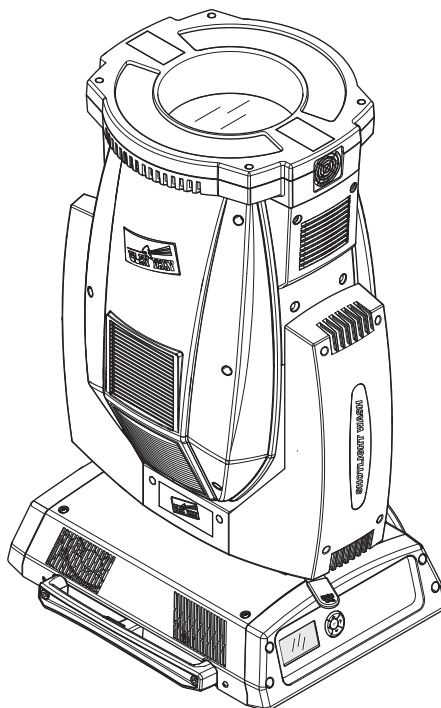




INSTRUCTION MANUAL



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Congratulations on choosing a Clay Paky product!

We thank you for your custom.

Please note that this product, as all the others in the rich Clay Paky range, has been designed and made with total quality to ensure excellent performance and best meet your expectations and requirements.

Carefully read this instruction manual in its entirety and keep it safe for future reference. It is essential to know the information and comply with the instructions given in this manual to ensure the fitting is installed, used and serviced correctly and safely.

CLAY PAKY S.p.A. disclaims all liability for damage to the fitting or to other property or persons deriving from installation, use and maintenance that have not been carried out in conformity with this instruction manual, which must always accompany the fitting.

CLAY PAKY S.p.A. reserves the right to modify the characteristics stated in this instruction manual at any time and without prior notice.

SAFETY INFORMATION

• Installation

Make sure all parts for fixing the projector are in a good state of repair.
Make sure the point of anchorage is stable before positioning the projector.
The safety chain must be properly hooked onto the fitting and secured to the framework, so that, if the primary support system fails, the fitting falls as little as possible.
If the safety chain gets used, it needs to be replaced with a genuine spare.

• Minimum distance of illuminated objects

The projector needs to be positioned so that the objects hit by the beam of light are at least 5 metres (16'5") from the lens of the projector.

• Minimum distance from flammable materials

The projector must be positioned so that any flammable materials are at least 0.20 metres (8") from every point on the surface of the fitting.

• Mounting surfaces

It is permissible to mount the fitting on normally flammable surfaces.

• Maximum ambient temperature

Do not operate the fixture if the ambient temperature (T_a) exceeds 40° C (104° F).

• IP20 protection rating

The fitting is protected against penetration by solid bodies of over 12mm (0.47") in diameter (first digit 2), but not against dripping water, rain, splashes or jets of water (second digit 0).

• Protection against electrical shock

Connection must be made to a power supply system fitted with efficient earthing (**Class I** appliance according to standard EN 60598-1).

It is, moreover, recommended to protect the supply lines of the projectors from indirect contact and/or shorting to earth by using appropriately sized residual current devices.

• Connection to mains supply

Connection to the electricity mains must be carried out by a qualified electrical installer.
Check that the mains frequency and voltage correspond to those for which the projector is designed as given on the electrical data label.
This label also gives the input power to which you need to refer to evaluate the maximum number of fittings to connect to the electricity line, in order to avoid overloading.

• Temperature of the external surface

The maximum temperature that can be reached on the external surface of the fitting, in a thermally steady state, is 150°C (302°F).

• Maintenance

Before starting any maintenance work or cleaning the projector, cut off power from the mains supply.
After switching off, do not remove any parts of the fitting for at least 10 minutes. After this time the likelihood of the lamp exploding is virtually nill. If it is necessary to replace the lamp, wait for another 20 minutes to avoid getting burnt.

The fitting is designed to hold in any splinters produced by a lamp exploding. The lenses must be mounted and, if visibly damaged, they have to be replaced with genuine spares.

• Lamp

The fitting mounts a high-pressure lamp that needs an external igniter. This igniter is fitted onto the apparatus.

- Carefully read the "operating instructions" provided by the lamp manufacturer.
- Immediately replace the lamp if damaged or deformed by heat.

• Battery

This product contains a rechargeable lead-acid battery. To preserve the environment, please dispose the battery at the end of its life according to the regulation in force. Instructions on how to remove the battery from the product are available on www.claypaky.it

1500W 

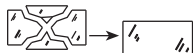


t_a 40°C

IP20



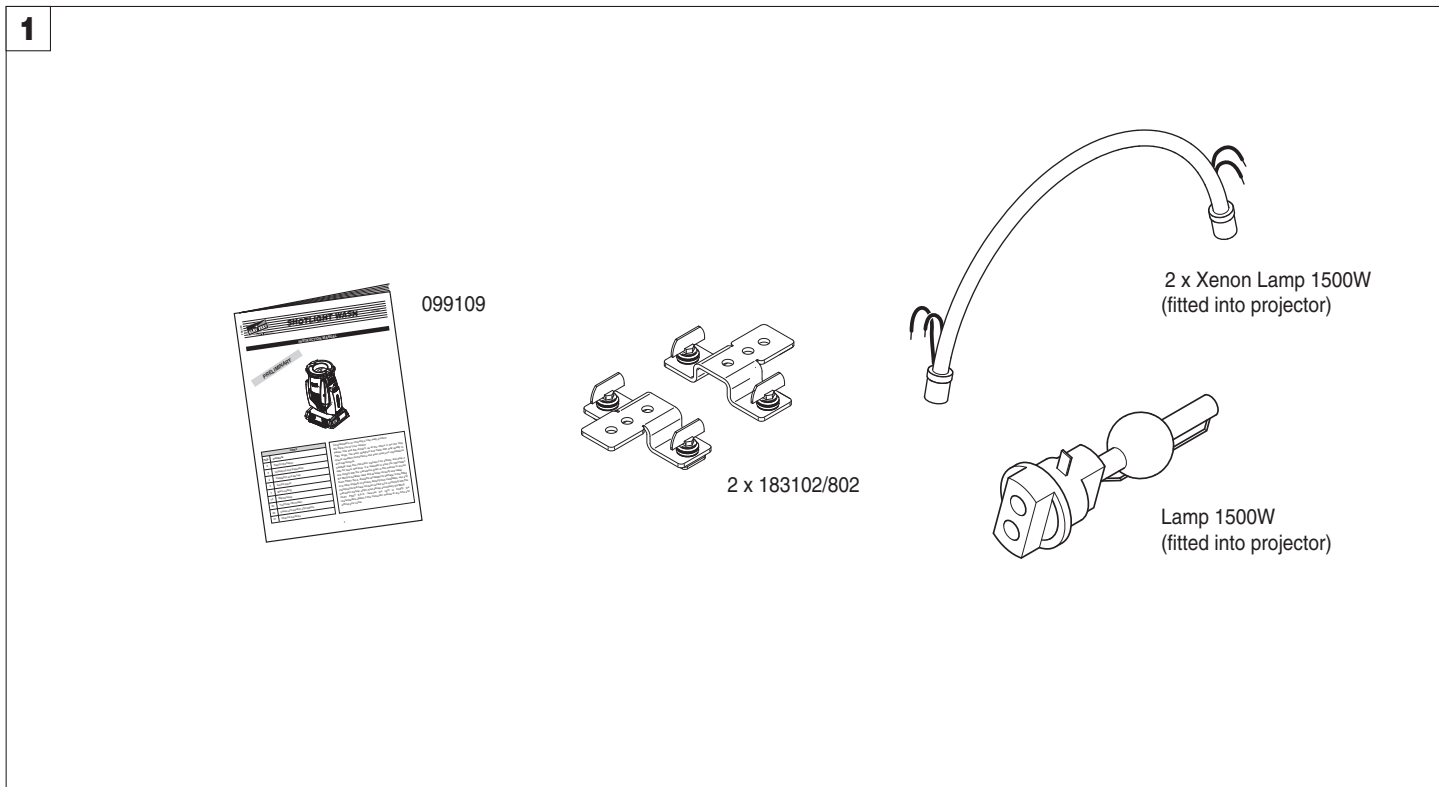
t_c 150°C



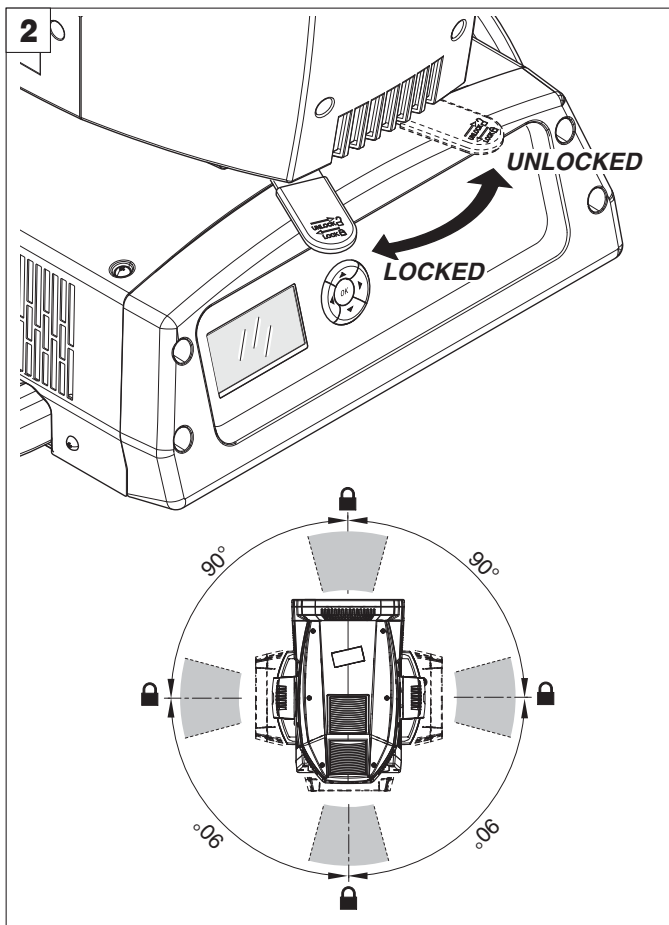
The products referred to in this manual conform to the European Community Directives to which they are subject:

- Low Voltage 2006/95/CE
- Electromagnetic Compatibility 2004/108/CE

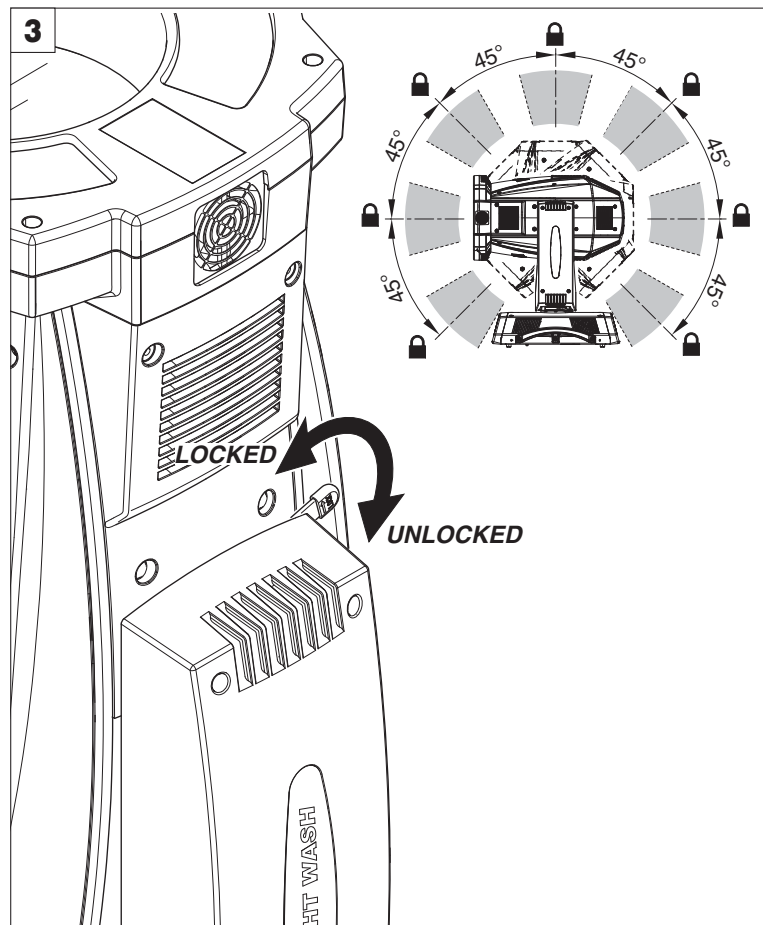
UNPACKING AND PREPARATION



Packing contents - Fig. 1

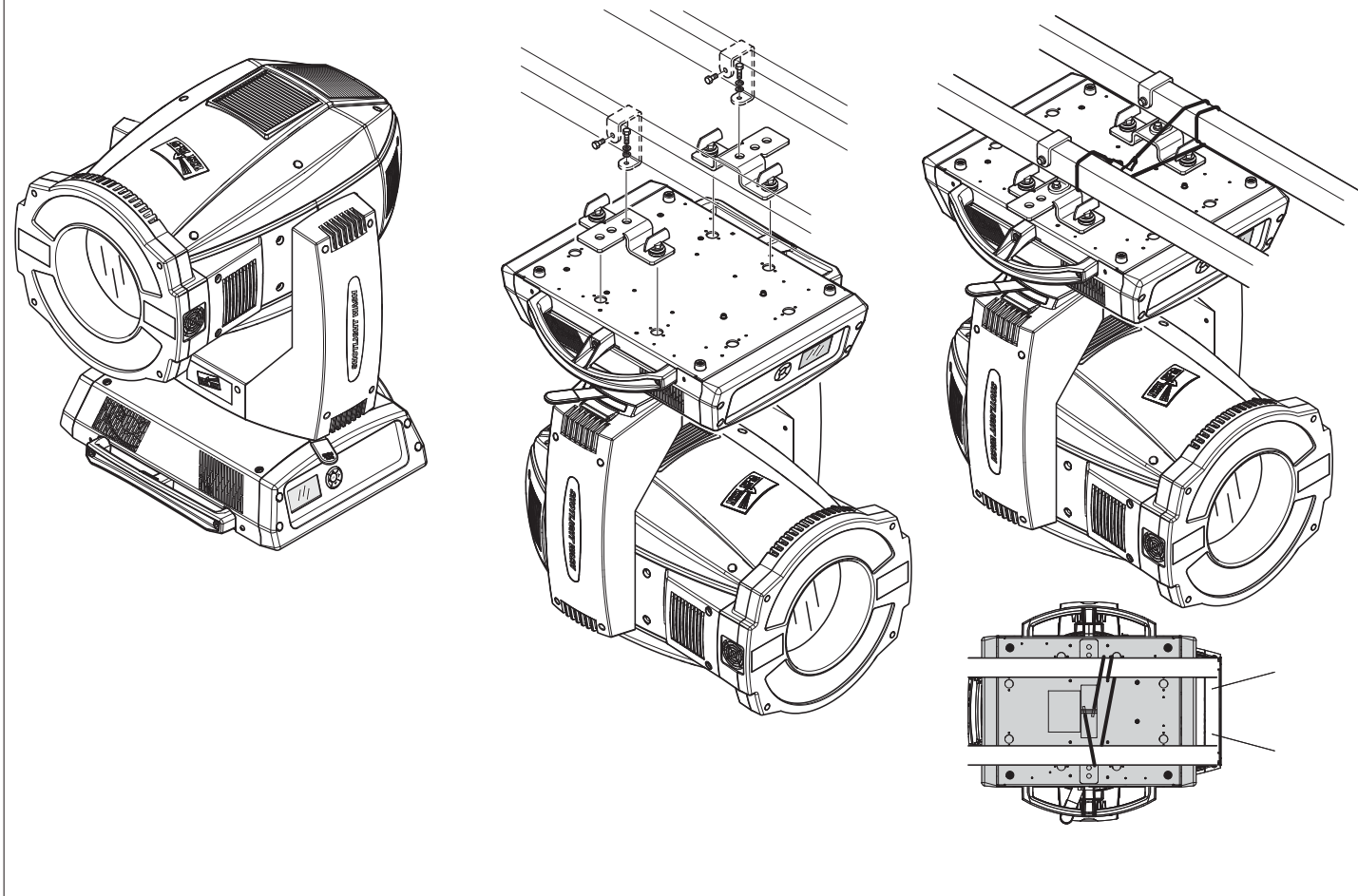


PAN Mechanism Lock and Release (every 90°) - Fig. 2



TILT Mechanism Lock and Release (every 45°) - Fig. 3

4

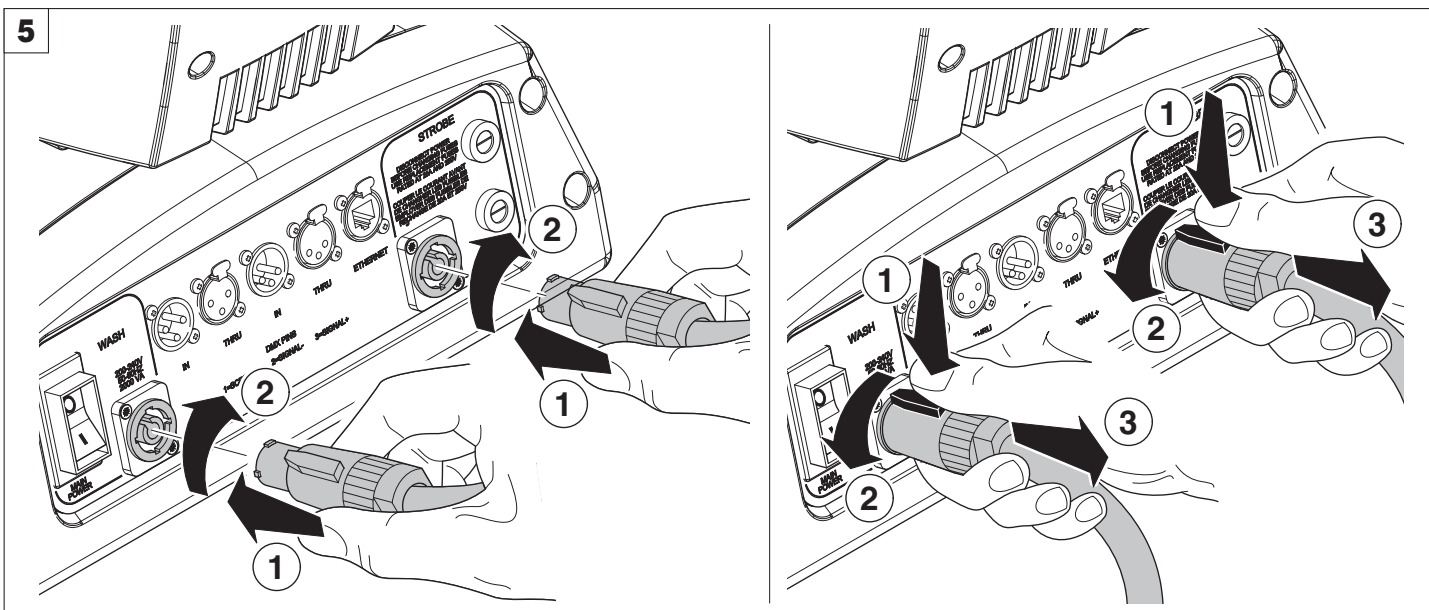


Installing the projector - Fig. 4

The projector can be installed on the floor resting on special rubber feet, on a truss or on the ceiling or wall.

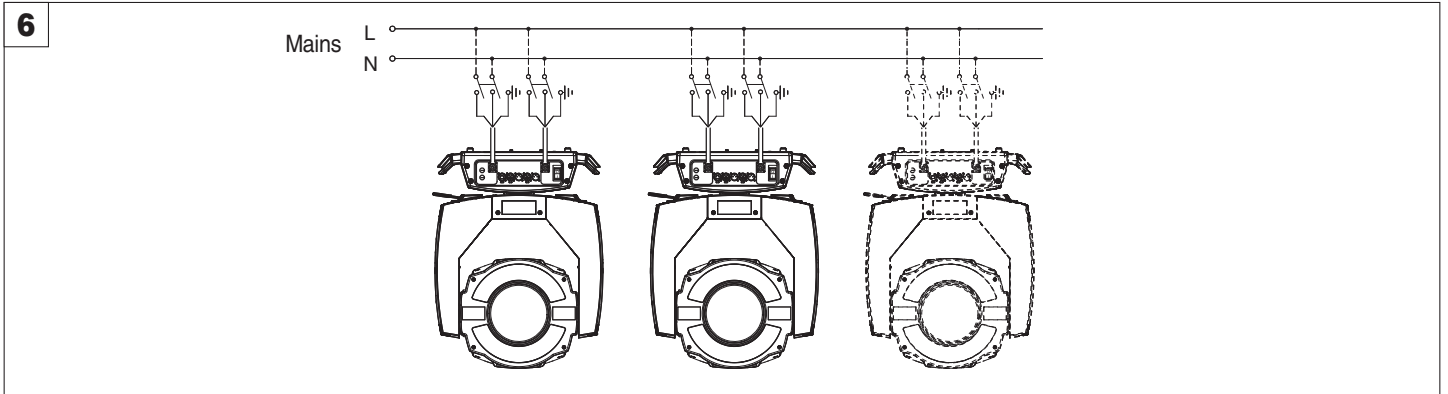
WARNING: with the exception of when the projector is positioned on the floor, the safety cable must be fitted. (Cod. 105041/003 available on request). This must be securely fixed to the support structure of the projector and then connected to the fixing point at the centre of the base.

5

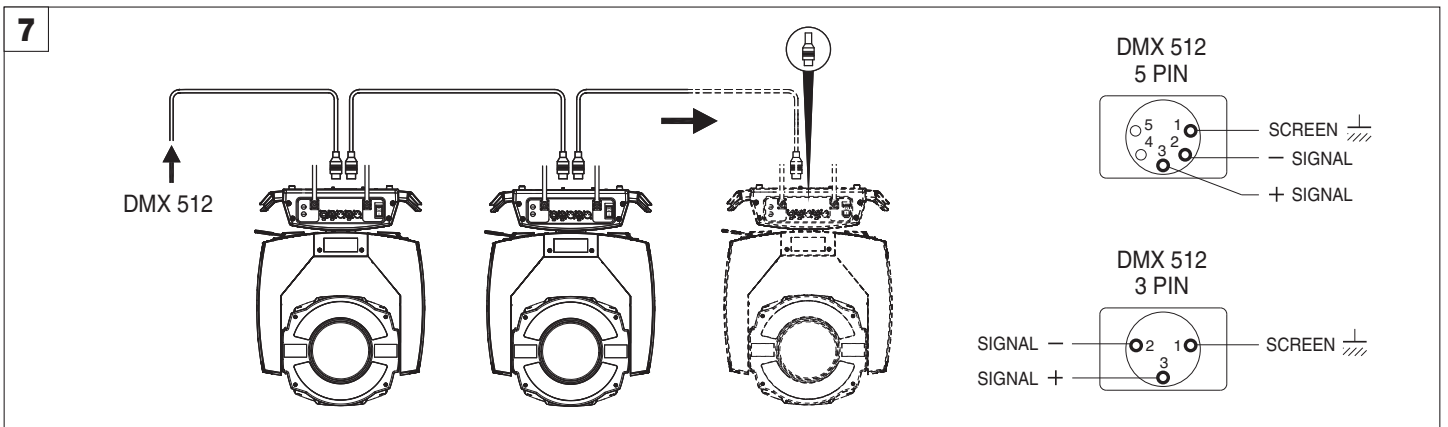


Connecting and disconnecting power cable - Fig. 5

CONTROL PANEL



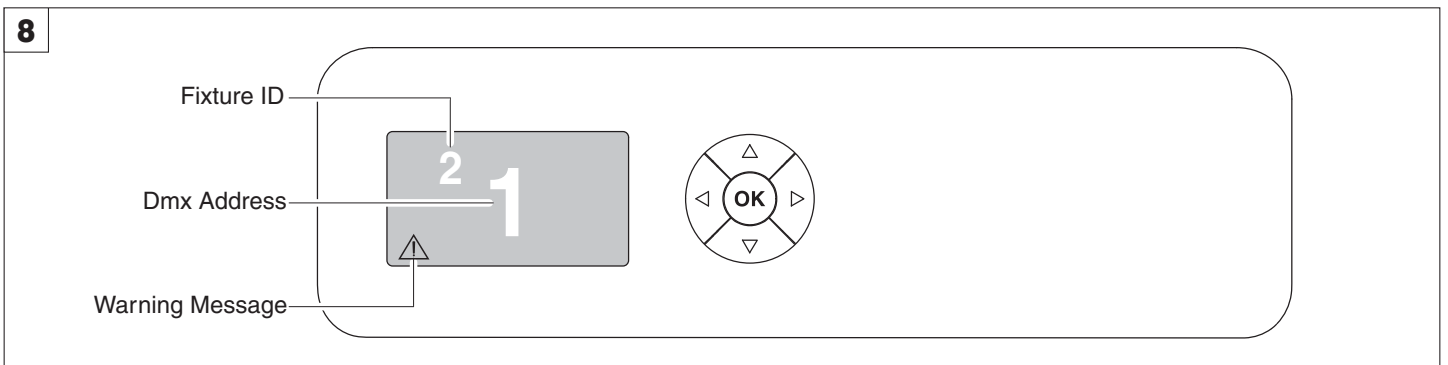
6 Connecting to the mains supply - Fig. 6



7 Connecting to the control signal line (DMX) - Fig. 7

Use a cable conforming to specifications EIA RS-485: 2-pole twisted, shielded, 120Ohm characteristic impedance, 22-24 AWG, low capacity. Do not use microphone cable or other cable with characteristics differing from those specified. The end connections must be made using XLR type 3 or 5-pin male/female connectors. A terminating plug must be inserted into the last projector with a resistance of 120Ohm (minimum 1/4 W) between terminals 2 and 3.

IMPORTANT: The wires must not make contact with each other or with the metal casing of the connectors. The casing itself must be connected to the shield braid and to pin 1 of the connectors.



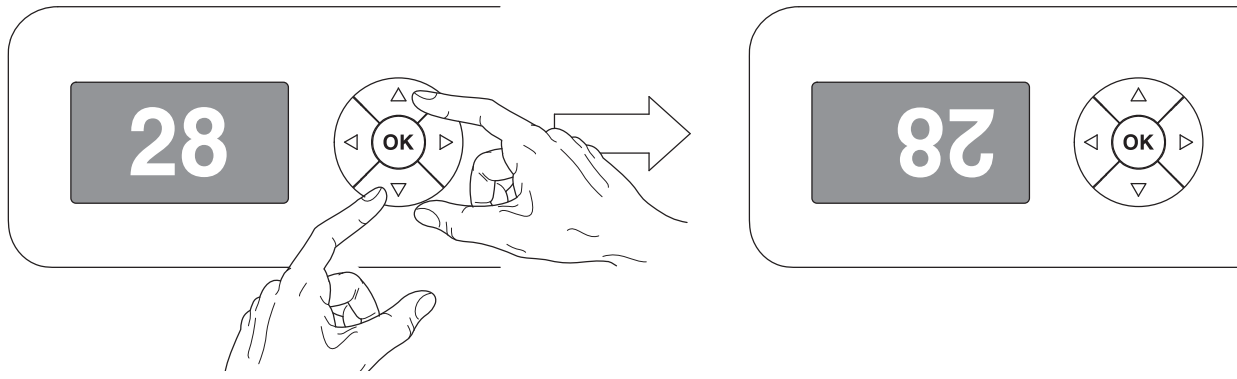
8 Switching on the projector - Fig. 8

Press the switch. The projector starts resetting the effects. At the same time, the following information scrolls on the display:

	Model Shotlight Wash	Firmware Version X.X.X Date - Hour	xxx (Fixture ID) Dmx Address xxx	System errors E: W:
--	----------------------------	--	-------------------------------------	---------------------------------------

On conclusion of resetting in case of absence of dmX signal, Pan and Tilt move to the “Home” position (Pan 50% - Tilt 50%). The control panel (Fig. 8) has a display and buttons for the complete programming and management of the projector menu. The display can be in one of two conditions: rest status and setting status. When it is in the rest status, the display shows the projector’s DMX address and the Fixture ID address (if set).

During menu setting status, after a wait time (about 30 seconds) without any key having been pressed, the display automatically returns to rest status. It should be noted that when this condition occurs, any possible value that has been modified but not yet confirmed with the **OK** key will be cancelled.



Reversal of the display - Fig. 9

To activate this function, press UP ▲ and DOWN ▼ keys simultaneously while the display is in the rest mode. This status will be memorised and maintained even for the next time it will be switched on. To return to the initial state, repeat the operation all over again.

Setting the projector starting address

On each projector, the starting address must be set for the control signal (addresses from 1 to 512).

The address can also be set with the projector switched off.

Setting the address: see pag. 8.

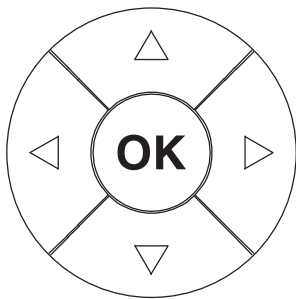
Setting the projector Fixture ID

On each projector, the Fixture ID address must be set for an easy identification of the fixtures in an installation (ID from 1 to 255).

The Fixture ID address can be set with the projector switched off.

Setting the Fixture ID: see pag. 8.

Functions of the buttons - Using the menu



Confirms the displayed value, or activates the displayed function, or enters the successive menu.



DOWN

Decreases the value displayed (with auto-repetitions) or passes to the next item in the menu.



UP

Increases the value displayed (with auto-repetitions) or passes to the previous item in a menu.



LEFT

Return to the top level



RIGHT

Commute from units, tens, hundreds, in the "Address", "Fixture ID" and "Calibration" menù.

USING THE MENU:

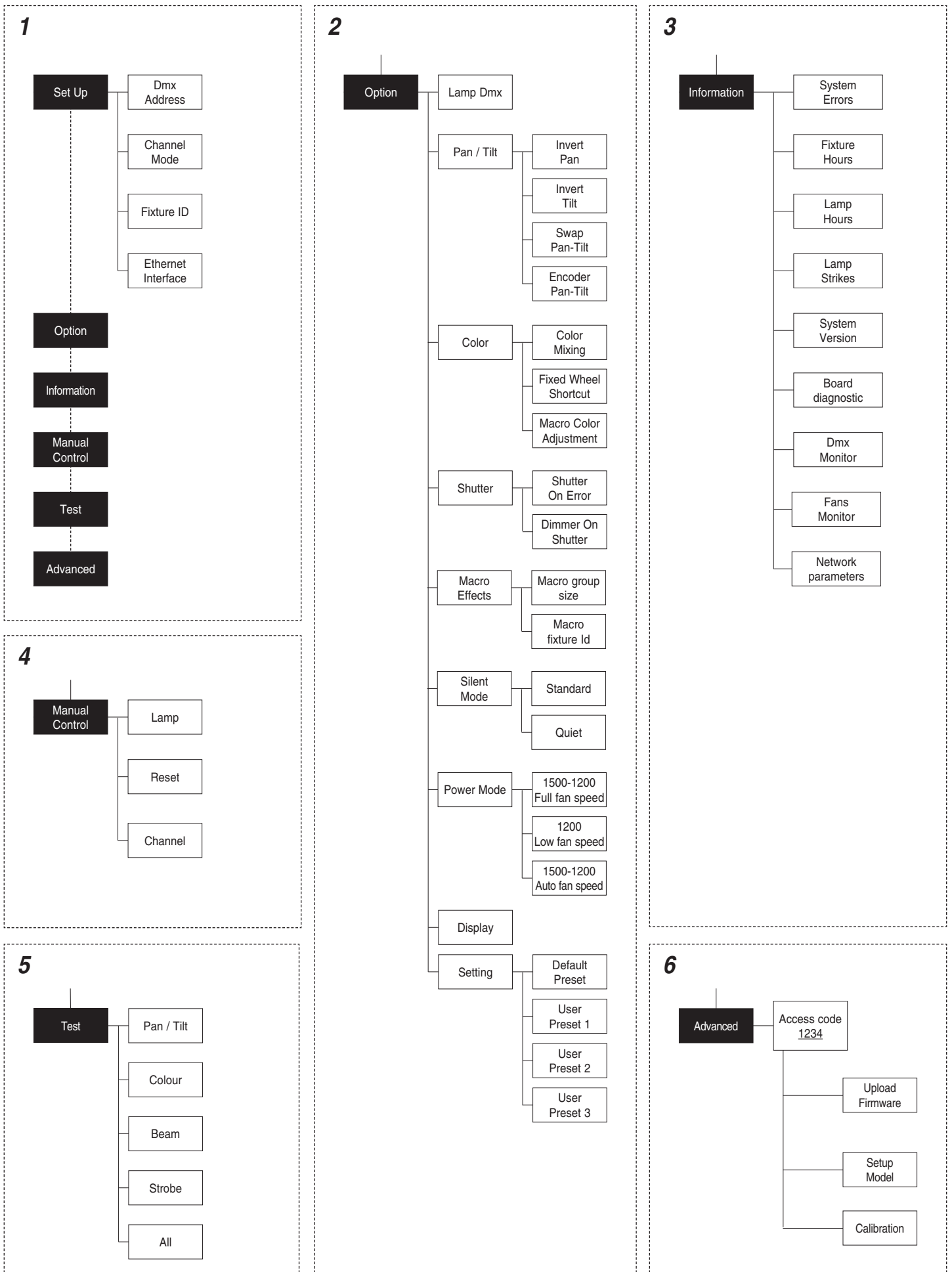
- 1) Press **OK** once – "Main Menu" appears on the display.
- 2) Use the UP ▲ and DOWN ▼ keys to select the menu to be used:
 - Setup (Setup Menu): To set the setting options.
 - Option (Option Menu): To set the operating options
 - Informations (Informations Menu): To read the counters, software version and other information.
 - Manual Control (Manual control Menu): To trigger the test and manual control functions.
 - Test (Test Menu): To check the proper functioning of effects
 - Advanced (Advanced Menu): Access to the "Advanced menu" is recommended for a trained technical personnel.

To enable the "Advanced" see pag.13
- 3) Press **OK** to display the first item in the selected menu.
- 4) Use the UP ▲ and DOWN ▼ keys to select the MENU items.

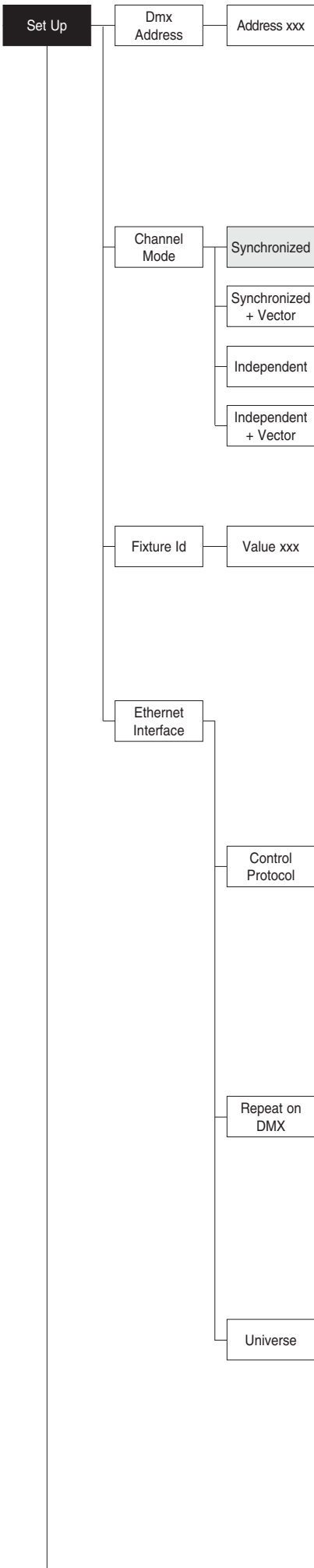
Setting addresses and options with the projector disconnected

The projector's DMX address, as well as other possible operating options, can also be set when the appliance is disconnected from the electricity supply. All that is needed is to press **OK** to momentarily activate the display and thus access the settings. Once the required operations have been carried out, the display will switch off again after a wait time of 30 seconds.

MENU SETTING



NOTE: On grey the default options



SET UP MENU

DMX ADDRESS

NOTE: without the DMX signal the Address (XXX) flashing

Allows you to select the DMX ADDRESS

- 1) Press **OK** - the current DMX Address appear on the display.
- 2) Use the UP **▲**, DOWN **▼**, RIGHT **▶** keys to plan the DMX Address.
- 3) Press **OK** to confirm the selection or LEFT **◀** to keep current settings.

CHANNEL MODE

Allows you to select a channel arrangement from the 4 available.

- 1) Press **OK** - the current settings appear on the display.
- 2) Use the UP **▲** and DOWN **▼** keys to select one of the following settings:
 - **Synchronized**
 - **Synchronized + Vector**
 - **Independent**
 - **Independent + Vector**
- 3) Press **OK** to confirm the selection or LEFT **◀** to keep current settings.

FIXTURE ID

Allows you to select the FIXTURE ID

- 1) Press **OK** - the current Fixture ID appear on the display.
- 2) Use the UP **▲**, DOWN **▼**, RIGHT **▶** keys to plan the Fixture ID.
- 3) Press **OK** to confirm the selection or LEFT **◀** to keep current settings.

ETHERNET INTERFACE

It lets you set the Ethernet settings to be attributed to the projector.

- 1) Premere **OK**.
- 2) Use the UP **▲** and DOWN **▼** keys to select the "Ethernet Interface" options to set:

Control Protocol

It lets you select the "Control Protocol" Art-net to assign according to the control unit used:

- 1) Press **OK** the current setting appears on the display.
- 2) Use the UP **▲** and DOWN **▼** keys to select one of the following settings:
 - **Disabled**
 - **Art-net on IP 2**
 - **Art-net on IP 10**
- 3) Press **OK** to confirm the selection or LEFT **◀** to keep the current setting.

Repeat on DMX

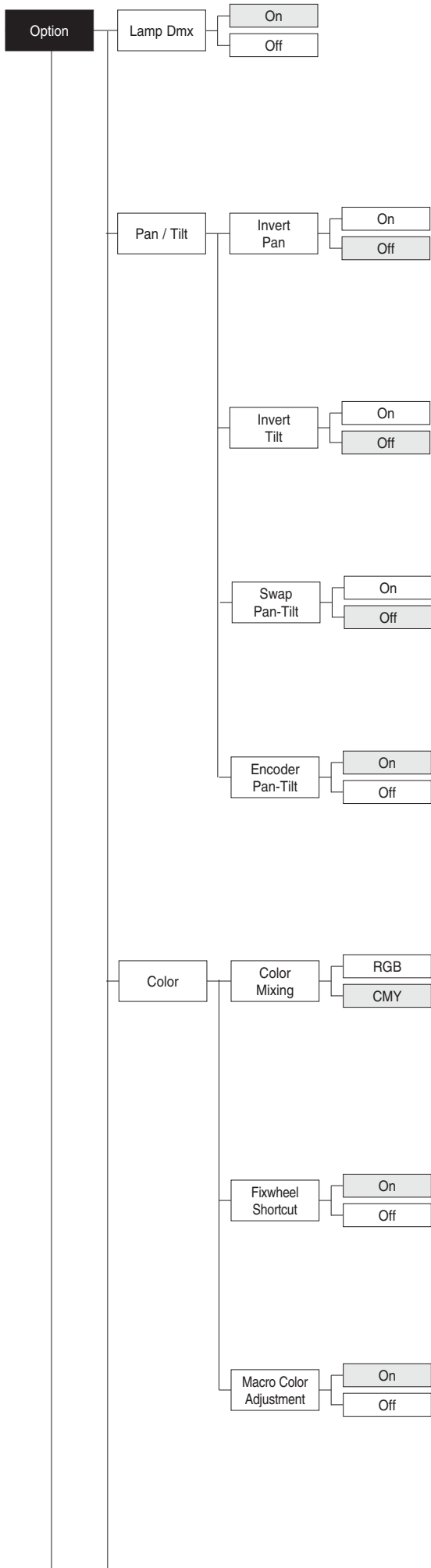
It lets you enable the transmission of the Ethernet protocol by DMX signal to all the connected projectors.

- 1) Press **OK** the current setting appears on the display.
- 2) Use the UP **▲** and DOWN **▼** keys to select one of the following settings:
 - **Disabled:** DMX transmission disabled.
 - **Enabled on primary:** DMX transmission enabled.
- 3) Press **OK** to confirm the selection or LEFT **◀** to keep the current setting.

Universe

It lets you assign the "Universe" number to be assigned to a series of projectors.

- 1) Press **OK** - the current Universe address appears on the display.
- 2) Use the UP **▲**, DOWN **▼**, RIGHT **▶** keys to set the Universe address.
- 3) Press **OK** to confirm the selection or LEFT **◀** to keep the current setting.



OPTIONS MENU

LAMP DMX

Used for enabling lamp remote control channel.

- 1) Press **OK** - the current settings appear on the display (On or Off).
- 2) Use the UP **▲** and DOWN **▼** keys to enable (On) or disable (Off) the lamp remote control channel.
- 3) Press **OK** to confirm the selection or LEFT **◀** to keep current settings.

PAN / TILT

Invert pan

Used for reversing Pan movement.

- 1) Press **OK** - the current settings appear on the display (On or Off).
- 2) Use the UP **▲** and DOWN **▼** keys to enable (On) or disable (Off) PAN inversion.
- 3) Press **OK** to confirm the selection or LEFT **◀** to keep current settings.

Invert tilt

Used for reversing tilt movement.

- 1) Press **OK** - the current settings appear on the display (On or Off).
- 2) Use the UP **▲** and DOWN **▼** keys to enable (On) or disable (Off) Tilt inversion.
- 3) Press **OK** to confirm the selection or LEFT **◀** to keep current settings.

Swap Pan-Tilt

Used for swapping Pan and Tilt channels (as well as Pan fine and Tilt fine).

- 1) Press **OK** - the current settings appear on the display (On or Off).
- 2) Use the UP **▲** and DOWN **▼** keys to enable (On) or disable (Off) Pan and Tilt channel swap.
- 3) Press **OK** to confirm the selection or LEFT **◀** to keep current settings.

Encoder Pan-Tilt

Used for enabling the Pan / Tilt encoders.

- 1) Press **OK** - the current settings appear on the display (On or Off).
- 2) Use the UP **▲** and DOWN **▼** keys to enable (On) or disable (Off) Pan / Tilt encoders.
- 3) Press **OK** to confirm the selection or LEFT **◀** to keep current settings.

COLOR

Color mixing

Used for reversing the CMY color mixing system.

- 1) Press **OK** - the current settings appear on the display (On or Off).
- 2) Use the UP **▲** and DOWN **▼** keys select one of the following settings:
RGB color mixing mode
CMY color mixing mode
- 3) Press **OK** to confirm the selection or LEFT **◀** to keep current settings.

Fixed wheel short-cut

Used for optimizing color change time so that the disc turns in the direction that requires shorter movement.

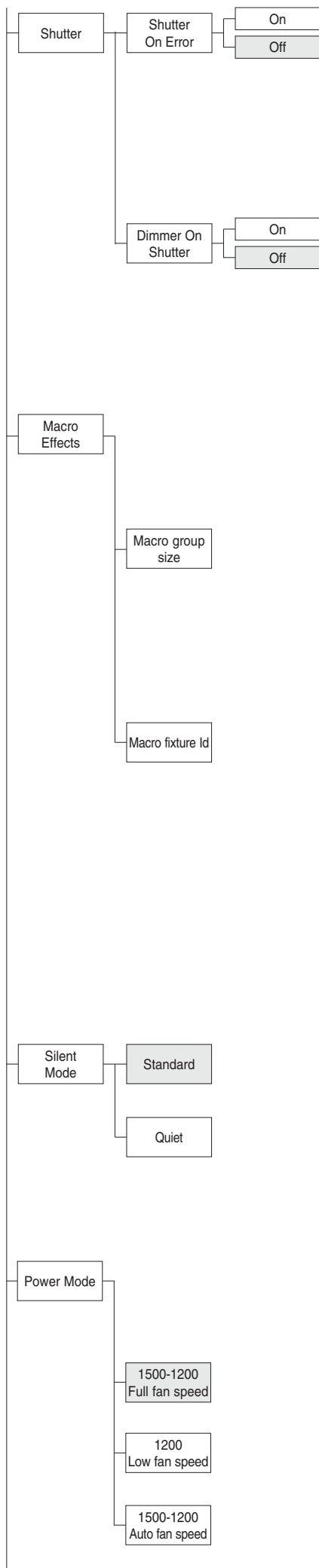
- 1) Press **OK** - the current settings appear on the display (On or Off).
- 2) Use the UP **▲** and DOWN **▼** keys to enable (On) or disable (Off) color change optimization.
- 3) Press **OK** to confirm the selection, or LEFT **◀** to keep current settings.

Macro color adjustment

It lets you enable the overwriting of a "Macro Colour" with the Cyan, Magenta, Yellow, CTO and Colour wheel channels.

Press **OK** the current setting appears on the display.

- 1) Use the UP **▲** and DOWN **▼** keys to enable (On) or disable (Off) the overwriting.
- 2) Press **OK** to confirm the selection or LEFT **◀** to keep the current setting.



SHUTTER

Shutter on error

Used for automatically closing the stop/strobe in the event of Pan/Tilt position error.

- 1) Press **OK** - the current settings appear on the display (On or Off).
- 2) Use the UP **▲** and DOWN **▼** keys to enable (On) or disable (Off) automatic stop/strobe closing in the event of Pan/Tilt position error.
- 3) Press **OK** to confirm the selection, or LEFT **◀** to keep current settings.

Dimmer on Shutter

Enables automatic closing of the dimmer when the strobe is completely closed.

- 1) Press **OK** - the current settings appear on the display (On or Off).
- 2) Use the UP **▲** and DOWN **▼** keys to enable (On) or disable (Off) the automatic closing of the dimmer.
- 3) Press **OK** to confirm the selection or LEFT **◀** to keep current settings.

MACRO EFFECTS

It lets you select the “Macro Effects” set up from the two available.

- 1) Press **OK** the current setting appears on the display.
- 2) Use the UP **▲** and DOWN **▼** keys to select one of the following settings:

Macro group size

It lets you set the number of projectors to be included in the macro mode operation.

- 1) Press **OK**
- 2) Use the UP **▲**, DOWN **▼**, RIGHT keys to set the number of projectors to be included in the “Macro Effect” operation.
- 3) Press **OK** to confirm the selection or LEFT **◀** to keep the current setting.

Macro fixture Id

It lets you attribute an ID address to the projector for the phase displacement for the scene’s starting time in Macro mode.

- 1) Press **OK**
- 2) Use the UP **▲** and DOWN **▼** keys to select one of the following settings:

Fixed to X. (to assign to all the projectors to be included in the Macro operation).

Auto by DMX Address: According to the DMX address, it automatically detects the starting sequence of the scene in the Macro mode (to assign to all the projectors to be included in the Macro operation).

- 3) Press **OK** to confirm the selection or LEFT **◀** to keep the current setting.

SILENT MODE

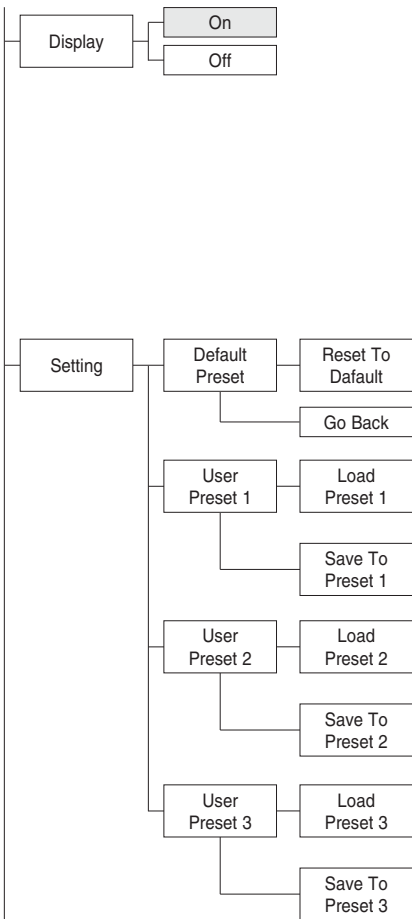
It lets you select the “Silent Mode” from the two available.

- 1) Press **OK** the current setting appears on the display.
- 2) Use the UP **▲** and DOWN **▼** keys to select one of the following settings:
 - Standard:** Maximum speed and consequently maximum effects noise level.
 - Quiet:** reduces the speed of some effects, thereby reducing their noise level.
- 3) Press **OK** to confirm the selection or LEFT **◀** to keep the current setting.

POWER MODE

Allows you to select a Power Mode from the three available.

- 1) Press **OK** - the current settings appear on the display.
- 2) Use the UP **▲** and DOWN **▼** keys to select one of the following settings:
 - **1500-1200W Full fan speed:** Lamp can change from full-power (1500W) to half-power (1200W) using the LAMP CONTROL channel. Fans always work at Full speed
 - **1200W Low fan speed:** Lamp constantly works in half-power mode (1200W) while the Fan always works at Low speed. With LAMP CONTROL channel you can only switch the lamp ON and OFF.
 - **1500-1200W Auto fan speed:** Lamp can change from full-power (1500W) to half-power (1200W) using the LAMP CONTROL channel. Automatically the fans switch from Full speed to Low speed respectively.
- 3) Press **OK** to confirm the selection or LEFT **◀** to keep current setting.



DISPLAY

Used for automatically reduce brightness on the display after about 30 seconds in idle.

- 1) Press **OK** - the current settings appear on the display (On or Off).
- 2) Use the UP **▲** and DOWN **▼** keys to enable (On) or disable (Off) the decreasing of display brightness.
- 3) Press **OK** to confirm the selection or LEFT **◀** to keep current settings.

SETTING

Used to save 3 different settings of the items in the options menu and relative submenus.

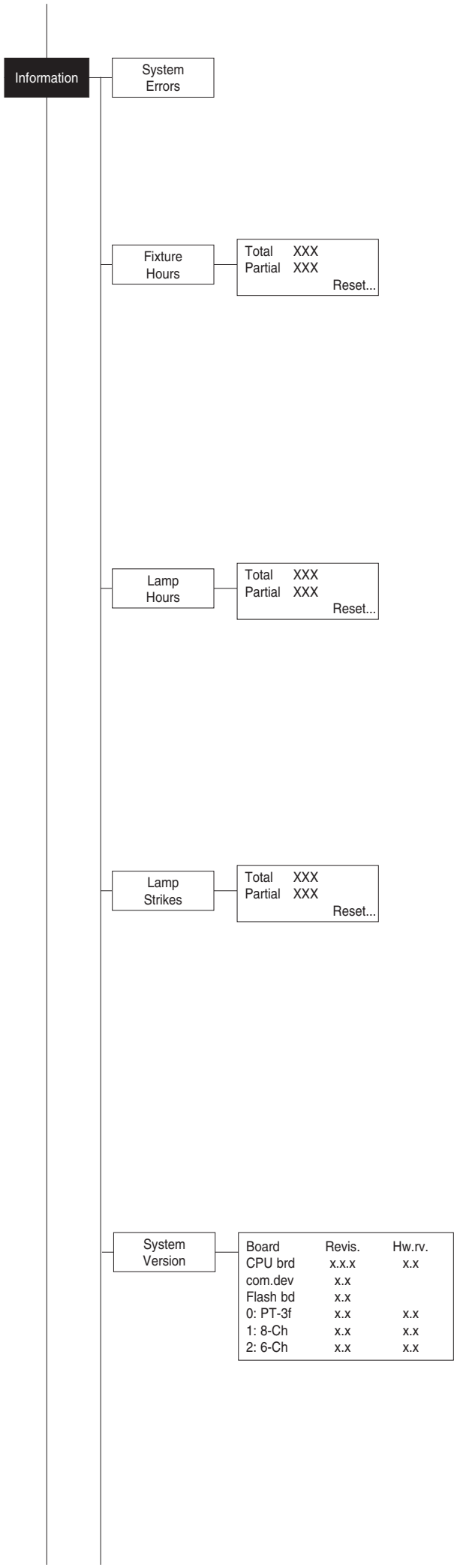
- 1) Press **OK** - "Default preset" appears on the display.
- 2) Use the UP **▲** and DOWN **▼** keys to select one of the following configurations:
 - Default preset (*)
 - User preset 1
 - User preset 2
 - User Preset 3
- 3) Press **OK** - "Load preset X" appears on the display.
- 4) Use the UP **▲** and DOWN **▼** keys to select:
 - Load preset X to recall a previously stored configuration.
 - Save to preset X to store the current configuration.
 a confirmation message (Are you sure?) appears on the display.
- 5) Select YES to confirm the selection or NO to keep the current setting and return to the next higher level.

(*) DEFAULT PRESET

Used for restoring default values on all options menu items and relevant submenus.

- 1) Press **OK**, a confirmation message (Are you sure?) appears on the display .
- 2) Select YES to confirm the selection or NO to keep current setting.

OPTION	DEFAULT
Lamp DMX	On
Invert Pan	Off
Invert Tilt	Off
Swap Pan-Tilt	Off
Encoder Pan-Tilt	On
Colour mixing	CMY
Fixed Wheel Shortcut	On
Macro Color Adjustment	On
Shutter on error	Off
Dimmer on Shutter	Off
Silent Mode	Standard
Power Mode	1500-1200W full fan speed
Display	On



INFORMATION MENU

SYSTEM ERRORS

Shows a list of warnings and messages relevant to errors occurred since the fixtures switching-on.

- 1) Pressing **OK** you are allowed to reset the SYSTEM ERRORS list.
A confirmation message (Are you sure you want to clear error list ?) appears on the display.
- 2) Select YES to reset the list or NO to go back.

FIXTURE HOURS

Used for displaying projector operating hours (total and partial).

- 1) Press **OK** - Hours total and partial appears on the display.
 - Total counter**
Counts the number of projector working life hours (from manufacture to date).
 - Partial counter**
Counts the number of partial projector working life hours since the last reset to date.
- 2) Press **OK** to reset partial projector working hours a confirmation message (Are you sure?) appears on the display.
- 3) Select YES to reset partial projectors counter or NO to keep the current setting and return to the top menu level.

LAMP HOURS

Used for displaying the lamp working hours (total and partial).

- 1) Press **OK** - Hours total and partial appears on the display.
 - Total counter**
Counts the number of projector working hours with the lamp on (from manufacture to date).
 - Partial counter**
Counts the number of lamp working hours since the last reset to date.
- 2) Press **OK** to reset partial lamp working hours, a confirmation message (Are you sure ?) appears on the display.
- 3) Select YES to reset partial counter or NO to keep the current setting and return to the top menu level

LAMP STRIKES

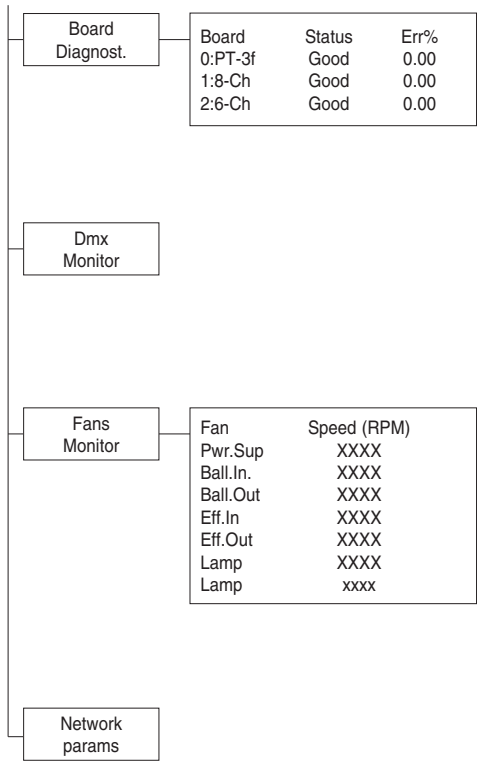
Used for displaying the number of times the lamp was turned on (total and partial).

- 1) Press **OK** - the number of times the lamp was turned on (total and partial) appears on the display.
 - Total counter**
Counts the number of times the lamp was turned on (from manufacture to date).
 - Partial counter**
Counts the number of times the lamp was turned on since the last reset to date.
- 2) Press **OK** to reset partial lamp strikes hours, a confirmation message (Are you sure ?) appears on the display.
- 3) Select YES to reset partial counter or NO to keep the current setting and return to the top menu level

SISTEM VERSION

Used for displaying the software and hardware version of each board installed in the projector.

- CPU brd (CPU board)
- Flash bd (Flash/Strobe CPU board)
- 0: PT-3f (Pan / Tilt board)
- 1: 8-Ch (8 channel board)
- 2: 6-Ch (6 channel board)



BOARD DIAGNOSTIC

Used for displaying the status error of each board installed in the projector:
 0: PT-3f (Pan / Tilt board)
 1: 8-Ch (8 channel board)
 2: 6-Ch (6 channel board)

DMX MONITOR

Used for displaying the projector DMX channel level in bit (Val) and in percentage (Perc).

FANS MONITOR

Used for displaying the speed of each fan installed in the projector:
 Pwr.Sup (Power supply Fan)
 Ball. IN (Ballast IN Fan)
 Ball. Out (Ballast OUT Fan)
 Eff.IN (Effects IN Fan)
 Eff.OUT (Effects OUT Fan)
 Lamp (Lamp Fan)
 Lamp (Lamp Fan)

NETWORK PARAMS

Allows the "Network" parameters of the projector to be displayed or:
IP address: Internet Protocol address (two projectors must not have the same IP address)
IP mask: 255.0.0.0
Mac address: Media Access Control: the projector's Ethernet Address.

MANUAL CONTROL

LAMP

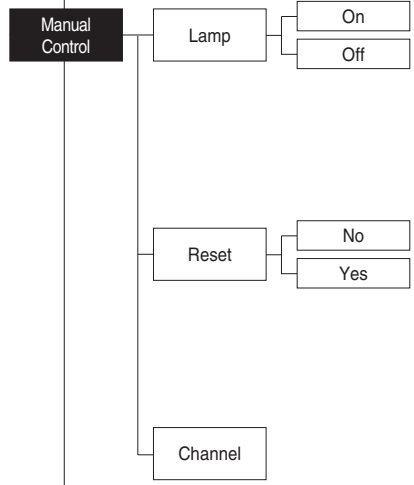
Used for turning lamp on and off from the projector control panel.
 1) Press **OK** - the current settings appear on the display (On or Off).
 2) Use the UP **▲** and DOWN **▼** keys to turn the lamp on (On) or off (Off)
 3) Press **OK** to confirm the selection or LEFT **◀** to keep current settings and return to the top level.

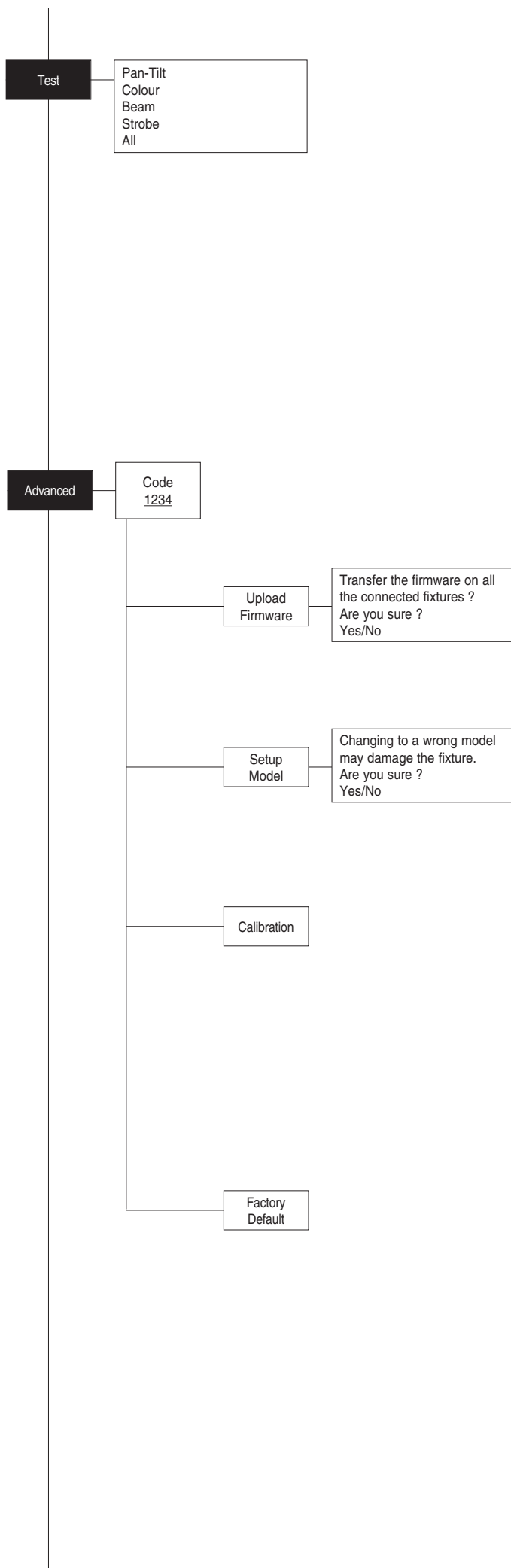
RESET

Used for resetting the projector.
 1) Press **OK** to reset the projectors, a confirmation message (Are you sure ?) appears on the display.
 2) Select YES to starting reset the fixture or NO to keep the current setting and return to the top menu level.

CHANNEL

Used for setting channel levels from the projector control panel.
 1) Press **OK** - the first channel appears on the display.
 2) Use the UP **▲** and DOWN **▼** keys to select the required channel:
 3) Press **OK** and use the UP **▲** and DOWN **▼** keys to select the required DMX level (value between 0 and 255).
 4) Press LEFT **◀** to return to the top menu level.





TEST MENU

AUTOTEST

Allows you to check the proper functioning of effects.

- 1) Press **OK**.
- 2) Use the UP **▲** and DOWN **▼** keys to select the required test.
- 3) Press **OK** to confirm the selection or LEFT **◀** to return to the top menu level.

Test sequence:

Pan - Tilt effects (Pan & Tilt)

Colour effects (CMY / colour wheels)

Beam effects (Stopper-Strobe / Dimmer / Beam shaper / Zoom)

Strobe (Strobe section)

All effects

ADVANCED MENU

To enable the "Advanced Menu" set up the "Access code" (1234) using the UP **▲**, DOWN **▼**, RIGHT **▶** keys.

Press **OK** - "Menu advanced" appears on the display

UPLOAD FIRMWARE

Allows you to transfer the firmware from 1 fixture to all the connected fixtures.

- 1) Press **OK**, a confirmation message appears on the display.
- 2) Select YES to start the firmware loading or NO to keep the current setting and return to the top menu level

SETUP MODEL

Allows you to change the default model of projector.

- 1) Press **OK** a confirmation message appears on the display.
- 2) Select YES to define the model of projector or NO to keep the current setting and return to the top menu level.

CALIBRATION

Allows you to adjust effects from the control panel to obtain perfect uniformity between the projectors.

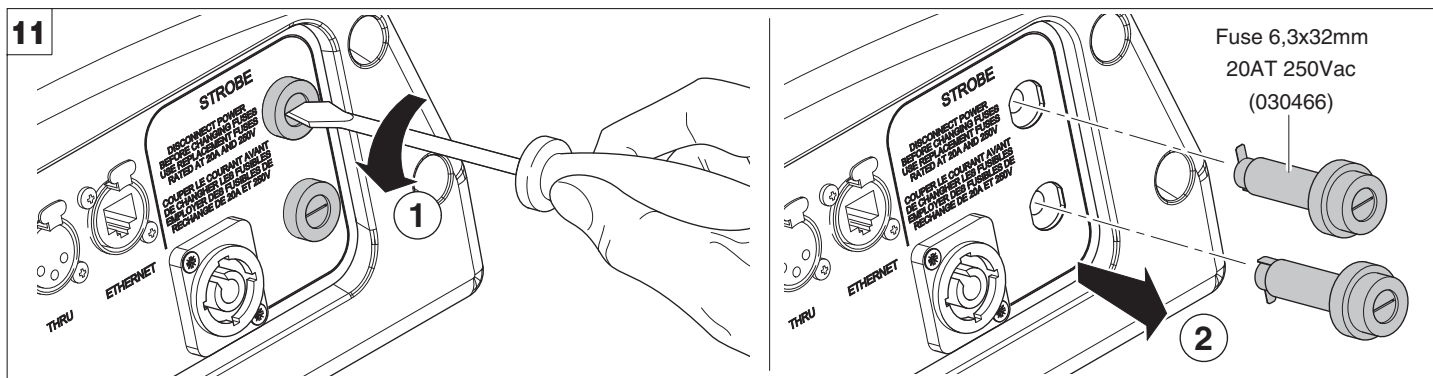
- 1) Press **OK** - "channels" appears on the display.
- 2) Using the UP **▲** and DOWN **▼** keys, select the effect you wish to regulate.
- 3) Press **OK** and use the RIGHT **▶**, UP **▲** and DOWN **▼** buttons to make the adjustment by setting a value between 0 and 255.
- 4) Press **OK** to confirm the selection or LEFT **◀** to keep current settings and return to the top level.

FACTORY DEFAULT

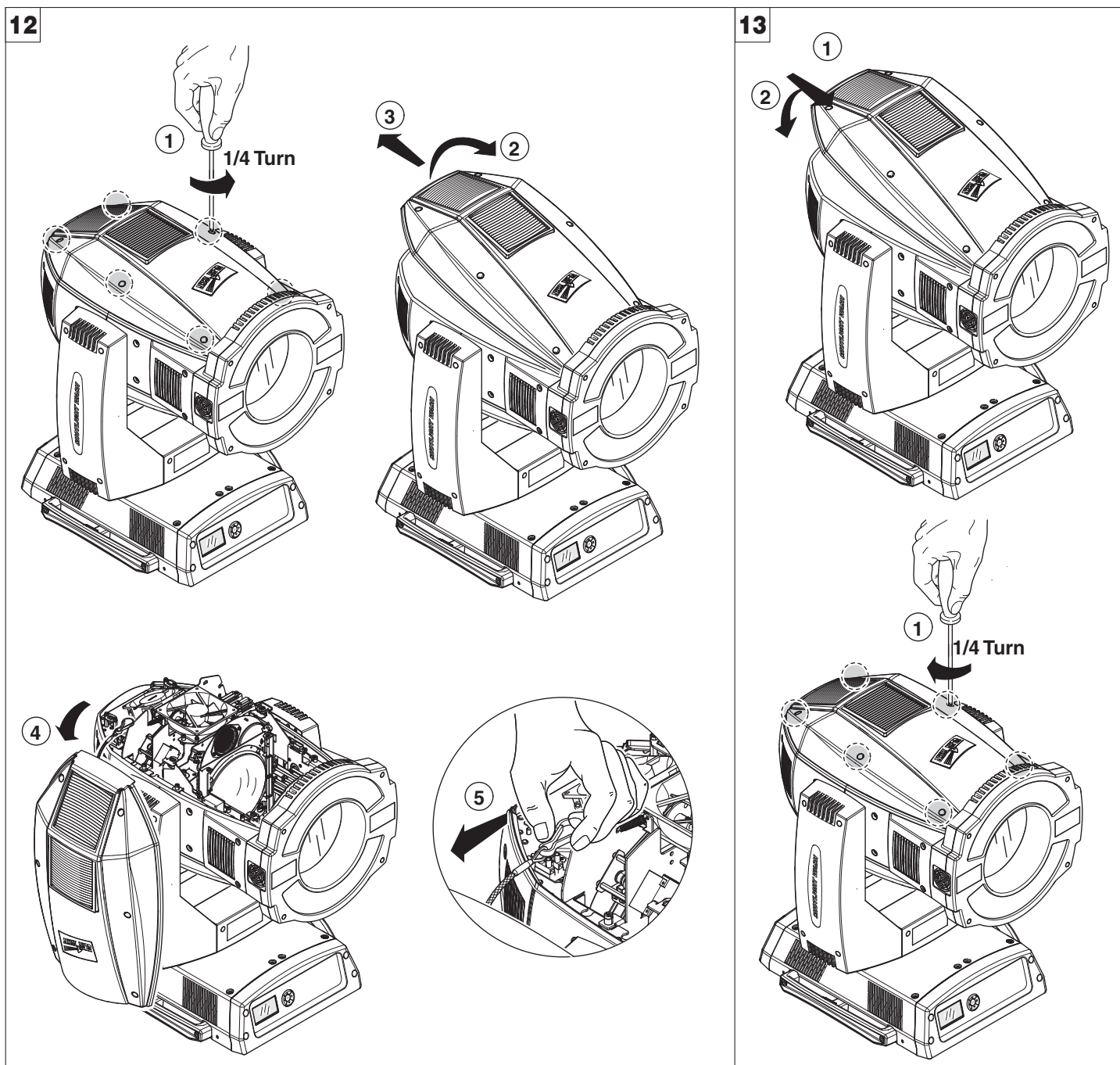
Allows you to restore default values of all channels (128).

- 1) Press **OK** – a confirmation message appears on the display (Reset calibration to factory default ?).
- 2) Select YES to reset calibration to factory default or NO to keep the current setting and return to the top menu level.

MAINTENANCE



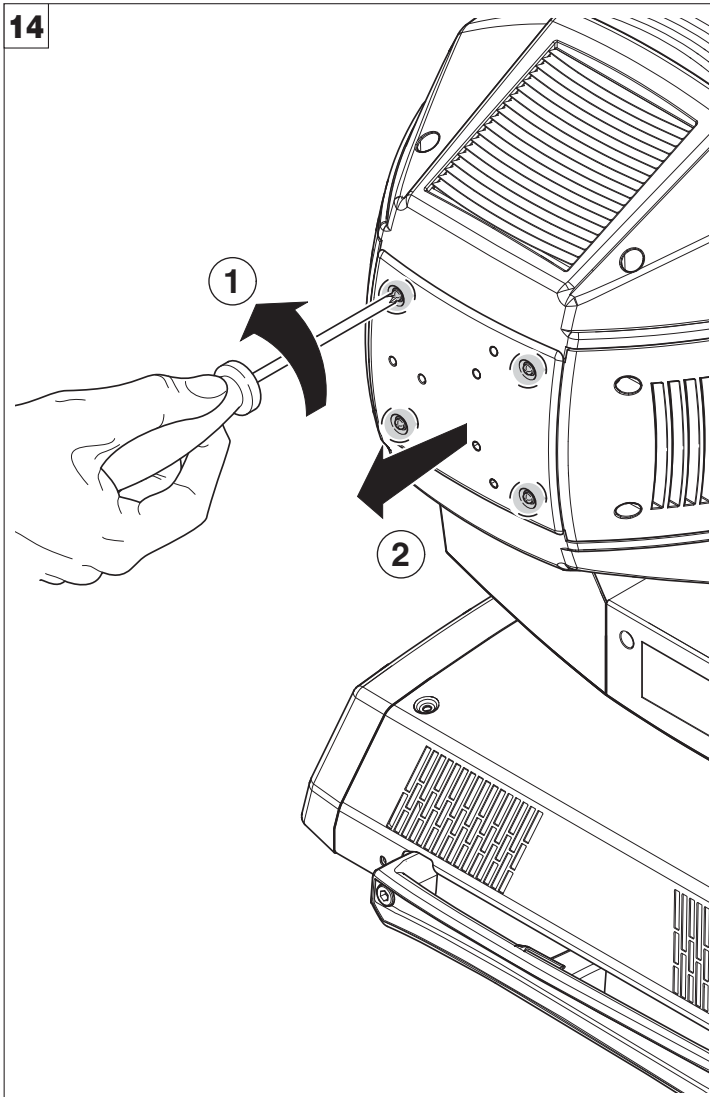
Replacing fuse - Fig. 11



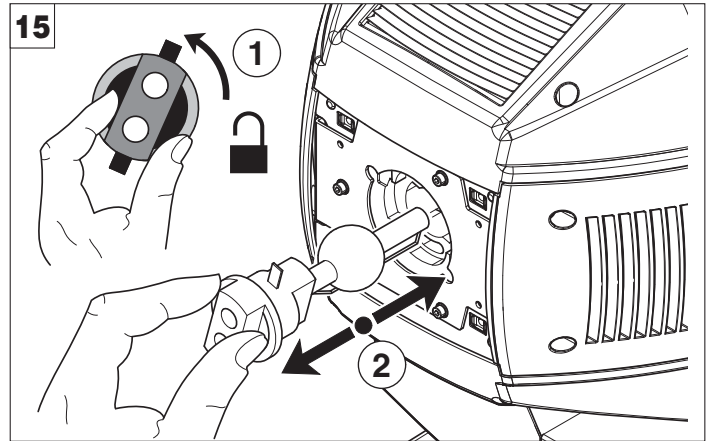
Locking and releasing Pan and Tilt movements - Refer to the instructions in the UNPACKING AND PREPARATION section.

Opening the head covers - Fig. 12

Closing the head covers - Fig. 13



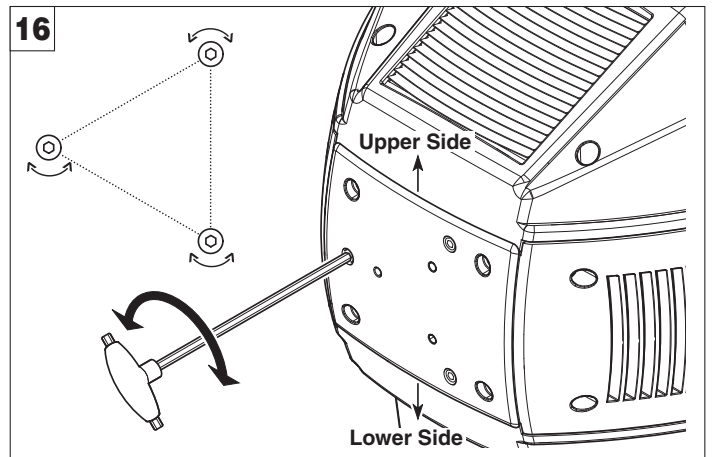
Opening and closing lamp compartment - Fig. 14



Lamp change - Fig 15

Take the new lamp out of its package and insert in the fitting.

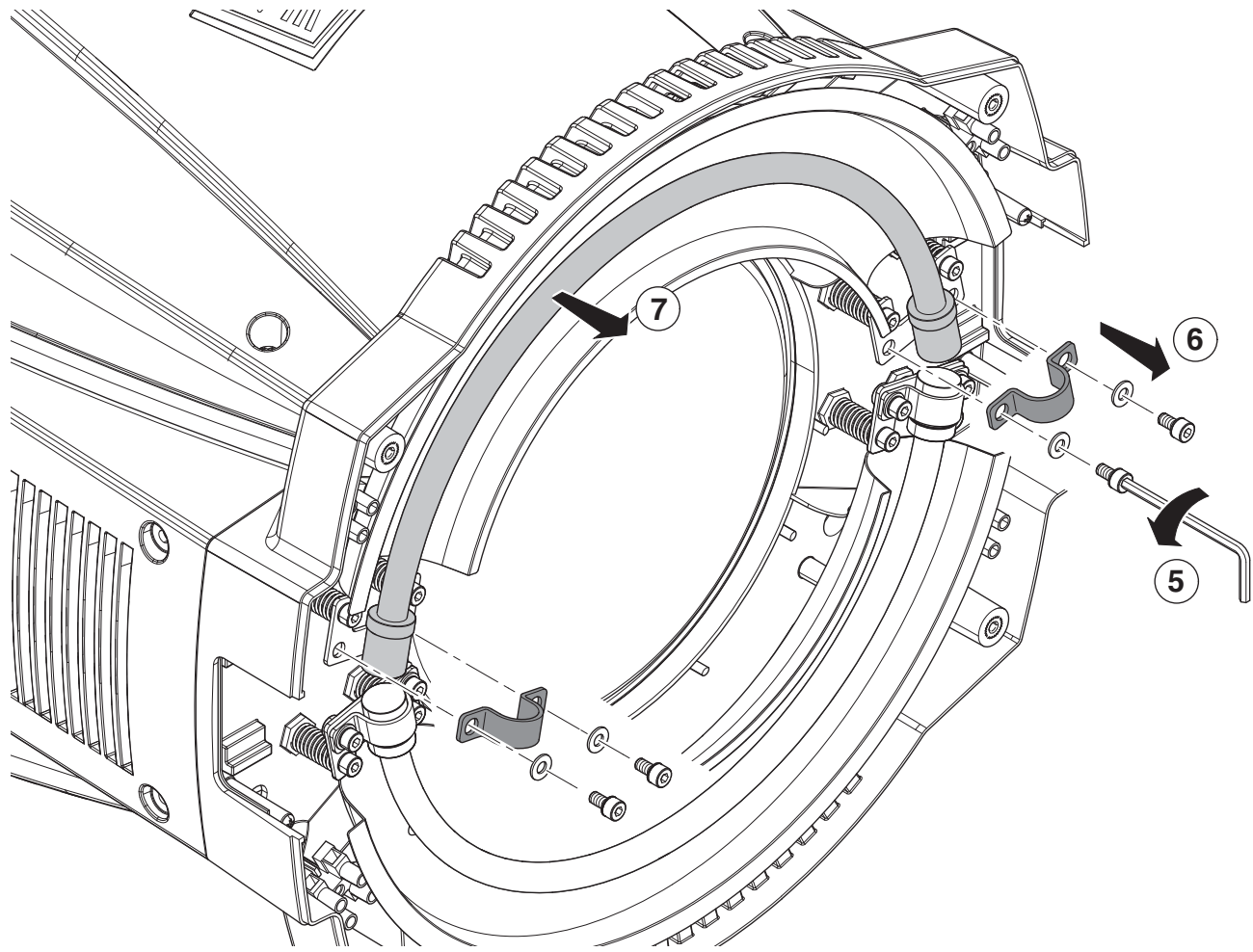
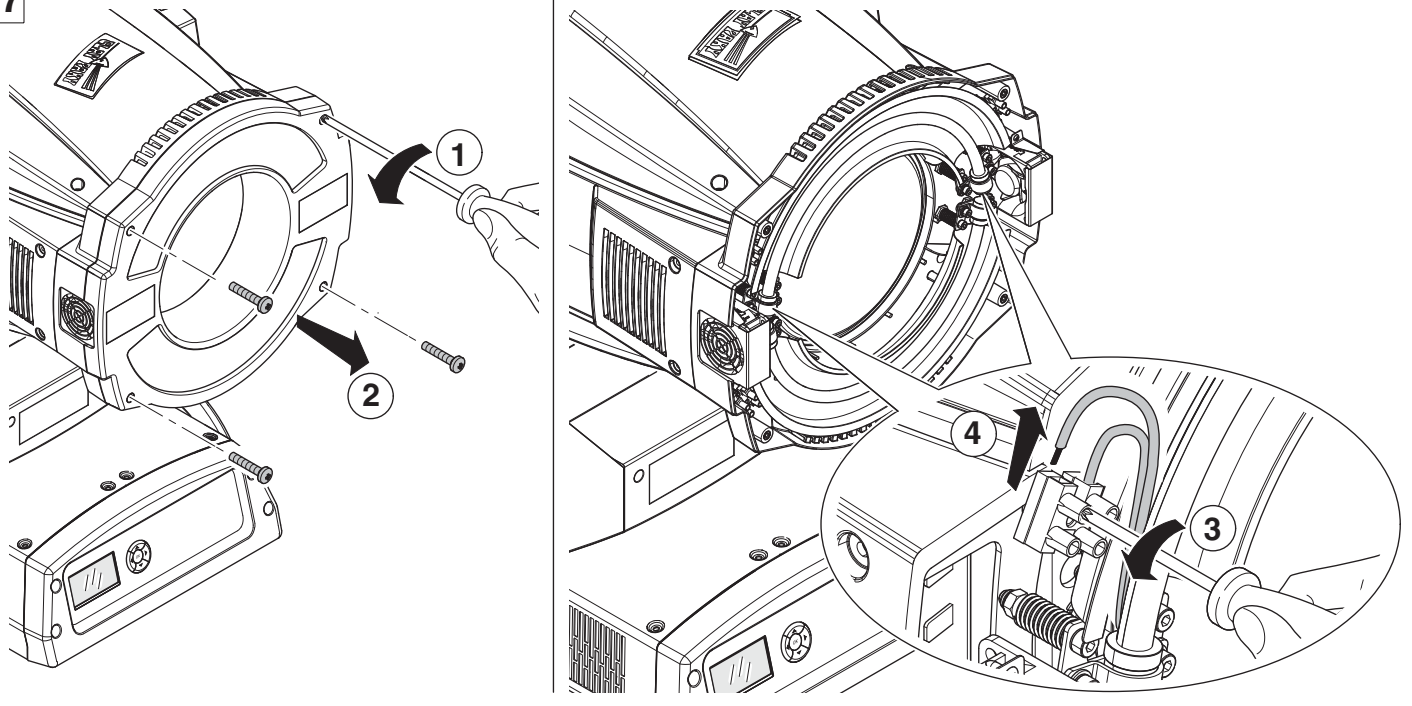
WARNING: do not touch the lamp's envelope with bare hands. Should this happen, clean the bulb with a cloth soaked in alcohol and dry it with a clean, dry cloth.



Lamp regulation - Fig. 16

To centre the lamp, turn the three adjusting screws as shown in the figure.

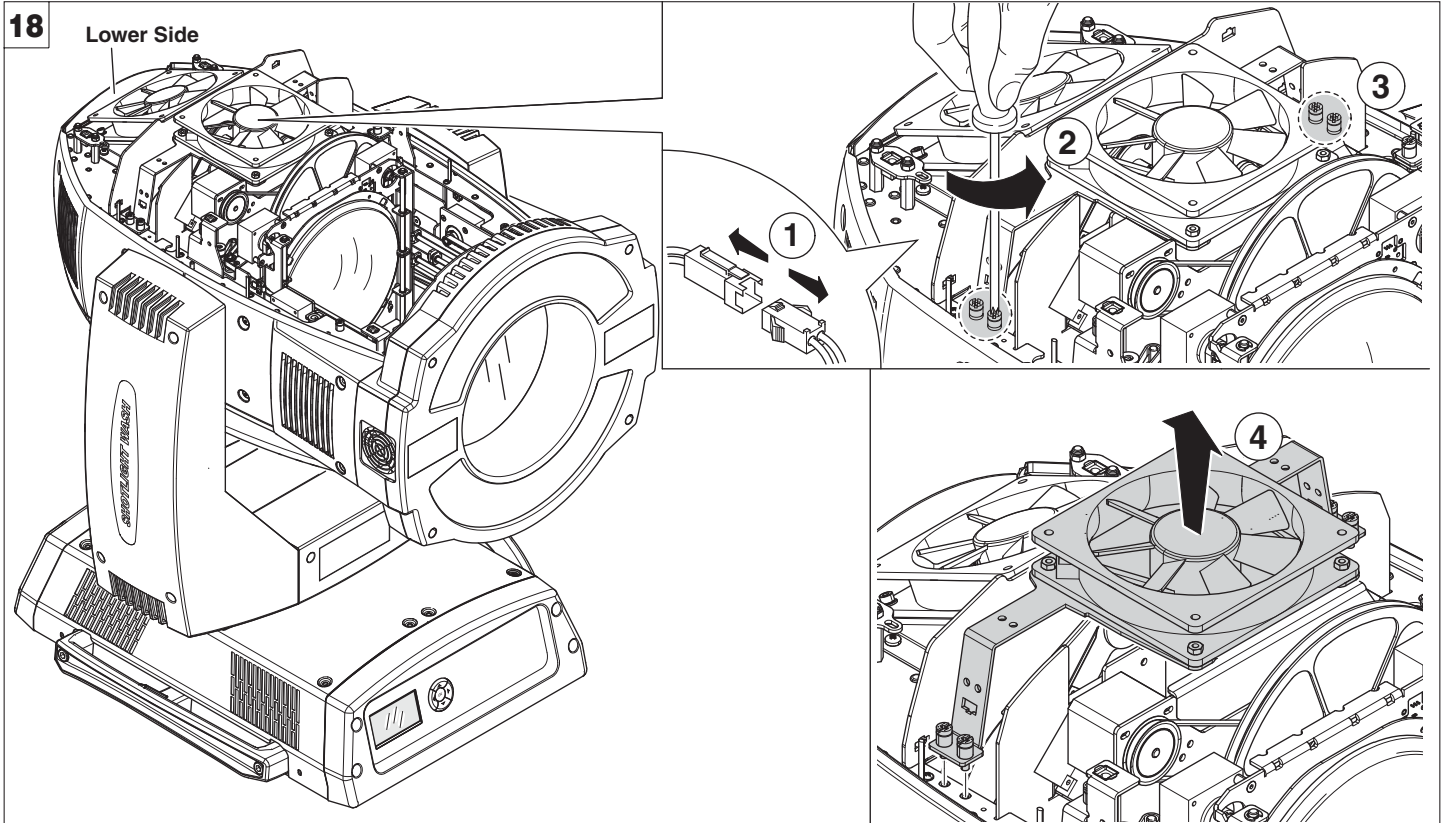
17



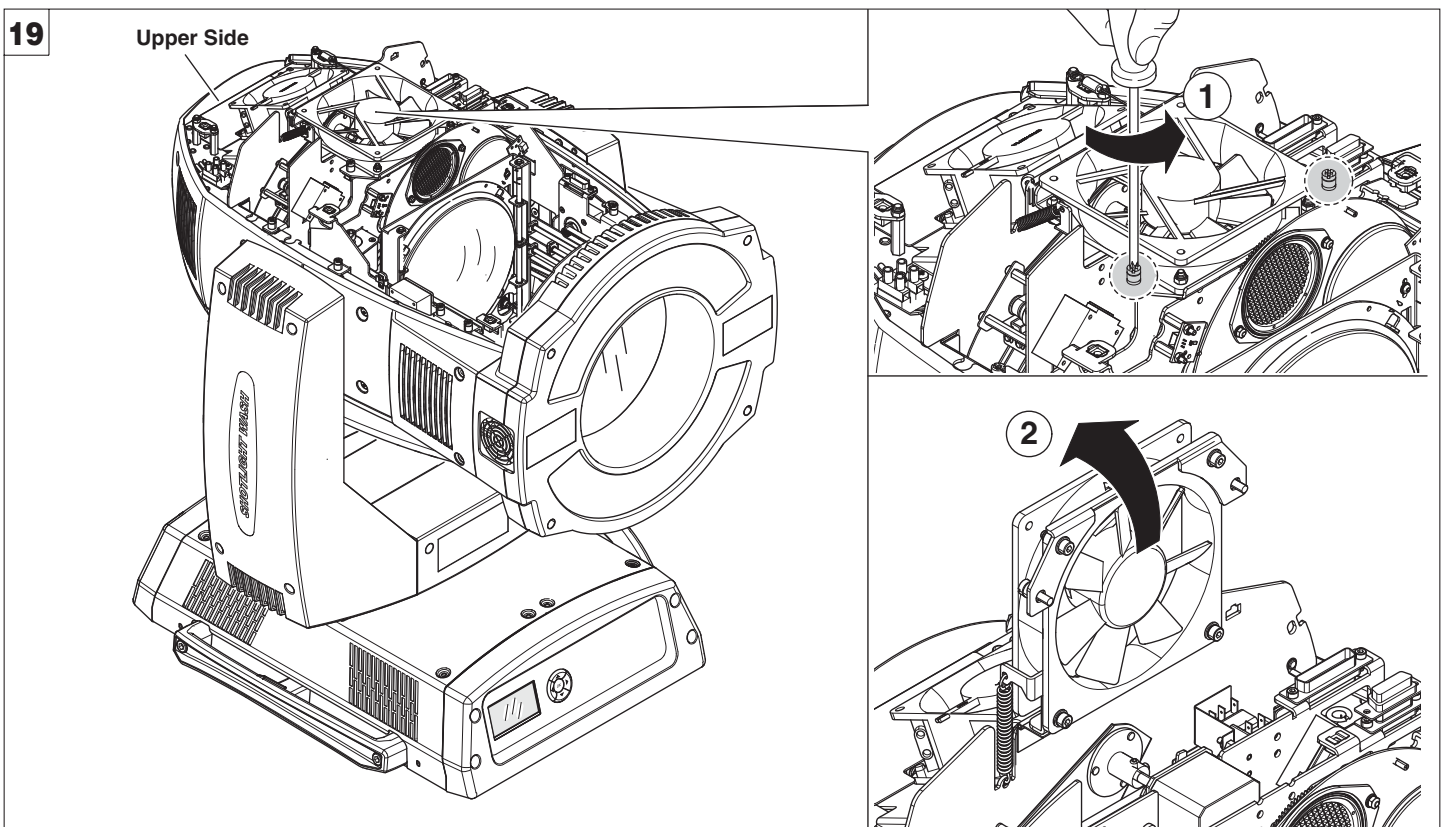
Plused Xenon lamp change - Fig 17

Take the new lamp out of its package and insert in the fitting.

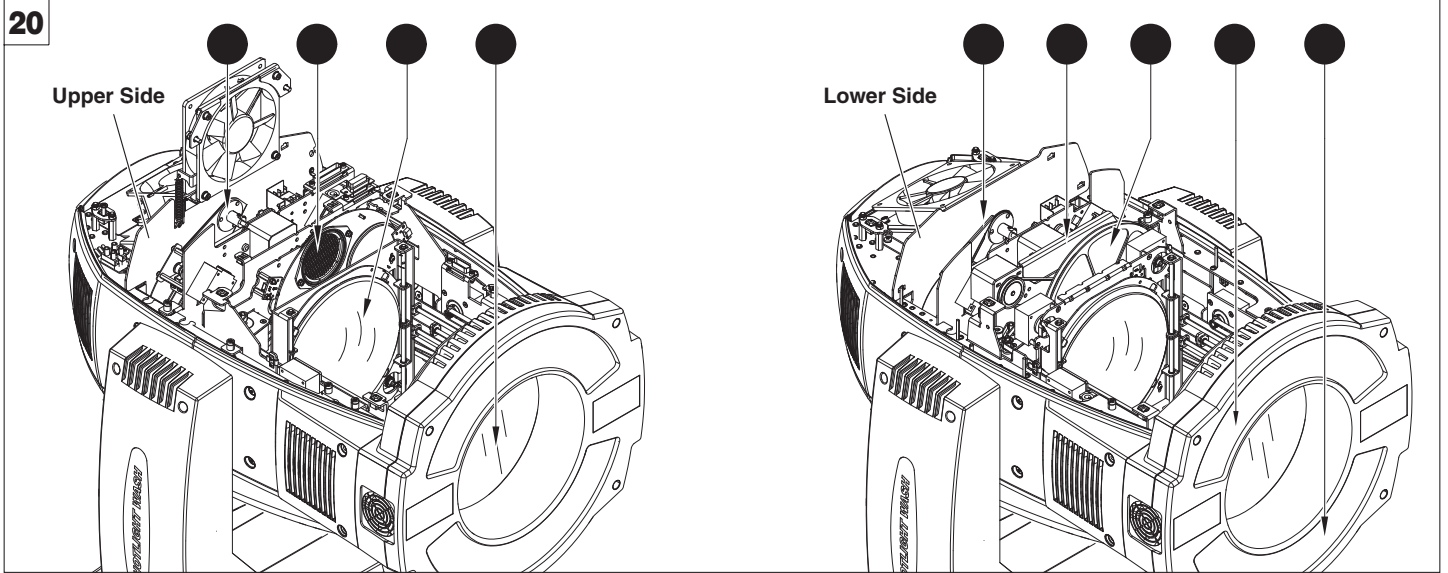
WARNING: do not touch the lamp's envelope with bare hands. Should this happen, clean the bulb with a cloth soaked in alcohol and dry it with a clean, dry cloth.



Fan support plate opening and closing (Lower side) - Fig. 18



Fan support plate opening and closing (Upper side) - Fig. 19

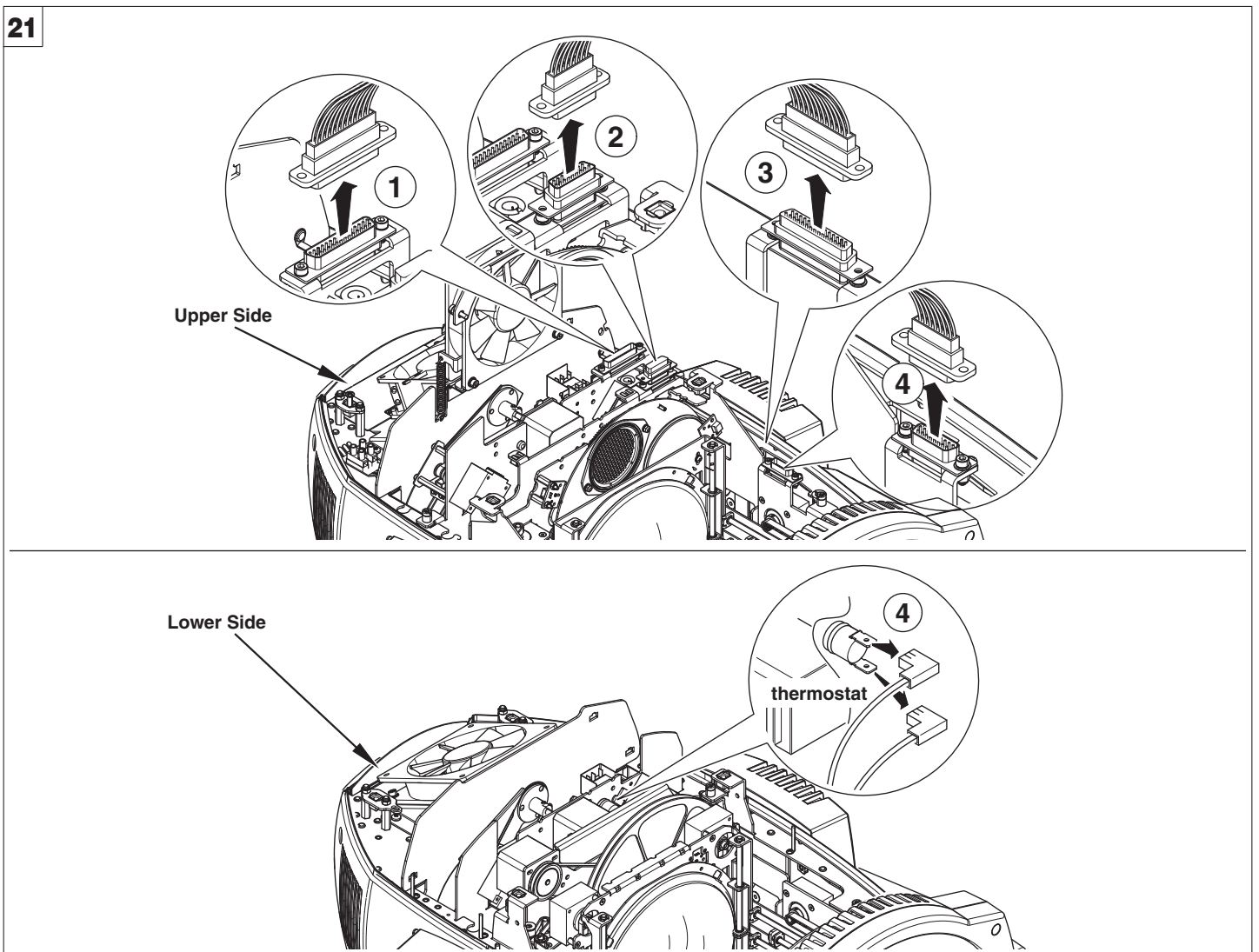


Periodical cleaning - Fig. 20

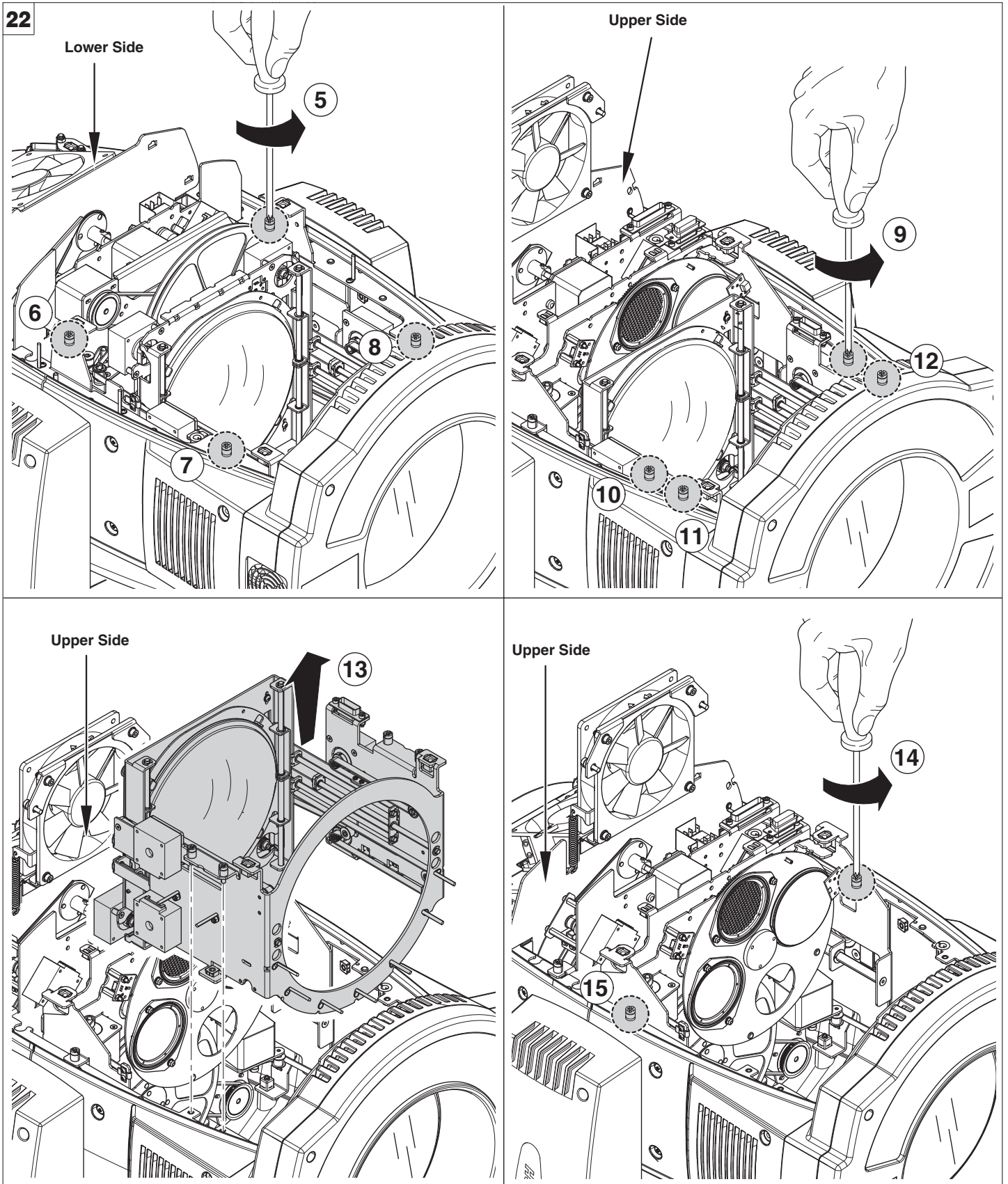
To ensure optimal operation and performance for a long time it is essential to periodically clean the parts subject to dust and grease deposits. The frequency with which the following operations are to be carried out depends on various factors, such as the amount of the effects and the quality of the working environment (air humidity, presence of dust, salinity, etc.).

Use a soft cloth dampened with any detergent liquid for cleaning glass to remove the dirt from the reflectors, from the lenses and filters. It is recommended that the projector undergoes an annual service by a qualified technician for special maintenance involving at least the following operations:

- General cleaning of internal parts.
- Restoring lubrication of all parts subject to friction, using lubricants specifically supplied by Clay Paky.
- General visual check of the internal components, cabling, mechanical parts, etc.
- Electrical, photometric and functional checks; eventual repairs.



Extraction of the effect modules: Preliminary operations - Fig. 21

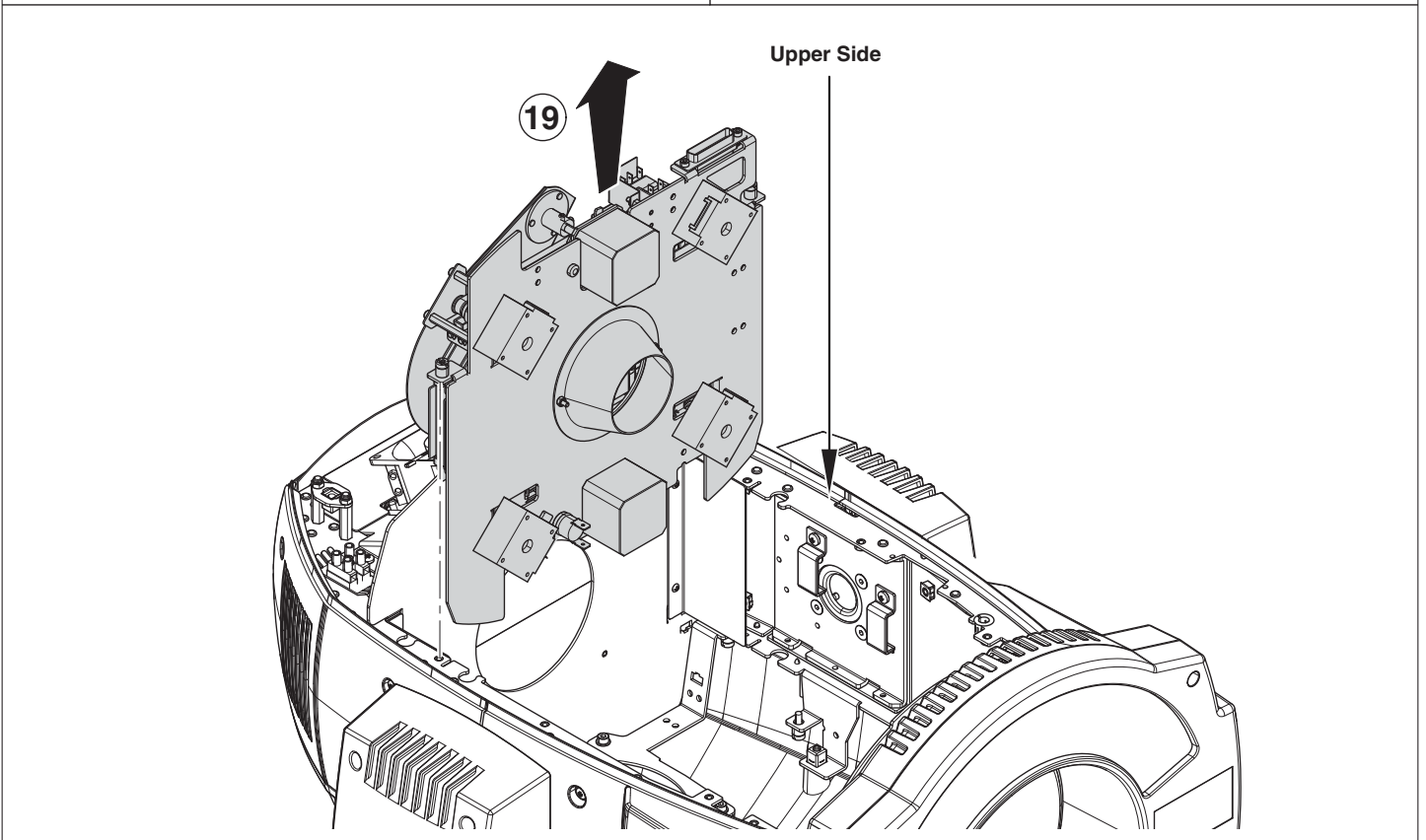
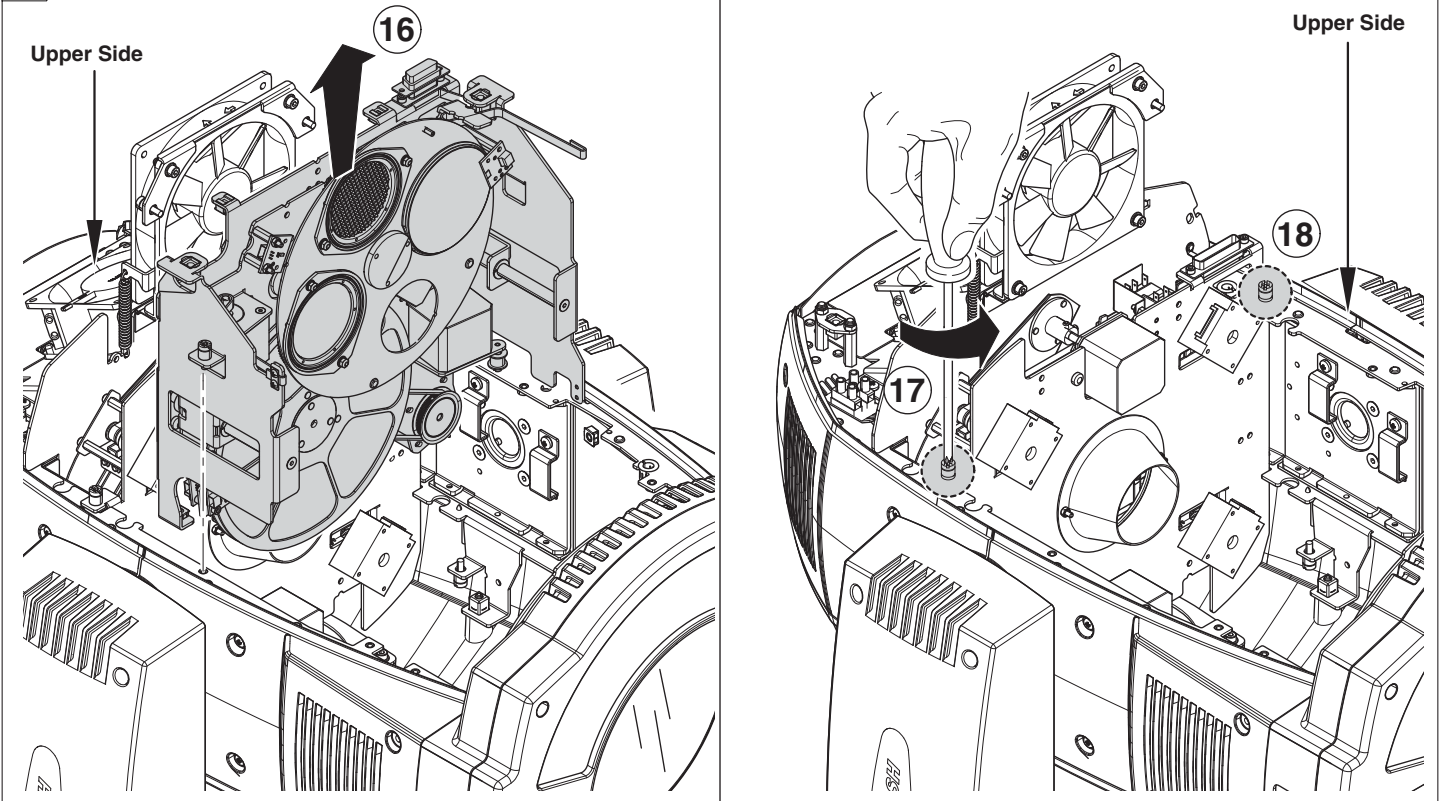


Extraction of the effect modules - Fig. 22

IMPORTANT: Grasp the modules using the support structure and not the details which could get damaged.

Insertion of the effect modules: Repeat the operations indicated in Fig. 20 and 21 in reverse order

23



Extraction of the effect modules - Fig 23

IMPORTANT: Grasp the modules using the support structure and not the details which could get damaged.

Insertion of the effect modules: Repeat the operations indicated in Fig. 20 and 21 in reverse order

TECHNICAL INFORMATION

Power supplies available

200-240V 50/60Hz

Input power:

Wash: 2000VA

Strobe:

- Typical current 12A
- Peak current 31.5A

Lamp Wash:

Discharge lamp.

- Type HTI 1500W/60/P50-L Lok-it Osram (L10102)
- Cap PGJ50
- Colour temperature 6000 K
- Luminous flux 135000 lm
- Average life 750 h
- Any working position

Lamp Strobe:

Lamp pulsed Xenon 1500W

- Type ER 9902 CPY [H] (L10201)
- Average life 500 h
- Any working position

Motors:

21 stepper motors, operating with microsteps, totally microprocessor controlled.

Optical unit:

Wash: Elliptic reflector with high luminous efficiency

Strobe: Special shape mirror reflector

Channels:

Max 31 control channels.

Inputs:

- DMX 512

Movable body:

- Movement by means of two stepper motors, controlled by microprocessor.
- Automatic repositioning of PAN and TILT after accidental movement not controlled by control unit.
- Travel:
 - PAN = 540°
 - TILT = 252°
- Maximum speeds:
 - PAN = 6.8 (normal) / 5.3 (fast) 540°
 - TILT = 4.8 (normal) / 3.3 (fast) 252°
- Resolution:
 - PAN = 2.11°
 - PAN FINE = 0.008°
 - TILT = 0.98°
 - TILT FINE = 0.004°

IP20 protection rating:

- Protected against the entry of solid bodies larger than 12mm (0.47").
- No protection against the entry of liquids.

CE Marking:

In conformity with the European Union Low Voltage Directive 2006/95/CE and Electromagnetic compatibility Directive 2004/108/CE.

Safety Devices:

- Bipolar circuit breaker with thermal protection.
- Automatic break in power supply in case of overheating or failed operation of cooling system.

Cooling:

Forced ventilation with axial fans.

Body:

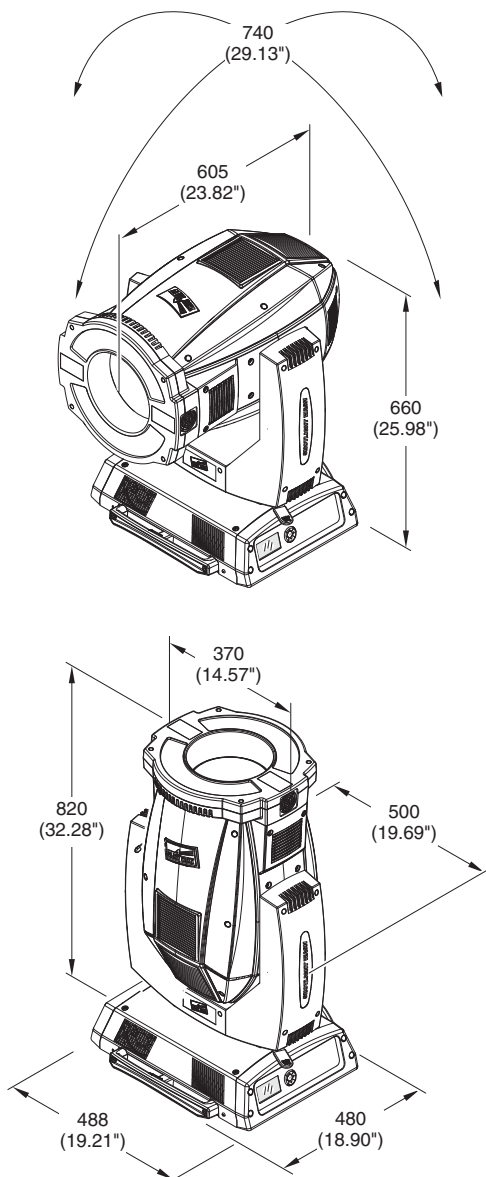
- Aluminium structure with die-cast plastic cover.
- Two side handles for transportation.
- Device locking PAN and TILT mechanisms for transportation and maintenance.

Working position

Functioning in any position.

Weights:

about 46,50 Kg.



CAUSE AND SOLUTION OF PROBLEMS

THE PROJECTOR WILL NOT SWITCH ON			PROBLEMS
ELECTRONICS NON-OPERATIONAL			
DEFECTIVE PROJECTION			
REDUCED LUMINOSITY			
POSSIBLE CAUSES			CHECKS AND REMEDIES
●		No mains supply.	Check the power supply voltage.
●	●	Lamp exhausted or defective.	Replace the lamp. (See instructions).
	●	Signal transmission cable faulty or disconnected.	Replace the cables.
	●	Incorrect addressing.	Check addresses (see instructions).
	●	Fault in the electronic circuits.	Call an authorised technician.
	●	Lenses or reflector broken	Call an authorised technician.
	● ●	Dust or grease deposited.	Clean (see instructions).

CHANNEL FUNCTION

SHOTLIGHT WASH

CHANNEL	CHANNEL MODE	
	SYNCHRONIZED	INDEPENDENT
1	FLASH INTENSITY	FLASH INTENSITY LAMP 1
2	FLASH DURATION	FLASH DURATION LAMP 1
3	FLASH RATE	FLASH RATE LAMP 1
4	LAMP POWER	FLASH INTENSITY LAMP 2
5	MACRO FLASH	FLASH DURATION LAMP 2
6	CYAN	FLASH RATE LAMP 2
7	MAGENTA	LAMP POWER
8	YELLOW	MACRO FLASH
9	C.T.O	CYAN
10	COLOUR WHEEL 1	MAGENTA
11	COLOUR WHEEL 2	YELLOW
12	MACRO COLOURS	C.T.O
13	STOP / STROBE	COLOUR WHEEL 1
14	DIMMER	COLOUR WHEEL 2
15	DIMMER FINE	MACRO COLOURS
16	BEAM SHAPER CHANGE	STOP / STROBE
17	BEAM SHAPER ROTATION	DIMMER
18	ZOOM	DIMMER FINE
19	PAN	BEAM SHAPER CHANGE
20	PAN FINE	BEAM SHAPER ROTATION
21	TILT	ZOOM
22	TILT FINE	PAN
23	FUNCTION	PAN FINE
24	RESET	TILT
25	LAMP CONTROL (with Option "Lamp DMX" ON)	TILT FINE
26		FUNCTION
27		RESET
28		LAMP CONTROL (with Option "Lamp DMX" ON)
29		PAN - TILT TIME
30		COLOUR TIME
31		BEAM TIME

NOTE: On conclusion of resetting in case of absence of DMX signal, Pan & Tilt move to the "Home" position (Pan 50% - Tilt 50%) all the others channels stay at 0%.

- FLASH INTENSITY - channel 1 (synchronized mode)
- FLASH INTENSITY LAMP 1 - channel 1 (independent mode)
- FLASH INTENSITY LAMP 2 - channel 4 (independent mode)



BIT	%	EFFECT
255	100	MAXIMUM INTENSITY
.....	
0	0.0	MINIMUM INTENSITY

- FLASH DURATION - channel 2 (synchronized mode)
- FLASH DURATION LAMP 1 - channel 2 (independent mode)
- FLASH DURATION LAMP 2 - channel 5 (independent mode)



BIT	%	EFFECT
255	100	MAXIMUM DURATION
.....	
0	0.0	MINIMUM DURATION

- LAMP POWER - channel 4 (synchronized mode)
- channel 7 (independent mode)



BIT	%	EFFECT
255	100	LAMP 1 1500W POWER
.....	
128	50	LAMP 1 & 2 750W POWER
.....	
0	0.0	LAMP 2 1500W POWER

- FLASH RATE - channel 3 (synchronized mode)
- FLASH RATE LAMP 1 - channel 3 (independent mode)
- FLASH RATE LAMP 2 - channel 6 (independent mode)

BIT	%	EFFECT			
		Frequency (Hz)		BPM	
		50 Hz	60 Hz	50 Hz	60 Hz
225-255	88,2-100	12,500	15,000	750,0	900,0
208-224	81,7-88,0	8,333	10,000	500,0	600,0
198-207	77,5-81,2	6,250	7,500	375,0	450,0
190-197	74,2-77,0	5,000	6,000	300,0	360,0
183-189	71,7-74,0	4,167	5,000	250,0	300,0
176-182	69,0-71,2	3,571	4,286	214,3	257,1
171-175	67,0-68,7	3,125	3,750	187,5	225,0
166-170	65,0-66,7	2,778	3,333	166,7	200,0
161-165	63,2-64,7	2,500	3,000	150,0	180,0
157-160	61,7-63,0	2,273	2,727	136,4	163,6
153-156	60,0-61,2	2,083	2,500	125,0	150,0
149-152	58,2-59,5	1,923	2,308	115,4	138,5
146-148	57,0-58,0	1,786	2,143	107,1	128,6
142-145	55,5-56,7	1,667	2,000	100,0	120,0
139-141	54,2-55,0	1,563	1,875	93,8	112,5
136-138	53,2-54,0	1,471	1,765	88,2	105,9
133-135	52,0-53,0	1,389	1,667	83,3	100,0
130-132	51,0-51,7	1,316	1,579	78,9	94,7
127-129	49,7-50,5	1,250	1,500	75,0	90,0
124-126	48,7-49,5	1,190	1,429	71,4	85,7
122-123	48,0-48,2	1,136	1,364	68,2	81,8
119-121	46,7-47,5	1,087	1,304	65,2	78,3
117-118	46,0-46,2	1,042	1,250	62,5	75,0
114-116	44,7-45,5	1,000	1,200	60,0	72,0
112-113	44,0-44,2	0,962	1,154	57,7	69,2
110-111	43,2-43,7	0,926	1,111	55,6	66,7
107-109	42,0-43,0	0,893	1,071	53,6	64,3
105-106	41,2-41,7	0,862	1,034	51,7	62,1
103-104	40,5-41,0	0,833	1,000	50,0	60,0
101-102	39,5-40,0	0,806	0,968	48,4	58,1
99-100	38,7-39,0	0,781	0,938	46,9	56,3
97-98	38,0-38,2	0,758	0,909	45,5	54,5
95-96	37,0-37,5	0,735	0,882	44,1	52,9
93-94	36,2-36,7	0,714	0,857	42,9	51,4
91-92	35,5-36,0	0,694	0,833	41,7	50,0
89-90	34,7-35,0	0,676	0,811	40,5	48,6
87-88	34,0-34,2	0,658	0,789	39,5	47,4
85-86	33,2-33,7	0,641	0,769	38,5	46,2
83-84	32,5-33,0	0,625	0,750	37,5	45,0
82	32,0	0,610	0,732	36,6	43,9
80-81	31,2-31,7	0,595	0,714	35,7	42,9
78-79	30,5-31,0	0,581	0,698	34,9	41,9
77	30,0	0,568	0,682	34,1	40,9
75-76	29,5-29,7	0,556	0,667	33,3	40,0
73-74	28,7-29,0	0,543	0,652	32,6	39,1
72	28,2	0,532	0,638	31,9	38,3
70-71	27,5-28,0	0,521	0,625	31,3	37,5
68-69	26,7-27,0	0,510	0,612	30,6	36,7
67	26,2	0,500	0,600	30,0	36,0
65-66	25,5-26,0	0,490	0,588	29,4	35,3
64	25,0	0,481	0,577	28,8	34,6
62-63	24,2-24,7	0,472	0,566	28,3	34,0
61	24,0	0,463	0,556	27,8	33,3
59-60	23,2-23,7	0,455	0,545	27,3	32,7
58	23,0	0,446	0,536	26,8	32,1
56-57	22,0-22,5	0,439	0,526	26,3	31,6
55	21,7	0,431	0,517	25,9	31,0
54	21,2	0,424	0,508	25,4	30,5
52-53	20,5-21,0	0,417	0,500	25,0	30,0
51	20,0	0,410	0,492	24,6	29,5
49-50	19,0-19,5	0,403	0,484	24,2	29,0
48	18,7	0,397	0,476	23,8	28,6
47	18,2	0,391	0,469	23,4	28,1
45-46	17,5-18,0	0,385	0,462	23,1	27,7
44	17,0	0,379	0,455	22,7	27,3
43	16,7	0,373	0,448	22,4	26,9
41-42	16,0-16,2	0,368	0,441	22,1	26,5
40	15,5	0,362	0,435	21,7	26,1
39	15,0	0,357	0,429	21,4	25,7
38	14,7	0,352	0,423	21,1	25,4
36-37	14,0-14,2	0,347	0,417	20,8	25,0
35	13,7	0,342	0,411	20,5	24,7
34	13,2	0,338	0,405	20,3	24,3
33	13,0	0,333	0,400	20,0	24,0
31-32	12,0-12,5	0,329	0,395	19,7	23,7
30	11,7	0,325	0,390	19,5	23,4
29	11,2	0,321	0,385	19,2	23,1
28	11,0	0,316	0,380	19,0	22,8
27	10,5	0,313	0,375	18,8	22,5
26	10,0	0,309	0,370	18,5	22,2
24-25	9,5-9,7	0,305	0,366	18,3	22,0
23	9,0	0,301	0,361	18,1	21,7
22	8,7	0,298	0,357	17,9	21,4
21	8,2	0,294	0,353	17,6	21,2
20	8,0	0,291	0,349	17,4	20,9
19	7,5	0,287	0,345	17,2	20,7
18	7,0	0,284	0,341	17,0	20,5
17	6,7	0,281	0,337	16,9	20,2
15-16	6,0-6,2	0,278	0,333	16,7	20,0
14	5,5	0,275	0,330	16,5	19,8
13	5,0	0,272	0,326	16,3	19,6
12	4,7	0,269	0,323	16,1	19,4
11	4,2	0,266	0,319	16,0	19,1
10	4,0	0,263	0,316	15,8	18,9
9	3,7	0,260	0,313	15,6	18,8
8	3,2	0,258	0,309	15,5	18,6
7	3,0	0,255	0,306	15,3	18,4
6	2,5	0,253	0,303	15,2	18,2
5	2,0	0,250	0,300	15,0	18,0
0-4	0,0-1,7	OFF	OFF	OFF	OFF

• **MACRO FLASH**

- channel 5 (synchronized mode)
- channel 8 (independent mode)

BIT	%	EFFECT
253 - 255	99.0 - 100	SINGLE SHOT
240 - 252	94.0 - 98.7	MACRO OFF
226 - 239	88.7 - 93.7	RANDOM StrobeWShutter
212 - 225	83.2 - 88.2	RANDOM Strobe
198 - 211	77.5 - 83.0	RANDOM SawWave
184 - 197	72.0 - 77.0	RANDOM FadeInOut
170 - 183	66.7 - 71.7	RANDOM StrobeFlash
156 - 169	61.2 - 66.2	RANDOM BurstOnBlack
142 - 155	55.5 - 61.0	RANDOM FlashAndBlack
128 - 141	50.0 - 55.0	RANDOM UpDown
114 - 127	44.7 - 49.7	MACRO OFF
100 - 113	39.0 - 44.2	SawWaveUpDown
86 - 99	33.7 - 38.7	SawWave
72 - 85	28.2 - 33.2	FadeInOut
58 - 71	23.0 - 28.0	StrobeFlash
44 - 57	17.0 - 22.5	BurstOnBlack
30 - 43	11.7 - 16.7	FlashAndBlack
16 - 29	6.2 - 11.2	UpDown
12 - 15	4.7 - 6.0	ShutterSync Inverted
8 - 11	3.2 - 4.2	ShutterSync Normal
0 - 7	0.0 - 3.0	MACRO OFF

• **COLOUR MIXING - channel 6 - 7 - 8 (synchronized mode) channel 9 - 10 - 11 (independent mode)**

Operation with option color mixing: RGB

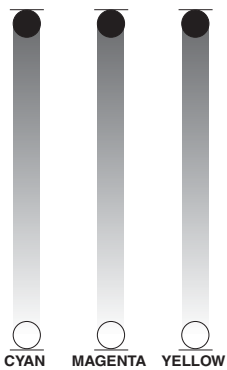


BIT	%	EFFECT
255	100	COLOUR EXCLUDED
0	0.0	COLOUR INSERTED

0% - 100% = 0.4 sec

IMPORTANT: The lamp dim to half power 1 second after all the 3 channels stay at 0% level. The lamp goes back to full power when the channels level is put higher than 0%.

Operation with option color mixing: CMY



BIT	%	EFFECT
255	100	COLOUR INSERTED
0	0.0	COLOUR EXCLUDED

0% - 100% = 0.4 sec

IMPORTANT: The lamp dim to half power 1 second after all the 3 channels stay at 100% level. The lamp goes back to full power when the channels level is put lower than 100%.

• **C.T.O. - channel 9 (synchronized mode) - 12 (independent mode)**



BIT	%	EFFECT
255	100	FILTER INSERTED
0	0.0	FILTER EXCLUDED

0% - 100% = 0.4 sec

• **COLOUR WHEEL 1 - channel 10 (synchronized mode) - 13 (independent mode)**



BIT	%	EFFECT
255	100	FAST ROTATION 160 rpm
128	50.0	SLOW ROTATION 0.2rpm
117	46.0	RED
97	38.0	UV FILTER
77	30.0	FULL GREEN
58	23.0	AQUAMARINE
39	15.0	ORANGE
20	8.0	BLUE
0	0.0	WHITE

• **COLOUR WHEEL 2 - channel 11 (synchronized mode) - 14 (independent mode)**



BIT	%	EFFECT
255	100	FAST ROTATION 160 rpm
128	50.0	SLOW ROTATION 0.2rpm
117	46.0	GREEN
97	38.0	PINK
77	30.0	CTB 8000
58	23.0	LIGHT GREEN
39	15.0	LAVENDER
20	8.0	CTO 3200
0	0.0	WHITE

• **STOP / STROBE - channel 13 (synchronized mode) - 16 (independent mode)**



BIT	%	EFFECT
252 - 255	98.7 - 100	OPEN
239 - 251	93.7 - 98.2	RANDOM FAST STROBE
226 - 238	88.7 - 93.2	RANDOM MEDIUM STROBE
213 - 225	83.7 - 88.2	RANDOM SLOW STROBE
208 - 212	81.7 - 83.2	OPEN
207	81.2	FAST PULSATION (12 pulse/sec)
108	42.5	SLOW PULSATION (1 pulse/sec)
104 - 107	41.0 - 42.0	OPEN
103	40.5	FAST STROBE (12 flash/sec)
4	1.7	SLOW STROBE (1 flash/sec)
0 - 3	0.0 - 1.2	CLOSED

IMPORTANT: The lamp dim to half power 1 second after the channel stay at 0% level. The lamp goes back to full power when the channel level is put higher than 0%.

• **DIMMER - channel 14 (synchronized mode) - 17 (independent mode)**



BIT	%	EFFECT
255	100	DIMMER OPEN
0	0.0	DIMMER CLOSE

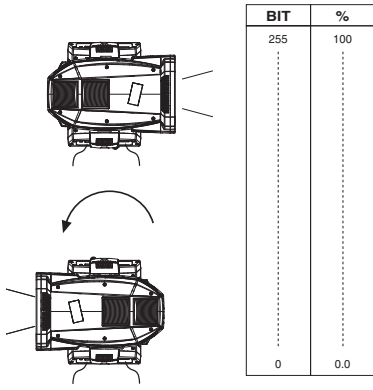
0% - 100% = 0.33sec

The lamp is linearly dimmed from full power to half power electronically and mechanically from half power to off.

• PAN - channel 19 (synchronized mode) - 22 (independent mode)

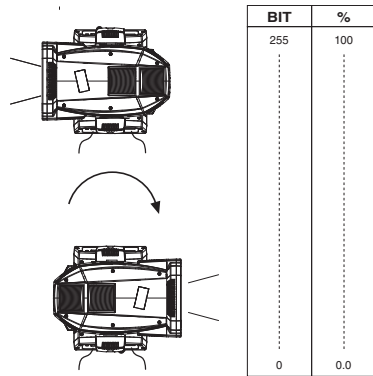
Operation with option InvertPan \diamond Off

(Tilt conventionally represented at 14% and option Invert Tilt \diamond Off)



Operation with option InvertPan \diamond On

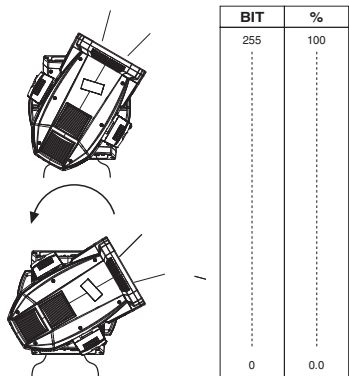
(Tilt conventionally represented at 14% and option Invert Tilt \diamond Off)



• PAN FINE - channel 20 (synchronized mode) - 23 (independent mode)

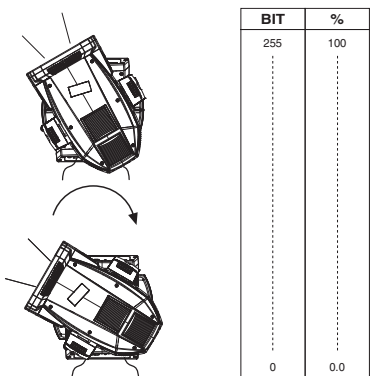
Operation with option InvertPan \diamond Off

(Tilt conventionally represented at 14% and option Invert Tilt \diamond Off)



Operation with option InvertPan \diamond On

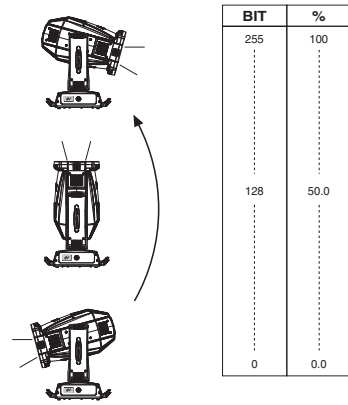
(Tilt conventionally represented at 14% and option Invert Tilt \diamond Off)



• TILT - channel 21 (synchronized mode) - 24 (independent mode)

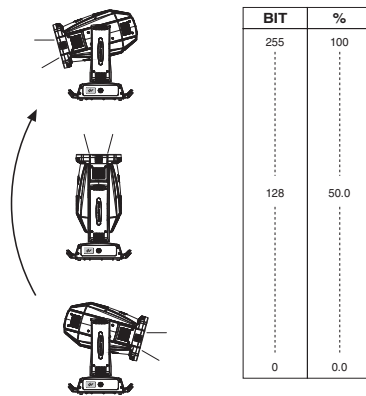
Operation with option Invert Tilt \diamond Off

(Pan conventionally represented at 0% and option Invert Pan \diamond Off)



Operation with option Invert Tilt \diamond On

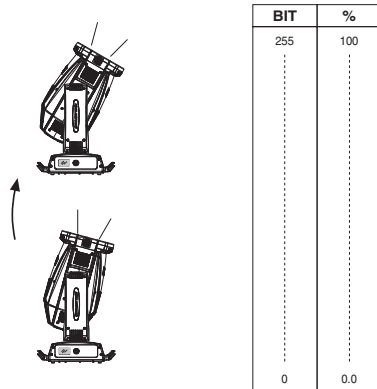
(Pan conventionally represented at 0% and option Invert Pan \diamond Off)



• TILT FINE - channel 22 (synchronized mode) - 25 (independent mode)

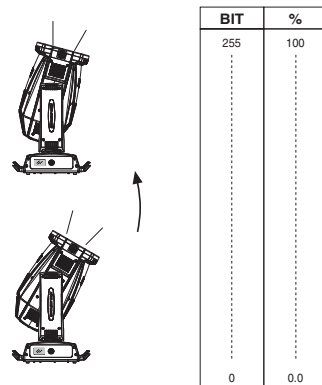
Operation with option Invert Tilt \diamond Off

(Pan conventionally represented at 0% and option Invert Pan \diamond Off)



Operation with option Invert Tilt \diamond On

(Pan conventionally represented at 0% and option Invert Pan \diamond Off)



• **FUNCTION - channel 23 (synchronized mode) - 26 (independent mode)**

BIT	%	EFFECT	
255	100	UNUSED RANGE	
⋮	⋮		
63	24.7		
51-62	20.0-24.2		DIMMER CURVE FUNCTION
38-50	14.7-19.5		
25-37	9.7-14.2		PAN-TILT FUNCTION
12-24	4.7-9.5		
0-11	0.0-4.2		UNUSED RANGE

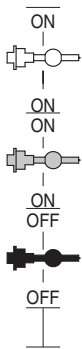
The functions are activated passing through unused range and staying 5 seconds in necessary level.

• **RESET - channel 24 (synchronized mode) - 27 (independent mode)**

BIT	%	EFFECT
255	100	COMPLETE RESET
⋮	⋮	Complete reset is activated passing through the unused range and staying 5 seconds in complete reset levels.
128	50.0	COMPLETE RESET
127	49.7	PAN / TILT RESET
⋮	⋮	Pan / Tilt reset is activated passing through the unused range and staying 5 seconds in Pan / Tilt reset levels.
77	30.0	PAN / TILT RESET
76	29.7	EFFECTS RESET
⋮	⋮	Effects reset is activated passing through the unused range and staying 5 seconds in Effects reset levels.
26	10.0	EFFECTS RESET
25	9.7	UNUSED RANGE
⋮	⋮	
0	0.0	UNUSED RANGE

• **LAMP CONTROL (only with option LAMP DMX On)
channel 25 (synchronized mode) - 28 (independent mode)**

IMPORTANT: Spotlight Wash is not provided with hot restrike igniter



BIT	%	EFFECT
255	100	LAMP ON (FULL POWER)
⋮	⋮	Lamp ignition after 5 s in full power levels. Immediate transition from half to full power.
180	70.5	LAMP ON (FULL POWER)
179	70.0	LAMP ON (HALF POWER)
⋮	⋮	Immediate transition from full to half power. Lamp ignition not allowed in half power.
101	39.5	LAMP ON (HALF POWER)
100	39.0	LAMP OFF
⋮	⋮	Lamp switch off passing through the unused range and staying 5 s in Lamp OFF levels.
26	10.0	LAMP OFF
25	9.7	UNUSED RANGE
⋮	⋮	
0	0.0	UNUSED RANGE

TIMING CHANNELS

	Timing Channel	Channel function
29	Pan - Tilt time	Pan – Tilt – (Pan Fine – Tilt Fine)
30	Colour time	CMY – C.T.O. – Color wheel
31	Beam time	Dimmer – Zoom

TIME TABLE

BIT	Seconds	BIT	Seconds	BIT	Seconds	BIT	Seconds	BIT	Seconds	BIT	Seconds
0	Full	43	8.6	86	24	129	41	172	58	216	170
1	0.2	44	8.8	87		130		173			
2	0.4	45	9	88	131	174		218			
3	0.6	46	9.2	89	25	132	175	219		180	
4	0.8	47	9.4	90	26	133	176	220	190		
5	1	48	9.6	91		134	177	221			
6	1.2	49	9.8	92	27	135	178	222	200		
7	1.4	50	10	93	28	136	179	223			
8	1.6	51	10.2	94	29	137	180	224	210		
9	1.8	52	10.4	95	30	138	181	225			
10	2	53	10.6	96	31	139	182	226	220		
11	2.2	54	11	97	32	140	183	227			
12	2.4	55		110	98	33	141	184	228		
13	2.6	56	12	99	34	142	185	229	230		
14	2.8	57	13	100	35	143	186	230			
15	3	58		13	101	36	144	187	231	240	
16	3.2	59	14	102	37	145	188	232			
17	3.4	60		14	103	38	146	189	233		
18	3.6	61	15	104	39	147	190	234	250		
19	3.8	62		15	105	40	148	191		235	
20	4	63	16	106	41	149	192	236	260		
21	4.2	64		16	107	42	150	193		237	
22	4.4	65	17	108	43	151	194	238	270		
23	4.6	66		17	109	44	152	195		239	
24	4.8	67	18	110	45	153	196	240	280		
25	5	68		18	111	46	154	197		241	
26	5.2	69	19	112	47	155	198	242	290		
27	5.4	70		19	113	48	156	199		243	
28	5.6	71	20	114	49	157	200	244	300		
29	5.8	72		20	115	50	158	201		245	
30	6	73	21	116	51	159	202	246	310		
31	6.2	74		21	117	52	160	203		247	
32	6.4	75	22	118	53	161	204	248	310		
33	6.6	76		22	119	54	162	205		249	
34	6.8	77	23	120	55	163	206	250	310		
35	7	78		23	121	56	164	207		251	
36	7.2	79	24	122	57	165	208	252	310		
37	7.4	80		24	123	58	166	209		253	
38	7.6	81	25	124	59	167	210	254	310		
39	7.8	82		25	125	60	168	211		255	
40	8	83	26	126	61	169	212	255	310		
41	8.2	84		26	127	62	170	213		255	
42	8.4	85	27	128	63	171	214	255	310		
				27		64		215		255	

