A Yokogawa Company

PXiSE Energy Solutions

Product Specifications

Distributed Energy Resource Management System (DERMS)

Balance simultaneous resource, load, demand, and network constraints while enabling a 100% renewable grid.

The PXiSE DERMS helps utilities control the increase in renewable energy assets, batteries, and electric vehicles. It coordinates both front-of-the-meter (FTM) and behind-the-meter (BTM) distributed energy resources (DERs) alongside traditional grid components on a single network through an integrated software platform that controls the dynamic two-way flow of energy.

Advantages
PXiSE's DERMS offers several advantages
• Visibility and control of both FTM and BTM DERs on a network
• Enables maximum renewables hosting capacity of existing network
• Scalable, modular platform with a distributed and tailored architecture for a large network
• Patented, reliable automation for autonomous operations with high availability
• Zero inertia operations when integrated with a Microgrid Controller

See our DERMS fact sheet or visit **pxise.com/derms** for details.

Product functionality

DERMS function	Standard	Advanced
Forecast system level DER generation and system load	X	X
System level demand management	X	X
DER registration and grouping	X	X
DER – energy storage co-optimization every 5 minutes	X	X
Autonomous DER scheduling	X	X
DER dispatch via IEEE 2030.5	X	X
Proactive renewable resources smoothing		X
System level adaptive forecasting		X
Circuit/feeder forecasting		X
Integrated network modeling		X
Dynamic DER aggregation		X
Dynamic volt/VAR management		X
Automated network topology import		X

Benefits comparison

DERMS benefit	Standard	Advanced
Customer DER integration & utility control	Enabled	Maximized
Renewable DER hosting capacity relative to the total energy consumption	30-40%	40-60%
Level of DER integration in the distribution circuit	Total DER peak energy production does not result in reverse power flow	Total DER peak energy production can exceed local peak load by approximately 1.5X when reverse power flow is planned
Power management	Macro level voltage or reactive power management at facilities with DERs	Dynamic voltage and reactive power management of distribution circuits and at facilities with DERs

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Data requirements

Standard	Advanced	Advanced
	Base network model	As-connected model (when available)

• DER registration data and digital certificates
• Logical network to DER relationship: substation, circuit, distribution transformer, and DERs
• SCADA interface for network information: current, voltage, and tie-switches
• One year of hourly load data history
• Multi-day weather forecast data
	All standard requirements, plus:
	• Three-phase balanced model of the medium-voltage distribution system for network load flow
	  ◦ Assumes DERs are distributed equally across the three phases in medium- and low-voltage networks
	• Basic nodes, segments, load, and generation data assuming balanced three phase
	• SCADA input and/or control of voltage control devices: setpoints of Load Tap Changer (LTC), voltage regulators, and capacitor banks
		All standard requirements, plus:
		• Three-phase imbalanced model of the medium- and low-voltage distribution network
		  ◦ Each phase of the three-phase network is modeled including both three-phase and single-phase equipment (transformer, switches, capacitors, etc.)
		  ◦ Requires phase identification of single-phase metered load and DERs connected in the three-phase network

Functional specifications

Optimization
• Forecasting – 24 hours
  ◦ Forecasts system level DER generation
  ◦ Forecasts system load
  ◦ Adaptive forecasting option
• Energy resources and storage co-optimization
• Provides 24 hours of DER setpoints scheduling with automated DER dispatch
• Maximizes customer DER participation

Controls
• Proactively curtails renewable DERs to mitigate power disturbances
• Fail-safe operation even during loss of communications
• Hierarchical DER and Microgrid Controller integration option to further increase DER adoption
• Dynamic volt/VAR control
  ◦ Voltage and Power factor control @ POI
  ◦ Automatic voltage regulation (AVR)

Control latency
• Regional DER level energy control response from seconds to minutes
• Local direct control in seconds or sub-seconds with integrated Microgrid Controller

Communication protocols and data interfaces
• Uses secured IEEE 2030.5 standards between the centralized DERMS server and local DERs
• Support for all major protocols including Modbus, DNP3, OPC, ICCP and IEC61850 (CIM)
• Supports data exchange with ADMS and SCADA systems
• Supports EVSE integration using API or OCPP (optional)

Alarms
• Standard alarm package
• User configurable alerts
• Email and SMS (text) notification to specified recipients

Software specifications

Installed programs
• PXiSE primary and local DERMS modules
  ◦ Accommodates stacking main/subordinate controllers for complex configurations
• OSIsoft PI System OEM license
• SunSpec certified 2030.5 server
• Network load flow analysis engine (Advanced DERMS)
• Microgrid Controller (optional)

Cybersecurity
• Certificate-based security
  ◦ Third party or self-managed certificates
• Microsoft Active Directory authentication and user access management

HMI
• Standard DERMS display templates, web-based human-machine interface (PI Vision)
  ◦ Energy supply forecast trends
  ◦ Energy demand forecast trends
  ◦ DER summary by DER group
  ◦ Individual DER level equipment monitor
  ◦ DER 24-hour dispatch schedule
  ◦ Alarms and alerts
  ◦ Active historical trends for up to 13 months
• User-defined customizable displays

Hardware specifications

Computing hardware
• Server-class computer such as DELL PowerEdge 740 or equivalent
• CPU, memory, and data storage capacity varies with the number of DERs and the size of the power network

DER devices integration
• Inverters or gateways compliant with SunSpec certified 2030.5 client
  ◦ Solar PV system
  ◦ Battery energy storage
  ◦ Demand response or load reduction controller
  ◦ Electric vehicle supply equipment (EV charging system)