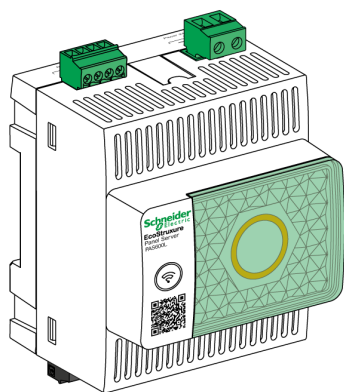# EcoStruxure™

EcoStruxure Panel Server Universal

User Guide

Wireless Concentrator and Modbus Gateway, Datalogger and Energy Server

EcoStruxure offers IoT-enabled architecture and platform.

DOCA0172EN-01
07/2021

Life Is On | Schneider Electric

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Table of Contents

Safety Information

Important Information

Read these instructions carefully, and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this documentation or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of this symbol to a "Danger" or "Warning" safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result** in minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

Please Note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

Cybersecurity Safety Notice

┌───┐
| ⚠ **WARNING** |
├───┤
| **POTENTIAL COMPROMISE OF SYSTEM AVAILABILITY, INTEGRITY, AND CONFIDENTIALITY** |
| |
| • Disable unused ports/services to help minimize pathways for malicious attackers. |
| • Place networked devices behind multiple layers of cyber defenses (such as firewalls, network segmentation, and network intrusion detection and protection). |
| • Use cybersecurity best practices (for example, least privilege, separation of duties) to help prevent unauthorized exposure, loss, modification of data and logs, or interruption of services. |
| |
| **Failure to follow these instructions can result in death, serious injury, or equipment damage.** |
└───┘

FCC Notice

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

• This device may not cause harmful interference, and

• this device must accept any interference received, including interference that may cause undesired operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operating in a commercial environment. This equipment generates, uses, and can radiate radiofrequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Caution:

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body.

NOTE: The country code selection is for non-US model only and is not available to all US models. Per FCC regulation, all Wi-Fi product marketed in US must fixed to US operation channels only.

Safety Precautions

┌───┐
| ⚠ **WARNING** |
├───┤
| **INCORRECT EQUIPMENT USE** |
| |
| Do not use the EcoStruxure Panel Server as a safety device. |
| |
| **Failure to follow these instructions can result in death, serious injury, or equipment damage.** |
└───┘

About the Book

Document Scope

The aim of this guide is to provide users, installers, and maintenance personnel with the technical information and procedures needed to use and maintain the EcoStruxure™ Panel Server Universal.

Validity Note

This guide applies to EcoStruxure Panel Server Universal devices with firmware version 001.001.000 or greater.

Online Information

The information contained in this guide is likely to be updated at any time. Schneider Electric strongly recommends that you have the most recent and up-to-date version available on www.se.com/ww/en/download.

The technical characteristics of the devices described in this guide also appear online. To access the information online, go to the Schneider Electric home page at www.se.com.

Related Documents

Title of documentation	Reference number
EcoStruxure Panel Server Universal - Instruction Sheet	GDE74119
EcoStruxure Panel Server - Firmware Release Notes	DOCA0178EN
EcoStruxure Panel Server - Cybersecurity Guide	DOCA0211EN
How Can I Reduce Vulnerability to Cyber Attacks?	Cybersecurity System Technical Note

You can download these technical publications and other technical information from our website at www.se.com/ww/en/download.

EcoStruxure Panel Server Presentation

What's in This Part

Introduction

EcoStruxure Master Range

EcoStruxure is Schneider Electric's IoT-enabled, plug-and-play, open, interoperable architecture and platform, in Homes, Buildings, Data Centers, Infrastructure and Industries. Innovation at Every Level from Connected Products to Edge Control, and Apps, Analytics and Services.

Overview

EcoStruxure Panel Server is a high performance gateway which provides:

- easy and fast connection to
  - edge control software such as EcoStruxure Power Monitoring Expert or EcoStruxure Power Operation,
  - Building Management Systems such as EcoStruxure Building Operation,
  - cloud applications such as EcoStruxure Facility Expert and EcoStruxure Asset Advisor.
- an all-in-one gateway to retrieve data from IEEE 802.15.4 and Modbus devices, and optimize energy and operation management solution.
- ease of commissioning with EcoStruxure Power Commission software, enabling device plug-and-play and auto-discovery features.
- ease of operation with user-friendly embedded webpages, and data contextualization for more relevant analytics.
- communication protocols:
  - Ethernet
  - IEEE 802.15.4
  - Wi-Fi

The 3 models of EcoStruxure Panel Server are Advanced, Universal, and Entry.

Main Features

EcoStruxure Panel Server provides the following main features:

- Gateway functionality Modbus TCP/IP to Modbus Serial Line (Modbus-SL)
- Data concentrator for the following wireless devices: PowerTag Energy sensors, environmental sensors, PowerTag Control modules (available begin 2022), Acti9 Active, HeatTag sensors (available end 2021), and wireless indication auxiliaries for ComPacT NSX and ComPacT NSXm circuit breakers (available end 2021)
- Connectivity to Schneider Electric monitoring software (such as EcoStruxure Power Monitoring Expert (PME), EcoStruxure Power Operation (PO), EcoStruxure Building Operation) or third-party software
- Connectivity to the cloud through 4G, wired Ethernet, or Wi-Fi
- Two Ethernet ports to optionally separate upstream cloud connection from field device network (Universal and Advanced models)
- The following supported transfer protocols: Modbus TCP/IP, HTTPS, and SFTP (available in 2022) with proxy management
- Real-time data in easy-to-understand embedded webpages
- 3 years of data logging (Advanced model)
- Dashboard view for reporting (Advanced model)

- Data export with native connection to Schneider Electric service platforms (such as EcoStruxure Facility Expert, EcoStruxure Asset Advisor, and EcoStruxure Resource Advisor) and with *.csv* file for other database servers
- Setup through EcoStruxure Power Commission software allowing off-line configuration preparation, backup and restore, and embedded webpages
- Compliance with electrical switchboard environment (temperature, electromagnetic compatibility)

Feature Availability

The following table presents the availability of the main features on the EcoStruxure Panel Server range.

Main features		EcoStruxure Panel Server		
		Entry[1]	Universal	Advanced[2]
Power supply	24 Vdc	–	PAS600L	PAS800L
	110–240 Vac/Vdc (IEC/NEMA)	–	PAS600T	–
	110–277 Vac/Vdc (IEC/NEMA)	PAS400	PAS600	PAS800
	PoE (Power over Ethernet)	–	PAS600P[2]	PAS800P
10Base-T/100Base-T Ethernet		One RJ45 ports	Two RJ45 ports	Two RJ45 ports
Wi-Fi		✓	✓	✓
Downstream Modbus-SL connectivity		–	✓	✓
Downstream Modbus TCP/IP connectivity		–	✓	✓
Downstream IEEE 802.15.4 connectivity		✓	✓	✓
Upstream Modbus TCP/IP connectivity (edge connection)		✓	✓	✓
Cellular connectivity to cloud through an optional external module		✓	✓	✓
Digital inputs (including WAGES (Water, Air, Gas, Electricity, Steam))		–	Two digital inputs (PAS600L)	Two digital inputs (PAS800L)
Data logging		–	–	3 years
Commissioning tool of EcoStruxure Panel Server and connected devices		- EcoStruxure Power Commission software (recommended) - EcoStruxure Panel Server webpages[2]		
Schneider Electric cloud applications		- EcoStruxure Facility Expert - EcoStruxure Asset Advisor - EcoStruxure Resource Advisor		

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1.   Available begin 2022.
2.   Available end 2021.

EcoStruxure Panel Server System

Architecture

From a simple electrical distribution system with one device to large electrical distribution systems, the EcoStruxure Panel Server collects data from any of the supported devices.

The following illustration shows possible architectures of EcoStruxure Panel Server:

EcoStruxure Panel Server webpages

Schneider Electric cloud services

Internet

Cellular

Power Monitoring Expert or third-party edge control software

Ethernet or Wi-Fi LAN

EcoStruxure Panel Server

Ethernet / Modbus TCP/IP

Gas meter   Water meter   Pulse energy meters

Circuit breakers   Power meters   Protection relays

Power meters   Energy meters

Circuit breakers

Smartlink gateway

HeatTag sensors   Environmental sensors   PowerTag Rope

Circuit breakers

Gas meter   Water meters   Miniature circuit breakers and contactors   Pulse energy meters

PowerTag Control   PowerTag Energy   Acti9 Active Miniature circuit breaker

──── Ethernet or Wi-Fi LAN

──── Modbus-SL communication

──── ULP system

──── Analog/Digital inputs/outputs

IEEE 802.15.4 wireless communication

Cellular wireless communication

Network Connectivity

EcoStruxure Panel Server network connectivity can be subdivided into two parts:

• Upstream connection to supervision software and cloud applications.
• Downstream connection to local field devices.

Upstream Connection

The upstream network of EcoStruxure Panel Server can be used to connect cloud applications or Modbus TCP/IP monitoring and supervision application.

This access can be provided through the two Ethernet ports on the EcoStruxure Panel Server or through the Wi-Fi interface (available end 2021).

Depending on the Ethernet port configuration, the data transmission behavior is as follows:

- In switched mode, the two Ethernet ports are connected to the internal Ethernet switch of the EcoStruxure Panel Server. Devices connected to either of the Ethernet ports can see each other if they belong to the same IP sub-network.
- In separated mode (available end 2021), Ethernet port **ETH1** is connected to the upstream network while Ethernet port **ETH2** is used to create a downstream Ethernet network separate from the upstream Ethernet network.

In case of Wi-Fi connection, Wi-Fi is always considered the upstream network.

Downstream Connection

Devices in the downstream network can be connected to the EcoStruxure Panel Server through different communication means:

- Wireless network according to IEEE 802.15.4
- Modbus-SL (Universal and Advanced models)
- Modbus TCP/IP (available end 2021)
- Digital inputs (PAS600L)

Depending on the configuration of the EcoStruxure Panel Server Ethernet ports, data transmission behavior is as follows:

- In switched mode, it is possible to daisy chain several network devices via the EcoStruxure Panel Server. The Modbus TCP/IP devices connected on either port of the EcoStruxure Panel Server can be directly accessed by monitoring and supervision software running on a device physically connected on either **ETH1** or **ETH2** port.
- In separated mode (available end 2021), the Modbus TCP devices connected via the EcoStruxure Panel Server **ETH2** port to the downstream Ethernet network can be accessed by upstream monitoring and supervision software through **ETH1** port.

Supported Devices

List of supported devices:

- Wired devices communicating though Modbus-SL, Modbus TCP/IP, or digital inputs:
  - Circuit breakers and switch-disconnectors
  - Protection relays
  - Power meters
  - Energy meters
  - Pulse meters
  - IO modules
  - Gateways
- Wireless devices:
  - PowerTag Energy sensors
  - Environmental sensors

◦ Acti9 Active

◦ HeatTag sensors (available end 2021)

◦ PowerTag Control modules (available begin 2022)

◦ Wireless indication auxiliaries for ComPacT NSX and ComPacT NSXm circuit breakers (available end 2021)

The devices supported by the EcoStruxure Panel Server are listed in DOCA0178EN *EcoStruxure Panel Server - Firmware Release Notes*.

Maximum Configuration

The maximum number of devices that can be configured in an EcoStruxure Panel Server system depends on the type of devices. For more information, contact your Schneider Electric local representative.

- System with EcoStruxure Panel Server Universal and Advanced:
  - ◦ Maximum number of wireless devices:
    - – 20 PowerTag Energy sensors or Acti9 Active
    - – or 65 Environmental sensors

      NOTE: The combination with HeatTag sensors will be available end 2021.
  - ◦ A maximum of 32 Modbus-SL devices without repeater
  - ◦ A maximum of 128 Modbus-SL devices with repeater
- System with EcoStruxure Panel Server Entry:
  - ◦ Maximum number of wireless devices:
    - – 20 PowerTag Energy sensors
    - – or 20 Acti9 Active
    - – or 20 Environmental sensors

Hardware Description

EcoStruxure Panel Server Universal Description

Front face **Bottom** **Rear**
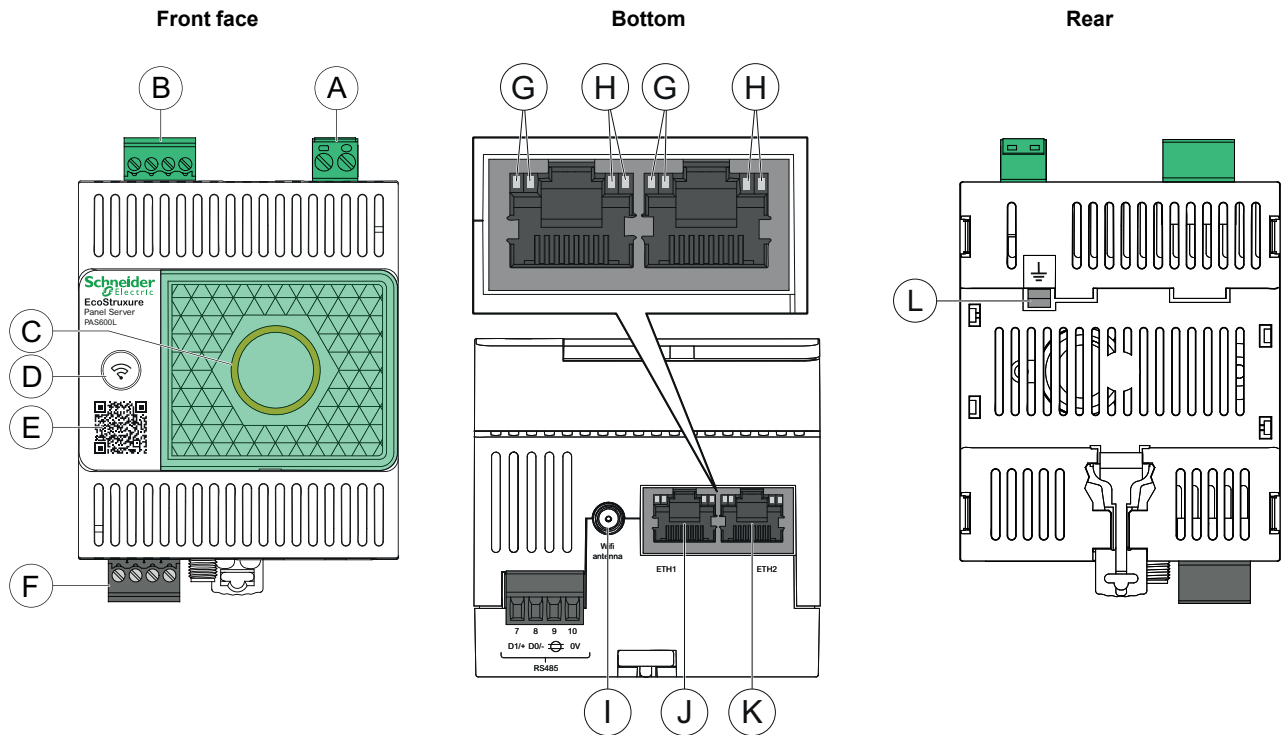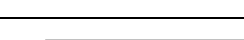
A. Power supply terminal block

B. Digital input terminal block (PAS600L)

C. EcoStruxure Panel Server status LED

D. Restart button

E. QR code to product information

F. RS-485 Modbus communication port

G. Ethernet LED 1: Speed

H. Ethernet LED 2: Activity

I. External Wi-Fi antenna port

J. Ethernet 1 communication port

K. Ethernet 2 communication port

L. Grounding connection

For information on installation, consult the instruction sheet available on the Schneider Electric website: GDE74119.
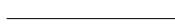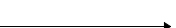
EcoStruxure Panel Server Status LED

The LED indicates the operation mode of the EcoStruxure Panel Server.

LED indication	Description
→	EcoStruxure Panel Server switched off.
▄▄▄▄▄▄ (orange)	EcoStruxure Panel Server is powering on. System boots within 2 minutes.
▄▄▄▄▄▄ (green)	EcoStruxure Panel Server in normal operation.
▄ ▄ ▄ (orange blinking)	Minor malfunction detected. Connect to EcoStruxure Panel Server software to diagnose.
▄▄▄▄▄▄ (red)	Major malfunction detected. EcoStruxure Panel Server must be replaced.
▄ ▄ ▄ (blue blinking)	Communication through Bluetooth® technology ready for pairing. (Available at a later date)
▄▄▄▄▄▄ (blue)	One client using Bluetooth® technology connected to EcoStruxure Panel Server. (Available at a later date)

Ethernet Status LEDs

The combination of the 2 LEDs of one RJ45 port indicates the Ethernet communication status of the EcoStruxure Panel Server.

Ethernet LEDs		Description
LED 1: Speed	LED 2: Activity	
→	→	No Ethernet communication
→	▄ ▄ ▄ (green blinking)	10 Mb Ethernet communication active
▄▄▄▄▄ (green)	▄ ▄ ▄ (green blinking)	100 Mb Ethernet communication active

Restart Button

To restart the EcoStruxure Panel Server:

1. Press and hold the button for more than 10 seconds then release it.

   Result: The status LED turns steady orange.

2. Wait for the EcoStruxure Panel Server to restart completely:

   a. The status LED remains steady orange while the EcoStruxure Panel Server is rebooting.

   b. The status LED turns steady green when the EcoStruxure Panel Server is in normal operation.

Tamper Detection

A tamper-indicating label helps detect unauthorized physical access into the EcoStruxure Panel Server. This label is light grey with Schneider Electric written in black.

The following figure illustrates the position of the tamper-indicating label **(A)** affixed on the right-hand side of the EcoStruxure Panel Server:
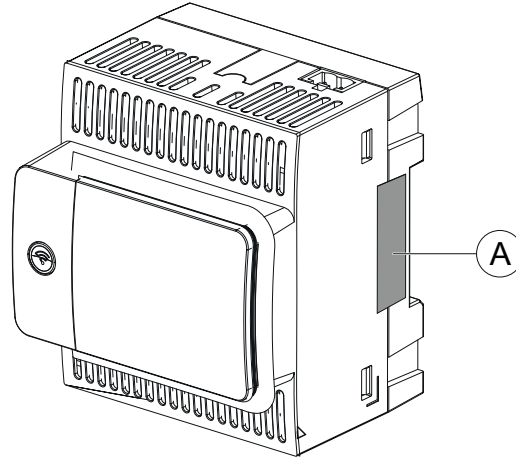
Before installing, operating, servicing, or maintaining the EcoStruxure Panel Server, check the tamper-indicating label integrity.

Hardware Connection

Connection to Ethernet
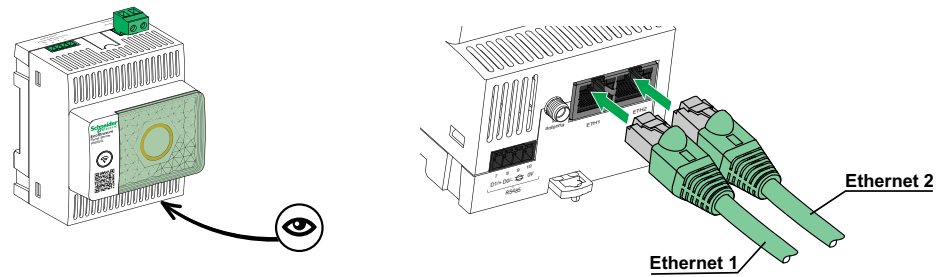
Connect a PC to Ethernet
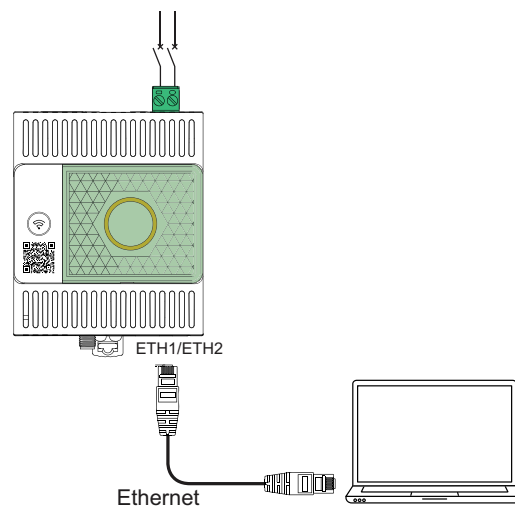
To connect a PC to EcoStruxure Panel Server through Ethernet, proceed as follows:

1. Check that no action is in progress on your PC.

2. Connect an Ethernet cable between the PC and one of the Ethernet ports on the EcoStruxure Panel Server (**ETH1** or **ETH2**).

EcoStruxure Power Commission Software

Overview

EcoStruxure Power Commission is intelligent software that helps you set up, test, and commission the electrical products and systems in your switchboards with efficiency and ease. It also allows you to generate a dedicated QR code for the electrical panel to enable digital collaboration with contractors and facility managers by sharing important documentation and initiating maintenance plans through the digital logbook functionality in EcoStruxure Facility Expert.

Key Features

EcoStruxure Power Commission software performs the following actions for the supported devices :

- Easy setup
  - Discover all the smart devices in your electrical switchboard
  - Check firmware compatibility and install upgrades as required
  - View communication architecture and adjust communication settings
  - View the list of devices organized in the switchboard, and configure electrical settings for breakers and meters
- Reliable testing
  - Execute Factory Acceptance Tests (FAT) and reporting:
    – Test MasterPacT MTZ circuit breakers with automatic trip curve tests, zone selectivity tests
    – Test the communication wiring and generate reports
- Fast commissioning
  - Adjust settings without connection to the devices through offline configuration feature
  - Use batch operations features to speed up settings configuration, for several devices at the same time
  - Generate a comprehensive project report that lists your switchboard and related devices, firmware version, serial numbers, for example.
- Digital collaboration
  - Create a unique QR code for the entire switchboard and then upload all relevant documentation including important CAD drawings, user guides, bill of materials, single-line diagrams, photos and more to our secure cloud repositoryInitiate preventive maintenance plans and export data to the digital logbook feature in EcoStruxure Facility Expert, app and cloud-based software for facility and building management
  - The digital logbook functionality simplifies the project handover, making it faster and easier for the facility manager to access historical information and collaborate with all project partners

For more information, tutorials, and download link, visit the EcoStruxure Power Commission software webpage.

Software Applications

EcoStruxure Panel Server Webpages

The web server embedded in the EcoStruxure Panel Server provides real-time data and event views, and historical analysis from devices, for entry-level energy and operation management.

Energy and operation management capabilities allow you to:

- View real-time data and events locally or remotely through a supported web browser.
- View site-aggregated data per usage or location.
- View site and devices dashboard and trending on historical data up to 3 years (Advanced model).
- Configure site and device events (for example, overtemperature, overcurrent)
- Select the set of device data you want to log and logging intervals.
- Automatically export selected logged data to your PC or through e-mail for additional analysis.
- Provide data and improve system security through password protection and controlled access to individual webpages.
- Perform simple control reset commands for supported devices (for example, minimum/maximum and accumulated energy).

EcoStruxure Power Monitoring Expert (PME)

EcoStruxure Panel Server can simultaneously support multiple edge control applications (such as EcoStruxure Power Monitoring Expert (PME), EcoStruxure Power Operation (PO), EcoStruxure Building Operation) thanks to its Modbus TCP/IP server supporting up to 64 concurrent connections.

EcoStruxure Panel Server allows you to export the panel configuration (list of devices and communication address) into PME or PO by using EcoStruxure Power Commission software, for setup efficiency.

PME is a complete, interoperable, and scalable software package for power management applications. The software collects and organizes data gathered from the electrical network and presents it as meaningful, actionable information through an intuitive Web interface. It allows you to share information with key stakeholders or across your entire operation to influence behavioral changes that can save you money.

EcoStruxure Facility Expert

EcoStruxure Facility Expert is a cloud-based software application from Schneider Electric to improve energy efficiency, and manage assets and maintenance. EcoStruxure Facility Expert is used for small and medium buildings in industry, retail, public, and healthcare markets.

EcoStruxure Facility Expert allows you to outsource energy management and maintenance, reducing your energy costs and increasing operating efficiency in buildings.

EcoStruxure Facility Expert provides the following features:

- Support for data acquisition hardware: meters, gateways, and sensors.
- Cloud platform for data displays.
- Consulting services from Schneider Electric expert teams.
- A network of local partners to implement solutions.

EcoStruxure Asset Advisor

EcoStruxure Asset Advisor brings a proactive approach to electrical distribution and critical data center assets, combining IoT and cloud-based technologies with Schneider Electric experts and services for business continuity. EcoStruxure Asset Advisor services offer the ability to anticipate and address issues before they become critical incidents, mitigating safety risks, reducing unplanned downtime, operational losses and expensive maintenance interventions.

EcoStruxure Resource Advisor

EcoStruxure Resource Advisor helps with aggregating all cross-enterprise, energy and sustainability information in a single, cloud-based platform. EcoStruxure Resource Advisor enables both data analysis and data action. Energy, water, waste, carbon, building metrics, weather, and more can all be integrated into a single platform, which provides the ability to see high-level trends across an enterprise down to granular load profiles of a single building or piece of equipment.

Technical Characteristics

Environmental Characteristics

Characteristic	Value
Conforming to standards	• IEC 61010-1/IEC 61010-2-201 • UL 61010-1/CSA C22.2 no. 61010-1-12 • UL 61010-2-201/CAN/CSA-C22.2 no. 61010-2-201
Certification	• CE • cULus • RCM • UKCA • FCC • IC
Ambient temperature during storage	-40 °C to +85 °C (-40 °F to +185 °F)
Ambient temperature in operation	-25 °C to +70 °C (-13 °F to +158 °F)
Pollution degree	• 2: PAS600, PAS600T • 3: PAS600L
Altitude	0–2000 m (0–6500 ft)
Relative humidity	5–95% relative humidity (without condensation) at 55 °C (131 °F)
Environment	In compliance with the RoHS directive and REACH Regulations
Electromagnetic compatibility	• IEC 61326-1 • EN 301489-1 • EN 301489-17
Immunity	• IEC 61326-1 • EN 301489-1 • EN 301489-17
Environment: emissions	• CISPR 11 • EN 55032
Electromagnetic compatibility and Radio spectrum Matters (ERM)	EN 300328

Communication Characteristics

Characteristic	Value
Communication interface	• Dual port Ethernet RJ45 10/100BASE-T • IEEE 802.15.4 • DPWS-ready, DHCP client IPv4, IPv6 • RS-485 Modbus port
Automatic IP configuration: DHCP client (Ethernet port)	Maximum simultaneous Modbus TCP/IP connections: 64
Communication network	Modbus TCP/IP connection
Radio-frequency ISM band	2.4 GHz to 2.4835 GHz (in accordance to IEEE 802.15.4 standard)

Electrical Characteristics

Characteristic	Value
Power supply	• PAS600L: 24 Vdc (±10 %) • PAS600T: 110–240 Vac/dc (±10 %) • PAS600: 110–277 Vac/dc (±10 %)
Power consumption	• PAS600L: 3 W (maximum) • PAS600T: 3 W (10 VA) (maximum) • PAS600: 3 W (10 VA) (maximum)
Frequency	50–60 Hz (±3 Hz)
Overvoltage category	III

Physical Characteristics

Characteristic	Value
Dimensions (L x H x D)	71.8 x 93 x 70.2 mm (2.82 x 3.66 x 2.76 in)
Weight	• PAS600L: 190 g (6.7 oz) • PAS600T: 200 g (7 oz) • PAS600: 190 g (6.7 oz)
Mounting	DIN rail
Connections	Screw type terminal blocks
Antenna	External Wi-Fi antenna (optional)
Degree of protection	• Connectors : IP20 • Other faces: IP30 • Front face nose: IP40

Digital Inputs Characteristics

Characteristic	Value
Digital input type	Type 1
Number of digital inputs	2 (PAS600L)

Schneider Electric Green Premium™ Ecolabel

Description

Green Premium by Schneider Electric is a label that allows you to develop and promote an environmental policy while preserving your business efficiency. This ecolabel is compliant with up-to-date environmental regulations.

Accessing Green Premium

Green Premium data on labeled products can be accessed online through any of the following ways:

- By navigating to the Green Premium page on the Schneider Electric website.
- By flashing the QR code displayed in the following image:

Checking Products Through the Schneider Electric Website

To check the environmental criteria of a product using a PC or smartphone, follow these steps:

1. From www.se.com, select **Support > Green Premium: RoHS, REACH**.
2. Find **Check a Product** and click **Launch now** to open the search tool webpage.
3. Enter the commercial reference or product range of the product to search for.
4. To search for several products simultaneously, click the **Add** button, and then fill in the field.
5. Click **Check product(s)** to generate a report of the environmental criteria available for the products with the entered commercial references.

Environmental Criteria

The Green Premium ecolabel provides documentation on the following criteria about the environmental impact of the products:

- RoHs: European Union Restriction of Hazardous Substances (RoHS) directive.
- REACh: European Union Registration, Evaluation, Authorization, and Restriction of Chemicals regulation.
- PEP: Product Environmental Profile.
- EoLI: End of Life Instructions.

RoHs

Schneider Electric products are subject to RoHS requirements at a worldwide level, even for the many products that are not required to comply with the terms of the regulation. Compliance certificates are available for products that fulfill the criteria of this European initiative, which aims to eliminate hazardous substances.

REACh

Schneider Electric applies the strict REACh regulation on its products at a worldwide level, and discloses extensive information concerning the presence of SVHC (Substances of Very High Concern) in all of these products.

PEP

Schneider Electric publishes complete set of environmental data, including carbon footprint and energy consumption data for each of the life cycle phases on all of its products, in compliance with the ISO 14025 PEP ecopassport program. PEP is especially useful for monitoring, controlling, saving energy, and/or reducing carbon emissions.

EoLI

These instructions provide:

- Recyclability rates for Schneider Electric products.
- Guidance to mitigate personnel hazards during the dismantling of products and before recycling operations.
- Part identification for recycling or for selective treatment, to mitigate environmental hazards/incompatibility with standard recycling processes.

EcoStruxure Panel Server Functions

What's in This Part

EcoStruxure Panel Server Universal   Network Settings

Network Settings

Overview

EcoStruxure Panel Server supports Ethernet wired communication through one or both Ethernet ports.

Both Ethernet ports **ETH1** and **ETH2** are switched, that is, both ports are set with the same IP address, and either of the ports can be used for configuration.

Configuring the Network

The network configuration is set as follows:

- With EcoStruxure Power Commission (EPC) software
- On the EcoStruxure Panel Server webpages, at **Settings > Network Communication**.

Select the appropriate network configuration for your system. If necessary, enter the parameters for each connection interface displayed.

TCP/IP Communication

What's in This Chapter

DNS

Presentation

Domain name system (DNS) is the naming system for PCs and devices connected to a local area network (LAN) or the Internet.

Availability

This function is available on Panel Server Universal.

Setting the Parameters

The DNS is set as follows:

- With EcoStruxure Power Commission (EPC) software
- On the EcoStruxure Panel Server webpages, at **Settings > Network Communication > DNS**

DNS Settings

The following table describes the settings and where they are available.

Parameter	Description	EPC software	Webpages
DNS Assignment Mode	Used to select the DNS server configuration mode: • Select **Static** to set manually the primary and secondary server addresses. • Select **DHCP** (default setting) to obtain the DNS server configuration automatically from the DHCP server.	–	✔
Primary DNS Server	Used to enter manually the IPv4 address of the primary DNS server when the parameter DNS configuration mode is set to **Static**.	✔	✔
Secondary DNS Server	Used to enter manually the IPv4 address of the secondary DNS server when the parameter DNS configuration mode is set to **Static**.	✔	✔

Internet Proxy

Presentation

It is necessary to configure Internet proxy settings in the EcoStruxure Panel Server when both the following conditions are met:

- if you use the HTTP or HTTPS protocols, and
- if the network administrator has implemented an Internet proxy on your local network.

The proxy address and port number are provided by your network administrator.

Availability

This function is available on Panel Server Universal.

Setting the Parameters

Proxy is set on the EcoStruxure Panel Server webpages, at **Settings > Network Communication > Proxy**

Proxy Activation Settings

Parameter	Description
HTTP Proxy	Used to enable/disable the HTTP proxy (disabled by default).
HTTPS Proxy	Used to enable/disable the HTTPS proxy (disabled by default).

HTTP Proxy Settings

The following parameters are displayed only when the parameter **HTTP Proxy** is enabled.

Parameter	Description
IP Address	Used to enter the IP address of the HTTP proxy server.
Port	Used to enter the HTTP port.
Authentication	Used to enable/disable if proxy authentication is required (disabled by default).
User Login	Used to enter the user name for the proxy host. **NOTE:** Displayed when the parameter **Authentication** is enabled.
User Password	Used to enter the password for the proxy host. **NOTE:** Displayed when the parameter **Authentication** is enabled.
Non Proxy Host	Used to enter the exceptions of hosts in a non-proxy host list.

HTTPS Proxy Settings

The following parameters are displayed only when the parameter **HTTPS Proxy** is enabled.

Parameter	Description
IP Address	Used to enter the IP address of the HTTPS proxy server.
Port	Used to enter the HTTPS port.
Authentication	Used to enable/disable if proxy authentication is required (disabled by default).

Parameter	Description
User Login	Used to enter the user name for the proxy host. **NOTE:** Displayed when the parameter **Authentication** is enabled.
User Password	Used to enter the password for the proxy host. **NOTE:** Displayed when the parameter **Authentication** is enabled.
Non Proxy Host	Used to enter the exceptions of hosts in a non-proxy host list.

IP Network Services

Presentation

The EcoStruxure Panel Server supports Devices Profile for Web Services (DPWS) protocol for IP network discovery.

Availability

This function is available on Panel Server Universal.

Setting the Parameters

The IP network services are set on the EcoStruxure Panel Server webpages, at **Settings > Network Communication > DPWS**

DPWS Settings

Parameter	Description
DPWS	Used to enable/disable the DPWS service (enabled by default).
Silent Mode	Used to enable/disable the silent mode (disabled by default). **NOTE:** Displayed when the parameter **DPWS** is enabled.
Discovery Type	Used to set the IP discovery type: • **IPv4** • **IPv6** • **IPv4IPv6** (default setting)
TPC Listening Port	Used to enter manually the port number.

Ethernet Communication

Presentation

The EcoStruxure Panel Server supports the following Ethernet protocols:

- **Modbus TCP/IP:** Modbus TCP/IP is a protocol which provides client/server communication between devices over an Ethernet connection. Modbus TCP/IP is used to exchange data between the EcoStruxure Panel Server and compatible monitoring software through TCP port 502.

- **Hypertext Transfer Protocol Secure (HTTPS):** HTTPS is a variant of the standard web transfer protocol (HTTP) that adds a layer of security on the data in transit through a Secure Socket Layer (SSL) or Transport Layer Security (TLS) protocol connection. HTTPS enables encrypted communication and helps to secure connection between a remote user and the EcoStruxure Panel Server.

The EcoStruxure Panel Server has two Ethernet ports. The Ethernet ports are configured in switched mode.

Availability

This function is available on Panel Server Universal.

Switched Mode Configuration

In switched mode, both Ethernet ports share the same settings. The EcoStruxure Panel Server has a single IP address. Devices connected on either Ethernet port belong to the same Ethernet network.

Using two ports simplifies wiring, for example:

- One port can be connected to a switch in the local network.

- One port can be used to connect a PC for configuration operations or to connect a data collection device locally with an Ethernet port.

- Daisy-chaining of multiple Ethernet devices relying on the embedded hardware switch inside the EcoStruxure Panel Server. Daisy-chaining allows devices located on either side of the EcoStruxure Panel Server to communicate together as part of the same network.

The following diagram illustrates a daisy-chain architecture with Ethernet port configuration in switched mode. Both Ethernet ports are connected together using the EcoStruxure Panel Server internal Ethernet switch. This enables devices located upstream or downstream from the EcoStruxure Panel Server to communicate together as part of the same network.
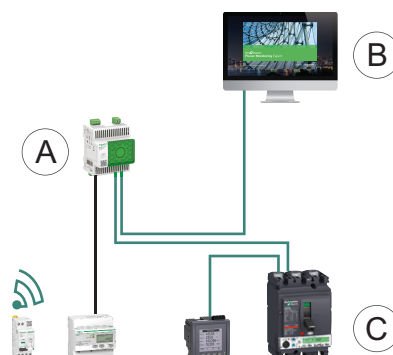
A. EcoStruxure Panel Server

B. Edge monitoring and supervision Software like EcoStruxure Power Monitoring Expert or EcoStruxure Power Operation

C. Devices

Setting the Parameters

NOTICE
IMPAIRED NETWORK PERFORMANCE
Only qualified personnel should modify the Ethernet settings. Perform such modifications only after you have read about and understood the Ethernet settings.
Failure to follow these instructions can result in equipment damage.

The Ethernet communication function is set as follows:

- With EcoStruxure Power Commission (EPC) software

- On the EcoStruxure Panel Server webpages, at **Settings > Network Communication > Ethernet**

Ethernet Port Configuration

The following table describes the settings and where they are available.

Parameter	Description	EPC software	Webpages
Ethernet port configuration	The Ethernet configuration mode is **Switched**: ETH1 and ETH2 ports are set with the same IP address. **NOTE:** Setting not editable.	✔	✔

Switched Port Settings

The following table describes the settings and where they are available.

Parameter	Description	EPC software	Webpages
Interface Status	**Up** indicates that an Ethernet cable is connected to EcoStruxure Panel Server **NOTE:** Setting not editable.	–	✔
MAC Address	A unique media access control address of an EcoStruxure Panel Server. **NOTE:** Setting not editable.	–	✔
IPv6 Activation	Used to enable/disable the IPv6 configuration (enabled by default).	–	✔
IPv6 link-local address	Shows the IPv6 address. Setting not editable. **NOTE:** Displayed when the parameter **IPv6 Activation** is enabled.	✔	✔

IP Configuration

The following table describes the settings and where they are available.

Parameter	Description	EPC software	Webpages
Configuration Mode	Used to select the IPv4 configuration mode: • Select **DHCP client** (default setting) to obtain IPv4 parameters automatically. • Select **Static** to enter the IPv4 address manually.	✔	✔
IP address	Used to enter the static IP address of the EcoStruxure Panel Server when the parameter IP v4 **Configuration Mode** is set to **Static**.	✔	✔
Subnet mask	Used to enter the Ethernet IP subnet mask address of your network when the parameter IP v4 **Configuration Mode** is set to **Static**.	✔	✔

Gateway Settings

The following table describes the settings and where they are available.

Parameter	Description	EPC software	Webpages
Assignment mode	The gateway configuration is the same as the IPv4 configuration mode settings, page 33 and not editable: • **DHCP** • **Static**	✔	✔
Default Gateway	Used to enter manually the gateway (router) IP address when the parameter **Gateway Settings > Assignment mode** is set to **Static**.	✔	✔

Wi-Fi Communication

Presentation

Function available end 2021.

By default, Wi-Fi is not active in the EcoStruxure Panel Server.

IEEE 802.15.4 Communication

Presentation

NOTICE

UNINTENDED EQUIPMENT OPERATION

Do not set the transmission power for IEEE 802.15.4 network to High when the EcoStruxure Panel Server is installed in a metallic switchboard.

Failure to follow these instructions can result in equipment damage.

IEEE 802.15.4 wireless communication devices provide a compact and high-density metering solution with numerous and accurate data for building systems. These wireless devices can send temperature, humidity, energy, power, current, voltage, and power factor to the EcoStruxure Panel Server.

Wireless devices are connected downstream to the EcoStruxure Panel Server.

The maximum number of wireless devices that can be connected to one EcoStruxure Panel Server is detailed in the related topic, page 13.

Availability

This function is available on Panel Server Universal.

Setting the Parameters

IEEE 802.15.4 communication function is set as follows:

- With EcoStruxure Power Commission (EPC) software

- On the EcoStruxure Panel Server webpages, at **Settings > Wireless Devices** (available end 2021)

Configuration Settings

The following table describes the settings and where they are available.

Parameter	Settings	Description
Wireless Settings	Channel selection	Used to specify how the IEEE 802.15.4 channel is selected: • Select **Auto** (default setting) to obtain channel automatically. • Select **Manual** to enter the channel manually. **NOTE:** Once the channel mode has been changed from **Auto** to **Manual**, it is not possible to configure it back to **Auto**. Automatic channel selection is performed once, when the IEEE 802.15.4 network is first established.
	Channel **NOTE:** Displayed when the parameter **Channel selection** is set to **Manual**.	Enter the channel number
	Wireless Power	Used to select the RF transmission power for the IEEE 802.15.4 network: • **Low level** (default setting) • **High level**
Duty Cycle Settings	Duty Cycle (s)	Used to specify the IEEE 802.15.4 duty cycle expressed in seconds (default setting: 5 s)

Modbus-SL Communication

Presentation

The EcoStruxure Panel Server is a Modbus-SL client. It can be connected to any Modbus-SL server devices to provide access over Modbus TCP/IP to EcoStruxure Power Monitoring Expert and EcoStruxure Power Operation.

Modbus-SL server devices are connected downstream to the EcoStruxure Panel Server.

Availability

This function is available on Panel Server Universal.

Setting the Parameters

NOTICE
IMPAIRED NETWORK PERFORMANCE
Only qualified personnel should modify the Modbus-SL settings. Perform such modifications only after you have read about and understood the Modbus-SL settings.
Failure to follow these instructions can result in loss of network connectivity.

The Modbus-SL communication function is set as follows:

- With EcoStruxure Power Commission (EPC) software
- On the EcoStruxure Panel Server webpages, at **Settings > Modbus Devices**.

For information about the Modbus registers, see the guide of each Modbus-SL device and Modbus registers tables, page 67.

Serial Configuration Settings

The following table describes the settings and where they are available.

Parameter	Description	EPC software	Webpages
Activation	Used to enable/disable the Modbus-SL feature (enabled by default).	–	✓
Baud rate (bits per sec)	Used to set the transmission rate: • 1200 • 2400 • 4800 • 9600 • 19200 (default setting) • 38400 • 57600 • 115200	✓	✓
No. of stop bits	Used to define the number of stop bits transmitted.	✓	✓
Parity	Used to define the parity bit of the transmitted bytes: • **ODD** • **NONE**	✓	✓

Parameter	Description	EPC software	Webpages
	• **EVEN** (default setting)		
Number of Bits	8 bits. Setting not editable.	–	✔
Silent Interval (ms)	Used to enter the silent interval (default setting: 5 ms).	–	✔
Frames Delay (ms)	Used to enter the frame delay (default setting: 10 ms).	–	✔
Timeout (ms)	Used to determine the timeout value after which a loss of communication is declared by the EcoStruxure Panel Server (default setting: 1000 ms).	✔	✔
Termination Resistor	Used to enable/disable the resistor for line termination (enabled by default).	✔	✔
Serial Line Polarization	Used to enable/disable the polarization resistor for the EcoStruxure Panel Server Modbus client (enabled by default).	✔	✔

Modbus Discovery Settings

The following table describes the settings and where they are available.

Parameter	Description	EPC software	Webpages
Modbus Serial Discovery	Used to enter the list of Modbus addresses (1–247) for which the devices must be discovered.	✔[3]	✔[4]
Discovered Devices	Displays information about each device discovered in the Modbus network: • Picture • Device name • Server ID • Device model	✔	✔

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3. When commissioning wireless devices with EcoStruxure Power Commission software, it is recommended to discover the Modbus devices connected to the EcoStruxure Panel Server by using an allowed list of addresses.
4. If no addresses are entered, discovery is done for addresses 1 to 10.

Gateway Function

Presentation

The EcoStruxure Panel Server implements a gateway function. It can serve requests received from up to 64 Modbus TCP/IP clients connected upstream so that each client can access data simultaneously from downstream devices connected either via IEEE 802.15.4 wireless network or Modbus-SL wired network.

Availability

This function is available on Panel Server Universal.

Gateway Function

The EcoStruxure Panel Server implements its own Modbus registers that are available at unit ID 255 to provide its own identification information. Therefore, EcoStruxure Panel Server has its own register table (see EcoStruxure Panel Server Modbus Registers, page 72).

The EcoStruxure Panel Server acts as a transparent Modbus-SL to Modbus TCP/IP gateway. It converts Modbus TCP/IP requests received on unit ID X to Modbus–SL requests sent on server ID X. Responses obtained from the downstream devices are then forwarded upstream to the Modbus TCP/IP client.

The EcoStruxure Panel Server implements a set of virtual Modbus register tables per paired IEEE 802.15.4 wireless device. Each time a new wireless device is paired to the EcoStruxure Panel Server, the device is automatically assigned a virtual Modbus server ID. The first paired wireless device is assigned virtual server ID 100. Each subsequent wireless device takes the next virtual ID, which gets automatically incremented by one each time a new device is paired. For detailed information about the registers of supported wireless devices, see EcoStruxure Power Commission System Modbus registers, page 76.

To avoid conflicts between the server IDs of the physical Modbus-SL devices and the virtual server IDs of the wireless devices, it is possible to update the virtual server ID via EcoStruxure Power Commission application.

Example of Modbus Server ID Conflict and Resolution

In the following example, the EcoStruxure Panel Server is used as a gateway with the following devices installed in the switchboard:

- One PM3250 Power Meter communicating through Modbus-SL, and configured with server ID 100
- One PowerTag Energy

Consider the following sequence that will generate a conflict and see how to resolve it:

1. Connect the PM3250 Power Meter configured with server ID 100 to the RS-485 Modbus communication port on EcoStruxure Panel Server.
2. Power up the EcoStruxure Panel Server.
3. From your monitoring tool connected upstream, you can access the Modbus registers of PM3250 by sending Modbus TCP/IP requests to unit ID 100 of the EcoStruxure Panel Server Modbus server.
4. From EcoStruxure Power Commission software, discover the EcoStruxure Panel Server and access the EcoStruxure Panel Server homepage without performing a Modbus-SL device discovery. From the wireless device

discovery card, launch a wireless device discovery for the first time. The PowerTag Energysensor is then discovered and paired to the EcoStruxure Panel Server.

Result: The PowerTag Energy is automatically assigned a virtual server ID equal to 100. Because it is the same ID as for PM3250, there is a conflict.

5. If you send Modbus TCP/IP requests to unit ID 100 of the EcoStruxure Panel Server Modbus server:

   • The virtual registers of the PowerTag Energy will be available.

   • You will no longer be able to send requests to the PM3250 Power Meter.

   • The PM3250 Power Meter is now masked by the virtual device.

6. To resolve this situation, you need to update the virtual server ID to any value you choose, except 100. This can be performed from the wireless device configuration by using EcoStruxure Power Commission software.

Date and Time

Presentation

The date and time function is used to configure date and time either manually or with automatic synchronization. Accurate date and time are required to enable TLS certificate validity checking, as well as to obtain properly time-stamped logs.

Availability

This function is available on Panel Server Universal.

Setting the Parameters

The date and time function is set as follows:

- With EcoStruxure Power Commission (EPC) software
- On the EcoStruxure Panel Server webpages, at **Settings > General > Date/Time**

General Settings

The following table describes the settings and where they are available.

Parameter	Description	EPC software	Webpages
Synchro Mode	Used to select the date and time configuration mode of the EcoStruxure Panel Server: • Select **Manual** to set the date and time manually in the dedicated fields. • Select **NTP** (default setting) to set the date and time automatically by an external time server (NTP server).	✔ (NTP available end 2021)	✔

NTP Server Settings

The following parameters are displayed only when the parameter of date and time synchronization mode is set to **NTP**.

The following table describes the settings and where they are available.

Parameter	Description	EPC software	Webpages
Mode	Used to select the synchronization mode: • Select **Static** to set date and time manually. • Select **DHCP** (default setting) to obtain date and time automatically from the NTP server that is specified by a DHCP server. **NOTE:** To use **DHCP** mode, the network settings must be set to **DHCP** (see related topic, page 33).	– (available end 2021)	✔
Primary Server Address	Used to enter the primary NTP server address when the parameter **NTP Settings > Mode** is set to **Static**.	– (available end 2021)	✔
Secondary Server Address	Used to enter the secondary NTP server address when the parameter **NTP Settings > Mode** is set to **Static**.	– (available end 2021)	✔

Setting Date and Time Manually

EcoStruxure Panel Server date and time can be set manually:

- With EcoStruxure Power Commission (EPC) software
- On the EcoStruxure Panel Server webpages, at **Settings > General > Date & Time > General Settings > Synchro Mode > Manual**

The following table describes the settings and where they are available.

The following parameters are displayed only when the parameter of date and time synchronization mode is set to **Manual**.

Parameter	Description	EPC software	Webpages
Date & Time	Used to set the date by using a date picker. Set time in UTC +00:00.	✓	✓

Firmware Update

Presentation

Update the EcoStruxure Panel Server to the latest version to obtain the latest features and keep up to date with security patches.

Use the latest version of EcoStruxure Power Commission to update your product to the latest available version. It is also possible to perform a firmware update using the embedded webpages.

All firmware designed for the EcoStruxure Panel Server are signed using the Schneider Electric public key infrastructure to help to provide integrity and authenticity of the firmware running on the EcoStruxure Panel Server.

For more information about EcoStruxure Panel Server firmware versions, refer to DOCA0178EN *EcoStruxure Panel Server - Firmware Release Notes*

Availability

This function is available on Panel Server Universal.

Checking the Firmware Version

The currently running EcoStruxure Panel Server firmware version can be checked:

- With EcoStruxure Power Commission software
- On the EcoStruxure Panel Server webpages at **Maintenance > Firmware Update**

The following information is available:

- Currently running EcoStruxure Panel Server firmware version
- Last security patch. It is the lowest firmware revision that the EcoStruxure Panel Server can be downgraded to, without removing currently installed security patches.

Firmware Compatibility

You can find the device firmware baseline for all communicating devices in the switchboard in order to check compatibility of firmware versions in the **Information** menu of EcoStruxure Power Commission software.

Updating the Firmware

To update EcoStruxure Panel Server firmware, use one of the following:

- EcoStruxure Power Commission software (recommended)
- EcoStruxure Panel Server webpages

Updating Firmware With EcoStruxure Power Commission Software

The prerequisites for updating the firmware with EcoStruxure Power Commission software are the following:

- The latest version of EcoStruxure Power Commission software must be downloaded and installed on the PC.

- The PC must be connected to a power supply. Standby mode must be deactivated to avoid the possibility of interruption during the update.

- The PC must be connected to the EcoStruxure Panel Server.

At the end of the firmware update process, the EcoStruxure Panel Server needs to be rebooted. After the reboot, check that the firmware version is the latest to make sure that the update is effective. If the firmware version is still the old one, perform the firmware update again. If the problem persists, contact your Schneider Electric customer support.

For more information, see *EcoStruxure Power Commission Online Help*.

EcoStruxure Power Commission software is available at www.se.com.

Updating Firmware With the EcoStruxure Panel Server Webpages

To update the firmware with the EcoStruxure Panel Server webpages, proceed as follows:

1. Make sure that the EcoStruxure Panel Server is continuously powered during the firmware update.

2. From www.se.com, download the latest version of EcoStruxure Panel Server firmware on your PC.

3. From the EcoStruxure Panel Server webpages, select **Maintenance > Firmware Revision > Firmware Update**.

4. Import the firmware file and follow the instructions.

5. Reboot the EcoStruxure Panel Server to update the firmware.

   NOTE: The EcoStruxure Panel Server webpages cannot be accessed while the EcoStruxure Panel Server is rebooting.

6. After the reboot, check that the firmware version is the latest to make sure that the update is effective.

   If the firmware version is still the old one, perform the firmware update again. If the problem persists, contact your Schneider Electric customer support.

User Management

Presentation

The single user **SecurityAdmin** has administrator rights such as reading and changing the product configuration, pairing or unpairing wireless devices, accessing system logs.

Availability

This function is available on Panel Server Universal.

Changing a Password

At first connection, it is required to set the password of the **SecurityAdmin** account. This action can be done as follows:

- With EcoStruxure Power Commission software
- On the home page of EcoStruxure Panel Server webpages

Password Requirements

A password must conform to the following rules:

- 6 to 32 characters
- At least one character in uppercase
- At least one character in lowercase

Password Lockout

In case of 10 invalid attempts to login to the EcoStruxure Panel Server, the user account is locked out.

When the user account is locked, the user must wait 10 minutes before being able to login again.

The user account is locked for 60 minutes each time there are 5 more invalid attempts.

User account lock state remains in case of reboot, including reboot after power loss.

Digital Inputs

Function available end 2021.

Presentation

The two digital inputs on the Panel Server Universal PAS600L are used to monitor the state of an external contact or as a pulse counter.

Availability

This function is available on Panel Server Universal PAS600L.

Digital Input Types

There are two types of digital inputs:

- Normal digital inputs, used to record the state of a normally open or normally closed external contact.

- Pulse digital inputs, used to count pulses delivered by a WAGES (Water, Air, Gaz, Electricity, Steam) metering device compliant with standard IEC 62053-21 (minimum pulse width of 30 ms).

Each digital input can be individually configured as either normal or pulse using EcoStruxure Power Commission software.

Pulse Digital Input Parameters

The pulse weight and pulse unit of each pulse input can be configured using EcoStruxure Power Commission software. A pulse counter is activated when the corresponding digital input is configured as a pulse input.

The pulse weight must be calculated according to the characteristics of the pulses delivered by the meter.
Examples:

- If each pulse delivered by an active energy meter corresponds to 10 KWh, and the pulse unit is set to Wh, the pulse weight must be set to 10,000 (Wh).

- If each pulse delivered by a volume meter corresponds to 125 liters, and the pulse unit is set to m^3, the pulse weight must be set to 0.125 m^3.

- If each pulse delivered by a volume meter corresponds to 1 gallon, and the pulse unit is set to m^3, the pulse weight must be set to 0.003785 m^3.

Diagnostics

Presentation

Diagnostics data provides statistical data about the EcoStruxure Panel Server and connected devices.

Availability

This function is available on Panel Server Universal.

Setting the Parameters

Diagnostics are set on the EcoStruxure Panel Server webpages, at **Maintenance**:

- Device diagnostics in **Devices Communication**:
- System diagnostics in **System Monitoring**,

EcoStruxure Panel Server Diagnostics

Parameter	Description
Modbus Serial Counter Information	Displays diagnostics counters for Modbus-SL protocol: • Received messages • Transmitted messages • Messages timeout • Protocol errors • Received exceptions • Cyclic Redundancy Check (CRC) errors
Modbus TCP Server Connection Information	Displays connection counters for Modbus TCP/IP protocol: • Active connection • Maximum active connection limit • Maximum active connection occurred • Connection counter
Modbus TCP Server Counter Information	Displays diagnostics counters for Modbus TCP/IP protocol: • Received messages • Transmitted messages • Protocol errors
Wireless Identification	Displays identification of IEEE 802.15.4 wireless network: • IEEE 802.15.4 address • Personal Area Network (PAN) identifier • Extended PAN identifier • Network address
Wireless Network Status	Displays status of the IEEE 802.15.4 wireless network • Network status • Optimization status

Modbus Devices Diagnostics

Parameter	Description
Modbus Information	Displays identification and diagnostics counters for Modbus devices: • Server identifier (1–247) • Frame transmitted counter • Frame received counter • CRC errors received counter • Timeout received counter • Exceptions received counter • Protocol errors counter
Internal Temperature[5]	Displays temperature records for Modbus devices: • Current temperature • Minimum current temperature experienced • Maximum current temperature experienced

Wireless Devices Diagnostics

Parameter	Description
Wireless Identification	Displays identification of the wireless network: • Address • PAN identifier • Extended PAN identifier[5] • Network address[5]
Modbus Identification	Displays Modbus identification: • Server identifier (1–247) (if virtualization of device is supported).
Connection Information	Displays connection information of the wireless devices: • Quality level • EcoStruxure Panel Server received signal strength indication • EcoStruxure Panel Server link quality indicator • EcoStruxure Panel Server packet error rate • Device received signal strength indication[5] • Device link quality indicator[5] • Device packet error rate[5] • Global link received signal strength indication • Global link link quality indicator • Global link packet error rate
Power Information[5]	Displays power information of the wireless devices: • Power source • Power source backup • Battery voltage • Battery percentage remaining
Internal Temperature[5]	Displays temperature records of the wireless devices: • Current temperature[5] • Minimum current temperature experienced • Maximum current temperature experienced

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5.   Depending on device.

System Monitoring Diagnostics

Parameter	Description
Health State	**Uptime** indicates time during which the EcoStruxure Panel Server is operational.
	Health State indicates the EcoStruxure Panel Server state: • **Nominal** • **Degraded**
Global Performance	Displays EcoStruxure Panel Server performances: • **CPU Usage** (in %) • **Memory Usage** (in %)

Cybersecurity Recommendations

What's in This Part

Security Capabilities

General Cybersecurity Recommendations

> ## ⚠ WARNING
>
> **POTENTIAL COMPROMISE OF SYSTEM AVAILABILITY, INTEGRITY, AND CONFIDENTIALITY**
>
> - Disable unused ports/services to help minimize pathways for malicious attackers.
> - Place networked devices behind multiple layers of cyber defenses (such as firewalls, network segmentation, and network intrusion detection and protection).
> - Use cybersecurity best practices (for example, least privilege, separation of duties) to help prevent unauthorized exposure, loss, modification of data and logs, or interruption of services.
>
> **Failure to follow these instructions can result in death, serious injury, or equipment damage.**

For detailed information about cybersecurity for the EcoStruxure Panel Server, see DOCA0211EN *EcoStruxure Panel Server - Cybersecurity Guide*. For a general introduction to cybersecurity threats and how to address them, see How Can I Reduce Vulnerability to Cyber Attacks?.

For more information about cybersecurity, visit Schneider Electric Cybersecurity Support Portal.

Security Features

Security features have been built into the EcoStruxure Panel Server to help the device to operate correctly and behave according to its intended purpose.

The key features are:

- Authentication when accessing to the product resources from EcoStruxure Power Commission software or from the webpages
- Secure communications between the EcoStruxure Panel Server and its associated wireless devices (supporting confidentiality and integrity)
- Configurable security services and settings
- Firmware update mechanism

These features provide security capabilities which help to protect the product from potential security threat, that could disrupt the product operation (availability), modify information (integrity) or disclose confidential information (confidentiality).

The security capabilities features are intended to mitigate the inherent threats which are linked with the use of the EcoStruxure Panel Server in an Operational Technology environment.

However, the effectiveness of these capabilities depends on the adoption and application of the following recommendations:

- Recommendations provided in this chapter to cover the commissioning, operation, maintenance, and decommissioning of the EcoStruxure Panel Server
- Recommended Cybersecurity Best Practices

Potential Risks and Compensation Controls

Area	Issue	Risk	Compensating controls
Unsecure protocols	Modbus and some IT protocols (NTP, DHCP, DNS, and DPWS) are unsecure. The device does not have the capability to transmit data encrypted using these protocols.	If a malicious user gained access to your network, they could intercept communications.	If transmitting data over an internal network, physically or logically segment the network. If transmitting data over an external network, encrypt protocol transmissions over all external connections using a VPN or a similar solution.
Wireless radio communication	During the pairing window, unauthorized radio devices may try to join the network.	If a rogue device gained access to your network, they could eavesdrop on the communication of your wireless network, create an integrity data breach (for example, by sending fake data), or create a Denial of Service (DoS).	Reduce commissioning window to limit exposure. Once the pairing is performed, consult the list of paired devices in EcoStruxure Panel Server configuration using EcoStruxure Power Commission software and make sure that the list of devices contains no unexpected or rogue devices.

Security Recommendations for Commissioning

Configuration of Security Services

Most EcoStruxure Panel Server services are disabled by default to reduce the attack surface and exposure to a minimum. Consequently, it is recommended to only enable the services that are strictly required for the EcoStruxure Panel Server operation.

Secure Communications with Wireless Devices

The control of wireless communications between the EcoStruxure Panel Server and wireless devices is enforced through a pairing mechanism. Only wireless devices that have been paired with the EcoStruxure Panel Server can join its wireless network.

In addition, the wireless communications are secured by cryptographic mechanisms supporting the integrity and confidentiality of data exchanged through the wireless network.

Once the pairing is performed, it is recommended to periodically verify the list of paired devices configured in the EcoStruxure Panel Server to make sure that the list of devices contains no unexpected or rogue devices.

Security Recommendations for Operation

Maintain the Firmware Up-to-date

Security updates and patches are published on a regular basis. Register to the Security Notifications service to be informed about security updates.

Secure Communication with Wireless Devices

It is recommended to periodically verify the list of paired devices configured in the EcoStruxure Panel Server to make sure that the list of devices are up-to-date and the list contains no unexpected or rogue devices.

Security Recommendations for Decommissioning

Decommissioning

The EcoStruxure Panel Server is configured with sensitive and confidential information, such as user account identifiers, IP addresses, Wi-Fi passwords, and cryptographic keys.

When disposing of the EcoStruxure Panel Server, it is required to reset it to factory settings to make sure that no sensitive or confidential information can be disclosed or reused.

Resetting to Factory Settings

When following the procedure below, all data that have been stored are erased.

NOTICE

HAZARD OF IP ADDRESS CONFLICT

Disconnect the EcoStruxure Panel Server from any Ethernet networks before resetting the IP settings to factory values.

Failure to follow these instructions can result in impaired communications.

To reset the EcoStruxure Panel Server completely, follow this procedure to set all configuration settings to factory values:

1. Unpair all wireless devices from the EcoStruxure Panel Server.

2. Power up the EcoStruxure Panel Server while pressing the Restart button for more than 10 seconds.
   Result: The status LED turns steady orange then blinks fast orange when the reset to factory setting is initiated.

3. Release the button once the status LED starts to blink fast orange.

4. Confirm or cancel reset to factory settings:

   - To confirm reset to factory settings:
     Press the button again within 5 seconds.
     Result: The status LED blinks fast green indicating that reset to factory setting is confirmed.

   - To cancel reset to factory settings:
     Wait until the status LED blinks fast red.

5. Wait for the EcoStruxure Panel Server to restart completely:

   a. The status LED turns steady orange while the EcoStruxure Panel Server is booting.

   b. The status LED turns steady green when the EcoStruxure Panel Server is in normal operation.

General Principle to Commission an EcoStruxure Panel Server

Overview

The commissioning of an EcoStruxure Panel Server can be performed using one of the following tools:

- EcoStruxure Power Commission (EPC) software, page 57 (recommended). See *EcoStruxure Power Commission Online Help*.

  Use the software for a system-focused, global approach to configure the EcoStruxure Panel Server and all the devices in the switchboard. In addition, the software advanced features allow you to:

  ◦ prepare a project off-line, to get quick and easy pairing of the wireless devices in the project.

  ◦ save a project (system configuration).

  ◦ create a new project from an existing one.

  ◦ generate a report with data collected during configuration testing and to retrieve the settings updated through the EcoStruxure Panel Server webpages.

  ◦ to export a project to a supervision software(for example, EcoStruxure Power Monitoring Expert).

- EcoStruxure Panel Server webpages, page 61.

  Use the webpages for a device-focused approach to modify some settings in the EcoStruxure Panel Server.

When commissioning the EcoStruxure Panel Server, update the firmware of the EcoStruxure Panel Server, page 43.

Pre-requisites to Commissioning

To commission the EcoStruxure Panel Server, connect it to Ethernet (see Ethernet connection, page 17).

Getting Started with EcoStruxure Power Commission Software

What's in This Part

Non-Selective Pairing of Wireless Devices

Presentation

Non-selective pairing of wireless devices is available on EcoStruxure Power Commission software: all wireless devices in the network and in pairing phase are discovered by the EcoStruxure Panel Server. The feature enables you to pair a large number of wireless devices at the same time.

Procedure

To commission the EcoStruxure Panel Server with EcoStruxure Power Commission software, proceed as follows:

1. Check that the wireless devices that are to be part of the EcoStruxure Panel Server project are powered on.

2. Connect the EcoStruxure Panel Server to the PC (see Ethernet connection, page 17).

3. Launch EcoStruxure Power Commission software.

4. In the EcoStruxure Panel Server home page, click the **CONNECT TO DEVICE** button.

   Result: When the EcoStruxure Panel Server is connected, the connection parameters (IP and EcoStruxure Panel Server address) display.

5. To add wireless devices, click the **Add Wireless Devices** card.

6. To automatically find all the wireless devices available within the range of the EcoStruxure Panel Server, click the **Automatic discovery** card. Wait until the wireless devices are discovered and display in the list of devices.

   NOTE: When the IEEE 802.15.4 network is established for the first time, the operation takes an extra 21-second time while communication is enabled and automatic channel selection is performed (see settings).

7. Locate a device in a switchboard by clicking the associated icon.

   Result: The **Locate Device** dialog box is displayed and the associated wireless device in the switchboard continuously blinks green.

8. Click **STOP BLINK** to stop blinking of the device once it is identified.

9. Click **CONFIRM** to proceed.

10. Configure the specific parameters for each wireless device.

11. Download EcoStruxure Panel Server pairing and filled information to EcoStruxure Panel Server by clicking the **WRITE TO PROJECT** button.

12. Confirm to proceed.

    Result: Message **Write to project successful** is displayed when finished.

13. In **COMMUNICATION VIEW**, click the EcoStruxure Panel Server in the communication diagram.

14. Save EcoStruxure Panel Server settings in the project by clicking the **APPLY TO SERVER** button.

    Result: Message **Write to project successful** is displayed when finished.

    NOTE:

    • In EcoStruxure Power Commission software, any gateway such as EcoStruxure Panel Server is defined as a Device.

    • By default, the Modbus TCP/IP protocol is enabled in the EcoStruxure Panel Server to offer the possibility of connecting with EcoStruxure Power Commission software. However, if there are any problems connecting to the software, check if the Modbus TCP/IP protocol is enabled using the webpages.

Selective Pairing of Wireless Devices

This feature will be available end 2021.

It will be possible to achieve a selective pairing by using EcoStruxure Power Commission software. You must define and upload a pairing list, and the EcoStruxure Panel Server will pair only the wireless devices belonging to this list. For more information, see *EcoStruxure Power Commission Online Help*.

Device Configuration with EcoStruxure Power Commission Software

It is possible to configure a wireless device or a Modbus-SL device by using EcoStruxure Power Commission software. For more information, see *EcoStruxure Power Commission Online Help*.

EcoStruxure Panel Server Webpages

What's in This Part

EcoStruxure Panel Server manages webpages in order to configure settings or monitor wireless devices, wired devices (through Modbus-SL or Modbus TCP/IP), and local digital inputs with the Panel Server Universal PAS600L.
The customer is responsible for the security of the networks and facilities into which the EcoStruxure Panel Server is deployed.

Access to EcoStruxure Panel Server Webpages

Recommended Web Browsers

The EcoStruxure Panel Server webpages are accessible from a PC with Windows operating system.

The following web browsers are recommended to access the EcoStruxure Panel Server webpages:

- Google Chrome v65.0 or higher
- Mozilla Firefox v59.0.2 or higher

The webpages are compatible with PCs running Windows 10.

Security Certificate

The EcoStruxure Panel Server has a self-signed security certificate. A security message appears on the web browser when connecting to the EcoStruxure Panel Server. Before accepting and continuing, check that communication with the EcoStruxure Panel Server has been established.

NOTE: If you are directly connected to the device as described in First Access Through PC, page 62, then you can continue through the web browser.

First Access Through PC

If you are accessing the webpages through a PC for the first time, proceed as follows:

1. Disconnect the PC from the local area network (LAN) and switch off Wi-Fi if any.

2. Connect an Ethernet cable from the PC to the EcoStruxure Panel Server (see Ethernet connection, page 17).

3. Click Network from the File Explorer on your PC. When the EcoStruxure Panel Server is discovered, it appears in the list of devices in the network.

4. Double-click the selected EcoStruxure Panel Server. The login page automatically opens in the web browser.

   NOTE: If the EcoStruxure Panel Server is not discovered by the PC, see Troubleshooting, page 101.

5. Change the default password (see Password Requirements, page 45).

6. Check the current EcoStruxure Panel Server firmware version by selecting **Maintenance > Firmware Update > Firmware Information > Current firmware version**.

7. Update the firmware if it is not in the latest version (see updating firmware with EcoStruxure Panel Server webpages, page 44).

NOTE: If you do not remember the IP configuration of your gateway or in case of duplicate IP detection, you may follow the procedure above to connect to the EcoStruxure Panel Server webpages to recover or update the network configuration.

EcoStruxure Panel Server User Interface Layout

Overview

The illustration shows the EcoStruxure Panel Server user interface layout.
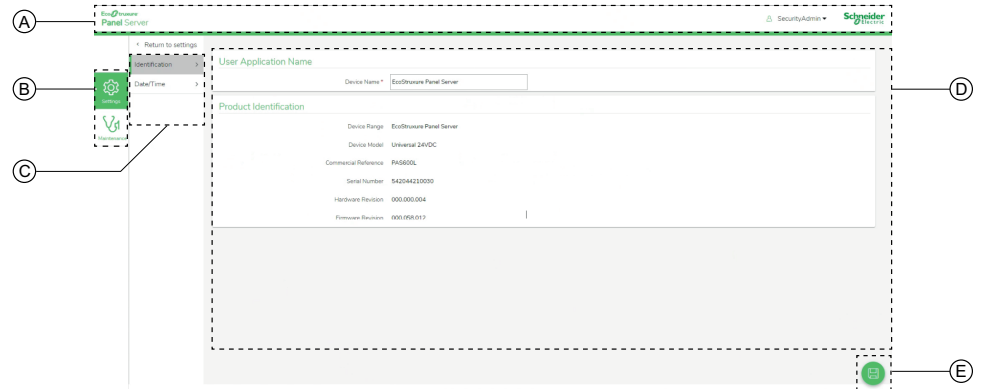
A. Header

B. Main menus

C. Sub menus

D. Display zone

E. Icons

Header

The header displays the following information at the top of every page.

A. User name

B. Drop-down list (language, change password, logout)

Header part	Description
User name	Name of the user who has logged in.
Language	Click to change the webpage language. The default language is **English (US)**.
Change Password	Click to change the user password (see password requirements, page 45).
Logout	Click to log out from the EcoStruxure Panel Server session. It is recommended to log out from the EcoStruxure Panel Server when it is not in use. You are logged out automatically after a certain time of inactivity.

Main Menus

The main menus are:

- **Settings**
- **Maintenance**

Cards and Sub-menus

The cards and sub-menus display the sub-levels available under the selected main menu.

Display Zone

The display zone shows the selected card or sub-menu in detail with all related fields.

Icons

The context-specific function icons displayed depend on the selected menu.

Icon	Actions
	Apply the changes in **Settings** pages. Can be used to update a consistent set of parameters through multiple webpages. • If a mandatory field is left blank, the field is highlighted in red. • If inappropriate characters are entered in a field, the field is highlighted in red.
	Save the changes in **Settings** pages.
	Cancel the modifications in **Settings** pages to return to the last saved settings.
	Open the contextual menu.
	Close the contextual menu

EcoStruxure Panel Server Webpage Description

Settings Menu

<table>
<tr><td align="center">NOTICE</td></tr>
<tr><td>IMPAIRED NETWORK PERFORMANCE

Only qualified personnel should modify the Ethernet and/or Modbus-SL settings. Perform such modifications only after you have read about and understood the Ethernet and/or Modbus-SL settings.

Failure to follow these instructions can result in equipment damage.</td></tr>
</table>

The webpage for the **Settings** menu displays the sub-menus for configuration and communication settings.

Settings main menu	Navigation menu webpage	Description
General	**Identification**	Information about the EcoStruxure Panel Server identification: • Device name • Device range • Device model • Commercial reference • Serial number • Hardware revision • Firmware revision
	Date & Time, page 41	Used to set the date and time manually or via NTP (Network Time Protocol).
Network Communication	**Ethernet**, page 32	Allows you to configure the EcoStruxure Panel Server Ethernet mode including ports and IP parameters (IPv4 and IPv6)
	DNS, page 28	Allows you to configure the DNS server.
	DPWS, page 31	Allows you to configure the IP network services.
	Proxy, page 29	Allows you to configure the Internet proxy settings.
Modbus Devices, page 37	**Modbus Configuration**	Allows you to define the Modbus-SL network.
	Modbus Discovery	Allows you to discover the Modbus-SL devices by using an allowed list.

Maintenance Menu

Webpage for the **Maintenance** menu displays the sub-menus for maintenance and diagnostic functions, based on diagnostic counters.

Maintenance main menu	Navigation menu webpage	Description
Devices Communication, page 47	Communication data about the Modbus and wireless devices in the network.	Allows you to check the communication status of the EcoStruxure Panel Server with downstream devices (Modbus-SL and wireless devices).

Maintenance main menu	Navigation menu webpage	Description
	Modbus Devices	Displays information and status about the selected device.
	Wireless Devices	
		Allows you to delete a previously paired or associated downstream device.
Firmware Update, page 44	–	Allows you to perform a local firmware update of the EcoStruxure Panel Server.
Restart	–	Allows you to restart the EcoStruxure Panel Server. **NOTE:** The EcoStruxure Panel Server webpages are disconnected and cannot be accessed while the EcoStruxure Panel Server is rebooting.
System Monitoring, page 49	–	Displays EcoStruxure Panel Server indicators.
Logs	–	Allows you to: • Change the log configuration level and download the logs in a .*zip* file. • Launch an auto-diagnostic and export result in a .*zip* file.
Remote Access	–	Allows you to provide the Schneider Electric Customer Care Center remote access to the EcoStruxure Panel Server and provide support.

Modbus Register Tables

What's in This Part

Overview

The following sections describe the Modbus registers of the EcoStruxure Panel Server and the Modbus registers of the wireless devices connected to it. These registers provide information that can be read, such as electrical measures and monitoring information.

The Modbus registers are presented in the tables as per the type of device as follows:

- EcoStruxure Panel Server Modbus registers (see detailed topic, page 72)

- EcoStruxure Panel Server system Modbus registers (see detailed topic, page 76)

    ◦ PowerTag Energy sensor Modbus registers (see detailed topic, page 78)

    ◦ Environmental sensor Modbus registers (see detailed topic, page 86)

    ◦ HeatTag sensor Modbus registers (available end 2021) (see detailed topic, page 87)

    ◦ PowerTag Control module Modbus registers (available begin 2022)

    ◦ Load monitoring Modbus registers (see detailed topic, page 89)

    ◦ Wireless devices Modbus registers (see detailed topic, page 93)

The compatible Modbus functions are described in Appendix, page 104.

Modbus Table Format and Data Types

Table Formats

Register tables have the following columns:

Address	Register	No.	RW	X	Unit	Type	Range	Default Value	Svd	Function Code	Applicable Devices	Description

Designation	Description
Address	16-bit register address in hexadecimal. The address is the data used in the Modbus frame.
Register	16-bit register number in decimal. Register = Address + 1
No	Number of 16-bit registers that need to be read/written to access the complete information
R/RW	Whether the register is read only (R) or read-write (RW).
X	Scale factor: • A scale of 1 means that the value of the register is the same as the value indicated. • A scale of 10 means that the register contains the value multiplied by 10. The actual value is therefore the value of the register divided by 10. • A scale of 0.1 means that the register contains the value multiplied by 0.1. The actual value is therefore the value of the register multiplied by 10.
Unit	Information unit of measurement: • "–": no unit corresponding to the value expressed. • "h": hours • "D": the unit depends on the connected device.
Type	Coding data type (see **Data type** table below).
Range	Range of permitted values for the variable, usually a subset of what the format allows. For BITMAP type data, the content of this domain is "–".
Default Value	Default value for the variable
Svd	Value saved when the power supply to the EcoStruxure Panel Server is switched off: • "Y": the value of the register is saved. • "N": the value is lost. **NOTE:** On start-up or reset, the available values are retrieved.
Function code	Code of functions that can be used in the register.
Applicable Devices	Code indicating the types of devices for which the register is available.
Description	Information about the register and the restrictions that apply.

Data Types

Name	Description	Range
INT16	16-bit signed integer (1 word)	-32768...+32767
UINT16	16-bit unsigned integer (1 word)	0...65535
INT32	32-bit signed integer (2 words)	-2 147 483 648...+2 147 483 647
UINT32	32-bit unsigned integer (2 words)	0...4 294 967 295
INT64	64-bit signed integer (4 words)	-9 223 372 036 854 775 808...9 223 372 036 854 775 807
UINT64	64-bit unsigned integer (4 words)	0 to 18 446 744 073 709 600 000
Float32	32-bit value (2 words)	-3.4028E+38... +3.4028E+38
ASCII	8-bit alphanumeric character	Table of ASCII Characters

Name	Description	Range
BITMAP	16-bit field (1 word)	–
DATETIME	See DATETIME, page 70	–

NOTE:

Float32 type data: Single precision float with sign bit, 8 bits exponent, 23 bits mantissa (positive and negative normalized real)

For ASCII type data, the order of transmission of characters in words (16-bit registers) is as follows:

- Character n as least significant
- Character n + 1 as most significant

All registers (16-bit or 2 bytes) are transmitted with Big Endian coding:

- The most significant byte is transmitted first.
- The least significant byte is transmitted second.

32-bit variables saved on two 16-bit words (for example, consumption meters) are in Big Endian format:

- The most significant word is transmitted first, then the least significant.

64-bit variables saved on four 16-bit words (for example, dates) are in Big Endian format:

- The most significant word is transmitted first, and so on.

DATETIME

DATETIME is a data type used to code date and time defined by the IEC 60870-5 standard.

Register	Type	Bit	Range	Description
1	INT16U	0–6	0x00–0x7F	Year: 0x00 (00) to 0x7F (127) correspond to years 2000 to 2127 For example, 0x0D (13) corresponds to year 2013.
		7–15	–	Reserved
2	INT16U	0–4	0x01–0x1F	Day
		5–7	–	Reserved
		8–11	0x00–0x0C	Month
		12–15	–	Reserved
3	INT16U	0–5	0x00–0x3B	Minutes
		6–7	–	Reserved
		8–12	0x00–0x17	Hours
		13–15	–	Reserved
4	INT16U	0–15	0x0000–0xEA5F	Milliseconds

Direct Bit Addressing

Addressing is permitted for BITMAP type zones with functions 1, 2, 5, and 15.

The address of the first bit is constructed as follows: (register address x 16) + bit number.

This addressing mode is specific to Schneider Electric.

Example: For functions 1, 2, 5, and 15, bit 3 of register 0x0078 should be addressed; the bit address is therefore 0x0783.

> **NOTE:** The register whose bit needs to be addressed should have an address ≤ 0x0FFF.

Example of Modbus Frames

Request

Definition	Number of Bytes	Value	Comment
Server number	1 byte	0x05	EcoStruxure Panel Server Modbus Address
Function code	1 byte	0x03	Reads n output or internal words
Address	2 bytes	0x36E2	Address of a consumption meter whose address is 14050 in decimal notation.
Number of words	2 bytes	0x002C	Reads 44 16-bit registers.
CRC	2 bytes	xxxx	Value of CRC16

Response

Definition	Number of Bytes	Value	Comment
Server number	1 byte	0x05	EcoStruxure Panel Server Modbus Address
Function code	1 byte	0x03	Reads n output or internal words
Number of Bytes	2 bytes	0x0058	Number of bytes read
Value of words read	88 bytes	–	Reads 44 16-bit registers
CRC	2 bytes	xxxx	Value of CRC16

Modbus Register

The address of register number n is n-1. The tables detailed in the following parts of this document provide both register numbers (in decimal format) and corresponding addresses (in hexadecimal format). For example, the address of register number 3000 is 0x0BB7 (2999).

> **NOTE:** To know the description of the registers of each associated device (how to use them), print the PDF report of Modbus registers using EcoStruxure Power Commission software (refer to *EcoStruxure Power Commission Online Help*). This report gives a dynamic knowledge of all the registers potentially to be integrated into the supervision systems including a description of each register.

EcoStruxure Panel Server Modbus Registers

Identification

The Modbus server address of EcoStruxure Panel Server to read Identification Modbus registers is 255 by default.

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Description
0x0050	81	6	R	–	–	ASCII	–	NA	Y	03, 100–4[6]	EcoStruxure Panel Server hardware version on 11 ASCII characters, valid for firmware version 001.008.007 and later. **Example:** 000.000.001
0x0064	101	6	R	–	–	ASCII	–	NA	Y	03, 100–4[6]	Serial number on 12 ASCII characters; 11 alphanumeric digits maximum [SN] or [S/N]: PP YY WW [D [nnnn]] • PP: Plant • YY: Year in decimal notation [05...99] • WW: Week in decimal notation [1...53] • D: Day of the week in decimal notation [1...7] • nnnn: Sequence of numbers [0001...10.00-0–1]
0x0078	121	6	R	–	–	ASCII	–	NA	N	03, 100–4[6]	EcoStruxure Panel Server firmware version on 11 ASCII characters, valid for firmware version 001.008.007 and later. **Example:** 001.008.007
0x1605	5638	32	R	–	–	ASCII	–	0xFFFF	Y	03, 100–4[6]	EcoStruxure Panel Server user application name
0xF002	61443	1	R	–	–	UINT16	–	0xFFFF	Y	03, 100–4[6]	EcoStruxure Panel Server product identifier
0xF003	61444	16	R	–	–	ASCII	–	–	Y	03, 100–4[6]	EcoStruxure Panel Server product model

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6.   Available end 2021.

Health State

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Description
0x009E	159	1	R	–	–	UINT16	–	0xFFFF	N	03, 100–4[7]	Health state of EcoStruxure Panel Server • 0 = Nominal • 1 = Degraded • 2 = Out of order

Date and Time

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Description
0x0073	116	4	R	–	–	DATE-TIME	[1]	NA	N	03	Indicates the year, month, day, hour, minute and millisecond on EcoStruxure Panel Server
(1) Refer to DATETIME, page 70.											

Local Digital Inputs

DI1 and DI2 are the digital inputs 1 and 2 of the Panel Server Universal PAS600L.

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Description
0x03E8	1001	1	R	–	–	UINT16	–	0xFFFF	N	03 100–4[7]	DI1 validity If a device is connected on DI1, a valid value is returned (= 1). Otherwise an invalid value is returned.
0x03E9	1002	1	R	–	–	UINT16	–	0xFFFF	N	03 100–4[7]	DI2 validity If a device is connected on DI2, a valid value is returned (= 1). Otherwise an invalid value is returned.
0x03EA	1003	1	R	–	–	UINT16	–	0xFFFF	N	03 100–4[7]	DI1 input mode • 0 = Pulse • 1 = Status
0x03EB	1003	1	R	–	–	UINT16	–	0xFFFF	N	03 100–4[7]	DI2 input mode • 0 = Pulse • 1 = Status
0x03EC	1004	20	R	–	–	ASCII	–	–	N	03 100–4[7]	User application name of the device connected on DI1
0x0401	1025	20	R	–	–	ASCII	–	–	N	03 100–4[7]	User application name of the device connected on DI2
0x0414	1045	3	R	–	–	ASCII	–	–	N	03 100–4[7]	Electrical label of the device connected on DI1

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7.   Available end 2021.

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Description
0x0417	1048	3	R	–	–	ASCII	–	–	N	03 100–4[8]	Electrical label of the device connected on DI2
0x041A	1051	1	R	–	–	UINT16	–	0xFFFF	N	03 100–4[8]	Usage of the device connected to DI1
0x041B	1052	1	R	–	–	UINT16	–	0xFFFF	N	03 100–4[8]	Usage of the device connected to DI2
0x041C	1053	1	R	–	–	UINT16	–	0xFFFF	N	03 100–4[8]	DI1 status value if DI1 mode is set to 'Status'
0x041D	1054	1	R	–	–	UINT16	–	0xFFFF	N	03 100–4[8]	DI2 status value if DI2 mode is set to 'Status'
0x041E	1055	2	R	–	–	UINT32	–	0xFFFF-FFFF	N	03 100–4[8]	Non resettable DI1 operating time[8]
0x0421	1057	2	R	–	–	UINT32	–	0xFFFF-FFFF	N	03 100–4[8]	Non resettable DI2 operating time[8]
0x0423	1059	2	RW	–	–	UINT32	–	0xFFFF-FFFF	N	03 100–4[8]	Resettable DI1 operating time[8]
0x0425	1061	2	RW	–	–	UINT32	–	0xFFFF-FFFF	N	03 100–4[8]	Resettable DI2 operating time[8]
0x0427	1063	4	R	–	–	DATE	–	0xFFFF-FFFF	N	03 100–4[8]	DI1 last reset operating time date[8]
0x042A	1067	4	R	–	–	DATE	–	0xFFFF-FFFF	N	03 100–4[8]	DI2 last reset operating time date[8]
0x042E	1071	2	R	–	–	UINT32	–	0xFFFF-FFFF	N	03 100–4[8]	Non resettable DI1 operation counter[8]
0x0430	1073	2	R	–	–	UINT32	–	0xFFFF-FFFF	N	03 100–4[8]	Non resettable DI2 operation counter[8]
0x0432	1075	2	RW	–	–	UINT32	–	0xFFFF-FFFF	N	03 100–4[8]	Resettable DI1 operation counter[8]
0x0434	1077	2	RW	–	–	UINT32	–	0xFFFF-FFFF	N	03 100–4[8]	Resettable DI2 operation counter[8]
0x0436	1079	4	R	–	–	DATE	–	0xFFFF-FFFFF-FFFFF-FF	N	03 100–4[8]	DI1 last reset operation counter date[8]
0x043A	1083	4	R	–	–	DATE	–	0xFFFF-FFFFF-FFFFF-FF	N	03 100–4[8]	DI2 last reset operation counter date[8]
0x043E	1087	2	R	–	–	FLOAT32	–	0xFF-C00000	N	03 100–4[8]	Pulse weight of device connected on DI1 if DI1 mode is set to 'Pulse'
0x0440	1089	2	R	–	–	FLOAT32	–	0xFF-C00000	N	03 100–4[8]	Pulse weight of device connected on DI2 if DI2 mode is set to 'Pulse'
0x0442	1091	4	R	–	–	INT64	–	0x8000-000000-000000	N	03 100–4[8]	Offset applied on DI1 is DI1 mode if set to 'Pulse'

8.   Available end 2021.

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Description
0x0446	1095	4	R	–	–	INT64	–	0x8000-000000-000000	N	03 100–4[9]	Offset applied on DI2 is DI2 mode if set to 'Pulse'
0x044A	1099	2	R	–	–	INT32U	–	0xFFFF-FFFF	N	03 100–4[9]	Non-resettable pulse counter on DI1 if DI1 mode is set to 'Pulse'
0x044C	1101	2	R	–	–	INT32U	–	0xFFFF-FFFF	N	03 100–4[9]	Non-resettable pulse counter on DI2 if DI2 mode is set to 'Pulse'
0x044E	1103	2	RW	–	–	INT32U	–	0xFFFF-FFFF	N	03 100–4[9]	Resettable DI1 pulse count[9]
0x0450	1105	2	RW	–	–	INT32U	–	0xFFFF-FFFF	N	03 100–4[9]	Resettable DI2 pulse count[9]
0x0452	1107	4	R	–	–	DATE	–	0xFFFF-FFFFF-FFFFF-FF	N	03 100–4[9]	Date of last reset pulse counter for DI1[9]
0x0456	1111	4	R	–	–	DATE	–	0xFFFF-FFFFF-FFFFF-FF	N	03 100–4[9]	Date of last reset pulse counter for DI2[9]
0x045A	1115	4	R	–	–	INT64	–	0x8000-000000-000000	N	03 100–4[9]	Metering accumulated value on DI1 if DI1 mode is set to 'Pulse'
0x045E	1119	4	R	–	–	INT64	–	0x8000-000000-000000	N	03 100–4[9]	Metering accumulated value on DI2 if DI2 mode is set to 'Pulse'
0x0463	1123	12	–	–	–	–	–	–	–	–	Reserved
0x048C	1165	2	R	–	–	FLOAT32	–	0xFF-C00000	N	03 100–4[9]	Measured flow unit on DI1 if DI1 mode is set to 'Pulse'
0x048E	1167	2	R	–	–	FLOAT32	–	0xFF-C00000	N	03 100–4[9]	Measured flow unit on DI2 if DI2 mode is set to 'Pulse'
0x0490	1169	42	–	–	–	–	–	–	–	–	Reserved

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9. Available end 2021.

EcoStruxure Panel Server System Modbus Registers

What's in This Chapter

Description

The EcoStruxure Panel Server assigns a Modbus address to each of the wireless devices paired with it. The Modbus address of the wireless devices is allocated automatically by the EcoStruxure Panel Server by selecting the first address available from address 100.

The Modbus address of a wireless device can be edited with EcoStruxure Power Commission software with the parameters of the wireless device and updated with a value range from 1 to 247.

The following section lists the Modbus registers that apply to the wireless paired devices.

To read a value from a particular wireless device, the supervision system uses the Modbus address of the device.

PowerTag Energy Sensor Modbus Registers

Applicable Devices

The code in the Applicable Devices column indicates the types of PowerTag Energy sensors for which the register is available:

- A: PowerTag Energy ●63 (A9MEM152●, A9MEM154●, A9MEM156●, A9MEM157●)
- M: PowerTag Energy M250/M630 (LV43402●)
- R: PowerTag Energy F160 (A9MEM1580) and Rope (A9MEM159●)
- C: Acti9 Active iC40 and iC60 (A9TAA●●●●, A9TAB●●●●, A9TDEC●●●, A9TDFC●●●, A9TDFD●●●, A9TPDD●●●, A9TPED●●●, A9TYAE●●●, A9TYBE●●●)

Current Metering Data

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices	Description
0x0BB7	3000	2	R	–	A	Float32	–	0xFF-C00000	N	03, 100–4[10]	A/M/R/C	RMS current on phase A
0x0BB9	3002	2	R	–	A	Float32	–	0xFF-C00000	N	03, 100–4[10]	A/M/R/C	RMS current on phase B
0x0BBB	3004	2	R	–	A	Float32	–	0xFF-C00000	N	03, 100–4[10]	A/M/R/C	RMS current on phase C
0x0BBD	3006	2	R	–	A	Float32	–	0xFF-C00000	N	03, 100–4[10]	R	RMS current on Neutral

Voltage Metering Data

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices	Description
0x0BCB	3020	2	R	–	V	Float32	–	0xFF-C00000	N	03, 100–4[10]	A/M/R	RMS phase-to-phase voltage A-B
0x0BCD	3022	2	R	–	V	Float32	–	0xFF-C00000	N	03, 100–4[10]	A/M/R	RMS phase-to-phase voltage B-C
0x0BCF	3024	2	R	–	V	Float32	–	0xFF-C00000	N	03, 100–4[10]	A/M/R	RMS phase-to-phase voltage C-A
0x0BD1	3026	2	–	–	–	–	–	–	–	–	–	Reserved
0x0BD3	3028	2	R	–	V	Float32	–	0xFF-C00000	N	03, 100–4[10]	A/M/R/C	RMS phase-to-neutral voltage A-N
0x0BD5	3030	2	R	–	V	Float32	–	0xFF-C00000	N	03, 100–4[10]	A/M/R/C	RMS phase-to-neutral voltage B-N
0x0BD7	3032	2	R	–	V	Float32	–	0xFF-C00000	N	03, 100–4[10]	A/M/R/C	RMS phase-to-neutral voltage C-N

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10. Available end 2021.

Power Metering Data

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices	Description
0x0BED	3054	2	R	–	W	Float32	–	0xFF-C00000	N	03, 100–4[11]	A/M/R/C	Active power on phase A
0x0BEF	3056	2	R	–	W	Float32	–	0xFF-C00000	N	03, 100–4[11]	A/M/R/C	Active power on phase B
0x0BF1	3058	2	R	–	W	Float32	–	0xFF-C00000	N	03, 100–4[11]	A/M/R/C	Active power on phase C
0x0BF3	3060	2	R	–	W	Float32	–	0xFF-C00000	N	03, 100–4[11]	A/M/R/C	Total active power
0x0BF5	3062	2	R	–	VAR	Float32	–	0xFF-C00000	N	03, 100–4[11]	R	Reactive power on phase A
0x0BF7	3064	2	R	–	VAR	Float32	–	0xFF-C00000	N	03, 100–4[11]	R	Reactive power on phase B
0x0BF9	3066	2	R	–	VAR	Float32	–	0xFF-C00000	N	03, 100–4[11]	R	Reactive power on phase C
0x0BFB	3068	2	R	–	Var	Float32	–	0xFF-C00000	N	03, 100–4[11]	M/R/C	Total reactive power
0x0BFD	3070	2	R	–	VA	Float32	–	0xFF-C00000	N	03, 100–4[11]	R	Apparent power on phase A
0x0BFF	3072	2	R	–	VA	Float32	–	0xFF-C00000	N	03, 100–4[11]	R	Apparent power on phase B
0x0C01	3074	2	R	–	VA	Float32	–	0xFF-C00000	N	03, 100–4[11]	R	Apparent power on phase C
0x0C03	3076	2	R	–	VA	Float32	–	0xFF-C00000	N	03, 100–4[11]	A/M/R/C	Total apparent power (arithmetic)

Power Factor Metering Data

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices	Description
0x0C05	3078	2	R	–	–	Float32	–	0xFF-C00000	N	03, 100–4[11]	R	Power factor on phase A
0x0C07	3080	2	R	–	–	Float32	–	0xFF-C00000	N	03, 100–4[11]	R	Power factor on phase B
0x0C09	3082	2	R	–	–	Float32	–	0xFF-C00000	N	03, 100–4[11]	R	Power factor on phase C
0x0C0B	3084	2	R	–	–	Float32	–	0xFF-C00000	N	03, 100–4[11]	A/M/R/C	Total power factor
0x0C0D	3086	1	R	–	–	UINT16	–	0xFFFF	N	03, 100–4[11]	R/C	Power factor sign convention • 0 = IEC • 1 = IEEE

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11. Available end 2021.

Frequency Metering Data

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices	Description
0x0C25	3110	2	R	–	Hz	Float32	–	0xFF-C0000-0	N	03, 100–4[12]	M/R	AC frequency

Device Temperature Metering Data

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Func-tion Code	Applicable Devices	Description
0x0C3B	3131	2	R	–	°C	Float32	–	0xFF-C0000-0	N	03, 100–4[12]	M/R	Device internal temperature

Energy Data - Legacy Zone

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices	Description
0x0C83	3204	4	R	–	Wh	INT64	–	0x800-00000-00000-000	Y	03	A	Total active energy delivered + received (not resettable)
0x0C87	3208	4	R	–	Wh	INT64	–	0x800-00000-00000-000	Y	03	M/R	Total active energy delivered count positively (not resettable)
0x0C8B	3212	4	R	–	Wh	INT64	–	0x800-00000-00000-000	Y	03	M/R	Total active energy received (not resettable)
0x0C8F	3216	4	R	–	Wh	INT64	–	0x800-00000-00000-000	Y	03	M	Active energy on phase A delivered – received (not resettable)
0x0C93	3220	4	R	–	Wh	INT64	–	0x800-00000-00000-000	Y	03	M	Active energy on phase B delivered – received (not resettable)
0x0C97	3224	4	R	–	Wh	INT64	–	0x800-00000-00000-000	Y	03	M	Active energy on phase C delivered – received (not resettable)
0x0C9A	3227	28	–	–	–	–	–	–	–	–	–	Reserved
0x0CB7	3256	4	R	–	Wh	INT64	–	0x800-00000-00000-000	Y	03	A	Partial active energy delivered + received (resettable)
0x0CBB	3260	4	RW	–	Wh	INT64	–	0x800-00000-00000-000	Y	03, 16	M	Set partial active energy counter. The value returns

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12. Available end 2021.

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices	Description
												to zero byEcoStruxure Panel Server.
0x0CBF	3264	4	R	−	Wh	INT64	−	0x800-00000-00000-000	Y	03	M/R	Partial active energy delivered (resettable)
0x0CC3	3268	4	RW	−	Wh	INT64	−	0x800-00000-00000-000	N	03, 16	M/R	Set partial active energy delivered counter. The value returns to zero by EcoStruxure Panel Server.
0x0CC7	3272	4	R	−	Wh	INT64	−	0x800-00000-00000-000	N	03	M/R	Partial active energy received (resettable)
0x0CCB	3276	4	RW	−	Wh	INT64	−	0x800-00000-00000-000	N	03, 16	M/R	Set partial active energy received counter. The value returns to zero by EcoStruxure Panel Server.
0x0CCF	3280	4	R	−	VARh	INT64	−	0x800-00000-00000-000	Y	03	M/R	Partial reactive energy delivered (resettable)
0x0CD3	3284	4	RW	−	VARh	INT64	−	0x800-00000-00000-000	N	03, 16	M/R	Set partial reactive energy delivered counter. The value returns to zero by EcoStruxure Panel Server.
0x0CD7	3288	4	R	−	VARh	INT64	−	0x800-00000-00000-000	N	03	M/R	Partial reactive energy received (resettable)
0x0CDB	3292	4	RW	−	VARh	INT64	−	0x800-00000-00000-000	N	03, 16	M/R	Set partial reactive energy received counter. The value returns to zero by EcoStruxure Panel Server.

Energy Data – New Zone

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices	Description
0x1391	5009	4	RW	–	Wh	INT64	–	0x800-00000-00000-000	Y	03, 16	R	Active energy delivered (resettable)
0x1394	5013	4	R	–	Wh	INT64	–	0x800-00000-00000-000	Y	03	R	Active energy delivered count positively (not resettable)
0x1398	5017	4	RW	–	Wh	INT64	–	0x800-00000-00000-000	Y	03, 16	R	Active energy received (resettable)
0x139C	5021	4	R	–	Wh	INT64	–	0x800-00000-00000-000	Y	03	R	Active energy received count negatively (not resettable)
0x13A0	5025	24	–	–	–	–	–	–	–	–	–	Reserved
0x13B8	5049	4	RW	–	Wh	INT64	–	0x800-00000-00000-000	Y	03, 16	R	Active energy on phase A delivered (resettable)
0x13BC	5053	4	R	–	Wh	INT64	–	0x800-00000-00000-000	Y	03	R	Active energy on phase A delivered (not resettable)
0x13C0	5057	4	RW	–	Wh	INT64	–	0x800-00000-00000-000	Y	03, 16	R	Active energy on phase A received (resettable)
0x13C4	5061	4	R	–	Wh	INT64	–	0x800-00000-00000-000	Y	03	R	Active energy on phase A received (not resettable)
0x13C8	5065	12	–	–	–	–	–	–	–	–	–	Reserved
0x13D4	5077	4	R	–	Wh	INT64	–	0x800-00000-00000-000	Y	03	R	Active energy on phase A delivered + received (not resettable)
0x13D8	5081	8	–	–	–	–	–	–	–	–	–	Reserved
0x13E0	5089	4	RW	–	Wh	INT64	–	0x800-00000-00000-000	Y	03, 16	R	Active energy on phase B delivered (resettable)
0x13E4	5093	4	R	–	Wh	INT64	–	0x800-00000-00000-000	Y	03	R	Active energy on phase B delivered (not resettable)
0x13E8	5097	4	RW	–	Wh	INT64	–	0x800-	Y	03, 16	R	Active energy on phase B

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices	Description
								00000-00000-000				received (resettable)
0x13EC	5101	4	R	−	Wh	INT64	−	0x800-00000-00000-000	Y	03	R	Active energy on phase B received (not resettable)
0x13F0	5105	24	−	−	−	−	−	−	−	−	−	Reserved
0x1408	5129	4	RW	−	Wh	INT64	−	0x800-00000-00000-000	Y	03, 16	R	Active energy on phase C delivered (resettable)
0x140C	5133	4	R	−	Wh	INT64	−	0x800-00000-00000-000	Y	03	R	Active energy on phase C delivered (not resettable)
0x1410	5137	4	RW	−	Wh	INT64	−	0x800-00000-00000-000	Y	03, 16	R	Active energy on phase C received (resettable)
0x1414	5141	4	R	−	Wh	INT64	−	0x800-00000-00000-000	Y	03	R	Active energy on phase C received (not resettable)
0x1418	5145	32	−	−	−	−	−	−	−	−	−	Reserved
0x1438	5177	4	RW	−	VARh	INT64	−	0x800-00000-00000-000	Y	03, 16	R	Reactive energy delivered (resettable)
0x143C	5181	4	R	−	VARh	INT64	−	0x800-00000-00000-000	Y	03	R	Reactive energy delivered count positively (not resettable)
0x1440	5185	8	−	−	−	−	−	−	−	−	−	Reserved
0x1488	5193	4	RW	−	VARh	INT64	−	0x800-00000-00000-000	Y	03, 16	R	Reactive energy received (resettable)
0x144C	5197	4	R	−	VARh	INT64	−	0x800-00000-00000-000	Y	03	R	Reactive energy received count negatively (not resettable)
0x1450	5201	32	−	−	−	−	−	−	−	−	−	Reserved
0x1470	5233	4	RW	−	VARh	INT64	−	0x800-00000-00000-000	Y	03, 16	R	Reactive energy on phase A delivered (resettable)
0x1474	5237	4	R	−	VARh	INT64	−	0x800-00000-00000-000	Y	03	R	Reactive energy on phase A delivered (not resettable)

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices	Description
0x1478	5241	4	RW	–	VARh	INT64	–	0x800-00000-00000-000	Y	03, 16	R	Reactive energy on phase A received (resettable)
0x147C	5245	4	R	–	VARh	INT64	–	0x800-00000-00000-000	Y	03	R	Reactive energy on phase A received (not resettable)
0x1480	5249	24	–	–	–	–	–	–	–	–	–	Reserved
0x1498	5273	4	RW	–	VARh	INT64	–	0x800-00000-00000-000	Y	03, 16	R	Reactive energy on phase B delivered (resettable)
0x149C	5277	4	R	–	VARh	INT64	–	0x800-00000-00000-000	Y	03	R	Reactive energy on phase B delivered (not resettable)
0x14A0	5281	4	RW	–	VARh	INT64	–	0x800-00000-00000-000	Y	03, 16	R	Reactive energy on phase B received (resettable)
0x14A4	5285	4	R	–	VARh	INT64	–	0x800-00000-00000-000	Y	03	R	Reactive energy on phase B received (not resettable)
0x14A8	5289	24	–	–	–	–	–	–	–	–	–	Reserved
0x14C0	5313	4	RW	–	VARh	INT64	–	0x800-00000-00000-000	Y	03, 16	R	Reactive energy on phase C delivered (resettable)
0x14C4	5317	4	R	–	VARh	INT64	–	0x800-00000-00000-000	Y	03	R	Reactive energy on phase C delivered (not resettable)
0x14C8	5321	4	RW	–	VARh	INT64	–	0x800-00000-00000-000	Y	03, 16	R	Reactive energy on phase C received (resettable)
0x14CC	5325	4	R	–	VARh	INT64	–	0x800-00000-00000-000	Y	03	R	Reactive energy on phase C received (not resettable)
0x14D0	5329	36	–	–	–	–	–	–	–	–	–	Reserved
0x14F4	5365	4	RW	–	VAh	INT64	–	0x800-00000-00000-000	Y	03, 16	R	Apparent energy delivered + received (resettable)
0x14F8	5369	4	R	–	VAh	INT64	–	0x800-00000-00000-000	Y	03	R	Apparent energy delivered + received (not resettable)
0x14FC	5373	16	–	–	–	–	–	–	–	–	–	Reserved

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices	Description
0x150C	5389	4	RW	–	VAh	INT64	–	0x800-00000-00000-000	Y	03, 16	R	Apparent energy on phase A (resettable)
0x1510	5393	4	R	–	VAh	INT64	–	0x800-00000-00000-000	Y	03	R	Apparent energy on phase A (not resettable)
0x1514	5397	32	–	–	–	–	–	–	–	–	–	Reserved
0x1534	5429	4	RW	–	VAh	INT64	–	0x800-00000-00000-000	Y	03, 16	R	Apparent energy on phase B (resettable)
0x1538	5433	4	R	–	VAh	INT64	–	0x800-00000-00000-000	Y	03	R	Apparent energy on phase B (not resettable)
0x153C	5437	32	–	–	–	–	–	–	–	–	–	Reserved
0x155C	5469	4	RW	–	VAh	INT64	–	0x800-00000-00000-000	Y	03, 16	R	Apparent energy on phase C (resettable)
0x1560	5473	4	R	–	VAh	INT64	–	0x800-00000-00000-000	Y	03	R	Apparent energy on phase C (not resettable)

Environmental Sensor Modbus Registers

Applicable Devices

The code in the Applicable Devices column indicates the types of environmental sensors for which the register is available:

- CL: CL110 (Contact your Schneider Electric representative for information about commercial references.)
- TH: TH110 (Contact your Schneider Electric representative for information about commercial references.)
- TR: TRH (SED-TRH-G-5045)
- TRC: TRHC02 (SED-CO2-G-5045)

Diagnostic Data

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices	Description
0x0CF3	3316	2	R	–	°C	Float32	–	0xFF-C00000	N	03	CL/TR/TRC	Battery Voltage

Ambient Data

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices	Description
0x0FA0	4001	2	R	–	°C	Float32	–	0xFF-C00000	N	03	CL/TH/TR/TRC	Temperature value
0x0FA2	4003	2	R	–	°C	Float32	–	0xFF-C00000	N	03	CL/TH/TR/TRC	Maximum value that the device is able to read.
0x0FA4	4005	2	R	–	°C	Float32	–	0xFF-C00000	N	03	CL/TH/TR/TRC	Minimum value that the device is able to read.
0x0FA6	4007	2	R	–	NA	Float32	–	0xFF-C00000	N	03	CL/TR/TRC	Relative humidity value
0x0FA8	4009	2	R	–	NA	Float32	–	0xFF-C00000	N	03	CL/TR/TRC	Maximum value that the device is able to read.
0x0FAA	4011	2	R	–	NA	Float32	–	0xFF-C00000	N	03	CL/TR/TRC	Minimum value that the device is able to read.

HeatTag Sensor Modbus Registers

The following table provide the registers that are available for HeatTag sensor (SMT10020) (available end 2021).

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Description
0x0C3C	3132	2	R	NA	°C	Float32	NA	0xFF-C00000	N	03, 100-4[13]	Internal temperature
0x0CE2	3298	2	R	NA	NA	UINT32	NA	0x0000-0000	N	03, 100-4[13]	Validity of the alarm bitmap (register 3300) • 0 = Invalid • 1 = Valid
0x0CE4	3300	2	R	NA	NA	UINT32	NA	0x0000-0000	N	03, 100-4[13]	Alarms bitmap 0 = Alarm OFF 1 = Alarm ON Bit 8 = HeatAlarm status Bit 9 = Preventive maintenance on the device (fan error from HeatTag sensor) Bit 10 = Device replacement (internal error from HeatTag sensor that implies to replacement)
0x0CFA	3322	1	R	NA	NA	UINT16	0–190	0x0000	N	03, 100-4[13]	HeatTag alarm type • 0 = No alarm • 1–15 = Low level alarm • 16–93 = Medium level alarm • 94–190 (except 99) = High level alarm • 99 = Test alarm (for more information on Test modes, refer to DOCA0171EN *PowerLogic HeatTag - User Guide*)
0x0CFB	3323	1	R	NA	NA	UINT16	0–3	0x0000	N	03, 100-4[13]	HeatTag alarm level • 0 = No alarm • 1 = Low level alarm • 2 = Medium level alarm • 3 = High level alarm
0x0FA1	4001	2	R	NA	°C	Float32	NA	0xFF-C00000	N	03, 100-4[13]	Temperature value
0x0FA3	4003	2	R	NA	°C	Float32	NA	0xFF-C00000	N	03, 100-4[13]	Maximum value that the wireless device can read (maximum measurable temperature)
0x0FA5	4005	2	R	NA	°C	Float32	NA	0xFF-C00000	N	03, 100-4[13]	Minimum value that the wireless device can read (minimum measurable temperature)
0x0FA7	4007	2	R	NA	NA	Float32	NA	0xFF-C00000	N	03, 100-4[13]	Relative humidity value **Example:** 50% represented as 0.50

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13. Available end 2021.

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Description
0x0FA9	4009	2	R	NA	NA	Float32	NA	0xFF-C00000	N	03, 100-4[14]	Maximum value that the wireless device can read (maximum measurable humidity)
0x0FAB	4011	2	R	NA	NA	Float32	NA	0xFF-C00000	N	03, 100-4[14]	Minimum value that the wireless device can read (minimum measurable humidity)
0x0FAD	4013	2	R	NA	NA	Float32	0–10	0xFF-C00000	N	03, 100-4[14]	Air quality index • 0 = Good without triggered alarm • 1–9 = Intermediate without triggered alarm • 10 = Bad with triggered alarm (register 3322 and 3323)
0x79C7	31175	1	R	NA	NA	UINT16	0–2	0xFFFF	N	03, 100-4[14]	Operation mode • 0 = Test mode (0–30 minutes after HeatTag sensor is powered on • 1 = Auto-learning mode (30 minutes–8 hours after HeatTag sensor is powered on) • 2 = Normal operation mode (>8 hours after HeatTag sensor is powered on)

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14. Available end 2021.

Load Monitoring Modbus Registers

Description

The Modbus registers of the wireless devices allow you to monitor the following status in any supervision system:

- **Alarm with two types:**
  - The voltage loss of the load.
  - If an overload has occurred at the voltage loss event.
- **Load Operating Time** (available end 2021): The duration of how long the load worked effectively (above a certain power, this avoids idle/standby time being counted), to optimize the maintenance times.

Applicable Devices

The code in the Applicable Devices column indicates the types of wireless devices for which the register is available:

- A: PowerTag Energy ●63 (A9MEM152●, A9MEM154●, A9MEM156●, A9MEM157●)
- M: PowerTag Energy M250/M630 (LV43402●)
- R: PowerTag Energy F160 (A9MEM1580) and Rope (A9MEM159●)
- C: Acti9 Active iC40 and iC60 (A9TAA●●●●, A9TAB●●●●, A9TDEC●●●, A9TDFC●●●, A9TDFD●●●, A9TPDD●●●, A9TPED●●●, A9TYAE●●●, A9TYBE●●●)

Alarm

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices	Description
0x0CE1	3298	1	R	–	–	BITMAP	–	0xFFFF	N	03, 100–4[15]	A/M/R/C	Validity of the alarm bitmap (register 3300) • 0 = Invalid • 1 = Valid
0x0CE2	3299	1	–	–	–	–	–	–	–	–	–	Reserved
0x0CE3	3300	1	R	–	–	BITMAP	–	0xFFFF	N	03, 100–4[15]	A/M/R/C	Alarms bitmap 0 = Alarm OFF 1 = Alarm ON Bit 0 = Voltage phase loss Bit 1 = Current overload when voltage loss Bit 2 = Current short-circuit Bit 3 = Current alarm: 45%[15]

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15. Available end 2021.

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices	Description
												Bit 4 = Load current loss[16]
												Bit 5 = Overvoltage 120%[16]
												Bit 6 = Undervoltage 80%[16]
												Bit 7 = Battery low[16]
												Bit 8= Heat alarm status
												Bit 9= Preventive maintenance on the device
												Bit 10= Device replacement
												Bit 11–15= Reserved
0x0CE4	3301	1	–	–	–	–	–	–	–	–	–	Reserved
0x0CE5	3302	2	R	NA	A	Float32	NA	0xFF-C00000	N	03, 100–4[16]	A/M/R/C	RMS current on phase A at voltage loss (last RMS current measured when voltage loss occurred)
0x0CE7	3304	2	R	NA	A	Float32	NA	0xFF-C00000	N	03, 100–4[16]	A/M/R/C	RMS current on phase B at voltage loss (last RMS current measured when voltage loss occurred)
0x0CE9	3306	2	R	NA	A	Float32	NA	0xFF-C00000	N	03, 100–4[16]	A/M/R/C	RMS current on phase C at voltage loss (last RMS current measured when voltage loss occurred)
0x0CEB	3308[16]	2	RW	–	5	UINT32	–	0xFFF-FFFFF	Y	03, 100–4[16]	A/M/R	Load operating time counter
0x0CED	3310[16]	2	RW	–	W	Float32	–	0xFF-C00000	Y	03, 100–4[16]	A/M/R	Active power threshold for load operating time counter. Counter starts above the threshold value.
0x0CEF	3312[16]	2	RW	–	–	DATE-TIME	–	0x0000-0000	Y	03, 100–4[16]	A/M/R	Date and time stamp of last set or reset of load

16.   Available end 2021.

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices	Description
												operating time counter
0x0CF5	3318	1	R	–	–	BITMAP	–	0xFFFF	N	03	C	Alarm validity bitmap registers • 0 = Invalid • 1 = Valid Bit 0 = Long-time protection Bit 1 = Short-time protection Bit 4 = Earth-leakage protection Bit 7 = AAF protection (Serial) Bit 8 = AAF protection (Parallel) Bit 12 = Push-button test Bit 13 = Internal cause Bit 14 = Tripping chain failure
0x0CF6	3319	1	R	–	–	BITMAP	–	0xFFFF	N	03	C	Alarm status bitmap registers • 0 = Inactive • 1 = Active Bit 0 = Long-time protection Bit 1 = Short-time protection Bit 4 = Earth-leakage protection Bit 7 = AAF protection (Serial) Bit 8 = AAF protection (Parallel) Bit 12 = Push-buttton test Bit 13 = Internal cause Bit 14 = Tripping chain failure

Load Operating Time

The Load Operating Time registers in the table below will be available end 2021.

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices	Description
0x0CEB	3308	2	RW	–	s	UINT32	–	0xFFFF-FFFF	Y	03, 100–4[17]	A/M/R	Load operating time counter.
0x0CED	3310	2	RW	–	W	Float32	–	0xFF-C00000	Y	03, 100–4[17]	A/M/R	Active power threshold for Load operating time counter. Counter starts above the threshold value.
0x0CEF	3312	4	R	–	–	DATE-TIME	–	0x0000-0000	Y	03, 100–4[17]	A/M/R	Date and time stamp of last set or reset of load operating time counter.

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17. Available end 2021.

Wireless Devices Common Modbus Registers

Applicable Devices

The code in the Applicable Devices column indicates the types of wireless devices for which the register is available:

- A: PowerTag Energy ●63 (A9MEM152●, A9MEM154●, A9MEM156●, A9MEM157●)
- M: PowerTag Energy M250/M630 (LV43402●)
- R: PowerTag Energy F160 (A9MEM1580) and Rope (A9MEM159●)
- C: Acti9 Active iC40 and iC60 (A9TAA●●●●, A9TAB●●●●, A9TDEC●●●, A9TDFC●●●, A9TDFD●●●, A9TPDD●●●, A9TPED●●●, A9TYAE●●●, A9TYBE●●●)
- CL: CL110 (Contact your Schneider Electric representative for information about commercial references.)
- TH: TH110 (Contact your Schneider Electric representative for information about commercial references.)
- TR: TRH (SED-TRH-G-5045)
- TRC: TRHC02 (SED-CO2-G-5045)
- H: HeatTag (SMT10020) (available end 2021)
- IO: PowerTag Control IO module (A9XMC1D3) (available begin 2022)
- 2DI: PowerTag Control 2DI module (A9XMC2D3) (available begin 2022)
- D: PowerTag Link display (A9XMWRD) (available in 2022)

Configuration Registers

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices	Description
0x7918	31001	10	R	–	–	ASCII	–	0x0000	Y	03, 06, 16, 100–4[18]	A/M/R/C/H	User application name of the wireless device. The user can enter maximum 20 characters.
0x7922	31011	3	R	–	–	ASCII	–	0x0000	Y	03, 06, 16, 100–4[18]	A/M/R/C/H	Circuit identifier of the wireless device. The user can enter maximum five characters.
0x7925	31014	1	R	–	–	UINT16	–	0xFFFF	Y	03, 06, 16, 100–4[18]	A/M/R/C	Indicates the usage of the wireless device[19].
0x7926	31015	1	R	–	–	UINT16	–	0xFFFF	Y	03, 06, 16, 100–4[18]	A/M/R/C	Phase sequence[20].

18. Available end 2021.
19. For register 31014, the usage of wireless devices is:
    - 1 = Main/Incomer
    - 2 = Sub/Head of group
    - 3 = Heating
    - 4 = Cooling
    - 5 = HVAC
    - 6 = Ventilation
    - 7 = Lighting
    - 8 = Office Equipment
    - 9 = Cooking
    - 10 = Food refrigeration
    - 11 = Elevators
    - 12 = Computers
    - 13 = Renewable Energy Production
    - 14 = Genset
    - 15 = Compressed air
    - 16 = Vapor
    - 17 = Machine
    - 18 = Process
    - 19 = Water
    - 20 = Other Sockets
    - 21 = Other
20. For register 31015, the various phase sequences available are:
    - 1 = Phase A
    - 2 = Phase B
    - 3 = Phase C
    - 4 = Phase sequence ABC
    - 5 = Phase sequence ACB
    - 6 = Phase sequence BCA
    - 7 = Phase sequence BAC
    - 8 = Phase sequence CAB
    - 9 = Phase sequence CBA

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices	Description
0x7927	31016	1	R	–	–	UINT16	–	0xFFFF	Y	03, 06, 16, 100–4[21]	A/M/R/C	Mounting position 0 = Not configured 1 = Top 2 = Bottom 3 = Not applicable
0x7929	31018	1	RW	–	A	UINT16	–	0xFFFF	Y	03, 06, 16, 100–4[21]	A/M/R/C	Rated current of the protective device to the wireless device
0x792A	31019	1	R	–	–	UINT16	–	0xFFFF	Y	03	M/R	Electrical network system type 0 = Unknown system type 3 = 3PH3W 11= 3PH4W
0x792B	31020	2	R	–	V	Float32	–	0xFF-C00000	Y	03	A/M/R/C	Rated voltage[22]
0x792D	31022	1	–	–	–	–	–	–	–	–	–	Reserved
0x792F	31024	1	R	NA	NA	UINT16	–	0xFFFF	N	–	A/M/R/C	Power supply type • 0 = Not config-ured • 1 = Top • 2 = Bottom (default value)

Device Identification

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices	Description
0x7931	31026	1	NA	NA	NA	UINT16	–	0xFFFF	Y	03, 100–4[21]	A/M/R/C/H/ CL/TH/TR/ TRC	Virtual Modbus server address
0x7932	31027	4	NA	NA	NA	UINT64	–	0x8000-000000-000000	Y	03, 100–4[21]	A/M/R/C/H/ CL/TH/TR/ TRC	Wireless device Radio Frequency Identifier (RF-Id)
0x7936	31031	1	–	–	–	–	–	–	–	–	–	Reserved
0x7938	31033	12	–	–	–	–	–	–	–	–	–	Reserved
0x7944	31045	16	R	NA	NA	ASCII	NA	0x00	N	03, 100–4[21]	A/M/R/C/H/ CL/TH/TR/ TRC	Vendor name

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21. Available end 2021.
22. Register 31020 has two types of rated voltage:
   • LN rated voltage for single phase wiring systems
   • LL rated voltage for 3 phases wiring systems

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices	Description
0x7954	31061	16	R	NA	NA	ASCII	NA	0x00	N	03, 100–4[23]	A/M/R/C/H/ CL/TH/TR/ TRC	Product code (commercial reference)
0x7964	31077	6	R	NA	NA	ASCII	NA	0x00	N	03, 100–4[23]	A/M/R/C/H/ CL/TH/TR/ TRC	Firmware revision
0x796A	31083	6	R	NA	NA	ASCII	NA	0x00	N	03, 100–4[23]	A/M/R/C/H/ CL/TH/TR/ TRC	Hardware revision
0x7970	31089	10	R	NA	NA	ASCII	NA	0x00	N	03, 100–4[23]	A/M/R/C/H/ CL/TH/TR/ TRC	Serial number
0x797A	31099	8	R	NA	NA	ASCII	NA	0x00	N	03, 100–4[23]	A/M/R/C/H/ CL/TH/TR/ TRC	Product range
0x7982	31107	8	R	NA	NA	ASCII	NA	0x00	N	03, 100–4[23]	A/M/R/C/H/ CL/TH/TR/ TRC	Product model
0x798A	31115	8	R	NA	NA	ASCII	NA	0x00	N	03, 100–4[23]	A/M/R/C/H/ CL/TH/TR/ TRC	Product family

Diagnostic Data Registers

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices	Description
0x79A8	31145	1	R	–	–	BITMAP	–	0xFFFF	N	03, 100–4[23]	A/M/R/C/H/ CL/TH/TR/ TRC	Validity of the RF communication between PowerTag system and EcoStruxure Panel Server status. • 0 = Invalid • 1 = Valid
0x79A9	31146	1	R	–	–	BITMAP	–	0xFFFF	N	03, 100–4[23]	A/M/R/C/H/ CL/TH/TR/ TRC	Communication status between EcoStruxure Panel Server and wireless devices. • 0 = Communication loss • 1 = Communication OK
0x79AA	31147	2	R	NA	NA	Float32	NA	0xFF-C00000	N	–	A/M/R/C/H/ CL/TH/TR/ TRC	Packet Error Rate (PER) of the device, received by EcoStruxure Panel Server

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23. Available end 2021.

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices	Description
0x79AC	31149	2	R	NA	dBm	Float32	NA	0xFF-C00000	N	–	A/M/R/C/H/CL/TH/TR/TRC	RSSI of the device, received by EcoStruxure Panel Server
0x79AE	31151	1	R	NA	NA	UINT16	NA	0xFFFF	N	–	A/M/R/C/H/CL/TH/TR/TRC	Link Quality Indicator (LQI) of the device, received by EcoStruxure Panel Server
0x79AF	31152	2	R	NA	NA	Float32	NA	0xFF-C00000	N	–	A/M/R/C/H/CL/TH/TR/TRC	PER of gateway, calculated inside the EcoStruxure Panel Server
0x79B1	31154	2	R	NA	dBm	Float32	NA	0xFF-C00000	N	–	A/M/R/C/H/CL/TH/TR/TRC	Radio Signal Strength Indicator (RSSI) of gateway, calculated inside the EcoStruxure Panel Server
0x79B3	31156	1	R	NA	NA	UINT16	NA	0xFFFF	N	–	A/M/R/C/H/CL/TH/TR/TRC	LQI of gateway, calculated inside the EcoStruxure Panel Server
0x79B4	31157	2	R	NA	NA	Float32	NA	0xFF-C00000	N	03, 100–4[24]	A/M/R/C/H/CL/TH/TR/TRC	PER – Maximum value between device and EcoStruxure Panel Server
0x79B6	31159	2	R	NA	NA	Float32	NA	0xFF-C00000	N	03, 100–4[24]	A/M/R/C/H/CL/TH/TR/TRC	RSSI – Minimal value between device and EcoStruxure Panel Server
0x79B8	31161	1	R	NA	NA	UINT16	NA	0xFFFF	N	03, 100–4[24]	A/M/R/C/H/CL/TH/TR/TRC	LQI – Minimal value between device and EcoStruxure Panel Server

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24. Available end 2021.

Substation Monitoring Device (SMD)

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices	Description
0x793E	31039	1	R	–	–	UINT16	–	0xFFFF	N	03	CL/TH/H	Monitored equipment[25]

25. For register 31039, monitored equipment is:
- 1 = MVCubicle
- 2 = MV_LV_Transformer
- 3 = Busway
- 4 = ElectricalRoom
- 5 = LV_Switchboard
- 50 = Other

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices	Description
0x793F	31040	1	R	–	–	UINT16	–	0xFFFF	N	03	CL/TH/H	Sensor location

For register 31040, sensor locations are:

- 1 = MVCableConnection1
- 2 = MVCableConnection2
- 3 = LVCableConnection
- 4 = CBLowerArms
- 5 = CBUpperArms
- 6 = Busbar1
- 7 = Busbar2
- 8 = WindingConnection
- 9 = TappingLinkConnection
- 10 = LVCabinet
- 11 = BusbarCabinet
- 12 = CBCabinet
- 13 = CableCabinet
- 14 = Room
- 15 = Busway
- 16 = LV Incomer CB Upstream 1
- 17 = LV Incomer CB Upstream 2,
- 18 = LV Incomer CB Downstream 1
- 19 = LV Incomer CB Downstream 2
- 20 = LV Incomer Cable Connection 1
- 21 = LV Incomer Cable Connection 2
- 22 = LV HBB-VBB Joint 1
- 23 = LV HBB-VBB Joint 2
- 24 = LV Splice Bar 1
- 25 = LV Splice Bar 2
- 26 = LV Bus Tie Upstream
- 27 = LV Bus Tie Downstream,
- 28 = LV Feeder CB Upstream
- 29 = LV Feeder CB Downstream
- 30 = LV Drawer
- 31 = LV Feeder MCCB Loads
- 32 = LV Cable Compartment
- 33 = LV Incomer CB 1 Downstream 1
- 34 = LV Incomer CB 1 Downstream 2
- 35 = LV Incomer CB 1 Upstream 1
- 36 = LV Incomer CB 1 Upstream 2
- 37 = LV Incomer CB 2 Downstream 1
- 38 = LV Incomer CB 2 Downstream 2
- 39 = LV Incomer CB 2 Upstream 1
- 40 = LV Incomer CB 2 Upstream 2
- 41 = LV Incomer CB 3 Downstream 1
- 42 = LV Incomer CB 3 Downstream 2
- 43 = LV Incomer CB 3 Upstream 1
- 44 = LV Incomer CB 3 Upstream 2
- 50 = Other

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices	Description
0x7941	31041	1	R	–	–	UINT16	–	0xFFFF	N	03	CL/TH/H	Measured point[26]
0x7992	31123	1	R	–	–	UINT16	–	0xFFFF	N	03	CL/TH/H	Cubicle type[27]
0x7993	31124	1	R	–	–	UINT16	–	0xFFFF	N	03	CL/TH/H	Cubicle ID
0x7994	31125	1	R	–	–	UINT16	–	0xFFFF	N	03	CL/TH/H	Feeder
0x7995	31126	1	R	–	–	UINT16	–	0xFFFF	N	03	CL/TH/H	Drawer

26.   For register 31041, measured points are:
- 1 = Phase1
- 2 = Phase2
- 3 = Phase3
- 4 = Phase1to3
- 5 = Neutral
- 6 = Ambient
- 7 = Cold point
- 50 = Other

27.   For register 31123, cubicle types are:
- 1 = 1 Incomer/Feeder/Bus Tie
- 2 = 2 Incomers
- 3 = 1 Incomer + 1 Bus Tie
- 4 = 3 Feeders ACBs
- 5 = 1 Incomer + 2 Feeder ACBs
- 6 = 2 Incomers + 1 Bus Tie
- 7 = Feeder MCCBs + Drawers
- 8 = 1 Incomer + Feeder MCCBs
- 9 = Drawers
- 10 = Feeder MCCBs
- 11 = None
- 12 = Incomer
- 13 = Incomer And Feeders
- 14 = Feeders
- 15 = Distribution
- 16 = Cable Compartment
- 17 = Outgoing Terminals

Troubleshooting

Troubleshooting of the EcoStruxure Panel Server

> ## ⚠⚠ DANGER
>
> **HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH**
>
> - Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, CSA Z462, NOM 029-STPS or local equivalent.
> - This equipment must only be installed and serviced by qualified electrical personnel.
> - Turn off all power supplying this equipment before working on or inside equipment.
> - Always use a properly rated voltage sensing device to confirm power is off.
> - Re-install all devices, doors, and covers before turning on power to this equipment.
> - Do not exceed the device ratings for maximum limits.
>
> **Failure to follow these instructions will result in death or serious injury.**

Problem	Diagnostics	Action
The status LED is not lit.	Source power not applied or not stable.	Apply power or check power source.
EcoStruxure Panel Server status LED blinking orange	EcoStruxure Panel Server in degraded health state.	See the EcoStruxure Panel Server Diagnostics webpages, page 47. In particular, you can look at the EcoStruxure Panel Server health state, that gives information about which internal component caused the EcoStruxure Panel Server to start blinking orange. For example: • If Modbus is identified, then a Modbus-SL device was maybe powered off or removed from EcoStruxure Power Commission software, but EcoStruxure Power Commission software did not remove the device as seen from the gateway. • If IEEE 802.15.4 is identified, then a device is maybe powered off and stopped communicating for a few cycles. • If a local device is identified, then there is maybe an IPv4 address conflict.
EcoStruxure Panel Server status LED steady red	Major malfunction.	Call your local service representative for assistance.

Troubleshooting of Webpages and Communication

Problem	Diagnostics	Action
Unable to browse the EcoStruxure Panel Server webpages.	Incorrect network configuration	Verify that all IP parameters are correct.
		Verify that EcoStruxure Panel Server receives requests (ping EcoStruxure Panel Server in the DOS prompt. Type **ping** and EcoStruxure Panel Server IP address. For example, ping `169.254.0.10`).
		Verify that all connection settings in your browser Internet options are correct.
The EcoStruxure Panel Server has lost communication with wireless devices.	Pollution on the radio frequency channel	Change the radio frequency channel that communicates between wireless devices and EcoStruxure Panel Server in EcoStruxure Power Commission software.

Problem	Diagnostics	Action
A wireless device is not discovered by the EcoStruxure Panel Server.	EcoStruxure Panel Server does not recognize this type of wireless devices.	Verify that the device is in the list of supported devices (see DOCA0178EN *EcoStruxure Panel Server - Firmware Release Notes*)
A Modbus device is not discovered by the EcoStruxure Panel Server.	Incorrect device configuration settings.	• Verify that the device is in the list of supported devices (see DOCA0178EN *EcoStruxure Panel Server - Firmware Release Notes*) • Verify that the device settings are set accordingly to the EcoStruxure Panel Server (see Serial Configuration Settings, page 37).
A Modbus device does not communicates with the EcoStruxure Panel Server.	The same server ID is set to two Modbus devices in the network.	Verify that a server ID is not used twice in the Modbus network. See the detailed topic, page 39 to correct conflicts by using EcoStruxure Power Commission software.

Appendices

What's in This Part

Appendix A: Details of Modbus Functions

What's in This Chapter

Modbus TCP/IP Functions

General Description

The Modbus messaging service provides a client/server communication between devices connected on an Ethernet TCP/IP network.

The client/server model is based on four types of messages:

- Modbus Request, the message sent on the network by the client to initiate a transaction.
- Modbus Indication, the request message received on the server side.
- Modbus Response, the response message sent by the server.
- Modbus Confirmation, the response message received on the client side.
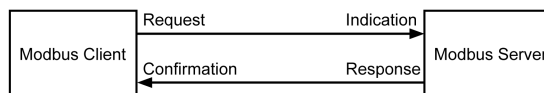
The Modbus messaging services (client/server model) are used for real time information exchange between:

- Two device applications.
- Device application and other device.
- HMI/SCADA applications and devices.
- A PC and a device program providing on line services.

A dedicated header is used on TCP/IP to identify the Modbus Application Data Unit. It is called the MBAP header (Modbus Application Protocol header).
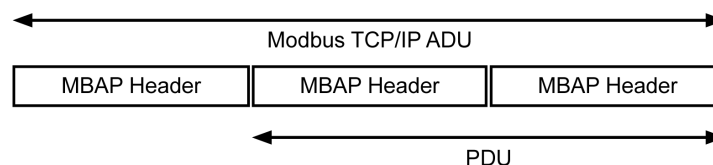
The MBAP header contains the following fields:

Fields	Length	Description	Client	Server
Transaction Identifier	2 bytes	Identification of a Modbus Request/Response transaction	Initialized by the client	Recopied by the server from the received request
Protocol Identifier	2 bytes	0 = Modbus protocol	Initialized by the client	Recopied by the server from the received request
Length	2 bytes	Number of following bytes	Initialized by the client (Request)	Initialized by the server (Response)
Unit Identifier	1 byte	Identification of a remote server connected on a serial line or on other buses	Initialized by the client	Recopied by the server from the received request

Table of Modbus Functions

The following table describes in detail the functions supported by the wireless devices of the EcoStruxure Panel Server:

Function code	Function name
03	Read n output or internal bits
06	Write 1 word
16	Write n words

Function code	Function name
43-14	Read device identification (refer to Function 43-14: Read Device Identification, page 109)
100-4 (available end 2021)	Read non-adjacent words where n ≤ 100 (refer to Function 100-4: Read Non-Adjacent Registers, page 111)

Modbus TCP/IP Exception Codes

Exception Responses

Exception responses issued by the client or a server can be the result of data processing errors. One of the following events can occur after a request from the client:

- If the server receives the request from the client without a communication error and manages the request correctly, it sends back a normal response.

- If the server does not receive the request from the client due to a communication error, it does not send back a response. The client program ends by applying a time delay condition to the request.

- If the server receives the request from the client but detects a communication error, it does not send back a response. The client program ends by applying a time delay condition to the request.

- If the server receives the request from the client without a communication error but cannot manage it (for example, the request consists of reading a register that does not exist), the server sends back an exception response to inform the client of the nature of the error.

Exception Frame

The server sends an exception frame to the client to indicate an exception response. An exception response consists of four fields:

Field	Definition	Size
1	Server number	1 byte
2	Exception function code	1 byte
3	Exception code	n bytes
4	Check	2 bytes

Managing Modbus Exceptions

The exception response frame consists of two fields that distinguish it from a normal response frame:

- The exception function code is the same as the original request function code plus 128 (0x80).

- The exception code depends on the communication error detected by the server.

The following table describes the exception codes managed by the wireless devices of the EcoStruxure Panel Server:

Exception Code	Name	Description
01	Illegal function	The function code received in the request is not a permitted action for the server. It is possible that the server is in an unsuitable state to process a specific request.
02	Illegal data address	The data address received by the server is not a permitted address for the server.
03	Illegal data value	The value of the request data field is not a permitted value for the server.
04	Server device failure	The server is unable to perform a required action due to an unrecoverable error.
06	Server device busy	The server is busy processing another command. The client should send the request once the server is free.

NOTE: For more information, a detailed description of the Modbus protocol is available on www.modbus.org.

Access to Variables

A Modbus variable can have the following attributes:

- Read-only
- Read/write
- Write-only

> **NOTE:** An attempt to write to a read-only variable generates an exception response.

Function 43-14: Read Device Identification

Structure of Modbus Read Device Identification Messages

The ID consists of ASCII characters called objects.

Request for basic information

Definition	Number of Bytes	Value
Server number	1 byte	0xFF
Function code	1 byte	0x2B
Sub-function code	1 byte	0x0E
Product ID	1 byte	0x01
Object identifier	1 byte	0x00

Response with basic information

Definition		Number of Bytes	Value
Server number		1 byte	0xFF
Function code		1 byte	0x2B
Sub-function code		1 byte	0x0E
Product ID		1 byte	0x01
Conformity level		1 byte	0x01
Reserved		1 byte	0x00
Reserved		1 byte	0x00
Number of objects		1 byte	0x03
Object 0: manufacturer name	Object number	1 byte	0x00
	Object length	1 byte	0x12
	Object content	18	Schneider Electric
Object 1: product code	Object number	1 byte	0x01
	Object length	1 byte	0x20 (maximum)
	Object content	0x20 (maximum)	EcoStruxure Panel Server product code
Object 2: firmware version	Object number	1 byte	0x02
	Object length	1 byte	0x0B
	Object content	11 bytes	XXX.YYY.ZZZ

Request for complete information

Definition	Number of Bytes	Value
Server number	1 byte	0xFF
Function code	1 byte	0x2B
Sub-function code	1 byte	0x0E
Product ID	1 byte	0x02
Object identifier	1 byte	0x00

Response with complete information

Definition		Number of Bytes	Value
Server number		1 byte	0xFF
Function code		1 byte	0x2B
Sub-function code		1 byte	0x0E
Product ID		1 byte	0x02
Conformity level		1 byte	0x02
Reserved		1 byte	0x00
Reserved		1 byte	0x00
Number of objects		1 byte	0x05
Object 0: manufacturer name	Object number	1 byte	0x00
	Object length	1 byte	0x12
	Object content	0x12	Schneider Electric
Object 1: product code	Object number	1 byte	0x01
	Object length	1 byte	0x20 (maximum)
	Object content	0x20 (maximum)	EcoStruxure Panel Server product code
Object 2: firmware version	Object number	1 byte	0x02
	Object length	1 byte	0x0B
	Object content	0x0B	XXX.YYY.ZZZ
Object 3: vendor URL	Object number	1 byte	0x03
	Object length	1 byte	0x20 (maximum)
	Object content	0x20 (maximum)	Vendor URL
Object 4: product range	Object number	1 byte	0x04
	Object length	1 byte	0x20 (maximum)
	Object content	0x20 (maximum)	EcoStruxure Panel Server product range
Object 5: product model	Object number	1 byte	0x05
	Object length	1 byte	0x20 (maximum)
	Object content	0x20 (maximum)	EcoStruxure Panel Server product model
Object 6: user application name	Object number	1 byte	0x06
	Object length	1 byte	0x20 (maximum)
	Object content	0x20 (maximum)	EcoStruxure Panel Server user application name

NOTE: The table above describes how to read the ID of an EcoStruxure Panel Server.

Function 100-4: Read Non-Adjacent Registers

This function will be available end 2021.

Structure of Modbus Read n Non-Adjacent Registers Messages Where n ≤ 100

The example below is the case of reading of 2 non-adjacent registers.

Request

Definition	Number of Bytes	Value
Modbus server number	1 byte	0x2F
Function code	1 byte	0x64
Length of data in bytes	1 byte	0x06
Sub-function code	1 byte	0x04
Transmission number[1]	1 byte	0xXX
Address of the first word to be read (MSB)	1 byte	0x00
Address of the first word to be read (LSB)	1 byte	0x65
Address of the second word to be read (MSB)	1 byte	0x00
Address of the second word to be read (LSB)	1 byte	0x67
(1) The client gives the transmission number in the request.		

NOTE: The table above describes how to read addresses 101 = 0x65 and 103 = 0x67 of a Modbus server. The Modbus server number is 47 = 0x2F.

Response

Definition	Number of Bytes	Value
Modbus server number	1 byte	0x2F
Function code	1 byte	0x64
Length of data in bytes	1 byte	0x06
Sub-function code	1 byte	0x04
Transmission number[1]	1 byte	0xXX
First word read (MSB)	1 byte	0x12
First word read (LSB)	1 byte	0x0A
Second word read (MSB)	1 byte	0x74
Second word read (LSB)	1 byte	0x0C
(1) The server sends back the same number in the response.		

NOTE: The table above describes how to read addresses 101 = 0x65 and 103 = 0x67 of a Modbus server. The Modbus server number is 47 = 0x2F.

Appendix B: Data Availability

What's in This Chapter

PowerTag Data Availability

Presentation

The data transmitted by the PowerTag Energy sensors and Acti9 Active to the EcoStruxure Panel Server depends on the type of PowerTag Energy sensors. The following tables indicate which data are available in the EcoStruxure Panel Server according to the type of PowerTag Energy sensors and Acti9 Active.

Device Commercial References

The device commercial references used for each type of PowerTag Energy sensors are:

- A1: A9MEM1520, A9MEM1521, A9MEM1522, A9MEM1541, A9MEM1542
- A2: A9MEM1540, A9MEM1543
- P1: A9MEM1561, A9MEM1562, A9MEM1563, A9MEM1571, A9MEM1572
- F1: A9MEM1560, A9MEM1570
- F2: A9MEM1573
- F3: A9MEM1564, A9MEM1574
- FL: A9MEM1580
- M0: LV434020
- M1: LV434021
- M2: LV434022
- M3: LV434023
- R1: A9MEM1590, A9MEM1591, A9MEM1592, A9MEM1593
- C: Acti9 Active iC40/iC60 (A9TAA●●●●, A9TAB●●●●, A9TDEC●●●, A9TDFC●●●, A9TDFD●●●, A9TPDD●●●, A9TPED●●●, A9TYAE●●●, A9TYBE●●●)

Power

Data	PowerTag M63		PowerTag P63	PowerTag F63			Power-Tag F160	Power-Tag M250		Power-Tag M630		PowerTag Rope	Acti9 Active
	A1	A2	P1	F1	F2	F3	FL	M0	M1	M2	M3	R1	C
Total active power	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Per phase active power	✓	N-A[28]	✓	✓	N-A[28]	✓	✓[29]	✓[29]	✓	✓[29]	✓	✓[29]	✓
Total reactive power	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓
Per phase reactive power	–	–	–	–	–	–	✓[29]	–	–	–	–	✓[29]	–
Total apparent power	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Per phase apparent power	–	–	–	–	–	–	✓[29]	–	–	–	–	✓[29]	–
Total factor power	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Per phase factor power	–	–	–	–	–	–	✓[29]	–	–	–	–	✓[29]	–

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28.   Not applicable because there is no neutral voltage on the PowerTag Energy sensors.
29.   The values are significant only if the neutral voltage picking is connected.

Data	PowerTag M63		PowerTag P63	PowerTag F63			Power-Tag F160	Power-Tag M250		Power-Tag M630		PowerTag Rope	Acti9 Active
	A1	A2	P1	F1	F2	F3	FL	M0	M1	M2	M3	R1	C
Actual demand power	✓	✓	✓	✓	✓	✓	✓	–	–	–	–	✓	✓
Peak demand power	✓	✓	✓	✓	✓	✓	✓	–	–	–	–	✓	–

Energy

Data	PowerTag M63		PowerTag P63	PowerTag F63			PowerTag F160	PowerTag M250		PowerTag M630		PowerTag Rope
	A1	A2	P1	F1	F2	F3	FL	M0	M1	M2	M3	R1
Total resettable active energy delivered	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓
Total non resettable active energy delivered	–	–	–	–	–	–	✓[30]	✓	✓	✓	✓	✓[30]
Per phase resettable active energy delivered	–	–	–	–	–	–	✓[30]	–	–	–	–	✓[30]
Per phase non resettable active energy delivered	–	–	–	–	–	–	✓[30]	–	–	–	–	✓[30]
Total resettable active energy received	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓
Total non resettable active energy received	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓
Per phase resettable active energy received	–	–	–	–	–	–	✓[30]	–	–	–	–	✓[30]
Per phase non resettable active energy received	–	–	–	–	–	–	✓[30]	–	–	–	–	✓[30]
Total resettable active energy delivered and received	✓	✓	✓	✓	✓	✓	NA[31]	NA[31]	NA[31]	NA[31]	NA[31]	NA[31]
Total non resettable active energy delivered and received	✓	✓	✓	✓	✓	✓	NA[31]	NA[31]	NA[31]	NA[31]	NA[31]	NA[31]
Per phase resettable active energy delivered and received	–	–	–	–	–	–	NA[31]	–	–	–	–	NA[31]
Per phase non resettable active energy delivered and received	–	–	–	–	–	–	NA[31]	✓[30]	✓	✓[30]	✓	NA[31]
Total resettable reactive energy delivered	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓
Total non resettable reactive energy delivered	–	–	–	–	–	–	✓[30]	–	–	–	–	✓[30]

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30. The values are significant only if the neutral voltage picking is connected.
31. Not applicable because energy is individually cumulated in received and delivered counters.

Data	PowerTag M63		PowerTag P63	PowerTag F63			PowerTag F160	PowerTag M250		PowerTag M630		PowerTag Rope
	A1	A2	P1	F1	F2	F3	FL	M0	M1	M2	M3	R1
Per phase resettable reactive energy delivered	–	–	–	–	–	–	✓[32]	–	–	–	–	✓[32]
Per phase non resettable reactive energy delivered	–	–	–	–	–	–	✓	–	–	–	–	✓
Total resettable reactive energy received	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓
Total non resettable reactive energy received	–	–	–	–	–	–	✓	–	–	–	–	✓
Per phase resettable reactive energy received	–	–	–	–	–	–	✓[32]	–	–	–	–	✓[32]
Per phase non resettable reactive energy received	–	–	–	–	–	–	✓[32]	–	–	–	–	✓[32]
Total resettable apparent energy delivered and received	–	–	–	–	–	–	✓	–	–	–	–	✓
Total non resettable apparent energy delivered and received	–	–	–	–	–	–	✓	–	–	–	–	✓
Per phase resettable apparent energy delivered and received	–	–	–	–	–	–	✓[32]	–	–	–	–	✓[32]
Per phase non resettable apparent energy delivered and received	–	–	–	–	–	–	✓[32]	–	–	–	–	✓[32]

Alarms

Data	PowerTag M63		PowerTag P63	PowerTag F63			Power-Tag F160	Power-Tag M250		PowerTag M630		PowerTag Rope	Acti9 Active
	A1	A2	P1	F1	F2	F3	FL	M0	M1	M2	M3	R1	C
Voltage loss	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Overcurrent at voltage loss	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Load current 45%	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Load current loss	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Over voltage 120%	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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32. The values are significant only if the neutral voltage picking is connected.

Data	PowerTag M63		PowerTag P63	PowerTag F63			Power-Tag F160	Power-Tag M250		PowerTag M630		PowerTag Rope	Acti9 Active
	A1	A2	P1	F1	F2	F3	FL	M0	M1	M2	M3	R1	C
Undervoltage 80%	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RMS current on phase A, B, C at voltage loss	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Other Measurements

Data	PowerTag M63		Power-Tag P63	PowerTag F63			Power-Tag F160	Power-Tag M250		PowerTag M630		PowerTag Rope	Acti9 Active
	A1	A2	P1	F1	F2	F3	FL	M0	M1	M2	M3	R1	C
Phase current (measured)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Neutral current (calculated)	–	–	–	–	–	–	✓	–	–	–	–	✓	
Phase-to-phase voltage	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Phase-to-neutral voltage	✓	NA[33]	✓	✓	NA[33]	✓	✓[34]	✓[34]	✓	✓[34]	✓	✓	✓[34]
Frequency	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	
Quadrant	1	1	1	1	1	1	4	4	4	4	4	4	
Internal temperature	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓
Load operating time counter	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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33. Not applicable because there is no neutral voltage on the PowerTag Energy sensors
34. The values are significant only if the neutral voltage picking is connected.

Environmental Sensor Data Availability

Presentation

The data transmitted by the environmental sensors to the EcoStruxure Panel Server depends on the type of environmental sensors. The following table indicates which data are available in the EcoStruxure Panel Server according to the type of environmental sensors.

Device Commercial References

The device commercial references used for each type of environmental sensors are:

- CL: environmental sensors CL110 (Contact your Schneider Electric representative for information about commercial references.)

- TH: environmental sensor TH110 (Contact your Schneider Electric representative for information about commercial references.)

- TR: environmental sensor TRH device (SED-TRH-G-5045)

- TRC: environmental sensor TRHC02 device(SED-CO2-G-5045)

Other Measurements

Data	CL110	TH110	TRH	TRHC02
	CL	TH	TR	TRC
Ambient temperature	✓	✓	✓	✓
Ambient humidity	✓	✓	✓	✓
Ambient CO_2 level	−	−	−	✓

As standards, specifications, and design change from time to time,
please ask for confirmation of the information given in this publication.

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