PX178

Driver LED 6x7,5A/OC

Manual

PXM®

CONTENTS

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

1. GENERAL DESCRIPTION

PX178 is a 6x7.5 A LED driver, with a built-in DMX512 signal receiver, designed to control voltage-driven LED lamps or strips. This is the most advanced driver of its kind offered by the PXM company. The PX 178 housing, which is 9 standard rail modules wide, features a colour display. This allows the user to program and control the device intuitively. The built-in DMX receiver allows for control of 6 channels (e.g. 2 x RGB) by directly using the DMX protocol. The wide supply voltage range and high output current-carrying capacity (7.5 A) enable the user to control large numbers of LED diodes. In addition, the driver incorporates an over-current protection device, a temperature protection device preventing driver overheating as well as a DMX line surge protection device.

You can control the PX178 using DMX signals or it can operate independently. In such a case, you can choose from 8 fully programmable scenes and 8 programs, and, in relation to these scenes and programs you can vary playback speed and step transition smoothness. Thanks to the use of 16-bit resolution, parameter adjustment in individual channels is fully variable.

The driver has a real time clock that allows you to set power ON and OFF times for the LEDs controlled, which is particularly suitable for advertising sign light systems. Besides, the built-in astronomical clock feature, using the current date, the co-ordinates of the driver installation location and its position relative to universal time (Greenwich UT), automatically sets driver output turn on and off times, on a 24-hour basis, in accordance with astronomical sunrise and sunset times.

The driver also features an option allowing you to change the control signal adjustment frequency ("flicker free" technology), used in television broadcasting.

The USB port allows the driver to communicate with a computer. The PXM company has developed software for setting program and scene parameters in the driver from the level of a computer running the Windows® system. You can download this application from PXM's website www.pxm.pl

2. SAFETY CONDITIONS

The PX178 is a device powered with safe voltage 12 - 24V; however, during its installation and use the following rules must be strictly observed:
1. The device may only be connected to 12 - 24 V DC current (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 parameters.
4. Connection of DMX signal should be made with shielded conductor.

5. All repairs and connections of outputs or DMX signal can only be made with power off.

6. The PX178 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. For cleaning use only a damp cloth.

3. DESCRIPTION OF THE CONNECTORS AND CONTROL ELEMENTS
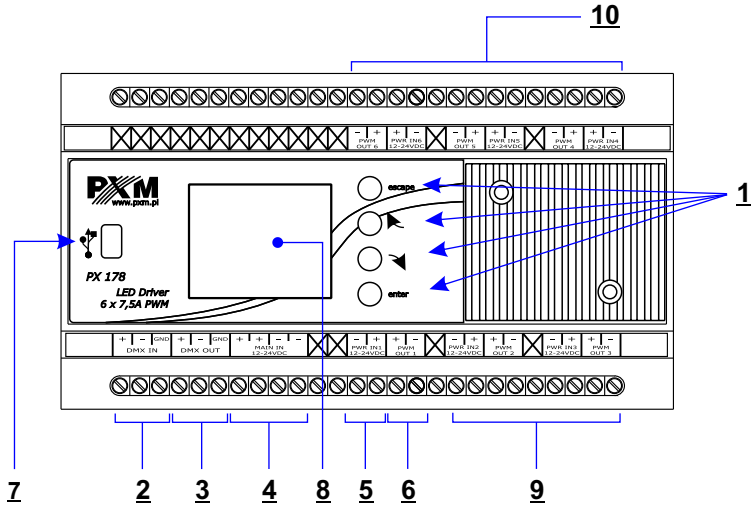
Legend:

1. Programming buttons
2. DMX512 signal input
3. DMX512 signal output
4. Driver input power terminal
5. Input power for the first PWM output
6. First PWM line output
7. USB input port
8. Display
9. Second and third PWM outputs with power connections
10. Fourth, fifth and sixth PWM outputs with power supply lines

4. NAVIGATING THE MENU

Programmable buttons allow navigating the menu. Each button is described on the right side and their use is as follows:

escape - exits from the currently programmed parameter without saving the changes or goes to the upper level in the menu. Pressing the *"escape"* button while being in main menu will cause to exit to the [**Summary**] screen

- scrolls up the menu or left (horizontal menu)

- scrolls back the menu or right (horizontal menu)

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

To change the value of selected parameter, you must choose on the screen button "+" or "-" using the button ⬉ or ⬊ , 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 PX178. To do this, after moving to the screen button ▤ you need to push *"enter"* button.

By skipping the [**Save**] stage and exit with the escape key from the menu, the changes you make will not be saved.

5. USE OF THE DEVICE

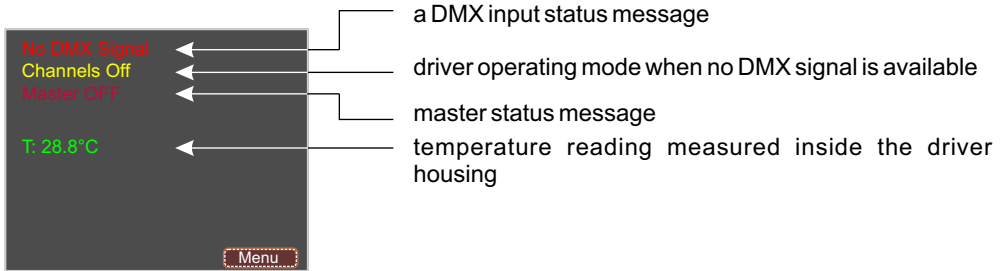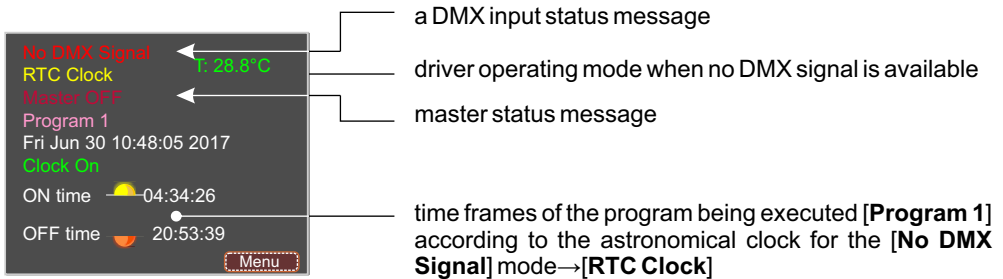Once the driver is powered up, the start screen displays the main window [**Menu**], with information on the current status of the device and selected active settings running at the moment. Information displayed includes, among other things, driver input signals and temperature values provided by the sensors active at a given moment.

If no DMX signal is detected at the driver input, the screen will show a [**No DMX Signal**] message.

No DMX Signal ← a DMX input status message

Channels Off ← driver operating mode when no DMX signal is available

Master OFF ← master status message

T: 28.8°C ← temperature reading measured inside the driver housing

Menu

Other (sample) parameters settings for the No Signal mode for the PX178:

No DMX Signal ← a DMX input status message

T: 28.8°C

RTC Clock ← driver operating mode when no DMX signal is available

Master OFF ← master status message

Program 1

Fri Jun 30 10:48:05 2017

Clock On

ON time 04:34:26 ← time frames of the program being executed [**Program 1**] according to the astronomical clock for the [**No DMX Signal**] mode→[**RTC Clock**]

OFF time 20:53:39

Menu

If the device is receiving a DMX signal, a [**DMX OK**] message in green letters is displayed:

(001): 255

(002): 255

(003): 255

(004): 255

(005): 255

(006): 255

DMX values at individual outputs (001÷006)

DMX OK ← a DMX input status message

001 ← DMX address of the first output channel

2x RGB ← device operating mode when no DMX signal is available

RTC Clock

Master OFF

T: 28.8°C ← status of controller outputs

Menu ← master status message

temperature as measured by the driver sensor

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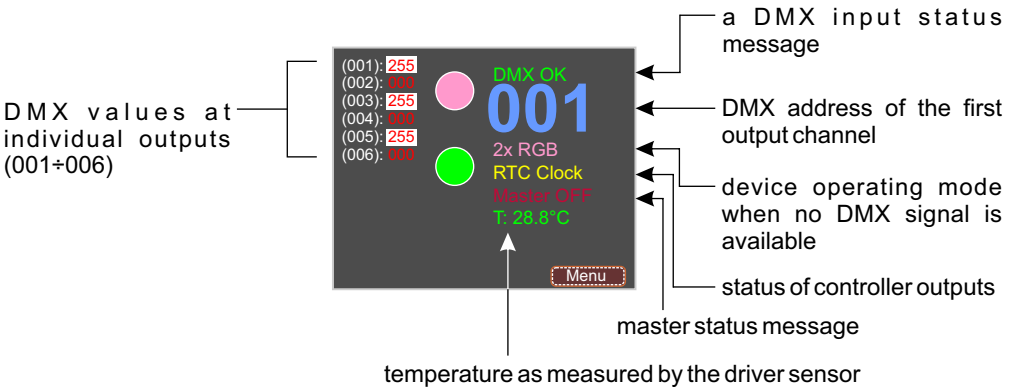
6. DEVICE PROGRAMMING

After you confirm your selection of the [**Menu**] option by pressing the "*enter*" button, a sub-menu will display, allowing you to select the available options. In order to program any of the options, select an option and confirm your selection by pressing the "*enter*" button. This will take you to a feature menu screen where you can set all the parameters and features.

```
DMX Address                          Screensaver
Driver Mode                          Local Settings
Channel's Balance                    PWM Frequency
No DMX Signal                        DMX Out Settings
Programs Edit                        Input DMX
Scenes Edit                          Internal Smooth    ◀——— dashed selection
Temperature Limits                   Language                 outline
Clock and date                       Firmware Info
```
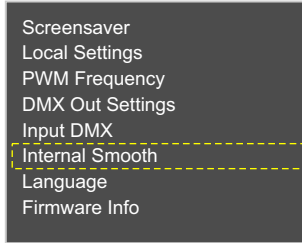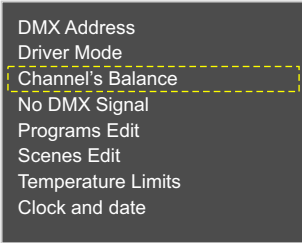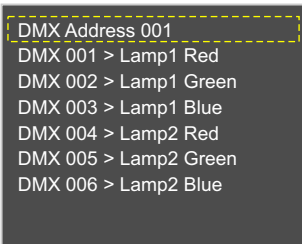
To program any of the options, select it with the dashed outline shown above using the ◣ and ◢ buttons and press "*enter*" to confirm your selection.

6.1. DMX address

After you select the [**DMX address**] sub-menu, the screen will display the current DMX address settings for the six available channels. The values shown below are the default settings for the device.

```
DMX Address 001         ◀——————— DMX address group setting
DMX 001 > Lamp1 Red
DMX 002 > Lamp1 Green
DMX 003 > Lamp1 Blue
DMX 004 > Lamp2 Red               individual DMX address setting for particular
DMX 005 > Lamp2 Green            channels
DMX 006 > Lamp2 Blue
```

NOTE: group change of DMX addresses will overwrite the individual settings of particular channels

```
Lamp1 Red

    1          +
               −
```
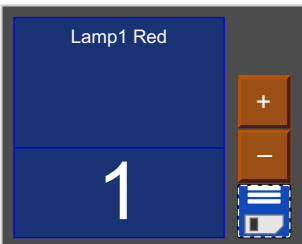
In order to change the default value in a channel, select the channel with a yellow outline, confirm by pressing the "*enter*" button, and using the plus and minus buttons, set the desired value for the channel. Confirm the change by pressing the save button.

6.2. Drivers' working mode

[**Driver Mode**] - this option allows you to set the number of DMX channels used and the method they will use to control the output channels:

```
RGB
RGBW
RGBWA          ← ─ ─ ─ ─ ─ ─ ─     change mode window, after selecting the
RGBWAX                             selected operating mode, confirm with "enter"
RGBD
RGBWD
RGBWAD         ←────────────       currently set operating mode
RGBWAXD
```
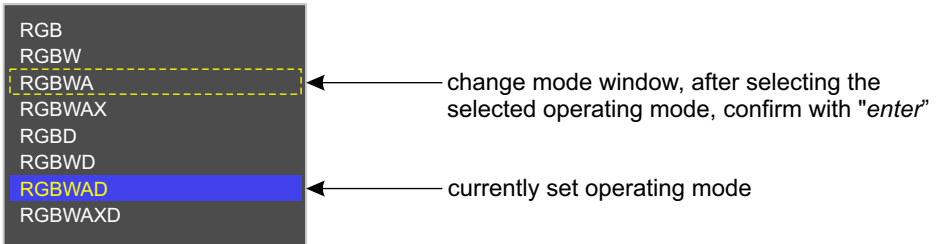
The device can operate in the following modes:

• **RGB** - controlling first 3 outputs using 3 DMX channels; the colours: **R**ed, **G**reen, **B**lue;
• **RGBW** - controlling first 4 outputs using 4 DMX channels; the colours: Red, Green, Blue and White;
• **RGBWA** - controlling first 4 outputs using 4 DMX channels; the colours: **R**ed, **G**reen, **B**lue, **W**hite, **A**mber;
• **RGBWAX** - the colours red, green, blue, white, amber and any colour **R**ed, **G**reen, **B**lue, **W**hite, **A**mber and **X** in 6 channels;
• **RGBD** - the colours red, green, blue in 3 channels and the dimming feature in the fourth channel **R**ed, **G**reen, **B**lue, **D**immer;
• **RGBWD** - the colours red, green, blue and white in 4 DMX channels and the dimming feature in the fifth channel **R**ed, **G**reen, **B**lue, **W**hite, **D**immer;
• **RGBWAD** - the colours red, green, blue, white and amber with the dimming feature in the sixth channel **R**ed, **G**reen, **B**lue, **W**hite, **A**mber, **D**immer;
• **RGBWAXD** - the colours red, green, blue, white, amber in subsequent DMX 512 channels and an additional colour with the dimming feature in the last channel;
• **HSV** - **H**ue **S**aturation **V**alue - white light intensity; the first channel is responsible for hue, the second one - for saturation, and the last one for white light intensity;
• **2xHSV** - 2 x 3 channels in the option as above;
• **2xRGB** - 6 channels, 2 x RGB allow for controlling two lamps independently;
• **2xRGBD** - 6 channels 2 x RGB with a dimming feature in the 4th and 8th channel;
• **6 Kanałów** - any 6 channels;
• **16 bit 6 Kan.** - 16-bit control of 6 channels;
• **CW Dyn**. - a lamp with cold and warm white diodes (colour adjustment in the first channel), with a dimming feature in the second channel; in this mode, the driver can control a maximum of 3 lamps;
• **WC Dyn**. - similarly as above, the only difference being that colour temperature is adjusted from warm colour (for DMX value of 1) to cool colour (DMX value of 255);

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- **CCW Dyn**. - a mode for a lamp fitted with 2x cool diodes and 1x warm diode, with a dimming feature in the second channel;
- **WWC Dyn**. - similarly as above, only for the following colours: 2 x warm white and cool white.

6.3. Channel's Balance

This option allows you to set control values for each of the six channels operated by the driver. You can adjust maximum brightness that the diodes can reach in a particular channel and thus set the range of colours that the lamps controlled will output.

To enable this option, select the [**Channel Balance Off**] option and confirm your selection by pressing "*enter*". Red colour text will change into green and you will be able to adjust control values of individual channels. To disable this option, select the [**Channel Balance On**] option and confirm your selection by pressing "*enter*".
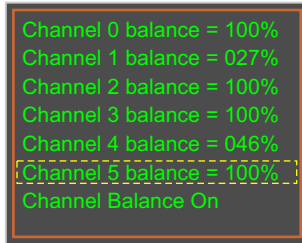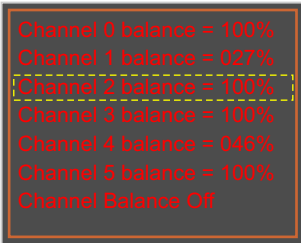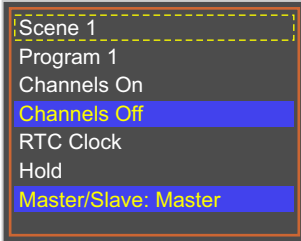

In order to limit values for a particular channel, select a channel and confirm your selection by pressing "*enter*" (after which the screen shown below will be displayed) and, using the plus or minus buttons, set the desired value on the screen.
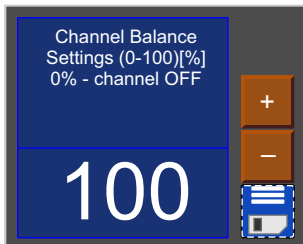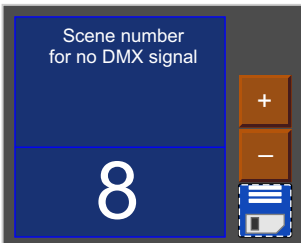
6.4. No DMX Signal

In this menu, you can configure the response of the device if no DMX signal is received. The astronomic clock feature is one of the options you can enable. This feature will switch on and off your lighting system according to sunrise and sunset; you can parametrise sunrise and sunset time settings, by entering the longitude and latitude values.

<table>
<tr><td>Scene 1</td></tr>
<tr><td>Program 1</td></tr>
<tr><td>Channels On</td></tr>
<tr><td>Channels Off</td></tr>
<tr><td>RTC Clock</td></tr>
<tr><td>Hold</td></tr>
<tr><td>Master/Slave: Master</td></tr>
</table>

In order to set an option available in this menu, select an option and confirm it by pressing "*enter*".
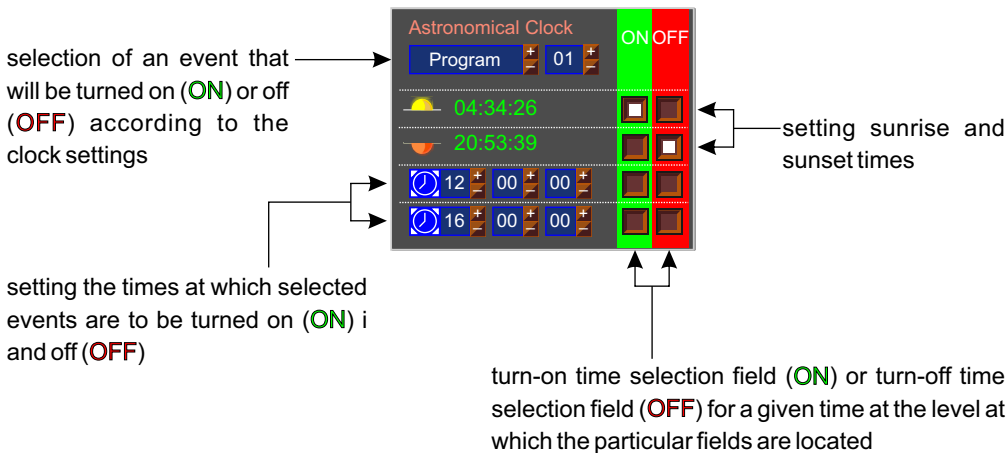
List of options available:
- **Scena 1** - This option sets one of the 8 available scenes which are programmed in the [**Scenes Edit**] menu when the driver does not detect a DMX signal at the input. To set such a scene in the menu you need to press "*enter*" button twice after you select the [**Scene 1**] option, and a scene number selection screen will display where you can select an appropriate scene using the plus or minus buttons.

```
Scene number
for no DMX signal

8                    +
                     −
```

- **Program 1** - This option sets one of the 8 available programs which are programmed in the [**Programs Edit**] menu when the driver does not detect a DMX signal at the input. In order to change the number of the program being displayed, follow the same steps as in the preceding item above.
- **Channels On** - If the driver detects a DMX signal loss, the output channels are set to full brightness.
- **Channels Off** - If the driver detects a DMX signal loss, the output channels are disabled, which in turn, will switch off the lamps.

- **RTC Clock** - The astronomical clock allowing for switching on and off e.g. a particular program, scene, or lamps according to sunrise and sunset times or times set by the user. To proceed to program this menu, you need to select the [**RTC Clock**] option and confirm your selection by pressing the "*enter*" button twice. Then the screen shown below will display:

selection of an event that will be turned on (ON) or off (OFF) according to the clock settings

setting sunrise and sunset times

setting the times at which selected events are to be turned on (ON) i and off (OFF)

turn-on time selection field (ON) or turn-off time selection field (OFF) for a given time at the level at which the particular fields are located

In the example shown above, Program 01 will be turned on at sunrise and turned off at sunset.

Scene 02 is scheduled to be turned on at 4.00 p.m. and turned off at sunrise.
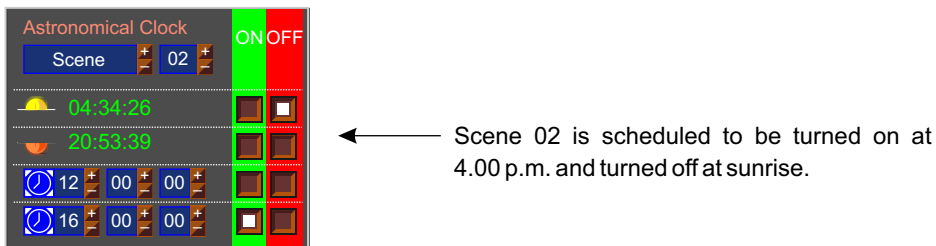
- **Hold** - After this option is selected, when the driver detects loss of DMX signal at the input, it will continue to hold the last value at the outputs.
- **Master/Slave: Master(Slave)** - In this mode, you can determine whether or not, after DMX signal is lost, the device is operating as a controller. This is the so-called master mode. The slave mode allows the device only to operate as a DMX transmitter.

6.5. Programs Edit

[**Program edit**] is a menu in which you can set the parameters of subsequent programs and the scenes (which are subsequent steps of the program) these programs consist of. With this option, you can set the course of a particular program which the driver can subsequently use when operating in the no DMX signal mode.

editing the parameters of individual scenes of the program that is selected in the first column

selection of one of 20 scenes (or simultaneously all of the scenes [**All**]) for editing

selection of a single program (or simultaneously all of the programs [**All**]) for editing

Scene parameters:

 [**XF**] (*xfade*) - smoothness of fading between programs steps;

 [**ST**] (*scene time*) - length of the entry of a scene in milliseconds;

 [**Cont/End**] - continuous playback of a program or a scene or termination;

 [**Ch01:000,..., Ch36:255**] - program step values in individual channels.

In order to assign a different input parameter to a DMX output channel, select the one in which you want to make changes and press "*enter*". Next, using the "*next*" or "*previous*" buttons set a new value and confirm it by pressing "*enter*".

6.6. Scenes Edit

In the [**Scene edit**] menu you can change settings for individual scenes. A programmed scene is played back continuously. The meanings of particular messages are described in the previous section (6.5. Program edit).
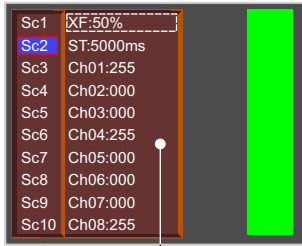

editing individual scenes of the program
that is selected in the first column

selection of one of 20 scenes (or simultaneously
all of the scenes [**All**]) for editing

6.7. Temperature limits

The [**Temperature limits**] option allows you to set a temperature limit which, if reached, triggers power reduction or causes the device powered by the driver to be turned off. The temperature sensor is installed inside the PX178.

The graph below shows how this feature operates:

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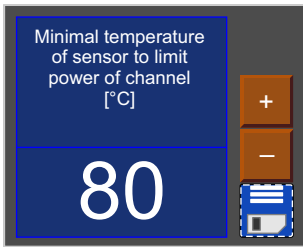| Temperature limitation |
|---|
| 50 °C |
| Sensor 1 On |
| 90 °C |
| Sensor 1 Off |
| 29.1°C 100% |
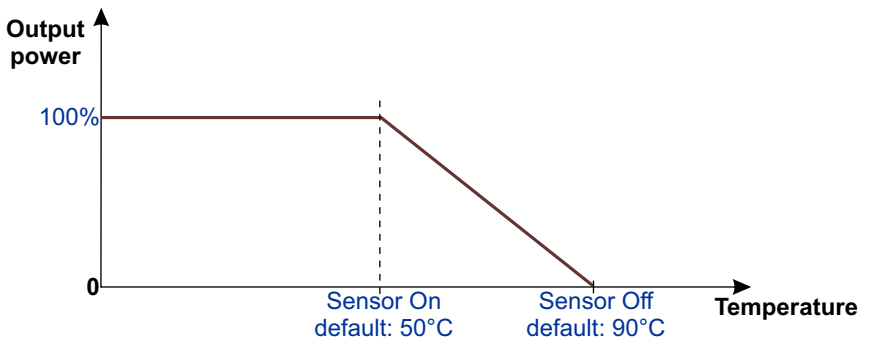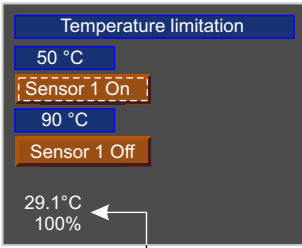
brightness reduction trigger temperature (set within the range of 20÷70°C)
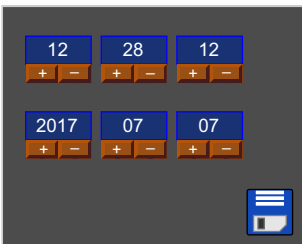
temperature at which brightness is totally reduced (e.g. lamps are turned off) - set within the range of 20÷90°C

current temperature and power output level

Minimal temperature of sensor to limit power of channel [°C]	+
80	−

6.8. Clock and date

This menu allows you to change dates and times saved in the driver. Changes are made using the plus and minus buttons.

| 12	28	12
+ −	+ −	+ −
2017	07	07
+ −	+ −	+ −

time [hour:minute:second]

date [year:month:day]

6.9. Screensaver

This driver has a feature allowing you to turn off the screen backlight. In the [**Screensaver**] menu, you can enable this mode after a pre-set idle time (i.e. not pressing programming buttons on the driver). To set the screensaver, confirm by pressing the "*enter*" button [**Screensaver OFF**] and then set the time period after which the screen backlight will be turned off. To do this, select the [**Set**] button and confirm by pressing "*enter*". A new screen will display where you can set screensaver parameters.
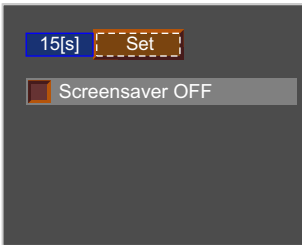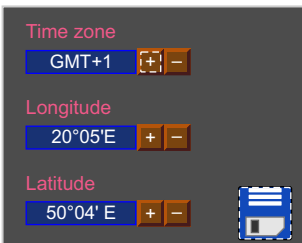

changing the time period after which the screen backlight is turned off

turning on/off the screensaver
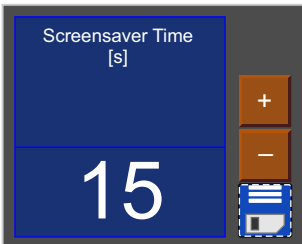
6.10. Local settings

The local settings are responsible for setting the location of your PX178 device according to geographical coordinates (longitude and latitude), and for setting the time zone in which the device operates.

6.11. PWM frequency

[**PWM frequency**] - This allows you to change the LED refresh rate from 287 Hz to 1082 Hz. Changing to a higher frequency enables the "*flicker free*" mode. This feature is very useful for the purpose of controlling lamps in television studios. It allows the user to prevent unpleasant flicker effect that is due to inadequate synchronisation of the LED control signal.

| Frequency 1098Hz |
| Frequency 274Hz |
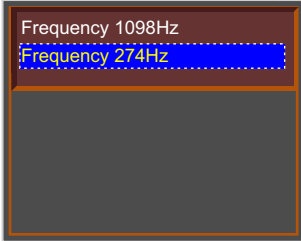
the current frequency setting is highlighted in blue; to change the frequency, use the arrows to move the outline rectangle and confirm by pressing the "*enter*" button.

6.12. DMX Out Settings

After you select the [**DMX Output Settings**] menu, the screen displays the current settings for DMX signal parameters. This menu allows you to modify the parameters of the DMX512 signal being transmitted by the driver operating in the master mode. The values shown below are the default settings for the device:

| 120	Break Time[µs]
60	MAB Time[µs]
0	MBF[µs]
100	Packet gap[µs]
512	Channels number

Packet length: 22808[µs]
Refresh rate: 43[Hz]

At the bottom of the screen, aggregate [**Packet length**] and [**Refresh rate**] are displayed for the parameters thus configured.

full DMX package
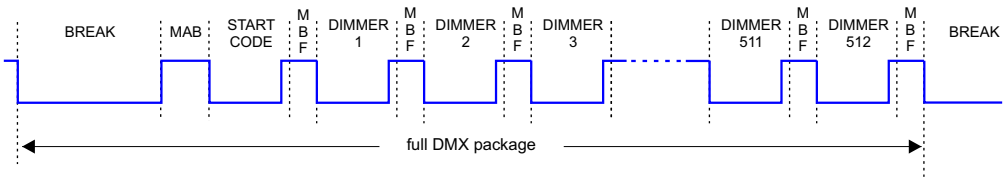
As many devices available on the market have no compliance with the DMX512 standard, the following options allow for selecting appropriate parameters of the output signal to a given device. If there are any problems, it is recommended to use longer Break Length, MAB, Channel break and package.

1. Break Time - option allowing you to modify the intervals between subsequent DMX packets.
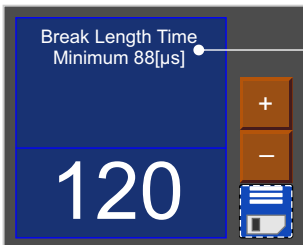
relevant information that helps you to set the proper value

2. MAB Time (*Mark after break*) – this is the time interval after Break that is present in each packet according to the DMX512 standard. You should set this parameter at a value within the range of 8 - 1000 µs.

3. MBF (*Mark Between Frames*) – Interval between DMX512 frames (channels). Its length may vary from 0 to 1 second; the shorter the interval, the better. MBFs separate stop bits of one channel from the start bits of another channel.

4. Packet gap – Interval between packets from the last slot to the Break start (*Mark after last channel*). The PX178 allows for setting this parameter within the range of 16 - 5000 µs.

5. Channels number – This feature allows you to reduce the number of channels being sent by the PX178. The minimum value is 24 channels, and maximum is 512 (default value).

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6.13. Input DMX

The [**Input DMX**] menu is a graphical view of the DMX512 signal that is being received by the driver. The right-hand side picture shows the screen displayed when no DMX signal is being received by PX 178:

DMX signal value in a
particular DMX channel

channel numbers

subsequent ten channels
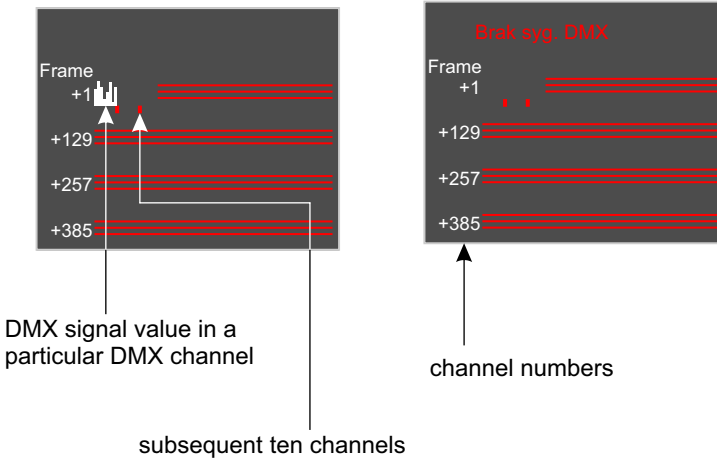
DMX signal presentation:
The value of DMX signal in a particular DMX channel is presented as a white bar whose height varies in proportion to the following relationship: the greatest height = DMX signal value is 255; no bar = DMX signal value is 0.

6.14. Internal smooth

The transition smoothing option, intended for transitions between successive control signal values, allows you to make smooth transitions between e.g. colours in the lamps connected.

This menu allows for setting the smoothing feature in two versions:
[**Smooth Disabled**] - the smoothing feature operates in a linear way between subsequent DMX signal packets being received by the driver

[**Packet To Packet Smooth**] - this feature allows you to apply a time criterion for smoothing DMX signal received by the driver. Once you confirm the message using the "*enter*" button, you can select a time setting within the range of 10 - 400 ms. This time setting determines the distance between DMX signal values that have been smoothed linearly.
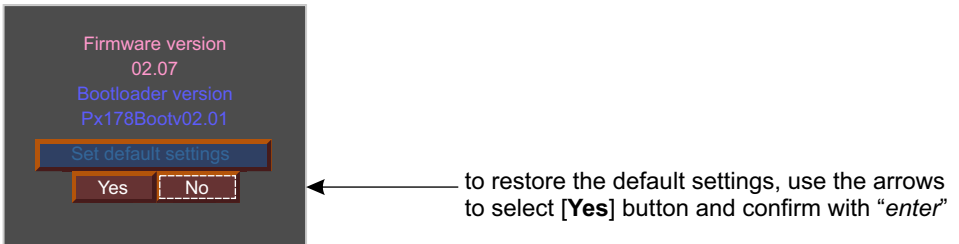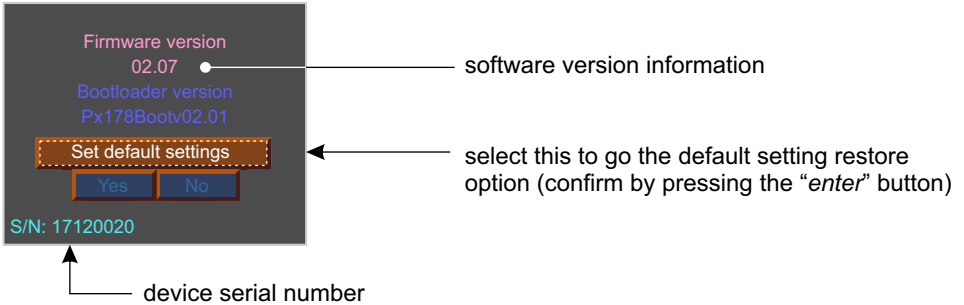
[**Time Smooth**] - if this option is enabled, the smoothing feature is disabled

6.15. Language

The language settings allow you to change the menu language. To do this, select the appropriate language icon and confirm your selection by pressing "*enter*".

6.16. Firmware info

In this submenu, you can check the firmware and bootloader version installed on your PX178 driver. You can also restore the default settings implemented on the device.

software version information

select this to go the default setting restore option (confirm by pressing the "*enter*" button)

device serial number

to restore the default settings, use the arrows to select [**Yes**] button and confirm with "*enter*"

7. CONNECTION SCHEME

a) Connection between LED strip group and a common power supply
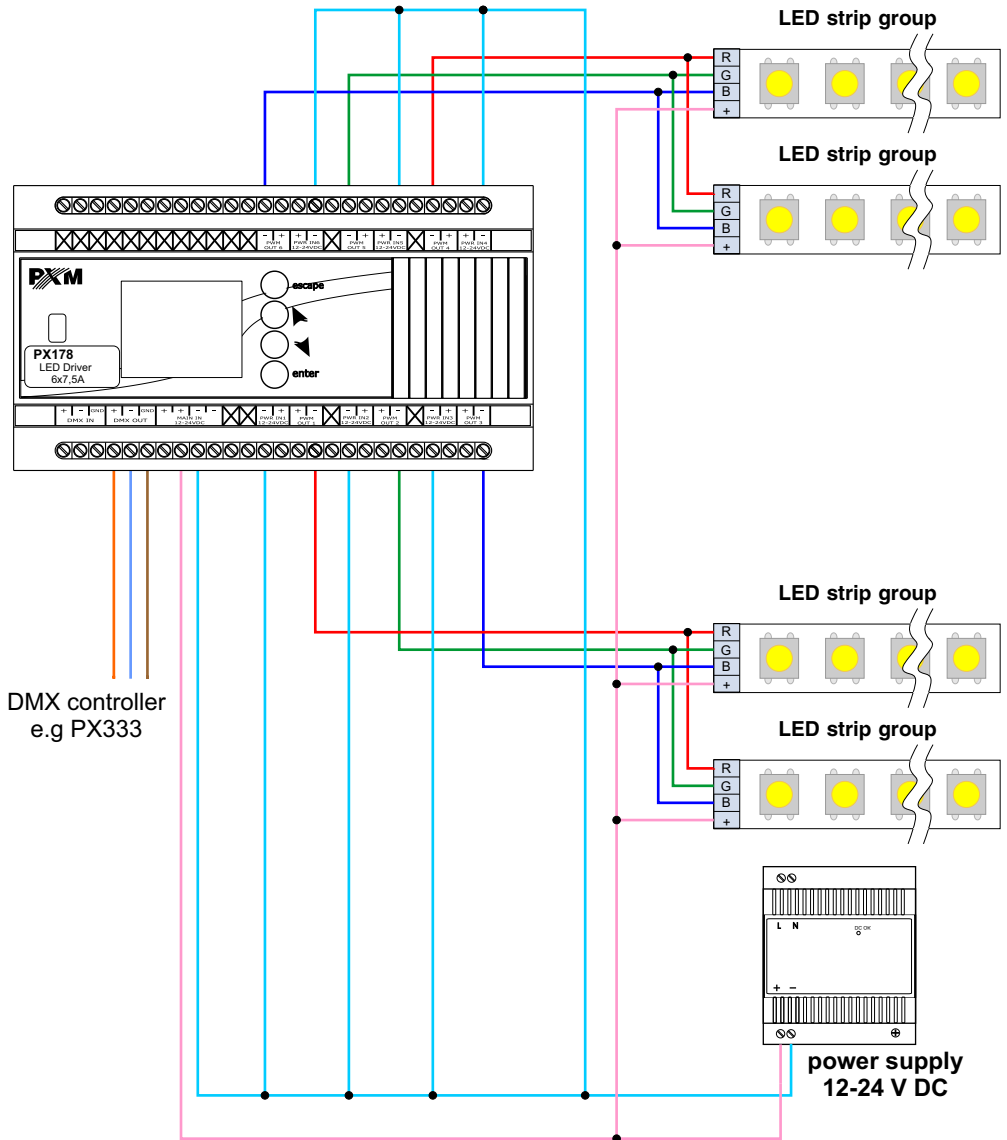
b) Connection between a LED strip group and
   two power supply units

**power supply
12-24 V DC**

LED strip group

R
G
B
+

LED strip group

R
G
B
+
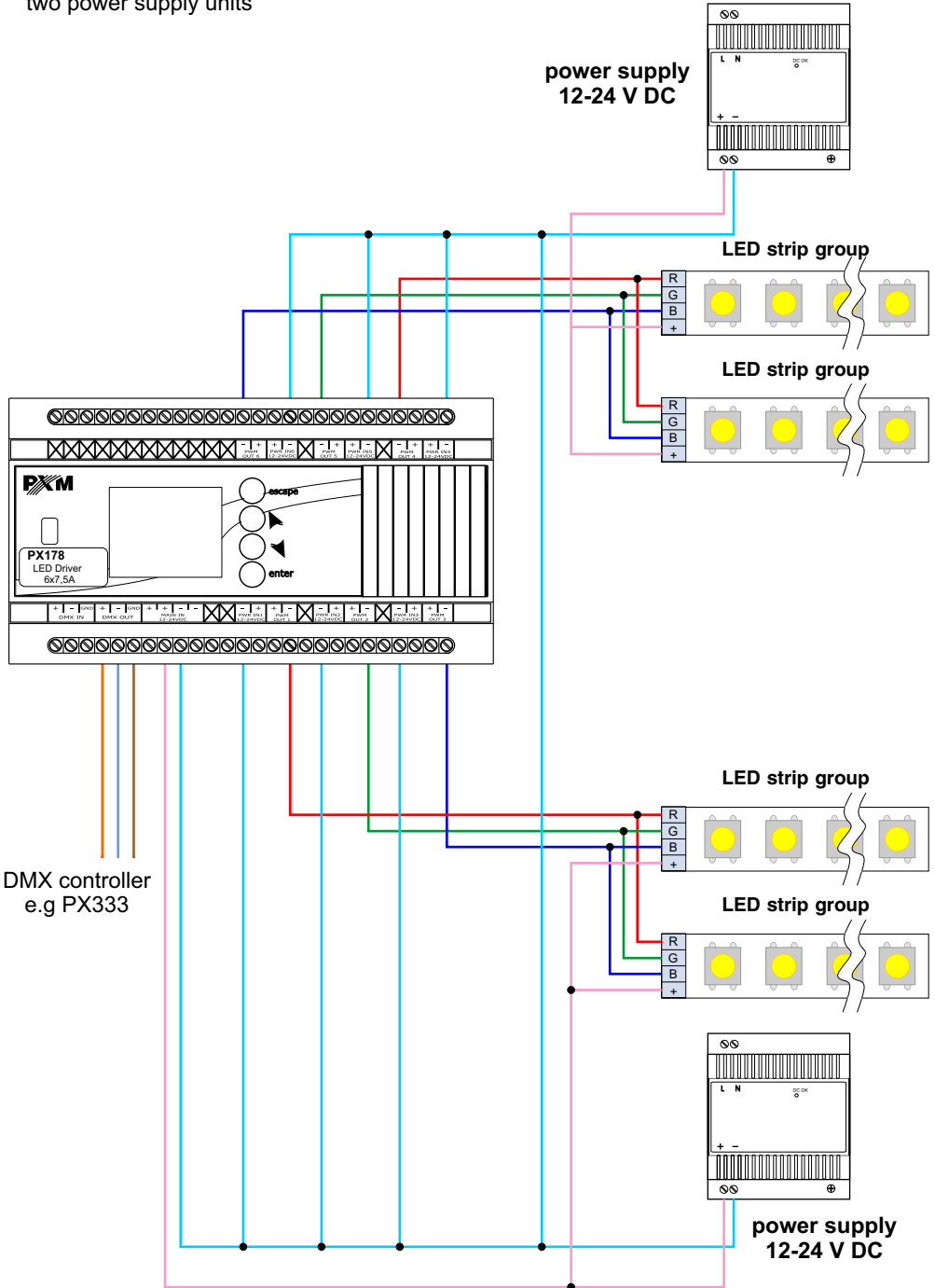
PX M

PX178
LED Driver
6x7,5A

escape

enter

DMX controller
e.g PX333

LED strip group

R
G
B
+

LED strip group
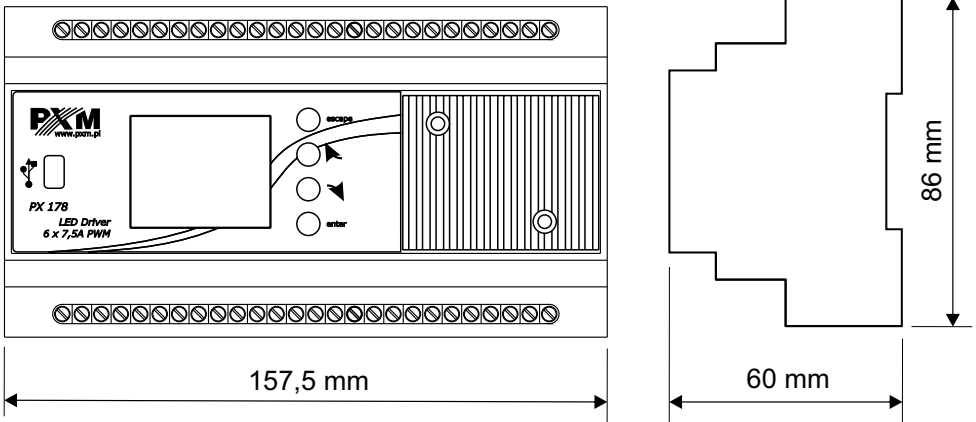
R
G
B
+

**power supply
12-24 V DC**

8. DMX SIGNAL CONNECTION

PX178 have to be connected to the DMX line in series, with no branching on the control cable. This means that the cable should be connected to DMX IN on driver, and then from the DMX OUT to the next DMX receivers.
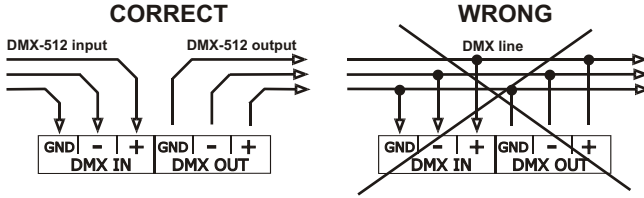
9. DIMENSIONS

10. TECHNICAL DATA

- Power supply   12-24 V DC
- DMX input   1 (512 channels)
- DMX output   1 (512 channels)
- Number of output channels   6
- Programmable scenes   8
- Number of programs   8
- Control accuracy   16-bit
- Outputs load   7,5 A/channel
- Master/Slave mode   YES
- Output sockets   Terminal blocks, USB
- Dimensions: Width: 157,5 mm (9 DIN rail modules)
                                       Height: 86 mm
                                       Depth: 60 mm

PXM

Podłęże 654   *tel:* *012 626 46 92*   *e-mail: info@pxm.pl*
32-003 Podłęże   *fax:* *012 626 46 94*   *http://www.pxm.pl*

DECLARATION OF CONFORMITY

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

we declare that our product:

Product name: **Driver LED 6x7,5A/OC**
Product code: **PX178**

smeets the requirements of the following standards as well as harmonised standards:

PN-EN 50581:2013,	**EN 50581:2012**
PN-EN 61000-4-2:2011,	**EN 61000-4-2:2009**
PN-EN 61000-6-1:2008,	**EN 61000-6-1:2007**
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 on the use of certain hazardous substances in electrical and electronic equipment.

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 and repealing Directive 2004/108/EC.

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

Podłęże, 25.07.2017   mgr ınz. Marek Żupnik.