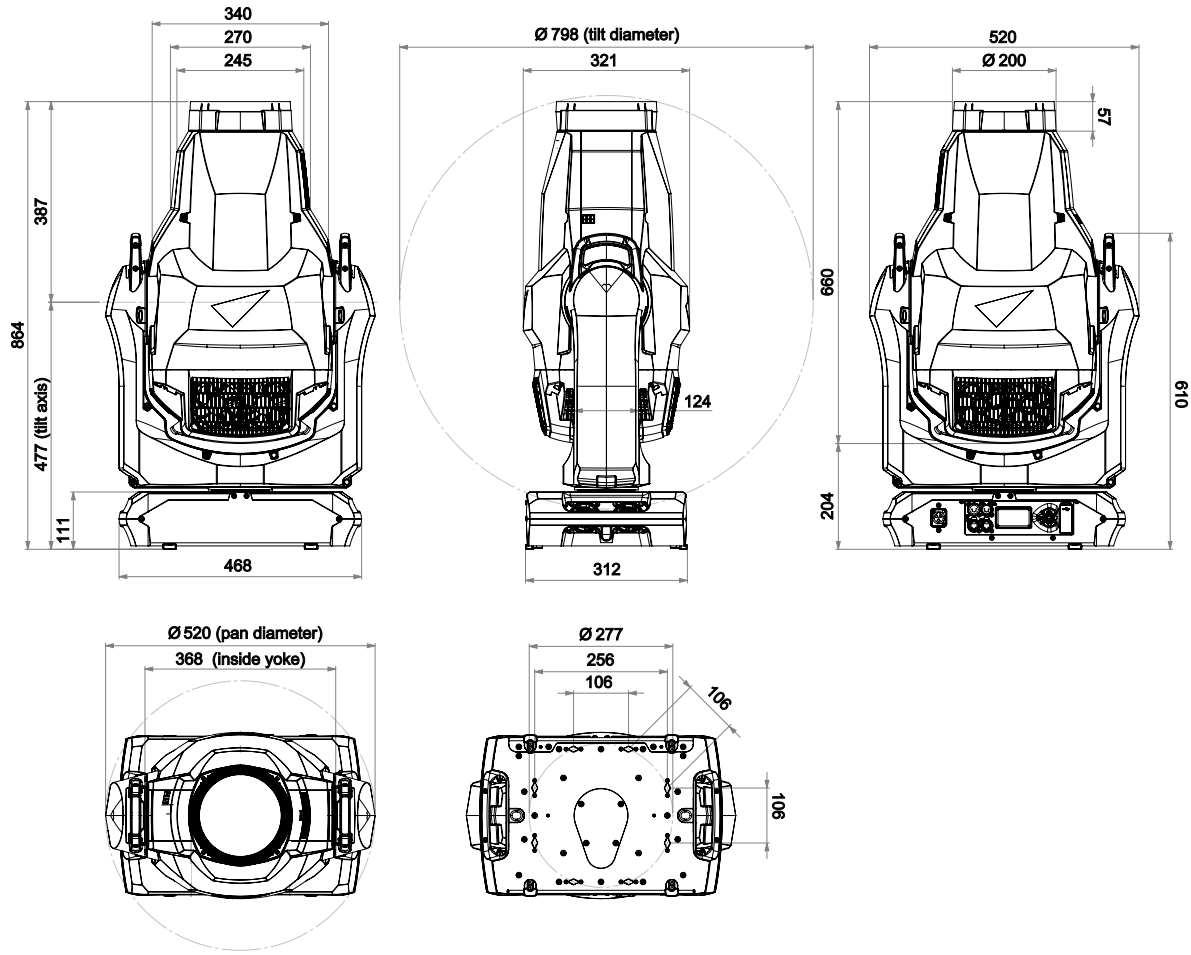
MAC Ultra Performance

Safety and Installation Manual

Martin by HARMAN

Dimensions

All measurements are given in millimeters



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www.martin.com

MAC Ultra Performance Safety and Installation Manual, P/N 5131478-00, Rev. C

Contents

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 document:


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


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


WARNING! Fire hazard.


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


WARNING! Intense light emission.


WARNING! Refer to user documentation.

Warning! The MAC Ultra Performance from Martin® contains components that are accessible and live at high voltage while the fixture is connected to power. These components remain under tension for up to five minutes after power is disconnected.

Warning! Risk Group 3 product (see "Protection from eye injury" on page 5 for full details). This product produces intense light output that may be hazardous if suitable precautions are not taken. Do not view the light output with optical instruments or any device that may concentrate the beam.

This product presents risks of severe injury or death due to fire and burn hazards, electric shock and falls if the safety precautions in this manual are not followed.

Read this manual before installing, powering or servicing the fixture. Follow the safety precautions and observe all warnings in this manual, in the MAC Ultra Performance User Guide and printed on the fixture.

The latest versions of this Safety and Installation Manual and the MAC Ultra Performance User Guide are available for download from the MAC Ultra Performance areas of the Martin website at www.martin.com. Before you install, operate or service the fixture, check the Martin website and make sure that you have the latest user documentation for the fixture. Document revisions are indicated at the bottom of page 2.

The MAC Ultra Performance is for professional use only. It is not for household use. Respect all locally applicable laws, codes and regulations when installing, powering, operating or servicing the fixture.

Install, operate and service Martin products and accessories only as directed in their user documentation, or you may create a safety hazard or cause damage that is not covered by product warranties.

The latest software, manuals and other documentation for all Martin products are available for download at www.martin.com

Technical Support

If you have questions about how to install or operate the fixture safely, please contact Harman Professional Technical support:

- For technical support in North America, please contact: HProTechSupportUSA@harman.com
  Phone: (844) 776-4899
- For technical support outside North America, please contact your national distributor.

PROTECTION FROM ELECTRIC SHOCK

- The fixture has an ingress protection rating of IP20 and is for use in dry locations only. Do not expose it to rain or moisture.
- Do not remove any cover from the fixture except as described under “Service and maintenance” on page 15.
- Disconnect the fixture from AC mains power before servicing it and when it is not in use.
- Ensure that the fixture is electrically connected to ground (earth).
- Use only a source of AC mains power that complies with local building and electrical codes and has both overload and ground-fault (earth-fault) protection.
- The fixture accepts AC mains power at 200-240 VAC (nominal), 50/60 Hz. Do not connect the fixture to mains power that is not within this range.
- The power input cable must be 14 AWG or 1.5 mm^2 minimum conductor size and heat-resistant to 90° C (194° F) minimum. Cables must have three conductors and an outer cable diameter of 6 - 12 mm (0.24 - 0.47 in.). In North America the cable must be UL/CSA-recognized, hard usage, type SJT, SJOOW or better. In the EU, the cable must be type HO5VV-F, H07RN-F or better.
- Connect only a Neutrik powerCON TRUE1 NAC3FX-W (TOP) type cable connector to the power input socket.
- Before using the fixture, check that all power distribution equipment, connectors 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.
- The fixture contains components that are accessible and live at high voltage while the fixture is connected to power and that remain under tension for up to five minutes after power is disconnected. Wait for at least five minutes after disconnecting from power before opening any of the fixture’s covers.
- Refer any service operation not described in this manual or in the MAC Ultra Performance User Guide to Martin Service or an authorized Martin Service partner.
- The light source contained in this fixture shall be replaced by Martin Service or an authorized Martin Service partner only.

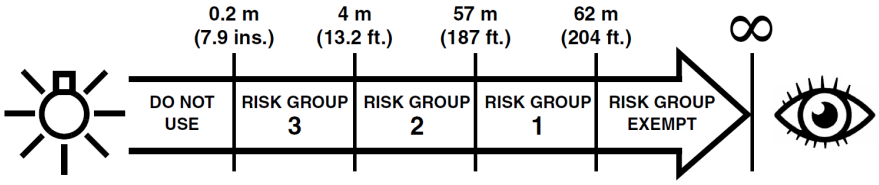
PROTECTION FROM BURNS AND FIRE

- The exterior of the fixture becomes hot during use. After 5 minutes of operation a surface temperature of 85° C (185° F) shall be expected. The maximum steady state surface temperature is also 85° C (185° F). Avoid contact by persons and materials.
- Allow the fixture to cool for at least 30 minutes before handling.
- Keep all combustible materials (e.g. fabric, wood, paper) at least 0.2 m (8 in.) away from the fixture.
- Keep flammable materials well away from the fixture.
- Ensure that there is free and unobstructed airflow around the fixture.
- Provide a minimum clearance of 0.2 m (8 in.) around fans and air vents.
- Do not illuminate surfaces within 4.75 m (15.6 ft.) of the fixture.
- Do not expose the front lens to sunlight or any other strong light source from any angle. Lenses can focus the sun's rays inside the fixture, creating a potential fire hazard.
- Do not attempt to bypass thermostatic switches or fuses.
- Do not operate the fixture if the ambient temperature (Ta) exceeds 40° C (104° F).
- Do not modify the fixture in any way not described in this manual or the fixture’s User Guide or install other than genuine Martin parts. Do not stick filters, masks or other materials onto any lens or other optical component. Use only accessories approved by Martin to mask or modify the light beam.

PROTECTION FROM EYE INJURY

- Do not look directly into the fixture’s light output.
- 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 fixture when the fixture lights up suddenly. This can happen when power is applied, when the fixture receives a DMX signal, or when certain control menu items are selected.
- Disconnect the fixture from power at all times when the fixture is not in use.
- Provide well-lit conditions to reduce the pupil diameter of anyone working on or near the fixture.

- This fixture corresponds to Risk Group 3 according to EN 62471 when all photobiological risks are considered and Risk Group 2 according to IEC/TR 62778 for blue light only. It emits possibly hazardous optical radiation.
- The fixture falls into the Risk Group categories shown below according to both EN 62471 and IEC/TR 62778 under worst-case conditions:



- At a distance of less than 4 m (13.2 ft.) from the fixture, the light output can potentially cause eye or skin injury before an exposed person's natural aversion responses (blink reflex and reaction to skin discomfort) can protect them. At distances greater than 4 m (13.2 ft.), potential eye and skin injury hazards from the light output are normally prevented by natural aversion reflexes.
- Position the fixture so that persons cannot be exposed to the fixture's light output at a distance of less than 4 m (13.2 ft.) from the fixture, and so that prolonged staring into the light output at less than 57 m (187 ft.) from the fixture is not expected.

PROTECTION FROM INJURY

- Fasten the fixture securely to a fixed surface or structure when in use. The fixture is not portable when installed.
- Do not lift or carry the fixture alone.
- Apply the tilt lock and use the handles on the base and on the yoke when carrying the fixture.
- The handles on the back of the head are designed for use by a followspot operator only. Do not use them to carry the fixture.
- Use two evenly spaced omega brackets with clamps to suspend the fixture from rigging structures. Do not use only one clamp.
- When clamping the fixture to a truss or other supporting structure, use two half-coupler clamps. Do not use G-clamps, quick-trigger clamps or any other type of clamp that does not completely encircle the supporting structure when fastened.
- The fixture weighs 44 kg (97.1 lbs.). When suspending the fixture, check that the supporting structure and all hardware used to suspend the fixture can hold at least six (6) times the weight of all devices suspended from them and that the installation respects all similar safety factors that are required by locally applicable regulations. Check that the structure and hardware are in perfect condition and suitable for their purpose.
- If the fixture is installed in a location where it may cause injury or damage if it falls, 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 that it secures. The safety cable must comply with EN/IEC 60598-2-17:2018 Section 17.7.4 or BGV C1 / DGUV 17, and must be capable of bearing a static suspended load at least six times (or more if required by locally applicable regulations) the weight that it secures.
- Eliminate as much slack as possible in the safety cable (by looping it more than once around the rigging truss, for example). Make sure that, if the primary attachment fails, the fixture cannot fall more than 20 cm (8 inches) maximum before the safety cable catches it.
- If the safety cable attachment point becomes deformed, do not suspend the fixture. Have the fixture repaired by an authorized Martin service partner.
- 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.
- Allow enough clearance around the head to ensure that it cannot collide with a person or object such as another fixture when it moves.

Introduction

Thank you for selecting the MAC Ultra Performance lighting fixture from Martin®.

This Safety and Installation Manual is supplied with the fixture. It gives details of installing and servicing the fixture. The MAC Ultra Performance User Guide, containing full instructions to help you set up, control and monitor the fixture, is available for download from the MAC Ultra Performance area of the Martin website at www.martin.com. If you have any difficulty locating this document, please contact your Martin supplier for assistance. The MAC Ultra Performance area of the Martin website also contains full product specifications and information to help you order accessories such as cables, flightcases etc.

Before installing, operating or servicing the MAC Ultra Performance, please check the fixture's area of the Martin website at www.martin.com and make sure that you have the latest user documentation for the product.

Product specifications are not included in the fixture's user documentation. You can find full specifications for the fixture in the MAC Ultra Performance area of the Martin website.

Unpacking

The MAC Ultra Performance is supplied in a SIP insert that is intended for use in the Martin MAC Ultra series flightcase. The fixture and SIP insert are supplied in a cardboard box that is designed to protect the fixture during initial shipment only. We strongly recommend that you store and transport fixtures in the rugged flightcases available from Martin (or custom flightcases of the same quality) using the SIP insert supplied with the fixture. The Martin flightcase holds two fixtures.

See the MAC Ultra Performance area of the Martin website at www.martin.com for details of flightcases and other accessories available for this fixture.

Avoiding condensation

If you move the fixture from a cold to a warm environment, remove it from its flightcase or packaging and give it at least two hours to acclimatise before you apply power. This will help to avoid damage due to condensation.

Tilt lock

Check that the tilt lock is released before applying power to the fixture.

See Figure 1. To release the tilt lock, slide the tilt lock button (arrowed) to the **Unlocked** position. To reapply the tilt lock, first check that the power is off and then slide the tilt lock button back to the **Locked** position.

Release the tilt lock before putting the fixture into its SIP insert and flightcase or cardboard box for transport or storage.

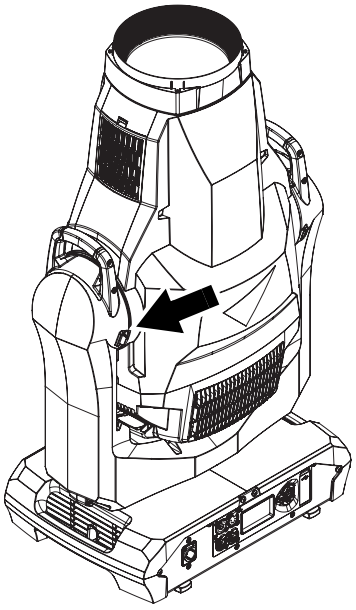


Figure 1: Tilt lock

Packing

Important! ***Allow the fixture to cool for 30 minutes and release the tilt lock before packing it for storage or transport.***

The SIP insert supplied with the fixture is designed to support the head with the tilt lock in the **Unlocked** position. Release the tilt lock before putting a fixture into its SIP insert in a flightcase or cardboard box. Leaving the tilt lock applied may cause damage that is not covered by the product warranty when the fixture is moved.

Physical installation

Installation safety

The fixture weighs 44 kg (97.1 lbs.), not including installation hardware.

See “Dimensions” on page 2 for details of the fixture’s physical dimensions.

Warning! The MAC Ultra Performance has a powerful pan motor. The torque reaction when the head is panned suddenly can cause the base to move if the fixture is standing unsecured on a surface. Do not apply power to the MAC Ultra Performance unless the base is securely fastened to a stable surface or structure.

Warning! Use two evenly spaced rigging clamps to rig the fixture. Do not hang the fixture from only one clamp. Lock omega brackets to the base of the fixture with both 1/4-turn fasteners. Fasteners are locked only when turned a full 90° clockwise.

Warning! When suspending the fixture above ground level, secure it against failure of primary attachments by attaching a safety cable that is approved as a safety attachment for the weight of the fixture to the attachment point in the base. Do not use the carrying handles for secondary attachment.

Warning! When clamping the fixture to a truss or other structure at any other angle than with the yoke hanging vertically downwards, use two clamps of half-coupler type. Do not use any type of clamp that does not completely encircle the structure when fastened.

Warning! To avoid head collisions when installing MAC Ultra Performance fixtures beside each other, allow a minimum center-to-center distance between fixtures of 830 mm (32.7 in.). The fixture also contains a programmable pan/tilt limitation system that allows you to limit head movement where necessary in order to prevent head collisions. See the MAC Ultra Performance User Guide for details.

Warning! You can fasten the fixture to a surface with ratchet straps passed through the carrying handles in the base so that the fixture cannot fall over, but do not over-tighten the ratchet straps or you may damage the carrying handles and leave the fixture in an unsafe condition.

Warning! See Figure 2. The MAC Ultra Performance’s lens can focus sunlight and strong artificial light, creating a potential fire hazard and causing damage that is not covered by the product warranty. Position or shade the head so that the front lens will not be exposed to sunlight or another strong light source from any angle – even for a few seconds.

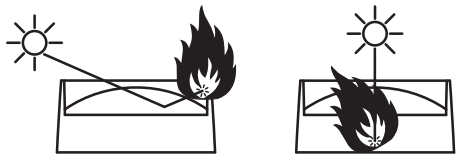


Figure 2: Potential sunlight damage

Important! Powerful light can damage the control panel display. Do not point the output from other lighting fixtures at the MAC Ultra Performance.

Installation options

The MAC Ultra Performance can be fastened to a surface such as a stage or clamped to a truss in any orientation using two omega brackets (see Figure 4) and rigging clamps. Clamps must be half-coupler type (see Figure 4) or equivalent type that fully encircles the truss unless the fixture is installed with the yoke hanging vertically downwards, in which case other clamp types that are approved for the supported weight may be used.

The four pairs of quarter-turn mounting points in the base accept 106 mm (4.17 in.) center-to-center omega brackets (see Figure 4) for rigging clamp attachment. The omega brackets can be fastened to the base parallel to the fixture's sides or diagonally (see Figure 3).

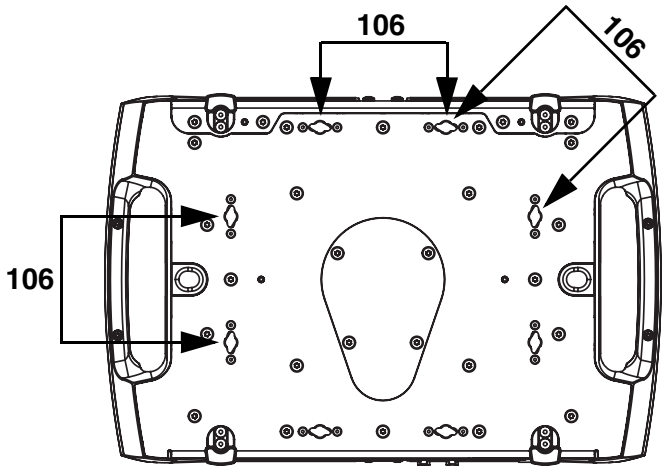


Figure 3: Omega bracket mounting points

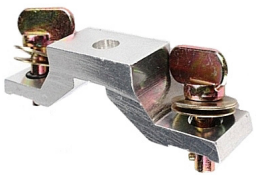
Installation hardware

Two omega brackets suitable for use when rigging the MAC Ultra Performance are supplied with the fixture. Martin can supply as accessories suitable rigging clamps and safety cables that are approved for the weight of the fixture. Contact your Martin supplier for details.

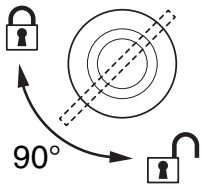
Clamping the fixture to a truss

To clamp the MAC Ultra Performance to a rigging truss:

1. Check that all rigging hardware is undamaged and can bear at least six (6) times the weight of the fixture or as required by locally applicable regulations. Check that the supporting structure can safely bear the weight of all installed fixtures, clamps, cables, auxiliary equipment, etc. and complies with locally applicable regulations.
2. Bolt two rigging clamps securely to omega brackets using M12 bolts (minimum grade 8.8) and self-locking nuts.



Omega bracket for rigging clamp attachment



Locking quarter-turn fasteners

Half-coupler rigging clamp, P/N 91602005

Safety cable, 60 kg SWL, black P/N 91604006

Figure 4: Martin rigging hardware

3. See Figure 3 on page 9. Align the first clamp and bracket with 2 mounting points in the base, and engage both the clamp bracket's quarter-turn fasteners in corresponding sockets in the base. See Figure 4. Turn the levers on the quarter-turn fasteners a full 90° clockwise to lock.
4. Repeat for the second clamp, installing it opposite the first so that the fixture will be held in balance.
5. Block access under the work area. See Figure 5. Note the position of the arrow marked **FRONT** on the base of the fixture. Working from a stable platform, hang the fixture on the rigging truss with the arrow marked **FRONT** facing towards the area to be illuminated. Tighten the rigging clamps.

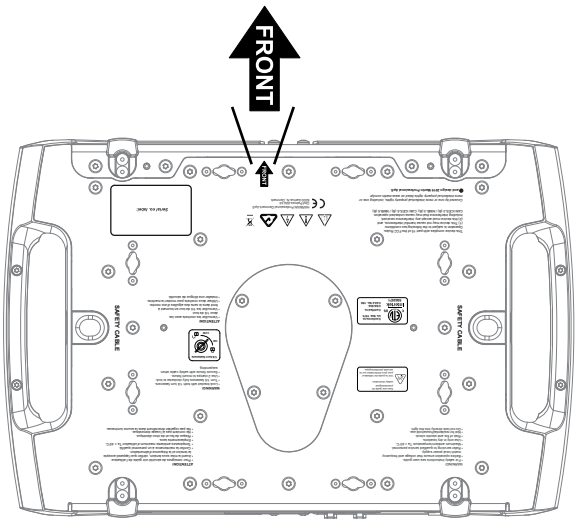


Figure 5: Front of fixture

6. See Figure 6. Install a safety cable that is approved as a safety attachment for the weight of the fixture by looping it through one of the safety cable attachment points (arrowed) in the bottom of the base and around a secure anchoring point so that the safety cable will catch the fixture if a primary attachment fails. Remove as much slack as possible from the safety cable (by looping it more than once around the truss, for example).
7. Check that the tilt lock is released. Check that there are no combustible materials within 0.2 m (8 in.) or surfaces to be illuminated within 4.75 m (15.6 ft.) of the fixture, and that there are no flammable materials nearby.
8. Check that there is no possibility of the head colliding with objects or other fixtures.

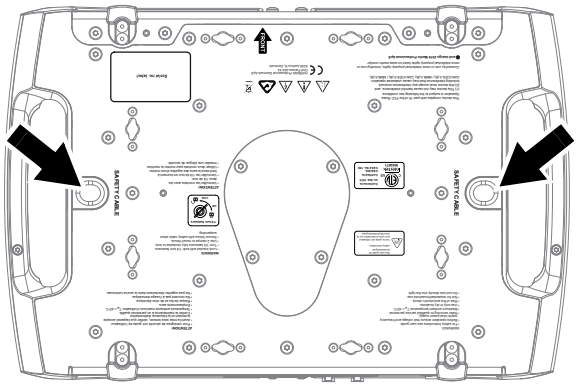


Figure 6: Safety cable attachment points

9. Check that other lighting fixtures cannot project light at the MAC Ultra Performance, as powerful illumination can damage the fixture's display.

AC power

Electrical safety

The MAC Ultra Performance features an auto-sensing switch-mode power supply that automatically adapts to AC mains power at 200-240 VAC (nominal), 50/60 Hz. Do not connect the fixture to power that is not within this range. *Note that the fixture must not be connected to AC mains power at 100-120 V.*

Maximum current draw is as follows:

- At 200 V: 8.0 A
- At 240 V: 6.7 A

Warning! Read "Safety Information" on page 4 before connecting the fixture to AC mains power.

For protection from electric shock, the fixture must be electrically connected to ground (earth). The AC mains power distribution circuit must be equipped with a fuse or circuit breaker and ground-fault (earth-fault) protection.

Power input

Important! Connect the MAC Ultra Performance directly to AC mains power. Do not connect it to a dimmer system; doing so may damage the fixture.

The MAC Ultra Performance automatically adapts to AC mains power at 200-240 VAC (nominal), 50/60 Hz. Connect the fixture only to AC mains power that is within this range.

The fixture requires a power input cable with a Neutrik powerCON TRUE1 NAC3FX-W (TOP) female cable connector for AC mains power input. The cable must meet the requirements listed under "Protection from electric shock" on page 5. Martin can supply suitable cables with female TRUE1 (TOP) input connectors and can also supply loose connectors. The specifications on the MAC Ultra Performance page on the Martin website at www.martin.com give details of all the suitable cables and connectors available from Martin.

Connection to an AC mains power source

When powering on, the MAC Ultra Performance will draw a half-cycle RMS inrush current of maximum 21 A at 230 V, 50 Hz for a few milliseconds. To avoid unwanted tripping, we recommend the use of MCBs (Miniature Circuit Breakers) that are classified Type D according to IEC 60898/UL489/CSA C22.2 No. 5.

The power cable can be hard-wired to a building installation circuit or fitted with a mains plug (cord cap) to allow connection to local AC mains power outlets.

If you install a mains plug on the power cable, install a grounding-type (earthed) plug rated minimum 16 A, 250 V (example rating: EN 60309-2 CEE 2P+E 16 A/250 VAC), following the plug manufacturer's instructions. Table 1 shows some possible mains power pin identification schemes; if the pins are not clearly identified, or if you have any doubts about proper installation, consult a qualified electrician.

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

Table 1: Cord cap (mains plug) connections

If you need to install a Neutrik powerCON TRUE1 connector on a power cable, follow the instructions on the Neutrik website at www.neutrik.com.

Applying power

Warning! The MAC Ultra Performance does not have a power On/Off switch. As soon as you connect an energized power input cable to the fixture or apply power to a power input cable that has already been connected, the fixture will power up: check that there is no safety risk from head movement or intense light output.

To apply power to the MAC Ultra Performance:

1. Check that the tilt lock is released and that the base is held securely. Be prepared for the fixture to light up and the head to move suddenly when power is applied.
2. See Figure 7. line up the keys in the power input cable's TRUE1 connector with the keyways in the MAINS IN socket (arrowed). Insert the connector into the socket and twist clockwise to engage. If the connector seems difficult to twist, remove it from the socket, check that you have lined up the keyways correctly and try again – do not use excessive force. Make sure that the connector latch clicks and that the connector is locked into the socket.

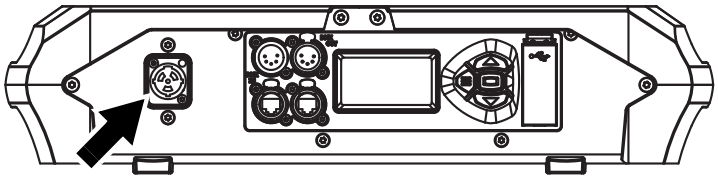


Figure 7: Mains input socket

3. Apply power to the input cable to power the fixture on.

To disconnect the MAC Ultra Performance from power, pull the release latch on the connector towards you to unlock the connector, twist the connector counter-clockwise, and then withdraw it from the MAINS IN socket.

Data links

Important! Shut down power to the fixture before connecting to or disconnecting from data.

The MAC Ultra Performance has two pairs of connectors for control data In/Out:

- one pair of XLR sockets (**A** in Figure 8), and
- one pair of etherCON sockets (**B** in Figure 8).

Use only one socket type – *either* XLR *or* etherCON – at any one time.

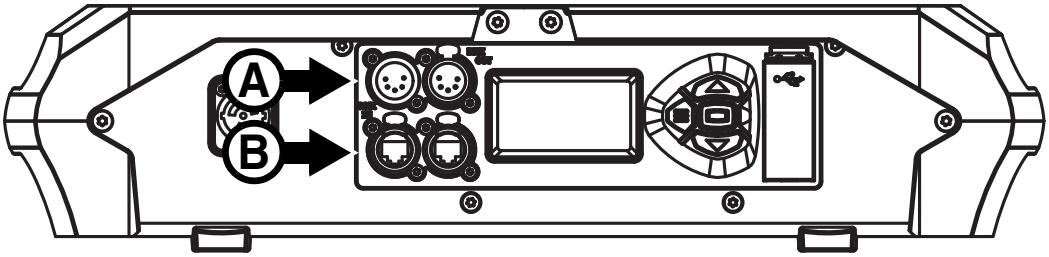


Figure 8: Data connections

Data via DMX cable

The MAC Ultra Performance has 5-pin locking XLR sockets (see **A** in Figure 8) for DMX and RDM input and output via DMX cable. The default pin-out on both sockets is:

- pin 1 to shield
- pin 2 to data 1 cold (-)
- pin 3 to data 1 hot (+).

Pins 4 and 5 are not used by the fixture but are bridged between input and output sockets. These pins can therefore be used as a pass-through connection for an additional data signal if required.

Tips for reliable data transmission via DMX cable

- Use shielded twisted-pair high-quality DMX cable.
- 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.
- Do not use microphone cable, as standard microphone cable does not have the correct impedance and cannot transmit control data reliably over long runs.
- To split the data link into branches, use an optically isolated splitter-amplifier.
- Do not overload the DMX data link. You can connect up to a maximum of 32 devices on a serial DMX link.
- Install a DMX termination plug on the last fixture on the link.

Connecting to data via DMX cable

To connect the MAC Ultra Performance to DMX and/or RDM data carried over DMX cable:

1. Shut down power to the fixture.
2. Connect the DMX data output from the controller to the MAC Ultra Performance's data input (male XLR) socket using good-quality DMX cable.
3. Run DMX cable from the MAC Ultra Performance's data output (female XLR) socket to the data input of the next fixture and continue until the link is complete.

4. Terminate the data link by connecting a 120 Ohm, 0.25 Watt resistor between the data 1 hot (+) and cold (-) conductors at the data output of the last fixture on the link. If the link is divided into branches using a DMX splitter, terminate each branch of the link.
5. You can now apply power.

Data via Ethernet cable

The MAC Ultra Performance has Neutrik etherCON data sockets (see **B** in Figure 8) that support DMX and RDM over Art-Net and sACN as well as Martin P3 video. Either socket can be used for input and the other socket used for throughput.

The etherCON data sockets have a fail-safe bypass feature. This means that the fixture will relay a data signal from the socket used for input to the socket used for throughput even if power to the fixture is shut down or lost.

Tips for reliable data transmission via Ethernet cable

- Use shielded twisted-pair Ethernet cable of type S/UTP, SF/UTP, S/STP or SF/STP only. The cable must be rated Cat 5e or better.
- The cable shield must be electrically connected to connector housings, and the other devices on the data link must also support shielded connections.
- Note that the MAC Ultra Performance is compatible with 10/100 Mbit Ethernet only. Do not connect the fixture to a network port or device that is fixed to Gigabit Ethernet speed. If you need to integrate a MAC Ultra Performance in a Gigabit Ethernet network, use a network switch to allow the link towards the fixture to operate at 100 Mbit/s Ethernet speed.
- To split the data link into branches, use a standard network switch that is able to operate at 100 Mbit/s towards the fixtures.
- Even though every fixture has a fail-safe bypass mechanism and minimal latency insertion, we recommend that you avoid connecting more than 50 devices in a single daisy-chain or branch.
- Unlike DMX cable, Ethernet cable does not require termination at the end of a daisy-chain of fixtures.

Connecting to data via Ethernet cable

To connect the MAC Ultra Performance to Art-Net, sACN or P3 video via Ethernet cable:

1. Shut down power to the fixture.
2. Connect the Ethernet cable to either of the fixture's etherCON data sockets.
3. Run Ethernet cable from the fixture's other etherCON data socket to a data socket on the next fixture.
4. Continue connecting data sockets as described above until the link is complete.
5. You can now apply power.

Simultaneous DMX and P3 control

To control the MAC Ultra Performance using DMX/Art-Net/sACN and P3 video at the same time, connect the DMX/Art-Net/sACN signal to the P3 System Controller. The P3 Controller will then merge DMX commands and video data together and send a combined data signal to fixtures over the Ethernet link using the P3 protocol.

Service and maintenance

Warning! Read "Safety Information" on page 4 before servicing the MAC Ultra Performance.

Warning! Disconnect the fixture from AC mains power and allow to cool for at least 30 minutes before handling. Do not stare into the light output. Be prepared for the fixture to light and move suddenly when connected to power.

Warning! The MAC Ultra Performance contains components that are accessible and live at high voltage while the fixture is connected to power and that remain under tension for five minutes after power is disconnected. Only qualified technicians are permitted to open the fixture. Users may carry out external cleaning, replace the battery, replace the air filter and replace gobos as described in this section, following the warnings and instructions provided, but any service operation not described in this manual or in the fixture's User Guide must be referred to an authorized Martin 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.

Important! Fixtures are calibrated at the factory when the light engine, CMY module and effect module (color wheel effects module) are installed. We therefore recommend that you keep the original modules with the fixture if you disassemble the fixture for service. If you swap modules from one fixture to another, the fixtures may need to be recalibrated in order to maintain consistent color characteristics across different fixtures. A small label indicating the type and serial number of the original fixture is fixed to each module at the factory to help you keep modules together with their original fixture.

Pressing MENU and ENTER buttons immediately when the fixture name appears in the display while powering the fixture on puts the fixture into service mode in which pan and tilt motors are deactivated and SERV appears in the display. To take the fixture out of service mode, power off and then power on again normally.

The MAC Ultra Performance User Guide (available for download from the MAC Ultra Performance page on www.martin.com) gives full details of the menus in the fixture's control panel.

The user must clean the MAC Ultra Performance periodically to maintain optimum performance and cooling. The user may also upload firmware (fixture software) to the fixture via the DMX data input port or USB port using firmware and instructions from Martin. All other service operations on the MAC Ultra Performance must be carried out by Martin, its approved service agents or trained and qualified personnel using the official Martin service documentation for the MAC Ultra Performance.

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, optical components are subject to wear and tear over the life of the product, resulting in gradual changes in color 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 performance will be affected. However, you may eventually need to replace optical components 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.

Tilt lock

The tilt position of the head can be locked for service. See Figure 1 on page 7.

Important! ***Release the tilt lock before applying power to the fixture. Leaving the tilt lock applied during transport can result in damage that is not covered by the product warranty. The SIP insert is designed to protect the head from shocks during transport. Release the tilt lock before packing the fixture in its SIP insert for transport or storage in its flightcase or cardboard box.***

Cleaning

Regular cleaning is very important for fixture life and performance. Buildup of dust, dirt, smoke particles, fog fluid residues, etc. degrades the fixture's light output and cooling ability.

Cleaning schedules for lighting fixtures vary greatly depending on the operating environment. It is therefore impossible to specify precise cleaning intervals for the MAC Ultra Performance. Cooling fans suck in airborne dust and smoke particles, and in extreme cases fixtures may require cleaning after surprisingly few hours of operation. 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 few 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.

Follow these precautions when cleaning the fixture:

- Work in a clean, dry, well-lit area.
- Use gentle pressure only. Do not use any product that contains abrasives. Do not use solvents. Use care when cleaning optical components: surfaces are fragile and easily scratched.
- Use a vacuum cleaner – do not use a pressurized air jet. A vacuum cleaner will remove dirt from the fixture and from the area where you are working. An air jet may blow dirt into the fixture, and this can cause visible objects in projections and possibly even damage to the fixture.
- Do not apply a strong vacuum directly to a cooling fan, as the strong airflow may spin the fan blades fast enough to cause damage. Instead, hold the vacuum cleaner nozzle a few centimeters away from the fan and dislodge dust with a soft brush.

Cleaning procedure

To clean the fixture:

1. Disconnect the fixture from power and allow it to cool for at least 30 minutes.
2. Vacuum 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, using a soft brush to help dislodge dust.
3. Clean the front lens on the front of the head 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.

Battery replacement

Warning! ***Disconnect the fixture from AC power before replacing its battery. Do not attempt to recharge the battery, or you may create a risk of fire or explosion. Replace the battery with one of the same type only. New batteries are available from Martin (P/N 05801011).***

The MAC Ultra Performance has a non-rechargeable CR123A 3-volt lithium battery that provides power to the control panel and display when the fixture is not connected to AC mains power. If the battery runs flat you must replace it with a new one. Do not attempt to recharge it.

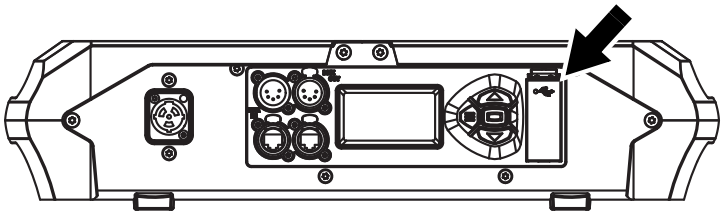


Figure 9: Battery compartment

See Figure 9. The battery is located in the USB port / battery compartment (arrowed) next to the control panel on the base of the fixture.

To replace the battery:

1. Disconnect the fixture from AC mains power and allow to cool.
2. See Figure 10. Push down on the locking tab (arrowed) with a screwdriver to release the USB port / battery compartment cover and remove the cover.
3. Remove the used battery and insert a new one of the correct type, respecting battery polarity (positive terminal facing downwards, away from the head).

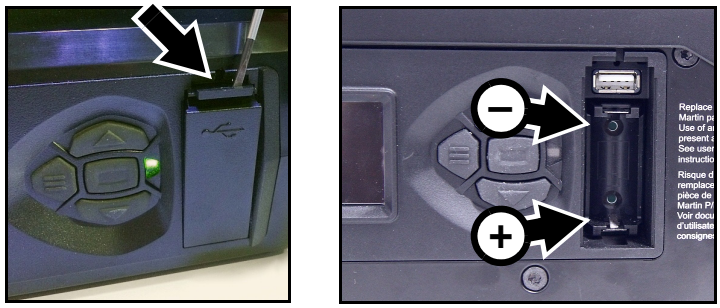


Figure 10: Battery replacement

4. Reinstall the compartment cover and check that it is closed securely before reapplying power.

Send used batteries to an authorized waste recycling center for recycling. Do not treat a battery as household waste.

Head air filter

The MAC Ultra Performance is protected from the entry of dirt and dust by an air filter in the head. Free airflow through filters is important for effective cooling, effective performance and maximum product life. Air filters therefore require periodical service.

Two types of air filter are available from Martin suppliers as service items for the MAC Ultra Performance:

- Re-usable air filters with a metal element, available as single filters (P/N 5132434-00).
- Disposable air filters with a paper element, available in sets of 12 filters (P/N 50400765).

Regardless of which type of filter the fixture is supplied with, you are of course free to choose which type you will use. The metal filters can be cleaned and re-used. Note that the filter mesh is not as fine as with paper filters, so the fixture may require internal cleaning at shorter intervals than you are used to.

Air filter service intervals depend on the environment the fixture is used in. Inspect air filters visually at regular intervals. Clean the fixture's metal re-usable filters – or replace paper filters – if they are visibly contaminated by dust, dirt, residue from atmospheric effects, etc.

To service the head air filter:

1. Disconnect the fixture from power and allow components to cool for 30 minutes.
2. The air filter is located in the left-hand side of the head. Position the head so that the air filter cover is accessible and apply the tilt lock (see Figure 1 on page 7).
3. See Figure 11. Unclip the air filter cover and lift it off the head.
4. Remove the air filter from its recess in the head.
5. Dispose of paper air filters. Do not try to clean or re-use a paper air filter. Clean metal air filters with a soft brush and vacuum cleaner or compressed air, taking care to avoid damaging the filter mesh. If metal filters are greasy, you can clean them in a household dishwasher at maximum 50° C (122° F), short cycle recommended. Dry them completely before reinstalling. The metal filter is designed to be re-used, but replace it with a new item if it is not in clean, undamaged condition after cleaning.

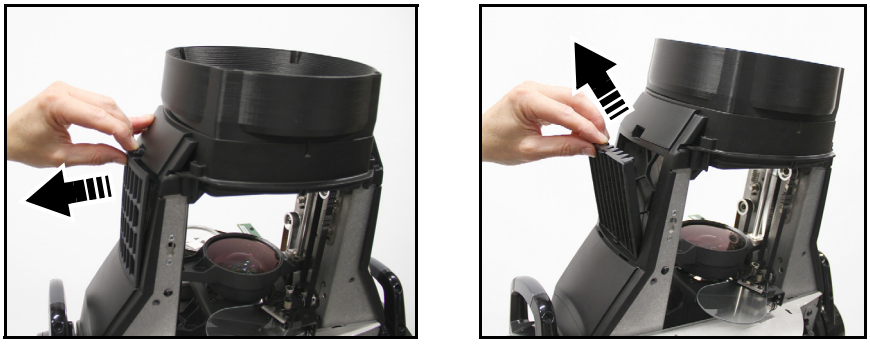


Figure 11: Releasing head air filter

6. Place the clean air filter into the space in the head, making sure that there is no gap for air to pass through around the edges of the filter.
7. Hook the rear end of the filter cover into the head and push the front end of the cover into the head until its clip engages fully. Check that the cover is held securely and cannot fall out of the head.
8. Release the tilt lock before applying power or packing the MAC Ultra Performance in its flightcase.

Lubrication

The MAC Ultra Performance does not require lubrication under normal circumstances. Moving parts can be checked and a long-lasting Teflon-based grease reapplied by a Martin service partner if necessary.

Service utilities

The fixture's **SERVICE** menu provides utilities for technicians rigging or servicing the fixture (see the MAC Ultra Performance User Guide for full details of the control panel menus):

- **ERROR LIST** displays a list of any status messages stored in memory. Up to 20 messages can be displayed.
- **FAN CLEAN** lets you set cooling fans to run at high speed to remove loose dust.
- **PAN/TILT FEEDBACK** lets you disable feedback to the fixture software from the pan, tilt and effects positioning systems.
  - If feedback is set to **ON** and a pan, tilt or effect position error is detected, the shutter closes and the effect resets.
  - This feature can be disabled by setting feedback to **OFF**. The **OFF** setting is not saved when the fixture is powered off, and the system will be re-enabled the next time the fixture starts.
- **ADJUST** is for use by Martin Service only. **Important!** Do not use the items in this menu without guidance or service documentation from Martin Service.
- For details of the **CALIBRATION** menu, see next section,
- **USB** provides two utilities:
  - **USB** → **FIRMWARE** lets you update the firmware (fixture software) from a USB flash memory drive. For a detailed guide to updating the firmware from a USB drive, see "Installing using a USB memory device" later in this chapter.
  - **USB** → **SERVICE LOG** (available from firmware version 1.2.0 which is due for release mid-2021) lets you save the fixture ID, current counter values and status messages stored in the fixture's memory to a USB flash memory drive. You can also delete all the status messages permanently from the fixture's memory.

Calibration

Martin fixtures are adjusted and calibrated at the factory, and further calibration should only be necessary if fixtures have been subjected to abnormal shocks during transport or if normal wear and tear has affected alignment after an extended period of use. You can also use calibration to fine-tune fixtures for a particular location or application.

The **SERVICE** → **CALIBRATION** menu lets you define offsets in the fixture software to adjust the positions of pan, tilt and effects relative to the DMX values the fixture receives. This allows you to fine-tune fixtures and achieve uniform behavior in multiple fixtures.

We recommend the following procedure:

1. Aim a reference fixture and the fixtures that you want to calibrate at a flat surface. You can calibrate fixtures one at a time or line up multiple fixtures in a row. Apply power and set pan, tilt and effects to the same DMX values.
2. In each fixture, scroll through the effects in the **SERVICE** → **CALIBRATION** menu and adjust the position of any effects that need calibration while comparing the light output with the reference fixture. The calibration range available varies depending on the effect.
3. After selecting a value, press ENTER to confirm. The fixture will remember any new calibration values that you have set, and the new positions will not be affected by powering the fixture off and on.

Loading and storing default calibration offsets

- **CALIBRATION → LOAD DEFAULTS** lets you erase any custom calibration offsets that you have defined and reload the default calibration offsets that are stored in memory.
- **CALIBRATION → SAVE DEFAULTS** lets you overwrite the factory default calibration offsets that are stored in memory with any new offsets that you have defined.

  Important! Overwriting is permanent. Once you have saved new default offsets, **LOAD DEFAULTS** will load the new defaults, not the original factory defaults. Once you have used a **CALIBRATION → SAVE DEFAULTS** command it will be impossible to restore the original factory defaults, even with a firmware upload.

Installing firmware

Important! Do not switch the fixture off or disconnect the source of the firmware during an update, or the firmware will be corrupted.

The currently installed firmware (fixture software) version appears briefly in the control panel display at startup. You can also check it at any time in the **INFORMATION** menu in the fixture's control panel.

Fixture information and settings are not affected when you upload new firmware to the fixture.

If you update firmware to a newer version, check the MAC Ultra Performance area of www.martin.com to see whether updated versions of the Safety and Installation Manual and User Guide are available for the fixture.

You need the following in order to install firmware:

- A Windows PC running the latest version of the Martin Companion software suite that is available for download from the Martin website at www.martin.com.
- The latest MAC Ultra Performance firmware files. Martin Companion automatically downloads these from the Martin fixture firmware cloud when you run Martin Companion on a PC that is connected to the Internet.
- Either:
  - a Martin Companion Cable USB-DMX hardware interface (you can find information about this product on the Martin website at www.martin.com), or
  - a USB flash memory drive formatted in Windows using the FAT32 file system.

Installing using a Martin Companion Cable

If you use a Martin Companion Cable it is possible to update multiple fixtures in one operation. All MAC Ultra Performance fixtures that are powered on and connected via a DMX link to the fixture that you update will also have their firmware updated.

To install the MAC Ultra Performance firmware using a Martin Companion Cable:

1. Apply power to the MAC Ultra Performance fixture (or fixtures) and allow it (or them) to boot.
2. Connect the Martin Companion Cable's USB connector to a USB port on your PC. Connect the Martin Companion Cable's XLR connector to either the fixture's DMX IN connector or the DMX link.
3. Start the PC and launch Martin Companion. Check that the Martin Companion application correctly detects the Martin Companion Cable (a green dot should appear next to **USB Connected** in the top right-hand corner of the window).
4. In Martin Companion's **Firmware - Fixture Update** window, locate the MAC Ultra Performance firmware version that you want to install.
5. Start the firmware update by clicking **Update Firmware** in Martin Companion. Do not disconnect the Martin Companion Cable or power off the fixture(s) until the upload is complete and the fixture(s) have successfully rebooted. If you are updating multiple fixtures over the DMX link, check that they have all rebooted correctly.
6. The newly-installed firmware version will now be displayed in the **INFORMATION** menu.

Installing using a USB memory device

To install the MAC Ultra Performance firmware in one fixture using a USB flash memory drive:

1. Launch the Martin Companion software suite on a PC that is connected to the Internet. Martin Companion will automatically download the latest Martin firmware files from the Martin cloud.
2. In Martin Companion's **Firmware - Fixture Update** window, click on **Download USB Stick Firmware** and navigate to the root directory of the USB drive where you want to save the firmware.

3. Click on **Select Folder**. Martin Companion will automatically save the firmware files in a correctly named folder to the USB drive's root directory.
4. When you see a **Download Successful** message you can close Martin Companion. Check that the USB drive now contains a folder whose name is the fixture type and software version. Then use an **Eject** command in Windows to make sure that you can remove the drive safely, and remove the drive from the PC.
5. Apply power to the fixture and allow it to boot. Insert the USB drive into the USB host socket next to the fixture's control panel. The fixture should illuminate the display and the contents of the root directory should appear in the display. If the fixture does not recognize the USB drive automatically, navigate to **SERVICE** → **USB** in the control panel.
6. Scroll to the folder that contains the update files on the USB drive. Select the folder and press ENTER. The update will begin automatically and the display will show progress status. At the end of the update process the fixture will reboot. Do not remove the USB drive until the reboot is complete.
7. Remove the USB drive from the fixture. The newly-installed firmware version will now be displayed in the **INFORMATION** menu.

Opening the head for access

To open the head for access to the rotating gobos:

1. Disconnect the fixture from power and allow to cool for 30 minutes.
2. Place the fixture on a suitable work surface.

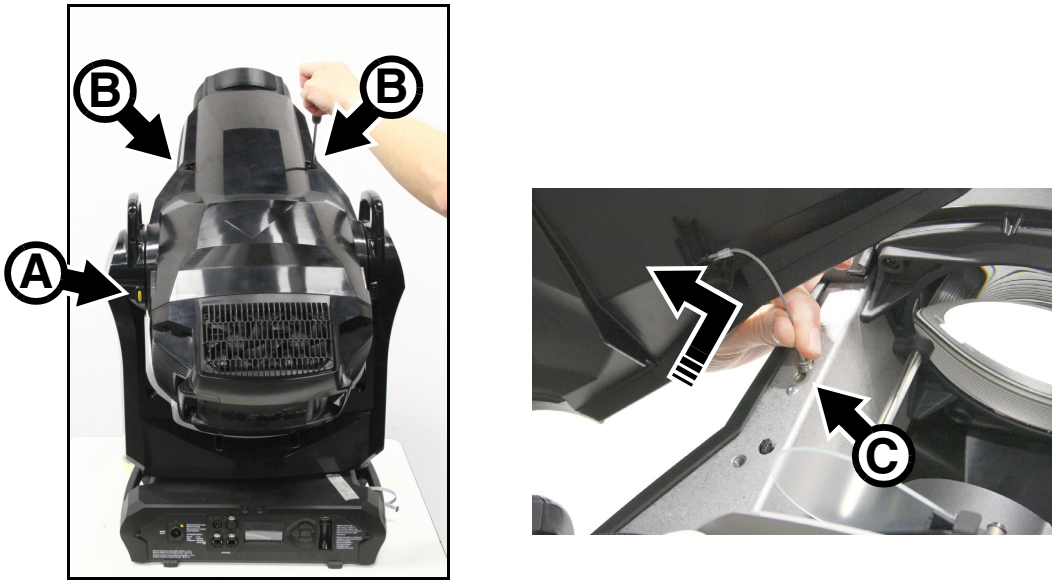


Figure 12: Removing the head covers

3. See Figure 12. Position the fixture so that the Martin logo on the back of the head is the right way up. The top and bottom head covers are now on the top and bottom of the head respectively. Apply the tilt lock **A**.
4. Remove the two retaining screws **B** from the top head cover, slide the cover towards the front of the fixture to release the back of the cover, and lift the cover away from the head slightly. Press the retaining clip **C** on the cover's safety wire in towards the head chassis, slide the clip along its slot until you can remove it, and then remove the safety wire and head cover completely from the fixture.
5. Release the tilt lock, reposition the head and remove the bottom head cover in the same way.

When closing the head, follow the above procedure in reverse. Check that the head covers are held securely after you have reinstalled them, and release the tilt lock before reapplying power or packing the MAC Ultra Performance in its flightcase.

Rotating gobo replacement

The MAC Ultra Performance uses specially designed borosilicate 3.3 rotating gobos. The gobos are a custom size. Their external diameter is 37.5 mm +0/-0.2 mm (1.476 in. +0/-0.008 in.), and the image diameter is 30 mm (1.181 in.). The gobo thickness is 1.1 mm +/- 0.1 mm (0.04 in. +/- 0.004 in.). The gobos are manufactured in Borofloat 33 glass with a heavy matted aluminum coating.

Although the goboholders on Gobo Wheel 1 are different from the goboholders on Gobo Wheel 2, the actual gobos are the same type and size and can be interchanged no matter which wheel they are installed on.

Replacement gobos must have the same dimensions, construction, materials and quality as the gobos supplied as standard. Using gobos that do not meet this requirement – such as metal gobos – will very probably cause damage that is not covered by the product warranty.

Optical components have fragile coatings and are exposed to very high temperatures. Handle and store components with care.

See the MAC Ultra Performance User Guide (available for download from the product pages on www.martin.com) for names, illustrations and part numbers of the gobos installed as standard.

Avoiding damage to gobos

Follow these precautions when handling, using and storing gobos:

- Do not use gobos with dark coatings on either side, as these will absorb heat – either directly from the light source or reflected back from other optical components – and will not be durable.
- Do not use metal gobos in the MAC Ultra Performance: their durability may be reduced when used in this fixture.
- Store all gobos in a dust-free environment with approx. 50% humidity.
- Wear clean nitrile cleanroom gloves when handling gobos.
- Avoid scratching coated and uncoated sides.
- Do not place a gobo with the coated side face-down on any surface.
- Avoid touching the other gobos when removing a gobo from a rack: the sharp edge of one gobo can scratch the others.
- Keep gobos perfectly clean to reduce the risk of heat damage.
- When cleaning gobos, use a repeated dabbing action rather than a rubbing action. When rinsing, use distilled or even better deionized water to avoid residue that will appear as drying marks.
- If possible, clean the coated side of gobos with dust and oil-free compressed air only. If the coated side is contaminated with oil, clean with isopropyl alcohol and optics cleaning tissues.
- Clean the uncoated side of gobos with isopropyl alcohol or photographic quality lens-cleaner and optics cleaning tissues.
- Do not try to clean gobos in an ultrasound bath, as this may cause delamination of the coating.
- Do not use acidic or alkaline cleaning solutions, as they will attack the aluminum coating.
- Correct gobo orientation is critical. Read the guidelines given later in this chapter carefully before installing a gobo.

Goboholder clips

See Figure 13. The goboholders in both gobo wheels are held in position by clips. When you install a gobo in a gobo wheel, you must make sure that the jaws of the clip **A** engage in the flange in the goboholder on both sides of the goboholder as shown at **B**.

Replacing a rotating gobo on Gobo Wheel 1

Gobo Wheel 1, the aerial wheel, is the wheel that is closer to the LEDs at the back of the head. To replace a rotating gobo on Gobo Wheel 1:

1. If you have not already removed the top head cover, remove it as described in “Opening the head for access” on page 20.
2. With your fingers, rotate the gobo that you want to remove so that you line up a reference point (for example, the magnet and marking **C** shown in Figure 14) on the goboholder with a reference point in the module.

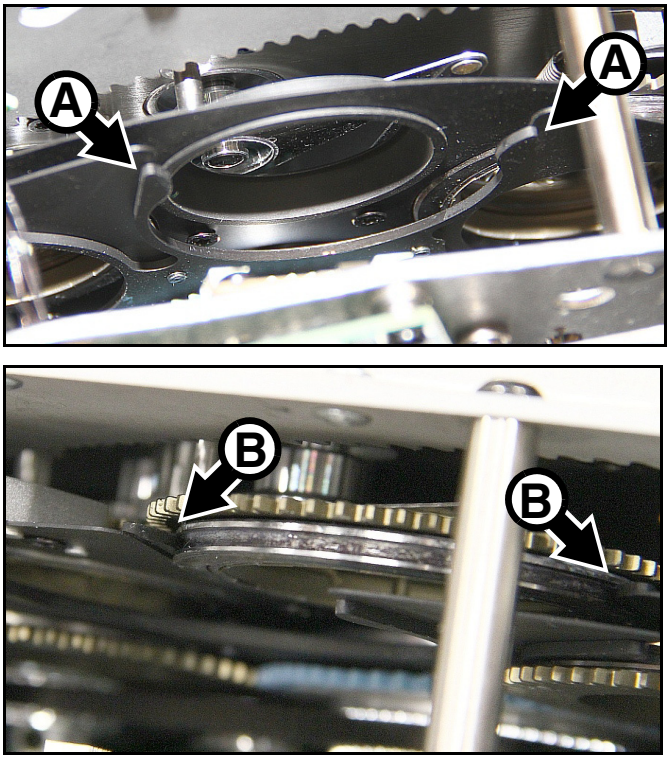


Figure 13: Goboholder clip and corresponding flange in the goboholder

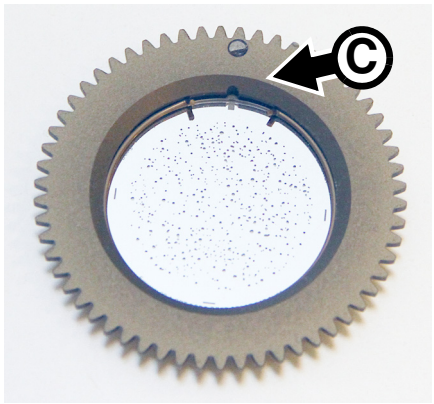


Figure 14: Goboholder reference mark

3. See Figure 15. Using a pair of flat-nosed pliers, grasp the teeth of the goboholder firmly and pull the goboholder out of its clip in the gobo wheel.

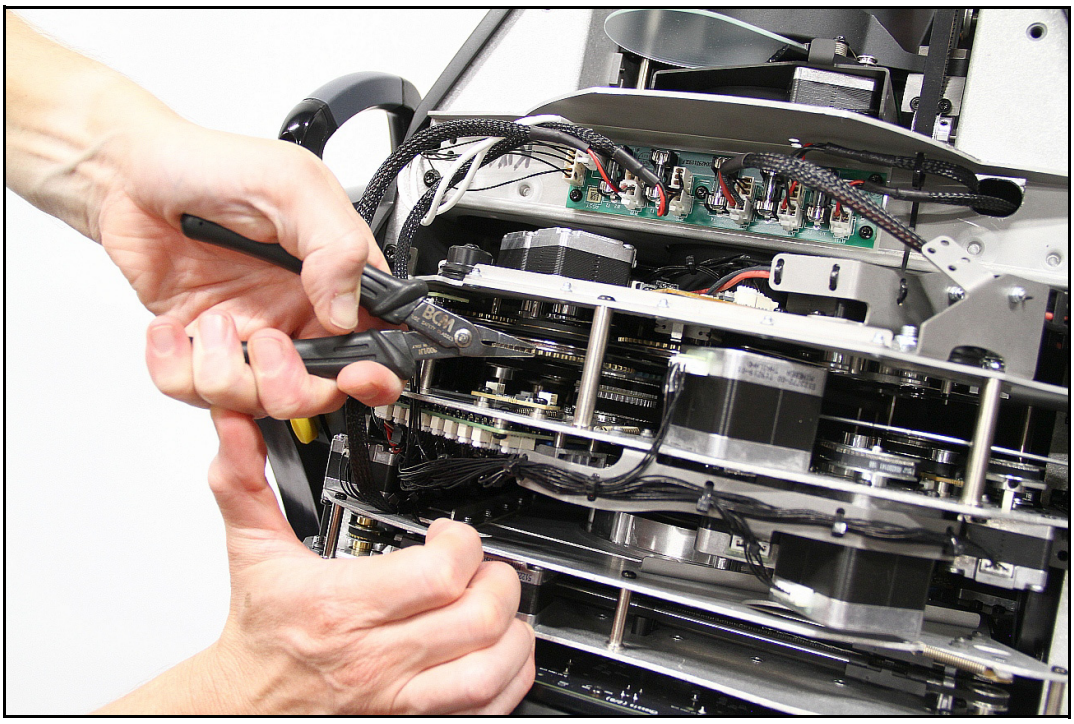


Figure 15: Removing a goboholder from Gobo Wheel 1

4. For instructions on how to install a new gobo in a goboholder, see “Replacing a gobo in a goboholder” on page 25.
5. Goboholders are held in position in the gobo wheel by clips (see Figure 13 on page 22). When you reinstall the goboholder, you must make sure that the jaws of the clip engage in the flange in the goboholder on both sides of the goboholder.
6. Line up your reference point on the goboholder with your reference point in the effects module. Holding the goboholder teeth with flat-nosed pliers, slide the goboholder back into the jaws of the clip in the gobo wheel.
7. Check that the gobo is pushed fully into the clip and held securely. To check that the goboholder is correctly installed, rotate the goboholder at least 180° in both directions in the gobo wheel and check that it and all the other goboholders move freely.
8. If you have finished service work, reinstall the top head cover and its safety cable with reference to “Opening the head for access” on page 20.

Replacing a rotating gobo on Gobo Wheel 2

Gobo wheels 1 and 2 sit very close to each other in the effects module, in almost the same plane of focus. Gobo wheel 2, the breakup wheel, is the wheel that is closer to the front lens. To replace a rotating gobo on Gobo Wheel 2:

1. Remove the top head cover as described in the previous section.
2. See Figure 16. With your fingers, rotate the gobo that you want to remove so that you line up a reference point (for example, the marking **C** shown in Figure 14 on page 22) on the goboholder with a reference point in the module.
3. Using a pair of flat-nosed pliers, grasp the teeth of the goboholder firmly and pull it out of its clip in the gobo wheel.
4. For instructions on how to install a new gobo in a goboholder, see "Replacing a gobo in a goboholder" on page 25.

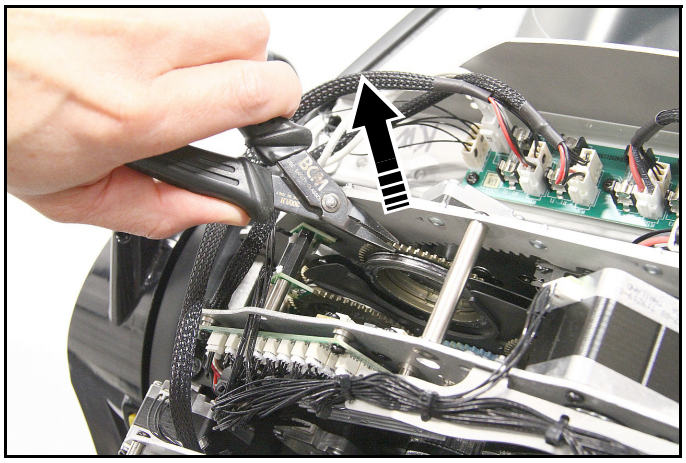


Figure 16: Removing a gobo from Gobo Wheel 2

5. Goboholders are held in position in the gobo wheel by clips (see Figure 13 on page 22). When you reinstall the goboholder, you must make sure that the jaws of the clip engage in the flange in the goboholder on both sides of the goboholder.
6. See Figure 17. Line up your reference point on the goboholder with your reference point in the effects module. Using two fingers as shown at **D**, bend the thin metal plate on the gobo wheel away from the wheel very slightly so that you have room to slide the goboholder back into the clip in the gobo wheel. Holding the goboholder teeth with flat-nosed pliers, slide the goboholder back into its clip.
7. Check that the gobo is pushed fully into its clip and held securely. To check that the goboholder is correctly installed, rotate the goboholder at least 180° in both directions in the gobo wheel and check that it and all the other goboholders move freely.

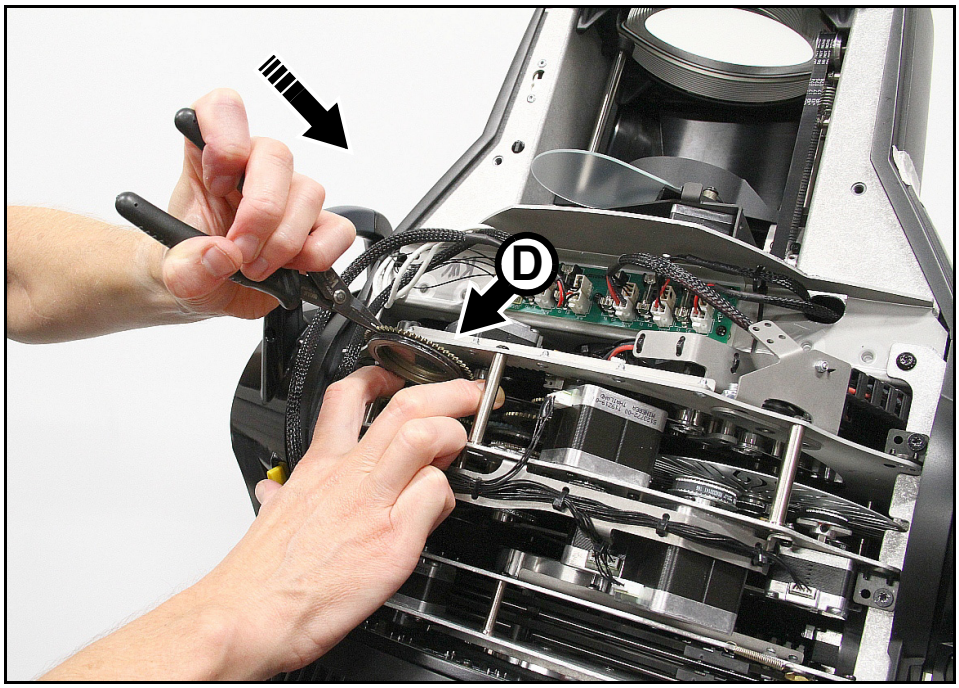


Figure 17: Reinstalling a goboholder

8. If you have finished service work, reinstall the top head cover and its safety cable with reference to "Opening the head for access" on page 20.

Replacing a gobo in a goboholder

The rotating gobos in the MAC Ultra Performance are held in their holders by springs and can be removed from their holders as described in this section.

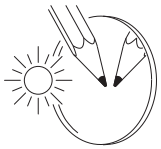
Gobo orientation: general

Make sure that you install gobos facing in the correct direction, or they may suffer heat damage. The orientations shown in Figure 18 are correct in most cases, but consult your Martin dealer or gobo supplier if you are in any doubt about the orientation of a specific gobo type.

Coated Glass Gobos

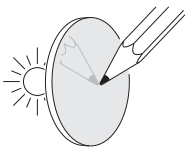
The heavy matted aluminum coated borosilicate gobos in the MAC Ultra Performance are factory-installed with the more reflective sides facing towards the LED light source. Replacement gobos must also be installed with more reflective sides facing the LEDs in order to avoid heat damage.

More reflective side towards LEDs



To minimize the risk of gobo overheating and damage, turn the more reflective side of a coated gobo towards the lamp.

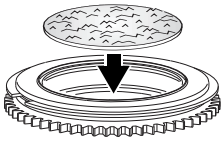
Less reflective side away from LEDs



The less reflective side of a coated gobo will absorb less heat if it faces away from the lamp.

Textured Glass Gobos

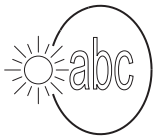
Flat side towards goboholder



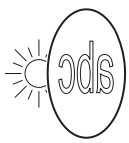
If you install a textured glass gobo in the fixture, note that a textured glass gobo sits most squarely in a goboholder with the flat side placed down into the recess in the goboholder. If in doubt, consult your Martin dealer or gobo supplier. We recommend that textured glass gobos are glued into the goboholder.

Image / text Gobos

True image towards LEDs



Reversed image away from LEDs



Gobos that have a specific left/right orientation (such as text gobos) will appear correctly in the projection if they appear correctly when viewed from the side that faces towards the LED light source.

Figure 18. Correct gobo orientation

Goboholder and gobo orientation, Gobo Wheel 1 (Aerial Wheel)

- Gobo Wheel 1 is the wheel that is closest to the LED light source.
- The side of the goboholder with the gobo retaining spring and with the teeth faces towards the LED light source.
- The shiny side of the gobo faces towards the spring and towards the teeth in the goboholder so that it faces towards the LED light source.
- The white, non-reflective side of the gobo faces away from the spring and away from the teeth in the goboholder so that it faces towards the front lens.

Goboholder and gobo orientation, Gobo Wheel 2 (Breakup Wheel)

- Gobo Wheel 2 is the wheel that is closest to the front lens.
- The side of the goboholder with the gobo retaining spring and without the teeth faces towards the LED light source.
- The shiny side of the gobo faces towards the spring and away from the teeth in the goboholder so that it faces towards the LED light source.
- The white, non-reflective side of the gobo faces away from the spring and towards the teeth in the goboholder so that it faces towards the front lens.

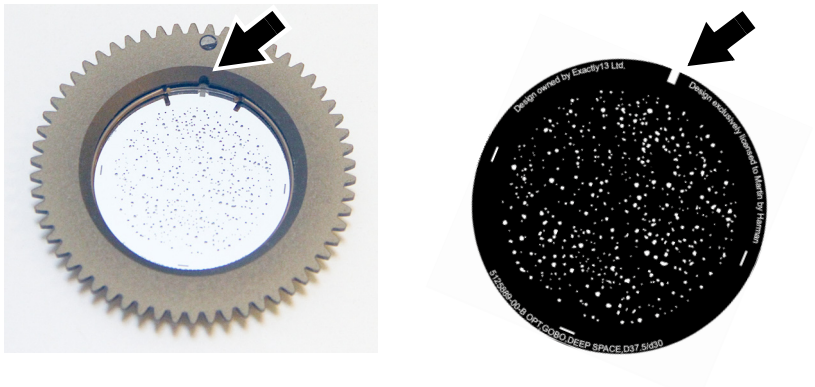
Gobo orientation, Wheels 1 and 2

On both gobo wheels in the MAC Ultra Performance:

- Images or text on gobos must appear correctly (i.e. not flipped left to right) when looking at the goboholder from the side with the spring.
- The textured side of textured glass gobos must always face towards the spring. The flat side of textured gobos must face downwards so that the gobo sits flat in the goboholder.

Gobo alignment

See Figure 19. Note the position of the alignment marks (arrowed) on goboholders and gobos. Install gobos with the alignment marks next to each other.



'Deep Space', Gobo Wheel 1

Figure 19: Gobo alignment marks

Gobo replacement procedure

Avoid getting grease from your fingers or dirt onto gobos. Hold gobos by their edges only. Wear clean nitrile cleanroom gloves when handling gobos.

To replace a gobo in a goboholder:

1. See Figure 20. Place the goboholder on a clean surface with the recess for the gobo and gobo spring facing upwards. Note the position of the bends (arrowed) in the ends of the gobo retaining spring. Using a plastic lever to avoid scratching the gobo, lever one end of the retaining spring out of the groove in the goboholder and lift the retaining spring out of the goboholder.

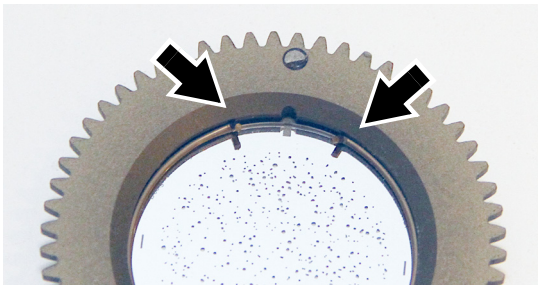


Figure 20: Gobo retaining spring

2. Turn the goboholder over so that the recess faces downwards and let the gobo fall out of the holder onto a clean, soft surface. Turn the goboholder back again and put it on the surface teeth with the recess facing upwards.
3. Holding the new gobo by its edges, insert it into the goboholder with the alignment marks on gobo and goboholder correctly lined up. The correct gobo orientation is different for Gobo Wheels 1 and 2. Make sure that you insert the gobo facing the correct way round by referring to the guidelines on pages 25 and 26.
4. Check that the gobo is seated flat in the holder. See Figure 20. Insert the retaining spring into the goboholder and press it into its groove in the goboholder. Check that the spring is pressed as flat as possible against the gobo and that the gobo is held securely in the goboholder.
5. Reinstall the goboholder in the gobo wheel and reinstall the top head cover following the directions given earlier in this section.

Replacing the prism with a frost filter

The MAC Ultra Performance is supplied with a rotating prism installed. It is possible to replace the prism with a heavy frost filter, P/N MAR-91614060HU. To remove the prism and install the heavy frost filter:

1. Following the instructions in “Opening the head for access” on page 20, remove the bottom head cover.
2. Position the head with the open lower side of the head facing upwards towards you and apply the tilt lock.
3. See Figure 21. Lift the prism up towards you so that you have good access to it.

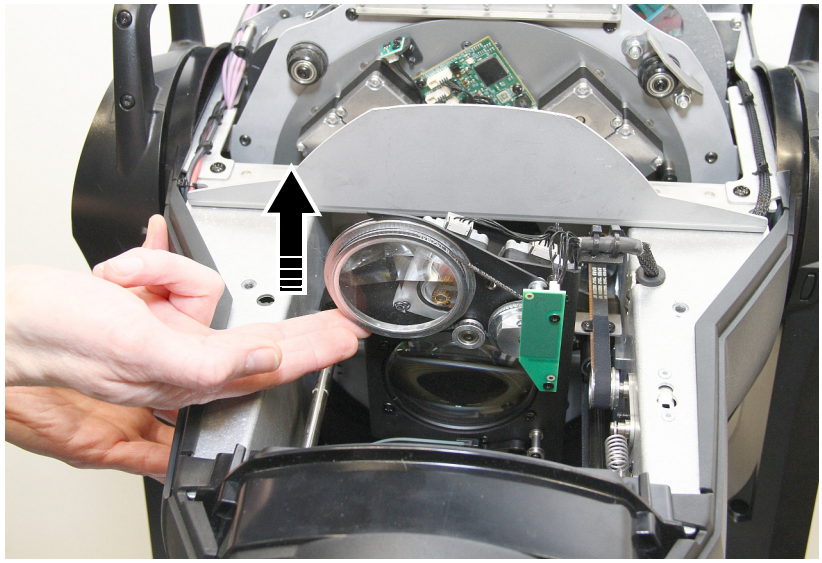


Figure 21: Lifting up the prism

4. See Figure 22. Rotate the prism counter-clockwise while at the same time pulling the prism drive belt over the lip of its channel in the prism holder, so that the belt is gradually drawn out of the channel.

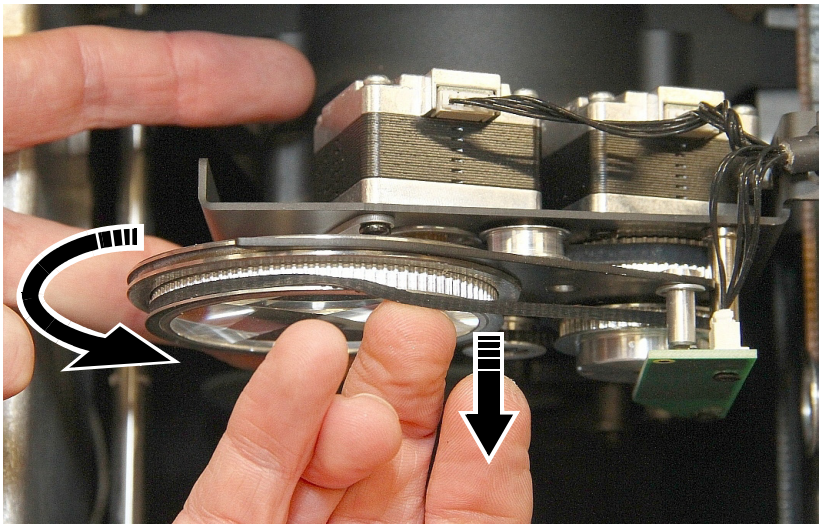


Figure 22: Disengaging the prism drive belt

5. See Figure 23. When the drive belt is free of the prism, twist it so that it will pass sideways through the gap (arrowed) between the prism drive pulley and the sensor PCB. Lift the belt up through this gap and remove it from the head. If the belt is in good condition, store it for possible re-use.

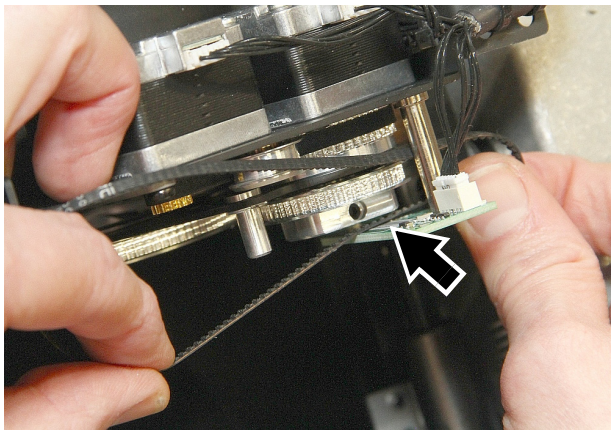


Figure 23: Disengaging the prism drive belt

6. See Figure 24. Slide the prism out of the jaws (arrowed) that it sits in. Store it for possible re-use.

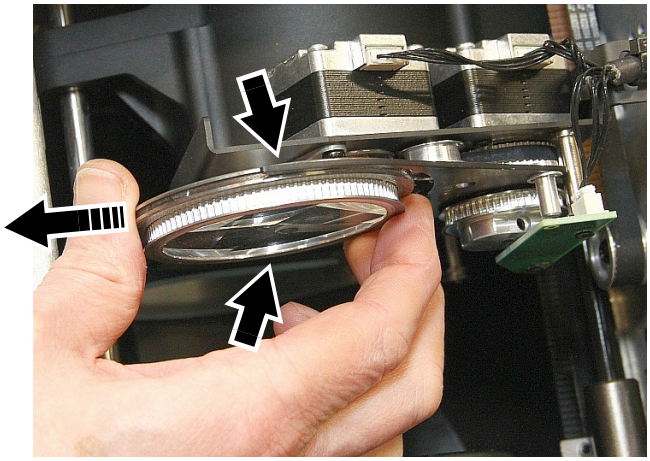


Figure 24: Removing the prism

7. The frost filter is glued into a metal holder. Look carefully at the holder and note which side of the holder the glass is glued into. Turn the frost filter so that this side – the side that the glass is glued into – faces *towards the back* of the fixture. See Figure 25. Slide the filter into the jaws (arrowed) and check that it is held securely.
8. If you touched the glass with your fingers, clean it with a soft, clean, lint-free cloth moistened in a little isopropyl alcohol/distilled water solution or photographic lens cleaner.

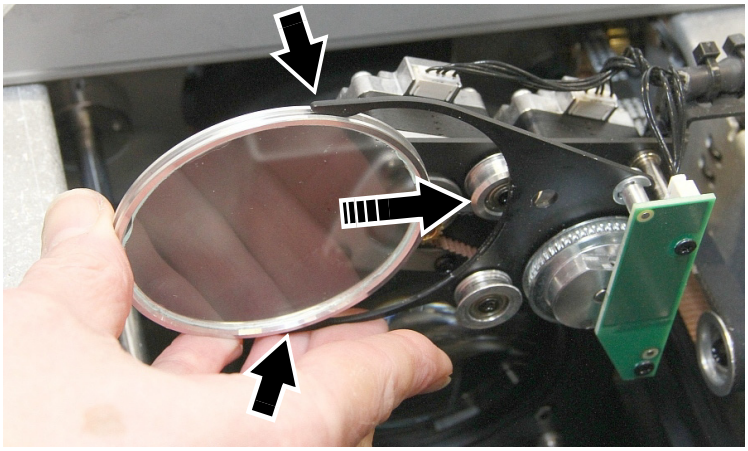


Figure 25: Installing the frost filter

9. Reinstall the bottom head cover following the directions given earlier in this section.

A label is supplied with the heavy frost filter (see on right). If you replace the prism with the heavy frost filter, you may find it helpful to stick this label on the base of the fixture and check the box marked 'Prism replacement' so that you can identify fixtures that have had the heavy frost modification.

Optional heavy frost installed	
Prism replacement	X
Frost replacement	

Replacing the standard frost with a heavy frost filter

The MAC Ultra Performance is supplied with a light frost filter installed as standard. It is possible to replace this with a heavy frost filter, *P/N MAR-91614063HU, MAC Ultra Heavy Frost - Frost Replacement*. The advantages of installing this filter are that, unlike the prism replacement filter described on the previous pages, you to keep the prism in the fixture, and also that the frost replacement filter can be inserted gradually into the beam whereas the prism replacement filter is either in or out.

If you replace the standard frost filter with a heavy frost filter, you may find it helpful to stick the label (see on right) supplied with the heavy frost filter on the base of the fixture and check the box marked 'Frost replacement' so that you can identify fixtures that have had the heavy frost modification.

To remove the existing standard frost filter and install the heavy frost filter:

1. Following the instructions in "Opening the head for access" on page 20, remove the top head cover.
2. Position the head with the top side of the head facing towards you.
3. Move the zoom car towards the front of the head to give you easier access to the frost filter (arrowed in Figure 26). If you let the head sink so that it points downwards, gravity will hold the zoom car away from the filter.

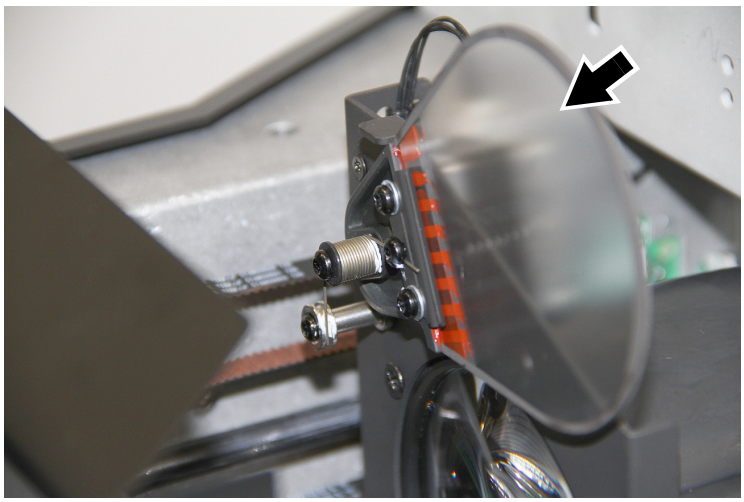


Figure 26: Frost filter

4. See Figure 27. Use a 2 mm Allen wrench to loosen the grub screw in the end of the filter to unfasten the filter from its shaft.

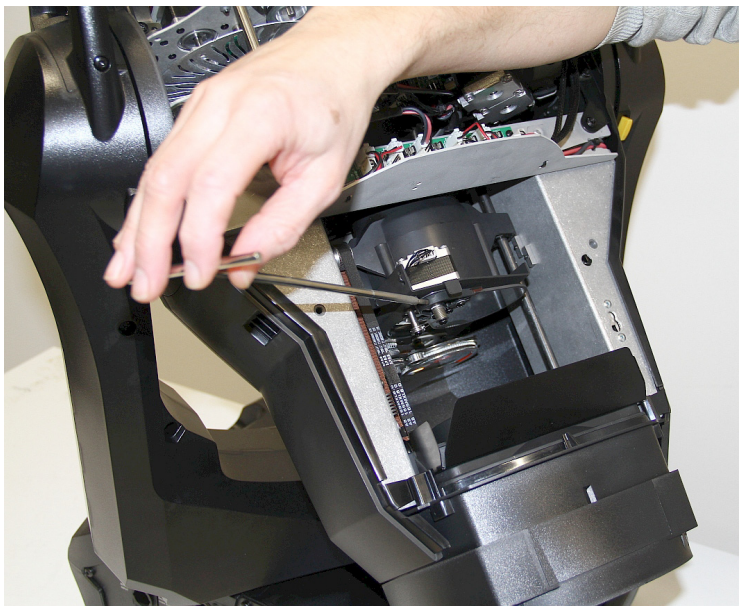


Figure 27: Unfastening the frost filter from its shaft

5. See Figure 28. Lift the end of the frost filter spring (arrowed) out of its groove in the spring anchor post. Do not remove the high-temperature lubricant from the anchor post.
6. Lift the filter together with its spring off its shaft.
7. Note the position of the flat on the shaft and the position of the grub screw in the end of the new frost filter. Slide the new filter onto the shaft in the same orientation as the filter that you removed. Use a 2 mm Allen wrench to tighten the grub screw against the flat in the shaft so that the filter is held firmly on the shaft. Check that the filter is secure, retightening the Allen screw if necessary.
8. See Figure 28. If necessary, spread the high-temperature lubricant on the spring anchor post around a little so that it will lubricate the new frost filter spring. Then engage the end of the spring (arrowed) in the groove in the spring anchor post as shown.

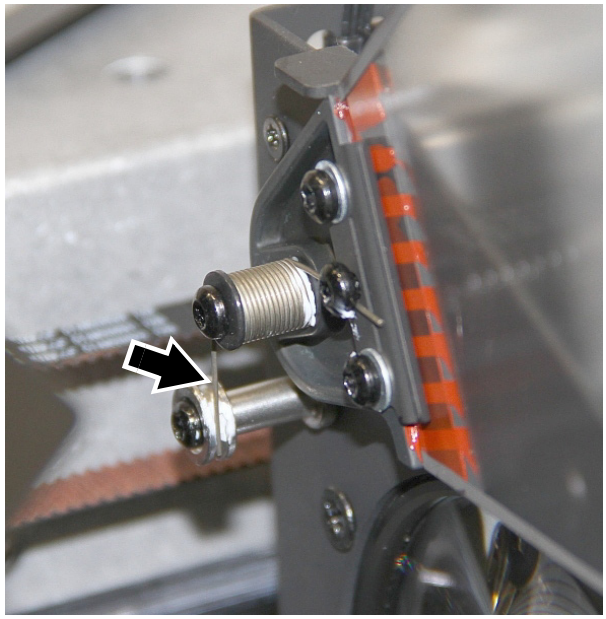


Figure 28: Frost filter spring

9. If you touched the frost filter glass with your fingers, clean it with a soft, clean, lint-free cloth moistened in a little isopropyl alcohol/distilled water solution or photographic lens cleaner.
10. Reinstall the top head cover following the directions given earlier in this section.

Using the fixture

Before using the fixture, download and read the latest version of the MAC Ultra Performance User Guide from the MAC Ultra Performance area of the Martin website at www.martin.com. The User Guide contains details of:

- The effects available in the fixture.
- The control options available using DMX and/or RDM.
- The setup, monitoring and control options available using the onboard control and display panel.
- Software service functions.

Warning! Before applying power to the fixture:

- ***Read the safety information section of this manual starting on page 4.***
- ***Read "Applying power" on page 12.***
- ***Check that the installation is safe and secure.***
- ***Check that the base is fastened securely so that the torque reaction when the head moves will not cause the base to move.***
- ***Check that the head tilt lock is released (see "Tilt lock" on page 7).***
- ***Be prepared for the fixture to light up suddenly. Check that no-one is looking at the fixture from close range.***
- ***Be prepared for the head to move suddenly. Check that there will be no risk of collision with persons or objects.***
- ***In a hot or cold environment, check the temperature. Do not operate the fixture if the ambient temperature is below 5° C (41° F) or above 40° C (104° F).***

The MAC Ultra Performance does not have an On/Off switch. To apply power to the fixture, apply power to the power input cable. Neutrik powerCON TRUE1 connectors also support hot-plugging.

Battery power

The MAC Ultra Performance's battery gives access to the most important functions in the control panel when the fixture is not connected to AC mains power.

The battery is not rechargeable. Do not try to recharge it, or you may create a risk of fire or explosion.

The following functions are available on battery power:

- DMX and Ethernet addressing and setup
- Fixture ID
- PERSONALITY menu
- DEFAULT SETTINGS loading and saving
- INFORMATION menu

To activate the display when the fixture is not connected to mains power, press MENU. Press MENU again to enter the menus.

The display extinguishes after 10 seconds with no user input and the control panel is de-activated after one minute with no user input. Press MENU again to re-activate.

Troubleshooting

Problem	Probable cause(s)	Remedy
One or more of the fixtures is completely dead.	No power to fixture.	Check that power is switched on and cables are plugged in.
	Fuse blown or internal fault.	Contact Martin Service or authorized service partner. Do not remove base or yoke covers, attempt to replace a fuse or carry out any repairs or service that are not described in this Safety and Installation Manual unless you have both authorization from Martin and official Martin service documentation.
Fixtures reset correctly but respond erratically or not at all to the controller.	Bad data link.	Inspect connections and cables. Correct poor connections. Repair or replace damaged cables.
	Data link not terminated.	Insert DMX termination plug in data output socket of the last MAC Ultra Performance on the data link.
	Incorrect addressing of fixtures.	Check fixture address and protocol settings.
	One of the fixtures is defective and is disturbing data transmission on the link.	Unplug the data in and out connectors and connect them directly together, or insert a relay cable, to bypass one fixture at a time until normal operation is regained. Have the fixture serviced by a qualified technician. Power fixtures off and on again to see if a restart solves the issue.
Timeout error after fixture reset.	Effect requires mechanical adjustment.	Check fixture's stored error messages for more information. Contact Martin Service or authorized Martin service partner.
Mechanical effect loses position.	Mechanical train requires cleaning, adjustment, or lubrication.	Check fixture's stored error messages for more information. Contact Martin Service or authorized Martin service partner.
Light output cuts out intermittently.	Fixture is too hot.	Check fixture's stored error messages for more information. Allow fixture to cool. Clean fixture. Reduce ambient temperature.
Control panel display only operates when fixture is connected to AC mains power.	Onboard battery fully discharged.	Replace battery with new one of same type (battery is not rechargeable).

Table 2: Troubleshooting

Compliance and legal

Approvals

This product has been tested and found to comply with the following standards:

- Global CB Certification/IECEE: IEC 60598-2-17 (IEC 60598-1)
- EU safety: EN 60598-2-17 (EN 60598-1), EN 62471, EN62493
- EU EMC: EN 55015, EN 55032, EN 55035, EN 61000-3-2, EN 61000-3-11, EN 61547
- US safety: UL1573
- US EMC: FCC Part 15 Class B
- Canadian safety: CSA C22.2 No. 166
- Canadian EMC: ICES-003 Class B; ICES-005 Class B
- United Kingdom: UKCA
- Australia/NZ: RCM

FCC Compliance

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

Supplier's Declaration of Conformity

Harman Professional, Inc. have issued an FCC Supplier's Declaration of Conformity for this product. The Declaration of Conformity is available for download from the MAC Ultra Performance area of the Martin website at www.martin.com

Canadian Interference-Causing Equipment Regulations - *Règlement sur le Matériel Brouilleur du Canada*

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.
Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le Matériel Brouilleur du Canada.

CAN ICES-003 (B) / NMB-003 (B); CAN ICES-005 (B) / NMB-005 (B)

EU Declaration of Conformity

An EU Declaration of Conformity covering this product is available for download from the MAC Ultra Performance area of the Martin website at www.martin.com.

Conditional connection

For conformity with mains voltage fluctuations and flicker according to EN61000-3-11 during extensive use of continuous strobe effects the user must determine, in consultation with the mains power supply authority if necessary, that the equipment is connected to a supply impedance of less than 0.39 ohms at 50 Hz.

Hibernation Mode

'Hibernation mode' is intended as an option to reduce the consequences of having a product fully operational in dirty environments or in situations where noise level is crucial such as during live performances. The small reduction in energy consumption in Hibernation Mode is only a subordinate effect.

Intellectual Property Rights

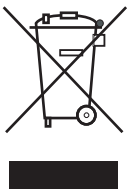
Martin® MAC Ultra Performance products are covered by one or more of these patents:

CN101430080; CN102713425; CNZL200810128720.0; CNZL200810128776.6; CNZL200810144668.8; CNZL201080025103.3; CNZL201180014884.0; CNZL201380004370.6; CZ17567; EP2058586; EP2113714; EP2117284; EP2136136; EP2326150; EP2443381; EP2536974; EP2550686; EP2828577; EP2881650; US6971770; US7,703,948; US7,789,543; US7,905,630; US7,942,535; US7,990,673; US7222997; US7498756; US8,449,141; US8,708,535; US8,770,762; US9217551; US9217559;

and/or one or more of these patent applications:

CN104696882; CN104698579; CN104976548; CN105402641; CN201410740291.8; CN201410742572; DKPA201700088; EP17167067.2; EP2091302; EP2881651; EP2881652; EP2881653; EP2927579; EP2995852; US2015/0285483; US20150159827; US20150159828; US20150159830; US20160069540; US20160102850;

and/or one or more other intellectual property rights, including one or more intellectual property rights listed on www.martin.com/ipr



Disposing of this product

Martin products are supplied in compliance with Directive 2012/19/EC of the European Parliament and of the Council of the European Union on WEEE (Waste Electrical and Electronic Equipment), 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.

The MAC Ultra Performance contains a lithium battery. Ensure that the battery is disposed of correctly and responsibly by an authorized recycling or waste disposal center at the end of its life. Where applicable, Martin participates in schemes whose aim is to ensure that local recycling and/or waste disposal centers accept batteries from Martin products.