AQTRONIC

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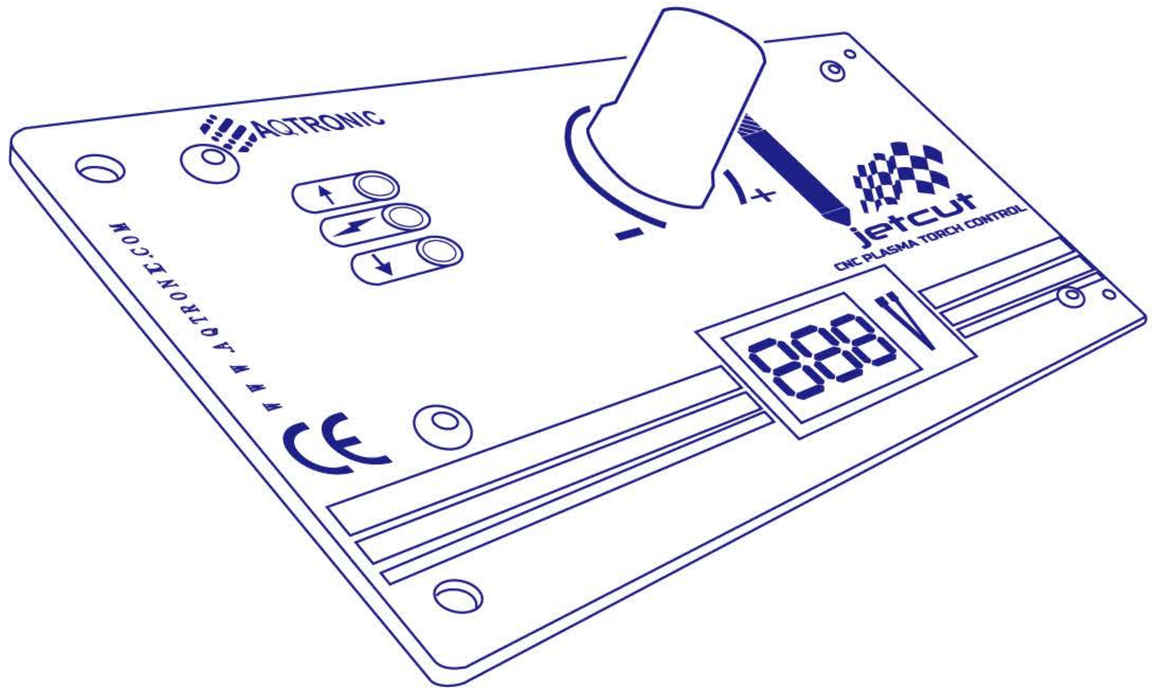
jetcut

PROFESSIONAL TORCH HEIGHT CONTROL



WWW.AQTRONIC.COM

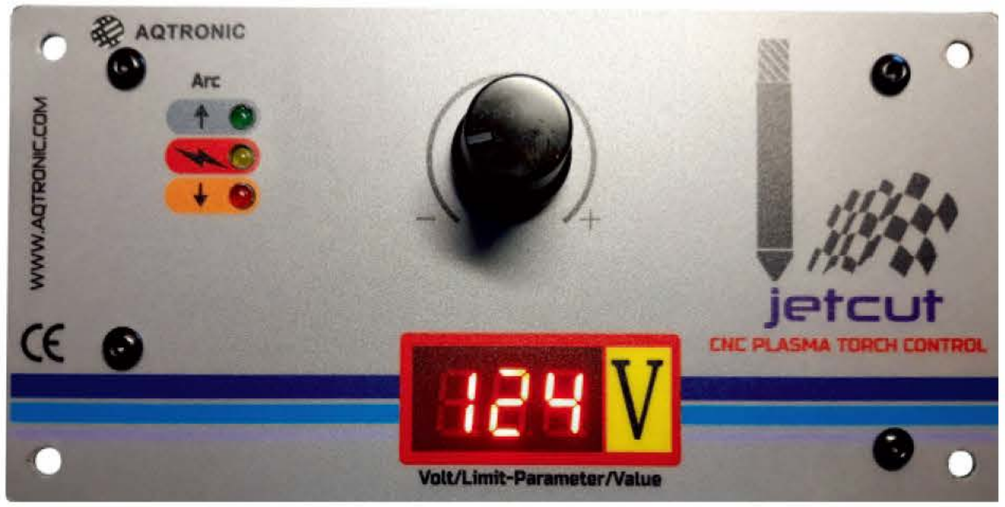
AQTRONIC
Kymi Evia 34003
(TEL) +30 210 300 8002

Made in Hellas

OPERATION MANUAL

jetcut

PROFESSIONAL TORCH CONTROL



Supply voltage (V)	24VDC
Plasma volatge input	0-600VDC
Plasma voltage threshold	40VDC
Inputs/outputs	opto-isolated open collector NPN
Plasma IV	opto-isolated
Supported plasma ratio	1:1 - 1:50
Display	3 bit 7 Segments
Weight	200g
Dimensions L*W*H (mm)	140*70*50

Jetcut Torch Height Control created for professional use under industrial environment conditions .
We focused on flawless operation as well as safety.
The Plasma voltage line either 1:1 or 1:50 are absolutely opto-isolation from other electronics devices such breakout board, computer or other sensitive equipment.
The operation algorithm offer a smooth action with extremely fast response that makes metal cutting a joyful task.

If you have any questions critical to the connectivity and operation of the device, do not hesitate to contact us in a timely manner.

email: info@aqtronic.com
Phone: +30 210 300 8002
WhatsApp: +30 6976119292

-Safety P-recautions

Enviroment cannot contain any explosive gas.
It must be wired by professional wiring staff.
Otherwise, it may cause electronic shock.
Cut off the power supply before wiring. Otherwise, it may cause electronic shock.
Do not touch any control port, internal boards and their electronic componets while the electricity is turned on.
Otherwise, it may cause electronic shock.

-Device information

The unit is a modern analogue - microprocessor plasma torch height controller that operates by analyzing voltage changes in the plasma source due to variations in height between the torch tip and the material being cut.
The microprocessor makes determinations to raise or lower the torch based off of the strength of the voltage signal being read.
It is equipped with an easy to read LED display and two user friendly keys making operation simple and does not require any additional measuring instruments. The device has patented solutions made with the highest quality components to ensure a safe, durable, and reliable long-term operation.

Start-up:

The device is pre-configured at the factory and after the correct connections are made, it immediately works properly.
After switching power on, the display shows an “animated” “Aqtronic”message, and then shows for a moment the **operation voltage** (**OV**) value.
When the device is ready for operation
it displays “- - - “ which means it is waiting to analyze the **incoming voltage** (**IV**) and (**OV**) providing torch height control.
User can be set the torch height during a cut by adjust the **OV** by rotate the digital knob.
When **IV** is lower than **OV** the up signal is activated, when **IV** is higher than **OV** the down signal is activated.
When **IV** equals **OV** the up and down signals are de-activated.

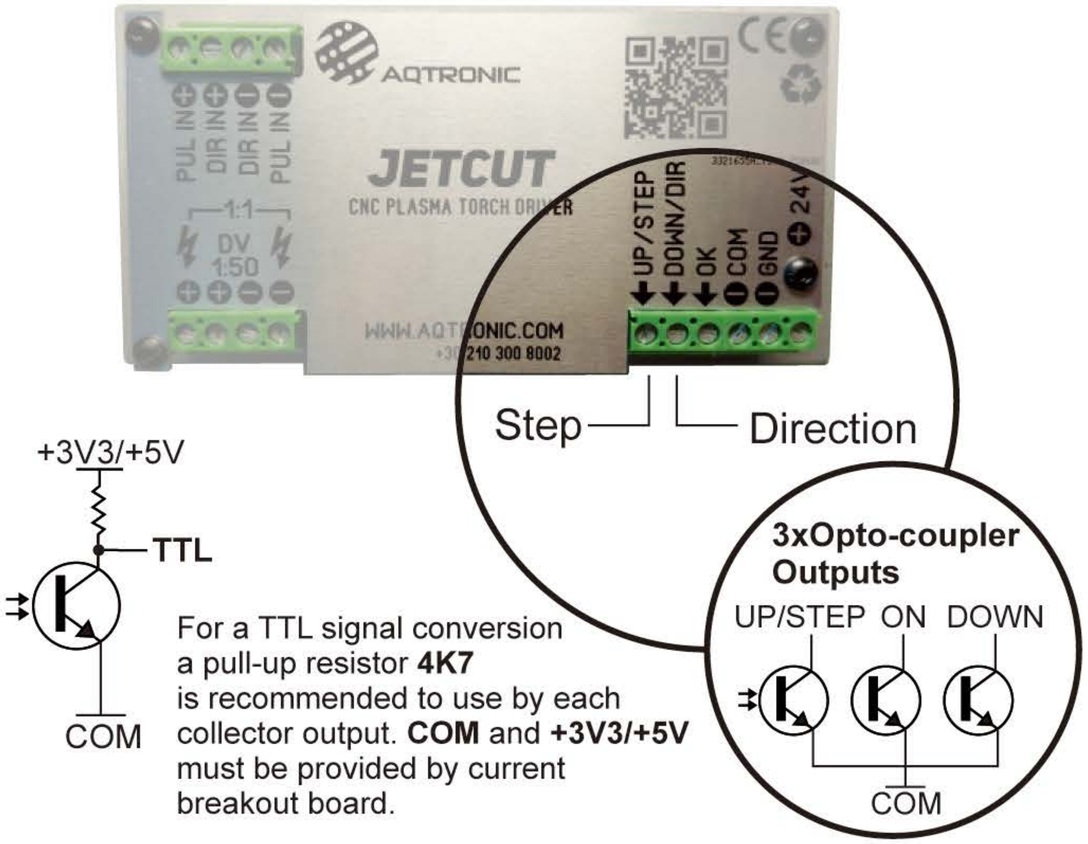
To specify other parameters,press the digital knob.
A cycle menu is available by rotate the digital knob such OSC (oscillation)>HYS (hysteresis) DLY (delay) CAL (calibration) LCU (low cut) HCU (high cut) TST (test) ESC (escape).

-Settings

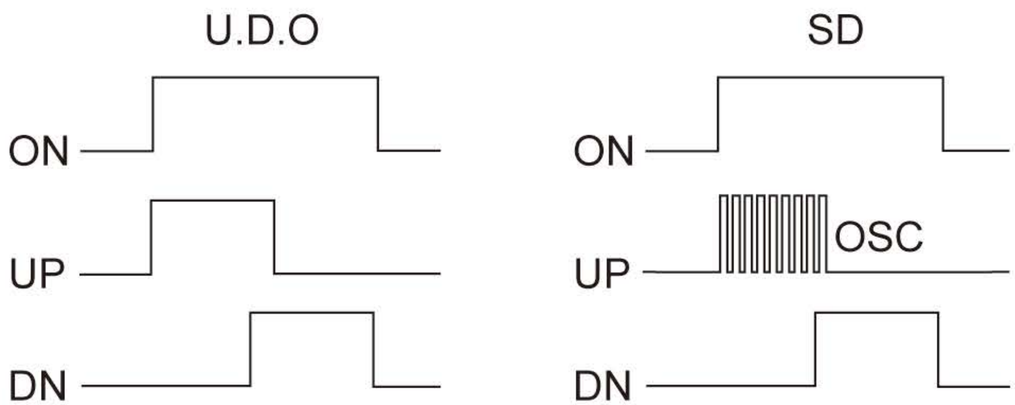
"**OSC**" (Oscillation)
When the SD mode is selected the UP/DOWN outputs are switching in to a Pulse/Direction interface for Servo or Stepper motor communication. Specifically the UP output switch in to a Pulse output and the DOWN output switch in to a Direction output.
The OSC value determines to the pulse frequency and consequently the speed of the current motor.
Please note, in UDO mode the OSC value should not be greater than zero.

"**HYS**" (Hysteresis)
The contain of this parameter lengthens the **OV** value both positive and negative. For example, if OV value was set at 120V with a hysteresis value at 2V then OV value automatically determined with the following values 118V,119V,120V,121V,122V. That means with IV from 118V to 122V any height control is ignored, therefore no movement on the Z-axis.
Although the analysis becomes less accurate when hysteresis defined greater to zero, this offers more stability to the torch by ignoring any micro changes in IV.

-Outputs Interface



-Control Interfce



“**DLY**” (Delay time)
During ignition the IV becomes undefined, most of times is higher than usual. For this reason any height control it should be good to ignored. Delay can be modified depending on the thickness of the cutting piece. Usually thin pieces requires less delay time.

“**LCU**” (Low Cut)
On some commercial Plasma Cutters has been observed a permanent low voltage (0-60V) on the Plasma line after power on. JetCut ignore any IV before ignition and therefore any height control using this parameter.

“**TST**” (Test function)
The user can confirm the correct operation of the product. When TST is enabled the UP and DOWN signals are activated sequentially. This function is accompanied by the sequential lighting of the LEDs UP and DOWN.

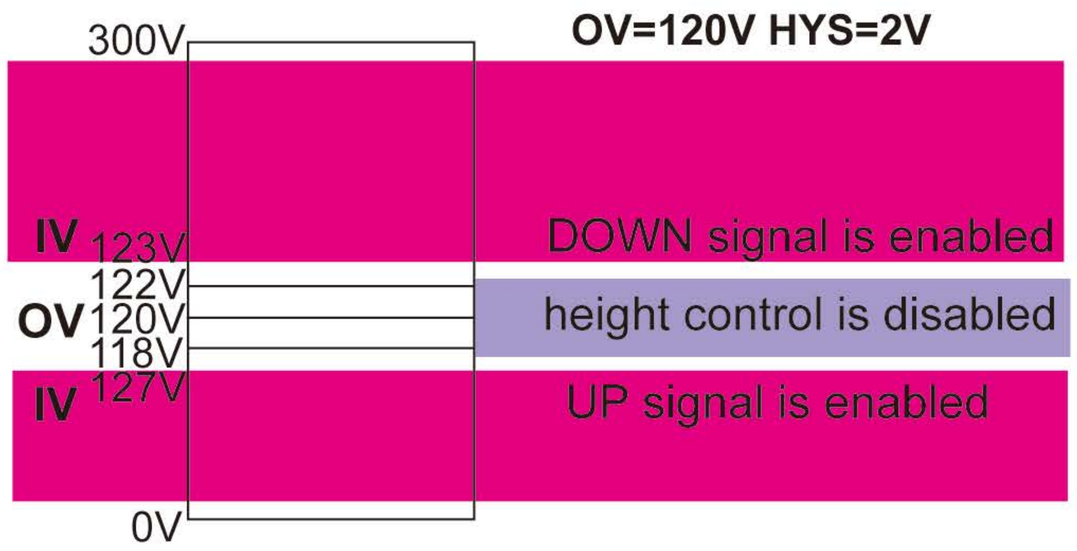
FACTORY DEFAULT SETTINGS

OSC.0 (U.D.O)
OSC.14 (SD)
HYS.1
DLY.1
CAL.0
HCU.40
ANT.80

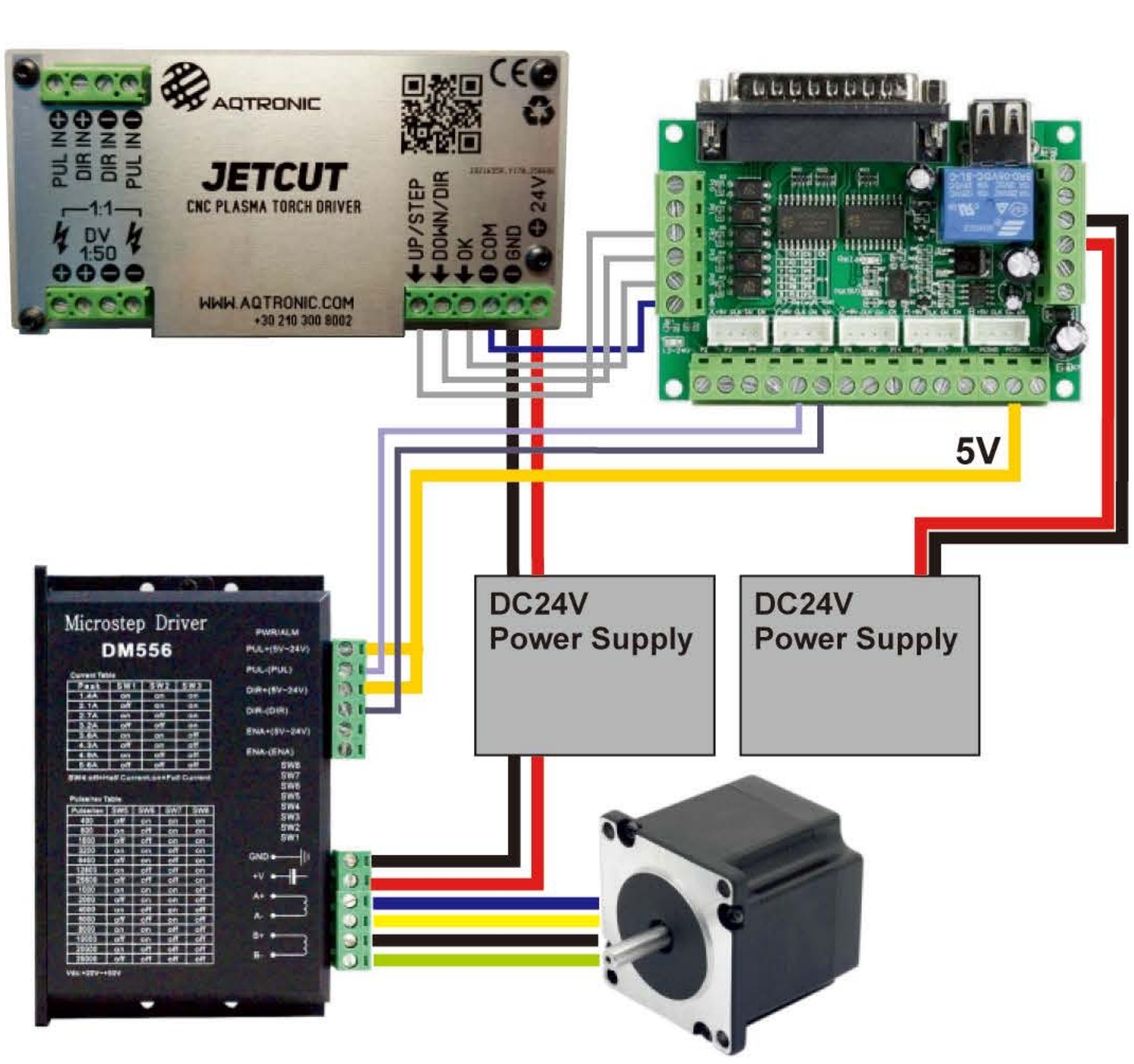
“**CAL**” (Calibration)
The IV can be measured with a common voltmeter. If there any deviation with JetCut display can be adjustment by modify the CAL value. Please note, this calibrating is used for aesthetic reasons only.

“**ANT**” (Anti-Dive)
When the arc is turned off, the IV becomes very high for a moment. This results in the torch immediately dive. When IV is over than Anti-dive value + OV value, any height control is disabled to avoid the step dive of the torch.

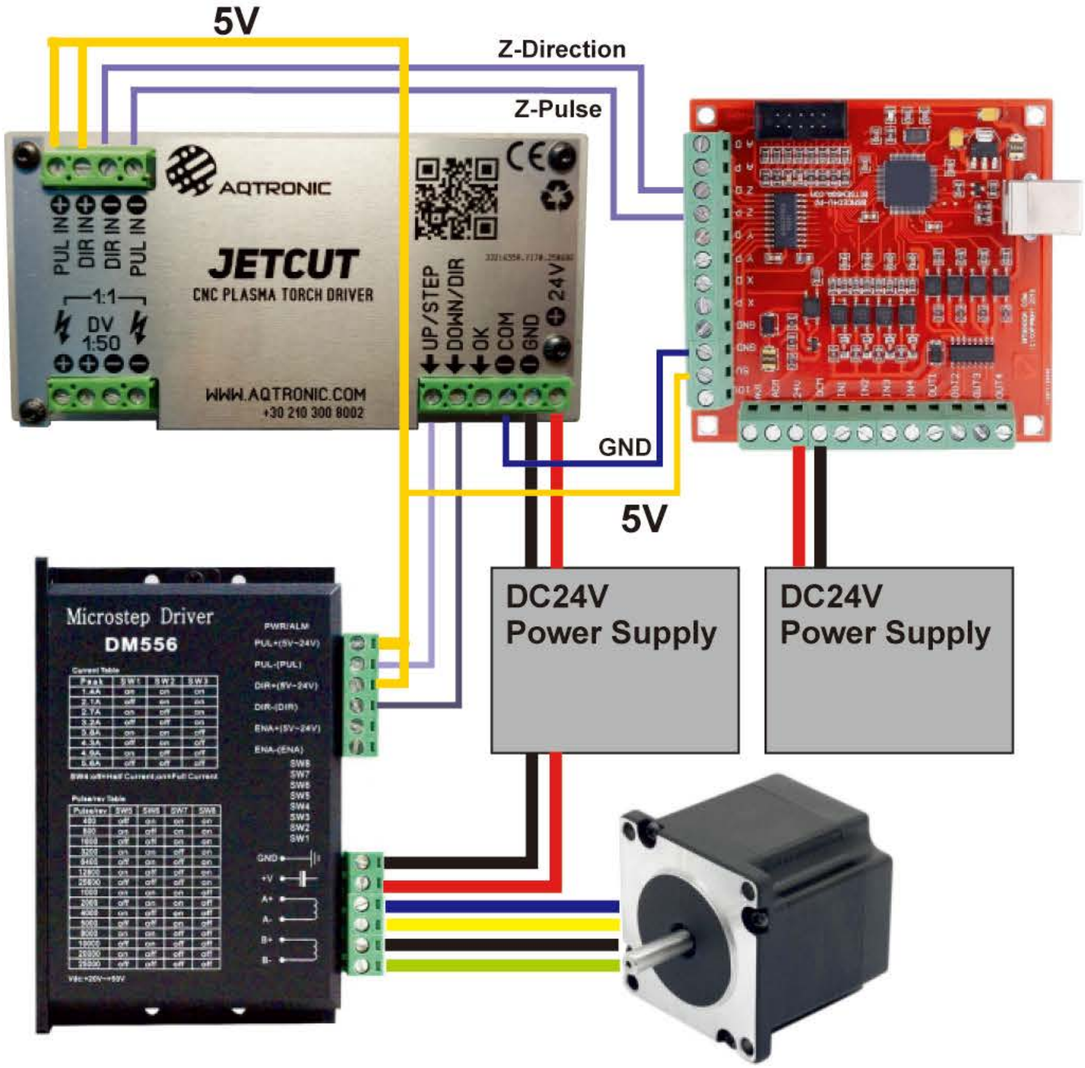
Hysteresis example



u.d.o wiring

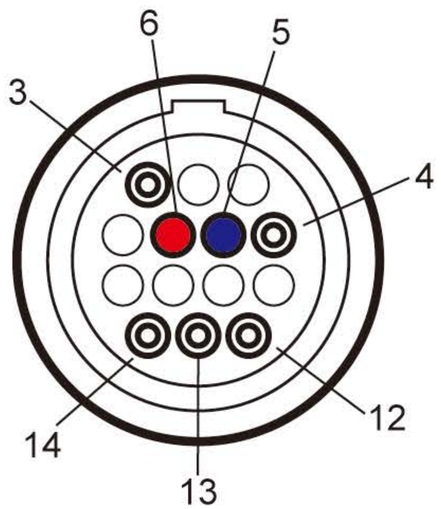


SD wiring



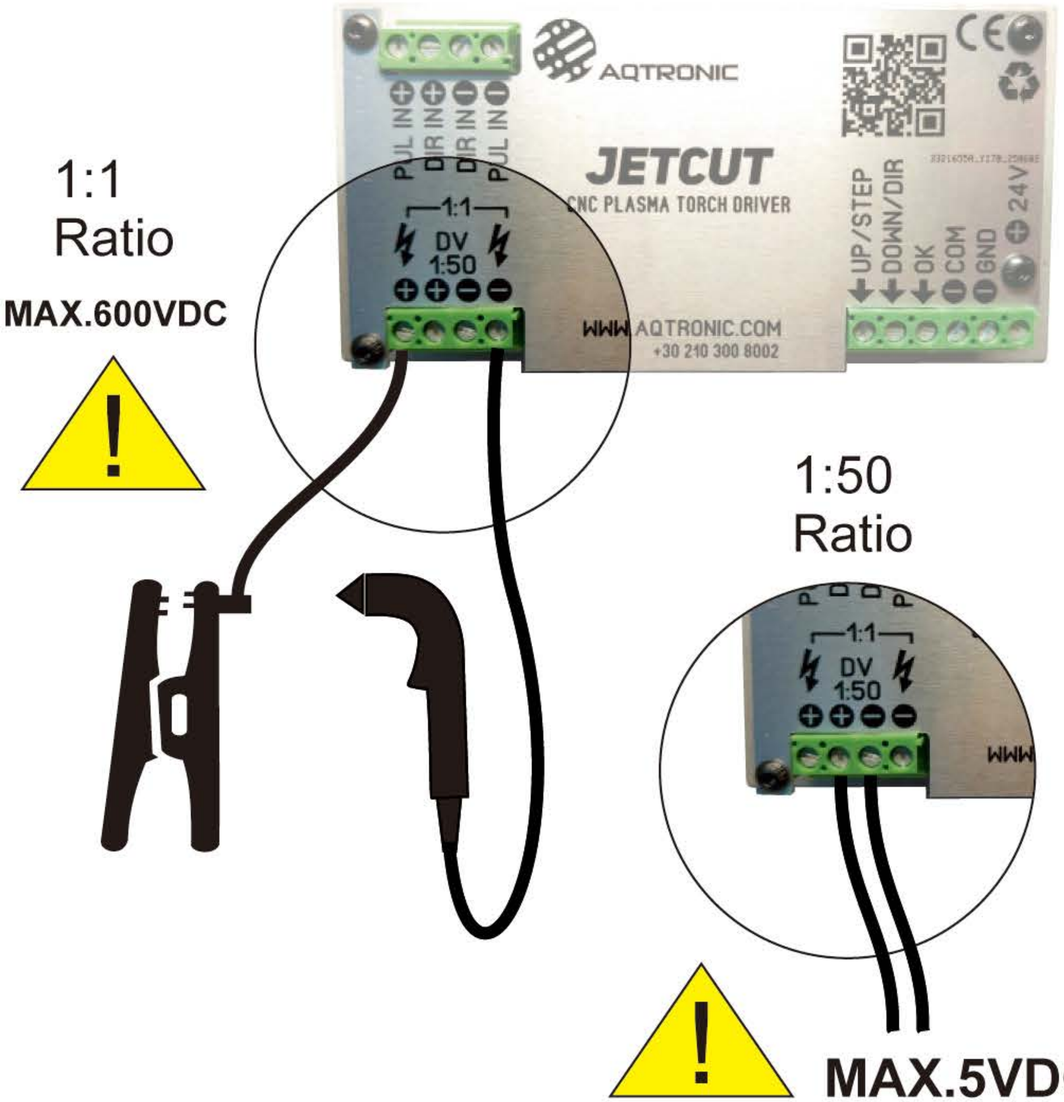
While being a universal THC, accepting full raw arc voltage for most any plasma cutter on the market, an exciting new standard feature of this unit is the addition of a 1:50 divider for an extremely fast, simple installation on most major brands. There will most likely be a direct connection for this 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 withthe output of the very popular Hypertherm Powermax45 ®- The THC comesstandard 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.

Hypertherm Powermax45
DV1:50 Connection



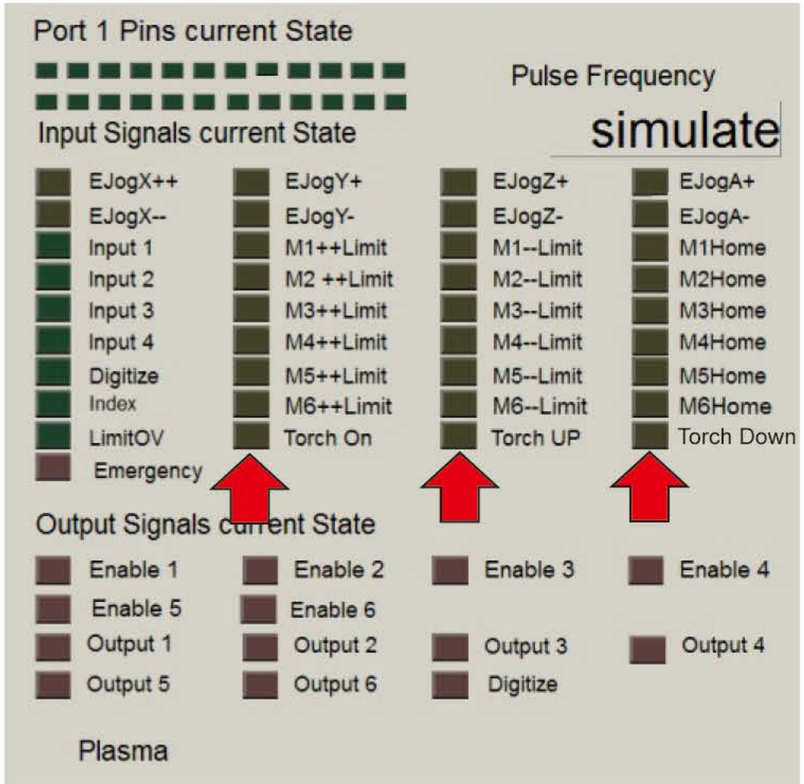
+DV=6
–DV=5

ATTENTION:When connecting directly 1:1, use the shortest possible cables for connecting the plasma source with THC controller - it is recommended the THC controllerto be located directly at the plasma source.



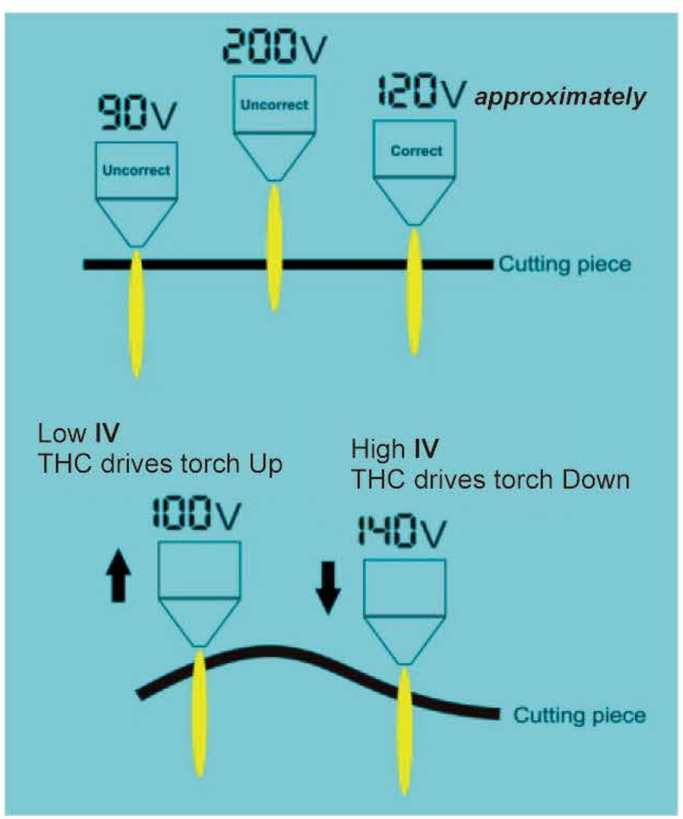
-Test and Operation

If the wiring successfully completed, refer to the device parameters/**test** function. A countdown timer appears on the screen. The up and down LEDs light up sequentially allowing confirmation of correct operation. The up and down output are sequentially activated as well.
In this mode the Z axis must be moves up when the up LED is light up or moves down when the down LED is light up. In the case Z axis works backwards in SD mode please swap the +A -A lines from Z axis stepper driver. When U.D.O mode is selected a confirmation of wiring is visible by Mach3 /Diagnostics page. The Torch On Torch UP, Torch Down indicators lights up when is activated from Jetcut.



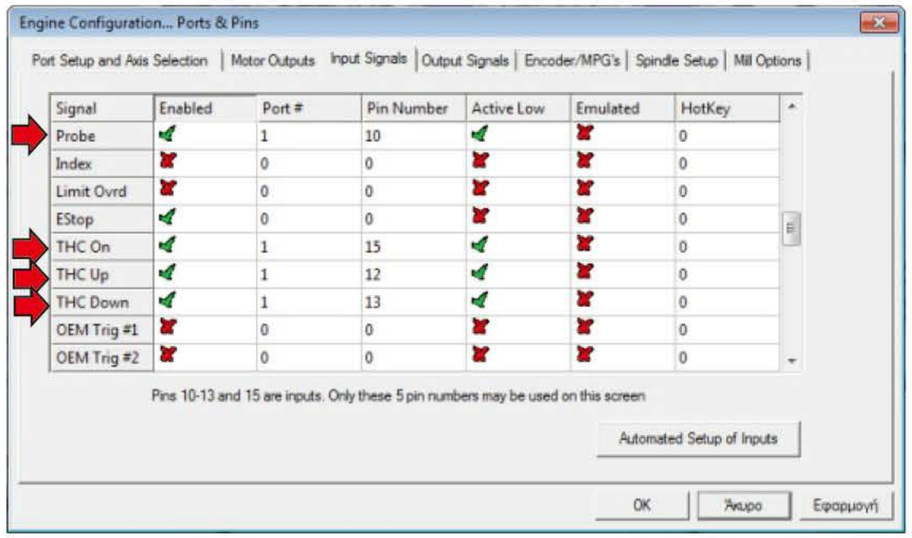
-OV setup

A straight line 30cm-40cm can be used for **OV** setup. Create a straight line on CAM/CAD software and opened on Mach3. Set pierce height at 4mm and run the machine. When the machine has traveled the first 5mm, the **IV** are ready to measure. In this point the Operator can setup the **OV** value according the **IV** value is visible on Jetcut display. **OV** can be set by rotate the digital knob during the cut. When the Z axis keeps a height of 4mm over the cutting piece, **OV** setup is done.
Parameters such Torch consumables, air pressure, amperage, Speed, material thickness may affect to the **IV.** Operator must always correction the **OV** after that changes.

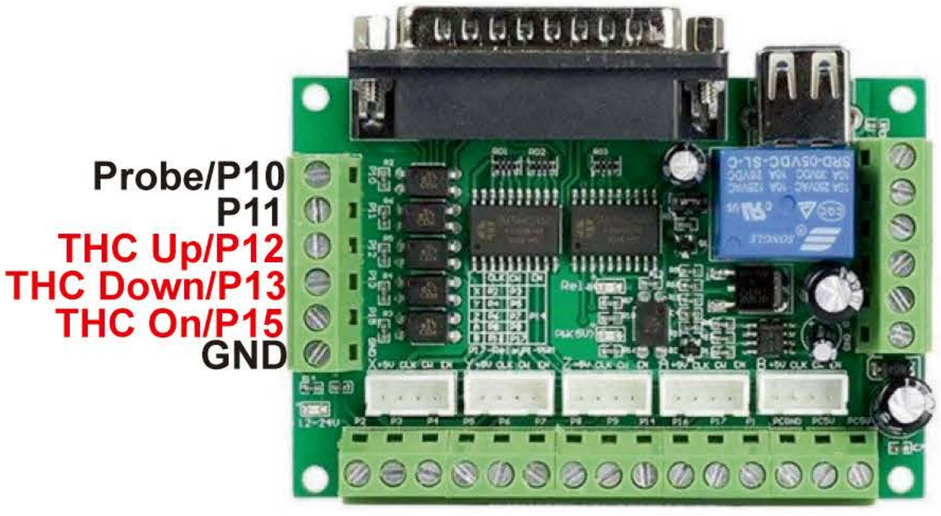


-Mach3 configuration

Setup Mach3 THC function.
Open Ports & Pins window by,
Mach3/Config/Ports & Pins/Inputs signals.
Enable inputs Probe,THC On,THC Up,THC Down
such image below is required.



***The layout input pins P10-P15 depends to your needs.**



Mach3 default THC Min/Max
Limits must be configured to the recommended values or greater,depends user needs.

Open Plsma.xml file by path:
My computer/C/Mach3/Plasma.XML
Open Plasma.XML file using a WordPad and modify THC Min/Max limit values such the image below.
Save the file after new values is entered (Ctrl + S)

<THC MAX>5. ➡ **<THC MAX>50.**

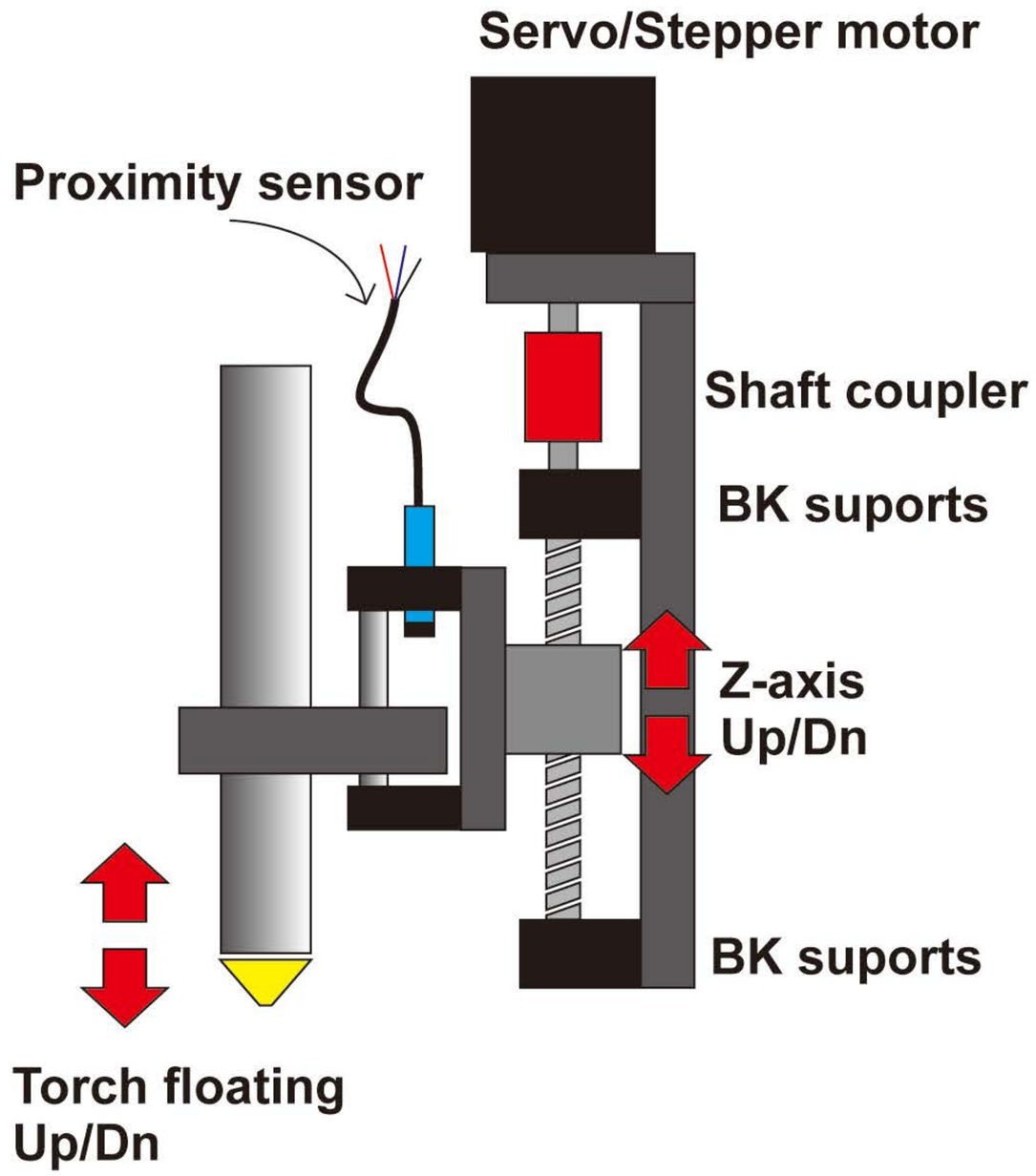
<THC MIN>-3. ➡ **<THC MIN>-50.**

Plasma.XML

```
<profile>
      <Preferences>
            <PulseSpeed>0</PulseSpeed>
            <Profile>Plasma</Profile>
            <BLState0>1</BLState0>
            <BLState1>0</BLState1>
            <BLState2>0</BLState2>
            <BLState3>0</BLState3>
            <BLState4>0</BLState4>
            <BLState5>0</BLState5>
            <JogMode>0</JogMode>
            <XStart>0</XStart>
            <YStart>0</YStart>
            <ZStart>0</ZStart>
            <AStart>0</AStart>
            <BStart>0</BStart>
            <CStart>0</CStart>
            <SpinInc>10</SpinInc>
            <BaudRate>9600</BaudRate>
            <ComPort>1</ComPort>
            <AutoTool>0</AutoTool>
            <FeedMode>0</FeedMode>
            <AAngular>0</AAngular>
            <BAngular>0</BAngular>
            <CAngular>0</CAngular>
            <BacklashOn>0</BacklashOn>
            <PathMode>2</PathMode><ThrottleFunc>2</ThrottleFunc>
<JoyOn>0</JoyOn>
            <PWMBase>5000</PWMBase><JogSpeed>100.</JogSpeed>
<m_SafeZ>0.</m_SafeZ>
            <JogInc>100.</JogInc><JogSlide>0.1</JogSlide>
            <THCMax>5.</THCMax><THCMin>-3.</THCMin><RadiusA>0.
</RadiusA>
            <RadiusB>0.</RadiusB><RadiusC>0.</RadiusC>
<LaserXGrid>0.</LaserXGrid>
            <LaserYGrid>0.</LaserYGrid><JogInc0>100.</JogInc0>
<JogInc1>10.</JogInc1>
            <JogInc2>1.</JogInc2><JogInc3>0.1</JogInc3><JogInc4>
100.</JogInc4>
            <JogInc5>10.</JogInc5><JogInc6>1.</JogInc6><JogInc7>
100.</JogInc7>
            <JogInc8>10.</JogInc8><JogInc9>1.</JogInc9>
<XRefHome>0</XRefHome>
```


-Floating Z axis

The simplest method to made a Probe sensor is the use of a Floating Z axis. A mechanical switch or Proximity sensor are easy installed in a Floating ballscrew Z axis design. See the image below.



-Probing

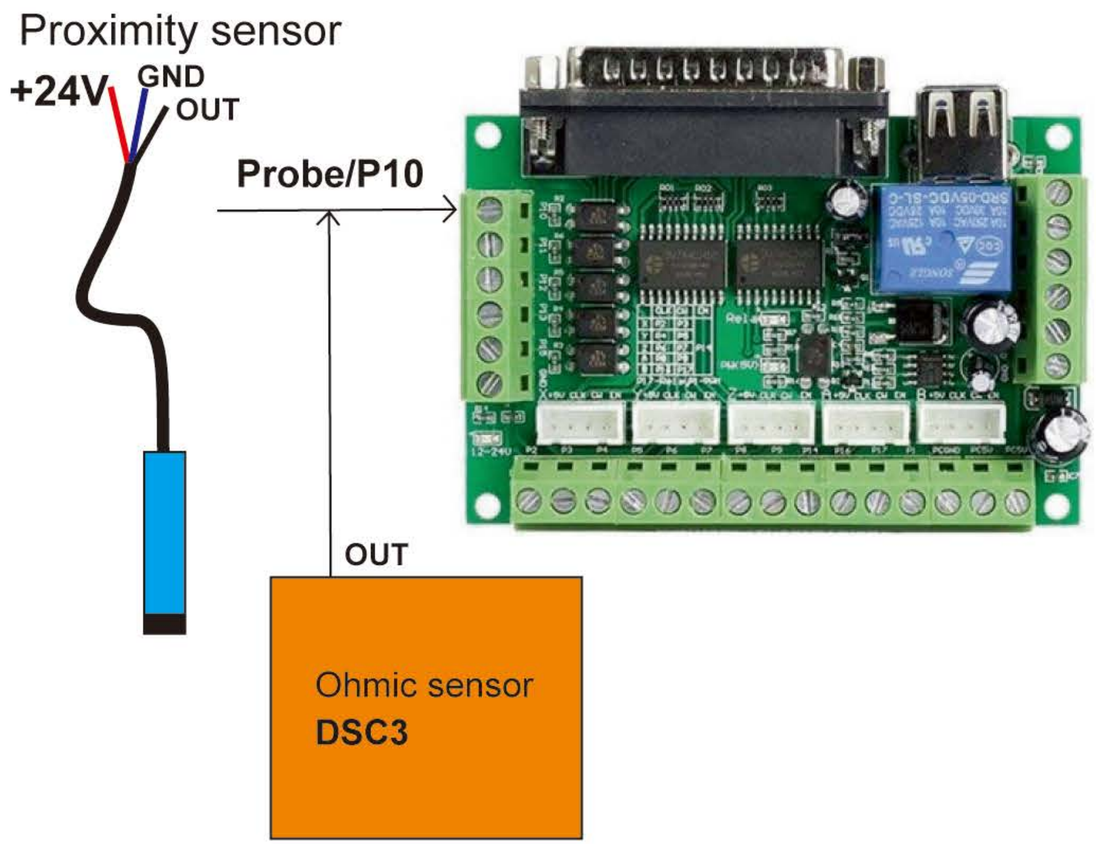
An important step in Plasma cutting works is the probe function. Due to the metal sheets height deviations is important of the use of Probe sequence before every arc ignition. Mach3 Z axis/pierce height is automatically updated after Probe sequence.

To enable Probe sequence, refer to your CAD software/Post processor. Recommended probing sequence over 50MM in the X,Y axis routing. Recommended Pierce height 4MM.

-Ohmic Probing

When thinner metal sheets it is to be cut, the traditional Floating method tends to fail. In this case an **Ohmic** probe solution is recommended. Ohmic probe can be placed parallel to the Floating probe without issues.
An Ohmic sensor has excellent performance and accuracy that makes easy cutting work with thin metal plates. The proximity output (NPN) of a Floating system can be share a common input of breakout board with an Ohmic sensor output (NPN).
*We recommended our Ohmic sensor **DSC3**
For more informations about DSC3 please refer to our official store.

Proximity sensor and Ohmic sensor shared P10 Probe input

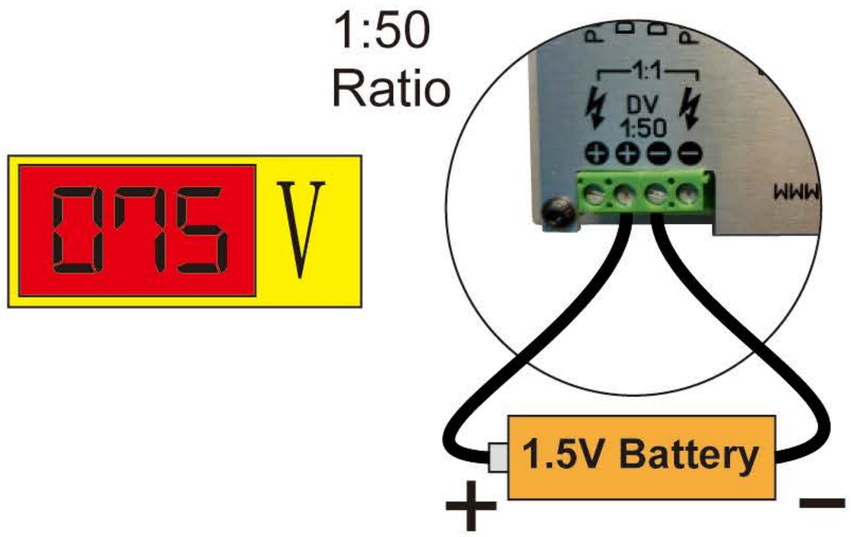


-Z axis recommendations

Since the Z axis needs to be faster than X,Y axis for rapid torch height correction in the middle of a cut a fast ballscrew is recommended like SFU1610 where a travel of 10mm per revolution is provided.
A stepper motor Nema 23 or greater is suitable for Z axis use.Mach3 Z axis acceleration and speed must be defined the maximum accepted for a proper operation.
The Z axis stepper motor driver microsteps can be adjusted at 400 steps per revolution.

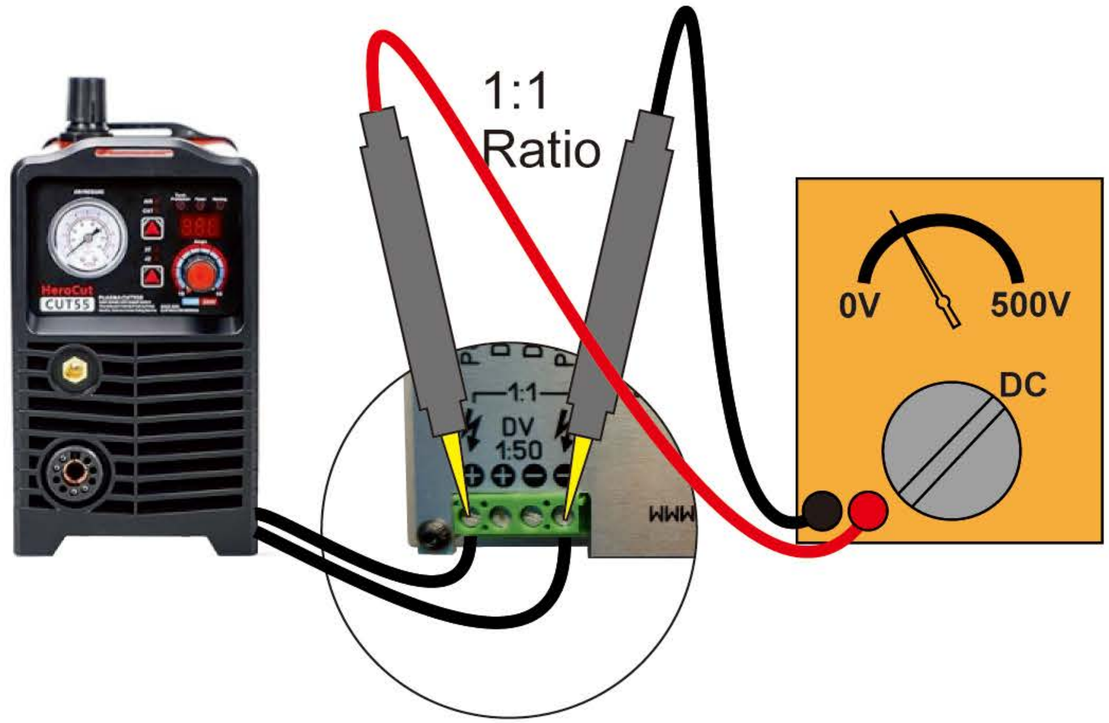
-IV confirmation

Using a common battery 1.5V either AA or AAA connecting at 1:50 port, the IV confirmation is possible. Please note the maximum IV for 1:50 defined at 5VDC. A voltage over that limit my cause damage to the device. After connecting the battery, Jetcut display must be appears an IV value 075V approximately. If this value has a divergence can be adjusted by menu/CAL parameter.



-IV calibrating

The 1:1 IV calibrating is possible with the use of a common multi-meter in DC volts scale. The prob must be placed parallel with 1:1 port as the image below. If any divergence can be adjusted by menu/CAL parameter.



DATE: _ _ _ _ / _ _ / _ _

NAME: _

QUALITY CONTROL SIGNATURE