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# User Manual

# EC335 4DC Environmental Condition Controller


**Version 2**

## Table of contents

| Warning: |
| --- |
| This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures. |

# 1 DEVICE DESCRIPTION

The EC335 4DC controller is designed to monitor environmental parameters (temperature, humidity, etc.) in a telecommunications cabinet or small rooms. Its purpose is to warn users about possible emergency situations and report any failures. The following can be connected to the controller: up to 4 analogue sensors, 4 sensors with potential-free contacts and two signalling devices. With extension modules can be connected up to 28 analogue sensors, 36 sensors with potential-free contacts, up to 20 1-wire sensors. To keep a satisfactory system performance, it is not recommended to connect more than 40 sensors to the controller.



# 2 PACKAGING CONTENTS

The packaging of the EC335 controller includes:

1. EC335 4DC controller
2. 230V AC, 12V DC 1A plug adapter
3. 1U 19'' bracket
4. RJ45-RJ45 patchcord
5. Cable: mini-B USB plug – A USB socket
6. 6-pin and 3-pin terminal connector

# 3 TECHNICAL PARAMETERS

| Hardware | |
|---|---|
| Analogue inputs | 4 inputs (RJ12 sockets) for compatible analogue sensors. Any combination of 4 sensors can be connected to the device. Some sensors can be connected in stacks. The type of a sensor is detected automatically. |
| Inputs for potential-free contacts | 4 inputs (removable 6-pin terminal strip) for any sensors with potential-free contacts |
| Outputs | 2x 12V/250mA voltage outputs (removable 3-pin terminal strip) |
| CAN connector | Connector (RJ12 socket) for up to 8 extension modules for additional analogue EE321 inputs and additional EE322 inputs for potential-free contacts |
| Other connectors | 10/100Mbps (RJ45 socket) Ethernet port, USB 2.0 port (Mini-B socket) |
| Other | Optional card of a GSM module. |
| Power supply | External 12V/1A plug adapter, power consumption ≤ 10W |
| Dimensions | 180x80x33 (width x depth x height) |
| Operating conditions | Temperature: 0°C - 60°C, Humidity: 0% - 90% RH (no condensation) |
| Storage conditions | Temperature: -25°C - 85°C, Humidity: 0% - 95% RH (no condensation) |
| Weight | 700g |
| Index | 122EC003351 |
| Software | |
| Operating system | Linux |
| Configuration | Through a web interface |
| Supported protocols | HTTP, HTTPS, PING, DHCP, RADIUS, SYSLOG, FTP, SNTP, SMTP, SNMP (v1,v2,v3) |
| Alarm notification | E-mail, SNMP trap, internet SMS gateway, SMS (optionally with GSM modem) |

# 4 SOCKET VIEW AND DESCRIPTION

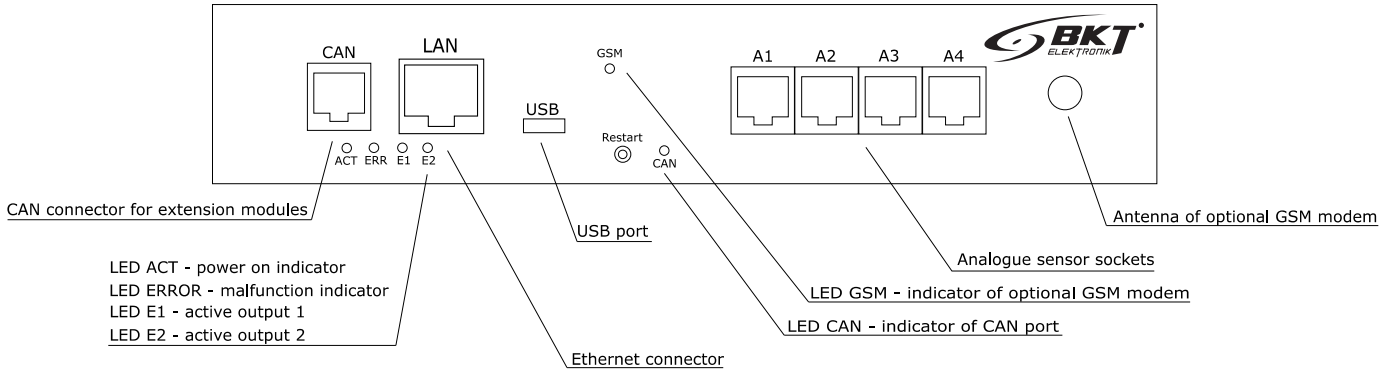



Fig 1. Front view

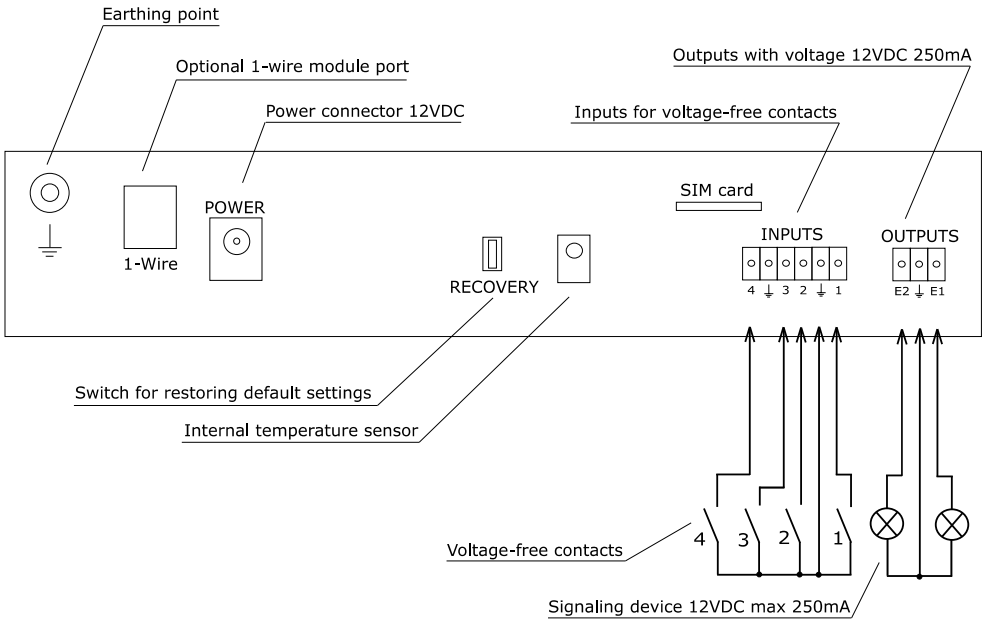



Fig 2. Rear view

# 5 ADDITIONAL COMPONENTS

## 5.1 Analogue sensors

| Type | Description | Index |
|---|---|---|
|  | **ES350** – Temperature sensor<br>Measurement range: -10°C - +100°C<br>Dimensions: 60x18x18<br>Maximum length of a connection cable: 100m | 122ES003500 |
|  | **ES351** – Humidity sensor<br>Measurement range: 10% - 95% RH<br>Dimensions: 60x18x18<br>Maximum length of a connection cable: 50m | 122ES003510 |
|  | **ES352** – 230V AC voltage sensor<br>Measurement range: 90VAC - 250VAC<br>Dimensions: 63x66x30<br>Maximum length of a connection cable: 100m | 122ES003520 |
|  | **ES353** – Door sensor (reed relay + magnet)<br>Stack connection of up to 10 sensors<br>Dimensions: 60x18x18<br>Maximum length of a connection cable: 150m | 122ES003530 |
|  | **ES354** – Vibration sensor<br>Stack connection of up to 10 sensors<br>Dimensions: 60x18x18<br>Maximum length of a connection cable: 150m | 122ES003540 |
|  | **ES356** – Optical smoke sensor<br>Stack connection of up to 10 sensors<br>Dimensions: ϕ100x45<br>Maximum length of a connection cable: 150m | 122ES003560 |
|  | **ES357** – Passive infrared sensor<br>Movement detection range: 100° x 12m<br>Dimensions: 105x57x40<br>Maximum length of a connection cable: 50m | 122ES003570 |
|  | **ES358** – External temperature sensor<br>Measurement range: -40°C - +100°C<br>Dimensions: ϕ7x30 + 15 m cable<br>Maximum length of a connection cable: 100m | 122ES003580 |
|  | **ES359** – Flood sensor<br>Detection delay: 1s<br>Dimensions: 60x18x18<br>Maximum length of a connection cable: 100m | 122ES003590 |
|  | **ES360** – Flood sensor for a water detection cable<br>For connection of an ES361 water detection cable<br>Dimensions: 60x18x18<br>Maximum length of a connection cable: 100m | 122ES003600 |
|  | **ES361** – Sensor detecting water and other conductive liquids<br>An ES360 sensor is required for connection<br>Dimensions: 60x18x18<br>Available lengths: 6m, 10m, 17m, 25m, 50m | 122ES003610 |

| | | |
|---|---|---|
|  | **ES362** - 4-20mA sensor<br>Any sensors with 4-20mA output can be connected to the controller. Galvanic insulation 1kV between the input and the output.<br>Dimensions: 60x18x18 | 122ES003620 |
|  | **ES363** - 60V DC voltage sensor<br>Galvanic insulation 1kV between the input and the output.<br>Measurement range: 0VDC - 60VDC<br>Dimensions: 60x18x18 | 122ES003630 |

## 5.2 Digital sensors

| Type | Description | Index |
|---|---|---|
|  | **ES340** - Integrated smoke, humidity 10-95%, temperature -10...+85°C sensors; CAN bus<br>Possibility to connect up to 8 devices in a daisy chain (sensor has 2 CAN ports)<br>Dimensions: ϕ100x45<br>Maximum cable length: 200m | 122ES003400 |
|  | **ES365** - 1-wire temperature sensor<br>Measurement range: -50…+105°C<br>Possibility to connect up to 20 sensors in a daisy chain<br>Dimensions: 60x18x18<br>Maximum cable length: 100m | 122ES003650 |
|  | **ES366** - Outdoor 1-wire temperature sensor<br>Measurement range: -50…+105°C<br>Dimensions: ϕ7x30 + 15m cable<br>Maximum cable length: 100m | 122ES003660 |

## 5.3 Extension modules and accessories

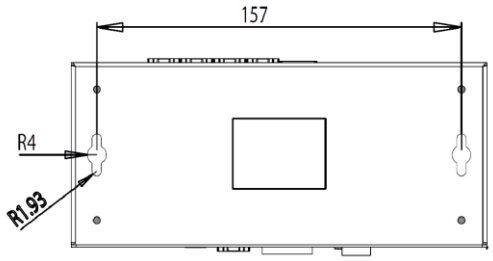
| Type | Description | Index |
|---|---|---|
|  | **EE321** – Extension module with additional 8 analogue inputs. The module is connected to a CAN controller connector. The controller supports up to 28 analogue sensors. The module has no 19” brackets.<br>Dimensions: 110x68x40 | 122EE003210 |
|  | **EE322** – Extension module with additional 32 inputs for potential-free contacts.<br>The module is connected to a CAN controller connector. The controller supports up to 32 inputs of potential-free contacts. 19” brackets included.<br>Dimensions: 215x40x40 | 122EE003220 |
|  | **EE323** – 1-wire extension module<br>The module is mounted inside the controller.<br>Dimensions: 44x23x15<br>The module is supplied with a connection cable. | 122EE003230 |

| | | |
|---|---|---|
|  | **EA311** - 1U bracket for a 19'' cabinet for EC335 4DC<br>Dimensions: 482x44x80 | 122EA003110 |
|  | **EA317** - GSM modem for EC300 4DC<br>Dimensions: 60x50x15<br>A modem for SMS communication operating in GSM 850/900/1800/1900 MHz networks. | 122EA003170 |

# 6 QUICK START GUIDE

## 6.1 Installation

The device can be installed on the wall using provided openings in the housing or mount it to a 19” profile with additional brackets. The 19” bracket symbol is shown in the ‘Accessories’ section.




## 6.2 Connection

1. Connect the analogue sensors to any A1-A4 socket.
2. Connect the RJ45-RJ45 patchcord to the LAN socket and the other end to the computer.
3. Connect the power adapter to the POWER socket.

## 6.3 Restoring default settings

In order to make sure that all settings have default values, it is recommended to reset the default setting before the first start-up.

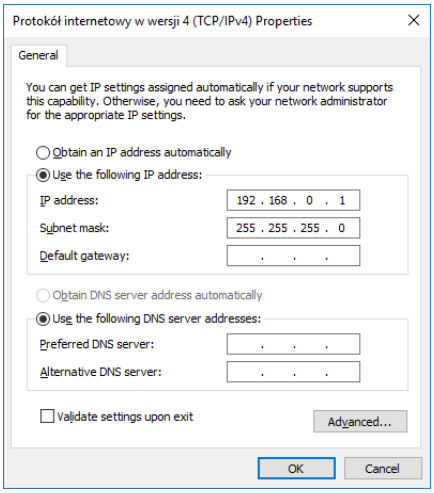
NOTE: All current settings will be deleted.

1. Make sure that the Normal/Recovery is in the NORMAL position. 

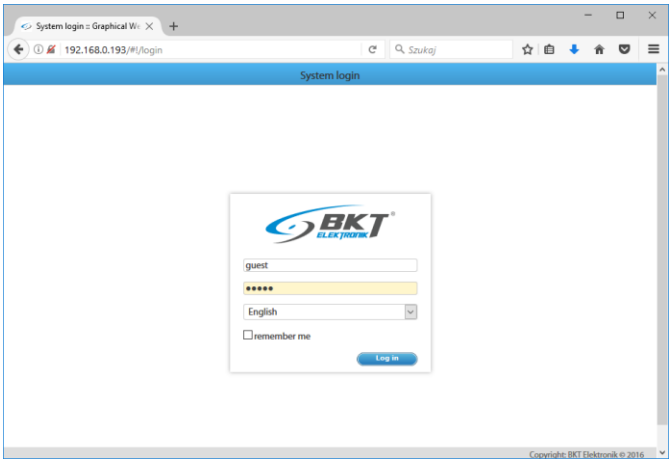
2. Connect the module power supply.
3. Wait for ACT LED flashing.
4. Switch the Normal/Recovery button to the RECOVERY position and wait until the LED ERROR indicator starts to flash (approx. 10 second).
5. When the LED ERROR indicator is still on, restore the button to the NORMAL position and wait until the device restarts.
6. The default settings have been restored.

| Default settings | |
|---|---|
| IP address | 192.168.0.193 |
| Network mask | 255.255.255.0 |
| Network gate | 192.168.0.1 |
| DNS | 192.168.0.1 |
| DHCP client | Disabled |
| Passwords | User: guest; password: guest |

## 6.4 Initial configuration

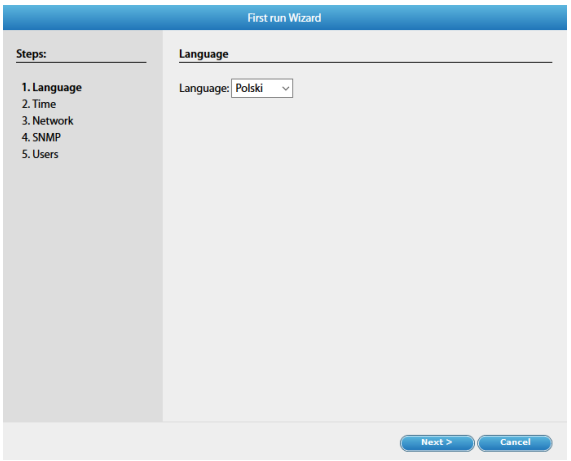



Configure the computer network card for operation in the same network as EC335. For example, you can use settings as shown in the figure.

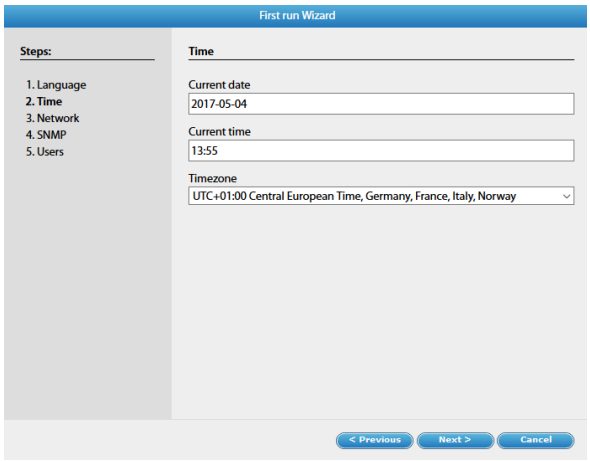



Run the browser and enter http://192.168.0.193 in the address bar. Enter the following in the login window: user: guest, password: guest.

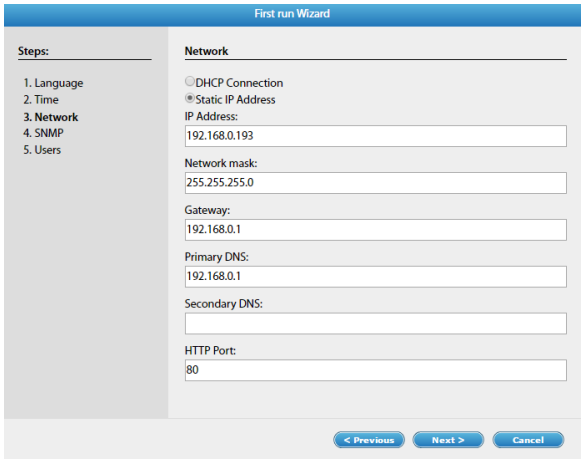
Use the displayed wizard for initial configuration.



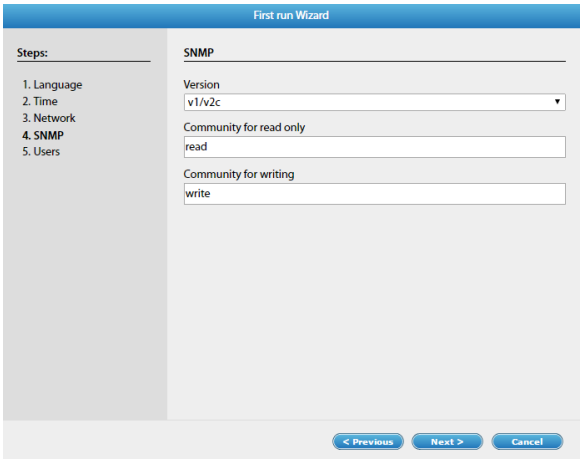

Choose the interface language.



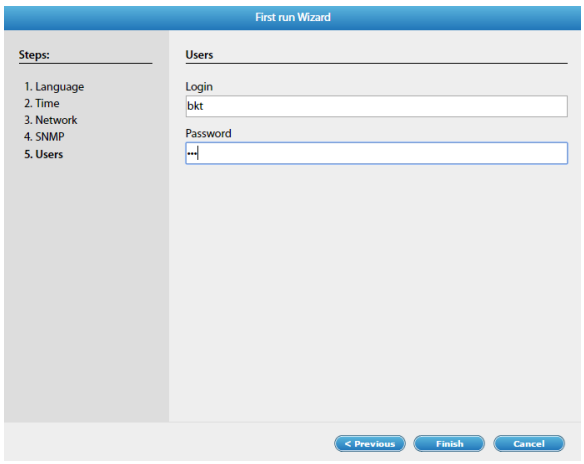

Set the date and time.




If necessary, change the network settings.

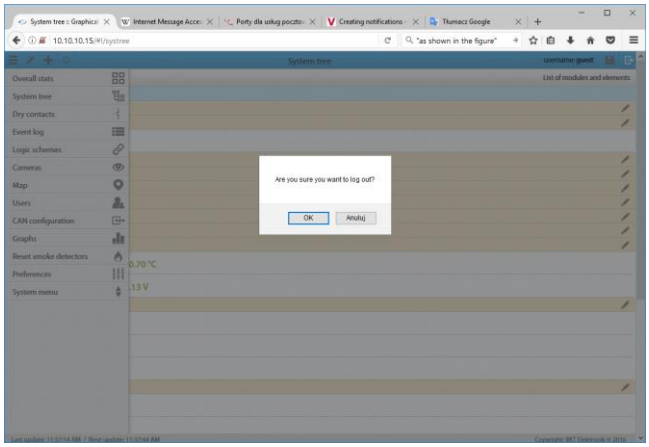



If necessary, change the SNMP protocol communication settings.




Create a new user. Click *Finish* and wait until the configuration is saved.

## 6.5 User Logging out




You can log out when you click on the *Logout* button from horizontal menu.

# 7 CONFIGURATION

## 7.1 Horizontal menu

Show and hide the vertical menu.

Run the initial configuration wizard.

Add a new element. This function is available only on certain screens selected from the vertical menu.

Refresh the view.

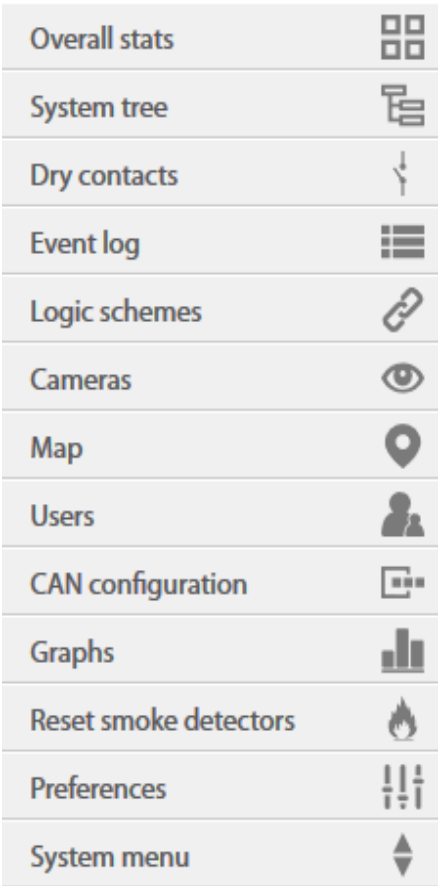
Additional settings. This function is availeble only on certain screens selected from the vertical menu.

Reset the smoke sensors. This function is available only after selecting ‘Reset the smoke sensors’ from the vertical menu.

Write the configuration to non-volatile memory of the module. Any configuration changes must be written to non-volatile memory, if they need to be kept after resetting the device.

Log out.

## 7.2 Vertical menu




General view of the system status.

View of all system components, incl. sensor values.

View of the potential-free contact status.

View of the system event history.

Creating relations between the sensors and potential alarms.

Camera image preview.

View of sensotr parameters against the room layout.

User management.

Configuration of extension modules.

Displaying sensor values on charts.

Resetting the smoke sensors following an alarm.

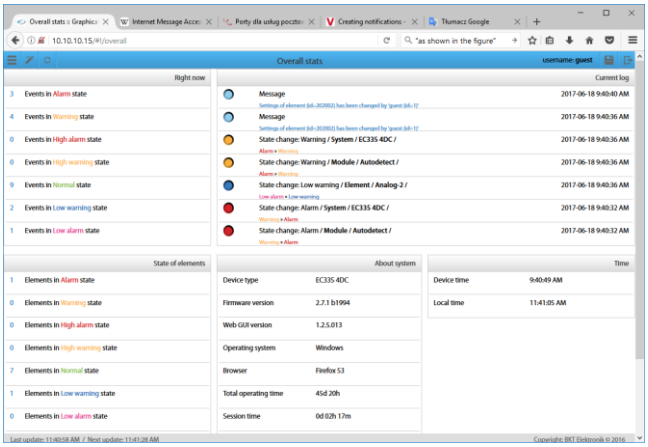
System settings.

Firmware update and data export.

## 7.3 Saving settings into non-volatile memory

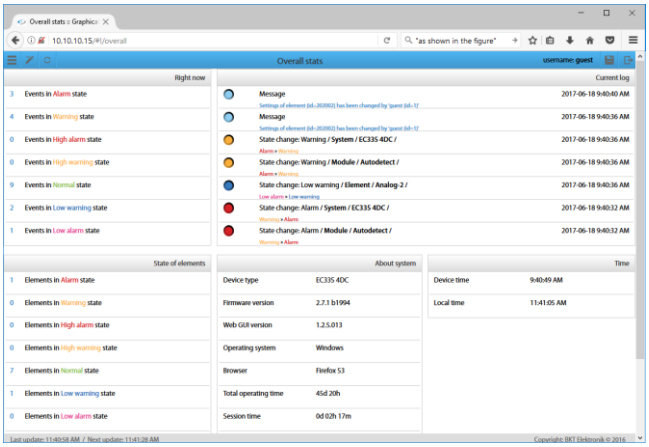
All new setting must be saved into FLASH non-volatile memory. Otherwise they will only be valid until the next reboot.

## 7.4 General statistics

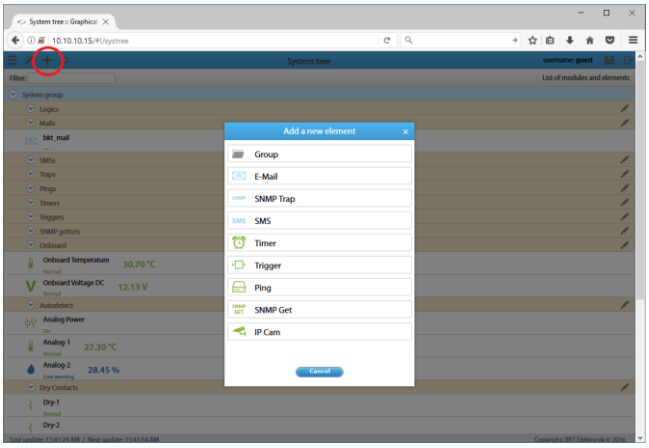


Select *Overall Stats* from the vertical menu to display basic data on the system status.

## 7.5 System tree (system components)



Select *System tree* from the vertical menu to display all system components. On this page, you can add, remove and modify settings of individual components.

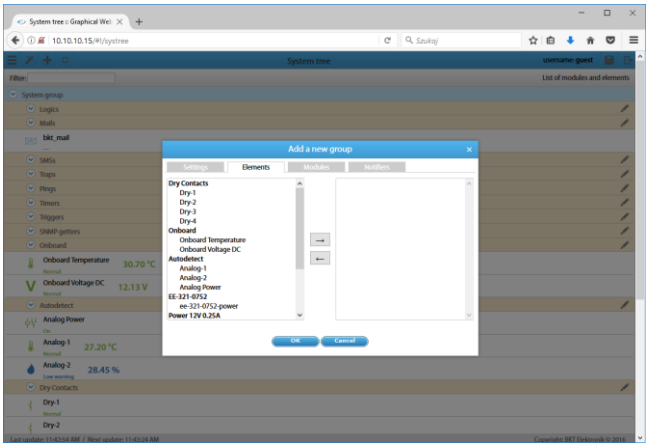



In order to add a new component, click the '+' button in the horizontal menu.

To maintain proper performance of the device, it is recommended to use max 100 components in the system.

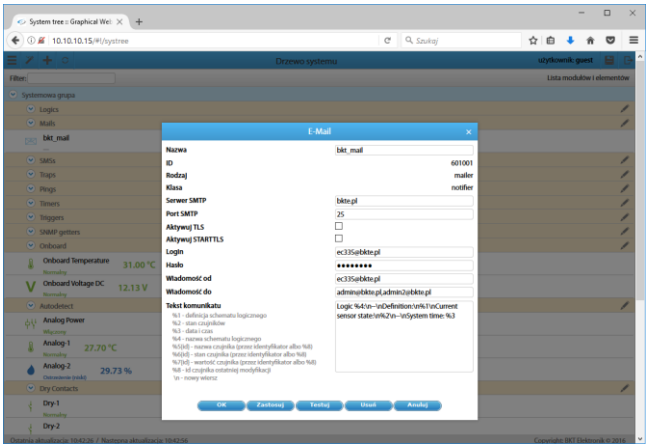
To maintain the settings after restarting the controller, write them to non-volatile memory.

### 7.5.1 Adding a new group



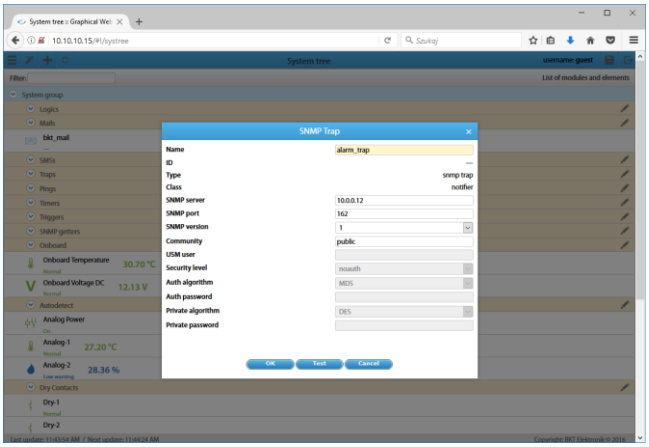

By default, there is one group in the system. Additional groups divide the system into parts, which in turn allows the user to assign individual components to proper groups. The user can be granted rights to manage a specific group.

### 7.5.2 Adding an email notification



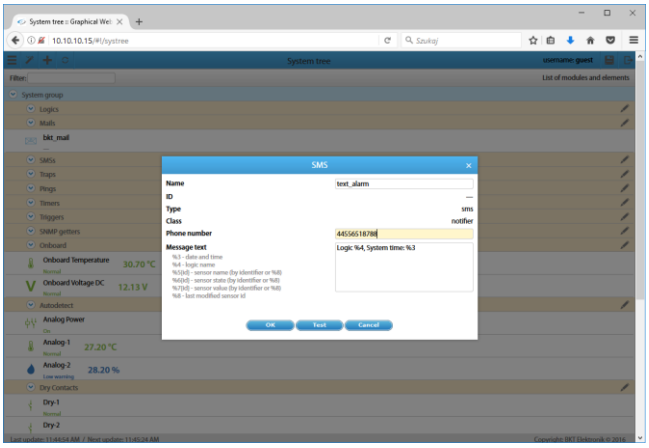

The system allows the user to configure email accounts which shall be used to notify of alarm situations. Only the SMTP service can be used.

### 7.5.3 Adding a trap notification




A trap is an alarm notification used in the SNMP protocol. Such notification can be sent to a network monitoring system.

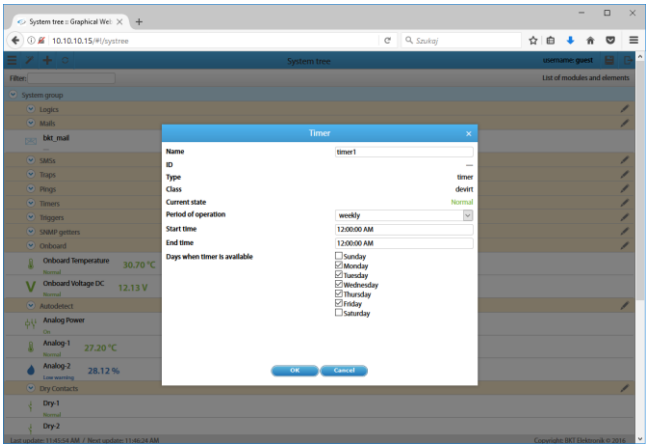
### 7.5.4 Adding an SMS notification




If there is an optional GSM modem installed in the controller, it is possible to send SMS (text message) notifications.

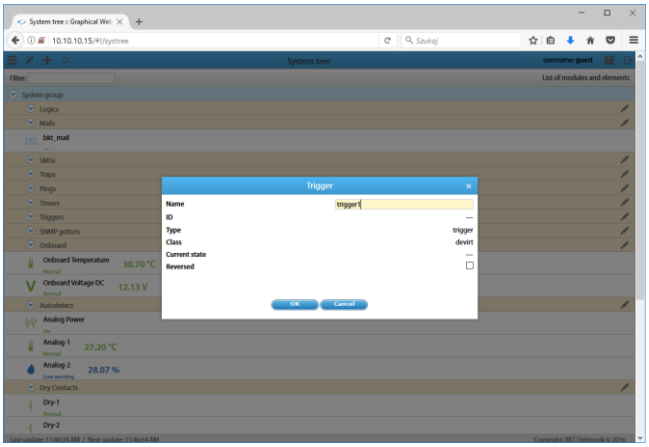
SMS notifications can also be sent via an SMS Internet gateway. The GSM modem is not required then.

### 7.5.5 Adding a timer



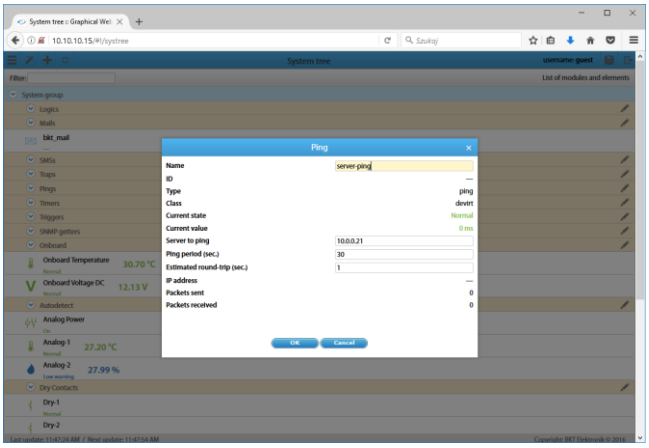

Time conditions can be introduced to the system. For this purpose, timers are used. They can be in an active or normal state in defined hours. In logical schemes they can be used as instruction execution conditions.

### 7.5.6 Adding a trigger



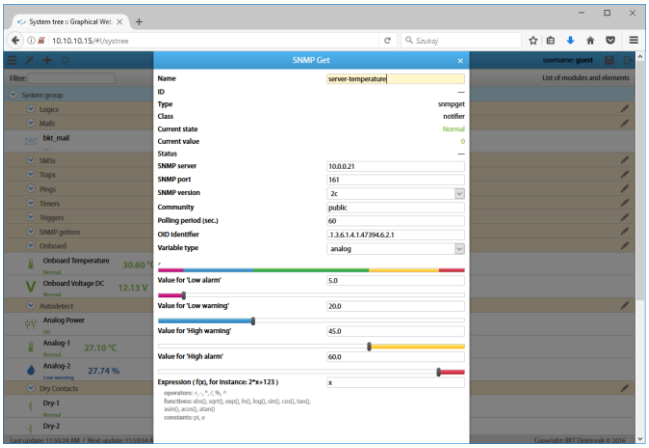

Triggers perform a similar function as a flag, however they can also generate an event. They can be used to define logical schemes.

### 7.5.7 Adding PING functions



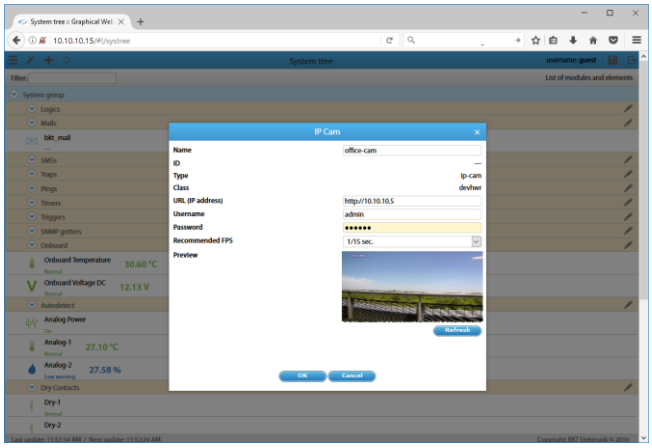

The controller can monitor an external device by sending a PING on a regular basis. In logical schemes, it is possible to define, e.g. sending an email alarm when the external device stops to respond to the PING.

### 7.5.8 Adding an SNMP Get




The controller can ask the external device for its parameters using the SNMP v1 and v2. Values of this parameters deviating from the defined ones can generate an event.

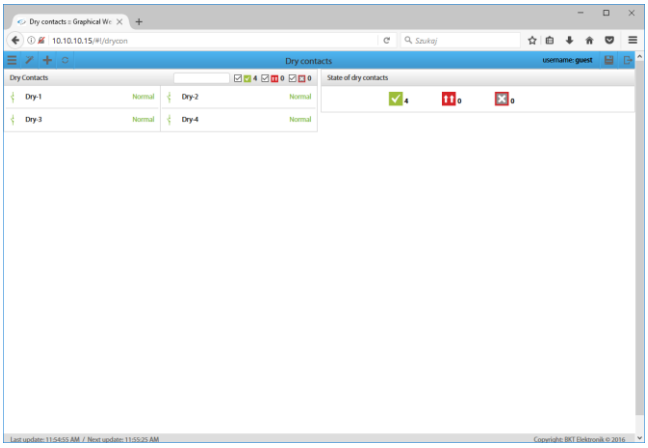
### 7.5.9 Adding a camera




The controller automatically detects a UVC (USB Video Class) type camera connected to a USB port, which supports MPEG compression. It is recommended to use C210, C270, C310 and C510 Logitech cameras.

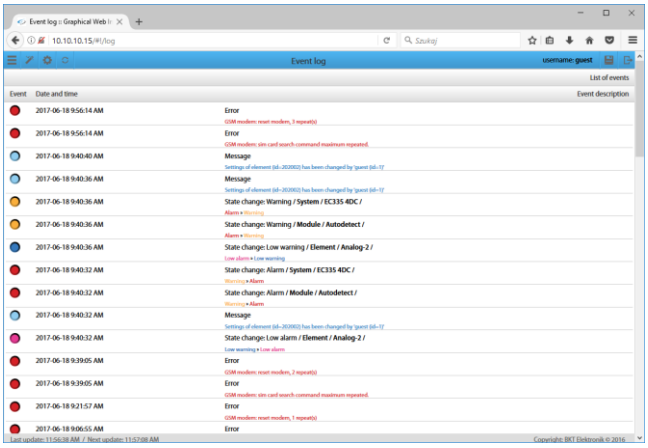
The controller can also be used to configure some IP cameras.

## 7.6 Dry contacts (binary inputs for potential-free contacts)



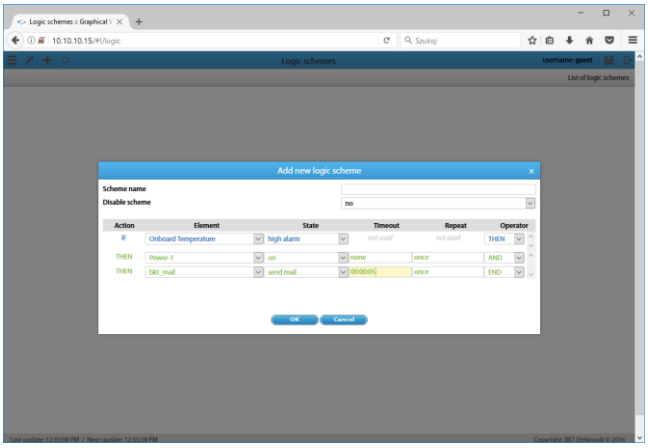

Select *Dry contacts* from the vertical menu to view the state of binary inputs for potential-free contacts.

## 7.7 Event log




Select *Event log* from the vertical menu to display logs on all system events.

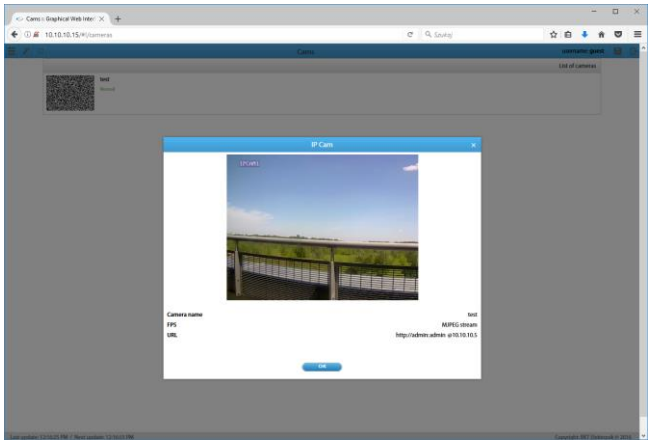
## 7.8 Logical schemes




Select *Logical schemes* from the vertical menu to create relations between the system components (sensors, controller inputs, outputs, etc.). In order to add a new logical relation, click the '+' button in the horizontal menu. 'IF THEN' and 'AND' and 'OR' logical functions are used. The *Timeout* function means an instruction execution delay.

To maintain the settings after restarting the controller, write them to non-volatile memory.

## 7.9 Cameras



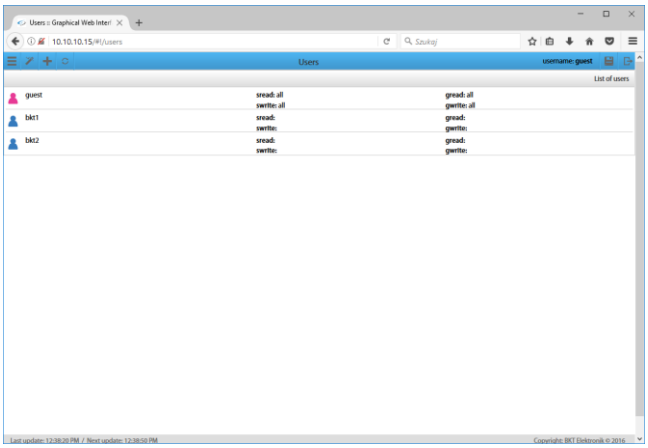
Select *Cameras* from the vertical menu to view the image captured from installed cameras. Select *System tree* to configure the cameras.

## 7.10 Map

The system provides a function of displaying the state of sensors against the building layout. Select *Map* from the vertical menu. Click *Settings* in the horizontal menu to configure this page.

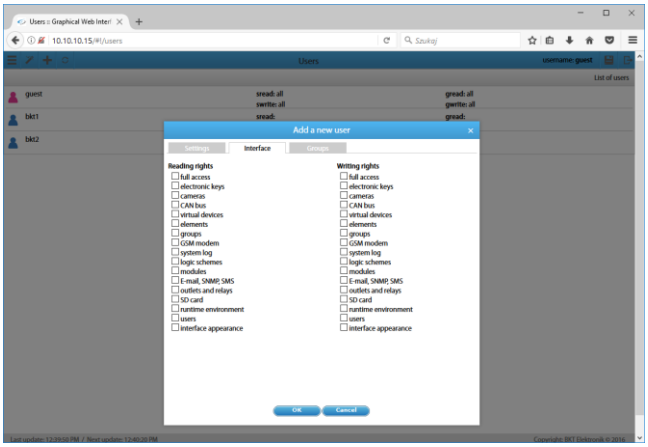
To maintain the settings after restarting the controller, write them to non-volatile memory.

## 7.11 Users



Select *Users* from the vertical menu to manage system users, create new users, remove users and grant rights.

Clock the '+' button in the horizontal menu to add a new user.

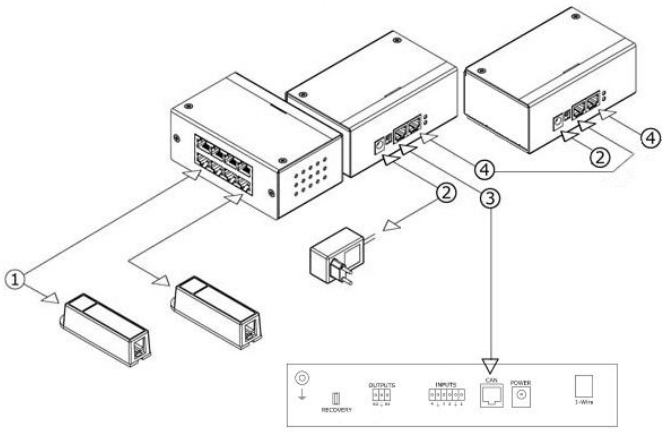



Enter the user name and password in the pop-up window and grant it appropriate right.

To maintain the settings after restarting the controller, write them to non-volatile memory.

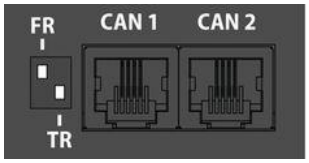
## 7.12 CAN configuration (extension module)

Devices extending the number of analogue ports - EE321 and binary input ports for potential-free contacts - EE322 can be connected to the controller. One controller can support up to 3 EE321 devices and one EE322 device.

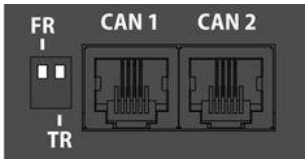



Connect CAN devices to the controller with a 6-wire cable ended with RJ12 plugs. The devices should be connected in stacks (from one device to another). The CAN socket number is irrelevant, either CAN1 or CAN2 can be used. The maximum CAN bus length is 300 m.

1. Connection of sensors to a device extending the number of analogue inputs.
2. Connection of 12VDC/1A power supply.
3. Connection of a CAN bus to the EC335 controller.
4. Stack connection of the CAN bus (from one device to another).



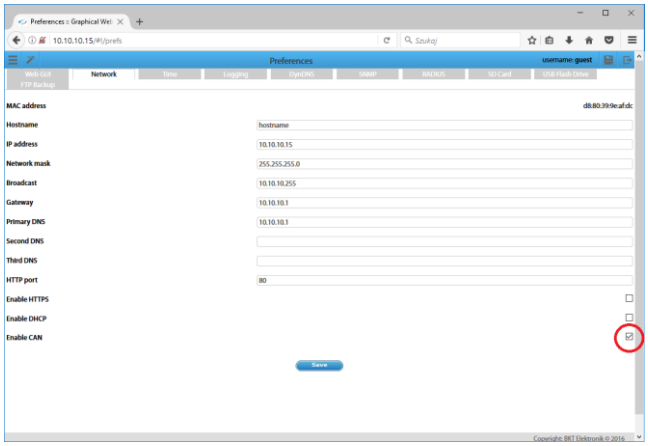

FR-off, TR-on



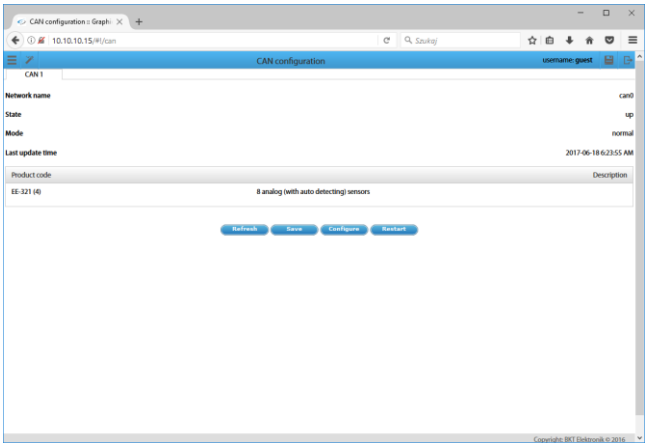

FR-off, TR-on

The bus terminator in the last device (from the controller) must be enabled. The bus terminator in the remaining devices must be disabled. The TR switch (activating the terminator) in ON and OFF position is shown in the drawing on the left.

The FR switch is for servicing and must be in OFF position during normal operation.




Activate the CAN bus. Select Preferences→*Network* from the vertical menu. Check the *Enable CAN* box and click *Save*.



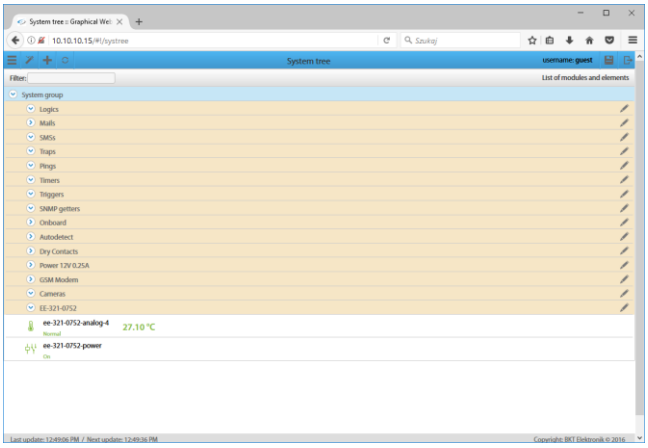

Select *CAN configuration* from the vertical menu, then click the *Configure* button and wait approx. 2 minutes until the CAN bus is scanned and the device is configured. When the device appears on the list, click the *Save* button.

**Refresh** – refresh the list of devices on the bus and their status.

**Save** – write CAN settings to non-volatile memory.

**Configure** – search for extension modules on the bus.

**Restart** – restart the CAN bus.



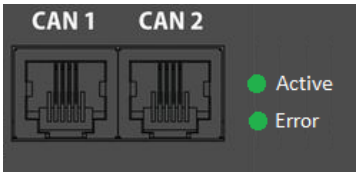

Following configuration, the extension module and sensors connected to it will be automatically detected and displayed in the system tree. Select *System tree* from the vertical menu.


The operating status of the CAN bus is signalled on the controller with the CAN indicator light.

CAN is off – the CAN bus has not been activated in the configuration.

CAN flashes – the CAN bus is active, but there is no communication with the extension module.

CAN is on – the CAN bus is active and there is communication with the extension module.




The extension modules have two indicator lights to signal the operating status.

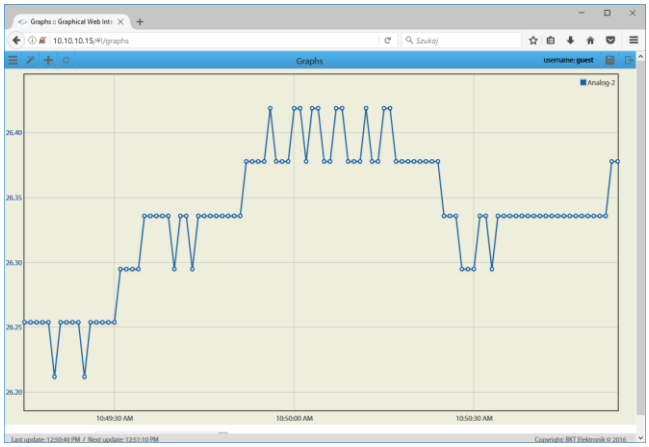
Error is on, Active flashed – no communication with the controller.

Error is on, Active is off – there is communicatio with the controller, but the module is not configured in the controller.

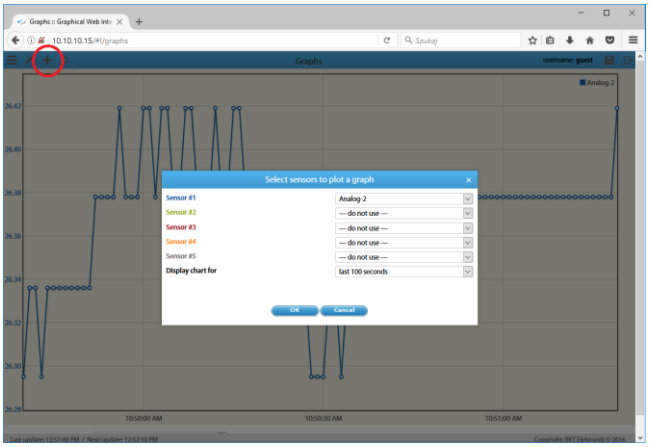
Error is off, Active is on – the module works properly.

Error is off, Active is off – no power supply or damaged module.

## 7.13 Graphs

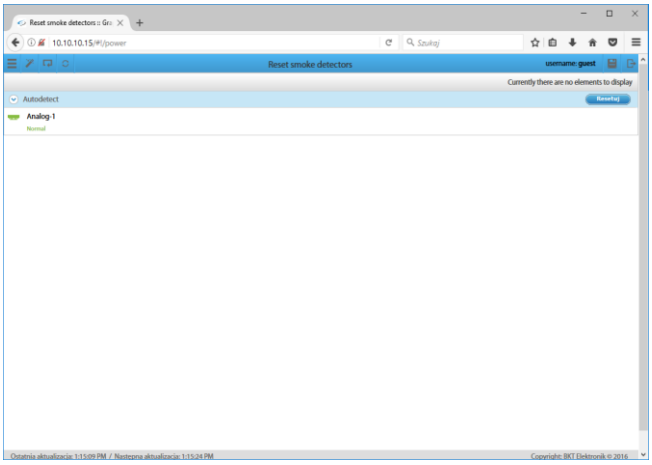


It is possible to display changes of values from the sensors on a chart. Select *Graphs* from the vertical menu.



To add the sensor to a chart, use the '+' button from the horizontal menu.

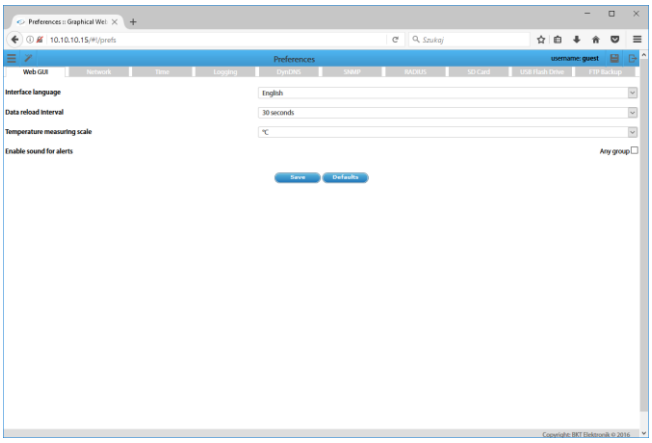
## 7.14 Reset smoke detectors



Once triggered (smoke detection), the sensors require a manual restart. This can be done through the controller web interface. Select *Reset smoke detectors* from the vertical menu. Resetting involves disconnecting the power supply from the sensors for a few seconds. All analogue sensors connected to the device where smoke is will be disconnected from the power supply for a moment.

## 7.15 Preferences (system settings)

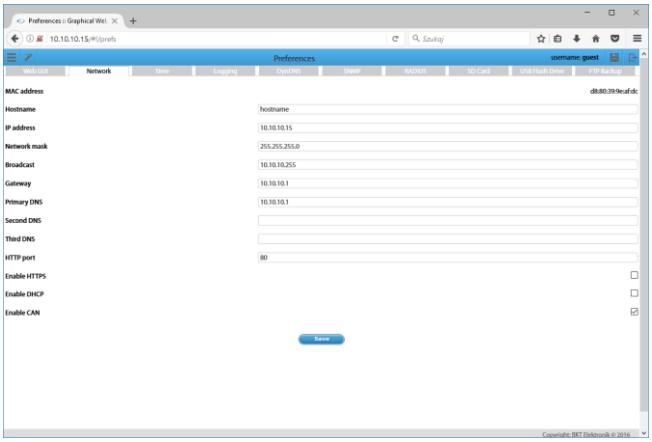
### 7.15.1 Web interface settings




Select *Preferences→Web GUI* from the vertical menu. Set the following web interface parameters:

- language
- automatic refresh rate
- temperature unit (Celsius or Fahrenheit degrees)
- activate an acoustic signal via the website when the alarms are active

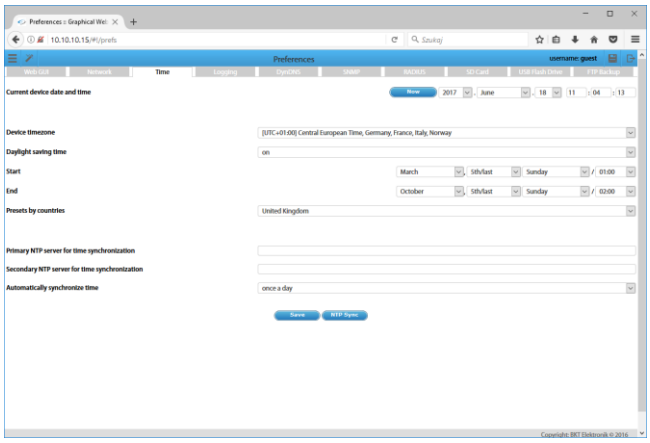
### 7.15.2 Network settings




Select *Preferences→Network* from the vertical menu.

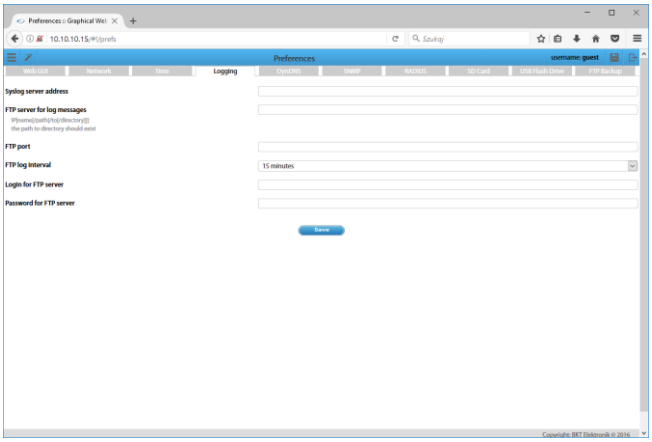
- IP address, subnetwork mask, broadcast, gate, DNS – to enter static network settings.
- HTTP port – it determines an access port to the device via a browser (default: 80).
- Enable HTTPS – activate encrypted connection via a browser.
- Enable DHCP – activate automatic import of network settings from a DHCP server.
- Enable CAN – this function must be checked if extension modules are to be used in the system.

### 7.15.3 Time settings



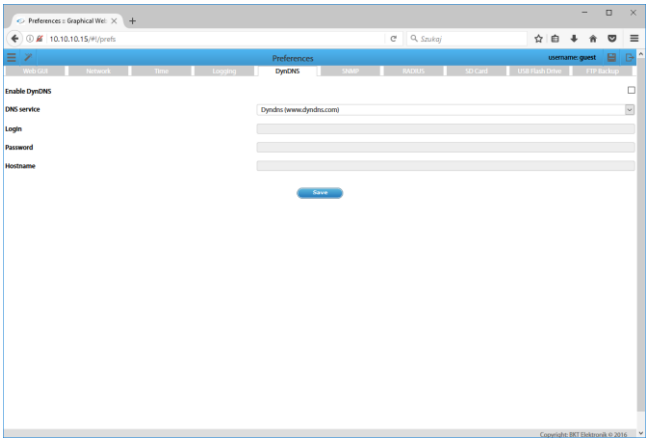

It is possible to set the device clock time manually and to set cyclical synchronisation with NTP servers. Select *Preferences→Time* from the vertical menu.

## 7.15.4 Logging settings



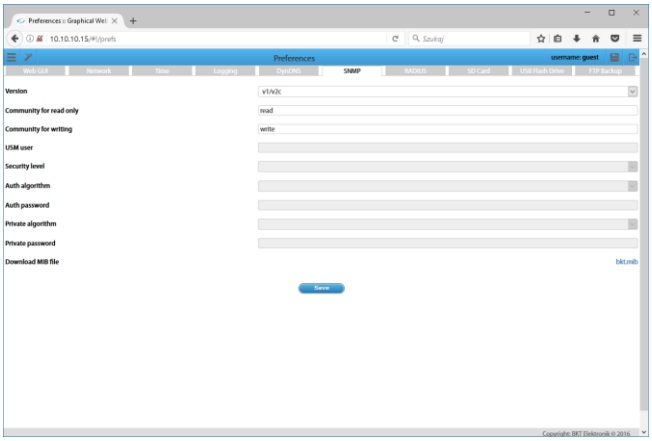

Readings of sensor and system log values can be saved to a file on an USB flash drive, FTP server, Syslog server (system logs only) or periodically sent to mail receipment. Select *Preferences→Logging* from the vertical menu.

## 7.15.5 DynDNS settings



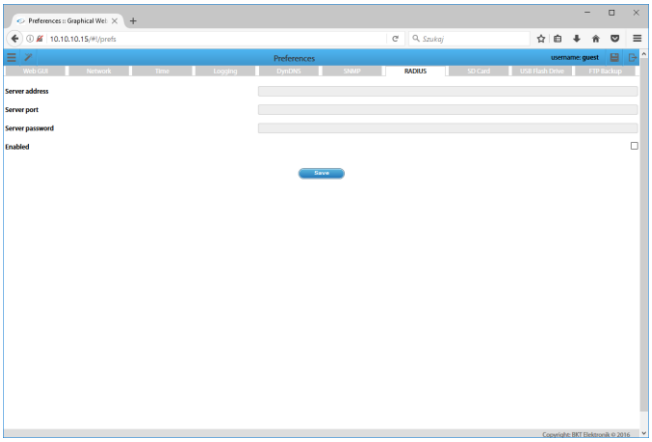

The DynDNS (www.dynDNS.com) or no-IP (www.no-ip.org) services can be used with the device. Select *Preferences→DynDNS* from the vertical menu.

## 7.15.6 SNMP settings



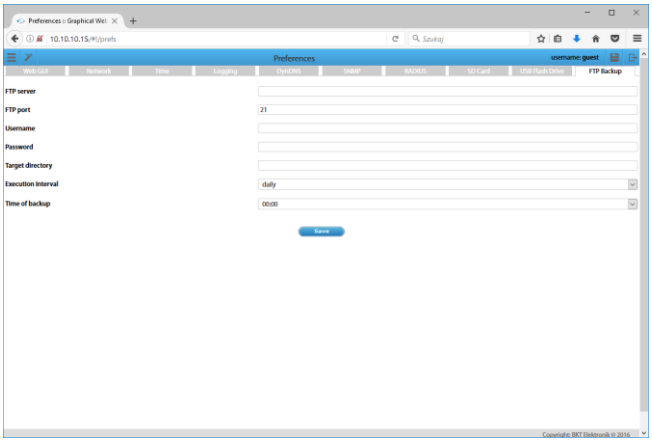

The device supports the SNMP (Simple Network Management Protocol) in versions 1, 2 and 3. In this tab, a Management Information Base with communication data can be downloaded. Select Właściwości→*SNMP* Preferences→*SNMP*) from the vertical menu.

## 7.15.7 RADIUS settings




The device supports the RADIUS (Remote Authentication Dial-In User Service) protocol. Select *Preferences→RADIUS* from the vertical menu.

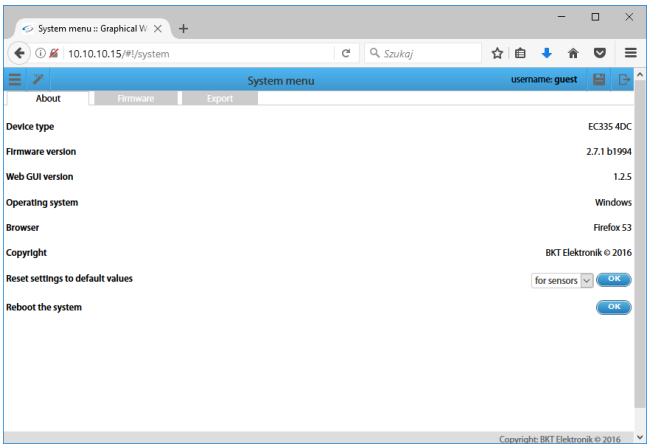
## 7.15.8 FTP backup settings



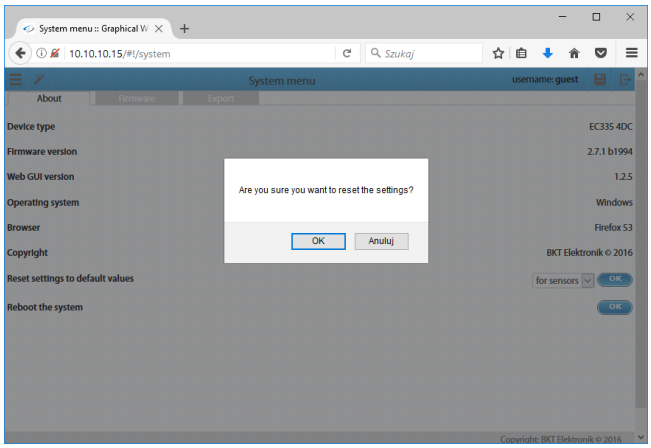

Device settings can be saved to a file on an FTP server on a regular basis. Select *Preferences→FTP Backup* from the vertical menu.

## 7.16 System menu (system management)

### 7.16.1 Restoring default settings through a website

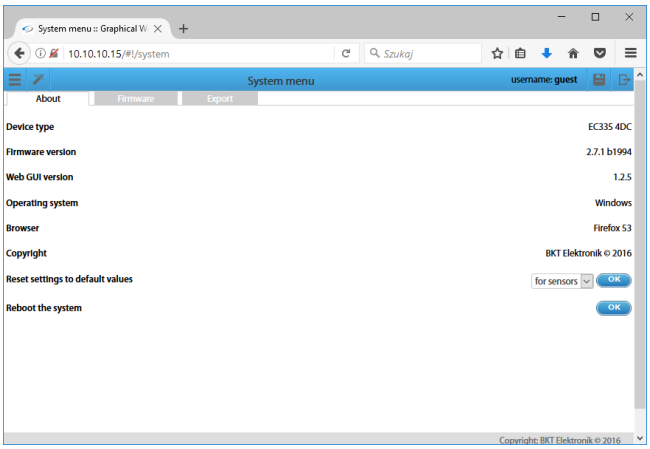



Select *System menu→About* from the vertical menu and click *OK* next to *Reset settings to default values*.

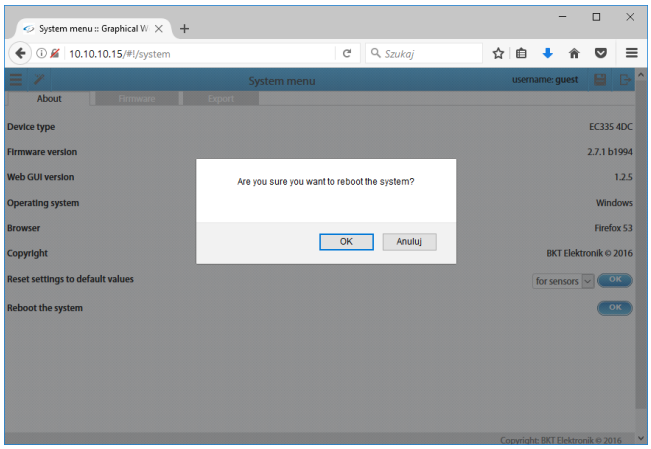



Confirm to reset default values and wait until the process is completed.

### 7.16.2 Restarting the device




Select *System menu→About* from the vertical menu and click *OK* next to Reboot the system.

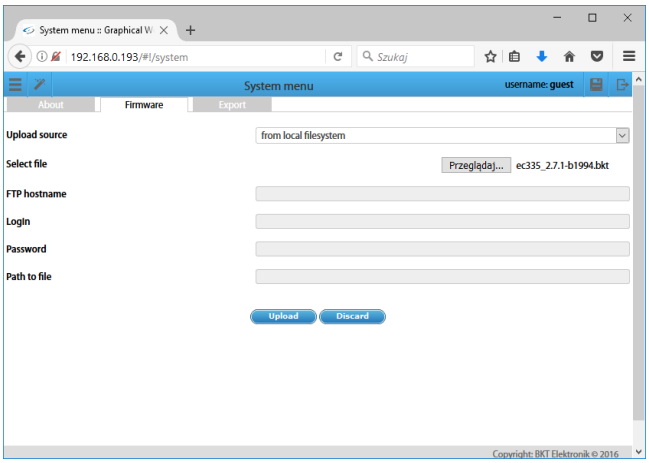



Confirm to restart the device and wait until the restarting process is completed.

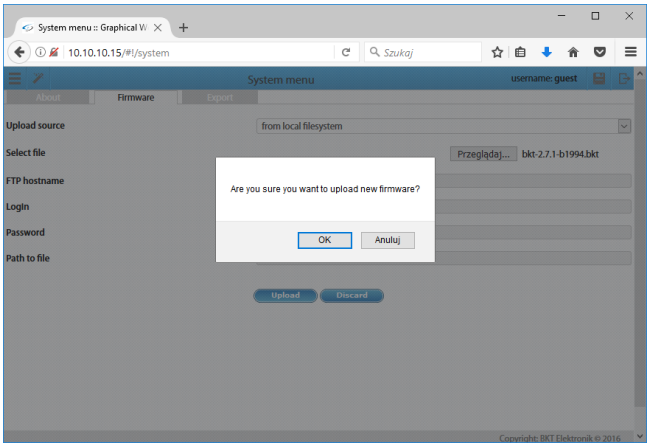
## 7.16.3 Firmware update

A file with a firmware update is available on http://www.bkte.pl.

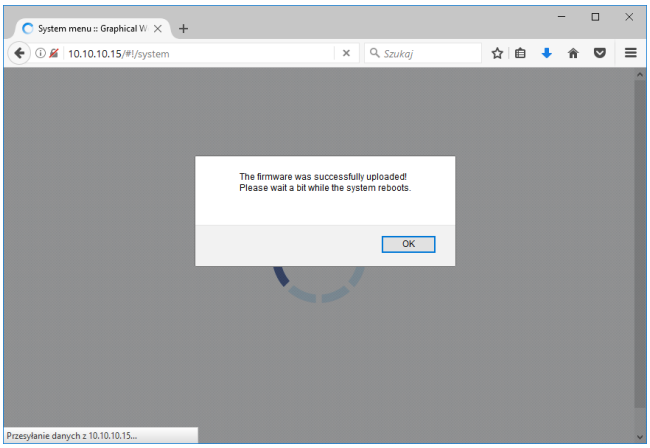
Note: It may become necessary to reconfigure the device after updating the firmware. It is recommended to reconfigure the device after resetting the default settings.




Select *System menu→Firmware* from the vertical menu, click *Browse* and choose a firmware update file, e.g. *ec335_2.7.3-b012.bkt*.

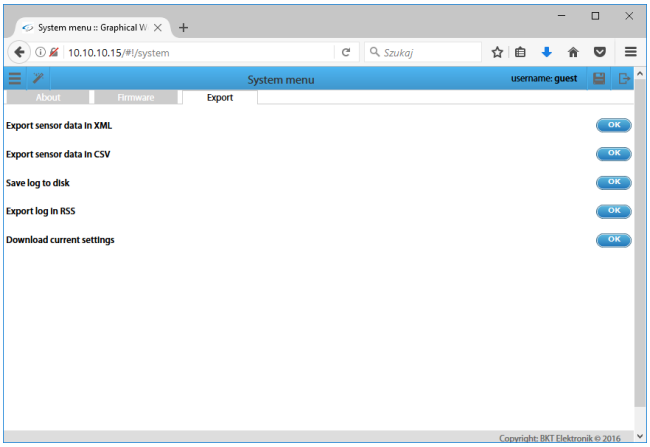



Click the *Upload* button and confirm to upload new firmware.




Wait until information on the completed update is displayed and the device is restarted. Refresh the browser using the CTRL+F5 keys.

## 7.16.4 Export data to a file




Select *Menu_Systemu→Export* from the vertical menu.

**Export sensor data in XML** – save the sensor data to an XML file. The file contains max 400 readins from each sensor:
100 readings (every second) from the last 100 seconds
100 readings (every minute) from the last 100 minutes
100 readings (every hours) from the last 100 hours
100 readings (every day) from the last 100 days
**Export sensor data in CSV** – save the sensor data in a CSV file.

**Save log to disk** – save system events to a TXT file.

**Export log in RSS** – system events in the RSS format.

**Download current settings** – save the current device settings to the settings.bkt file.

## 7.16.5 Restoring settings from a file

The method of saving data to a file is described in 7.16.4 Export data to a file.

NOTE: The current setting will be overwritten by the settings included in the file.

To restore the settings:

1. Copy the settings.bkt file to a USB flash drive (pendrive).
2. Connect the flash drive (pendrive) to the mini-B USB socket of the controller using an attached cable and wait for a while.
3. Start of the setting restoration process is indicated by the ERROR light, whereas successful completion of the same is indicated by the ACT light flashing.
4. Restart the device.
5. The device settings have been restored from the file.

# 8 DOCUMENT REVISIONS

| Version | Changes | Date |
|---|---|---|
| 1 | Initial version | May 2017 |
| 2 | Updated with hardware modifications | January 2018 |