

# CENTRAL BATTERY SYSTEMS

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Emergency lighting is most commonly provided in the UK with integral emergency control gear, this provides a robust and reliable system given each emergency luminaire operates independently during power failure, however can be costly to test and maintain as each emergency luminaire contains its own battery.

Central battery systems offer a lower lifetime cost solution for larger installations as batteries do not need to be individually replaced, although it does not negate the need to test and ensure that emergency luminaires are operational in emergency mode. Such central battery systems come in a range of types the most common of which are explored below and which must be understood when ordering luminaires for a central battery emergency lighting installation.

## Voltages

The most common voltages used for central battery systems in the UK are 230v, 110v and 50v, occasionally 24v systems are also used.

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## Centrally Switched

Centrally switched systems handle the changeover from mains supply to central battery supply during mains failure at a central changeover relay, usually at the distribution board or at the central battery itself. These are sometimes called "hold off" systems as the central battery system holds the supply off until a power failure occurs. These systems are lower cost than locally switched systems as each emergency luminaire does not contain a changeover relay, however they also have a single point of failure should the single changeover relay fail so locally switched systems are more popular from a reliability perspective.

Centrally switched emergency luminaires only require a single live feed, this carries the mains supply in normal operation, during a power failure the central relay switches the supply to the battery and supplies the luminaire through the same feed as the mains, hence the wiring requirements for centrally switched systems are generally more simplistic and lower cost.

- Centrally switched systems typically operate at 230v. As there is no changeover relay in the luminaire or emergency control gear the central battery runs the mains driver in the luminaire during power failure.
- As the luminaire operates from the mains driver during power failure it provides 100% of its output in emergency operation, 230v centrally switched central battery systems are therefore often used where high lux levels are required during mains power failure for high risk areas or where staff must remain to continue working on critical activities.
- Centrally switched luminaires only require live, earth and neutral connections and the single live connection carries either the mains supply in normal operation or the central battery supply during power failure. A ceramic terminal block is also required in most instances depending on how the installation has been wired.

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## Locally Switched

Locally switched systems are more complex and costly as the luminaire has to contain a relay to handle the changeover of supply from mains supply to central battery supply during power failure, however locally switched emergency systems provide a more robust emergency solution than centrally switched systems as any failure of a changeover relay will only prevent a single luminaire from operating in emergency mode. These locally switched systems are sometimes referred to as "hold on" as the central battery power is constantly live at the luminaire. The wiring for such systems is also more complex as three live feeds are required to the luminaire, switched live for normal operation, a permanent live feed so that the luminaire can detect when mains power failure occurs and the central battery feed to operate the luminaire during power failure.

- The power from the central battery is constantly present at the luminaire so the luminaire must contain a relay to switch over to the central battery supply when the permanent live feed fails.
- In 230v systems this changeover relay switches power to operate the normal mains driver during power failure. 230v systems therefore provide 100% of its output in emergency operation.
- In 110v, 50v and 24v systems the changeover relay also contains a driver to operate the luminaire at the reduced voltage and the lumen output is typically lower than in normal mains operation.
- A locally switched system will require switched live, earth and neutral feeds for normal mains operation, as well as a permanent live feed and a central battery live feed to enable it to detect power failure and operate from the battery during mains failure. Again, locally switched systems must use ceramic terminals depending on how the installation has been wired.

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## Central Battery Cabling Systems

Central battery systems have specific requirements for their cabling to ensure they provide a safe and robust system. The cabling carrying the central battery supply must be fire rated to ensure that during a fire the cabling cannot burn through and disconnect power from other parts of the building where people may still be trying to evacuate. All parts of the cabling system must meet this fire rated standard including joints, for this reason the terminal block in the luminaire must be ceramic where it is used for loop in / loop out wiring methods. If luminaires are wired from spurs from the fire rated cabling system the cable in the spur itself and the terminal within the luminaire do not need to be fire rated, however such spurs must not exceed one metre in length. All fire rated cabling must be contained in metal conduit secured with metal clips to prevent it falling from the ceiling during a fire and causing an electrical shock hazard to emergency workers.

The above is not an exhaustive list of all central battery systems and installation requirements but is intended to act as a guide to provide a basic understanding of these systems and some of the critical information to consider when specifying luminaires for a central battery system. There are a variety of other central battery systems on the market, for example older central battery systems may operate a dedicated emergency lamp in the luminaire entirely separately from the mains source. Such systems were commonly used in older high intensity discharge luminaires where the strike time of the lamp was too slow to work as an effective emergency light source hence a separate halogen lamp would be used to provide a light source capable of instantly striking. Specifying the incorrect luminaire for a central battery system can be extremely costly so it is important to ensure that the system is fully understood prior to placing your order and we would always recommend seeking the advice of a specialist to ensure that the cabling system is compliant with the latest regulations.