SECTION D

INTELLIGENT AUTOMATION SYSTEM:

INTELLIGENT AUTOMATION SYSTEM FOR ELECTRICAL ENERGY DISTRIBUTION

- Control functions are related to switching operations, such as switching a capacitor.

- The function that is the most popular among the utilities is fault location and service restoration or outage management.

- This function directly impacts the customers as well as the system reliability.

BENEFITS OF INTELLIGENT AUTOMATION SYSTEM

- ***Operational & Maintenance benefits***
- Improved reliability by reducing outage duration using auto restoration scheme
- Improved voltage control by means of automatic VAR control
- Reduced man hour and man power
- Accurate and useful planning and operational data information
- Better fault detection and diagnostic analysis
- Better management of system and component loading
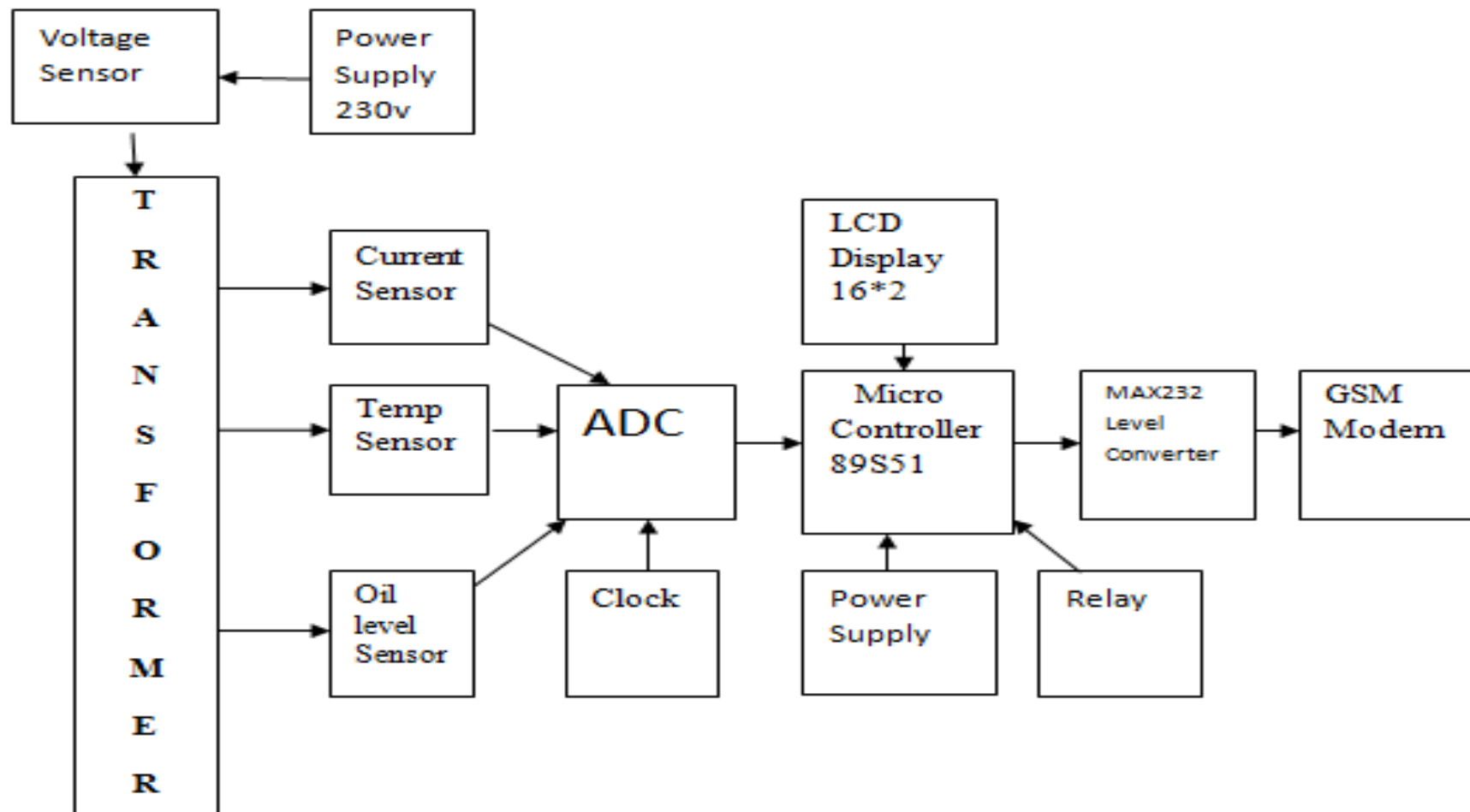
Financial benefits

- Increased revenue due to quick restoration
- Improved utilization of system capacity
- Customer retention for improved quality of supply

Customer related benefits

- Better service reliability
- Reduce interruption cost for Industrial/Commercial customers
- Better quality of supply

Proposed Block Diagram

Control of distribution transformer

- Distribution transformers have a long service life if they are operated under good and rated conditions.
- Overloading and ineffective cooling of transformers are the major causes of failure in distribution transformers.
- Distribution transformers are currently monitored manually where a person periodically visits a transformer site for maintenance and records parameter of importance.
- This type of monitoring cannot provide information about occasional overloads and overheating of transformer oil and windings. All these factors can significantly reduce transformer life.

Distribution transformer

- Our system is designed based upon online monitoring of key operational parameters of distribution transformers

- It 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.

- It is also has the advantages of significant cost savings and greater reliability

Levels of Automation

Substation Level Automation

Feeder Level Automation

Customer Level Automation

## Operational problems and Potential Applications of substation automation

- Fault location, isolation and Service Restoration
- Maintaining good voltage profile
- Load Balancing
- Load Control
- Metering
- Maintaining Maps
- Fuse-off call operations
- Energy accounting

Substation automation

- SA has been focused on automation functions such as monitoring, controlling, and collecting data inside the substation.

- Substation Automation is expected to expand dramatically with increased control of relays, capacitor banks, and voltage regulators along the feeders.

Functional structure of substation automation
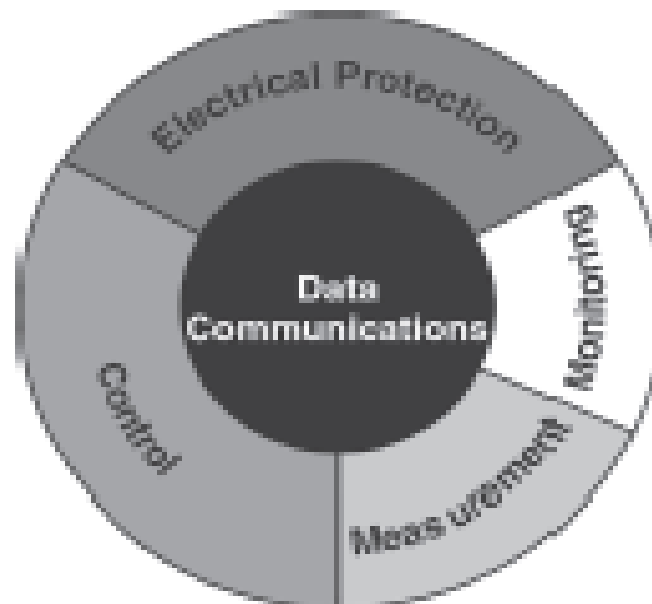
Substation automation components

- Electrical protection
- Control
- Measurement
- Monitoring
- Data communication