



P 10 WASH

Operating instructions

Version 1.03

Software \geq 1.0.0

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1. Introduction

1.1 P10 Wash models

The P10 Wash is available in 3 models. The models differ in the light module and partly in the color filters and in the CTC filters. The differences can be found in the DMX channel functions.

- P10 Wash HP (High Power)
- P10 Wash HC (High CRI)
- P10 Wash WW (Warm white)



P10^{HP}



P10^{HC}

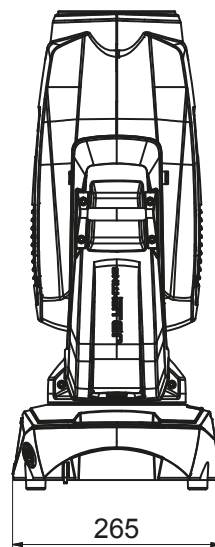
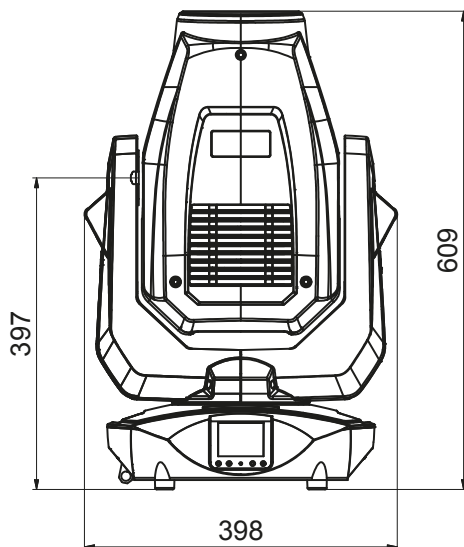
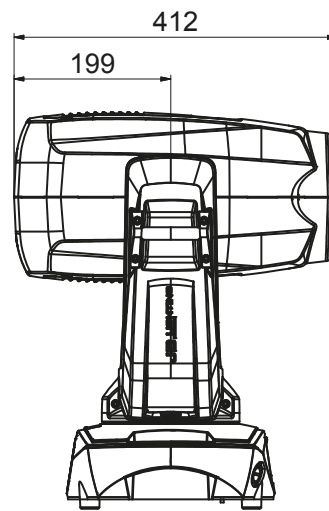
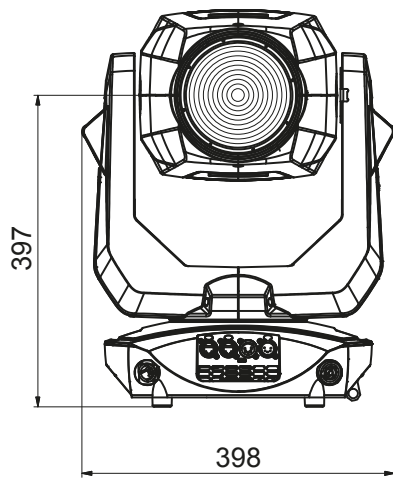
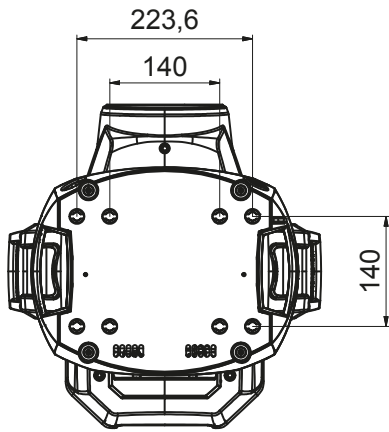


P10^{WW}

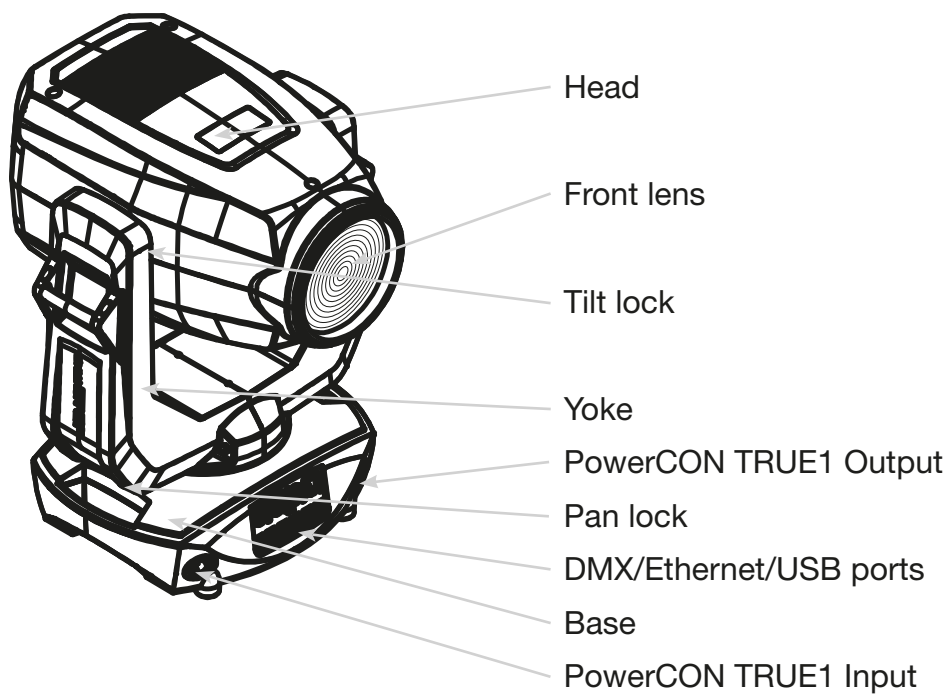
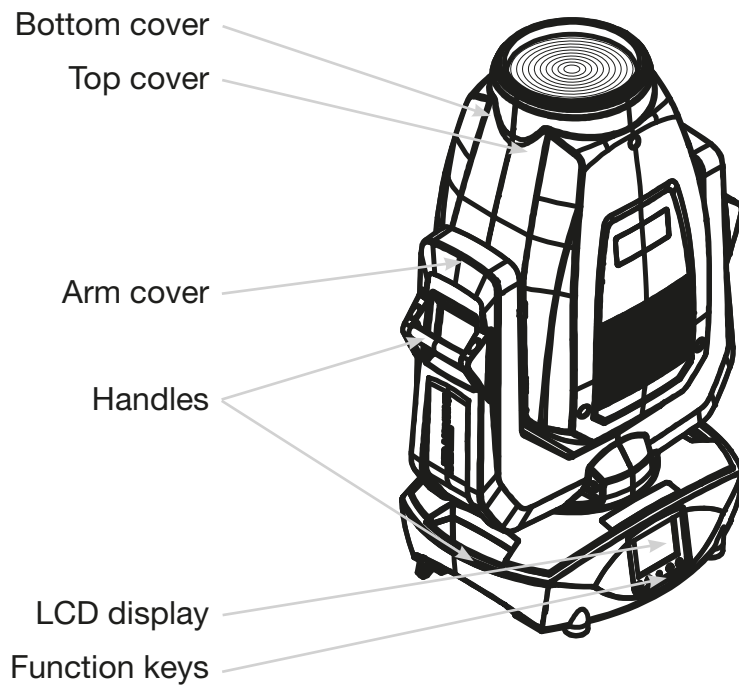
| Specification | HP - High Power | HC - High CRI | WW - Warm White |
|-----------------------|-------------------------------------------|---------------------------------|--------------------------------|
| Color temperature | 7200 K | 6000 K | 3200 K |
| Luminous flux | 25.000 lm (15.000 lm Output) | 16.000 lm (10.000 lm Output) | 12.000 lm (8.000 lm Output) |
| CRI | ≥ 70 (with CRI filter ≥ 90) | ≥ 90 | ≥ 92 |
| Correction filter CTO | linear CTO 7200 K to 3200 K | linear CTO 6000 K to 2700 K | linear CTO 3200 K to 1800 K |
| Correction filter CTB | linear CTO 7200 K to 24900 K | linear CTO 6000 K to 16300 K | linear CTB 3200 K to 5600 K |

P 10 WASH

2. Dimensions



3. Product overview



4. Safety instructions



ATTENTION: For your own safety, please read these operating instructions carefully before first use.

This spotlight has left our company in excellent condition. To maintain this condition and to ensure safe operation, it is absolutely essential to observe the following safety instructions and warnings which are described in this operating manual.

The manufacturer accepts no liability for damage caused to the device by disregard of these operating instructions or unauthorised modifications.

Please note that damage caused by manual modifications to this unit is not covered by the warranty.



ATTENTION: This device is only suitable for professional use! Protection class IP 20 - only for use in dry environments (indoors)!

ATTENTION: JB-Lighting Lichtenlagentechnik GmbH does not authorise the use of its devices in life support systems. Life-supporting systems are systems whose purpose is to maintain or stabilise life and whose defect or malfunction may result in death or injury to persons.

The product in this manual complies with the following EU directives:

- Low Voltage Directive 2014/35/EU
- EMC Directive 2014/30/EU



ATTENTION: Allow the device to cool down and disconnect the device from the mains before opening the device. Touching live parts (high voltage) can give you an electric shock.

Ensure that the mains voltage to be connected is not higher than that indicated on the type plate. This device should only be operated with the power source indicated on the type plate. If you are not sure what type of power supply you have, contact your dealer or power supplier.

Always disconnect the device from the power supply before carrying out cleaning work or before replacing fuses or parts.

The mains plug must always be accessible after the spotlight has been installed. Do not overload the sockets or extension cables as this could result in fire or electric shock. Do not place any objects on the power cable. Do not install the spotlight in such a way that people can trip over or step on the power cable. Make sure that the power cable can never be crushed or damaged by sharp edges. Check the unit and the power cable from time to time.

Leave maintenance work to a qualified technician!



ATTENTION: This fixture corresponds to protection class I. For this reason, this spotlight must be connected to a mains socket with earthing contact.

Never connect this device to a dimmer pack.

During first use, some smoke and odour may occur. This is normal and does not necessarily mean that the device is defective.

The device becomes hot during operation. Never touch the device with bare hands during operation!

When replacing fuses, only use the same types with identical values! Only have fuse replacement carried out by a qualified technician



ATTENTION: DAMAGE TO EYES! Do not look into the light source for long periods during operation. This can be harmful to the eyes. Attention: potentially hazardous radiation - Risk group 2 based on DIN EN 62471

If the device has been exposed to strong temperature fluctuations (e.g. after transport), the device must not be switched on immediately. The resulting condensation can damage your device. Leave the device switched off until it has reached room temperature.

If the P10 Wash is operated below 20°, gobo/prism swapping and gobo/prism rotation are reduced in speed. This is a protective mechanism of the P10 Wash, as at low temperatures the lubricant is relatively viscous in the rotational mechanism and can therefore cause the effect to be slurred. From indoor temperatures of 21° and upwards, the spotlight runs normally! This temperature is quickly reached under normal operation (LED engine on).

Do not shake or knock the device. Avoid brute force during installation or operation.

This light was designed for indoor use only. Do not expose this device to rain or moisture.

When choosing a mounting location, make sure that the device is not exposed to extreme heat, moisture or dust.

Ventilation openings and slots in the head and foot of the spotlight are used for ventilation to ensure reliable operation of the device and to protect it from overheating, these openings must not be covered.

Never cover the front lens when the spotlight is in use.

The openings should never be covered with substances or other objects so that the airways are blocked.

This device must not be operated in an environment without adequate ventilation.

The device may only be operated when the housing is closed and all screws/Camlocs are firmly tightened.

The device must always be secured with an additional safety device.

Ensure that the area below the spotlight is clear during installation, alteration and removal.



ATTENTION: Allow a fixture distance of at least 0,5 metres from easily flammable material and the distance between the light emission and the surface to be illuminated must be at least 2,0 meters.

The maximum ambient temperature of 45°C must not be exceeded.



ATTENTION: The front lens must be replaced if it is visibly damaged to the extent that its function is impaired, e.g. by cracks or deep scratches!

Do not operate the device until you have become familiar with its functions. Prevent operation by persons who are not qualified to use the device. Most damage is the result of improper operation!

Please use the original packaging or specially adapted flight cases if the device is to be transported. When using the original packaging, the locks must not be closed!



ATTENTION: To avoid damaging the internal parts of the light head, never let sunlight shine directly into the front lens.

5. Installation


5.1 Unpacking the device

Contents of the packaging: This spotlight, two Omega brackets with original Camloc fasteners, powerCON-TRUE1 Schuko cable and a safety note. Open the packaging at the top and remove the powerCON TRUE1 cable, the inlay and the safety instructions. The Omega brackets are located under the spotlight. Check the P10 Wash for possible transport damage. This should be communicated immediately to the transport company.

5.2 Connection of the fixture to the power supply

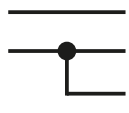

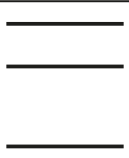
The P10 Wash is supplied with an assembled Schuko power cable with the powerCON-TRUE1 plug (only the powerCON-TRUE1 plug is included in the US version). The connection of the P10 Wash to the power supply (100-240 volts, 50 - 60 hertz) must comply with the connection rules of the respective country.

Connection in Germany/Europe:

| Wire colour | Function | Symbol |
|--------------|------------------|------------------------------------------------------------------------------------------|
| Brown | Phase | “L” |
| Blue | Neutral wire | “N” |
| Green/Yellow | Protective earth | “PE”  |

Connection outside Europe:

The P10 Wash may only be operated on the following power supply systems:

| | Mains | | P10 Wash |
|-------------------|---------------------------------------------------------|-----------------------------------------------------------------------------------|--------------|
| 2 wires, 1 phase | L N |  | L N PE |
| 3 wires, 1 phase | L N L |  | L N |
| 4 wires, 3 phases | L ₁ L ₂ L ₃ N |  | L N PE |



ATTENTION:

In Canada, the P10 Wash may only be operated in a 2-wire, 1 phase network with a maximum voltage of 120V!

5.3 Mains connection

Connected loads: Voltage 100-240 V, frequency 50 - 60 Hz, power max. 490 VA

The electrical safety and function of the device can only be guaranteed if it is connected to a properly installed protective conductor system. It is very important that this basic safety requirement is met. If in doubt, have the electrical installation checked by a specialist. The manufacturer cannot be held responsible for damage caused by a missing or interrupted protective conductor (e.g. electric shock)! Only use the device when it is completely assembled so that no electrical components can be touched. **(Danger 100-240 V)**

If you have observed the listed points, you can plug in the devices or have them connected to the mains by a specialist.



ATTENTION: The P10 Wash can light up immediately if standalone operation is activated or a DMX signal is present!


5.4 Wiring the power feed-through



ATTENTION: Only have it carried out by a specialist!

The P10 Wash has a powerCON-TRUE1 out power output. Depending on the local conditions several devices can be linked by powerCON-TRUE1 in and powerCON-TRUE1 out. Connect a maximum of four (when using 230V/16A) P10 Wash's in a row.

Use an approved three-core cable with a cross-section of at least 1.5 mm². Cabling must be done with the original Neutrik coded plugs. The installation instructions of the manufacturer (www.neutrik.com) and the colour coding of the cable must be observed.

| Wire colour | Function | Symbol |
|--------------|------------------|------------------------------------------------------------------------------------------|
| Brown | Phase | “L” |
| Blue | Neutral wire | “N” |
| Green/Yellow | Protective earth | “PE”  |

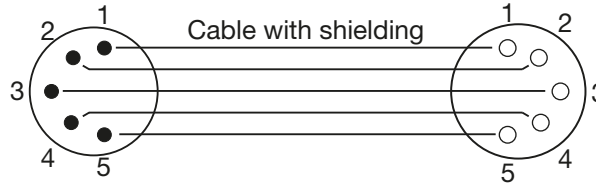
5.5 Signal connections

5.5.1 DMX cabling

The DMX cabling (signal lines) should be done with a 4-pin cable with shielding. We recommend a DMX cable (110 Ohm, 4x0.22mm²), alternatively a 2-pole micro cable can be used. The plugs and sockets are 5-pin XLR connectors, which can be purchased in specialist shops.

Pin assignment:

- Pin1 = Ground/Shielding
- Pin2 = DMX -
- Pin3 = DMX +
- Pin4 = not connected
- Pin5 = not connected



The P10 Wash has a DMX-in and DMX-out connector. Now connect the DMX output of your controller to the 1st P10 Wash (Controller DMX-Out -> P10 Wash DMX-In). Then the 1st P10 Wash with the 2nd P10 Wash (P10 Wash DMX-Out -> P10 Wash DMX-In) and so on. In some cases it is advisable to insert a so-called end connector (XLR connector with a 120 Ohm resistor between pin 2 and pin 3). Whether an end connector is required depends on various factors, including the cable lengths used and the number of devices. However, as long as no problems occur in the DMX line, this is not necessary.

5.5.2 Ethernet cabling

Ethernet cabling can be done with standard network lines. The sockets on the device are Neutrik etherCON sockets. Special cables with etherCON connectors are recommended by Neutrik. The two sockets on the P10 Wash are connected to each other via a switch. Up to 10 devices can be connected in series without any delay. Of course, the spotlights can also be supplied in a star configuration via an external switch. The received signal can be output via DMX. To do this, set the DMX OUTPUT CONFIG setting to ON in the PERSONALITY menu. After confirming with ENTER, the spotlight emits the entire universe received via DMX.



ATTENTION: Make sure that there is no signal at the DMX input at the same time !!

5.5.3 Wireless reception

The P10 Wash is equipped as standard with a **LumenRadio** CRMX receiver for wireless DMX. The receiver can process both DMX and RDM. If a cable and wireless connection are connected to the P10 Wash, the cable connection has priority! The received signal can be output via DMX. To do this, set the DMX OUTPUT CONFIG setting to ON in the PERSONALITY menu. After confirming with ENTER, the spotlight emits the entire universe received via DMX.



ATTENTION: Make sure that there is no signal at the DMX input at the same time !!

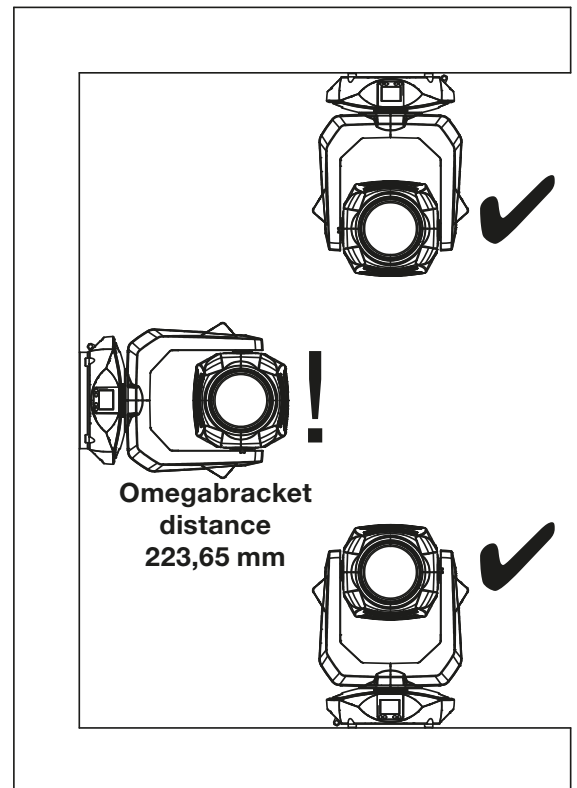
5.6 Mounting the devices



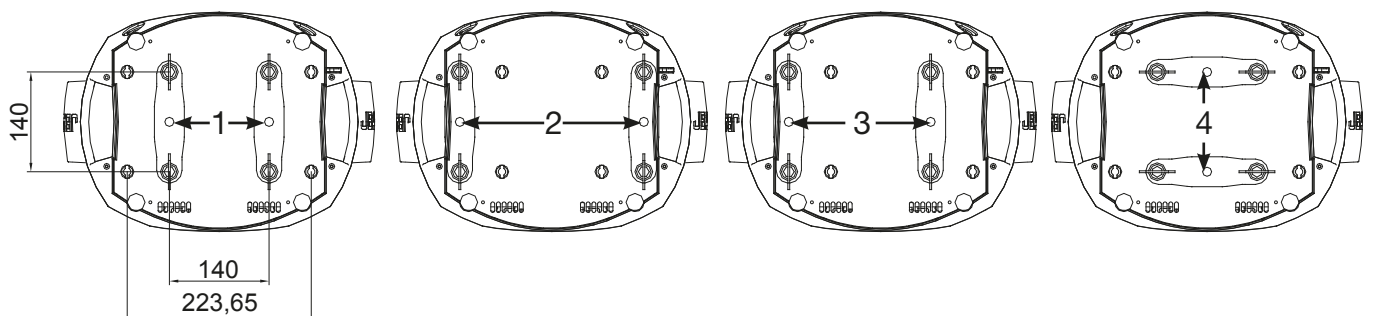
ATTENTION: Allow a fixture distance of at least 0.5 metres from easily flammable material and the distance between the light emission and the surface to be illuminated must be at least 2.0 meters.

The P10 Wash can be placed on the floor or hang on a trussing system. **A mounting horizontally to a truss system like in the picture is only allowed if the omega brackets are attached to the outer camlocks. (distance 223.65mm)**

When placing the unit on the floor make sure that it stands on rigid ground, because the air inlets in the base must not be covered with anything!



To mount the unit on a trussing system use two of the original JB-Lighting omega brackets with original Camloc-connectors. You have following four possibilities to mount the omega brackets.



The Camlocs must snap in to be locked properly. Ensure that the structure (for example a truss system) to which you are attaching the fixture is secure. If you install the fixture to a hanging system (for example to a truss system) always attach a safety cable, that can hold at least 10 times the weight of the fixture. There is a corresponding eyelet on the fixture for the secondary safety device (see picture).



eyelet for the secondary safety device

6. Control panel

The P10 Wash has a graphic colour display that can be rotated 180° when installed in a suspended position. The display can be rotated in the PERSONALITY MENU or via short cut ENTER + UP in the main screen.

All parameters of the P10 Wash can be set on the control panel (see menu overview page 15).

Function and operation of the display

The main menu provides information regarding the set DMX mode and, when the wireless mode is switched on, the field strength of the associated transmitter module. "ENTER" calls up a sub-menu or confirms an input. "ESC" is used to exit a function or a menu item. "UP" and "DOWN" are used to navigate within the menu and to enter values.



Special areas can only be called up using a specific key combination. To do this, press and hold the "ENTER" key and then use the opposite "ESC" key to access the menu. To exit the function, proceed in reverse order.

This applies in the STAND ALONE area for the MODIFY, RUN and REMOTE functions.

The main menu can also be locked to prevent unintentional access. It is also locked by pressing the "ENTER" key (keep it pressed) and then additionally locking it with the opposite "ESC" key.

Display illumination as function display

The display illumination remains switched off during the reset. Slowly flashing display illumination when "JB-Lighting" is displayed means no DMX signal is present.

A very rapidly flashing display illumination when "JB-Lighting" is displayed means that a new error has been stored in the "ERROR LIST", also an error message in the display (e.g. *PAN TIMEOUT) indicates this current error. This error occurs during this reset or in the operation. This error is now automatically set to "read", but remains in the "ERROR LIST".

A rapidly flashing display illumination shows an error in the "ERROR LIST" is still in it but has already been confirmed or was automatically confirmed. Only when the error has been deleted from the ERROR LIST does the P10 Wash start again without error signalling.

If errors occur again and again contact the dealer / distributor or our service department.

If the P10 Wash receives a DMX signal, the display illumination goes out after a short time.

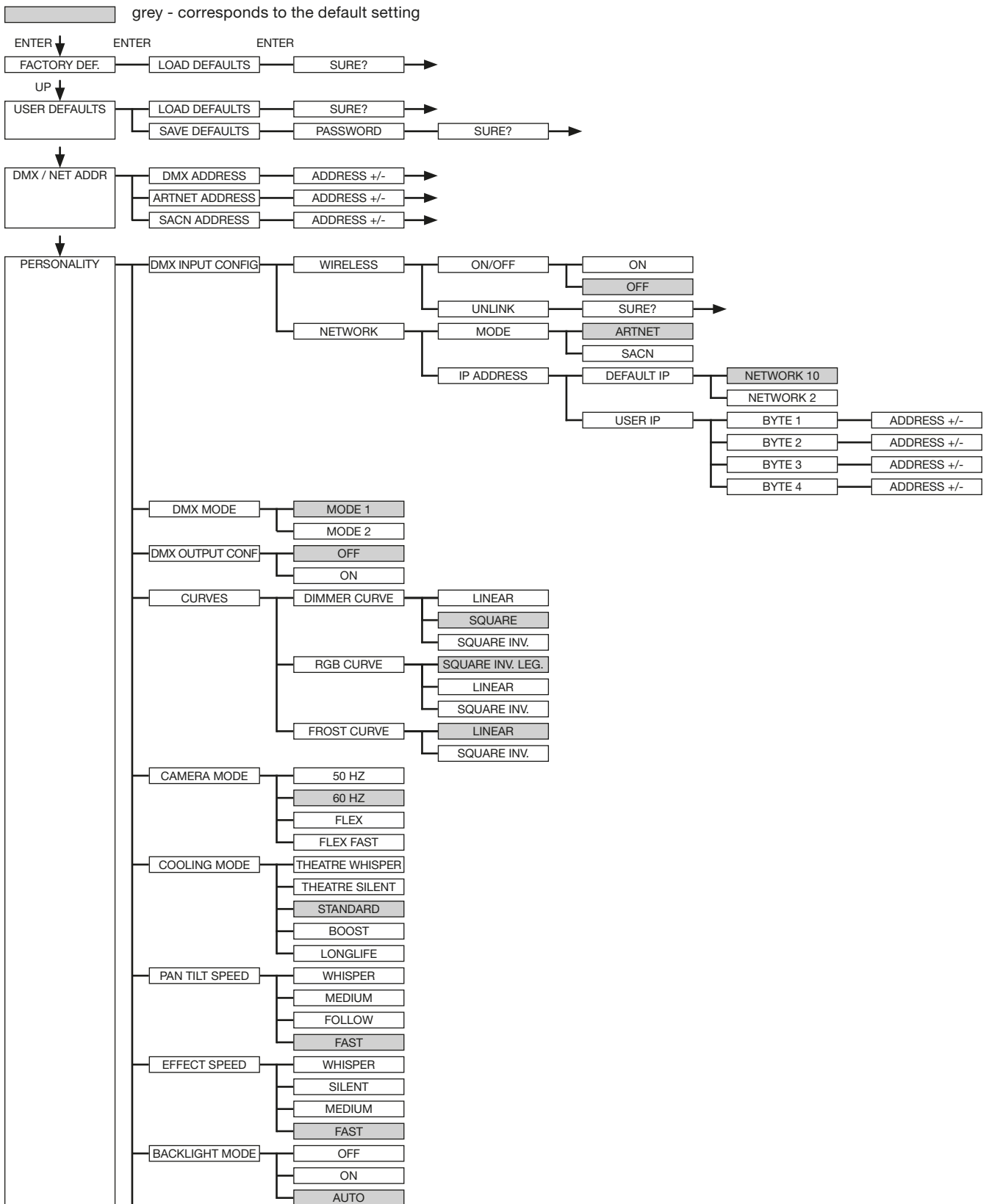
DMX addressing

In the main menu, the DMX address can be set directly by pressing the up/down keys.

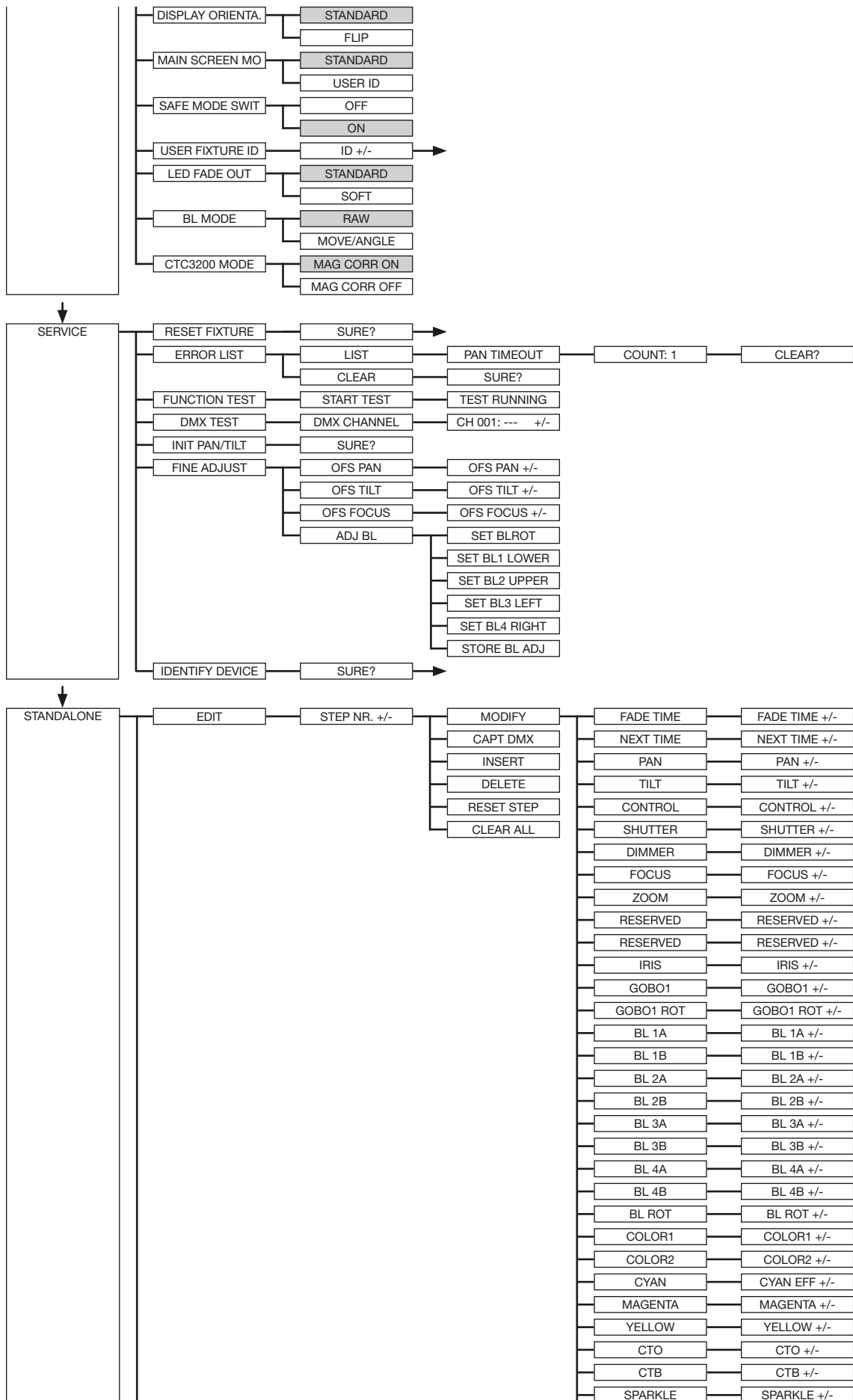
Display operation via battery backup

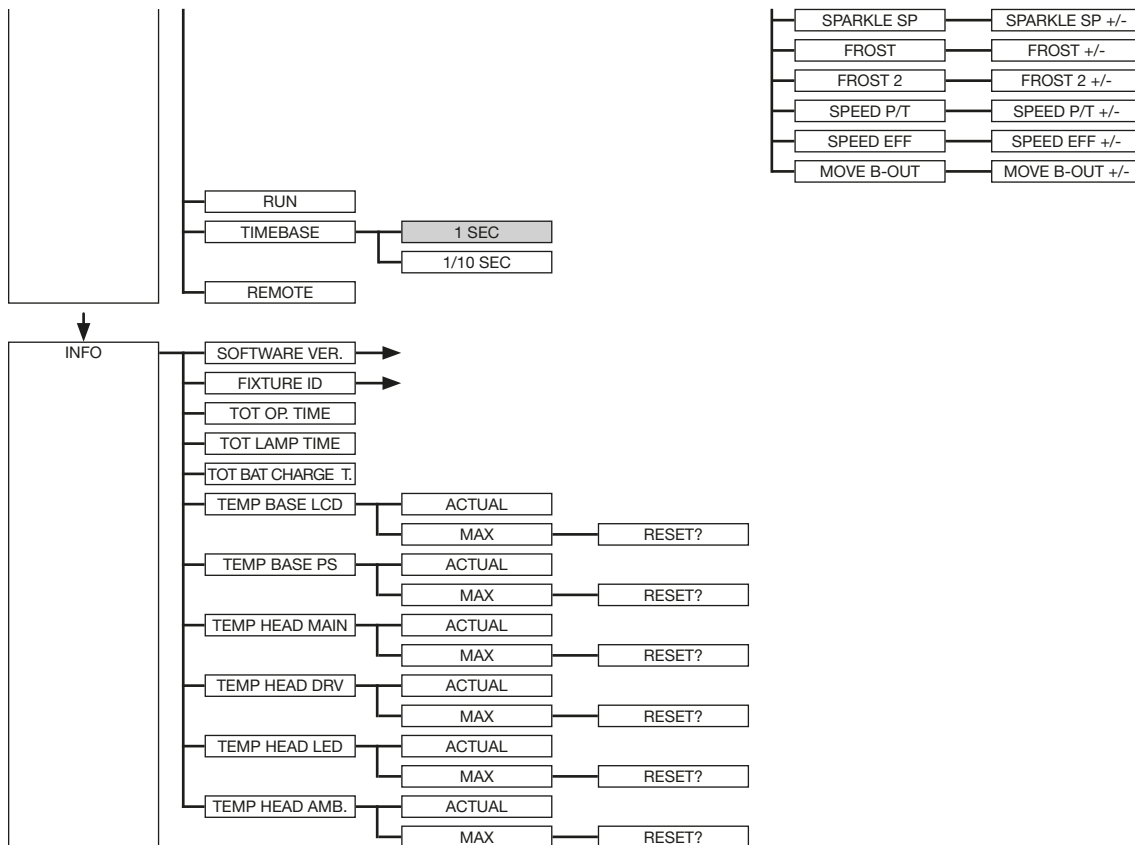
By pressing the left button below the display, the configuration battery operation of the headlamp is activated, so the headlamp can be configured without power. It is possible to configure all the settings displayed by the menu, for example the DMX address can be set.

6.1 Menu overview



P 10 WASH





6.2 FACTORY DEFAULTS - Factory settings

To reset the P10 Wash to factory settings, go to the menu item FACTORY DEFAULTS, LOAD DEFAULTS. After confirming the security query SURE? by pressing the "ENTER" button for 2 seconds, all parameters are reset to the factory settings.

6.3 USER DEFAULTS - User settings

If the user has set the P10 Wash in the PERSONALITY menu to their personal settings, these can be saved and loaded in the USER DEFAULTS menu. In order to prevent unintentional alteration of the data, you must enter the following password during the saving process: Buttons "ESC DOWN UP ENTER"

6.4 DMX / NET ADDRESS - DMX addressing / Artnet addressing / sACN addressing

The DMX addressing can be done either directly in the display. Press the "UP" or "DOWN" button to set the desired DMX address. The value is confirmed with the "ENTER" key. However, the DMX addressing can also be done within the menu item DMX / NET ADDR, and there under DMX ADDRESS.

To set the Artnet address, the menu item ARTNET ADDRESS must be selected in the DMX / NET ADDR menu. The Artnet address can now be set using the UP / DOWN buttons. The Artnet address is displayed in the form 000.00.00. This display corresponds to: Net.Subnet.Universum. The sACN address can then be selected in the DMX / NET ADDR -> sACN ADDRESS menu. The address can now be set using the UP / DOWN buttons. The sACN address is displayed in the form 00000.

6.5 PERSONALITY - Personal settings

DMX INPUT CONFIG

In this menu item the options WIRELESS and NETWORK are available.

Under WIRELESS -> ON / OFF the factory-installed radio DMX receiver module of Lumen-Radio can be activated or deactivated and via WIRELESS -> UNLINK the connection to the connected transmitter can be deleted. In order to connect the fixture to a transmitter, wireless must be set to ON on the fixture and the connection button must be pressed briefly on the transmitter. The transmitter is now looking for all fixtures where wireless is enabled and fixtures that are not connected to a transmitter. If the P10 Wash has successfully connected to the transmitter, the display shows a level indication of the current reception quality. If the P10 is additionally connected via the DMX / etherCON connection sockets, these signals have priority over the radio link. Using the key shortcut ESC and DOWN, pressed in the main menu, the headlamp can be booked out of the booked transmitter (see page 22).

Under NETWORK -> MODE you can toggle between Artnet operation and sACN operation.

For network operation, the IP address of the spotlight must be selected or set under NETWORK -> IP ADDRESS. Each headlight has a unique standard IP address.

Under IP ADDRESS -> DEFAULT IP this can be changed from the network 10.xxx.xxx.xxx to a network 2.xxx.xxx.xxx. For your own self-definable IP address, you can set your own desired IP address under IP ADDRESS -> USER-IP. This address is divided into BYTE1 to BYTE 4 and can be set one after the other.

DMX MODE - setting the operation mode

The P10 Wash has 2 operating modes (see channel assignment page 23). All parameters of P10 Wash can be operated via mode 1. However, all channels (except pan/tilt) are controlled with 8 bits. By selecting Mode 2 - 16 Bit the gobo, prism rotation, CMY/CTO, dimmer, focus, zoom, the complete shutter slide unit as well as pan/tilt are controlled via 16 Bit.

DMX OUTPUT CONFIG - configuration of the DMX output

Under this menu item, the DMX output of the headlamp can be activated, that is a received Artnet, or wireless DMX signal can be output by activating this menu item -> ON via the DMX socket again. Make sure that there is no signal at the DMX input at the same time !!

CURVES - setting dimmer, RGB/CMY, frost curve

Dimmer curve:

The dimmer curve can be changed from SQUARE to LINEAR and to SQUARE INV.. The "exponential" dimmer curve (factory setting) causes the dimmer to fade in and out more smoothly.

RGB/CMY curve:

3 different curves can be set for the RGB/CMY curve: LINEAR, SQUARE INV. and SQUARE. LINEAR enables the color to be run in linearly. At SQUARE INV. retraction appears optically linear.

Frost curve:

The frost curves can be changed from invers exponential (square inv.) to linear. The "invers exponential" frost curve causes the frost to fade in and out more smoothly.

CAMERA MODE - setting the repetition frequency of the LEDs

To avoid flickering during TV recordings, the P10 Wash can be adjusted from 50 Hertz (PAL, Secam) to 60 Hertz (NTSC) for different camera systems. Flex mode is set when using different camera systems or when shooting with mobile phone cameras or similar non-professional cameras. A HighFlex mode is also available. In this mode, the repetition frequencies are set to 3 kHz, which is necessary to ensure smooth movements in dimmed lighting scenes. The factory setting of the P10 Wash is 60 Hertz. The changeover is also possible with the light mixing console via the control channel.

COOLING MODE - adjustment of brightness and fan volume

In the COOLING MODE menu item you can set the fan control and the brightness of the P10 Wash. The following settings are available.

THEATRE WHISPER: Brightness 11500lm (model HP), volume 29dB(a). In this mode, the spotlight runs at the same brightness up to an ambient temperature of 40°C. It is not necessary to speed up the fans in this mode.

THEATRE SILENT: Brightness 12500lm (model HP), from 40°C ambient temperature the spotlight regulates the fans a little up thus remains that the brightness is always the same level.

STANDARD: Brightness 14000lm (model HP), from an ambient temperature of approx. 36°C the fans run to cool the LED accordingly. The brightness remains constant.

BOOST: Brightness 15000lm (model HP), the fans run a little stronger in this mode, from approx. 40° ambient temperature the fans run again accordingly.

LONGLIFE: Brightness 12500lm (model HP), the fans run a little stronger in this mode, from approx. 40° ambient temperature the fans run again accordingly. We would recommend this mode for permanent installations, as the LED module runs cooler and thus more “stress-free”.

There is no danger to the life of the device in any mode, as the P10 Wash has a temperature safety shutdown. In addition, the LED module is switched off from an ambient temperature of 60°C!

PAN TILT SPEED - setting pan/tilt speed

In the PAN TILT SPEED menu you can set the maximum speed, the acceleration and thus also the movement volume of the P10 Wash. The following setting options are available.

WHISPER: The speed of Pan / Tilt is reduced so much that a volume of 29dB (A) is not exceeded.

MEDIUM: The acceleration and deceleration ramps are set very soft so that the headlamp brakes softly and starts.

FOLLOW: The positioning and speed of pan/tilt are specially adapted to a wide variety of follow systems.

FAST: The acceleration and deceleration ramps are set very hard so that the headlamp moves very fast and directly at maximum speed.

EFFECT SPEED - setting effect speed

In the menu item EFFECT SPEED you can set the maximum speed, the effects and thus also the volume of the effects of the P10 Wash. The following setting options are available.

WHISPER: The speed of the effects is reduced so much that a volume of 29dB (A) is not exceeded.

SILENT: The speed of the effects is slightly faster and thus a bit louder than with the Whisper setting.

MEDIUM: The acceleration and deceleration ramps of the effects are set very soft, so that the effects are very soft and thus cause little noise.

FAST: The acceleration and deceleration ramp effects are set to maximum speed. Very fast gobo and color changes are possible!

BACKLIGHT MODE - setting the display backlight

This menu item controls the backlight of the display.

OFF: The backlight of the display is always off. The lighting only switches on when a button is pressed. Errors that are indicated by flashing are not displayed in this mode.

ON: The backlight of the display is always on.

AUTO: The backlight is switched on / off due to the action.

DISPLAY ORIENTATION - setting the display orientation

This menu item turns the display orientation. The display can also be rotated when the shortcut ENTER and UP is pressed in the main screen.

MAIN SCREEN MODE - view of the main screen

With this menu item the display of the main screen can be changed. Either the standard (STANDARD) screen is displayed with DMX address and DMX mode or the USER FIXTURE ID. This ID is used to number the headlights and to display this number in the display.

SAFE MODE SWITCH - setting of the safe mode switch

This setting can be used to decide whether switching the menu item COOLING MODE can be done directly "OFF" or whether for safety the dimmer and the shutter of the fixture must be closed before switching. -> "ON"

USER FIXTURE ID - adjustment of the user fixture ID

Used to set the USER FIXTURE ID (0-65535). This can be displayed via MAIN SCREEN MODE and serves as an info display of the headlight number.

LED FADE OUT - type of dimming

Used to set how to dim the lower range from 0-5%.

STANDARD: When dimming the headlamp, all LED's dim out at the same time.

SOFT: When the headlamp is dimmed, the LED's are dimmed out in groups (in a row) one row after the other.

BLMODE - Type of shutter control

Serves to switch the shutter control. With the RAW setting, the two motors of the individual apertures are controlled separately via DMX. With the MOVE/ANGLE setting, one channel is used as a movement channel and the angle of the individual aperture is set via the second channel. A special MA fixture for the MOVE/ANGLE mode is available for download on our homepage.

CTC3200 MODE - Setting the magenta correction for CTO

MAG CORR ON: some magenta is added to the CTO to get a better 3200K white.

MAG CORR OFF: only the pure CTO is brought in.

This selection only makes a change for the P10 Wash HP.

6.6 STANDALONE operation

In standalone operation, up to 10 program steps can be stored in the P10 Wash, which can then run in an endless loop. The images can be saved in two ways. Either you program the desired DMX values directly on P10 Wash and save them, or you set the DMX values via a connected DMX console and then store them in the P10 Wash.

The menu items MODIFY, RUN and REMOTE can only be called up using a specific key combination. To do this, press and hold "ENTER", and also press "ESC". Before activating these menu items, remove all other devices in the DMX line that send DMX, e.g. consoles or other spotlights that are not configured as slave devices, as otherwise damage to the DMX drivers may occur.

Programming the standalone programme on the spotlight display:

Call up the STANDALONE, EDIT menu item. In the STEP NR+/- menu item, select the desired step and you can change it and its channel parameters in the following menu items: In the MODIFY menu item, set the desired lighting scene and position and determine the individual sequence times of the steps with FADE TIME and NEXT TIME (time for the complete step).

Use INSERT to insert an additional programming step. The DMX values of the previous step are copied to the new step.

Use DELETE to delete a step. The display shows STEP NR: 1/X. Use the selection keys to move to the desired step.

With RESET STEP you reset one step to its default values (DMX 000). The display shows STEP NR: 1/X. Use the selection keys to select your step. CLEAR ALL resets the complete standalone programming steps. Under MODIFY you will find STEP1/1 again. In the STANDALONE, TIMEBASE menu item you have the possibility to change the Fade Time and Next Time from 1 second to 1/10 second.

Accept the DMX values from an external console:

To accept the DMX values of a connected console, you must first enable the Capture DMX input. To do this, go to the CAPT DMX menu item. The display now shows CAPTURE DMX 01/01, press the Enter key to switch to START CAPTURE. Now the P10 Wash reacts to the signals from the external console.

Launch the standalone program:

Call up the STANDALONE menu and navigate to the RUN submenu. Confirm the selection by pressing the key combination "ENTER" (press and hold) and simultaneously "ESC". The display then shows: S-ALONE: 01/XX and the program runs in an endless loop.

Deactivation: Press and hold the "ESC" key and then also press "ENTER". The menu jumps back one level and RUN appears in the display.

Operation via master-slave function:

Connect the P10 Wash via DMX lines and activate the REMOTE menu item for all slave devices. To do this, navigate in the STANDALONE menu to the REMOTE sub-menu. Activate the REMOTE function by pressing and holding "ENTER", and also pressing "ESC". The spotlight is in slave mode when the display shows the status REMOTE INACTIVE or REMOTE ACTIVE.

REMOTE INACTIVE: The P10 Wash is in slave mode but does not receive a DMX signal.

REMOTE ACTIVE: The P10 Wash is in slave mode and receives a DMX signal.

The master device is programmed via the MODIFY menu item and started via RUN (press and hold "ENTER" and also press "ESC").

6.7 INFO-menu

The Info menu informs you about the respective software and firmware status, about the total operating time and the different temperatures of the spotlight. The first two menu items in the Info area are the software version and the firmware version, whereby the software version is an important source of information for our service requests, the firmware version is less important source of internal information. Under the menu item TOT OPERATE TIME the complete operating time of the headlight is displayed. The menu item TOT LAMP TIME provides information about the pure operating time of the LED module. TOT BAT CHARGE TIME shows the complete charging time of the battery (battery backup). The TOT OPERATE TIME and the TOT BAT CHARGE TIME can not be deleted! The following temperatures are also displayed:

TEMP BASE LCD, the temperature on the display board

TEMP BASE PS, the temperature of the power supply unit

TEMP HEAD MAIN, the temperature of the head board

TEMP HEAD DRV, the temperature of the LED driver board

TEMP HEAD LED, the temperature of the LED module

TEMP HEAD AMBIENT, the temperature in the head next to the air inlet (ambient temperature)

Both the current temperature and the maximum temperature are displayed. The maximum temperatures can be individually deleted.

6.8 Shortcuts - quick access

ESC + DOWN

Pressing the ESC and DOWN buttons in the main menu will log the fixture off the programmed Lumen Radio Wireless transmitter. The fixture is now ready to be logged in another transmitter.

ENTER + UP

If ENTER + UP is pressed in the main screen, the screen orientation is rotated by 180 °.

ENTER + ESC

By pressing the ENTER and ESC key, the fixture is locked for user input -> LOCKED. ESC and ENTER release the lock again!

7. Control options

7.1 DMX

7.1.1 Operating modes

The P10 Wash has 2 different DMX modes. The respective mode can be set in the PERSONALITY-DMX MODE menu item. The set mode is displayed in the main menu.

| | Mode 1(M1) | Mode 2 (M2) |
|------------|-------------------|------------------------|
| Channel 1 | Pan | Pan |
| Channel 2 | Pan fine | Pan fine |
| Channel 3 | Tilt | Tilt |
| Channel 4 | Tilt fine | Tilt fine |
| Channel 5 | Control channel | Control channel |
| Channel 6 | Shutter | Shutter |
| Channel 7 | Dimmer | Dimmer |
| Channel 8 | Focus | Dimmer fine |
| Channel 9 | Zoom | Focus |
| Channel 10 | Reserved | Focus fine |
| Channel 11 | Reserved | Zoom |
| Channel 12 | Iris | Zoom fine |
| Channel 13 | Gobo 1 | Reserved |
| Channel 14 | Gobo 1 rotation | Reserved |
| Channel 15 | Aperture 1a | Iris |
| Channel 16 | Aperture 1b | Iris fine |
| Channel 17 | Aperture 3a | Gobo 1 |
| Channel 18 | Aperture 3b | Gobo 1 rotation |
| Channel 19 | Aperture 2a | Gobo 1 rotation fine |
| Channel 20 | Aperture 2b | Aperture 1a |
| Channel 21 | Aperture 4a | Aperture 1a fine |
| Channel 22 | Aperture 4b | Aperture 1b |
| Channel 23 | Aperture rotation | Aperture 1b fine |
| Channel 24 | Colour wheel 1 | Aperture 3a |
| Channel 25 | Colour wheel 2 | Aperture 3a fine |
| Channel 26 | Cyan | Aperture 3b |
| Channel 27 | Magenta | Aperture 3b fine |
| Channel 28 | Yellow | Aperture 2a |
| Channel 29 | CTO | Aperture 2a fine |
| Channel 30 | CTB | Aperture 2b |
| Channel 31 | Sparkle | Aperture 2b fine |
| Channel 32 | Sparkle speed | Aperture 4a |
| Channel 33 | Frost 1 | Aperture 4a fine |
| Channel 34 | Frost 2 | Aperture 4b |
| Channel 35 | Pan/tilt speed | Aperture 4b fine |
| Channel 36 | Effect speed | Aperture rotation |
| Channel 37 | Blackout Move | Fine aperture rotation |
| Channel 38 | | Colour wheel |
| Channel 39 | | Colour wheel |
| Channel 40 | | Cyan |

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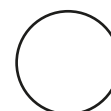
| | |
|------------|----------------|
| Channel 41 | Cyan fine |
| Channel 42 | Magenta |
| Channel 43 | Magenta fine |
| Channel 44 | Yellow |
| Channel 45 | Yellow fine |
| Channel 46 | CTO |
| Channel 47 | CTO fine |
| Channel 48 | CTB |
| Channel 49 | CTB fine |
| Channel 50 | Sparkle |
| Channel 51 | Sparkle speed |
| Channel 52 | Frost 1 |
| Channel 53 | Frost 2 |
| Channel 54 | Pan/tilt speed |
| Channel 55 | Effect speed |
| Channel 56 | Blackout Move |

7.1.2 DMX channel assignment Mode 1 and Mode 2








| M1 | M2 | Function | DMX |
|----|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | 1 | Pan (X) movement 546.74° | 000-255 |
| 2 | 2 | Pan (X) fine (16 Bit) | 000-255 |
| 3 | 3 | Tilt (Y) movement 281.16° | 000-255 |
| 4 | 4 | Tilt (Y) fine (16 Bit) | 000-255 |
| 5 | 5 | <p>Control channel To enable uniform dimming manually via faders for all light mixing consoles, 5 different settings for the DMX smoothing are available. If the DMX signal is interrupted or too few packets are sent on some DMX consoles, the response of the Sparx 18/30 can be adjusted with this channel. The Minimum DMX Smoothing setting should work on most popular consoles. The values for DMX smoothing must be permanent. For the other values, such as cooling mode, color temperature, zoom modes, camera mode, reset, the values must be applied for 2 seconds, then the device will be permanently switched (Same setting as in the PERSONALITY menu).</p> <p>Setting for minimal DMX smoothing (A dimmed shutter sequence is possible) Dimmer fade out via fader (fast - slow) not used</p> <p>Setting for minimum / medium DMX smoothing Dimmer fade out via fader (fast - slow) not used</p> <p>Setting for medium DMX smoothing Dimmer fade out via fader (fast - slow) not used</p> <p>Setting for medium / maximum DMX smoothing Dimmer fade out via fader (fast - slow)</p> <p>BACKLIGHT MODE - Display backlight configuration AUTO - the fixture controls the backlight automatically ON - the backlight is always on OFF - the backlight is always off until a key is pressed</p> <p>DISPLAY ORIENTATION - display flip or not STANDARD - the display can be read when the headlamp is on a surface FLIP - the display orientation is rotated by 180 °, hanging readable not used</p> <p>MAIN SCREEN MODE - view of the main screen STANDARD - the main screen displays the DMX address, the DMX mode, and when wireless is enabled, the field strength. USER FIXTURE ID - the main screen displays the user definable fixture ID / head-light number not used</p> <p>USER FIXTURE ID SET - Scheinwerfernummer setzen SET - the USER ID can be set. The headlamp takes the 16-bit value of Pan for the USER ID not used</p> | <p>000-007 008-031</p> <p>032-039 040-063</p> <p>064-071 072-095</p> <p>096-103</p> <p>104-104 105-105 106-106</p> <p>107-107 108-108 109-109</p> <p>110-110 111-111 112-112</p> <p>113-113 114-127</p> |

| | | |
|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| | <p>Setting for maximum DMX smoothing Dimmer fade out via fader (fast - slow)</p> | 128-135 |
| | <p>DIMMER CURVE - selection of dimmer curve LINEAR - linear dimmer curve SQUARE - exponential dimmer curve SQUARE INVERSE - exponential inverse dimmer curve not used</p> | 136-136 137-137 138-138 139-139 |
| | <p>RGB/CMY CURVE - selection of RGB/CMY curve LINEAR - linear RGB/CMY curve SQUARE - exponential RGB/CMY curve SQUARE INVERSE - exponential inverse RGB/CMY curve</p> | 140-140 141-141 142-142 |
| | <p>FROST CURVE - selection of frost curve LINEAR - linear frost curve SQUARE INVERSE - Exponential inverse frost curve not used</p> | 143-143 144-144 145-145 |
| | <p>PAN/TILT SPEED - selection of PAN/TILT speed WHISPER MEDIUM FOLLOW FAST</p> | 146-146 147-147 148-148 149-149 |
| | <p>EFFECT SPEED - selection of effect speed WHISPER SILENT MEDIUM FAST</p> | 150-150 151-151 152-152 153-153 |
| | <p>LED FADE OUT MODE - selection of dimming out STANDARD SOFT</p> | 154-154 155-155 |
| | <p>BLMODE - type of shutter control RAW MOVE/ANGLE</p> | 156-156 157-157 |
| | <p>CTC3200K MODE - setting the magenta correction for CTO MAG CORR ON MAG CORR OFF</p> | 158-158 159-159 |
| | <p>COOLING MODE - Adjust the fan volume and brightness This takes place with dimmer / shutter set to closed (DMX 000) then after 2 seconds the fixture will switch this option, except the switch "SAFE MODE SWITCH" in the PERSONALITY menu is set to OFF, then the changeover can take place directly without dimmer and shutter having to be closed. THEATRE WHISPER THEATRE SILENT STANDARD BOOST LONGLIFE not used</p> | 160-160 161-161 162-162 163-163 164-164 165-207 |
| | <p>CAMERA MODE - Setting the LED refresh rate 50Hz 60Hz FLEX - 600Hz High FLEX - 3kHz not used</p> | 208-215 216-223 224-227 228-231 232-239 |

| | | | |
|----|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | RESET - a basic reset of the fixture is carried out Reset not used | 240-247 248-255 |
| 6 | 6 | Shutter Shutter closed Shutter open Open pulsing shutter >20Hz (rapid - slow) Shutter open Fade effect with dimmer (slow - rapid) Shutter open Shutter closed Open pulsing shutter <20Hz (rapid - slow) Shutter open Close pulsing shutter >20Hz (rapid - slow) Shutter closed Shutter fade, 0% (rapid - slow) Shutter open Shutter fade, 100% (rapid - slow) Shutter closed Random shutter 100% (rapid - slow) Shutter open Random shutter 0% (rapid - slow) Shutter closed Random shutter fade, 0% (rapid- slow) Shutter open Random shutter fade, 100% (rapid- slow) Shutter open | 000-015 016-095 096-110 111-111 112-125 126-126 127-126 128-142 143-143 144-158 159-159 160-174 175-175 176-190 191-191 192-206 207-207 208-222 223-223 224-238 239-239 240-254 255-255 |
| 7 | 7 | Dimmer 0 - 100% | 000-255 |
| | 8 | Fine dimmer (16Bit) | 000-255 |
| 8 | 9 | Focus 0-100% | 000-255 |
| | 10 | Fine focus (16 Bit) | 000-255 |
| 9 | 11 | Zoom 0 -100% (near 11° - far 66°) | 000-255 |
| | 12 | Fine zoom (16 Bit) | 000-255 |
| 10 | 13 | Reserved not used | 000-255 |
| 11 | 14 | Reserved not used | 000-255 |
| 12 | 15 | Iris 0-100% (open -> closed) | 000-255 |
| | 16 | Fine iris (16Bit) | 000-255 |
| 13 | 17 | Gobo wheel Gobo 0 (open) | 000-007 |



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| | | | | |
|----|----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|------------------------------------------|
| | | Gobo 1 |  | 008-015 |
| | | Gobo 2 |  | 016-023 |
| | | Gobo 3 |  | 024-031 |
| | | Gobo 4 |  | 032-039 |
| | | Gobo 5 |  | 040-047 |
| | | Gobo 6 "Symmetry gobo": the beam can be used at an angle be illuminated evenly on the wall |  | 048-055 |
| | | Gobo 7 |  | 056-127 |
| | | Gobo 0 shake (fast - slow) | | 128-135 |
| | | Gobo 1 shake (fast - slow) | | 136-143 |
| | | Gobo 2 shake (fast - slow) | | 144-151 |
| | | Gobo 3 shake (fast - slow) | | 152-159 |
| | | Gobo 4 shake (fast - slow) | | 160-167 |
| | | Gobo 5 shake (fast - slow) | | 168-175 |
| | | Gobo 6 shake (fast - slow) | | 176-183 |
| | | Gobo 7 shake (fast - slow) | | 184-191 |
| | | Gobo wheel rotation (fast - slow) | | 192-223 |
| | | Gobo wheel rotation (fast - slow) | | 224-255 |
| 14 | 18 | Gobo positioning/rotation Gobo positioning 0° - 540° Gobo rotation, right (rapid - slow) Stop gobo rotation Gobo rotation, left (slow - rapid) | | 000-191 192-222 223-224 225-255 |
| | 19 | Gobo positioning/rotation 2 fine (16 Bit) | | 000-255 |
| 15 | 20 | Aperture 1a 0-100% | | 000-255 |
| | 21 | Aperture 1a fine (16 Bit) | | 000-255 |
| 16 | 22 | Aperture 1b 0-100% | | 000-255 |
| | 23 | Aperture 1b fine (16 Bit) | | 000-255 |
| 17 | 24 | Aperture 3a 0-100% | | 000-255 |
| | 25 | Aperture 3a fine (16 Bit) | | 000-255 |

| | | | | |
|----|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|
| 18 | 26 | Aperture 3b 0-100% | | 000-255 |
| | 27 | Aperture3b fine (16 Bit) | | 000-255 |
| 19 | 28 | Aperture 2a 0-100% | | 000-255 |
| | 29 | Aperture 2a fine (16 Bit) | | 000-255 |
| 20 | 30 | Aperture 2b 0-100% | | 000-255 |
| | 31 | Aperture 2b fine (16 Bit) | | 000-255 |
| 21 | 32 | Aperture 4a 0-100% | | 000-255 |
| | 33 | Aperture 4a fine (16 Bit) | | 000-255 |
| 22 | 34 | Aperture 4b 0-100% | | 000-255 |
| | 35 | Aperture 4b fine (16 Bit) | | 000-255 |
| 23 | 36 | Aperture slider rotation -55° / +55° | 000-255 | |
| | 37 | Aperture slider rotation fine (16 Bit) | 000-255 | |
| 24 | 38 | Color wheel 1 White (color shift gobo on) White (color shift gobo off) White/CTB CTB CTB/Red Red Red/Yellow Yellow Yellow/Magenta Magenta Magenta/Green Green Green/Orange Orange Orange/CRI CRI CTO Linear colors: White - CTB - Red - Yellow - Magenta - Green - Orange - CRI - CTO - White Colour cycle, right (rapid - slow) Colour cycle, left (slow - rapid) | 000-000 001-001 002-003 004-005 006-007 008-009 010-011 012-013 014-015 016-017 018-019 020-021 022-023 024-025 026-027 028-029 030-063 064-191 192-223 224-255 | |
| 25 | 39 | Color wheel 2 White (open) CTO1 CTO2 CTO3 CTB1 CTB2 CTB3 Dark blue CTB White (open) | 000-001 004-005 008-009 012-013 016-017 020-021 024-025 028-029 030-031 032-063 | |

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| | | | |
|----|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|
| | | Linear colours: white (open) - CTO1 - CTO2 - CTO3 - CTB1 - CTB2 - CTB3 - dark Blue - linear CTB - white (open) Colour cycle, right (rapid - slow) Colour cycle, left (slow - rapid) | 064-191 192-223 224-255 |
| 26 | 40 | Cyan (8 Bit) 0-100% | 000-255 |
| | 41 | Fine cyan (16 Bit) | 000-255 |
| 27 | 42 | Magenta (8 Bit) 0-100% | 000-255 |
| | 43 | Fine magenta (16 Bit) | 000-255 |
| 28 | 44 | Yellow (8 Bit) 0-100% | 000-255 |
| | 45 | Fine yellow (16 Bit) | 000-255 |
| 29 | 46 | CTO (8 Bit) 0-100% | 000-255 |
| | 47 | Fine CTO (16 Bit) | 000-255 |
| 30 | 48 | CTB (8 Bit) 0-100% | 000-255 |
| | 49 | Fine CTB (16 Bit) | 000-255 |
| 31 | 50 | Sparkle - Glitter effect Sparkle effect inactive Sparkle effect intensity (minimum - maximum) | 000-000 001-255 |
| 32 | 51 | Sparkle speed Faded sparkle effect (slow -> rapid) Switched sparkle effect (slow -> rapid) Repetition of the fading and switching blocks | 000-031 032-063 064-255 |
| 33 | 52 | Frost 1 Frost 0-100% | 000-255 |
| 34 | 53 | Frost 2 Frost 0-100% | 000-255 |
| 35 | 54 | Pan/tilt speed Real-time motion Delayed motion (rapid - slow) | 000-003 004-255 |
| 36 | 55 | Effects speed Real-time effects Delayed effects (rapid - slow) | 000-003 004-255 |
| 37 | 56 | Blackout Move Not assigned Blackout during pan/tilt Blackout during Colour, CMY, Iris, Frost Blackout during Colour, CMY, Iris, Frost, Zoom, Focus Blackout during Colour, CMY, Iris, Frost, Pan/Tilt Blackout during Colour, CMY, Iris, Frost, Zoom, Focus, Pan/Tilt | 000-095 096-127 128-159 160-191 192-223 224-255 |

7.1.3 Control channel

Via the control channel different functions of the fixture can be permanently switched. The following functions can be switched via the control channel.

Response of the headlamp when dimming via faders

BACKLIGHT MODE - display backlight

DISPLAY ORIENTATION - display orientation

MAIN SCREEN MODE - main screen view

USER FIXTURE ID SET - set headlight number

DIMMER CURVE - dimmer curve adjustment

FROST CURVE - setting the frost curve

PAN / TILT SPEED - pan / tilt speed

EFFECT SPEED - effect speed

LED FADE OUT MODE - type of dimming

BL MODE - type of shutter control

CTC3200 MODE - setting the magenta correction of cto

COOLING MODE - adjust the fan volume and brightness

CAMERA MODE - sets the LED refresh rate

RESET - a basic reset of the headlight is performed

For details, see DMX Channel functions for the P10 Wash on page 25.

7.1.4 Sparkle effect, sparkle speed

Animation effects can be created via this channel in connection with the focus. Depending on the intensity, the projection can be made to shake more or less. This effect can be dimmed or switched.

7.2 Artnet

The spotlight can be controlled via Artnet - ArtNET 4. To do this, set the Artnet address via the menu item DMX / NET ADDR -> ARTNET ADDRESS and also select it via the menu item PERSONALITY -> DMX INPUT CONFIG -> NETWORK -> MODE -> ARTNET. In addition, define the IP address of the spotlight via PERSONALITY -> DMX INPUT CONFIG -> NETWORK -> IP ADDRESS. Further details and setting options can be found on page 17

7.3 Streaming ACN

The headlight can be controlled via sACN - Streaming ACN. To do this, set the sACN address via the menu item DMX / NET ADDR -> SACN ADDRESS and also select it via the menu item PERSONALITY -> DMX INPUT CONFIG -> NETWORK -> MODE -> SACN. In addition, define the IP address of the spotlight via PERSONALITY -> DMX INPUT CONFIG -> NETWORK -> IP ADDRESS. Further details and setting options can be found on page 17

7.4 Wireless-DMX

The P10 is equipped with a Lumen Radio CRMX receiver for wireless DMX. The receiver can process both DMX and RDM. If there is a cable and wireless connection to the P10, the cable connection has priority! The received signal can be output via the DMX connection. To do this, set the DMX OUTPUT CONFIG setting to ON in the PERSONALITY menu. After confirming with ENTER, the spotlight will output the entire universe received via wireless DMX.

7.5 RDM

The P10 can communicate via RDM (Remote Device Management) in accordance with ESTA American National Standard E1.20-2006. RDM is a bidirectional communication protocol for use in DMX512 control systems. It is the open standard for the configuration and status monitoring of DMX-512 devices. The RDM protocol enables data packets to be inserted into a DMX-512 data stream without affecting existing non-RDM devices. It enables a console or dedicated RDM controller to send commands to specific devices and receive messages. The P18 can send and receive RDM via DMX and Artnet 4. The spotlight is also designed to send RDM via sACN and receive it via Artnet. The RDM functionality depends on the lighting control desk used, the operating instructions of the respective desk manufacturer must also be observed.

7.5.1 RDM-UID

Every P10 has a factory-set RDM-UID (unique identification number), which makes it addressable and identifiable in RDM systems.

7.5.2 RDM-PIDs

The P10 supports the RDM PIDs (parameter IDs) required by ESTA as well as manufacturer-specific PIDs.

7.5.3 Standard RDM parameter IDs

| RDM parameter ID | GET | SET | DISCOVERY | Note |
|-----------------------------|-----|-----|-----------|------------------------------------|
| RDM identification | | | | |
| DISC_UNIQUE_BRANCH | | | ✓ | is used for fixture identification |
| DISC_MUTE | | | ✓ | is used for fixture identification |
| DISC_UN_MUTE | | | ✓ | is used for fixture identification |
| RDM status determination | | | | |
| QUEUED_MESSAGE | ✓ | | | |
| STATUS_MESSAGES | ✓ | | | |
| STATUS_ID_DESCRIPTION | ✓ | | | |
| CLEAR_STATUS_ID | | ✓ | | |
| RDM information | | | | |
| SUPPORTED_PARAMETERS | ✓ | | | |
| RDM configuration | | | | |
| DEVICE_MODEL_DESCRIPTION | ✓ | | | |
| MANUFACTURER_LABEL | ✓ | | | |
| FACTORY_DEFAULTS | | ✓ | | |
| SOFTWARE_VERSION_LABEL | ✓ | | | |
| DMX_PERSONALITY | | ✓ | | |
| DMX_PERSONALITY_DESCRIPTION | ✓ | | | |
| DMX_START_ADDRESS | | ✓ | | |
| SENSOR_DEFINITION | ✓ | | | |
| DEVICE_HOURS | ✓ | | | |
| LAMP_HOURS | ✓ | | | |
| IDENTIFY_DEVICE | | ✓ | | |
| RESET_DEVICE | | ✓ | | |
| PERFORM_SELFTEST | | ✓ | | |
| SELFTEST_DESCRIPTION | ✓ | | | |

7.5.4 Manufacturer specific RDM parameter IDs

| RDM parameter ID | GET | SET | DISCO- VERY | Note |
|-----------------------|-----|-----|----------------|------|
| RDM configuration | | | | |
| Battery Charge Hours | ✓ | | | |
| Error Number | ✓ | | | |
| Error | ✓ | | | |
| Select Next Error | | ✓ | | |
| Remove Error | | ✓ | | |
| Remove New Error Flag | | ✓ | | |
| User Defaults | | ✓ | | |
| User Fixture ID | | ✓ | | |
| Fixture Lock On/Off | ✓ | ✓ | | |
| Dimmer Curve | ✓ | ✓ | | |
| RGB Curve | ✓ | ✓ | | |
| Frost Curve | ✓ | ✓ | | |
| Camera Mode | ✓ | ✓ | | |
| Cooling Mode | ✓ | ✓ | | |
| Pan Tilt Speed | ✓ | ✓ | | |
| Effect Speed | ✓ | ✓ | | |
| Backlight Mode | ✓ | ✓ | | |
| Disp Orientation | ✓ | ✓ | | |
| Main Screen Mode | ✓ | ✓ | | |
| Safe Mode Switch | ✓ | ✓ | | |
| LED Fade Out Mode | ✓ | ✓ | | |
| Blade Mode | ✓ | ✓ | | |
| CTC3200 mode | ✓ | ✓ | | |

7.5.5 RDM sensor IDs

| RDM sensor ID | GET | SET | DISCO- VERY | Note |
|--------------------|-----|-----|----------------|------|
| RDM sensors | | | | |
| Temp Sens Base LCD | ✓ | ✓ | | |
| Temp Sens Base PS | ✓ | ✓ | | |
| Temp Sens Head PCB | ✓ | ✓ | | |
| Temp Sens Head Drv | ✓ | ✓ | | |
| Temp Sens Head LED | ✓ | ✓ | | |
| Temp Sens Head Air | ✓ | ✓ | | |

8. Service

8.1 Service menu

RESET FIXTURE

Upon the "Reset" command, P10 Wash will initialise to its initial values. It is the same procedure as after switching on the P10 Wash. If an error message appears in the display, this could be the first step to correct it.

ERROR LIST

The P10 Wash stores all occurring errors internally. An error message can have a harmless cause. If you experience frequent error messages, please contact your dealer or the JB-Lighting service department. All error messages are displayed with the respective frequency and can be deleted.

FUNCTION TEST

This function allows you to test all functions of the P10 Wash without using a light mixer. The pan/tilt reset is deactivated in the process.

DMX TEST

This menu item is used to test the DMX input. Use the function keys to select the DMX channel to be tested. The display shows the incoming value, at the same time the P10 Wash reacts accordingly.

INIT PAN TILT

The P10 Wash is calibrated in the pan/tilt position at the factory. If it loses this calibration, i.e. it strikes against the stop or no longer finds its position, it can be re-initialised using this function. This process takes about 3-4 minutes and ends with a reset of the spotlight.

FINE ADJUST

The FINE ADJUST area is protected by a key combination. Focus, shapers, shaper rotation, pan and tilt are calibrated at the factory. If there are large deviations in the calibration between the individual headlights, this can be corrected in the FINE ADJUST menu. For more information please contact our service.

IDENTIFY DEVICE

The RDM command IDENTIFY DEVICE can be called up or deactivated via this menu item.

8.2 Gobo handling instructions

The used Gobo material for coating has low reflection and therefore it need to be handled according to following specification.

- Store all gobos in a dust free environment with appr. 50 % humidity
- Always use clean protection gloves when handling the gobos.
- Avoid touching the coated side of the gobos.
- Clean only with dust and oil free compressed air on the coating side.
- Glass side can be cleaned with lens cleaner and recommended tissues.
- Avoid scratching the coating side and the glass side as well.
- Never place a gobo with the coating facing down on any surface.
- Reflective side of the gobo "looks" to the lamp

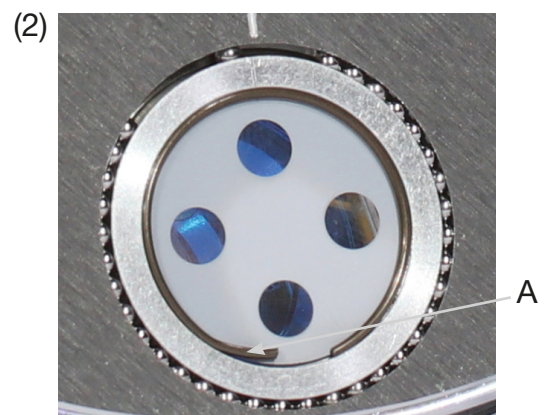
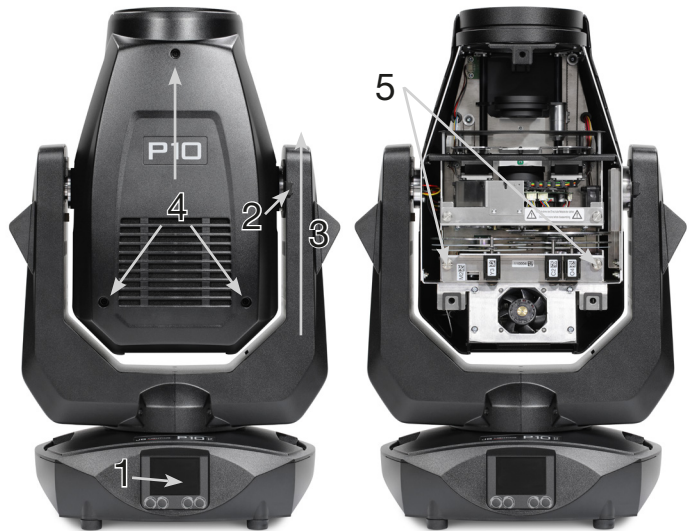
8.3 Changing gobos



WARNING: Disconnect fixture before opening!

To open the device (from the right side) place the spotlight on a firm base as shown in the picture, the display (1) facing you, the tilt lock (2) is on the right side and the spotlight head facing away from you (3) (Or if you look at the grille from behind, you will see a closed honeycomb showing the side of the opening lid).

To lift off the cover, open the three camlocks (4) by half a turn, lift off the cover and unhook the safety lanyard. Now open the two knurled screws (5) and remove the gobo insert. The following figure (1) shows the gobo insert of the P10 Wash.



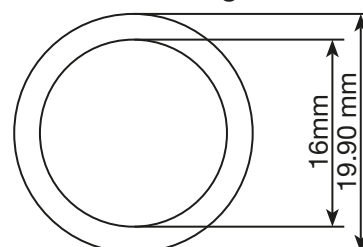
To change the rotating gobos remove only the clamping ring (A) with a pointed object replace the gobo and then put the clamping ring again. When installing glass gobos, make sure the white coated side faces the front lens. Gobos that are not allowed to twist, e.g. Logos are additionally recommended to be secured against twisting with a drop of silicone adhesive.

When inserting original gobos, pay attention to the markings on the gobo, the gobo holder and the gobo wheel!

8.4 Gobo size

If you want to have your own gobos produced, please note the following dimensions:

Usable diameter, rotating gobowheel 1: 16.00 mm
 Outer diameter: 19.90 mm (+0/-0.1 mm)
 Maximum thickness: 1.1 mm



8.5 Cleaning the device



ATTENTION: Allow the device to cool down and disconnect the device from the mains before opening the device. Touching live parts (high voltage) can give you an electric shock.

You should check the function of the fans in the head and foot at regular intervals. Above all, you should make sure that the air inlets and the inside of the P10 Wash are free of fluff and dust. Also make sure that the dust filters in the covers are clean.

Open the head cover (3x camlocks with a half turn) and the bottom plate on the foot. You can clean the P10 Wash with a brush and a vacuum cleaner. Also vacuum the dust protection mats in the lids. If the dust protection mats are no longer clean, they must be replaced. You can also remove the effects slide-in (1) and the shapers slide-in (2) by loosening the knurled screws (3) and sliding the focus slide towards the lens. You can then clean the color filters, glass gobos and the CMY disks with a soft cloth and some glass cleaner. You can also clean the frost flaps and zoom/focus unit. Be careful not to bend or damage any parts when cleaning. After cleaning is complete, the inserts are put back into the device and the lid is closed again.



8.6 Software update

The P10 Wash can be updated via a USB stick with micro-USB connection. To do this, copy the file directly into the root directory of the USB stick. Then press and hold the right key below the display, switch on the power of the P10 Wash, as soon as the message “Insert USB stick” appears on the display release the key. Now plug in the USB stick on the back of the device below the signal connections and follow the instructions on the display. The P10 Wash completes the software update with a reset. You will find the latest software on our homepage.

8.7 Service and maintenance



ATTENTION: Allow the device to cool down and disconnect the device from the mains before opening the device. Touching live parts (high voltage) can give you an electric shock.

8.7.1 Inspection of lubricated moving parts

On the P10 Wash, the zoom/focus guide rails, the rotating gobos and the shutter slide bearings should be checked at regular intervals - once a year - for sufficient lubrication. To do this, open the head cover (3x camlocks with a half turn) and remove the gobo- and shaper modul (2 knurled screws each).

It should be noted that the rotating gobos and the guide rails do not run dry. If necessary, the rotating gobos must be lightly oiled/greased with our special lubricant using a syringe and the guide rails using a brush. The brass bearings of the individual shutter blades must also be checked for sufficient lubrication and re-oiled/greased if necessary. For the right lubricant, please contact our service.

After the shutter blades bearings, gobos and the rails have been checked and oiled, reinsert the slide-in units. After completing the work, put the head cover back on the fixture and test all functions of the headlight.

8.7.2 Checking the plastic parts

The plastic parts of the P1Wash should be checked regularly for damage and the onset of cracks. If a plastic part is cracked, do not use this fixture until the damaged part is replaced. Cracks or other damage to the plastic parts can be caused by transport or manipulation by third parties, as well as the aging process can affect plastic materials.

This check is required for both permanent installations and when preparing rental equipment. All damaged plastic parts must be replaced immediately! Defective plastic parts can also lead to further damage in the headlight.

8.8 Testing of electrical equipment

According to the German Social Accident Insurance (DGUV) Regulation 3 / Regulation 4, electrical systems and equipment must be subjected to regular inspections. The fixing screw of the DMX 5-pin socket can be used as measuring point for insulation and residual current measurement. The screw is connected to all sheet metal parts via a contact washer.



PE measuring point

8.9 Optional pan/tilt limitation

The P10 Wash profile offers the option of installing a pan/tilt limitation. The following parts are included with the limitation:

2x Tilt stop with fastening screw



2x Pan stop with fastening screw



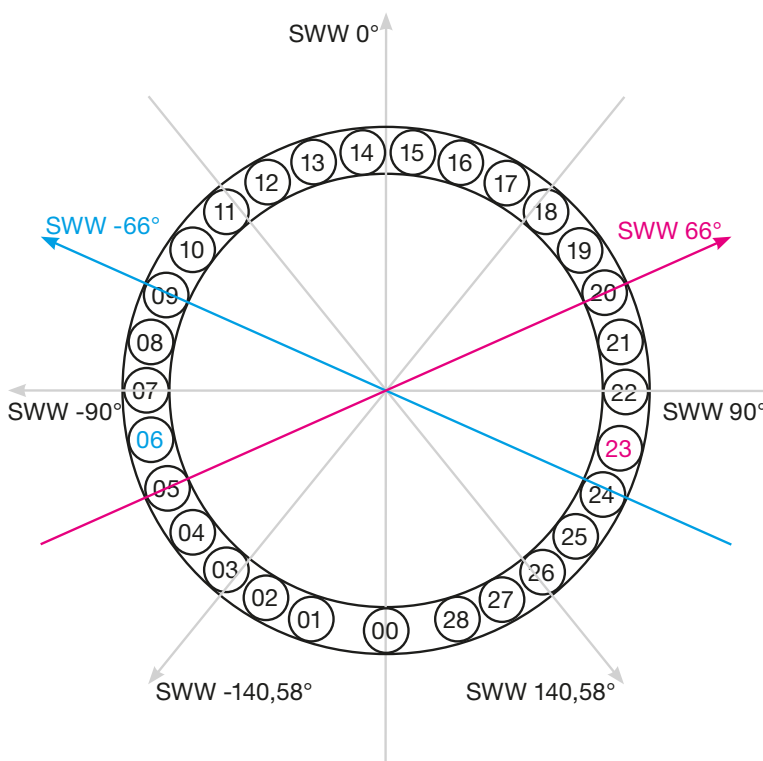
8.9.1 Installation of the limitation

For installation, tweezers or needle-nose pliers, a Torx TX10 and a Torx TX20 are required.

In order to install the pan/tilt limitation, the two arm side parts must first be removed. To do this, 6 screws each must be loosened in order to be able to remove the side panel. See image.



In the next step, the rotating parts for the tilt limitation are installed. To do this, use tweezers/nose-nosed pliers to insert the rotating part between the head and the arm, place it in the corresponding hole from behind and tighten the screw with the Torx TX20 screwdriver. Repeat this procedure accordingly for the 2nd stop. For example to get a limited movement from -66° to 66° you have to put the stops in hole **6** for the first stop and hole **23** for the second stop.

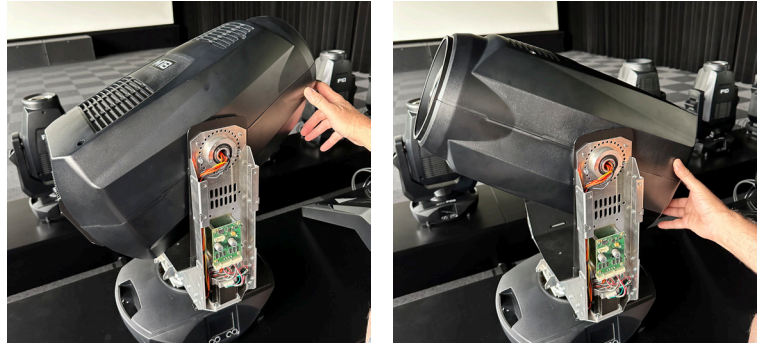


| Pos | AN1 | SWW | Pos | AN2 | SWW |
|-----------|------------|-------------|-----------|-------------|------------|
| 00 | 0° | -140,58° | 00 | 360° | 140,58 |
| 01 | 18° | -126° | 28 | 342° | 126° |
| 02 | 30° | -114° | 27 | 330° | 114° |
| 03 | 42° | -102° | 26 | 318° | 102° |
| 04 | 54° | -90° | 25 | 306° | 90° |
| 05 | 66° | -78° | 24 | 294° | 78° |
| 06 | 78° | -66° | 23 | 282° | 66° |
| 07 | 90° | -54° | 22 | 270° | 54° |
| 08 | 102° | -42° | 21 | 258° | 42° |
| 09 | 114° | -30° | 20 | 246° | 30° |
| 10 | 126° | -18° | 19 | 234° | 18° |
| 11 | 138° | -6° | 18 | 222° | -6° |
| 12 | 150° | 6° | 17 | 210° | 6° |
| 13 | 162° | 18° | 16 | 198° | 18° |
| 14 | 174° | 30° | 15 | 186° | 30° |
| 15 | 186° | 42° | 14 | 174° | 42° |
| 16 | 198° | 54° | 13 | 162° | 54° |
| 17 | 210° | 66° | 12 | 150° | 66° |

SWW -> max tilt angle of the fixture
AN -> stop



This results in a tilt path as shown in the two images on the right, as in the example "M18" from -66° to 66°



Now the parts for the PAN limitation are installed. To do this, place the perforated bricks on the intended screw holes according to the desired angle and fix them with the two TX10 screws (see pictures). An overview about the angles you will see at the following page.

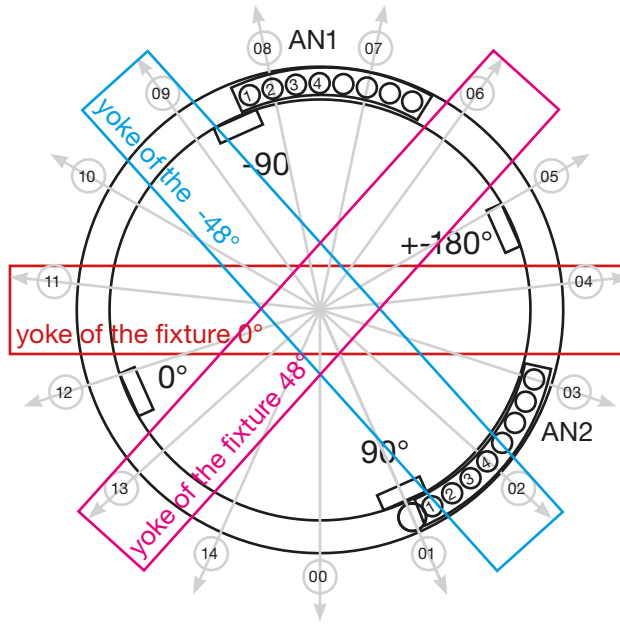


This results in a pan path as shown in the two images on the right, as in the example "M18".



P 10 WASH

| SWW | Pos. | AN1 |
|-------|------|--------|
| -288 | 00 | 1 00° |
| -282 | | 2 06° |
| -276 | | 3 12° |
| -270 | | 4 18° |
| -264 | 01 | 1 24° |
| -258 | | 2 30° |
| -252 | | 3 36° |
| -246 | | 4 42° |
| -240 | 02 | 1 48° |
| -234 | | 2 54° |
| -228 | | 3 60° |
| -222 | | 4 66° |
| -216 | 03 | 1 72° |
| -210 | | 2 78° |
| -204 | | 3 84° |
| -198 | | 4 90° |
| -192 | 04 | 1 96° |
| -186 | | 2 102° |
| -180° | | 3 108° |
| -174° | | 4 114° |
| -168° | 05 | 1 120° |
| -162° | | 2 126° |
| -156° | | 3 132° |
| -150° | | 4 138° |
| -144° | 06 | 1 144° |
| -138° | | 2 150° |
| -132° | | 3 156° |
| -126° | | 4 162° |
| -120° | 07 | 1 168° |
| -114° | | 2 174° |
| -108° | | 3 180° |
| -102° | | 4 186° |
| -96° | 08 | 1 192° |
| -90° | | 2 198° |
| -84° | | 3 204° |
| -78° | | 4 210° |
| -72° | 09 | 1 216° |
| -66° | | 2 222° |
| -60° | | 3 228° |
| -54° | | 4 234° |
| -48° | 10 | 1 240° |
| -42° | | 2 246° |
| -36° | | 3 252° |
| -30° | | 4 258° |
| -24° | 11 | 1 264° |
| -18° | | 2 270° |
| -12° | | 3 276° |
| -6° | | 4 282° |
| 0° | 12 | 1 288° |
| 6° | | 2 294° |
| 12° | | 3 300° |
| 18° | | 4 306° |
| 24° | 13 | 1 312° |
| 30° | | 2 318° |
| 36° | | 3 324° |
| 42° | | 4 330° |
| 48° | 14 | 1 336° |
| 54° | | 2 342° |
| 60° | | 3 348° |
| 66° | | 4 354° |
| 72° | 00 | 360° |



display of the fixture

SWW -> max tilt angle of the fixture
AN -> stop

| SWW | Pos. | AN2 |
|-------|------|--------|
| -108° | | 1 -12° |
| -102° | 09 | 4 -18° |
| -96° | | 3 -24° |
| -90° | | 2 -30° |
| -84° | | 1 -36° |
| -78° | 10 | 4 -42° |
| -72° | | 3 -48° |
| -66° | | 2 -54° |
| -60° | | 1 -60° |
| -54° | 11 | 4 -66° |
| -48° | | 3 -72° |
| -42° | | 2 -78° |
| -36° | | 1 -84° |
| -30° | 12 | 4 -90° |
| -24° | | 3 -84° |
| -18° | | 2 -78° |
| -12° | | 1 -72° |
| -6° | 13 | 4 -66° |
| 0° | | 3 -60° |
| 6° | | 2 -54° |
| 12° | | 1 -48° |
| 18° | 14 | 4 -42° |
| 24° | | 3 -36° |
| 30° | | 2 -30° |
| 36° | | 1 -24° |
| 42° | 00 | 4 -18° |
| 48° | | 3 -12° |
| 54° | | 2 -06° |
| 60° | | 1 00° |
| 66° | 01 | 4 06° |
| 72° | | 3 12° |
| 78° | | 2 18° |
| 84° | | 1 24° |
| 90° | 02 | 4 30° |
| 96° | | 3 36° |
| 102° | | 2 42° |
| 108° | | 1 48° |
| 114° | 03 | 4 54° |
| 120° | | 3 60° |
| 126° | | 2 66° |
| 132° | | 1 72° |
| 138° | 04 | 4 78° |
| 144° | | 3 84° |
| 150° | | 2 90° |
| 156° | | 1 96° |
| 162° | 05 | 4 102° |
| 168° | | 3 108° |
| 174° | | 2 114° |
| 180° | | 1 120° |
| 186° | 06 | 4 126° |
| 192° | | 3 132° |
| 198° | | 2 138° |
| 204° | | 1 144° |
| 210° | 07 | 4 150° |
| 216° | | 3 156° |
| 222° | | 2 162° |
| 228° | | 1 168° |
| 234 | 08 | 4 174° |
| 240 | | 3 180° |
| 246 | | 2 186° |
| 252 | | 1 192° |

Now the fixture has to be taught that it has new end points for Pan/Tilt. To do this, press and hold buttons 1 and 3 below the display and plug in the fixture. As soon as the main menu appears, the buttons can be released. The fixture will jump to the SET PAN/TILT TYPE selection. To activate the pan/tilt limit, press the 2nd button from the left (LIMIT). The spotlight now carries out an INIT PAN/TILT and thus finds its 2 limits and saves them. This init is completed by a reset. Finally, all that remains is to reinstall the two arm covers and the fixture is now ready for limited pan/tilt movement!



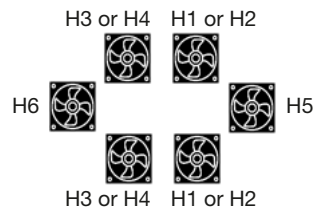
8.9.2 Removal/dismantling of the limitation

In order to remove the travel limitation again, the two arm side parts must be removed. To do this, 6 screws each must be loosened in order to be able to remove the side panel. Then remove all the built-in additional parts and switch the headlight back to "without" limitation. To do this, press and hold buttons 1 and 3 below the display and plug in the headlight. As soon as the main menu appears, the buttons can be released. The fixture will jump to the SET PAN/TILT TYPE selection. To deactivate the pan/tilt limitation, press the 1st button from the left (MAX). The spotlight now performs an INIT PAN/TILT and finds its stop (Hall sensor) again and saves this value. This init is completed by a reset. Finally, only the two arm covers have to be reinstalled and the headlight is now ready for a "full" pan/tilt ride.



9. Overview of error codes for all fixtures

| | | |
|-------------------|----------------------------|------------|
| PAN TIMEOUT | Pan | |
| TILT TIMEOUT | Tilt | |
| GOBO1 TIMEOUT | Gobo wheel 1 position | |
| GROT1 TIMEOUT | Gobo wheel 1 rotation | |
| GOBO2 TIMEOUT | Gobo wheel 2 position | |
| GROT2 TIMEOUT | Gobo wheel 2 rotation | |
| COLOR TIMEOUT | Color wheel | |
| CYAN TIMEOUT | Cyan | |
| MAGENT TIMEOUT | Magenta | |
| YELLOW TIMEOUT | Yellow | |
| CTC TIMEOUT | CTB / CTO | |
| IRIS TIMEOUT | Iris | |
| BLADEROT TIMEOUT | Blades Rotation | |
| BLADE1A TIMEOUT | Blade1A | |
| BLADE1B TIMEOUT | Blade1B | |
| BLADE2A TIMEOUT | Blade2A | |
| BLADE2B TIMEOUT | Blade2B | |
| BLADE3A TIMEOUT | Blade3A | |
| BLADE3B TIMEOUT | Blade3B | |
| BLADE4A TIMEOUT | Blade4A | |
| BLADE4B TIMEOUT | Blade4B | |
| ZOOM TIMEOUT | Zoom | |
| FOCUS TIMEOUT | Focus | |
| PRISM1 TIMEOUT | Prism 1 (linear) | |
| PRISM1ROT TIMEOUT | Prism 1 rotation | |
| PRISM2 TIMEOUT | Prism 2 (circular) | |
| PRISM2ROT TIMEOUT | Prism 2 rotation | |
| ANI TIMEOUT | Animation wheel | |
| ANIROT TIMEOUT | Animation wheel rotation | |
| FAN B1 ER | Error Fan Base 1 | |
| FAN B2 ER | Error Fan Base 2 | |
| FAN B3 ER | Error Fan Base Transformer | SPARX ONLY |
| FAN H1 ER | Error Fan Head 1 | |
| FAN H2 ER | Error Fan Head 2 | |
| FAN H3 ER | Error Fan Head 3 | |
| FAN H4 ER | Error Fan Head 4 | |
| FAN H5 ER | Error Fan Head 5 | |
| FAN H6 ER | Error Fan Head 6 | |
| FAN H7 ER | Fan Blades (P18) / CMY P10 | |



| | | |
|---------------------|-------------------------------------------------------|------------|
| TSENS BPS ER | Sensor Error Base Power Supply AC/DC | |
| TSENS BLCD ER | Sensor Error Base LCD | |
| TSENS BAIR ER | Sensor Erroe Base Air | SPARX ONLY |
| TSENS HMAIN ER | Sensor Error Head Main PCB | |
| TSENS HDRV ER | Sensor Error Head LED Driver PCB | |
| TSENS HLED ER | Sensor Error Head LED | |
| TSENS HAIR ER | Sensor Error Head Air (Ambient) | |
| HIGH TEMP BLCD | High Temperature Base LCD PCB | |
| HIGH TEMP BAIR | High Temperatur Base Air (SPARX ONLY) | |
| HIGH TEMP BPS | High Temperature Base PSU AC/DC | |
| HIGH TEMP HMAIN | High Temperature Head Main PCB | |
| HIGH TMP HDRV | High Temperature Head LED Driver PCB | |
| HIGH TMP H LED | High Tempperature Head LED Module | |
| HIGH TEMP HEAD AIR | High Temperature Head Air (Ambient) | |
| CPU1 NOT RESPONDING | CPU Display PCB | |
| CPU2 NOT RESPONDING | CPU Pan/Tilt PCB | |
| CPU3 NOT RESPONDING | CPU Main Head PCB | |
| CPU4 NOT RESPONDING | CPU Main Head PCB: MK2 MAIN HEAD, P10 CMY, MK1 BLADES | |
| CPU5 NOT RESPONDING | CPU Blades PCB: MK1 LED DRIVER PCB | |
| CPU6 NOT RESPONDING | CPU LED Driver PCB: MK1 N.A. | |

10. Specifications

Dimensions and weight

| | |
|------------|--------|
| Length | 265 mm |
| Width | 398 mm |
| Height | 609 mm |
| Net weight | 17 kg |

Electronic system

| | |
|------------------------------|-----------------------|
| Mains connection | 100-240 V AC, 50-60Hz |
| Maximum power consumption | 490 VA |
| Power consumption in standby | 90 VA |

Temperature

| | |
|-----------------------------|-------|
| Maximum ambient temperature | 45 °C |
| Minimum ambient temperature | 5 °C |

Optics, Photometric Data

| | |
|------------------|-----------------------------|
| Light source | White light LED module 330W |
| Luminous flux HP | 15000 Lumen @ 20°C |
| Luminous flux HC | 10000 Lumen @ 20°C |
| Luminous flux WW | 8000 Lumen @ 20°C |

Effects

| | |
|------|-----------|
| Pan | 546.74° |
| Tilt | 281.16° |
| Zoom | 12° - 70° |

Construction

| | |
|--------------------|--------|
| Colour | black |
| Housing | PC ABS |
| Protection class | IP 20 |
| Plug-in technology | yes |

Installation

| | |
|-------------------------------------------------------------------------------|-------------------|
| Installation site | indoors |
| Holder | 2x Omega brackets |
| Position | any |
| Minimum fixture distance to flammable objects | 0.5 m |
| Minimum distance between the light emission and the surface to be illuminated | 2,0 m |

Connections

| | |
|-----------------------------|------------------------|
| Power input | Neutrik powerCON TRUE1 |
| Power feed-through | Neutrik powerCON TRUE1 |
| DMX/RDM in/out USITT DMX512 | 5-pin, in/out XLR |
| Ethernet in/out | Neutrik etherCON |
| Micro-USB | Software update |

11. Declaration of Conformity



Declaration of Conformity

in the sense of the Directive: 2014/35/EU Low Voltage Directive,
(Directive 2014/35/EU of the European Parliament and of the Council of 26/02/2014 to approximate
the laws of the Member States relating to electrical equipment designed
for use within certain voltage limits)

in the sense of the Directive: 2014/30/EU Electromagnetic compatibility
(Directive 2014/30/EU of the European Parliament and of the Council of 26/02/2014 to approximate the
laws of the Member States relating to electromagnetic compatibility)

The manufacturer, **JB-Lighting Lichtenlagentechnik GmbH**
Sallersteigweg 15
89134 Blaustein-Wippingen

declares that the product: **P10 Wash**

complies with the essential protection requirements of the directives. The following standards were used for conformity assessment:

Emissions requirements per EN 55022:2010

Conducted interference emission
EN 55022:2010

Radiation
EN 55022:2010

Harmonic currents
EN 61000-3-2:2015

Flicker
EN 61000-3-3:2013

Immunity - requirements per EN 61000-6-2:2005

EN 61000-4-2:2009
EN 61000-4-3:2006 +A1:2008 +A2:2010
EN 61000-4-4:2012

EN 61000-4-5:2006
EN 61000-4-6:2014

EN 61000-4-8:2010

EN 61000-4-11:2004

Information technology equipment, radio interference characteristics - Limit values and measuring methods - Limit value class A

requirements for information technology equipment, radio interference
characteristics -

Limit values and measuring methods - Limit value class A
Information technology equipment, radio interference characteristics -
Limit values and measuring methods - Limit value class A
Electromagnetic compatibility

Part 3-2: Limits, testing of harmonic currents
(for devices with an input current < 16A per phase)
Electromagnetic compatibility (EMC)

Part 3-3: Limits, limitation of voltage changes,
Voltage fluctuations and flicker in low-voltage networks
(for devices with an input current < 16A per phase)

Electromagnetic compatibility (EMC) - Part 6-2: Generic standard - Immunity in industrial areas

Part 4-2: Immunity to static electricity discharge
Part 4-3: Immunity to high-frequency electromagnetic fields
Part 4-4: Immunity against fast transient electrical
disturbances (burst)

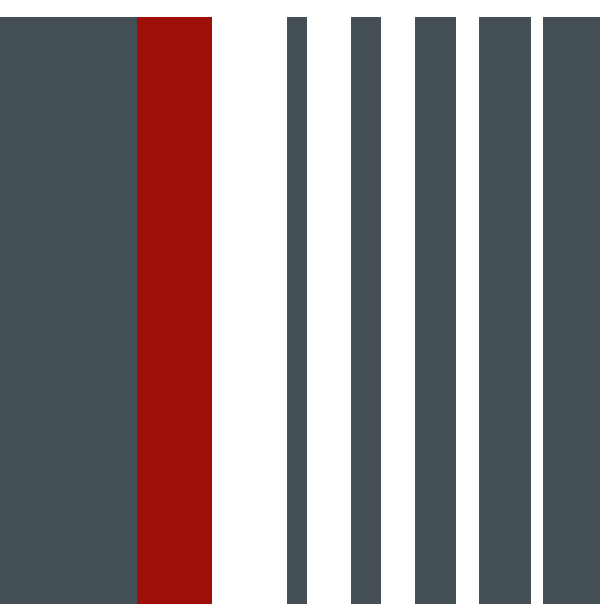
Part 4-5: Interference voltages against surge voltages
Part 4-6: Immunity to conducted disturbances,
induced by HF

Part 4-8: Immunity to magnetic fields with power technology
frequencies

Part 4-11: Immunity against voltage dips, short-term
interruptions and voltage fluctuations

Blaustein, 01/11/2023

Jürgen Braungardt
CEO



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