Application Paper
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New Issue

Source-Transfer Applications Using VisoVac Switchgear

VisoVac summary

Source power switching applications are found everywhere within power distribution systems. They are commonly used in commercial and industrial switching applications, but they can also be found in utility, government, and university power systems.

Source-power transfer-switching applications can be accomplished manually or automatically with the use of an auto-transfer controller. The VisoVac is a compact solution that can provide source-transfer capability for manual or automatic open/closed transition switching.

The VisoVac utilizes proven Eaton breaker and vacuum bottle technology, available with up to 40 kA RMS symmetrical interrupting. The switch comes standard with vacuum fault interruption (VFI), visible isolation, and visible ground. It is also available with the VFI only for a lower-profile design.

The VisoVac is available in several different style enclosures: submersible, NEMA indoor/outdoor dust-tight, or padmount style conforming to IEEE C57.12.28.

VisoVac switchgear does not contain oil or SF6 gas. It is completely air-insulated with vacuum interruption, reducing environmental concerns and periodic maintenance. Please visit Eaton's website at www.Eaton.com for more information.

Example case application

General description

The following example case application reviews the use of the VisoVac at a large university in the United States to replace dated fused gear with a manual transfer switch using overcurrent protection.

Design challenges

The existing 5 kV class installation was dated beyond the equipment product life, and a replacement was required. The installed equipment provided the capability of switching in one of two non-loop fed 5 kV sources. Each switched way was key-interlocked so only one source could serve the load at any given time. A fused-tap way was used to provide overcurrent protection of the 300 kVA, 5 kV class three-phase power transformer.

Replacing gear throughout the system with the same two-switched, single-fused gear created several issues. The university did not want to maintain stock on different fuses; they wanted to increase safety and switching options during maintenance with the possibility of future SCADA interconnections. See Figure 1.

Solution

The VisoVac is an alternate solution that meets all of the university's requirements, but also offers enhancement functionality. Instead of using a single-switch/fused tap with two switched ways, the VisoVac uses two VFI ways with resettable, built-in overcurrent protection, interlocked with visible isolation and ground.

A fuse tap is not necessary because each VFI is equipped with a Digitrip 1150 V overcurrent protection relay. Each VFI is interlocked so only one can be closed at any given time.
See Figure 2.

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Source-Transfer Applications Using VisoVac Switchgear

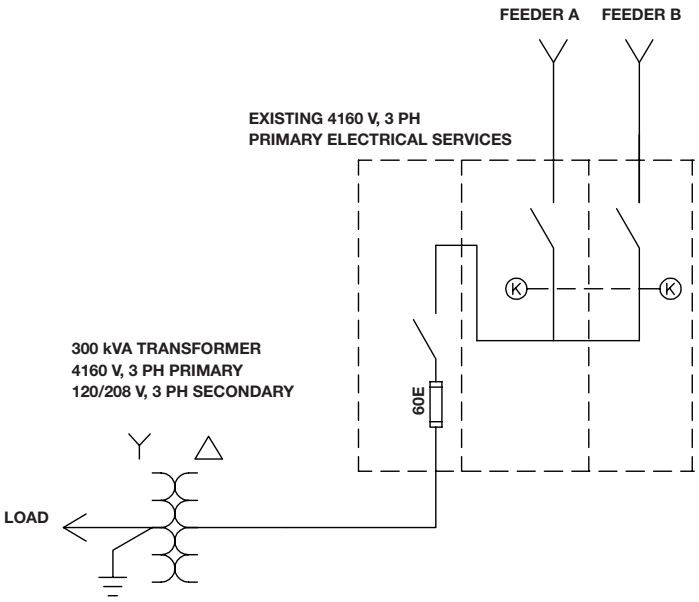

Figure 1. Existing system installation

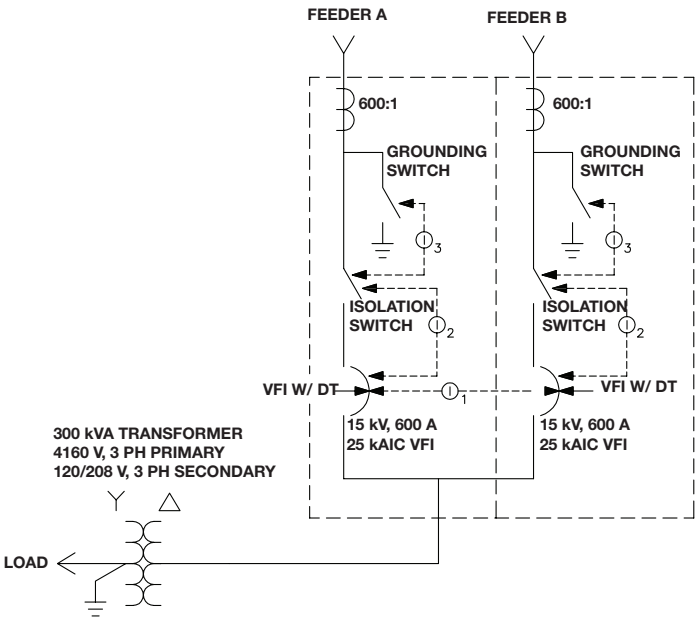

Figure 2. New system installation

Existing system installation

- Two manually-switched ways, key interlocked so that Feeder A and Feeder B cannot be closed at the same time.
- Switch-over, fused-tap way provides overcurrent protection for the 300 kVA, 4160 V / 208 V, 3 PH transformer.
- Switching cabinet utilizes three 36-inch wide sections with external operating handles for each switch way.

New system installation

- Two manually-switched ways, internally interlocked (no keys required) so that Feeder A and Feeder B cannot be closed at the same time.
- Three-position design, internally interlocked between VFI, visible isolation, and visible ground. VFI comes standard with 600 A load-break and 25 kA symmetrical RMS fault-interrupting capabilities.
- Eaton Digitrip 1150 V overcurrent protection relays with same setpoints used for transformer overcurrent protection. Digitrip 1150 V protection is energy harvesting, providing overcurrent protection without control power and during voltage collapse.
- Each protective way provides overcurrent protection for the 300 kVA 4160 V / 208 V, 3 PH transformer.
- Switching cabinet utilizes two 24-inch wide sections with deadfront panel.
- Stored-energy design with spring-charge motor internally mounted allows for remote operation. Pushbutton OPEN and CLOSE with spring-charge handle for dead-start operation.
- Digitrip 1150 V is SCADA ready with the future addition of Eaton VaultGard or NPServe platforms.
- **Optional:** Eaton automatic transfer controller ATC-900. The ATC-900 is available with Open (break-before-make) and Close (make-before-break) transition switching. For more information, please reference *Eaton ATC-900 Bulletin IB140012EN*.

Figure 3. Optional ATC-900 automatic transfer controller

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