19th November 2019

Guidance on storage and handling of batteries

Introduction

Our products are designed to give you the most flexible, convenient and reliable Emergency lighting solutions on the market however we do still rely heavily on batteries as a key component in these products.

We work continuously to evaluate new battery technologies and develop better products and for the moment we consider we are using the best technologies that balance price and performance across the normal operating conditions of our products.

The bulk of our products are based on industry standard high temperature NiCd (Nickel Cadmium) emergency cells. These operate across a wide temperature range and meet the design life of in excess of 4 years we require for standard Emergency lighting applications.

We ship the batteries fully charged but disconnected to give the best life during shipping (no external load from our driver electronics) however the batteries do have some limitations with the battery technology available to us today.

The following points should be kept in mind when working with our battery packs and the products that use them.

Storage

The batteries provided with all relevant Raytec products are fully charged and tested before shipping.

The external packaging and the battery pack are labeled with the last charged date before shipping.

To secure that the products work as expected we recommend that the batteries are kept in low humidity environment (RH <65 %).

Temperature	Storage Period	Notes
5 °C to 25°C	3 months	Recommended[1]
-40 °C to 5°C	1 month	Once only[2]
25 °C to 70 °C	1 month	Once only[3]
< 40 °C OR > 70 °C	Not permitted	

Warranty

Batteries are classified as a consumable item and are not covered by the Raytec standard 5-year warranty, battery life will be between 4 and 7 years depending on environmental conditions at which point they will have to be replaced to maintain the performance of the fixture.

[1] If the batteries are required to be stored for a longer period than that recommended, then the batteries should be recharged periodically using an external battery charger.
[2] Where the batteries are stored at lower than recommended temperatures this period cannot be extended by recharging.
[3] Where the batteries are stored at higher than recommended temperatures and humidity this period cannot be extended by recharging.

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Installation and Commissioning

Commissioning

After installation our product go through a series of commissioning cycles with new or changed batteries to ensure that the full rated capacity of the battery is achieved.

Once the batteries are installed and mains power is connected the units will enter the commissioning cycle within 24 hours and carry out 3 full cycles of battery charging/discharging. The battery is charged for approximately 24 hours before each discharge cycle. To prevent multiple lights entering testing at the same time a short random delay is added to the commissioning cycle. To secure that all batteries are fully cycled during commissioning we recommend that a full 5 days is allowed for this process to complete and the indication LED turns green.

During that period the mains supply ***must not*** be interrupted.

If the main supply is interrupted the program will revert to the previous cycle, if luminaires are switched off every night the commissioning phase will never be completed successfully

Avoiding excess discharge cycles

The batteries are protected by the controller / power supply and will shut off before fully depleted however if left for long periods or frequently cycled the life of the battery is likely to be compromised.

If power is not available for prolonged periods and the batteries are repeatedly depleted without the normal trickle charge provided by the controller / power supply, then there is a high risk that the batteries could be permanently damaged or have their useful life reduced.

Avoiding deep discharge

If the light fixtures are disconnected from power for long periods (>2 weeks) they will continue to draw a low amount of power from the batteries. If such events happen it is recommended to disconnect the batteries and only reconnect them once mains power is resumed.

Even when disconnected the storage life of the batteries (see Storage) should be considered.

Failure to do so could result in batteries being deeply discharged below the threshold that the build in charger can recover them.

Safety

Do not short-circuit the battery pack.

Do not open, damage or try to disassemble the battery packs.

Keep battery packs dry.

Keep the battery packs away from excessive heat.

Disposal

Batteries are not typically handled as normal waste. Refer to local regulations for the safe disposal of NICd (Nickel Cadmium) batteries.

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Recommended Charging / battery recovery process

Equipment

We recommend charging our battery packs with Mascot 2115 (NiMh/NICd) charger.

This is available direct from Mascot

https://www.mascot.no/products?catalog=24&category=1323&product=160

Or from other distributors

https://uk.rs-online.com/web/p/battery-pack-chargers/0211376/

https://cpc.farnell.com/mascot/2115000042/charger-nimh-10-20-cells/dp/BT03197

The charger requires a separate mains cable available from the same suppliers.

As supplied the charger is fitted with a barrel plug which can be removed and replaced with a suitable screw or spring terminal block for use with Raytec battery packs.

Note the positive wire on the charge cable is identified by a white printed line.

Charger Use

1. With the charger off
    a. The red wire on the battery should be connected to the positive wire on the charger cable.
    b. The black wire on the battery should be connected to the negative wire on the charger cable.
2. Check the wires are inserted into the correct socket and with the correct polarity.
3. Switch ON the charger.
   Notice that the LED will flash RED and GREEN twice, and then off. After which a RED LED should be constantly ON, indicating the battery is being charged. If not, disconnect the battery immediately and check the connections!
4. When the batteries are fully charged, the LED will turn GREEN.
   The average charging duration is 4-6 hours depending on the initial battery charge level.
5. After the batteries are charged, SWITCH-OFF the charger.
6. The battery voltage should be 13,5V DC. This can be checked with a suitable Voltmeter or multimeter set to a suitable DC Volt range.
7. Indicate the charge date on the batteries.
8. When removing the batteries from the charger place a label or insulation over the positive wire to prevent accidental short circuit or discharge.

Do not leave the batteries on the charger charging unattended for longer than 24 hours.

George Peattie