NETIO 4
NETIO 4 All

FIRMWARE 2.3.0

USER MANUAL

Koukaam

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Preface

Thank you for purchasing a KOUKAAM product. To prevent incorrect installation or improper use of equipment please carefully read this **User Manual** and the **Quick Installation Guide**, which is included in the package. This will prevent any wrong installation or incorrect usage of NETIO4.

Carefully read the following notice. The device you have purchased operates under a certain voltage. Incorrect manipulation with the device may result in damage to the device or it can cause injury or even death to the person handling it.

Important notices

1. The manufacturer is not liable for potential damage caused by incorrect usage or placing the device in an unsuitable environment.
2. The device is not intended for usage outdoors.
3. Do not use the device in an environment with strong vibrations.
4. Unauthorized modification of this device can damage it or cause fire.
5. Prevent contact with fluids; do not expose the device to high temperatures.
6. Protect the device from falling.
7. Only devices approved for use in the electricity network may be connected.
8. If the device malfunctions, disconnect it from the electric power supply and contact your vendor.

1. Introduction

NETIO4 is a multifunctional power supply controller. This device is intended to control power supply via web interface or CGI commands. Thanks to the network administration technology based on IP protocol basis, the user can control or provide a power supply to a connected external device (appliance) via a computer connected to the LAN or Internet network. No special software is necessary to control the device, the Web interface is already integrated in the firmware. Using the web interface, you can easily control and set the entire device and individual outlets.

Imagine that you are travelling around the world and you can remotely or via a timer control the power supply to your electrical appliances such as computers, servers, routers, electric gates, security/surveillance system or other appliances.

NETIO4 is available in several versions with different outlet types. Note that in this user manual, all screenshots of the user web interface contains only one outlet type and outlets on your device may differ from those shown in this user manual.

This manual is meant for the following models:

NETIO4	Basic model with integrated Wi-Fi.
NETIO4 All	NETIO4 with power consumption meter for each outlet and Bluetooth 4.0 LE support.

1.1. Characteristics

- Four manageable power outlets.
- Standardized power outlets allow direct connection of powered device.
- Available outlets for DE, FR, CZ, US or UK.
- Every outlet has separate LED status indicator and power switch.
- Robust design, every outlet and inlet has own voltage over-protection.
- 1.2m long power-cord and power off switch on the device.
- Re-settable 15A fuse.
- Possibility to login using an encrypted password.
- Bluetooth 4.0 LE support for expanders and sensors (NETIO4 All only).
- Independent power consumption meter for every outlet (NETIO4 All only).
- LED indicator for Wi-Fi and Bluetooth network status.
- Watchdog for device network status monitoring with reboot option.
- User defined schedules for timing of the outlet power.
- Previous state of the outlet is set after reboot or restart.

- Integration by CGI commands. NETIO4 can be controlled by CGIs and can control other devices by CGIs.
- Integrated scripting by LUA for system integration and customization by system integrators.
- Advanced integration by XML API, NDA obligatory.
- E-mail notification about switching the outlets, watchdog/timer action.
- User accounts with configurable privileges.
- Localized user interface CZ, EN, DE, ES, IT.
- iOS and Android mobile application for remote outlet control.
- Supported protocols HTTP, HTTPS, SMTP, DNS, NTP, UPnP, DHCP

1.2. Specifications

Power supply voltage:	90 - 250 V AC
Maximum switched current:	EU – 15 A total / 8 A per each outlet
	US – 15 A total / 12 A per each outlet
Consumption:	4.1 W
Network interface:	1x RJ-45 10/100 Mbit/s
	Wi-Fi 802.11b/g/n 2,4 GHz
	Bluetooth 4.0 LE 2.4 GHz (NETIO4 All only)
Antennas:	1x fixed antenna with 2 dB gain (NETIO4 only)
	2x antenna with 3 dB gain (one for WI-FI, one for BT) connected over SMA-reverse F connector (NETIO4 All only)
Dimensions:	302 x 58 x 90 mm (h x w x d)
	11,89 x 2,283 x 3,543 inches (h x w x d)
Operating temperature:	0 - 50 °C
	32 - 122 °F

1.3. System requirements

- Supported Internet browsers:
  - Internet Explorer 9 or later version

  - Mozilla Firefox 20 or later version
  - Google Chrome 26 or later version
  - Safari 5.1 or later version
- Computer with supported Internet browser with JavaScript support enabled.

2. Control and configuration

Mobile application

Install mobile application **NETIO Mobile** to control your NETIO4 from your mobile device. The application is for mobile devices with operating system **Android (version 2.0 or later)** or **iOS (version 5.1 or later)**. For further information, visit *http://www.netio-products.com/en/all-products/netio-mobile/*. Use link below to download the application.

2.1. Outlets

Outlet control

In the left menu, choose **Outlets** item. You will be provided with the outlet overview. Each outlet and its automatic functions can be controlled by four associated buttons next to each outlet. All outlets at once are controlled by two buttons at the bottom of the page.

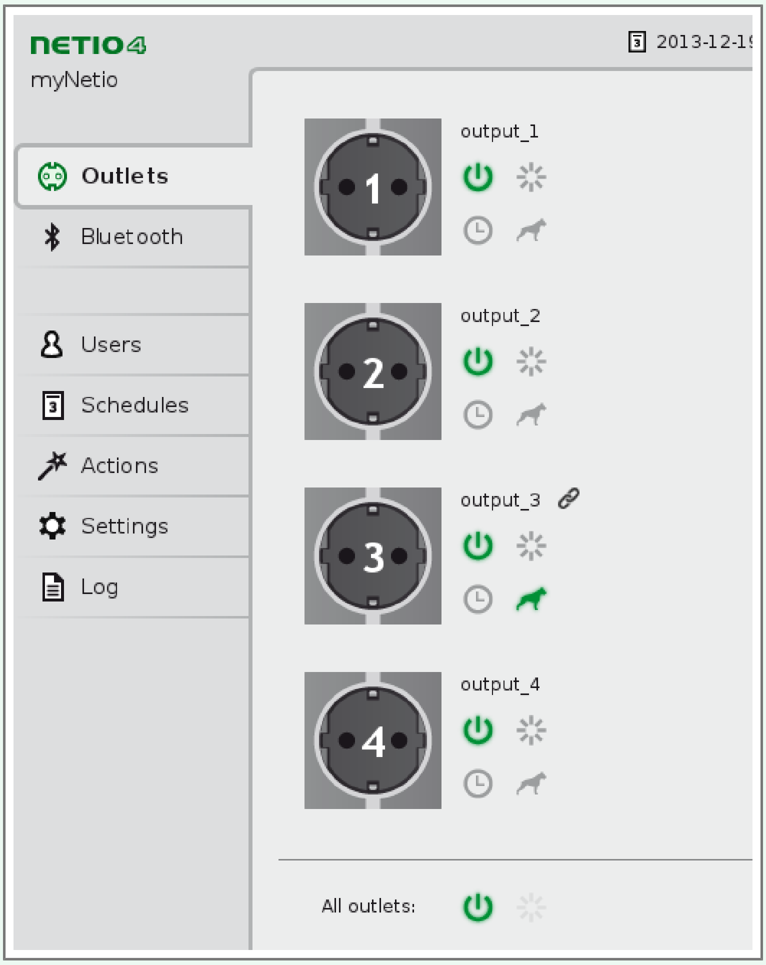


Figure 1. Outlet control

Use button ⏻ **Power** for direct control of outlet power supply. The button of an active outlet is green, for a starting outlet is orange and for an inactive outlet is grey. Any starting outlet can be turned off by its ⏻ **Power** button. Button ✳ **Restart** turns on and off power for the device plugged into the outlet with defined **Reset delay**. Only active outlet can be restarted. During restart, there is a delay between power off and power on of the outlet, which can be adjusted in the section called "General outlet settings". During the outlet restart, ✳ **Restart** button is green.

Starting outlet

The actual time, when an outlet is turned on, is affected by value of system variable **Switch delay** (in the section called "System settings") in case multiple outlets should be turned on at once or in a very short time. This can happen for example if you turn on all outlets at once, or if multiple outlets has enabled function **Timer** and they have set the same schedule or if you turn on individual outlets in a very short time. The second and every following outlet that should be turned on is actually turned on after **Switch delay** will pass from the moment when the previous outlet is turned on. During the time the outlet is starting, its ⏻ **Power** button is orange.

All outlets can be controlled at once by means of two icons at the page bottom. Depending on current outlet state, it is possible either to power off or power on all outlets and also to restart them. If there is at least one outlet on, you will turn off all outlets at once by clicking the ⏻ **Power** button. If all outlets are off, this button can be used to turn all outlets on. Click on the ✳ **Restart** button to restart all active outlets.

After restart of your NETIO4 or when it starts after an unexpected switch off (e.g. in case of power loss), manually controlled outlets will be in their previous state. Outlets controlled by timer will be in state according to the schedule of the timer.

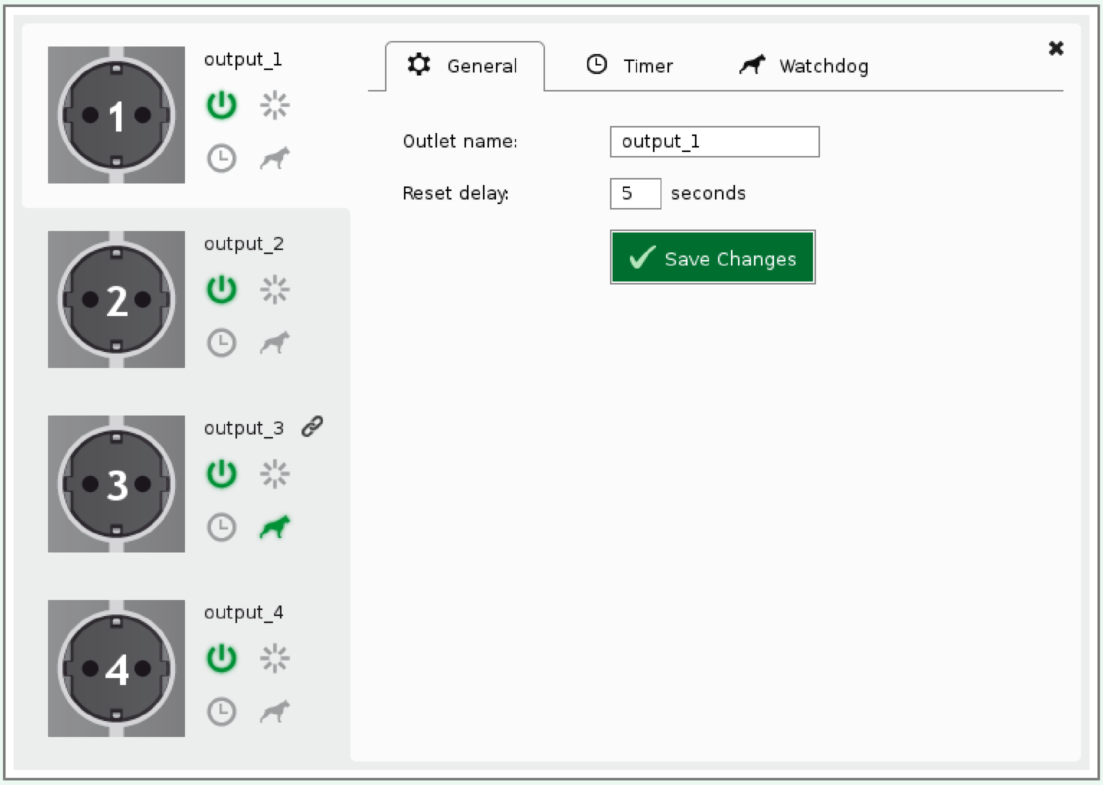
The two remaining buttons control ◷ **Timer** and **Watchdog** automatic functions. Turned on function is represented by green colour of its button. First, you need to set these functions for each outlet in the section called "Timer" and in the section called "Watchdog".

General outlet settings

Use panel ⚙ **General settings** to configure various outlet related settings. **Outlet name** serves for outlet identification and is displayed above its control icons. **Reset delay** is a number of seconds to wait between power off and power on during outlet restart cycle.

Note

According to set values of **Reset delay** at particular outlet and system variable **Switch delay** (in the section called "System settings"), an outlet may be in state of Starting outlet. For example: outlet1 has set Reset delay to 2 seconds, outlet2 to 5 seconds. System switch delay is set to 5 seconds. If user resets both outlets at once, outlet1 will be on in 2 seconds but outlet2 will be on in 7 seconds. To 5 second that represent Reset delay of the outlet, will be added 2 more second from the Switch delay, that has started after outlet1 has been turned on.



Outlet name: output_1

Reset delay: 5 seconds

✓ Save Changes

Figure 2. General outlet settings

Save configuration changes by clicking **Save changes** button.

Timer

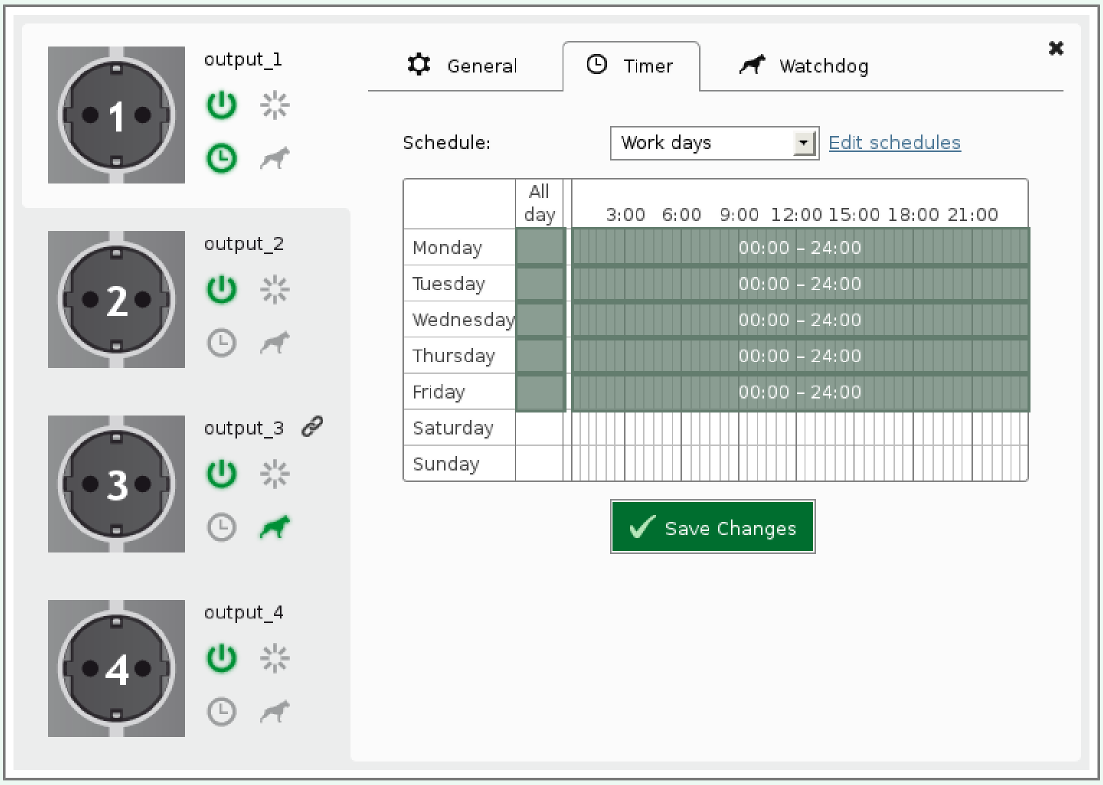
Timer function allows for an outlet to be power on/off at certain times. Choose a schedule to decide when an outlet should be active. When a schedule is chosen, its details are then graphically displayed. You can see in which time intervals will be the outlet active. Confirm the change by clicking the **Save changes** button. After saving, the timer will be automatically activated and the outlet will be set in accordance with it. Should it be the outlet turned off by activating the timer, you have to further confirm the change.

You cannot change schedules while setting the timer. To change schedules, use **Edit schedules** button.

You can turn on/off the timer by clicking **Timer** button at particular outlet. If you manually turn off the timer, the outlet remains in its current state, but will be controlled manually. If you manually turn on the timer, the outlet will be set in accordance with it.

Automatic timer disabling

Note that by switching the outlet by **Power** button, the timer of the outlet will be also disabled. You will be inform about this in the following confirmation dialog by default.



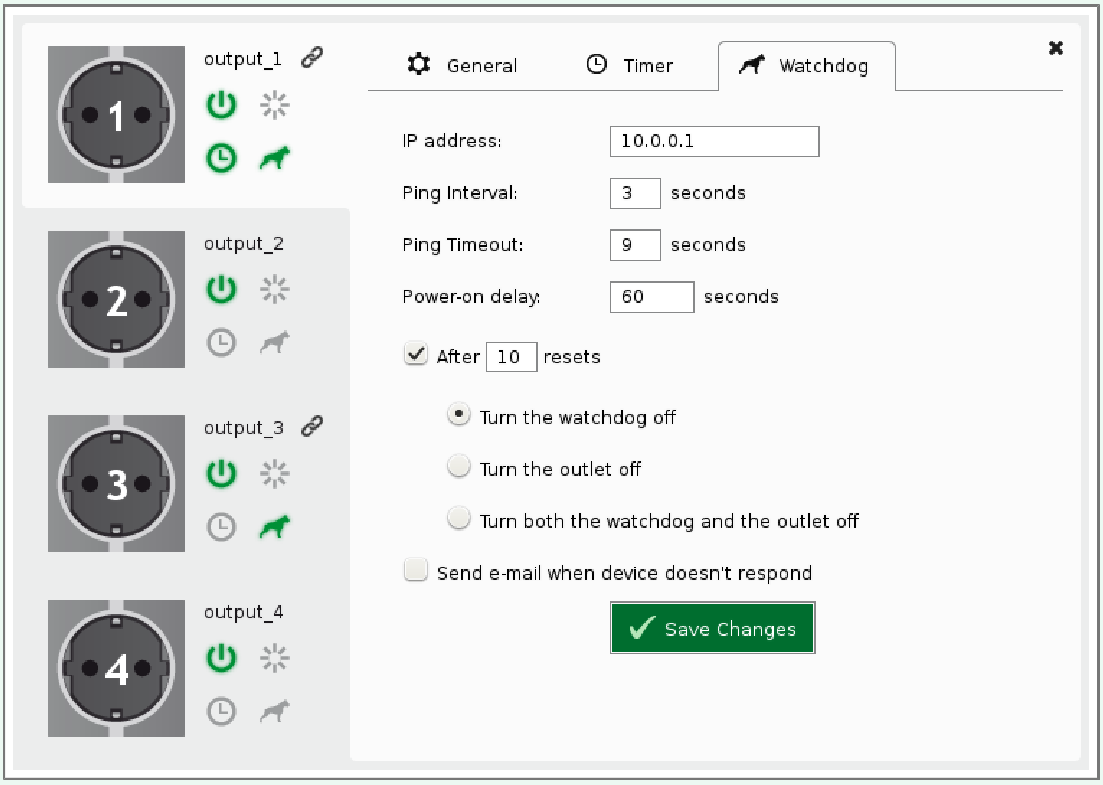
Schedule: Work days Edit schedules

	All day	3:00 6:00 9:00 12:00 15:00 18:00 21:00
Monday	🟩	00:00 - 24:00
Tuesday	🟩	00:00 - 24:00
Wednesday	🟩	00:00 - 24:00
Thursday	🟩	00:00 - 24:00
Friday	🟩	00:00 - 24:00
Saturday		
Sunday		

Figure 3. Timer settings

Watchdog

Use **Watchdog** function to monitor various network devices. If the monitored device is unavailable, the corresponding outlet will be turned off and on. The monitored device is considered unavailable if it does not respond to **Ping** (Ping is used to test reachability of a host on a computer network) request in a given time interval. The delay between power off and power on is configurable. It is possible to limit number of outlet restarts so that it does not happen infinitely.



IP address: 10.0.0.1

Ping Interval: 3 seconds

Ping Timeout: 9 seconds

Power-on delay: 60 seconds

☑ After 10 resets

● Turn the watchdog off

○ Turn the outlet off

○ Turn both the watchdog and the outlet off

□ Send e-mail when device doesn't respond

Figure 4. Watchdog settings

IP address IP address of monitored device.

Ping Interval How often will be Ping query sent to the monitored device (in seconds).

Ping Timeout When no responses to Ping requests arrive from the moment last response was received in the period of the ping timeout (in seconds) interval, the connected device is considered unreachable and the outlet is reset.

Power-on delay **Watchdog** will postpone querying monitored device for this many seconds after outlet power up, so that the device can fully start up.

After X resets Limits the number of restarts and after is the limit reached, the **Watchdog** stops reset the outlet to prevent periodic restarts (when controlled device fails).

Turn the watchdog off After the limit is reached, the **Watchdog** will be turned off and the outlet remains on.

Turn the outlet off After the limit is reached, the outlet will be turned off and the **Watchdog** remains on. If the outlet has been controlled by timer, the timer will be also turned off.

Turn both the watchdog and the outlet off After the limit is reached, both the **Watchdog** and the outlet will be turned off. If the outlet has been controlled by timer, the timer will be also turned off.

Send e-mail when device doesn't respond

Sends e-mail every time when controlled device doesn't respond and outlet restart is necessary. You need to have correctly set email settings (in the section called "E-mail") for this option to work.

Save configuration changes by clicking **Save changes** button. After saving, the function will be automatically turned on. The Watchdog function can be manually turned on or off by clicking the **Watchdog** button next to the outlet.

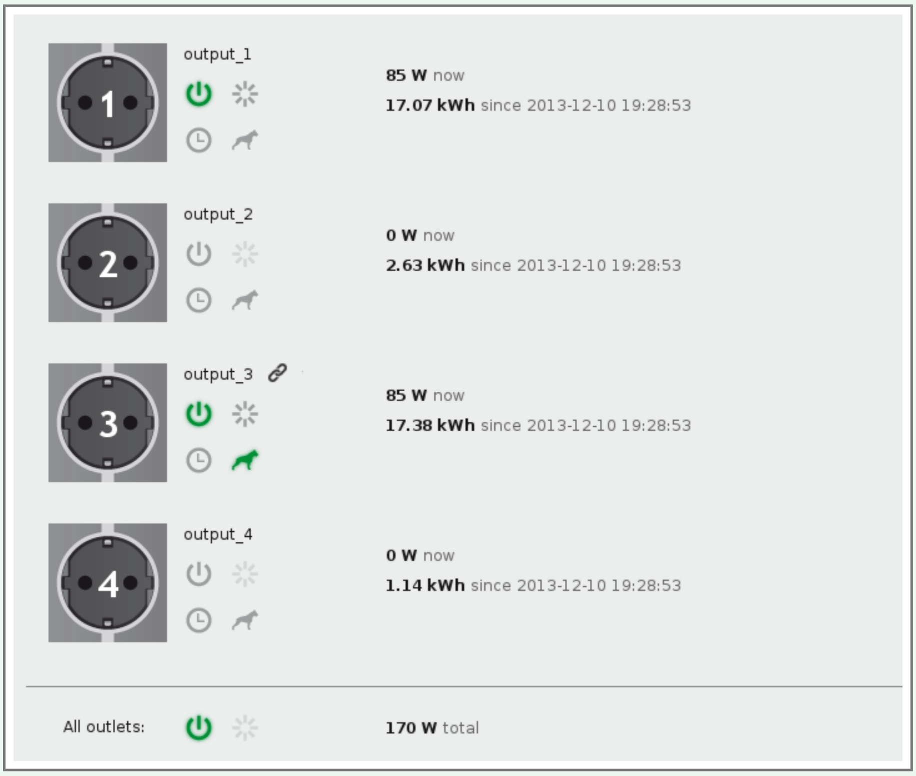
Warning

Note that that function is active (thus sends Ping requests) only when the outlet is active too. If the timer is not set on the outlet, you have to turn on the outlet manually. There is the **Link** button, which you can use to go to IP address of the monitored device, next to the name of the outlet which is active and has also active the **Watchdog** function.

Power consumption

For selected models only

This function is available for selected models of NETIO4 series only. Please make sure that this function is supported by your model. A list of models can be found in Chapter 1, *Introduction*.



output_1 — 85 W now — 17.07 kWh since 2013-12-10 19:28:53

output_2 — 0 W now — 2.63 kWh since 2013-12-10 19:28:53

output_3 — 85 W now — 17.38 kWh since 2013-12-10 19:28:53

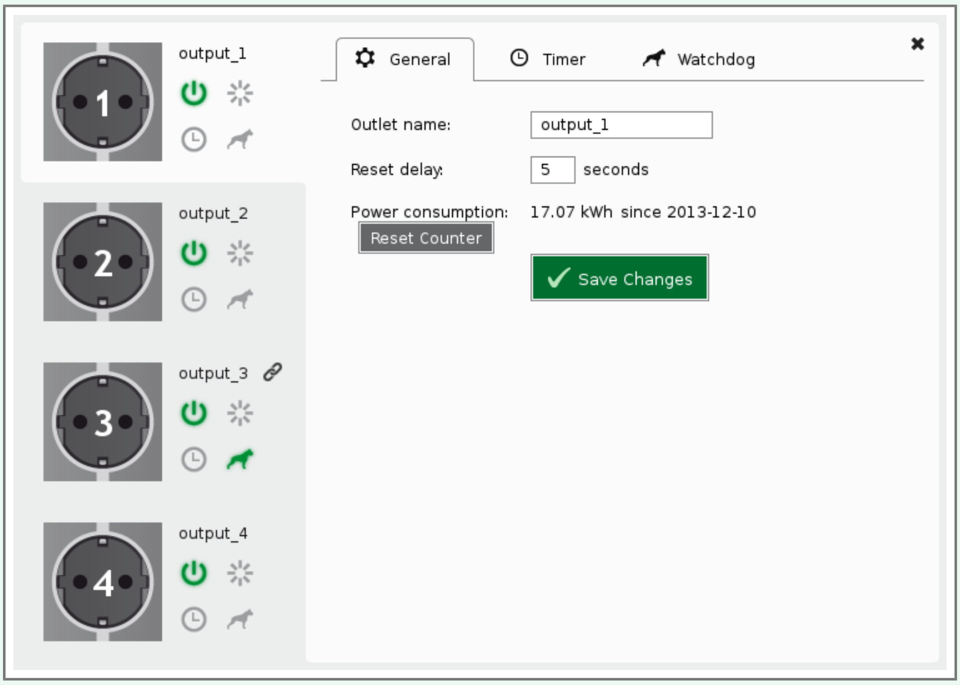
output_4 — 0 W now — 1.14 kWh since 2013-12-10 19:28:53

All outlets: 170 W total

Figure 5. Power consumption

Use this function to gain access to current and cumulative power consumption of connected devices. The power consumption is displayed on the right next to outlet control buttons. The upper reading is the **Current power consumption** in Watts (W) of the device connected to the particular outlet. In the lower part of the screen, next to the group outlet control buttons, is the reading for the current power consumption for all outlets. For an outlet, which is turned off, is the current power consumption always 0 W.

The lower reading next to each outlet is the **Cumulative power consumption** in Watt hours (Wh), or in kilowatt hours (kWh), for given time interval, in other words the aggregate power consumption of a device connected to the outlet from the given date up to the present. By default settings, the cumulative power consumption is measured from the first start of NETIO4, if automatic data and time synchronization from the NTP server has been successful. Make sure that your date and time has been correctly set in the section called "Date/Time". To adjust the beginning of the power measurement, go to ⚙ general outlet settings and click on the **Reset Counter** button.



Outlet name: output_1
Reset delay: 5 seconds
Power consumption: 17.07 kWh since 2013-12-10

Figure 6. Power consumption Counter Reset

2.2. Bluetooth

Selected NETIO4 models supports up to three Bluetooth 4.0 LE (hereinafter BT) devices. You can use Actions (described in Section 2.5, "Actions") to react on paired BT devices vicinity. Actions can be used for example to automatic garage gate opening or light control on the basis of your BT device availability.

For selected models only

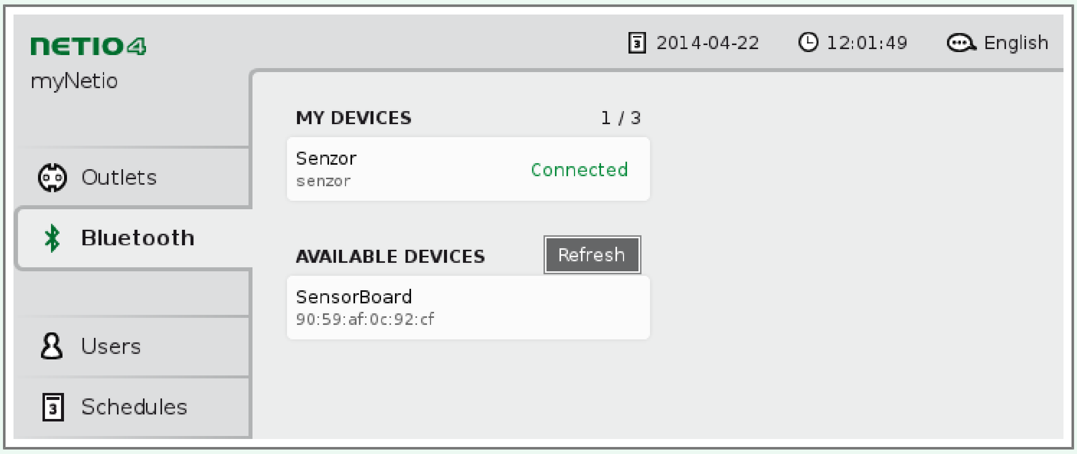
Support for Bluetooth 4.0 LE devices is available for selected models of NETIO4 series only. Please make sure that this function is supported by your model. A list of models can be found in *Chapter 1, Introduction*.

User actions for BT devices can react to **Device reconnected** or **Device disconnected** events or the value of a global variable `devices.<sensorName>.connected`. A more detailed description can be found in Appendix A, *Description of the Lua language*.

Pairing with the Bluetooth device

On the left menu, go to ✱ **Bluetooth**. Then click on **Turn Bluetooth On** to activate it. Make sure that all your BT devices are switched into discoverable mode and are ready for pairing. Once your devices are ready, press **Search for Devices**.

Newly scanned BT devices can be added by clicking on the name of detected device. A dialog box for entering your own device name and a PIN code appears. After entering the name and PIN (see your device documentation), press **Add** button which will pair your BT device with NETIO4.



NETIO4
myNetio

2014-04-22 12:01:49 English

MY DEVICES 1 / 3

Senzor
senzor
Connected

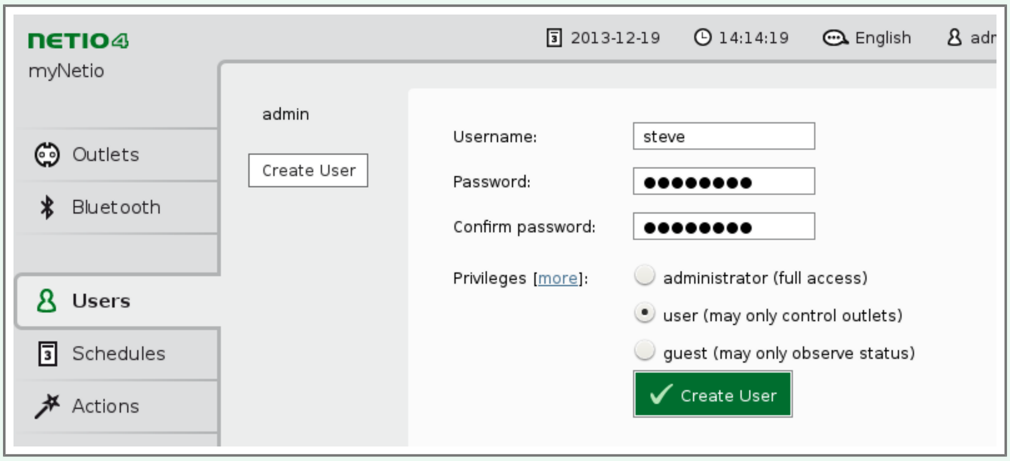
AVAILABLE DEVICES

SensorBoard
90:59:af:0c:92:cf

Figure 7. Bluetooth device management

2.3. User account management

If the device is used by multiple users, using accounts with different privileges is advised. In the left menu, click **Users** menu item. There are three different user types:



Username: steve

Password: ●●●●●●●●

Confirm password: ●●●●●●●●

Privileges [more]:
○ administrator (full access)
● user (may only control outlets)
○ guest (may only observe status)

Figure 8. Add user

Admin User with full authorization

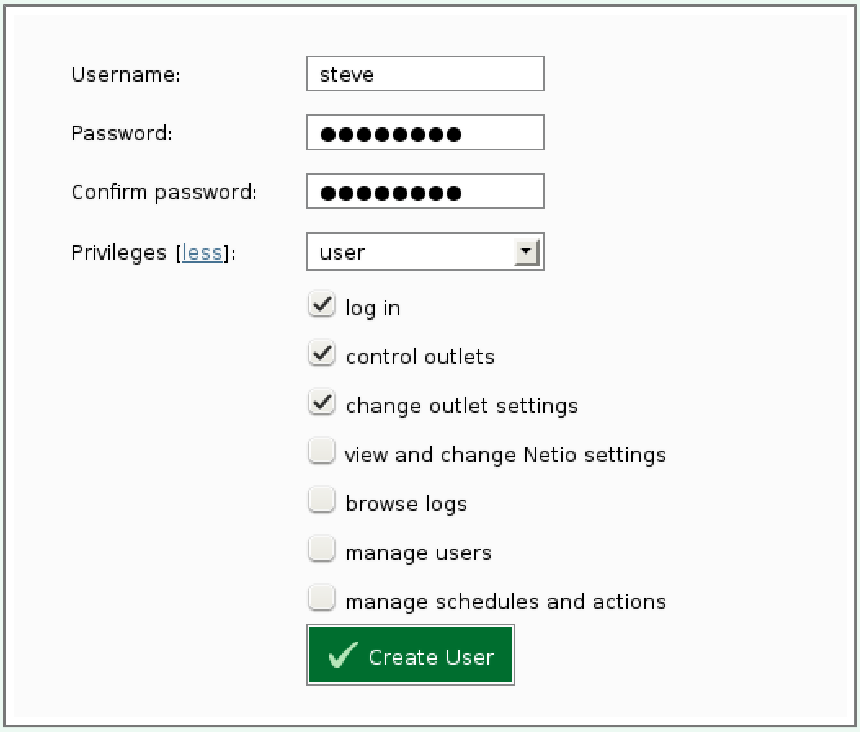
User User that can control the outlets, but cannot change system settings

Guest User that does not have the rights to change any settings and can only see the current state of the outlets

Note

NETIO4 supports up to 5 user accounts. Username have to begin with a letter and can include only digits and letters without diacritic.

Pick one of above options as necessary. There is option of finer grained access control. List of all available permissions will be available after clicking **More** hyperlink:



Username: steve

Password: ●●●●●●●●

Confirm password: ●●●●●●●●

Privileges [less]: user

☑ log in

☑ control outlets

☑ change outlet settings

☐ view and change Netio settings

☐ browse logs

☐ manage users

☐ manage schedules and actions

Figure 9. Detailed user permissions management

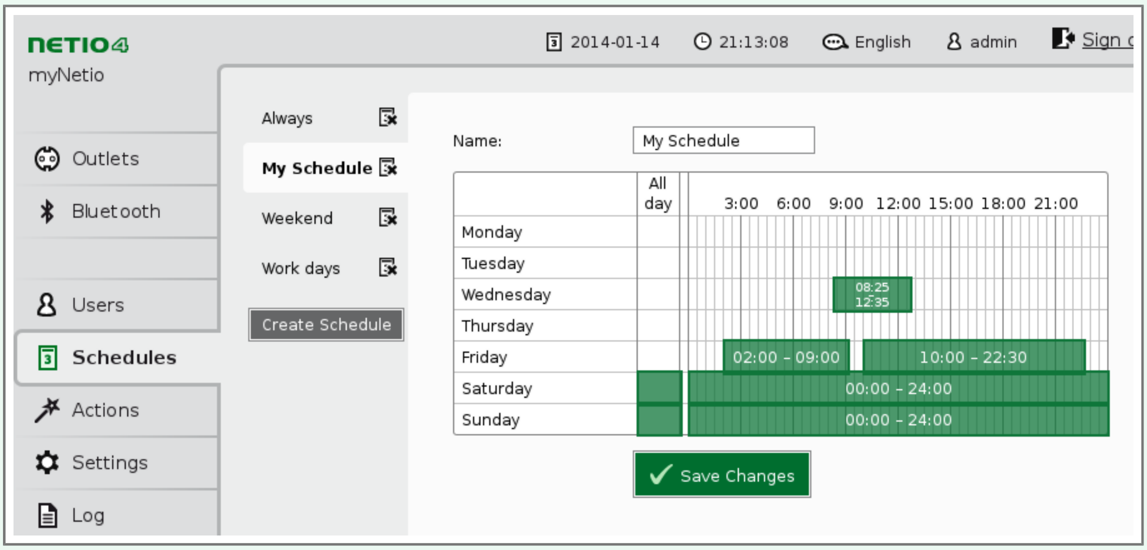
Confirm your settings by clicking **Create user** button. User accounts can be adjusted later in similar way.

2.4. Schedules

Use schedules to plan when an outlet will be on and when it will be off or where an action will be active. To manage schedules, click on the **Schedules** button in the left menu. There are three default schedules on NETIO4: **Always**, **Weekend** and **Work days**. If you want to create a new schedule, click on the **Create schedule** button. Enter schedule name and then create time intervals, when the outlet will be on.

Note

Set your schedule to the outlet timer in order to the outlet to be switched by that schedule in the section called "Timer".



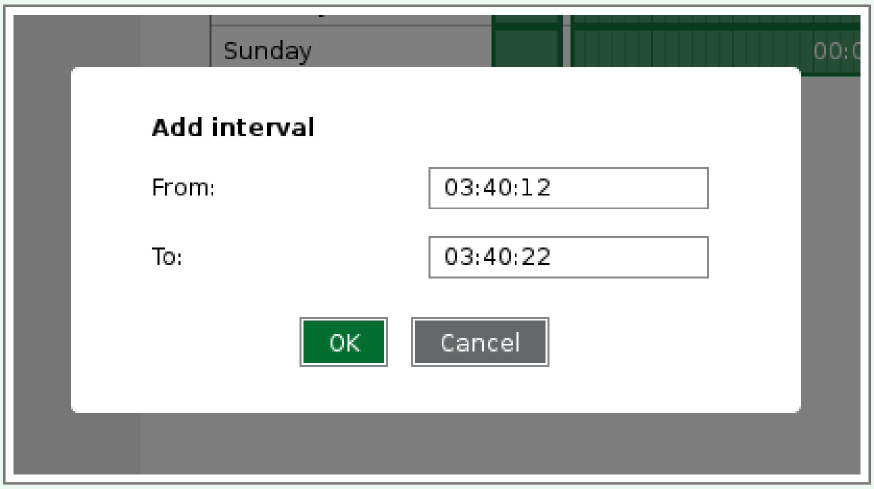
Name: My Schedule

	All day	3:00 6:00 9:00 12:00 15:00 18:00 21:00
Monday		
Tuesday		
Wednesday		08:25 12:35
Thursday		
Friday		02:00 - 09:00 10:00 - 22:30
Saturday	🟩	00:00 - 24:00
Sunday	🟩	00:00 - 24:00

Figure 10. Adding custom schedule

An interval can be quickly created by press and drag method. Simply click with the left mouse button to the desired day and time and while still holding the button, drag your mouse to side to create an interval. Resize an existing interval by holding its front or rear end and dragging your mouse to side. If you want to create an 24 hour interval, click on the cell next to the selected day in the column **All day**. By press and drag, you cover multiple days with one interval, even the all day intervals. To delete an interval, click on it with right mouse button.

Quickly created intervals have precision up to 10 minutes. To enter interval with absolute precision (up to one second), click on the existing interval to edit it and enter precise times. Save the new settings by clicking on the **OK** button. If you want to create new interval with absolute precision, simply click to the desired day and time where there is no existing interval already.



Add interval

From: 03:40:12

To: 03:40:22

Figure 11. Adding interval in second precision

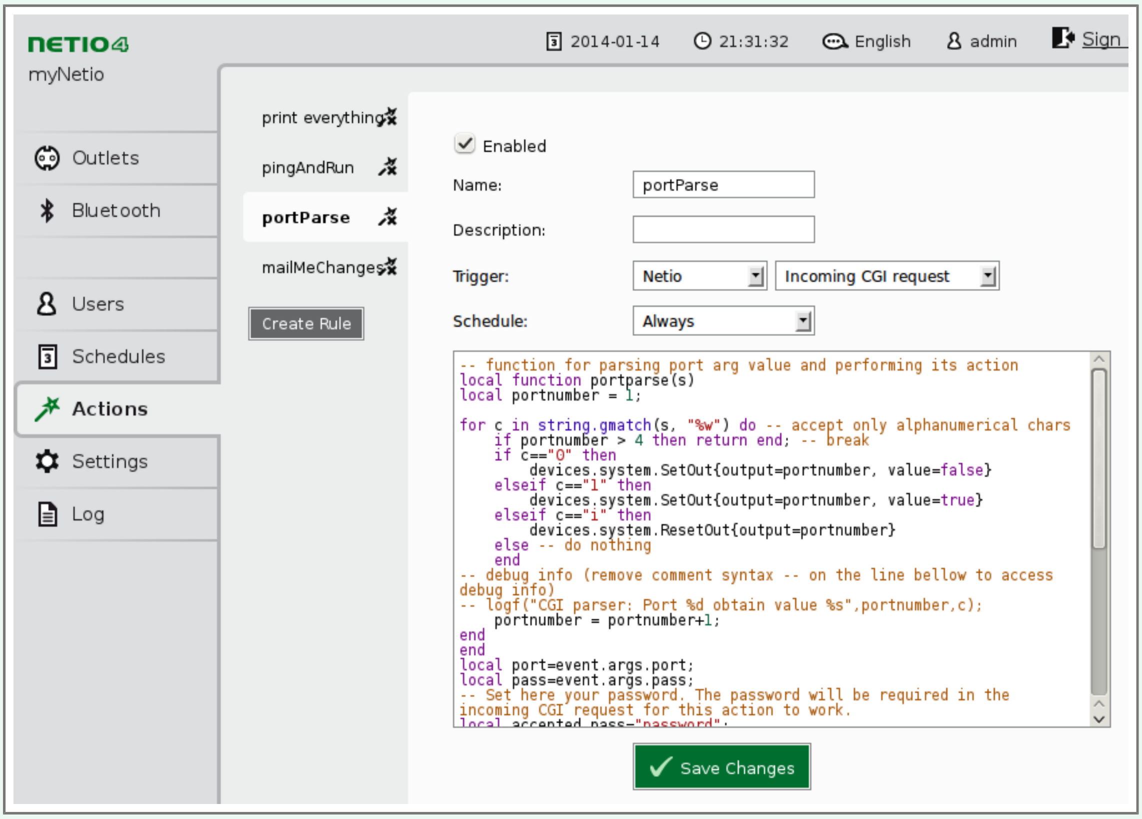
⚠

Delete schedule

If you delete a schedule, all timers which have this schedule set will be disabled. The outlets remain in the same state, but will be controlled manually henceforth.

2.5. Actions

Actions can be used to create user-defined rules which your NETIO4 will automatically perform. To manage action, click on the **Actions** button in the left menu. Use **Create rule** button to add new rule. In the upper part of the form, select action **Trigger** and **Schedule**, in which the action if triggered will be performed.



☑ Enabled

Name:	portParse
Description:	
Trigger:	Netio / Incoming CGI request
Schedule:	Always

```
-- function for parsing port arg value and performing its action
local function portparse(s)
local portnumber = 1;

for c in string.gmatch(s, "%w") do -- accept only alphanumerical chars
    if portnumber > 4 then return end; -- break
    if c=="0" then
        devices.system.SetOut{output=portnumber, value=false}
    elseif c=="1" then
        devices.system.SetOut{output=portnumber, value=true}
    elseif c=="i" then
        devices.system.ResetOut{output=portnumber}
    else -- do nothing
    end
-- debug info (remove comment syntax -- on the line bellow to access
debug info)
-- logf("CGI parser: Port %d obtain value %s",portnumber,c);
    portnumber = portnumber+1;
end
end
local port=event.args.port;
local pass=event.args.pass;
-- Set here your password. The password will be required in the
incoming CGI request for this action to work.
local accepted pass="password";
```

Figure 12. Adding action

To define what action should follow the trigger event, you have to write it in source code of Lua language. Basics of Lua language can be found in Appendix A, *Description of the Lua language*. For simple and more comfortable code writing, the Lua source code highlighting is supported.

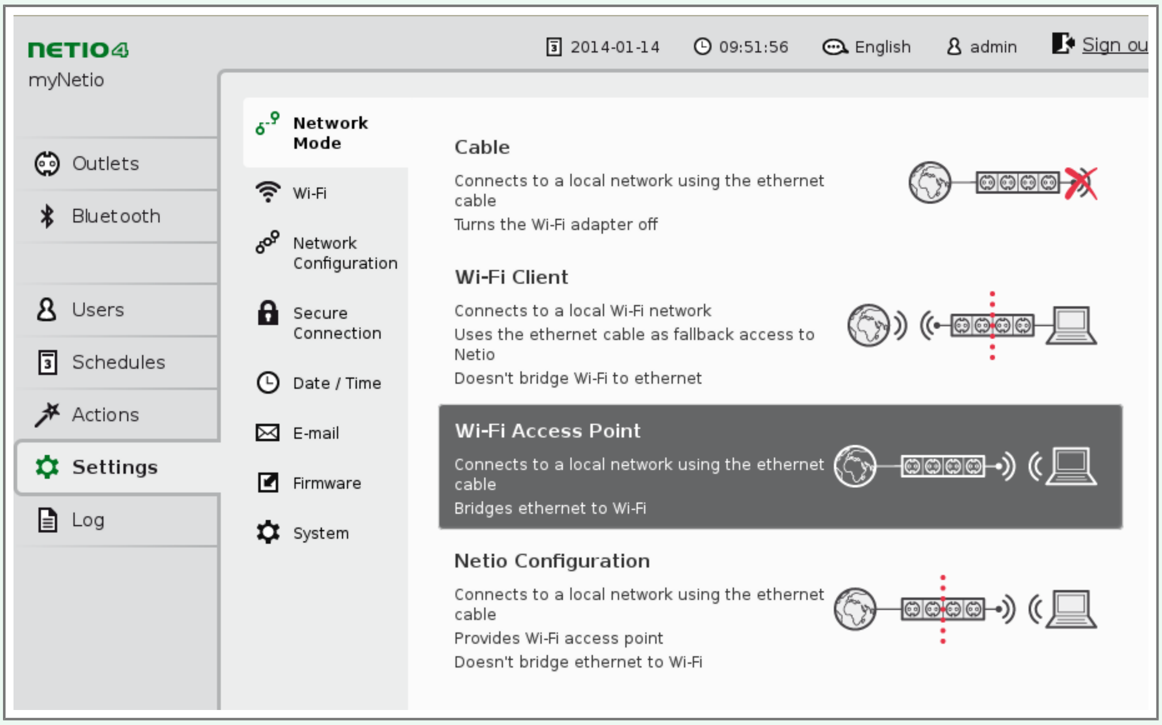
2.6. Device configuration

Please pay attention to device configuration, so that it can function properly. Click on ⚙ **Settings** in the left menu to display the submenu, where you can further set your device.

Network Mode

To properly set up network interfaces of your NETIO4, begin with clicking the **Network Mode** in the left Settings menu. You can choose from four different network modes based on if and how do you want to use Ethernet and/or Wi-Fi interface.

If you do not want to use Wi-Fi on your NETIO4 at all, simply select **Cable** mode. Your NETIO4 is connected via the Ethernet (primary network interface) only and Wi-Fi is turned off.



Cable

Connects to a local network using the ethernet cable
Turns the Wi-Fi adapter off

Wi-Fi Client

Connects to a local Wi-Fi network
Uses the ethernet cable as fallback access to Netio
Doesn't bridge Wi-Fi to ethernet

Wi-Fi Access Point

Connects to a local network using the ethernet cable
Bridges ethernet to Wi-Fi

Netio Configuration

Connects to a local network using the ethernet cable
Provides Wi-Fi access point
Doesn't bridge ethernet to Wi-Fi

Figure 13. Network mode setting

If you prefer NETIO4 to be accessible via local Wi-Fi network, select **Wi-Fi Client** mode. Your NETIO4 is connected via the Wi-Fi (primary network interface). The Ethernet (secondary network interface) has a separate network range and is used only for fallback access to your NETIO4. The Ethernet interface has static IP address 192.168.2.78 and runs its own DHCP server on network 192.168.2.0/24. Be advised that there is no routing between Ethernet and Wi-Fi networks, so any device connected via the Ethernet interface cannot be accessed from the Wi-Fi network through your NETIO4 (Do not bridge Wi-Fi to Ethernet).

In **Wi-Fi Access Point** mode, your NETIO4 is connected via the Ethernet (primary network interface) as in Cable mode, but it is also serving as Wi-Fi Access Point at the same time. Other devices can connect to your NETIO4 via the Wi-Fi (secondary network interface) and have access to the network of the Ethernet interface (Bridge Ethernet to Wi-Fi). DHCP server is not provided in this mode.

NETIO Configuration mode is similar to the Wi-Fi Access Point, but the two networks are separated in this case (Do not bridge Ethernet to Wi-Fi) and DHCP server on network 192.168.2.0/24 is running on the Wi-Fi interface (192.168.2.78).

Based on the network mode you select, you are asked to make corresponding changes in network configuration of the selected primary network interface and in Wi-Fi settings if needed. You have to make all required changes for the selected mode to be successfully activated.

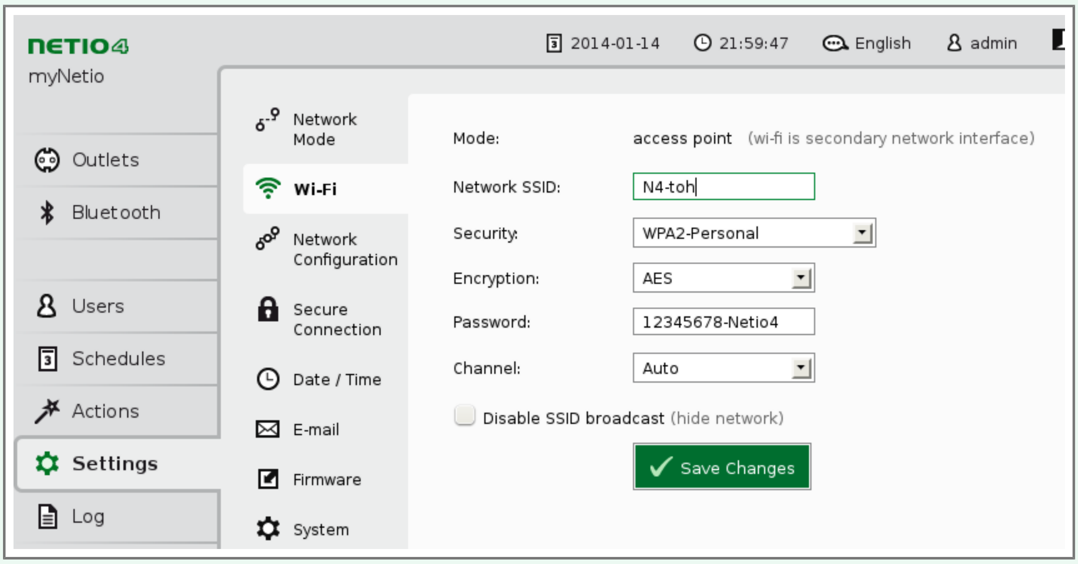
Wi-Fi

Click on the Wi-Fi button **Wi-Fi** in the left Settings menu to configure Wi-Fi. Based on which network mode is active, configure entries described below.

Select a Network Mode first

Note that you have to select a Network Mode first to determine if Wi-Fi interface is enabled and in which mode is active. Wi-Fi is turned off in Cable mode and the Wi-Fi menu is not accessible.

If you are not sure about this setting, contact your network administrator or your Internet connection provider.



Mode: access point (wi-fi is secondary network interface)

Network SSID: N4-toh

Security: WPA2-Personal

Encryption: AES

Password: 12345678-Netio4

Channel: Auto

☐ Disable SSID broadcast (hide network)

✓ Save Changes

Figure 14. Wi-Fi setting

Mode This says in which mode is the Wi-Fi interface currently running.

Status (for client mode only) Check if your NETIO4 has successfully connected to the selected Wi-Fi network.

Network SSID Type identifier of your Wi-Fi network (for AP mode only) or select an existing Wi-Fi network you want to connect to (for client mode only). If you cannot see the network you want to connect to, try to use the **Refresh** button or enter the network SSID manually (SSID is not broadcasted publicly).

Security Select security of the Wi-Fi network, if used.

Encryption Select the encryption type of the secured Wi-Fi network.

Password Type password to the secured Wi-Fi network.

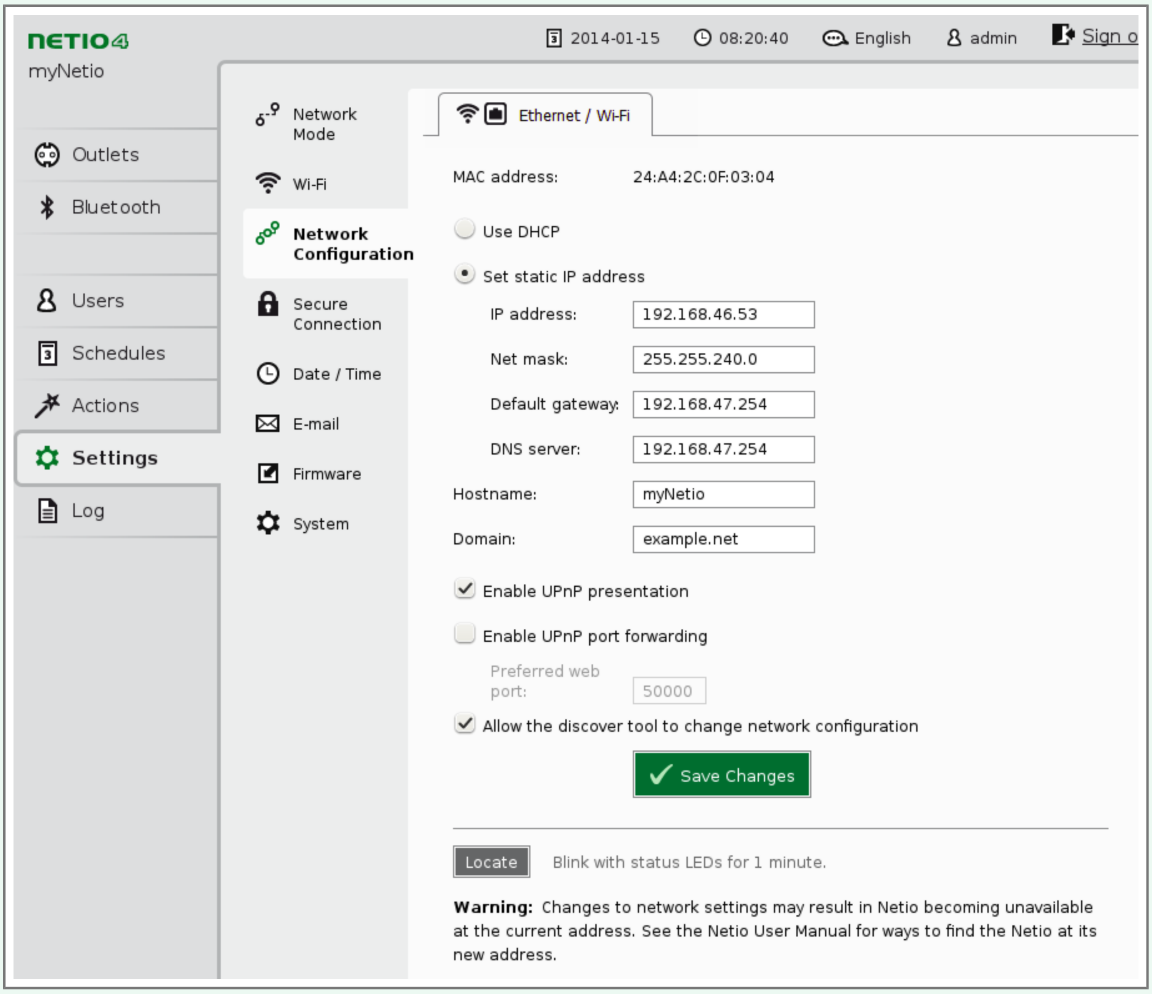
Channel (for AP mode only) Select a channel of your Wi-Fi network.

Disable SSID broadcast (for AP mode only) Check this only if you want to hide your Wi-Fi network.

Save the settings by clicking the **Save changes** button.

Network

Click **Network** in the left Settings menu. The simplest way how to set network parameters is to select **Use DHCP**. If you have a DHCP server available on your network, all network parameters will be automatically set. To make sure that device IP address remains the same, you can **Set static IP address** and other network parameters manually.



MAC address: 24:A4:2C:0F:03:04

○ Use DHCP

● Set static IP address

IP address: 192.168.46.53

Net mask: 255.255.240.0

Default gateway: 192.168.47.254

DNS server: 192.168.47.254

Hostname: myNetio

Domain: example.net

☑ Enable UPnP presentation

☐ Enable UPnP port forwarding

Preferred web port: 50000

☑ Allow the discover tool to change network configuration

Blink with status LEDs for 1 minute.

Warning: Changes to network settings may result in Netio becoming unavailable at the current address. See the Netio User Manual for ways to find the Netio at its new address.

Figure 15. Network configuration

Then pay attention to domain settings. Enter a **Hostname** by which the device is identified in your network and the name of your **Domain**. The current hostname is displayed left in the upper part of the web interface below device type.

By checking the **Enable UPnP presentation**, you can enable presentation of your device via UPnP protocols, e.g. in Network places in Windows. To set up a remote access to your NETIO4, check **Enable UPnP port forwarding** and set the preferred web port. After saving changes in settings, you can see an IP address for the remote access next to this checkbox.

Warning

Note that for the remote access to work, your router has to support control via UPnP protocols and has to have set all required parameters. If you are not sure, contact your connection provider or your network administrator.

It is recommended to disable **Allow the discover tool to change network configuration** setting as soon as you discover the device and change its basic network parameters during initial configuration. Use button **Locate** to blink with the red LED diode of the outlet number 1. This makes the physical localization of the particular device easier in case you have more than one device connected to your network.

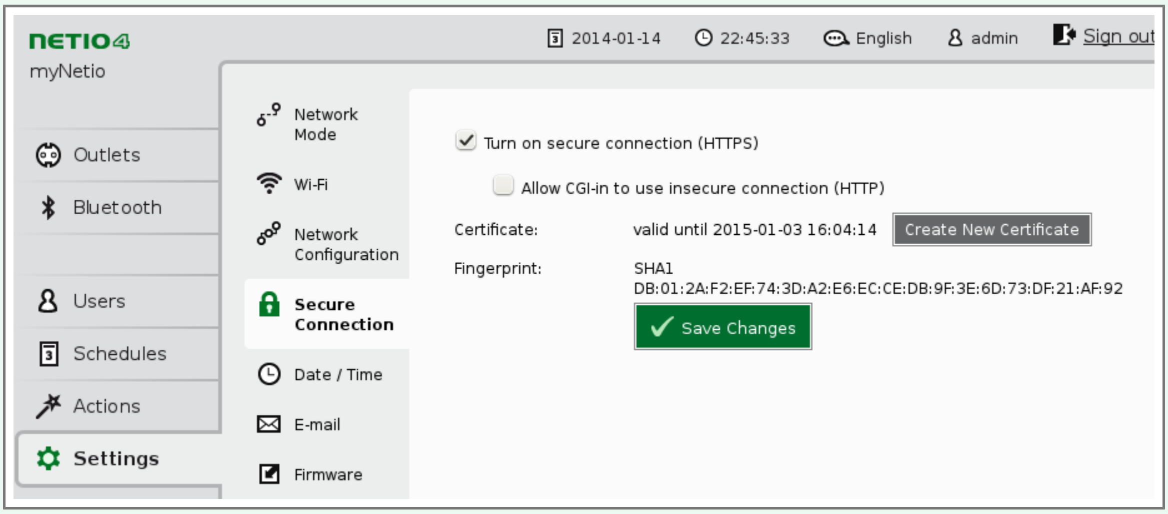
Warning

Changes to network settings of the device may result in NETIO4 becoming unavailable at the current address. Use the web discover http://discover.netio-products.com/ to find out its new address.

Save network settings by clicking **Save changes** button.

Secure connection

Click on the **Secure connection** button in the left Settings menu. NETIO4 supports secure connection over HTTPS. To use this feature, simply check **Turn on secure connection (HTTPS)** and confirm with **Save changes** button. Self-signed certificate will be generated and you will be automatically redirected to device web interface. All active connections will be terminated and then reconnected. You have to add permanent exception for the created certificate in your browser.



☑ Turn on secure connection (HTTPS)

□ Allow CGI-in to use insecure connection (HTTP)

Certificate: valid until 2015-01-03 16:04:14

Fingerprint: SHA1 DB:01:2A:F2:EF:74:3D:A2:E6:EC:CE:DB:9F:3E:6D:73:DF:21:AF:92

Figure 16. Secure connection setting

You can view information about validity of the certificate and key fingerprint in the menu. If needed, new certificate can be generated by **Create New Certificate** button. If you still want to use incoming CGI requests, check **Allow CGI-in to use insecure connection (HTTP)**.

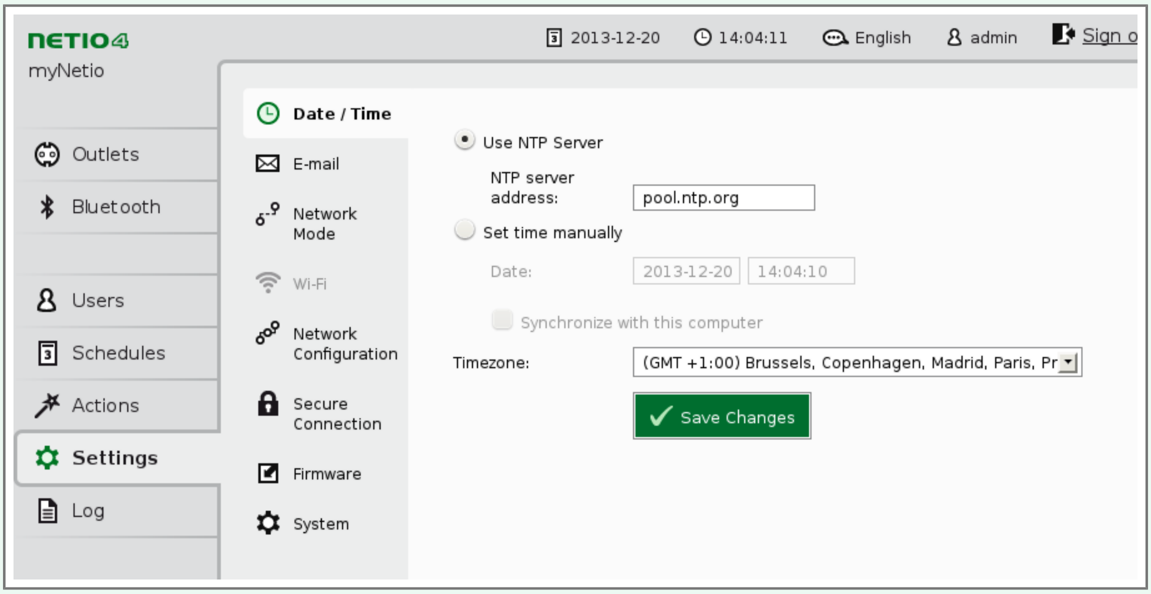
Date/Time

Click **Date/Time** in the left Settings menu. Specify the time zone first where your NETIO4 is used by selecting the area and the city (this may differ from the time of the computer you are connecting from to your NETIO4).

NETIO4 supports two ways of time setting. You can set time manually or use a NTP server for automatic time synchronization. Should you prefer automatic time synchronization, simply enter an address of desired NTP server. If you are not sure, leave the pre-selected pool.ntp.org. In case of manually set time, enter date in the format **YYYY-MM-DD** and time in the format **HH:MM:SS**. You can also select to synchronize time with your computer.

Note

When your NETIO4 is connected to a network with access to the Internet during its first start, system date and time will be automatically synchronized with default location in the prime meridian timezone.



● Use NTP Server

NTP server address: pool.ntp.org

○ Set time manually

Date: 2013-12-20 14:04:10

□ Synchronize with this computer

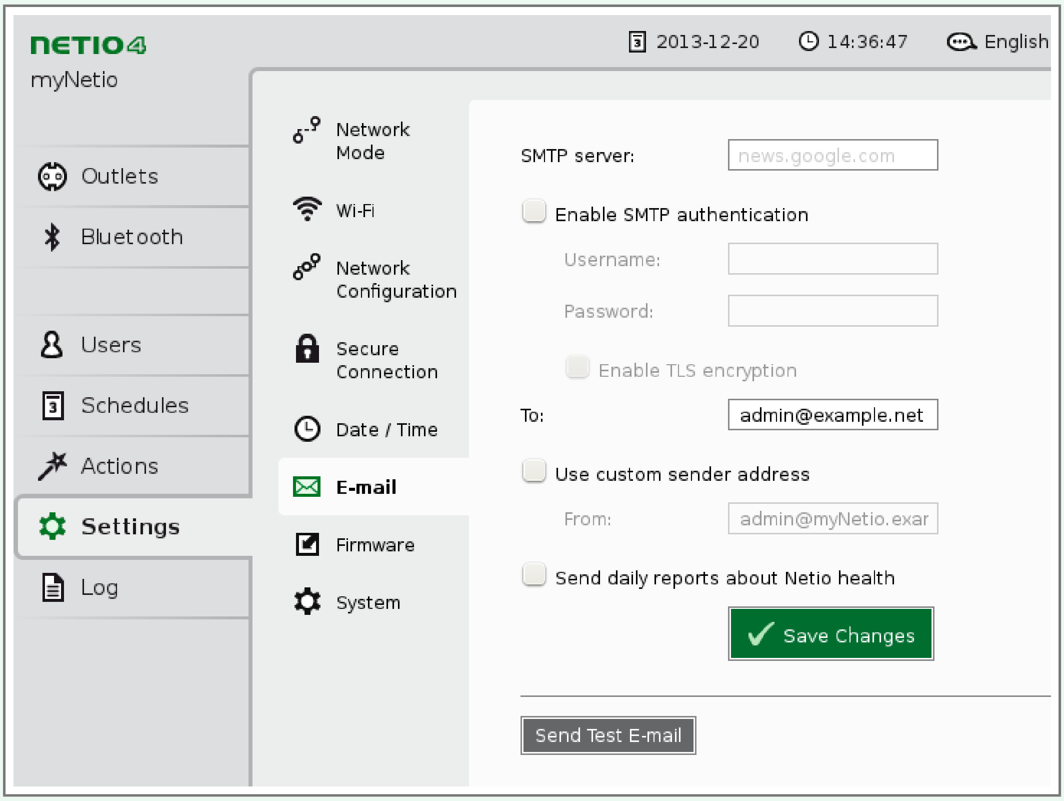
Timezone: (GMT +1:00) Brussels, Copenhagen, Madrid, Paris, Pr

Figure 17. Date and time configuration

Save date and time settings by clicking **Save changes** button.

E-mail

Click ✉ **E-mail** from the left Settings menu. The setting will be used to send e-mail reports from this device.



SMTP server: news.google.com

□ Enable SMTP authentication

Username:

Password:

□ Enable TLS encryption

To: admin@example.net

□ Use custom sender address

From: admin@myNetio.exar

□ Send daily reports about Netio health

Figure 18. E-mail configuration

SMTP server Mailserver used to send messages.

Enable SMTP authentication Check this option, if your mailserver requires authentication. You need to enter **Username** and **Password** to your account on the mailserver.

Enable TLS encryption Check if the SMTP server requires TLS encryption to login.

To Email addresses of message recipients, use comma to separate each address.

Use custom sender address Use this if you want to use user defined sender address for all emails from your device.

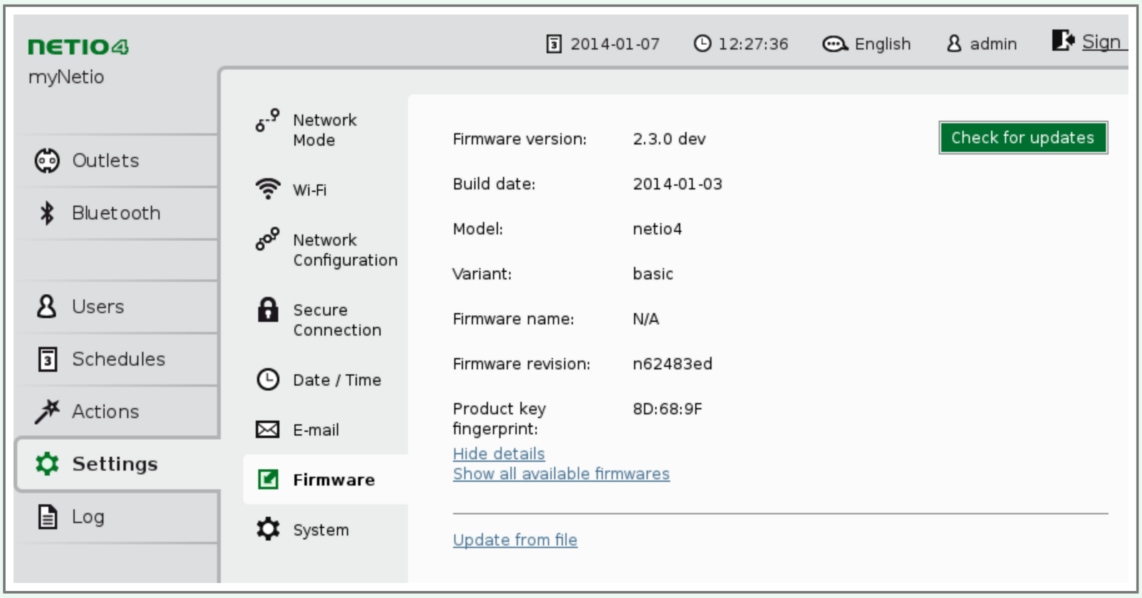
From The address, that will be used as custom sender address.

Should you require periodic reports about device state, check **Send daily reports about NETIO health**. The message, which is sent every day after midnight, contains a summary of device load and log messages from the past day.

Save e-mail settings by clicking **Save changes** button. It is possible to verify configuration by clicking **Send test e-mail** button.

Firmware

In section ☑ **Firmware** you can upgrade firmware on your device. Use button **Show details** to learn more about currently installed version.



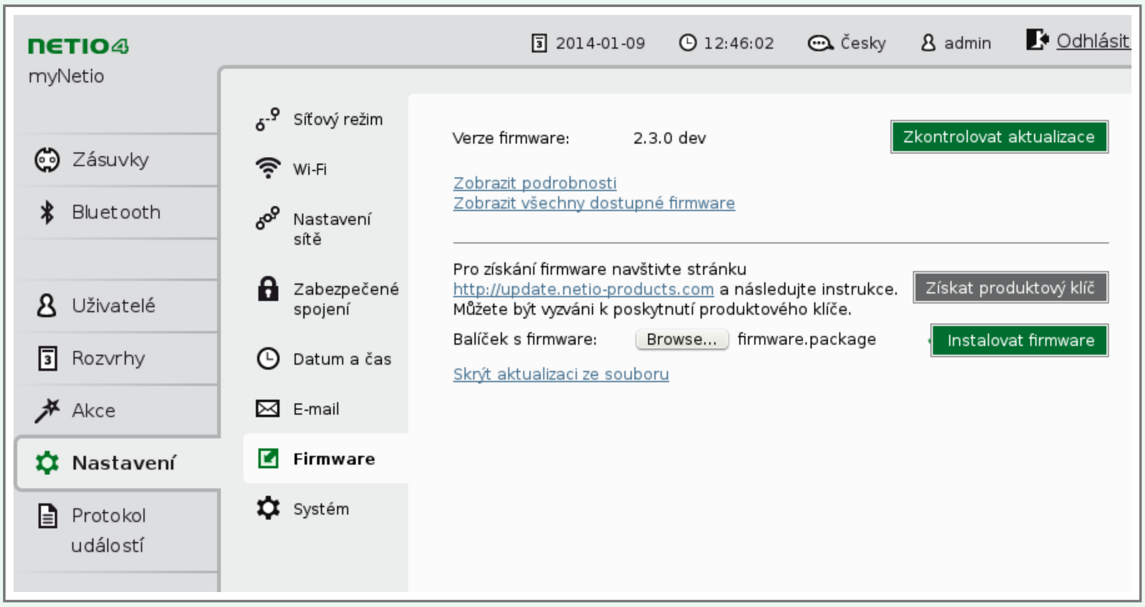
Firmware version: 2.3.0 dev
Build date: 2014-01-03
Model: netio4
Variant: basic
Firmware name: N/A
Firmware revision: n62483ed
Product key fingerprint: 8D:68:9F

Figure 19. Details about installed firmware

You can easily upgrade firmware via the web interface on condition that your device is connected to the Internet and you have entered valid network settings. First, click on the **Show all available firmwares** button to view the firmware list. Then update the list by **Check for updates** button. Please, read carefully **Release notes**, which contains the summary of changes and fixes in the selected version.

To download a particular firmware, click on the ⇩ button with its name. A firmware, which has been already downloaded, is distinguished by green color and its legend. To install a downloaded firmware, click on the ⇩ button with the firmware name and then confirm it by clicking the **Start Update** button. If you want to install a firmware, which is being downloaded, check the **Install automatically when the download completes** during the download.

The alternate way how to upgrade firmware is **Update from file**. For this, you need the product key of your device - click the **Get Product Key** button. Detailed instructions how to download the file with the firmware can be found on *http://update.netio-products.com*. Then select the file and begin the installation with the **Install Firmware** button.



NETIO4
myNetio

2014-01-09 12:46:02 Česky admin Odhlásit

Zásuvky
Bluetooth
Uživatelé
Rozvrhy
Akce
Nastavení
Protokol událostí

Síťový režim
Wi-Fi
Nastavení sítě
Zabezpečené spojení
Datum a čas
E-mail
Firmware
Systém

Verze firmware: 2.3.0 dev

Zkontrolovat aktualizace

Zobrazit podrobnosti
Zobrazit všechny dostupné firmware

Pro získání firmware navštivte stránku http://update.netio-products.com a následujte instrukce. Můžete být vyzváni k poskytnutí produktového klíče.

Získat produktový klíč

Balíček s firmware: Browse... firmware.package

Instalovat firmware

Skrýt aktualizaci ze souboru

Figure 20. Firmware update from file

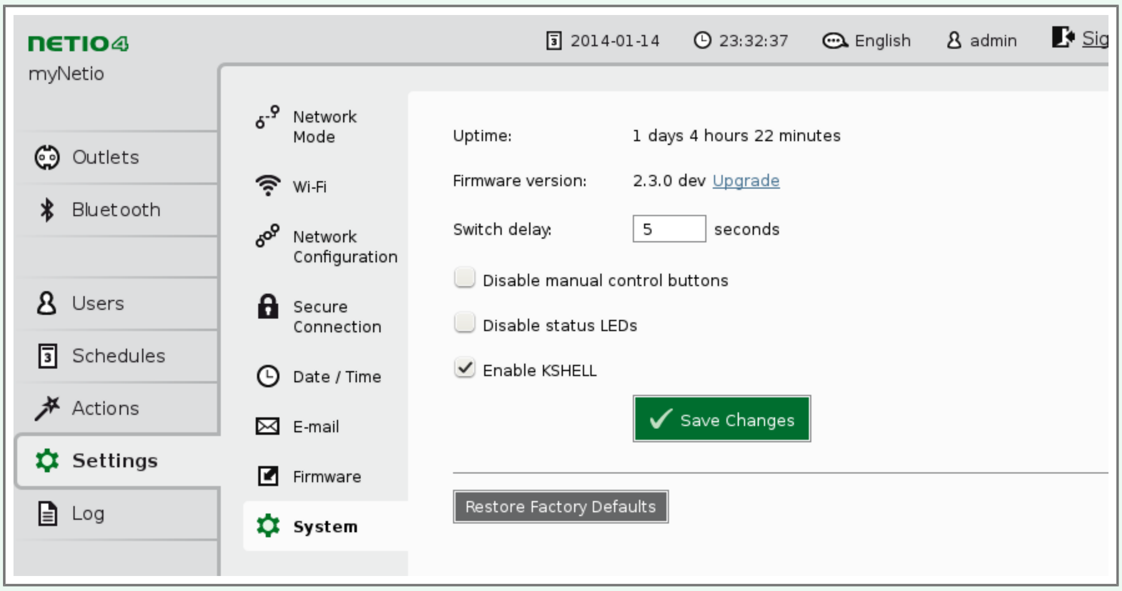
Warning

NETIO4 will be restarted during the upgrade process. Do not turn off or restart NETIO4 during the procedure in order not to damage the firmware or NETIO4.

You will be continuously notified about upgrade progress, when the process is successfully finished and then automatically redirected to the login screen. LED of outlet 3 will be blinking red and LED of outlet 4 is red during the firmware upgrade. (Section 2.9, “Status LED diodes”)

System settings

In this section, you can do basic settings and view basic system parameters.



Uptime: 1 days 4 hours 22 minutes

Firmware version: 2.3.0 dev Upgrade

Switch delay: 5 seconds

□ Disable manual control buttons

□ Disable status LEDs

☑ Enable KSHELL

Figure 21. System settings

Uptime Time from the last device restart.

Firmware version Current firmware version and **Upgrade** link.

Switch delay Delay in seconds between turning on two and more outlets. To understand how and when this variable influences turning on of outlets, see Starting outlet note.

Disable manual control buttons Select option for disabling physical control buttons.

Disable status LEDs Select option to deactivate status LEDs.

Enable KSHELL Select option to enabling KSHELL communication (see Section 2.11, “Communication via KSHELL interface”).

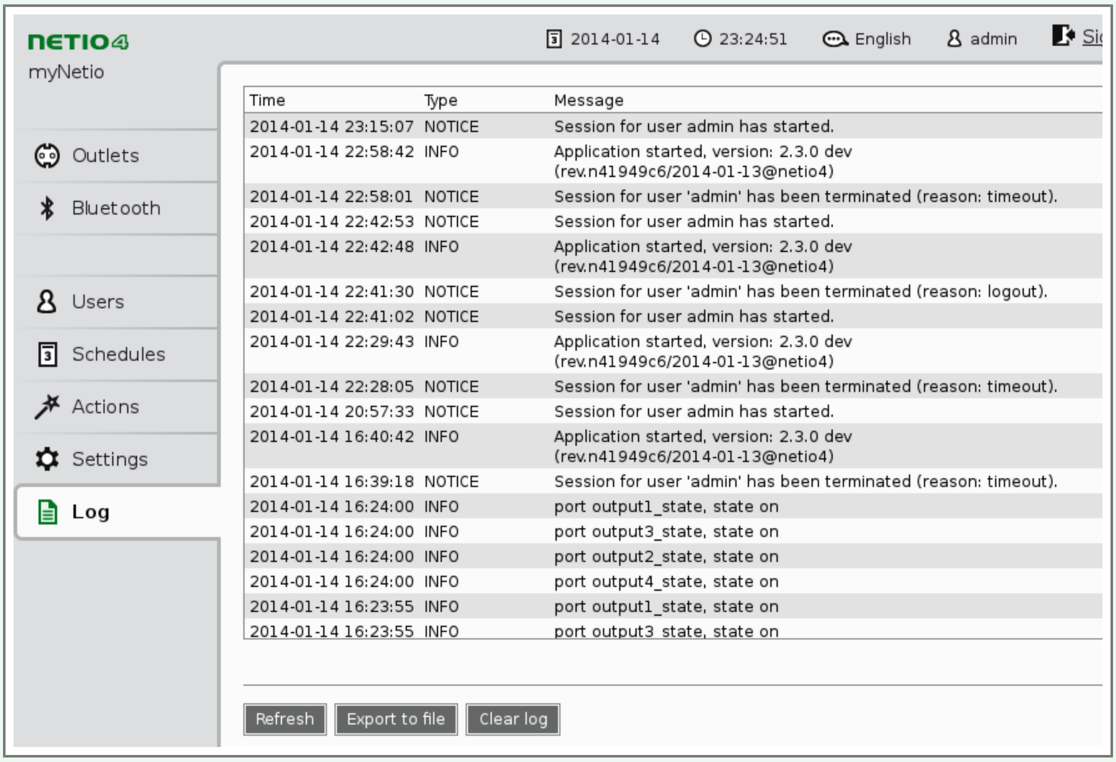
Save the settings by clicking the **Save changes** button. Click on **Restore Factory Defaults** button to restore initial settings of NETIO4. Note that all user settings will be deleted and default settings will be restored. You can check **Preserve network settings** in confirm dialog window, so NETIO4 can be easily found after the restoration. By clicking the **Reset settings** button, the process of restoration will begin.

Warning

NETIO4 will be restarted during the process of restoring factory defaults.

2.7. Log

Click on the 🗎 **Log** button in the left menu.



```
Time                 Type    Message
2014-01-14 23:15:07  NOTICE  Session for user admin has started.
2014-01-14 22:58:42  INFO    Application started, version: 2.3.0 dev
                             (rev.n41949c6/2014-01-13@netio4)
2014-01-14 22:58:01  NOTICE  Session for user 'admin' has been terminated (reason: timeout).
2014-01-14 22:42:53  NOTICE  Session for user admin has started.
2014-01-14 22:42:48  INFO    Application started, version: 2.3.0 dev
                             (rev.n41949c6/2014-01-13@netio4)
2014-01-14 22:41:30  NOTICE  Session for user 'admin' has been terminated (reason: logout).
2014-01-14 22:41:02  NOTICE  Session for user admin has started.
2014-01-14 22:29:43  INFO    Application started, version: 2.3.0 dev
                             (rev.n41949c6/2014-01-13@netio4)
2014-01-14 22:28:05  NOTICE  Session for user 'admin' has been terminated (reason: timeout).
2014-01-14 20:57:33  NOTICE  Session for user admin has started.
2014-01-14 16:40:42  INFO    Application started, version: 2.3.0 dev
                             (rev.n41949c6/2014-01-13@netio4)
2014-01-14 16:39:18  NOTICE  Session for user 'admin' has been terminated (reason: timeout).
2014-01-14 16:24:00  INFO    port output1_state, state on
2014-01-14 16:24:00  INFO    port output3_state, state on
2014-01-14 16:24:00  INFO    port output2_state, state on
2014-01-14 16:24:00  INFO    port output4_state, state on
2014-01-14 16:23:55  INFO    port output1_state, state on
2014-01-14 16:23:55  INFO    port output3_state, state on
```

Figure 22. Log

Log provides information about device performance. Entries are ordered automatically from the newest. Older entries are gradually shown when scrolling down using the scrollbar or the mouse wheel. Use **Refresh** button to access new entries. Log can be exported as a HTML file via the **Export to file** button. You can also permanently delete all log entries by clicking the **Clear log** button.

There are four types of log entries.

Info These are information entries, which document common device activities, e.g. application start or automatic database maintenance. You can add entries of this type by defining some user actions (see Section 2.5, “Actions”).

Notice Notices about devices activities, e.g. start or end of user session.

Warning This type are warning entries, e.g. failure in case of unsuccessful login after invalid username or password was entered.

Error An entry of this type can indicate nonstandard or possibly an error state of the device .

2.8. Manual outlet control

Apart from control via PC, the device can also be controlled using the four buttons on the front panel. The buttons correspond to the outlets 1-4, from left to right. To switch the given outlet on or off, press the button for two seconds. If the outlet was off, it will be turned on, if it was on, it will be turned off. The starting outlet will be turned off by the button.

2.9. Status LED diodes

The status LED diodes on the device inform the user about the current state of the outlet and about specific states of the device.

Each outlet has one two-coloured green-red LED diode above its control button. Green colour of the outlet LED indicates the current state of the outlet. If the outlet LED is green, the outlet is on, if the outlet LED is not green, the outlet is off. Green blinking outlet LED means that the outlet is restarting or starting.

Red colour of outlet LED diodes indicates specific states of the entire device. The following states are possible:

LED of outlet 1 is blinking red	Locate function was started.
LED of outlet 2 is red	DHCP failed.
LED of outlet 3 is blinking red	Firmware update is in progress.
LED of outlet 4 is red	Device is in service mode.
All outlet LEDs are red	NETIO4 is starting.
All outlet LEDs are blinking red	Reset of Factory Defaults is in progress.

The two remaining LED diodes indicate states of Wi-Fi and Bluetooth (for selected models [7] only) wireless connection. If the 📶 Wi-Fi LED is green, then Wi-Fi on you device is active, if not, then Wi-Fi is inactive. A problem with Wi-Fi is indicated by the ᛒ LED blinking.

2.10. Acoustic signalization

The acoustic signalization will be activated in the following situations:

Beeps once	Device is starting.
Beeps twice	Service mode requested.
	Start of reset to factory defaults.
	Reset to factory defaults is done.

2.11. Communication via KSHELL interface

The connection procedure is shown in the following example:

1. Open the window with command line
2. Enter the command **telnet 192.168.10.100 1234** (enter the address after the address of your device, will 1234 with the port, which you have set for KSHELL on the device)
3. The device should list a response similar to the following: **100 HELLO 00000000 - KSHELL V1.5**
4. Now you can login with the command:

   login name password

where **name** is the username and **password** is your password. If you have entered the correct username and password, the device response is **250 OK**. You are now logged on and you can control the NETIO device using the commands from the following chapter.

Every communication session via KSHELL interface has limited validity. In case of inactivity of approximate duration one minute, the session will be terminated automatically. If you need to keep the session active, you can use the command **noop**.

KSHELL commands overview

login <name> <password>

Sign in using the plain password. Example: Use command **login admin admin** to log in with username **admin** a password **admin**.

quit

Sign out. In case of changes in system settings, perform restart of the device.

noop

Keeps the connection alive, performs no action

port list [xxxx]

- without parameter gets the state of all ports
- xxxx is a command for control of all ports simultaneously - in place of **x** enter the commands:
  - 0 - deactivate output
  - 1 - activate output
  - i - call interruption of a given output
  - u - leave output unchanged

Example: The command **port list 01ui** deactivates output 1, activates output 2, leaves output 3 unchanged and interrupts output 4.

port <output> [0 | 1 | manual | int]

Gets and sets output state:

- if you enter only the number of the output without any parameter, the command gets the output state (0 - off / 1 - on)
- output number with parameter **0/1** - turns the output on/off
- output number with parameter **'int'** or **'i'** - interrupts the output

Example: The command **port 2 1** activates output 2.

2.12. Troubleshooting

Forgotten password. Restore Factory Defaults.

If you forget your password, it is possible to manually reset the device to factory defaults. This is done by pressing and holding outlet buttons 1 and 2 with device on. Hold the buttons until the device beeps 2 times. During the resetting process, all the outlet LED are blinking red. As soon as reset is completed, the device beeps 2 times.

Problem with firmware upgrade

If a problem occurs during the firmware upgrade (e.g. power failures, or switching off the device before the upgrade is completed), it is possible to force the device into service mode. You can do this by pressing the outlet button 4 on device boot. Hold the button until the device beeps 2 times. After this, connect to the device IP address via the browser and click on **Firmware** button in top menu. Continue by uploading the firmware file as described in Upgrade from file [31].

Resetting the fuse

If NETIO4 stops working and no indication LEDs are shining, it is possible that the rated current was exceeded and the device was turned off. To prevent the current from damaging the device in this situation, the resettable fuse interrupts power to your NETIO4. This is represented by releasing the resettable fuse button on the right side of the device. Disconnect all devices connected to the outlets. Before turning your NETIO4 on again, you have to wait for the device to cool down. This may take up to several minutes based on situation. Press the resettable fuse button to turn NETIO4 on again. If it is not possible to press the button, wait for a moment for the device to cool down. Check all connected devices for any malfunction which could cause that the rated current was exceeded and power was interrupted before you plug them in again.

Appendix A. Description of the Lua language

NETIO4 uses the Lua scripting language, which allows users to extend the functionality of the device with user actions. These actions can react to external signals such as incoming CGIs or events of the NETIO4 device itself, for instance by sending an email to a user, initiating an outgoing CGI request to another device, etc.

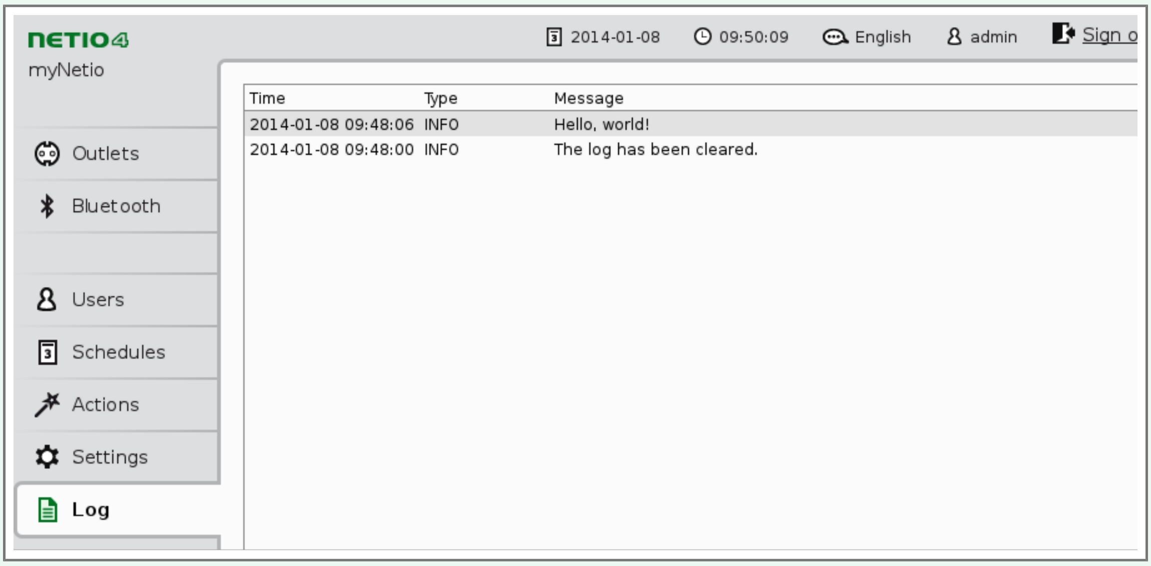
A.1. Basics of the Lua language

You can find an introduction to programming in the Lua language in the book Programming in Lua (http://www.lua.org/pil/). The freely available version covers Lua 5.0; NETIO4 uses Lua 5.1, but the difference between the two versions is negligible. Lua 5.1 also has an extended Reference Manual (http://www.lua.org/manual/5.1/manual.html) that describes all the control structures and built-in functions.

An example of a simple command is:

```
log("Hello, world!")
```

The `log()` function is a specific function that writes a message directly to the NETIO4 event log. It can be used for instance to confirm that a given action has been executed or to get other information. In the image shown below, you can see a message that has been successfully written by a triggered rule.



```
Time                 Type    Message
2014-01-08 09:48:06  INFO    Hello, world!
2014-01-08 09:48:00  INFO    The log has been cleared.
```

Figure 23. output of the log() function

The `log()` function also supports inserting the contents of a device variable directly into output text:

```
log("Hello, world!");
-- separate commands with semicolons or spaces
log("Name of event is: ${event.name}");
-- logs the name of the event when it is initiated (choose an appropriate trigger action)
-- a double dash marks the beginning of a comment
```

A.2. Specifics of the Lua environment in NETIO4

Because of hardware limitations, NETIO4 uses the Lua language without support for decimal numbers. Therefore, arithmetic only supports whole numbers (unlike standard distributions of the language). All input values are thus entered as multiples to maintain precision. So for instance the temperature 24.5°C is represented in the code with the number 2450.

To maintain system integrity, any code entered by the user runs in a closed environment with limited access to system variables (for instance, device variables that provide access to current values are set as read-only). Furthermore, running user actions is limited so as to rule out the possibility of getting stuck in an infinite loop which would preclude normal operation of the system. This limit is set to 32,000 virtual machine instructions each time a user action is triggered.

Besides this, the Lua environment in NETIO4 provides certain functions to allow cooperation between NETIO4 and other devices.

A.3. Controlling outlets

Switching outlets

It is possible to control the state of outlets with the **SetOut** command, which takes two arguments. You can use the numerical value of the **output** argument to specify which outlet will be switched. The outlet numbers correspond to the numbers from the outlets overview in the **Outlets** menu. You use the value of the boolean **value** to specify whether the outlet should be switched on or off.

```
devices.system.SetOut{output=3, value=false};
-- switches outlet number 3 off
devices.system.SetOut{output=1, value=true};
-- switches outlet number 1 on
```

⚠ **Warning**

If the automatic **Timer** function was switched on for the given outlet, switching outlets by means of user actions turns it off.

Resetting outlets

It is possible to restart outlets with the **ResetOut** command, which takes two arguments. Use the first, obligatory, argument **output** to specify which outlet will be reset, as with the **SetOut** command above. Using the second, optional argument **resetDelay**, you specify how long the outlet restart delay will be (the time from when it is switched off to when it is switched back on again).

```
devices.system.ResetOut{output=4, resetDelay=10};
-- restarts outlet number 4 with a delay of 10 seconds
```

A.4. NETIO4 device variables

NETIO4 internal device variables are accessible through the **devices.system** object. For instance, you can get the CPU load through the `devices.system.averageLoad` variable.

NETIO4 device variables within actions			
availability	**variable name**	**contents**	**description**
All NETIO4 models	**output1_state**	takes the values on/off/starting/ resetting	State of outlet 1.
	outputN_state for N from 1 to 4	takes the values on/off/starting/ resetting	State of outlet N.
	sessionCount	number	Number of users currently logged in.
	freeSpace	disc space in megabytes	Total disc space on internal flash memory.
	totalSpace	disc space in megabytes	Total available disc space on internal flash memory.
	averageLoad	number	Represents the average value of the CPU system load in the last 5 minutes, multiplied by 100. Smaller is better; bigger is a sign of performance problems.
Only for model NETIO4 All	**outputN_consumption** for N from 1 to 4	value in Watts (W)	Actual power consumption of outlet N.
	outputN_cumulatedConsumption for N from 1 to 4	value in Watt-hours (Wh)	Actual cumulated power consumption of outlet N since measuring started.
	outputN_consumptionStart for N from 1 to 4	date and time	Date and time when the measuring of the cumulative power consumption has been started on the given outlet.

Table 1. Internal device variables

Variables for added Bluetooth devices

If NETIO4 is paired with BT devices, availability of these devices can be detected through a global variable `devices.<sensorName>.connected`, where `<sensorName>` is the name of added BT device. This variable can be used for example to trigger actions in response to **System variables updated** event.

To determine the name of the specific BT device that triggered the event created for **Any device** with **Device disconnected** or **Device reconnected** triggers, use `self.name` variable.

Variables for added Bluetooth devices			
availability	**variable name**	**contents**	**description**
NETIO4 All with paired BT device	**connected**	boolean value true/false	State (connected/disconnected) of added BT device.
	name	text string	Name of BT device which eg. triggers an action.

Table 2. Variables for added Bluetooth devices

These variables and theirs values can be later used in code, see complex example in Section A.10, "Examples".

A.5. NETIO4 device actions

Besides variables, NETIO4 also offers some actions that can be used to control connected devices or other devices in the computer network directly by invoking CGI commands (the controlled device must support CGI).

```
devices.system.SetOut{output=1, value=false}; -- switches off output no. 1
```

Device actions			
availability	**action name**	**argument**	**example**
All NETIO4 models	**SetOut** Controls the state of the outlet.	**output** outlet number from 1 to 4 **value** true/false; activates/deactivates the outlet	`devices.system.SetOut{output=1, value=true};`
	ResetOut Restart of the outlet and the powered device.	**output** outlet number from 1 to 4 **resetDelay** outlet restart delay in seconds. If not specified, the settings value of the given outlet is used.	`devices.system.ResetOut{value=1, resetDelay=10};`
	CustomCGI Sends an HTTP GET request to the given URL.	**url** URL to which the command should be sent	`devices.system.CustomCGI{url="http://192.168.0.1/ cgi-bin/foo.cgi"};`
	Reboot Immediate restart of the NETIO4 device.	without arguments	`devices.system.Reboot{};`
Only for model NETIO4 All	**ResetCumulativeConsumption** Resets the consumption counter of the given outlet to zero.	**output** outlet number from 1 to 4	`devices.system.ResetCumulativeConsumption{output=1};`

Table 3. Device actions

A.6. IncomingCgi event as an action trigger

IncomingCgi is an event that can be used to input any data into user actions from external sources, such as cameras, UPS backup sources or various sensors. In order for a user action to be able to react to a received CGI request, this action must be stored with the trigger **Incoming CGI request**. The IncomingCgi event is invoked on the basis of a received HTTP request entered with a URL.

Requests can be sent with the HTTP GET or POST methods. CGI requests using the GET method can be entered directly into the address bar of an Internet browser:

```
http://192.168.0.1/event?foo=bar&baz=qux
```

The same CGI request can also be sent with the POST method using the tools wget (*http://www.gnu.org/software/wget/*), curl (*http://curl.haxx.se/*), etc. Example of sending a request from the command line of a client PC with the curl tool:

```
> curl --data "foo=bar&baz=qux" http://192.168.0.1/event
```

where **192.168.0.1** is the NETIO4 device's address. The following Lua code processes data sent with the GET or POST methods:

```
local output = "Incoming CGI request: ";
for key,value in pairs(event.args) do
  output = output .. " (" .. key .. " = " .. value .. ")";
end
logf("%s", output);
```

and writes the following message to the system events log:

```
Incoming CGI request: (foo = bar) (baz = qux)
```

It is possible to process values obtained in this way further; see the complex example in section Section A.10, “Examples”.

A.7. Other action triggers

NETIO4 also offers other action triggers used for automating tasks and interacting with the environment. When creating user actions, select an appropriate trigger to activate your action. The usage is similar to that of the **Incoming CGI request** trigger described in section Section A.6, “IncomingCgi event as an action trigger”.

If you are using NETIO4 All model with the Bluetooth 4.0 LE support, please select desired device first and then its action trigger. Available devices are - **NETIO**, **paired BT device** or **Any device** (for an actions triggered by more than one BT device).

NETIO4 device action triggers			
availability	**name of trigger**	**name of internal event**	**description**
All NETIO4 models	**System started up**	SystemStarted	The trigger is activated when the NETIO4 device starts.
	State of digital output changed	DoStateChanged	The trigger is activated when the state of an output (outlet) changes.
	Schedule has started or stopped.	ScheduleStartStop	The trigger is activated when an active schedule is started or stopped.
	System variables updated	Input_updated	The trigger is activated when the system variables are updated, which occurs every 10 seconds; appropriate for repeated actions.
	Incoming CGI request	IncomingCgi	The trigger is activated when a CGI request arrives.
Only for model NETIO4 All	**Device disconnected**	DeviceDisconnect	The trigger is activated when the paired BT device is out of range.
	Device reconnected	DeviceReconnect	The trigger is activated when the paired BT device is reconnected.

Table 4. Action triggers

A.8. Special variables

Special variables within actions	
name	**description**
devices	read-only table of devices and their variables; described above

Special variables within actions	
name	**description**
event	A table filled with the values of the event just handled on the basis of the selection action trigger; contains the following entries: • **device** – name of the device that invoked the event (e.g., **system** for NETIO4) • **name** - name of the event (e.g., **IncomingCgi**) • **args** – table of the arguments of the events; depends on the event.

Table 5. Special variables within action

It is possible to access individual entries in the **event.args** table of arguments by extending this variable with the name of the desired argument. This is an alternative to the example above that does not use the **for** and **pairs** commands to traverse the entire **event.args** table. When the **Incoming CGI request** trigger is used, the following example writes the value "bar" of the argument with the name foo from the incoming CGI to the system log:

```
log("${event.args.foo}");
-- CGI in the form http://192.168.0.1/event?foo=bar writes the value "bar" of the argument
 foo into the log.
```

A.9. Functions and libraries

The standard **assert**, **error**, **ipairs**, **next**, **pairs**, **pcall**, **select**, **tonumber**, **tostring**, **toboolean**, **type** and **unpack** Lua language functions can be used for programming actions. Only the **os.date**, **os.difftime** and **os.time** functions are available from the **os** library. All functions from the **string** and **table** libraries are also available.

It is also possible to use Lua language functions that are specific to NETIO4:

delay

The `delay(seconds, callback)` function invokes the callback function after the given number of seconds. The **delay** function itself executed immediately, and the callback function runs independently of the main code.

Example:

```
-- we create a local callback function local function
delayedDate()
  log("date extraction delayed");
end

-- we time the function
delay(5, delayedDate);
log("delayed date extraction timed"); -- this message appears immediately
```

Note

Errors that arise in processing delayed functions are not standardly logged anywhere. If necessary, this can be circumvented with the `pcall()` function:

```
local function wrong()
  devices.non_existing.SetLED{enabled=0}
  -- attempt to access a non-existent device and/or action causes the error
end

local function logWrongErrors()
  local result, errorMessage = pcall(wrong)
  if result == false then
    logf("Function failed with error: %s", errorMessage)
  end
end

delay(1, logWrongErrors)
```

milliDelay

The `milliDelay(milliseconds, callback)` function works like delay, except that it uses milliseconds instead of seconds. The minimum delay that can be set is 50 ms.

A callback function may also be specified directly in a parameter:

```
devices.system.SetOut{output=1, value=true}; -- switches outlet no. 1 on
milliDelay(500, function() devices.system.SetOut{output=2, value=false}; end); -- switches
 outlet no. 2 off after 500 ms
```

log

The `log(message)` function writes the message to the event log of the NETIO4 device that is accessible through its web interface. The message may contain substitution code in the form `${variable}`, which will be replaced with the values of the global variables in the system.

Example:

```
log("Current NETIO4 CPU load is ${devices.system.averageLoad}; state of outlet no. 4 is
 ${devices.system.output4_state}")
log("Event ${event.name} has been processed")
```

Note

A substitution executed with `log()` cannot access local variables. Therefore, the following code won't work:

```
local foo = 1; log("value of foo is ${foo}"); -- won't work
```

Of course, this can be solved with a global variable:

```
foo = 1; -- foo is now a global variable
log("value of foo is ${foo}");
```

or with the logf function, which does not have this limitation:

```
local foo = 1;
logf("value of foo is %s", foo);
```

logf

The `logf(messageFormat, ...)` function works like `log()`, but `messageFormat` is a string containing substitute codes which are replaced by other parameters of the `logf()` function, which may also include functions. The most important parameters for specifying the format are:

- `%s` – output as a string
- `%d` – output as a number

Examples:

```
logf("Time on device: %s, event: %s", os.date("%H:%M:%S"), event.name);
-- writes the local time on the device and event name for automatically executed actions
logf("UNIX time on device: %d, number of users logged in: %d", os.time(),
 devices.system.sessionCount);
-- writes the time in UNIX form and number of users logged in
```

Note

The exact formatting options that `log()` accepts are identical to those of the **string.format** Lua function (*http://www.lua.org/manual/5.1/manual.html#pdf-string.format*) and very similar to those of the `printf()` function used in the C language.

mail

The `mail(to, subject, text)` function sends an email with the given text to the recipient entered. The subject and text of the email use the same `${variable}` code expansion as the `log()` function. Under the default setting, an email with a particular subject is sent at most once every 5 minutes.

```
mail("john@example.com", "Current NETIO4 load", "Current load is
 ${devices.system.averageLoad}")
```

By changing the subject of the email, it is possible to ensure that sending occurs at most once per minute under the default setting.

```
mail("john@example.com", "Current NETIO4 load is ${devices.system.averageLoad}", "Further
 information");
```

The maximum frequency at which messages are sent by the `mail` function can be set with two optional parameters: `minIntervalSec` and `intervalKey`. The `minIntervalSec` parameter makes it possible to set the exact interval at which messages are sent. The default value is 300 (5 minutes). The `intervalKey` parameter is used internally to ascertain whether the same message has already been sent in the past; if the parameter is not set, the default message subject is used.

These optional parameters allow better control over the intervals for sending emails repeatedly. The following code sets the minimum interval for repeatedly sending messages to 30 minutes and also sets a particular interval key in such a way that all messages sent with this code are assigned to the same category for the purposes of the limit on repeatedly sending messages, even if their subjects are different.

```
mail("john@example.com", "An event with name ${event.name} occurred", "Some event is coming",
 30*60, 'some-event-coming');
```

The `mail()` function returns a boolean value (`true` or `false`) that designates whether the message was transmitted to be sent or was blocked by the filter for limiting the number of messages within a given time period.

```
local ret = mail("john@example.com", "mail", "hello", 60)
if ret == true then
  log("we have tried to send the email")
  -- we provide an alert that the email may not actually be sent, even at this moment
  -- details on this situation will be logged in the NETIO4 system log
else
  log("e-mail was not sent, because that would have been more than once in a minute")
end
```

ping

The `ping(address, timeout, callback)` function makes it possible to check the functionality of connections between the NETIO4 device and another device at the specified address in the computer network. The target device must support the ICMP protocol. Based on the accessibility of the device, it is then possible to execute your own action with the callback function. The duration of the validity of the request in seconds is an optional argument.

```
ping{address="example.com", timeout=60, callback=function(o) log("duration: " .. o.duration);
 end}
```

As can be seen in the previous example, the callback function can get a table from the ping function after it executes with the following arguments and their return values:

- success: ping success (true/false)
- duration: ping duration (value in milliseconds)
- errorInfo: error description (text)

With these return values, it is possible to write information about the accessibility of any server or other devices to the NETIO4 device event log. For the following example, use the action trigger **Input state updated** (the action will be executed every 10 s):

```
-- ping example.com and log the result
local function logPingResult(o)
  if o.success then
    log("example.com ping OK in time: " .. o.duration)
  else
    log("example.com ping FAILED: " .. o.errorInfo)
  end
end

ping{address="example.com", callback=logPingResult}
```

After entering and saving the rule, look at the event log.

A.10. Examples

Action for processing incoming CGI requests with a change of the states of outlets

The first example shows an action for processing an incoming CGI request that contains a change of the state of outlets. Save the action with the trigger **Incoming CGI request**.

The incoming CGI request must be in the form *http://netio.ip/event?port=10iu&pass=password*. Select the value **1** to switch the outlet on, **0** to switch it off, **i** to restart it and **u** or another character to leave the given outlet in the current state. Pass the selected password as the value of the pass argument.

```
   -- function for parsing port arg value and performing its action
local function portparse(s)
  local portnumber = 1;
  for c in string.gmatch(s, "%w") do -- accept only alphanumerical chars
    if portnumber > 4 then return end; -- break
    if c=="0" then
      devices.system.SetOut{output=portnumber, value=false}
    elseif c=="1" then
      devices.system.SetOut{output=portnumber, value=true}
    elseif c=="i" then
      devices.system.ResetOut{output=portnumber}
    else -- do nothing
    end
    -- debug info (remove comment syntax -- on the line bellow to access debug info)
    -- logf("CGI parser: Port %d obtain value %s",portnumber,c);
    portnumber = portnumber+1;
   end
end

local port=event.args.port;
local pass=event.args.pass;

-- Set here your password. The password will be required in the incoming CGI request for this
 action to work.
local accepted_pass="password";

-- Comment out the following block of code if you are using more than one CGI-triggered
 action.
if (not port) or (not pass) then
  log("CGI parser: PORT and/or PASS argument missing, please check your CGI command. Use
 following syntax for the control CGI http(s)://netio.ip/event?port=10iu&pass=password where
 accepting arguments for port 1 to 4 are: 0...off, 1...on, i...interrupt (reset), any other
 char for port skip (unused)");
  do return end; -- break (end of action)
end

if (pass==accepted_pass) then portparse(port)
else log("CGI parser: Wrong password")
end
```

Action for controlling an outlet on the basis of the accessibility of another device in the network

The following example uses the internal ping function to confirm the accessibility of a device in the network and activates the desired output (outlet) based on it accessibility. For instance, the action can be used to automatically switch a peripheral device (printer, monitor) of a computer on after the computer is switched on. Save the action with the trigger **System variables updated**, which makes it possible to check accessibility every 10 seconds. Change the address of the monitored device and the controlled output. We also recommend using logf commands to write comments to the system log for debugging.

```
-- local user variables
local port = 4 -- Change output number of controlled port here
local device = "192.168.0.100" -- Change ping destination address here

-- callback function for ping function
-- comment out logf commands after debugging
local function pingAndRun(o)
local portState = devices.system["output" ..port.. "_state"];
  -- two dots ".." for concatenation of the system variable name eg. output4_state
  if o.success and (portState == "off") then
    logf("PING OK, state of output %d is %s, Enabling port %d", port, portState, port);
    devices.system.SetOut{output=port, value=true};
  elseif o.success and (portState ~= "off") then
    logf("PING OK, but state of output %d is %s, Do nothing", port, portState);
    -- do nothing if ping success and portState is different than "off"
  else
    -- do nothing if the device is unreachable
    -- or you can turn off the same output by uncommenting of following line
    -- devices.system.SetOut{output=port, value=false};
    logf("PING FAIL, state of output %d is %s", port, portState);
  end
end

-- main program with the callback function pingAndRun
ping{address=device, timeout=5, callback=pingAndRun}
```

Action for cyclic outlet control

Another example uses delay function to switching states of individual outputs after a certain time. Action still uses local function cycler which receives argument with number - how many action repeats we want. Save this action with trigger **Incoming CGI request** and run it by incoming CGI like *http://netio.ip/event*.

```
local function cycler(n)
  local function sw(z, state) devices.system.SetOut{output=z, value=state} end
  if n <= 0 then _G.cycler_active = false; return end
  if n % 2 == 1 then -- if n is odd number (modulo is used)
    sw(1, true); sw(2, true); sw(3, false); sw(4, false); -- output actions
  else
    sw(1, false); sw(2, false); sw(3, true); sw(4, true); -- output actions
  end
  delay(10, function() cycler(n-1) end)
  -- delay between on/off states in seconds
end

if not _G.cycler_active then
  _G.cycler_active = true
  cycler(5) -- how many times
end
```

Actions to control outlets based on the availability of Bluetooth devices

This example demonstrates the use of the availability of the BT device to control the outlet. If BT device appears within range NETIO4 local `returnState` function returns **true** value and selected outlet is switched on. Conversely, if the BT device disappears from the range NETIO4, `returnState` function returns **false** value and the outlet is switcheds off. Action requires the BT device called **sensorboard** (change as needed) added and paired. Trigger set to **System variables updated** and save this action.

```
local function returnState()
  -- stores actual connection state of the BT device named "sensorboard"
  local actState=devices.sensorboard.connected;
  if prevState == nil then prevState = false; end;
  -- logf("actState=%s", tostring(actState)); -- debug only
  -- logf("prevState=%s", tostring(prevState)); -- debug only
  if actState == true and prevState == false then -- actual state connected, previous state
 unreachable
    retState = true; -- output should be ON
  elseif actState == false and prevState == true then -- actual state unreachable, previous
 state connected
    retState = false; -- output should be OFF
  else
    retState = nil; -- both states are still the same
  end
  prevState = actState; -- stores actual state as previous
  -- logf("retState=%s", tostring(retState)); -- debug only
  return retState;
end

-- Main program
local state = returnState()
if state ~= nil then
  devices.system.SetOut{output=1, value=state}; --change number of controlled port here
end
```

Conclusion

The manufacturer bears no responsibility for any technical or printing errors and reserves the right to make any changes in the product and in this user manual without prior notice. Any such changes will be announced via the manufacturer's website www.koukaam.se.

The manufacturer does not provide warranties of any kind whatsoever with regard to any information given in this user manual or any derived warranties regarding product saleability or fitness for a specific purpose.

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We believe that you will be satisfied with our product. In case of any questions or comments relating to the functionality of the NETIO product, please do not hesitate to contact us.

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Declaration of Conformity

Bulgarian Български	Снастоящето, Koukaam a.s. декларира, че това безжично устройство е в съответствие със съществените изисквания и другите приложими разпоредби на Директива 1999/5/EC.
Czech Česky	Koukaam a.s. tímto prohlašuje, že tento Radio LAN device je ve shodě se základními požadavky a dalšími příslušnými ustanoveními směrnice 1999/5/ES.
Danish Dansk	Undertegnede Koukaam a.s. erklærer herved, at følgende udstyr Radio LAN device overholder de væsentlige krav og øvrige relevante krav i direktiv 1999/5/EF
Dutch Nederlands	Hierbij verklaart Koukaam a.s. dat het toestel Radio LAN device in overeenstemming is met de essentiële eisen en de andere relevante bepalingen van richtlijn 1999/5/EG Bij deze Koukaam a.s. dat deze Radio LAN device voldoet aan de essentiële eisen en aan de overige relevante bepalingen van Richtlijn 1999/5/EC.
English	Hereby, Koukaam a.s., declares that this Radio LAN device is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
Estonian Eesti	Käesolevaga kinnitab Koukaam a.s. seadme Radio LAN device vastavust direktiivi 1999/5/EÜ põhinõuetele ja nimetatud direktiivist tulenevatele teistele asjakohastele sätetele.
Finnish Suomi	Valmistaja Koukaam a.s. vakuuttaa täten että Radio LAN device tyyppinen laite on direktiivin 1999/5/EY oleellisten vaatimusten ja sitä koskevien direktiivin muiden ehtojen mukainen.
French Français	Par la présente Koukaam a.s. déclare que l'appareil Radio LAN device est conforme aux exigences essentielles et aux autres dispositions pertinentes de la directive 1999/5/CE
German Deutsch	Hiermit erklärt Koukaam a.s., dass sich dieser/diese/dieses Radio LAN device in Übereinstimmung mit den grundlegenden Anforderungen und den anderen relevanten Vorschriften der Richtlinie 1999/5/EG befindet". (BMWi) Hiermit erklärt Koukaam a.s. die Übereinstimmung des Gerätes Radio LAN device mit den grundlegenden Anforderungen und den anderen relevanten Festlegungen der Richtlinie 1999/5/EG. (Wien)
Greek Ελληνική	με την παρουσα Koukaam a.s. δηλωνει οτι radio LAN device συμμορφωνεται προσ τισ ουσιωδεισ απαιτησεισ και τισ λοιπεσ σχετικεσ διαταξεισ τησ οδηγιασ 1999/5/εκ.
Hungarian Magyar	Alulírott, Koukaam a.s. nyilatkozom, hogy a Radio LAN device megfelel a vonatkozó alapvetõ követelményeknek és az 1999/5/EC irányelv egyéb elõírásainak.
Italian Italiano	Con la presente Koukaam a.s. dichiara che questo Radio LAN device è conforme ai requisiti essenziali ed alle altre disposizioni pertinenti stabilite dalla direttiva 1999/5/CE.
Latvian Latviski	Ar šo Koukaam a.s. deklarē, ka Radio LAN device atbilst Direktīvas 1999/5/EK būtiskajām prasībām un citiem ar to saistītajiem noteikumiem.
Lithuanian Lietuvių	Šiuo Koukaam a.s. deklaruoja, kad šis Radio LAN device atitinka esminius reikalavimus ir kitas 1999/5/EB Direktyvos nuostatas.
Maltese Malti	Hawnhekk, Koukaam a.s., jiddikjara li dan Radio LAN device jikkonforma mal-ħtiġijiet essenzjali u ma provvedimenti oħrajn relevanti li hemm fid-Dirrettiva 1999/5/EC.
Polish Polski	Niniejszym Koukaam a.s. oświadcza, że Radio LAN device jest zgodny z zasadniczymi wymogami oraz pozostałymi stosownymi postanowieniami Dyrektywy 1999/5/EC.
Portuguese Português	Koukaam a.s. declara que este Radio LAN device está conforme com os requisitos essenciais e outras disposições da Directiva 1999/5/CE.
Romanian Romană	Koukaam a.s. declară că acest dispozitiv fără fir respectă cerinţele esenţiale precum şi alte dispoziţii relevante ale Directivei 1999/5/EC.
Slovak Slovensky	Koukaam a.s. týmto vyhlasuje, že Radio LAN device spĺňa základné požiadavky a všetky príslušné ustanovenia Smernice 1999/5/ES.
Slovenian Slovensko	Koukaam a.s. izjavlja, da je ta radio LAN device v skladu z bistvenimi zahtevami in ostalimi relevantnimi določili direktive 1999/5/ES.
Spanish Español	Por medio de la presente Koukaam a.s. declara que el Radio LAN device cumple con los requisitos esenciales y cualesquiera otras disposiciones aplicables o exigibles de la Directiva 1999/5/CE
Swedish Svenska	Härmed intygar Koukaam a.s. att denna Radio LAN device står I överensstämmelse med de väsentliga egenskapskrav och övriga relevanta bestämmelser som framgår av direktiv 1999/5/EG.
Turkish Turk	Koukaam a.s. bu kablosuz cihazın temel gereksinimleri ve 1999/5/EC yonergesindeki ilgili koşulları karşıladığını beyan eder.