

Operating and installation instructions

Professional plasma torch height control

Model: MyPlasm THC



Characteristics of the device:

- A miniature casing for panel mounting
- Full optical insulation of inputs / outputs
- PID - generator – Step, Dir Signals, precise and infinitely variable adjustment
- Very short response time to the height changing
- Anti-Dive Feature
- Easy to read LED display
- Cooperation with external potentiometer of cutting height adjustment
- Cooperation with the voltage divider 1/20; 1/50
- Easy installation, configuration and operation

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1. General Description

MyPlasm THC is the controller guaranteeing the highest quality of cutting thanks to extremely precise and smooth control of distance of the burner from the material by measuring plasma arc voltage. The use of PID and direct stepper motor with Step / Dir signals (as in THC SD model) provided fluency and accuracy unattainable when using an UP / Down signals used in controllers of lower class.

The machine has also an optional Up / Down control algorithm (similar to THC 150 model) implemented. The user can select the THC SD control algorithm (default) or THC 150.

Using the Disable input, it is possible to turn off / on the THC regulation by software controlling the machine, which makes it possible to take advantage of the Anti-Dive feature, as well as to turn on the THC after the penetration time after acceleration of the XY axis, allowing to control work of the THC by the controlling program without the need to frequently change parameters of the THC menu.

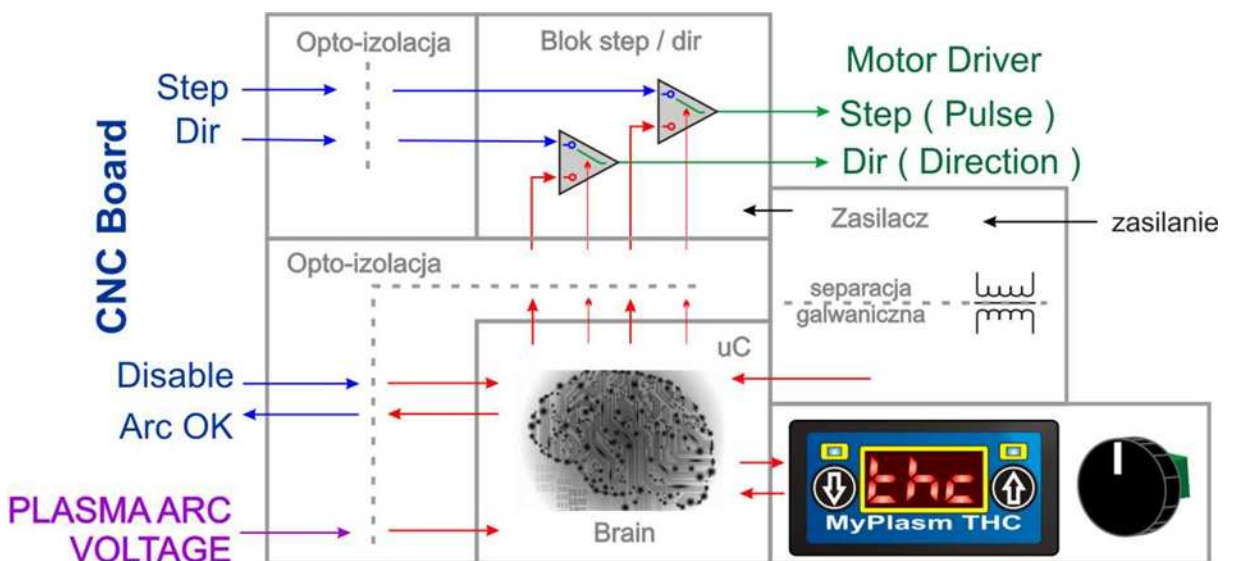
The panel mounted device is made with the latest technology, therefore while maintaining the size / readability of the LED display, very small dimensions have been achieved, allowing its mounting in the location convenient for the operator.

All signals have galvanic isolation (optical insulation).

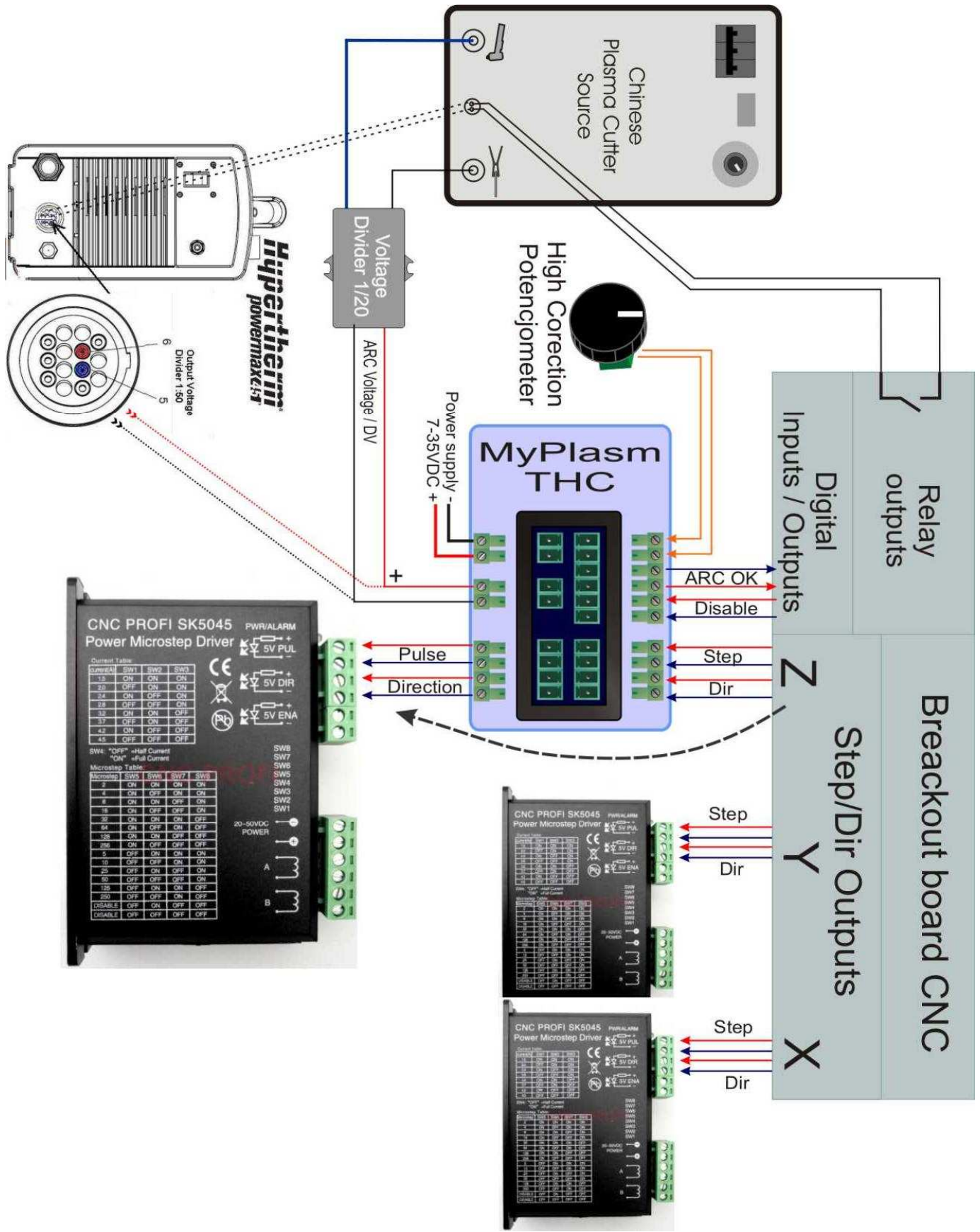
2. Specifications

Power	7-35V DC / 150mA
Insulation of opto signals	3000 V
Insulation of power supply	1000 V
Measured voltage range	0 – 250V DC
Supported voltage dividers	1/20; 1/50
The built-in HV voltage divider	NO
Max input voltage	30Vpp
Step / dir input type	Opto TTL
Step / dir output type	TTL 20mA
Up / Down / Arc output type	Opto OC 20mA
Disable input type	Opto 4-30V DC
Response time	<10ms
The frequency of the step / dir input signals	0 – 500 kHz
The signal frequency step height adjustment	0 – 15 kHz
Dimensions without connectors [width x height x depth]	48 x 24 x 65
Weight	60g
Sealing	IP 50

3. Block Diagram (* Sd mode)

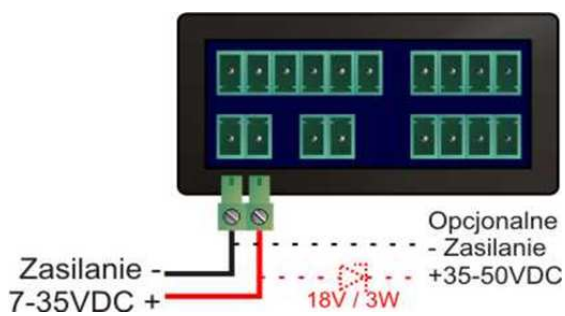


4. General Schematic diagram (SD mode)



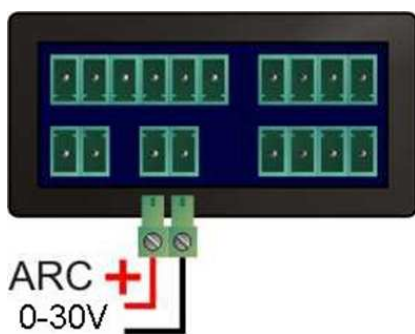
5. Detailed description of connections

5.1 Power



To supply power to the controller, use an AC adapter with voltage of 7-35V / 150mA min. Voltage stabilization is not required. The system can be powered from a power supply with a higher voltage (35 - 50V) – then use 18V / 3W Zener diode.

5.2 Plasma arc voltage measuring input

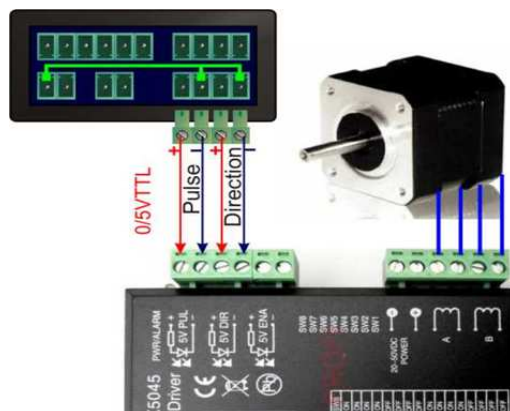


The controller has a configurable voltage plasma arc measurement input. To the input you can connect voltage from the 1/20 or 1/50 voltage divider. The input is completely galvanically separated and does not require additional separation. The selection of division is carried out by appropriate setting in the controller service menu.

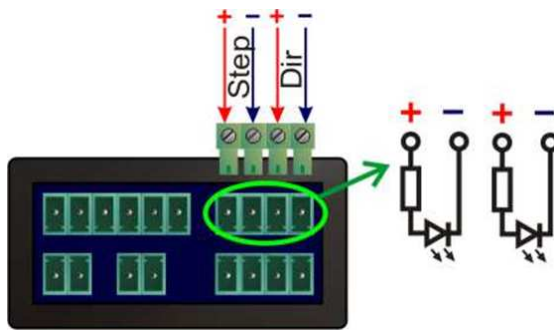
5.3 Step / dir output for stepper motor controller

The output step / dir signals (PULSE / DIRECTION) for the stepper motor controller are made in TTL standard with the current of 20mA, which

allows control of optical insulation input LEDs used in most controllers. The output signals "-" are connected inside the controller to the terminal "-" of the power supply, as indicated with the green line in the picture.



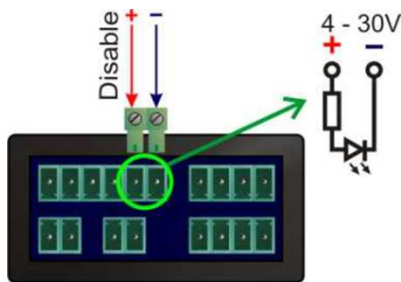
5.4 step / dir inputs from the CNC motherboard



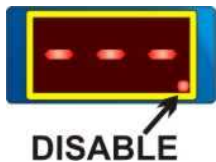
Step / dir signal inputs of the motherboard are made with the use of optical-insulation 5V technology, as in most motor controllers, therefore these inputs are connected in the same way "instead of" the stepper motor controller.

By arranging step / dir input / output according to the standard used in stepper motor controllers –the step dir block is connected as a "pass-through".

5.5 Disable input (Anti - Diving)



The Disable input is designed to stop the work of THC by program which allows using the Anti-dive feature or turning on THC after measuring the penetration time by the program which frees the user from setting the Delay-Time in the THC menu.

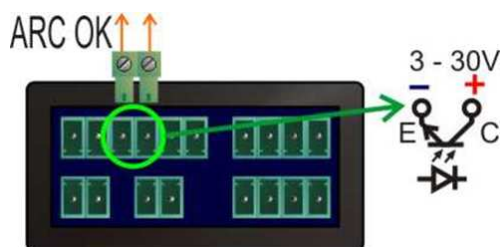


DISABLE INPUT CONTROL: When DISABLE signal is active last dot on display is lighting.

The input is optically insulated and accepts voltage between 4 - 30V DC.

*DISABLE input signal isn't require for operation controller.

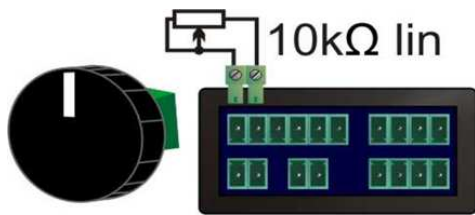
5.6 ARC OK output (main arc ignition confirmation)



ARC OK output (confirmation of the main arc ignition) is the optically insulated OC output (open collector). The output is active (closed) when the main arc has been detected.

*ARC OK output signal isn't require for operation controller.

5.7 Height adjustment potentiometer input



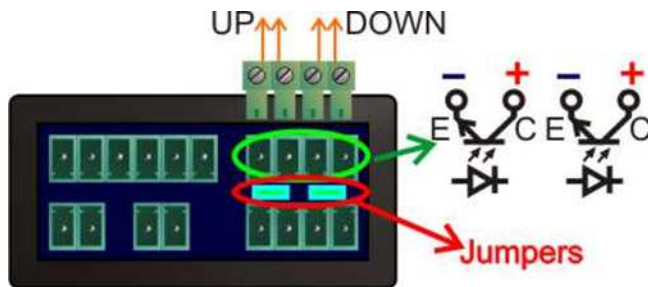
The input supports 10kΩ potentiometer and is used for fast and convenient adjustment of the preset voltage by +/- 15V.

Using the potentiometer is optional; if the potentiometer is not connected, the correction of voltage will be 0V (as the potentiometer in middle position).

To ensure the linear adjustment, a potentiometer with linear characteristics should be used.

*potentiometer isn't require for operation controller.

5.8 Outputs Up / Down (* optional / only for the feature "Model THC 150")

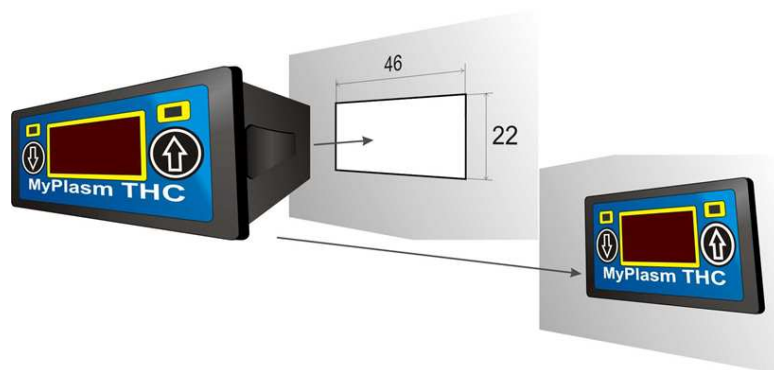


The UP / DOWN outputs are OC optically insulated outputs (open collector). The maximum voltage that can be connected to the UP /

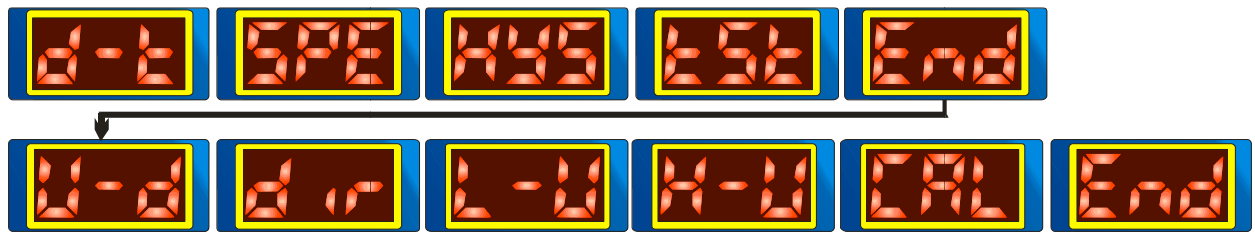
DOWN outputs is 30V but for **voltages above 5V**, remove "jumpers" – see the picture.

6 Installation, connection and start-up


To install the controller, make the rectangular opening 46 x 22, into which the controller should just be inserted – the side flexible mounting elements will immobilize the module.



The **menu** includes a set of user and service functions. To preview / edit function, hold both DOWN / UP buttons pressed until the display shows the function symbols:





6.1 Starting the controller should begin by connecting **ONLY** the power supply (**point 5.1**) and initial configuration of key service parameters. First, select the operating mode of the controller - **THC SD (default)**, or THC 150. For this purpose, when supplying the power-hold both UP /


DOWN buttons pressed until the flashing sign  appears, after releasing the buttons, by clicking Down / Up, it is possible to select the type of work of the THC or THC SD 150 controller:



NOTE: When using the controller in THC SD mode, it is forbidden to connect the THC 150 mode outputs and vice versa!!!

6.2 The second step is to hook the engine control unit (**point. 5.3** for the THC SD operating mode) or UP / DOWN outputs (**pt. 5.8** for the THC 150

operating mode). Starting the test  from the menu should move to a small extent the Z axis Up / Down in directions consistent with what is shown by the blue LEDs above the buttons. If the directions are opposite, change in the menu the dir parametr (* available only in SD THC mode)  (1 / -1).

In test mode it is also possible to monitor operation of the Disable input - if it is active - axis motion is stopped,  is displayed.

6.3 The next step (* only for THC SD) is connecting (**point. 5.4**) controlling Step / Dir signals from the motherboard, which after being correctly connected should be forwarded to the stepper motor controller when the



controller is idle. When connected correctly, it should be possible to control the axis with the computer.

6.4 Connecting the voltage divider (1/20) and (1/50) (**pt. 5.2**) should be simultaneously configured in the parameter setting the division of the



divider possible settings 20 (1/20) and 50 (1/50)



6.5 At this stage the device is ready to be used and only requires to adjust the user's parameters to individual needs. Press Down / Up buttons to set the pre-fixed voltage (height of smoking) according to the instructions of the plasma cutter / burner. After attaching the optional potentiometer (**pt. 5.7**) we obtain the ability to quickly and conveniently adjust the pre-set voltage range of +/- 15V, this value is displayed during adjustment of the potentiometer. Pre-set the value at 0.

6.6 Controlling THC function with the program / Anti-Dive feature

Disable input (**pt. 5.5**) can be used to suspend the operation of the controller, which can be used as Anti-Dive feature or to stop the THC operation with the program for the time of the material penetration so that there is no need to change the D-T time in the menu. These functions should be implemented in the CNC control software in such a way that the corresponding output send the deactivation THC signal.

6.7 Parameters:



(50 - 180) by default 112 [V]

Set voltage (changed with Down / Up keys without entering the menu)



(0.0 - 9.9) default: 0.5 [s]

"d-t" Delay Time - Control delay time after detection of the main arc



(1-15) by default 5 [1 kHz]

"SPE" Speed - Max. frequency of the generated signal (only in THC SD mode)



(1-10) by default 2 [V]

"HYS" Hysteresis - The voltage range within which the controller does not compensate the height.

6.8 Service parameters:



(20/50) by default 20 [1/20]

"U-d" Voltage Divider - coefficient of the voltage divider



(1 / -1) by default is 1 [CW]

"dir" Direction - the direction of rotation of the motor



(25 -80) by default 50 [V]

"L-U" Low Voltage - the lower range of the measured voltage



(120 - 250) by default 180 [V]

"H-U" High Voltage - the upper range of the measured voltage



(80 - 120) by default 100 [%]

"CAL" Calibration - calibration / scaling of the measurement result

Additional information can be found at <http://proma-elektronika.com>