PX914

Modular Advanced 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

PX914 is a professional modular dimmer with rack mounting. Up to 24 modules divided into 4 groups (up to 6 modules in each group) can be installed in the cabinet. Each group can have 4 x 3000W or 2 x 5000W modules (one type within the group).

The device is powered from three phases. The dimmer allows to control from 5 different sources simultaneously:

- 2 x DMX-512,
- 3 x Art-Net / sACN.

The Modular Advanced Dimmer is equipped with a touch color display, 4 – 8 buttons and a knob. Using the buttons and the knob, you can easily navigate through the intuitively prepared menu, where you can set all the parameters of the dimmer and view its status.

PX914 has a built-in signal merging system with the possibility of selecting one of 13 priorities, including switching on any circuit permanently, regardless of the control. Advanced electronics allow for individual addressing of each output channel and graphic editing of the control characteristics (5 default characteristics and 5 user-set characteristics). The modules have switches (On / Off) at each of the outputs that allow to manually switch the output to 100% (the so-called Bypass) – the supply current flows directly to the output, bypassing the regulator circuit.

The dimmer also allows to set the limits of output voltages and currents for each channel separately. It is also equipped with a bulb heating system (10

levels) and control of the attached fuse and broken circuit / blown bulb. Reaction to DMX signal loss can be defined by the user. In addition to the basic options (*ON*, *OFF*, *HOLD*, *SLOW TURN OFF*), there are 64 scenes and a program to define.

Built-in "*soft-start*", "*soft-on*" and "*even-off*" circuits ensure reliable operation in harsh conditions. Direct grid zero detection and optical isolation of the DMX input guarantee high noise immunity.

PX914 is a durable free-standing rack cabinet, and each module has a metal housing with an efficient cooling system.

Module models available:

- 4 x 3000W
- 2 x 5000W

The device comes with PC software available for download from the manufacturer's website (https://pxm.pl/), which allows to remotely edit the dimmer settings. The application also allows to view the operating parameters of the device, individual channels and change the configuration.

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

2 Safety conditions

PX914 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 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. Each receiver should be powered by a separate cable.
6. After installation, test the effectiveness of resetting all the equipment controlled.
7. All repairs that require the housing to be removed can only be carried out with power disconnected.
8. The dimmer must be strictly protected against contact with water or other liquids.
9. Avoid sudden shocks.
10. Do not connect dimmer with damaged housing to the power supply.
11. Do not operate the device in rooms with humidity above 90%.
12. The device must not be used in rooms with a temperature below +2°C or above +40°C.

13. 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.

3 Configurations available

Control module

No. catalog	Name	Description	Contains
PX914-C	MAD Control Unit	control module	control module

- C – control module

Type of cabinet

No. catalog	Name	Description	Contains
PX914-24	MAD Rack 24	cabinet	• fans • power connections • PE and N bus • control module housing
PX914-48	MAD Rack 48		
PX914-72	MAD Rack 72		
PX914-96	MAD Rack 96		

- 24 / 48 / 72 / 96 – maximum number of output channels (using 4 x 3kW modules)

Module housing

No. catalog	Name	Description	Contains
PX914-F-3	MAD Frame 24 x 3kW	module housing 3kW 1FI/1CH	• housing for 6 modules • fuse protection block • output ZUG connectors
PX914-F-5	MAD Frame 12 x 5kW	module housing 5kW 1FI/1CH	
PX914-F-3-R	MAD Frame 24 x 3kW R	module housing 3kW 1FI/4CH	• housing for 6 modules • fuse and residual current protection block • output ZUG connectors
PX914-F-5-R	MAD Frame 12 x 5kW R	module housing 5kW 1FI/2CH	

- F – housing
- 3 / 5 – adapted to 3kW or 5kW modules
- R – residual current protection for each module in the housing
    - version 4 x 3000W one residual current device for 4 circuits
    - version 2 x 5000W one residual current device for 2 circuits

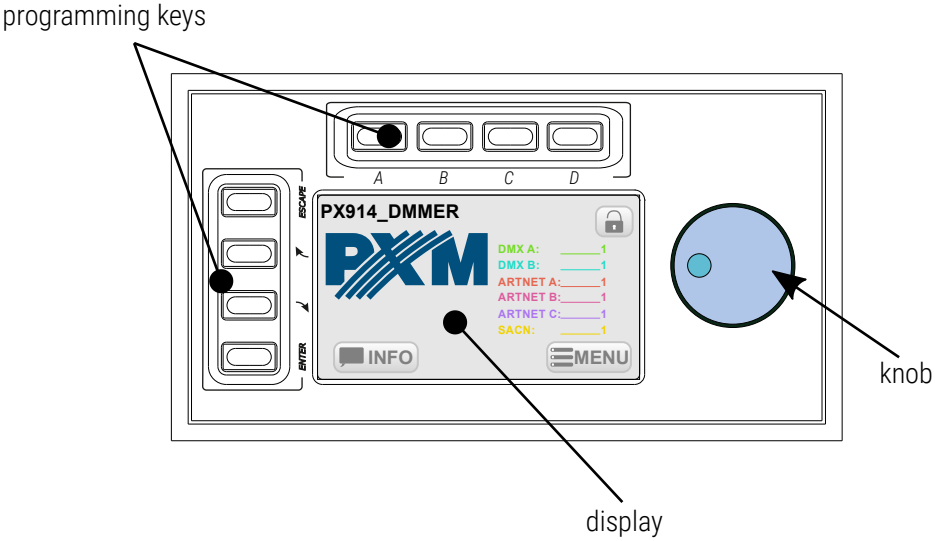
Modules

No. catalog	Name	Description	Contains
PX914-D-3-R	MAD Dim Module 4 x 3kW R	dimmer module 4 x 3kW 1FI/1CH	dimmer and relays
PX914-D-3	MAD Dim Module 4 x 3kW	dimmer module 4 x 3kW 1FI/4CH	
PX914-D-5-R	MAD Dim Module 2 x 5kW R	dimmer module 2 x 5kW 1FI/1CH	
PX914-D-5	MAD Dim Module 2 x 5kW	dimmer module 2 x 5kW 1FI/2CH	

- D – dimmer – it also contains relays that enable switching each circuit individually into the mode of direct power supply to the outputs, bypassing the regulator system (*Bypass*)
- 3 / 5 – 4 x 3kW or 2 x 5kW module
- R – each circuit is protected by an individual 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 warnings and errors. The display 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, of 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 selected values from the list and numeric fields,
- *Esc* – it allows to cancel the changes.

Additional four keys located above the screen are used to display channel ranges and their preview (summary screen and parameter setting).

- *A* – range 1 – 24,
- *B* – range 25 – 48,
- *C* – range 49 – 72,
- *D* – range 73 – 96.

4.3 Interface

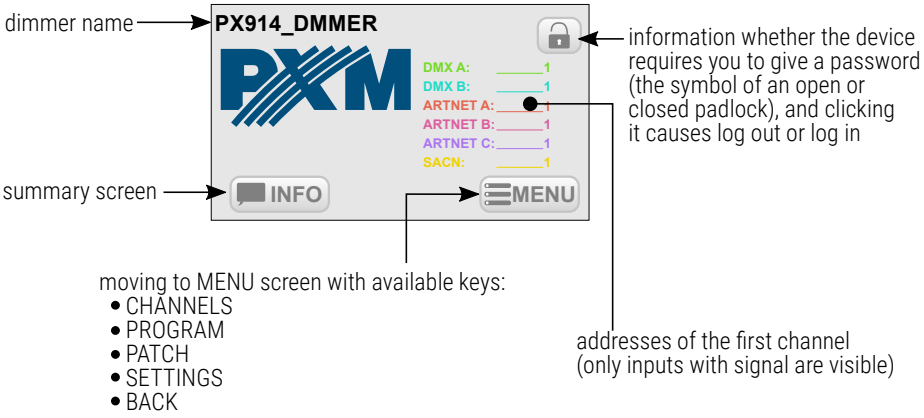
During the preview of information and setting parameters on the screen, there are 3 types of interactive elements: keys, text boxes and selection lists. Items can be selected directly on the touch screen or by using the arrow keys. *Next* / *Prev* keys (or knob) are used to select the next / previous 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

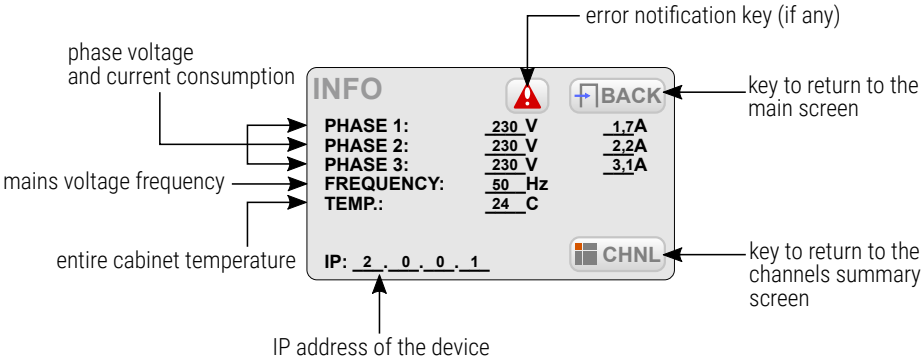
After starting the device, the display shows the start screen, including:



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:

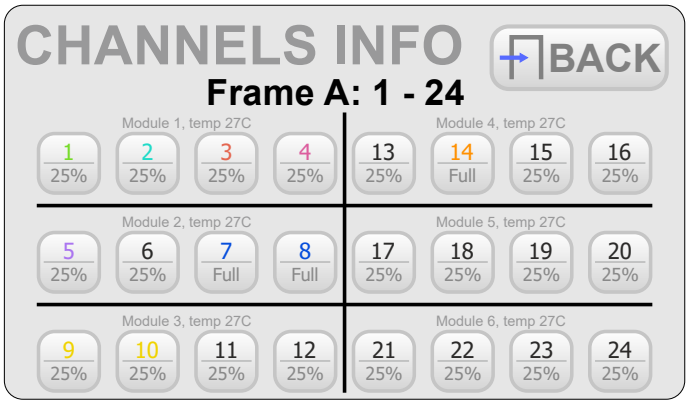
- DRIVER HIGH TEMPERATURE – warning about exceeding the maximum temperature set in the *FAN* menu,
- PHASE LOSS – error, no voltage on the phase (contact the service),
- PHASE ERROR 1 – internal error (contact the service),
- MODULE NOT RESPONDING – error, no communication with the module (contact the 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,
- MODULE MISS – no module or no communication,
- POWER FAN – the main fan is not working properly.

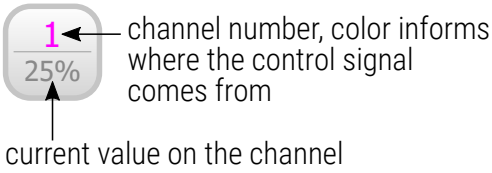
The messages are divided into errors and warnings – errors are shown in red and a warnings in orange.

5.2 Channel summary screen

The channel summary screen CHNL (*CHANNELS INFO*) shows the buttons corresponding to the output channels. Using the buttons above the screen (*A*, *B*, *C* and *D*) you can switch between four pages (depending on the cabinet version) with channel information.



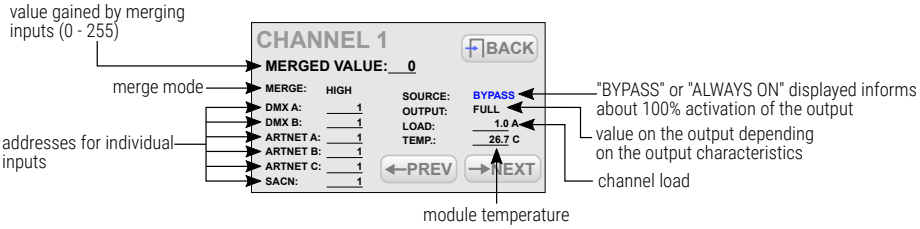
Each key shows:



The colors of the channel numbers depend on the signal source:

- green – DMX A
- blue – DMX B
- red – Art-Net A
- pink – Art-Net B
- violet – Art-Net C
- yellow – sACN
- blue – Bypass from switch
- orange – Bypass *Always On*
- gray – no signal

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 (***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

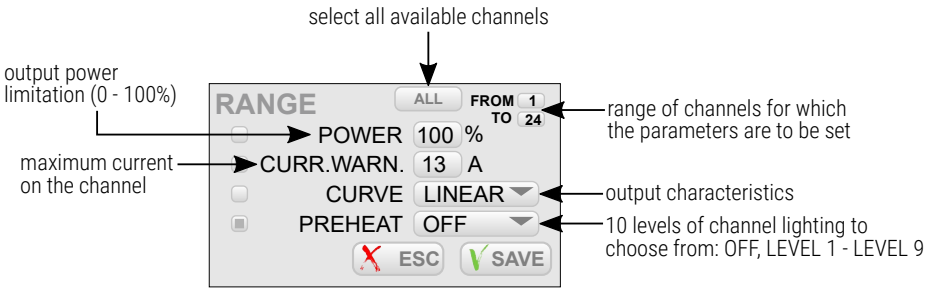
6.1 Setting the channel parameters

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:



NOTE! Only the selected options will be saved in the selected channels.

The range *FROM TO* can be selected with the buttons:: A – 1 – 24 / B – 25 – 48 / C – 49 – 72 / D – 73 – 96.

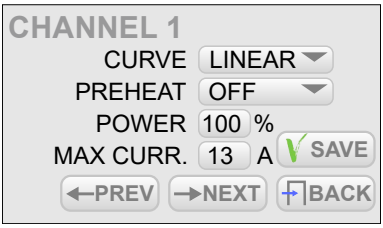
The user can select the following curves:

- *LINEAR* – the values on the output are direct proportional to the input value,
- *EXPONENTIAL* – exponential characteristic,
- *LOGARITHMIC* – logarithmic characteristic,

- *ON/OFF* – two-level characteristic,
- *REVERSED* – the values on the output are inversely proportional to the input values,
- *USER 1 – 5* – curves to be define 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 I (*SINGLE*) option, the screen will display the keys for all output channels. Using the buttons above the screen (*A*, *B*, *C* and *D*) you can switch between four pages (depending on the cabinet version) with 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 Scenes

In the  (*SCENES*) menu, you can program 8 scenes that can be activated in the absence of DMX signal. Scene is a static adjustment of the value at the output channels.

The screen shows the following keys:

 EDIT SCENE – editing on of 128 scenes

 COPY SCENE – copying set values between the scenes

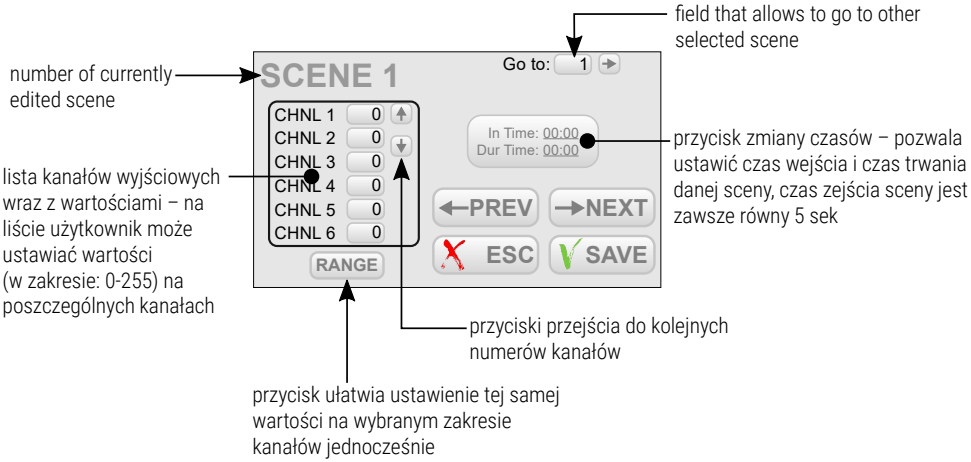
 CAPTURE SCENE – capturing the current scene output status

 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.

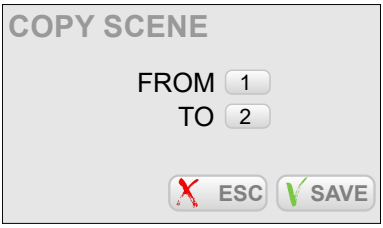
Scene edit screen includes:



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

6.2.2 Scene copying

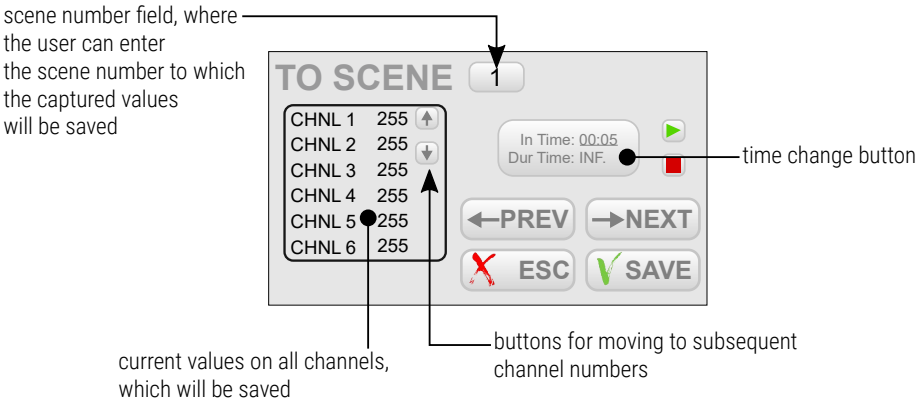
Scene copying screen (*COPY SCENE*) contains 2 fields: *FROM* and *TO*, which allow to specify the source scene and the target scene between which the values are to be copied.



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.

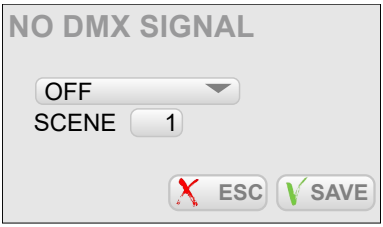
6.2.4 No signal

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

Available options:

- *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 8 scenes)

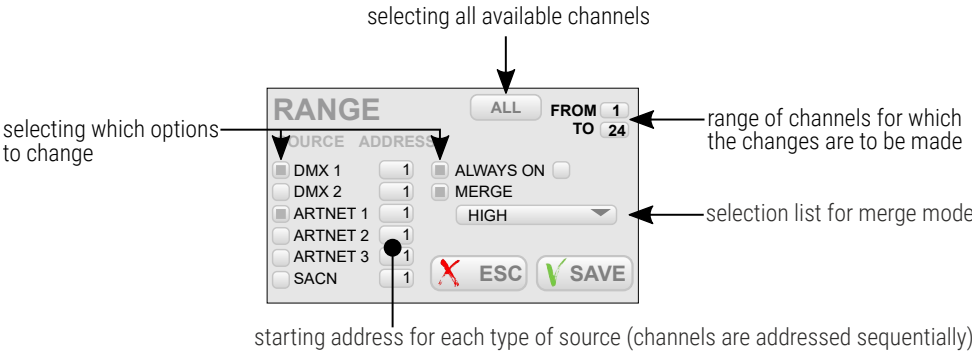


6.3 Patch

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:



NOTE! Only selected options will be saved in the selected channels.

The *FROM TO* range can be selected using the buttons: A – 1 – 24 / B – 25 – 48 / C – 49 – 72 / D – 73 – 96.

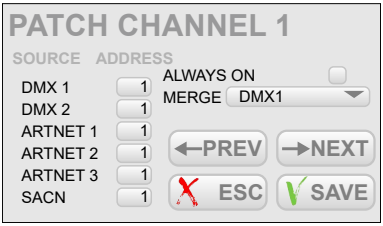
Available values of the merge mode:

- *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,
- SACN – value from the sACN 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.

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 I (*SINGLE*) option, the screen will display the keys for all output channels. Using the buttons above the screen (*A*, *B*, *C* and *D*) you can switch between four pages (depending on the cabinet version) with 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

 PROTOCOL – 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

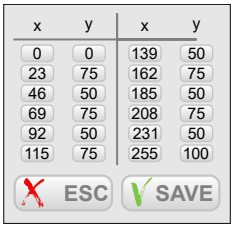
Clicking on of the keys takes you to the preview of the curve. For pre-set curves, ***COPY*** and ***BACK*** keys are displayed next to the preview. For user's curves, ***EDIT*** and ***BACK*** keys are available.

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.

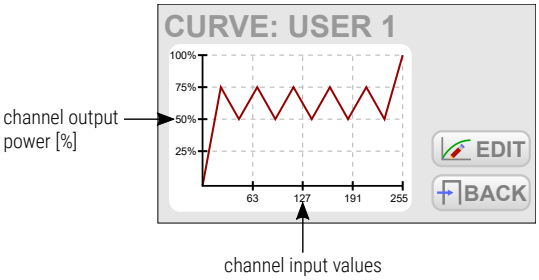
NOTE! The first point of the defined curve must always have the *x* coordinate equal to 0.

Sample configuration of the user's curve:

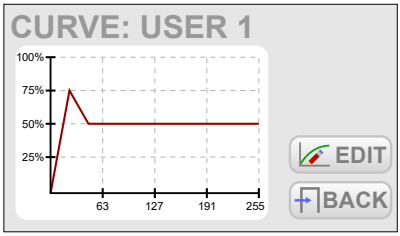
1. *From the **CURVES** menu, select the user's curve key, for example **USER 1**.*
2. Press ***EDIT***, the application displays a table of 12 coordinates of the points between which the new curve is drawn.
3. Complete the table.



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.:



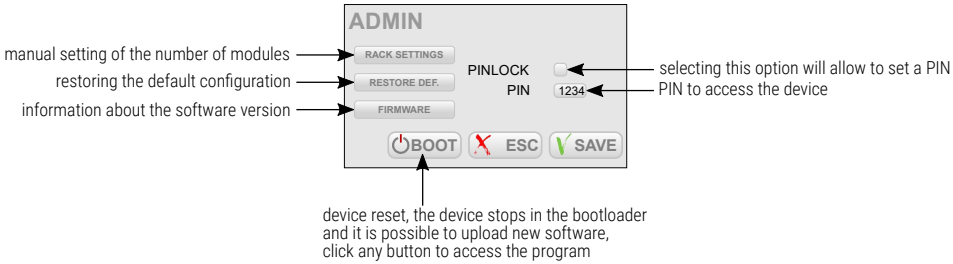
entering a values smaller than the previous one will cause that only the first three points will be taken into account in this case

x	y	x	y
0	0	139	50
23	75	162	75
46	50	185	50
43	75	208	75
92	50	231	50
115	75	255	100

ESC SAVE

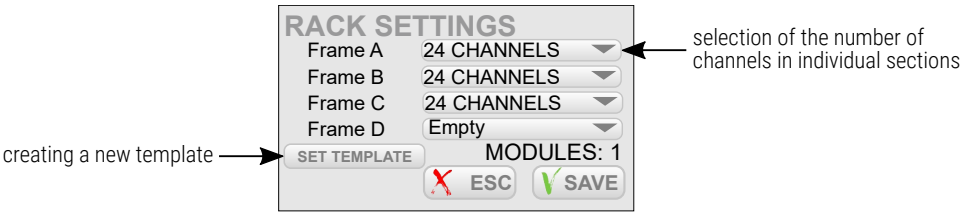
6.4.2 Admin

Category (***ADMIN***) contains the administrator settings:

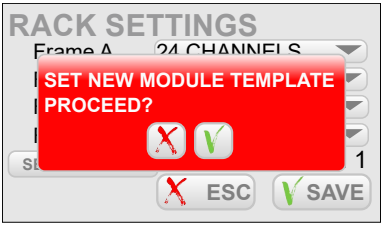


RACK SETTINGS

In this option, the Administrator can change the configuration according to what modules have been installed.



After selecting the button to create a new template, a query window will appear.

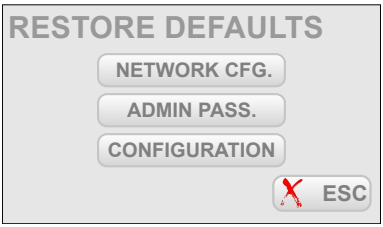


NOTE! The template should be created with the modules inserted into the cabinet. Creating a template remembers the arrangement of modules in the cabinet. If there is no module in one of the slots, the cabinet will not return an error informing about its absence after creating the template.

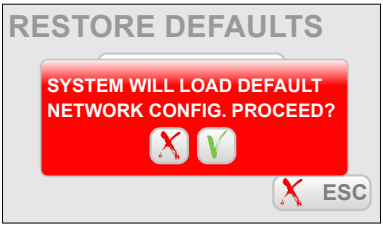
RESTORE DEF.

The administrator has the ability to restore:

- network default settings,
- admin password in the application – the default password is the serial number of the device,
- resetting the configuration.

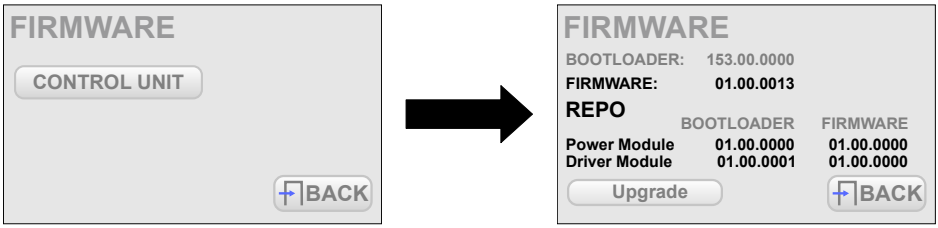


Selecting any of the options will display a message to confirm whether you are sure to restore the factory settings, e.g. network settings.

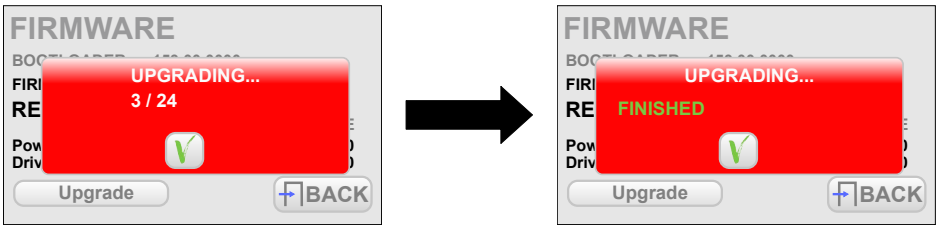


FIRMWARE

By selecting this option, the user can see the currently loaded software version. Additionally, by clicking the ***Upgrade*** button, the cabinet will automatically update all modules to the latest software version that is currently in the main cabinet controller.

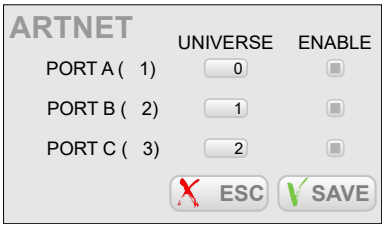


By clicking ***Upgrade***, the system will check all modules and, if necessary, update them. Finally, a message will be displayed informing you that the process is complete.



6.4.3 Protocol

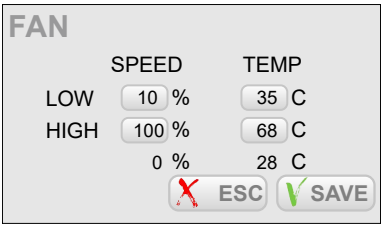
The Art-Net and sACN address settings are available in the (***Protocol***) menu. In the Art-Net and sCAN settings you can change the input Universe and enable / disable reception of the control signal.



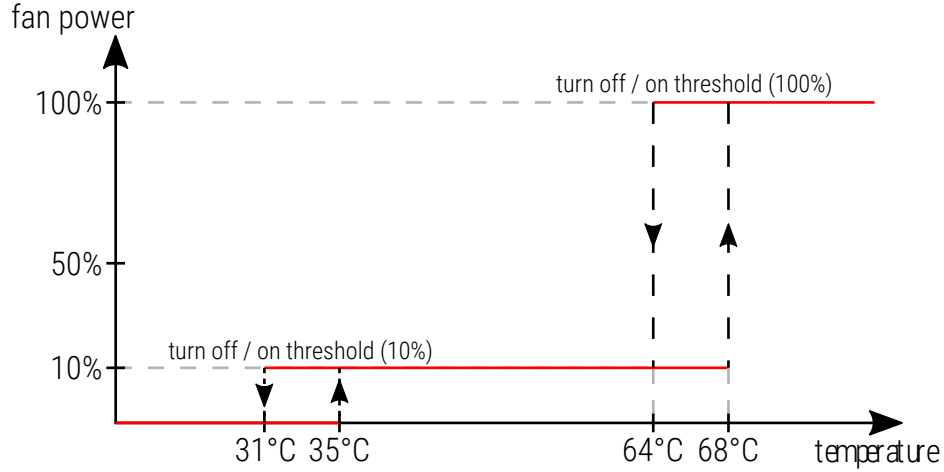


6.4.4 Fan

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

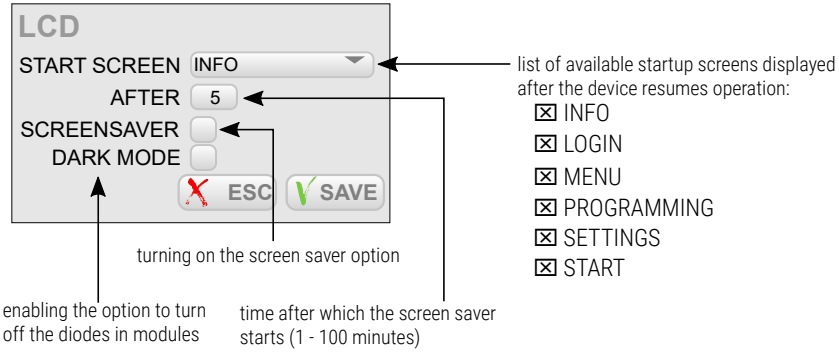


Below is a chart showing the above fan setting. By default, the hysteresis is set to 4°C.



6.4.5 LCD

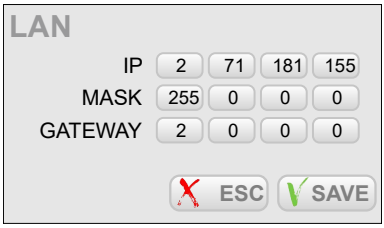
The display menu (*LCD*) includes the screen saver settings. You can determine whether the screen saver is to be run, and if so, after what idle time and which of the screens is to be displayed after the "awakening".



6.4.6 LAN

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

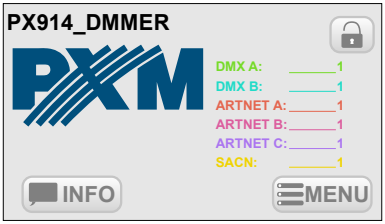
- *IP* – device IP address,
- *MASK* – subnet mask,
- *GATEWAY* – gateway.



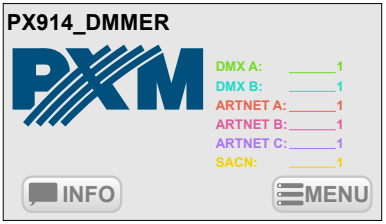
6.5 Screen lock

For screen locking to be active, you must first set a ***PIN*** and enable ***PINLOCK*** in the administrative settings described in section 6.4.2. Admin.

PINLOCK active



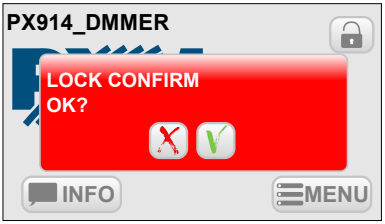
PINLOCK inactive



NOTE! The lock icon – open or closed (/) – in the main window is displayed only if the screen locking option (PINLOCK) has been activated in the administrator settings.

To lock the screen:

1. Click the button (located on the start panel screen). A message will be displayed.



2. Confirm .
3. The padlock will be "closed" and the screen will be locked.

From now on, without entering your PIN, you can only access the main window and ***INFO***.

NOTE! If the ***SCREENSAVER*** option is activated, after the set time the screen will be locked with a PIN, provided that ***PINLOCK*** has been activated.

To unlock the screen:

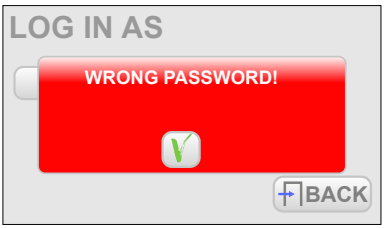
1. Click the button (located on the start panel screen) or click ***MENU***. The following window will appear.



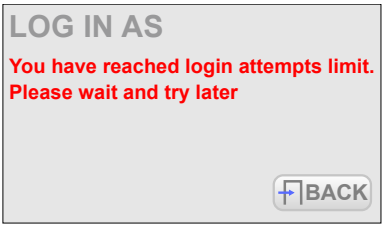
2. Select the ***ADMIN*** account.

   NOTE! There is only 1 user implemented in the device with all permissions.

3. A window will appear in which you can enter your PIN.
4. Enter your PIN and select confirm .
   a. If the PIN is incorrect, a message will be displayed.



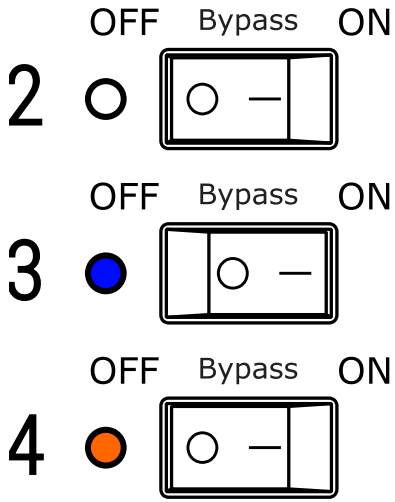
NOTE! If the user enters an incorrect PIN three times, the device will temporarily block the possibility of entering the PIN again.



5. The padlock will be "opened" and the screen will be unlocked until it is locked again.

7 Bypass

The device 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% 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.

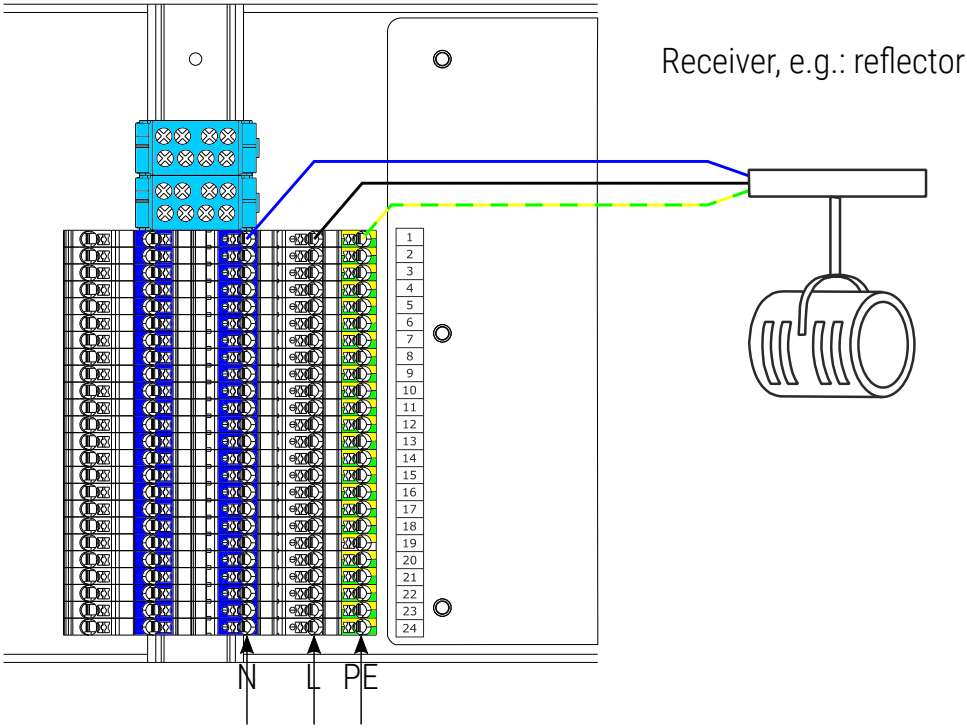
8 Indication lights

Each drawer has 3 built-in main lights and lights on each output channel that mean:

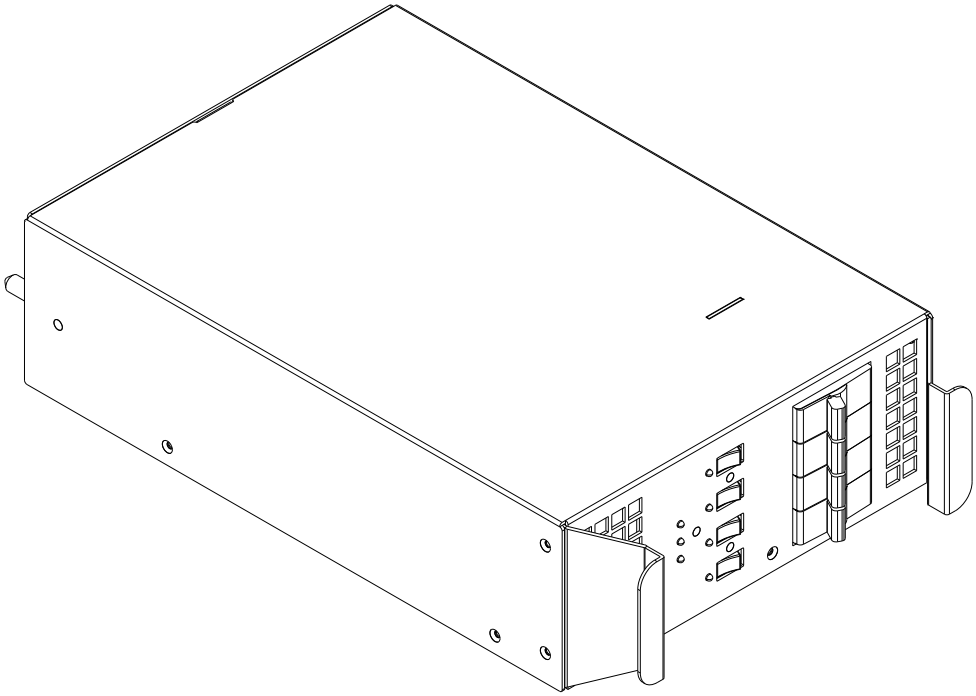
Indicator	Action	Meaning
blue **SIGNAL**	flashes	correct communication on the data bus
green **POWER**	shines	the device is turned on
STATUS	shines on green	the module is installed correctly
	shines on red	the module is installed incorrectly (push the module)
diodes on output channels (***Bypass***)	is off	***Bypass*** is not active
	shines on blue	***Bypass*** function is active – activated from the switch
	shines on orange	***Bypass*** function is active – started by the ***Always ON*** function in the ***Patch*** menu

9 Connection scheme

Output sockets – 4mm^2 terminals.



10 Technical drawing of the module



11 Technical data

type	PX914
DMX lines	2
Art-Net Universe	3
optically insulated DMX line	yes
overvoltage protection of DMX line	yes
circuit break detection	yes
faulty circuit control	yes
Residual current protection	yes (depending on the configuration – the **Modules** table)
resolution of control	8 or 16 bit
touch screen resolution	480 x 272px (4,3”)
preheat	yes
output merge	yes (13 priority)
output power limiter	yes
attenuation	according to the declaration of conformity (400µs)
output carrying capacity	3000W or 5000W
output protection	full electronic protection + automatic fuses
fans	electronic control
cabinet color	RAL9005
input connectors	copper busbars with M10 screw holes
output sockets	4mm^2 terminals
power supply	3-NPE AC 400/230V / 50Hz
current consumption	3 x 416A (at full load in 96 x 3000W)

weight	MAD Rack 96 cabinet (whole): 400kg MAD Rack 72 cabinet (whole): 305kg MAD Rack 48 cabinet (whole): 210kg MAD Rack 24 cabinet (whole): 115kg 4 x 3000W module: 6.7kg
dimensions (Rack cabinet)	width: 600mm height MAD Rack 96 / 72 / 48 / 24: 2150 / 1750 / 1350 / 950mm + leveling feet 40 – 70mm depth: 800mm

Podłęże, 29.12.2022

DECLARATION OF CONFORMITY

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

we declare that our product:

Product name:	Modular Advanced Dimmer
Product code:	PX914

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

PN-EN IEC 63000:2019-01	EN IEC 63000:2018
PN-EN IEC 62368-1:2020-11	EN IEC 62368-1:2020
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/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.

This declaration also covers all component parts such as: (PX914-C, PX914-24, PX914-48, PX914-72, PX914-96, PX914-F-3, PX914-F-5, PX914-F-3-R, PX914-F-5-R, PX914-D-3-R, PX914-D-3, PX914-D-5-R, PX914-D-5, PX914-S-3-R, PX914-S-3, PX914-S-5-R, PX914-S-5).

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



mgr inż. Marek Żupnik.