

TRANSFORMER VACUUM DRYOUT UNIT

The ESI TDS, Transformer Vacuum Dry-out System incorporates all the necessary features to allow a transformer to remain in-service while moisture from insulation is effectively removed. The system is safe with several alarm features that shut the system off isolating it from the transformer, in the event of any abnormal signal. The ESI TDS provides a non-intrusive, cost effective and convenient method of maintaining a transformer is dried, the system can be retrofitted with Activated Alumina cartridges to reduce acidity in the transformer oil. This flexibility allows increased oil processing application compared to heat and vacuum systems.

Applications

- Drying wet transformers and insulation
- Drying transformers not braced for vacuum
- Drying transformers that cannot be taken out of service

Benefits

- The transformer remains in-service during process
- Reduced transformer dry-out costs
- Improved oil dielectric values
- Improved transformer power factor
- Operates continuously unattended
- Extends oil service life Extends transformer service life

System Overview

The ESI TDS oil processing system is designed to allow a transformer under load to dry itself out. SD-718 Superdri® cartridges are installed in the filter vessel, through which oil is processed at a rate of 1000Litres/hr. The filtering system removes dissolved water from oil to less than 10ppm, and included 1micron nominal particle removal capabilities. The process does not affect dissolved gas in the oil, and does not remove oil oxidation inhibitors in the oil, and does not remove oil oxidation inhibitors. The system is complete with all components necessary to monitor the mechanical and electrical operating conditions of the unit. The system includes components to purge air during start up and after filter changes.

Process Overview

The on-line dry-out process is designed for safe, unattended 24-hour operation. The system suction line is connected to the transformer bottom fill connection. The oil is then returned from the ESI TDS to a top connection valve. The number of cartridge change-out intervals will vary according to moisture content and moisture transfer rate from the insulation to the oil. One set of Superdri® cartridges will remove a minimum of 4Liters of dissolved water from the oil. The in-line moisture allows for simple and accurate measurements of incoming and outgoing moisture in-oil and temperature. These can be used to determine the amount of moisture being removed from the transformer and are also used to determine when cartridges should be changed.



General Conditions and Guidelines

The system relies on load from the energized transformer to push moisture from the insulation out to the surrounding oil. As the moisture is released into the oil, it is removed by the Superdri® cartridges which continually dry the oil to less than 10ppm total water. Transformer top oil temperature should be kept at least 40-60°C for moisture equilibration between insulation and oil to continue in a timely fashion. A single set of Superdri® cartridges will remove approximately 4 Liters of water. Cartridge performance can be monitored by observing the Viasala HMP 228 moisture sensor. The process will not release moisture back into the oil even if cartridges are fully saturated.

Specifications

Power Requirements:

230V, Single Phase, 50Hz, 10amps

Control Box:

NEMA 4 enclosure with motor started, motor overload protection, latching relay start/stop/reset switch, run light indicator, high pressure cut-off switch and indicating light, and elapsed hour meter.

Electric Motor:

½ hp, TEFC, 1750rpm

Oil Pump:

1000Litre/hr positive displacement gear pump with mechanical seal and internal pressure bypass.

Coaxial Hoses with Oil Level Alarm:

Two 5m x ¾" coaxial lengths of hose for suction and discharge are provided with a N.O. solenoid which is wired to the main control panel. If a leak should develop on the hose connections to the transformer, oil will collect on the bottom of the enclosure and the system will shut off automatically. Extra contacts are provided for alarm detection.

Online Moisture Meter:

An online direct reading moisture sensor continuously displays the oil and ppm of total water in the oil (or percent of the saturation of the oil) the piping layout of the TDS system allows easy checking for both the influent and effluent moisture contents with a single sensor.

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