

Installation and Maintenance of AC Surge Protection at Cellular Base Stations

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ACData Solutions recommends that AC surge protection be provided at the load center or distribution panel at all cellular base stations. To enhance both performance and maintainability, ACData Solutions recommends that the protector:

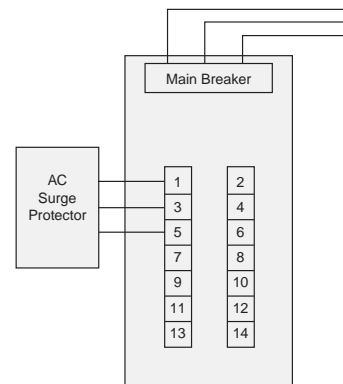
- Be installed with short leads on the load side of a dedicated circuit breaker,
- Contain multiple individually-fused MOVs in each supplied mode of protection,
- Provide both normal mode (L-N) and common mode (N-G) protection elements.

For both integrated and non-integrated applications, the protector should be connected to a dedicated load breaker in the breaker position nearest the main breaker. Connection in the first breaker position ensures that bus length will not add to the effective lead length of the AC protector. Use of a breaker will ensure that in the rare event of AC protector failure, the main breaker will not trip and interrupt service to the site. ACData Solutions recommend that leads be a maximum of 24 inches.

Parallel-connected panel-mount SPD

For optimum performance and safety, adhere to the following points:

- Minimum length connecting wires
- No sharp bends or excess length in connecting wire
- Use a dedicated circuit breaker located near top of panel
- Do not connect to a panel's main breaker or power feeds lugs
- Neutral wire is connected for single phase & Wye panels
- Ground wire connection per NEC requirements

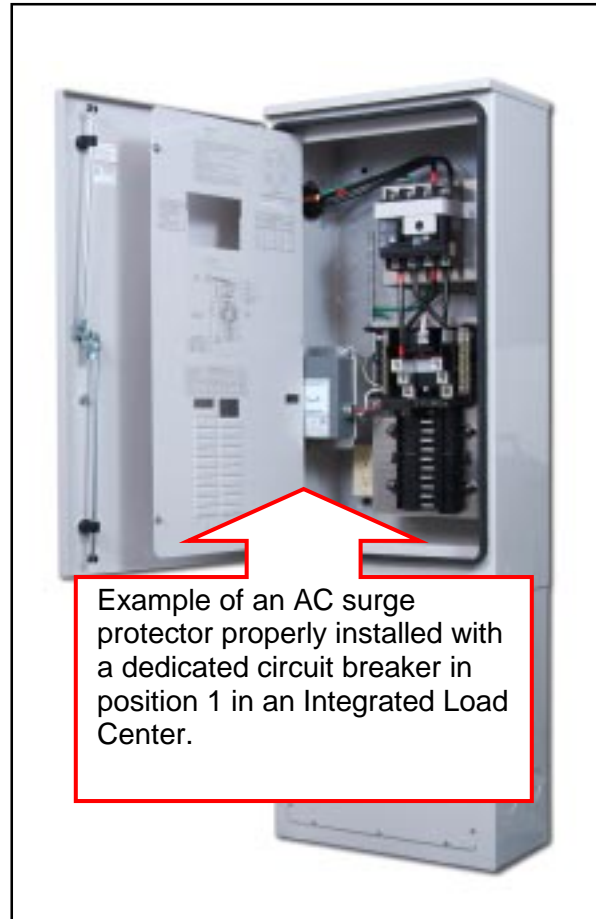


Installation to the bus, or in series between the main and load breakers (sometimes called Kelvin connection, or V wiring) is not recommended as internal fusing within the AC surge protector may not clear before the main breaker is tripped. Indeed, there are some

protection technologies on the market which are designed to fail as a hard short and thus always trip the main circuit breaker. In such cases, the failure is both hard to diagnose and power is interrupted until a truck roll can be performed.

To ensure the site remains protected when a single protection element fails, the protector should be highly reliable, utilizing multiple individually-fused MOVs in each mode of protection. This allows for an individual MOV to fail and fuse out of the circuit without compromising protection. For larger facilities such as cellular switch sites, partial fail alarming should be provided to allow predictive maintenance in advance of protection failure.

Primary protection elements should be provided from each line to neutral. It is important that the AC protector be closely bonded to site ground. As the neutral to ground bond point is often some distance from the load center/distribution panel (see Common Mode Protection white paper authored by ACData Solutions), it is important in cell site applications to require common mode protection between neutral and ground. Without common mode protection, flashover may occur within the base station transceiver equipment.



Example of an AC surge protector properly installed with a dedicated circuit breaker in position 1 in an Integrated Load Center.