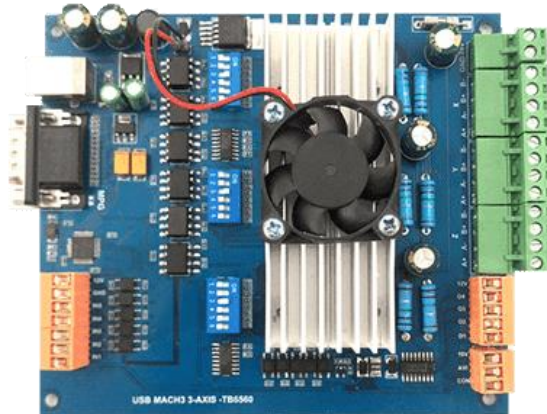




DrufelCNC USBCNC3 TB6560 Installation Manual



DrufelCNC, 2020

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Annotation

This document is the user guide for the DrufelCNC software. The information contained in this document may be modified by employees of the company with the subsequent notification. Your changes are reflected in the document version. The company does not guarantee the absence of errors or typographical errors in this document, but will work to eliminate them, and will also be grateful to everyone who finds them and points to them.

Comments and suggestions to this document are accepted by email: social@drufelcnc.com. Document version - V.1.16.

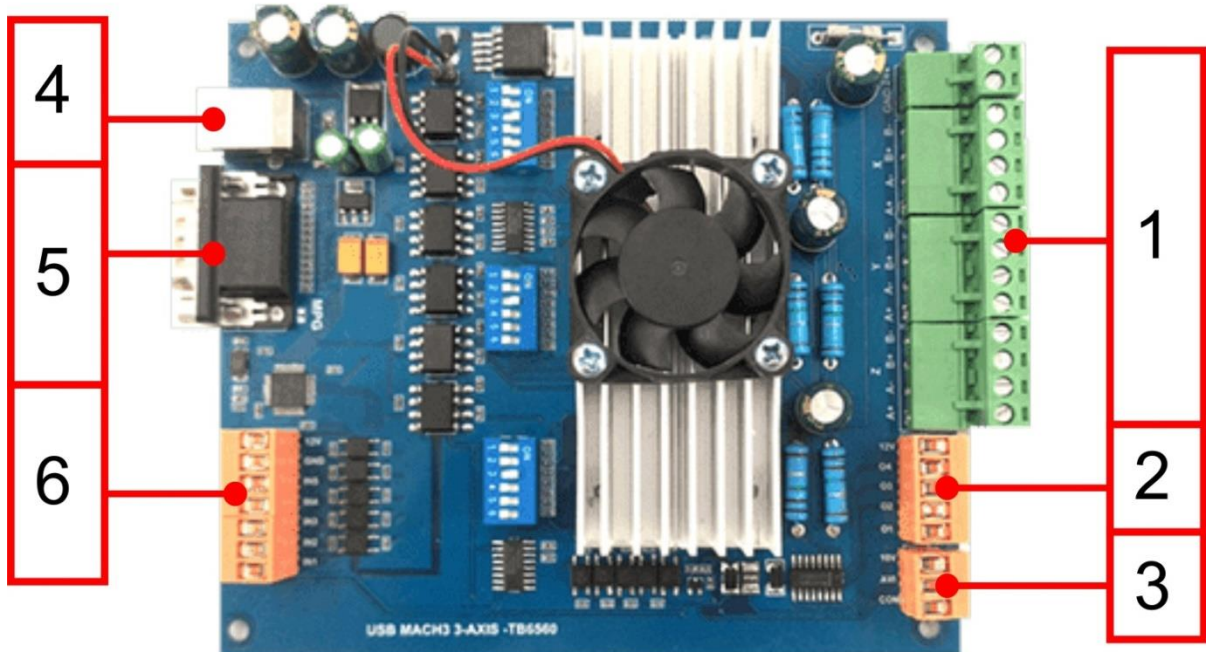
NOTICE OF LIABILITY

Using any CNC machine is a dangerous operation. All precautions must be taken, as the machines may turn on at any time, the software MAY malfunction at any time, any user of the Software must understand and take this into account, and must immediately uninstall the Software and not proceed with the installation if they are not fully understand all the consequences of the use, as well as the fact that in case of misuse, the wrong code, unexpected movement or any damage caused by the aforementioned consequences mi, there is no legal protection.

1. Features

- Support for CNC controlled 3-Axis, can connect five stepper motor drivers or servo drives.
- Power of the control board: voltage 12-24 V DC, current more than 500 mA.
- The maximum frequency of the output pulse is 100 kHz, and the pulse width can automatically change depending on the frequency of the pulse.
- Support for the operating system Windows XP, Windows 7 (32 / 64bit), Windows 8, Windows 10.
- Applicable to all versions of DrufelCNC software.

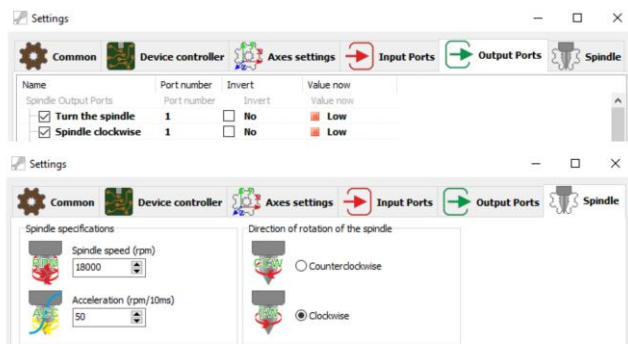
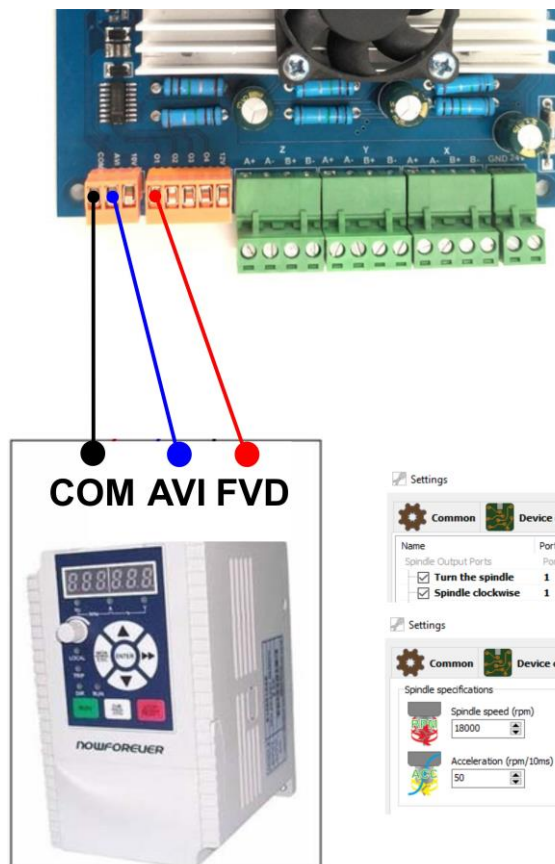
2. Product connection define and method



1 - Stepper motor control interface.

2 - Common IO output interface.

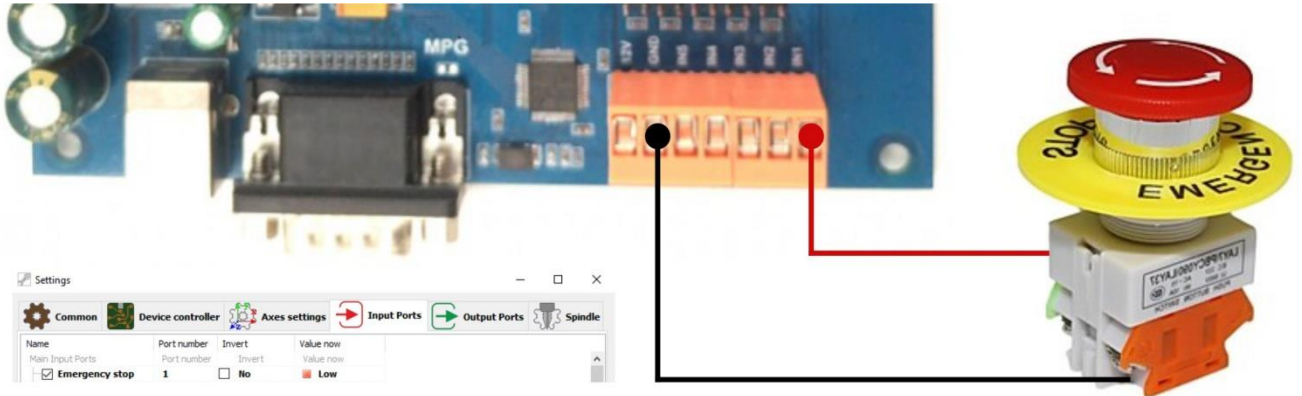
3 – Spindle Control Output Port.



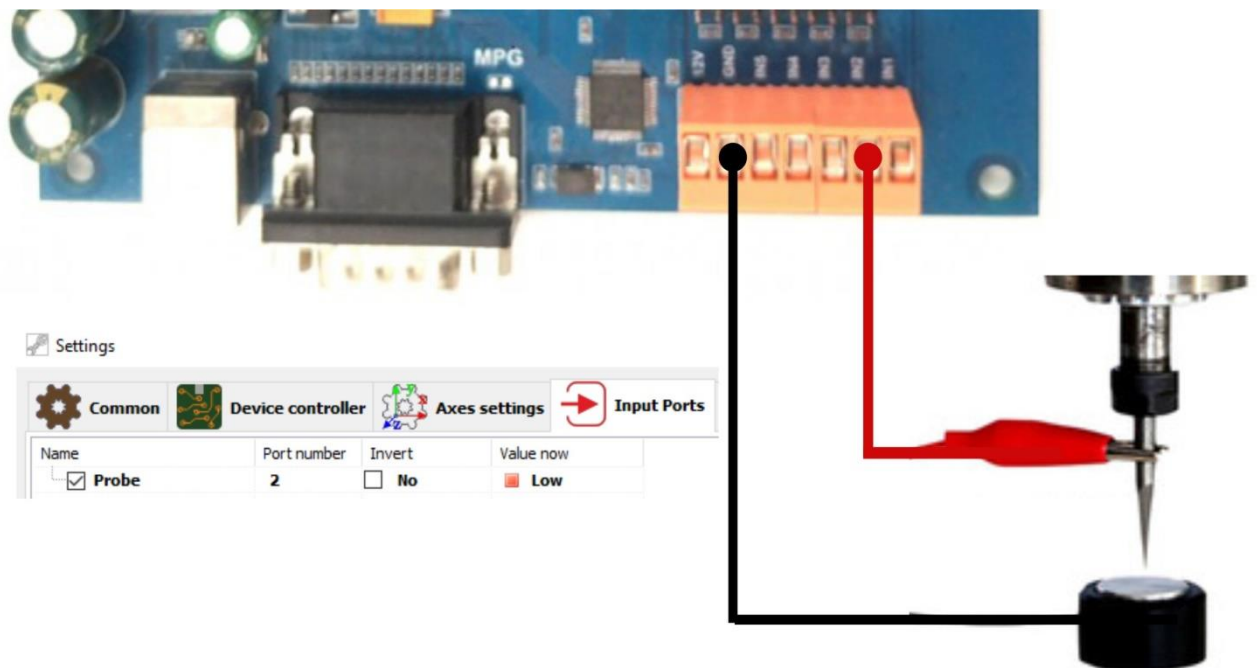
4 - USB Port.

5 - MPG Interface.

6 - Input Ports. Estop input connection.








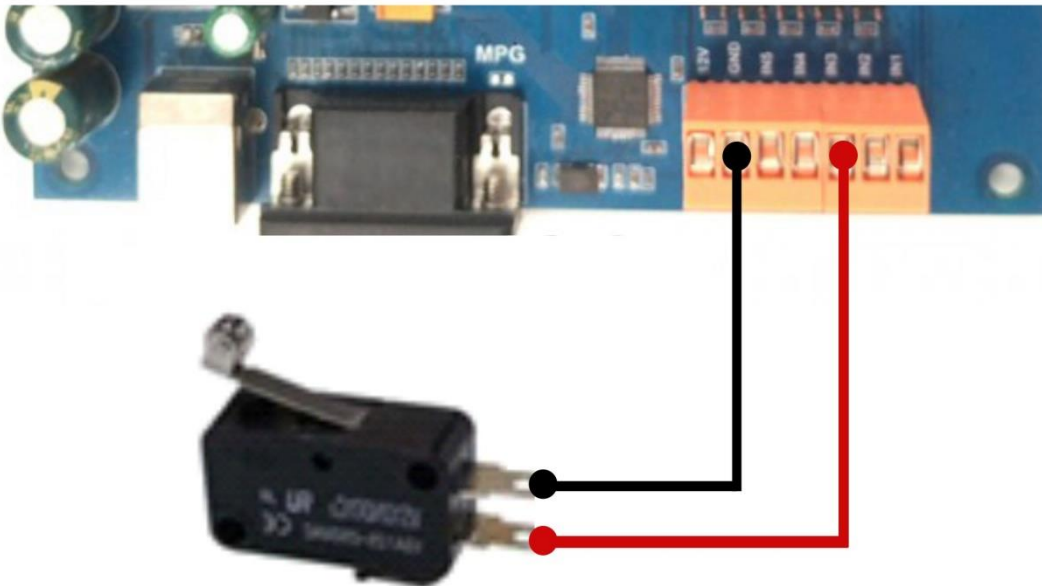
Probe input connection



End switch input connection

Settings

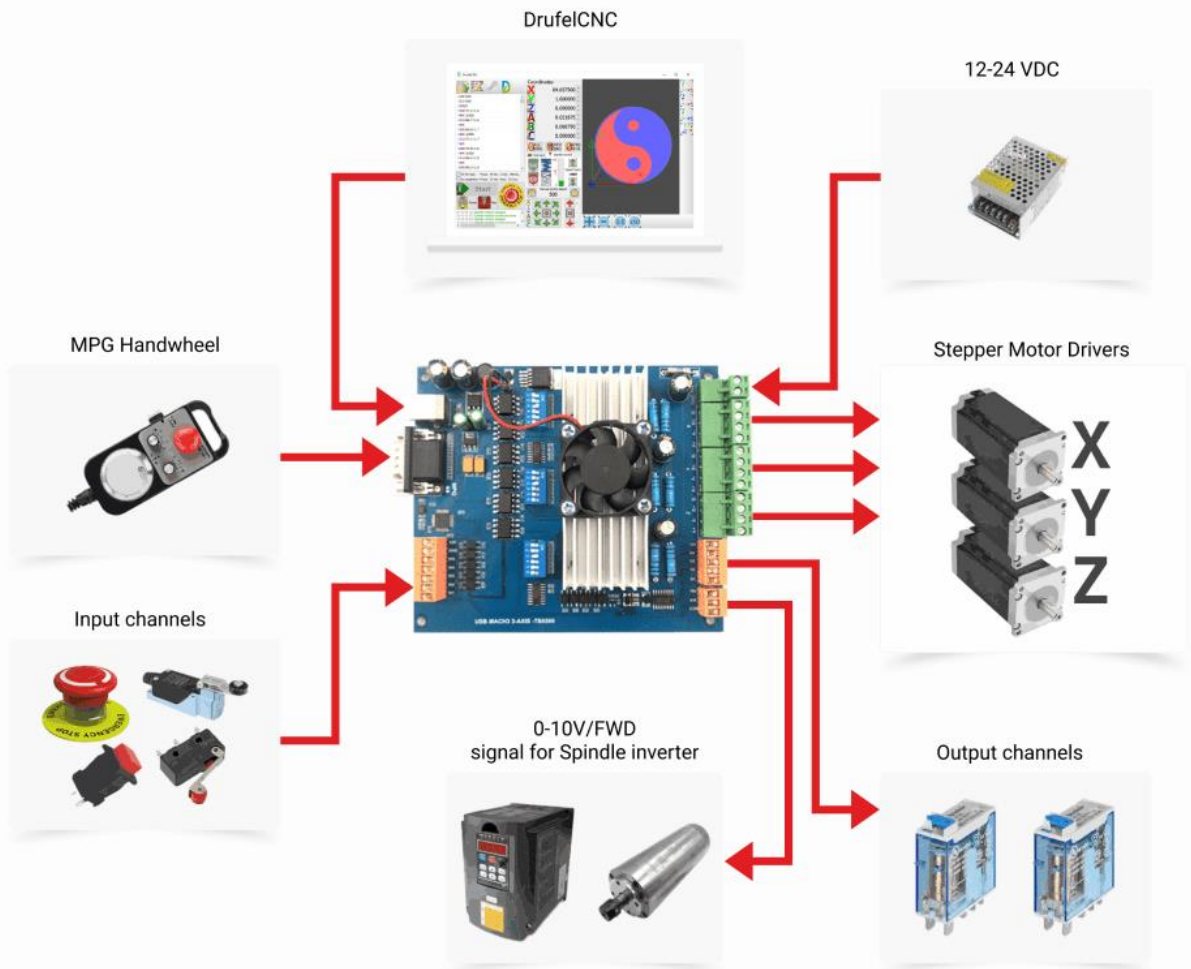
 Common	 Device controller	 Axes settings	 Input Ports
Name	Port number	Invert	Value now
<input checked="" type="checkbox"/> Limit X+	3	<input type="checkbox"/> No	 Low



3. Basic connection diagram

DrufelCNC

Connection diagram **USBCNC3 TB6560** of DrufelCNC

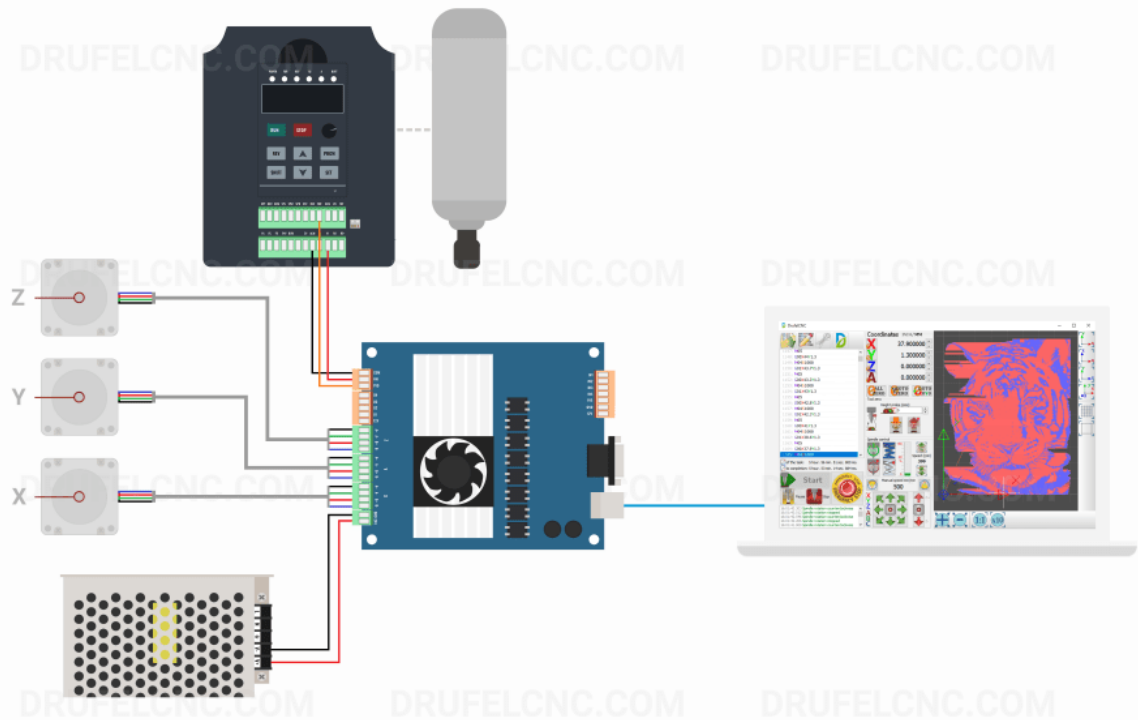


Using any CNC machine is a dangerous operation. Before use, all safety measures must be taken. If you do not have complete information, if you do not have an engineering background, then do not use this diagram. In case of improper connection, unexpected movement or any damage caused by the aforementioned consequences, there is no legal protection.

4. Connection diagram stepper motors and spindle

DrufelCNC

Connection diagram for USB CNC3 TB6560, stepper motors and spindle in DrufelCNC



Using any CNC machine is a dangerous operation. Before use, all safety measures must be taken. If you do not have complete information, if you do not have an engineering background, then do not use this diagram. In case of improper connection, unexpected movement or any damage caused by the aforementioned consequences, there is no legal protection.

5. Installing DrufelCNC

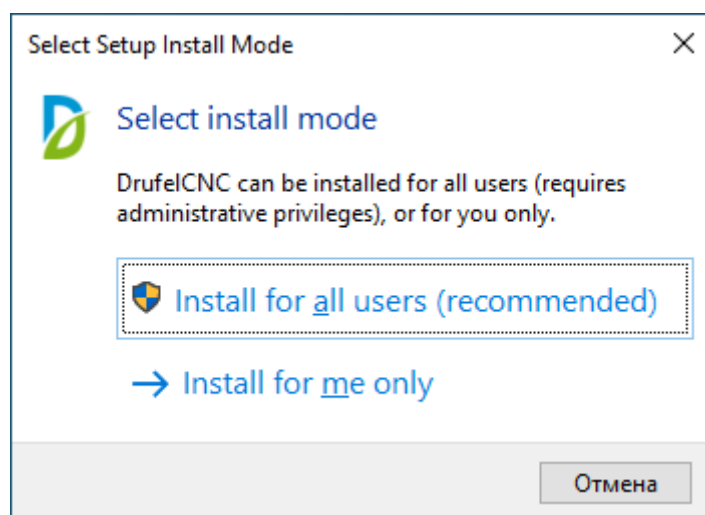
To install the program you need to download the installation files on the official website www.drufelcnc.com. You can use one of the following files:

- DrufelCNC_installer_x64.exe, DrufelCNC_installer_x32.exe - this installation file will automatically install DrufelCNC on your computer documentation and examples of g-codes;
- DrufelCNC.zip - archive with DrufelCNC x32 and x64 with examples and documentation.

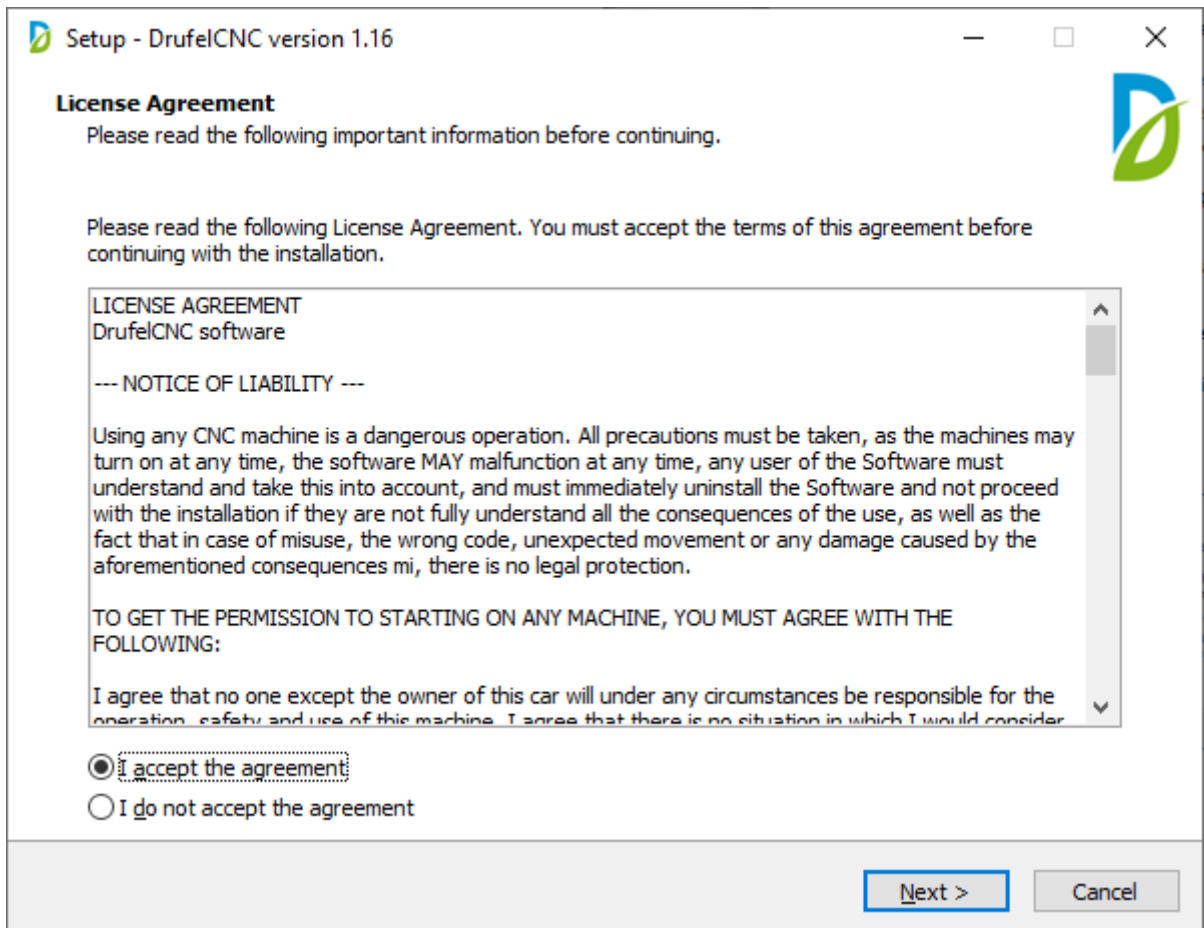
Run the desired file and follow the installation instructions.

Description of the installation process

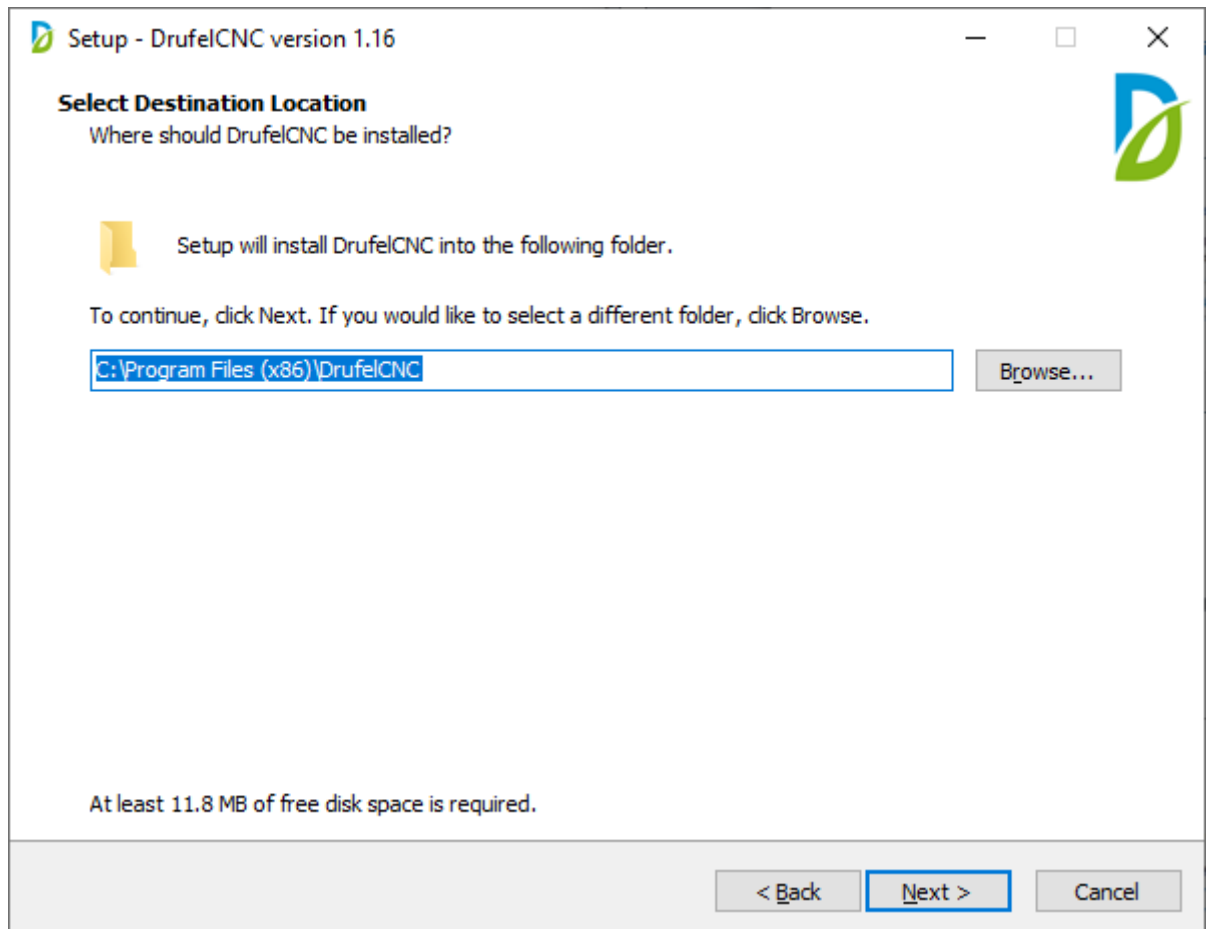
1. *Start the installation process.* In this installation window you need to select the program installation mode.



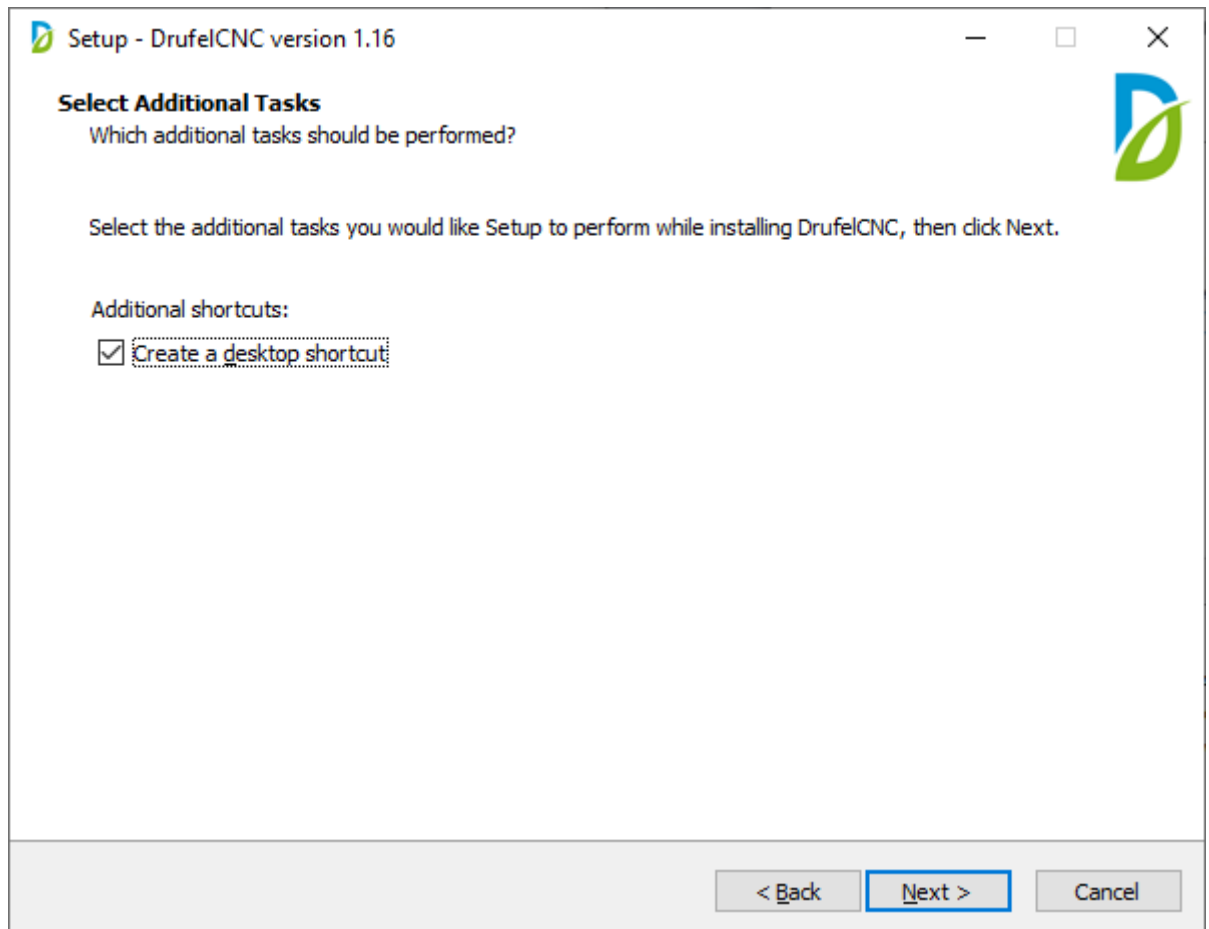
2. License Agreement. The License Agreement installation window contains the text of the license agreement for the use of the DrufelCNC software product. Please read the agreement and select "I accept the terms of the license agreement". To continue the installation, click "Next." During the entire installation process, to return to the previous installation step, click the Back button. To exit the installer, click Cancel.



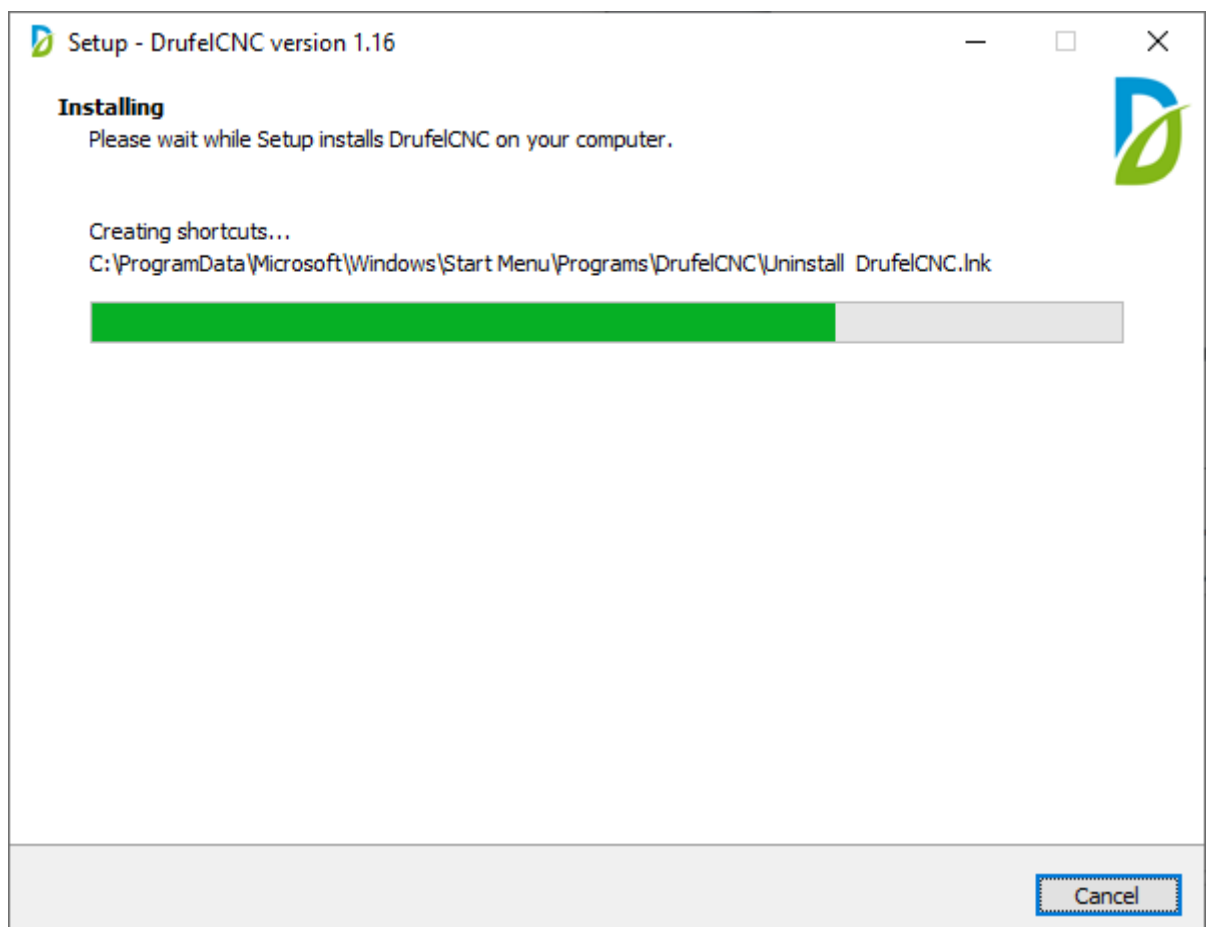
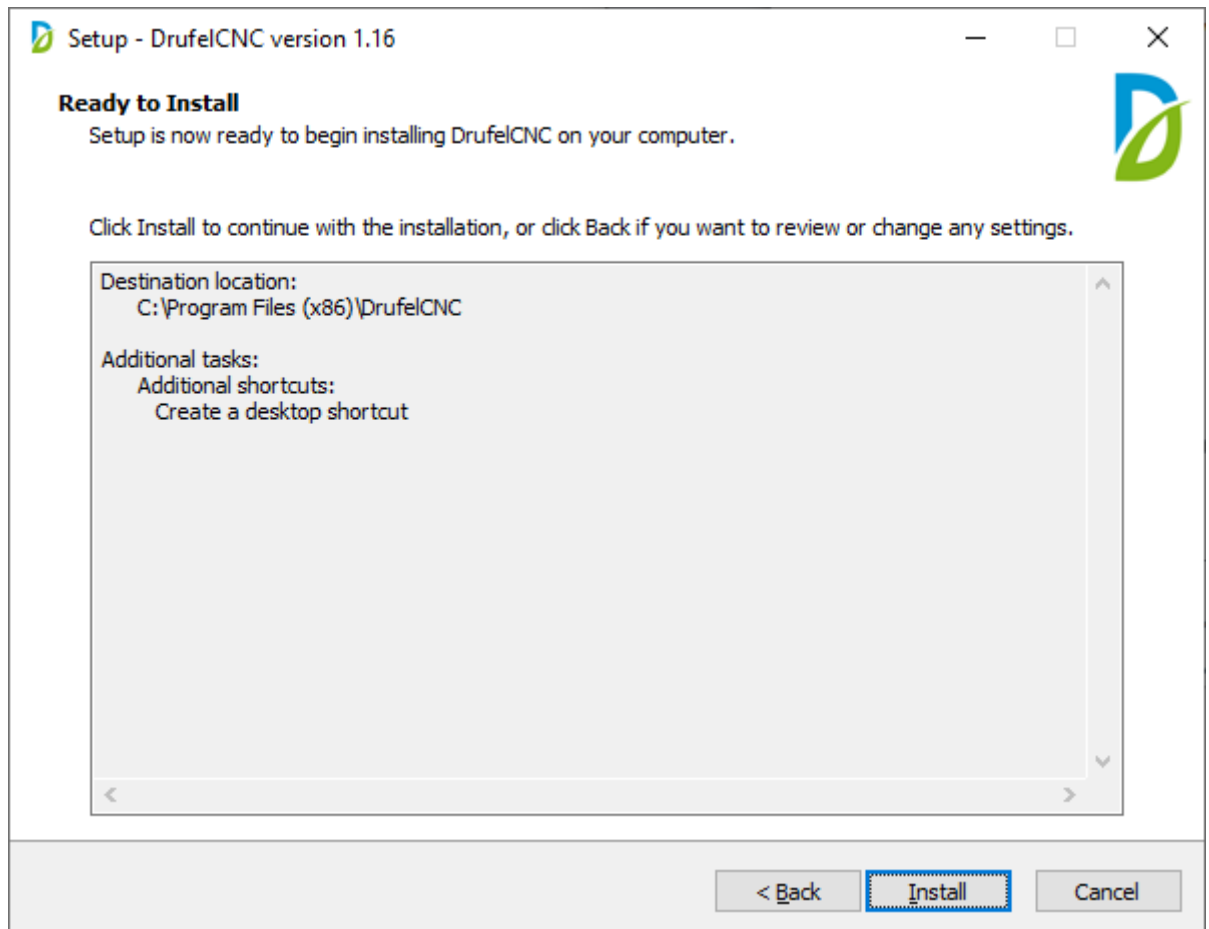
3. Select the directory in which the installation will be made. At this stage of the installation, you must specify the directory in which DrufelCNC will be installed. The default installation directory is "C:\Program Files\DrufelCNC". If you wish, you can specify any other path. Depending on the version of Windows, the default path may be different. To continue the installation, click "Next."



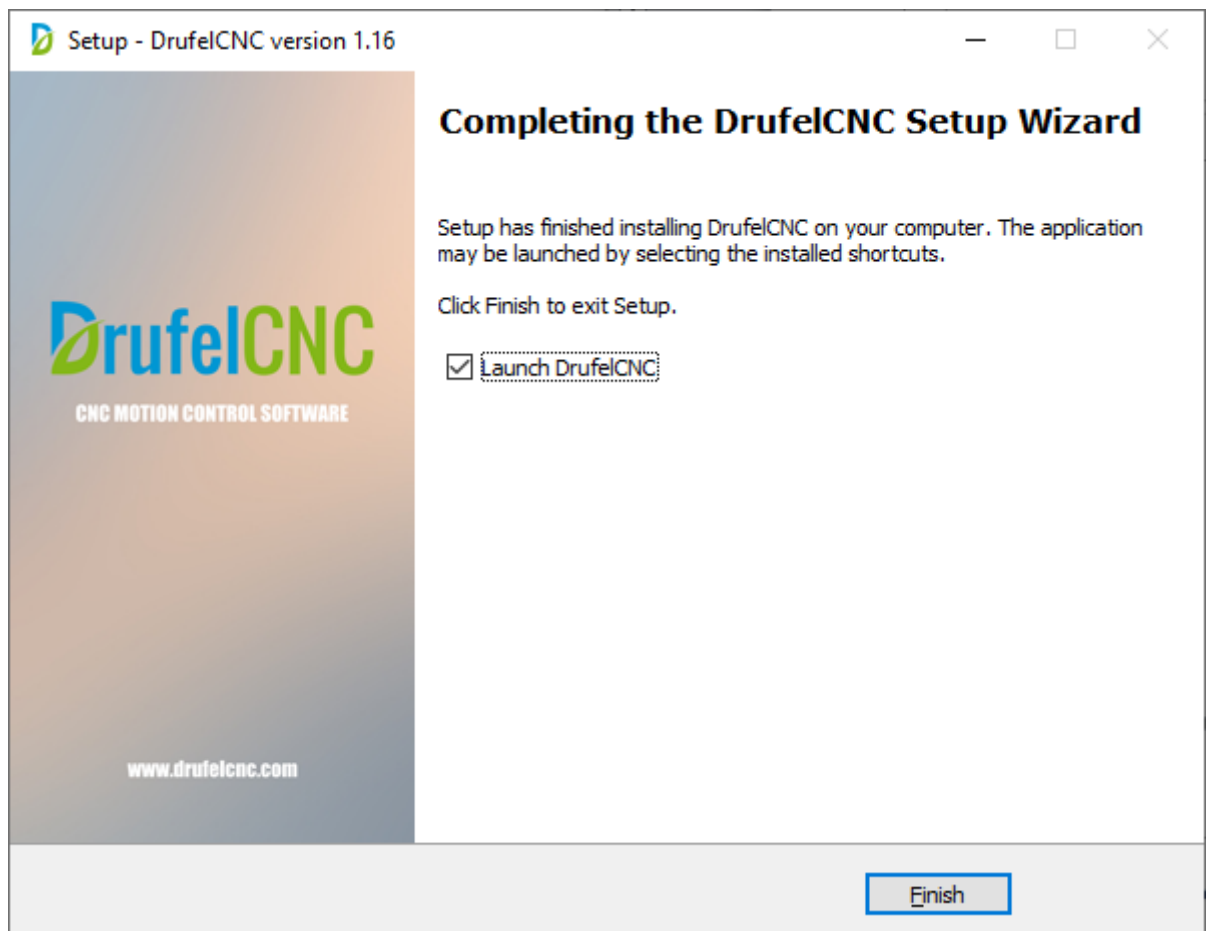
4. *Selection of additional installation parameters.* At this stage of installation, it is necessary to determine the need to create program shortcuts on the desktop. By default, a program shortcut will be created. To continue the installation, click "Next."



- 5.** *Preparing for installation.* A window with information about the selected installation type, selected components and installation directory will be displayed. Check the information and click "Install."



6. *The final stage of installation.* At the last stage, the installation program will report the result and will offer to start the programs depending on the type of installation selected earlier. By default, you can run the program. To complete the installation, click Finish.

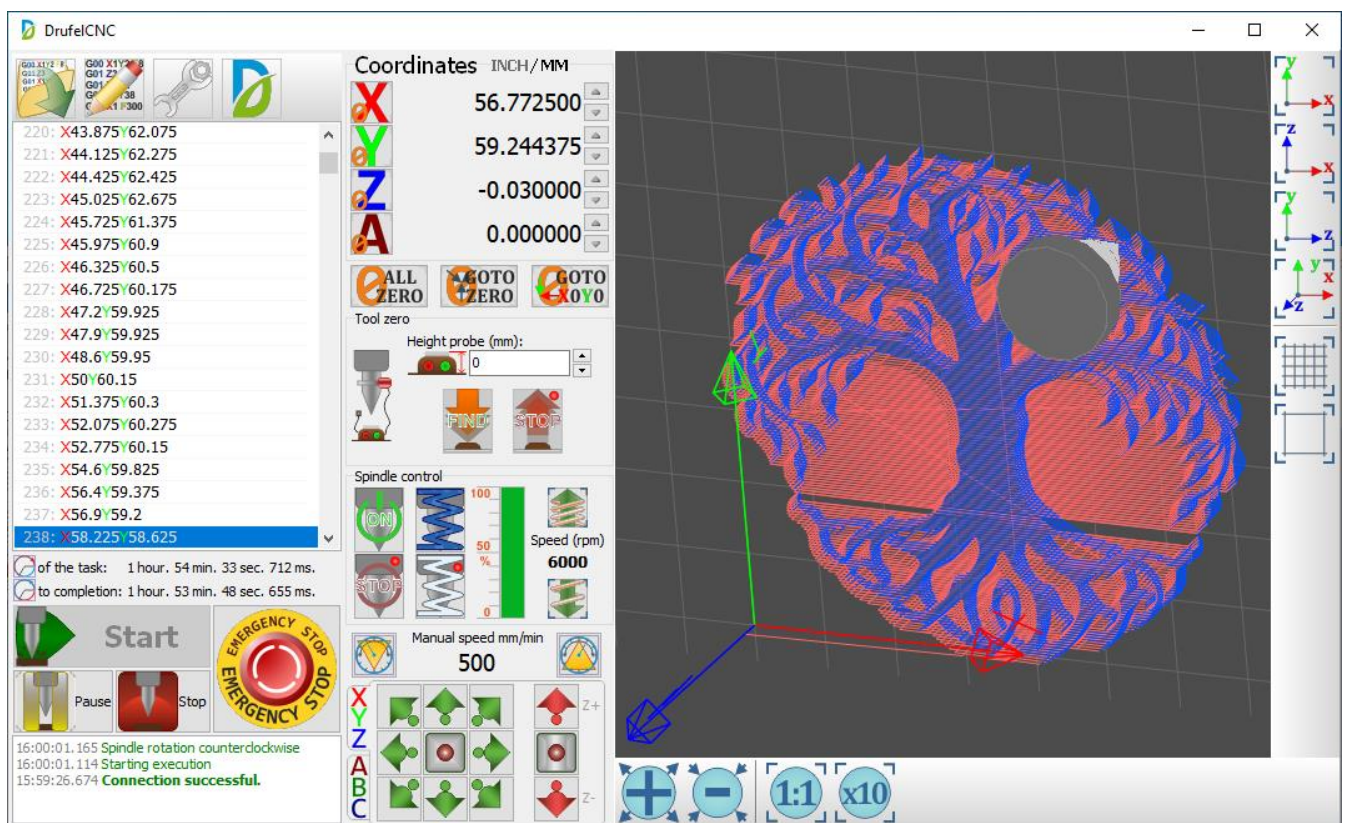


6. Run the program

To run the program, use the version depending on the bitness of your operating system:

- DrufelCNCx32.exe - version for 32-bit operating systems
- DrufelCNCx64.exe - version for 64-bit operating systems

The main window of the program.



In the lower left corner displays the status of the connection to the USB controller, and other informational messages.

7. Customization

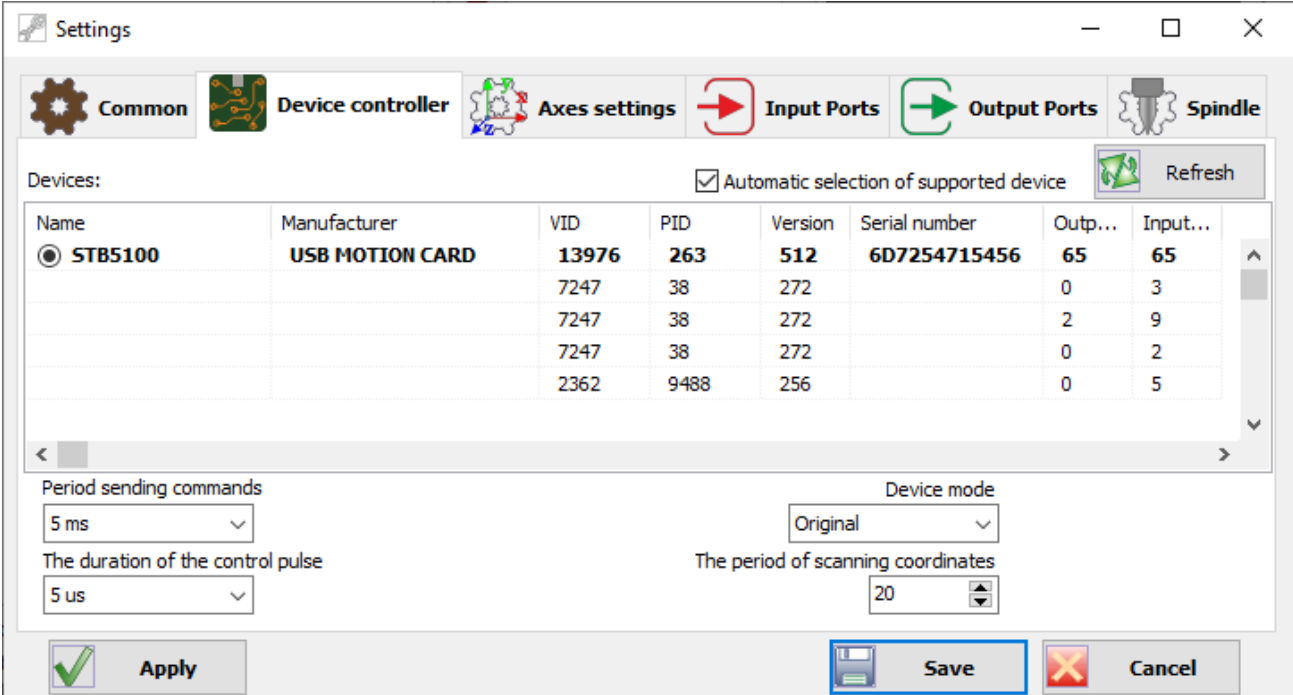
To configure DrufelCNC you must click on the button with the image of the key



. Next, go to the section of settings that interests you.

a. Controller Configuration

In the window that opens, go to the “Device Controller” tab.

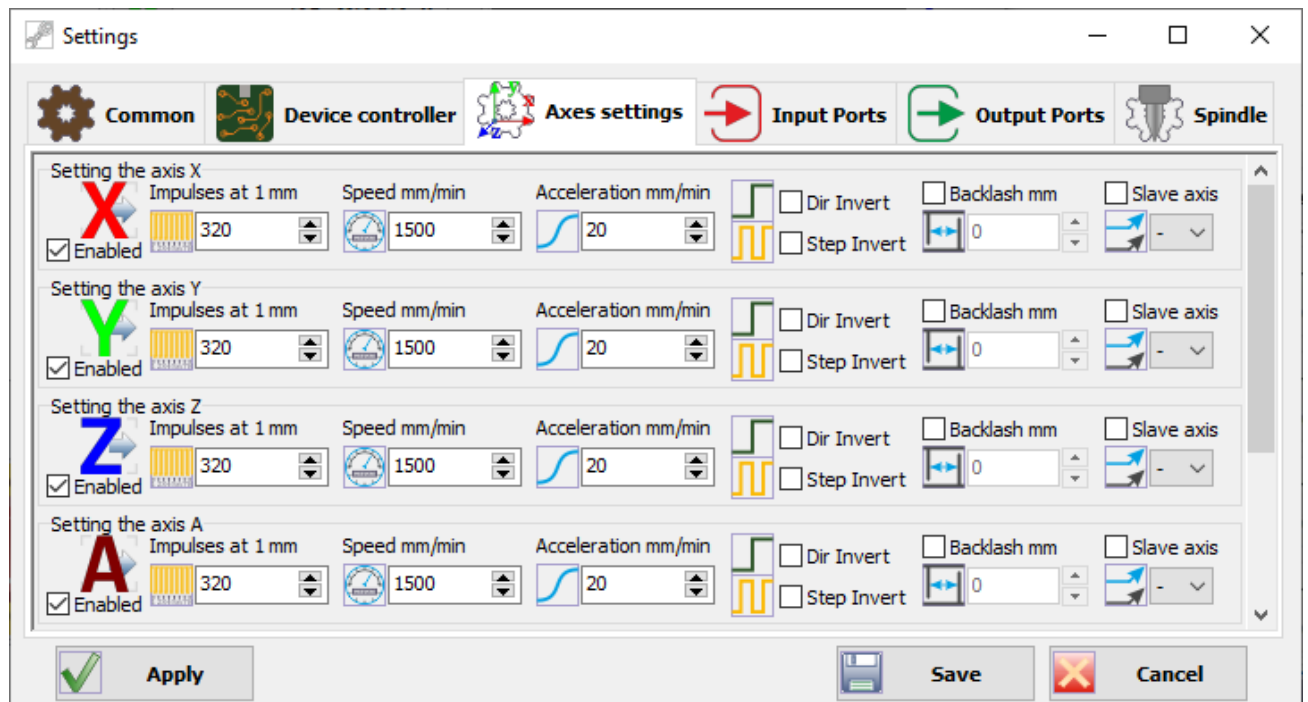
A screenshot of the 'Settings' window in DrufelCNC, specifically the 'Device controller' tab. The window has a title bar with standard OS controls. Below the title bar is a tabbed interface with five tabs: 'Common' (selected), 'Device controller', 'Axes settings', 'Input Ports', and 'Output Ports'. The 'Device controller' tab is active, showing a 'Devices:' section with a table of detected devices. A checkbox 'Automatic selection of supported device' is checked, and a 'Refresh' button is present. The table lists several devices, with 'STB5100' selected. Below the table are four configuration fields: 'Period sending commands' (5 ms), 'The duration of the control pulse' (5 us), 'Device mode' (Original), and 'The period of scanning coordinates' (20). At the bottom are 'Apply', 'Save', and 'Cancel' buttons.

Name	Manufacturer	VID	PID	Version	Serial number	Outp...	Input...
STB5100	USB MOTION CARD	13976	263	512	6D7254715456	65	65
		7247	38	272		0	3
		7247	38	272		2	9
		7247	38	272		0	2
		2362	9488	256		0	5

In the hardware section, you must select a controller by setting a point in the radio button block opposite the USB controller. Save the settings.

b. Axis Setup

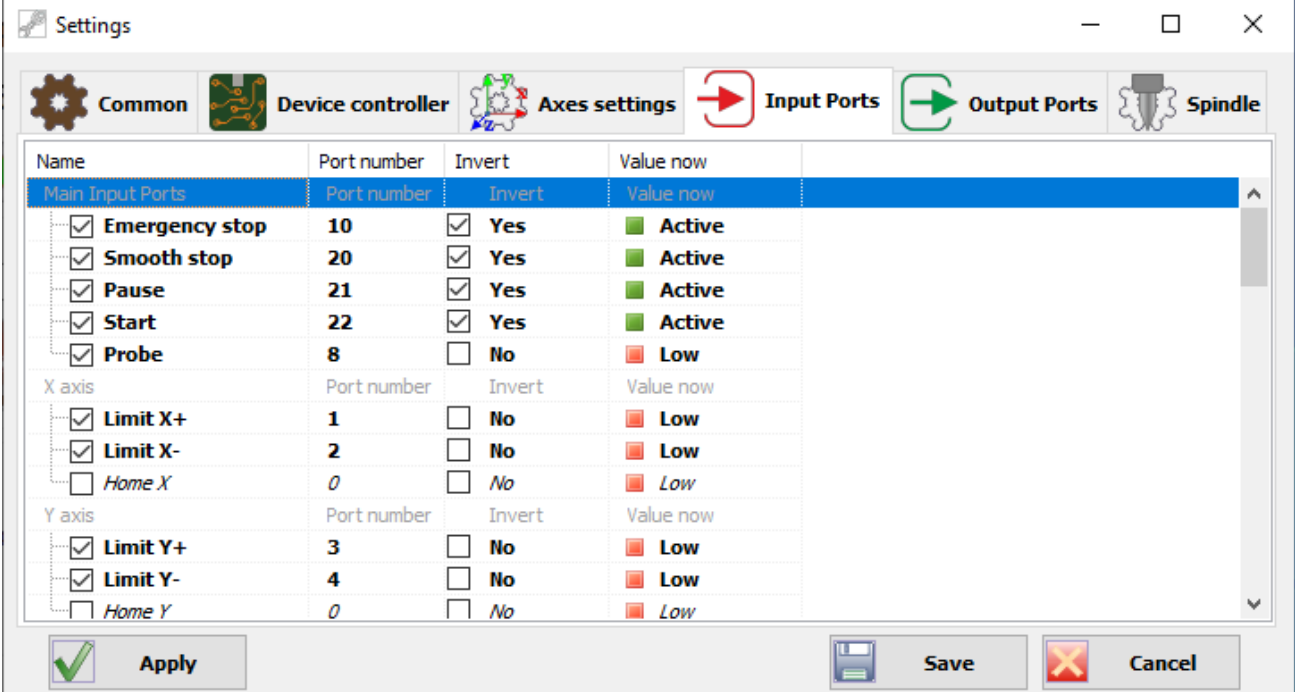
To configure a stepper motor or servo drive, go to the Axis Settings tab.



Set the required number of pulses for each axis. Save the settings. If necessary, specify the submission of the axes. Use the inversion setting to change the direction of rotation of the motor.

c. Configure Input Ports

To configure input ports, go to the Input Ports tab.



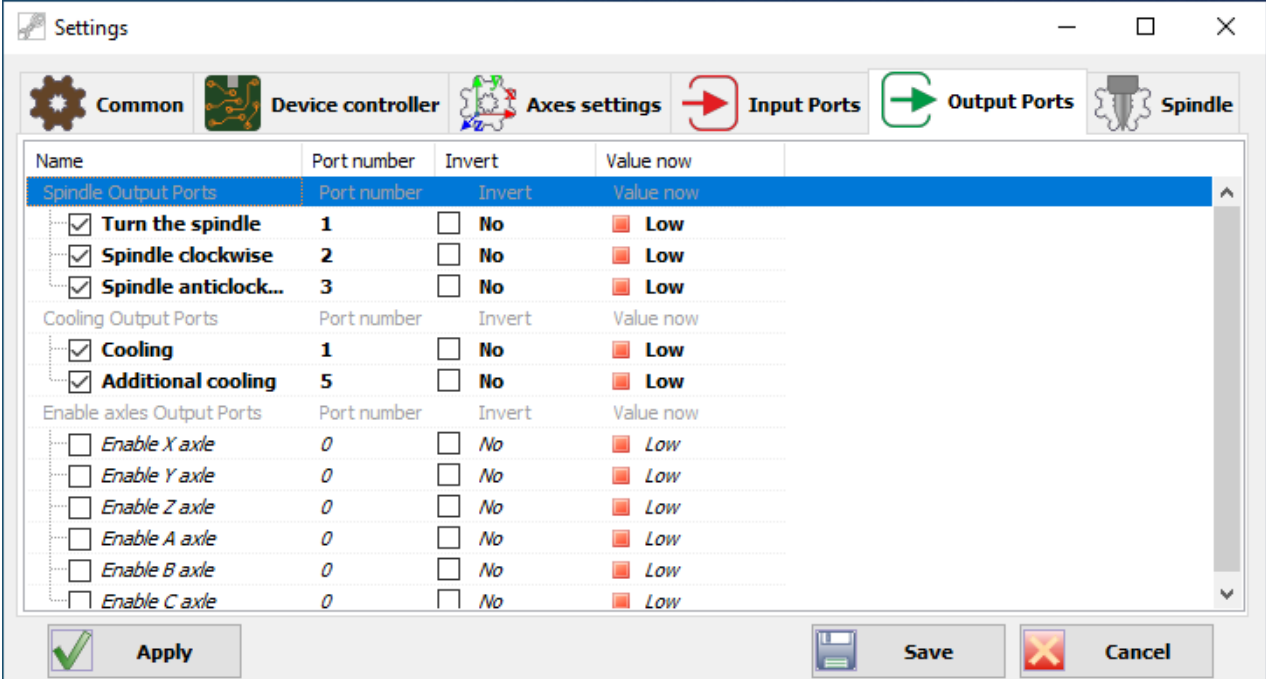
The screenshot shows the 'Settings' window with the 'Input Ports' tab selected. The window contains a table with columns: Name, Port number, Invert, and Value now. The table is divided into sections: Main Input Ports, X axis, and Y axis. The 'Main Input Ports' section has 5 rows: Emergency stop (Port 10, Invert Yes, Value Active), Smooth stop (Port 20, Invert Yes, Value Active), Pause (Port 21, Invert Yes, Value Active), Start (Port 22, Invert Yes, Value Active), and Probe (Port 8, Invert No, Value Low). The 'X axis' section has 3 rows: Limit X+ (Port 1, Invert No, Value Low), Limit X- (Port 2, Invert No, Value Low), and Home X (Port 0, Invert No, Value Low). The 'Y axis' section has 3 rows: Limit Y+ (Port 3, Invert No, Value Low), Limit Y- (Port 4, Invert No, Value Low), and Home Y (Port 0, Invert No, Value Low). At the bottom, there are buttons for Apply, Save, and Cancel.

Name	Port number	Invert	Value now
Main Input Ports			
<input checked="" type="checkbox"/> Emergency stop	10	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Active
<input checked="" type="checkbox"/> Smooth stop	20	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Active
<input checked="" type="checkbox"/> Pause	21	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Active
<input checked="" type="checkbox"/> Start	22	<input checked="" type="checkbox"/> Yes	<input checked="" type="checkbox"/> Active
<input checked="" type="checkbox"/> Probe	8	<input type="checkbox"/> No	<input type="checkbox"/> Low
X axis			
<input checked="" type="checkbox"/> Limit X+	1	<input type="checkbox"/> No	<input type="checkbox"/> Low
<input checked="" type="checkbox"/> Limit X-	2	<input type="checkbox"/> No	<input type="checkbox"/> Low
<input type="checkbox"/> Home X	0	<input type="checkbox"/> No	<input type="checkbox"/> Low
Y axis			
<input checked="" type="checkbox"/> Limit Y+	3	<input type="checkbox"/> No	<input type="checkbox"/> Low
<input checked="" type="checkbox"/> Limit Y-	4	<input type="checkbox"/> No	<input type="checkbox"/> Low
<input type="checkbox"/> Home Y	0	<input type="checkbox"/> No	<input type="checkbox"/> Low

Set the input port numbers according to the configuration of the machine and the CNC controller. Save the settings.

d. Configuring output ports

To configure output ports, click the Output Ports tab.



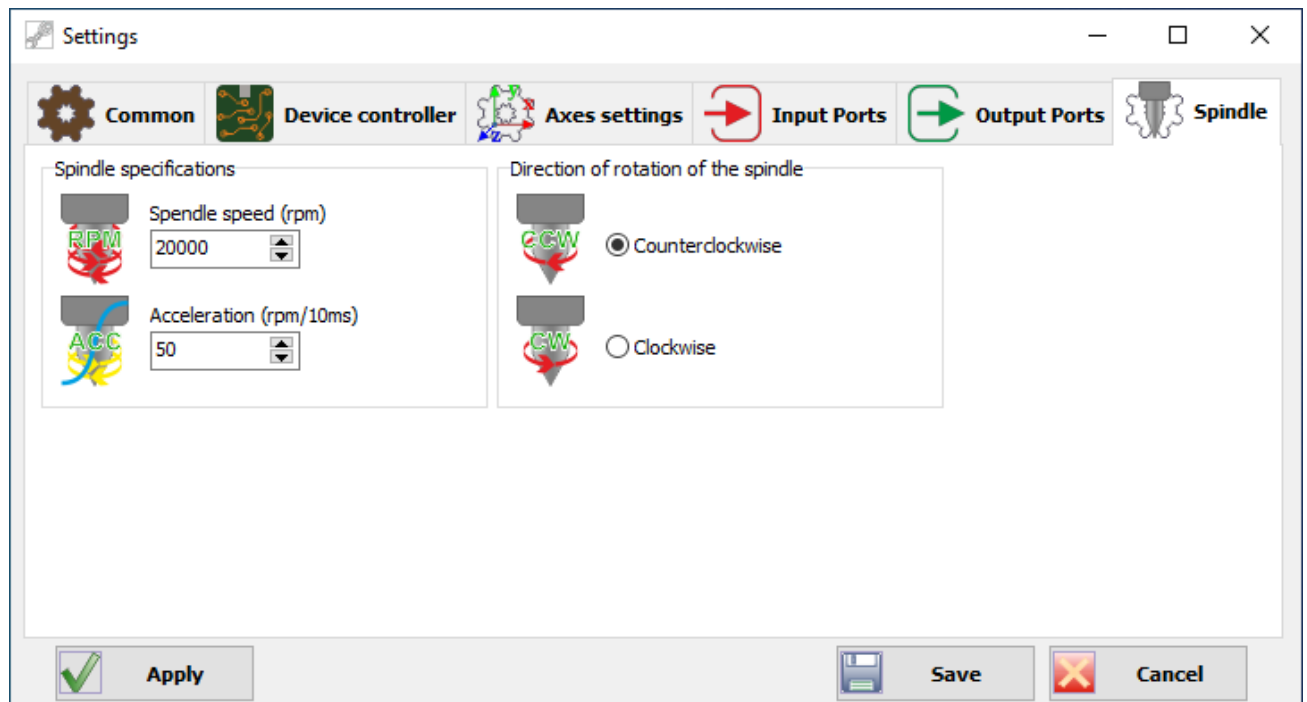
The screenshot shows the 'Settings' window with the 'Output Ports' tab selected. The window contains a table with columns: Name, Port number, Invert, and Value now. The table is divided into sections: Spindle Output Ports, Cooling Output Ports, and Enable axes Output Ports. The 'Spindle Output Ports' section has 3 rows: Turn the spindle (Port 1, Invert No, Value Low), Spindle clockwise (Port 2, Invert No, Value Low), and Spindle anticlockwise (Port 3, Invert No, Value Low). The 'Cooling Output Ports' section has 2 rows: Cooling (Port 1, Invert No, Value Low) and Additional cooling (Port 5, Invert No, Value Low). The 'Enable axes Output Ports' section has 6 rows: Enable X axis (Port 0, Invert No, Value Low), Enable Y axis (Port 0, Invert No, Value Low), Enable Z axis (Port 0, Invert No, Value Low), Enable A axis (Port 0, Invert No, Value Low), Enable B axis (Port 0, Invert No, Value Low), and Enable C axis (Port 0, Invert No, Value Low). At the bottom, there are buttons for Apply, Save, and Cancel.

Name	Port number	Invert	Value now
Spindle Output Ports			
<input checked="" type="checkbox"/> Turn the spindle	1	<input type="checkbox"/> No	<input type="checkbox"/> Low
<input checked="" type="checkbox"/> Spindle clockwise	2	<input type="checkbox"/> No	<input type="checkbox"/> Low
<input checked="" type="checkbox"/> Spindle anticlockwise	3	<input type="checkbox"/> No	<input type="checkbox"/> Low
Cooling Output Ports			
<input checked="" type="checkbox"/> Cooling	1	<input type="checkbox"/> No	<input type="checkbox"/> Low
<input checked="" type="checkbox"/> Additional cooling	5	<input type="checkbox"/> No	<input type="checkbox"/> Low
Enable axes Output Ports			
<input type="checkbox"/> Enable X axis	0	<input type="checkbox"/> No	<input type="checkbox"/> Low
<input type="checkbox"/> Enable Y axis	0	<input type="checkbox"/> No	<input type="checkbox"/> Low
<input type="checkbox"/> Enable Z axis	0	<input type="checkbox"/> No	<input type="checkbox"/> Low
<input type="checkbox"/> Enable A axis	0	<input type="checkbox"/> No	<input type="checkbox"/> Low
<input type="checkbox"/> Enable B axis	0	<input type="checkbox"/> No	<input type="checkbox"/> Low
<input type="checkbox"/> Enable C axis	0	<input type="checkbox"/> No	<input type="checkbox"/> Low

Set the output port numbers according to the configuration of the machine and the CNC controller. Save the settings.

e. Spindle adjustment

To configure the spindle parameters, you need to go to the "Spindle" tab.



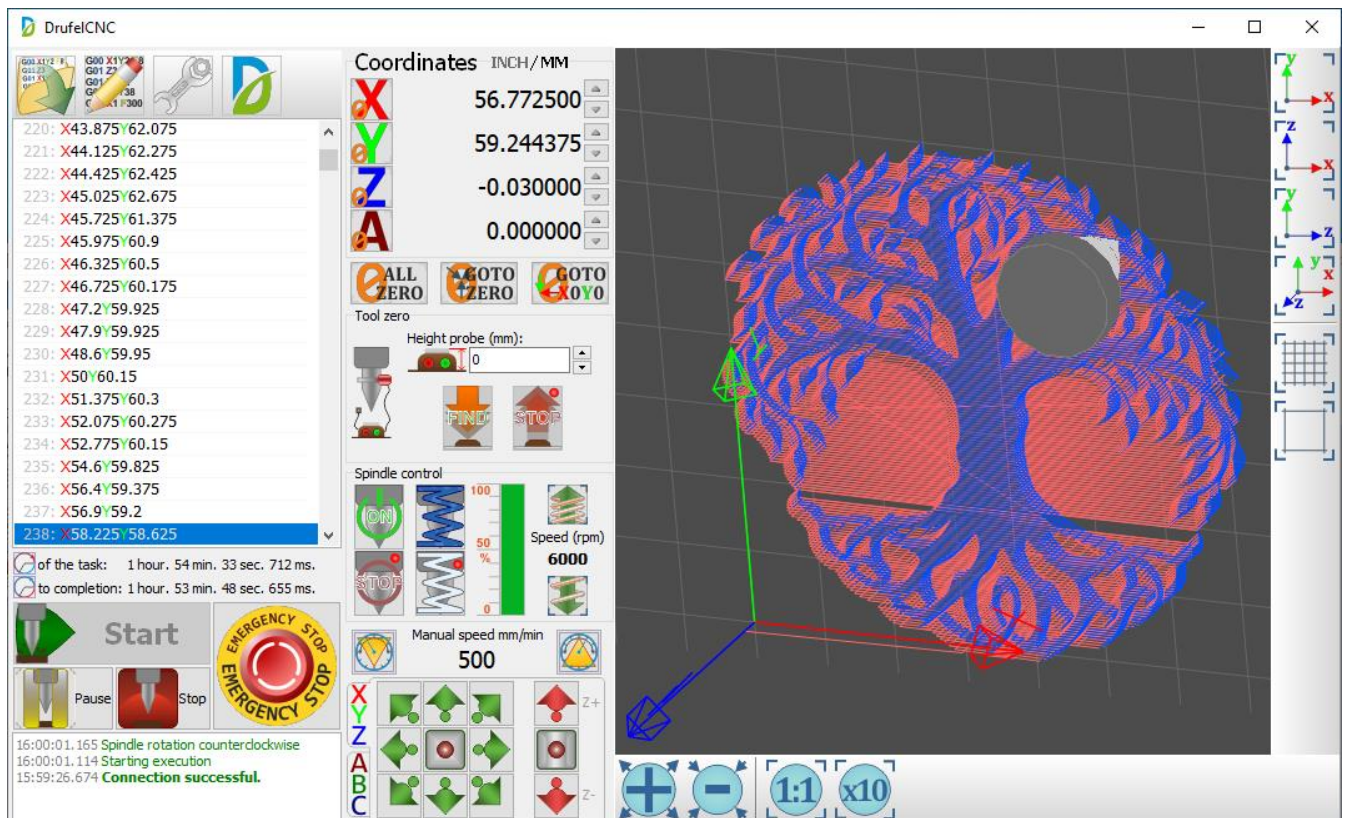
Set the speed and acceleration parameters according to the spindle specification. Set the default spindle rotation direction. Save the settings.

8. Run the control program (G-code)

To run the control program in the language of G-code, you must click on the

button with the image of the folder , then select the file.


If the file is recognized successfully, the three-dimensional model of the file will be displayed in the right part of the main window.



To start processing, click "Start" .

9. Search tool zero

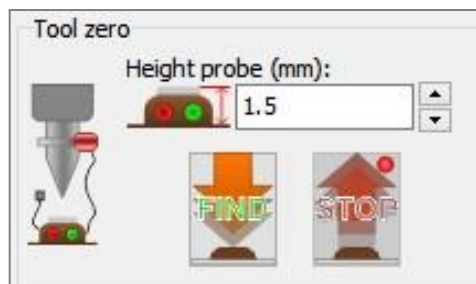
To begin searching for a tool zero, set the height of the sensor used. Next,

click . Wait until the end of the process.

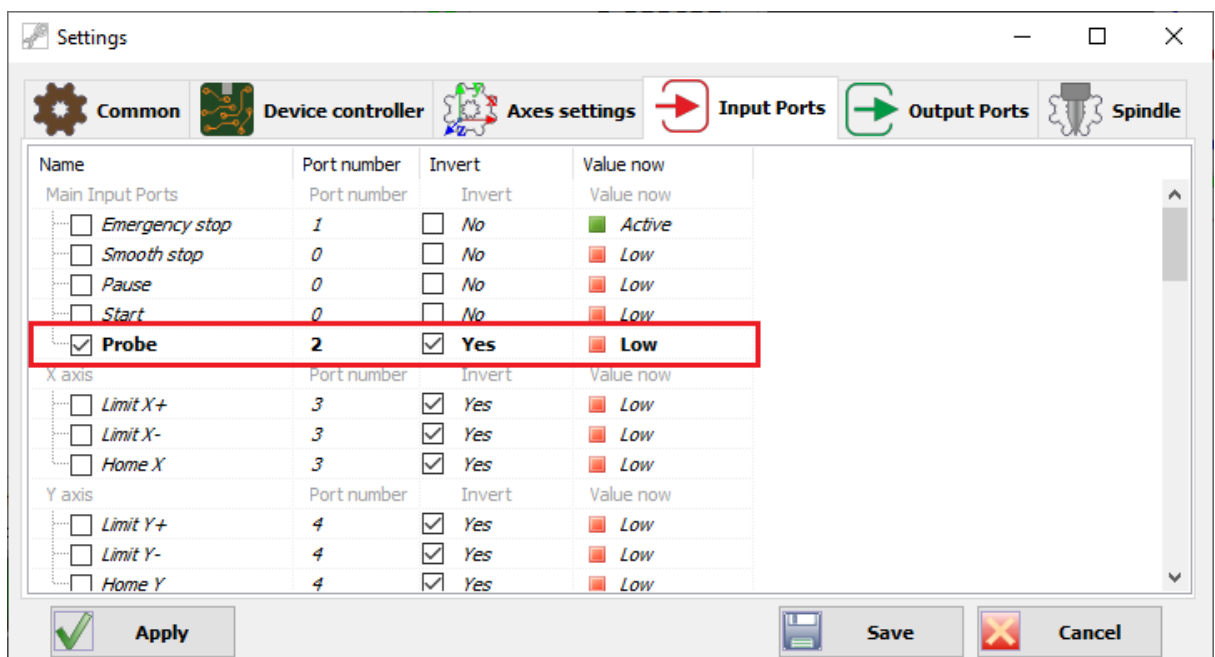
First you need to configure the input port number for the probe. The Z axis is assigned according to the value found and the height of the probe.

After completing the tool zero search, the tool will return to its original position.


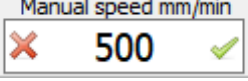

To cancel the tool zero search, click .



For the tool zero search to work correctly, you must set the input port number in accordance with the port number on the controller where your probe is connected.



10. Manual control

This field    sets the speed of movement of the instrument during manual operation.



- Speed reduction button.



- Speed increase button.

For manual control, press the corresponding joystick button



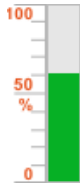
11. Spindle control and cooling



- Spindle power button.



- Spindle off button.



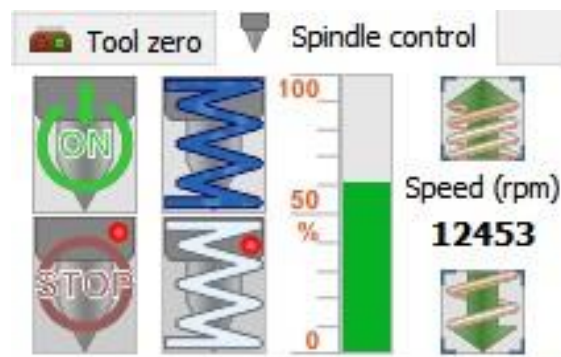
To set the spindle speed, click on the progress bar area.




- Button to increase the rotation of the spindle.









- Button to reduce the rotation of the spindle.




12. Assignment of coordinates












To reset the x-axis, click the button . To reset the remaining coordinates, click on similar buttons.



To set your own X coordinate axis, click the digital value of the X coordinate axis.   1.246875 . In the field that appears, enter the desired value and click on the button . To cancel the entry, click .

Use the buttons to set more accurate coordinates . To set the values of the remaining coordinates, use the same action algorithm.

To reset all coordinates, click on the button .

To move the tool to zero coordinates, click . To go to the coordinates X0 and Y0, click on the button .

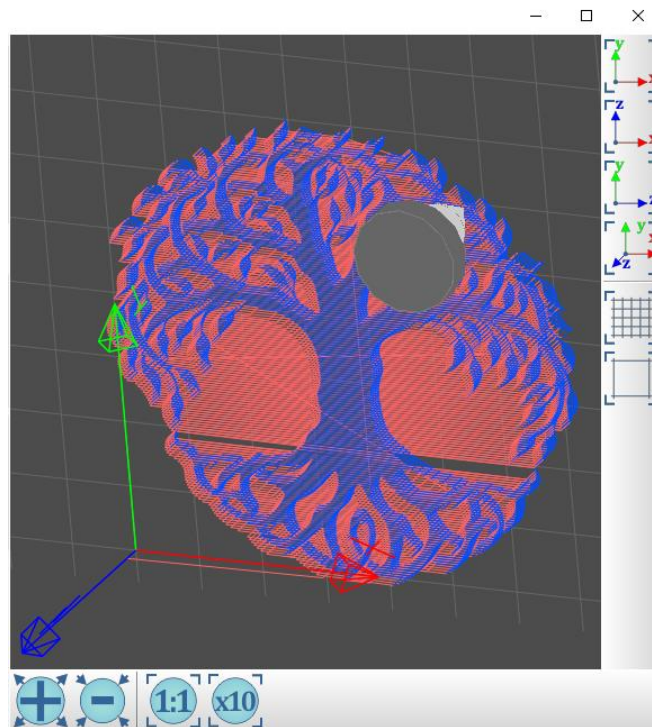
Coordinates		INCH/MM
	X	88.005000 
	Y	33.080625 
	Z	12.545625 
	A	12.003125 
  		

The default system of units is millimeters. To set the units in inches, click on **Coordinates** . To set the system of units in millimeters, click on **Coordinates** .

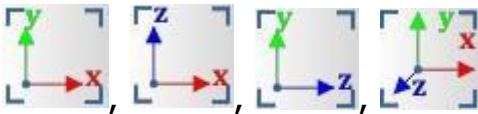
The current coordinate system is highlighted in black.

13. Display 3D model


The code you downloaded is displayed as a 3D model on the right side of the application window.

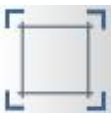


To rotate the 3D model, move the mouse pointer to the display area of the 3D model. Right-click and hold to move the mouse pointer. You can also use


additional buttons. . To zoom the 3D model, use

the mouse wheel or . To move the model in the plane, use the left mouse button.

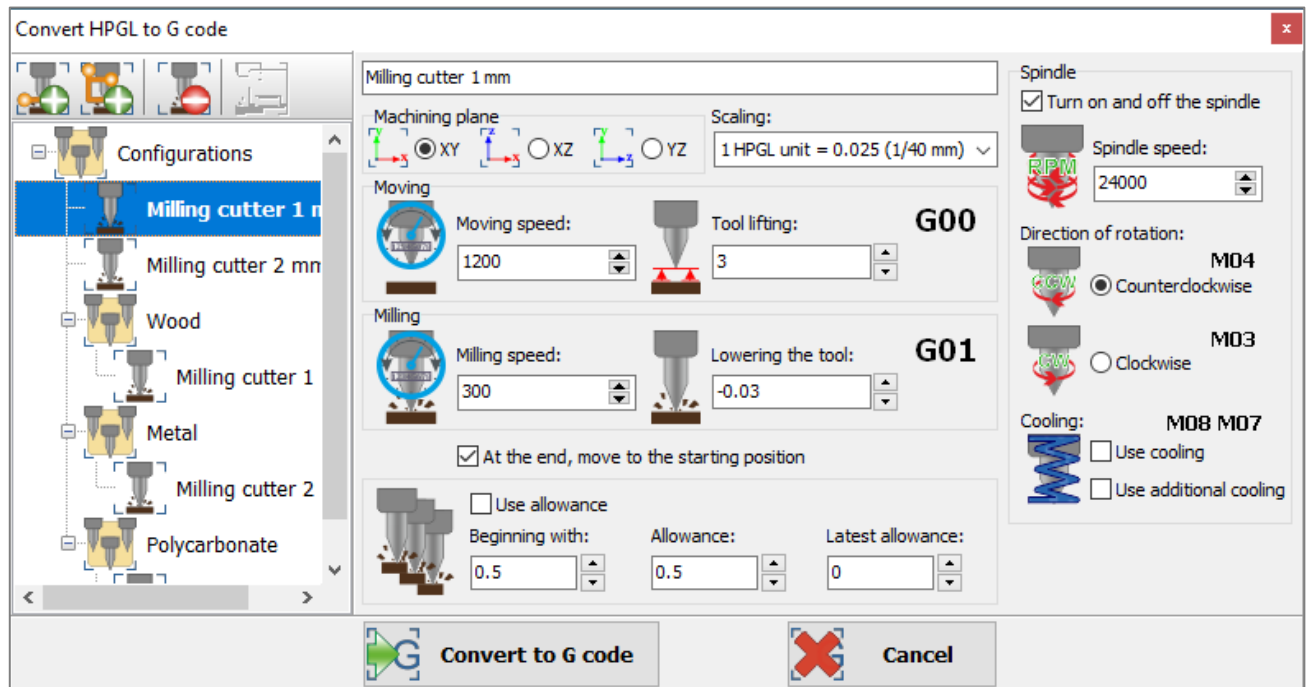
To turn on the grid, click on the button . In order to turn off the grid, click

on the button . Grid enabled by default.

14. Opening HPGL files


To open files in HPGL format, you must click on the button with the image of the folder , then select the file.

In the window that opens, you must select the parameters for converting HPGL to G-code.

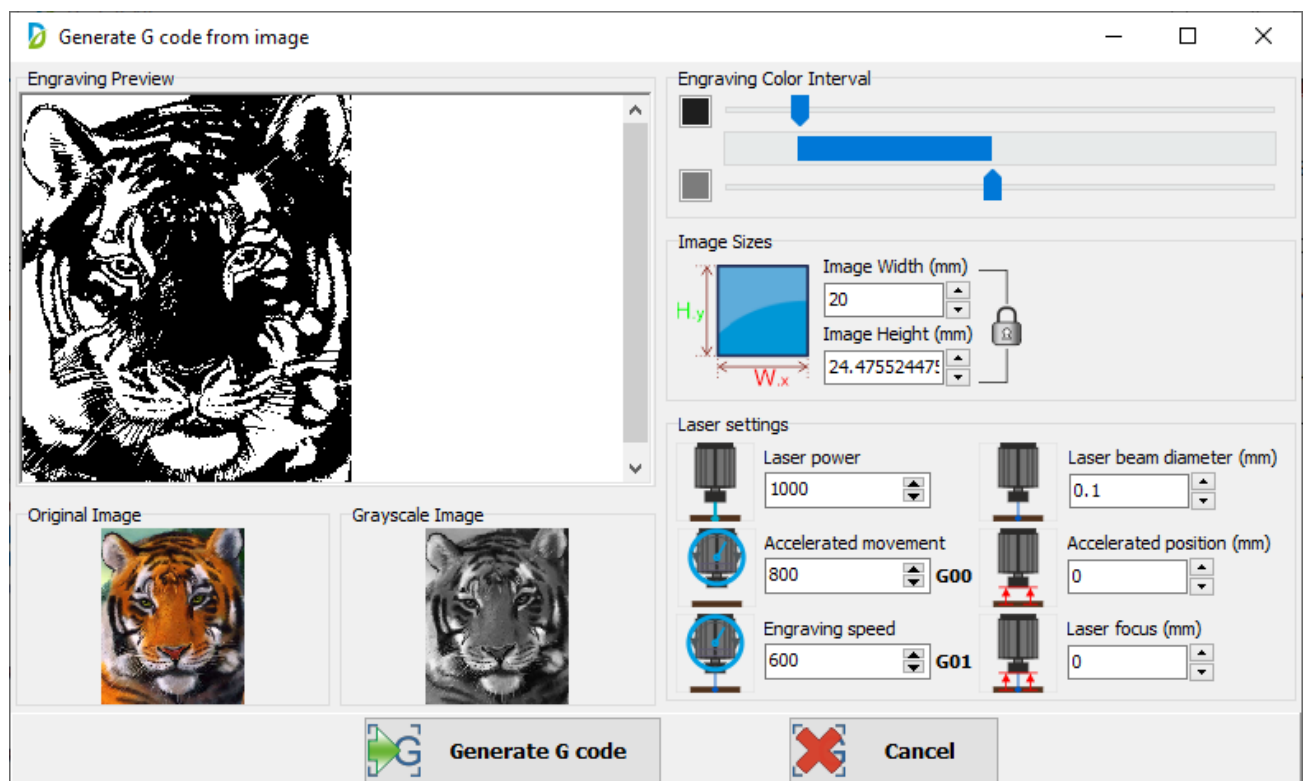


After successful conversion, you will see a three-dimensional model of the file.

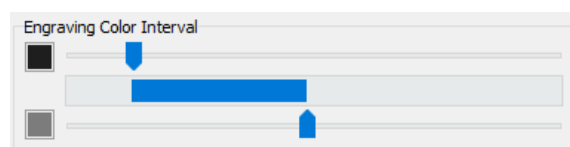
15. Generating a G-code from an image

To open a file in the format (png, jpeg, gif, bmp), you must click on the button with the image of the folder , or select the necessary file and transfer it to the G-code field.

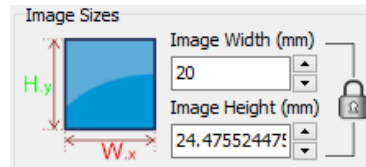
In the window that opens, you must select the options for converting the image into a G-code.




In the engraving color interval block, you can adjust the color interval.



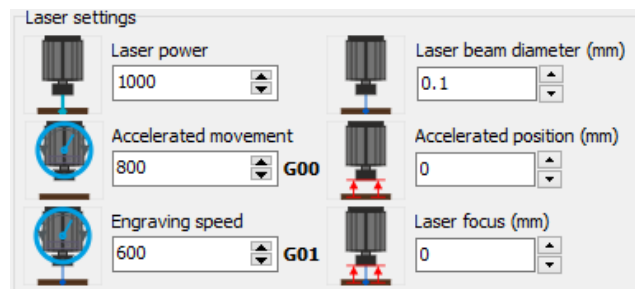
In the Image Sizes block, you can adjust the image size.





 - proportional image resizing.


 - not proportional image resizing.


In the Laser Settings block, you can configure the laser settings.





 - laser power setting

 - accelerated position adjustment (mm)

 - accelerated motion setting (G00)

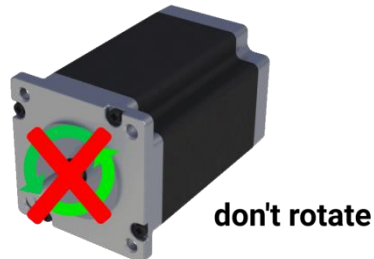
 - laser focus adjustment

 - engraving speed setting

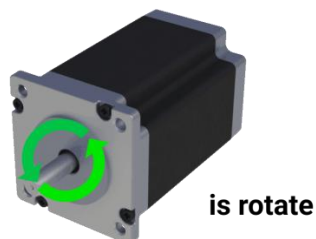
 - laser beam diameter adjustment (mm)

16. Stepper motors

If your stepper motors don't rotate



Turn on Step Invert ☒ Step Invert



If you doubt the correct connection of ENA + ENA- then temporarily do not connect it. Make sure your motors spin. The default ENA port is activated on most stepper motor drivers.

