

Combo Disconnect Enclosures Improve 5G Site Implementation and Aesthetics

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Power management and protection systems are not top of mind when it comes to 5G small cell sites, but they can have a significant impact on installation and aesthetics. To provide reliable power to multiple, expensive 4G and 5G radios, every site needs a power connection, meter, AC disconnect and load center-mounted on the streetlight pole (or other surface). This equipment and its cabling take time to install and can create unsightly complexity.

The new Combination Meter/Disconnect enclosure from Raycap integrates all this functionality into one narrow enclosure assembled at the factory. It reduces installation time, ensures consistent quality and safety, and provides a more attractive addition to any small cell site or other application with similar requirements.

Satisfying Carrier, County and Utility Requirements

According to the CTIA, there were 154,000 small cells in 2019, and this number will grow 5X to 800,000 by 2026. This rapid build-out will be driven by competition among the wireless carriers (and some enterprises) to be first to offer services in a given area and gain market share. This “5G land rush” will be accelerated by the recent availability of mid-band frequencies such as the C-band.

According to CTIA, wireless carriers and their partners will have deployed 800,000 small cell sites in the U.S. by 2026.

The sites that support 5G services need to be located closer to end user devices than 4G macro towers due to the shorter propagation distance of their high-frequency signals. As a result, small cells are often sited on streetlights, power poles and other structures on city blocks, with antennas, radios, power and connectivity equipment perched above the heads of pedestrians and traffic. As a result, many municipalities are looking for solutions that support 5G deployment but maintain the aesthetic appeal and continuity of their neighborhoods.

Similarly, utilities that own street infrastructure and power the 5G sites face the challenge of making sure small cells meet rigorous electrical, mechanical and safety guidelines. AC power connections to the site must be properly engineered, manufactured, installed and metered so they will operate reliably and present no hazard to the utility crews who service the infrastructure, not to mention the general public. With so many new small cells on the horizon, utilities need some standardization of small cell components to streamline review of applications for small cell installations.

Power Management Requirements for Small Cell Sites

Even though they are smaller than 4G macrocells, 5G small cells are still complex electrical systems. Each one typically contains multiple radios: some to operate at different 5G bands, others to provide 4G services for existing equipment and customers, and to help fill-in blind spots where 5G signals can't reach. Every radio needs AC power and fiber backhaul connectivity. Being mounted outside on poles and buildings, all that equipment needs thermal engineering to operate over wide environmental ranges.

The AC power provided by the utility is first connected to an AC meter for the utility to track power usage by the small cell site. The meter then connects to an AC disconnect or main breaker that allows the electrical service to be disconnected for service or repair. The power then runs from the AC disconnect to a load center that provides power distribution through multiple individual breakers and circuits for the radios, fans and other subsystems in the site. To date, each of these functions has typically been housed in its own enclosure.

The contractor installing the small cell site must mount all the boxes, and interconnect them on-site, according to electrical drawings. This can often lead to an unsightly collection of boxes and cables and introduces a complex set of connections that can lead to reliability problems.



Figure 1. An example of a typical power configuration for telecom equipment.

The Combo Meter/Disconnect Eliminates The Mess

Because the basic power management needs for pole-mounted small cell sites are consistent, Raycap has engineered a product that combines all these components into one standardized unit. Its Combination Meter/Disconnect (RMx-E2) products comprise a ringless meterbase, AC disconnect, load center and cabling into one enclosure. In addition, the products can optionally incorporate Raycap's unique Strikesorb® technology to provide robust surge protection for up to 12 AC power circuits to support today's 4G and 5G radio systems. Rated Suitable for Use as Service Equipment (SUSE), they are a one-step solution to improve the aesthetics and reliability of small cell sites.



Figure 2: The Raycap Combination Meter/Disconnect unit combines a ringless meterbase, AC disconnect, optional surge protection, load center and cabling.

Clearly, replacing multiple boxes and cables with one integrated unit goes a long way to improving the appearance of a small cell site. The narrow 9-inch width makes it easy to mount and fits well on wooden or metal poles (see Figure 3). The enclosures can be finished and painted to blend in and meet city codes.



Figure 3: The Raycap Combination Meter/Disconnect unit replaces multiple boxes and their cabling with one sleek unit that looks good on wooden or steel poles.

Faster Installation and More Reliable Electric Service

A unique cable-routing strategy accommodates mains connection from the bottom, sides or the top. This is especially important in urban environments where the electrical service is often underground. Contractors installing the products can run power directly into the box without having to snake cable around it, and then the tower- or pole-mounted 5G equipment loads are fed through the top. The ringless mount accommodates most common meters. In all, this sensible design delivered in a lightweight narrow form factor contributes to faster, more consistent installation.

These integrated products also provide superior, maintenance-free power management and protection. The meter-output connections to the main breaker are pre-terminated and tested in the factory to eliminate the cost of extra parts and labor required for on-site configuration. The RMx-E2 products are NEMA 3R rated for use in harsh environments or inside poles. In fact, they have already been reviewed and approved for use by a major east-coast utility and can be found on the MEG-approved list.

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The optional surge protection is provided by Raycap's Strikesorb 30-A-2CHV Surge Protective Device (SPD), a Class I SPD, certified by VDE per the IEC 61643-11 standard as suitable for installation in areas where induced lightning exposure is expected. It can withstand direct surge currents up to 5kA (10/350 μ s) and induced surge currents of up to 60kA (8/20 μ s). Choosing the surge protection option helps to ensure safe operation of equipment on top of poles and towers.

Simplifying One Key Aspect Of Any 5G Deployment

U.S. municipalities and utilities are facing a tidal wave of small cell sites in their neighborhoods and service areas. While these sites will typically be designed and installed according to regional needs and differences, the Raycap Combination Meter/Disconnect will simplify one important aspect of every site: power management, surge protection and distribution. With its integrated, unobtrusive enclosure, the products help municipalities optimize the appearance of 4G and 5G wireless equipment on their streets. The products also give utilities a more robust and streamlined solution to power small cells sites—as well as other service needs.

For more information on the RMx-E2 Combination Meter/Disconnect, contact Raycap.

Contact us today at info@raycap.com

About Raycap

Raycap is an international manufacturer and technology leader with decades of experience providing innovative infrastructure solutions for customers in the telecom, energy, defense, transportation, and other industrial markets. Its solutions protect mission-critical applications and ensure the best possible system availability. The company's product portfolio includes lightning and surge protection technologies, structured cabling and connectivity solutions, power management systems, custom enclosures, cabinets, and wireless network concealments. Since its founding in 1987, the company has experienced continuous growth. Its engineering expertise, test laboratories, and multiple manufacturing facilities guarantee quality, reliability, and innovation. Product design, testing, and approval processes comply with all international safety standards. Raycap operates in the United States, Germany, Greece, Cyprus, Slovenia, and Romania.

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