Transformer controls adaptable to your needs
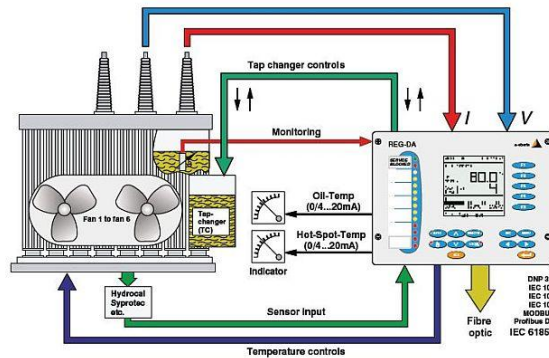

Figure 1. Transformer tap change control and temperature control

REG-D and REG-DA Tap Changer Control relays from A.Eberle are fourth generation products optimised through thousands of applications and feedback provided by utility engineers worldwide. These devices are good examples of how a variety of measurement, monitoring and control functions can be successfully integrated into one multifunctional IED.

Many customers also extend the use of these devices with customised applications using background H-Code programs developed to provide additional functionality specific to their needs. Here are two examples:

Customer Application #1:

The requirement to control multiple transformers across several paralleling groups, using circulating current control was implemented using standard features available in the REG-D (and REG-DA) regulators.

For this particular utility however the transformer breakers were old and the auxiliary contacts considered unreliable. In order to ensure that there was certainty around the connection of a transformer in its paralleling group, an H-Code program was written to confirm breaker status by monitoring the load current on it.

Figure 2. Voltage regulator monitors breaker status.

![HV Power - Power Automation Technologies logo]

The solution which the customer adopted checks if the transformer circuit breaker is indicating CLOSED and the transformer is in parallel with at least one other transformer. The REG-D regulator then checks to see no current* is flowing through this transformer CT and current* is flowing through its partners, in the event of a discrepancy the REG-D Regulator issues a "ParErr" alarm (paralleling error) to all transformers in that group and indicate to SCADA a faulty auxiliary switch.

If the transformer circuit breaker is indicating OPEN and current* is flowing through that transformer CT, then the REG-D will also issue a "ParErr" alarm to all transformers in the group and indicate to SCADA a faulty auxiliary switch.

*Current threshold values are specified and adjustable in the H-Code.

Figure 3. Example of REG-D customised screen for user defined settings, which can be developed using H-Code.

Customer Application #2

A Hydro Generation Company has unit connected step-up transformers which are cooled by oil, which is circulated by pumps through water coolers. The water coolers also have pumps to circulate and cool the water. The flow of oil and water is monitored by Flow Captors which give an alarm when flow rates fall below a set limit. The REG-DA Regulators implemented with Transformer Temperature Monitoring (TMM) functionality are programmed to start an oil pump if the Transformer is on-load AND if the first cooling temperature limit is reached. Additionally, H-Code has been supplied which effectively keeps the oil pumps running for a further 30 minutes after the Transformer CB is opened.

In order to be able to schedule maintenance, the customer wanted to monitor the number of starts and run time of the transformer oil cooling pumps, which rotate between duty and standby cycles. This was accomplished by the use of an hour register in the REG-DA Regulator which can be interrogated remotely by the maintenance manager.

An additional requirement to be able to interlock the operation of the transformer if the water cooling pumps were not running was also implemented with H code. This interlock still allows operation in an emergency but signals to the operator that the transformer is "not ready for normal service" and therefore there are strict limits on the operation that is allowed.

A future enhancement being worked on is *a request to provide a separate grading curve on the Winding Temperature Indicator (WTI) based on the transformer running without pumps.*

Figure 4. Advanced Transformer Cooling Application.

Please contact HV Power if you would like to discuss how A.Eberle REG-D and REG-DA can address your specific tap change, parallel transformer operation or transformer temperature monitoring and control requirements.