Specification for EcoStruxure Panel Server Entry

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1 Introduction

The EcoStruxure Panel Server Entry gateway serves as an Ethernet coupler for PowerLogic / Schneider Electric System and devices as a data concentrator for wireless devices to Modbus TCP/IP.

From a single building to a multi-site enterprise, the EcoStruxure Panel Server Entry gateway helps providing cost effective wireless to Ethernet Modbus TCP/IP connectivity in demanding applications:

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

The EcoStruxure Panel Server Entry gateway 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.

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 gateway capable of retrieving and concentrating real time data with regards to devices and sensors communication status, measurements, and alarms on load failure.

Electrical Distribution board shall be enabled with a Gateway capable of connecting and retrieving data from devices and sensors connected through wireless IEEE802.15.4.

The display of real-time 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 Gateway embedded webpages or dedicated commissioning application.

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

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

In case of communication loss, the Gateway shall continue data harvesting and shall store measured data for one month.

3 Standards

The gateway 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

4 Operating environment

The gateway shall be able to operate in the -25°C to + 60°C temperature range up to an altitude of 2000m.

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

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

The gateway shall be rated OVCIII.

The gateway shall be rated Pollution Degree 2.

The Gateway shall be installed inside or outside the switchboard and within 4 meters from the wireless devices and sensors.

5 Power supply

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

- 110 to 277 V AC / DC (+/-10%)

6 Gateway communications and data interface

6.1 Limitation

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

The Gateway shall communicate with up to 20 mixed wireless devices.

6.2 Networks

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

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

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

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

6.3 Ethernet port

The gateway shall have one Ethernet port that shall be configurable as:

- DHCP client
- Static IP address

6.4 Wi-Fi

The gateway shall support Wi-Fi as infrastructure mode to connect through the customer’s Wi-Fi network to the monitoring system.

6.5 Wireless IEEE 802.15.4

The gateway shall comply to IEEE 802.15.4 to support various wireless devices.

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

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

6.6 Data communication

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

The Gateway shall be equipped with embedded webpages enabling real time data visualization.

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

7 Hardware Installation and Settings (in building)

The gateway shall be compatible with a type 'O' DIN rail. Its size on the DIN rail shall not be greater than 54 mm.

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

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

8 Gateway configuration

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

The gateway settings shall be accessible through its onboard web pages.

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

The gateway 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 software, the gateway shall have a nonvolatile memory and retained already stored data for one months.

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

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 gateway in operation phase.

The gateway shall embed a unique device genuineness certificate that helps proving that it is a genuine hardware from the manufacturer. The certificate shall be stored in an EAL6+ certified security controller.

The gateway access to login page shall operate using HTTPS protocol.

The user password shall be stored encrypted.

The gateway shall have a switch mode ability which separates LAN and WAN within a network.

The gateway shall only accept signed firmware from the gateway provider.

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

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

10 Gateway Features

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

- The Gateway shall be compatible with tools 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 gateway to access wireless devices values through Modbus TCP/IP in "real time" through EcoStruxure Power Monitoring Expert, EcoStruxure Power Operations, EcoStruxure Building Operation or other software platform whether Edge or Cloud based.
- The Gateway shall have the capability to customize the sampling period for the different measurement available one each metering device from one minute to one hour.
- The Gateway shall be connected to Cloud applications, SCADA, or other software, if any, through Modbus through Ethernet or Wi-Fi connection.
- The gateway shall have embedded synthesis Modbus registers for connected wireless devices table to optimize communication from the upstream system to the wireless devices.

The gateway shall also provide services for energy and operation efficiency:

- The gateway shall have embedded web pages for real time information monitoring and display alarms for connected devices by loads and by meters and usage.
- The gateway shall support multiple concurrent connections and up to 64 concurrent TCP/IP sessions opened.

11 Troubleshooting

The gateway shall have a visible indicator on its front-face to show:

- Power is on and the gateway is in nominal operating mode.
- Minor malfunction requiring the gateway or the system to be serviced.
- Major malfunction requiring the gateway to be replaced.

The gateway shall detect and report the following:

- Device communication loss
- CPU overuse
- Memory overuse

The gateway shall log internal diagnostics events for troubleshooting support.

The gateway shall have embedded webpages for diagnostic and troubleshooting.