PX814

AC+ Dimmer

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

PX814 is a professional AC class dimmer with built-in 24 outputs each with a power of 3600W.

The device is powered from three phases and has a system that completely protects against the effects of reverse phase connection. The dimmer allows to control from 6 different sources simultaneously:

- 2 x DMX-512
- 3 x Art-Net
- 24 x analogue inputs (option available to order)

AC + Dimmer is equipped with a color touch screen, four buttons and a knob. Using the buttons and the knob, you can easily navigate through the intuitively prepared menu, in which it is possible to set all the dimmer parameters and view the dimmer status.

PX814 has a built-in merger system with an option to select one of 13 priorities, including permanent activation of any circuit, regardless of the controls. Advanced electronics allow to address each output channel in any way and graphically edit the characteristics of its control (5 characteristics implemented by default and 5 set by the user). The device in option (PX814-B) has switches (On / Off) at each of the outputs that allow manual activation of the output at 100% (the so-called Bypass) – the supply current flows directly to the output bypassing the controller system.

The dimmer also allows to set output voltage and current limits for each channel separately. It is also equipped with a bulb heating system (10 levels)

and control of the attached fuse and broken circuit / burnt bulb. The reaction to DMX signal loss can be defined by the user. In addition to the basis options (*ON*, *OFF*, *HOLD*, *SLOW TURN OFF*), 64 stages and the program are available to be defined.

Built-in "*soft-start*", "*soft-on*" and "*even-off*" systems ensure reliable operation in harsh conditions. Direct detection of zero of the network and optical insulation of DMX input guarantee high resistance to interface.

PX814 has a solid metal housing with an efficient cooling system, adapted for wall mounting.

Software is available for the device that can be downloaded from the manufacturer's website (https://pxm.pl/), which allows to connect with up to 16 dimmers at once. The application allows live view of the device's operating parameters, individual channels and configuration changes.

NOTE! The device should be installed in a technical room.

2 Safety conditions

PX814 dimmer is a device powered directly from the 230V AC mains. Failure to observe safety instructions may result in electric shock and pose a threat to life. Therefore, you should strictly adhere to the rules outlined below:

1. Installation of the device, and in particular, connection of power, should be made by a suitably qualified person, as described in the manual.
2. The device can be connected only to 3- or 5-wire installation (with a separate protective conductor).
3. Protect all cables against mechanical and thermal damage.
4. In case of failure of any of the cables, it must be replaced with a cable of the same technical parameters.
5. Use only 3-wire cables of not less than 2,5mm^2 for connecting devices to the dimmer.
6. Each receiver should be powered by a separate cable.
7. After installation, test the effectiveness of resetting all the equipment controlled.
8. All repairs that require the housing to be removed can only be carried out with power disconnected.
9. The dimmer must be strictly protected against contact with water or other liquids.
10. Avoid sudden shocks, particularly dropping.
11. Do not connect dimmer with damaged (dented) housing to the power supply.

12. Do not operate the device in rooms with humidity above 90%.
13. The device must not be used in rooms with a temperature below +2°C or above +40°C.
14. Clean only with a damp cloth – the dimmer must be at this time completely disconnected from the power supply.

NOTE!!!

1. Improper connection of the protective conductor (yellow-green color) creates the risk of electric shock.
2. Improper connection of the neutral wire (blue color) will automatically turn off the dimmer and start the buzzer.
3. It is also acceptable to power the dimmer with one or two phases.

3 Models available

Below is a description of the PX814 model markings with their explanation:

PX814

PX814 – ½

PX814 – B

PX814 – B – ½

PX814 – R

PX814 – R – ½

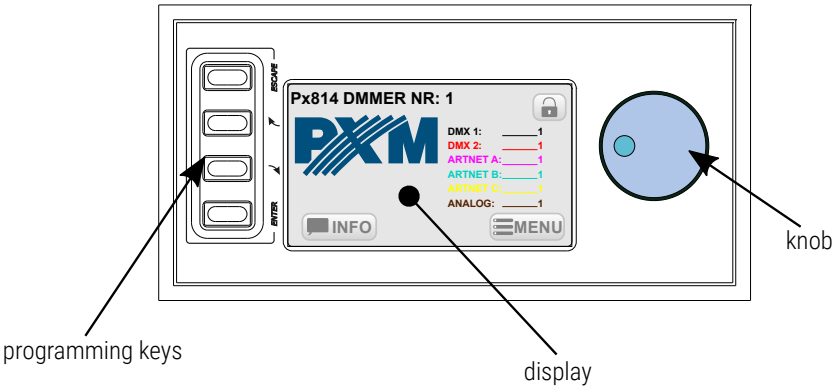
PX814 – R – B

PX814 – R – B – ½

- the standard version has 24 outputs protected by two residual current circuit breakers,
- *B* – a cabinet with switches at each output (so-called Bypass) – the supply current flows directly to the output, bypassing the regulator circuit,
- *½* – the cabinet consists of 12 outputs (half of the standard version),
- *R* – each output is individually protected by a residual current device.

4 Control elements

The device is equipped with a color touch display with a resolution of 480 x 272px. During operation, it displays basic information and possible warning and errors. The displays also allows to set the parameters of the dimmer. The settings menu can be locked with a password.



4.1 Knob

It is used to quickly change the numerical values in the boxes and switch between successive elements on the screen. Pressing the knob is equal to pressing the *Enter* key.

4.2 Keys

The four keys on the left side of the screen help navigate the menus:

- *Enter* – it activates the selected item. If the selected item is a key – it presses this key, if a list – it expands this list, if a text box – it starts to edit it, also approves the changes made

- *Next / Prev* – they are used to switch between successive items on the screen and select values from the list and numeric fields
- *Esc* – it allows to cancel the changes

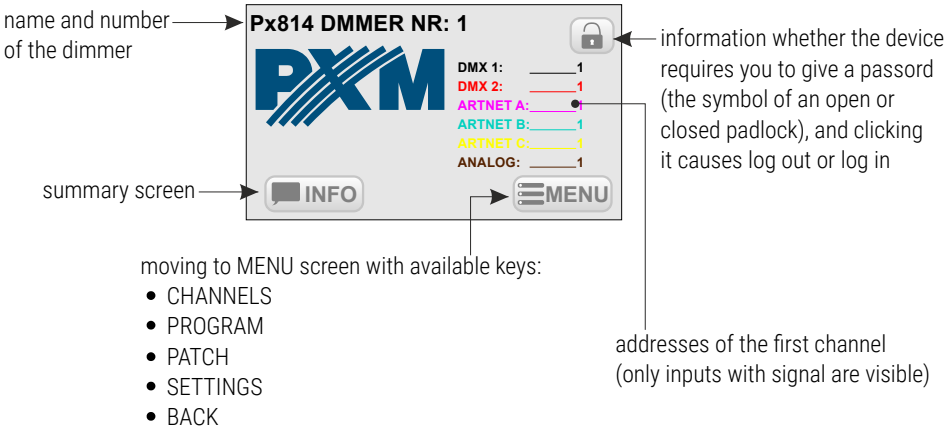
4.3 Interface

During the preview of information and setting parameters on the screen, there are 3 types of interactive elements: keys, text boxes and selection lists. Items can be selected directly on the touch screen or by using the arrow keys. *Next* / *Prev* keys (or knob) are used to select the next / previous item on the screen (item envelope becomes orange), the *Enter* key is used to activate the currently selected item (item envelope and background become orange). Activation of the key causes it to be pressed, activation of the text box allows to enter a new value, activation of the selection list causes it to expand and display available options. When using the touch screen, numeric values in the text boxes are added using the onscreen keyboard, *Next* and *Prev* keys or the knob.



5 Operation

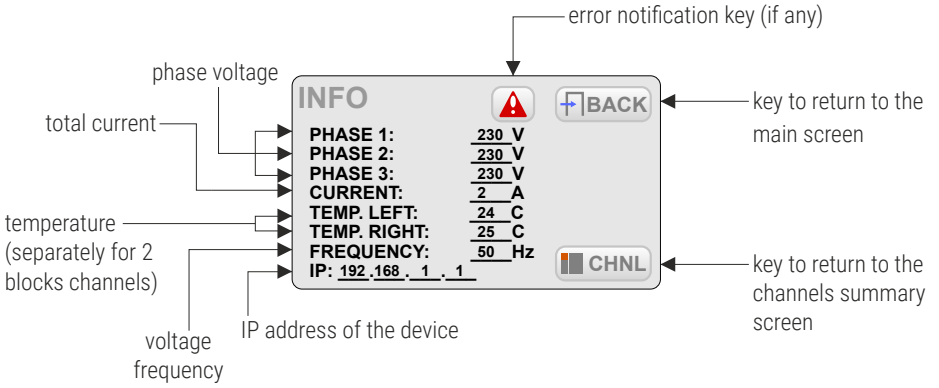
After starting the device, the display shows the start screen, including:



Start screen is visible to every user, without a password.

5.1 Summary screen

Pressing the INFO (*INFO*) key takes you to the summary screen. This screen includes the following information:



Temperature can have four states:

- *24,2* – current temperature
- *???* – no communication with the given channel block
- *MISS* – no sensor
- *SHRT* – sensor shorted

Error notification key is displayed on the screen when one of the following errors is detected in the dimmer:

- DRIVER HIGH TEMPERATURE – warning about exceeding the maximum temperature set in the *FAN* menu
- PHASE LOSS – error, no voltage on the phase (contact the service)
- PHASE ERROR 1 – internal error (contact the service)
- MODULE NOT RESPONDING – error, no communication with the unit (contact the service)
- DRIVER TERMISTOR MISSING – error, thermistor damage (contact the service)
- DRIVER TERMISTOR SHORTED – error, thermistor is shorted (contact the service)
- CHNL OUTPUT SHORTED – error, channel is shorten (contact the service)
- CHNL FUSE MISSING – warning, fuse is not enabled or one supply phases is missing
- CHNL OVERLOAD – warning, channel overcurrent
- CHNL TRIAC SHORTED – error, triac is shorted (contact the service)
- CHNL OPEN CIRCUIT – warning, open circuit or burnt bulb

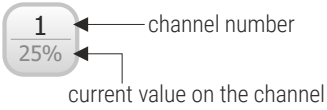
The messages are divided into errors and warnings – errors are shown in red and a warnings in orange.

NOTE! In case of closing the output circuit, the dimmer automatically disconnects the circuit. In this case, disconnect device from the power supply and check the cause of short circuit.

5.2 Channel summary screen

The channel summary screen CHNL (*CHANNELS INFO*) shows keys corresponding to 24 output channels.

Each key shows:

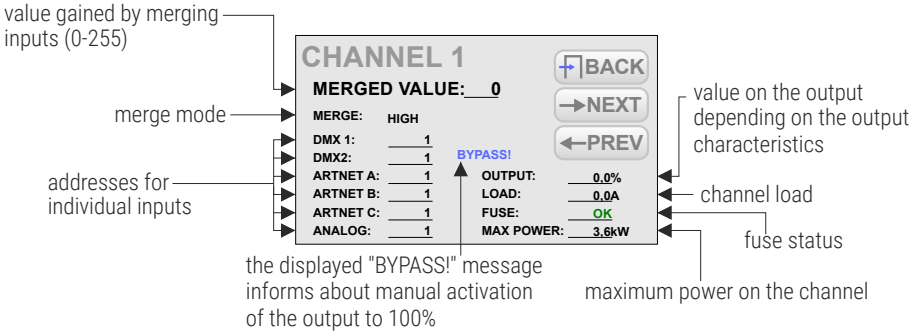


The colors of captions depend on the source of value on the channel:

- black – DMX 1
- red – DMX 2
- magenta – Art-Net 1
- cyan – Art-Net 2
- yellow – Art-Net 3
- brown – analog input*
- green – Always ON
- gray – no signal

* – analog input available on special order

Pressing one of the channel keys takes you to the corresponding channel summary screen. This screen displays the following information:



On this screen, there are also available the ***NEXT*** and ***PREV*** keys used to quickly navigate to the next / previous channel and the ***BACK*** key used to return to the list of channels.

If the dimmer is connected to the application on a PC – all the information is also available on an ongoing basis in the program.

6 Programming

Pressing the 

(*MENU*) key on the main screen of the dimmer, takes you to the screen with available keys:

 CHANNELS – setting the parameters of output channels

 PROGRAM – defining the scenes and program that can be activated in the absence of DMX signal

 PATCH – addressing inputs and merge mode for individual inputs

 SETTINGS – other settings

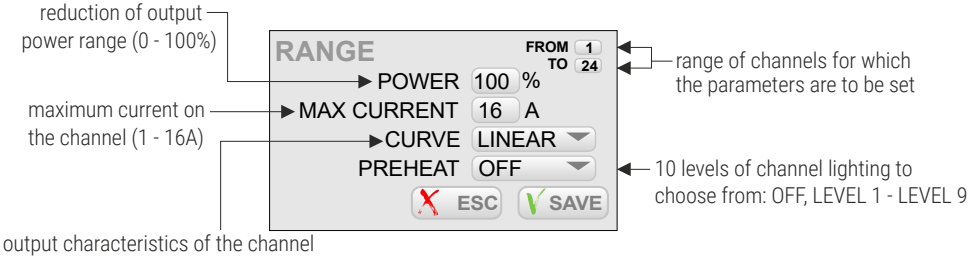
6.1 Setting the channel parameters

After selecting (*CHANNELS PARAMETERS*), you can set the parameters:

SINGLE – separately for individual channel

RANGE – collectively for the channel range

If you select (*RANGE*), the following fields will be available on the screen:

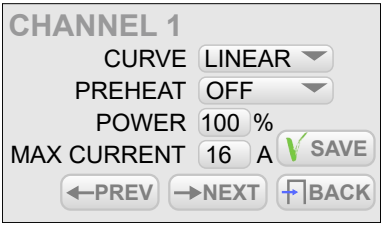


The user can select the following curves:

- *LINEAR* – the value on the output is directly proportional to the input value
- *EXPONENTIAL* – exponential characteristics
- *LOGARITHMIC* – logarithmic characteristics
- *ON/OFF* – two-level characteristics
- *REVERSED* – the value on the output is inversely proportional to the input value
- *USER 1 – 5* – curves to be defined by the user

Pressing the *ESC* key exits the screen without saving your changes, press the *SAVE* key to exit the screen and save your settings for all channels in a given range.

If you select the  (*SINGLE*) option, the screen will display the keys for all output channels. Pressing one of the channel keys takes you to the corresponding parameter screen:



NEXT and *PREV* keys allow to quickly switch between successive channels. To save your parameters, press *SAVE* before switching to another channel.

6.2 Program

In the  (*PROGRAMMING*) menu, you can program 128 scenes and a program that can be activated in the absence of DMX signal. Scene is a static adjustment of the value at the output channels. Program is a set of successive scenes.

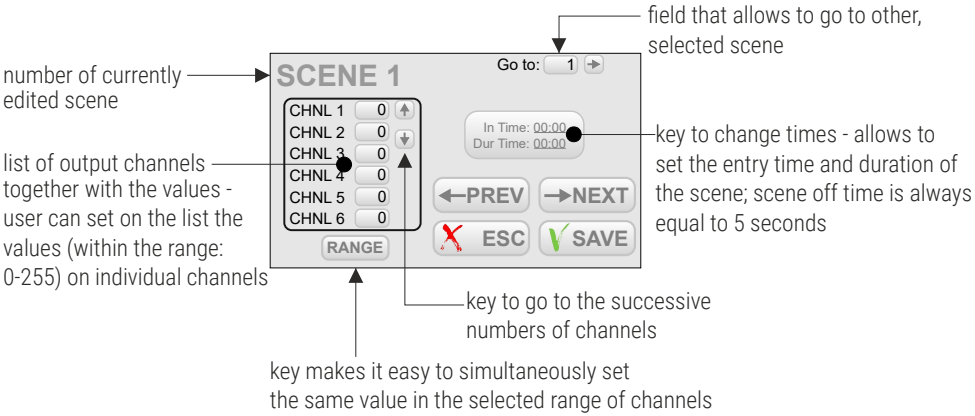
The screen shows the following keys:

	EDIT SCENE	– editing on of 128 scenes
	COPY SCENE	– copying set values between the scenes
	CAPTURE SCENE	– capturing the current scene output status
	EDIT PROGRAM	– defining the order of scenes in the program
	PLAY	– scene or program preview
	NO SIGNAL	– defining the dimmer operation in the absence of DMX signal

6.2.1 Scene editing

When you select  (***EDIT SCENE***), the application displays the screen for editing scene 1; in addition, scene 1 occurs on the outputs.

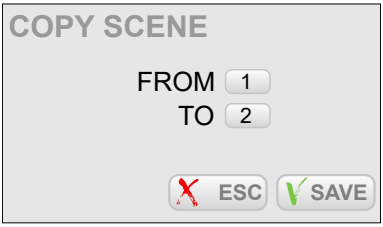
Scene edit screen includes:



NEXT and ***PREV*** keys allow to switch between the scenes. Transitions are made in a linear way.

6.2.2 Scene copying

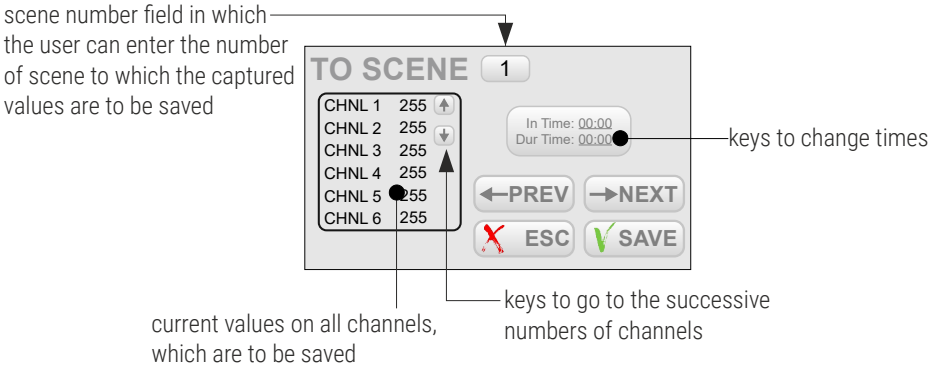
Scene copying screen (***COPY SCENE***) contains 2 fields: ***FROM*** and ***TO***, which allow to specify the source scene and the target scene between which the values are to be copied.



6.2.3 Scene capture

Scene capture option (***TO SCENE***) allows to save current values on the output channels to the selected scene.

Scene capture screen includes:



NEXT and ***PREV*** keys allow to switch between the scenes.

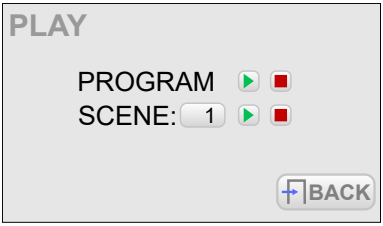
6.2.4 Program edit

The program edit screen (*EDIT PROGRAM*) shows a list of 64 steps and scenes corresponding to these steps.



6.2.5 Playback

The playback screen (*PLAY*) allows to preview the created scenes and program. On the screen, there are keys to play and stop the program and the field to select a scene. The *BACK* key which exits the screen.

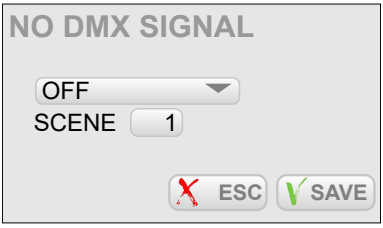


6.2.6 No signal

By using the (*NO DMX SIGNAL*) screen, you can program the operation of the device in the absence of DMX signal.

Available options:

- *ON* – all channels will be enabled at 100%
- *OFF* – all channels will be disabled
- *SLOW TURN OFF* – there will be a slow blanking of all channels
- *HOLD* – the last value present before the signal loss will be saved on the channels
- *SCENE* – the selected scene will be displayed (to choose from 128 scenes)
- *PROGRAM* – the program will be played

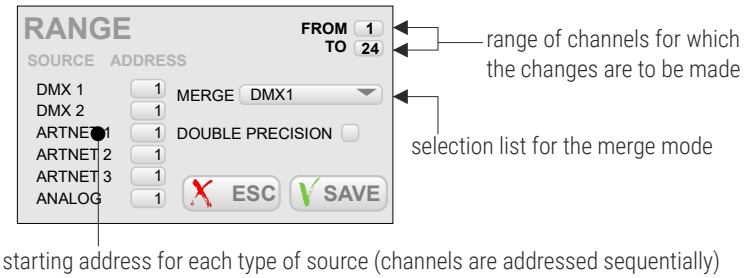


6.3 Patch

The (*PATCH*) menu allows to set the merge mode for inputs and DMX address on the various inputs, as well as to determine whether the channel is controlled with double-precision (using two DMX channels).

Settings can be changed separately for the selected channels (*SINGLE*) or in groups for a fixed range of channels (*RANGE*).

Selecting [...] (*RANGE*) takes you to the screen for group settings. This screen includes the following fields:



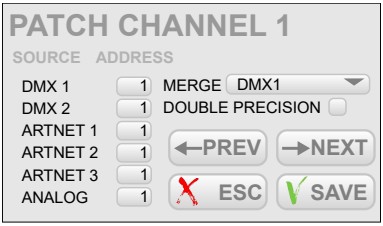
Available values of the merge mode:

- *HIGH* – the highest of value
- *LAST* – last value
- *DMX1* – value from the DMX 1 input
- *DMX2* – value from the DMX 2 input
- *UNIVERSE 1* – value from the Art-Net 1 input
- *UNIVERSE 2* – value from the Art-Net 2 input
- *UNIVERSE 3* – value from the Art-Net 3 input
- *is DMX1/DMX2* – value from the DMX 1 input, if there is a signal, if not – DMX 2 input
- *is DMX1/DMX2 CAPTURE* – if DMX 1 and DMX 2 are enabled, value from the DMX 1 input is selected. If you disable DMX 1, value from the DMX 2 is selected only when it reaches the DMX 1 input value. This mode prevents abrupt changes in values.
- *is DMX2/DMX1* – value from the DMX 2 input, if there is a signal on it, if not – DMX 1 input

- *is DMX2/DMX1 CAPTURE* – if DMX 1 and DMX 2 are enabled, value from the DMX 2 input is selected. If you disable DMX 2, value from the DMX 1 is selected only when it reaches the DMX 2 input value.
- *is DMX1/UNVRS 1* – value from the DMX 1 input, if there is a signal on it, if not – UNIVERS 1 input
- *is DMX1/UNVRS 1 CAPT.* – if DMX 1 and UNIVERS 1 are enabled, value from the DMX 1 input is selected. If you disable DMX 1, value from the UNIVERS 1 is selected only when it reaches the DMX 1 input value.
- *is UNVRS 1/DMX1* – value from the UNIVERS 1 input, if there is a signal on it, if not – DMX 1 input
- *is UNVRS 1/DMX1 CAPT.* – if DMX 1 and UNIVERS 1 are enabled, value from the UNIVERS 1 input is selected. If you disable UNIVERS 1, value from the DMX 1 is selected only when it reaches the UNIVERS 1 input value.
- *ALWAYS ON* – channel always switched on – the channel is switched on to 100% using BYPASS

Pressing the *ESC* key exits the screen without saving your changes, press the *SAVE* key to exit the screen and save your settings for all channels in a given range.

If you select the (*SINGLE*) option, the screen will display the keys for all output channels. Pressing one of the channel keys takes you to the corresponding parameter screen:



NEXT and *PREV* keys allow to quickly switch between successive channels. To save your parameters, press *SAVE* before switching to another channel.

6.4 Settings

The (*SETTINGS*) menu includes the following categories:

- CURVES – management of characteristics curves
- ADMIN – administrator settings
- ARTNET – Art-Net settings
- FAN – fan settings
- LCD – display settings
- LAN – network settings

6.4.1 Curves

There are 10 curves available in the device: 5 factory-set and 5 user-defined. Preset curves can be previewed and copied. User's curves can be edited. The  (***CURVES***) screen includes 10 keys for all the curves:

- LINEAR
- REVERSED
- SWITCHED
- LOGARITHMIC
- EXPONENTIAL
- USER 1 – USER 5

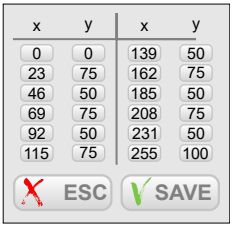
Clicking on of the keys takes you to the preview of the curve. For pre-set curves, ***COPY*** and ***BACK*** keys are displayed next to the preview. For user's curves, ***EDIT*** and ***BACK*** keys are available.

Pressing the ***COPY*** key displays the copy window, where you can determine to which user's curve, and to what extent, the selected curve will be copied. Pressing the ***EDIT*** key displays windows with 12 points for which you can enter values. The curve will be drawn between the designated points. The curve can be created from 2 to 12 points.

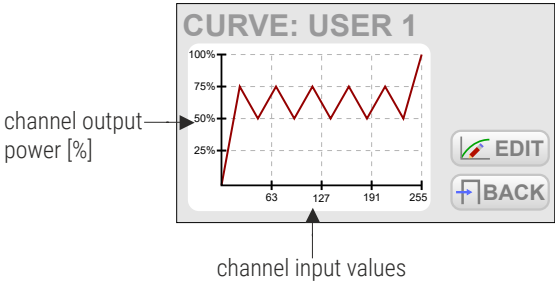
NOTE! The first point of the defined curve must always have the *x* coordinate equal to 0.

Sample configuration of the user's curve:

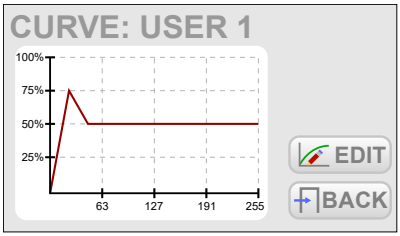
1. From the ***CURVES*** menu, select the user's curve key, for example ***USER 1***
2. Press ***EDIT***, the application displays a table of 12 coordinates of the points between which the new curve is drawn
3. Complete the table



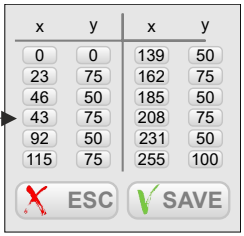
4. To save the settings, press ***SAVE***, a user-defined curve appears on the screen



Only the points which the values on the x-axis are given incrementally are taken into account, e.g.:

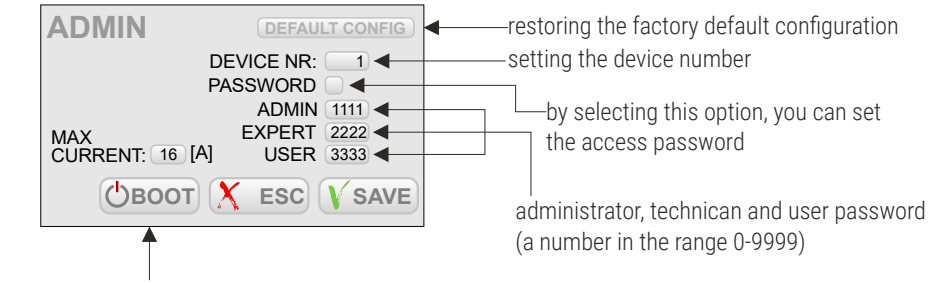


entering a value smaller than the previous one will cause that only the first three points will be taken into account in this case



6.4.2 Admin

Category (*ADMIN*) <u>contains the administrator settings:</u>



NOTE! If an incorrect administrator password is entered ten times (in each case, the message "NO RIGHTS TO ACCESS!" is displayed), the device will be blocked and you will need to contact customer service.

<u>Switching between user accounts:</u>

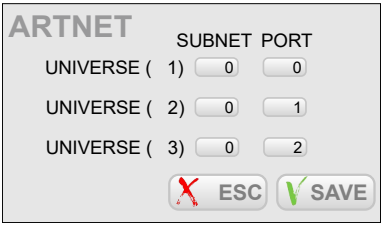
1. Click the button (located on the start screen of the panel), it will cause the user logout
2. Click again in the padlock key , to display the login screen
3. Select the account that you want to log on and enter your password
4. Confirm

The device has 3 users whose access levels are shown in the table below:

	No logging	User	Technican	Administrator
Start screen	✓	✓	✓	✓
Summary screen	X	✓	✓	✓
Channel preview screen	X	✓	✓	✓
Scene / program running	X	X	✓	✓
Channel settings	X	X	✓	✓
Program / scene edit	X	X	✓	✓
Channel patch	X	X	✓	✓
Curve, fan, display setting	X	X	✓	✓
Ethernet, Art-Net settings	X	X	X	✓
User and password management	X	X	X	✓

6.4.3 Art-Net

In the  (*ARTNET*) menu, there are address settings *SUBNET* and *PORT* which allow to select Univers for each of the three Art-Net input ports.

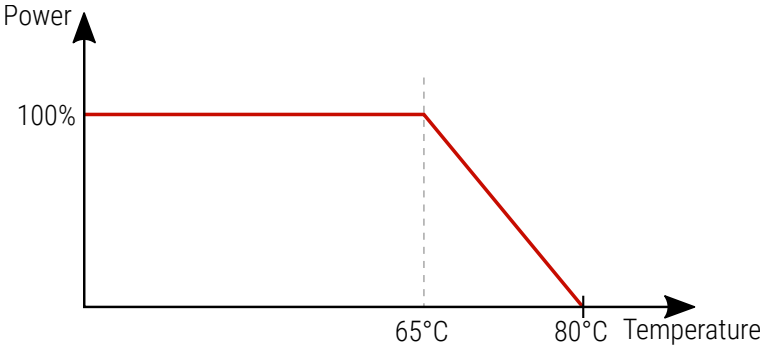


6.4.4 Fan

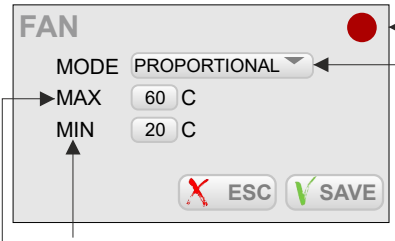
The device is equipped with a built-in automatic power reduction system. Dimmer monitors the temperature of channel groups; if the temperature of +65°C is exceeded, the output power is automatically reduced. This reduction

is linear over the range +65°C to +80°C, i.e., if the temperature of +80°C is exceeded, the device will disable the channels.

The course of the linear power limitation between +65°C and +80°C is shown in the graph below:



The following settings are available in the (*FAN*) menu:



information on the operation of fans: red - fans are off, green - fans are on

fan operation mode:

- ☒ **PROPORTIONAL** – the air flow increases linearly with the increasing temperature (between the minimum and maximum temperature)
- ☒ **HYSTERESIS** – the fans turns on and operates at 100% when the specified maximum temperature is exceeded, and turns off below the minimum temperature
- ☒ **ON** – fan operates with maximum power all the time

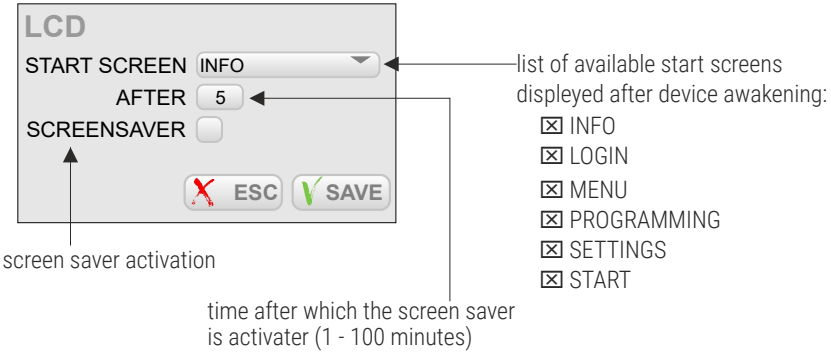
temperature at which the fan turns on

temperature at which the fan operates with maximum power

NOTE! The device has a safety feature that turns the fan on also when the load current of any output exceeds 5A, or the total current exceeds 20A.

6.4.5 LCD

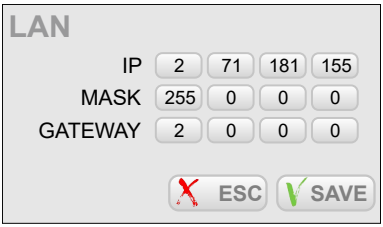
The display menu (*LCD*) includes the screen saver settings. You can determine whether the screen saver is to be run, and if so, after what idle time and which of the screens is to be displayed after the "awakening".



6.4.6 LAN

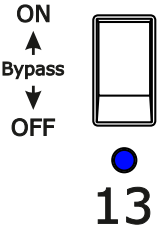
In the (*LAN*) menu, local network settings are available:

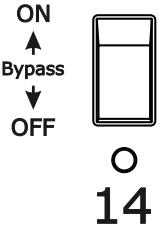
- *IP* – device IP address
- *MASK* – subnet mask
- *GATEWAY*



7 Bypass

The device in option (PX814-B) has *On* / *Off* switches installed at each output channel, they are responsible for enabling or disabling the *Bypass* function. When the switch is turned on (the LED is blue), the channel is 100% (1 Full *Full*) and the supply current flows directly to the output, bypassing the controller system.





NOTE! *Bypass* mode is also activated when the *Always ON* function in the *Patch* menu is active. This is indicated by the orange LED lighting up.

8 Indication lights

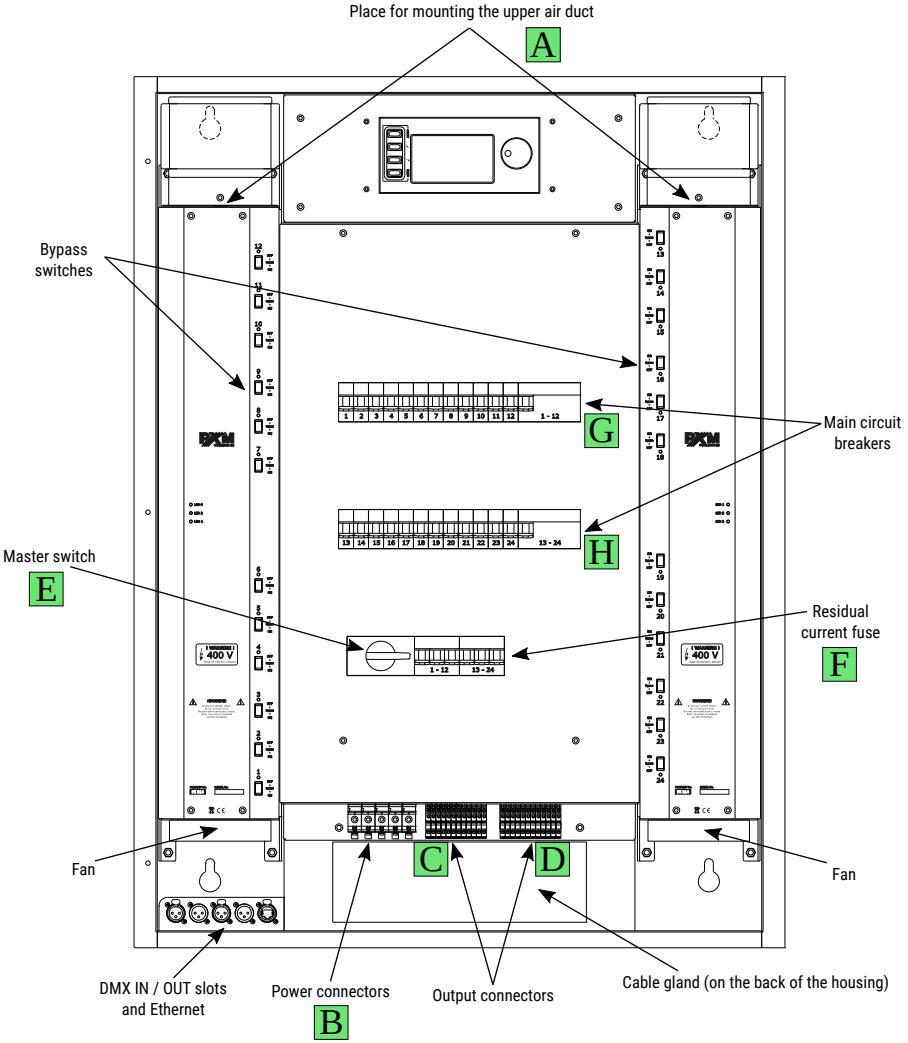
The device has 3 built-in controls for each channel group, which means:

Indicator	Action	Meaning
green	flashes	the device is turned on
blue	single flashing	first channel group
	double flashing	second channel group
yellow	is off	no communication on the *CAN* bus in the device
	flashes	correct communication on the *CAN* bus in the device
LEDs at the output channels	is off	*Bypass* is not active
	shines blue	*Bypass* function is active – activated from the switch
	shines orange	*Bypass* function is active – started by the *Always ON* function in the *Patch* menu

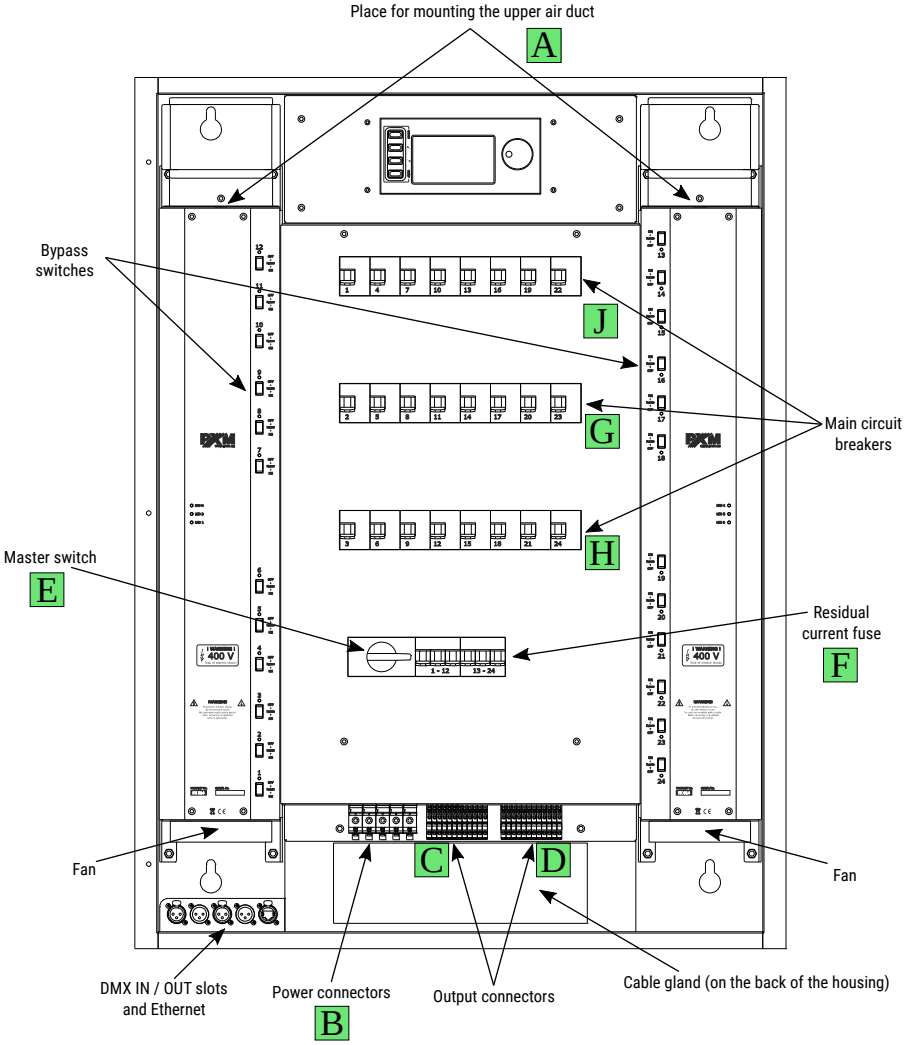
9 Connection scheme

9.1 Dimmer view after opening the door

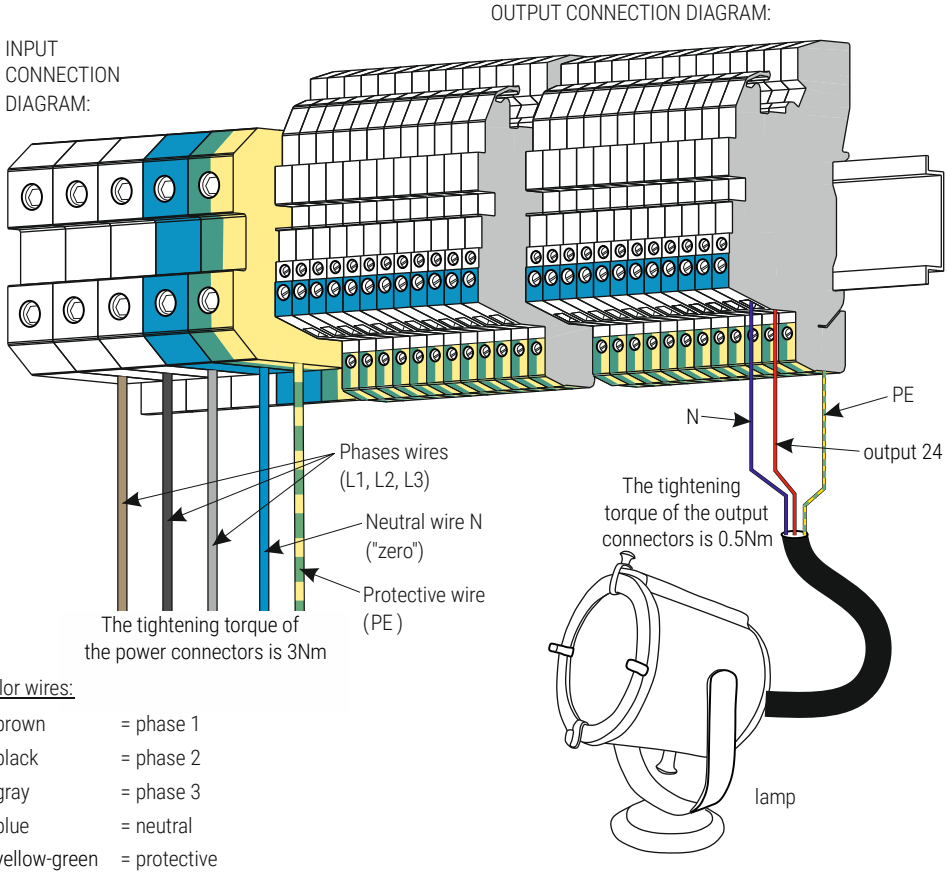
Version PX814–B



Version PX814–B–R



9.2 Connection scheme



Color wires:

brown	= phase 1
black	= phase 2
gray	= phase 3
blue	= neutral
yellow-green	= protective

The smallest cross section of an individual input cable is 25mm^2

The smallest cross section of an individual output cable is 3 x 2.5 mm^2

9.3 Installation steps

All electrical connections must be performed only by adequately qualified personnel!!!

1. Install anchor bolts in the wall according to the dimensions given in point 9.4 Arrangement of fixing holes. The size and type of dowels should be selected so that, taking into account the weight of the dimmer, ensure safe and durable fixing. Do not use anchor bolts with a diameter of less than 12mm.
2. Remove the screws in the places marked with the letter "*A*" in the figure in point 9.1 Dimmer view after opening the door.
3. Pull out two upper ventilation ducts.
4. Attach the dimmer to the wall.
5. Insert the ventilation ducts.
6. Tighten screws securing the ducts – "*A*".
7. Connect the power supply to the power connectors "*B*".

   NOTE! Pay special attention to the correct connection of the protective conductor.
8. Connect the receiver to the input connectors.

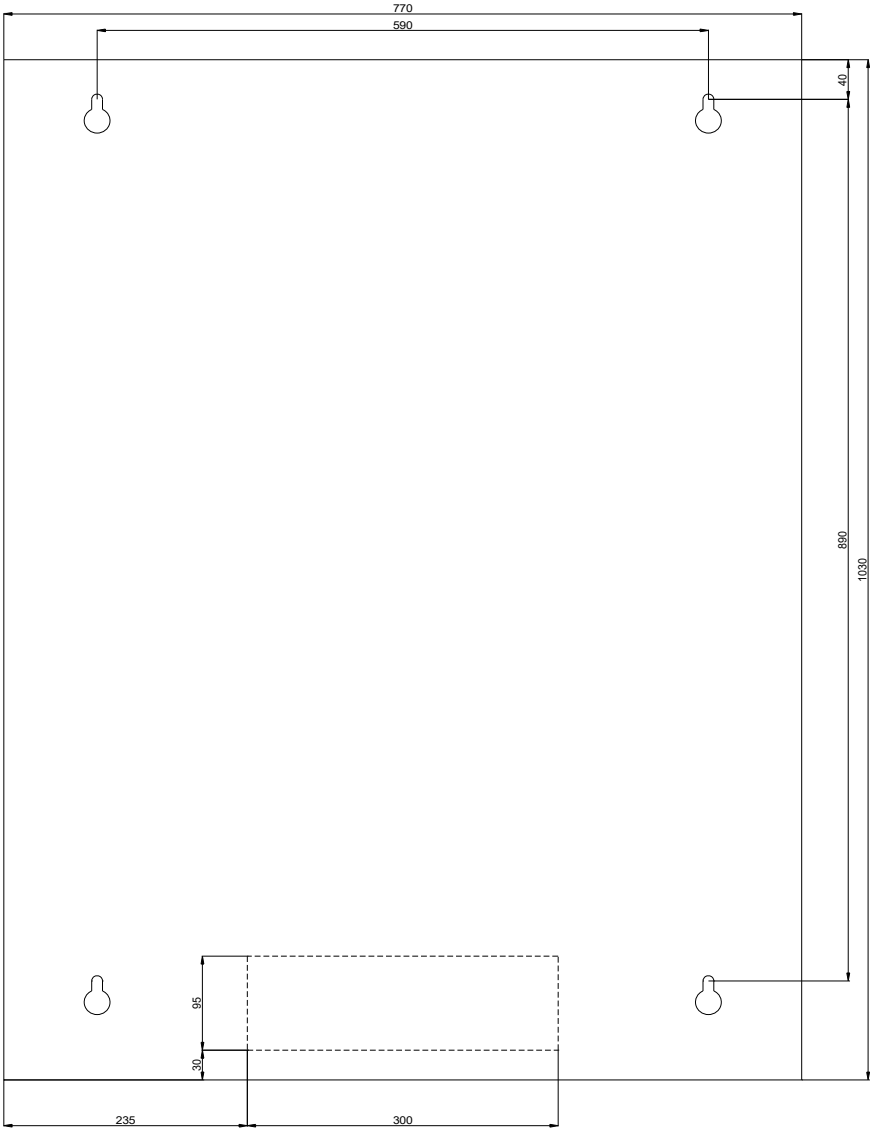
   NOTE! Phase and zero conductors of one receivers MUST be connected to the same group of terminals (marked with letters "*C*" or "*D*" in the figure). Do not connect the phase conductor of one receiver to the group "*C*", and zero conductor to the group "*D*" and vice versa.
9. Switch off all fuses and circuit breakers.

10. Set all Bypass switches to the "*OFF*" position.
11. Turn on the external power switch.
12. Turn on the master switch "*E*", and the main circuit breakers "*F*". The control panel should turn on.

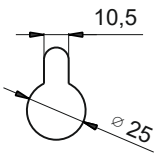
    NOTE! If the control panel does not turn on and an acoustic alarm is started, immediately turn off the power supply and check if the power cables are properly connected. An acoustic alarm informs about improper connection of phases.

    Turn on the two circuit breakers "*G*" and "*H*" (and "*J*").
13. You can turn on the fuses for the output channels and check the operation of the dimmer.
14. Connect DMX cables.
15. Program the dimmer in accordance with the description in this manual.

9.4 Arrangement of fixing holes



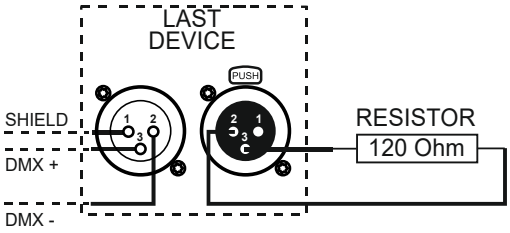
DETAIL A:



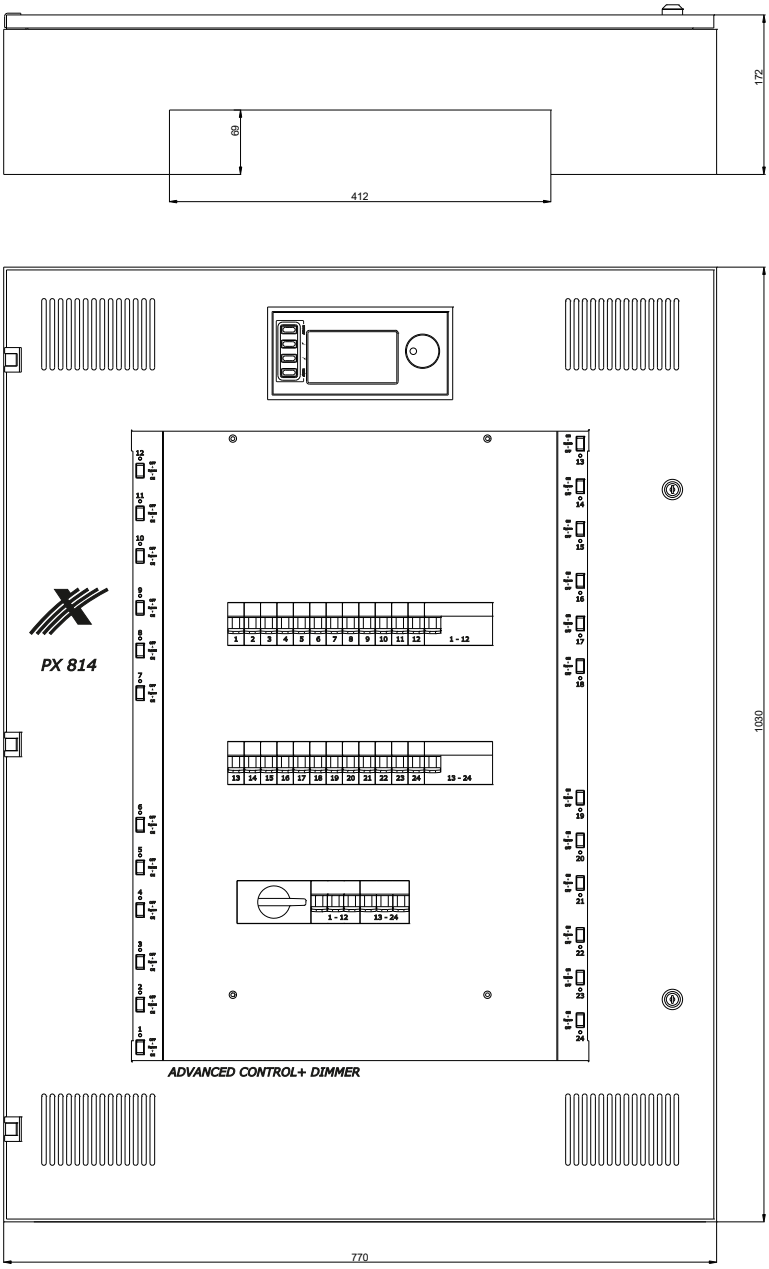
dimensions are given in milimeters

9.5 DMX signal connection

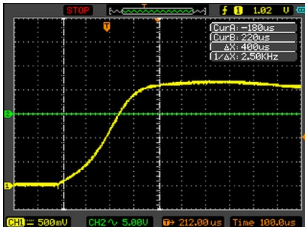
1. The recommended cable for the connection is RS485 (two wires in a shield).
2. Devices must always be connected in series.
3. To split the DMX line, use the Splitter DMX (e.g. PX716).
4. For more devices (over 32) or long distances (more than 300 meters) use DMX Repeater (e.g. PX097). It is recommended not to reach the maximum length and number of devices on the DMX line.
5. It is necessary to install a terminator, i.e. 120 Ohm resistor, in the last device.



10 Dimensions



11 Technical data

type	PX814
DMX lines	2
Art-Net Universe	3
optically insulated DMX line	yes
circuit break detection	yes
overvoltage protection of DMX line	yes
faulty circuit control	yes
residual current protection	yes (the ability to protect each circuit individually in option – ***R***)
resolution of control	8 or 16 bit
touch screen resolution	480 x 272px (4,3”)
preheat	yes
output merge	yes (13 priorities)
output power limiter	yes
attenuation	according to standard PN-EN 55014
up-slope time at the interference suppression choke: ~ 380 µs	
output carrying capacity	3600W – continuous resistive load 2400VA – continuous inductive load (conventional and neon transformers)
output protection	full electronic protection + automatic 16A fuses

built-in master switch	yes
fans	electronic control
acoustic emission level	≤ 50dB (at a distance of 1m from the housing)
input slots	35mm^2 terminals
output slots	4mm^2 terminals
power supply	3-NPE AC 400/230V / 50Hz
current consumption	3 x 128A (at full load)
weight	75kg
dimensions	width: 770mm height: 1030mm depth: 172mm

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Podłęże, 04.11.2020

DECLARATION OF CONFORMITY

PXM Marek Żupnik spółka komandytowa
Podłęże 654, 32-003 Podłęże

we declare that our product:

Product name:	AC+ Dimmer
Product code:	PX814

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

PN-EN IEC 63000:2019-01	EN IEC 63000:2018
PN-EN 62368-1:2015-03	EN 62368-1:2014
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 61000-6-3:2008	EN 61000-6-3:2007

and meets the essential requirements of the following directives:

2011/65/UE 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
Text with EEA relevance.

2014/30/UE 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 (recast)
Text with EEA relevance.

2014/35/UE 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 the making available on the market of electrical equipment designed for use within certain voltage limits.

PXM
Marek Żupnik spółka komandytowa
32-003 Podłęże, Podłęże 654
NIP 677-002-54-53



mgr inż. Marek Żupnik.