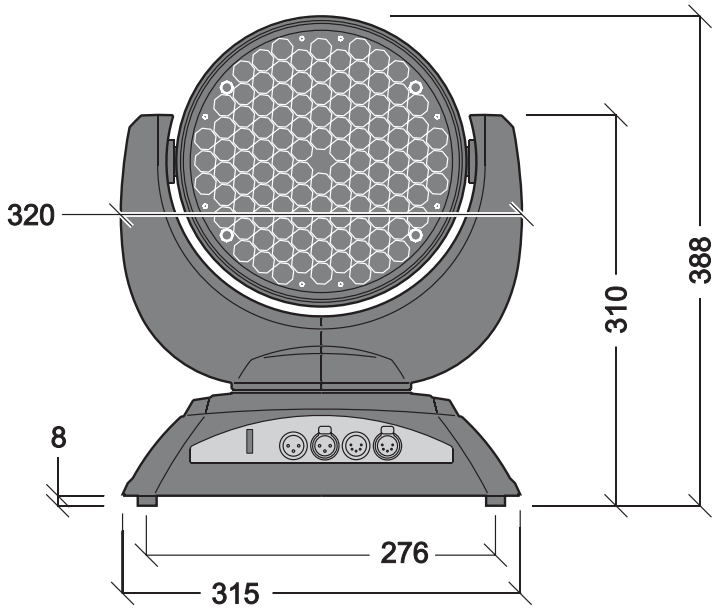
MAC 301 Wash™

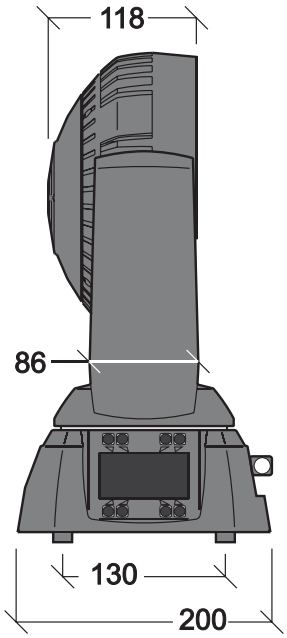
user manual

Martin®

Dimensions

All dimensions are in millimeters





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P/N 35000228, Rev. F

Safety Information

WARNING!
Read the safety precautions in this section before installing, powering, operating or servicing this product.

The following symbols are used to identify important safety information on the product and in this manual:

DANGER! Safety hazard. Risk of severe injury or death.

DANGER! Hazardous voltage. Risk of lethal or severe electric shock.

WARNING! Fire hazard.

WARNING! LED light emission. Risk of eye injury.

WARNING! Burn hazard. Hot surface. Do not touch.

WARNING! Wear protective eyewear.

WARNING! Refer to user manual.

Warning! Risk Group 3 (high risk) LED product according to EN 62471. Do not look into the beam at a distance of less than 0.5 meters (20 inches) from the front surface of the product. Do not view the light output with optical instruments or any device that may concentrate the beam.

This product is for professional use only. It is not for household use.

This product presents risks of severe injury or death due to fire and burn hazards, electric shock and falls.

Read this manual before installing, powering or servicing the fixture, follow the safety precautions listed below and observe all warnings in this manual and printed on the fixture. If you have questions about how to operate the fixture safely, please contact your Martin supplier or call the Martin 24-hour service hotline on +45 8740 0000, or in the USA on 1-888-tech-180.

PROTECTION FROM ELECTRIC SHOCK

- Disconnect the fixture from AC power before removing or installing any cover or part – including fuses – and when not in use.
- Always ground (earth) the fixture electrically.
- Use only a source of AC power that complies with local building and electrical codes and has both overload and ground-fault (earth-fault) protection.
- Before using the fixture, check that all power distribution equipment and cables are in perfect condition and rated for the current requirements of all connected devices.
- Isolate the fixture from power immediately if the power plug or any seal, cover, cable, or other component is damaged, defective, deformed, wet or showing signs of overheating. Do not reapply power until repairs have been completed.
- Do not expose the fixture to rain or moisture.
- Refer any service operation not described in this manual to a qualified technician.
- Socket outlets used to supply MAC 301 Wash fixtures with power or external power switches must be located near the fixtures and easily accessible so that the fixtures can easily be disconnected from power.

PROTECTION FROM BURNS AND FIRE

- Do not operate the fixture if the ambient temperature (Ta) exceeds 40° C (104° F).
- The exterior of the fixture becomes hot during use. Avoid contact by persons and materials. Allow the fixture to cool for at least 10 minutes before handling.
- Keep all combustible materials (e.g. fabric, wood, paper) at least 100 mm (4 ins.) away from the head.
- Keep flammable materials well away from the fixture.
- Ensure that there is free and unobstructed airflow around the fixture.
- Do not illuminate surfaces within 250 mm (10 ins.) of the fixture.
- Do not attempt to bypass thermostatic switches or fuses. Replace defective fuses with ones of the specified type and rating.
- Do not stick filters, masks or other materials onto any optical component.
- Do not modify the fixture in any way not described in this manual
- Install only genuine Martin parts.

PROTECTION FROM INJURY

- Do not look continuously at LEDs from a distance of less than 0.5 meters (20 inches) from the front surface of the fixture without protective eyewear such as shade 4-5 welding goggles. At less than this distance, the LED emission can cause eye injury or irritation. At distances of 0.5 meters (20 inches) and above, light output is harmless to the naked eye provided that the eye's natural aversion response is not overcome.
- Do not look at LEDs with magnifiers, telescopes, binoculars or similar optical instruments that may concentrate the light output.
- Ensure that persons are not looking at the LEDs from within 0.5 meters (20 inches) when the product lights up suddenly. This can happen when power is applied, when the product receives a DMX signal, when a stand-alone program suddenly increases light output intensity or when SERVICE menu items are selected.
- Install as described in this manual a secondary attachment such as a safety cable that is approved by an official body such as TÜV as a safety attachment for the weight of all the fixtures it secures. The safety cable must comply with EN 60598-2-17 Section 17.6.6 and be capable of bearing a static suspended load ten times the weight of the fixture.
- If suspending from a rigging structure, attach the fixture with two evenly spaced clamps. Do not use only one clamp.
- Ensure that any supporting structure and/or hardware used can hold at least 10 times the weight of all the devices they support.
- Allow enough clearance around the head to ensure that it cannot collide with an object or another fixture when it moves.
- Check that all external covers and rigging hardware are securely fastened.
- Block access below the work area and work from a stable platform whenever installing, servicing or moving the fixture.
- Do not operate the fixture with missing or damaged covers, shields or any optical component.

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Fixture overview

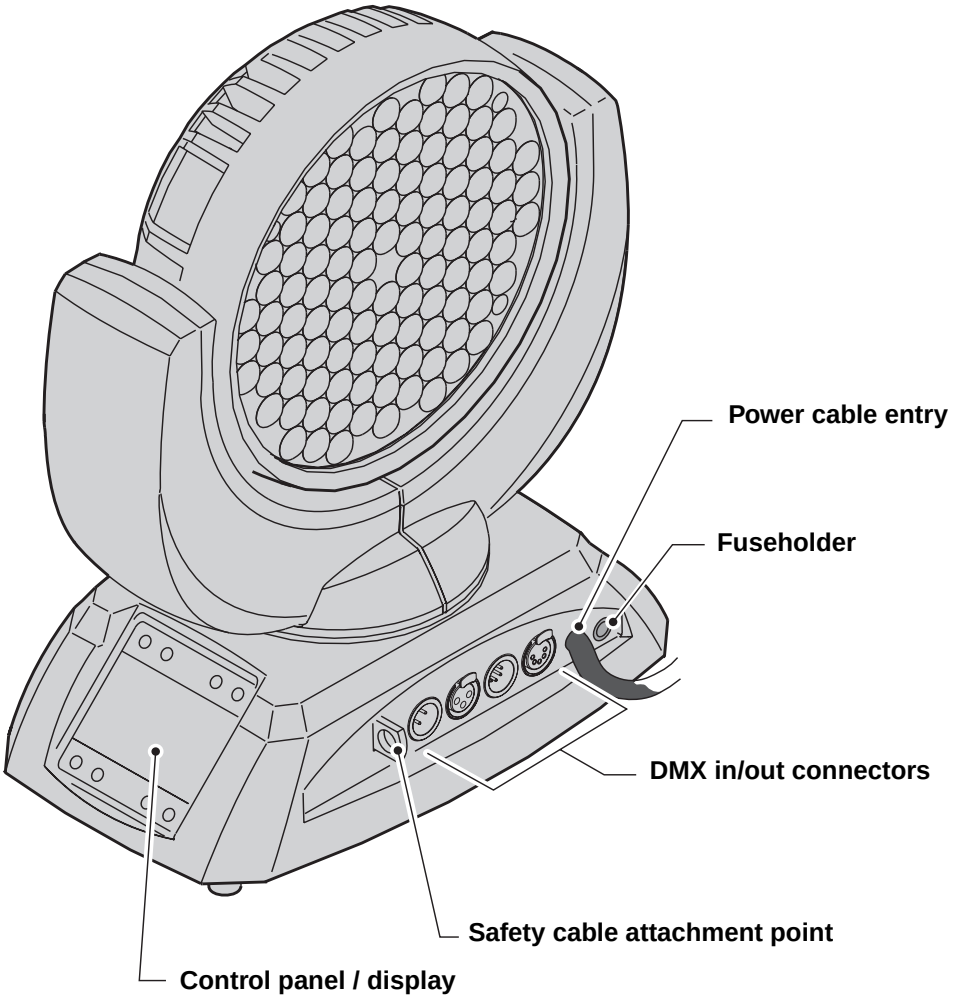


Figure 1: Connections panel overview

Introduction

Thank you for selecting the MAC 301 Wash™, an intelligent lighting fixture from Martin Professional™. This LED-based moving-head washlight features:

- Luxeon Rebel high-power emitters
- DMX control and stand-alone operation with scenes programmed on fixture or captured via DMX
- Onboard control panel and backlit LCD graphic display
- RGB color mixing with CTC
- 'Color wheel' color-snap feature
- Smooth electronic dimming
- Electronic strobe with pulse effects
- Motorized zoom, 13° - 36°
- 430° pan and 300° tilt ranges
- Two 8-bit and two 16-bit DMX control modes

For the latest firmware updates, documentation, and other information about this and all Martin Professional products, please visit the Martin website at http://www.martin.com

Comments or suggestions regarding this document may be e-mailed to service@martin.dk or posted to:

Technical Documentation
Martin Professional A/S
Olof Palmes Allé 18
DK-8200 Aarhus N
Denmark

Warning! Read "Safety Information" on page 3 before installing, powering, operating or servicing the MAC 301 Wash.

Unpacking

The following items are included with the MAC 301 Wash:

- Two clamp attachment brackets with quarter-turn fasteners.
- This user manual.

Using for the first time

Before applying power to the fixture:

- Check the Martin Professional website at www.martin.com for the most recent user documentation and technical information about the MAC 301 Wash. Martin user manual revisions are identified by the revision letter at the bottom of page 2.
- Carefully review "Safety Information" on page 3.
- Check that the fixture's power voltage and frequency ranges match the local AC mains power source.
- If drawing power from a socket, install a suitable power plug on the power cable as described in "Power cables and power plug" on page 8.

AC power

Warning! Read “Safety Information” starting on page 3 before connecting the MAC 301 Wash to AC mains power.

For protection from electric shock, the MAC 301 Wash must be grounded (earthed). The power distribution circuit must be equipped with a fuse or circuit breaker and ground-fault (earth-fault) protection.

The MAC 301 Wash does not have a power on/off switch. Socket outlets or external power switches used to supply the MAC 301 Wash with power must be located near the fixture and easily accessible so that the fixtures can easily be disconnected from power.

Important! Do not use an external dimming system to supply power to the MAC 301 Wash, as this may cause damage to the fixture that is not covered by the product warranty.

The MAC 301 Wash can be hard-wired to a building electrical installation if you want to install it permanently, or a power plug can be installed on the power cable in the case of temporary installation.

Main fuse

Warning! Replace fuses with ones of the same type and rating only.

MAC 301 Wash EU and US models are protected by a 6.3 amp slow-blow main fuse. The main fuse is located in a fuseholder on the connections panel next to the power cable entry. See “Fuse replacement” on page 21 for details of accessing and changing fuses.

Power voltage

Warning! Check that the voltage range specified on the fixture’s serial number label matches the local AC mains power voltage before applying power to the fixture.

MAC 301 Wash EU and US models accept AC mains power at 100-240 V nominal, 50/60 Hz. Do not apply AC mains power to the fixture at any other voltage than that specified on the fixture’s serial number label.

Power cables and power plug

The MAC 301 Wash is supplied with a hard-wired power cable that can either be permanently connected to a building’s electrical installation circuits (in this case an external power switch must be installed close to the fixture) or fitted with a power plug that is suitable for the local AC mains power outlets.

- MAC 301 Wash EU models have an EU color-coded power cable.
- MAC 301 Wash US models have a US color-coded power cable.

These color codes are listed in Table 1 on page 9.

If you decide to install a power plug on the fixture’s power cable, install a grounding-type (earthed) plug that is correctly rated for the current and power requirements of the fixture. Follow the plug manufacturer’s instructions. Table 1 shows standard wire color-coding schemes and some possible pin identification

schemes; if pins are not clearly identified, or if you have any doubts about proper installation, consult a qualified electrician.

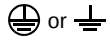
Wire Color (EU models)	Wire Color (US models)	Conductor	Symbol	Screw (US)
brown	black	live	L	yellow or brass
blue	white	neutral	N	silver
yellow/green	green	ground (earth)		green

Table 1: Wire color-coding and power connections

Data link

A data link is required in order to control a MAC 301 Wash via DMX.

The MAC 301 Wash has both 3-pin and 5-pin XLR connectors for DMX data input and output. The pin-out on all connectors is pin 1 = shield, pin 2 = cold (-), and pin 3 = hot (+). Do not use the outputs to split the DMX link.

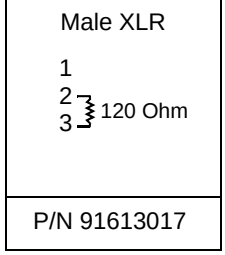
Pins 4 and 5 in the 5-pin XLR connectors not used in the MAC 301 Wash but are available for possible additional data signal requirements. Standard pin-out is pin 4 = data 2 cold (-) and pin 5 = data 2 hot (+).

Sockets are wired in parallel: both inputs connect to both outputs.

Tips for reliable data transmission

- Use shielded twisted-pair cable designed for RS-485 devices: standard microphone cable cannot transmit control data reliably over long runs. 24 AWG cable is suitable for runs up to 300 meters (1000 ft). Heavier gauge cable and/or an amplifier is recommended for longer runs.
- Never use both a fixture's outputs to split a DMX link. To split the link into branches, use a splitter such as the Martin 4-Channel Opto-Isolated RS-485 Splitter/Amplifier.
- Do not overload the link. Up to 32 devices may be connected on a serial link.
- Terminate the link by installing a termination plug in the output socket of the last fixture. The termination plug, which is a male XLR plug with a 120 Ohm, 0.25 Watt resistor soldered between pins 2 and 3, "soaks up" the control signal so it does not reflect and cause interference. If a splitter is used, terminate each branch of the link.

Male termination plug



P/N 91613017

Connecting the data link

1. Connect the DMX data output from the controller to the MAC 301 Wash's 3-pin or 5-pin input (male) socket.
2. Using the sockets that match your data cable, connect the output of the fixture closest to the controller to the input of the next fixture.
3. Insert a male 120 Ohm XLR termination plug in the 3-pin or 5-pin output of the last fixture on the link.

Physical installation

The MAC 301 Wash can be placed on a horizontal surface such as a stage or clamped to a truss in any orientation using the quarter-turn clamp brackets supplied with the fixture.

Warning! Attach an approved safety cable to the attachment point on the connections panel (see "Fixture overview" on page 6).

Check that all surfaces to be illuminated are minimum 250 mm (10 ins.) from the fixture, that combustible materials (wood, fabric, paper, etc.) are minimum 100 mm (4 ins.) from the head, that there is free airflow around the fixture and that there are no flammable materials nearby.

Make sure that it is impossible for the moving head to collide with another fixture or other object.

Placing the fixture on a flat surface

The MAC 301 Wash can be placed on a stage or other level, flat surface. Check that the surface can support at least 10 times the weight of all fixtures and equipment to be installed on it.

Warning! The supporting surface must be hard and flat or air vents in the base may be blocked, which will cause overheating. Secure the fixture against falling. Attach a securely anchored safety cable to the safety cable attachment point (see "Fixture overview" on page 6) if the fixture is to be placed above ground level in any location where it may fall and cause injury or damage.

Mounting the fixture on a truss

The MAC 301 Wash can be clamped to a truss or similar rigging structure in any orientation. Clamp brackets can be attached to the base of the fixture using quarter-turn quick connectors.

Warning! Use two clamps to rig the fixture. Lock each clamp bracket by turning both 1/4-turn fasteners fully clockwise.

To clamp a MAC 301 Wash to a truss:

1. Check that the rigging structure can support at least 10 times the weight of all fixtures and equipment to be installed on it.
2. Obtain two rigging clamps and check that they are undamaged and can bear at least 10 times the weight of the fixture. Bolt the clamps securely to the supplied clamp brackets with a minimum grade 8.8 M12 bolt and lock nut.
3. See Figure 2. Align each of the two clamp brackets with two mounting points in the base. Insert the quarter-turn fasteners into the base and turn all levers a full 90° clockwise to lock.
4. Block access under the work area. Working from a stable platform, hang the fixture on the truss with the arrow on the base towards the area to be illuminated. Tighten the rigging clamps.
5. Secure the fixture against clamp or bracket failure with a secondary attachment such as a safety cable that can bear at least 10 times the weight of the fixture using the attachment point on the connections panel (see "Fixture overview" on page 6). This attachment point is designed to accept a carabiner clamp. Do not use any other part of the fixture as a safety cable attachment point.
6. Check that the head will not collide with other fixtures or objects.

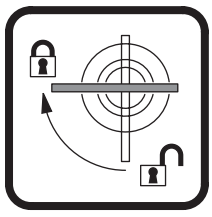


Figure 2: Quarter-turn fasteners

Setup

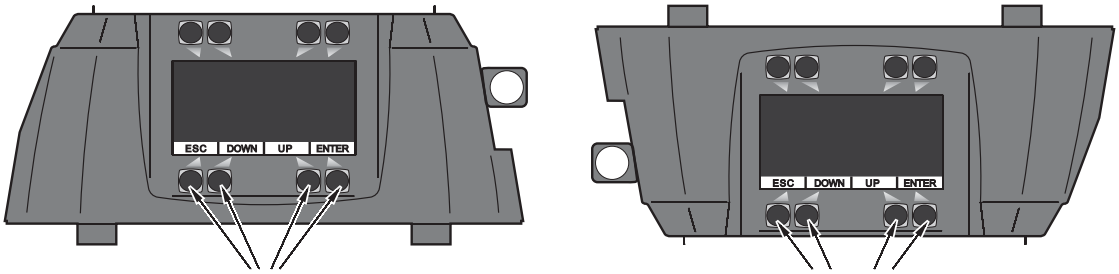
Warning! Read “Safety Information” on page 3 before installing, powering, operating or servicing the MAC 301 Wash.

Control panel and menu navigation

The onboard control panel and backlit graphic display are used to set the MAC 301 Wash’s DMX address, program stand-alone operation, configure individual fixture settings (personality), read out data and execute service utilities. See “Onboard control menus” on page 24 for a complete list of menus and commands.

Using the control buttons

- To enter a menu, select a function or apply a selection, press ENTER.
- Press UP and DOWN to scroll within a menu or adjust values.
- To escape a function or move back one level in the menu structure, press ESC.
- The control panel can be locked, disabling the control buttons. Hold ENTER pressed in and press ESC to lock the control panel. Hold ESC pressed in and press ENTER to unlock the control panel and restore control button functionality.
- The RUN, MODIFY and REMOTE commands in the STANDALONE menu and FINE ADJUST in the SERVICE menu are locked by default. Hold ENTER pressed in and press ESC to unlock them. Hold ESC pressed in and press ENTER to lock them again.
- See Figure 3. There are two sets of control buttons. If the fixture is rotated through 180°, press once on any control button in the set that are now below the display. The display will rotate through 180° so that it is correctly orientated.



Control buttons, standing installation

Control buttons, hanging installation

Figure 3: Control buttons

Display panel functions

The DMX address is shown in the display panel when the MAC 301 Wash is powered on and has reset.

The display panel backlighting indicates fixture status as follows:

- The display dims to zero during resets.
- The display flashes slowly if the fixture is not receiving a valid DMX signal.
- The display flashes quickly if an error has been detected, and the error type is shown in the display. If the error message is not deleted, the Martin logo flashes quickly in the display and the error type is stored in the ERROR LIST menu.
- The display dims to zero 30 seconds after the fixture begins receiving a valid DMX signal.

Restoring factory default settings

The MAC 301 Wash factory default settings can be restored by applying a LOAD DEFAULT command. If you have fine-adjusted white balance, your new custom setting is not affected if you reload factory default settings.

DMX address setting

The DMX address, also known as the start channel, is the first channel used to receive instructions from the controller. For independent control, each fixture must be assigned its own control channels. Two MAC 301 Wash fixtures may share the same address, however, if identical behavior is desired. Address sharing can be useful for diagnostic purposes and symmetric control, particularly when combined with the inverse pan and tilt options.

The DMX address is configured using the DMX ADDRESS menu in the control panel.

If you are resetting the DMX address in a flightcase, you can prevent the fixture from physically resetting by holding the right-hand base button down while powering the fixture on.

DMX modes

The MAC 301 Wash provides standard or compressed, 8-bit or 16-bit DMX control modes. These four modes can be selected in the PERSONALITY menu. Depending on the selected DMX mode, the MAC 301 Wash requires 12, 15, 16 or 19 DMX channels. See “DMX protocol” on page 22 for details of DMX commands available in the different modes.

The currently selected DMX mode is displayed in the main menu: S8, S16, C8 or C16.

Tailoring performance

Movement

The MAC 301 Wash provides several options for optimizing movement for different applications.

- RESOLUTION in the PAN/TILT menu sets pan and tilt to 16-bit or 8-bit control resolution during stand-alone programming. The default setting is 16-bit. If this fine resolution is not required, you can set to 8-bit resolution for quicker scrolling through pan/tilt values.
- The PAN INVERS and TILT INVERS commands invert the direction of pan and tilt and the PAN/TILT SWAP command sets pan commands to tilt and vice versa. These settings are useful for symmetrical effects with multiple fixtures.
- SHORTEST DIST. sets effects to always take the shortest route from one scene to another and can normally be left at the default setting ON.

Other performance settings

- CURVES allows you to select dimming curves for DIMMER CURVE (overall intensity) and RGB CURVE (intensity of individual RGB). In both cases, either optically linear or square-law curves can be selected. See Figure 4. Square-law dimming curves give finer control at low intensity and coarser control at high intensity.
- CAMERA MODE is designed to offer flicker-free illumination in TV studios. 50HZ is best suited to PAL and SECAM systems and 60HZ to NTSC systems. FLEX mode is designed to eliminate flicker if cameras have a refresh frequency that makes the 50HZ or 60HZ settings ineffective. Besides the PERSONALITY control menu, CAMERA MODE options can also be selected from the lighting desk on the fixture’s DMX channel 5.

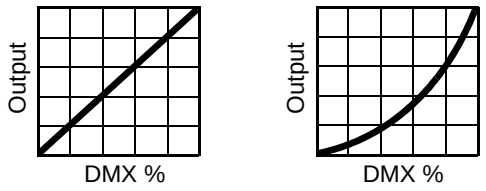


Figure 4: Dimming curves

- COOLING MODE gives you a choice of three settings:
  - The default setting STANDARD should suit use in all normal situations and ensure excellent service lifetimes for all components.
  - SILENT reduces head fan operation to a minimum whenever a lower level of cooling is required, giving quietest possible operation. This mode should only be used in well-ventilated areas where the ambient temperature is low or when light output is reduced or only required occasionally.
  - HI POWER maximizes cooling and reduces the operating temperature of the components in the head. It is recommended when the MAC 301 Wash is used intensively in a warm environment or in fixed installations. Note that it will give increased fan noise compared to the other cooling modes.

  Whatever cooling mode is selected, a thermal cutout shuts down power to the LEDs if the fixture temperature exceeds safe limits. If this occurs, you must reset the fixture via the control menus or via DMX, or cycle power to the fixture off and on again.

  If a thermal shutdown occurs, you are pushing the fixture to its limits. Clean the fixture, particularly the air vents, and check that there is sufficient airflow around the fixture. Consider increasing ventilation, reducing the ambient temperature, or switching to HI POWER mode.

Effects

This section describes the effects provided in the MAC 301 Wash. The effects are available in both DMX control and stand-alone operation.

Pan and tilt

The MAC 301 Wash's moving head can be panned through 430° and tilted through 300°.

White balance

White balance for the white output in the color wheel effect can be adjusted electronically.

Shutter effect

The electronic 'shutter' effect provides instant open and blackout, variable speed regular and random strobe and opening/closing pulse effects.

Dimming

Overall intensity can be adjusted using 0 - 100% electronic dimming.

Zoom

The motorized zoom varies the beam angle continuously from 13° through to 36°.

Zoom speed at low ambient temperatures

Completely regular zoom operation is only possible when the zoom components are at normal operating temperature. Zoom speed is therefore reduced for a short period if the fixture is started in an ambient temperature of 9° C (48° F) or lower in order to give components time to warm up. The lower the temperature, the longer the warm-up period during which zoom speed is reduced. At 9° C (48° F), the warm-up period is 18 seconds. At 5° C (41° F), the warm-up period is 90 seconds.

RGB color mixing

8-bit RGB color mixing is available in all DMX modes, with 16-bit fine RGB control available in both standard and compressed 16-bit modes.

CTC

Color temperature can be varied from 8000 - 2800 K.

Color wheel effect

The electronic 'color wheel' effect gives the convenience and feel of a color wheel in a discharge or incandescent lamp-based fixture. The color wheel effect in the MAC 301 Wash lets you fade or snap between the following full colors:

- White
- Red
- Yellow
- Magenta
- Green
- Amber
- Blue
- Cyan

You can also scroll continuously forwards or backwards through these colors at variable speed.

Pan, tilt and effects movement speed and blackout

The speed of pan/tilt movement and effects changes can be adjusted.

The fixture can also be set to go to a blackout during pan/tilt movement or color changes, with adjustable blackout fade out/fade in times from 5 seconds to a fast snap.

DMX operation

Warning! Read “Safety Information” on page 3 before installing, powering, operating or servicing the MAC 301 Wash.

This section describes only DMX control features that require particular explanation. See “DMX protocol” on page 22 for a full list of the DMX channels and values required to control the different effects. See “Effects” on page 15 for a full description of the fixture’s effects.

8- and 16-bit Standard and Compressed DMX control modes

The MAC 301 Wash has four DMX operating modes:

- **Standard 8-bit** uses 16 DMX channels
- **Compressed 8-bit** uses 12 DMX channels
- **Standard 16-bit** uses 19 DMX channels
- **Compressed 16-bit** uses 15 DMX channels

In Compressed modes, the color wheel, pan/tilt speed, effect speed and movement blackout channels are not available. This means that color can be changed using the RGB channels only.

The 16-bit modes include the same control options as 8-bit modes but fine control of RGB is added on 3 extra channels.

Where fine control is available, the main control channel sets the first 8 bits (the most significant byte or MSB), and the fine channel sets the second 8 bits (the least significant byte or LSB) of the 16-bit control byte. In other words, the fine channel works within the position set by the main channel.

Color control and CTC using DMX

The MAC 301 Wash has a color wheel effect channel, RGB color mixing channels and a CTC channel.

The color wheel effect channel is only available in 8-bit and 16-bit standard modes. In compressed modes, you can only control color with the RGB channels.

The color wheel effect channel that is available in standard modes has priority over the RGB channels. If you want to use the RGB channels in standard modes, you must set the color wheel effect channel to DMX values 000 - 001.

The CTC channel can be used to adjust white color temperature both when using the color wheel effect and RGB control. The CTC adjustment range available depends on the fixture’s white balance setting. If white balance is set to 6500 K, you can reduce color temperature to approximately 2800 K.

Color balance using DMX

The control channel (DMX channel 5 in all DMX modes) lets you adjust color balance as follows:

- **DMX values 000 - 007**: Unbalanced mode, full power on all RGB strings.
- **DMX values 008 - 015**: White balance approx. 8500 K. Marginally reduced intensity of the RGB strings. Can be used to balance the color output of different MAC 301 Wash fixtures.
- **DMX values 016 - 023**: White balance approx. 6500 K. Definite reduced brightness in blue. Possible reduced brightness in green and red. Can be used to balance the color output of different MAC 301 Wash fixtures. If all RGB channels are set to 100%, you should obtain a good general-purpose white color temperature.
- **DMX values 024 - 031**: White balance the same as for DMX values 016 - 023, but the RGB curve is set to linear. This setting lets you use the color picker function on several lighting consoles.

The color balance selected on channel 5 applies when using both the color wheel effect and RGB to control color.

Stand-alone operation

Warning! Read “Safety Information” on page 3 before installing, powering, operating or servicing the MAC 301 Wash.

Important! Before activating stand-alone operation with the menu items MODIFY, RUN and REMOTE, disconnect any DMX transmitting devices (lighting desk, other fixture set to stand-alone master, etc.) that are connected to the MAC 301 Wash, or you may cause damage to DMX circuits. MODIFY, RUN and REMOTE can only be activated by holding the ENTER button pressed in and then pressing the ESC button.

This section describes how to program and run stand-alone light shows on the MAC 301 Wash without a DMX controller. See “Onboard control menus” on page 24 for a full list of stand-alone commands. See “Effects” on page 15 for a full description of the MAC 301 Wash’s effects.

In stand-alone operation, the MAC 301 Wash can play up to 20 pre-programmed scenes continuously in a loop.

About scenes

A stand-alone light show consists of a sequence of steps (also called scenes). Each step is a particular lighting effect with predetermined effects (color, intensity, pan, tilt, etc.) and duration.

See Figure 5. Each step has a dynamic part called the FADE TIME – during which effects move to the step’s programmed positions, and a static part – the wait – where effects do not change. The total of the fade and wait times (i.e the time before the fixture moves to the next step in the sequence) is called the NEXT TIME.

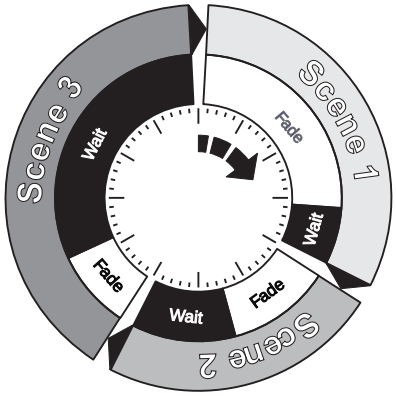


Figure 5: Scene timing

Programming stand-alone operation

Programming stand-alone operation via the control panel

The stand-alone programming commands available are given under “Onboard control menus” on page 24. Note the following points:

- To add a step to a sequence, navigate to the step before the one you want to add, then apply the INSERT command. The new step will be added after the current step, and the effects in the current step will be automatically copied to the new step.
- Use the MODIFY command to define the effects (fade and wait times, pan/tilt positions, color, zoom angle, etc.) in a step. To access the MODIFY command, you must unlock it by holding ENTER pressed in and pressing ESC.
- To clear the effects in a step, navigate to that step, and apply the RESET STEP command. All values in that step will be reset to zero.
- To delete a step from a sequence, navigate to that step, then apply the DELETE command.
- To clear an entire stand-alone sequence from memory and reset the stand-alone program to one step with all values set to zero, navigate to and apply the CLEAR ALL command.
- To speed up the stand-alone program by a factor of ten, select 1/10 SEC in the TIMEBASE menu.

Programming stand-alone scenes via DMX

You can program the effects in each step by capturing the DMX values the fixture is receiving. To do this:

1. Send the DMX values you want to capture.
2. Navigate to and apply the CAPT DMX command. The MAC 301 Wash will display CAPTURE DMX 01/XX, where XX is the step currently being programmed. Press ENTER to confirm and the fixture will display START CAPTURE.

3. Continue creating steps using the INSERT command in the control panel. Adjust the DMX values you send to the fixture and use CAPT DMX each time you want to apply those values to a new step.
4. Reset and delete steps using the control panel commands.

Running a stand-alone program

Select RUN in the STANDALONE menu to start the fixture running its programmed sequence in a repeating loop. To access the RUN command, you must unlock it by holding ENTER pressed in and pressing ESC.

Press ESC to stop stand-alone operation.

During stand-alone operation, S-ALONE 01/XX appears in the display, where XX is the current step in the sequence.

Master-slave stand-alone operation

The MAC 301 Wash can operate in master-slave stand-alone mode, in which one ‘master’ MAC 301 Wash fixture running a stand-alone program controls ‘slave’ MAC 301 Wash fixtures via DMX so that they run the same program. This means that all fixtures run an identical synchronized program.

Important! ***Before activating master-slave stand-alone operation in the MAC 301 Wash, disconnect any DMX transmitting device (lighting desk, other fixture set to stand-alone master, etc.) that is connected to it.***

To set up master-slave stand-alone operation:

1. Create a stand-alone program in the master fixture as described above.
2. Set all fixtures apart from the master to REMOTE in the STANDALONE menu. To access the REMOTE command, you must unlock it by holding ENTER pressed in and pressing ESC. If a slave fixture has been set up with a stand-alone program, that stand-alone program is de-activated and the slave fixture will only respond to DMX commands from the master fixture when you set the slave fixture to REMOTE.
3. Connect the DMX output of the master fixture to the DMX input of the first slave fixture and continue connecting slave fixtures in a daisy-chain, DMX output to DMX input.
4. Select RUN in the master fixture’s STANDALONE menu. To access the RUN command, you must unlock it by holding ENTER pressed in and pressing ESC. The master fixture will start running its programmed sequence itself and in all the connected slave fixtures in a repeating loop.

Service and maintenance

Warning! Read “Safety Information” on page 3 before servicing the MAC 301 Wash.

Warning! Disconnect the fixture from AC mains power and allow to cool for at least 10 minutes before handling. Do not view the light output from less than 0.5 meters (20 inches) without shade 4-5 welding goggles. Be prepared for the fixture to light suddenly if connected to power.

Warning! Refer any service operation not described in this user manual to a qualified service technician.

Important! Excessive dust, smoke fluid, and particle buildup degrades performance, causes overheating and will damage the fixture. Damage caused by inadequate cleaning or maintenance is not covered by the product warranty.

The user will need to clean the MAC 301 Wash periodically, and it is also possible for the user to change the main fuse and update the firmware. All other service operations on the MAC 301 Wash must be carried out by Martin Professional or its approved service agents.

Installation, on-site service and maintenance can be provided worldwide by the Martin Professional Global Service organization and its approved agents, giving owners access to Martin’s expertise and product knowledge in a partnership that will ensure the highest level of performance throughout the product’s lifetime. Please contact your Martin supplier for details.

It is Martin policy to apply the strictest possible calibration procedures and use the best quality materials available to ensure optimum performance and the longest possible component lifetimes. However, LEDs are subject to wear and tear over the life of the product, resulting in gradual changes in color and overall brightness over many thousands of hours of use. The extent of wear and tear depends heavily on operating conditions and environment, so it is impossible to specify precisely whether and to what extent LED performance will be affected. However, you may eventually need to ask Martin Professional to replace LEDs if their characteristics are affected by wear and tear after an extended period of use and if you require fixtures to perform within very precise optical and color parameters.

Cleaning

Cleaning schedules for lighting fixtures vary greatly depending on the operating environment. It is therefore impossible to specify precise cleaning intervals for the MAC 301 Wash. Environmental factors that may result in a need for frequent cleaning include:

- Use of smoke or fog machines.
- High airflow rates (near air conditioning vents, for example).
- Presence of cigarette smoke.
- Airborne dust (from stage effects, building structures and fittings or the natural environment at outdoor events, for example).

If one or more of these factors is present, inspect fixtures within their first 100 hours of operation to see whether cleaning is necessary. Check again at frequent intervals. This procedure will allow you to assess cleaning requirements in your particular situation. If in doubt, consult your Martin dealer about a suitable maintenance schedule.

Use gentle pressure only when cleaning, and work in a clean, well-lit area. Do not use any product that contains solvents or abrasives, as these can cause surface damage.

Warning! Disconnect from power and allow to cool before cleaning.

To clean the fixture:

1. Disconnect the fixture from power and allow it to cool for at least 10 minutes.
2. Vacuum or gently blow away dust and loose particles from the outside of the fixture and the air vents at the back and sides of the head and in the base with low-pressure compressed air.
3. Clean the front glass by wiping gently with a soft, clean lint-free cloth moistened with a weak detergent solution. Do not rub the surface hard: lift particles off with a soft repeated press. Dry with a soft, clean,

lint-free cloth or low-pressure compressed air. Remove stuck particles with an unscented tissue or cotton swab moistened with glass cleaner or distilled water.

4. Check that the fixture is dry before reapplying power.

Control menu service utilities

Fixture reset

The RESET FIXTURE command resets the fixture and can be used as a first remedy if an error occurs.

Error logging

The ERROR LIST command displays a list of any errors detected. An error can simply be a harmless and isolated incident, but if repeated errors occur, the MAC 301 Wash may require new software, firmware, service or repair. Contact your Martin supplier for advice

Error types are counted, and the error list can be cleared.

Functions test

The FUNCTIONS TEST feature provides a general test of all effects, allowing testing without a controller.

Pan/tilt reinitialization

The INIT PAN TILT feature reinitializes pan and tilt relative to their end stops. Use it if pan and tilt appear to have lost calibration.

White balance adjustment

The white balance in all MAC 301 Wash fixtures is calibrated relative to a reference source before fixtures leave the factory. However, it is possible to fine-tune the white output in the color wheel effect using the FINE ADJUST menu. To access the FINE ADJUST commands, you must unlock the menu by holding ENTER pressed in and pressing ESC.

Warning! ***The MAC 301 Wash lights up immediately the FINE ADJUST menu is activated.***

The SKAL RED, SKAL GREEN and SKAL BLUE items let you adjust the intensity of red, green and blue pixels as a percentage in the white light mix. Keep at least one value at 100% for maximum intensity. Overall intensity can be adjusted from 0% to 100% using SKAL ALL.

White balance adjustment is stored in onboard memory and is not affected if the fixture is returned to factory default settings.

Zoom adjustment

The zoom effect in all MAC 301 Wash fixtures is also calibrated at the factory, but it is possible to fine-tune the zoom using the ZOOM OFS command.

Software upload

The MAC 301 Wash is loaded with both software (that can be installed and updated by the user) and firmware (that is internal and accessible to Martin Service and its authorized partners only). Software updates are available from the Martin website and can be installed with a special MAC 301 upload device that can upload software to one fixture at a time.

The following are required in order to install software:

- The latest version of the MAC 301 Wash software, available for download free of charge from the Product Support Area of the Martin website at http://www.martin.com
- A PC running Windows 98/2000/XP
- A special MAC 301 Software Uploader interface device and 5-pin DMX cable (supplied with device).

Use the RECEIVESOFT command to prepare the fixture for a software upload. See the MAC 301 Software Uploader device user documentation for full details of the upload process.

Fixture readouts

DMX input signal

The DMX TEST menu lets you view the DMX values received on each channel. If the fixture does not behave as expected, reading the DMX values can help you troubleshoot the problem.

Fixture status

The MAC 301 Wash gives fixture status readouts in the INFO menu:

- Current software/firmware version information is available.
- The non-resettable TOT OPERATE TIME counter displays total hours of use since the fixture was manufactured.
- Temperature readouts from the display panel and power supply unit in the base as well as the driver and LED PCB in the head are available. In each case, you can view the current temperature and the maximum temperature reached since the readout was last reset. The maximum temperatures can be reset individually.

Lubrication

In general, the MAC 301 Wash does not require lubrication. However, depending on use conditions, the moving parts in the head and zoom mechanisms may eventually require reapplication of lubricant. Excessive noise during pan/tilt and zoom movement is a sign that lubrication may be required. This operation can be carried out by a Martin service partner if necessary.

Fuse replacement

Warning! Disconnect from power before replacing a fuse. Replace fuses with ones of the same type and rating only. Never bypass or bridge a fuse.

The MAC 301 Wash is protected by a 6.3 A slow-blow main fuse located in a fuseholder next to the power cable entry (see “Fixture overview” on page 6).

To replace a fuse:

1. Isolate the fixture from power.
2. Use a flathead screwdriver to open the fuseholder and remove the fuse for testing or replacement.
3. Replace defective fuses with ones of the same type and rating only. Replacement fuses are available from Martin.
4. Reinstall the fuseholder before reapplying power.

If a fuse blows repeatedly, disconnect the fixture from power immediately and consult your Martin supplier.

Diagnostic feedback

If an error occurs, the following feedback flashes in the MAC 301 Wash display:

Message	Condition
EEPROM ERROR	CPU gets no response from EEPROM
HIGH TMP BLCD	LCD PCBs temp is 80° C, LEDs shut down
HIGH TMP BPS	Power supply temp. is 97° C, LEDs shut down
HIGH TMP H DRV	Head driver PCB temp. is 97° C, LEDs shut down
HIGH TMP H LED	LED PCB temp. is 97° C, LEDs shut down
PAN TIMEOUT	Pan movement failure (motor will not run, failure on motor driver PCB LK0104, encoder processor PCB LK0098, encoder PCB LK0099)
TILT TIMEOUT	Tilt movement failure (motor will not run, failure on motor driver PCB LK0104, encoder processor PCB LK0098, encoder PCB LK0099)
TSENS BLCD ER	CPU gets no response from temp. sensor on LCD PCB (LK0100)
TSENS BPS ER	CPU gets no response from temp. sensor on power supply PCB
TSENS HDRV ER	CPU gets no response from temp. sensor on head driver PCB (LK0106)
TSENSHLED ER	CPU gets no response from temp. sensor on LED PCB

DMX protocol

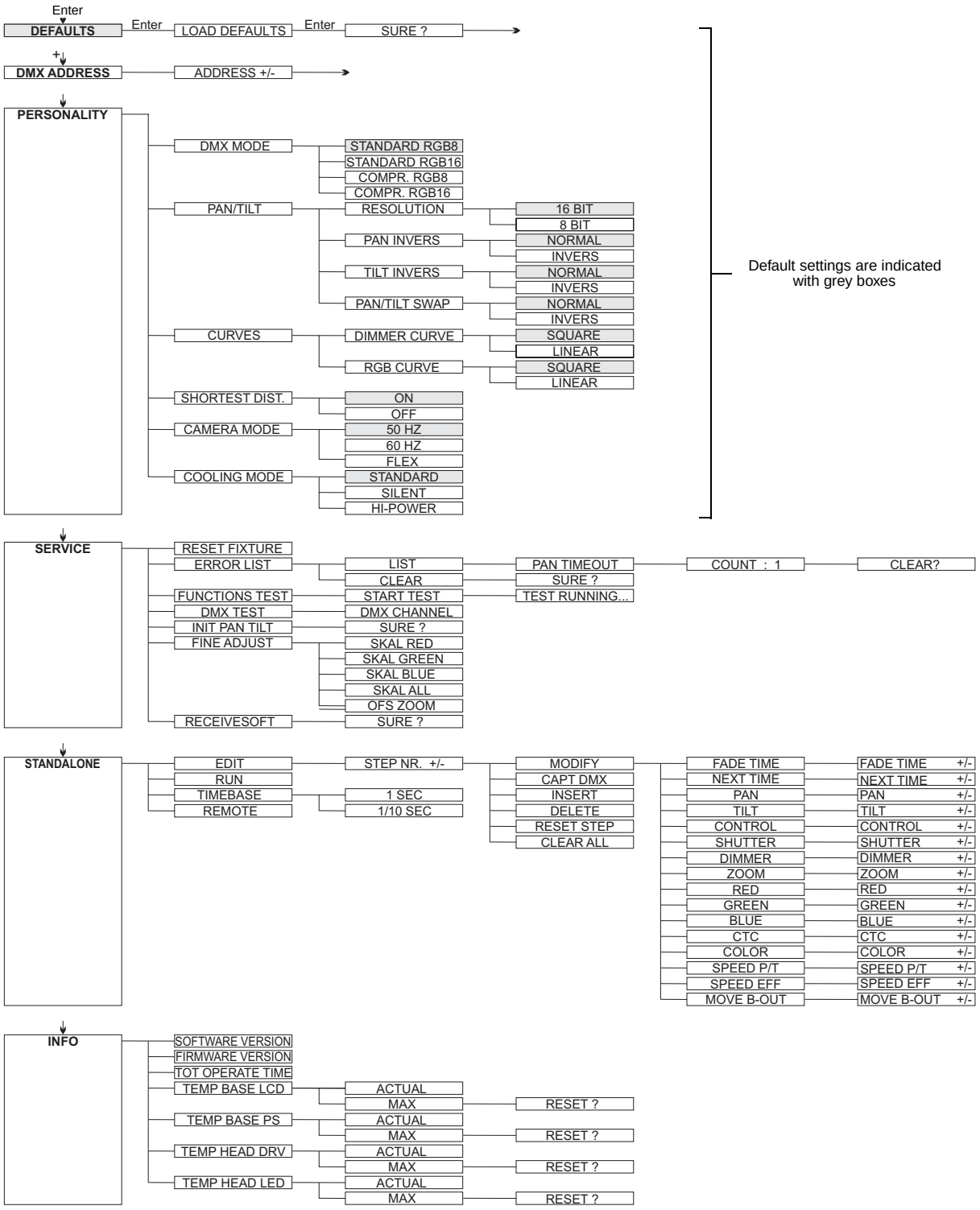
Std. 8-bit	Std. 16-bit	Comp. 8-bit	Comp. 16-bit	DMX Value	Percent	Function
1	**1**	**1**	**1**	0 - 255	0 - 100	**Pan** Pan 0 - 430°
2	**2**	**2**	**2**	0 - 255	0 - 100	**Pan fine** Pan fine (Least Significant Byte)
3	**3**	**3**	**3**	0 - 255	0 - 100	**Tilt** Tilt 0 - 300°
4	**4**	**4**	**4**	0 - 255	0 - 100	**Tilt fine** Tilt fine (Least Significant Byte)
5	**5**	**5**	**5**			**General control**
				0 - 7	0 - 3	Full LED output power (unbalanced) Fade out with fader (slow → fast)
				8 - 15	3 - 6	White balance 8500 K (if RGB active) Fade out with fader (slow → fast)
				16 - 23	6 - 9	White balance 6500 K (if RGB active) Fade out with fader (slow → fast)
				24 - 31	9 - 12	White balance (use with lighting desk 'color picker' function) Fade out with fader (slow → fast)
				32 - 207	13 - 81	*Safe zone: no reset or effects available*
				208 - 215	82 - 84	Camera mode, 50 Hz
				216 - 223	85 - 87	Camera mode, 60 Hz
				224 - 231	88 - 91	Camera mode, FLEX mode
				232 - 239	91 - 93	*Safe zone: no reset or effects available*
				240 - 247	94 - 97	Reset (after 1 second delay)
				248 - 255	97 - 100	*Safe zone: no reset or effects available*
6	**6**	**6**	**6**			**Electronic shutter effect**
				0 - 15	0 - 6	Shutter closed
				16 - 95	6 - 37	Shutter open
				96 - 110	38 - 43	Strobe effect >10 Hz (fast → slow)
				111	43	Shutter open
				112 - 125	44 - 49	Dimmer fade time adjustment, slow → fast
				126	49	Shutter open
				127	47	Shutter closed
				128 - 142	47 - 56	Strobe effect <10 Hz (fast → slow)
				143	56	Shutter open
				144 - 158	56 - 62	Closing pulse (0.6 → 4.8 seconds)
				159	62	Shutter closed
				160 - 174	63 - 68	Shutter fade to 0% (0.6 → 4.8 seconds)
				175	69	Shutter open
				176 - 190	69 - 74	Shutter fade to 100% (0.6 → 4.8 seconds)
				191	75	Shutter closed
				192 - 206	75 - 81	Random shutter 100% (0.6 → 4.8 seconds)
				207	81	Shutter open
				208 - 222	82 - 87	Random shutter 0% (0.6 → 4.8 seconds)
				223	87	Shutter closed
				224 - 238	88 - 93	Random shutter fade to 0% (0.6 → 4.8 seconds)
				239	94	Shutter open
				240 - 254	94 - 100	Random shutter fade to 100% (0.6 → 4.8 seconds)
				255	100	Shutter open
7	**7**	**7**	**7**	0 - 255	0 - 100	**Dimmer** Dimmer 0 → 100%
8	**8**	**8**	**8**	0 - 255	0 - 100	**Zoom** Zoom 12 → 36° (one-tenth peak angles)
9	**9**	**9**	**9**	0 - 255	0 - 100	**Red** Red 0 → 100%
	10		**10**	0 - 255	0 - 100	**Red fine** Red fine (LSB)
10	**11**	**10**	**11**	0 - 255	0 - 100	**Green** Green 0 → 100%
	12		**12**	0 - 255	0 - 100	**Green fine** Green fine (LSB)

Table 2: DMX Protocol

Std. 8-bit	Std. 16-bit	Comp. 8-bit	Comp. 16-bit	DMX Value	Percent	Function
11	**13**	**11**	**13**	0 - 255	0 - 100	**Blue** Blue 0 → 100%
	14		**14**	0 - 255	0 - 100	**Blue fine** Blue fine (LSB)
12	**15**	**12**	**15**	0 - 255	0 - 100	**CTC** CTC 0 → 100%
13	**16**			0 - 1 2 - 3 4 - 7 8 - 11 12 - 15 16 - 19 20 - 23 24 - 27 28 - 31 32 - 35 36 - 39 40 - 43 44 - 47 48 - 51 52 - 55 56 - 59 60 - 63 64 - 191 192 - 222 223 - 224 225 - 255	0 1 2 3 - 4 5 - 6 6 - 7 8 - 9 9 - 10 11 - 12 13 - 14 14 - 15 16 - 17 17 - 18 19 - 20 20 - 21 22 - 23 24 - 25 25 - 75 75 - 87 87 - 88 88 - 100	**Color wheel effect** Inactive: color mixing with RGB control White White → Red Red Red → Yellow Yellow Yellow → Magenta Magenta Magenta → Green Green Green → Amber Amber Amber → Blue Blue Blue → Cyan Cyan Cyan → White Continuous color wheel positioning **Color wheel rotation effect** Clockwise, fast → slow Color wheel stop Counter-clockwise, slow → fast
14	**17**			0 - 3 4 - 255	0 - 1 2 - 100	**Pan/tilt speed** Moves in real time Delayed movement, fast → slow
15	**18**			0 - 3 4 - 255	0 - 1 2 - 100	**Effects speed** Move in real time Delayed movement, fast → slow
16	**19**			0 - 95 96 - 127 128 - 159 160 - 223 224 - 255	0 - 37 38 - 50 50 - 62 63 - 87 88 - 100	**Movement blackout** No function Blackout during pan/tilt movement Blackout during color changes No function Blackout during pan/tilt movement and color changes Fade-out/fade-in times for blackouts is adjustable, slow (5 secs.) → snap

Table 2: DMX Protocol

Onboard control menus



Troubleshooting

Problem	Probable cause(s)	Remedy
Fixture is completely dead.	No power to fixture.	Check power and connections.
	Fuse blown.	Disconnect fixture from power. Check fuses and replace.
One or more fixtures resets correctly but responds erratically or not at all to the controller.	Fault on data link.	Inspect connections and cables. Correct poor connections. Repair or replace damaged cables.
	Data link not terminated.	Insert termination plug in output connector of the last fixture on the link.
	Incorrect fixture DMX addressing.	Check addressing on fixture and controller. Check fixture is set to correct DMX mode.
	One of the fixtures is defective and is disturbing data transmission on the link.	Unplug XLR in and out connectors and connect them directly together to bypass one fixture at a time until normal operation is regained. Have faulty fixture serviced by Martin service technician.
	XLR pin-out on fixtures does not match (pins 2 and 3 reversed).	Install a phase-reversing cable between the fixtures or swap pins 2 and 3 in the fixture that behaves erratically.
Light output shuts down unexpectedly.	Fixture is too hot.	Clean the fixture, especially air vents. Ensure free airflow around fixture. Check that ambient temperature does not exceed max. permitted level. Switch to HI POWER cooling mode. If problem persists, contact Martin for advice.

Table 3: Troubleshooting

Specifications

Physical

Length . . . . . 200 mm (7.9 in.)
Width . . . . . 320 mm (12.6 in.)
Height . . . . . 388 mm (15.3 in.)
Weight . . . . . 8.9 kg (19.6 lbs.) excl. brackets

Dynamic Effects

Color mixing . . . . . RGB
Red . . . . . 0 - 100%
Green . . . . . 0 - 100%
Blue . . . . . 0 - 100%
Electronic 'color wheel' effect . . . . . 7 colors plus white, color wheel rotation effect, snap, blackout or dimmer fade at color changes
Variable CTC
Electronic dimming . . . . . 0 - 100%, two dimming curve options for overall/individual RGB intensity
Zoom . . . . . 13 - 36°
Strobe effect . . . . . Electronic, with pulse and random effects
Pan . . . . . 430°
Tilt . . . . . 300°
Adjustable pan/tilt and effects speed

Optics

Light source . . . . . Luxeon Rebel high power emitters
Red . . . . . 621-637 nm
Green . . . . . 525-542 nm
Blue . . . . . 445-461 nm

Control and Programming

Control options . . . . . DMX, stand-alone, master/slave
Control resolution . . . . . 8- and 16-bit
DMX channels 12/15/16/19
Setting and addressing . . . . . Control panel with backlit graphic display
Protocol . . . . . USITT DMX512/1990
Stand-alone memory . . . . . 20 scenes
Stand-alone programming . . . . . Control panel with backlit graphic display
Transceiver RS-485
Firmware update . . . . . Serial upload via DMX link

Construction

Color . . . . . Black
Housing . . . . . High-impact flame-retardant thermoplastic
Protection rating . . . . . IP 20

Installation

Mounting points . . . . . 2 pairs of 1/4-turn locks
Orientation . . . . . Any
Minimum distance to illuminated surfaces . . . . . 250 mm (9.8 in.)
Minimum distance to combustible materials . . . . 100 mm (3.9 in.) from head, no min. distance from base

Connections

AC power input . . . . . 1.6 m cable tail
DMX data in/out . . . . . 3-pin and 5-pin locking XLR

Electrical

AC power . . . . . 100-240 V nominal, 50/60 Hz
Maximum total power consumption . . . . . .350 W
Power supply unit. . . . . Auto-ranging electronic switch mode
Main fuse . . . . . 6.3 AT (slow blow)
Standby power . . . . . <60 W

Typical Power and Current

100 V, 60 Hz. . . . . 344 W, 3.5 A, PF 0.998
110 V, 60 Hz. . . . . 341 W, 3.1 A, PF 0.997
120 V, 60 Hz. . . . . 338 W, 2.9 A, PF 0.996
208 V, 60 Hz. . . . . 331 W, 1.7 A, PF 0.983
230 V, 50 Hz. . . . . 332 W, 1.5 A, PF 0.972
240 V, 50 Hz. . . . . 332 W, 1.5 A, PF 0.968
PF = power factor. Measurements made at nominal voltage with all LEDs at full intensity. Allow for a deviation of +/- 10%.

Thermal

Cooling. . . . . Forced air (temperature-regulated, low noise, user-definable levels)
Maximum ambient temperature (Ta max.) . . . . . 40° C (104° F)
Minimum ambient temperature (Ta min.) . . . . . 5° C (41° F)
Total heat dissipation (calculated, +/- 10%) . . . . . 1200 BTU/hr.

Approvals

EU safety . . . . . EN 60598-1, EN 60598-2-17
EU EMC. . . EN 61000-3-2, EN 61000-3-3, EN 61000-6-2, EN 61000-6-4
US safety (US model) . . . . . UL 1573, UL 8750
Canadian safety (US model) . . . . . CAN/CSA C.22.2 No. 166

Included Items

Two Omega clamp attachment brackets with 1/4-turn fasteners for MAC 301 . . . . . 2 x P/N 91602015
User manual . . . . . P/N 35000228
6.3 AT main fuse (installed) . . . . . P/N 05020020

Accessories

MAC 301 Software Uploader . . . . . P/N 90758099
MAC 301 Diffusion Filter . . . . . P/N 91611324
G-clamp . . . . . P/N 91602003
Half-coupler clamp. . . . . P/N 91602005
Quick trigger clamp . . . . . P/N 91602007
Safety wire, universal, 50 kg safe work load . . . . . P/N 91604003
DMX cable, STP, 1 pair + shield, IEC/UL-CL, 1 m . . . . . P/N 91611242
DMX cable, STP, 1 pair + shield, IEC/UL-CL, 2 m . . . . . P/N 91611243
DMX cable, STP, 1 pair + shield, IEC/UL-CL, 5 m . . . . . P/N 91611244
DMX cable, STP, 1 pair + shield, IEC/UL-CL, 10 m . . . . . P/N 91611245
DMX cable, STP, 1 pair + shield, IEC/UL-CL, 20 m . . . . . P/N 91611246
Four-unit flightcase for 4 x MAC 301 . . . . . P/N 91510021

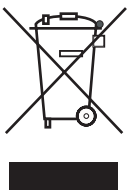
Spare parts

6.3 AT main fuse . . . . . P/N 05020020

Ordering Information

MAC 301 Wash™, EU model (100-240 V, 50/60 Hz), in cardboard box . . . . . P/N 90218000
MAC 301 Wash™, EU model (100-240 V, 50/60 Hz), in 4-unit flightcase . . . . . P/N 90218001
MAC 301 Wash™, US model (100-240 V, 50/60 Hz), in cardboard box . . . . . P/N 90218100
MAC 301 Wash™, US model (100-240 V, 50/60 Hz), in 4-unit flightcase . . . . . P/N 90218101

Specifications subject to change without notice. For the latest product specifications, see www.martin.com



Disposing of this product

Martin™ products are supplied in compliance with Directive 2002/96/EC of the European Parliament and of the Council of the European Union on WEEE (Waste Electrical and Electronic Equipment), as amended by Directive 2003/108/EC, where applicable.

Help preserve the environment! Ensure that this product is recycled at the end of its life. Your supplier can give details of local arrangements for the disposal of Martin products.

Martin®

www.martin.com • Olof Palmes Allé 18 • 8200 Aarhus N • Denmark
Tel: +45 8740 0000 • Fax +45 8740 0010