

THE AUTOMATIC CIRCUIT RECLOSER USAGE AT THE 10KV NETWORKS OF ELECTRIC POWER DISTRIBUTION KRALJEVO

M.Vuckovic, Company "Elektrosrbija" Kraljevo, "Elektrodistribucija Kraljevo"
V.Stevanovic, Company "Elektrosrbija" Kraljevo, "Elektrodistribucija Kraljevo"

SHORT DESCRIPTION

Automatic circuit recloser is a modern device used in the middle voltage networks (10kV, 20kV and 35kV), which contains common features: switching (vacuum switchgear with magnetic actuator), protection (overcurrent, earthfault, sensitive earthfault, under voltage, under frequency, auto reclosing...), measurement, event log and remote control. The control cubicle is microprocessor based controller that provides the protection, data logging, communications and signalization (by radio or modem) in the single device.

This document provides automatic circuit recloser usage in the distribution overhead lines and substations, concrete for usage in the company ELEKTRODISTRIBUCIJA KRALJEVO.

Any fault at any place in the network causes drop off the hole line. Consistently, loss supply occur without detection the point of the fault. There have to be many manipulations for determining the part of overhead line where fault occurred. That requires technique and people engagement, but with problem which still existing: undelivered energy. Automatic circuit reclosers make possibility for switching only the part of line where fault occurred. This is the great advantage, especially in case of long, branch lines or in case of lines with very important consumers at the beginning of the line. In the second case very important consumers need the protection because the faults that incessantly occur at the end of line.

REFERAT

Building the new substations X/10kV ELEKTRODISTRIBUCIJA KRALJEVO Company have almost succeed to solve problem of energy balance in the village areas. Furthermore, there still exist very long lines 10kV. In respect of fact that our distribution network are radial the fault at the end of line causes drop off the hole line.

Using automatic circuit recloser our company have recognized switching and protection function, possibility of simple mounting at the network 10kV and adapting in existing remote control system. The biggest results of this common features are shown at the 10kV long lines, very important buses and priority consumers. Continuously monitoring are made possible from dispatching centre , with toss over and protection possibilities.

The automatic circuit recloser are designed for use on distribution overhead lines as well as distribution substation applications for voltage classes 15kV and 27kV. The product supplied complete with switching module and with the RC control and communications cubicle. The control cubicle is microprocessor based controller that provides protection, data logging and communications in a single device. The recloser can be easily mounted and integrated into distribution automation and remote control.



The automatic circuit reclosers use vacuum interrupters inside polycarbonate housing which is enclosed inside an aluminium tank. The reclosers mechanism operated by three separate magnetic actuators, one per phase.

The control cubicle is microprocessor based controller that provides direct overcurrent, earthfault, sensitive earthfault relay, autoreclose, measurement, event log and remote terminal unit, all in the single device.

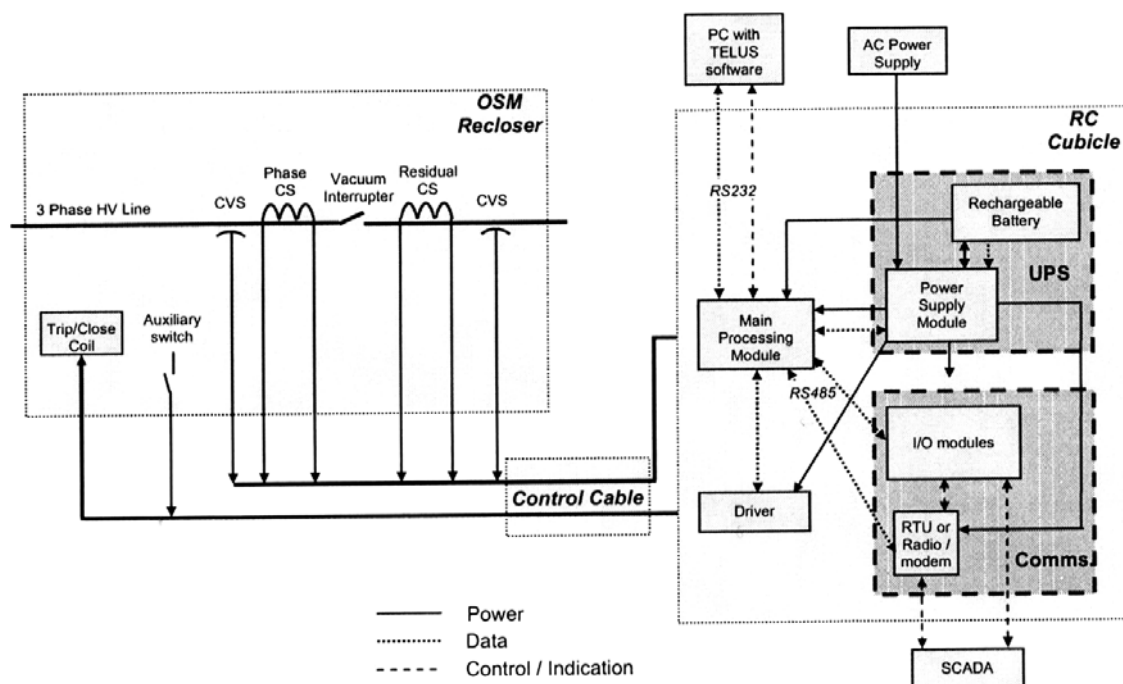
The operator control panel is provided with four line backlit LCD display and keypad to provide the local control functions.

The control cubicle has three main modules:

- The main microprocessors modul(MPM) which incorporates the operator control panel
- The driver module which incorporates the capacitors that provides tripping and closing energy to the OSM tank.
- The supply power module that provides auxilliary power supply, radio power supply and battery charging function.

Temperature compensated float charging is provided to the sealed lead acid batteries located in the RC control cubicle.

There is space provided in the control cubicle to install the communications equipment to be connected to the inbuilt RTU or I/O module.



The company ELEKTRODISTRIBUCIJA KRALJEVO mounted automatic circuit recloser at the substation 10/0,4 kV named 'Samaila 1', which is supplied from substation 35/10 kV named 'Ladjevci'. The substation named 'Samaila 1' is bus substation because the overhead line branch on the three sides at that place. The line 10kV is too long and branchy and it is necessary very hard work to find the point of the fault. After recloser mounting it is very easy to determine the part of overhead line where fault occurred. Besides, automatic circuit recloser provides the remote changing status possibility. The switching module of automatic circuit recloser mounted outside and RC control cubicle mounted inside the substation.



An RS485 RTU interface offering 300-19200 baud, full and half duplex modes is provided to connect to remote control systems. DNP3 protocol is provided in the standard combined which is incorporated in existing remote control system. Radio or modem can be used for data transfer. Concrete, the substation 'Samaila 1' used radio for data transfer.



The selective protection setup executed by the software.
The main processors module provide fours settings group. Every group contains folowing protection functions:

- Over current and earthfault protection
- Sensitive earthfault protection
- Live line overcurrent
- Under voltage protection

Under frequency protection
Voltage reclose control with automatic back feed restoration
Cold load pick up
Inrush restraint
Auto reclosing

The elements for monitoring generate and maintain following notes:

Elementi za monitoring (praćenje) generišu i održavaju sledeće zapise:

C/O operations

Fault profile

Event log

Setting change logs

Operational logs

Load profile log

The elements for monitoring generate and maintain lifetime counter log and fault counter log. All that notes can be copied at the personal computer.

The control and indication abilities can be shown by four separate control and indicational elements:

Man Machine Interface (MMI)

Personal computer (PC).

Supervise control and data acquisition (SCADA)

Digital inputs and outputs (I/O)

Control signals are active by SCADA only when control status are set on remote. Indicational signals by SCADA are active in both status, local and remote.

CONCLUSION

The in-built automatic circuit reclosers reduce outage time and increase profitability and quality in distribution networks. Because of faults and switching plans, number of consumers without power supply reduced at minimum. Besides, the technique and people engagement reduced at minimum, too. One more advantage is the fault localization. The dispatchers have completely access in situation at the network. Although the price of automatic circuit reclosers are not neglected, exploitation advantages justify their usage entirely.

LITERATURE:

1. **User guide <<TAVRIDA ELECTRIC>>**
2. **User guide <<ABB>>**