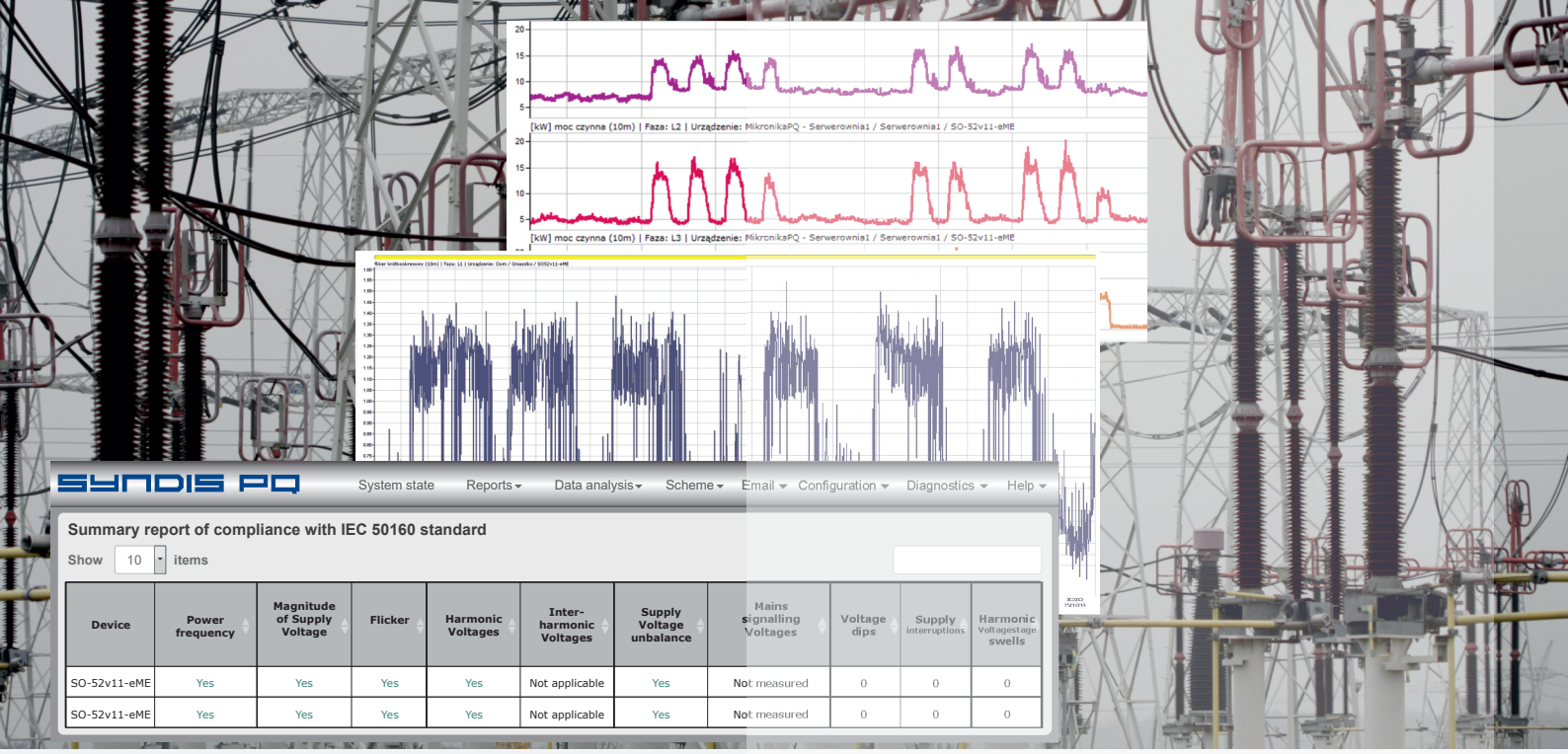


Device	Power frequency	Magnitude of Supply Voltage	Flicker	Harmonic Voltages	Inter-harmonic Voltages	Supply Voltage unbalance	Mains signalling Voltages	Voltage dips	Supply interruptions	Harmonic Voltagestage swells
SO-52v11-eME	Yes	Yes	Yes	Yes	Not applicable	Yes	Not measured	0	0	0
SO-52v11-eME	Yes	Yes	Yes	Yes	Not applicable	Yes	Not measured	0	0	0

SYNDIS PQ

power quality assessment and monitoring system

The SYNDIS PQ system ensures IT solutions required for monitoring and assessing power quality (PQ) according to the standards, regulations, instructions and also individual agreements. The necessity for such assessment emerges from requirements which concern maintaining quality parameters of supplied electric energy and the necessity of possible claims verification.

MIKRONIKA, within the SYNDIS PQ system, offers also power quality analyzers which calculate primary values. The SYNDIS PQ system may obtain data also from analyzers, meters and devices measuring those values which are produced by other manufacturers. The data is processed in the process server, realizing analytical and statistical functions. Results are available in the form of configurable reports, analyses and charts by means of a web page or they are automatically sent to authorised receivers.

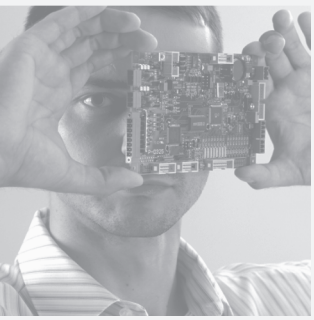
The communication with devices providing data for power quality assessment may be performed using a network, RS-232 or RS-485 connection, according to requirements and available transmission channels.

The server of the system and specific power quality analyzers are automatically synchronized by a NTP server or GPS signal.

The voltage level, harmonic content, asymmetry factor, flicker factor and others define the state of the network. Therefore, the SYDNIS PQ system transmits selected PQ parameters in the on-line mode to a substation supervisory and control system.

The SYNDIS PQ is a system for power quality assessment, applied to analyze its compliance with standards, regulations and instructions.

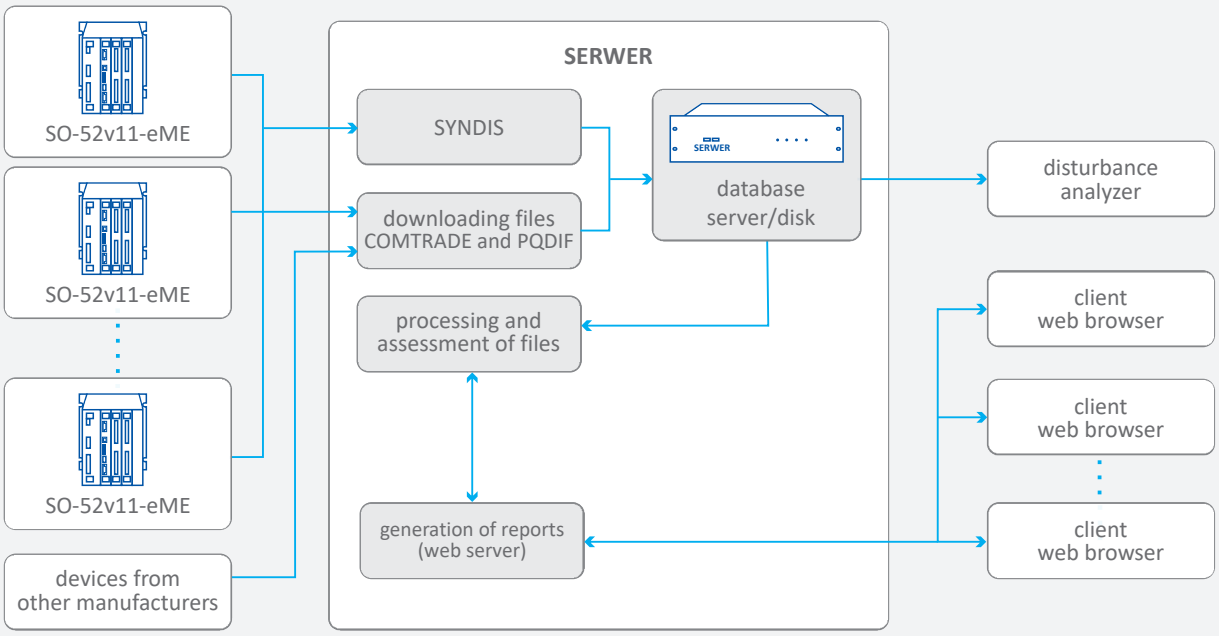
The system also provides information essential to improve asset management.



MIKRONIKA

Structure

There are three functional aspects which may be distinguished in the PQ assessment process. PQ analyzers and other measuring devices create the first aspect of data capturing. The PQ assessment process server with its software is the aspect which transforms data into information. User workstations of local and remote system constitute another aspect. These aspects and their communication connections create the IT structure of the power quality assessment system.



Power quality assessment

The PQ assessment is realized in a stationary or virtual server on the basis of data either introduced manually or sent automatically by means of network, GPRS/LTE or radio connections. The server aggregates week-long data sets which are a basis for performing statistical assessment for most of the PQ parameters. Configurable calculation thresholds and reports enable to assess power quality according to the IEC 50160 standard or regulations, dispatch and operating instructions or agreements between electric energy consumers and suppliers.

Data according to IEC 50160; measured in the A-class according to IEC 61000-4-30 or GOST P51317	
supply voltage value	dips and swells
power frequency	interruptions
flicker	over and underdeviation
voltage harmonics and interharmonics	rapid voltage changes (RVC)
supply voltage unbalance	overcurrents
mains signalling voltage	---

Apart from continuous acquiring of parameters applied for power quality assessment, the server saves files with courses of voltages and currents recorded during voltage interruptions, dips and swells and other disturbances.

According to a PQ analyzer or device, those files comprise recorded input signal samples and/or RMS values.

Functions

- automatic and on-line reading of data from at least 200 measuring devices
- data acquiring and export according to the PQDIF (IEEE11593) or COMTRADE standard
- manual reading of data and extending its range
- access to all data based on the web technology by secure connections
- remote time synchronization with the automatic daylight time change by the PQ server
- configuration of measuring devices and software remote replacement
- 20 simultaneous users with verified permissions and recorded logging and operations
- capturing data in one database for stationary and remote measuring devices
- states presentation of data acquiring devices and tracing their operation
- automatic reading of disturbances and events which were recorded in PQ analyzers
- configurable charts of all recorded and calculated values
- detailed analysis of files in a clear graphic form
- multiple charts one screen presentations with zooming
- data analysis and PQ assessment reports according to IEC 50160, GOST R and other regulations
- CBEMA and ITIC presentation of events
- web page download of any COMTRADE or PQDIF files
- presentation of the cooperating analyzers on a geographical backplane

Cooperation with substation systems

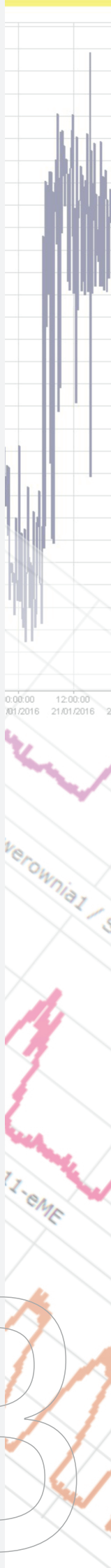
The SYNDIS PQ system systematically transmits to a supervision and control system the parameters calculated or measured by PQ analyzers. These may be the selected values determined within PQ assessment, e.g. asymmetry factor, harmonic content factor, present frequency of voltage, and also additional parameters, such as active power, tg ϕ, K-factor. These parameters are transmitted to a supervision and control system in the IEC 61850 or DNP 3.0 standard or any other protocol in order to present a full image of a power network. Required values, such as interphase voltages, active and reactive powers may be transmitted on-line by a separated transmission channel to DCS control systems of wind farms.

Power quality reports

Reports provide clear and unambiguous basic information about the compatibility of power quality with a corresponding standard, regulation or agreement. The structure, exceed thresholds and content of a report are user configurable, who may define a period of analysis and desired power quality indicators. Reports are available on a web page or sent via e-mail to authorised receivers.

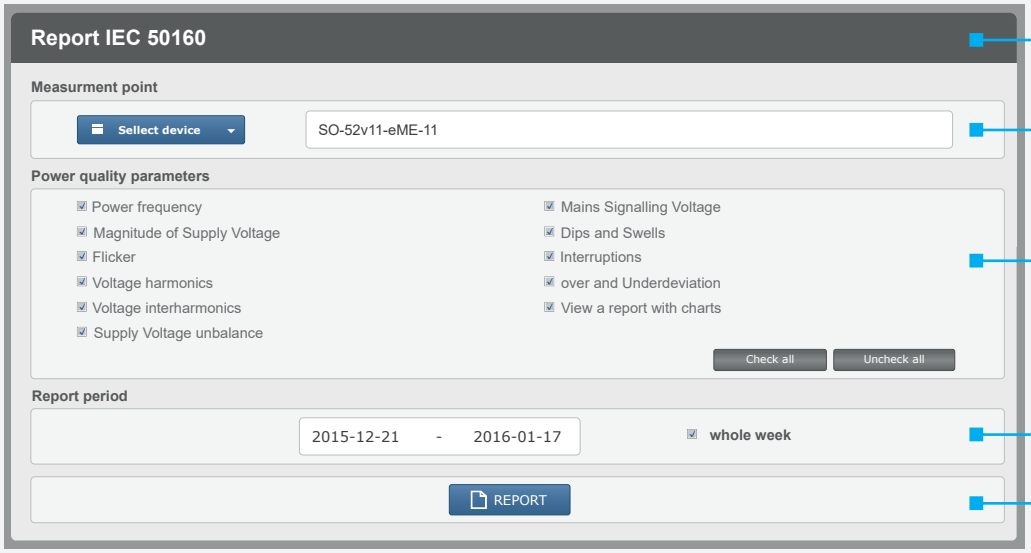
Features of the report system

- presentation of all information required by standards and regulations
- statistics for maintaining acceptable ranges of parameters for PQ assessment
- recording and charts of dips, rises and breaks and voltage fast changes and overcurrents
- harmonic distribution and appropriate percentage factors
- user-defined structure, parameter exceed thresholds and content of a report
- reports may be generated periodically or on request



Examples of reports

Report configuration screen



report type

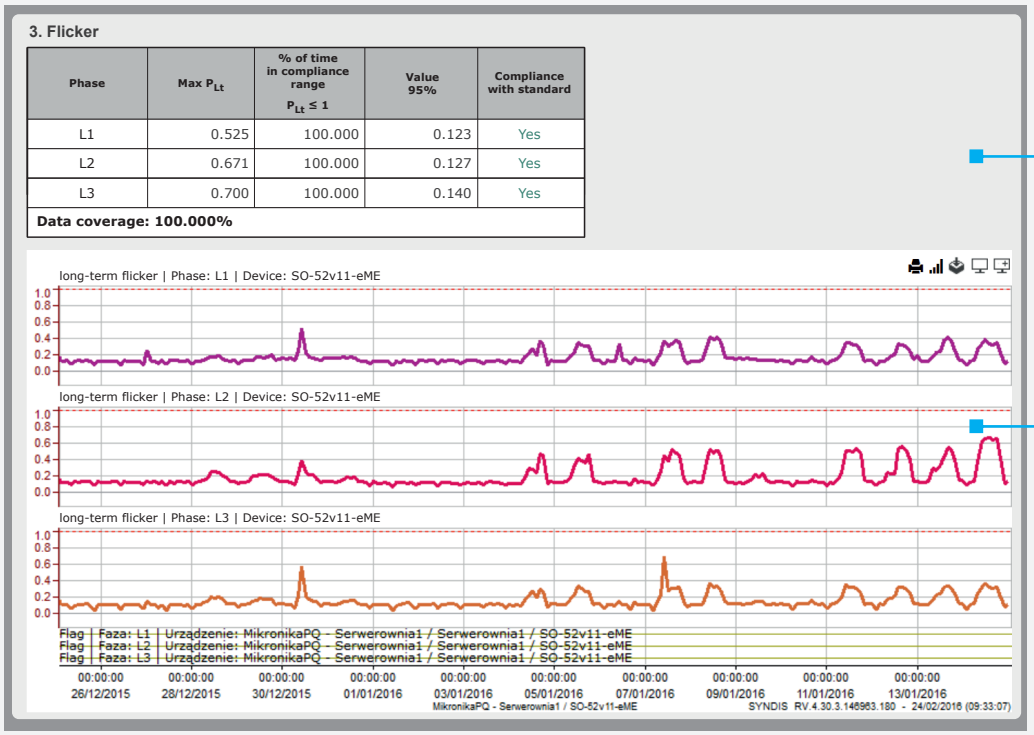
device selection

parameter type

time range

report generation

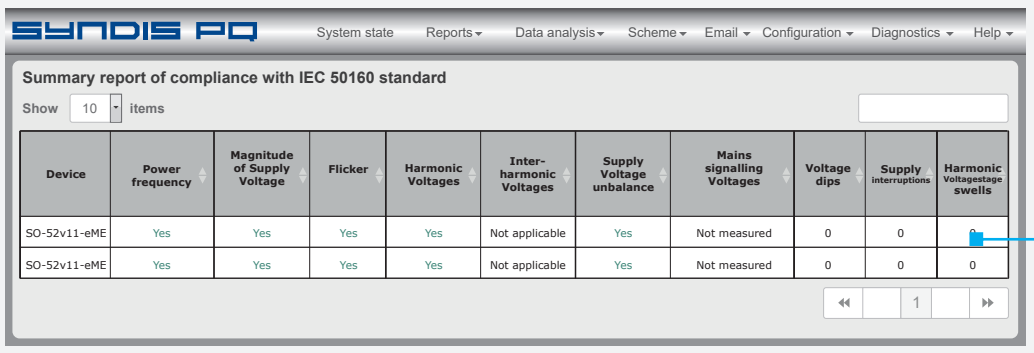
Detailed report: flicker



parameter statistics

parameter charts

Summary report of compliance with IEC 50160 standard



summary report