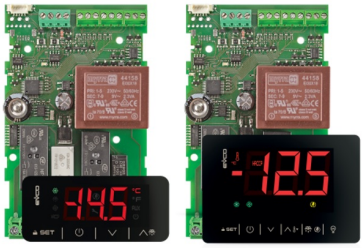


EVCO EV3 WEB Gateway Network 10 Devices Instruction Manual

Advanced Controllers

EV3 WEB
Gateway for a network of up to 10 devices

Installer Manual
1143W01E4.01 – 08/2022

WARNING


Read and fully understand user manual before using this device. Failure to follow these instructions can result in death or serious injury.

Contents

IMPORTANT INFORMATION

Liability and residual risks
EVCO assumes no liability for any damage caused by the following (by way of example; this is not an exhaustive list):

- Installation/use for purposes other than those specified and, in particular, not adhering to the safety provisions set out by current regulations in the country in which the product is installed and/or contained in this manual;
- Use in appliances that do not guarantee sufficient protection against electric shocks, water and dust within the installation conditions created;
- Use in appliances that allow access to hazardous parts without the use of a keyed or tooled locking mechanism when accessing the instrument;
- Tampering and/or modifying the product;
- Installation/use in appliances which do not comply with current regulations in the country in which the product is installed.

  The customer/manufacturer is responsible for ensuring their machine complies with these regulations.

  EVCO's responsibility is limited to the correct and professional use of the product in accordance with regulations and the instructions contained in this manual and other product support documents.

  To comply with EMC standards, observe all the electrical connection instructions. As it depends on the wiring configuration as well as the load and the installation type, compliance must be verified for the final machine as specified by the relevant product standard.

Disclaimer
This document is the exclusive property of EVCO. It contains a general description and/or a description of the technical specifications for the features offered by the products listed herein. This document should not be used to

determine the suitability or reliability of these products in relation to specific user applications. Each user or integration specialist should conduct their own complete and appropriate risk analysis, in addition to carrying out a product evaluation and test in relation to its specific application or use. Users can send us comments and suggestions on how to improve or correct this publication. Neither EVCO nor any of its associates or subsidiaries shall be held responsible or liable for improper use of the information contained herein.
EVCO has a policy of continuous development, therefore reserves the right to make changes and improvements to any product described in this document without prior notice.
The images in this document and other documentation supplied with the product are provided for illustrative purposes only and may differ from the product itself.
The technical data in this manual is subject to change without prior notice.

Terms and Conditions of use

Permitted use

The device must be installed and used in accordance with the instructions provided and, in particular, hazardous live parts must not be accessible under normal conditions.
The device must be suitably protected from water and dust with regard to its application and must also only be accessible with the aid of a tool (with the exception of the front panel).
Only qualified personnel may install the product or perform technical support procedures on it.
The customer must only use the product as described in the documentation relating to that product.

Prohibited use

Any use other than those described in the “Permitted use” section and in the product support documentation is prohibited.

Disposal

 The device must be disposed of according to local regulations governing the collection of electrical and electronic equipment.

Consider the environment

 The company strives to respect the environment, taking account of customer requirements, technological innovations in terms of materials and the expectations of the community to which we belong. EVCO places great importance on respecting the environment, encouraging all associates to become involved with company values and guaranteeing safe, healthy and functional working conditions and workplaces.
Please consider the environment before printing this document.

IMPORTANT SAFETY INFORMATION

Read this document carefully before installation and take all precautions before using the device. Only use the device in accordance with the methods described in this document. The following safety messages may be repeated several times in the document, to provide information regarding potential hazards or to attract attention to information which may be useful in explaining or clarifying a procedure.

 This symbol is used to indicate a risk of electric shock.

It is a safety indication and as such, should be observed to avoid potential accidents or fatalities.

 This symbol is used to indicate a risk of serious personal injury.

It is a safety indication and as such, should be observed to avoid potential accidents or fatalities.

 **DANGER**

DANGER indicates a situation of imminent danger which, if not avoided, will result in death or serious injury.

 **WARNING**

WARNING indicates a situation of imminent danger which, if not avoided, may result in death or serious injury.

CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, could cause minor or moderate injury.
NOTICE
NOTICE indicates a situation not related to physical injuries but which, if not avoided, could damage the equipment.
N.B. The maintenance, repair, installation and use of electrical equipment must only be entrusted to qualified personnel.
QUALIFIED PERSONNEL
Only suitably trained and experienced personnel capable of understanding the content of this manual and all documentation regarding the product are authorised to work on and with this equipment. Furthermore, the personnel must have completed courses in safety and must be able to recognise and prevent the implied dangers. The personnel must have suitable training, knowledge and experience at a technical level, and be capable of anticipating and detecting potential risks caused by using the product, as well as changing the settings and modifying the mechanical, electric and electronic equipment for the entire system in which the product is used. All personnel working on and with the product must be entirely familiar with the relevant standards and directives, as well as safety regulations.

SAFETY INFORMATION RELATING TO THE PRODUCT

Before carrying out any work on the equipment, read these instructions carefully, making sure you understand everything.
DANGER
RISK OF ELECTRIC SHOCK, EXPLOSION OR ELECTRIC ARC

- Only use electrically insulated measuring devices and equipment.
- Do not install the equipment while the power supply is connected.
- Switch off all equipment, including connected devices, before installing or uninstalling the device.
- Always use a correctly calibrated voltmeter to check the system is switched off.
- Do not touch the unshielded components or the terminals while they are live.
- Do not open, disassemble, repair or modify the product.
- Do not expose the equipment to liquids or chemicals.
- Before applying voltage to the equipment:
- Make sure all protective elements, such as covers, hatches and grilles, are fitted and/or closed.
- Check all wiring connections.

 **DANGER**
RISK OF ELECTRIC SHOCK AND FIRE

- Do not use the device with loads greater than those indicated in the technical specifications.
- Do not exceed the temperature and humidity ranges indicated in the technical specifications.
- Use the required safety interlocks (fuses and/or magnetothermal switches) of a suitable size.

 **DANGER**
RISK OF ELECTRIC SHOCK OR MALFUNCTIONING OF THE EQUIPMENT
Do not use damaged products or accessories.
This device was designed to operate in non-hazardous environments, excluding applications that generate, or could potentially generate, hazardous atmospheres. Only install this device in areas and for applications which are reliably free from hazardous atmospheres

 **DANGER**
RISK OF EXPLOSION

- Only install and use this device in sites that are not at risk.
- Do not install or use this device in applications which are capable of generating hazardous atmospheres, such as applications that use flammable refrigerants

WARNING
MALFUNCTIONING OF THE EQUIPMENT

- Perform the wiring carefully, in compliance with electromagnetic compatibility requirements.
- Make sure the wiring is correct for the application.
- Use shielded cables for all I/O signal and communication cables.
- Minimise the length of the connections as much as possible and avoid winding the cables around electrically connected parts.
- The signal cables (analogue and digital inputs, communication and corresponding power supplies), power cables and power supply cables for the device must be routed separately.
- Before applying the power supply, check all the wiring connections.
- Use the required safety interlocks where personnel and/or equipment hazards exist.
- Install and operate this equipment in a cabinet appropriately rated for its intended environment and secured by a keyed or tooled locking mechanism.
- Power line and output circuits must be wired and fused in compliance with local and national regulatory requirements for the rated current and voltage of the particular equipment.
- Do not use this equipment in safety-critical machine functions.
- Do not disassemble, repair or modify this equipment.
- Do not connect wires to unused terminals and/or to terminals labelled “No connection “(N.C.)”.

INTRODUCTION

1.1 DESCRIPTION

EVCO EV3 Web controllers remotely monitor up to 10 EPoCA-compatible controllers on the EPoCA cloud via the on-board Ethernet and RS-485 serial ports.
EV3 Web is compliant with HACCP regulations for food safety during food processing.

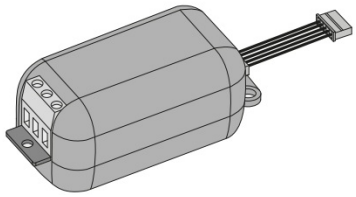
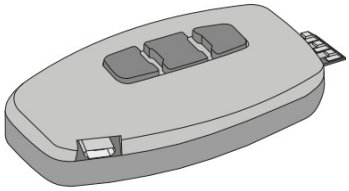
1.2 FEATURES

The main features of EV3 Web are:

- 1 digital input;
- 1 analogue input for NTC/PTC probes;
- 1 relay output;
- 1 Ethernet RJ45 Modbus TCP/IP compatible serial port;
- 1 micro-B USB serial port;
- 1 RS-485 serial port;
- 1 32 MB internal memory;
- 1 year of HACCP data recording with 5-minute intervals, up to 3 probes;
- RTC shared with subnetwork;
- EPoCA compatible.

1.3 ACCESSORIES

The following accessories are available for EV3 Web controllers:

Type	P/n	Description
	EVTPN615F200	SND NTC TERM 1,5M 6×15 COSTFL
	EVTPN630F200	SND NTC TERM 3,OM 6×15 COSTFL
	EVTPP815P200	SND PTC PVC2 1,5M 6×30 STEEL67
	EVTPP830P200	SND PTC PVC2 3,OM 6×30 STEEL67
	810500023	USB A-micro-B cable 1.5 m
	EVIF22TSX	Module for TTL/RS-485 serial interface
	EV3KEY	Programming key for EV3 regulation parameters

TECHNICAL SPECIFICATIONS

All the system components of the EV3 Web controllers meet the requirements of the European Community (EC) for electric equipment. They must be installed in a casing or other location designated for the specific ambient conditions and to keep the possibility of involuntary contact with dangerous electrical voltages to a minimum. Use metal casings to improve the immunity of the EV3 Web system to electromagnetic fields. This equipment meets EU requirements as shown in the tables below.

WARNING
MALFUNCTIONING OF THE EQUIPMENT
Do not exceed the nominal values given in this section.

2.1 TECHNICAL SPECIFICATIONS

Type	Description
The product complies with the following harmonised standards:	EN60730-1 and EN60730-2-9
Device construction:	Built-in electronic device
Device purpose:	Operating control device
Type of action:	1
Pollution category:	2
Overvoltage category:	III
Rated impulse withstand voltage:	4000 V
Power supply:	115…230 Vac, ±10%, 50/60 Hz
Consumption:	10 VA maximum
Ambient operating conditions:	0 … 50 °C (32 … 122 °F) 10 … 90 % RH non-condensing
Transportation and storage conditions:	-20 … 70 °C (-4 … 158 °F) 10 … 90 % RH non-condensing
Software class:	A
Environmental front protection:	IP65
Clock (RTC):	Built-in lithium battery
Clock drift:	s 60 s/month at 25 °C (77 °F)
Battery life:	30 days
Battery charging time:	24 h through device’s power supply
Data memory:	32 MB
Data memory per device:	—2.7 MB

2.2 I/O FEATURES

Type	Description
Digital inputs:	1 voltage-free digital input
Analogue inputs for temperature:	1 analogue input for NTC/PTC probes
Digital output with non-hazardous voltage (SELV):	1 relay output
Serial:	1 Ethernet RJ45 10/100 MAC serial port 1 USB serial port

Analogue input features

	Default	NTC 10 kΩ at 25 °C BETA 3 435	PTC KTY 81-121 990 Ω at 25 °C
Pb1	Probe Temperature	•	•

Range	—	-40…105 °C (-40…220 °F)	-50…150 °C (-58…302 °F)
Resolution	—	0.1 °C (1 °F)	—
Input impedance	—	10 kΩ	990 Ω

Digital output features

	Default	Description	Load (at 250 Vac)	Type of load
Out4	AUX	SPDT	5 A	Resistive

MECHANICAL ASSEMBLY

3.1 BEFORE STARTING

Read this manual carefully before installing the system.
In particular, the safety instructions, electrical requirements and current regulations for the machine or the process in which this device is involved must be observed. The use and application of the information contained herein require experience in the design and programming of automated control systems. Only the user, system integrator or machine builder can be aware of all the conditions and factors present during the installation, configuration, operation and maintenance of the machine or process, and can therefore determine the associated automation equipment and the related safeties and interlocks which can be effectively and properly used. When selecting automation and control equipment and any other related equipment or software for a particular application, always consider all the applicable local, regional or national standards and/or regulations.

WARNING
REGULATORY NON-COMPLIANCE
Make sure all the equipment used and the systems comply with all the applicable local, regional and national regulations.

3.2 INFORMATION ON INSTALLATION AND THE ENVIRONMENT

Before carrying out any work on the equipment, read these instructions carefully, making sure you understand everything.

DANGER
RISK OF ELECTRIC SHOCK, EXPLOSION OR ELECTRIC ARC

- Only use electrically insulated measuring devices and equipment.
- Do not install the equipment while the power supply is connected.
- Switch off all equipment, including connected devices, before installing or uninstalling the device.
- Always use a correctly calibrated voltmeter to check the system is switched off.
- Do not touch the unshielded components or the terminals while they are live.
- Do not open, disassemble, repair or modify the product.
- Do not expose the equipment to liquids or chemicals.
- Before applying voltage to the equipment:
- Make sure all protective elements, such as covers, hatches and grilles, are fitted and/or closed.

- Check all wiring connections.

This device was designed to operate in non-hazardous environments, excluding applications that generate, or could potentially generate, hazardous atmospheres. Only install this device in areas and for applications which are reliably free from hazardous atmospheres.

DANGER
RISK OF EXPLOSION

- Only install and use this device in sites that are not at risk.
- Do not install or use this device in applications which are capable of generating hazardous atmospheres, such as applications that use flammable refrigerants.

WARNING
MALFUNCTIONING OF THE EQUIPMENT

- Perform the wiring carefully, in compliance with electromagnetic compatibility and safety requirements.
- Make sure the wiring is correct for the application.
- Use shielded cables for all I/O signal and communication cables.
- Minimise the length of the connections as much as possible and avoid winding the cables around electrically connected parts.
- The signal cables (analogue and digital inputs, communication and corresponding power supplies), power cables and power supply cables for the device must be routed separately.
- Before applying the power supply, check all the wiring connections.
- Use the required safety interlocks where personnel and/or equipment hazards exist.
- Install and operate this equipment in a cabinet appropriately rated for its intended environment and secured by a keyed or tooled locking mechanism.
- Power line and output circuits must be wired and fused in compliance with local and national regulatory requirements for the rated current and voltage of the particular equipment.
- Do not use this equipment in safety-critical machine functions.
- Do not disassemble, repair or modify this equipment.
- Do not connect wires to unused terminals and/or to terminals labelled “No connection “(N.C.)”.

3.3 DIMENSIONS

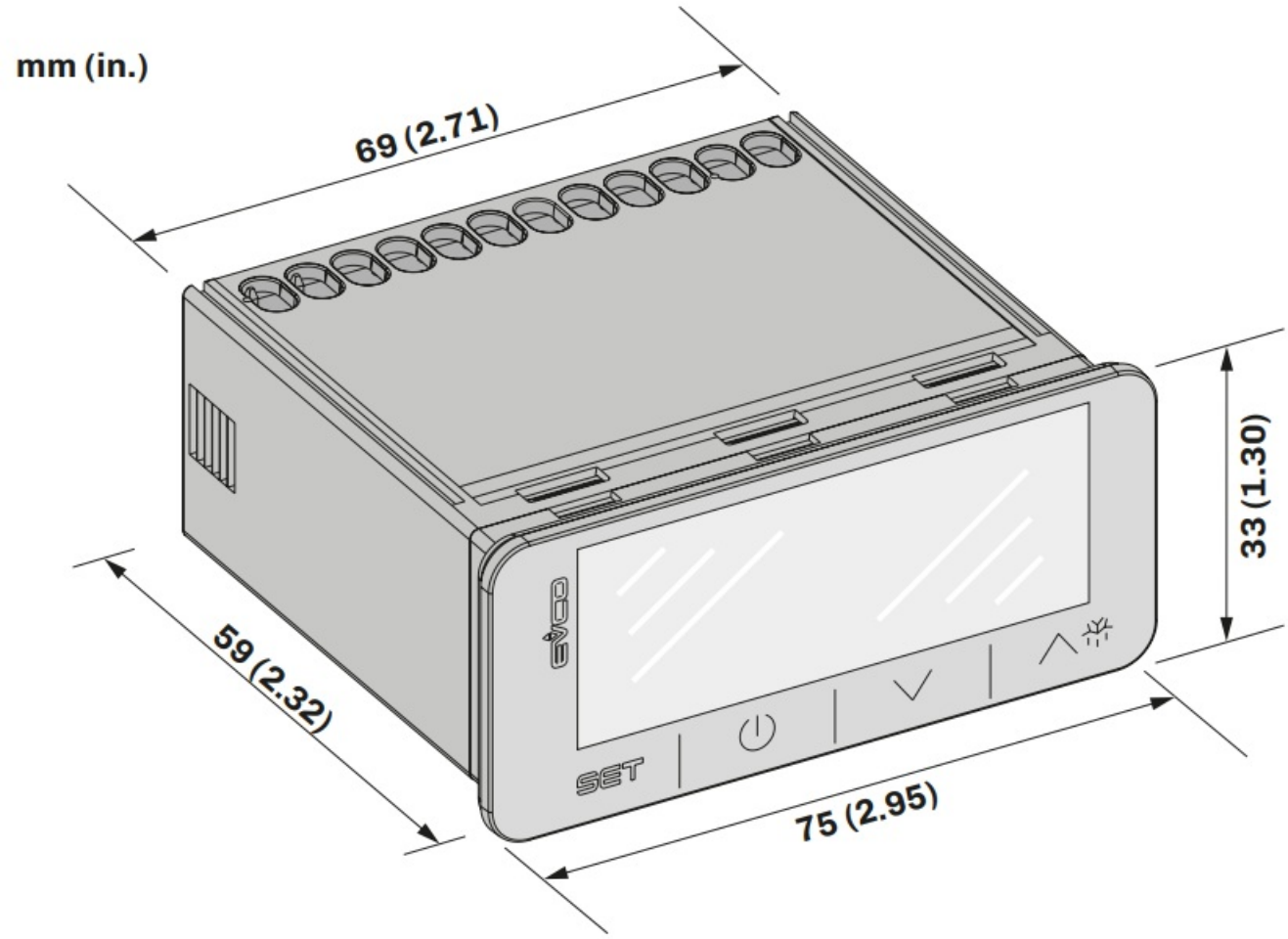


Fig. 1. *Dimensions **EV3 Web***

3.4 INSTALLATION

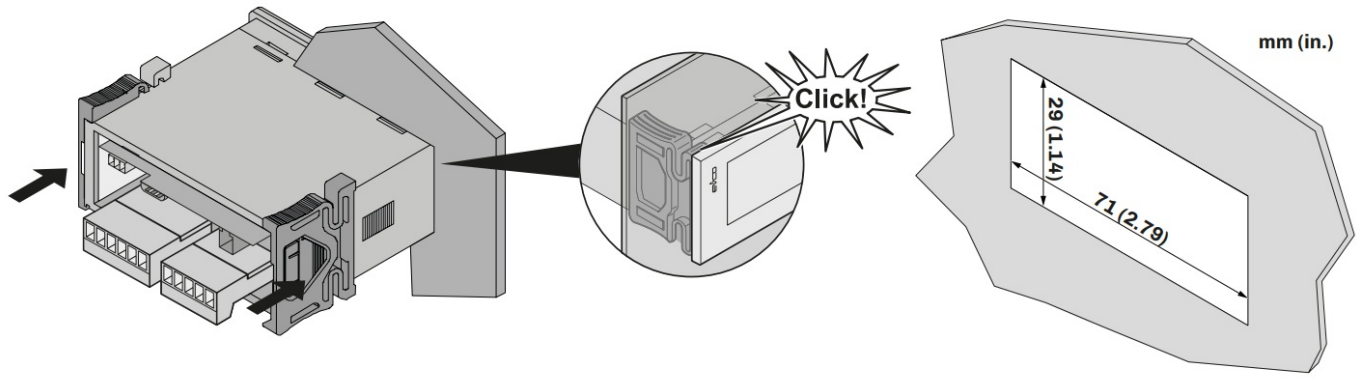


Fig. 2. *Installation **EV3 Web***

3.4.1 Minimum distances

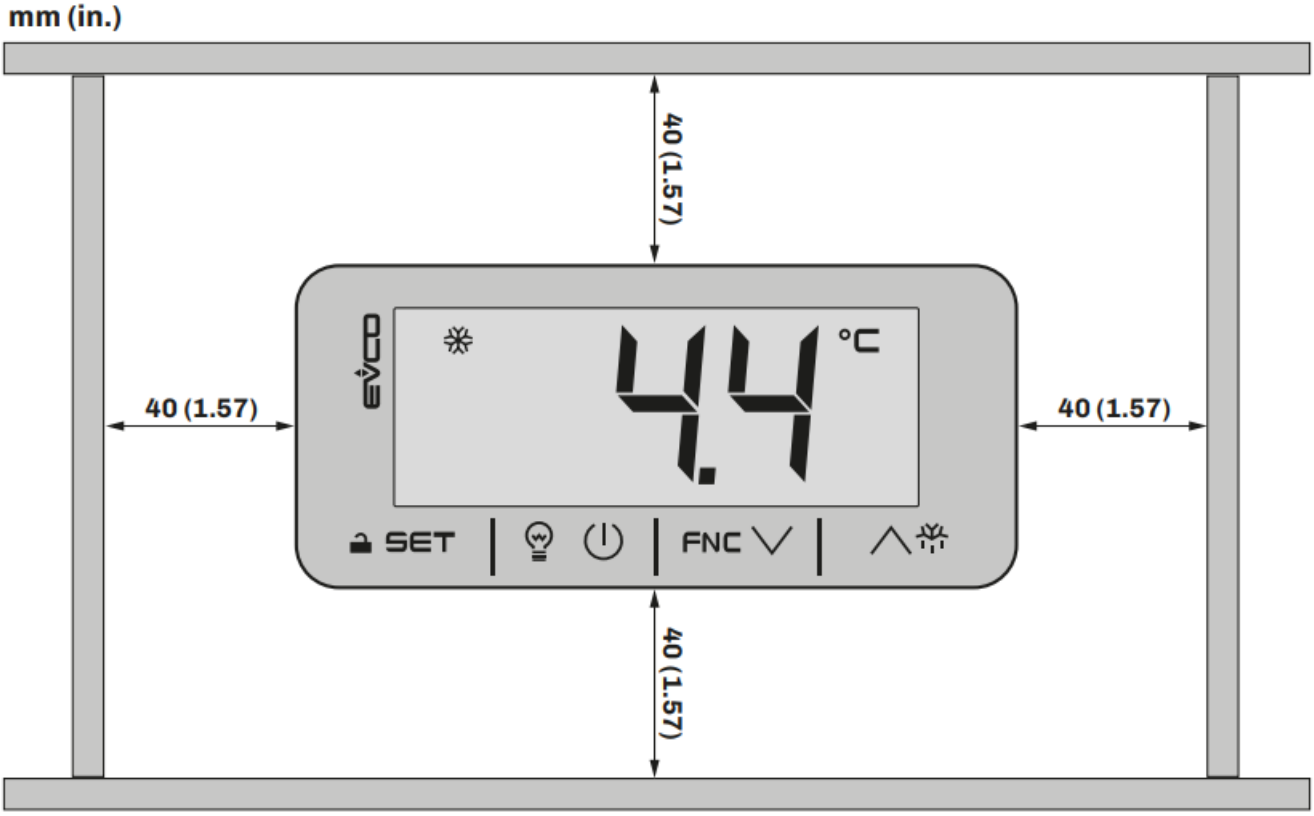


Fig. 3. *Minimum installation distances* ***EV3 Web***

ELECTRICAL CONNECTIONS

4.1 WIRING BEST PRACTICES

The following information describes the wiring guidelines and best practices which should be observed when using the equipment described in this manual.

DANGER

RISK OF ELECTRIC SHOCK, EXPLOSION OR ELECTRIC ARC

- Only use electrically insulated measuring devices and equipment.
- Do not install the equipment while the power supply is connected.
- Switch off all equipment, including connected devices, before installing or uninstalling the device.
- Always use a correctly calibrated voltmeter to check the system is switched off.
- Do not touch the unshielded components or the terminals while they are live.
- Do not open, disassemble, repair or modify the product.
- Do not expose the equipment to liquids or chemicals.
- Before applying voltage to the equipment:
- Make sure all protective elements, such as covers, hatches and grilles, are fitted and/or closed.
- Check all wiring connections.

4.1.1 Wiring guidelines

When wiring the controllers, observe the following instructions:

- The I/O and communication wiring must be kept separate from the power supply wiring. These two types of wiring must be routed in separate ducts.
- Make sure the operating environment and conditions fall within the specified values.

- Use wires with the correct diameter, suited to the voltage and current requirements.
- Use copper conductors (compulsory).
- Use shielded twisted pair cables for analogue/digital I/O connections.

  Use correctly earthed shielded cables for all analogue inputs or outputs and for communication connections. If shielded cables are not used for these connections, electromagnetic interference could cause the signal to deteriorate. Deteriorated signals can lead to unpredictable operation of the controller or modules and connected equipment.

⚠ WARNING
MALFUNCTIONING OF THE EQUIPMENT

- Perform the wiring carefully, in compliance with electromagnetic compatibility and safety requirements.
- Make sure the wiring is correct for the application.
- Use shielded cables for all I/O signal and communication cables.
- Minimise the length of the connections as much as possible and avoid winding the cables around electrically connected parts.
- The signal cables (analogue and digital inputs, communication and corresponding power supplies), power cables and power supply cables for the device must be routed separately.
- Before applying the power supply, check all the wiring connections.
- Use the required safety interlocks where personnel and/or equipment hazards exist.
- Install and operate this equipment in a cabinet appropriately rated for its intended environment and secured by a keyed or tooled locking mechanism.
- Power line and output circuits must be wired and fused in compliance with local and national regulatory requirements for the rated current and voltage of the particular equipment.
- Do not use this equipment in safety-critical machine functions.
- Do not disassemble, repair or modify this equipment.
- Do not connect wires to unused terminals and/or to terminals labelled “No connection (N.C.)”.

4.1.2 Fixed screw terminal blocks guidelines

Suitable wiring for power supply and I/O SELV
Step 5.08 mm (0.199 in.)

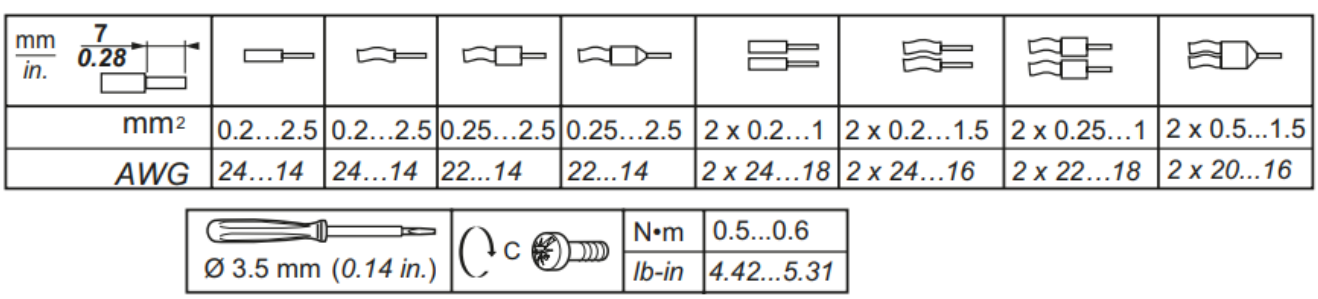


Fig. 4. *Suitable wiring for power supply and I/O SELV*

4.1.3 Permitted lengths of wiring

NOTICE
INOPERABLE DEVICE

- When connecting the probes, the digital inputs and the power supply, use cables with a maximum length of 10 m (32.80 ft).
- When connecting the power supply of the controller and the relay outputs, use cables with a maximum length of 10 m (32.80 ft.).

4.2 WIRING DIAGRAM

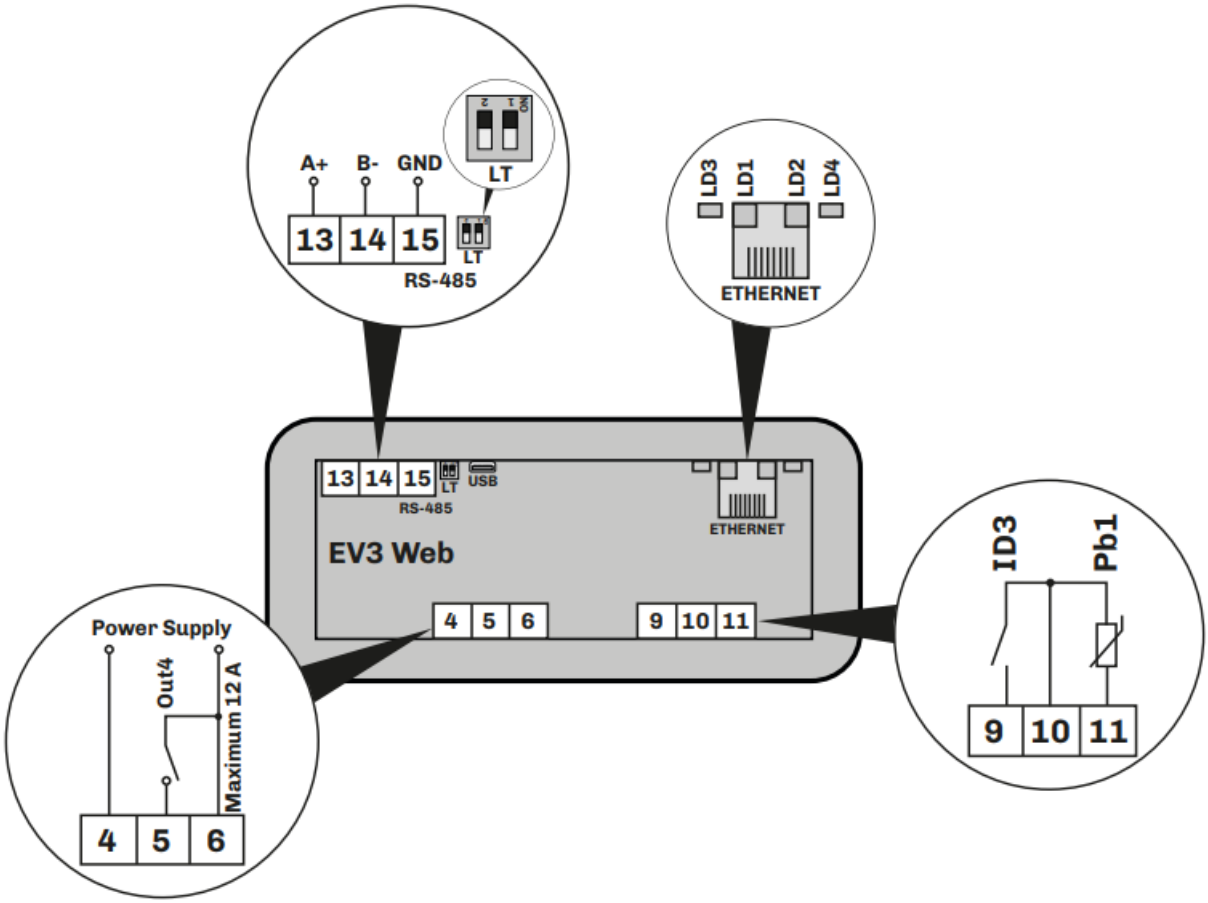


Fig. 5. *Wiring diagram* ***EV3 Web***

<table>
<tr><th colspan="6">TERMINALS</th></tr>
<tr><td colspan="2">4-6</td><td>Power supply input</td><td>USB</td><td colspan="2">USB 2.0 input for communication</td></tr>
<tr><td colspan="2">5-6</td><td>Relay output Out2 (AUX)</td><td>ETHERNET</td><td colspan="2">RJ45 connector to connect to Ethernet serial port</td></tr>
<tr><td colspan="2">8-10</td><td>Digital input ID1 (Door switch)</td><td rowspan="5">LED</td><td>LD1 Red</td><td>Flashes with messages from subnetwork</td></tr>
<tr><td colspan="2" rowspan="2">9-10</td><td rowspan="2">Digital input ID3 (Multifunction) (if P4=0) Probe input Pb3 (if P4 ≠ 0)</td><td>LD2 Green</td><td>Stays on if connected to EPoCA</td></tr>
<tr><td>LD3 Red</td><td>Stays on with Ethernet link-up</td></tr>
<tr><td colspan="2">11-10</td><td>Analogue input Pb1 (Temperature)</td><td>LD4 Green</td><td>Stays on with Ethernet activity</td></tr>
<tr><td colspan="2">13-14-15</td><td>RS-485 serial input</td><td colspan="2">LEDs off: No communication</td></tr>
<tr><td rowspan="2">LT</td><td>1</td><td>ON = Termination resistor inserted</td><td colspan="3" rowspan="2"></td></tr>
<tr><td>2</td><td>Reserved</td></tr>
</table>

USER INTERFACE

5.1 INTERFACE

Fig. 6. ***EV3 Web** user interface*

5.2 TOUCH KEYS

A description of the touch keys is given below:

Key…	Press and release to…	Press for at least 3 seconds to…
∧ ☀	• Scroll up through values • Move within a menu	—
FNC ∨	• Scroll down through values • Move within a menu	Access the FNC functions menu (functions activated by key)
💡 ⏻	—	Switch the device on/off (stand-by)
SET	• Confirm values on the display • Set the setpoint	Enter the parameter menu

5.3 ICONS

Icon	ON	Flashing	OFF
°C	Temperature displayed in °C	—	• Over-heating ON • Over-cooling ON
°F	Temperature displayed in °F	—	
AUX	• AUX function ON • AUX digital output ON	—	
🔧	Compressor maintenance request	• Parameters being changed • Access to FNC menu (functions activated by key) • Active connection with EVconnect	—
⏻	Device off	—	Device on

5.4 CONTROLLER OPERATION

5.4.1 Switching the controller ON/OFF

With the function enabled (POF = 1), press the ⏻ key for at least 3 seconds to switch the controller on/off.

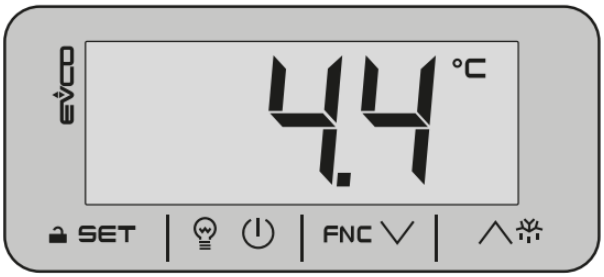


Fig. 7. *Main screen*

Fig. 8. *Controller off*

5.4.2 Unlocking the keypad

After about one minute of inactivity, the device automatically locks the keypad (the code Loc appears for a few seconds).
To unlock the keypad, hold down any key for about 3 seconds until the code UnL appears to confirm the keypad has been unlocked.

Fig. 9. *Keypad locked*

Fig. 10. *Confirmation keypad unlocked*

5.4.3 Setting/changing the setpoint

With the keypad unlocked, touch and release the SET key to access the setpoint menu. Scroll the values with the FNC or keys and touch to confirm the setpoint value.

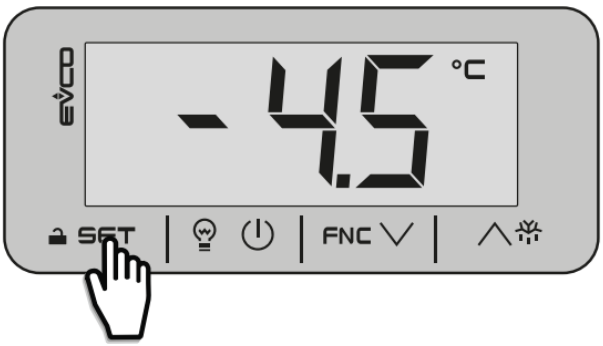


Fig. 11. *Accessing the setpoint menu*

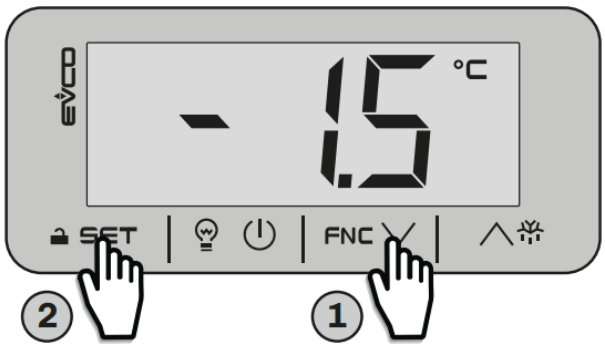


Fig. 12. *Changing the setpoint*

5.4.4 Functions that can be activated by key

To choose the function, touch the key for at least 3 seconds to access the function menu; use the scroll through and choose the following functions:

- RTC: sets/changes the clock;
- Pb1: displays the temperature read by probe Pb1;

5.4.5 Activating the AUX digital output by key

With the keypad unlocked, touch and release the on. key to manually activate the AUX digital output. The AUX icon will come

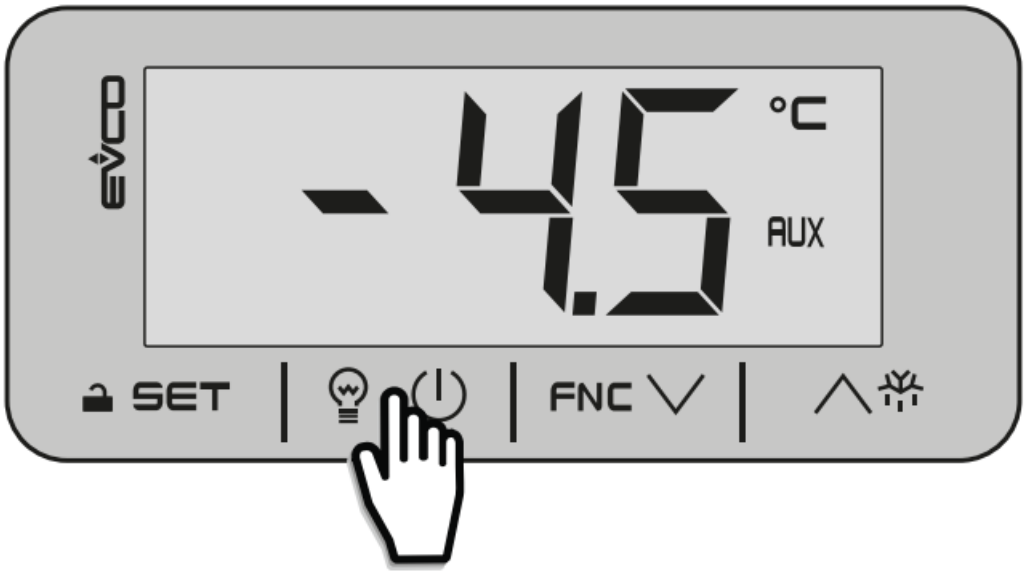


Fig. 13. *Activating the AUX output by key*

5.4.6 Accessing the parameters

With the keypad unlocked, touch the appear. Touch the SET key; then use the 1 key to enter the password, scrolling with the key for at least 3 seconds to access and change the parameters. The code PA will keys and confirming with the or SET keys to scroll the list of parameters.

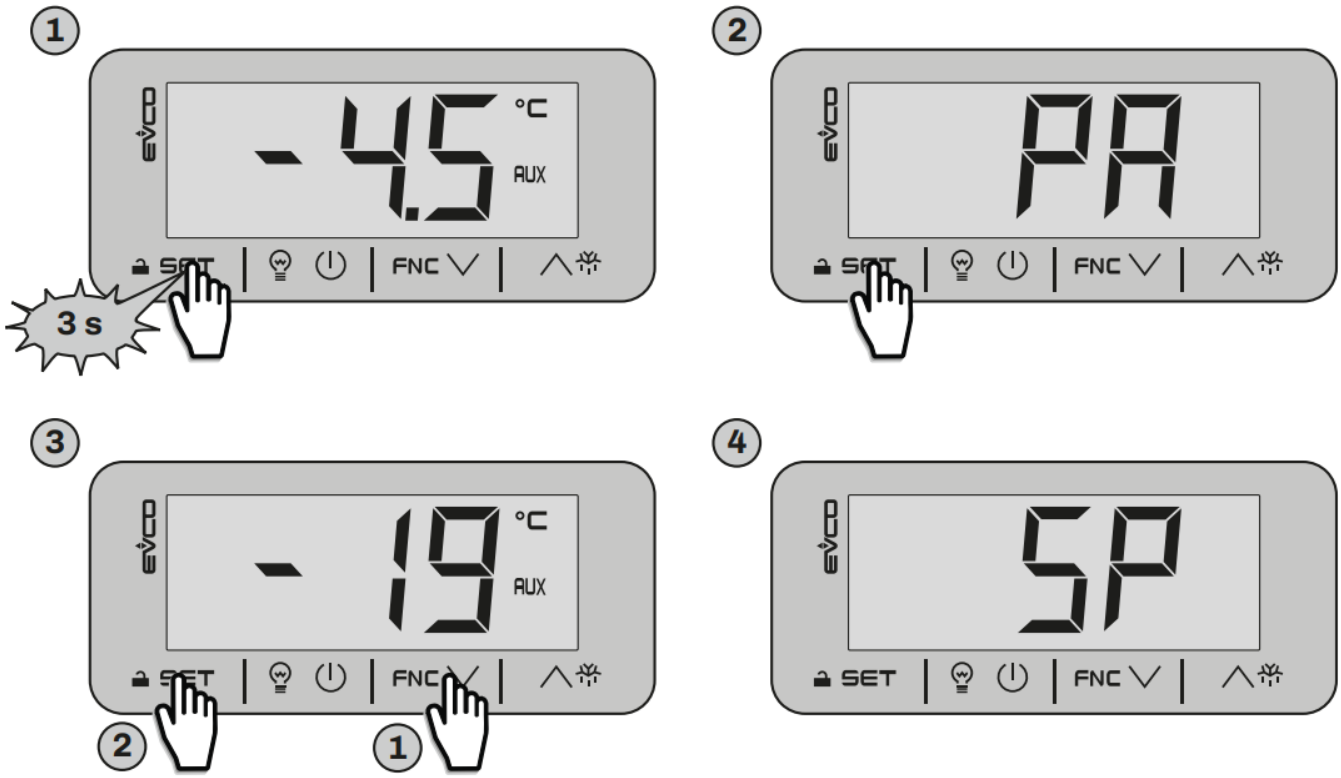


Fig. 14. *Accessing the parameters*

REGULATORS

6.1 FAN

EV3 Web manages a fan according to the Pb1 probe temperature and the SP setpoint.
The configuration parameters are:

Par.	Description	UM	Range
SP	Temperature setpoint.	°C/°F	**r1**…**r2**
r0	Setpoint differential.	°C/°F	0.1…15.0
r1	Minimum value attributable to setpoint.	°C/°F	-30.0…**r2**
r2	Maximum value attributable to setpoint.	°C/°F	**r1**…99.0

6.1.1 Operation

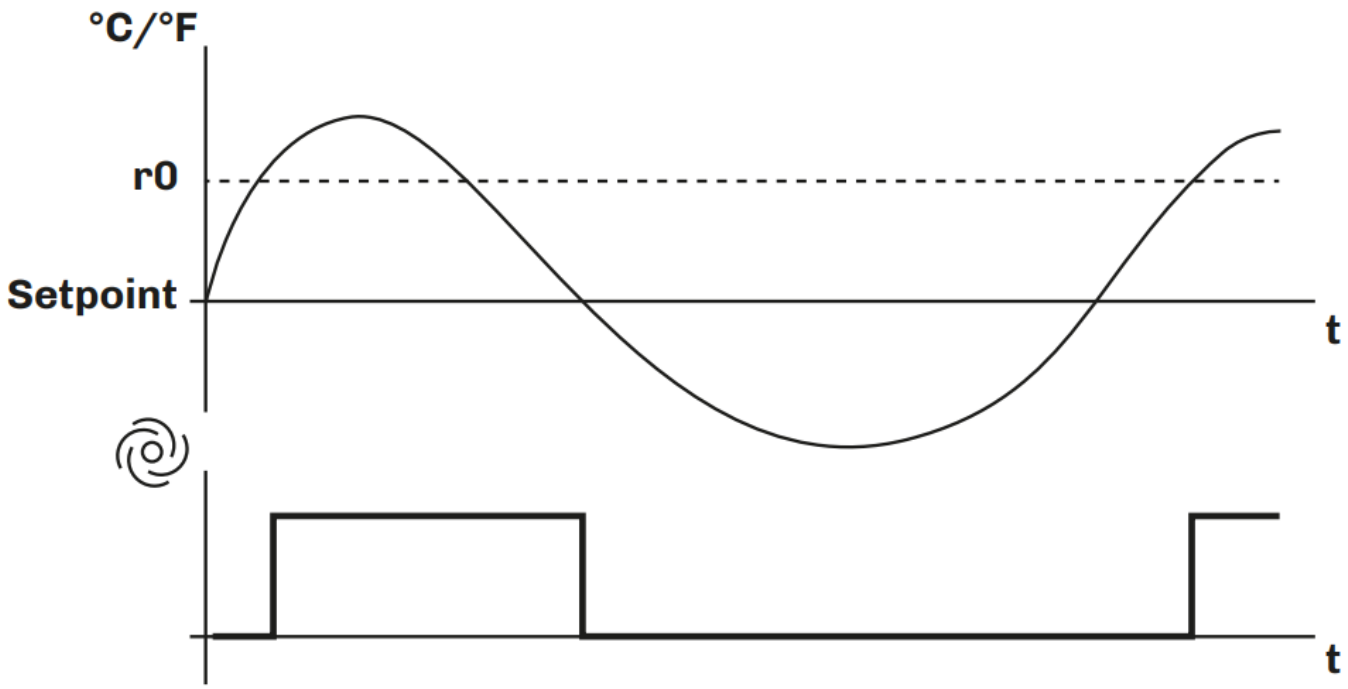


Fig. 15. *Operation of fan*

REMOTE COMMUNICATION CONFIGURATION

7.1 INTRODUCTION

EV3 Web can be configured to connect with EPoCA in two different ways:

- From a PC (Windows only) through EPoCA.exe (online/offline) which can be downloaded from the website: **https://www.evco.it/assets/doc/EVCO-EV3200Web_configurator_for_EPoCA.zip**
- From a smartphone/tablet using the EPoCA START app.

In both cases, the devices must be visible on the local network. If the local network requires a static IP address, configure using the micro-B USB cable.
If used in a subnetwork, configure the BLE parameter for every device from 1 to 10 before searching on the network.

7.1.1 Configuration diagram when using a PC with direct connection via USB

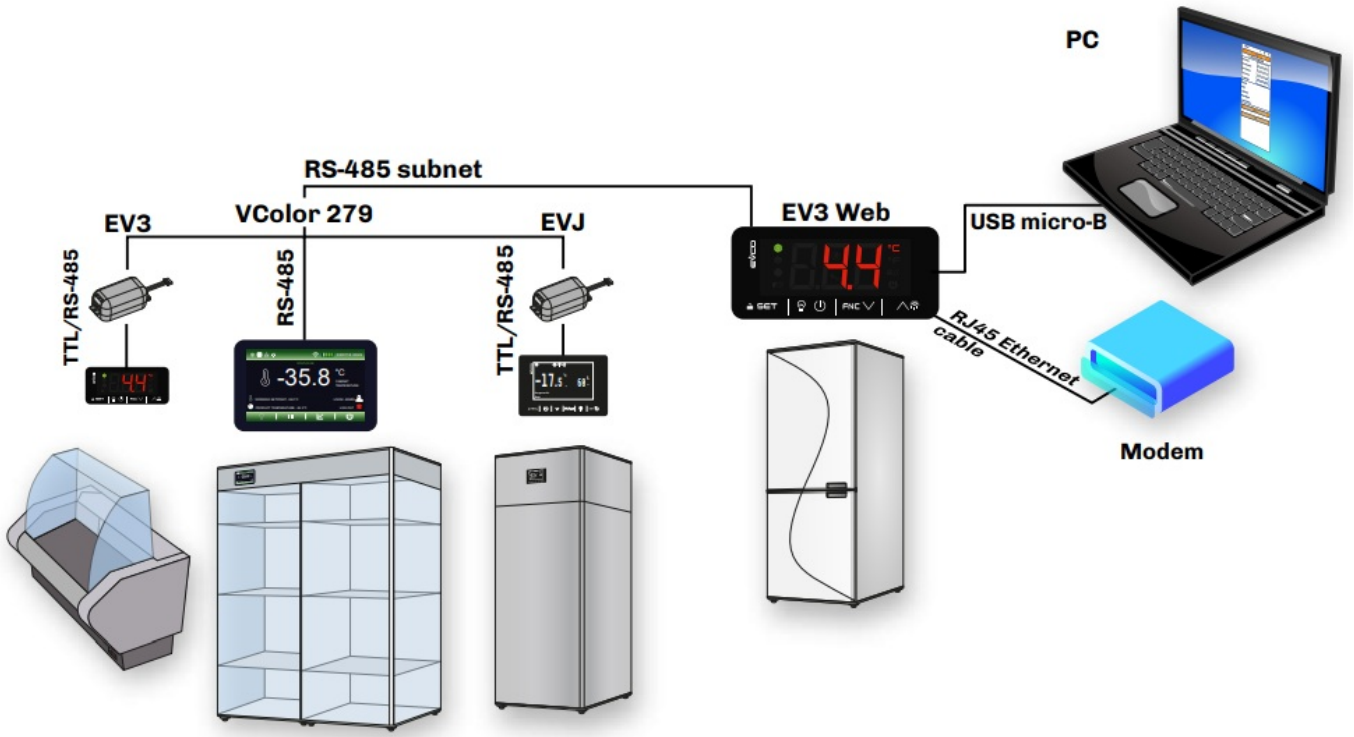


Fig. 16. *Configuration diagram when using a PC - USB*

7.1.2 Configuration diagram when using a PC with connection via Ethernet

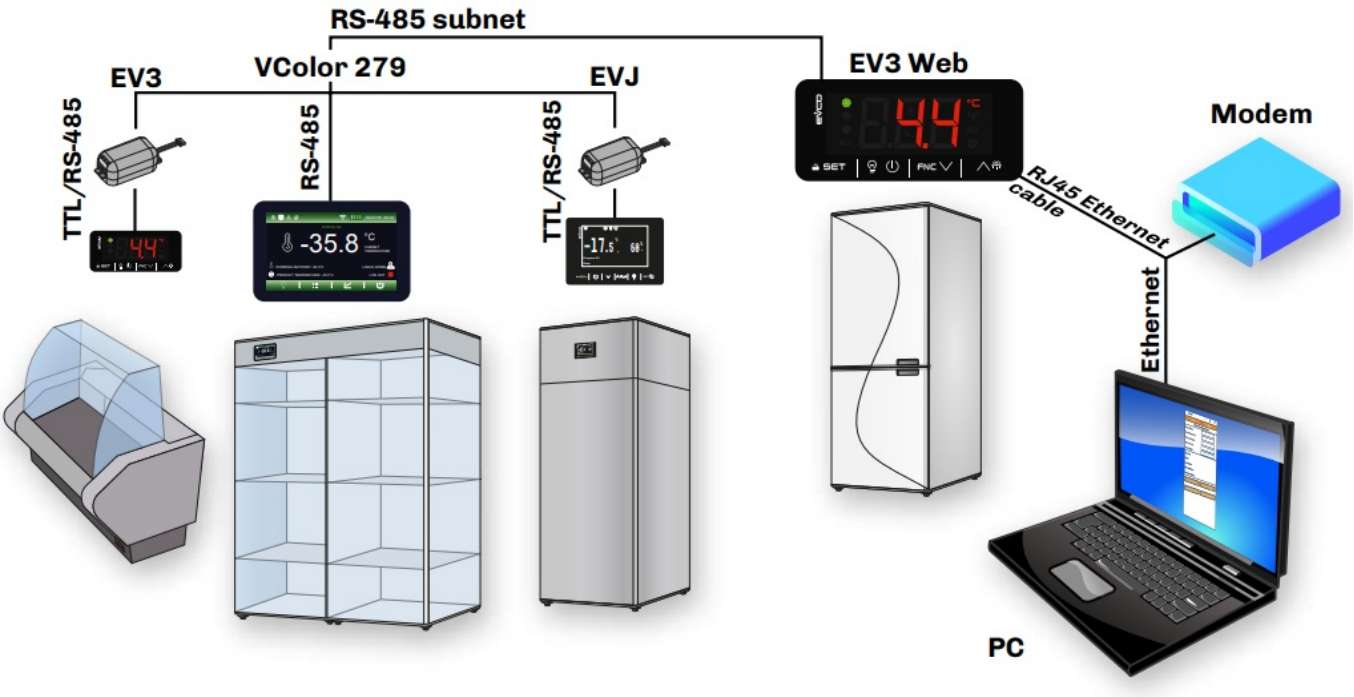


Fig. 17. *Configuration diagram when using a PC - Ethernet*

7.1.3 Configuration diagram when using a smartphone and the EPoCA START app.

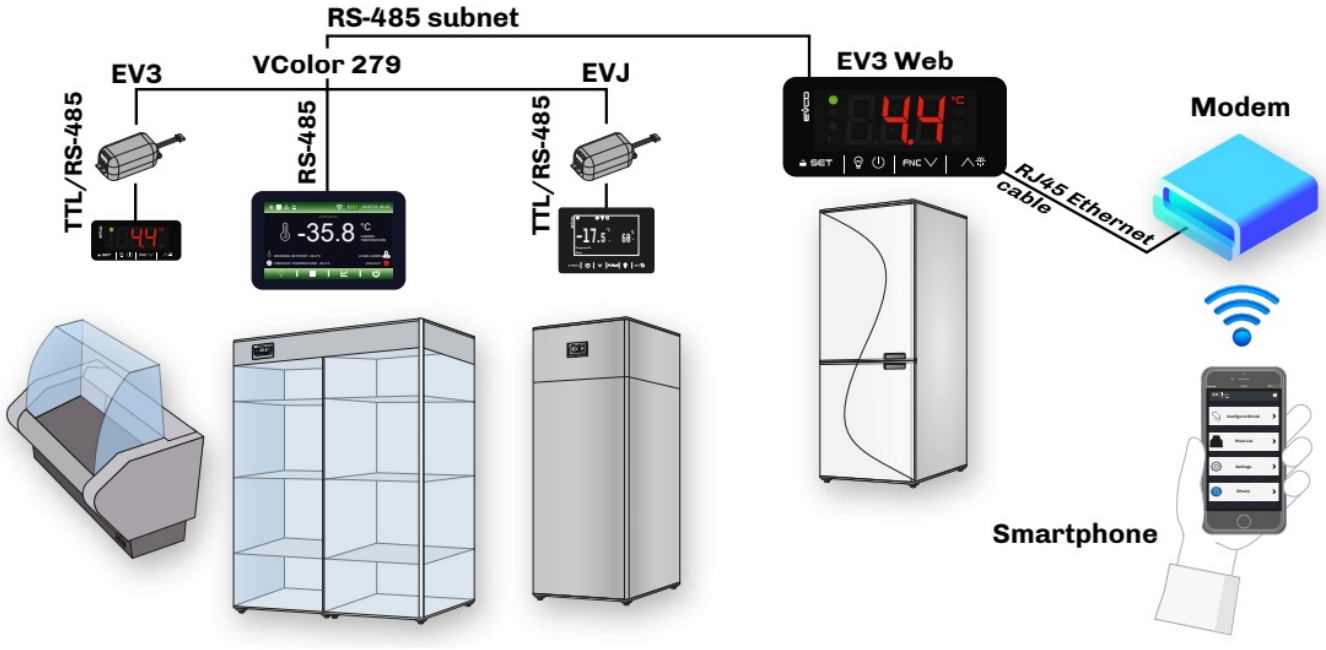


Fig. 18. *Configuration diagram when using a smartphone*

7.2 FIRST CONFIGURATION

7.2.1 Configuration using a PC

Connecting using a micro-B USB cable

1. Connect the micro-B USB cable from the PC to the device;
2. Make sure EPoCA.exe has been installed in the PC and boot up EPoCA.exe;
3. Set the Plant and Device data, save the configuration by pressing Save Config. and continue by pressing Next

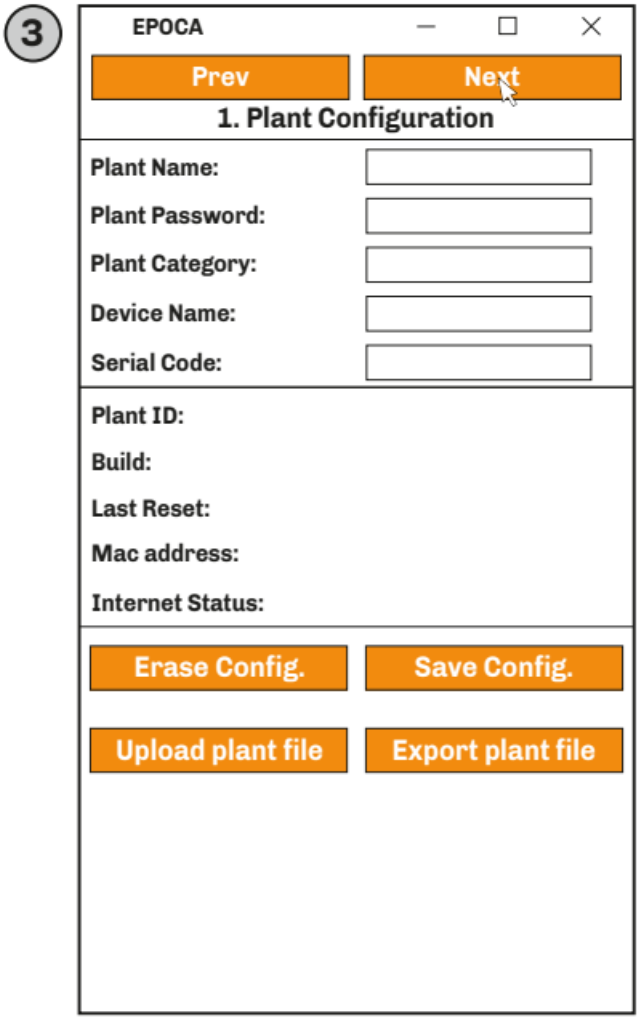


Fig. 19. *Selecting the device and configuring the Plant and Device*

N.B.: Save to continue with configuration by pressing Save Config. .

NOTICE

WRONG OR FORGOTTEN ACCESS CREDENTIALS

Keep your access credentials in a safe place.

case of incorrect or lost login credentials, log in using a USB cable to skip the login procedure.

Other commands:

Command	Description
Erase Config.	Cancels current configuration
Save Config.	Saves current configuration
Upload Plantfile	Uploads a previously saved plant file
Export Plantfile	Saves the plant file in a folder chosen by the user

4. Set the date, time and local time used and press Next ;
5. Set the name of the controllers connected via RS-485 to EV3 Web and press

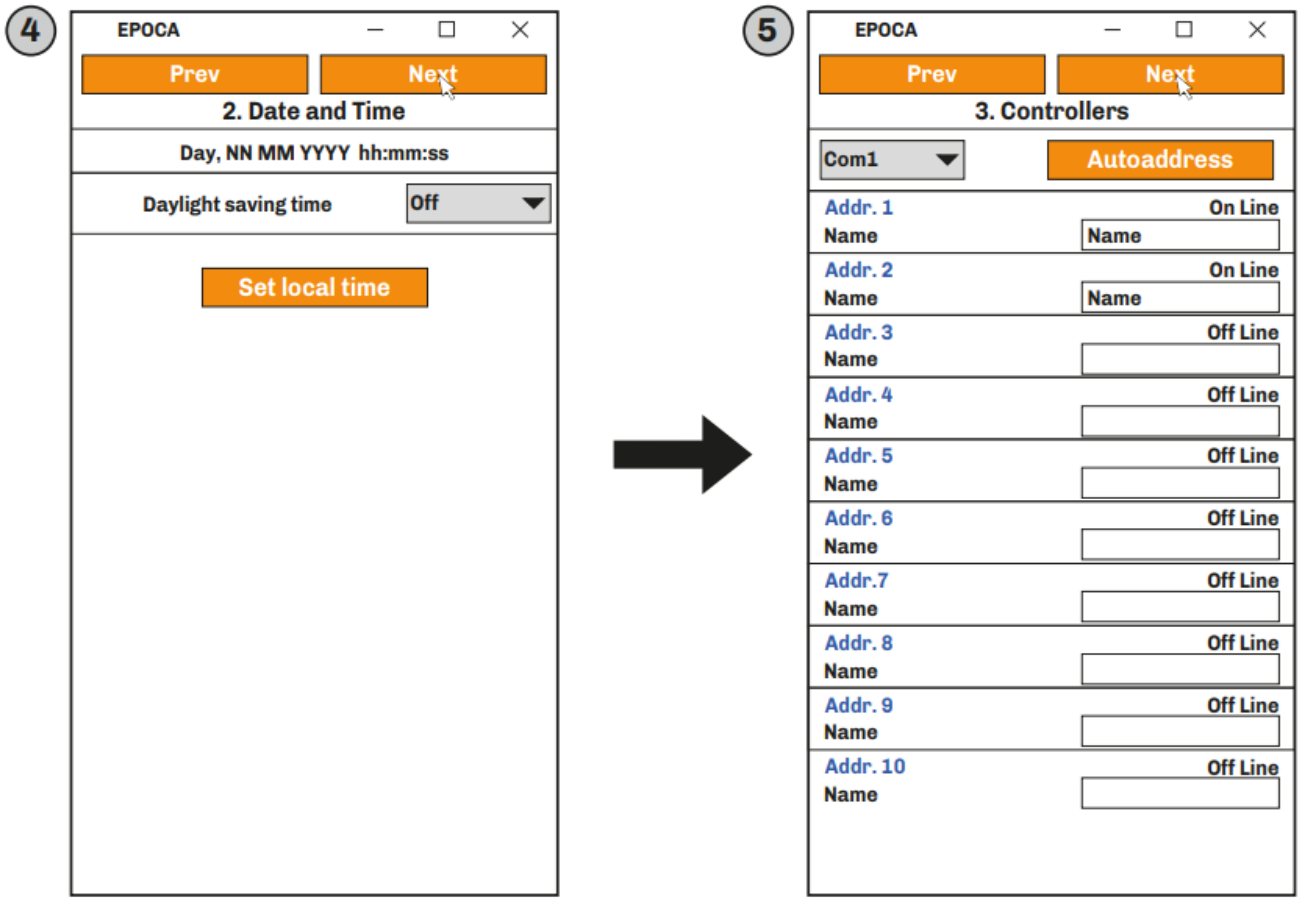


Fig. 20. *Selecting the device and configuring the Plant and Device*

Autoaddress : if the devices are switched on one at a time, this key automatically configures the BLE parameter of the device being switched on.

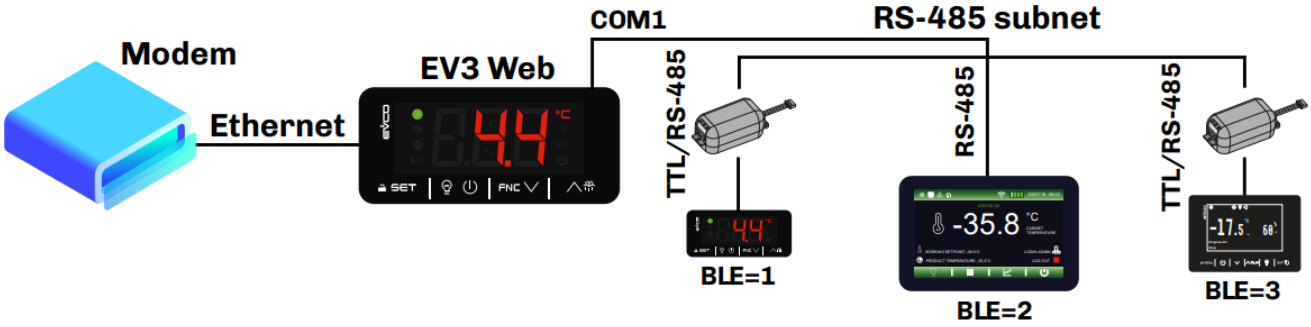


Fig. 21. *Diagram of subnetwork and BLE configuration*

To erase a device and its failed configuration, press Addr. X. A pop-up appears where you can choose to erase the recordings or the configuration of the device.

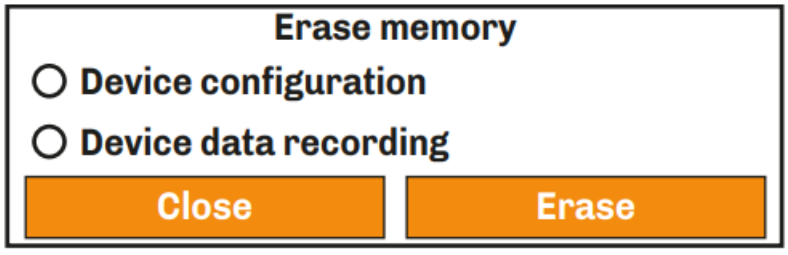


Fig. 22. *Pop-up to erase memory*

6. Set the type of IP address and press Next ;
7. Set the Modbus RTU and Modbus TCP communication parameters and press Next
8. press Configure to complete configuration of the device

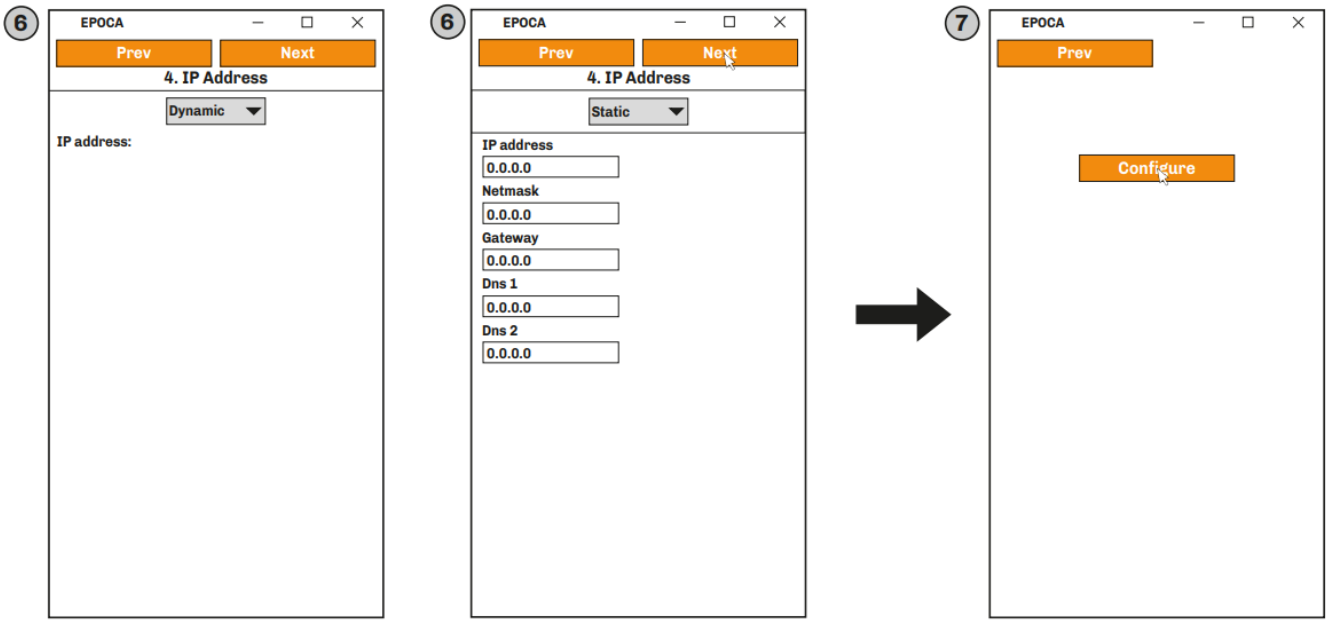


Fig. 23. *Selecting the type of IP address and end of configuration*

Connecting using an Ethernet cable (with connection to modem)

1. Make sure EPoCA.exe has been installed in the PC;
2. Boot up EPoCA.exe, the programme scans the local network (LAN) which the PC is connected to to detect the devices;
3. Select the device to configure and press Next ;
4. Set the Plant and Device data, save the configuration by pressing Save Config. and continue by pressing

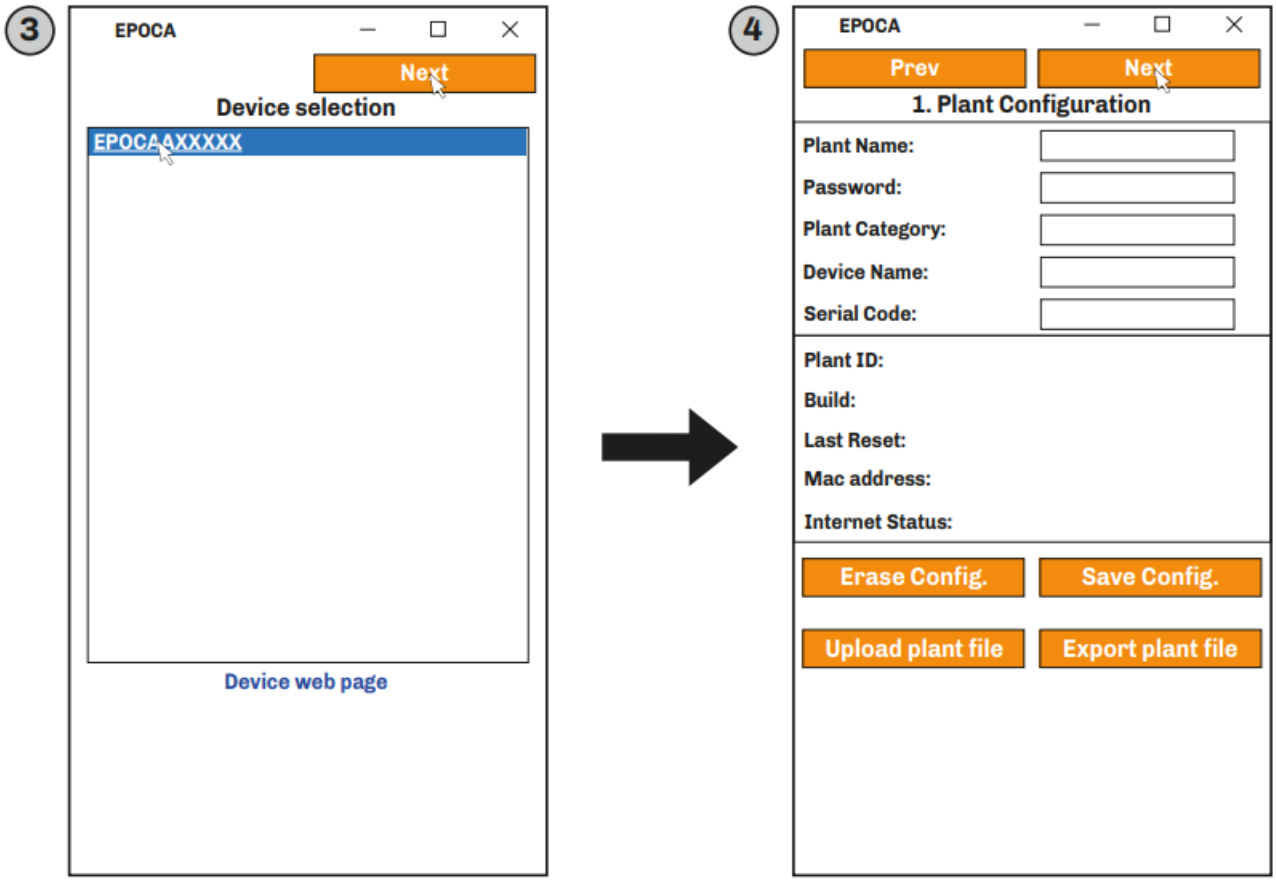


Fig. 24. *Selecting the device and configuring the Plant and Device*

N.B.: Save to continue with configuration.

NOTICE

WRONG OR FORGOTTEN ACCESS CREDENTIALS

Keep your access credentials in a safe place.

case of incorrect or lost login credentials, log in using a USB cable to skip the login procedure.

5. Set the date, time and local time used and press Next ;
6. Set the name of the controllers connected via RS-485 to EV3 Web and press Next

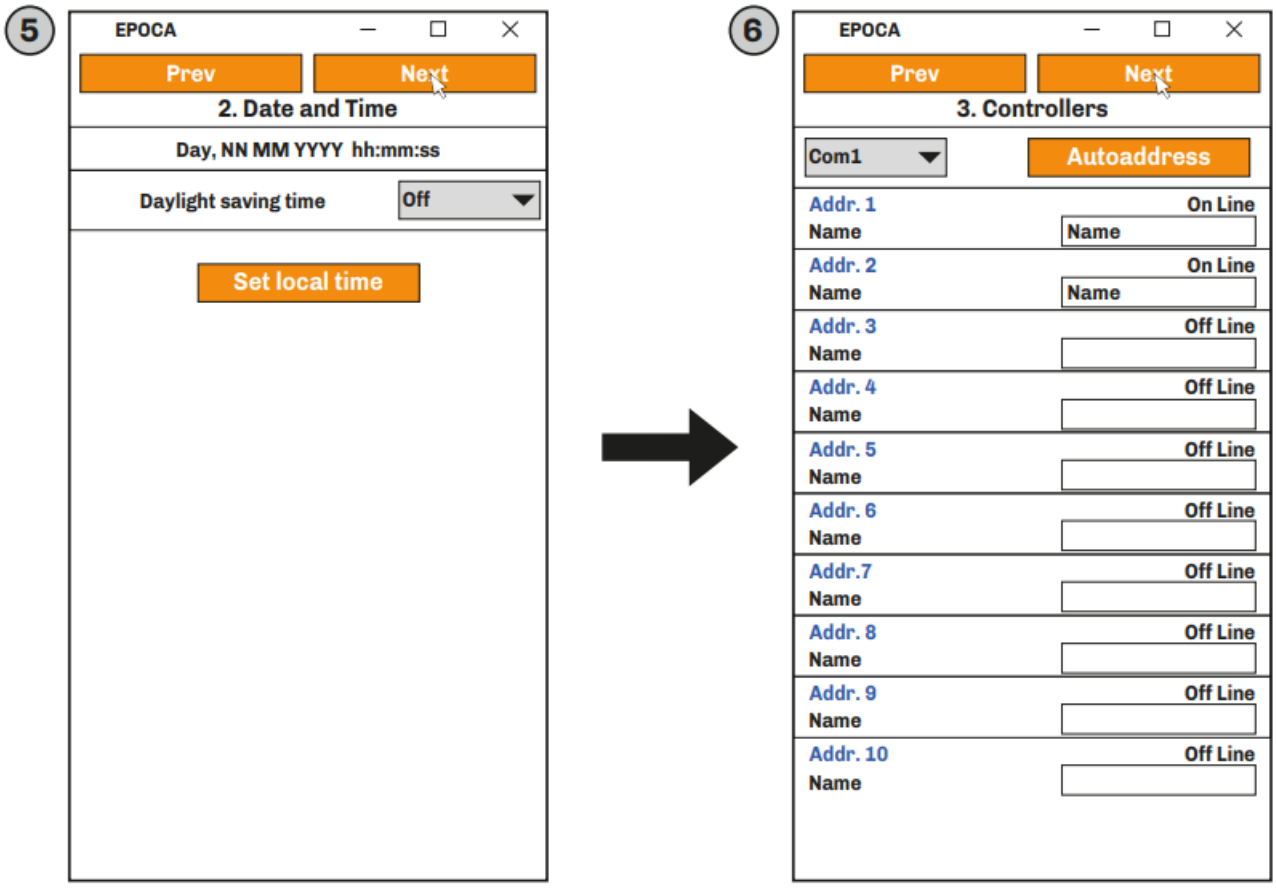


Fig. 25. *Selecting the device and configuring the Plant and Device*

Set the type of IP address and press Next ;

7. Press Configure to complete configuration of the device.
8. Set the Modbus RTU and Modbus TCP communication parameters and press Next.
9. Press Configure to end the instrument configuration phase.

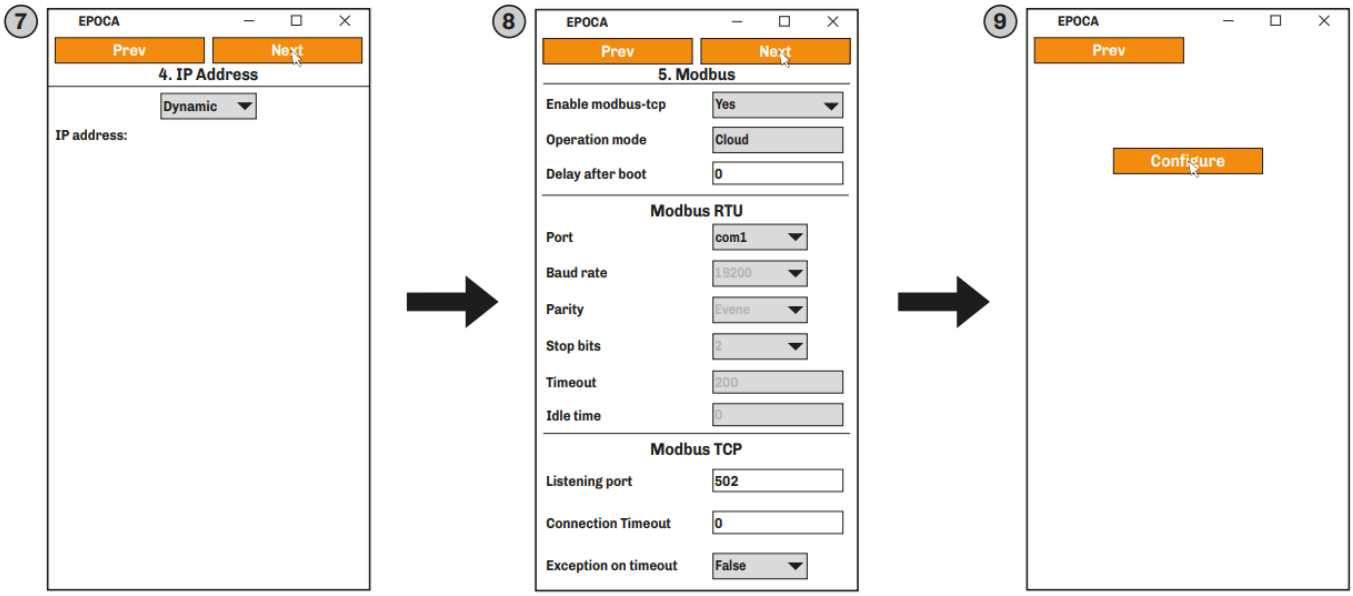


Fig. 26. *Selecting the type of IP address and end of configuration*

- Enable modbus-tcp: Enables/disables Modbus TCP communication.
- Operation Mode: Establishes the operating mode of the Modbus TCP network:
- Raw Bridge: operation for EVCO controllers without functions with RTC and not EPoCA compatible or for third-party controllers;
- Cloud: operation for EPoCA compatible controllers.
- Delay after booting: establishes the minimum time between the controller powering on and the start of communication.
- Modbus RTU: Sets the Modbus RTU serial communication parameters:
- Port: sets the Modbus RTU communication port number on which the device waits for connection requests
- Baud rate: sets the Modbus RTU communication speed (in baud) with the controller;
- Parity: sets the parity bit for data-bit error checking;
- Stop bits: sets the number of stop bits of Modbus RTU communication with the controller;
- Timeout: sets the maximum time allowed for the controller to respond to a request;
- Idle time: sets the minimum time between receiving a response and the subsequent request.
- Modbus TCP: Sets the Modbus TCP serial communication parameters:
- Listening port: sets the Modbus TCP communication port number on which the device waits for connection requests;
- Connection timeout: sets the idle time of Modbus TCP communication to terminate the connection;
- Exception on timeout: sets whether to send an error code after the expiry of the Timeout.

  NOTE: Do not change value 502 TCP Port.

  NOTE: In case of use with EPoCA do not modify the displayed defaults.

7.2.2 Configuration using a smartphone or tablet

To configure EV3 Web using a smartphone or tablet follow these steps:

1. Make sure the EPoCA START app has been downloaded to the smartphone or tablet (otherwise download it from:

   • Google Play Store for smartphone/tablet Android 5.0 or later);

   To download the EPoCA START app from the Google Play Store, scan the QR code in the image below; this

takes you directly to the download page.

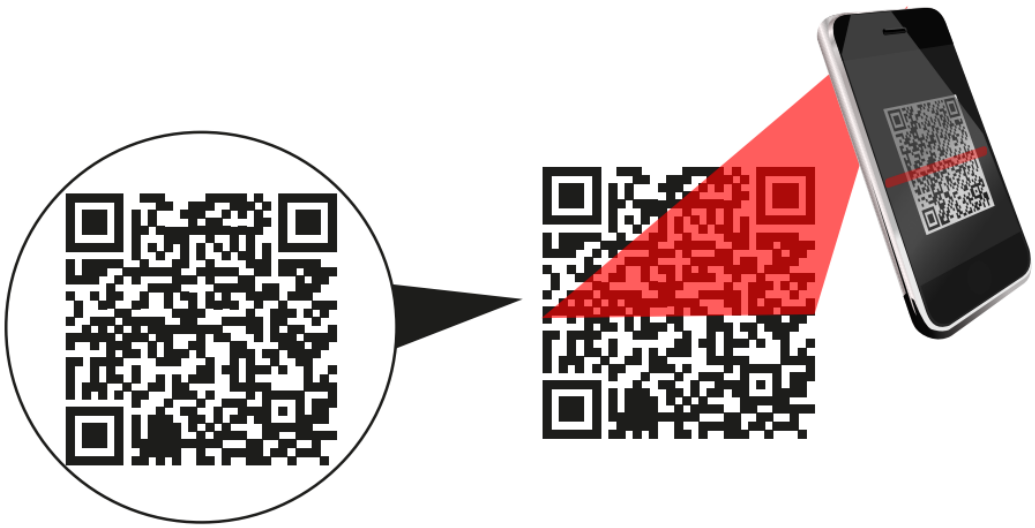


Fig. 27. *Scanning the QR code to download the* ***EPoCA START*** *app*

https://play.google.com/store/apps/details?id=it.evco.epoca

2. Boot up EPoCA START;
3. Touch Configure Devices;
4. Select the device to configure;

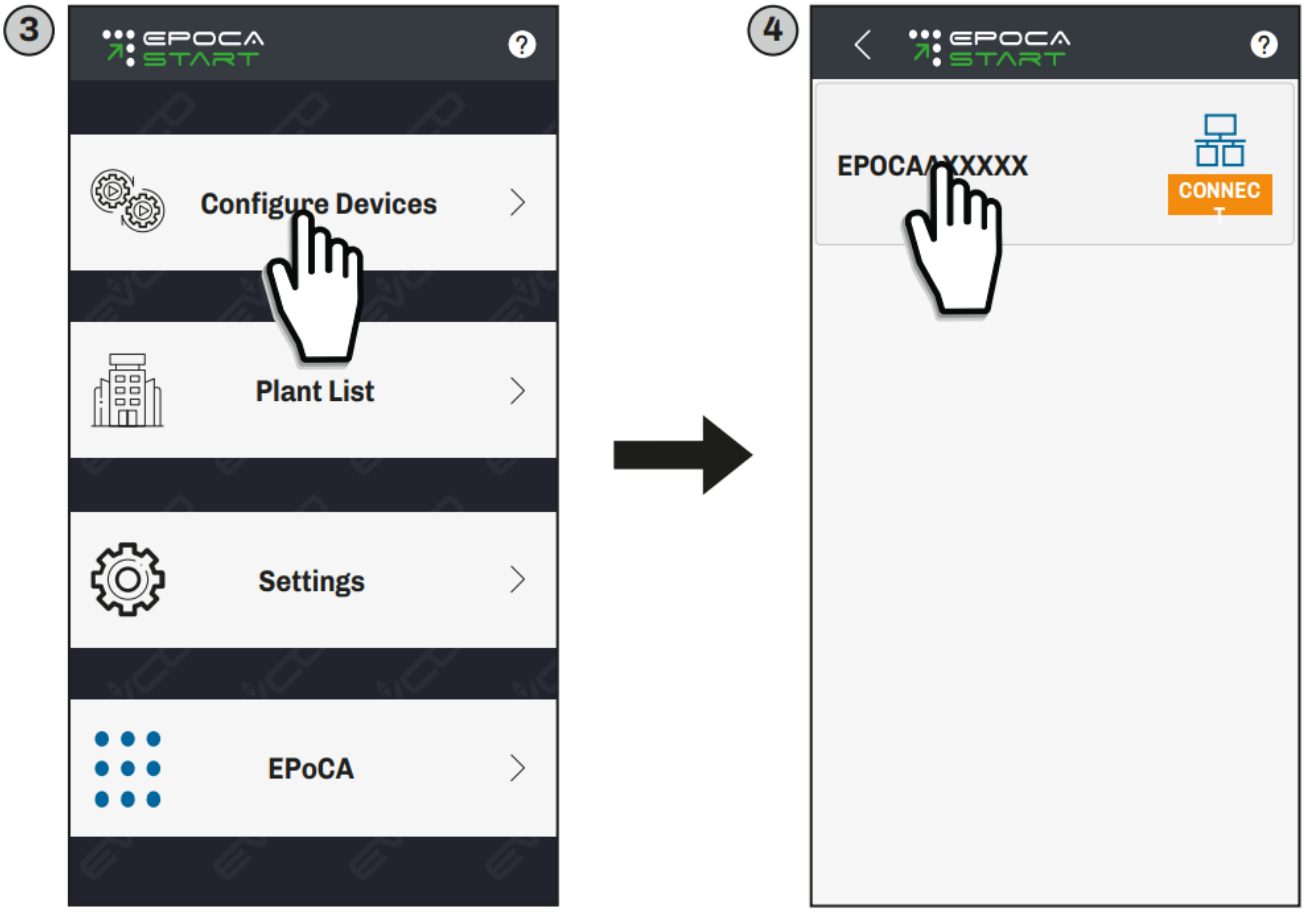


Fig. 28. *HOME screen and selecting the device*

5. Touch Configure, set the Plant data and touch Next.

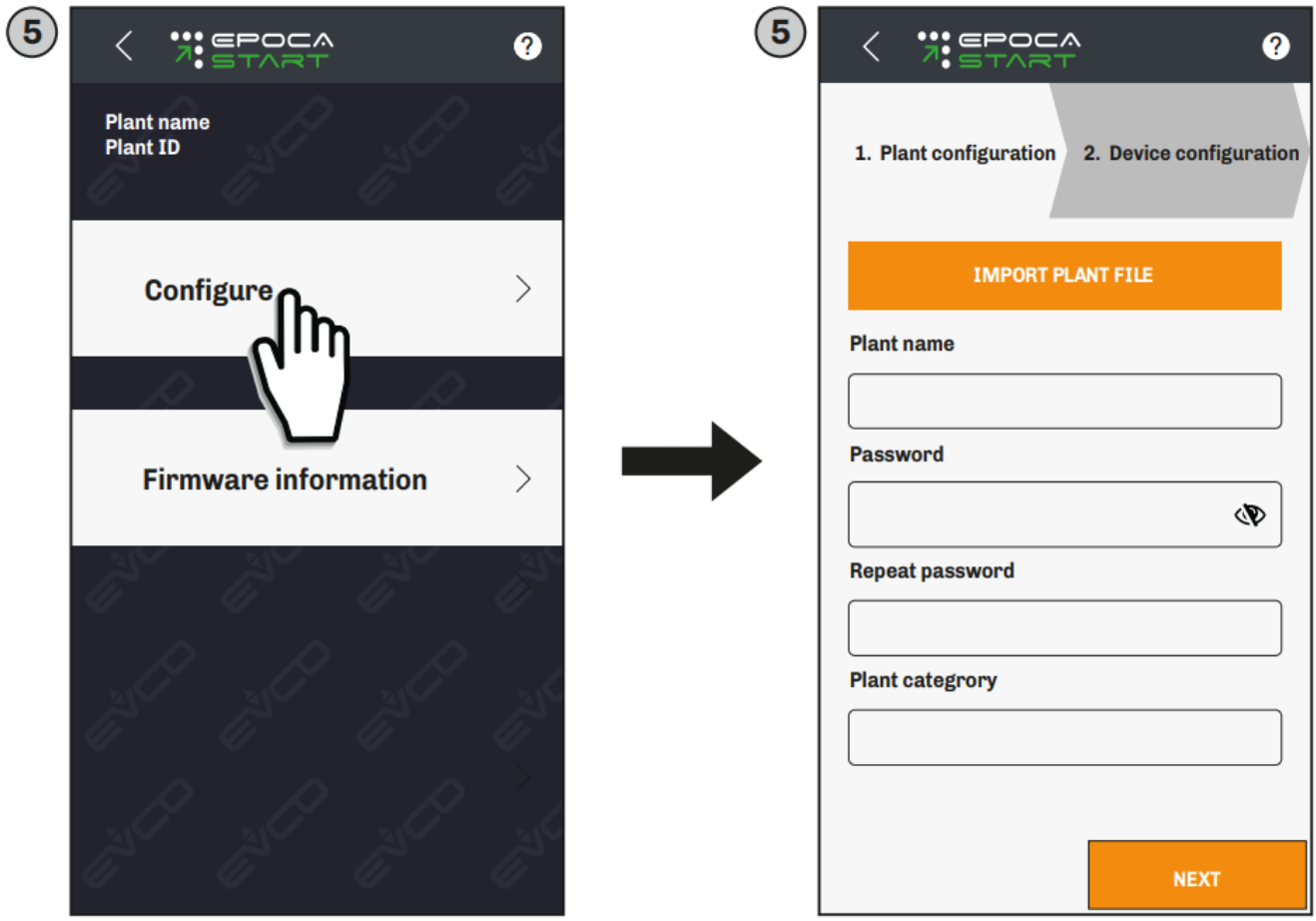


Fig. 29. *Configuring the plant*

6. Insert the device data and touch NEXT; Next.
7. Set the date, time and local time used and touch Next.

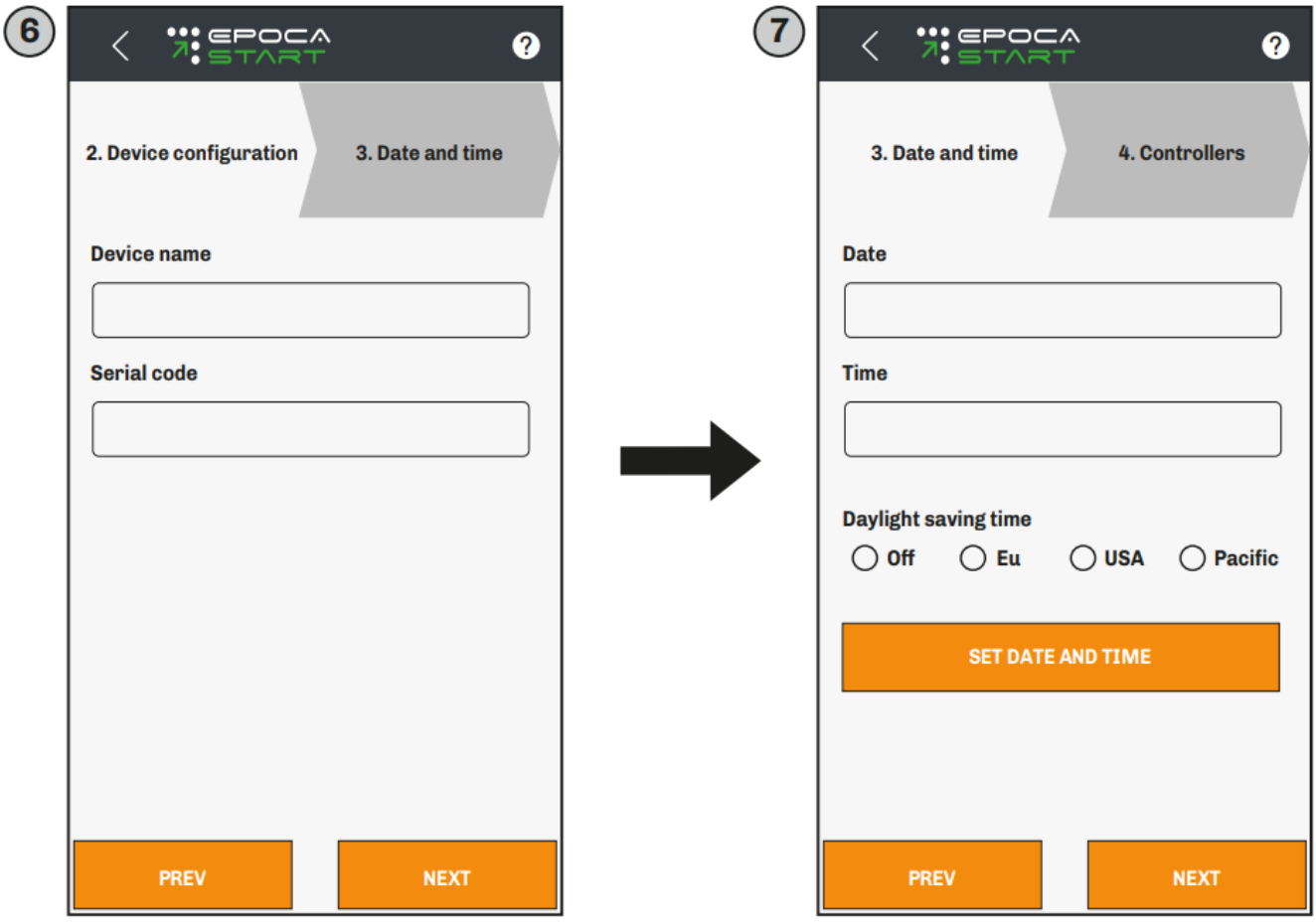


Fig. 30. *Configuring the device, date and time*

8. Set the name of the controllers connected via RS-485 to EV3 Web and touch NEXT Next.
9. Set the type of IP address of the network and touch Next.

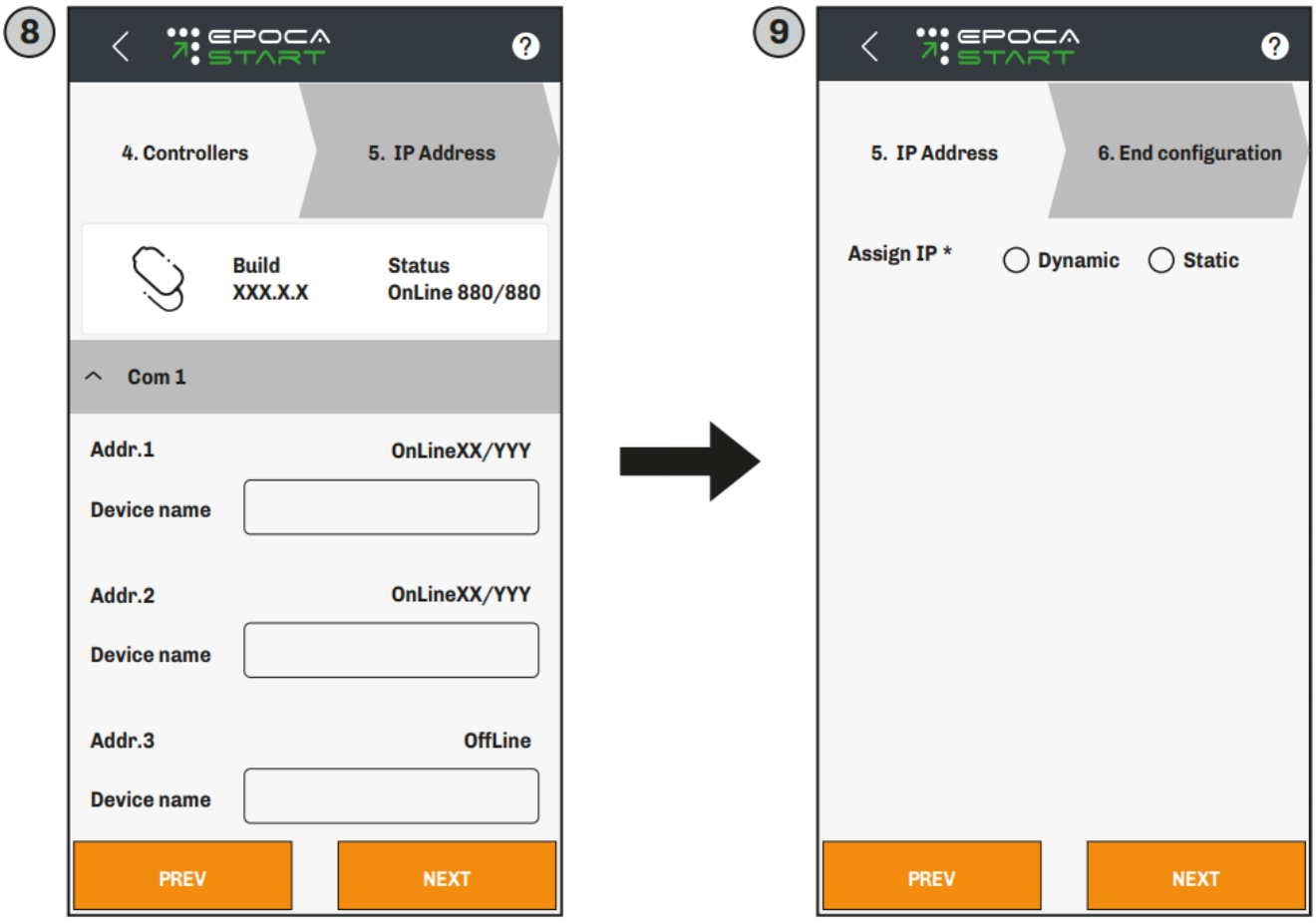


Fig. 31. *Configuring the addresses of the controllers and type of IP address*

When selecting a Static type of IP it is necessary to set other information:

- The IP address that you want to assign;
- Subnet mask (Netmask);
- The Gateway;
- Preferred DNS (DNS 1):
- Alternative DNS (DNS 2).

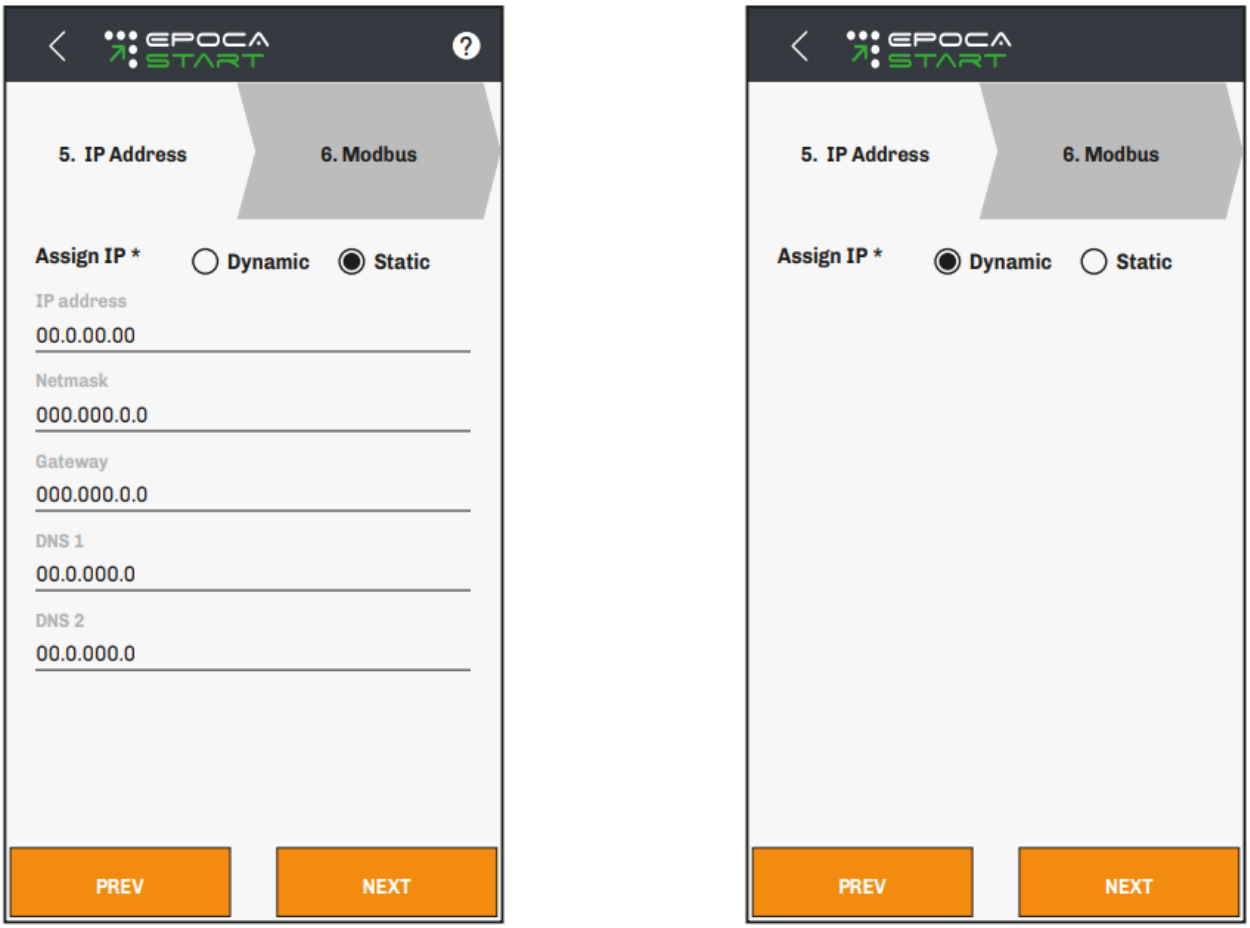


Fig. 32. *Configurazione IP Statico / Dinamico*

If necessary, configure the settings of the Modbus TCP network

- Operation Mode: Establishes the operating mode of the Modbus TCP network:
- Raw Bridge: operation for EVCO controllers without functions with RTC and not EPoCA compatible or for third-party controllers;
- Cloud: operation for EPoCA compatible controllers.
- Boot Delay: establishes the minimum time between the controller powering on and the start of communication.
- Modbus: Sets the Modbus RTU serial communication parameters:
- Baud rate: sets the Modbus RTU communication speed (in baud) with the controller;
- Parity: sets the parity bit for data-bit error checking;
- Stop bits: sets the number of stop bits of Modbus RTU communication with the controller;
- Timeout: sets the maximum time allowed for the controller to respond to a request;
- Idle time: sets the minimum time between receiving a response and the subsequent request.
- Modbus TCP: Sets the Modbus TCP serial communication parameters:
- Connection timeout: sets the idle time of Modbus TCP communication to terminate the connection;
- TCP port: sets the Modbus TCP communication port number on which the device waits for connection requests;

- Exception on timeout: sets whether to send an error code after the expiry of the Timeout.

NOTE: Do not change the value 502 TCP Port.
NOTE: In case of use with EPoCA do not modify the displayed defaults.
Touch **CONFIGURE** to complete configuration of the device;
The next time the device is accessed, it will ask for the access credentials (Plant name, Password).

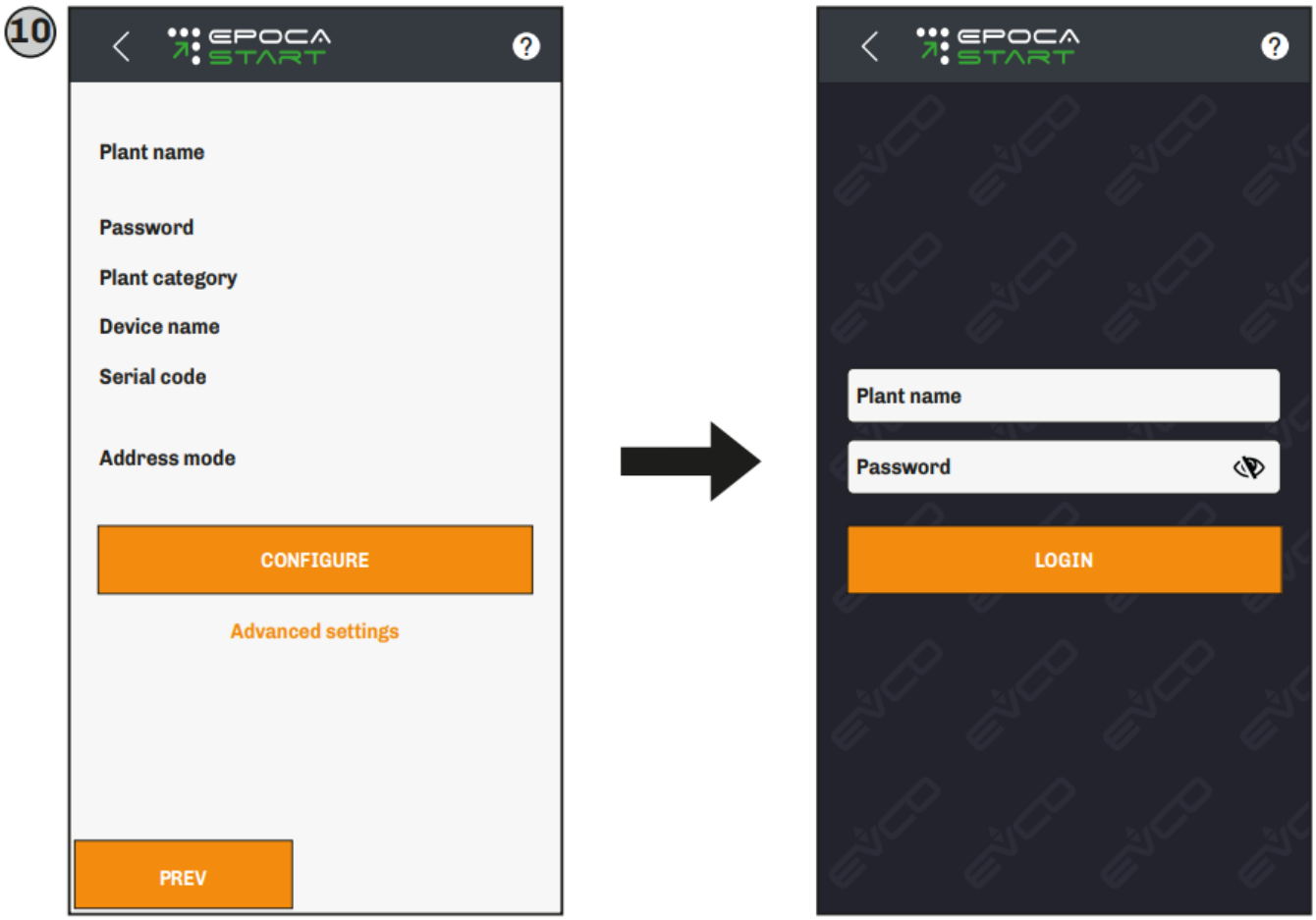


Fig. 34. *End of configuration*

REGULATION PARAMETERS

Description of columns in the Table of Parameters

- Par.: List of configurable device parameters;
- Description: Indicates parameter operation and any possible selections;
- MU: Measurement unit relating to the parameter;
- Range: Describes the interval of values that the parameter can assume. This can be correlated with other instrument parameters (indicated with the parameter code).

  NOTE: if the actual value is outside the permitted limits for that parameter (for example, because other parameters defining the aforementioned limits have been altered), the value of the violated limit is displayed instead of the actual value;
- Default: Indicates the pre-set factory configuration;
- PW: Indicates the access level for the parameter.
- MODBUS address: Indicates the address of the MODBUS register containing the resource you want to access.

8.1 TABLE OF REGULATION PARAMETERS

Par.	Description	MU	Range	Default
SETPOINT Group				
SP	Temperature setpoint.	°C/°F	**r1**…**r2**	0,0
ANALOGUE INPUTS Group				
CA1	Probe Pb1 offset.	°C/°F	-25.0…25.0	0,0
P0	Type of probe. **0** = PTC; **1** = NTC.	—	0/1	1
P1	Enable decimal point in °C. **0** = No; **1** = Yes.	—	0/1	1
P2	Temperature measurement unit (if the value is changed, th e temperature parameter limits must be reset manually). **0** = °C; **1** = °F.	—	0/1	0
TEMPERATURE REGULATION Group				
r0	Setpoint differential.	°C/°F	0.1…15.0	2,0
r1	Minimum setpoint.	°C/°F	-99.0…**r2**	-50,0
r2	Maximum setpoint.	°C/°F	**r1**…199	50,0
PASSWORD Group				
POF	Enable stand-by key (ON/OFF). **0** = Disabled; **1**= Enabled.	—	0/1	1
PAS	Level 2 password to access parameters (installer).	—	-99… 999	-19
PA1	EVlink/EVconnect user password (not entered on device).	—	-99… 999	426
PA2	EVlink/EVconnect service password (not entered on device).	—	-99… 999	824

CLOCK Group				
Hr0	Enable clock. **0** = Disabled; **1**= Enabled.	—	0/1	0
REMOTE COMMUNICATION Group				
BLE	Reserved. **Do not change**.	—	—	1
rE0	Recording interval.	min	0…240	15
MODBUS CONFIGURATION Group				
LA	MODBUS protocol controller address.	—	0…247	247
Lb	MODBUS transmission speed (baud rate). **0** = 2400; **1** = 4800; **2** = 9600; **3** = 19200.	baud	0…3	2

MODBUS TCP FUNCTIONS AND RESOURCES

9.1 INTRODUCTION

The Modbus TCP is a variant of Modbus and is based on the TCP that allows sending messages over an Intranet and the Internet.
The Modbus TCP uses binary data encoding and the TCP detection mechanism for transmission errors. It also uses the Master – Slave paradigm, in the Client – Server variant between devices connected to a TCP Ethernet network.
Four types of messages are used in this type of communication.

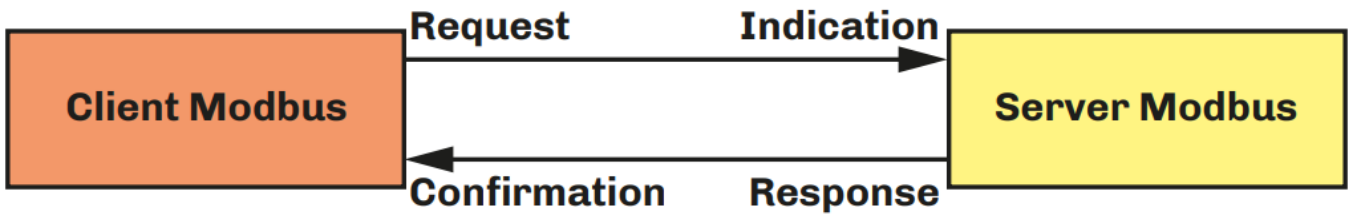


Fig. 35. *Diagram showing message exchange in a Modbus TCP communication*

The Modbus TCP message exchange service is used to exchange data in real time between two application devices, between application devices and other devices, between HMI (Human Machine Interface) or SCADA applications and devices, and between PCs and application devices that provide online services.
Only the client device identified as the master can initiate a transaction, building the message ADU, whose function code tells the server what action to take.

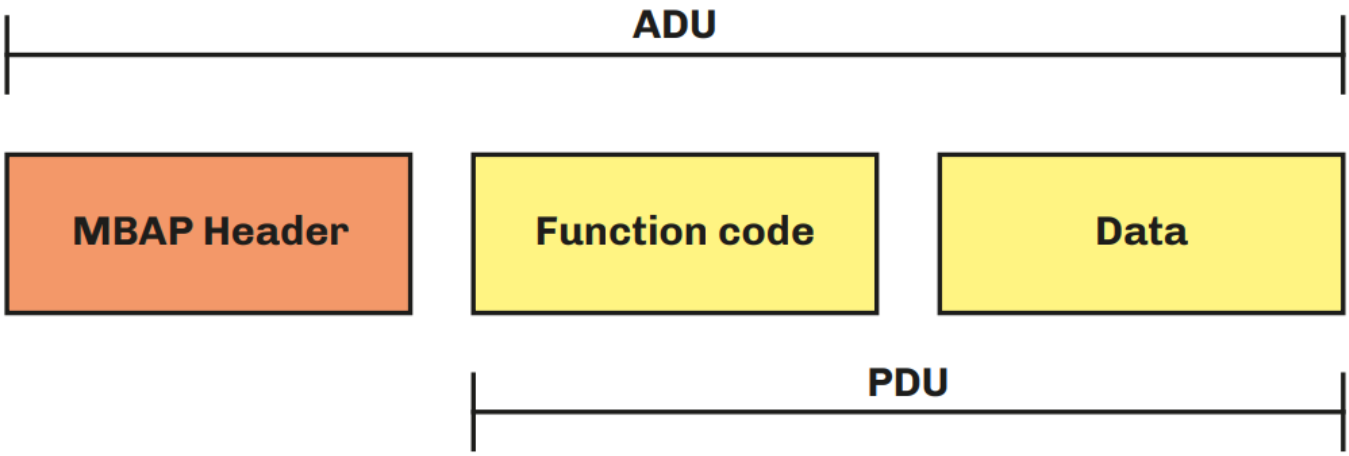


Fig. 36. *Framing of a message using the Modbus TCP*

For further information relating to the Modbus protocol, visit the official Modbus website: www.modbus.org.

9.2 MANAGING MODBUS CONNECTIONS OVER A TCP NETWORK

EV3 Web supports up to 5 concurrent Modbus client connections. If a new connection request is received and the number of connections is already at the limit, the connection is rejected.

9.3 MODBUS MESSAGE STRUCTURE

The Modbus protocol uses a 16-bit word. The Modbus message starts with a header. A Modbus message uses a Modbus unction code as the first byte.

A description of the structure of a modbus message header is given below.

Unique identifier	**Type of protocol**	**Command length**	**Unit ID**	**Modbus message**
2 bytes	2 bytes	2 bytes	1 byte	N-bytes
Field associating a request with a r esponse	The Modbus field value is always 0	The field value is the size of the rest of the message	This field is used to i dentify a remote serv er located on a non-T CP network (for seria l connection)	The first byte is the M odbus function code

9.4 MODBUS FUNCTIONS AND REGISTERS

The Modbus registers for the device are organised around the four types of basic data reference indicated above, and this type of data is further identified by the first number of the address.

9.4.1 Available Modbus commands and data areas

The commands implemented are as follows:

Command	**Description**
03 (hex 0x03)	Resource reading command
06 (hex 0x06)	Resource writing command
16 (hex 0x10)	Writing command for one or more registers

9.5 ADDRESS CONFIGURATION

Node address 0 is used exclusively for broadcast messages, recognized by all servers. To a broadcast message, the Server devices do not respond.

To work with Modbus TCP the BLE parameter must be 1. In this case the LA, Lb and BLE parameters must not be

modified.
The address of a device within a Modbus message is set by the LA parameter.
Address 0 is only used for broadcast messages, recognised by all slaves. Slave devices do not respond to a broadcast message.
Unit address: this is the address of the node that allows communicating with the connected instrument or with other slaves.
Holding register number: modbus addresses of each instrument.
Modbus TCP default port: 502.

9.6 OPERATION

9.6.1 Stand-alone operation

To communicate solely with EV3 200 Web, set the Destination ID of the modbus message to 247 (value set by the BLE = 1 parameter).

NOTICE

NO COMMUNICATION

Do not change the default value of the BLE parameter.

9.6.2 Cloud + Modbus TCP

In this operating mode it is possible to use up to 10 devices (1 EV3 Web + 9 compatible EPocA devices)

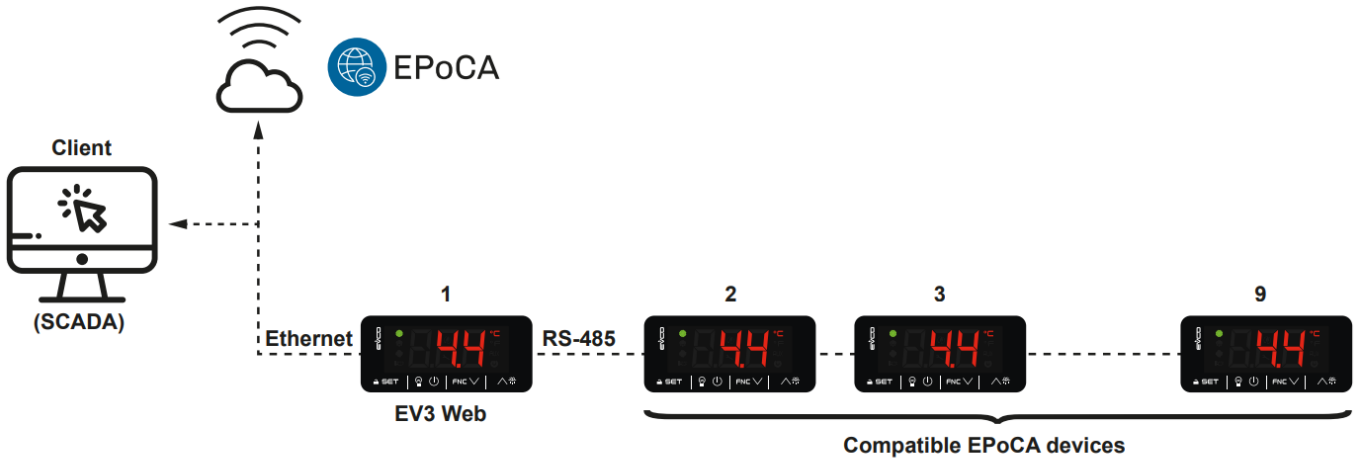


Fig. 37. *Cloud + Modbus TCP*

Setup

- Modbus TCP = 1;
- Operation Mode = Cloud.

9.6.3 Modbus TCP only

In this operating mode it is possible to use up to 20 devices (1 EV3 Web + 19 compatible EPocA devices).

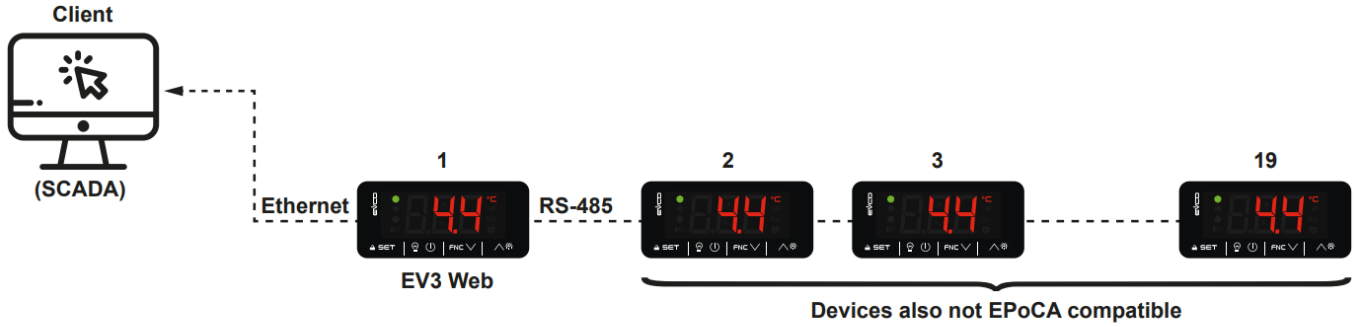


Fig. 38. *Modbus TCP only*

Setup

- Modbus TCP = 1;
- Operation Mode = Raw Bridge.

9.7 MODBUS TABLES CONTENT

Table content description

The tables below contain the information required to access the resources properly and directly.
There are 2 tables:

- Modbus parameter table, which contains all the configuration parameters for the device and the corresponding addresses
- Modbus resource table, which contains all the status (I/O) and alarm resources in the device memory.

Description of columns in the Table of addresses

- Par.: List of configurable device parameters;
- Description: Indicates parameter operation and any possible selections;
- UM: Measurement unit relating to the parameter;
- Range: Describes the interval of values that the parameter can assume. This can be correlated with other instrument parameters (indicated with the parameter code).

  NOTE: If the actual value is outside the permitted limits for that parameter (for example, because other parameters defining the aforementioned limits have been altered), the value of the violated limit is displayed instead of the actual value;
- Val. Adr.: Indicates the address of the Modbus register containing the resource you want to access;
- Filter value: bit position of the data to be considered in the holding register. This information is always provided when the register contains more than one piece of information and it is necessary to distinguish which bits actually represent the data (the useful size of the data indicated in the DATA SIZE column should also be taken into account);

  NOTE: Some holding registers contain two separate fields: one contained in the MSB (most significant byte) and the other in the LESS.
- **R/W:** Indicates the option of reading or writing the resource:
  - **R**: The resource is read-only;
  - **W**: The resource is write-only;
  - **R/W**: The resource can be both read and
  - **CPL**: When the fields indicates Y, the value read by the register needs to be converted because the value represents a number with a sign. In the other cases the value is always positive or zero.
  - **DATA SIZE**: Indicates the size in data bits:
    - **WORD** = 16 bits
    - **Byte** = 8 bits
    - The “**n**” bit = ..15 bit depending on the value of “n”.

9.8 EV3 WEB MODBUS ADDRESSES

9.8.1 Table of Modbus Parameters

Par.	Description	Val. Adr.	Filter value	R/W	DATA SIZE	CPL	Range	MU
SETPOINT group								
SP	Temperature setpoint.	1538	—	RW	WORD	Y	**r1**…**r2**	°C/°F
ANALOGUE INPUT group								
CA1	Probe Pb1 offset.	1539	—	RW	BYTES	Y	-25.0…25.0	°C/°F
P0	Probe type.	1542	—	RW	BYTES	—	0/1	—
P1	Enables decimal point in °C.	1543	—	RW	BYTES	—	0/1	—
P2	Temperature unit of measure (changing value means that the temperature parameter limits will need to be reset manually).	1544	—	RW	BYTES	—	0/1	—
TEMPERATURE MANAGEMENT group								
r0	Setpoint differential.	1550	—	RW	BYTES	—	0.1…15.0	°C/°F
r1	Minimum setpoint.	1551	—	RW	BYTES	Y	-99.0…**r2**	°C/°F
PASSWORD group								
POF	Enable standby key (ON/OFF).	1648	—	RW	BYTES	—	0/1	—
PAS	Level 2 (Installer) parameters password.	1649	—	RW	WORD	Y	-99…999	—
PA1	EVlink/EVconnect user password (not via instrument).	1650	—	RW	WORD	Y	-99…999	—
PA2	EVlink/EVconnect password service (not via instrument).	1651	—	RW	WORD	Y	-99…999	—
CLOCK group								

Hr 0	Enable clock.	1652	—	RW	BYTES	—	0/1	—
REMOTE COMMUNICATION group								
BLE	Reserved. **Do not change** .	1653	—	RW	BYTES	—	—	—
rE 0	Recording interval.	1654	—	RW	BYTES	—	0…240	min
rE 1	Value to record.	1655	—	RW	BYTES	—	0…5	—
MODBUS CONFIGURATION group								
LA	Modbus protocol controller address.	1656	—	RW	BYTES	—	0…247	—
Lb	Modbus transmission speed (baud rate).	1657	—	RW	BYTES	—	0…3	baud

9.8.2 Table of Modbus Resources

Code	Description	Val. Adr.	Filter value	R/W	DATA SIZE	CPL
—	Probe 1.	514	—	R	WORD	Y
—	AUX output.	386	3	R	1 BIT	—
—	Digital input **ID3**.	258	3	R	1 BIT	—
—	Device ON/OFF status.	1282	—	RW	BYTES	—
—	AUX status.	1284	—	RW	1 BIT	—
—	Setpoint.	1369	—	R	WORD	Y
—	Service request.	10439	10	RW	1 BIT	—
—	Setpoint reached.	10437	11	RW	1 BIT	—
—	End of cooling.	10437	10	R	1 BIT	—
—	Real time clock. MonthYear.	10321	—	RW	WORD	—

—	Day of the week	10322	—	RW	WORD	—
—	Tenth of a second.	10324	—	RW	WORD	—
—	Minutes Hours.	10323	—	RW	WORD	—
—	Firmware identifier.	65289	—	R	WORD	—
—	Firmware revision.	65290	0…7	R	8 BIT	—
—	Firmware variations (MSB).	65290	8…15	R	8 BIT	—
—	Prog. Firmware.	65291	—	R	WORD	—
—	Serial number.	65521 … 65524	—	R	WORD	—
iA	Digital input alarm **ID3**.	770	6	R	1 BIT	—
Pr 1	Temperature probe error.	770	0	R	1 BIT	—
RT C	Clock alarm.	770	13	R	1 BIT	—
Ct h	Compressor thermal switc h alarm.	770	12	R	1 BIT	—

DIAGNOSTICS

The table below lists alarms with their corresponding solutions. To signal an alarm, the LED alarm lights up A and the buzzer sounds. Every alarm is recorded in the Alarm menu.

10.1 EV3 Web alarms table

Code	Description	Cause	Effects	Resolution
Prl	Probe error	•Probe not working •Probe incorrectly co nnected •Incorrect type of pro be	•Code Prl displayed •Alarm output ON •Regulation suspended	•Check the type of probe (P0) •Check probe wiring •Change type of probe
rtc	Clock alarm	Clock (RTC) alarm not working	Clock-connected functions not present or not synchronised w ith the actual time	Set the right time. If the error persists, replace th e device (RTC battery dead)
iA	Multi-purpose input alarm	Digital input activated	•Code iA displayed •No effect on regulation	Check for and remove the cau se of the alarm on the digital i nput

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Documents / Resources

	EVCO EV3 WEB Gateway Network 10 Devices [pdf] Instruction Manual EV3 WEB Gateway Network 10 Devices, EV3 WEB, Gateway Network 10 Devices, Network 10 Devices, Devices

References

- The Modbus Organization