How to Calculate Fire Alarm Standby Battery Size

In accordance with BS 5839, all category L & M fire alarm systems must be fitted with a standby power supply for continued operation in the event of a mains power failure.

BS 5839 sets out that in the event of a mains power failure, the backup batteries should be capable of running the system for a minimum of 24hrs, followed by 30 minutes in full alarm state (all sounders circuits in alarm state).

If it is a category P fire alarm, the above statement applies if the building is constantly occupied. In the situation is that the premises are not continuously manned, then the standby time may need to be increased to 72hrs.

Stand by power is predominantly achieved by using appropriately calculated SLA (Sealed Lead Acid) batteries.

Standby Battery Calculation

The following formula can be used to calculate the appropriate standby battery size:

\[ C_{min} = \left( I_1 \times T_1 \right) + I_2 \times 1.25 \]

Definitions and example of the above

\( I_1 \) (Standby current from the fire alarm panel) = 0.05 Amps

\( T_1 \) (Standby time, assume category L1) = 24 Hours

\( I_2 \) (Full alarm current from panel) = 0.3 Amps

First multiply \( I_1 \) (0.05 Amps) by \( T_1 \) (324 Hours) = 1.2Ah (Amp hours)

Then add on \( I_2 \) (0.3Amps) = 1.5Ah

Then multiply the whole by the aging factor (1.25)

\[ 1.5 \times 1.25 = 1.874 \text{Ah} \]

\( C \) minimum would therefore be 1.874 Amp hours

Please note, it is often over looked that, if a much larger battery is found to be required, a higher capacity charger may be necessary to support the battery!