Energy management system for industrial and commercial electrical networks

ENERGY MONITORING

Voltage	Phase (L1, L2, L3) and line (L12, L23, L31) voltages
Current & frequency	L1, L2, L3 currents, frequency
Power	Active, reactive and apparent power, per phase and total
Energy	Import active energy (EP+), reactive / inductive energy (EQ+)
Power quality	Power factor, cos φ, voltage and current THD, voltage and current unbalance
Units	V, A, W – GW, VAr, VA, Wh – GWh, VArh, Hz, %
Sampling	Polling interval per device, 500 ms – 60 s

DEVICE LIBRARY & COMMUNICATION

Built-in analyzers	11 models: ENTES MPR32S, MPR34S-11, MPR34S-20, MPR42-OGT, MPR45S, MPR46S, MPR47S, MPR47-SE · TENSE TPM05 · Schneider Electric PM2225 · Siemens PAC3200
Custom devices	User-defined library models · Excel import / export
Protocol	Modbus TCP
Modbus	Read FC1–FC4, write FC5, FC6, FC16 · 15 data types incl. word-swapped · block reads
Scaling	Multiply, divide, add, subtract
Network topology	Gateways and switches up to 62 ports, communication diagram
Data logging	Periodic or on change with deadband, per tag

DASHBOARD & LIVE MONITORING

Dashboard	Power and energy gauges, live P / Q / S charts, top 5 consumers, alarms, sustainability and cost
Electrical grid	Voltage / current, PF / cos φ and THD values of all analyzers
Analyzers	Analyzer list, detail pages, live tags, connection status
Kiosk mode	Full-screen view for control-room screens

SCADA VISUALIZATION

Editor	Drag-and-drop page editor, multiple pages, full-screen and pop-out views
Symbol library	90 symbols in 8 groups: electrical, energy monitoring, generation, hydro, single-line diagram, EV charging, renewables, site / demand
Energy widgets	Phasor diagram, power triangle, harmonic spectrum, PQ radar, waveform scope, Pareto
Single-line diagram	Live energization from the network topology

TREND & BENCHMARK

Trend graphic	Line, bar, pie, area, box plot · 1 s live sampling · saved trends
Benchmark	Compare analyzers by energy, power and quality, with ranking and share
Quality limits	Voltage unbalance 2%, current unbalance 10%, PF ≥ 0.9, THD-V 5%, THD-I 8%

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COST & REACTIVE ENERGY

Energy cost	Unit price per kWh
CO_2 equivalent	Emissions estimate with tree, fuel and coal equivalents
Reactive penalty	Inductive 20% and capacitive 15% limits, early warning at 80%, per-analyzer limits

ALARMS

Severities	Critical, warning, info · alarm groups and colours
Alarm sources	Voltage, current, frequency, power, energy, communication loss, any analyzer value
Conditions	>, <, ≥, ≤, =, within range, outside range
Handling	Server-side evaluation, alarm log, acknowledgement with message

REPORTING

Report types	Tag logs, alarm logs, event logs
Event log	Login / logout, alarm acknowledgement, value writes
Report charts	Line, bar, pie, area
Output formats	PDF, XLSX, CSV

PLATFORM

Architecture	Web-based, on-premise server; runs as a Windows service
Projects	Multiple projects, each with its own database
Secure access	HTTPS (local CA or Let's Encrypt certificate)
Languages & themes	English, Turkish, German, Russian, Chinese · 5 themes
Built-in help	In all 5 languages
Licensing	Annual subscription by number of devices

SYSTEM REQUIREMENTS

Operating system	Windows, Linux
Processor	Minimum 2.4 GHz x64
Memory	Minimum 8 GB RAM · Recommended 16 GB or more
Disk	1 GB free space (plus historian data)
Database	PostgreSQL
Clients	Modern web browser on desktop, tablet or phone

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