PX987

DALI / DMX – Art-Net Interface

User manual

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Manufacturer reserves the right to make modifications in order to improve device operation.

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1 Description

PX987 – DALI to DMX and Art-Net Signal Converter

The PX987 is an advanced interface designed to integrate lighting systems using the DALI protocol with installations controlled via DMX and Art-Net.

With the PX987, control signals transmitted via the DALI standard can be converted and used to control devices operating with DMX and Art-Net protocols. The converter provides a practical solution wherever different lighting control standards need to be integrated within a single installation.

The device is equipped with one DMX port and one DALI port.

The PX987 can be configured and managed in two ways: using the buttons and display on the device enclosure or via the built-in web server, which provides convenient access to device parameters through a web browser. Available functions include:

- Scanning for devices connected to the DALI bus,
- Configuring DALI-to-DMX and DALI-to-Art-Net signal conversion parameters,
- Changing the device's network settings,
- Updating the firmware.

The converter is housed in a compact enclosure designed for mounting on a standard 35mm DIN rail. The device is powered by a safety extra-low voltage supply of 12 – 24V DC.

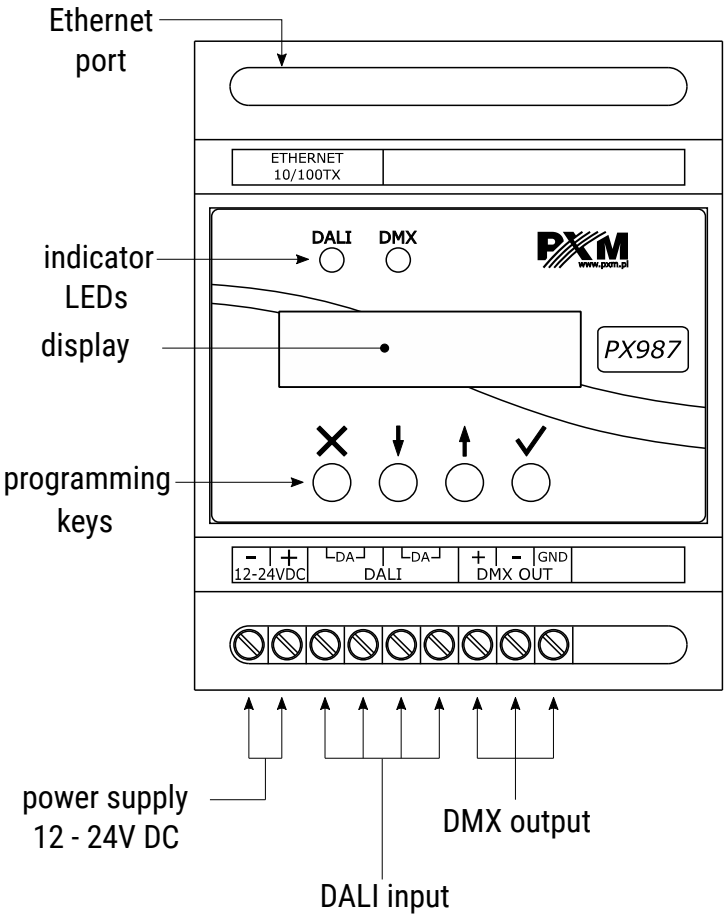
Please note that the DALI bus requires a separate, independent power supply.

2 Safety conditions

PX987 is a device powered with safe voltage 12 – 24V DC; however, during its installation and use the following rules must be strictly observed:

1. The device may only be connected to 12 – 24V DC with current-carrying capacity compatible with technical data.
2. All the conductors should be protected against mechanical and thermal damage.
3. In the event of damaging any conductor, it should be replaced with a conductor of the same technical data.
4. Connection of DMX signal can only be made with shielded conductor.
5. All repairs and connections of outputs or DMX signal can only be made with cut off power supply.
6. The PX987 should be strictly protected against contact with water and other liquids.
7. All sudden shocks, particularly dropping, should be avoided.
8. The device cannot be turned on in places with humidity exceeding 90%.
9. The device cannot be used in places with temperature lower than +2°C or higher than +40°C.
10. Clean with damp duster only.

3 Connectors and control elements



4 Programming using buttons

4.1 Navigating the menu

✕ (escape)	- allows to exit the parameter being programmed without saving any changes or to move to a higher menu level
↓ (previous)	- scrolls the menu up or reduces the values to be set
↑ (next)	- scrolls the menu down or increases the values to be set
✓ (enter)	- allows to enter the programming mode and confirm the values set

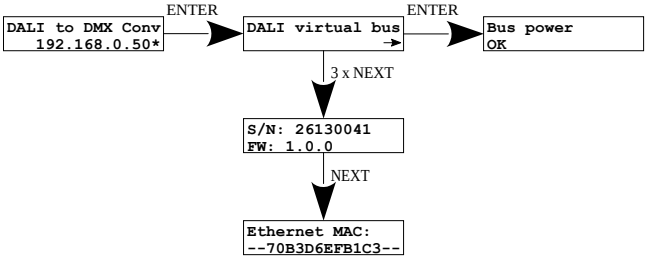
If the parameter is editable, the edit symbol is in the lower right corner, and ✓ causes the transition to the edition of the first field. The field that is being edited is indicated by the arrow ← and the buttons ↓ / ↑ change the value of the field. The ✓ button causes the transition to the next field or saving the value and exiting the parameter edition.

The → symbol informs about the possibility of entering the parameter edition tree.

4.2 Description of information parameters

On-screen menu allows to read information parameters related to the converter, such as:

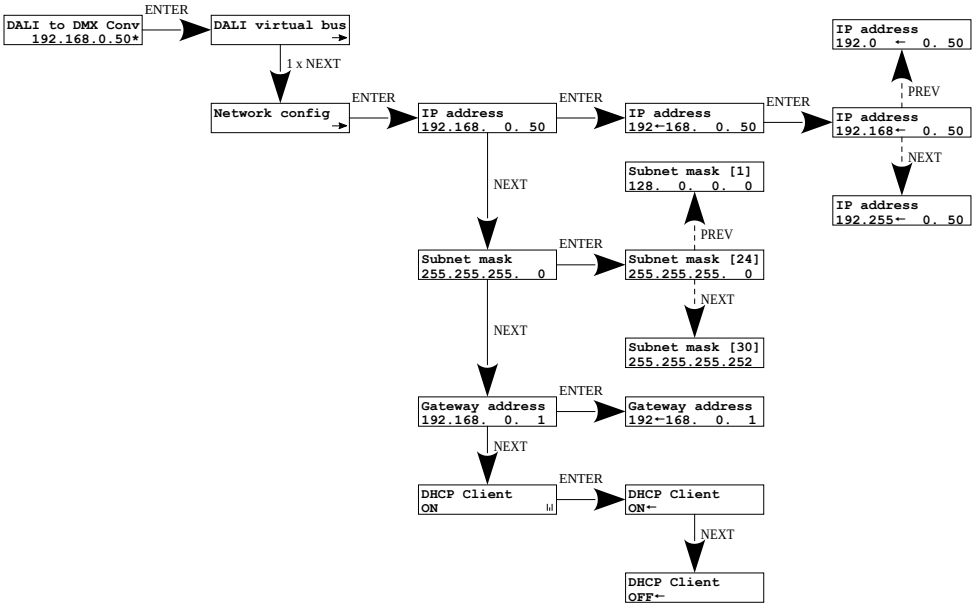
- individual converter name and current IP address (if the IP address is assigned from DHCP, the "*" symbol is added),
- information about the DALI line power supply (***Bus power***),
- converter serial number (***S/N***) and installed software version (***FW***),
- individual MAC address of the device (***Ethernet MAC***).



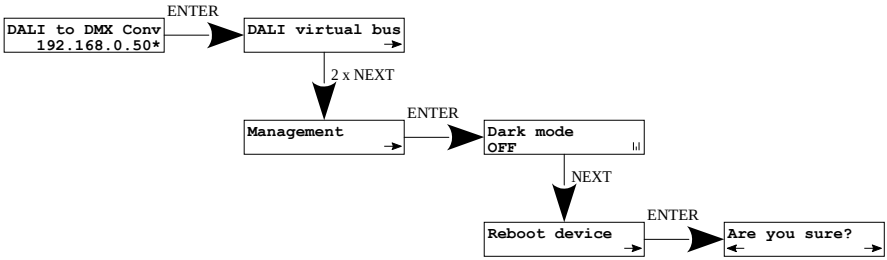
4.3 Converter network settings

PX987 gives you the ability to change network settings in the ***Network config.*** menu. The following parameters can be changed: static ***IP address***, ***Subnet mask*** (subnet mask edited by changing the CIDR in the range of 1 – 30), default ***Gateway address*** and enabling ***On*** or disabling ***Off*** support ***DHCP***.

If DHCP is **turned off**, the converter works according to the static network configuration. If DHCP is **turned on**, the converter will start up using static settings, but will attempt to acquire new network configuration from the DHCP server.



NOTE! After making changes to the network settings, restart the device in the *Management* menu by selecting *Reboot device* – according to the diagram below. The device will restart.



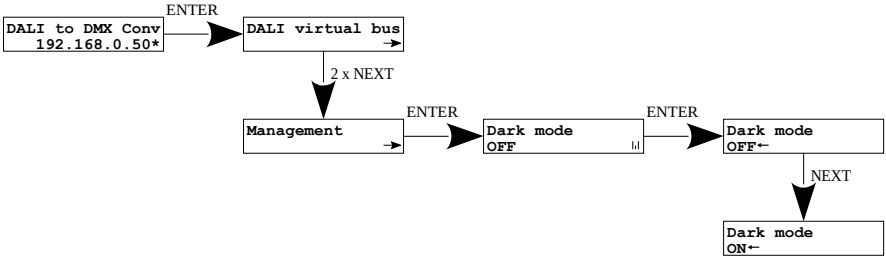
When the user selects this option, *Are you sure?* appears on the display. Pressing the ✓ button will confirm the selected option and the device will execute it, while pressing the ✕ button will exit the selected restart option.

4.4 Other parameters

The menu containing other ***Management*** settings allows to turn ***ON*** or ***OFF*** the screen and ***Dark mode*** indicator diodes, ***Reboot device***, restore ***Factory defaults*** and set the device lock using a PIN code.

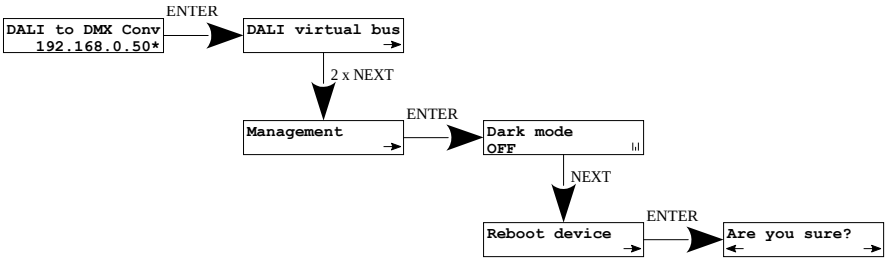
4.4.1 Dark mode

When ***Dark mode*** is turned on, after 10 seconds of inactivity, the display and indicator lights turn off. The device continues to work without interfering with other parameters. To restore the backlight, press any key.



4.4.2 Reboot the device

Reboot device is available, which should be used after making network changes to the device via the built-in LCD and buttons.

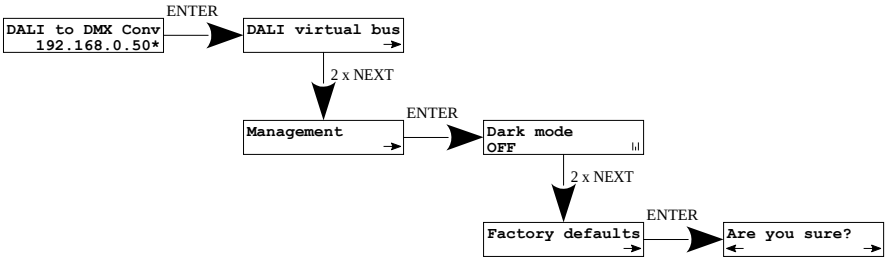


When the user selects this option, the query ***Are you sure?***. Pressing the ✓ button will confirm the selected option and the device will execute it, while pressing the ✕ button will exit the selected restart option.

4.4.3 Restore default settings

To restore the default settings, go to the ***Management*** menu and then select ***Factory defaults***. When restoring factory settings the device will be restart and following changes will be made to the device:

- ***IP address***: 192.168.0.50
- ***Subnet mask***: 255.255.255.0
- ***Gateway address***: 192.168.0.1
- ***DHCP***: ON
- ***Dark mode***: OFF
- removing the device's PIN protection
- deleting saved virtual ballasts from the list



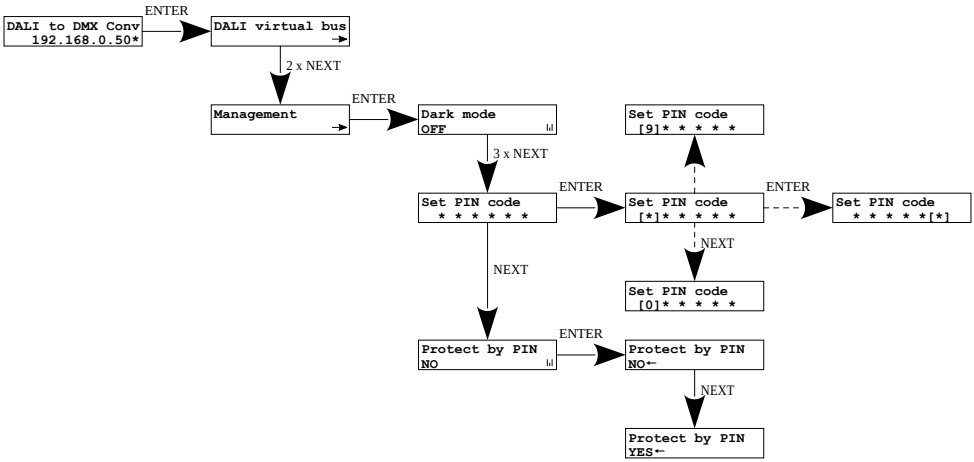
When the user selects this option, the query ***Are you sure?*** appears on the display. Selecting the ✓ button will confirm the selected option and the device will execute it, while pressing the ✕ button will exit the selected option of restoring factory settings.

Additionally, the user can restore factory settings by holding the *Prev* button for 4 seconds when turning on the power.

4.4.4 PIN code protection

The user can protect their device with a PIN by setting it in the ***Set PIN Code*** menu and then setting ***Protect by PIN*** to ***YES***. The PIN code can be set in the range 000000 – 999999.

To deactivate PIN protection, set ***Protect by PIN*** to ***OFF***.

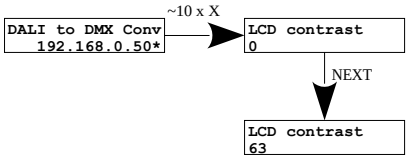


NOTE! If the user enables protection of the device with the PIN ***Protect by PIN*** code, but does not set his own code ***Set PIN code***, the device will be protected with the default PIN code – ***108000***.

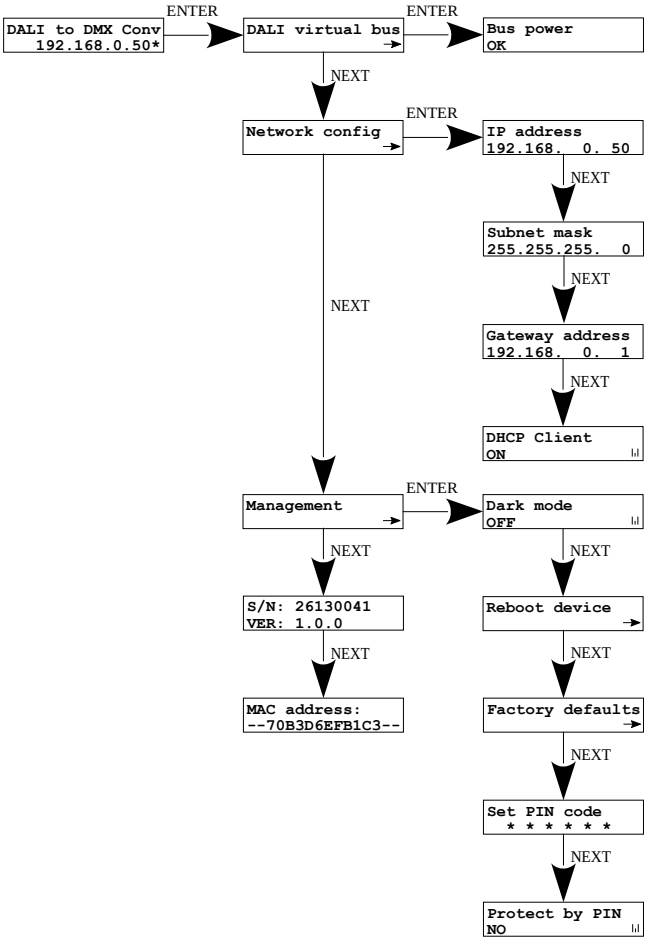
4.5 Setting the display contrast

If the device has a problem with the readability of messages displayed on the screen, it is possible to change its settings. To do this, press the ~10x ✕ button. The contrast can be set in range from 0 to 63. If the screen is illegible and only "▒" characters are visible or the screen is completely white. Being in the contrast menu is signaled by alternating green and blue diodes blinking.

With the ↓ / ↑ find the appropriate value (it is recommended to press the ↑ key to find the value in which the screen becomes readable, and then use the ↓ / ↑ keys to adjust the value to suit your needs). To exit *LCD contrast* menu, press the ✓ key.



4.6 Menu scheme in PX987



5 Connecting to the PC

The module has a built-in Web Server, which allows to change all settings via a web browser. To use the web interface, it is necessary to connect the PX987 module to a computer.

In automatic mode (DHCP), after connecting to the network the converter attempts to get the network configuration from a DHCP server (e.g router). Thanks to this, manual configuration of networks parameters is not needed. In the absence of a DHCP server on the network the converter will operate according to the static configuration (manual setup). When selecting static addressing, configure the network parameters so that the PX987 works in the same subnet as the computer and that there is no conflict of IP addresses (devices must have unique IP addresses in the network).

If the converter obtained the IP address from the DHCP server, unplugging the network cable will cause the loss of the assigned IP address. If PX987 is reconnected to the network, it will try to get a new address from the DHCP server, if it fails to receive the address, it will work according to the saved static settings.

It is recommended to use automatic addressing and connect the converter to the network with a running DHCP server.

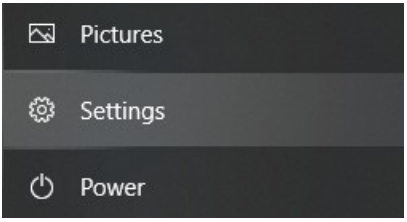
If the converter is connected directly to the computer (no DHCP server), it is necessary to manually set the network parameters of both the computer and PX987 so that they work in one network and connect the devices with a crossover Ethernet cable.

5.1 Change of the computer network configuration

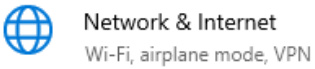
The procedure for changing the computer network configuration varies depending on the operating system. Windows® 7 system is an example here.

Change of the computer network configuration in the Windows® 7 operating system in done in the following:

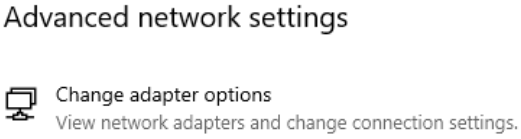
1. Click **[Start]** 
2. Select **[Settings]** tab



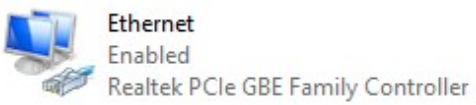
3. Go to **[Network & Internet]** tab



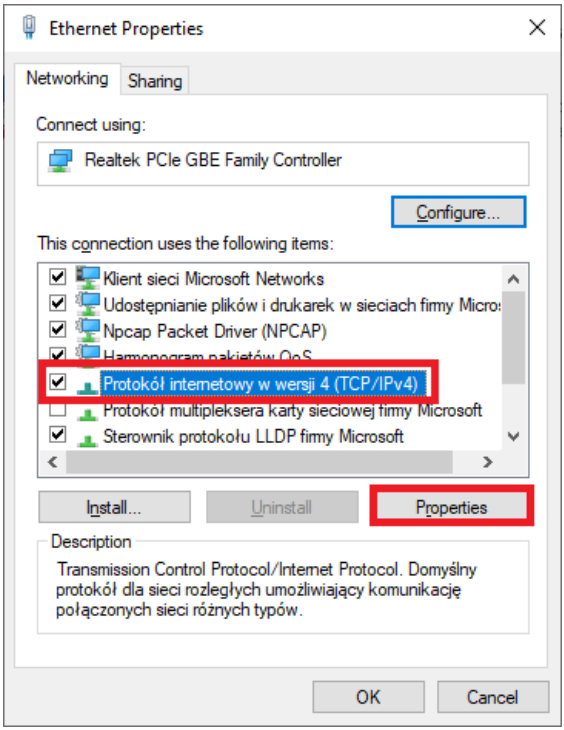
4. Select **[Advanced network settings]**



5. Right-click on the appropriate connection, for example it could be **[Ethernet]** and select **[Properties]**

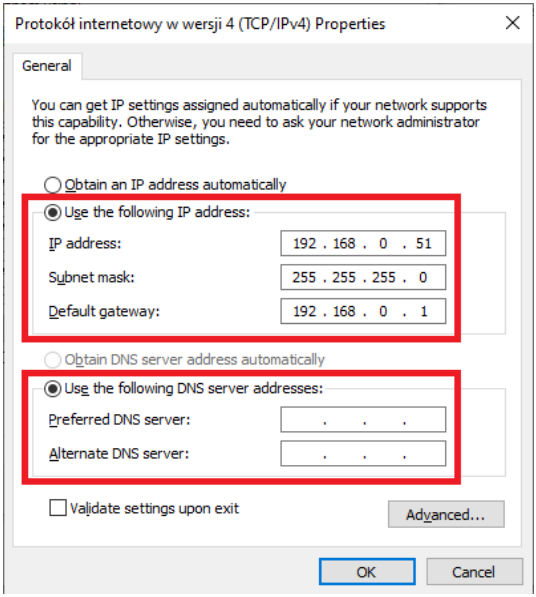


6. In the new window that appears, select **[Internet Protocol Version 4 (TCP/IPv4)]** and then press properties



7. In the next window, select **[Use the following IP address:]**

   To connect directly (computer – driver) with a controller that has a default configuration, use the sample settings:



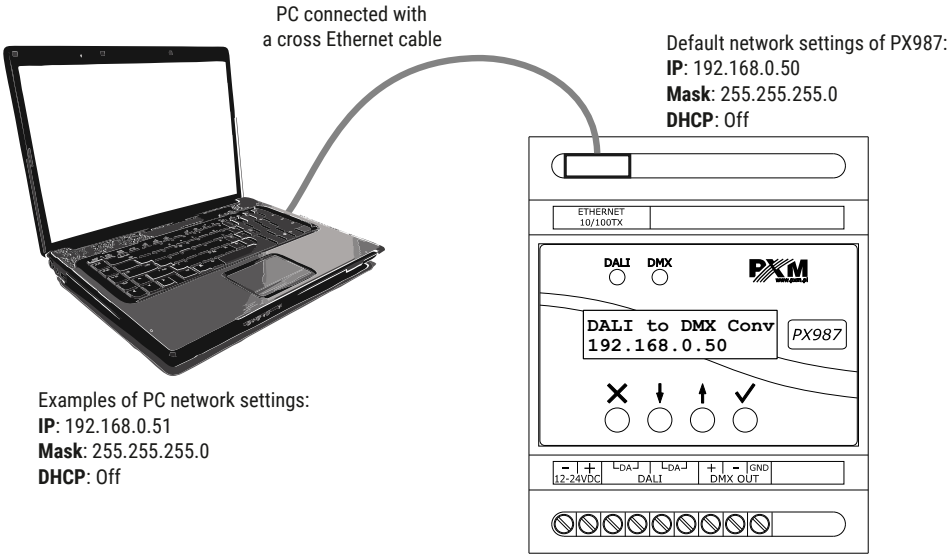
IP address: 192.168.0.51

Subnet mask: 255.255.255.0

Default gateway: 192.168.0.1

5.2 Connecting converter directly to the PC

When connecting the converter directly to a computer it is recommended to use a braided cable. Newer network cards will work both on a braided cable or a non-braided cable, but older ones may require a braided cable.



NOTE! Remember that the PX987 converter and the computer should be in the same network and there is no conflict of IP addresses.

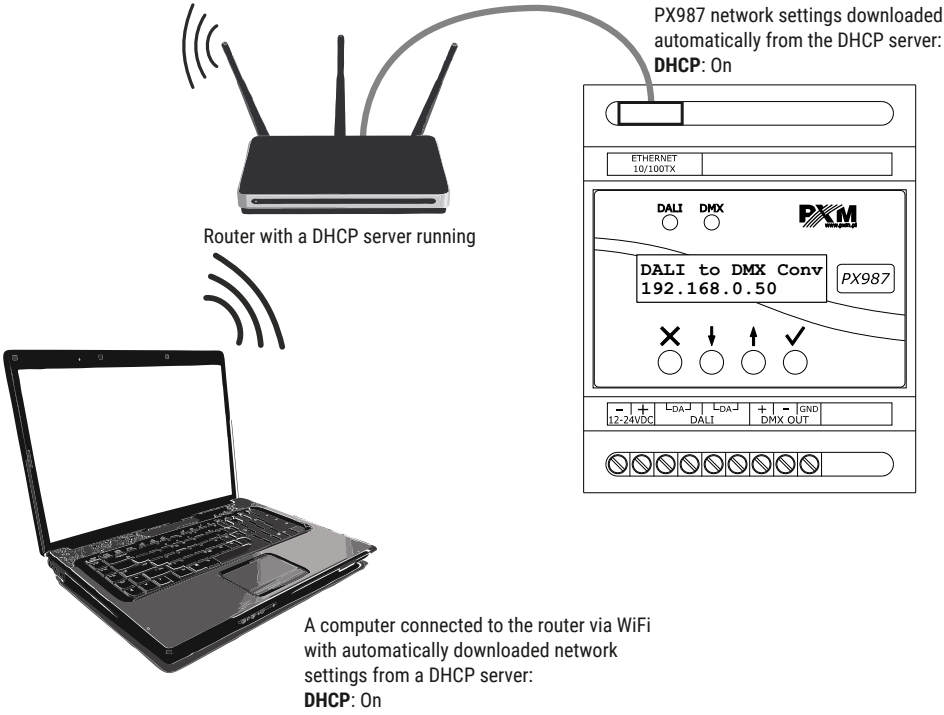
5.3 Connecting the converter using a router

When connecting the converter to the router, there are two options for network settings. The first of these is the use router with a DHCP server running, the network configuration on all devices in the network is set automatically. The second option is to connect the converter and PC to a switch or router that does not support DHCP server, in this case all devices in

the network must have manually configured network settings in such a way that each device operates in the same network and has a unique IP address.

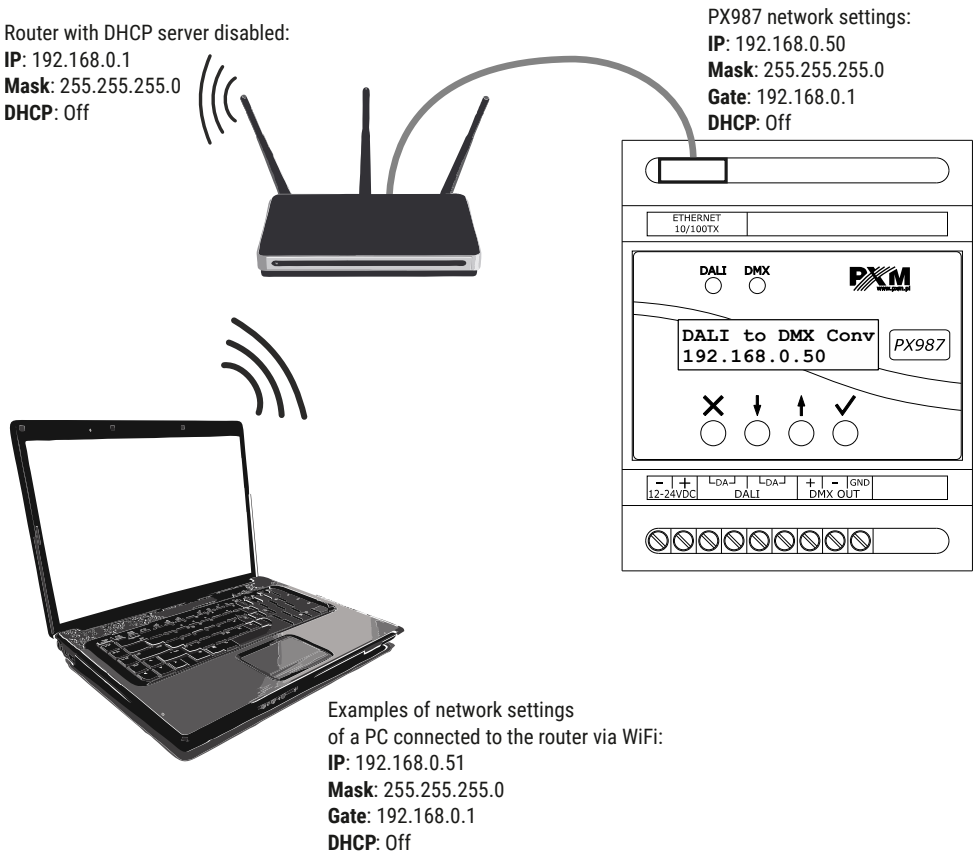
5.3.1 Automatic addressing

The diagram below shows the connection of the device with the router on which the DHCP server operates:



5.3.2 Static addressing

Below is an example diagram of network settings of the converter, router and PC, in the case when the DHCP server in the network is not running:



Examples of network settings
of a PC connected to the router via WiFi:
IP: 192.168.0.51
Mask: 255.255.255.0
Gate: 192.168.0.1
DHCP: Off

The advanced converter connection from the external network is described in section 7. Remote connection.

6 WWW interface

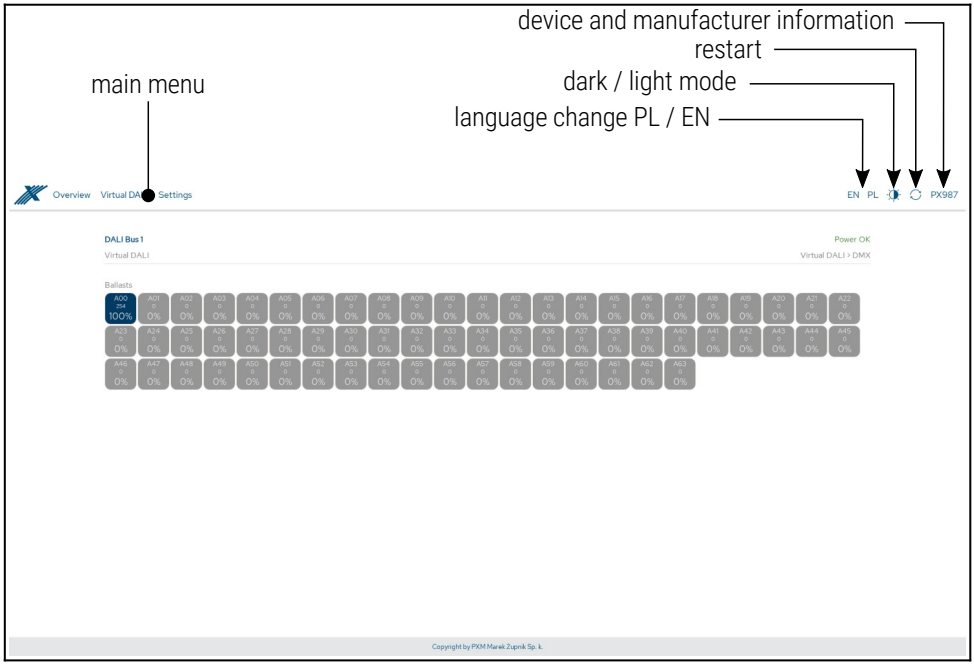
The device has a built-in Web Server that starts with the device. To open the PX987 management panel, enter the device's IP address in the browser (default is 192.168.0.50).

NOTE! Pay special attention if the PX987 is in the same network as the device on which the browser is running or in the router there are redirects configured accordingly.

Supported browsers:

- *Google Chrome* – from version *79.0.3945.117*
- *Mozilla Firefox* – from version *72.0.2*
- *Opera* – from versions *66.0.3515.44*
- *Edge* – from versions *79.0.309.71*

6.1 WWW window structure

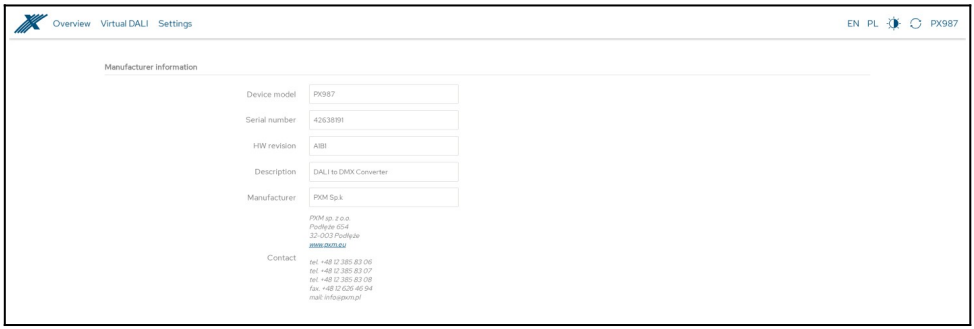


The following tabs are available *in the main menu*:

- ***Overview*** – graphic representation of the DALI input and all DMX and Art-Net output channels,
- ***Virtual DALI*** – this tab is responsible for configuring the conversion of the DALI signal to DMX and Art-Net,
- ***Settings*** – is used to locally change the device name, network settings, display settings, configuration management, software updates, and change DMX and Art-Net output settings.

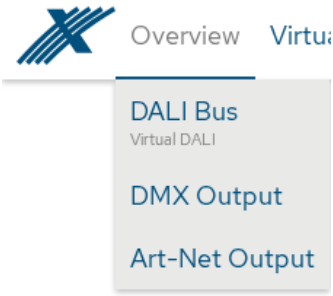
The following options are in the upper right corner:

- language change (EN / PL),
- dark / light mode switching,
- restarting the device,
- device and manufacturer information:



6.2 Overview

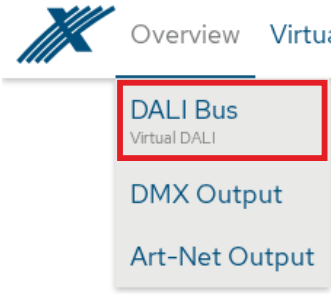
After entering the converter's website, the first tab is the *Overview* tab. This tab displays the values on the DALI line and the DMX and Art-Net output channels.

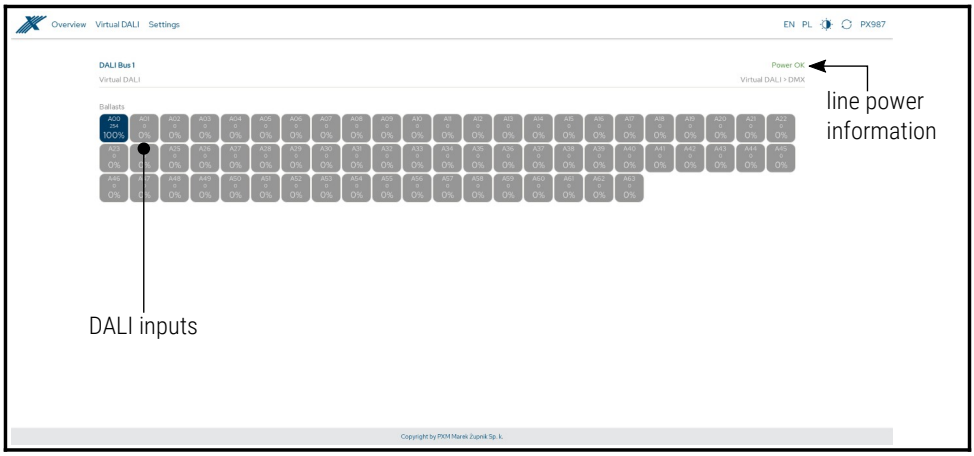


6.2.1 DALI line (Virtual DALI)

In this tab you can read:

- DALI line status (*Power OK* / *No power*),
- values received on the DALI line.

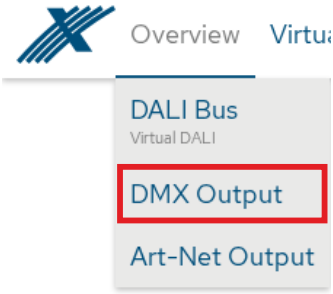


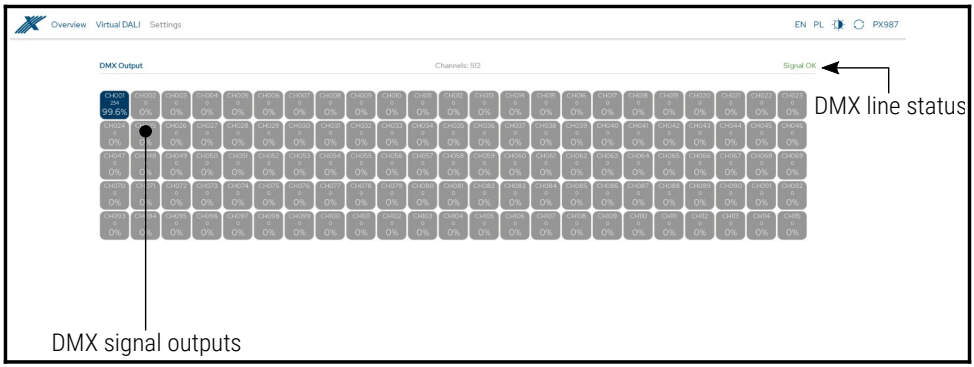


6.2.2 *DMX Output*

Readable parameters:

- DMX signal status (*Signal OK* / *No Signal*),
- values sent at the DMX output.



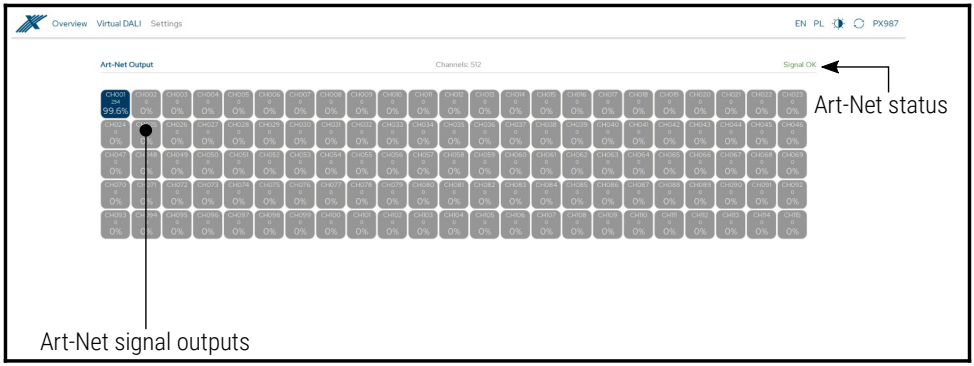


6.2.3 Art-Net Output

Readable parameters:

- signal line status (*Signal OK* / *No Signal*),
- values sent at the Art-Net output.

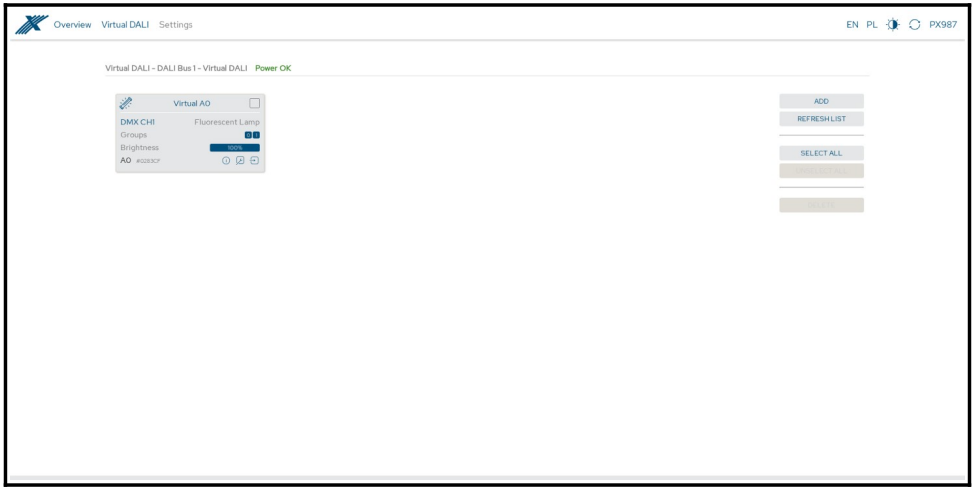




6.3 Virtual DALI

To convert the DALI signal into the DMX output signal, it is necessary to add virtual DALI devices that represent DMX receivers (single DMX channels). The DMX receivers will work exactly like ballasts on the DALI line.

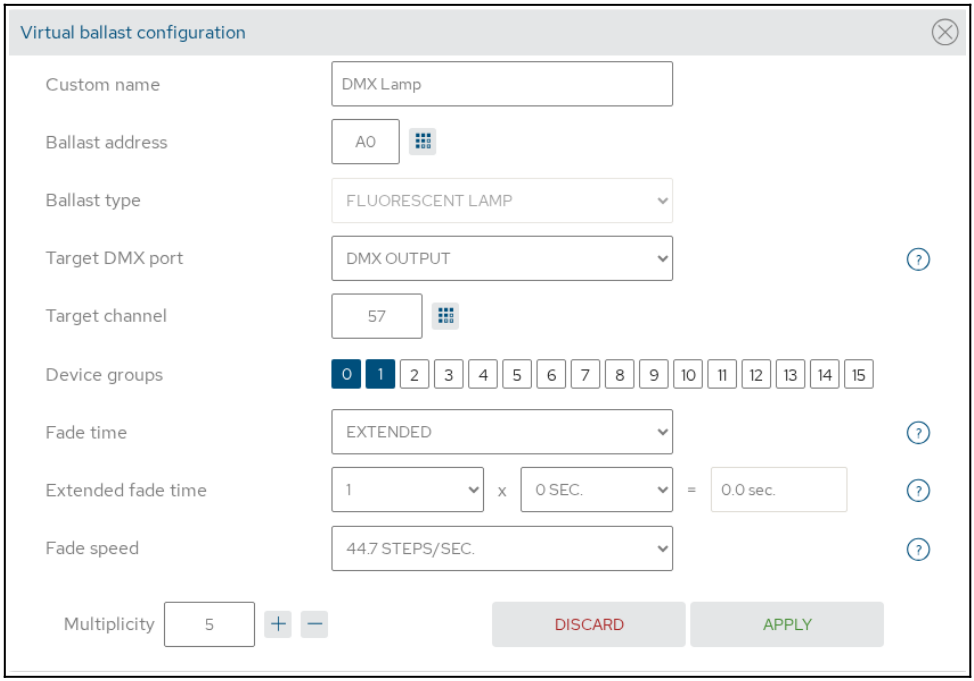
This allows lighting systems based on DALI and DMX to be combined into one coherent system.



Buttons on the right:

- *Add* – adding a new virtual ballast,
- *Refresh list* – refreshes the list,
- *Select all* – selects all virtual ballasts,
- *Unselect all* – deselects all virtual ballasts,
- *Delete* – removes selected virtual ballasts.

Adding a virtual ballast:



- *Custom name* – individual ballast name, the name is stored in the PX987 memory,
- *Ballast address* – device address on the DALI line,
  - 

– address conflict occurs,
    - *red* – address occupied (in the address table),



NOTE! The virtual ballast address can have the value *MASK* – i.e. not assigned to any address. 

- ***Ballast type*** – information on the ballast type (always *FLUORESCENT LAMP*),
- ***Target DMX port*** – selecting the output (DMX or Art-Net),
- ***Target channel*** – output DMX / Art-Net address to which the value will be sent after conversion from the DALI signal,
  - 

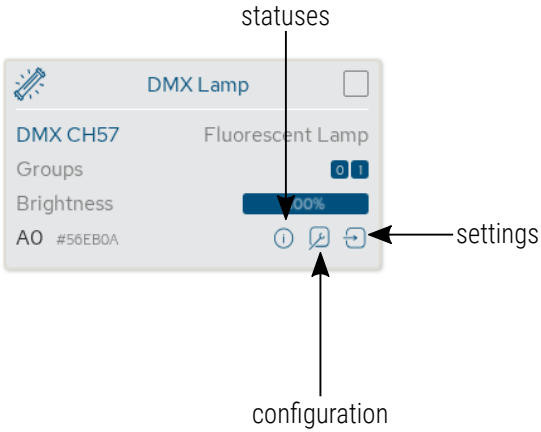
– address conflict occurs,
    - *red* – address occupied (in the address table),



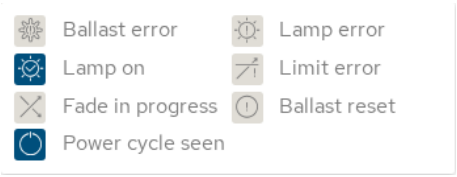
- ***Device groups*** – assigning the ballast to selected group / groups,
- ***Fade time*** – time determining the speed of transition between brightness levels,
- ***Extended fade time*** – time that determines how quickly it changes between user-defined brightness levels (only DALI 2.0),
- ***Fade speed*** – number of steps per second determining the speed of transition between brightness levels,
- ***Multiplicity*** – number of virtual ballasts that will be added – DALI ballast addresses and target DMX addresses will be assigned in ascending order.

6.3.1.1 *Actions available for virtual ballasts*

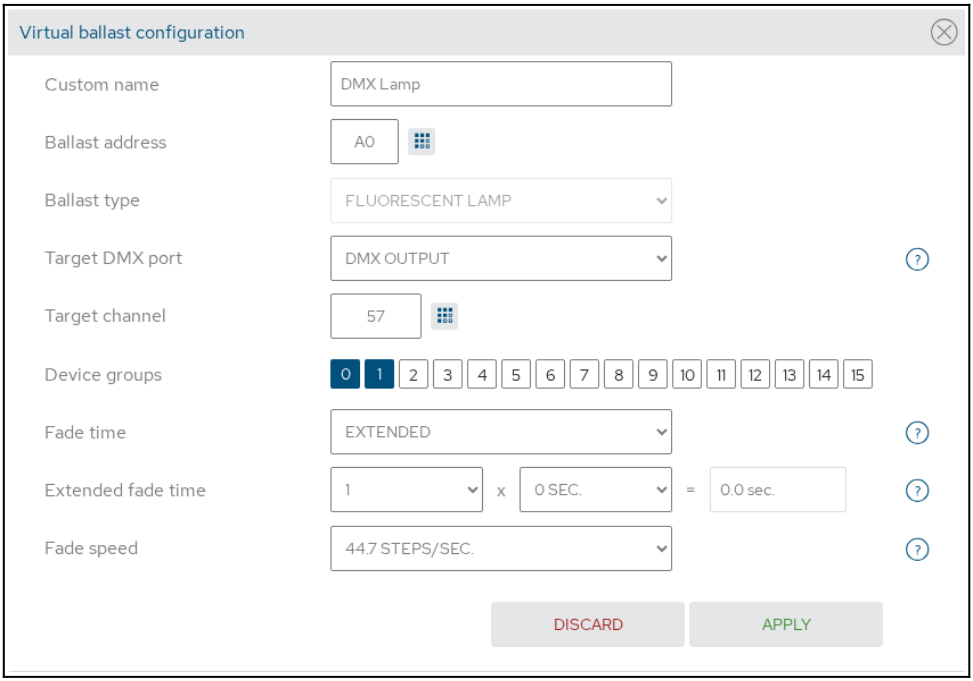
For each virtual ballast on the DALI line created by the PX987, an action can be selected.



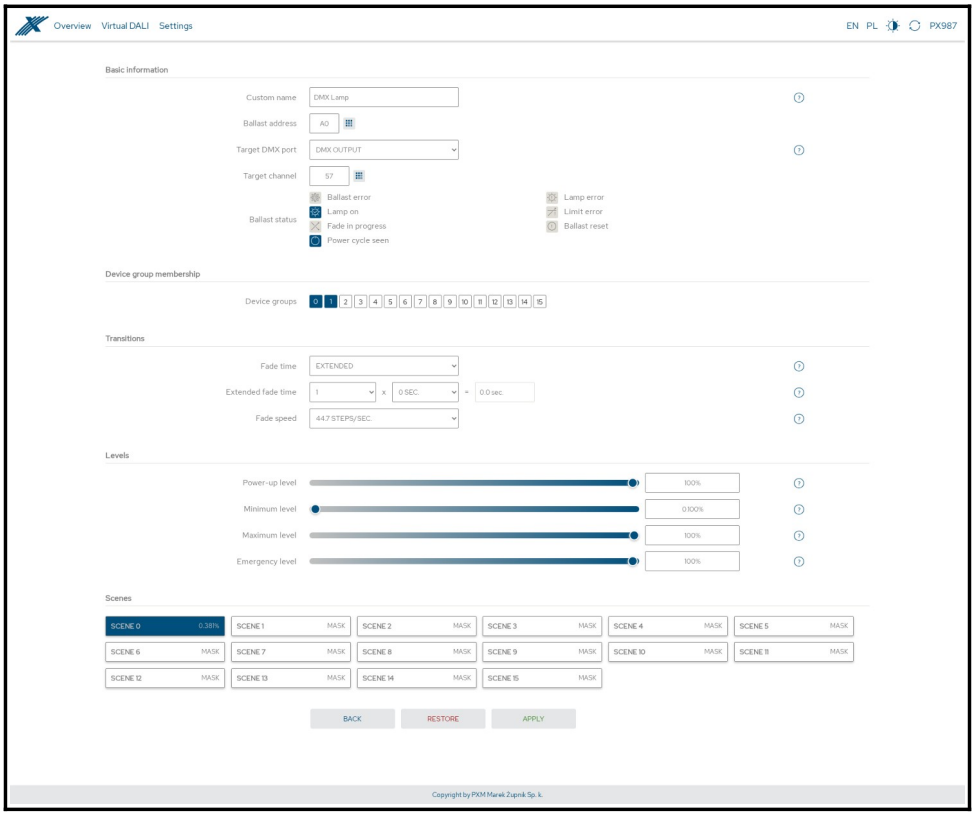
- *Statuses* (i) – ballast information (active one lights up blue),



- ***Configuration*** – quick configuration of the virtual ballast – opens a pop-up window,



- ***Settings*** – goes to the ballast parameters configuration.

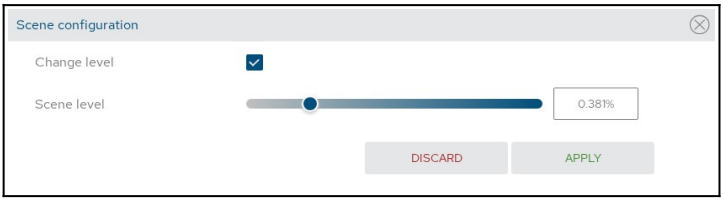


Available parameters of the virtual ballast:

- *Custom name* – individual ballast name, the name is stored in the PX987 memory,
- *Ballast address* – virtual ballast address on the DALI line, to change it, select the address,

  NOTE! If a device with such an address already exists on the DALI line, the addresses will be swapped.
- *Target DMX port* – selecting the output (DMX or Art-Net),
- *Target channel* – output DMX / Art-Net address to which the value will be sent after conversion from the DALI signal,
- *Ballast status –* ballast information (*Ballast error, Lamp error, Lamp on, Limit error, Fade in progress, Ballast reset, Power cycle seen*),
- *Groups* – assigning the ballast to selected group / groups,
- *Fade time* – time determining the speed of transition between brightness levels,
- *Extended fade time* – time that determines how quickly it changes between user-defined brightness levels (only DALI 2.0),
- *Fade speed* – number of steps per second determining the speed of transition between brightness levels,
- *Power-up level* – default brightness after turning on the ballast in the range *0 – 100%* or *MASK*,
- *Minimum level* – minimum ballast brightness,
- *Maximum level* – maximum ballast brightness,
- *Emergency level* – ballast brightness in case of DALI line failure in the range *0 – 100%* or *MASK*,

- *Scenes* – scene brightness level. Click on the selected scene tile, then select *Change level* and set the *Scene level* in [%].

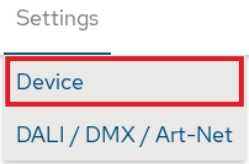


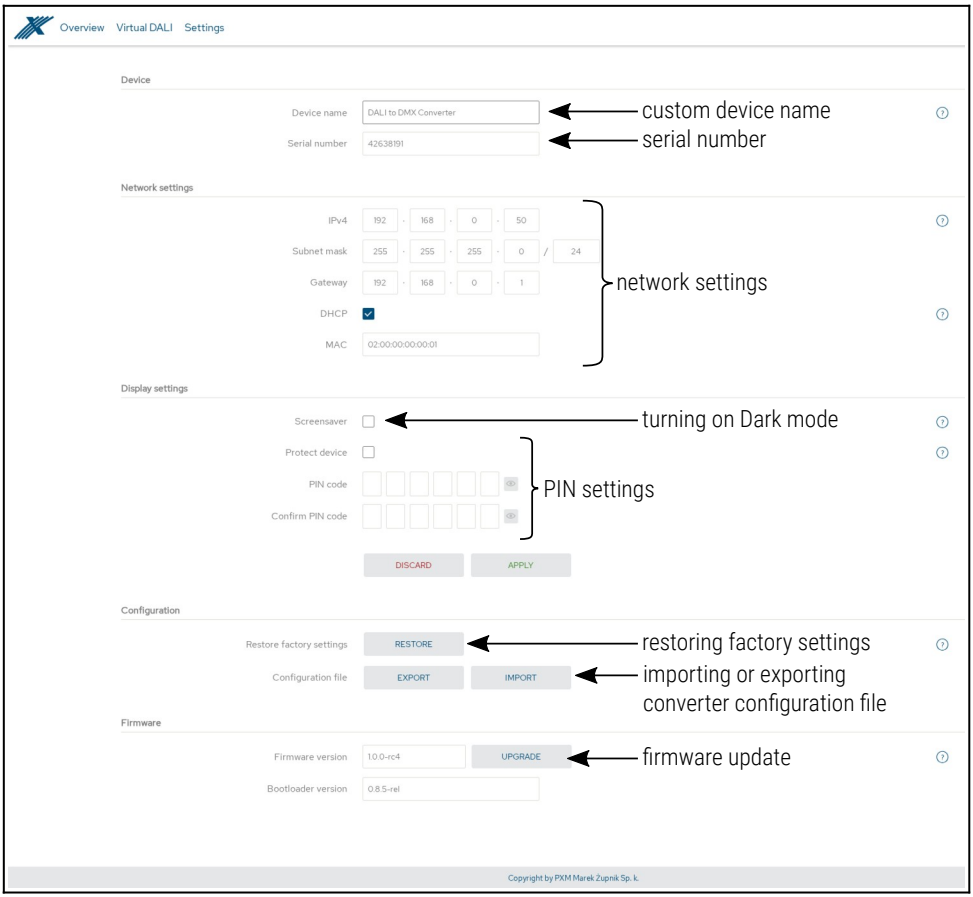
6.4 Settings

6.4.1 Device

In this tab the user can:

- change the device name (saved locally),
- change the converter's network settings,
- change the display settings,
- set device security (PIN code),
- restore factory settings,
- export and import settings to and from a file,
- update the software.





Available options:

- ***Device name*** – custom device name set by the user,
- ***Serial number***,
- ***IPv4*** – setting the IP address,
- ***Subnet mask*** – setting the subnet mask,
- ***Gateway*** – default gateway setting,

- *DHCP* – enable or disable DHCP support,
  NOTE! After making changes to the network settings, restart the device (button).
- *MAC* – individual MAC address of the network card,
- *Screensaver* – turning off the screen and indicator lights after 10 seconds,
- *Protect device –* the user can protect the device with a PIN code (6 digits – default 108000), after activation of the protection, entering the PIN code is required on the website and LCD screen,
- *Factory settings*:
  - *IP address*: 192.168.0.50
  - *Subnet mask*: 255.255.255.0
  - *Gateway address*: 192.168.0.1
  - *DHCP*: ON
  - *Dark mode*: ON
  - removing the device's protection with a PIN code
  - removing from the list of saved virtual ballasts

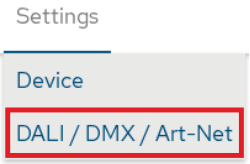
By selecting *Export* you can save the device, DALI line, virtual ballast, and DMX and Art-Net output settings to a file. In the window that appears, you can select which groups of settings will be saved. By clicking *Import* you can load the configuration from a file and select which groups of settings will be applied.

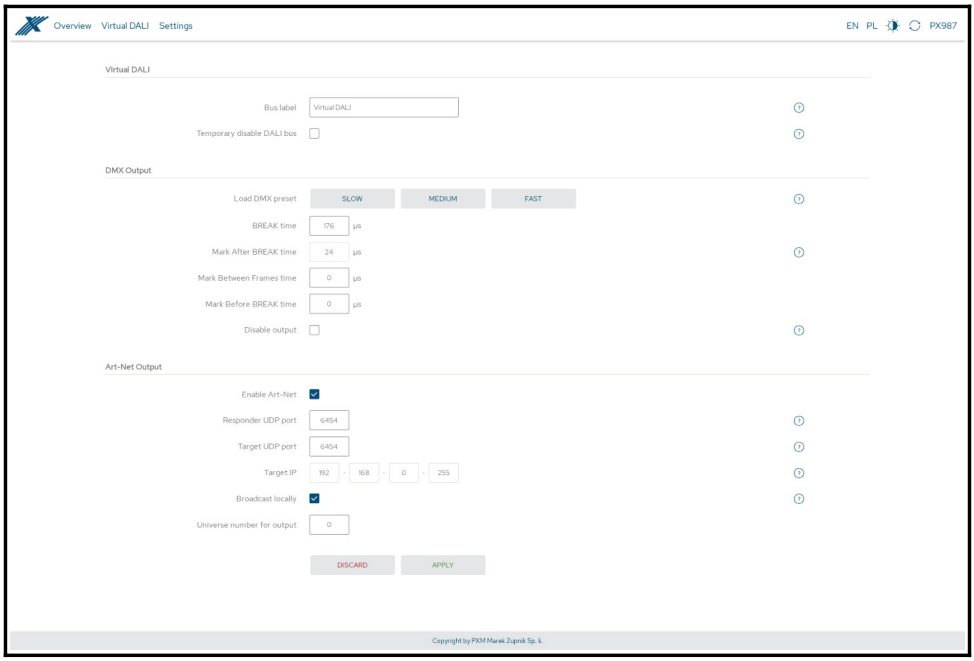
Software update is possible after selecting the *Upgrade* button and then selecting the update file.

6.4.2 DALI / DMX / Art-Net

In this tab, the user can:

- add a DALI line label – saved locally,
- change the parameters of the DMX output signal,
- enable the Art-Net output and change parameters





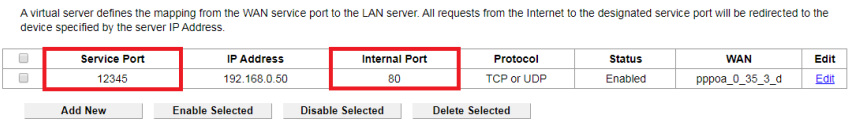
7 Remote connection

The converter allows to log in to device from an external network via the internet, for this purpose it should be:

- have an external IP address on the router assigned by the internet provider and be able to establish connection from outside (incoming packets are not blocked by the provider's and router's firewall),
- redirect port 80 to the IP address of the converter working in the local network (so-called forwarding port),
- unblock the appropriate ports in the router's firewall,
- the address of the converter / converters in the local network can not change (the converter must have a static IP address set or the DHCP server must assign the same addresses to the same devices each time).

NOTE! The destination port of the device is always port 80, for added security it is recommended to redirect other ports from the external network to port 80 in the local network.

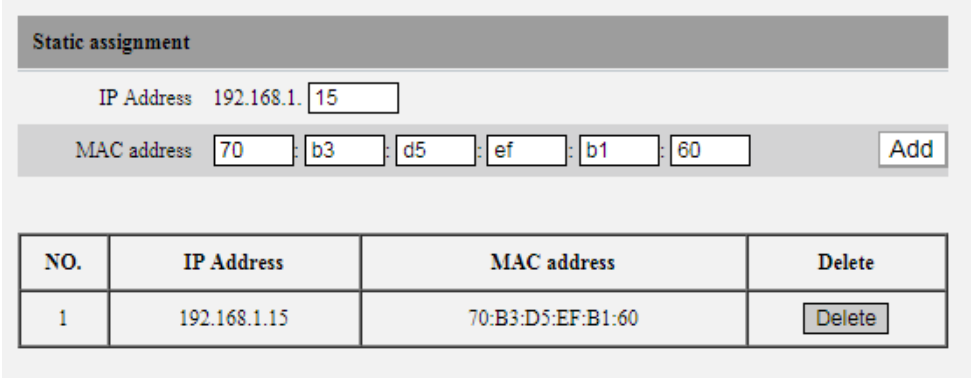
Example: by sending a query to the external IP address of a router with port number 12345 (e.g. 66.77.88.99:12345), the router will forward this query to the address of the device with port number 80 (e.g. 192.168.0.50:80).


A virtual server defines the mapping from the WAN service port to the LAN server. All requests from the Internet to the designated service port will be redirected to the device specified by the server IP Address.

	Service Port	IP Address	Internal Port	Protocol	Status	WAN	Edit
☐	12345	192.168.0.50	80	TCP or UDP	Enabled	pppoa_0_35_3_d	Edit

Add New | Enable Selected | Disable Selected | Delete Selected

NOTE! In most routers available on the market, you can set a static IP address by the DHCP server based on the MAC address of the device. For example, for a device with the MAC address 70:B3:D5:EF:B1:60 the IP address 192.168.1.15 will always be assigned by the DHCP server (example below).



Most routers available on the market usually have several parameters in port forwarding options:

- forwarding number,
- port or port range for redirection,
- the IP address of the device to be redirected to,
- protocol type (TCP / UDP or both),
- attach / delete diversion.

7.1.1 One converter in the internal network

Examples of network settings:

- external IP address: 66.77.88.99 (example address)
- converter IP address: 192.168.1.50
- mask: 255.255.255.0

- target device port: 80
- protocol: TCP or TCP/UDP (in this case option "*Both*")

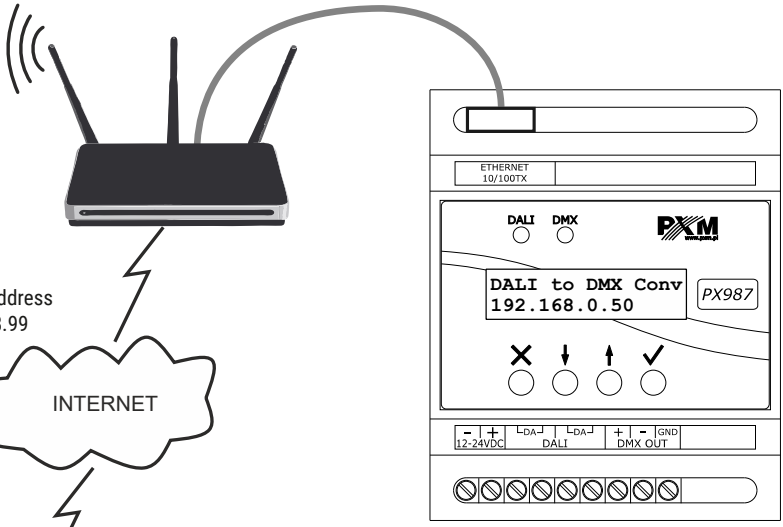
Below is the screen of the example setting in the router:

NO.	Start Port-End Port	LAN IP	Protocol	Enable	Delete
1.	80 - 80	192.168.1. 50	Both	☑	☐
2.	-	192.168.1.	TCP	☐	☐
3.	-	192.168.1.	TCP	☐	☐
4.	-	192.168.1.	TCP	☐	☐
5.	-	192.168.1.	TCP	☐	☐
6.	-	192.168.1.	TCP	☐	☐
7.	-	192.168.1.	TCP	☐	☐
8.	-	192.168.1.	TCP	☐	☐
9.	-	192.168.1.	TCP	☐	☐
10.	-	192.168.1.	TCP	☐	☐

If the router does not have the option to set up one port forwarding, create a range (from 80 to 80). If everything is correctly configured to open the web interface, enter the external IP address in the browser window (e.g. 66.77.88.99) or if you have redirected another port to internal port number 80 (e.g. 66.77.88.99:12345) – described in detail in section 7.1.2. More than one converter in the internal network.

Example of connection without using other ports:

Router network settings:
IP: 192.168.1.1
Mask: 255.255.255.0
DHCP: Off
Port 80 forwarding
to the device address (192.168.1.50)



External IP address
e.g. 66.77.88.99

INTERNET

PX987 network settings:
IP: 192.168.1.50
Mask: 255.255.255.0
Gate: 192.168.1.1
DHCP: Off



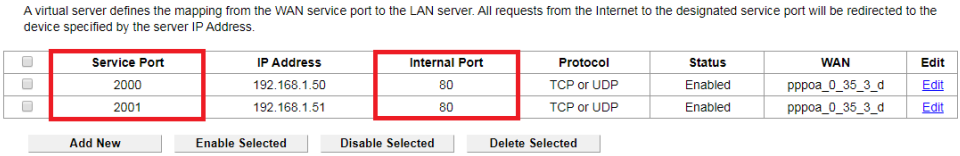
A computer connected to the internet

7.1.2 More than one converter in the internal network

Examples of network settings:

- external IP address: 66.77.88.99 (example address)
- IP address of the first converter: 192.168.1.50
- IP address of the second converter: 192.168.1.51
- mask: 255.255.255.0
- target device port: 80
- protocol: TCP or TCP/UDP (in this case option "*Both*")

Below is a screen with examples of settings in the router (port forwarding 2000 and 2001 to the appropriate IP address of the converter and port 80):


A virtual server defines the mapping from the WAN service port to the LAN server. All requests from the Internet to the designated service port will be redirected to the device specified by the server IP Address.

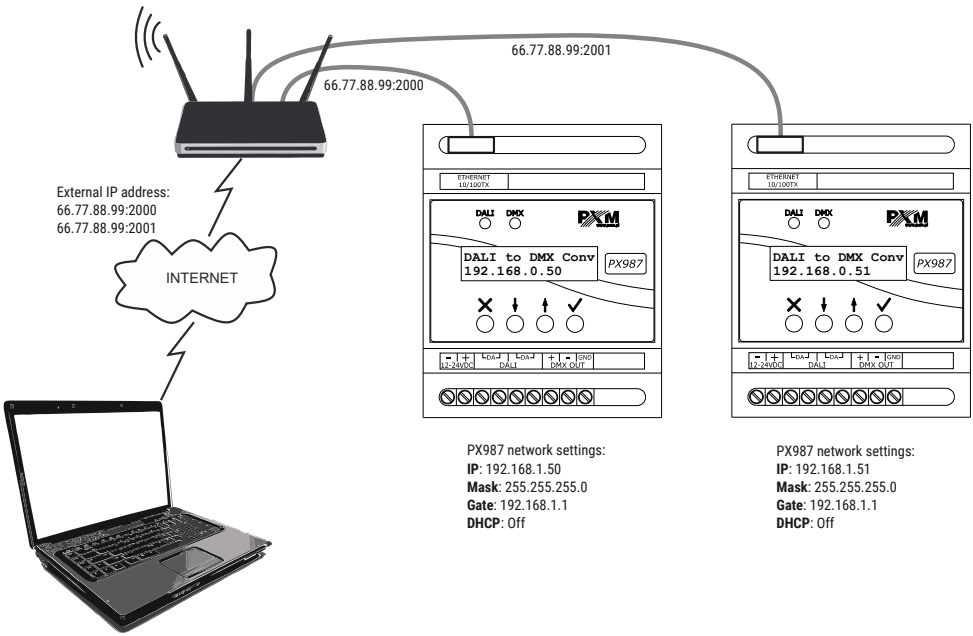
	Service Port	IP Address	Internal Port	Protocol	Status	WAN	Edit
☐	2000	192.168.1.50	80	TCP or UDP	Enabled	pppoa_0_35_3_d	Edit
☐	2001	192.168.1.51	80	TCP or UDP	Enabled	pppoa_0_35_3_d	Edit

Add New | Enable Selected | Disable Selected | Delete Selected

In this case, port 2000 indicates a device with IP address 192.168.1.50 and sends a query to port 80 in the internal network. The query sent to port 2001 will send a query to the other device with the address 192.168.1.51.

Example of connecting more than one converter with port forwarding:

Router network settings:
IP: 192.168.1.1
Mask: 255.255.255.0
DHCP: Off
Port 2000 forwarding to the device address (192.168.1.50:80)
Port 2001 forwarding to the device address (192.168.1.51:80)



PX987 network settings:
IP: 192.168.1.50
Mask: 255.255.255.0
Gate: 192.168.1.1
DHCP: Off

PX987 network settings:
IP: 192.168.1.51
Mask: 255.255.255.0
Gate: 192.168.1.1
DHCP: Off

A computer connected to the internet

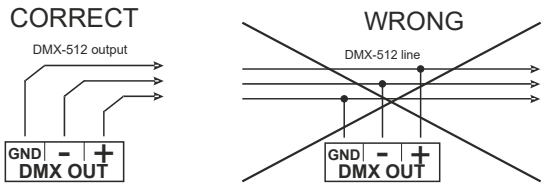
8 Indication lights

Converter is equipped with 2 indicators signaling:

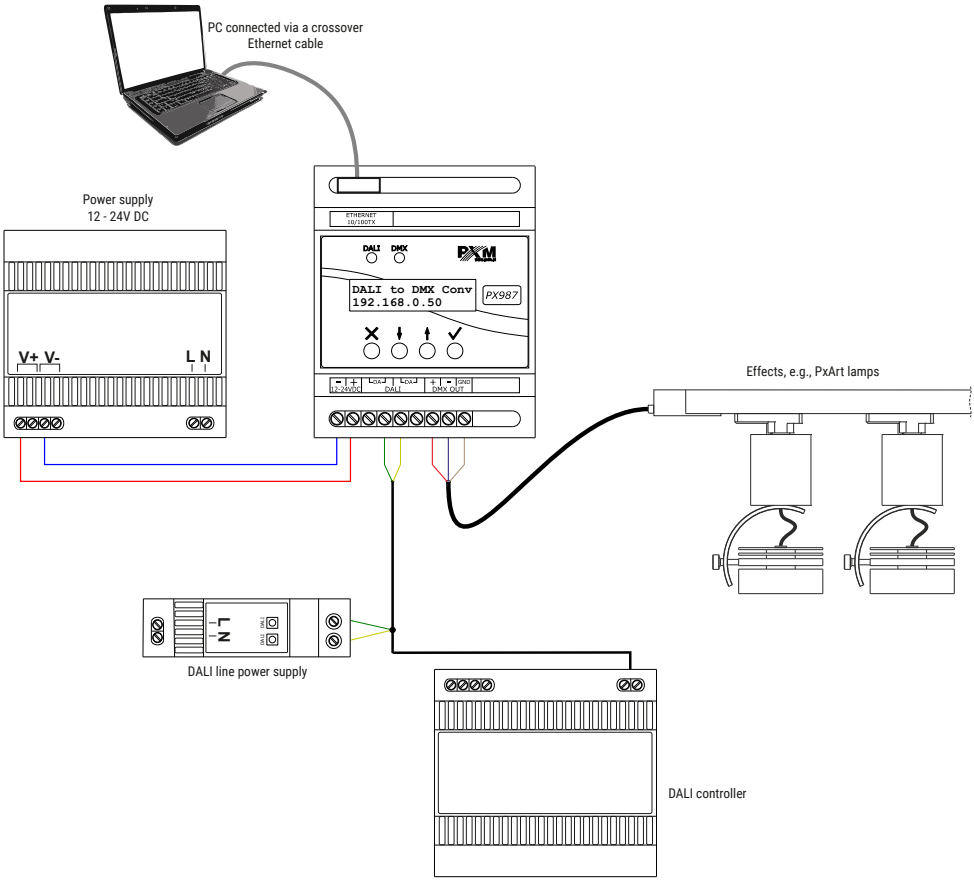
Indicator	Action	Function
green DALI	flashing / steady on	communication on the DALI line
	is off	the converter does not receive any commands on the line
blue DMX	flashes	transmitting DMX signal

9 DMX signal connecting

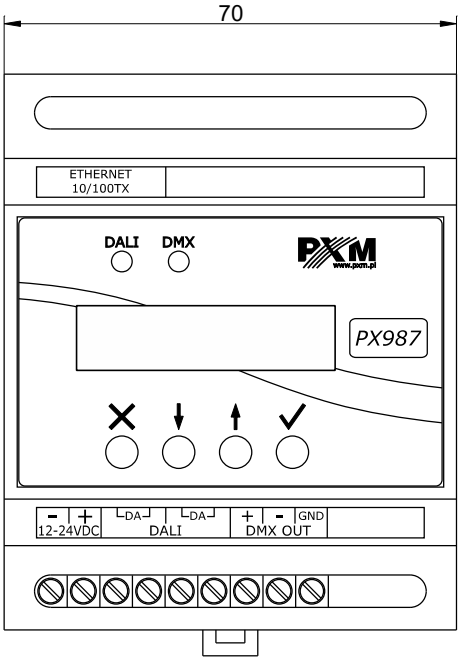
PX987 has to be connected to the DMX line with no branches on the control cable. That means that the control cable must be led out from the ***DMX OUT*** pins of the PX987 and then routed to the next DMX receivers.

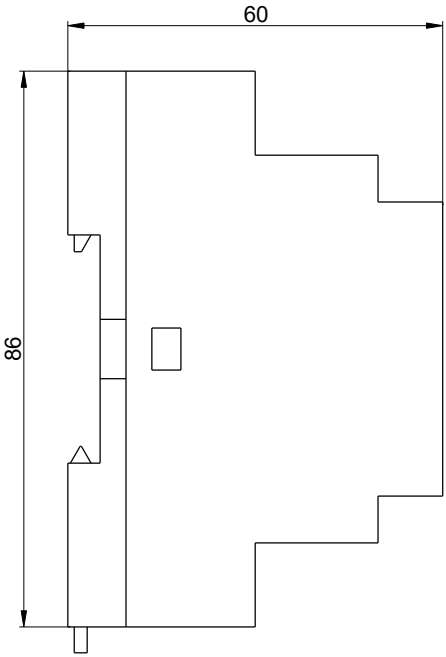


10 Connection scheme



11 Dimensions





12 Technical data

type	PX987
power supply	12 – 24V DC
power consumption	max. 1W
DALI ports	1
DMX outputs	1
Ethernet ports	1
DMX channels	512
supported ballasts	DT0 – DT8*
settings change protection (LCD / Web Server)	yes – PIN (6 digits)
APIPA support	yes
programming	LCD display 2 x 16 and 4 buttons Web Server
version of the DALI protocol	1.0
weight	0.15kg
dimensions	width: 70mm (4 DIN rail modules) height: 86mm depth: 60mm

* - DT8 only colour temperature

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Podłęże, 04.09.2026

DECLARATION OF CONFORMITY

PXM sp. z o.o.
Podłęże 654, 32-003 Podłęże

we declare that our product:

Product name:	DALI / DMX – Art-Net Interface
Product code:	PX987

meets the requirements of the following standards, as well as harmonised standards:

PN-EN IEC 63000:2019-01	EN IEC 63000:2018
PN-EN 62386-101:2015-06	EN 62386-101:2014
PN-EN 62386-102:2015-06	EN 62386-102:2014
PN-EN 61000-4-2:2011	EN 61000-4-2:2009
PN-EN IEC 61000-6-1:2019-03	EN IEC 61000-6-1:2019
PN-EN IEC 61000-6-3:2021-08	EN IEC 61000-6-3:2021

and meets the essential requirements of the following directives:

2011/65/EU DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment.

2014/30/EU DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility, replacing Directive 2004/108/EC.

PXM sp. z o.o.
32-003 Podłęże, Podłęże 654
NIP 677-002-54-53



mgr inż. Marek Żupnik.