

Harmony XB5R

ZBRN1/ZBRN2

User Manual

12/2014



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

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

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

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

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

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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” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.



This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

WARNING

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

CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result in** minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury.

PLEASE NOTE

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction and operation of electrical equipment and its installation, and has received safety training to recognize and avoid the hazards involved.

About the Book



At a Glance

Document Scope

This documentation is a reference for the Harmony XB5R wireless and batteryless push-buttons used with the 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 push-buttons, 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 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 push-buttons.

The technical characteristics of the devices described in this document 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. <ul style="list-style-type: none">• Do not include blank spaces in the model number/product range.• To get information on 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 may 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 Push-button	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.

Chapter 1

Introduction

Offer Description

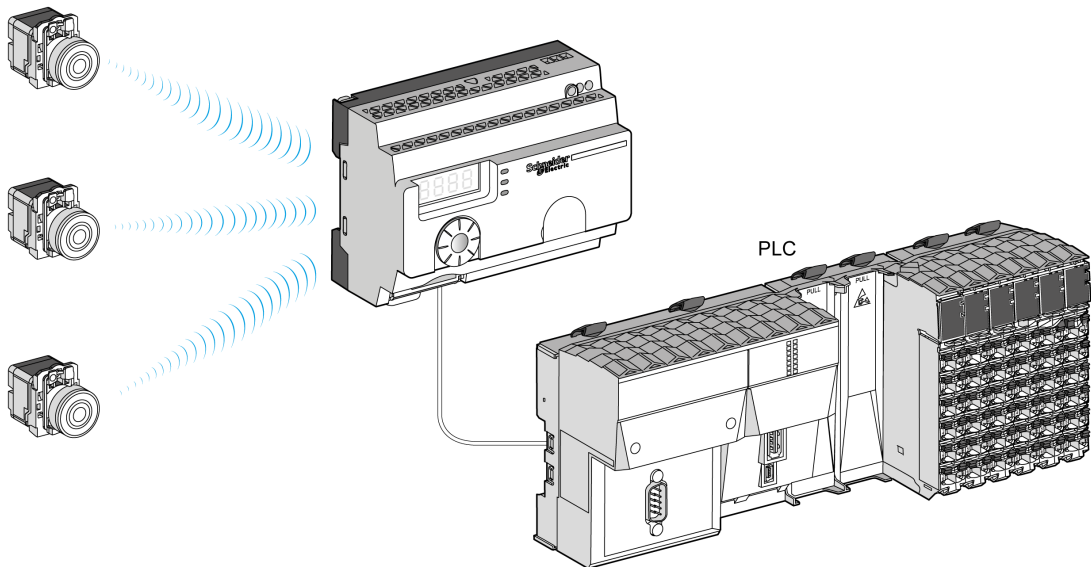
Overview

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

It has a wide range of industrial and building applications. For example, in packing lines, automatic doors in logistic centers, manufacturing of vehicles in automotive industries, for bag filling in cement industries, and for efficient use of power in office lighting.

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 the Harmony batteryless and wireless push-button offer based on radio technology.

The following figures show some examples of transmitters:

Example 1: Push-button with a plastic head



ZB5RTA1

Example 2: Push-button with a metal head



ZB4RTA3

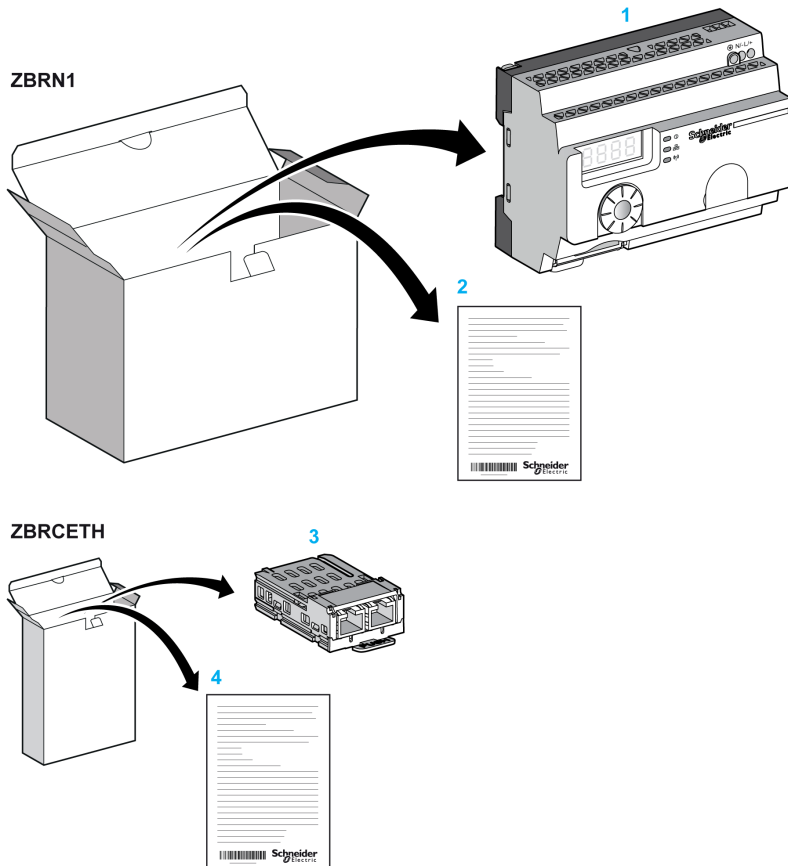
Example 3: Push-button with a plastic head enclosed in a handy box



ZB5RTA3 + ZBRM01

Product References

ZBRN1: Standard Access Point with Communication Module

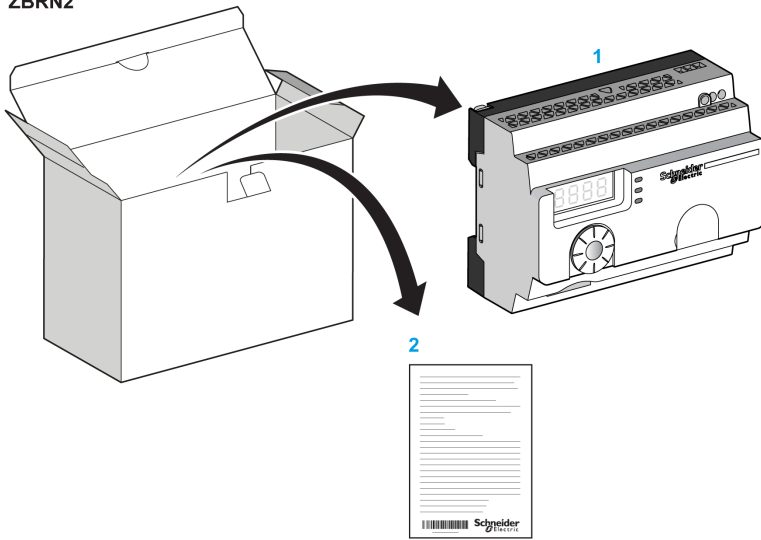


- 1 Access point
- 2 Instruction sheet (ZBRN1)
- 3 Communication module
- 4 Instruction sheet (ZBRCETH)

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 a Modbus serial line, whereas ZBRN1 can support different protocols using a communication module.

Chapter 2

Physical Description

Purpose

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

What Is in This Chapter?

This chapter contains the following sections:

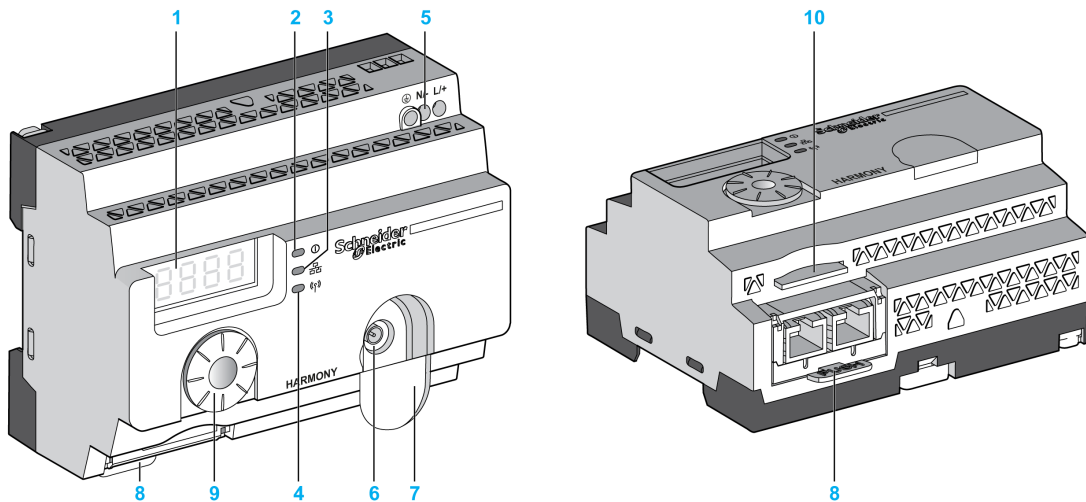
Section	Topic	Page
2.1	Product Overview	16
2.2	Installation	18
2.3	Specifications	31
2.4	Data Management	34

Section 2.1

Product Overview

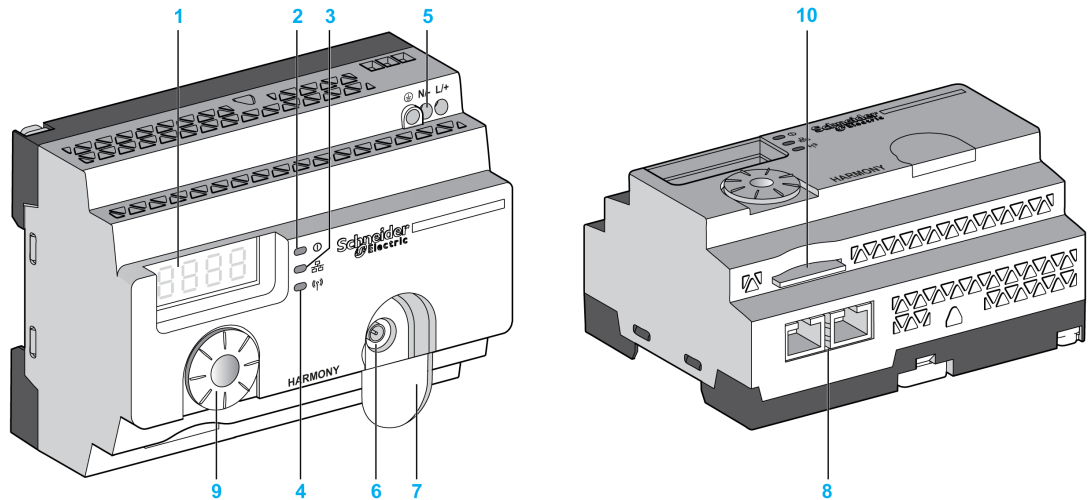
Hardware Description

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 Connector for the optional external antenna
- 7 Protective plug for the connector for the optional external antenna
- 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 Connector for the optional external antenna
- 7 Protective plug for the connector for the optional external antenna
- 8 2 RS-485 Modbus serial line connectors
- 9 Jog dial
- 10 SD memory card slot

Section 2.2

Installation

What Is in This Section?

This section contains the following topics:

Topic	Page
Installation Requirements	19
Mechanical Installation	26
Environmental Features	28
Housing	30

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 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.

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

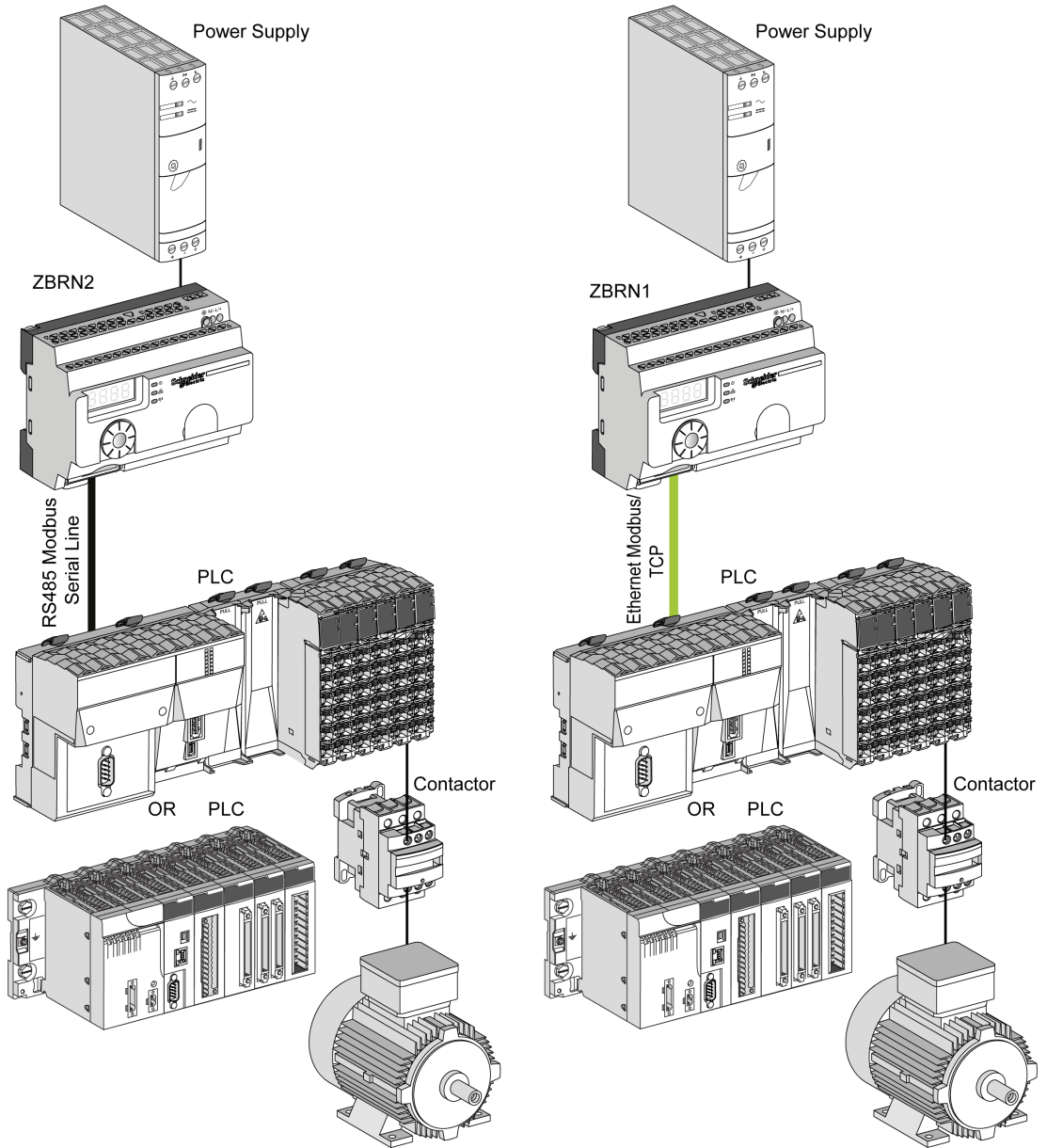
UNINTENDED EQUIPMENT OPERATION

- Use appropriate safety interlocks where personnel and/or equipment hazards exist.
- Install and operate this equipment in an enclosure appropriately rated for its intended environment.
- Do not use this equipment in safety critical and hoisting machine functions due to:
 - No permanent communication
 - No acknowledge of the message from the receiver to the transmitters.
- 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

The following figure shows the general principle of the access point architecture:



NOTE:

- The previous figure is not exhaustive. It shows only the general principle of the architecture.
- Refer to the specifications section ([see page 31](#)) for detailed wiring diagram and instructions for the access points.
- Refer to the user manual of your associated products for detailed wiring diagrams and instructions.
- The access point can be connected to any PLC supporting the network buses listed in this document.

Connection Requirements

Power Supply Connection

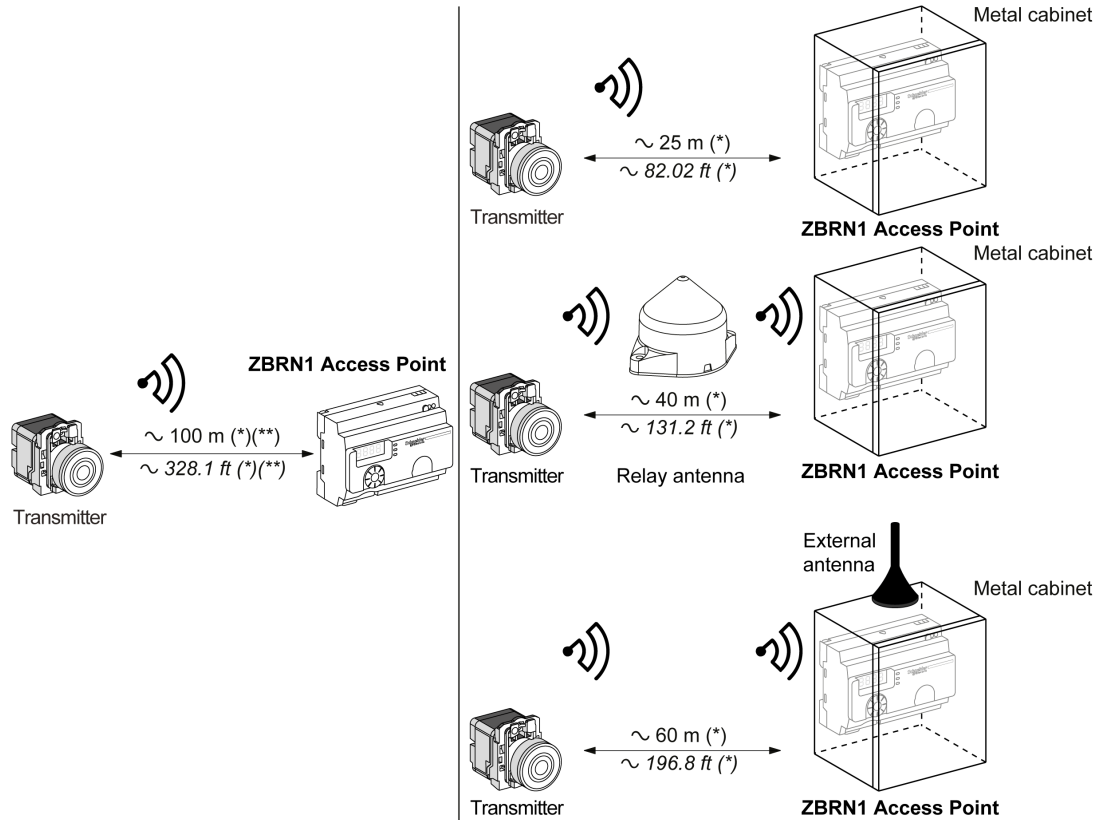
24...240 Vac/Vdc

Network connection

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

Maximum Distances

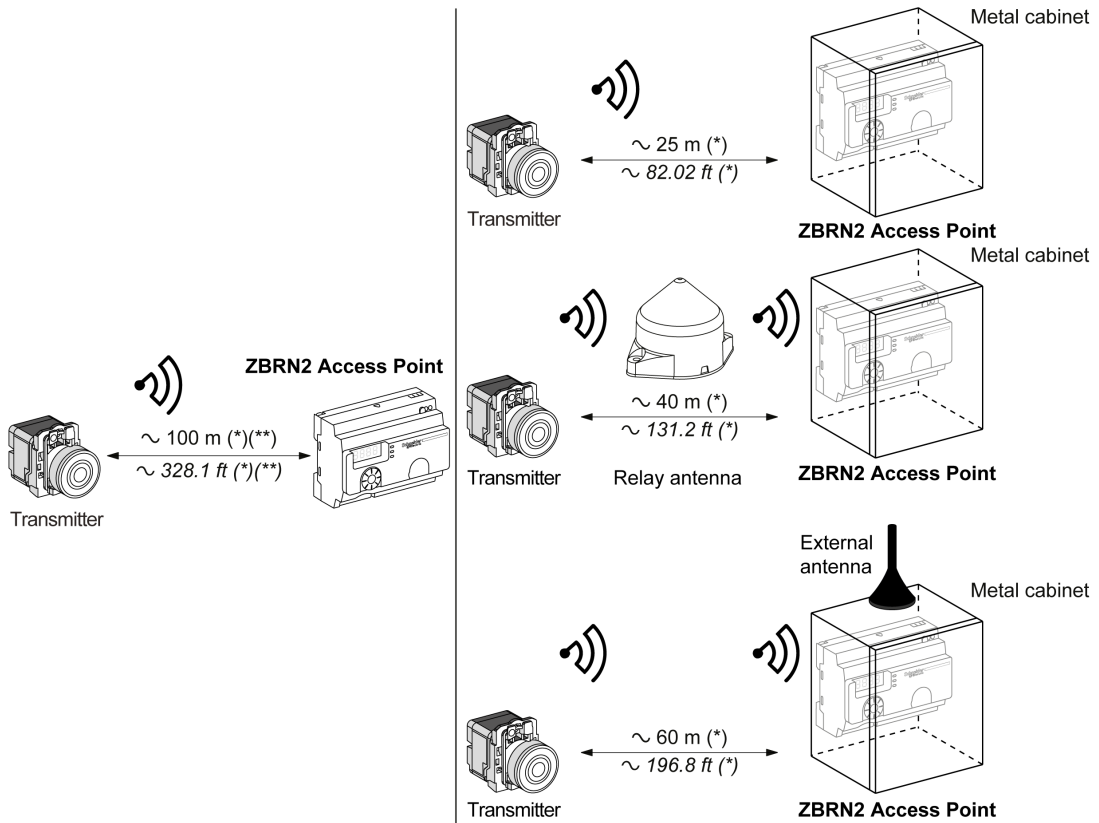
The following figure shows the maximum distance between the transmitters and the ZBRN1 access points:



(*) The application environment can modify the typical values.

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

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:

Material	Attenuation
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 ([see page 71](#)).

Impact of the radio performances in the environment:

- For any environment, the radio performances are subjected to be instable due to perturbations made by any kind of industrial machines, processes, or electronic devices.
- As a consequence at any time, it is possible that the radio frames sent by a transmitter will not be caught by the receiver during the perturbation.
- With Harmony XB5R offer, only one radio frame is sent to the receiver, there is no permanent radio communication. This reason prevents the use of Harmony XB5R offer for applications where permanent reliability and/or permanent precisions are needed.

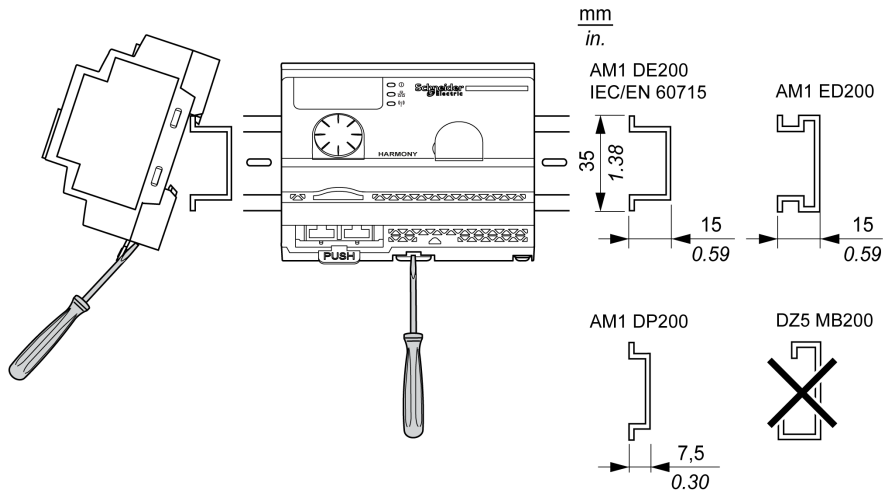
Mechanical Installation

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:

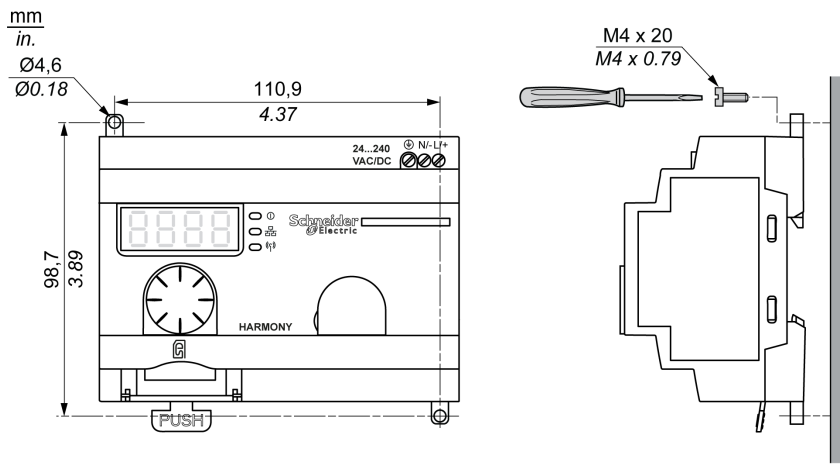


Mounted on a Grid or Plate

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

Specifications

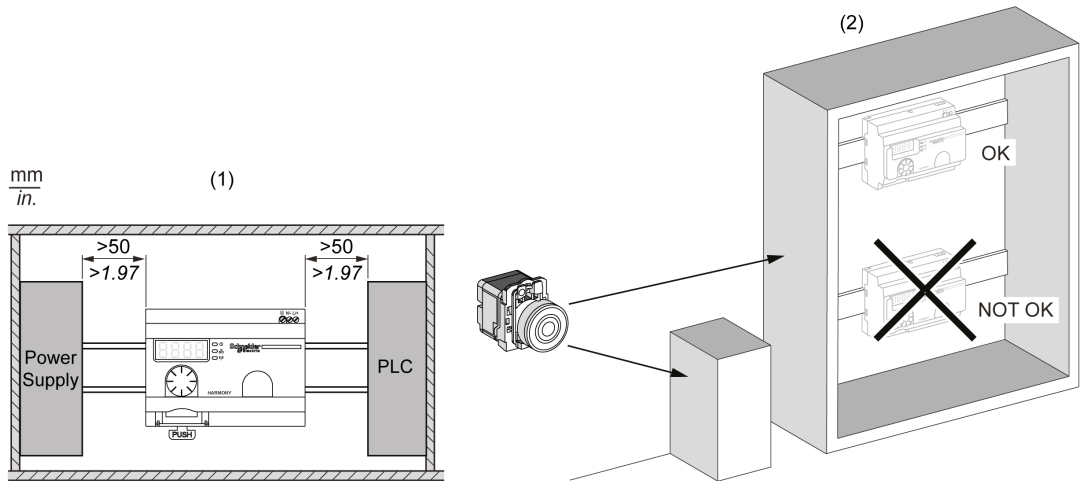
The table below shows the general environmental specifications:

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, observe 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.

Section 2.3

Specifications

Electrical Specifications

Power Supply Specifications

The access point should comply with the following power requirements:

Electrical Features	Description	
	AC Power Supply	DC Power Supply
Rated voltage	24...240 Vac	24...240 Vdc
Voltage range	21...264 Vac	21...264 Vdc
Rated frequency	50/60 Hz	–
Frequency range	47...63 Hz	–
Under voltage protection	No	No
Terminal blocks	3-pin terminal with a pitch of 7.62 mm (0.3 in.) 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 (internal fuse 2 A, 250 V)	
* PE = protective earth ground		

Power Supply Connections

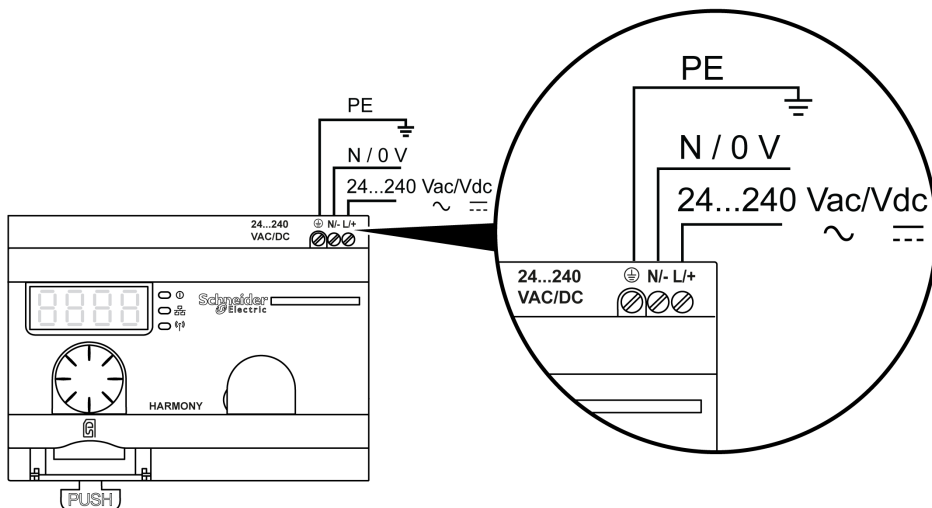
You can connect the power supply to any common supply from 24...240 Vac/Vdc.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

Comply with the wiring diagram shown immediately after this message.

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





The table below shows the recommended wire sizes for the L/+ and N/- terminals:

$\frac{6}{0.24}$ 				
mm ²	0,75	0,75...2,5	1...4	1...1,5
AWG	18	18...14	17...12	17...16

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

$\frac{6}{0.24}$ 		
mm ²	0,75...4	0,75...4
AWG	18...12	18...12

The table below shows the recommend torque for the 3 terminals:

 \varnothing 3,5 mm / 0.14 in.		N·m	0,35 ± 0,05
		lb-in	3.10 ± 0.44

WARNING

UNINTENDED EQUIPMENT OPERATION

For the protective earth ground (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 below shows the input power consumption:

Reference	Input Power
ZBRN1	9 W
ZBRN2	3.3 W

WARNING

UNINTENDED EQUIPMENT OPERATION

- Supply this product with a power line protected by a circuit breaker rated 16 A maximum and a ground fault circuit breaker.
- A readily accessible disconnect device shall be incorporated external to the equipment.
- 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.

Section 2.4

Data Management

What Is in This Section?

This section contains the following topics:

Topic	Page
Compatibility Rules	35
Transmitter Types	36
Monostable Input	38
Set/Reset	39

Compatibility Rules

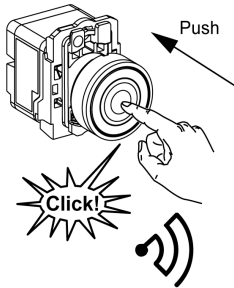
Transmitter Compatibility

ZBRT2 transmitter is compatible with the following only:

- ZBRR• receivers with firmware version 2.0 and higher
- ZBRA1 relay antenna with firmware version 2.0 and higher
- ZBRN• access points with firmware version higher than 1.2

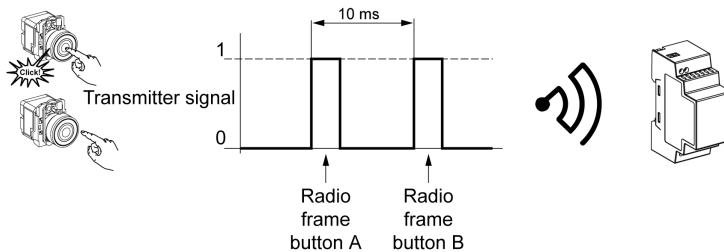
Transmitter Types

ZBRT1 and ZBRTP Transmitters



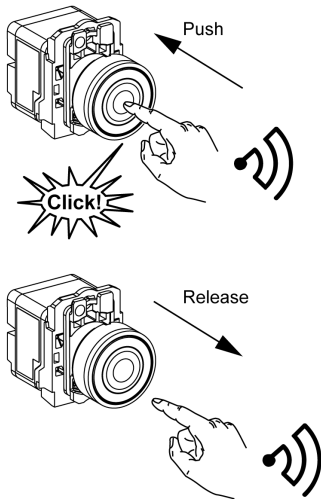
The radio message is sent when the button is pressed, signalled by a click. If the button is held down, the message is not transmitted continuously. The message is not sent when the button is released.

To avoid any conflict of multiple transmission from different transmitters, a minimum of 10 ms is required between each radio transmission.



ZBRT1 is used for applications where single pulse is required (for example, remote start of machine and reset after machine fault).

ZBRT2 Transmitter



The radio message is sent when the button is pressed, signaled by a click. If the button is held down, the message is not transmitted continuously.

A second radio message is sent when the button is released. This message is not transmitted continuously. It is transmitted once, at the release of the push-button.

This transmitter is used only for the set/reset output mode.

Monostable Input

Principle

The transmitter is equipped with a dynamo generator that converts 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.

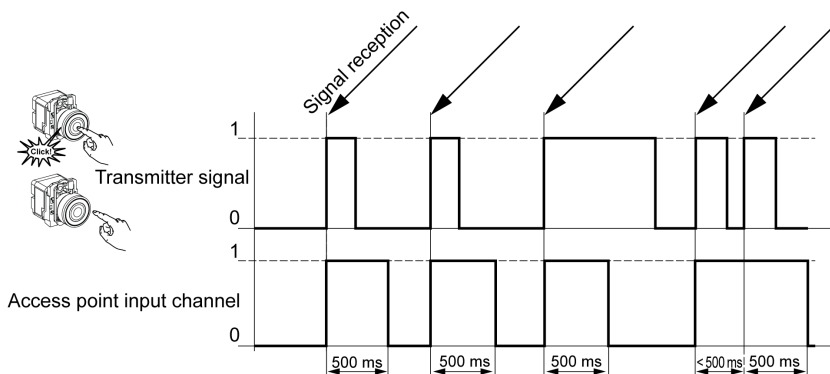
The radio signal is transmitted when the push-button is pressed. This action is indicated by a click in the example shown below. If the button is held, the signal is not transmitted continuously. No signal is sent when the button is released.

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.

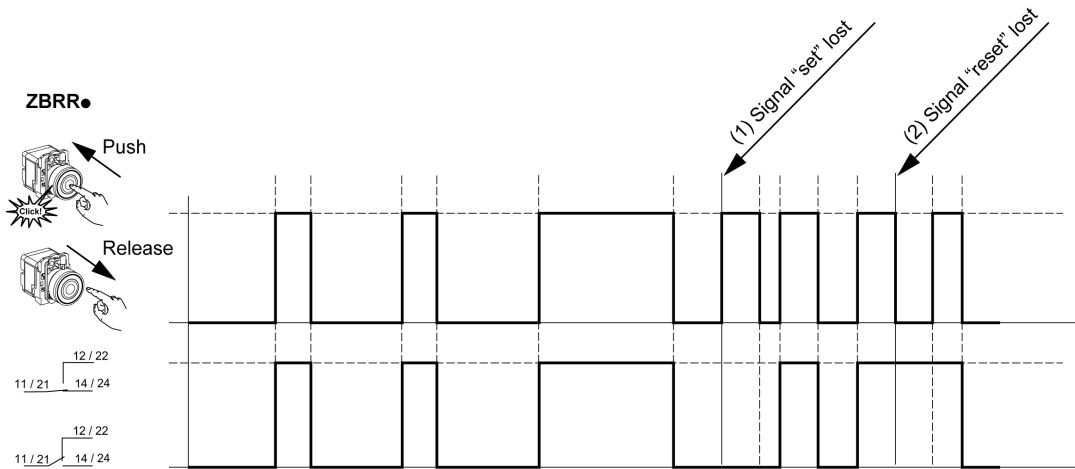
Example

The following figure shows an example of a monostable channel with the input holding time of 500 ms:



Set/Reset

Push-button Set/Reset



NOTE:

1. Release and push again to resynchronize
2. Push and release again to resynchronize

Chapter 3

ZBRN2 Modbus Serial Line Communication

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:

Topic	Page
Communication on the Modbus Network	42
Communication and Status Indicator	45
Modbus Serial Line Cabling	46
Modbus Settings and Supported Functions	48
Memory Mapping	50
Modbus Serial Line Cables	55

Communication on the Modbus Network

Introduction

The Modbus protocol is a master-slave protocol. It allows a single master to request responses 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 requests addressed to them individually. The slaves do not return responses to broadcast requests from the master.

⚠ WARNING

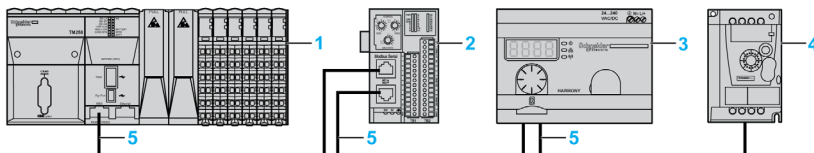
RISK OF UNINTENDED EQUIPMENT OPERATION

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.

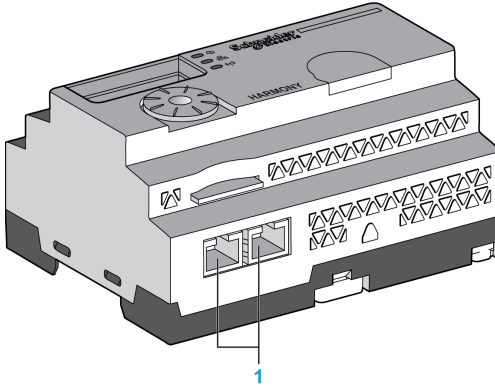
Network Connection



- 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.

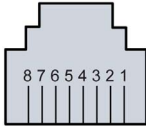
The table below shows the specifications of ZBRN2 :

Features	Specification
Function	Modbus slave and Modbus RTU
Plug	2 RJ45 connectors
Isolated	Yes
Maximum cable length	1000 m (3280.83 ft)
Polarization	No
Supported baud rates	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.

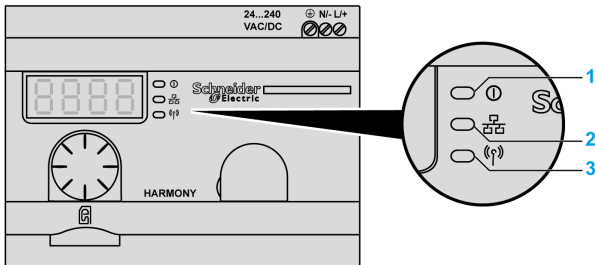
The following figure shows the layout of RJ45 connector:



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

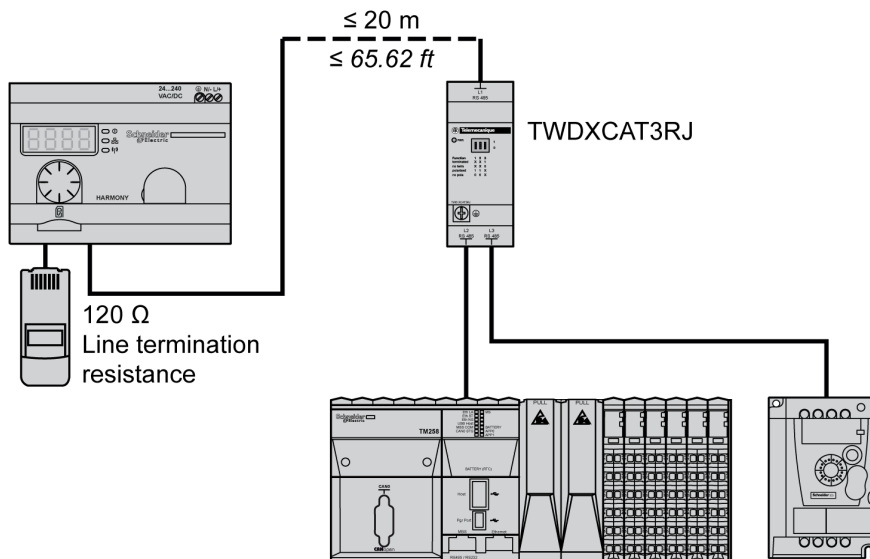
The yellow Modbus communication LED shows the following status:

- On/flashing: Data is being exchanged (depends on the quantity of information).
- Off: No data is being exchanged.

Modbus Serial Line Cabling

Network Connection

You can directly connect the access point to a PLC for a distance up to 20 m (65.62 ft) as shown in the following figure:



⚠ WARNING

UNINTENDED EQUIPMENT OPERATION

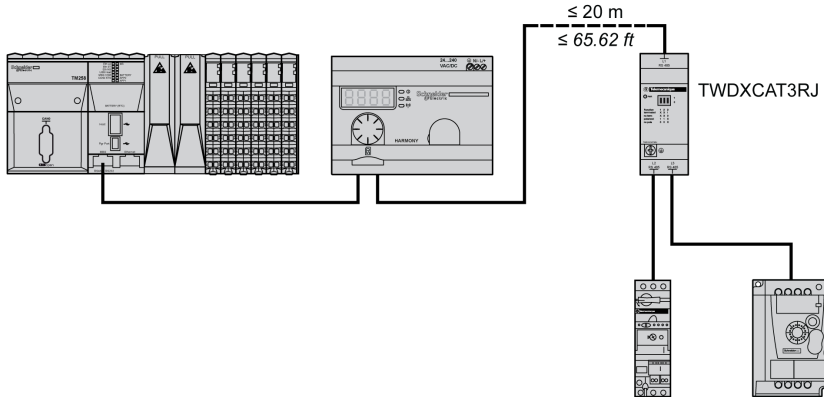
- Use a Modbus serial line cable not longer than 20 m (65.62 ft).
- Add a 120 ohm termination line when the access point is located at the end of the Modbus serial line (reference VW3A8306RC).

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

Using TWDXCAT3RJ

TWDXCAT3RJ is used for 3 connections, polarization, and line termination.

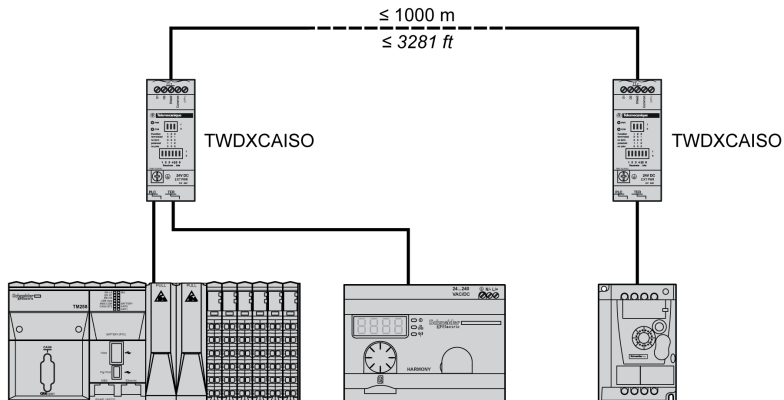
The following figure shows the connection of the device on the bus using TWDXCAT3RJ:



Using TWDXCAISO

TWDXCAISO is used for isolation and line termination.

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



For distances longer than 20 m (65.62 ft), verify that the other devices connected to the bus are isolated. If other devices are not isolated, use the TWDXCAISO 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 below shows 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 below shows 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 one or more contiguous coil statuses in a slave.

Reading holding registers (03):

This function code is used to read the content of one 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 one 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 below 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.
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 according to the IEC %MW standard format.

For access to Modbus registers, 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 16 bits.

Input Channels

Register Address	Name	Access Type	Input Channel	Channel Status	Description
0	Input register 1	R	0...15	0: Off 1: On	Stores the status (0 or 1) of input channels from 0 to 15.
1	Input register 2	R	16...31	0: Off 1: On	Stores the status (0 or 1) of input channels from 16 to 31.
2	Input register 3	R	32...47	0: Off 1: On	Stores the status (0 or 1) of input channels from 32 to 47.
3	Input register 4	R	48...59	0: Off 1: 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. One bit is assigned for one 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. One bit is assigned for one 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. One bit is assigned for one 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. One bit is assigned for one 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: 100 ms 1: 200 ms 2: 300 ms 3: 400 ms 4: 500 ms 5: 1 s	Stores the holding time for all the input channels.
6100–6159	Teaching list	RW	0–59	Bit 0 to 7: 0: The channel is disabled. 1: The type 1 transmitter is used. Bits 8 to 15 are not used.	Stores the type of transmitter used. Type 1: Wireless batteryless push-button (ZBRT1).
6160–6399	Reserved	–	–	–	–
6400–6519	Transmitter ID/MAC addresses	RW	0–59	srcID0: First byte of the MAC address. srcID1: Second byte of the MAC address. srcID2: Third byte of the MAC address. srcID3: 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:

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

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

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

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

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

Module Diagnostics

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: The device is not being configured through the user interface. 1: The device is being configured through the user interface.	Stores the configuration status of the device.
R: Read only. RW: Read and write.				

Register Address	Name	Access Type	Status	Description
4004	Detected error	R	<p>0: There is no detected error. 1: The SD card cannot be accessed. 2: The SD card is write protected. 3: There is not enough space in the SD card. 4: An invalid communication configuration file. 5: An invalid device configuration file. 6: More than 1 configuration file is available in the SD card.</p> <p>NOTE: Only 1 configuration file should be available in the appropriate directory of the SD card (see page 140).</p> <p>7: The configuration file is not available in the SD card. 8: The watchdog reset device. 9: Detection of a radio communication error. 10: Detection of a radio chip error. 11: The access point does not support the communication module. 12: The communication module is not responding. 13: The communication module is not present in the access point. 14: Duplicate IP address. 15: Invalid IP address.</p>	Stores the code of the detected error.
4006	Radio channel	R	11...26: 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	<p>1: Insufficient signal. 2: Satisfactory signal.</p>	Stores the details of the signal strength.
4008	Radio counter	RW	<p>2 registers to store the double word value. 4008: Stores the most significant word. 4009: Stores the least significant word. The value is incremented each time the access point receives a radio signal from an associated device.</p>	Stores the details of the radio counter.
4009				
<p>R: Read only. RW: Read and write.</p>				

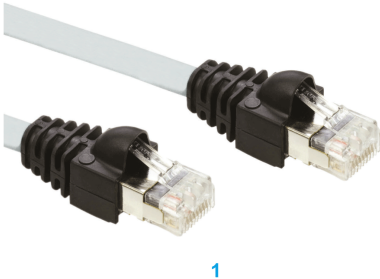
Modbus Serial Line Communication Diagnostics

Register Address	Name	Access Type	Status	Description
5000	Actual baud rate	R	1: 1200 bps 2: 2400 bps 3: 4800 bps 4: 9600 bps 5: 19,200 bps 6: 38,400 bps 7: 115,200 bps	Stores the baud rate at which the data is sent.
5001	Actual frame setting	R	1: The frame format sent is 8 data bits, even parity, and 1 stop bit. 2: The frame format sent is 8 data bits, odd parity, and 1 stop bit. 3: The frame format sent is 8 data bits, no parity, and 2 stop bits.	Stores the data frame format received by the access point.
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 following figure shows the Modbus serial line cable with 2 RJ45 connectors to connect to any device supporting the protocol:



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)

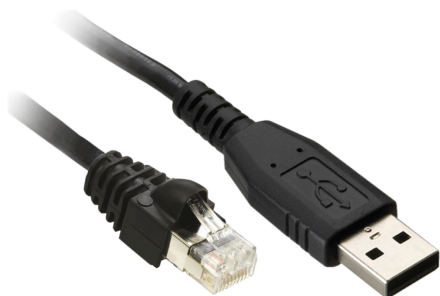
The following figure shows the Modbus serial line cable with 1 RJ45 connector and 1 mini DIN connector to connect to a Twido PLC:



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 following figure shows the Modbus serial line cable with 1 RJ45 connector and 1 USB connector to connect to a PC:



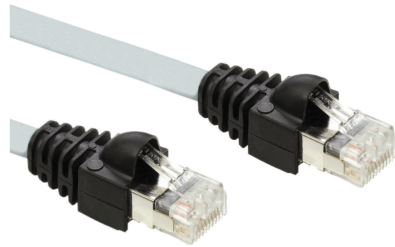
3

Item	Description	Reference	Length
3	Modbus serial line cable	TCSMCNAM3M002P	2.5 m (8.2 ft)

The following figures show USB to RS-485 converter and Modbus serial line cable to connect to a PC:



4a



4b

Item	Description	Reference	Length
4a	USB to RS-485 converter	TSXCUSB485	–
4b	Modbus serial line cable	VW3A8306R03	–

The following figures show USB to RS-485 converter and Modbus serial line cable to connect to a Twido PLC.



5a



5b

Item	Description	Reference	Length
5a	USB to RS-485 converter	TSXCUSB485	–
5b	Modbus serial line cable for Twido PLC	TWDXCARJP03P	–

Chapter 4

ZBRN1 Ethernet Communication

What Is in This Chapter?

This chapter contains the following topics:

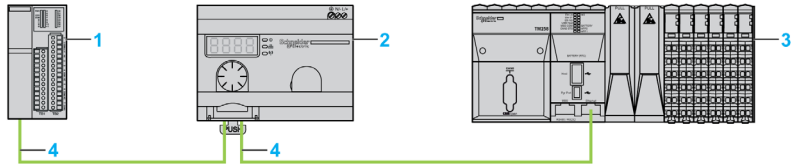
Topic	Page
Communication on an Ethernet Network	60
Addressing Modes	64
Communication and Status Indicator	66
Modbus TCP Settings and Supported Functions	68
Ethernet Cable	69

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

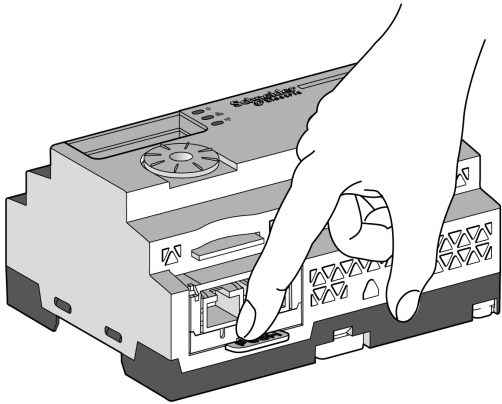
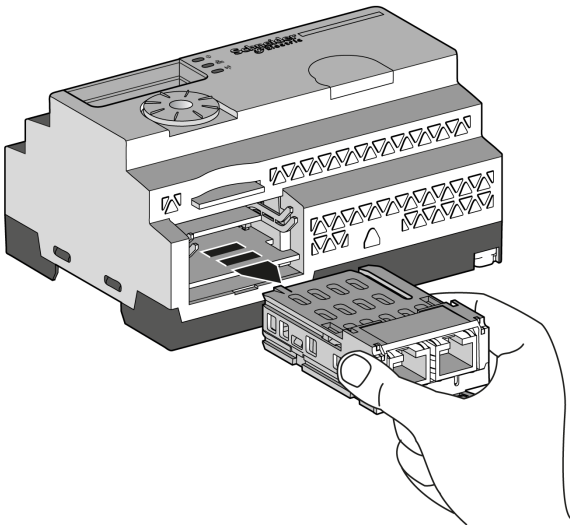
ZBRCETH Communication Module

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 the ZBRN1 access point.
2	Place the module in ZBRN1 access point. <ul style="list-style-type: none">1 ZBRN1 access point2 ZBRCETH communication module
3	Press firmly into place.

The following procedure describes the removal of the communication module:

Step	Action
1	Disconnect all power from the ZBRN1 access point.
2	<p data-bbox="321 282 583 305">Push down the release tab.</p> 
3	<p data-bbox="321 760 513 782">Pull out the module.</p> 

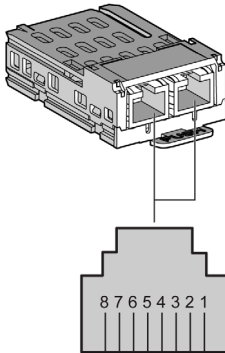
ZBRCETH offers 1 Ethernet communication port equipped with two RJ45 plugs. It enables daisy chain cabling between devices without using a switch.

The table below shows the specifications of the communication module:

Feature	Specifications
Plug	Two RJ45 connectors
Driver	<ul style="list-style-type: none"> ● 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 two RJ45 connectors for Ethernet connectivity as shown in the following figure:



The table below shows the pin details of the 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

Assign the IP address to the access point using one of the following methods:

- By a DHCP (dynamic host control protocol) server.
- By a BOOTP (bootstrap protocol) server (BOOTP zone).
- Using the 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 the Ethernet menu using the jog dial on the access point.	For further information, refer to the IP setting menu (<i>see page 93</i>).
2	Select the DHCP value between 0–159 using the jog dial.	This action defines the device name.
3	Wait 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 the jog dial on the access point.	For further information, refer to the IP setting menu (<i>see page 93</i>).
2	Wait 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 the 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 (<i>see page 93</i>).
2	Wait 10 s.	When the display stops flashing after 10 s, the access point triggers a request for an IP address.

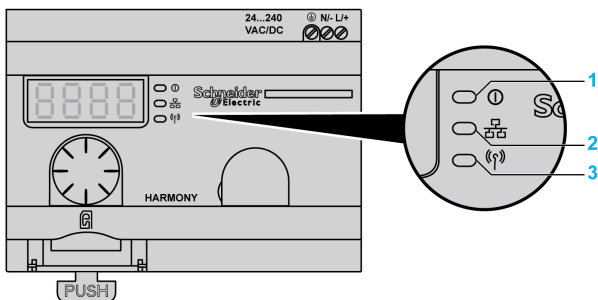
Modbus Unit ID Parameter

Use the PLC with the following UIDs to access the device communication details:

- Use UID 247 to access the Ethernet diagnostics information (ZBRCETH communication module server).
- Use UID 248 or 255 to access the Modbus/TCP registers, such as input registers and holding time (ZBRN1 access point server).

Communication and Status Indicator

Status LED on the ZBRN1 Access Point

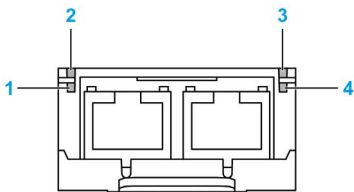


- 1 Power LED
- 2 Communication LED
- 3 Radio signal strength LED

The yellow Ethernet communication LED shows the following status:

- On/flashing: Data is being exchanged (depends on the quantity of information).
- Off: No data is being exchanged.

Status LED on the ZBRCETH Communication Module



The table below shows the Ethernet Modbus/TCP LED status:

Item	Name	LED State	Description	Module State
1	Link/Activity port 1	Solid green	Ethernet link is present at 100 Mbps.	The module is detecting an Ethernet link.
		Flashing green	Ethernet link is present with Ethernet traffic at 100 Mbps.	The module is detecting Ethernet traffic.
		Solid yellow	Ethernet link is present at 10 Mbps.	The module is detecting an Ethernet link.
		Flashing yellow	Ethernet link is present with Ethernet traffic at 10 Mbps.	The module is detecting Ethernet traffic.
2	Module status	Green	On.	The module is turned on.
			Off.	The module is off.
3	Network status	Red	The access point is being turned on.	The module is being turned on.
		Solid green	The network is operating normally.	The module is operating normally.
		4 flashes	A duplicate IP condition exists.	The module is offline.
		5 flashes	The module is attempting to get an IP configuration from BootP server.	The module is sending BOOTP/DHCP requests to a BootP server and awaiting a reply.
		6 flashes	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).
4	Link/Activity port 2	Solid green	Ethernet link is present at 100 Mbps.	The module is detecting an Ethernet link.
		Flashing green	Ethernet link is present with Ethernet traffic at 100 Mbps.	The module is detecting an Ethernet traffic.
		Solid yellow	Ethernet link is present at 10 Mbps.	The module is detecting an Ethernet link.
		Flashing yellow	Ethernet link is present with Ethernet traffic at 10 Mbps.	The module is detecting an 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 48*).

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 (2 x RJ45 connectors, one at each end)	490NTW00002U	2 m (6.6 ft)
		490NTW00005U	5 m (16.4 ft)
		490NTW00012U	12 m (39.4 ft)

Chapter 5

Radio

Radio Receiver

Introduction

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

Radio Receiver Specifications

The table below shows the specifications of the radio receiver:

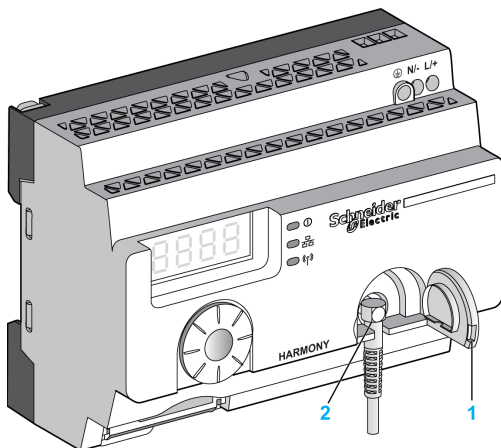
Characteristics	Specifications
Frequency	2.405 GHz (channel 11 IEEE 802.15.4)
Maximum distance	100 m (328.08 ft) (when the access point is in free field)

For more details, refer to Maximum Distances ([see page 23](#)).

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

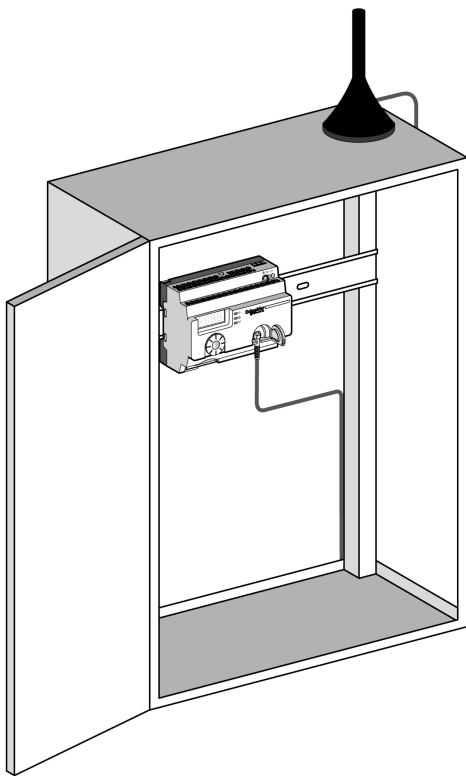
NOTE: Only the ZBRA2 external antenna can be connected to the radio connector.

The table below shows the specifications of ZBRA2 antenna:

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

Mounting Tips for the ZBRA2 External Antenna

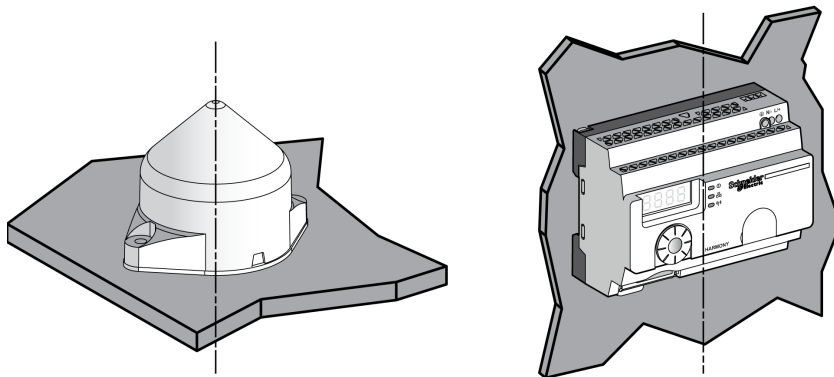
The ZBRA2 external antenna is to be placed on the top of the metal cabinet where the access point is installed as shown in the following figure:



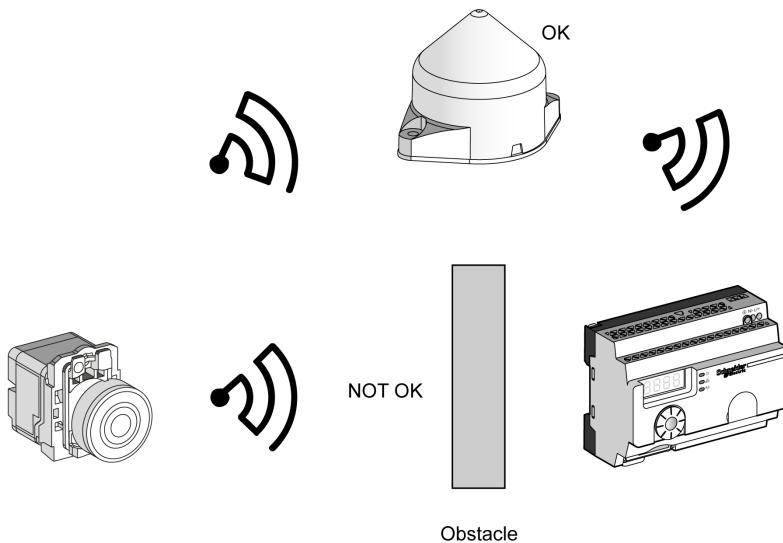
The antenna is equipped with a magnet at the bottom to mount it on the metal cabinet. When the ZBRA2 external antenna is connected to the access point, you can also use the ZBRA1 relay antenna.

Mounting Tips for the ZBRA1 Relay Antenna

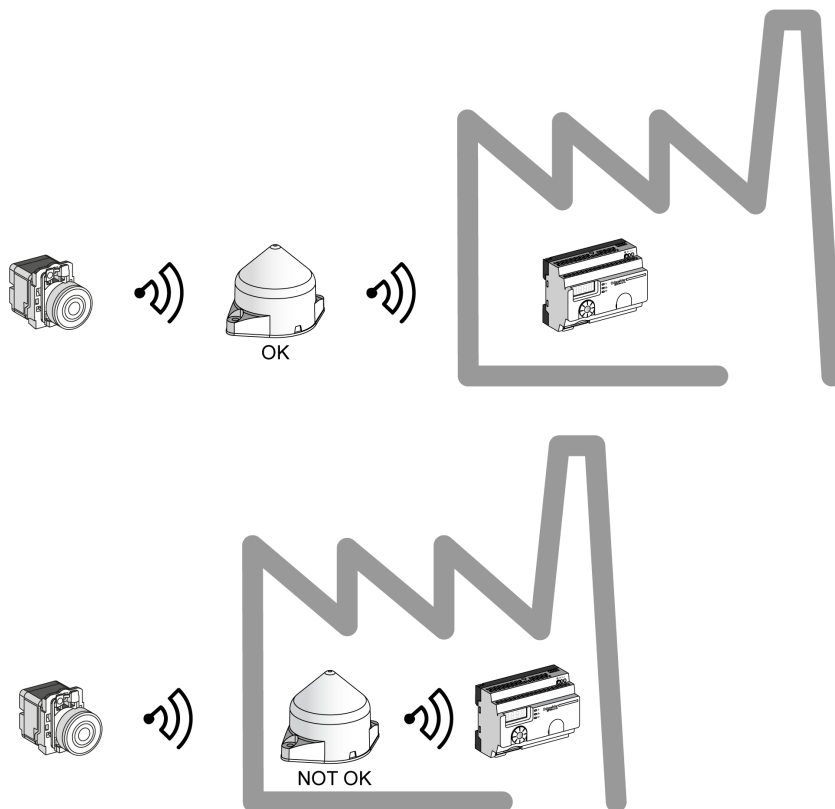
The ZBRA1 relay antenna and the access point are installed with regard to their vertical axis as shown in the following figure:



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:



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

The table below shows the differences between ZBRA1 and ZBRA2:

ZBRA1	ZBRA2
An active antenna (transceiver) for increasing the signal reception.	A passive antenna for increasing the signal reception without saturating the bandwidth.
Repeats the signal received from the transmitter and amplifies it.	Does not repeat the signal received from the transmitter.
Consumes power.	Does not consume power.

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.

Chapter 6

User Interface

What Is in This Chapter?





This chapter contains the following topics:

Topic	Page
Principle	80
Modes	83
Configuration Menu	87
Diagnostic Menu	96
SD Card Menu	98

Principle

Jog Dial Operation

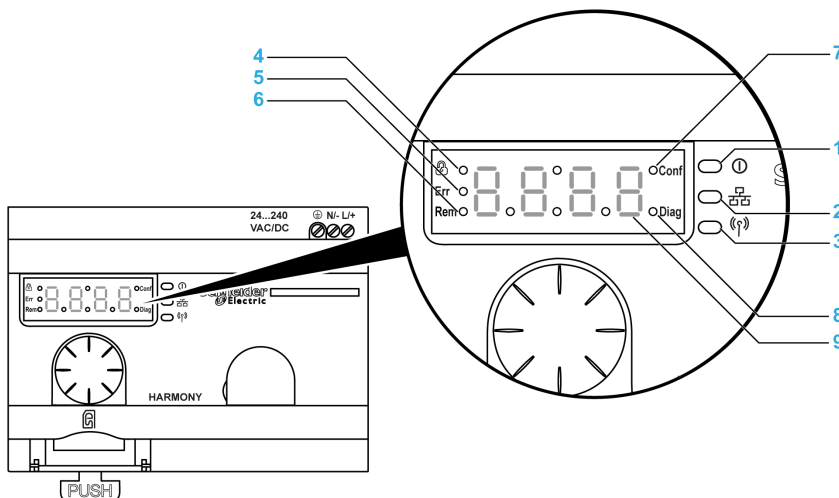
The table below shows the operation of the jog dial:

Input Keys	Function
	Turn the jog dial clockwise/counterclockwise for menu navigation and to increase/decrease the parameter values.
 <p>Single click</p>	Press the jog dial for less than 3 s to validate the parameters entered.
 <p>Double click</p>	Double-click the jog dial to return to the previous menu.
 <p>Long press</p>	Press the jog dial for more than 3 s to return to the Ready mode immediately. When the access point is in the Ready mode, press the jog dial for more than 3 s to lock the user interface. When the access point is locked, press the jog dial for more than 3 s 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 83](#)).

User Interface LEDs

The following figure shows LEDs on the user interface:

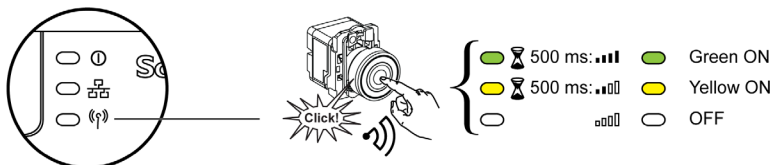


Item	LED	Color	Function
1	Power	Green	On: The unit is turned on. Off: The unit is turned off.
2	Communication	Yellow	Flashing: Communication for the Ethernet or Modbus serial line is detected on the bus. Off: No communication for the Ethernet or Modbus serial line is detected on the bus.
3	Radio signal strength	Green/Yellow	The LED color indicates the strength of the radio signal. See Radio Signal Strength LED (see page 82).
4	Lock	Red	On: The user interface is locked. Off: The user interface is unlocked.
5	Err	Red	On: The access point has detected an error. Off: The access point did not detect an error.
6	Rem	Red	On: The access point is in auto teach mode and is remotely configured by DTM or web. Off: The access point is not remotely configured.
7	Conf	Red	On: Configuration menu is active. Off: Configuration menu is not active.
8	Diag	Red	On: Diagnostic menu is active. Off: Diagnostic menu is not active.

Item	LED	Color	Function
9	Display	Red	Slow flashing: The parameter value can be changed through the jog dial. Fast flashing 3 times: The parameter setting was successful.

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

The normal working state of the access point is **Ready** mode. When the access point is switched on, it displays the protocol (for example, SL for serial line) and the firmware version (for example, 01.00). Then, it switches to **Ready** mode, and the 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, the input/output LED turns on, and the radio signal strength LED indicates the strength of the input signal.

The following figure shows the input status in run mode:



NOTE: The 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 read-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 the jog dial clockwise or counterclockwise to navigate through the different menus while in **Ready** mode.

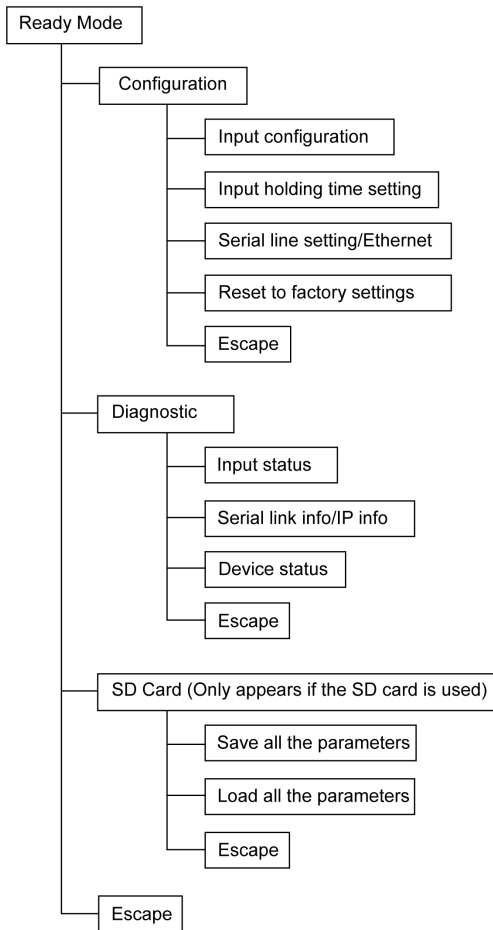
In online auto binding mode, the dedicated LED turns on and the 7 segment LED displays the current binding channel. You can modify the binding channel from the DTM or webpage refer to Teach Screen ([see page 111](#)).

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



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

The following figure shows the menu structure:



The table below shows the properties of the **Configuration** menu:

Menu	Parameters (Can Be Configured)
Input configuration	<p>Allows you to do the following operations:</p> <ul style="list-style-type: none"> ● Auto teach. ● Auto unteach. ● Manual teach. ● Manual unteach. <p>For further information, refer to Input Configuration (see page 88).</p>
Input holding time setting	<p>Allows you to set the input holding time. For further information, refer to Input Holding Time Menu (see page 90).</p>
Serial line settings	<p>Allows you to set the following:</p> <ul style="list-style-type: none"> ● Manual baud rate ● Manual frame format ● Auto baud rate ● Auto frame format <p>For further information, refer to Serial Line Menu (see page 91).</p>
Ethernet Modbus/TCP settings	<p>Allows you to do the following operations:</p> <ul style="list-style-type: none"> ● Select the DHCP mode. ● Select the BOOTP mode. ● Select the static IP mode. <ul style="list-style-type: none"> ● Set the 4 byte IP address. ● Set the 4 byte subnet mask. ● Set the 4 byte gateway address. ● Save the IP address. <p>For more information, refer to IP Setting Menu (see page 93).</p>
Reset to factory settings	<p>Allows you to do the following operations:</p> <ul style="list-style-type: none"> ● Reset the communication parameter to the default value. ● Reset all the parameters to the default value. ● Set the communication parameters. ● Set all the parameters. <p>For further information, refer to Factory Mode (see page 94).</p>

The table below shows the properties of the **Diagnostic** menu:

Menu	Parameters Displayed
Input status	Status of the transmitter.
Serial link information	<ul style="list-style-type: none"> ● Slave ID. ● Baud rate. ● Frame format. <p>For further information, refer to Diagnostic Menu (see page 96).</p>
Ethernet information	<ul style="list-style-type: none"> ● IP address. ● Subnet mask. ● Gateway address. ● MAC address. <p>For further information, refer to Diagnostic Menu (see page 96).</p>
Device status	<ul style="list-style-type: none"> ● Code of the detected error. ● Device reference (ZBRN1/ZBRN2). ● Firmware version. ● Channel. <p>For further information, refer to Diagnostic Menu (see page 96).</p>

The table below shows the properties of the **SD card** menu:

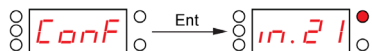
Menu	Parameters
Save all parameters	Allows you to save all the parameters in the SD card. For further information, refer to SD Card Menu (see page 98).
Load all parameters	Allows you to load all the parameters from the SD card. For further information, refer to SD Card Menu (see page 98).

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.

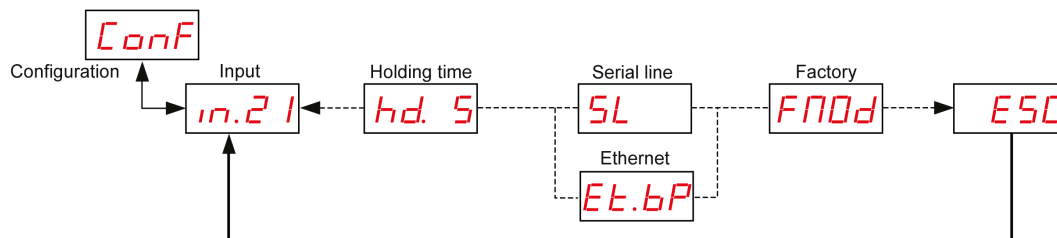
The following figure shows the display screen when **Configuration** menu is active:

















NOTE: In this example, the value 21 represents the total number of configured inputs.

Organization Tree

The following figure shows the **Configuration** menu structure:



Code	Name/Description
<code>Conf</code>	Configuration menu.
<code>in.21</code>	Input menu.
<code>hd.5</code>	Input Holding Time setting menu. In the example, the value 5 means that the holding time is set to 500 ms.
<code>SL</code>	Serial Line setting menu. It appears only in ZBRN2.
<code>Et.bP</code>	IP Setting menu. It appears only in ZBRN1.
<code>FNOd</code>	Factory mode menu. It allows you to reset the device settings to the default factory mode.

Code	Name/Description	Range	Factory Setting
	Displays the channel number which is taught.	0-59	0
	Unteach 1 transmitter.	-	-
	Unteach all the transmitters.	-	-
	Auto teach mode. You can teach the transmitter by pressing the transmitter 3 times.	-	-
	Transmitter taught.	-	-
	Transmitter not taught.	-	-
	The transmitter is already taught. Duplication of MAC addresses is not allowed.	-	-
  	Enter the 4 bytes of the MAC/ID of the transmitter.	-	-
   	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

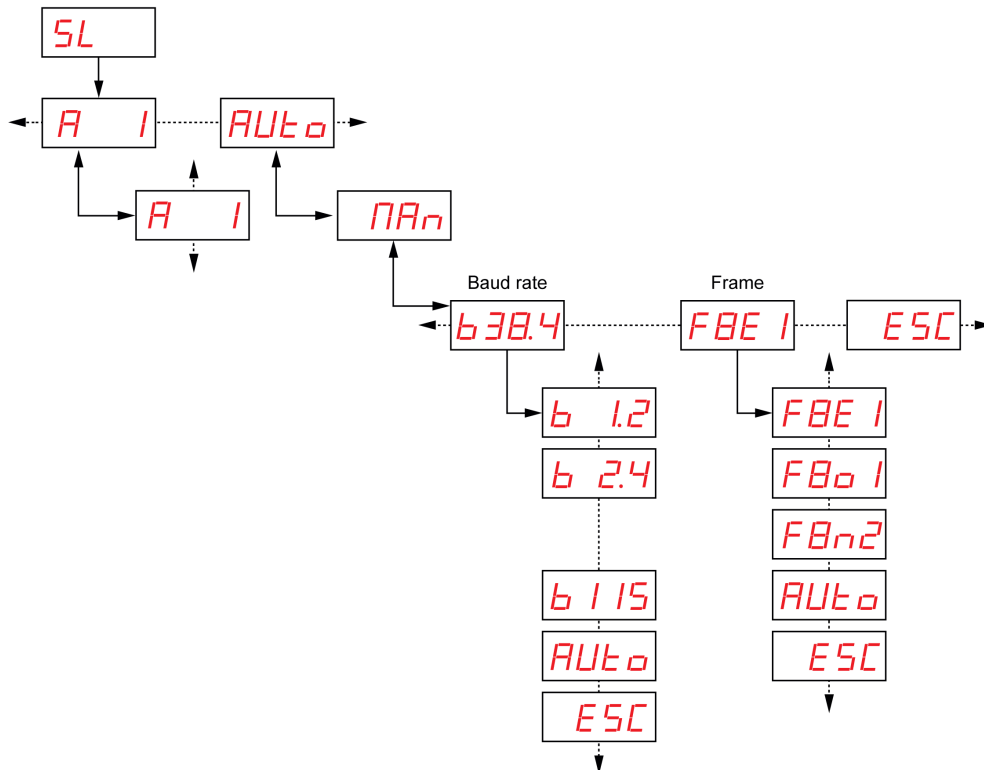
The following figure shows the organization tree of **Input Holding Time** menu:

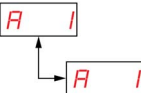






Code	Name/Description	Range	Factory Setting
<div style="border: 1px solid black; padding: 2px; display: inline-block;">hd. 5</div>	Input holding time setting menu.	1 = 100 ms	1 = 100 ms
		2 = 200 ms	
		3 = 300 ms	
		4 = 400 ms	
		5 = 500 ms	
		10 = 1 s	

Serial Line Menu

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

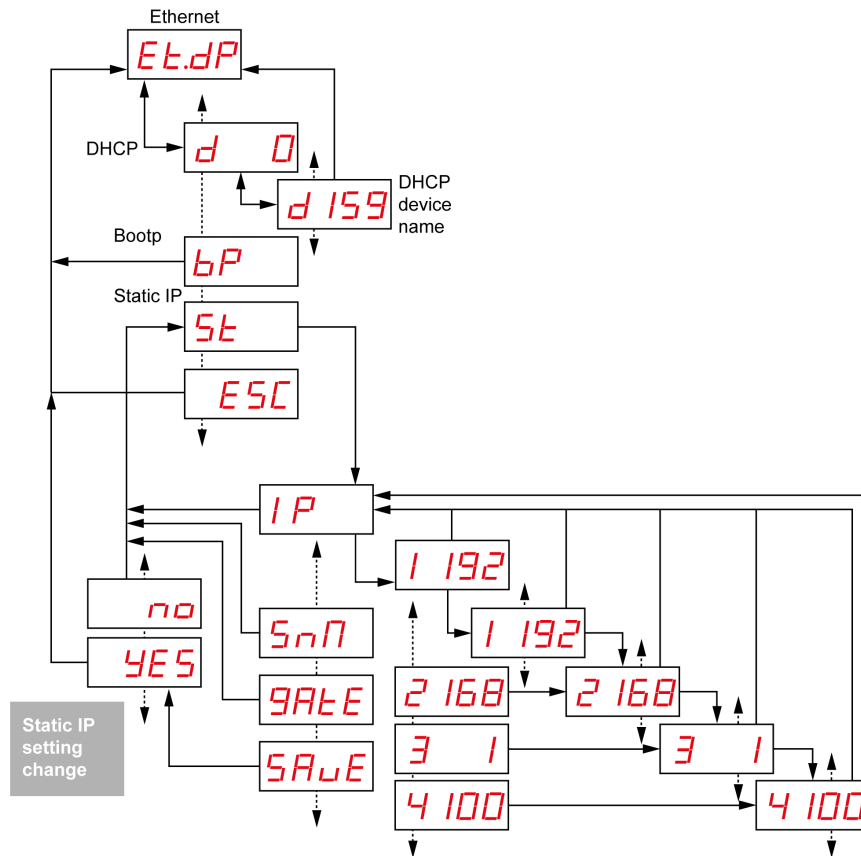


Code	Name/Description	Range	Factory Setting
	Slave address menu. It allows you to set the slave address.	1–247	1
	Enables auto detection mode. All the parameters (baud rate and frame setting) are set automatically.	–	Auto
	Allows you to set the baud rate and frame setting manually.	–	–

Code	Name/Description	Range	Factory Setting
	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	
	Frame setting menu. It allows you to select the frame format from the list.	8e1 = Even parity	Auto
		8o1 = Odd parity	
		8n2 = No parity	

IP Setting Menu

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

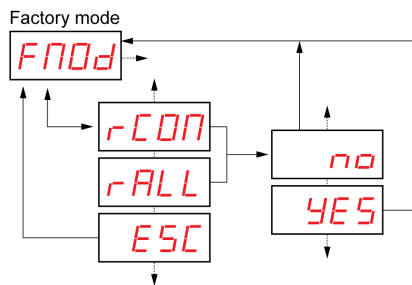


Code	Name/Description	Range	Factory Setting
<code>Et.dP</code>	The access point uses DHCP mode to set the network-specific parameters.		
<code>d 159</code>	In DHCP mode, enter the device name. The access point gets the IP address from the DHCP server. Example: The complete device name is ZBRN1_078 when the value is set to 78.	000–159	000



Code	Name/Description	Range	Factory Setting
<code>Et.bP</code>	The access point uses BOOTP mode to set the network-specific parameters.		
<code>bP</code>	BOOTP mode access point gets the IP address from BOOTP server.	–	–
<code>Et.St</code>	The access point uses static IP mode to set the network-specific parameters.	–	–
<code>St</code>	In static IP mode, the IP address, subnet mask, and gateway are entered manually using the jog dial.	–	–
<code>SnM</code>	Enter the 4 bytes of the subnet address.	–	–
<code>gAtE</code>	Enter the 4 bytes of the gateway address.	–	–
<code>SAUE</code>	Enable the IP address and return to the previous menu.	–	–

Factory Mode

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



Code	Name/Description
<code>rCON</code>	Reset the communication parameters to the default value.

Code	Name/Description
	Reset all the parameter values to default setting.
	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 the **Diagnostic** menu, **Diagnostic** LED turns on.

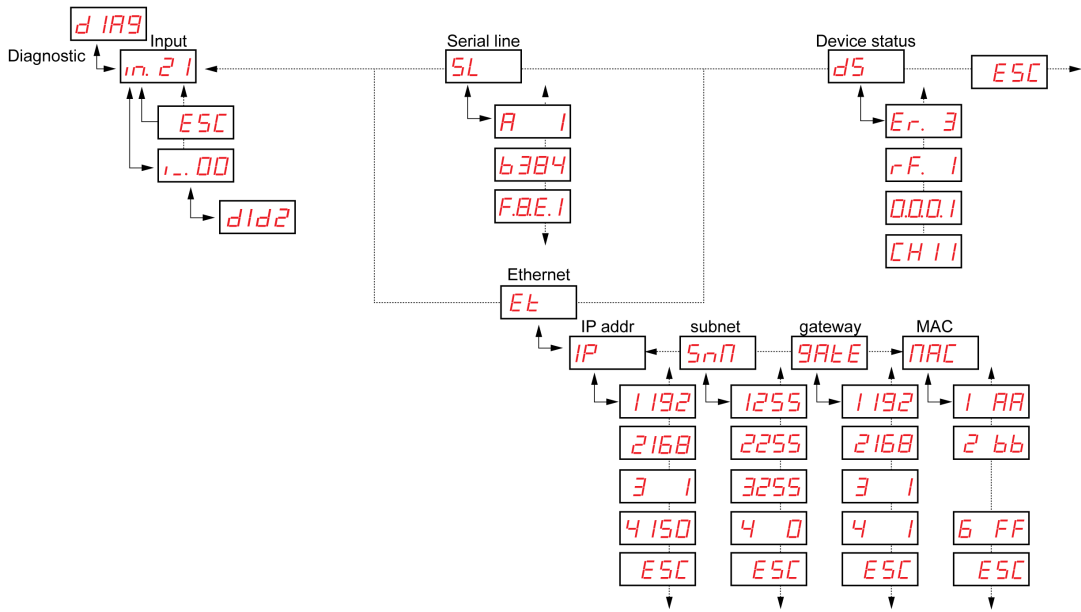
The following figure shows the display screen when the **Diagnostic** menu is active:



NOTE: In this example, the value 21 represents the total number of configured inputs.

Organization Tree

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



Code	Name/Description
d 1A9	Diagnostic menu.

Code	Name/Description
	Displays the binding information, such as the current binding number.
	Displays the serial information: <ul style="list-style-type: none"> ● slave address ● current baud rate ● frame setting
	Displays the IP information: <ul style="list-style-type: none"> ● IP address ● subnet mask ● gateway ● MAC address
	Displays the device status: <ul style="list-style-type: none"> ● code of the detected error ● reference (ZBRN1/ZBRN2) ● firmware version (v00.01) ● channel type <p>NOTE: To clear a detected error, push the jog dial when selecting the code of the detected error parameter.</p>

NOTE: The serial line information menu exists only for ZBRN2. The IP information menu exists only for ZBRN1.

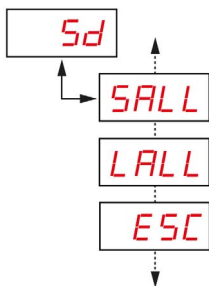
SD Card Menu




Introduction

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

Organization Tree

The following figure shows the SD card menus:



Code	Name/Description
	The SD card setting menu allows you to back up and restore the binding and network parameters.
	Allows you to save all the parameters in the SD card. To validate this parameter, select Yes from the sub-menu.
	Loads all the parameters from the SD card. To validate this parameter, select Yes from the sub-menu.

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

Chapter 7

DTM

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Introduction	100
Configuration	101
Diagnostics	109

Introduction

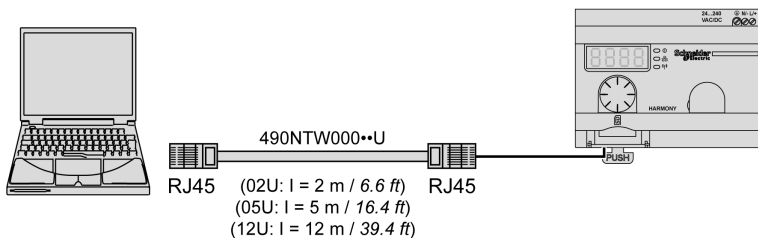
General

The device type manager (DTM) is a part of the field device tool (FDT) standard. The DTM contains an FDT-compliant interface to enable communication with the connected system.

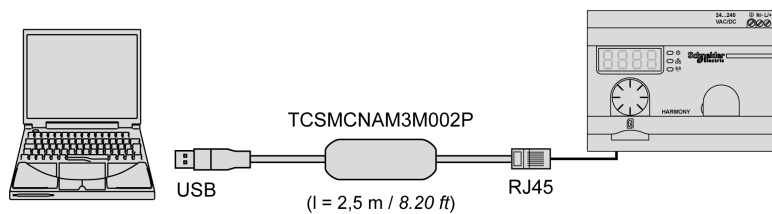
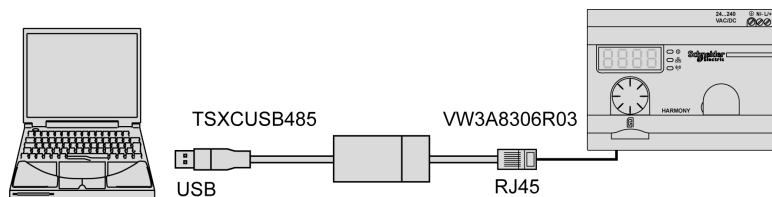
Connection to a PC

To use the DTM feature, connect the PC to the access point.

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



ZBRN2: Connect the access point 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 below shows the communication DTMs and their product references:

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 V3.1 or higher for Modbus serial line, V4.1 SP1 or higher for Ethernet Modbus/TCP**
- **Unity Pro V5.0**

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

Device Module

The following figure shows the offline **Device Module** screen:

Harmony XB5R
Harmony XB5R DTM for wireless access point configuration
1.0.35

Device Module
Teach Screen
Protocol Information
IO Screen

Data not synchronized

Device Information

Reference: ZBRN2
Version: V1.XX
Protocol supported:
Protocol present:

Error: Clear

Device Icon:

RF strength:
Frequency channel:
Radio frames received: Clear

OK Cancel Apply Help

Disconnected Data-set

The table below shows 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 (Green Power) frames received.	Disabled

Parameters	Description	Status
Clear	Clears the signal information and details of the detected error.	Disabled
Error	Displays the code of the detected error.	Disabled

Teach Screen

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

Harmony XB5R
Harmony XB5R DTM for wireless access point configuration
1.0.35

Schneider Electric

Device Module
Teach Screen
Protocol Information
IO Screen

Data not synchronized

Teach List

Clear Import Export Number of channels (total/untaught) 60/60

Channel	Enabled	Type	Radio device identifier
0	<input type="checkbox"/>		
1	<input type="checkbox"/>		
2	<input type="checkbox"/>		
3	<input type="checkbox"/>		
4	<input type="checkbox"/>		
5	<input type="checkbox"/>		
6	<input type="checkbox"/>		
7	<input type="checkbox"/>		
8	<input type="checkbox"/>		
9	<input type="checkbox"/>		
10	<input type="checkbox"/>		

OK Cancel Apply Help

Disconnected Data-set

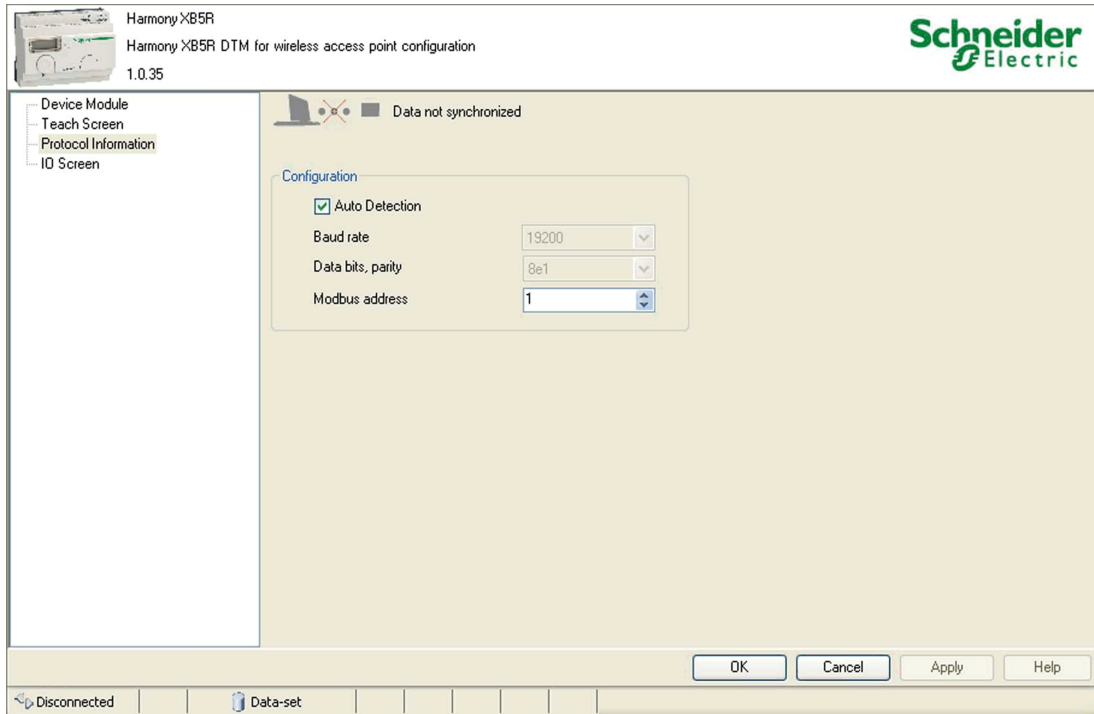
NOTE: The access point supports 60 transmitters (for example: ZBRT1). The **Teach List** contains the radio device identifier of each transmitter.

The table below shows 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 (whether 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 below shows 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	

Parameters	Description	Value	Status
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 screenshot shows the Schneider Electric Harmony XB5R DTM configuration interface. The title bar includes 'Harmony XB5R', 'Harmony XB5R DTM for wireless access point configuration', and the version '1.0.35'. The Schneider Electric logo is in the top right. A left sidebar contains a tree view with 'Device Module', 'Teach Screen', 'Protocol Information' (selected), and 'IO Screen'. The main area displays a 'Configuration' window with the following fields:

- IP addressing method: Stored (dropdown)
- IP address: 192.168.2.150
- Subnet mask: 255.255.255.0
- Device Name: ZBRN1_0 (dropdown)
- Gateway address: 0.0.0.0

At the top of the configuration area, there is a warning icon and the text 'Data not synchronized'. At the bottom right of the configuration area are buttons for 'OK', 'Cancel', 'Apply', and 'Help'. The bottom status bar shows 'Disconnected' and 'Data-set'.

The table below shows 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 number of the ZBRN1 device, which uses same protocol. Example: If the value is set to 78, the complete device name is ZBRN1_078.	000-159	Enabled
Gateway address	Enter the gateway address.	–	Enabled

IO Screen

The following figure shows the offline **IO Screen**:

The screenshot displays the Schneider Electric Harmony XB5R DTM software interface for wireless access point configuration. The top left shows the device image and version 1.0.35. The top right features the Schneider Electric logo. A navigation menu on the left includes Device Module, Teach Screen, Protocol Information, and IO Screen (selected). The main area shows the IO Screen configuration with a grid of 10 inputs (0-9) and 6 rows (00-50). A legend indicates that a white circle represents 'Taught' and a black circle represents 'Untaught'. The input holding time is set to 100ms. A 'Data not synchronized' warning is visible at the top. At the bottom, there are buttons for OK, Cancel, Apply, and Help, and a status bar showing 'Disconnected' and 'Data-set'.

The table below shows the properties of **IO Screen** in offline mode:

Item	Parameters	Description	Values
1	Input	Displays the input status (whether 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 below shows 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 the **Protocol Information** screen.
3. Enter the address parameters (depending on the **IP addressing method**).
4. Select the **Input holding time** from the list in the **IO Screen**.
5. Download the configuration to 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**, **Data bits**, **parity**, and **Modbus address** from the list in **Protocol Information** screen.
4. Select the **Input holding time** from the list in the **IO Screen**.
5. Download the configuration on the access point.

Diagnostics

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 screenshot displays the Schneider Electric DTM software interface for the Device Module screen. The top right corner features the Schneider Electric logo. The main window title is "Harmony XB5R" and the subtitle is "Harmony XB5R DTM for wireless access point configuration" with version "1.0.35". A "Data synchronized" indicator is visible at the top of the main content area.

On the left, a navigation pane lists: Device Module (selected), Teach Screen, Protocol Information, and IO Screen. The main content area includes an "Auto Refresh" checkbox (unchecked) and a "Device Information" section with the following fields:

Reference	ZBRN2
Version	V0.18
Protocol supported	Modbus serial line
Protocol present	Modbus serial line

Below the Device Information section, there is an "Error" field displaying "No error detected" with a "Clear" button. To the right, a "Device Icon" section shows a small image of the device. Further right, there are fields for "RF strength" (Good Signal), "Frequency channel" (11), and "Radio frames received" (1), each with a "Clear" button.

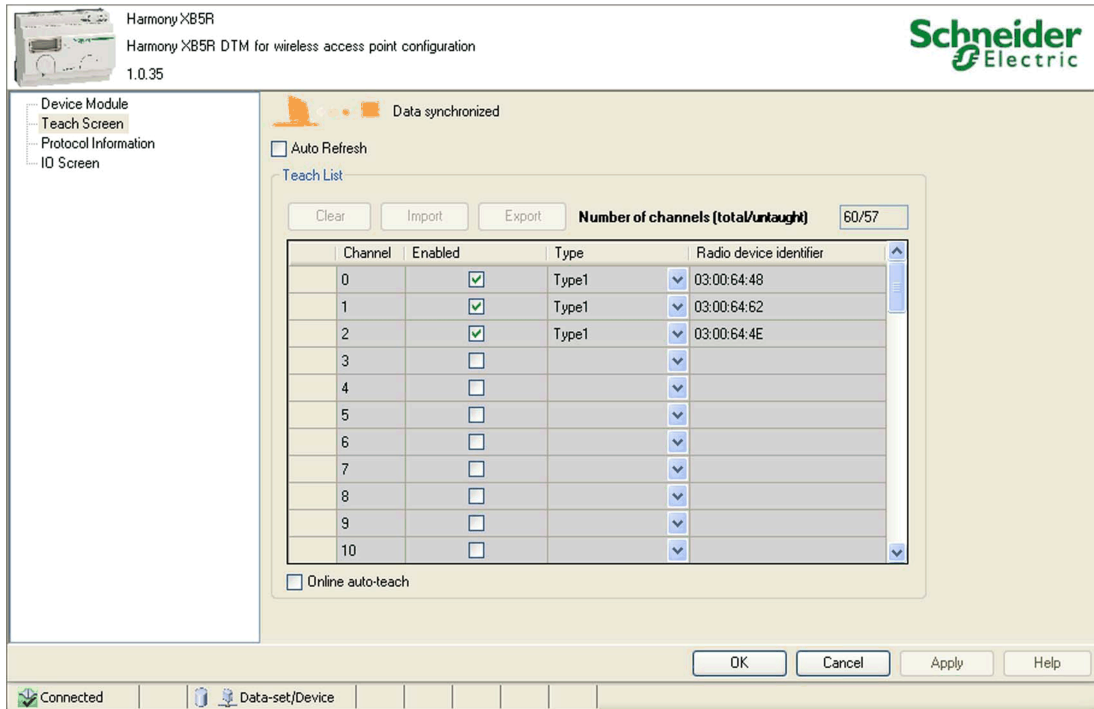
At the bottom of the window, there are "OK", "Cancel", "Apply", and "Help" buttons. The status bar at the very bottom shows "Connected" and "Data-set/Device".

The table below shows 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 (Green Power) packages received.	Enabled
Clear	Clears the signal information and detected error details.	Enabled
Error	Displays the code of the detected error.	Enabled

Teach Screen

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

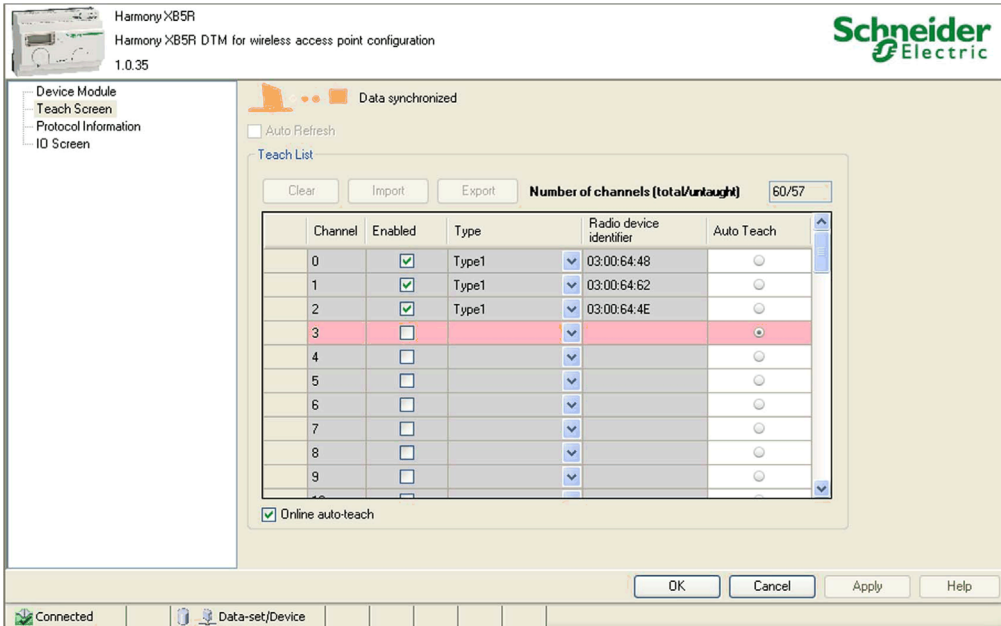


The table below shows the properties of the online **Teach Screen**:

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 (whether taught or not).	Disabled
Type	Displays the device type.	Disabled
Radio device identifier	Displays the identifier of the radio device.	Disabled

Parameters	Description	Status
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:

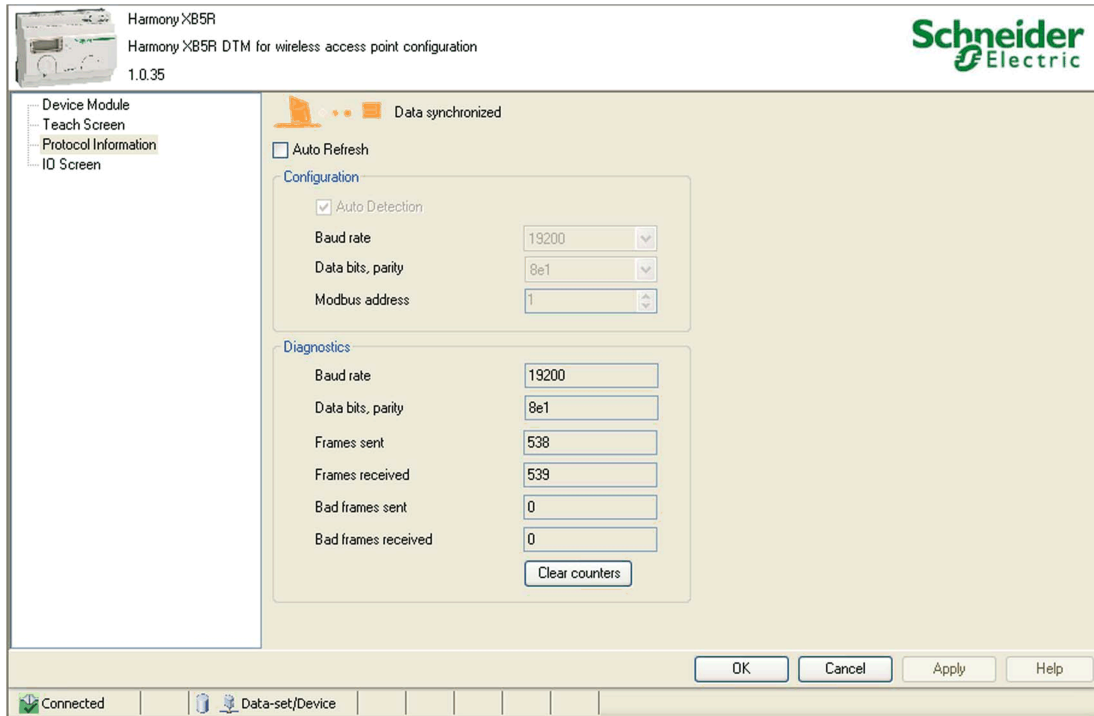


Auto teach features are as follows:

- Check the **Online auto-teach** checkbox. The active channel is highlighted with the 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 below shows the properties of the **Configuration** information of the 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 below shows 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 (Green Power) frames sent.	Enabled
Frames received	Displays the number of GP (Green Power) 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:

Harmony XB5R
Harmony XB5R DTM for wireless access point configuration
1.0.35

Device Module
Teach Screen
Protocol Information
IO Screen

Data not synchronized

Auto Refresh

Configuration

IP addressing method: Stored | Device Name: ZBRN1_ | Gateway address: 0 . 0 . 0 . 0

IP address: 192 . 168 . 2 . 150

Subnet mask: 255 . 255 . 255 . 0

Diagnostics

Ethernet status: Ready | IP address: 192 . 168 . 2 . 150

MAC address: 00-C0-B7-C5-6A-7B | Subnet mask: 255 . 255 . 255 . 0

Port 1 status: 10M | Gateway address: 0 . 0 . 0 . 0

Port 2 status: 10M

Channel	Protocol	Client IP	Client port	Local port	Transmitted	Received	Transmission errors
0	MB TCP	192.168.2.1	4435	502	3	3	0
1	MB TCP	192.168.2.1	4436	502	3	4	1

Clear counters

OK Cancel Apply Help

Connected | Data-set/Device

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

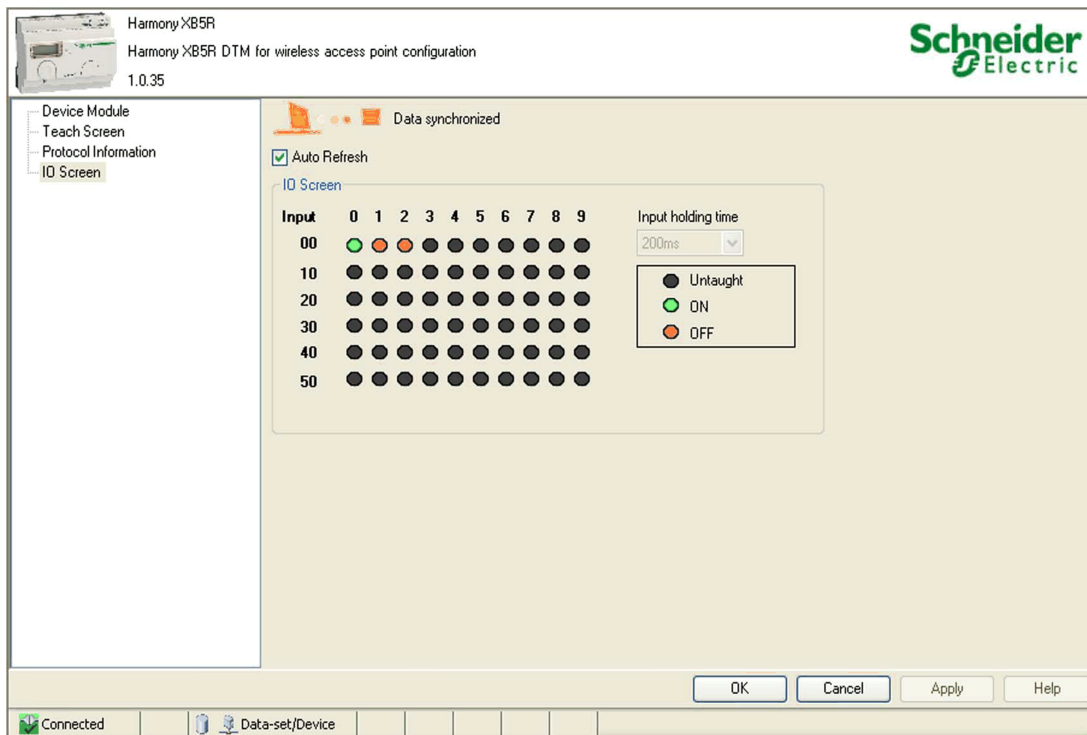
Parameters	Description	Status
IP addressing method	Displays the selected IP addressing method.	Disabled
IP address	Displays the selected IP address.	Disabled
Gateway address	Displays the selected gateway address.	Disabled
Device Name ZBRN1_	Displays the number of devices, which uses same protocol information.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

The table below shows 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 a detected error.	Enabled

IO Screen

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



The table below shows the properties of the **IO Screen** in online mode:

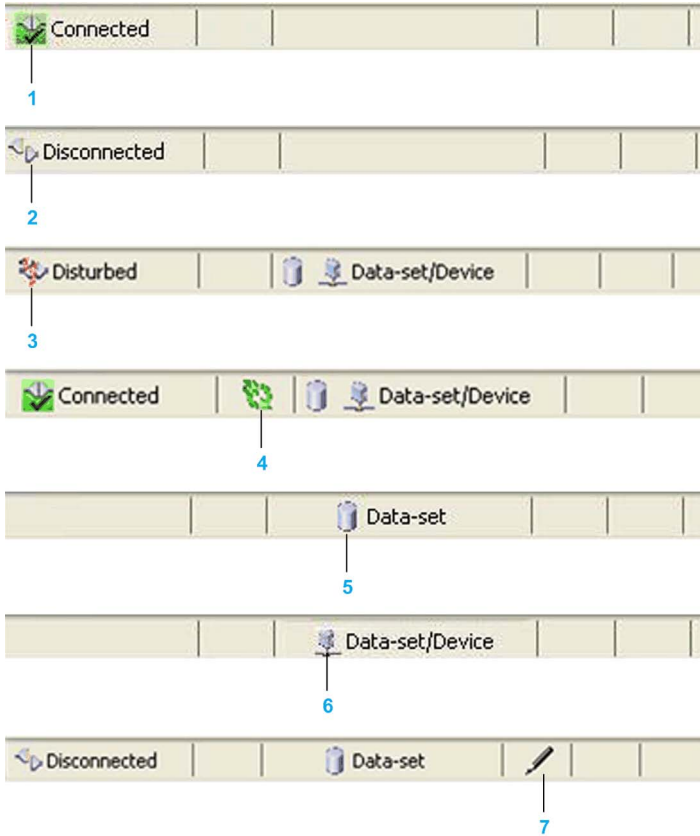
Item	Parameter	Description
1	Auto Refresh	Automatically updates the input status.
2	Input	Displays the input status.
3	Input holding time	Displays the input holding time.




The table below shows the input status:





Color	Meaning
Gray	Input is untaught.
Green	Input is on.
Red	Input is off.

Status Area

The following figure shows some examples of the connection status:



Item	Icon	Meaning
1		DTM is in online mode.
2		DTM is in offline mode.
3		A communication error is detected.

Item	Icon	Meaning
4		Communication between the DTM and device is active.
5		The offline data is stored in the DTM.
6		The data is stored in the device.
7		The parameter has been modified.

Chapter 8

Web Pages

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Introduction	120
Configuration	122
Diagnostics	129

Introduction

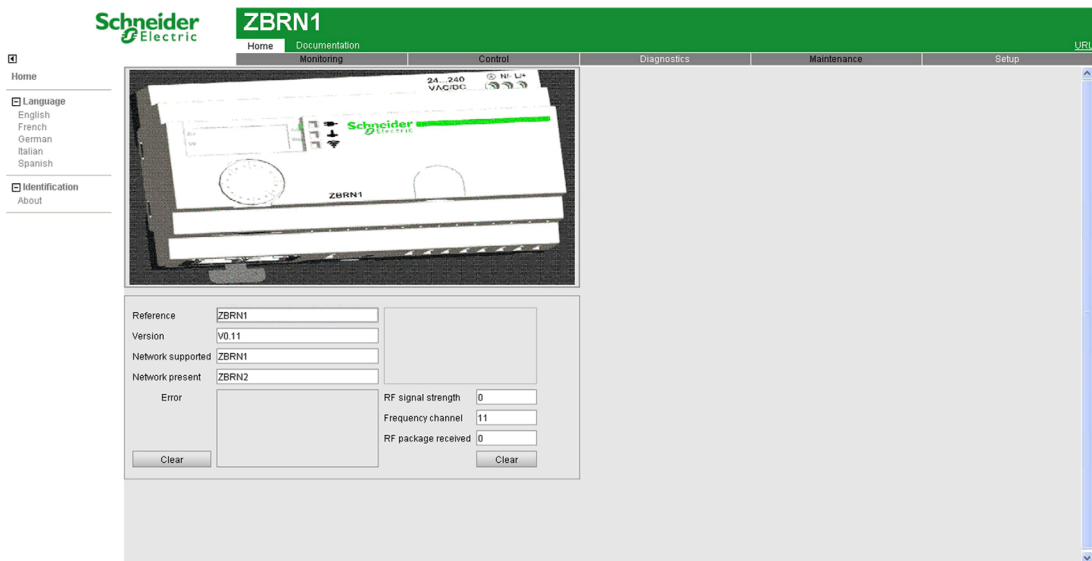
General

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

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

Home Page

The following figure shows the **Home** page:



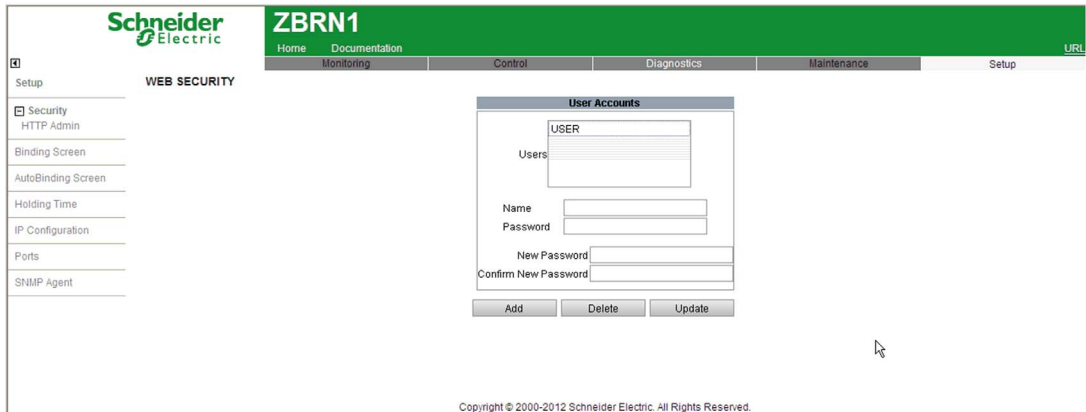
The table below shows the properties of the **Home** page:

Parameters	Description
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 code of the detected error.
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 GP (Green Power) packages received.
Clear	Clears the codes of the detected errors and the signal settings.

Configuration

Web Security Page

The following figure shows the **WEB SECURITY** page:



The table below shows 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	Add a new user account.
Delete	Delete an existing user account.
Update	Update an existing user account.

Binding Screen Page

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

The screenshot displays the 'Binding Screen' configuration page for a Schneider Electric ZBRN1 device. The page features a top navigation bar with 'Home', 'Documentation', 'Monitoring', 'Control', 'Diagnostics', 'Maintenance', and 'Setup' (URL). A sidebar on the left contains navigation links for 'Setup', 'Security', 'HTTP Admin', 'Binding Screen', 'AutoBinding Screen', 'Holding Time', 'IP Configuration', 'Ports', and 'SNMP Agent'. The main content area is titled 'Binding Screen' and contains a table with the following data:

Input				Binding Number (used/total)	
Index	Enabled	Type	MAC Address		
0	<input type="checkbox"/>	Disabled	00-00-00-00		
1	<input type="checkbox"/>	Disabled	00-00-00-00		
2	<input type="checkbox"/>	Disabled	00-00-00-00		
3	<input type="checkbox"/>	Disabled	00-00-00-00		
4	<input type="checkbox"/>	Disabled	00-00-00-00		
5	<input checked="" type="checkbox"/>	Type 1	03-00-0F-9E		
6	<input type="checkbox"/>	Disabled	00-00-00-00		
7	<input type="checkbox"/>	Disabled	00-00-00-00		
8	<input checked="" type="checkbox"/>	Type 1	03-00-68-DD		
9	<input type="checkbox"/>	Disabled	00-00-00-00		
10	<input type="checkbox"/>	Disabled	00-00-00-00		
11	<input type="checkbox"/>	Reserved	nn.nn.nn.nn		

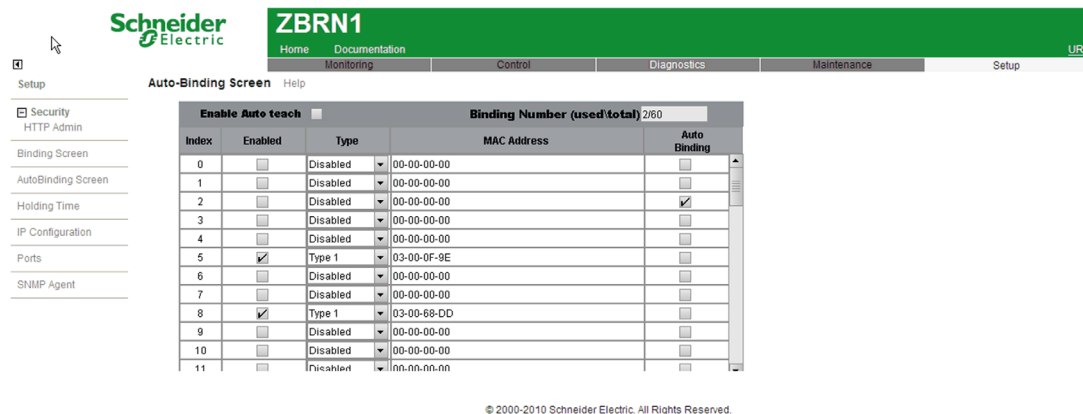
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The table below shows the properties of the **Binding Screen** page:

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 (whether taught or not).
Type	Indicates the type of transmitter used.
MAC Address	Displays the MAC address of the transmitter.
Apply	Apply the changes.
Undo	Undo the changes.

Auto-Binding Screen Page

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



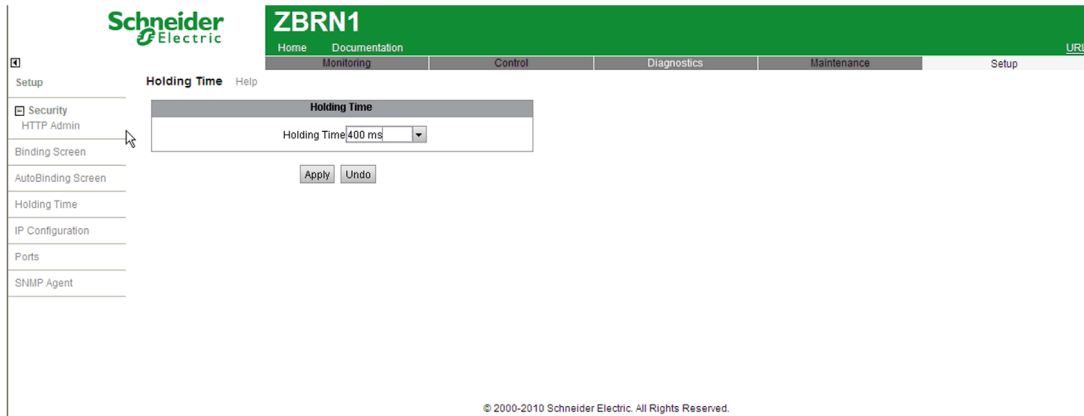
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The table below shows the properties of the **Auto-Binding Screen** page:

Parameter	Description
Enable Auto teach	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 (whether taught or not).
Type	Displays the device type.
MAC Address	Displays the MAC address of the transmitter.
Auto Binding	Indicates which transmitters are automatically enabled.
Online Auto Binding	Enable or disable online auto binding.
Apply	Apply the changes.
Undo	Undo the changes.

Holding Time Page

The following figure shows the **Holding Time** page:

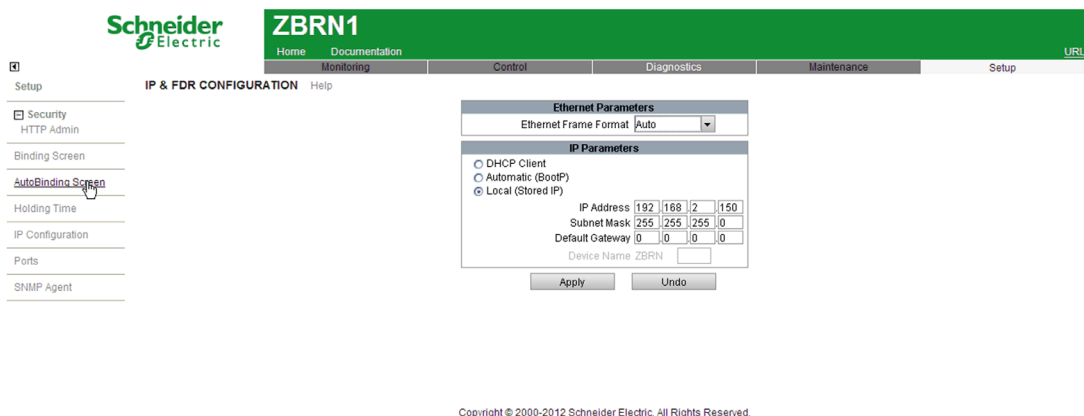


The table below shows the properties of the **Holding Time** page:

Parameters	Description
Holding Time	Select holding time from the list.
Apply	Apply the changes.
Undo	Undo the changes.

IP and FDR Configuration Page

The following figure shows the **IP & FDR CONFIGURATION** page:



The table below shows the properties of the **IP & FDR CONFIGURATION** page:

Parameters	Description
Ethernet Frame Format	Select the frame format from the list.
	Ethernet II
	802.3
	Auto
DHCP Client	Select the IP address from the DHCP server.
Automatic (BootP)	Select the IP address from the BootP server.
Local (Stored IP)	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	Apply the changes.
Undo	Undo the changes.

Ethernet Ports Configuration Page

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

The screenshot displays the Schneider Electric ZBRN1 web interface. At the top, there is a green header with the Schneider Electric logo and the device name 'ZBRN1'. Below the header is a navigation bar with tabs for Home, Monitoring, Control, Diagnostics, Maintenance, and Setup. The main content area is titled 'ETHERNET PORTS CONFIGURATION' and includes a 'Port Number' dropdown menu set to '1'. A 'Port Control' dialog box is open, showing three settings: Speed (100Mbps), Duplex Mode (Full-Duplex), and Auto Negotiation (Disabled). Below the dialog are 'Apply' and 'Undo' buttons. A sidebar on the left contains a 'Setup' menu with various options like Security, Binding Screen, and IP Configuration. At the bottom of the page, there is a copyright notice: 'Copyright © 2000-2012 Schneider Electric. All Rights Reserved.'

The table below shows the properties of the **ETHERNET PORTS CONFIGURATION** page:

Parameters	Description
Port Number	Configure the port number.
Speed	Select the speed from the list.
	10 Mbps
	100 Mbps
Duplex Mode	Select Duplex mode from the list.
	Full duplex
	Half duplex
Auto Negotiation	Select the auto configuration setting from the list:
	Enabled: Duplex mode and the speed are selected automatically.
	Disabled: Auto configuration is disabled.
Apply	Apply the changes.
Undo	Undo the changes.

SNMP Agent Configuration Page

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

Schneider Electric **ZBRN1**

Home Documentation Monitoring Control Diagnostics Maintenance Setup URL

SNMP AGENT CONFIGURATION Help

Manager's IP Address

Manager 1 82 32 83 79
 Manager 2 76 79 0 0

Agent

System Name
 System Location
 System Contact

Community Names

Get
 Set
 Trap

Enabled Traps

Cold Start Trap
 Link Down Trap
 Link Up Trap
 Authentication Failure Trap

Apply Undo

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The table below shows 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	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 <code>public</code> .
Set	Configure the Set community names.
Trap	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	Apply the changes.
Undo	Undo the changes.

Diagnostics

Ethernet TCP/IP Statistics Page

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

The screenshot shows the Schneider Electric ZBRN1 interface. The top navigation bar includes Home, Documentation, Monitoring, Control, Diagnostics, Maintenance, and Setup. The left sidebar lists various diagnostic tools. The main content area is titled 'ETHERNET TCP/IP STATISTICS' and contains two parameter tables and a 'Reset Counters' button.

Ethernet Parameters	
MAC Address	00:c0:b7:c5:6c:b8
Frames Received	965
Frames Transmitted	981

TCP/IP Parameters	
Device Name	
IP Address	192.168.2.150
Subnet Mask	255.255.255.0
Default Gateway	0.0.0.0

Reset Counters

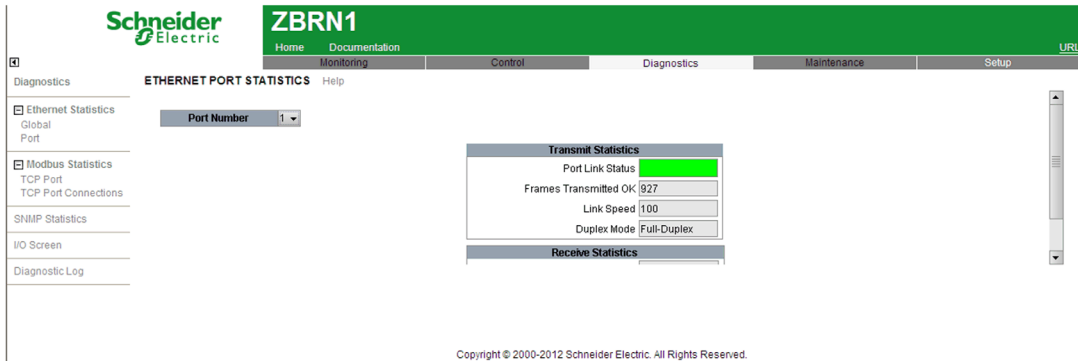
Copyright © 2000-2012 Schneider Electric. All Rights Reserved.

The table below shows 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	Reset all counters.

Ethernet Port Statistics Page

The following figure shows the **ETHERNET PORT STATISTICS** page:

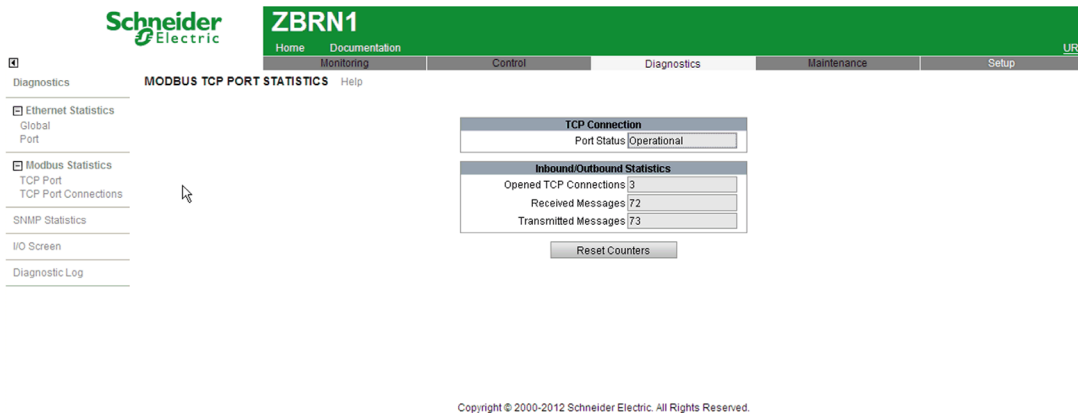


The table below shows the properties of the **ETHERNET PORT STATISTICS** page:

Parameters	Description
Port Number	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 below shows 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	Reset all counters.

Modbus TCP Messaging Statistics Page

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

The screenshot displays the Schneider Electric ZBRN1 interface. The main content area is titled "MODBUS TCP MESSAGING STATISTICS" and contains a table with the following data:

Connections						
Index	Remote IP	Remote Port	Local Port	Transmitted Messages	Received Messages	Sent Errors
1	192.168.2.149	1131	502	27	27	0
2	192.168.2.149	1139	502	32	32	0
3	192.168.2.149	1155	502	3	4	0

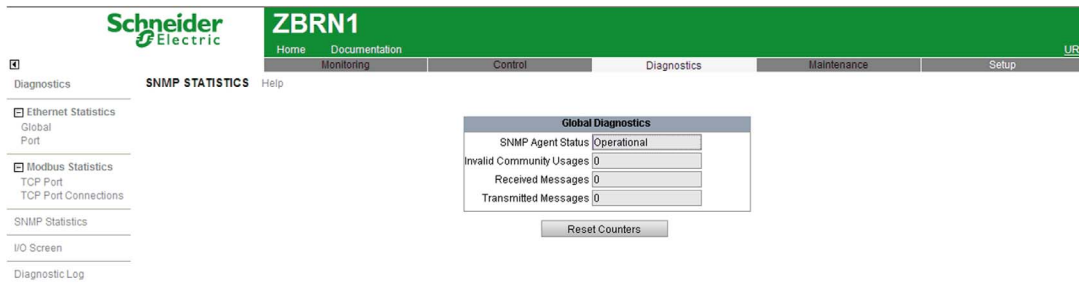
Below the table is a "Reset Counters" button. The page footer includes the copyright notice: "Copyright © 2000-2012 Schneider Electric. All Rights Reserved."

The table below shows 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	Reset all counters.

SNMP Statistics Page

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



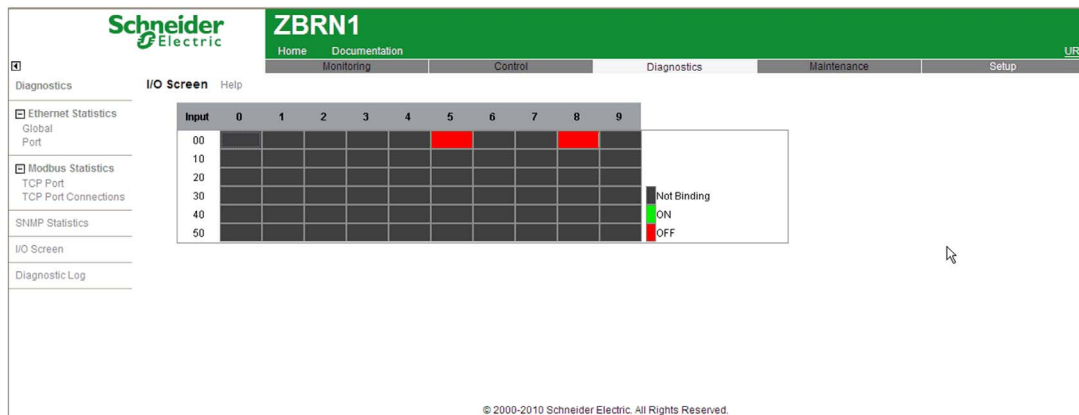
Copyright © 2000-2012 Schneider Electric. All Rights Reserved.

The table below shows 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	Reset all counters.

I/O Screen Page

The following figure shows the **I/O Screen** page:



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The table below shows the properties of the **I/O Screen** page:

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

Chapter 9

SD Card

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
Introduction	136
Functions	138
File Management and Diagnostics	140

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

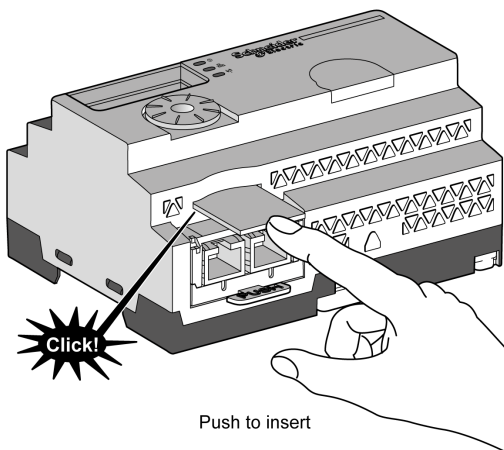
⚠ CAUTION

UNINTENDED EQUIPMENT OPERATION

- Do not expose the SD card to any of the following:
 - Electrostatic or electromagnetic sources.
 - Heat, sunlight, water, or moisture.
 - High radiation. High-level radiation can erase the content of the SD card.
- Avoid impact to the SD card.

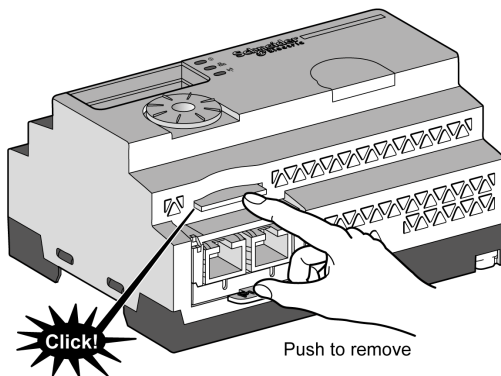
Failure to follow these instructions can result in injury or equipment damage.

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



Push to insert the SD card into 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

The SD card supports the following features:

- Write protection
- Dynamic detection
- Saving and loading the configuration and network parameters

Saving and Loading the 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	<p>This action creates 2 subfolders in the SD card:</p> <ul style="list-style-type: none"> • <i>device</i>: Stores the configuration parameter file <i>ZBRNXDEV.csv</i>. <table border="1"> <tbody> <tr><td>0</td><td>TRUE</td><td>Type1</td><td>03:00:8b:df</td><td></td><td></td></tr> <tr><td>1</td><td>FALSE</td><td></td><td></td><td></td><td></td></tr> <tr><td>2</td><td>FALSE</td><td></td><td></td><td></td><td></td></tr> <tr><td>3</td><td>FALSE</td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td>TRUE</td><td>Type1</td><td>03:00:01:54</td><td></td><td></td></tr> <tr><td>5</td><td>FALSE</td><td></td><td></td><td></td><td></td></tr> <tr><td>6</td><td>FALSE</td><td></td><td></td><td></td><td></td></tr> <tr><td>7</td><td>FALSE</td><td></td><td></td><td></td><td></td></tr> </tbody> </table> <p>NOTE: This is an extract of the file opened in Excel.</p> <ul style="list-style-type: none"> • <i>net</i>: Stores the network parameter file <i>ZBRNXNET.csv</i> <table border="1"> <thead> <tr> <th>Parameter</th> <th>Value</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>Holding_time</td> <td>2</td> <td>0:100ms 1:200ms 2:300ms 3:400ms 4:500ms 5:1s</td> </tr> <tr> <td>Baudrate</td> <td>5</td> <td>1:1200bps 2:2400bps 3:4800bps 4:9600bps 5:19200bps 6:38400bps 7:115200bps</td> </tr> <tr> <td>Frame_setting</td> <td>1</td> <td>1:8e1 2:8o1 3:8n2</td> </tr> <tr> <td>Slave_id</td> <td>2</td> <td>[1-247]</td> </tr> <tr> <td>Auto_detection</td> <td>1</td> <td>0=disable 1=enable</td> </tr> </tbody> </table> <p>NOTE: This is an extract of the file opened in Excel. You can update the .csv files manually and load them into the access point afterwards.</p>	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					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
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Auto_detection	1	0=disable 1=enable																																																																	

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 <i>\device</i> and <i>\net</i> subfolders if they do not exist in the SD card): <ul style="list-style-type: none">● <i>\device</i>: Stores the configuration parameter file <i>ZBRNXDEV.csv</i>● <i>\net</i>: Stores the network parameter file <i>ZBRNXNET.csv</i> NOTE: <i>ZBRNXDEV.csv</i> is the same file used in the Import/Export DTM feature.
3	On the SD card menu, click Load all .

File Management and Diagnostics

File Management

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

Path	Description
<code>\device</code>	Folder containing the configuration file.
<code>ZBRNXDEV.csv</code>	Configuration file name.
<code>\net</code>	Folder containing the network file.
<code>ZBRNXNET.csv</code>	Network file name.

Diagnostics

The table below shows the diagnostic details of the SD card:

Description	Device Indication	Code of the Detected Error
SD card is present in the access point.	The SD Card menu is available.	0: No error is detected.
SD card is not present in the access point.	The SD Card menu is not available.	0: No error is detected.
SD card is not compatible.	Error LED turns on.	1: The SD card cannot be accessed.
SD card is write-protected.	Error LED turns on.	2: The SD card is write-protected.
No space in the SD card.	Error LED turns on.	3: Not enough space in the SD card.
The format of <code>ZBRNXNET.csv</code> file is invalid.	Error LED turns on.	4: Communication configuration file is invalid.
The format of <code>ZBRNXDEV.csv</code> file is invalid.	Error LED turns on.	5: 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: 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: Configuration file is not available in the SD card.

Chapter 10

First Installation

What Is in This Chapter?

This chapter contains the following topics:

Topic	Page
First Startup	142
Configuration	144

First Startup

Overview

Follow this procedure when installing and starting up the access point.

Startup Procedure

The table below shows the startup procedure for the ZBRN2 access point:

Step	Action	Comments
1	Unpack your access point (ZBRN2) and check the contents of the package.	Contents of the package: instruction sheet, access point (ZBRN2).
2	Choose an appropriate cabinet.	Refer to Mechanical Installation.
3	Install the access point on a DIN rail, a grid, or a plate.	
4	Connect the external antenna to the access point (optional).	Refer to Mounting Tips for the ZBRA2 External Antenna (see page 73).
5	Ensure that upstream power is off. Connect the external 24...240 Vac/Vdc power supply.	Refer to Power Supply Connections (see page 32).
6	Turn on the power.	–
7	Configure the access point, either through the user interface (7a) or the DTM (7b).	–
7a	Configure the access point through the user interface.	Refer to User Interface (see page 87).
7b	Connect the access point to the PC.	Refer to Connection to a PC (see page 100).
	Configure the access point through the DTM.	Refer to Configuration (see page 101).
	Disconnect the PC.	–
8	Connect the serial line communication buses and network.	Refer to Modbus Serial Line Cables (see page 55).
9	Connect line termination devices to the access point (optional).	Refer to Modbus Serial Line Cabling (see page 46).
10	Verify all the connections.	–
11	Run the application.	–

The table below shows the startup procedure for ZBRN1 access point:

Step	Action	Comments
1	Unpack your access point (ZBRN1) and check the contents of the package.	Contents of the package: instruction sheet, access point (ZBRN1), ZBRN2 instruction sheet, communication module (ZBRCETH), and ZBRCETH instruction sheet.
2	Insert the communication module in the access point.	Refer to ZBRCETH) Communication Module (see page 61).
3	Choose an appropriate cabinet.	Refer to Mechanical Installation.
4	Install the access point on a DIN rail, a grid, or a plate.	
5	Connect the external antenna to the access point (optional).	Refer to Mounting Tips for ZBRA2 External Antenna (see page 73).
6	Ensure that upstream power is off. Connect the external 24...240 Vac/Vdc power supply.	Refer to Power Supply Connections (see page 32).
7	Turn on the power.	–
8	Configure the access point, either through the user interface (8a) or the DTM (8b).	–
8a	Configure the access point through the user interface.	Refer to User Interface (see page 87).
8b	Connect the access point to the PC.	Refer to Connection to a PC (see page 100).
	Configure the access point through the DTM.	Refer to Configuration (see page 101).
	Disconnect the PC.	–
9	Connect the Ethernet communication buses and network.	Refer to the Ethernet Cable (see page 69).
10	Verify all the connections.	–
11	Run the application.	–

Configuration

Mandatory Settings

Configure the following 2 types of parameters:

- Communication protocol
- Wireless, batteryless push-button association

Configure the access points using one of the following methods:

- Through the user interface. Refer to Configuration Menu ([see page 87](#)).
- Remotely using a PC:
 - ZBRN2: For configuration through the DTM, refer to DTM Configuration ([see page 101](#)).
 - ZBRN1: For configuration through the DTM or Web pages, refer to DTM Configuration ([see page 101](#)) and Web Pages Configuration ([see page 122](#)).

Chapter 11

Architectures

Modbus Serial Line

Architecture Example for ZBRN2 Access Point

