

Operation Manual



A new generation height controller of plasma torch

Model : Compact THC Controller SD

(Step / Dir PID generator)

Notes on safety

WHEN THE DEVICE IS IN OPERATION, VOLTAGE HAZARDOUS TO HEALTH AND HUMAN LIFE IS PRESENT INSIDE THE HOUSING AND AT THE CONNECTION TERMINALS

The device should be connected only by a qualified and authorized person. Improper connection can cause serious injury or death. Prior to installation and operating, carefully read the entire installation and maintenance manual and be absolutely sure, you fully understand and are able to make the sole decision to determine if you are capable of a safe and proper installation. Remember that, inside the device and at the connection terminals, voltage hazardous to health and life may be present.

The following actions, although not all inclusive, should be strictly adhered to:

Installation of this product by an unqualified individual should not be done.
No physical contact with any electrical connections while under power.
Do not operate this product with wet hands, wet gloves, or any wet clothing.
Before turning the unit on, secure the safety of others, and read and understand all instructions. If you have any questions or concerns, do not continue.

Warning: Provide adequate protection for all risks associated with plasma cutting.

For more detailed information of the risk associated with plasma cutting, refer to your plasma cutter's owner manual.

Touching non-insulated and non-grounded elements can be fatal. Provide a safe place for your device. After assembly, secure protection of contact terminals from operator's touch.

It is strictly prohibited to perform any repairs or modifications to this product! - Performing either one of these actions could lead to serious injury or death to yourself and/or others.

Terms of Use: By proceeding with installation and use of this product, you fully understand and agree Proma-Elektronika nor their distributors, are not liable for any incident or event resulting in direct loss, indirect loss, injury to self or others, damage to property, or loss or damage of any kind. End user assumes all risks. If you do not agree to these terms in its entirety, proceed no further, and return this product for a full refund.

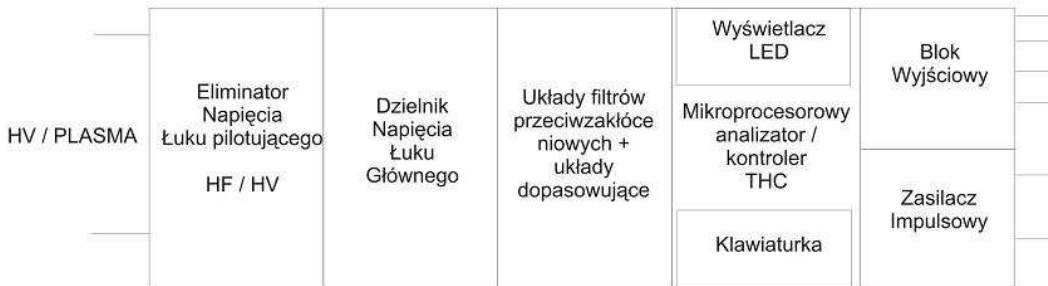
If you have any questions or are unsure about anything stated in this manual problem, immediately contact a Proma-Elektronika dealer or service centre for assistance.

Device Information

A new generation height controller of plasma torch is based on the popular Compact THC 150 model, in which relay outputs were replaced by inputs / outputs STEP DIR. These inputs / outputs generate corrective signals step/dir proportionally to the slope of the material after the detection of a cutting arc so that the cutting quality is maintained at a very high level. The connection method of a controller “beyond the software” allows you to use it with the software without the THC function.

Intended for use with any control system that uses STEP/DIR signals to control the Z axis.

Simplified Block diagram:



Pilot Arc Voltage Neutraliser - protection system, which is responsible for removing spikes in the AC electrical flow, which can be caused by a plasma source with contact-less arc striking (HV/HF pilot arc) generating a high voltage or from surges coming from plasma cutters equipped with contact arc striking system.

Main Arc Voltage Divider – While in operation, the cutter generates dangerous voltage levels, unsafe for precision electronics. A voltage divider system is incorporated to reduce this voltage to a safe level.

A quick acting filter system removes any interference that may pass through a voltage divider.

Filtered and scaled voltage values derived from the plasma cutter's “raw arc voltage” are then sent to the brain of the device. The "brain" consists of a programmed microprocessor, which in addition to the analysis of the cutting voltage parameters and proper output blocks controlling, also supports the LED display and function keys.

A built-in switching power supply ensures compatibility in a wide range of power supply voltages without the need for heat sinking. The power supply connection is optically isolated from the rest of the system which allows you to use to share power from existing systems providing they output the recommended voltage.

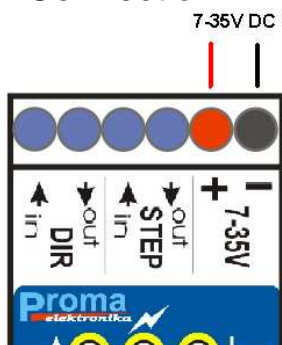
The last block is an output system, which transmits signals to the stepper motor controller.

The main parameters of the device:

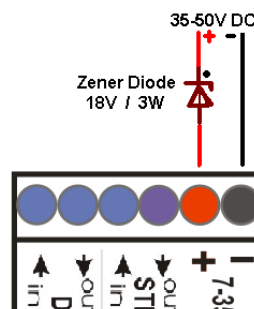
Parameter name	Acceptable	TEST*
Supply voltage (V)	7 – 35V DC	36VDC*
Maximum input current	120mA	-
Maximum direct input voltage	300VDC	1000V DC*
Maximum input voltage of 1:50 divider	10VDC	60V DC*
Ability to eliminate HV/HF ionizing voltage	0.3kVAC	30kV AC*
Ability to eliminate HV/HF ionizing frequency	>100kHz	75kHz
Duty cycle (%)	100%	-
Duty Cycle of HV/HF elimination (%)	100%	-
Capacity of relays	50mA / 60V DC	-
STEP / DIR Inputs and Outputs	TTL 5V	-
The frequency of a transmitted signal	100 kHz	-
The frequency of the generated correction signal	0-5 kHz	-
Degree of protection	IP20	-
Weight (g)	130g	-
External Dimensions (L * W * H) [mm]	33*89*65	-
Mounting	DIN35 rail	-

* Tested in the laboratory.

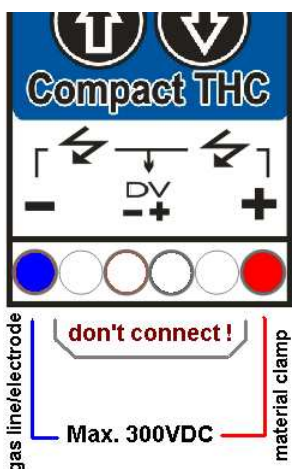
Power Connection:



Optional power supply 35-50V:



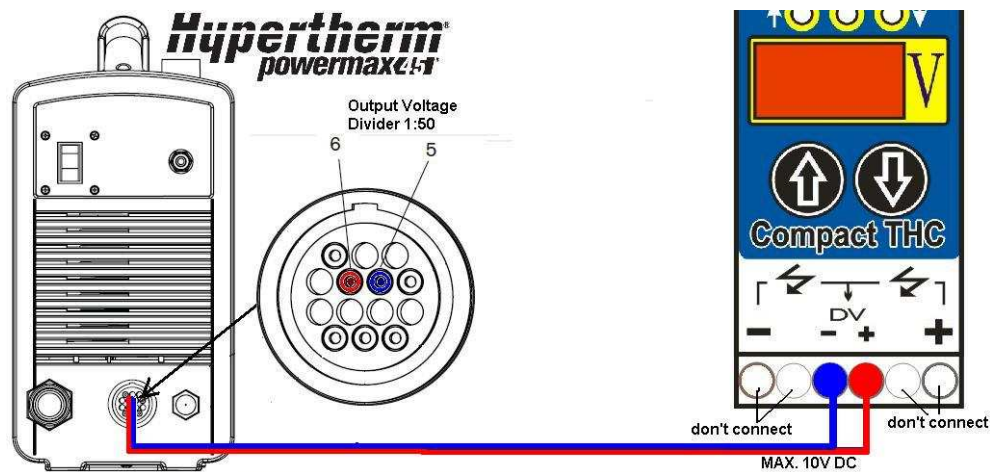
For lower **limit** switches of the device, one can lead full output voltage of plasma source. In this connection **do not connect anything to the other input terminals of the controller.**



When connecting directly, use the shortest possible cables for connecting the plasma source with THC controller - it is recommended the THC controller to be located directly at the plasma source.

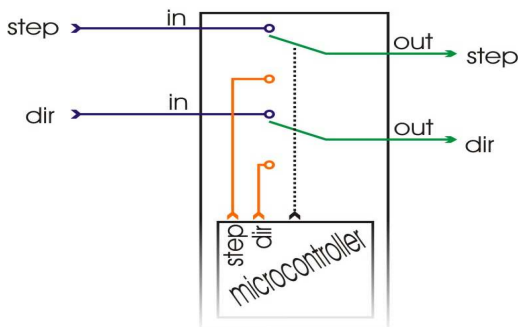
While being a universal THC, accepting full raw arc voltage for most any plasma cutter on the market, an exciting new standard feature of this unit is the addition of a 1:50 divider for an extremely fast, simple installation on most major brands. There will most likely be a direct connection for this on the outside of the plasma cutter's unit. Please refer to your plasma cutter owner's manual.

An example of how to connect the THC controller's measurement input with the output of the very popular Hypertherm Powermax45[®] - The THC comes standard equipped with a low voltage output of **1:50 divider**. This ratio is the most commonly used division in most major brands and there will most likely be a plug for this connection on the outside of the cutter's unit.

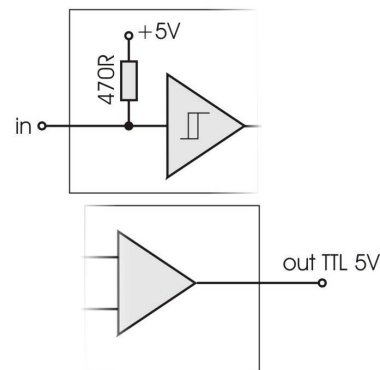


Inputs and Outputs:

Simply diagram:



Step/Dir In/out schematic



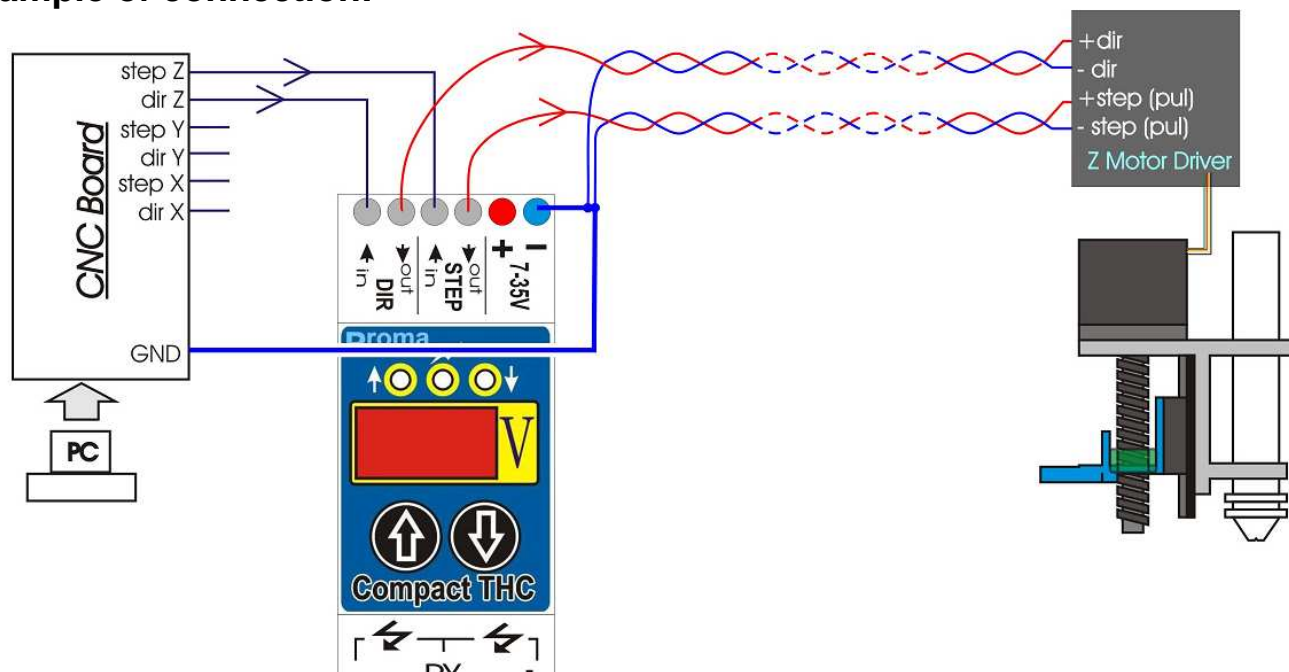
DIR in – an input of the DIR control signal for the “Z” axis from the CNC system – the signal is transmitted to the DIR output when it is not detected by the THC cutting act.

DIR out – an output of the “Z” DIR control signal – the signal is transmitted from the DIR input when it is not detected by the THC cutting arc, control over the output is taken over by the THC at the time of detection of the main arc after the d-t breakdown (signal from the DIR input is disconnected in this situation).

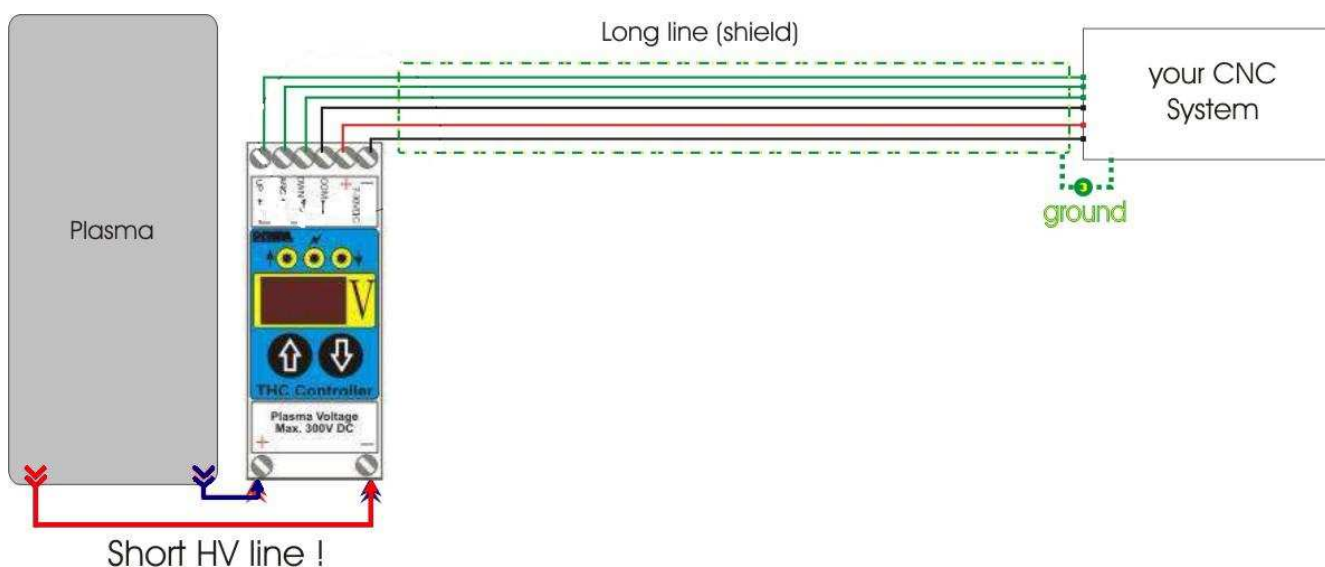
STEP in – an input of the STEP control signal for the “Z” axis from the CNC system – the signal is transmitted to the STEP output when it is not detected by the THC cutting arc.

STEP out - an input of the “Z” STEP control signal – the signal is transmitted from the STEP input when it is not detected by the THC cutting arc, control over the output is taken over by the THC (THC generates the clock signal) at the moment of the main arc’s detection after the d-t breakdown time (signal from the STEP input is disconnected in this situation).

Example of connection:



To reduce the possibility of the short-circuit entering the CNC system, the connection should be made with a shielded cable - the shielding must be connected to grounding on the CNC system side. Do not connect the shielding to the THC controller side.



Start-up and operation:

The device is pre-configured at the factory and after the correct connections are made, it immediately works properly with most plasma devices. After switching power on, the THC controller's display shows an "animated" "thc" message, and then a flashing voltage value is presented for 1 second; the device is undergoing automatic calibration at this moment.



When the device is ready for operation it displays "- - -" which means, that there is no input voltage.

In this state, by depressing both the up/down keys, simultaneously and holding for a few seconds, the voltage setpoints can be modified and thus set the torch's height above the material. Press shortly once to display the set value without modification.

To determine other parameters simultaneously hold both keys until you see the desired parameter on the display - when you release the keys, its value will be displayed - using the up/down keys to set the desired value:



„SPE” (SPEED) – Parameter responsible for the clock frequency what translates into a movement speed of the Z axis during when cutting.



"d - t" (delay time) - delay time of output closed despite no supply voltage, when the system detects the main (cutting) arc 0.1 - 9.9s factory setting: 0.5s



"H - U" (High Voltage) - value of the off load voltage detection in the plasma cutter - used to detect the main (cutting) arc: 50-300V by default: 200V



"tSt" (Test) - Simulation of the controller's work - the system simulates the appearance of "floating" voltage within the selected value - causes the activation of inputs for easy system testing without switching the cutter on.



„dir” (direction) - Selection of the DIR control signal's polarization – it is responsible for reversing the direction of movement of the Z axis when cutting (the direction should be consistent with LEDs).

When the plasma cutter is switching on, the display presents the measured voltage value and LED diodes present the current status of outputs. Fast blinking of the measured value indicates the detection of pilot arc; continuous display indicates the detection of the main (cutting) arc.

All parameters can be modified during operation; these changes are reflected in real time in the control of output signals.