PX714

Driver LED 4x350mA/48V

MANUAL



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

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1. GENERAL DESCRIPTION

The PX714 current driver has been designed for LED control

The built-in DMX receiver allows for controlling 4 channels (e.g. R, G, B, W) using the DMX protocol directly. The wide range of power supply voltage (12 - 48 V DC) and high current-carrying capacity (350 mAmax) enable controlling high numbers of LEDs.

The PX714 can be controlled the DMX signal and it can work on its own. In this case, the user has a fully programmable scene and 18 pre-programmed sequences for which the playback speed and smoothness of step changing can be freely set.

The driver has a built-in flicker free frequency control system, which makes it especially suitable for use in the television industry.

As the RGBW series LEDs often differ quite considerably in parameters, the driver has been equipped with the ability to limit the maximum output power of individual output channels.

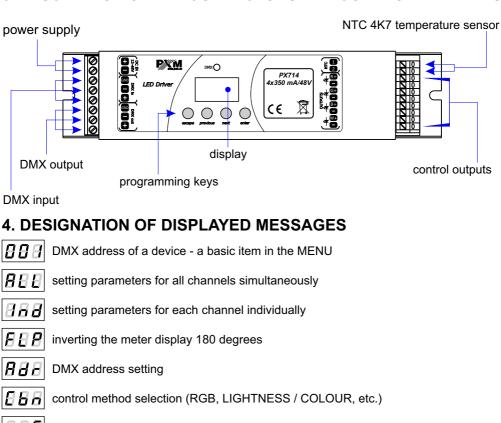
What is more, the driver has been equipped with an output for the temperature sensor and RDM protocol support. The support of the sensor allows for power reduction depending on temperature.

2. SAFETY CONDITIONS

The PX714 Driver LED 4x350mA/48V is a device powered with safe voltage up to 48V; however, during its installation and use the following rules must be strictly observed:

- 1. The device may only be connected to 12 48 V 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 damaging any conductor, it should be replaced with a conductor of the same technical data.
- 4. Connection of DMX signal can only be made with shielded conductor.
- 5. All repairs and connections of outputs or DMX signal can only be made with cut off power supply.
- 6. The PX714 should be strictly protected against contact with water and other liquids.
- 7. All sudden shocks, particularly dropping, should be avoided.
- 8. The device cannot be turned on in places with humidity exceeding 90%.
- 9. The device cannot be used in places with temperature lower than 2° C or higher than 40° C.
- 10. Clean with damp duster only.

3. DESCRIPTION OF THE CONNECTORS AND CONTROL ELEMENTS



- Image: Second second
- AASTER / SLAVE mode settings
- LIGHTNESS /COLOUR control mode
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- RGB control mode
- BBB RGBW control mode
- **BBB** RGB Dimmer control mode
- RGBW Dimmer control mode
- HSL control mode HUE / SATURATION / LIGHTNESS

effect control mode

dynamic white

4

all outputs at 100%
BEE all outputs off
SEB scene
P P P programme no. 17
B B DMX address settings for first channel
ASTER mode on / off
I B A number of channels being sent in the MASTER mode
BB white colour balance setting
BER red balance
B E G green balance
B B blue balance
B C white colour balance on / off
SPB program playback speed
E B B level of steps change smoothness in the program
<i>E B</i> red during scene programming colour
green colour during scene programming
B B B blue colour during scene programming
B B basic frequency of brightness control
Screen and DMX signal LED blanking
E B B memory error message
BB restore default device settings menu
E B function to limit power
value of the limit activation temperature
BB value of the maximum limit temperature
E B E current temperature



858 858 888

the lowest temperature recorded by the sensor

temperature limit is switched off and it is not possible to read the following temperatures: maximum, minimum, and current or when a mode which does not use all channels is set, and unused channels will have the address of the channel

5. DEVICE PROGRAMMING

After you switch on the module, its display shows the program version for a brief moment. To access the main menu, press *"enter*", and the display will show *Adr*. Press *"previous*" or *"next"* to select the appropriate menu and press *"enter*" to confirm your selection.

5.1. Button features

- escape goes back to the previous MENU level or discards changes made
- *previous* scrolls to the previous feature on the same MENU level or decreases the parameter's value
 - *next* scrolls to the next feature on the same MENU level or increases the parameter's value
 - enter enters the next MENU level and confirms changes made

5.2. DMX addressing: group and individual

The PX714 menu allows the user to set a DMX address in the 1 - 512 range. It is possible to set an address individually *Ind* for each channel or on a group basis "*ALL*" for all the channels simultaneously.

ON A GROUP BASIS

Using the *"next"* or *"previous"* keys, set the desired DMX address by selecting values from 1 to 505÷511 (depending on the control mode selected) and press *"enter"*. The address thus set will be assigned to the first channel, subsequent DMX addresses will be assigned to subsequent channels.

Once an address is programmed in this manner, the individual settings for each channel are cancelled.

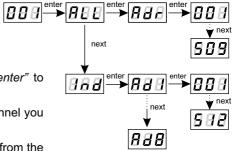
ON AN INDIVIDUAL BASIS

Using this menu you can set a DMX address individually for all the channels (the number of channels depends on the control mode selected).

After you select *Ind* in the main menu, press *"enter"* to confirm your selection.

Using the *"previous"* or *"next"* keys, select the channel you want to set (*Ad1* - *Ad8*) and press *"enter"*.

Using the *"previous"* or *"next"* keys, select a value from the range 1 - 512 and press *"enter"*.



5.3. Colour mode

This driver can operate under various control modes. Depending on the mode selected, the device will occupy different numbers of DMX channels.

The following modes are available:

• *HSL* mode (Hue, Saturation, Lightness) is available on 3 DMX channels, responsible for hue, saturation and lightness of output channels, respectively;

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- **4b** mode (4-byte) mode direct control of output channels by means of DMX channels;
- 4bd mode (4-byte plus a dimmer) four DMX channels directly control the driver output channels, the fifth channel dims values on all the channels at the same time;
- **3bd** mode (3-byte plus a dimmer) direct control of three channels, with a dimmer on the fourth channel;
- **3b** mode (3-byte) mode direct control of three channels only; the fourth channel is inactive;
- 2b mode (2-byte) operation in this mode involves selecting one of the 256 colours, defined by the manufacturer, on one DMX channel and lightness on the other DMX channel;
- *dW* mode dynamic white control of 2 channel groups: cold white + warm white, by means of four DMX channels. The first DMX channel is responsible for colour temperature of the first group, and the other channel - for lightness of the group. Similarly, the third and the fourth DMX channels control the other group;
- *EFF* mode an effect control mode. It is available on 8 DMX channels and allows you to select desired effects and their parameters.

Description guide of *EFF* mode settings - (the table on the next page):

- CHANNEL1 red component
- CHANNEL2 green component
- CHANNEL3 blue component
- CHANNEL4 white component
- CHANNEL5 operating mode selection
- CHANNEL6 speed settings (higher value quicker changes)
- CHANNEL7 fade settings (higher value smoother transition)
- CHANNEL8 lightness settings (higher value stronger glow)

character ("x")- possibility to control a given parameter of a selected mode

character ("-") - no possibility to control a given parameter of a selected mode

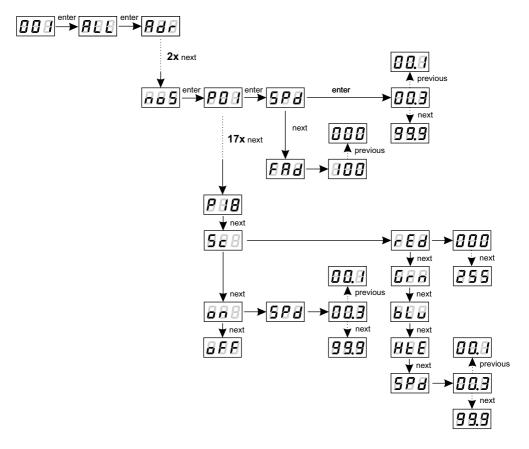
Channel 1 RED	Channel 2 GREEN	Channel 3 BLUE	Channel 4 WHITE	Channel 5 TRYB	Channel 6 SPEED	Channel 7 FADE	Channel 8 JASNOŚĆ
_	-	-	-	0 ÷ 7 - Program 1	х	x	х
-	-	-	-	8 ÷ 15 - Program 2	х	x	х
_	-	-	-	16 ÷ 23 - Program 3	х	x	х
-	-	-	-	24 ÷ 31 - Program 4	x	x	x
-	-	-	-	32 ÷ 39 - Program 5	х	x	x
_	-	-	-	40 ÷ 47 - Program 6	х	х	х
_	-	-	_	48 ÷ 55 - Program 7	х	х	х
_	-	-	_	56 ÷ 63 - Program 8	х	х	х
_	-	-	-	64 ÷ 71 - Program 9	х	х	х
_	-	-	-	72 ÷ 79 - Program 10	х	х	х
_	-	-	-	80 ÷ 87 - Program 11	х	х	х
_	-	-	_	88 ÷ 95 - Program 12	х	х	х
_	_	-	_	96 ÷ 103 - Program 13	х	х	х
_	-	-	_	104 ÷ 111 - Program 14	х	х	х
_	-	-	-	112 ÷ 119 - Program 15	х	х	х
_	-	-	_	120 ÷ 127 - Program 16	x	x	х
_	-	-	_	128 ÷ 135 - Program 17	х	x	х
_	_	-	_	136 ÷ 143 - Program 18	x	x	х
-	-	-	_	144 ÷ 151 - OFF	-	-	_
x	x	x	х	152 ÷ 169 - Strobo 10%	x	x	х
x	x	x	x	170 ÷ 199 - Strobo 20%	x	x	х
x	x	x	x	200 ÷ 229 - Strobo 50%	x	x	х
x	х	x	х	230 ÷ 255 - RGBD	-	-	х

EFF mode (effect) channels desription

5.4. Reaction of the device to DMX signal interruption

This function is used both to protect the system against disappearance of DMX signal and to gain control of LEDs without connecting an external driver. After it has been activated, in case of the lack of DMX signal, the module will perform the selected function by itself. Reconnection of DMX signal will automatically break the performed function, and the module will again send the command with DMX line.

- P01-P18 18 ready programs are available. For each of them, the user can set the playback speed Spd (value from 0.1 to 99.9 seconds) and the step change frequency in FAd (value from 0, i.e. abrupt transition, to 100, i.e. totally smooth transition)
 - Sc programming the scene value for red (*rEd*) channel, for green (*Grn*) channel, for blue (*bLu*) channel, for white (*HtE*) channel, as well as the scene entrance time (*SPd*) (value from 0.1 to 99.9 seconds)
 - on switching on of all outputs at 100% for which Spd is defined switching time at 100% (0.1÷99.9 s)
 - oFF complete switch-off of outputs



DESCRIPTION OF PROGRAMS

The following tables show the values for each output channel - R, G, B and W in programs from 1 up to 18 (*P01 - P18*). The value of 255 corresponds to the maximum lightness level on a given channel, 127 - 50% of power level, 0 - full channel blanking.

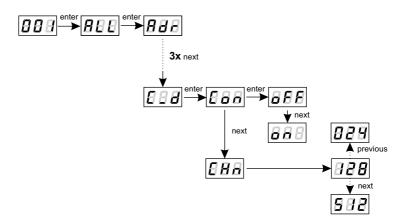
		P01	P02	P03	P04	P05	P06	P07	P08	P09	P10
	R	255	0	0	0	255	255	0	255	0	255
stop 1	G	0	0	0	0	0	0	255	0	255	0
step 1	в	0	255	0	0	0	0	255	0	0	0
	W	0	0	255	0	255	0	0	0	255	0
	R	0	0	255	0	255	255	0	0	0	0
step 2	G	255	255	0	0	255	0	255	255	0	0
step z	В	0	0	0	255	0	255	0	0	255	255
	W	0	0	0	0	0	0	255	0	0	0
	R	0	255	0	0	0	0	255			
oton 2	G	0	0	0	0	255	0	255			
step 3	В	255	0	0	0	0	255	0			
	W	0	0	255	0	255	0	0			
	R			0	0	0	0				
step 4	G			255	255	255	255				
Step 4	В			0	0	255	255				
	¥			0	0	0	0				
	R			0	0	0	0				
step 5	G			0	0	0	255				
step 5	В			0	0	255	0				
	W			255	0	255	0				
	R			0	255	255	255				
step 6	G			0	0	0	255				
sieh o	В			255	0	255	0				
	W			0	0	0	0				

		P11	P12	P13	P14	P15	P16	P17	P18
	R	0	0	0	255	0	0	0	0
aton 1	G	0	0	0	0	255	0	127	0
step 1	В	0	0	0	0	0	255	255	0
	W	0	0	0	127	127	127	0	0
	R	255	0	0	255	127	127	127	255
otop 2	ŋ	0	255	0	127	255	0	255	255
step 2	в	0	0	255	0	0	255	127	255
	W	0	0	0	0	0	0	0	255
	R				255	0	0	255	
otop 2	ŋ				0	255	0	127	
step 3	В				0	0	255	0	
	W				127	127	127	0	
R					255	0	0	127	
step 4	G				0	255	127	0	
step 4	В				127	127	255	127	
	W				0	0	0	0	

5.5. MASTER / SLAVE function

The PX714 module has a built-in DMX512 receiver and can be controlled from any desktop or controller running in this standard. Moreover, it is equipped with a programmable function of response to no DMX signal (*nos*). With 18 built-in default programs, it is possible to obtain interesting effects without an external controller. However, in larger installations, several PX714 drivers implementing the same program cannot provide a full reproduction synchronisation. Therefore, PX714 has a MASTER feature. When it is activated, the module changes from a DMX receiver into a transmitter of this signal and sends self-realized programs to the other modules. The first driver on the DMX line should be assigned MASTER status. The other drivers should operate in SLAVE mode.

With this solution, it is possible to make a precise synchronization even in very large installations.



Con - turning on or off the MASTER function

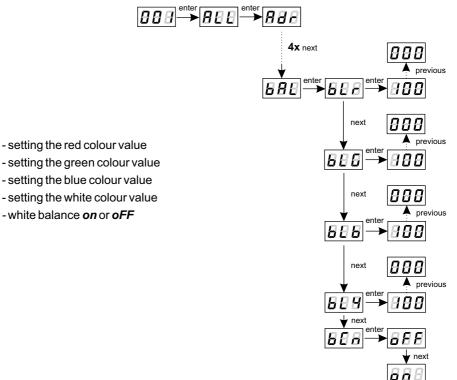
CHn - select the amount of DMX channels sent

NOTE:

Generally, PX714 sends 4 channels – R, G, B, and W, respectively. The minimum number of channels sent is 24, so the four basic channels are multiplied six times. Where needed, they can be multiplied to give 512 channels (it is not recommended to use this setting due to the slow transmission).

5.6. White balance

Sometimes, there may be problems achieving white colour on the LEDs of RGB series. This may be due to the use of diodes with different technical parameters. For this reason, the PX714 module is equipped with a white balance function (*bAL*). This option allows you to select the proper colour temperature for the full control of all four outputs (white colour) in the range of 0-100%.



5.7. Smooth

bLr

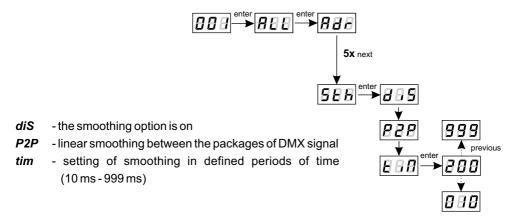
bLG

bLb

bLY

bCn

The driver has an option of smoothing the output signal. Smooth feature allows for smooth changes in lightness and colour. When the transition between successive DMX values sent to the lamp is turned on (e.g. corresponding to changes in lightness) the changes are smooth with no visible twitches, which prevents the common light "vibrations" effect. Two consecutive DMX values sent to the lamp are smoothed linearly between the DMX signal packets for the selected **P2P** option or the time interval set in the menu.



5.8. Light control frequency

The Frg function allows for setting the basic control frequency. This feature is extremely useful for controlling lamps for the television industry. By applying the "flicker free" technology, it is possible to avoid the unpleasant flickering effect which is caused by improper signal synchronization that controls the LEDs.

The user can choose from the available frequency range from 366 Hz up to 25 kHz which can be smoothly changed using the "previous" or "next" buttons and selecting a different value.

Frequency values above 1.51 kHz can avoid flickering in the camera.

5.9. Screen saving

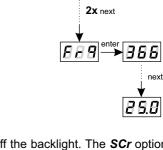
The device is equipped with a feature that allows for turning off the backlight. The SCr option activated turns off the display after a minute of inactivity (do not use the keys). The device continues its operation without interfering with other parameters. Press any key to restore the backlight.

on - screen saver activation

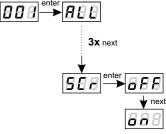
oFF - screen saver deactivation

5.10. Temperature limits and sensor failure

PX714 has been equipped with a function that limits the output power depending on the temperature value read using the external sensor mounted in the lamp. This allows for programming a temperature value which, if reached, limits the power or disables the lamp supplied by the driver. The product is designed to work only with the NTC 4K7 type thermistor.

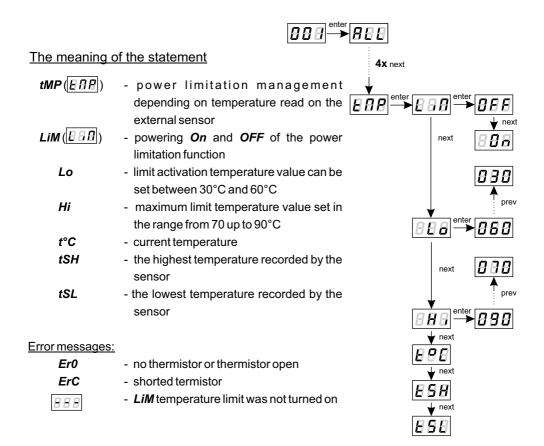


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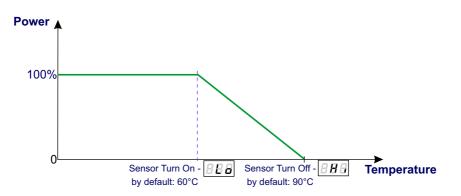




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The course of the power limitation between *Lo* and *Hi* values is linear as shown in the graph below:



If this function is activated and the temperature sensor is incorrectly connected or there is no sensor, the driver displays a relevant message – *Er0* at the current temperature location, and instead of the first DMX address, i.e. at the very beginning of the menu. To disable the message, connect an appropriate sensor or disable the temperature limit.

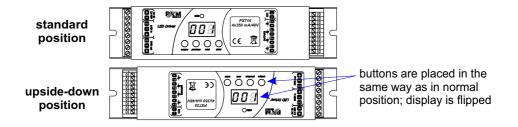
5.11. Display function

As the driver should be installed (as far as possible) in a small distance from the controlled LEDs, the lack of space may force the necessity of mounting the device upside-down. In such case the displayed messages become illegible, that does not have the influence on device operation, but makes the programming much more difficult.

That is why the PX714 driver has a display flip feature available. It turns the screen 180°. The keys order is reversed as well.

To activate this both middle buttons ("previous" and "next") of the driver have to be pressed in the same time for about 3s. To deactivate function the procedure is the same.

The figure on the next page shows how flip function works.



5.12. Default settings and memory error

If you have any difficulty accessing the device menu, e.g. it is not possible to enter a particular menu level or it is necessary to restore the device to its default settings, follow the instructions below.

In the first case, if there is no access to the menu level or it is incorrectly displayed, this may indicate an error of saving to the device memory.

If the procedure has been performed and the device still does not operate properly, it must be sent to the manufacturer.

To restore the device to its default settings, press and hold the previous key while switching on the device. One of the messages that will be displayed will say *dFI*, which means successful restoring to default settings (the previous key has to be held down while powering on the device, until the *dFI* message is displayed).

If this message is accepted by pressing "enter", the default settings will be restored. The user can also exit this menu level without restoring the default settings. In order to do this, press the "esc" key.

Please note that all set parameters of the PX714 device after restoring the default settings will be changed to those shown below:

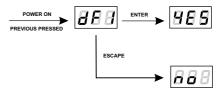
- DMX address 1,
- driver operating mode RGBW (4b 4-byte),
- master mode off,
- number of sent DMX channels 128,
- white balance off
- no signal operating mode Program 1
- smoothing function (smooth) off

Err message - memory error

The device is equipped with a built-in memory work control function.

If there are problems with the memory operation on the PX714 display, the *Err* message appears - memory error.

In this situation, select the "enter" key. The device will reload the default configuration and upload it to the memory. If after this operation, the *Err* message remains on the screen, the memory is permanently damaged and the unit must be sent to the service point.



5.13. RDM description of available parameters

The PX714 supports the DMX-RDM protocol. DMX protocol allows only of a one-way data transmission, while its extension the RDM protocol can transmit information in two directions. This makes possible to simultaneously send and receive information, and hence the possibility of monitoring activities of the compatible devices. Thanks to RDM some available settings of compatible devices may be programmed using this protocol.

Parameter name	PiD	Description
SUPPORTED_PARAMETERS	0x0050	all supported parameters
PARAMETER_DESCRIPTION	0x0051	description of additional parameters
DEVICE_INFO	0x0060	information concerning the device
SOFTWARE_VERSION_LABEL	0x00C0	firmware version of the device
DMX_START_ADDRESS *	0x00F0	DMX starting address of the device; minimum value: 1, maximum value: 512. According to the RDM standard, for device whose footprint is 0, the value of this parameter may be 65535 and then it is not possible to change the initial address settings for the entire device, but only for sub-devices.
IDENTIFY_DEVICE *	0x1000	device identification; Two states are possible: identification is off (0x00 value) and identification is on (0x01 value).
STATUS_MESSAGES	0x0030	information about device status
DEVICE_MODEL_ DESCRIPTION	0x0080	device description, e.g. name
MANUFACTURER_LABEL	0x0081	manufacturer description, e.g. name
DEVICE_LABEL *	0x0082	additional device description; It is possible to enter an additional device description using up to 32 ASCII characters.
FACTORY_DEFAULTS	0x0090	device default settings
DMX_PERSONALITY	0x00E0	DMX operational mode
DMX_PERSONALITY_ DESCRIPTION	0x00E1	description of individual operational modes
DEVICE_HOURS	0x0400	operating time counted in hours
TEMPERATURE_LIMIT_ ON/OFF	0x800E	temperature limitation activation for the temperature sensor connected to the driver, For 0 value, the function is not active; for 1 value, the function is active. Default value is 1.

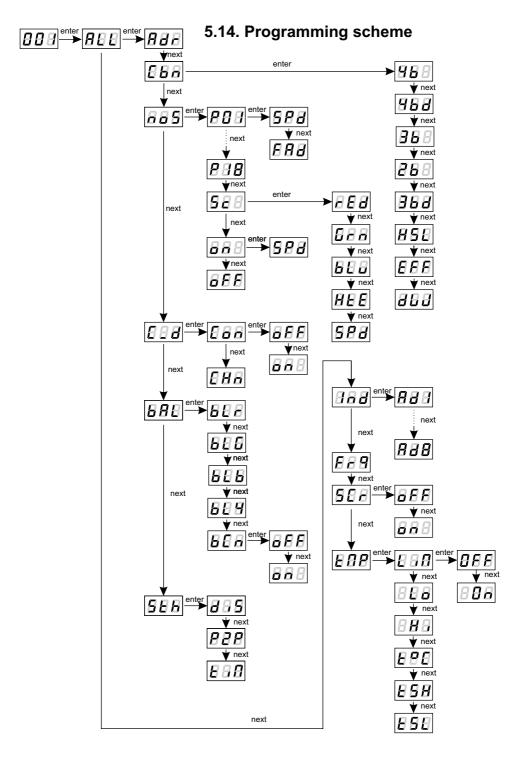
Below is a list of RDM parameters supported by the PX714:

Parametr name	PiD	Description
TEMPERATURE_ THRESHOLD_LOW *	0x800F	lower temperature value for which the temperature limitation is being activated
TEMPERATURE_ THRESHOLD_HIGH *	0x8010	upper temperature value for which thetemperature limitation is active, i.e. the cut- off temperature for exits from the driver
BALANCE_RED *	0x8011	value of control level of red chanel balance; Minimum value is 0 and maximum is 100 (the value equals to pecentage of control level). For the maximum value (100) the LEDs work with maximum brightness. Default value is 100.
BALANCE_GREEN *	0x8012	value of control level of green chanel balance; Minimum value is 0 and maximum is 100 (the value equals to pecentage of control level). For the maximum value (100) the LEDs work with maximum brightness. Default value is 100.
BALANCE_BLUE *	0x8013	value of control level of blue chanel balance; Minimum value is 0 and maximum is 100 (the value equals to pecentage of control level). For the maximum value (100) the LEDs work with maximum brightness. Default value is 100.
BALANCE_WHITE *	0X8014	value of control level of white chanel balance; Minimum value is 0 and maximum is 100 (the value equals to pecentage of control level). For the maximum value (100) the LEDs work with maximum brightness. Default value is 100.
SMOOTH_DIS_0/P2P_ 1/TIM_2 *	0x801A	the choice of options relating to the Smooth function; At 0 value Smooth is turned off, for a value of 1 Smooth mode is set to a Packet to Packet (<i>P2P</i>) and for the value of 2 Smooth is in time mode (<i>tim</i>). The default value is 0 - Smooth off.
SMOOTH_TIME *	0x801B	smooth time for <i>tim</i> function chosen in subsection above; Unit in [ms]. Minimal value of this parameter is 10 and maximal 999 [ms]. Default value is 200.

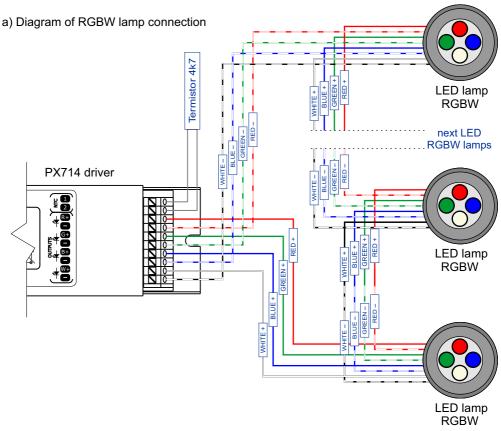
Parametr name	PiD	Description
NO_SIG_P1- 18 SC_19 ON_20 OFF_21	0x801C	choice of work mode for No DMX signal; Minimal Value is 1, maximal 21. For values 1- 18 menu allows to chose program from 1 to 18 which is played during no DMX signal detection. For the 19 value a scene saved in memory is set and for the 20 value all outputs are set to ON with maximum value. The value 21 sets to OFF all outputs during time with no DMX signal received. Default value is 21.
SCENE_RED *	0x801D	settings of red channel value for scene saved; Minimal value is 0, maximal 255 (maximal brightness). By defualt value set to 255.
SCENE_GREEN *	0x801E	settings of green channel value for scene saved; Minimal value is 0, maximal 255 (maximal brightness). By defualt value set to 255.
SCENE_BLUE *	0x801F	settings of blue channel value for scene saved; Minimal value is 0, maximal 255 (maximal brightness). By defualt value set to 255.
SCENE_WHITE *	0x8020	settings of white channel value for scene saved; Minimal value is 0, maximal 255 (maximal brightness). By defualt value set to 255.
SCREENSAVER_ON/OFF *	0x8024	settings of screensaver; With the 0 value display blanking is not active, the 1 value means screensaver active. Default value is 0.
PROGRAM_SPEED *	0x8025	programs playback speed settings (playing next steps of program); Minimum value is 1 and maximal 999 (maximum speed). By default it is set to 10. Value 1 represents 0,1s, and 999 - 99,9s.
PROGRAM_FADE *	0x8026	settings of smooth transition between following steps of a program; The minimum value is 0 (step transition) a maximum of 100 (transition completely smooth). The default value is 100.

Parametr name	PiD	Description
BALANCE ON/OFF *	0x8027	to activate or deactivate the balance of output channels; A value of 0 is a balance off, a value of 1 active balance. The default value is set to 0.
PWM_FREQENCY *	0x8028	LEDs refresh frequency; The minimum value is 366 and the maximum is 25000. The unit is [Hz] and the default value is 366.
SERIAL_NUMBER	0x8030	device serial number
DISPLAY_FLIP *	0x8031	inverting the meter display 180 degrees; The minimum value is 0, and the maximum is 1. The default value is 0.

* - parameter editable



6. CONNECTION SCHEME



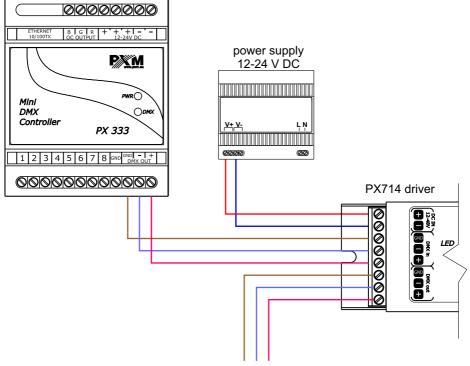
Example connection the PX714 driver to the LED lamp:

- the cables should be connected with the correct order of colors,
- LEDs should be connected only in series,
- controlled LEDs can be connected using two conductors only, i.e. two per channel,
- the number of serially connected LEDs depends on the driver and supply voltage.
- a) RGBW lamp connection, 350 mApower supply

LED Driver	Power supply	Number of diodes of one color
	12 V	1 ÷ 3
PX714	24 V	4 ÷ 6
	48 V	7 ÷ 12

b) Monochrome lamp connection (one colour), 350 mA power supply

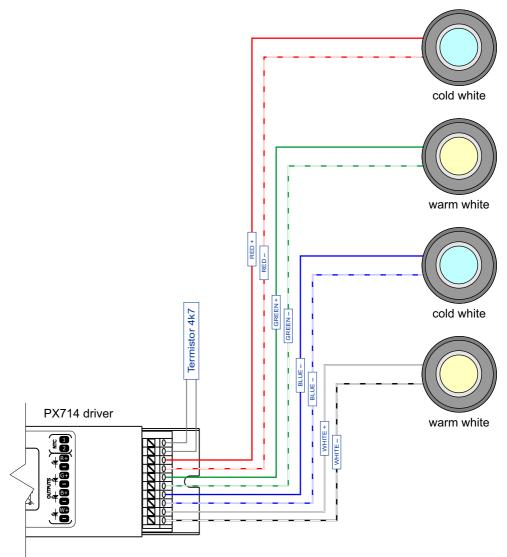
LED Driver	Power supply	Quantity of powered lamps
	12 V	3
PX714	24 V	6
	48 V	12



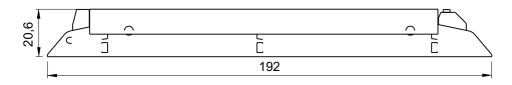
controller, e.g PX333

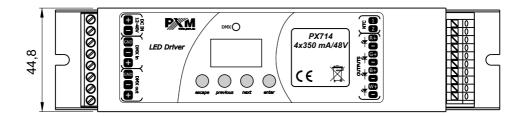
DMX receiver, e.g PxArt lamp

c) Monochrome lamp in DW mode connection diagram



7. DIMENSIONS





8. TECHNICAL DATA

- power supply
- total current consumption
- current consumption without load
- number of output channels
- control accuracy
- programmable scene
- number of programs
- output load
- output sockets
- DMX-RDM
- MASTER mode
- weight
- dimensions:
 - length
 192

 width
 44,8

 height
 20,6
- 512 12 V DC for 1, 2 or 3 LEDs 24 V for 4, 5 or 6 LEDs 48 V for 7, 8, 9, 10, 11 or 12 LEDs max. 1.4 A 1 W 4 16 bit 1 18 350 mA / channel +2% PCB terminal block; Push-button; max.1.5 mm² yes yes 0,13 kg 192 mm 44.8 mm 20.6 mm

SYSTEM DMX S

STEROWNIKI ARCHITEKTONICZNE OŚWIETLENIE LED



Podłęże 654 32-003 Podłęże tel: 012 626 46 92 fax: 012 626 46 94 e-mail: info@pxm.pl 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 4x350mA/48V Product code: PX714

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.



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

mgr ınz. Marek Żupnik.

Podłęże, 09.06.2017