

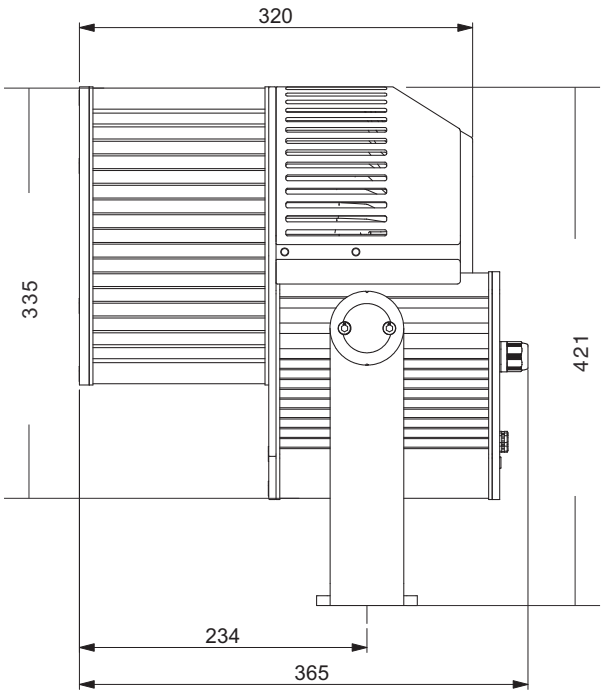


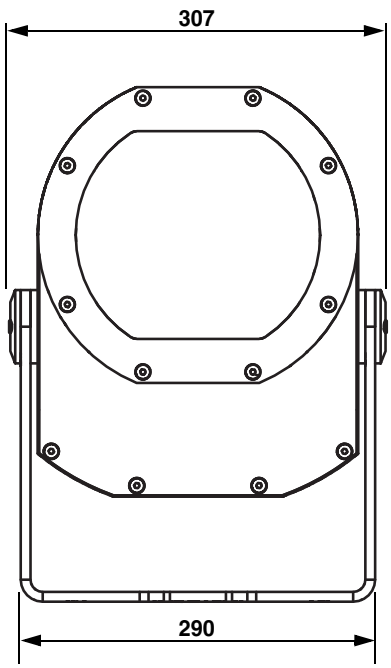
Exterior 400 Image Projector™ user manual

Martin®

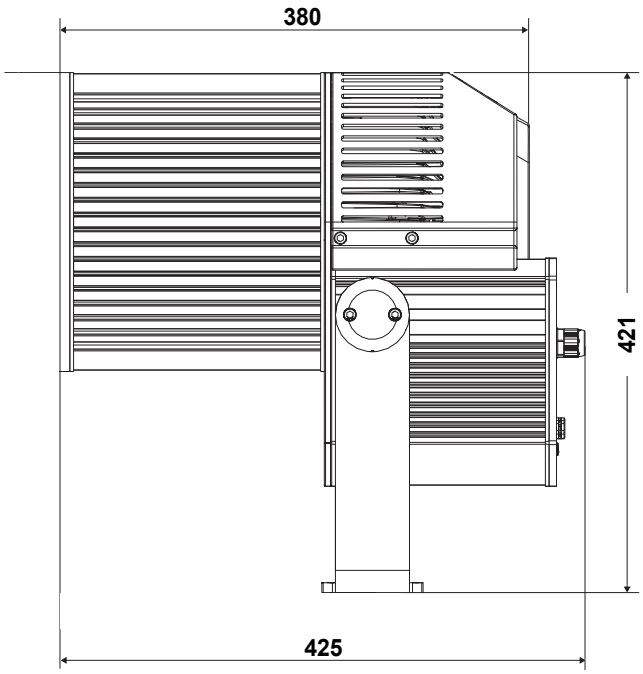
Dimensions

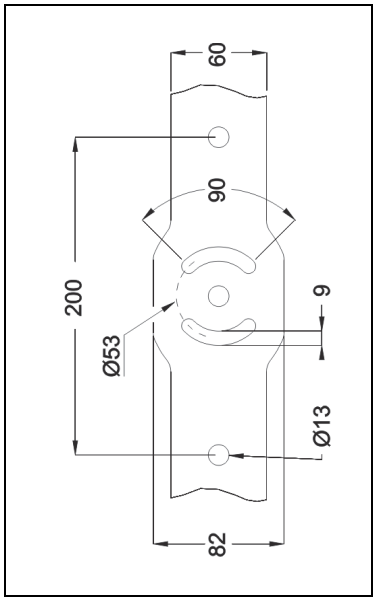
All dimensions are in millimeters





Narrow-angle models (long barrel)





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P/N 35000256, Rev. E

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 2 LED product according to EN 62471.



WARNING!
Fire hazard.



WARNING!
Refer to user manual.



WARNING! Risk Group 2 LED product according to EN 62471. Do not look into the beam at a distance of less than 8.3 m (27.3 ft.) from the front surface of the product. Do not view the light output with optical instruments or any device that may concentrate the beam.

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

This product presents risks of severe injury or death due to fire 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 an authorized Martin Service partner.



Terminal block not included.

Installation may require advice from a qualified person.

If you have any questions about how to install or 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 ensure that it cannot be reapplied, deliberately or accidentally, 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 using the supplied power cable only. The power and data cables supplied with the fixture may only be replaced by Martin Professional or its authorized agents. If either of the supplied cables is in any way unsuitable, contact Martin Professional for assistance.
- 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, deformed or shows signs of overheating. Contact Martin Professional for assistance and 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



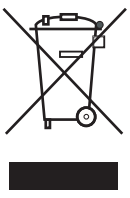
- Do not operate the fixture if the ambient temperature (Ta) exceeds 45° C (113° F).
- The exterior of the fixture becomes hot, up to 65° C (149° F) during normal operation. Ensure that accidental physical contact with a hot fixture is impossible.
- Allow the fixture to cool for at least 30 minutes before servicing.
- Do not illuminate any surface that is less than 0.5 m (20 ins.) from the front 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 or the front glass. Use only Martin-approved accessories to mask or modify the light beam.
- Install the fixture outdoors or in a well-ventilated area only. Provide unrestricted airflow and a minimum clearance of 0.1 m (4 ins.) around the fixture.



PROTECTION FROM INJURY



- Classified as LED Risk Group 2 product with all LEDs at full intensity 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 provided that the eye's natural aversion response is not overcome.
- Do not look at LEDs with magnifiers or similar optical instruments that may concentrate the light output.
- Ensure that persons are not looking at the LEDs from within 8.3 m (27.3 ft.) when the product lights up suddenly. This can happen when power is applied, when the product receives a DMX signal or when stand-alone operation starts.
- 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.
- 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 60598-2-17 Section 17.6.6 and be capable of bearing a static suspended load that is ten times the weight of the fixture and all installed accessories.



Disposing of this product

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

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

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Introduction

Thank you for selecting the Exterior 400™ Image Projector, a compact IP65-rated LED-based color-changing projector from Martin Professional™. The Exterior 400 Image Projector features:

- Seven Luminus CBT-90 (50 W) LEDs
- Narrow-, medium- and wide-angle options
- Motorized rotating gobo wheel with slots for 6 interchangeable gobos plus open, indexing, continuous gobo rotation & scrolling, shake
- Motorized color wheel with slots for 8 interchangeable color filters plus open
- Motorized iris
- Electronic shutter with instant intensity control, 2 - 9 Hz strobe effects and pulse effects
- Motorized focus, approx. 2 m (6.6 ft.) to infinity
- DMX 512A control
- Stand-alone operation with up to 100 programmable scenes
- Synchronized (master/client) stand-alone operation
- RDM (Remote Device Management)
- Auto-sensing power supply unit with 100-240 VAC, 50/60 Hz operating range
- Remote configuration and addressing over the DMX data link.

For the latest photometric data, 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 Image Projector:

- 1.8 m (5.9 ft.) power and data cables (installed)
- Adjustable mounting yoke
- 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 optical components as described in “Installing color filters and gobos” on page 7.
- Install the fixture as described in this manual.

Installing color filters and gobos

Warning! Read the "Safety Information" section starting on page 3 before installing, powering, operating or servicing the Exterior 400 Image Projector.

Since many customers prefer to choose color filters and gobos themselves or use custom-made items, the Exterior 400 Image Projector is supplied with two color filters and two gobos pre-installed as examples only (see "Included Items" on page 40). All necessary goboholders with their gobo retaining springs are supplied. A range of dichroic color filters and gobos for the Exterior 400 Image Projector is available from Martin and can be ordered separately. If you wish to use custom-made optical components, please consult your Martin supplier. Custom-made components must meet the same specifications as Martin items, or their use may invalidate the product warranty.

It is easiest to install filters and gobos before the fixture is physically installed. To install color filters and gobos, you must remove the front cover and effects module for access.

Filter and gobo care

Important! Filters and gobos are sensitive components that are exposed to extreme conditions. Avoid contaminating them with dirt and grease, especially from your fingers, and follow these precautions:

1. Use clean, dry, lint-free gloves when handling optical parts such as filters and gobos.
2. To give maximum protection from heat, install optical components with the shiny side facing the light source and the darker side facing away from the light source.
3. Protect optical parts from scratches. Avoid touching components together: the sharp edge of one item can scratch another.
4. Do not place an optical components with its coated side face-down on any surface.
5. If cleaning is necessary, use cotton swabs or lens cleaning tissues moistened with 99% isopropyl alcohol or photographic quality lens cleaning fluid. Do not use standard domestic tissues, as these can cause micro-scratches and dust. Wipe surfaces gently with a slow circular motion from center to edge. Remove any stuck particles with a cotton swab moistened with lens cleaner or distilled water. Do not rub the surface: lift particles off with a soft repeated press. Rinse off any residues with distilled water, then dry components with low-pressure compressed air or a clean, soft, lint-free cloth.
6. Store all optical components in a dust-free environment with approx. 50% humidity.

Access to the effects module

To access the effects module:

1. Make sure that power cannot be applied to the fixture during installation work. If the fixture has been in use, allow it to cool for at least 30 minutes.

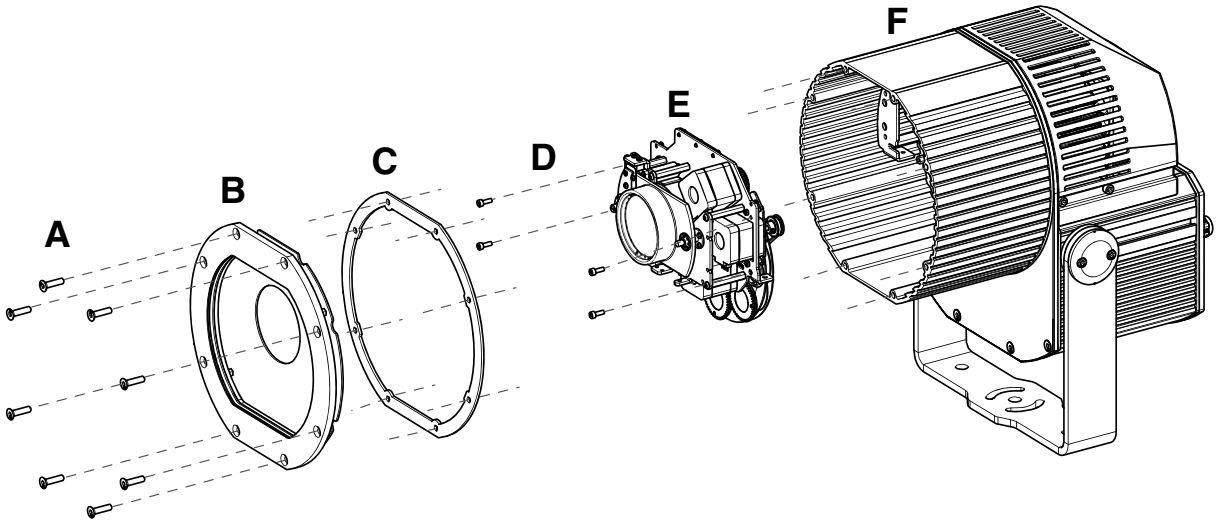


Figure 1: Removing the front cover and effects module

2. Tilt the fixture back and rest it on a piece of cloth, for example, so that it is held securely and the front cover is facing upwards.
3. See Figure 1. Remove the eight Allen screws **A** that hold the front cover **B**, then remove the front cover **B** and front cover seal **C** from the fixture housing **F**.
4. Using a T-bar or long Allen key, reach down into the housing and remove the four effects module retaining screws **D**.
5. Lift the effects module up carefully. It is connected to the rest of the fixture by three multi-connectors. Each connector has a different number of pins, so it is impossible to get them mixed up. Disconnect the multi-connectors, then lift the effects module out of the fixture and place the module gently on a clean, flat surface. You can now install color filters and rotating gobos.

Installing color filters

To install a filter in the Exterior 400 Image Projector effects module:

1. See Figure 2. Refer to the diagram for filter position numbers. The color wheel is shown from the rear (the side facing the back of the effects module, away from the front cover). It will help you identify filter positions if you note the position of the small magnet **A** on the color wheel opposite the open slot.

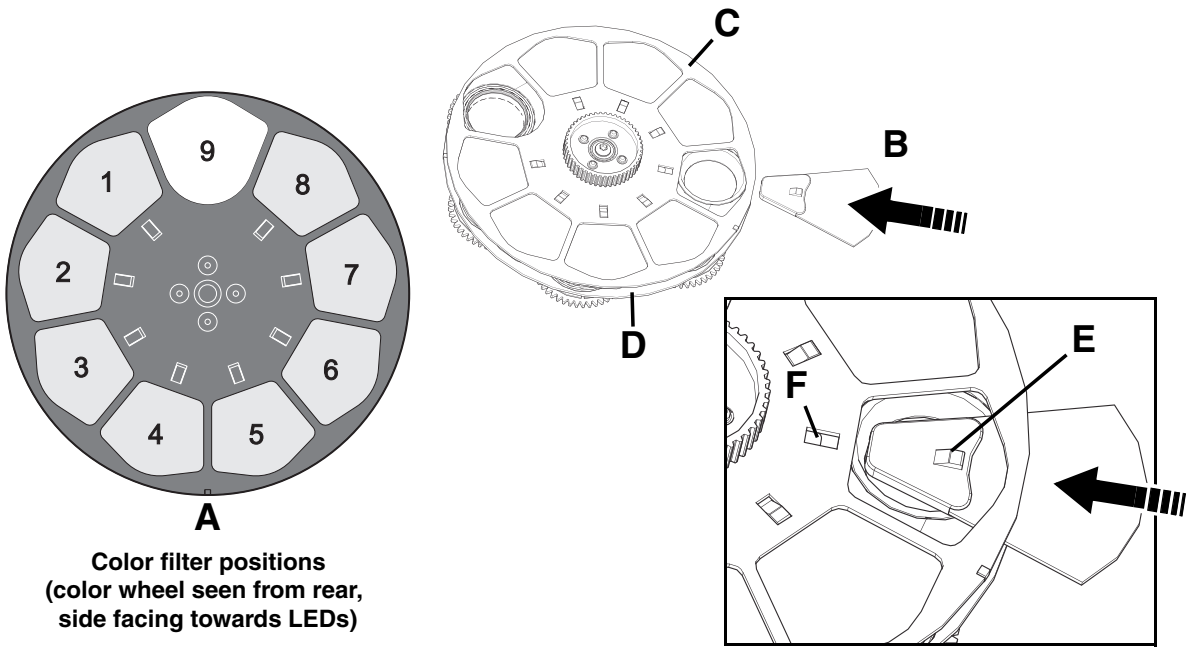


Figure 2: Installing a color filter

2. If a filter has already been installed, push it away from the color wheel towards the gobo wheel slightly to release it, then grasp it by the edges and remove it. If your fingers are too large, protect the glass with a piece of paper that has been folded several times and grasp the filter with needle-nose pliers.
3. To install a filter, push the filter **B** in between the color wheel **C** and the gobo wheel **D** and slide it under the retention spring in the color wheel until it snaps into place on the color wheel and the raised lug **E** in the filterholder engages in its cutout **F**.

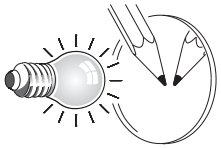
Installing gobos

Most gobos must be installed facing in a certain direction in order to avoid heat damage. Follow the gobo orientation guidelines given in Figure 3. Consult your Martin dealer or gobo supplier if you are in any doubt about the orientation of a specific gobo type.

Coated Glass Gobos

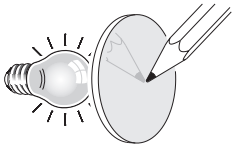
Focus is easiest to maintain if all coated gobos in a fixture are installed with their coatings as close as possible to the same plane of focus. However, the first priority is normally to ensure that the more reflective side faces towards the LEDs.

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 LEDs.

Less reflective side away from LEDs



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

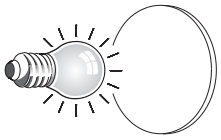
To determine which side of a gobo is coated, hold an object up to it. On the uncoated side, there is a space between the object and its reflection and the edge of the gobo can be seen when looking through the glass.



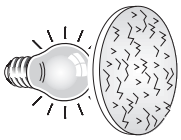
Uncoated side ***Coated side***

Textured Glass Gobos

Smooth side towards LEDs



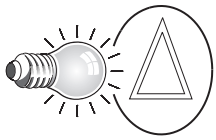
Textured side away from LEDs



Textured glass gobos in the Exterior 400 Image Projector give the best focus results with the smooth side towards the LEDs. If in doubt, consult your Martin dealer or gobo supplier.

Metal Gobos

Reflective side towards LEDs



Black side away from LEDs

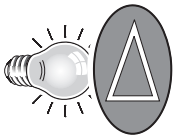
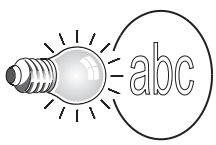
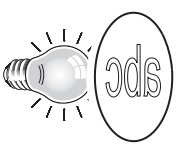


Image / text Gobos

True image towards LEDs



Reversed image away from LEDs

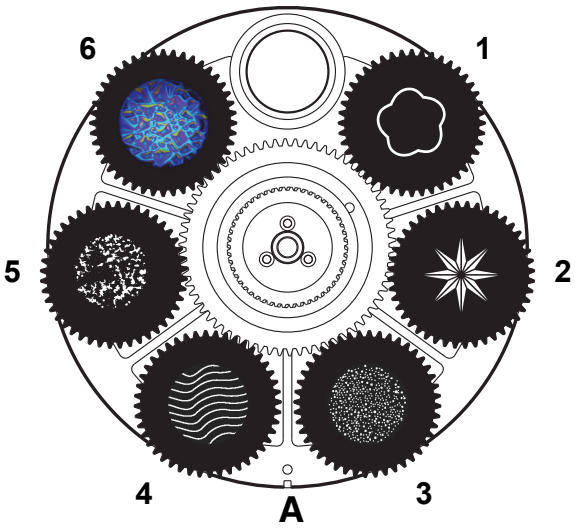


Custom gobos must be designed so that the true image appears on the more reflective side so that it faces the LEDs when installed.

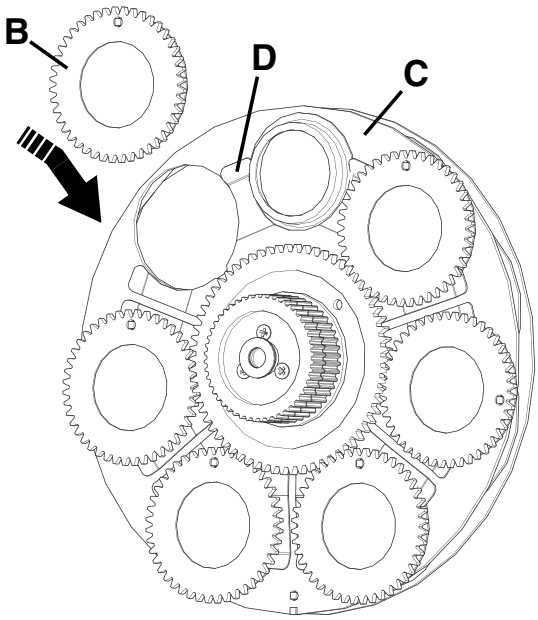
Figure 3. Correct gobo orientation

Gobo installation

Wear clean, lint-free cotton gloves while handling optical parts.



**Gobo positions*
(gobo wheel seen from front of module facing towards front cover)**



**Gobos 5 (Tight Stripple) and 3 (Dots Breakup Small) are supplied pre-installed. Other gobos are examples only.*

Figure 4: Installing a gobo

To install a rotating gobo in the Exterior 400 Image Projector effects module:

1. See Figure 4. Refer to the diagram for gobo position numbers. The gobo wheel is shown from the front (the side facing the front of the effects module, towards the front cover). It will help you identify gobo positions if you note the position of the small magnet **A** on the gobo wheel opposite the open slot. Rotate the gobo wheel if necessary for access to the different gobo positions.
2. If a gobo has already been installed, lift it away from the gobo wheel slightly to release it from its cutout in the gobo wheel, then hold it by the edges and slide it outwards.
3. To insert a gobo, slide the goboholder **B** onto the gobo wheel **C**, working it in so that the gobo retaining clips **D** engage in the slot around the edge of the goboholder. If necessary, lever the clips away from the wheel slightly with a small screwdriver or similar tool. Push the goboholder in until it snaps into place in its cutout in the gobo wheel.

Replacing gobos in goboholders

Gobos in rotating goboholders are interchangeable and can be replaced with gobos either supplied or specifically approved by Martin.

See Figure 5. Gobos are held in rotating holders by a retention spring. Note that the retention spring can only be used with gobos maximum 3 mm thick. Thicker gobos can be glued to the holder with a UV adhesive or Loctite 330 Multibond with Activator.

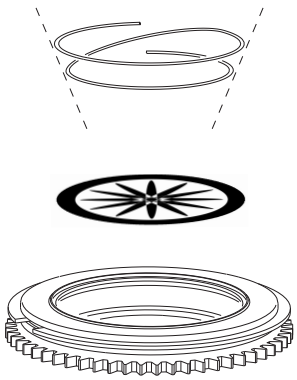


Figure 5: Rotating goboholder

Important! ***A gobo can fall out of its holder if the spring is inserted the wrong way round.***

To replace a gobo:

1. Put on clean, lint-free gloves to protect your fingers and to avoid contaminating optical components with grease and dirt.
2. Remove the goboholder from the gobo wheel as described in the previous section.
3. With a small screwdriver or similar, unhook the end of the gobo spring furthest from the gobo and pull out the spring. Drop the gobo out of the holder.

4. With reference to Figure 3 on page 10, insert the new gobo in the holder with the side that must face towards the LEDs facing upwards, towards the spring.
5. Insert the spring with the narrow end against the gobo, as shown in Figure 5. To identify the narrow end, press the spring flat: the narrow end is on the inside. Push the end of the spring in under the lip of the holder.
6. Check that the gobo is seated flush against the holder. Press the spring as flat as possible against the back of the gobo.
7. Install the goboholder in the gobo wheel as described in the previous section.

Reinstallation after accessing the effects module

To reinstall the effects module and front cover:

1. Lower the effects module into position in the housing. Note the number of pins in the multi-connectors to the module and reconnect them.
2. See Figure 1 on page 8. Using a T-bar or long Allen key, reinstall the four effects module retaining screws **D**.
3. Check the front cover seal **C**. If it is not in perfect condition, it must be replaced with a new item from Martin™ to maintain the fixture's IP65 rating.
4. Place the front cover **B** with its seal **C** in position on the front of the fixture housing **F** and insert the eight Allen screws **A**. Tighten the screws until they are finger-tight only.
5. Using a torque driver, cross-tighten the screws gradually – tightening all screws opposite each other, working around the cover in at least three stages – to a torque of 8 Nm (5.9 ft.-lbs.). Do not over-tighten, or the front glass may break.
6. You can now either apply power or proceed with physical installation.

Physical installation

Warning! Read "Safety Information"* on page 3 *before installing the Exterior 400 Image Projector.

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 Image Projector. 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 or the suitability of an installation.

Location and orientation

Warning! The Exterior 400 Image Projector mounting yoke base must be securely anchored to a suitable flat surface. Ensure that the supporting structure can bear the weight of all installed devices plus an adequate safety margin.

Warning! If the fixture is to be installed in any location where it may fall and cause injury or damage if the primary attachment fails, install an approved safety cable as described below.

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

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

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

- Install the fixture as shown in Figure 6 and Figure 7 (see page 14).
- 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.

The Exterior 400 Image Projector requires free and unobstructed airflow around it 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 65° C (149° F). Restrict public access or locate the fixture so that it cannot accidentally be touched.

Mounting angle and avoiding damage to seals

See Figure 6 on right. If you install the Exterior 400 Image Projector with its heat exchanger air intake **A** pointing upwards and its power box **B** below the main luminaire housing, and if you point the luminaire from approx. +5° to -95°, rainwater can collect on top of the power box (see arrow). This can immerse silicone seals in hot and cold water, often mixed with pollutants, for long periods. This can in turn cause damage and allow water to enter the product.

See Figure 7 below. If you install the Exterior 400 Image Projector with its light beam pointing downwards, install it with its air intake **A** facing downwards and its power box **B** above the main housing so that water will drain away from the top of the power box **B**. Depending on whether you install the luminaire in a standing or hanging position, you may need to release the luminaire completely from its mounting yoke, turn it so that its power box **B** is above the main luminaire housing, and then reinstall the luminaire in its yoke.

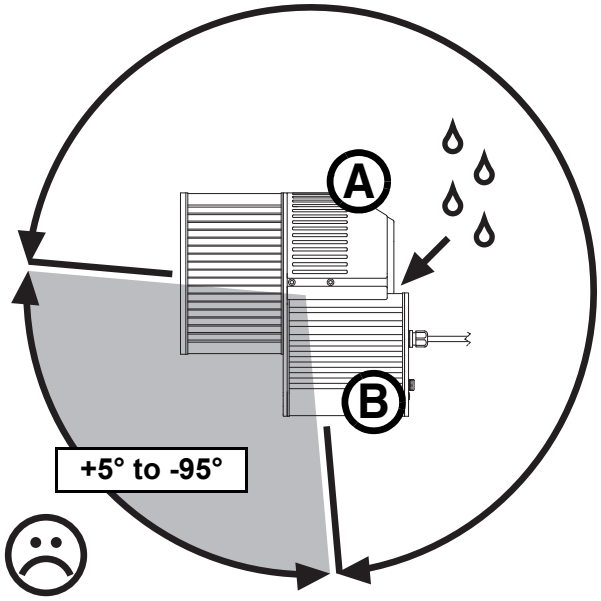


Figure 6: Mounting angle 1

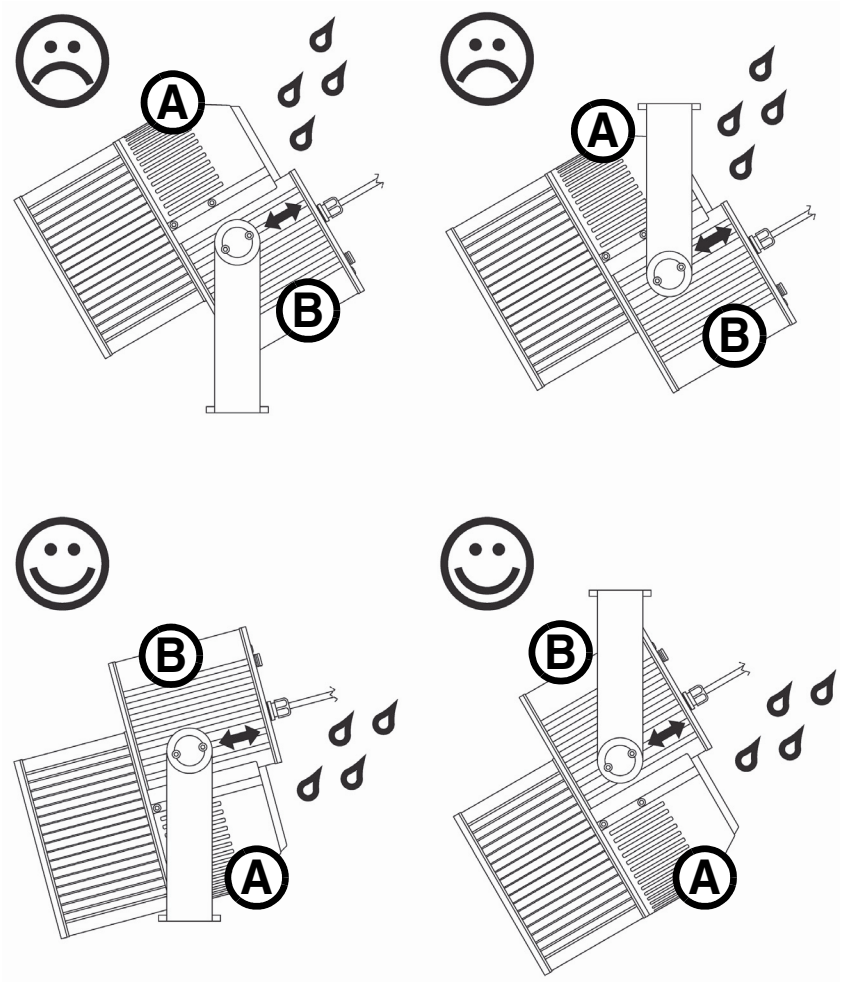


Figure 7: Mounting angle 2

Fastening to a surface

Warning! All fasteners used to mount the Exterior 400 Image Projector 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 yoke must be fastened to the installation surface using minimum three fasteners. If there is a danger that the fixture may cause injury or damage if it falls, a securely anchored safety cable that is approved for the weight of the fixture must be looped through one of the holes in the yoke base marked A, B or C in Figure 8 on page 15.

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

The mounting yoke base must be safely anchored to a horizontal 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). Any nuts used must be self-locking. Washers must be installed between the head of each fastener and the yoke base. Suitable washers are supplied with the fixture.

See Figure 8. To mount the fixture:

1. Attach a safety cable that is approved for the weight of the fixture to a secure anchoring point such as an eyebolt in the installation surface and loop it through one of the holes in the yoke base shown as **A**, **B** or **C** in Figure 6.
2. Fasten the yoke base to the mounting surface using a 12 mm (1/2 inch) shaft diameter bolt with a washer in the center hole **A**.
3. Then either use two bolts with 12 mm (1/2 inch) shaft diameter and washers passing through holes **B** or use two bolts with 8 mm (5/16 inch) shaft diameter and washers passing through slots **C** to secure the fixture. Installing bolts through slots **C** will give approximately 90° of pan adjustment.

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

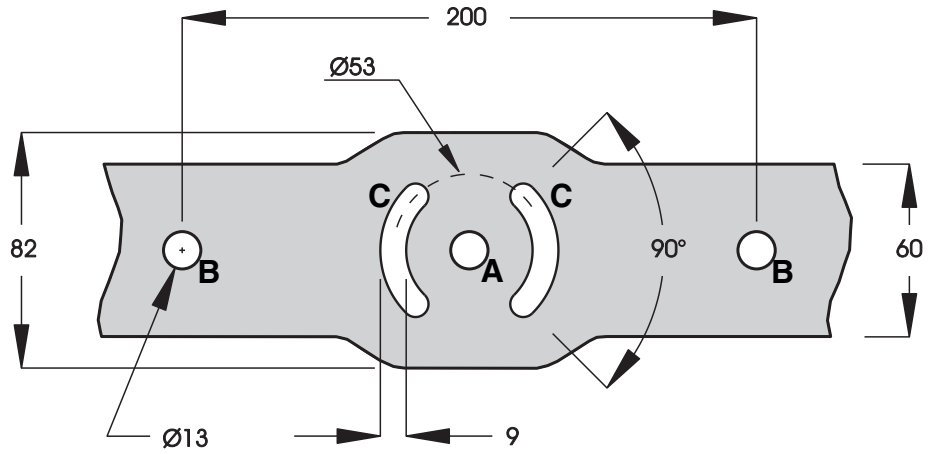


Figure 8: Mounting yoke attachment points

Tilt adjustment

Tilt-lock screws at either side of the mounting yoke allow adjustment of vertical beam aiming. It is possible to slide the fixture in the yoke once the tilt-lock screws are loosened. This allows some extra clearance and adjustment.

Important! ***Do not slide the fixture in the yoke so far that the yoke comes into contact with one of the silicone seals between the aluminum elements in the housing, as this may make it impossible to achieve a waterproof seal.***

Tilt adjustment can be carried out with the fixture powered on. To adjust the tilt:

1. Put on heat-resistant gloves if the fixture is or has recently been powered on.

2. See Figure 9. Loosen, but do not remove, the tilt-lock screws.
3. Tilt the fixture to the desired angle and slide it backwards or forwards in the yoke until its weight is evenly distributed.
4. Retighten the screws.

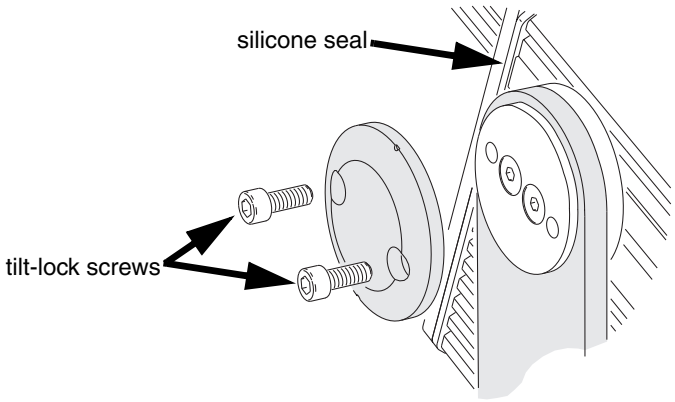


Figure 9: Tilt adjustment

Power and DMX data cable layout

Figure 10 gives an overview of a suitable cable layout. The dotted lines represent AC mains power circuits. The solid lines represent the data link.

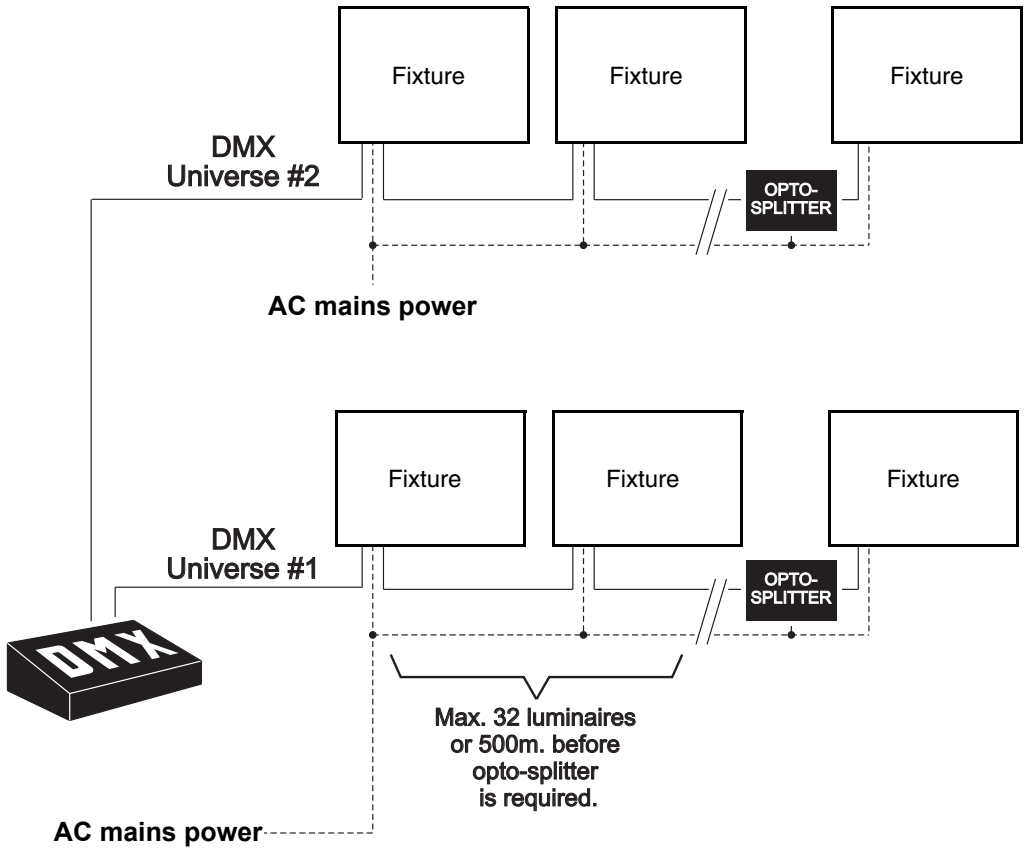


Figure 10: Schematic cable layout diagram

AC mains power

Warning! Read "Safety Information" on page 3 before installing, powering, operating or servicing the Exterior 400 Image Projector.

Warning! Electrical installation must be carried out by qualified professionals only.

See Figure 10 on page 17 for a schematic diagram of cable layout. If you require help in planning or dimensioning the power distribution system, please contact your Martin 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 Image Projector 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.

Power is applied to the Exterior 400 Image Projector 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 tail installed ready for connection to a single-phase 3-wire (live, neutral, ground/earth) AC mains power distribution system at 100-240 V nominal, 50/60 Hz. Terminal blocks or suitable connection devices must be provided by the installer.

Danger! Lock out power to the entire installation before working on cables and connections.

Warning! If you have any other type of distribution system than the one listed above, contact Martin for assistance.

Warning! Make sure that cable connections are totally protected from water in approved enclosures such as sealed junction boxes or sealed cable connectors, or moisture may be drawn up the inside of the cable by the vacuum effect that results from heating and cooling during operation. Follow the safety precautions and instructions provided by the enclosure supplier.

Warning! If the supplied power cable is unsuitable for any reason, contact your Martin supplier for replacement. Exterior 400 Image Projector power and data cables may be installed or replaced only by Martin or its authorized service agents.

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

1. Lock out power to the installation.
2. Prepare a suitable junction box or sealed cable connector.
3. 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

4. Check that cable connection enclosures are sealed, check that all installation work is completed, and carry out appropriate tests and safety checks before applying power.

Power plug (not North America)

In regions outside North America, legislation or building codes may allow the installation of a power plug that is suitable for local AC mains power outlets and approved for the installation environment on the supplied power cable. If you choose to do this, install a grounding-type (earthed) plug that is rated 5 A minimum, following the plug manufacturer's instructions. Table 1 on page 18 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 protected from water, moisture, dirt, etc.

Control data link

Exterior 400 Image Projector 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 mm^2 (24 AWG) for runs up to 300 meters (1000 ft.) and 0.32 mm^2 (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 10 on page 17.
- Each chain may connect a maximum of 32 fixtures. After this the signal must be amplified.
- An optically isolated amplifier-splitter such as the Martin DMX 5.3 Splitter™ (P/N 90758140) or Martin RDM 5.5 Splitter™ (P/N 90758150) 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 Splitters mentioned above allow a link to be branched into five 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.
- An Exterior 400 Image Projector requires nine DMX channels. The total number of Exterior 400 Image Projectors that can be linked in one DMX universe will therefore be 512 / 9 = 56 (note that an amplifier-splitter must be used each time the limit of 32 devices on one branch is reached).

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 DMX/RDM pin-out:

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

Pins 4 and 5 on 5-pin XLR connectors are not used by DMX or RDM signals but are available for special Data 2 connections. If used, they must be wired as follows:

- Pin 4: Data 2 - (cold)
- Pin 5: 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 11). 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/RDM data hot (+)
- Pin 2 (Orange): DMX/RDM data cold (-)

- Pins 7 (White/brown) and 8 (Brown): Common

Pins 3 and 6 are available for Data 2 connections. If used, 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)

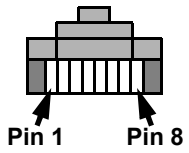


Figure 11: RJ-45 cable connector pins

Connecting the data link



Danger! Lock out power to the entire installation before working on cables and connections.

Warning! Make sure that cable connections are totally protected from water in approved enclosures such as sealed junction boxes or sealed cable connectors, or moisture may be drawn up the inside of the cable by the vacuum effect that results from heating and cooling during operation. Follow the safety precautions and instructions provided by the enclosure supplier.



Warning! If the supplied power cable is unsuitable for any reason, contact your Martin supplier for replacement. Exterior 400 Image Projector power and data cables may be installed or replaced only by Martin or its authorized service agents.

The Exterior 400 Image Projector is supplied with a 1.8 meter (5.9 ft.) data cable tail for DMX/RDM data connection. The cable contains both data input and output cables. Conductors are identified as follows:

Data input

- Black wire = data input hot (+ve)
- Red wire = data input cold (-ve)
- Wire without insulation = data input shield/drain

Data output

- White wire = data output hot (+ve)
- Green wire = data output cold (-ve)
- Wire without insulation = data output shield/drain

To connect a fixture to the data link:

1. Connect the conductors in the fixture's cable tail to the data circuit 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 20. Standard procedure is to use a male connector on a fixture's cable tail for data input and a female connector for data through/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. Check that cable connection enclosures are sealed, check that all installation work is complete, and carry out appropriate tests and safety checks before applying power.

Effects

This section describes the effects available in the Exterior 400 Image Projector. Details of controlling effects via DMX are given in “DMX protocol” on page 36. Details of programming effects in stand-alone operation are given in “Stand-alone operation” on page 27.

Electronic shutter effect

The electronic shutter effect uses the LEDs to provide instant open and blackout as well as variable speed regular and random strobe, and opening/closing pulse and sinewave intensity modulation effects.

Electronic dimming

The LEDs can be dimmed smoothly from 100% to zero. Note that four different dimming curves can be selected using the Martin MUM™ application (see “Dimming curve options” on page 25) or via DMX on the fixture control channel 9.

Color wheel

The color wheel can be scrolled continuously (giving split colors), scrolled in steps (giving full colors only) set to continuous rotation or set to random color chases (auto-trig).

Rotating gobo wheel

Any of the six rotating gobos can be selected at an indexed angle, rotated, or shaken from side to side at an indexed angle or while rotating. The entire gobo wheel can also be scrolled continuously.

Iris

The motorized iris can be opened or closed smoothly, with pulse effects also available.

Focus

The motorized focus system can be varied from infinity to approximately 2 meters (6.4 feet).

Fixture setup

You can set up Exterior 400 Image Projector fixtures for DMX control and/or set up stand-alone operation using the Martin MUM™ Windows application. MUM lets you communicate with one fixture at a time

You can also set up fixtures for DMX control using an RDM (Remote Device Management) compliant DMX controller such as the Martin M1™ console or the Martin M-PC™ WIndows application. An RDM-compliant DMX controller connected to the data link lets you set up all the fixtures on the link.

Setting up using MUM

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

Tip! Using MUM, you can connect to and set up one fixture at a time. It is therefore most convenient if you set up and program the fixture before it is installed.

Refer to the MUM user manual for instructions on installing and starting the MUM application.

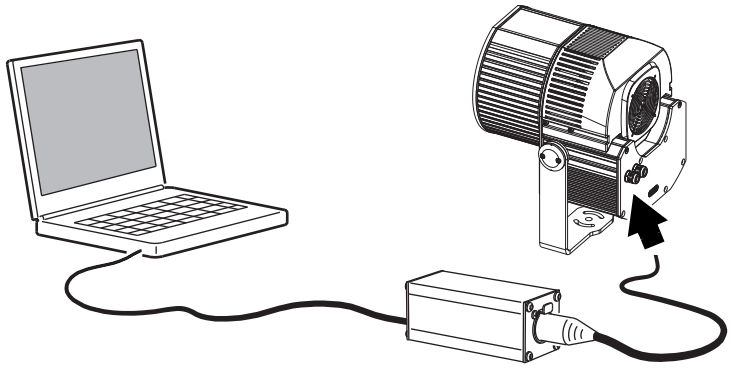


Figure 12: Connecting to a PC with MUM

Connecting a PC with MUM

To connect a PC running MUM to an Exterior 400 Image Projector:

1. Obtain the Martin MUM application, a Martin DABS 1 interface box and interface cables. These are available as a set, P/N 90758090, from Martin. If your version of MUM does not cover the Exterior 400 Image Projector, download the ‘Martin DMX Tools’ software package from the Martin website at www.martin.com. This package includes the latest version of MUM that covers the Exterior 400 Image Projector. The download is free of charge.
2. Connect the DABS 1 to your PC using the supplied USB cable.
3. Connect the DABS 1’s XLR output to the Exterior 400 Image Projector via 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 Image Projector 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:

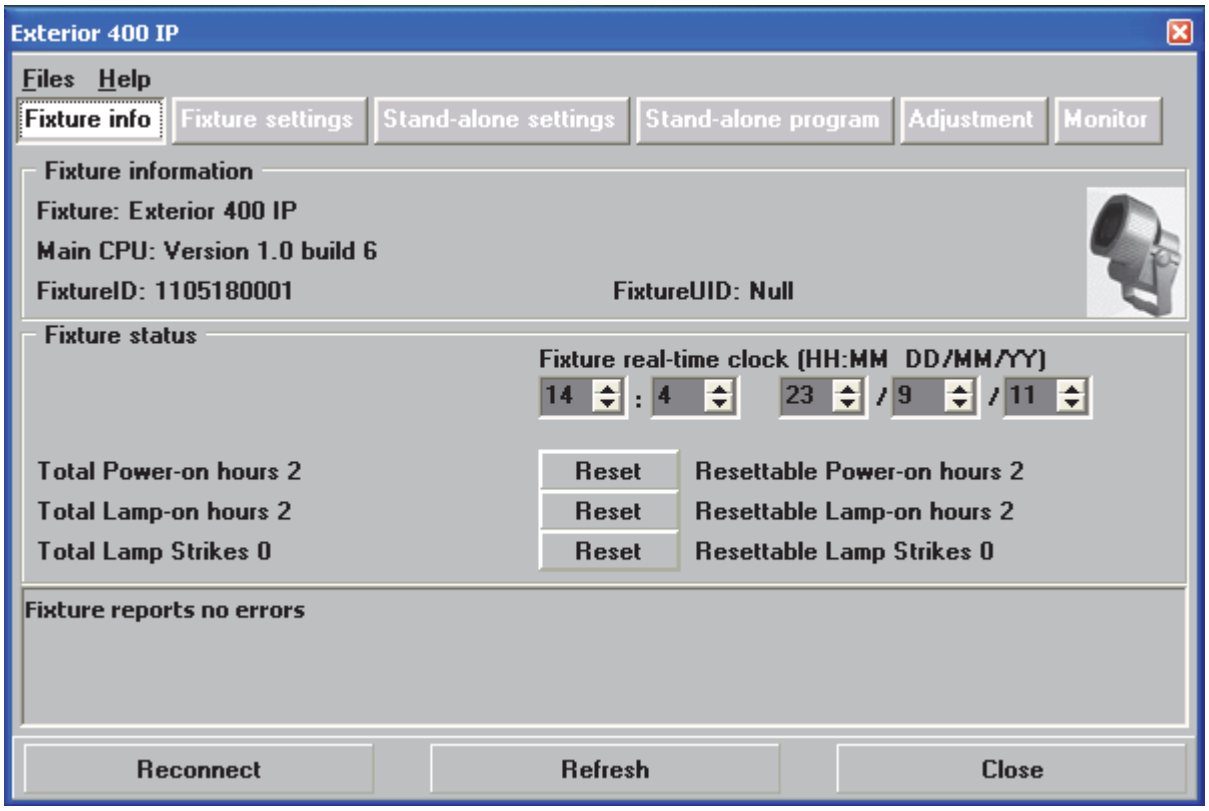


Figure 13: Fixture info window

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.

DMX address and other fixture settings

If individual control of each Exterior 400 Image Projector 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 Image Projector fixtures use nine DMX channels. If a fixture's DMX address is set to 1, it will use channels 1 - 9. Channel 10 will be available as the DMX address for the next fixture, which can use channels 10 - 18, and so on.

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.

Setting DMX Addresses

To set a 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.

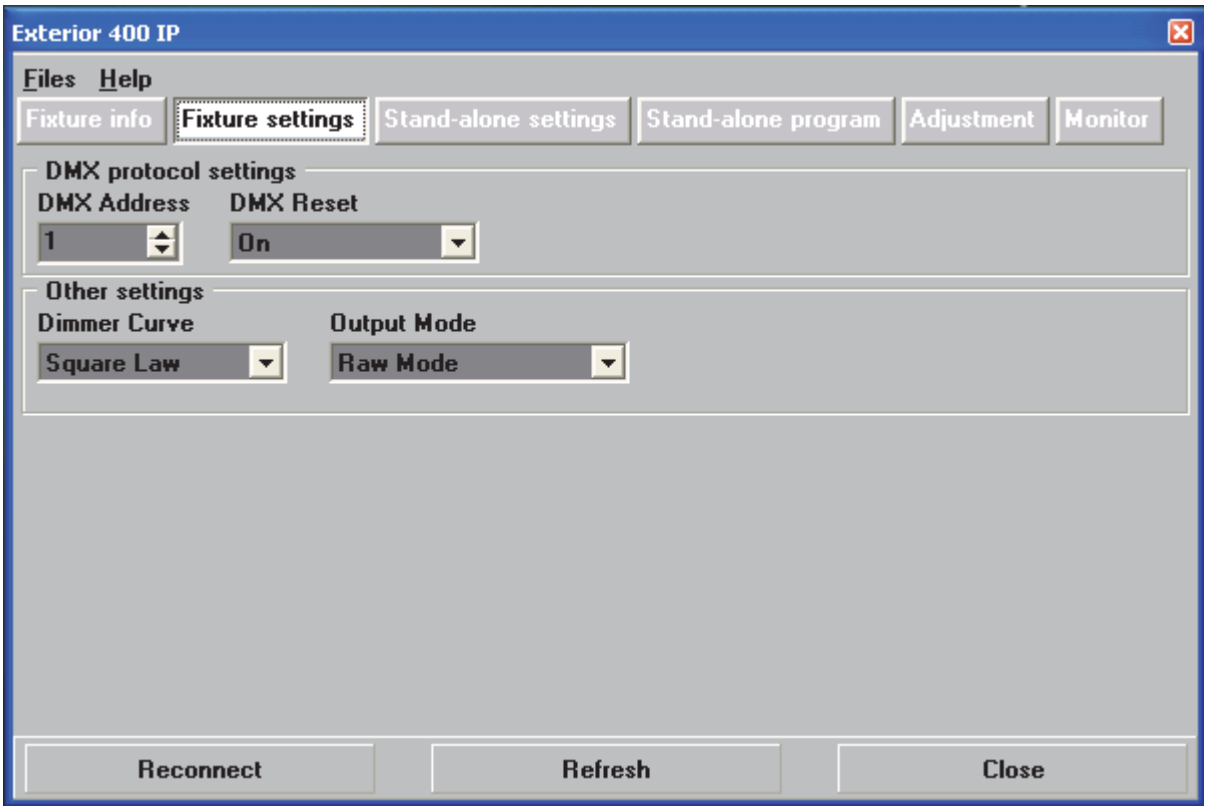


Figure 14: Fixture settings window

DMX reset

Three settings are available in **DMX Reset**:

- **On** – The fixture will accept a reset command sent via DMX on channel 9 (the "Fixture control settings" channel: see page 37). This can be a useful 'escape route' if you have had problems programming the fixture correctly or a minor software problem has occurred.
- **Off** – Resetting via DMX is disabled to prevent accidental resets.
- **5 Sec** – A reset command sent on DMX channel 9 must be sent for five seconds to reset the fixture.

Dimming curve options

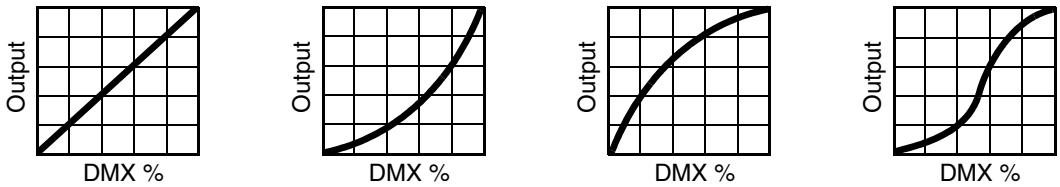


Figure 15: Dimming curve options

The **Dimming Curve** setting provides four dimming options (see Figure 15):

- **Linear** – Optically linear: the increase in light intensity appears to be linear as DMX value is increased.
- **Square Law** – Light intensity control is finer at low levels and coarser at high levels.
- **Inverse Square Law** – Light intensity control is coarser at low levels and finer at high levels.
- **S-Curve** – Light intensity control is finer at low levels and high levels and coarser at medium levels.

Raw and calibrated modes

The **Output Mode** setting lets you set the fixture to raw or calibrated output:

- **Raw** – Maximum LED light output is available but intensity may differ very slightly between fixtures
- **Calibrated** – LED light output is limited very slightly to ensure that intensity is the same in different fixtures.

Setting up via RDM

The Exterior 400 Image Projector is compatible with RDM (Remote Device Management). Using an RDM-compliant DMX controller such as the Martin M-PC™ Windows application, you can communicate with all the fixtures on a data link via RDM without needing to connect to each fixture individually. You can set the DMX addresses of all the fixtures on the link, carry out basic configuration and retrieve basic fixture data.

To use Martin M-PC, connect a PC running this application to the data link via the Martin USB Duo™ USB/DMX interface box. Before you can communicate with fixtures, you will need to send a **Scan** command from M-PC to detect the devices on the data link.

Operation

Exterior 400 Image Projector fixtures can be operated using a DMX controller or programmed to run a stand-alone light show that does not require DMX control.

If a fixture has been set up to run stand-alone operation, it will follow its program according to its programmed times as soon as powered is applied, unless it receives DMX commands. DMX commands sent to a fixture override its stand-alone program.

Ambient temperatures

The Exterior 400 Image Projector can be operated at ambient temperatures from -30° C (-22° F) minimum to 45° C (113° F) maximum.

Important! If the ambient temperature falls – or is forecast to fall – below 0° C (32° F), leave the Exterior 400 Image Projector permanently powered on, even if LEDs are dimmed to zero. This will provide heat and help protect circuits and components from the effects of low temperature. Starting a fixture that is below 0° C (32° F) may cause damage to moving parts that is not covered by the product warranty.

DMX control

The industry-standard DMX system allows remote control of the Exterior 400 Image Projector over the DMX data link using a DMX controller or a PC running DMX controller software. such as the Martin M-PC™ application. If Luminaires have been set up with individual DMX addresses, they can be controlled individually.

The section “DMX protocol” on page 36 gives details of the control options available using DMX.

Stand-alone operation

In stand-alone operation, the fixture displays effects that change at variable intervals and speeds, either as soon as power is applied or for one or two periods during a 24-hour period. All parameters are programmable. The term *stand-alone* means that the Exterior 400 Image Projector is not connected to a control device, but is pre-programmed with a sequence of up to 100 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 Martin MUM™ application as described in "*Connecting a PC with MUM"* on page 23, and click on the **Stand-alone settings** button (see Figure 16).

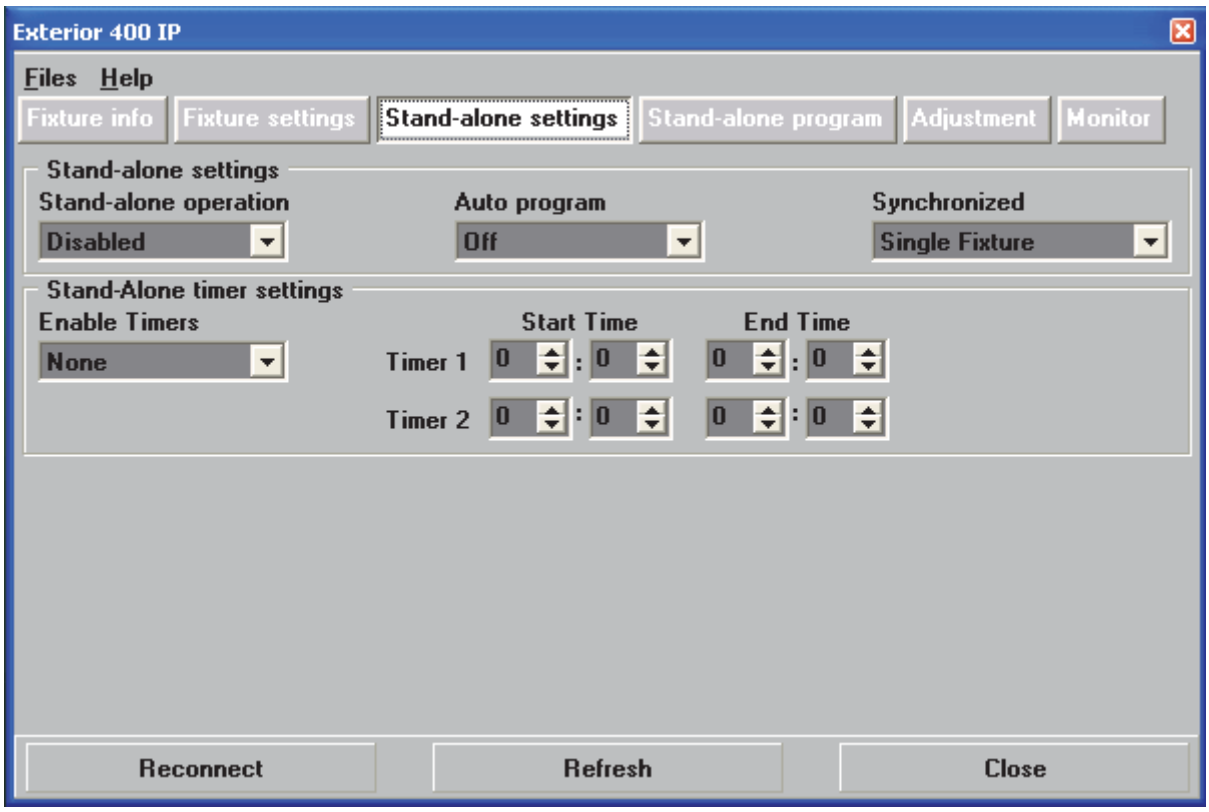


Figure 16: Stand-alone settings window

Stand-alone operation can be set to either:

- start automatically as soon as power is applied, or
- respond to a timer trigger that activates operation for one or two periods in a 24 hour period.

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 the correct time has been set on the luminaire's built-in clock (see "*Setting the clock"* on page 24).
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).

Programming stand-alone operation

About scenes

A stand-alone light show consists of scenes. Each scene is a particular lighting effect with predetermined gobo selection, focus, color, intensity, iris and shutter effects, and duration. Up to 100 scenes can be programmed into the Exterior 400 Image Projector'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.

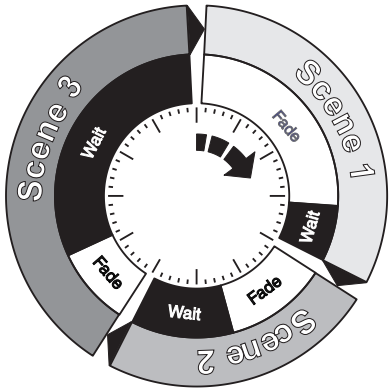


Figure 17: Scene timing

Programming scenes

To program a scene:

1. See Figure 18. Click on the **Stand-alone program** button.
2. In the **Gobo** section, clicking on a number to select a gobo slot and move the **Rotate** fader to select rotation direction and speed.
3. In the **Intensity** section, move the fader to the desired output intensity.
4. In the **Focus** section, move the fader to adjust focus.
5. Select a color filter slot in the color filter section (arrowed). **0** is the open position (no color filter).
6. The **Iris** and **Shutter and Strobe** options available match those listed in the "DMX protocol" section starting on page 36.
7. The **Effect Macros** are pre-programmed combinations of the fixture's effects that give immediate access to different types of action. Setting the same **Effect Macros** in multiple fixtures can help you make sure that scenes are the same in those fixtures.
8. Select a wait time and a fade time for the scene.

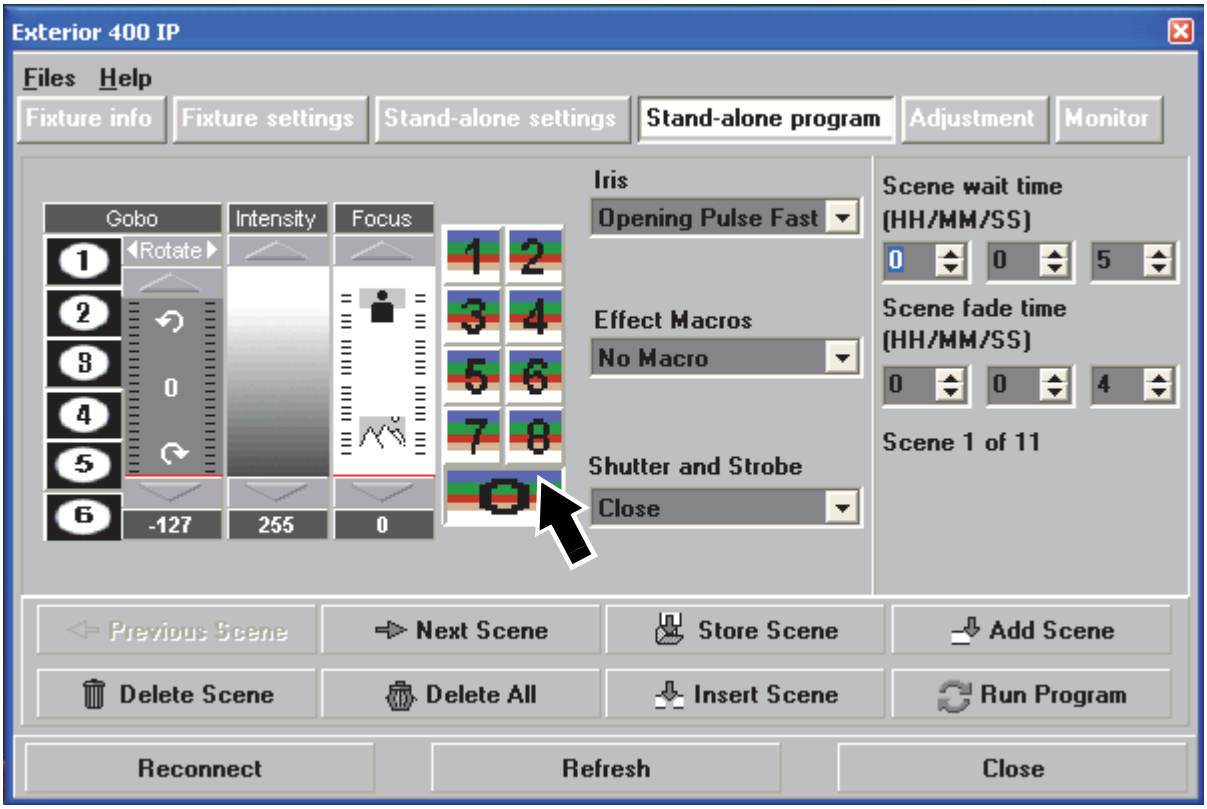


Figure 18: Stand-alone programming window

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 (see Figure 18):

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. *Tip: Think of the Add and Insert commands as Save commands, to be used as the last step after programming all effects.*
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 16):

- **Single Fixture** – Operates in stand-alone mode independently of other fixtures
- **Master** – Sends trigger signals to other fixtures, or
- **Synchronized** – Sets fixture as a 'client' that receives trigger signals from a 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.

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 19), and then
3. Upload the program and settings to each subsequent fixture that you connect to.

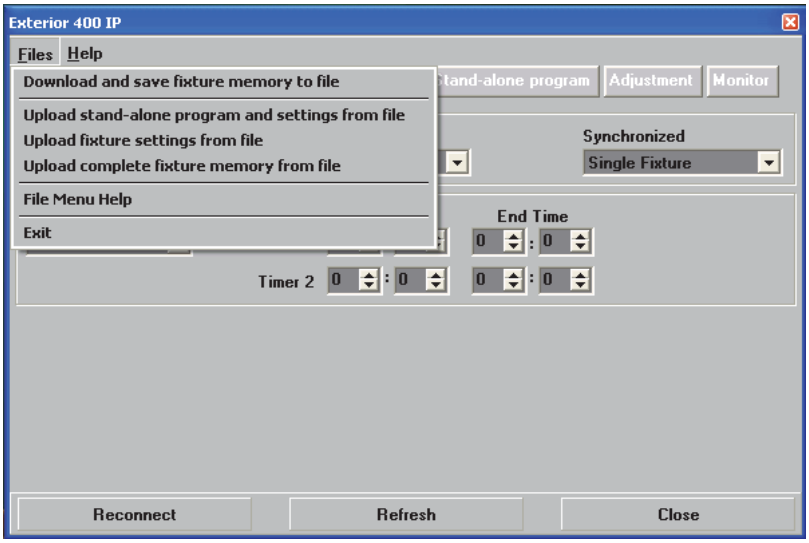


Figure 19: Managing fixture settings and stand-alone programs as files

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.

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.***

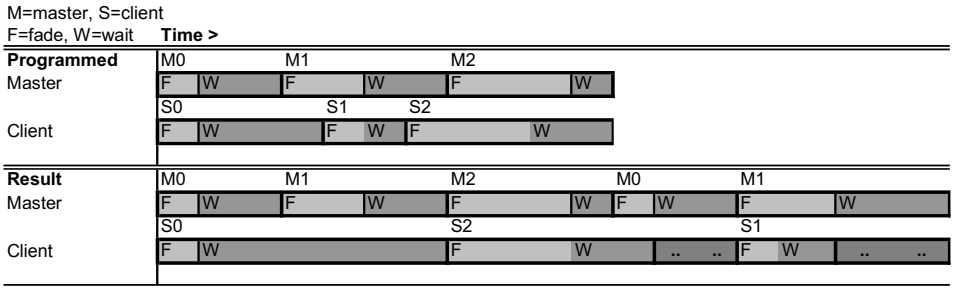
The principles in stand-alone synchronized operation are as follows:

1. A scene contains a fade section, followed by a wait section
2. Each fixture can be individually programmed with up to 100 scenes, and each scene can have its own individual fade and wait times.
3. Scenes are numbered from 0 to 99.
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 x*x*" message will result in the first scene being played.
6. 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 =>									
Programmed in Master	M0		M1		M2		M3			
	F	W	F	W	F	W	F	W		
Programmed in Client	S0		S1		S2		S3		S4	
	F	W	F	W	F	W	F	W	F	W
Result	M0		M1		M2		M3			
	F	W	F	W	F	W	F	W		
	S0		S1		S2		S3			
	F	W	F	W	F	W	--	--	F	W

7. 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.
8. 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.



Service and maintenance



Warning! Read "Safety Information" on page 3 before carrying out service or maintenance work on the Exterior 400 Image Projector.

Danger! Lock out power to the entire distribution system before servicing or opening any cover.



Warning! 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 may be carried out only by the Martin Service organization or its authorized agents.

Important! The Exterior 400 Image Projector requires occasional service and maintenance to maintain reliable operation and protect the investment it represents. It also requires a cleaning schedule that is appropriate for the environment it is used in. 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.

As with electronic components in general, Exterior 400 Image Projector fixture PCBs are sensitive to ESD (electrostatic discharge). Take precautions to avoid ESD damage during service.

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.

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 Image Projector. 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, cables and cable glands during cleaning.

The Exterior 400 Image Projector's aluminum housing and front glass can be cleaned with a mild detergent such as a car wash shampoo solution. To clean the housing and front glass:

1. Isolate the fixture from AC power and allow the fixture to cool for 30 minutes.
2. Visually check that the silicone seals between joints in the housing 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.

Cleaning optical parts

See the precautions in “Filter and gobo care” on page 7.

Replacing filters and gobos

See “Installing color filters and gobos” on page 7.

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 23 and clicking on the **Monitor** button:

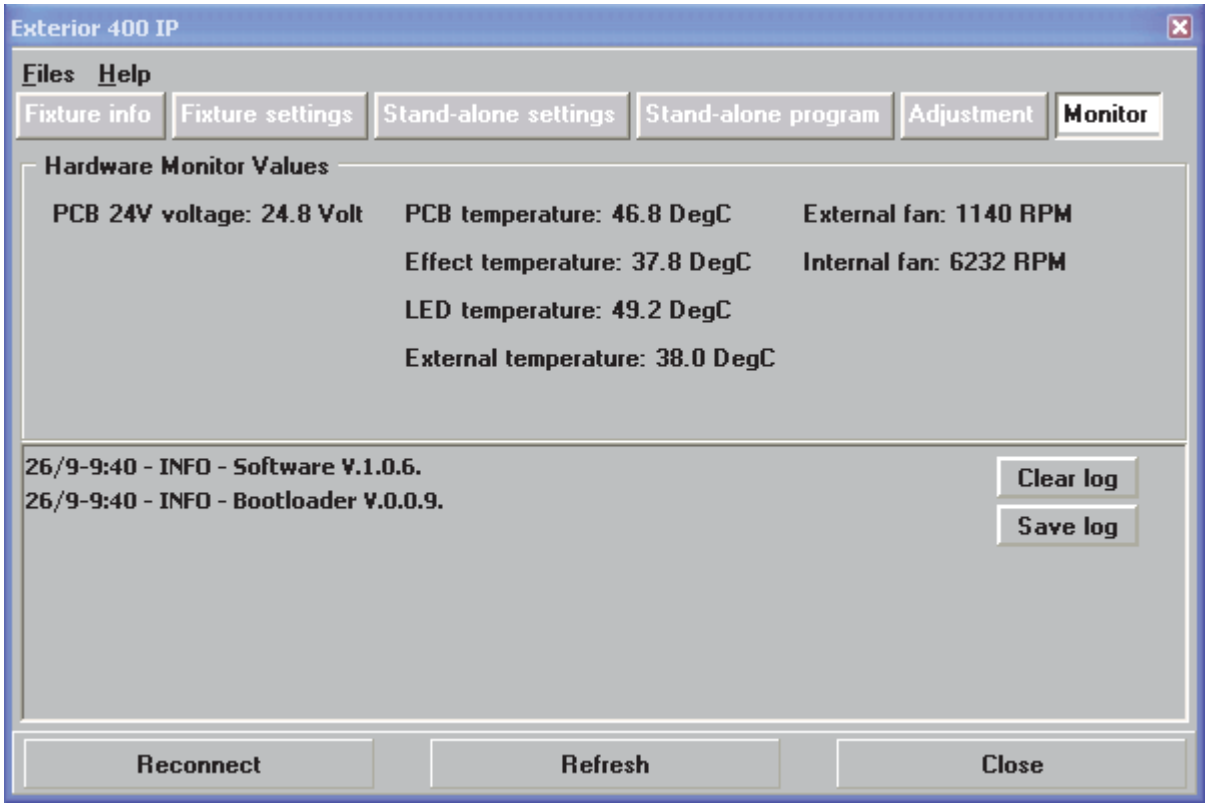


Figure 20: Fixture Monitor data

PCB 24V Voltage displays the current voltage in the 24 volt circuits on the main PCB (this data is for service purposes).

Temperature readouts display the current main PCB temperature, current effects temperature, the current temperature on the LED circuit board that gives the highest reading, and the current ambient temperature.

Fan readouts display the current internal and external cooling fan speeds in RPM (revolutions per minute).

Software installation

It may be necessary to upload new software (i.e. firmware) to an Exterior 400 Image Projector 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 DABS 1™ PC/fixture hardware interface box (supplied in a package with the Martin MUM™ application) and a Windows PC.

Installing software

1. Connect the uploader hardware to a Exterior 400 Image Projector 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 and behaves normally. If it does not, cycle power off and on again and check that the fixture now resets correctly and behaves normally. If the problem persists, contact Martin for assistance.

Status indicator LEDs

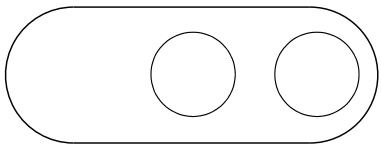
Two LEDs on the rear cover give information about fixture status.

LED 1 (DMX / data 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 (e.g. RDM).
- Lights steady yellow during a software upload.
- Flashes yellow while the fixture is resetting.

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

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



Reserved LED 1 LED 2

Figure 21: Status indicator LEDs

LED 2 (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.
- Does not light at all if power is not applied to the fixture.

Adjustment

The **Adjustment** window in MUM is for use by service technicians only. Do not use any commands in this window unless specifically instructed to do so by Martin™ Service personnel. If you alter the factory settings, there is a risk that you will cause unsatisfactory performance.

DMX protocol

Channel	DMX Value	Percent	Function	Fade type	Default value
			Electronic shutter effect, strobe (snap)		
	0 - 19	0 - 19	Shutter closed		
	20 - 49	20 - 49	Shutter open		
	50 - 64	50 - 64	Strobe 1, fast → slow		
	65 - 69	65 - 69	Shutter Open		
	70 - 84	70 - 84	Strobe 2, fast → slow - Opening Pulse		
	85 - 89	85 - 89	Shutter Open		
	90 - 104	90 - 104	Strobe 3, fast → slow - Closing Pulse		
	105 - 109	105 - 109	Shutter Open		
	110 - 124	110 - 124	Strobe 4, fast → slow - Random Strobe		
	125 - 129	125 - 129	Shutter Open		
1	130 - 144	130 - 144	Strobe 5, fast → slow - Random Opening Pulse	Snap	20
	145 - 149	145 - 149	Shutter Open		
	150 - 164	150 - 164	Strobe 6, fast → slow - Random Closing Pulse		
	165 - 169	165 - 169	Shutter Open		
	170 - 184	170 - 184	Strobe 7, fast → slow - Burst Pulse		
	185 - 189	185 - 189	Shutter Open		
	190 - 204	190 - 204	Strobe 8, fast → slow - Random Burst Pulse		
	205 - 209	205 - 209	Shutter Open		
	210 - 224	210 - 224	Strobe 9, fast → slow - Electronic Sinewave		
	225 - 229	225 - 229	Shutter Open		
	230 - 244	230 - 244	Strobe 10, fast → slow - Electronic Burst		
	245 - 255	245 - 255	Shutter Open		
2	0 - 255	0 - 100	**Intensity (fade)** Zero → full	Fade	0
			Color selection		
			Continuously scrolling color wheel positions		
	0	0	Open (white)		
	1-15	0 - 6	Open → Color 1		
	16	6	Color 1		
	17 - 31	7 - 12	Color 1 → Color 2		
	32	13	Color 2		
	33 - 47	13 - 18	Color 2 → Color 3		
	48	19	Color 3		
	49 - 63	19 - 25	Color 3 → Color 4		
	64	25	Color 4		
	65 - 79	25 - 31	Color 4 → Color 5		
	80	31	Color 5		
	81 - 95	32 - 37	Color 5 → Color 6		
	96	38	Color 6		
	97 - 111	38 - 44	Color 6 → Color 7		
	112	44	Color 7		
	113 - 127	44 - 50	Color 7 → Color 8		
	128	50	Color 8		
3	129 - 143	51 - 56	Color 8 → Open	Fade	0
	144	56	Open		
			Stepped scroll (indexed) color wheel positions		
	145 - 148	57 - 58	Color 8		
	149 - 152	59 - 60	Color 7		
	153 - 156	60 - 61	Color 6		
	157 - 160	62 - 63	Color 5		
	161 - 164	63 - 64	Color 4		
	165 - 168	65 - 66	Color 3		
	169 - 172	66 - 67	Color 2		
	173 - 176	68 - 69	Color 1		
	177 - 180	69 - 71	Open		
			Continuous color wheel rotation		
	181 - 203	71 - 79	CW, fast → slow		
	204 - 207	80	Color wheel stop		
	208 - 230	81 - 90	CCW, slow → fast		
			Random color chase		
	231 - 242	91 - 94	Fast		
	243 - 244	95	Medium		
	245 - 255	96 - 100	Slow		

Table 2: DMX Protocol

Channel	DMX Value	Percent	Function	Fade type	Default value
4			**Rotating gobo selection and shake**	Snap	0
			Indexed static gobo (set indexed gobo angle on channel 5)		
	0 - 3	0 - 1	Open		
	4 - 7	2 - 3	Gobo 1		
	8 - 11	3 - 4	Gobo 2		
	12 - 15	5 - 6	Gobo 3		
	16 - 19	6 - 7	Gobo 4		
	20 - 23	8 - 9	Gobo 5		
	24 - 27	9 - 11	Gobo 6		
			Rotation (set gobo rotation speed on channel 5)		
	28 - 31	11 - 12	Open		
	32 - 35	13 - 14	Gobo 1		
	36 - 39	14 - 15	Gobo 2		
	40 - 43	16 - 17	Gobo 3		
	44 - 47	17 - 18	Gobo 4		
	48 - 51	19 - 20	Gobo 5		
	52 - 55	20 - 22	Gobo 6		
			Indexed gobo shake (set indexed gobo angle on channel 5)		
	56 - 66	22 - 26	Gobo 1 shake, slow → fast		
	67 - 77	26 - 30	Gobo 2 shake, slow → fast		
	78 - 88	31 - 35	Gobo 3 shake, slow → fast		
	89 - 99	35 - 39	Gobo 4 shake, slow → fast		
	100 - 110	39 - 43	Gobo 5 shake, slow → fast		
	111 - 121	44 - 47	Gobo 6 shake, slow → fast		
			Rotating gobo shake (set gobo rotation speed on channel 5)		
	122 - 132	48 - 52	Gobo 6 shake, slow → fast		
	133 - 143	52 - 56	Gobo 5 shake, slow → fast		
	144 - 154	56 - 60	Gobo 4 shake, slow → fast		
	155 - 165	61 - 65	Gobo 3 shake, slow → fast		
	166 - 176	65 - 69	Gobo 2 shake, slow → fast		
	177 - 187	69 - 73	Gobo 1 shake, slow → fast		
			Continuous gobo wheel scroll (set gobo rotation speed on channel 5)		
	188 - 219	74 - 85	CW fast → slow		
	220 - 255	85 - 100	CCW slow → fast		
5			**Gobo indexing and rotation (select gobo on channel 4)**	Fade	128
			Indexed position		
	0 - 255	0 - 100	0 - 395°		
			Continuous rotation direction and speed		
	0 - 125	0 - 48	CW, fast → slow		
	126 - 128	49 - 50	No rotation		
	129 - 255	51 - 100	CCW, slow → fast		
6	0 - 255	0 - 100	**Gobo rotation, fine**	Fade	128
7			**Iris**	Fade	0
	0-199	0 - 77	Open → closed		
	200-215	78 - 84	Closed		
	216-229	85 - 89	Opening pulse, Fast → Slow		
	230-243	90 - 94	Closing pulse, fast → slow		
	244-249	95 - 97	Random opening pulse, fast → slow		
	250-255	98 - 100	Random closing pulse, fast → slow		
8			**Focus**	Fade	128
	0 - 255	0 - 100	Infinity → near		
9			**Fixture control settings**	Snap	0
	0 - 9	0 - 1	No function		
	10 - 14	2 - 3	Reset entire fixture		
	15 - 19	4 - 5	No function		
	20 - 24	6 - 7	Dimmer curve = Optically linear*		
	25 - 29	8 - 9	No function		
	30 - 34	10 - 11	Dimmer curve = Square law*		
	35 - 39	12 - 13	No function		
	40 - 44	14 - 15	Dimmer curve = Inverse square law*		
	45 - 49	16 - 17	No function		
	50 - 54	18 - 19	Dimmer curve = S-curve*		
	55 - 59	20 - 21	No function		
	60 - 64	22 - 23	Calibrated output*		
	65 - 69	24 - 25	No function		
	70 - 74	26 - 27	Raw output (maximum possible, non-calibrated)*		
	75 - 255	28 - 100	No function		
			*Menu override – setting not affected by power off/on		

Table 2: DMX Protocol

Troubleshooting

Problem	Probable cause(s)	Remedy
Fixture is completely dead.	No power to fixture.	Check power and connections.
	Internal fuse blown or internal fault.	Isolate fixture from power. Have fixture serviced by Martin authorized service technician.
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 DMX addressing.	Check fixtures' DMX 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 authorized service technician.
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. Have fixture serviced by Martin authorized service technician.
Different fixtures give uneven light output intensity.	One or more fixtures set to Raw (uncalibrated) output.	Set all fixtures to Calibrated output.

Table 3: Troubleshooting

Specifications

Physical

Medium and Wide-angle models

Length	365 mm (14.4 in.) including cable gland
Width	307 mm (12.1 in.) including mounting yoke
Height	421 mm (16.6 in.) including mounting yoke
Weight	14 kg (30.9 lbs.)

Narrow-angle (long barrel) models

Length	425 mm (16.7 in.) including cable gland
Width	307 mm (12.1 in.) including mounting yoke
Height	421 mm (16.6 in.) including mounting yoke
Weight	15 kg (33.1 lbs.)

Dynamic Effects

Color wheel	Slots for 8 interchangeable dichroic filters + open, full and split colors, continuous rotation, random color
Rotating gobo wheel	Slots for 6 interchangeable gobos + open, indexing, continuous gobo rotation & scrolling, shake
Motorized iris	0 - 100%, pulse effects
Motorized focus	Approx. 2 m (6.6 ft.) to infinity
Electronic dimming	0 - 100% continuous dimming
Electronic 'shutter' effect	Strobe, pulse and sinewave intensity modulation effects
Pre-programmed effects	Varied macro effects available in stand-alone mode

Optics

Light source	7 x Luminus CBT-90 (50 W) LEDs
White LED	6500 K
Minimum LED lifetime	60 000 hours (to >70% luminous output)*

**Manufacturer´s figure obtained under manufacturer´s test conditions*

Photometric Data

Luminous flux*	7400 lm (with 25° lens)
Cutoff angles*	Narrow models 15°, Medium models 25°, Wide models 40°

**Preliminary data – see www.martin.com for updated photometric data*

Control and Programming

Control options	DMX, stand-alone, synchronized (master/client)
Device management	RDM
DMX channels	9
DMX address setting	PC with Martin MUM™ software and DABS 1™ interface box, RDM
Stand-alone trigger options	Internal timer
Stand-alone (single fixture and/or synchronized) programming	PC with MUM software and DABS 1 interface box
Stand-alone program capacity	Up to 100 scenes
DMX compliance	ANSI E1.11 (USITT DMX 512-A)
RDM compliance	ANSI E1.20
Receiver	RS-485
Firmware update	Serial upload via DMX link

Construction

Color	Clear anodized, white, custom colors to special order
Housing	Anodized aluminum
Mounting yoke	8 mm (0.3 in.) anodized aluminum
Front glass	6 mm (0.2 in.) anti-reflection coated
Protection rating	IP65
Effective projected area (EPA)	0.15 m^2

Gobos

Outside diameter . . . . . 27.9 mm (1.1 in.) +0/- 0.3 mm (0.01 in.)
Maximum image diameter . . . . . .23 mm (0.9 in.)
Maximum thickness . . . . . 1.8 mm (0.1 in.)
Recommended glass . . . . . High-temperature Borofloat or better with dichroic or enhanced aluminum coating
Recommended metal . . . . . Aluminum (steel for temporary use only)

Installation

Orientation . . . . . .Any
Vertical aiming . . . . . 330°
Minimum distance to illuminated surfaces . . . . . 0.5 m (20 ins.)

Connections

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

Electrical

AC power . . . . . 100-240 V nominal, 50/60 Hz
Power consumption, zero output, all effects static . . . . . .13 W
Power supply unit . . . . . .Integrated, auto-sensing multi-voltage

Typical Power and Current

100 V, 50 Hz . . . . . 422 W, 4.2 A, PF 0.995
100 V, 60 Hz . . . . . 418 W, 4.2 A, PF 0.995
110 V, 60 Hz . . . . . 417 W, 3.8 A, PF 0.994
120 V, 60 Hz . . . . . 415 W, 3.5 A, PF 0.992
208 V, 60 Hz . . . . . 409 W, 2.1 A, PF 0.957
230 V, 50 Hz . . . . . 409 W, 1.9 A, PF 0.960
240 V, 50 Hz . . . . . 408 W, 1.8 A, PF 0.954

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 . . . . . 65° C (149° F)
Total heat dissipation (calculated, +/- 10%) . . . . . 1440 BTU/hr.

**Power must remain applied to the fixture at all times if the ambient temperature falls below 0° C (32° F)*

Approvals

EU safety . . . . . .EN 60598-2-17
EU EMC . . . . . EN 55015, EN 61000-3-2, EN 61000-3-3, EN 61547
US safety (US model) . . . . . UL 1573, UL 1598
US EMC (US model) . . . . . FCC Part 15 Class A
Canadian safety (US model) . . CSA C.22.2 No. 166, CSA C.22.2 No. 250

Included Items

Power and data cable tails (pre-installed)
Adjustable mounting yoke
Washers for use with mounting fasteners
User manual

Color filters (pre-installed)

Blue B04-6 . . . . . P/N 62327198
Orange B09-6 . . . . . P/N 62327201

Gobos (pre-installed)

Tight Stripple . . . . . P/N 43072011
Dots Breakup Small . . . . . P/N 43072009

All necessary goboholders with springs (six in total) are included

Accessories

Safety eyebolt . . . . . P/N 91611239
Safety wire, safe working load 50 kg (110.2 lbs.). . . . . P/N 91604003
3-pin male XLR connector, cable-type, IP65-rated . . . . . P/N 91611306
3-pin female XLR connector, cable-type, IP65-rated . . . . . P/N 91611307

Example color filters (glued in holders)

Light green B08-0 . . . . . P/N 62327199
Light yellow B03-0 . . . . . P/N 62327200
Pink B11-2 . . . . . P/N 62327196
Magenta B12 . . . . . P/N 62327180
Congo B13-1 (“Fluorescent”) . . . . . P/N 62327197
Deep red B4-17 . . . . . P/N 62327179

These are just examples of the range of color filters available from Martin™

Example gobos

Jessica Rose (aluminum, gobo only) . . . . . P/N 43070098
Rotation Spikes (glass, gobo only) . . . . . P/N 43072008
Organic 6 (glass, gobo only) . . . . . P/N 43072010
Blue Ripple (glass, gobo glued in holder) . . . . . P/N 62400796

These are just examples of the range of gobos available from Martin™

Related Items

Martin MUM™ (Multi-Utility Manager) incl. DABS 1™ interface box & cables. . . . . P/N 90758090
Martin RDM 5.5 Splitter™ . . . . . P/N 90758150
Martin M-PC™ Pro (up to 64 DMX universes) incl. USB Duo™ interface box . . . . . P/N 90732010
Martin M-PC™ Basic (up to 8 DMX universes) incl. USB Duo™ interface box . . . . . P/N 90732070
Martin USB Duo™ USB/DMX interface box . . . . . P/N 90703010

Ordering Information

Exterior 400 Image Projector™ Narrow, EU model . . . . . P/N 90356500
Exterior 400 Image Projector™ Narrow, US model . . . . . P/N 90356510
Exterior 400 Image Projector™ Medium, EU model . . . . . P/N 90507050
Exterior 400 Image Projector™ Medium, US model . . . . . P/N 90507060
Exterior 400 Image Projector™ Wide, EU model . . . . . P/N 90356540
Exterior 400 Image Projector™ Wide, US model . . . . . P/N 90356550

Custom colors available by special order – please contact your Martin™ supplier for details

Specifications subject to change without notice.
See Product Support page on www.martin.com for latest specifications including photometric data.

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