

MyPlasm CNC System

Operation Manual



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1. Requirements, General description:

The application is designed for running on MS Windows (XP, 7, 8, 10) and is completely free for professional and commercial use. The software has no limitations as far as the scope of machine work and project size (number of code lines) are concerned.

Basic functions of software / controller

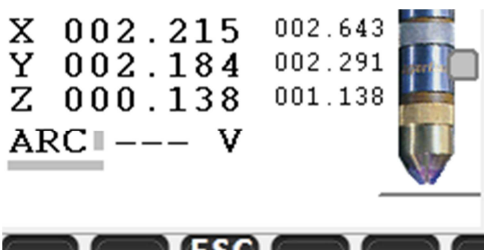
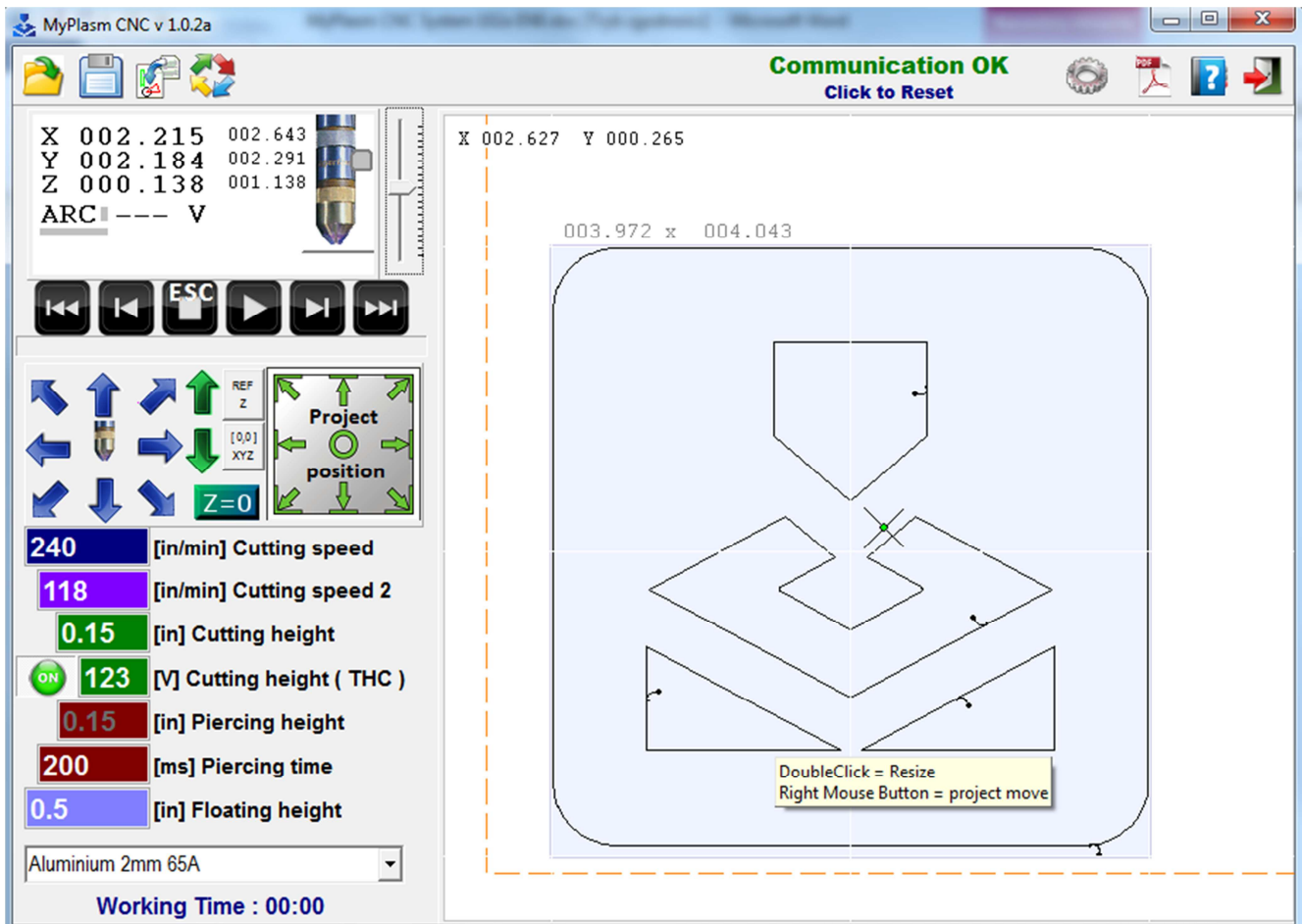
- max work area of machine: **No limitations**
- minimal width of Step pulses: **Automatic**
- max frequency of STEP signal: **350kHz**
- integrated THC height regulator: **Yes**
- THC anti-dive function: **Yes**
- material detection: **Yes, Touch (OHMIC) / Floating head**
- collision switch support: **YES**
- Accepted file formats: **DXF, PLT (hpgl), G-Codes (.tap)**
- Integrated CAM module: **Yes, MyMini CAM**
- Automatic recognition of internal and external objects: **YES**
- Path analysis with lead: **YES**
- Cutting parameters base: **YES,**
- Correction of project angle for material: **YES**
- Operation using GamePad controller: **YES**
- Option of cutting from any place: **YES**
- Option of cutting from the end: **YES**
- Applicable CNC controllers: **MyPlasm CNC**
- Support for controllers and main boards of other manufacturers: **NO**
- Operation through LPT port: **NO**

Similarly as in case of each piece of software, MyPlasm CNC may have hidden defects. The author of the software shall bear no responsibility for damages resulting from improper operation of the application. The author of the project shall make every effort that the software was free of faults by publishing updates and patches at proma-elektronika.com . The author of the project shall make every effort that the software was free of faults by publishing updates and patches at proma-elektronika.com

The heart of the system is MyPlasm CNC Controller and it controls the machine, not a computer, thanks to which the quality and efficiency of cutting does not depend on computer's efficiency. Computer is used only for preparing a cutting path, which is next sent to the controller via **USB** port.

When the controller is not connected, its work is simulated (in preview windows). Many functions are simulated in great simplification or not simulated at all.

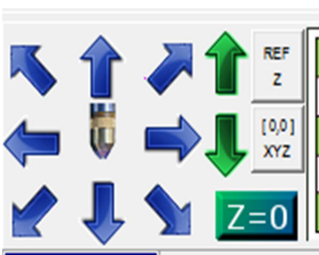
2. Main window:



Window displaying current coordinates of torch (in respect to material and machine), measured ARC voltage of plasma arc (for the needs of controlling the height of THC Controller). Picture of torch indicates current location on Z axis (height over material) and signals detection of material.



Automatic work buttons – Reversing program to any path (possible also by moving the blue progress bar), stopping (ESC), and launching a program, holding SHIFT allows launching a program without switching on the torch (simulation of cutting).

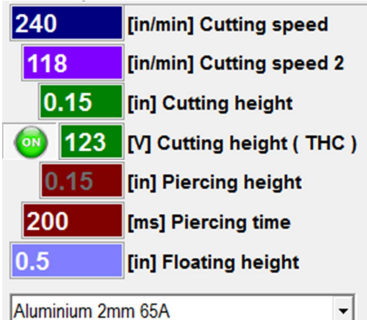


Manual control (keyboard arrows, PgUp, PgDown, or GamePad). By right clicking, you are able to force boundaries / work scope, as well as move by axes ignoring activity of home extremes. Holding SHIFT makes moves take place at the highest speed, while CTRL provides slowing function. The button with torch launches plasma arc. REF XYZ buttons are used for basing the machine / reference HOME travel. Z=0 button is used for setting the material position in relation to the torch.



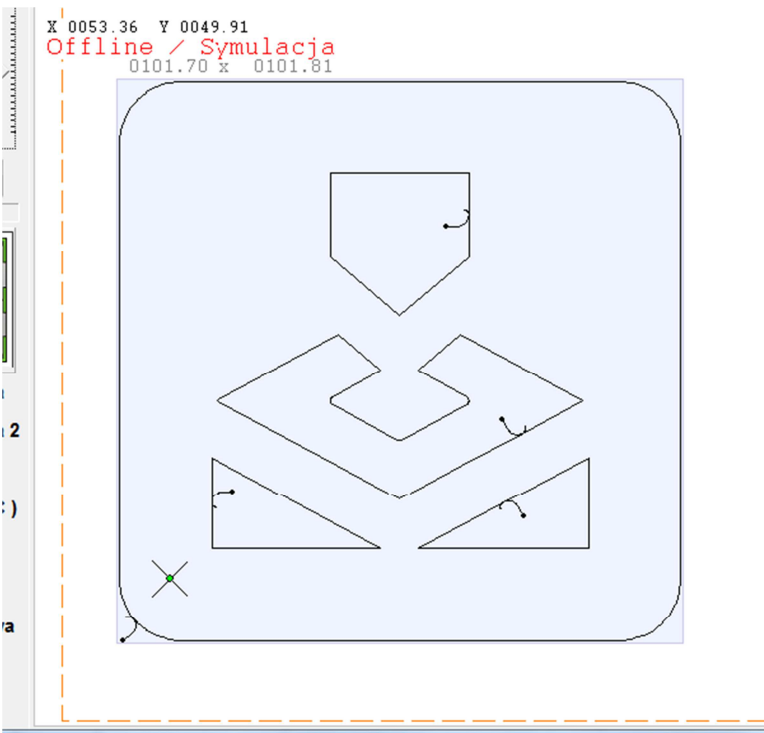
Buttons indicating location of project / material on the machine.

Right clicking allows one to adjust the project angle to material angle in case it is not placed upright on the machine.

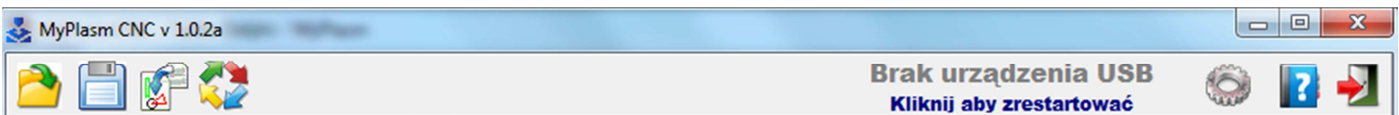
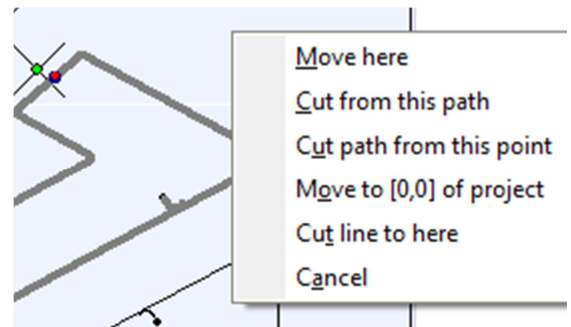


Basic parameters of cutting. Holes / small objects are cut out at the speed of 2 (at the height of 2), for which THC height control function is switched off.

Parameters can be saved in the base of material parameters. You need to enter any name and click CTRL+S (Save). In order to delete a position from the list, please push CTRL+D (Delete).



Project preview: use mouse scroll wheel to enlarge/diminish preview size, while left button to move the preview. The orange broken line presents the work scope (Soft Limits). By holding right mouse button, you can move the project to any place. Left button double click resets the view (adjusts the project to a window). Short right button click display context menu of additional functions.

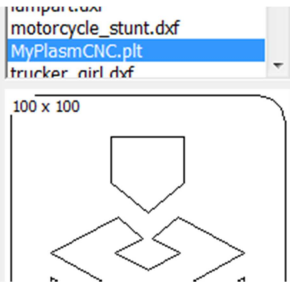
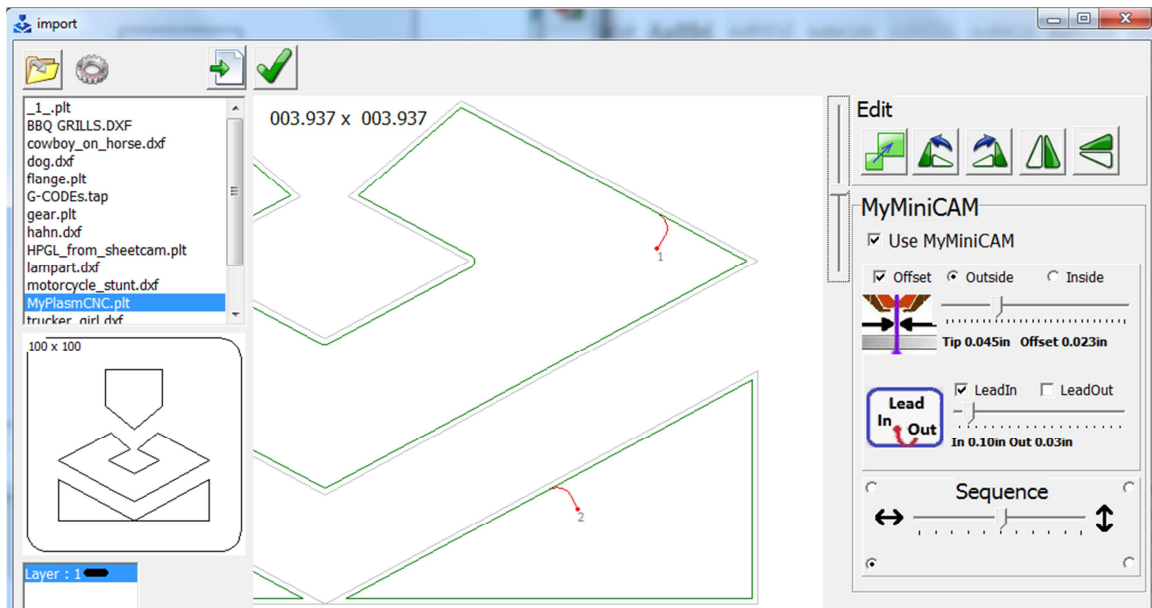


Open / Save project, Import of files to project (MyMini CAM module), Path analysis.

Brak urządzenia USB Kliknij aby zrestartować Status of USB communication with MyPlasm CNC controller,

Software and controller configuration

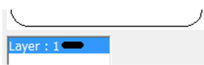
3. Import window / MyMini Cam:



Window for browsing files with prompt preview of DXF, HPGL and G-CODE files in default folder.



Open files from other folder (change of default folder)



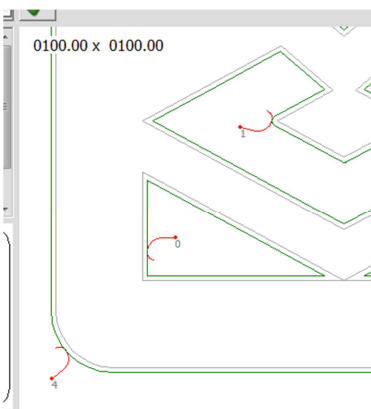
Selection of layer / colour to be imported.



Import of selected file.



Acceptance of project / Generating plasma cutting path.



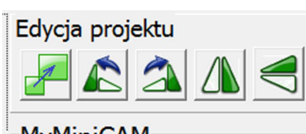
Preview window. Left click to move preview, scroll wheel to enlarge view, double click to reset view. Right click on path to change place of burning.

Grey: unprocessed file

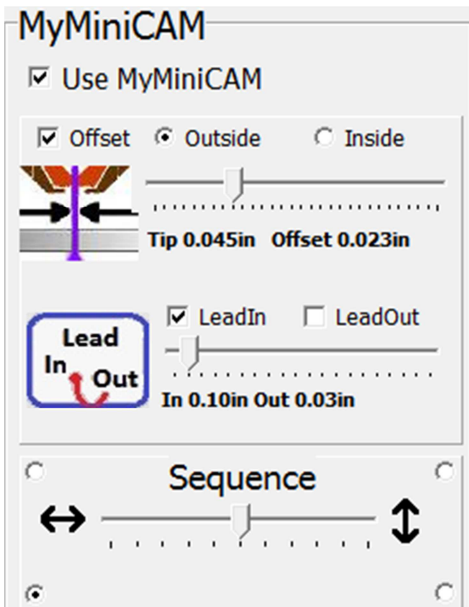
Blue: raw path not processed by MyMini CAM module

Green: path created by MyMini CAM module

Red: Torch entry / exit path



Basic edition tool for imported files – scaling, rotation (left mouse button rotates by 90° and right by 5°), vertical and horizontal mirror reflections.



MyMini CAM module – basic functions of creating paths basing on drawings.

Use MyMiniCam – launches MyMini CAM module.

For prepared paths, e.g. G-Codes generated in external CAM software, module needs to be **SWITCHED OFF.**

Offset – function for retracting path (wholes to inside, contour to outside) in order to correct the path width (size of head).

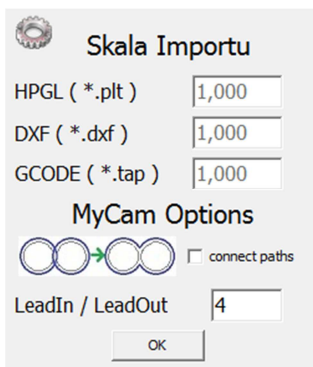
LeadIn – Creates entry paths in order to punch material outside edge.

LeadOut – Creates Lead out paths in order to re-cut thick materials.

Sequence – Forces place of start and direction of queuing paths.

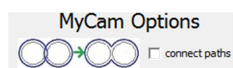
MyMiniCAM module is very simple and includes only basic functions necessary for automatic, very fast, and comfortable generation of paths basing on drawings. For more requiring projects, one can use any external CAM software.

In order to make current preview comfortable, MyMiniCAM module processes paths in real time what is presented in the preview window during changes of parameters. In order to improve efficiency in case of very large projects and computers of worse performance, it is recommended to launch the module only after setting all processing parameters.

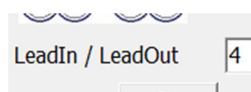


Basic functions of module.

Default scaling of input files.

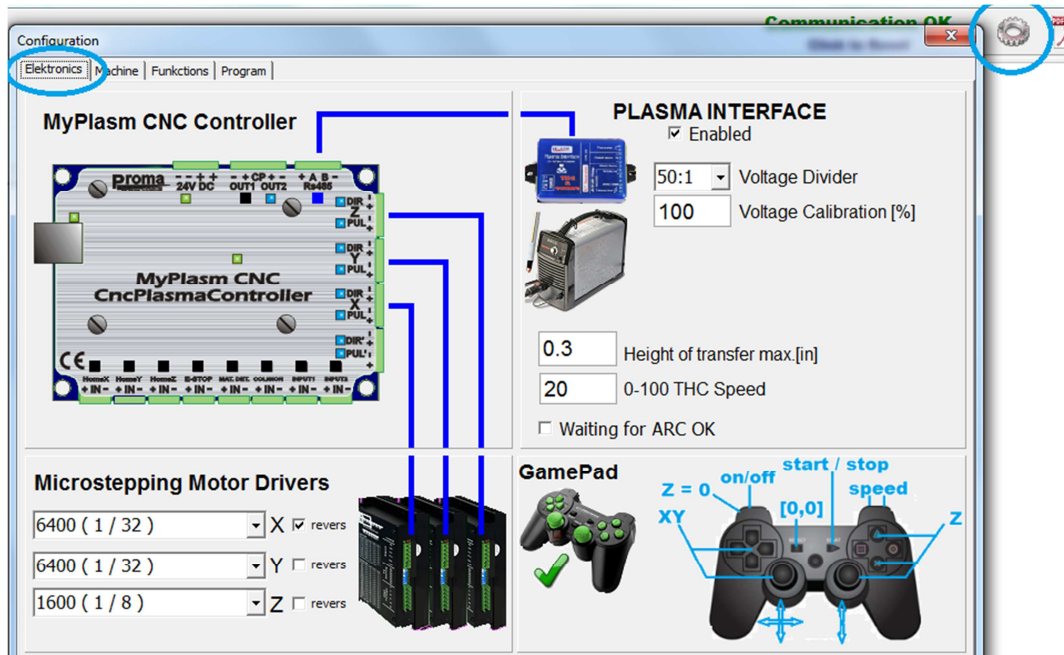


Function determines in resulting paths will be joined in case when collisions are detected (intersecting paths).



Ration of lengths of burning and exit paths.

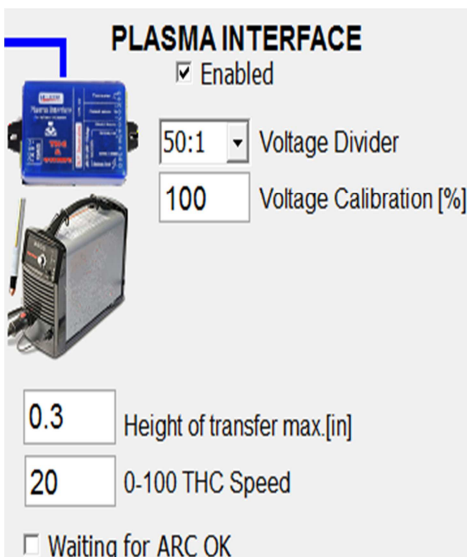
4. Software and controller configuration



In the **Elektronisc** section, we can configure external electronic devices connected to the System:



Setting division of steps of particular controllers of stepper motors. To achieve an optimal work of the machine, it is recommended to set the division of steps in such way that per one step there took place a shift of the machine of about 0,01 mm. This will provide very high quality and speed of cutting. Settings in the application should be identical with the setting of Step Controllers. **revers** – Change of axis direction.



Configuration of Plasma Interface

Voltage Divider : One should set voltage divider in accordance to operation manual of plasma cutter; available dividers are 1:1, 20:1, 50:1.

Voltage Calibration: percentage correction of indicated voltage.

Height of transfer max. (Max transfer height): Maximal height at which a plasma cutter is able to initiate the main arc (transfer to material), e.g. for cutters with touch arc ignition, the value should amount to 0 [mm].

THC Speed – Speed/sensibility at which correction of torch height takes place (0 - 100 %);

Waiting for ARC OK (wait for reverse signal): Waiting for ignition of main arc (ARC OK.) at the beginning of each path.



Status of connection of GamePad for operating the machine.

Configuration

Elektronik **Machine** Funktionen Program

XY Axis moving parameters

XY maximum speed [in/min] **400**

Hand XY speed [in/min] **40**

XY safety speed [in/min] **40**

Acceleration XY (RAMP) **20**

Z Axis moving parameters

100 Z maximum speed [in/min]

20 Hand Z speed [in/min]

20 Z safety speed [in/min]

20 Acceleration Z (RAMP)

Axis soft limits

X	Y	Z
20	20	5

Homing

Home switches active

Revers **40** X Speed [mm/min] **20** Z Speed [mm/min]

Revers **40** Y Speed [mm/min]

XY moving / gear parameters

X Axis move per motor rev [in]

Y Axis move per motor rev [in]

Z moving / gear parameters

Z Axis move per motor rev [in]

Machine Section: Axis moving parameters:

maximum speed: Determines speed for passages (at switched off torch)

Hand speed: Basic speed for manual move of axes (MAX speed when pressing SHIFT, 10% when pressing CTRL)

Safe Speed: Maximal speed of cutting at corners and fine/complex shapes – too low speed can significantly slow down the processing process (less dynamics), while too high speed shall result in lower work culture of the machine) tearing and slapping at sudden changes of direction – **potential missing of steps**).

Acceleration (RAMP length): Determines machine's work dynamics – too long RAMP (low acceleration) can significantly slow down the processing process (less dynamics), while too short platform will increase machine's work culture (tearing and slapping at sudden changes of direction – **potential missing of steps**). **10 is recommended for very light constructions up to 50 for very heavy gates;**

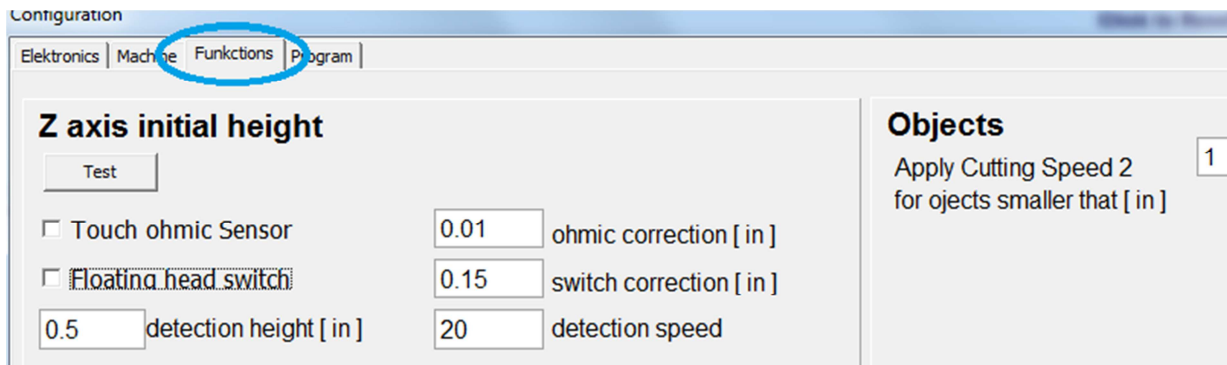
Axis soft limits: Determines machine's work field – presented in the main window as orange dotted line. As the work range for Z axis, one should set the complete range possible to be executed by Z axis (from grate to max. position).

Homing (Reference positioning): Determines speed of automatic reference positioning of axes if HOME limiting switches are used.

Gear ratio parameters of axes: Determines move of axes when motor performs one rotation.

Proper setting of gear ration of axes along with setting division of step (in Elektronika section) is the basis for proper work of the program – distances and speeds are calculated.

Proper configuration can be easily checked by moving an axis and comparing values on the screen (coordinates) with physical move.

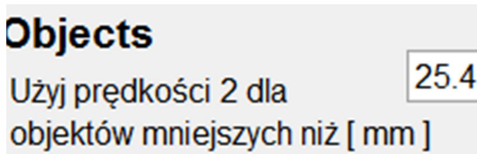


Funkcje section (Functions):

Z axis initial height (Detection of material height): Function of Automatic detection of locating of material can use the sensible and precise OHMIC SENSOR touch measuring system (if torch is quipped in head screen designed for this aim) or using a floating head with a marginal sensor activated by float of torch. It is possible to use both functions at the same time what significantly increases reliability and problem-free work in case of soiled materials.

TEST button allows one to check correctness of the function of determining initial height over material. Properly configured function should set torch at the height of punching (or the transfer height if it is limited in Elektronika section).

Detection height: Determines to what height (from the pass height) the feed will take place with the maximal speed before starting detection.

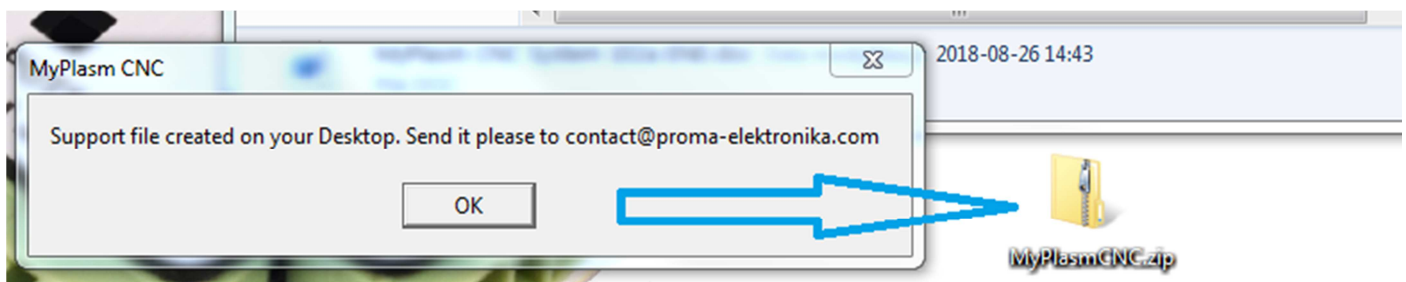


Determining size of objects (wholes) below which they will be performed with lower speed 2 with switched off THC height controller.



„Program” Section enables selection of language and Metric / Inch system.

Create File for technical support of Proma-Elektornikia – creates a ZIP file on Desktop named MyPlasmCNC enabling diagnostics of problems with software – in case of any problems, please send such file and problem description to kontakt@proma-elektronika.pl



5. Reference positioning / Reference run

After each powering machine on it is recommended to perform reference positioning / reference run.

In order to achieve proper reference positioning of Z axis, one should provide its work range in Maszyna section.

Axis soft limits (inches)		
X	Y	Z
20	20	5

Manual reference positioning (without using HOME limiting switches):



raise Z axis maximally to the top, X axis maximally to the left, and Y axis maximally to the bottom (to yourself) and click REF XYZ button.

If work boundaries do not allow the move, click right button what enables moves beyond work range.

Automatic reference positioning (using HOME limiting switches)

In case of automatic reference positioning, one just has to click **REF XYZ button** and the controller will perform automatic precise reference positioning (reference run) for each axis, using reference switches.. Reference positioning takes place at the speed set in **Maszyna / Bazowanie section**. In order to make the process faster, one can manually move close to extremities and the launch positioning.

After completion of reference positioning, maximally raised torch should be located in the bottom left corner (X,Y) of the machine and machine coordinates should indicate 0.00 for X, Y, and limit Z axes.

XY Axis moving parameters

XY maximum speed [in/min]	400
Hand XY speed [in/min]	40
XY safety speed [in/min]	40
Acceleration XY (RAMP)	20

Axis soft limits

X	Y	Z
20	20	5

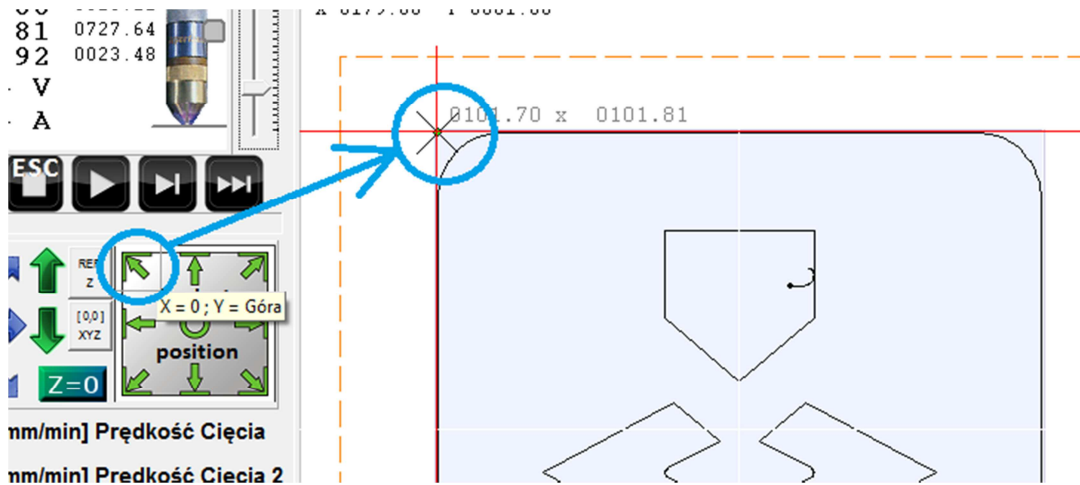
XY moving / gear parameter

2	X Axis move per motor rev [in]
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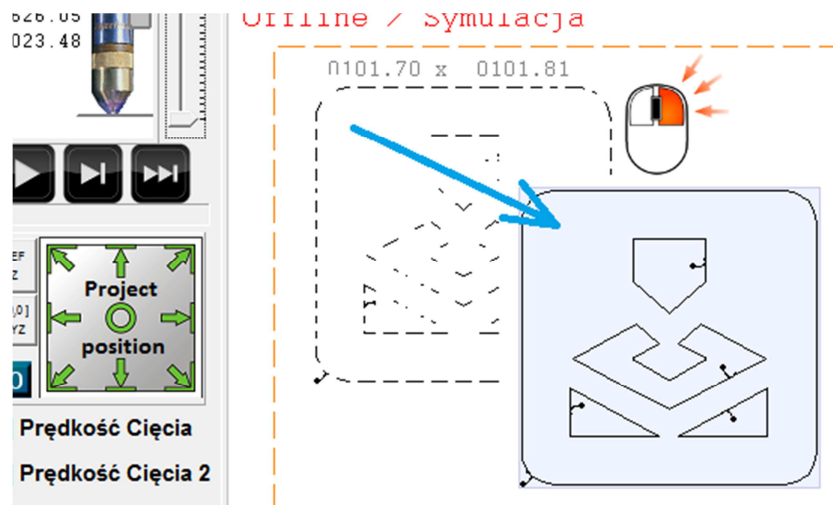
6. Project Positioning

There are several ways for determining the project position.

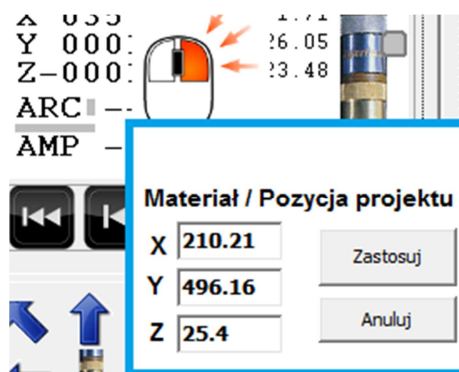
The fastest way is to use the torch to indicate the place on material where one wants to position the project (it is comfortable to use crossing two linear laser indicators). There are options of setting any corner, „side”, or centre of the project.



Using right mouse button, one can directly move the project in the preview window.



A precise location of the project in respect to the reference point [0,0] can be checked, corrected in the coordination window. It should be right clicked to enable edition.



7. Setting cut parameters

Setting proper parameters has a key influence on the quality of cutting. Unfortunately, parameters are individual for various plasma sources so it is not possible to provide a ready solution. Parameters should be selected in accordance to recommendations of a manufacturer of a certain plasma cutter. Key values for a certain material are: gas pressure, current intensity, cutting speed, and cutting height.

If THC controller is on, the cutting height is set on the basis of the arc voltage and expressed in V. In other case, the height is 2, e.g. in case of cutting wholes where THC function is switched off automatically.

240	[in/min] Cutting speed
118	[in/min] Cutting speed 2
0.15	[in] Cutting height
ON 123	[V] Cutting height (THC)
0.15	[in] Piercing height
200	[ms] Piercing time
0.5	[in] Floating height
Parameters for the material	
Aluminium 2mm 65A	
Mild steel 15mm 85A	
Mild steel 1mm 45A	
Mild steel 3mm 65A	
Mild steel 4mm 65A	

Cutting Speed – set cutting speed

Cutting Speed 2 – set cutting speed for small objects / wholes.

Cutting Height – Set cutting height when THC function is off

Cutting Height (THC) – Setting arc voltage for THC height regulator – Higher voltage = cutting height when THC is on.

Piercing height – Height at which material is punched at the path beginning – Active only to piercing time >400ms – if the time is shorter, punching takes place at cutting height.


Piercing time – Time of waiting after launching torch until material is piercing.

Floating Height – Height at which torch fast moves between paths.

If cutting quality is satisfactory, it is worth to save Group of Parameters in the database for future use – just enter any name and click CTRL + S (Save).

In order to delete a position from the list, please push CTRL+D (Delete).

8. Automatic Cutting.

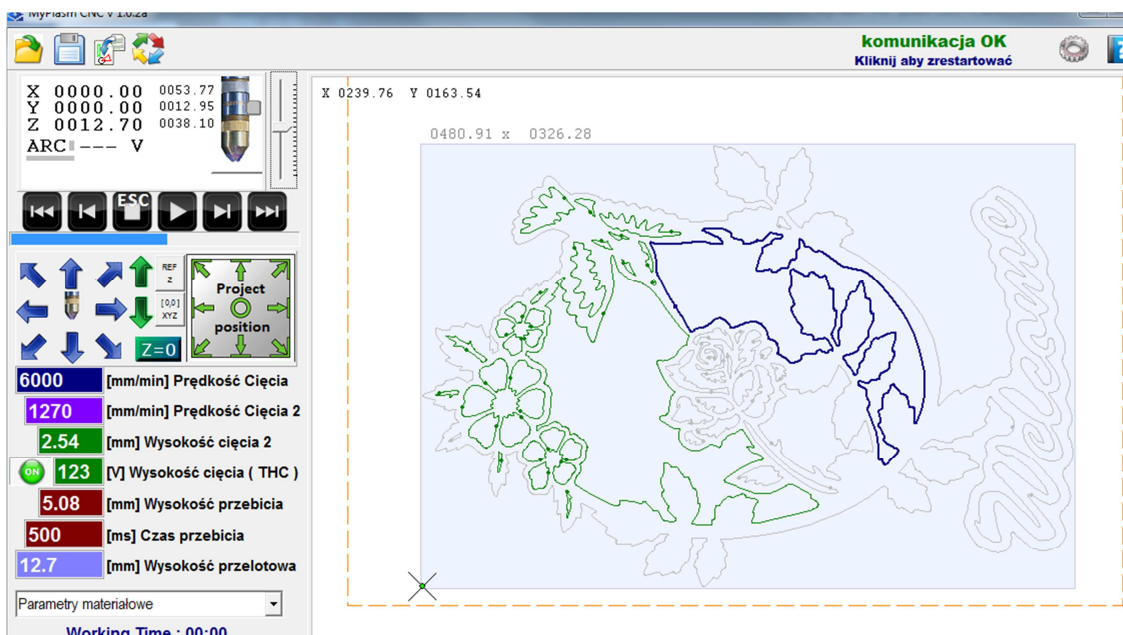
In order to launch automatic cutting, one has to make sure that cutting parameters are properly input and the project is well positioned (see point 6.), Program is rewind into proper location, and using torch select material surface +  and press START.

Press STOP or ESC (Escape) to stop program.

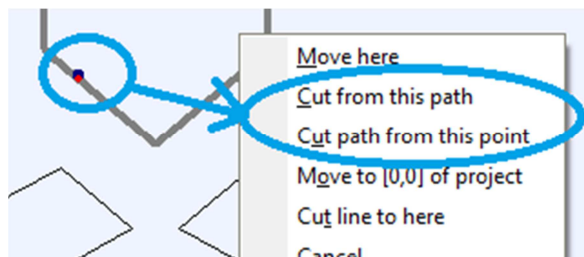
Program can be executed from any place; object from which we start can be selected using program scrolling buttons or dragging blue progress indicator to a selected position:



Currently selected path from which program starts is dark blue bolded:



One can also select an object using right mouse button in the preview window; this way also allows setting place on path until which it should be performed:



In order to launch cutting from the end of path (e.g. in order to re-cut unfinished detail), just click START pressing CTRL. Only one detail will be executed from the end.

For simulation aims, it is possible to launch automatic mode without switching torch on – one needs to click START holding down CTRL.

During cutting, it is possible to change cutting height if THC regulators is on – press PgUp or PgDown – current arc voltage shall be corrected by +/- 5V.

9. Control and manual operation

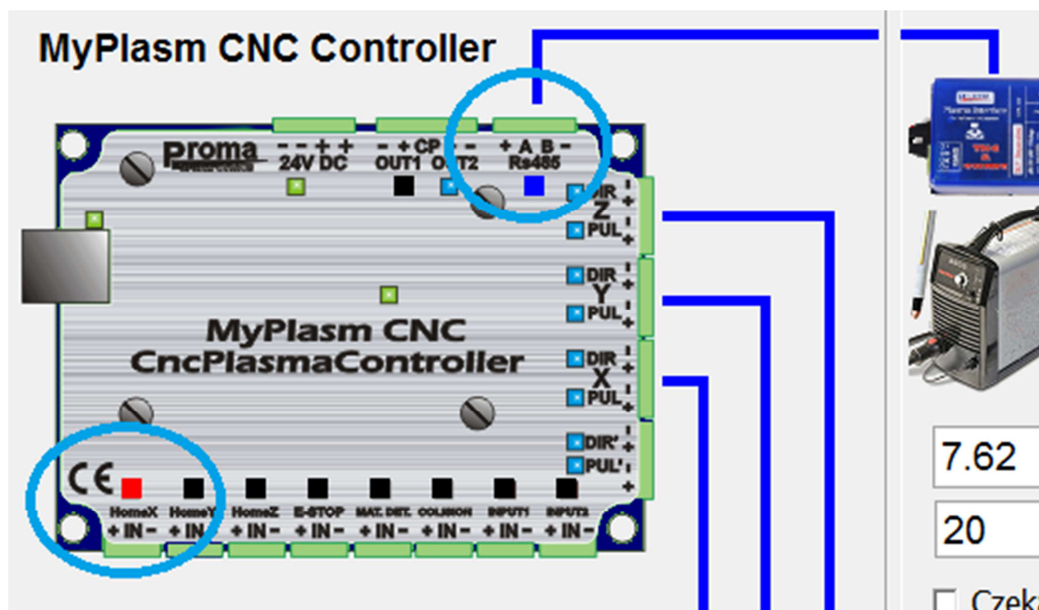


The symbol of torch in the main window indicates operation of function of detecting material - OHMIC SENSOR system or / and floating head.

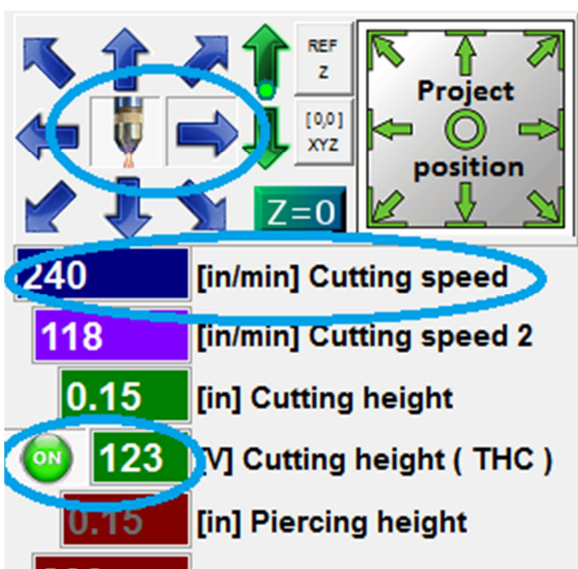
Improper operation of this function can cause torch or material damage.

It is recommended to often check correctness of operation of these functions (if used).

In the Elektronika section, you can check correctness of operation of input signals and transmission between modules.



In order to perform cutting test, one can manually launch torch over material and manually move in any direction – after completion of movement, torch is automatically switched off.



During manual cutting (if torch is on), speed is set at the level of automatic cutting speed, while the speed of manual feed is ignored.

If THC regulator is on, the function is active also during manual cutting, what allows testing correctness of its operation.