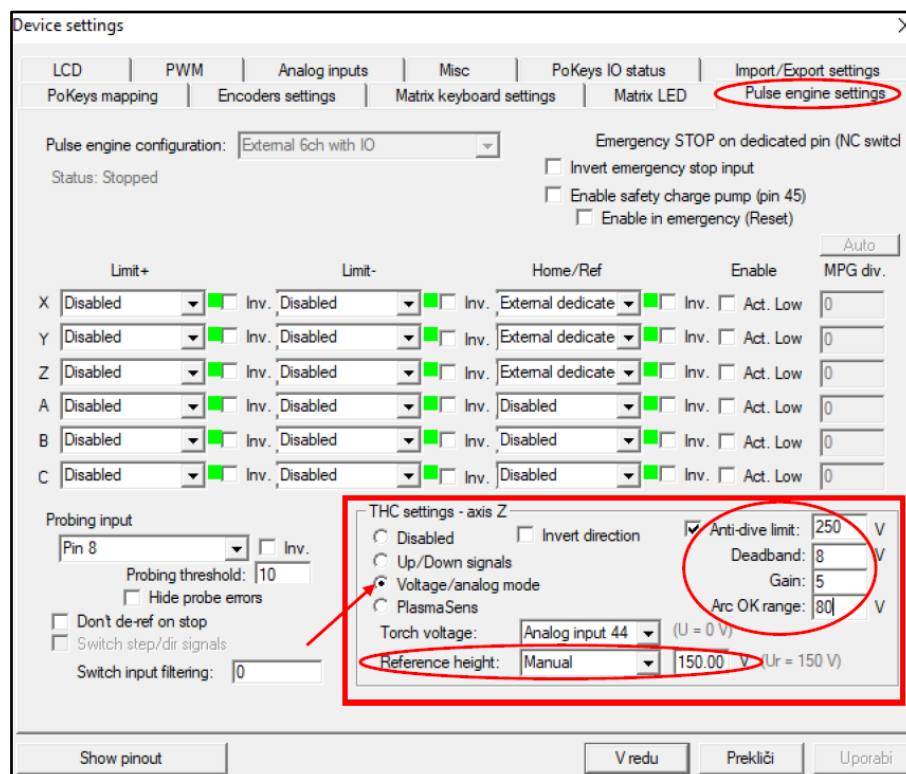


Figure 4: Pokeys Mach3 plugin setup window

Mach4 – PlasmaDiv configuration

Download and install the latest PoKeys Mach4 plugin from <https://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. Mach4 plasma THC is handled with so called out-of-band(OB) motor. For example: if your THC plasma cutter uses Motor2 for Z-axis you will need also to enable axis OB1(6) and select motor for that axis.

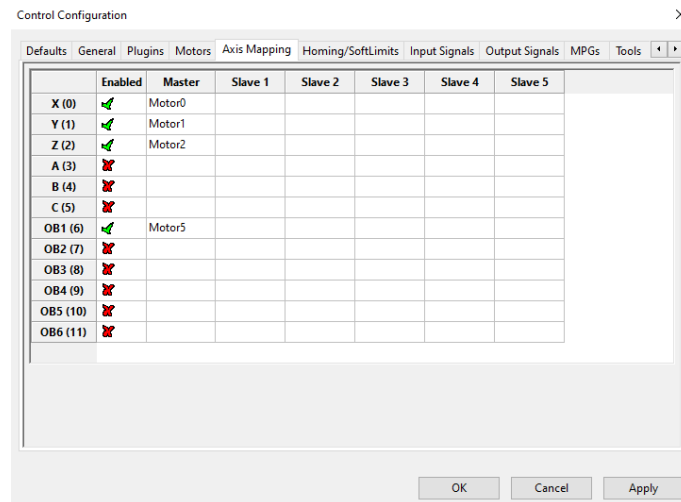


Figure 5: Mach4 Axis Mapping

- 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)!

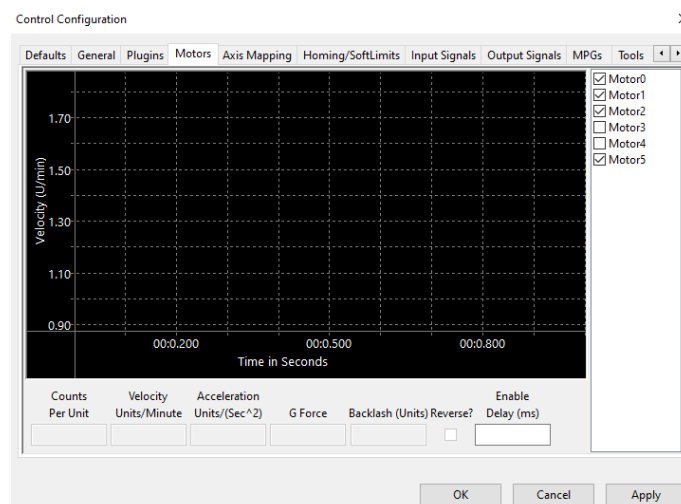


Figure 6: Mach4 Motors assigning

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/Analog input 42

Note that all voltages have divider factor of 30 applied (1:10 by the PlasmaDiv and additional 1:3 by the resistor voltage divider). Enter all voltages in range between 0 and 3.3 V.

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

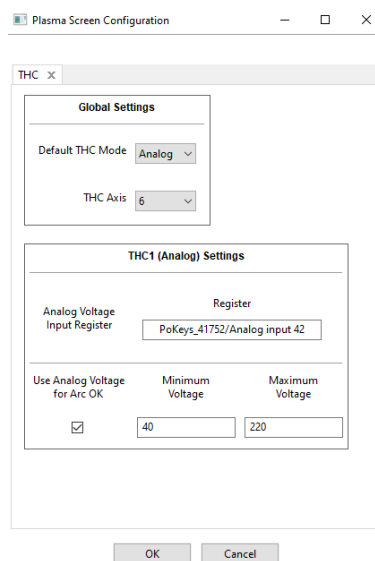


Figure 7: Mach4 Plasma screen configuration

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)

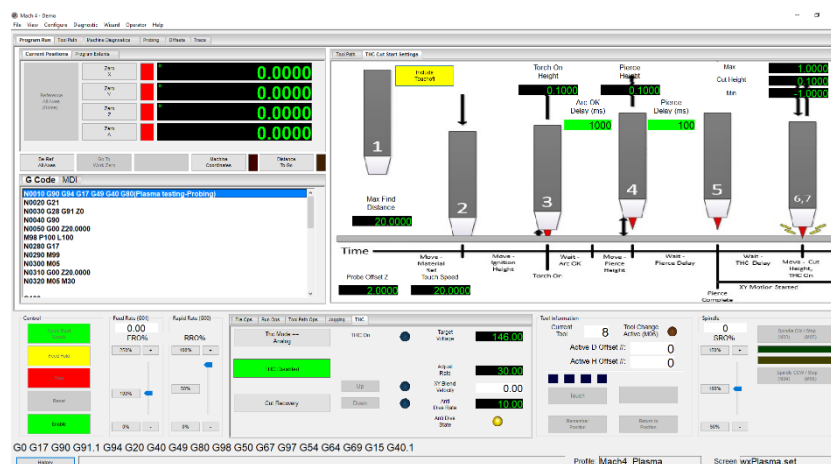


Figure 8: Mach4 THC settings



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