

ONLINE MONITORING OF DISTRIBUTION TRANSFORMER USING IOT

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Abstract - In power system network, distribution transformer is electrical equipment which distributes power to the low-voltage users directly and its operating condition is a vital part of the operation of distribution network. Operation of distribution transformer under rated condition assures their long life. However, their life is significantly reduced if they are subjected to overloading condition, resulting in sudden failures and loss of supply to a large number of customers thus affecting system reliability. Overloading and rise in oil & winding temperature of transformer are the major causes of failure in distribution transformers. Our system is designed based upon online monitoring of key Operational parameters of distribution transformers can provide useful Information about the health of transformers which will help the utilities to Optimally use their transformers and keep the asset in operation for a longer Period.

Key Words: Distribution transformer, online monitoring, power system, IOT, reliability

1. INTRODUCTION

In Indian perspective, power system network is visible and controlled only up to this extent. Transformers have an average life of 20- 25 years. Most of the transformers installed are in the verge of their operational life. The current monitoring methods are only associated with electrical parameters which gives no clue about the internal condition of the distribution transformer. Periodical maintenance is not enough for such a major asset in power system. Condition based maintenance will be effective only when an online monitoring system is present so that equipment condition will be known remotely and maintenance scheduling as well as control. Most power companies use Supervisory Control and Data Acquisition (SCADA) system for web-based monitoring of power transformers yet amplifying the SCADA system for online monitoring of distribution transformers is an a costly suggestion.

2. Literature Survey

As a large number of transformers are distributed over a wide area in present electric systems, it's difficult to monitor the condition manually of every single transformer. So automatic data acquisition and transformer condition monitoring has been an important issue. With the progress and development of national economy as well as power

system, reliability and safety issues of power system have been more important. Development of distribution Transformer Health Monitoring System (THMS) has been done in that reason. Distribution transformer is the most vital asset in any electrical distribution network and therefore it needs special care and attention. This THMS can monitor the health status of the distribution transformer in real time aspect.

3. PROPOSED SYSTEM

Our system is designed based upon online monitoring of key Operational parameters of distribution transformers can provide useful Information about the health of transformers which will help the utilities to Optimally use their transformers and keep the asset in operation for a longer Period.

1) Distribution transformers are as of now observed physically where a man intermittently visits a transformer site for support and records parameter of significance. This type of monitoring can't give data about incidental over-load and overheating of transformer oil and windings. Every one of these variables can essentially decrease transformer life.

2) A monitoring system can only monitor the operation state or guard against steal the power, and is not able to monitor all useful data of distribution transformers to reduce costs.

3) Auspicious detection data will not be sent to observing centers in time, which cannot judge distribution transformers three phase equilibrium.

According to the above requirements, we need a distribution transformer real-time monitoring system to detect all operating parameters operation, and send to the monitoring centre in time. It leads to Online monitoring of key operational parameters of distribution transformers can provide useful information about the health of transformers which will help the utilities to optimally use their transformers and keep the asset in operation for a longer period. This will also help identify problems before any catastrophic failure which can result in a significant cost savings and greater reliability.

4. BLOCK DIAGRAM

The block diagram consists of sensors, distribution transformers, IOT module and relay circuit respectively