

# Grid Reliability



## INTRODUCTION

**Grid reliability impacts every aspect of our lives from hospitals, factories, telecom systems, and government operations to potable water production and the powering of individual households.** Automation, new construction, urbanization, population growth, growth of electric vehicles, increased renewable generation, and severe weather events impact grid reliability and stability significantly. System failures and massive outages have occurred requiring utilities and other companies that support the grid to look for ways to prevent these occurrences in the most economical manner.

## Affordable Solution – Reclosers

Reclosers are one of the most important solutions in overhead applications. Reclosers help utilities better manage and mitigate disruption of electrical service. From simplifying the mechanism to incorporating smart technology while eliminating the need for routine maintenance, reclosers have evolved into a critical must-have component for a utility's grid reliability.

## Installing Reclosers into Existing Grids

Due to aging infrastructure, changes in loads, and increases in distributed energy resources, distribution power lines and substations are facing increasing reliability issues. As smart-grid technology becomes more affordable, replacing or upgrading those lines is not only necessary but an investment in the future. Reclosers improve reliability metrics and save utilities time and money when outages occur by restoring power automatically. If an outage requires a repair, reclosers help crews quickly locate the problem and restore power faster by minimizing the outage area.

Grid automation controls and manages the distribution system operation to minimize interruptions in the power supply. As a result, equipment such as reclosers is installed to reduce the complexity of fault diagnosis, detection, and isolation with SCADA, which becomes an integral part of the digital solution comprising the smart grid.

## Features to Consider for Grid Reliability

**Reliable service and reduced outage times require reclosers that have features that meet the needs of the installation environment and fit into the existing network.**

### Increased Phase Spacing

One method to mitigate flashover events is by engineering overhead distribution equipment with extended phase spacing. For instance, G&W Electric Viper® reclosers offer customized designs with independent pole mechanisms for each phase. This flexibility allows for phase-to-phase spacing ranging from 15 to 30 inches or more. By implementing wider spacing, flashovers caused by vegetation, overvoltage, and wildlife contact can be significantly reduced.

### Flexible Configurations

Reclosers must be installed to fit the environment. Vertical insulator "L" configurations and horizontal insulator "Z" configurations are available on Viper reclosers. Multiple frame configurations, substation, padmount, or complete site-ready assembly are available to meet the installation needs in the most flexible way.

### Site-Ready Reclosers for Rapid Deployment

Site-ready reclosers offer a streamlined approach. Viper reclosers and recloser controls can be configured as complete systems, incorporating all necessary components during quality-controlled manufacturing. Minimizing variability associated with field installations makes the installation process more efficient, reducing time and labor requirements. With G&W Electric serving as a single supplier for all components, sourcing becomes simpler and more manageable.

## Protecting Workers and the Environment

Improving worker safety, protecting nature, and reducing carbon footprint are factors that impact automation selection.

### Manual Trip Operation

When workers need to work on a line, operator safety is paramount. To ensure their safety, a manual trip and lockout handle prohibits power operation from either the control or remotely. Mechanical blocking of the device further ensures against accidental close. An open and close contact indicator verifies contact position. The contact status and lockout condition can also be verified at the control.

### Dead-Tank Recloser Design

The Viper reclosers employ a dead-tank design featuring solid dielectric modules. This reduces wildlife interruptions and increases operator safety by minimizing the surface area of the recloser assembly at higher voltages, using recloser modules with the exterior of the module body at ground potential. When coupled with wildlife protectors, this additionally reduces the chance of wildlife causing an arc that can result in wildlife-related wildfire initiation. With wildfires increasingly becoming a significant challenge for utilities, the benefits of this design are substantial.

### Solid Dielectric Modules

In addition to, and enabled by, the dead front design, Viper-ST recloser modules have removable IEEE apparatus bushing interfaces with durable silicone insulators standard for all overhead applications. Silicone insulators are removable, permitting easy replacement in the field if damaged or if higher external BIL levels are required due to high altitude or local environmental conditions. Additionally, the silicone insulators are much less likely to be cracked or damaged as compared to the epoxy body of most reclosure insulators.

### Flame-Retardant Wildlife Guards

Wildlife interaction with electrical infrastructure can inadvertently trigger flashovers, and falling wildlife following a flashover can further create wildfire risk. To counter this, the Viper-ST recloser has a dead front body style, and when flame-retardant wildlife guards are employed to cover energized parts, this further prevents flashover events from igniting and eliminates the risk of flaming material dripping onto the ground.



## CASE STUDY

### Custom Viper®-ST Recloser Installation

The monk parakeet is one of the few temperate-zone parrots that can survive cold climates partly because they build communal nests, sometimes with sticks up to 2 feet long. Colonies of monk parakeets live throughout the U.S. from New York, Connecticut, and Illinois to Texas and Florida. The monk parakeets build their nests in holes in trees as well as around heat-producing electrical equipment located on utility poles.

A major investor-owned utility in the Northeast was experiencing significant problems with flashovers and outages at a critical location in their service territory. After investigation, they determined that the monk parakeets built a communal nest on one of their poles located outside of a hospital, causing service reliability issues. To reduce the flashovers and outages, existing reclosers were temporarily removed to prevent any new nests from being built. However, this only provided a short-term and less than ideal solution.

### Understanding the Situation

The utility needed to find a long-term solution that would restore reliable service to the local hospital and surrounding area without harming the monk parakeets so they worked with G&W Electric to find a solution that wouldn't invite the monk parakeets to build their nests again.

G&W Electric designed the Viper ST recloser platform to be as flexible as possible to accommodate the widest range of solutions to solve the unique needs that arise in today's power grid. G&W Electric recommended installing the Viper-ST recloser which combines the reliability of electronically controlled vacuum fault interrupters with the reduced-maintenance benefits of a dead front solid dielectric insulated device. The Viper-ST recloser is designed for overhead applications with vertical insulation "L" and horizontal insulation "Z" module designs and multiple frame configurations with site-ready options. This flexible module design was exactly what was needed to solve this unique challenge.

### Solution

G&W Electric offered a solution that modified the existing structure and left little to no space for large, communal nests. The space between the phases was increased along with the pole mount spacing. The junction boxes were relocated below the cross-arm frame. This modular and open design prevented the monk parakeets from building their nests. Reliable electrical service was restored to the hospital and surrounding area – and the monk parakeets found other places to build their nests, places where flashovers and outages would not be an issue.

Learn more about the Viper reclosers or contact G&W Electric at [info@gwelectric.com](mailto:info@gwelectric.com)

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