



Trans-Rupter II® Transformer Protector—Model SE . . . An Economical Solution for a Substation Upgrade

S&C Featured Solution: Substation Upgrade

Location: Midwest USA

Customer Challenge

A municipal utility in the Midwest needed to upgrade one of its 69-kV distribution substations to meet the increasing power demands of the surrounding community comprised of residential, commercial, and industrial customers. Plans called for replacing the existing 7.5/9.5-MVA transformer with a new 15/20/25-MVA transformer.

Instead of replacing the existing power fuses with new fuses rated for the new transformer, the utility decided that more sophisticated transformer protection was needed. It wanted a relay-activated device that would provide fast, three-phase tripping—a purchase certainly warranted given the investment the utility had just made in its new transformer.

S&C Solution

Initially, the utility planned to use an S&C circuit-switcher to protect the new transformer. Internal bushing current transformers would provide sensing for the overcurrent protective relays, which would be housed in a nearby control house.

But the utility came to realize that the overcurrent relays, control-house modifications, external control-power requirements, and the associated wiring would use up a significant portion of the project budget. The utility needed a less expensive alternative.

Fortunately, S&C's Trans-Rupter II Transformer Protector—Model SE was the perfect solution to the utility's needs. The transformer protector provides three-phase protection, fast three-cycle circuit interruption, and a 31.5-kA interrupting rating—more than enough protection for the new transformer, and at a very reasonable price.

The Model SE device features a self-powered over-current-protection system that includes three single-phase digital overcurrent relays. The secondary current

from the current transformers provides the energy to power the relays and trip the Trans-Rupter II device. No substation batteries are required. Although a nearby control house was available for power, the utility appreciated the extra level of security provided by not having to rely on the availability of control power for transformer protection.

The transformer protector's slim profile and lightweight design allowed it to fit easily into the crowded substation. The utility chose to install the Trans-Rupter II pole-unit on an S&C mounting pedestal, which includes wired conduit for connecting the pole-units to the control cabinet.

The Trans-Rupter II Transformer Protector—Model SE.



S&C's Trans-Rupter II Transformer Protector provided excellent protection within the utility's budget.



Valued Outcome

The Trans-Rupter II Transformer Protector saved the utility almost 50% over the cost of a comparable circuit-switcher or circuit breaker, but the initial purchase price wasn't the only thing the utility liked about the Model SE pole-unit.

Installation of the transformer protector was fast and simple. It took a crew of three only 3½ hours to install the pole-units and control cabinet and to make the necessary electrical connections—lowering the total installation cost. The crew used a bucket truck to hoist the pole-units into position, and then routed conductors from the pole-units to the old fuse mountings.

The Trans-Rupter II Transformer Protector features terminal pads that can be oriented in a variety of positions, which simplified attachment of the

conductors. The existing source-side, three-phase, group-operated disconnect—required to provide visible air-gap isolation for the pole-unit and to pick up transformer magnetizing inrush current—was reused.

The transformer protector was called upon to operate twice within a few days of its installation—even before the upgrade had been completed. In one instance, it tripped in response to a fault in a control device. In the second instance, technicians in the substation used the local Trip pushbutton to open the pole-unit in response to a fire in a faulted voltage transformer. In both cases, the Trans-Rupter II Transformer Protector performed as intended, sparing the utility possible damage to the new transformer and other substation equipment.



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