Revolutionize the way you monitor your transformer

VT

Virginia Control Module

A PLC based Transformer Monitoring and diagnostic module developed by

VIRGINIA TRANSFORMER CORP

Extended Life

Remote Control of Transformer Monitoring

Built In Annunciator

A New Way to Ensure Peak Performance
Key Benefits:
- Recommendations based on monitoring
- Storage and retrieval of data available remotely and periodically, allowing projected changes in loss of life.
- Uses transducers to monitor parameters
- 5.7" wide LCD screen for viewing data
- Built-in annunciator feature (12 point annunciator)
- Obtain readings in digital format (Ex: Oil temperature reading: 26.52°C)
- Provides diagnostics based on transformer measurements
- Electronic relay contacts to drive fans
- Data recording and charting available
- VCM2 eliminates the need of contacts and switches for the following:
  - Pressure Vacuum Gauge
  - Liquid Temperature Gauge
  - Liquid Level Gauge
- It incorporates the functions of the winding temperature gauge and the Seal in Relay function for the Sudden Pressure Relay and pressure switches
- Analog gauges are also available for local viewing
- Operating temperature -40°C to 85°C

Control:
Based on the measurements, the following set points are activated:

**Oil Temperature Control**
- Fanstage 1
- Fanstage 2
- Alarm
- Trip

**Oil level Control**
- low level Switch
- low-low level Switch
- High level Switch

**Pressure Control**
- +9 PSI switch
- -7 PSI switch

Option to switch fans activation based on the measured value of either oil temperature or winding temperature.

Communication:
The VCM communicates data using the MODBUS/DNP3 protocol and the RJ45 port to allow remote access to adjust the following functions:
- Modify set points
- Connect through internet remotely to have real time view of the conditions
- Local or remote accessible programming is available using Ethernet connection
- Manual reset on Sudden Pressure – Seal-In Relay function

VCM measures and monitors transformer parameters of:
- Oil Temperature
- Winding Temperature
- Oil Level
- Pressure
- Ambient Temperature
  - When an alarm is activated an alert is sent through the 12-point annunciation
  - Rate of rise of pressure – activation

VCM2 Features:
- All the output contacts are available at a remote point for annunciator, SCADA and other display protection purposes.
- Option to download the data of various transformer parameters onto a personal computer/Laptop.
- Analyze transformer performance based on the downloaded data.
- Capability to communicate the data between the VCM2 and the user through wired connection. (Figure 1)
- Optional capability to communicate the data between the VCM2 and the user through wireless connection. (Figure 2)

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VCM2 Features:
- Unlike other ETM's, VCM doesn't require any extra RTD's and other components. VCM2 includes sensors for measurement.
- VCM2 uses solid state devices, no maintenance required.
- Sensors used in the VCM2 are more accurate compared to the conventional mechanical gauges.
- Results are based on the exact set points. Set points are fixed, but the user can change the set points locally on the VCM2 screen or remotely from the customer's computer / laptop.
- User has the provision to change the delay time of contacts closing to prevent false alarms.
- Compatible to SCADA using DNP3.0 and Modbus protocol.

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**VT**

**VIRGINIA TRANSFORMER CORP**
VCM is a PLC based Transformer monitoring and diagnostic module developed by Virginia Transformer Corporation to monitor the transformers various parameters. The VCM is another step for Virginia Transformer in engineering and automation. It presents many value-added opportunities for both VTC and our customers. It essentially provides customers with a new “peace of mind” in the area of successful operation over the life of the transformer.

This monitoring module will read, analyze and transmit parameters of a transformer such as oil temperature, winding temperature, pressure, oil level, ambient temperature. Electronic sensors are used to read the parameters, compare them to the programmed set points and the VCM device sends real time solid state contact outputs and data to supervisory controls via Ethernet connection. The VCM analyzes and detects abnormal conditions and can provide data for trend analysis and historical review. The analog display for local indications of gas space pressure, oil level, winding temperature and the oil temperature is maintained using VTC standard (or Qualitrol®) gauges some of which do not have contacts.

It elevates the data collection and analysis to the highest reliability level by using electronic sensors and contacts, allows field programming of set points to accommodate varying operating conditions, integrates all the parameters and provides local annunciation of all data and status of set points.

VCM3 Features:
All the functions of VCM2, plus the following

- Estimate the total % loss of life at the end of each interval (15 min interval), calculates daily % loss of life, monthly % loss of life, yearly% loss of life.
- Based on the IEEE standards and calculated total % loss of life, VCM3 provides guidelines/suggestions on what actions to be taken to get back to the transformer’s normal loss of life for the insulation.
- Detects, records and displays the number of short circuit fault current events on the transformer.
- Whenever a short circuit fault current event is detected, VCM3 stores the% loss of life Vs time for the next 24 hours with 15 min. sampling intervals.
- Retrieve the short circuit fault current event details at anytime.
- Save the abnormal data into VCM3.
- Display of total dissolved combustible gas (TDCG) quantity and % RH in oil. value in 15 minutes intervals.
- VCM3 provides gas analysis based on H2, CO, C2H2, C2H4. It’s accuracy rating is ± 10% of reading, ± 25 ppm (H2 equivalent). Moisture accuracy is ± 2 % RH.
- Based on the TDCG and TDCG rate/Day, provides suggestions/guidelines on what actions to take to protect the transformer from severe damage.
- Customer will be able to retrieve the % loss of life and % RH value of hourly data (latest 2 weeks data), monthly (up to 760 months), and yearly (up to 60 years) of data.
- Calculation / estimation of the moisture in paper (in ppm), which indicates the dryness of the transformer.
- Customer will be able to retrieve the % moisture in paper (in ppm) of hourly data (latest 2 weeks data), monthly (up to 760 months), and yearly (up to 60 years) of data.

VCM3 is another step for Virginia Transformer in engineering and automation.

VCM3 Package Components:

1. Sensor box
   - Top oil temperature sensor
   - Liquid level sensor
   - Pressure sensor
   - Ambient sensor
2. Current Transmitter Sensor to measure the load current.
5. LTC Oil Temperature Sensor.
6. LTC Tap Position Sensor Assembly.
7. RS Linux Software - (GUI) application running on remote PC.

VCM3 Features:

- LTC monitoring:
  - VCM3 provides the following alarm contacts for LTC monitoring.
  - At extreme lower position (16L position)
  - At extreme rise position (16R position)
  - At its nominal position (Neutral position)
  - Stall position (off-tap position)
  - LTC Operational Counter
- In addition VCM3 provides the physical display of the 16L,16R, Neutral stall position and operational counter information on the VCM3 screen.
- VCM3 allows the user to see the operational counter information remotely.
- VCM measures temperature difference between main tank oil and LTC tank oil.
- Fail safe operation- switch on the fans activation in case of VCM3 power failure.
- Battery back up – in the event of power failure all the data will be retained.
- Routine fan bank exercise automatically activated weekly for a 15 minute period
Virginia Transformer Corp. is an engineering company that manufactures custom power transformers. In addition to our engineering and design strengths, we have the resources of 3 facilities in North America.

Building application specific units for forty years, VTC has the product, process and people to meet any power transformer need. With the broadest product ranges available from one source. From utilities to industrial to commercial markets, from 300 kVA to 100 MVA.

Virginia Transformer is world class in quality and service, we are

“The Commitment Company”.

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