



# User Manual

V4.1  
15.06.2016

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*eTactica Gateway EG-100 and EG-200*



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This is the user manual for the eTactica Gateways, valid for the products marked as EG-100 and EG-200 and firmware release 1.24. In this document, you will find information about installing and configuring your eTactica Gateway device.

The intended reader is a person with electrical background and basic knowledge in TCP/IP networking.

## 1. Introduction

The eTactica Gateway (EG) is a part of the eTactica line of products, including the eTactica Power Meter (EM), the eTactica Current Bar (EB) and the eTactica Current Meter (ES).

The EG collects and analyses your energy data, measured by the EM, EB and ES. The EG reads live data from connected devices via its device bus, using Modbus/RTU protocol on RS485 network (default settings: 19200, 8, E, 1). This allows multiple eTactica devices to be connected, as well as other 3rd party measurement devices that support Modbus/RTU.

The EG is a 32 bit Linux platform with Ethernet and WiFi connectivity and acts as a secure gateway between the electrical panel and the Internet. Measurement data is securely pushed through any Internet gateway to the eTactica datastore, where the data is securely accessible from any Internet browser. No need to open ports, just plug and play. Easy. Secure.

The EG-100 includes a 12W power supply which provides 12VDC@1A, to supply the EG itself as well as all the eTactica devices connected to the device bus.

The EG-200 uses an external power supply 12VDC, minimum 1,1A to power the EG and connected devices.

### Main characteristics

- Supports up to 32 eTactica devices or 3rd party Modbus devices
- 5 LEDs that indicate the status of the device
- Built in webserver for device configuration and live measurements
- Wired and wireless LAN connections
- Modbus/RTU via RS485
- Standard DIN rail mounting (EG-100 6 unit, EG-200 2 unit)

## Network Requirements

The Gateway has some network requirements for proper operation. The notes below apply to the normal, centrally hosted eTactica system.

### DNS access

We expect to have DNS access available. How you configure your network and the EG's network interfaces (WiFi and LAN) is up to you, but we expect DNS access to be available.

### Port access

#### *For secure messaging*

Outbound access to TCP port 8883 is required.

(Note, for secure messaging, outbound http(s) is required, for the secure signup process)

#### *For insecure messaging*

Outbound TCP port 1883 is required.

### NTP access

The eTactica system expects to have reliable timestamps on the data sent from the EG. If there is an outbound access on UDP port 123, this will happen automatically, but you can also edit the list of NTP servers used and provide one in your own network if you prefer. See [Time Synchronization](#) in chapter 12, [Troubleshooting](#).

### HTTP and HTTPS access

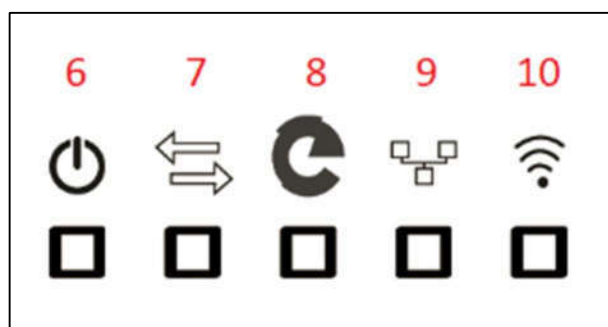
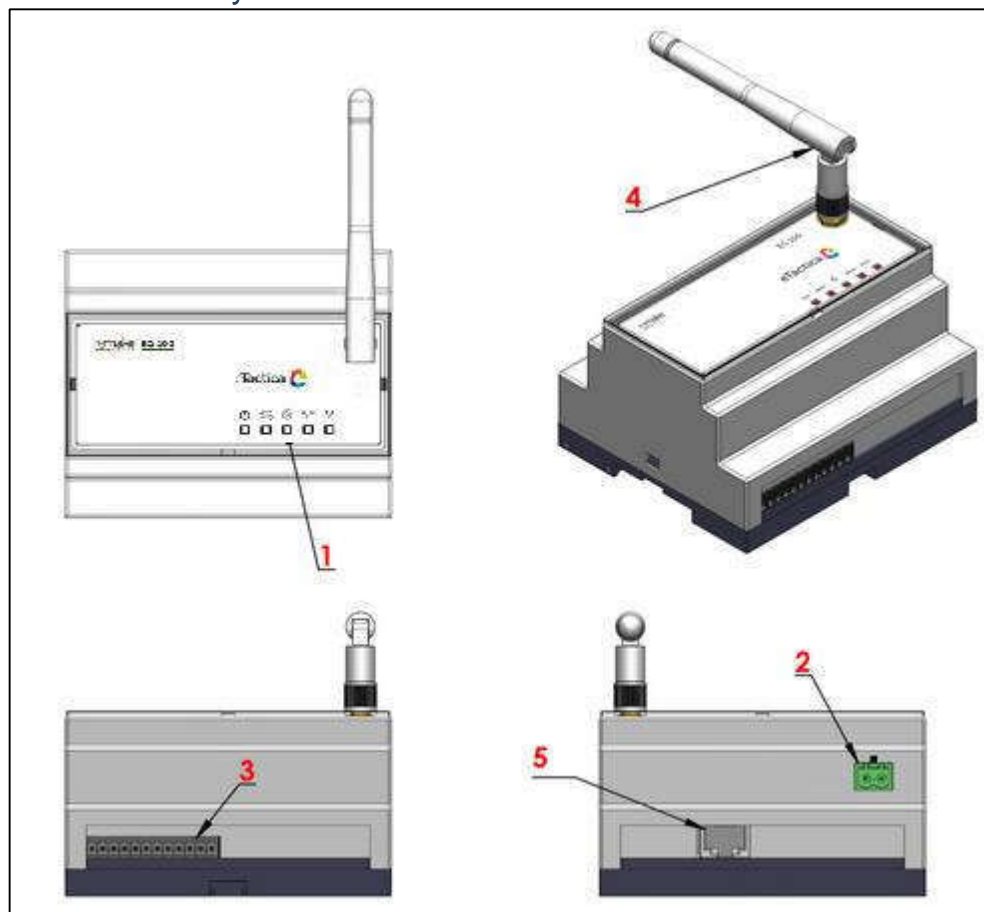
This is required for secure messaging, but optional for insecure messaging.

General web access on ports 80 and 443 are used for software updates and signing up for secure messaging. This is not required but it certainly makes things easier for everybody, and we highly recommend it.

## Technical Specifications

EG-100	
OS	32-bit Linux
Network communication	Ethernet TCP/IP (10/100Mbit) WiFi (802.11b/g)
Device bus protocol	Modbus/RTU 19200, 8, E, 1 (default settings)
Device bus interface	RS485, 2-wire, shielded twisted pair, Multi stranded AWG22, Terminated
Device bus power source	12VDC@700mA
Max devices	32
Max cable length	60 m (Max cable length for the entire RS485 network, from the Gateway to the last slave-device)
Power Supply	90-260VAC@50/60 Hz
Power consumption	< 16W
Fastenings	DIN (EN 50022) 6 unit
Weight	180g
General Data	
Storage Temperature	-20° C to +70° C
Operating Temperature	0° C to +50° C
Safety	IEC/EN 60950-1 UL 60950-1 CSA C22.2 No. 60950-1-03, GB4943
EMC	EN 55022:2006 + A1:2007 EN 55024:1998 + A1:2001 + A2:2003 (class B) EN 61000-3-2:2006 + A1:2009 + A2:2009 EN 61000-3-3:2008 FCC: Part 15 Subpart B, Subpart C EN 62311:2008 EN 300 328 V1.7.1:2006-05 EN 301 489-17 V2.1.1:2009-05

## Connection Layout

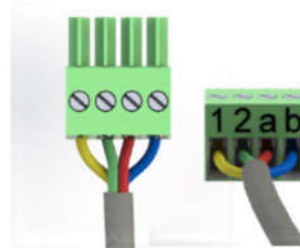


1. Status LEDs  
(6 - Power, 7 - Modbus, 8 - eTactica online, 9 - Ethernet link, 10 - WiFi)
2. Power input 90-260VAC@50/60 Hz
3. Device-bus connector
4. External Wifi antenna
5. RJ45 LAN connector (Ethernet)

### Device bus connector

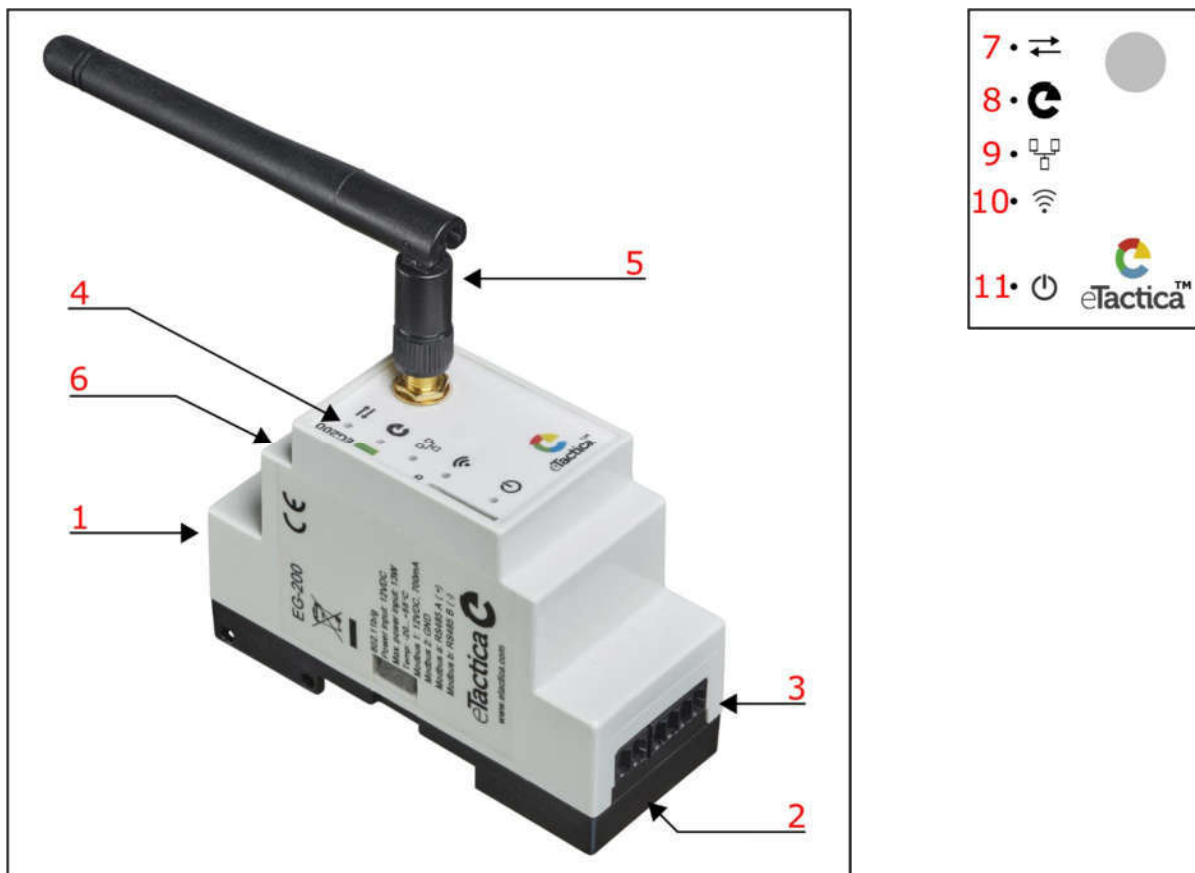
The device-bus connection layout, the communication bus that interconnects all eTactica devices.

- [ 1 ] DC Power, 12VDC@700mA
- [ 2 ] GND
- [ a ] RS485 A
- [ b ] RS485 B





EG-200	
OS	32-bit Linux
Network communication	Ethernet TCP/IP (10/100Mbit) WiFi (802.11b/g/n)
Device bus protocol	Modbus/RTU 19200, 8, E, 1 (default settings)
Device bus interface	RS485, 2-wire, shielded twisted pair, Multi stranded AWG22, Terminated
Device bus power source	12VDC@700mA
Max devices	32
Max cable length	60 m (Max cable length for the entire RS485 network, from the Gateway to the last slave-device)
Power Supply	12VDC 1,1A
Power consumption	< 13W
Fastenings	DIN (EN 50022) 2 unit
Weight	87g
General Data	
External memory	Micro SD-card slot
Storage Temperature	-20° C to +70° C
Operating Temperature	-20° C to +50° C
Safety	IEC/EN 60950-1 UL 60950-1 CSA C22.2 No. 60950-1-03, GB4943
EMC	EN 55022:2006 + A1:2007 EN 55024:1998 + A1:2001 + A2:2003 (class B) EN 61000-3-2:2006 + A1:2009 + A2:2009 EN 61000-3-3:2008 FCC: Part 15 Subpart B, Subpart C EN 62311:2008 EN 300 328 V1.7.1:2006-05 EN 301 489-17 V2.1.1:2009-05



1. RJ45 LAN connector (Ethernet)
2. Power input 12VDC
3. Device-bus connector
4. Status LEDs  
(7 - Modbus, 8 - eTactica online, 9 - Ethernet link, 10 - WiFi, 11 - Power)
5. External Wifi antenna
6. Reset button (accessed through an opening on the enclosure)

Emission: Product family standard, Measurement, control and laboratory equipment

EN 61326-1:2013

EN 301-489-1-9-2:2011

Product standards:

EN 61000-3-2:2006 with Amd.1:2009 and Amd.2:2009, Harmonic current

EN 61000-3-3:2008, Flicker

Immunity: Product family standard Measurement, control and laboratory equipment

EN 61326-1:2013

EN 301-489-1-9-2:2011

## 2. Connecting to Gateway

In this chapter, you find a description of how to connect to the eTactica Gateway (EG) and how to do a simple setup, where a Wizard will guide you through all the steps.

Most commonly, this is done using the WiFi interface. By default, every Gateway comes with an open WiFi interface (wireless hotspot) for initial configuration. The SSID for the wireless hotspot is always "eTactica eg\_xxxxxx", where xxxxxx is a unique number for each Gateway.

Alternatively, you connect by using your Ethernet connection.

### Connection via WiFi

#### Step 1 - Connect to WiFi hotspot

Use the normal operating system method for connecting to a new wireless hotspot. On Windows it looks something like this:



#### Step 2 - Visit the administration web console

If you have connected via WiFi, the URL to the administration console is always <http://192.168.49.1>. Type this IP address into your web-browser to get access.

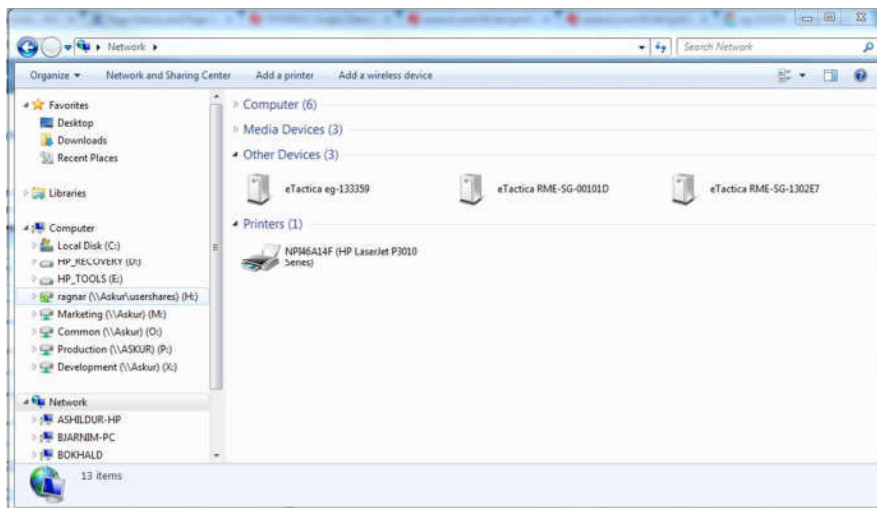
## Connection via Ethernet

In our recommendation, the EG is connected to an existing managed IP network and receives an IP address via DHCP. If your computer/laptop is connected to the same network, you can also access the EG via this interface.

## Windows

If the device has been connected to your existing Ethernet network, as we recommend, you can find the device in *Windows Explorer -> Network -> Other devices*, as shown below. Simply double click the name of the device you wish to connect to and you will automatically be directed to the administration web console page of the gateway, via your web-browser.

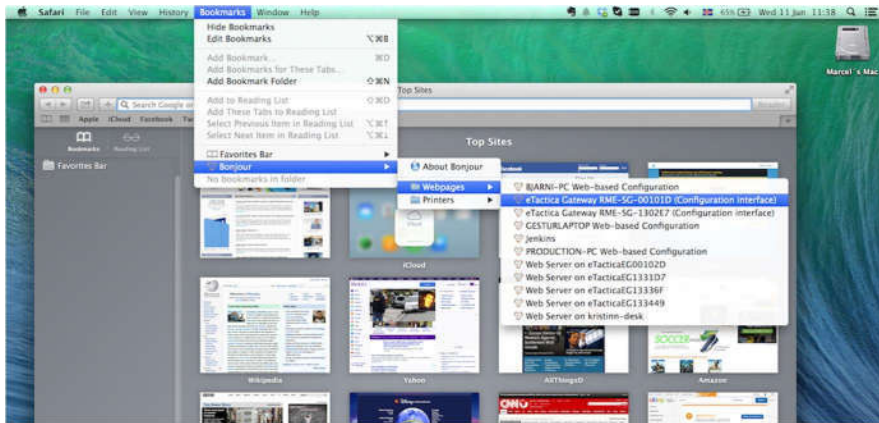
The name of the device shown here, will also match "*eTactica eg\_XXXXXX*", where -XXXXXX is a unique number for each gateway device.



## OSX

On OSX, using the Safari Browser, you can visit *Bookmarks -> Bonjour Bookmarks* and choose the entry for the matching device.

Note, you may need to enable browsing Bonjour Bookmarks first, see information at <https://www.apple.com/support/bonjour/>.



## Linux

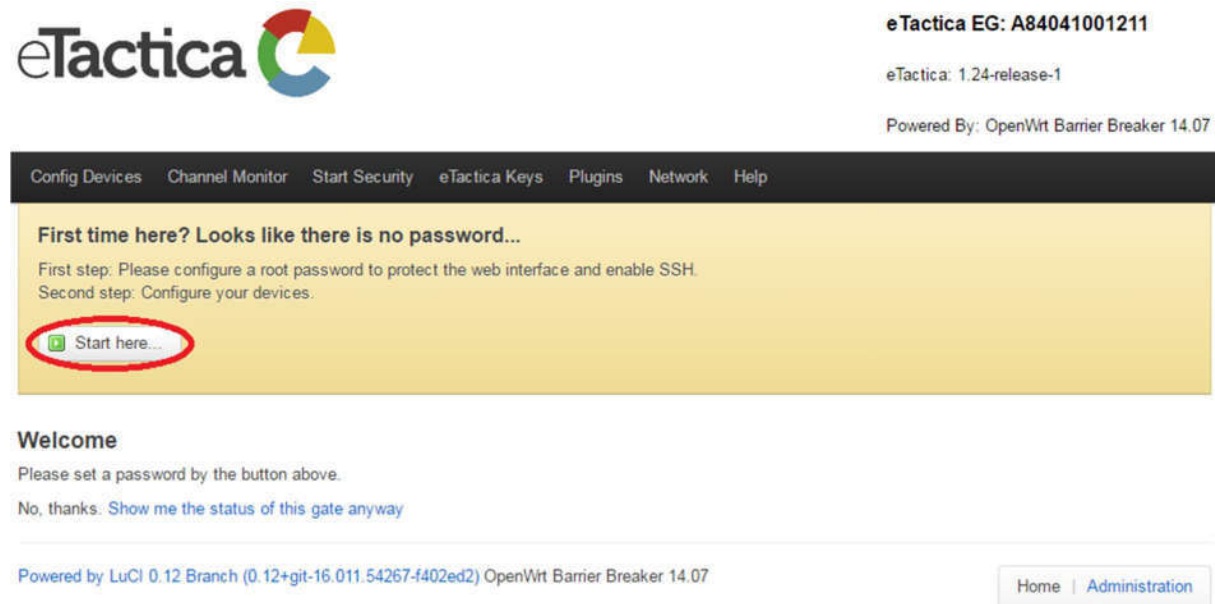
On Linux there are different tools available for this kind of discovery, i.e. *Avahi-discover*. You can use these tools to find your device and to the IP address (URL) it got assigned.

Once you have the IP address, you can enter it in your web-browser to access the admin console page of the gateway.

### 3. Simple Configuration Wizard

The following chapter describes the steps during configuration of your eTactica gateway, using the simple wizard and then setting up secure messaging.

#### Step 1 - Starting Wizard



The wizard process helps you configure the following items:

- The root password for your device
- Networking and WiFi passwords
- Configuring Modbus device list

If you want to configure these items manually, you may simply proceed as documented in the rest of this manual. However, the vast majority of installations should be able to use the wizard.

Simply press the *[Start here]* button.

#### Step 2 - Setting Root Password

The root password is used to log in to the web administration console for modifying any important settings. The root password also provides SSH access to the device. As always, you should use a good password here.

When done, press the *[Next: Configure Network]* button for next step.

## Gate Password

This password will be used for accessing your gate, both on this webconsole and via SSH.

It is **highly recommended** to set a password for this gate!

Password

Repeat Password

 Next: Configure Network

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## Step 3 - Configure Network

The recommended networking setup is to connect the Ethernet port to a regular DHCP network, as this requires the least configuration. Simply leave the mark on DHCP and move down to the WiFi password.

In either case, you should also enter a WiFi password here. This will use WPA2/WPA2-PSK, the best available wireless security at this time. This should be perfectly reasonable for most use cases.

When done, press the *[Apply Network Settings]* button to continue.

## Network

Please review your basic network settings below. The default settings should be suitable for most environments.

### Network protocol for LAN (Ethernet)

You might switch to static ip address or keep DHCP.

DHCP (Default) ☒

Static ☐

### Wireless network password

It is **highly recommended** to set a password for the wifi. Encryption will be set to WPA2-PSK.

Wifi Password  Must be at least 8 characters.

Repeat Wifi Password

 Apply Network Settings

 Skip

If you need to configure more advanced settings, please visit the "Network" menu in the home page. You may then safely skip this step.

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## Note

If you wish to completely disable WiFi, that is of course possible, please see [Enable/Disable WiFi](#) in chapter 8, [Network Settings](#), for instructions. Until you have reconnected with any updated networking settings, it's simply too unsafe to turn off the WiFi this early in the configuration process.

## Step 4 - Reconnect

Once you have entered your desired networking setup and WiFi password, the device networking will restart.

Depending on how you had originally connected to the device, you will most likely have to reconnect. The WiFi SSID will be shown, to help you reconnect via WiFi. This may take a minute or two to restart, so please be patient.

### Gate is now restarting networking...

Everything looks fine.

If necessary, please reconnect to this gateway using the following wireless settings:

Network Security Key

.....

Show Network Security Key

SSID

eTactica eg-001211

Once you have reconnected your network, you have finished basic setup. Please return [Home](#)

---


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Once you have reconnected to the device, you should see a new home page.

## Step 5 - Device Configuration

Now that your basic networking and security is setup, it's time to proceed to configure your measurement devices.



**eTactica EG: A84041001211**

eTactica: 1.24-release-1

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[Config Devices](#)
[Channel Monitor](#)
[Start Security](#)
[eTactica Keys](#)
[Plugins](#)
[Network](#)
[Help](#)

### Welcome

There aren't any devices configured. Why not configure some?

Next: Config Devices

No thanks, [Show me the status of this gate](#)

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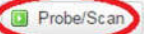


Please press the *[Next: Config Devices]* button to continue and you will see the following screen.



## Modbus Devices

You can manage the list of Modbus devices you wish to read from here.

Existing configuration loaded 

Unit ID (decimal)	(hex)	Device Type	Plugin	Actions
 Probe/Scan				

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### Step 6 - Scan for Devices

If you have many devices and they are all eTactica devices, you can attempt to scan for all connected devices. You should always review scan results to be sure they match the devices you expected to be found.

If you choose to scan, simply press the *[Probe/Scan]* button.

The process will take about 30 seconds, as it scans all possible Modbus addresses looking for eTactica devices.

#### Note

This only works for eTactica devices and only for devices that are properly connected.



Here is a screenshot of the process about half complete.




**Probe results**

Scanned 160 / 246

**Devices Found: 2**

Note: Only eTactica devices are found by this scan, and only devices that are properly connected and configured. Please check that all devices are found that you expect to find. Use the manual Modbus address entry for non-eTactica devices.

Modbus Slaveld	Device Type	Serial	Version	Icon
131 (0x83)	EB-106	2D000A8D9925	v3.10	
150 (0x96)	EM-200	0004A3ED6796	v3.14	

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Note that it shows the Modbus address (slave ID) of the detected device, its device type, the unique serial string and an icon for each device found to help you match against what you expected.




When the scan has finished you should see all connected eTactica devices.

## Probe results

Complete!

### Devices Found: 3

Note: Only eTactica devices are found by this scan, and only devices that are properly connected and configured. Please check that all devices are found that you expect to find. Use the manual Modbus address entry for non-eTactica devices.

Modbus Slaveld	Device Type	Serial	Version	Icon
131 (0x83)	EB-106	2D000A8D9925	v3.10	
150 (0x96)	EM-200	0004A3ED6796	v3.14	
186 (0xba)	ES-080	BD4A13037BBA	v3.14	

1 2

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## Step 7 - Saving Configuration

If you only care about the devices that were successfully scanned, you can press the *[Replace address list]*(1) button to replace any existing list with your scan results.

If you had third party devices already in your list, or if you have eTactica devices you plan on connecting later that you had manually entered in the previous step, then press the *[Merge with existing address list]* button (2) to merge a combined device list. See chapter 4 [Device Configuration](#) for further information about configuration.

If a device is not showing up in the scan list, please recheck its wiring and power supply, and feel free to scan again.

When choosing either *[Replace address list]* or *[Merge with existing address list]*, the configuration will be saved and applied.

## Modbus Devices

You can manage the list of Modbus devices you wish to read from here.

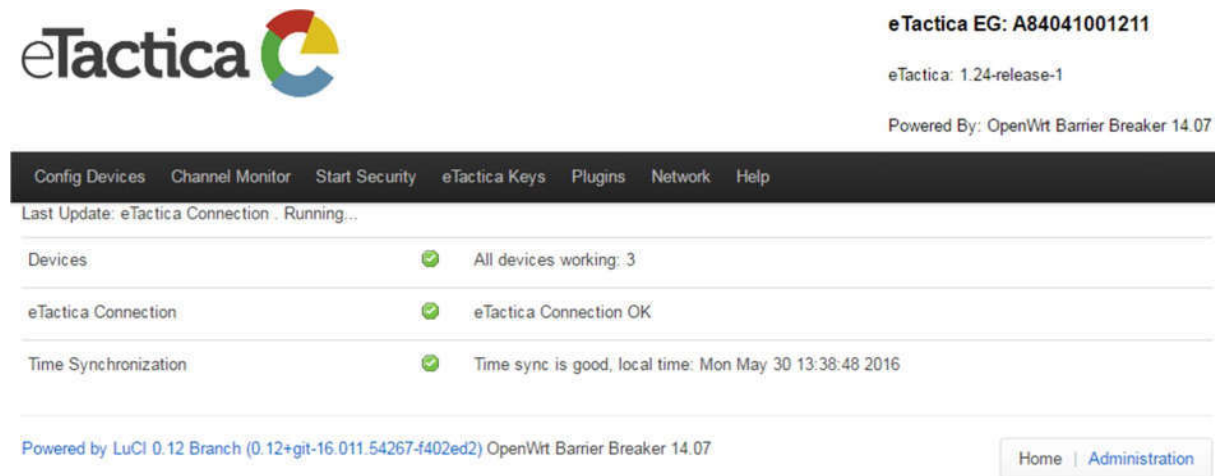
Existing configuration loaded 

Unit ID (decimal)	(hex)	Device Type	Plugin	Actions
<input type="text" value="131"/>	<input type="text" value="0x83"/>	Autodetect ▼		<input type="button" value="Remove"/> <input data-bbox="1177 1697 1295 1729" type="button" value="Advanced..."/>
<input type="text" value="150"/>	<input type="text" value="0x96"/>	Autodetect ▼		<input type="button" value="Remove"/> <input data-bbox="1177 1765 1295 1796" type="button" value="Advanced..."/>
<input type="text" value="186"/>	<input type="text" value="0xba"/>	Autodetect ▼		<input type="button" value="Remove"/> <input data-bbox="1177 1832 1295 1863" type="button" value="Advanced..."/>

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For final diagnostics of your configuration go back to the home page of the administration web console by clicking on the *[Home]* button or the eTactica logo.



eTactica EG: A84041001211

eTactica: 1.24-release-1

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Config Devices Channel Monitor Start Security eTactica Keys Plugins Network Help

Last Update: eTactica Connection . Running...

Devices	✓	All devices working: 3
eTactica Connection	✓	eTactica Connection OK
Time Synchronization	✓	Time sync is good, local time: Mon May 30 13:38:48 2016

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Home Administration

Hopefully you will see three green ticks that mean that everything is working correctly:

- Devices - All devices from your configuration list are connected and recognized
- eTactica Connection - Your network settings are correct and you are successfully connected to the eTactica web application
- Time Synchronization - You have access to a NTP server that will secure correct timestamp of your measurement data

If you see red ticks on any of the above, please refer to chapter 12, [Troubleshooting](#), to look for a solution to your problem.

### Step 8 - Enter secure settings page

Here you find information to enable secure connection. This makes all communication between your eTactica gateway and the eTactica host securely encrypted.

The encryption is not enabled by default, but can and **SHOULD** be enabled as shown in the following steps.

From the home page of the administration web console on your device, select **Start Security** from the top menu.

[Config Devices](#)
[Channel Monitor](#)
[Start Security](#)
[eTactica Keys](#)
[Plugins](#)
[Network](#)
[Help](#)

Last Update: eTactica Connection . Running...

Devices	✓	All devices working: 3
eTactica Connection	✓	eTactica Connection OK
Time Synchronization	✓	Time sync is good, local time: Mon May 30 15:25:47 2016

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## Step 9 - Start secure connection

Press the *[Get eTactica Key]* button.

### Start Secure Connection

eTactica servers appear to be reachable, press the button to enable secure messaging

Enabling security is a one way operation. In future releases, security will be enabled for all devices automatically, it is only while devices are transitioning to fully secure operations that there is an option to "start" security.

 Get eTactica Key

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Wait a few seconds while the key is retrieved.  
If everything is working fine, you should see this.

### Start Secure Connection

eTactica servers appear to be reachable, press the button to enable secure messaging

Enabling security is a one way operation. In future releases, security will be enabled for all devices automatically, it is only while devices are transitioning to fully secure operations that there is an option to "start" security.

✓ Successfully enabled secure connection, this is your eTactica key:A84041001211

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Your gateway is now securely communicating with the eTactica host.

## Step 10 - Completed

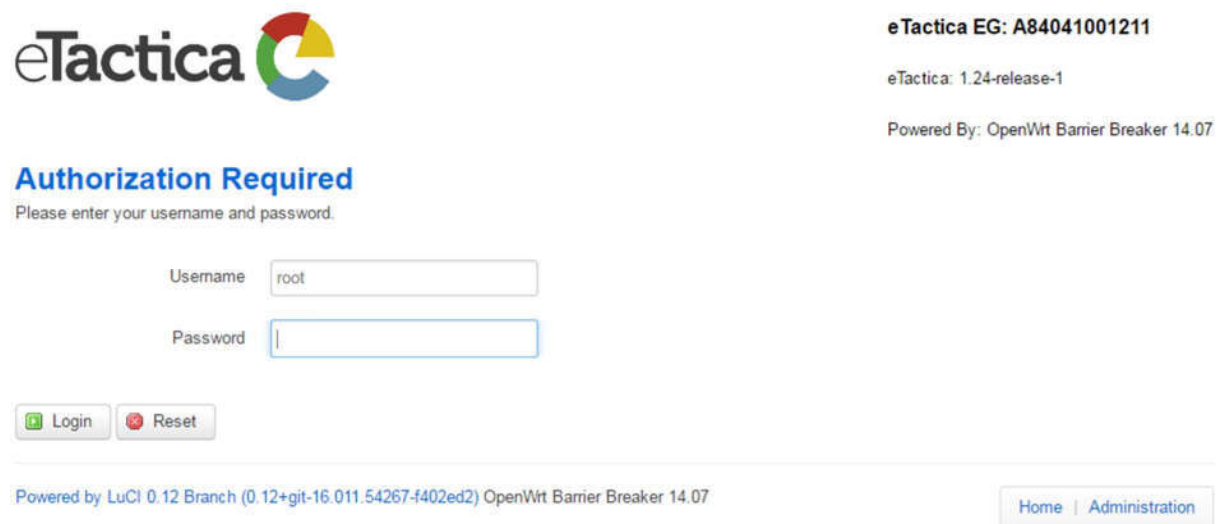
This completes your configuration, using the simple Wizard step by step guide.

## Further Configuration

If you need to do some further configuration see the following chapters.

### Login required

To edit most settings, you will need to be logged in and you will be presented with a screen like below.



The screenshot shows the eTactica Gateway login interface. At the top left is the eTactica logo. To the right, it displays 'eTactica EG: A84041001211', 'eTactica: 1.24-release-1', and 'Powered By: OpenWrt Barrier Breaker 14.07'. Below the logo is the heading 'Authorization Required' with the instruction 'Please enter your username and password.' There are two input fields: 'Username' with the value 'root' and 'Password' which is empty. Below these fields are two buttons: 'Login' and 'Reset'. At the bottom left, it says 'Powered by LuCI 0.12 Branch (0.12+git-16.011.54267-f402ed2) OpenWrt Barrier Breaker 14.07'. At the bottom right, there are links for 'Home' and 'Administration'.

The username is ALWAYS root and the password is the root password chosen by you during initial configuration.

## 4. Device Configuration

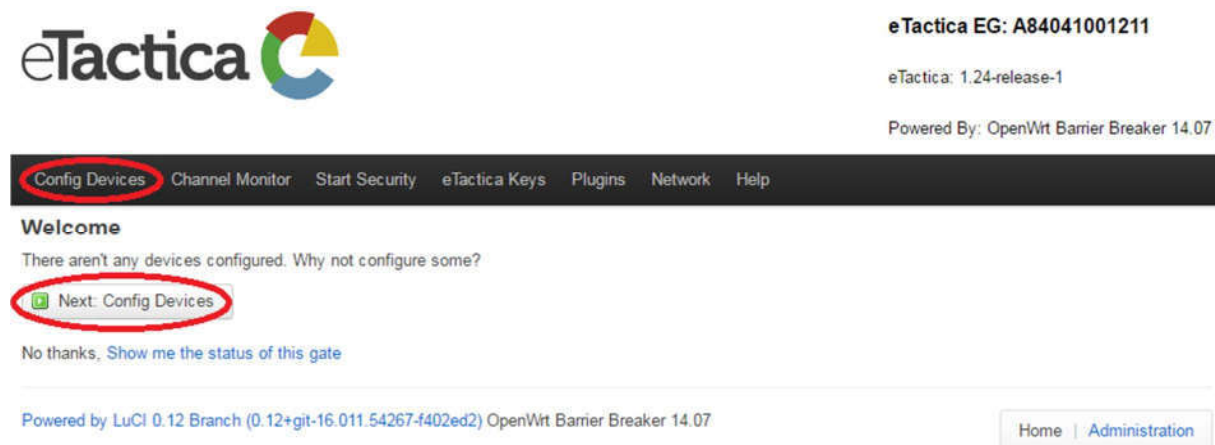
The following chapter describes how to add a Modbus device to the list of connected devices. This is done by entering the Modbus address of your device/s to the list, either manually or automatically by scanning.

### Pre-requirements

You are successfully connected to your eTactica gateway, either via WiFi or Ethernet. If not, please see chapter 2 [Connecting to Gateway](#).

### Step 1 - Choose

From the menu at the home page for the administration web console, choose [Config Devices](#).



### Note

This will require you to login, using the root password you have configured earlier. If not, please see chapter 9, [Password Settings](#).


### Step 2a - Manually enter the device address




If you only have one or two devices, you can simply enter the Modbus slave addresses manually. (See [A note on Modbus addresses](#) below). Press the *[Add Device]* button as many times as you have devices to add. For each device fill in the Unit ID in either decimal or hex, the other will then be filled in automatically.






## Modbus Devices

You can manage the list of Modbus devices you wish to read from here.

Existing configuration loaded 

Unit ID (decimal)	(hex)	Device Type	Plugin	Actions
<input type="text" value="25"/>	<input type="text" value="0x19"/>	Autodetect ▼		 Remove  Advanced...
<input type="text" value="67"/>	<input type="text" value="0x43"/>	Autodetect ▼		 Remove  Advanced...

 Probe/Scan
  Add Device
  save


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When Autodetect is chosen under Device Type the gateway should choose the right plugin for the device. If, for some reasons, Autodetect does not work, you can choose the plugin manually, choose the right category under device type and then choose the right plugin in the Plugin drop down list. By pressing the *[Advanced]* button you will find further configuration possibilities if they are available for that plugin. There will be a red frame around the *[Advanced]* button if the default value have been changed. There is more information about plugins in chapter 6, [Device Plugins](#).

## Modbus Devices

You can manage the list of Modbus devices you wish to read from here.

Existing configuration loaded 

Unit ID (decimal)	(hex)	Device Type	Plugin	Actions
<input type="text" value="41"/>	<input type="text" value="0x29"/>	Autodetect ▼		 Remove  Advanced...
<input type="text" value="131"/>	<input type="text" value="0x83"/>	electricity ▼	<div> Autodetect  carlo-gavazzi-em21.lua (system)  dent_powerscout3.lua (system)  etactica_eb-es.lua (system)  etactica_em.lua (system)  frer.lua (system)  ime-ce4dmid01.lua (system)  <b>janitza_umg-96.lua (system)</b>  saia-burgess-Axx3D5x.lua (system)  schneider_electric_a9mem3xx.lua (system)  schneider_electric_pm7xx.lua (system)  siemens_sentron.lua (system)  socomec_diris.lua (system)  janitza_umg-508.lua (user) </div>	 Remove  Advanced...
<input type="text" value="150"/>	<input type="text" value="0x96"/>	Autodetect ▼		 Remove  Advanced...

 Probe/Scan
  Add Device
  save

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Press the *[save]* button to store settings.

### Step 2b - Automatically scan for devices

If you have many devices, you can attempt to scan for all connected devices. Please note that this only works for eTactica devices and only for devices that are properly connected.

You should always review the scan results to be sure they match the devices you expected to be found.

If you choose to scan, simply press the *[Probe/Scan]* button.

The process will take about 30 seconds, as it scans all possible Modbus addresses looking for eTactica devices.




Below is a screenshot of a completed scan process.

## Probe results

Complete!

**Devices Found: 3**

Note: Only eTactica devices are found by this scan, and only devices that are properly connected and configured. Please check that all devices are found that you expect to find. Use the manual Modbus address entry for non-eTactica devices.

Modbus SlaveId	Device Type	Serial	Version	Icon
131 (0x83)	EB-106	2D000A8D9925	v3.10	
150 (0x96)	EM-200	0004A3ED6796	v3.14	
186 (0xba)	ES-080	BD4A13037BBA	v3.14	

1

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For each device that is detected, you can see the Modbus address found, the device type, the unique serial string and an icon for each device to help you match against what you expect.

If you had third party devices already in your list, or if you have eTactica devices you plan on connecting later that you had manually entered in the previous step, then press the *[Merge with existing address list]* button (2) to merge a combined device list.

If you only care about the devices that were successfully scanned, you can press the *[Replace address list]* (1) button to replace any existing list with your scan results.

If a device is not showing up in the scan list, please recheck its wiring and power supply, and feel free to scan again.

When choosing either *[Replace address list]* or *[Merge with existing address list]*, the configuration will be saved and applied.



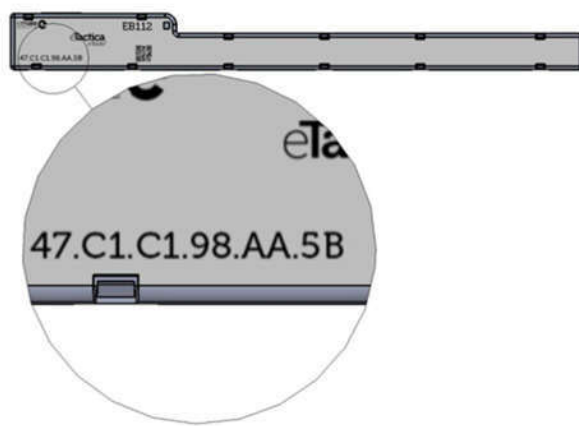
### *For 3rd party devices*

For third party devices you need to find or change the Modbus address yourself. This might be via the LCD screen and buttons on the device, or in the device manuals. Once you have found/configured the address, enter it just like any other.

### *A note on Modbus addresses*

The Modbus addresses are fixed for all eTactica devices and are based on the serial number (unique ID) of the device.

The unique ID is a 12-digit sequence of hexadecimal numbers that you find on the label of the device.



You need to read the last two letters/digits (hexadecimal) from the unique ID of each device that represent the Modbus address.

#### Example:

If the unique ID for your EB-112 device is 47.C1.C1.98.AA.5B, then the Modbus address is 5B.

### *Unauthorized Modbus addresses*

According to the Modbus protocol specifications, some addresses are not allowed: 00, F8, F9, FA, FB, FC, FD, FE, FF.

Even so, these addresses can exist in the unique ID string.

### *For manual configuration of devices*

For manual configuration of devices you need to be careful. If you have a device with an unauthorized Modbus address, then the address isn't the code but the two previous letters (and if they are also unauthorized the next two).

#### Example:

If your device ID is .43.4C.FD then you have to put 4C into the list.