



Exterior 400



Exterior 410



Exterior 420

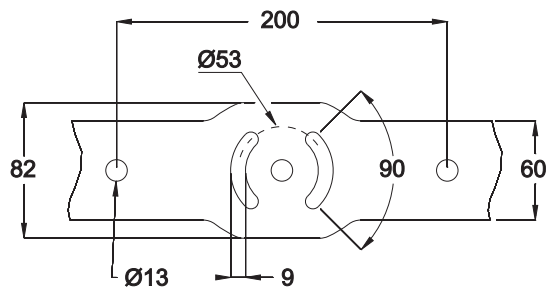
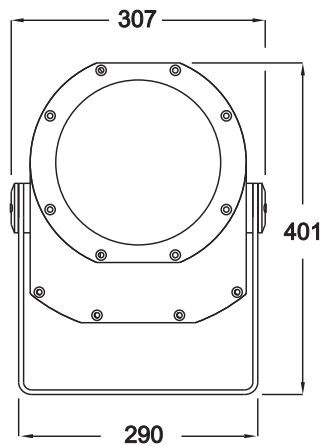
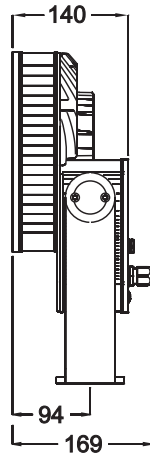


Exterior 430

Exterior 400™ Range user manual

Dimensions

All dimensions are in millimeters



©2010-2015 Martin Professional ApS. Information subject to change without notice. Martin Professional ApS and all affiliated companies disclaim liability for any injury, damage, direct or indirect loss, consequential or economic loss or any other loss occasioned by the use of, inability to use or reliance on the information contained in this manual. The Martin logo, the Martin name and all other trademarks in this document pertaining to services or products by Martin Professional ApS or its affiliates and subsidiaries are trademarks owned or licensed by Martin Professional ApS or its affiliates or subsidiaries. The use of certain patents in Martin Exterior 400 Range products is licensed by Color Kinetics, Inc. (see details printed on product).

P/N 35000237, 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:



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



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



WARNING!
LED light emission. Risk Group 3 according to IEC 62471.



WARNING!
Fire hazard.



WARNING!
Refer to user manual.

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 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. Install and operate the fixture only as described in this manual and in accordance with local laws and regulations. Refer any operation not described in this manual to a qualified technician.



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

- Shut down power to the entire installation at the main power distribution board and lock out power (by removing the fuse for example) before carrying out any installation or maintenance work.
- Disconnect the fixture from AC power before removing or installing any cover or part and when not in use.
- Connect the fixture electrically to ground (earth).
- 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.
- Connect the fixture to AC power either using either the supplied power cable or a listed 3-conductor Hypalon or neoprene rubber-jacket cable rated to 90° C (194° F) minimum and with conductor size 1.5 mm² or 16 AWG minimum.
- Before using the fixture, check that all power distribution equipment and cables are in perfect condition, are rated for the current requirements of all connected devices, are protected to IP67 or higher and are of suitable type for the location (including water, pollution, temperature and UV resistance).
- Isolate the fixture from power immediately if any cable, seal, cover or other component is damaged, cracked or deformed. Do not reapply power until repairs have been completed.
- Do not expose any part of the fixture to a high-pressure water jet.
- Do not immerse the fixture in water or any other fluid, or install it in a location where flooding may occur.
- Refer any service operation not described in this manual to an authorized Martin Service partner.



PROTECTION FROM BURNS AND FIRE

- Do not operate the fixture if the ambient temperature (T_a) exceeds 45°C (113°F).
- The exterior of the fixture becomes hot, up to 90°C (194°F) during normal operation. Ensure that accidental physical contact with a hot fixture is impossible.
- Allow the fixture to cool for 20 minutes before servicing.
- Do not illuminate surfaces less than 0.1 m (4 in.) from the front surface of the fixture.
- Keep flammable materials well away from the fixture.
- Do not modify the fixture in any way not described in this manual or install other than genuine Martin parts. Do not stick filters, masks or other materials directly onto LEDs. Use only Martin approved accessories to mask or modify the light beam.
- Do not attempt to bypass thermostatic switches or fuses. Replace defective fuses with ones of the specified type and rating only.
- Install the fixture outdoors or in a well-ventilated area only. Provide a minimum clearance of 150 mm (6 in.) and ensure unrestricted airflow around the fixture.
- Provide a minimum center-to-center distance of 550 mm (21.7 in.) between Exterior 400 Range fixtures.



PROTECTION FROM INJURY

- Classified as LED Risk Group 3 product with all LEDs at full intensity, 1/10 peak beam angle 6° , according to IEC 62471. Do not look at LEDs from a distance of less than 8.3 m (27.3 ft.) from the front surface of the fixture without suitable protective eyewear. At less than this distance, the LED emission can cause eye injury or irritation. At distances of 8.3 m (27.3 ft.) and above, light output is harmless to the naked eye.
- Do not look at LEDs with magnifiers or similar optical instruments that may concentrate the light output.
- Ensure that all external covers, components and installation fittings are securely fastened.
- Block access below the work area and work from a stable platform whenever installing, servicing or moving the fixture.
- Ensure that all supporting structures, surfaces, fasteners and lifting equipment can bear the weight of all the devices they are intended to support plus an adequate safety margin, and that they conform to local building and safety regulations.
- Use a sufficient number of fasteners with sufficient corrosion resistance, dimensions and strength to mount the fixture safely. Any nuts used must be self-locking. Washers must be installed directly under the fasteners' heads when anchoring the yoke base to the installation surface.



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.

Contents

Dimensions	2
Safety Information	3
Introduction	6
Unpacking	6
Using for the first time	6
Managing humidity	7
Physical installation	8
Location and orientation	8
Extended mounting yoke	8
Mounting fasteners	10
Tilt adjustment	10
Power and DMX data cable layout	11
AC power	12
Connecting to power	12
Replacing the power cable	13
Control data link	15
Connecting the data link	16
Fixture setup	17
Connecting a PC with MUM	17
Configuring a fixture with MUM	18
Operation	21
DMX control	21
Stand-alone operation	21
Service and maintenance	27
Cleaning	27
Installing and removing a diffuser filter	28
Fuse replacement	29
Fixture readouts in MUM	29
Software installation	30
Status indicators	31
DMX protocols	32
Exterior 400, Exterior 410	32
Exterior 420	33
Exterior 430	34
Troubleshooting	35
Specifications	36

Introduction

Thank you for selecting a product from the Exterior 400™ Range of compact IP65-rated LED-based floodlights from Martin Professional™. The Exterior 400 Range includes the following models:

Exterior 400

- Optimized for long-throw applications in combination with very narrow beam angle optics
- 56 single-chip Cree XP-E LEDs
- RGBW (red, green, blue, white) and RGB color mixing, HSIC (hue, saturation, intensity, color temperature) and HSI color management

Exterior 410

- Optimized for evenness of color mixing
- 22 multi-chip Cree MC-E LEDs
- RGBW and RGB color mixing, HSIC and HSI color management

Exterior 420

- Optimized for color temperature control
- Single-chip Cree XP-E warm white and cold white LEDs

Exterior 430

- Optimized for single-color, high-output applications
- Single-color, single-chip Cree XP-E LEDs
- Red, green, blue, warm white or cold white LEDs
- Color fine-tuning available on red, green and blue fixtures through use of auxiliary color LEDs

All Exterior 400 Range models feature:

- Diffuser filters for alternative beam angles
- Auto-sensing power supply unit with 100 - 240 V, 50/60 Hz operating range
- DMX 512A control (1 - 4 channels depending on fixture and control mode)
- Remote configuration and addressing over the DMX data link using Martin MUM™ software running on a Windows PC and a USB/DMX hardware interface such as the Martin DABS1™.

For the latest light output measurements, firmware updates, documentation, product specifications 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.

Unpacking

The following items are included with the Exterior 400 Range:

- Adjustable mounting bracket
- Narrow, Medium and Wide diffuser filters (supplied separately)
- This user manual

Using for the first time

Before applying power to the fixture:

- Carefully review “Safety Information” on page 3.
- Check that the local AC power voltage is within the range listed on the fixture’s serial number label.
- Install the fixture as described in this manual

Managing humidity

The fixtures in the Exterior 400 Range are IP65-rated and are designed to resist water and moisture in environments with widely varying climate, temperature and humidity conditions. But if fixtures are not managed correctly during installation and service, water and moisture can enter, leading to humidity and condensation inside the fixtures. Follow the precautions in this chapter to avoid this problem.

General

- Carry out service during low-humidity weather conditions (or indoors if possible). Check that fixtures are dry and free of moist air before closing them.
- Tighten cover screws exactly as directed in this manual and using a torque driver.
- Make sure that all threads are clean and dry. Do not apply lubricant to threads before assembly. While lubricant may make disassembly easier during future service, it means that tightening screws to the specified torque will apply excessive compression to seals. This may deform them and reduce their effectiveness.
- Air, and even water, can be sucked along cables and into fixtures. A cracked or porous cable jacket can allow water into the cable. Replace any cable that is not in perfect condition. Make sure that cables from fixtures open into dry areas (e.g. junction boxes in dry locations).
- Do not clean fixtures with high-pressure water jets or immerse them.

Seals and sealing surfaces

The fixture must be sealed effectively. Covers have silicone seals that will withstand rain and water splashing but will not withstand immersion or high-pressure water jets. Covers and seals must be reinstalled carefully if they are removed.

- Invert the fixture if necessary to avoid water collecting in a pool around a seal (see “Avoiding water pooling on the power box” on page 9).
- Make sure that seals and sealing surfaces are perfectly clean, dry and in perfect condition before installing a cover. If you need to clean seals, use water and a soft cloth only. Replace any seal that shows signs of aging, damage, cracking, stretching or deformation. Replacement seals are available from Martin™.
- Reinstall seals in exactly their original position.
- Install seals so that they closely follow the profile of the metal parts they are installed on. When you run your finger around the sealing surface after you have installed a cover, you should not be able to feel any places where the seal sticks out or sinks into the gap between the sealing surfaces.
- If spacer rings are fitted on screws that hold sealing surfaces together, reinstall them in the same positions when you reassemble products after service. Spacer rings ensure that the silicone seal around them is compressed by exactly the right amount when bolts are tightened and minimize the risk of deformation of components.
- Do not use liquid gasket or any other type of sealant on sealing surfaces or seals.

Anti-humidity valves

A valve with a Gore-tex membrane on the back of the fixture equalizes pressure by allowing air to pass through it when the fixture heats up and cools down, but at the same time it acts as a barrier to water in liquid form. The expulsion of warm air (with a slightly higher water vapor content) and intake of cool air (with a slightly lower water vapor content) prevents humidity buildup over time, provided that the valve works correctly and the fixture is correctly sealed.

Valves become blocked over time as the micropores in the membrane fill with particles. If a valve becomes blocked by dirt or water, excess pressure can damage seals or cause air and even water to be sucked into the fixture along cables. Valves cannot be cleaned and must be replaced if not in perfect condition.

Valves have a limited service life, but replacement intervals depend on the amount of airborne dirt and dust in the installation location. Replacement valves are available from Martin™.

- Do not allow water to collect on or near valves. Do not install a fixture with the valve membrane horizontal so that water can pool on it.
- Replace a valve with a new item if it shows any signs of contamination or is not in perfect condition.
- Replace valves after an extended period of use. Intervals for valve replacement depend on the installation environment.

Physical installation



Warning! Read "Safety Information" on page 3 before installing the Exterior 400 Range.

Warning! The safety and suitability of lifting equipment, installation location, anchoring method, mounting hardware and electrical installation is the responsibility of the installer. All local safety regulations and legal requirements must be observed when installing and connecting the Exterior 400 Range. Installation must be carried out by qualified professionals only.

Contact your Martin supplier for assistance if you have any questions about how to install this product safely.

Location and orientation



Warning! The Exterior 400 Range mounting yoke base must be securely anchored to a suitable flat surface at any angle, pedestal or other suitable support. Ensure that the supporting structure can bear the weight of all installed devices plus an adequate safety margin.

Important! Make sure that there will be at least 0.1 m (4 in.) of free space and unrestricted airflow around the fixture.

Allow for service access to the front and rear of the fixture.

An Exterior 400 Range fixture can be installed outdoors. It has an IP rating of 65 and is designed to withstand rain and other low-pressure water projections but:

- Do not expose it to high-pressure water jets from any direction
- Do not immerse it in water (or any other fluid)
- Do not install it in a location where flooding may occur.

Ensure sufficient drainage to cope with the heaviest rainfall. Make sure that water can drain away from the installation area at least as fast as it can enter it.

Exterior 400 Range fixtures require free and unobstructed airflow around them to ensure adequate cooling:

- Do not bury the fixture or locate it in an unventilated space
- Allow at least 0.1 m (4 in.) free space around the fixture

Install the fixture at least 0.5 m (20 in.) away from any combustible materials (wood, paper, etc.) and well away from any flammable materials.

The aluminum housing reaches temperatures up to 90° C (194° F). Restrict public access or locate the fixture so that it cannot accidentally be touched.

Extended mounting yoke

An extended mounting yoke is available as an accessory for the Exterior 400 Range by ordering P/N 21080030 (see Figure 1, Exterior 400 Image Projector illustrated). This extra-long bracket gives additional installation options. It offers a practical solution if you cannot install a fixture at a specific tilt angle using the standard yoke.

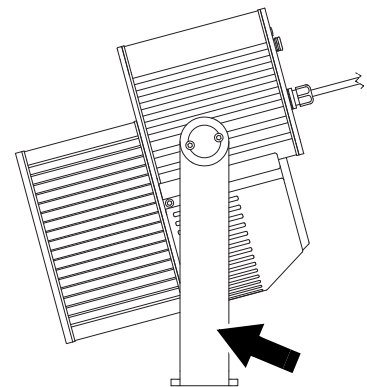


Figure 1: Extended mounting yoke

Avoiding water pooling on the power box

See Figure 2. If you install a fixture in the Exterior 400 range with its power box under the main fixture housing, and if you aim the light beam downwards from approx. $+5^\circ$ to -95° , rainwater can form a pool on top of the power box (see arrow). This can immerse silicone seals in hot and cold water, possibly mixed with leaves, dirt and/or pollutants, for long periods.

Provided that the product is installed and serviced as directed in this manual, it will perform in this orientation without problem throughout the product warranty period and afterwards. But to obtain maximum service life from silicone seals over years of use, we recommend that you follow the guidelines below.

See Figure 3. If you install the fixture with its light beam pointing downwards, install it with its power box above the main housing so that water will drain away from the fixture.

Depending on whether you install the fixture in a standing or hanging position, you may need to invert the fixture in its mounting yoke so that the power box is above the main fixture housing. See "Inverting a fixture in its mounting yoke" below.

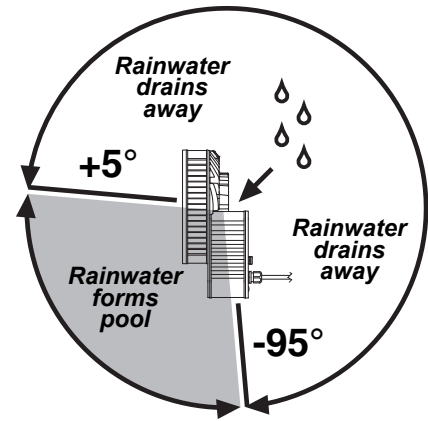


Figure 2: Rainwater pooling

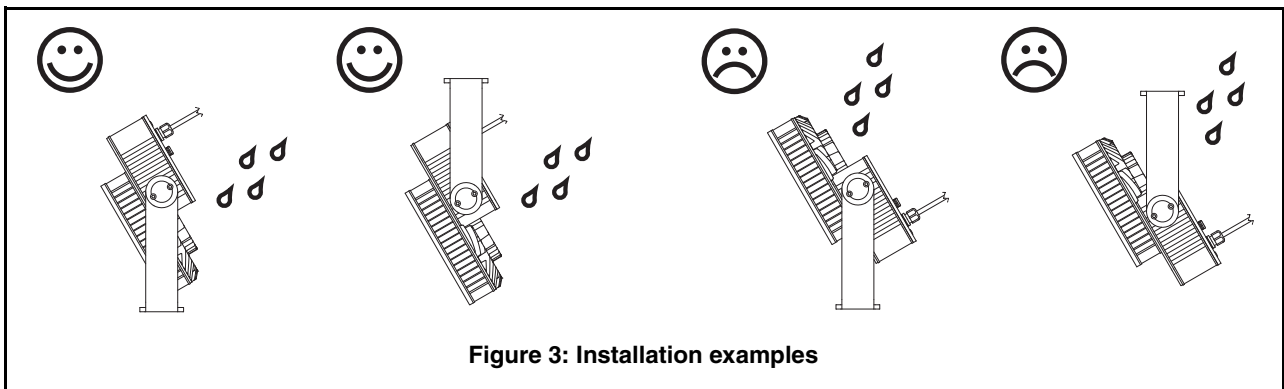


Figure 3: Installation examples

Inverting a fixture in its mounting yoke

See Figure 4. To invert a fixture in its mounting yoke:

1. Be ready to support the weight of the fixture and catch all screws as you remove them.
2. On both sides of the fixture, remove the tilt lock screws **A** completely and remove the tilt adjustment covers **B**.
3. Supporting the weight of the fixture, remove the fixture mounting screws **C** and remove the mounting discs **D** and **E**.
4. Turn the fixture upside down and reinstall the fasteners in their original positions. Note that the sliders **F** let you slide the fixture forward or backward in the yoke to adjust its position before you tighten the fixture mounting screws **C** through the mounting discs **D** and **E** into the sliders **F**.
5. Check that all fasteners are secure and that the fixture is secured against falling and causing injury or damage.

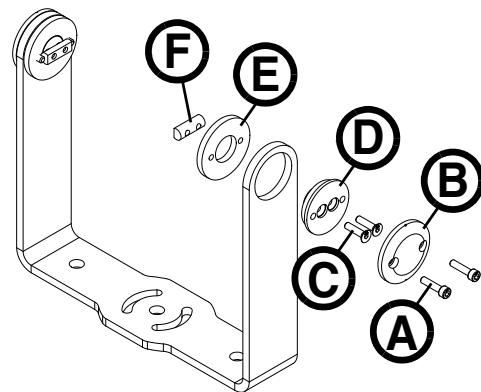


Figure 4: Fasteners in yoke

If it is impossible to achieve the desired tilt angle when you have inverted the fixture, the longer yoke available from Martin™ may provide a solution (see "Extended mounting yoke" on page 8).

Mounting fasteners



Warning! All fasteners used to mount the Exterior 400 Range must be corrosion-resistant and strong enough to mount the fixture safely. The washers supplied with the fixture must be installed directly under the fasteners' heads when anchoring the yoke base to the installation surface.

The mounting yoke base must be safely anchored to a flat surface. The number and type of fasteners used will depend on the installation, but use at least three high-strength corrosion-resistant fasteners (recommended minimum properties: stainless steel A4-70 grade according to ISO 3506 or steel grade 8.8 according to ISO 898-1). All nuts used must be self-locking. Washers must be installed between the head of each fastener and the yoke base.

The yoke allows the fixture to be manually panned (i.e. rotated horizontally) and tilted for beam aiming adjustment.

See Figure 5. To mount the fixture, use a 12 mm (1/2 inch) thread diameter bolt in the center hole **A**. Then either use two bolts with 12 mm (1/2 inch) shaft diameter passing through holes **B** or use two bolts with 8 mm (5/16 inch) shaft diameter passing through slots **C** to anchor the fixture. Installing bolts through slots **C** will give approximately 90° of pan adjustment.

Install washers under all nuts and bolt heads.

If additional bolts are required to mount the fixture safely, install bolts through holes **B** and slots **C**.

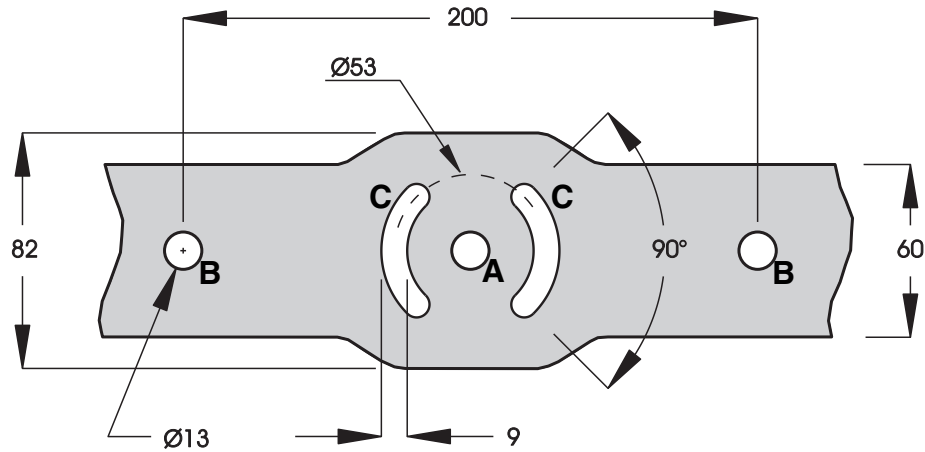


Figure 5: Mounting yoke attachment points

Tilt adjustment

Tilt adjustment can be carried out with the fixture powered on.

To adjust tilt:

1. Put on heat-resistant gloves if the fixture is or has recently been powered on.
2. See Figure 6. Loosen, *but do not remove*, the tilt lock screws (arrowed). Tilt the fixture to the desired angle and retighten the screws.

If it is impossible to achieve the desired tilt angle, the longer yoke available from Martin™ may provide a solution (see “Extended mounting yoke” on page 8).

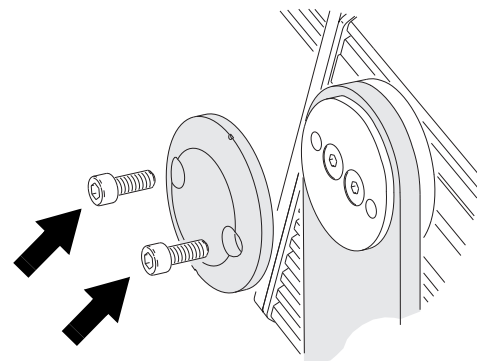


Figure 6: Tilt adjustment

Power and DMX data cable layout

Figure 7 gives an overview of a suitable cable layout. The dotted lines represent AC power circuits. The solid lines represent the data link.

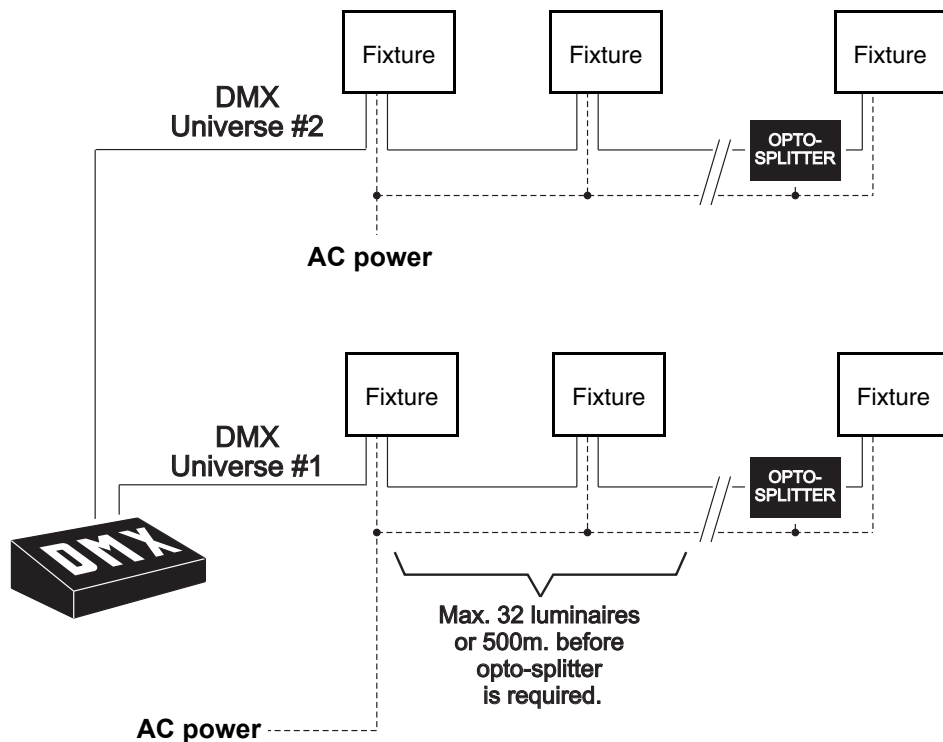


Figure 7: Schematic cable layout diagram

Cables and cable glands

The power cable supplied with the product is 9.5 mm (0.37 in.) external diameter. The data cable is 6.5 mm (0.25 in.) external diameter. If you install these cables in cable glands in the installation (when connecting cables in external junction boxes, for example), make sure that the cable glands are designed to accept these cable diameters.

The IPON[®] IP68-rated cable glands used for power and data cable entry into the fixture accept cable with 5 - 10 mm (0.2 - 0.4 inch) external diameter. If you replace a cable, install a new rubber seal or a complete cable gland if the seal is not in perfect condition. If you use a cable with an external diameter that is not within the range accepted, replace the cable gland with a suitably dimensioned item. Cable glands must be rated IP68 and suitable for the cable diameter and application. New cable glands can be obtained from Martin[™] (P/N 13102000) or from electrical suppliers.

To replace an IPON cable gland:

1. Lock out power to the installation and allow it to cool for 20 minutes.
2. Loosen the dome nut in the existing gland to release the cable, then unscrew the gland from the rear cover.
3. Remove the rear cover from the fixture, note connections and disconnect the cable from its terminals.
4. Slide the old gland off the cable.
5. Screw the new gland into the rear cover until it is tight enough to make a seal. Do not overtighten.
6. Pass the cable through the new gland and rear cover, then connect it to its terminals (with reference to "Replacing the power cable" on page 13 or "Connection pinouts" on page 15 if necessary).
7. Reinstall the rear cover as follows:
 - a. Read "Managing humidity" on page 7.
 - b. Check that the seal is in perfect condition.
 - c. Place the seal and cover in position and drive the cover screws until they are finger-tight only.
 - d. Cross-tighten the screws evenly in a diagonal pattern, increasing torque gradually in stages to a maximum torque of 8 Nm (5.9 ft.-lbs.).
8. Tighten the dome nut on the cable gland to seal the cable before applying power.

AC power



DANGER! Read “Safety Information” on page 3 before attempting to install an Exterior 400 Range fixture. Lock out power to the entire installation before working on cables and connections or removing any cover.

Electrical installation must be carried out by qualified professionals only.



For protection from dangerous electric shock, the fixture must be grounded (earthed). The AC power distribution system must be fitted with current overload and ground-fault (earth-fault) circuit breakers as well as a means to isolate fixtures from power and lock out power during service.



Important! Do not connect an Exterior 400 Range fixture to an electrical dimmer system. Doing so can damage the electronics.

See Figure 7 on page 11 for a schematic diagram of cable layout. If you require help in planning or dimensioning the power distribution system, please contact your Martin Architectural supplier for assistance.

If there is a break or cut at any point in a cable (for example at a connection point), and if this is exposed to water, moisture can be drawn up the inside of the cable due to the vacuum effect of temperature fluctuations during operation. Ensure that the fixture is protected from the entry of water via the power cable by using IP65-rated connectors or junction boxes, or by protecting connectors with weatherproof housings.

The Exterior 400 Range is supplied in EU and US models. Both models accept AC power at 100 - 240 V nominal, 50 or 60 Hz. Do not connect to power at any other voltage or frequency.

The Exterior 400 Range is protected by a 2.5 amp slow-blow primary fuse located on the power PCB inside the rear cover. See “Fuse replacement” on page 28 for details of changing fuses.

There is no power on/off switch. Power is applied to an Exterior 400 Range fixture as soon as it is connected to power. Provide a means to disconnect from power or shut down power to fixtures that is easily accessible and is located close to the fixtures.

Connecting to power

The fixture is supplied with a power cable installed ready for connection to a single-phase 3-wire (live, neutral, ground/earth) power distribution system at 100 - 240 V nominal, 50/60 Hz.

Important! *If you have any other type of distribution system than the one listed above, you must replace the power cable and connect the fixture to power as described under “Replacing the power cable” on page 13.*

To connect to a single-phase 3-wire (live, neutral, ground/earth) power system:

1. Lock out power to the installation.
2. The power cable color coding for US and EU models is given in Table 1. Connect the conductors in the power cable to the distribution circuit as follows:
 - Connect the green wire (US models) or yellow/green wire (EU models) to ground (earth)
 - Connect the white wire (US models) or blue wire (EU models) to neutral
 - Connect the black wire (US models) or brown wire (EU models) to live.



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

Table 1: Conductor identification

3. Check that all installation work is completed and carry out appropriate tests and safety checks before applying power.

Replacing the power cable

If you replace the supplied power cable, the new cable must be listed, adequately dimensioned for the current requirements and suitable for the installation environment, particularly with regard to water, pollution, thermal and UV resistance. Use Hypalon or neoprene rubber-jacket cable rated to 90° C (194° F) minimum. The conductor size must be 1.5 mm² or 16 AWG minimum.

To install a new power cable:

1. Lock out power to the installation and allow the fixture to cool for at least 20 minutes.
2. Loosen the dome nut in the power cable gland and then unscrew the gland from the rear cover.
3. See Figure 8. Remove the rear cover retaining screws (arrowed) and remove the rear cover.
4. Disconnect the existing cable from the power terminals, then remove it together with the old cable gland.
5. Pass the new cable through a new cable gland and through the rear cover.

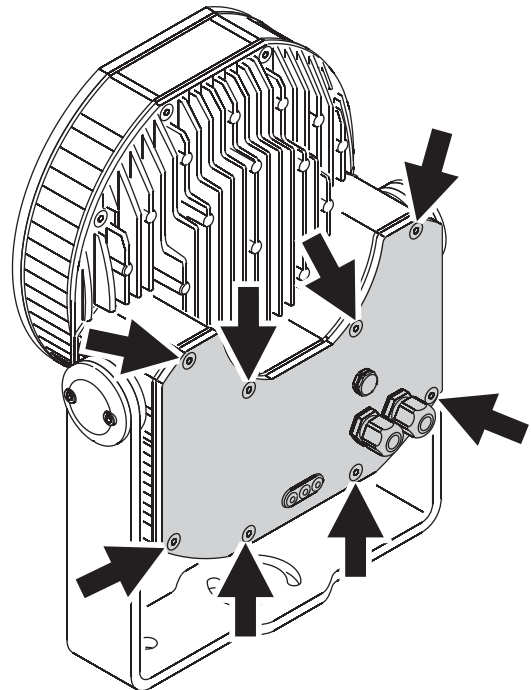


Figure 8: Rear cover retaining screws

6. See Figure 9. Connect the conductors in the new cable to the spring-loaded power terminals in the rear cover as follows:
 - Connect the ground (earth) wire to the terminal marked \perp
 - If using a **single-phase system**, connect the power cable's neutral wire to terminal **N** and connect the power cable's live wire to terminal **L**. **Important! Do not connect the live wire to terminal L2 as there is electrical continuity between this terminal and terminal N (see Figure 10).**

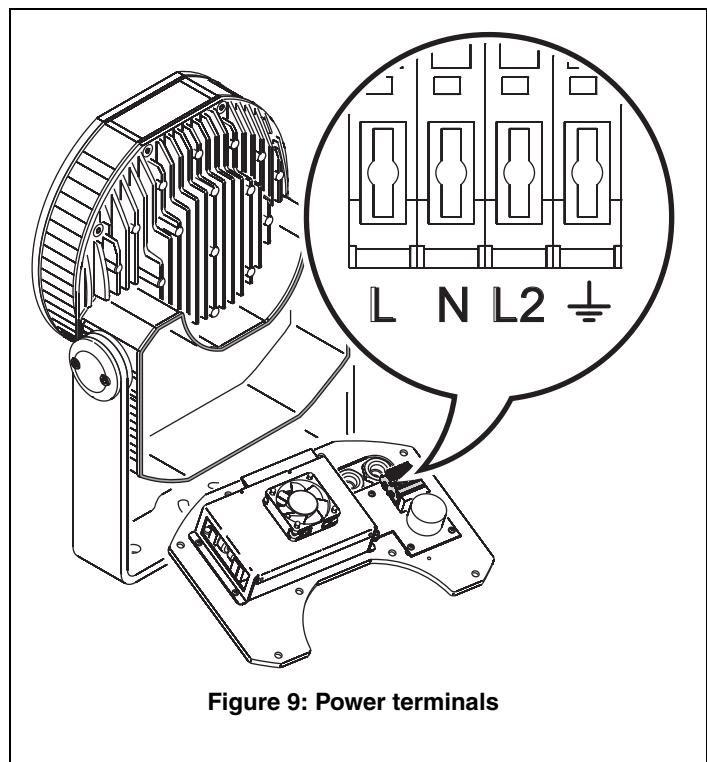
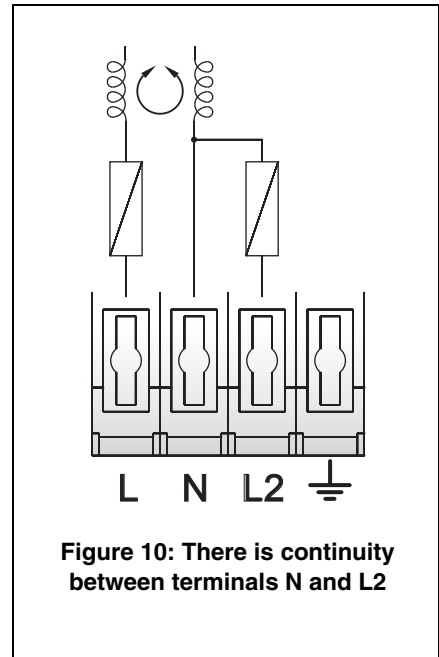


Figure 9: Power terminals

- If using **two phases of a three-phase system** to obtain 200 - 240 V between two phases, connect one phase to terminal **L** and the other phase to terminal **L2**. Do not connect anything to terminal **N**.
 - If using a **single-phase three-wire earthed mid-point system** (used in certain regions of the USA) to obtain 200 - 240 V between two live conductors, connect one live wire to terminal **L** and the other live wire to terminal **L2**. Do not connect anything to terminal **N**.
7. Reinstall the rear cover as follows:
 - a. Read "Managing humidity" on page 7.
 - b. Check that the seal is in perfect condition.
 - c. Place the seal and cover in position and drive the cover screws until they are finger-tight only.
 - d. Cross-tighten the screws evenly in a diagonal pattern, increasing torque gradually in stages to a maximum torque of 8 Nm (5.9 ft.-lbs.).
 8. Screw the new gland into the rear cover until it is tight enough to make a seal. Do not overtighten.
 9. Tighten the dome nut on the cable gland to grip the cable and make a seal before applying power.



Power plug

You may need to fit the supplied power cable with a plug that is suitable for your AC power outlets. If so, install a grounding-type (earthed) plug with integral cable grip that is rated 5 A minimum, following the plug manufacturer's instructions. Table 1 on page 12 shows some possible pin identification schemes; if pins are not clearly identified, or if you have any doubts about proper installation, consult a qualified electrician. Ensure that all connections are sufficiently protected from water.

Control data link

Exterior 400 Range fixtures must be connected via a control data link for DMX controller or synchronized (master/client) operation. The following considerations must be taken into account when planning the data link:

- RS-485 data cable designed for exterior use is required for outdoor installations. RS-485 cable has low capacitance and a characteristic impedance of 85 to 150 Ohms. It is electrically shielded and has at least 1 twisted pair of conductors. The minimum recommended wire size is 0.25 mm² (24 AWG) for runs up to 300 meters (1000 ft.) and 0.32 mm² (22 AWG) for runs up 500 meters (1640 ft). CAT 5 network cable designed for direct burial can be used in outdoor installations, but you are recommended to run it inside conduit.
- The maximum permitted control data cable length before a control signal amplifier is required is 500 meters (1640 ft.).
- Fixtures must be 'daisy-chained', i.e. the data cable must be connected in one single chain of fixtures as shown in Figure 11.
- Each chain may connect a maximum of 32 fixtures.
- An optically isolated amplifier-splitter such as the Martin RS-485 Opto-Splitter (P/N 90758060) must be used to:
 - extend a link beyond 500 meters (1640 ft.)
 - extend the link to include a further maximum 32 fixtures, or
 - branch the link into further single chains, each containing 32 fixtures. The Martin Opto-Splitter allows a link to be branched into four new chains.
- Each chain on the link must be terminated by placing a 120 ohm resistor (available from Martin, P/N 04150308) across the data hot (+) and cold (-) conductors of the last fixture on the chain.
- Long parallel runs of AC power and control data cables may cause interference on the data link and must be avoided. Even if not required by law, use separate conduits for power and data cables.
- One DMX universe has 512 DMX control channels available. If individual control of the fixtures in an installation is required, each fixture must be given its own channels until the limit of 512 is reached. At this point, a new DMX universe must be created before more fixtures can be added.
- The number of fixtures that can be individually controlled in one DMX universe depends on the number of DMX channels they use. If an Exterior 400 fixture is set to HSI mode, for example, that fixture will require 3 DMX channels (one channel for hue, one for saturation and one for intensity). The total number of Exterior 400 Range fixtures set to HSI mode that can be linked in one DMX universe will therefore be $512/3 = 170$ (note that an amplifier-splitter must be used each time the limit of 32 devices on one branch is reached).

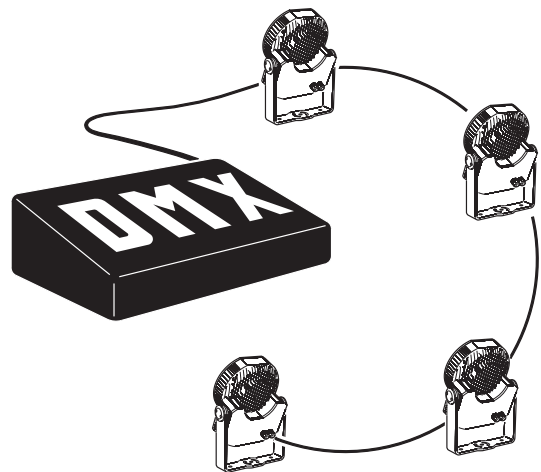


Figure 11: DMX link

Connection pinouts

XLR connection

XLR connectors are suitable if DMX cable is used for the data link. XLR pin numbers are normally marked on connectors. Connectors must be wired using the standard XLR DMX pin-out:

- Pin 1: Cable shield
- Pin 2: DMX Data 1 - (cold)
- Pin 3: DMX Data 1 + (hot)

Pins 4 and 5 on 5-pin XLR connectors are available for Data 2 connections in DMX 512-A or similar systems. They must be wired as follows:

- Pin 4: DMX Data 2 - (cold)
- Pin 5: DMX Data 2 + (hot)

To avoid ground/earth loop interference, ensure that the DMX cable shield does not come into contact with the shell or body of XLR connectors.

RJ-45 connection

RJ-45 connectors are suitable if CAT 5 cable is used for the data link. RJ-45 cable connector pins are numbered from the left looking at the face of the connector with the locking clip on top (see Figure 12). Connectors must be wired according to the 568-B system using the standard RJ-45 pin-out for DMX applications:

- Pin 1 (White/orange): DMX data hot (+)
- Pin 2 (Orange): DMX data cold (-)
- Pins 7 (White/brown) and 8 (Brown): Common

Pins 3 and 6 are available for Data 2 connections in DMX 512-A or similar systems. They must be wired as follows:

- Pin 3 (White/green): Available for Data 2 hot (+)
- Pin 6 (Green): Available for Data 2 cold (-)

Pins 4 and 5 are not used in currently available lighting control systems but can be wired as follows:

- Pin 4 (Blue)
- Pin 5 (White/blue)

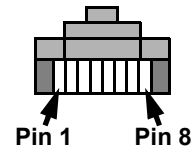


Figure 12: RJ-45 cable connector pins

Connecting the data link



DANGER! Lock out power to the entire installation before working on cables and connections or removing any cover.

Warning! Make sure that data connections are totally protected from water, or moisture may be drawn up the inside of the cable due to the vacuum effect from the heat generated during operation.

The fixture is supplied with a 1.8 meter (5.9 ft.) data cable tail for data connection. The cable contains both input and output conductors that are identified as follows:

- 1 x shield = data input and output common
- 2 x white wires = data input and output hot (+)
- 1 x green wire = data input cold (-)
- 1 x brown wire = data output cold (-)

To connect a fixture to the data link:

1. Connect the conductors in the fixture's cable tail to the data cable respecting the above color code. If required, install input and output connectors on the data cable respecting the pinouts described in "Connection pinouts" on page 15. Standard procedure is to use a male connector on a fixture or its cable tail for data input and a female connector for data output. Do not connect the shield conductor to ground (earth) or allow it to come into contact with a connector shell, as this may cause interference.
2. Protect connectors in a weatherproof housing if they are not totally weatherproof.

Replacing the data cable

If you replace the supplied DMX data cable tail, connect the new cable's conductors to the data terminals as shown in Figure 13 and follow the instructions under "Control data link" on page 15 to ensure correct weatherproofing.

If the new cable is not the same diameter as the supplied cable, or if the cable gland seal is not in perfect condition, install a new rubber seal or complete cable gland.

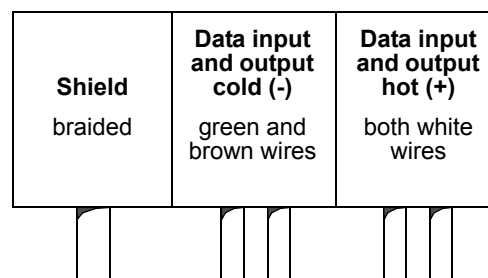


Figure 13: Data terminals

Fixture setup

The Martin MUM (Multi-Utility Manager) application allows you to program and configure Martin Exterior 400 Range fixtures from a laptop PC and features an intuitive GUI (graphic user interface).

Using MUM, you can connect to and set up one fixture at a time. Refer to the MUM user manual for instructions on installing and starting the MUM application.

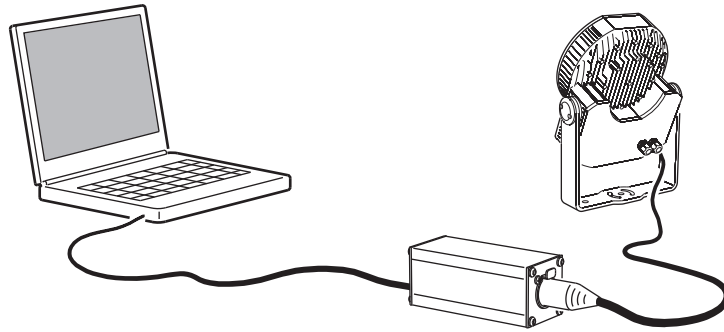


Figure 14: Connecting to a PC with MUM

Connecting a PC with MUM

To connect a PC with MUM to an Exterior 400 Range fixture:

1. Obtain the MUM application, a Martin DABS1 adaptor and interface cables. These are available as a set, P/N 90758090, from Martin.
2. Connect the DABS1 adaptor to your PC using the USB cable.
3. Connect the DABS1 adaptor to the fixture using an XLR connector connected to the data link. Note that you may only connect to one fixture at a time.
4. Apply power to the fixture and start the MUM application. The application will automatically detect the fixture if it is powered on and correctly connected. It will also retrieve and display information and current settings from the fixture.

Configuring a fixture with MUM

Setting the clock

Exterior 400 Range fixtures have a battery-operated 24-hour clock that is used to start and stop stand-alone operation.

To set the clock:

1. Click on the **Fixture Info** button in MUM:

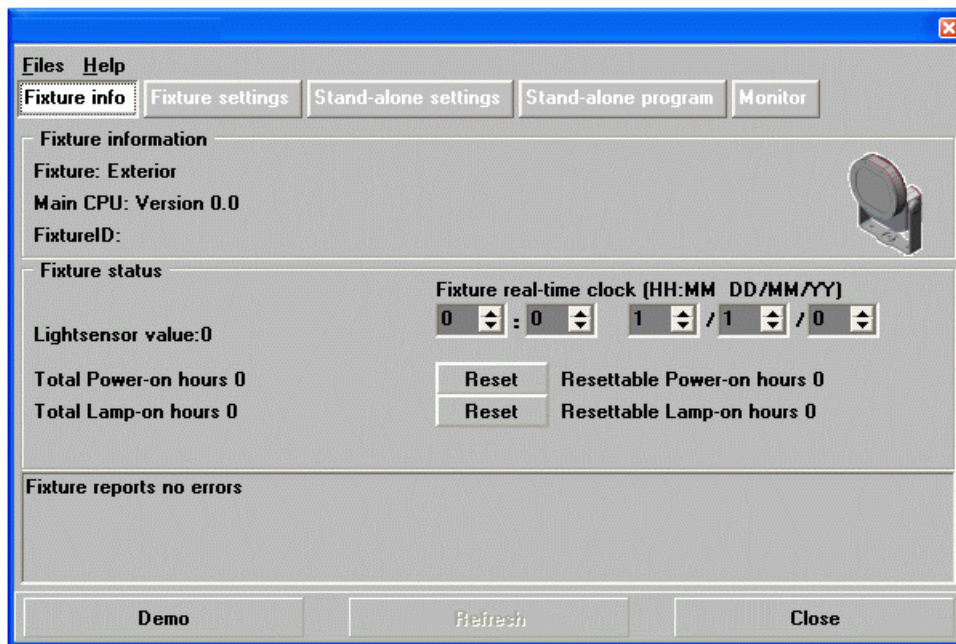


Figure 15: Fixture info window

2. Using the **Fixture real-time clock** spin buttons, set the fixture to the current time (expressed in the 24-hour clock in hours and minutes) and date. The time will be updated in the fixture in real time.

Setting DMX address and DMX control mode

If individual control of each Exterior 400 Range fixtures is required, each fixture must be set up to receive instructions from the DMX controller on a group of DMX channels that are not used by any other device in its DMX universe. The DMX address, also known as the control address or start channel, is the first of these channels. Each fixture uses this channel and the channels immediately above it to receive instructions.

Exterior 400 Range fixtures use 1, 2, 3, or 4 DMX channels, depending on model and DMX color control mode. For example, if a fixture's DMX address is set to 1 and the fixture is in RGB DMX mode, it will use channels 1 - 3. Channel 4 will be available as the DMX address for the next fixture.

If two or more identical fixtures are set up with the same DMX address and in the same DMX mode, they will receive the same instructions and behave identically. Setting up identical fixtures with the same address is a good tool for troubleshooting unexpected behavior and an easy way to achieve synchronized action.

DMX Address

To set the DMX address using MUM, click on the **Fixture settings** button and use the **DMX Address** spin buttons to set the fixture's DMX address. The DMX address will be updated in the fixture in real time.

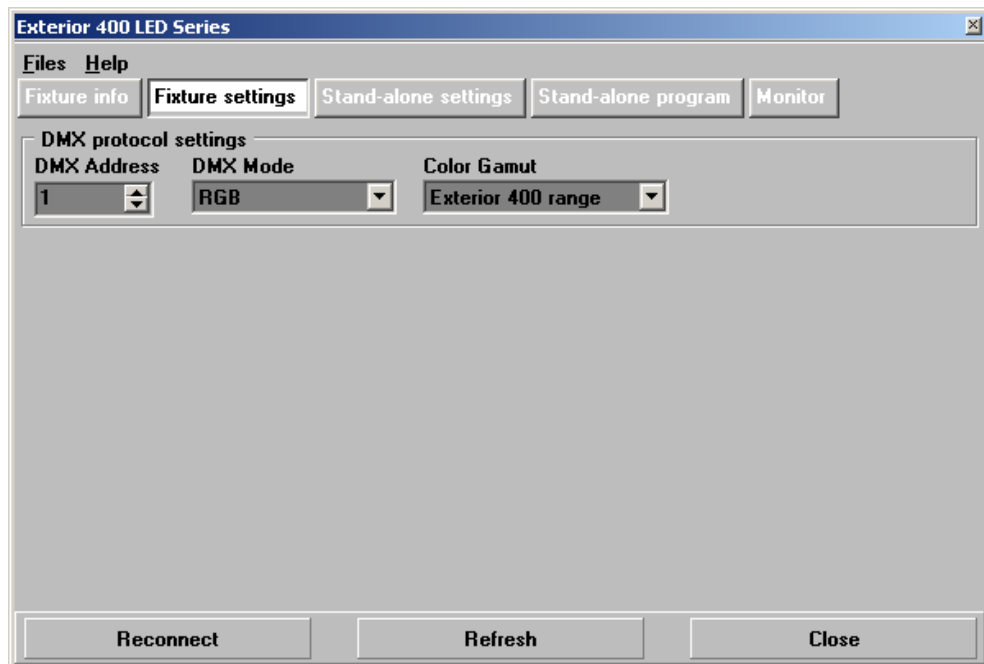


Figure 16: Fixture settings window

DMX Mode

The **DMX Mode** setting allows you to set the fixture to respond in various control modes.

To set the DMX mode using MUM, click on the **Fixture settings** button and use the **DMX Mode** drop-down dialog box to select the desired mode. The DMX mode will be updated in the fixture in real time.

Bear in mind that changing the DMX mode may affect the number of DMX channels the fixture uses.

The following modes are available:

Exterior 400, Exterior 410

- **RAW** (Individual control of red, green, blue and white LED groups - uncalibrated)
- **RGB** (red, green, blue - calibrated, all LEDs including white can be activated to optimize color and intensity)
- **HSI** (hue, saturation, intensity - calibrated)
- **HSIC** (hue, saturation, intensity, color temperature - calibrated)

Exterior 420

- **RAW** (Individual control of warm white and cold white LED groups - uncalibrated)
- **CT** (intensity, color temperature - calibrated)

Exterior 430

In Exterior 430 red, green and blue single-color fixtures, RGB & HSI modes let you fine-tune the fixture's main color by adding a little of the other two primary colors.

- **RGB** (red, green, blue - calibrated if **Color Gamut** set to **Exterior 400 Range**, uncalibrated if **Color Gamut** set to **Fixture**)
- **HSI** (hue, saturation, intensity - calibrated if **Color Gamut** set to **Exterior 400 Range**, uncalibrated if **Color Gamut** set to **Fixture**)
- **I** (intensity - calibrated)

Options for managing color in different fixtures

The different fixture types in the Exterior 400 Range use different LEDs, and it is normal that these have different color gamuts. The **Color Gamut** setting lets you take this into account and set the fixture to either **Exterior 400 Range** or **Fixture**:

- The **Exterior 400 Range** setting sets all Exterior 400 Range fixture types to display colors within the same color gamut (i.e. within the same color saturation limits). The **Exterior 400 Range** setting ensures that the same colors can be obtained from different fixture types, but it limits color saturation if necessary.
- The **Fixture** setting optimizes color saturation for one specific fixture type. Color is identical with other fixtures of the same type, but there may be slight color differences when you try to display the same color close to or at its maximum saturation on different fixture types.

The only exception to this is the Exterior 430, in which the **Fixture** setting is uncalibrated and there may be very slight differences in color with other Exterior 430 fixtures of the same type: For example, two Exterior 430 red fixtures set to **Fixture** may not display exactly the same red. To obtain an identical red, set both fixtures to **Exterior 400 Range**.

Note that the **Color Gamut** setting only affects fixtures when they are set to a DMX mode that is calibrated (see "*DMX Mode*" on page 19) and has no effect on fixtures that are set to **RAW** DMX modes.

A simple formula to obtain the best results:

- ***Use the Exterior 400 Range setting where color evenness across different fixture types (or, in the case of the Exterior 430, across different fixtures) is more important than obtaining maximum color saturation.***
- ***Use the Fixture setting where the installation only consists of one fixture type or where obtaining maximum color saturation is more important than color evenness across different fixture types.***

Operation

Exterior 400 Range fixtures can be operated using a DMX controller or programmed to run a stand-alone light show without DMX control.

Ambient temperatures

The Exterior 400 Range can be operated at ambient temperatures from -30° C (-22° F) to 45° C (113° F). At temperatures below 0° C (32° F), leave the fixture permanently powered on, even if LEDs are dimmed to zero because light output is not required. The standby power will provide a little heat and help protect circuits and components from the effects of low temperature.

DMX control

In DMX-controlled operation, the options available to a DMX controller depend on which DMX mode the fixture is set to (see “DMX Mode” on page 19).

The section “DMX protocols” on page 31 gives details of all the modes available in all the fixtures in the Exterior 400 Range and which DMX channels are used to control color, color temperature and intensity in the different modes.

Stand-alone operation

In stand-alone operation, the fixture executes color changes at set intervals and speeds, at pre-defined periods during the day, and/or when the light level falls below a defined level. The term *stand-alone* means that the Exterior 400 Range is not connected to a control device, but is pre-programmed with a sequence of up to 20 scenes that play continuously in a loop.

Configuring stand-alone settings

First, the fixture needs to be configured to know if and when to activate a stand-alone program. Connect a PC running the MUM application as described in “Connecting a PC with MUM” on page 17, and click on the **Stand-alone settings** button (see Figure 17).

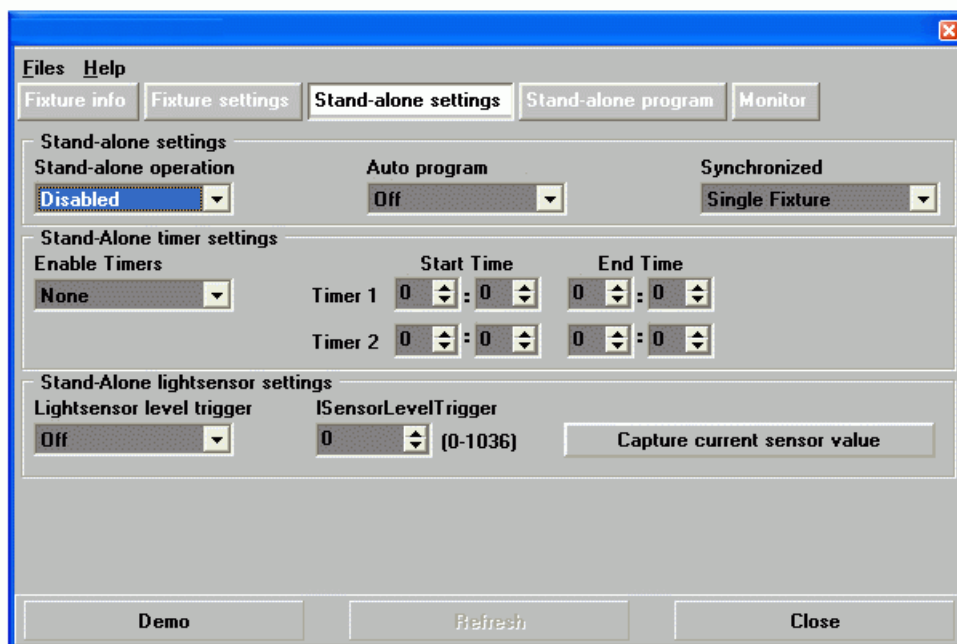


Figure 17: Stand-alone settings window

Stand-alone operation can be set to:

- start automatically as soon as power is applied
- respond to a timer trigger that activates operation for one or two periods in a 24 hour period, or
- respond to a light-level trigger that uses a light sensor to activate operation when ambient light is below a certain level.

If both the timer *and* the light-level trigger are used, operation starts whenever it is darker than the light-level setting, and within the times set.

Enabling stand-alone operation

To enable stand-alone operation, set **Stand-alone operation** to **Enabled**.

Starting automatically

To set stand-alone operation to start automatically, set **Auto program** to **On**. The fixture will now start stand-alone operation automatically as soon as power is applied and no DMX signal is being received.

Setting a timer trigger

To set a timer trigger:

1. Make sure that the correct time has been set on the fixture's built-in clock (see "Setting the clock" on page 18).
2. Select **None**, **Timer 1**, **Timer 2** or **Both Timers** in the **Enable Timers** box.
3. Use the **Start Time** and **End Time** spin buttons to set a period of stand-alone operation on the selected timer(s).

Setting a light-level trigger

To set a light-level trigger:

1. Set **Light level sensor trigger** to **On**.
2. Set the light level that triggers stand-alone operation using the **Trigger level** spin button, or press **Capture current sensor value** to set the current ambient light level to trigger stand-alone operation.

To avoid false triggering by sudden light changes (caused by vehicle headlights or clouds, for example), the light level must remain above or below the trigger threshold for 5 minutes to activate the trigger.

Programming stand-alone operation

About scenes

A stand-alone light show consists of scenes. Each scene is a particular lighting effect with predetermined color, intensity and duration. Up to 20 scenes can be programmed into the Exterior 400 Range's program memory.

Each scene has a dynamic part – the fade – during which effects move to the scene's programmed positions, and a static part – the wait – where effects do not change.

The duration of the fade and wait is programmed individually for each scene. The fade time may be 0 - 120 seconds; the wait time may be 1 second to 12 hours. The total time it takes a scene to execute is the sum of the fade and wait times.

Programming scenes

To program a scene:

1. click on the **Stand-alone program** button (see Figure 19).
2. Depending on which DMX mode the fixture is set to, the stand-alone programming window will show columns for RGB, RGBAW, HSI or HSIC. Apply values by setting levels in each column.

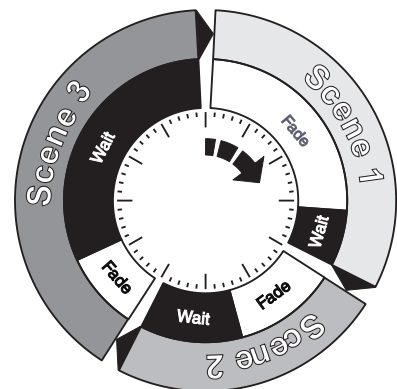


Figure 18: Scene timing

3. Select a fade time and a wait time for the scene.

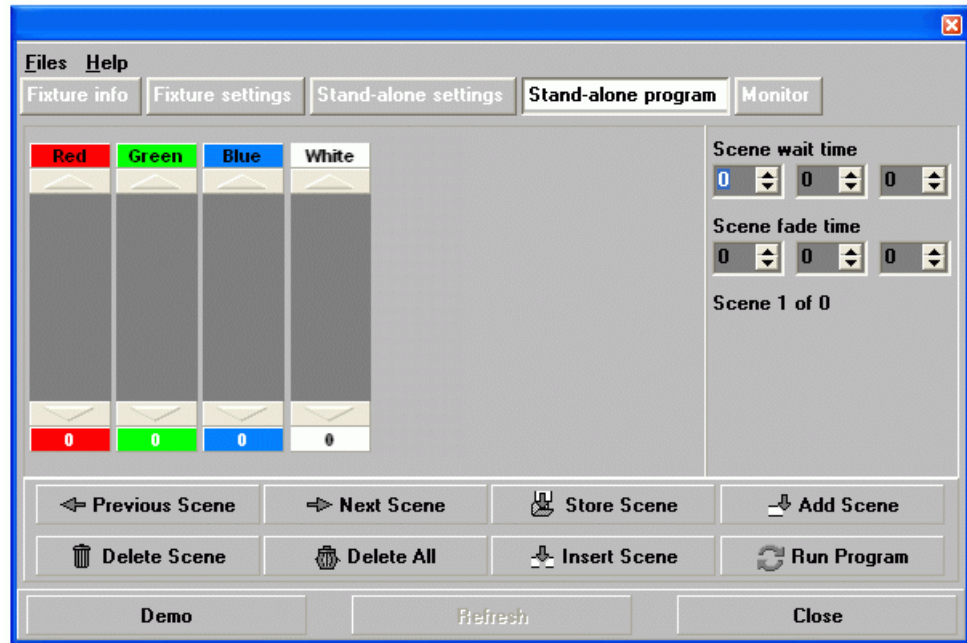


Figure 19: Stand-alone programming window

Scene management

Once you have specified values for the effects and fade and wait times for the scene, you can store and manage scenes using the commands available at the bottom of the **Stand-alone program** window:

Store scene	Save settings in the current scene.
Add scene	Save settings in a new scene at the end of the current sequence of scenes.
Insert scene	Save settings in a new scene before the current scene. <i>Tip: Think of the Add and Insert commands as Save commands, to be used as the last step after programming all effects.</i>
Delete scene	Remove the current scene from memory. Scenes after the deleted scene are renumbered.
Next scene	Step to the next scene.
Previous scene	Step to the previous scene.
Delete all	Remove all scenes from the fixture's memory.
Run program	Run the scenes in the programmed light show.

When the program is run by applying the **Run program** command, scenes execute in a continuous, ascending loop.

Synchronizing stand-alone operation

If you are running multiple fixtures on a data link, you can synchronize action so that all fixtures start their programmed shows and start fading to the next scene at the same time.

Setting master and client fixtures

In synchronized operation, one fixture is set as the master and the others are set as clients. Each fixture must be programmed with its own show. When the master fades to the next scene or starts its show from the beginning again, it tells each client fixture to fade to its next scene or start its show again. In other words, each client fixture will run its show repeatedly in a cycle, changing scene when prompted to by the master, until the master finishes its own show and signals that all fixtures should start from the first scene once again.

Before running synchronized operation, you must set fixtures to one of the following in the **Synchronized** drop-down dialog box (see Figure 17):

- **Single Fixture:** operates in stand-alone mode independently of other fixtures
- **Master:** sends trigger signals to other fixtures, or
- **Synchronized:** client – receives trigger signals from master fixture.

No more than one fixture may be the master. Any fixture on the link, regardless of its position, may be the master. All other fixtures must be set as clients.

Combining with other fixtures

An Exterior 400 Range running a stand-alone show can perform synchronized scene changes with other Exterior 400 Range fixtures as well as Martin fixtures of the following types:

- Exterior 200 LED
- Exterior 1200 Wash
- Exterior 1200 Image Projector
- Exterior 200
- Exterior 600
- Exterior 600 Compact
- Inground 200 CMY
- Inground 200 6-Color
- FiberSource CMY150
- Imager range
- Alien O2 range
- MiniMAC Maestro
- smartMAC

Stand-alone programming tips

If you want to keep things as simple as possible when programming synchronized operation, ensure that:

1. Every fixture has the same number of scenes.
2. Scene times are a few seconds longer on the master fixture than on client fixtures (this will ensure that client fixtures always have time to finish scenes before the master tells them to start the next scene).

It is important to note that the only commands transmitted by the master are scene change and show start commands. No data about the *appearance* of the scene is transmitted between fixtures.

If you are programming a group of fixtures to perform the same scenes with synchronized master/client triggering, we recommend that you:

1. Use MUM to program a show on one client fixture
2. Download and save this fixture's memory (program and settings) to your PC using MUM's Files menu (see Figure 20), and then
3. Upload the program and settings to each subsequent fixture that you connect to.

For a more detailed explanation of synchronized operation and how advanced effects can be created by programming fixtures with a different number of scenes, see the next section.

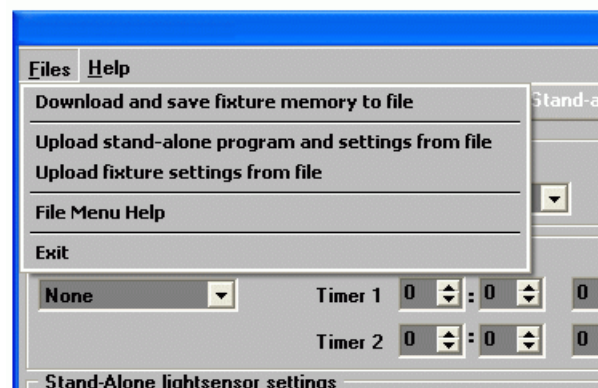


Figure 20: Managing fixture settings and stand-alone programs as files

Synchronized stand-alone operation: detailed description

Note: *This section gives advanced information about stand-alone synchronized operation. You only need to read it if you require help with problem diagnosis or if you want to program advanced synchronized light shows.*

The principles in stand-alone synchronized operation are as follows:

1. A scene contains a fade section, followed by a wait section
2. Each fixture can be individually programmed with up to 20 scenes, and each scene can have its own individual fade and wait times.
3. Scenes are numbered from 0 to 19.
4. In synchronized operation, one master fixture issues commands to the other client fixtures to “go to scene xx”, where xx is the scene number that the master will execute next.
5. If a client has fewer scenes than the master, it will derive which scene to go to by dividing the number of the scene it has been commanded to go to (scene 5, for example) by the total number of scenes that the

client fixture has (4, for example) in whole numbers (no decimal places). In this example 5 divided by 4 results in 1, with 1 remainder. This remainder will be the number of the scene that the client fixture starts - scene 1. Generally though, when a Client fixture reaches its own last scene before the Master fixture, a "go to scene xx" message will result in the first scene being played.

- If a client has more scenes than the master calls, the last scenes in the client will never be executed, as is the case with scene S4 in the following example.

F=fade, W=wait Timeline =>

	M0	M1	M2	M3	
Programmed in Master	F W	F W	F W	F W	
	S0	S1	S2	S3	S4
Programmed in Client	F W	F W	F W	F W	F W
	M0	M1	M2	M3	
Result	F W	F W	F W	F W	
	S0	S1	S2	S3	
	F W	F W	F W	-- -- F W	

- In synchronized operation, the wait time is determined by the master. Every client fixture fades and waits at its own rate and then remains in the "wait" state until it receives a "start scene xx" command from the master.
- A client fixture will not listen for the next message from the master fixture before it has finished its current scene. This may result in a client skipping a scene if the client has a longer scene time than the master. Note that in the following example, the scenes in the client run out of their programmed sequence because scenes 0 and 2 on the client are longer than the corresponding scenes on the master.

M=master, S=client
F=fade, W=wait Time >

	M0	M1	M2		
Programmed Master	F W	F W	F W		
	S0	S1	S2		
Client	F W	F W	F W		
	M0	M1	M2	M0	M1
Result Master	F W	F W	F W	F W	F W
	S0	S2		S1	
Client	F W	F W	-- --	F W	-- --

Service and maintenance



DANGER! Read “Safety Information” on page 3 before carrying out service or maintenance work on the Exterior 400 Range. Lock out power to the entire distribution system before servicing or opening any cover.

Important! The Exterior 400 Range requires regular service and maintenance to maintain reliable operation and protect the investment it represents. Excessive dirt 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! As with electronic components in general, Exterior 400 Range fixture PCBs are sensitive to ESD (electrostatic discharge). Take precautions to avoid ESD damage during service.

The service and maintenance procedures described in this section must be carried out by qualified professionals only. Any service procedures not described in this section must be carried out by the Martin Service organization or its authorized agents.

It is Martin policy to use the best quality materials available to ensure optimum performance and the longest possible component lifetimes. However, optical components in all lighting fixtures are subject to wear and tear over the life of the fixture, resulting in gradual changes in color rendition, for example. The extent of wear and tear depends heavily on operating conditions, maintenance and environment, so it is impossible to specify precise lifetimes for optical components. However, you will eventually need 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.

When installing front and rear covers, use a torque driver and cross-tighten screws (tighten screws opposite each other gradually in steps, working around the cover). Tighten front and rear cover screws to 8 Nm (5.9 ft.-lbs.).

Cleaning

Regular cleaning is essential for fixture life and performance. Buildup of dust and dirt degrades the fixture's light output and cooling ability.

Cleaning schedules will vary greatly depending on the operating environment. It is therefore impossible to specify precise cleaning intervals for the Exterior 400 Range. Inspect fixtures within their first few weeks 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.

Do not use products that contain solvents, abrasives or caustic agents for cleaning, as they can cause surface damage to the fixture.



Warning! Do not use a high-pressure water jet for cleaning. Take care not to damage seals and wiring during cleaning.

The Exterior 400 Range's aluminum housing and front glass can be cleaned with mild detergents such as those for washing cars. To clean the housing and front glass:

1. Isolate the fixture from AC power and allow the fixture to cool for 20 minutes.
2. Visually check that the silicone seals are in good condition. If any seal shows signs of damage or loss of water resistance, stop cleaning the fixture and contact a Martin authorized service technician for seal replacement.
3. If seals are in good condition, rinse off loose dirt with a hosepipe or low-pressure water spray. Do not spray water into the heat exchanger.
4. Wash the aluminum housing and front glass using warm water with a little mild detergent and a soft brush or sponge. Do not use abrasive cleaners.
5. Rinse with clean water and wipe dry.

Installing and removing a diffuser filter

Important! *Install diffuser filter sheets with the matt, textured surface facing in towards the LEDs and the shiny surface against the front glass.*

Exterior 400 Range fixtures are supplied with no diffuser filter installed and narrow, medium and wide diffuser filters packed separately with each product. Diffuser filters soften the output from the LEDs and alter the beam angle. See Figure 22. Diffuser filters are marked with notches to identify them.

To install a diffuser filter:

1. Isolate the fixture from power. If the fixture has been in use, allow it to cool for at least 20 minutes.
2. See Figure 21. Remove the front cover screws and front cover with its seal.
3. Loosen the two diffuser retaining clips on the inner side of the front cover.
4. Slide in the new filter so that the matt, textured side will face towards the LEDs, and the shiny side will face towards the front glass.
5. Make sure that the edges of the diffuser locate under the diffuser retaining clips, then tighten the clips so that the filter is pressed flat against the front glass.
6. Reinstall the front cover as follows:
 - a. Read "Managing humidity" on page 7.
 - b. Check that the seal is in perfect condition.
 - c. Place the seal and cover in position and drive the cover screws until they are finger-tight only.
 - d. Cross-tighten the screws evenly in a diagonal pattern, increasing torque gradually in stages to a maximum torque of 8 Nm (5.9 ft.-lbs.). See example tightening order in Figure 21. Do not over-tighten, or the front glass may break.
7. Reapply power.

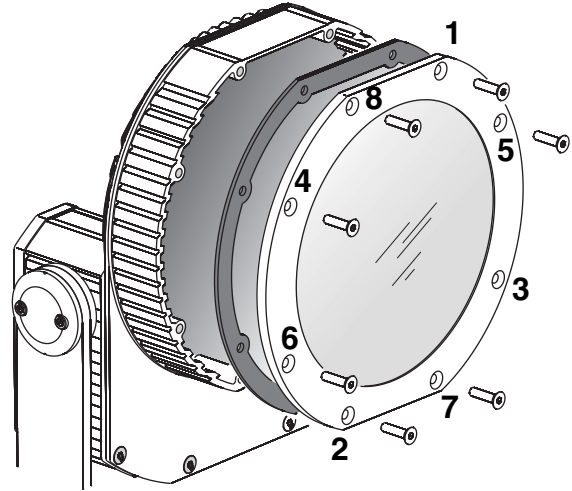


Figure 21: Front cover screws and seal

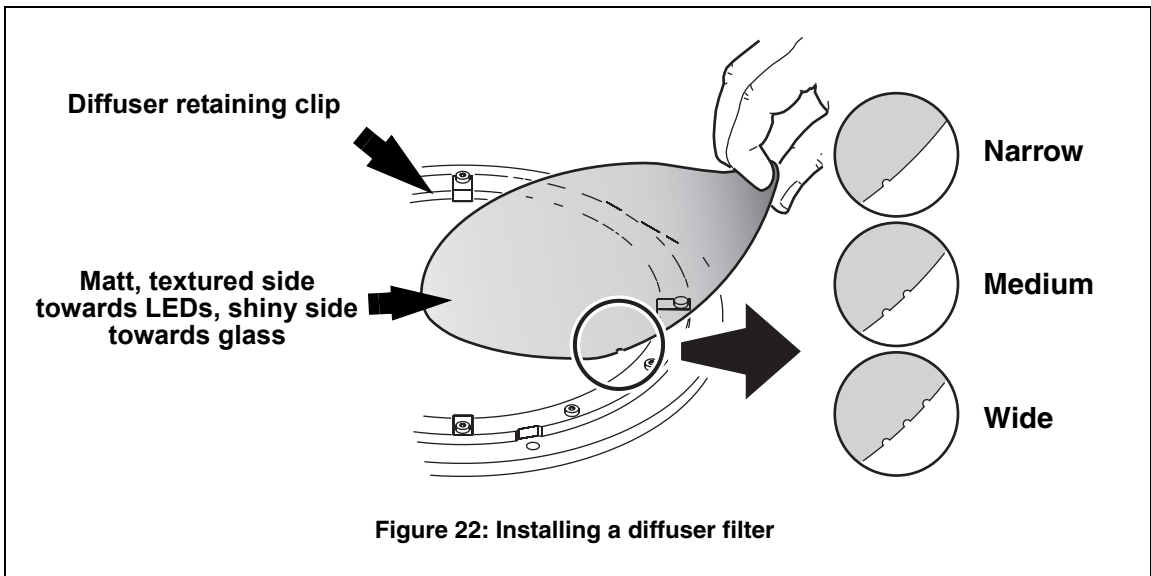


Figure 22: Installing a diffuser filter

Fuse replacement



DANGER! Lock out power to the entire distribution system before servicing or opening any cover. Replace fuses with ones of the same type and rating only.

Primary fuse



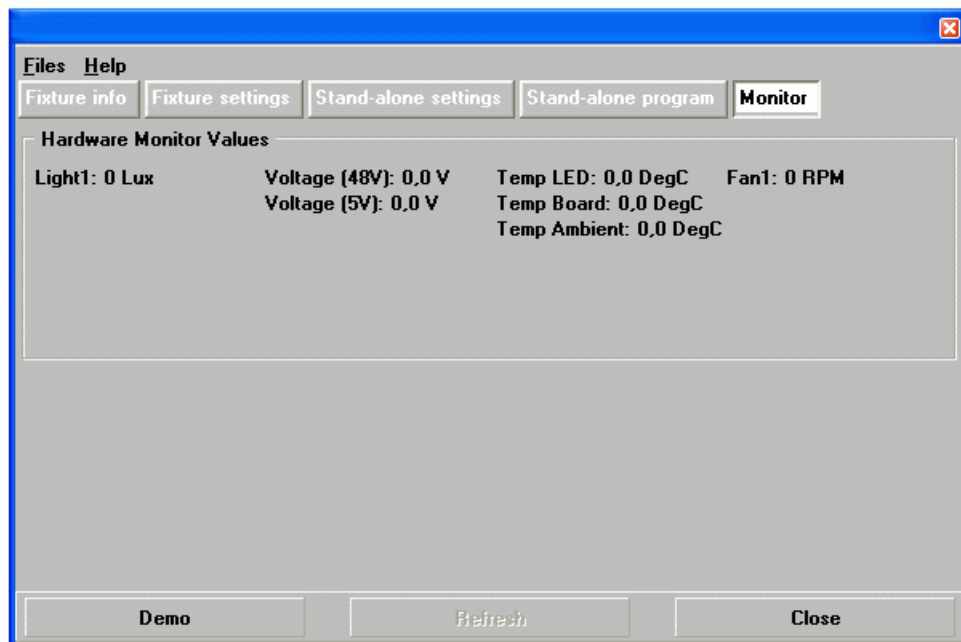
Exterior 400 Range fixtures are protected by a 2.5 amp slow-blow primary fuse located on the power PCB. If a fixture is completely dead, the primary fuse may have blown.

To replace the primary fuse:

1. Isolate the fixture from power and allow to cool for 20 minutes.
2. Open the rear cover (see Figure 8 on page 13).
3. Replace a defective fuse with one of the same type and rating only. Replacement primary fuses are available from Martin suppliers (P/N 05020010).
4. Reinstall the rear cover as follows:
 - a. Read "Managing humidity" on page 7.
 - b. Check that the seal is in perfect condition.
 - c. Place the seal and cover in position and drive the cover screws until they are finger-tight only.
 - d. Cross-tighten the screws evenly in a diagonal pattern, increasing torque gradually in stages to a maximum torque of 8 Nm (5.9 ft.-lbs.).
5. Reapply power.

Fixture readouts in MUM

Various types of data can be displayed by connecting a PC as described in "Connecting a PC with MUM" on page 17 and clicking on the **Monitor** button:



Light1 displays the light level currently measured by light sensor 1 on the back of the fixture.

Voltage displays the current voltage in 48 V and 5 V circuits on the main PCB (this data is for service purposes).

Temp displays the current temperature on the LED circuit board that gives the highest reading, the current main PCB temperature and the current ambient temperature.

Fan1 displays the current cooling fan speed in RPM (revolutions per minute).

Software installation

It may be necessary to upload new software (i.e. firmware) to an Exterior 400 Range fixture if you believe that the product has a software-related fault or if you want to update to a newer version. Software updates are available from the Martin website (<http://www.martin.com>) and can be installed via the DMX data link with the following items:

- The Martin Uploader application, version 5.0 or later, downloadable free of charge from the Support area of the Martin website.
- The fixture's main CPU software update file, downloadable free of charge from the Support area of the Martin website (this file can be downloaded automatically from within the Martin Uploader application)
- A Martin Universal USB-DMX Interface or similar PC/fixture hardware interface and a Windows PC (if you have a Martin MP-2 Uploader device, it can also be used).

Installing software: normal method

1. Connect the uploader hardware to a Exterior 400 Range fixture's data input connector. The software will be uploaded to that fixture and all fixtures of the same type that are powered on and connected via the DMX link.
2. Upload the fixture software as described in the uploader's help file or user documentation.
3. Disconnect the uploader hardware and reconnect the fixture to the DMX link.
4. Cycle power off and on. Check that the fixture resets correctly. If an error message appears in the display, cycle power off and on again and check that the fixture now resets correctly.

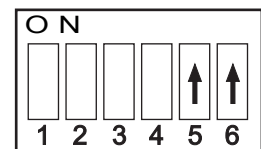
Installing software: boot mode upload

A boot mode upload may be required if the software update notes call for it or if the fixture software is seriously corrupted and the fixture will not accept a software upload using the normal method described above.

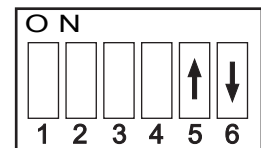
To carry out a boot mode upload:

1. Isolate the fixture from power and allow to cool for at least 20 minutes.
2. Open the rear cover (see Figure 8 on page 13).
3. Locate the DIP switch on the main PCB and move pin 6 to OFF.
4. Reinstall the rear cover seal and the rear cover temporarily.
5. Reapply power and perform the upload as described above.
6. Isolate from power, open the rear cover and move DIP pin 6 back to ON.
7. Reinstall the rear cover as follows:
 - a. Check that the seal is in perfect condition.
 - b. Place the seal and cover in position and drive the cover screws until they are finger-tight only.
 - c. Cross-tighten the screws evenly in a diagonal pattern, increasing torque gradually in stages to a maximum torque of 8 Nm (5.9 ft.-lbs.).
8. Reapply power.
9. Check that the fixture resets correctly. If an error occurs, cycle power off and on again and check that the fixture now resets correctly.

Normal DIP switch setting



DIP switch setting for boot mode upload



Details corrected in manual Rev. D

Status indicators

Two LEDs on the rear cover give information about fixture status.

LED 1 (Fixture status)

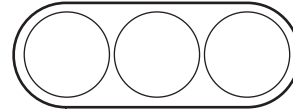
- Flashes red if an error occurs that requires service intervention.
- Lights steady green when the fixture is ready for operation.
- Lights steady yellow during a software upload.
- Flashes yellow while the fixture is resetting.

LED 2 (DMX status)

- Lights steady red if the fixture receives data it cannot recognize.
- Lights steady green when the fixture is successfully receiving a DMX signal.
- Flashes green when the fixture is successfully receiving a data signal.
- Lights steady yellow during a software upload.
- Flashes yellow while the fixture is resetting.

	LED 1 (Fixture)		LED 2 (DMX)	
	On	Flash	On	Flash
Red	—	Error	Illegal data	—
Green	Ready	—	DMX ok	Data ok
Yellow	Upload	Reset	Upload	Reset

No light in LED1 = No power No light in LED2 = No DMX



LED 1 LED 2 Sensor

DMX protocols

Exterior 400, Exterior 410

RAW mode, uncalibrated

Start code = 0

Channel	Value	Percent	Function
1	0 - 255	0 - 100	Red Intensity 0 →100%
2	0 - 255	0 - 100	Green Intensity 0 →100%
3	0 - 255	0 - 100	Blue Intensity 0 →100%
4	0 - 255	0 - 100	White Intensity 0 →100%

RGB mode, calibrated

All LEDs – including white – can be activated to obtain the calibrated target color at maximum intensity.

Start code = 0

Channel	Value	Percent	Function
1	0 - 255	0 - 100	Red Intensity 0 →100%
2	0 - 255	0 - 100	Green Intensity 0 →100%
3	0 - 255	0 - 100	Blue Intensity 0 →100%

HSI mode, calibrated

Start code = 0

Channel	Value	Percent	Function
1	0 - 255	0 - 100	Hue Red → Orange → Yellow → Green → Cyan → Blue → Indigo → Violet → Magenta → Red
2	0 - 255	0 - 100	Saturation Zero (white) → Full
3	0 - 255	0 - 100	Intensity Intensity 0 →100%

HSIC mode, calibrated

Start code = 0

Channel	Value	Percent	Function
1	0 - 255	0 - 100	Hue Red → Orange → Yellow → Green → Cyan → Blue → Indigo → Violet → Magenta → Red
2	0 - 255	0 - 100	Saturation Zero (white) → Full saturation
3	0 - 255	0 - 100	Intensity Intensity 0 → 100%
4	0 - 255	0 - 100	Color Temperature Control Warm → cold

Exterior 420

RAW mode, uncalibrated

Start code = 0

Channel	Value	Percent	Function
1	0 - 255	0 - 100	Warm white Intensity 0 → 100%
2	0 - 255	0 - 100	Cold white Intensity 0 → 100%

CT mode, calibrated

Start code = 0

Channel	Value	Percent	Function
1	0 - 255	0 - 100	Intensity Intensity 0 → 100%
2	0 - 255	0 - 100	Color temperature control 2700 → 6500 K

Exterior 430

I (Intensity) mode (red, green, blue, warm white and cold white fixtures)

Red, green and blue fixtures are calibrated if **Color Gamut** is set to **Exterior 400 Range** and uncalibrated if **Color Gamut** is set to **Fixture**.

Cold white and warm white fixtures are uncalibrated and **Color Gamut** is disabled.

Start code = 0

Channel	Value	Percent	Function
1	0 - 255	0 - 100%	Single color Intensity 0 →100%

RGB mode (red, green and blue fixtures only)

Red, green and blue fixtures are calibrated if **Color Gamut** is set to **Exterior 400 Range**, uncalibrated if **Color Gamut** is set to **Fixture**.

The main fixture color is dominant, the two auxiliary colors are intended for fine-tuning the main color.

Start code = 0

Channel	Value	Percent	Function
1	0 - 255	0 - 100	Red Intensity 0 →100%
2	0 - 255	0 - 100	Green Intensity 0 →100%
3	0 - 255	0 - 100	Blue Intensity 0 →100%

HSI mode (red, green and blue fixtures only)

Red, green and blue fixtures are calibrated if **Color Gamut** is set to **Exterior 400 Range**, uncalibrated if **Color Gamut** is set to **Fixture**.

The main fixture color is dominant, the two auxiliary colors are intended for fine-tuning the main color hue.

Start code = 0

Channel	Value	Percent	Function
1	0 - 255	0 - 100	Hue Variable within color fine-tuning range
2	0 - 255	0 - 100	Saturation Variable 0 →100%
3	0 - 255	0 - 100	Intensity Variable 0 →100%

Troubleshooting

Problem	Probable cause(s)	Remedy
Fixture is completely dead.	No power to fixture.	Check power and connections.
	Primary fuse blown.	Isolate fixture from power. Check fuse and replace.
One or more fixtures responds incorrectly to control or does not respond at all.	Fault on DMX link.	Inspect connections and cables. Correct poor connections. Repair or replace damaged cables.
	Incorrect fixture addressing.	Check fixture is set to correct DMX mode. Check number of channels required by fixture's DMX mode and check fixture addresses.
	Fixture defective.	Have faulty fixture serviced by Martin service technician.
	Other device on DMX link defective.	Bypass devices on DMX link until the faulty device has been identified. Have faulty device tested and serviced by Martin service technician or device supplier.
LEDs cut out intermittently.	Fixture is too hot.	Ensure free airflow around fixture. Clean fixture. Check that ambient temperature does not exceed maximum permitted level. Contact Martin for service.
LEDs give uneven color from fixture type to fixture type.	One or more fixtures set to Fixture color gamut.	Set all fixtures to Exterior 400 Range color gamut with Martin MUM application.

Table 2: Troubleshooting

Specifications

Physical

Length	169 mm (6.7 in.) including cable gland
Width	307 mm (12.1 in.)
Height	401 mm (15.8 in.)
Weight	7.6 kg (16.8 lbs.) including bracket
Supplied power cable external diameter	9.5 mm (0.37 in.)
Supplied data cable external diameter	6.5 mm (0.25 in.)

Dynamic Effects

Exterior 400, Exterior 410

Color mixing	RGBW
Red	.0 - 100%
Green	.0 - 100%
Blue	.0 - 100%
White	.0 - 100%

Exterior 420

Color temperature control	2700 - 6500 K
Warm white (2700 K in Calibrated mode)	.0 - 100%
Cold white (6500 K in Calibrated mode)	.0 - 100%

Exterior 430

All Exterior 430 fixtures

Red, green, blue, warm white (2700 K) or cold white (6500 K) depending on model	.0 - 100%
---	-----------

Red, green and blue fixtures only

Red, green or blue depending on model	Single color fine-tuning
---------------------------------------	--------------------------

Control and Programming

Exterior 400, Exterior 410

Color control modes	RAW, RGB, HSI, HSIC
DMX channels	3 or 4

Exterior 420

Color temperature control modes	RAW, CTC
DMX channels	2

Exterior 430

Control modes	I, RGB, HSI (RGB and HSI allow color fine-tuning on red, green & blue models)
DMX channels	1 or 3

Exterior 400 Range (Exterior 400, 410, 420 & 430)

Control options	DMX, stand-alone, synchronized (master/client)
DMX address setting and setup	PC with Martin MUM software and DABS1 hardware interface
Stand-alone trigger options	Internal timer and/or ambient light level
Stand-alone and master/client programming	PC with Martin MUM software and DABS1
Protocol	USITT DMX512-A
Receiver	RS-485
Firmware update	Serial upload via DMX link

Photometric Data

Light source	Exterior 410 = Cree MC-E; other fixtures = Cree XP-E high power emitters
Half-peak angle	21° with narrow diffuser

Construction

Color	Clear anodized, white or black
Housing	Anodized aluminum
Mounting bracket	.8 mm (0.3 in.) anodized aluminum
Front glass	6 mm (0.2 in.) anti-reflection coated
Protection rating	IP 65

Installation

Orientation	Any
Mounting	Flat surface at any angle, pedestal or other suitable support
Vertical aiming	330°
Minimum distance to illuminated surfaces	0.1 m (4 inches)

Connections

Power cable entry	IP68 cable gland
Power connection	1.8 m (5.9 ft.) cable tail
Data cable entry	IP68 cable gland
Data connection	1.8 m (5.9 ft.) combined input + output cable tail

Electrical

AC power	100-240 V nominal, 50/60 Hz
Power supply unit	Integrated, auto-sensing multi-voltage
Main fuse	2.5 AT (slow blow)

Typical power and current

100 V, 50 Hz	139 W, 1.4 A, PF = 0.990
100 V, 60 Hz	139 W, 1.4 A, PF = 0.989
110 V, 60 Hz	137 W, 1.3 A, PF = 0.988
120 V, 60 Hz	136 W, 1.2 A, PF = 0.986
208 V, 60 Hz	133 W, 0.7 A, PF = 0.932
230 V, 50 Hz	132 W, 0.7 A, PF = 0.925
240 V, 50 Hz	131 W, 0.7 A, PF = 0.886

Measurements made at nominal voltage with all LEDs at full intensity. Allow for a deviation of +/- 10%.

Thermal

Cooling	Convection
Maximum ambient temperature (Ta max.)	45° C (113° F)
Minimum ambient temperature (Ta min.)	-30° C (-22° F)
Maximum surface temperature, steady state, Ta=40° C	90° C (194° F)
Total heat dissipation (calculated, +/- 10%)	860 BTU/hr.

Approvals



EU safety	EN 60598-2-5 (EN 60598-1), IEC/EN 60825-1
EU EMC	EN 55103-1, EN 55103-2, EN 61000-3-2, EN 61000-3-3
US safety (US models)	UL 1598
Canadian safety (US models)	CAN/CSA C.22.2 No. 250
Australia/NZ	C-TICK N4241

Included items

Adjustable mounting yoke
Narrow, medium and wide diffusers
Power cable tail, 1.8 m (5 ft. 10 in.), Ø 9.5 mm (0.37 in.), installed
Data cable tail, 1.8 m (5 ft. 10 in.), Ø 6.5 mm (0.25 in.), installed

Accessories

Exterior 200/400 extended mounting yoke	P/N 21080030
Exterior 200/400 floor stand	P/N 91611305
Safety eyebolt	P/N 91611239
Narrow beam angle kit (diffuser)	P/N 41600122
Medium beam angle kit (diffuser)	P/N 41600123
Wide beam angle kit (diffuser)	P/N 41600124
3-pin male XLR connector, cable-type, IP65	P/N 91611306
3-pin female XLR connector, cable-type, IP65	P/N 91611307

Spare parts

2.5 AT main fuse	P/N 05020010
------------------	--------------

Related items

Martin DABS1™ USB-DMX Hardware Interface	P/N 90758090
Martin USB Tools™ package including MUM™ application	Free download from www.martin.com

Ordering Information

Exterior 400™

Exterior 400 EU model (aluminum)	P/N 90545050
Exterior 400 US model (aluminum)	P/N 90545150
Exterior 400 EU model (black)	P/N 90545060
Exterior 400 US model (black)	P/N 90545160
Exterior 400 EU model (white)	P/N 90545070
Exterior 400 US model (white)	P/N 90545170

Exterior 410™

Exterior 410 EU model (aluminum)	P/N 90545053
Exterior 410 US model (aluminum)	P/N 90545151
Exterior 410 EU model (black)	P/N 90545061
Exterior 410 US model (black)	P/N 90545161
Exterior 410 EU model (white)	P/N 90545071
Exterior 410 US model (white)	P/N 90545171

Exterior 420™

Exterior 420 EU model (aluminum)	P/N 90545051
Exterior 420 US model (aluminum)	P/N 90545152
Exterior 420 EU model (black)	P/N 90545062
Exterior 420 US model (black)	P/N 90545162
Exterior 420 EU model (white)	P/N 90545072
Exterior 420 US model (white)	P/N 90545172

Exterior 430™

Exterior 430 Red, EU Model, Aluminum	P/N 90545052
Exterior 430 Red, US Model, Aluminum	P/N 90545153
Exterior 430 Red, EU Model, Black	P/N 90545063
Exterior 430 Red, US Model, Black	P/N 90545163
Exterior 430 Red, EU Model, White	P/N 90545073
Exterior 430 Red, US Model, White	P/N 90545173
Exterior 430 Green, EU Model, Aluminum	P/N 90545054
Exterior 430 Green, US Model, Aluminum	P/N 90545154
Exterior 430 Green, EU Model, Black	P/N 90545064
Exterior 430 Green, US Model, Black	P/N 90545164
Exterior 430 Green, EU Model, White	P/N 90545074
Exterior 430 Green, US Model, White	P/N 90545174
Exterior 430 Blue, EU Model, Aluminum	P/N 90545055
Exterior 430 Blue, US Model, Aluminum	P/N 90545155
Exterior 430 Blue, EU Model, Black	P/N 90545065
Exterior 430 Blue, US Model, Black	P/N 90545165
Exterior 430 Blue, EU Model, White	P/N 90545075
Exterior 430 Blue, US Model, White	P/N 90545175
Exterior 430 Cold White (6500 K), EU Model, Aluminum	P/N 90545056
Exterior 430 Cold White (6500 K), US Model, Aluminum	P/N 90545156
Exterior 430 Cold White (6500 K), EU Model, Black	P/N 90545066
Exterior 430 Cold White (6500 K), US Model, Black	P/N 90545166
Exterior 430 Cold White (6500 K), EU Model, White	P/N 90545076
Exterior 430 Cold White (6500 K), US Model, White	P/N 90545176
Exterior 430 Warm White (2700 K), EU Model, Aluminum	P/N 90545057
Exterior 430 Warm White (2700 K), US Model, Aluminum	P/N 90545157
Exterior 430 Warm White (2700 K), EU Model, Black	P/N 90545067
Exterior 430 Warm White (2700 K), US Model, Black	P/N 90545167
Exterior 430 Warm White (2700 K), EU Model, White	P/N 90545077
Exterior 430 Warm White (2700 K), US Model, White	P/N 90545177

Specifications subject to change without notice.

Data is valid for all models in range except where indicated.

See www.martin.com for latest specifications including full photometric data, LED lifetimes, etc.



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