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Cyclo Directional IP65

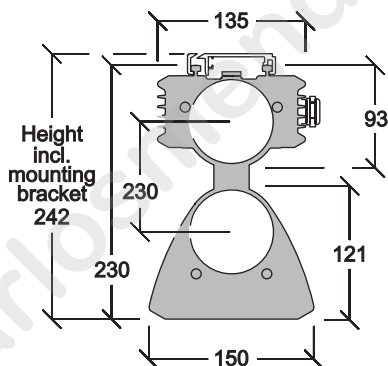
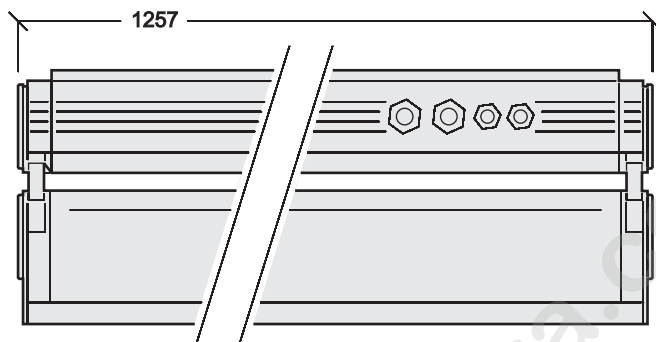


user manual

Martin

Dimensions

Measurements are in millimeters



Martin

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P/N 35000191, Rev. A

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:



Danger! Safety hazard. Risk of personal injury or death.



Danger! Hazardous voltage. Contact will cause electric shock.



Danger! Fire hazard.



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



DANGER! This product is not for household use. It presents risks of injury due to electric shock, fire, burns and falls if safety precautions are not followed.

Read this manual before installing, powering, operating or servicing the luminaire. Follow the safety precautions listed below, and observe all warnings in this manual and on the luminaire. Use the luminaire only as described in this manual and in accordance with local laws and regulations. Refer any operation not described in this manual to a qualified technician.

If you have any questions about how to operate this luminaire safely, contact your Martin Architectural supplier or call the Martin 24-hour service hotline on +45 70 200 201.



Protection from electric shock

- Do not use the luminaire if any cable, seal, cover, housing or other component is cracked, deformed or damaged in any way.
- Isolate the luminaire from power and lock out power before removing or installing a tube, fuses 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.
- Ensure that the AC power distribution system includes a means of isolating all installed devices from power and locking out power during service.
- Ensure that all components in the AC power distribution circuits (cables, junction boxes, etc.) are protected from water and airborne particles to IP67 or higher, are suitably dimensioned for the current and power requirements of the devices installed, and are of suitable type for the location (including water, pollution, temperature and UV resistance).
- Do not expose the luminaire to a high-pressure water jet.
- Do not immerse the luminaire in water or install it in a location where flooding may occur.
- Refer all service not described in this manual to a Martin service technician.



Protection from burns and fire

- Do not operate the luminaire if the ambient temperature (T_a) exceeds 40° C (104° F).
- Keep flammable materials well away from the luminaire.
- Allow the luminaire to cool for 15 minutes before servicing.
- Do not attempt to bypass thermostatic switches or fuses. Replace defective fuses with ones of the specified type and rating only.
- Do not modify the luminaire. Install only genuine Martin parts and approved fluorescent tubes of the type and wattage specified for the armature.
- Provide a minimum clearance of 25 mm (1 inch) and unobstructed airflow around the luminaire.
- Do not mask or modify light output with filters or other materials.



Protection from injury due to falls

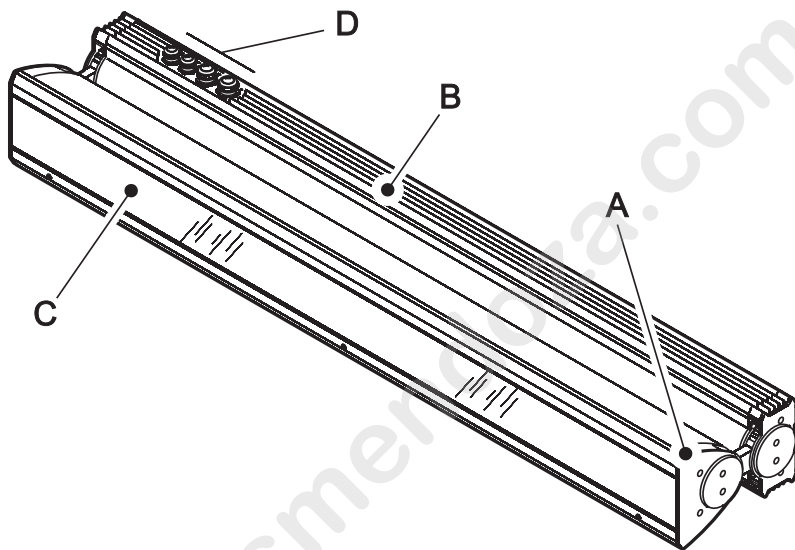
- Block access below the work area and work from a stable platform whenever installing, servicing or removing the luminaire.
- Ensure that all supporting structures, surfaces, fasteners and lifting equipment can bear the weight of all the devices they are intended to support plus an adequate safety margin, and that they conform to local building and safety regulations.
- Use fasteners that have sufficient corrosion resistance, dimensions and strength to mount the luminaire safely. Any nuts used must be self-locking.
- Ensure that all components and installation fittings are securely fastened.



Contents

Safety information	3
Product overview	6
Introduction	7
Installation	8
Included items	8
Access to tube module	9
Access to connections compartment	10
Mounting	11
Orientation and adjustment	12
Cable entry	15
AC power	18
Linking luminaires for DMX and synchronized operation	21
Operation: general	27
Fluorescent tube lifetimes and performance	27
Avoiding condensation and humidity	27
Operation in extreme ambient temperatures	28
Stand-alone operation	29
Stand-alone operation settings	30
Single stand-alone operation	31
Master/slave stand-alone operation	31
DMX-controlled operation	35
DMX control functions	35
Service	36
Cleaning	36
Tube replacement	36
Main fuse replacement	39
Voltage setting	40
Troubleshooting	41
DMX protocols	42
Cyclo IP65 Directional specifications	43

Product overview



- A – Tube module**
- B – Base module**
- C – Front cover**
- D – Metal cable glands (if used)**

Introduction

Thank you for selecting a luminaire from the Martin Architectural® Cyclo IP65 Directional series. Cyclo IP65 Directional luminaires are fluorescent tube-based dynamic color-changing luminaires designed for illumination of walls and surfaces. Dimmable 54 watt T5 fluorescent tubes combine high efficiency, bright color and long lamp life. Luminaires are designed for surface mounting, and adjustable arms allow tilting through a wide range of angles.

Cyclo IP65 Directional luminaires offer independent 0-100% control of tube intensity using a standard DMX controller. They can also be programmed to run stand-alone light shows alone or in synchronized groups.

Two models are available. The 03 has red, green and blue tubes, allowing RGB additive color mixing. The 04 has red, green and blue tubes plus a cool daylight white tube, allowing RGBW color mixing. The color temperature of the white tube's output can be controlled using the colored tubes.

Luminaires are dustproof and protected from water projections and low-pressure water jets to IP65. A self-purging humidity valve eliminates condensation. Luminaires can start and operate with tubes dimmed to 1% light output in ambient temperatures as low as -20° C (-4° F).

Versions are available to suit the following voltage ranges:

- 120 V models accept 100-130 V nominal AC power at 50/60 Hz.
- 230 V models accept 200-240 V nominal AC power at 50/60 Hz.

Martin Architectural 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.

The most recent version of this user manual is available from the Support area of <http://www.martin-architectural.com>

Installation



DANGER! Read “*Safety information*” on page 3 before attempting to install this product.

The safety and suitability of lifting equipment, installation location, anchoring method, mounting hardware and electrical circuits are the responsibility of the installer. All local safety regulations and legal requirements must be observed when installing and connecting the Cyclo IP65 Directional. Installation must be carried out by qualified professionals only.

This section describes how to install the luminaire, including how to connect it to power and control data cables, and how to set it up for DMX control or stand-alone operation.

We recommend that you read the Installation section of this manual and familiarize yourself with the procedures involved before starting to install luminaires. If you are not familiar with DMX, pay particular attention to the section on setting DMX addresses.

Included items

Cyclo IP65 Directional luminaires are supplied with the following items:

- Osram T5 fluorescent tubes (installed)
- Surface-mounting bracket.
- Two TET 5-7 Thorsman rubber membrane cable glands (installed) for data cable entry: cable diameter 5-7 mm (0.20-0.28 in.)
- Two TET 10-14 Thorsman rubber membrane cable glands (installed) for power cable entry: cable diameter 10-14 mm (0.40-0.55 in.)
- Two M25 metal blanking plugs (installed) for unused power cable entry holes.
- Two M16 metal blanking plugs (installed) for unused data cable entry holes.
- Two M25 metal IP68 cable glands (supplied loose) for AC power cable entry: cable diameter 7 - 15 mm (0.28 - 0.6 in.).
- Two M16 metal IP68 cable glands (supplied loose) for data cable entry: cable diameter 5 - 12 mm (0.2 - 0.45 in.).

Access to tube module

Various operations described in this manual require access to the inside of the module that contains the tubes. To access the inside of the tube module:

1. Isolate the luminaire from power and ensure that power cannot be reconnected.
2. See Figure 1. Loosen the three front cover release screws in the hinged front cover release flap until they turn freely.

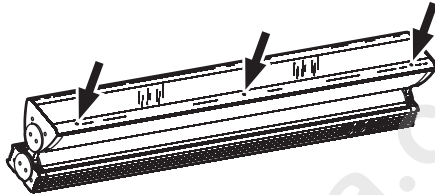


Figure 1: Front cover release screws

3. See Figure 2. Lift the release flap (A) and then lift the hinged front cover (B). If you need to lever the release flap up, use a plastic or wooden object, as a metal object may damage the glass. Avoid damaging seals while you are working.

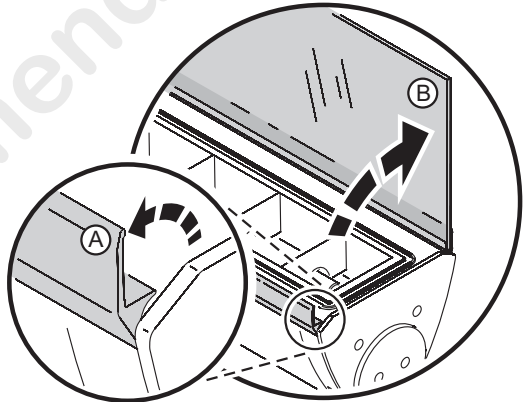


Figure 2: Opening the front cover

4. To close the front cover, first close the cover (B), then close the release flap (A) so that it clips down over the cover. The seals on the inside faces of covers must be in perfect condition to maintain their waterproof qualities. Avoid damaging them. Any seal that is not in perfect condition must be replaced by a Martin service agent.

Access to connections compartment

Various operations described in the is manual require access to the connections compartment in the base module. To access the connections compartment:

1. See Figure 3. Remove the two screws from the ends of the connections compartment cover.

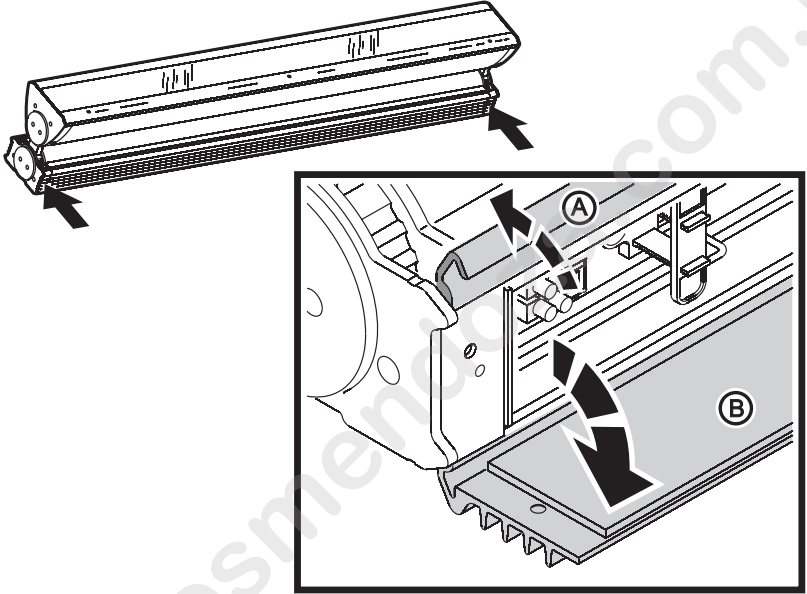


Figure 3: Opening the connections compartment cover

2. Open the hinged release flap (A) and then open the hinged cover (B). Avoid damaging the seal on the inside of the cover.
3. To close the connections compartment, first close the hinged cover (B), then close the release flap (A) so that it clips down over the cover. The seals on the inside faces of covers must be in perfect condition to maintain their waterproof qualities. Avoid damaging them. Any seal that is not in perfect condition must be replaced by a Martin service agent.
4. Tighten the two screws at either end of the cover before applying power.

Mounting



DANGER! It is the installer's responsibility to ensure that the installation is safe and that all local safety regulations and legal requirements are observed when mounting the Cyclo IP65 Directional.

The Cyclo IP65 Directional can be surface-mounted on a floor, wall or ceiling. To surface-mount the Cyclo IP65 Directional:

1. Ensure that the mounting surface is flat and can support the weight of all the devices to be installed on it. Allow 25 mm (1 inch) of free space around each luminaire.
2. Using the mounting bracket as a guide, mark up and drill holes in the mounting surface to take mounting fasteners.
3. Fasten the mounting bracket to the surface with at least two fasteners that have sufficient corrosion resistance and strength to mount the luminaire safely. Choice of mounting hardware will depend on the installation, but use high-quality corrosion-resistant fasteners with recommended minimum properties grade A4-70 (ISO 3506), or grade 8.8 (ISO 898-1). Any nuts used must be self-locking.
4. Check that the bracket is not distorted and is securely attached to the mounting surface.

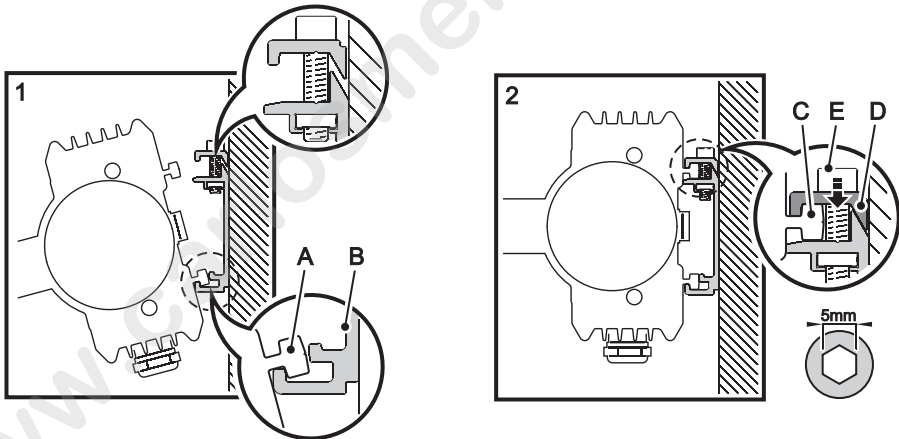


Figure 4: Installing on the mounting bracket

5. See Figure 4. To install the luminaire on the mounting bracket, hook the raised T-section (A) on the lower side of the luminaire base into the channel (B) on the mounting bracket, then swing the luminaire up so that

the T-section (C) on the upper side of the base passes behind the retaining rail (D).

6. Tighten the retaining screws (E) so that the retaining rail (D) grips the T-section (C) tightly. Check that the luminaire is held securely.

Orientation and adjustment

Important! The Cyclo IP65 Directional support arms must both be fixed at the same angle. Do not twist the luminaire in the support arms, or you may deform the product and make it impossible to obtain a waterproof seal.

The Cyclo IP65 Directional can be installed in any orientation.

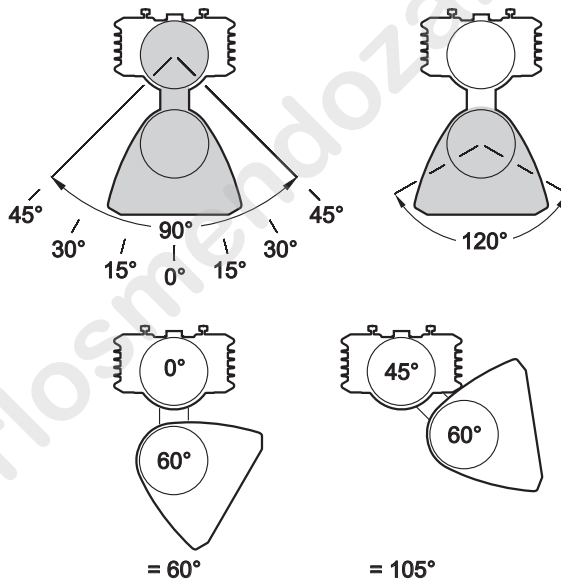


Figure 5: Tilt angle adjustment

See Figure 5. The angle of the support arms can be adjusted in the base module, and the tube module can be rotated in the support arms, allowing a wide range of tilt angles.

Adjusting the support arm angle

To adjust the angle of the support arms in the base module:

1. Ensure that the luminaire is securely mounted and isolated from power.
2. Open the connections compartment as described in “Access to connections compartment” on page 10.
3. See Figure 6. Support the weight of the tube module. Loosen the arm adjustment screws at both ends of the base module with a long Allen key, tilt the arms to the desired angle and retighten slowly, rocking the tube module up and down slightly while you tighten so that the adjustment screws engage correctly in the cutouts in the arm.

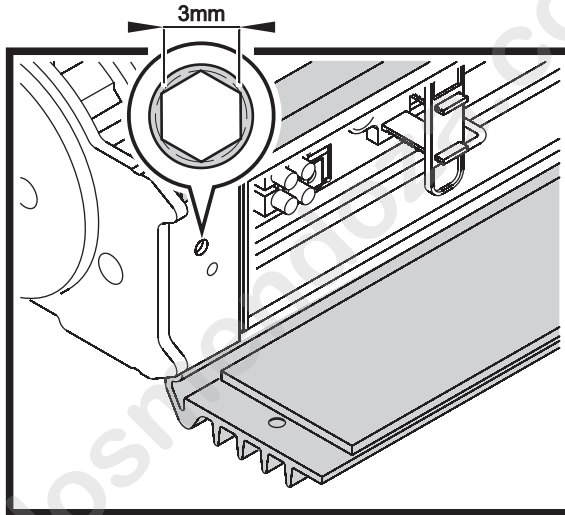


Figure 6: Arm-to-base adjustment screws

4. Reinstall the connections compartment cover as described in “Access to connections compartment” on page 10.

Adjusting the tube module tilt angle

To rotate the tube module in the support arms:

1. Ensure that the luminaire is securely mounted and isolated from power.
1. Open the front cover as described in “Access to tube module” on page 9.
2. See Figure 7. Loosen both the tilt adjustment screws with a long Allen key, rotate the tube module to the desired angle, and retighten.

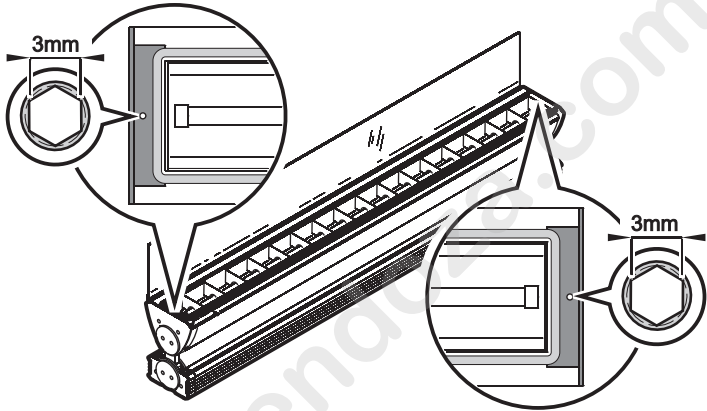


Figure 7: Tube module tilt adjustment screws

3. Reinstall the front cover as described in “Access to tube module” on page 9.

Cable entry

Two types of seal can be used for cable entry:

Thorsman rubber membrane cable glands (see Figure 9) installed in the base module and metal cable glands (see Figure 10) packed loose with the product. If the metal glands are used, blanking plugs must be removed and replaced with metal glands.

Use the larger glands for power cable entry and the smaller glands for DMX data cable entry.

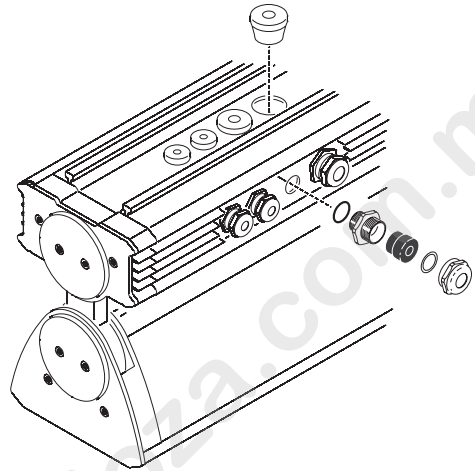


Figure 8: Cable gland options

Cable glands may need to be replaced in the following situations:

- If power or data cable is used that is not within the diameters specified under “*Included items*” on page 8, new cable glands that match cable diameter must be obtained from Martin or an electrical supplier.
- Rubber and metal glands must be replaced with new items if cable in an existing installation is replaced with cable of a different diameter.
- Used rubber membrane glands must be replaced with new unpierced items or replaced with blanking plugs if they are no longer used for cable entry.
- If metal cable glands are installed, they must be replaced with blanking plugs if no longer used for cable entry.

Replacement rubber membrane glands must have the following characteristics:

<i>Temperature range</i>	-20° to +70°C or better
<i>Ingress protection rating</i>	IP67 or IP68
<i>Installation plate thickness</i>	0.5-4.0 mm (0.02-0.17 in.)
<i>Power cable gland installation hole diameter</i>	23 mm (0.91 in.)
<i>Data cable gland installation hole diameter</i>	16 mm (0.63 in.)

Replacement metal glands must have the following characteristics:

Temperature range: -20° to +70°C or better
Ingress protection rating: IP67 or IP68
Power cable gland thread size: M25
Data cable gland thread size: M16
Minimum entry thread length: 10 mm (0.4 in.)

Installing cable using rubber membrane glands



DANGER! Using a rubber membrane gland involves making a hole in the membrane. A used gland is therefore only waterproof with cable installed. If the cable is removed, the hole in the housing must be sealed with a blanking plug or new gland.



Figure 9: Thorsman rubber membrane cable glands

To install cable using a rubber gland:

1. Push a round spiked object through the center of the membrane from the outside of the housing just enough to pierce it. Do not enlarge the hole or remove rubber from the membrane.
2. Push cable through the gland from the outside of the housing.

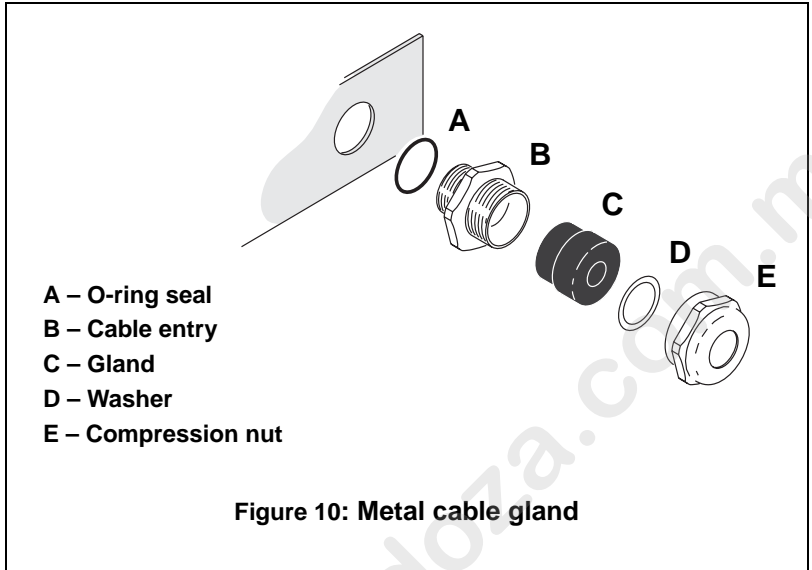
Installing cable using metal cable glands

Two sizes of metal cable gland are supplied loose with the product. Use the larger glands for power cable entry and the smaller glands for DMX data cable entry.

To install cable using a metal cable gland:

1. Remove a blanking plug that matches the cable gland size from the base module housing.

2. See Figure 10. Dismantle the cable gland.



3. Ensure that there is a rubber O-ring **A** on the housing end of the cable entry **B**, and screw this end into the threaded hole in the housing. Tighten until the O-ring **A** makes a water-resistant seal against the outer surface of the housing. Do not over-tighten, as this may damage the seal or housing.
4. Thread the cable through the compression nut **E**, washer **D**, gland **C**, and cable entry **B** into the housing.
5. Allow approx. 20 cm (8 in.) of cable slack inside the housing. Prevent the cable entry from turning and tighten the compression nut sufficiently to make a water-resistant seal. Do not over-tighten, as this may damage the gland. Check that the cable is firmly gripped in the rubber gland.

AC power



DANGER! It is the installer's responsibility to ensure that all power cable and equipment is adequately dimensioned and of appropriate type for the installation, and that all local safety regulations and legal requirements are observed when installing and connecting the Cyclo IP65 Directional.



Current and power data are given in the Specifications section on page 43.

Inrush currents and electronic circuit-breakers

When fluorescent tubes with ECG (electronic control gear) systems are switched on at the AC wave peak, a larger current surge occurs than with conventional ballasts. If a large number of luminaires are switched on simultaneously, this inrush current can trip electronic circuit breakers. To avoid this in large installations, either switch on luminaires at intervals or limit the number of luminaires per 16 A electronic circuit breaker to approximately ten luminaires.

RCDs and common neutral conductors

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/earth leakage circuit breaker), ensure that each luminaire's neutral conductor is connected to AC power via the same RCD as the live conductor.

Leakage to ground and RCDs

Each ECG "leaks" a total current of maximum 0.5 mA to ground (earth). Luminaires must be correctly connected to ground so that this "leakage" current can be absorbed.

Allow for the "leakage" current from ECGs when connecting luminaires to a circuit that has an RCD for ground fault protection, otherwise the RCD may trip unintentionally. Bear in mind that RCDs are rated at their *maximum* trip current, and that some RCDs rated 30 mA may trip when leakage to ground is as low as 20 mA.

RCDs can also be tripped by the inrush current when tubes are switched on.

To avoid unintentional tripping of RCDs:

1. Distribute power using 3 phases and install 3-phase RCDs.
2. If it is both safe and legal, use 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. Maximum legally

permitted RCD trip current ratings are normally stated in national electrical and building codes.

3. Install surge current-resistant RCDs.

Connecting to power

A screw clamp is provided for connecting the luminaire to the power cable's earth conductor, and a block of spring-loaded clamp terminals are provided for connecting the luminaire to the power cable's live and neutral power conductors. Some common color-coding systems for power wiring are given below:




Wire (EU)	Wire (US)	Pin	Marking on luminaire
brown	black	live	L1
blue	white	neutral	N
yellow/green	green	ground	

Table 1: Power cable color-coding systems

To connect to AC power:

1. Ensure that power cannot be applied to the cable during installation.
2. Open the connections compartment as described in “*Access to connections compartment*” on page 10.
3. Pass the power input cable through a cable gland as described in “*Cable entry*” on page 15 so that approximately 20 cm (8 in.) of cable is free inside the luminaire, and prepare the end of the cable for connection.
4. See Figure 11. Four spring-loaded terminals marked **L1**, **L2**, **L3** and **N** and one screw clamp marked  are provided for power cable connection. The terminals marked **L2** and **L3** are not used to supply power to the luminaire and are provided only to allow phase conductors to be connected if power is supplied from a 3-phase system (see “*Connecting to a 3-phase system*” on page 20).

5. Connect the conductors in the power input cable as follows:
 - Connect the ground (earth) wire to the screw terminal marked  close to the power terminals.
 - Connect the neutral wire to the spring-loaded power terminal marked **N**
 - Connect the live wire to the spring-loaded power terminal marked **L1**.

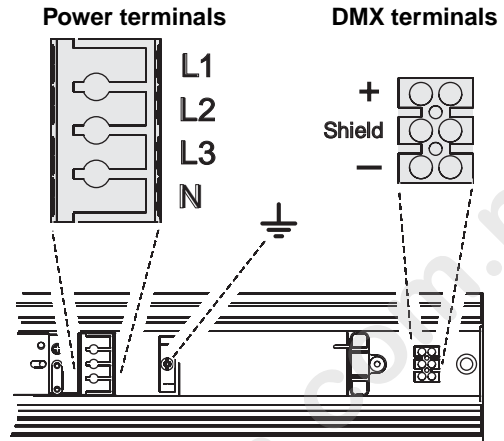


Figure 11: Power and DMX connections

6. If power is to continue to another luminaire, pass power output cable through a cable gland as described in “*Cable entry*” on page 15 and prepare the end of the cable for connection. Each spring-loaded terminal has two holes. One hole now contains a conductor from the input cable and one is available for a conductor from the output cable. Using the spare holes, connect the conductors in the power output cable as described under point 5. above.

Connecting to a 3-phase system

If you are supplying luminaires with power from a 3-phase system, the live conductor in the power input cable that you connect to terminal **L1** will be one of the phases. Connect one of the remaining phases to terminal **L2** and the last remaining phase to terminal **L3**.

To distribute the load evenly over the 3 phases, connect phase 1 to terminal **L1** on one-third of the luminaires in the installation, phase 2 to terminal **L1** on one-third of the luminaires, and phase 3 to terminal **L1** on the remaining one-third of the luminaires. Terminals L2 and L3 do not supply power to the luminaire and are provided simply to allow phase conductors in separate lengths of power cable to be joined.

To avoid confusion, each time you install a power output cable to take power to the next luminaire, connect each phase conductor in the power *output* cable to the terminal used for that phase conductor in the power *input* cable.

After making power connections

If you are installing DMX data cables, continue to the next section. Otherwise, close the connections compartment as described in “Access to connections compartment” on page 10.

Linking luminaires for DMX and synchronized operation

You need to create a data link to:

- Control luminaires with a DMX control device.
- Operate two or more Cyclo IP65 Directionals in master/slave stand-alone mode, where all luminaires run a synchronized light show without a separate DMX control device.

A reliable data connection requires suitable cable. CAT 5 (category 5) UTP (unshielded twisted pair) network cable is suitable for this purpose. The minimum recommended wire size is 0.2 mm² (24 AWG) for runs up to 300 meters (1000 ft.) and 0.322 mm² (22 AWG) for runs up to 500 meters (1640 ft). Your Martin Architectural supplier can advise and supply suitable cable.

Luminaires on a serial data link must be daisy-chained in one single line, maximum 500 meters (1640 ft.) long, with maximum 32 luminaires. To exceed 32 luminaires or 500 meters, or to add branches, an optically isolated amplifier-splitter such as the Martin RS-485 Opto-Splitter (P/N 90758060) must be used.

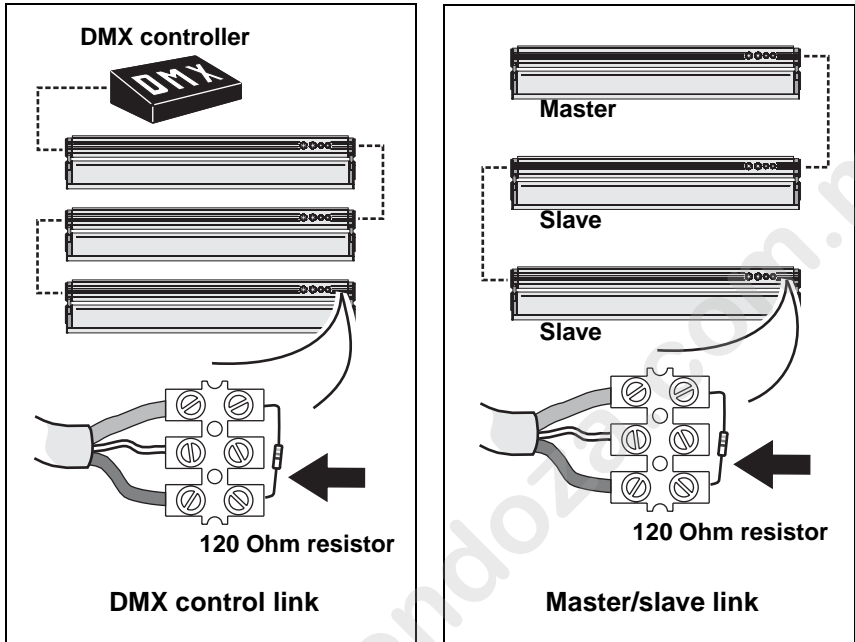
A male 3-pin XLR connector can be fitted at the controller end of the data link to allow a standard connection to Martin DMX controller. The XLR connector should be wired as follows:

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

To avoid ground (earth) loop interference, make sure that the DMX cable shield does not come into contact with the shell or body of the XLR connector.

A screw-type terminal block is provided in the connections compartment for connecting the data link. The data input and data output cables must both be connected to this terminal block. The data output may only be used to relay data to one luminaire.

Connecting to control data



To create the data link:

1. If using a DMX control device, run suitable cable from the controller's DMX output to the first luminaire on the link.
2. Use an M16 cable gland to run the data cable through the housing (see "Cable entry" on page 15).
3. Connect the data cable wires to the data terminal block (see "DMX terminals" in Figure 11). Wiring polarity is labelled on the luminaire.
4. Continue connecting up to 32 luminaires using the above procedure.
5. Terminate the data link by connecting a 120 Ohm, 0.25 W resistor across the + (hot) and - (cold) terminals of the last luminaire's terminal block.

Tip! *Random "flicker" and other unexplained control problems during stand-alone master/slave operation can often be cured by also connecting a 120 Ohm resistor across the + (hot) and - (cold) terminals of the first luminaire's data connection terminal block.*

Configuring luminaires for DMX or stand-alone operation

Each DMX model Cyclo IP65 Directional luminaire needs to be set up for DMX or stand-alone operation using the DIP switch located on the circuit board in the base module.

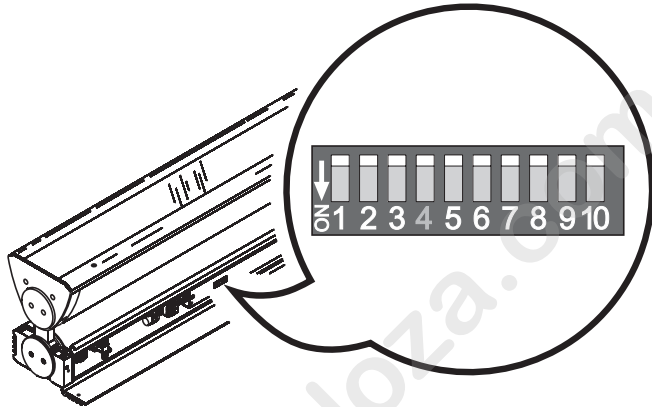


Figure 12: DIP switch

Configuring for DMX operation

DMX operation is enabled by setting pin 10 on the DIP switch to OFF. Pins 1 - 9 are then used to set the luminaire's control address.

The Cyclo IP65 Directional uses one DMX channel to control each tube. The DMX address, also known as the start channel, is the first of these channels. It must be set on the luminaire (and selected on the DMX controller) before the controller can send commands to the luminaire via a data link. For example, a Cyclo 04 IP65 Directional with its DMX address set to 101 uses channels 101, 102, 103 and 104 to control its four tubes.

Allow enough channels when setting the DMX address. If control channels for two luminaires overlap, one of the luminaires will receive the wrong commands.

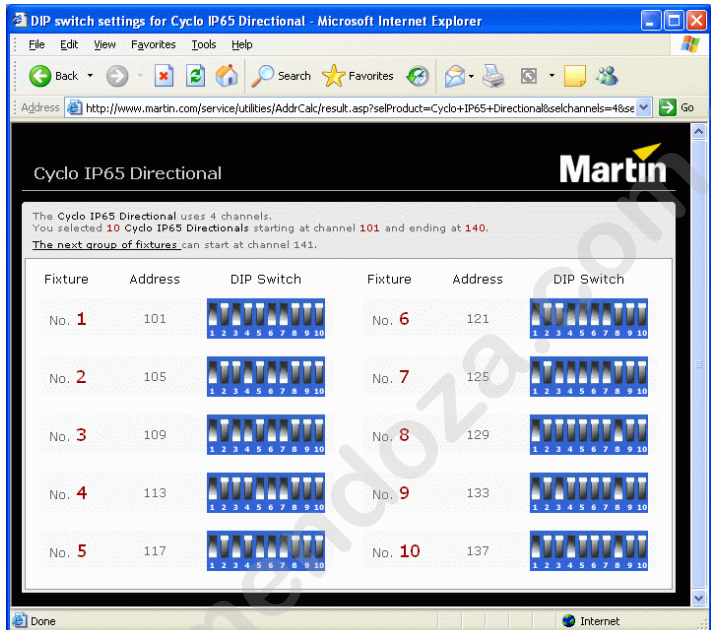
If two or more Cyclo IP65 Directional luminaires share the same DMX address, they will receive the same commands and respond identically. Individual control will be impossible.

The default factory-set control address is '1'.

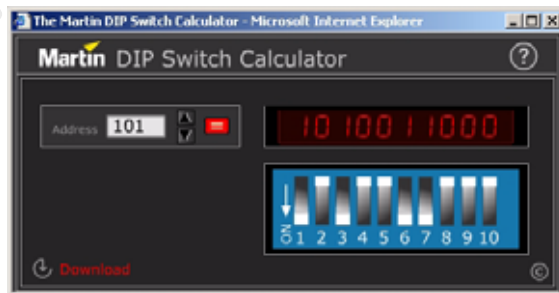
To set the Cyclo IP65 Directional's DMX address:

1. Set DIP switch pin 10 to OFF.

- Decide on a DMX address for the luminaire. If you are calculating the DMX addresses for multiple luminaires, save time by using the online Martin Address Calculator at <http://www.martin.dk/service/utilities/AddrCalc/index.asp> (see illustration below).



- You can also look up DIP switch settings using the Martin DIP Switch Calculator, available for use and downloadable at <http://www.martin.dk/service/dipswitchpopup.htm>. If you do not have Internet access, refer to "Table 2: DMX address DIP switch settings" on page 25.



- Set DIP switch pins 1 through 9 to ON (1) or OFF (0) with reference to the table.

To use this table, first find the DMX address in the main block in the table. Then read the settings for pins 1 - 5 to the left and read the settings for pins 6 - 9 above the address. "0" means OFF and "1" means ON.

For example, to set the DMX address to 101, you need to set DIP switch pins 1, 3, 6 and 7 to ON, as highlighted in the table.

DIP switch pins setting 0 = OFF 1 = ON					#9	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1			
					#8	0	0	0	0	1	1	1	1	0	0	0	0	1	1	1	1	1	1	1	
					#7	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0	1	1
					#6	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1
#1	#2	#3	#4	#5		32	64	96	128	160	192	224	256	288	320	352	384	416	448	480					
0	0	0	0	0	1	33	65	97	129	161	193	225	257	289	321	353	385	417	449	481					
1	0	0	0	0	2	34	66	98	130	162	194	226	258	290	322	354	386	418	450	482					
0	1	0	0	0	3	35	67	99	131	163	195	227	259	291	323	355	387	419	451	483					
1	1	0	0	0	4	36	68	100	132	164	196	228	260	292	324	356	388	420	452	484					
0	0	1	0	0	5	37	69	101	133	165	197	229	261	293	325	357	389	421	453	485					
1	0	1	0	0	6	38	70	102	134	166	198	230	262	294	326	358	390	422	454	486					
1	1	1	0	0	7	39	71	103	135	167	199	231	263	295	327	359	391	423	455	487					
0	0	0	1	0	8	40	72	104	136	168	200	232	264	296	328	360	392	424	456	488					
1	0	0	1	0	9	41	73	105	137	169	201	233	265	297	329	361	393	425	457	489					
0	1	0	1	0	10	42	74	106	138	170	202	234	266	298	330	362	394	426	458	490					
1	1	0	1	0	11	43	75	107	139	171	203	235	267	299	331	363	395	427	459	491					
0	0	1	1	0	12	44	76	108	140	172	204	236	268	300	332	364	396	428	460	492					
1	0	1	1	0	13	45	77	109	141	173	205	237	269	301	333	365	397	429	461	493					
0	1	1	1	0	14	46	78	110	142	174	206	238	270	302	334	366	398	430	462	494					
1	1	1	1	0	15	47	79	111	143	175	207	239	271	303	335	367	399	431	463	495					
0	0	0	0	1	16	48	80	112	144	176	208	240	272	304	336	368	400	432	464	496					
1	0	0	0	1	17	49	81	113	145	177	209	241	273	305	337	369	401	433	465	497					
0	1	0	0	1	18	50	82	114	146	178	210	242	274	306	338	370	402	434	466	498					
1	1	0	0	1	19	51	83	115	147	179	211	243	275	307	339	371	403	435	467	499					
0	0	1	0	1	20	52	84	116	148	180	212	244	276	308	340	372	404	436	468	500					
1	0	1	0	1	21	53	85	117	149	181	213	245	277	309	341	373	405	437	469	501					
0	1	1	0	1	22	54	86	118	150	182	214	246	278	310	342	374	406	438	470	502					
1	1	1	0	1	23	55	87	119	151	183	215	247	279	311	343	375	407	439	471	503					
0	0	0	1	1	24	56	88	120	152	184	216	248	280	312	344	376	408	440	472	504					
1	0	0	1	1	25	57	89	121	153	185	217	249	281	313	345	377	409	441	473	505					
0	1	0	1	1	26	58	90	122	154	186	218	250	282	314	346	378	410	442	474	506					
1	1	0	1	1	27	59	91	123	155	187	219	251	283	315	347	379	411	443	475	507					
0	0	1	1	1	28	60	92	124	156	188	220	252	284	316	348	380	412	444	476	508					
1	0	1	1	1	29	61	93	125	157	189	221	253	285	317	349	381	413	445	477	509					
0	1	1	1	1	30	62	94	126	158	190	222	254	286	318	350	382	414	446	478	510					
1	1	1	1	1	31	63	95	127	159	191	223	255	287	319	351	383	415	447	479	511					

Table 2: DMX address DIP switch settings

Configuring for stand-alone operation

Stand-alone operation is enabled by setting pin 10 on the DIP switch to ON and pin 8 to OFF. The other pins are then used to program the luminaire. See “*Stand-alone operation settings*” on page 30 for details of how to set these pins.

After making connections

After you have finished making power and data connections, make sure that any holes not used for cable entry are sealed either with blanking plugs or unpierced membrane cable glands, then close the connections compartment as described in “*Access to connections compartment*” on page 10 before applying power.

Operation: general



DANGER! Read “*Safety information*” on page 3 before operating this product!

Fluorescent tube lifetimes and performance

The Osram high output T5 tubes fitted as standard meet color specifications for at least 10 000 hours. Average tube life is 20 000 hours, but note that tube life will vary depending on operating conditions.

Each power off/on cycle reduces tube life by approximately 30 minutes. To optimize tube life when controlling via DMX, do not dim tubes below DMX value 3 (i.e. approximately 1%) when they are not required in the color mix. To optimize tube life in stand-alone mode, program color-changing cycles that run as slowly as possible. For more detailed information on maximizing tube lifetimes, see the Martin website at <http://www.martin.com/service>.

Achieve optimum tube performance by ‘burning in’ new fluorescent tubes, i.e. running them for 100 hours at full power.

Avoiding condensation and humidity

Excess humidity inside the luminaire can be experienced if:

- Seals are affected because covers are distorted or not correctly fastened
- Cable glands are not correctly assembled and tightened
- Cable diameters are not correct for cable glands
- Blanking plugs are not correctly fitted and tightened
- Cables open into damp or wet locations (e.g. poorly sealed junction boxes), which will encourage moisture to pass along the cable into the luminaire.

The Cyclo IP65 Directional is fitted with a self-purging valve that gradually expels moisture as the luminaire heats up and cools down in normal use. To eliminate condensation rapidly (after installation, for example), run the luminaire at full operating temperature in dry weather conditions for a minute

or two with the front cover removed so that air circulates, then refit the front cover while the luminaire is hot. If you do this:

- The exposed internal components present a risk:, so block public access.
- Ensure that no dust or objects enter the luminaire while it is open.

Operation in extreme ambient temperatures

Do not operate the Cyclo IP65 Directional if the ambient temperature exceeds 40° C.

Cyclo IP65 Directional 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 and cause voltage across tubes to rise. In extreme cases, luminaires will shut down power to tubes to avoid damage to components. If this happens, luminaires must be reset by powering them off and on again before tubes can be restarted.

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.

Stand-alone operation



DANGER! Read “*Safety information*” on page 3 before attempting to operate this product!

In stand-alone operation, the Cyclo IP65 Directional can run light shows without a DMX controller. Luminaires can be programmed to change colors in cycles. Changes can be programmed at 1, 5, 10 or 30 second intervals.

Two stand-alone operation modes are available:

- In **single stand-alone operation**, luminaires run independently of each other. No data link is required.
- In **master/slave stand-alone operation**, luminaires must be linked with a serial data link (“*Linking luminaires for DMX and synchronized operation*” on page 21 explains how to install this link). Synchronized action in all luminaires is triggered by one “master” luminaire.

In both single and master/slave stand-alone operation, luminaires are programmed by setting the pins on the DIP switch on the circuit board as shown in the following table.

Pin	Function		
1	White active (04 models), red active (03 models)		
2	Red active (04 models), green active (03 models)		
3	Green active (04 models), blue active (03 models)		
4	Blue active (04 models)		
5 & 6	Program speed		
	Pin 6	Pin 5	Speed
	OFF	OFF	1 sec. steps (fastest setting)
	OFF	ON	5 sec. steps
	ON	OFF	10 sec. steps
	ON	ON	30 sec. steps (slowest setting)
7	OFF = Blackout fading, ON = Crossfading		
8	OFF = Run program, ON = Deactivate program (Note: always set to OFF)		
9	OFF = Master, ON = Slave (Note: do not set more than one luminaire as master)		
10	ON = Stand-alone mode.		

Table 3. Stand-alone DIP switch settings

A quick reference table covering DIP switch functions is also provided on the back cover of this manual.

Stand-alone operation settings

Activating tubes

DIP switch pins 1 to 3 (03 models) or 1 to 4 (04 models) activate tubes in the stand-alone program.

Setting program speed

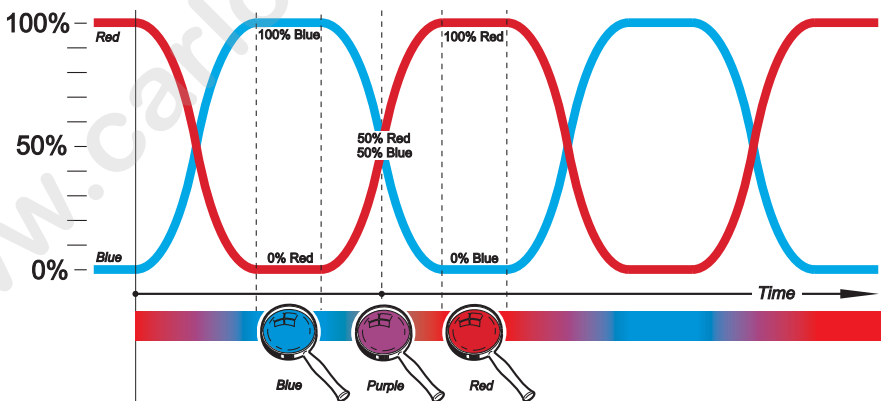
Combinations of DIP switch pins 5 and 6 allow one of four different speeds to be set.

Note that the speed of color changes affects tube life (see “*Fluorescent tube lifetimes and performance*” on page 27).

Fading between colors

If DIP switch pin 7 is set to OFF (blackout fading), colors fade to almost blackout before the next color fades in.

If DIP switch pin 7 is set to ON (crossfading), color fading overlaps. If two or more colors are active, one color fades in while another is fading out, giving a color mixing effect. For example, if red and blue are activated and crossfading is selected, colors will crossfade from red through purple to blue, then back through purple to red in a continuous cycle (see example).



Example: crossfading between red and blue

Single stand-alone operation

In single stand-alone operation, a luminaire runs its own program independently of all other luminaires. To do this, the luminaire must be set as a master.

Activating single stand-alone operation

To activate single stand-alone operation:

1. Set DIP switch pin 10 to ON (switches from DMX to stand-alone mode).
2. Set DIP switch pin 9 to OFF (activates master mode).
3. Set DIP switch pin 8 to OFF (activates stand-alone mode)
4. Program the luminaire using DIP switch pins 1 - 7 (see table on page 29).

Master/slave stand-alone operation

Important! Do not set more than one luminaire on a data link as master, and do not set a luminaire as master on a data link with a DMX controller. Doing so may cause damage to the electronics that is not covered by the product warranty.

In master/slave stand-alone operation, one master luminaire transmits a synchronizing signal to slave luminaires over the data link each time it starts a new action. Slave luminaires start their next programmed action when they receive this signal from the master luminaire. Programs can be identical on all luminaires, or luminaires can – subject to certain practical constraints – run programs that are synchronized but not identical.

Note that each luminaire follows the program set on its own DIP switch as described in the table on page 29.

Note also that colors are always displayed in the order: white → red → green → blue.

This means for example that if white is activated, it will always be first in the program. If white is not activated but red is activated, red will be first in the program.

More sophisticated light shows can be programmed using a DMX controller (see “DMX-controlled operation” on page 35).

The synchronization signal used by the Cyclo IP65 Directional is identical to that used in other Cyclo luminaires with the same number of tubes, allowing these products to be combined in master/slave operation on one data link. However, Cyclos with different numbers of tubes cannot be mixed in master-

slave operation. Consult your Martin Architectural supplier if you need advice on combining and controlling products.

Identical light shows

Master and slave luminaires can be set to behave identically. In this mode, the master sends synchronizing signals to the slaves, and all luminaires run the same light show. Each slave luminaire follows the program set on its own DIP switch, so for identical operation, all luminaires' DIP switch settings must be the same apart from pin 9, which is set to ON for slaves and OFF for the master.

Synchronized non-identical light shows

It is also possible to synchronize changes but program slave luminaires to behave differently from the master. To use this feature effectively, you need to plan your light show using *scenes* as building blocks and set the luminaires' DIP switches accordingly.

A scene is a change from one output to another. When a luminaire is in slave mode, it starts a scene when it receives a synchronization signal from the master. The time taken by the scene is determined by the speed setting of the DIP switch. A slave will not respond to new synchronization signals until its scene is complete.

When crossfading is selected, each color takes up one scene (fade in only). When blackout fading is selected, each color takes up two scenes (fade in and fade out). This means that the maximum number of scenes that can be programmed is twice the number of tubes installed, with all tubes activated and blackout fading selected.

Each time the master luminaire starts at scene 1, it sends a signal to all the slave luminaires to start at scene 1. This means that if a slave luminaire has:

1. Fewer scenes than the master luminaire, it will run these in a cycle until the master luminaire signals that the program should start from the beginning again.
2. More scenes than the master, the additional scenes will never run, because the program will reset to the first scene when the master starts its program from the beginning.

Here is an example of what will happen when a slave luminaire has fewer scenes than the master luminaire:

Luminaire setting	Scene pattern
Master with 6 scenes	1 2 3 4 5 6 1 2 3 4 5 6 1 2 3 4 5 6...
Slave with 4 scenes	1 2 3 4 1 2 1 2 3 4 1 2 1 2 3 4 1 2...

Program examples

The following examples of programs show how an individual luminaire's program is made up of scenes.

The following symbols are used in program diagrams:

—	Tube turned fully off
/	Fade in
\	Fade out
∨	Fade to 50% and back to 100% in one scene (applies when only one color is active and crossfading is selected)

Example 1

DIP switch 7 is set to ON (crossfading) and only red is activated:

Red	∨	∨	∨	∨	∨	∨	∨	∨	∨	∨	∨	∨
Scene	1	1	1	1	1	1	1	1	1	1	1	1

Example 2

DIP switch 7 is set to OFF (blackout fading) and only red is activated:

Red	/	\	/	\	/	\	/	\	/	\	/	\
Scene	1	2	1	2	1	2	1	2	1	2	1	2

Example 3

DIP switch 7 is set to ON (crossfading) and red and blue are activated:

Red	/	\	/	\	/	\	/	\	/	\	/	\
Blue	\	/	\	/	\	/	\	/	\	/	\	/
Scene	1	2	1	2	1	2	1	2	1	2	1	2

Example 4

DIP switch 7 is set to OFF (blackout fading) and red and blue are activated:

Red	/	\	-	-	/	\	-	-	/	\	-	-
Blue	-	-	/	\	-	-	/	\	-	-	/	\
Scene	1	2	3	4	1	2	3	4	1	2	3	4

Example 5

To achieve a rainbow effect, activate red, green and blue tubes and set DIP switch pin 7 to ON (crossfading).

Red	/	\	-	/	\	-	/	\	-	/	\	-
Green	-	/	\	-	/	\	-	/	\	-	/	\
Blue	\	-	/	\	-	/	\	-	/	\	-	/
Scene	1	2	3	1	2	3	1	2	3	1	2	3

Activating master/slave stand-alone operation

To activate master/slave stand-alone operation:

1. Isolate all luminaires from power.
2. Set all luminaires as slaves and enable stand-alone mode by setting DIP switch pins 9 and 10 to ON and pin 8 to OFF.
3. Decide which luminaire to use as master and set this luminaire's DIP switch pin 9 to OFF. Note that any luminaire can be set as master, but you will obtain the most reliable data signal by either setting the first luminaire on the link as master or using 120 Ohm resistors to terminate the data link (see "Connecting to control data" on page 22) at both ends.
4. When power is applied, slave luminaires will go to the next scene in their program each time the master goes to its next scene. Slave luminaires will also start scene 1 of their programs each time the master starts scene 1 of its program.

DMX-controlled operation



DANGER! Read “*Safety information*” on page 3 before attempting to operate this product!

Cyclo IP65 Directional DMX models may be operated with any lighting control device that is compatible with the USITT DMX (1990) standard.

For details of connecting luminaires on a data link to a DMX controller, see “*Linking luminaires for DMX and synchronized operation*” on page 21.

For details of setting up luminaires for DMX control, see “*Configuring luminaires for DMX or stand-alone operation*” on page 23

DMX control functions

The Cyclo IP65 Directional's advanced fluorescent tubes can be dimmed from maximum output right down to zero using one channel per tube on a DMX controller. This allows a wide range of color shades with variable intensity to be obtained using additive color mixing. On 04 models the color temperature of white light can also be fine-tuned.

Depending on the functions available on the controller, sophisticated light shows on the Cyclo IP65 Directional can be programmed over time, allowing constantly and rapidly shifting color mixes, or color displays which change slowly according to the time of day, or even year, for example. See the controller's manual for details.

Your Martin Architectural supplier can advise about available controllers and control options.

Service



DANGER! Read “*Safety information*” on page 3 before attempting to service this product!

With long-life fluorescent tubes and no moving parts, the Cyclo IP65 Directional is almost service-free, but this section describes the minimum of periodic maintenance required.

Refer any service operation not described in this manual to an authorized Martin service agent.

Cleaning

Use a damp cloth or soft brush soaked in a solution of water and a mild detergent cleaner such as auto shampoo to clean luminaires. Do not use abrasive, acidic or caustic cleaning products, or you will damage the luminaires' anodized finish.

Do not use a high pressure water-jet for cleaning: IP65 luminaires are protected against water projections and low-pressure water jets only.

Tube replacement

To replace the tubes in the Cyclo IP65 Directional:

1. Isolate the luminaire from power and ensure that power cannot be reapplied, even accidentally.
2. Loosen the front cover release screws, lift up the release flap and open the front cover as described in “*Orientation and adjustment*” on page 12.

3. See Figure 13. Remove the reflector by lifting it out of the tube module housing.

4. In 04 models, remove the white tube by holding the metal caps at both ends of the tube, rotating the tube approx.

1/4 turn in either direction, and sliding the tube's terminal pins out of their sockets. Support the tube at both ends as it is released.

5. See Figure 14. To release the diffuser, push the locking bars from position B in towards the center of the luminaire until they are in position A. Lift the diffuser out of the luminaire.

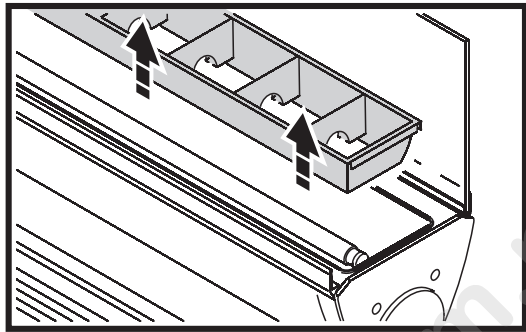


Figure 13: Removing the reflector

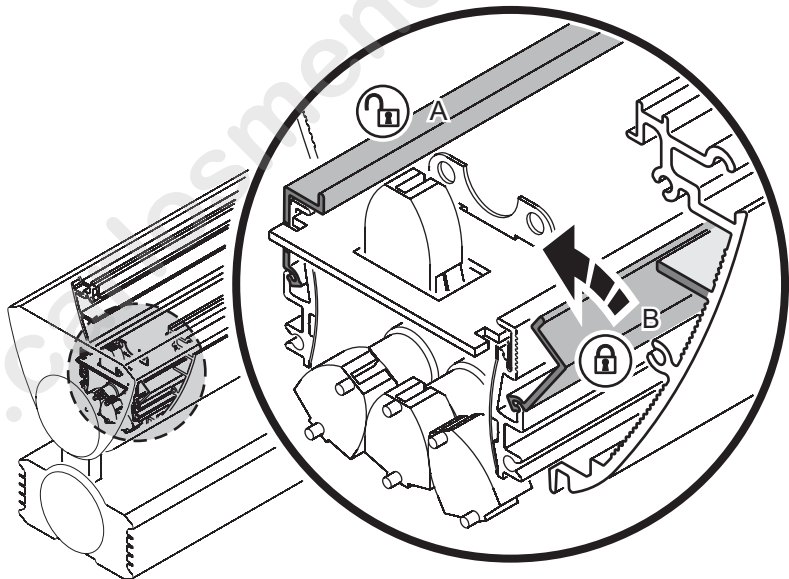


Figure 14: Removing the diffuser

6. The red, green and blue tubes are installed close together. To remove, press with one finger on the metal caps at both ends of each tube and rotate to release from the sockets.

7. When installing new tubes, line them up so that the manufacturer's markings on all tubes are at the same end of the luminaire. Tube positions are labelled **R** for red, **G** for green and **B** for blue. Slide each tube's terminal pins fully into their sockets and rotate the tube approx. 1/4 turn in either direction to engage the pins. Check that tubes are held securely.
8. Reinstall the diffuser, reflector, white tube (in 04 models) and front cover before reapplying power.

Tube positions

The burning positions of fluorescent tubes affect their warm-up times, operating temperature, light output and tube life. For optimum results:

- Install tubes so that the manufacturer's markings are all at the same end of the luminaire.
- If the luminaire is installed in a vertical position or at an angle from the horizontal, locate the ends of the tubes that carry the manufacturer's markings at the lower end of the luminaire. However, in a cold environment, i.e. where temperatures are generally around or below freezing point, locate the markings at the *upper* end of the luminaire).

Main fuse replacement

The main fuse is located on the PCB in the ballast tray. See page 43 in the Specifications section for details of fuse types and ratings. Never replace a fuse with one of a different type or rating.

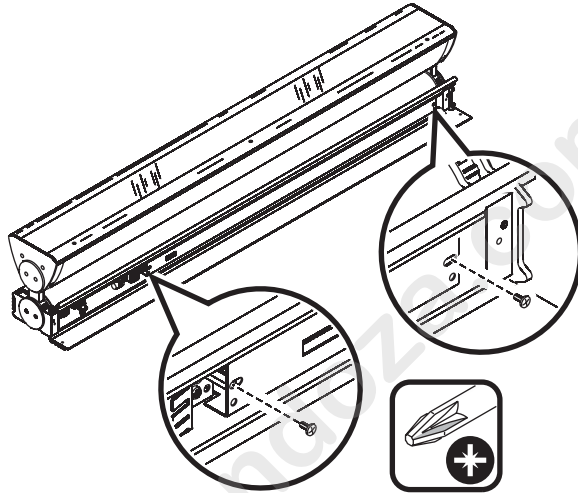


Figure 15: Removing the PCB

To replace the fuse:

1. Isolate the luminaire from power and ensure that power cannot be reapplied accidentally.
2. Open the connections compartment cover as described in “Access to connections compartment” on page 10.
3. See Figure 15. Undo the two retaining screws from the ballast tray and slide the tray out of the housing.

4. See Figure 16. Replace the main fuse on the PCB with one of the same type and rating.

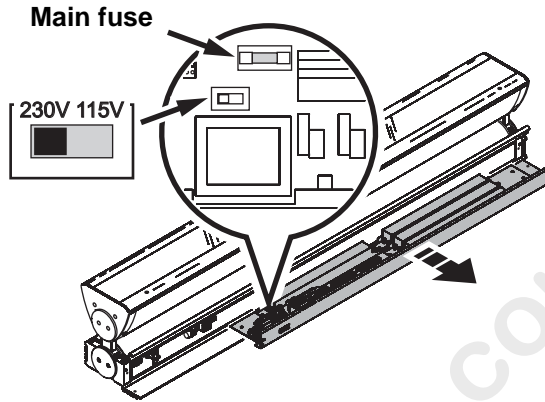


Figure 16: Main fuse

5. Reinstall all covers before reapplying power.

If a fuse blows repeatedly, refer to your Martin Architectural supplier for service.

Voltage setting

See Figure 16. The voltage switch on the PCB is factory-set to match 100-120 or 200-240 V nominal AC power at 50 or 60 Hz.

Important! Do not change the voltage setting without first consulting your Martin Architectural supplier.

Troubleshooting

Problem	Probable cause(s)	Remedy
No response from luminaire when power is applied.	No power to luminaire.	Check power connections.
	Ground fault protection circuit breaker (RCD) has tripped.	Reset RCD. If problem persists, have an electrician replace the RCD or reduce the number of luminaires powered via one RCD.
	If running in stand-alone mode, DIP switch pin 8 is set to ON.	Set DIP switch pin 8 to OFF to allow stand-alone operation.
Luminaires do not respond correctly to DMX control.	Controller not connected.	Check DMX data link. Inspect connections and test cables. Repair or replace as necessary.
	Incorrect DMX addressing.	Check address setting on luminaire and controller.
	Data link not terminated.	Connect 120 Ohm termination resistor across data link + (hot) and - (cold) in parallel with last luminaire on link.
	Two devices transmitting on link.	Check that all luminaires are set as slaves (DIP switch pin 9 ON).
	Defective luminaire.	Bypass luminaires one at a time until normal operation is regained to identify faulty luminaire. Have faulty luminaire tested and repaired by Martin service technician.
Luminaires do not behave correctly in master/slave mode	Two luminaires transmitting on link.	Check that only one luminaire is set to operate as master.
	Defective luminaire.	Bypass luminaires one at a time until normal operation is regained to identify faulty luminaire. Have faulty luminaire tested and repaired by Martin service technician.
Poor quality light output and/or color rendering.	Tube or tubes not burnt in.	Run tubes at 100% intensity for 100 hours to burn in.
	Tube defective.	Disconnect luminaire and replace tube.

Table 4: Troubleshooting

DMX protocols

Cyclo 04 IP65 Directional

Channel	Value	Percent	Function
1	0-2	0	White intensity Tube off
	3-252	1 - 99	Intensity 1→100%
	253-255	100	Intensity 100%
2	0-2	0	Red intensity Tube off
	3-252	1 - 99	Intensity 1→100%
	253-255	100	Intensity 100%
3	0-2	0	Green intensity Tube off
	3-252	1 - 99	Intensity 1→100%
	253-255	100	Intensity 100%
4	0-2	0	Blue intensity Tube off
	3-252	1 - 99	Intensity 1→100%
	253-255	100	Intensity 100%

Table 5: DMX protocol, Cyclo 04 IP65 Directional

Cyclo 03 IP65 Directional

Channel	Value	Percent	Function
1	0-2	0	Red intensity Tube off
	3-252	1 - 99	Intensity 1→100%
	253-255	100	Intensity 100%
2	0-2	0	Green intensity Tube off
	3-252	1 - 99	Intensity 1→100%
	253-255	100	Intensity 100%
3	0-2	0	Blue intensity Tube off
	3-252	1 - 99	Intensity 1→100%
	253-255	100	Intensity 100%

Table 6: DMX protocol, Cyclo 03 IP65 Directional

Cyclo IP65 Directional specifications

Physical

L x W x H 1257 x 149 x 230 mm (49.5 x 5.9 x 9.1 in.)
Weight 22 kg (48.5 lbs)

Lamp

Type T5 fluorescent tubes
Approved lamps Osram FQ 54 W HO
Average tube life 20 000 hours
Socket G5

Dynamic effects

Color mixing RGB (03 models) RGBW (04 models)
Red 0 - 100%
Green 0 - 100%
Blue 0 - 100%
Cool white (4000 K) 0 - 100% (04 models)

Control and programming

Control options DMX, stand-alone, synchronized (master/slave)
Number of DMX channels 3 (03 models), 4 (04 models)
DMX address setting DIP switch
Stand-alone and master/slave programming DIP switch
Protocol USITT DMX512/1990
Receiver RS-485

Construction

Housing Aluminum and stainless steel
Finish Clear anodized
Front cover Toughened glass
Reflectors High specular 99.9% aluminum
Protection factor IP65

Installation

Orientation Any
Minimum free space around luminaire 25 mm (1 inch)

Connections

Power cable entry IP68 cable gland
Power connection Quick connector terminals
Data cable entry IP68 cable gland
Data connection Screw terminals

Electrical

AC power	100-120/200-240 V nominal, 50/60 Hz
Main fuse, 03, 120 V model	2 AT (slow blow)
Main fuse, 04, 120 V model	2.5 AT (slow blow)
Main fuse, 03, 230 V model	1 AT (slow blow)
Main fuse, 04, 230 V model	2 AT (slow blow)

Typical power and current

Cyclo IP65 03 Directional, 120 V model

100 V, 60 Hz.	163 W, 1.6 A
120 V, 60 Hz.	180 W, 1.5 A

Cyclo IP65 03 Directional, 230 V model

208 V, 60 Hz.	180 W, 0.9 A
230 V, 50 Hz.	181 W, 0.8 A
240 V, 50 Hz.	179 W, 0.8 A

Cyclo IP65 04 Directional, 120 V model

100 V, 60 Hz.	219 W, 2.2 A
120 V, 60 Hz.	236 W, 2.0 A

Cyclo IP65 04 Directional, 230 V model

208 V, 60 Hz.	235 W, 1.2 A
230 V, 50 Hz.	234 W, 1.1 A
240 V, 50 Hz.	231 W, 1.0 A

Measurements made at nominal voltage. Allow for a deviation of +/- 10%.

Thermal

Maximum ambient temperature (T_a).	40° C (104° F)
Minimum ambient temperature (starting from and dimming at 1% output possible when permanently powered).	-20°C (-4°F)
Cooling	Convection
Total heat dissipation (calculated, +/- 10%):	615 BTU/hr. (03 models)
.	805 BTU/hr. (04 models)

Approvals



US Safety	UL 1573
Canadian Safety	CSA C22.2 No. 166
European safety	EN 60598-1, EN 60598-2
European EMC	EN 60555-3, EN 55015

Included items

Osram FQ 54 W/60 HO red T5 tube
Osram FQ 54 W/66 HO green T5 tube
Osram FQ 54 W/67 HO blue T5 tube
Osram FQ 54 W/840 HO cool daylight white (4000 K) T5 tube (04 models)
Two M25 cable glands, IP68, metal, cable Ø 7 - 15 mm (0.28 - 0.6 in.)
Two M16 cable glands, IP68, metal, cable Ø 5 - 12 mm (0.2 - 0.45 in.)
M25 blanking plug, metal
M16 blanking plug, metal
Surface-mounting bracket
User manual

Accessories

DMX termination resistor, 120 Ohm P/N 04150308
Osram T5 FQ 54 W/827 HO 2700 K warm white
tube (04 model) P/N 97020009
Osram T5 FQ 54 W/865 HO 6500 K daylight white
tube (04 model) P/N 97020011

Spare parts

Osram T5 FQ 54 W/60 HO red tube P/N 97020006
Osram T5 FQ 54 W/66 HO green tube P/N 97020007
Osram T5 FQ 54 W/67 HO blue tube P/N 97020008
Osram T5 FQ 54 W/840 HO 4000 K cool white
tube (04 model) P/N 97020010

Ordering information

Cyclo IP65 03 Directional, 54 W tubes, 120 V P/N 90566810
Cyclo IP65 03 Directional, 54 W tubes, 230 V P/N 90566010
Cyclo IP65 04 Directional, 54 W tubes, 120 V P/N 90567810
Cyclo IP65 04 Directional, 54 W tubes, 230 V P/N 90567010

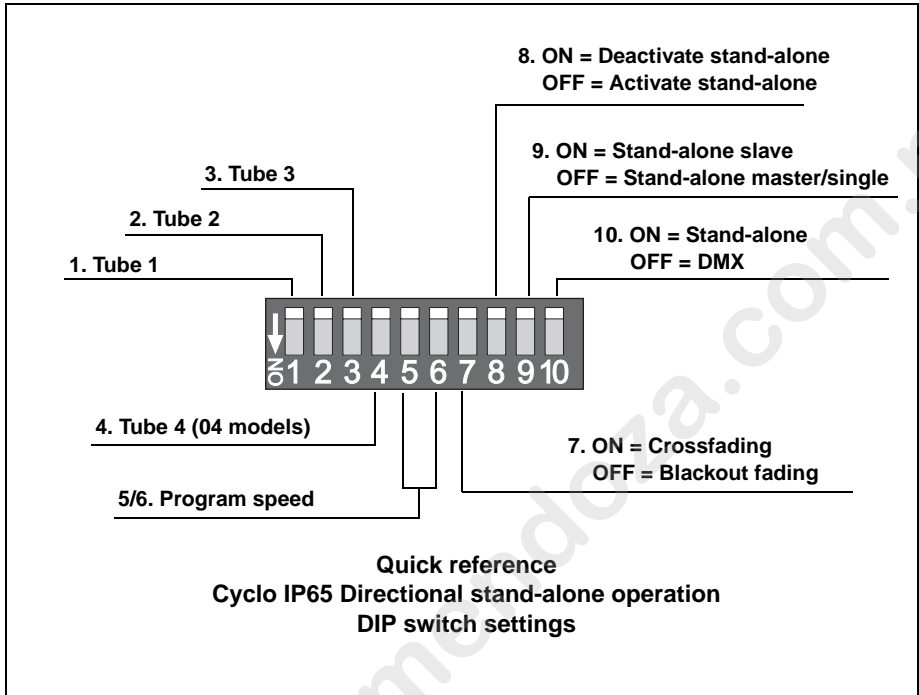
Specifications subject to change without notice.



Disposing of this product

Martin Architectural® 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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