Acti9 PowerTag Link
User Manual

07/2019

DOCA0157EN-01

www.schneider-electric.com

The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof. Neither Schneider Electric nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein. If you have any suggestions for improvements or amendments or have found errors in this publication, please notify us.

You agree not to reproduce, other than for your own personal, noncommercial use, all or part of this document on any medium whatsoever without permission of Schneider Electric, given in writing. You also agree not to establish any hypertext links to this document or its content. Schneider Electric does not grant any right or license for the personal and noncommercial use of the document or its content, except for a non-exclusive license to consult it on an "as is" basis, at your own risk. All other rights are reserved.

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.

Table of Contents

Safety Information

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.

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 Acti9 PowerTag Link communication system.

Validity Note

The Acti9 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 Acti9 PowerTag Link communication system allows switchboards and busbar truncking 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 Acti9 PowerTag Link (English, Dutch, French, German, Italian, Portuguese, Spanish, Chinese, Russian)	PHA81113
Instruction Sheet for the PowerTag Acti9 M63 Wireless Communication Energy Sensors (English, Dutch, French, German, Italian, Portuguese, Spanish, Chinese, Russian)	EAV31628_web
Instruction Sheet for the PowerTag Acti9 P63 Wireless Communication Energy Sensors (Chinese, Dutch, English, French, German, Italian, Portuguese, Romanian, Russian, Spanish)	QGH78639
Instruction Sheet for the PowerTag Acti9 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.schneider-electric.com/en/download

Chapter 1
Acti9 PowerTag System

What Is in This Chapter?

This chapter contains the following topics:

Overview

Introduction

The Acti9 PowerTag system is used to monitor the electrical distribution installation through any supervision system.

Wireless devices in the Acti9 PowerTag system are used to monitor, and measure the electrical switchboards and busbar trunking systems via a Modbus TCP/IP communication network.

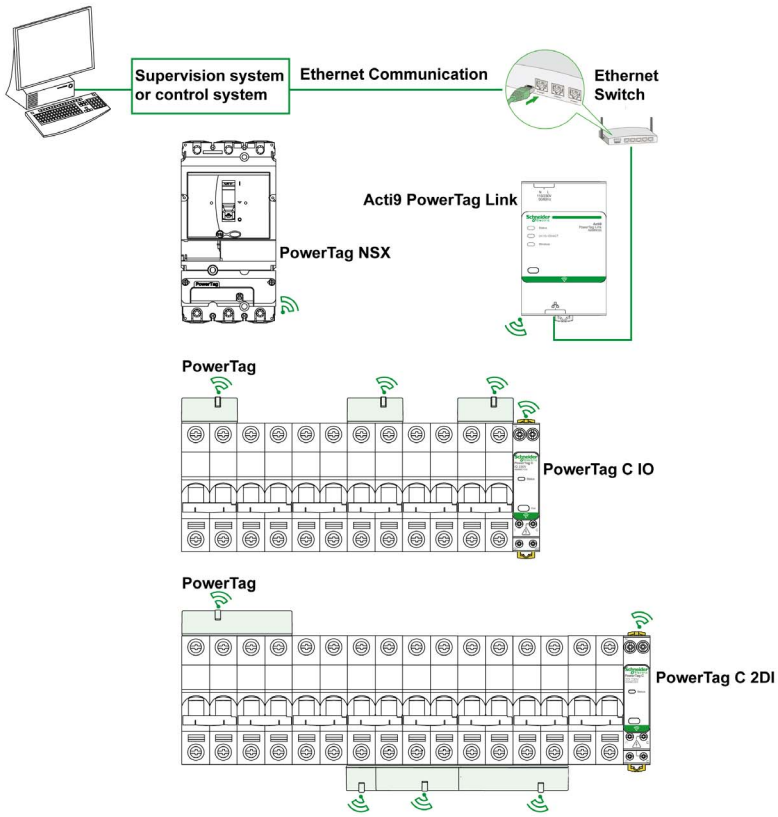
The Acti9 PowerTag system collects the data from electrical switchboards and busbar trunking systems in real time, thus contributing to achieve energy efficiency targets or monitoring final loads.

This system consists of:
- Acti9 PowerTag Link
- PowerTag energy sensors (PowerTag Acti9 M63 (for iC60 offer), PowerTag Acti9 P63 (for DT40 and iC40 offers), PowerTag Acti9 F63 (for other devices such as VigiBlock and specific installations).
- PowerTag NSX energy sensors (for Compact NSX, Compact INS, Compact INV).

This system offers the following advantages and services:
- Telemetering applications.
  - Load unbalance monitoring.
  - Power and voltage loss monitoring.
- Energy management and regulations.

Acti9 PowerTag Link is a wireless gateway that exposes over TCP/IP all the Modbus registers of metering and monitoring data to any supervision system.

Acti9 PowerTag System Architecture Diagram



Acti9 PowerTag Link also manages web pages in order to configure settings or to monitor the wireless devices.

⚠ WARNING

POTENTIAL COMPROMISE OF SYSTEM AVAILABILITY, INTEGRITY, AND CONFIDENTIALITY

- Change the default passwords to help prevent unauthorized access to device settings and information.
- Disable unused ports or services and default accounts to 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 cyber security best practices (for example, least privilege, separation of duties) to help prevent unauthorized exposure, loss, or modification of data and logs, or interruption of services.

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

Acti9 PowerTag Link

Acti9 PowerTag Link Acting as a Gateway

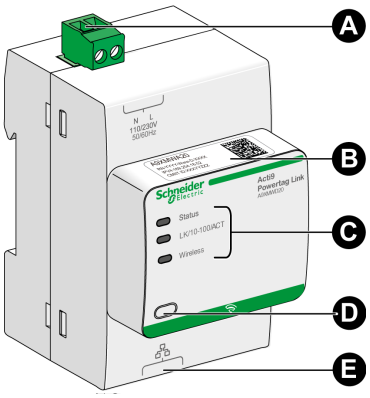
The wireless communication devices provide compact and high density metering solution with rich and accurate data for building systems (that can send energy, power, current, voltage, temperature and power factor to Acti9 PowerTag Link concentrator).

You can configure:

- up to 20 wireless communication devices with PowerTag Link reference A9XMWD20.
- up to 100 wireless communication devices with PowerTag Link reference A9XMWD100 and up to 20 PowerTag Control devices among them.

The Acti9 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 Acti9 PowerTag Link are listed as follows:

- A9MEM15xx
- LV43402x

Refer to the PowerTag Selection Guide:
https://www.schneider-electric.com/en/download/document/CA908058E

Principle of Wireless Device Installation

The Acti9 PowerTag Link is installed in such a manner that the Wireless communication devices are distributed around the gateway. It is recommended to install the Acti9 PowerTag Link in the center of the switchboard. The distance between the wireless communication devices and the gateway should be smaller than 3 meters.

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.

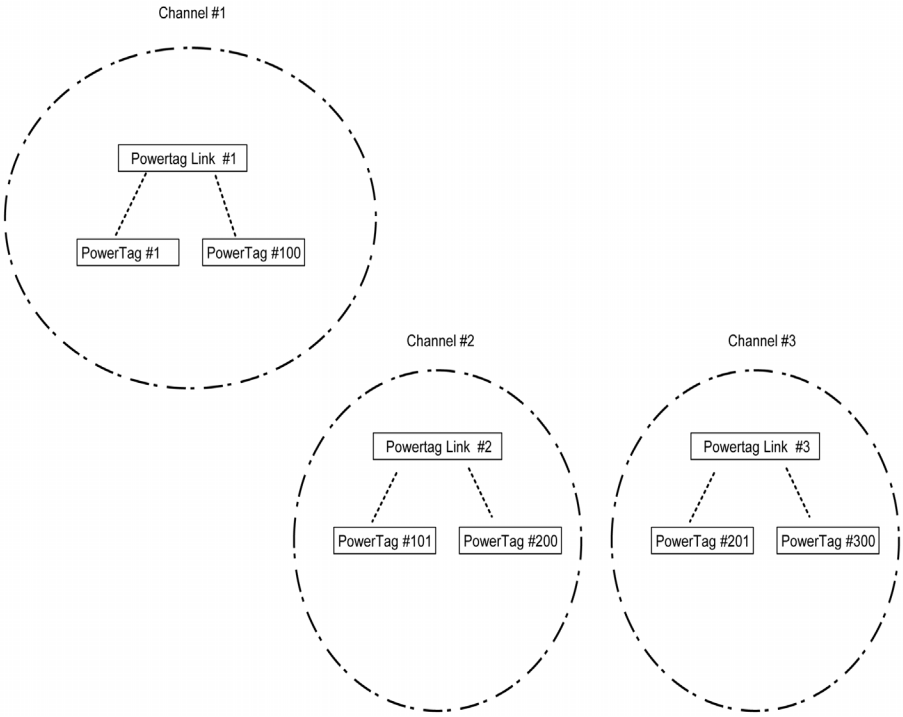
For any installation with more than 400 wireless devices, please consult us for a detailed study of the RF plan.

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 Acti9 PowerTag Link via the web pages and is applied to all the wireless communication devices that are commissioned with Acti9 PowerTag Link.
- An Acti9 PowerTag Link device can manage.
  - up to 20 wireless communication devices with PowerTag Link reference A9XMWD20.
  - up to 100 wireless communication devices with PowerTag Link reference A9XMWD100, and up to 20 PowerTag Control devices among them.
- A set of Acti9 PowerTag Link devices has to be installed and commissioned to concentrate all the needed Wireless communication devices.


Channel #1
Powertag Link #1
PowerTag #1
PowerTag #100
Channel #2
Powertag Link #2
PowerTag #101
PowerTag #200
Channel #3
Powertag Link #3
PowerTag #201
PowerTag #300

Chapter 2
Technical Characteristics

Technical Characteristics of the Acti9 PowerTag Link

Main Characteristics

Characteristic		Value
Supply voltage	Us	110/230 V AC ± 20 %, 2 A
Frequency		50/60 Hz
Power consumption		5 VA
Communication interface		Ethernet 10/100 BASE-T, Cable length ≤ 100 m Cat.6 STP
maximum number of wireless devices		Up to 20 sensors for PowerTag Link Up to 100 sensors for PowerTag Link HD
Automatic IP configuration		DHCP client (Ethernet port)
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		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 Acti9 PowerTag Link

What Is in This Chapter?

This chapter contains the following topics:

Mounting

Introduction

The Acti9 PowerTag Link can be mounted on a DIN rail and can be also installed horizontally.

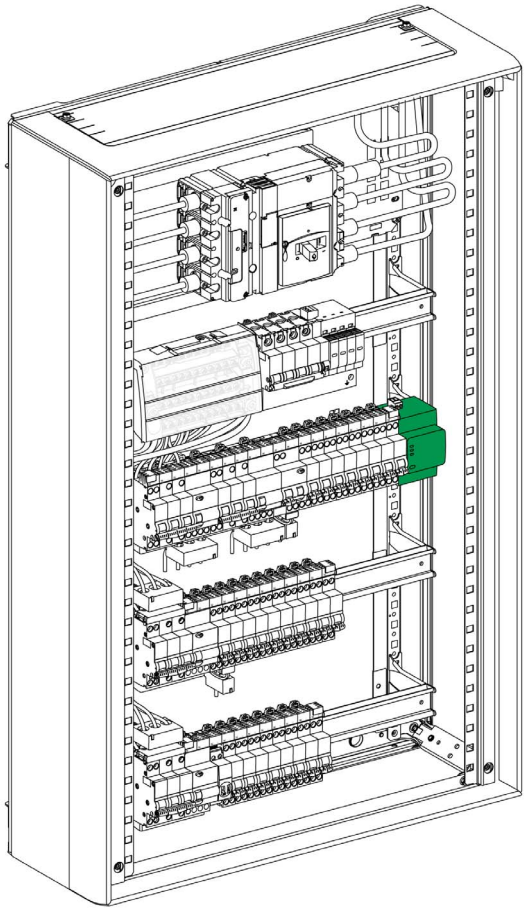
The ambient operating temperature is:
- Horizontal and vertical mounting: −25°...+60°C

⚠ DANGER

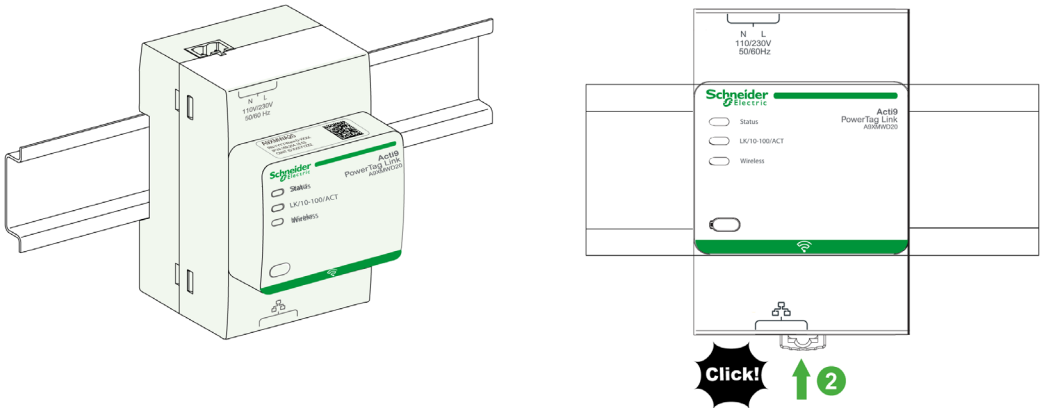
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- 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 Acti9 PowerTag Link device on a DIN rail:

Step	Action
1	Position the Acti9 PowerTag Link onto the DIN rail.
2	Slide the Acti9 PowerTag Link device until it clicks into place.

Wiring

Introduction

Protect Acti9 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

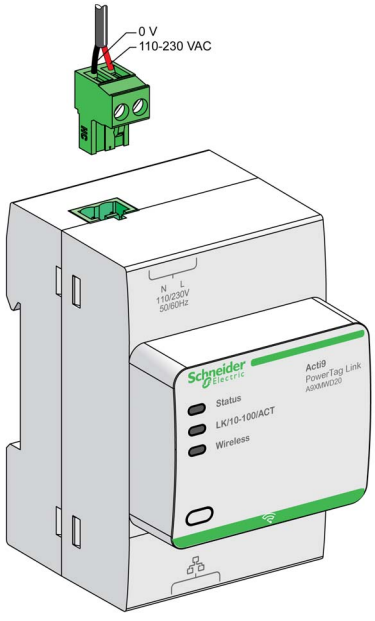
⚠ ⚠ DANGER

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 connecting 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.

The following figure gives the characteristics of cables that can be used to connect the 230 Vac power supply:

7 mm	0.2...1.5 mm²	0.8 N.m	0.6 x 3.5

NOTICE

HAZARD OF EQUIPMENT DAMAGE

Plug the power-supply connector (Phase-Neutral) into the power-supply socket with marking N-L on the Acti9 PowerTag Link product.

Failure to follow these instructions can result in equipment damage.

Chapter 4
General Principle to Commission an Acti9 PowerTag System

What Is in This Chapter?

This chapter contains the following sections:

Section 4.1
Commissioning Overview

What Is in This Section?

This section contains the following topics:

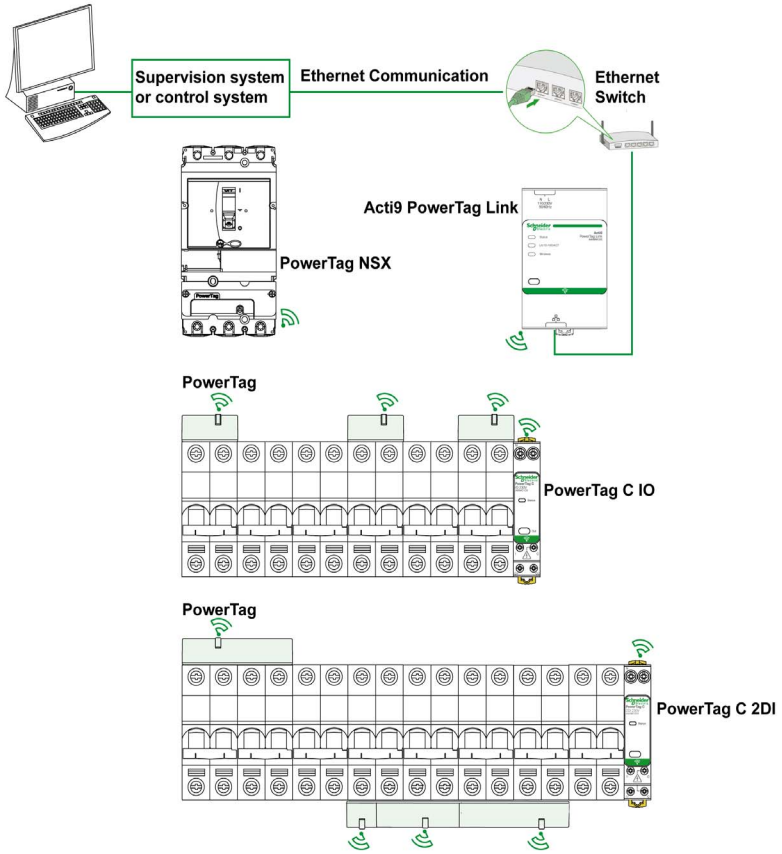
Overview

The commissioning of an Acti9 PowerTag Link system can be performed using:

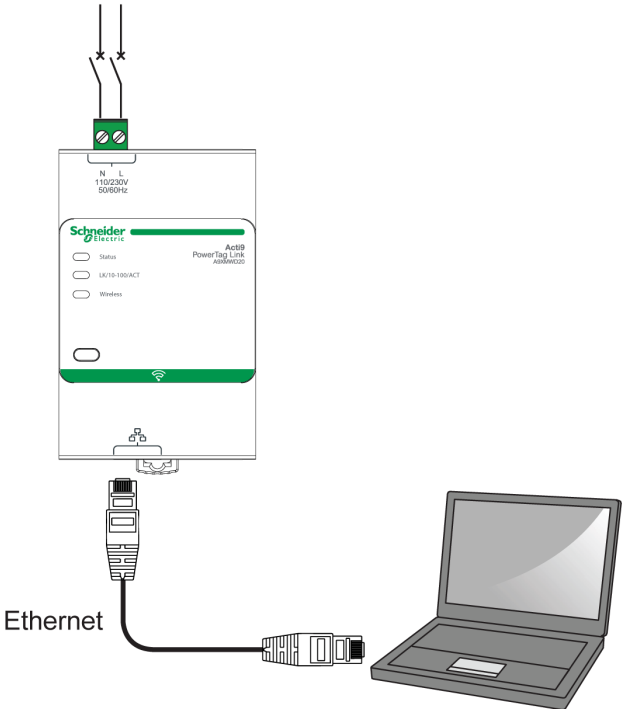
- the EcoStruxure Power Commission (see *Ecostruxure Power Commission Online Help*).
- the Acti9 PowerTag Link web pages. The web pages are autonomous to configure any devices connected or paired with Acti9 PowerTag Link.

NOTE:

- Before commissioning the Acti9 PowerTag Link device, update the firmware of the Acti9 PowerTag Link device.
- The firmware upgrade of the Acti9 PowerTag Link device can only be done using the EcoStruxure Power Commission. see *Ecostruxure Power Commission Online Help*.



Ethernet Connection



Acti9 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 webpages.

Step	Action
1	Disconnect your computer from all your actions
2	Connect an Ethernet straight cable between your PC and the Ethernet port on the Acti9 PowerTag Link

Section 4.2
Pre-Requisites

What Is in This Section?

This section contains the following topics:

Installation of EcoStruxure Power Commission Software

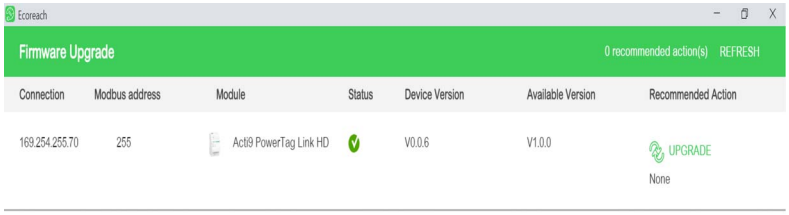
Downloading and Installation

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

Firmware Upgrade

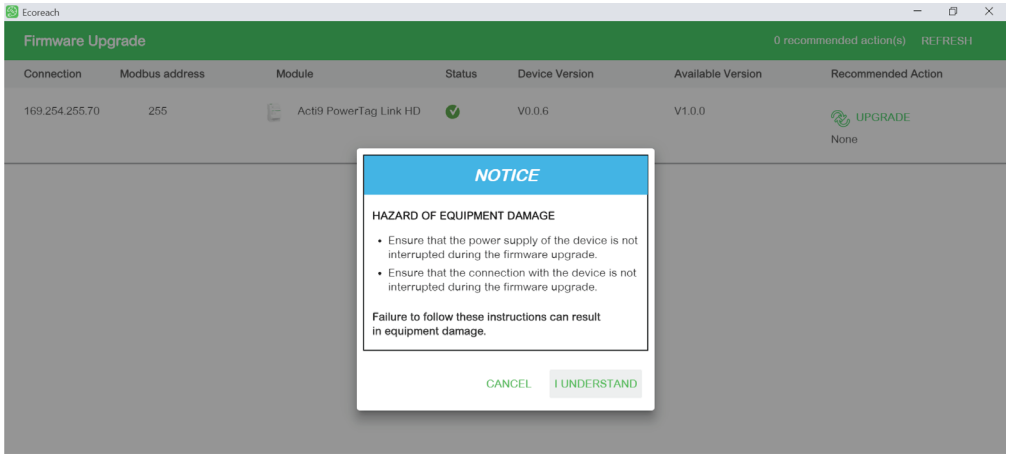
Firmware Upgrade

The firmware upgrade of Acti9 PowerTag Link can only be done using the EcoStruxure Power Commission software if the Acti9 PowerTag Link is not in the latest firmware version.



Firmware Compatibility

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



Chapter 5
Getting Started with EcoStruxure Power Commission Software

What Is in This Chapter?

This chapter contains the following topics:

Basic Commissioning of Wireless Devices with EcoStruxure Power Commission Software

Overview

Follow the steps given in the table to commission the Acti9 PowerTag Link with EcoStruxure Power Commission software:

Step	Action
1	Connect the Acti9 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 Acti9 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 Acti9 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 PowerTag energy sensors. **Result**: The discovered PowerTag energy sensor is displayed.
7	Click **Locate** to find the PowerTag energy sensor in an electrical panel **Result**: The **Locate Wireless Device** dialog box is displayed and the associated PowerTag energy sensor 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 PowerTag energy sensor.
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 Acti9 PowerTag Link by clicking on **Write to Device** button. **Result:** Message “write to device successful” when finished.
17	Save Acti9 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 Acti9 PowerTag Link is defined as a "device".

Advanced Commissioning of Wireless Devices with EcoStruxure Power Commission Software

It is possible to achieve an advanced commissioning 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 PowerTag energy sensors of Acti9 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:

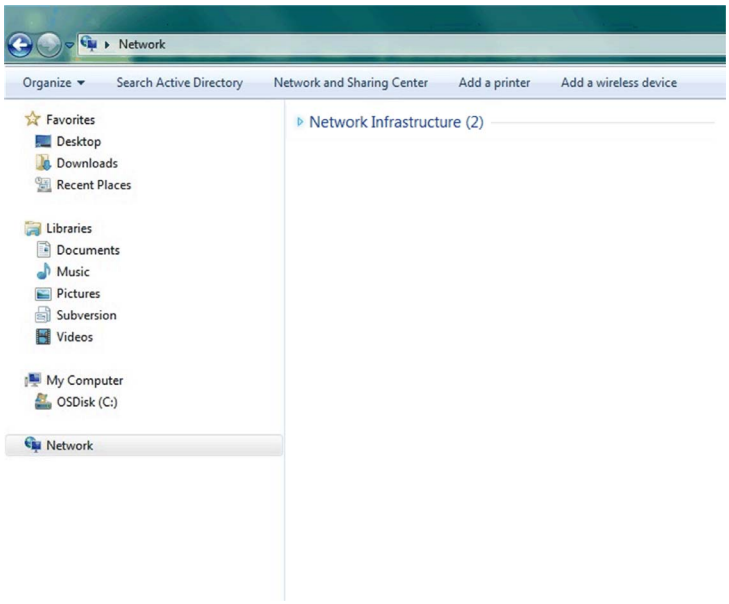
Discovering Acti9 PowerTag Link through Web Browser

Accessing Acti9 PowerTag Link from Windows Operating System

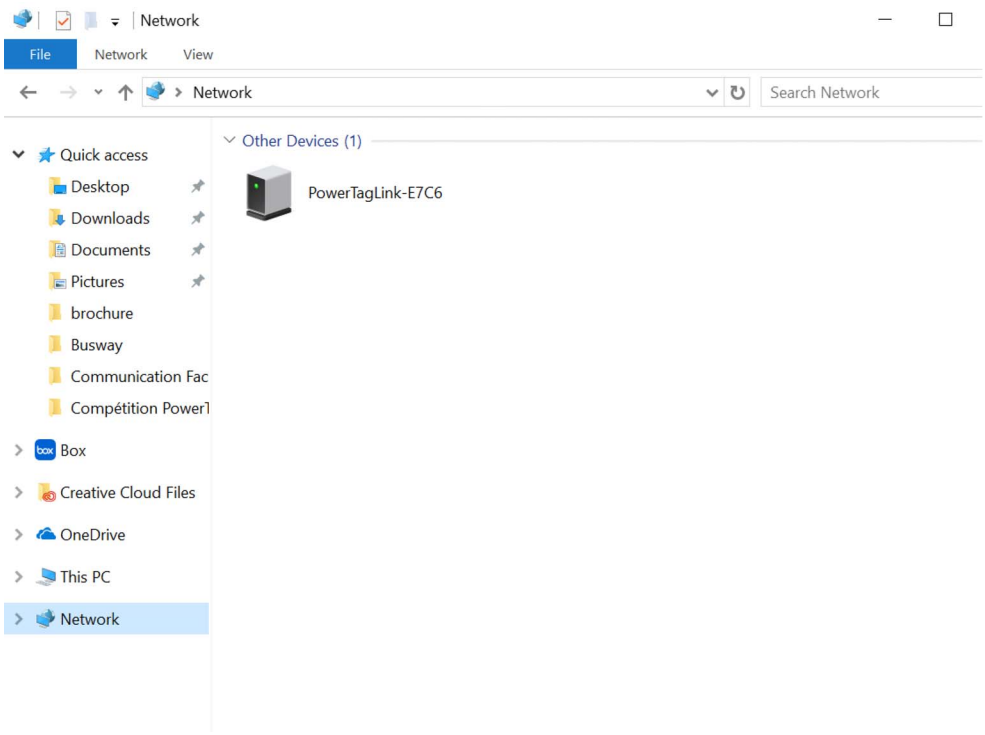
Follow the steps given in the table to access the web page of Acti9 PowerTag Link through Windows Explorer from Windows operating system:

Step	Action
1	Open the Windows Explorer and click **Network** to display the Acti9 PowerTag Link icon in the list of devices, this may take up to 2 minutes after device power on. (if the Acti9 PowerTag Link icon does not appear, change the PC settings as given in the note below).
2	Double-click the Acti9 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 Acti9 PowerTag Link.



The following figure shows the Windows Explorer screen after the discovery of Acti9 PowerTag Link.



If Acti9 PowerTag Link IPV4 is in DHCP mode, the computer must also be in DHCP mode. If Acti9 PowerTag Link uses a static IP, the computer 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 Acti9 PowerTag Link from the Operating System other than Windows

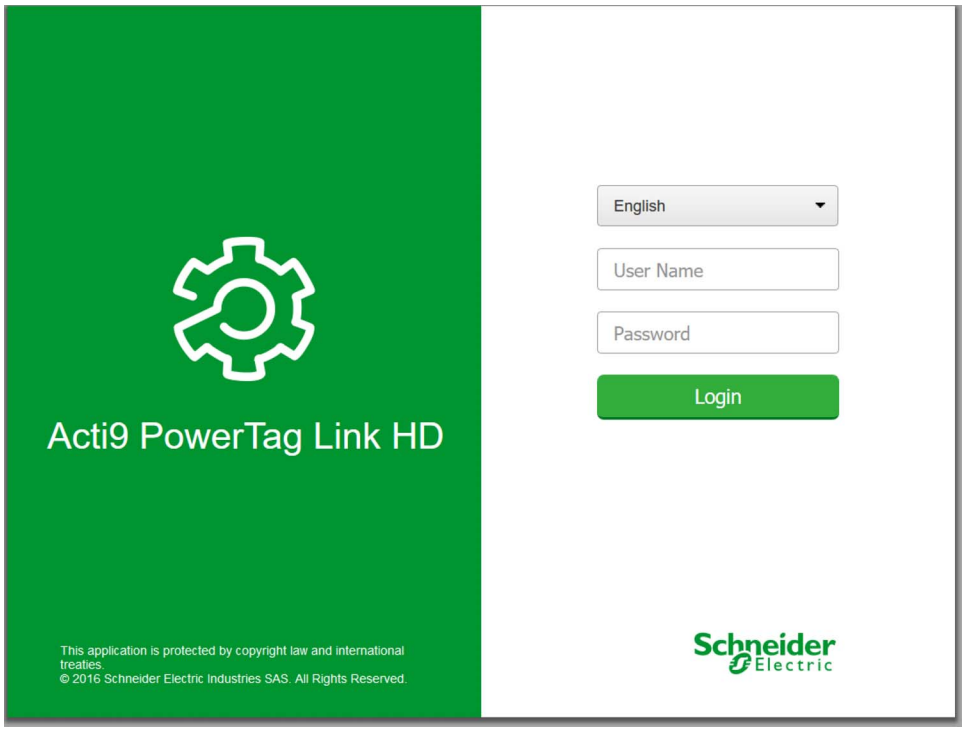
Follow the steps given in the table to access the web page of Acti9 PowerTag Link from the operating system other than Windows:

Step	Action
1	Launch the Internet browser.
2	Type the IPv4 address (encoded into the data matrix on the upper side of Acti9 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**.

Login into Web Pages

Login Page

The **Login** page is used to enter the user credentials and select the preferred language to access Acti9 PowerTag Link web pages. When the user connects to the Acti9 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**

Enter the user name and password to access the web pages related to Acti9 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 logout of the Acti9 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 Acti9 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:

- Acti9 PowerTag Link
- Wireless devices

Web Page Organization

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

Basic Commissioning of Wireless Devices

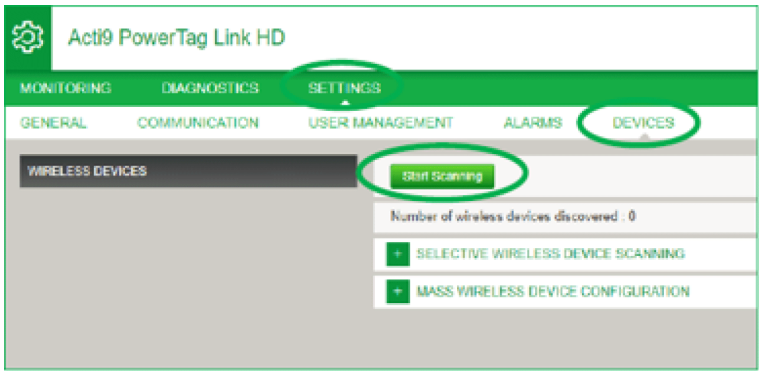
Principle of Wireless Device Commissioning

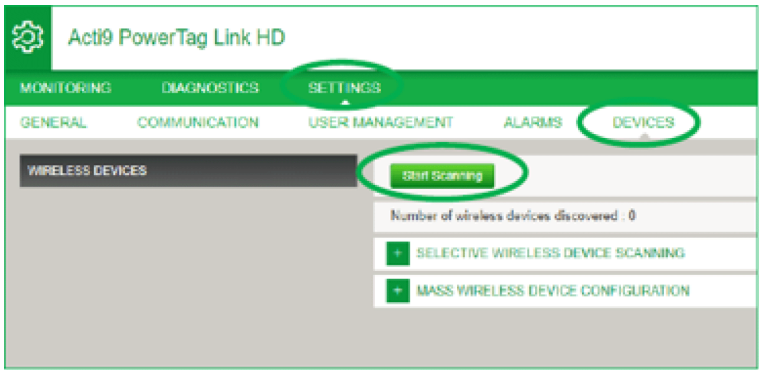
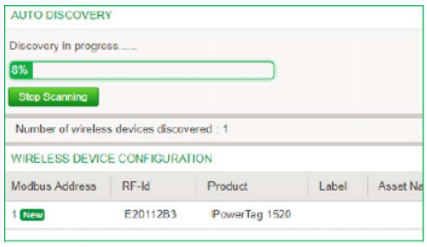
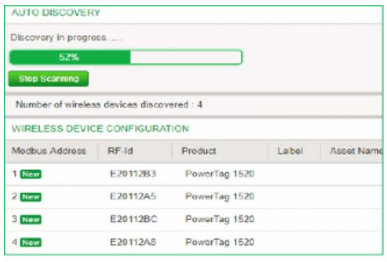
The principle of wireless device commissioning consists of two steps:

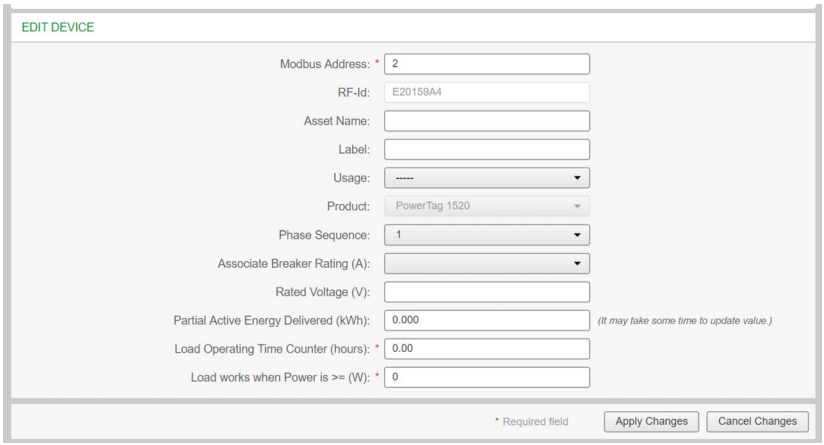
- Pairing the wireless devices withe the concentrator
- Configuring the wireless devices

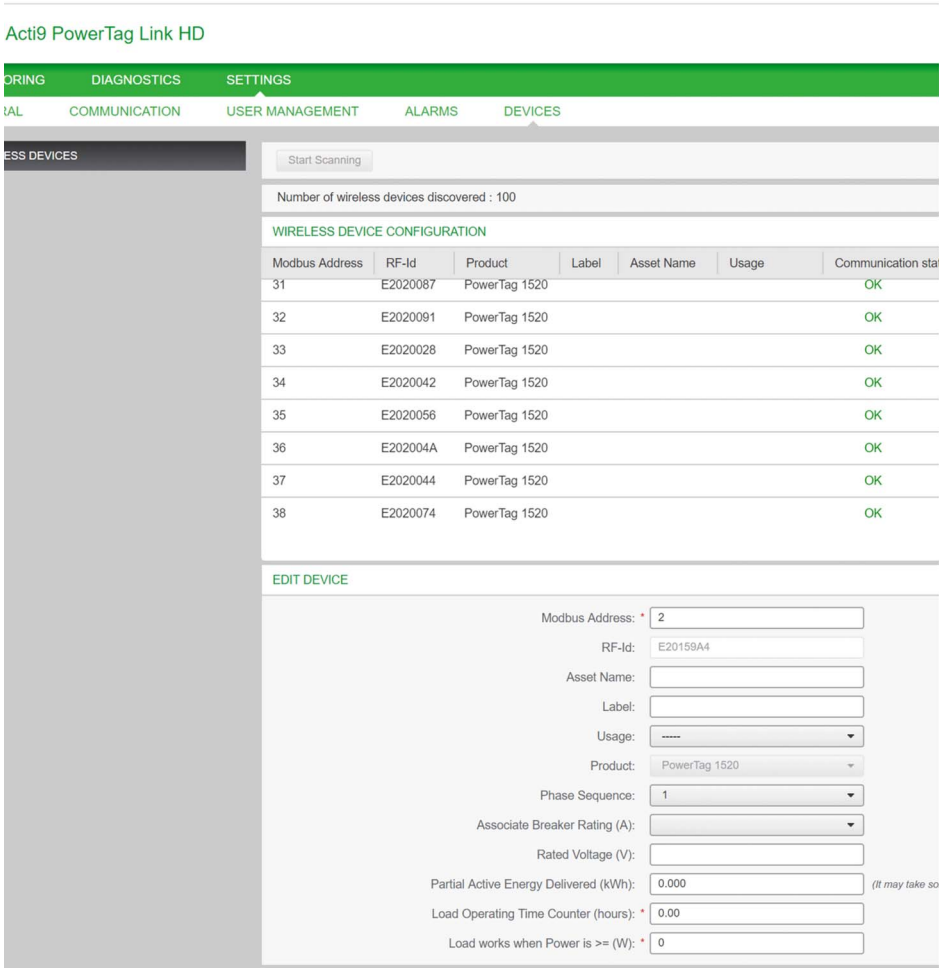
Commissioning the Wireless Communication Devices

The configuration of the wireless communication devices is done with Acti9 PowerTag Link web page.

Step	Action	
1	Launch the Acti9 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 white list, the gateway will only pair the wireless devices belonging to the defined white list. Pairing process options are:	
	a	**Free Pairing** Recommended when: ● no particular Modbus address plan is required. ● pairing a reduced number of wireless devices (up to 20). **Initial state:** All devices are powered ON. Click **Start Scanning**.  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.

Step	Action	
	b	**Controlled Pairing** Recommended when: ● a Modbus address plan shall be followed. ● pairing a large number of wireless devices (more than 20.) Applicable when: ● the wireless devices can be individually powered. ● the wireless devices are installed downstream the related circuit breaker. Initial state: ● All PowerTag are powered OFF Click **Start Scanning**.  Power on the wireless devices, one by one, respecting the required order.     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. **NOTE:** Modbus address can be changed after completing the of pairing process.
5	Select the wireless device to configure and click **Locate** to find the device in the panel. **Result**: The associated device blinks in the panel.	
6	If one of the located wireless device is not part of your selection, click **Delete** to reject the device.	

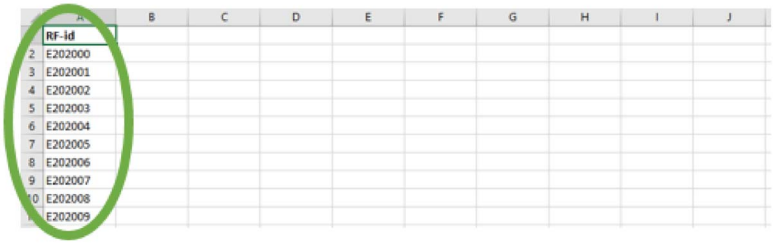
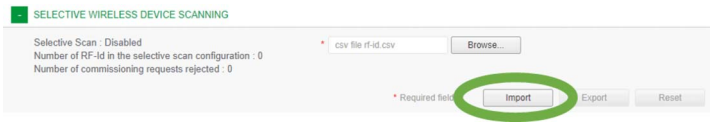
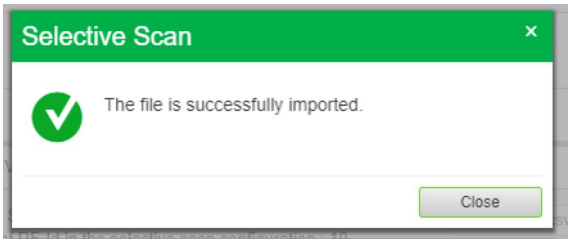
Step	Action
7	Configure the associated device as below: 



NOTE: If you have multiple panels and if each panel has PowerTag energy sensors, then it is recommended to switch on power and commission each Acti9 PowerTag Link one by one if possible. This helps to discover only the required wireless communication devices specific to each Acti9 PowerTag Link and avoids discovering the long list of devices.
If other Acti9 PowerTag Link devices are powered on while you commission a new Acti9 PowerTag Link, the new Acti9 PowerTag Link automatically selects the less polluted radio channel, and creates its network on a different channel than the previous Acti9 PowerTag Link devices. This avoids having all the PowerTag energy sensors on the same radio channel.

However, if all panels are powered on and commissioned simultaneously, then locate only the required PowerTag energy sensors in multiple panels and reject the ones you do not want to configure with the panel currently commissioned. All the rejected PowerTag energy sensors can be auto-discovered again from another Acti9 PowerTag Link without any issues.

Advanced Commissioning of Wireless Devices with Web Pages

Step	Action
1	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. 
2	Login to the webpage *(see page 38)*.
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	Import the csv file.  **Result:** A confirmation message is displayed. 
7	Refer to step 4 in Commissioning the Wireless Communication Devices *(see page 40)*.

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.

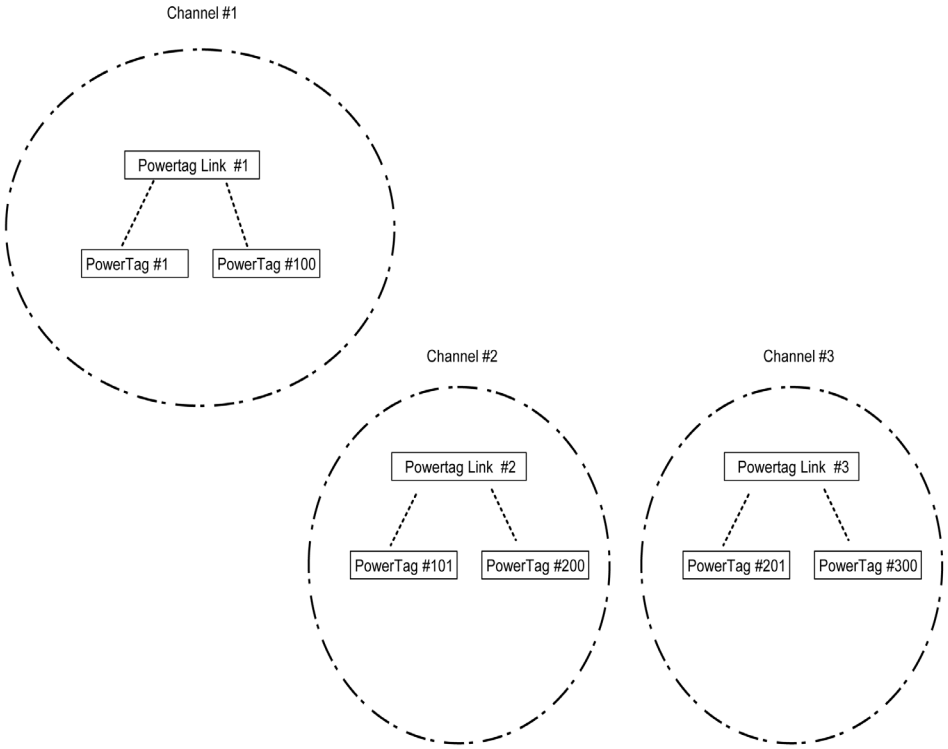
Any modification to the communication period has to be done after the commissioning of the wireless communication devices is completed to avoid slowdown of the commissioning process.

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 Acti9 PowerTag Link and is applied to all the wireless communication devices that are commissioned with Acti9 PowerTag Link.
- A set of Acti9 PowerTag Link devices has to be installed and commissioned to concentrate all the needed Wireless communication devices.

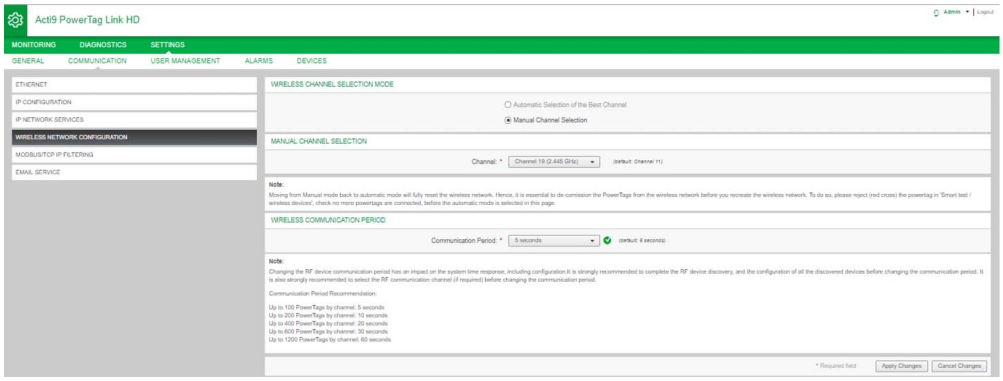
NOTE: The communication period of thermal sensors is different. Please contact Schneider Electric for more information.



Wireless Network Configuration with Webpages

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

Step	Action
1	Launch the Acti9 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.

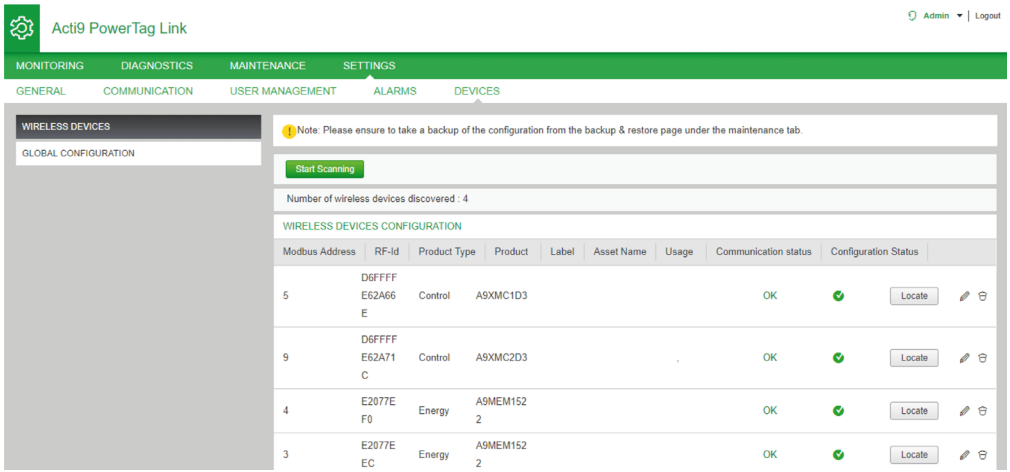
- define the communication period which defines the amount of time each PowerTag sends its data to the Acti9 PowerTag Link. This step has to be done after commissioning.

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 Acti9 PowerTag Link. This step has to be done after commissioning.

Wireless Device Configuration with Web Pages

Step	Action
1	Launch the Acti9 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 Acti9 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. 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 laptop using the backup function available in the Maintenance menu of the webpage. 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
Acti9 PowerTag Link Settings

What Is in This Chapter?

This chapter contains the following sections:

Section 7.1
Acti9 PowerTag Link General Settings

What Is in This Section?

This section contains the following topics:

Identification

Identification

Step	Action
1	Launch the Acti9 PowerTag Link web page in the web browser.
2	Login with user name and password.
3	Click **Settings → General → Identification**.

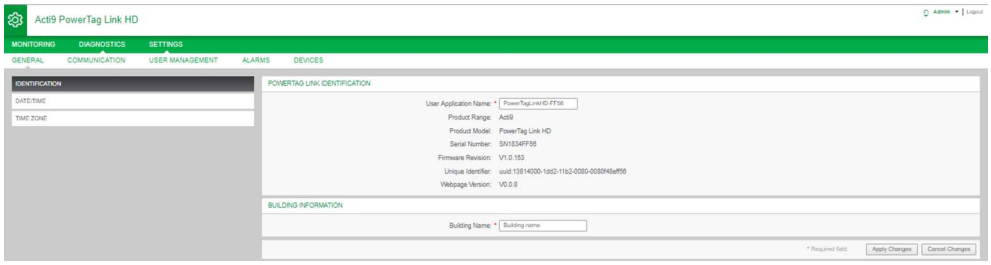
The **Identification** page is used to edit the gateway name and it displays the following parameters:

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.

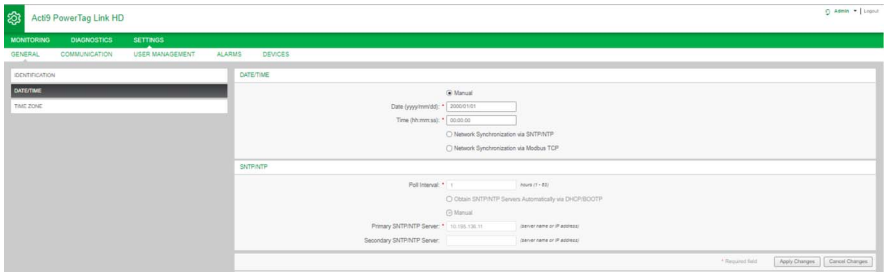


Date/Time

Step	Action
1	Launch the Acti9 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.

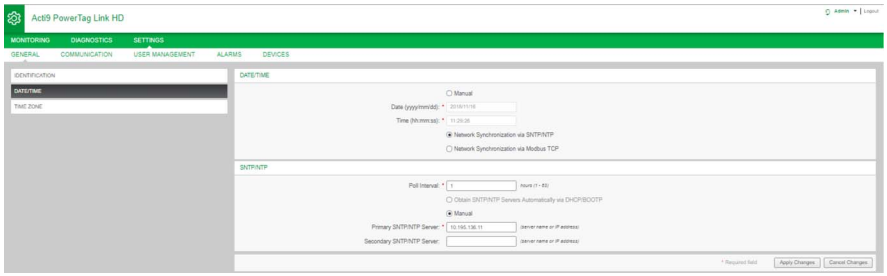
When automatic time configuration is selected and NTP servers are configured, the Acti9 PowerTag Link can communicate with NTP and server to synchronizes its time.

The Acti9 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 Acti9 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: ● 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.

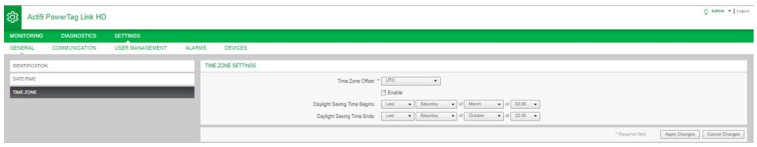


Time Zone Page

Time Zone

Step	Action
1	Launch the Acti9 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 Acti9 PowerTag Link with Web Pages

What Is in This Section?

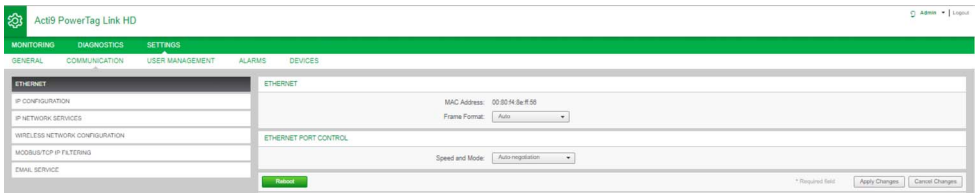
This section contains the following topics:

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 Acti9 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:

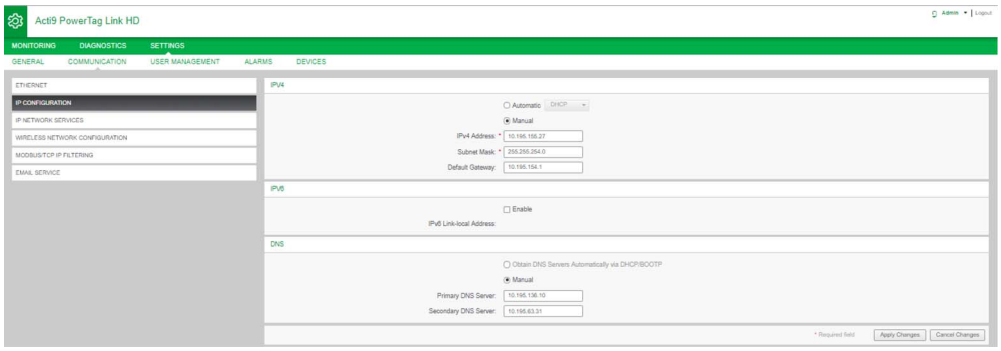
Step	Action
1	Select the type of Ethernet frame format from the **Frame Format** list. It can be **Ethernet II**, **802.3**, or **Auto**. The default value of the frame format is **Auto**.
2	Select the value for speed and mode of the Ethernet port from the **Speed and Mode** list. The value of speed and mode can be one of the following: • **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 Acti9 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 Acti9 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 Acti9 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:

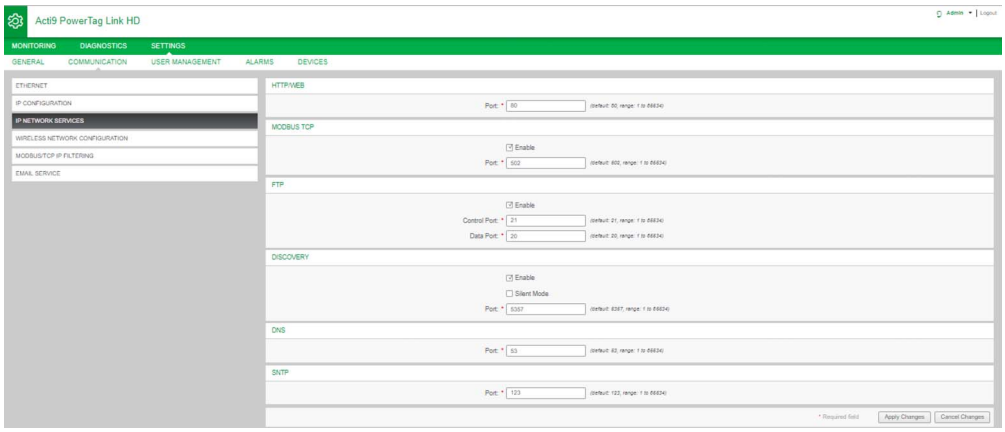
Step	Action
1	Select **Manual**.
2	Enter the **Primary DNS Server** of the device.
3	Enter the **Secondary DNS Server** of the device.
4	Click **Apply Changes** to save the settings. Click **Cancel Changes** to revert the settings.

IP Network Services

Description

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

Step	Action
1	Launch the Acti9 PowerTag Link web page in the web browser.
2	Login with user name and password.
3	Click **Settings** → **Communication** → **IP Network Services**.



The Acti9 PowerTag Link supports HTTP, Modbus/TCP, DNS, SNTP, and discovery services.

The default value of the HTTP port number is 80.

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

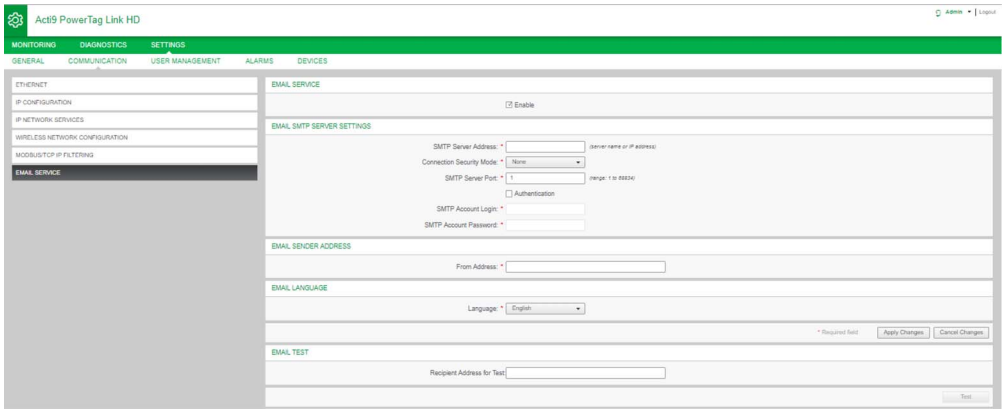
Description

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.

NOTE: Check your IT policies/administrator to get the right IT connection (port, LAN connection to Internet, and email server to use).
The event notifications should not be used if email services are managed internally by a customer IT domain administrator.

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

Step	Action
1	Launch the Acti9 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). Acti9 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: • **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.

Step	Action
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: ● 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.

Chapter 8
Acti9 PowerTag Link Security

What Is in This Chapter?

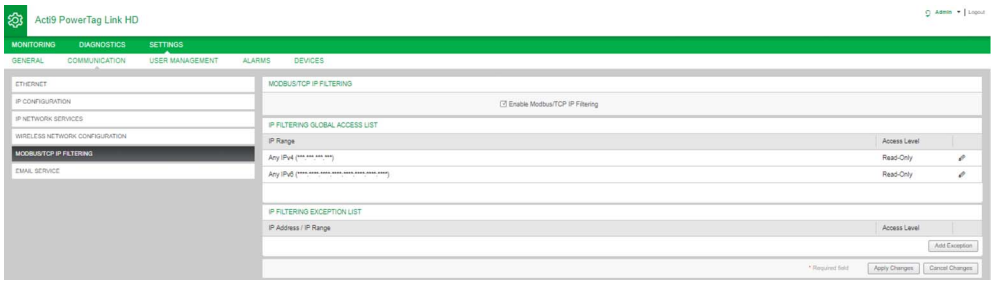
This chapter contains the following topics:

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 Acti9 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.

User Management

Users 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.

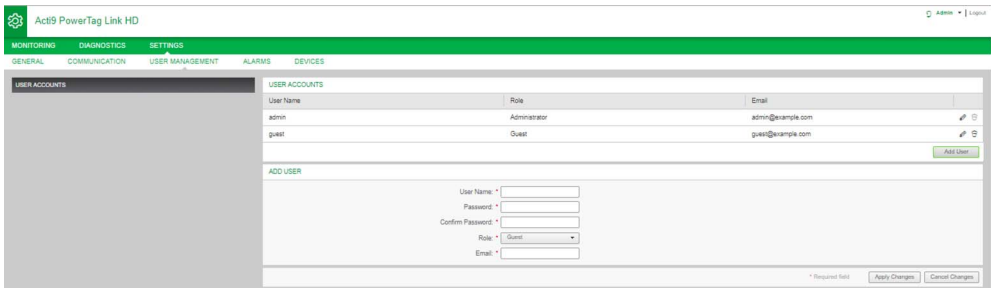
The following table lists the three types of user account supported by Acti9 PowerTag Link and their access rights:

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 number of user accounts at administrator level is up to XX, at operator level is up to YY, and at guest level is up to ZZ.

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

Step	Action
1	Launch the Acti9 PowerTag Link web page in the web browser.
2	Login with user name and password.
3	Click **Settings** → **User Management** → **User Accounts**.

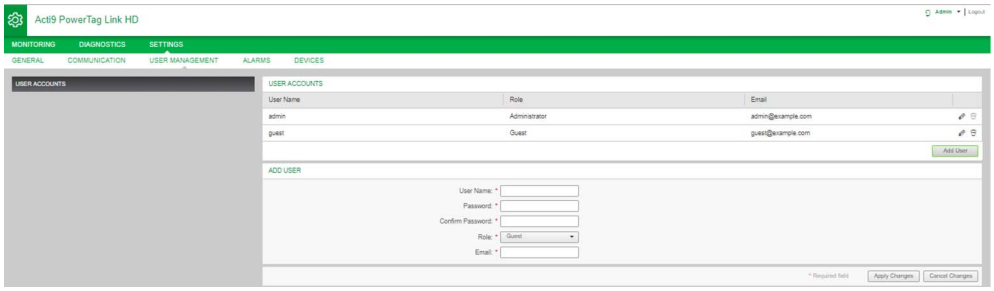


Follow the procedure to add a new user profile:

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.

Chapter 9
Load Monitoring and Control

What Is in This Chapter?

This chapter contains the following topics:

Load Monitoring

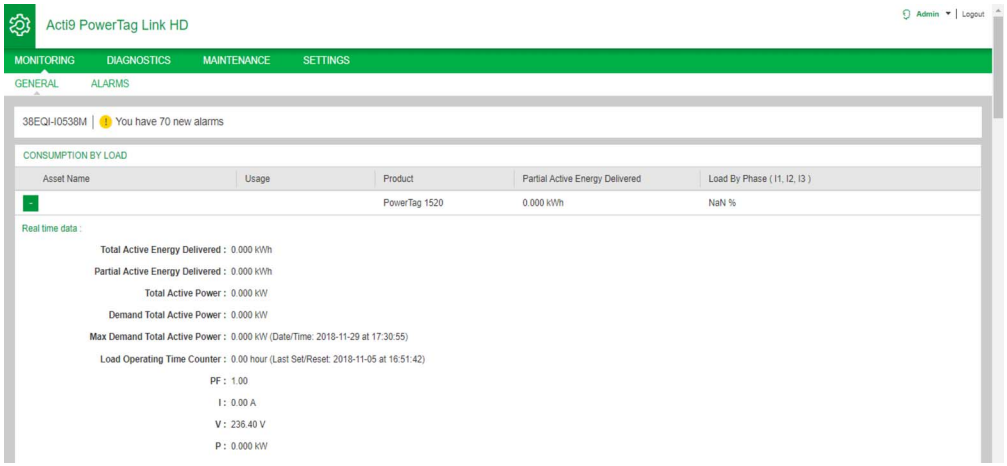
Description

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 Acti9 PowerTag Link web page in the web browser.
2	Login with user name and password.
3	Click **Monitoring** → **General**.

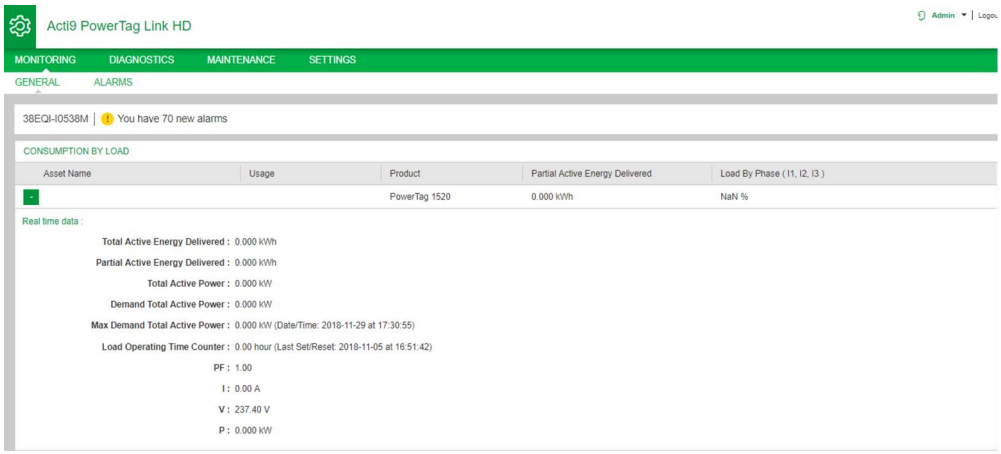


The following information is displayed for the load:

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.

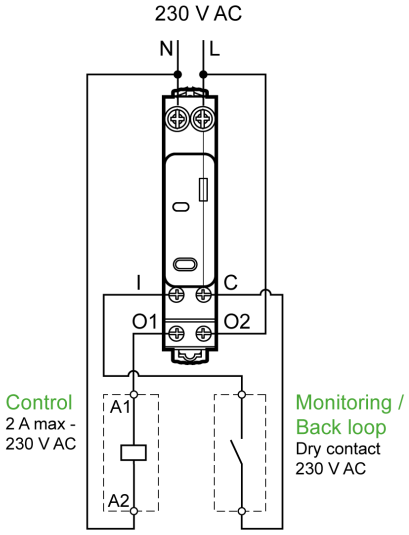
As an example, the following screenshot shows all the real-time data available for each PowerTag sensor:



Status Monitoring and Load Control

PowerTag C IO 230V

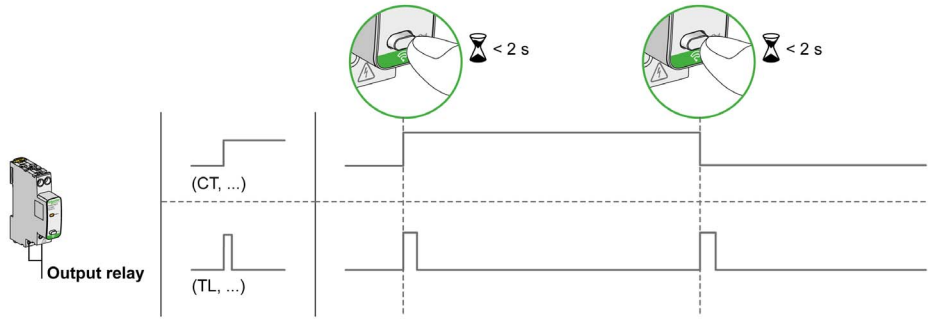
Load control with feedback loop can be achieved with PowerTag Control IO 230V module (reference A9XMC1D3).



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.

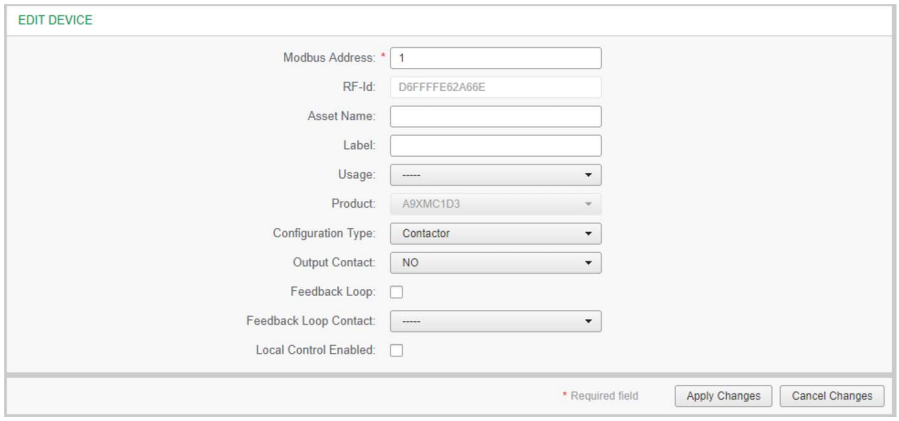


Commissioning and decommissioning are done through web pages.

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.

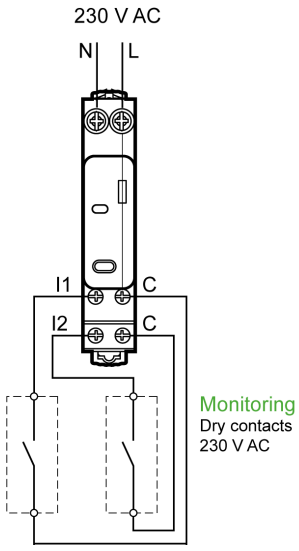
To configure PowerTag C IO 230V, you can refer to the following or to EcoStruxure Power Commission Online Help

Step	Action
1	Click **Start Scanning** to discover the wireless devices connected to the Acti9 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.



PowerTag C 2DI 230V

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



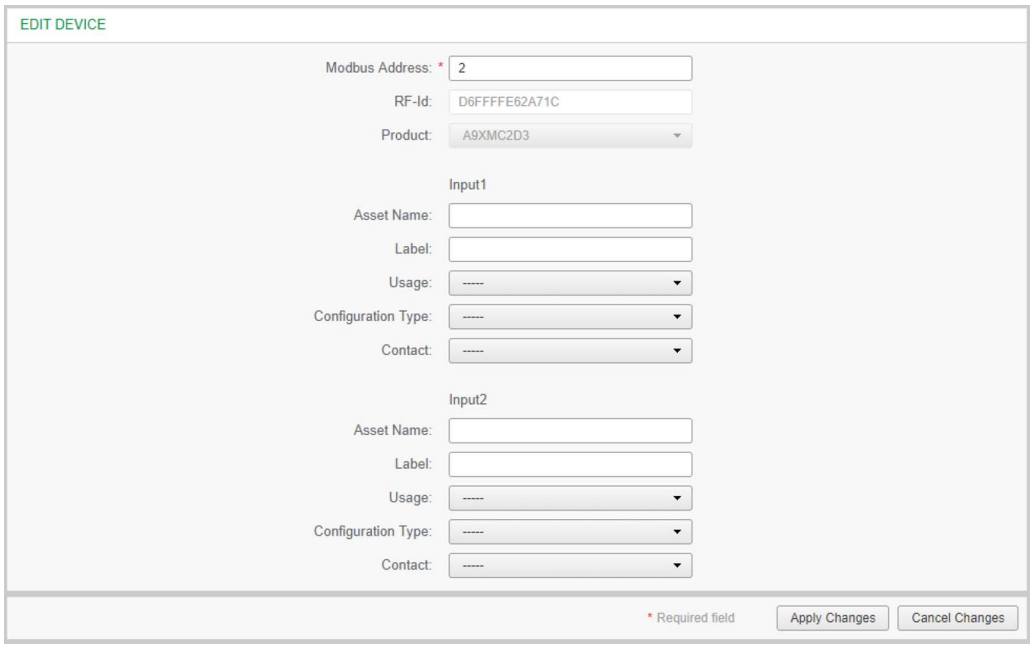
With this solution, you can easily know the status of two contacts or achieve OF/SD daisy chain.

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, please refer to chapter **Wireless Device Commissioning with Web Pages** or refer to EcoStruxure Power Commission Online Help.
To configure PowerTag C 2DI 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 Acti9 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 thse actions for the **Input 2**.
9	Click **Apply Changes** to save the settings. Click Cancel Changes to revert the settings.



Chapter 10
Energy Management

What Is in This Chapter?

This chapter contains the following topics:

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.

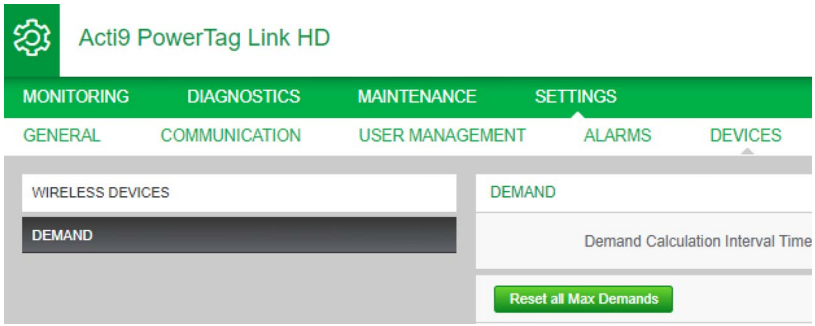
Maximum Power Demand

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.



Chapter 11
Alarms

What Is in This Chapter?

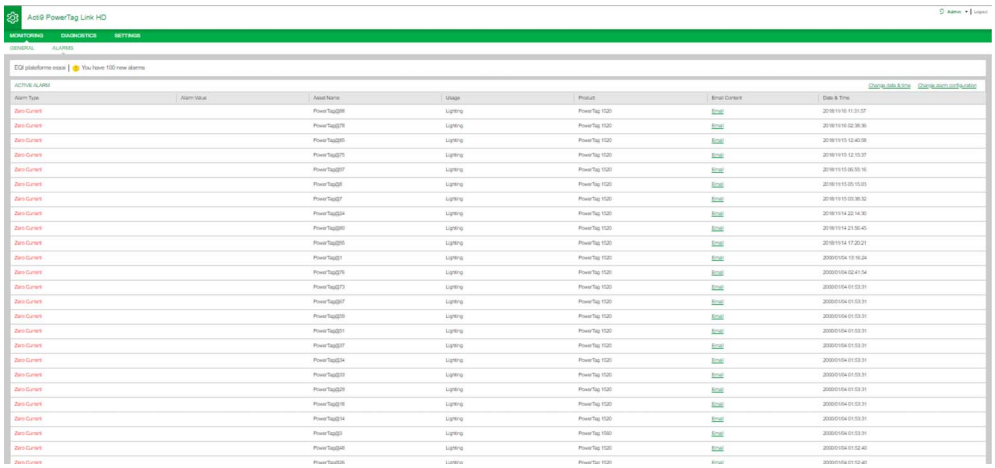
This chapter contains the following topics:

About Alarms

Description

The **Alarms** page displays the active alarms. When an alarm is displayed, a notification is sent to the user either by email (if the email service is enabled). An active alarm disappears when an issue is resolved.

Step	Action
1	Launch the Acti9 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 & Time** page.

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

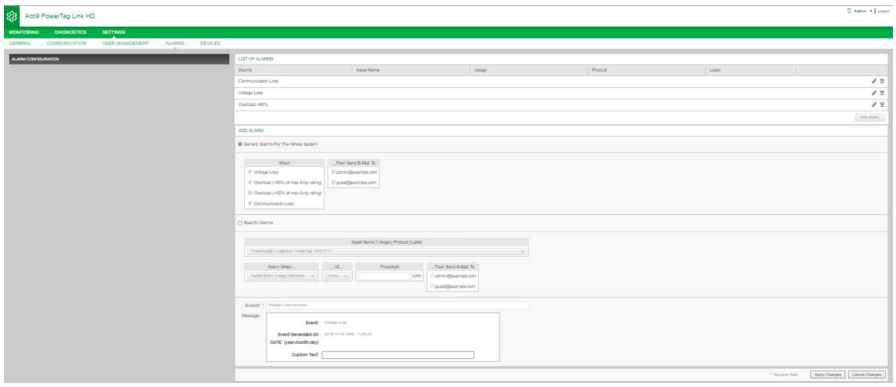
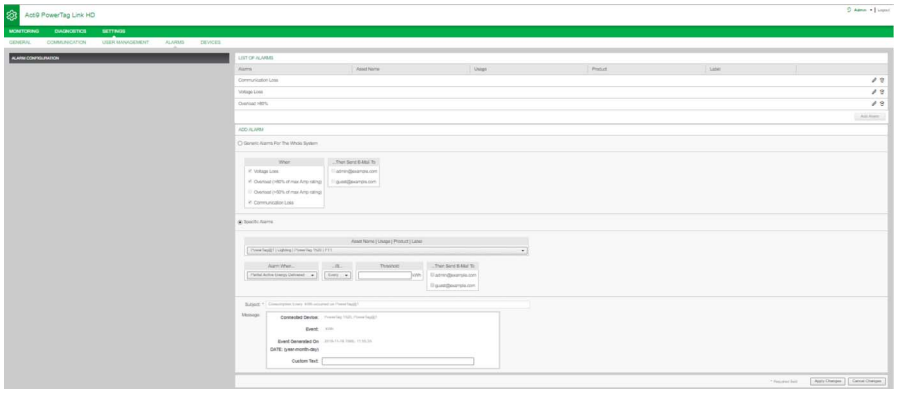
Alarm Configuration Page

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

Step	Action
1	Launch the Acti9 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	a	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). 
	b	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. 
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	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 PowerTag 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. PowerTag 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 PowerTag E is powered again.

Current Overload at Voltage Loss

This alarm indicates that, there will be overcurrent 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: 44 wireless communication periods
- PowerTag C: 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 the breaker rating (Ir) of the associated protection device. 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 PowerTag E. The response time of the alarm depends on the communication period set into the Acti9 PowerTag system wireless network (default = 5s). The alarm automatically disappears when the load current remains below the threshold for 15 minutes. Note that a hysteresis of 10% is applied on the threshold.

Overload 50%

This alarm indicates that the load current exceeded 50% of the nominal current or the breaker rating (Ir) of the associated protection device.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 PowerTag E. The response time of the alarm depends on the communication period set into the Acti9 PowerTag system wireless network (default = 5s)The alarm automatically disappears when the load current remains below the threshold for 15 minutes.

NOTE: Note that a hysteresis of 10% is applied on the threshold.

Overload 45%

This alarm indicates that the load current exceeded 45% of the nominal current or the breaker rating (Ir) of the associated protection device.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 PowerTag E. The response time of the alarm depends on the communication period set into the Acti9 PowerTag wireless network (default = 5s)The alarm automatically disappears when the load current remains below the threshold for 15 minutes. Note that a hysteresis of 10% is applied on the threshold.

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 conditions.The gateway manages the alarms based on the values of the currents sent by the PowerTag E. The response time of the alarm depends on the communication period set into the Acti9 PowerTag system wireless network (default = 5s)Zero current alarm allow 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 alarms triggers when voltage in a phase falls below 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) for 15 minutes.

Load Operating Time

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

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

Over Voltage (120%)

This alarms triggers when voltage in a phase exceeds 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) for 15 minutes.

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.
- 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 15 minutes 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 15 minutes 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 15 minutes 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 15 minutes 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:

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: ● 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: ● “–”: 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: ● “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. **NOTE:** On start-up or reset, the available values are retrieved.
Function code	Code of functions that can be used in the register.
Applicable Devices	Availability of the data depending on the associated device: ● “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 ≤ 0x0FFF.

Example of Modbus Frames

Request

Definition	Number of Bytes	Value	Comment
Slave number	1 byte	0x05	Acti9 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	Acti9 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 Acti9 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]] ● 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	Acti9 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	Register	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 Acti9 PowerTag Link device.

(1) See description of the DATE type *(see page 97)*.

Wireless Devices Modbus Tables

Description

Acti9 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 Power Tag 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	Float32	–	0xFFC 00000	N	03, 100–4	Y	Y	RMS Current on phase A.
0xBB9	3002	2	R	–	A	Float32	–	0xFFC 00000	N	03, 100–4	Y	Y	RMS Current on phase B.
0xBBB	3004	2	R	–	A	Float32	–	0xFFC 00000	N	03, 100–4	Y	Y	RMS Current on phase C.
Voltage -Metering Data													
0xBCB	3020	2	R	–	V	Float32	–	0xFFC 00000	N	03, 100–4	Y	Y	RMS Phase-to-phase voltage A-B.
0xBCD	3022	2	R	–	V	Float32	–	0xFFC 00000	N	03, 100–4	Y	Y	RMS Phase-to-phase voltage B-C.
0xBCF	3024	2	R	–	V	Float32	–	0xFFC 00000	N	03, 100–4	Y	Y	RMS Phase-to-phase voltage C-A.
0xBD3	3028	2	R	–	V	Float32	–	0xFFC 00000	N	03, 100–4	Y	Y	RMS Phase-to-neutral voltage A-N.
0xBD5	3030	2	R	–	V	Float32	–	0xFFC 00000	N	03, 100–4	Y	Y	RMS Phase-to-neutral voltage B-N.
0xBD7	3032	2	R	–	V	Float32	–	0xFFC 00000	N	03, 100–4	Y	Y	RMS Phase-to-neutral voltage C-N.
Power - Metering Data													
0xBED	3054	2	R	–	W	Float32	–	0xFFC 00000	N	03, 100–4	Y	Y	Active power on phase A.
0xBEF	3056	2	R	–	W	Float32	–	0xFFC 00000	N	03, 100–4	Y	Y	Active power on phase B.
0xBF1	3058	2	R	–	W	Float32	–	0xFFC 00000	N	03, 100–4	Y	Y	Active power on phase C.
0xBF3	3060	2	R	–	W	Float32	–	0xFFC 00000	N	03, 100–4	Y	Y	Total active power.
0xBFB	3068	2	R	-	Var	Float32	-	0xFFC 00000	N	03, 100–4	N	Y	Total reactive power
0xC03	3076	2	R	-	VA	Float32	-	0xFFC 00000	N	03, 100–4	Y	Y	Total apparent power (arithmetic)
Power Factor - Metering Data													
0xC0B	3084	2	R	–	–	Float32	–	0xFFC 00000	N	03, 100–4	Y	Y	Total power factor.
Frequency -Metering Data													
0xC25	3110	2	R	–	Hz	Float32	–	0xFFC 00000	N	03, 100–4	N	Y	AC Frequency

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	
Device temperature - Metering Data													
0xC3B	3131	2	R	–	°C	Float32	–	0xFFC 00000	N	03, 100–4	N	Y	Device internal temperature
Energy - Metering Data													
0xC83	3204	4	R	-	Wh	INT64	-	0x8000 000000 000000	Y	03	Y	N	Total active energydelivered + received, non resettable
0xC87	3208	4	R	–	Wh	INT64	–	0x8000 000000 000000	Y	03	N	Y	Active energy delivered count positively non resettable (Total Energy)
0xC8B	3212	4	R	–	Wh	INT64	–	0x8000 000000 000000	Y	03	N	Y	Total active energy received, non resettable
0xC8F	3216	4	R	–	Wh	INT64	–	0x8000 000000 000000	Y	03	N	Y	Active energy on phase A delivered - received, non resettable
0xC93	3220	4	R	–	Wh	INT64	–	0x8000 000000 000000	Y	03	N	Y	Active energy on phase B delivered - received, non resettable
0xC97	3224	4	R	–	Wh	INT64	–	0x8000 000000 000000	Y	03	N	Y	Active energy on phase C delivered - received, non resettable
0xCB7	3256	4	R	-	Wh	INT64	-	0x8000 000000 000000	Y	03	N	Y	Partial active energy delivered + received, resettable
0xCBB	3260	4	RW	-	Wh	INT64	-	0x8000 000000 000000	Y	03, 16	N	Y	Set partial active energycounter. The valuereturns to zero by Acti9 PowerTag Link
0xCBF	3264	4	R	–	Wh	INT64	–	0x8000 000000 000000	Y	03	N	Y	Partial active energy delivered, resettable
0xCC3	3268	4	RW	–	Wh	INT64	–	0x8000 000000 000000	N	03, 16	N	Y	Set partial active energy delivered counter. The value returns to zero by Acti9 PowerTag Link.
0xCC7	3272	4	R	–	Wh	INT64	–	0x8000 000000 000000	N	03	N	Y	Partial active energyreceived, resettable
0xCCB	3276	4	RW	–	Wh	INT64	–	0x8000 000000 000000	N	03, 16	N	Y	Set partial active energy received counter. The value returns to zero by Acti9 PowerTag Link.
0xCCF	3280	4	R	–	VARh	INT64	–	0x8000 000000 000000	Y	03	N	Y	Partial reactive energy delivered, resettable
0xCD3	3284	4	RW	–	VARh	INT64	–	0x8000 000000 000000	N	03, 16	N	Y	Set partial reactive energy delivered counter. The value returns to zero by Acti9 PowerTag Link.
0xCD7	3288	4	R	–	VARh	INT64	–	0x8000 000000 000000	N	03	N	Y	Partial reactive energy received, resettable

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	
0xCDB	3292	4	RW	–	VAR h	INT64	–	0x8000 000000 000000	N	03, 16	N	Y	Set partial reactive energy received counter. The value returns to zero by Acti9 PowerTag Link.

Modbus Table to PowerTag Control Devices

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
0X84EA	34027	1	R	NA	NA	ENUM	NA	0xFFF F	Y	03 100-4	Y	Y	Digital input 1 product usage ● 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 ● 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 register 37036)
0X84ED	34030	1	R	NA	NA	ENUM	NA	0xFFFF	Y	03 100-4	Y	Y	Digital input 1 contact type ● 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. ● 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) ● 0 = Open ● 1 = Close
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) ● 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) ● 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

Address	Register	No.	RW	XR	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices		Description
											PowerTag Control 2DI	PowerTag Control IO	
0X854E	34127	1	R	NA	NA	ENUM	NA	0xFFFF	Y	03 100-4	Y	N	Digital input 2 product usage ● 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
0X8550	34129	1	R	NA	NA	ENUM	NA	0xFFFF	Y	03 100-4	Y	N	Digital input 2 assignment reference ● 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 ● 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. ● 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) ● 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) ● 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) ● 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 ● 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
0X90A4	37029	1	R	NA	NA	ENUM	NA	0xFFFF	Y	03 100-4	N	Y	Digital output 1 behavior ● 0 = Normal ● 1 = Latched
0X90A7	37032	1	R	NA	NA	ENUM	NA	0xFFFF	Y	03 100-4	N	Y	Digital output 1 contact type ● 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 ● 0 = Disable ● 1 = Enabled

Address	Register	No.	RW	XR	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices		Description
											PowerTag Control 2DI	PowerTag Control IO	
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) ● 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 ● 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. ● 0 = Off ● 1 = On

Load Monitoring Registers

The Modbus Registers of the PowerTag energy sensor 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	–	0xFFF FFFFF	N	03, 100–4	Y	Y	N	N	Validity of the Alarm bitmap (register 3300) ● 0 = Invalid. ● 1 = Valid.
	0xCE3	3300	2	R	–	–	UINT	–	0xFFF FFFFF	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)
Operating Time	0xCEB	3308	2	RW	–	Sec	UINT 32	–	0xFFF FFFFF	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.
	0xCEF	3312	4	R	–	–	D/T IEC 870-5-4 (T081)	–	0x0000 0000	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.
0x7925	31014	1	RW	–	–	ENUM	–	0xFFFF	Y	03, 06, 16, 100–4	Y	Y	N	N	Indicates the usageof the wireless device. ● 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
0x7926	31015	1	RW	–	–	ENUM	–	0xFFFF	Y	03, 06, 16, 100–4	Y	Y	N	N	Phase sequence. ● 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. ● 0 = Not configured ● 1 = Top ● 2 = Bottom

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	
0x7928	31017	1	RW	–	–	ENUM	–	0xFFFF	Y	03, 06, 16, 100–4	Y	Y	N	N	Circuit diagnostic. ● 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) ● 0 = Unknown system type ● 3 = 3PH3W ● 11= 3PH4W
0x792B	31020	2	R	–	V	Float 32	–	0xFFC00000	Y	03	N	Y	N	N	Rated voltage ● LN rated voltage for single phase wiring systems ● LL rated voltage for 2 or 3 phases wiring systems

Device Identification

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices				Description
											PowerTag Energy	PowerTag NSX	PowerTag IO 230 V	PowerTag 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 F63 1P+N 110V (A9MEM1564) 102 = PowerTag Acti9 F63 3P (A9MEM1573) 103 =PowerTag Acti9 F63 3P+N 110/230V (A9MEM1574)
0X7931	31026	1	NA	NA	UINT	NA	0xFFFF	Y	03 100-4	Y	Y	Y	Y	Y	Virtual Modbus slave address
0X7932	31027	4	NA	NA	UINT64	NA	0x8000000000000000	Y	03 100-4	Y	Y	Y	Y	Y	Wireless device Radio Frequency Identifier (RF-Id)

Address	Register	No.	RW	X	Unit	Type	Range	Invalid Value	Svd	Function Code	Applicable Devices				Description
											PowerTag Energy	PowerTag NSX	PowerTag IO 230 V	PowerTag 2DI 230 V	
0X7944	31045	16	NA	NA	ASCII	NA	0x00	Y	03 100 -4	Y	Y	Y	Y	Y	Vendor name
0X7954	31061	16	NA	NA	ASCII	NA	0x00	Y	03 100 -4	Y	Y	Y	Y	Y	Product Code (Commercial reference)
0X7964	31077	6	NA	NA	ASCII	NA	0x00	Y	03 100 -4	Y	Y	Y	Y	Y	Firmware revision
0X796A	31083	6	NA	NA	ASCII	NA	0x00	Y	03 100 -4	Y	Y	Y	Y	Y	Hardware revision
0X7970	31089	10	NA	NA	ASCII	NA	0x00	Y	03 100 -4	Y	Y	Y	Y	Y	Serial Number
0X797A	31099	8	NA	NA	ASCII	NA	0x00	Y	03 100 -4	Y	Y	Y	Y	Y	Product range
0X7982	31107	8	NA	NA	ASCII	NA	0x00	Y	03 100 -4	Y	Y	Y	Y	Y	Product model
0X798A	31115	8	NA	NA	ASCII	NA	0x00	Y	03 100 -4	Y	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 63A	PowerTag Energy 250/630A	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 Acti9 PowerTag Link and wireless devices. ● 0 = Communication loss. ● 1 = Communication OK.
0x79B4	31157	2	R	NA	NA	Float32	NA	0xFFC00000	N	03, 100–4	Y	Y	Y	Y	Packet Error Rate (PER)
0x79B6	31159	2	R	NA	NA	Float32	NA	0xFFC00000	N	03, 100–4	Y	Y	Y	Y	Radio Signal Strength Indicator (RSSI) link
0x79B8	31161	1	R	NA	NA	UINT16	NA	0xFFFF	N	03, 100–4	Y	Y	Y	Y	Link Quality Indicator (LQI) link
0x79C5	31174	2	R	–	–	BITMAP	–	–	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 13.1
Monitoring and Diagnostics Display

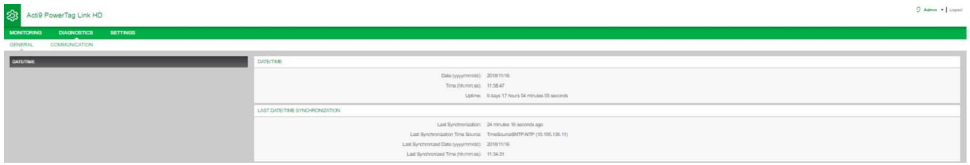
What Is in This Section?

This section contains the following topics:

General Diagnostics

Date/Time

Step	Action
1	Launch the Acti9 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:

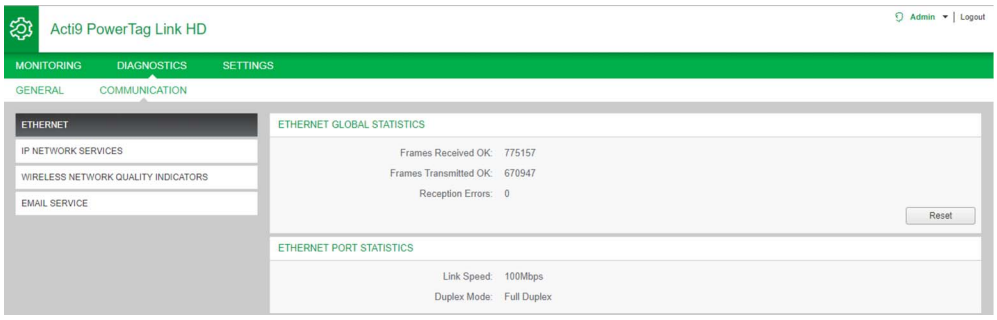
Parameters	Description
Date/Time	
Date	Displays the current date in the format YYYY-MM-DD.
Time	Displays the current in the local time zone in the format hh:mm:ss.
Uptime	Displays the elapsed time since the last restart of the device.
Last Date/Time Synchronization	
Last Synchronization	Displays when 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 Acti9 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.

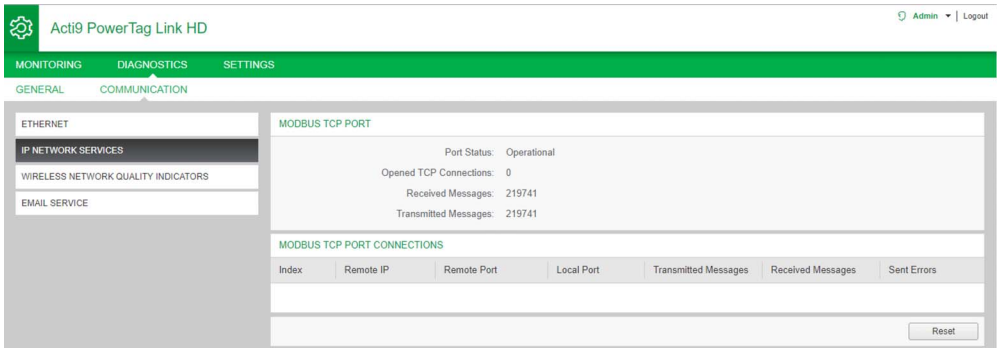


	Function Name	Description
Ethernet Global Statistics	Frames Received OK	Displays the number of frames received from all the Ethernet ports.
	Frames Transmitted OK	Displays the number of frames transmitted from all the Ethernet ports.
	Reception Errors	Displays the number of errors during reception of 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 Acti9 PowerTag Link web page in the web browser.
2	Login with user name and password.
3	Click **Diagnostics → Communication → IP Network Services**.



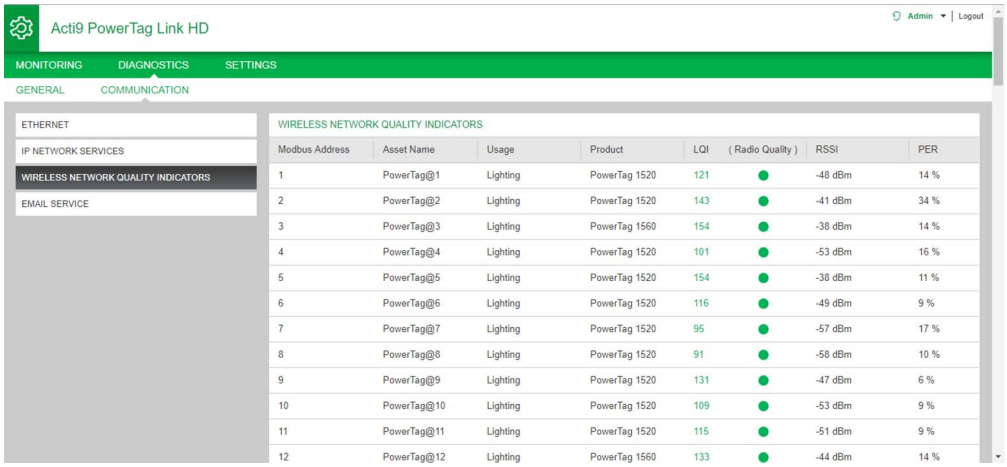
	Function Name	Description
Modbus TCP Port	Port status	Displays the current status of the Modbus/TCP port.
	Opened TCP connections	Displays the number of established Modbus/TCP connections.
	Received messages	Displays the counter of received Modbus/TCP messages.
	Transmitted messages	Displays the counter 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 Acti9 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).

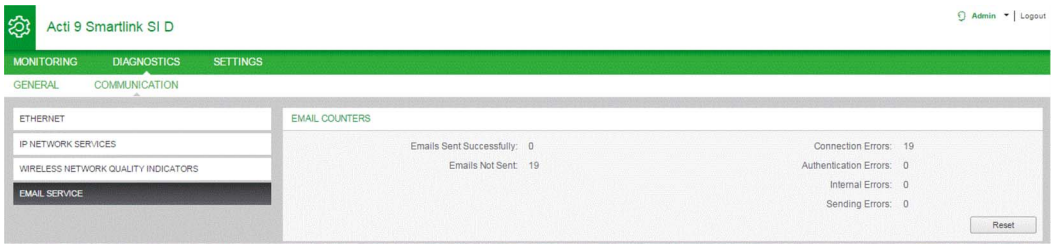


Parameter	Description
Modbus Address	Displays the Modbus address of the wireless device.
Asset Name	Displays the user-defined asset name of the wireless device.
Usage	Displays the user-defined usage of the wireless device.
Product	Displays the type of wireless sensor.
LQI	Displays the measurement of the strength and / or quality of the received frames. The following values of LQI indicates the quality of the received frames: ● 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 Acti9 PowerTag Link inside the panel to be closer to the PowerTag energy sensors. ● 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. **NOTE:** It is recommended to use this indicator as the main indicator of acceptance.
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.
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. ● 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 Acti9 PowerTag Link system, the ratio is calculated over a fixed window of five minutes.

Email Service

Step	Action
1	Launch the Acti9 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 Acti9 PowerTag Link

Description

Resetting Acti9 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, the Acti9 PowerTag Link is reset to the factory parameter settings.
  The reset data is as follows:
  - The user application name is set to myPowerTagLink-xxxx (IP 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 Acti9 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).
  - 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?

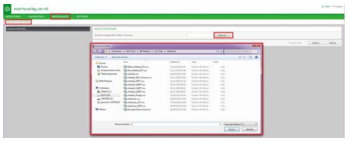
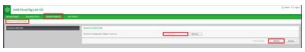
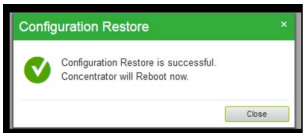
This section contains the following topics:

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: 1. Disconnect PowerTag Link from the network. 2. Power cycle the PowerTag Link. 3. Connect your PC or laptop directly to the PowerTag Link. 4. Use **Automatic Discovery** from the EcoStruxure Power Commission software to connect Acti9 PowerTag Link, see *Ecostruxure Power Commission Online Help*. 5. Launch firmware upgrade.
Acti9 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 Acti9 PowerTag Link in the **Settings → Communication → Wireless Network Configuration** page.
A wireless device is not detected/discovered by Acti9 PowerTag Link.	Acti9 Powertag Link does not recognize this type of wireless devices.	Upgrade the firmware of Acti9 PowerTag Link with EcoStruxure Power Commission software, see *Ecostruxure Power Commission Online Help*.

Problem	Diagnostics	Action
You have detected a dysfunction of the gateway.	Lost data, problem of data display on webpage or on Modbus registers, lost connexion with the wireless devices.	Pre-requisite: You should have a backup file saved on your laptop by using the backup function available in the **Maintenance** menu of the webpage. The file will be automatically saved under the name “backup.dat”  1. Apply reset to factory settings (reset level 2): Fast red blink (2 blinks / sec) while pressing the reset button for more than 10 seconds. The LED stops after the product is restarting, do not switch off until the LED stops blinking. If step 1 is not successful, apply step 2. 2. Replace the default gateway by a new one (with the same commercial reference). Power ON the new PowerTag Link and connect to the webpage *(see page 36)*. Go to **Maintenance → Backup & Restore**, click **Browse** and open the backup file (.dat) from the previous gateway. Then, click **Restore**.   

NOTE: If you have communication issues (Wireless LED not OK or communication loss), please refer to the recommendations made in Chapter 1 - Acti9 PowerTag System --> Wireless Comunication 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 ● 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 than10 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:

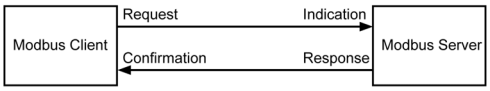
Modbus TCP/IP Functions

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:

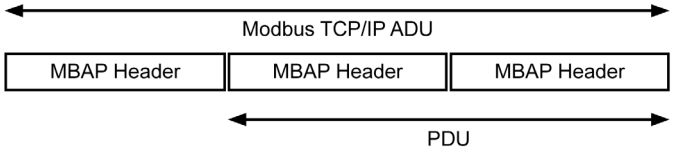
- Modbus Request, the message sent on the network by the client to initiate a transaction.
- Modbus Indication, the request message received on the server side.
- Modbus Response, the response message sent by the server.
- Modbus Confirmation, the response message received on the client side.



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 Acti9 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

Function Code	Function Name
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 ≤ 100

[1]For more details, see the appendix describing function 8 *(see page 133)*

[2]For more details, see the appendix describing function 43-14 *(see page 135)*

[3]For more details, see the appendix describing function 43-15 *(see page 137)*

[4]For more details, see the appendix describing function 43-16 *(see page 138)*

[5]For more details, see the appendix describing function 100-4 *(see page 139)*

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 Acti9 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 Acti9 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: ● 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 ● 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 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.

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 Acti9 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 97)*.					

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 97)*.

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 97)*.

Function 100–4: Read Non-Adjacent Registers

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

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

Request

Definition	Number of Bytes	Value
Modbus 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-01

Schneider Electric Industries SAS
35, rue Joseph Monier
CS30323
F - 92506 Rueil Malmaison Cedex

www.se.com

07/2019