



GUJARAT POWER RESEARCH & DEVELOPMENT CELL

GUJARAT URJA VIKAS NIGAM LTD

Gujarat Power Research and Development (GPRD) Cell is a research center established by the Government of Gujarat for Gujarat Urja Vikas Nigam Limited (GUVNL) and its subsidiaries Companies namely GSECL, GETCO, DGVCL, MGVCL, UGVCL and PGVCL

GPRD Cell is working under Gujarat Urja Vikas Ltd (GUVNL) and is funded by the Government of Gujarat through the GUVNL. GUVNL is a parent company of GSECL, GETCO, DGVCL, MGVCL, UGVCL and PGVCL. GSECL is looking after the electricity generation, GETCO is looking after the transmission of electricity and DGVCL, MGVCL, UGVCL, and PGVCL are distribution companies looking after the distribution, operation and maintenance of the electricity up to the consumer level in Gujarat.

The success of the leading companies depend on the strength of their efforts employed towards R&D. Such companies spare and spend a huge amount of funds for the R&D activities. With this concept and considering the future requirements of the power, an independent R&D Cell, called GPRD cell has been established.

ABOUT WATCH DOG TRANSFORMER (WDT)

The WDT is a new concept for existing Distribution Transformers and Consumers for remote monitoring, controlling, analysis and operating to various specific applications.

CURRENT SCENARIO

The Distribution Transformer is a critical component in the power distribution system for all the utilities. The reliability and quality of power supply, maintenance of SoP of the regulations and consequently to reduce the consumer grievances, it all depends upon the service life of the distribution transformer. Therefore, monitoring of the 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 a sudden unexpected



WATCH DOG TRANSFORMER

RELIABLE & SUSTAINABLE
COMPREHENSIVE & CONCRETE
SOLUTION OF DISCOMS NEED

failure. Overloading and rise in oil & winding temperature of transformer are the major causes of failure in a distribution transformers. There is no such monitoring of above critical electrical operational parameters at distribution transformer level, in the utility. **For this issue, the WDT is the best solution.**



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 areas 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 are very difficult to monitor. **The WDT will over come the above limitations**

DELIVERING TOWARDS THE SITUATION BY WDT

The watch dog transformer is the combination of a distribution transformer (DT) with monitoring and controlling Watch Dog Device. The WDD shall be mounted on the 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 heavy duty contactors, semi intelligent IoT base DCU for real time data acquisition, monitoring & controlling of the parameters of the transformer and the energy meter for the accurate energy measurement. The energy exported from the transformers are measured and monitored by WDD. The WDD will keep monitoring the energy exported to the consumers from the transformer and recorded in the consumer tariff meter, periodically on the basis of the data available on a single platform. Whenever the system finds the difference in the energy measured, it notifies the concern DISCOM authority for the corrective actions to be taken. It is also equipped with the disconnection of the consumer power function, if such irregularities persist. The WDD is facilitated with short circuit and over current protection. Thus, WDD shall effectively monitor and control 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, tap oil winding temperature (by using necessary sensors) will consequently help in reducing the distributor transformer failure.

QUALITY ASSURANCE

For any equipment, we know that quality is a major concern for any tool, for its durability and performance. In WDT, it has been already focused on its quality, by usage of rigorously type tested components of WDT. The components are verified, certified and reviewed before its usage in the manufacturing process for the WDT. The best quality's IoT Gateway (Processor

& Clock, Power Supply etc.), Three Phase Redundant SMPS, Energy Meter, Operational Logic Controller are used in the WDT. A part of future inter-operability for the functionality of WDT, standardization of Data Acquisition is set at every platform.

STRATEGIC ABILITY

- We have prepared a strategic design to challenge the prevailing operational limitations
- The prosperous plan and manufacturing of WDTs were taken on by the competent and the skilled engineers, who have endlessly shined to modify the Transformers as per stakeholder's need
- By using latest engineering tools & software, the WDT's complex design is prepared for the rapid performance of the transformer

SOUNDLESS NATURES

- Monitoring the Power theft & overloading
- Reducing in failure of DTs
- No human intervention
- WDD is programmed device to take intelligent decisions
- Anytime On/Off without visiting the place of Transformer
- Customize the schedule Power On/Off operations
- Energy Audit at DT level
- Better electrical stress resistance
- Increased reliability & efficiency of Power
- Enhanced Total regulation at one place
- Need base control by way of connection/disconnection of the consumer installation
- Superior technology for reducing operating costs and increasing operational life
- Can check health of Transformer By monitoring oil and winding temperature, load, ampere, voltage etc

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. All the WDTs having found working satisfactory since more than one year.

PATENT DETAIL

For the Watch Dog Transformer, we have already applied for the patent which is registered by IPA no 201821019946.

FOR MORE DETAILS, PLEASE CONTACT US WITHOUT HESITATION, WE ARE READY TO HEAR AND SERVE YOU AT

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