Acti 9 Smartlink SI D
User Manual

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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.

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 Acti 9 Smartlink SI D communication system.

Validity Note

The Acti 9 Smartlink SI D communication system can be easily integrated into any building management architecture.

It combines command and control, metering and protection functions designed for energy efficiency solutions. Based on the Modbus protocol, the Acti 9 Smartlink SI D communication system allows switchboard 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 Acti 9 Smartlink SI D (English, Dutch, French, German, Italian, Portuguese, Spanish, Chinese, Russian)	NVE60007
Instruction Sheet for the PowerTag (Chinese, Dutch, English, French, German, Italian, Portuguese, Russian, Spanish)	EAV31628_web
User Manual for the Acti 9 Smart Test Software (English)	DOCA0029EN

You can download these technical publications and other technical information from our website at http://www.schneider-electric.com/ww/en/download

Chapter 1
Acti 9 Smartlink System

Overview

Introduction

The Acti 9 Smartlink system is used to monitor the final distribution boards to any supervision system.

Modular Acti 9 devices in the Acti 9 Smartlink system is used to monitor, and measure the electrical distribution boards via a Modbus TCP/IP communication network.

The Acti 9 Smartlink system collects the data from electrical distribution boards in real time, thus contributing to achieve energy efficiency targets or monitoring final loads.

This system consists of:

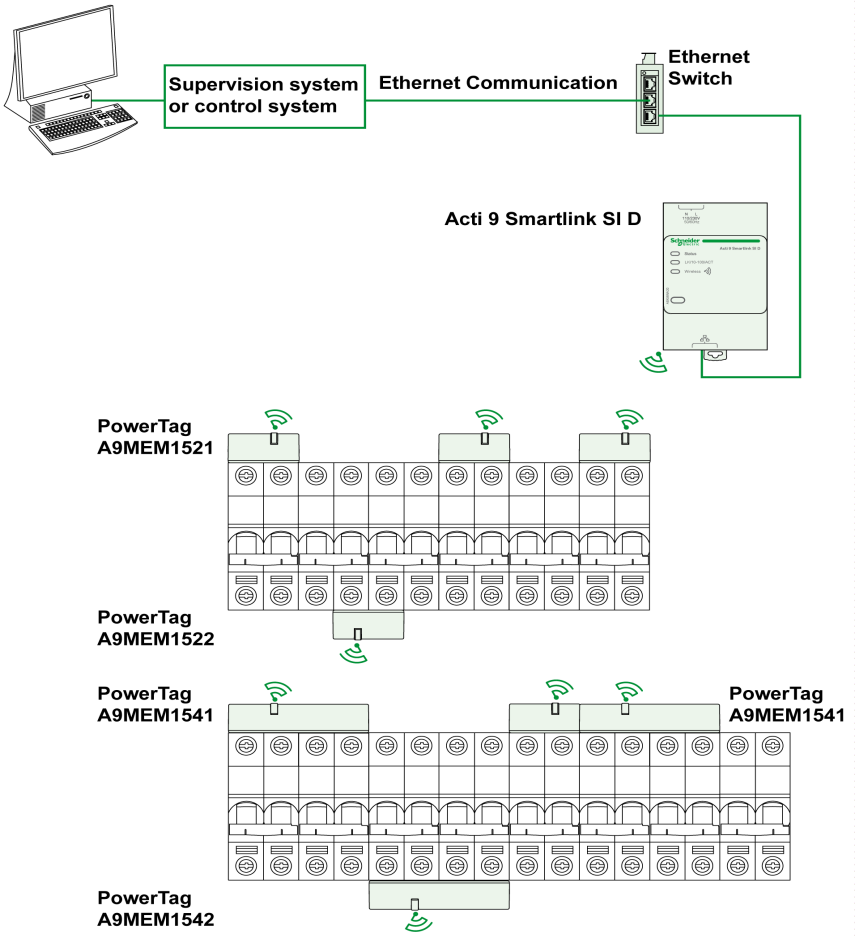
- Acti 9 Smartlink SI D
- PowerTag energy sensors (A9MEM1520, A9MEM1521, A9MEM1522, A9MEM1540, A9MEM1541, and A9MEM1542) are the wireless devices that are directly mounted on a circuit breaker and are connected to Acti 9 Smartlink SI D through a wireless communication. The circuit breaker auxiliary allows you to monitor the devices and collects not only energy, but also power and alarm events on the voltage loss. PowerTag energy sensors are mounted upstream or downstream of Acti 9 circuit breaker or Multi 9 circuit breaker.
- Pre-wired cables.

This system offers the following advantages and services:

- Calculation functions.
- Telemetering applications.
- Monitor load unbalance.
- Monitor power and voltage loss.
- Energy management and regulations.

Acti 9 Smartlink SI D is a wireless connection to Modbus TCP/IP concentrator.

Acti 9 Smartlink SI D Communication System Block Diagram



Acti 9 Smartlink SI D 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.

Chapter 2
Architecture of Acti 9 Smartlink System

What Is in This Chapter?

This chapter contains the following topics:

Acti 9 Smartlink SI D

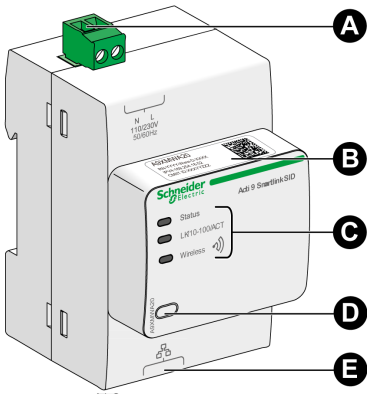
Introduction

The Acti 9 Smartlink SI D device can be connected to the laptop or a PC using a straight cable. The data can be transmitted from the Acti 9 Smartlink SI D device to a PLC or a supervision system.

The Acti 9 Smartlink SI D device can also communicate with wireless devices.

The PowerTag energy sensors can be connected to the Acti 9 Smartlink SI D.

Description



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

PowerTag Wireless Devices

Description

Devices that can be connected to the Acti 9 Smartlink SI D are listed in the following table:

Designation	Product Reference	Description
PowerTag energy sensors	A9MEM1520	One-phase wireless energy sensor (installation on bottom or top of a circuit breaker).
	A9MEM1521	One-phase and neutral wireless energy sensor (installation on top of a circuit breaker).
	A9MEM1522	One-phase and neutral wireless energy sensor (installation on bottom of a circuit breaker).
	A9MEM1540	Three-phase wireless energy sensor (installation on bottom or top of a circuit breaker).
	A9MEM1541	Three-phase and neutral wireless energy sensor (installation on top of a circuit breaker).
	A9MEM1542	Three-phase and neutral wireless energy sensor (installation on bottom of a circuit breaker).

Chapter 3
Technical Characteristics

Technical Characteristics of the Acti 9 Smartlink SI D

General Characteristics

Characteristic		Value
Product marking		CE
Temperature	Operation (horizontal)	–25...+60°C
	Storage	–40...+85°C
Tropicalization		Execution 2 (relative humidity of 93% at 40°C)
Resistance to voltage dips		10 ms, class 3 according to IEC 61000-4-29
Degree of protection	Front face	IP 40
	Casing	IP 20
Level of pollution		2
Overvoltage category		OVC III
Conforming to SELV specifications		Yes
Altitude	Operation	0...2,000 m
	Storage	0...3,000 m
Immunity to vibration	IEC 60068-2-6	1 g/± 3.5 mm, 5...300 Hz, 10 cycles
Immunity to mechanical shock		15 g/11 ms
Immunity to electrostatic discharge	IEC 61000-4-2	Air: 8 kV
		Contact: 4 kV
Immunity to radiated electromagnetic interference	IEC 61000-4-3	10 V/m – 80 MHz to 3 GHz
Immunity to fast transients	IEC 61000-4-4	1 kV Ethernet communication. 2 kV for the 230 Vac - 5 kHz - 100 kHz power supply
Surge	IEC 61000-4-5	Power supply: 0.5 kV Ethernet: 1 KV
Immunity to conducted magnetic fields	IEC 61000-4-6	10 V from 150 kHz to 80 MHz
Immunity to magnetic fields at line frequency	IEC 61000-4-8	30 A/m continuous 100 A/m pulse
Conducted emissions	IEC 61131-2, CISPR	Class A (0.15...30 MHz)
Radiated emissions	IEC 61131-2, CISPR	Class A (30...1000 MHz)
Resistance to corrosive atmospheres	IEC 60721-3-3	Level 3C2 on $H^2S/SO^2/NO^2/Cl^2$
Fire withstand	For live parts	30 s at 960°C. IEC 60695-2-10 and IEC 60695-2-11
	For other parts	30 s at 650°C. IEC 60695-2-10 and IEC 60695-2-11
Salt mist	IEC 60068-2-52	Severity 2
Environment		Conforms to RoHS directives
Installation position		Horizontal or vertical
Mean time between failures		More than 1 M hours

Mechanical Characteristics

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

Communication Module

Characteristic		Value
Type of interface module		Ethernet
Transmission	Ethernet	Transfer rate: 10/100 Mbps Medium: Shielded, STP or S/FTP, Cat6, straight cable, RJ45 connector
Structure	Type	Ethernet
	Method	Master/Slave
Transmission		Server
Turnaround time		1 ms
Maximum length of cable		100 m
Type of bus connector		RJ45 (Shielded)
Power supply	Nominal	Non-isolated 230 Vac with protection against negative voltages up to -28.8 Vdc
	Voltage limits	19.2... 28.8 Vdc with ripple
	Current consumption, no-load	110 mA
	Maximum input intensity	1.5 A
	Maximum current inrush	3 A
Number of Ethernet ports		1

Radio Frequency Characteristics

Characteristic	Value
Radio communication ISM band	2.4...2.4835 GHz
Number of channels	11...26 (IEEE 802.15.4)
Equivalent isotropic radiated power (EIRP)	0 dBm (1)
Number of radio frequency devices	up to 20
RF standard compliance	ETSI / EN 300328 v1.9.1 ETSI / EN 301489-17 v2.2.1
(1)0dBM = 1 mW	

PowerTag Energy Sensors

Characteristic		Value
Nominal voltage (Un)		230/400 Vac (± 20%)
Frequency		50/60 Hz
Maximum power consumption		≤2 W
Maximum current		63 A
Saturation current		135 A
Operating temperature		-25 … 60°C
Overvoltage and measurement		Category III
Level of pollution		Category 3
Altitude		≤ 2,000 m
Impact resistance index		IK05
Starting current		40 mA
Base current		10 A
Accuracy	Voltage	Class 0.5
	Current, power, and active energy	Class 1

Chapter 4
Installation

What Is in This Chapter?

This chapter contains the following topics:

Mounting

Introduction

The Acti 9 Smartlink SI D can be mounted on a DIN rail and can be also installed horizontally.

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

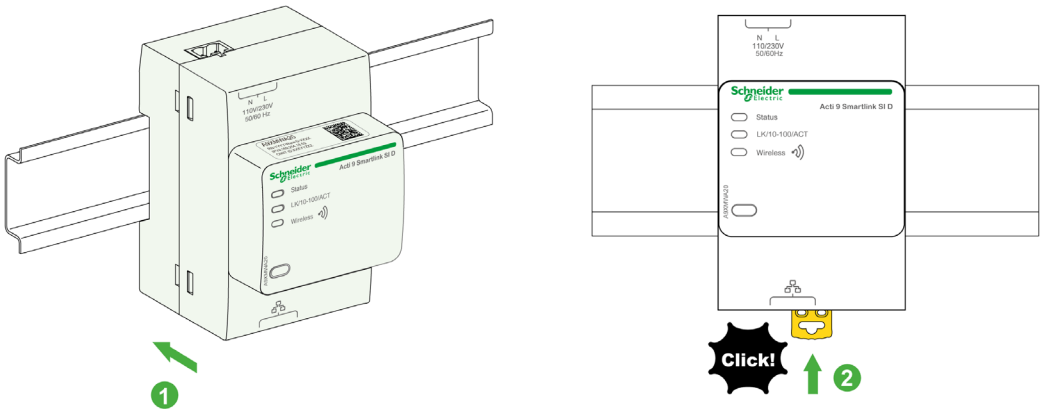
⚠ DANGER

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 Acti 9 Smartlink SI D device on a DIN rail:

Step	Action
1	Position the Acti 9 Smartlink SI D onto the DIN rail.
2	Slide the Acti 9 Smartlink SI D device until it clicks into place.

Connection

Safety Instructions

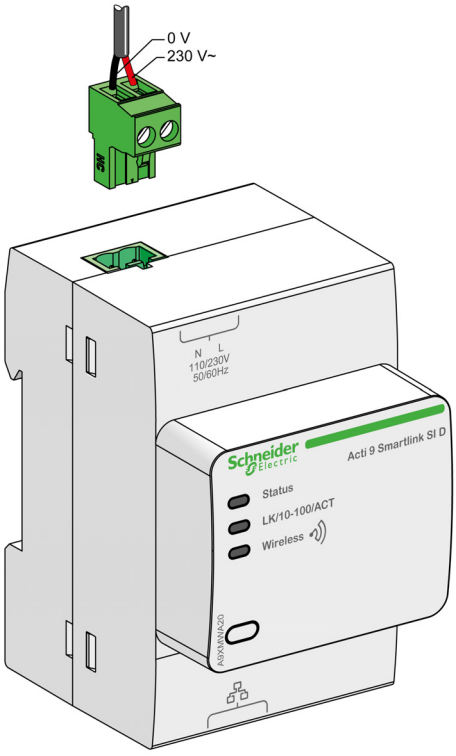
⚠ ⚠ DANGER

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:

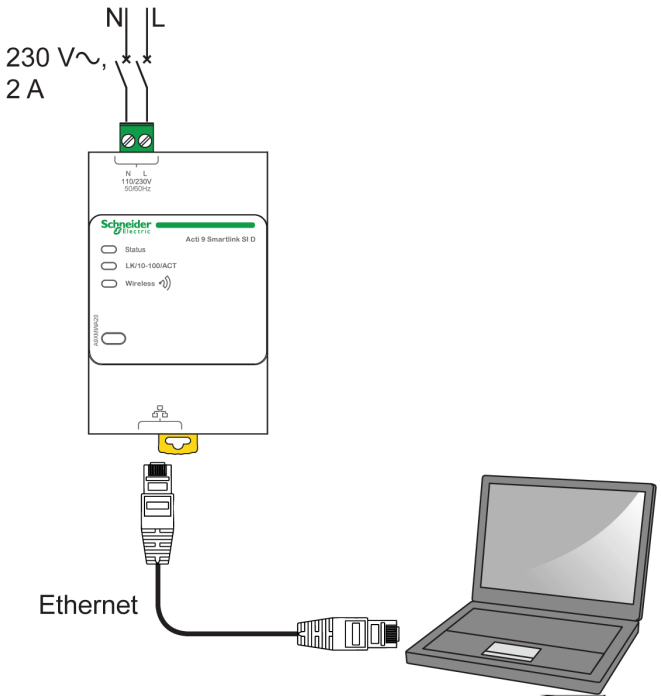
Step	Action
1	Insert both stripped power supply wires in the connector.
2	Fix the wires in place using the connector tightening screws.

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

7 mm	0.2...1.5 mm^2			0.8 N.m

NOTICE
HAZARD OF EQUIPMENT DAMAGE Plug the power-supply connector (Phase-Neutral) into the power-supply socket with marking N-L on the Acti 9 Smartlink SI D product. **Failure to follow these instructions can result in equipment damage.**

Ethernet Connection



Acti 9 Smartlink SI D has an embedded web server. A web server is used to set Ethernet parameters or to display or control auxiliaries configured with Acti 9 Smart Test tool.

1. Disconnect your computer from all networks.
2. Connect an Ethernet straight cable between your PC and the Ethernet port on the Smartlink.

For Windows operating systems, perform the following steps:

Step	Action
1	Open the Windows Explorer and then click “Network” to display the Smartlink Ethernet icon in the list of devices (if the Smartlink Ethernet icon does not appear, refer to the user guide).
2	Double-click the Smartlink Ethernet icon, the login page automatically opens in your browser.
3	Type the user name (“admin” by default) and password (“admin” by default). **NOTE:** These identifiers are case-sensitive.
4	Then click OK.

NOTE:
If Acti 9 Smartlink does not appear in the Windows Explorer, the IP settings on the computer has certainly a static IP address to connect to the IP network.

In case, Acti 9 Smartlink is also not in DHCP and its setup is in static IP address (for example, factory IP mode), the computer IP settings must be changed to be in the same subnet as that of Acti 9 Smartlink.

Step	Action
1	When Acti 9 Smartlink comes from factory, look at the IP address printed on front face of the product.
2	In the configuration Panel of Windows, click the local network properties and change the IPv4 Internet protocol settings. For example, in Windows 10 version: **1.** Go to **Control Panel → Network and Internet → Network Connections → Local Area Connection** **2.** Right-click the **Local Area Network** and click **Properties**. **3.** Select **Internet Protocol Version 4 (TCP/IPv4)** from the list and click **Properties**. **4.** Select the option **Use the following IP address** from the properties window to change the IP address.
3	Change the IP Address of the PC to be in the same subnet as the Acti 9 Smartlink. For example, if the IP address of Acti 9 Smartlink is 169.254.26.61, you can set a local static IP address at 169.254.26.60 for your computer. This way the computer is in the same sub network as Acti 9 Smartlink, and hence can connect to Acti 9 Smartlink.
4	To connect to Acti 9 Smartlink: ● Open Acti 9 Smart test commissioning software directly or, ● Open the web browser and type the IP address of the Acti 9 Smartlink, and start the commissioning. In the web pages, you can change the IP Settings easily if you need to have your Acti 9 Smartlink in dynamic IP allocation (DHCP mode).

For other operating systems than Windows, perform the following steps:

Step	Action
1	Launch your Internet browser.
2	In the “Address” field, type: the IPv4 address encoded into the data matrix on the upper side of Acti 9 Smartlink SI D 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	Then click OK.

Chapter 5
Getting Started with Acti 9 Smartlink SI D

What Is in This Chapter?

This chapter contains the following topics:

Presentation

Description

The commissioning of Acti 9 Smartlink SI D is done as follows:

- The wireless device configuration of the Acti 9 Smartlink SI D is done with the Acti 9 Smartlink SI D web pages.
- The network setup configuration of the Acti 9 Smartlink SI D is done through Acti 9 Smartlink SI D web pages.

For further information, see below in this chapter.

The Acti 9 Smartlink SI D web pages allow you to set any parameter for the Acti 9 Smartlink system:

- Setting Up Ethernet Communication *(see page 37)*.
- Setting Up Wireless Communication *(see page 31)*.

Configuring Acti 9 Smartlink SI D - Web Pages

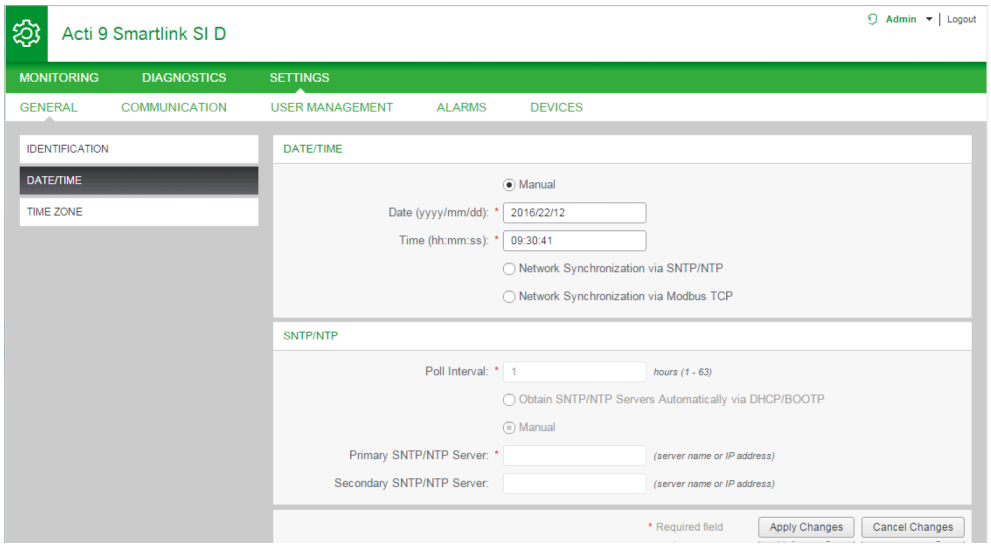
Description

The setting of these parameters is done through Acti 9 Smartlink SI D web pages.

Logging to the Web Page

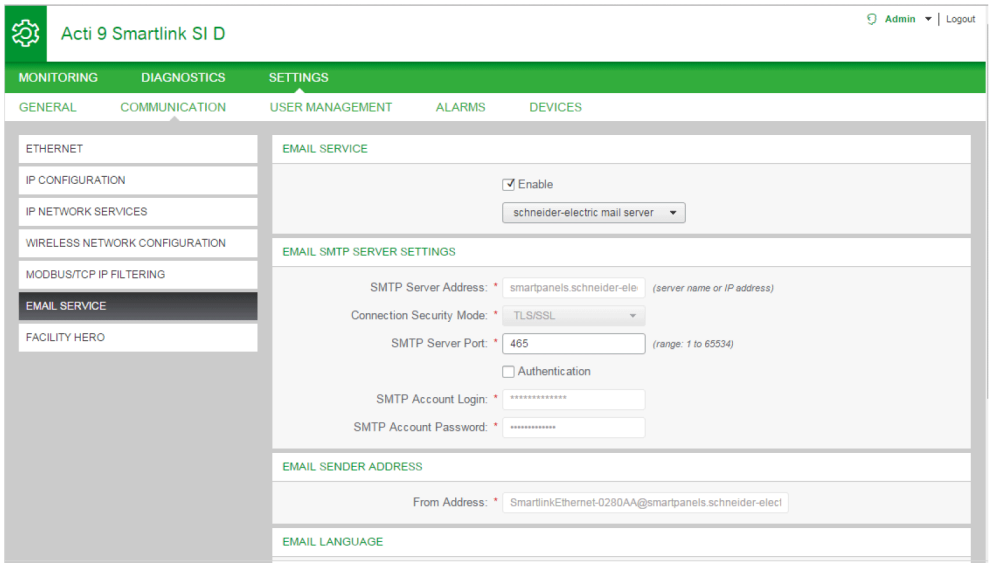
Step	Description
1	Browse to the network folder of Windows Explorer and click the Acti 9 Smartlink SI D icon or you can enter the IP address (factory address printed on the front face of the device) of the Acti 9 Smartlink SI D in the web browser.
2	Enter the username as admin and password as admin to log in to the web page.

Setting Date and Time of the Acti 9 Smartlink SI D



Step	Description
1	Click **Settings** → **General** → **Date/time** in the web page of the Acti 9 Smartlink SI D.
2	Enter the date and time in the respective fields in the **Date/time** page.
3	Click **Apply Changes** to save the settings.

Configuring the Email Settings and Email Events

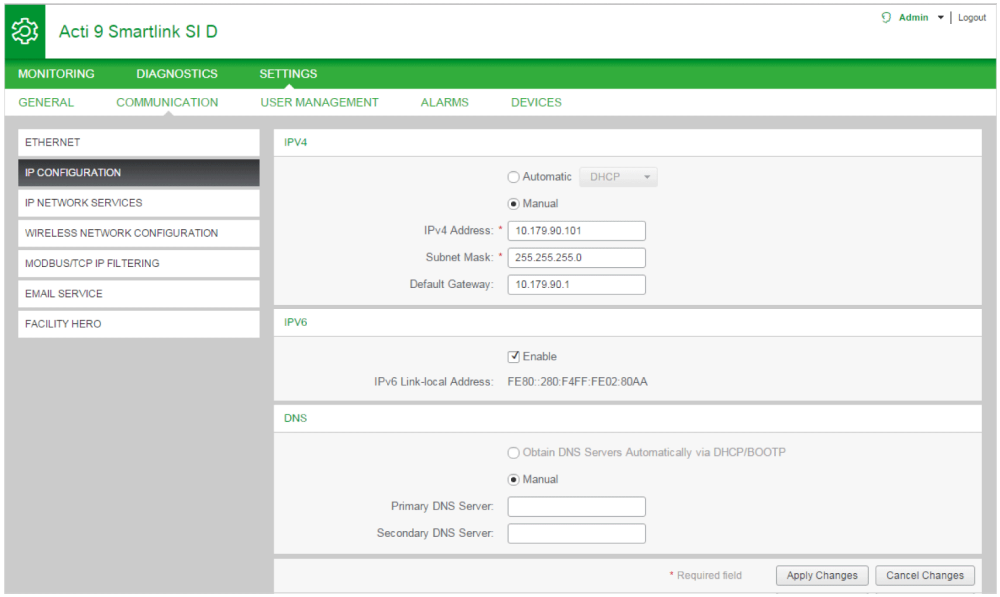


Step	Description
1	Click **Settings** → **Communication** → **Email Service** in the web page of the Acti 9 Smartlink SI D. **NOTE:** By default, the system is configured to work with a predefined email server managed by Schneider Electric.
2	Select the **Enable** check box to configure the email server. You can configure email using one of the following options: ● The pre-configured **schneider-electric mail server** profile. ● The **my own SMTP server** profile that you can configure the email settings according to the requirement. ● The Facility Hero service in the **Settings** → **Communication** → **Facility Hero** web page of the Acti 9 Smartlink SI D sends an alarm to the Facility Hero notification center on occurrence of an event. The smartphone application informs to the Facility Hero maintenance log book whenever there is an electrical issue.

Step	Description
3	Click the **Settings → Alarms → Alarm Notification** page to create an alarm event.

NOTE: For the default **schneider-electric mail server** profile, a high level of cyber security is used that is compatible with highest standard on the Internet.

Configuring the IPv4/v6 Service



Step	Description
1	Click **Settings → Communication → IP Configuration** to change the IP address to static IP address and to enable IPv6 service.
2	Change the IP address to static IP address.
3	Click the **Enable** check box to enable the IPv6 service. IPv6 (link local) is enabled by default. **NOTE:** To enable IPv6 service, it is required to restart the system. Click the **Settings → Communication → Ethernet** page and then click **Reboot** to restart the system.

Commissioning the Wireless Devices (PowerTag Energy Sensors)

Firmware Upgrade

The firmware upgrade of Acti 9 Smart Test can be done by the Acti 9 Smart Test software if your Acti 9 Smartlink SI D is not in the latest firmware version.

Commissioning the Wireless Devices

The configuration of the wireless devices (PowerTag energy sensors) is done with Acti 9 Smartlink SI D web page.

Step	Description
1	Launch the Acti 9 Smartlink SI D web page in the web browser.
2	Login with user name and password.
3	Click **Settings → Devices → Wireless Devices** to configure the PowerTag energy sensors
4	Click **Start Scanning** to discover the wireless devices. **Result**: Displays the discovered devices and assigns the Modbus slave ID to each PowerTag. Each supervision system can read this address inside the Smartlink. The Modbus slave ID ranges from 150 through 220. **NOTE:** The Acti 9 Smartlink SI D can discover up to 20 wireless devices.
5	Select any wireless device and click **Locate** to find the wireless device in the panel. **Result**: The associated wireless device blinks in the panel.
6	Configure the wireless device with the following parameters: ● Asset name ● Usage ● Product ● Phase Sequence ● Mounting Position ● Partial Energy ● Associated Breaker Rating (A)
7	Select the wireless device and click the delete icon to reject or decommission the wireless device.

NOTE: You can also configure the PowerTags and do the firmware upgrade of Acti 9 Smartlink SI D using Acti 9 Smart Test commissioning tool. For further details, refer the *Acti 9 Smart Test Software User Manual*.

Chapter 6
Setting Up Wireless Communication

What Is in This Chapter?

This chapter contains the following topics:

Acti 9 Smartlink SI D Acting as a PowerTag Concentrator

Description

The PowerTag auxiliaries provide compact and high density metering solution with rich and accurate data for building systems (that can send energy, power, current, voltage, and power factor to Acti 9 Smartlink concentrator every 5 seconds). The mounting of the circuit breaker allows you to monitor any electrical device with high flexibility (for example, you can add PowerTag energy sensors after the last-minute changes in the distribution board).

The PowerTag energy sensors provide an advanced alarm on load level of each phase to monitor and balance the loads, and sends an alarm if the electrical device is down.

The Acti 9 Smartlink SI D behaves as a data concentrator to collect information from wireless auxiliaries. The Acti 9 Smartlink SI D provides monitoring of the switchboard via embedded web pages for local access. The addition of new wireless auxiliaries provides low-cost metering with panel size optimization.

Basic Commissioning of PowerTag Energy Sensors

Description

The commissioning of the PowerTag energy sensors is done with embedded web page.

The Acti 9 Smartlink SI D supports the following PowerTag energy sensors:

- PowerTag 1P (A9MEM1520)
- PowerTag 1P+N up (A9MEM1521)
- PowerTag 1P+N down (A9MEM1522)
- PowerTag 3P (A9MEM1540)
- PowerTag 3P+N up (A9MEM1541)
- PowerTag 3P+N down (A9MEM1542)

Principle of Wireless Device Installation

The Acti 9 Smartlink SI D is installed in such a manner that the PowerTags are distributed around the concentrator. It is recommended to install the Acti 9 Smartlink SI D in the center of the switchboard for maximum data quality.

For example, when the switchboard is partitioned, and if you have three-column switchboard with PowerTag in each column, then install the {(notrans) Acti 9 Smartlink SI D} in the central cubicle. For more than three columns of 650 mm in the same switchboard, add one {(notrans) Acti 9 Smartlink SI D} for every three sections.

The system is compatible with Prisma Plus enclosure (form1and 2), Prisma iPM form 1, Pragma, and plastic final distribution enclosures. The distance between the concentrator and PowerTag should be smaller than 3 meters.

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

Maximum number of PowerTags in an electrical room

Do not use more than 100 PowerTags in the same RF channel. Up to 16 wireless channels can be used in Acti Smartlink SI D. For such installation with more than 100 PowerTags in the same electrical room, you need an RF plan to make sure the Smartlinks will not communicate at the same time on the same channel.

Principle of Wireless Device Commissioning

Each PowerTag energy sensor is recognized by Acti 9 Smartlink SI D. You can enter the name of the associated electrical device and the breaker rating of the associated circuit breaker to have the complete advantage of the load monitoring feature.

The PowerTag energy sensors are commissioned with one Acti 9 Smartlink that is installed in the same switchboard. You can configure up to 20 PowerTag energy sensors. It is recommended to commission the PowerTag energy sensors with Acti 9 Smartlink before the panel site installation.

NOTE: If you install a Wi-Fi access point in an electrical room right above the panel after commissioning of the PowerTag energy sensors, there is a possibility of overlapping of the frequencies of the data exchange between the PowerTag energy sensor and the Acti 9 Smartlink.
Hence, it is recommended to check whether the RF signal quality is good between the PowerTag energy sensor and the Acti 9 Smartlink if Wi-Fi is used in an electrical room. However, if there is an issue in RF signal quality due to Wi-Fi overlapping, it is easy to change the channel of communication manually to a new frequency in the **Diagnostics → Communication → Wireless Network Quality Indicators** web page and check the RF signal quality after few seconds.

To avoid any interference issues, it is recommended to follow the rules below:

1. Place the Acti 9 Smartlink SI D inside the panel along with the associated PowerTags.
2. Ensure that the closest Wi-Fi access point is at least three meters away from the panel enclosure.

Discover, Locate, and Configure PowerTag Energy Sensors

If you have multiple panels and if each panel has PowerTag energy sensors, then it is recommended to switch on power and commission each Acti 9 Smartlink one by one. This helps to discover only the required wireless devices specific to each Acti 9 Smartlink and avoids discovering the long list of wireless devices.

If other Acti 9 Smartlink's are powered on while you commission a new Smartlink, the new Smartlink automatically selects the less polluted radio channel, and creates its network on a different channel than the previous Smartlink's. This avoids having all the PowerTags on the same radio channel.

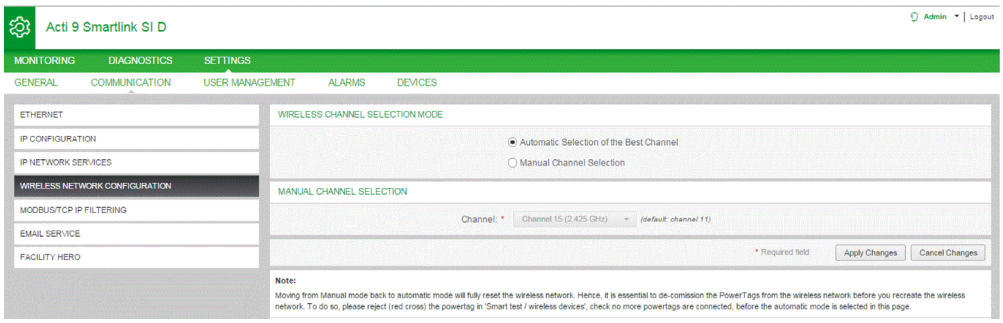
However, if all panels are powered on and commissioned simultaneously, then locate only the required PowerTag energy sensors in multiple panels and reject the ones you do not want to configure with the panel currently commissioned. All the rejected PowerTag energy sensors can be auto-discovered again from another Acti 9 Smartlink without any issues.

The discovering and configuring of wireless devices is explained in **Settings → Devices → Wireless Devices** section *(see page 81)*.

Wireless Device Selection and Configuration

Overview

The wireless device parameters can be set using the Acti 9 Smartlink SI D web page.



This page allows you to select the wireless channel either automatically or manually. Click **Automatic Selection of Best Channel** to select the channel automatically. Click **Manual Channel Selection** and select the channel from the available channels. The default channel is **Channel 11**.

More About Setting up Wireless Network

The wireless network quality indicators such as Link Quality Indicator (LQI) and Received Signal Strength Indicator (RSSI) indicates whether the quality of the signal is good or not. For more details on network quality indicators, refer the **Diagnostics → Communication → Wireless Network Quality Indicators** web page *(see page 60)*.

Description of Wireless LEDs

Wireless LED Status

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

Mode	LEDs	Status
Initialization	WIRELESS	Solid amber: not configured
Startup	WIRELESS	Blinking amber: looking for wireless device
Operation	WIRELESS	Flash green every five seconds: networking complete (normal operation
Degraded	WIRELESS	Blink green and red (one second): downgraded while boot mode
Disabled	WIRELESS	No light: wireless disabled

Chapter 7
Setting Up Ethernet Communication

What Is in This Chapter?

This chapter contains the following topics:

Ethernet Principle

Overview

Ethernet is a data link and physical layer protocol defined by IEEE 802 specification that connects computer or other Ethernet devices. Ethernet is an asynchronous Carrier Sense Multiple Access with Collision detection (referred as CSMA/CD) protocol. Carrier Sense means that the hosts can detect whether the medium (coaxial cable) is idle or busy. Multiple Access means that multiple hosts can be connected to the common medium. Collision Detection means that a host detects whether its transmission has collided with the transmission of another host (or hosts).

The Acti 9 Smartlink SI D can be connected to a PC or a laptop over Ethernet.

The Acti 9 Smartlink SI D has an embedded web server (web page).

The settings of the Ethernet communication are done through Acti 9 Smartlink SI D web pages.

Set Up and Ethernet Addressing Mode

Ethernet Connection

The following table provides the steps recommended to connect a PC or a laptop for the first time to Acti 9 Smartlink SI D device:

Step	Action
1	**Disconnect your PC from all networks.**
2	Connect an Ethernet straight cable between your PC or a laptop and the Ethernet port on the Acti 9 Smartlink SI D.
3	Perform the actions described in the section below for accessing web page.

The following tables provide the steps to access web page of Acti 9 Smartlink SI D from Windows XP and Windows 7.

Access Web Page of Acti 9 Smartlink SI D from Windows XP

The following table provides the steps to access web page of Acti 9 Smartlink SI D from Windows XP:

Use Case	Procedure
Panel not connected to building network	1. Launch the web browser (Google Chrome, Internet Explorer, Mozilla Firefox, or Safari)(1) on your PC. 2. Type the IPv4 address(2) in the address field of the web browser. 3. Press ENTER. This opens the home page of the web page.
Panel is already connected for the first time to building network with no DHCP server, using static addressing mode	1. Connect your PC or a laptop directly to Acti 9 Smartlink SI D (point to point) or if not connected to Acti 9 Smartlink SI D, connect your PC to the building Ethernet network. 2. Launch the web browser (Google Chrome, Internet Explorer, Mozilla Firefox, or Safari)(1) on your PC. 3. Type the IPv4 address(2) in the address field of the web browser. 4. Press ENTER. This opens the home page of the web page. 5. From the web page, click **Settings → Communication → IP Configuration** and type new IPv4 address, subnet mask, and gateway address. 6. Put a sticker on the product with the new IPv4 address.
Panel is already connected to building network with DHCP server, using dynamic addressing mode	1. Connect your PC or a laptop to the building Ethernet network. 2. Launch the web browser (Google Chrome, Internet Explorer, Mozilla Firefox, or Safari)(1) on your PC. 3. Type the name(3) of the Acti 9 Smartlink SI D in the address field of the web browser. 4. Press ENTER. This opens the home page of the web page.

(1) The browsers compatible with Acti 9 Smartlink SI D are:
- Internet Explorer (Windows) version 8, 9, 10, and 11
- Google Chrome (Windows) version 42.0.2311.90m
- Mozilla Firefox version 27.0.1
- Safari (Windows) from 5.1.7

(2) IPv4 address is printed on Acti 9 Smartlink SI D with this format 169.254.xxx.yyy. The last two numbers (xxx, yyy) are unique per product.

(3) By default the name of the product is SmartLinkIP-1234.

Access Web Page of Acti 9 Smartlink SI D from Windows 7

The following table provides the steps to access web page of Acti 9 Smartlink SI D from Windows 7:

Use Case	Procedure
Panel not connected to building network	1. Connect your PC or a laptop directly to Acti 9 Smartlink SI D (point to point) or connect your PC or a laptop to the Ethernet switch of the panel. 2. Launch the Windows Explorer, then select Network to see the available devices. 3. Double-click the auto-discovered(3) Acti 9 Smartlink SI D product. This opens the home page of the web page.
Panel is already connected for the first time to building network with no DHCP server, using static addressing mode	1. Connect your PC or a laptop directly to Acti 9 Smartlink SI D (point to point) or connect your PC or a laptop to the Ethernet switch of the panel or if not connected to Acti 9 Smartlink SI D, connect your PC to the building Ethernet network. 2. Launch the Windows Explorer, then select Network to see the available devices. 3. Double-click the auto-discovered(3) Acti 9 Smartlink SI D product. This opens the home page of the web page. 4. From the web page, click **Settings → Communication → IP Configuration**, type new IPv4 address, subnet mask, and gateway address. 5. Put a sticker on the product with the new IPv4 address.
Panel is already connected to building network with DHCP server, using dynamic addressing mode	From either different subnet or same subnet: 1. Connect your PC or a laptop to the building Ethernet network. 2. Launch the web browser (Google Chrome, Internet Explorer, Mozilla Firefox, or Safari)(1) on your PC. 3. Type the name(3) of the Acti 9 Smartlink SI D in the address field of the web browser. 4. Press ENTER. This opens the home page of the web page. From same subnet: 1. Connect your PC or a laptop to the building Ethernet network. 2. Launch the Windows Explorer, then select Network to see the available devices. 3. Double-click the auto-discovered(3) Acti 9 Smartlink SI D product. This opens the home page of the web page.
Panel is already connected to the building network with DHCP server, using fixed addressing mode	From either different subnet or same subnet: 1. Connect your PC or a laptop to the building Ethernet network. 2. Launch the web browser (Google Chrome, Internet Explorer, Mozilla Firefox, or Safari)(1) on your PC. 3. Type the IPv4 address(2) of the Acti 9 Smartlink SI D in the address field of the web browser. 4. Press ENTER. This opens the home page of the web page. From same subnet: 1. Connect your PC or a laptop to the building Ethernet network. 2. Launch the Windows Explorer, then select Network to see the available IP devices. 3. Double-click the auto-discovered(3) Acti 9 Smartlink SI Dproduct. This opens the home page of the web page.

(1) The browsers compatible with Acti 9 Smartlink SI D are:
- Internet Explorer (Windows) version 8, 9, 10, and 11
- Google Chrome (Windows) version 42.0.2311.90m
- Mozilla Firefox version 27.0.1
- Safari (Windows) from 5.1.7

(2) IPv4 address is printed on Acti 9 Smartlink SI D with this format 169.254.xxx.yyy. The last two numbers (xxx, yyy) are unique per product.

(3) By default the name of the product is SmartLinkIP-1234.

Access Web Page Using Tablet

The following table describes the procedure to access web page using tablet:

Step	Action
1	Connect Acti 9 Smartlink SI D to the wireless router using Ethernet cable.
2	Search for the available networks in the tablet.
3	Connect the tablet to the same wireless router to which Acti 9 Smartlink SI D is connected.
4	Launch web browser in the tablet after a connection is established.
5	Type the IP address of the Acti 9 Smartlink SI D on the web browser if Acti 9 Smartlink SI D is in static IP address mode. Type the product name (for example, https://SmartlinkIP-1234) on the web browser if Acti 9 Smartlink SI D is in DHCP mode and tablet is used along with wireless router (DHCP).
6	Type the username and the password in the login page to access the device.

Access Web Page Using Smartphone

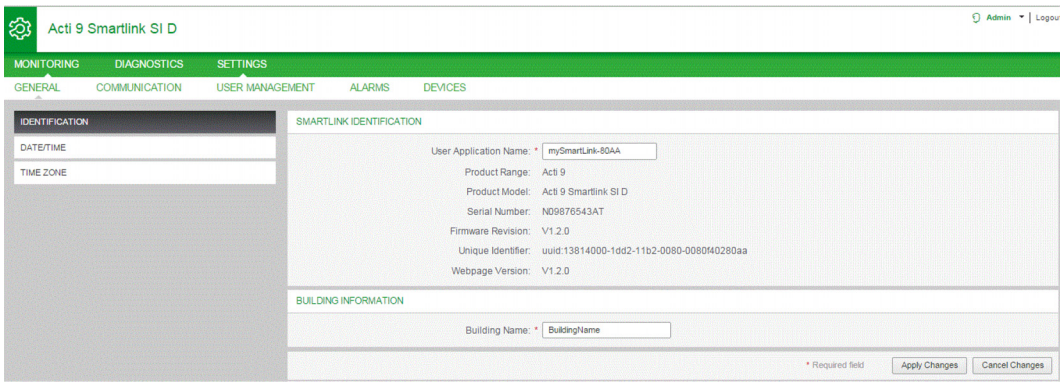
The following table describes the procedure to access web page using smartphone:

Step	Action
1	Connect Acti 9 Smartlink SI D to the wireless router using Ethernet cable.
2	Search for the available networks in the smartphone.
3	Connect the smartphone to the Wi-Fi network to access to the Ethernet. If Wi-Fi network is not available, it is recommended to use Wifer from Schneider Electric that can connect to Acti 9 Smartlink and create a Wi-Fi hotspot on which the smartphone can be connected.
4	Launch web browser in the smartphone after a connection is established.
5	Enter the IP address of the Acti 9 Smartlink SI D on the web browser of the smartphone.
6	Type the username and the password in the login page to access the device.

Web Page Setting Menu

Description

The first page displayed in the **Settings** menu is the **Identification** page as shown in the following figure:

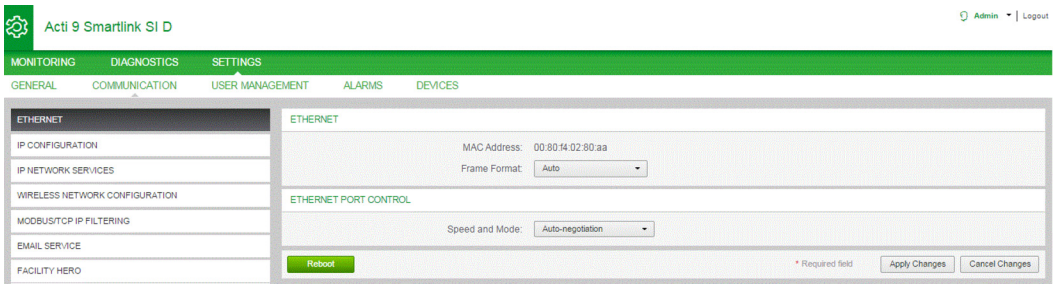


This page is used to read or modify the **User Application Name** that is used by the communication protocol to identify the device. For more details, refer the **Identification page** *(see page 66)* described in web page chapter.

Ethernet Settings

The Ethernet parameters can be set using the Acti 9 Smartlink SI D web page (access to web page is described in Web Page chapter *(see page 54)*).

The following figure shows the **Ethernet** page to configure Ethernet parameters:



You can modify the following parameters in the **Ethernet** page:

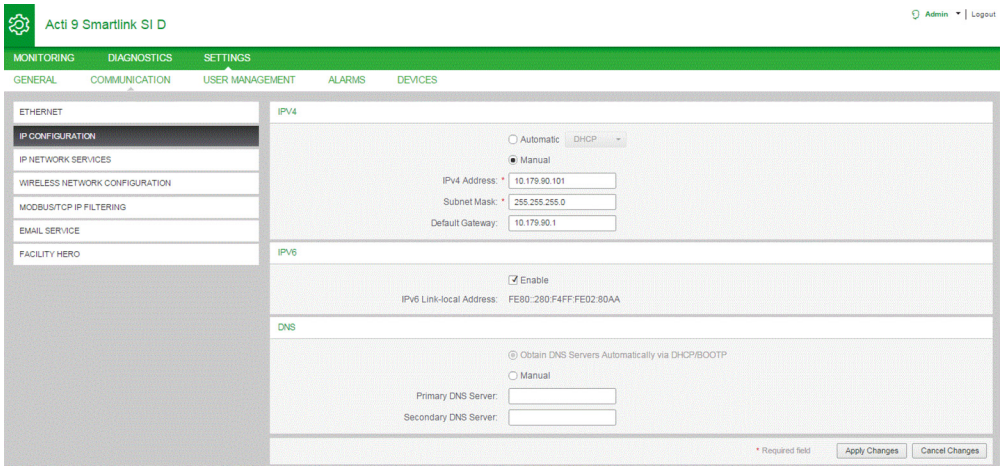
- **Frame format** (the default value is **Auto**)
- **Speed and mode** (the default value is **Auto-negotiation**)

This page also permits you to read the **MAC address** of the product. The configuration of the Ethernet parameters is explained in detail in Ethernet page *(see page 69)*.

IP Configuration

The IPv4 parameters can be configured using the **Settings → Communication → IP Configuration** page.

The following figure shows the IP Configuration page:



This page allows you to select one of the following modes to configure IPv4 parameters:

- **Automatic**: When you select **Automatic**, the network allocates the IP address automatically. You can select DHCP or BOOTP (the default is DHCP) from the list to configure IPv4 parameters using **Automatic** mode. *(see page 69)*
- **Manual**: When you select **Manual**, then assign the static IP address manually. Enter the details of the following parameters to configure the IPv4 parameters in **Manual** mode:
  - **IPv4 Address**
  - **Subnet Mask**
  - **Default Gateway**

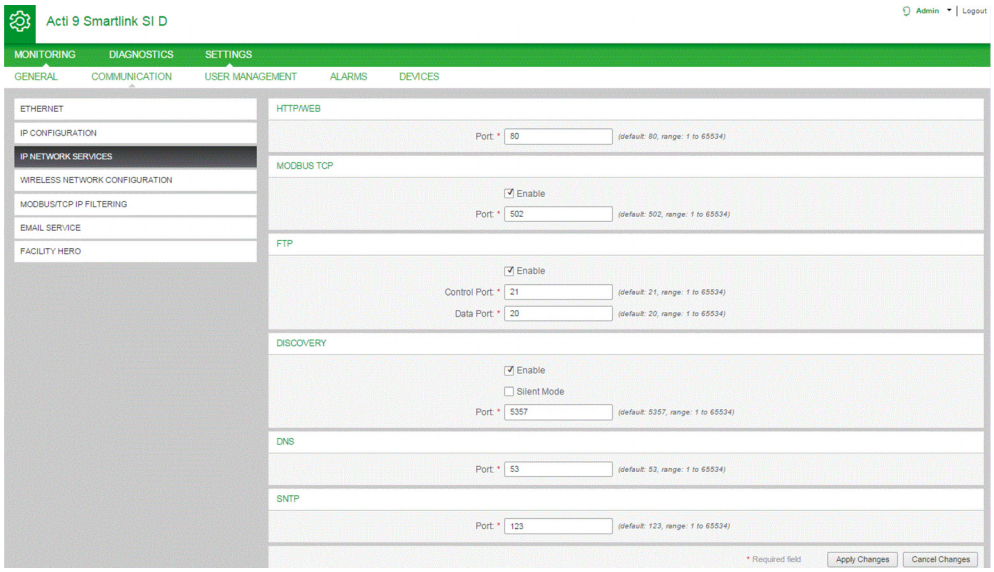
Select the **Enable** check box to enable the IPv6 service. It is recommended to restart the device for enable or disable action to take effect.

NOTE: It takes about a minute for the IP setting changes to take effect.

You can either manually assign the DNS server address or can obtain the DNS server address via DHCP or BOOTP.

IP Network Services

The IP network services can be configured using **Settings → Communication → IP Network Services** page.



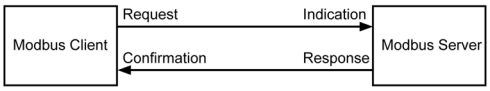
The Acti 9 Smartlink SI D supports HTTP/WEB, FTP, Modbus TCP, DNS, SNTP, and Discovery protocols and services. You can select the **Enable** check box and configure the port numbers for the **Modbus/TCP**, **FTP**,and **Discovery** protocols. If the discovery service is enabled, Acti 9 Smartlink SI D can be accessed from a laptop or a PC directly. The configuration of the network parameters is explained in detail in IP Network Services page *(see page 71)*.

Modbus TCP/IP Functions

General Description

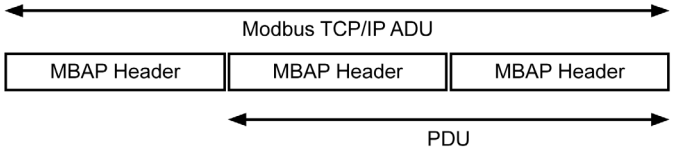
The Modbus messaging service provides a client/server communication between devices connected on an Ethernet TCP/IP network.

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 Acti 9 Smartlink SI D 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

Function Code	Function Name
43-14[2]	Read identification
43-15[3]	Read the date and time
43-16[4]	Write the date and time
100-4[5]	Read non-adjacent words where n ≤ 100

[1]For more details, see the appendix describing function 8 *(see page 100)*

[2]For more details, see the appendix describing function 43-14 *(see page 102)*

[3]For more details, see the appendix describing function 43-15 *(see page 104)*

[4]For more details, see the appendix describing function 43-16 *(see page 105)*

[5]For more details, see the appendix describing function 100-4 *(see page 106)*

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 byte

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 Acti 9 Smartlink SI D 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.

Description of Ethernet LEDs

Ethernet LED Status

Mode	LED	Status
Ethernet communication	LK/10-100/ACT	Activity at 10 Mb
	LK/10-100/ACT	Activity at 100 Mb

LED Network Status

Mode	LED	Status
Network status	NETWORK STATUS	No power, invalid IP address
	NETWORK STATUS	Connected, valid IP address
	NETWORK STATUS	Factory setting IPv4 address
	NETWORK STATUS	Duplicated IP address/IP error
	NETWORK STATUS	Self-test

Description of Status LEDs

LED Status

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

Mode	LEDs	Status
Initialization	STATUS	**STATUS**: Green light
Start-up	STATUS	**STATUS**: Alternate green and red light every second
Operation	STATUS	**STATUS**: Green light
Degraded	STATUS	**STATUS**: Flashing orange light (Power supply of the product is degraded)
Failure	STATUS	**STATUS**: Red light (Caused by a duplicate IP address)

Setting Time Synchronization with SNTP Server

Overview

The Acti 9 Smartlink SI D supports Simple Network Time Protocol (SNTP) and Devices Profile for Web Services (DPWS) protocols.

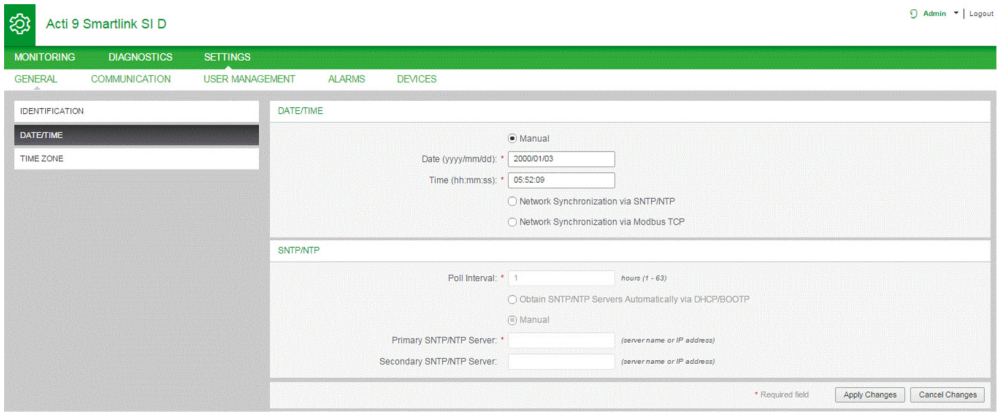
Simple Network Time Protocol

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 Acti 9 Smartlink SI D can communicate with NTP and server to synchronizes its time.

The Acti 9 Smartlink SI D 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.



NOTE: SNTP feature works only when the device is integrated with the remote server network.

Devices Profile for Web Services

DPWS defines a minimal set of implementation constraints to enable the Web Service messaging, discovery, description, and eventing on resource-constrained devices.

DPWS is supported on Acti 9 Smartlink SI D.

Setting Up Email Service with SMTP Servers

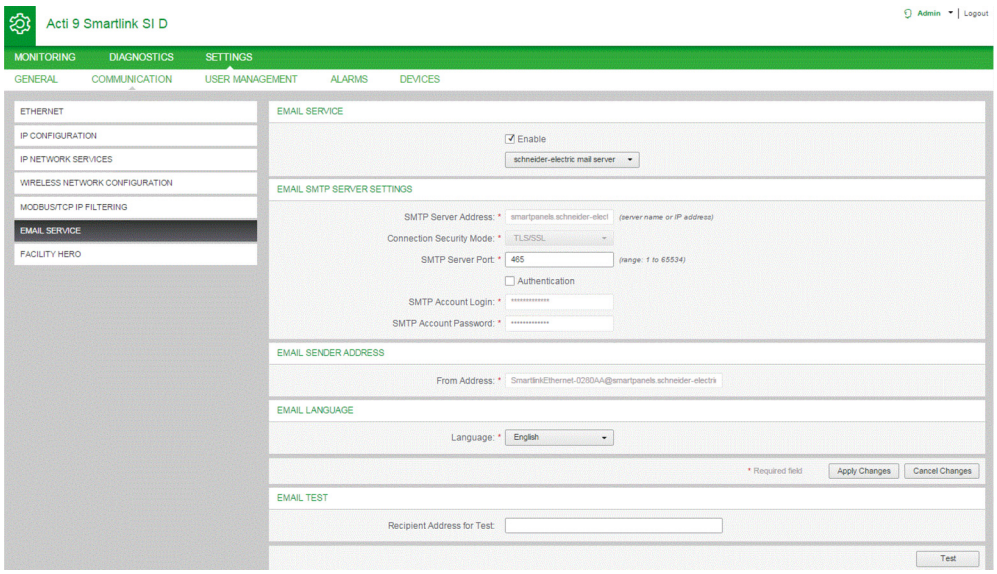
Email SMTP Service

The Acti 9 Smartlink SI D web page allows you to set up the email service with either pre-configured **schneider-electric mail server** profile or user configured **my own SMTP server** profile.

If you select **schneider-electric mail server** profile, then you can configure only **SMTP Server Port**, and **Language** parameters.

If you select **my own SMTP server** profile, then manually configure the SMTP server parameters like **SMTP Server Address**, **SMTP Server Port**, **Email Sender Address**, and user authentication credentials.

For more details, refer the Email Service page *(see page 73)*.



Chapter 8
Monitoring and Diagnostics Web Pages

What Is in This Chapter?

This chapter contains the following topics:

Introduction

Description

The Acti 9 Smartlink SI D has an embedded web server and a user can monitor the electrical distribution by using embedded web pages with PC or mobile tool like laptop *(see page 39)*.

The web pages can be used for multiple operations:

- Monitoring page allows the facility managers to check the health of the electrical devices (such as HVAC, lighting, pumps, machines, and so on).
- Building managers can also monitor the temperature, third-party breakers (breaker inputs), and energy meters.
- Setting of Ethernet parameters and wireless device parameters to connect Acti 9 Smartlink SI D on the network.
- Diagnosis of exchanges on Ethernet network.
- Configuration of the wireless devices connected.
- Adding or removing the wireless devices connected to Acti 9 Smartlink.

The administration part of the web pages allows the system integrators commission the Acti 9 Smartlink system.

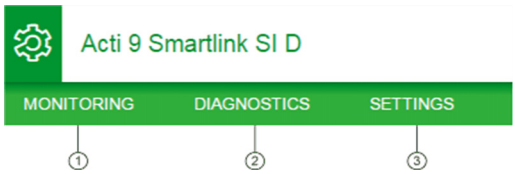
Web pages are accessible to the following three categories of user:

- Administrator, can access all information and modify the parameters in the **Settings** menu.
- User and Guest can access only the monitoring pages of connected devices.

The scope of products supported in web pages are:

- Acti 9 Smartlink SI D
- PowerTag energy sensors.

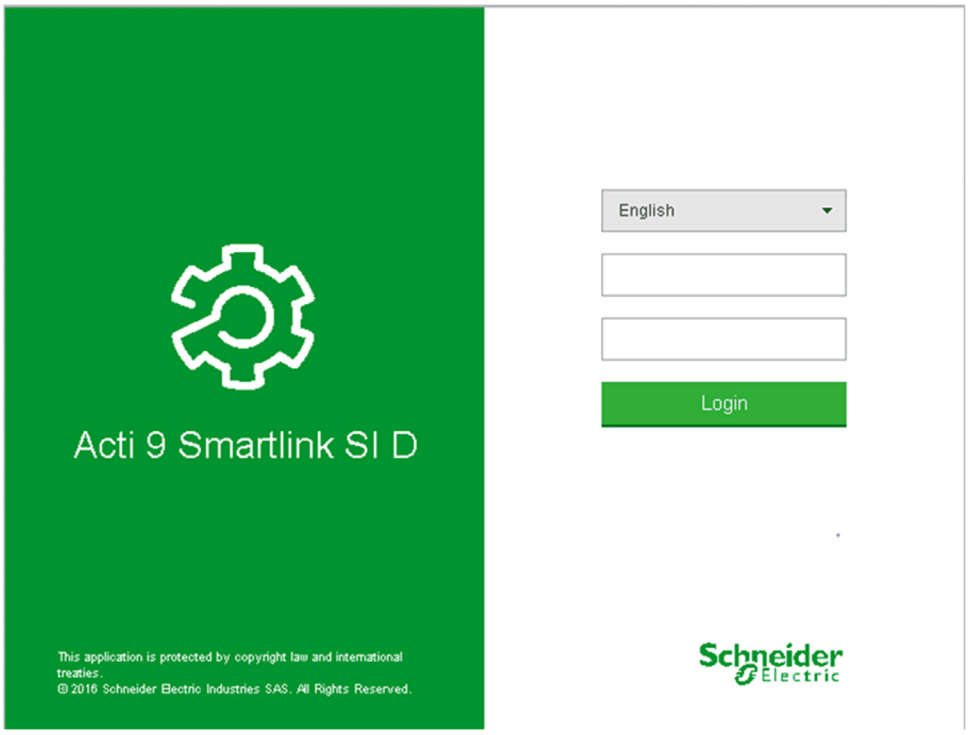
Web Page Organization



1 Displays the electrical status and consumption of the devices. This also displays the active alarms, if any.
2 Information is classified based on product and channel; Ethernet diagnosis
3 Configuration of Ethernet parameter and wireless parameters

Login Page

The **Login** page is used to enter the user credentials and select the preferred language to access Acti 9 Smartlink SI D web pages. When the user connects to the Acti 9 Smartlink SI D through a web browser, the **Login** page is displayed as shown in the figure below.



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 Acti 9 Smartlink SI D. The default user name and password is **admin** to access the web page for the first time. You can modify the user name and password in the **Settings → User Management** page. 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 Acti 9 Smartlink SI D web page.

Monitoring Page

Description

The **Monitoring** page is used to monitor the wireless devices. The facility managers can check the health of the electrical devices like HVAC, lighting, pumps, machines, and so on). The building managers can also monitor the temperature, third-party breakers (breaker inputs), and energy meters.

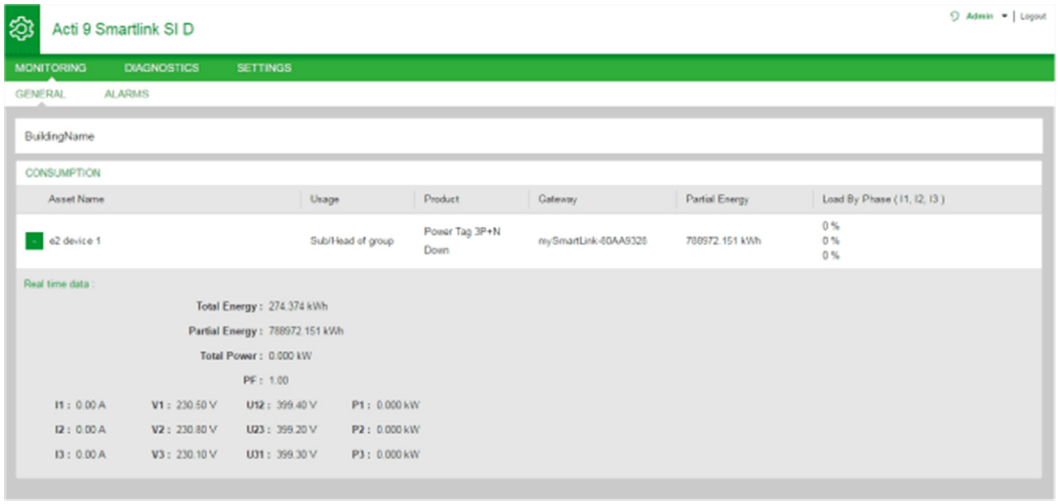
The **Monitoring** menu, **Diagnostics** menu, and the **Settings** menu consists of two main areas:

- Sub menu and function list
- Dashboard

Area	Description
Sub menu and function list	List of functions or lists the wireless devices connected to Acti 9 Smartlink SI D
Dashboard	Displays the general characteristics of the function depending on the selected device from the function list or device list area.

General Page

The **General** page displays the status of the PowerTag energy sensors.



The following information is displayed for the PowerTag energy sensors:

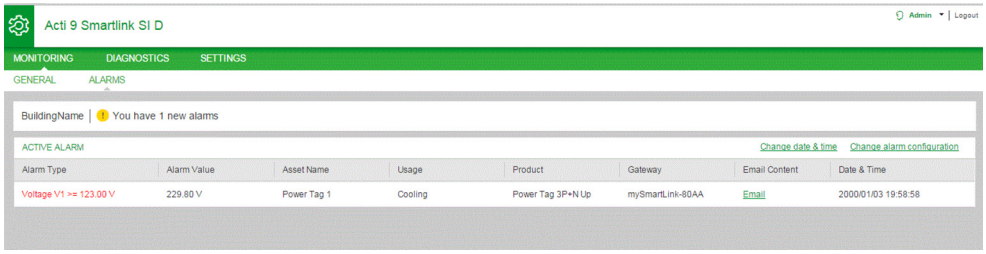
Parameter	Description
Asset Name	Displays the name of the equipment or load name that the PowerTag tracks.
Usage	Displays the usage of the energy of the equipment or load (for example, cooling, lighting, IT loads, and so on.)
Product	Displays the type of PowerTag device associated to a circuit breaker.
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. **NOTE:** To use and see the percentage of load, enter the maximum breaker rating during the configuration of PowerTag energy sensors in Acti 9 SmartTest software.

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

Alarms Page

Description

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



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.

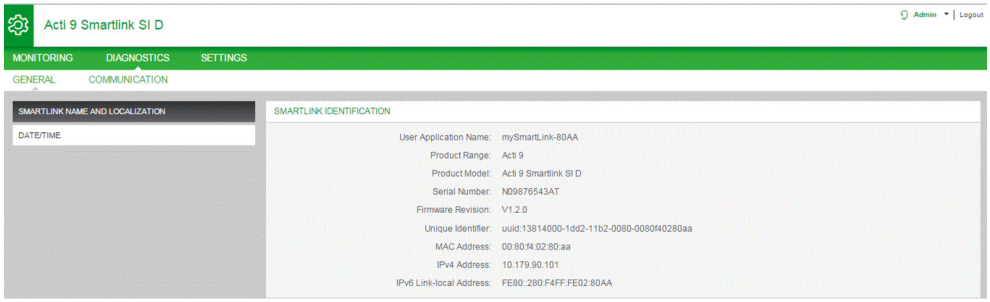
Click **Change date & time** to modify the date and time parameters in the **Settings → General → Date & Time** page.

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

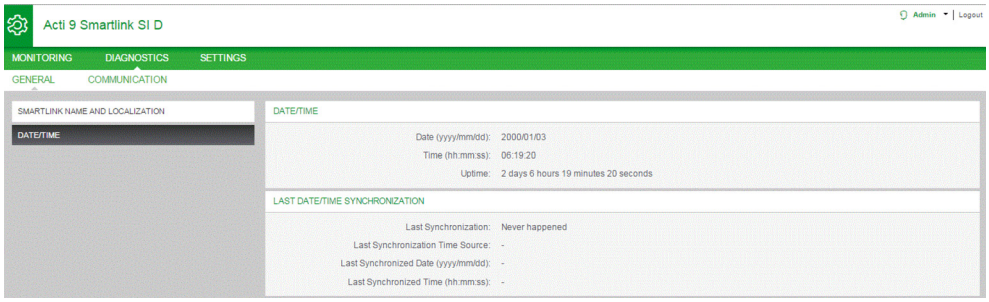
Diagnostics General Page

Smartlink Name and Localization

The **Smartlink Name and Localization** page displays the information of the Smartlink as shown in the following figure:



Date/Time



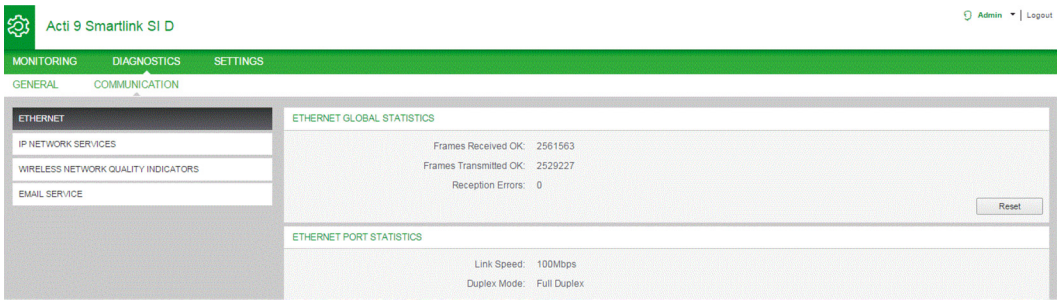
The **Date/Time** page displays the following information:

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.

Diagnostics Communication

Ethernet

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

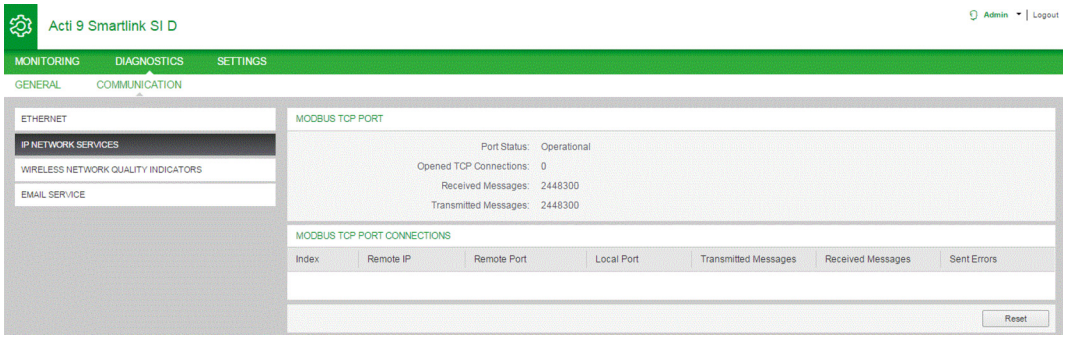


	Function Name	Description
Ethernet Global Statistics	Frames Received OK	Displays the number of frames received from all the Ethernet ports.
	Frames Transmitted OK	Displays the number of frames transmitted from all the Ethernet ports.
	Reception Errors	Displays the number of errors during reception of 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

The **IP Network Services** page displays Modbus/TCP port information, number of active connections, and number of received and transmitted frames.

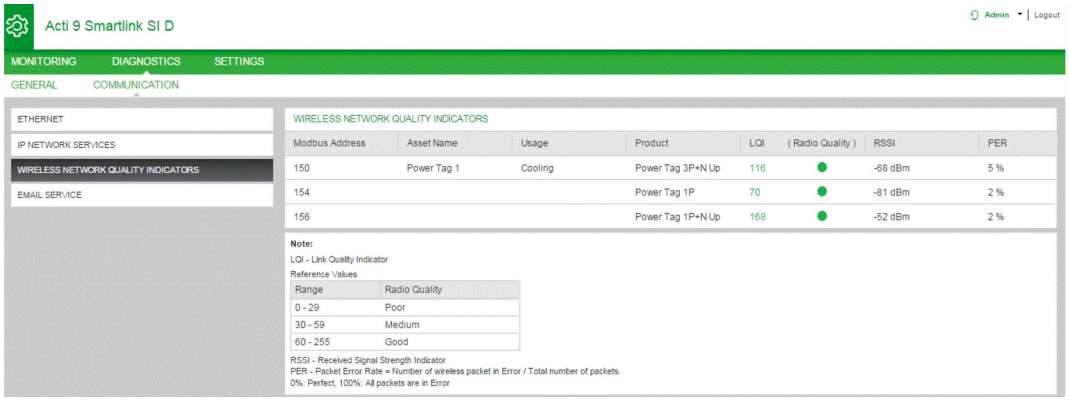


	Function Name	Description
Modbus TCP Port	Port status	Displays the current status of the Modbus/TCP port.
	Opened TCP connections	Displays the number of established Modbus/TCP connections.
	Received messages	Displays the counter of received Modbus/TCP messages.
	Transmitted messages	Displays the counter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

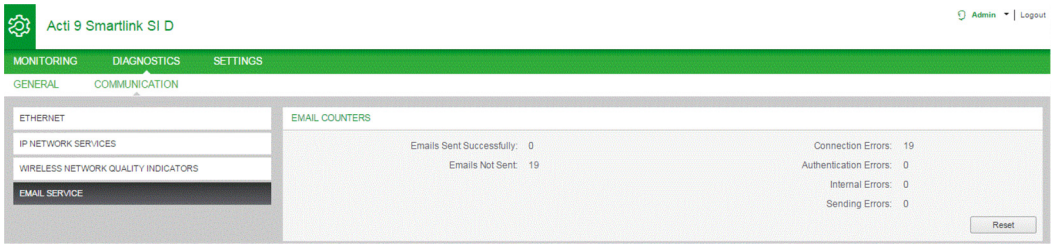
The **Wireless Network Quality Indicators** page displays wireless network quality information such as Link Quality Indicator (LQI), Received Signal Strength Indicator (RSSI), and Packet Error Rate (PER).



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 Acti 9 Smartlink inside the panel to be closer to the PowerTag. ● 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 Acti 9 Smartlink system, the ratio is calculated over a fixed window of five minutes. The value lesser than 5 % is acceptable.

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.

Chapter 9
System Settings Configuration

What Is in This Chapter?

This chapter contains the following sections:

Section 9.1
Commissioning of the General Network Settings

What Is in This Section?

This section contains the following topics:

Introduction

This chapter provides information about commissioning and configuring the HTTP, Modbus/TCP, FTP protocols, DNS, SNTP, and SMTP server settings.

General

Identification Page

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

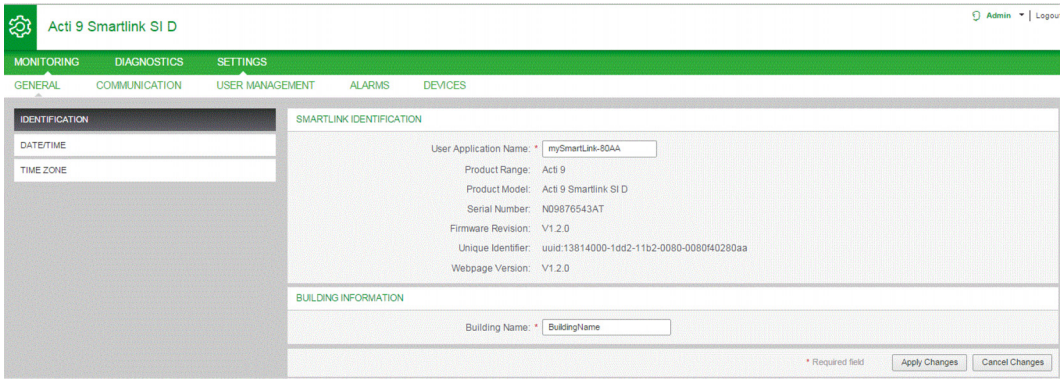
Parameters	Description
Smartlink Identification	
User Application Name	Displays the name of the particular device used by communication services to identify the device.
Product Range	Displays the product range name of the device.
Product Model	Displays the product model name of the device.
Serial Number	Displays the serial number of the device.
Firmware Revision	Displays the firmware version number of the device.
Unique identifier	Displays the identifier used by communication protocols.
Webpage Version	Displays the web page version of the device.
Building Information	
Building Name	Displays the user configured building name.

The **Identification** page allows you to edit only the **Device Name** and the **Building Name**. The **Device Name** is same as the name displayed in Windows 7 explorer. The other parameters in this page cannot be edited, as these are read-only parameters.

NOTE: The **Device Name** should contain only alphanumeric characters and a hyphen (-) character. The '-' character cannot be the last character.

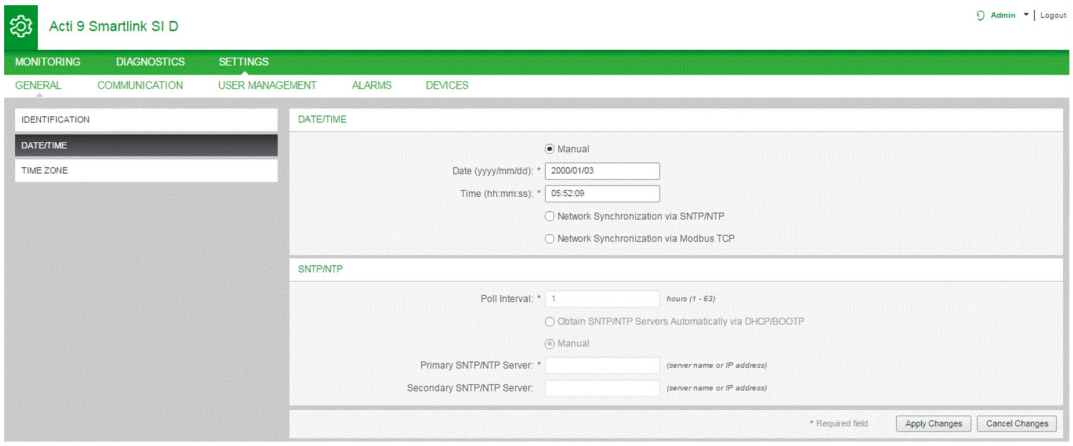
Click **Apply Changes** to save the changes. Click **Cancel Changes** to revert the settings.

NOTE: Once you click apply changes, you cannot undo the changes. You can click undo changes only before saving the changes.



Date/Time Page

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



NOTE: After every power cycle, the device will reset to a default value of date and time. The default date and time value is 2000/1/1, 00:00:00.

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

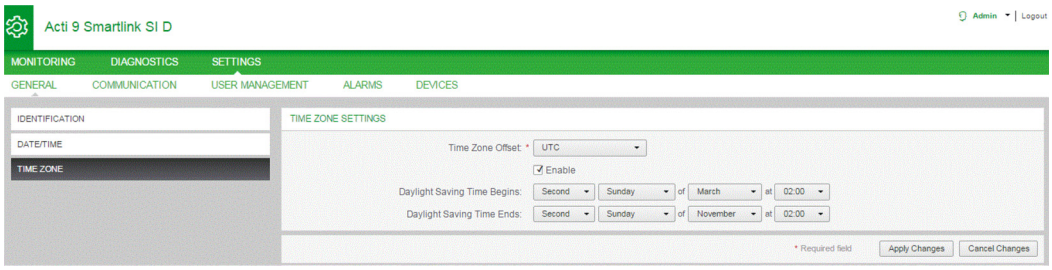
Step	Action
1	Select **Manual**.
2	Enter the **Date** to be set in the format **yyyy-mm-dd**.
3	Enter the **Time** in the format **hh:mm:sec**. Ensure to enter the time in a proper format.
4	Select **Network Synchronization via SNTP/NTP** to configure the date and time automatically via SNTP/NTP.
5	Select **Network Synchronization via Modbus TCP** to configure the date and time via Modbus TCP.
7	Click **Apply Changes** to save the settings. Click **Cancel Changes** to revert the settings.

In automatic mode, the Acti 9 Smartlink SI D 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

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



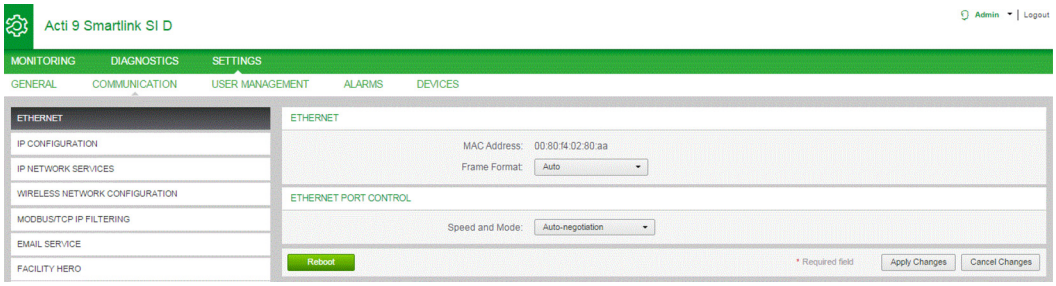
Follow the procedure to configure timezone settings:

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.

Communication

Ethernet Page

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.

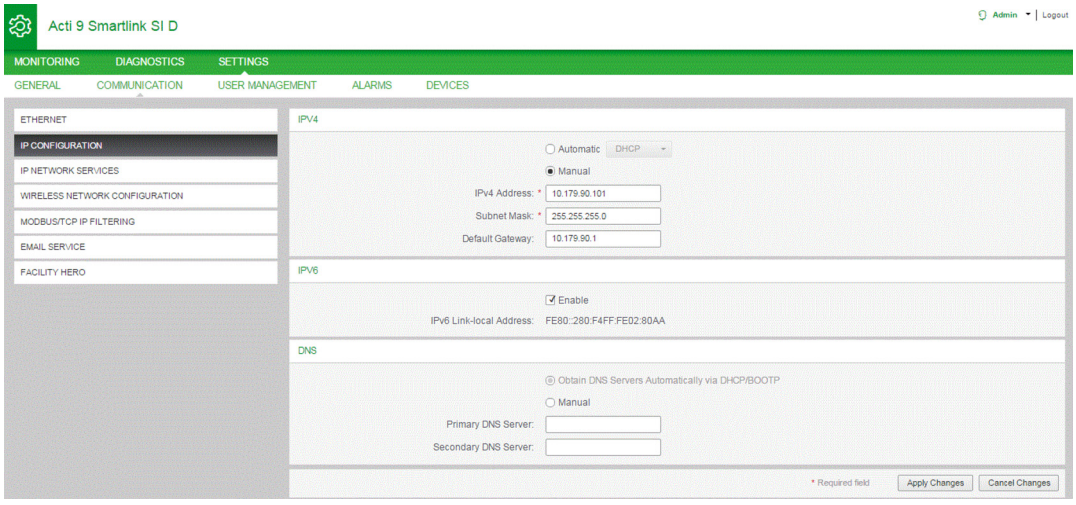


Follow the procedure to configure Ethernet parameters:

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 Page

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



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 Acti 9 Smartlink SI D 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 **Default Gateway** of the device.
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	Displays 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.

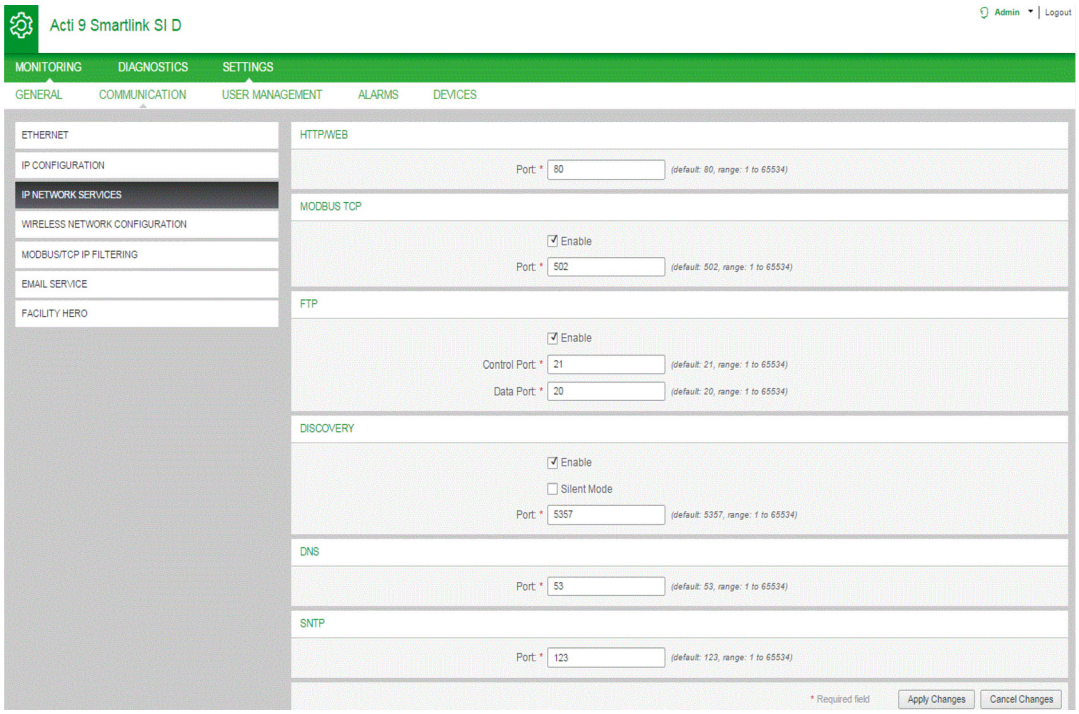
The Acti 9 Smartlink SI D can acquire the domain name automatically or you can set the DNS server address manually. Click **Obtain DNS Servers Automatically via DHCP/BOOTP** to acquire the DNS server automatically from the network.

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 Page

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



The Acti 9 Smartlink SI D supports HTTP, Modbus/TCP, FTP protocols, 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	Displays 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 FTP parameters:

Step	Action
1	Select the **Enable** check box to enable the FTP service. The **Enable** check box is selected by default.
2	Displays the control port number of the FTP network. The default value is 21.
3	Displays the data port number of the FTP network. The default value is 20.
4	Click **Apply Changes** to save the settings. Click **Cancel Changes** to revert the settings.

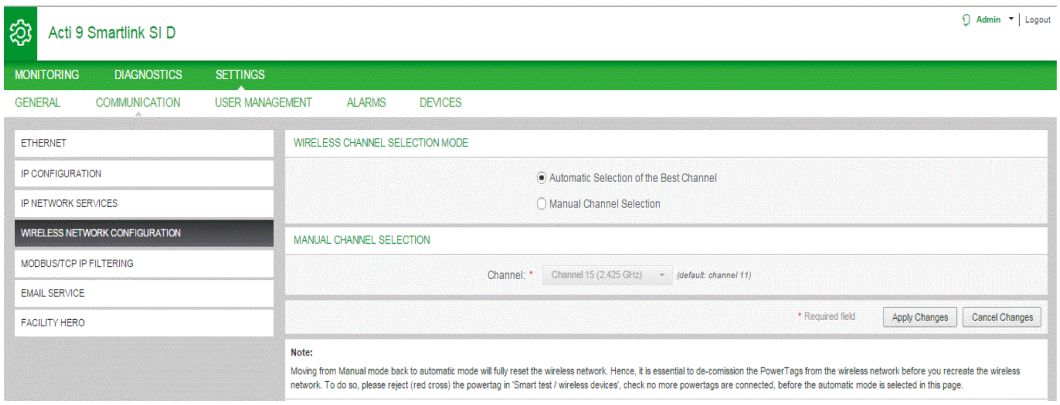
Follow the procedure to configure discovery services:

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	Displays 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.

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

Wireless Network Configuration Page

The **Wireless Network Configuration** page is used to configure wireless parameters.



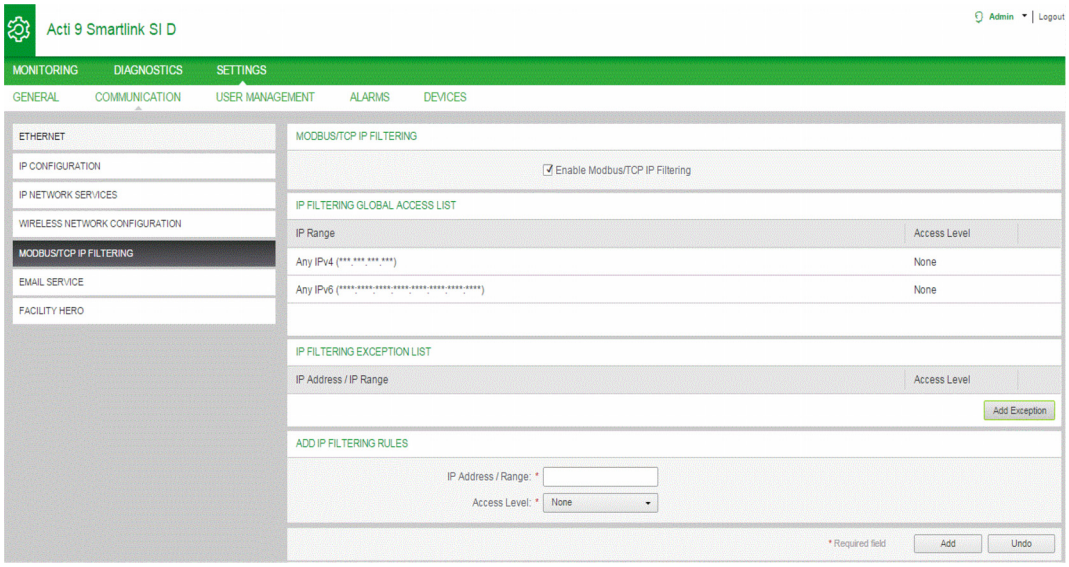
Click **Automatic Selection of the Best Channel** to select the channel automatically.

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

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

Modbus TCP/IP Filtering Page

The Modbus TCP/IP filtering is a security feature that lists the IP addresses from which the communication can be accepted (Ethernet client). 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.



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

Step	Action
1	Select the **Enable Modbus TCP/IP Filtering** check box to enable write access for the global IP address range and for the listed IP address range. **NOTE:** If you do not select the **Enable Modbus TCP/IP Filtering** check box, you cannot edit global IP address range and add or edit applicable exceptions.
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.

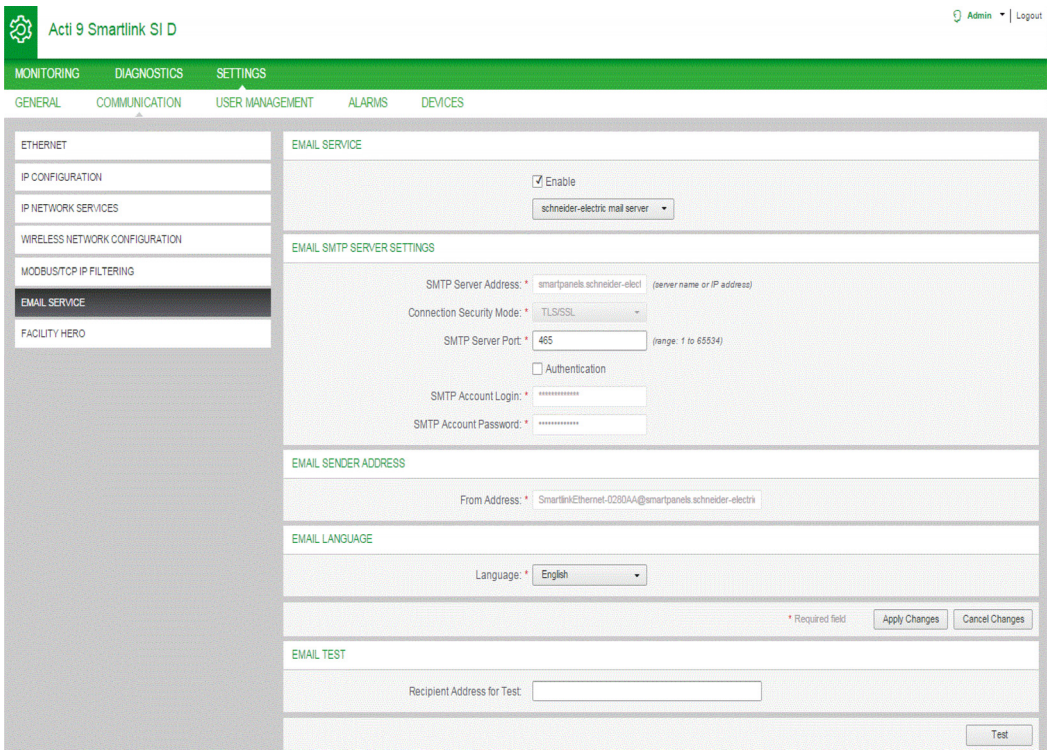
NOTE: You can only edit the global IP address range, but you cannot delete the global IP address range. You can edit and delete the added exceptions.

Email Service Page

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

NOTE: Please check your IT policies/ administrator to get the right IT connection (Port, LAN connection to Internet, e-mail 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.



Click the **Enable** check box to configure the email server settings. Acti 9 Smartlink SI D allows you to select the **schneider-electric mail server** or **your own SMTP server** profiles from the drop-down list.

Follow the steps given in the table to configure the email server settings if you select **your own SMTP server** profile:

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 device 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”, “device 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.
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 device 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 device that sends the email and the site router settings.
11	Click **Test** to deliver the email to the added recipient.

If you select **schneider-electric mail server** profile, then you can configure only **SMTP server port** and **Language** parameters.

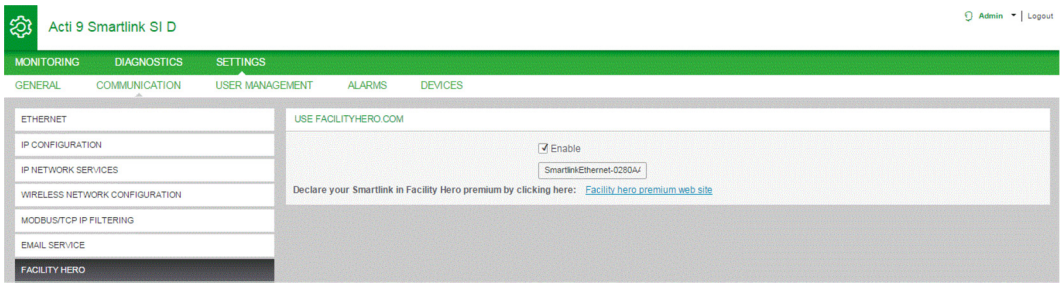
Schneider Electric provides an email service, free of charge, which allows you to receive the alarm notifications. When you choose to activate this service, you accept that Schneider Electric collects the data of your smart panel and your email address for the purpose to improve the product and the associated services and in accordance with our *Data Privacy policy.*

Facility Hero Page

The **Facility Hero** service enables the electricians and the facility manager to stay connected with their customer assets. The manager in charge of maintaining the electrical installation can receive the alarms from all the installed Acti 9 Smartlink devices logged in a notebook, and the complete history of the maintenance is shared within the maintenance staff. You can receive alarms directly in the notification center of **Facility Hero** as it is easy to monitor all the connected panels in the same space.

For more details on facility hero, see www.facilityhero.com.

The following figure allows you to connect the Acti 9 Smartlink SI D to the Facility Hero service:



Enabling Facility Hero

Follow the steps given in the table to configure the Facility Hero service:

Step	Action
1	Select the **Enable** check box to enable the Facility Hero service in Acti 9 Smartlink SI D.
2	Click **OK** to confirm. When you enable the Facility Hero service, you can receive all the alarm emails in the Facility Hero notification center. **NOTE:** If the SMTP server is already configured, then the Facility Hero service over writes the SMTP configuration and saves the earlier configuration.
3	Click the link **Facility hero premium web site** to log into the Facility Hero account. Facility Hero manages a special page to declare the Acti 9 Smartlink SI D.
4	An alarm notification is sent to the Facility Hero premium website on occurrence of an alarm.

Disabling Facility Hero

Follow the steps given in the table to disable the Facility Hero service:

Step	Action
1	Click to clear the **Enable** check box to disable the Facility Hero service in Acti 9 Smartlink SI D.
2	Click **OK** to confirm the disable of the Facility Hero service.
3	No alarm is sent to the Facility Hero on occurrence of an alarm.

Section 9.2
Manage User and Alarm Settings

What Is in This Section?

This section contains the following topics:

User Management

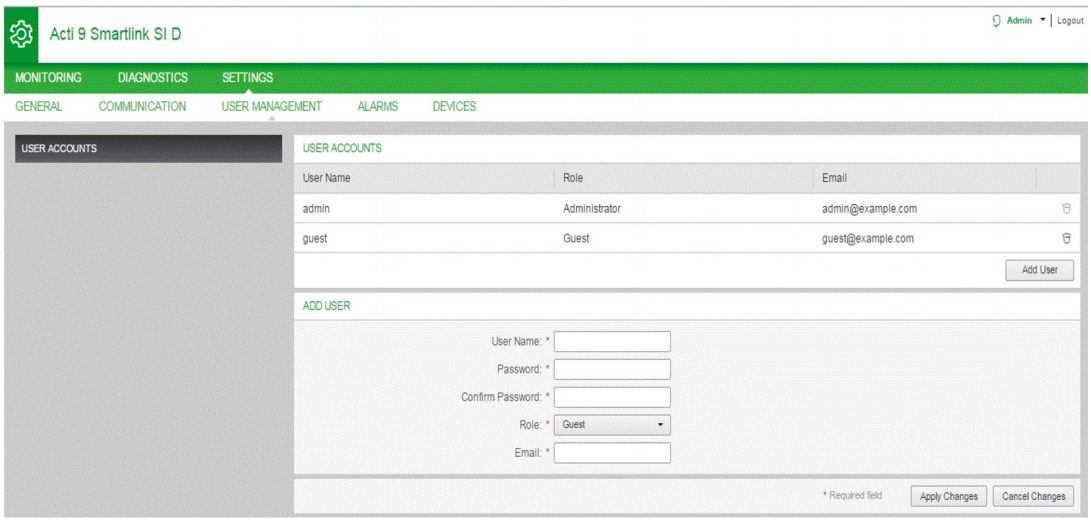
Users Accounts Page

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.

The following table lists the three types of user account supported by Acti 9 Smartlink SI D and their access rights:

User Accounts	Access	Username	Password
Administrator	• Edit parameters in **Settings** menu • Monitor the devices • View all menus	admin	admin
User	• Monitor the devices • View all menus	user	user
Guest	• View all menus	guest	guest

Administrator account is the first level of access to the web page by default. The number of user accounts at administrator level is up to 1. The number of user accounts at user level is up to 10.



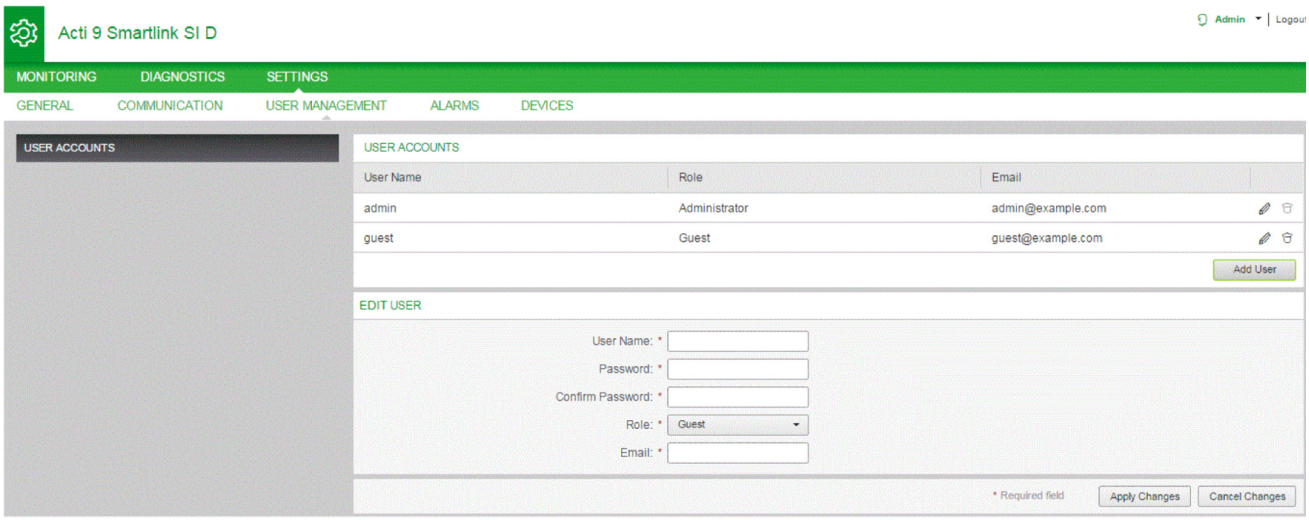
Follow the procedure to add a new user profile:

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.

By default, only one administrator account and one user account is available.

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:

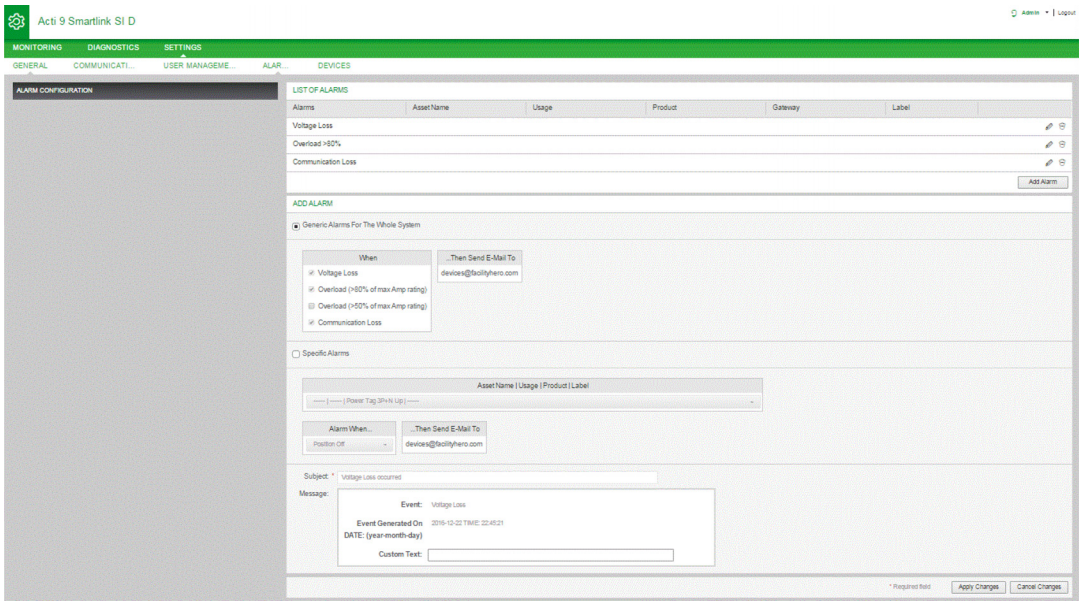
Step	Action
1	Select the user account from the **User Accounts** list and click the edit icon.
2	Select the type of user from the **Role** list.
3	Modify the **Password** for the selected user account, if required.
4	Enter the email of the user in the **Email** area.
5	Click **Apply Changes** to save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

Alarms

Alarm Configuration Page

The **Alarm Configuration** page is used to configure alarms when there is an electrical issue. This page displays the information about the email events, products, channels and devices, and email recipients.



This page allows you to add a new alarm and edit the selected alarm from the list of events.

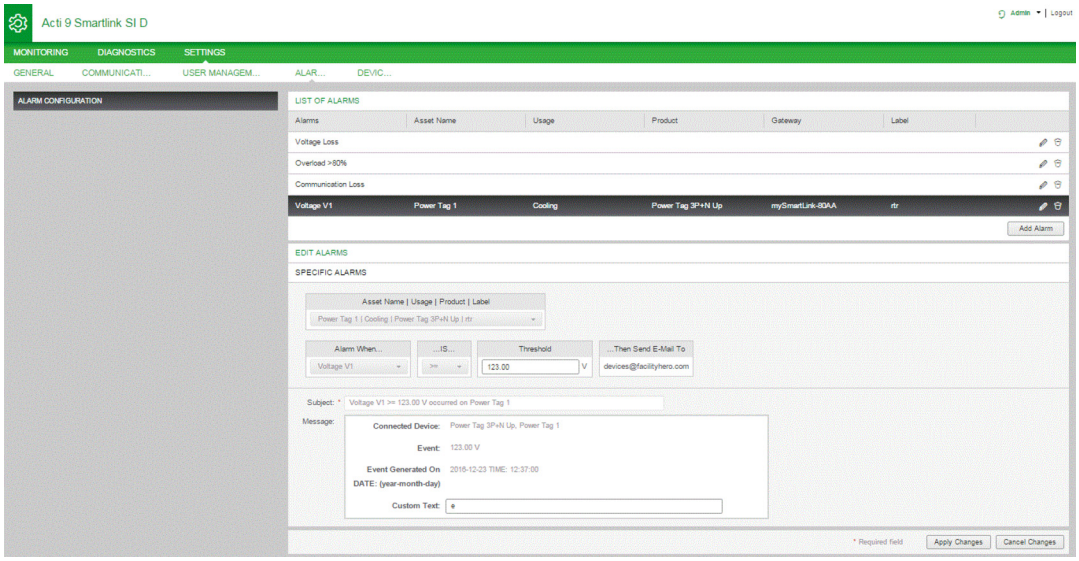
Follow the steps given in the table to add a new alarm:

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	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. Or 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.
4	Enter the **Subject** and **Message** of the email event.
5	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.

Follow the steps given in the table to edit the parameters of an event:

Step	Action
1	Select an event and click the edit icon to edit the parameters of an event.
2	Modify the required to edit an event.
3	Select the email recipients from the **Email** list.
4	Click **Apply Changes** to save the settings. Click **Cancel Changes** to revert the settings.



Section 9.3
Manage Device Settings

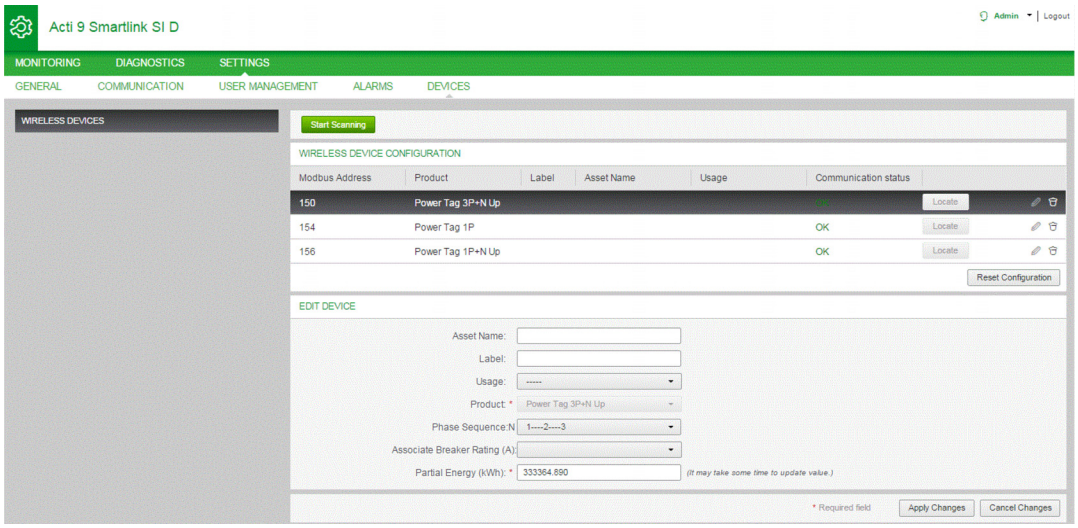
Devices

Wireless Device Page

The **Wireless Device** page discovers and configures the wireless devices connected to Acti 9 Smartlink SI D. It also allows you to edit the configuration or unpair the wireless device from Acti 9 Smartlink SI D.

The Acti 9 Smartlink SI D web page allows the configuration of the following wireless devices:

- PowerTag 1P (A9MEM1520)
- PowerTag 1P+N (A9MEM1521)
- PowerTag 1P+N (A9MEM1522)
- PowerTag 3P (A9MEM1540)
- PowerTag 3P+N (A9MEM1541)
- PowerTag 3P+N (A9MEM1542)



Follow the procedure to configure the wireless devices:

Step	Action
1	Click **Start Scanning** to discover the wireless devices connected to the Acti 9 Smartlink SI D. **Result**: Displays the discovered wireless devices and allocates Modbus address to each device.
2	Select any wireless device and click the edit 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 type of the product from the **Product** 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**.
8	Select the breaker rating from the **Associate Breaker Rating (A)** list to calculate the percentage of loads.
9	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	Click **Apply Changes** to save the settings. Click **Cancel Changes** to revert the settings.

Chapter 10
Tables of Modbus Registers

What Is in This Chapter?

This chapter contains the following sections:

Section 10.1
General Description of Modbus Tables

What Is in This Section?

This section contains the following topics:

Overview

Overview

All the Modbus tables in the Acti 9 Smartlink SI D device have been designed to minimize the number of Modbus requests that the master system needs to send in order to collect the data prepared by Acti 9 Smartlink SI D.

The Modbus tables in the Acti 9 Smartlink SI D device are described in:

- The section presenting:
  - The overall list of Acti 9 Smartlink SI D device address zones.
- The section presenting the address zones for each type of device that can be connected to Acti 9 Smartlink SI D: *(see page 91)*
  - PowerTag energy sensors
- The section presenting the address zones for each type of data (measurements and parameter settings) *(see page 91)*.

General Organization of Modbus Tables in Acti 9 Smartlink SI D Devices

Item	Description	Link
1	System data independent of the channel	*(see page 92)*
2	PowerTag energy sensors 1 to 20	*(see page 94)*

Modbus Table Format and Data Types

Table Formats

Register tables have the following columns:

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

Designation	Description
Address	16-bit register address that allows the user to access the variable. The address is expressed in decimal notation. Modbus Address: The list of Modbus addresses, defined by the Modbus protocol, starts at 0. The detailed tables in subsequent chapters of this manual give the Modbus addresses. If the programmable controller (master) refers to the data model addresses, the addresses to be supplied to this controller must meet the following rule: Data model address = Modbus address + 1. If the programmable controller (Modbus master) refers to the procotol addresses, the addresses to be supplied to this controller must be the Modbus addresses.
No.	Number of 16-bit registers that need to be read/written to access the complete information.
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.
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
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	Acti 9 Smartlink SI D 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	Acti 9 Smartlink SI D 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 Address

The list of Modbus addresses, defined by the protocol, starts at 0. The detailed tables in subsequent chapters of this manual give the addresses.

If the programmable controller (Modbus master) refers to the data model addresses, the addresses to be supplied to this controller must meet the following rule: Data model address = address + 1.

If the programmable controller (Modbus master) refers to the procotol addresses, the addresses to be supplied to this controller must be the Modbus addresses.

Global Modbus Address Table

Modbus Address

Description	Address (1)	No. of Words	Type	RW
System				
Identification	100	11	ASCII	R
Status	112	1	BITMAP	R
Date and Time	115	4	DATE	RW

(1) Modbus register = Modbus address + 1.

Modbus Address for Wireless Devices

Acti 9 Smartlink SI D allocates dynamically, a slave number 150 through 169 for each of the 20 wireless devices (up to 20 wireless devices) that could be connected to the Acti 9 Smartlink SI D.

Each of these 20 devices has exactly the same Modbus register table (same structure, same addresses) as described in the following table.

The supervision system uses the dynamically allocated slave number (of each wireless device) to pull the right Modbus register table.

Description	Unit	Address (1)	No. of Words	Type	RW
Current measurement					
Current on phase A	A	2999	2	Float32	R
Current on phase B	A	3001	2	Float32	R
Current on phase C	A	3003	2	Float32	R
Voltage measurement					
Phase-to-phase voltage A-B	V	3019	2	Float32	R
Phase-to-phase voltage B-C	V	3021	2	Float32	R
Phase-to-phase voltage C-A	V	3023	2	Float32	R
Phase-to-neutral voltage A-N	V	3027	2	Float32	R
Phase-to-neutral voltage B-N	V	3029	2	Float32	R
Phase-to-neutral voltage C-N	V	3031	2	Float32	R
Power measurement					
Active power on phase A	W	3053	2	Float32	R
Active power on phase B	W	3055	2	Float32	R
Active power on phase C	W	3057	2	Float32	R
Total active power	W	3069	2	Float32	R
Power factor measurement	W	3083	2	Float32	R
Energy measurement					
Total active energy delivered and received	Wh	3203	4	INT64	R
Sum of partial energy set and accumulated active energy from the set delivered by PowerTag energy sensors	Wh	3255	4	INT64	R
Reset partial energy counter	Wh	3259	4	INT64	W
Circuit diagnostic counters					
Validity of each bit of register	–	3297	2	UINT	R
Alarm status	–	3299	2	UINT	R
Product Identification					
User application name	–	31000	10	ASCII	RW
Circuit identifier	–	31010	3	ASCII	RW
Usage attribute	–	31013	1	ENUM	RW
Phase sequence	–	31014	1	ENUM	RW

Description	Unit	Address (1)	No. of Words	Type	RW
Mounting position	–	31015	1	ENUM	RW
Circuit diagnostic	–	31016	1	ENUM	RW
Breaker rating	A	31017	1	UINT	RW
Product type	–	31024	1	ENUM	R

(1) Modbus register = Modbus address + 1.

How to use registers

To know the description of each register (how to use them), please print the excel report of Modbus registers using Acti 9 Smart test software. It gives you a dynamic knowledge of all your registers necessary to integrate to building management systems including a description of each register.

Modbus Address

The list of Modbus addresses, defined by the Modbus protocol, starts at 0. The detailed tables in subsequent chapters of this manual give the Modbus addresses.

If the programmable controller (Modbus master) refers to the data model addresses, the addresses to be supplied to this controller must meet the following rule: Data model address = Modbus address + 1.

If the programmable controller (Modbus master) refers to the procotol addresses, the addresses to be supplied to this controller must be the Modbus addresses.

Section 10.2
Summary and Detailed Modbus Tables

What Is in This Section?

This section contains the following topics:

System

Modbus Address of Smartlink: 255

Address	No.	RW	X	Unit	Type	Range	Default Value	Svd	Function Code	Description
100	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: SAP Bridge plant number ● 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]
106	3	R	–	–	ASCII	–	N/A	Y	03, 100–4	Hardware version on 6 ASCII characters
109	3	R	–	–	ASCII	–	N/A	Y	03, 100–4	Software version on 6 ASCII characters. **Example:** “V0.0.1”

Status

Address	No.	RW	X	Unit	Type	Range	Default Value	Svd	Function Code	Description
112	1	R	–	–	BITMAP	–	0x0000	N	01, 02, 03, 100–4	Acti 9 Smartlink SI D device status and diagnostic register Bit 0 = 1: start-up phase Bit 1 = 1: operating phase Bit 2 = 1: downgraded mode(1) Bit 3 = 1: failure mode Bit 4: not used Bit 5: not used Bit 6 = 1: invalid data Bit 7 = 1: 24 V channel error Bit 8: not used Bit 9: not used Bit 10: not used Bit 11: not used 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.

(1)Downgraded mode comes into effect:
- When the power supply is cut or less than 16 Vdc.
- In the event of overcurrent (overload or short-circuit) on the Ti24 I/O.

If a short-circuit on an output has caused a change to downgraded mode, at the end of the short-circuit, the output is reset to 0 by the electronics: the Modbus master system sends a Modbus message to reset the output to 1 if it was at 1, before the short-circuit.

Failure mode intervenes if there is an FLASH and/or RAM and/or E2PROM error.

The data is invalid in the start-up phase, downgraded, and failure modes. Invalid data include inputs 1 and 2, the power or flow indicator, the operation and running hours counter.

- The E2PROM error bit is activated during the operating phase when a checksum error is detected in an E2PROM page.
- The RAM error bit is activated during the product initialization phase when an error is detected during a test of the RAM.
- The FLASH error bit is activated during the start-up phase when a checksum error is detected on the FLASH memory.

Date and Time

Address	No.	RW	X	Unit	Type	Range	Default Value	Svd	Function Code	Description
115	4	RW	–	–	DATE	(1)	N/A	N	03, 16 100–4	Indicates the year, month, day, hour, minute and millisecond on the Acti 9 Smartlink SI D device.

(1) See description of the DATE type *(see page 87)*.

PowerTag Energy Sensors 1 to 20

Description

Acti 9 Smartlink SI D allocates dynamically, a slave number 150 through 169 for each of the 20 wireless devices (up to 20 wireless devices) that could be connected to the Acti 9 Smartlink SI D.

Each of these 20 devices has exactly the same Modbus register table (same structure, same addresses) as described in the following table.

The supervision system uses the dynamically allocated slave number (of each wireless device) to pull the right Modbus register table.

Basic Configuration Registers

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

Address	No.	RW	X	Unit	Type	Range	Default Value	Svd	Function Code	Description
31000	10	RW	–	–	ASCII	–	0x0000	Y	03, 06, 16, 100–4	User application name of the wireless device. The user can enter maximum 20 characters.
31010	3	RW	–	–	ASCII	–	0x0000	Y	03, 06, 16, 100–4	Circuit identifier of the wireless device. The user can enter maximum five characters.
31013	1	RW	–	–	ENUM	–	0xFFFF	Y	03, 06, 16, 100–4	Indicates the usage attribute of the wireless device.
31014	1	RW	–	–	ENUM	–	0xFFFF	Y	03, 06, 16, 100–4	Indicates the phase sequence.
31015	1	RW	–	–	ENUM	–	0xFFFF	Y	03, 06, 16, 100–4	Indicates the mounting position. 0 = Not configured 1 = Up 2 = Down
31016	1	RW	–	–	ENUM	–	0xFFFF	Y	03, 06, 16, 100–4	Indicates the circuit diagnostic. 0 = Disable 1 = Enable
31017	1	RW	–	–	UINT	–	0xFFFF	Y	03, 06, 16, 100–4	Indicates the breaker rating of the wireless device.
31024	1	R	–	–	ENUM	–	0x8000	Y	03, 06, 16, 100–4	Indicates the product type of wireless devices. 41 = PowerTag 1P 42 = PowerTag 1P + N up 43 = PowerTag 1P + N down 44 = PowerTag 3P 45 = PowerTag 3P + N up 46 = PowerTag 3P + N down

Metering Data Registers

Address	No.	RW	X	Unit	Type	Range	Default Value	Svd	Function Code	Description
Current - Metering Data										
2999	2	R	–	A	Float32	–	0xFFC0 0000	N	03, 100–4	RMS Current on phase A.
3001	2	R	–	A	Float32	–	0xFFC0 0000	N	03, 100–4	RMS Current on phase B.
3003	2	R	–	A	Float32	–	0xFFC0 0000	N	03, 100–4	RMS Current on phase C.
Voltage -Metering Data										
3019	2	R	–	V	Float32	–	0xFFC0 0000	N	03, 100–4	RMS Phase-to-phase voltage A-B.
3021	2	R	–	V	Float32	–	0xFFC0 0000	N	03, 100–4	RMS Phase-to-phase voltage B-C.
3023	2	R	–	V	Float32	–	0xFFC0 0000	N	03, 100–4	RMS Phase-to-phase voltage C-A.
3027	2	R	–	V	Float32	–	0xFFC0 0000	N	03, 100–4	RMS Phase-to-neutral voltage A-N.
3029	2	R	–	V	Float32	–	0xFFC0 0000	N	03, 100–4	RMS Phase-to-neutral voltage B-N.
3031	2	R	–	V	Float32	–	0xFFC0 0000	N	03, 100–4	RMS Phase-to-neutral voltage C-N.
Power - Metering Data										
3053	2	R	–	W	Float32	–	0xFFC0 0000	N	03, 100–4	Active power on phase A.
3055	2	R	–	W	Float32	–	0xFFC0 0000	N	03, 100–4	Active power on phase B.
3057	2	R	–	W	Float32	–	0xFFC0 0000	N	03, 100–4	Active power on phase C.
3059	2	R	–	W	Float32	–	0xFFC0 0000	N	03, 100–4	Total active power.
Power Factor - Metering Data										
3083	2	R	–	–	Float32	–	0xFFC0 0000	N	03, 100–4	Total power factor.
Energy - Metering Data										
3203	4	R	–	Wh	INT64	–	0x8000	Y	03, 100–4	Total active energy sent and received.
3255	4	R	–	Wh	INT64	–	0x8000	Y	03, 100–4	Sum of partial energy set and accumulated active energy from the set delivered by PowerTag energy sensors
3259	4	W	–	Wh	INT64	–	0x8000	Y	03, 100–4	Reset partial energy counter

Circuit Diagnostic Registers

Address	No.	RW	X	Unit	Type	Range	Default Value	Svd	Function Code	Description
3297	2	R	–	–	UINT	–	0xFFFF	N	03, 100–4	0 = Invalid. 1 = Valid.
3299	2	R	–	–	UINT	–	0xFFFF	N	03, 100–4	0 = Alarm OFF. 1 = Alarm ON. Bit 0 = Voltage phase loss. Bit 1 = Current overload.

Section 10.3
Modbus Tables for Connected Devices

PowerTag Energy Sensors (A9MEM1520, A9MEM1521, A9MEM1522, A9MEM1540, A9MEM1541, and A9MEM1542)

Overview

The PowerTag energy sensors are the wireless devices that are mounted upstream or downstream on Acti 9 and Multi 9 circuit breakers.

Acti 9 Smartlink SI D allocates dynamically, a slave number 150 through 169 for each of the 20 wireless devices (up to 20 wireless devices) that could be connected to the Acti 9 Smartlink SI D.

Description	Address(1)	No. of Register(s)	Type	Action	Values and Meanings
Basic configuration counters					
User application name	31000	10	ASCII	RW	–
Circuit identifier	31010	3	ASCII	RW	–
Usage attribute	31013	1	ASCII	RW	–
Phase sequence	31014	1	ENUM	RW	–
Mounting position	31015	1	ENUM	RW	0 = Not configured 1 = Up 1 = down
Circuit diagnostic	31016	1	ENUM	RW	0 = Disable 1 = Enable
Breaker rating	31017	1	UINT	RW	–
Product type	31024	1	ENUM	R	41 = PowerTag 1P 42 = PowerTag 1P + N up 43 = PowerTag 1P + N down 44 = PowerTag 3P 45 = PowerTag 3P + N up 46 = PowerTag 3P + N down
Consumption counters					
Current	2999	6	Float32	R	–
Voltage	3019	12	Float32	R	–
Power	3053	8	Float32	R	–
Power factor	3083	2	Float32	R	–
Energy	3203	12	INT64	R	–
Circuit diagnostic counters					
Validity of each bit of the register	3297	2	UINT	R	0 = Invalid. 1 = Valid.
Alarm status	3299	2	UINT	R	0 = Alarm OFF. 1 = Alarm ON. Bit 0 = Voltage phase loss. Bit 1 = Current overload.

(1) Modbus register = Modbus address + 1.

Appendices

What Is in This Appendix?

The appendix contains the following chapters:

Appendix A
Details of Modbus Functions

What Is in This Chapter?

This chapter contains the following topics:

Function 8: Modbus Diagnostics

Structure of Modbus Messages Concerning Acti 9 Smartlink SI D 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	A9XMWA20
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
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	A9XMWA20
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 Acti 9 Smartlink SI D.

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 87)*.					

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 87)*.					

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 87)*.					

Function 100–4: Read n Non-Adjacent Words

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

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.

Appendix B
Reset of Acti 9 Smartlink SI D

Description

Resetting Acti 9 Smartlink SI D

Press and hold the **Reset** button for 10 to 20 seconds of Acti 9 Smartlink SI D to reset to the factory parameter settings.

The reset data is as follows:

- The mode of IP acquisition is set to DHCP.
- The password is set to the default value.
- The panel information saved in Acti 9 Smartlink SI D is erased.
- The user accounts is erased (only default user accounts will be retained).
- The operation counters are set to 0.
- The running hours counters are set to 0.
- The counter modification values are set to the value “1 January 2000”.

Appendix C
Troubleshooting

Common Problems

Description

The following table describe the abnormal behavior and diagnostics, and provide 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.	Smartlink is disconnected from the network	Follow the below steps to recover the Smartlink: 1. Disconnect Smartlink from the network. 2. Power cycle the Smartlink. 3. Connect your PC or laptop directly to the Smartlink. 4. Use **Automatic Discovery** from the Start page of Acti 9 Smart Test to connect to the Smartlink. 5. Launch firmware upgrade.
Acti 9 Smartlink has lost the communication with PowerTag energy sensors.	Pollution on the radio frequency channel	Change the radio frequency channel that communicates between PowerTag energy sensors and Acti 9 Smartlink in the **Settings → Communication → Wireless Network Configuration** page.

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