



Gujarat Power Research & Development Cell

(A Govt. of Gujarat Initiative)

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Watch Dog Transformer

Title of the Research: Introduction of the new concept design of WDD (Watch Dog Device) in existing Distribution Transformers and Consumers for remote monitoring, controlling, analysis and operating for various specific applications.

Present System: The Distribution Transformer is critical component in power distribution system for all utilities. The reliability and quality of power supply, maintenance of SoP of the regulations and consequently to reduce the consumer grievances all depend upon the service life of the distribution transformer. Therefore monitoring of key parameters like voltage, current and temperature rise are necessary for evaluating the performance of the distribution transformer and also helpful to avoid or reduce disruption due to sudden unexpected failure. Overloading and rise in oil & winding temperature of transformer are the major causes of failure in distribution transformers. There is no such monitoring and controlling mechanism in prevailing system in the utility and distribution transformers get replaced in case of failure.

Limitations of the present system:

- No monitoring and controlling of the working and its operating parameters of the distribution transformer once they are installed in the field.
- Over loading of the distribution transformers by the consumers specifically in agriculture and industrial area are also not monitored precisely and regularly.
- Bypassing the distribution transformer from LV bushings are the usual practice for power theft in some of the utilities and which are very difficult to monitor.

Detail report of Innovation/solution:

The watch dog transformer is the combination of Distribution Transformer (DT) with monitoring and controlling Watch Dog Device. The WDD shall be mounted on LV terminals of DT in such a way that there shall not be direct access to LV terminals of DT. The Watch Dog Device comprises of phase wise heavy duty contactors, semi intelligent IoT base DCU for real time data acquisition, monitoring & controlling of the parameters of the transformer and energy meter for the accurately energy measurement. The energy exported from the transformers are measured and

monitored by WDD. The WDD will keep monitoring the energy exported to consumer from transformer and recorded in the consumer tariff meter periodically on the basis of data available on single platform. Whenever the system finds the difference in energy, it notifies the concern of the DISCOM for the corrective actions to be taken. It is also equipped with disconnection of the consumer power if such irregularities persists. The WDD is facilitate with short circuit and over current protection. Thus, WDD shall effectively monitored and controlled without human intervention, the distribution transformer system for over loading, irregular usage, three phase/single phase working hours & monitoring the health parameters of the transformer etc. A remote monitoring of electrical parameters, Top oil & Winding Temperature (by using necessary sensors) will consequently help in reducing distribution transformer failure.



Field study report: As on Aug 2019, total 1380 units of WDT at 11KV feeder level and total 631 units of WDD at consumer level have been already installed, commissioned and successfully being monitored through responsive web platform under the SKY scheme.

How does new innovation help to overcome Limitations of the present system: After successful implementation of the Watch DOG Transformer (WDT) the monitoring of power theft, over loading of the transformers, health monitoring of the transformers, reduction in failure of DTs, controlling by way of connection/disconnection of the consumer installation etc. shall be implemented without human intervention.