

SURGE PROTECTION IN STREET LIGHTING COLUMNS & FEEDER PILLARS

What are surges?

A voltage surge (or spike) is a short burst of energy (a transient event) which typically last between 1 and 30 microseconds (a millionth of a second).

Voltages ranging between 1 - 10 kV can be experienced with smaller spikes occurring each day.

Causes

The causes vary but are commonly:

- A direct lightning strike to a power line
- A ground lightning strike into a supply cable
- The switching on, or off of a motor which can cause surges through the main power network
- An unplanned cable cut such as those that occur during construction or maintenance works when an unidentified cable is severed
- Nuclear electromagnetic pulses
- Electrical faults

Effects

Built-in surge protection can become degraded or fail without prior indication. Surges can degrade wiring insulation and destroy electronic devices; for street lighting this could affect relays and other electronic protective devices in the feeder pillar.

In the street lighting column, the LED drivers and lamp fittings are at risk of being damaged.

Street lighting and highway equipment are critical infrastructure and failure could cause interruption to service, e.g. failure of lighting on a busy motorway, or in a busy city centre with potential risk of serious injury or loss of life.

Surge protection devices in isolators

Surge protection devices (SPDs) can be fitted within isolators which can then be installed into street lighting columns. The example below shows an open isolator unit fitted with a SPD, two fuse carriers (CEL1132) and a switch (CEL1232).

Surge protection devices can also be fitted on distribution boards situated in feeder pillars, see overleaf



Authorities have started to make the inclusion of surge protection mandatory in their new LED street lighting schemes.

BS 7671:2018

18th edition IET wiring regulations

Why do we need Surge Protection for street lighting and highway infrastructure?

The current wiring regulations state:

“Protection against transient overvoltages shall be provided where the consequence caused by overvoltage could result in:

- Serious injury to, or loss of, human life,
- Failure of a safety service, as defined in Part 2. (Part 2 defines “safety service” as “an electrical system for electrical equipment provided to protect or warn persons in the event of a hazard, or essential to their evacuation from a location”),
- Significant financial or data loss.

Protecting assets

Well-designed Surge Protection can safeguard:

- ✓ Older generation lighting assets: wire wound and electronic ballasts
- ✓ Modern lighting assets: LED luminaires, LED drivers
- ✓ Other assets: CMS connectivity, CCTV cameras
- ✓ Detectors and monitoring devices
- ✓ Electrical equipment in feeder pillars

Installing surge protection is far more cost effective than replacing the assets themselves.

Additional benefits of Surge Protection

- ✓ Reduced maintenance costs
- ✓ Simple installation and replacement procedure
- ✓ Easy visual indication for maintenance teams

Surge protection devices in feeder pillars

Surge protection devices (SPDs) can also be fitted on distribution boards which can then be installed into roadside feeder pillars.

The example below shows a distribution board fitted with two SPDs, eight fuse carriers (CEL1132) and a double switch.



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