Fault Identification And Restoration Using SYNC 2100 Series

Application Note

Application Description

The growing complexities of networks and increasing operational objectives has necessitated the need for the electrical supply to each consumer to be fed from alternate sources, during faults to the main line. This could be due to a failure of main supply feeding point, avoid conductor overloading of portion of network or for reducing losses in the network. RMUs are the critical control device in the distribution circuit allows multi input multi output interconnection of the distribution network. For example, a 4-way ring unit has three ring switches and a single tee off circuit breaker, each having an earth switch as given in figure below. Typically the CB associated have continues current rating of 200Ams and Ring Switches have 630 Amps rating.

![Figure 1: Circuit of a 4 way RMU](image)

On average, there could be 500 to 600 numbers of RMUs for a distribution company. Travelling to each location for controlling these equipments is difficult and time consuming. Housing Feeder RTUs (FRTUs) with appropriate communication interface can bring the necessary automation to RMUs.

With Automated RMUs, following status indications can be remotely monitored:

- State of ring switches 1, 2 and 3
- Ring cable earth switches open & close status
- Tee off circuit earth switch open & close
- SF6 gas pressure low (depending upon the CB selected)
- CB protection operation
- Fault passage indicator operation
- Capacitor bank un-balance alarm

Data in control direction

- Ring switch open and close command
- CB open and close command

Control centre application will have the necessary switching sheet to manage the RMUs. The switches can be operated based on the inputs.

Application Solution

Feeder Remote Terminal Units (FRTUs) are required to perform both the function of data concentration as well as IO collection, with protocol capabilities and wide communication media support like GPRS/CDMA/RF to help it to transmit data to control center. SYNC 2100 series is one such device that is responsible for fetching the data from multi-function transducer and also directly from field IOs and converting the data to the IEC60870-5-104/ DNP3.0 format which the control center software can read. SYNC 2100 is also capable of controlling field devices using DO modules. DI, DO and AI cards can be chosen depending upon the application requirement.

An M2M Gateway is also required for manage remote connection of FRTU located in multiple locations in field, supporting secure VPN connections over dynamic IP, and support for GPRS/CDMA as well as 3G technologies.

SYNC 4911 M2M Gateway is used as the communication front end (CFE) for interconnecting the automation system (SCADA/DMS) LAN to public radio networks like GPRS/CDMA/UMTS without compromising on the security of the network. The M2M Gateway creates a trusted network of widely distributed FRTUs. The security is guaranteed by Open-VPN, a virtual private network achieved by creating a tunneling between sites using SSL/TLS. VPN is the term used to refer to any device that...
is capable of creating a semi-permanent encrypted tunnel over the public network between two private machines.

**Features**

- Extended IO connectivity for different RMU types
- High end security over VPN and CIP enabled devices
- Remote configuration of the FRTU from control center.
- Transparent channel connectivity to the end devices having propriety protocols

**Products Used**

Products used for the fault monitoring application are:

- SYNC 2111 with GPRS modem and expandable IO rack
- SYNC 4911 M2M gateway at control center

**Advantages**

- Kalkitech M2M application ensures end to end VPN connection from Nodes to gateway apart from other solutions which offer only VPN security provided by the telecom provider.
- SYNC 4911 M2M Gateway provides virtualization support which helps applications to scale up to 10000-20000 M2M connections.
- Transparent channel concept can be utilized for downloading the configuration and firmware of the end devices.