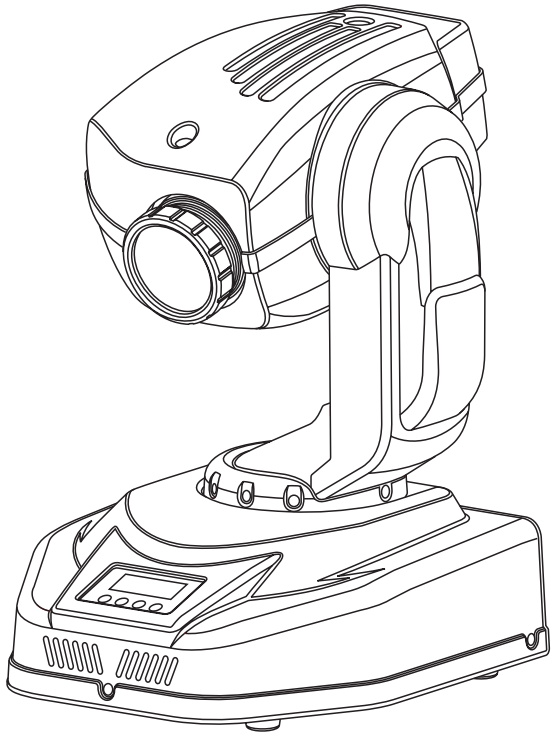
Futurelight®

LIGHTING SYSTEMS MADE IN EUROPE

USER MANUAL

MH - 420 Spotlight



CE

Keep this manual for future needs!

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English

MH - 420 Spotlight

User manual

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English

CAUTION!
Keep this device away from rain and moisture!
Unplug mains lead before opening the housing!

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

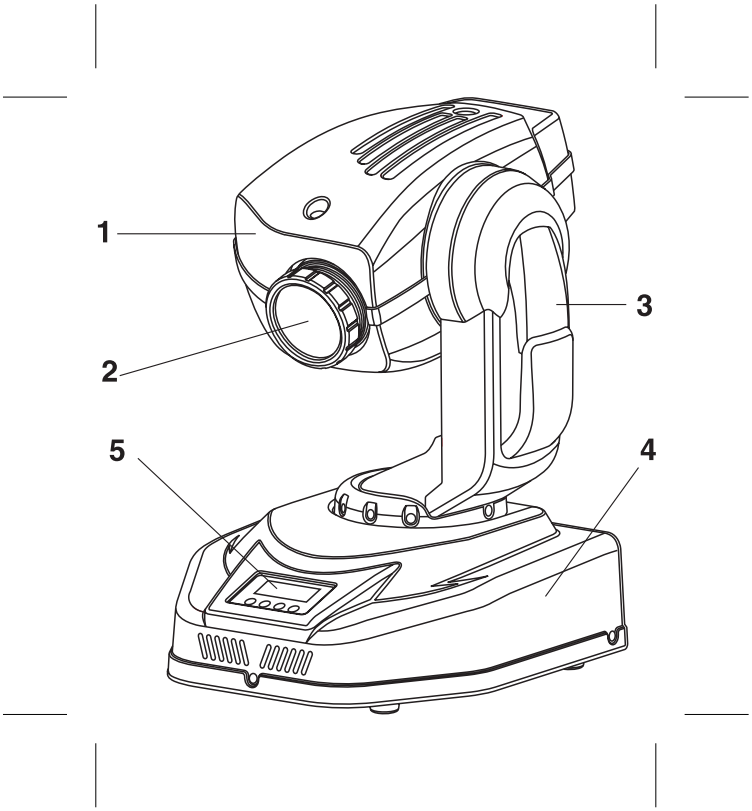
Introduction

Thank you for having chosen a FUTURELIGHT MH-420. You acquired a versatile, powerful and intelligent lighting-effect.
Unpack your FUTURELIGHT MH-420 and make sure that there are no damages caused by transportation. Should there be any, please consult your local dealer and do not take the device into operation.

Features

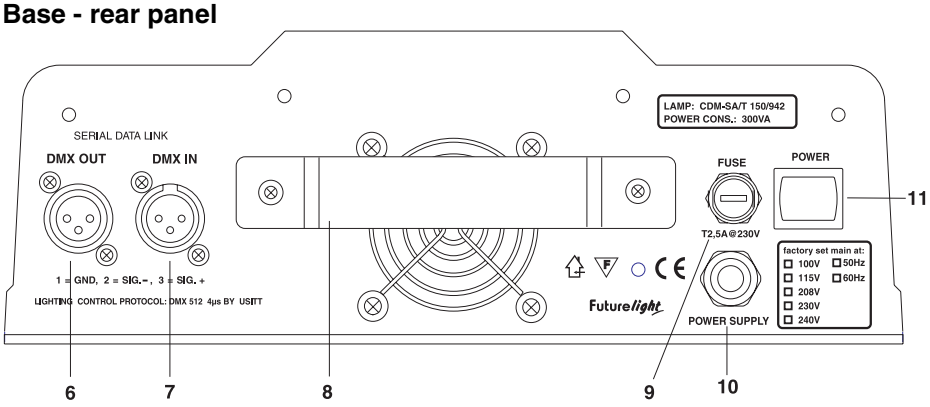
Automatic spotlight
Versatile Moving-Head with a wide range of illumination and decoration possibilities • 11 brilliant, dichroic colours plus white • 11 static metal gobos • Lightbeam with 19° radiation angle and manual focus • Strobe-effect with 1-8 flashes per second • Exact positioning within 530° Pan and 285° Tilt • Control panel with 3-digit LED display • Cam Lock system with 2 Omega holders included in the delivery • For bright 150 W discharge lamp • Versatile operation modes via DMX-512 (8 control channels), as stand alone or in Master/Slave-mode (up to 9 slaves) • Three freely programmable programs by which all slaves can be controlled via the master-device • Suitable FUTURELIGHT controllers: EX-4 controller, CP-192 controller, CP-256 controller

Description of the fixture

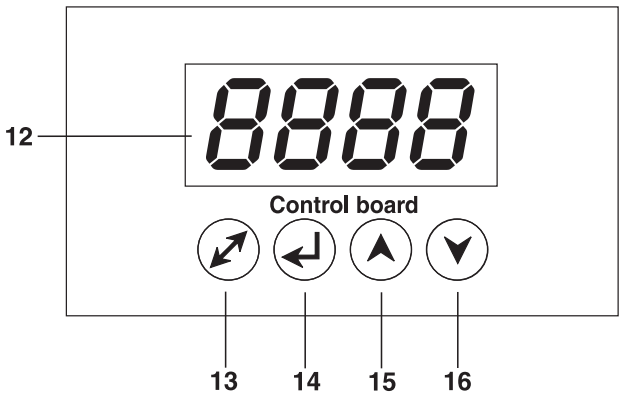


1 - Projector-head
2 - Lense
3 - Carrying handle
4 - Base
5 - Control Board

Base - rear panel



6 - DMX-output
7 - DMX-input
8 – Carrying handle
9 - Fuseholder
10 - Powercord
11 - Power-switch



Control Board:
12 - Display
13 - Mode button
14 - Enter-button
15 - Up-button
16 - Down-button

Safety instructions

CAUTION!

Be careful with your operations. With a dangerous voltage 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 user manual.

Important:
Damages caused by the disregard of this user manual are not subject to warranty. The dealer will not accept liability for any resulting defects or problems.

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.

This device falls under protection-class I. The power plug must only be plugged into a protection class I outlet.

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.

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.

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.

Caution: During the operation, the housing becomes very hot.

HEALTH HAZARD!

Never look directly into the light source, as sensitive persons may suffer an epileptic shock (especially meant for epileptics)!

Keep away children and amateurs!

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 (EU-version) or 110 V, 60 Hz (US-version) and was designed for indoor use only.

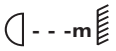
This device is designed for professional use, e.g. on stages, in discotheques, theatres etc.

Lighting effects are not designed for permanent operation. Consistent operation breaks will ensure that the device will serve you for a long time without defects.

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 handle.

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 symbol  determines the minimum distance from lighted objects. The minimum distance between light-output and the illuminated surface must be more than this value.

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 must never be exceeded.

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!

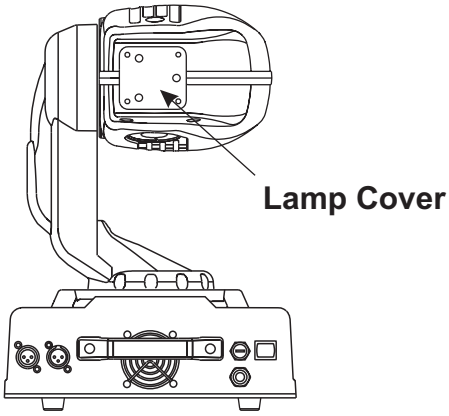
Never remove the serial barcode from the device as this would make the guarantee void.

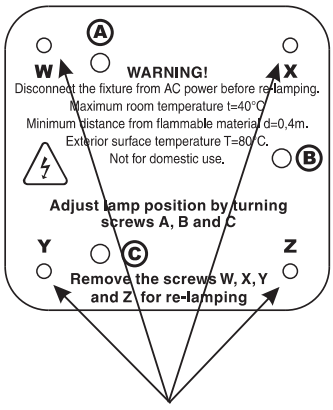
If this device will be operated in any way different to the one described in this manual, the product may suffer damages and the guarantee becomes void. Furthermore, any other operation may lead to dangers like short-circuit, burns, electric shock, lamp explosion, crash etc.

Installation

Fitting/Exchanging the lamp

DANGER!
Install the lamp with the device switched off only.
Unplug from mains before!



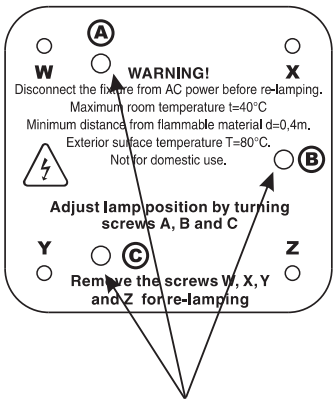


Screws "W , X, Y , Z"

To insert the lamp (CDM-SA/T 150/942, G-12 socket) open the top cover of the head (see the drawings to identify which cover is top) by loosening the 4 Phillips screws on the front and rear sides of the top cover.
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-handed during the installation! Make sure that the lamp is installed tightly into the lampholder system.
Adjust the optimal distance 1-1.5 mm from the lens by turning the screw **"A"** (see the drawings "Lamp adjustment" below).
Reclose the top cover of the head and tighten the Phillips screws.
Before striking the lamp, reset the "LAti" counter and the "LASt" 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.

Do not operate the fixture with opened housing-cover!

Lamp adjustment

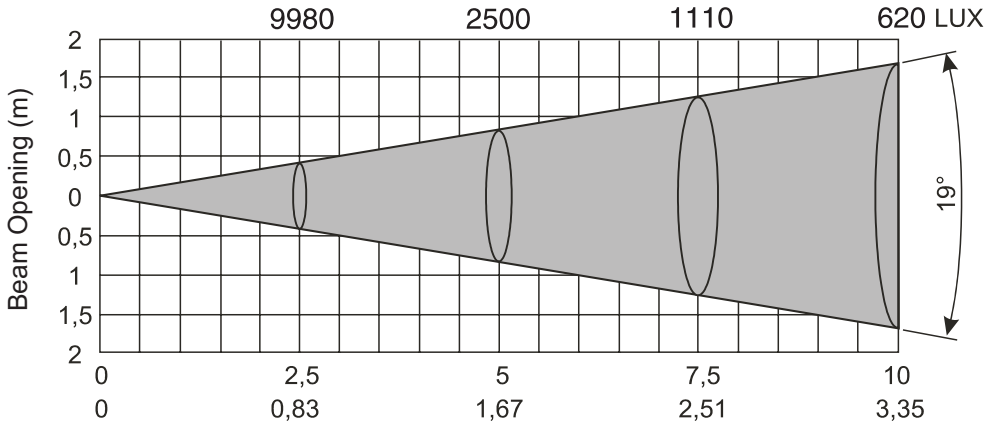


Screws "A, B, C"

The MH-420 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). As the optimum distance of lamp from lens was adjusted during the installing or changing the lamp (by turning the screw **"A"**), it is necessary to adjust only the second position by turning the screw "B", in order to center the hot-spot (the brightest part of the beam).
If the Hot Spot seems to be too bright, you can lower its intensity by moving the lamp closer to the reflector. Do so by turning srew **"A"** until the light is evenly distributed.
If the light on the edge seems to be brighter as in the center, the lamp is too close at the reflector. In this case, you need to move the lamp away from the reflector until the light is evenly distributed and the beam appears bright enough.

Beam path:

19° Lens



Rigging

DANGER TO LIFE!
Please consider the EN 60598-2-17 and the respective national norms during the installation! The installation must only be carried out by an authorized dealer!

The installation of the projector has to be built and constructed in a way that it can hold 10 times the weight for 1 hour without any harming deformation.

The installation must always be secured with a secondary safety attachment, e.g. an appropriate catch net. This secondary safety attachment must be constructed in a way that no part of the installation can fall down if the main attachment fails.

When rigging, derigging or servicing the fixture staying in the area below the installation place, on bridges, under high working places and other endangered areas is forbidden.

The operator has to make sure that safety-relating and machine-technical installations are approved by an expert before taking into operation for the first time and after changes before taking into operation another time.

The operator has to make sure that safety-relating and machine-technical installations are approved by an expert after every four year in the course of an acceptance test.

The operator has to make sure that safety-relating and machine-technical installations are approved by a skilled person once a year.

Procedure:
The projector should be installed outside areas where persons may walk by or be seated.

IMPORTANT! OVERHEAD RIGGING REQUIRES EXTENSIVE EXPERIENCE, including (but not limited to) calculating working load limits, installation material being used, and periodic safety inspection of all installation material and the projector. If you lack these qualifications, do not attempt the installation yourself, but instead use a professional structural rigger. Improper installation can result in bodily injury and.or damage to property.

The projector has to be installed out of the reach of people.

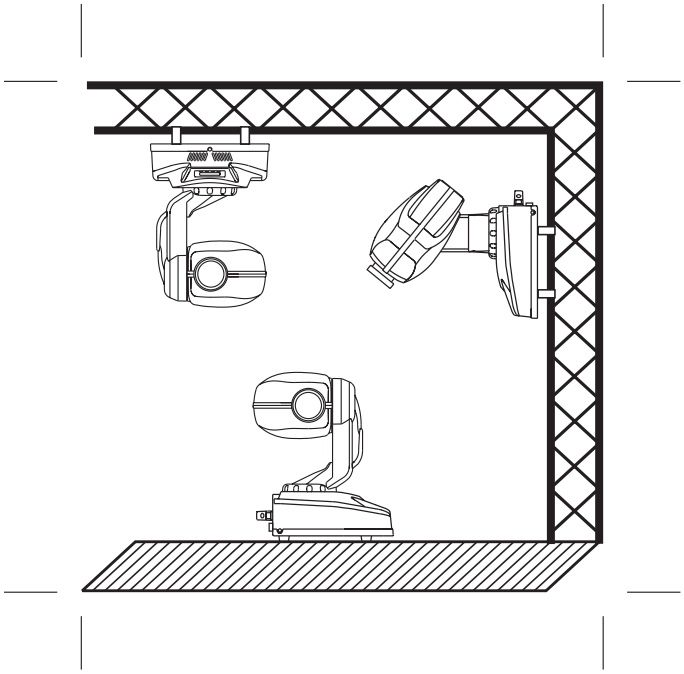
If the projector shall be lowered from the ceiling or high joists, professional trussing systems have to be used. The projector must never be fixed swinging freely in the room.

Caution: Projectors may cause severe injuries when crashing down! If you have doubts concerning the safety of a possible installation, do NOT install the projector!

Before rigging make sure that the installation area can hold a minimum point load of 10 times the projector's weight.

DANGER OF FIRE!
When installing the device, make sure there is no highly-inflammable material (decoration articles, etc.) within a distance of min. 0.5 m.

CAUTION!
Use 2 appropriate 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.

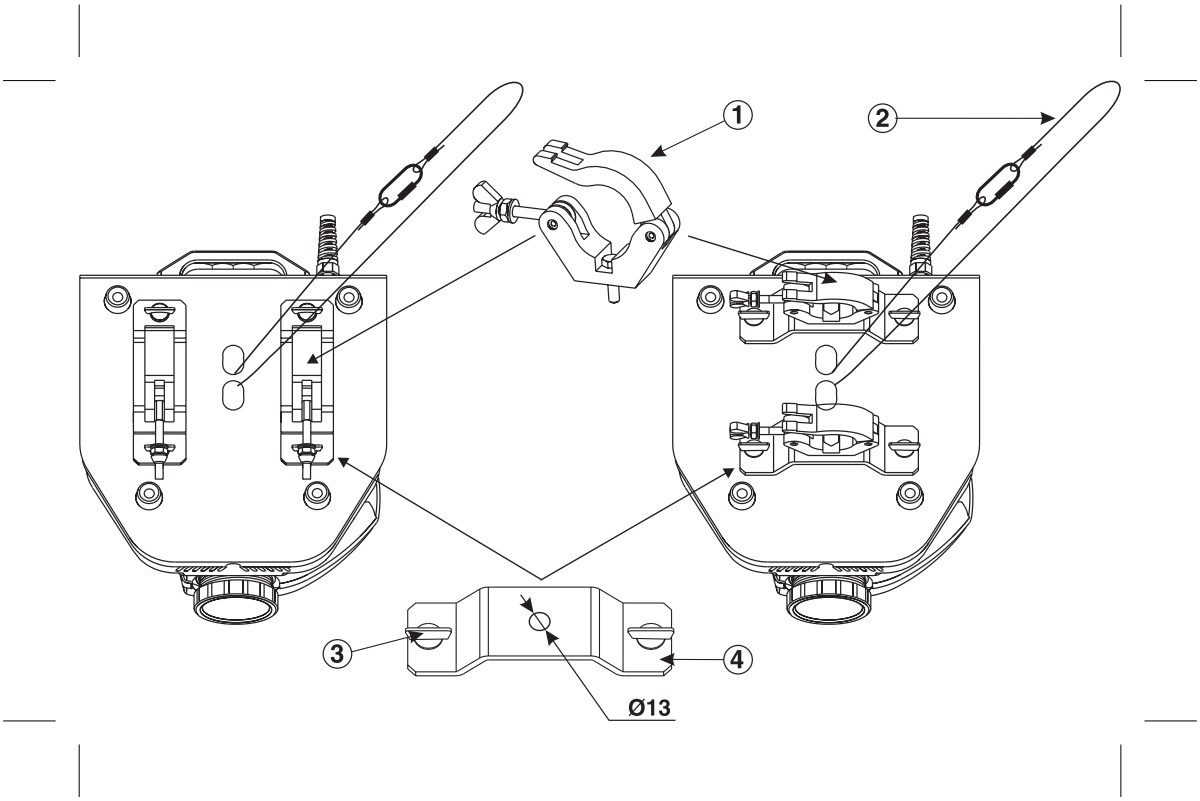


The Moving-Head can be placed directly on the stage floor or rigged in any orientation on a truss without altering its operation characteristics (see the drawing).

The fixture's base enables to be mounted in two ways: via the Omega-holders or via the adapter plate. Use the clamps with screws M12.

For overhead use, always install a safety-rope that can hold at least 12 times the weight of the fixture. You must only use safety-ropes with screw-on carabines.

Installation via the Omega holders



(1) Clamp
(2) Safefty rope
(3) Quick-lock fastener
(4) Omega-holders

Screw one clamp each via a M12 screw and nut onto the Omega holders.
Insert the quick-lock fasteners of the first Omega holder into the respective holes on the bottom of the device. Tighten the quick-lock fasteners fully clockwise. Install the second Omega holder.
Pull the safety-rope through the holes on the bottom of the base and over the trussing system or a safe fixation spot. Insert the end in the carabine and tighten the safety screw.

Connection with the mains

Connect the device to the mains with the power-plug.

The occupation of the connection-cables is as follows:

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

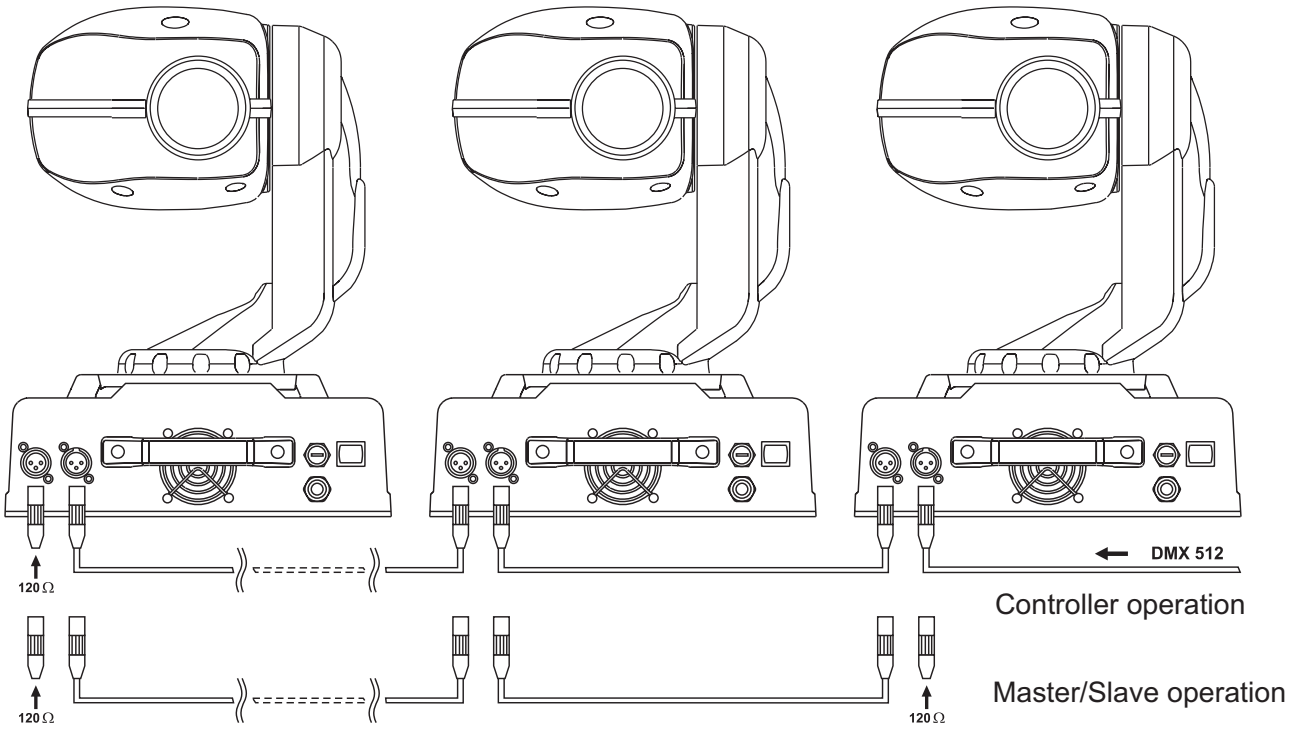
The earth has to be connected!

In general, lighting effects should not be connected to dimming-packs.

DANGER TO LIFE!
Before taking into operation for the first time, the installation has to be approved by an expert!

English

DMX-512 connection / Master/Slave connection



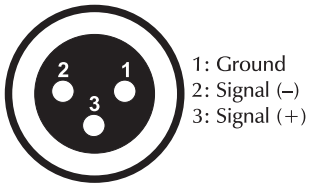
The wires must not come into contact with each other, otherwise the fixtures will not work at all, or will not work properly.

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:

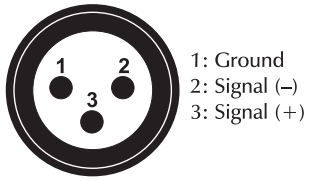
DMX-output

XLR mounting-socket:



DMX-input

XLR mounting-plug:



If you are using the recommended FUTURELIGHT-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 Ω resistor between Signal (–) and Signal (+) into a 3-pin XLR-plug and plug it in the DMX-output of the last fixture.

Master/Slave-operation
The master/slave-operation enables that several devices can be synchronized and controlled by one master-device.

On the side panel of the MH-420 you can find an XLR-jack (DMX Out) and an XLR-plug (DMX In), which can be used for connecting several devices.

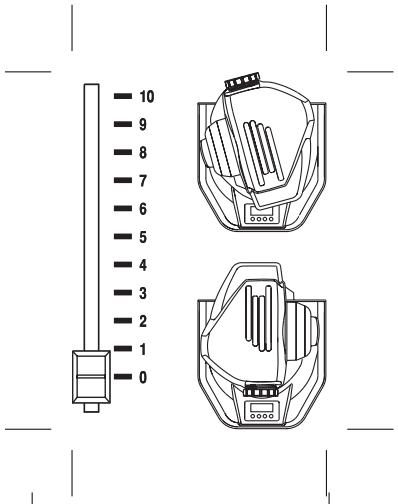
Choose the device which is to control the effects. This device then works as master-device and controls all other slave-devices, which are to be connected to the master-device via a balanced microphone lead. Connect the DMX OUT-jack with the DMX IN-plug of the next device.

Caution: At the master-device and at the last slave-device, the DMX-cable has to be terminated with a terminator. Solder a 120 Ω resistor between Signal (–) and Signal (+) into a 3-pin XLR-plug and plug it in the DMX-output.

Function of the control channels

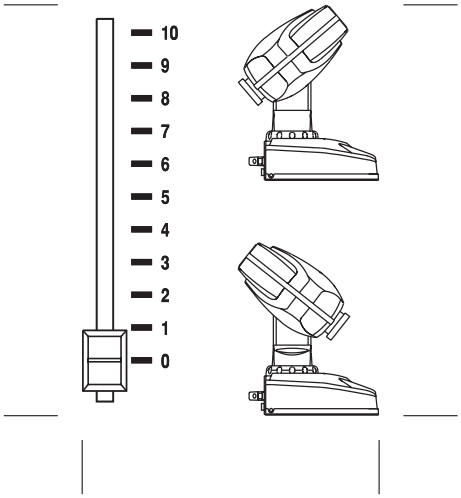
Channel 1 - Horizontal movement (Pan)

Push slider up in order to move head horizontally (PAN).
Gradual head adjustment from one end of the slider to the other (0-255, 128-center). The head can be turned by 530° and stopped at any position you wish.



Channel 2 - Vertical movement (Tilt)

Push slider up in order to move head vertically (TILT).
Gradual head adjustment from one end of the slider to the other (0-255, 128-center). The head can be turned by 280° and stopped at any position you wish.



Channel 3 - Pan 16 bit

Channel 4 - Tilt 16 bit

Channel 5 - Speed of PAN / TILT movement

0	Max speed (tracking mode)
1	Max speed (vector mode)
249	Min. speed (vector mode)
250-255	Max. speed, black-out while PAN, TILT moving or color changes (tracking mode)

Channel 6 - Colours

Linear colour change following the movement of the slider. In this way you can stop the colour-wheel in any position - also between two colours creating double-coloured beams.
Between 128 and 189 and between 194 and 255, the colour-wheel rotates continuously the so-called "Rainbow" effect.

0	Open / white
10	Turquoise
21	Red
32	Cyan
42	Light Green
53	Magenta
64	Light Blue
74	Yellow
85	Green
96	Pink
106	Blue
117	Orange
128 - 189	Forwards rainbow effect from fast to slow
190 - 193	No rotation
194 - 255	Backwards rainbow effect from slow to fast

Channel 7 – Static Gobos

0 - 07	Open
08 - 15	Gobo 1
16 - 23	Gobo 2
24 - 31	Gobo 3
32 - 39	Gobo 4
40 - 47	Gobo 5
48 - 55	Gobo 6
56 - 63	Gobo 7
64 - 71	Gobo 8
72 - 79	Gobo 9
80 - 87	Gobo 10
88 - 95	Gobo 11
96 - 227	**Shaking gobos with variable speed**
96 - 107	Gobo 1
108 - 119	Gobo 2
120 - 131	Gobo 3
132 - 143	Gobo 4
144 - 155	Gobo 5
156 - 167	Gobo 6
168 - 179	Gobo 7
180 - 191	Gobo 8
192 - 203	Gobo 9
204 - 215	Gobo 10
216 - 227	Gobo 11
228 - 255	Gobowheel rotation from slow to fast

Channel 8 - Shutter, Strobe

0	Shutter closed
1 - 63	Gradual adjustment of the dimmer intensity from 0 to 100 %
64 - 95	Shutter open
96 - 127	Strobe-effect from slow to fast (max. 8 flashes/second)
128 - 139	Reset
140 - 159	Shutter closed
160 - 175	Pulse-effect in sequences from slow to fast
176 - 191	Pulse-effect in sequences from fast to slow
192 - 223	Random strobe-effect from slow to fast
224 - 255	Shutter open

Function of the control channels – 2-16 bit protocol:

Channel 1 - Horizontal movement (Pan)

Channel 2 - Pan fine 16 bit

Channel 3 - Vertical movement (Tilt)

Channel 4 - Tilt fine 16 bit

Channel 5 - Speed of PAN / TILT movement

0	Max speed (tracking mode)
1	Max speed (vector mode)
249	Min. speed (vector mode)
250-255	Max. speed, black-out while PAN, TILT moving or color changes (tracking mode)

Channel 6 - Colours

Linear colour change following the movement of the slider. In this way you can stop the colour-wheel in any position - also between two colours creating double-coloured beams.
Between 128 and 189 and between 194 and 255, the colour-wheel rotates continuously the so-called "Rainbow" effect.

0	Open / white
10	Turquoise
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42	Light Green
53	Magenta
64	Light Blue
74	Yellow
85	Green
96	Pink
106	Blue
117	Orange
128 - 189	Forwards rainbow effect from fast to slow
190 - 193	No rotation
194 - 255	Backwards rainbow effect from slow to fast

Channel 7 – Static Gobos

0 - 07	Open
08 - 15	Gobo 1
16 - 23	Gobo 2
24 - 31	Gobo 3
32 - 39	Gobo 4
40 - 47	Gobo 5
48 - 55	Gobo 6
56 - 63	Gobo 7
64 - 71	Gobo 8
72 - 79	Gobo 9
80 - 87	Gobo 10
88 - 95	Gobo 11
96 - 227	**Shaking gobos with variable speed**
96 - 107	Gobo 1
108 - 119	Gobo 2
120 - 131	Gobo 3
132 - 143	Gobo 4
144 - 155	Gobo 5
156 - 167	Gobo 6
168 - 179	Gobo 7
180 - 191	Gobo 8
192 - 203	Gobo 9
204 - 215	Gobo 10
216 - 227	Gobo 11
228 - 255	Gobowheel rotation from slow to fast

Channel 8 - Shutter, Strobe

0	Shutter closed
1 - 63	Gradual adjustment of the dimmer intensity from 0 to 100 %
64 - 95	Shutter open
96 - 127	Strobe-effect from slow to fast (max. 8 flashes/second)
128 - 139	Reset
140 - 159	Shutter closed
160 - 175	Pulse-effect in sequences from slow to fast
176 - 191	Pulse-effect in sequences from fast to slow
192 - 223	Random strobe-effect from slow to fast
224 - 255	Shutter open

Function of the control channels – 3-8 bit protocol:

Channel 1 - Horizontal movement (Pan)

Channel 2 - Vertical movement (Tilt)

Channel 3 - Speed of PAN / TILT movement

0	Max speed (tracking mode)
1	Max speed (vector mode)
249	Min. speed (vector mode)
250-255	Max. speed, black-out while PAN, TILT moving or color changes (tracking mode)

Channel 4 - Colours

Linear colour change following the movement of the slider. In this way you can stop the colour-wheel in any position - also between two colours creating double-coloured beams.
Between 128 and 189 and between 194 and 255, the colour-wheel rotates continuously the so-called "Rainbow" effect.

0	Open / white
10	Turquoise
21	Red
32	Cyan
42	Light Green
53	Magenta
64	Light Blue
74	Yellow
85	Green
96	Pink
106	Blue
117	Orange
128 - 189	Forwards rainbow effect from fast to slow
190 - 193	No rotation
194 - 255	Backwards rainbow effect from slow to fast

Channel 5 – Static Gobos

0 - 07	Open
08 - 15	Gobo 1
16 - 23	Gobo 2
24 - 31	Gobo 3
32 - 39	Gobo 4
40 - 47	Gobo 5
48 - 55	Gobo 6
56 - 63	Gobo 7
64 - 71	Gobo 8
72 - 79	Gobo 9
80 - 87	Gobo 10
88 - 95	Gobo 11
96 - 227	**Shaking gobos with variable speed**
96 - 107	Gobo 1
108 - 119	Gobo 2
120 - 131	Gobo 3
132 - 143	Gobo 4
144 - 155	Gobo 5
156 - 167	Gobo 6
168 - 179	Gobo 7
180 - 191	Gobo 8
192 - 203	Gobo 9
204 - 215	Gobo 10
216 - 227	Gobo 11
228 - 255	Gobowheel rotation from slow to fast

Channel 6 - Shutter, Strobe

0	Shutter closed
1 - 63	Gradual adjustment of the dimmer intensity from 0 to 100 %
64 - 95	Shutter open
96 - 127	Strobe-effect from slow to fast (max. 8 flashes/second)
128 - 139	Reset
140 - 159	Shutter closed
160 - 175	Pulse-effect in sequences from slow to fast
176 - 191	Pulse-effect in sequences from fast to slow
192 - 223	Random strobe-effect from slow to fast
224 - 255	Shutter open

Function of the control channels – 4-8 bit protocol:

Channel 1 - Horizontal movement (Pan)

Channel 2 - Vertical movement (Tilt)

Channel 3 - Colours

Linear colour change following the movement of the slider. In this way you can stop the colour-wheel in any position - also between two colours creating double-coloured beams.
Between 128 and 189 and between 194 and 255, the colour-wheel rotates continuously the so-called "Rainbow" effect.

0	Open / white
10	Turquoise
21	Red
32	Cyan
42	Light Green
53	Magenta
64	Light Blue
74	Yellow
85	Green
96	Pink
106	Blue
117	Orange
128 - 189	Forwards rainbow effect from fast to slow
190 - 193	No rotation
194 - 255	Backwards rainbow effect from slow to fast

Channel 4 – Static Gobos

0 - 07	Open
08 - 15	Gobo 1
16 - 23	Gobo 2
24 - 31	Gobo 3
32 - 39	Gobo 4
40 - 47	Gobo 5
48 - 55	Gobo 6
56 - 63	Gobo 7
64 - 71	Gobo 8
72 - 79	Gobo 9
80 - 87	Gobo 10
88 - 95	Gobo 11
96 - 227	**Shaking gobos with variable speed**
96 - 107	Gobo 1
108 - 119	Gobo 2
120 - 131	Gobo 3
132 - 143	Gobo 4
144 - 155	Gobo 5
156 - 167	Gobo 6
168 - 179	Gobo 7
180 - 191	Gobo 8
192 - 203	Gobo 9
204 - 215	Gobo 10
216 - 227	Gobo 11
228 - 255	Gobowheel rotation from slow to fast

Channel 5 – No Function

Channel 6 - Shutter, Strobe

0	Shutter closed
1 - 63	Gradual adjustment of the dimmer intensity from 0 to 100 %
64 - 95	Shutter open
96 - 127	Strobe-effect from slow to fast (max. 8 flashes/second)
128 - 139	Reset
140 - 159	Shutter closed
160 - 175	Pulse-effect in sequences from slow to fast
176 - 191	Pulse-effect in sequences from fast to slow
192 - 223	Random strobe-effect from slow to fast
224 - 255	Shutter open

Note: If Mode 4 is selected, then the speed of PAN/TILT movement is set to MAXIMUM. This mode is suitable for the EX-4 controller.

DMX-controlled operation

You can control the projectors individually via your DMX-controller. Every DMX-channel has a different occupation with different features.

Addressing

The Control Board on the front side of the base allows you to assign the DMX fixture address, which is defined as the first channel from which the MH-420 will respond to the controller.
If you set, for example, the address to channel 5, the MH-420 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 MH-420 correctly and independently from any other fixture on the DMX data link.
If two, three or more MH-420 are addressed similarly, they will work similarly.

For address setting, please refer to the instructions under "Addressing" (menu "A001").

Controlling:
After having addressed all MH-420, you may now start operating these via your lighting controller.
Note:
After switching on, the MH-420 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 occurr if:
- the 3 PIN XLR plug (cable with DMX signal from controller) is not connected with the input of the MH-660.
- 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.

Remotely controllable functions

Colour-wheel

The MH-420 features a colour-wheel with 12 color positions - 11 of these with dichroic colors and the last one open. The wheel can be positioned between two adjacent colors in any position. It is also possible to rotate the color-wheel continuously at different speeds - the so-called "Rainbow effect" is created.

English

Static gobo-wheel

The gobo-wheel includes 11 metal gobos and 1 open position. The gobos have an outside diameter of 26,5 mm and an image diameter of 22 mm.

Dimmer / Shutter / Strobe

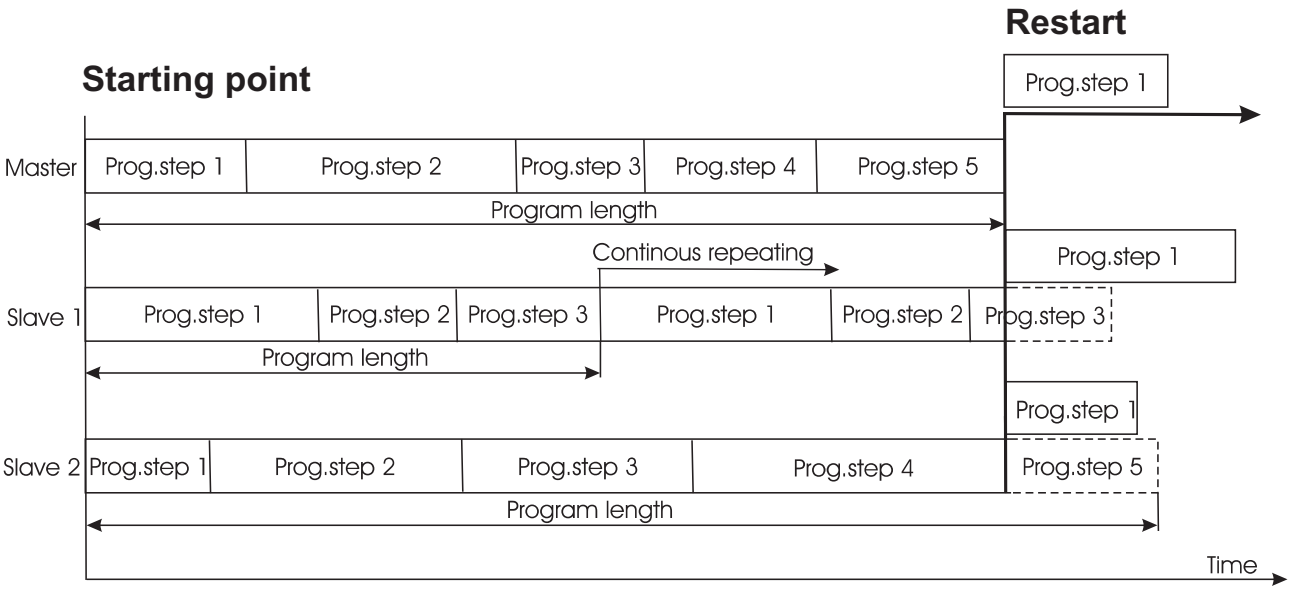
Smooth 0 - 100 % dimming is provided by the combined mechanical dimmer / shutter unit. This unit may also be used for strobe-effects (1 - 10 flashes per second)

Stand Alone-mode

In the Stand Alone-mode, one or several projectors of the data link can be operated without controller. Every projector features three pre-programmed programs which can be edited individually. Every projector can call up a different program. In order to set the desired program, please refer to the explanations under "Stand Alone-setting" (menu "St.AL.").
The Stand Alone-mode includes the operation of an individual projector or a chain of several projectors in master/slave-operation.
For the synchronized operatio of several projectors, the projectors have to be connected with each other via a data cable. One projector has to be defined as master-device and the others as slaves. Every slave needs to have its own slave-address "SLA-1" to "SLA-9". Please note that every slave-address can only be assigned to one projector.

The device's display shows the current program.

Please note: If the master-device runs through a reset, switches the lamp on or off or runs through the test program, all slave-devices follow the master. Furthermore, you cannot call up programs via the Control Board or edit them if the master-device is switched on and connected with the slaves.
The master-device starts the program run simultaneously at all slaves. All devices start their programs at a defined starting point. Every slave runs through the internal programs until the master-device requires a restart. If the slave's internal program is longer than the master's, the last step will not be executed and the program will be restarted.



Please note: Disconnect the master and slaves from the DMX-controller before you start master/slave-operation. Otherwise danger of data collisions.

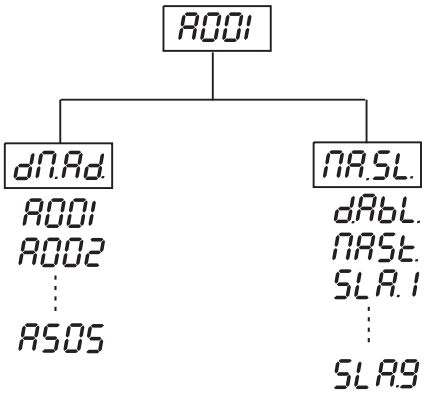
Caution: At the master-device and at the last slave-device, the DMX-cable has to be terminated with a terminator. Solder a 120 Ω resistor between Signal (–) and Signal (+) into a 3-pin XLR-plug and plug it in the DMX-output.

Control Board

The Control Board situated on the front side of the base offers several features. You can simply set the starting address, read the number of lamp or unit hours, switch on and off the lamp, run a test program, make a reset and also use special functions for manual control 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. 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.

Main functions

A001 - Address setting and master/slave-selection



dMAd. - DMX 512 Address settings

1. 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 pressing the [Up] and [Down] keys.
2. Press **[Enter]** and select "dM.Ad." by pressing the [Up] and [Down] keys.
3. Press **[Enter]**. 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.
4. Select "MA.SL." and press **[Enter]**. Select "d.Abl." (no master/slave) by pressing the [Up] and [Down] keys and press **[Enter]**.
5. Press the **[Mode]** key and the adjusted starting address is displayed. If the starting address is flashing, there is no DMX-data on the DMX-input.

MASL. - Master/Slave settings

1. 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).
2. Press **[Enter]** and select "MA.SL." by pressing the [Up] and [Down] keys.
3. Press **[Enter]**. Use the [Up] and [down] keys to select "MASt" (in order to define the projector as master) or "SLA.1" to "SLA.9" (in order to define the projector as a slave) and press **[Enter]** to confirm or **[Mode]** to cancel and return to the main menu. If you want to define "No master, no slave", select "d.AbL.".
4. Press the **[Mode]** key and the adjusted starting address is displayed. If "MASt." is flashing, a DMX-signal is received on the DMX-input. In this case, you need to disconnect the DMX-controller.

Only one fixture may be the master. Up to the 9 slaves may be connected to the master and on the certain address can be connected only one slave fixture (SLA1-SLA9).
Note: Disconect the fixtures from the DMX controller before master/slave operating, otherwise data collisions can occur and the fixtures will not work properly!
If the fixture is set as the master and DMX signal is connected to its input ,the error massage "MAEr" will appear on its display and the fixture's address will be set to its DMX address in order to respond to DMX signal from the controller.
For example:
The master fixture has these address setting:"dM.Ad."-menu.....**A017**
"MA.SL."-menu.....**MASt** (is displayed)

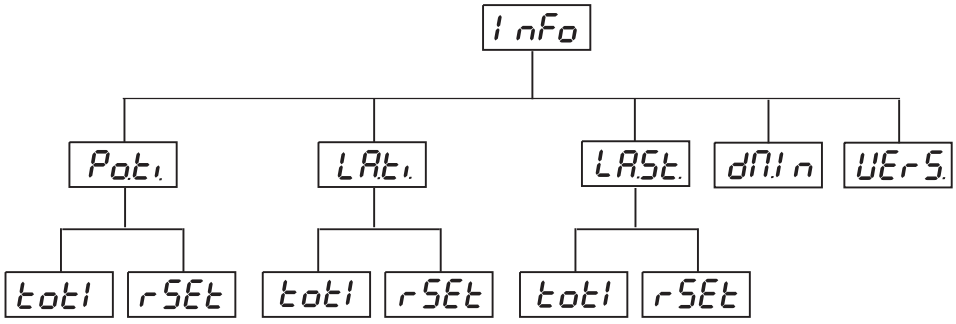
The DMX signal is connected to the master fixture.The message **"MAst"** starts fast flashing and after 20s error massage "MA.Er" appears on its display and the fixture automatically will be switched to its DMX address (master address is disabled).
Now the fixture has these address setting: "dM.Ad."-menu.....**A017** ("A017"/" MA.Er" flashing)
"MA.SL."-menu.....**d.AbL.**
If the fixture is set as the slave and DMX signal is connected to its input, the fixture will respond to DMX signal from the controller (in dependence on the fixture's DMX address).

SLCt. - Slave control

This function allows you to control the slaves from the master's control panel in a master/slave operation.
Select this function from the main menu and press **[Enter]**-button**.** Browse the list of all connected slaves (**"SL.C.1" - "SL.C.9"**) by pressing **[Up]** or **[Down]** button. Select the desired slave and press **[Enter]**-button.The slave's control panel is available from the master's control panel.

InFo - Fixture information

The menu allows you to read an useful information about the fixture as the lamp life, head temperature, software version, etc.
Press **[Up]** and **[Down]** buttons to select the desired option and press **[Enter]** to see the value or next submenu.



Pot. - Power On time

totl - By this option you can read the total number of the operation hours since the MH-660 has been fabricated. Press **[Enter]** or [Mode] to return to the menu.

rSEt - The number of the hours that the MH-420 has been powered On since the counter was last reset. Press **[Enter]** or **[Mode]** to return to the menu. In order to reset this counter to 0, you have to hold the **[Up]** and **[Down]**-button and press the **[Enter]**-button.

LAt. - Lamp On time

totl - By this option you can read the total number of the lamp's operation hours since the MH-420 has been fabricated. Press **[Enter]** or [Mode] to return to the menu.

rSEt - The number of the hours that the lamp has been powered On since the counter was last reset. Press **[Enter]** or **[Mode]** to return to the menu. In order to reset this counter to 0, you have to hold the **[Up]** and **[Down]**-button and press the **[Enter]**-button.

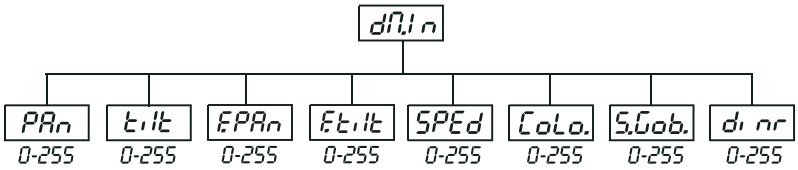
LASt. - Lamp strikes

totl - By this option you can read the total number of lamp strikes since the MH-420 has been fabricated. Press **[Enter]** or [Mode] to return to the menu.

rSEt - The number of lamp strikes since the counter was last reset. Press **[Enter]** or **[Mode]** to return to the menu. In order to reset this counter to 0, you have to hold the **[Up]** and **[Down]**-button and press the **[Enter]**-button.

dMX - 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.

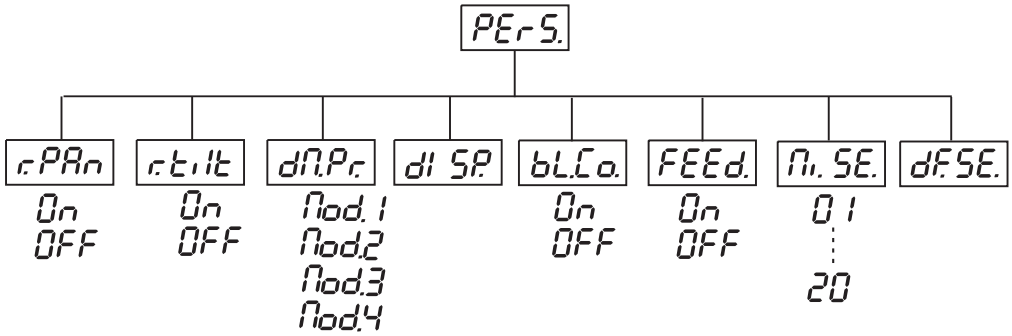


UErS. - Software version

By this function you can read the software version of the display module. Press **[Enter]** to read its value or [Mode] to return to the menu.

PErS. - Personality options

These options allow you to modify MH-660 operating behavior. Press **[Up]** and **[Down]** buttons to select the desired option and press **[Enter]** to set the value or to see next submenu.



rPAn - 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.

rtiLt - Tilt reverse

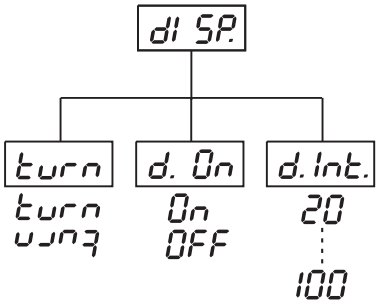
This function allows you to invert the Tilt-movement. Use the [Up] and [Down] keys to select **"On"** if you wish this feature or **"Off"** if you don't wish this feature and press **[Enter]** to confirm or **[Mode]** to cancel and return to the main menu.

dMPr. - DMX Presetting (Mode 1 default):

Channel	Mode 1	Mode 2	Mode 3	Mode 4
1	Pan	Pan	Pan	Pan
2	Tilt	Fine Pan	Tilt	Tilt
3	Fine Pan	Tilt	Speed	Colours
4	Fine Tilt	Fine Tilt	Colours	Gobos
5	Speed	Speed	Gobos	No function
6	Colours	Colours	Dimmer	Dimmer
7	Gobos	Gobos		
8	Dimmer	Dimmer		

diSP. - Display-adjusting

This function allows you to adjust the display settings:



d. Int. - Display intensity

With this function, you can adjust the display-intensity from 20 % to 100 %. 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.

turn - Display-reverse

With this function, you can rotate the display by 180°. Use the **[Up]** and **[Down]** keys to select **"normal display"** or **"display turned by 180°"** and press **[Enter]** to confirm or **[Mode]** to cancel and return to the menu.

d. On - Display-On

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.

bLCo. - Blackout during movement correction

The function executes the blackout during the head movement correction (the moving head has lost its right pan/tilt-position for a short moment). Use the **[Up]** and **[Down]** buttons to select **"On"** if you want to execute the blackout or **"Off"** if you don't and press **[Enter]** to confirm or **[Mode]** to cancel and return to the menu.

FEEd. - PAN/TILT-Feedback:

This function allows to return the Mowing Head to the required position after changing the position by external force (e. g. by stroke). Use the **[Up]** and **[Down]** keys to select **"On"** if you wish to enable this function or **"Off"** if you wish not to return the Moving Head to the required position and press **[Enter]** to confirm or **[Mode]** to cancel and return to the menu.

Note: If feedback was switched Off, the PAN/TILT-position is changed by external force and feedbeck is switched On again, the Moving Head might not to be synchronized with the DMX signal. You have to make a reset in order to synchronize the Moving Head with the DMX signal.

Mi. SE. - Mikrofon-Empfindlichkeit

With thiss function, you can adjust the microphone sensitivity from 1 (maximum) to 20 (minimum). Use the Up-/Down Buttons to select the level of sensitivity. Press the Enter Button to confirm the chosen level or the Mode Button to cancel and return to the menu.

Sensitivity too low

Signal level ok

Sensitivity too high

dFSE. - 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.

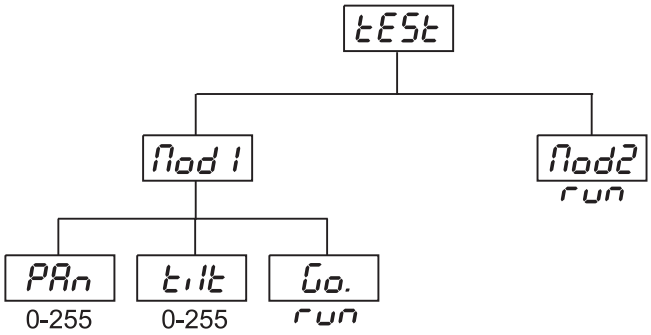
Personality	Display	Default values (SHADED)
Pan reverse	rPAn	On
		OFF
Tilt reverse	rtilt	On
		OFF
DMX presetting	dMPr	Mod 1
		Mod2
		Mod3
		Mod4
Blackout during mov. Correction	bLCo	On
		OFF
Display permanent on	d On	On
		OFF
Display intensity	d Int	20 40 60 80 100
Display reverse	turn	turn
		usng
Pan/Tilt feedback	FEEd	On
		OFF
Music trigger	Audi	On
		OFF
Microphone sensitivity	Ni SE	01 02 03 04 05
		06 07 08 09 10
		11 12 13 14 15
		16 17 18 19 20

tESt. - Test sequences

This function allows you to run a special demo-test sequences without an external controller, which will show you some possibilities of using MH-420. Press **[Up]** and **[Down]** keys to select the **"Mod1"** or **"Mod2"** sequences.

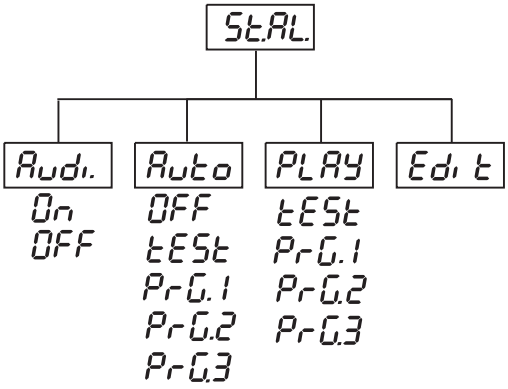
The **"Mod1"** is suitable for projections on the wall, ceiling or ground without any head-movement, the **"Mod2"** uses all MH - 420 functions and therefore is good for a complete introduction of the fixture.Select "**Mod1**" or "**Mod2**" by **[Up]** and **[Down]** buttons and press **[Enter]** to confirm the choice.If the test program is running, message "**run/test**" flashes on the display.

If you want to pause the runnnig program in the required position, press the **[Enter]-**button(messages"**PAUS**"/"**test**" blink).To continue the program running,press the **[Enter]-**button again.



StAL. - Stand Alone-settings

This menu offers options for stand-alone mode as a selection of playing program, programming and modifying current programs.



Audi. - Music control

This function activates the music control, in order to run the programs according to the music in Stand Alone Mode. Press the Up/Down Buttons to select **„ON“** or **„OFF“**. Press the Enter Button to confirm, or the Mode Button to cancel.

Auto - Playback preset

This function allows you to select the the program which will be played in the stand-alone mode after switching the fixture On.Use the **[Up]** and **[Down]** buttons to select desired program ("**tESt**"- bilt-in program) or **"OFF"** if you don't want trigger any program after switching the fixture On and press **[Enter]** to confirm or **[Mode]** to cancel and return to the menu.Selected program will be played continuously in a loop as long as it appears on the display.
This option should be set "**OFF**" for all slaves in the master/slave chain by reason of the right program starts.
For example: You have selected program "**PrG.3**" in this menu and:
- this fixture is set as a single fixture (master/slave or controller operating)- the fixture will run its program "**PrG.3**".
- this fixture is set as a master in a data chain- the fixture will run its program "**PrG.3**".
- this fixture is set as a slave in a data chain- the fixture will run its program according to the master(if the master runs its own program "**PrG.1**", the slave will run its own program "**PrG.1**"also).
Note:If the fixture operates in the controller mode (DMX controller is connected) and any program from this menu is selected, in this case the fixture will not respond to the DMX controller after switching On and will play selected program.

PLAY - Playing program

This function allows you to run a built-in program **"tESt"** and the 3 freely-programmable programs **"PrG.1, PrG.2, PrG.3"**. Press **[Up]** or **[Down]** buttons to select the desired program and press **[Enter]** to run the program which will be played continuously in a loop.
If you want to pause the runnnig program in the required position, press the **[Enter]-**button(messages"**PAUS**"/"**program No**." flashes).To continue the program running, press the **[Enter]-**button again.
Note: If the fixture operates in the controller mode (DMX controller is connected) and any program from this function is selected in this case the fixture will not respond to the DMX controller and will play selected program.
You can't play programs on the slave fixtures from their control panels if the master fixture is switched On and connected to the slaves (playing is forced by the master).

Edit - Editing program

This menu item allows you to select a program to edit or create.The MH-240 has one built-in program (**"tESt"**) and the 3 free programs,each up to 99 steps.Each program step has a dynamic part(fade time) and static part(step time).
Fade time-the time,during which effects move to the programmed position.
Step time-the time,during which effects last in the current step.
If the fixture is set as a master, then you may edit any program in the slaves.You can't edit programs on the slave fixtures from their control panels if the master fixture is switched on and connected to the slaves (editing is possible by the master control panel only).
Procedure:
1. Press **[Up]** or **[Down]-**button to select the program you want to edit ("PrG.1" - "PrG.3") and press **[Enter]**.
2. Press **[Up]** or **[Down]-**button to select the desired fixture ("MASt." - "SLA.9") and press **[Enter]**-button.
3. Press **[Up]** or **[Down]-**button to select the desired program step ("St.01" - "St.99") and press **[Enter]**-button.
4 Press **[Up]** or **[Down]-**button to select the desired item and press **[Enter]-**button.Now you can edit by **[Up]** or **[Down]** buttons the DMX value for selected item:

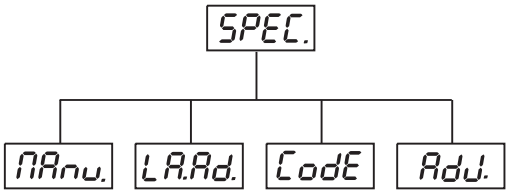
"P.End." - a total number of the program steps,value 1-99 .**This value you must set before start programming**(e.g. if you want to create program with the 10 steps,set the value onto 10).
"PAn" - a pan,value 0-255
"tilt" - a tilt,value 0-255
"F.PAn" - a fine pan, value 0-255
"F.tilt" - a fine tilt,value 0-255
"SPEd" - a speed of PAN/TILT movement,value 0-255
"Colo" - a colour, value 0-255
"S.Gob." - a satic gobowheel,value 0-255
"Stro." - a strobe,value 0-255
"dimr" - a dimmer, value 0-255
"S.tim." - a step time,value 0,1-25,5 seconds
"F.tim." - a fade time,value 0,1-25,5 seconds
"COPY." - a copying the current prog. step to the next prog. step .If the last prog.step is copied to the next prog. step, parameter **"P.End"** is increased about 1 by itself (except step 99).
5. Press **Enter]-**button to confirm adjusted value .
6. Press **[Mode]-**button,select next prog. step and repeat this procedure (steps 4 and 6).
The editing programs "PrG.1, PrG.2, PrG.3" are saved in the current modified fixture (master or slave1-9).

rESE. - Reset Function

Press **[Enter]** key to run reset. This option enables the MH-660 to index all effects (functions) and return to their standard positions.

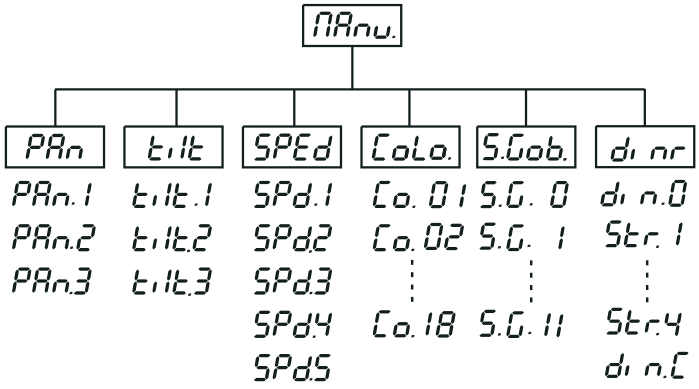
SPEC -Special functions

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



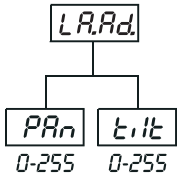
MAnu - Manual control of effects

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.



LAAd. - Lamp adjustment

This function can be used when you make the fine adjustment of the lamp.If you select "**LAAd**" pressing by **[Enter]**-button ,all effects will be canceled,shutter will be opened and the dimmer intensity will be set onto 100%. By using the options "**PAn, tilt, Foc**" you can focus the light on a flat surface (wall) and perform the fine lamp adjustment.

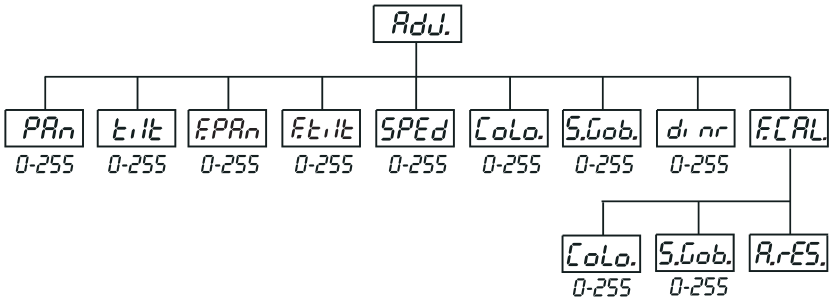


CodE - Fixture code

The option contains identification code (1-9999) for the fixture, which is used for the master/slave operation.

AdJ- Adjusting the default positions of colour, gobo and effect wheels

By this function you can calibrate and adjust the colour and gobo wheels 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, FPAn, Ftilt, SPEd, Colo, 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, SGob"** 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 (EEPROM) and to make a reset in order to check the newly adjusted positions of the colour, gobo and effect 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, SGob"** - calibration parameters. Select one of them and press **[Enter]**.
Now you can calibrate the colour, gobo and effect wheel by your controller. The DMX calibration protocol is described in the table mentioned below.

DMX Calibration Protocol:

DMX Channel	1	2	3	4	5	6	7	8
Function	COLOUR	STATIC GOBO	-	-	-	COLOUR	STATIC GOBO	DIMMER
	CALIBRATION 0-255	CALIBRATION 0-255	-	-	-	STANDARD PROTOCOL	STANDARD PROTOCOL	STANDARD PROTOCOL
	SMOOTH MICROSTEP MOVEMENT							

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 static gobo wheels and gobo indexing.

Error and information messages

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

CoEr
(Color-wheel error) This message 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.

SGEr (Static gobo-wheel error) This message 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 static gobo-wheel is not located in the default position after the reset.

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

PAEr
(PAN-yoke movement error) This message will appear after the reset of the fixture if the yoke's magnetic-indexing circuit malfunction (sensor 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.

ti Er
(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.

MAEr
This message will appear when the device has been defined as master device and a DMX-signal is present at the DMX-input. Remove the controller cable from the input and redefine the device as master.

Technical specifications

Power supply
EU-model: 208/230/240 V AC, 50/60 Hz ~
Fuse: T 2,5 A, 250 V
US-model: 100/115/208/230/240 V AC, 50/60 Hz ~
Fuse: T 5,0 A, 115 V
Power consumption: 300 W

Lamp
CDM-SA/T 150/942 G-12 socket

Optical System

-Parabolic mirror for optimal luminousness
-High luminous-efficiency parabolic mirror and double condenser system
-Standard 19° lens
-All lenses are anti-reflection coated

Colours
- 11 interchangeable dichroic-filters plus white
- Colour-wheel with variable rotation speed

Gobos
- 11 metal gobos plus an open position
- Outside diameter 26,5 mm, image diameter 22 mm.

Focus
- Manual focus

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

Shutter/Dimmer
- Smooth dimmer from 0 - 100 %

Motor
- 5 high quality stepping-motors controlled by microprocessors

English

Fans
- Two axial fans, one in the projector head and one in the base

Electronics
- Digital serial input DMX-512
- 4 different DMX control-channels (8 or 16 bit protocol):

Channel	Mode 1	Mode 2	Mode 3	Mode 4
1	Pan	Pan	Pan	Pan
2	Tilt	Fine Pan	Tilt	Tilt
3	Fine Pan	Tilt	Speed	Colours
4	Fine Tilt	Fine Tilt	Colours	Gobos
5	Speed	Speed	Gobos	No function
6	Colours	Colours	Dimmer	Dimmer
7	Gobos	Gobos		
8	Dimmer	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 3.0 s
Maximum TILT-movement 280° in 1.9 s

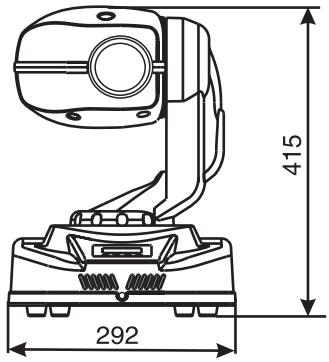
Rigging
Stands directly on the floor
Mounts horizontally or vertically with 2 clamps
Cam Lock system with 2 Omega holders
Safety chain/cord attachment point

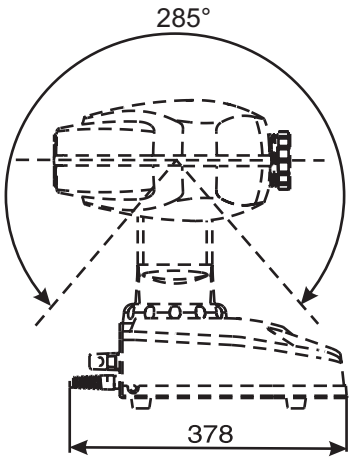
Temperatures
Maximum ambient temperature t_a: 45° C
Maximum housing temperature t_B (steady state): 80° C

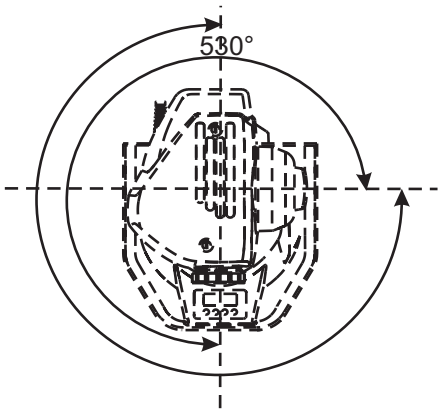
Minimum distances:
Min.distance from flammable surfaces: 0.5 m
Min.distance to lighted object: 1.0 m

Dimensions and weight

Length of base (including handles):	378 mm
Width of yoke:	292 mm
Height (head horizontal):	415 mm
Weight (net):	10.5 kg
Shipping weight:	12.5 kg







Cleaning and maintenance

The operator has to make sure that safety-relating and machine-technical installations are inspected by an expert after every four years in the course of an acceptance test.

The operator has to make sure that safety-relating and machine-technical installations are inspected by a skilled person once a year.

The following points have to be considered during the inspection:
1) All screws used for installing the devices or parts of the device have to be tighly connected and must not be corroded.
2) There must not be any deformations on housings, fixations and installation spots (ceiling, suspension, trussing).
3) Mechanically moved parts like axles, eyes and others must not show any traces of wearing (e.g. material abrading or damages) and must not rotate with unbalances.
4) The electric power supply cables must not show any damages, material fatigue (e.g. porous cables) or sediments. Further instructions depending on the installation spot and usage have to be adhered by a skilled installer and any safety problems have to be removed.

DANGER TO LIFE!
Disconnect from mains before starting maintenance operation!

We recommend a frequent cleaning of the device. Please use a moist, lint-free cloth. Never use alcohol or solvents!

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!

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

The gobos may be cleaned with a soft brush. The interior of the fixture should be cleaned at least annually using a vacuum-cleaner or an air-jet.

The dichroic colour-filters, the gobo-wheel and the internal lenses should be cleaned monthly.

To ensure a proper function of the gobo-wheel, we recommend lubrication in six month intervals. The quantity of oil must not be excessive in order to avoid that oil runs out when the gobo-wheel rotates.

There are no serviceable parts inside the device except for the lamp and the fuse. Maintenance and service operations are only to be carried out by authorized dealers.

Please refer to the instructions under "Installing/Replacing the lamp".

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.

Before replacing the fuse, unplug mains lead.

Procedure:

Step 1: Unscrew the fuseholder on the rearpanel 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.

Should you need any spare parts, please use genuine parts.

If the power supply cable of this device becomes damaged, it has to be replaced by authorized dealers only in order to avoid hazards.

Should you have further questions, please contact your dealer.

Appendix

We hope you will enjoy your MH-420. We can assure you that you will enjoy this device for years if you follow the instructions given in this manual.

Should you have further questions, do not hesitate to contact your local dealer.