PUMOTIX

CNC ETHERNET CONTROLLER
PLCM-E1b

CONTENTS:

1 GENERAL INFORMATION

01

This device is PLCM series controller (see "User manual"). It has input-output port and USB interface for connection with PC. This port corresponds with LPT-port of PC in form and location.

It`s recommended to use the PLCM in conjunction with the breakout boards PLC4x-G2, PLC5x, PLC6x-G2. It will provide opto-isolation of input signals. PLCM inputs and outputs can be connected directly to the driver, it`s recommended to use PLB-D25M, PLB-DB25M adapters for such connection.

2 DELIVERY SET

02

- PLCM-E1b controller – 1 pcs.
- Ethernet cable – 1 pcs.

ATTENTION!
TURN OFF POWER DEVICE BEFORE MAKING ANY CONNECTIONS.
POWER SUPPLY NEGATIVE WIRE CONNECTION WITH GROUND (GND), HOUSING AND ETC. IS FORBIDDEN.
HIGH-QUALITY SHIELDED CONNECTION CABLES IS RECOMMENDED TO USE.

3

03

TECHNICAL SPECIFICATIONS

Supply voltage	12V DC
Maximum consumption current	250 mA
Control interface	Ethernet, connector type 8P8C («RJ-45») STEP/DIR/ENABLE signals transmission, input signals transmission Control program: PUMOTIX
STEP signals maximum frequency	100 kHz
Quantity of inputs	5 pcs, buffered Logical levels: "0"<1.8V, "1">2.5V Maximum input voltage: 15V
Quantity of outputs	12 pcs, buffered, 5V, 10 mA MAX
Max number of simultaneously controlled axes	6
Isolation resistance	500 MOhm
Operating temperature	0...50 °C
Net weight	0.3 kg
Overall dimensions (Width x Height x Depth)	83 x 27 x 66 mm

4

04

BASIC SOCKETS AND INDICATORS

• For controller power supply, direct current source is used, supply voltage is 12V.

• Ethernet connector is designed for PLCM-E1b connection to local area network. The connection must be performed with cable 5 or of higher category. You can apply patch-cords with straight through or crossover crimping type. Direct connection to PC without commutator usage is possible.

• P1 Port represents LTP PC port analog and has identical assignment and location of contacts:
Outputs 1, 2, 3, 4, 5, 6, 7, 8, 9, 14, 16, 17.
Inputs 10, 11, 12, 13, 15.

• RESET button is for IP-address of controller current value reset to default value.

• Coil short-circuit module protection, wrong stepper motor connection protection (192.168.10.10).
To do this it is necessary to:

1) Disconnect controller power supply.

2) Press and hold down RESET.
3) Supply power voltage, pressing RESET.
4) Release RESET in 1-2 sec.
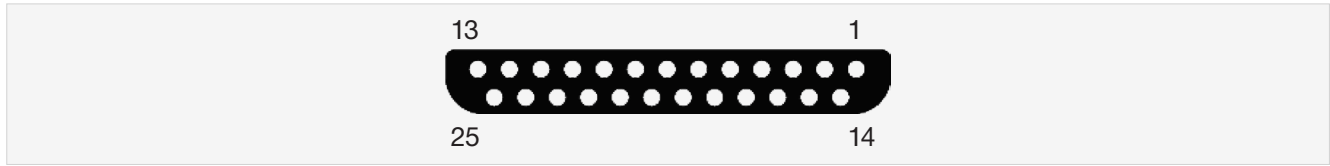
Номер пина	Назначение	Input/Output
1	ENABLE	Output
2	STEP1	Output
3	STEP2	Output
4	STEP3	Output
5	STEP4	Output
6	STEP5	Output
7	DIR1	Output
8	DIR2	Output
9	DIR3	Output
10	IN1	Input
11	IN2	Input
12	IN3	Input
13	IN4	Input
14	DIR4	Output
15	IN5	Input
16	DIR5	Output
17	DIR6	Output
18-25	GND	-

Fig. 1. Pinout of the LPT-compatible P1 port

5 SOFTWARE INSTALLATION AND SETTING

1. Turn on the controller and connect it to the Ethernet.
Link LED should to light up in the process of Ethernet connection.

2. Install the PUMOTIX software.

To install the software, download the archive from the pumotix.com, unzip it, run the installation file contained in it and follow the recommendations of the installation wizard.

3. After installation, run the program using the shortcut on the desktop or in the Start menu.

PUMOTIX software is based on a client-server architecture. The server part is intended for direct control of the CNC machine using the controller, the client part provides the transmission of operator commands and the display of information received from the server part.

The interaction between them, as well as between the server part and the controller is provided by means of the Ethernet local area network. However, using the controller does not require installation of any additional drivers. The client and server parts can be located on the same physical computer, or on different computers in the same local area network. At the same time, it is allowed to communicate between a client and a server parts via wireless network segments while ensuring the stability and noise immunity of the communication channel. The interaction of the server part and the controller is recommended to be provided via a wired communication channel.

Attention:
Communication failure between the server and the controller automatically stops the program being executed by the machine.
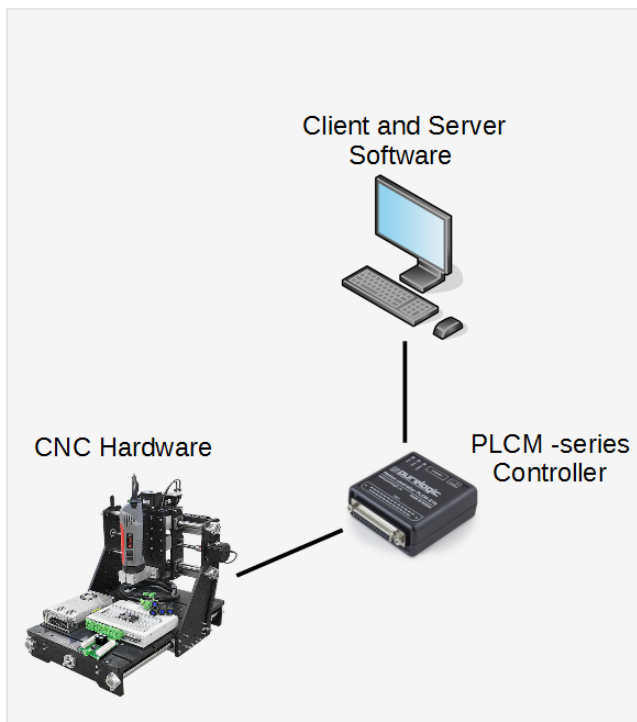
05

Fig. 2. The option of deploying the system on a single computer
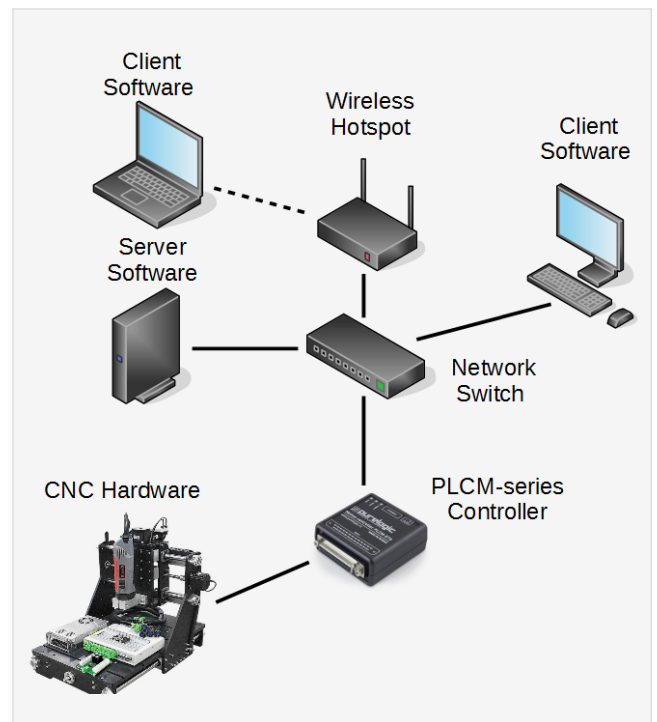

Fig. 3. The option of deploying the system in a local network

After starting the client part of the program, a window for selecting the starting module will appear. A module is a set of functionalities and interface elements loaded at program startup that is designed to support a particular workflow (Milling, plasma cutting, gas cutting, etc.).

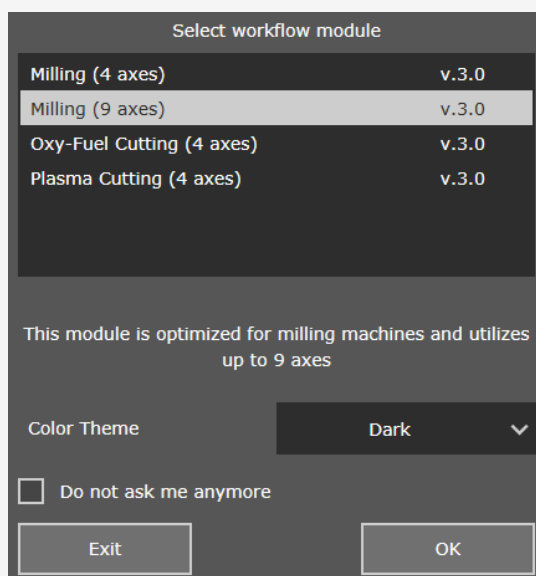Check pumotix.com for more information

Fig. 4. Select workflow module

Select the starter module you need and confirm your choice with the OK button. After loading the selected module, the client interface will appear on the screen.
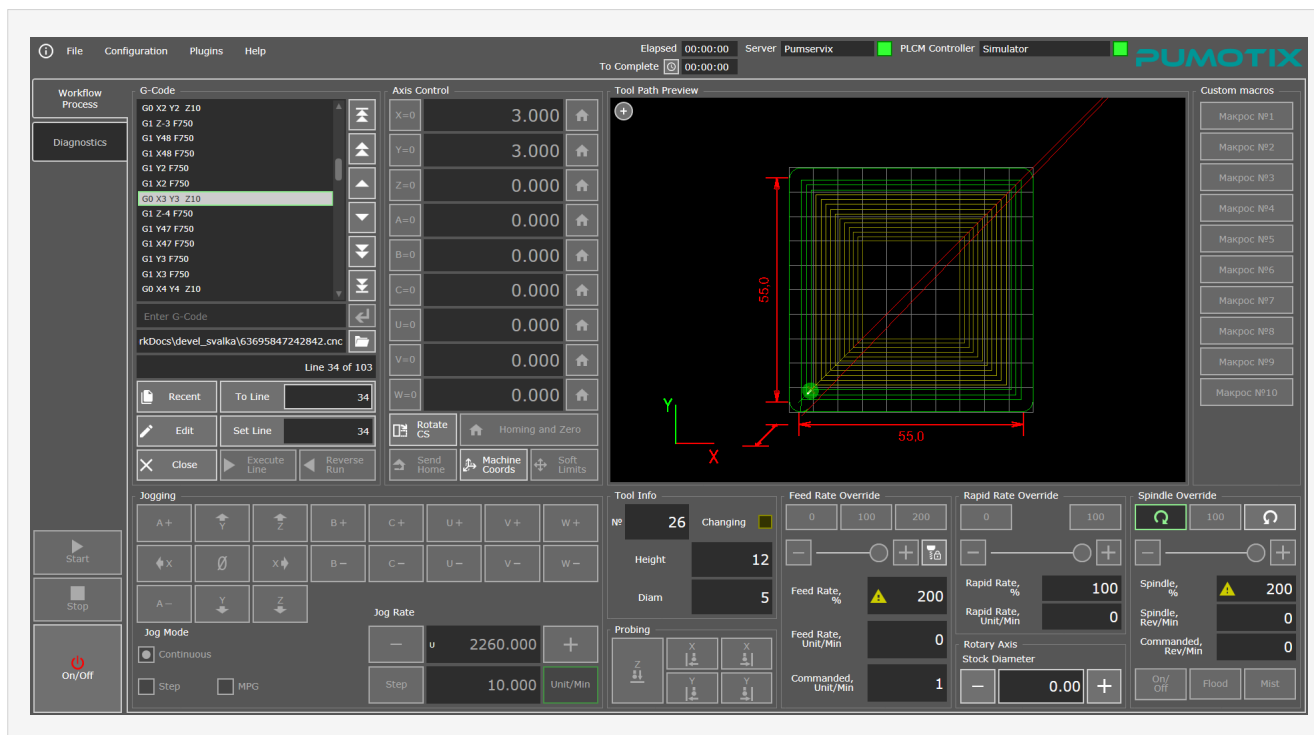

Fig. 5. The interface of the client part connected to the server

The appearance and composition of the controls may vary depending on the selected module and the theme used. If the client part of the program at startup could not automatically connect to the server part for one reason or another, then the window will look like this (fig. 6):
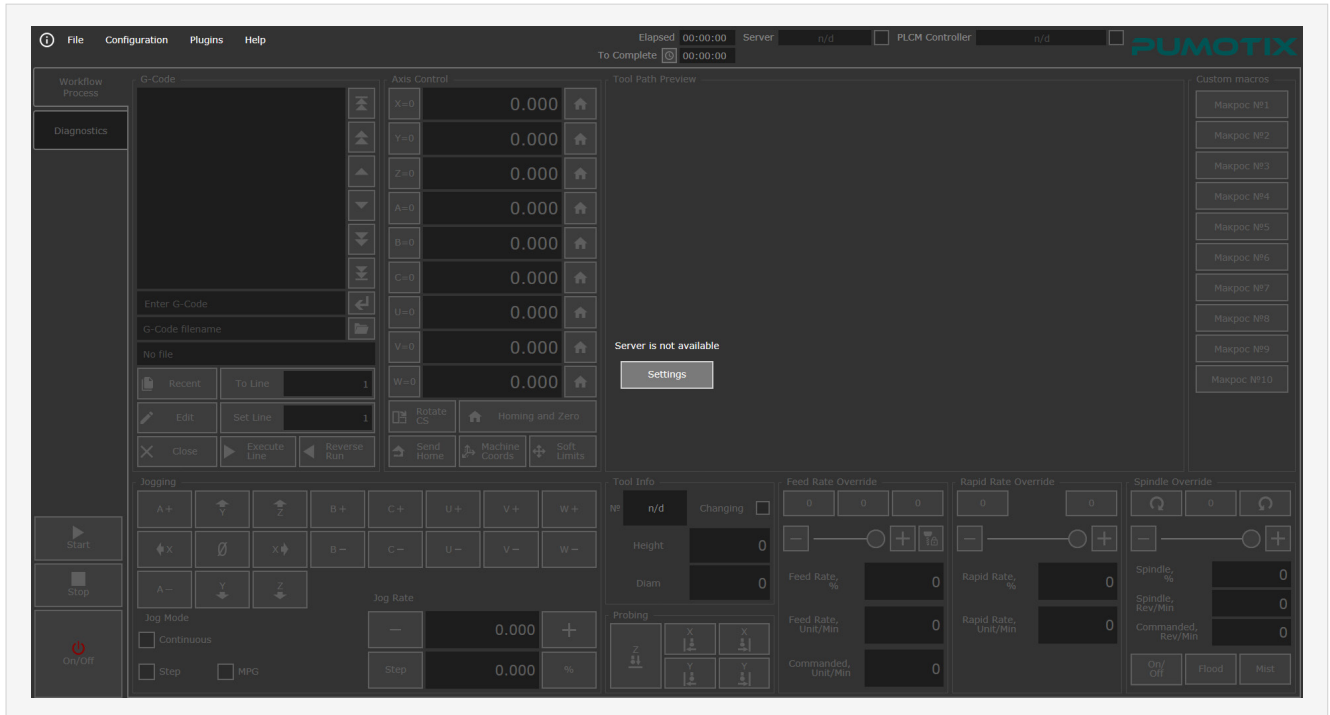
PLCM-E1b

Fig. 6. The appearance of the client window that does not have a connection to the server

In order to find the server part of the software and connect to it, click the Settings button. The program settings window will open on the "General Settings" tab, it will automatically search for servers available in your local network and connect to the first one found.
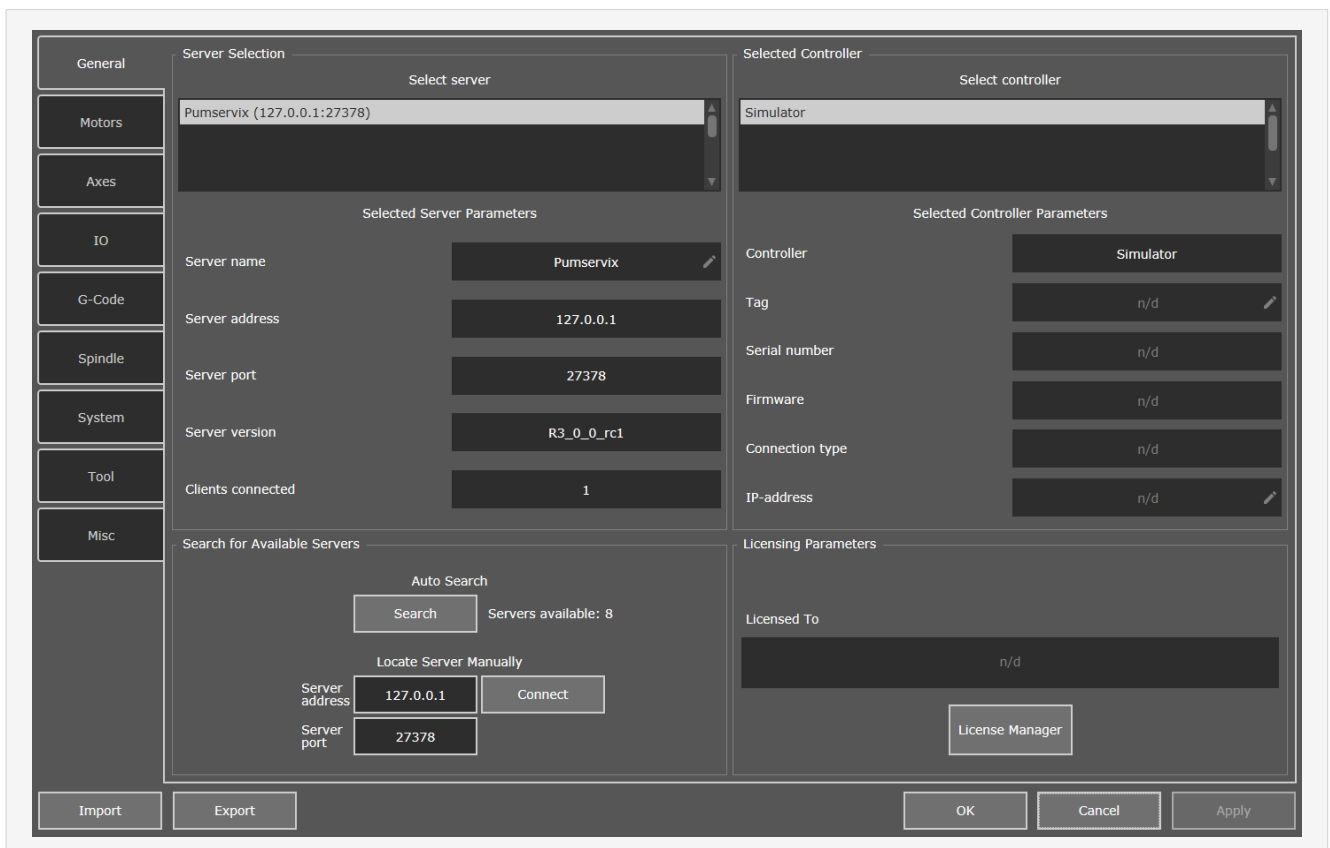

Fig. 7. Appearance tab of the settings window «General settings»

A list of detected servers will be displayed in the upper left area of the screen, the selected server will be highlighted. If the list of servers is empty, then make sure that the server part of the program is running on a local or remote computer on your local network and is not blocked by your firewall. You can repeat the automatic server search using the "Search" button in the lower left part of the "Settings" window.

The upper right pane of the window displays a list of PLCM controllers available on your network. By default, immediately after the first entry into the settings window, the software controller simulator is selected. It is intended solely for demonstration purposes and allows you to evaluate the functionality of the software. It is not possible to control a real CNC machine using a simulator - for this you need a PLCM series hardware controller. Search and update of the list of available controllers is done automatically by the server side of the software. If your controller is not listed, then check its connection to the power supply and your local network.

To connect to the controller, select it in the list of detected devices. This will automatically begin the process of updating the controller firmware (if necessary). This process can take up to several minutes, while the corresponding inscription is displayed on the screen. Do not interrupt it or turn off the system while updating the firmware.
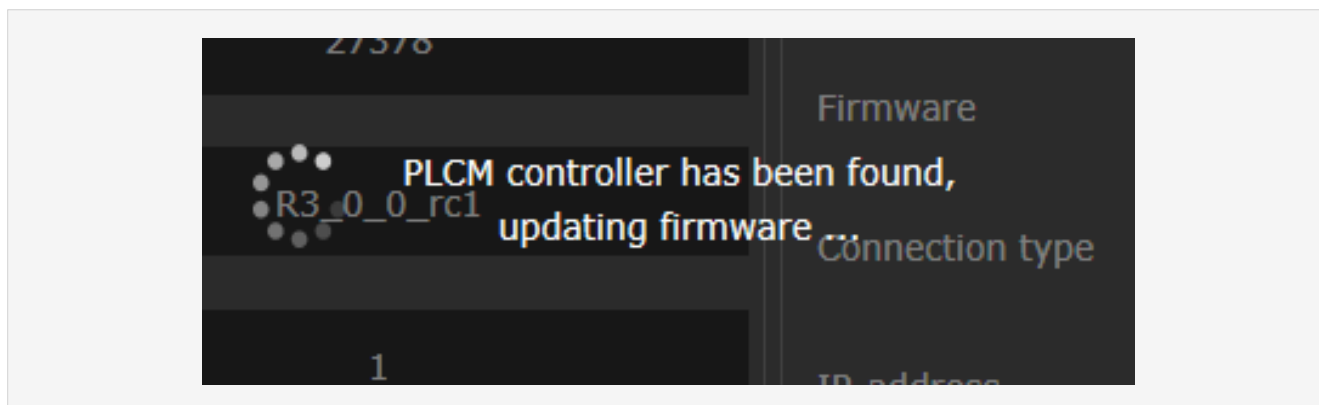

Fig. 8. Updating the controller firmware

At the end of the firmware update, the server will try to automatically connect to the controller. For this, the controller must have the correct IP address. By default, it is configured to automatically obtain an IP address from a DHCP server on the network. If this is not possible (for example, if the computer and the controller are connected directly by a network cable or there is no DHCP server in the network), the controller will automatically receive an address of the form 169.254. XXX.XXX. This address can be used, but stable operation is not guaranteed on all operating systems, so we recommend changing it to a more correct one.

To do this, you need to assign static IP addresses to the network card of the computer to which the controller is connected, and to the controller itself. First, configure the static address of the network card on your computer. To do this, follow these steps:

 - for Windows XP: Start → Control Panel → Network Connections;
 for Windows Vista and newer: press the key combination Win () + R, enter the command ncpa.cpl in the opened "Run" window and press the Enter key;
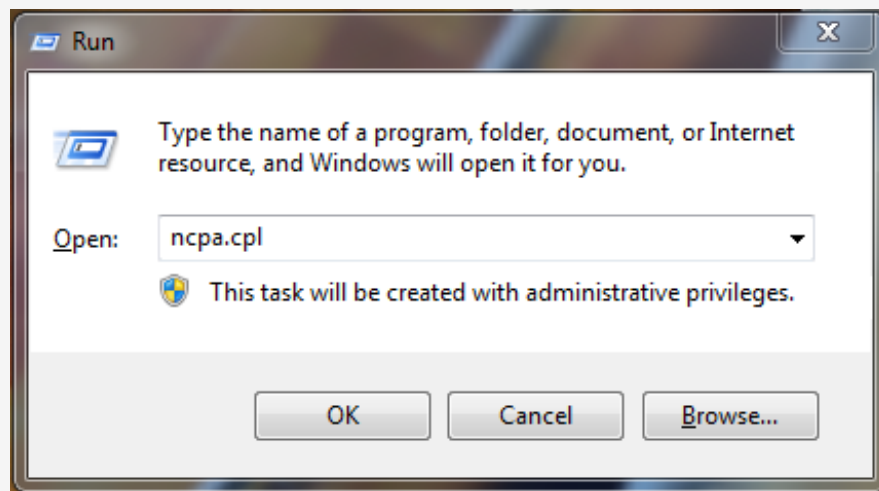
Fig. 9. Run dialog box

- find in the window that opens the network connection used to work with your controller, right-click on it and select the "Properties" menu option;

- in the window that appears, select the item "Internet Protocol Version 4 (TCP/IPv4)" and click the "Properties" button (fig. 10);
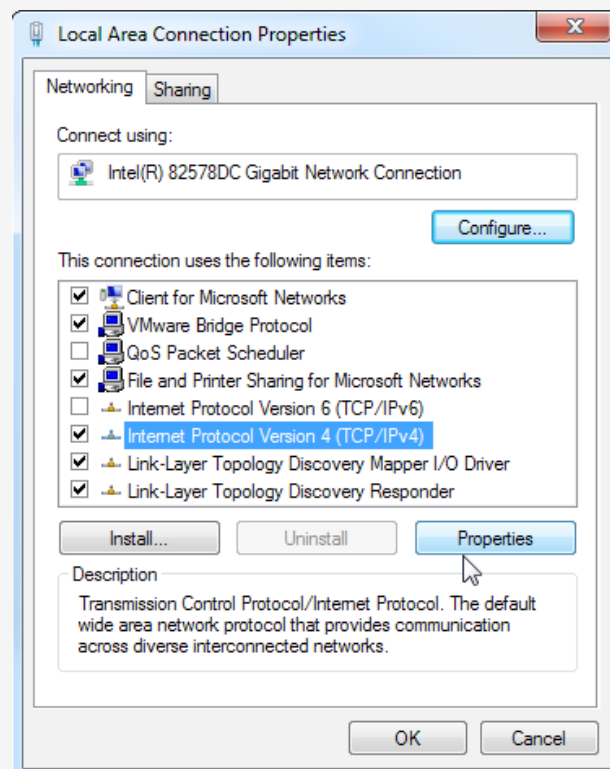

Fig. 10. Network connection properties window

- in the window that appears, set the IP address from the range of local addresses (for example, 192.168.10.5), the default mask (255.255.255.0), leave the remaining fields empty, and then confirm the selection with the OK button.
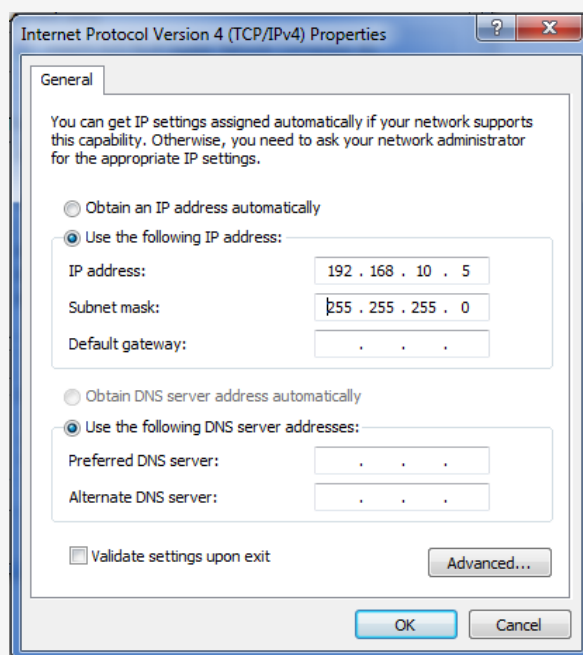
Fig. 11. Configuring a Windows Network Connection

Now configure the PLCM controller address. To do this, you need to return to the program window, select your controller again in the settings, wait for a message to appear that there is no connection with it, and then click the «Change address» button. In the "PLCM controller connection settings" window that appears, select the «Use the following IP address» option, then set the address from the same subnet as the address of the network card of your computer (for example, 192.168.10.10), the default mask (255.255.255.0) and click Apply button. This will configure the network address of the controller and try again to connect to it. If the attempt is successful, then information about the controller you selected appears in the settings window (fig. 12).
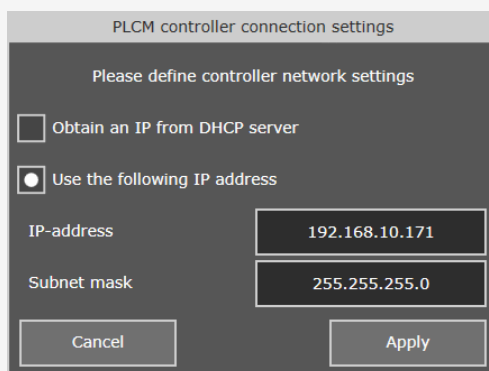

Fig. 12. Configuring the controller connection settting

Notice the "Licensing Parameters" area at the bottom of the "General Settings" tab. The data of the license holder is reflected here, as well as a button for switching to the «License Manager» window is placed.

All license information, including available, active and inactive options, their expiration dates and owner data, is available in the PUMOTIX License Manager window.
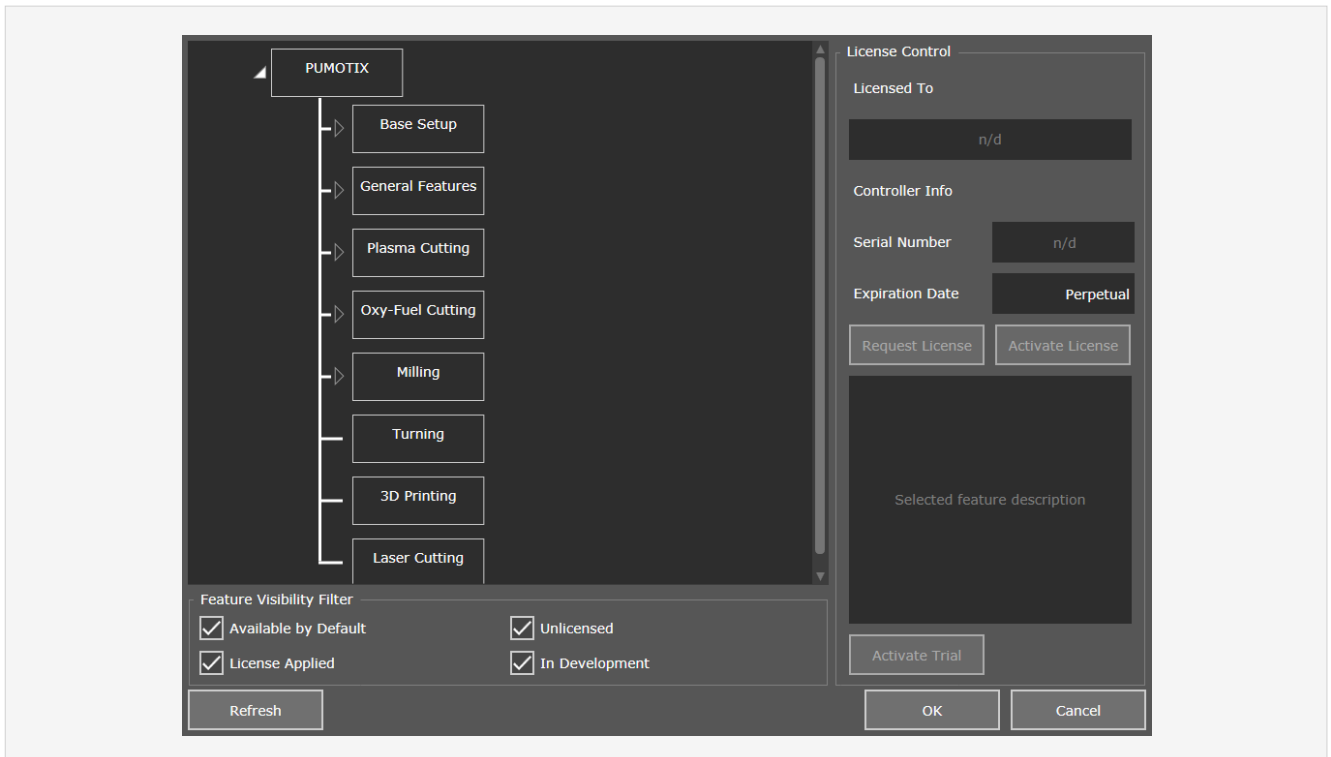
Fig. 13. License manager

The window consists of an features tree, a custom visibility filter, and a license control unit.

It includes information about the license owner and the controller, and also license request and activation buttons.

In order to see the description or activate the trial period (if one is provided), left-click on any feature. Use pumotix.com to select features and purchase a license.

Before buying, you can use the trial period. To do this, select the feature you are interested directly in the program and click the "Activate trial" button. After activation, the selected feature will be highlighted in yellow, and inside it will appear the time until the trial ends.

Attention:

A trial period is not available for some features!

The trial period is presented as a countdown. The duration of the trial period is reduced only during operation of the machine!

Follow these steps to activate a license:

1. Make the purchase of the necessary features at pumotix.com. After payment, the generation of an individual license file will be available.
2. Download the license file from the site.
3. Open the PUMOTIX program, then Configuration → License Manager → Activate License.
4. Select the downloaded license file, click the «Open» button.

After completing all the steps, the license is activated, the available features in the features tree will be highlighted with a green frame. Also, an expiration date will appear inside them, which can be up to a certain date and time or unlimited. In the license control block, the name of the owner and information about the controller will appear.
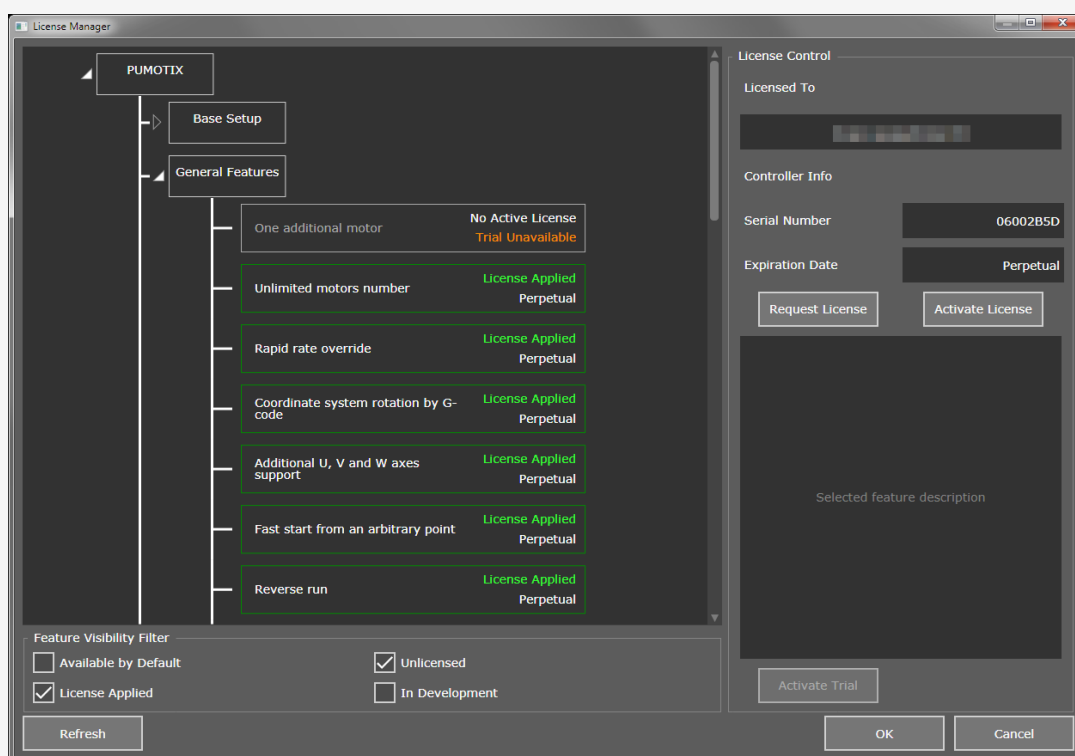
Fig. 14. Available features in the features tree

6 Terms of Warranty

The warranty period is 12 months after purchasing and is valid only if all operational conditions and scheduled maintenance are strictly followed.

1. General terms

1.1. In case of product acquisition as separate components, Seller guarantees working ability of every component, but does not assume responsibility for the quality of their joint work (mismatch of components). If you have questions please consult our technical support team.

1.2. Seller does not guarantee compatibility of the purchased product with the one that Buyer already has or bought from third parties.

1.3. Product's component parts and configuration can be changed by manufacturer without notice due to the product consistent technical improvement.

2. Conditions for warranty acceptance

2.1. The product is accepted only in the same completeness of set as it was purchased.

3. Warranty service procedure

3.1. Warranty service is performed by testing the claimed product defect.
3.2. If the defect is proved, warranty repair is carried out.

06

4. We do not assume any responsibility for glass, electric lamps, starters and expendable materials as well as:

4.1. Damaged product caused by inappropriate transport and store conditions, wrong connection, operation in abnormal (off-design) mode, or in conditions which are not manufacturer-supplied (including temperature and humidity out of limits of recommended range), having damages due to third-party circumstances (voltage jumps, natural disasters, etc.), also having mechanical or thermal damages.

4.2. The product with traces of foreign objects or substances impact, including dust, liquids, insects, also objects having extraneous inscription.

4.3. The product with traces of unauthorized tampering and (or) repair process (traces of opening, home-made soldering, elements changing etc).

4.4. The product with self-diagnostic function that shows improper exploitation.

4.5. Technically complex product in respect of which assembly and integration and start-up works were not performed by Seller specialists or by recommended organizations, except in cases directly regulated under goods documentation.

4.6. In cases when the product exploitation was performed in conditions when power supply did not correspond with manufacturer's requirements, also when there is no electrical protection device.

4.7. The product which was resold by the initial buyer to the third party.

4.8. The product with defects which were caused by low-quality spare parts or fulfilled their service life spare parts, consumable materials, also using spare parts, consumable materials not corresponding with manufacturer's requirements.

We draw your attention to the fact that there can be some changes in this instruction due to the product consistent technical improvement. You can always download our latest versions at pumotix.com

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