Specification for EcoStruxure Panel Server Advanced

The EcoStruxure Panel Server Advanced serves as a Local Energy Server or Energy server at Edge, and as an Ethernet coupler for PowerLogic/Schneider Electric systems and devices and for other communicating devices that use Modbus protocol and as a data concentrator for wireless devices.

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Internal

1 Introduction

The EcoStruxure Panel Server Advanced serves as a Local Energy Server, or Energy Server at Edge, and as an Ethernet coupler for PowerLogic/Schneider Electric systems and devices, for other communicating devices that use Modbus protocol, and as a data concentrator for wireless devices.

From a single building to a multi-site enterprise, the EcoStruxure Panel Server Advanced helps providing Energy Server, Data Logger, reliable Modbus serial line to Ethernet Modbus RS485 / TCP/IP and wireless to Ethernet Modbus TCP/IP connectivity in demanding applications:

- Energy management
- Power distribution
- Building automation
- Factory automation

The EcoStruxure Panel Server Advanced Energy Server offers complete access to status and measurement information provided by the connected devices via proprietary SCADA or Schneider Electric software installed on a PC such as EcoStruxure Power Monitoring Expert, EcoStruxure Power Operation, EcoStruxure Building Operation or to Schneider Electric Cloud Services such as EcoStruxure Energy Hub, EcoStruxure Asset Advisor or EcoStruxure Resource Advisor or through a simple web-browser accessing the embedded web-pages providing local insights and measurement.

2 System

Electrical Distribution Boards shall be enabled with load monitoring devices and sensors capable of monitoring individual loads, electrical measurements, and environmental measurements.

Electrical Distribution board shall be enabled with a Local Energy Server capable of retrieving and concentrating real time and historized data up to three years with regards to devices and sensors communication status, measurements, and alarms on load failure.

Electrical Distribution board shall be enabled with a Local Energy Server capable of connecting and retrieving data from devices and sensors connected through wired Modbus serial line to Ethernet Modbus RS485, TCP/IP to Ethernet Modbus TCP/IP connection and / or trough wireless IEEE802.15.4.

Electrical Distribution board shall be enabled with a Energy Server capable of connecting and retrieving data from downstream devices through embedded digital inputs for digital devices and counters such as Gas counters or water counters (PAS800L).

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The display of real-time and historized values shall be the reflection of each connected devices in a wide range of measures encompassing:

- Power Demand
- Power (active, reactive, apparent and per phase)
- Energy
- Current (per phase, THD, and Harmonic)
- Unbalance
- Voltage
- Environment (Temperature, etc.)
- Circuit breaker
- Internal devices measurement (temperature, Battery, etc.)
- …

The user shall have the capability to easily commission and maintain his system through the Energy Server embedded webpages or dedicated commissioning application.

The user shall have the possibility to easily visualize and manage real time and historized measurement and alarms through:

- Embedded Webpages
- Cloud Application connected to the Energy Server through Wi-Fi or Ethernet connection.
- Edge Application or SCADA connected to the Energy Server through Wi-Fi or Ethernet connection.

In case of communication loss with the upstream application, the Energy Server shall continue data harvesting and shall store measured data for three years.

3 Standards

The Energy Server shall comply with the following standards:

3.1 Radio communication / telecom & electromagnetic compatibility

- North America: FCC Class A
- IEC: EN 55032, CISPR 11, EN301-489-1, EN301-489-17
- Wi-Fi: IEEE 802.11 a/b/g/n
- Wireless: IEE 802.15.4

3.2 Safety

- IEC: IEC 61010-1
- North America: UL61010-1

3.3 Energy Server

- IEC: 62974-1

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4 Operating environment

The Energy Server shall be able to operate in the -25°C to + 70°C temperature range up to an altitude of 2000m.

The Energy Server shall be able to operate in the -25°C to + 60°C temperature range for an altitude comprised between 2000m and 4000m (PAS800L only).

The Energy Server shall be able to be stored in the -40°C to +85°C temperature range.

The Energy Server shall be rated IP20 & IP40 (front panel).

The Energy Server shall be rated OVCIII (PAS800 only).

The Energy Server shall be rated Pollution Degree 2 (PAS800 only).

The Energy Server shall be rated Pollution Degree 3 (PAS800L only).

The Energy Server shall be installed inside or outside the switchboard and shall be within 4 meters of the wireless connected devices and sensors, if any.

If used in Open field or within separated metallic cabinet, the Energy Server shall be installed within 10 meters of the wireless connected devices and sensors, if any, and shall be equipped with and external antenna for IEEE 802.15.4 communication.

5 Power supply

The Energy Server shall be able to operate using wide range power supplies:

- 110 to 277 V AC / DC (+/-10%) (PAS800 only)
- PoE-PD CLASS 0, IEEE802.3af/at (PAS800P only)
- 24 V DC (+/-10%) (PAS800L only)

6 Energy Server communications interface

6.1 Inputs

The Energy Server shall have two IEC62053-31 Class A-compatible digital inputs (PAS800L only).

6.2 Limitation

The Energy Server shall support up to 64 Ethernet TCP/IP clients, and up to 128 Ethernet TCP/IP Server.

The Energy Server shall support up to 32 Modbus Serial Line RS485 connections without repeater, and up to 128 Modbus Serial Line RS485 connection with repeater.

The Energy Server shall communicate with up to 40 mixed wireless devices.

The Energy Server shall communicate with up to 85 PowerLogic PowerTag Energy.

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The Energy Server shall communicate with up to 85 wireless Acti9 Active devices.

The Energy Server shall communicate with up to 85 Wireless indication auxiliaries for ComPacT and PowerPacT circuit breakers.

The Energy Server shall communicate with up to 85 wireless Environmental / Ambient sensors.

6.3 Networks

The Energy Server shall enable network upstream communication with customer infrastructure through DNS server.

The Energy Server shall enable network upstream communication with customer infrastructure through DPWS network.

The Energy Server shall enable network upstream communication with customer infrastructure through NTP network.

The Energy Server shall enable network upstream communication with customer infrastructure through HTTP and/or HTTPS Proxy.

6.4 Ethernet port

The Energy Server shall have two Ethernet ports, which can be used either as a switched topology or separated topology (with one IP address for each port).

The Ethernet ports shall be configured in DHCP client or Static IP address.

Ethernet Port 1 shall be configurable as:

- DHCP client (switch mode)
- Static IP address (switch or separated mode)

Ethernet Port 2 shall be configurable as:

- DHCP client (switch or separated mode)
- Static IP address (switch or separated mode)

6.5 Modbus port

The Energy Server shall have one Modbus serial line port, with a 4-pin screw connector.

6.6 Wi-Fi

The Energy Server shall support Wi-Fi as infrastructure mode to connect through the customer’s Wi-Fi network to the monitoring system.
When Wi-Fi is used in a metal enclosure an external antenna shall be proposed as a separate accessory.

6.7 Wireless IEEE 802.15.4

The Energy Server shall comply to IEEE 802.15.4 to support various wireless devices.

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Wireless communication shall be encrypted on AES128 bit CCM and using star topology only (no mesh).

Wireless devices shall communicate wirelessly with Ethernet Energy Server (no communication cables) with a limited Isotropic Radiated Power up to 0dBm (or 1mW).

When wireless devices are connected in a metal enclosure an external antenna shall be proposed as a separate accessory.

6.8 Data communication

The Energy Server shall enable data publication to SFTP Server or HTTPS Server.

The Energy Server shall enable local data export through CSV files.

The Energy Server shall be equipped with embedded webpages enabling data visualization and aggregation, alarms historization, and trending capability.

The Energy Server shall enable upstream connection with Schneider Electric Cloud application, proprietary SCADA and / or other Edge solution.

7 Hardware Installation and Settings (in building)

The Energy Server shall be compatible with a type 'O' DIN rail. Its size on the DIN rail shall not be greater than 72 mm.

The Energy Server shall be easy to connect: The ports shall be equipped by using removable screw connectors or plug-in connectors.

The Energy Server shall provide an automatic grounding connection point through the DIN rail.

8 Energy Server configuration

The Energy Server settings shall be accessible through a configuration software allowing back-up and restore of the settings.

The Energy Server settings shall be accessible through its onboard web pages.

The Energy Server shall be equipped by DPWS (Device Profile for Web Services) technology with two specific web services: discovery and identification.

The Energy Server shall auto-discover wireless devices and allow to customize or label each load monitoring device separately including the type of connected load.

9 Security features

In case of new connection, power loss or communication loss with upstream Cloud application, the Energy Server shall have a nonvolatile memory and retained already stored data for three months.

The Energy Server shall be designed through a secured development lifecycle in accordance with IEC 62443-4-1.

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Users shall have the ability to set their own passwords following Cybersecurity best practices.

A password containing letters, numbers and special characters shall be made mandatory for the Energy Server in operation phase.

The Energy Server shall embed a unique device genuineness certificate that helps proving that it is a genuine Schneider hardware. The certificate shall be stored in a EAL6+ certified security controller.

The Energy Server access to login page shall operate using HTTPS protocol.

The user password shall be stored encrypted.

The Energy Server shall have a separated mode ability which separates LAN and WAN within a network.

The Energy Server shall only accept signed firmware from the Energy Server provider.

It shall be possible to field upgrade the firmware in the Energy Server to enhance functionalities. These firmware upgrades shall be done through the Ethernet or Wi-Fi connection and shall allow upgrades of individual Energy Server or groups through embedded webpages, connected cloud application, or commissioning application.

The Energy Server shall provide the option to temporarily disable wireless connections, ports or protocols not used.

The Energy Server shall provide the option to permanently disable wireless connections.

10 Energy Server Features

The Energy Server is meant to provide communication between communicating devices and an upstream software platform.

- The Energy Server shall be compatible with tools such as like EcoStruxure Power Commission for initial configuration of the switchboard, commissioning, and maintenance (setting parameters of the different devices).
- The End User shall be able to use the Energy Server to access downstream Modbus devices, digital inputs (PAS800L only) and wireless devices values in "real time" through EcoStruxure Power Monitoring Expert, EcoStruxure Power Operations, EcoStruxure Building Operation or other software platform whether Edge or Cloud based.
- The Energy Server shall have the capability to connect and display data and analytics from any Modbus Serial Line RS485 or Modbus TCP/IP independently of the brand.
- The Energy Server shall have the capability to customize the sampling period for the different measurement available one each metering device from one minutes to one hour.
- The Energy Server shall be connected to Cloud applications, SCADA, or other software, if any, through Modbus through Ethernet or Wi-Fi connection.
- The Energy Server shall enable upstream Modbus RS485 to TCP/IP connection in reverse mode.

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  - The Energy Server shall enable to be used as a transparent gateway if connected to upstream Edge or Cloud software.
- The Energy Server shall have embedded synthesis Modbus registers for connected wireless devices table to optimize communication from the upstream system to the wireless devices.

The Energy Server shall also provide services for energy & operation efficiency:

- The Energy Server shall have embedded web pages for real time information monitoring and display alarms for connected devices by meters and usage.
- The Energy Server shall have embedded web pages for historical measurements storage, trending, and analysis over up to 3 years.
- The Energy Server shall have embedded web pages for basic measurement, meters and usages benchmarking.
- The Energy Server shall have embedded web pages for historical data analysis and aggregation, but also trending and comparison of data, individual meter, or defined group of meters at Edge.
- The Energy Server shall be able to send alerts and alarms over email to the Users.
- The Energy Server shall have embedded webpages for historical alarms display with mention of appearances and disappearances by meters.
- The Energy Server shall support multiple upstream concurrent connections and up to 64 concurrent TCP/IP sessions opened.

The Energy Server shall have a 32GB memory for measurement logging up to 3 years.

11 Troubleshooting

The Energy Server shall have a visible indicator on its front-face to show:
- Power is on and the Energy Server is in nominal operating mode.
- Minor malfunction requiring the Energy Server or the system to be serviced.
- Major malfunction requiring the Energy Server to be replaced.

The Energy Server shall detect and report the following:
- Device communication loss
- CPU overuse
- Memory overuse

The Energy Server shall log internal diagnostics events for troubleshooting support.

The Energy Server shall have embedded webpages for diagnostic and troubleshooting.

Internal