PX235

0-10V/DMX

Interface 8ch

User manual

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

1   Description

Multiplexer is a device that allows to change analog signal 0 – 10V to the DMX512 signal. Analog signal is converted into a digital signal and then it is inserted or replaced at the appropriate (chose by the user) DMX channel from the DMX512 package.

The PX235 is a professional device enabling the reception of data from 8 analogue inputs 0 – 10V and their conversion to a DMX signal. The device allows to select a channel from the DMX512 package, to which the processed signal is insert. The PX235 has one DMX signal input and output. The built-in color display makes it easier to operate the device, as well as the graphical representation of the signal status and thus allows its control.

In addition, the device has a built-in wind sensor module. It allows to conversion of pulse signal to digital values of the DMX512 packet.

The Multiplexer also has an OC type (Open Collector) output that allows signaling of preset states, e.g. caused by changes in wind speed, in the form of alarms. Sample application: lowering the height of the water jet.

The device also has a 10V output that can power analog sensor such as potentiometers and photometers. The USB connector allows to communicate with a computer and to update a software installed on the PX235.

2   Safety conditions

Multiplexer PX235 is a device powered with safe voltage12 – 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 (stabilized voltage) 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 any conductor damaging, it should be replaced with the one of the same technical data.
4. Only use a shielded cable for connecting the DMX signal.
5. All repairs and connections of outputs or DMX signal can only be made with power off.
6. PX235 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 cloth only.

3 Connectors and control elements
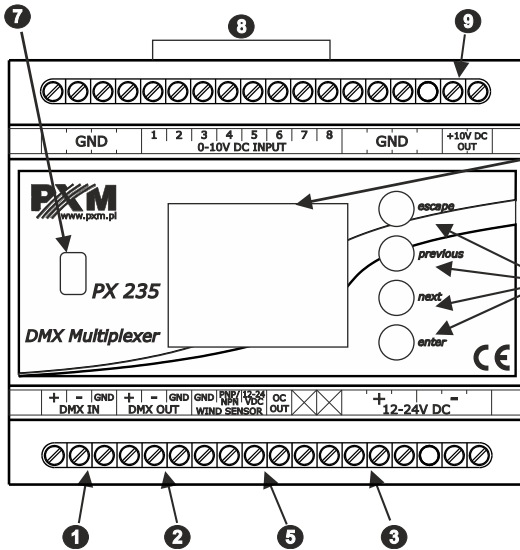
1. DMX-512 Input
2. DMX-512 Output
3. Power supply
4. LCD screen
5. Wind sensor and alarm output support block
6. Control buttons
7. USB Input
8. 0-10V Inputs
9. Reference voltage +10V (for power supply e.g. potentiometers)

4 Navigating the menu

Navigating the menu allow programmable buttons. Every button is described on the right side and their use is as follows:

enter – allows to enter the selected option and approve set value

next – scrolls up the menu or right (horizontal menu)

previous – scrolls back the menu or left (horizontal menu)

escape – exits from the currently programmed parameter without saving the changes or goes to the level in the menu above
(pressing the *escape* button while being in main menu will cause to exit to the summary screen)

To change the value of selected parameter, you must choose on the screen button "*+*" or "*-*" using the button *next* or *previous*, and then using the *enter* button to change the value.

After that you need to save the settings before going level up, this will allow storing value in memory of the PX235. To do this, after moving to the screen button 🖫 you need to push *enter* button.

5   Summary screen

When you turn the device appears on the screen panel, which describes the current state of DMX signal.

If the device takes the DMX signal is green displays *DMX Signal OK*. In case of no DMX detected at the input to the device on the screen will be showed message *No DMX Signal*.
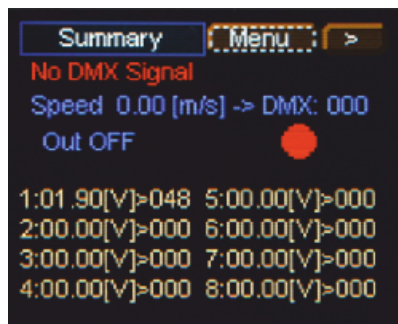

Description of the other messages on the *Summary* screen:

- *Speed 0.00[m/s] → DMX: 000* – current wind speed from the anemometer and its value after conversion to the DMX protocol (value of this function can be changed in a *Menu → Wind Speed > DMX*)

- *Out OFF / ON* – information regarding the status of alarm output: red dot indicates the output off and the green output on
- *1:00.00[V]>000 …* – voltage value in the subsequent analog inputs 0 – 10V and the value in DMX protocol of assigned to them DMX channels

6 Main menu

At the top of the *Summary* screen is a bar to choose between a 3 screens of the main menu. To go to the other two please select the "˃" button by pressing *previous* or *next*, and then confirm the selection of the *enter* key. The first screen shown after hitting the button is the *DMX In.* Another is the *DMX Out*. Both represent in graphic form the current state of input and output signal from the device.
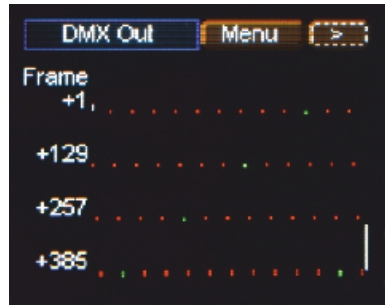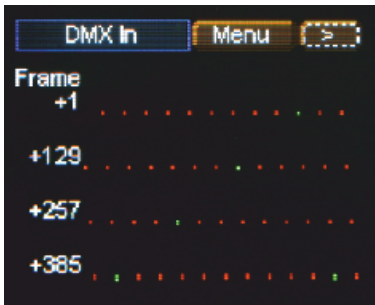
The presentation of the DMX signal:

The value of DMX signal to the frame (DMX channel) is portrayed as a white column, whose height varies proportionally according to the formula: the highest = largest value of DMX signal – 255, no column = no DMX signal, value is 0.

Number of frame (DMX channel) is described on the left, respectively: *+1, +129, +257, +385* for subsequent lines. In addition, each line is divided into parts, where red dots means another ten channels, and green ones the next 100 channels.

7   Programming the device functions

On the top of each of the main screens is the *Menu* button. After the selection of which, from each of the screens, the user will be moved to the menu screen, which allows to set all the functions of the device.

7.1　DMX Out Settings

After selecting a submenu *DMX Out Settings* on the screen show up currently set parameters of the DMX signal. Default values set on the devices are visible below.
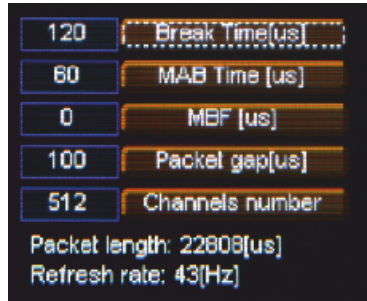
At the bottom of the screen is displayed the aggregate *Packet length* and *Refresh rate* for so configured parameters.

7.1.1　Break Time

Allows to change the length of the interval between successive DMX packets.

At the top of the screen next to the option name are visible important information that simplify setting an appropriate value.

To save the value before leaving level up in menu you need to select floppy disc button and press *enter*

7.1.2 MAB Time

Mark After Brake is the interval time that occurs in each package according to the standard DMX512.

To save the value before leaving level up in menu you need to select floppy disc button and press *enter*

Mark After Break
Time
Minimum 16µs

+

-

60

7.1.3 MBF Time

Mark Between Frames – the amount of time (if any) between the end of one frame (end of the 2nd stop bit) and the start of the next. Its length can range from 0 to 1 seconds, the shorter the better.

7.1.4 Packet gap

The amount of time between packets. Its length can range from 16 to 5000µs.

To save the value before leaving level up in menu you need to select floppy disc button and press *enter*

Time between packets
from last slot
to start of break
[us]

+

-

100
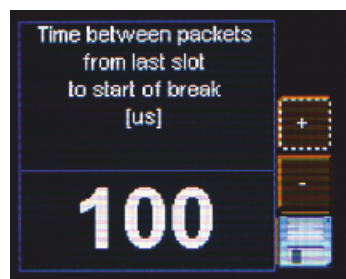
7.1.5 Channels number

Using this feature, it is possible to limit the number of channels sent from the PX235. The minimum value is 24 channels and the maximum is 512 (default).

7.2 Analog input > DMX

This option allows to set up conversion voltage of the analog inputs onto the DMX signal. Thus allows the selection characteristic conversion.

The configuration consists in determining the coordinates of points A and B between which a linear relationship is generated. For each point, the voltage value and the corresponding DMX value should be given. Extreme values (outside the points) are determined by the Offset settings.

Setting the value A 0 [V] and DMX 0 and values B at 10 [V] and DMX 255 allows to obtain linear proportional operating characteristic. Changing to opposite values of the A and B allows to get reverse operating characteristic. To set the value you need to select the *Set* button, and then proceed as described in section 4 Navigating the menu, to change the parameter value and save it. Each input can have distinct characteristics of the signal conversion. The inputs are set by selecting the keys on the screen in the lower right corner and using the *enter* key, setting the modified entry number.
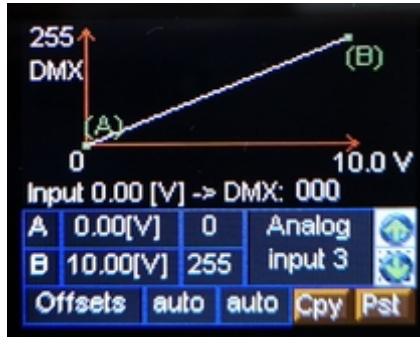
Additionally, it is possible to change the DMX value parameters (A and B) in the range from 0 to 255. The settings of a given analog input can be copied by selecting *Cpy*, and then select *Pst* in another input.
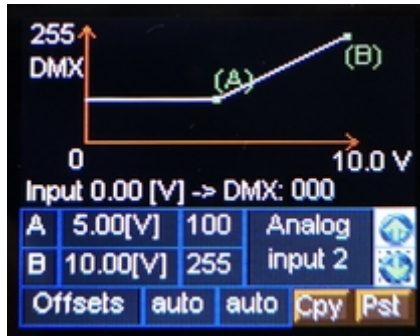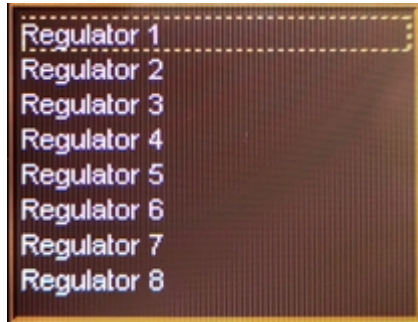

The *Offsets* parameter is responsible for setting the value before point A and after point B. Possible values are *0 – 255* or *auto*, which causes the values of points A and B.
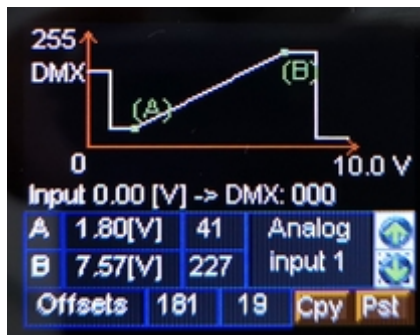
7.3   Regulators settings

PX235 allows you to configure 8 *PID* controllers. By default they are turned off.

Controller configuration requires defining signal sources for (*Setpoint src*) and measured value (*Sensor src*). You can choose between DMX input channels and analogue inputs.

The next parameters are:
- *T* – sampling period
- *Kp* – reinforcement of the proportional part
- *Ki* – strengthening of the integrating part
- *Kd* – strengthening of the derivative part
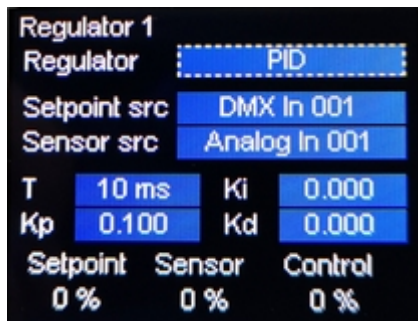
7.4 Screensaver

The screen blanking option has been implemented in the device, by default this option is disabled. The time after which the screen is to be turned off can be set from 3 to 16 seconds. To make the screen light, just press any button on the device.
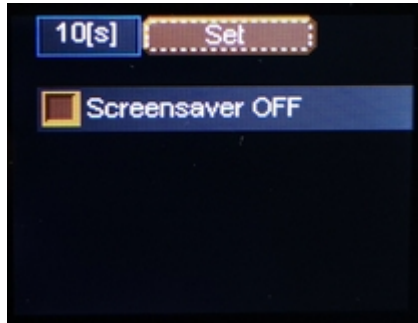
7.5 Analog inputs calibration

The analog inputs can be characterized by the fact that controlling them to the maximum value (10V) will actually correspond to the examples of the value 9.6 [V] (DMX will be controlled to ~245). To this end, the device has implemented the option of calibrating the inputs so that the system knows that when it receives a 9.6 [V] signal at the analog input, it is its maximum value and the value sent on the DMX channel is to be equal to 255. Other values are scaled.
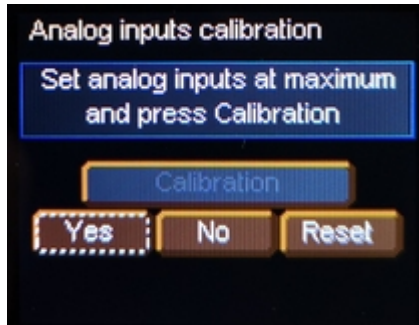
Before calibrating, make sure that all analog inputs are set to the highest available value, then select *Yes*. The Reset option restores the default settings.

7.6   Wind speed > DMX

Wind speed onto the DMX is a function that allows to set parameters of conversion of the voltage signal from the anemometers to values compatible with DMX protocol. To set the limit values you need to approve with the *enter* the set button on the screen and follow the point 4 Navigating the menu. Changes made to the settings are shown graphically in the chart. Setting the value of A to 0 [m/s] and DMX 0 and the value of B to 50 [m/s] and DMX 255 allowed to obtain a proportional linear characteristic. The presentation of the values of the parameters A and B will allow to obtain the inverse characteristic.
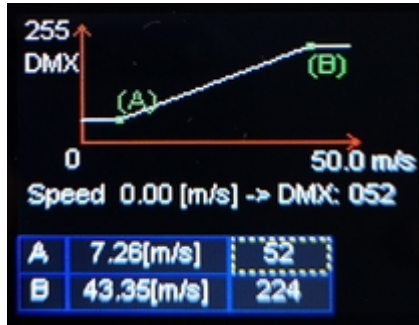
Parameter A and B is the wind speed, adjustable from 0 to 50[m/s]. By default, parameter A is set to 0 [m/s] and the value DMX 0, while parameter B to 50 [m/s] and DMX to the value 255.

7.7   DMX Patching

DMX Patching allows to assign the subsequent channels of DMX512 package output value from both DMX inputs, as well as analog and counter input. It is also possible to set each channel to a constant value of 0 or 255 (default channels 511 and 512 are set to 0 and 255).

In order to assign an output DMX channel with a different input parameter you should choose that one, on which we want to make changes and press the *enter* key. Then using *next* or *previous* buttons set the new value and confirm with *enter*.

7.8 Counter Input Settings

Counting Input Settings menu allows to change some values and the characteristic parameter of the anemometer (Transducer output) of formula 1 [Hz] = x [m/s]. The default is set to 0.1[m/s], but be sure to check this parameter and (if needed) to change after connection of the new anemometer.
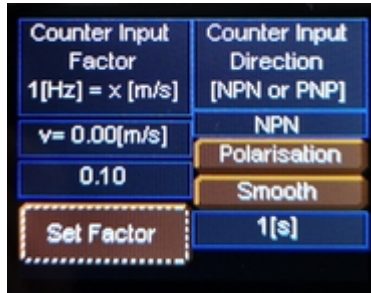
Another option you can set is the counting input configuration. Sometimes there is need to change the type of electric signal amplifying transistor (PNP or NPN) dependent on the anemometers (or if both types of method connecting to the device are used). To change the type select field *Polarisation* and confirm with *enter*.

The default NPN configuration is set on the device.

The third parameter is *Smooth*, i.e. the time of smoothing the received signal can be set in the range of 1 to 20 seconds.

7.9   Alert output

Alarm output allows the individual set the parameters on and off the alarm output. *Time On Set* determines how many seconds takes to turn on the alarm, during which the wind speed exceeds a threshold alarm. *Time Off Set* is the time after which the alarm turns off, the alarm status changes if wind speed decreases below the predetermined threshold.
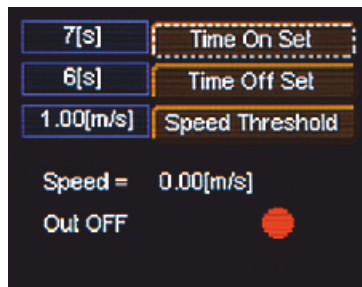
7.10 Firmware info

In this submenu you can check the firmware installed on the device. You can also restore the default settings implemented on the device.

To do this push *enter*, then select the *Yes* button and again approve with *enter*. In the case of incorrect choosing this option, you can go back by selecting *No*, or go directly level up in menu by pressing *escape*.

7.11 Language settings

Language Settings allows to change the menu language. To do this select appropriate language with *previous* or *next* button and press *enter*.
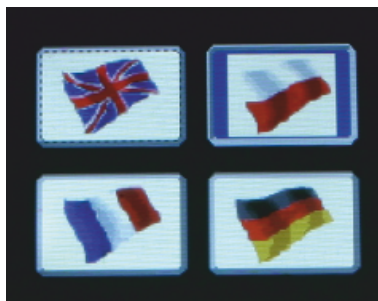
8   DMX signal connecting

PX235 have to be connected to DMX line in serial mode, with no branches on DMX control cable. That means that DMX line, from the signal source, must be connected to **DMX IN** pins of PX235 and later, directly from **DMX OUT** pins to the next device in DMX chain. If the PX235 is the last DMX chain receiver there should be terminator (resistor 120 Ohm) mounted between "**DMX+**" and "**DMX-**" pins of **DMX OUT** section.
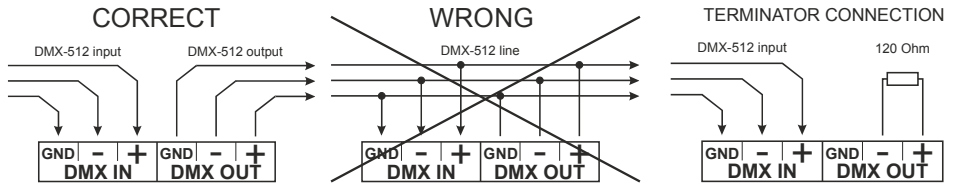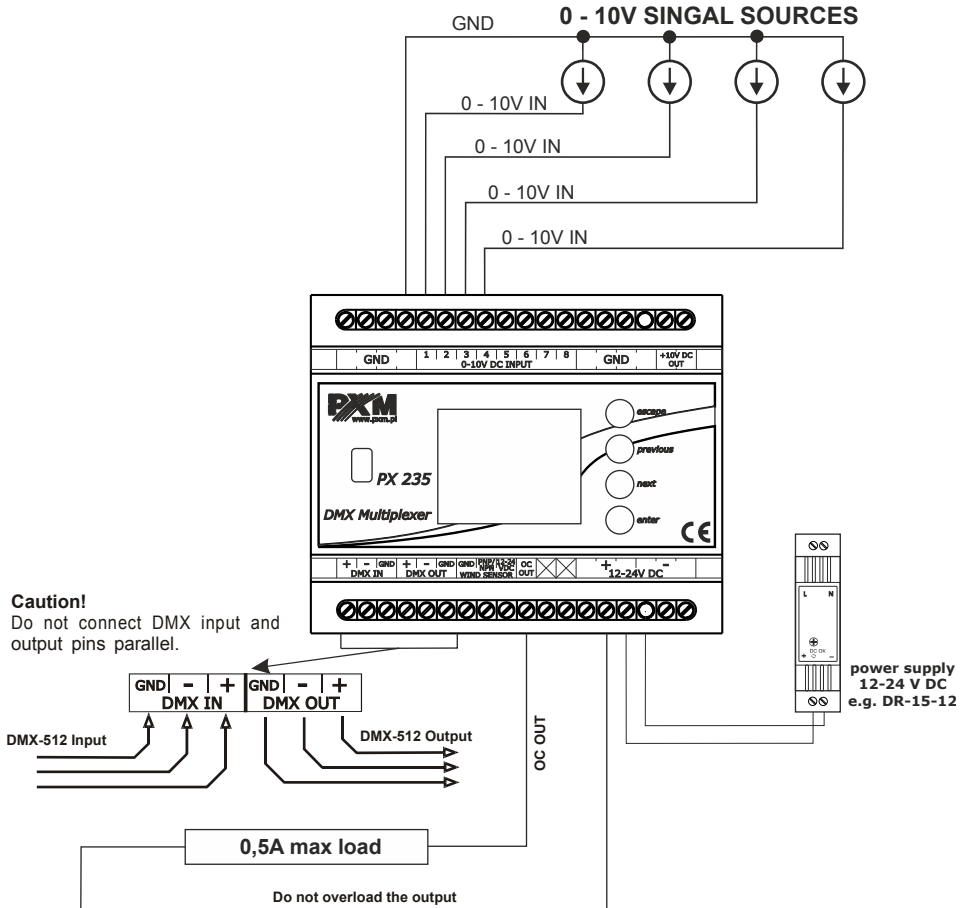
9   Connection scheme

a) potentiometers
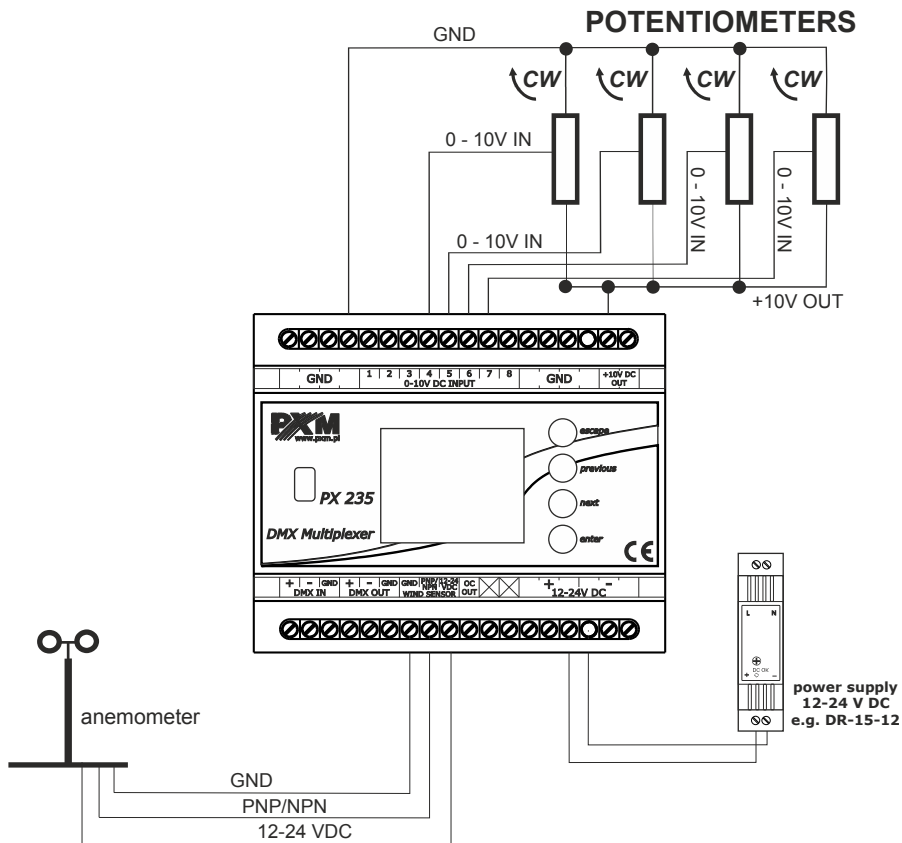
* In the case of winders supplied by PXM, one of the two wires should be connected (e.g. NPN, which is compatible with the default polarity set in PX235 see section 7.8). In other cases, according to the type of transistor used in the anemometer.

b) 0 – 10V control

0 - 10V SINGAL SOURCES

GND

0 - 10V IN

0 - 10V IN

0 - 10V IN

0 - 10V IN

Caution!
Do not connect DMX input and output pins parallel.

DMX-512 Input

DMX-512 Output

0,5A max load

Do not overload the output

OC OUT

**power supply
12-24 V DC
e.g. DR-15-12**

10   Dimensions

105 mm

86 mm

60 mm
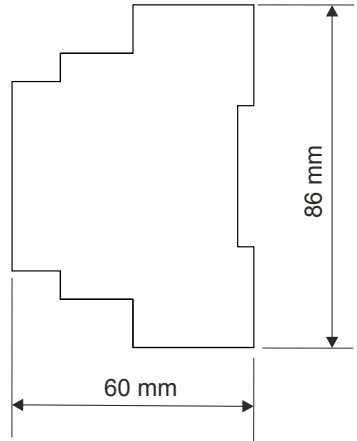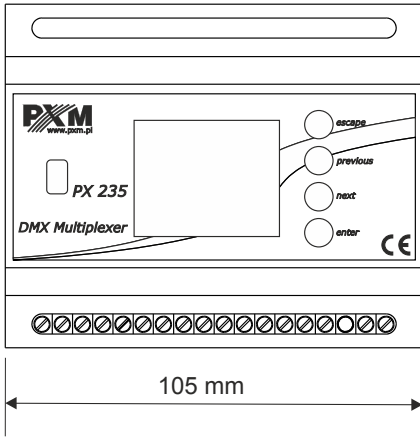
11   Technical data

type	PX235
power supply	12 – 24V DC
power consumption	max. 3W
DMX output	1 (512 channels)
DMX input	1 (512 channels)
0 – 10V inputs	8
input resistance 0 – 10V	100kΩ
input current consumption 0 – 10V	0,1mA
10V output	1 (to power supply e.g. potentiometers)
10V output load	50mA
OC output	1
load capacity OC type	0,5A
connectors	terminal blocks, USB
weight	0.2kg
dimensions	width: 105mm (6 modules) height: 86mm depth: 60mm

NOTE! From the serial number 13091243, the device introduced a new firmware version 2.0, which can be operated from a PC only with the software version 2.0 or newer.

DECLARATION OF CONFORMITY

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

we declare that our product:

Product name: 0-10V/DMX Interface 8ch

Product code: PX235

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

PN-EN IEC 63000:2019-01	EN IEC 63000:2018
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.

PXM
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NIP 677-002-54-53

mgr inż. Marek Żupnik.