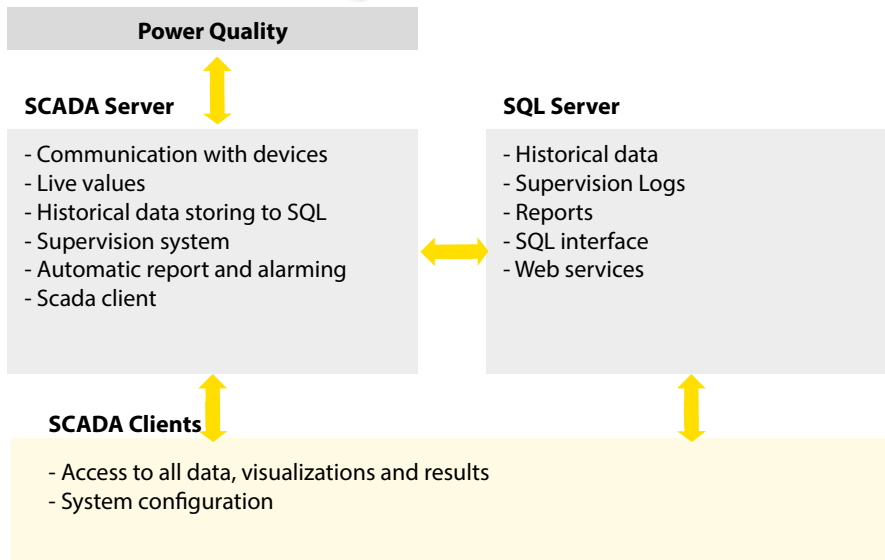


INTRODUCTION

PQM-SCADA is the enterprise management software for Power Quality Analyzers and Disturbance Recorders. PQM-SCADA software shows real-time data from all the PQ instruments as well as historical data stored in a central server or cloud storage.

- Real-Time Data
- Historical data
- Multiple Visualization
- Automatic Report Generation (EN50160)
- Notifications, Alarm, Email, SMS
- Remote meter configuration
- User Management tool



This central software can communicate with hundreds of instruments, and can support third party PQ meters (if documentation is provided). Data migration from existing data bases is possible as well as interfaces. Typical usage of PQM-SCADA is to monitor power quality and other parameters of the transmission or distribution grid.

CONNECTIVITY & INTERFACES

The PQM-SCADA system can communicate with other systems, and can also provide data to any third party system. The User Management tool allows an unlimited number of users to be added with different access and security levels.

OVERVIEW

This PQM-SCADA enterprise is an easy-to-use software solution which allows the user to visualize live-data, historical data or reports. The multi-screen capability gives the user the ability to design their own visualization screens including the use of multiple monitors. User-management with different access and security levels is integrated.... even the possibility to give your customers access to view limited data. The following picture shows the Overview & Configuration menu.



LIVE DATA

All visualizations are flexible and can easily be configured (parameters, colors, etc.). All graphs can be shown simultaneously.

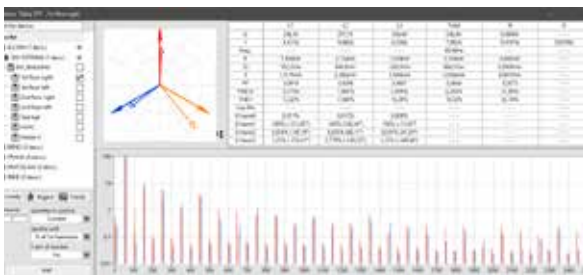
TABLES



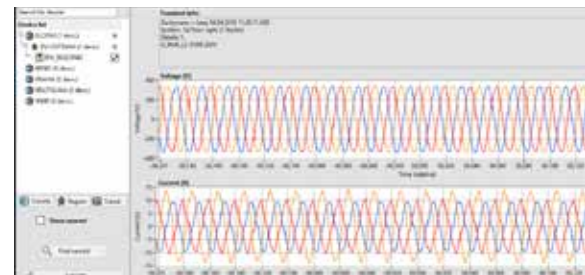
GRAPHS



VECTOR / HARMONICS



LAST TRANSIENT / DISTURBANCE



SUPERVISION



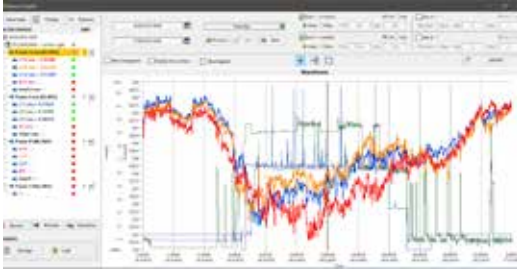
MAPS



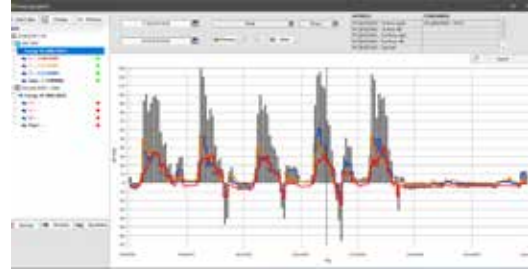
HISTORICAL DATA

The powerful analysis capabilities allows for comprehensive data analysis inside the enterprise software.

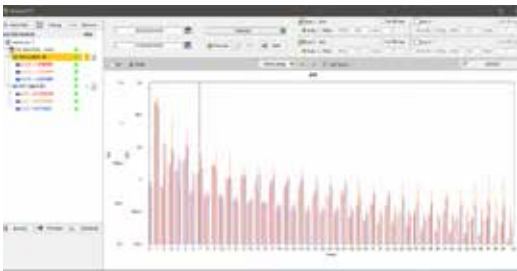
GRAPHS



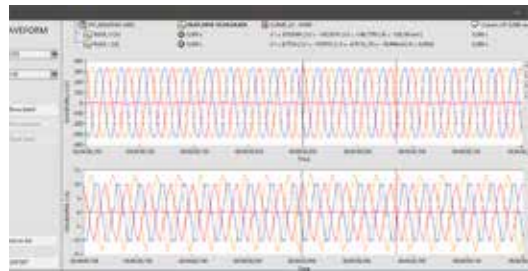
ENERGY



FFT



TRANSIENTS / WAVEFORM



HISTOGRAM



AUTOMATIC EN50160 REPORT

EVENT LIST

EVENT STATISTICS

| Event Type | Count | Status |
|------------------|-------|--------|
| ALFA (0) | 2 | 264 |
| SO140/PQ-EVE (2) | 2 | 264 |
| TRA/WAVE (244) | 2 | 264 |
| DIS (0) | 2 | 264 |
| CUST (0) | 2 | 264 |

ADDITIONAL FEATURES

There are additional features such as alarms, notifications, emails and SMS services. All PQM and PQA meters can be configured remotely (firmware, software, configuration etc.). This powerful system monitors each device status and its fault state. The supervision overview distinguishes between two states: OK and Failed. Some of the functions available for monitoring include: ping, sw running, data storing, data in the database, etc.

PMU - PHASOR MEASUREMENT UNIT

Highest Precision Synchrophasor Measurement

PMU - The Phasor Measurement Unit is a device for accurate synchrophasor measurements. The measurement results are used for the online detection of the electrical grid status. This principle is based on comparing the phase angles of the fundamental harmonic measured at different points of the distribution or transmission network using several devices at synchronized points in time.

High-Accurate GPS Receiver

The meter has to be equipped by the internal/external GPS for receiving synchronous timestamps.

Additional Sensor and Range calibration

The additional sensor and measurement range calibration (see chapter PQA8000 calibration) enables for highly accurate measurement results.

IEEE C37.118

The PMU firmware measures voltage and current phasors, frequency, and calculates the positive symmetrical components of voltages and currents. The measured data is sent to the superior system according to the IEEE C37.118 communication protocol. By default, the device fully complies with the requirements of IEEE C37.118, which defines the PMU accuracy in stabilized state and a communication protocol for real-time phasor transmission.

The PQA8000 instrument offers a built-in GPS receiver together with highly-accurate voltage inputs and

- Total Vector Error 0.01% (typ.)

- Angle Accuracy 0.003° (typ.)

WAMS - Wide Area Monitoring System

Phasor angle differences between various parts of the transmission grid are an indicator of grid health and can provide early warning in the case of developing power system disturbances that can lead to grid separation known as islanding, or even blackout. The accurate measurement of the phasor angles across the grid is made possible by the use of GPS-synchronized phasor-sampling clocks. Nationwide networks of time-synchronized phasor measurement units (PMUs) are called Wide Area Monitoring Systems (WAMS).

The main features of the WAMS systems are the visualization and monitoring of phasors, islanding detection, resynchronization and black start detection, oscillations detection, stability and voltage monitoring. The results can also be transmitted to SCADA

ENERGY MEASUREMENT

Meter input modules are designed to measure one 3-phase voltage and multiple 3-phase current systems. The intention of this meter is typically to monitor the distribution transformer powering multiple output feeders. The functionality of multi-feeder-monitors is similar to a PQ meter, with the possibility of measuring up to 10x the number of 3-phase feeders in total. The multi-feeder-monitor also provides detailed information about the power and energy consumption of each feeder

