User’s guide

Torch height controller.

Model : THC Controller

CE

SAFETY

WHILE OPERATING THE DEVICE HAS INSIDE ITS CASING AND ON ITS CONNECTORS HIGH VOLTAGE WHICH IS DANGEROUS FOR HUMAN LIFE AND HEALTH.

Remember that inside the device and on its connectors can appear voltage dangerous for health and life. It is highly forbidden: to plug in the device by unauthorized person, touching connectors of working device, operating device by unqualified staff, using device with wet hands, gloves/clothes. Before you turn on the device, ensure the safety of other people and read this instruction with full understanding. Warning: Ensure proper precautions to protect you from any kind of risk, which can occur during plasma cutting process. In order to get the detailed information refer to a manual. The touch of not insulated and not grounded elements can cause death. Do not touch live elements. Ensure the proper insulation between the operator and a processed item. Ensure safe place for the device. After installation, ensure protection of connectors from the touch of the operator.

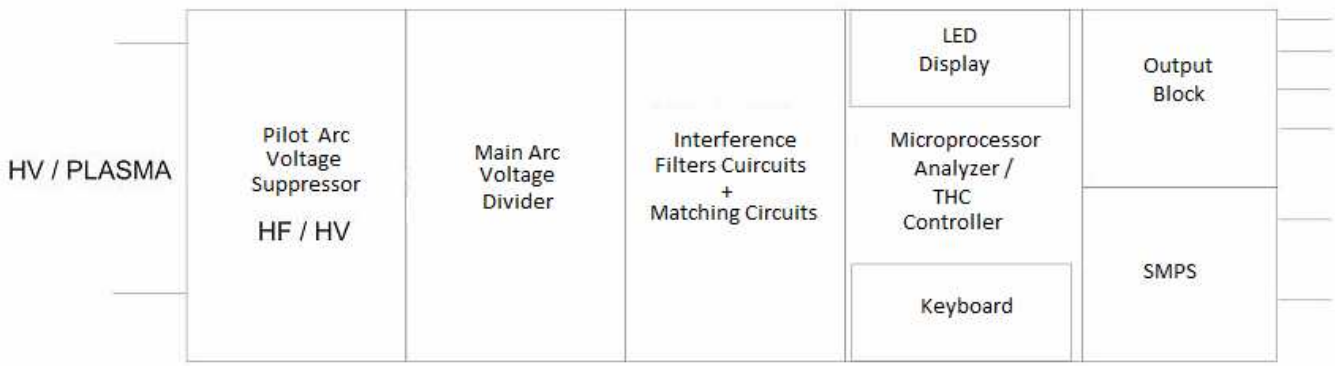
Do not disassemble, repair and make any modifications to the device – this can result in death or serious injury of people who install and use the device.

In case of any problems ask qualified person for help or contact a supplier or the service center of Proma-Elektronika to get help.

Information about the device

The device is a modern analog - digital controller of height of a plasma torch over a cut material. It is based on analysis of change of voltage generated by a source of plasma. Thanks to having a readable LED display and a key-pad, operating is extremely easy and doesn't need any additional measure equipment. It consists of patented solutions made from the highest-class elements. This guarantees safe, comfort and reliable long-life work.

Simplified block diagram:



Pilot Arc Voltage Suppressor - filters off spikes of AC which are dangerous for electronic equipment. These spikes can come from the source of plasma circuits in the pilot arc type plasma cutters generating high voltage or the spikes can come from overvoltages in the HF contact plasma cutters.

Main Arc Voltage Divider – while operating plasma cutter creates dangerous for electric elements voltage, which is reduced in divider circuit to safe level.

Filter Circuits - are fast filters filtering off noise, which can get across voltage divider.

Microprocessor's block - gets filtered and graduated voltage of the main cutting arc. It is the most important block of the device. Its "brain" is a programmed microprocessor, which beyond analyzing cutting voltage parameters and proper controlling output block, operates also LED display and keyboard.

Built-in SMPS ensures work in wide range of supplying voltages without need of carrying away heat from device's elements. SMPS's block is galvanically separated from the rest of the circuit, which allows getting the power supply from existing circuits.

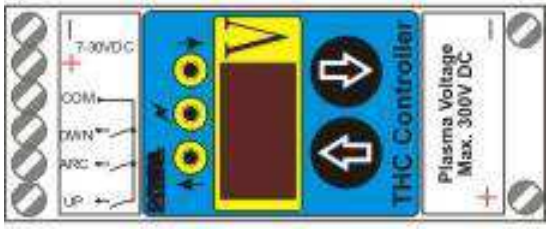
The last block is relay output circuitry connected to drivers/inputs of the computer responsible for e.g. Z-axis motor control of CNC plasma cutter.

Specification*:*

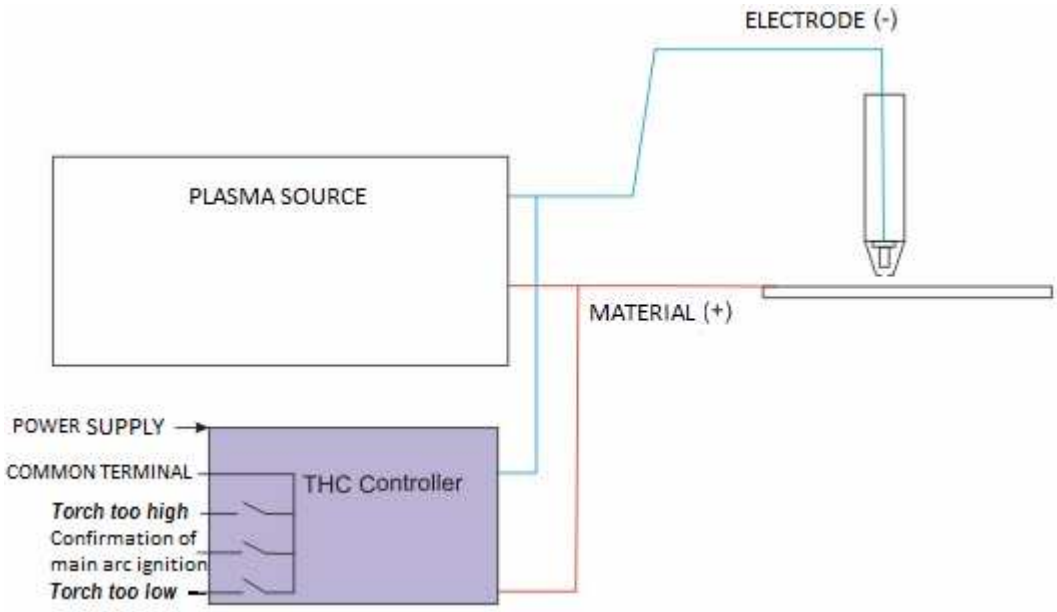
Supply voltage (V)	4,5 – 35V DC
Maximum supply current	120mA
Maximum input voltage	300V DC
Ability of HV/HF ionization voltage suppressing	20kV
Ability of HV/HF ionization frequency suppressing	>10kHz
Duty cycle (%)	100%
Duty cycle of HV / HF suppression (%)	100%
Rated load	1,25A / 60V DC
Relay reliability (minimum amount of cycles) under load of 5V / 10mA	500 * 10^6 cykli
Degree of protection of enclosure IP	IP20
Weight (g)	180g
Dimensions (width*length*height)	33*89*65
Mounting	DIN 35 rail

Connection method:

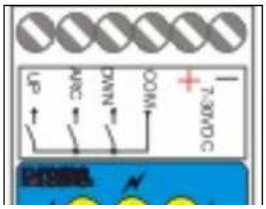
Configuration of connectors/terminals:



To input / measuring connectors marked on the casing as „Plasma Voltage" connect output voltage from plasma source. The minimal level of the wires' insulation has to fit to the maximal voltage occurring on the output connectors of plasma generator – check the manual of your plasma source. By *output voltage of plasma source* one mean voltage occurring during the process of cutting between cut material and ELECTRODE of plasma torch. Pay attention to proper polarity of connected voltage – <u>reverse connection will not cause damage of circuit</u> but the device will not work.



Power supply of the thc controller has to be connected to supply terminals. Obey polarity +/-.



Description of control outputs:

COM terminal is common terminal for output relays. It is joined to contacts of inner relays according to the scheme on the casing (figure above).

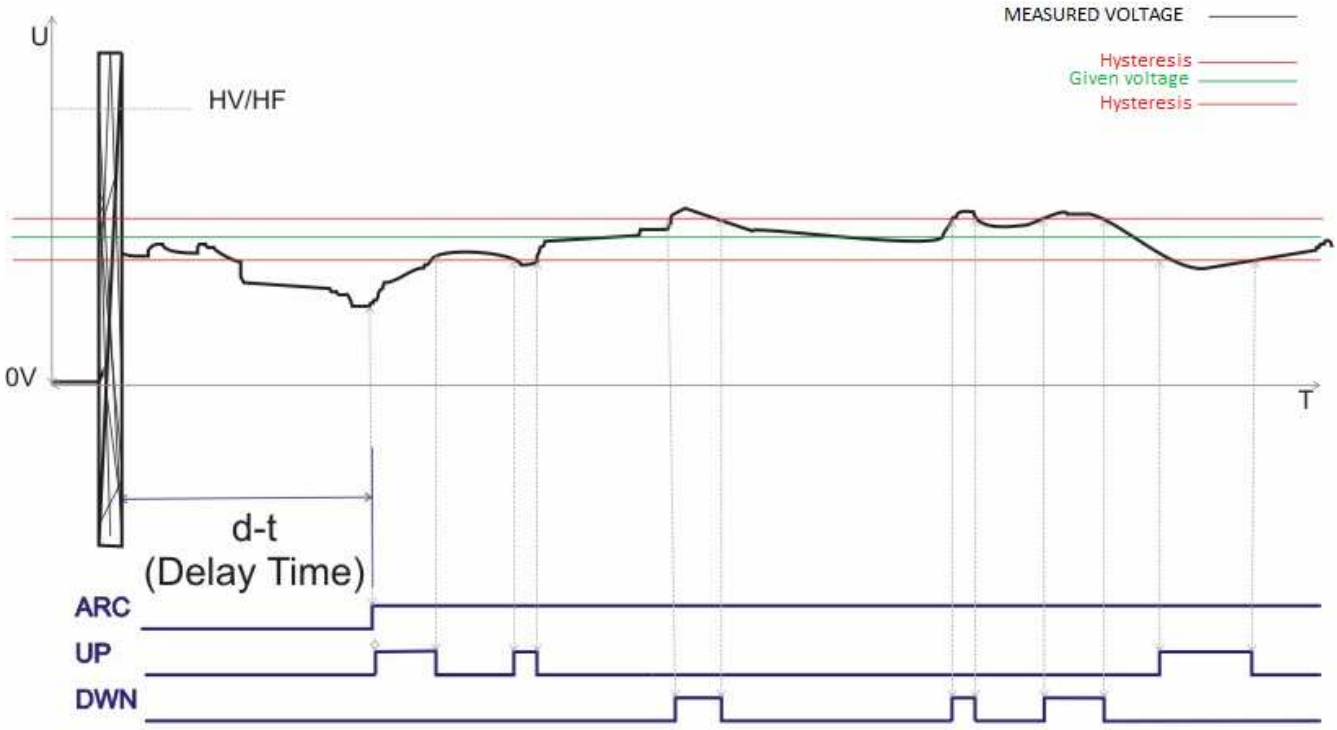
ARC terminal is connected to NO contact of inner relay, which is turned on after detection of main/cutting arc ignition.

UP terminal is connected to NO contact of inner relay (“up” signal), which is turned on when the measured voltage is lower than given voltage reduced by half of hysteresis voltage.

DWN terminal is connected to NO contact of inner relay (“down” signal) which is turned on when measured voltage is higher than given voltage increased by half of hysteresis voltage.

ATTENTION: None output relays are turned on when the pilot arc is only detected and when the main arc will be interrupted.

ALGORITHM OF WORKING



Starting and operation:

The device is initially configured by manufacturer and after proper connection is ready to work with most of the plasma devices.

When you switch on the THC controller, the display shows animated inscription: “thc” and one should see for 1 second the blinking value of given voltage, during this moment the device is being automatically calibrated.

The device ready to work shows „---” on the display, which means that there is no voltage on the input of the device.

In that state with up (arrow directed upwards) and down (arrow directed downwards) buttons one can adjust given voltage and thus given height of the troche over the material (distance between troche and cut material). One time short press of the button cause display of a given value without its modification.

In order to set other parameters press two buttons simultaneously up to the moment you see the needed parameter. After releasing the buttons the value of the needed parameter will be displayed – use the up/down buttons to set the wanted value:

“HYS” (Hysteresis)- voltage of hysteresis – this is the span of measured voltage inside which the UP / DOWN (2-100V) signals are not issued.

„d - t” (Delay Time) – time of delay of setting the outputs after main (cutting) arc is being detected and ranges 0,1-9,9s.

„H - U” (High Voltage (U))- quantity which determines the value of detection no-load voltage of plasma cutter – it serves to detect the main(cutting) arc interruption ranges 50-250V

„tSt” (Test) – work simulation of the controller – system simulates the occurence of floating voltage between given values – that sets the inputs which allows to test easily following automatic devices without the need of turning on the plasma torch.

While starting the plasma torch display shows measured voltage and LED diodes show current state of control outputs. Fast blinking of measured value indicates pilot arc detection; constant display of measured value indicates main (cutting) arc detection.

All parameters one can modify while working, these modifications influence continuously (online) the output signals and set these signals.