DynaVar's pressure-relief system exceeds industry standard requirements

Directional ports promote arc transfer

O-B's intermediate and station class DynaVar surge arresters have a reliable pressure-sensitive relief system which exhausts abnormal gas buildup within the sealed structure. The pressure-relief system functions to help protect adjacent equipment.

Pressure relief is not a normal arrester operation. It occurs when some unusual system circumstance occurs damaging internal components and causing electrical failure. Fault current through the arrester may vary widely in magnitude and duration, depending on system capabilities. Heat developed by the internal arc vaporizes materials along its path, resulting in rapid formation and expansion of gases within the arrester housing. Internal pressure increases immediately and quickly reaches dangerous levels unless relief is provided. Without such provisions, the total pressure developed by severe faults of high current and long duration can explode the porcelain arrester housing.

In the rare occurrence of an arrester failure, a reliable, tested' pressure-sensitive relief system serves to prevent an immediate or delayed explosion of the porcelain housing due to high internal pressure.

American National Standard C62.1-19B1 states: "All station and intermediate arresters shall be equipped with pressure-relief devices and tested in accordance with this standard." Pressure-relief test procedures outline test specimen preparation and general test requirements.

Test specifications include:

1. The test circuit power frequency shall be between 48 and 62 Hz.
2. The minimum test current duration shall be 0.2 seconds for intermediate class arresters and station class arresters 72 kV and below. The minimum duration for higher-voltage station class arresters shall be 0.1 seconds.
3. The maximum time for the arrester to vent shall be 0.085 seconds.
4. The high test current shall be measured at the crest of the highest asymmetric current loop white the current is through the arrester. The rms value of the asymmetrical current shall be determined in accordance with American National Standard Methods for Determining the Values of a Sinusoidal Current Wave and a Normal-Frequency Recovery Voltage for AG High-Voltage Circuit Breakers, ANSI C37.05.

To pass the test, the arrester must vent properly to relieve pressure, and the arrester housing must remain intact or, if the housing fails thermally, all parts must fall within a circle of specified radius.

Pressure relief for intermediate and station class DynaVar arresters is provided by a modified design of the pressure-relief system that proved successful for many years in O-B's conventional station and intermediate silicon-carbide arresters. The DynaVar modification incorporates end castings with directional ports to direct ionized gas across the outside length of the arrester and form an external arc. Venting of internal gases as they develop plus arc transfer reduce the possibility of thermal collapse of the porcelain.

DynaVar pressure-relief design tests are performed according to rigid conditions defined in specifications of ANSI C62. 1. Tests are monitored with a combination of high-speed photography and oscillographic recording of arrester current and arc voltage. A reduced voltage test source is used during the high-current pressure relief tests. The claimed symmetrical rms current is, therefore, the crest asymmetrical current divided by 2.6, in accordance with Standard C62.1.

The DynaVar design with linear series impedance has an enviable service history, and test results demonstrate that DynaVar's pressure-relief system performs substantially better than required by industry standards.

The following table indicates results of high-current pressure-relief tests on the longest units available of DynaVar VI, VL, VS and VX arresters.

DynaVar Arrester Unit Size	Arrester Current		Peak	Current Duration (Cycles)	Comment
	Assym-rms	Sym-rms			
VI 33-kV MCOV*	54.0 kA	37.5 kA	91.9 kA	13.5	Porcelain intact
VL 33-kV MCOV*	104.3 kA	67.7 kA	175.0 kA	12.5	Vented top & bottom and transferred arc external within one-half cycle
VS 84-kV MCOV*	147.8 kA	140.8 kA	242.9 kA	6	Porcelain intact
VX 136-kV MCOV*	79.5 kA	76.8 kA	129.3 kA	6	Porcelain successfully vented in one-quarter cycle

*MCOV is the Maximum Continuous Operating Voltage, which is approximately 81 percent of duty-cycle rating.

NOTE: Because Hubbell has a policy of continuous product improvement, we reserve the right to change design and specifications without notice.

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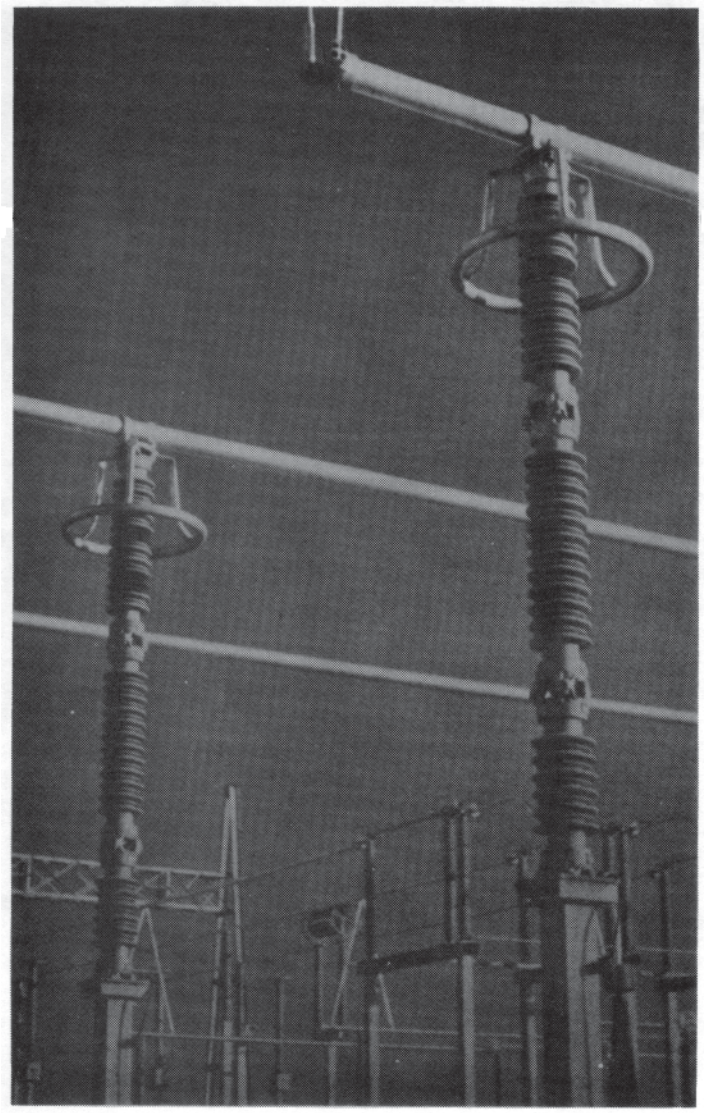
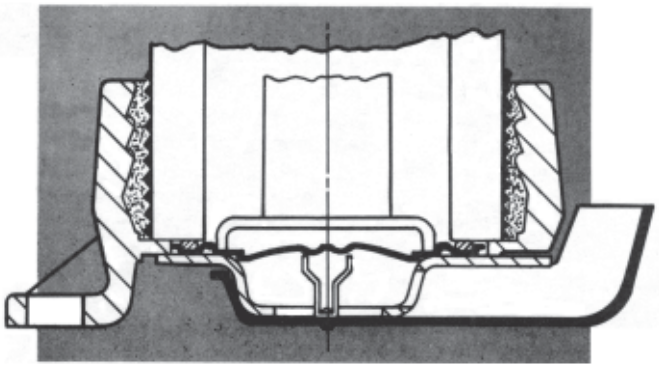
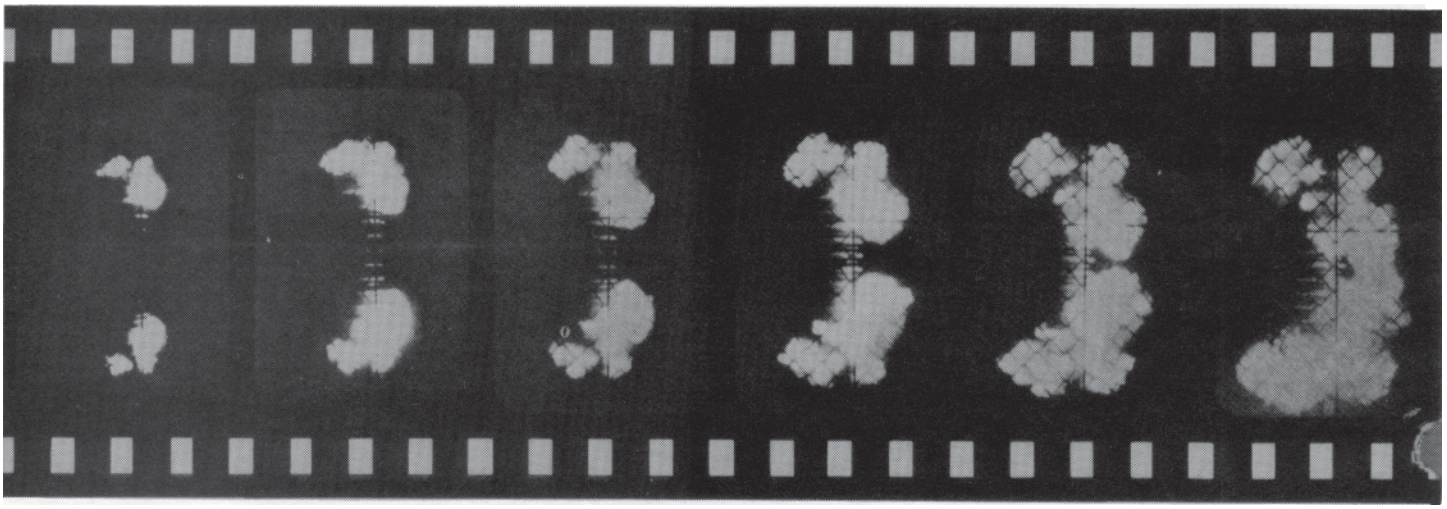


DynaVar's pressure-relief system design incorporates end castings with directional ports to promote arc transfer.



Cross section of DynaVar's two-stage pressure-relief system with directional port.

High-speed motion picture film of fault current test records sequence of operation of DynaVar VS-84 pressure-relief mechanism.



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