



Vacuum breaker breakthroughs

ABB is creating innovative breakthroughs in vacuum breaker technology, including spring-activated interrupters, embedded poles and magnetic actuators. The eVM1 - the world's first intelligent, integrated circuit breaker for medium-voltage applications – is the latest leap forward.

It's pretested and ready for plug-and-operate installation, and further demonstrates ABB's ongoing efforts to meet customer demand for compact circuit breakers with fewer parts and lifelong reliability.

As part of a grid, circuit breakers have to “listen and talk” in order to efficiently carry out their main function of current interruption. With this in mind, ABB is for the first time integrating measurement, protection and control functions within a single-device circuit breaker, called the eVM1.

Intelligent and integrated

This electronic breaker marries the advantages of the previous VM1 circuit breaker, adding onboard electronics that will allow customers to install one compact device that meets and handles all of their switching and protection needs.

In addition, the eVMI will need fewer cables, and can be monitored and controlled via the Internet.

Although the effectiveness of using vacuum to break an electrical current has been known since the 1920s, it was not until 1982, when ABB launched the VD4 vacuum circuit breaker, that vacuum technology became a serious alternative to gas or oil as an interrupting medium.

The VD4 was unique because the spring-activated operating mechanism was specifically designed and perfectly suited for vacuum interruption. It was also the most compact medium-voltage vacuum breaker on the market at the time – about half the size of its closest competitor.

Compact and maintenance free

Spring-activated actuators remained the preferred method of vacuum interruption until ABB launched the VM1 in 1997, which combined two pioneering technologies - magnetic actuators and embedded poles - which had a revolutionary impact on circuit breaker performance.

By using magnetic actuators and embedding the vacuum interrupters in epoxy resin to form a complete pole, the number of parts was reduced by more than 100, while the poles were protected from impact and external contaminants like dust and condensation.

The VM1 is a compact, robust, simply designed circuit breaker that can perform up to 30,000 switching operations, a huge improvement on previous breakers. At the same time, it requires no maintenance over its entire service lifespan of more than 30 years.

Embedded poles are now standard in all new ABB MV circuit breakers. The powerful magnetic actuation is also now used in outdoor switches (OVS) and outdoor reclosers (OVR).