martinarchitectural®

Rail Light

installation guide and user manual

P/N 35000190 Rev. B

Contents

Safety information

Warning! ***This product is for professional use only. It is not for household use.***

This product presents risks of lethal or severe injury due to fire and heat, electric shock and falls. Read this manual before powering or installing this luminaire, follow the safety precautions listed below and observe all warnings in this manual and on the luminaire. If you have questions about how to operate this luminaire safely, please contact your Martin supplier or call the Martin 24-hour service hotline at +45 70 200 201.

Protection from electric shock

- Isolate the luminaire from AC power before removing or installing a tube or any part.
- Always ground (earth) the luminaire electrically.
- Use only a source of AC power that complies with local building and electrical codes and has both overload and ground (earth) fault protection.
- The AC power distribution system must include a means of isolating all installed devices from power and locking out power during service.
- All components in the AC power distribution circuits (cables, junction boxes, etc.) must be protected from water and airborne particles to IP67 or higher, must be suitably dimensioned for the current and power requirements of the devices installed, and must be of suitable type for the location (including water, pollution, temperature and UV resistance).
- Do not expose the luminaire to high-pressure water jets.
- Do not immerse the luminaire in water or install it in a location where flooding may occur.
- Do not use the luminaire if any cable, component, cover or casing is cracked, deformed or damaged in any way.
- Refer all service to a Martin service technician.

Protection from burns and fire

- Do not modify the luminaire.
- Install only genuine Martin parts and approved fluorescent tubes of the type and wattage specified for the armature.
- Do not operate the luminaire if the ambient temperature (Ta) exceeds 40° C (104° F).

- Allow the luminaire to cool for 15 minutes before servicing.
- Do not mask or modify light output with filters or other materials.
- Keep flammable materials well away from the luminaire.

Protection from injury due to falls

- Ensure that all external covers, components and installation fittings are securely fastened.
- Ensure that all supporting structures, surfaces and fasteners can bear the weight of all luminaires installed.
- Block access below the work area whenever installing, servicing or removing the luminaire.
- Use adequately dimensioned 8.8 grade minimum marine grade or acid-resistant bolts to mount the luminaire.

Introduction

Thank you for selecting the Martin Rail Light, a modular system of fluorescent-tube based luminaires that are remotely dimmable via an analog 1-10 V control device.

The Rail Light luminaire is designed primarily for the dynamic illumination of bridges and walkways. Dimmable T5 fluorescent tubes offer high efficiency and long lamp life. Luminaires consist of modular profiles of varying lengths for mounting on top of a bridge parapet or walkway handrail. Control and power cables are wired through the luminaire, and profiles are joined end-to-end. Each modular profile contains one or more armatures, and each armature consists of one dimmable tube and associated circuits.

The Rail Light features:

- 0-100% intensity control with remote dimming
- 1-10 V analog control
- High output, long life T5 fluorescent tubes
- Modular construction, giving flexible installation options
- Robust aluminum design

Martin can offer expert assistance with planning an installation, if desired.

Installation, on-site service and maintenance can be provided worldwide by the Martin Global Service organization and its authorized agents. Choosing a Martin service contract gives owners access to Martin's expertise and product knowledge in a partnership that will ensure the highest level of performance throughout the product's lifetime.

Warning! ***Read this manual before attempting to install, operate or service this product.***

Installation

Warning! ***Read “Safety information” on page 4 before attempting to install, operate or service this product.***

This section describes how to install the luminaire and make connections to power and control circuits. These procedures must be performed by qualified professionals.

Weight calculation

The weight of a Rail Light installation can be calculated by allowing 6.5 kg per meter (4.4 lbs. per ft.) +/- 5%. Through cabling, joints and all other luminaire components are included in the +/- 5% margin. However, the weight of cables from distribution boxes to the first luminaire in each group is not included in this figure and must be obtained from the installation electrician.

Mounting

Warning! ***Check that all fasteners and structures used to mount the Rail Light can bear the total weight of all devices installed. Fasteners must be marine grade or acid-resistant, grade 8.8 minimum.***

The Rail Light is designed to be mounted on brackets or posts using suitable hardware. Martin can advise and supply hardware if desired. Individual luminaires are mounted end-to-end, with power and control cables running through waterproof connectors from one luminaire into the next.

It is important to allow a clearance of exactly 5 mm between luminaires (see Figure 1) so that waterproofing is maintained while leaving enough space for thermal expansion.

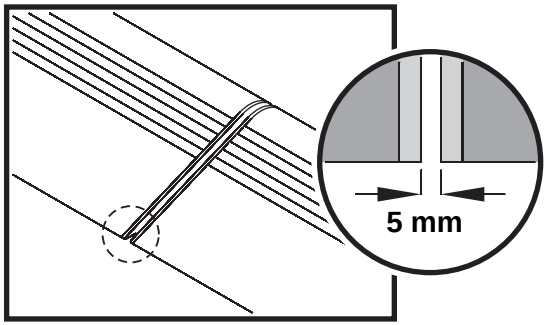


Figure 1: Clearance between luminaires

To mount the Rail Light:

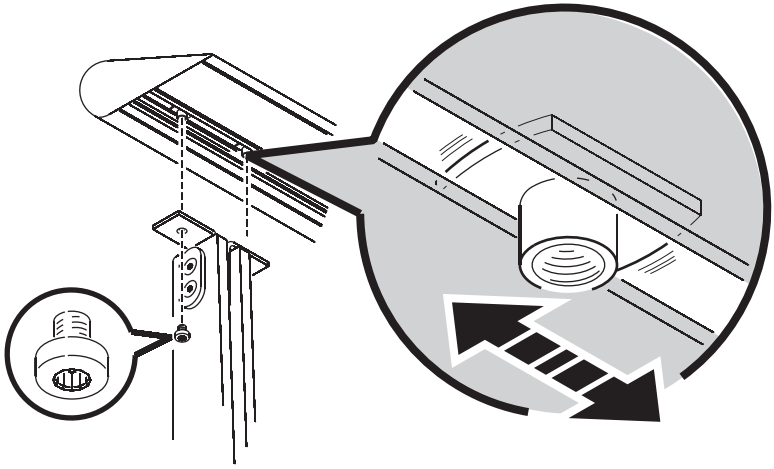


Figure 2: Mounting post and captive nuts

1. Make sure that power cables are isolated from power and that power cannot be accidentally applied.
2. Hold the first luminaire in position above its mounting brackets or posts.
3. See Figure 2. Slide the captive nuts along their channels in the bottom of the profile until you can pass screws through the mounting bracket or post and into the captive nuts.

4. Tighten the screws and check that the luminaire is totally secure.

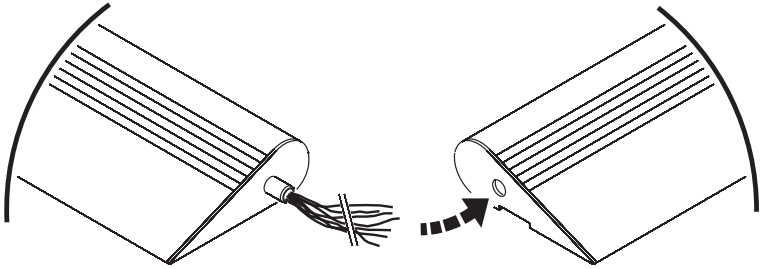


Figure 3: Luminaire-to-luminaire connection

5. See Figure 3. Holding the second luminaire approximately in position, push the wires from the first luminaire through the entry hole in the end of the second luminaire and into the second luminaire's housing.
6. Allowing 5 mm of clearance between the two luminaires as shown in Figure 1, fasten the second luminaire by means of the captive nuts and mounting screws.
7. Continue fastening luminaires, following the plan supplied with the products.

Concealed cable entry

Power and control cables can be routed inside support posts, etc. for concealed entry to luminaires. Luminaires that have this type of cable entry must be drilled on site during installation, and a Thorsman membrane nipple must be installed for cable feed-through.

Membrane nipples must be ordered at the same time as Rail Lights but are supplied free of charge for Rail Light installations.

To drill the required holes:

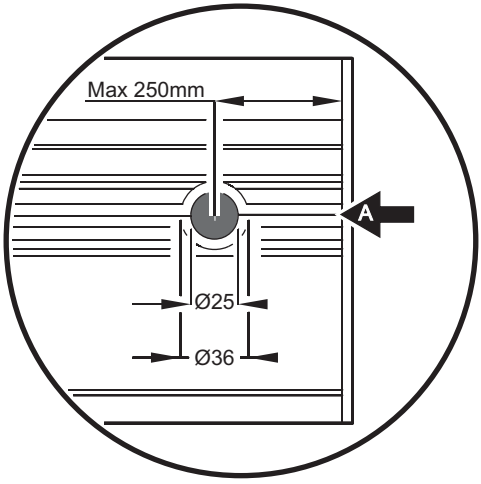


Figure 4: Drilling extra cable holes

1. See Figure 4 and Figure 5. Note the position of the drilling guide groove (A) in the channel on the lower side of the luminaire. Drill or grind a flat countersink 36 mm in diameter, centered on the guide groove and flush with the guide groove surface at the bottom of the channel, maximum 250 mm (9.5 in.) from the end of the luminaire.

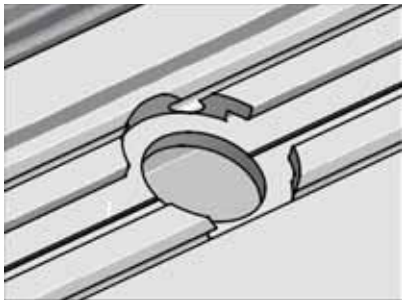


Figure 5: Luminaire after drilling

2. Drill a hole 25 mm in diameter, centered on the countersink, through the luminaire housing.

Mount the membrane nipple ready for cable entry as shown in Figure 5. Cable must be passed through the nipple for waterproof and safe cable entry.

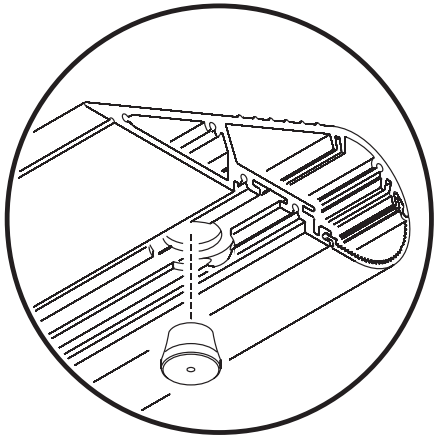


Figure 6: Membrane nipple

AC power: general

Warning! ***It is the installer's responsibility to ensure that all local safety regulations and legal requirements are observed when installing and connecting the Rail Light, and that all power cable and equipment is adequately dimensioned and of appropriate type for the installation.***

It is the installer's responsibility to calculate the power and current requirements of the installation and make sure that cables and equipment are adequately dimensioned. Power voltage, current, wattage and power factor data are given in the Specifications section on page 22.

Inrush currents and electronic circuit-breakers

If luminaires are switched on at the AC power voltage peak, their electronic control gear systems cause a large but very brief current surge. The OSRAM electronic QTi ballasts in Rail Light luminaires draw an inrush current of max. 28 amps for max 220 microseconds when power is applied. Table 1 gives full data and the maximum number of armatures per 10 A automatic circuit breaker recommended by OSRAM.

In connection with Table 1 please note the following:

- The data is per armature. Since Rail Light luminaires can contain one or more armatures you must calculate accordingly.
- The recommended maximum applies to N circuit breakers of Type 5 SN1–6 and 5 SX with B characteristics. If circuit breaker types with C characteristics are used, the number of armatures can be doubled (but where applicable, bear in mind DIN standard VDE 0100 Part 410).

Ballast	Max. inrush current	Max. inrush duration	Max. number of armatures
QTi 1 x 14/24	25 A	170 µs	18
QTi 1 x 21/39	25 A	170 µs	18
QTi 1 x 28/54	25 A	170 µs	18
QTi 1 x 35/49/80	28 A	220 µs	12

Table 1: Maximum number of armatures per 10 A circuit breaker

- Table 1 gives data for single-pole circuit breakers. When multi-pole circuit breakers are employed (2-pole, 3-pole) the maximum number of armatures is reduced by 20%.
- The recommended maximum is for a line impedance of 800 mΩ. This corresponds to a 15 m, 1.5 mm² (49 ft., 16 AWG) cable from the

distribution board to the first luminaire and a further distance of 20 m (66 ft.) to the middle of the circuit. At a line impedance of 400 mΩ, the maximum is reduced by 10%, and at a line impedance of 200 mΩ it is reduced by 20%.

RCDs and earth leakage

Many fixed installations use common neutral conductors in branch circuit distribution boxes. To avoid unintentional tripping of the RCD (residual current device or ground fault circuit breaker), ensure that the Rail Light's neutral conductor is connected to AC power via the same RCD as the live conductors.

Important! ***Each Rail Light armature contains an electronic ballast that "leaks" a total current of approximately 0.5 mA to ground (earth). Make sure that fixtures are correctly connected to ground (earthed) so that this "leakage" current can be absorbed.***

The 0.5 mA "leakage" current from each armature must be allowed for when connecting luminaires to a circuit that is protected by a 30mA RCD (residual current device) for ground fault (earth leakage) protection, otherwise the RCD may trip unintentionally. Bear in mind that some RCDs rated at 30 mA may trip when leakage to ground is as low as 20 mA. Depending on the type of installation, electrical regulations in some countries may permit the use of RCDs with a trip current rating higher than 30 mA. When considering this option, the installer must ensure that all local building and electrical regulations are respected.

Connecting to power and control

Removing components for access to connections

To gain access for connecting to power and control circuits:

1. Isolate the cables from power and make sure that power cannot be connected accidentally. Put on safety gloves to protect your fingers, especially from the sharp edges of the reflector.
2. See Figure 10. First, apply pressure (A) to the upper edge of the polycarbonate cover to release the cover from its retaining channel in the luminaire profile. Then lift the cover down and away from the luminaire (B). In large installations, the special tool supplied with the Rail Light will make this task easier.
3. Twist the tube 90° in either direction to release it from its sockets, and remove it (C).
4. Remove the reflector retaining screws (D) and remove the reflector (E). Avoid getting dirt or fingerprints on the reflector.
5. Remove the connections tray retaining screws (F) and pull the tray towards you a few centimeters (G) for easier access to the terminals.

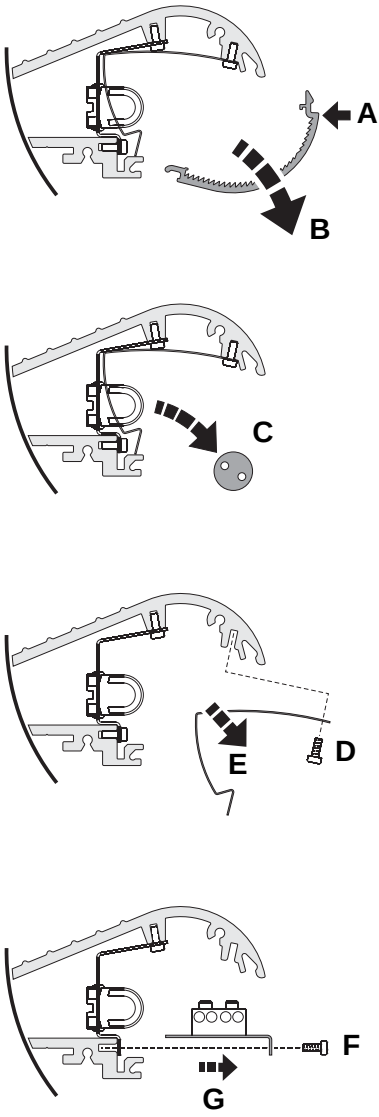


Figure 7: Access to power connectors

Schematic overview of power connections

Rail Light luminaires are designed to accept power input from a three-phase system. For example:

- In luminaires containing one armature, one phase can be used to feed the armature.
- In luminaires containing two armatures, two phases can be used to feed two armatures.
- In luminaires containing three armatures, one phase can be used to feed each armature. Neutral and earth are common (see Figure 8).
- In luminaires containing four armatures, one phase can be used to feed two armatures, and the two remaining phases used to feed one armature each (see Figure 9).

In each case, conductors are continued to the next luminaire.

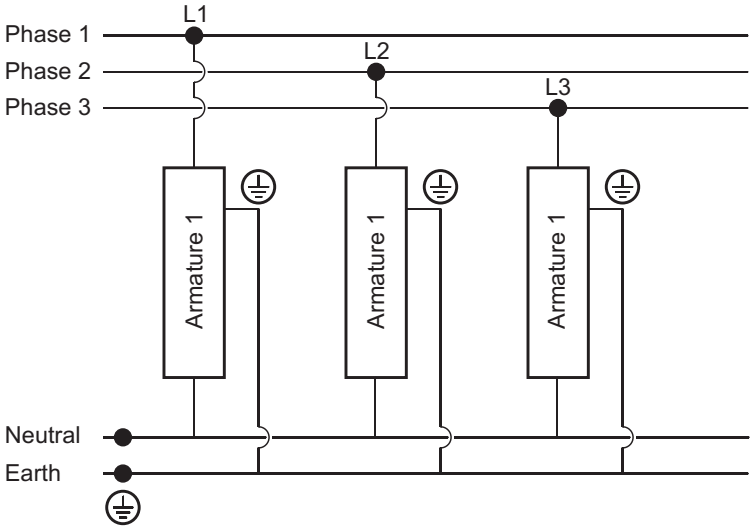


Figure 8: Schematic diagram of power connections, luminaire with 3 armatures

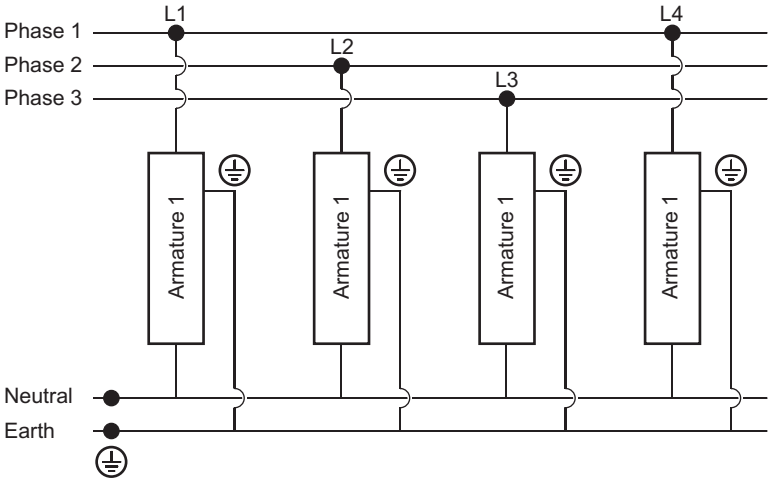
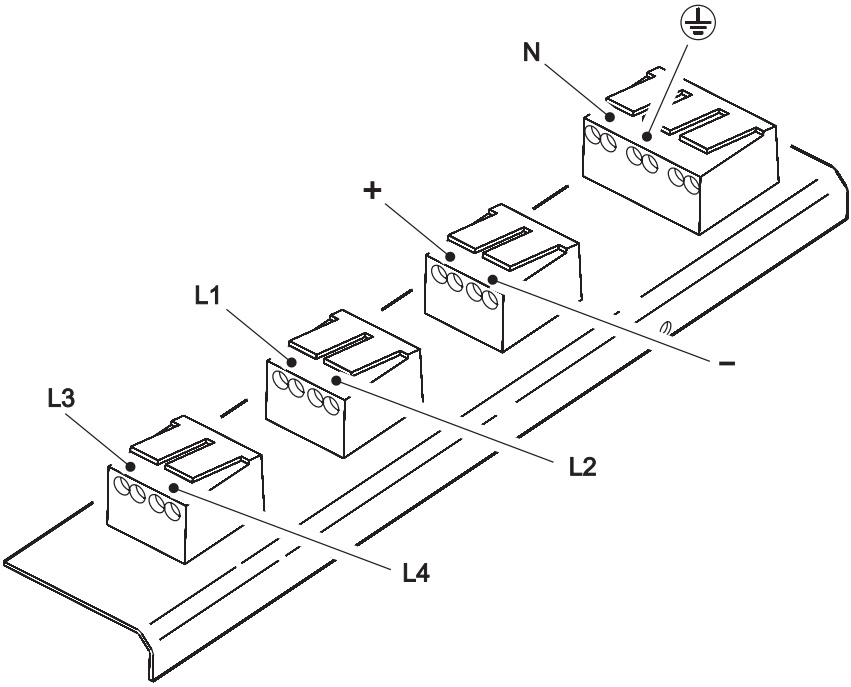


Figure 9: Schematic diagram of power connections, luminaire with 4 armatures

Connecting to power

Warning! ***Ensure that power cannot be applied to cables during installation.***

1. Ensure that power cable is disconnected from power and cannot be reconnected.
2. See Figure 10. Connect conductors that will carry live phases to the connectors marked **L** as follows:
   - If the luminaire contains one armature, connect a phase to the connector marked **L1**.
   - If the luminaire contains two armatures, connect phases to the connectors marked **L1** and **L2**.
   - If the luminaire contains three armatures, connect phases to the connectors marked **L1**, **L2** and **L3**.
   - If the luminaire contains four armatures, connect phases to the connectors marked **L1**, **L2**, **L3** and **L4**. Connect one phase to two connectors so that one phase supplies power to two armatures.
3. Connect the neutral conductor (blue wire) to the connector marked **N**.
4. Connect the earth conductor (yellow/green wire) to the connector marked ⏚.



L1 = Phase to armature 1, brown wire
L2 = Phase to armature 2, grey wire
L3 = Phase to armature 3, white wire
L4 = Phase to armature 4, orange wire
N = Neutral, blue wire
⏚ = Earth, yellow/green wire
+ = 1-10 V analog hot (+), red wire
– = 1-10 V analog cold (-), black wire

Figure 10: Connections overview

Connecting to analog control

An analog 1-10 V DC control link is required in order to control luminaire intensity with a suitable dimming device. The control link consists of two conductors, one for hot (+) and one for cold (-), that are connected to luminaires in parallel.

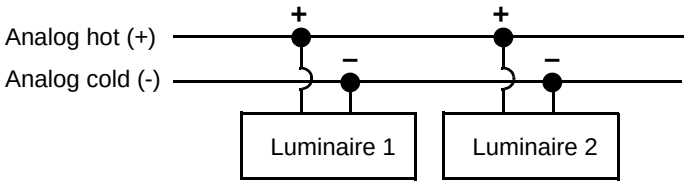


Figure 11: Schematic diagram of analog control connections

See Figure 10. While the connections tray is accessible, connect the 1-10 V DC analog control circuit to the luminaire as follows:

- Connect the 1-10 V hot (+) conductor to the connector marked **+** .
- Connect the 1-10 V cold (-) conductor to the connector marked **–** .

Reinstalling components after making connections

See Figure 7. Reinstall components in the reverse order of disassembly.

Do not reapply power until all components and covers have been reinstalled and the installation has been inspected and tested to rule out any electrical safety hazard.

Operation

Warning! ***Read “Safety information” on page 4 before attempting to install, operate or service this product.***

Burning in fluorescent tubes

For optimum tube life and performance, burn in new fluorescent tubes for 100 hours at full power.

Analog control

When a standard 1-10 V DC analog dimmer is connected via the dimming circuit, Rail Light luminaires can be dimmed from 0 to 100% intensity.

Operation in extreme ambient temperatures

Do not operate the Rail Light if the ambient temperature exceeds 40° C.

Rail Light luminaires can be operated in ambient temperatures as low as -20° C (-4° F), but a combination of low temperature and low dimming level will give a risk of flickering. In extreme cases, luminaires will shut down power to tubes and will not operate until they have been reset by powering the luminaire off and on again.

Flickering can be avoided at ambient temperatures below freezing point if luminaires are operated so that they generate their own heat and maintain tube temperature at or above freezing point. For best low-temperature dimming performance:

- As soon as the ambient temperature falls below 0° C (32° F), apply power permanently to luminaires. If light output is not required, reduce output by dimming tubes instead of shutting down power completely.
- If flickering occurs when dimming, increase the minimum dimming level.
- If flickering occurs when dimming luminaires after startup, start luminaires at full power for several minutes.

As a general rule, the higher the light output, the lower the ambient temperature luminaires can tolerate.

Service

Warning! ***Read “Safety information” on page 4 before attempting to install, operate or service this product.***

With long-life fluorescent tubes and no moving parts, the Rail Light is almost service-free. However, occasional cleaning is necessary to maintain the appearance and performance of the product.

The Rail Light’s Osram T5 tubes have an average lifetime of 20 000 hours, but tube life will vary depending on operating conditions. As an approximate rule, each power off/on cycle will reduce a tube’s lifetime by 30 minutes.

Fluorescent tube replacement

Warning! ***Isolate luminaires from power and ensure that power cannot be reconnected before replacing a tube.***

To change a tube:

1. Isolate the installation from power and make sure that power cannot be connected accidentally.
2. See Figure 12 on page 20. First, press the upper edge of the polycarbonate front cover (A) in to release it from its retaining channel in the luminaire profile. This operation can be carried out by hand, but the special clamping tool supplied with the Rail Light can save time and ease the operation.
3. Lift the cover down and away from the luminaire.
4. Pressing on the tube with both thumbs, twist it 90° in either direction to release it from its sockets, and then remove it.

5. To install a new tube, slide the tube's terminal pins fully into their sockets and rotate the tube 90° in either direction to engage the pins. Check that the tube is held securely in the sockets.

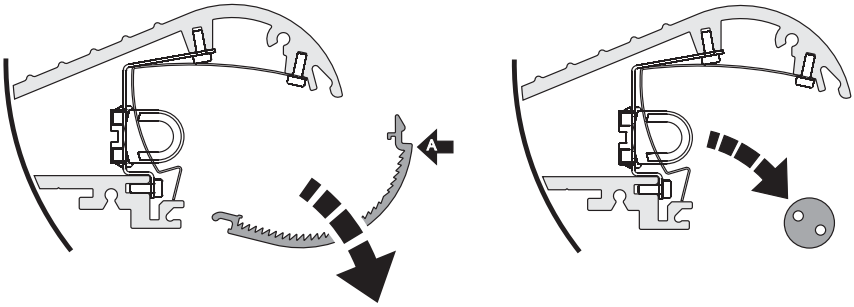


Figure 12: Tube removal

6. Replace all polycarbonate front covers before reapplying power to the installation.

Cleaning

Warning! ***Do not use a high-pressure water jet to clean luminaires. Isolate from power and ensure that power cannot be reconnected before cleaning. Clean the inside of luminaires in dry weather only.***

To clean the Rail Light:

1. Isolate the installation from power and ensure that power cannot be reconnected.
2. If it is necessary to clean the inside of the luminaires, allow luminaires to cool for 15 minutes if they have been in use, remove polycarbonate front covers as described under "*Fluorescent tube replacement*" on page 19, wipe reflectors and tubes with a dry cloth only, and replace all covers.
3. Use a cloth or soft brush soaked in a water/auto shampoo solution to wipe outside surfaces clean.

Do not use a high-pressure water jet for cleaning. The Rail Light is waterproof to IP 54, but is not designed to withstand high-pressure water projections.

Do not use abrasives or solvents for cleaning, as these may damage the aluminum housing, front covers and seals.

Troubleshooting

Problem	Probable cause(s)	Remedy
No response from fixture when power is applied.	No power to luminaire.	Check power connections.
	Ground fault protection circuit breaker (RCD) has tripped.	Reset RCD. If problem persists, test and if necessary replace the RCD, or reduce the number of fixtures powered via one RCD.
	Problem on analog control link.	Check controller, cables and connections. Repair or replace as necessary.
Luminaires do not respond correctly to analog control.	Controller not connected correctly.	Check connection.
	Fault on analog control link.	Check cables and connections. Repair or replace as necessary.
Poor quality light output.	Tube not burnt in.	Run luminaire for at least 100 hours to burn in tubes.
	Tube defective.	Disconnect luminaire and replace tube.
	Ambient temperature too low.	Leave luminaires permanently powered. Increase minimum dimming levels to raise temperature inside luminaires.

Rail Light Specifications

PHYSICAL

Weight* . . . . . 6.5 kg per meter (4.36 lbs. per ft.) +/- 5%

**Through cabling, joints and all other luminaire components are included in the +/- 5% margin. The weight of cables from distribution boxes to the first luminaire in each group is not included.*

LAMP

Type . . . . . Osram T5 fluorescent tube
Average tube life . . . . . 20 000 hours

DYNAMIC EFFECTS

White intensity 0-100%

CONTROL AND PROGRAMMING

Control method . . . . . 1-10 V DC analog

APPROVALS

CE

EU safety . . . . . EN 60598-1, EN 60598-2-3
EMC . . . . . EN 60555-3, EN 55015

INSTALLATION

Mounting . . . . . On brackets or steel profile
Orientation . . . . . Horizontal, polycarbonate cover facing down

THERMAL

Maximum ambient temperature (T_a max.) . . . . . 40° C (104° F)
Minimum ambient temperature (T_a min.) . . . . . -20° C (-4° F)*
Cooling . . . . . Convection/conduction

**Operation below 0° C (32° F) requires luminaires to be powered permanently.*

ELECTRICAL

Nominal power voltage . . . . . 208-250 VAC, 50/60 Hz, auto-sensing

Power and current, 14 watt armature*

@ 208 V, 50 Hz . . . . . 0.09 A, 17 W, PF = 0.981
@ 230 V, 50 Hz . . . . . 0.08 A, 17 W, PF = 0.966
@ 240 V, 50 Hz . . . . . 0.08 A, 17 W, PF = 0.965
@ 250 V, 50 Hz . . . . . 0.07 A, 17 W, PF = 0.957

Power and current, 21watt armature*

@ 208 V, 50 Hz . . . . . 0.12 A, 24 W, PF = 0.990
@ 230 V, 50 Hz . . . . . .0.11 A, 24 W, PF = 0.986
@ 240 V, 50 Hz . . . . . 0.10 A, 24 W, PF = 0.983
@ 250 V, 50 Hz . . . . . 0.10 A, 24 W, PF = 0.978

Power and current, 28 watt armature*

@ 208 V, 50 Hz . . . . . 0.15 A, 31W, PF = 0.994
@ 230 V, 50 Hz . . . . . 0.14 A, 32 W, PF = 0.991
@ 240 V, 50 Hz . . . . . 0.14 A, 33 W, PF = 0.983
@ 250 V, 50 Hz . . . . . 0.14 A, 33 W, PF = 0.966

Power and current, 35 watt armature*

@ 208 V, 50 Hz . . . . . 0.2 A, 39 W, PF = 0.955
@ 230 V, 50 Hz . . . . . 0.18 A, 39 W, PF = 0.935
@ 240 V, 50 Hz . . . . . 0.18 A, 39 W, PF = 0.928
@ 250 V, 50 Hz . . . . . 0.17 A, 39 W, PF = 0.919

**See labels on luminaires for armature wattages.*
Inrush current max. 28 A per ballast, max. 220 μs duration.
Figures are typical, not maximum. Allow for +/- 10% deviation.
PF = Power Factor

CONNECTIONS

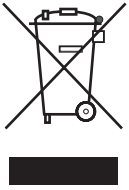
Power input . . . . . Quick connector terminal block
Control input/output . . . . . Quick connector terminal block

CONSTRUCTION

Housing . . . . . .Aluminum
Finish . . . . . Clear anodized
Optics . . . . . .High specular 99.9% aluminum
IP rating IP54

INCLUDED ITEMS

T5 Osram fluorescent tubes (wattage depends on length of armature)
Special tool for cover removal
End-to-end connection seals



Disposing of this product

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

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

Martin

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