Substation Monitoring System:Real-Time Monitoring of PowerSubstationsaa

Introduction

Power substations play a crucial role in electricity transmission and distribution. They transform voltages from high to low or vice versa using transformers and facilitate the flow of power across the grid. As the core of any power system, it is essential that substations operate efficiently and any issues are detected promptly. This is where a substation monitoring system comes in.

Components of a Monitoring System

A modern [substation monitoring systems] incorporates sensors,controllers, switches and communication devices to continually supervisecritical parameters. Temperature sensors are installed on transformers and other heat-producing equipment to check for overheating. Voltage and currenttransducers measureincoming and outgoing voltages/currents. Gas monitors detect anyaccumulation of combustible gases inside transformers that could lead to fires.Circuit breakers and relays have contacts to feed back their operational status.Data from all these components is concentrated by programmable logiccontrollers (PLCs).

Data Communication

The PLCs transmit real-time sensor data via variousmediums to a centralized control center. Hardwired connectionsusing RS-232/RS-485 and fiber optic links send analog values. Wirelesstechnologies like GPRS, CDMA etc. enable remote transmission. Some systems employpower line carrier communication to utilize existing distribution lines.Satellite links ensure connectivity even in geographically isolatedlocations. The monitoring software processes live measurements, status indications as well as logged historical values.

Alarm Notifications

Threshold limits are programmed into the control software for all major parameters. Dedicated logic evaluates readings and promptly triggers audio/visual alarms if any preset targets are crossed. SMS, emails and push notifications instantly reach operators on duty. Critical alarms transmit automated phone calls. Live trend displays provide early warning of