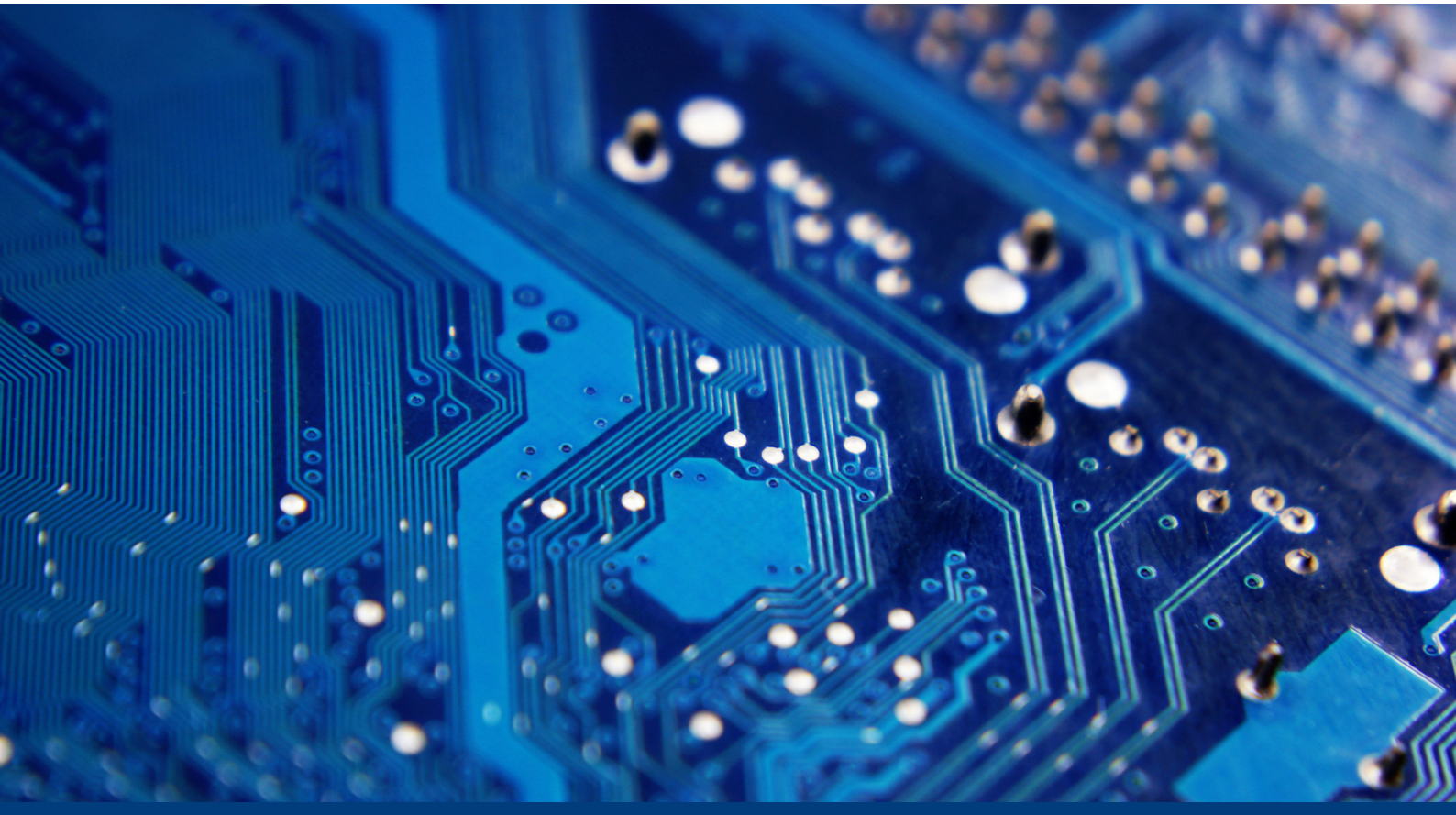
BARDIC

Whitepaper

BARDIC Emergency Lighting



Everything you need to know about single point automatic self-testing systems

Introduction

Exit and emergency luminaires are mandatory in most buildings in Australia. The inspection and maintenance of these luminaires, governed by the BCA and AS2293 Standard are necessary to ensure satisfactory operation in the event of a loss of the normal power supply. The Standard necessitates that such an event be simulated by performing a discharge test at least once every six months. It is required that the luminaire remain illuminated for at least 90 minutes and upon completion of the discharge test, return to its normal operating state. The battery charger should then begin restoring charge to the battery.

What options exist to facilitate the testing of exit and emergency luminaires?

Several options exist to facilitate the testing of exit and emergency luminaires. On one hand, the testing facility can be manual, requiring a test switch leading to an individual or a group of exit and emergency luminaires which can be toggled to simulate a failure of the supply circuit. It is important to note that such a switch should not be installed in a configuration which would disrupt any normal lighting. The reverse also holds true in that a normal lighting switch should not cut the power to any exit and emergency luminaire. This implies that the sub-circuits for normal lightings should be separate to that of exit and emergency luminaires.

On the other hand, the testing facility can be automatic and centrally controlled. While this may allow for more efficient testing and even remote monitoring of luminaires, it also comes at the cost of additional complexities such as the communication system between the central controller and each individual or group of luminaires. It is paramount that the operation and malfunction of such a system does not compromise the ability of a luminaire in responding to a loss of supply and switching over to emergency mode.

Between the extremes of the two aforementioned testing facilities is a third option; single-point automatic self-testing systems. These are essentially fully self-contained systems equivalent to having a test switch in each individual luminaire that automatically triggers at periodic intervals. Similar to automatic centrally controlled systems, a self-contained system should not interfere with the core functionality of an exit or emergency luminaire.

How does single-point automatic self-testing systems work?

The automatic discharge test is required to occur at a minimum of once every six months however, the Standard additionally requires the availability of a method for performing manual discharge tests at any given time. Depending on the individual implementation of a system, triggering a manual discharge test may reset the interval timing thus, causing the next automatic test to only occur after the prefixed period from the current manual test. Alternatively, a manual discharge test may have no effect on the timing, with the next cycle of the automatic test occurring after the prefixed period from the last automatic test. Regardless, it is important to note that an actual power loss event should not affect the interval timing of the system.

While discharge tests are automatically performed, visual checks are still required to identify the operational status of each luminaire. As such, a combination of a suitable sensing method and visual indicator is required to be present on each luminaire unit. The Standard does not define a specific sensing method as long as it adequately provides confirmation that the emergency lamp had remained illuminated for the duration of the discharge test. On the other hand, the visual indicator is required to distinctively denote three states; normal, recently tested and complies, and tested and failed. Guidelines are provided by the Standard for the case of a single visual indicator. Such an indicator is required to be yellow in colour and denote the three states each with a unique flashing pattern.

The normal state is literal, indicating that a luminaire is operating normally and waiting for the next automatic discharge test to occur. In this state, a singular indicator should be continuously illuminated. The second state, recently tested and complies, is a state that immediately follows after the completion of a discharge test. This only holds true if the luminaire had remained illuminated for the duration of the test otherwise, the system should indicate the third state; tested and failed. The second state is only a temporary state but should be maintained for at least five days after which, should be reverted back to the normal state. This would then allow for maintenance personnel to inspect and log the test results within the time frame. In the second state, a singular indicator should implement a slow flash; a cycle consisting of four seconds illuminated

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and one second off. Unlike the second state, the third state persists until the next successful test. To reset the third state, any faults on the luminaire has to be rectified and the discharge test reinitiated. A fast flashing singular indicator, cycling between half a second on and half a second off, represents the third state.

BARDIC Sentinel, Australia and New Zealand's leading single-point automatic self –testing system

BARDIC Emergency Lighting is one of the companies that provide one such single-point automatic self-testing system known as BARDIC Sentinel™. BARDIC Sentinel™ is a circuit board module that can be easily installed into many BARDIC branded luminaires thereby converting it into a fully self-contained system. The system is fully compliant to the AS2293 Standard and eliminates the need for additional wirings and test switches on switchboards. The operational state is indicated by a yellow LED that is either already present on the BARDIC luminaire or can be easily retrofitted. Certain BARDIC luminaires come equipped with current sensing to determine the light output while others can be retrofitted with light sensors. All the necessary components necessary for converting a compatible BARDIC luminaire into a self-testing system is included in the Sentinel™ kit.

BARDIC Sentinel™ automatically performs a 90 minute discharge test every 91 days on the luminaire it is installed in. While the Standard only requires one discharge test every six months, doubling the rate of testing allows for maintenance personnel to perform a routine six-monthly visual check with the knowledge that the current test results are guaranteed to be no more than 13 weeks old. The increased rate of testing also implies that batteries and lamps are cycled more frequently for optimal performance and service life.

An additional feature is available on BARDIC Sentinel™ that allows for the staggering of discharge test schedules for each luminaire. This is a useful feature that accommodates for unforeseen actual power outages that may occur immediately after a test cycle. Under normal circumstances, all exit and emergency luminaires would have simultaneously executed discharge tests which would significantly reduce the capacity of the backup battery. A subsequent actual power failure would imply that the mostly-discharged luminaires may not be able to remain illuminated for the required duration for the safe evacuation of residents. BARDIC Sentinel™ provides the option to introduce a random delay to the automatic discharge test such that not all BARDIC Sentinel™ equipped luminaires will be tested at the same time. This means that the majority of luminaires in a group would have sufficient charge to remain illuminated in the event of an emergency. The random delay is only added to the first scheduled test in increments of 90 minutes and will be no greater than 72 hours. Subsequent test cycles for each luminaire will occur 91 days thereafter. Discharge tests for all luminaires are therefore guaranteed to be completed within three days in every cycle and the sequence in which each luminaires executes its discharge test will be identical.

How does BARDIC comply with the Australian Standards?

BARDIC Emergency Lighting goes above and beyond in its endeavour to adhere to the Australian Standard to such an extent that the clause in the AS2293 pertaining to self-contained automatic discharge facility was actually based on the Sentinel™ itself. Sentinel™ is a BARDIC product that clearly demonstrates this design philosophy by adhering to an AS2293 requirement that is often overlooked. The Standard states that a discharge test lasting at least 120 minutes is required for when a luminaire is first commissioned or following a significant repair or replacement. BARDIC Sentinel™ automatically adheres to this by always performing a 120 minute commissioning test from when it is first powered up or after a reset. This holds true regardless of whether the discharge test was initiated manually or automatically. Subsequent discharge tests will revert back to the normal 90 minute duration however only if the 120 minute commissioning test had passed. As if that were not enough, BARDIC Sentinel™ is also sophisticated enough to recognise the state of charge of the batteries and recent actual power losses. This allows BARDIC Sentinel™ to factor in delays to ensure that the batteries have enough time to recharge before executing a test.

Countless hours and resources had been invested into the research and development of the Sentinel™. It should come as no surprise that BARDIC Sentinel™ is a refined solution for single-point automatic self-testing of exit and emergency luminaires that is robust and covers all possible scenarios in addition to tightly adhering to the Standard. Even more impressive is that the system is entirely self-contained and can be easily retrofitted into any existing compatible BARDIC luminaires.