

PowerTag Link User Manual

03/2020



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All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.

When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

Failure to use Schneider Electric software or approved software with our hardware products may result in injury, harm, or improper operating results.

Failure to observe this information can result in injury or equipment damage.

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Important Information

NOTICE

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.

⚠ WARNING

POTENTIAL COMPROMISE OF SYSTEM AVAILABILITY, INTEGRITY, AND CONFIDENTIALITY

- Change default passwords at first use to help prevent unauthorized access to device settings, controls, and information.
- Disable unused ports/services and default accounts 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.

About the Book



At a Glance

Document Scope

The purpose of this manual is to provide users, installers, and maintenance personnel with the technical information necessary to install and use the PowerTag Link communication system.

Validity Note

The PowerTag Link communication system can be easily integrated into any building management architecture.

It combines monitoring and metering and protection functions designed for energy efficiency solutions. Based on the Modbus protocol, the PowerTag Link communication system allows switchboards and busbar trunking systems data to be exchanged in real time with a supervision system or a PLC.

This system's pre-wired cables can save time and prevent wiring errors during installation.

Related Documents

Title of Documentation	Reference Number
Instruction Sheet for the PowerTag Link (English, Dutch, French, German, Italian, Portuguese, Spanish, Chinese, Russian)	PHA81113
Instruction Sheet for the PowerTag M63 Wireless Communication Energy Sensors (English, Dutch, French, German, Italian, Portuguese, Spanish, Chinese, Russian)	EAV31628_web
Instruction Sheet for the PowerTag P63 Wireless Communication Energy Sensors (Chinese, Dutch, English, French, German, Italian, Portuguese, Romanian, Russian, Spanish)	QGH78639
Instruction Sheet for the PowerTag F63 Wireless Communication Energy Sensors (Chinese, Dutch, English, French, German, Italian, Portuguese, Romanian, Russian, Spanish)	QGH78642
Instruction Sheet for the PowerTag NSX Wireless Communication Energy Sensor for Compact NSX100-250, Compact NS100-250, Compact INS250, Compact INV100-250 (Chinese, English, French, German, Italian, Portuguese, Russian, Spanish)	QGH46815
Instruction Sheet for the PowerTag NSX Wireless Communication Energy Sensor for Compact NSX400-630, Compact NS400-630, Compact INS320-630, Compact INV320-630 (Chinese, English, French, German, Italian, Portuguese, Russian, Spanish)	QGH46820
EcoStruxure Power Commission Installation Guide (English)	DOCA0134EN

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

Chapter 1

PowerTag System

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Overview	12
PowerTag Link	14
Wireless Communication Devices	15

Overview

Introduction

The PowerTag system is used to monitor the electrical distribution installation through any supervision system.

Wireless devices in the PowerTag system are used to monitor, and measure the electrical switchboards and busbar trunking systems via a Modbus TCP/IP communication network.

The PowerTag system collects the data from electrical switchboards and busbar trunking systems in real time, thus contributing to achieve energy efficiency targets or monitoring final loads.

This system consists of:

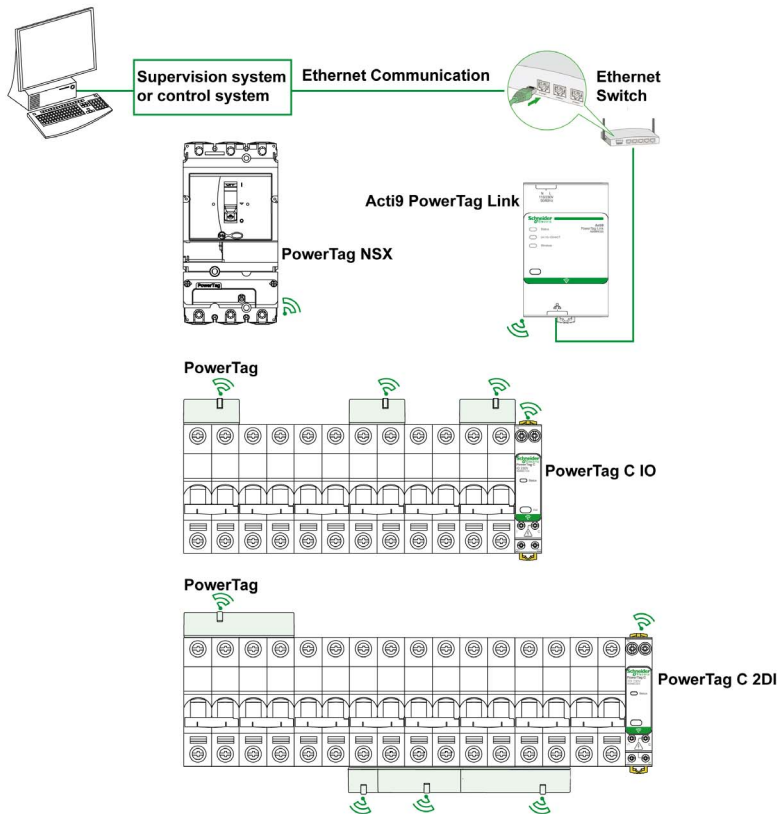
- PowerTag Link gateway
- PowerTag energy sensors (PowerTag M63 (for iC60 offer), PowerTag P63 (for DT40 and iC40 offers), PowerTag F63 (for other devices such as VigiBlock and specific installations).
- PowerTag NSX energy sensors (for Compact NSX, Compact INS, Compact INV)
- PowerTag Control modules
- PowerTag Link display

This system offers the following advantages and services:

- Telemetry applications
 - Load unbalance monitoring
 - Power and voltage loss monitoring
- Energy management and regulations

PowerTag Link gateway is a wireless gateway that exposes over TCP/IP all the Modbus registers of metering and monitoring data to any supervision system.

PowerTag System Architecture Diagram



PowerTag Link also manages web pages in order to configure settings or to monitor the wireless devices. The customer shall be responsible for the security of their networks and facilities into which the PowerTag Link is deployed.

 WARNING

POTENTIAL COMPROMISE OF SYSTEM AVAILABILITY, INTEGRITY, AND CONFIDENTIALITY

Change default passwords at first use to help prevent unauthorized access to device settings, controls, and information.

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

PowerTag Link

PowerTag Link Acting as a Concentrator

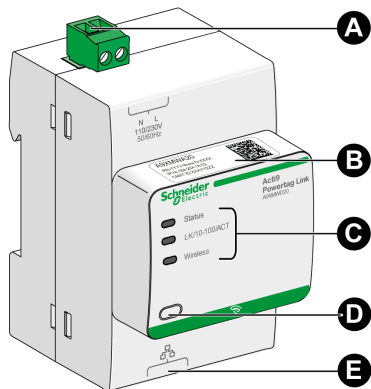
The wireless communication devices provide compact and high density metering solution with rich and accurate data for building systems (that can send energy, power, current, voltage, temperature and power factor to PowerTag Link gateway).

You can configure:

- up to 20 wireless communication devices with PowerTag Link reference A9XMWD20 and up to 5 PowerTag Control modules among them.
- up to 85 wireless communication devices with PowerTag Link reference A9XMWD100 and up to 5 PowerTag Control modules among them.

The PowerTag Link provides monitoring of the switchboard and busbar trunking via embedded web pages for local access.

Description



- A** Power supply connector 110-230 Vac
- B** Default IPv4 address
- C** Communication status indicators
- D** Reset button
- E** RJ45 Ethernet connection

Wireless Communication Devices

Description

Wireless communication devices that can be connected to the PowerTag Link are listed as follows:

- A9MEM15xx
- LV43402x
- A9XMWRD

Refer to the PowerTag Selection Guide:

<https://www.schneider-electric.com/en/download/document/CA908058E>

Principle of Wireless Device Installation

The PowerTag Link is installed in such a manner that the Wireless communication devices are distributed around the gateway. It is recommended to install the PowerTag Link in the center of the switchboard. The distance between the wireless communication devices and the gateway should be smaller than three meters for installation in simple plastic panels (example: Kaedra panel) up to multi-columns (non-partitioned, form2) metallic switchboard (example: Prisma-P).

NOTE: There is a possibility of disruption in the RF signal quality if wireless communication devices are installed in a different switchboard (particularly if the enclosure has metallic partitions and door).

Maximum Number of Wireless Communication Devices in an Electrical Room

The wireless network configuration is used for special applications like data centers and high density metering applications. In standard building applications, use the default settings.

For high density applications, thousands of wireless communication devices are placed in the same environment. Therefore, it is necessary to consider radio frequency plan and bandwidth. For an installation with multiple gateways, it is recommended to assign a dedicated and different channel to each gateway. To increase the radio quality, you can adjust the communication period from 5 seconds (default) to 60 seconds.

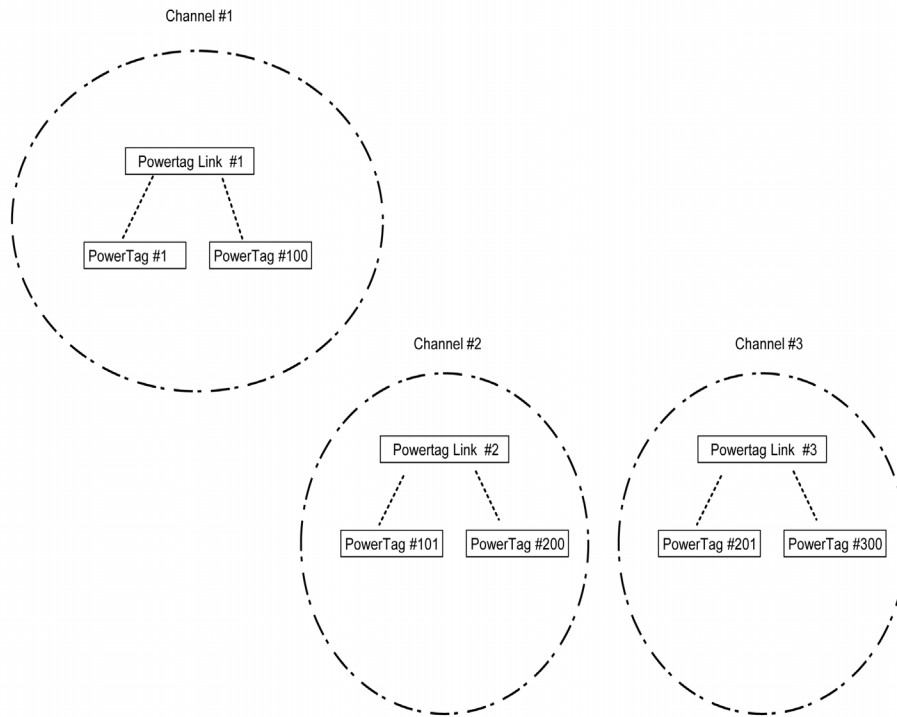
For any installation with more than 400 wireless devices, please consult us for a detailed study of the RF plan.

Any modification to the communication period has to be done after the commissioning of the wireless communication devices is completed to avoid slowdown of the commissioning process.

NOTE: Modification in communication period does not slowdown the alarms. The voltage loss is sent immediately. The communication period is used to send regular metering data (P, U, I, E, PF), and alarms are sent immediately.

NOTE:

- The radio channel is chosen in the wireless settings of PowerTag Link via the web pages and is applied to all the wireless communication devices that are commissioned with PowerTag Link.
- An PowerTag Link device can manage.
 - PowerTag Link reference A9XMWD20 can support up to 20 wireless devices, and up to 5 PowerTag Control modules among them.
 - PowerTag Link HD reference A9XMWD100 can support up to 85 wireless devices, and up to 5 PowerTag Control modules among them.
- A set of PowerTag Link devices has to be installed and commissioned to concentrate all the needed Wireless communication devices.



Chapter 2

Technical Characteristics

Technical Characteristics of the PowerTag Link

Main Characteristics

Characteristic		Value
Supply voltage	Us	110/230 V AC \pm 20 %, 2 A
Frequency		50/60 Hz
Power consumption		5 VA
Communication interface		Ethernet 10/100 BASE-T, Cable length \leq 100 m Cat.6 STP
Maximum number of wireless devices		Up to 20, for PowerTag Link Up to 100, for PowerTag Link HD
Automatic IP configuration		DHCP client (Ethernet port) Maximum simultaneous connections: Modbus TCP=8, HTTPS=2, HTTP=5
Communication Network	Modbus TCP connection	8
	HTTPS	2
	HTTP	5
Local indication	Product state	Green, orange and red LED
	Ethernet state (LAN ST)	Green, orange and red LED
Overvoltage category		III
Radio-frequency communication ISM band 2.4 GHz in accordance to IEEE 802.15.4 standard		2.4 GHz to 2.4835 GHz
Degree of protection(IEC 60068-2-30)	Device only	IP20
	Device in modular enclosure	IP40 Insulation class II
Fire resistance		650°C, 30 s
Environment		In compliance with the RoHS directive REACH Regulations

Additional Characteristics

Characteristic		Value
Operating temperature		-25°C to +60°C
Storage temperature		-40°C to +85°C
Pollution degree		2
Tropicalization (IEC 60068-2-30)		Treatment 2 (relative humidity of 93% at 40°C)
Operating altitude		0 to 2000 m
Electromagnetic compatibility	Reference standards	
	Immunity	EN 55035
	Emissions	EN 55032
	Electromagnetic compatibility and Radio spectrum Matters (ERM)	EN 300328 EN 301489-1 EN 301489-17

Mechanical Characteristics

Characteristic		Value
Dimensions	Length	359 mm
	Height	22.5 mm
	Depth	42 mm
Weight		180 g

Chapter 3

Installation of the PowerTag Link

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Mounting	20
Wiring	22

Mounting

Introduction

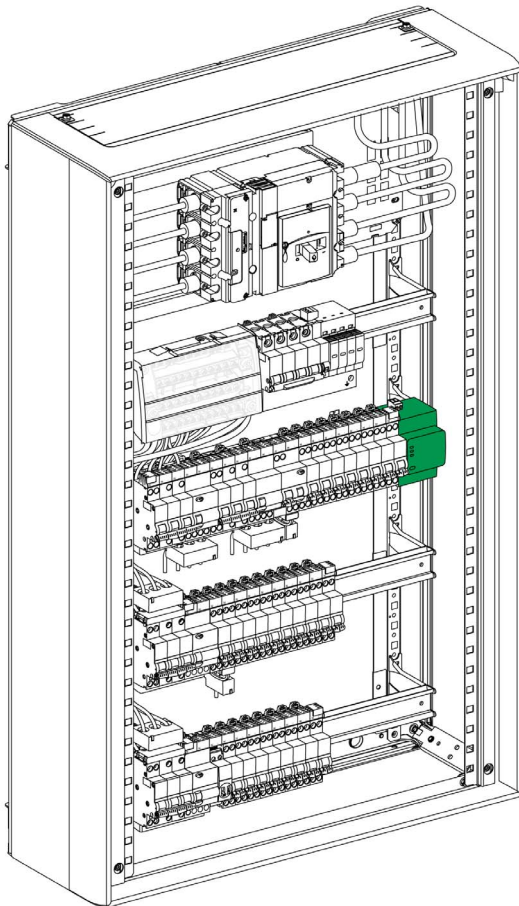
The PowerTag Link can be mounted on a DIN rail and can be also installed horizontally.

⚠ DANGER

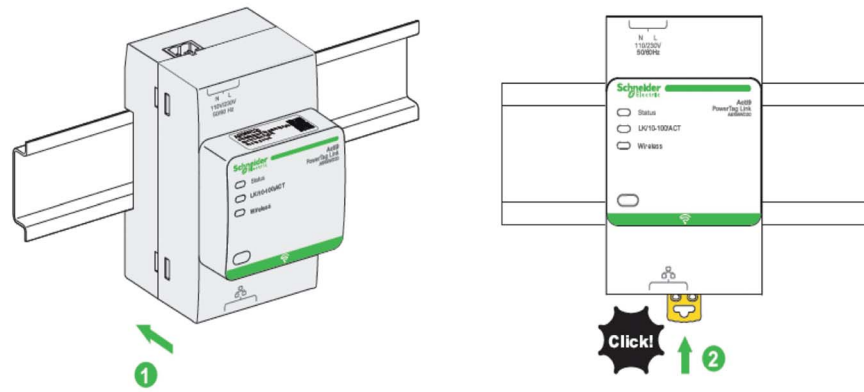
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Turn off all power supply sources before installing and during maintenance of this equipment.
- This equipment is intended only for installation in a restricted access location.
- Always use a voltage detection device with an appropriate rated value to make sure that the power supply is off

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



DIN Rail Mounting



The following table describes the procedure for mounting the PowerTag Link device on a DIN rail:

Step	Action
1	Position the PowerTag Link onto the DIN rail.
2	Slide the PowerTag Link device until it clicks into place.

Refer PowerTag instruction sheet reference (PHA81113) for more information.

Wiring

Introduction

Protect PowerTag Link with an Acti9 MCB rated 4A curve C with a cable length under 3 meters (in accordance to IEC 60.364).

Safety Instructions

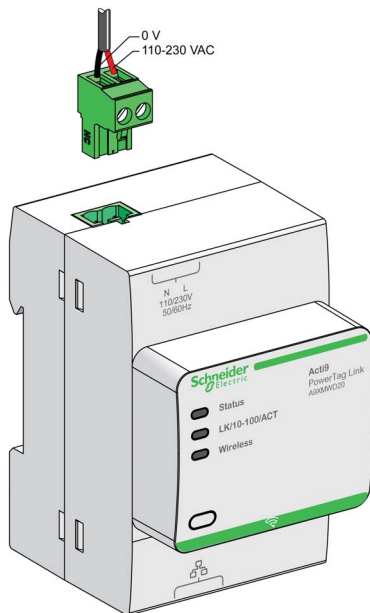
⚡ ⚠ **DANGER**

RISK OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Wear suitable personal protective equipment and follow the currently applicable electrical safety instructions.
- This equipment may only be installed by qualified electricians who have read all the relevant information.
- NEVER work alone.
- Before performing visual inspections, tests, or maintenance on this equipment, disconnect all sources of electric power. Assume that all circuits are live until they have been de-energized, tested, and tagged. Pay particular attention to the design of the power system. Consider all power supply sources, particularly the potential for backfeed.
- Before closing protective covers and doors, carefully inspect the work area to ensure that no tools or objects have been left inside the equipment.
- Take care when removing or replacing panels. Take special care to ensure that they do not come into contact with live Busbars. To minimize the risk of injuries, do not tamper with the panels.
- The successful operation of this equipment depends upon proper handling, installation, and operation. Failure to follow basic installation procedures can lead to personal injury as well as damage to electrical equipment or other property.
- NEVER shunt an external fuse/circuit breaker.
- This equipment must be installed inside a suitable electrical cabinet.

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

Connecting the Power Supply Connector



The following table describes the procedure for wiring the power supply connector:

Step	Action
1	Insert both stripped power supply wires in the connector.
2	Fix the wires in place using the connector tightening screws.

NOTICE**HAZARD OF EQUIPMENT DAMAGE**

Plug the power-supply connector (Phase-Neutral) into the power-supply socket with marking N-L on the PowerTag Link product.

Failure to follow these instructions can result in equipment damage.

Chapter 4

General Principle to Commission an PowerTag Link System

What Is in This Chapter?

This chapter contains the following sections:

Section	Topic	Page
4.1	Commissioning Overview	26
4.2	Pre-Requisites	29

Section 4.1

Commissioning Overview

What Is in This Section?

This section contains the following topics:

Topic	Page
Overview	27
Ethernet Connection	28

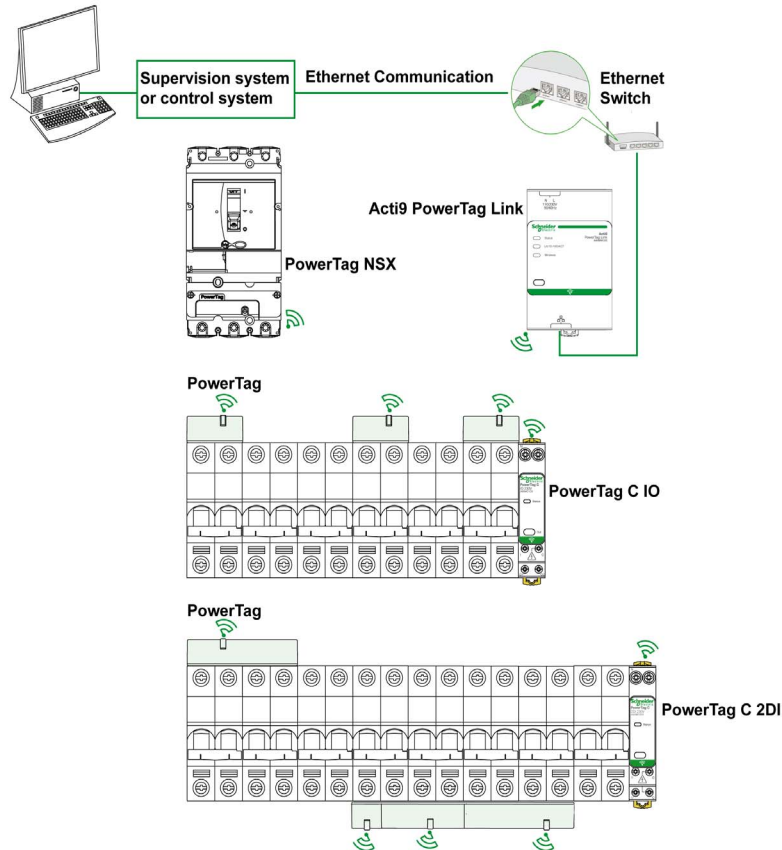
Overview

The commissioning of an PowerTag Link system can be performed using:

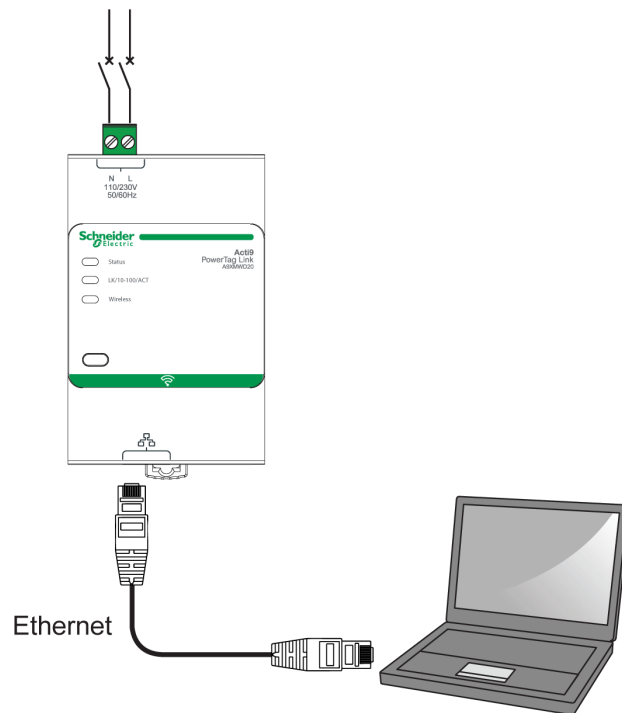
- the EcoStruxure Power Commission (EPC) software. See *EcoStruxure Power Commission Online Help*.
- the PowerTag Link web pages. The web pages are autonomous to configure any devices connected or paired with PowerTag Link.

NOTE:

- Before commissioning the PowerTag Link device, update the firmware of the PowerTag Link device.
- The firmware upgrade of the PowerTag Link device can only be done using the EcoStruxure Power Commission software. See *EcoStruxure Power Commission Online Help*.



Ethernet Connection



PowerTag Link has an embedded web server. A web server is used to set Ethernet parameters or to display wireless devices configured with EcoStruxure Power Commission software or with web pages.

Step	Action
1	Disconnect your PC from all your actions.
2	Connect an Ethernet straight cable between your PC and the Ethernet port on the PowerTag Link.

Section 4.2

Pre-Requisites

What Is in This Section?

This section contains the following topics:

Topic	Page
Installation of EcoStruxure Power Commission Software	30
Firmware Upgrade	31

Installation of EcoStruxure Power Commission Software




Downloading and Installation

The EcoStruxure Power Commission software is available on www.se.com.

Firmware Upgrade

Firmware Upgrade

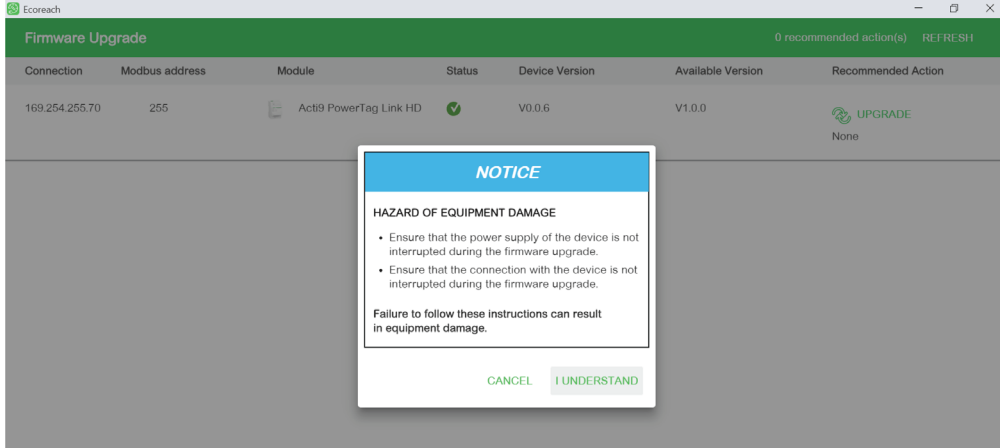
The firmware upgrade of PowerTag Link can only be done using the EcoStruxure Power Commission software if the PowerTag Link is not in the latest firmware version.

Firmware Upgrade							0 recommended action(s) REFRESH
Connection	Modbus address	Module	Status	Device Version	Available Version	Recommended Action	
169.254.255.70	255	 Acti9 PowerTag Link HD		V0.0.6	V1.0.0	 None	

NOTE: It is recommended to connect your PC directly with PowerTag Link gateway, using RJ45 cable to perform a peer to peer firmware upgrade. In case of connection to TCP/IP network, it is recommended to disconnect Modbus TCP client (BMS, or other upper system).

Firmware Compatibility

You can find a compatibility table **Device Firmware Baseline** in the **Information** menu of EcoStruxure Power Commission software.



The screenshot shows the EcoStruxure Power Commission software interface. At the top, there is a green header bar with the text "Firmware Upgrade" and "0 recommended action(s) REFRESH". Below this is a table with the following columns: Connection, Modbus address, Module, Status, Device Version, Available Version, and Recommended Action. The table contains one row of data for an Acti9 PowerTag Link HD module with device version V0.0.6 and available version V1.0.0. The recommended action is "UPGRADE" with a green circular arrow icon, and "None" below it.

A modal dialog box titled "NOTICE" is displayed in the center of the screen. The dialog box contains the following text:

HAZARD OF EQUIPMENT DAMAGE

- Ensure that the power supply of the device is not interrupted during the firmware upgrade.
- Ensure that the connection with the device is not interrupted during the firmware upgrade.

Failure to follow these instructions can result in equipment damage.

At the bottom of the dialog box, there are two buttons: "CANCEL" and "I UNDERSTAND".

Chapter 5

Getting Started with EcoStruxure Power Commission Software

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Non-Selective Pairing of Wireless Devices with EcoStruxure Power Commission Software	34
Selective Pairing of Wireless Devices with EcoStruxure Power Commission Software	35
Wireless Devices Configuration with EcoStruxure Power Commission Software	36

Non-Selective Pairing of Wireless Devices with EcoStruxure Power Commission Software

Overview

Follow the steps given in the table to commission the PowerTag Link with EcoStruxure Power Commission software:

Step	Action
1	Connect the PowerTag Link device to the PC.
2	Launch the EcoStruxure Power Commission software.
3	Click Launch Device Discovery in the welcome screen. Result: Discover Device(s) window displays all the devices connected in the network.
4	Select the device in the list and click on Find Devices button on the bottom left hand corner to continue Click on Add Devices button on the bottom left hand corner to add the PowerTag Link to the new project. Complete project details in next screens and finish by clicking on Continue button. Result: A new project with the PowerTag Link is created (switchboard view / communication view).
5	Click on Connect to Device button to connect. When connection is established, select the Configure option. Result: Screen to discover wireless devices is displayed.
6	Click Scan to discover the wireless devices. Result: The discovered wireless devices are displayed.
7	Click Locate to find the wireless device in an electrical panel Result: The Locate Wireless Device dialog box is displayed and the associated wireless device on the electrical panel continuously blinks green.
8	Click STOP BLINK to stop blinking of the device once it is identified.
9	Click the down arrow icon. Result: The configuration parameters page is displayed.
10	Enter the label for the wireless device.
11	Enter the name of the asset (name of the load), where it is located in the building, in the Asset name field.
12	Select the usage of the load from the Usage list.
13	Select the circuit breaker rating from the Associate breaker rating (A) list to calculate the percentage of loads.
14	Select the phase sequence corresponding to the physical sequence wired in the panel from the Phase sequence list.
15	Load works when Power is >= (W) (kWh) by moving the slider left or right.
16	Download PowerTag pairing and filled information to PowerTag Link by clicking on Write to Device button. Result: Message "write to device successful" when finished.
17	Save PowerTag Link settings in the project by clicking on Write to Device button. Result: Message "write to project successful" when finished.

NOTE:

- In the EcoStruxure Power Commission software, any gateway such as PowerTag Link is defined as a "device".
- By default, the Modbus TCP protocol is enabled in the PowerTag Link to offer the possibility to connect with EcoStruxure Power Commission software. However, if there are any problems connecting to the software, check if the Modbus TCP protocol is enabled using the web pages.

Selective Pairing of Wireless Devices with EcoStruxure Power Commission Software

It is possible to achieve a selective pairing using EcoStruxure Power Commission software. For further details, refer *EcoStruxure Power Commission Online Help*.

Wireless Devices Configuration with EcoStruxure Power Commission Software

Introduction

It is possible to configure the wireless device of PowerTag Link using EcoStruxure Power Commission software. For further details, refer *EcoStruxure Power Commission Online Help*.

Chapter 6

Getting Started with Web Pages

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Discovering PowerTag Link through Web Browser	38
Login into Web Pages	40
Web Pages Layout	41
Non-Selective Pairing of Wireless Devices	42
Selective Pairing of Wireless Devices with Web Pages	46
Wireless Network Configuration with Web Pages	47
Wireless Device Configuration with Web Pages	49

Discovering PowerTag Link through Web Browser

Default Passwords

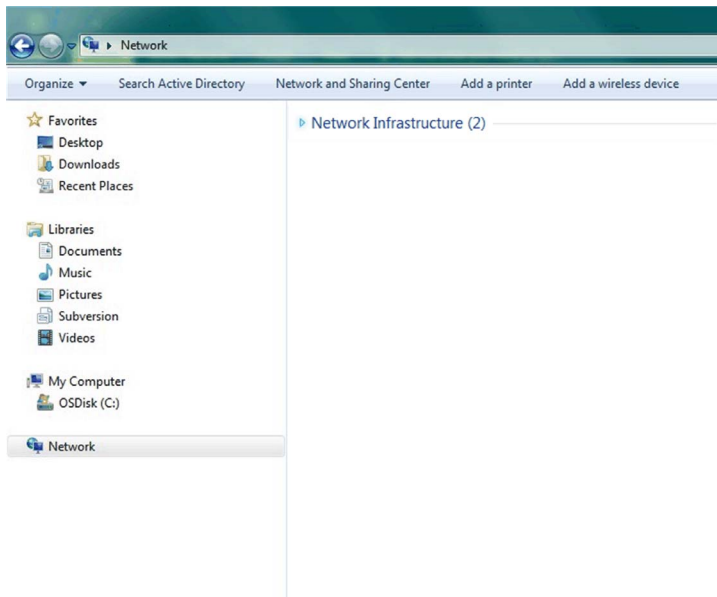
⚠ WARNING
POTENTIAL COMPROMISE OF SYSTEM AVAILABILITY, INTEGRITY, AND CONFIDENTIALITY
Change default passwords at first use to help prevent unauthorized access to device settings, controls, and information.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

Accessing PowerTag Link from Windows Operating System

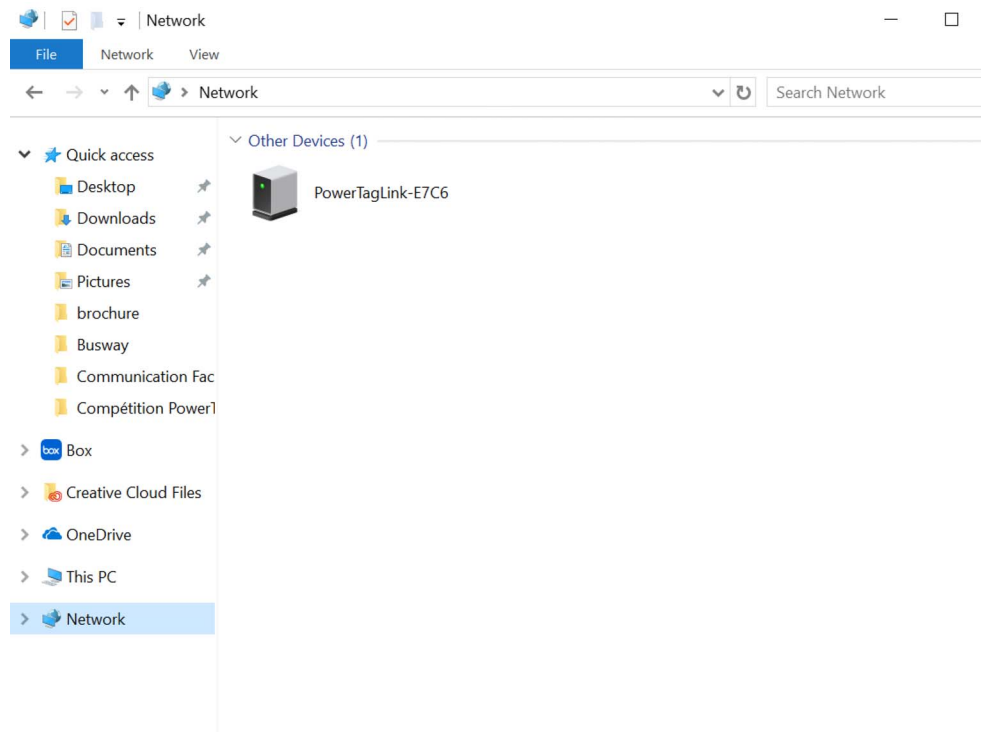
Follow the steps given in the table to access the web page of PowerTag Link through Windows Explorer from Windows operating system:

Step	Action
1	Open the Windows Explorer and click Network to display the PowerTag Link icon in the list of devices, this may take up to 2 minutes after device power on. (if the PowerTag Link icon does not appear, change the PC settings as given in the note below). NOTE: PowerTag Link gateway and the PC should be connected to the same sub network.
2	Double-click the PowerTag Link icon. This launches the login page automatically in the web browser.
3	Type the user name (“admin” by default) and password (“admin” by default). NOTE: These identifiers are case-sensitive.
4	Click OK.

The following figure shows the Windows Explorer screen without the discovery of PowerTag Link.



The following figure shows the Windows Explorer screen after the discovery of PowerTag Link.



If PowerTag Link IPv4 is in DHCP mode, the PC must also be in DHCP mode. If PowerTag Link uses a static IP, the PC must also use a static IP and Network setting (Subnet mask), and must be the same for both devices (for example, factory IP settings).

In the configuration panel of Windows, click the local network properties and change the IPv4 settings.

Step	Action
1	Right-click the Network icon located at the bottom-right corner of the Desktop screen then click Open Network and Sharing Center .
2	Click Change adapter settings , then right-click on the Local Area Connection icon and click Properties .
3	Select Internet Protocol Version 4 (TCP/IPv4) from the list and click Properties .
4	Select Obtain an IP address automatically and click OK .

Accessing PowerTag Link from the Operating System other than Windows

Follow the steps given in the table to access the web page of PowerTag Link from the operating system other than Windows:

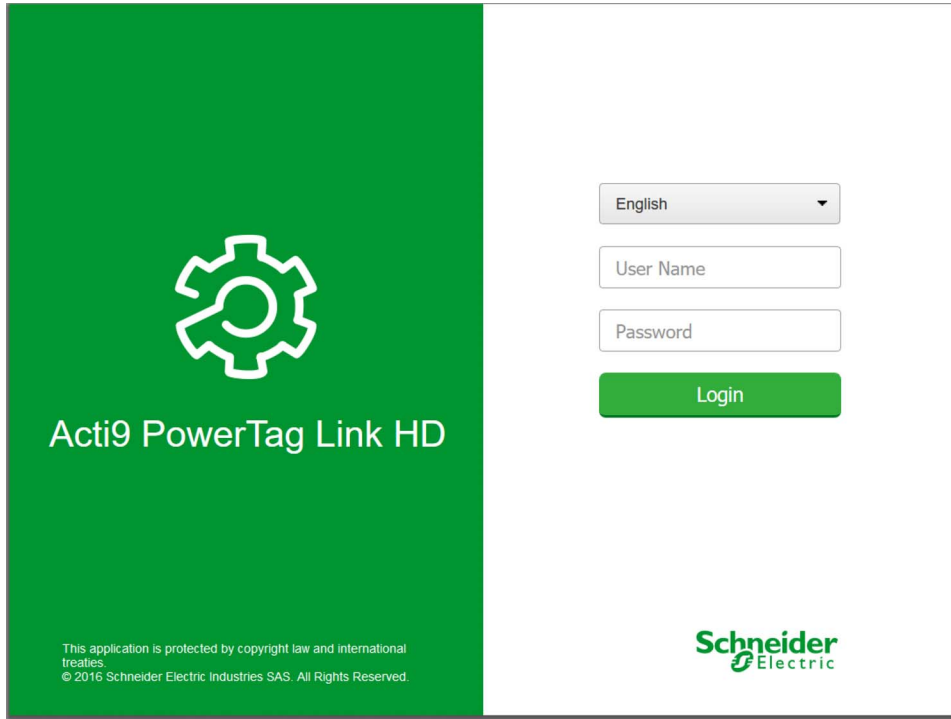
Step	Action
1	Launch the Internet browser.
2	Type the IPv4 address (encoded into the QR code on the upper side of PowerTag Link) in the Address field of the web browser and press Enter to access the login page.
3	Type the User name ("admin" by default) and Password ("admin" by default). NOTE: These identifiers are case-sensitive.
4	Click OK .

NOTE: For Firefox web browser, web pages are optimized for Firefox version V73.0.1. No specific version is recommended for other web browsers.

Login into Web Pages

Login Page

The **Login** page is used to enter the user credentials and select the preferred language to access PowerTag Link web pages. When the user connects to the PowerTag Link through a web browser, the **Login** page is displayed as shown in the following figure.



Enter the following details in the **Login** page:

- **Language**
- **User name**
- **Password**

⚠ WARNING

POTENTIAL COMPROMISE OF SYSTEM AVAILABILITY, INTEGRITY, AND CONFIDENTIALITY

Change default passwords at first use to help prevent unauthorized access to device settings, controls, and information.

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

Enter the user name and password to access the web pages related to PowerTag Link. The default user name and password is **admin** to access the web page for the first time. You can select the language in the **Login** page so that all the pages are displayed in the selected language.

The top right corner of all the web pages displays the following information:

- User name
- Logout

The **Logout** link is used to log out of the PowerTag Link web page.

Web Pages Layout

Description

The web pages can be used for two main operations:

- Monitoring page allows to check the health of the electrical devices (such as HVAC, lighting, pumps, machines, and so on).
- Gateway settings allows
 - setting of Ethernet parameters and wireless devices parameters.
 - diagnosis of exchanges on Ethernet network.
 - adding or removing wireless devices connected to the gateway.
 - management of time setting and time zone selection.
 - IP configuration and IP services
 - IP filtering
 - configuration of email accounts
 - management of user accounts
 - alarm configuration

The administration part of the web pages allows the system integrators commission the PowerTag system.

Web pages are accessible to the following three categories of user:

- Administrator can access all information and modify the parameters in the **Settings** menu.
- Operator can access monitoring pages of the connected devices and get access to **Diagnostic** menu.
- Guest can access only **Monitoring** menu.

The scope of products supported in the web pages are:

- PowerTag Link
- Wireless devices

Web Page Organization



1. Displays the measurements and alarms associated to the devices.
2. Communication diagnostics
3. Wireless network configuration
 - gateway settings
 - wireless devices commissioning (pairing and configuration)
 - alarm settings

Non-Selective Pairing of Wireless Devices

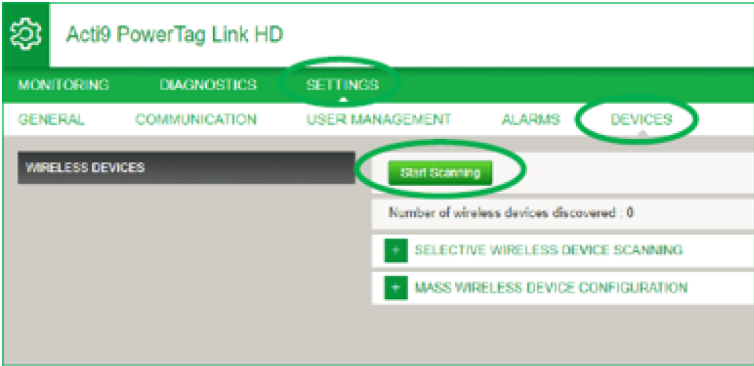
Principle of Wireless Device Commissioning

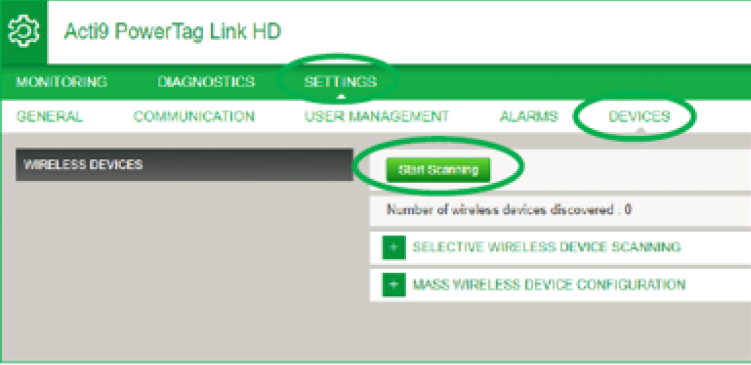
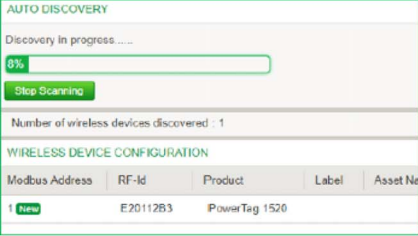

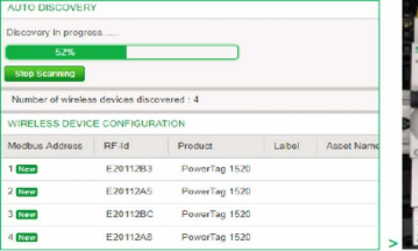

The principle of wireless device commissioning consists of two steps:

- Pairing the wireless devices with the gateway
- Configuring the wireless devices

Commissioning the Wireless Communication Devices

The configuration of the wireless communication devices is done with PowerTag Link web page.

Step	Action
1	Launch the PowerTag Link web page in the web browser.
2	Login with user name and password.
3	Click Settings → Devices → Wireless Devices .
4	Pairing process principle: When the scanning process is running, the gateway discovers the wireless devices located in the environment, in the order of their appearance in the RF network. The gateway assigns a virtual Modbus address respecting the order of appearance. If you define and upload a pairing list, the gateway will only pair the wireless devices belonging to this list. Pairing process options are:
a	<p>Free Pairing Recommended when:</p> <ul style="list-style-type: none"> • no particular Modbus address plan is required. • pairing a reduced number of wireless devices (up to 20). <p>Initial state: All devices are powered ON. Click Start Scanning.</p>  <p>The screenshot shows the 'Acti9 PowerTag Link HD' web interface. The top navigation bar includes 'MONITORING', 'DIAGNOSTICS', and 'SETTINGS'. Under 'SETTINGS', there are sub-menus for 'GENERAL', 'COMMUNICATION', 'USER MANAGEMENT', 'ALARMS', and 'DEVICES'. The 'DEVICES' menu is highlighted. Below it, the 'WIRELESS DEVICES' section is visible, featuring a 'Start Scanning' button, a status indicator 'Number of wireless devices discovered: 0', and two expandable options: 'SELECTIVE WIRELESS DEVICE SCANNING' and 'MASS WIRELESS DEVICE CONFIGURATION'. Red circles in the original image highlight the 'Start Scanning' button and the 'DEVICES' menu item.</p> <p>Stop scanning when all devices are discovered, or click Start scanning again to complete the scanning process. Result: A list of paired devices are displayed.</p>

Step	Action
b	<p>Controlled Pairing Recommended when:</p> <ul style="list-style-type: none"> • a Modbus address plan shall be followed. • pairing a large number of wireless devices (more than 20.) <p>Applicable when:</p> <ul style="list-style-type: none"> • the wireless devices can be individually powered. • the wireless devices are installed downstream the related circuit breaker. <p>Initial state:</p> <ul style="list-style-type: none"> • All PowerTag are powered OFF <p>Click Start Scanning.</p>  <p>Power on the wireless devices, one by one, respecting the required order.</p>     <p>Stop scanning when all the devices are discovered, or click Start Scanning again to complete the scanning process. A list of paired devices are displayed, according to the required order (Modbus address plan). Note: Modbus address can be changed after pairing process is done.</p> <p>NOTE: Modbus address can be changed after completing the of pairing process.</p>
5	<p>Select the wireless device to configure and click Locate to find the device in the panel. Result: The associated device blinks in the panel.</p>
6	<p>If one of the located wireless device is not part of your selection, click Delete to reject the device.</p>

Step	Action
7	<p>Configure the associated device as below:</p> <div data-bbox="236 241 1056 683" style="border: 1px solid gray; padding: 10px;"> <p>EDIT DEVICE</p> <p>Modbus Address: * <input type="text" value="2"/></p> <p>RF-Id: <input type="text" value="E20159A4"/></p> <p>Asset Name: <input type="text"/></p> <p>Label: <input type="text"/></p> <p>Usage: <input type="text" value="-----"/></p> <p>Product: <input type="text" value="PowerTag 1520"/></p> <p>Phase Sequence: <input type="text" value="1"/></p> <p>Associate Breaker Rating (A): <input type="text"/></p> <p>Rated Voltage (V): <input type="text"/></p> <p>Partial Active Energy Delivered (kWh): <input type="text" value="0.000"/> <small>(It may take some time to update value.)</small></p> <p>Load Operating Time Counter (hours): * <input type="text" value="0.00"/></p> <p>Load works when Power is >= (W): * <input type="text" value="0"/></p> <p style="text-align: right;">* Required field <input type="button" value="Apply Changes"/> <input type="button" value="Cancel Changes"/></p> </div>

Acti9 PowerTag Link HD

[SETTING](#) [DIAGNOSTICS](#) [SETTINGS](#) [WIRELESS DEVICES](#) [COMMUNICATION](#) [USER MANAGEMENT](#) [ALARMS](#) [DEVICES](#)

WIRELESS DEVICES

Number of wireless devices discovered : 100

WIRELESS DEVICE CONFIGURATION

Modbus Address	RF-Id	Product	Label	Asset Name	Usage	Communication sta
31	E2020087	PowerTag 1520				OK
32	E2020091	PowerTag 1520				OK
33	E2020028	PowerTag 1520				OK
34	E2020042	PowerTag 1520				OK
35	E2020056	PowerTag 1520				OK
36	E202004A	PowerTag 1520				OK
37	E2020044	PowerTag 1520				OK
38	E2020074	PowerTag 1520				OK

EDIT DEVICE

Modbus Address: *

RF-Id:

Asset Name:

Label:

Usage:

Product:

Phase Sequence:

Associate Breaker Rating (A):

Rated Voltage (V):

Partial Active Energy Delivered (kWh): (It may take so

Load Operating Time Counter (hours): *

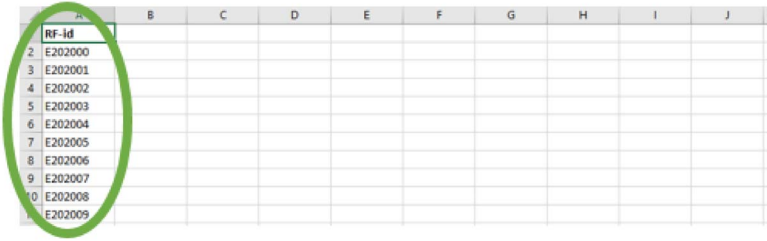
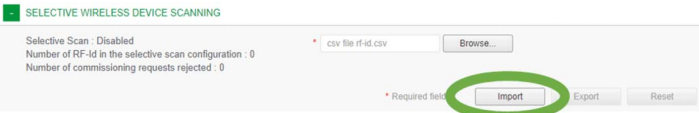
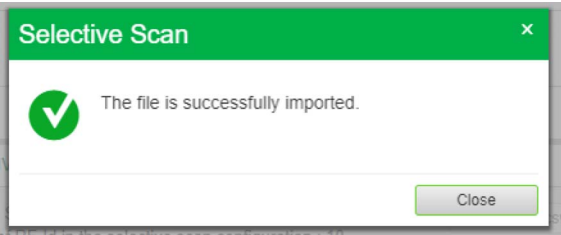
Load works when Power is >= (W): *

NOTE: If you have multiple panels and if each panel has wireless device, then it is recommended to switch on power and commission each PowerTag Link one by one if possible. This helps to discover only the required wireless communication devices specific to each PowerTag Link and avoids discovering the long list of devices.

If other PowerTag Link devices are powered on while you commission a new PowerTag Link, the new PowerTag Link automatically selects the less polluted radio channel, and creates its network on a different channel than the previous PowerTag Link devices. This avoids having all the wireless devices on the same radio channel.

However, if all panels are powered on and commissioned simultaneously, then locate only the required wireless devices in multiple panels and reject the ones you do not want to configure with the panel currently commissioned. All the rejected wireless devices can be auto-discovered again from another PowerTag Link without any issues.

Selective Pairing of Wireless Devices with Web Pages

Step	Action
1	<p>In excel, create a csv file with separators containing the RF-id of the wireless devices you want to pair with the gateway. For example, as shown in the following excel screenshot, RF-id shall be listed in the first column of the csv file, and the first row shall be dedicated to the description of the column.</p> 
2	Login to the web page <i>(see page 40)</i> .
3	Navigate to Settings → Communication → Wireless Network Configuration .
4	If specified in the radio frequency plan, choose the right communication channel in the Communication tab.
5	Navigate to Settings → Devices → Wireless Devices → Selective Wireless Device Scanning .
6	<p>Import the csv file.</p>  <p>Result: A confirmation message is displayed.</p> 
7	Refer to step 4 in Commissioning the Wireless Communication Devices <i>(see page 42)</i> .

Wireless Network Configuration with Web Pages

Overview

The wireless network configuration is used for special applications like data centers and high density metering applications. In standard building applications, use the default settings.

For high density applications, thousands of wireless communication devices are placed in the same environment. Therefore, it is necessary to consider the radio frequency plan and bandwidth. For an installation with multiple gateways, it is recommended to assign a dedicated and different channel to each gateway. To increase the radio quality, you can adjust the communication period from 5 seconds (default) to 60 seconds. For any installation with more than 400 wireless devices, please consult us for a detailed study of the radio frequency plan.

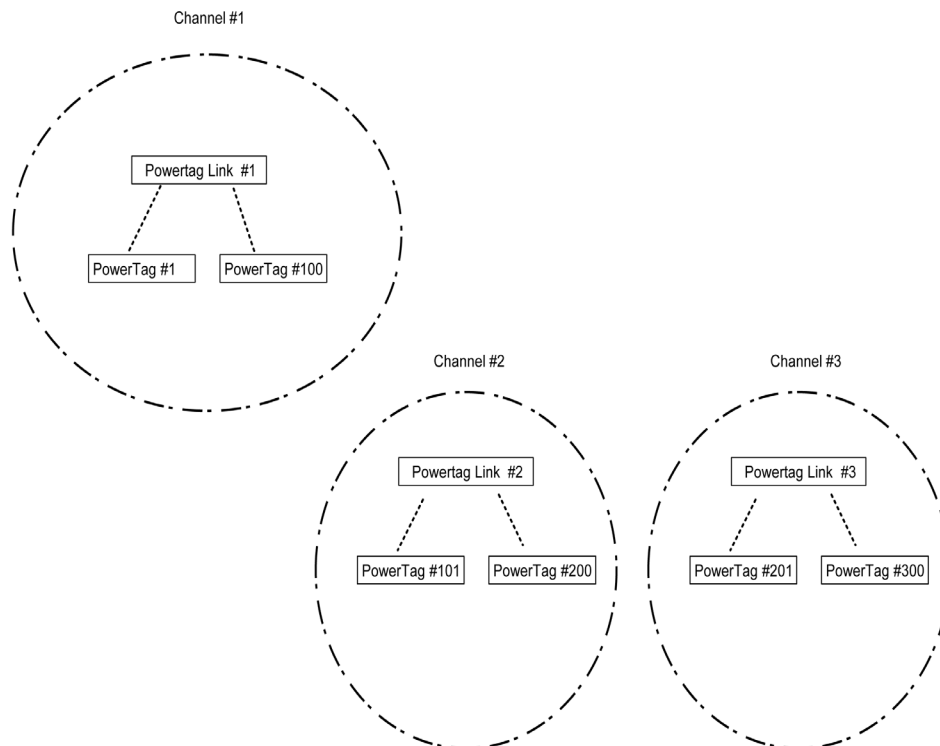
Any modification to the communication period has to be done after the commissioning of the wireless communication devices is completed to avoid slowdown of the commissioning process.

NOTE: Modification in communication period does not slowdown the alarms. The voltage loss is sent immediately on demand. The communication period is used to send regular metering data (P, U, I, E, PF), not voltage loss alarms.

NOTE:

- The radio channel is chosen in the wireless settings of PowerTag Link and is applied to all the wireless communication devices that are commissioned with PowerTag Link.
- A set of PowerTag Link devices has to be installed and commissioned to concentrate all the needed Wireless communication devices.

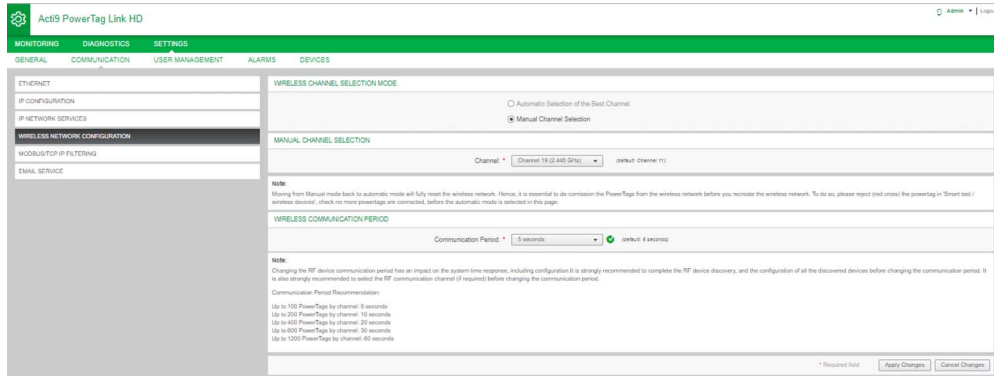
NOTE: The communication period of thermal sensors is different. Please contact Schneider Electric for more information.



Wireless Network Configuration with Web Pages

The **Wireless Network Configuration** web page is used to configure wireless parameters (only with administrator credentials).

Step	Action
1	Launch the PowerTag Link web page in the web browser.
2	Login with user name and password.
3	Click Settings → Communication → Wireless Network Configuration .



This page allows you to:

- select the wireless channel either automatically or manually. Click **Automatic Selection of the Best Channel** to select the channel automatically.

Follow the procedure to configure wireless parameters in the manual mode:

Step	Action
1	Select the required channel from the Channel list. The default channel is Channel 11 .
2	Click Apply Changes to save the settings. Click Cancel Changes to revert the settings.

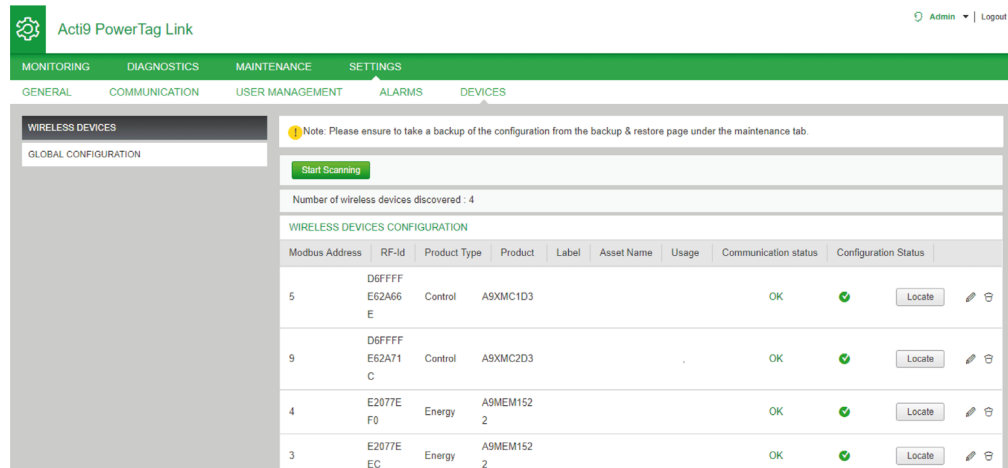
- Define the communication period which defines the amount of time each PowerTag sends its data to the PowerTag Link. This step has to be done after commissioning.

Follow the procedure to define the communication period:

Step	Action
1	Select the required communication period from the Communication Period list. Default period: 5 seconds
2	Click Apply Changes to save the settings. Click Cancel Changes to revert the settings.
3	Define the communication period which defines the amount of time each PowerTag sends its data to the PowerTag Link. This step has to be done after commissioning.

Wireless Device Configuration with Web Pages

Step	Action
1	Launch the PowerTag Link web page in the web browser.
2	Login with user name and password.
3	Click Settings → Devices → Wireless Devices .



Step	Action
1	Click Start Scanning to discover the wireless devices connected to the PowerTag Link. Result: Displays the discovered wireless devices and allocates Modbus address to each device.
2	Select any wireless device and click the pencil icon to modify the configuration of the selected wireless device.
3	Enter the Asset Name of a wireless device.
4	Enter the Label of a wireless device
5	Select the Usage from the drop-down list.
6	Select the phase sequence for the wireless device from the Phase Sequence . You can define 1, 2, or 3 phase sequence of the meter depending on the way the physical panel is wired (from left to right).
7	Select the Mounting Position as either Up or Down when applicable.
8	Select the breaker rating from the Associate Breaker Rating (A) list to calculate the percentage of loads.
9	If requested, enter the value for the energy counter in the Partial Energy area. Click Reset or enter the value as 0 to reset the partial energy counter.
10	Load Operating Time Counter (hours): The Load Operating Time counter indicates the running operating time of the load in hours. The load is powered and power flows to/from the load above the set threshold value. The default value in this field is 0. You can set this between 0 to 1000000 hours.
11	Load work when Power is >=: The Load Operating Time counter increments only when this condition (the power is greater or equal to (>=)) is met. You can set the value between 10W to 15000W.
12	Click Apply Changes to save the settings. Click Cancel Changes to revert the settings.

NOTE: It is recommended to create a backup file saved on your PC using the backup function available in the Maintenance menu of the web page. The file will be automatically saved under the name "backup.dat". It will be used in case of disfunction and replacement of the gateway.

NOTE: Thermal sensors are only proposed through Schneider Electric service offer.

Chapter 7

PowerTag Link Settings

What Is in This Chapter?

This chapter contains the following sections:

Section	Topic	Page
7.1	PowerTag Link General Settings	52
7.2	Ethernet Communication of the PowerTag Link with Web Pages	57
7.3	Email Service	61
7.4	Modbus TCP/IP Filtering	64
7.5	User Management	65
7.6	Device Replacement	69
7.7	PowerTag Link Web Server Certificate Management	73

Section 7.1

PowerTag Link General Settings

What Is in This Section?

This section contains the following topics:

Topic	Page
Identification	53
Date/Time	54
Time Zone Page	56

Identification

Identification

Step	Action
1	Launch the PowerTag Link web page in the web browser.
2	Login with user name and password.
3	Click Settings → General → Identification .

The **Identification** page is used to edit the gateway name and it displays the following parameters:

Parameters	Description
Gateway Identification	
User Application Name	You can customize the name of the gateway used by communication services.
Product Range	Displays the product range name of the gateway.
Product Model	Displays the product model name of the gateway.
Serial Number	Displays the serial number of the gateway.
Firmware Revision	Displays the firmware version number of the gateway.
Unique identifier	Displays the identifier used by communication protocols.
Webpage Version	Displays the web page version of the gateway.
Building Information	
Building Name	You can customize the name of the gateway place inside the building.

The **Device Name** is same as the name displayed in Windows Explorer.

NOTE: The **Device Name** should contain only alphanumeric characters and a hyphen (-) character.

The '-' character cannot be the last character.

Click **Apply Changes** to save the changes. Click **Cancel Changes** to revert the settings.

The screenshot shows the 'Acti9 PowerTag Link HD' web interface. The 'SETTINGS' tab is active, and the 'IDENTIFICATION' sub-tab is selected. The main content area is titled 'POWERTAG LINK IDENTIFICATION' and contains the following fields:

- User Application Name:
- Product Range: Acti9
- Product Model: PowerTag Link HD
- Serial Number: SN124FF58
- Firmware Revision: V1.0.102
- Unique Identifier: uuid:13114000-16d0-11e2-0000-00004e4d88
- Webpage Version: V0.0.8

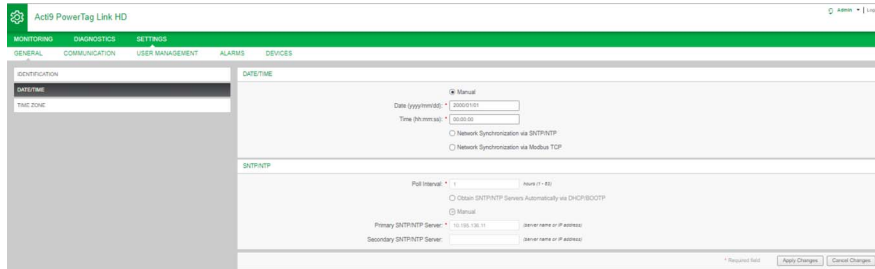
Below this, the 'BUILDING INFORMATION' section contains a 'Building Name' field with the value 'Building name'. At the bottom right, there are buttons for 'Apply Changes' and 'Cancel Changes', along with a '* Required field' indicator.

Date/Time

Step	Action
1	Launch the PowerTag Link web page in the web browser.
2	Login with user name and password.
3	Click Settings → General → Date/Time .

Manual mode

The **Date/time** page is used to set date and time and SNTP parameters as shown in the following figure:



NOTE: After any gateway power shut down, the gateway will reset to a default value of date and time. The default date and time value is 2000/1/1, 00:00:00.

You can reset the date and time manually or automatically.

Follow the procedure to reset the date and time in **Manual** mode:

Step	Action
1	Select Manual .
2	Enter the Date to be set in the format yyyy-mm-dd .
3	Enter the Time in the format hh:mm:sec .
4	Click Apply Changes to save the settings. Click Cancel Changes to revert the settings.

Follow the procedure to reset the date and time in **Automatic** mode:

Step	Action
1	Select Network Synchronization via SNTP/NTP to configure the date and time automatically via SNTP/NTP. Or Select Network Synchronization via Modbus TCP to configure the date and time via Modbus TCP.
2	Click Apply Changes to save the settings. Click Cancel Changes to revert the settings.

SNTP Mode

Network Time Protocol (NTP) is a networking protocol for clock synchronization between computer systems over packet-switched, variable-latency data networks.

A less complex implementation of NTP, using the same protocol without the storage of state over extended periods of time is known as the Simple Network Time Protocol. It is used in embedded devices and in applications where high accuracy timing is not required.

When automatic time configuration is selected and NTP servers are configured, the PowerTag Link can communicate with NTP and server to synchronizes its time.

The PowerTag Link supports time synchronization with remote server using SNTP. When SNTP is activated, time synchronization from one of the selected time servers can be achieved at every configured interval and also supports Modbus time services Get Date-Time (function code 43-15) and Set Date-Time (function code 43-16). The time is configured in 24-hour format.

Automatic Mode with SNTP Service

The PowerTag Link receives date and time from SNTP server after every poll interval time. Follow the procedure to configure date and time using **SNTP/NTP** parameters:

Step	Action
1	Enter the value for Poll Interval in hours that ranges from 1 through 63. The default value of poll interval is 1.
2	Select Obtain SNTP/NTP Servers Automatically via DHCP/BOOTP to obtain the server address automatically from SNTP or NTP servers.
3	Select Manual .
4	Enter the primary server name or IP address for Primary SNTP/NTP Server parameter. The primary server can be: <ul style="list-style-type: none"> ● IPv4 address ● IPv6 address ● Domain name
5	Enter the secondary server name or IP address for Secondary SNTP/NTP server parameter. This is an optional parameter.
6	Click Apply Changes to save the settings. Click Cancel Changes to revert the settings.

The screenshot shows the configuration interface for an Act89 PowerTag Link HD. The page is titled "Act89 PowerTag Link HD" and has a navigation menu with options: GENERAL, DIAGNOSTICS, SETTINGS, COMMUNICATION, USER MANAGEMENT, ALARMS, and DEVICES. The "SETTINGS" tab is active, and the "DATE/TIME" sub-tab is selected. The interface is divided into two main sections: "IDENTIFICATION" and "DATE/TIME".

In the "DATE/TIME" section, there are two radio buttons: "Manual" (selected) and "Obtain SNTP/NTP Servers Automatically via DHCP/BOOTP". Below these are input fields for "Date (yyyy/mm/dd)" and "Time (hh:mm:ss)".

The "SNTP/NTP" section contains a "Poll Interval" dropdown menu set to "1 hour (1-60)", a radio button for "Obtain SNTP/NTP Servers Automatically via DHCP/BOOTP", and another "Manual" radio button (selected). Below are input fields for "Primary SNTP/NTP Server" (containing "10.165.136.11") and "Secondary SNTP/NTP Server".

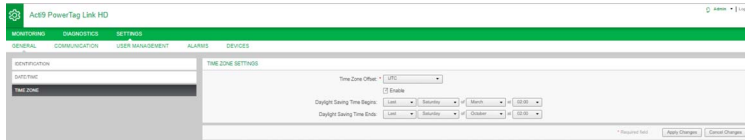
At the bottom right of the configuration area, there are three buttons: "Required field" (with a red asterisk), "Apply Changes", and "Cancel Changes".

Time Zone Page

Time Zone

Step	Action
1	Launch the PowerTag Link web page in the web browser.
2	Login with user name and password.
3	Click Settings → General → Time Zone .

The **Time Zone** page is used to configure the offset and daylight saving time for the selected time zone.



Follow the procedure to configure time zone settings:

Step	Action
1	Click the offset value used by the local time zone from the Time Zone Offset list.
2	Select the Enable check box to configure the daylight time saving settings. The Enable check box is not selected by default.
3	Select the day, month, and time to configure the start time of daylight saving time from the respective Daylight Saving Time Begins list.
4	Select the day, month, and time to configure the end time of daylight saving time from the Daylight Saving Time Ends list.
5	Click Apply Changes to save the settings. Click Cancel Changes to revert the settings.

Section 7.2

Ethernet Communication of the PowerTag Link with Web Pages

What Is in This Section?

This section contains the following topics:

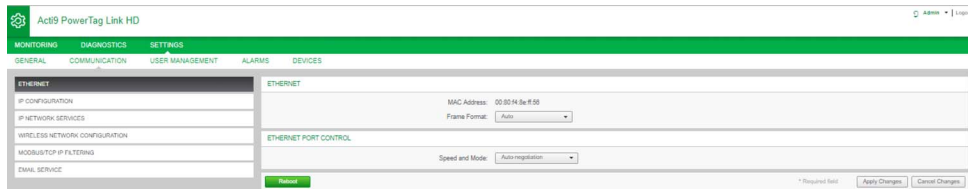
Topic	Page
Ethernet Settings	58
IP Configuration	59
IP Network Services	60

Ethernet Settings

Description

The Ethernet page is used to configure the frame format and speed and mode of the Ethernet port. This page also displays the MAC address of the Ethernet network.

Step	Action
1	Launch the PowerTag Link web page in the web browser.
2	Login with user name and password.
3	Click Settings → Communication → Ethernet .



Follow the procedure to configure Ethernet parameters:

Step	Action
1	Select the type of Ethernet frame format from the Frame Format list. It can be Ethernet II , 802.3 , or Auto . The default value of the frame format is Auto .
2	Select the value for speed and mode of the Ethernet port from the Speed and Mode list. The value of speed and mode can be one of the following: <ul style="list-style-type: none"> ● 10 Mbps - Half duplex ● 10 Mbps - Full duplex ● 100 Mbps - Half duplex ● 100 Mbps - Full duplex ● Auto-negotiation The default value is Auto-negotiation .
3	Click Apply Changes and then click Reboot to automatically restart the device to save the settings. Click Cancel Changes to revert the settings.

IP Configuration

Description

The **IP Configuration** page is used to configure IPv4, IPv6, and DNS parameters.

Step	Action
1	Launch the PowerTag Link web page in the web browser.
2	Login with user name and password.
3	Click Settings → Communication → IP Configuration .

IPv4 parameters can be set either in manual mode or in automatic mode. To configure IPv4 parameter in automatic mode, click **Automatic** and select the type of protocol (DHCP or BOOTP) from the list. The default type is **DHCP** protocol.

DHCP mode is used to acquire the IPv4 address from the DHCP server in the network to which PowerTag Link is connected. BOOTP mode is used to acquire the IPv4 address if DHCP server is not present in the network. A BOOTP server is configured in the network to assign the IPv4 address.

Follow the procedure to configure IPv4 parameters in the manual mode:

Step	Action
1	Select Manual .
2	Enter the IPv4 Address of the device.
3	Enter the Subnet Mask of the device.
4	Enter the address of the Default Gateway .
5	Click Apply Changes to save the settings. Click Cancel Changes to revert the settings.

Follow the procedure below to configure IPv6 parameters:

Step	Action
1	Select the Enable check box to enable the IPv6 service. The Enable check box is selected by default.
2	Display the value of the IPv6 Link Local Address . You cannot modify this parameter.
3	Click Apply Changes to save the settings. Click Cancel Changes to revert the settings.

The PowerTag Link can acquire the domain name automatically or you can set the DNS server address manually. Click **Obtain DNS Servers Automatically via DHCP/BOOTP** to acquire the DNS server automatically from the network.

Follow the procedure below to configure DNS parameters in manual mode:

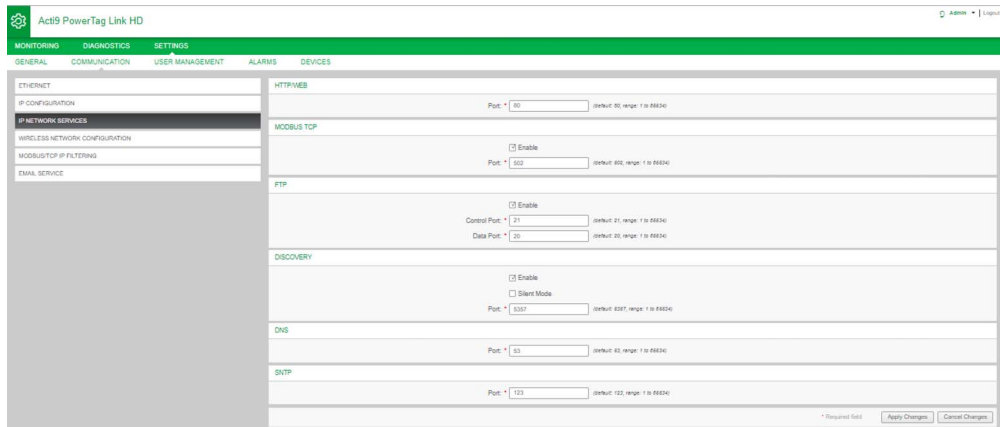
Step	Action
1	Select Manual .
2	Enter the Primary DNS Server of the device.
3	Enter the Secondary DNS Server of the device.
4	Click Apply Changes to save the settings. Click Cancel Changes to revert the settings.

IP Network Services

Description

The **IP Network Services** page is used to configure the network protocols and discovery services.

Step	Action
1	Launch the PowerTag Link web page in the web browser.
2	Login with user name and password.
3	Click Settings → Communication → IP Network Services .



The PowerTag Link supports HTTPS/HTTP, Modbus/TCP, DNS, SNTP, and discovery services.

The default value of the HTTP port number is 80.

Follow the procedure to configure HTTPS parameters:

Step	Action
1	Select the Enable check box to enable the HTTPS service. The Enable check box is selected by default.
2	Display the port number of the used by HTTPS. The default value is 443.
3	Click Apply Changes to save the settings. Click Cancel Changes to revert the settings.

Follow the procedure to configure Modbus/TCP parameters:

Step	Action
1	Select the Enable check box to enable the Modbus/TCP service. The Enable check box is selected by default.
2	Display the port number of the Modbus/TCP network. The default value is 502.
3	Click Apply Changes to save the settings. Click Cancel Changes to revert the settings.

Follow the procedure to configure discovery services:

Step	Action
1	Select the Enable check box to enable the discovery service. The Enable check box is selected by default.
2	Select the Silent Mode check box. The Silent Mode check box is selected by default.
3	Display the port number of the discovery network. The default value is 5357.
4	Click Apply Changes to save the settings. Click Cancel Changes to revert the settings.

Display the port value of the DNS and SNTP network. The default value of the port number is 53 and 123 respectively.

Section 7.3

Email Service

What Is in This Section?

This section contains the following topics:

Topic	Page
Description	62
Settings	63

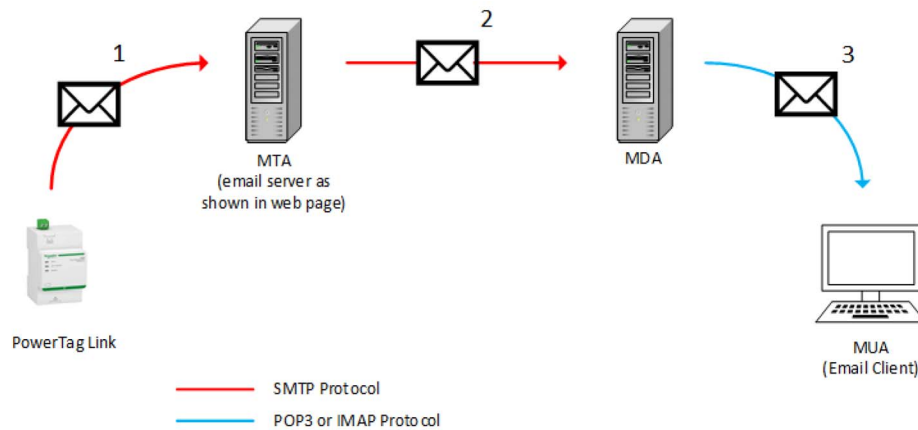
Description

The event notification is used to send emails when the wireless devices trigger an alarm. The alarms are configured by the administrator and can be sent to many users.

Prerequisite

Consult the administrator to get the right IT connection to access the port, Internet, and e-mail server.

Principle



Step 1: PowerTag Link sends an email to the configured email server / MTA (Mail Transfer Agent) using SMTP protocol.

Step 2: MTA forwards the message to the email client MDA (Mail Delivery Agent).

Step 3: MDA delivers email to the client/ MUA (Mail User Agent) using POP3 or IMAP protocol.

Recommendation

- To ensure secure delivery of the email to the MTA, the PowerTag Link must be updated to the last available firmware to use recent security email transfer mechanisms. However, this will not guarantee a full compatibility with the latest version of internet email service provider. Schneider Electric is not liable for these policies and their impact in email deliverability.
- When possible, Schneider Electric recommends using an on-premise email server (instead of internet email service provider) with stable and clear security policy defined by the client IT department.
- Schneider Electric recommends selecting "TLS/SSL" or "STARTTLS" for the connection security mode between the PowerTag Link and the Email SMTP server. Consequently, it is strongly recommended to use an Email SMTP server that supports at least one of these two modes. The "None" option is provided only for compatibility with older Email SMTP servers. Since the "None" option does not provide a secure communication, its usage is not recommended and should be avoided.
- Each internet email service provider has its own security policy and data protection mechanisms to check sender's reputation, detect spam message, and so on. Schneider Electric is not liable for these policies and their impact in email deliverability.

Settings

Settings

The **Email Service** page is used to configure the email server settings.

Step	Action
1	Launch the PowerTag Link web page in the web browser.
2	Login with user name and password.
3	Click Settings → Communication → Email Service .

Click the **Enable** check box to configure the email server settings (enabled by default). PowerTag Link allows you to define your own SMTP server.

Follow the steps given in the table to configure the email server settings:

Step	Action
1	Enter the email server name or IP address in the SMTP Server Address area.
2	Select the type of security mode from the Connection Security Mode list. The following are the available connection security modes: <ul style="list-style-type: none"> • None • TLS/SSL • STARTTLS
3	Enter the server port value in the SMTP Server Port area. The value ranges from 1 to 65535.
4	Select Authentication if the server requires login information. This option is disabled by default.
5	Enter the user name in the SMTP Account Login area.
6	Enter the password to authenticate the SMTP login in the SMTP Account Password area.
7	Enter the email address of the administrator who is administering the gateway in the From Address area. The From Address can be used in different ways: <ul style="list-style-type: none"> • Use the From Address as a context provider: If you want to notify and does not want to receive a reply, use a From Address as contextual information. The From Address syntax includes “no-reply”, “gateway name”, “site name”, @a validated domain .com, .net, and so on. • Create an alias in the From Address to allow replies to be sent to the person in charge of an alarm: An email can be sent to multiple people who are responsible for a specific appliance. This feature allows the receivers to reply to follow up with the responsible person. For example, if the facility manager receives an email from an alarm, the facility manager can send a reply email to the Maintenance Contractor to follow up on the action.
8	Select the language of the email body from the Language list: French or English .
9	Click Apply Changes to save the settings. If you do not want to save the changes, click Cancel Changes .
10	Enter the email address of the recipient to test the delivery of the email in the Recipient Address for Test area. The test email feature enables connection from the gateway to the service. If the test emails are not received, the Internet connection needs to enable the email ports (port 25 or 587). The port settings are configured in accordance between the gateway that sends the email and the site router settings.
11	Click Test to deliver the email to the added recipient.

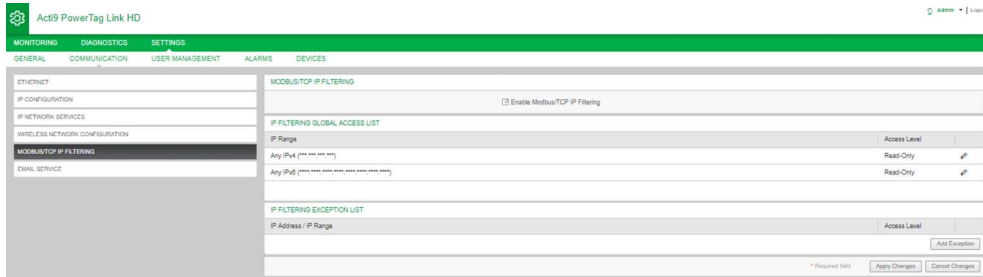
Section 7.4

Modbus TCP/IP Filtering

Description

The Modbus TCP/IP filtering is a security feature that lists the IP addresses that the gateway can accept. This function is used only with Ethernet static addressing mode. This page is used to configure the IP address in order to enable write access.

Step	Action
1	Launch the PowerTag Link web page in the web browser.
2	Login with user name and password.
3	Click Settings → Communication → Modbus TCP/IP Filtering .



Follow the procedure to configure the IP address to enable write access:

Step	Action
1	Select the Enable Modbus TCP/IP Filtering check box.
2	Click Add exception to add the IP address and access level. A maximum of 10 IP address can be added. The IP address added has a write access.
3	Enter the IP address in the IP Address/Range area and select the Access level for the entered IP address.
4	Click Apply Changes to save the settings. Click Cancel Changes to revert the settings.

NOTE: You can only edit the global IP address range, but you cannot delete the global IP address range. You can edit and delete the added exceptions.

Section 7.5

User Management

What Is in This Section?

This section contains the following topics:

Topic	Page
User Accounts Page	66
User Account Lockout	68

User Accounts Page

The **User Management** is used to manage the user profiles. The **Users Accounts** page displays the existing user accounts. This page is used to add a new user account and edit the password of the existing user account.

NOTE: The email associated to each declared user is significant, as it is used during an alarm creation to send an email if there is an occurrence of an alarm.

The following table lists the three types of user account supported by PowerTag Link and their access rights:

User Accounts	Access
Administrator	Access all information and modify the parameters in the Settings menu
Operator	Access monitoring pages of the connected devices and get access to diagnostic menu.
Guest	Access only monitoring pages

One Administrator account and one Guest account are the first level of access to the web page by default. The maximum number of user accounts is five. It can be in combination of administrator, operator and guest. However there should be one administrator account which should not be deleted.

⚠ WARNING

POTENTIAL COMPROMISE OF SYSTEM AVAILABILITY, INTEGRITY, AND CONFIDENTIALITY

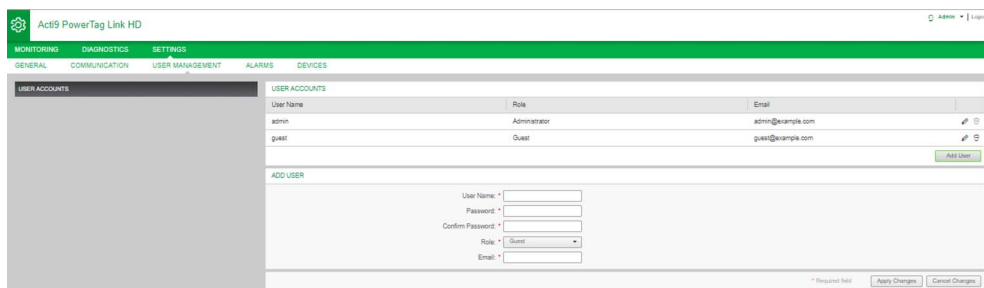
Change default passwords at first use to help prevent unauthorized access to device settings, controls, and information.

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

- Default Administrator account: User name **admin** and password **admin**
- Default Guest account is: User name **admin** and password **admin**

Follow the steps given in the table to create more accounts:

Step	Action
1	Launch the PowerTag Link web page in the web browser.
2	Login with user name and password.
3	Click Settings → User Management → User Accounts .

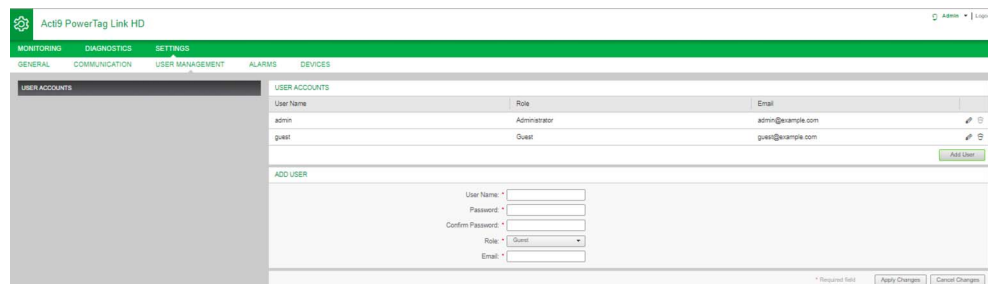


Follow the procedure to add a new user profile:

Step	Action
1	Click Add User .
2	Enter the authentication information in the Username and Password area for a user.
3	Select the type of user from the Role list.
4	Enter the email of the user in the Email area.
5	Click Apply Changes to save the settings. Click Cancel Changes to revert the settings.

The **Username** and **Password** must meet the following criteria:

- The **Username** must have minimum of four characters.
- The **Username** must not exceed 16 characters.
- The **Password** must contain minimum of eight characters with one special character, one number, and one alphabet in upper case.
- The **Password** must not exceed 16 characters.



Follow the procedure to edit the details of an existing user profile:

Step	Action
1	Select the user account from the User Accounts list and click the edit icon.
2	Select the type of user from the Role list.
3	Modify the Password for the selected user account, if required.
4	Enter the email of the user in the Email area.
5	Click Apply Changes to save the settings. Click Cancel Changes to revert the settings.

Click the delete icon to delete the user profile from web page. The user profile with Admin account cannot be deleted.

User Account Lockout

Administrator may configure account lockout on PowerTag Link. This feature enhances security of the gateway by blocking the account access for a particular period of time, in case of too many attempts of failed login.

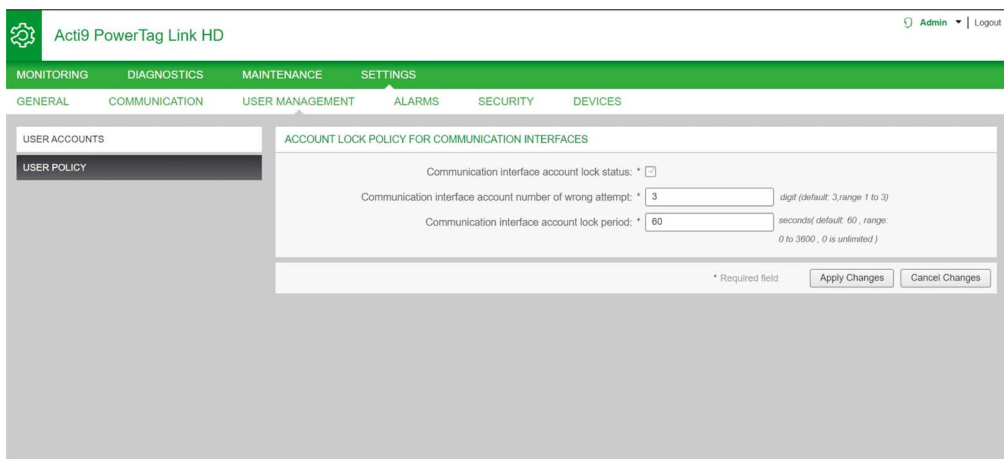
- Maximum login attempts:
 - Default value: 3
 - Configurable: Yes (1 to 3)
- Blocking time duration:
 - Default value: 60 seconds
 - Configurable: Yes (0 to 3600 seconds)

Reboot of gateway removes the enabled account lockout.

Account lockout feature is enabled by default in PowerTag Link and it cannot be disabled from the web page. A failed login attempt refers to incorrect password and not an incorrect user name. Configuration of blocking time duration with the value 0 will disable the locking mechanism. To activate account locking, at least 1 second should be configured.

When the blocking time is blocked for a duration, you will able to login only after the blocking period is elapsed or PTL is restarted. When the account gets locked, all the active sessions for that user will be deleted.

When a user is blocked, then there will be no option to retrieve the **password/Forgot password**. The user should wait for the blocking duration to get elapsed or should restart the gateway.



Follow the procedure to modify the parameters:

Step	Action
1	Launch the PowerTag Link web page in the web browser.
2	Login with user name and password.
3	Click Settings → User Management → User Policy .
4	Enter the maximum number of wrong login attempts.
5	Enter the duration of account locking period.
6	Click Apply Changes to save the settings. Click Cancel Changes to revert the settings.

Section 7.6

Device Replacement

What Is in This Section?

This section contains the following topics:

Topic	Page
Overview	70
Backup Generation	71
Restore Operation	72

Overview

Device Replacement (DR) is a feature that allows you to download the configuration of the gateway. If the gateway breaks down, you will be able to upload the old configuration that was saved in the new gateway.

NOTICE

POTENTIAL COMPROMISE OF SYSTEM AVAILABILITY, INTEGRITY, AND CONFIDENTIALITY

- Encrypt the file and protect it with a password in order to ensure that the configuration file integrity and confidentiality is preserved. Most compression utilities can perform such an operation.
- Store the encrypted archive in a location on a PC or a network directory where access controls are enforced in order to prevent any unauthorized access to the file.

Failure to follow these instructions can result in equipment damage.

NOTE: The configuration file generated by the PowerTag Link contains sensitive information about the PowerTag Link security.

Backup Generation

After finishing the commissioning, it is highly recommended to back up the configuration. This will save information that are mandatory in case of replacement of the PowerTag Link gateway.

If the back up is not done, and in case if the PowerTag Link fails and needs replacement, then all sensors which are connected to PowerTag Link should be replaced or unpaired. This will lead to:

- Over cost (for the installation of the replacement sensors)
- Shut down of the switchboard to access the sensor

Follow the steps given in the table to generate the Backup file:

Step	Action
1	Launch the PowerTag Link web page in the web browser.
2	Login with user name and password.
3	Click Maintenance → Backup & Restore .
4	Click on Backup button to generate the file.
5	Result: The backup file with name backup.dat will be automatically saved on your PC.

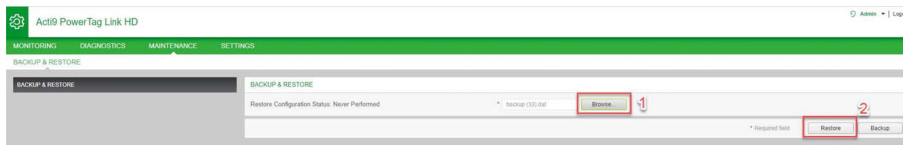


Restore Operation

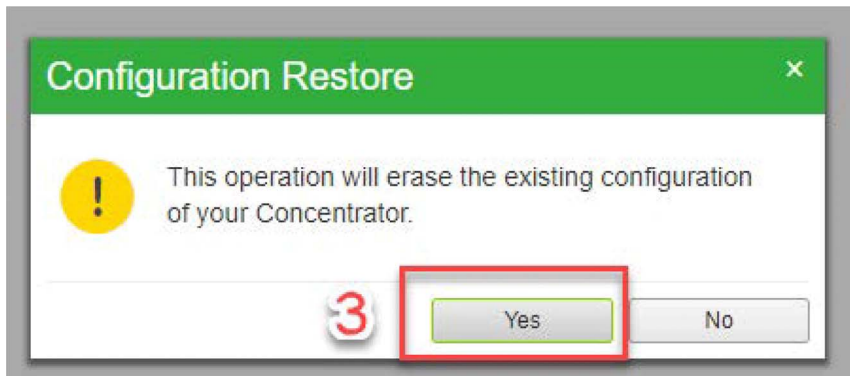
It is possible to replace a defective PowerTag Link with a new one and to restore the setup if the backup file has been previously generated at the end of the commissioning process.

Follow the steps given in the table to restore and configure the setup:

Step	Action
1	Launch the PowerTag Link web page in the web browser.
2	Login with user name and password.
3	Click Maintenance → Backup & Restore .
4	Click Browse to select the backup file.
5	Click Backup button to restore the configuration.



- Validate the restore operation in the confirmation pop up window and click **Yes**.



- Wait till the end of the restoration process.



Section 7.7

PowerTag Link Web Server Certificate Management

What Is in This Section?

This section contains the following topics:

Topic	Page
Overview	74
Commissioning	75
Decommissioning	76

Overview

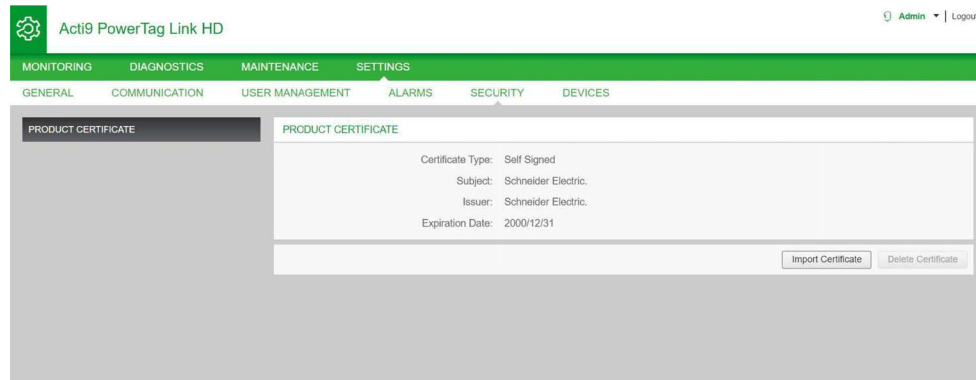
- PowerTag Link embeds an internal self-signed certificate compliant with the X.509v3 certificate (as specified in RFC 5280) to support secure communications with HTTPS. This certificate relies on Elliptic Curves cryptographic keys (256 bits). It has a validity period of 365 days and it is automatically renewed by the PowerTag Link before its expiration.
- The PowerTag Link has the ability to use a product certificate supplied by the end user (customer). The certificate format and content must comply with the general certificate specification. If the certificate is not imported into the product by any user, the PowerTag Link will use its internal self-signed certificate.

Commissioning

- The PowerTag Link uses an internal self-signed certificate by default.
- During the commissioning phase, user intervention is not required when dealing with product certificate management.
- User can configure the device to use the product certificate which is provided by the end - user.
- User can delete a certificate which he uploads and he cannot delete a **self certificate**.

Certificate regeneration is automatic and is activated in two cases:

- When the certificate has expired or when imported certificate has been deleted.
- During the deletion of the imported certificate.



NOTE: Imported Certificate Obligatory features:

- **File:** PKCS12 (.pfx or .p12)
- **Encryption:** RSA \geq 2048 bit or ECC \geq 256 bit
- **Signature:** RSA256
- **Key Usages:** Digital Signature and Key Encryption
- **Extended Key Usages:** Server Authentication
- **Format:** X509 v3

Decommissioning

- If a user supplied certificate has been provided, it is recommended to delete this certificate from the product, to ensure that the certificate and associated cryptographic keys are removed from the product memory.
- The product internal self-signed certificate cannot be manually deleted. It can be deleted through a factory reset operation. In all cases, it is recommended to perform such a factory reset to ensure that all credentials and cryptographic elements (including certificates) are removed from the product.
- During factory reset process, a new certificate will be automatically regenerated.

Chapter 8

PowerTag Link Security

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Security Capabilities	78
Security Recommendations for PowerTag Link Commissioning	79
Security Recommendations for PowerTag Link Operation	80
Security Recommendations for PowerTag Link Decommissioning	81

Security Capabilities

Security features have been built in the PowerTag Link to ensure that the PowerTag Link operates properly and behaves accordingly to its intended purpose.

The Key features are:

- User account management
- Authentication and authorization controls of user access when accessing to the product resources from EcoStruxure Power Commission (EPC) software or from the web pages
- Secure network communications when accessing to the product through the EcoStruxure Power Commission software or web pages (supporting confidentiality and authenticity) with TLS 1.2
- Secure communications between the PowerTag Link and its associated wireless sensors and devices (supporting confidentiality and integrity)
- IP-filtering mechanisms for Modbus TCP AES128 communications
- Configurable security services and settings
- Firmware update mechanism

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

The security capabilities features are intended to mitigate the inherent threats which are linked with the usage of the PowerTag Link in an OT environment. However, the effectiveness of these capabilities will depend on the adoption and application of the recommendations provided in this chapter to cover the commissioning, operation, maintenance, and decommissioning of the PowerTag Link.

The PowerTag Link supports the following protocols:

- HTTPS for configuration through configuration tools and embedded web pages
- Modbus TCP for communications with other OT devices
- DHCP for network IP addressing
- DNS for network name resolution
- SNTP for time synchronization
- DPWS for network discovery
- SMTPS for email sending
- Wireless communications using radio frequency communication ISM band 2.4 GHz

Security Recommendations for PowerTag Link Commissioning

Default User Accounts

Default user accounts are provided for supporting the initial connections with product which is needed to perform the commissioning steps.

WARNING

POTENTIAL COMPROMISE OF SYSTEM AVAILABILITY, INTEGRITY, AND CONFIDENTIALITY

Change default passwords at first use to help prevent unauthorized access to device settings, controls, and information.

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

The accounts and the associated passwords are described in the user documentation. It is not safe to keep on using these accounts during operation.

During the commissioning step, these accounts should be replaced by the new accounts which is intended for the product operation and maintenance. The account should be secured by strong password.

Product Configuration of Security Services

Most product services are disabled by default in order 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 product operation. When HTTPS is enabled, all communications done on the HTTP port are automatically redirected to the HTTPS port.

Some security services such as HTTPS can be configured to disable the security layer and use plain HTTP with no secure communication for instance. This capability is only provided for interoperability reasons with legacy products or network devices. It is strongly recommended not to disable security options. When HTTPS is enabled, all communications done on the HTTP port are automatically redirected to the HTTPS port.

Modbus TCP Communications

The PowerTag Link supports Modbus TCP network communications. When Modbus TCP service is enabled, it is strongly recommended to secure the protocol usage by activating and configuring Modbus IP filtering.

This feature allows you to restrict the access of the PowerTag Link Modbus service to the sole network endpoints that are explicitly configured in the filters.

Product Web Server Certificate

To support HTTP secure communications as soon as the product is installed, the PowerTag Link is equipped with a self-signed X.509v3 certificate by default.

This certificate allows you to setup a HTTPS communication supporting integrity and confidentiality but lacks some enforcements supporting the full communication authenticity (as indicated by most web browsers through a security warning message).

For most sensible installations, it is recommended to replace this certificate and to import in the PowerTag Link a certificate signed by a well know certificate authority.

Secure Communications with Wireless Sensors and Devices

The use control of wireless communications between the PowerTag Link and wireless sensors and devices is enforced through a pairing mechanism. Only wireless sensors and devices that have been paired with the PowerTag Link Link gateway 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 consult the list of paired devices in the PowerTag Link configuration and to ensure that the devices listed contains no unexpected or rogue devices.

Security Recommendations for PowerTag Link Operation

Maintain the Firmware up-to-date

Security updates and patches are published on a regular basis. To ensure the appropriate level of security in the PowerTag Link, verify periodically that the PowerTag Link software is the latest one available.

Product Web Server Certificate Renewal

The PowerTag Link features a HTTPS web server relying on a X.509v3 certificate for setup secure communications with either EcoStruxure Power Commission (EPC) software or a web browser. This certificate has a validity period and will expire at the end of the period.

The default PowerTag Link certificate is valid for 10 years starting from the first startup (or last reset to factory) date and this certificate must be renewed periodically (at least a few days or weeks before its expiration date). For certificates provided by the certificate authority, check for the validity period and expiration date with the certificate provider authority.

Passwords Renewal

It is recommend to update the passwords on a regular basis, for every three to six months.

User Accounts Management

The organization or people operating or maintaining the product may change from overtime. It is recommend to verify the list of user accounts configured with the PowerTag Link periodically to ensure that all the configured user accounts are still representing the valid product users. Keeping user accounts up-to-date will ensure that the user accounts are set up with the correct roles and also helps in removing the unused ones.

Security Recommendations for PowerTag Link Decommissioning

The product is configured with the sensible information which includes user account identifiers and passwords, and cryptographic keys.

When disposing the product, it is required to perform a level 2 reset of the product (Refer [\(see page 79\)](#)) in order to ensure no sensible or confidential information can be disclosed or reused.

Chapter 9

Load Monitoring and Control

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Load Monitoring	84
Status Monitoring and Load Control	86
Status Monitoring	88

Load Monitoring

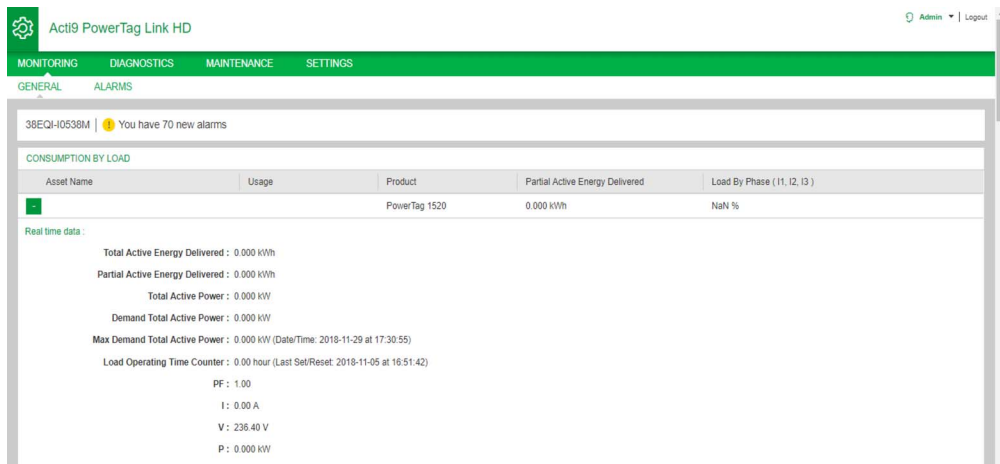
Description

The **Monitoring** page is used to monitor the electrical loads. The facility managers can check the health of the electrical loads like HVAC, lighting, pumps, machines, and so on.

General Page

The **General** page displays the status of the load.

Step	Action
1	Launch the PowerTag Link web page in the web browser.
2	Login with user name and password.
3	Click Monitoring → General .



The following information is displayed for the load:

Parameter	Description
Asset Name	Displays the name of the equipment or load name that the PowerTag tracks.
Usage	Displays the usage of the energy of the equipment or load (for example, cooling, lighting, IT loads, and so on.)
Product	Displays the type of PowerTag device associated to a circuit breaker.
Gateway	Displays the gateway connected to the PowerTag.
Partial Energy	Displays the partial counter of energy for the given electrical asset.
Load by Phase	Displays the percentage of the load of the feeder connected to the PowerTag. The percentage indicates how far an user is away from the tripping of a breaker. It is the ratio of the actual current to breaker rating. Green: Indicates the circuit is loaded up to 50% in regards to circuit breaker rating. Orange: Indicates the circuit is loaded between 50% and 80%. Red: Indicates the circuit is loaded above 80% versus circuit breaker rating.

Click the expand button to see the real-time data for each device.

As an example, the following screenshot shows all the real-time data available for each wireless device:

The screenshot displays the Acti9 PowerTag Link HD web interface. At the top, the title 'Acti9 PowerTag Link HD' is visible along with user information 'Admin | Logon'. A navigation bar includes 'MONITORING', 'DIAGNOSTICS', 'MAINTENANCE', and 'SETTINGS'. Below this, 'GENERAL' and 'ALARMS' are listed. A notification states '38EQI-I0538M | You have 70 new alarms'. The main section is titled 'CONSUMPTION BY LOAD' and contains a table with the following data:

Asset Name	Usage	Product	Partial Active Energy Delivered	Load By Phase (11, 12, 13)
		PowerTag 1520	0.000 kWh	NaN %

Below the table, the 'Real time data' section provides the following metrics:

- Total Active Energy Delivered : 0.000 kWh
- Partial Active Energy Delivered : 0.000 kWh
- Total Active Power : 0.000 kW
- Demand Total Active Power : 0.000 kW
- Max Demand Total Active Power : 0.000 kW (Date/Time: 2018-11-29 at 17:30:55)
- Load Operating Time Counter : 0.00 hour (Last Set/Reset: 2018-11-05 at 16:51:42)
- PF : 1.00
- I : 0.00 A
- V : 237.40 V
- P : 0.000 kW

Status Monitoring and Load Control

PowerTag C IO 230V

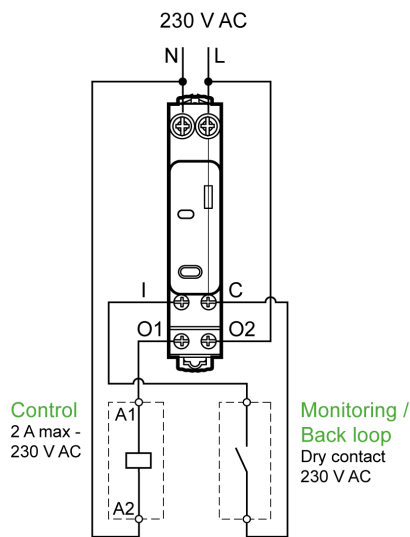
Load control with feedback loop can be achieved with PowerTag Control IO 230V module (reference A9XMC1D3).

⚠ WARNING

UNEXPECTED START OF OPERATION

Only use PowerTag Control IO 230V module (reference A9XMC1D3) and PowerTag Control 2DI 230V module (reference A9XMC2D3) to control electrical loads that can be safely left unattended.

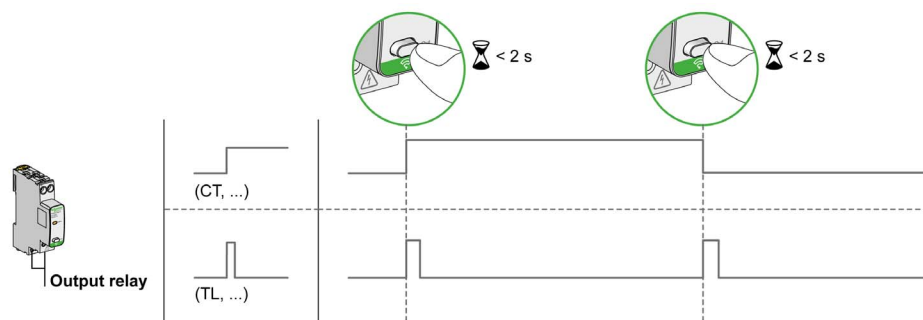
Failure to follow these instructions can result in death, serious injury, or equipment damage.



With this solution, you can easily control remotely a contractor (CT) or an impulse relay (TL) with or without the information of the load circuit contact using the associated input.

Local Output Control

During commissioning phase, you will select if the output order should be a pulse (for “Impulse Relay”) or a latch order (for “Contactor”). Once the IO Module has been commissioned, the front face push button allows you to change the status of output control circuit.



Commissioning and decommissioning are done through web pages.

NOTE: The push button is not active when the LED is yellow or “Off”.

The push button can also be used for decommissioning in case of communication loss (>240 s). To commission or decommission PowerTag C IO 230V, please refer to chapter “Wireless Device Commissioning with Web Pages” or refer to *EcoStruxure Power Commission Online Help*.

To configure PowerTag C IO 230V, you can refer to the following or to *EcoStruxure Power Commission Online Help*.

Step	Action
1	Click Start Scanning to discover the wireless devices connected to the PowerTag Link: Result: Displays the discovered wireless devices and allocates Modbus address to each device.
2	Select any wireless device and click the pencil icon to modify the configuration of the selected wireless device.
3	Enter the Asset Name of a wireless device.
4	Enter the Label of a wireless device.
5	Enter the Usage from the drop-down list.
6	Enter the Configuration Type from the drop-down list.
7	Enter the Output Contact type from the drop-down list.
8	Check the Feedback Loop box if necessary.
9	Enter the Feedback Loop Contract type from the drop-down list.
10	If necessary, enable the Local Control by ticking the associated box.
11	Click Apply Changes to save the settings. Click Cancel Changes to revert the settings.

EDIT DEVICE

Modbus Address: *

RF-Id:

Asset Name:

Label:

Usage:

Product:

Configuration Type:

Output Contact:

Feedback Loop:

Feedback Loop Contact:

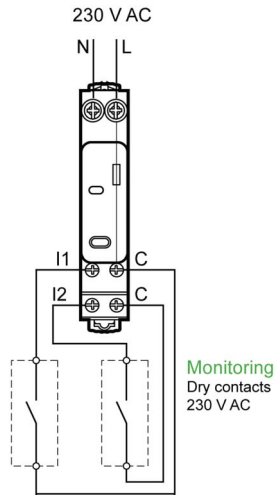
Local Control Enabled:

* Required field

Status Monitoring

PowerTag C 2DI 230V

Status monitoring alone is achieved with PowerTag Control 2DI 230V module (reference A9XMC2D3).



With this solution, you can easily know the status of two contacts or achieve OF/SD daisy chain.

Commissioning and decommissioning are done through web pages.

NOTE: The push button is used for decommissioning in case of communication loss (>240 s).

To commission or decommission PowerTag C 2DI 230V, refer to the chapter “Wireless Device Commissioning with Web Pages” or refer to *EcoStruxure Power Commission Online Help*.

To configure PowerTag C 2DI 230V, refer to the following procedure or to *EcoStruxure Power Commission Online Help*.

Step	Action
1	Click Start Scanning to discover the wireless devices connected to the PowerTag Link: Result: Displays the discovered wireless devices and allocates Modbus address to each device.
2	Select any wireless device and click the pencil icon to modify the configuration of the selected wireless device.
3	Enter the Asset Name of the Input 1 .
4	Enter the Label of the Input 1 .
5	Select the Usage from the drop-down list.
6	Select the Configuration Type from the drop-down list.
7	Select the Contact type from the drop-down list.
8	Repeat these actions for the Input 2 .
9	Click Apply Changes to save the settings. Click Cancel Changes to revert the settings.

EDIT DEVICE

Modbus Address: * 2

RF-Id: D6FFFFE62A71C

Product: A9XMC2D3

Input1

Asset Name:

Label:

Usage: -----

Configuration Type: -----

Contact: -----

Input2

Asset Name:

Label:

Usage: -----

Configuration Type: -----

Contact: -----

* Required field

Apply Changes Cancel Changes

Chapter 10

Energy Management

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Energy Counter	92
Active Power Demand	93

Energy Counter

Total Active Energy Delivered

Displays the total counter of energy for the given electrical asset. It is not possible to reset this value.

Partial Active Energy Delivered

Displays the partial counter of energy for the given electrical asset. It is possible to clear all active energy accumulated since the last reset. This does not reset the total active energy accumulation.

Active Power Demand

Power Demand

PowerTag Link/PowerTag Link HD provides:

- Total active power demand calculated on a sliding block interval.
- Maximum of the total active power demand.
- Date and time of occurrence of that maximum.

Power Demand Calculation

Power demand is calculated using arithmetical integration of the power value during a period of time (interval) divided by the length of the interval. The result is equivalent to the energy accumulated during the interval divided by the length of the interval.

Interval for Power Demand Calculation

Power demand is calculated over a sliding block interval. Navigate to **Settings** → **Devices** → **Demand** to set the interval duration from 1 to 60 minutes. The default value is 10 mn.

The screenshot shows the 'Acti9 PowerTag Link HD' web interface. The top navigation bar includes 'MONITORING', 'DIAGNOSTICS', 'MAINTENANCE', and 'SETTINGS'. Under 'SETTINGS', there are sub-menus for 'GENERAL', 'COMMUNICATION', 'USER MANAGEMENT', 'ALARMS', and 'DEVICES'. The 'DEVICES' menu is expanded, showing 'WIRELESS DEVICES' and 'DEMAND'. The 'DEMAND' page displays a 'Demand Calculation Interval Time(minutes)' input field with a value of '10' and a dropdown arrow. Below the input field is a green button labeled 'Reset all Max Demands'. At the bottom right, there are buttons for '* Required field', 'Apply Changes', and 'Cancel Changes'.

Maximum Power Demand

The maximum power demand is the highest value calculated since the beginning of the measurement or the last reset. PowerTag Link/PowerTag Link HD time stamps (date and time) the maximum power demand occurrence.

PowerTag Link/PowerTag Link HD stores the maximum power demand and the associated date and time.

Resetting the Maximum Power Demand

Navigate to **Settings** → **Devices** → **Demand** and, click **Reset all Max Demands** to reset the maximum power demand.

This screenshot is similar to the previous one, showing the 'Acti9 PowerTag Link HD' web interface. The 'DEVICES' menu is expanded to 'DEMAND'. The 'Demand Calculation Interval Time' is visible. A green button labeled 'Reset all Max Demands' is highlighted with a white border, indicating it is the focus of the action.

Chapter 11

Alarms

What Is in This Chapter?

This chapter contains the following topics:

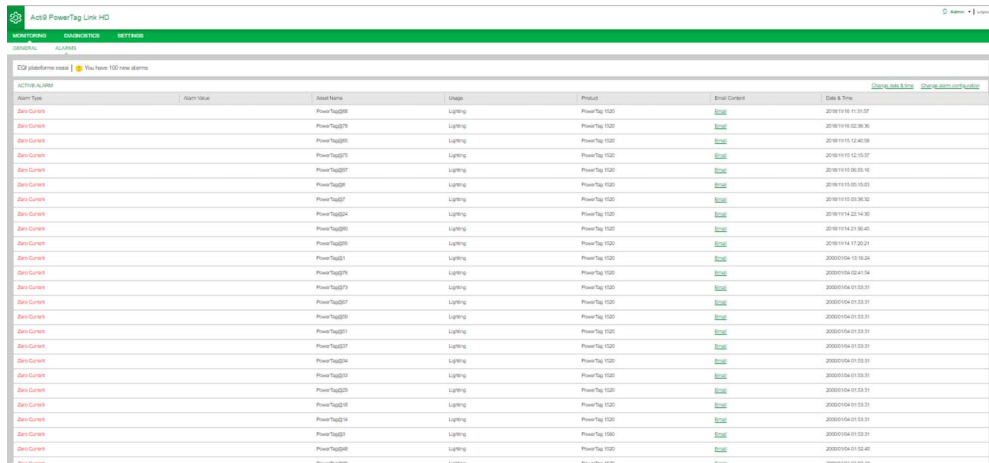
Topic	Page
About Alarms	96
Alarms Output Table	98
Voltage Loss	99
Overcurrent at Voltage Loss	100
Communication Loss	101
Overload 80%	102
Overload 50%	103
Overload 45%	104
Zero Current	105
Under Voltage (80%)	106
Load Operating Time Counter	107
Over Voltage (120%)	108
Partial Active Energy Delivered	109
Current I	110
Voltage V	111
Total Active Power	112
Power Factor	113

About Alarms

Description

The **Alarms** page displays the active alarms. When an alarm is displayed, a notification is sent to the user by email (if the email service is enabled). An active alarm disappears when conditions of this alarm are not met anymore.

Step	Action
1	Launch the PowerTag Link web page in the web browser.
2	Login with user name and password.
3	Click Monitoring → Alarms .



Parameter	Description
Alarm Type	Displays the type of an alarm when an alarm is occurred.
Alarm Value	Displays the threshold value of an alarm.
Asset Name	Displays the user-defined name of the alarm.
Usage	Displays the type of the usage.
Product	Displays the device type for which an alarm is configured.
Gateway	Displays the user-configured gateway of the device.
Email Content	Click Email to view the custom text of the email defined during an alarm configuration.
Date & Time	Displays the date and time of the configured alarm in yyyy/mm/dd hh:mm:sec format.

Click **Change date & time** to modify the date and time parameters in the **Settings** → **General** → **Date and Time** page.

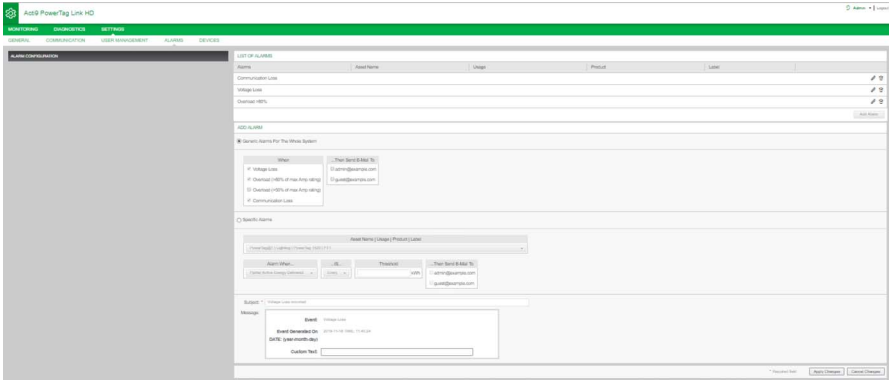
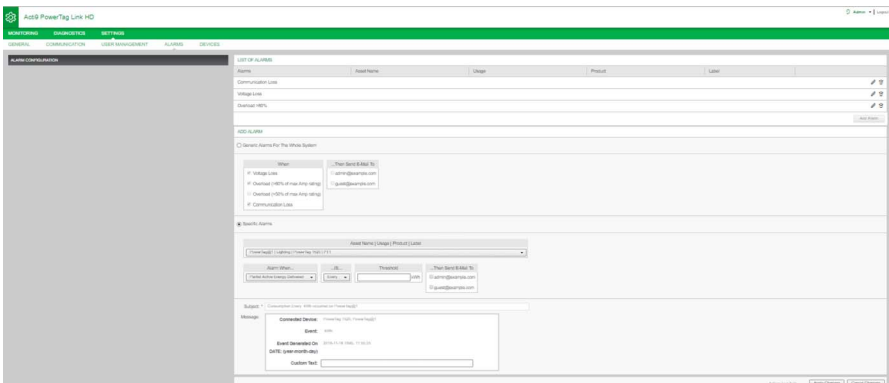
Click **Change alarm configuration** to modify an existing alarm or to configure a new alarm in the **Settings** → **Alarms** → **Alarm Configuration** page.

Alarm Configuration Page

The **Alarm Configuration** page is used to configure alarms when there is an electrical event and communication loss.

Step	Action
1	Launch the PowerTag Link web page in the web browser.
2	Login with user name and password.
3	Click Settings → Alarms → Alarm Configuration .

This page allows you to add a new alarm and edit the selected alarm from the list of events. Follow the steps given in the table to add a new alarm:

Step	Action
1	Click Add Alarm to add a new event. You can create either generic alarm for the whole system or specific alarms to a selected device.
2	<p>a</p> <p>Select Generic Alarms for the Whole System, select when an alarm to occur, and then select the users to whom an alarm notification to be sent through email (optional).</p> 
	<p>b</p> <p>Select Specific Alarms, select the required parameters, enter the threshold value that indicates for an alarm to occur, and then select the users to whom an alarm notification to be sent through email (optional). It is possible to add up to 25 specific alarms maximum.</p> 
3	Enter the Subject and Message of the email event (if necessary).
4	Click Apply Changes to save the settings. Click Cancel Changes to revert the settings.

NOTE: The email with custom text that uses characters such as à, è, ù, é, â, ê, î, ô, û, ë, ï, ü, ÿ, and ç are not shown correctly in the email but the generic text message is shown correctly.

Alarms Output Table

Alarms output table

Alarms	Alarms Output		
	Modbus Registers	Email Notifications	
	Generic	Generic	Specific
Voltage Loss	x	x	
Current Overload at Voltage Loss	x	x	
Communication Loss		x	
Overload 80%		x	
Overload 50%		x	
Overload 45%	x		
Zero Current	x		
Under Voltage (80%)	x		
Over Voltage (120%)	x		
Partial Active Energy Delivered			x
Current I			x
Voltage V			x
Total Active Power			x
Power Factor			x
Load Operating Time Counter			x

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 occurred 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: RMS value of the current during the voltage loss, are available in the Modbus table. (See **Modbus Registers** section for more details). These measurements help to diagnose the root cause of the overcurrent.

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

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

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

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:

- PowerTag energy sensors: 44 wireless communication periods
- PowerTag Control: 3 minutes and 40 seconds

The alarm will automatically disappear as soon as the wireless device is back in the RF network.

Overload 80%

This alarm indicates that the load current exceeded 80% of the nominal current or exceed 80% of the associated circuit breaker rating (I_r). On polyphase circuits, the alarm happens 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.

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

Overload 50%

This alarm indicates that the load current exceeded 50% of the nominal current or exceed 50% of the associated circuit breaker rating (I_r). On polyphase circuits, the alarm happens 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.

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

Overload 45%

This alarm indicates that the load current exceeded 45% of the nominal current or exceed 45% of the associated circuit breaker rating (I_r). On polyphase circuits, the alarm happens 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 wireless network (default = 5 seconds). The alarm automatically disappears when the load current remains below the threshold value.

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.

Under Voltage (80%)

This alarm 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).

Load Operating Time Counter

This alarm indicates that the load operating time counter has reached the configured threshold value. The alarm can be set with the following conditions:

- **Greater than:** The alarm is triggered when the **Load Operating Time Counter** exceed the configured threshold value.
- **Every:** The alarm is triggered every time the **Load Operating Time Counter** has reached the time configured in the threshold value.

When an alarm is triggered, the system manager receives the email notification and he commissions the loop of the alarm.

Over Voltage (120%)

This alarm 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).

Partial Active Energy Delivered

This alarm indicates that the “Partial Active Energy Delivered” has reached the configured threshold value. The alarm can be set with the following conditions:

- Greater than: The alarm is triggered when the “Partial Active Energy Delivered” exceeds the configured threshold value.
- Every: The alarm is triggered every time the “Partial Active Energy Delivered” has reached the time configured in the threshold value.

Current I

This alarm indicates that the **Current I** is greater or lower than the configured threshold value. The alarm will become inactive if the **Current I** remains under or over (as defined by the comparator) 90% of the threshold value.

Voltage V

This alarm indicates that the **Voltage V** is greater or lower than the configured threshold value. The alarm will become inactive if the **Voltage V** remains under or over (as defined by the comparator) 90% of the threshold value.

Total Active Power

This alarm indicates that the **Total Active Power** is greater or lower than the configured threshold value. The alarm will become inactive if the **Total Active Power** remains under or over (as defined by the comparator) 90% of the threshold value.

Power Factor

This alarm indicates that the **Power Factor** is greater or lower than the configured threshold value. The alarm will become inactive if the **Power Factor** remains under or over (as defined by the comparator) 90% of the threshold value.

Chapter 12

Modbus Registers Tables

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Modbus Table Format and Data Types	116
System Modbus Table	119
Wireless Devices Modbus Tables	120

Modbus Table Format and Data Types

Table Formats

Register tables have the following columns:

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

Designation	Description
Address	16-bit register address in hexadecimal. The address is the data used in the Modbus frame.
Register	16-bit register number in decimal. Register = Address + 1
No	Number of 16-bit registers that need to be read/written to access the complete information
R/RW	Whether the register is read only (R) or read-write (RW).
X	Scale factor: <ul style="list-style-type: none"> ● Scale "X1" means that the value of the register is the right one with the unit indicated. ● A scale of 10 means that the register contains the value multiplied by 10. The actual value is therefore the value of the register divided by 10. ● A scale of 0.1 means that the register contains the value multiplied by 0.1. The actual value is therefore the value of the register multiplied by 10.
Unit	Information unit of measurement: <ul style="list-style-type: none"> ● "-": no unit corresponding to the value expressed. ● "h": hours ● "D": the unit depends on the connected device.
Type	Coding data type (see Data type table below).
Range	Range of permitted values for the variable, usually a subset of what the format allows. For BITMAP type data, the content of this domain is "-".
Default Value	Default value for the variable
Svd	Saving the value in the event of a power failure: <ul style="list-style-type: none"> ● "Y": the value of the register is saved in the event of a power failure. ● "N": the value is lost in the event of a power failure. <p>NOTE: On start-up or reset, the available values are retrieved.</p>
Function code	Code of functions that can be used in the register.
Applicable Devices	Availability of the data depending on the associated device: <ul style="list-style-type: none"> ● "Y": the associated device provides the information. ● "N": the associated device provides the information.
Description	Information about the register and the restrictions that apply.

Data Types

The following data types appear in the tables of Modbus registers:

Name	Description	Range
UINT	16-bit unsigned integer (1 word)	0...65535
INT	16-bit signed integer (1 word)	-32768...+32767
UINT32	32-bit unsigned integer (2 words)	0...4 294 967 295
INT32	32-bit signed integer (2 words)	-2 147 483 648...+2 147 483 647
INT64	64-bit signed integer (4 words)	-9 223 372 036 854 775 808...9 223 372 036 854 775 807
Float32	32-bit value (2 words)	-3.4028E+38... +3.4028E+38
ASCII	8-bit alphanumeric character	Table of ASCII Characters
BITMAP	16-bit field (1 word)	-
DATE	See below	-

NOTE:

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

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

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

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

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

32-bit variables saved on two 16-bit words (e.g. consumption meters) are in Big Endian format:

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

64-bit variables saved on four 16-bit words (e.g. dates) are in Big Endian format:

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

DATE

DATE format in accordance with TI081 standard:

Word	Bits																
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
1	Reserved (0)								R4 (0)	Year (0...127)							
2	0				Month (1...12)				WD (0)				Day (1...31)				
3	SU (0)	0		Hour (0...23)				iV	0	Minute (0...59)							
4	Millisecond (0...59,999)																
R4:									Bit reserved								
Year:									7 bits (year starting at 2000)								
Month:									4 bits								
Day:									5 bits								
Hour:									5 bits								
Minute:									6 bits								
Millisecond:									16 bits								
WD (day of the week) :									Bit at 0 if this parameter is not used.								
SU (summertime):									Bit at 1 for summertime, bit at 0 if this parameter is not used.								
iV (validity of the information received):									Bit at 1 if the information is not valid, bit at 0 if this parameter is not used.								

Direct Bit Addressing

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

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

This addressing mode is specific to Schneider Electric.

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

NOTE: The register whose bit needs to be addressed should have an address \leq 0x0FFF.

Example of Modbus Frames**Request**

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

Response

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

Modbus Register

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

NOTE: How to use registers:

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

System Modbus Table

Identification

The Modbus slave ID of PowerTag Link to read Identification Modbus table is 255.

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Description
0x64	101	6	R	-	-	ASCII	-	N/A	Y	03, 100-4	Serial number on 12 ASCII characters; 11 alphanumeric digits maximum [SN] or [S/N]: PP YY WW [D[nnnn]] <ul style="list-style-type: none"> ● PP: Plant ● YY: Year in decimal notation [05...99] ● WW: Week in decimal notation [1...53] ● D: Day of the week in decimal notation [1...7] ● nnnn: Sequence of numbers [0001...10.000-1]
0x6A	107	3	R	-	-	ASCII	-	N/A	Y	03, 100-4	Hardware version on 6 ASCII characters
0x6D	110	3	R	-	-	ASCII	-	N/A	Y	03, 100-4	Software version on 6 ASCII characters. Example: "V0.0.1"

Status

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Description
0x70	113	1	R	-	-	BITMAP	-	0x0000	N	01, 02, 03, 100-4	PowerTag Link device status and diagnostic register Bit 0 = 1: start-up phase Bit 1 = 1: operating phase Bit 2 = 1: downgraded mode Bit 3 = 1: Failure mode Bit 12: not used Bit 13: E2PROM error Bit 14: RAM error Bit 15: FLASH error NOTE: Bits 0 to 3 are exclusive: only one mode is used at any given time.

Date and Time

Address	Registers	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Description
0x73	116	4	RW	-	-	DATE	(1)	N/A	N	03, 16 100-4	Indicates the year, month, day, hour, minute and millisecond on the PowerTag Link device.

(1) See description of the DATE type ([see page 117](#)).

Wireless Devices Modbus Tables

Description

PowerTag Link dynamically allocates a Modbus slave address to each of the wireless devices paired with it. Addresses range from 1 to 247.

The following table lists the Modbus registers that applies to all wireless paired devices.

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

Modbus Table Common to PowerTag Energy Sensors

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices		Description
											PowerTag Energy 63 A	PowerTag Energy 250/630 A	
Current - Metering Data													
0xBB7	3000	2	R	-	A	Float3 2	-	0xFFC 00000	N	03, 100-4	Y	Y	RMS Current on phase A.
0xBB9	3002	2	R	-	A	Float3 2	-	0xFFC 00000	N	03, 100-4	Y	Y	RMS Current on phase B.
0xBBB	3004	2	R	-	A	Float3 2	-	0xFFC 00000	N	03, 100-4	Y	Y	RMS Current on phase C.
Voltage - Metering Data													
0xBCB	3020	2	R	-	V	Float3 2	-	0xFFC 00000	N	03, 100-4	Y	Y	RMS Phase-to-phase voltage A-B.
0xBCD	3022	2	R	-	V	Float3 2	-	0xFFC 00000	N	03, 100-4	Y	Y	RMS Phase-to-phase voltage B-C.
0xBCF	3024	2	R	-	V	Float3 2	-	0xFFC 00000	N	03, 100-4	Y	Y	RMS Phase-to-phase voltage C-A.
0xBD3	3028	2	R	-	V	Float3 2	-	0xFFC 00000	N	03, 100-4	Y	Y	RMS Phase-to-neutral voltage A-N.
0xBD5	3030	2	R	-	V	Float3 2	-	0xFFC 00000	N	03, 100-4	Y	Y	RMS Phase-to-neutral voltage B-N.
0xBD7	3032	2	R	-	V	Float3 2	-	0xFFC 00000	N	03, 100-4	Y	Y	RMS Phase-to-neutral voltage C-N.
Power - Metering Data													
0xBED	3054	2	R	-	W	Float3 2	-	0xFFC 00000	N	03, 100-4	Y	Y	Active power on phase A.
0xBEF	3056	2	R	-	W	Float3 2	-	0xFFC 00000	N	03, 100-4	Y	Y	Active power on phase B.
0xBF1	3058	2	R	-	W	Float3 2	-	0xFFC 00000	N	03, 100-4	Y	Y	Active power on phase C.
0xBF3	3060	2	R	-	W	Float3 2	-	0xFFC 00000	N	03, 100-4	Y	Y	Total active power.
0xBFB	3068	2	R	-	Var	Float3 2	-	0xFFC 00000	N	03, 100-4	N	Y	Total reactive power.
0xC03	3076	2	R	-	VA	Float3 2	-	0xFFC 00000	N	03, 100-4	Y	Y	Total apparent power (arithmetic).
Power Demand													
0xEB3	3764	2	R	-	W	Float3 2	-	0xFFC 00000	N	03,100- 4	Y	Y	Demand Total Active Power

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices		Description
											PowerTag Energy 63 A	PowerTag Energy 250/630 A	
0xEB8	3768	2	R	-	W	Float3 2	-	0xFFC 00000	Y	03, 100-4	Y	Y	Max Demand Total Active Power
0xEBB	3771	4	R	-	NA	D/T IEC 870-5- 4(T08 1)	-	0xFFF FFFF F \blacklozenge FF Y	Y	03, 100-4	Y	Y	Max Demand Total Active Power Timestamp
Power Factor - Metering Data													
0xC0B	3084	2	R	-	-	Float3 2	-	0xFFC 00000	N	03, 100-4	Y	Y	Total power factor.
Frequency - Metering Data													
0xC25	3110	2	R	-	Hz	Float3 2	-	0xFFC 00000	N	03, 100-4	N	Y	AC Frequency
Device temperature - Metering Data													
0xC3B	3131	2	R	-	°C	Float3 2	-	0xFFC 00000	N	03, 100-4	N	Y	Device internal temperature
Energy - Metering Data													
0xC83	3204	4	R	-	Wh	INT64	-	0x800 00000 00000 000	Y	03	Y	N	Total active energy delivered + received, non resettable
0xC87	3208	4	R	-	Wh	INT64	-	0x800 00000 00000 000	Y	03	N	Y	Total active energy delivered + count positively, non resettable
0xC8B	3212	4	R	-	Wh	INT64	-	0x800 00000 00000 000	Y	03	N	Y	Total active energy received, non resettable
0xC8F	3216	4	R	-	Wh	INT64	-	0x800 00000 00000 000	Y	03	N	Y	Active energy on phase A delivered + received, non resettable
0xC93	3220	4	R	-	Wh	INT64	-	0x800 00000 00000 000	Y	03	N	Y	Active energy on phase B delivered + received, non resettable
0xC97	3224	4	R	-	Wh	INT64	-	0x800 00000 00000 000	Y	03	N	Y	Active energy on phase C delivered + received, non resettable
0xCB7	3256	4	R	-	Wh	INT64	-	0x800 00000 00000 000	Y	03	Y	N	Partial active energy delivered + received, resettable
0xCBB	3260	4	RW	-	Wh	INT64	-	0x800 00000 00000 000	Y	03, 16	N	Y	Set partial active energy counter. The value returns to zero by PowerTag Link.

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices		Description
											PowerTag Energy 63 A	PowerTag Energy 250/630 A	
0xCBf	3264	4	R	–	Wh	INT64	–	0x800 00000 00000 000	Y	03	N	Y	Partial active energy delivered, resettable
0xCC3	3268	4	RW	–	Wh	INT64	–	0x800 00000 00000 000	N	03, 16	N	Y	Set partial active energy delivered counter. The value returns to zero by PowerTag Link.
0xCC7	3272	4	R	–	Wh	INT64	–	0x800 00000 00000 000	N	03	N	Y	Partial active energy received, resettable
0xCCB	3276	4	RW	–	Wh	INT64	–	0x800 00000 00000 000	N	03, 16	N	Y	Set partial active energy received counter. The value returns to zero by PowerTag Link.
0xCCF	3280	4	R	–	VA Rh	INT64	–	0x800 00000 00000 000	Y	03	N	Y	Partial reactive energy delivered, resettable
0xCD3	3284	4	RW	–	VA Rh	INT64	–	0x800 00000 00000 000	N	03, 16	N	Y	Set partial reactive energy delivered counter. The value returns to zero by PowerTag Link.
0xCD7	3288	4	R	–	VA Rh	INT64	–	0x800 00000 00000 000	N	03	N	Y	Partial reactive energy received, resettable
0xCDB	3292	4	RW	–	VA Rh	INT64	–	0x800 00000 00000 000	N	03, 16	N	Y	Set partial reactive energy received counter. The value returns to zero by PowerTag Link.

Modbus Table for PowerTag Control Modules

Address	Register	No.	RW	XR	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices		Description
											PowerTag Control 2DI	PowerTag Control IO	
0X84D0	34001	10	R	NA	NA	ASCII	NA	0X00	Y	03 100-4	Y	Y	Digital input 1 name
0X84E7	34024	3	R	NA	NA	ASCII	NA	0X00	Y	03 100-4	Y	Y	Digital input 1 circuit identifier

Address	Register	No.	RW	XR	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices		Description
											PowerTag Control 2DI	PowerTag Control IO	
0X84EA	34027	1	R	NA	NA	ENUM	NA	0xFFFF	Y	03 100-4	Y	Y	Digital input 1 product usage <ul style="list-style-type: none"> ● 1 = Main/Incomer ● 2 = Sub/Head of group ● 3 = Heating ● 4 = Cooling ● 5 = HVAC ● 6 = Ventilation ● 7 = Lighting ● 8 = Office Equipment ● 9 = Cooking ● 10 = Food refrigeration ● 11 = Elevators ● 12 = Computers ● 13 = Renewable Energy Production ● 14 = Genset ● 15 = Compressed air ● 16 = Vapor ● 17 = Machine ● 18 = Process ● 19 = Water ● 20 = Other sockets ● 21 = Other

Address	Register	No.	RW	XR	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices		Description
											PowerTag Control 2DI	PowerTag Control IO	
0X84EC	34029	1	R	NA	NA	ENUM	NA	0x8000	Y	03 100-4	Y	Y	Digital input 1 assignment reference <ul style="list-style-type: none"> ● 0 = None ● 1 = Standard input ● 2 = Breaker position ● 3 = Trip indicator (SD) ● 4 = Chained trip indicator ● 5 = Electrical trip signal contact ● 6 = Thermal trip signal contact ● 7 = Earth leakage trip signal contact (SDV) ● 8 = Groud fault trip signal contact ● 9 = Surge failure contact ● 15 = Switchboard board door contact ● 16 = Feedback loop Register is forced to 'Feedback loop' (16), when Digital output 1 Feedback loop is configured to 'Enabled'. (See reg. 37036)
0X84ED	34030	1	R	NA	NA	ENUM	NA	0xFFFF	Y	03 100-4	Y	Y	Digital input 1 contact type <ul style="list-style-type: none"> ● 0 = Normally open ● 1 = Normally close
0X84F8	34041	1	R	NA	NA	ENUM	NA	0xFFFF	Y	03 100-4	Y	Y	Digital input 1 electrical status Indicates the electrical status of the input regardless of the assignment reference. <ul style="list-style-type: none"> ● 0 = Low level ● 1 = High level
0X84FE	34047	1	R	NA	NA	ENUM	NA	0xFFFF	Y	03 100-4	Y	Y	Digital input 1 breaker position Indicates the breaker position - Only available if input 1 assignment reference is 'Breaker position' (case = 2) <ul style="list-style-type: none"> ● 0 = Open ● 1 = Close

Address	Register	No.	RW	XR	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices		Description
											PowerTag Control 2DI	PowerTag Control IO	
0X8508	34057	1	R	NA	NA	ENUM	NA	0xFFFF	Y	03 100-4	Y	Y	Digital input 1 trip indicator Indicates the trip status- Only available if input 1 assignment reference is one of the trip cause (case = 3 to 8) <ul style="list-style-type: none"> ● 0 = Tripped ● 1 = Not tripped
0X8510	34065	1	R	NA	NA	ENUM	NA	0xFFFF	Y	03 100-4	Y	Y	Digital input 1 status Indicates the status of the Digital Input 1 - Only available if input 1 assignment reference is not 'Breaker position' or none of the trip causes. (Cases 1, 9, 15, 16) <ul style="list-style-type: none"> ● 0 = On ● 1 = Off
0X8534	34101	10	R	NA	NA	ASCII	NA	0X00	Y	03 100-4	Y	N	Digital input 2 name
0X854B	34124	3	R	NA	NA	ASCII	NA	0X00	Y	03 100-4	Y	N	Digital input 2 circuit identifier
0X854E	34127	1	R	NA	NA	ENUM	NA	0xFFFF	Y	03 100-4	Y	N	Digital input 2 product usage <ul style="list-style-type: none"> ● 1 = Main/Incomer ● 2 = Sub/Head of group ● 3 = Heating ● 4 = Cooling ● 5 = HVAC ● 6 = Ventilation ● 7 = Lighting ● 8 = Office Equipment ● 9 = Cooking ● 10 = Food refrigeration ● 11 = Elevators ● 12 = Computers ● 13 = Renewable Energy Production ● 14 = Genset ● 15 = Compressed air ● 16 = Vapor ● 17 = Machine ● 18 = Process ● 19 = Water ● 20 = Other sockets ● 21 = Other

Address	Register	No.	RW	XR	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices		Description
											PowerTag Control 2DI	PowerTag Control IO	
0X8550	34129	1	R	NA	NA	ENUM	NA	0xFFFF	Y	03 100-4	Y	N	Digital input 2 assignment reference <ul style="list-style-type: none"> ● 0 = None ● 1 = Standard input ● 2 = Breaker position ● 3 = Trip indicator (SD) ● 4 = Chained trip indicator ● 5 = Electrical trip signal contact ● 6 = Thermal trip signal contact ● 7 = Earth leakage trip signal contact (SDV) ● 8 = Groud fault trip signal contact ● 9 = Surge failure contact ● 15 = Switchboard door contact ● 16 = Feedback loop
0X8551	34130	1	R	NA	NA	ENUM	NA	0xFFFF	Y	03 100-4	v	N	Digital input 2 contact type <ul style="list-style-type: none"> ● 0 = Normally open ● 1 = Normally close
0X855C	34141	1	R	NA	NA	ENUM	NA	0xFFFF	Y	03 100-4	Y	N	Digital input 2 electrical status Indicates the electrical status of the input regardless of the assignment reference. <ul style="list-style-type: none"> ● 0 = Low level ● 1 = High level
0X8562	34147	1	R	NA	NA	ENUM	NA	0xFFFF	Y	03 100-4	Y	N	Digital input 2 breaker position Indicates the breaker position - Only available if input 2 assignment reference is 'Breaker position' (case = 2) <ul style="list-style-type: none"> ● 0 = Open ● 1 = Close

Address	Register	No.	RW	XR	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices		Description
											PowerTag Control 2DI	PowerTag Control IO	
0X856C	34157	1	R	NA	NA	ENUM	NA	0xFFFF	Y	03 100-4	Y	N	Digital input 2 trip indicator Indicates the trip status- Only available if input 2 assignment reference is one of the trip cause (case = 3 to 8) <ul style="list-style-type: none"> ● 0 = Tripped ● 1 = Not tripped
0X8574	34165	1	R	NA	NA	ENUM	NA	0xFFFF	Y	03 100-4	Y	N	Digital input 2 status Indicates the status of the Digital Input 2 - Only available if input 2 assignment reference is not 'Breaker position' or none of the trip causes. (Cases 1, 9, 15, 16) <ul style="list-style-type: none"> ● 0 = On ● 1 = Off
0X9088	37001	10	R	NA	NA	ASCII	NA	0x00	Y	03 100-4	N	Y	Digital output 1 name
0X909F	37024	3	R	NA	NA	ASCII	NA	0x00	Y	03 100-4	N	Y	Digital output 1 circuit identifier
0X90A2	37027	1	R	NA	NA	ENUM	NA	0xFFFF	Y	03 100-4	N	Y	Digital output 1 product usage <ul style="list-style-type: none"> ● 1 = Main/Incomer ● 2 = Sub/Head of group ● 3 = Heating ● 4 = Cooling ● 5 = HVAC ● 6 = Ventilation ● 7 = Lighting ● 8 = Office Equipment ● 9 = Cooking ● 10 = Food refrigeration ● 11 = Elevators ● 12 = Computers ● 13 = Renewable Energy Production ● 14 = Genset ● 15 = Compressed air ● 16 = Vapor ● 17 = Machine ● 18 = Process ● 19 = Water ● 20 = Other sockets ● 21 = Other

Address	Register	No.	RW	XR	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices		Description
											PowerTag Control 2DI	PowerTag Control IO	
0X90A4	37029	1	R	NA	NA	ENUM	NA	0xFFFF	Y	03 100-4	N	Y	Digital output 1 behavior <ul style="list-style-type: none"> ● 0 = Normal ● 1 = Latched
0X90A7	37032	1	R	NA	NA	ENUM	NA	0xFFFF	Y	03 100-4	N	Y	Digital output 1 contact type <ul style="list-style-type: none"> ● 0 = Normally open ● 1 = Normally close
0X90A9	37034	1	R	NA	NA	ENUM	NA	0xFFFF	Y	03 100-4	N	Y	Digital output 1 local control enable <ul style="list-style-type: none"> ● 0 = Disable ● 1 = Enabled
0X90AB	37036	1	R	NA	NA	ENUM	NA	0xFFFF	Y	03 100-4	N	Y	Digital output 1 feedback loop enable. Register is forced to 'enabled' when Output is configured to 'Latched' behavior. (See register 37029) When enabled, feedback data are available in Input 1 registers (starting from register 34001) <ul style="list-style-type: none"> ● 0 = Disable ● 1 = Enabled
0X90BA	37051	1	RW	NA	NA	UINT16	NA	0xFFFF	N	03,06, 16, 100-4	N	Y	Digital output 1 command NOTE: Off and On commands (value 1 and 2) are possible only if the control device is a PowerTag Control IO with configuration type set to "contactor" <ul style="list-style-type: none"> ● 0 = No command ● 1 = Off command ● 2 = On command ● 3 = Toggle command
0X90BB	37052	1	R	NA	NA	UINT16	NA	0xFFFF	N	03 100-4	N	Y	Digital output 1 status Only significant if Output is configured to 'Normal' behavior. (See register 37029). Otherwise is set to invalid value. <ul style="list-style-type: none"> ● 0 = Off ● 1 = On

Load Monitoring Registers

The Modbus Registers of the wireless device allows you to monitor the following status in any supervision system.

Alarms with two Types

- The voltage loss of the load.
- If an overload has occurred at the voltage loss event.

Load Operating Time: The duration of how long the load worked effectively (above a certain power, this avoiding idle/standby times to be counted), to optimize the maintenance times.

	Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices				Description
												PowerTag Energy 63 A	PowerTag Energy 250/630 A	PowerTag Control 2DI	PowerTag Control IO	
Alarm	0xCE1	3298	2	R	-	-	UINT	-	0xFFFF FFFFFF	N	03, 100-4	Y	Y	N	N	Validity of the Alarm bitmap (register 3300) ● 0 = Invalid. ● 1 = Valid.
	0xCE3	3300	2	R	-	-	UINT	-	0xFFFF FFFFFF	N	03, 100-4	Y	Y	N	N	Alarms bitmap 0 = Alarm OFF. 1 = Alarm ON. Bit 0 = Voltage loss Bit 1 = Current Overload at Voltage Loss Bit 2 = Reserved Bit 3 = Overload 45% Bit 4 = Load current loss Bit 5 = Overvoltage 120% Bit 6 = undervoltage 80% Bit 7 = Battery Low
	0xCE5	3302	2	R	NA	A	Float 32	NA	0xFFC 00000	N	03, 100-4	Y	Y	N	N	RMS Current on Phase A at Voltage Loss (Last RMS current measured when voltage loss occurred)
	0xCE7	3304	2	R	NA	A	Float 32	NA	0xFFC 00000	N	03, 100-4	Y	Y	N	N	RMS Current on Phase B at Voltage Loss (Last RMS current measured when voltage loss occurred)
	0xCE9	3306	2	R	NA	A	Float 32	NA	0xFFC 00000	N	03, 100-4	Y	Y	N	N	RMS Current on Phase C at Voltage Loss (Last RMS current measured when voltage loss occurred)

	Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices				Description
												PowerTag Energy 63 A	PowerTag Energy 250/630 A	PowerTag Control 2DI	PowerTag Control IO	
Operating Time	0xCED	3308	2	RW	-	Sec	UINT 32	-	0xFFFF FFFFFF	Y	03, 100-4	Y	Y	N	N	Load Operating Time counter.
	0xCED	3310	2	RW	-	W	Float 32	-	0xFFC 00000	Y	03, 100-4	Y	Y	N	N	Active Power Threshold for Load Operating Time counter. Counter starts above the threshold value.
	0xCEF	3312	4	R	-	-	D/T IEC 870-5-4 (T08 1)	-	0x000 00000	Y	03, 100-4	Y	Y	N	N	Date and time stamp of last Set or reset of Load Operating Time counter.

Configuration Registers

The detailed information for all the wireless devices has the same structure as given in the following table.

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices				Description
											PowerTag Energy 63 A	PowerTag Energy 250/630 A	PowerTag Control 2DI	PowerTag Control IO	
0x7918	31001	10	RW	-	-	ASCII	-	0x0000	Y	03, 06, 16, 100-4	Y	Y	N	N	User application name of the wireless device. The user can enter maximum 20 characters.
0x7922	31011	3	RW	-	-	ASCII	-	0x0000	Y	03, 06, 16, 100-4	Y	Y	N	N	Circuit identifier of the wireless device. The user can enter maximum five characters.

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices				Description
											PowerTag Energy 63 A	PowerTag Energy 250/630 A	PowerTag Control 2DI	PowerTag Control IO	
0x7925	31014	1	RW	-	-	ENUM	-	0xFFFF	Y	03, 06, 16, 100-4	Y	Y	N	N	Indicates the usage of the wireless device. <ul style="list-style-type: none"> ● 1 = Main/Incomer ● 2 = Sub/Head of group ● 3 = Heating ● 4 = Cooling ● 5 = HVAC ● 6 = Ventilation ● 7 = Lighting ● 8 = Office Equipment ● 9 = Cooking ● 10 = Food refrigeration ● 11 = Elevators ● 12 = Computers ● 13 = Renewable Energy Productio ● 14 = Genset ● 15 = Compressed air ● 16 = Vapor ● 17 = Machine ● 18 = Process ● 19 = Water ● 20 = Other Sockets ● 21 = Other

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices				Description
											PowerTag Energy 63 A	PowerTag Energy 250/630 A	PowerTag Control 2DI	PowerTag Control IO	
0x7926	31015	1	RW	-	-	ENUM	-	0xFFFF	Y	03, 06, 16, 100-4	Y	Y	N	N	Phase sequence. <ul style="list-style-type: none"> ● 1 = Phase A ● 2 = Phase B ● 3 = Phase C ● 4 = Phase sequence ABC ● 5 = Phase sequence ACB ● 6 = Phase sequence BCA ● 7 = Phase sequence BAC ● 8 = Phase sequence CAB ● 9 = Phase sequence CBA
0x7927	31016	1	RW	-	-	ENUM	-	0xFFFF	Y	03, 06, 16, 100-4	Y	N	N	N	Mounting position. <ul style="list-style-type: none"> ● 0 = Not configured ● 1 = Top ● 2 = Bottom
0x7928	31017	1	RW	-	-	ENUM	-	0xFFFF	Y	03, 06, 16, 100-4	Y	Y	N	N	Circuit diagnostics. <ul style="list-style-type: none"> ● 0 = Not configured ● 1 = Top ● 2 = Bottom
0x7929	31018	1	RW	-	A	UINT	-	0xFFFF	Y	03, 06, 16, 100-4	Y	Y	N	N	Rated current of the protective device to the wireless device.
0x792A	31019	1	R	-	-	BITMAP	-	0xFFFF	Y	03	N	Y	N	N	Electrical network System Type (Only for PowerTag NSX) <ul style="list-style-type: none"> ● 0 = Unknown system type ● 3 = 3PH3W ● 11 = 3PH4W

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices				Description
											PowerTag Energy 63 A	PowerTag Energy 250/630 A	PowerTag Control 2DI	PowerTag Control IO	
0x792B	31020	2	R	-	V	Float 32	-	0xFFC00000	Y	03	N	Y	N	N	Rated voltage <ul style="list-style-type: none"> ● LN rated voltage for single phase wiring systems ● LL rated voltage for 2 or 3 phases wiring systems

Device Identification

Addresses	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices				Description
											PT Energy	PT NSX	PT IO 230 V	PT 2DI 230 V	
0x7930	31025	1	R	-	-	ENUM	-	0x8000	Y	03 100-4	Y	Y	Y	Y	Indicates the product type of wireless devices. 41 = PowerTag Acti9 M631P (A9MEM1520) 42 = PowerTag Acti9 M631P+N Top (A9MEM1521) 43 = PowerTag Acti9 M631P+N Bottom (A9MEM1522) 44 = PowerTag Acti9 M633P (A9MEM1540) 45 = PowerTag Acti9 M633P+N Top (A9MEM1541) 46 = PowerTag Acti9 M633P+N Bottom (A9MEM1542) 81 = PowerTag Acti9 F631P+N (A9MEM1560) 82 = PowerTag Acti9 P631P+N Top (A9MEM1561) 83 = PowerTag Acti9 P631P+N Bottom (A9MEM1562) 84 = PowerTag Acti9 P631P+N Bottom (A9MEM1563) 85 = PowerTag Acti9 F633P+N (A9MEM1570) 86 = PowerTag Acti9 P633P+N Top (A9MEM1571) 87 = PowerTag Acti9 P633P+N Bottom (A9MEM1572) 88 = 3P-250A (LVSMC13) 89 = 3P-630A (LVSMC23) 92 = PowerTag NSX 3P-250 A (LV434020) 93 = PowerTag NSX 4P-250 A (LV434021) 94 = PowerTag NSX 3P-630 A (LV434022) 95 = PowerTag NSX 4P-630 A (LV434023) 96 = PowerTag Acti9 M633P 230V (A9MEM1543) 97 = PowerTag Acti9 C 2DI 230V (A9XMC2D3) 98 = PowerTag Acti9 C IO 230V (A9XMC1D3) 101 = PowerTag Acti9 F631P+N 110V (A9MEM1564) 102 = PowerTag Acti9 F633P (A9MEM1573) 103 = PowerTag Acti9 F633P+N 110/230V (A9MEM1574)

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices				Description
											PT Energy	PT NSX	PT IO 230 V	PT 2DI 230 V	
0X7931	31026	1	NA	NA	UNIT	NA	0xFFFF	Y	03 100-4	Y	Y	Y	Y	Virtual Modbus slave address	
0X7932	31027	4	NA	NA	UNIT64	NA	0x8000 000000 000000	Y	03 100-4	Y	Y	Y	Y	Wireless device Radio Frequency Identifier (RF-Id)	
0X7944	31045	16	NA	NA	ASCII	NA	0x00	Y	03 100-4	Y	Y	Y	Y	Vendor name	
0X7954	31061	16	NA	NA	ASCII	NA	0x00	Y	03 100-4	Y	Y	Y	Y	Product Code (Commercial reference)	
0X7964	31077	6	NA	NA	ASCII	NA	0x00	Y	03 100-4	Y	Y	Y	Y	Firmware revision	
0X796A	31083	6	NA	NA	ASCII	NA	0x00	Y	03 100-4	Y	Y	Y	Y	Hardware revision	
0X7970	31089	10	NA	NA	ASCII	NA	0x00	Y	03 100-4	Y	Y	Y	Y	Serial Number	
0X797A	31099	8	NA	NA	ASCII	NA	0x00	Y	03 100-4	Y	Y	Y	Y	Product range	
0X7982	31107	8	NA	NA	ASCII	NA	0x00	Y	03 100-4	Y	Y	Y	Y	Product model	
0X798A	31115	8	NA	NA	ASCII	NA	0x00	Y	03 100-4	Y	Y	Y	Y	Product family	

Diagnostic Data Registers

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices				Description
											PowerTag Energy 63 A	PowerTag Energy 250/630 A	PowerTag Control 2DI	PowerTag Control IO	
0x79A8	31145	1	R	-	-	BITMAP	-	0xFFFF	N	03, 100-4	Y	Y	Y	Y	Validity of the RF communication between PowerTag and PowerTag Link status. ● 0 = Invalid. ● 1 = Valid.
0x79A9	31146	1	R	-	-	BITMAP	-	0xFFFF	N	03, 100-4	Y	Y	Y	Y	Communication status between PowerTag Link and wireless devices. ● 0 = Communication loss. ● 1 = Communication OK.
0x79B4	31157	2	R	NA	NA	Float32	NA	0xFFC0000	N	03, 100-4	Y	Y	Y	Y	Packet Error Rate (PER)

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices				Description
											PowerTag Energy 63 A	PowerTag Energy 250/630 A	PowerTag Control 2DI	PowerTag Control IO	
0x79B6	31159	2	R	NA	NA	Float3 2	NA	0xFFC00 000	N	03, 100-4	Y	Y	Y	Y	Radio Signal Strength Indicator (RSSI) link
0x79B8	31161	1	R	NA	NA	UINT 16	NA	0xFFFF	N	03, 100-4	Y	Y	Y	Y	Link Quality Indicator (LQI) link
0x79C5	31174	2	R	-	-	BITM AP	-	-	N	03	Y	Y	N	N	Alarm status value = 0: PowerTag Link is operational value different than 0: PowerTag Link is non operational

Chapter 13

Diagnostics and Troubleshooting

What Is in This Chapter?

This chapter contains the following sections:

Section	Topic	Page
13.1	Monitoring and Diagnostics Display	152
13.2	Reset of PowerTag Link	157
13.3	Troubleshooting	158

Section 13.1

Monitoring and Diagnostics Display

What Is in This Section?

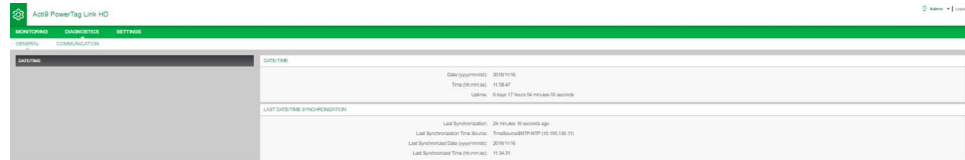
This section contains the following topics:

Topic	Page
General Diagnostics	153
Communication Diagnostics	154

General Diagnostics

Date/Time

Step	Action
1	Launch the PowerTag Link web page in the web browser.
2	Login with user name and password.
3	Click Diagnostics → General → Date/Time .



The **Date/Time** page displays the following information:

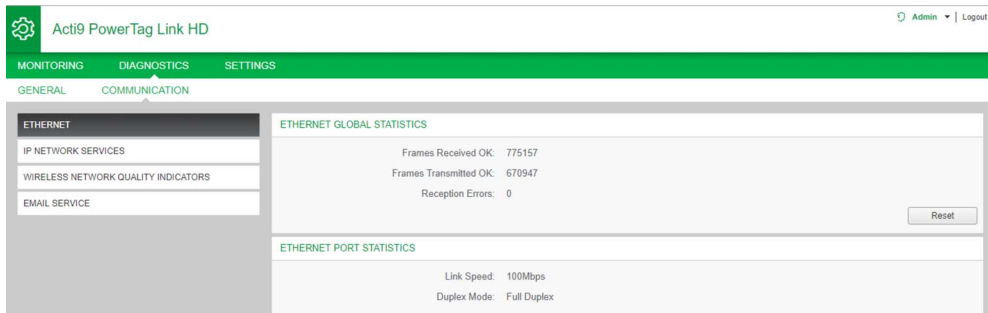
Parameters	Description
Date/Time	
Date	Displays the current date in the format YYYY-MM-DD.
Time	Displays the current in the local time zone in the format hh:mm:ss.
Uptime	Displays the elapsed time since the last restart of the device.
Last Date/Time Synchronization	
Last Synchronization	Displays when the last synchronization happened.
Last Synchronization Time Source	Displays the time source of the last synchronization.
Last Synchronized Date	Displays the last synchronized date in the format YYYY-MM-DD.
Last Synchronized Time	Displays the last synchronized time in the format hh:mm:ss.

Communication Diagnostics

Ethernet

Step	Action
1	Launch the PowerTag Link web page in the web browser.
2	Login with user name and password.
3	Click Diagnostics → Communication → Ethernet .

The **Ethernet** page displays the global and port statistics of the Ethernet network.

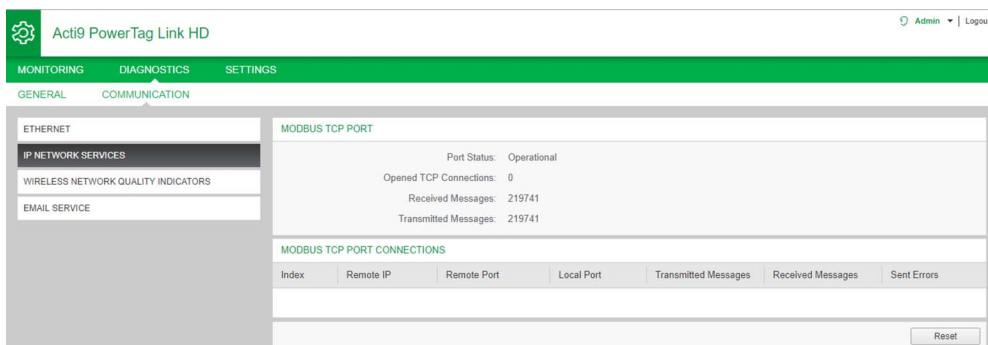


	Function Name	Description
Ethernet Global Statistics	Frames Received OK	Displays the number of frames received from all the Ethernet ports.
	Frames Transmitted OK	Displays the number of frames transmitted from all the Ethernet ports.
	Reception Errors	Displays the number of errors during reception of the frames.
Ethernet Port Statistics	Link speed	Displays link speed on Ethernet port.
	Duplex mode	Displays the communication mode of the Ethernet port. It can be half duplex or full duplex.

Click **Reset** to clear the Ethernet frame counters.

IP Network Services

Step	Action
1	Launch the PowerTag Link web page in the web browser.
2	Login with user name and password.
3	Click Diagnostics → Communication → IP Network Services .



	Function Name	Description
Modbus TCP Port	Port status	Displays the current status of the Modbus/TCP port.
	Opened TCP connections	Displays the number of established Modbus/TCP connections.
	Received messages	Displays the counter of received Modbus/TCP messages.
	Transmitted messages	Displays the counter of transmitted Modbus/TCP messages.
Modbus TCP Port Connections		Displays the statistics of open Modbus/TCP connections.

Click **Reset** to clear the Modbus/TCP counter.

Wireless Network Quality Indicators

Step	Action
1	Launch the PowerTag Link web page in the web browser.
2	Login with user name and password.
3	Click Diagnostics → Communication → Wireless Network Quality Indicators .

The **Wireless Network Quality Indicators** page displays wireless network quality information such as Link Quality Indicator (LQI), Received Signal Strength Indicator (RSSI), and Packet Error Rate (PER).

ETHERNET		WIRELESS NETWORK QUALITY INDICATORS						
Modbus Address	Asset Name	Usage	Product	LQI	(Radio Quality)	RSSI	PER	
1	PowerTag@1	Lighting	PowerTag 1520	121	●	-48 dBm	14 %	
2	PowerTag@2	Lighting	PowerTag 1520	143	●	-41 dBm	34 %	
3	PowerTag@3	Lighting	PowerTag 1560	154	●	-38 dBm	14 %	
4	PowerTag@4	Lighting	PowerTag 1520	101	●	-53 dBm	16 %	
5	PowerTag@5	Lighting	PowerTag 1520	154	●	-38 dBm	11 %	
6	PowerTag@6	Lighting	PowerTag 1520	116	●	-49 dBm	9 %	
7	PowerTag@7	Lighting	PowerTag 1520	95	●	-57 dBm	17 %	
8	PowerTag@8	Lighting	PowerTag 1520	91	●	-58 dBm	10 %	
9	PowerTag@9	Lighting	PowerTag 1520	131	●	-47 dBm	6 %	
10	PowerTag@10	Lighting	PowerTag 1520	109	●	-53 dBm	9 %	
11	PowerTag@11	Lighting	PowerTag 1520	115	●	-51 dBm	9 %	
12	PowerTag@12	Lighting	PowerTag 1560	133	●	-44 dBm	14 %	

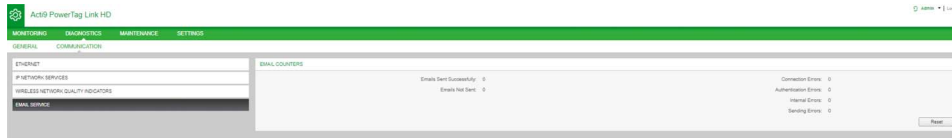
Parameter	Description
Modbus Address	Displays the Modbus address of the wireless device.
Asset Name	Displays the user-defined asset name of the wireless device.
Usage	Displays the user-defined usage of the wireless device.
Product	Displays the type of wireless sensor.
LQI	<p>Displays the measurement of the strength and / or quality of the received frames. The following values of LQI indicates the quality of the received frames:</p> <ul style="list-style-type: none"> ● The value from 0...29 indicates that the RF communication is bad. In this case, check whether the rules of installation are respected. You can also change the location of the PowerTag Link inside the panel to be closer to the wireless device. ● The values from 29...59 indicates that the RF communication is average. In this case, look at the RSSI value whether to accept the level of quality or not. If the RSSI is above limit, consider the value of LQI as acceptable. ● The value greater than 59 indicates that the RF communication is OK. <p>NOTE: It is recommended to use this indicator as the main indicator of acceptance.</p>
Radio Quality	Displays the quality of the frames. When the LQI value is greater then 59, it indicates with green light and when LQI value is lesser than 29, it indicates with red light. When the LQI value is between 30 and 59, it indicates with orange light.

Parameter	Description
RSSI	Displays the measurement of the power level (in dBm) that an RF device is exchanging from the remote radio nodes. This indicator is used if the LQI is not acceptable. <ul style="list-style-type: none"> • The value < -95 dBm is not good. • The value > -95 dBm is acceptable.
PER	Displays the ratio of the packet that does not reach a destination over the total expected number of packets and is expressed as percentage. For PowerTag Link system, the ratio is calculated over a fixed window of five minutes.

Email Service

Step	Action
1	Launch the PowerTag Link web page in the web browser.
2	Login with user name and password.
3	Click Diagnostics → Communication → Email Service .

The **Email Service** page displays the information such as number of emails sent and emails not sent. This page also displays the error count, if any, for connection errors, authentication errors, internal errors, and sending errors as shown in the following figure:



Parameter	Description
Email Sent successfully	Displays the total number of successfully sent emails.
Emails Not Sent	Displays the total number of emails not delivered to the recipients.
Connection Errors	Displays the total number of connection errors if a connection is lost during an email delivery.
Authentication Errors	Displays the total number of authentication errors.
Internal Errors	Displays the total number of internal errors during the email service.
Sending Errors	Displays the total number of sending errors.

Click **Reset** to clear the Email counter.

Section 13.2

Reset of PowerTag Link

Description

Resetting PowerTag Link

There are two levels of reset:

- Level 1: Press and hold the **Reset** button between 5 to 10 seconds to retain all the configurations of the product. However, the mode of IP acquisition is set to DHCP mode, that is if you had set up a static IP address and lost your IP address, you can still retrieve your product using DHCP.
- Level 2: Press and hold the **Reset** button for more than 10 seconds until Status LED switch to red color, the PowerTag Link is reset to the factory parameter settings.

The reset data is as follows:

- The user application name is set to myPowerTagLink-xxxx (where xxxx are the last four digits of mac address).
- The building name becomes default.
- The mode of IP acquisition is set to DHCP.
- The password is set to the default value.
- The panel information saved in PowerTag Link is erased.
- The user accounts are erased (only default user accounts are retained).
- The wireless device configurations are deleted.
- The IP related settings are set to default value (date/time, DNS, IP filter, and email service). HTTPS is enabled.
- Generic events are set to default configurations.
- Specific alarm is deleted.

NOTICE

HAZARD OF EQUIPMENT DAMAGE

Do not switch off the power supply until the LED status stops blinking in RED, as the reboot is still in progress.

Failure to follow these instructions can result in equipment damage.

Section 13.3

Troubleshooting

What Is in This Section?


This section contains the following topics:

Topic	Page
Common Problems	159
Description of Status LED	160
Description of Ethernet Status LED	161
Description of Wireless Status LED	162

Common Problems

Description

The following table describes the abnormal behavior and diagnostics, and provides some corrective actions:









Problem	Diagnostics	Action
Web page is displayed only with texts without graphics.	The text and graphics in the web page is loaded based on the traffic and disruptions on the IT network.	Refresh the browser.
IP setting changes are not effected.	IP settings not applied	Reboot the device if the changes do not take effect within two minutes.
Firmware upgrade is not succeeded.	PowerTag Link is disconnected from the network	Follow the below steps to recover the PowerTag Link: <ol style="list-style-type: none"> 1. Disconnect PowerTag Link from the network. 2. Power cycle the PowerTag Link. 3. Connect your PC directly to the PowerTag Link. 4. Use Automatic Discovery from the EcoStruxure Power Commission software to connect PowerTag Link, see <i>EcoStruxure Power Commission Online Help</i>. 5. Launch firmware upgrade.
PowerTag Link has lost the communication with wireless devices.	Pollution on the radio frequency channel	Change the radio frequency channel that communicates between wireless devices and PowerTag Link in the Settings → Communication → Wireless Network Configuration page.
A wireless device is not detected/discovered by PowerTag Link.	PowerTag Link does not recognize this type of wireless devices.	Upgrade the firmware of PowerTag Link with EcoStruxure Power Commission software, see <i>EcoStruxure Power Commission Online Help</i> .
You have detected a dysfunction of the gateway.	Lost data, problem of data display on web page or on Modbus registers, lost connexion with the wireless devices.	Pre-requisite: You should have a backup file saved on your PC by using the backup function available in the Maintenance menu of the web page. The file will be automatically saved under the name "backup.dat"  Refer to the Device Replacement (DR) (<i>see page 70</i>). NOTE: Time for PowerTag Link to restart wireless communication with all wireless devices can be up to 10 minutes.

NOTE: If you have communication issues (Wireless LED not OK or communication loss), refer to the recommendations made in Chapter 1 - PowerTag System --> Wireless Communication Devices.

Description of Status LED



Status LED

The following table lists the Status LED according to the operating mode:

Mode	Status LED	Status
Initialization / Operation		Green light: Product operates normally.
Start-up		Alternate green and red light every second: Device is starting.
Factory Settings		Orange light: The PowerTag Link is <ul style="list-style-type: none"> • in DHCP client mode • DHCP server has not assigned IP address
Reset (level 1)		Green blink: Reset button acknowledgment (pressed between 5 to 10 seconds). IP settings are reconfigured to DHCP mode.
Reset (level 2)		Red blink (Fast, 2 blinks/sec): while pressing the reset button for more than 10 seconds. The LED stops blinking after the reset button is released: do not switch off the product until the LED stops blinking in RED for at least 30 seconds, as the product restarts.
Duplicate IP address		Red blink (1 blink per second): System has detected duplicate IP address. Check and change the IP address of the PowerTag Link.
Degraded		Orange blink: Power supply of the product is degraded.
Failure		Red light: Out of service or hardware failure.

Description of Ethernet Status LED






Ethernet Status LED

Mode	LK/10-100/ACT LED	Status
Ethernet communication		Activity at 10 Mbps: alternate yellow and white
		Activity at 100 Mbps: alternate green and white

Description of Wireless Status LED

Wireless Status LED

The following table lists the Wireless Status LED according to the operating mode:

Mode	Wireless Status LED	Status
Initialization		Amber light: not configured
Startup		Amber blink: looking for wireless device
Operation		Flash green every five seconds: networking complete (normal operation)
Degraded		Green blink (1 blink per 5 seconds): downgraded while boot mode
Disabled		No light: wireless disabled

Appendices



Appendix A

Appendix Details of Modbus Functions

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Modbus TCP/IP Functions	166
Modbus TCP/IP Exception Codes	168
Function 8: Modbus Diagnostics	169
Function 43-14: Read Device Identification (Basic)	171
Function 43-15: Read Date and Time	173
Function 43-16: Write Date and Time	174
Function 100-4: Read Non-Adjacent Registers	175

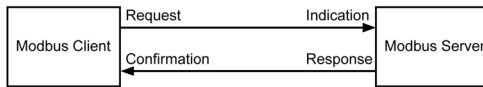
Modbus TCP/IP Functions

General Description

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

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

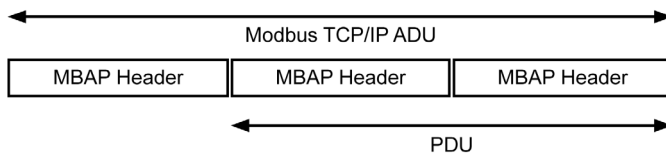
- Modbus Request, the message sent on the network by the client to initiate a transaction.
- Modbus Indication, the request message received on the server side.
- Modbus Response, the response message sent by the server.
- Modbus Confirmation, the response message received on the client side.



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 slave connected on a serial line or on other buses	Initialized by the client	Recopied by the server from the received request

Table of Modbus Functions

The following table describes in detail the functions supported by PowerTag Link devices:

Function Code	Function Name
01	Read n output or internal bits
02	Read n input bits
03	Read n output or internal bits
05	Write 1 bit
06	Write 1 word
08 ⁽¹⁾	Modbus diagnostic data
15	Write n bits
16	Write n words
43-14 ⁽²⁾	Read identification
43-15 ⁽³⁾	Read the date and time
43-16 ⁽⁴⁾	Write the date and time
100-4 ⁽⁵⁾	Read non-adjacent words where $n \leq 100$

⁽¹⁾For more details, see the appendix describing function 8 (*see page 169*)

⁽²⁾For more details, see the appendix describing function 43-14 (*see page 171*)

⁽³⁾For more details, see the appendix describing function 43-15 (*see page 173*)

⁽⁴⁾For more details, see the appendix describing function 43-16 (*see page 174*)

⁽⁵⁾For more details, see the appendix describing function 100-4 (*see page 175*)

Modbus TCP/IP Exception Codes

Exception Responses

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

- If the slave receives the request from the master without a communication error and manages the request correctly, it sends back a normal response.
- If the slave does not receive the request from the master due to a communication error, it does not send back a response. The master program ends by applying a time delay condition to the request.
- If the slave receives the request from the master but detects a communication error, it does not send back a response. The master program ends by applying a time delay condition to the request.
- If the slave receives the request from the master without a communication error but cannot manage it (for example, the request consists of reading a register that does not exist), the slave sends back an exception response to inform the master of the nature of the error.

Exception Frame

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

Field	Definition	Size
1	Slave 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 response's 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 slave.

The following table describes the exception codes managed by the PowerTag Link device:

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

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

Access to Variables

A Modbus variable can have the following attributes:

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

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

Function 8: Modbus Diagnostics

Structure of Modbus Messages Concerning PowerTag Link Diagnostic Counter Management

Request

Definition	Number of Bytes	Value
Slave number	1 byte	0xFF
Function code	2 bytes	08 (0x08)
Sub-function code	2 bytes	22 (0x0016)
Operation code	2 bytes	1 ((0x0001) see below list for operation code)
Diagnostic control	2 bytes	0x0100 (see below list for diagnostic control)
Starting entry index	1 byte	0x00 (0 to 255)

The operation code field is used to select the diagnostic and the statistic data to be read from the device.

Most Significant Byte								Least Significant Byte							
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Reserved				Protocol Version				Operation Code							

Bit assignments are included in the table below:

Bit	Field	Description
15...12	Reserved	Must be zero
11...8	Protocol Version (PV)	Indicates version of the protocol of the client (requestor) Values are: 0x00 (initial version)
7...0	Operation Code	Indicates function to be performed by the command Values are: <ul style="list-style-type: none"> ● 0x01 = Read diagnostic data ● 0x02 = Clear diagnostic data ● 0x03 = Clear all diagnostic data ● 0x04 = List ports

The diagnostic control field provides the data selection information for this protocol as well as specifies the logical port from which, the data is to be retrieved (if applicable). The diagnostic control field is defined as shown in the following table:

Most Significant Byte								Least Significant Byte							
15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Data Selection Code								Port Select							

Bit assignments are included in the following table:

Bit	Field	Description
15...8	Data Selection Code (DS)	Indicates the diagnostic data to retrieve or to clear from the logical port. See the table below for valid values.
7...0	Port Select (PS)	Indicates the logical port number to retrieve the selected data from <ul style="list-style-type: none"> ● 0x00 = the internal port of a device that supports an embedded switch or any single port not accessible externally ● 0x01 to 0xFE = logical number of the desired port ● 0xFF = the port the current request came in <p>This value should be 0xFF if the requested data is not port specific. See the Port Select Needed column in the table below for which Data Selection Code requires a valid port select value.</p>

Data selection code

Data Selection Code	Diagnostic Data Retrieved	Port Select Needed	Type
0x00	Reserved		Public
0x01	Basic network diagnostics		Public
0x02	Ethernet port diagnostics	Yes	Public
0x03	Modbus TCP port 502 diagnostics		Public
0x04	Modbus TCP port 502 connection table		Public
0x05 to 0x7E	Reserved for other public codes		Public
0x7F	Data structure offsets		Public
0x80 to 0xFF	Reserved		Reserved

Response

Definition	Number of Bytes	Value
Slave number	1 byte	0xFF
Function code	2 bytes	08 (0x08)
Sub-function code	2 bytes	22 (0x0016)
Operation code	2 bytes	1 ((0x0001) see the above list for operation code)
Diagnostic control	2 bytes	0x0100 (see the above list for diagnostic control)
Starting entry index	1 byte	0x00 (0 to 255)

Resetting Counters

The counters are reset to 0:

- When they reach the maximum value 65535.
- When they are reset by a Modbus command (function code 8, sub-function code 10).
- When the power is cut off, or
- When the communication parameters are modified.

Function 43-14: Read Device Identification (Basic)

Structure of Modbus Read Device Identification Messages

The ID consists of ASCII characters called objects.

Request for basic information

Definition	Number of Bytes	Value
Slave 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
Slave 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 bytes Schneider Electric
Object 1: product code	Object number	1 byte 0x01
	Object length	1 byte 0x08
	Object content	8 bytes A9XMWD20/A9XMWD100
Object 2: version number	Object number	1 byte 0x02
	Object length	1 byte 0x06 (minimum)
	Object content	6 bytes minimum Vx.y.z

Request for complete information

Definition	Number of Bytes	Value
Slave 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
Slave 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

Definition		Number of Bytes	Value
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	18 bytes	Schneider Electric
Object 1: product code	Object number	1 byte	0x01
	Object length	1 byte	0x08
	Object content	8 bytes	A9XMWD20/A9XMWD100
Object 2: version number	Object number	1 byte	0x02
	Object length	1 byte	0x06 (minimum)
	Object content	6 bytes minimum	Vx.y.z

NOTE: The above table describes how to read the ID of a PowerTag Link.

Function 43–15: Read Date and Time

Structure of Modbus Read Date and Time Messages

Request

Definition	Number of Bytes	Value	Example
Slave number	1 byte	0x2F	47
Function code	1 byte	0x2B	43
Sub-function code	1 byte	0x0F	15
Reserved	1 byte	0x00	Reserved

Response

Definition			Number of Bytes	Value	Example
Slave number			1 byte	0x2F	47
Function code			1 byte	0x2B	43
Sub-function code			1 byte	0x0F	15
Reserved			1 byte	0x00	Reserved
Date and time ⁽¹⁾	byte 1	Not used	1 byte	0x00	Not used
	byte 2	Year	1 byte	0x0A	Year 2010
	byte 3	Month	1 byte	0x0B	Month of November
	byte 4	Day of the month	1 byte	0x02	Second day of the month
	byte 5	Hour	1 byte	0x0E	14 hours
	byte 6	Minute	1 byte	0x20	32 minutes
	byte 7 and byte 8	Millisecond	2 bytes	0x0DAC	3.5 seconds

(1) See description of the DATE type ([see page 117](#)).

Function 43-16: Write Date and Time

Structure of Modbus Write Date and Time Messages

Request

Definition			Number of Bytes	Value	Example
Slave number			1 byte	0x2F	47
Function code			1 byte	0x2B	43
Sub-function code			1 byte	0x10	16
Reserved			1 byte	0x00	Reserved
Date and time ⁽¹⁾	byte 1	not used	1 byte	0x00	Not used
	byte 2	Year	1 byte	0x0A	Year 2010
	byte 3	Month	1 byte	0x0B	Month of November
	byte 4	Day of the month	1 byte	0x02	Second day of the month
	byte 5	Hour	1 byte	0x0E	14 hours
	byte 6	Minute	1 byte	0x20	32 minutes
	byte 7 and byte 8	Millisecond	2 bytes	0x0DAC	3.5 seconds
⁽¹⁾ See description of the DATE type (see page 117).					

Response

Definition			Number of Bytes	Value	Example
Slave number			1 byte	0x2F	47
Function code			1 byte	0x2B	43
Sub-function code			1 byte	0x10	15
Reserved			1 byte	0x00	Reserved
Date and time ⁽¹⁾	byte 1	Not used	1 byte	0x00	Not used
	byte 2	Year	1 byte	0x0A	Year 2010
	byte 3	Month	1 byte	0x0B	Month of November
	byte 4	Day of the month	1 byte	0x02	Second day of the month
	byte 5	Hour	1 byte	0x0E	14 hours
	byte 6	Minute	1 byte	0x20	32 minutes
	byte 7 and byte 8	Millisecond	2 bytes	0x0DAE	3.502 seconds
⁽¹⁾ See description of the DATE type (see page 117).					

Function 100–4: Read Non-Adjacent Registers

Structure of Modbus Read n Non-Adjacent Registers Messages Where $n \leq 100$

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

Request

Definition	Number of Bytes	Value
Modbus slave 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 master gives the transmission number in the request.		

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

Response

Definition	Number of Bytes	Value
Modbus slave 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 slave sends back the same number in the response.		

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



DOCA0157EN-02

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

03/2020