



25kV MAVRiC® Expands the Range of PVE Pad-Mounted Switchgear to 25kV — Now Featuring New In-Line Disconnect Designs

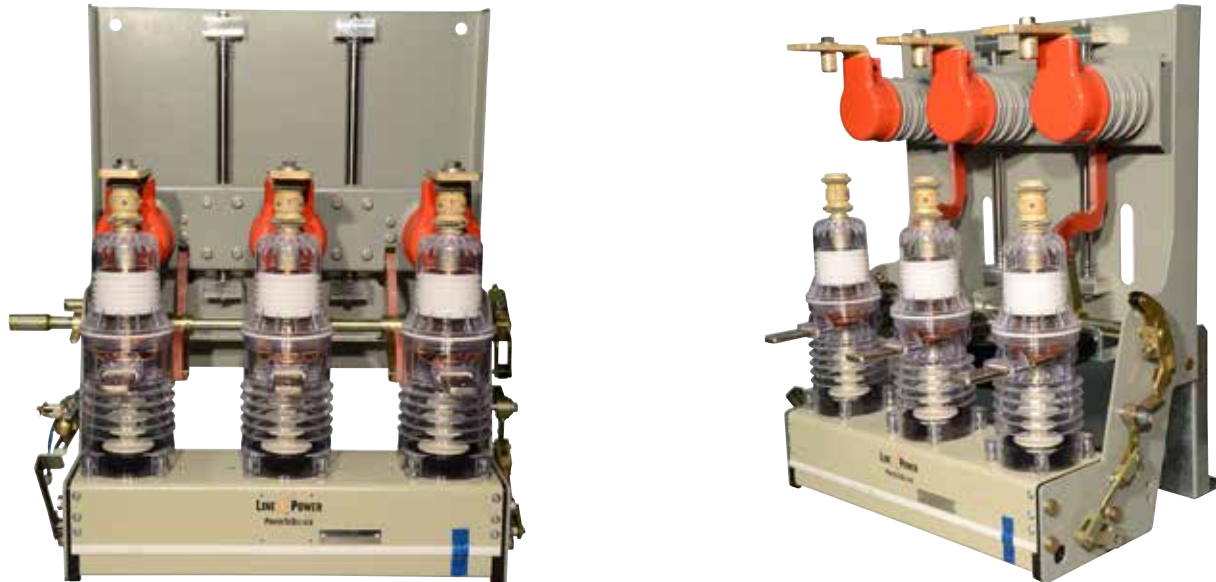


Figure 1. Shows the 25kV MAVRiC® modular interrupter featuring the new, more compact, in-line visible disconnects, with the disconnects closed (left) and open (right). The connections from the bushings ends to the main bus are not shown.

Federal Pacific continues to expand the range of MAVRiC® product offerings, now bringing air-insulated vacuum interruption and integral visible disconnect to the 25kV pad-mounted switchgear market. The modular MAVRiC® designs (air insulated vacuum circuit breakers with visible disconnects) now provide industry-leading switching and fault protection options for applications in this popular voltage class.

The 25kV MAVRiC® provides continuous current and load interrupting ratings to 600 amperes, with short-circuit ratings to 16,000 amperes symmetrical, and up to 30,000 load switching operations at 25kV, making the MAVRiC® the logical choice for repetitive switching operations, such as a Distribution Automation or Smart Grid applications.

The MAVRiC® provides these superior operational characteristics, without the need to resort to such problematic insulating media as SF6 or liquid dielectrics. The MAVRiC®

design delivers long-term value, by avoiding the issues related with these troublesome gas and liquid dielectrics. Specifically, the MAVRiC® design:

- Replaces switches and fuses with resettable vacuum interrupters
- Eliminates the environmental and health concerns associated with SF6 gas and liquid dielectrics
- Eliminates maintenance issues caused by degrading or leaking insulating media, as encountered with liquid dielectrics and SF6 gas.
- Avoids government reporting requirements on gas emissions or spills of liquids into the environment.
- Provides an easy to see and clearly discernible visible disconnect, a feature not normally present when vacuum interrupters are utilized
- Isolates the vacuum interrupters from the environment

The electrical ratings for the 25kV MAVRiC® designs are listed below.

Table 1 – Electrical Ratings of 25kV MAVRiC®

Overall Unit Ratings	
Nominal Voltage	25kV
Maximum Design Voltage	27kV
Basic Impulse Level (BIL)	125kV
Main-Bus Continuous Current	600A
Short-Circuit Withstand RMS SYM	16kA
Vacuum Interrupter Ratings	
Maximum Design Voltage	27kV
Basic Impulse Level (BIL)	125kV
Continuous Current	600A
Load Interrupting	600A
Short-Circuit Interrupting Rating RMS SYM	16kA

As is the case with the 15kV design, the 25kV MAVRiC® is available in two different designs of the integral visible disconnects – the more traditional hinged blade style and the newer “In-Line” disconnect. The “In-Line” disconnect offers a more compact design, enabling MAVRiC® technology to be applied with the same footprint and cable locations as with conventionally fused PSE dead-front pad-mounted switchgear, in particular, the more common 4-compartment designs.

The 25kV MAVRiC® is not a concept. It is an actual product, sold to actual customers, to solve real-world problems that conventionally fused pad-mounted switchgear could not fully, or economically address, such as three-phase fault interruption, load protection for currents in excess of 200 amps (or up to 200 amps if dead-front load-break elbows are required), re-set after operation, and selectable response characteristic curves.

In one recent case, a utility customer had a need for three-phase over-current protection of loads of up to 600 amps, utilizing vacuum fault interrupters, SEL relays, and an internal power source, while providing frame-mounted integral visible isolating disconnects suitable for their lock-out/tag-out operational requirements. The customer uses 25kV class switchgear and cables, but this particular application would be served initially at 12470/7200 volt grounded wye, with the option to change to the standard 25kV system voltage at a later date. Federal Pacific was able to provide the flexibility of design needed by this customer to meet changes in service voltage, without later needing to engage in an expensive switchgear change-out to accommodate a new system voltage.

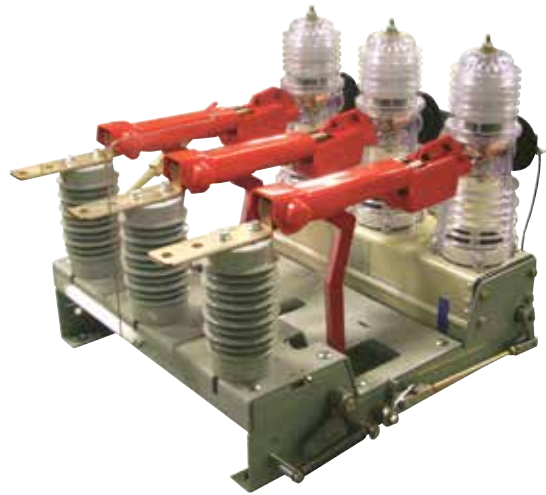


Figure 2 - Conventional hinge style visible disconnect MAVRiC® design (top) and the new, compact in-line MAVRiC® design (bottom), with both shown with visible disconnects in the closed position.

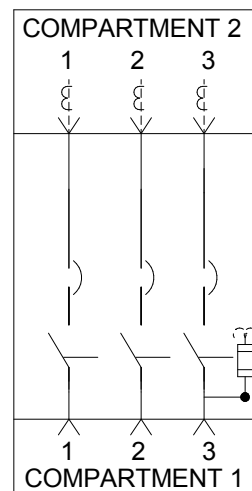


Figure 3 - MAVRiC® PVE-5 circuit diagram. Compartment 1 is the source side, while Compartment 2 is the load side.

Federal Pacific responded to this customer's needs by proposing the use of 25kV MAVRiC® PVE-5 pad-mounted switchgear, utilizing an SEL-751A Feeder Protection Relay, a 600 amp 25kV MAVRiC® fault interrupter with integral hinged visible isolation blades, current sensors for fault detection, and a dual-voltage potential transformer to provide the necessary choices of primary voltages needed to provide power, both now and in the future, should this location later be converted to the 25kV system. This switchgear was also outfitted with 600 amp non-loadbreak bushings on both the source and load sides, providing a true 600 amp solution for this customer.

Due to the integration of the visible isolation blades with the vacuum interrupters in the MAVRiC® design, the need for an additional set of largely redundant ganged loadbreak switches was eliminated, saving the customer money, while providing a more elegant, simplified design. Federal Pacific was able to offer this efficient 25kV PVE-5 vacuum interrupter design in a compact two-compartment design, while still maintaining the footprint of the standard 25kV PSE-5 dead-front pad-mounted switchgear.

Despite this fully-featured, highly functional design, Federal Pacific was able to quote a cost-effective, built-to-order switchgear assembly with a lead time for shipment of only 12 – 14 weeks after receipt of the purchase order from the customer.

Once again, Federal Pacific provides the winning combination of technical capability, flexibility of design, responsiveness to specific customer needs, product value, and the best delivery times in the industry for this type of switchgear.

For further information on MAVRiC® offerings, and their many benefits to the environment, your operating personnel, your customers, and your bottom line, please contact your Federal Pacific sales engineer or call 276-669-4084.



Figure 4. 25kV MAVRiC® application in a PVE-5 (interrupters and visible disconnect) pad-mounted application, ready for installation.

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