

SITRAM DRY

Stationary transformer drying system and moisture monitoring



Industry challenge

The insulation materials on all power transformers will degrade with time in service. Insulation aging depends on several different factors, including the original insulation material, oil temperature, moisture content, oxygen content, particle contamination and acids from oil and paper aging. Moisture content has a significant impact on transformer life expectancy, especially on the aging of the solid insulation. Conventional methods of removing moisture, e.g. oil treatment plants, have focused on rapidly drying out transformer oil, however, 98 percent of the moisture is actually stored in the cellulose insulation. The rate of drying depends on the rate of water diffusion from the insulation into the insulating oil, which is a very slow process.

The solution

The SITRAM® DRY online oil dehydration system removes moisture from the insulating oil through disturbing the moisture equilibrium so moisture diffuses from the wet insulating paper to the dried insulating oil, slowly removing the moisture from the solid insulation. The system has modular construction and is well suited for transformers of varying ages, manufacturers and ratings (from distribution to generator step-up transformers).



SITRAM DRY utilizes an advanced molecular sieve absorbent material. As the oil is circulated through SITRAM DRY by a small pump motor, the sieve material contained in the cylinders absorbs the moisture. Moisture diffusion will slow down as the moisture content of the insulating paper converges to its equilibrium with the dried insulating oil. The SITRAM DRY system is capable of reducing transformer oil moisture levels from 50 ppm to less than 10 ppm. This process not only reduces the aging rate of the cellulose, but it also improves the dielectric strength of the insulation oil and can increase transformer reliability and life expectancy. Transformers can be run with a significantly reduced risk of failure and on higher load cycles.



Extending the life of your transformers with SITRAM DRY

Modular product concept

SITRAM DRY has a modular product concept that is easily adaptable to individual requirements. Two basic models of SITRAM DRY are available: the frame version and the cabinet version.

The frame version of SITRAM DRY is fitted together with moisture and temperature sensors in an open steel frame. The cabinet version protects against environmental conditions of the system best (IP 55). Supervision modules for control are optionally available for controlling the efficiency of the drying process.

Benefits for new transformers

SITRAM DRY installed on a new or refurbished transformer can maintain the moisture content at or below the original 0.5 percent factory level. The system can significantly extend the expected life of a transformer at a fraction of its replacement costs. Typically, molecular sieve cylinders should not require replacement for several years.

Benefits for older or wet transformers (greater than two percent ppm)

Legacy transformers generally have higher moisture content, so the target is to reduce the moisture content of the insulating paper to an acceptable level and then maintain that level. The amount of time required to dry out the unit will vary with the size, moisture content and operational temperature variation. Siemens will develop a moisture reduction plan that includes a dry-out period and an estimated number of cylinder replacements. The time period is typically between 10 and 24 months.

Comprehensive service

SITRAM DRY is a robust system that requires little maintenance. Thanks to the humidity sensors at the inlet and the outlet, the degree of saturation of the cartridges can be precisely determined. The exchange of the cartridges works with a few grips because of the quick couplings. Siemens provides transformer drying services from installation to the exchange of cartridges, so we can support in whatever capacity is desired.



SITRAM DRY – factors for the success of a large installed base

- Continuous online removal of moisture from solid insulation
- Based on a molecular sieve technology
- Easy to install on any energized transformer
- Temperature and moisture monitoring
- Cartridge replacement and regeneration service
- Flexible hose connections improve reliability during cartridge change out
- Two options: frame version and cabinet version
- Can be integrated with Siemens TLM™ monitoring solutions
- Highest product quality made in Germany

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Order No: IC1000-E240-A151-X-4AUS

Printed in USA

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