# SERVO*COLOR*
## automated light system

# USER MANUAL
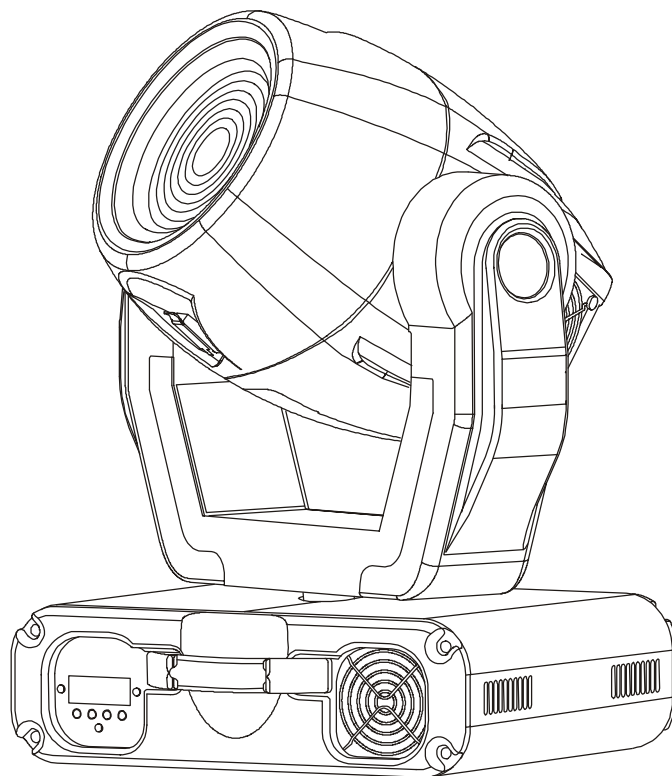
# ServoColor

## Table of contents

**FOR YOUR OWN SAFETY, PLEASE READ THIS USER MANUAL CAREFULLY
BEFORE YOU INITIAL START - UP!**

# 1. Safety instructions

Every person involved with installation and maintenance of this device have to:
- be qualilfied
- follow the instructions of this manual

*CAUTION!*
*Be careful with your operations.*
*With a voltage of 230V you can suffer*
*a dangerous electric shock when touching the wires!*

This device has left our premises in absolutely perfect condition. In order to maintain this condition and to ensure a safe operation, it is absolutely necessary for the user to follow the safety instructions and warning notes written in this manual.

**Important:**
The manufacturer will not accept liability for any resulting damages caused by the non-observance of this manual or any unauthorized modification to the device.

Please consider that damages caused by manual modifications to the device are not subject to warranty.

Never let the power-cord come into contact with other cables! Handle the power-cord and all connections with the mains with particular caution!

Make sure that the available voltage is not higher than stated on the rear panel.

Always plug in the power plug least. Make sure that the power-switch is set to OFF-position before you connect the device to the mains. The power-plug has to be accessable after installing the device.

Make sure that the power-cord is never crimped or damaged by sharp edges. Check the device and the power-cord from time to time.

Always disconnect from the mains, when the device is not in use or before cleaning it. Only handle the power-cord by the plug. Never pull out the plug by tugging the power-cord.

This device falls under protection class I. Therefore it is essential to connect the yellow/green conductor to earth.

The electric connection, repairs and servicing must be carried out by a qualified employee.
Do not connect this device to a dimmer pack.

Do not switch the fixture on and off in short intervals as this would reduce the lamp's life.

During the initial start-up some smoke or smell may arise. This is a normal process and does not necessarily mean that the device is defective.

Do not touch the device's housing bare hands during its operation (housing becomes hot)!
For replacement use lamps and fuses of same type and rating only.

*CAUTION !  EYEDAMAGES !*
*Avoid looking directly into the light source*
*(meant especially for epileptics) !*

# 2. Operating determinations

This device is a moving-head spot for creating decorative effects. This product is only allowed to be operated with an alternating current of 230 V, 50 Hz and was designed for indoor use only.

If the device has been exposed to drastic temperature fluctuation (e.g. after transportation), do not switch it on immediately. The arising condensation water might damage your device. Leave the device switched off until it has reached room temperature.

Never run the device without lamp!

Do not shake the device. Avoid brute force when installing or operating the device.

Never lift the fixture by holding it at the projector-head, as the mechanics may be damaged. Always hold the fixture at the transport handles.

When choosing the installation-spot, please make sure that the device is not exposed to extreme heat, moisture or dust. There should not be any cables lying around. You endanger your own and the safety of others!

The minimum distance between light-output and the illuminated surface must be more than 1 meter.

Make sure that the area below the installation place is blocked when rigging, derigging or servicing the fixture.

Always fix the fixture with an appropriate safety-rope. Fix the safety-rope at the correct holes only.

Only operate the fixture after having checked that the housing is firmly closed and all screws are tightly fastened.

The lamp must never be ignited if the objective-lens or any housing-cover is open, as discharge lamps may explose and emit a high ultraviolet radiation, which may cause burns.

The maximum ambient temperature $t_a = 45°$ C must never be exceeded. Otherwise, the lamp is switched off and the fixture is out of operation for 5 minutes.

## CAUTION!
### The lens has to be replaced when it is obviously damaged, so that its function is impaired, e. g. due to cracks or deep scratches!

Operate the device only after having familiarized with its functions. Do not permit operation by persons not qualified for operating the device. Most damages are the result of unprofessional operation!

## CAUTION!
### The lamp has to be replaced when it is damaged or deformed due to the heat!

Please use the original packaging if the device is to be transported.

Please consider that unauthorized modifications on the device are forbidden due to safety reasons!

If this device will be operated in any way different to the one described in this manual, the product may suffer damages and the guarantee becomes void. Furthermore, any other operation may lead to dangers like short-circuit, burns, electric shock, burns due to ultraviolet radiation, lamp explosion, crash etc.

# 3. Description of device
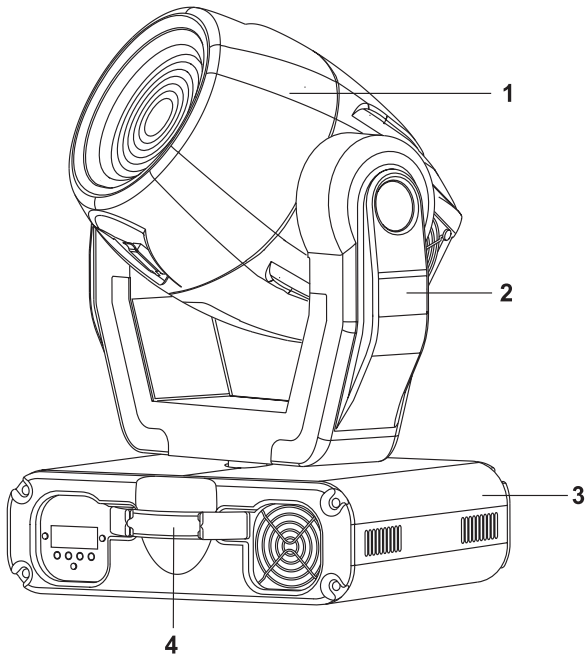
**1** - Moving Head
**2** - Yoke
**3** - Base
**4** - Carrying handles
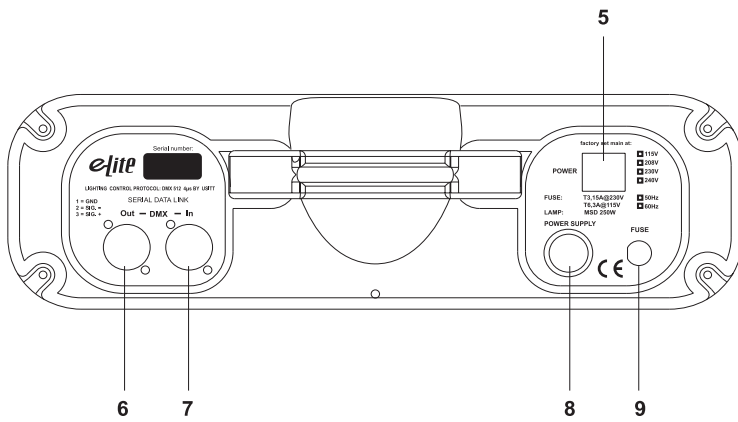
**Rear panel:**
**5** - Power-switch
**6** - DMX output
**7** - DMX input
**8** - Powercord
**9** - Fuseholder
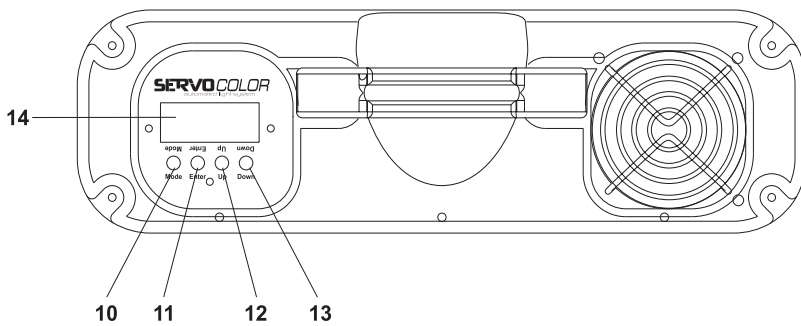
**Front panel:**
**10** - Mode-button
**11** - Enter-button
**12** - Up-button
**13** - Down-button
**14** - Display

# 4. Installation

## 4.1  Fitting the lamp

### *DANGER !*
### *Install the lamps with the device switched off only.*
### *Unplug from mains before !*

To insert the lamp MSD 230V/250W or MSD 230V/200W open the small cover at the rear of head (See the drawings) by loosening the 2 Phillips screws on the cover.
Gently pull out the lamp assembly.
If changing the lamp, remove the old lamp from the socket. Insert the lamp to the socket.
Do not install a lamp with a higher wattage!  A lamp like this generates temperatures the device is not designed for.
Damages caused by non-observance are not subject to warranty. Please follow the lamp manufacturer's notes!
Do not touch the glass-bulb bare hand during the installation! Make sure that the lamp is installed tightly into the lampholder system.
Reinsert the lamp assemby and tighten 2 screws again.
Before striking the lamp, reset the **"LAti"** counter in the main menu of the Control Board, by pressing the **"Up"** and **"Down"** buttons in one time and then confirming with the **Enter**-button.



**Lamp assembly**

**2 phillips screws**
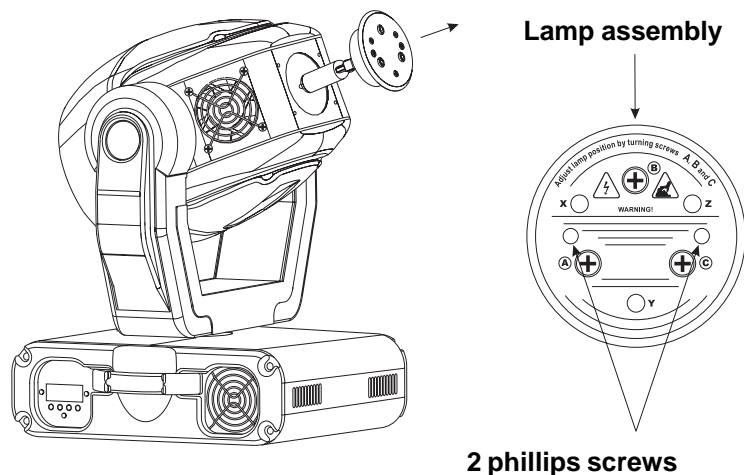
### *Do not operate this fixture with opened housing-cover!*

## 4.2 Lamp adjustment

The fixture lampholder is aligned at the factory. Due to differences between lamps, fine adjustment may improve light performance.
Strike the lamp and focus the light on a flat surface (wall).
Center the  hot-spot (the brightest part of the beam) using the 3 adjustment screws **„A, B, C"**. Turn one screw at a time to drag the hot-spot, diagonally across the projected image. If you cannot detect a hot -spot, adjust the lamp until the light is even.
To reduce a hot-spot, pull the lamp in by turning all three screws „A, B, C" clockwise 1/4-turn at a time until the light is evenly distributed.
If the light is brighter around the edge than it is in the center, or if light output is low, the lamp is too far back in the reflector. „Push" the lamp out by turning the screws „A, B, C" counterclockwise 1/4-turn at a time the light is bright and evenly distributed.



**screws „A, B, C"**
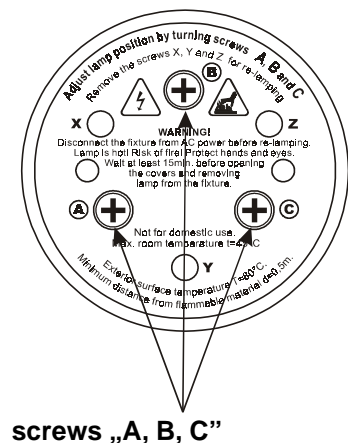
# 4.3 Rigging the fixture

***Danger of fire !***
***When installing the device, make sure there is no highly inflammable***
***material (decoration articles, etc.) in between a distance of  min. 0,5 m.***

The SERVOCOLOR can be placed directly on the
stage floor or rigged in any orientation on a truss
without altering its operation characteristics (see the
drawing).
The fixture's base enables to be mounted in two ways.
Use the clamps with screws M10.

Install a safety wire that can hold at least 10 times
the weight of the fixture. Never use the carrying
handles for secondary attachment.
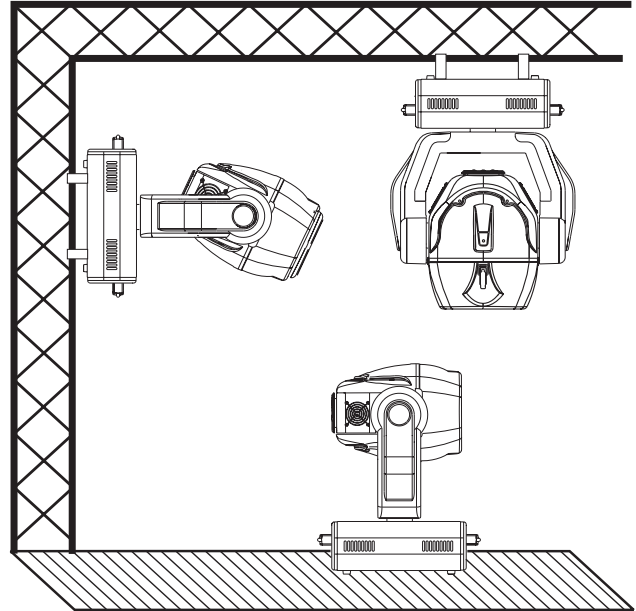
***Warning !  Use 2 clamps to rig the fixture on the truss.***
***Follow the instructions mentioned at the bottom of the base.***
***Make sure that the device is fixed properly! Ensure that***
***the structure (truss) to which you are attaching the fixtures is secure.***

**Secure chain**

**Clamp**
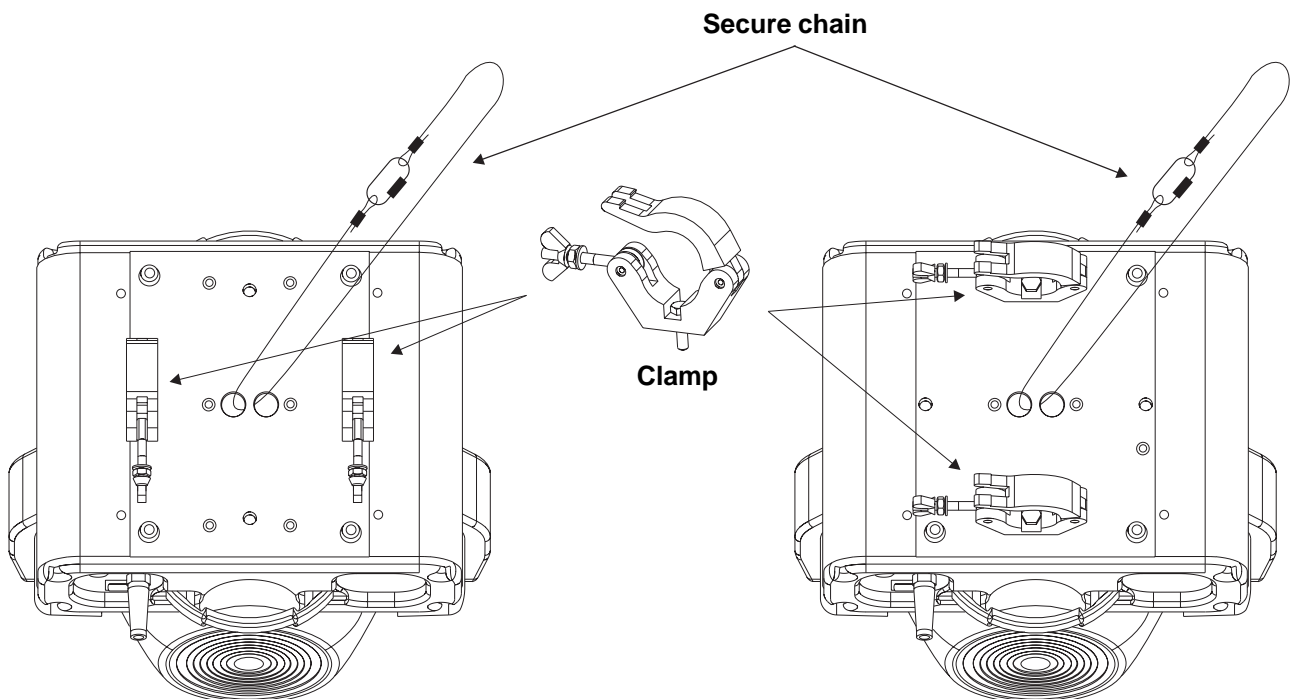
## 4.4 Connection to the mains

Connect the fixture to the mains with the enclosed power-plug.
The earth has to be connected!

**The occupation of the connection-cables is as follows:**

| Cable | Pin | International |
|---|---|---|
| Brown | Live | L |
| Blue | Neutral | N |
| Yellow/Green | Earth | ⏚ |

## 4.5 DMX-512 connection/connection between fixtures

*The wires must not come into contact with each other, otherwise the fixtures will not work at all, or will not work properly.*
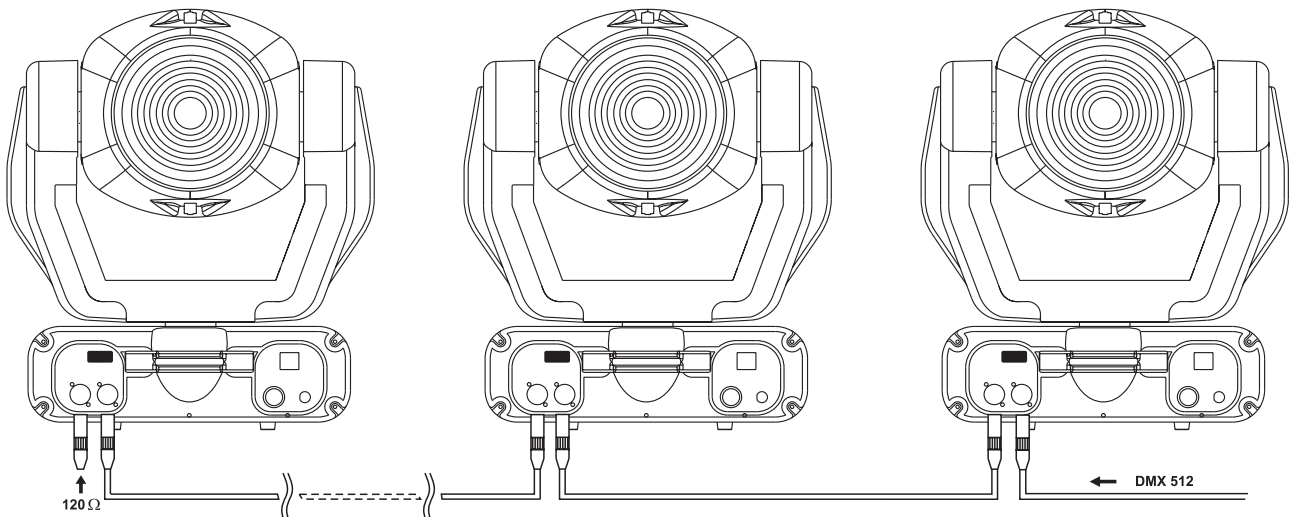


Only use a stereo shielded cable and 3-pin XLR-plugs and connectors in order to connect the controller with the fixture or one fixture with another.

**Occupation of the XLR-connection:**

**DMX - output**
**XLR mounting-socket:**
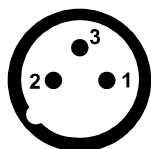
**1** - Ground
**2** - Signal (-)
**3** - Signal (+)

**DMX-input**
**XLR mounting-plug:**
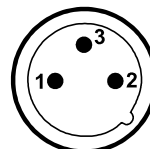
**1** - Ground
**2** - Signal (-)
**3** - Signal (+)

If you are using the standard DMX-controllers, you can connect the DMX-output of the controller directly with the DMX-input of the first fixture in the DMX-chain. If you wish to connect DMX-controllers with other XLR-outputs, you need to use adapter-cables.

**Building a serial DMX-chain:**

Connect the DMX-output of the first fixture in the DMX-chain with the DMX-input of the next fixture. Always connect one output with the input of the next fixture until all fixtures are connected.
**Caution:** At the last fixture, the DMX-cable has to be terminated with a terminator. Solder a 120 W resistor between Signal (–) and Signal (+) into a 3-pin XLR-plug and plug it in the DMX-output of the last fixture.

# 5. DMX PROTOCOL

| Channel 16 bit | Channel 8 bit | Value | Function | Type of control |
|---|---|---|---|---|
| 1 | 1 | 0-255 | **Pan**<br>Pan movement by 530° | proportional |
| 2 | | 0-255 | **Pan fine**<br>Fine control of pan movement | proportional |
| 3 | 2 | 0-255 | **Tilt**<br>Tilt movement by 280° | proportional |
| 4 | | 0-255 | **Tilt fine**<br>Fine control of tilt movement | proportional |
| 5 | 3 | 0<br>1-249<br>250-255 | **Speed of PAN/TILT movement**<br>Max. speed (tracking mode)<br>From max. speed to min.speed (vector mode)<br>Max. speed,black-out while PAN,TILT moving or<br>color changes (tracking mode) | step<br>proportional<br>step |
| 6 | 4 | 0-127<br>128-139<br>140-229<br>230-239<br>240-255 | **Lamp on/off,reset,fans speed control**<br>From max.speed of fan to min. speed of fan<br>Lamp on,reset<br>No function<br>Lamp off after 3 sec<br>No function | proportional<br>step<br>step<br>step<br>step |
| 7 | 5 | 0-17<br>18-35<br>36-53<br>54-72<br>73-90<br>91-108<br>109-127<br>128-190<br>191-192<br>193-255 | **Colours**<br>Open/white<br>Red<br>Blue<br>Green<br>CTF 3200 K<br>CTF 5600 K<br>UV filter<br>Forwards rainbow effect from fast to slow<br>No rotation<br>Backwards rainbow effect from slow to fast | step<br>step<br>step<br>step<br>step<br>step<br>step<br>proportional<br>step<br>proportional |
| 8 | 6 | 0-255 | **Cyan**<br>Cyan ( 0- white, 255 - full cyan ) | proportional |
| 9 | 7 | 0-255 | **Magenta**<br>Magenta ( 0-white, 255-full magenta ) | proportional |
| 10 | 8 | 0-255 | **Yellow**<br>Yellow (0-white,255-full yellow) | proportional |
| 11 | 9 | 0-255 | **Speed of CMY and dimmer**<br>From max. speed  to min. speed | proportional |
| 12 | 10 | 0-7<br>8-15<br>16-23<br>24-31<br>32-39<br>40-47 | **Colours macros - CMY and color wheel**<br>Off<br>Macro 1<br>Macro 2<br>Macro 3<br>Macro 4<br>Macro 5 | step<br>step<br>step<br>step<br>step<br>step |

| Channel 16 bit | Channel 8 bit | Value | Function | Type of control |
|---|---|---|---|---|
| **12** | **10** | | **Colours macros - CMY and color wheel** | |
| | | 48-55 | Macro 6 | step |
| | | 56-63 | Macro 7 | step |
| | | 64-71 | Macro 8 | step |
| | | 72-79 | Macro 9 | step |
| | | 80-87 | Macro 10 | step |
| | | 88-95 | Macro 11 | step |
| | | 96-103 | Macro 12 | step |
| | | 104-111 | Macro 13 | step |
| | | 112-119 | Macro 14 | step |
| | | 120-127 | Macro 15 | step |
| | | 128-135 | Macro 16 | step |
| | | 136-143 | Macro 17 | step |
| | | 144-151 | Macro 18 | step |
| | | 152-159 | Macro 19 | step |
| | | 160-167 | Macro 20 | step |
| | | 168-175 | Macro 21 | step |
| | | 176-183 | Macro 22 | step |
| | | 184-191 | Macro 23 | step |
| | | 192-199 | Macro 24 | step |
| | | 200-207 | Macro 25 | step |
| | | 208-215 | Macro 26 | step |
| | | 216-223 | Macro 27 | step |
| | | 224-231 | Macro 28 | step |
| | | 232-239 | Macro 29 | step |
| | | 240-247 | Macro 30 | step |
| | | 248-255 | Macro 31 | step |
| **13** | **11** | | **Effect wheel** | |
| | | 0-70 | Full beam | step |
| | | 71-180 | Beam shaper | proportional |
| | | 181-255 | Frost filter | step |
| **14** | **12** | | **No function** | |
| **15** | **13** | | **Shutter,strobe** | |
| | | 0-31 | Shutter closed | step |
| | | 32-63 | No function (shutter open) | step |
| | | 64-95 | Strobe-effect from slow to fast (max.10 flashes/s) | proportional |
| | | 96-127 | No function  (shutter open) | step |
| | | 128-159 | Pulse-effect in sequences | proportional |
| | | 160-191 | No function  (shutter open) | step |
| | | 192-223 | Random strobe-effect from slow to fast | proportional |
| | | 224-255 | No function (shutter open) | step |
| **16** | **14** | | **Dimmer intensity** | |
| | | 0-255 | Gradual adjustment of the dimmer intensity from 0 to 100% | proportional |

# 6. Addressing

The control board on the top side of the SERVOCOLOR allows you to assign the DMX fixture address, which is defined as the first channel from which the SERVOCOLOR will respond to the controller.
If you set, for example, the address to channel 5, the SERVOCOLOR will use the channel 5 to 20 for control.
Please, be sure that you don't have any overlapping channels in order to control each SERVOCOLOR correctly and independently from any other fixture on the DMX data link.
If two, three or more SERVOCOLOR are addressed similarly, they will work similarly.

### For address setting follow this procedure:

**1.** Switch On the SERVOCOLOR and wait until the fixture reset has finished (**"rSt"** is flashing at the display).
**2.** Press the **[Mode]** key in order to access the main menu. Browse through the menu by pressing the **[Up]** and **[Down]** keys until the display shows **"A001"**. Confirm by pressing **[Enter]** key and the letter **"A"** will flash.
**3.** Use the **[Up]** and **[Down]** keys to select the desired address.
**4.** Confirm by pressing **[Enter]** or **[Mode]** to cancel.

### Controlling:

After having addressed all SERVOCOLOR , you may now start operating these via your lighting controller.
**Note:** After switching on, the SERVOCOLOR will automatically detect whether DMX 512 data is received or not.
   If there is no data received at the DMX-input, the display will start to flash **"A001"** with actually set address.
This situation can occur if:
   - the 3 PIN XLR plug (cable with DMX signal from controller) is not connected with the input of the SERVOCOLOR
   - the controller is switched off or defective, if the cable or connector is defective or the signal wires are swap in the input connector.
**Note:** It's necessary to insert the XLR termination plug (with 120 Ohm) in the last lighting in the link in order to ensure proper transmission on the DMX data link.

# 7. Remotely controllable functions

## 7.1 Lamp

The SERVOCOLOR is run with a MSD 250W/200W lamp.
A relay inside of the SERVOCOLOR allows you to switch On and Off the lamp via itself control board on the front panel or via your controller without affecting the rest of the lighting.

## 7.2 Switching On and Off the lamp by Control Board

**1.** Switch On the SERVOCOLOR and wait until the fixture reset has finished.
**2.** Press the **[Mode]** key in order to access the main menu. Browse through the menu by pressing the **[Up]** and **[Down]** keys until the display shows „LAMP". Confirm by pressing **[Enter]** key.
**3.** Use the **[Up]** and **[Down]** keys to select **"On"** for switch On the lamp and **"Off"** for switch Off the lamp and press **[Enter]** to confirm or **[Mode]** to cancel.

**Note:** It is also important to note, that the discharge lamp is cold restrike types, that means, that they have to be cold before re-striking. For this reason, you have to wait 5 minutes (max. speed of fan must be adjusted) after having switched Off the lamp before you can switch it back On again. If you try to switch On the lamp within 5 minutes after having switched it Off, the SERVOCOLOR will store this information and automatically ignite the lamp when the 5 minutes period has expired. The message **"HEAt"** will appear on the control board display at the back side of the SERVOCOLOR.  If the ignition of the lamp is seven times unsuccessful, on the display will appear **"LA.Er"**, meaning that the lamp could be damaged or even missed, or there could be a failure on the ignitor or ballast.

## 7.3 Colour wheel

The SERVOCOLOR features a colour-wheel with 7 color positions - 6 of these with dichroic colors and the last one open. It is also possible to rotate the color-wheel continuously at different speeds - the so-called "Rainbow effect" is created.

## 7.4 CMY - colours mixing system

The CMY color mixing system is based on graduated cyan, magenta, and yellow color filters. A continuous range of colors may be achieved by varying the amount of each filter from 0 to 100%.

## 7.5 Beam effects

The beam shaper allow you to widen and flatten beam. Beam shaper rotates 180°.
Frost filter on the same wheel as beam shaper softens the beam.

## 7.6 Dimmer

Smooth 0 - 100 % dimming is provided by the special dimmer unit.

## 7.7 Shutter/Strobe

Extremely fast shutter may also be used for strobe effect (1 - 10 flashes per second)

## 7.8 Fan

The SERVOCOLOR is cooled by free axial fans - two in the projector head and one in the base. The speed of the fan (and of course the noise) can be continuously reduced if very quiet performance is required.
By the Control Board using the **"FAnS"** function you can choose 4 types of low fan speed operating:

> **1. "High" - high (max) speed of fans**
> The cooling fans work on max. speed (max. cooling)
> **2. "reg" - continuous controlling of the fan speed**
> the fan automatically raises its speed in order to control inside temperature of the lighting, if the temperature inside increases about certain level (the low fan speed reduces the cooling of the lighting). This cycle can repeat several times until the temperature inside is on suitable level.
> **3. "loof" - low speed/Switch Off the lamp operating**
> the fan keeps the adjusted low speed until the temperature exceeds max. inside temp. Then the SERVOCOLOR automatically switch Off the lamp.
> **4. "lohi" - low/high speed of the fan operating**
> the fan keeps the adjusted low speed until the temperature exceeds max. inside temp. of the fixture, then the SERVOCOLOR automatically switch from low to high the fan speed.

# 8. Control Board

The control board situated on the front panel of the SERVOCOLOR offers several features. You can simply set the lighting address, read the number of lamp or unit hours, switch On and Off the lamp, run test show, make a reset and also use special functions for manual, demo and service purposes.
The main menu is accessed by pressing the **[Mode]** key - press this one so many times until the display shows message **"A001"** (with actually stored address). Browse through the menu by the pressing **[Up]** and **[Down]** keys - the display shows step by step these messages: **A001, rPAn, rTilt, 16br, Lati, Poti, LAMP, dEMo, rESE, SPEC**. Press **[Enter]** if you wish to select one of them. The functions provided are described in the following sections and the function hierarchy is shown below.

| A001 |─| rPAn |─| rtilt |─| 16br |─| LAti |─| Poti |─| LAMP |─| dEMo |─| rESE |─| SPEC |
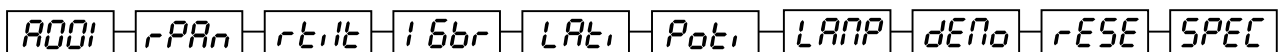
## 8.1 Main functions

**A001**    **DMX 512 Address settings**

The letter **"A"** flashes. Use the **[Up]** and **[down]** keys to select required address (001 - 497) and press **[Enter]** to confirm or **[Mode]** to cancel and return to the main menu.

**Pan reverse**

This function allows you to invert the pan movement. Use the **[Up]** and **[Down]** keys to select **"On"** if you wish this feature or **"Off"** if you don't wish this feature and press **[Enter]** to confirm or **[Mode]** to cancel and return to the main menu.



**Tilt reverse**

This function allows you to invert the tilt movement. Use the **[Up]** and **[Down]** keys to select **"On"** if you wish this feature or **"Off"** if you don't wish this feature and press **[Enter]** to confirm or **[Mode]** to cancel and return to the main menu.



**Movement resolution**

By this function you can adjust the desired movement resolution 8 or 16 bit. Use the **[Up]** and **[Down]** keys to select **"On"** if you wish the 16 bit high resolution or **"Off"** if you wish only 8 bit resolution and press **[Enter]** to confirm or **[Mode]** to cancel and return to the main menu.
**Note:** If you adjust the 16 bit resolution the fixture will occupy 16 DMX channels, if you adjust the 8 bit resolution, the fixture will be operated by only 14 DMX channels. Please, check the DMX protocol.



**Lamp On time**

This option enables you to read the total number of hours that the lamp has been powered On. Press **[Enter]** or **[Mode]** to return to the main menu. In order to reset the counter to 0, you have to hold the **[Up]** and **[Down]**-button and press the **[Enter]**-button.



**Power On time**

By this option you can read the total number of hours that the SERVOCOLOR has been powered On. Press **[Enter]** or [Mode] to return to the main menu.

## LANP

**Switch On/Off the lamp**

Use the **[Up]** and **[Down]** keys to select **"On"** if you wish the switch On the lamp or **"Off"** if you wish switch Off the lamp and press **[Enter]** to confirm or **[Mode]** to cancel and return to the main menu.

## dEMo

**Demo sequences**

This function allows you to run a special demo-test sequences without an external controller, which will show you some possibilities of using SERVOCOLOR. Press **[Up]** and **[Down]** keys to select the **"Mod1"** or **"Mod2"** sequences. The **"Mod1"** is suitable for projections on the wall, ceiling or ground without any head-movement, the **"Mod2"** uses all SERVOCOLOR functions and therefore is good for a complete introduction of the fixture.

```
                    dEMo
          ┌───────────┴───────────┐
        Mod 1                    Mod2
                                  run
   ┌──────┬──────┬──────┐
  PAn    tilt   Foc    Go
 0-255  0-255  0-255   run
```
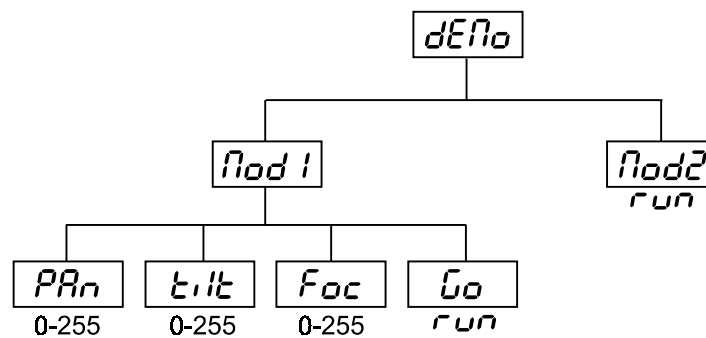
## rESE

**Reset Function**

Press **[Enter]** key to run reset. This option enables the SERVOCOLOR to index all effects (functions) and return to their standard positions.

## 8.2 SPEC -Special functions

## SPEc

Use the **[Up]** and **[Down]** keys to browse through the special functions and select the one by pressing **[Enter]**.

```
                              ┌──────┐
                              │ SPEC │
                              └──────┘
        ┌──────┬──────┬──────┬──────┼──────┬──────┬──────┬──────┐
     ┌──────┐┌──────┐┌──────┐┌──────┐┌──────┐┌──────┐┌──────┐┌──────┐┌──────┐┌──────┐
     │ NAnu ││ LAAu ││ dNln ││ dlSP ││ dlnt ││ dLOF ││ tENP ││ FAnS ││ dFSE ││ AdJ  │
     └──────┘└──────┘└──────┘└──────┘└──────┘└──────┘└──────┘└──────┘└──────┘└──────┘
```



**Manual control of effects**

This function allows you to control manually the channel functions of the fixture. Use the **[Up]** and **[Down]** keys to select desired function and press **[Enter]** to adjust the effect or **[Mode]** to cancel and return to the menu.

```
                              ┌──────┐
                              │ NAnu │
                              └──────┘
   ┌──────┬──────┬──────┬──────┬──────┼──────┬──────┬──────┬──────┬──────┬──────┐
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│ PAn  ││ tilt ││ SPEd ││ Colo ││ CYAn ││ NAGE ││ YELL ││ CSPd ││ NACr ││ EFEC ││ Stro ││ dlnr │
└──────┘└──────┘└──────┘└──────┘└──────┘└──────┘└──────┘└──────┘└──────┘└──────┘└──────┘└──────┘
  PAn1   tilt1   SPd1    Co 0    CYA0    NAG0    YEL0    CSP0    OFF    HOLE   OPEn   din0
  PAn2   tilt2   SPd2    Co 1    CYA1    NAG1    YEL1    CSP1    NA 1   SHA1   Str1   din1
  PAn3   tilt3   SPd3    Co 2    CYA2    NAG2    YEL2    CSP2    NA 2   SHA2          dinc
                 SPd4                                                   Str9   din4
                 SPd5    Co12    CYAS    NAGS    YELS    CSPS    NA30   SHAS          dinc
```



**Lamp On automatically**

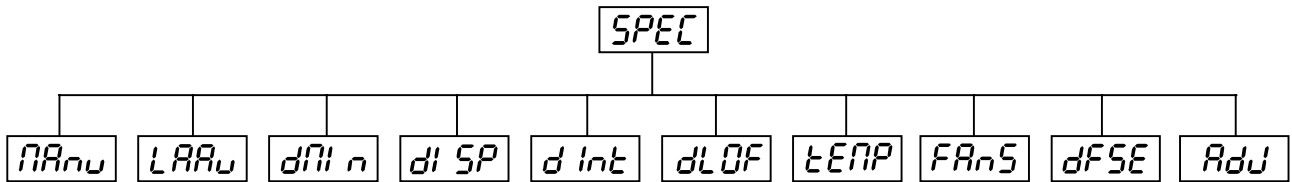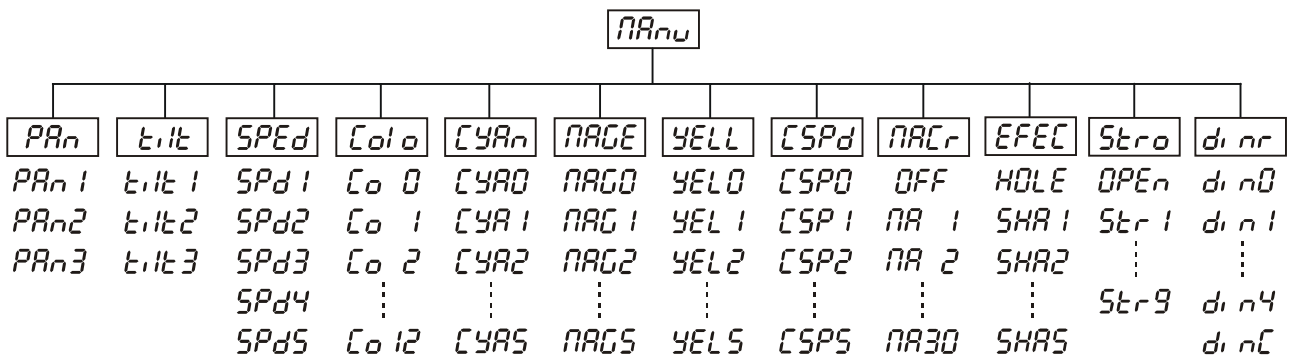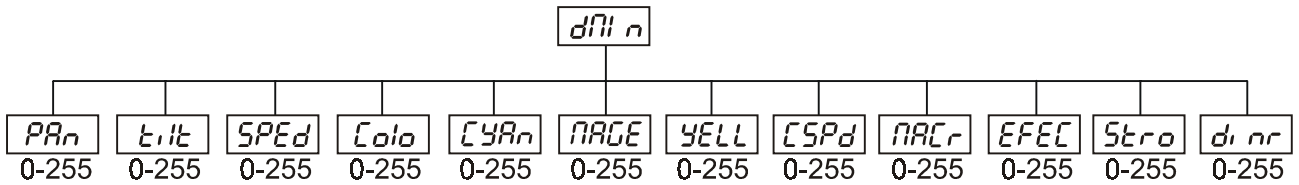This function enables to switch On the lamp automatically after switching On the fixture. Use the **[Up]** and **[Down]** keys to select **"On"** if you wish to switch On the lamp automatically after switching On the fixture or **"Off"** if you wish the lamp off after switching On the fixture and press **[Enter]** to confirm or **[Mode]** to cancel and return to the menu.



**DMX values**

Readout DMX values of each channel received by the fixture. Use the **[Up]** and **[Down]** keys to select desired channel and press **[Enter]** to read its value coming to the fixture or **[Mode]** to cancel and return to the menu.

```
                              ┌──────┐
                              │ dNI n│
                              └──────┘
  ┌──────┐┌──────┐┌──────┐┌──────┐┌──────┐┌──────┐┌──────┐┌──────┐┌──────┐┌──────┐┌──────┐┌──────┐
  │ PAn  ││ tilt ││ SPEd ││ Colo ││ CYAn ││ NAGE ││ YELL ││ CSPd ││ NACr ││ EFEC ││ Stro ││ di nr│
  └──────┘└──────┘└──────┘└──────┘└──────┘└──────┘└──────┘└──────┘└──────┘└──────┘└──────┘└──────┘
   0-255   0-255   0-255   0-255   0-255   0-255   0-255   0-255   0-255   0-255   0-255   0-255
```

**dISP** — **Automatic blackout of Display**

This function allows you to keep the display On or to turn Off automatically 2 minutes after last pressing any key on the control board. Use the **[Up]** and **[Down]** keys to select **"On"** if you wish to keep the display On or **"Off"** if you wish to turn Off automatically 2 minutes after last pressing any key on the control board and press **[Enter]** to confirm or **[Mode]** to cancel and return to the menu.

**d Int** — **Display intensity**

By this function you can adjust from 20% to 100% the intensity of the display. Use the **[Up]** and **[Down]** keys to select the level of the display intensity and press **[Enter]** to confirm or **[Mode]** to cancel and return to the menu.

**dLOF** — **Lamp Off via DMX**

This function allows you to switch Off the lamp by DMX. Use the **[Up]** and **[Down]** keys to select **"On"** if you want to switch Off the lamp by DMX or **"Off"** if you don't want to switch Off the lamp by DMX and press **[Enter]** to confirm or **[Mode]** to cancel and return to the menu.
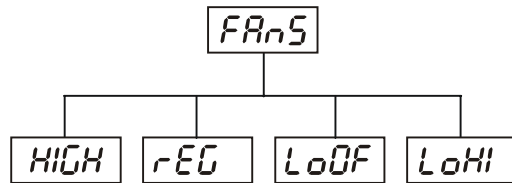
**tENP** — **Temperature**

Temperature readouts of fixture inside in Celsius. Inside temperatures below 70° C are not critical. 70° C and more lead to the lamp being switched off. Please note that the outside temperature should not exceed 45° C.

 **Low fan speed operating**

By using this function you can choose 3 types of low fan speed operating. Browse through this menu by the pressing **[Up]** and **[Down]** keys - the display shows step by step these messages: **"HIGH, reG, LoOF, Lo.HI,"**. Press **[Enter]** if you wish to select one of them or **[Mode]** to cancel and return to the menu.



 **high (max) speed of fans**

The cooling fans work on max. speed (max. cooling)

 **continuous controlling of the fan speed**

the fan automatically raises its speed in order to control inside temperature of the lighting, if the temperature inside increases about certain level (the low fan speed reduces the cooling of the lighting). This cycle can repeat several times until the temperature inside is on suitable level.

 **low speed/Switch Off the lamp operating**

the fan keeps the adjusted low speed until the temperature exceeds max. inside temp., then the SERVOCOLOR automatically switch Off the lamp.

 **low/high speed of the fan operating**

the fan keeps the adjusted low speed until the temperature exceeds max. inside temp.of the fixture, then the SERVOCOLOR automatically switch from low to high the fan speed.

 **Default settings**

Press **[Enter]** to reset all fixture personalities (not the adjusting functions) to the default values. On the display will appear **"rSt"** meaning that the fixture makes the reset. See the table of personality setting and their default positions.

| Personality | Display | Default values (SHADED) | | | | |
|---|---|---|---|---|---|---|
| Pan reverse | *rPAn* | On | | | | |
| | | OFF | | | | |
| Tilt reverse | *rtilt* | On | | | | |
| | | OFF | | | | |
| Movement resolution | *16br* | On | | | | |
| | | OFF | | | | |
| Lamp on automatically | *LAAu* | On | | | | |
| | | OFF | | | | |
| Automat. blackout of display | *diSP* | On | | | | |
| | | OFF | | | | |
| Display intensity | *dInt* | 20 | 40 | 60 | 80 | 100 |
| Lamp Off via DMX | *dLOF* | On | | | | |
| | | OFF | | | | |
| Low fan speed operating | *FAnS* | rEG | | | | |
| | | LoOF | | | | |
| | | LoHI | | | | |



**Adjusting the default positions of colour and CMY**

By this function you can calibrate and adjust the colour and CMY to their standard/right positions. Use the **[Up]** and **[Down]** keys to browse through the adjusting menu - the display shows step by step these messages: **"PAn, Tilt, SPEd, Colo, CYAn, MAGE, YELL, MACr, EFEC, Stro, dimr, FCAL"** by which you can adjust the fixture to the required/desired position (0-255) before the function calibration. Then when the positioning is finished use the last **"FCAL"** function (Fixture calibration).
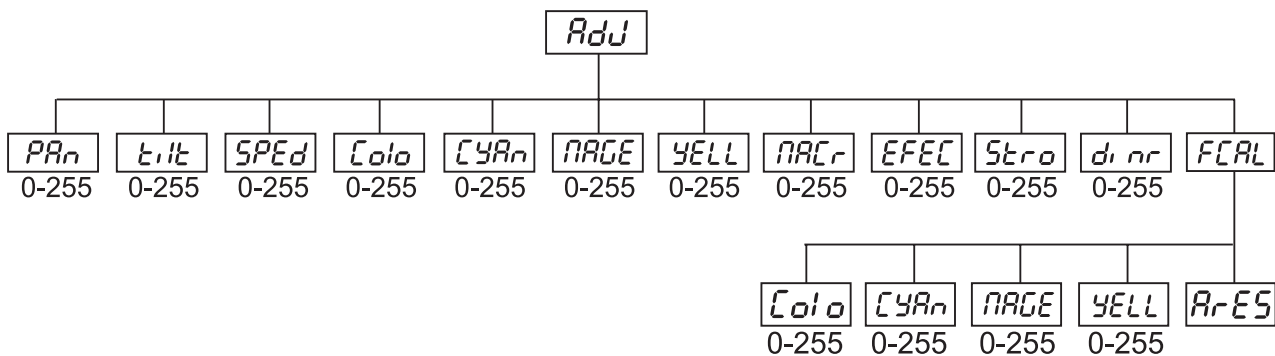


**1. Calibration via the control board**

Press **[Enter]** and the **[Up]** and **[Down]** keys in order to display the following messages: **"Colo, CYAn, MAGE, YELL,"** for very smooth function calibration. Select one of them, press **[Enter]** and use the **[Up]** and **[Down]** keys in order to adjust their right value from 0 to 255. Then press **[Enter]** to confirm or **[Mode]** to cancel and return to the menu. This can be repeated for each calibration parameter if it is required. When the calibration is finished, it is necessary to use the **"ArES"** function in order to write the calibration values to the memory (EPROM) and to make a reset in order to check the newly adjusted positions of the colour, and CMY wheels. When the reset of the fixture is finished, the display will show the **"FCAL"** message. Press **[Enter]** to repeat the calibration or **[Mode]** to return to the **"AdJ"** menu.

## 2. Calibration via the external controller

Press **[Enter]** and the **[Up]** and **[Down]** keys in order to display the following messages: **"Colo, CYAn, MAGE, YELL"** - calibration parameters. Select one of them and press **[Enter]**.

Now you can calibrate the colour and CMY wheel by your controller. The DMX calibration protocol is described in the table.

**DMX Calibration protocol:**

| DMX chanel | Function | | |
|:---:|:---:|:---:|:---:|
| 1 | Colour | Smooth microstep movement | Calibration 0-255 |
| 2 | Cyan | | Calibration 0-255 |
| 3 | Magenta | | Calibration 0-255 |
| 4 | Yellow | | Calibration 0-255 |
| 5 | No function | | |
| 6 | No function | | |
| 7 | Colours | Standart protocol | |
| 8 | Cyan | Standart protocol | |
| 9 | Magenta | Standart protocol | |
| 10 | Yellow | Standart protocol | |
| 11 | Speed CMY,dimmer | Standart protocol | |
| 12 | Colours macros | Standart protocol | |
| 13 | Beam effects | Standart protocol | |
| 14 | No function | | |
| 15 | Strobo | Standart protocol | |
| 16 | Dimmer | Standart protocol | |

After having calibrated required functions press **[Enter]** to confirm (or **[Mode]** to cancel and return to the menu without reset by the **"ArES"** function) and use the **"ArES"** function in order to write the calibration values to the memory (EEPROM) and to make a reset in order to check the new adjusted positions of the colour and CMY wheels .

# 9. Error and information messages

### HEAt

This message appears if you try to switch on the lamp within 5 minutes after having switched it off (the lamp is too hot). The message will appear on the display if the lamp doesn't ignite within 28 seconds. The SERVOCOLOR will store this information and automatically ignite the lamp when the 5 minutes period has expired.

### LAEr

The ignition of the lamp is seven times unsuccessful (the HEAt message appeared six times before), and the display shows "*LAEr*", meaning that the lamp could be damaged or even missed, the fixture is overheating (this can occur if the ambient temperature is 45° C or more) or there could be a failure on the ignitor or ballast. Please place or replace the lamp, check the ambient temperature or contact your dealer if the situation was not caused by the lamp.

### MbEr

This messsage informs you that the main PCB does not communicate correctly with the Control Board.

### CoEr  (color-wheel error)

This messsage will appear after the reset of the fixture if the magnetic-indexing circuit malfunctions (sensor failed or magnet missing) or the stepping-motor is defective (or its driver circuit on the main PCB). The color-wheel is not located in the default position after the reset.

### FtEr

This error message informs you that the fixture was overheating (occured if the ambient temperature is 45° C or more) and that the relay switched off the lamp. This message will appear on the display until the temperature will be on a suitable level, then the display will show the "*HEAt*" message meaning the lamp is too hot (explanation see above).

### SnEr

This message appears if the lamp lighting sensor is failed.

### PoEr

This message will appear if the fixture was shortly disconnect from the main.

### PAEr  (PAN-yoke movement error)

This message will appear after the reset of the fixture if the yoke's magnetic-indexing circuits malfunction (sensors failed or magnet missing) or the stepping motor is defective. (Or its driving IC on the main PCB). The yoke is not located in the default position after the reset.

### tiEr  (TILT-head movement error)

This message will appear after the reset of the fixture if the head's magnetic-indexing circuit malfunctions (sensor failed or magnet missing) or the stepping motor is defective. (Or its driving IC on the main PCB). The head is not located in the default position after the reset.

### FrEr

It will appear if the frequency of the main is not standard 50 or 60Hz.

# 10. Technical specifications

### Power supply:

```
-Voltage............................................210/230/250 V AC, 50/60 Hz ~
-Fuse.................................................T 3.15 A, 250 V
-Power consumption...........................500 W
```

**Motors:**

-9 high quality stepping-motors controlled by microprocessors
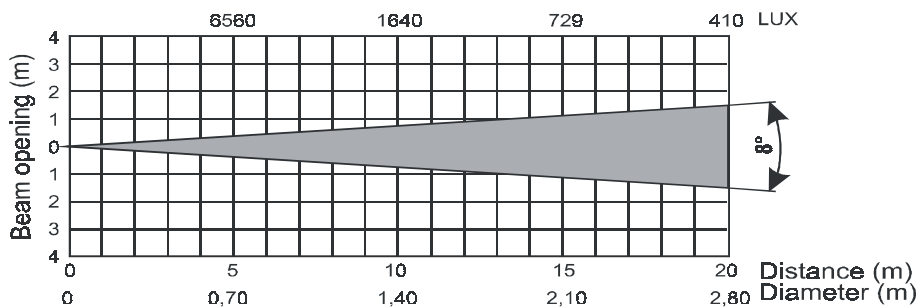

**Compatible lamps:**

-MSD/HSD 230 V/250 W GY-9.5 or MSD/HSD 230 V/200 W GY-9.5
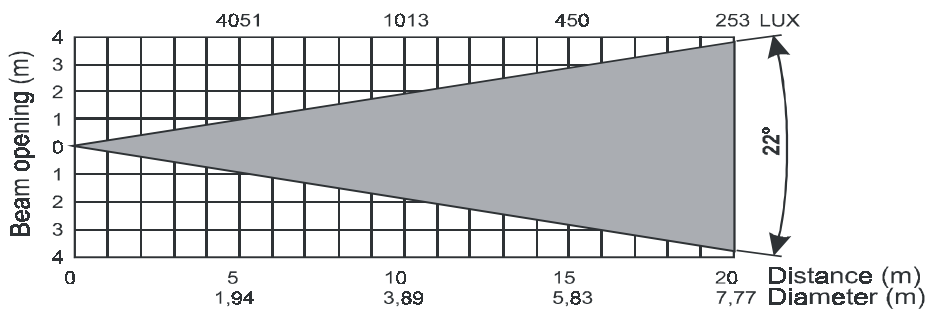

**Optical system:**

-High luminous-efficiency parabolic reflector
-Fresnel lens of diameter 150 mm
-Manualy adjustable beam angle from 8° to 22°


**Beampath:**

## Min. beam angle 8°

| | | | | |
|---|---|---|---|---|
| 6560 | 1640 | 729 | 410 | LUX |

Beam opening (m)

| 0 | 5 | 10 | 15 | 20 | Distance (m) |
|---|---|---|---|---|---|
| 0 | 0,70 | 1,40 | 2,10 | 2,80 | Diameter (m) |

## Max. beam angle 22°

| | | | | |
|---|---|---|---|---|
| 4051 | 1013 | 450 | 253 | LUX |

Beam opening (m)

| 0 | 5 | 10 | 15 | 20 | Distance (m) |
|---|---|---|---|---|---|
| | 1,94 | 3,89 | 5,83 | 7,77 | Diameter (m) |

**Colours:**

-CMY - colours mixing system
-6 dichroic-filters plus white
-Red,green,blue colors and 3200 K,5600K ,UV filters
-Colour-wheel continuos rotation in both directions (rainbow effect)


**Beam effects:**

-Beam shaper
-Wide and flat beam can steplesly be rotated by 90°
-Frost filter for softer beam

**Strobe:**

-Strobe effect with variable speed (1 - 10 flashes per second)


**Dimmer:**

-Smooth dimmer from 0 - 100 %


**Electronics:**

-Addressing,special functions setting,effects calibration via control panel with 4-digit LED display
-Readout fixture and lamp usage,receiving DMX values,temperature, etc
-Built-in analyzer for easy fault finding,error messages
-Remotely switching of the lamp
-Bilt-in demo sequences
-Black-out while head moving or color changing
-Silent fans cooling,remotely controllable speed of fans
-Self-resetable thermo-fuse
-Digital serial input DMX-512
-DMX-control via every standard DMX controller
-14 DMX-channels (8 bit Pan/Tilt movement resolution)
-16 DMX-channels (16 bit Pan/Tilt movement resolution):

      Channel 1: Horizontal mirror-movement 8 bit
      Channel 2: Fine Horizontal mirror-movement 16 bit
      Channel 3: Vertical mirror-movement 8 bit
      Channel 4: Fine Vertical mirror-movement 16 bit
      Channel 5: Pan/Tilt speed
      Channel 6: Fan speed, On/Off lamp, reset
      Channel 7: Colours wheel
      Channel 8: Cyan
      Channel 9: Magenta
      Channel 10: Yellow
      Channel 11: Speed of CMY and Dimmer
      Channel 12: Colours macros - CMY and colour wheel
      Channel 13: Beam effect
      Channel 14: No function
      Channel 15: Shutter, strobe
      Channel 16: Dimmer


**Pan/Tilt:**

-Pan movement range 530°
-Tilt movement range 280°
-8/16 bit movement resolution
-Automatic Pan / Tilt position correction
-Maximum PAN-movement 530° in 2.65 s
-Maximum TILT-movement 280° in 1.68 s
-Remotely controllable speed of Pan/Tilt movement for easy programming


**Rigging:**

-Stands directly on the floor
-Mounts horizontally or vertically with 2 clamps
-2 truss orientation
-Safety chain/cord attachment point

**Temperatures:**

-Maximum ambient temperature $t_a$: 45° C
-Maximum housing temperature $t_B$ (steady state): 80° C

**Dimensions and weight:**

-Length of base (including handles):   372 mm
-Width of yoke:   426 mm
-Height (head horizontal):   500 mm
-Weight (net):   16 kg
-Shipping weight:   25 kg
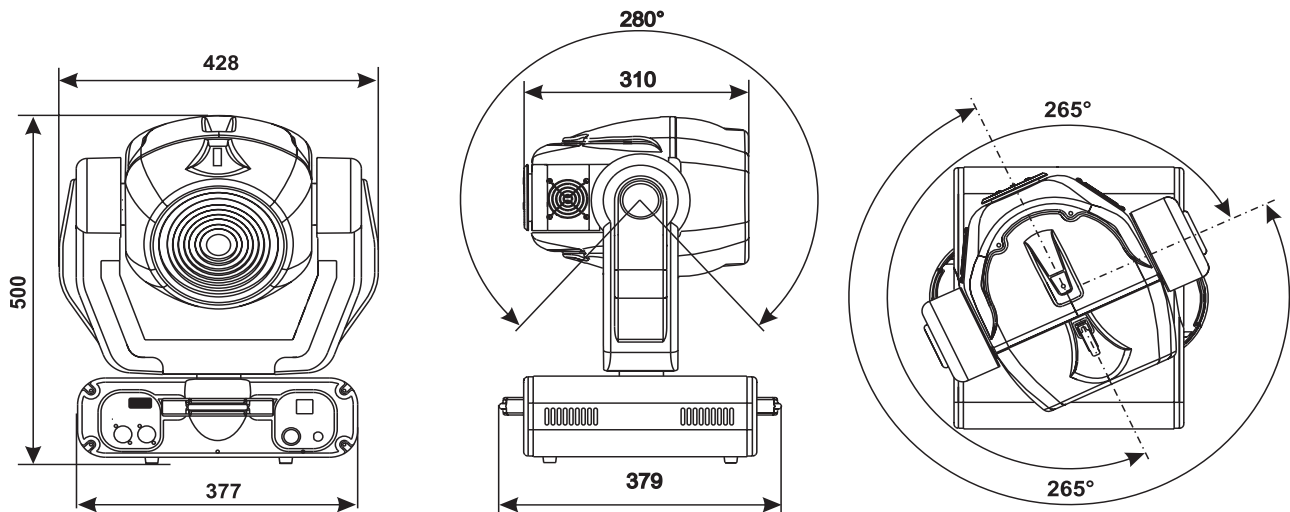


# 11. Maintenance and cleaning

It is absolutely essential that the fixture is kept clean and that dust, dirt and smoke-fluid residues must not build up on or within the fixture. Otherwise, the fixture's light-output will be significantly reduced. Regular cleaning will not only ensure the maximum light-output, but will also allow the fixture to function reliably throughout its life. A soft lint-free cloth moistened with any good glass cleaning fluid is recommended, under no circumstances should alcohol or solvents be used!

*DANGER !*
*Disconnect from the mains before starting any*
*maintenance work*

The fresnel lens will require weekly cleaning as smoke-fluid tends to building up residues, reducing the light-output very quickly. The cooling-fans should be cleaned monthly.

The interior of the fixture should be cleaned at least annually using a vacuum-cleaner or an air-jet.
The dichroic colour-filters should be cleaned monthly.

### Replacing the fuse

If the lamp burns out, the fine-wire fuse of the device might fuse, too. Only replace the fuse by a fuse of same type and rating (T 3.15 A, 250 V slow).

Before replacing the fuse, unplug mains lead.

### Procedure:

Step 1: Unscrew the fuseholder on the rear panel with a fitting screwdriver from the housing (anti-clockwise).
Step 2: Remove the old fuse from the fuseholder.
Step 3: Install the new fuse in the fuseholder.
Step 4: Replace the fuseholder in the housing and fix it.

## 12. Appendix

We believe you will enjoy your SERVOCOLOR. We assure you will enjoy this product for years if you follow the instructions given in this manual.

If you have any questions and comments, please do not hesitate to contact us.

**Please note:** errors and omissions for every information given in this manual excepted. Every information is subject to change without prior notice. Any claim due to missing or wrong information in this manual is herewith excluded!