SIEMENS

www.usa.siemens.com/techtopics

TechTopics No. 54

Interrupter switch technology comparison - type SIMOSEC SF_6 switch - conventional air switch

In TechTopics No. 53, the characteristics of SF_6 (sulfur hexafluoride) gas that make it advantageous for use in medium- and high-voltage electrical equipment were discussed. This issue of the TechTopics series will discuss this issue further by comparing the features of conventional, medium-voltage load-interrupter switches operating in air with those operating in an SF_6 gas environment.

The table on the next page shows some of the major characteristics of medium-voltage load-interrupter switches that influence the application or the space required. Of course, the table data for air switches is generic, and the specific data for a particular vendor of air switches can vary significantly. The air switch dimensions shown are for the most common (15 kV 600 A) switch, and the dimensions for a 27 kV switch are significantly greater. Even though typical data is used for the air switch, the table is considered valid for an overall understanding.

From the data in the table, these observations can be made:

- Endurance: The switching endurance of the type SIMOSEC SF_6 switch is significantly higher than that of an air switch that merely meets the ANSI C37.22 endurance requirements.
- Environmental: The switching performance does not deteriorate in adverse environments since the type SIMOSEC SF_6 switch is isolated from the atmosphere.
- Size: The type SIMOSEC SF_6 switch (without operator) is over 90 percent smaller than the basic air switch, allowing for a great reduction in space for the overall type SIMOSEC switchgear installation.
- Maintenance: Maintenance required for the switch itself is essentially eliminated.

This comparison illustrates the superiority of the type SIMOSEC SF_6 load-interrupter switch in comparison to traditional load-interrupter air switches.

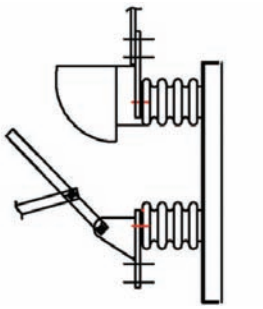
Siemens Industry, Inc.
7000 Siemens Road
Wendell, NC 27591

Subject to change without prior notice.
Order No.: E50001-F710-A341-X-4A00

For more information, contact: +1 (800) 347-6659

www.usa.siemens.com/techtopics

Answers for infrastructure.

Characteristic	Type SIMOSEC SF_6 switch	Medium-voltage air switches
		
Switching life: ■ Mechanical ■ Electrical	High: ■ 1,000 operations Very high: ■ 100 operations at 600 A	Low – ANSI C37.22 requires: ■ 500 operations up to 15 kV ■ 350 operations at 27 kV Low – ANSI C37.22 requires: ■ 50 operations up to 4.76 kV ■ 30 operations for 4.8 to 15 kV ■ 10 operations for over 15 to 27 kV
Environmental	Welded, stainless steel switch enclosure, sealed-for-life, isolated from contaminants	Switch in air, exposed to contaminants, corrosive influences, dust, dirt
Size	Very small: ■ Basic 600 A switch module for up to 27.6 kV (without enclosure) is about 14"D x 8"W x 9"H (0.6 cubic feet)	Large: ■ Basic 600 A switch module for up to 15 kV 600 A (without enclosure) is about 28"D x 25"W x 26"H (10.5 cubic feet)
Visible isolation	Yes ■ Large viewing window for verification of position (CLOSED – OPEN – GROUNDED)	Yes
Functionality	■ Integrated fault-making (make-proof) grounding for outgoing feeder cables ■ Inherently prevents simultaneous CLOSED and GROUNDED positions	No integral grounding capability
Operation means	■ Manual spring operator (standard) ■ Motorized spring operator (optional) ■ Motorized spring stored-energy operator (optional)	■ Manual spring operator (standard) ■ Motorized spring stored-energy operator (optional)
Mechanism force	Very low: ■ Small moving mass ■ Short travel distance ■ Easier operation ■ Increased reliability	High: ■ High moving mass ■ Long travel distance ■ Harder operation ■ Lower reliability
Gas handling	None: ■ Switch enclosure sealed-for-life ■ No gas handling during maintenance	Not applicable
Gas leakage	Less than 0.1% per year: ■ Welded, stainless steel gas enclosure ■ Switch enclosure sealed-for-life ■ Bushings welded to enclosure ■ No sliding or rotating seals	Not applicable
Maintenance of switch module	Extremely low: ■ Switch enclosure sealed-for-life ■ No contact inspection or replacement ■ No lubrication for operating mechanism ■ Insignificant contact erosion during switching ■ No arc chutes	High: ■ Switch operates in air ■ Switch needs adjustment, inspection ■ Operating mechanism requires lubrication ■ Arcing contacts subject to erosion ■ Arc chutes subject to degradation