EcoStruxure Panel Server

User Guide

Wireless Devices Concentrator and Modbus Gateway, Datalogger, and Energy Server

EcoStruxure offers IoT-enabled architecture and platform.

DOCA0172EN-12
03/2024

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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.

Remote Control

⚠WARNING

UNEXPECTED START OF OPERATION

In case of remote control of loads, only do it for non-critical electrical loads that can safely be left unattended.

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 of 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 the US must be fixed to US operation channels only.

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.

Validity Note

This guide applies to the EcoStruxure Panel Server models and firmware versions described in the following table:

Commercial reference	Firmware version
PAS400	EcoStruxure Panel Server Entry firmware for version 001.009.000 or greater
PAS600, PAS600T, PAS600L	EcoStruxure Panel Server Universal firmware for version 001.009.000 or greater for hardware version 001.000.000
PAS600LWD, PAS600PWD	EcoStruxure Panel Server Universal Wired by Design model firmware version 001.009.000 or greater for hardware version 002.000.000
PAS800, PAS800L, PAS800P	EcoStruxure Panel Server Advanced firmware version 001.009.000 or greater

NOTE: The content of this guide also applies to **EcoStruxure Panel Server Wired by Design models PAS600LWD and PAS600PWD**. A Wired by Design model is a Panel Server without the capability to connect to IEEE.802.15.4 wireless devices and without Wi-Fi communication capability.

All the information related to the Panel Server presented in this guide applies to Wired by Design models except information about wireless devices and Wi-Fi communication.

Convention

EcoStruxure Panel Server is hereafter referred to as Panel Server.

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 - Catalog	PLSED310196EN
EcoStruxure Panel Server Entry - Instruction Sheet	NNZ76760
EcoStruxure Panel Server Universal - Instruction Sheet for PAS600, PAS600L and PAS600T	GDE74119
EcoStruxure Panel Server Universal Wired by Design - Instruction Sheet for PAS600LWD and PAS600PWD hardware version 002.000.000	PKR28607
EcoStruxure Panel Server Advanced - Instruction Sheet for PAS800, PAS800L and PAS800P	JYT24469

Title of documentation	Reference number
EcoStruxure Panel Server - Wireless Devices / Wi-Fi Antenna - Instruction Sheet	NNZ58425
EcoStruxure Panel Server Entry - Firmware Release Notes	DOCA0249EN
EcoStruxure Panel Server Universal - Firmware Release Notes	DOCA0178EN
EcoStruxure Panel Server Advanced - Firmware Release Notes	DOCA0248EN
EcoStruxure Panel Server - Cybersecurity Guide	DOCA0211EN
EcoStruxure Panel Server - Modbus File	DOCA0241EN
EcoStruxure Panel Server - Alarm File	DOCA0330EN
How Can I Reduce Vulnerability to Cyber Attacks?	Cybersecurity System Technical Note
EcoStruxure Power - Guide for Designing and Implementing a Cyber Secure Digital Power System - Technical Guide	ESXP2TG003EN
Wireless Communication Architectures With EcoStruxure Panel Server - Design Guide	DOCA0289EN

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

Information on Non-Inclusive or Insensitive Terminology

As a responsible, inclusive company, Schneider Electric is constantly updating its communications and products that contain non-inclusive or insensitive terminology. However, despite these efforts, our content may still contain terms that are deemed inappropriate by some customers.

EcoStruxure Panel Server Presentation

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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, depending on the model:

- 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 Energy Hub, EcoStruxure Facility Expert, EcoStruxure Resource Advisor, 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 Panel Server are:

- Entry (PAS400)
- Universal (PAS600 series)
- Advanced (PAS800 series)

Main Features

EcoStruxure Panel Server provides the following main features, depending on the model:

- Gateway functionality Modbus TCP/IP to Modbus Serial Line (Modbus-SL)
- Data concentrator for the following wireless devices: PowerTag Energy and PowerLogic Tag sensors, environmental sensors, Acti9 Active, HeatTag sensors, wireless indication auxiliaries for ComPacT and PowerPacT circuit breakers. For more information, see Supported Devices, page 15.
- Connectivity to FDM128 Ethernet display
- 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 Ethernet or Wi-Fi
- Two Ethernet ports to optionally separate upstream cloud connection from field device network (Universal and Advanced models)
- Supported transfer protocols: Modbus TCP/IP, HTTPS (HTTP not supported), and SFTP

- 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 cloud services (such as EcoStruxure Energy Hub, EcoStruxure Facility Expert, EcoStruxure Asset Advisor, and EcoStruxure Resource Advisor)
- Setup through EcoStruxure Power Commission software allowing off-line configuration preparation, and embedded webpages

Feature Availability

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

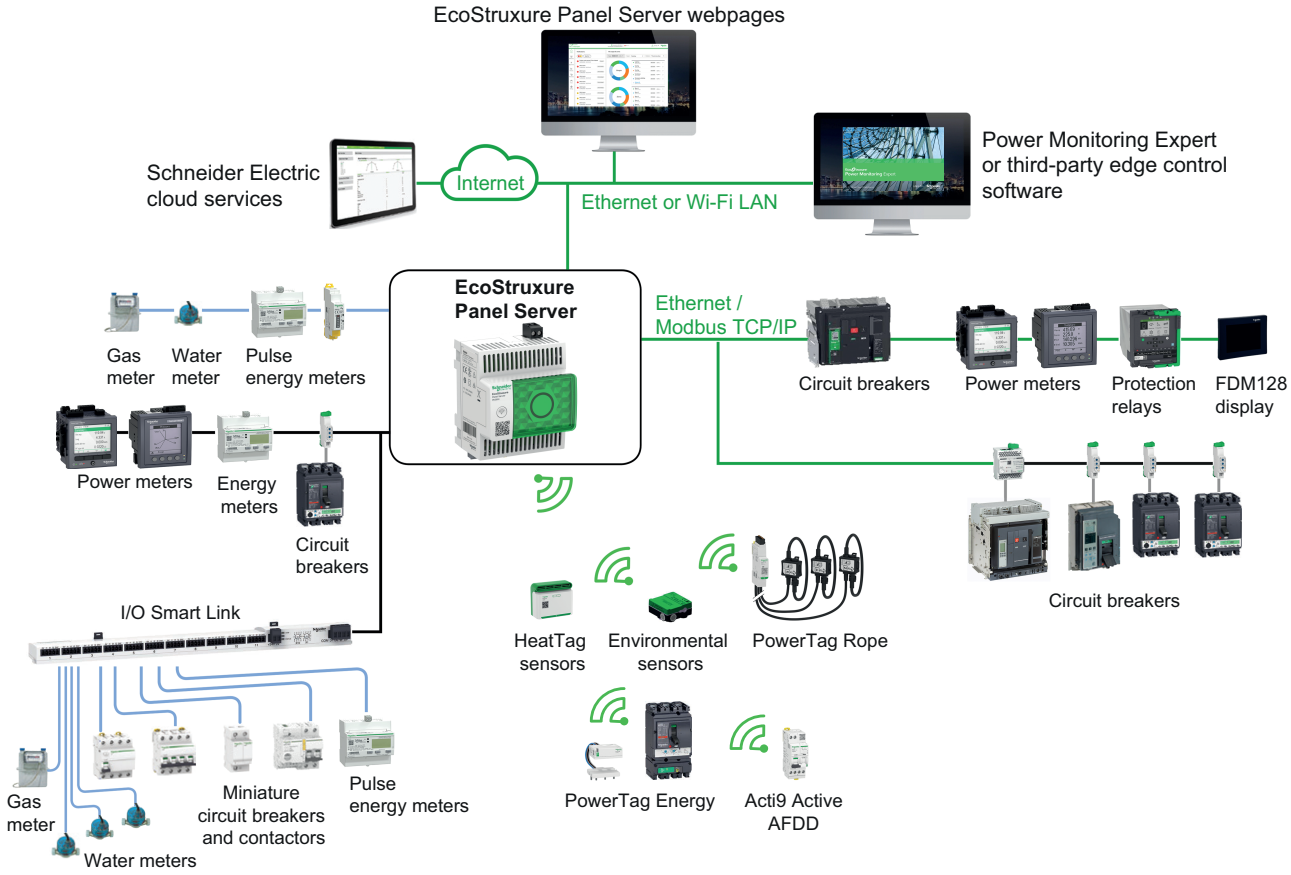
Main Features		**EcoStruxure Panel Server**								
		Entry	**Universal**					**Advanced**		
		PAS400	**PAS600**	**PAS600T**	**PAS600L**	**PAS600LWD**	**PAS600PWD**	**PAS800**	**PAS800L**	**PAS800P**
Power supply	24 Vdc	-	-	-	✓	✓	-	-	✓	-
	110-240 Vac / Vdc	-	-	✓	-	-	-	-	-	-
	110-277 Vac / Vdc	✓	✓	-	-	-	-	✓	-	-
	Power over Ethernet (PoE)	-	-	-	-	-	✓	-	-	✓
10/100BASE-T Ethernet	One RJ45 port	✓	-	-	-	-	-	-	-	-
	Two RJ45 ports	-	✓	✓	✓	✓	✓	✓	✓	✓
Upstream Modbus TCP/IP connectivity		✓	✓	✓	✓	✓	✓	✓	✓	✓
Upstream Wi-Fi connectivity		✓	✓	✓	✓	-	-	✓	✓	✓
Downstream Modbus TCP/IP connectivity		-	✓	✓	✓	✓	✓	✓	✓	✓
Downstream IEEE 802.15.4 connectivity		✓	✓	✓	✓	-	-	✓	✓	✓
Downstream Modbus-SL connectivity		-	✓	✓	✓	✓	✓	✓	✓	✓
Two digital inputs (for WAGES (Water, Air, Gas, Electricity, Steam))		-	-	-	✓	✓	-	-	✓	-
Wi-Fi external Antenna		-	✓	✓	✓	-	-	✓	✓	✓
IEEE 802.15.4 external Antenna		-	-	-	-	-	-	✓	✓	✓
Data sampling		✓	✓	✓	✓	✓	✓	✓	✓	✓
Data logging		-	-	-	-	-	-	3 years		
Data trending		-	-	-	-	-	-	✓	✓	✓
Notification of alarms		-	-	-	-	-	-	✓	✓	✓
Commissioning tool of Panel Server and connected devices		• EcoStruxure Power Commission software • EcoStruxure Panel Server webpages								
Schneider Electric cloud application		• EcoStruxure Energy Hub • EcoStruxure Facility Expert • EcoStruxure Asset Advisor • EcoStruxure Resource Advisor								

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 typical architectures of EcoStruxure Panel Server:



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.

- Entry model:

  This access is provided either through the Ethernet port on the Panel Server or through the Wi-Fi interface.

- Universal and Advanced models:

  This access is provided through the two Ethernet ports on the EcoStruxure Panel Server or through the Wi-Fi interface, where applicable.

  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.
  - In separated mode, 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 and the Ethernet ports are separated from the Wi-Fi network.

Downstream Connection (Entry Model)

Devices in the downstream network can be connected to the Panel Server Entry wireless concentrator through wireless network according to IEEE 802.15.4.

Downstream Connection (Universal and Advanced Models)

Devices in the downstream network can be connected to Panel Server Universal and Advanced through different means:

- Wireless network according to IEEE 802.15.4 (PAS600, PAS600T, PAS600L, and PAS800 series)
- Modbus-SL
- Modbus TCP/IP (Ethernet and Wi-Fi)
- Panel Server digital inputs (PAS600L, PAS600LWD, PAS800L)

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

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

Supported Devices

List of supported devices (depending on Panel Server model):

- Wired devices communicating through 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:
  - Energy-related devices:
    - PowerTag Energy and PowerLogic Tag sensors
    - Acti9 Active
  - Environmental sensors:
    - Easergy TH110/CL110
    - HeatTag sensors
    - Wireless CO_2 sensors
    - Wireless temperature and humidity sensors
    - PowerTag Ambient
    - PowerTag A
  - Control devices:
    - PowerTag Control
    - Wireless indication auxiliaries for ComPacT and PowerPacT circuit breakers
  - Other wireless devices: PowerLogic PD100

The devices supported by the Panel Server are listed in the respective release notes:

- DOCA0249EN *EcoStruxure Panel Server Entry - Firmware Release Notes*
- DOCA0178EN *EcoStruxure Panel Server Universal - Firmware Release Notes*
- DOCA0248EN *EcoStruxure Panel Server Advanced - Firmware Release Notes*

Maximum Configuration

The maximum number of devices that can be configured in a system with a Panel Server depends on the model.

Panel Server Entry

Wireless device	**Maximum concurrent number of devices**
PowerTag Energy sensors	20
PowerLogic Tag energy sensors	20
Acti9 Active devices	20
PowerTag Control devices	20
Wireless indication auxiliaries for ComPacT and PowerPacT circuit breakers	20
Wireless CO_2 sensors	20
Wireless temperature and humidity sensors	20
PowerTag A devices	20
PowerTag Ambient sensors	20
Easergy TH110/CL110 environmental sensors	20
PowerLogic HeatTag sensors	15
PowerLogic PD100 devices	15
Constraints within a mixed configuration: Any combination of wireless devices listed in the rows above must not exceed **20 devices**.	

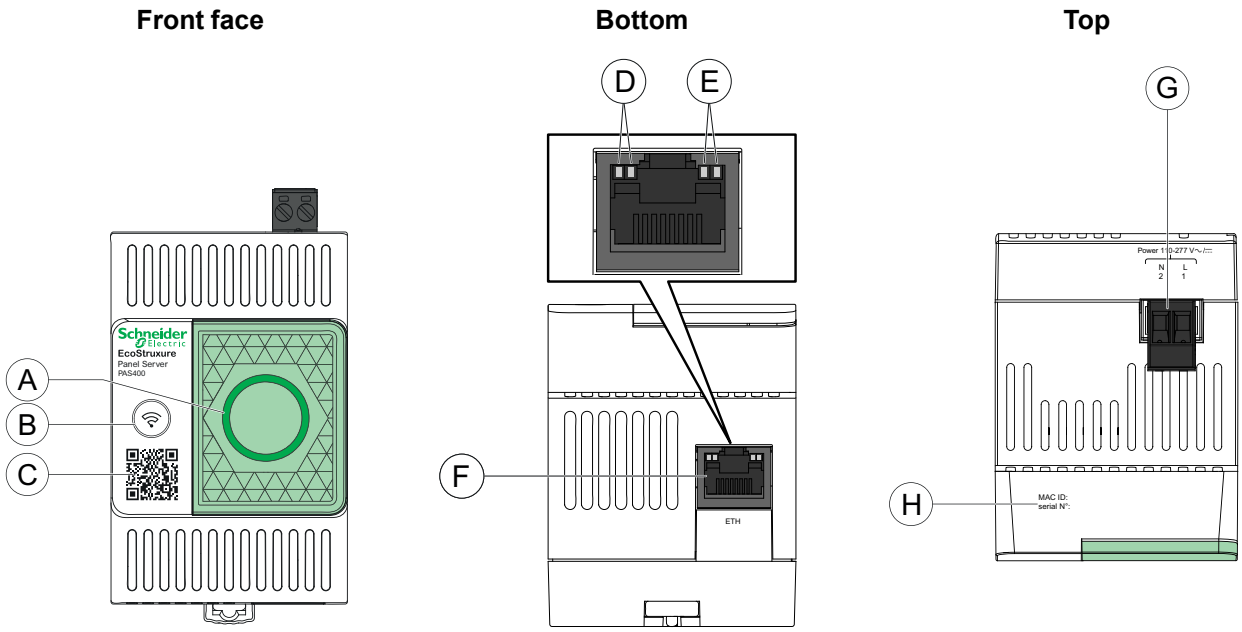
The maximum number of devices that can be configured in a system with a Panel Server Universal or Advanced depends on the type of connected devices:

Device type		**Maximum concurrent number of devices**
Wireless device (not supported by PAS600LWD and PAS600PWD)	PowerTag Energy sensors	85
	PowerLogic Tag energy sensors	85
	Acti9 Active devices	85
	Wireless indication auxiliaries for ComPacT and PowerPacT circuit breakers	85
	Wireless CO_2 sensors	85
	Wireless temperature and humidity sensors	85
	PowerTag A devices	85
	PowerTag Ambient sensors	85
	Easergy TH110/CL110 environmental sensors	85
	PowerLogic HeatTag sensors	15
	PowerTag Control devices	10
	PowerLogic PD100 devices	15
	Constraints within a mixed configuration of wireless devices: • Any combination of wireless devices listed in the rows above must not exceed **40 devices**. • The total number of PowerTag Control, PowerLogic HeatTag, and PowerLogic PD100 should not exceed **20 devices**.	
Modbus-SL devices	without repeater	32 **NOTE:** The maximum number depends on the serial line length and the type of device(s)
	with repeater	128
	Acti9 Smartlink Modbus-SL device or I/O Smart Link device	8
Modbus TCP/IP devices	Devices physically connected to the Panel Server and virtual devices, that is, IEEE 802.15.4 wireless devices connected to a child Panel Server gateway	128 **NOTE:** The Panel Server supports 64 simultaneous Modbus TCP/IP client connections (for example, SCADA system).

For more information, contact your local Schneider Electric representative.

Hardware Description

Panel Server Entry

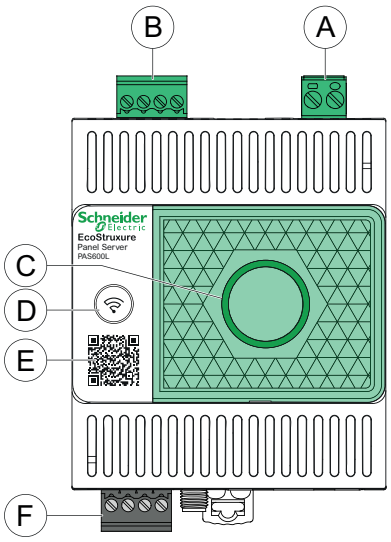


A. EcoStruxure Panel Server status LED
B. Restart button
C. QR code to product information
D. Ethernet LED 1: Speed
E. Ethernet LED 2: Activity
F. Ethernet communication port
G. Power supply terminal block
H. MAC address and serial number

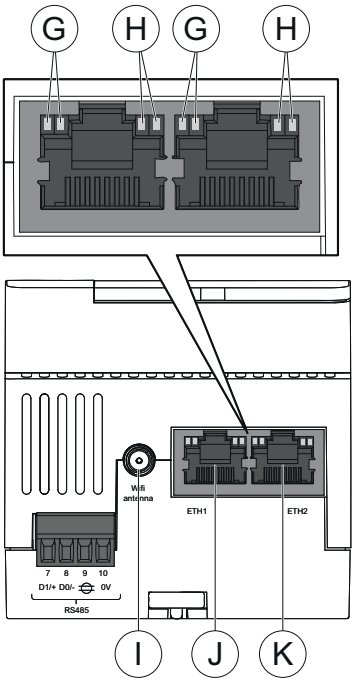
For information about installation of Panel Server Entry, consult the instruction sheet available on the Schneider Electric website: NNZ76760.

Panel Server Universal

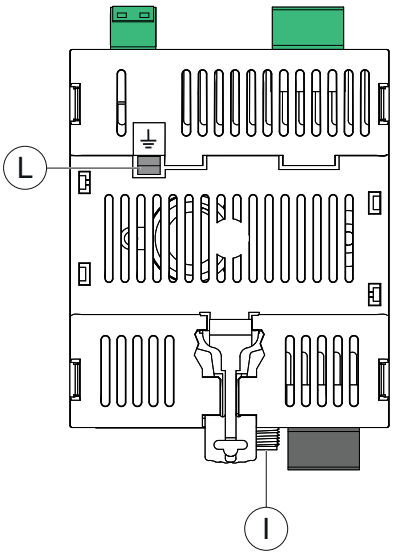
Front face



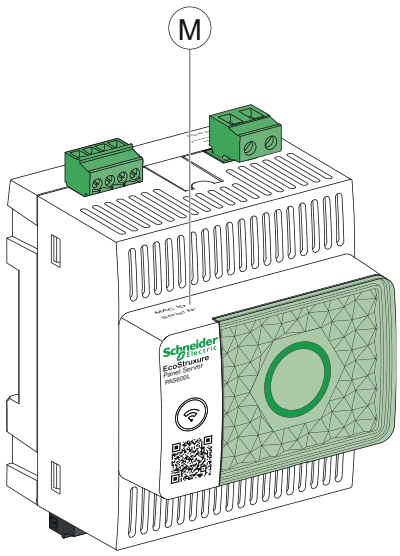
Bottom



Rear



Top

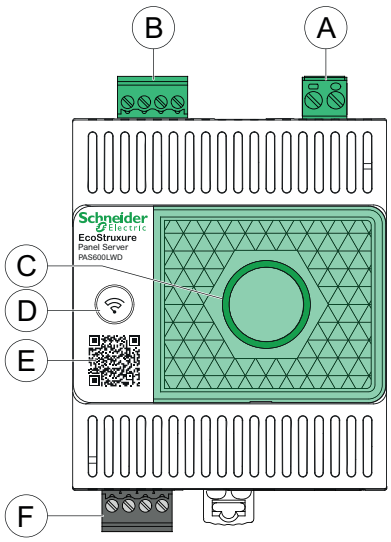


A. Power supply terminal block
B. Digital input terminal block (PAS600L)
C. EcoStruxure Panel Server status LED
D. Restart button
E. QR code to product information
F. RS485 Modbus communication port
G. Ethernet LED 1: Speed
H. Ethernet LED 2: Activity
I. External Wi-Fi antenna port
J. Ethernet 1 communication port
K. Ethernet 2 communication port
L. Grounding connection
M. MAC address and serial number

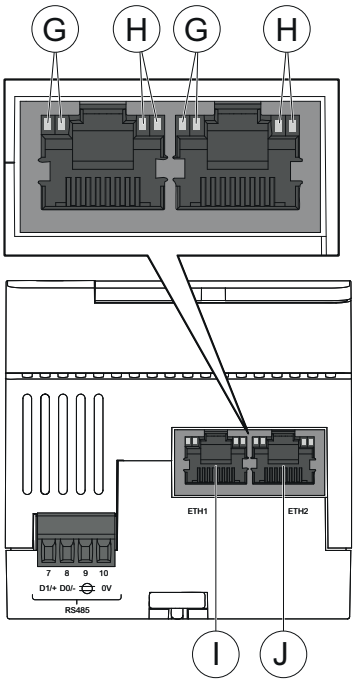
For information about installation of Panel Server Universal, consult the relevant instruction sheet available on the Schneider Electric website: GDE74119

Panel Server Universal Wired by Design

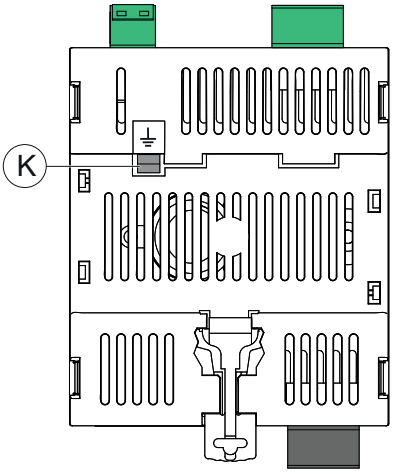
Front face



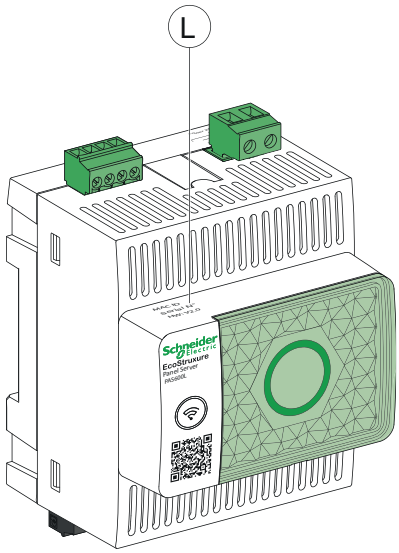
Bottom



Rear



Top

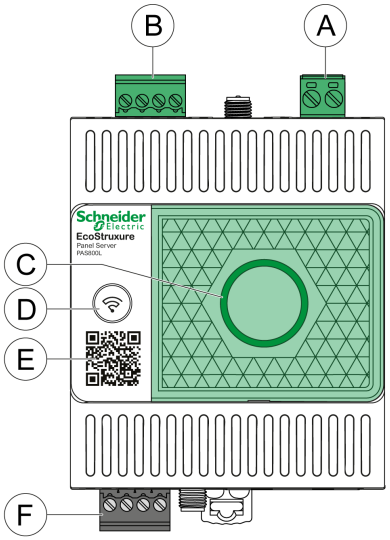


A. Power supply terminal block
B. Digital input terminal block (PAS600LWD)
C. EcoStruxure Panel Server status LED
D. Restart button
E. QR code to product information
F. RS485 Modbus communication port
G. Ethernet LED 1: Speed
H. Ethernet LED 2: Activity
I. Ethernet 1 communication port
J. Ethernet 2 communication port
K. Grounding connection
L. MAC address, serial number, and hardware version HW: V2.0

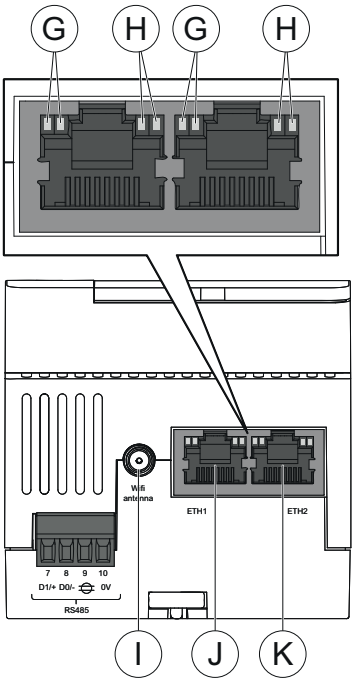
For information about installation of Panel Server Universal Wired by Design, consult the instruction sheet available on the Schneider Electric website: PKR28607.

Panel Server Advanced

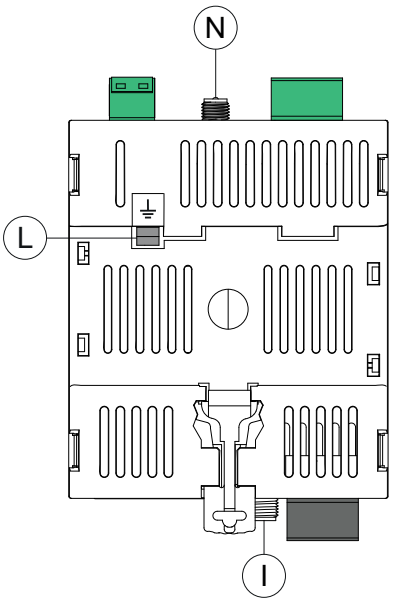
Front face



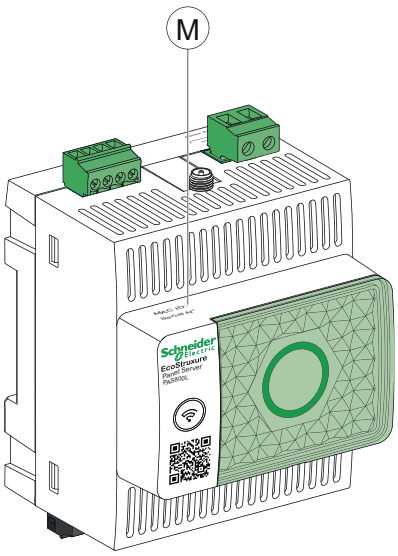
Bottom



Rear



Top



A. Power supply terminal block (PAS800, PAS800L)
B. Digital input terminal block (PAS800L)
C. EcoStruxure Panel Server status LED
D. Restart button
E. QR code to product information
F. RS485 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
M. MAC address and serial number
N. External IEEE 802.15.4 antenna port (PAS800, PAS800L)

For information about installation of Panel Server Advanced, consult the relevant instruction sheet available on the Schneider Electric website

For information about installation of Panel Server Advanced, consult the instruction sheet available on the Schneider Electric website: JYT24469.

Hardware Version

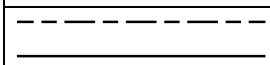
The new models of EcoStruxure Panel Server, PAS600LWD and PAS600PWD are released with hardware version 002.000.000.

To identify your hardware version, check in one of the following ways:

- The information printed on the top of the Panel Server:
  - Hardware version 001.000.000: MAC address and serial number
  - Hardware version 002.000.000: MAC address, serial number, and HW: V2.0
- In the Panel Server webpages at either of the following paths:
  - **Settings > General > Identification > Hardware revision**
  - **Maintenance > Firmware update > Hardware revision**

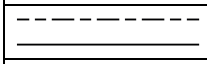
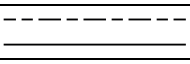
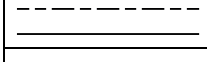
EcoStruxure Panel Server Status LED

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

LED indication	Description
	EcoStruxure Panel Server switched off.
	EcoStruxure Panel Server is powering on. System boots within 2 minutes.
	EcoStruxure Panel Server in normal operation.
	Minor malfunction detected. Connect to EcoStruxure Panel Server software to diagnose.
	Major malfunction detected. EcoStruxure Panel Server must be replaced.

Ethernet Status LEDs

The combination of the two 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
		10 Mb Ethernet communication active
		100 Mb Ethernet communication active

Restart Button

To restart the EcoStruxure Panel Server:

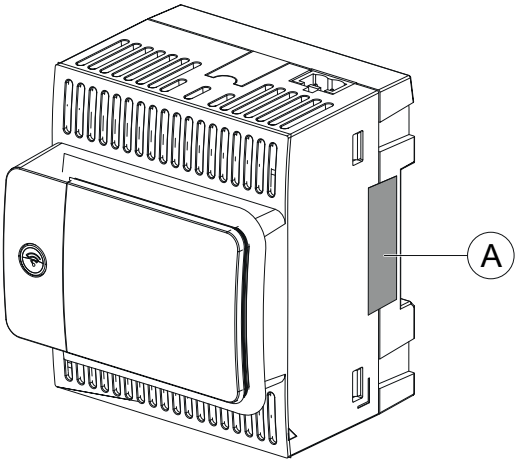
1. Press and hold the button for more than 10 seconds then release it.

   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.

External Wi-Fi Antenna (Optional)

The external Wi-Fi antenna is an option for Panel Server Universal (except Wired by Design models) and Advanced.

Use the external Wi-Fi antenna in specific use cases such as when the Panel Server is installed in a switchboard with metallic partitions and door. The antenna improves the quality of radio frequency signal.

Connect the Wi-Fi antenna (reference PASA-ANT1) at the bottom of the Panel Server and install the antenna on the roof of the switchboard.

For information about installation of the external antenna, consult the instruction sheet available on the Schneider Electric website: NNZ58425.

For information about Wi-Fi communication in the Panel Server system, consult DOCA0289EN *Wireless Communication Architectures With EcoStruxure Panel Server - Design Guide*.

External IEEE 802.15.4 Antenna (Optional)

The external IEEE 802.15.4 antenna is an option for Panel Server Advanced.

Use the external IEEE 802.15.4 antenna in specific use cases such as when the Panel Server Advanced is installed in a switchboard with metallic partitions and door and some wireless devices are located in a different place. The antenna extends the wireless network outside the switchboard.

Connect the IEEE 802.15.4 antenna (reference PASA-ANT1) at the top of the Panel Server Advanced and install the antenna on the roof of the switchboard.

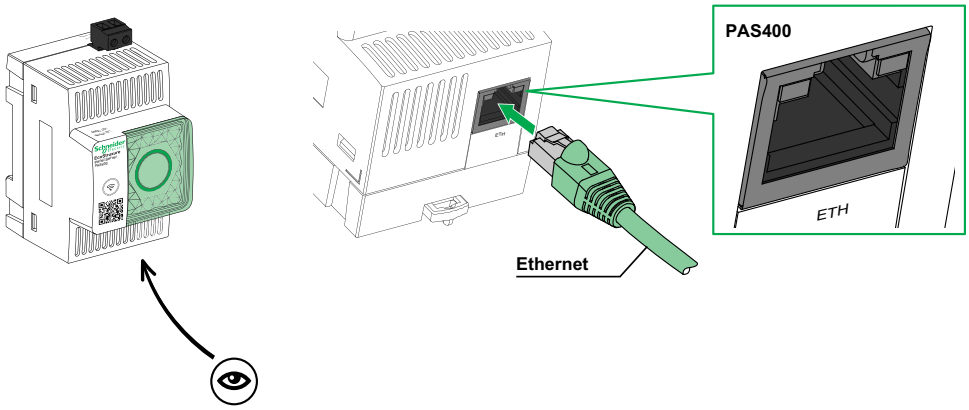
For information about installation of the external antenna, consult the instruction sheet available on the Schneider Electric website: NNZ58425.

For information about wireless communication in the Panel Server system, consult DOCA0289EN *Wireless Communication Architectures With EcoStruxure Panel Server - Design Guide*.

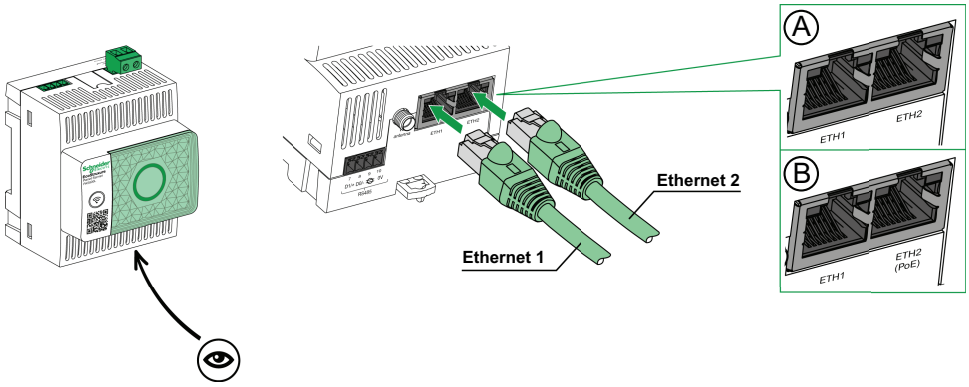
Hardware Connection

Connection to Ethernet

Entry model



Universal, Advanced models



A. Ethernet ports for PAS600, PAS600T, PAS600L, PAS600LWD, PAS800, PAS800L

B. Ethernet ports for PAS600PWD, PAS800P

NOTE: PAS600PWD and PAS800P can be powered by Power over Ethernet (PoE). For information about connection of these models to an Ethernet switch with Endspan PoE ports or Midspan PoE ports, consult the instruction sheet available on the Schneider Electric website:

- PKR28607 *EcoStruxure Panel Server Universal Wired by Design - Instruction Sheet* for PAS600PWD
- JYT24469 *EcoStruxure Panel Server Advanced - Instruction Sheet* for PAS800P

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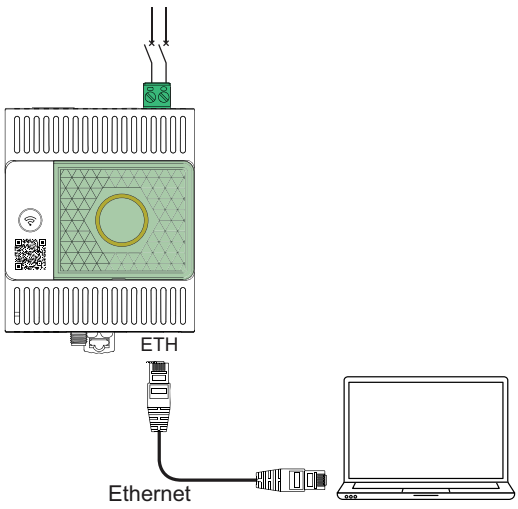
Connection to a PC



Proceed as follows to connect a PC to a Panel Server through Ethernet:

- Entry model: connect an Ethernet cable between the PC and the Ethernet port on Panel Server.
- Universal and Advanced models: connect an Ethernet cable between the PC and one of the Ethernet ports on 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
- Advanced 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, and 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 Schneider Electric cloud repository.
  - Initiate 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.
  - Simplify project handover with the digital logbook functionality, 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

What's in This Chapter

EcoStruxure Panel Server Webpages Overview 28
Edge Monitoring and Supervision Software 28
Cloud Applications..... 29

EcoStruxure Panel Server Webpages Overview

The web server embedded in the EcoStruxure Panel Server provides webpages enabling you to commission electrical products and systems compatible with the EcoStruxure Panel Server in your switchboard.

In addition the webpages provide real-time data and alarm views, and historical analysis from devices (depending on the model), for entry-level energy and operation management.

Electrical product and commissioning capabilities allow you to:

- Define and pair wireless devices installed in the EcoStruxure Panel Server system (depending on the model)
- Define and discover Modbus TCP/IP devices from EcoStruxure Panel Server (depending on the model)

Energy and operation management capabilities allow you to:

- View real-time data and events locally or remotely through a supported web browser.
- View trending on historical data, up to a period of 3 years (Advanced model).
- Select the device data you want to log, and set logging intervals (Advanced model).
- Export selected logged data to your PC or an SFTP server for additional analysis (Advanced model).
- Provide data and improve system security through password protection and controlled access to individual webpages.

For more detailed information about the webpages, refer to EcoStruxure Panel Server Webpages, page 138.

Edge Monitoring and Supervision Software

EcoStruxure Power Monitoring Expert (PME)

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

EcoStruxure Power Monitoring Expert 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 Building Operation (EBO)

EcoStruxure Building Operation is an integrated building management system that delivers the actionable insights needed to better manage and optimize buildings,

improve engineering efficiency, and meet cybersecurity needs. EcoStruxure Building Operation is an open building management platform that integrates multiple systems for centralized, real-time control and management across one to many enterprise buildings.

EcoStruxure Power Operation (EPO)

EcoStruxure Power Operation is a SCADA system uniquely designed to help large electrical distribution applications in facilities like data centers, industrials, airports and electro-intensive operations maximize uptime, unite their medium and low voltage networks and integrate mechanical monitoring. With rich data integration from connected devices, EcoStruxure Power Operation unique capabilities provide real-time situational awareness and offer a high-performance, cyber-resilient solution for your specialized power network.

Cloud Applications

EcoStruxure Energy Hub (EEH)

Connect your building energy systems and smart devices with EcoStruxure Energy Hub. Automatically collect, store, visualize, report, and alarm on your data to simplify the energy management of digitalized electrical and energy systems in commercial, industrial and institutional buildings.

As power digitalization continues to transform our electrical distribution infrastructure, today's commercial, industrial and institutional buildings face increasing regulatory requirements and public interest in sustainability and decarbonization. Building owners and operators need to ensure compliance with building codes/standards as well as demonstrate to occupants, future tenants, and investors that their building is up to the sustainability challenge.

- Hit energy targets and comply with standards
- Track and retain energy data for transparency and compliance requirements
- Benchmark buildings' energy performance and identify savings opportunities
- Break down energy use by area, zone, and usage type
- Easily visualize your energy system status and alert maintenance of detected faults
- Diagnose and resolve issues quickly

EcoStruxure Energy Hub is designed to address these challenges with a simple, smart energy application for your building, without a large upfront investment.

EcoStruxure Facility Expert (EFE)

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 (EAA)

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 (ERA)

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 • EAC • CB • WPC • IMDA
Ambient temperature during storage		-40 °C to +85 °C (-40 °F to +185 °F)
Ambient temperature in operation: < 2000 m (< 6500 ft)	Horizontal installation (for indoor use in non-wet locations only)	• Entry model: -25 °C to +60 °C (-13 °F to +140 °F) • Universal, Advanced models: -25 °C to +70 °C (-13 °F to +158 °F)
	Vertical installation (for indoor use in non-wet locations only)	• Entry model: -25 °C to +45 °C (-13 °F to +113 °F) • Universal, Advanced models: -25 °C to +50 °C (-13 °F to +122 °F)
Ambient temperature in operation: 2000–4000 m (6500–13000 ft)	PAS600L, PAS600LWD, PAS800L	+60 °C (+142 °F)
Pollution degree	PAS400, PAS600, PAS600T, PAS600PWD, PAS800, PAS800P	2
	PAS600L, PAS600LWD, PAS800L	3
Altitude	All models	< 2000 m (< 6500 ft)
	PAS600L, PAS600LWD, PAS800L	< 4000 m (< 13000 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 • IEC 62974-1 • EN 301489-1 • EN 301489-17
Immunity		• IEC 61326-1 • IEC 62974-1 • EN 301489-1 • EN 301489-17
Environment: emissions		• CISPR 11 • EN 55032
Electromagnetic compatibility and Radio spectrum Matters (ERM)		• EN 300328 • EN 301893
Mean time to failure (MTTF)		More than a million hours. See following table.

Mean time to failure

Product	MTTF (years)
PAS400	307
PAS600, PAS600T, PAS600L, PAS600LWD, PAS600PWD	208
PAS800, PAS800L, PAS800P	172

Communication Characteristics

Characteristic	Value
Communication interface	• 10/100BASE-T Ethernet RJ45 ports: ◦ Entry model: one port ◦ Universal and Advanced models: two ports • RS485 Modbus port • Wi-Fi compliant to standard IEEE 802.11 a/b/g/n ◦ Universal models: 2.4 GHz ◦ Entry, , and Advanced models: 2.4 GHz, 5 GHz • IEEE 802.15.4 (all models, excluding WD models) • Ethernet 2 IEEE 802.3af (802.3at Type 1) (PAS600PWD, PAS800P)
Automatic IP configuration	DPWS-ready, DHCP client IPv4, IPv6
IP network	• Modbus TCP/IP connection • HTTPS
Radio frequency ISM band	2.4 GHz to 2.4835 GHz (in accordance with IEEE 802.15.4 standard) (all models, excluding WD models)

Electrical Characteristics

Characteristic		EcoStruxure Panel Server								
		Entry	Universal					Advanced		
		PAS400	PAS600	PAS600T	PAS600L	PAS600LWD	PAS600PWD	PAS800	PAS800L	PAS800P
Power supply	110–277 Vac/dc (±10 %)	✓	✓	-	-	-	-	✓	-	-
	24 Vdc (±10 %)	-	-	-	✓	✓	-	-	✓	-
	110–240 Vac/dc (±10 %)	-	-	✓	-	-	-	-	-	-
	Power over Ethernet (PoE)	-	-	-	-	-	✓	-	-	✓
Power consumption	3W (10VA) (maximum)	-	✓	✓	-	-	-	-	-	-
	3W (maximum)	-	-	-	✓	-	-	-	-	-
	3.5W (12VA) (maximum)	✓	-	-	-	-	-	✓	-	-
	3.5W (maximum)	-	-	-	-	✓	✓	-	✓	✓
Power input	• Power over Ethernet: Class 0 • Operating Input Range: 37–57 Vdc • Rating: < 3.5 W (72 mA) 48 Vdc typical	-	-	-	-	-	✓	-	-	✓
Frequency	50-60 Hz (±5 Hz)	✓	✓	-	-	-	-	✓	-	-
	50-60 Hz (±3 Hz)	-	-	✓	-	-	-	-	-	-
Overvoltage category		III	III					III		

IEC62974-1 Certification Characteristics

Characteristic	Value
PAS400	Data gateway (in accordance with IEC 62974-1 standard, Class 2, -5° C to +55° C (23 °F to 131 ° F))
PAS600, PAS600T, PAS600L, PAS600LWD, PAS600PWD	Data gateway (in accordance with IEC 62974-1 standard, Class 2, -25° C to +70° C (-13 °F to +158 °F))
PAS800, PAS800L, PAS800P	Energy server (in accordance with IEC 62974-1 standard, Class 2, -25° C to +70° C (-13 °F to +158 °F))

Physical Characteristics

.

Characteristic		Value
Dimensions (L x H x D)	PAS400	54 x 93 x 70.2 mm (2.12 x 3.66 x 2.76 in)
	PAS600, PAS600T, PAS600L, PAS600LWD, PAS600PWD, PAS800, PAS800L, PAS800P	72 x 93 x 70.2 mm (2.83 x 3.66 x 2.76 in)
Weight	PAS400	163 g (5.7 oz)
	PAS600, PAS600T	201 g (7 oz)
	PAS600L	181 g (6.38 oz)
	PAS600LWD	180 g (6.34 oz)
	PAS600PWD	182 g (6.42 oz)
	PAS800	206 g (7.3 oz)
	PAS800L	186 g (6.6 oz)
	PAS800P	184 g (6.5 oz)
Mounting		DIN rail
Connections		Screw type terminal blocks
Antenna		• External Wi-Fi antenna (option for Advanced models) • External IEEE 802.15.4 antenna (option for Universal, excluding WD models, and Advanced models)
Degree of protection		• Connectors: IP20 • Other faces: IP30 • Front face nose: IP40

Digital Inputs Characteristics

Characteristic	Value
Number of digital inputs	2
Digital input type	Current sink, compliant with IEC 61131-2, type 1
Rated input voltage	24 V
Input voltage limits	19.2–28.8 Vdc
Input voltage logic	• State 0: 0–5 V • State 1: 15–28 V
Input current	• State 0: 0 mA

Characteristic	Value
	• State 1: 3–7.5 mA
Isolation	Functional isolation
Maximum cable support	10 m (32.8 ft)

Wi-Fi Antenna Characteristics

Characteristic	Value
Antenna frequency range	Dual band: 2.4 GHz, 5 GHz
Kit composition	Antenna with cable 3 m (9.84 ft)
Input impedance	50 Ω
Connector	RPSMA plug antenna gain 2–3 dBi
Net weight	150 g (5.29 oz)

IEEE 802.15.4 Antenna Characteristics

Characteristic	Value
Antenna frequency range	Dual band: 2.4 GHz, 5 GHz
Kit composition	Antenna with cable 3 m (9.84 ft)
Input impedance	50 Ω
Connector	RPSMA plug antenna gain 2–3 dBi
Net weight	150 g (5.29 oz)

Miscellaneous

The EcoStruxure Panel Server complies with the *DNV rules for classification - Ships, offshore units, high speed and light craft*. The Entry (PAS400), Universal (PAS600) and Advanced (PAS800) models can be installed on all vessels classified by DNV as per the Type Approval Certificate issued by DNV.

Schneider Electric Green Premium™ Ecolabel

Description

Green Premium 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 navigating to the product page on the mySchneider application on your smartphone

  NOTE: To download and install the mySchneider app, scan the QR code on the front face of any Schneider Electric product and click the mySchneider link to go to your app store.

Checking Products Through the Schneider Electric Website

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

Step	Action
1	On the Green Premium page, select **Sustainability > For customers > Green Premium products**.
2	Click **Check your product and access environmental data**.
3	On the page **Check a product**, manually enter the commercial reference or product range of the product to search for. **NOTE:** You can also select the **Search a list of part numbers** tab to send a file with a list of commercial references of products to search for.
4	To search for several products simultaneously, click the **Add product** button, and then fill in the fields.
5	Click **Check product(s)** to generate a report of the environmental criteria available for the products with the entered commercial references.
6	A window named **Green Premium Declaration** appears. Click on **I accept** to access the product information.
7	The **Check a product** page is displayed with the list of documents for the selected products for each type of environmental data. Each document can be downloaded to your PC.

Checking Products Through the mySchneider App

To check the environmental criteria of a product using mySchneider app on your smartphone, follow these steps:

Step	Action
1	Open the mySchneider app.
2	In the search field at the top of the **Product Catalog** page: • Enter the commercial reference of the product to search for • or press the QR code icon in the search box and scan the QR code on the front face of the product to search for.
3	When the page of the commercial reference searched for opens, scroll down and select **Green Premium**.
4	The Green Premium documents attached to the product are listed on the Green Premium page. Select the required document to consult or download it.

Environmental Criteria

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

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

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 RoHS criteria defined by the European Union.
- The RoHS criteria defined by China.

REACh

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

Product Environmental Profile (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. Product environmental profile is especially useful for monitoring, controlling, saving energy, and/or reducing carbon emissions.

End of Life Instructions (EoLI)

The end of life instructions are in compliance with the Waste Electrical and Electronic Equipment (WEEE) directive and 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

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Communication Architectures

Overview

Panel Server Universal and Advanced feature two Ethernet ports and Wi-Fi connection. The Panel Server Entry features one Ethernet port and Wi-Fi connection

This topic presents several typical architectures that can be built with a Panel Server Entry, Universal or Advanced to highlight the use cases they serve.

Availability

This function is available on Panel Server Entry, Universal, and Advanced.

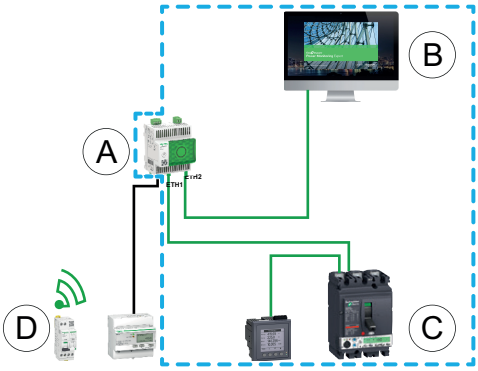
Switched Ethernet Network

When the Panel Server is configured in switched Ethernet mode, either ETH1 or ETH2 can be used for cloud connectivity and/or downstream device aggregation (single IP interface). Downstream devices connected to the same subnet as the Panel Server are reachable.

The following diagram illustrates a daisy-chain architecture with Ethernet port configuration in switched mode. Both Ethernet ports are connected together using the Panel Server internal Ethernet switch.

This architecture enables devices located upstream or downstream from the Panel Server to communicate together as part of the same network.

Switched Mode Configuration is available only for Universal and Advanced Models.



A. Panel Server
B. Edge monitoring and supervision software such as EcoStruxure Power Monitoring Expert or EcoStruxure Power Operation or EcoStruxure cloud services such as EcoStruxure Asset Advisor and EcoStruxure Resource Advisor
C. Wired devices
D. Wireless devices

IP communication area where **ETH1** and **ETH2** ports belong to the same IP network.

To set up this architecture:

- Configure Ethernet network in the switched mode.
- Enable Modbus service on Panel Server Ethernet ports.

Separated Ethernet Network

This architecture is recommended for network security:

- This architecture keeps the Ethernet network segregated.
- No IP packet is forwarded between Panel Server ports ETH1 and ETH2.
- Modbus server can be enabled on Panel Server port ETH1 or ETH2.

The Panel Server supports direct connection to a PC on either of the Ethernet ports (ETH1 and ETH2). When connected, it is possible to ping and/or access the Panel Server webpages from a PC. Note that SSH connection is not supported.

When the Panel Server is configured in separated Ethernet mode, ETH1 is used as the upstream interface (default route passes through ETH1). ETH2 port is used for downstream device aggregation and only devices connected to the same subnet are reachable.

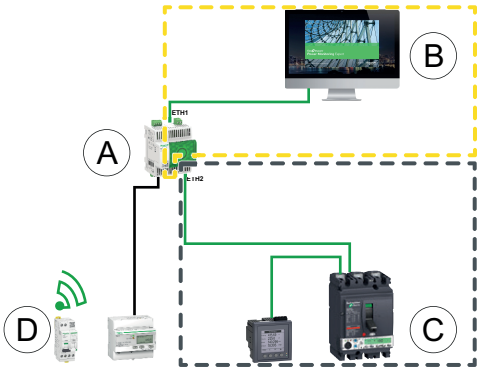
The following diagram illustrates an architecture with Ethernet port configuration in separated mode:

- In the case of cloud connection, this architecture allows you to avoid malicious access to the downstream devices (including Modbus TCP/IP devices connected on ETH2). Cloud connection is done through ETH1 port. Modbus TCP/IP server is disabled on ETH1 port.

  Modbus TCP/IP server on ETH2 port can also be disabled.
- In the case of edge software, this architecture allows you to separate electrical distribution devices from the IT network (LAN) and also allows you to have a single IP address to access the electrical distribution devices. Modbus TCP/IP client is enabled on ETH1port to allow the edge software to access data within devices connected to ETH2 port.

  Modbus TCP/IP server on ETH2 port can be disabled.

Separated Mode Configuration is available only for Universal and Advanced Models.



A. Panel Server
B. Edge monitoring and supervision software such as EcoStruxure Power Monitoring Expert or EcoStruxure Power Operation or EcoStruxure cloud services such as EcoStruxure Asset Advisor and EcoStruxure Resource Advisor
C. Wired devices
D. Wireless devices

IP communication area accessible from **ETH1** port

IP communication area accessible from **ETH2** port

To set up this architecture:

- Configure Ethernet network in the separated mode.
- Disable Modbus service on ETH1 port if you want to block upstream software using Modbus TCP/IP to access Panel Server and downstream devices.

In this case, an edge software connected upstream will not have access to the Panel Server and the devices connected.

Separated Ethernet network with two Ethernet ports enabled upstream

The Panel Server supports polling of serial devices connected downstream from two isolated Ethernet networks.

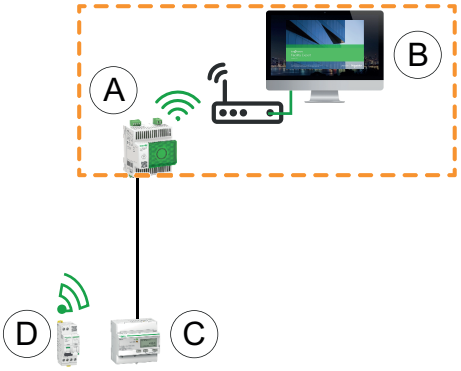
To set up this architecture:

- Configure Ethernet network in the separated mode.
- Enable Modbus service on ETH1 and ETH2 ports to allow upstream software using Modbus TCP/IP to access the Panel Server and downstream devices.

Wi-Fi Network

The following diagram illustrates an architecture with Wi-Fi only.

This architecture allows you to leverage Wi-Fi infrastructure network to avoid wiring a solid Ethernet cable. Depending on the upstream application (for example, SCADA or cloud), Modbus service on Wi-Fi interface can be disabled to avoid malicious access to downstream Modbus and wireless devices.



A. Panel Server
B. Edge monitoring and supervision software such as EcoStruxure Power Monitoring Expert or EcoStruxure Power Operation or EcoStruxure cloud services such as EcoStruxure Asset Advisor and EcoStruxure Resource Advisor
C. Wired devices
D. Wireless devices

IP communication area accessible from Wi-Fi interface

To set up this architecture:

- Enable Wi-Fi.
- Disable Modbus service on Wi-Fi interface if you want to block upstream software using Modbus TCP/IP to access Panel Server and downstream devices.

This set up is possible through the Panel Server webpages, not EcoStruxure Power Commission software.

Network with Wi-Fi and Switched Ethernet Network

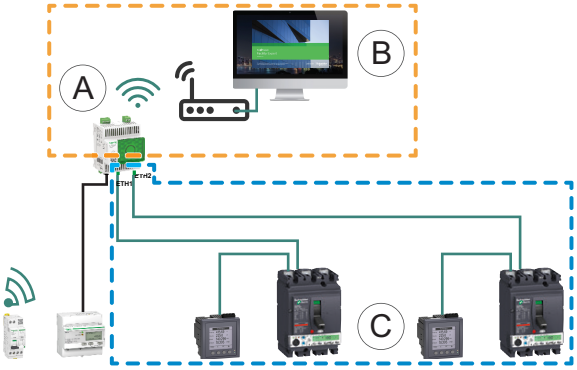
The following diagram illustrates an architecture with Wi-Fi upstream and Ethernet port configuration in switched mode downstream. There is one downstream Ethernet network. The Wi-Fi and Ethernet networks managed by the Panel Server are separated.

This architecture allows you to leverage Wi-Fi infrastructure network to avoid wiring a solid Ethernet cable. Depending on the upstream application (SCADA, cloud, or web browser), Modbus service can be disabled to avoid malicious access to Modbus and wireless devices.

If the upstream system is an edge control software using Modbus TCP/IP service, then Modbus service needs to be enabled on Wi-Fi. Modbus service can be disabled on ports ETH1 and ETH2.

If the upstream system is a web browser accessing the Panel Server webpages or a cloud application, then Modbus service can be disabled on Wi-Fi and on ports ETH1 and ETH2.

Switched mode configuration is available only for Universal and Advanced models.



A. Panel Server
B. Edge monitoring and supervision software (for example, EcoStruxure Power Monitoring Expert or EcoStruxure Power Operation) or EcoStruxure cloud services (for example, EcoStruxure Asset Advisor and EcoStruxure Resource Advisor)
C. Devices

IP communication area accessible from Wi-Fi interface

IP communication area accessible from ports **ETH1** and **ETH2**

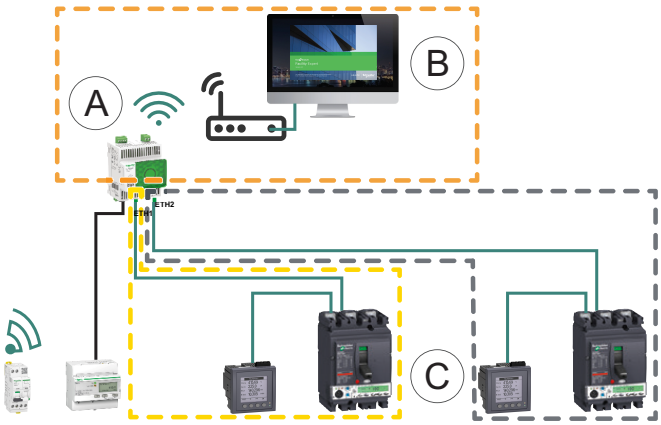
To set up this architecture:

- Enable Wi-Fi.
- Configure Ethernet network in the switched mode.
- Disable Modbus service on Wi-Fi interface if you want to block Wi-Fi access to Panel Server and downstream devices.

Network with Wi-Fi and Separated Ethernet Network

The following diagram illustrates an architecture with Wi-Fi upstream and Ethernet port configuration in separated mode downstream. There are two downstream Ethernet networks. The Wi-Fi and Ethernet networks managed by the Panel Server are always separated.

This architecture allows you to leverage Wi-Fi infrastructure network to avoid wiring a solid Ethernet cable. Depending on the upstream application (SCADA, cloud, or web browser), Modbus service can be disabled on a per interface basis (ETH1/ETH2/Wi-Fi) for optimized security.



A. Panel Server

B. Edge monitoring and supervision software (for example, EcoStruxure Power Monitoring Expert or EcoStruxure Power Operation) or EcoStruxure cloud services (for example EcoStruxure Asset Advisor and EcoStruxure Resource Advisor)

C. Devices

IP communication area accessible from Wi-Fi interface

IP communication area accessible from **ETH1** port

IP communication area accessible from **ETH2** port

To set up this architecture:

- Enable Wi-Fi.
- Configure Ethernet network in the separated mode.
- Disable Modbus service on the one or several interfaces where Modbus TCP/IP server is not used if you want to help prevent malicious access to the Modbus devices through these interfaces.

  NOTE: This architecture is technically feasible but complex to set up, therefore the architecture with Wi-Fi and switched ETH1/ETH2 ports should be preferred.

Network Settings

Overview

EcoStruxure Panel Server features wired and wireless communication and enables network communication. The Panel Server offers the following connection interfaces:

- Ethernet:
  - One port on Entry model
  - Two ports on Universal and Advanced models
- Wi-Fi (depending on the model)

Availability

This function is available on Panel Server Entry, Universal, and Advanced.

Setting the Parameters

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.

For detailed information about a network configuration option and settings, see:

- Switched Mode Configuration (Universal and Advanced models), page 48
- separated Mode Configuration (Universal and Advanced models), page 49
- Wi-Fi, page 52
- Modbus TCP/IP Client (Universal and Advanced models), page 60
- Modbus TCP/IP Server, page 72

TCP/IP Communication

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Ethernet Communication

Presentation

The EcoStruxure Panel Server supports the following applicative protocols on Ethernet:

- **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 through the TCP port that has been configured (port 502 by default).
- **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 Panel Server.
- **Secure File Transfer Protocol (SFTP) Client:** A variant of the standard file transfer protocol (FTP) that uses secure shell encryption to provide a high level of security for file transfer.

The Entry model has one Ethernet port.

The Universal and Advanced models have two Ethernet ports. The Ethernet ports can be configured in two modes:

- Switched mode:
  - Both Ethernet ports belong to the same network.
  - An Ethernet switch function is enabled.
- Separated mode:
  - Both Ethernet ports are connected to separate local area networks (LAN).
  - Ports are isolated one from another, that is, neither router nor forwarding packets are enabled from TCP/IP standpoint.
  - Modbus routing can be enabled from port ETH1 to ETH2 by enabling Modbus service on ETH1.
  - Modbus routing can be enabled from port ETH2 to ETH1 by enabling Modbus service on ETH2.

Availability

The Ethernet communication function is available on Panel Server Entry, Universal, and Advanced.

Switched Mode Configuration (Universal and Advanced Models)

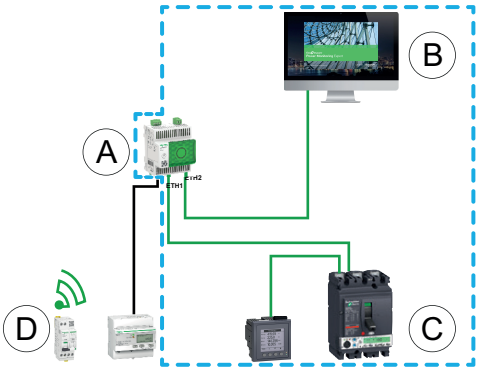
In switched mode, both Ethernet ports (ETH1, ETH2) share the same settings. The Panel Server has one single unique IP address applied to both Ethernet ports. Devices connected to either Ethernet port belong to the same Ethernet network.

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.
- Multiple Ethernet devices relying on the embedded hardware switch inside the Panel Server can be daisy-chained. Daisy-chaining allows devices located on either side of the Panel Server to communicate with each other as part of the same network.

NOTE: Ring topology is not supported.

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



A. Panel Server

B. Edge monitoring and supervision software (for example, EcoStruxure Power Monitoring Expert or EcoStruxure Power Operation) or EcoStruxure cloud services (for example, EcoStruxure Resource Advisor)

C. Wired devices

D. Wireless devices

IP communication area where ports **ETH1** and **ETH2** belong to the same IP network.

Separated Mode Configuration (Universal and Advanced Models)

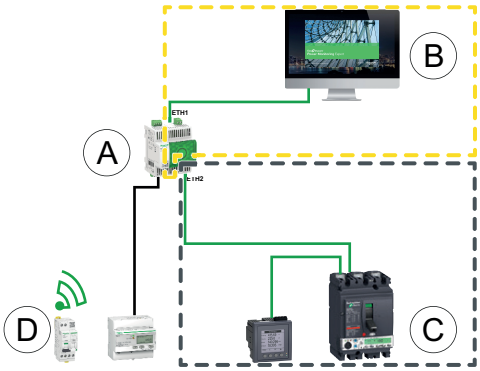
In separated mode, one IP network is assigned to each Panel Server Ethernet port and each IP network assigns an IP address to the Panel Server. The separated mode is used to segregate downstream Modbus TCP/IP devices connected to **ETH2** port from upstream communication systems connected to **ETH1** port. There are neither router nor forwarding packets at the network level. Only Modbus routing can be enabled.

The two Ethernet ports have different settings and function independently.

ETH1 is the port used for data publishing to a cloud application or a SCADA system. This port can be configured in DHCP client or static IPv4 address. Modbus service can be disabled if the upstream system is a cloud application or a web browser to access the Panel Server webpages. Modbus service needs to be enabled if the upstream system is a SCADA or a Building Management System using Modbus TCP/IP communication.

ETH2 is the port used for data collection to connect downstream Modbus TCP/IP devices for either data collection to a cloud application connected to ETH1or management by a SCADA system connected to ETH1. This port can be configured in DHCP client or static IPv4 address. Modbus service needs to be enabled on ETH1 in case of connection to a SCADA system. It is recommended to disable it in case of connection to a cloud application.

The following diagram illustrates an architecture with Ethernet port configuration in separated mode.



A. Panel Server

B. Edge monitoring and supervision software like EcoStruxure Power Monitoring Expert or EcoStruxure Power Operation or EcoStruxure cloud services like EcoStruxure Asset Advisor and EcoStruxure Resource Advisor

C. Wired devices

D. Wireless devices

IP communication area accessible from **ETH1** port

IP communication area accessible from **ETH2** port

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 Settings (Universal and Advanced Models)

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

Parameter	Description	EPC software	Webpages
Ethernet port configuration	Used to select the Ethernet configuration mode: • Select **Separated** to define 2 different IP addresses: one for each Panel Server Ethernet port. The separated mode is configured to segregate downstream Modbus TCP/IP devices connected to ETH2 port from upstream communication systems connected to ETH1 port. • Select **Switched** (default setting) to define one single unique IP address applied to both Ethernet ports ETH1 and ETH2.	✓	✓

IP Configuration Settings

IP configuration settings are available as follows:

- For Entry model : ETH1 port settings
- For Universal and Advanced models:
  - In the case of separated mode: **ETH1 port settings** and **ETH2 port settings**
  - In the case of switched mode: **Switched port settings**

Parameter	Description	EPC software	Webpages
Interface status	• **Active** indicates that an Ethernet cable is connected to Panel Server Ethernet port. • **Inactive** indicates that no Ethernet cable is connected. **NOTE:** Setting not editable.	✓	✓
MAC address	The Media Access Control (MAC) address is a unique identifier for each Panel Server port. The MAC address is marked on the Panel Server front face nose. **NOTE:** Setting not editable.	✓	✓
IPv6 activation	Used to enable/disable the IPv6 configuration (enabled by default).	–	✓
IPv6 address	Shows the IPv6 address. Setting not editable. **NOTE:** Displayed when the parameter **IPv6 Activation** is enabled.	✓	✓
Assignment mode	Used to select the IPv4 assignment mode: • Select **DHCP client** (default setting) to obtain IPv4 parameters automatically. • Select **Static** to enter the IPv4 address manually.	✓	✓
IPv4 address	Used to enter the static IP address of the Panel Server when the parameter **IPv4 Configuration mode** is set to **Static IPv4 address**.	✓	✓
Netmask	Used to enter the Ethernet IP netmask address of your network when the parameter **IPv4 Configuration mode** is set to **Static IPv4 address**.	✓	✓

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 50 and not editable: • **DHCP** • **Static** **NOTE:** The gateway embeds a DHCP client that receives the IP configuration from the DHCP server.	✓	✓
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

The EcoStruxure Panel Server supports Wi-Fi infrastructure, that is, the Panel Server can connect to a Wi-Fi router (access point).

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

The Panel Server supports the following applicative protocols on Wi-Fi:

- HTTPS to provide access to the Panel Server embedded webpages
- Modbus TCP/IP
- Devices Profile for Web Services (DPWS) protocol for IP network discovery

If the Panel Server Universal or Advanced is installed in a metallic enclosure, a Wi-Fi external antenna (reference PASA-ANT1) can be installed to extend the Wi-Fi network outside the metallic enclosure. The settings of output power for the external antenna are predefined and not editable.

If the Panel Server Entry is installed in a metallic enclosure, use the Ethernet port connection instead of Wi-Fi to avoid interruptions in communication.

Availability

This function is available on Panel Server Entry, Universal (depending on the model), and Advanced.

Setting the Parameters

Wi-Fi is set on the EcoStruxure Panel Server webpages. Proceed as follows:

1. Access the Panel Server webpages (see detailed topic, page 139).
2. Activate and configure connection to Wi-Fi on the webpage **Settings > Network communication > Wi-Fi**.

General Settings

⚠WARNING

UNINTENDED EQUIPMENT OPERATION OR ALTERED FEATURE OF PROTECTIVE DEVICES

Do not set Wi-Fi **Antenna** parameter to **External** if the external Wi-Fi antenna is not connected to the Panel Server Universal or Advanced gateway.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Parameter	Description
Wi-Fi activation	Used to activate/deactivate Wi-Fi (deactivated by default).
Infrastructure activation	Used to activate the capability to connect to an existing infrastructure (deactivated by default).
Antenna (Universal andAdvanced models)	When Wi-Fi is enabled, used to set the type of antenna used: • **Internal** (default setting) • **External**

Infrastructure Settings

The following parameters are displayed only when the parameter **Infrastructure Activation** is enabled.

Parameter	Description
Connection status	Shows the Panel Server connection status to Wi-Fi network: • **Connected** • **Not Connected** **NOTE:** If the Wi-Fi network is temporarily out of service, the Panel Server connects to the Wi-Fi network again within three minutes after network recovery.
SSID	Used to select the wireless network name by typing it in the field or displayed when double-clicked in **Network list**. **IMPORTANT**: It is recommended to use WPA2 (Wi-Fi Protected Access version 2) (or WPA3 if available) for wireless network security **NOTE:** Temporal Key Integrity Protocol (TKIP) is not supported.
Authentication key	Used to enter the authentication key for Wi-Fi network.
Network list	Used to select a Wi-Fi network. The SSID field is automatically filled with the corresponding data by double-clicking the network name. For each network name in the list, the following information is displayed: • A Wi-Fi strength indicator icon • A lock icon if a password is required to connect to the network

Wi-Fi Infrastructure IP Settings

The following parameters are displayed only when the parameter **Infrastructure activation** is enabled.

Parameter	Description
Interface status	Shows the status of the Wi-Fi interface.
MAC address	Shows the Media Access Control (MAC) address. Setting not editable.
IPv6 activation	Used to enable/disable the IPv6 configuration (enabled by default).
IPv6 address	Shows the IPv6 address. Setting not editable. **NOTE:** Displayed when the parameter **IPv6 activation** is enabled.
IPv4 Configuration mode	Used to select the IPv4 configuration mode: • Select **DHCP** (default setting) to obtain IPv4 parameters automatically. • Select **Static** to enter the IPv4 address manually.
IPv4 address	Used to enter the static IP address of the Panel Server when the parameter IPv4 **Configuration mode** is set to **Static IPv4 address**.
Netmask	Used to enter the netmask address of your network when the parameter IPv4 **Configuration mode** is set to **Static IPv4 address**. **NOTE:** When Wi-Fi is activated, the Wi-Fi configuration takes precedence over the Ethernet IP configuration. **IMPORTANT**: Use a different netmask for Wi-Fi from the netmask used for Ethernet to avoid connectivity issues on the Panel Server.

Gateway Settings

The following parameters are displayed only when the parameter **Infrastructure activation** is enabled.

Parameter	Description
Gateway assignment mode	The gateway configuration is the same as the IPv4 configuration mode settings, page 53 and not editable: • **DHCP** • **Static** **NOTE:** The gateway embeds a DHCP client that receives the IP configuration from the DHCP server.
Gateway IPv4 address	Used to enter manually the gateway (router) IP address when the parameter **Gateway settings > Assignment mode** is set to **Static**.

Permanent Deactivation of Wireless Networks

Presentation

Panel Server models PAS600LWD and PAS600PWD natively have no IEEE 802.15.4 or Wi-Fi wireless network capability.

IEEE 802.15.4 and Wi-Fi wireless networks can be permanently and concurrently disabled in Panel Server Universal and Advanced models. **Once the wireless networks are disabled via this command, it is permanent and cannot be undone.** Neither a factory reset, nor a backup restore can activate the radio capabilities again. If an IEEE 802.15.4 or Wi-Fi network is required, the Panel Server must be replaced by a new one.

The permanent deactivation of the wireless networks is not saved in the backup file of Panel Server configuration (see detailed topic, page 125).

Availability

This function is available on Panel Server Universal and Advanced.

Setting the Parameters

Permanent deactivation of wireless networks is set on the EcoStruxure Panel Server webpages, at **Settings > Security > Network Management > Wireless networks disable**.

Deactivating Wireless Networks Permanently

To permanently and concurrently disable the IEEE 802.15.4 and Wi-Fi wireless networks in the Panel Server, proceed as follows:

1. In the **Network Management** webpage, click **Disable all wireless networks**.
2. Confirm or cancel the deactivation in the window that appears.

   Result: After confirming deactivation, the Panel Server automatically reboots. After rebooting, **both types of wireless network are permanently deactivated** in the Panel Server and indicated as such on the webpages. The deactivation is irreversible.

DNS

Presentation

TCP/IP communication is used to perform commissioning, data collection and data publishing, and connection to supervision software.

TCP/IP communication general principles, such as DNS and proxy settings, apply to Ethernet and Wi-Fi.

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

The following features require DNS service:

- Cloud connection.
- HTTP/HTTPS proxy if a domain name is used.
- SFTP if a domain name is used.
- NTP if a domain name is used.

Availability

This function is available on Panel Server Entry, Universal, and Advanced.

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**.	✓	✓

Proxy

Presentation

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

- if you use the remote access or cloud connection, and
- if your network administrator has implemented a 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 Entry, Universal, and Advanced.

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
Address	Used to enter the IP address or domain name of the HTTP proxy server. **IMPORTANT**: Do not type prefix **http://** or **https://**.
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 hosts	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
Address	Used to enter the IP address or domain name of the HTTPS proxy server. **IMPORTANT**: Do not type prefix **http://** or **https://**.
Port	Used to enter the HTTPS 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 hosts	Used to enter the exceptions of hosts in a non-proxy host list.

IP Network Services (DPWS)

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 Entry, Universal, and Advanced.

Setting the Parameters

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

DPWS can be enabled or disabled.

DPWS Settings

Parameter	Description
DPWS Activation	Used to enable/disable the DPWS service (enabled by default).
Silent mode	Used to enable/disable the silent mode (disabled by default). In silent mode, DPWS only answers requests.
Discovery type	Used to set the IP discovery type: • **IPv4** • **IPv6** • **IPv4 & IPv6** (default setting)
TCP listening port	Used to enter manually the port number (default setting: 5357).

Modbus TCP/IP Client (Universal and Advanced Models)

Presentation

The EcoStruxure Panel Server acts as both a Modbus TCP/IP gateway and a Modbus device by using the internal Modbus TCP server.

To correctly configure your Modbus TCP/IP client to access data from Panel Server and from devices under Panel Server, see Modbus Gateway Function, page 72.

The Panel Server acts as a Modbus gateway for wired or wireless Ethernet communications from an upstream PC to Ethernet devices and field devices on the downstream network. By using a local monitoring software you can access information from devices for data collection and other functions.

The Panel Server manages Modbus communication on all interfaces including Wi-Fi.

For more information, see Modbus TCP/IP functions, page 179 and Modbus TCP/IP exception codes, page 182 in appendix.

Availability

This function is available on Panel Server Universal and Advanced.

Setting the Parameters

NOTICE

IMPAIRED NETWORK PERFORMANCE

Only qualified personnel should modify the Modbus TCP/IP settings. Perform such modifications only after you have read about and understood the Modbus TCP/IP settings.

Failure to follow these instructions can result in loss of network connectivity.

Modbus TCP/IP client function is set as follows:

- With EcoStruxure Power Commission (EPC) software
- On the EcoStruxure Panel Server webpages, at **Settings > Modbus devices > Modbus configuration > Modbus TCP/IP client**.

For information about the Modbus registers, see the guide of each Modbus-SL device and DOCA0241EN *EcoStruxure Panel Server - Modbus File* for wireless devices.

Modbus TCP/IP Client Settings

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

Parameter	Description	EPC software	Webpages
Connection timeout (s)	Used to set the length of time the Panel Server will wait for a remote Modbus TCP/IP device to establish the connection with the Panel Server. Values from 0.1 to 10 seconds (default setting: 2 seconds)	✓	✓
Message timeout (s)	Used to set the length of time the Panel Server will wait for a remote Modbus TCP/IP device to respond and send a message following a Modbus TCP/IP request initiated by the Panel Server. Values from 1 to 20 seconds (default setting: 3 seconds)	–	✓

Modbus TCP/IP Server

Presentation

Modbus TCP/IP devices connected downstream the Panel Server can be accessed from an upstream SCADA system.

Availability

This function is available on Panel Server Entry, Universal, and Advanced.

Setting the Parameters

Modbus TCP/IP server function is set as follows:

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

Modbus TCP Server Settings

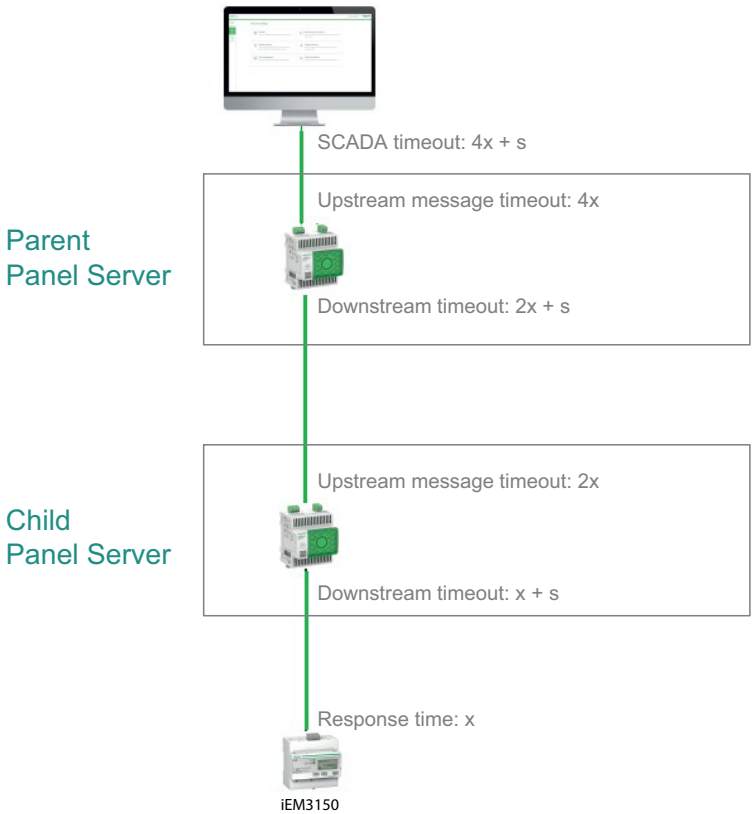
The following table describes the settings and where they are available.

Parameter	Description	EPC software	Webpages
Message timeout (ms)	In Modbus network configuration, you can set the message timeout period for the Modbus TCP server. Setting used to set the time-to-live of a Modbus request in the Panel Server. Any messages older than this setting will be dropped. Values from 1,000 to 320,000 ms (default setting: 6,000 ms) The value that you set for the Modbus TCP server must meet both following conditions: • Be equal to the message timeout that is defined on the upstream Modbus client (SCADA or another Panel Server). • Be higher than the timeout defined in the Panel Server Modbus client setting (Modbus TCP/IP and Modbus-SL). For recommended parameter settings, see details below.	–	✓

In the Panel Server, the following settings are recommended for the message timeout: the value of message timeout for Modbus TCP server should be double the value of message timeout for Modbus client.

Message timeout for Modbus TCP server is called **Upstream timeout** and message timeout for Modbus client is called **Downstream timeout** as shown in the diagram.

How to configure the message timeout in a parent/child Panel Server architecture



x: Basic response time of the end device

s: Small amount of additional time (margin)

Upstream timeout: Message timeout setting for Modbus TCP server

Downstream timeout: Message timeout setting for Modbus client

IEEE 802.15.4 Communication

Presentation

In an EcoStruxure system where IEEE 802.15.4 wireless devices are connected to a Panel Server, these wireless devices are required to withstand EMC levels as per IEEE 802.15.4 standard for proper device performance. For details about supported Schneider Electric IEEE 802.15.4 wireless devices, refer to the relevant Panel Server firmware release notes:

- DOCA0249EN *EcoStruxure Panel Server Entry - Firmware Release Notes*
- DOCA0178EN *EcoStruxure Panel Server Universal - Firmware Release Notes*
- DOCA0248EN *EcoStruxure Panel Server Advanced - Firmware Release Notes*

⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Use IEEE 802.15.4 communication only with PowerPacT, MasterPact MTZ, and other qualified devices.

Failure to follow these instructions will result in death or serious injury.

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 17.

The Panel Server Advanced can be connected to an external IEEE 802.15.4 antenna to extend the wireless network.

Availability

This function is available on Panel Server Entry, Universal (depending on the model), and Advanced.

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**

Configuration Settings

⚠WARNING

UNINTENDED EQUIPMENT OPERATION OR ALTERED FEATURE OF PROTECTIVE DEVICES

When installing a Panel Server in a metallic enclosure, and connecting it to an external IEEE 802.15.4 antenna, do not install this antenna within the enclosure.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Correct operation of protective devices installed in a metallic enclosure can be altered by a high level of IEEE 802.15.4 network radio frequency transmission power.

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

Parameter	Settings	Description	EPC software	Webpages
Wireless network settings	**Wireless activation**	Used to enable/disable wireless emission of the EcoStruxure Panel Server (disabled by default).	✓	✓
	Channel mode	Used to specify how the IEEE 802.15.4 channel is selected: • When you select **Auto** (default setting), the most appropriate channel is automatically selected by the Panel Server. • When you select **Manual**, configure the wireless parameters: 1. Select the required channel from the channel list. 2. Click: ◦ **Apply Changes** to save the settings. ◦ **Cancel Changes** to revert the settings, as applicable.	✓	✓
	Channel	Enter the channel number.	✓	✓
	Antenna selection	Used to select the type of IEEE 802.15.4 antenna used in the architecture: • **Internal** (Panel Server internal antenna) • **External** (Panel Server external antenna, Advanced model option) • **Both** (internal and external antennas are used with Panel Server Advanced.)	✓	✓
	Output power	Output power level cannot be changed when the internal antenna or both antennas (internal and external) are used. **Output power** can be set only when an external IEEE 802.15.4 antenna is connected to a Panel Server Advanced: • If **Antenna selection** is set to **Internal** or **Both**, the internal antenna is used therefore level is low (setting not editable). • If **Antenna selection** is set to **External**, set the output power to **Low Level** or **High Level** depending on your network. **NOTE:** When a Panel Server connected to an external IEEE 802.15.4 antenna is installed in a metallic enclosure, check that the	✓	✓

Parameter	Settings	Description	EPC software	Webpages
		antenna is not installed within the enclosure.		
Wireless communication	**Communication period**	It defines the length of time (in seconds) each wireless device (sensor, control, energy related) sends data to the Panel Server. This is only applicable to real-time data and not to alarms that are immediately notified in case of event. **NOTE:** If the communication period is reduced, it can potentially impact the stability of the wireless network, and indicator of radio quality may be degraded. As standard, the Panel Server has a defined default value for each family of wireless devices. The communication period can be adapted as follows, if needed: 1. Select the required communication period from the **Communication Period** list. 2. Apply the selected values. 3. Click: • **Apply Changes** to save the settings. • **Cancel Changes** to revert the settings, as applicable.	✓	✓
Wireless device management	**Remove all devices**	Used to remove all wireless devices connected to the Panel Server.	✓	✓

Settings of Wireless Devices Discovery

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

Parameter	Settings	Description	EPC software	Webpages
Wireless discovery	**Selective list**	Used to discover a selective list of wireless devices to be connected to the EcoStruxure Panel Server.	✓	✓
	Discovery status	Indicates the status of the device discovery on the wireless network: • **Idle**: device discovery is inactive. • **InProgress**: device discovery is in progress • **Done**: device discovery is performed.	–	✓
Discovered devices	**Remove all devices**	Identification of the discovered wireless devices with device type, name, and model.	✓	✓

Modbus-SL Communication

Presentation

Panel Server Universal and Advanced are Modbus-SL clients and they can be connected to any Modbus-SL server devices. The Panel Server acts as a Modbus gateway and then allows any upstream software such as EcoStruxure Power Monitoring Expert and EcoStruxure Power Operation using Modbus TCP/IP communication to access the Modbus-SL devices.

The Panel Server is also able to collect data from the Modbus-SL devices for publishing to a cloud application or for historization by the energy server in a Panel Server Advanced.

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

For more information, see Modbus-SL functions, page 181 and Modbus-SL exceptions codes, page 182 in appendix.

The Panel Server Modbus serial port can be configured in reverse mode (see Modbus-SL Reverse Mode, page 70).

Availability

This function is available on Panel Server Universal and Advanced.

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 > Modbus configuration**.

For information about the Modbus registers, see the guide of each Modbus-SL device and DOCA0241EN *EcoStruxure Panel Server - Modbus File* for wireless devices.

Modbus Serial Mode Settings

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

Parameter	Description	EPC software	Webpages
Modbus mode	Used to select the configuration of Modbus-SL mode: • **Client** (default setting) • **Server**	–	✓

Modbus Serial Client Configuration Settings

The following parameters are displayed only when the parameter of Modbus-SL mode is set to **Client**.

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	✓	✓
Parity	Used to define the parity bit of the transmitted bytes: • **Odd** • **None** • **Even** (default setting)	✓	✓
Number of bits	8 bits. Setting not editable.	–	✓
Number of stop bits	Used to define the number of stop bits transmitted: 1 or 2 (default setting: 1)	✓	✓
Silent interval (ms)	Used to define the silent time after the end of a Modbus-SL packet communication. Values from 0 to 10 ms (default setting: 5 ms)	–	✓
Frames delay (ms)	Used to define the minimum silent time between the end of a received response and the beginning of a new request on the serial line Values from 0 to 100 ms (default setting: 50 ms) **NOTE:** The Frame Delay value needs to be aligned with the End Device Frame Delay. For example, if End Device Frame Delay equals 50 ms, then set 50 ms on Panel Server). Data loss may occur if these values are not aligned.	–	✓
Timeout (ms)	Used to define the timeout value after which a loss of communication is declared by the EcoStruxure Panel Server. Values from 100 to 320,000 ms (default setting: 3,000 ms)	✓	✓
Termination resistor	Used to connect/disconnect the RS485 termination resistor embedded in the Panel Server to help prevent reflection. (**Connect** by default)	✓	✓
Serial line polarization	Used to enable/disable forcing the transmission line into a known state to help prevent invalid data bits (enabled by default). The transmission line into the RS485 port enters an indeterminate state when it is not being transmitted to. This indeterminate state causes the receivers to receive invalid data bits from the noise picked up on the cable.	✓	✓

Modbus Serial Server Configuration Settings

The following parameters are displayed only when the parameter of Modbus-SL mode is set to **Server**.

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

Parameter	Description	EPC software	Webpages
Baud rate (bits per sec)	Used to set the transmission rate: • 1200 • 2400 • 4800 • 9600 • 19200 (default setting) • 38400 • 57600 • 115200	✓	✓
Parity	Used to define the parity bit of the transmitted bytes: • **Odd** • **None** • **Even** (default setting)	✓	✓
Number of bits	8 bits. Setting not editable.	–	✓
Number of stop bits	Used to define the number of stop bits transmitted: 1 or 2 (default setting: 1)	✓	✓
Silent interval (ms)	Used to define the silent time after the end of a Modbus-SL packet communication. Values from 0 to 10 ms (default setting: 5 ms)	–	✓
Frames delay (ms)	Used to define the minimum silent time between the end of a received response and the beginning of a new request on the serial line Values from 0 to 100 ms (default setting: 50 ms) **NOTE:** The Frame Delay value needs to be aligned with the End Device Frame Delay. For example, if End Device Frame Delay equals 50 ms, then set 50 ms on Panel Server). Data loss may occur if these values are not aligned.	–	✓
Termination resistor	Used to connect/disconnect the RS485 termination resistor embedded in the Panel Server to help prevent reflection. (**Connect** by default)	✓	✓
Serial line polarization	Used to enable/disable forcing the transmission line into a known state to help prevent invalid data bits (enabled by default). The transmission line into the RS485 port enters an indeterminate state when it is not being transmitted to. This indeterminate state causes the receivers to receive invalid data bits from the noise picked up on the cable.	✓	✓
Message timeout (ms)	In Modbus network configuration, you can set the message timeout period for the Modbus-SL server. Setting used to set the time-to-live of a Modbus request in the Panel Server. Any messages older than this setting will be dropped. Values from 1000 to 32000 ms (default setting: 6000 ms) The value that you set for the Modbus-SL server must meet both following conditions: • Be equal to the message timeout that is defined on the upstream Modbus client (SCADA or another Panel Server). • Be higher than the timeout defined in the Panel Server Modbus client setting (Modbus TCP/IP and Modbus-SL).	✓	✓

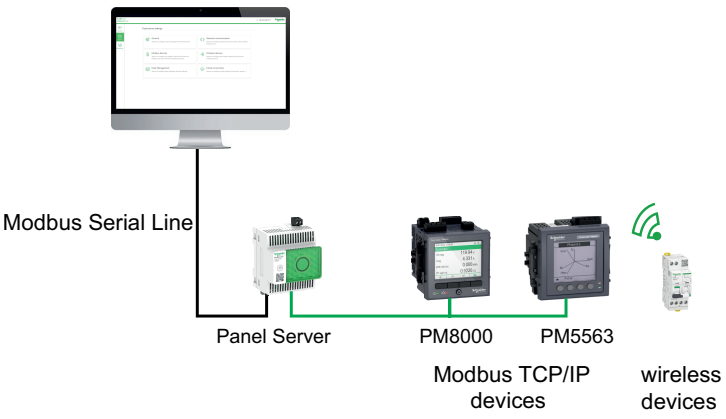
Modbus Discovery Settings

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 (1–254) for which the devices must be discovered.	✓[1]	✓[2]
Discovered devices table	Displays information about each device discovered in the Modbus-SL network: • Picture • Device name • Server ID	✓	✓
Manual addition	Used to manually enter Modbus-SL devices: • Enter the physical server ID / Unit ID. A virtual server ID is assigned as part of the process. • Select the device type in the drop-down list.	–	✓[3]

Modbus-SL Reverse Mode

Panel Server Modbus serial port can be configured in reverse mode. The Modbus-SL reverse mode allows any Modbus client (for example, SCADA) connected to the RS485 port, to access data from Modbus TCP/IP devices connected to ETH1 and/or ETH2 Ethernet port, and from any associated wireless devices by means of the virtual Modbus ID of the wireless device, as shown on this diagram:



Modbus Serial Line network

Ethernet network

The Modbus-SL reverse mode can be set and monitored on the Panel Server webpages at **Settings > Modbus Devices**. In **Modbus configuration** change the **Modbus mode** from **Client** to **Server**.

1. 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 a selective list of addresses.
2. If no addresses are entered, discovery is done for addresses 1 to 10.
3. For detailed information, see addition of Modbus devices, page 156.

I/O Smart Link Modbus Settings

If you configure or change the settings of a I/O Smart Link Modbus device by using EcoStruxure Power Commission software or through Smartlink SIB webpages, and then connect to Panel Server webpages, you must update the I/O Smart Link Modbus settings in the Panel Server webpage to synchronize the configuration.

It takes approximately one minute to get the I/O Smart Link Modbus configuration refreshed on the Panel Server webpages. You can navigate through the other Panel Server webpages during the synchronization.

You can not synchronize two I/O Smart Link Modbus devices at the same time.

When you have launched a synchronization, you cannot cancel the process.

I/O Smart Link Modbus Control

Output Control order can be sent through Panel Server webpages. This feature is used to control non-critical electrical loads.

Modbus Gateway Function

Presentation

The EcoStruxure Panel Server implements a Modbus gateway function. It can serve requests received from the 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 (depending on the model) , or Modbus-SL wired network (Universal and Advanced models). The maximum number of Modbus TCP/IP devices connected to one Panel Server is 128 and includes devices physically connected to the Panel Server and any type of devices connected to a child gateway. For more information, see *Maximum Configuration*, page 17.

The Modbus protocol exchanges information using a request-reply mechanism between a client (formerly *master*) and a server (formerly *slave*). The client-server principle is a model for a communication protocol in which one device (the client) controls one or more other devices (the servers). Modbus client ID was formerly known as *Master* and Modbus server ID was formerly known as *Slave*.

Availability

This function is available on Panel Server Entry, Universal, and Advanced.

Modbus Gateway Function

The Panel Server implements its own Modbus registers that are available at unit ID 255, to provide its own identification information. Therefore, Panel Server has its own register table (see DOCA0241EN *EcoStruxure Panel Server - Modbus File*).

The 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.

By default, out-of-the-box, the Modbus gateway uses the unit ID in the Modbus TCP/IP request as unit ID / Server ID of the physical Modbus-SL device.

For Modbus TCP/IP devices, when carrying out commissioning, a virtual server ID is added to a Modbus TCP/IP device to allow access in case of separate topology or to enable the Modbus TCP proxy feature.

The 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 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, refer to spreadsheet DOCA0241EN *EcoStruxure Panel Server - Modbus File*.

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 through EcoStruxure Power Commission software or the Panel Server webpages (select **Settings > Wireless devices** then choose one connected device and change value in **Modbus virtual > Virtual server ID**).

> **NOTE:** The Modbus gateway function should not be confused with a network gateway or a router. The Panel Server does no routing and no forwarding at the network (IP) layer.

Definitions of Modbus Unit ID / Server ID and Virtual Server ID

To enable an external Modbus TCP/IP client to access a device connected to the Panel Server, each device must have a unique ID named *virtual server ID*.

The *virtual server ID* is automatically assigned:

- when a wireless device is connected to the Panel Server.
- whenever a device is created and associated to a device Unit ID / Server ID.

The *unit ID / server ID* is either:

- the configured unit ID of any device connected to the RS485 serial port,
- the configured unit ID of a connected Modbus TCP/IP device, or
- the unit ID used by a Modbus TCP/IP gateway that connects a device to an Ethernet network.

The Panel Server uses the following rules to assign the *virtual server ID* when a downstream device is discovered or added:

- For Modbus-SL devices, if the physical server ID / unit ID (also known as the Modbus address) is not already used as a virtual server ID by another device, it will be assigned as the virtual server ID. If not, then, the first available virtual server ID in the range 1–254 will be assigned starting from virtual server ID 1.
- For wireless devices, the first available virtual server ID in the range 1–254 will be given starting from virtual server ID 100.
- For Modbus TCP/IP devices, the first available virtual server ID in the range 1–254 will be given starting from virtual server ID 200.

  IMPORTANT: It is recommended to set the Modbus physical address of Modbus-SL devices in the range 1–99.

Following this recommendation, in most configurations with less than 100 Modbus-SL devices, less than 100 wireless devices, and less than 48 Modbus TCP/IP devices, the virtual server ID will automatically be given as follows:

- Modbus-SL devices will have their physical server ID assigned as virtual server ID in the range 1–99.
- Virtual server ID of wireless devices will be in the range 100–199.
- Virtual server ID of Modbus TCP/IP devices will be in the range 200–254.

The virtual server ID can be changed using EcoStruxure Power Commission software or on the Panel Server webpages (see **Modbus Discovery** settings, page 70). The virtual server ID must be unique.

EcoStruxure Power Commission software and the Panel Server webpages provide the following information for each device (see addition of Modbus devices, page 156):

- Virtual server ID
- Connection:
  - Unit ID / server ID for Modbus-SL devices
  - IP address for remote devices and unit ID / server ID for Modbus TCP/IP devices
  - RFID for wireless devices
- Device type as defined in the device settings

For information about how to manage virtual server ID conflict, see Example of Modbus Server ID Conflict and Resolution, page 74.

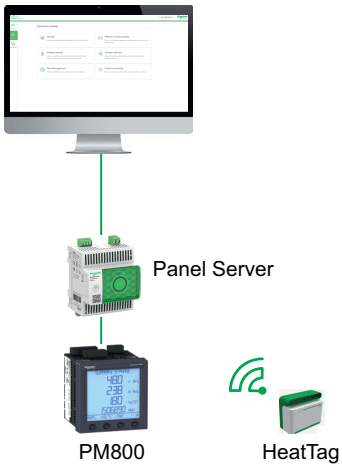
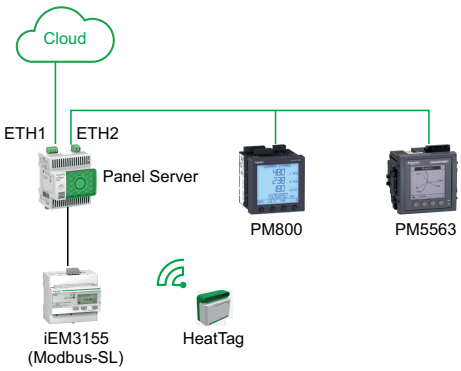
For examples how to use virtual server ID to access data in downstream devices according to the communication architecture, see Examples of Modbus Routing, page 76.

Modbus TCP/IP Service Activation

To help reinforce security of data access and avoid malicious access to device data from an upstream connection, Modbus TCP/IP server can be enabled/disabled per interface (ETH1/ETH2 (not on Entry model)/Wi-Fi) on the Panel Server webpages at **Settings > Network communication > Services > Service activation**.

Do not disable Modbus service on port ETH1, ETH2, or Wi-Fi if the interface is used to connect EcoStruxure Power Commission software or a monitoring software such as SCADA.

Examples of typical cases of architectures for which Modbus TCP/IP service is disabled for the upstream connection:

Architecture	Modbus TCP/IP service configuration
Panel Server connected to Panel Server webpages and Modbus and wireless devices 	To allow access only to the upstream application (such as a web browser), it is recommended to disable Modbus service on Ethernet ports and Wi-Fi. This avoid malicious access to the downstream devices.
Panel Server connected to the cloud and in the separated mode to Modbus and wireless devices 	When the Ethernet network is configured in the separated mode, it is recommended to: • Disable Modbus service on Panel Server ETH1 port to avoid malicious access to data of the downstream devices. • Enable Modbus service on Panel Server ETH2 port to allow data acquisition from the downstream devices only if you need to connect a Modbus TCP/IP client on ETH2 through EcoStruxure Power Commission software.

Modbus Server ID Conflict and Resolution

With the above discovery and addition mechanism, the Panel Server will always assign an available and unique virtual server to every device.

However, it is possible to assign the same virtual server ID to two devices when carrying out commissioning.

To resolve this situation, update the virtual server ID in one of the two devices to an available server ID.

Example of Modbus Server ID Conflict and Resolution

In the following example, 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 RS485 Modbus communication port on Panel Server.
2. Power up the Panel Server.
3. From the monitoring tool connected upstream, you can access the Modbus registers of PM3250 by sending Modbus TCP/IP requests to unit ID 100 of the Panel Server Modbus server.
4. From EcoStruxure Power Commission software, discover the Panel Server and access the 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 Energy sensor is then discovered and paired to Panel Server.

   Result: The PowerTag Energy sensor 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 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.

Modbus TCP/IP Proxy

The Panel Server can act as a Modbus TCP proxy for a Modbus TCP/IP device connected to the Panel Server. This function can be used to connect several devices simultaneously to a TCP/IP device offering a single TCP/IP connection.

With this function, the upstream communication system establishes as many TCP/IP connections as required by the Panel Server. This is done by using the virtual server ID of the Modbus TCP/IP device managed by the Panel Server. The Panel Server establishes a single connection to the downstream Modbus TCP/IP device.

For more information about Modbus routing and assignment of virtual Modbus server IDs, see Examples of Modbus Routing, page 76.

Examples of Modbus Routing

Presentation

This topic presents examples to illustrate how an upstream SCADA using Modbus TCP/IP accesses the devices connected to a Panel Server depending on the communication architecture using the Modbus virtual server ID. For detailed information about *Modbus unit ID / server ID* and *virtual server ID*, see definitions, page 73.

NOTE: Modbus routing should not be confused with network routing at the network (IP) layer.

Availability

This function is available on Panel Server Entry, Universal, and Advanced. The function is available depending on the model.

Recommendations for Virtual Server ID Mapping

To help ensure consistency of device data being communicated to upstream system, follow these rules for virtual server ID mapping:

- 1–99 for Modbus-SL devices (Universal and Advanced models)
- 100–199 for wireless devices
- 200–254 for Modbus TCP/IP devices (Universal and Advanced models)

Example of Modbus TCP/IP Requests for Wireless Devices

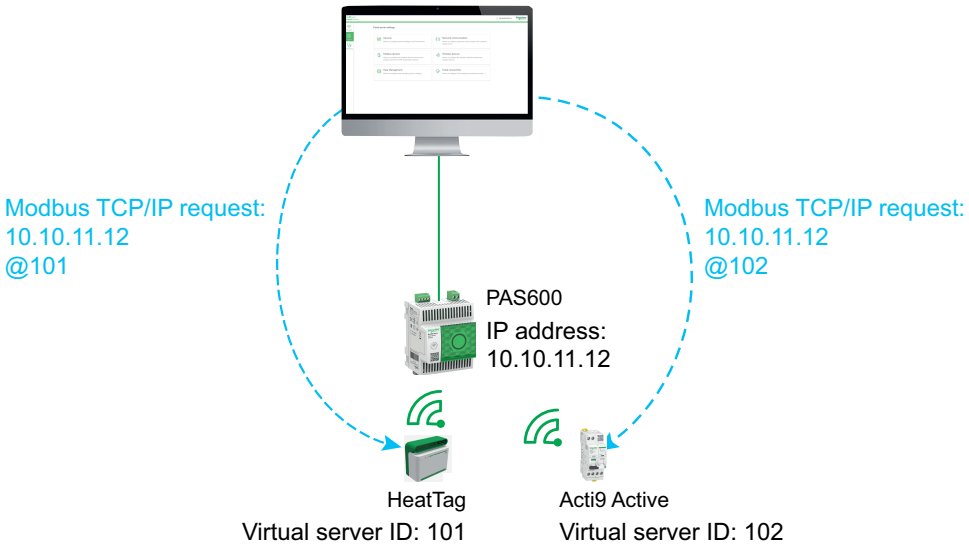
This example presents the Modbus TCP/IP requests for wireless devices.

Panel Server with IP address `10.10.11.12` is connected to:

- a HeatTag configured with virtual server ID `101`, and
- an Acti9 Active configured with virtual server ID `102`.

To collect and gather data from the wireless devices, the monitoring system will issue the following Modbus TCP/IP requests:

- `10.10.11.12`, address `101` for HeatTag
- `10.10.11.12`, address `102` for Acti9 Active



Example of Modbus TCP/IP Requests for Modbus-SL Devices

This example applies to Universal and Advanced models.

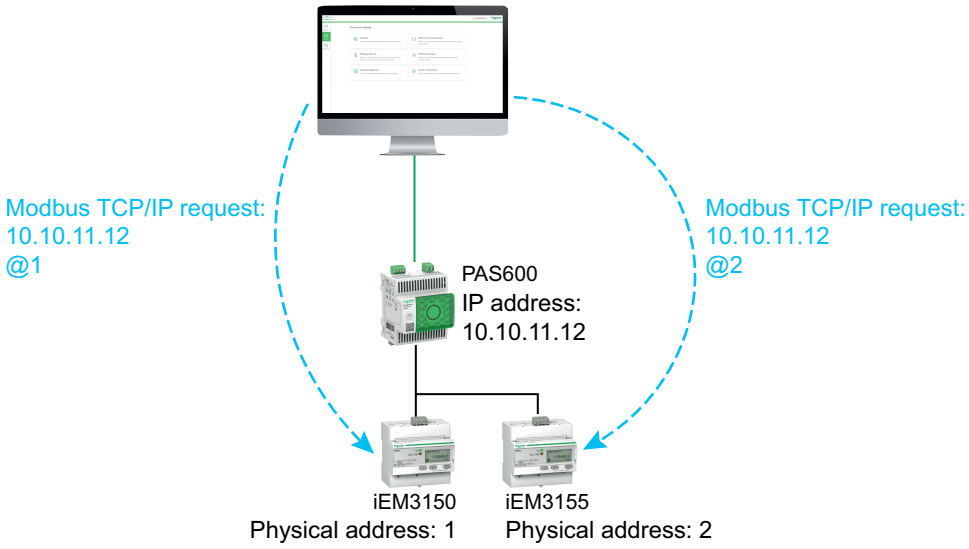
This example presents the Modbus TCP/IP requests for Modbus-SL devices when the serial physical address is used as virtual server ID.

Panel Server with IP address `10.10.11.12` is connected to:

- an iEM3150 with physical address `1`, and
- an iEM3155 with physical address `2`.

To collect and gather data from the Modbus RS485 devices, the monitoring system will issue the following Modbus TCP/IP requests:

- `10.10.11.12`, address `1` for iEM3150
- `10.10.11.12`, address `2` for iEM3155



Example of Modbus TCP/IP Requests for Modbus-SL Devices With Virtual Server ID Different from the Physical Address

This example applies to Universal and Advanced models.

A virtual server ID which is different from the physical address can be used in the following cases:

- The physical address is already used as a virtual server ID for a different device (either a wireless, Modbus-SL, or Modbus TCP/IP device).
- This use case helps to apply a dedicated communication address plan for easier and consistent integration in the upstream system.

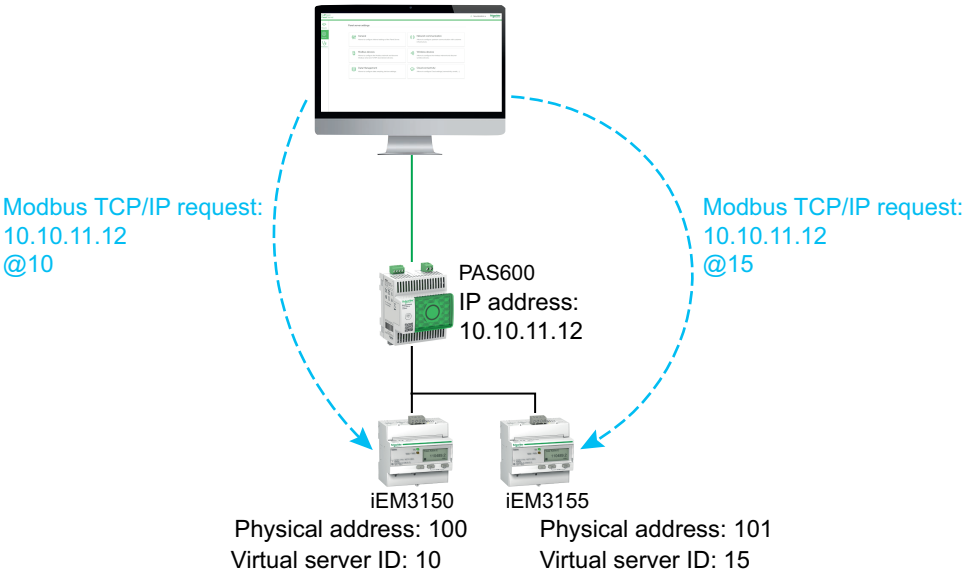
This example presents the Modbus TCP/IP requests when the virtual server ID of Modbus-SL devices is different from the serial physical address.

Panel Server with IP address `10.10.11.12` and virtual server ID `15` is connected to:

- an iEM3150 with physical address `100` and virtual server ID `10`, and
- an iEM3155 with physical address `101` and virtual server ID `15`.

To collect and gather data from the Modbus devices, the monitoring system will issue the following Modbus TCP/IP requests:

- `10.10.11.12`, address `10` for iEM3150
- `10.10.11.12`, address `15` for iEM3155



Example of Modbus TCP/IP Requests for Devices in Separate Topology

This example applies to Universal and Advanced models.

This example presents the Modbus TCP/IP requests for devices in a separate topology.

Panel Server with

- IP address on ETH1 port: `10.10.10.10`
- IP address on ETH2 port: `192.168.10.1`

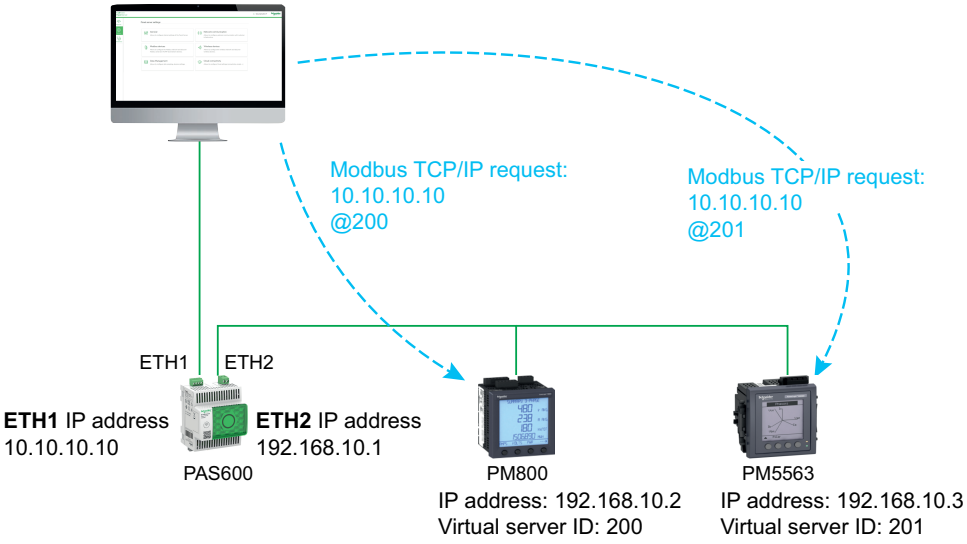
is connected to:

- a PM800 with IP address `192.168.10.2` and virtual server ID `200`, and
- a PM5563 with IP address `192.168.10.3` and virtual server ID `201`

To collect and gather data from the Ethernet devices, the monitoring system will issue the following Modbus TCP/IP requests:

- `10.10.10.10`, address `200` for PM800
- `10.10.10.10`, address `201` for PM5563

Modbus service is to be enabled on ETH1.



Example of Modbus TCP/IP Requests for Devices in Switched Topology

This example applies to Universal and Advanced models.

This solution offers multiple Modbus TCP client connections. If a device supports only one Modbus TCP/IP client, the Panel Server acts as a Modbus TCP/IP proxy and can support several upstream connections.

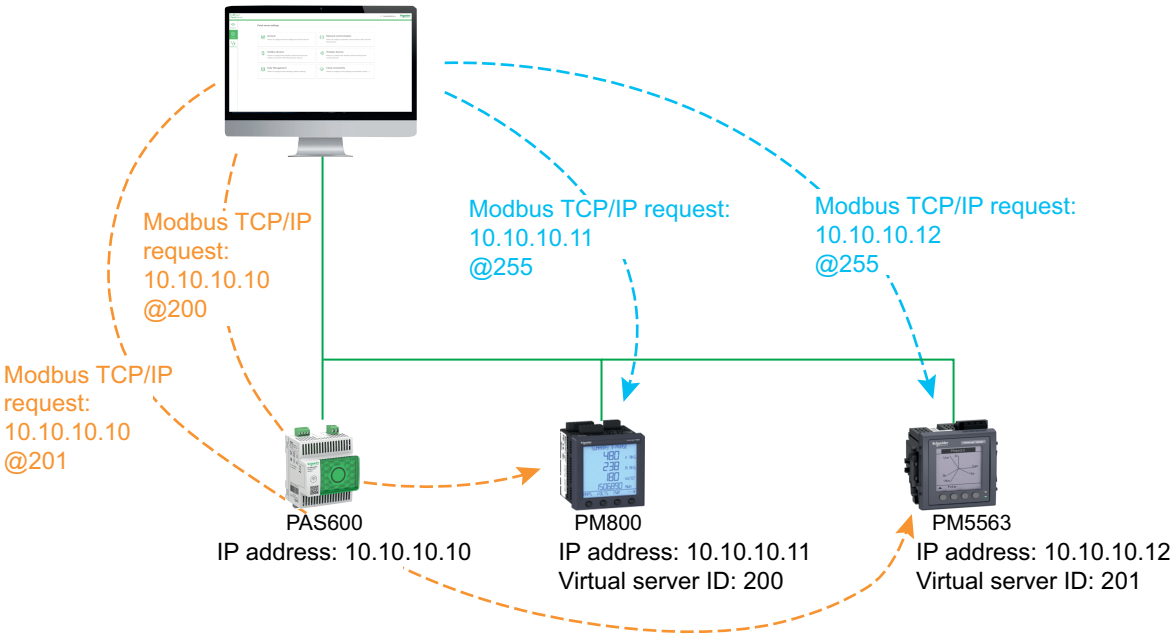
This example presents the Modbus TCP requests for devices in a switched topology.

Panel Server with IP address `10.10.10.10` is connected to:

- a PM800 with IP address `10.10.10.11` and virtual server ID `200`, and
- a PM5563 with IP address `10.10.10.12` and virtual server ID `201`.

To collect and gather data from the Ethernet devices, the monitoring system will issue the following Modbus TCP/IP requests in one of the following ways:

- Requests are issued directly to the downstream device:
  - `10.10.10.11`, address `255` for PM800
  - `10.10.10.12`, address `255` for PM5563
- or requests are issued through the Panel Server and the Modbus device discovery uses the virtual server ID:
  - `10.10.10.10`, address `200` for PM800
  - `10.10.10.10`, address `201` for PM5563



Example of Modbus TCP/IP Requests for Modbus-SL Devices under a Child Panel Server in Separate Topology

This example applies to Universal and Advanced models.

This example presents the Modbus TCP/IP requests for Modbus-SL devices when they are connected to a child/downstream Panel Server in a separate topology: the child/downstream Panel Server (PAS#2) is connected to one Ethernet port on the parent/upstream Panel Server (PAS#1).

For information on how to discover Modbus-SL devices connected to a child/downstream Panel Server by using Panel Server webpages, see detailed topic, page 157.

PAS#1 with

- IP address on ETH1 port: `10.10.10.10`
- IP address on ETH2 port: `192.168.10.10`

is connected to child PAS#2 with IP address `192.168.10.11` and connected to:

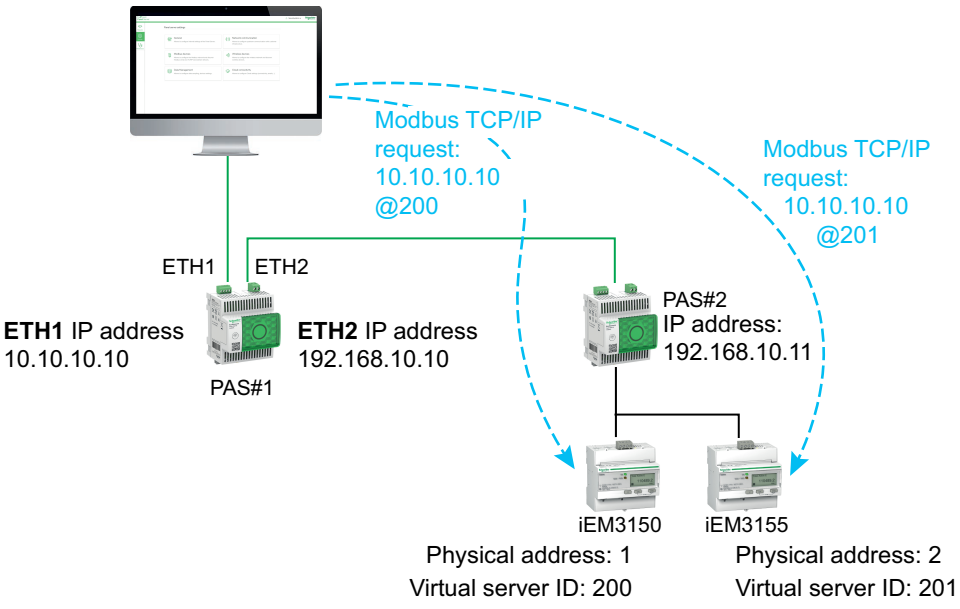
- an iEM3150 with physical address `1`, and
- an iEM3155 with physical address `2`.

To access the Modbus-SL devices under the child/downstream Panel Server (PAS#2) from the monitoring system, first the Modbus-SL devices must be manually added to the parent/upstream Panel Server (PAS#1) with the Panel Server webpages:

- Manual addition of iEM3150 to PAS#1 is done by using `192.168.10.11`, address `1`, assigned to virtual server ID `200`.
- Manual addition of iEM3155 to PAS#1 is done by using `192.168.10.11`, address `2`, assigned to virtual server ID `201`.

Then to collect and gather data from the Modbus devices, the monitoring system will issue the following Modbus TCP/IP requests:

- `10.10.10.10`, address `200` for iEM3150
- `10.10.10.10`, address `201` for iEM3155



Data Publication

What's in This Chapter

Publication on Schneider Electric Cloud 83
Publication on SFTP Server 86
Publication of Emails for Alarms (Advanced Model) 89
Publication on SFTP Server and Email Notification for Alarms (Advanced Model) 91

Presentation

Data publication allows you to publish sampled data from connected devices (Modbus, wireless or input/output) using one of the following methods:

- **Schneider Cloud services**
- **SFTP**

With Panel Server Advanced, you can also activate email notifications on active alarms.

Set up data sampling, page 95 before activating data publication. Data sampled before activation of data publication is also published, with the following limits:

- Panel Server Entry and Universal: up to one month of sampled data
- Panel Server Advanced: up to three months of sampled data. All previously logged data is retained, up to a maximum of three years of data.

Publication Methods

You can select the method and activate data publication from Panel Server on the EcoStruxure Panel Server webpages, at **Settings > Data publication > Publication method**:

- Select **Schneider Cloud services** (default value) to send the sampled data to the Schneider Electric cloud. See detailed topic, page 83.
- Select **SFTP** to send the sampled data to an SFTP server. See detailed topic, page 86.
- Select **Email service for alarms** to send email notifications on active alarms (Panel Server Advanced). See detailed topic, page 89.
- Select **SFTP & Email for alarms** to activate SFTP publication or to combine both services (Panel Server Advanced). See detailed topic, page 91.

Publication on Schneider Electric Cloud

Presentation

EcoStruxure Panel Server provides connection to Schneider Electric cloud services such as EcoStruxure Energy Hub, EcoStruxure Facility Expert, EcoStruxure Asset Advisor, and EcoStruxure Resource Advisor.

NOTE: Schneider Electric cloud services and service of publication of emails for alarms, page 89 are mutually exclusive, that is, both features cannot be enabled concurrently.

NOTE: If a remote configuration of the Panel Server from cloud services attempts to enable more than 5,000 measurements, or 500 samples per minute or 100 alarms, the configuration is rejected.

Availability

This function is available on Panel Server Entry, Universal, and Advanced.

Setting the Parameters

Publishing function is set on the EcoStruxure Panel Server webpages, at **Settings > Publication > Publication method > Schneider Cloud services**.

To publish data in the cloud, the Panel Server network settings must allow access to the internet (cloud). For example, DNS must be configured and a proxy setting may be needed. The firewall on your network may also need to be open to allow access to the Schneider Electric servers via port 443.

Enabling Schneider Electric Cloud Infrastructure

To enable Panel Server to access services of Schneider Electric cloud infrastructure, the access to the following URLs and ports must be authorized in LAN protection configuration:

Domain name	Protocol	Description
cbBootStrap.gl.StruXureWareCloud.com	HTTPS (TCP port 443)	Used at first connection of Panel Server to the cloud (or after a factory reset) to authenticate and register the Panel Server.
etp.prod.StruXureWareCloud.com	HTTPS (TCP port 443)	Used to download firmware update.
cnm-ih-na.Azure-devices.net	HTTPS (TCP port 443)	Used for communication of Panel Server with Schneider Electric cloud services such as configuration, data, or alarms.
RemoteShell.rsp.Schneider-Electric.com	HTTPS (TCP port 443)	Allows Schneider Electric Customer Care Center to remotely access the Panel Server webpages through VPN.
cnmdapiappstna.Blob.Core.Windows.net	HTTPS (TCP port 443)	Allows the Panel Server to upload logs and diagnostics files upon request from Schneider Electric Customer Care Center.
cnmiothubappstna.Blob.Core.Windows.net/file-upload	HTTPS (TCP port 443)	Allows the Panel Server to upload large topology (>250 kB) to the Schneider Electric cloud services.
time.gl.StruXureWareCloud.com	NTP (UDP port 123)	NTP server allows the Panel Server clock to remain synchronized.

Cloud Connection Settings

The following table describes the settings.

Parameter	Description
Cloud applications management	Buttons used to connect to and disconnect from the cloud: • Button **Connect** to connect the Panel Server to the Schneider Electric cloud. • Button **Disconnect** to disconnect from the Schneider Electric cloud.
Connection status	Shows the Panel Server connection status to the cloud: • **Not connected** **NOTE:** If the Panel Server does not succeed in connecting to the cloud, check that communication settings are correctly set (for example, proxy required but not defined) and that the date and time synchronization mode is set to **Cloud** (see Troubleshooting, page 176). • **Connection in progress** • **Connected**
Connection diagnostics	Shows diagnostic of connection to the cloud: • **Device activated** indicates that the Panel Server is connected to the cloud services. • **Device not registered** indicates that the Panel Server is not recognized by the cloud services. • **Network unreachable** indicates that the Panel Server is not able to reach the Schneider Electric cloud platform. Check your network configuration. Refer to Troubleshooting, page 175. • **Bad credentials** indicates that the security certificates used to connect to the Schneider Electric cloud platform could not be validated. Check that date and time synchronization mode has been set as **Cloud** on the Panel Server webpages or EcoStruxure Power Commission software.
Topology	**Publish topology** button used to send the list of the devices connected to the Panel Server to the cloud, as well as information such as device name and label entered at commissioning, available measurements, and usage or other contextualization information. **NOTE:** Topology does not contain personal data. Schneider Electric does not scan, nor use, nor sell this data. This data is for the sole usage of the customer.
Publication period	The publication period is set by the cloud service and not editable.

Connecting to the Schneider Electric Cloud

To publish data and alarms on the Panel Server to Schneider Electric cloud:

1. In the **Publication** webpage, select **Publication method > Cloud** and click **Connect**.
2. Wait until **Connection Status** indicates **Connected**.
3. Click **Publish topology** to send information about the Panel Server and connected devices to the cloud.

   IMPORTANT: Every time you change the configuration of Panel Server or the connected devices, you must publish the topology again.

   Result: The cloud service sends back a remote configuration to the Panel Server. The remote configuration imposes the selection of measurements and alarms, and the sampling and publisher configuration. The settings are not editable (read only) with Panel Server webpages.

4. Check the Cloud service icon in the webpage header, page 142:
   - Green: valid remote configuration
   - Orange: invalid remote configuration

Disconnecting from Cloud Services

To temporarily disconnect Panel Server from Schneider Electric cloud:

1. Click **Disconnect**.
2. Wait until **Connection Status** indicates **Not connected**.

Publication on SFTP Server

Presentation

EcoStruxure Panel Server provides connection to an SFTP server.

If SFTP publication is active:

- Alarms can be monitored and displayed in Panel Server webpages.
- Alarms are not published in the CSV or JSON file.
- Alarms can be enabled for email notification.

When SFTP function is active, the data publication on cloud is not available.

Availability

This function is available on Panel Server Entry, Universal, and Advanced.

Setting the Parameters

Publishing function is set on the EcoStruxure Panel Server webpages, at **Settings > Publication > Publication method > SFTP**.

SFTP Publication Settings

The following table describes the settings.

Parameter	Settings	Description
Connection information	**Server**	The host name of the SFTP server can be defined as the IP address value or as, for example, `mysftpserver.mydomain.com`.
	Port	Used to define the SFTP server TCP port. It is usually set to 22.
	Path	Used to enter the path to use on the SFTP server for data publishing. For example, if `/home/user/` is the default directory for the SFTP server, then the path configured with `/mySFTPPath` will publish on `/home/user/mySFTPPath`.
	User ID	Used to type the username for SFTP server access.
	Authentication method	Connection to the SFTP server is done with either user name and password or user name and SSH key in PEM (Privacy Enhanced Mail) format.
	Password	Used to type the password for SFTP server access.
	Test connection	Button used to test connection to the SFTP server.
Publication settings	**Publication format**	Used to select the exported file format: • **JSON** (for details, page 88) • **CSV** (for details, page 87)
	Publication period	Used to select the publication frequency to the SFTP server (default setting: **1h**).
	Start	Button used to activate data publication to the SFTP server.

Connecting to SFTP Server

To connect the Panel Server to an SFTP server:

1. On the SFTP server, configure a connection for the publication of data from the Panel Server.
2. On the Panel Server webpages, configure data to be sampled at **Settings > Data management** (see detailed topic, page 95).
3. Activate sampling in **Settings > Data management > Data Sampling**.
4. In the **Settings > Data publication** webpage, select **SFTP** as **Publication method**.

   By default, SFTP data publications (CSV or JSON file format) are stored at the top of the hierarchical file tree of the SFTP server. If you customize the file path for the data storage, make sure that the path is created and validated on the SFTP server. For more information, refer to the user guide of your SFTP server.
5. To connect to the SFTP server, enter the user name and password or user name and SSH key in PEM (Privacy Enhanced Mail) format in the **Connection information** section, and click **Test connection**. The list of SSH key exchanges and ciphers supported by the Panel Server is available in Appendix E, page 198.

   When using SSH key authentication, the key must be provided in PEM format (default setting when relying on OpenSSH version less than 7.8).

   NOTE: If it is the first time the Panel Server connects to this SFTP server, a message appears and requests that you confirm the authenticity of the SFTP server.
6. Once the test is performed, the Panel Server webpage displays information:
   - In case of success, a file has been successfully uploaded on the SFTP server.
   - In case of dysfunction, check the SFTP server parameters, user credentials, and write access privileges on the SFTP server.
7. To publish data, set **Publication settings** and click **Start**.

   Result: The sampled data of devices, related to the selected sampling period, is published to SFTP, in the CSV file format, page 87 or JSON format, page 88. A maximum of one month of data (Entry or Universal) or three months of data (Advanced) is published to the SFTP server. If data sampling was activated before this period, older data is not published.
8. If you update the SFTP server, the SFTP server fingerprint changes. In this case, click **Test connection** to allow you to connect to the SFTP server again.

Disconnecting from Publishing Services

To disconnect Panel Server from the SFTP server, click **Stop**.

File Format of CSV Publication

One .csv file is produced per downstream device and includes measurements configured with the same sampling period.

The name of the CSV files that are exported follows the naming convention `ReducedID_DeviceName_DateTime.csv` where:

- `ReducedID` is the internal identifier of the device, what enables that files produced are unique for devices that would share the same name (for example, `10_mb`, `21_zd`).
- `DeviceName` is the name given to the downstream device.
- `DateTime` is the time stamp corresponding to when the file was published, expressed down to the milliseconds in the format YYYYMMDDhhmmssSSS.
- Only the following characters are allowed in the .csv file name : UTF-8 and basic ASCII (32 to 7F, excluding \ / : * ? " < > |). Any non-supported characters will be replaced by **~**.

Example: Considering the following file name:
11_mb_F160 3P 3P+N_20221104084830994.csv where:

- `ReducedID` is **11_mb**.
- `DeviceName`is **F160 3P 3P+N**, name of the device.

  NOTE: This name is the default value (product model) if the user has not updated it.
- `DateTime` is **20221104084830994**, that means, produced November 4, 2022 at 8:48:30.994.

The .csv file content only supports UTF-8 standard character encoding for device name, event name, measurement name, and file name.

Quotation marks in all data fields of the .csv file help ensure compatibility with special characters.

For details and examples of the .csv file, see *Appendix D SFTP Publication File Formats*, page 196.

File Format of JSON Publication

One .json file is produced, which includes measurements of multiple downstream devices configured with the same sampling period.

The name of the JSON file that is exported follows the naming convention `DateTime.json` where `DateTime` is the time stamp corresponding to when the file was published, expressed down to the milliseconds in the format YYYYMMDDhhmmssSSS.

For an example of a .json file, see *Appendix D SFTP Publication File Formats*, page 196.

Publication of Emails for Alarms (Advanced Model)

Presentation

The Panel Server Advanced allows you to trigger an email notification when an alarm becomes active.

To execute the email service tasks, the Panel Server Advanced must be connected to the Internet through an Internet service provider or a firewall with or without proxy management. The email service is provided through the Schneider Electric cloud infrastructure to provide a high quality of service.

To perform email notification, proceed as follows:

1. Activate the email service, page 89.

   NOTE: Service of publication of emails for alarms and Schneider Electric cloud services, page 83 are mutually exclusive, that is, both features cannot be enabled concurrently.
2. Create the list of recipients, page 89.
3. Select the alarms that trigger an email notification when activated, page 109.
4. Send email notification, page 90.

If the Panel Server Advanced does not succeed in connecting to the cloud services, see Troubleshooting, page 176.

Availability

This function is available on Panel Server Advanced.

Setting the Parameters

Publishing function is set on the EcoStruxure Panel Server webpages, at **Settings > Publication > Publication method > Email service for alarms**.

Activating the Email Service

To activate the email notification service, click the **Activate** button.

Result: Connection Status turns from **Not connected** to **Connected**.

When email notification is activated, alarms are displayed in the webpages.

Creating Recipients

When email notification service is activated, you can complete the list of recipients with a maximum of 10 different recipients. In **Email recipients**, enter the name and email address for each recipient and click the **Save** button. The list can be edited or deleted.

An email address must be less than 128 characters.

To test the function, you can send an email to one selected recipient.

Recommendations for Email Addresses

Schneider Electric recommends that you use professional or generic email addresses to send alarms to avoid any privacy-related issue.

The email addresses are sent to the Schneider Electric cloud when an alarm occurs and only kept for the lifetime of the transaction. Email addresses are ephemeral data from the cloud point of view. The Panel Server keeps the email addresses locally and transmits them each time an alarm occurs.

Schneider Electric does not keep or use the email addresses for any other purpose than sending alarms and events.

Sending Email Notification

When email notification service is activated, all alarms that have been enabled trigger a notification to the recipients defined in the list. You cannot select the emails to be sent to some of the recipients.

The address from the Internet service provider has the format `noreply@xxx.mail.ecostruxure.se.com`. Email messages are only in English whatever the language selected for the Panel Server webpages or EcoStruxure Power Commission software.

NOTE: A 4-minute period of time can occur between event occurred and mail is sent.

Publication on SFTP Server and Email Notification for Alarms (Advanced Model)

Presentation

This service combines the publication to SFTP server and email notification for alarms.

For more information on each individual service, see the detailed topic:

- Publication on SFTP Server, page 86
- Publication of Emails for Alarms, page 89

Availability

This function is available on Panel Server Advanced.

Setting the Parameters

Publishing function is set on the EcoStruxure Panel Server webpages, at **Settings > Publication > Publication method > SFTP & Email for alarms**.

Output Control from Cloud

Presentation

⚠WARNING

UNEXPECTED START OF OPERATION

In case of remote control of loads, only do it for non-critical electrical loads that can safely be left unattended.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

Output remote control allows you to manage non-critical electrical loads remotely when the EcoStruxure Panel Server is connected to the Schneider Electric cloud service.

The function allows you to:

- Remotely execute control orders on a device connected via a PowerTag C IO device configured as contactor with feedback loop mode or impulse relay mode , by using the a Schneider Electric cloud application. See *Configuration of PowerTag Control Devices Through Webpages*, page 166 for more information about configuring contactor with feedback loop mode and impulse relay mode.
- Send real-time status updates of the monitored device to the Schneider Electric cloud.

Availability

This function is available on Panel Server Entry, Universal, and Advanced.

Setting the Parameters

The output remote control function is enabled and disabled in the EcoStruxure Panel Server webpages, at **Settings > Data Publication**.

1. In **Publication method**, select **Schneider cloud services**.
2. In **Output remote control**, click the slider to enable remote control of outputs.
3. Save the settings.
4. Read the safety message popup and click **Confirm** or **Cancel**.

   NOTE: The output remote control function is supported for PowerTag C IO devices only.

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.

EcoStruxure Panel Server date and time are used for time stamping events to provide a chronological order.

Availability

This function is available on Panel Server Entry, Universal, and Advanced.

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 and 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** to synchronize the date and time automatically with an external NTP server. • Select **Cloud** (default setting) to synchronize the date and time automatically with an NTP server hosted by Schneider Electric cloud services, page 83.	✓	✓

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 NTP server address 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 50).	✓	✓
Polling interval (s)	Allows you to enter the polling interval to set how frequently (in seconds) the EcoStruxure Panel Server requests updates from the time server. • 64 • 128 • 256	–	✓

Parameter	Description	EPC software	Webpages
	• 512 • 1024		
Primary server address	Used to enter the primary NTP server address when the parameter **NTP settings > Mode** is set to **Static**.	✓	✓
Secondary server address	Used to enter the secondary NTP server address when the parameter **NTP settings > Mode** is set to **Static**.	✓	✓

Setting Date and Time Manually

EcoStruxure Panel Server date and time can be set manually:

- With EcoStruxure Power Commission (EPC) software
  - By manually setting the date and time in the dedicated fields.
  - By user-initiated synchronization with date and time of the PC running EcoStruxure Power Commission software.
- On the EcoStruxure Panel Server webpages, at **Settings > General > Date & Time > General settings > Synchro mode > Manual**
  - By user-initiated synchronization with date and time of the PC.

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.	✓	✓

Data Sampling

Presentation

The data sampling function on Panel Server samples data from connected devices at a defined frequency for a defined set of measurements. The frequency and measurements depend on the configuration of the function, set either by a connected cloud application or manually in the Panel Server webpages.

Availability

This function is available on Panel Server Entry, Universal, and Advanced.

Setting the Parameters

Activate data sampling on the EcoStruxure Panel Server webpages, at **Settings > Data Management > Data sampling**.

NOTE: In the case of manual configuration, set the sampling frequency and measurements individually, page 95 before activating data sampling.

Data Sampling Configuration from Cloud Application

When a connection to a cloud application is enabled, data sampling is automatically activated and configured by the cloud system. The settings are not editable (read only) with Panel Server webpages.

Data measured on the connected devices is sampled and published to the cloud application.

For Panel Server Entry and Universal, the sampled data is pushed to a buffer before being published. The buffer stores data for up to one month and publishes to the cloud application when data publication is activated or when the connection is restored after an interruption.

For Panel Server Advanced, the data is logged in the Panel Server, page 98.

Manual Data Sampling Configuration

Manual data sampling allows you to configure the measurements to be sampled for each device in the system:

- Modbus devices
- Wireless devices
- Input/output devices

After the commissioning of all the devices connected to the Panel Server, the choice of measurements and sampling period can be set individually for each device in the **Settings > Data Management** webpage :

1. For each device, click the device name.
2. Click **Data**.
3. Select or deselect sampling for every measurement with the **Sampling** checkbox.
4. Select the sampling period for the measurement. Refer to Changing the Data Sampling Frequency, page 96, if relevant.

5. Click **Save** to apply changes.

   IMPORTANT: Applying the changes may take up to a few minutes. during which the following pages and functions are not accessible:

   - Home page dashboard (Advanced)
   - Trending - device and aggregated data views (Advanced)
   - Custom models - custom model updates
   - CSV export
   - Backup and restore
   - Data sampling
   - Measurement sampling

   NOTE: The default sampling configuration for every device comprises of the most commonly used data for each device type.

Calculation of Valid Configurations for Data Measurements

Consider how much data is being sampled across the devices when defining the sampling parameters for the system. To maintain system performance, it is recommended to follow these performance criteria:

- A maximum of 5,000 simultaneous individual data points from different devices whatever the type (wireless, Modbus-SL, or Modbus TCP/IP, input/output devices)
- A maximum of 500 samples per minute
- A maximum of 100 individual alarms for monitoring and sending email notifications

  NOTE: Any remote configuration that tries to enable more than these limits is rejected.

The following tables shows examples of data sampling configurations and indicates if they are valid or not:

Number of devices	Number of measure-ments	Sampling period (min)	Total number of sampled data points	Samples per minute	Number of alarms	Valid configuration
30	30	15	900	60	90	Yes - < 5,000 simultaneous measurements, < 500 samples per minute and < 100 alarms
30	30	15	900	60	**150**	No - number of alarms > 100
30	170	10	**5,100**	51	90	No - total number of simultaneous measurements > 5,000
30	30	1	900	**900**	90	No - samples per minute > 500

Changing the Data Sampling Frequency

For Panel Server Advanced, when the sampling period (frequency) is changed locally or by a remote configuration, historical logged data points are retained and migrated to comply with the new sampling period, with the following results:

- Reducing the frequency (for example, changing the period from 5 minutes to 10 minutes): The data points relevant to the reduced frequency are retained. Intermediate data points are deleted.
- Increasing the frequency (for example, changing the period from 10 minutes to 5 minutes): Data points for which no historical data exists are duplicated from existing historical data (data points on either side), which may create non-linear trends where linear trends are expected.

Data Sampling Activation and Reset

The following table describes the settings.

Parameter	Description
Activation mode	Used to activate/deactivate data sampling by the Panel Server. • Click button **Activate sampling** to activate the function. • Click button **Deactivate sampling** to deactivate the function.
Flush data	Used to delete all sampling data. To delete data: 1. Deactivate data. 2. Click button **Flush data**. **NOTE:** During the operation, which may take up to a few minutes, the following pages and functions are not accessible: • Home page dashboard • Trending - device and aggregated data views • Custom models - custom model updates • CSV export • Backup and restore • Data sampling • Measurement sampling 3. Confirm the data flush request by clicking **Confirm** in the popup message

Data Logging (Advanced Model)

Presentation

When data sampling is activated, the Panel Server Advanced historizes (or logs) the sampled data.

Data is logged in the logging memory. The memory stores approximately three years of data of a system or 788,400,000 measurement data points. For more detail about quantities of logged data, see calculation of valid configurations, page 96.

Availability

In addition to published data, the historized data is available on the EcoStruxure Panel Server webpages at **Home** and at **Data Trending**.

Setting the Parameters

To enable data logging, activate data sampling on the EcoStruxure Panel Server webpages, at **Settings > Data Management > Data sampling**.

Data Logging Configuration

Configure data logging in the same way as for data sampling, page 95.

Consider the maximum number of data points that can be stored and the recommended sampling limits, page 96 when configuring data logging.

Logging too many data samples per period may affect your Advanced model performance, including degraded web page response, missed logging periods, and less responsive Panel Server operation.

NOTE: Historical data is maintained if the settings of a measurement are modified. Refer to Changing the Data Sampling Frequency.

Data Logging Configuration from Cloud Application

When a Panel Server Advanced is connected to a cloud application, the data that is sampled and published is logged in the Panel Server Advanced in addition to being published to the cloud application.

NOTE: The Panel Server Advanced publishes the last three months of sampled data when publication is activated.

The logged data can be seen in the **Trending** screens. The sampling and publishing configuration is directly received from the cloud application and cannot be set with the Panel Server commissioning webpages. The logging memory of the Panel Server Advanced serves as a buffer if the cloud connection is lost. The data is published when the cloud connection is restored.

Home (Advanced Model)

Presentation

The Panel Server Advanced Home menu allows you to see an analytical view of energy consumption.

Availability

This function is available on Panel Server Advanced.

Setting the Parameters

The Home menu is available on the EcoStruxure Panel Server webpages, at **Home**.

Consumption Settings

The following table describes the settings.

Parameter	Description
Commodity	Used to select the commodity type(**Electricity** (default setting), **Gas**, **Fuel Oil**, **Air**, **Steam**, **Water**)
Period	Used to select the period duration (**One day**, **One week**, **4 weeks**).
From	Used to select the start date for each period: 1. Select the current period (**Period 1**) start date. 2. Select the previous period (**Period 2**) start date. **NOTE:** The default start date depends on the period selected: • One day: Period 1: D-1; Period 2: D-2 • One week: Period 1: D-7; Period 2: D-14 • 4 weeks: Period 1: D-4 weeks; Period 2: D-8 weeks **NOTE:** The default period is one day and the start date is yesterday (D-1).
To	Used to select the period end date.

By Usage Settings

The following table describes the settings.

Parameter	Description
By Usage	A pie-chart shows the distribution of the top five consumers.

Data Trending (Advanced Model)

Presentation

The Panel Server Advanced allows you to display trending graphs based on the logged historical data over a selected time period.

The trending of the logged data on a Panel Server Advanced requires that the measurements to be viewed have been selected for logging and data sampling is activated. For more information, see Data Sampling, page 95.

You can view data trends in two ways:

- **Device view** provides a device centric view. It displays data from a selection of devices for a specified period of time and compares data within an equivalent period of time.
- **Aggregated view** provides a data centric view. It displays aggregated data of energy consumption based on a commodity and/or usage, without reference to specific devices.

You can trace trends of historical data over a single period of time or, using the compare mode, you can compare the same data from two different periods of the same duration (for example, comparing data from the week starting July 10th 2022 to the week starting July 17th 2022).

NOTE: The energy values shown in the trending graphs differ from the raw data values in the CSV file exported to your PC , page 103.

The type of trending graph displayed depends on the type of data selected. There are two types of graph:

- Bar chart: used to display integrated data (for example, energy, reactive energy) or aggregated data
- Line graph: used to display continuous data (for example, temperature, apparent energy)

The type of graph is indicated by an icon next to each type of data in the **Data** drop down menu. The types of data available in the list depend on the device selected.

A legend below the graph indicates device and data type per curve. A tooltip pops up when hovering the cursor over the graphs, indicating date, time, device name, value and unit for each data plot.

NOTE: A maximum of 16 curves can be displayed on a line graph.

Availability

This function is available on Panel Server Advanced webpages, at **Trending**.

Aggregation Principle

The trending figures in **Aggregated view** are the result of an aggregation algorithm used to calculate the consumption of energy. Only Active energy is calculated.

In order to aggregate the consumed energy of the loads, all usages are considered in the aggregation except:

- Main/Incomer
- Sub/Head of group
- Total

Any device configured with one of these usages is not displayed in **Aggregated view** or in the **Home** page.

Data Trending Device View Settings

To customize data displayed in **Device view**:

1. Select the device(s) you want to view.
2. Select the data you want to view. Only two different types of data can be displayed together.
3. Activate compare mode by clicking the slider icon if you want to compare periods.
4. Select the period of time you want to display.

The following table describes the settings.

Parameter	Description
Devices	Used to select one or several devices.
Data	Used to select the data to be used for the graph. For different types of data with continuous measurements (for example, voltage and current).
Compare mode	• Disable to get the graph on a single period. • Enable to get comparing data from two periods of same duration.
Period	When the parameter **Compare mode** is enabled, used to select the period duration (**One day**, **One week**, **4 weeks**).
From	When the parameter **Compare mode** is disabled, used to select the period start date. **NOTE:** The default period is one day and the start date is yesterday (D-1). When the parameter **Compare mode** is enabled, used to select the start date for each period: 1. Select the current period (**Period 1**) start date. 2. Select the previous period (**Period 2**) start date. **NOTE:** The default start date depends on the period selected: • One day: Period 1: D-1; Period 2: D-2 • One week: Period 1: D-7; Period 2: D-14 • 4 weeks: Period 1: D-4 weeks; Period 2: D-8 weeks
To	When the parameter **Compare mode** is disabled, used to select the period end date. **NOTE:** The default end date is today (D). **NOTE:** When the parameter **Compare mode** is enabled, the end date is defined automatically according to the selected start date and period.
Interval	When the parameter **Compare mode** is disabled, used to select the interval of data displayed by hour (**H**), day (**D**), or **Month**. **NOTE:** Week is only applicable for integrated data, fro example, to display Energy consumption over a period of month displayed as energy consumed by day.
Clear filters	Used to erase any selection of devices, data or periods of time previously selected.

Data Trending Aggregated View Settings

To customize data displayed in **Aggregated view**:

1. Select the commodity you want to view. Only one commodity can be selected.
2. Select the usage(s) you want to view.
3. Activate compare mode by clicking the slider icon if you want to compare periods.

   NOTE: When compare mode is activated, a maximum of 16 usages can be displayed.
4. Select the period of time you want to display.

The following table describes the settings.

Parameter	Description
Commodity	Used to select one or several commodities from a drop-down list of values.
Usage	Used to select one or several or all usages.

Parameter	Description
Compare mode	• Disable to get the graph on a single period. • Enable to get comparing data from two periods of same duration.
Period	When the parameter **Compare mode** is enabled, used to select the period duration (**One day**, **One week**, **4 weeks**).
From	When the parameter **Compare mode** is disabled, used to select the period start date. **NOTE:** The default period is one day and the start date is yesterday (D-1). When the parameter **Compare mode** is enabled, used to select the start date for each period:. 1. Select the current period (Period 1) start date. 2. Select the previous period (Period 2) start date. **NOTE:** The default start date depends on the period selected: • One day: Period 1: D-1; Period 2: D-2 • One week: Period 1: D-7; Period 2: D-14 • 4 weeks: Period 1: D-4 weeks; Period 2: D-8 weeks
To	When the parameter **Compare mode** is disabled, used to select the period end date. **NOTE:** The default end date is today (D). **NOTE:** When the parameter **Compare mode** is enabled, the end date is defined automatically according to the selected start date and period.
Interval	When the parameter **Compare mode** is disabled, used to select the interval of data displayed by hour (**H**), day (**D**), or **Month**. **NOTE:** Week is only applicable for integrated data, for example, to display Energy consumption over a period of month displayed as energy consumed by day.
Clear filters	Used to erase any selection of devices, data or periods of time previously selected.

Data Log Export (Advanced Model)

Presentation

The Panel Server Advanced can export data measured on the connected devices and logged through data sampling, page 95. Data can be exported on your PC in a .csv file.

To export data logged on a Panel Server Advanced:

1. Configure data to be sampled (see Selecting Measurements to Log, page 96).
2. Activate sampling.

   NOTE: To enable exporting of logged data to a CSV file after backup restore on the same Panel Server Advanced (see detailed topic, page 125), you must first reset the Panel Server to factory settings (see procedure, page 132).

When the Panel Server is connected to Schneider Electric cloud services, data logged on Panel Server is controlled by the cloud configuration. When a new cloud configuration is received by the Panel Server, data previously logged in the Panel Server is lost.

Availability

This function is available on Panel Server Advanced.

Setting the Parameters

Data logging export is set on the EcoStruxure Panel Server webpages, at **Settings > Data Management > Local export**.

Data Log Export Settings

The following table describes the settings.

Parameter	Description
From	Used to select the start date of the period.
To	Used to select the end date of the period.
Device selection	Used to select one of the following from which to export sample data: • One device • All devices **NOTE:** To export data from several devices, consider performing multiple single device exports to improve readability. Select one device and click **Export data** to generate the .csv file for the selected device. Repeat for each device.

Exporting Data

To export data that has been sampled by the Panel Server Advanced, click **Export data**. Data is exported into a CSV file on your PC. Data can be exported for a period of time by selecting the start-date and the end-date of the required period of time.

Up to 6.5 million data points can be exported to a single file; larger sets of data must be exported to several files. An error is generated if you attempt to export more than 6.5 million data points. Take note of the over configuration factor included in the error to assist your selection of a valid shorter export period. For example, if you attempt to export 20 days of data, but receive an error that you are 1.0 times over the limit, you would reduce the duration of each export period to less than 10 days.

You can calculate the size of your export file by calculating for each device, the number of samples, and then adding the samples of all devices together. For example, if you have three currents for one device configured for data logging at a 1 minute sampling rate, the total number of samples is 1,581,120. The following table illustrates the calculation.

Measurement	Sampling period (minute)	Start date	End date	Elapsed time (minute)	Number of samples
Current A	1	July, 28 2022	July, 29 2023	527,040	527,040
Current B	1	July, 28 2022	July, 29 2023	527,040	527,040
Current C	1	July, 28 2022	July, 29 2023	527,040	527,040

File Format of CSV Export Saved on a PC

Data is logged in a .csv file. The date is appended in the format `yyyymmdd` to the file name `data-export_`. For example, data exported on June 8, 2022 are in the file named `data-export_20220608.csv`.

Data time stamps in the CSV file are in the format `DD/MM/YYYY HH:MM` UTC (Coordinated Universal Time).

The following table provides the details of each row of the .csv file, with sample data. Data for each device is displayed per column.

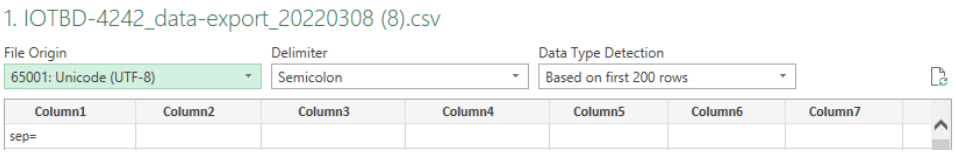
Row	Data in .csv file	Description	Example of data in comma-separated values (CSV) format
1	Element ID	Element ID for each of the columns	`modbus:2_mb_PkWD, modbus:1_mb_PFTtl`
2	`Device Name`	Customer specified device name for each of the columns	`myPM5560, myPM8000`
3	`Device Type`	Device type defined by the Panel Server for each of the columns	`PM5560, PM8000`
4	`Measurement Name`	Data name for each of the columns	`Total Demand Max Active Power, Total Rms Power Factor`
5	`Measurement Unit`	Unit of the data for each of the columns	`W`
6 and more	`DD/MM/YYYY HH:MM`	Logged data	`02/10/2022 20:20, 8880.13, -1`

Read the .csv File

To read the .csv file, you need to import data into Microsoft Excel and use the correct data encoding.

By default, Excel uses Western European character encoding, as shown below:

However, the Panel Server Advanced exports data using UTF-8 character encoding. Therefore, to get all characters to display correctly, such as °C, you need to select UTF-8 as **File Origin** as shown below:



To select UTF-8 encoding in the exported .csv file, proceed as follows:

1. Open Microsoft Excel and select **Data** then, in **Get & Transform Data**, select **From Text/CSV**.
2. Select the .csv file exported from the Panel Server Advanced and click **Import**.
3. In the window that opens, select these parameters:
   - **65001: Unicode (UTF-8)** in **File Origin**.
   - **Based on entire dataset** in **Data Type Detection**.
4. Click **Load**.

   Result: The Panel Server Advanced data logging file displays in Excel with UTF-8 character encoding, as shown in the following illustration:

A	B	C	D
Column1	Column2	Column3	Column4
sep=			
Element ID	zigbee:19_zd_WHr_I	modbus:29_mb_VBC	modbus:14_mb_VAB
Device Name	P63 1P+N B123	Compact NS P 7.0 IFM	PM8000
Device Type	A9MEM1562	TRV00210	PM8000
Measurement Name	Total Delivered Active Energy	Rms Voltage Phs B C	Rms Voltage Phs A B
Measurement Unit	Wh	V	V
2022/06/08 00:00:00	0	nan	399.366
2022/06/08 00:01:00			

To ensure that the separators are correctly configured to avoid data reading issues, proceed as follows:

1. In Excel, select **File > Options > Advanced**
2. Uncheck **Use system separators**.
3. In **Decimal separator**, check that , (comma) is entered.
4. Click **OK**.
5. Reload the .csv file, if necessary.

Custom Models for Downstream Modbus Devices (Universal and Advanced Models)

Presentation

The Panel Server supports the use of custom models for downstream Modbus devices. A custom model can be created to manage a Modbus device that is not natively managed by the Panel Server built-in models or when a different model than the built-in one is desired.

Custom models are only dedicated to support EcoStruxure Asset Advisor EcoStruxure Resource Advisor, and EcoStruxure Energy Hub applications and Panel Server Advanced energy server functions. On other applications, custom models can be used, but only allow the visualization of device data on the monitoring screen.

Custom models are created or modified in the EcoStruxure Power Commission web portal tool.

New and modified custom models are imported in the Panel Server by using the Panel Server webpages. To connect a new Modbus device or to automatically discover Modbus devices, see Addition and Removal of Modbus Devices, page 156.

Availability

This function is available on Panel Server Universal and Advanced.

Setting the Parameters

Custom models are available on the EcoStruxure Panel Server webpages at **Settings > Modbus Devices > Custom models**.

Creating a Custom Model

Create the custom model by using the EcoStruxure Power Commission web portal tool.

The custom device model must contain the following facets:

- modelingInformation
- productIdentification
- measure
- modbusMapping
- modbusDataModel

The custom model cannot be imported into the Panel Server webpages if it does not follow these rules.

The custom units in the custom device model must comply with the following syntax rules:

- Maximum number of characters: 16
- Use only characters from the following table.

Characters	Description
Alphanumeric characters	All upper case letters from A to Z All lower case letters form a to z All numbers from 0 to 9
/	forward slash

Characters	Description
*	star (multiply)
-	minus
+	plus
%	percent
(	left parenthesis
)	right parenthesis
.	point
Ω	omega (ohm)
µ	mu (micro)
'space'	the space character
°	degrees, for example °C
superscript characters	All numbers from 0 to 9 Plus and minus characters

Export the custom model to a zip file.

Importing a Custom Device Model

To import a custom device model previously created and exported in a zip file, from the Panel Server webpages, select **Settings > Modbus Devices > Custom models**, and follow this procedure:

1. Click **Import**. You can import:
   - A new custom model. This is a custom model which is not currently imported to the Panel Server.
   - A modified custom model. This is a modification of a custom model which is already imported and used by connected Modbus devices.
2. Select a custom device model stored locally in a zip file.

   The zip file can contain both new and modified custom models. You can have a maximum of two different versions with the same custom model name. Only one version is used by Modbus devices.

   NOTE: An error message is displayed if the custom model does not comply with the syntax rules (see Creating a Custom Model, page 106).

When the custom model is successfully imported, it is listed in the custom models table.

A new custom model is automatically instantiated so that new Modbus devices can be added using that custom model.

For modified custom models, the new version is available for use in the custom models table. It is not automatically instantiated. Perform an update to apply the new version to selected Modbus devices. See the following table for more information.

Custom Models Table

The custom models table displays the following information and allows you to perform version updates, and delete and export custom models:

Column	Description
Model name	Name of imported custom model.
Model version	Current version of the custom model, used by associated Modbus devices.
Available version	An alternative version of the custom model available to be applied on associated Modbus devices.

Column	Description
Associated devices	The number of Modbus devices associated with the custom model. This number is updated when new Modbus devices are discovered manually or automatically.
⋮ Contextual menu	Click this icon to open a contextual menu. The items displayed depend on the device: • Update model: Click to update the model to the available version. **NOTE:** After updating to a new version, the original version appears in the **Available version** column and can be reinstated to the associated devices by clicking the Update icon again. • Export model: Click to export a custom model to a zip file. • Remove model: Click to delete a previously imported device.

Supported Functions

Modbus functions are described in the appendix:

- Modbus TCP/IP functions, page 179
- Modbus-SL functions, page 181

Alarms

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Presentation

⚠WARNING

EQUIPMENT INCOMPATIBILITY OR INOPERABLE EQUIPMENT

Do not rely solely on alarms for the maintenance of your equipment.

Failure to follow these instructions can result in death, serious injury, or equipment damage.

For each device connected to the Panel Server, you can enable and/or disable alarms which are issued in the case of electrical events or communication loss.

An active alarm disappears when conditions of the alarm are no longer met.

Alarms are defined by severity:

- High severity
- Medium severity
- Low severity

Availability

This function is available on Panel Server Entry, Universal, and Advanced.

Selecting Alarms

Alarms to be displayed when they become active can be enabled individually for each device as follows.

A maximum of 100 alarms can be enabled concurrently.

1. Click the device name on the EcoStruxure Panel Server webpages, at **Settings > Data management**.
2. Click **Alarms**.
3. Enable/disable an alarm with the **Enable alarm** checkbox.

   NOTE: By default, alarms are disabled.

   NOTE: The alarm bit in Modbus register is always active therefore it is not available in the **Alarms** webpage.

   NOTE: When the Panel Server is connected to the Schneider Electric cloud (see Publication on Schneider Electric Cloud, page 83), the selection of alarms is managed at the cloud level. Therefore, it is not possible to enable/disable alarms from the **Alarms** webpage.

Notification of Alarms

When an alarm is enabled and becomes active, it is displayed in the page of the device on the **Monitoring and Control** webpage.

On Panel Server Advanced:

- When an enabled alarm becomes active, a notification is sent to the user by email (see Publication of Emails for Alarms, page 89)
- From the **Notifications** menu, page 114, you can view a list of alarm notifications.

Alarms

The complete list of alarms is as follows:

Alarm severity	Alarm description
High-severity alarms	Capacitor abnormal cosphi alarm
	Capacitor broken step alarm
	Capacitor hunting alarm
	Capacitor low current alarm
	Capacitor max cycles and count step alarm
	Capacitor over current alarm
	Capacitor overload alarm
	Capacitor over temperature alarm
	Capacitor step power loss alarm
	Capacitor too high THDV alarm
	Capacitor voltage tolerance alarm
	Maximum operating time alarm
	Circuit breaker fault trip alarm
	Circuit breaker opened alarm
	Circuit breaker trip alarm
	Current transformer supervision alarm
	Device replacement alarm
	Voltage loss alarm
	Fan error alarm
	Ground-fault alarm
	HeatTag alarm
	Falling edge on input alarm
	Rising edge on input alarm
	Instantaneous overcurrent trip alarm
	Integrated instantaneous overcurrent trip alarm
	Internal cause trip alarm
	Long-time protection trip alarm
	Overcurrent when voltage loss alarm
	Overvoltage alarm
	Overvoltage trip alarm
	Parallel arc fault detection protection trip alarm
	Serial arc fault detection protection trip alarm
	SF6 alarm
	Short-time protection trip alarm
	Tripping chain malfunctioning trip alarm
	Internal trip unit malfunctioning alarm

Alarm severity	Alarm description
	Undervoltage alarm
	Voltage transformer supervision alarm
	Zero current alarm
Medium-severity alarms	Battery low alarm
	Trip test not performed alarm
Low-severity alarms	Battery alarm
	Earth-leakage pre-alarm
	Ground-fault pre-alarm
	Long-time overcurrent pre-alarm
	45% rated current alarm
	50% rated current alarm
	80% rated current alarm
	Overcurrent pre-alarm
	Overvoltage pre alarm
	Test pushbutton trip alarm

NOTE:

- Concerning MasterPact NT/NW circuit breakers, the ERMS (Energy Reduction Maintenance Setting) feature is limited. ERMS alarm is compatible from Panel Server only when ERMS application is configured on IO module 1. When the application switch of IO module 1 is set to position 3, you may receive a notification of ERMS activation due to electrical noise on the IO module. It does not necessarily indicate that the ERMS mode is activated. Schneider Electric recommends always confirming by checking the present alarm status from the Panel Server webpages and ERMS status indicator on the MasterPact NT/NW circuit breaker. For more information, refer to NHA67346 *Energy Reduction Maintenance Setting (ERMS) System Installation and User Guide*.
- Concerning IO module generic function, alarm activation is enabled when the input status is 1.
- When Acti9 iATL24, OFSD or iACT24 auxiliaries are connected under an I/O Smart Link device and commissioned in the Panel Server, if the cable is disconnected from the I/O Smart Link device, a **Circuit breaker opened alarm** is triggered into the Panel Server instead of the **Communication Loss alarm**.

Communication Loss

This alarm indicates that the gateway has lost the communication with a wireless device.

The communication loss happens if the gateway has not received packets for a period of time equal to 6 times the communication period of the device.

The alarm will automatically disappear as soon as the wireless device is connected to the RF network.

Voltage Loss

This alarm indicates that the circuit on which wireless device is installed is no longer under voltage. The cause of the voltage loss can be a manual opening of the circuit, a mains power outage, a circuit breaker tripping. Wireless device sends the Voltage Loss alarm to the gateway as soon as it happens, and before being fully de-energized, i.e the alarm response-time does not depend on the wireless

communication period.The alarm will automatically disappear as soon as the wireless device is powered again.

Overcurrent at Voltage Loss

This alarm indicates that an overcurrent occured during the time of voltage loss. This alarm occurs only if the option is activated. The alarm is managed only if the nominal current or the breaker rating (Ir) of the associated protection device has been set.

NOTE: The RMS value of the current during the voltage loss is available in the Modbus table. For more details, refer to . These measurements help to diagnose the root cause of the overcurrent.

⚠DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

Make sure that the cause of the overcurrent is identified and is fixed before closing the circuit.

Failure to follow these instructions will result in death or serious injury.

80% of Nominal Current

This alarm indicates that the load current exceeded 80% of the nominal current or exceeded 80% of the associated circuit breaker rating (Ir). On polyphase circuits, the alarm triggers if the current of one of the phases meets the above conditions. The gateway manages the alarms based on the values of the currents sent by the wireless device. The response time of the alarm depends on the communication period set into the PowerTag system wireless network (default = 5 seconds). The alarm automatically disappears when the load current remains below the threshold value for 15 minutes.

NOTE: Hysteresis of 10% is applied on the threshold value.

50% of Nominal Current

This alarm indicates that the load current exceeded 50% of the nominal current or exceeded 50% of the associated circuit breaker rating (Ir). On polyphase circuits, the alarm triggers if the current of one of the phases meets the above conditions. The gateway manages the alarms based on the values of the currents sent by the wireless device. The response time of the alarm depends on the communication period set into the PowerTag system wireless network (default = 5 seconds). The alarm automatically disappears when the load current remains below the threshold value for 15 minutes.

NOTE: Hysteresis of 10% is applied on the threshold value.

45% of Nominal Current

This alarm indicates that the load current exceeded 45% of the nominal current or exceeded 45% of the associated circuit breaker rating (Ir). On polyphase circuits, the alarm triggers if the current of one of the phases meets the above conditions. The gateway manages the alarms based on the values of the currents sent by the wireless device. The response time of the alarm depends on the communication period set into the PowerTag system wireless network (default = 5 seconds). The

alarm automatically disappears when the load current remains below the threshold value for 15 minutes.

NOTE: Hysteresis of 10% is applied on the threshold value.

Zero Current

This alarm indicates that the load current value is 0 A. On polyphase circuits, the alarm happens if the current of one of the phases meets the above condition. The gateway manages the alarms based on the values of the currents sent by the wireless device. The response time of the alarm depends on the communication period set into the PowerTag system wireless network (default = 5 seconds). Zero current alarm allows the monitoring of full time running loads. The alarm automatically disappears when the load current is greater than 0 A on all phases.

Undervoltage (80%)

This alarms triggers when a phase-to-neutral voltage or a phase-to-phase voltage falls below the threshold of 80% of the nominal value. The alarm automatically disappears when the voltage remains greater than 88% of the nominal value (a hysteresis of 10% is applied).

Overvoltage (120%)

This alarms triggers when a phase-to-neutral voltage or a phase-to-phase voltage exceeds the threshold of 120% of the nominal value. The alarm automatically disappears when the voltage remains lower than 108% of the nominal value (a hysteresis of 10% is applied).

Notifications (Advanced Model)

Presentation

The Panel Server Advanced allows you to display a list of alarm notifications issued by connected downstream devices.

The notification list is for display only.

By default, the list displays alarm notifications issued in the 30 days prior to the current date. You can select other time periods or customize the time period.

The list of notifications displays the following information for each alarm:

- Date of alarm
- Severity icon
- Name of device which triggered alarm
- Alarm name
- Status of alarm

Availability

This function is available on Panel Server Advanced webpages, at **Notifications**.

Display Settings

The time period of alarms notifications to display can be selected from a list of options:

- Last 24 hrs
- Last 7 days
- Last 30 days
- Last 90 days
- Custom (select the start and end dates of the period required)

You can filter notifications on the following fields:

- Severity
- Device name
- Alarm name
- Status

Alarm Icons

Icon	Description
	High-severity alarm. Appearance.
	High-severity alarm. Disappearance.
	Medium-severity alarm. Appearance.
	Medium-severity alarm. Disappearance.

Icon	Description
	Low-severity alarm. Appearance.
	Low-severity alarm. Disappearance.

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 is signed using the Schneider Electric public key infrastructure 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 the respective release notes:

- DOCA0249EN *EcoStruxure Panel Server Entry - Firmware Release Notes*
- DOCA0178EN *EcoStruxure Panel Server Universal - Firmware Release Notes*
- DOCA0248EN *EcoStruxure Panel Server Advanced - Firmware Release Notes*

Availability

This function is available on Panel Server Entry, Universal, and Advanced.

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 **Settings > General**

The latest security patch is also available on the EcoStruxure Panel Server webpages. It is the lowest firmware revision that the EcoStruxure Panel Server can be downgraded to, without removing currently installed security patches.

Updating the Firmware

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

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

For more information about updating EcoStruxure Panel Server firmware, refer to the respective release notes:

- DOCA0249EN*EcoStruxure Panel Server Entry - Firmware Release Notes*
- DOCA0178EN *EcoStruxure Panel Server Universal - Firmware Release Notes*
- DOCA0248EN *EcoStruxure Panel Server Advanced - Firmware Release Notes*

User Management

Presentation

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

Availability

This function is available on Panel Server Entry, Universal, and Advanced.

Changing a Password

At first connection, you are required to set the password of the default user account to allow access to all the EcoStruxure Panel Server features. This action can be done as follows:

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

Password Requirements

The EcoStruxure Panel Server incorporates password requirements. The user is prompted to change the password when logging in for the first time to help prevent unauthorized access to the application.

A password must conform to the following rules:

- 6 to 32 characters
- At least one character in uppercase
- At least one character in lowercase
- Must not contain special characters other than: ! “ # $ % & ‘ ( ) * + - , . ; : / ~ < > = ? @ [ ] \ ^ _ ` { } |
- The space character is permitted

Password Lockout

After 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 (PAS600L, PAS600LWD, PAS800L)

Presentation

The two embedded digital inputs on Panel Server Universal PAS600L and Advanced PAS800L 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, PAS600LWD, and Advanced PAS800L.

Digital Input Types

There are two types of digital input:

- Standard 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, Gas, Electricity, Steam) metering device compliant with standard IEC 62052-11 (minimum pulse width of 30 ms). Pulse digital inputs support up to 16 pulses/second, as per the requirements of the standard.

Each digital input can be individually configured as either standard or pulse.

Pulse Digital Input Parameters

The pulse weight and pulse unit of each pulse input can be configured using EcoStruxure Power Commission software or EcoStruxure Panel Server webpages. 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.

Setting the Parameters

The digital inputs are set as follows:

- With EcoStruxure Power Commission (EPC) software
- On the EcoStruxure Panel Server webpages, at **Settings > Embedded Input Management**

Digital Input Settings

The following table describes the settings of **Embedded input 1 (DI01)** and **Embedded input 2 (DI02)** digital inputs.

Parameter	Description
Type	Used to select the type of each digital input (**Embedded input 1 (DI01)**/**Embedded input 2 (DI02)**): • **Not connected** • **Standard I/O** • **Pulse counter**

Standard Input Settings

The following table describes the settings of **Embedded input 2 (DI02)** or **Embedded input 2 (DI02)** when the digital input is set to **Standard I/O**:

Parameter	Description
Name	Enter the input name.
Label	Enter the input label.
Commodity	Select the commodity type in the list, as contextualization data.
Usage	Select the usage in the list, as contextualization data.
Meaning of status	Enter the label for the threshold: • Meaning of status when **Input is high**. • Meaning of status when **Input is low**.

Pulse Counter Settings

The following table describes the settings of **Embedded input 2 (DI02)** or **Embedded input 2 (DI02)** when the digital input is set to **Pulse counter**:

Parameter	Description
Name	Enter the input name of the device.
Label	Enter the input label as per the name plate in the network.
Type	Type of digital input **NOTE:** Setting not editable.
Consumption meter elements	Select either a meter element or **Custom** in the pre-defined list. **NOTE:** If a meter element is selected, the consumption unit, flow element, and flow unit are displayed.
Consumption meter element name	Enter the name of the custom meter element. **NOTE:** Displayed when **Custom** is selected.
Consumption unit	Enter the consumption unit of the meter element. **NOTE:** Displayed when **Custom** is selected.
Custom flow element name	Enter the name of the flow the meter element is intended for. **NOTE:** Displayed when **Custom** is selected.
Custom flow unit name	Enter the unit of the meter element flow (calculated on a per hour basis). **NOTE:** Displayed when **Custom** is selected.
Pulse weight	Enter the pulse weight to be calculated according to the characteristics of the pulses delivered by the meter.
Preset meter consumption value	Set a value to the consumption meter element if any, taking into account the pulse weight value.
Commodity	Select the commodity type in the list, as contextualization data.
Usage	Select the commodity usage in the list, as contextualization data.

Diagnostics

Presentation

Diagnostics data provides statistical data about the EcoStruxure Panel Server and connected devices. The events are gathered by type of application: cloud connection, Modbus Serial network, and wireless network.

Availability

This function is available on Panel Server Entry, Universal, and Advanced.

Setting the Parameters

Diagnostics are set on the EcoStruxure Panel Server webpages:

- At **Maintenance > Devices communication**, device diagnostics:
  - EcoStruxure Panel Server, page 120
  - Modbus Devices, page 121
  - Wireless Devices, page 121
- At **Maintenance > System monitoring**, system diagnostics, page 122

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 • Physical server ID
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 message counters for Modbus TCP/IP protocol: • Received messages • Transmitted messages • Protocol errors • Failed connections
Wireless identification[4]	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[4]	Displays status of the IEEE 802.15.4 wireless network • Network status • Optimization status

4. Depending on the model

Modbus Devices Diagnostics

Parameter	Description
Modbus information	Displays identification and diagnostics counters for Modbus devices: • Server identifier historical data (1–254) • 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 temperature • Maximum temperature

Wireless Devices Diagnostics

Parameter	Description
Wireless identification[5]	Displays identification of the wireless network: • Address • PAN identifier • Extended PAN identifier[5] • Network address[5]
Modbus identification[5]	Displays Modbus identification: • Virtual server identifier (1–254) (if virtualization of device is supported).
Connection information[5] For more information, see Appendix C, page 195.	Displays connection information of the wireless devices: • Signal quality level • Device received signal strength indication (RSSI)[5] • Device link quality indicator (LQI)[5] • Device packet error rate (PER)[5] • EcoStruxure Panel Server (RSSI) • EcoStruxure Panel Server (LQI) • EcoStruxure Panel Server packet error rate (PER) • Global link (RSSI) • Global link (LQI) • Global link (PER)
Battery 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 temperature • Maximum temperature

5. Depending on device.

System Monitoring Diagnostics

Parameter	Description
Health state	**Uptime** indicates how long the EcoStruxure Panel Server has been running for.
	Health state indicates the EcoStruxure Panel Server state: • **Nominal** • **Degraded**
Global performance	Displays EcoStruxure Panel Server performances: • **CPU usage** (in %) • **Memory usage** (in %)

Diagnostics Logs

Presentation

The EcoStruxure Panel Server can log data for diagnostics. You can change log level and export diagnostics logs locally to your PC.

Availability

This function is available on Panel Server Entry, Universal, and Advanced.

Setting the Parameters

Logs are set on the EcoStruxure Panel Server webpages, at **Maintenance > Logs**.

Logs Configuration Settings

The logs files are mainly used by Schneider Electric Customer Care Center for technical support to facilitate diagnosis in the event of an unexpected behavior.

To display the application name of the log level selected, click **Show application log levels table**.

The events of the log are grouped in four levels:

Log level	Description
Debug	Fine-grained informational events that are most useful to debug an application.
Info	Informational messages that highlight the progress of the application at coarse-grained level.
Warning	Medium severity event that still allows the application to run.
Error	High severity event that designates potential harmful situations.

Changing Log Level

To change the level of a log, proceed as follows:

1. Select a log level in **Global log level**.

   IMPORTANT: Exporting **Debug** logs can result in slowdown of the Panel Server performance. It is recommended that you export **Debug** logs for a limited, temporary period during troubleshooting and then apply **Info** as default setting for each application.
2. Click **Show application log levels table**.
3. In the table that displays, change the log level of one or several logs.
4. Click the **Save** button to apply changes.

Downloading Logs

To download logs, proceed as follows:

1. Select a log level in **Global log level**.

   IMPORTANT: If you export **Debug** logs, it can result in slowdown of the Panel Server performance. It is recommended that you export **Debug** logs for a limited, temporary period during troubleshooting and then apply **Info** as default setting for each application.

2. Click **Export logs**.
3. Wait until the .zip file is downloaded on your PC.
4. Unzip the .zip file to access the detailed logs.

Downloading Auto-diagnostic

Click **Export auto-diagnostic** to launch an auto-diagnostic and export result in a .zip file to your PC.

Backup and Restore Panel Server Configuration

Presentation

At any moment after commissioning, the configuration of a Panel Server can be saved into a file and used to restore the configuration in a Panel Server of the same model, or the same Panel Server.

Schneider Electric recommends that you encrypt the backup file with a password to help secure sensitive information. Safeguard the backup file in a protected location to prevent unauthorized access.

NOTICE
UNAUTHORIZED DATA ACCESS • Secure access to the backup file by setting up a password. • Do not communicate a backup file to unauthorized persons. **Failure to follow these instructions can result in equipment damage.**

IMPORTANT: The backup file password is stored irreversibly. If you do not remember the password, the configuration backed up in the file becomes unusable.

Data related to commissioning is stored in the backup file, for example:

- Commissioning data
  - System settings including date and time, networks (Ethernet, Wi-Fi), DPWS, Modbus S-L, Proxy, and Schneider Electric cloud platform activation status
  - IEEE 802.15.4 network settings and status
  - End-device settings and contextualization, including Modbus-SL, Modbus TCP/IP, IEEE 802.15.4, and inputs/outputs
  - Data sampling settings and contextualization
  - Events and alarms settings including notification configuration per alarm.
- Custom models

The backup file only contains data that allows you to restore an installation back to a previous state, that is, the state it was in when generating the backup file. Therefore, it does not include data unrelated to commissioning, for example:

- Permanent deactivation of wireless networks, page 55
- Logs including diagnostics counters, page 120 and diagnostics logs, page 123
- Alarms, page 109
- Sampled data, page 95
- Firmware revision of the Panel Server
- SFTP server password and SFTP server key fingerprint. These settings need to be entered again after a restore operation.

Availability

This function is available on Panel Server Entry, Universal, and Advanced.

Setting the Parameters

Backup restore is set as follows:

- With EcoStruxure Power Commission (EPC) software
- On the EcoStruxure Panel Server webpages, at **Maintenance > Backup & restore**

Panel Server Configuration Backup Settings

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

Parameter	Description	EPC software	Webpages
Backup	Used to save the Panel Server configuration.	✓	✓
Backup settings	Used to name the backup file and help secure backup data by encrypting the backup file with a password. **IMPORTANT**: The file password is stored irreversibly. If you do not remember the password, the configuration backed up in the file becomes unusable.	✓	✓

Panel Server Configuration Restore Settings

The following table describes the setting where it is available.

Parameter	Description	EPC software	Webpages
Restore	Used to restore configuration from a backup file. Check that the Panel Serverreceiving the backup has a firmware revision equal to or greater than the firmware revision of the Panel Server used to create the backup file. **NOTE: A backup file can be restored only once and on one Panel Server only.** When the configuration is restored in the Panel Server, an error message may be displayed. The message indicates that the number of Modbus devices on the current Panel Server differs from the number of Modbus devices on the previous Panel Server when configuration was backed up. **NOTE:** When the configuration is restored, existing logged data is flushed.	✓	✓

Restoring Configuration With Wireless Networks Permanently Disabled

The permanent deactivation of the wireless networks is not saved in the Panel Server backup file.

Setting this feature depends on the type of restored Panel Server:

If...	Then...
Data is restored in a new Panel Server	The wireless networks are enabled by default. If permanent deactivation is required as in the backed-up Panel Server, follow the procedure, page 55.
Data is restored in the same Panel Server	Wireless networks remain deactivated.

Cybersecurity Recommendations

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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 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

Two Wired by Design EcoStruxure Panel Server models (PAS600LWD and PAS600PWD) are offered with no native wireless chipset. This removes the potential threat from unauthorized radio devices.

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 to 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 (Virtual Private Network) or a similar solution. For communication with Modbus devices limit access to Modbus TCP/IP devices on you network by deactivating Modbus communication per Panel Server interface (ETH1/ETH2/Wi-Fi) on the Panel Server webpages.
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 malicious devices. Reinforce access to device data by disabling Modbus TCP/IP service.

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 malicious 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 (including logs and keys) 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.

IMPORTANT: After performing a reset to factory setting on a Panel Server that has been previously connected to the Schneider Electric cloud, contact the Schneider Electric Customer Care Center to allow the reset Panel Server to connect again to the Schneider Electric cloud or to enable a Panel Server Advanced used as a local energy server to send e-mails again.

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 134 (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.
  - 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 138.

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

During commissioning the EcoStruxure Panel Server, update the firmware of the EcoStruxure Panel Server, page 116.

Pre-requisites to Commissioning

To commission the EcoStruxure Panel Server, connect it to Ethernet (see Connection to a PC, page 26).

Getting Started with EcoStruxure Power Commission Software

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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 25).
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 displayed 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 seconds while communication is enabled and automatic channel selection is performed (see settings, page 65).
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.

Selective Pairing of Wireless Devices

Presentation

It is possible to achieve a selective pairing by using EcoStruxure Power Commission software. To pair the wireless devices with EcoStruxure Panel Server, define and upload a pairing list to EcoStruxure Power Commission software. The Panel Server will pair only the wireless devices belonging to the list.

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

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Getting Started with EcoStruxure Panel Server Webpages

Overview

EcoStruxure Panel Server manages webpages to configure settings or monitor wireless devices (depending on the model), wired devices (through Modbus-SL or Modbus TCP/IP), and local digital inputs with the Panel Server Universal PAS600L, PAS600LWD, and Advanced PAS800L.

Recommended Web Browsers

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

To access the Panel Server webpages, the web browser Google Chrome v65.0 or higher is recommended.

Security Certificate

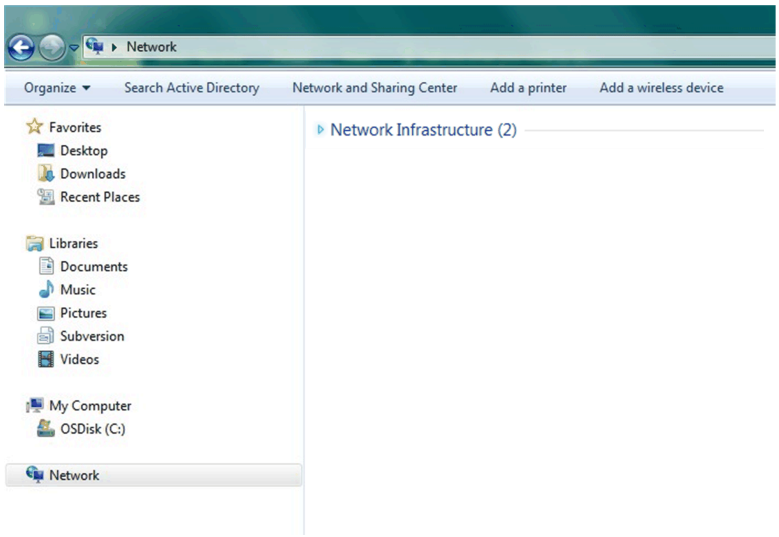
The Panel Server has a self-signed security certificate. A security message appears on the web browser when connecting to the Panel Server. Before accepting and continuing, check that communication with the Panel Server has been established either by directly connecting your PC to the Panel Server or making sure that your network is free of any rogue devices.

Discovering Panel Server on a PC

The Panel Server supports Device Profile for Web Service (DPWS) that allows self-discovery of the Panel Server.

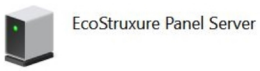
To discover the Panel Server through your PC for the first time, proceed as follows:

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 Panel Server (see Connection to Ethernet, page 25).
3. On the PC, launch the File Explorer (Windows file manager application) and click **Network**.



4. Wait until the EcoStruxure Panel Server icon displays in the list of devices in the network. It may take up to 2 minutes after the Panel Server is powered on.

   Result: The EcoStruxure Panel Server icon that displays under **Network** is as follows:

5. Double-click the EcoStruxure Panel Server icon.

   Result: The Panel Server webpages open.

6. If the Panel Server is not displayed under **Network**:
   a. Perform the following checks:
      - Check that the Panel Server and the PC are connected to the same sub-network.
      - If the Panel Server uses a static IP, check that the PC uses a static IP in the same network (same Subnet mask).
      - If the Panel Server IPV4 is in DHCP mode (default setting), set DHCP mode on your PC:
        - Access the Windows control panel of your PC.
        - Click **Network and Sharing Center**.
        - Click **Change adapter settings**.
        - Right-click the **Local Area Connection** icon then click **Properties**.
        - Select **Internet Protocol Version 4 (TCP/IPv4)** from the list and click **Properties**.
        - Select **Obtain an IP address automatically** and click **OK**.

   b. Go to step 1 and do the procedure again.
   c. If the Panel Server is still not displayed under **Network**, see Troubleshooting, page 140.

Troubleshooting

If the Panel Server is still not displayed under **Network**, follow the procedure below that describes how to convert the hexadecimal value of the Panel Server MAC address to the decimal value to get the Panel Server IP address.

The Panel Server IPv4 address is a generic address, for example `169.254.X.Y`, where `X` and `Y` correspond to the last 2 bytes of the Panel Server MAC address. The `Y` value is dependent on the configuration of the Ethernet switch.

You need to convert the hexadecimal value of the MAC address to a decimal value to get the Panel Server IP address.

1. Proceed as follows to convert the hexadecimal value of the MAC address (printed on the Panel Server front face nose) to the decimal value to get the IP address:

   - **Serial number starting with `54-21-44` or lower**

If...	Then...	Example with MAC address `00-00-54-01-07-70`
The Panel Server is in Ethernet switch mode (default setting).	`Y` is equal to the last digits of the Panel Server MAC address converted into decimal value + `1`.	Hexadecimal `70` converted to decimal is `112`. `Y` = `112` + `1` = `113` Therefore IPV4 address will be `169.254.7.113`.
The Panel Server is in Ethernet separated mode and the PC is connected to Panel Server ETH1 port.		
The Panel Server is in Ethernet separated mode and the PC is connected to Panel Server ETH2 port.	`Y` is equal to the last digits of the Panel Server MAC address converted into decimal value + `2`.	Hexadecimal `70` converted to decimal is `112`. `Y` = `112` + `2` = `114` Therefore IPV4 address will be `169.254.7.114`.

   - **Serial number starting with `54-21-45` or higher**

If...	Then...	Example with MAC address `00-00-54-02-07-10`
The Panel Server is in Ethernet switch mode (default setting).	`Y` is equal to the last digits of the Panel Server MAC address converted into decimal value.	Hexadecimal `10` converted to decimal is `16`. Therefore IPV4 address will be `169.254.7.16`.
The EcoStruxure Panel Server is in Ethernet separated mode and the PC is connected to Panel Server ETH1 port.		
The Panel Server is in Ethernet separated mode and the PC is connected to Panel Server ETH2 port.	`Y` is equal to the last digits of the Panel Server MAC address converted into decimal value + `1`.	Hexadecimal `10` converted to decimal is `16`. `Y` = `16` + `1` = `17` Therefore IPV4 address will be `169.254.7.17`.

2. Launch one of the recommended web browser on your PC.
3. In the address field, type the IPv4 address starting with `https://` and press **Enter** to access the login page `https://169.254.XX.YY`.

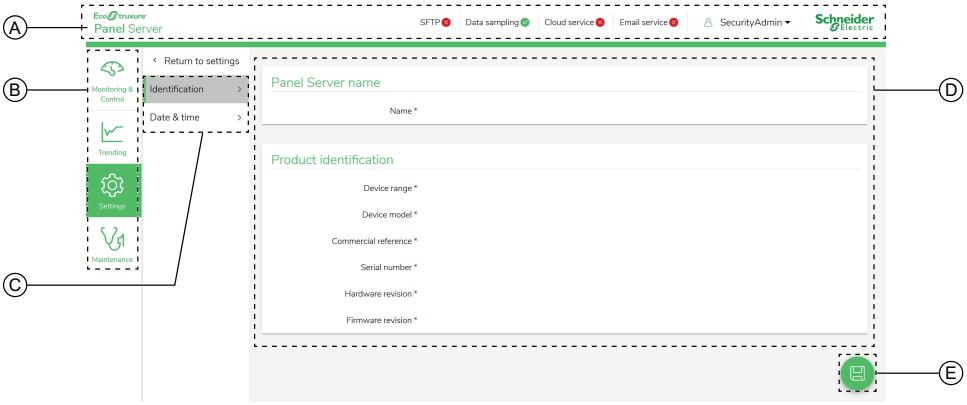
   IMPORTANT: Start the IPv4 address with `https://`.
4. At the first connection, change the default password (see Password Requirements, page 117).
5. At the first connection, check the Panel Server firmware version:
   a. From the Panel Server webpages, select **Maintenance > Firmware update > Firmware update** and take note of the firmware version.
   b. Compare the firmware version with the one available in your Schneider Electric country website.
   c. Update the Panel Server firmware if it is not in the latest version (see details to update firmware).

NOTE: If you do not remember the IP configuration of your gateway or in case of duplicate IP detection, follow the procedure above to connect to the 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. Icon for contextual menu

Header

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

A. Services and associated status
B. User name
C. Drop-down list (language, change password, logout)

Header part	Description
User name	The user name is **SecurityAdmin**, a user account with administrator rights such as reading and changing the product configuration, pairing or unpairing wireless devices, accessing system logs.
Language	The webpage language is English (US) by default. Other languages are available in the list.
Change password	Click to change the user password (see password requirements, page 117).
Logout	Click to log out from the EcoStruxure Panel Server session. It is recommended that you log out from the EcoStruxure Panel Server when it is not in use. You are logged out automatically after a certain time of no activity.

Header part	Description
Service name	Services are displayed depending on the Panel Server model: • SFTP • Data sampling • Cloud service • Email service (Advanced model) • Data maintenance
Service status	The icon displays the service status: • Service activated and operative • Service activated but inoperative • Cloud service only: ◦ Initial configuration of the Panel Server is complete, however these additional actions are needed: publish the topology and associate the Panel Server on the cloud application side. ◦ The remote configuration sent by the cloud application is invalid and is rejected by the Panel Server. Data publication does not start. If data publication is in progress, it stops. • Data maintenance operation in progress. The service name and status icon will disappear when the data maintenance operation is completed.

Main Menus

The main menus are:

- **Home** (Advanced model), page 147
- **Notifications** (Advanced model), page 114
- **Monitoring and Control**, page 149
- **Trending** (Advanced model), page 152
- **Settings**, page 153
- **Maintenance**, page 155

Cards and Sub-menus

The cards and sub-menus display the sub-levels available under the selected main menu. Fields with a red star icon should be filled in to help ensure the proper behavior of the gateway and devices.

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	Action
	Open the contextual menu.
	Close the contextual menu.
	In **Settings** pages, save the setting changes and apply them on the Panel Server. 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.
	In **Settings** pages, save the setting changes without applying the configuration on the Panel Server.
	Contextual icon: • In **Settings** pages, cancel the setting changes to return to the last saved settings. • In **Network communication** pages, restore settings of the network communication configuration. Used to reapply the full list of settings previously saved.
	Go to the maintenance page of the selected device.
	Go to the settings page of the selected device.
	Go to the real-time data page of the selected device.
	Go to the data management page of the selected device.
	Go to the trending page.
	Go to the monitoring and control page of the selected device.

Trending Icons (Home Page)

The trending icons are displayed on the Home page depending on consumption trends.

Icon	Description
	The consumption of the commodity (for example, electricity) or a selected usage (for example, lighting) is increasing.
	The consumption of the commodity (for example, electricity) or a selected usage (for example, lighting) is decreasing.
	No icon is displayed if the consumption rate is not changing.

Alarm Icons

Icon	Description
	High-severity alarm appearance.
	High-severity alarm disappearance.

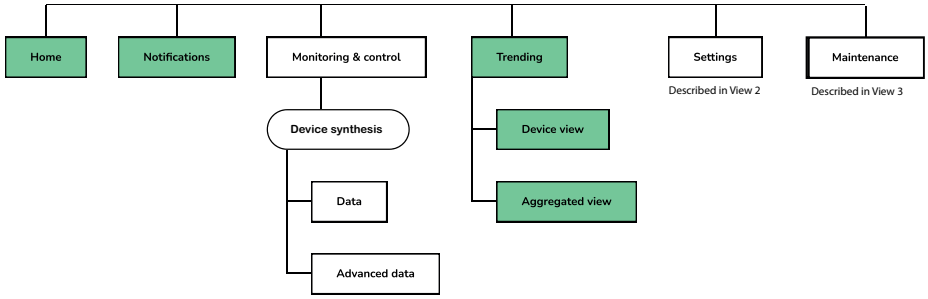
Icon	Description
	Medium-severity alarm appearance.
	Medium-severity alarm disappearance.
	Low-severity alarm appearance.
	Low-severity alarm disappearance.

EcoStruxure Panel Server Webpage Menus

Overview

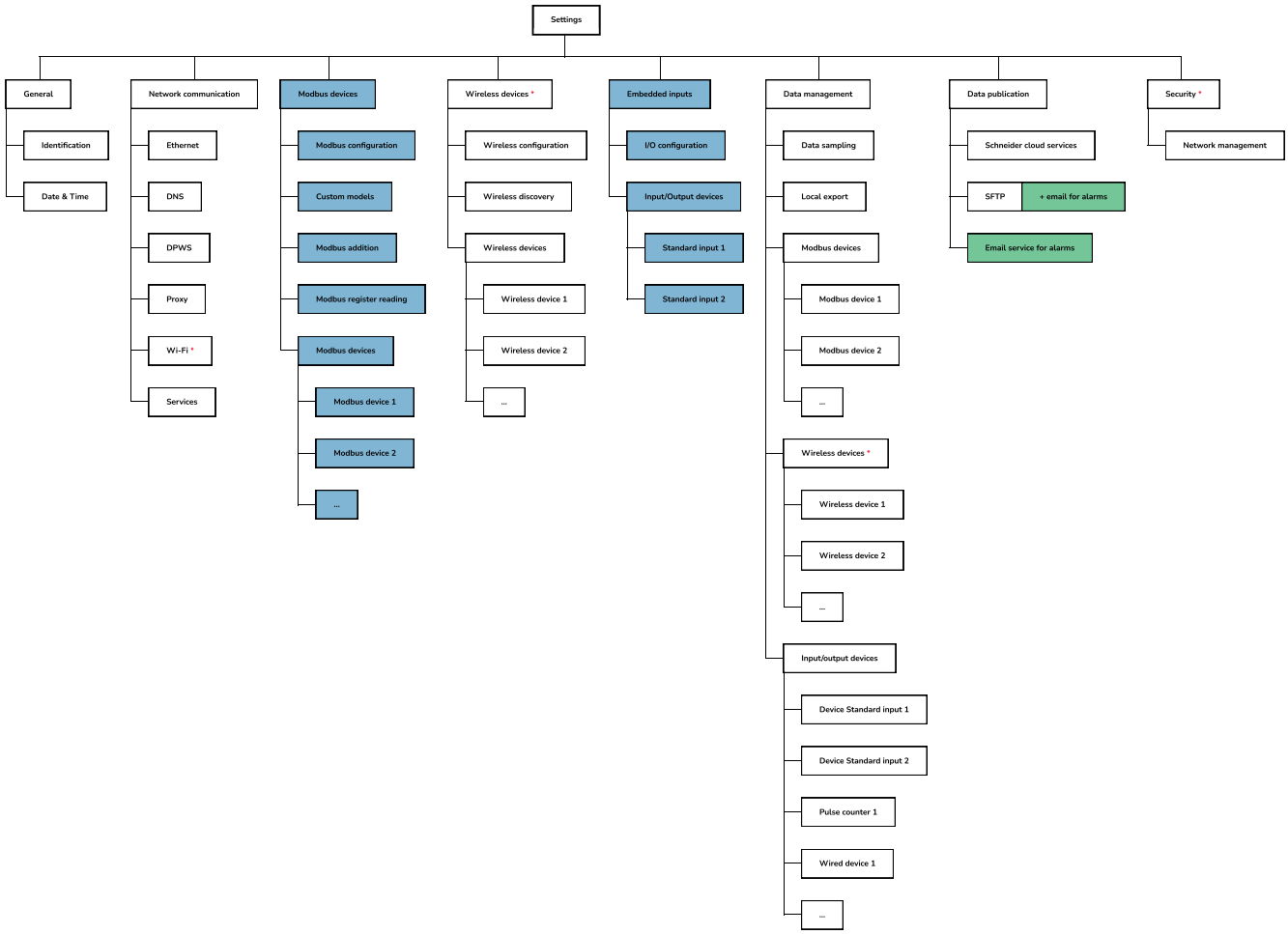
The following diagrams give an overview of the structure of webpages.

View 1: Main menu structure



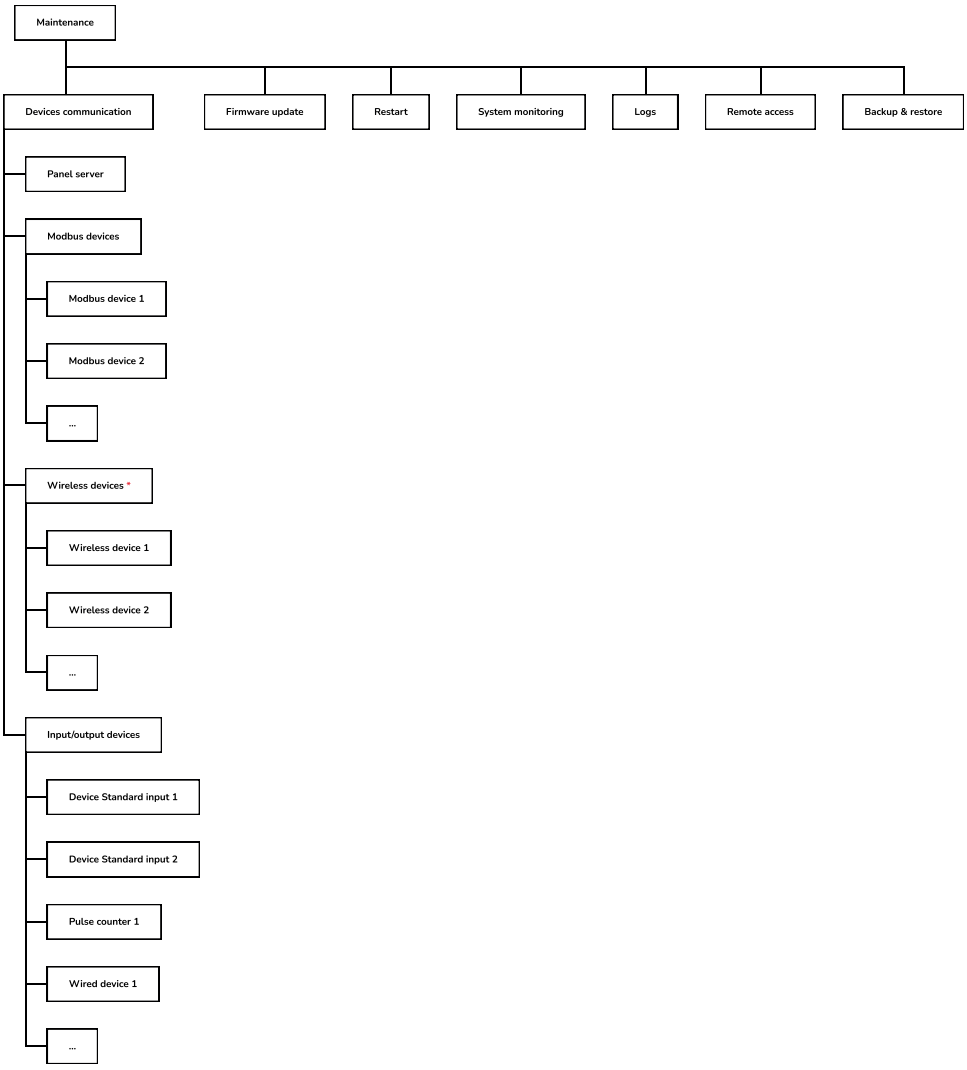
Menus shown in white are available on all models.
Menus shown in blue are available on Universal and Advanced models.
Menus shown in green are available on Advanced models.

View 2: Settings menu



Menus shown in white are available on all models.
Menus shown in blue are available on Universal and Advanced models.
Menus shown in green are available on Advanced models.

View 3: Maintenance menu



Menus shown in white are available on all models.

Menus shown in blue are available on Universal and Advanced models.

Menus shown in green are available on Advanced models.

Home Menu (Advanced Model)

The webpage for the **Home** menu displays the consumption of energy of the system managed by the Panel Server.

By default, the consumption of electricity is displayed for a period of one day (yesterday, day before yesterday), and organized by usage. Other commodities and periods can be selected.

The top five types of usage (plus any other type of usage that is also consuming the selected commodity) are displayed, arranged from highest to lowest consumption.

A pie-chart shows the distribution of the top five consumers. The webpage displays for each usage:

- The consumption of period 1
- The change in consumption over period 1, compared to period 2 (as a percentage)
- The trend: increasing, decreasing (indicated by an arrow icon),or flat (no icon)

In the **Home** page the user can select a different commodity (for example, gas) and a different period (one day, one week, or 4 weeks). For more information about filtering, see Data Trending, page 100.

When the user is logged in the Panel Server webpages, the Home page automatically displays if historized data is available.

For more information about the trending data, click the **Trending** icon on the right-hand side of the **Home** webpage to go to **Trending > Aggregated view**.

Notifications Menu (Advanced Model)

The webpage for the **Notifications** menu displays a list of alarms for a selected period.

For more information, refer to Notifications, page 114.

Monitoring and Control Menu

Overview

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Do not rely only on the measurements or equipment status provided on the Panel Server webpages before working on or inside the equipment.

Failure to follow these instructions will result in death or serious injury.

The webpage for the **Monitoring and Control** menu displays devices installed in the system and associated with the EcoStruxure Panel Server.

General information is displayed for each device (for example, name and type of the device communicating with the EcoStruxure Panel Server). The **Additional data** button can be used to display more information, depending on the device type (for example, energy, environment, or voltage).

In a large electrical distribution system, filtering enables you to display one device by using one or several of the following filters:

- Device type
- Device usage
- Zone in which the device is installed.

For a selected device, the webpage displays the following:

- Information about the device:
  - Device model
  - Device firmware version
  - Device serial number
  - Device connection status
- Real-time data of the device:
  - The displayed data depends on the device type.
  - An alarm is displayed when the following conditions are met:
    - the alarm is enabled,
    - the alarm is active when you access the webpages,
    - the alarm is not acknowledged.
  - Data can be displayed per family (see details, page 150).
- Access to the device maintenance page by clicking the Maintenance icon .
- Access to the device settings page by clicking the Settings icon .
- Access to the data management page by clicking the Database icon .
- Access to the trending data by clicking the Trending icon .

Device Real-time Data

In the **Monitoring and Control** menu, the **Advanced data** page of the selected device shows the exhaustive list of data related to this device. Data can be sorted by family, for example **Energy**.

The following table presents data available per measurement family. The availability of measurements depends on the type of connected device.

Data family	Data on Panel Server webpage
Active power	Active power total
	Active power A
	Active power B
	Active power C
	Power factor total
Apparent power	Apparent power total
	Apparent power A
	Apparent power B
	Apparent power C
Circuit breaker	Breaker position
	Trip indicator (SD position)
	Trip cnt (Close to SD position) non resettable
	Trip Electrical fault cnt (Close > SDE) non resettable
Current	Current
	Current A
	Current B
	Current C
	Current N
	Current ground
Current THD	THD fund current A
	THD fund current B
	THD fund current C
	THD fund current N
Digital input	Digital input 1 status
	Digital input 1 name
	Digital input 2 status
	Digital input 2 name
	Digital output status
Energy	Active energy delivered
	Active energy received
	Reactive energy delivered
	Reactive energy received
	Apparent energy
	Apparent energy delivered
Environment	Temperature
	Relative humidity
	CO_2 concentration
	Air quality

Data family	Data on Panel Server webpage
Harmonic current	Load harmonics current A
	Output harmonics current A
	Load harmonics current B
	Output harmonics current B
	Load harmonics current C
	Output harmonics current C
	Output harmonics current N
	Harmonic current alarm
IGBT temperature	Temperature board in device
	Temperature IGBT A
	Temperature IGBT B
	Temperature IGBT C
Insulation	Insulation ground
	Earth coupling capacity
Motor	Motor trip indicator
	Motor running
	Motor operating mode
Reactive power	Reactive power total
	Reactive power A
	Reactive power B
	Reactive power C
Unbalance	Current unbalance A
	Current unbalance B
	Current unbalance C
	Current unbalance N
	Voltage unbalance A-B
	Voltage unbalance B-C
	Voltage unbalance C-A
	Voltage unbalance A-N
	Voltage unbalance B-N
	Voltage unbalance C-N
Voltage	Voltage L-L
	Voltage A-B
	Voltage B-C
	Voltage C-A
	Voltage L-N
	Voltage A-N
	Voltage B-N
	Voltage C-N
Winding temperature	Temperature transformer winding A
	Temperature transformer winding B
	Temperature transformer winding C

Trending Menu (Advanced Model)

When integrated data, such as energy, is selected in the **Trending** page, you can view the accumulated value per hour, day, or month. The accumulated values are calculated by subtracting the value at the beginning of the subsequent interval from the value at the beginning of the current time interval.

For example, if you are visualizing Active Energy per hour in the **Trending** page, and the Active Energy at 01:00 is 200 Wh and at 02:00 is 300 Wh, then the accumulated data displayed for Active Energy at 01:00 is 100 Wh. If one of the two data points required in the calculation is missing, then the accumulated data cannot be calculated and is not displayed.

For information about trending graphs, see Data Trending, page 100.

Settings Menu

NOTICE

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.

The webpage for the **Settings** menu displays the sub-menus for configuration and communication settings. The menus and sub-menus on the webpages depend on the Panel Server model.

Settings 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 93	Used to set the date and time manually or via NTP (Network Time Protocol).
Network communication	**Ethernet**, page 47	Allows you to configure the EcoStruxure Panel Server Ethernet mode including ports and IP parameters (IPv4 and IPv6)
	DNS, page 56	Allows you to configure the DNS server.
	DPWS, page 59	Allows you to configure the IP network discovery.
	Proxy, page 57	Allows you to configure the Internet proxy settings.
	Wi-Fi, page 52	Allows you to configure the Wi-Fi settings.
	Services	Allows you to deactivate services per interface (ETH1 port, ETH2 port, and Wi-Fi)
Modbus devices	**Modbus configuration**, page 67	Allows you to define the Modbus-SL and Modbus TCP/IP network.
	Custom models, page 106	Allows you to upload Modbus-SL and Modbus TCP/IP devices that are not natively managed by the Panel Server built-in models.
	Modbus addition, page 156	Allows you to discover the Modbus-SL and Modbus TCP/IP devices by using a selective list.
	Modbus registers read, page 157	Allows you to troubleshoot the addition of Modbus devices
	Modbus devices	Detailed information about each device in the Modbus network. Information (for example, device identification, custom model name and version, electrical characteristics) and contextualization data (entered by the user) depend on the device type.

Settings menu	Navigation menu webpage	Description
Wireless devices, page 64	**Wireless (802.15.4) configuration**	Allows you to define the IEEE 802.15.4 network when activated.
	Wireless (802.15.4) discovery	Allows you to discover the wireless devices in the IEEE 802.15.4 network by using a selective list or non-selective discovery.
	Wireless devices	Detailed information about each wireless device in the IEEE 802.15.4 network. Information (for example, device identification, electrical characteristics, Modbus virtual server ID) and contextualization data (entered by the user) depend on the device type.
Embedded Input Management	**I/O configuration**, page 118	Allows you to configure the Panel Server digital inputs.
	Input/Output	Allows you to configure inputs/outputs of I/O devices associated with Panel Server.
Data Management	**Data sampling**, page 95	Allows you to define data sampling of the connected devices.
	Local export, page 103	Allows you to export the data sampled locally in a .csv file. (Available in Advanced model only.)
	Modbus devices	Detailed information about sampling for each device in the Modbus network. Measurements and alarms depend on the device type.
	Wireless devices	Detailed information about sampling for each wireless device in the IEEE 802.15.4 network. Measurements and alarms depend on the device type.
	Input/Output	Detailed information about sampling for devices connected to the embedded inputs of the Panel Server. Measurements and alarms depend on the device type.
Data Publication, page 82	**Data Publication**	Allows you to set the means used to publish data and to enable the email of alarms service
Security	**Network management**, page 55	Allows you to configure the security feature to permanently disable the wireless networks.

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 120	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).
	Modbus devices	Displays information and status about the selected device. Allows you to delete a previously paired or associated downstream device.
	Wireless devices	
Firmware update	–	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 122	–	Displays EcoStruxure Panel Server health status indicators.
Logs, page 123	–	Allows you to: • Change the log level and download the logs in a .zip file. • Launch an auto-diagnostic and export a detailed report of the EcoStruxure Panel Server configuration and a status report per internal application in a .zip file.
Remote access	–	• The **Remote access** section allows you to provide the Schneider Electric Customer Care Center with a temporary remote access to the EcoStruxure Panel Server webpages: ◦ When you have contacted the Schneider Electric Customer Care Center, you can give access to Schneider Electric local support to the EcoStruxure Panel Server. ◦ A password is displayed that you communicate to the Schneider Electric local support. ◦ The support connects to the EcoStruxure Panel Server. ◦ As soon as you click the disconnection button on the webpages or after 3 hours maximum, the password is no longer active and remote access is terminated. • The **Remote operation** section allows you to authorize a remote connection with the Schneider Electric Customer Care Center through the Schneider Electric cloud. The Customer Care Center is able to connect remotely to the Panel Server without any action from the user's side and as long as the Cloud service is connected: ◦ Enable the toggle button to proceed. For information about the cloud infrastructure, see Schneider Electric cloud services, page 83.
Backup & restore, page 122	–	Allows you to save the Panel Server current configuration and restore it.

Addition and Removal of Modbus Devices

Presentation

Modbus TCP/IP and Modbus-SL devices can be added to or removed from the EcoStruxure Panel Server system through the Panel Server webpages.

Discovery of Modbus TCP/IP Devices With a List

In the **Settings > Modbus devices > Modbus addition > Modbus TCP/IP > Discovery > Selective list** webpage, create a list of devices to be discovered by entering the IP address for each device. The port is always `502` (see Ethernet Communication, page 47) and unit ID `255` (see Modbus Gateway Function, page 72).

Result: The table shows the following information for each device discovered on the Modbus TCP/IP network:

- Picture
- Device name

  NOTE: If applicable, for example for a third-party device, **unknown device** is displayed. In this case, data not displayed in the webpages.
- IP address
- Port
- Virtual server ID

The device is displayed in the **Modbus devices** section.

Manual Addition of Modbus TCP/IP Devices

In the **Settings > Modbus devices > Modbus addition > Modbus TCP/IP > Manual addition > IP address** webpage, enter the following information for each device:

- IP address
- Port
- Unit ID
- Device type

  NOTE: If the device type is not available in the drop-down list, for example for a third-party device, select **unknown device**. In this case, data is not displayed in the Panel Server webpages.

Result: Once the device is discovered, it is displayed in the **Modbus devices** section.

To manually add a Modbus TCP/IP device applying a custom device model from the drop-down list, select **Settings > Modbus Devices > Modbus Addition > Modbus TCP/IP > Manual Addition** then:

- Type the value for **Physical Server ID**.
- Select the custom device model name in **Device**.

Discovery of Modbus-SL Devices With a List

In the **Settings > Modbus devices > Modbus addition > Modbus serial > Discovery > Selective list** webpage, enter the list of Modbus addresses (1–254) for which the devices must be discovered.

NOTE: If no addresses are entered, discovery is done for addresses 1 to 10.

Result: The table shows the following information for each device discovered on the Modbus-SL network:

- Picture
- Device name

  NOTE: If applicable, for example for a third-party device, **unknown device** is displayed. In this case, data is not displayed in the Panel Server webpages.
- Virtual server ID (**Server ID**)

The device is displayed in the **Modbus devices** section.

Manual Addition of Modbus-SL Devices

In the **Settings > Modbus devices > Modbus addition > Modbus Serial > Manual addition > Server ID** webpage, enter the physical server ID of the device to be added and select the device type.

NOTE: If the device type is not available in the drop-down list, for example for a third-party device, select **unknown device**.

Result: Once the device is discovered, it is displayed in the **Modbus devices** section.

To manually add a Modbus Serial device applying a custom device model from the drop-down list, select **Settings > Modbus Devices > Modbus Addition > Modbus Serial > Manual Addition** then:

- Type the value for **Physical server ID**.
- Select the custom device model name in **Device**.

Addition of Modbus-SL Devices Connected to a Child Panel Server Gateway

To add Modbus-SL devices connected to a child/downstream Panel Server (see example, page 81), navigate to **Settings > Modbus devices > Modbus addition > Modbus TCP/IP > Manual addition > IP address**.

Enter:

- The IP address of the child/downstream Panel Server
- The virtual server ID of the Modbus device in **Unit ID**
- The Modbus device type

  NOTE: If the device type is not available in the drop-down list, for example for a third-party device, select **unknown device**. In this case, data is not displayed in the Panel Server webpages.

Result: Once the device is discovered, it is displayed in the **Modbus devices** section.

Modbus Registers Read

To troubleshoot the addition of Modbus devices, navigate to the webpage **Settings > Modbus devices > Modbus registers read**. Fill in the Modbus device identification parameters described in the following table and click the **Read registers** button.

NOTE: When a device discovery is in progress, you cannot use the Modbus register reading function.

Result: A table is displayed containing the list of register numbers and the register content in the selected format.

NOTE: When the Panel Server is configured in Reverse gateway mode, the reading register function is supported for Modbus TCP/IP devices only.

Parameter	Availability by device		Description
Device Type	Modbus Serial	Modbus TCP/IP device	Select from the list either Modbus Serial or Modbus TCP/IP. Other parameters displayed depend on the device type selected.
Device ID	✓	-	Enter the virtual device ID you want to read registers from. Value range 1–254.
IP address	-	✓	Enter the address of the TCP network.
Port	-	✓	Enter the port of the device
Unit ID	-	✓	Enter the ID of the device. Value range 1–255.
Function code	✓	✓	Select from the list the Modbus function to use to read the registers of the identified device: • **FC01 Read coils status** • **FC02 Read inputs status** • **FC03 Read holding registers** • **FC04 Read input registers**
Starting register	✓	✓	Enter the number of the first register to be read. For function codes FC01 and FC02, use the following calculation to specify the bit number: (Register number - 1) * 16 + (bit offset+1) where offset is the bit order (from 0 to 15)
Number of registers	✓	✓	Enter the total number of consecutive registers to be read.
Result format	✓	✓	For function codes FC03 and FC04, select from the list the format to display the results: • Hexadecimal (default format) • Binary • Signed integer 16 • Unsigned integer 16 The result of function codes FC01 and FC02 is 1 when true and 0 when false.

Removal of Modbus Devices

Follow this procedure to remove Modbus devices from the system:

1. Navigate to **Settings > Modbus devices > Modbus devices** to view the list of connected devices.
2. Select the device to be removed from the system.
3. Click the bin icon on the top right side of the webpage.
4. Confirm removal process.

   Result: Once the Modbus device is successfully disconnected from the Panel Server, it is no longer visible in the list of Modbus devices.

Pairing/Unpairing of Wireless Devices Through Webpages

What's in This Chapter

Selective Pairing of Wireless Devices Through Webpages 160
Controlled Pairing of Wireless Devices (PowerTag Energy, HeatTag) Through Webpages 161
Configuration of Wireless Energy Devices Through Webpages 162
Configuration of PowerTag Control Devices Through Webpages 166
Configuration of Ambient Sensors Through Webpages 169
Unpairing Wireless Devices Through Webpages 171
Adding Wireless Devices Paired Under a Child Gateway (Universal and Advanced Models) 173

Selective Pairing of Wireless Devices Through Webpages

Presentation

It is possible to achieve a selective pairing through the EcoStruxure Panel Server webpages. To pair the wireless devices installed in the EcoStruxure Panel Server system, define and type a pairing list to EcoStruxure Panel Server webpages. The Panel Server will pair only the wireless devices belonging to the list.

Procedure to Pair Wireless Devices Through Webpages

To generate the file that lists the selective wireless devices to be uploaded on the Panel Server webpages:

- List the devices to be paired with Panel Server by typing the RF-id (unique radio frequency identification code) of each wireless device.

  The format of RF-id code is alphanumeric.
- It is mandatory to add `0x` before each RF-id code printed on the device.
- In the list of devices, separate each RF-id by a comma and no space after the comma.

A virtual ID address will be applied during the pairing process with the Panel Server. The first virtual server address ID is allocated to the first discovered device. If you need to apply virtual ID addresses in a defined order, follow the procedure of controlled pairing, page 161. By default, Modbus virtual server IDs allocated to wireless devices start from 100.

To perform selective pairing of wireless devices through webpages, proceed as follows:

1. Log in to the Panel Server webpages (see how to access the webpages, page 139).
2. Navigate to **Settings > Wireless devices > Wireless configuration**.
3. If specified in the radio frequency plan, choose the correct communication channel in **Wireless network settings**.
4. In **Wireless communication**, set the communication period for each of the 3 types of devices.
5. Navigate to **Settings > Wireless devices > Wireless discovery > Selective list** and type the RF-id of each wireless device in the field, separating RF identifiers with a comma, and no space after the comma. **Example:** `0xFF900A59,0xFF900A58`

   All and only the wireless devices in the selective list can be paired with the Panel Server.
6. Click **Start** to scan the environment to discover the list of imported wireless devices.

   Result: Once pairing is completed you can view the list of paired wireless devices.

   NOTE: A popup message indicates if the network is overconfigured and suggests solutions. To check the network occupancy, navigate to **Settings > Wireless devices > Wireless configuration**.

Controlled Pairing of Wireless Devices (PowerTag Energy, HeatTag) Through Webpages

1. All the wireless devices in the EcoStruxure Panel Server system must be powered on.
2. Launch the EcoStruxure Panel Server webpage in the web browser.
3. Log in to the webpages (see how to access the webpages, page 139).
4. Navigate to **Settings > Devices > Wireless devices**.
5. Click **Start Scanning**.
6. Power on the wireless devices, one by one, in the required order.
7. Stop scanning when all the devices are discovered, or click **Start Scanning** again to complete the scanning process.

   A list of paired devices is displayed according to the required order (Modbus address plan).
8. Select the wireless device to configure and click **Locate** to find the device in the panel.

   Result: The status LED of the selected device blinks fast green in the panel.
9. If one of the located wireless devices is not part of your selection, click **Delete** to reject the device.
10. Once pairing is completed you can view the list of the paired wireless devices in webpage **Settings > Devices > Wireless devices**.
11. Configure the wireless devices.

    NOTE: The Modbus address assigned to the wireless devices can be changed after the pairing process is done.

Configuration of Wireless Energy Devices Through Webpages

To configure PowerTag Energy devices with EcoStruxure Panel Server webpages, proceed as follows:

1. Navigate to **Settings > Wireless Devices > Wireless Devices** to view the list of the paired wireless devices.

   Result: The list of paired devices is displayed (with **Connected** written in green under the device name).

2. Select the required PowerTag Energy device to modify the configuration of the selected wireless device.

   Result: The parameters of the PowerTag Energy device are displayed.

3. Enter the data in the fields, referring to the following tables for more information about the parameters.

4.

   Click **Apply Changes** to save the settings

   or

   Click **Cancel Changes** to revert the settings.

   NOTE: When saving the settings, a message may be displayed indicating either that 90% of wireless bandwidth capacity is reached or that the Panel Server is over configured. Follow the recommendation in the message to increase the communication period of a particular device or to reduce the number of wireless devices.

The following tables list the parameters for the configuration of wireless PowerTag Energy devices.

The fields displayed depend of the type of PowerTag Energy device.

Parameter Tables

Identification

Parameter name	Description
Name	Enter the name of the wireless device.
Label (optional)	Enter the label of the wireless device .
RF-id	For display only
Device range	For display only
Commercial reference	For display only
Hardware revision	For display only
Device family	For display only

Electrical characteristics

Parameter name	Description
Phase sequence	Select from the list to define the phase sequence of the meter depending on the way the physical panel is wired and according to the phase indication printed on the product, for example ACB.
External neutral voltage sensor	Select the availability from the list: • **Available** • **Not available**
Mounting position	Select the mounting position from the list: • **Top/Line**: The PowerTag Energy device is mounted on the top of the device.

Electrical characteristics (Continued)

Parameter name	Description
	• **Bottom/Load**: The PowerTag Energy device is mounted at the bottom of the device.
Current flow	For PowerTag Energy devices F160 and Rope, select the **Current flow** to define the convention for PowerTag Energy device to count energies. See the section Current Flow, page 164 for more information about filling this parameter.
Power factor sign convention	Select the power factor sign convention form the list. The setting has an influence on the convention used to sign the power factor. • IEC • IEEE For more information, see the section Power Factor Sign Convention, page 164.

Communication Settings

Parameter name	Description
Communication period (s)	When available for the selected wireless device, you can set the communication period at a value different from the value set at family devices level. Select a value of between 2 and 120 seconds from the list (default setting 5 seconds). **NOTE:** It is possible to set 2 seconds as the communication period of a device which belongs to the Energy-related wireless devices family, like Acti9 Active, Acti9 PowerTag, Acti9 Vigi, PowerLogic Tag (PLT).

Modbus virtual

Parameter name	Description
Virtual server ID	Enter the ID of the Modbus virtual server.

Associated circuit breaker

Parameter name		Description
Circuit breaker characteristics	**Circuit breaker label** (optional)	Enter the label of the associated circuit breaker.
	Rated current (A)	Enter the value for the rated current in Amps of the associated circuit breaker or the protective device rating. It cannot be higher than Imax of the device.
	Rated Voltage (V) (optional)	Enter the value of the rated voltage for the associated circuit breaker. • LN rated voltage for 3P4W installation. • LL rated voltage for 3P3W installation.
Load information	**Load zone** (optional)	The Load operating time counter increments only when the power is greater or equal to the value set. You can set the value between 10 W and 15000 W.

Contexualization data

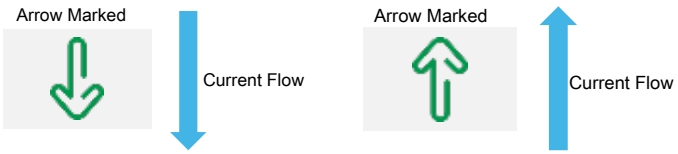
Parameter name	Description
Commodity (optional)	Select the commodity required from the list to indicate the main purpose of the device.
Usage (optional)	Select the usage required from the list to indicate the precise function of the device, for example, the type of lighting to be monitored: Lighting (Exterior and Park) or Lighting (Interior)

Current Flow

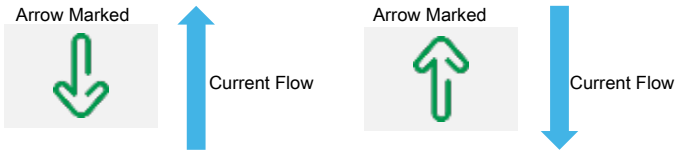
For PowerTag Energy devices F160 and Rope, selecting the current flow defines the convention for the PowerTag Energy device to count energies.

The current flow can be **Direct** or **Reverse**:

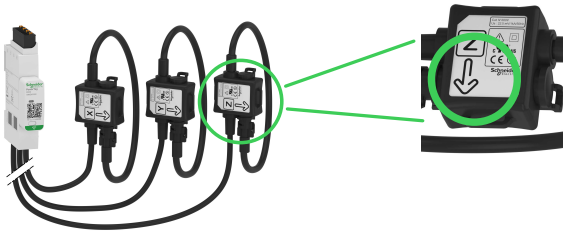
- **Direct**: If the arrow marked on the PowerTag Energy device is in the same direction as the current flow.



- **Reverse**: If the arrow marked on the PowerTag Energy device is in the opposite direction to the current flow.



The following figures show the location of the arrow marked on the PowerTag Energy F160 and Rope:

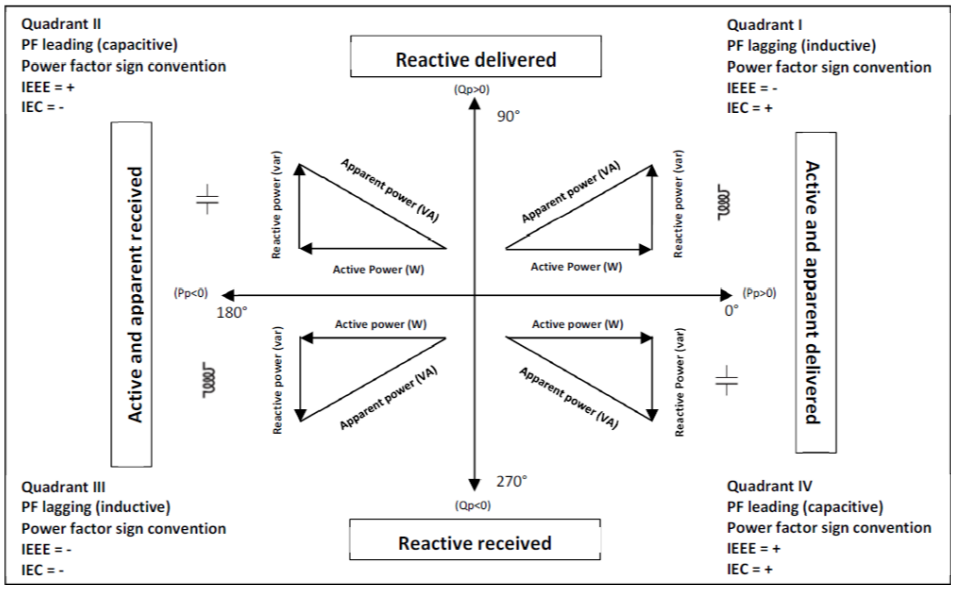
PowerTag Energy F160	PowerTag Rope
	

Power Factor Sign Convention

The power factor sign convention setting can be one of the following:

- IEC: In this setting,
  - when active and apparent power is received, the power factor sign is **–**.
  - when active and apparent power is delivered, the power factor sign is **+**.
- IEEE: In this setting,
  - when the load is resistive, the power factor sign is +.
  - when the load is inductive, the power factor sign is –.

The following diagram summarizes the power factor sign convention:


Quadrant II
PF leading (capacitive)
Power factor sign convention
IEEE = +
IEC = -
Quadrant I
PF lagging (inductive)
Power factor sign convention
IEEE = -
IEC = +
Reactive delivered
(Qp>0)
90°
Active and apparent received
Active and apparent delivered
Reactive power (var)
Apparent power (VA)
Active Power (W)
(Pp<0)
180°
0°
(Pp>0)
Active power (W)
Quadrant III
PF lagging (inductive)
Power factor sign convention
IEEE = -
IEC = -
Quadrant IV
PF leading (capacitive)
Power factor sign convention
IEEE = +
IEC = +
270°
(Qp<0)
Reactive received

Configuration of PowerTag Control Devices Through Webpages

To configure PowerTag Control devices with EcoStruxure Panel Server webpages, proceed as follows:

1. Navigate to **Settings > Wireless Devices > Wireless Devices** to view the list of the paired wireless devices.

   Result: The list of paired devices is displayed (with **Connected** written in green under the device name).
2. Select the required PowerTag Control device to modify the configuration.

   Result: The parameters of the PowerTag Control device are displayed.
3. If necessary, in **Locate**, click **Start** to identify the specific device in its location. The PowerTag Control device LED blinks for 30 seconds.
4. Enter the data in the fields, referring to the following tables for more information about the parameters.
5. Click **Apply Changes** to save the settings

   or

   Click **Cancel Changes** to revert the settings.

   NOTE: When saving the settings, a message may be displayed indicating either that 90% of wireless bandwidth capacity is reached or that the Panel Server is over configured. Follow the recommendation in the message to increase the communication period of a particular device or to reduce the number of wireless devices.

Parameter Tables

Identification

Parameter name	Description
Name	Enter the name of the wireless device.
Label (optional)	Enter the label of the wireless device.
RF-id	For display only
Device range	For display only
Commercial reference	For display only
Hardware revision	For display only
Device family	For display only

Communication Settings

Parameter name	Description
Communication period (s)	When available for the selected wireless device, you can set the communication period at a value different from the value set at family devices level. Select a value of between 5 and 120 seconds from the list.

Modbus virtual

Parameter name	Description
Virtual server ID	Enter the ID of the Modbus virtual server.

Input/Output Settings

Parameter name	Description
Local Control	Toggles local control on or off.
Configuration Type	Select from the list: • **Contactor without feedback loop**: Configure parameters for Output and Input separately • **Contactor with feedback loop** • **Impulse relay** The parameters displayed depend on the selection of configuration type. See details in the following tables.

Parameters for Contactor without feedback loop

Parameter name		Description
Output	**I/O Type**	Select from the list: • **Standard I/O** • **Not connected**
	Name	Enter the name of the wireless device.
	Label	Enter the label of the wireless device (optional).
	I/O Contextualization	Select an option from the list.
	Status name	If you select **Custom** as contextualization option, then enter the custom name for the device.
	Meaning of output = 0	Displayed values depend on selection of **I/O Contextualization**. Enter your custom values if you select **Custom** as contextualization option. **NOTE:** Clicking the double arrow icon on the right allows you to swap the meanings of outputs 0 and 1.
	Meaning of output = 1	Displayed values depend on selection of **I/O Contextualization**. Enter your custom values if you select **Custom** as contextualization option. **NOTE:** Clicking the double arrow icon on the right allows you to swap the meanings of outputs 0 and 1.
	Commodity	Select the commodity to be monitored from the list.
	Usage	Select the usage to be monitored from the list.
Input	**I/O Type**	Select from the list: • **Standard I/O** • **Not connected**
	Name	Enter the name of the wireless device.
	Label	Enter the label of the wireless device (optional).
	I/O Contextualization	Select an option from the list.
	Meaning of output = 0	**Engaged** (for display only). **NOTE:** Clicking the double arrow icon on the right allows you to swap the meanings of outputs 0 and 1.
	Meaning of output = 1	**Released** (for display only). **NOTE:** Clicking the double arrow icon on the right allows you to swap the meanings of outputs 0 and 1.
	Commodity	Select the commodity to be monitored from the list.
	Usage	Select the usage to be monitored from the list.

Parameters for Contactor with feedback loop and for Impulse Relay

Parameter name		Description
I/O Type		Select from the list: • **Standard I/O** • **Not connected** **NOTE:** No parameters are displayed if **Not connected** is selected.
Output/Input Feedback Loop	**Name**	Enter the name of the wireless device.
	Label	Enter the label of the wireless device (optional).
	Commodity	Select the commodity to be monitored from the list.
	Usage	Select the usage to be monitored from the list.
	I/O Contextualization	Select an option from the list.
	Status name	If you select **Custom** as contextualization option, then enter the custom name for the device.
	Meaning of output = 0	Displayed values depend on selection of **I/O Contextualization**. Enter your custom values if you select **Custom** as contextualization option. **NOTE:** Clicking the double arrow icon on the right allows you to swap the meanings of outputs 0 and 1.
	Meaning of output = 1	Displayed values depend on selection of **I/O Contextualization**. Enter your custom values if you select **Custom** as contextualization option. **NOTE:** Clicking the double arrow icon on the right allows you to swap the meanings of outputs 0 and 1.

Configuration of Ambient Sensors Through Webpages

To configure ambient sensors with EcoStruxure Panel Server webpages, proceed as follows:

1. Navigate to **Settings > Wireless Devices > Wireless Devices** to view the list of the paired wireless devices.

   Result: The list of paired devices is displayed (with **Connected** written in green under the device name).
2. Select the required ambient sensor to modify the configuration.

   Result: The parameters of the sensor are displayed.
3. If necessary, in **Locate**, click **Start** to identify the specific sensor in its location. The sensor LED blinks for 30 seconds.
4. Enter the data in the fields, referring to the following tables for more information about the parameters.
5. Click **Apply Changes** to save the settings

   or

   Click **Cancel Changes** to revert the settings.

   NOTE: When saving the settings, a message may be displayed indicating either that 90% of wireless bandwidth capacity is reached or that the Panel Server is over configured. Follow the recommendation in the message to increase the communication period of a particular device or to reduce the number of wireless devices.

Parameter Tables

Identification

Parameter name	Description
Name	Enter the name of the wireless device.
Label (optional)	Enter the label of the wireless device.
RF-id	For display only
Device range	For display only
Commercial reference	For display only
Hardware revision	For display only
Device family	For display only

Communication Settings

Parameter name	Description
Communication period (s)	When available for the selected wireless device, you can set the communication period at a value different from the value set at family devices level. Select a value of between 60 and 600 seconds from the list.

Modbus virtual

Parameter name	Description
Virtual server ID	Enter the ID of the Modbus virtual server.

Contextualization

Parameter name	Description
Commodity	Select from the list the commodity to be monitored.

Unpairing Wireless Devices Through Webpages

Unpairing of Wireless Devices Through Webpage

To unpair one or several wireless devices through EcoStruxure Panel Server webpages, follow the procedures in the subsequent sections, as applicable:

- Unpairing all connected wireless devices
- Unpairing one connected wireless device
- Forcing unpairing of one or several connected wireless devices

Some wireless devices have a local method to unpair the devices. Refer to the instruction sheet of the specific device. For example, for wireless indication auxiliaries for ComPacT NSX and ComPacT NSXm circuit breakers, consult the instruction sheet available on the Schneider Electric website: NNZ8882801.

Unpairing of all Wireless Devices Through Webpage

1. Navigate to **Settings > Wireless devices > Wireless Configuration** to view the list of paired wireless devices.
2. In the **Wireless device management** section, click the **Unpair all devices** button.

   Result: A message displays to confirm the removal of the wireless devices from the configuration.
3. Click **Yes** to initiate the removal process for all devices in the Panel Server system.
4. A progress bar shows the progress of the request execution. Wait until the progress bar is completed, indicating that all wireless devices should have received unpairing order. The process duration depends on the device. It may take up to 10 minutes.

   Result: Once a wireless device is successfully unpaired with the Panel Server, it is no longer visible in the list of wireless devices discovered.

Unpairing of one Wireless Device Through Webpage

1. Navigate to **Settings > Devices > Wireless devices > Wireless Devices** to view the list of paired wireless devices.
2. Select the device to be removed from the configuration.
3. Click the bin icon on the right side of the webpage.
4. Click **Yes** to initiate the removal process.
5. Wait until unpairing is completed. The process duration depends on the devices. It may take up to 10 minutes.

   Result: Once the wireless device is successfully unpaired with the Panel Server, it is no longer visible in the list of wireless devices discovered.

Forcing Unpairing of Wireless Devices Through Webpage

It is possible that the unpairing process does not succeed with one or several devices when a device is not powered or is out of order. If a device has not been unpaired 10 minutes after the unpairing process has begin, the status is shown as **Removing** in red in the list of discovered devices. You can force removal of a device from the Panel Server system.

To force device removal, open the webpage for the selected device and click the **Force remove** button.

Result: Once the wireless device is successfully deleted from the Panel Server configuration, it will not be visible in the list of devices discovered.

If you want to pair the forced unpaired device with a new Panel Server, reset and power off this device.

Adding Wireless Devices Paired Under a Child Gateway (Universal and Advanced Models)

Presentation

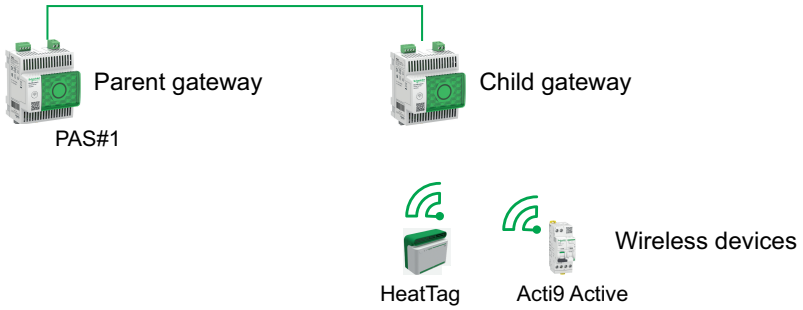
The Panel Server Universal allows you to display and publish data from wireless devices connected to a child gateway. In addition, the Panel Server Advanced can log the data, display them in the trending screens and export them in a csv file.

A wireless child gateway is a gateway that is connected downstream to one Panel Server via Modbus TCP. It incorporates wireless data aggregation tables to be enable direct and autonomous response to Modbus requests. In this family of products, only Smartlink SIB, PowerTag Link, and Panel Server are supported. Other gateways, such as EGX100, EGX300, and Link150, operate as transparent gateways which transfer Modbus requests and responses to and from end devices. They have no data aggregation table to handle Modbus requests, and are therefore not impacted by the limitations introduced by such tables.

The child gateway can be one of the following:

- Panel Server
- PowerTag Link
- Smartlink SIB

The following diagram shows a typical architecture of wireless devices connected to a child/downstream Panel Server in a separate topology. The child/downstream gateway is connected to one Ethernet port of the parent/upstream Panel Server (PAS#1).



NOTE: Panel Server Universal and Advanced allow you to display data from wireless devices connected to a child gateway. The parent Panel Server gateway monitors the Modbus TCP/IP communication status of the child gateway and its downstream wireless devices, and reports an alarm when the child gateway disconnects.

Availability

This function is available on Panel Server Universal and Advanced.

Procedure to Add the Wireless Devices to the Child Gateway and to the Parent Gateway

1. Connect to the child gateway using EcoStruxure Power Commission desktop or embedded webpages
2. Pair all the wireless devices to the child gateway.
3. Connect to the parent gateway using the embedded webpages.

4. Each wireless device is added to the parent gateway using the Modbus/TCP manual addition procedure by accessing the **Settings > Modbus devices > Modbus discovery > Modbus TCP/IP > Manual addition** webpage and entering the following information for each wireless device:
   - IP address: Enter the IP address of the child gateway
   - Port: Usually port 502
   - Unit ID: Enter the virtual server ID assigned by the child gateway to the wireless device
   - Device: Select the device type in the drop-down selection list
5. Repeat step 4 for each wireless device

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 120. In particular, you can look at the EcoStruxure Panel Server health state, which 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 may have been 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 may be powered off and stopped communicating for a few cycles. • If a local device is identified, then there may be an IPv4 address conflict.
EcoStruxure Panel Server status LED steady red	Major malfunction.	Call your local Schneider Electric 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 or EcoStruxure Panel Server webpages.

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 the respective release notes: • DOCA0249EN*EcoStruxure Panel Server Entry - Firmware Release Notes* • DOCA0178EN *EcoStruxure Panel Server Universal - Firmware Release Notes* • DOCA0248EN *EcoStruxure Panel Server Advanced - Firmware Release Notes*
Status of wireless devices (for example, Easergy TH110) does not update in EcoStruxure Panel Server webpages or EcoStruxure Power Commission software.	The wireless device is powered off or has stopped communicating with the EcoStruxure Panel Server (for example, if the wireless device has been moved out of range) and has status **Not connected** in the webpages .	• Verify that the device is powered on. • Verify that the wireless device is not installed out of range of the EcoStruxure Panel Server.
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. • Verify that the device settings are set according to the EcoStruxure Panel Server (see Serial Configuration Settings, page 68).
A Modbus device does not communicate 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 72 to correct conflicts by using EcoStruxure Power Commission software.
Alarms are not displayed in the EcoStruxure Panel Server webpages and cannot be monitored in the webpages.	SFTP publication is active.	1. In the webpage **Settings > Publication > Publication method > SFTP**, verify that **SFTP Publication** is disabled. 2. In the webpage **Settings > Data management** , enable or disable the alarms under monitoring. 3. In the webpage **Settings > Publication > Publication method > SFTP**, enable **SFTP Publication**.
The EcoStruxure Panel Server cannot reach the Schneider Electric cloud. **Network unreachable** is displayed in **Connection diagnostics**.	Incorrect network or communication configuration.	Verify that the network and communication settings are correctly set (for example, proxy or DNS is required but not defined).
		Verify that the firewall allows network access and connection from the EcoStruxure Panel Server, in particular ports and protocols are enabled and correctly configured.
		Check that time is set to **Schneider Electric cloud** on the EcoStruxure Panel Server webpage (see **Date & Time**, page 93).
The EcoStruxure Panel Server is not recognized by the Schneider Electric cloud services.	–	Check that port 443 has been opened to cloud services (see parameters for cloud connection and services, page 83). If a reset to factory settings was performed on the Panel Server, contact your Schneider Electric Customer Care Center to have the Panel Server re-associated to Schneider Electric cloud services.

Appendices

What's in This Part

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Appendix B: Data Availability 188
Appendix C: Wireless Device Connection Information 195
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Appendix A: Details of Modbus Functions

What's in This Chapter

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Modbus Registers Tables 184
Function 43-14: Read Device Identification 185
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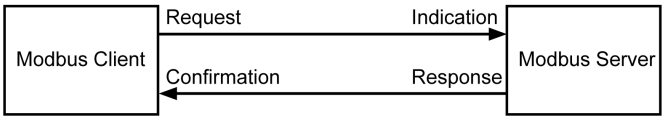
Modbus TCP/IP Functions

General Description

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

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

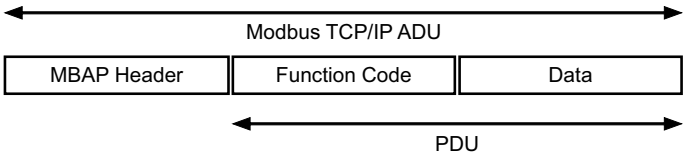
- Modbus Request, the message sent on the network by the client to initiate a transaction.
- Modbus Indication, the request message received on the server side.
- Modbus Response, the response message sent by the server.
- Modbus Confirmation, the response message received on the client side.



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 to 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 Modbus TCP/IP devices supported by the EcoStruxure Panel Server:

Function code	Function name
03	Read n words
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 185)
100-4	Read non-adjacent words where n ≤ 100 (refer to Function 100-4: Read Non-Adjacent Registers, page 187)

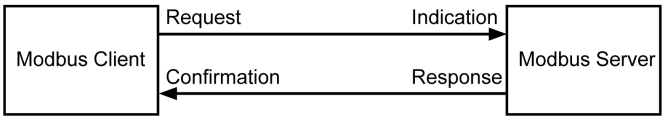
Modbus-SL Functions

General Description

The Modbus messaging service provides a client/server communication between devices connected to a Modbus Serial Line (Modbus-SL) 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.

On Serial Line, the Modbus Application Data Unit (ADU) encapsulates the Protocol Data Unit (PDU) adding the server address and a Cyclic Redundancy Check (CRC). 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).

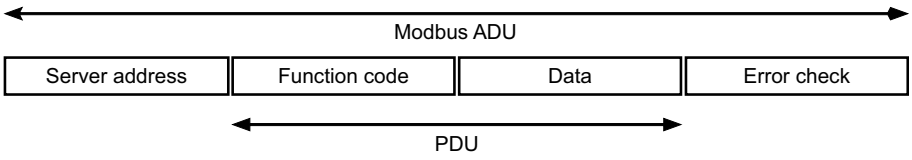


Table of Modbus Functions

The following table describes in detail the functions supported by the Modbus-SL devices supported by the EcoStruxure Panel Server:

Function code	Function name
03	Read n words
04	read input register
06	Write 1 word
16	Write n words
43-14	Read device identification (refer to Function 43-14: Read Device Identification, page 185)
100-4	Read non-adjacent words where n ≤ 100 (refer to Function 100-4: Read Non-Adjacent Registers, page 187)

IMPORTANT: Function codes 1 and 2 are not supported.

Modbus TCP/IP and Modbus-SL 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 perform 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 when 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.

Modbus Registers Tables

Presentation

The Modbus registers of EcoStruxure Panel Server and the Modbus registers of the supported wireless devices connected to it provide measurement and monitoring information.

For detailed information about these Modbus registers, refer to spreadsheet DOCA0241EN *EcoStruxure Panel Server - Modbus File*.

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

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, PowerLogic Tag, and Acti9 Active Data Availability 189
Environmental Sensor Data Availability 194

PowerTag, PowerLogic Tag, and Acti9 Active Data Availability

Presentation

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

Device Commercial References

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

- A1: A9MEM1520, A9MEM1521, A9MEM1522, A9MEM1541, A9MEM1542, PLTQO●, PLTE60●
- 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, PLTR●
- C: Acti9 Active iC40/iC60 (A9TAA●●●●, A9TAB●●●●, A9TDEC●●●, A9TDFC●●●, A9TDFD●●●, A9TPDD●●●, A9TPED●●●, A9TYAE●●●, A9TYBE●●●)

Power

Data	PowerTag M63, PowerLogic Tag QO, PowerLogic Tag E-Frame		PowerTag P63	PowerTag F63			Power-Tag F160	Power-Tag M250		Power-Tag M630		PowerTag Rope, PowerLogic Tag Rope	Acti9 Active
	A1	A2	P1	F1	F2	F3	FL	M0	M1	M2	M3	R1	C
Total active power	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Per phase active power	✓	NA[6]	✓	✓	NA[6]	✓	✓[7]	✓[7]	✓	✓[7]	✓	✓[7]	✓
Total reactive power	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓
Per phase reactive power	–	–	–	–	–	–	✓[7]	–	–	–	–	✓[7]	–
Total apparent power	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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

Data	PowerTag M63, PowerLogic Tag QO, PowerLogic Tag E-Frame		PowerTag P63	PowerTag F63			Power-Tag F160	Power-Tag M250		Power-Tag M630		PowerTag Rope, PowerLogic Tag Rope	Acti9 Active
	A1	A2	P1	F1	F2	F3	FL	M0	M1	M2	M3	R1	C
Per phase apparent power	–	–	–	–	–	–	✓[8]	–	–	–	–	✓[8]	–
Total factor power	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Per phase factor power	–	–	–	–	–	–	✓[8]	–	–	–	–	✓[8]	–
Actual demand power	–	–	–	–	–	–	–	–	–	–	–	–	✓

Energy

Data	PowerTag M63, PowerLogic Tag QO, PowerLogic Tag E-Frame		PowerTag P63	PowerTag F63			Power-Tag F160	PowerTag M250		PowerTag M630		PowerTag Rope, PowerLogic Tag Rope	Acti9 Active
	A1	A2	P1	F1	F2	F3	FL	M0	M1	M2	M3	R1	C
Total resettable active energy delivered	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Total non resettable active energy delivered	✓	✓	✓	✓	✓	✓	✓[8]	✓	✓	✓	✓	✓[8]	✓[8]
Per phase resettable active energy delivered	–	–	–	–	–	–	✓[8]	–	–	–	–	✓[8]	✓[8]
Per phase non resettable active energy delivered	–	–	–	–	–	–	✓[8]	–	–	–	–	✓[8]	✓[8]
Total resettable active energy received	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Total non resettable active energy received	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Per phase resettable active energy received	–	–	–	–	–	–	✓[8]	–	–	–	–	✓[8]	✓[8]
Per phase non resettable active energy received	–	–	–	–	–	–	✓[8]	–	–	–	–	✓[8]	✓[8]
Total resettable active energy	✓	✓	✓	✓	✓	✓	NA[9]	NA[9]	NA[9]	NA[9]	NA[9]	NA[9]	NA[9]

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

Data	PowerTag M63, PowerLogic Tag QO, PowerLogic Tag E-Frame		PowerTag P63	PowerTag F63			Power-Tag F160	PowerTag M250		PowerTag M630		PowerTag Rope, PowerLogic Tag Rope	Acti9 Activ-e
	A1	A2	P1	F1	F2	F3	FL	M0	M1	M2	M3	R1	C
delivered and received													
Total non resettable active energy delivered and received	✓	✓	✓	✓	✓	✓	NA[10]	N-A[10]	N-A[10]	N-A[10]	N-A[10]	NA[10]	NA[10]
Per phase resettable active energy delivered and received	–	–	–	–	–	–	NA[10]	–	–	–	–	NA[10]	NA[10]
Per phase non resettable active energy delivered and received	–	–	–	–	–	–	NA[10]	✓[11]	✓	✓[11]	✓	NA[10]	NA[10]
Total resettable reactive energy delivered	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓
Total non resettable reactive energy delivered	–	–	–	–	–	–	✓[11]	–	–	–	–	✓[11]	✓[11]
Per phase resettable reactive energy delivered	–	–	–	–	–	–	✓[11]	–	–	–	–	✓[11]	✓[11]
Per phase non resettable reactive energy delivered	–	–	–	–	–	–	✓	–	–	–	–	✓	✓
Total resettable reactive energy received	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓
Total non resettable reactive energy received	–	–	–	–	–	–	✓	–	–	–	–	✓	✓
Per phase resettable reactive energy received	–	–	–	–	–	–	✓[11]	–	–	–	–	✓[11]	✓[11]
Per phase non resettable reactive energy received	–	–	–	–	–	–	✓[11]	–	–	–	–	✓[11]	✓[11]
Total resettable apparent energy	–	–	–	–	–	–	✓	–	–	–	–	✓	✓

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

Data	PowerTag M63, PowerLogic Tag QO, PowerLogic Tag E-Frame		PowerTag P63	PowerTag F63			Power-Tag F160	PowerTag M250		PowerTag M630		PowerTag Rope, PowerLogic Tag Rope	Acti9 Active
	A1	A2	P1	F1	F2	F3	FL	M0	M1	M2	M3	R1	C
delivered and received													
Total non resettable apparent energy delivered and received	–	–	–	–	–	–	✓	–	–	–	–	✓	✓
Per phase resettable apparent energy delivered and received	–	–	–	–	–	–	✓[12]	–	–	–	–	✓[12]	✓[12]
Per phase non resettable apparent energy delivered and received	–	–	–	–	–	–	✓[12]	–	–	–	–	✓[12]	✓[12]

Alarms

Data	PowerTag M63, PowerLogic Tag QO, PowerLogic Tag E-Frame		PowerTag P63	PowerTag F63			Power-Tag F160	Power-Tag M250		PowerTag M630		PowerTag Rope, PowerLogic Tag 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%	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Undervoltage 80%	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RMS current on phase A, B, C at voltage loss	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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

Other Measurements

Data	PowerTag M63, PowerLogic Tag QO, PowerLogic Tag E-Frame		Power-Tag P63	PowerTag F63			Power-Tag F160	Power-Tag M250		PowerTag M630		PowerTag Rope, Power-Logic Tag 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[13]	✓	✓	NA[13]	✓	✓[14]	✓[14]	✓	✓[14]	✓	✓	✓[14]
Frequency	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	
Quadrant	1	1	1	1	1	1	4	4	4	4	4	4	
Internal temperature	–	–	–	–	–	–	✓	✓	✓	✓	✓	✓	✓
Load operating time counter	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

13. Not applicable because there is no neutral voltage on the PowerTag Energy sensors
14. 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 is 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:

- CL110 (Contact your Schneider Electric representative for information about commercial references.)
- TH110 (Contact your local Schneider Electric representative for information about commercial references.)
- TRH (SED-TRH-G-5045)
- TRHC02 (SED-CO2-G-5045)

Other Measurements

Data	CL110	TH110	TRH	TRHC02
Temperature	✓	✓	✓	✓
Ambient humidity	✓	–	✓	✓
Ambient CO_2 level	–	–	–	✓

Appendix C: Wireless Device Connection Information

The following table defines connection information of wireless devices.

Information type	Description
LQI	Displays the measurement of the strength and/or the quality of the received frames. **NOTE:** It is recommended to use this indicator as the main indicator of acceptance.
RSSI	Displays the power level of the wireless signal. • Good: 0 to -65 dbm • Average: -65 to -75 dbm • Poor (with risk of outage): < -75 dbm
PER	Displays the ratio of the packet that does not reach a destination over the total expected number of packets. It is expressed as a percentage.

Appendix D: SFTP Publication File Formats

CSV Publication

The following table provides the details of each row of the .csv file, with sample data:

Row	Data in .csv file	Description
1	`Gateway Name,Gateway SN,Gateway IP Address,Gateway MAC Address,Device Name,Device Local ID,Device Type ID,Device Type Name,Logging Interval, Historical Intervals`	This row contains the column headings for the information provided in row 2: • `Gateway Name`: name given to Panel Server during commissioning • `Gateway SN`: serial number of Panel Server • `Gateway IP`: IP address of Panel Server • `Gateway MAC Address`: MAC address of Panel Server • `Device Name`: name given to the device during commissioning • `Device Local ID`: reference of the logged device, unique across Panel Server • `Device Type ID`: device model • `Device Type Name`: device model • `Logging Interval`: sampling period expressed in minutes • `Historical Intervals`: total number of rows of logged data in this file
2	`Device TypeEcoStruxure Panel Server,542206310926,10.195.253.81,00:00:54:E5:8A:36,F160 3P 3P+N,modbus:1_mb_81,F160 3P 3P+N, F160 3P 3P+N,5,7`	This row contains information about the Panel Server that produced the file, and the downstream device from which the measurements were sampled.
3	–	–
4	`,,,Topic ID1,Topic ID2`	This row contains the column headings for the topic IDs. A topic ID is a reference to the quantity being logged. The name given to a quantity may differ between devices and languages. Topic IDs are used to identify the quantity regardless of the device or language. Topic IDs are unique across the Panel Server. **NOTE:** The first 3 commas are used for layout purposes in a spreadsheet application.
5	`,,,"modbus:1_mb_VAB","modbus:1_mb_VAN"`	This row contains the topic IDs of the measurements logged.
6	–	–
7	`Error,UTC Offset (minutes),Local Time Stamp, RmsVoltagePhsAB (V),RmsVoltagePhsAN (V)`	This row contains the column headings for the data logged in rows 8 and more: • `Error`: `0` for success, `19` when at least one measurement was invalid or not available for sampling (`NaN`). • `UTC Offset (minutes)`: offset of local timestamp from UTC timezone. • `Local Time Stamp`: date and time of the samples From the fourth item onward, each measure is described by its name and unit (if known).

8 and more	`0,0,2022-11-04 08:10:00,127.80000305,235.3999939`
	`0,0,2022-11-04 08:15:00,128.1000061,235.69999695`
	`0,0,2022-11-04 08:20:00,127.69999695,234.8999939`
		These rows contain the logged data.

JSON Publication

The following lines provide an example of a .json file with data consisting of a list of two time series with a collection of several records:


```
{
 "$schema": "ESX/EDM/Protocol/Specific/CloudMessaging/DeviceToCloud/Data/CewsMessage",
 "message": {
  "remoteId": "urn:dev:cer:a66e3ea13bbe1b67aa46b4a5c1552f162b467cb4",
  "contentType": "data",
  "cewsVersion": "3.0.0",
  "timestamp": "2023-03-28T08:22:13.342Z",
  "content": {
   "data": {
    "timeseries": [
     {
      "valueItemId": "io_block:7_iod_827_DO1",
      "timestamp": "2023-03-28T08:13:00Z",
      "records": [
       {
        "v": "Open",
        "t": 120000
       },
       {
        "v": "Open",
        "t": 180000
       },
       {
        "v": "Open",
        "t": 240000
       },
       {
        "v": "Open",
        "t": 300000
       },
       {
        "v": "Open",
        "t": 360000
       },
       {
        "v": "Open",
        "t": 420000
       },
       {
        "v": "Open",
        "t": 480000
       }
      ]
     },
     {
      "valueItemId": "io_block:10_iod_827_DO1",
      "timestamp": "2023-03-28T08:13:00Z",
      "records": [
       {
        "v": "Disengaged",
        "t": 120000
       },
 {
        "v": "Disengaged",
        "t": 180000
       },
       {
        "v": "Disengaged",
        "t": 240000
       },
       {
        "v": "Disengaged",
        "t": 300000
       },
       {
        "v": "Disengaged",
        "t": 360000
       },
       {
        "v": "Disengaged",
        "t": 420000
       },
       {
        "v": "Disengaged",
        "t": 480000
       }
      ]
     }
    ]
   }
  }
 }
}
```

Appendix E: SSH Key Exchange and Cipher

The Panel Server provides secure SFTP data publication based on the following elements:

Key Exchange

- diffie-hellman-group-exchange-sha1
- diffie-hellman-group1-sha1
- diffie-hellman-group14-sha1
- diffie-hellman-group-exchange-sha256
- ecdh-sha2-nistp256
- ecdh-sha2-nistp384
- ecdh-sha2-nistp521

Cipher

- blowfish-cbc
- 3des-cbc
- aes128-cbc
- aes192-cbc
- aes256-cbc
- aes128-ctr
- aes192-ctr
- aes256-ctr
- 3des-ctr
- arcfour
- arcfour128
- arcfour256

Glossary

A

Aggregated data :

Integrated data which is summed up in order to present a view. It is applicable only in the **Home** and **Trending** menus

C

Continuous data: A measurement, for example Active power A, Apparent power C, Temperature.

Custom model: Panel Server supports several native device models. It is also possible to create and import a custom model to manage a Modbus device that is not natively managed by the Panel Server built-in models or when a different model than the built-in one is desired. The custom model is defined using the EPC Web tool.

D

Data publication: The sampled data can be exported to a dedicated server.

Data sampling: Function that allows you to log and historize the measurements in the Panel Server or in the Schneider Cloud. The Panel Server webpages allow you to select a subset of measurements and to configure the sampling period.

E

EWP: EcoStruxure Panel Server embedded webpages

H

Hardware version:

The new models of EcoStruxure Panel Server, PAS600LWD and PAS600PWD are released with hardware version 002.000.000 (HW: V02).

To identify the hardware version of your device, use one of the following methods:

- On the front face of the product check the laser marking which includes the MAC ID and serial number of the device. For hardware version 002.000.000 devices, an additional line indicates HW: V02.
- On the Panel Server webpages, navigate to **Settings > General > Identification** or to **Maintenance > Firmware update**. Check the **Hardware revision** line for the hardware version of your device.

I

IEEE 802.15.4: Standard defined by the IEEE and used by the EcoStruxure Panel Server to communicate with wireless devices.

Integrated data: A measurement calculated over a period of time, for example Reactive energy received measured in KWh. Available for Energy only.

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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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DOCA0172EN-12