

TELEM SCADA SYSTEM



TELEM SCADA is a solution designed for use in high and low voltage electric power distribution networks. Martem's hardware and software solution, used in TELEM-SCADA, is built on modern industry standards and standard interfaces, which is a key for guaranteeing the long-term life cycle of the system. Software and hardware are scalable and this makes possible to build systems with different size:

- **SCADA Centres - dispersed multilevel systems with several servers, separate communication processors and separate workstations for several purposes.**
- **Substation Control System - minimal configuration where base server, communication processor and workstation are located on the same computer**

SCADA computers have Windows operating systems.

System features

- System and equipment compatibility with other producers equipment (system can be interfaced with relay protection and other measurement and control equipment via standard communication protocols)
- Open system with standard protocols. Local staff can do configuration work
- Modern equipment and technology. User may connect with system from any place
- Special library of screen components
- Native language interface
- Flexible administration possibilities

Functions

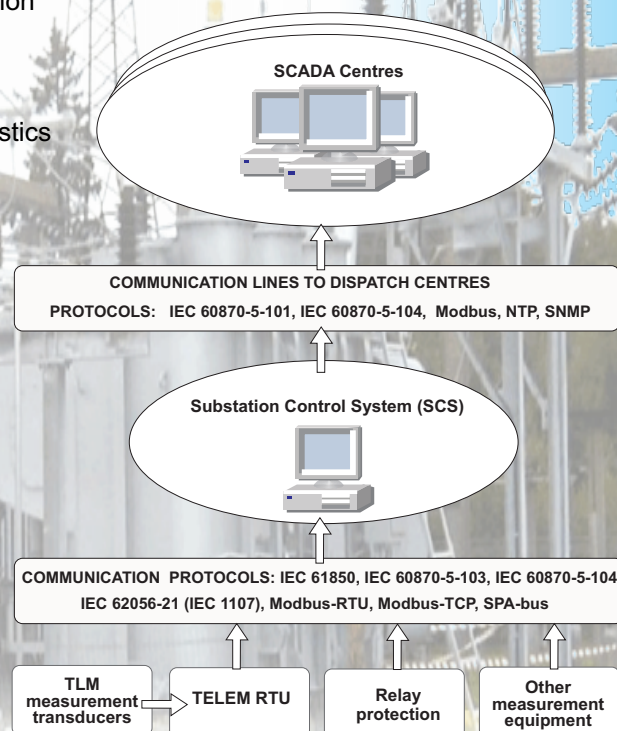
- Information collection from low-level equipment i.e. relay protection equipment
- Fast failure detection and localization
- Displaying vector graphic images
- Operative control and blocking of equipment
- Equipment status control and management
- Accurate registration and logging of events and operator actions
- Event and disturbance reports with possible filtration
- Analogue and digital calculations, calculated values can cause also alarms and events
- Saving and archiving of measurement information
- Various trends, tables and reports
- Dynamic colour control of graphical schemas
- Checking of users passwords and rights
- Equipment diagnostics and system self-diagnostics

SCADA center equipment

- System servers
- Communication concentrators
- Workstations
- Other visualization equipments: printers, projectors, mimic boards

Substations equipment

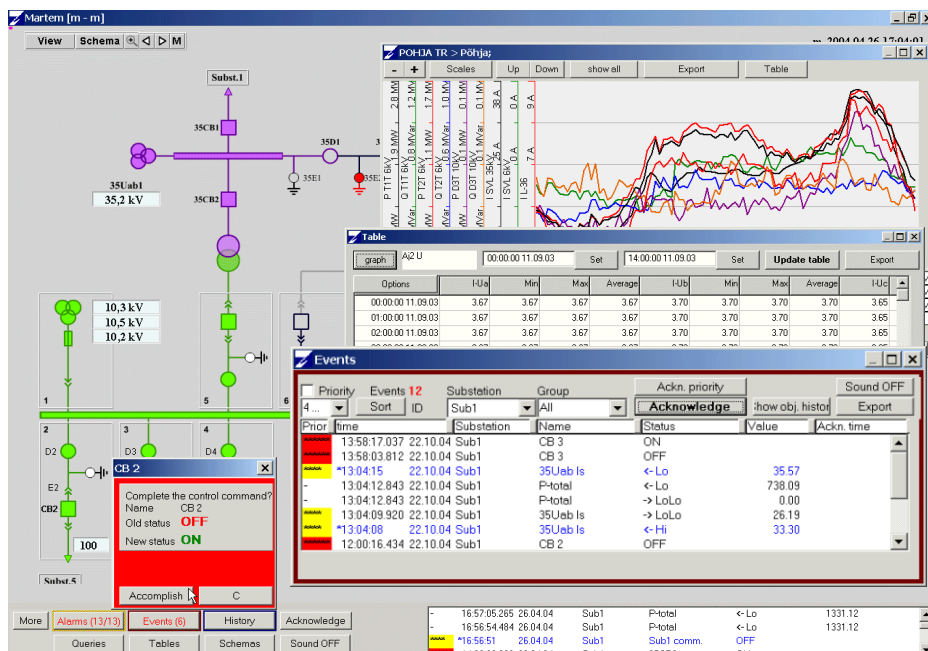
- Substation Control System PC
- Remote terminal units (RTU)
- Transducers
- GPS time synchronization modules



TELEM SCADA System's software is designed for Intranet and Internet environment.

Software features

- Vector graphical Schema System with several possibilities
- Measurement trends and tables
- Event recording
- Event priority levels
- Alarm list
- History list
- Database queries
- Software is configurable



Reliability and reservation

- High reliability is achieved using the following solutions:
- Using industrial PC computers
- Using flash disk for storing operating system and software in data concentrators and Linux firewalls
- RAID (Redundant Array of Independent Disks) Mirror disk arrays in SCADA servers. Disks are hot swappable - can be replaced in working system
- Concentrators and SCADA servers can be reserved
- System is powered via UPS
- Client computers can be easily replaced with any Windows PC

Communication with substations equipment

- Communication concentrators collect the information via serial communication lines. Concentrators transfer the collected information over LAN to SCADA server.
- Each concentrator can have up to 32 RS-232 serial lines and up to 16 devices on one line.

Communication protocols:

- IEC60870-5-101
- IEC60870-5-103
- OPC
- Modbus
- We have experience of integrating ABB, Siemens, Alstom and Harris equipment to our system

Security

- Security is achieved using the following methods:
- If possible, the SCADA LAN is separated from other networks
- Access to system with user name and password. Users can have different access rights:
- Dispatcher can do everything except configuration and administration work
- Administrator can manage the users
- Engineer can do the configuration work
- Guest can supervise the system without control right
- Firewall can be configured to let in only clients with certain IP addresses
- In case of WAN the data encryption software and hardware can be used
- In case of Dial-up connections the callback can be used
- Registers all attempts of unauthorized access with time stamps
- Registers all logins and logouts with time stamps

Communication with other systems

- IEC 60870-5-101 and IEC 60870-5-104 communication protocols
- SQL database interface
- Data export to Excel and text files.