

The Value of a Real End-to-End Lateral Protection Strategy

by Andrew Jones, S&C Electric Company

The COVID-19 pandemic has resulted in a significant increase in demand for reliable power at the grid's edge, making lateral-protection strategies more important than ever. With a shift to more "at-home" lifestyles becoming the norm, utilities will likely continue experiencing a larger strain at the edge of the grid for many months to come. There's no better time for utilities to adapt to changing environments and customer lifestyles by prioritising lateral protection today.

Placing an increased focus on modernising the last mile of the grid can bolster reliability and drive significant O&M savings—all while increasing customer satisfaction. Conventional lateral-protection strategies are typically composed of a variety of devices that aren't "smart." This mix of unrelated protective devices can result in lengthy, avoidable outages for customers and unnecessary truck rolls that can put line crews at risk while servicing the grid.

The better way to support the last mile of the grid is with a suite of advanced protection devices designed to work together and protect lateral lines from end to end.



S&C's TripSaver II Cutout-Mounted Recloser.

Protecting All Types Of Lateral Lines

S&C's TripSaver® II Cutout-Mounted Reclosers are designed to provide advanced protection throughout the lateral system. The device is available in a variety of ratings, ranging from 40-200 amperes, making it the only advanced lateral protection solution designed to support all lateral line locations, from closest to generation all the way to the grid's edge.

Regardless of where a device is placed on the grid, its rating capability must closely match the expected load of the line it's protecting. Compared to conventional alternatives that support fewer, specific locations throughout the grid, TripSaver II reclosers simplify the need for crews to learn and manage several devices, allowing them to use variations of the same device throughout their laterals.

Many systems around the world are also being designed to include three-phase lateral lines, which can create additional delivery and protection challenges for utilities. If a fault is detected on one phase and the other two phases remain energised, this poses a significant safety risk for line crews responding to the fault. When configured for group operation, TripSaver II reclosers can collectively operate to effectively respond to faults on three-phase laterals. When one device detects a persistent fault and trips open, the other two devices will follow suit, limiting the risk of phase-to-phase faults and providing a safer environment for line crews responding to the outage.



S&C's TripSaver II Cutout-Mounted Recloser in three-phase, group operations configuration.

The TripSaver II recloser is not only versatile in where it can support lateral lines, but it also has more than 190 operation curves available, making it possible to configure in series with any protective device already on the system. The wide range of curves available for this device makes it the smartest choice when integrating into new or legacy systems.

These reclosers are also designed to adjust to your changing system. Whether a utility is experiencing expected increased loads or adding new devices to its lateral lines, the utility may want to update operational curves for existing devices. Cutout-mounted reclosers allow for easy adjustments by accommodating updates made in the field through a simple laptop connection, without needing to remove the device from operation.

Lateral Segmentation

Having cutout-mounted reclosers available at a variety of ratings means utilities can place multiple devices on the same line to better segment the grid and limit the number of customers affected by any outage. Increased lateral segmentation works best when all the devices on the line coordinate with each other to avoid unnecessary operations and momentary outages.

The TripSaver II Cutout-Mounted Recloser is enabled with a sequence-coordination feature, which equips devices further upstream from the fault with the ability to detect whether a downstream device has completed its operating sequence before operating itself. Without sequence coordination, automatic protection devices upstream from a fault typically react before a downstream device can identify, clear, or isolate the fault, creating unnecessary momentary outages for more customers.

O&M Savings

The biggest benefit from using smart devices on laterals is the operation and maintenance (O&M) savings. With 80% of overhead faults being temporary in nature, TripSaver II reclosers keep these faults from becoming permanent outages—and utilities from needing to send crews to restore power.

When a fault is permanent, the reclosers physically swing open to provide a clear visual indicator for line crews to identify the location of the fault. By simply inserting the TripSaver II recloser back into the cutout, this speeds up the process of crews finding and fixing the fault.

Over time, these O&M costs remain low, too. The TripSaver II recloser has no user-serviceable or replacement parts. There's no need to change oil or replace a battery. To ensure constant operation and data-logging, the cutout-mounted recloser harvests energy from power lines, eliminating the need for a battery backup system. With various ratings of the TripSaver II recloser needing as little as 1 amp to run, the recloser is more reliable than its battery-powered counterparts. This energy-harvesting capability ensures utilities never have to worry about sending a crew to recharge the device or replace a battery after a prolonged outage.

The benefits cutout-mounted reclosers bring to a utility's O&M costs are also reflected in improved customer satisfaction. As an industry, we know customers won't accept outages of any length because any outage can cause costly disruptions to businesses and households. This is especially true as more power users are spending a majority of time at home because of the COVID-19 pandemic.



S&C's VacuFuse Self-Resetting Interrupter.

Bringing Advanced Protection To The Grid Edge

End-to-end lateral protection should truly mean end to end, protecting everything from the head of the lateral to overhead distribution transformers. S&C is the first innovator to take advanced lateral protection to the very edge of the grid with the VacuFuse® Self-Resetting Interrupter—the first device to replace fuses at this location and bring intelligence to the grid edge. Specifically designed to respond to faults at overhead distribution transformers, these devices help restore service to homes after experiencing a transient fault, eliminating up to 70% of O&M costs at this grid location.

Often, these locations experience repeat outages, so the VacuFuse interrupters provide a solution to the difficult-to-solve problem areas of the grid. Especially for the customers who are subject to repeat outages, VacuFuse interrupters improve customer satisfaction in these troublesome locations.

For more information please contact S&C on SalesAustralia@sandc.com or visit sandc.com