

E-kit

User Manual



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1 - General information

Recipients of this document

This document is intended for system integrators.
A system integrator is an experienced person who is perfectly familiar with how to physically and functionally connect different systems (hardware devices and/or software applications) and who works in compliance with the laws in force.

Purpose of the manual

The purpose of this manual is to guide the user step by step through the E-kit commissioning operations. The manual includes general information, with details on cyber security, a brief description of the product, instructions on how to connect the hardware, instructions on how to configure and use E-kit.

Other useful documentation

Document	Description	Link
E-learning	Interactive guide to use E-kit in all its phases: configuration, creation of models , provisioning until the data is displayed on the Energy Manager platform	https://mylearning.abb.com/coursepage/37415_enUS/ExpertusONE_1
Modbus map	Document for system integrators with Modbus map exhibited by E-kit	https://search.abb.com/library/Download.aspx?DocumentID=1SDH002281A1001&LanguageCode=en&DocumentPartId=&Action=Launch
Commissioning Rules and FAQ	Collection of frequently asked questions and tips to best configure E-kit. Document continuously updated with information gathered from the field	https://search.abb.com/library/Download.aspx?DocumentID=1SDH002312A1001&LanguageCode=en&DocumentPartId=&Action=Launch

Cyber security disclaimer

E-kit is designed to be connected and to communicate information and data via a network interface, which must be connected to a secure network.

Solely the user is responsible for continuously providing and guaranteeing a secure connection between the E-kit product and the network and establishing and maintaining appropriate measures (for example: installation of firewalls, application of authentication measures, data encryption, installation of antivirus programs, etc.). The user must protect the E-kit product, the network, his/her system and his/her interfaces from all types of security breach, unauthorized access, interference, intrusion, loss and/or theft of data or information. ABB and its affiliates are not liable for damages and/or losses related to such security breaches, unauthorized accesses, interference, intrusion, loss and/or theft of data or information.

The ports used by E-kit are outlined in the table below

Protocol	Port
ABB netConfig	UDP 24576
Online access with driver 3S UDP BIKDrvUdp (with scan)	UDP 1740
Online access with driver 3S TCP/IP BIKDrvTcp (no scan)	TCP 11740
Modbus TCP Server	TCP 502
Web Server	TCP 80/443
FTP Server	TCP 21

Rules for secure use

The Modbus protocol does not provide encryption, authentication or integrity checking of the transmitted data.

In addition, the web server uses an http protocol that transmits data in cleartext and which could therefore be liable to interception by unauthorized persons. For these reasons, communication via E-kit and the control system is not totally secure.

To protect E-kit and make sure that it functions as expected, it must be connected to a reliable network, that is, with restricted access and monitored. In addition, access to E-kit must be limited to persons authorized to make changes to the configuration.

If communication between E-kit and a device is interrupted, the web interface of E-kit activates an alarm to warn of the fault.

How to retrieve your credentials If you lose or forget the password, send an e-mail to GLOBAL-EL.OPERATIONS.DIGITAL@ABB.COM to reset and choose a new password.

2 - Overview of E-kit

How E-kit works

E-kit is an ABB Electrification solution developed from the ABB Motion AC500 product which provides an application layer enabling ABB devices and third-party devices to be integrated.

Using E-kit, a device can be integrated by setting a model allowing E-kit to interpret incoming data from that device correctly. Model creation starts from a generic template, which includes the main measurements managed by a family of devices (such as circuit-breakers, meters, relays, analog inputs/outputs, etc.).

For security reasons, E-kit does not face the Internet directly but, via integration of an [ELECTRIFICATION GATEWAY \(ELGW\)](#), users can view the data of devices integrated by E-kit in the [ABB ABILITY ENERGY MANAGER](#) Cloud solution promoted by ABB Electrification.

E-kit enables several devices to be integrated by means of the Modbus RTU and Modbus TCP/IP protocols. E-kit integrates up to 45 devices:

- up to 15 devices connected via the Modbus RS-485 serial network (Modbus RTU protocol - COM 1 port)
- up to 30* devices connected via the Ethernet network (Modbus TCP/IP protocol - Eth1 and Eth2 ports)

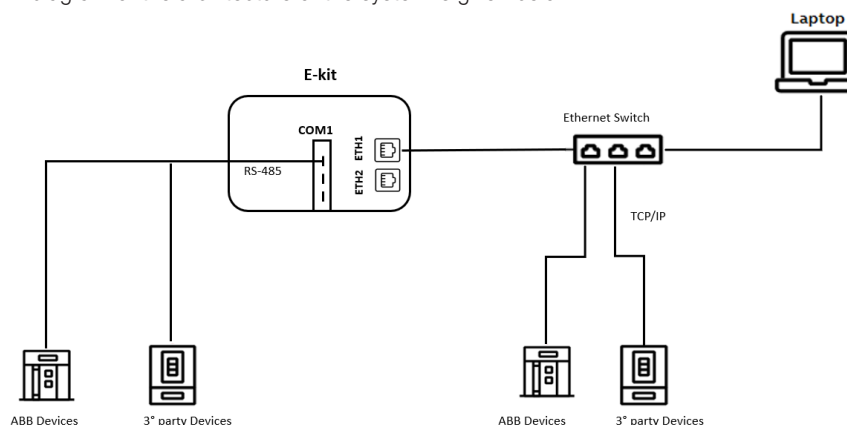
Note: if there are no devices communicating via Modbus serial network, the devices that can be integrated via Ethernet network can be up to 45.*

From FW version 1.0.7, E-kit supports management of 30 parallel interfaces to communicate with devices.

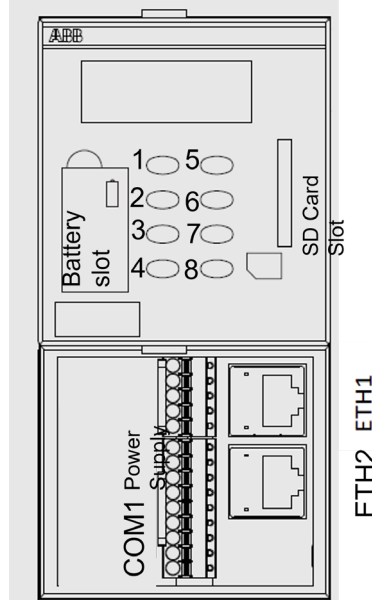
Note: For information with respect to interface management for earlier versions, send an e-mail to GLOBAL-ELSP.OPERATIONS.DIGITAL@ABB.COM.

Devices with the same interface communicate in a sequential mode, devices with different interfaces communicate in parallel; up to 8 interfaces for Modbus TCP devices and only 1 for Modbus RTU devices.

A diagram of the architecture of the system is given below.



E-kit is illustrated below along with a description of its components.



The keypad used for communicating with the interface of E-kit includes the following commands:

1. RUN
2. VAL
3. ESC
4. OK: for saving new settings
5. DIAG
6. CFG: for accessing the menu to configure the IP address of E-kit
7. ↑ : for moving among the menu options
8. ↓ : for moving among the menu options

Templates supported by E-kit

E-kit allows different families of devices to be integrated. A dedicated template is available for each family with the main measurements managed by the devices of the family.

A list of the available templates is given below:

0. No Template*
1. Meter
2. Breaker
3. Digital Input – output
4. Analog Input – output
5. Protection relay
6. Battery rack – BMS
7. PV string inverter
8. ESS inverter
9. Temperature Monitoring Device
10. Motor drive and softstarter
11. Gen Set Controller

Note: The “No Template” option allows E-kit to be integrated with a local supervisory system (e.g., BMS, Scada System). However, models created with this option are not gathered by ABB Ability EMTM EDGE Industrial Gateway and therefore will not be shown on the ABB Ability™ Energy and Asset manager platform.*

Available templates and models

The list of templates could be extended in future. you can find the complete list of templates with also ready-to-use models available for ABB devices with links to download the device’s user manual, [HERE](#).

Structure of E-kit

E-kit consists of a CPU with a COM1 serial port, two Ethernet ports (used as a switch for Ethernet connection). An SD card is also supplied with E-kit.

E-kit has an integrated web server presenting a web interface for the purpose of configuring and displaying all the states of the devices connected.

Clock function

E-kit does not integrate the clock function, therefore it does not require a battery.

Access to the web interface

The web interface can be accessed in the following ways:

- via the browser, by entering the IP address set during the configuration process in the address bar (see Setting of static IP address (recommended).
- via [EKIP CONNECT 3](#) software (see Integration with Ekip Connect 3).

SD card functions

The SD card provided in E-kit enables the following functions to be performed:

- Update the software of E-kit. Operation to be performed by ABB. For support request, send an e-mail to GLOBAL-ELSP.OPERATIONS.DIGITAL@ABB.COM
- Backup the configuration created
- Update the catalog of templates and models supported by E-kit

3 - Power supply

Introduction

E-kit must be supplied at 24 V D.C. E-kit connects to the power supply by means of a removable 5-pin terminal box. Thanks to replication of pins L+/M, E-kit can, for example, supply external sensors (up to 8 A max with 1.5 mm² conductors).

Alerts



WARNING!

Risk of damaging CPU and base of terminals!

Exceeding the maximum voltage value could cause irreparable damage to the system. The system could be destroyed.



WARNING!

Risk of faulty operation!

To ensure reliable and correct operation, the supply voltage must increase from 0 to 24 V within 2.5 s maximum.



WARNING!

Risk of damage to base of terminal and power supply!

Short-circuits could damage the base of the terminal and power supply. Make sure that the four L+ and M terminals (two of each) have not been connected in the wrong way (e.g. +/- the power supplier is connected to both L+/L+ or both M/M terminals).



WARNING!

Risk of damage to base of terminal!

A high current could damage the terminal and base of the terminal. Make sure that the current which flows through the removable terminals is never higher than 8 A (with 1.5 mm of conductor).

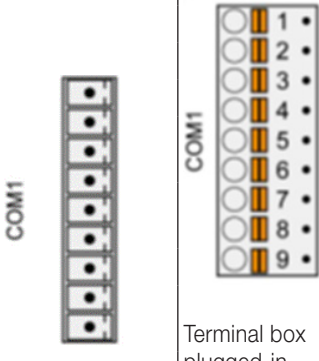
Description of terminal box

Pin allocation		Label	Function	Description
<p>Terminal block removed</p>	<p>Terminal block plugged-in</p>	L+	+24 VDC	Positive pin of supply voltage
		L+	+24 VDC	Positive pin of supply voltage
		M	0 V	Negative pin of supply voltage
		M	0 V	Negative pin of supply voltage
		⏏	FE	Ground connection

4 - RS-485 serial communication interface (COM1 port)

Description of terminal box

E-kit is provided with a COM1 port with 9-pin removable terminal box for communication with the Modbus RTU protocol.

Interface	Pins	Signal	Interface	Description
	1	Termination P	RS-485	Termination P
	2	Modbus +	RS-485	Receive/Transmit, +
	3	Modbus -	RS-485	Receive/Transmit, +
	4	Termination N	RS-485	Termination N
	5	RTS	RS-232	Request to send (output)
	6	TxD	RS-232	Transmit data (output)
	7	SGND	Ground signal	Ground signal
	8	RxD	RS-232	Receive data (input)
	9	CTS	RS-232	Clear to send (input)



WARNING!

Connector unused!

Make sure that the terminal box is always plugged into the terminals, even when there are no cables connected.

Connection ports

A Modbus RS-485 network connects a Master device to one or more Slave devices.

Each device has a communication port with two terminals, conventionally called A and B. The communication cable is connected in these two terminals so that all the devices taking part in the communication are connected in parallel.

All "A" terminals must be connected to each other and all "B" terminals must be connected to each other, respectively.

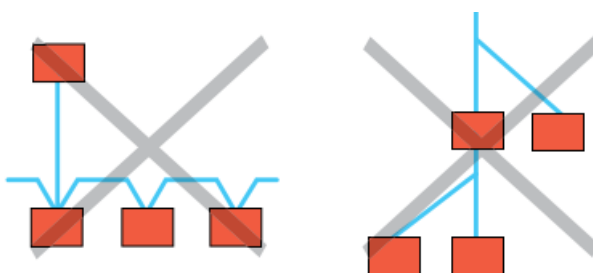
Note: Certain ABB devices, such as electrical metering instruments B21, B23, B24, are an exception. For this reason, terminal M+ will now be indicated as the positive terminal while terminal M- will be indicated as the negative terminal.

If connections "A" and "B" of a device are inverted, besides making them incapable of communicating, the entire communication system may not function due to the incorrect direct current (bias) voltage values on the terminals of the badly connected device.

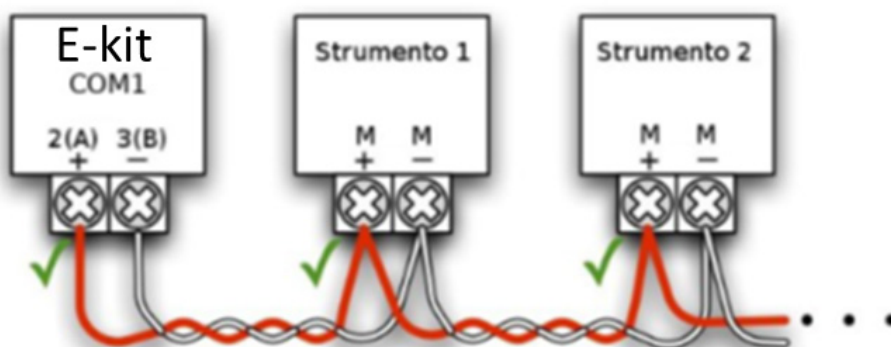
To prevent errors when several devices are connected, it is advisable to use cables of the same color for all connections to the A terminals and cables of the same color for all connections to the B terminals of the different devices (e.g. white for A/M+ and red for B/M-). This makes it much easier to identify cabling errors.

Connection among devices

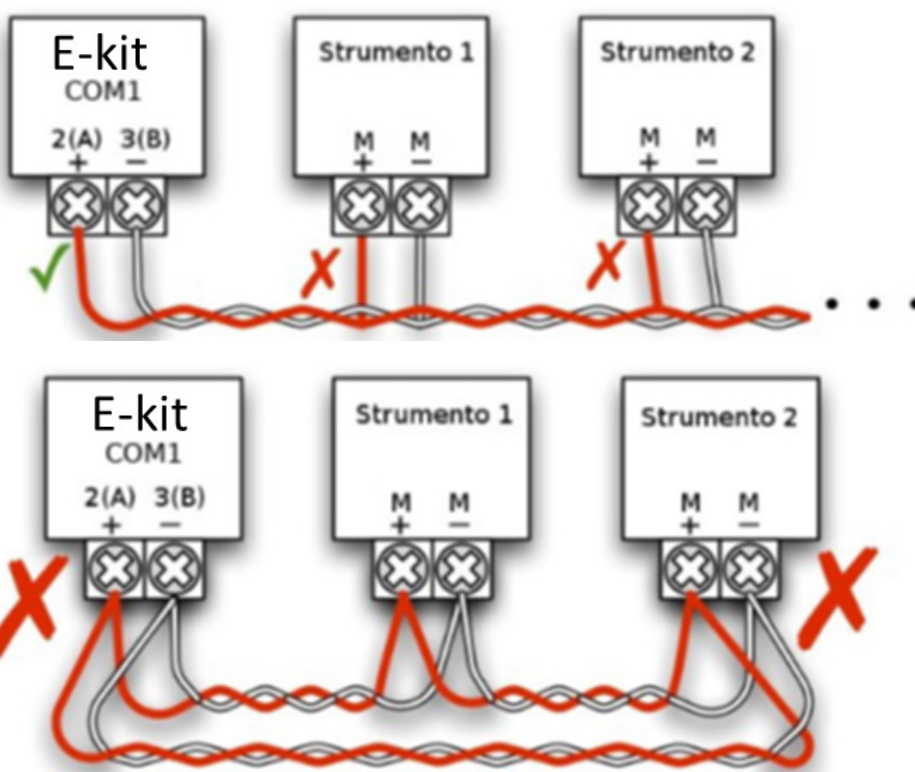
The Modbus RS 485 network is of the "daisy-chain" type (also called in-out) where all the devices in the network are connected in serial mode. Connection among devices is direct, without ever crossing the cables. Examples of incorrect connections are illustrated in the next figure



The first setup below is the correct one. Cabling examples are given in the figure below.



The next figure shows examples of incorrect connections.



Maximum distance and maximum number of devices

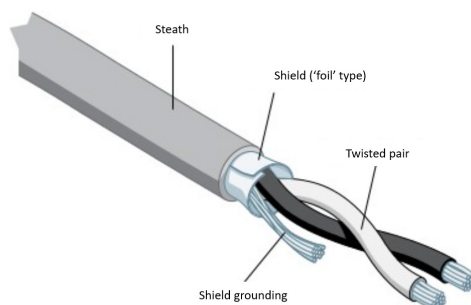
The main cable can be up to 700 m in length. This distance does not include branches (which, however, must be short). Up to 15 devices (besides E-kit) can be connected to a main cable.

Type of cable required

Shielded twisted pair cable is required. ABB specifies Belden 3105A cables, but other types with equivalent characteristics can be used.

Twisted pair cable is formed by two insulated conductors twisted together. This improves the level of immunity to electromagnetic disturbances. The cable forms a series of consecutive coils, each pointing in the opposite direction to the next. If there were a magnetic field in the vicinity, it would pass through each pair of coils in opposite directions and its effect would consequently be very much reduced. Theoretically, the effect on each coil is exactly opposite to that on the next, thus the resulting effect is annulled.

The shielding can be "braided" (formed by a woven lattice of conductor wires) or the "foil" type (formed by a sheet of metal wound around the conductors); the two types are equivalent.



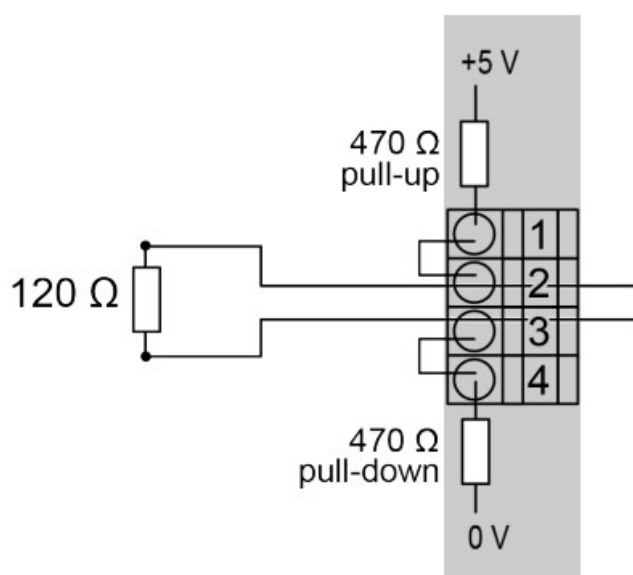
Termination resistor

To avoid signal reflection, a 120 Ohm termination resistor must be fitted to each end of the main cable. Installation of termination resistors can only be omitted if the main cable is less than 50 m in length.

Note: there is no internal termination resistance in ABB SACE new Emax, X1 air and Tmax molded-case devices and in the majority of ABB devices.

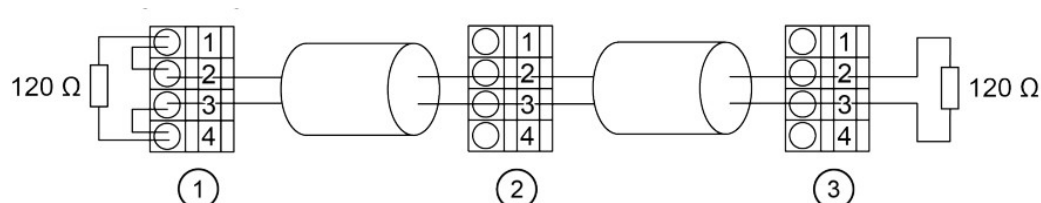
Pull-up and pull-down resistors

Two resistors, equal to 470 Ω , are integrated into connector COM1 of E-kit. They maintain a high level defined in the Modbus network, even when data exchange is not taking place. To activate them, just connect terminals 1 to 2 and 3 to 4 as shown in the diagram below.



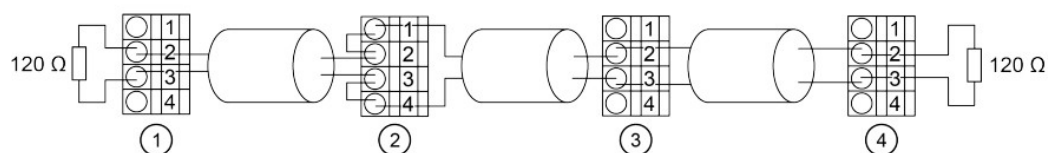
1. Positive terminator
2. Modbus M+
3. Modbus M-
4. Negative terminator

The next diagram illustrates an RS-485 network with Master device at the end of the serial line.



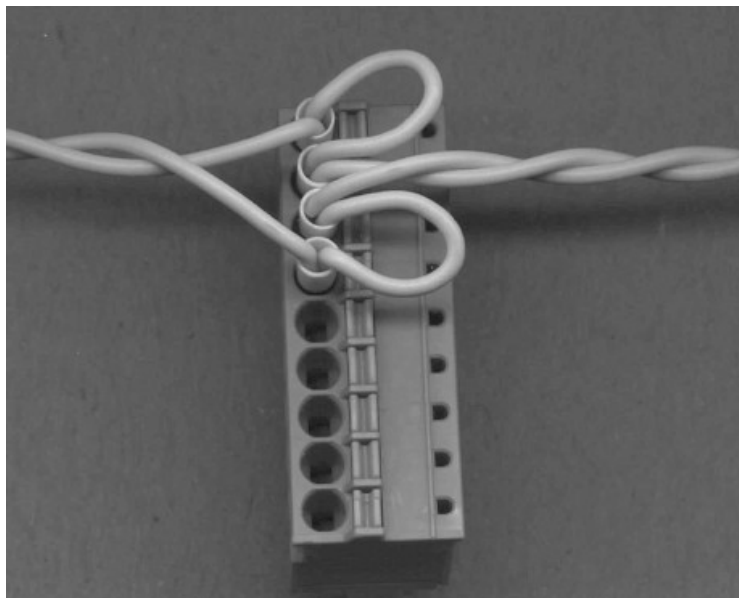
1. E-kit Master at the end of the bus line, pull-ups and pull-downs activated, bus termination with 120 Ω resistors
2. Slave in the serial line.
3. Slave at the end of the serial line, termination with 120 Ω resistors

There is no need for a termination resistor if the Master device is in the serial line. However, the pull-up and pull-down resistors must be activated (see next diagram).



1. Slave at end of serial line, termination with 120 Ω resistors
2. E-kit Master at end of serial line, pull-ups and pull-downs activated
3. Slave in the serial line
4. Slave at the end of the serial line, termination with 120 Ω resistors

The following photo illustrates the COM1 terminal box of E-kit when it is inside the serial line.



Communication parameters

All devices on the same Modbus network must have the same communication parameter values. On E-kit, the parameters are set by default and cannot be changed. Only when the parameters have been correctly set on all devices can the E-kit Master acquire data.

The following are the values to be set on the devices:

- data transmission speed, known as baud rate: 9600 bps;
- data bits (number of bits): 8;
- parity bits: Even;
- stop bits: 1;
- address of each slave.

Baud Rate Disclaimer

The baud rate of E-kit is: 9600 baud/s.

Sampling time is about 26 seconds using the Modbus RTU protocol and connecting up to 15 devices. For this reason, it is inadvisable to acquire data at higher frequency.

5 - Ethernet communication interface (ports ETH1 and ETH2)

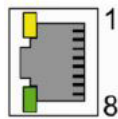
Introduction

E-kit is provided with two network interfaces which function like switches.

ETH1/ETH2:	192.168.0.10	255.255.255.0	0.0.0.0
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Description of terminal box

The connector for Ethernet communication is the RJ45 type. Pin allocation is given in the next table:

Interface	Pins	Signal	Description
	1	TxD+	Data Transmitted +
	2	TxD-	Data Transmitted -
	3	RxD+	Data Received +
	4	NU	Not used
	5	NU	Not used
	6	RxD-	Data Received -
	7	NU	Not used
	8	NU	Not used
Shield	Shielded cable	Ground signal	

Type of cable required

Use braided twisted pair cables (TP cables) of at least category 3 (IEA / TIA 568-A-5 Cat3) or class C (according to the European standards) for 10 MBit/s (10Base-T) Ethernet.

Braided twisted pair cables (TP cables) of category 5 (cat5) or class D or higher should be used for 100 Mbit/s (fast) (100Base-TX) Ethernet.


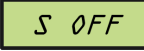



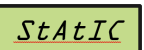

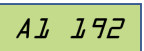

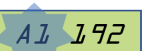


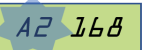
Maximum distance between devices






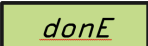
The maximum length of a trunk, i.e. the maximum distance between two network components, is limited to 80 m due to the electrical properties of the cable.

Setting of static IP address (recommended)


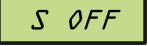



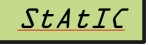

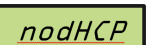





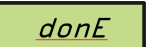
The IP address of E-kit is configured by means of the keypad. The IP address is expressed on the display in form A1.A2.A3.A4, the subnetwork in form N1.N2.N3.N4 and the network gateway in form G1.G2.G3.G4. An example is given below:

IP 192.168.0.113 → A1=192, A2=168, A3=0, A4=113
 subnetwork 255.255.255.0 → N1=255, N2=255, N3=255, N4=0
 gateway 192.168.0.1 → G1=192, G2=168, G3=0, G4=1

		Power-up E-kit and press button CFG to access the configuration screen.
		Press the arrow key to select the port (Eth1 or Eth2)
		Press CFG to set the mode with static address
		Press CFG to view the first parameter
		The parameter indicator will start to flash Use the arrow keys to change the value.
 		Press OK to view the second parameter Press CFG to edit the first parameter. Use the arrow keys to change the value.

		Repeat these steps to configure parameters A3, A4, N1, N2, N3, N4, G1, G2, G3, G4.
		Press OK to terminate the configuration process
		Press OK again to confirm the changes
		The changes will be implemented once OK has been pressed for the second time. Shut down the CPU and then reboot to make the changes effective

Setting of IP address with DHCP

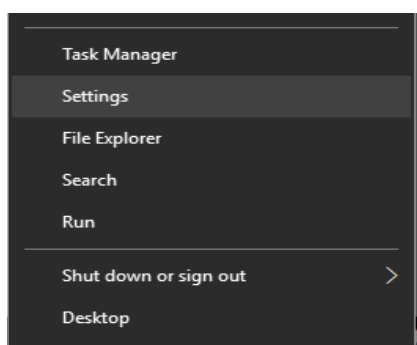
		Power-up E-kit and press button CFG to access the configuration
		Press the arrow key to select the port (Eth1 or Eth2)
		Press CFG to set the mode with static address
		Press the arrow key to select the DHCP setting
		The word DHCP will start to flash. Press CFG to confirm the setting.
		Press OK to confirm the changes
		The changes will be implemented once OK has been pressed for the second time. Shut down the CPU and then reboot to make the changes effective

Configuration of PC Ethernet network

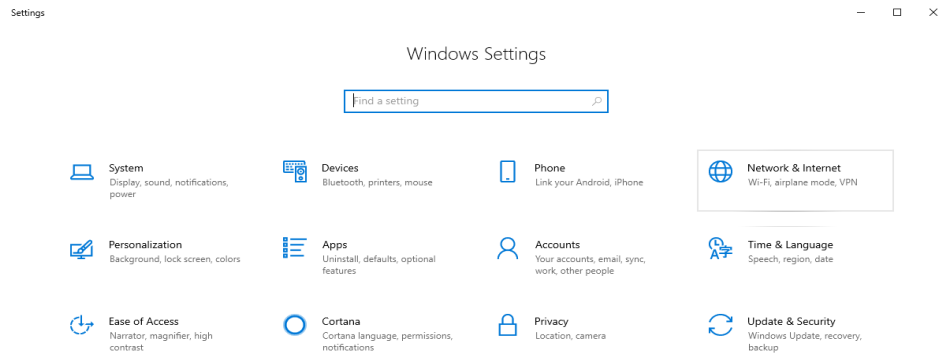
To access E-kit via a PC, this latter must have a compatible network address. If the E-kit address is 192.168.0.113, then the PC can be assigned address 192.168.0.114.

The procedure for configuring the IP address of a PC with Windows 10 Operating System is given below.

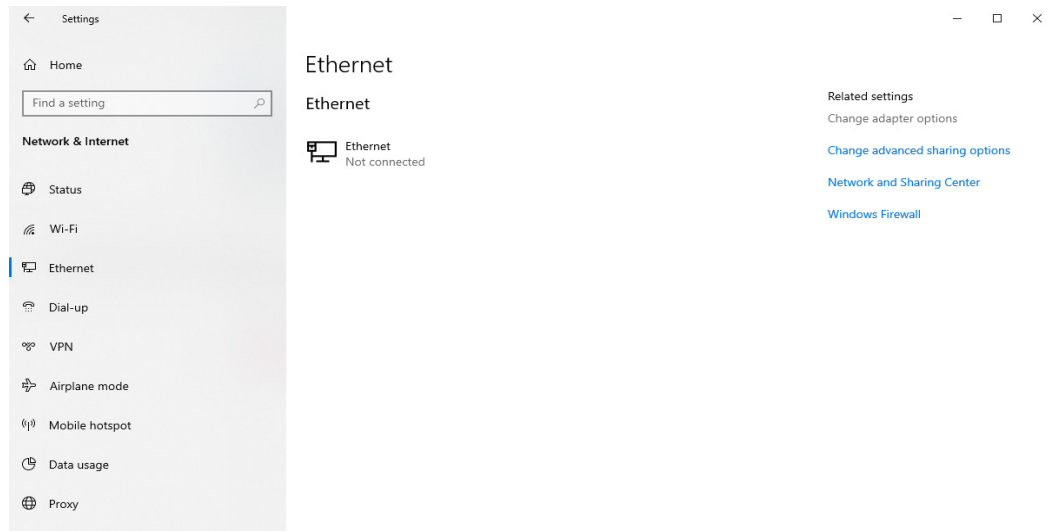
1. Right-click on the Start icon at the bottom left and select **Settings**.



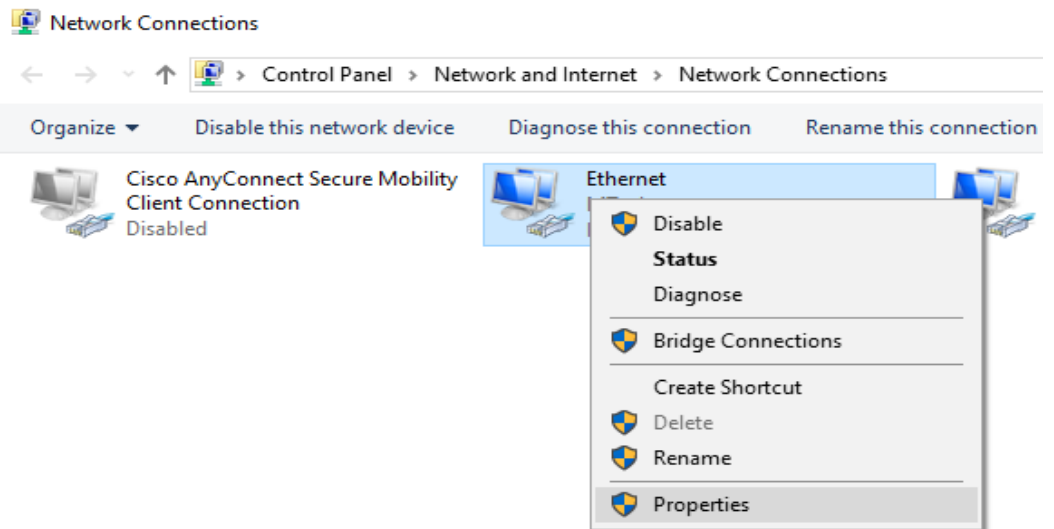
2. Having accessed the Settings window, click on **Network & Internet**.



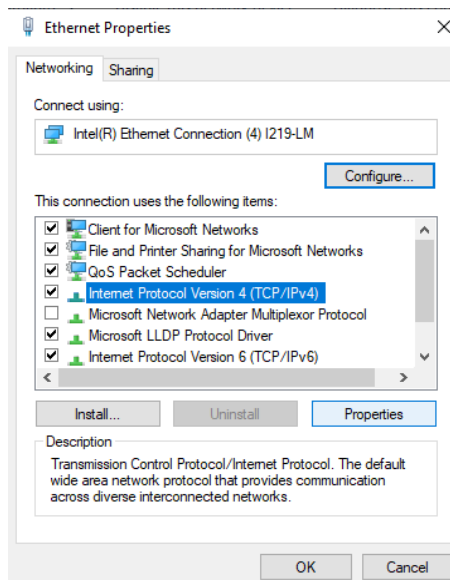
3. Select Ethernet from the window on the left of the menu and click on **Change Adapter Option**.



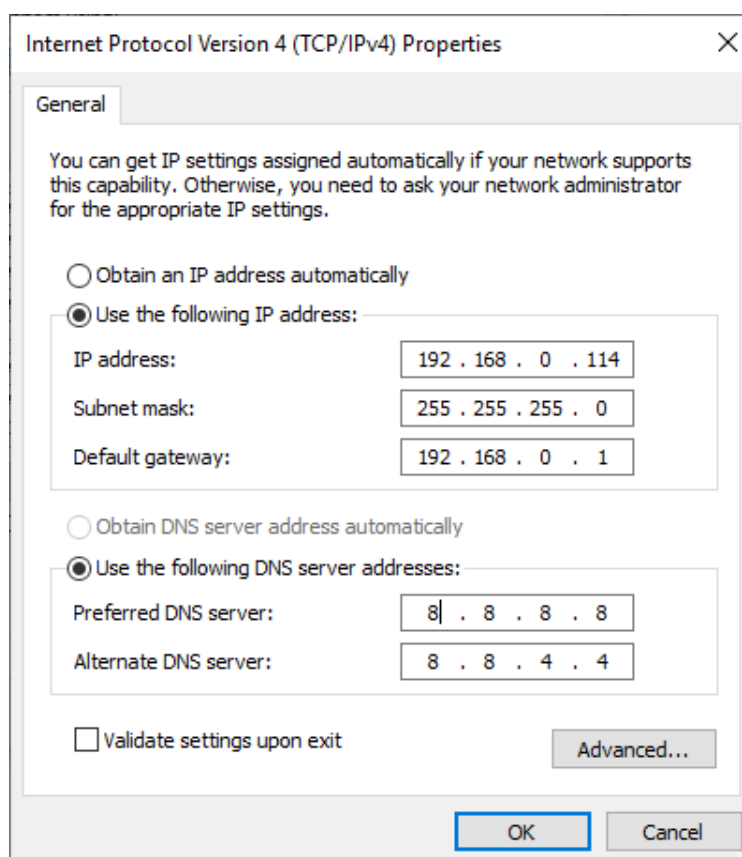
4. Right-click on the connected Ethernet port and select **Properties**.



5. Select **Internet Protocol Version 4 (TCP/IPv4)** and click on **Properties**.



6. Make sure that the Use the following IP address item has been selected and fill out the parameters as follows:
- **IP address:** 192.168.0.114
 - **Subnet mask:** 255.255.255.0
 - **Default Gateway:** gateway address, if present.



6 - Commissioning of E-kit

Power-up

E-kit powers up automatically when correctly supplied. After power-up, the word E-Kit will appear on the display.



From this moment onwards, all the information acquired by the devices will be accessible via Modbus RTU and TCP.

Firmware upgrade

New firmware can be obtained if the following situation occurs:

- Faulty operation of web interface
- Availability of a new major version with new features

Send an email to the Support Center (GLOBAL-EL.OPERATIONS.DIGITAL@ABB.COM). The Support Center will provide help and guide you through the E-kit firmware upgrade.

7 - E-kit user interface

User level

There are two user levels:

- Guest
- Admin

Guest user is the user with which E-kit is initially accessed. A password is not required and only the individual devices can be viewed.

The default password of Admin user is "Admin". It enables you to configure the system, add new devices, configure models and display them.

The Admin user password can be changed via web interface.

IMPORTANT: to ensure secure use, you are strongly advised to choose a new password the first time E-kit is used.

Reset password

If you lose or forget your password, send an e-mail to GLOBAL-ELSP.OPERATIONS.DIGITAL@ABB.COM. ABB support will arrange a remote call with screen sharing and perform the password reset.

Note: Internet connection is required for the remote call.

Usage session

Several sessions of E-kit can be active at the same time. This means that up to 15 browser tabs can be opened, but all with the same user level.

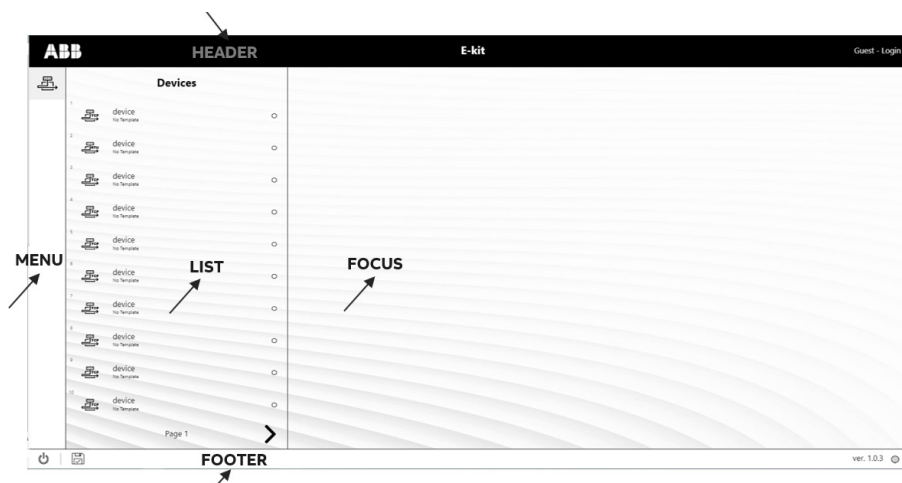
For example, if the open session is in the Admin user mode, then a simultaneous session cannot be opened in the Guest user mode, and vice versa.


Access to the web interface


To access the E-kit integrated web server, open the browser (tested on Google Chrome web browser) and type the IP address set during the configuration process into the address bar (see Setting of static IP address (recommended)).

Homepage

The following page appears in the browser screen




The footer on the left provides the option to restart E-kit using button  and to save any changes made to the settings of the devices using button  (function only available for Admin users).

The save button turns red if there are changes that have not been saved . The new changes will be lost if the session is closed without saving.

The software version and E-kit status are displayed in the status bar on the right. The dot alongside the version flashes alternately in the grey and yellow colors in the absence of faults, otherwise it remains fixed on the same color.

The current user is displayed in the right header. Click on the **Login** button to change the user.

The area on the left displays the menu and enables the devices to be viewed in the list at center screen while the focus, i.e. the detail of the device selected in the list, is shown in the right-hand part of the page.

The button  at the bottom of the menu allows the Admin user to access the database for model management.

8 - Web interface configuration

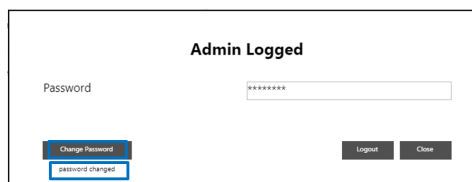
Access as Admin user

To configure the web interface, you must access the first time as Admin user.

1. Click on **Login** in the homepage header, enter the Admin user password ("Admin" by default) and click on **Login**.

Enter of the Admin user password accesses the system with administrator rights and opens the window below.

2. To change the password, enter the new password in **Password** and click on **Change password**. After this operation, the words "Password changed" will appear under the button.





3. Click on **Logout** to return to the Guest user mode.

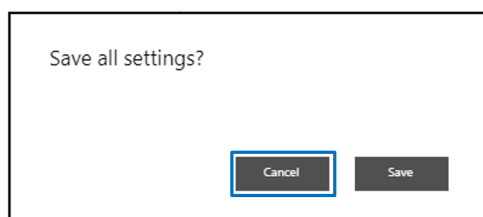
Note: after 30 minutes of inactivity, the system will automatically logout from Admin user to Guest user.

4. Click on **Close** to access the web interface as Admin user.

Save changes

Note: function only available for Admin users

1. Click on button  to save the changes made to the system configuration: a window will open with a request for confirmation before saving.
2. Click on **Save** to save the changes locally: the icon in the button becomes . Click on **Cancel** to cancel saving.



3. Click on **Backup to SD** to make a backup of the configuration on an SD card. Otherwise click on **Close**.

Note: "No SD card" will appear if the SD card has not been inserted or has not been inserted properly.





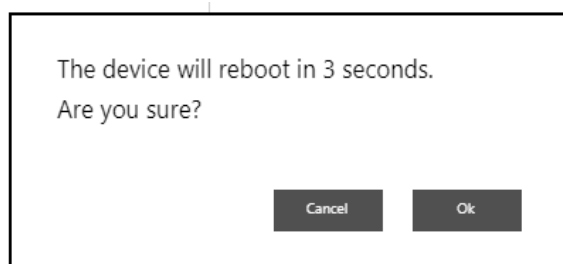
AVVISO!

The contents of the SD card take priority over a local save made later. Each time E-kit is restarted, the CPU reads what is saved in the SD and reloads it, thus rewriting any changes made locally. Save the Backup when final programming is completed and then remove the SD Card and keep it in a safe place.

Copy configuration to another E-kit

You can copy the configuration of an E-kit into another E-kit using the SD card.

1. Save the configuration of the first E-kit in the SD card ( > Save > Backup to SD).
2. Remove the SD from the first E-kit.
3. Insert the SD into the other E-kit and click on  to reboot it. A window will appear asking for confirmation before rebooting. Click on **OK**.



Configuration of a device

Individual devices can be configured in the Admin user mode. Click on the icon at the top of the menu to access the required section. The first ten devices are displayed. Use arrows < and > to browse through the pages of the up to 45 available devices.



Each device comprises the following parts, indicated in the figure below:

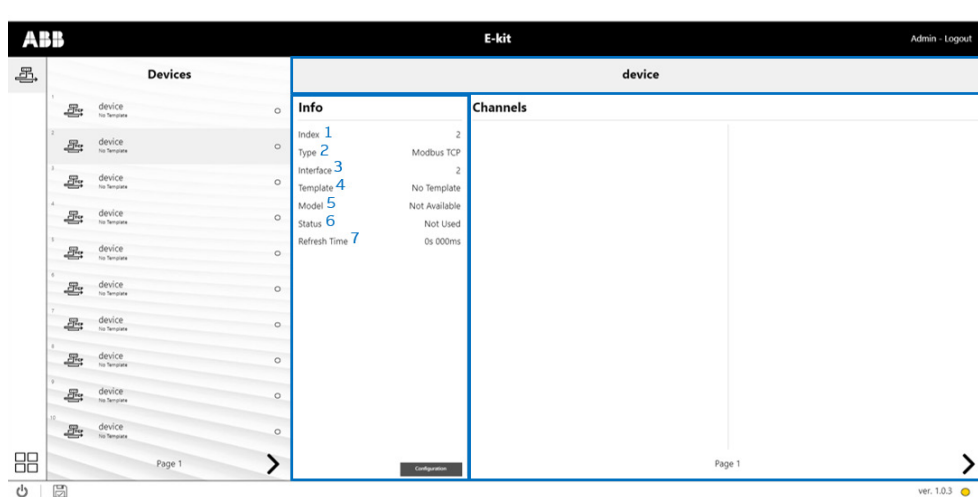
1. Index of device, i.e. the order in which the devices were inserted;
2. Name of device;
3. Template of device;
4. Communication status (red: not connected, green: connected, white: not used);



Click on the chosen device to view its characteristics: the information will appear in the focus.

As shown in the figure below, the focus comprises three parts: the name of the device appears at the top, the **Info** section on the left and the **Channels** section on the right. The following information is given in the **Info** section:

1. Index of device;
2. Type;
3. Interface number;
4. Template;
5. Model;
6. Status of the device (not used, connected or disconnected - red);
7. Refresh time (only different from 0 if the device is connected), indicating how often it is interrogated.

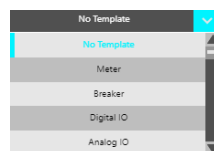


Click on the **Configuration** button at the bottom of the focus. This will access the window below, where you can configure the selected device in the following way:

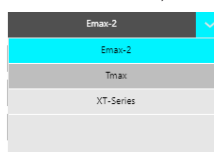
Device Configuration

Name	1	<input style="width: 95%;" type="text" value="device"/>
Device Used	2	<input style="width: 45%;" type="button" value="yes"/> <input style="width: 45%; background-color: yellow;" type="button" value="no"/>
Type	3	<input style="width: 45%; background-color: yellow;" type="button" value="TCP"/> <input style="width: 45%;" type="button" value="RTU"/>
Template	4	<input style="border: none;" type="button" value="No Template"/> ▼
Vendor	5	<input style="border: none;" type="button" value="Not Available"/> ▼
Model	6	<input style="border: none;" type="button" value="Not Available"/> ▼
UnitID	7	<input style="width: 95%;" type="text" value="1"/>
IP Address	8	<input style="width: 20%;" type="text" value="10"/> <input style="width: 20%; border-left: 1px solid black;" type="text" value="0"/> <input style="width: 20%; border-left: 1px solid black;" type="text" value="0"/> <input style="width: 20%; border-left: 1px solid black;" type="text" value="1"/>
TCP Port	9	<input style="width: 95%;" type="text" value="502"/>
10		11
<input style="width: 100%;" type="button" value="Cancel"/>		12
		<input style="width: 45%; background-color: #333; color: white;" type="button" value="Save & Initialize"/> <input style="width: 45%; background-color: #333; color: white;" type="button" value="Save & Reload"/>

1. Change the name of the device;
2. Add the device to the system by selecting **Yes** on a level with **Device Used**;
3. Select whether the device is connected in in Modbus TCP/IP or RTU;
4. Set a template from the pull-down menu accessed by clicking on the grey bar with the words No Template; The **Vendor** and **Model** fields will be automatically populated once a template has been selected;



5. Select the correct Vendor from the corresponding pull-down menu;
6. Select the required model from the pull-down menu ;



7. The Unit ID parameter is 1 by default;
8. Enter the IP address of the device;
9. The TCP Port parameter is 502 by default;
10. Quit the window without performing any action (**Cancel** button);
11. Restore the default values of all the channels (**Save & Initialize** button);
12. Save the model configuration and upload the changes made to the focus (**Save & Reload** button).
13. If the device is connected in Modbus RTU network, the UnitID, IP Address and TCP Port properties are replaced by Slave, with default value 1, enabling the address of the device to be entered, as shown in the next figure.

Device Configuration

Name

Device Used

Type

Template

Vendor

Model

Slave

Once the device has been configured and one of the two Save Changes keys has been pressed, the focus is populated with the information and channels relating to the typology selected, as illustrated in the figure below

Index	Type	Interface	Template	Model	Status	Refresh Time
1	Emax-2 Breaker	Modbus TCP	Breaker	Emax-2	Not Connected	0s 100ms

Tag Name	Serial Number	Value	Unit
13	Phase reactive power Q2	0.0	KVAR
14	Phase reactive power Q3	195306658.1	KVAR
15	Total apparent power	625228.8	KVA
16	Phase apparent power S1	85967936.3	KVA
17	Phase apparent power S2	625228.8	KVA
18	Phase apparent power S3	0.0	KVA
19	Active energy positive	1953066581	KWh
20	Active energy negative	625228.8	KWh
21	Total active energy	875456579	KWh
22	Reactive energy positive	6252288	KVARh
23	Reactive energy negative	0	KVARh
24	Total reactive energy	0	KVARh

Use arrows < and > to browse among the pages of the channels available in the **Channels** section.

There are three types of channels available:

- **User:** information that can be edited by the user, not acquired by the device;
- **Modbus:** information acquired by the device;
- **Constant:** information defined in the model, not acquired by the device.
- **Logic:** values processed by logic defined in E-kit. Not used at the present time.

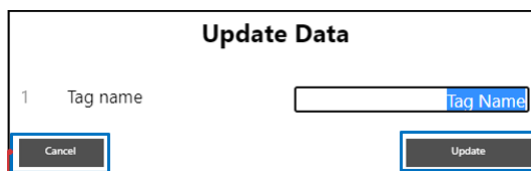
The rectangle containing the word **valid** illustrated in the next figure shows whether the corresponding Modbus value has been acquired correctly:

- Green: acquisition correct
- Grey: acquisition not correct

Index	Type	Interface	Template	Model	Status	Refresh Time
1	Emax-2 Breaker	Modbus TCP	Breaker	Emax-2	Connected	0s 760ms

Tag Name	Serial Number	Value	Unit
13	Phase reactive power Q2	0.0	KVAR
14	Phase reactive power Q3	0.0	KVAR
15	Total apparent power	0.0	KVA
16	Phase apparent power S1	0.0	KVA
17	Phase apparent power S2	0.0	KVA
18	Phase apparent power S3	0.0	KVA
19	Active energy positive	0	KWh
20	Active energy negative	0	KWh
21	Total active energy	0	KWh
22	Reactive energy positive	0	KVARh
23	Reactive energy negative	0	KVARh
24	Total reactive energy	0	KVARh

To change a value in the **User** type channel, click on the corresponding value. This will access a window where the required value can be entered. Click on **Update** to change the value, otherwise click on **Cancel** to quit without performing actions.

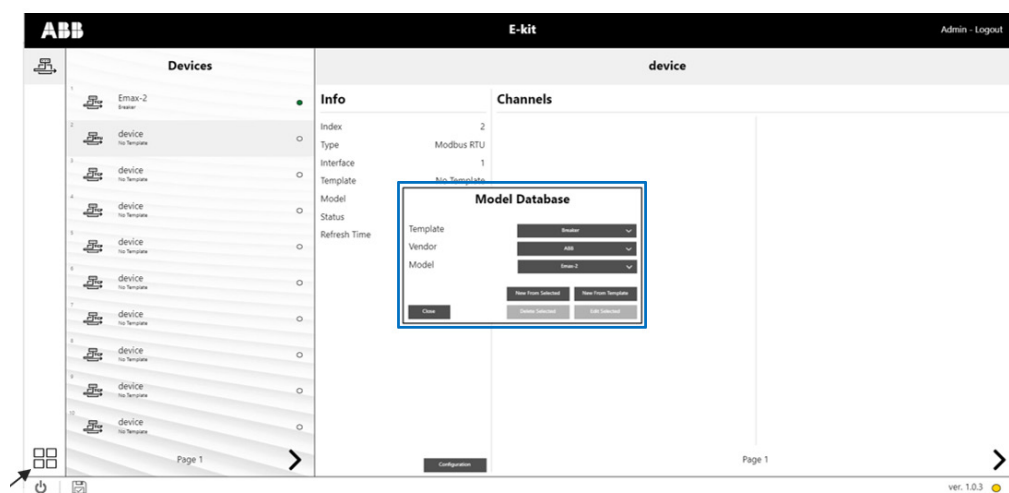


Model management

Note: function only available for Admin users

The key indicated by the arrow in the next figure appears at the bottom of the menu in the Admin user mode. Use this key to change the Database by creating new models.

A model can be created by starting from a template or from an existing model.

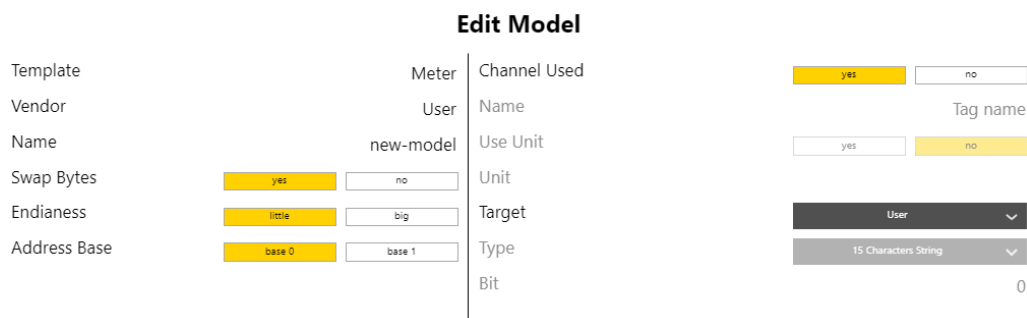


Select the template and click on **New From Template** to create a model from a template. Select the model and click on **New from selected** to create a model from an existing model.

The configuration window of the new model shown in the Figure below is accessed in both cases. The **Edit Model** window is divided into two parts: the following fields are displayed in the left part:

1. **Template;**
2. **Vendor:** automatically set as “User” for a new model;
3. **Name:** editable field with the name of the new device;
4. **Swap Bytes** select Yes if the bytes are swapped;
5. **Endianness:** selectable big and little endian fields.
6. **Address Base:** select the Base Address type of the device whose model you want to create.

The required channels can be selected in the right part and configured by browsing among the pages using arrows < and > .



A channel is enabled by selecting the corresponding **Yes** button: all the parameters that can be configured will now appear. The editable parameters are listed below:

1. Target: type of channel

Note: the Logic type is reserved for future use;

2. Enabling of value validity control (**Check Not Valid Value** option). If the value is not valid, the default value will appear on a level with the value itself.
3. If the **Check not valid** option is enabled, the default value will appear in **Not Valid Value** if the value is not valid;
4. **Access:** type of access to the data item (read or write)
5. **Addressing:** type of data item addressing;
6. **Address:** the data address is entered;
7. **Modbus Type:** type of data item;
8. **Modbus Bit** (only with Modbus Type = bool) specific bit;
9. **Normalization bit mask:** mask for annulling the unwanted bits. The format managed is Hexadecimal; the mask entered must have this form: '16# (...) followed by the content expressed in hex. For example, if only the first two bits of a register must be considered, '16# 3'; would have to be indicated within this field;
10. **Normalization bit shift:** shifts the bits to the right or left by as many positions as the configured value;
11. **Normalization numerator:** scales the value by multiplying it by the indicated number;
12. **Normalization denominator:** scales the value by dividing it by the indicated number;
13. **Normalization offset:** adds an offset to the data item. The value set can be both positive and negative

An example of the parameters displayed with **Target = User** is given below.

The following is an example of parameters displayed with **Target = Constant**. The **Constant Value** parameter, with which a constant value can be assigned to the data item, is added in this case.

Edit Model

Template	Breaker	Channel Used	<input checked="" type="checkbox"/> yes <input type="checkbox"/> no
Vendor	User	Name	Current L1
Name	new-model	Use Unit	<input checked="" type="checkbox"/> yes <input type="checkbox"/> no
Swap Bytes	<input checked="" type="checkbox"/> yes <input type="checkbox"/> no	Unit	A
Endianess	<input checked="" type="checkbox"/> little <input type="checkbox"/> big	Target	Constant
Address Base	<input checked="" type="checkbox"/> base 0 <input type="checkbox"/> base 1	Type	Integer 32
		Bit	0
		Constant Value	0.00


< Channel 2 >

Click on **Save** to save the changes to the model. The word **Saved** appears alongside the button to notify that saving has taken place. After this, press Close to close the window.

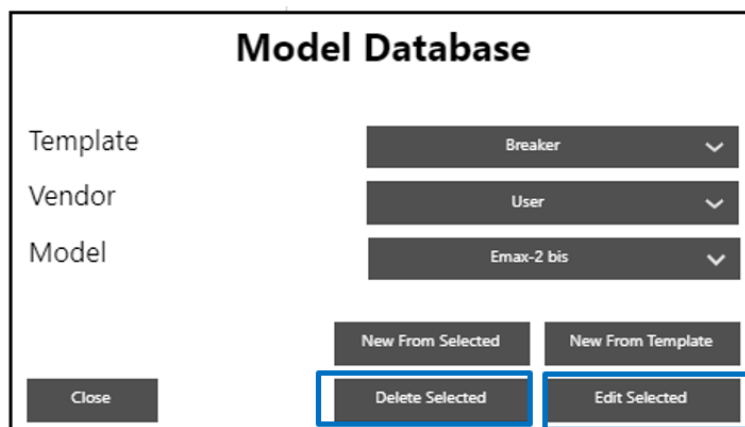
Edit Model

Template	Breaker	Channel Used	<input checked="" type="checkbox"/> yes <input type="checkbox"/> no
Vendor	User	Name	Current L1
Name	new-model	Use Unit	<input checked="" type="checkbox"/> yes <input type="checkbox"/> no
Swap Bytes	<input checked="" type="checkbox"/> yes <input type="checkbox"/> no	Unit	A
Endianess	<input checked="" type="checkbox"/> little <input type="checkbox"/> big	Target	Constant
Address Base	<input checked="" type="checkbox"/> base 0 <input type="checkbox"/> base 1	Type	Integer 32
		Bit	0
		Constant Value	0.00

< Channel 2 >

Once a new model has been created, it can be edited or eliminated from the Model Database window, accessible using the  button of the menu.

Select the model and then click on Delete Selected to eliminate it or on Edit Selected to make changes.



9 - Use of the Web interface

Access as Guest user

Once the web interface has been configured, the Guest user can view the devices and relative data. Click on **Logout** in the header to switch to Guest user.

Available information and actions An example screen shot is illustrated in the figure below:

Index	Tag Name	Value	Status
1	Digital IO 3 Enabled	37	TRUE
2	Digital IO 4 Enabled	38	TRUE
3	Digital Counter Raw 1	100	TRUE
4	Digital Counter Value 1	200	TRUE
5	Digital Counter Unit 1	Unit	TRUE
6	Digital Counter Tag Name 1	Ch.1	TRUE
7	Digital Counter Raw 2	300	TRUE
8	Digital Counter Value 2	400	TRUE
9	Digital Counter Unit 2	Unit	TRUE
10	Digital Counter Tag Name 2	Ch.2	TRUE
35	Digital IO 1 Enabled	TRUE	TRUE
36	Digital IO 2 Enabled	TRUE	FALSE

Selection of an individual device opens the corresponding focus where the name of the device, the variables and configured states can be viewed. The index, the type of device, interface, template, model, status and refresh time are given in the **Info** section. The available channels appear in the **Channels** section along with the values read by the device, if used and connected. You can browse among the pages of the available devices and among the pages of the channels of the selected device using arrows < and >.

10 - Integration with Ekip Connect 3

Note: function only available for E-kit versions 3.2.11.0, 3.3.1.0 or higher.

E-kit with Ekip Connect 3

Ekip Connect 3 allows you to communicate with E-kit and access its web interface.

Requirements




Download Ekip Connect [HERE](#) to integrate E-kit using the Ekip Connect desktop solution. Consult the manual for further information about Ekip Connect and how to install it.

Procedure

1. Access the Connection to devices area in the homepage of Ekip Connect and click on **link** to connect a device in the manual mode

CONNECT TO DEVICES

Scan for your devices by selecting one of the below communication channels...

	T&P	<input type="button" value="SCAN"/>
	Serial Configure	<input type="button" value="SCAN"/>
	Ethernet Configure	<input type="button" value="SCAN"/>

1 ... or connect devices manually by clicking this [link](#).

2. Set the following fields in the **Add device** window:
 - Type of device: E-kit
 - Slave address 1
 - Communication protocol: Modbus TCP
 - IP address: address of E-kit set during the configuration process (see Setting of static IP address (recommended))
3. Click on **OK**.

2

ADD DEVICE ✕

Device type
E-kit

Slave address
1

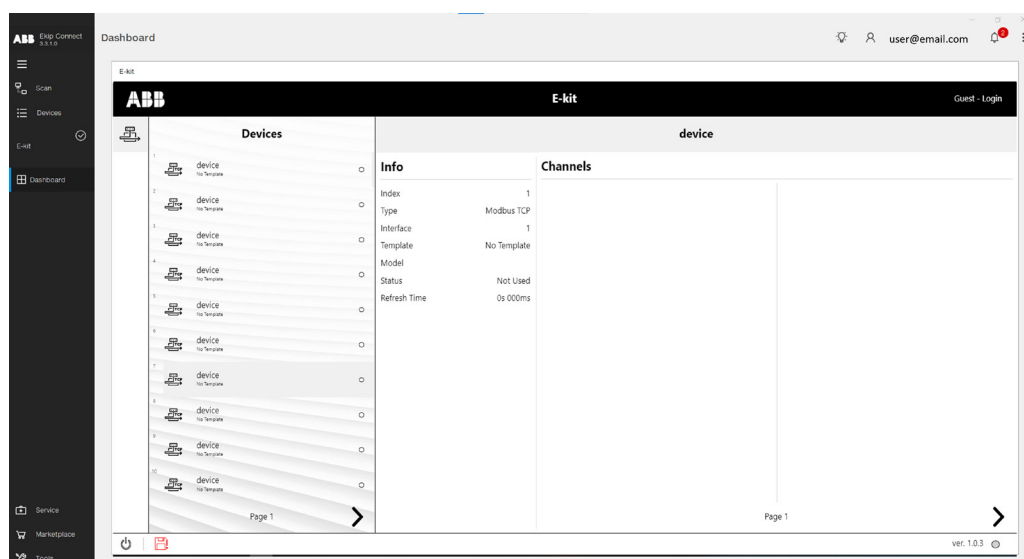
Communication protocol
Modbus TCP

Protocol settings

IP address 192.168.2.95

Timeout [ms] 300

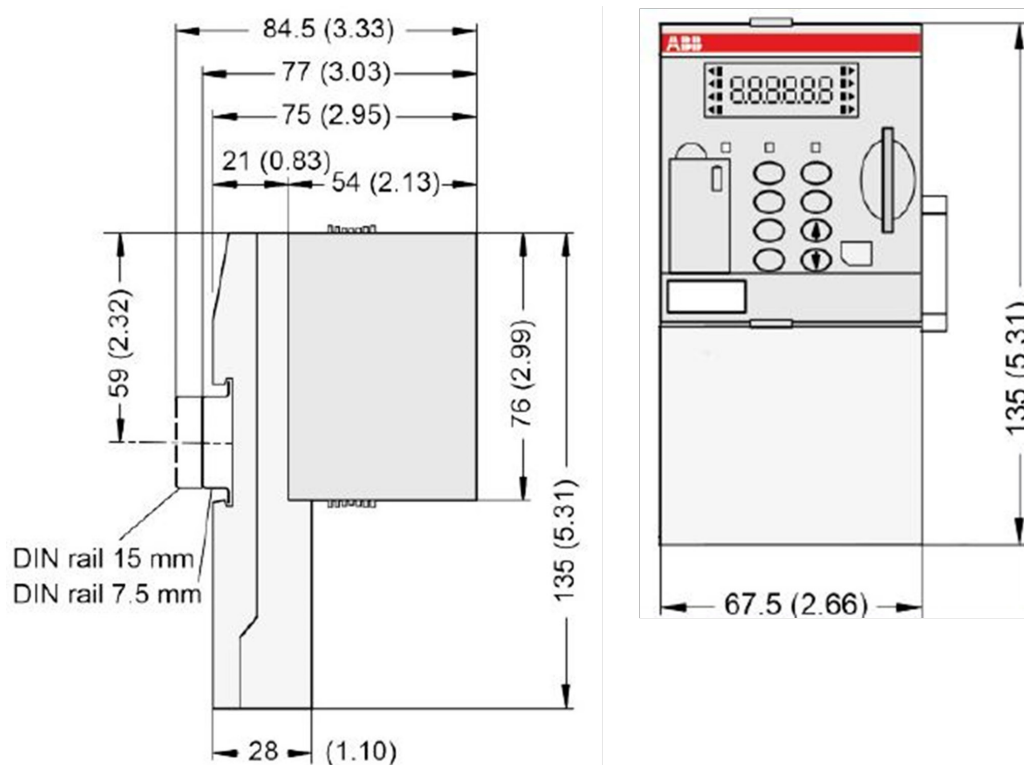
If the procedure has been performed correctly, the web interface of E-kit will open in Ekip Connect.



11 - Technical specifications

Dimensions

The dimensions of E-kit are given below in millimeters. The dimensions in inches are between brackets.



Certifications

E-kit has obtained the following certifications:

- CE
- UKCA
- China Rohs (SJ/T 11363-2006)
- Eurasian certification
- cUL (Ordinary locations)
- cUL (Hazardous locations)
- American Bureau of Shipping
- Bureau Veritas

- Lloyds Register
 - RINA
 - Korean register of Shipping
 - China classification Society
-

EU Declaration of Conformity

The manufacturer, ABB Electrification, states that E-kit complies with the 2014/30/EU e 2011/65/EU directives. The full EU Declaration of Conformity text is available on the following website: [EU Declaration of conformity - PM5630, PM5650, PM5670, PM5675, TB5600, TB5610, TB5620, TB5640, TB5660 may be followed by other suffix - Distributed Automation PLCs \(abb.com\)](#).

cUL Declaration of Conformity

E-kit complies the cUL standards. The full certificate is available on the following website: [cULus Certificate - Distributed Automation PLC AC500, AC500 V3, AC500-XC, AC500-S Safety PLC, S500, S500-XC \(Class 1 Div 2 - for hazardous locations\) \(abb.com\)](#).

