Harmony XB5R

ZBRN1/ZBRN2
User Manual

03/2013

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All pertinent state, regional, and local safety regulations must be observed when installing and using this product. For reasons of safety and to help ensure compliance with documented system data, only the manufacturer should perform repairs to components.
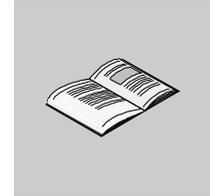
When devices are used for applications with technical safety requirements, the relevant instructions must be followed.

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

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

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, 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 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 an imminently hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

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

⚠ CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, **can 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
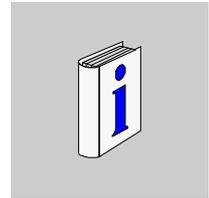
At a Glance

Document Scope

This documentation is a reference for the Harmony XB5R wireless and batteryless pushbuttons used with ZBRN• access point.

The purpose of this document is to:
- show you how to install and operate your access point.
- show you how to connect the access point with Harmony XB5R wireless and batteryless pushbuttons, programmable logic controllers (PLCs), and other devices.
- help you become familiar with the access point features.

NOTE: Read and understand this document and all related documents *(see page 9)* before installing, operating, or maintaining your access point.

The users must read through the entire document to understand all its features.

Validity Note

This documentation is valid for Harmony XB5R.

The technical characteristics of the devices described in this manual also appear online. To access this information online:

Step	Action
1	Go to the Schneider Electric home page *www.schneider-electric.com*.
2	In the **Search** box type the reference of a product or the name of a product range. ● Do not include blank spaces in the model number/product range. ● To get information on a grouping similar modules, use asterisks (*).
3	If you entered a reference, go to the **Product datasheets** search results and click on the reference that interests you. If you entered the name of a product range, go to the **Product Ranges** search results and click on the product range that interests you.
4	If more than one reference appears in the **Products** search results, click on the reference that interests you.
5	Depending on the size of your screen, you maybe need to scroll down to see the data sheet.
6	To save or print a data sheet as a .pdf file, click **Download XXX product datasheet**.

The characteristics that are presented in this manual should be the same as those characteristics that appear online. In line with our policy of constant improvement, we may revise content over time to improve clarity and accuracy. If you see a difference between the manual and online information, use the online information as your reference.

Related Documents

Title of Documentation	Reference Number
Harmony XB5R Wireless and Batteryless Pushbutton	960562 (Eng), 960563 (Fre), DIA5ED2110402EN (Eng), DIA5ED2110402FR (Fre)
Harmony XB5R Expert Instruction Sheet	EIO0000000812 (Eng), EIO0000000813 (Fre), EIO0000000814 (Ger), EIO0000000815 (Spa), EIO0000000816 (Ita), EIO0000000817 (Chs), EIO0000000818 (Por)
ZBRN1 Instruction Sheet	S1B87888
ZBRN2 Instruction Sheet	S1B87941
ZBRCETH Instruction Sheet	S1B88209
Packages Instruction Sheet	S1A57199
Receivers Instruction Sheet	S1A57202
Transmitter with Metal or Plastic Head and Cap Instruction Sheet	S1A57198
Relay Antenna Instruction Sheet	S1A57194
Handy Box Instruction Sheet	S1A57210

You can download these technical publications and other technical information from our website at www.schneider-electric.com.

Product Related Information

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Disconnect all power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, or wires except under the specific conditions specified in the appropriate hardware guide for this equipment.
- Always use a properly rated voltage sensing device to confirm the power off where and when indicated.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to the equipment.
- Use only the specified voltage when operating this equipment and any associated products.

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

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

- Only persons with expertise in the design and programming of control systems are allowed to program, install, alter, and apply this product.
- Follow all local and national safety codes and standards.

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

User Comments

We welcome your comments about this document. You can reach us by e-mail at techcomm@schneider-electric.com.

Introduction

1

Offer Description

General

Harmony XB5R using access point offer allows more flexibility and simplicity in the installation. Wireless and batteryless push-button technology reduces the wiring hence the cost of installation. The access point converts radio frequency inputs into various communication protocols and operates as an intermediate equipment between a transmitter and a PLC.

It has wide range of industrial, and building applications such as in packing lines, automatic doors in logistic centers, and manufacturing of vehicles in automobile industries. Also for bag filling in cement industries, and office lighting for efficient usage of the power.

Basic Architecture

The following figure shows the transmission between the 3 transmitters and 1 access point:
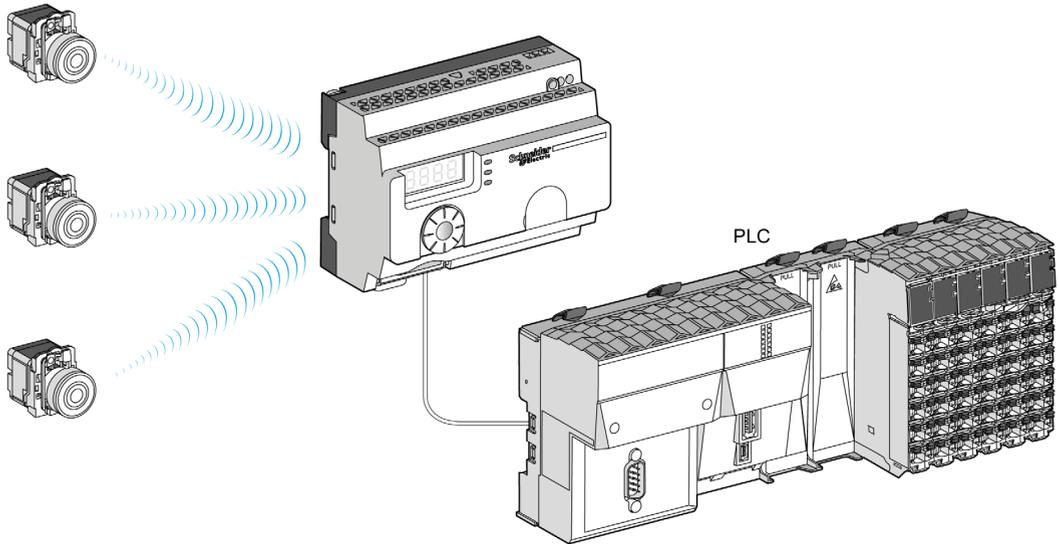
NOTE: You can associate 1 access point with up to 60 transmitters. Each transmitter has a unique ID (for example, 030079B1).

Compatible Transmitters

The access point is compatible with Harmony batteryless and wireless push-button offer based on the radio technology.

The following figures show some different transmitters:

Example 1: Push-button with a plastic head

ZB5RTA1

Example 2: Push-button with a metal head

ZB4RTA3
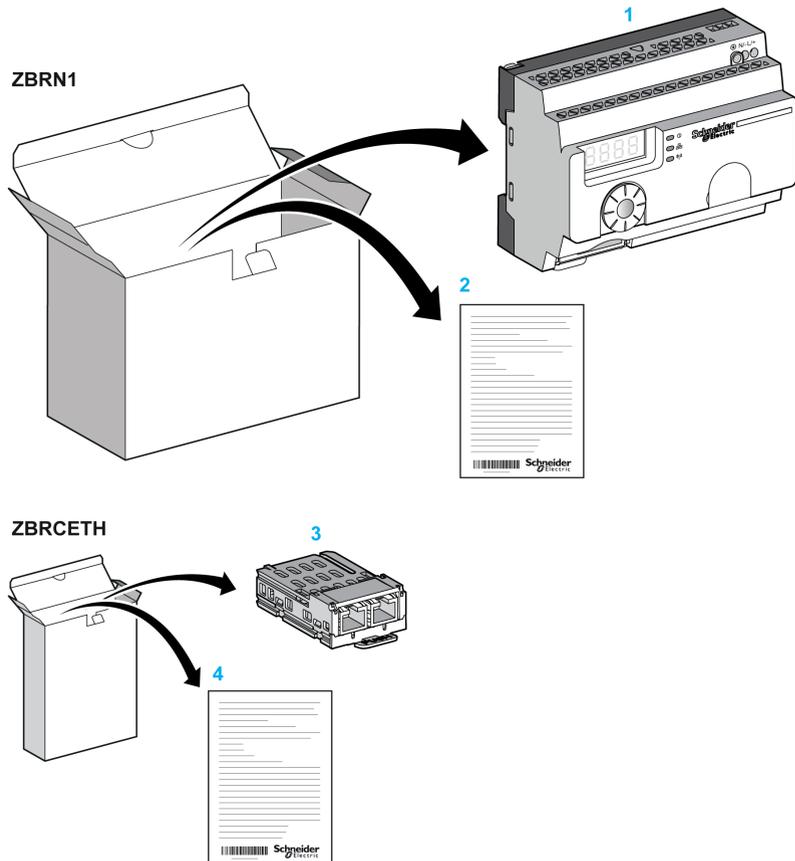
Example 3: Push-button with a plastic head enclosed in a handy box

ZB5RTA3 + ZBRM01

Product References

ZBRN1: Standard Access Point with Communication Module

1 Access point
2 Instruction Sheet (ZBRN1)
3 Communication module
4 Instruction Sheet (ZBRCETH)

NOTE: ZBRN1 must be associated with a communication module, reference ZBRCETH (Ethernet protocol).

ZBRN2: Access Point for Modbus Serial Line Communication

ZBRN2

1 Access point
2 Instruction Sheet
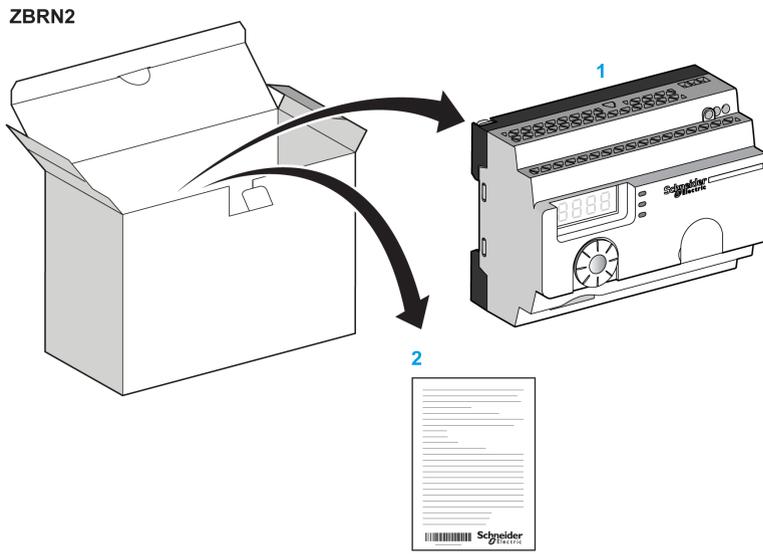
Difference Between ZBRN1 and ZBRN2

ZBRN2 has an embedded communication port for Modbus serial line, whereas ZBRN1 can support different protocols using a communication module.

Physical Description

2

Purpose

This chapter provides an overview of the Harmony XB5R ZBRN1/ ZBRN2 hardware description, output connectors, installation, and power supply connections.

What Is in This Chapter?

This chapter contains the following sections:

2.1 Product Overview

Hardware Description

ZBRN1
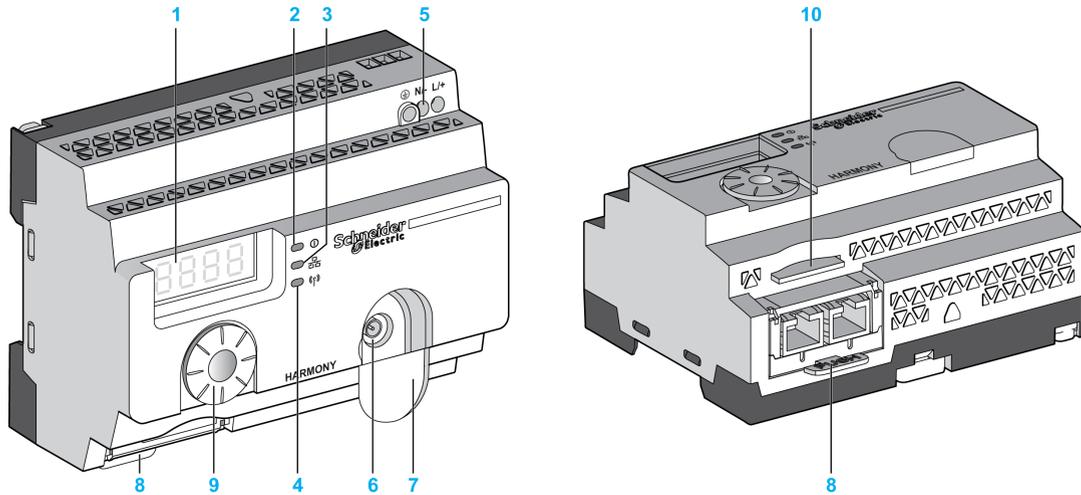
1 Four 7-segment displays with 5 LEDs
2 Power LED
3 Communication LED
4 Radio signal strength LED
5 Power input terminal block
6 External antenna (optional) connector
7 External antenna (optional) connector protective plug
8 Communication module inserted with 2 RJ45 Ethernet connectors
9 Jog dial
10 SD memory card slot

ZBRN2
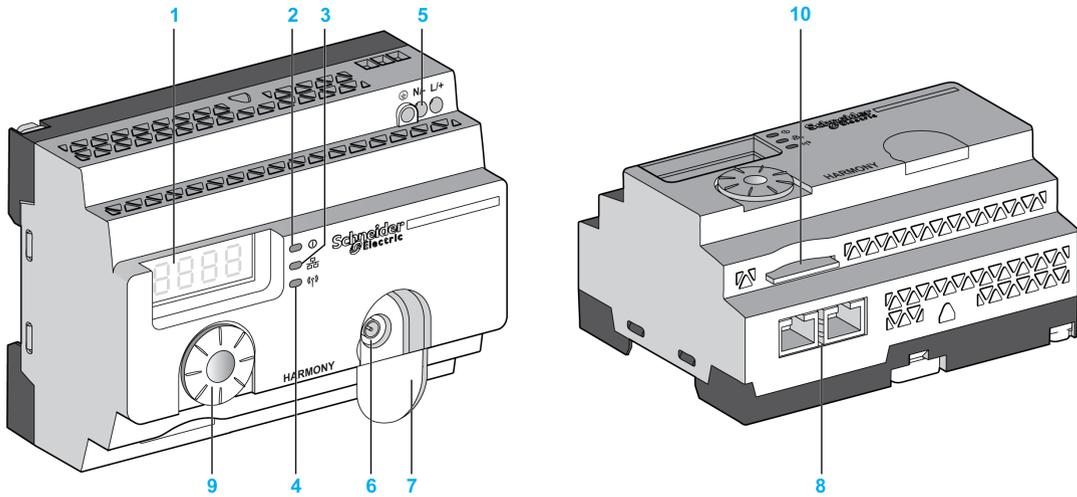
1 Four 7-segment displays with 5 LEDs
2 Power LED
3 Communication LED
4 Radio signal strength LED
5 Power input terminal block
6 External antenna (optional) connector
7 External antenna (optional) connector protective plug
8 2 RS-485 Modbus serial line connectors
9 Jog dial
10 SD memory card slot

2.2   Installation

What Is in This Section?

This section contains the following topics:

Topic	Page
Installation Requirements	21
Mechanical Installation	28
Environmental Features	30
Housing	32

Installation Requirements

Before Starting

Read and understand this chapter before beginning the installation of your access point.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Disconnect power from all equipment including connected devices prior to removing any covers or doors, or installing or removing any accessories, hardware, cables, or wires except under the specific conditions specified in the appropriate hardware guide for this equipment.
- Always use a properly rated voltage sensing device to confirm the power is off where and when indicated.
- Replace and secure all covers, accessories, hardware, cables, and wires and confirm that a proper ground connection exists before applying power to the equipment.
- Use only the specified voltage when operating this equipment and any associated products.

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

Operating Environment

⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

Install and operate this equipment according to the environmental conditions described in the operating limits.

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

Installation Considerations

⚠ **WARNING**

UNINTENDED EQUIPMENT OPERATION

- Use appropriate safety interlocks where personnel and/or equipment hazards occur.
- Install and operate this equipment in an enclosure appropriately rated for its intended environment.
- Do not use this equipment in safety-critical machine functions.
- Do not disassemble, repair, or modify this equipment.
- Do not connect any wiring to reserved, unused connections, or to connections designated as not connected (N.C.).

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

Architecture Principle

The architecture principle of the access points is shown in the following figure:
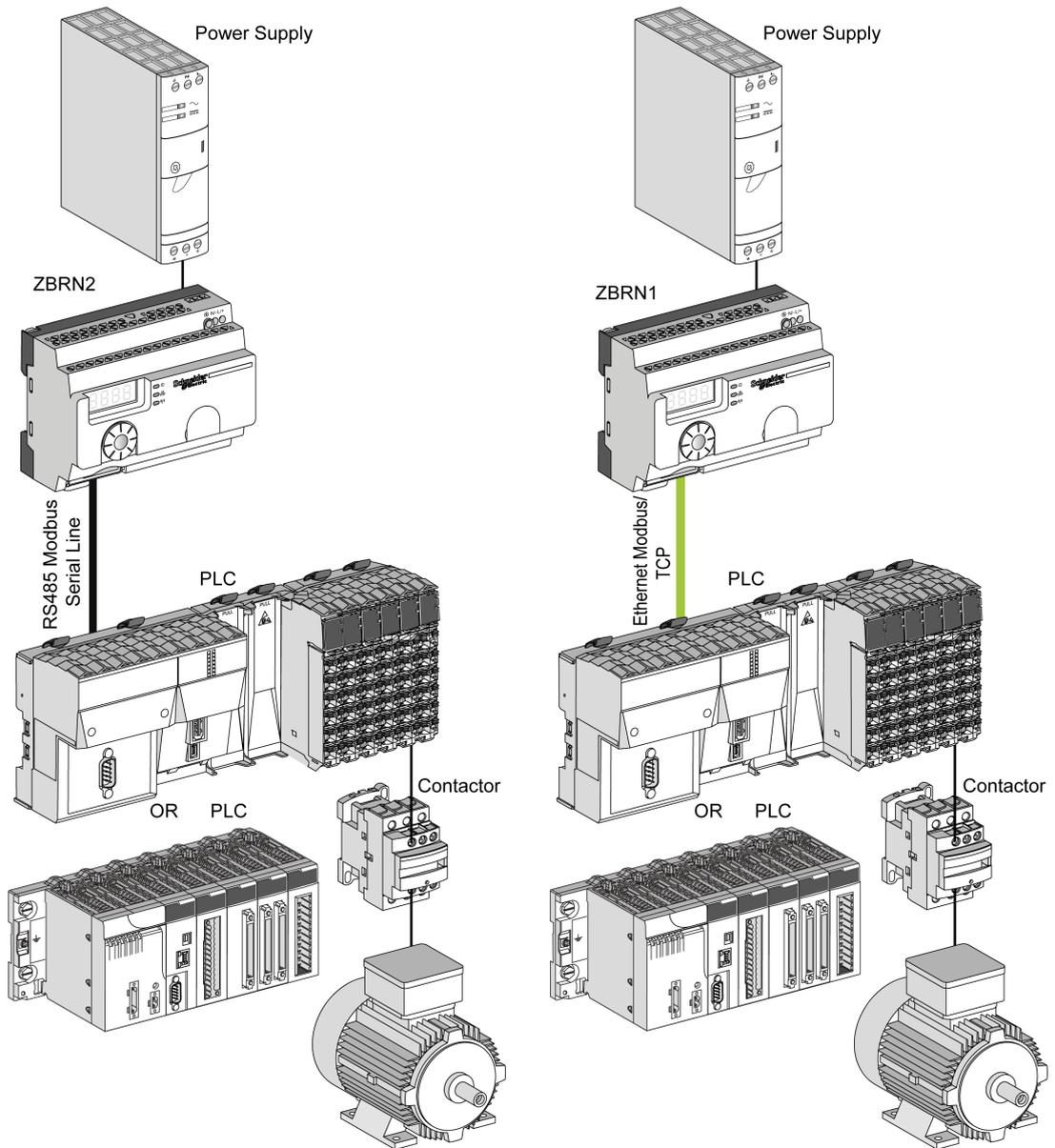
NOTE:

- The above figure is not exhaustive and it only shows the architecture principle.
- Refer to the specifications section *(see page 33)* for detailed wiring diagram and instructions to be followed for the access points.
- Refer to the user manual of your associated products for detailed wiring diagrams and instructions to be followed.
- The access point is connected to any PLC supporting the network buses listed in this document.

Connection Requirements

Power Supply Connection
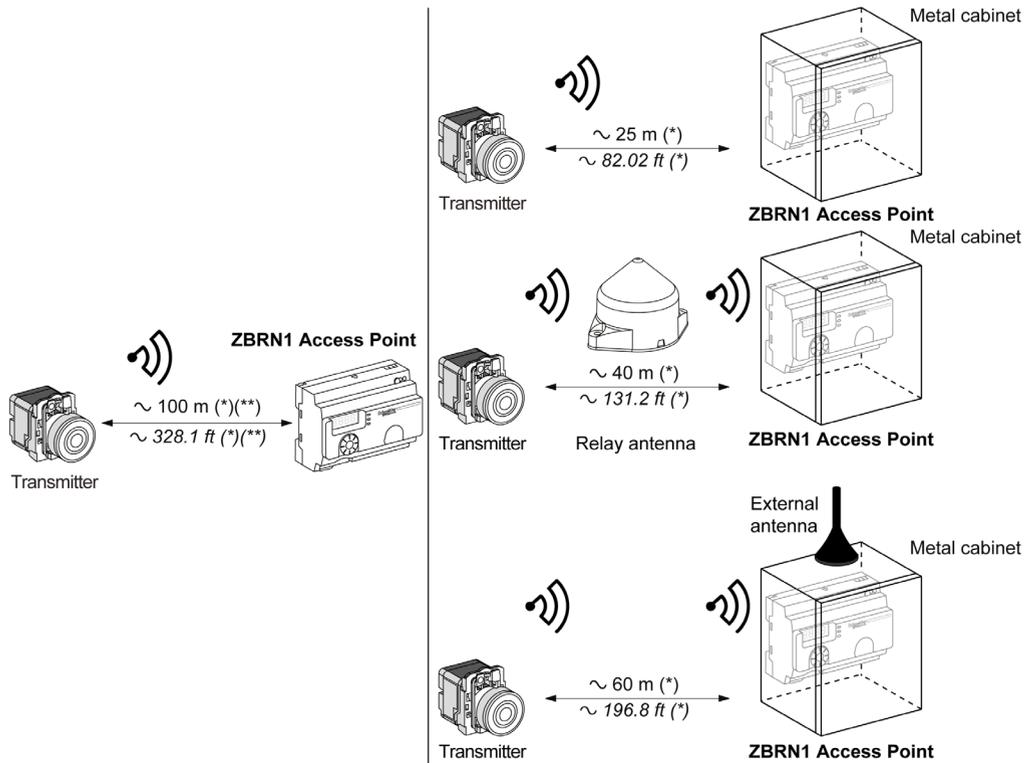
24...240 Vdc/ac

Network connection

- RS-485 Modbus serial line network
- Ethernet Modbus/TCP network

Maximum Distances

The following figure shows the maximum distance between the transmitters and the ZBRN1 access points:

The following figure shows the maximum distance between the transmitters and the ZBRN2 access points:
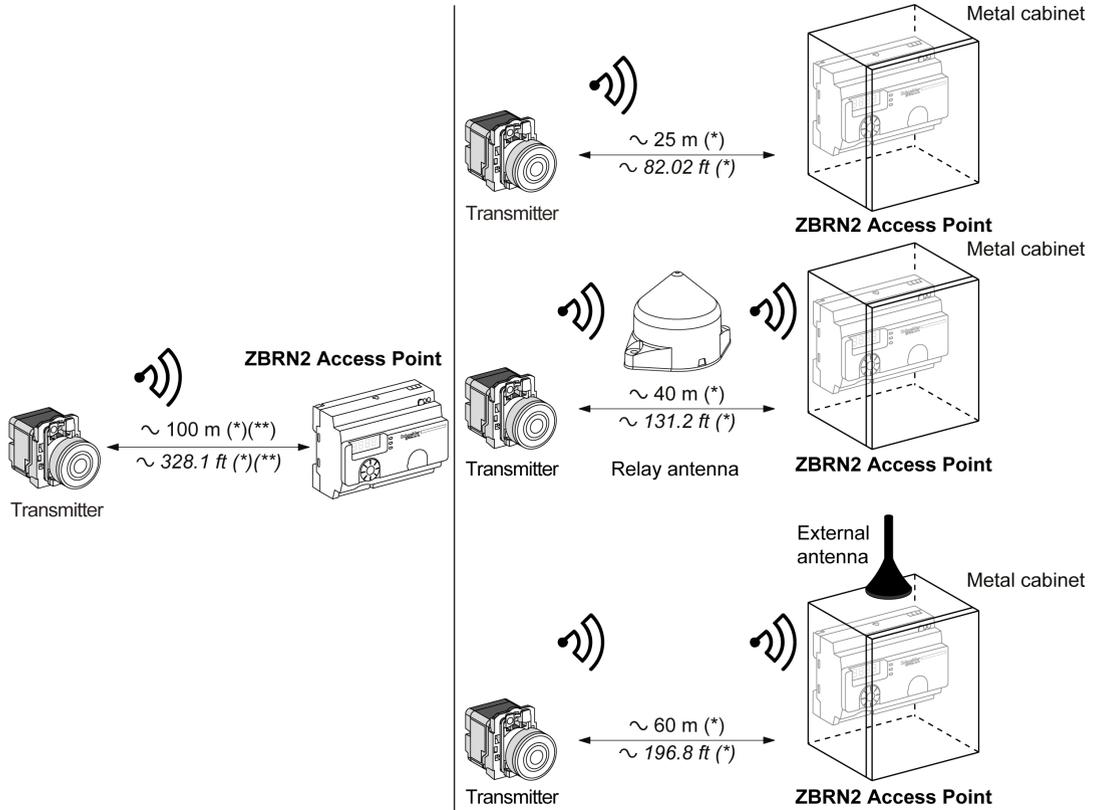
(*) The application environment can modify the typical values.

(**) Free field (unobstructed and without electromagnetic perturbations).

The level of signal attenuation depends on the material through which the signal passes:

Glass window	10...20 %[*]
Plaster wall	30...45 %[*]
Brick wall	60 %[*]
Concrete wall	70...80 %[*]
Metal structure	60...100 %[*]
(*) Values for indication purpose only. Actual values depend on the thickness and nature of the material.	

NOTE: You can add ZBRA1 or ZBRA2 antenna or both to increase the range. The reception is reduced if the access point is placed in a metal cabinet.

For further information on the use of ZBRA1 and ZBRA2 antennas, refer to the Radio chapter .
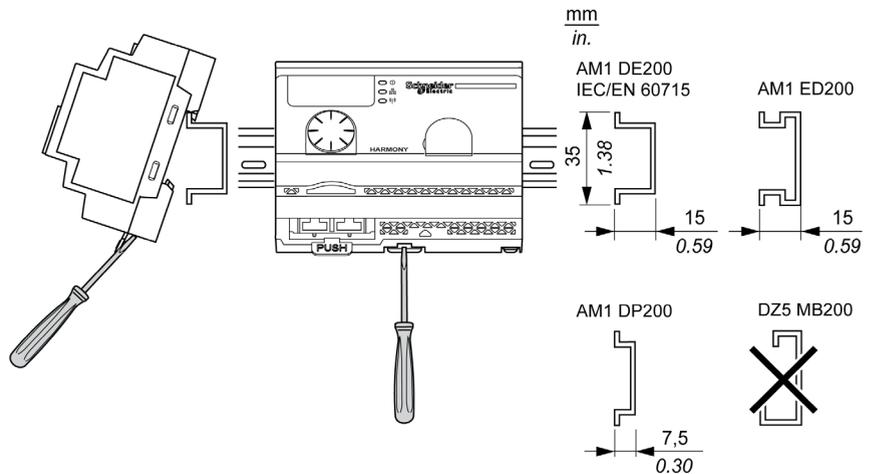
Mechanical Installation

Mounted on DIN Rail

The access points must be installed on DIN rails complying with EN/IEC 60715.

To install the access point, use a tool to press down the D lock for inserting the DIN rail.

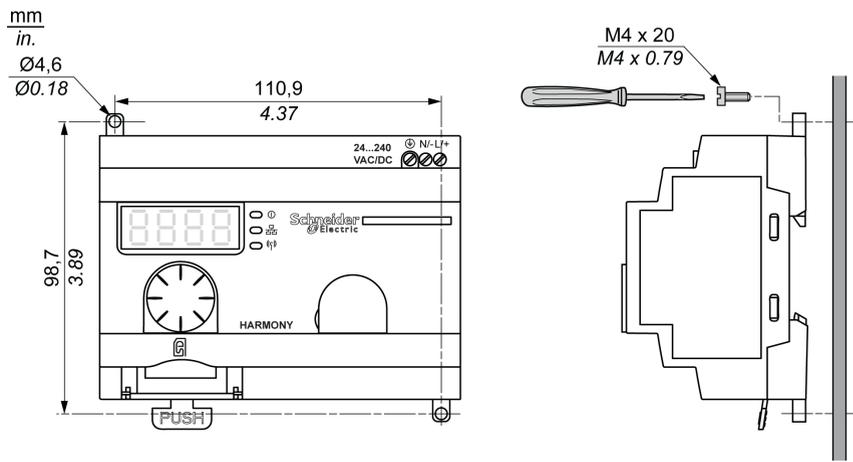The following figure shows the position of the access point on the DIN rail:

Mounted on a Grid or Plate

The access point can be installed on a grid or a plate.

The following steps explain how to install the module:

Step	Action
1	Pull out the panel mounting hooks.
2	Mount the access point on the grid or plate using the screws as shown in the following figure.

Environmental Features

Characteristics

The table provides the general environmental characteristics:

Characteristics		Specifications
Standards	Conformity to standards	R&TTE 1999/5/EC, LVD 2006/95/EC, EMC2004/108/EC
	Conformity to standards	EN/IEC 60947-1, EN/IEC 60947-5-1, EN/IEC60950-1, IEC61131-2, EN 300440-2, EN300489-3, EN300328, EN62311
	Conformity to standards	UL 508 (USA), CSA C22-2 n° 14 (Canada), CCC (China), Gost (Russia)
	Radio certifications	FCC (USA), CSA, RSS (Canada), C-Tick (Australia), ANATEL (Brazil), SRRC (China), MIC (Japan)
Agencies		
UL	USA	UL508, 17th edition
CSA	Canada	CSA C22.2, No. 142-M2000
C-Tick	Australia	–
GOST	Russia	–
ANATEL	Brazil	–
FCC	USA	–
SRRC	China	–
CCC	China	–
MIC	Japan	–
RSS	Canada	–
Ambient operating temperature		−25...+55 °C (−13...+131 °F)
Storage temperature		−40...+70 °C (−40...+158 °F)
Relative humidity		95% RH at 55 °C (131 °F)
Degree of pollution		2 (IEC60664-1)
Degree of protection		IP20
Shock resistance		Half sine wave acceleration: 11 ms 30 gn (IEC 60068-2 27)
Resistance to vibration		±3.5 mm (±0.13 in.): 5...8.14 Hz 1 gn: 8.14...150 Hz when mounted on a panel 2 gn: 8.45...150 Hz when mounted on a DIN rail (IEC 60068-2-6)

Characteristics	Specifications
Altitude requirement	Operation: 0...2000 m (6561.66 ft) Storage: 0...3000 m (9842.49 ft)
	Only used at altitude not exceeding 2000 m (6561.66 ft).
	Only used in non-tropical climate regions.

Housing

Clearances and Mounting Position
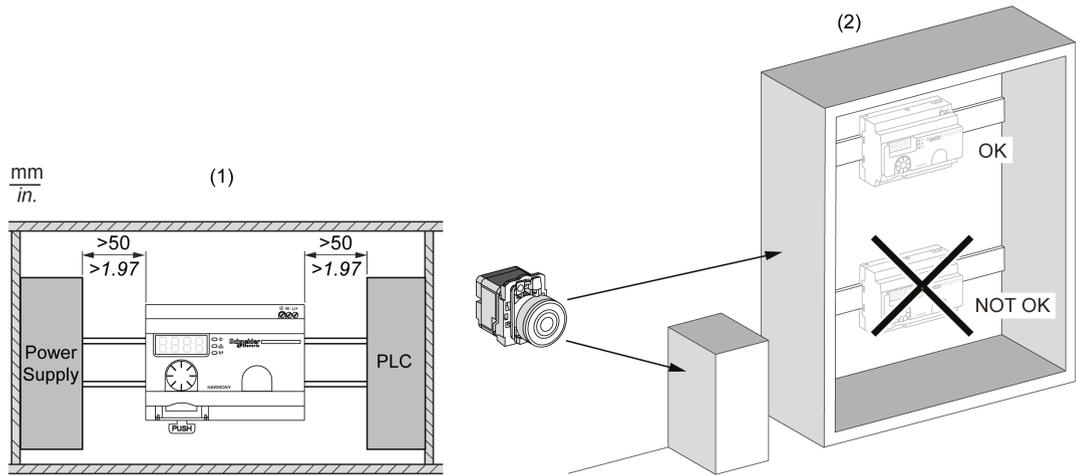
(1) To enhance the signal reception, respect the above positioning.
(2) In a metal cabinet, the optimum place for the access point is on the top. This position avoids obstacles and enhances the signal reception.

2.3   Specifications

Electrical Characteristics

Power Supply Characteristics

The access point should comply to the following power requirements:

Electrical Features	Description	
	AC Power Supply	**DC Power Supply**
Rated voltage	24...240 Vac	24...240 Vdc
Range of voltage allowance	21...264 Vac	21...264 Vdc
Rated frequency	50/60 Hz	–
Range of frequency allowance	47...63 Hz	–
Under voltage protection	No	No
Terminal blocks	3-pin terminal with 7.62 mm (0.3 in.) pitch on the output terminal block	
Immunity to short interruptions (Conforming to IEC 61000-4-11)	10 ms	10 ms
Dielectric strength with others	3000 Vac / 4250 Vdc (input-output) 1500 Vac / 2150 Vdc (input-PE)	
Short-circuit protection	Yes	

Power Supply Connections

The power supply voltage allows any common supply connection from 24...240 Vac/dc.
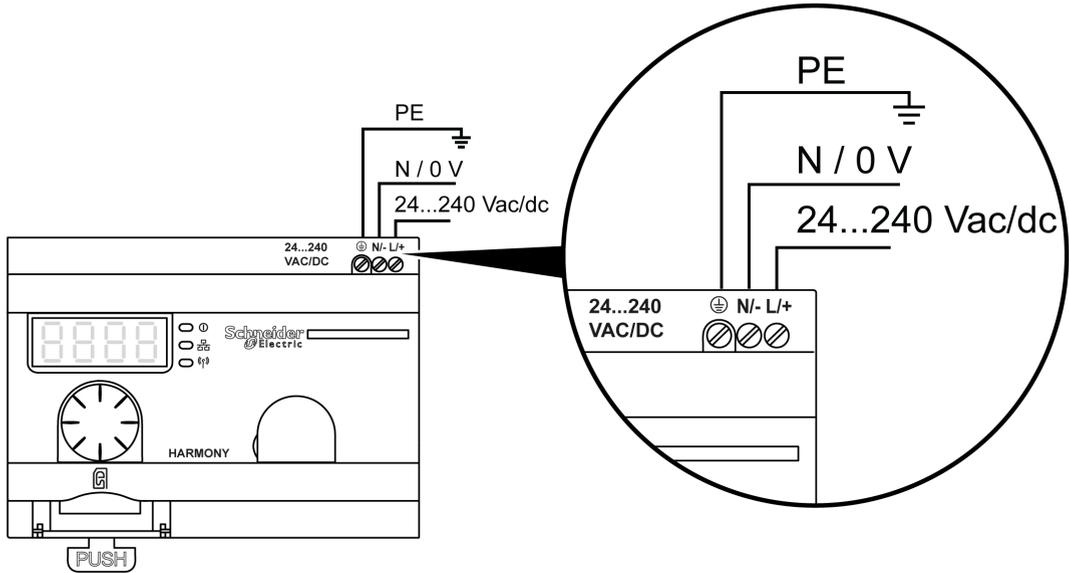
⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

Comply with the wiring diagram immediately before this message.

Failure to follow these instructions will result in death or serious injury.
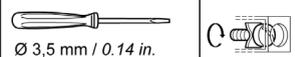
The table shows the recommended wire sizes for the L/+ and N/- terminals:

$\frac{mm}{in.}$ $\frac{6}{0.24}$				
mm^2	0,2…0,75	0,2…2,5	0,2…4	0,2…1,5
AWG	24…18	24…14	24…12	24…16

The table shows the recommended wire sizes for the PE (protective earth ground) terminal:

$\frac{mm}{in.}$ $\frac{6}{0.24}$		
mm^2	0.5...4	0.5...4
AWG	20...12	20...12

The following figure shows the recommend torque for the 3 terminals:

		N•m	0,35 ± 0,05
Ø 3,5 mm / 0.14 in.		lb-in	3.10 ± 0.44

⚠ **WARNING**

UNINTENDED EQUIPMENT OPERATION

For the PE wiring, use a cable not longer than 300 mm (11.8 in.).

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

The table provides the input power consumption:

Reference	Input Power
ZBRN1	9 W
ZBRN2	3.3 W

⚠ **WARNING**

UNINTENDED EQUIPMENT OPERATION

● Supply this product by a power line protected by a 16 A maximum circuit breaker.
● Install this product in an electrical cabinet and lock the cabinet using a key.

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

2.4   Data Management

Monostable Input

Principle

The transmitter is equipped with a "dynamo" generator that converts the mechanical energy produced by pressing the push-button into electrical energy. A radio-coded message with a unique ID code is sent in single pulse form.

The radio signal is transmitted when the push-button is pressed, signaled by a click in the example shown below. If the button is held, the signal is not transmitted continuously. No signal is sent when the button is released.

The corresponding input channel of the access point stays active depending on the input holding time range from 100 ms...1 s.

The input holding time is set for all the input channels.

Example

The following figure shows an example of a monostable channel with the input holding time of 500 ms:
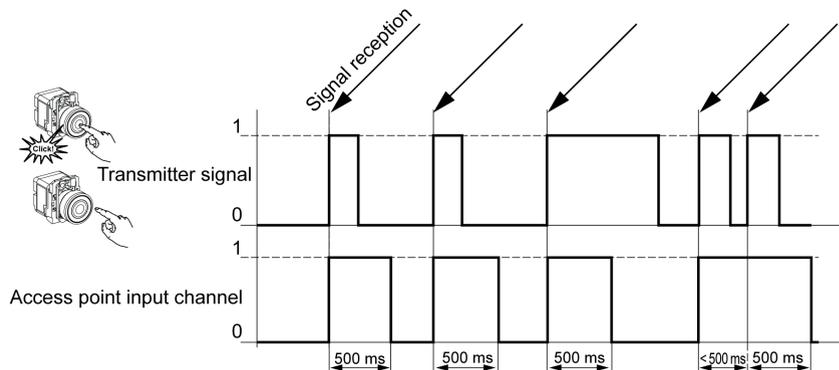
ZBRN2 Modbus Serial Line Communication

3

Purpose

This chapter provides an overview of the Modbus layout description, communication and status indicator, line termination mode, settings, and the supported functions.

What Is in This Chapter?

This chapter contains the following topics:

Communication on the Modbus Network

Introduction

The Modbus protocol is a master-slave protocol that allows only 1 master to request response from the slaves, or to act based on the request. The master can address individual slaves, or can send a broadcast message to all slaves. The slaves return a message (response) to the request that are addressed to them individually. The slaves do not return responses to broadcast request from the master.

> ## ⚠ WARNING
>
> **RISK OF UNINTENDED EQUIPMENT OPERATION**
>
> Do not use more than 1 master on the Modbus network. Unexpected I/O behavior can result if more than 1 master is able to communicate on the network at the same time.
>
> Depending on the I/O configuration, unexpected equipment operation can result if more than 1 master is in use.
>
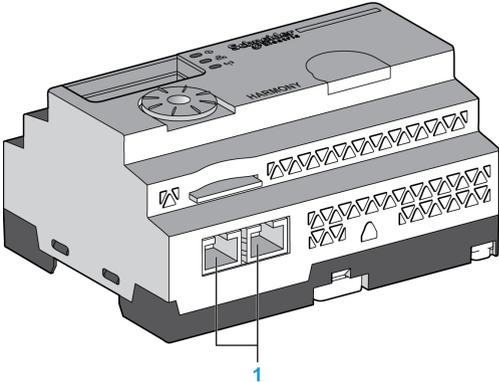> **Failure to follow these instructions can result in death, serious injury, or equipment damage.**

Network Connection
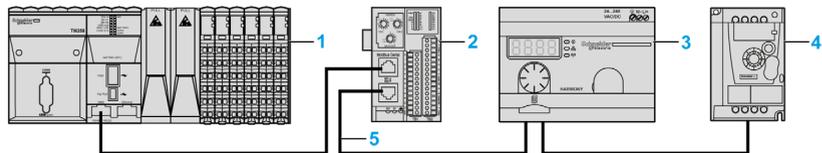
1 PLC as master
2 Modbus Advantys OTB network interface module
3 ZBRN2 access point
4 ATV12 drive
5 Modbus serial line

Modbus Serial Ports

The following figure shows the serial line connectors in ZBRN2:

1 Serial line connectors

ZBRN2 offers 1 Modbus serial line communication port equipped with 2 RJ45 plugs. It enables wiring between the devices without using a hub.

The table provides the characteristics of ZBRN2:

Features	Specification
Function	Modbus slave and Modbus RTU
Plug	2 RJ45 connectors
Isolated	Yes
Maximum cable length	1000 m (3280.83 ft)
Polarization	No
Support baud rate.	Auto/1200/2400/4800/19200/38400/115200
Parity	Even/Odd/No/Auto
Stop bit	1 bit (even and odd) 2 bits (no parity)

RJ45 Layout Description

Modbus serial port is an RS-485, 2-wire and common Modbus serial line using an RJ45 connector.

The following figure shows the layout of RJ45 connector:
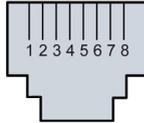
RJ45 Pin	Signal	Description
1	Unused	–
2	Unused	–
3	Unused	–
4	D1	Transmission signal.
5	D0	Reception signal.
6	Unused	Reserved.
7	Unused	Reserved (5...24 Vdc).
8	Common	Common of signal and supply.

Communication and Status Indicator

Modbus Communication and Status LED
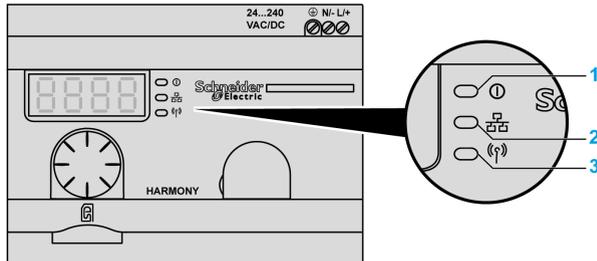
1 Power LED
2 Communication LED
3 Radio signal strength LED
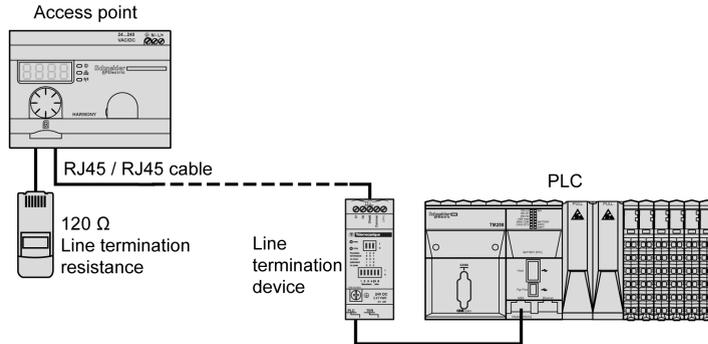
The yellow color Modbus communication LED shows the following status:
- on/flashing: Indicates that the data is exchanged (depends on the quantity of information).
- off: Indicates that no data has been exchanged.

Modbus Serial Line Cabling

Network Connection

You can directly connect the access point to PLC for a distance up to 1000 m (3280.83 ft) as shown in the following figure:
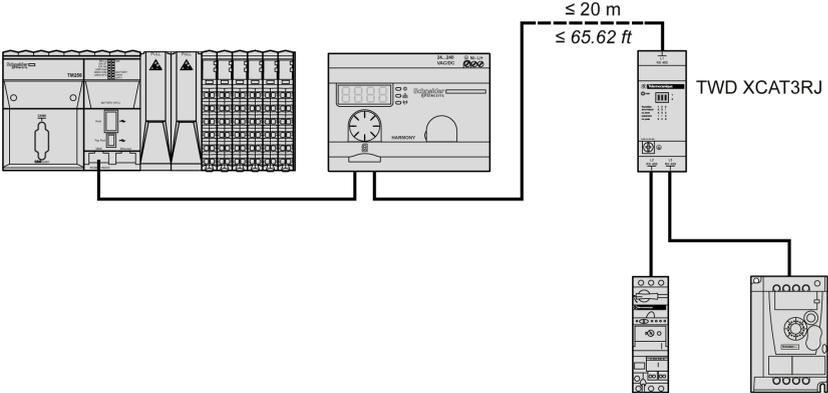
Using TWD XCAT3RJ

TWD XCAT3RJ is used for 3 connections, polarization, and line termination.

The following figure shows the connection of the device on the bus using TWD XCAT3RJ:

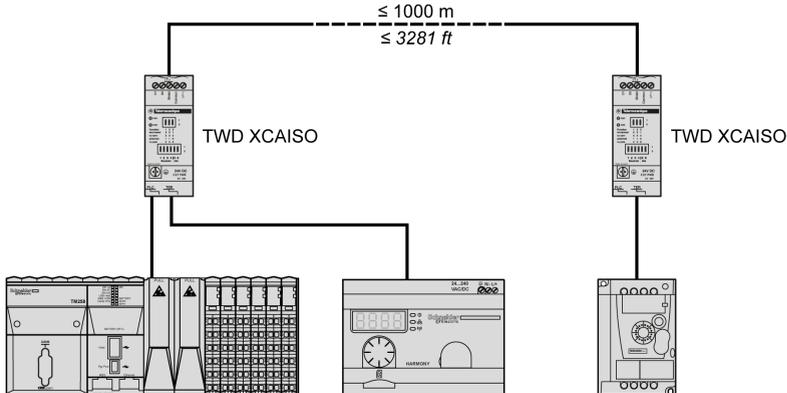**Using TWD XCAISO**

TWD XCAISO is used for isolation and line termination.

The following figure shows the connection of the device on the bus using TWD XCAISO (even if the access point is already isolated):

For longer distance (more than 20 m (65.61 ft)), verify that the other devices connected to the bus are isolated. If other devices are not isolated, use the TWD XCAISO module.

Modbus Settings and Supported Functions

Modbus Message Structure

The Modbus protocol uses 16-bit words (registers) divided into 2 bytes of 8 bits each. A Modbus message starts with a header followed by a 1-byte address. A Modbus message uses a Modbus function as its first byte.

The table provides the full structure of a Modbus RTU message:

	Modbus Messages		
Address	**Function Code**	**Data**	**CRC**
1 byte	1 byte	n-byte field	2 bytes

List of Supported Commands

The table provides the list of Modbus commands:

Modbus Function Code: Dec Index (Hex)	Sub-Function: Modbus Encapsulated Interface	Command
01 (0001 H)	–	Read coils.
03 (0003 H)	–	Read holding registers.
06 (0006 H)	–	Write single register.
16 (0010 H)	–	Write n registers.
23 (0017 H)	–	Read/Write n registers.
43 (002BH)	14 (000EH)	Read device identification.

NOTE: Registers can be read or written only if the registers are adjacent.

Reading Coils (01):

This function code is used to read the content of 1 or more contiguous status of coils in a slave.

Reading holding registers (03):

This function code is used to read the content of 1 or more adjacent registers in a slave.

Writing a register (06):

This function code is used to write the content of a register in a slave.

Writing n registers (16):

This function code is used to write the content of 1 or more contiguous registers in the slave.

Reading/Writing n registers (23):

This function code is used to execute a combination of reading and writing n registers.

Identification (43 Modbus Encapsulated Interface 14):

This function code is used to read the identification and other information relating to the physical description of a slave.

List of Identification Registers

The table lists the Modbus identification registers:

Identifier	Register Name	Value	Data Type
0 (0000 H)	`VendorName`	Schneider Electric	ASCII string
1 (0001 H)	`ProductCode`	ZBRN1: 052848 ZBRN2: 052849	
2 (0002 H)	`MajorMinorRevision`	1.0 for the first official version	
3 (0003 H)	`VendorUrl`	http://www.schneider-electric.com	
4 (0004 H)	`ProductName`	Harmony	
5 (0005 H)	`ModelName`	ZBRN1 ZBRN2	

Abort Code

Function Code	Abort Code	Description
03 H	02 H	One of the registers does not exist.
	03 H	Incorrect register number
	04 H	Unavailable value
06 H	02 H	The register does not exist.
	04 H	Invalid value or register in read only.
10 H	02 H	The register does not exist.
	03 H	Incorrect register number
	04 H	Invalid value or register in read only.
16 H	02 H	The register does not exist.
	04 H	Invalid value or register in read only.
17 H	02 H	The register does not exist.
	03 H	Incorrect register number
	04 H	Invalid value or register in read only.

Function Code	Abort Code	Description
2B H	01 H	Modbus encapsulated interface different from 14
	02 H	Identifier does not exist.
	03 H	Identifier > 4 or = 0

Memory Mapping

Introduction

All the following addresses are indicated as per the IEC %MW standard format.

For Modbus registers access, add 1 to each address.

⚠ **WARNING**
UNINTENDED EQUIPMENT OPERATION
Do not write or read the register addresses which are not mentioned in this document.
Failure to follow these instructions can result in death, serious injury, or equipment damage.

All the registers used are of 16 bit in size.

Input Channels

Register Address	Name	Access Type	Input Channel	Channel Status	Description
0	Input register 1	R	0–15	0: Indicates that the input channel is off. 1: Indicates that the input channel is on.	Stores the status (0 or 1) of input channels from 0 to 15.
1	Input register 2	R	16–31	0: Indicates that the input channel is off. 1: Indicates that the input channel is on.	Stores the status (0 or 1) of input channels from 16 to 31.
2	Input register 3	R	32–47	0: Indicates that the input channel is off. 1: Indicates that the input channel is on.	Stores the status (0 or 1) of input channels from 32 to 47.
3	Input register 4	R	48–59	0: Indicates that the input channel is off. 1: Indicates that the input channel is on.	Stores the status (0 or 1) of input channels from 48 to 59.
R: Read only.					

Input register 1:

A 16-bit register stores the status of channels from 0...15, 1 bit is assigned for 1 input channel to store the input status as 0 or 1.

Input register 2:

A 16-bit register stores the status of channels from 16...31, 1 bit is assigned for 1 input channel to store the input status as 0 or 1.

Input register 3:

A 16-bit register stores the status of channels from 32... 47, 1 bit is assigned for 1 input channel to store the input status as 0 or 1.

Input register 4:

A 16-bit register to store the status of channels from 48...59, 1 bit is assigned for 1 input channel to store the input status as 0 or 1.

NOTE: Out of the 16 bits of the register, 12 bits are used to store the status of the input channel.

Channel Configuration

Register Address	Name	Access Type	Input Channel	Channel Status	Description
6000	Holding time	RW	–	0: Indicates that the holding time is 100 ms. 1: Indicates that the holding time is 200 ms. 2: Indicates that the holding time is 300 ms. 3: Indicates that the holding time is 400 ms. 4: Indicates that the holding time is 500 ms. 5: Indicates that the holding time is 1 s.	Stores the holding time for all the input channels.
6100–6159	Teaching list	RW	0–59	Bit 0 to 7: 0: Indicates that the channel is disabled. 1: Indicates that the type 1 transmitter is used. Bit 8 to 15 not used.	Stores the type of transmitter used. Type 1: Wireless batteryless push button (ZBRT1).
6160–6399	Reserved	–	–	–	–
RW: Read and write.					

Register Address	Name	Access Type	Input Channel	Channel Status	Description
6400–6519	Transmitter ID/MAC addresses	RW	0–59	srcID0: Indicates first byte of the MAC address. srcID1: Indicates second byte of the MAC address. srcID2: Indicates third byte of the MAC address. srcID3: Indicates fourth byte of the MAC address.	Stores the MAC addresses of the transmitters. 2 registers are used to store MAC address of 1 transmitter. Example: Transmitter ID (written on the transmitter label) = 030079B1. Registers 6410–6411, input channel 5. 6410: stores 0300 (2 bytes of the transmitter ID). 6411: stores 79B1 (2 bytes of the transmitter ID).
RW: Read and write.					

Holding time:

A 16-bit register stores the holding time of the input channels.

Teaching list:

A 16-bit register stores the details of the transmitters used.

Transmitter/MAC addresses:

2 registers of 16 bits store the MAC address of the transmitters.

First byte of the MAC address is stored in 8 bits of the register 1.

Second byte of the MAC address is stored in 8 bits of the register 1.

Third byte of the MAC address is stored in 8 bits of the register 2.

Fourth byte of the MAC address is stored in 8 bits of the register 2.

Module Diagnostic

Register Address	Name	Access Type	Status	Description
4000	Device name	R	1: ZBRN1. 2: ZBRN2.	Stores the device name.
4001	Firmware version	R	Example for 0121: V01.21	Stores the firmware version.
4002	Communication protocol	R	0001: ZBRN2 (Modbus serial line). 0002: ZBRN1 (Ethernet).	Stores the communication protocol used by the access point.
4003	Configuration	R	0: Indicates that the device is not being configured through the user interface. 1: Indicates that the device is being configured through the user interface.	Stores the configuration status of the device.
4004	Detected error	R	0: Indicates that there is no detected error. 1: Indicates that the SD card cannot be accessed. 2: Indicates that the SD card is write protected. 3: Indicates that there is not enough space in the SD card. 4: Indicates an invalid communication configuration file. 5: Indicates an invalid device configuration file. 6: Indicates that more than 1 configuration file is available in the SD card. **NOTE:** Only 1 configuration file should be available in the appropriate directory of the SD card *(see page 136)*. 7: Indicates that the configuration file is not available in the SD card. 8: Indicates that the watchdog reseted device. 9: Indicates a radio communication detected error. 10: Indicates a radio chip detected error. 11: Indicates that the access point does not support communication module. 12: Indicates that the communication module is not responding. 13: Indicates that the communication module is not present in the access point. 14: Indicates duplicate IP address. 15: Indicates invalid IP address.	Stores the detected error code.
R: Read only. RW: Read and write.				

Register Address	Name	Access Type	Status	Description
4006	Radio channel	R	11...26: Indicates the radio channel with frequency 2.405 GHz (channel 11...26 IEEE 802.15.4).	Stores the details of the radio channel.
4007	Radio signal strength	R	1: Indicates insufficient signal. 2: Indicates satisfactory signal.	Stores the details of the signal strength.
4008 4009	Radio counter	RW	2 registers to stores the double word value. 4008: Stores the most significant word. 4009: Stores the least significant word. The value is incremented each time when the access point receives a radio signal from an associated device.	Stores the details of the radio counter.
R: Read only. RW: Read and write.				

Modbus Serial Line Communication Diagnostic

Register Address	Name	Access Type	Status	Description
5000	Actual baud rate	R	1: Indicates that the baud rate is 1200 bps. 2: Indicates that the baud rate is 2400 bps. 3: Indicates that the baud rate is 4800 bps. 4: Indicates that the baud rate is 9600 bps. 5: Indicates that the baud rate is 19,200 bps. 6: Indicates that the baud rate is 38,400 bps. 7: Indicates that the baud rate is 115,200 bps.	Stores the baud rate at which the data is sent.
5001	Actual frame setting	R	1: Indicates that the frame format sent is of 8 data bits, even parity, and 1 stop bit. 2: Indicates that the frame format sent is of 8 data bits, odd parity, and 1 stop bit. 3: Indicates that the frame format sent is of 8 data bits, no parity, and 2 stop bits.	Stores the data frame format received by the access point.
R: Read only.				

Register Address	Name	Access Type	Status	Description
5002	Number of packages received	R	2 registers to store the double word value. 5002: Stores the most significant word. 5003: Stores the least significant word.	Stores the number of packages received by the access point.
5003		R		
5004	Number of bad packages received	R	2 registers to store the double word value. 5004: Stores the most significant word. 5005: Stores the least significant word.	Stores the number of bad packages received by the access point.
5005		R		
5006	Number of packages sent	R	2 registers to store the double word value. 5006: Stores the most significant word. 5007: Stores the least significant word.	Stores the number of packages sent by the transmitters.
5007		R		
5008	Number of bad packages sent	R	2 registers to store the double word value. 5008: Stores the most significant word. 5009: Stores the least significant word.	Stores the number of bad packages sent by the transmitters.
5009		R		
R: Read only.				

Modbus Serial Line Cables

Modbus Serial Line Cables for ZBRN2 Access Point

The Modbus serial line cable with 2 RJ45 connectors to connect to any device supporting the protocol is shown in the following figure:

1
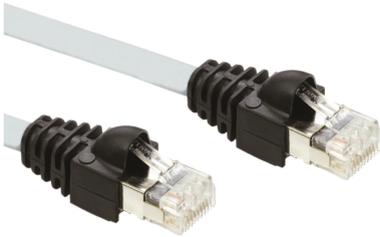
Item	Description	Reference	Length
1	Modbus serial line cable	VW3A8306R03	0.3 m (0.9 ft)
		VW3A8306R10	1 m (3.2 ft)
		VW3A8306R30	3 m (9.8 ft)

The Modbus serial line cable with 1 RJ45 connector and 1 mini DIN connector to connect to a Twido PLC is shown in the following figure:

2

Item	Description	Reference	Length
2	Modbus serial line cable for Twido PLC	TWDXCARJ003	0.3 m (0.9 ft)
		TWDXCARJ010	1 m (3.2 ft)
		TWDXCARJ030	3 m (9.8 ft)

The Modbus serial line cables with 1 RJ45 connector and 1 USB connector to connect to a PC is specified in the table:

Item	Description	Reference	Length
3	Modbus serial line cable	TCSMCNAM3M002P	2.5 m (8.2 ft)
4	USB to RS-485 converter and Modbus serial line cable	TSXCUSB485 VW3A8306R03	–
5	USB to RS-485 converter and Modbus serial line cable for Twido PLC	TSXCUSB485 TWDXCARJP03P	–

ZBRN1 Ethernet Communication

4

What Is in This Chapter?

This chapter contains the following topics:

Communication on an Ethernet Network

Introduction

Ethernet is a widely used, low-cost technology for local area networks. This technology is used to exchange data between several devices connected together on a network.

Network Connection
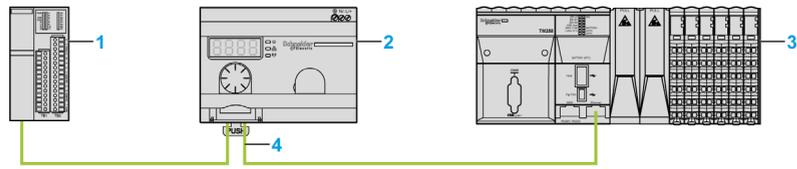
1   Ethernet Advantys OTB network interface module
2   ZBRN1 access point associated with ZBRCETH communication module
3   PLC
4   Ethernet

ZBRCETH Communication Module

ZBRCETH is a communication module that supports Ethernet Modbus/TCP protocol.

The following procedure describes the insertion of the communication module:

Step	Action
1	Disconnect all power from ZBRN1 access point.
2	Place the module in ZBRN1 access point. **1** ZBRN1 access point **2** ZBRCETH communication module
3	Press firmly into the place.
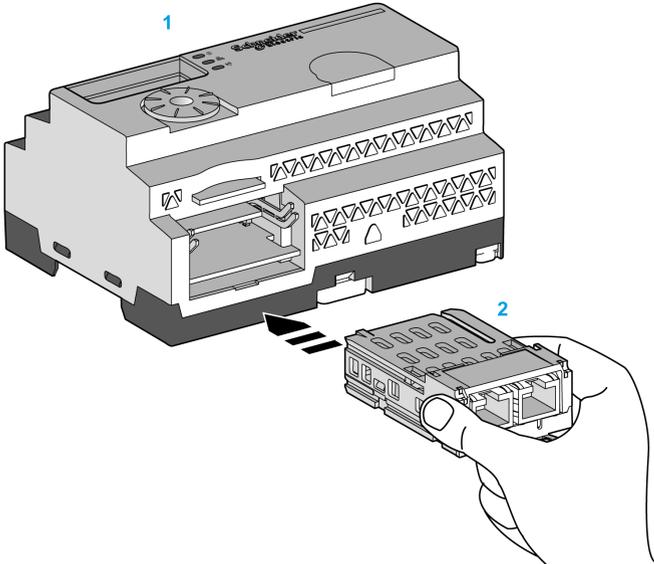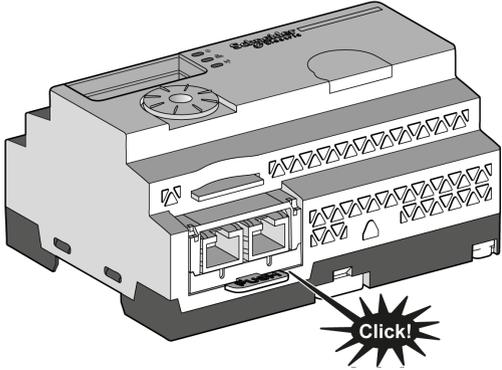
The following procedure describes the removal of the communication module:

Step	Action
1	Disconnect all power from ZBRN1 access point.
2	Push back the release tab.
3	Pull out the module.
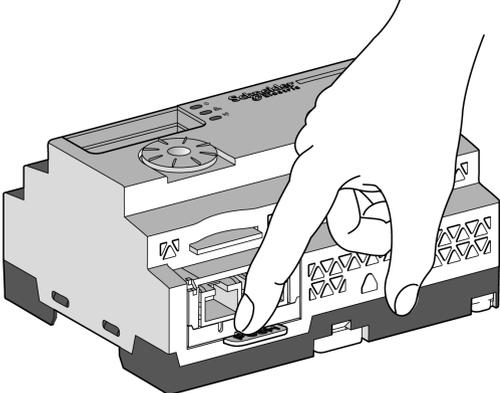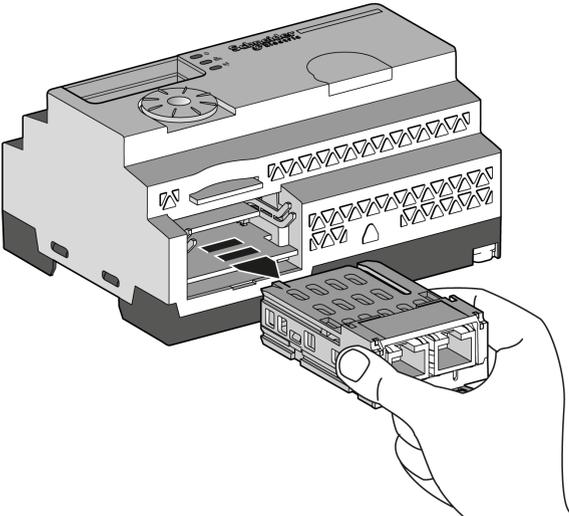
ZBRCETH offers 1 Ethernet communication port equipped with 2 RJ45 plugs. It enables daisy chain cabling between devices without using a switch.

The table provides the specifications of the communication module:

Characteristics	Specifications
Plug	2 RJ45 connectors
Driver	● 10/100 MB/s ● Auto negotiation ● Half/Full duplex
Type of cable	Shielded
Topology	Daisy chain
Automatic polarity correction	Yes

RJ45 Layout Description

ZBRCETH communication module has 2 RJ45 connectors for Ethernet connectivity as shown in the following figure:
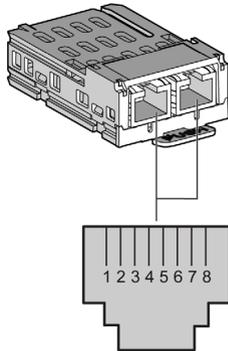
The table provides the pin details of RJ45 connector:

RJ45 Pins	Signal	Description
1	TX+	Transmission signal
2	TX-	Transmission signal
3	RX+	Reception signal
4	Unused	–
5	Unused	–
6	RX-	Reception signal
7	Unused	–
8	Unused	–

Addressing Modes

Address Assignment

The following 3 different ways are used to assign the IP address to the access point:

● Address assignment by a DHCP (Dynamic host control protocol) server.
● Address assignment by a BOOTP (Bootstrap protocol) server (BOOTP zone).
● IP address stored in the flash memory.

NOTE: If the access point detects a duplicate address, it does not start until a unique address is assigned to the transmitter.

Address Assignment by a DHCP Server

The IP address assigned by a DHCP server is stored in a table of DHCP server.

Step	Action	Comments
1	Select **DHCP** mode from Ethernet menu using the jog dial on the access point.	For further information, refer to the IP setting menu *(see page 89)*.
2	Select the **DHCP** value between 0–159 using the jog dial.	This action defines the device name.
3	Wait for 10 s.	When the display stops flashing after 10 s, the access point triggers a request for an IP address.

Address Assignment by BOOTP Server

The BOOTP server contains a MAC address table for the device connected to network with its IP address. The following steps explain how to assign the address to the access point from the BOOTP server:

| Step	Action	Comments
1	Select the **BOOTP** mode from the Ethernet menu using jog dial on the access point.	For further information, refer to the IP setting menu *(see page 89)*.
2	Wait for 10 s.	When the display stops flashing after 10 s, the access point triggers a request for an IP address.

Assignment of Stored IP Addresses

The access point uses the IP address stored in its flash memory. The following steps explain how to assign the address to the access point from the flash memory:

Step	Action	Comments
1	Select the **Static IP** mode from the Ethernet menu using jog dial on the access point.	The access point uses the IP address stored in the flash memory, for further information refer to the IP setting menu *(see page 89)*.
2	Wait for 10 s.	When the display stops flashing after 10 s, the access point triggers a request for an IP address.

Modbus Unit ID Parameter

Use the PLC with the following UIDs to access the device communication details:
- use 247 UID to access the Ethernet diagnostic information (ZBRCETH communication module server).
- use 248 or 255 UID to access the Modbus/TCP registers like input registers and holding time (ZBRN1 access point server).

Communication and Status Indicator

Status LED on the ZBRN1 Access Point
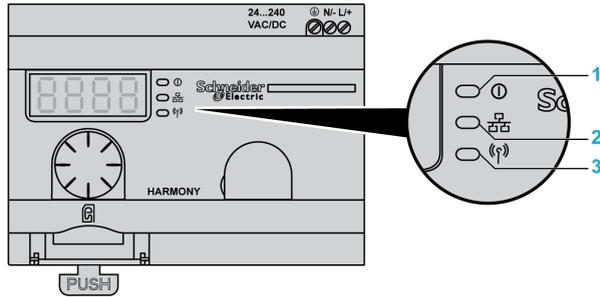
1 Power LED
2 Communication LED
3 Radio signal strength LED

The yellow color Ethernet communication LED shows the following status:
- on/flashing: Indicates that the data is exchanged (depends on the quantity of information).
- off: Indicates that no data has been exchanged.

Status LED on the ZBRCETH Communication Module
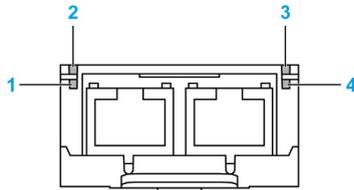
The table provides the Ethernet Modbus/TCP LED status:

Item	Name	LED State	Description	Module State
1	Link/Activity port 1	solid green	Indicates that an Ethernet link is present at 100 Mbps.	The module detects an Ethernet link.
		flashing green	Indicates that an Ethernet link is present with Ethernet traffic at 100 Mbps.	The module detects Ethernet traffic.
		solid yellow	Indicates that an Ethernet link is present at 10 Mbps.	The module detects an Ethernet link.
		flashing yellow	Indicates that an Ethernet link is present with Ethernet traffic at 10 Mbps.	The module detects Ethernet traffic.
2	Module status	green	on.	Indicates that the module is turned on.
			off.	Indicates that the module is off.
3	Network status	red	Indicates that the access point is being turned on.	The module is being turned on.
		solid green	Indicates that the network is operating normally.	The module operates normally.
		4 flashes	Indicates that a duplicate IP condition exists.	The module operates offline.
		5 flashes	Indicates that the module attempts to get an IP configuration from BootP server.	The module sends BOOTP/DHCP requests to a BootP server and awaits a reply.
		6 flashes	Indicates that the operation is normal with default IP addressing settings.	The BootP request timed out. The module applies the default IP address (85.16.x.y).

Item	Name	LED State	Description	Module State
4	Link/Activity port 2	solid green	Indicates that an Ethernet link is present at 100 Mbps.	The module detects an Ethernet link.
		flashing green	Indicates that an Ethernet link is present with Ethernet traffic at 100 Mbps.	The module detects Ethernet traffic.
		solid yellow	Indicates that an Ethernet link is present at 10 Mbps.	The module detects an Ethernet link.
		flashing yellow	Indicates that an Ethernet link is present with Ethernet traffic at 10 Mbps.	The module detects Ethernet traffic.

Modbus TCP Settings and Supported Functions

For further information on Modbus TCP settings, refer to the Modbus Settings and Supported Functions *(see page 44)*.

Ethernet Cable

Ethernet Cable for ZBRN1 Access Point

The following figure shows the Ethernet cable used to connect to the terminal equipment:

1

Item	Description	Reference	Length
1	Ethernet cable	490NTW00002U	2 m (6.6 ft)
		490NTW00005U	5 m (16.4 ft)
		490NTW00012U	12 m (39.4 ft)

Radio

5

Radio Receiver

Introduction

The access points are equipped with a radio receiver. They receive radio frames from wireless and batteryless push buttons.

Radio Receiver Characteristics

The table provides the characteristics of the radio receiver:

Characteristics	Specifications
Frequency	2.405 GHz (channel 11 IEEE 802.15.4)
Maximum distance	100 m (328.08 ft) (when the access point is in free field)

NOTE: For details on the maximum distances, refer to Maximum Distances *(see page 25)*.

ZBRA2 External Antenna

The ZBRA2 external antenna is an accessory, which you have to order separately. You can connect it to the access point to improve the signal reception.

To install the ZBRA2 external antenna, open the protective plug and connect the antenna as shown in the following figure:
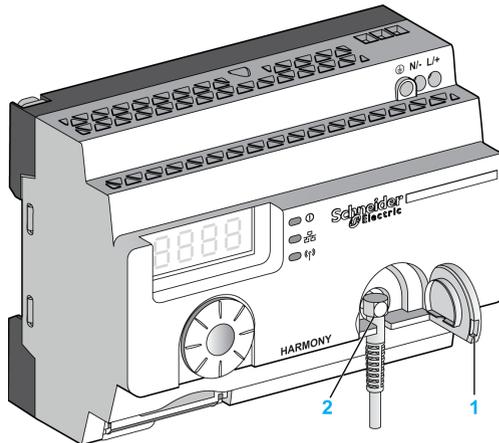
1 Protective plug
2 Radio connector

NOTE: Only the ZBRA2 external antenna can be connected to the radio connector.

The table provides the specifications of ZBRA2 antenna:

Parameters	Specifications
Bandwidth	83...100 MHz
Frequency	2400...2483 MHz
Gain	>3 dBi
Impedance	50 ohm
Polarization	Vertical
RF connector	Radial R 300113100
Cable length	2 m (6.56 ft)

Mounting Tips for ZBRA2 External Antenna

The ZBRA2 external antenna is to be placed on the top of the metal cabinet where the access point is installed as shown in the following figure:
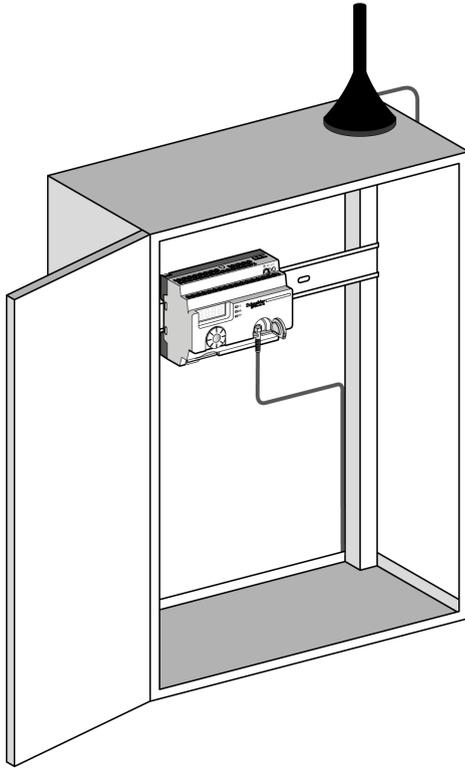
The antenna is equipped with a magnet at the bottom to fix it on the metal cabinet. When ZBRA2 external antenna is connected to the access point, you can also use ZBRA1 relay antenna.

Mounting Tips for ZBRA1 Relay Antenna

The ZBRA1 relay antenna and the access point are installed according to their vertical axis as shown in the following figure:
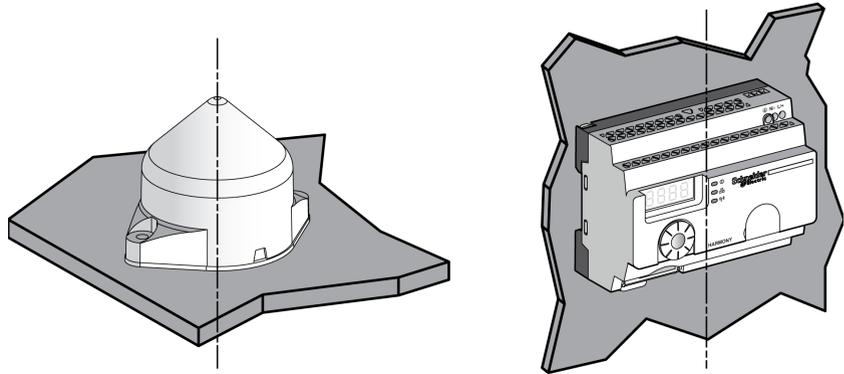
The relay antenna is used to bypass the obstacle as shown in the following figure:
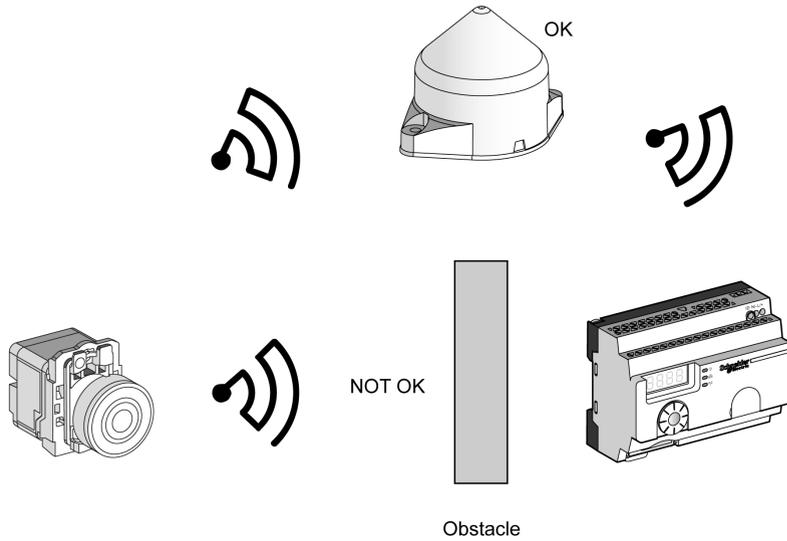
You can also use the relay antenna to amplify the signal before an obstacle that cannot be bypassed, such as a factory building as shown in the following figure:

OK

NOT OK
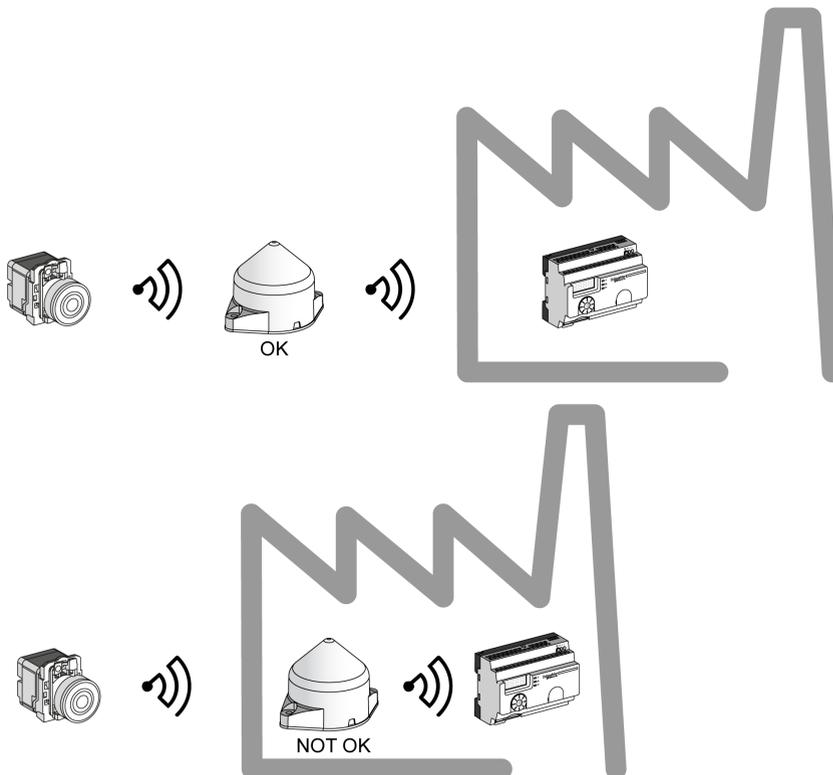
NOTE: In this case, if there is no relay antenna, the signal received by the access point may not be sufficient.

The table provides the differences between ZBRA1 and ZBRA2:

ZBRA1	ZBRA2
It is an active antenna (transceiver) which enables to increase the signal reception.	It is a passive antenna which enables to increase the signal reception without saturating the bandwidth.
It repeats the signal received from the transmitter and amplifies it.	It does not repeat the signal received from the transmitter.
There is power consumption.	There is no power consumption.

FCC USA and I C Canada Compliance Statement (ZBRN1 and ZBRN2)

This device complies with part 15 of the FCC Rules and Industry Canada licence-exempt RSS standard(s). Operation is subject to the following 2 conditions:

1) This device may not cause harmful interference.
2) This device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivante:

1) L'appareil ne doit pas produire de brouillage.
2) L'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

● Reorient or relocate the receiving antenna.
● Increase the separation between the equipment and receiver.
● Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
● Consult the dealer or an experienced radio/TV technician for help.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication. This radio transmitter (IC: 7002C-ZBRN1, 7002C-ZBRN2) has been approved by Industry Canada to operate with the antenna types listed below with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante. Le présent émetteur radio (identifier IC: 7002C-ZBRN1, 7002C-ZBRN2) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

- ZBRN1 and ZBRN2: Maximal gain of internal antenna = 6 dB / allowed impedance: 50 Ohm.
- ZBRA2: Maximal gain of external antenna (including cable) = 1 dB / allowed impedance: 50 Ohm.

Any changes or modifications not expressly approved by Schneider Electric could void the user's authority to operate the equipment.

User Interface

6

What Is in This Chapter?

This chapter contains the following topics:

Principle

Jog Dial Operation

The table provides the operation of the jog dial:

Input Keys	Function
− (dial) +	Turn the jog dial clockwise/anticlockwise for menu navigation and to increase/decrease the parameter values.
= ENT Single click	Short push the jog dial to validate the parameters entered.
= ESC Double click	Double-click the jog dial to return to the previous menu.
Long press	Long push (more than 3 s) the jog dial to return to the **Ready** mode immediately.
	When the access point is in the **Ready** mode, long push (more than 3 s) the jog dial to lock the user interface.
	When the access point is locked, long push (more than 3 s) the jog dial to unlock the user interface.

NOTE: If there is no action on the jog dial after 3 minutes, the access point automatically switches to **Ready** mode. For more information, refer to Modes *(see page 79)*.

User Interface LEDs

The following figure shows LEDs on the user interface:
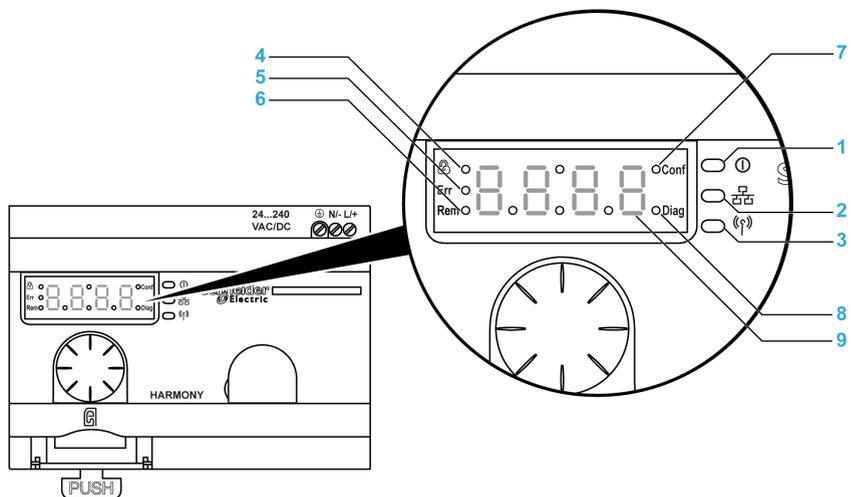
Item	LED	Color	Function
1	Power	Green	On: Indicates that the unit is turned on. Off: Indicates that the unit is turned off.
2	Communication	Yellow	Flashing: Indicates communication on the bus for Ethernet or Modbus serial line. Off: Indicates no communication on the bus for Ethernet or Modbus serial line.
3	Radio signal strength	Green/Yellow	Indicates the strength of the radio signal.
4	Lock	Red	On: Indicates that the user interface is locked. Off: Indicates that the user interface is unlocked.
5	**Err**	Red	On: Indicates that the access point has detected an error. Off: Indicates that the access point did not detect an error.
6	**Rem**	Red	On: Indicates that the access point is in auto teach mode and is remotely configured by DTM or web. Off: Indicates that the access point is not remotely configured.
7	**Conf**	Red	On: Indicates that **Configuration** menu is active. Off: Indicates that **Configuration** menu is not active.
8	**Diag**	Red	On: Indicates that **Diagnostic** menu is active. Off: Indicates that **Diagnostic** menu is not active.
9	**Display**	Red	Slow flashing: Indicates that you can change the parameter value through the jog dial. Fast flashing 3 times: Indicates a successful parameter setting.

Radio Signal Strength LED

The following figure shows the status of the radio signal strength LED:
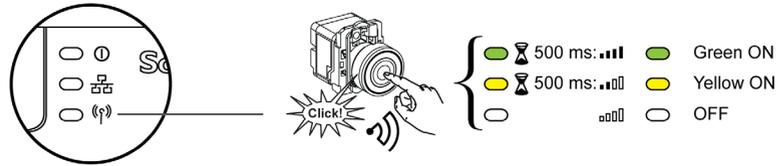
Modes

Operating Modes

The access points have the following 3 basic operating modes:

- **Ready**
- **Configuration**
- **Diagnostic**

Ready Mode

Normal working state of the access point is **Ready** mode. When the access point is switched on, it indicates the protocol (for example, SL for serial line), the firmware version (for example, 01.00), and then it switches to **Ready** mode and power LED turns on.

The following figure shows the default screen in **Ready** mode:

In **Ready** mode, the access point receives the input signal from the transmitter, input/output LED turns on, and radio signal strength LED indicates the strength of the input signal.

The following figure shows the input status in run mode:

NOTE: 7 segment display shows the channel number and input value for 1 s. The red LED indicates that the user interface is locked.

All the parameters of the device are set in **Configuration** mode. All parameters are accessible as ready only values in **Diagnostic** mode.

You can switch from **Ready** mode to **Configuration** or **Diagnostic** modes by clicking the jog dial once when the access point is in **Ready** mode.

You can turn in the jog dial clockwise or anticlockwise direction to navigate through the different menus in the **Ready** mode.

In online auto binding mode dedicated LED turns on and 7 segment LED displays the current binding channel.You can modify the binding channel from the DTM or webpage refer to the *(see page 106)*.

The following figure shows the default screen in online auto binding mode:

NOTE: You can exit from the auto-binding mode by rotating the jog dial in clockwise or anticlockwise direction.

The following figure shows the menu structure:

```
Ready Mode
    │
    ├── Configuration
    │        │
    │        ├── Input configuration
    │        │
    │        ├── Input holding time setting
    │        │
    │        ├── Serial line setting/Ethernet
    │        │
    │        ├── Reset to factory settings
    │        │
    │        └── Escape
    │
    ├── Diagnostic
    │        │
    │        ├── Input status
    │        │
    │        ├── Serial link info/IP info
    │        │
    │        ├── Device status
    │        │
    │        └── Escape
    │
    ├── SD Card (Only appears if the SD card is used)
    │        │
    │        ├── Save all the parameters
    │        │
    │        ├── Load all the parameters
    │        │
    │        └── Escape
    │
    └── Escape
```
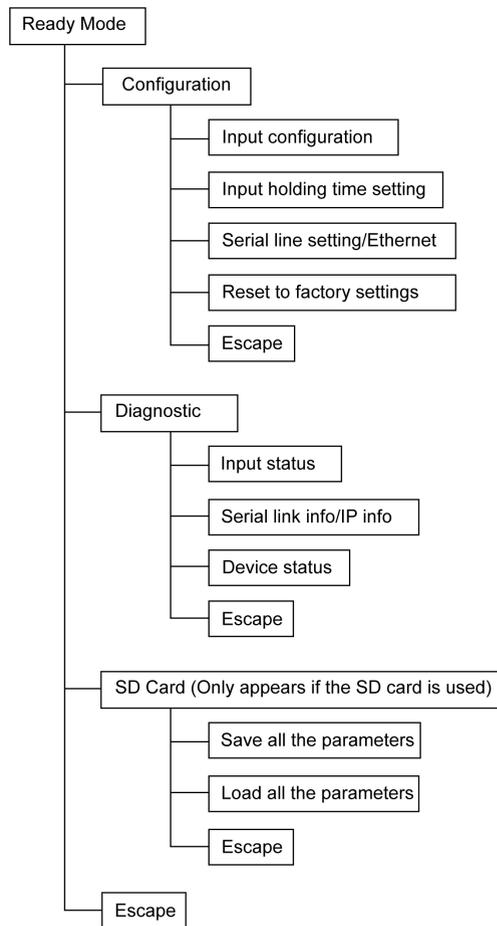
The table provides properties of the **Configuration** menu:

Menu	Parameters (Can Be Configured)
Input configuration	Allows you to do the following operations: • Auto teach. • Auto unteach. • Manual teach. • Manual unteach. For further information, refer to the Input configuration *(see page 84)*.
Input holding time setting	Allows you to set the input holding time. For further information, refer to the Input Holding Time Menu *(see page 86)*.
Serial line settings	Allows you to do the following operations: • Manual baud rate setting. • Manual frame format setting. • Auto baud rate setting. • Auto frame format setting. For further information, refer to the Serial line Menu *(see page 87)*.

Ethernet Modbus/TCP settings	Allows you to do the following operations:
	• Select the DHCP mode.
	• Select the BOOTP mode.
	• Select the static IP mode.
	  • Set the 4 byte IP address.
	  • Set the 4 byte subnet mask.
	  • Set the 4 byte gateway address.
	  • Save the IP address.
	
	For more information, refer to the IP setting menu *(see page 89)*.

Reset to factory settings	Allows you to do the following operations: • Reset the communication parameter to the default value. • Reset all the parameters to the default value. • Set the communication parameters. • Set all the parameters. For further information, refer to the Factory Mode *(see page 91)*.

The table provides the properties of the **Diagnostic** menu:

Menu	Parameters
Input status	Displays the status of the transmitter.
Serial link information	● Display the slave ID. ● Display the baud rate. ● Display the frame format. For further information, refer to the Diagnostic menu *(see page 92)*.
Ethernet information	● Displays the IP address. ● Displays the subnet mask. ● Display the gateway address. ● Display the MAC address. For further information, refer to the Diagnostic menu *(see page 92)*.
Device status	● Displays the detected error code. ● Displays the device reference (ZBRN1/ZBRN2.) ● Displays the firmware version. ● Displays the channel. For further information, refer to the Diagnostic menu *(see page 92)*.

The table provides the properties of the **SD card** menu:

Menu	Parameters
Save all parameters	Allows you to save all the parameters in the SD card. For further information, refer to the SD card menu *(see page 94)*.
Load all parameters	Allows you to load all the parameters from the SD card. For further information, refer to the SD card menu *(see page 94)*.

Configuration Menu

Introduction

You can enter all the settings for the access point from the **Configuration** menu. When you activate the **Configuration** menu, configuration LED turns on.

The following figure shows the display screen when **Configuration** menu is active:
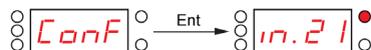
NOTE: In this example, the value 21 means that total 21 inputs are configured.

Organization Tree

The following figure shows **Configuration** menu structure:
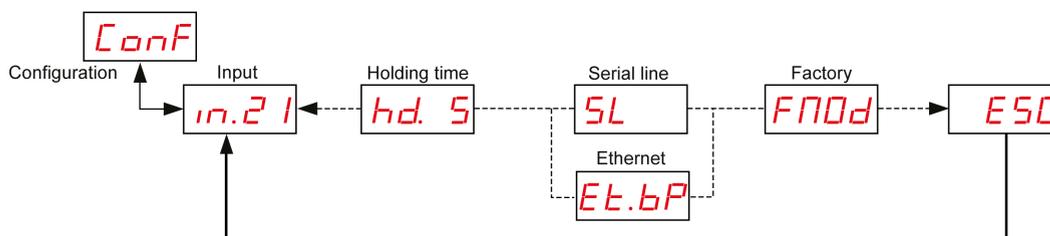
Code	Name/Description
ConF	**Configuration** menu.
in.21	**Input** menu.
hd. 5	Input holding time setting menu. It allows you to set the input holding time. In the example, the value 5 means that the holding time is set to 500 ms.
SL	Serial line setting menu. It appears only in ZBRN2.
Et.bP	IP setting menu. It appears only in ZBRN1.
FNOd	Reset to factory mode menu. It allows you to reset the device settings to the default factory mode.

Input Configuration

The following figure shows the organization tree of **Input Configuration** menu:

Code	Name/Description	Range	Factory Setting
⌐⌐.2 1	Displays the channel number which is taught.	0–59	0
CLr	Unteach 1 transmitter.	–	–
CLrA	Unteach all the transmitters.	–	–
t	Auto teach mode, you can teach the transmitter by pressing the transmitter 3 times.	–	–
ı _	Transmitter taught.	–	–
ı .	Transmitter not taught.	–	–
dUP	Indicates that the transmitter is already taught and duplication of the MAC addresses are not allowed.	–	–
Id d1d2 d3d4	Enter the 4 bytes of the MAC/ID of the transmitter.	–	–
1 d1 2 d2 3 d3 4 d4	First byte of MAC/ID. Second byte of the MAC/ID. Third byte of the MAC/ID. Fourth byte of the MAC/ID.	–	–

Input Holding Time Menu

The following figure shows the organization tree of **Input Holding Time** menu:
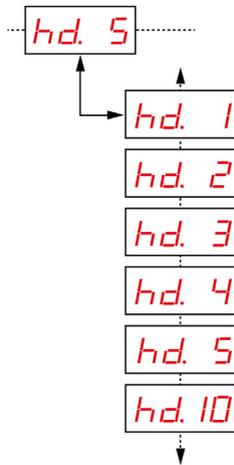
Code	Name/Description	Range	Factory Setting
hd. 5	Holding time menu. It allows you to set the input holding time.	1 = 100 ms	1 = 100 ms
		2 = 200 ms	
		3 = 300 ms	
		4 = 400 ms	
		5 = 500 ms	
		10 = 1 s	

Serial Line Menu

The following figure shows the organization tree of **Serial Line** menu:

Code	Name/Description	Range	Factory Setting
A 1 ↗ A 1	Slave address menu. It allows you to set the slave address.	1–247	1
AUto	Enables auto detection mode. All the parameters (baud rate and frame setting) are set automatically.	–	Auto
NAn	Allows you to set the baud rate and frame setting manually.	–	–
b38.4	Baud rate menu. It allows you to select the baud rate value from the list.	1.2 = 1200 bps 2.4 = 2400 bps 4.8 = 4800 bps 9.6 = 9600 bps 19.2 = 19,200 bps 38.4 = 38,400 bps 115 = 15,200 bps	–
F8E1	Frame setting menu. It allows you to select the frame format from the list.	8e1 = Even parity 8o1 = Odd parity 8n2 = No parity	Auto

IP Setting Menu

The following figure shows the organization tree of **IP Setting** menu:

Ethernet
`Et.dP`

DHCP
`d    0`

`d 159`
DHCP device name

Bootp
`bP`

Static IP
`St`

`ESC`

`IP`

`no`

`YES`

Static IP setting change

`SnN`

`9AtE`

`SAuE`

`1  192`

`1  192`

`2 168`

`2 168`

`3    1`

`3    1`

`4 100`

`4 100`
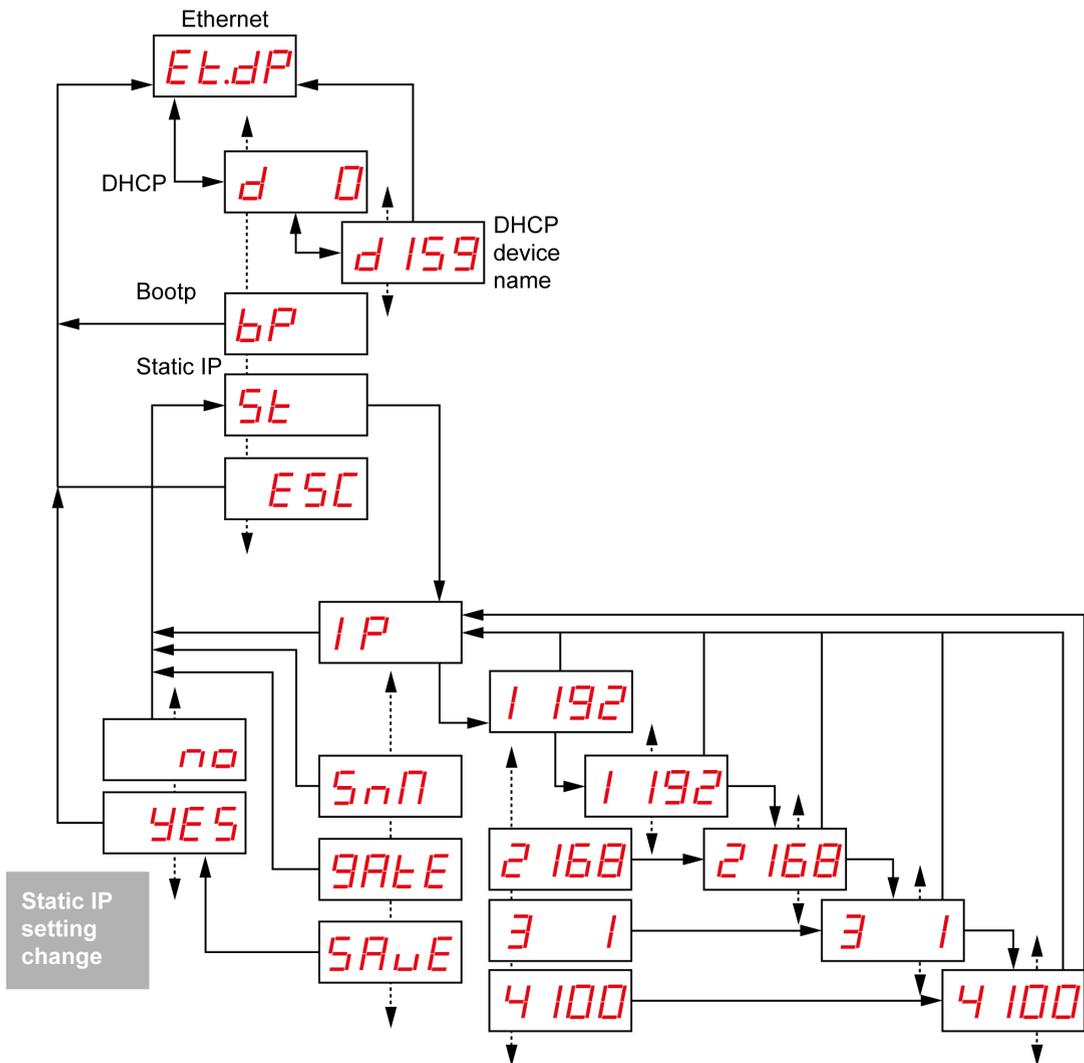
Code	Name/Description	Range	Factory Setting
`Et.dP`	Indicates that the access point uses DHCP mode to set the network-specific parameters.		
`d 159`	In DHCP mode, enter the device name. The access point gets the IP address from the DHCP server. **NOTE:** The complete device name is ZBRN1_078 when the value is set to 78.	000–159	000
`Et.bP`	Indicates that the access point uses BOOTP mode to set the network-specific parameters.		
`bP`	BOOTP mode access point gets the IP address from BOOTP server.	–	–
`Et.St`	Indicates that the access point uses static IP mode to set the network-specific parameters.	–	–
`St`	In static IP mode, the IP address, subnet mask, and gateway is entered manually using the jog dial.	–	–
`SnM`	Enter the 4 bytes of the subnet address.	–	–
`9AtE`	Enter the 4 bytes of the gateway address.	–	–
`SAuE`	Enable the IP address and return to the previous menu.	–	–

Factory Mode

The following figure shows the organization tree of **Factory Mode** menu:

Factory mode
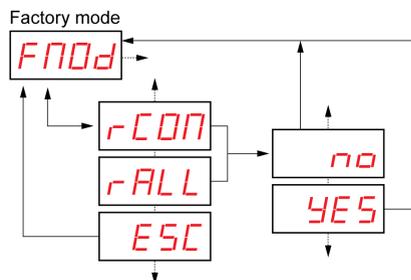
Code	Name/Description
rCON	Reset the communication parameters to the default value.
rALL	Reset all the parameter values to default setting.
ESC	Quit to return to the previous menu.

Diagnostic Menu

Introduction

Diagnostic menu gives the information about various settings of the device and the detected error status. When you activate **Diagnostic** menu, **Diagnostic** LED turns on.

The following figure shows the display screen when **Diagnostic** menu is active:
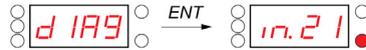
NOTE: In the example, the value 21 means that total 21 inputs are configured.

Organization Tree

The following figure shows the **Diagnostic** menus:

Code	Name/Description
d 1A9	**Diagnostic** menu.
in.2 1	Displays binding information, such as current binding number.
5L *A247* *b 1.2* *F8E 1*	Displays serial information: ● slave address ● current baud rate ● frame setting
Et *IP* → *1 192* *5nN* → *1255* *9AtE* → *1 192* *NAC* → *1 AA*	Displays the IP information: ● IP address ● subnet mask ● gateway ● MAC address
d5 *Er. 3* *rF. 1* *00.0 1* *CH 1 1*	Displays the device status: ● detected error code ● reference (ZBRN1/ZBRN2) ● firmware version (v00.01) ● channel type **NOTE:** To clear a detected error, push the jog dial when selecting the detected error code parameter.
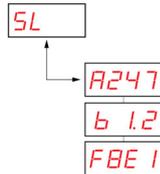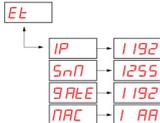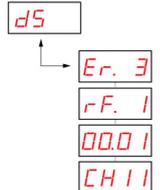
NOTE: Serial line information menu exists only for ZBRN2. IP information menu exists only for ZBRN1.

SD Card Menu

Introduction

SD card menu allows you to back up and restore the binding and network parameters.

Organization Tree

The following figure shows SD card menus:
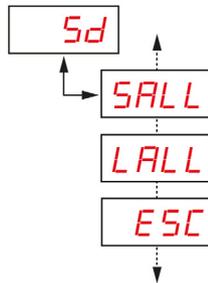
Code	Name/Description
5d	SD card setting menu allows you to back up and restore binding and network parameters.
5ALL	Allows you to save all the parameters in the SD card. To validate this parameter, select **Yes** from the sub-menu.
LALL	Loads all the parameters from the SD card. To validate this parameter, select **Yes** from the sub-menu.

NOTE: SD card menu appears only if the SD card is inserted into the device.

DTM

7

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Introduction	96
Configuration	97
Diagnostic	105

Introduction

General

Device Type Manager (DTM) is a part of the Field Device Tool (FDT) standard that is a software component for a device that contains specific data and functions. It contains FDT-complaint interface to enable communication with the connected system.

Connection to a PC

You need to connect the PC to the access point to use the DTM feature.

ZBRN1 access point is connected to the PC as shown in the following figure:

ZBRN2 access point is connected to the PC as shown in the following figure:
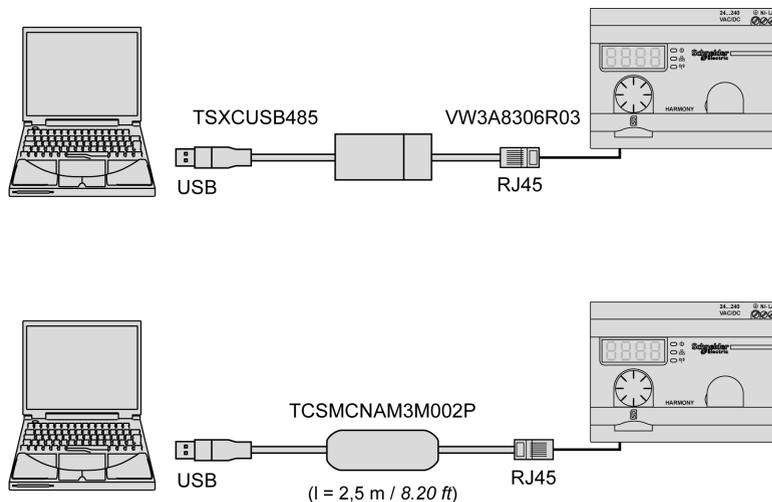
Configuration

Overview

The offline configuration data is classified into 4 types, which are as follows:
- device module
- teach screen
- protocol information
- IO status

The table provides the communication DTMs and its reference:

Communication DTMs	Product Reference
Ethernet Modbus/TCP	ZBRN1
Modbus serial line	ZBRN2

NOTE:

The related product reference is selected automatically when the communication DTM is selected.

The communication DTM is selected through the DTM catalog.

The DTMs are compatible with the following Schneider Electric FDT containers:

- **SoMachine**
- **Unity**

The DTMs are also compatible with the third-party FDT containers, such as M&M (recommended), PactWare, and so on.

Device Module

The following figure shows the offline **Device Module** screen:
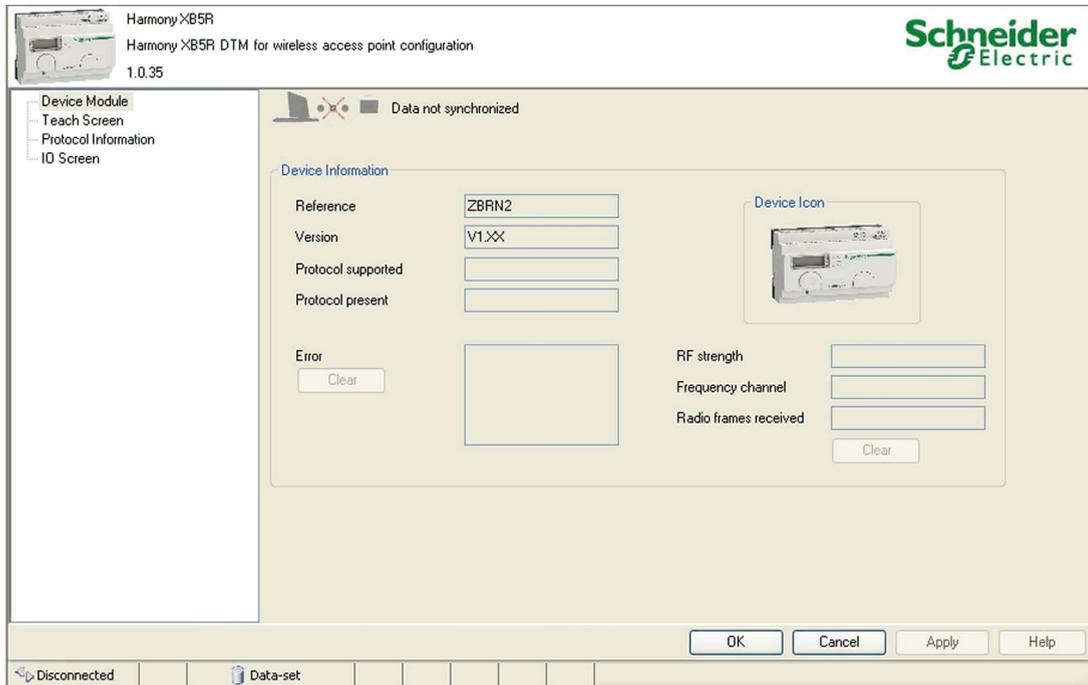
The table provides the properties of the offline **Device Module**:

Parameters	Description	Status
Auto Refresh	Automatically updates the signal information (available only in online mode).	Disabled
Reference	Displays the product reference.	Enabled
Version	Displays the product firmware version.	Enabled
Protocol supported	Displays the supported protocol.	Disabled
Protocol present	Displays the protocol present.	Disabled
Device Icon	Displays the graphical representation of the device.	Disabled
RF strength	Displays the strength of the radio frequency signal.	Disabled
Frequency channel	Displays the frequency channel. Default value is 11.	Disabled
Radio frames received	Displays the number of the GP frames received.	Disabled
Clear	Clears the signal information and detected error details.	Disabled
Error	Displays the detected error code.	Disabled

Teach Screen

The following figure shows the offline **Teach Screen**:
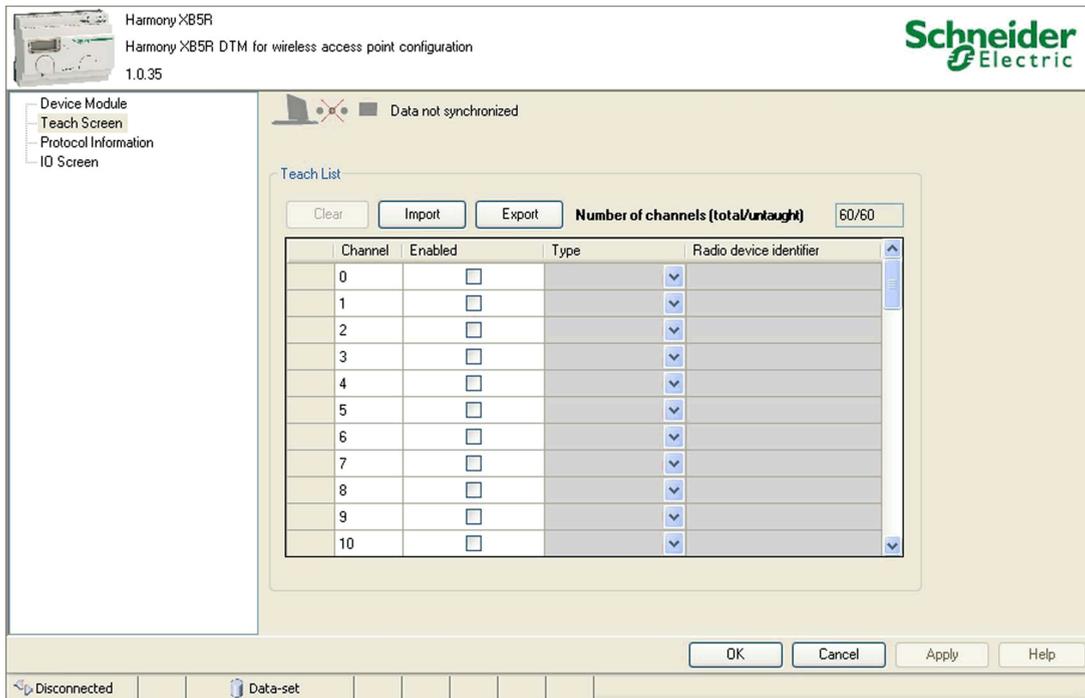
NOTE: The access point supports 60 transmitters (for example: ZBRT1). **Teach List** contains the radio device identifier of each transmitter.

The table provides the properties of the offline **Teach Screen**:

Parameters	Description	Status
Clear	Clears the teach list.	Enabled
Import	Import the saved file to use the previous teach information.	Enabled
Export	Exports the teach list to your hard drive.	Enabled
Channel	Displays the number of transmitters that can be used.	Enabled
Enabled	Displays the status of the channel (if taught or not).	Enabled
Type	Select the device type (type 1 by default).	Enabled
Radio device identifier	Enter the identifier of the transmitter radio device. Radio device identifier must be in format AA:BB:CC:DD (4 bytes length).	Enabled
Number of channels (total/untaught)	Displays the number of taught transmitters.	Disabled

Protocol Information

> The following figure shows the offline Modbus serial line **Protocol Information** screen:
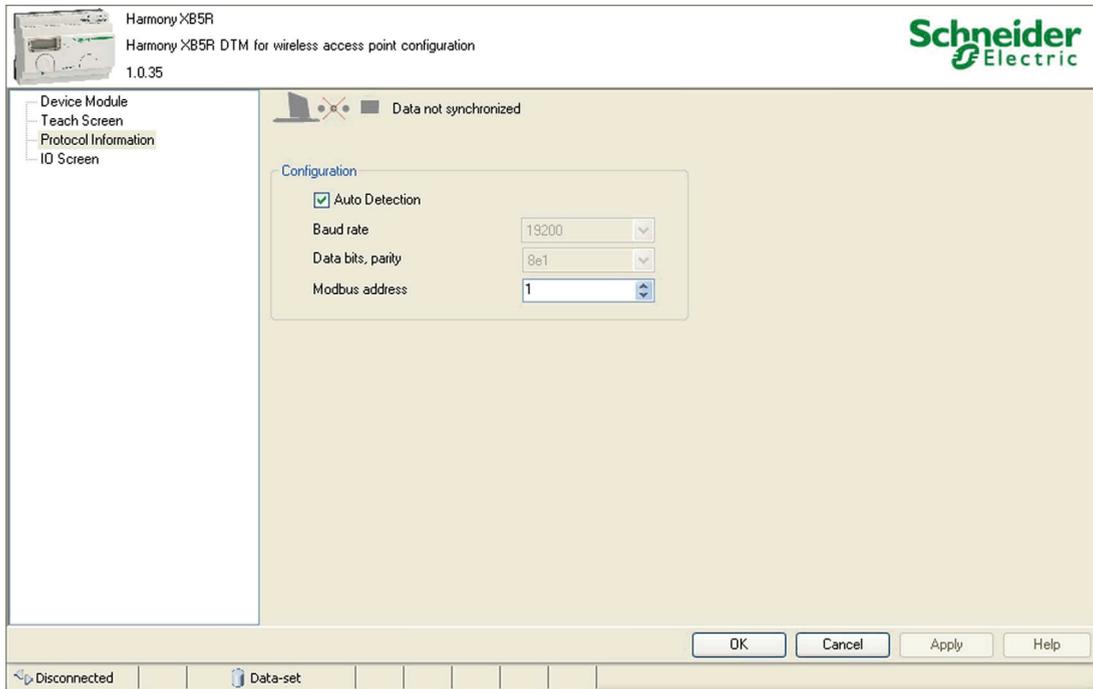
The table provides the properties of the offline Modbus serial line **Protocol Information**:

Parameters	Description	Value	Status
Auto Detection	Automatically sets the protocol information depending on the first data frame received.	–	Enabled
Baud rate	Select a baud rate from the list.	Auto	Enabled
		1200 bps	
		2400 bps	
		4800 bps	
		9600 bps	
		19,200 bps	
		38,400 bps	
		115,200 bps	
Data bits, parity	Select a parity from the list.	Auto	Enabled
		8e1	
		8o1	
		8n1	
Modbus address	Enter the modbus address.	1–247	Enabled

The following figure shows the offline Ethernet Modbus/TCP **Protocol Information** screen:
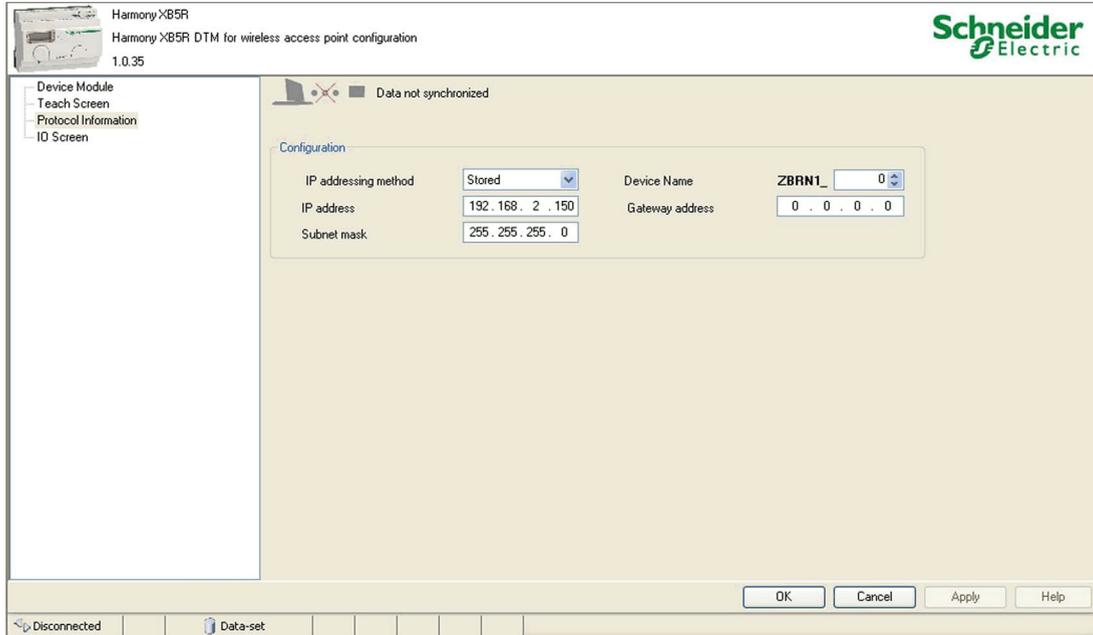
The table provides the properties of the offline Ethernet Modbus/TCP **Protocol Information**:

Parameters	Description	Value	Status
IP addressing method	Select the IP addressing method from the list.	DHCP	Enabled
		BOOTP	
		Static IP	
IP address	Enter the IP address.	–	Enabled
Subnet mask	Enter the subnet mask address.	–	Enabled
Device Name ZBRN1_	Enter the device name. **NOTE:** The complete device name is **ZBRN1_078** when the value is set to 78.	000-159	Enabled
Gateway address	Enter the gateway address.	–	Enabled

IO Screen

The following figure shows the offline **IO Screen**:
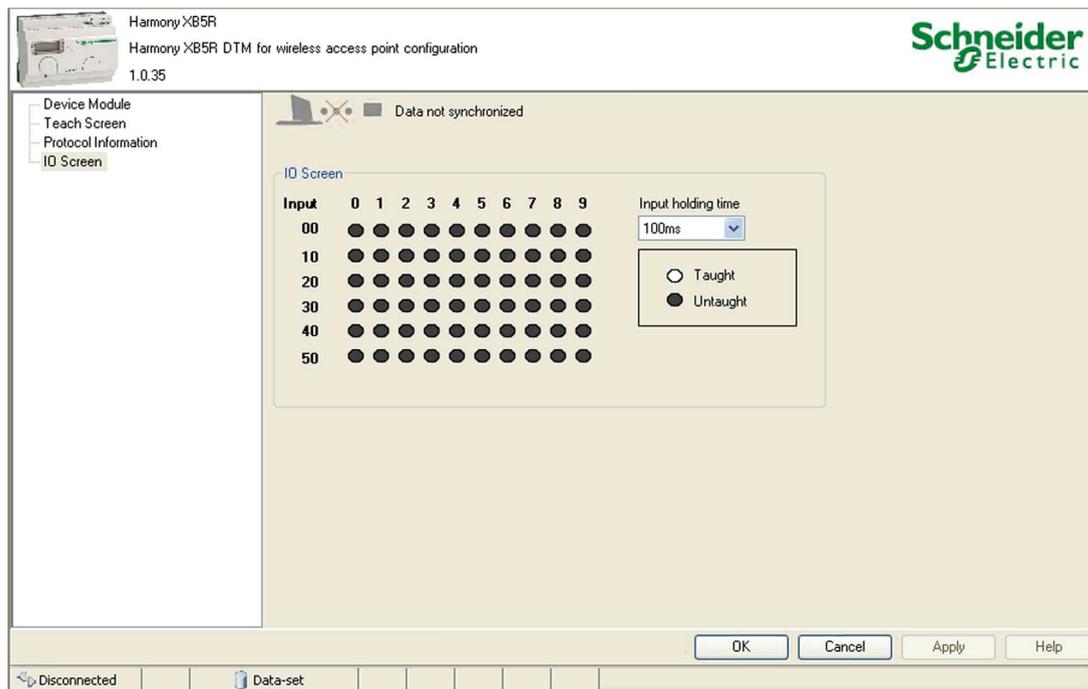
The table provides the properties of **IO Screen** in offline mode:

Item	Parameters	Description	Values
1	**Input**	Displays the input status (if taught or not).	–
2	**Input holding time**	Select the input holding time from the list.	100 ms
			200 ms
			300 ms
			400 ms
			500 ms
			1 s

The table provides the input status:

Color	Meaning
Gray	Input is untaught.
White	Input is taught.

Steps to Configure ZBRN1

1. Select the **Ethernet Modbus/TCP channel** from the communication DTM.
2. Select the **IP addressing method** from the list in **Protocol Information** screen.
3. Enter the address parameters (depending on the **IP addressing method**).
4. Select the **Input holding time** from the list in **IO Screen**.
5. Download the configuration on the device.

Steps to Configure ZBRN2

1. Select the **Modbus Serial channel** from the communication DTM.
2. Enter the teach information manually or import the existing teach details.
3. Select the **Baud rate** and **Data bits, parity** from the list in **Protocol Information**.
4. Select **Modbus address** from the list in **Protocol Information** screen.
5. Select the **Input holding time** from the list in **IO Screen**.
6. Download the configuration on the access point.

Diagnostic

Overview

The online diagnostic data is classified into 4 types, which are as follows:
- device module
- teach list
- protocol information
- IO status

Device Module

The following figure shows the online **Device Module** screen:
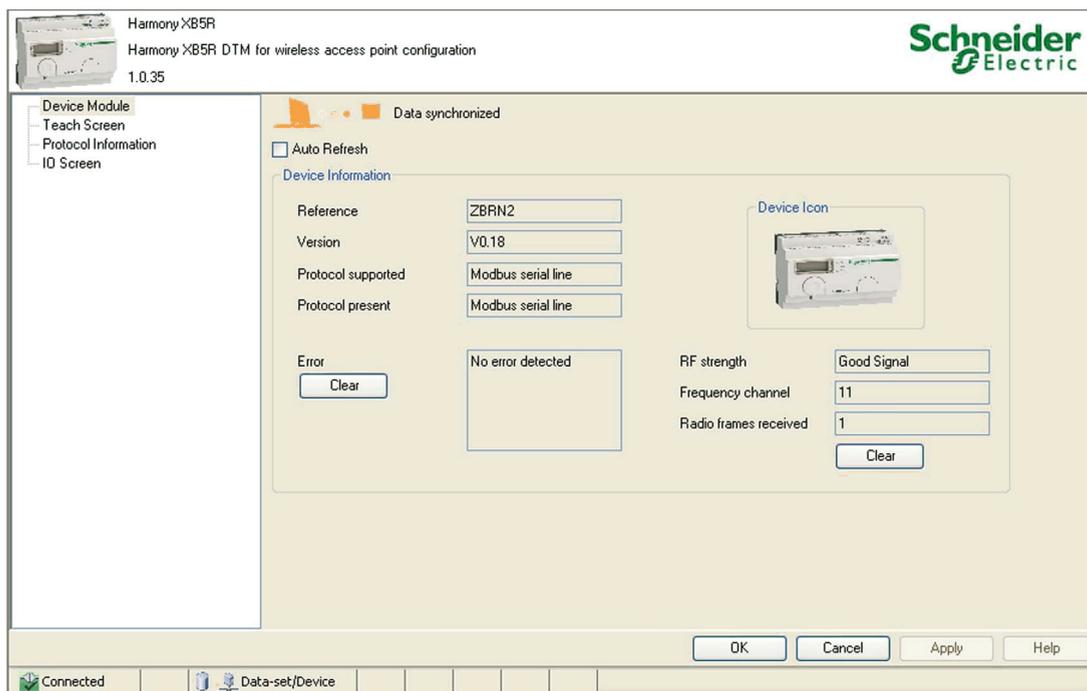
The table provides the properties of the online **Device Module**:

Parameters	Description	Status
Auto Refresh	Automatically updates the signal information.	Enabled
Reference	Displays the product reference.	Enabled
Version	Displays the product version.	Disabled
Protocol supported	Displays the supported protocol.	Enabled
Protocol present	Displays the protocol present.	Enabled
Device Icon	Displays the graphical representation of the device.	Enabled
RF strength	Displays the strength of the radio frequency signal.	Enabled
Frequency channel	Displays the frequency channel (default value is 11).	Enabled
Radio frames received	Displays the number of GP package received.	Enabled
Clear	Clears the signal information and detected error details.	Enabled
Error	Displays the detected error code.	Enabled

Teach Screen

The following figure shows the online **Teach Screen**:

The table provides the properties of the online **Teach Screen**:

Parameters	Description	Status
Auto Refresh	Automatically updates the teach information.	Enabled
Clear	Clears the teach list.	Disabled
Import	Import the saved file to use the previous teach information.	Disabled
Export	Exports the teach list to your hard drive.	Disabled
Channel	Displays the number of transmitters that can be used.	Disabled
Enabled	Displays the status of the channel (if taught or not).	Disabled
Type	Displays the device type.	Disabled
Radio device identifier	Displays the identifier of the radio device.	Disabled
Number of channels (total/untaught)	Displays the number of taught transmitters.	Enabled
Online auto-teach	Automatically teaches the transmitter to the active channel.	Disabled

The following figure shows the online **Teach Screen** when online auto-teach is active:
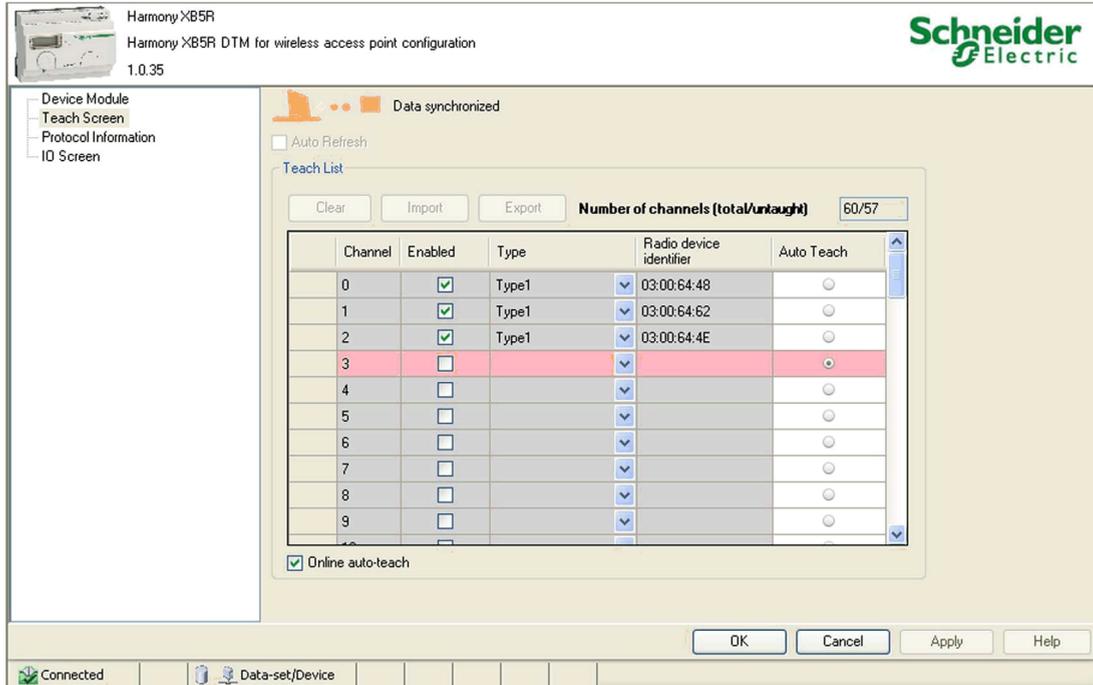
Auto teach features are as follows:

- Enable **Online auto-teach** checkbox. The active channel is highlighted with active option.
- Click the transmitter 3 times to bind it to the active channel.
- Uncheck the **Online auto-teach** checkbox to disable auto teach of the transmitter.

Protocol Information

The following figure shows the online Modbus serial line **Protocol Information** screen:
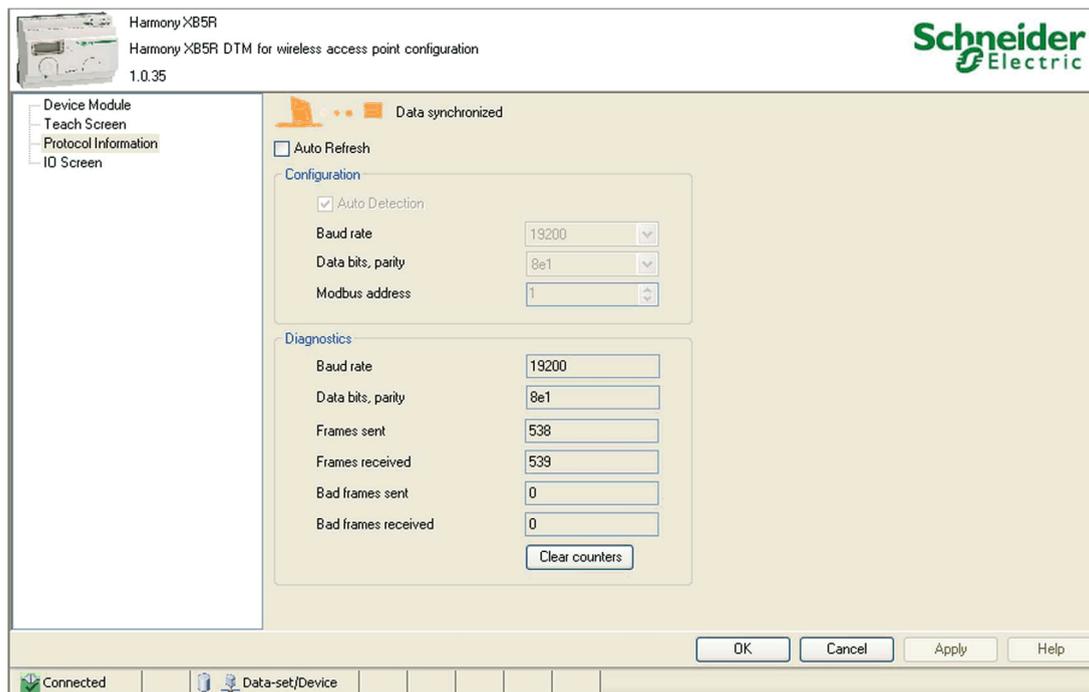
The online Modbus serial line **Protocol Information** has the following 2 sub sections:

- **Configuration**
- **Diagnostics**

The table provides the properties of the **Configuration** information of online Modbus serial line **Protocol Information**:

Parameters	Description	Status
Auto Refresh	Automatically refreshes the product information.	Enabled
Baud rate	Displays the selected baud rate.	Disabled
Data bits, parity	Displays the selected data bit and parity.	Disabled
Modbus address	Displays the modbus address.	Disabled

The table provides the properties of the **Diagnostics** information of online Modbus serial line **Protocol Information**:

Parameters	Description	Status
Baud rate	Displays the active baud rate.	Enabled
Data bits, parity	Displays the active data bit and parity.	Enabled
Frames sent	Displays the number of GP frames sent.	Enabled
Frames received	Displays the number of GP frames received.	Enabled
Bad frames sent	Displays the number of bad frames sent.	Enabled
Bad frames received	Displays the number of bad frames received.	Enabled
Clear counters	Clears all the diagnostics information.	Enabled

The following figure shows the online Ethernet Modbus/TCP **Protocol Information** screen:

The table provides the properties of the **Configuration** information of online Ethernet Modbus/TCP **Protocol Information**:

Parameters	Description	Status
IP addressing method	Displays the selected IP addressing method.	Disabled
IP address	Displays the selected IP address.	Disabled
Gateway address	Displays the selected gateway address.	Disabled
Device Name ZBRN1_	Displays the number of devices, which uses same protocol information.	Disabled
Subnet mask	Displays the selected subnet mask address.	Disabled

The table provides the properties of the **Diagnostics** information of online Ethernet Modbus/TCP **Protocol Information**:

Parameters	Description	Status
Ethernet status	Displays the Ethernet status.	Enabled
IP address	Displays the IP address.	Enabled
Port 1 status	Displays the port 1 status.	Enabled
Port 2 status	Displays the port 2 status.	Enabled
MAC address	Displays the Ethernet MAC address.	Enabled
Subnet mask	Displays the subnet mask address.	Enabled
Gateway address	Displays the gateway address.	Enabled
Channel	Displays the number of transmitters in use.	Enabled
Protocol	Displays the protocol used (Ethernet Modbus/TCP).	Enabled
State	Displays the connection status.	Enabled
Client IP	Automatically refreshes the product information (Established, connecting, listening, and idle).	Enabled
Client port	Displays the client port address.	Enabled
Local port	Displays the local port address.	Enabled
Transmitted	Displays the address of the port from which the data is transmitted.	Enabled
Received	Displays the address of the port that receives the data.	Enabled
Transmission errors	Displays the address of the port that has detected error.	Enabled

IO Screen

The following figure shows the online **IO Screen**:
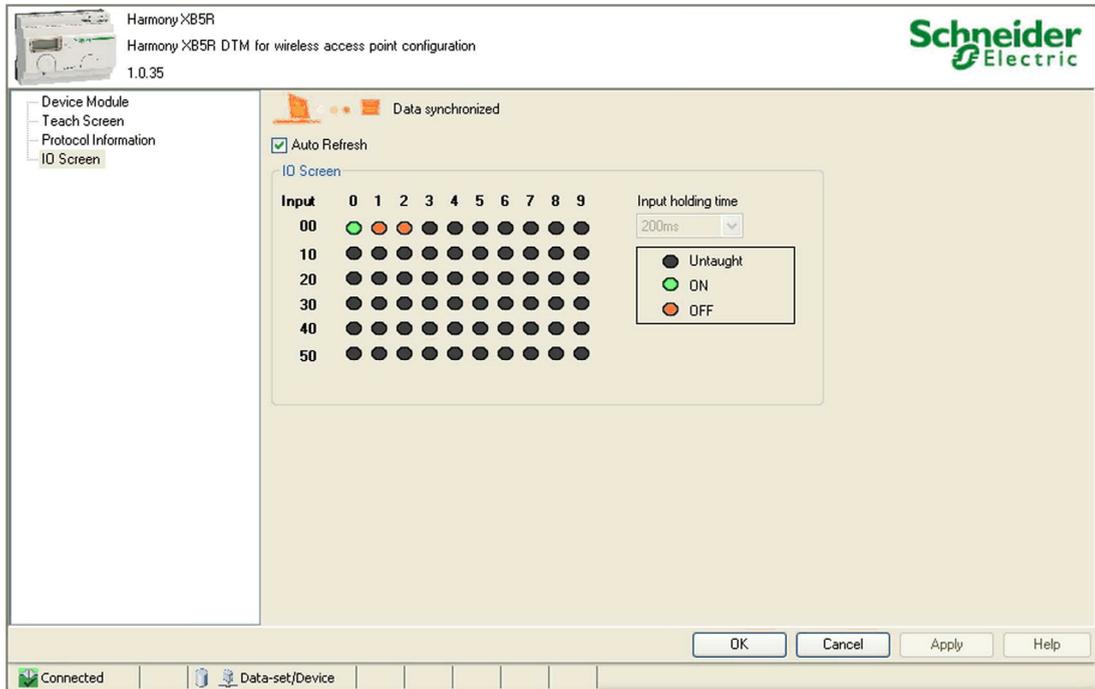
The table provides the properties of **IO Screen** in online mode:

Item	Parameter	Description
1	**Auto Refresh**	Automatically updates the input status.
2	**Input**	Displays the input status.
3	**Input holding time**	Displays the input holding time.

The table provides the input status:

Color	Meaning
Gray	Input is not taught.
Green	Input is on.
Red	Input is off.

Status Area

The following figure shows some examples of connection status:
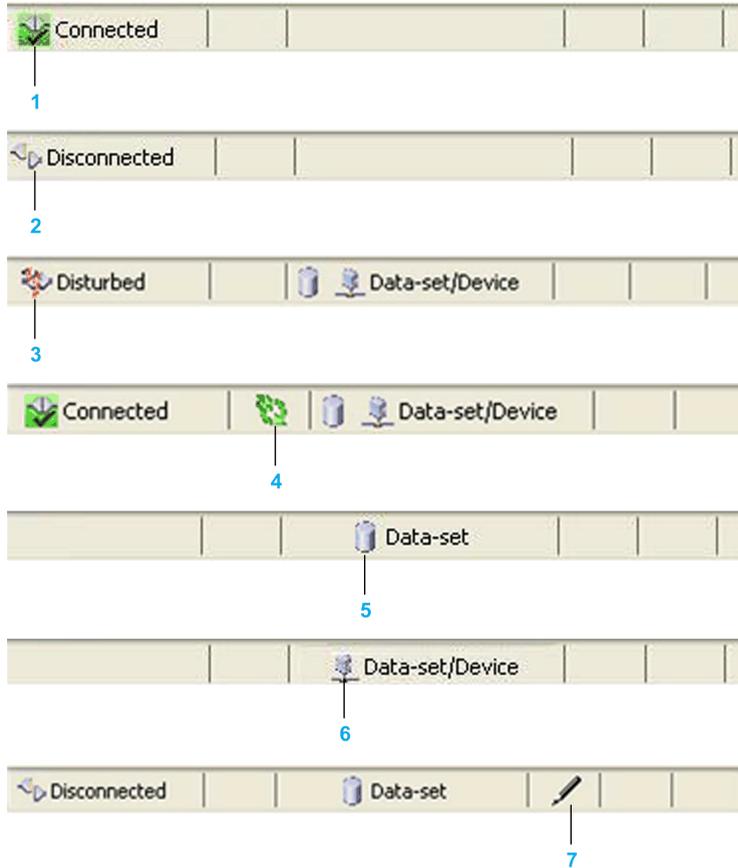
Item	Icon	Meaning
1		DTM is in online mode.
2		DTM is in offline mode.
3		Indicates that there is a detected error in communication.
4		Indicates that the communication between the DTM and device is active.
5		The offline data is stored in the DTM.

Item	Icon	Meaning
6		The data is stored in the device.
7		Indicates that the parameter is modified.

Web Pages

8

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Introduction	116
Configuration	118
Diagnostic	125

Introduction

General

ZBRCETH communication module has an embedded HTTP server. The web pages are stored in the communication module and can be updated by downloading the files from the FTP.

Web pages are used for the online configuration of the access point. To access the web pages, the user authentication is required. The default user name and password are USER.

Home Page

The following figure shows the **Home** page:
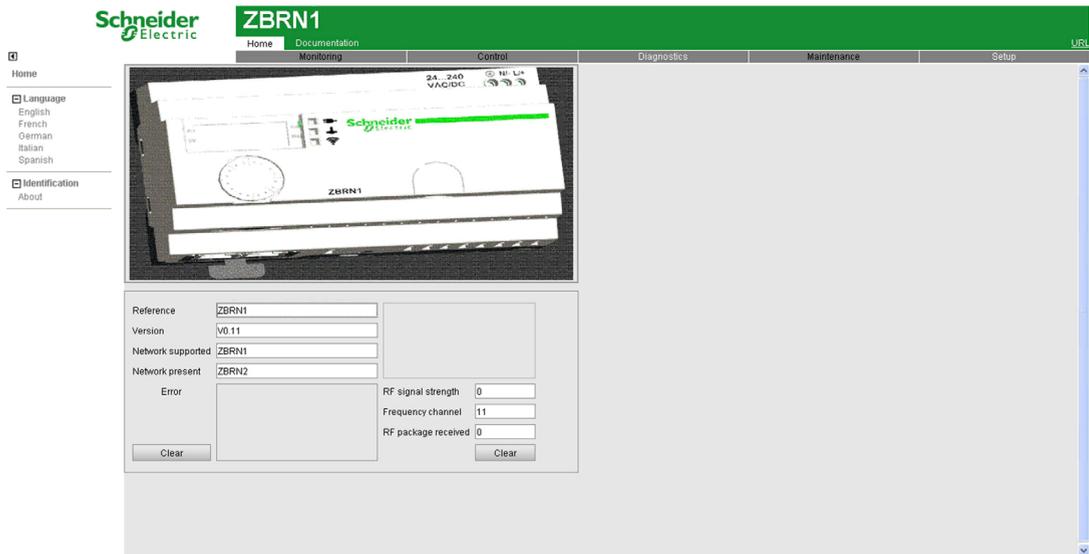
The table provides the properties of the **Home** page:

Parameters	Description
Device icon	Displays the graphical representation of the device.
Reference	Displays the product reference.
Version	Displays the product firmware version.
Network supported	Displays the supported network.
Network present	Displays the network present.
Error	Displays the detected error code.
RF signal strength	Displays the strength of the radio frequency signal.
Frequency channel	Displays the frequency channel. Default value is 11.
RF package received	Displays the number of the GP package received.
Clear	Clears the detected error codes and signal settings.

Configuration

Web Security Page

The following figure shows the **WEB SECURITY** page:
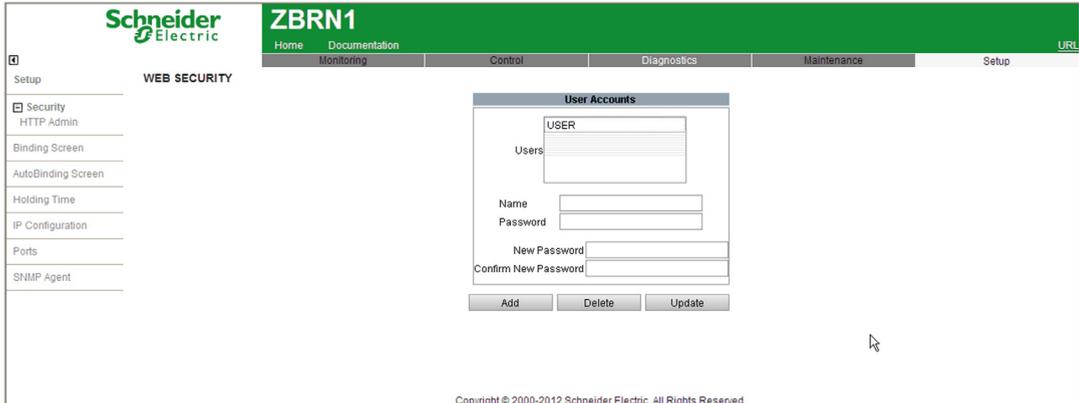
The table provides the properties of the **WEB SECURITY** page:

Parameters	Description
Name	Enter the user name.
Password	Enter the password.
New Password	Enter the new password.
Confirm New Password	Enter the new password again for confirmation.
Add	Allows you to add a new user account.
Delete	Allows you to delete an existing user account.
Update	Allows you to update an existing user account.

Binding Screen Page

The following figure shows the **Binding Screen** page:

The table provides the properties of the **Binding Screen** page:

Parameters	Description
Binding Number (used/total)	Indicates the number of transmitters enabled and configured.
Index	Displays the number of transmitters that can be used.
Enabled	Displays the status of the channel (if taught or not).
Type	Indicates the type of transmitter used.
MAC Address	Displays the MAC address of the transmitter.
Apply	Allows you to apply the changes.
Undo	Allows you to undo the changes.

Auto-Binding Screen Page

The following figure shows the **Auto-Binding Screen** page:

The table provides the properties of the **Auto-Binding Screen** page:

Parameter	Description
Enable Auto teach	Allows you to enable or disable the auto teach mode.
Binding Number (used\total)	Displays the number of taught transmitters.
Index	Displays the number of transmitters that can be used.
Enabled	Displays the status of the channel (if taught or not).
Type	Displays the device type.
MAC Address	Displays the MAC address of the transmitter.
Auto Binding	Indicates the number of the transmitters automatically enabled.
Online Auto Binding	Allows you to enable or disable the online auto binding.
Apply	Allows you to apply the changes.
Undo	Allows you to undo the changes.

Holding Time Page

The following figure shows the **Holding Time** page:
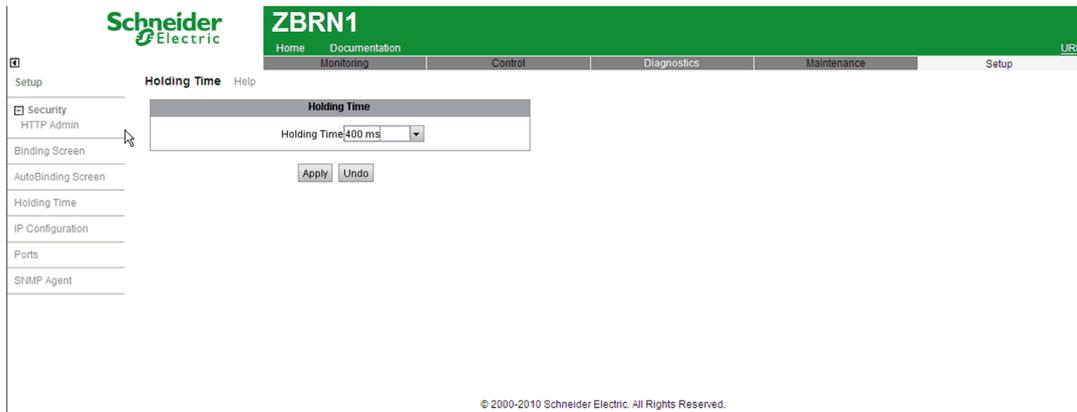
The table provides the properties of the **Holding Time** page:

Parameters	Description
Holding Time	Allows you to select holding time from the list.
Apply	Allows you to apply the changes.
Undo	Allows you to undo the changes.

IP and FDR Configuration Page

The following figure shows the **IP & FDR CONFIGURATION** page:
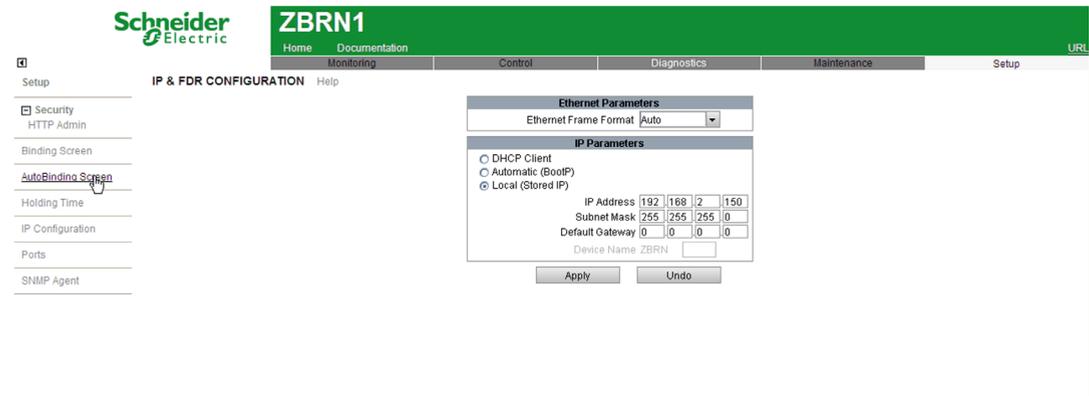
The table provides the properties of the **IP & FDR CONFIGURATION** page:

Parameters	Description
Ethernet Frame Format	Allows you to select the frame format from the list.
	Ethernet II
	802.3
	Auto
DHCP Client	Allows you to select the IP address from the DHCP server.
Automatic (BootP)	Allows you to select the IP address from the BootP server.
Local (Stored IP)	Allows you to configure the IP address, subnet mask, and default gateway address.
IP Address	Displays the IP address.
Subnet Mask	Displays the subnet mask.
Default Gateway	Displays the gateway address.
Device Name ZBRN	Allows you to enter the device name (ZBRN1).
Apply	Allows you to apply the changes.
Undo	Allows you to undo the changes.

Ethernet Ports Configuration Page

The following figure shows the **ETHERNET PORTS CONFIGURATION** page:

The table provides the properties of the **ETHERNET PORTS CONFIGURATION** page:

Parameters	Description
Port Number	Allows you to configure the port number.
Speed	Allows you to select speed from the list.
	10 Mbps
	100 Mbps
Duplex Mode	Allows you to select the duplex mode from the list.
	Full duplex
	Half duplex
Auto Negotiation	Allows you to select the auto configuration from the list:
	Enabled: Indicates that the speed and duplex mode are selected automatically.
	Disabled: Indicates that the auto configuration is disabled.
Apply	Allows you to apply the changes.
Undo	Allows you to undo the changes.

SNMP Agent Configuration Page

The following figure shows the **SNMP AGENT CONFIGURATION** page:

The table provides the properties of the **SNMP AGENT CONFIGURATION** page:

Parameters	Description
Manager 1	Displays the IP address of **Manager 1** SNMP manager. It consists of 4-octet decimal values in the range 0...255. The first octet value of the SNMP manager IP address must be in the range 1...126 or 128...223.
Manager 2	Displays the IP address of **Manager 2** SNMP manager. It consists of 4-octet decimal values in the range 0...255. The first octet value of the SNMP manager IP address must be in the range 1...126 or 128...223.
System Name	Allows you to define a string which describes the controller.
System Location	Describes the location of the controller.
System Contact	Identifies the contact location of the controller.
Get	Enter the password for **Get** parameter. This field can be empty. The maximum password length is 16 printable ASCII characters. The default setting for each community name is `public`.
Set	Allows you to configure the set community names.
Trap	Allows you to configure the trap community names.
Cold Start Trap	Indicates that the agent is reinitializing and its configuration may be altered.
Link Down Trap	Indicates that one of the communication links for the agent has turned off.
Link Up Trap	Indicates that one of the communication links for the agent has turned on.
Authentication Failure Trap	Indicates that the agent received a request from an unauthorized manager.
Apply	Allows you to apply the changes.
Undo	Allows you to undo the changes.

Diagnostic

Ethernet TCP/IP Statistics Page

The following figure shows the **ETHERNET TCP/IP STATISTICS** page:

The table provides the properties of the **ETHERNET TCP/IP STATISTICS** page:

Parameters	Description
MAC Address	Displays the MAC address.
Frames Received	Displays the count of received frames.
Frames Transmitted	Displays the count of transmitted frames.
Device Name	Displays the device name.
IP Address	Displays the IP address.
Subnet Mask	Displays the subnet mask address.
Default Gateway	Displays the default gateway address.
Reset Counters	Allows you to reset all counters.

Ethernet Port Statistics Page

The following figure shows the **ETHERNET PORT STATISTICS** page:
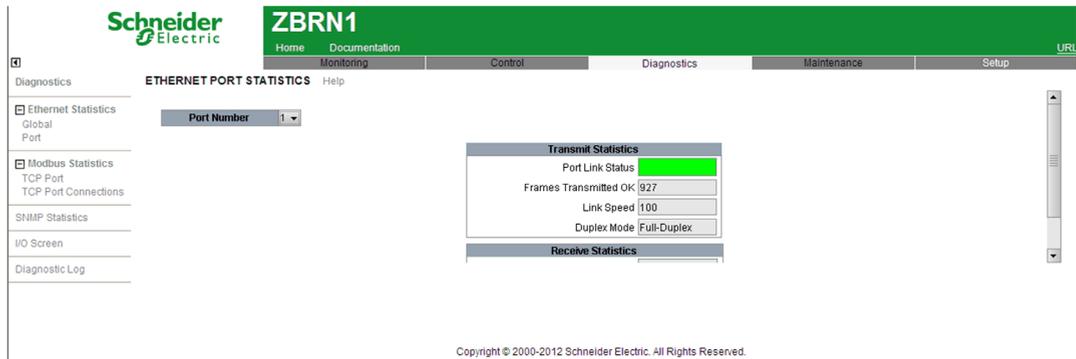
The table provides the properties of the **ETHERNET PORT STATISTICS** page:

Parameters	Description
Port Number	Allows you to select the port number from the list.
Port Link Status	Displays the port link status.
Frames Transmitted OK	Displays the count of transmitted frames with OK status.
Link Speed	Displays the link speed.
Duplex Mode	Displays the duplex mode.

Modbus TCP Port Statistics Page

The following figure shows the **MODBUS TCP PORT STATISTICS** page:

The table provides the properties of the **MODBUS TCP PORT STATISTICS** page:

Parameters	Description
Port Status	Displays the port status.
Opened TCP Connections	Displays the count of opened TCP connections.
Received Messages	Displays the count of received messages.
Transmitted Messages	Displays the count of transmitted messages.
Reset Counters	Allows you to reset all counters.

Modbus TCP Messaging Statistics Page

The following figure shows the **MODBUS TCP MESSAGING STATISTICS** page:
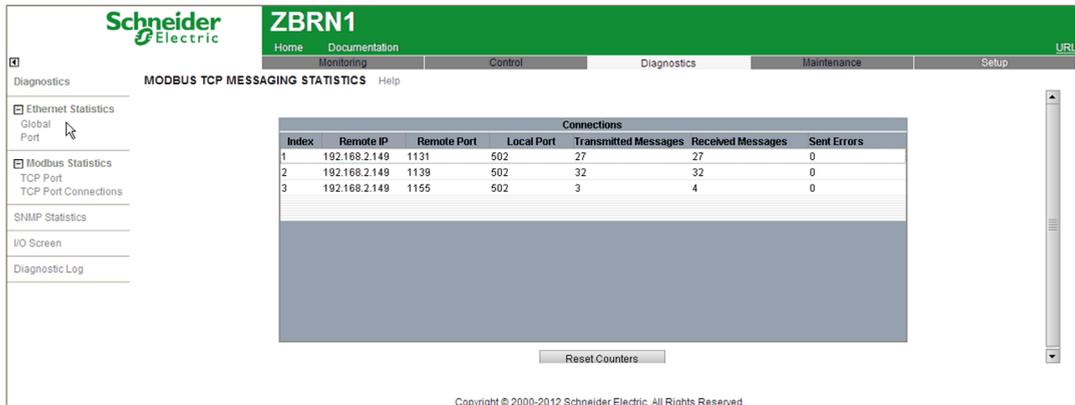
The table provides the properties of the **MODBUS TCP MESSAGING STATISTICS** page:

Parameters	Description
Index	Displays the index number.
Remote IP	Displays the IP address of the remote connection.
Remote Port	Displays the port number of the remote connection.
Local Port	Displays the port number of the local connection.
Transmitted Messages	Displays the count of transmitted messages.
Received Messages	Displays the count of received messages.
Sent Errors	Displays the count of sent errors.
Reset Counters	Allows you to reset all counters.

SNMP Statistics Page

The following figure shows the **SNMP STATISTICS** page:

The table provides the properties of the **SNMP STATISTICS** page:

Parameters	Description
SNMP Agent Status	Displays the SNMP agent status.
Invalid Community Usages	Displays the count of invalid community usage.
Received Messages	Displays the count of received messages.
Transmitted Messages	Displays the count of transmitted messages
Reset Counters	Allows you to reset all counters.

I/O Screen Page

The following figure shows the **I/O Screen** page:
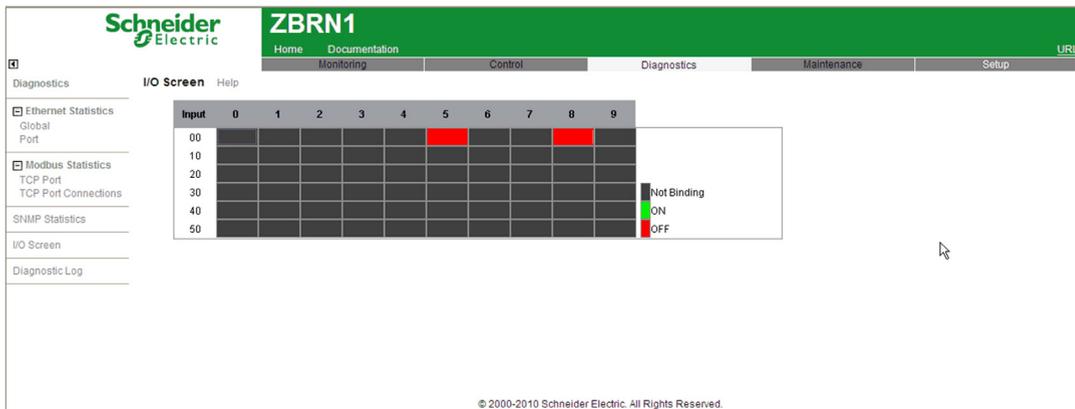
The table provides the properties of the **I/O Screen** page:

Parameters	Description
Input	Displays the input status.
Not Binding	Indicates that the transmitter is not configured.
ON	Indicates that the transmitter is configured and enabled.
OFF	Indicates that the transmitter is configured but not enabled.

SD Card

9

What Is in This Chapter?

This chapter contains the following topics:

Introduction

General

The secure digital card (SD card) is an ultra small flash memory card designed to provide high-capacity memory in a small size. The minimum capacity of the SD card is 16 Mb.

SD Card Insertion and Removal

> ## ⚠ CAUTION
>
> **UNINTENDED EQUIPMENT OPERATION**
>
> ● Do not expose the SD card to electrostatic and electromagnetic sources.
> ● Do not expose the SD card to heat, sunlight, water, and moisture.
> ● Do not expose SD card to high radiation. High-level radiation can erase the content of the SD card.
> ● Avoid impact to the SD card.
>
> **Failure to follow these instructions can result in injury or equipment damage.**

The following figure shows how to insert the SD card into the access point:
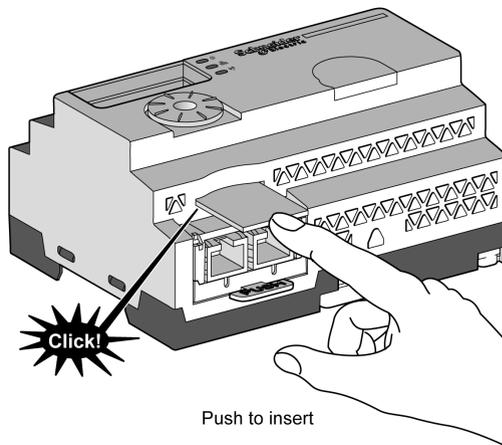
Push to insert

Push to insert the SD card in the SD card slot on the access point. Make sure that the SD card is inserted properly.

The following figure shows how to remove the SD card from the access point:
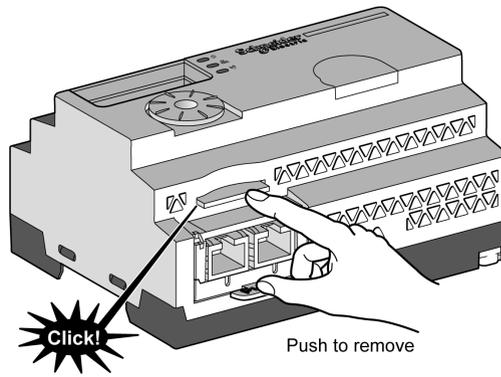
Push to remove the SD card from the SD card slot on the access point.

Functions

Supported Features

SD card supports the following features:
- Write protect
- Dynamic detection
- Save and Load configuration and network parameters

Save and Load Configuration

The following steps explain how to save the configuration and network parameters:

Step	Action
1	Insert an empty SD card into the access point.
2	On the **SD card** menu, click **Save all**.
3	It creates 2 subfolders in the SD card: ● \device: Stores the configuration parameter file *ZBRNXDEV.csv*. 	0	TRUE	Type1	03:00:8b:df
1	FALSE		
2	FALSE		
3	FALSE		
4	TRUE	Type1	03:00:01:54
5	FALSE		
6	FALSE		
7	FALSE		| **NOTE:** This is an extract of the file opened in Excel. ● \net: Stores the network parameter file *ZBRNXNET.csv* | Parameter	Value	Description
Holding_time	2	0:100ms 1:200ms 2:300ms 3:400ms 4:500ms 5:1s
Baudrate	5	1:1200bps 2:2400bps 3:4800bps 4:9600bps 5:19200bps 6:38400bps 7:115200bps
Frame_setting	1	1:8e1 2:8o1 3:8n2
Slave_id	2	[1-247]
Auto_detection	1	0=disable 1=enable	 **NOTE:** This is an extract of the file opened in Excel. You can update the .csv files manually and load them in the access point afterwards.

The following steps explain how to load the device configuration and network parameters:

Step	Action
1	Insert the SD card into the access point.
2	Make sure that the files you want to load are located in the appropriate SD card subfolders (create \device and \net subfolders if they are not existing in SD card): ● \device: Stores the configuration parameter file *ZBRNXDEV.csv* ● \net: Stores the network parameter file *ZBRNXNET.csv* **NOTE:** *ZBRNXDEV.csv* file is the same as the one used in the Import/Export DTM feature.
3	On the **SD card** menu, click **Load all**.

File Management and Diagnostic

File Management

The table provides the file names with the path used in the SD card:

Path	Description
\device	Stores the configuration file in this folder.
ZBRNXDEV.csv	Configuration file name.
\net	Stores the network file in this folder.
ZBRNXNET.csv	Network file name.

Diagnostic

The table provides the diagnostic details of the SD card:

Description	Device Indication	Detected Error Code
SD card is inserted in the access point.	**SD Card** menu appears.	0: Indicates that there is no detected error.
SD card is removed from the access point.	**SD Card** menu disappears.	0: Indicates that there is no detected error.
SD card is not compatible.	**Error** LED turns on.	1: Indicates that the SD card cannot be accessed.
SD card is write-protected.	**Error** LED turns on.	2: Indicates that the SD card is write-protected.
No space in the SD card.	**Error** LED turns on.	3: Indicates that there is not enough space in the SD card.
The format of *ZBRNXNET.csv* file is invalid.	**Error** LED turns on.	4: Indicates that the communication configuration file is invalid.
The format of *ZBRNXDEV.csv* file is invalid.	**Error** LED turns on.	5: Indicates that the device configuration file is invalid.
More than 1 configuration file is stored in the device or net folder while restoring, which is not allowed.	**Error** LED turns on.	6: Indicates that more than 1 configuration file is available in the appropriate directory of the SD card.
While restoring configuration files, no files exist in the device and net folders.	**Error** LED turns on.	7: Indicates that the configuration file is not available in the SD card.

First Installation

10

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
First Start Up	138
Configuration	140

First Start Up

Overview

This procedure helps you through the installation and startup of your access point.

Startup Procedure

The table provides the start-up procedure for ZBRN2 access point:

Step	Action	Comments
1	Unpack your access point (ZBRN2) and check the content of the package.	Contents of the package: Instruction Sheet, access point (ZBRN2).
2	Choose an appropriate cabinet.	For further information, refer to the Mechanical Installation *(see page 28)*.
3	Install the access point on a DIN rail, on a grid, or a plate.	
4	Connect the external antenna to the access point (optional).	For further information, refer to the Mounting Tips for ZBRA2 External Antenna *(see page 69)*.
5	Connect the external 24...240 Vac/dc power supply.	For further information, refer to the Power Supply Connections *(see page 34)*.
6	Turn on the power.	–
7a	Configure the access point through the user interface.	For further information, refer to the User Interface *(see page 83)*.
7b	Connect the access point to the PC.	For further information, refer to the Connection to a PC *(see page 96)*.
	Configure the access point through the DTM.	For further information, refer to the DTM *(see page 97)*.
	Disconnect the PC.	–
8	Connect the serial line communication buses and network.	For further information, refer to the Modbus Serial Line Cables *(see page 53)*.
9	Connect line termination devices to the access point (optional).	For further information, refer to the Modbus Serial Line Cabling *(see page 42)*.
10	Verify all the connections.	–
11	Run the application.	–
NOTE: Step 7a is applicable if the access point is configured through the user interface. Step 7b is applicable if the access point is configured through the DTM.		

The table provides the start-up procedure for ZBRN1 access point:

Step	Action	Comments
1	Unpack your access point (ZBRN1) and check the content of the package.	Contents of the package: Instruction Sheet, access point (ZBRN2), ZBRN2 Instruction Sheet, communication module (ZBRCETH), and ZBRCETH Instruction Sheet.
2	Insert the communication module in the access point.	For further information, refer to the ZBRECTH Communication Module *(see page 57)*.
3	Choose an appropriate cabinet.	For further information, refer to the Mechanical Installation *(see page 28)*.
4	Install the access point on the DIN rail. Mounting on a grid or a plate.	
5	Connect the external antenna to the access point (optional).	For further information, refer to the Mounting Tips for ZBRA2 External Antenna *(see page 69)*.
6	Connect the external 24...240 Vac/dc power supply.	For further information, refer to the Power Supply Connections *(see page 34)*.
7	Turn on the power.	–
8a	Configure the access point through the user interface.	For further unformation, refer to the User Interface *(see page 83)*.
8b	Connect the access point to the PC.	For further information, refer to the Connection to a PC *(see page 96)*.
	Configure the access point thought the DTM.	For further information, refer to the DTM *(see page 97)*.
	Disconnect the PC.	–
9	Connect the Ethernet communication buses and network.	For further information, refer to the Ethernet Cables *(see page 66)*.
10	Verify all the connections.	–
11	Run the application.	–
NOTE: Step 8a is applicable if the access point is configured through the user interface. Step 8b is applicable if the access point is configured through the DTM.		

Configuration

Mandatory Settings

2 types of parameters should be configured:
- **communication protocol**
- **wireless and batteryless pushbutton association**

The access points can be configured through:
- **user interface**, for further information, refer to the Configuration Menu *(see page 83)*.
- **remote configuration using a PC**
  - Configuration of ZBRN2 through DTM, for further information, for more information refer to the Configuration *(see page 97)*.
  - Configuration of ZBRN1 through DTM or web pages, for more information, refer to the DTM Configuration *(see page 97)* and Web Pages.

Architectures

Modbus Serial Line

Architecture Example for ZBRN2 Access Point

BACnet or Modbus TCP

Expansion Bus

Modbus