Boutronic

SNI

Manual

Versie 4.0a

9-8-2024

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Manual: *SNI20240809 – v4.0*

SNI

The SNI creates a link between your PC and the Boutronic CAN-bus. This way you can view all your devices in one overview with the Boutronic Studio 3. The SNI enables an easy way to change settings and sharing of information between the products. The SNI has multiple functions which are explained in this document.

The SNI connects you via the CAN-bus, with all present Boutronic devices, as described in chapter 'Boutronic CAN-bus Network'. The connection between the SNI and the PC can be made in two ways:

1. Via the computer network;
2. Via the Boutronic USB dongle.

With the Boutronic Studio 3, you can add the SNI to the studio (Devices -> Device settings -> left side ***Add SNI's***).

After the SNI has been added, all the Boutronic devices can be added (Devices -> Device settings -> right side ***Add devices***). All devices that are connected to the CAN-bus will be visible in this list. After the devices have been added, they can be approached.

Boutronic Studio 3

It's possible to change the settings of the SNI with the Boutronic Studio 3. The Studio can be downloaded from www.boutronic.nl.

Liability and warranty

Every SNI is checked before shipping for correct operation.
Therefor Boutronic has a warranty period of 1 year.

The warranty expires if:

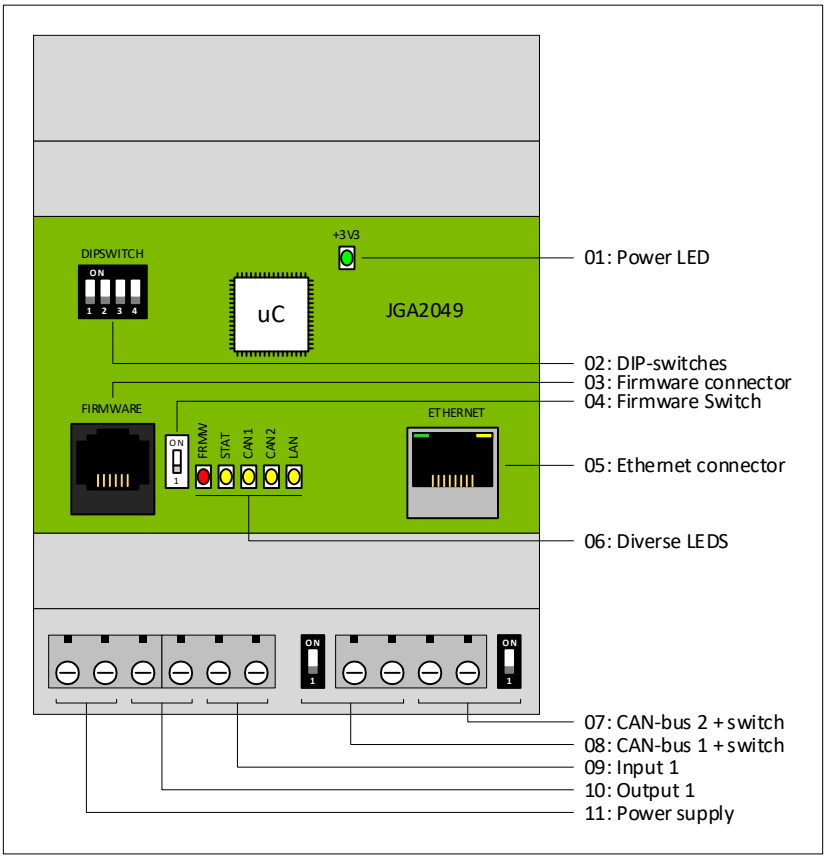
- The defect is caused by gross negligence or by improper installation;
- Repairs and/or modification to the SNI have been made without permission from Boutronic.

Boutronic is in no way liable for damage caused as a direct or indirect consequence by the use of the SNI.

Manual SNI®
August 2024
From software version 4.0a
www.boutronic.nl

Connections

The SNI is schematically shown in the figure below. The important parts will be described below. When the top lid of the SNI is removed, the following connectors become visible:



Part	Description
+3V3 LED	This LED indicates that the power supply is connected
DIP-switches	The switches can be used to activate or deactivate functions. (See chapter DIP-switches for more information)
Firmware connector	This connector is used to communicate via the Boutronic USB dongle.
Firmware DIP	The SNI4 can be put into the update firmware position with this switch. (Only use this after discussing with your supplier!)
LED's	The LED's indicates the status of the SNI4. (See chapter LED's for more information)
Ethernet connector	The SNI4 is connected to an ethernet network (computer network) using this connector.
CAN2 terminator	Via this switch you can terminate the CAN-bus [CAN2]. (The termination resistor will be placed between CAN-H and CAN-L when the switch is in the ON position)
CAN2 CAN-H	CAN-H connection of the CAN-bus [CAN2][1]
CAN2 CAN-L	CAN-L connection of the CAN-bus [CAN2][1]
CAN1 CAN-H	CAN-H connection of the CAN-bus [CAN1][1]
CAN1 CAN-L	CAN-L connection of the CAN-bus [CAN1][1]
CAN1 terminator	Via this switch you can terminate the CAN-bus [CAN1]. (The termination resistor will be placed between CAN-H and CAN-L when the switch is in the ON position)
IN1	Input (See chapter In-/Outputs for more information)
GND	Ground connection
OUT1	Output (See chapter In-/Outputs for more information)
+V OUT	Voltage output, the power supply is put through so it can be used externally.
GND	Ground connection
+V IN	Power supply connector. You need to connect the power supply to this connector.

1. See chapter Boutronic CAN-bus network for more information about the CAN-bus and how to connect it.

DIP-switches

The SNI contains a quadruple DIP switch. These switches can have functions. The function is determined by the state of the switch. When the switch is next to the number it will be (OFF) otherwise it will be (ON).

The DIP-switches have the following functions:

DIP	Function
DIP1	Return the IP-address back to automatic.
DIP2	No functie (reserved for future use)
DIP3	No functie (reserved for future use)
DIP4	No functie (reserved for future use)

DIP1: Resetting the IP-address

By switching DIP1 to ON, the IP-address of the SNI4 is returned to automatic (DHCP).

If DIP1 is switched back to OFF, the SNI4 will reboot itself.

LED's

The SNI4 has a couple status LED's. next to the LED is text that shows which function is linked to the LED.

<table>
<tr><th>LED</th><th>Function</th></tr>
<tr><td>+3V3</td><td>This LED will be turned on as long as the power supply is available.</td></tr>
<tr><td>FRMW</td><td>This LED will be turned on when the SNI4 is in the 'Firmware update' position.</td></tr>
<tr><td>STAT</td><td>This LED indicates the status of the SNI.

<table><tr><th>Status</th><th>Action</th></tr><tr><td>OK</td><td>LED off</td></tr><tr><td>Warning</td><td>LED blinks slowly</td></tr><tr><td>Alarm</td><td>LED blinks fast</td></tr></table></td></tr>
<tr><td>CAN1</td><td>This LED indicates the communication of CAN1.

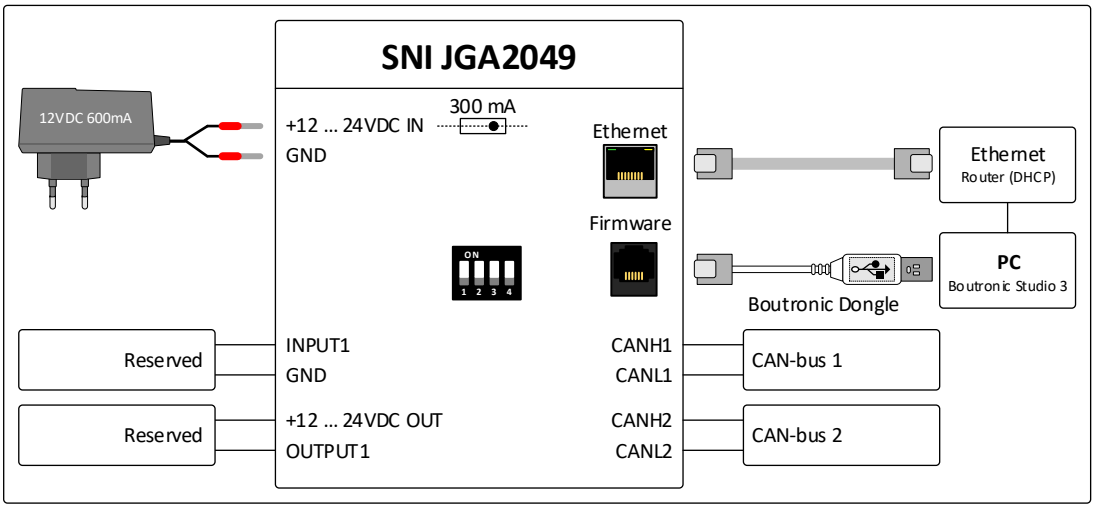
<table><tr><th>Status</th><th>Action</th></tr><tr><td>Communication</td><td>LED blinks fast</td></tr><tr><td>Recently had communication</td><td>LED on</td></tr><tr><td>Long period without communication</td><td>LED off</td></tr></table></td></tr>
<tr><td>CAN2</td><td>This LED indicates the communication of CAN2.

<table><tr><th>Status</th><th>Action</th></tr><tr><td>Communication</td><td>LED blinks fast</td></tr><tr><td>Recently had communication</td><td>LED on</td></tr><tr><td>Long period without communication</td><td>LED off</td></tr></table></td></tr>
<tr><td>LAN</td><td>This LED indicatest he communication via the Ethernet connector.
The LED will blink when a connection is made through one of the TCP connections.

<table><tr><th>Status</th><th>Action</th></tr><tr><td>Communication</td><td>LED blinks fast</td></tr><tr><td>Recently had communication</td><td>LED on</td></tr><tr><td>Long period without communication</td><td>LED off</td></tr></table></td></tr>
</table>

Diagram

In the following figure the connection diagram of the SNI is shown schematically.



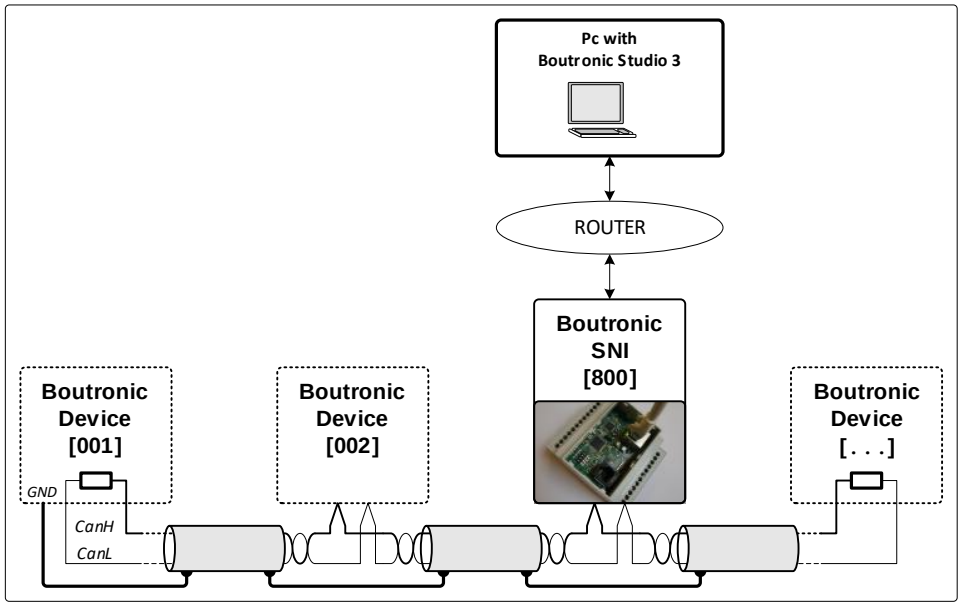
The SNI enables the connection between the PC and the Boutronic devices. The connection between the SNI and the Boutronic devices is realised using the CAN-bus. The connection between the SNI and the PC can be made in two ways:

1. Via the computer network;
2. Via the Boutronic USB dongle.

In most cases option 1 will be used.
Other settings of the SNI can be observed and changed after a connection is made between the SNI and the PC. An example is the IP-address.

Via computer network

To enable communication via the computer network, both the SNI and the PC have to be connected to the **same network**. It is desired to have a computer network with at least one router containing a DHCP-server. A connection using a computer network can be found in the figure below.

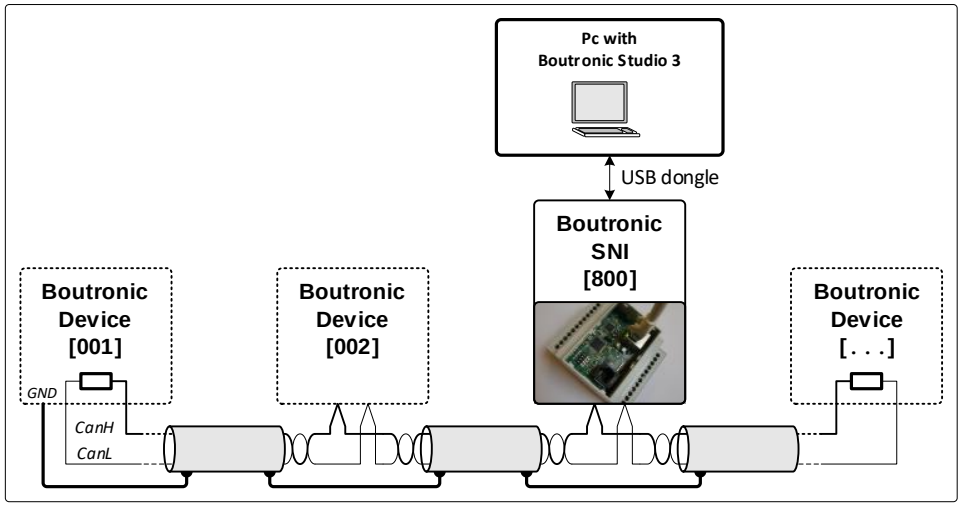


Via Boutronic USB dongle

To enable communication via the USB dongle, the SNI is connected to the PC with the Boutronic USB dongle. The USB dongle is connected to the SNI through the 'Firmware connector'. The other side of the USB dongle is connected to the PC.

Remark: The SNI4 automatically recognizes the connection. No settings have to be changed like with older versions of the SNI.

A CAN-bus network using the USB dongle is shown in the figure below.



Boutronic CAN-bus Network

Boutronic devices communicate via the Boutronic CAN-bus network. Through this network you can remotely manage all your settings with your PC. The CAN-bus network is also used by devices to share information with one another.

The minimum requirement for the connection is:

- at 100 kbps (standard speed) : 0,6 mm², twisted pair, max 500 mtr
- at 20 kbps (selectable) : 0,8 mm², twisted pair, max 1000 mtr

Note: All devices on the same CAN-bus have to use the same speed.

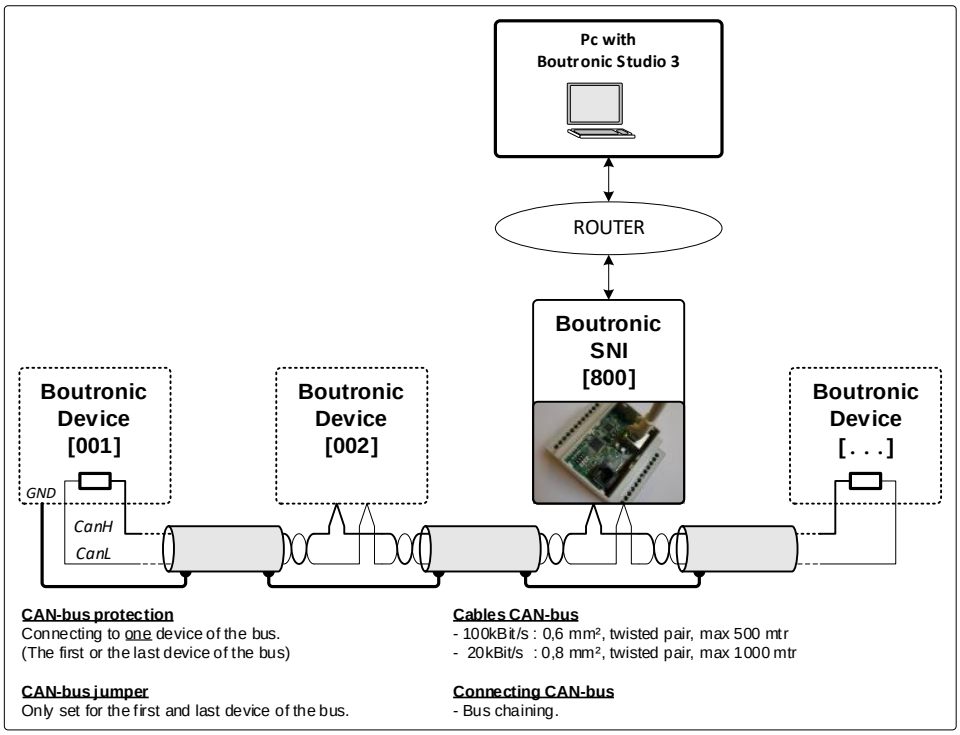
Remarks about the CAN-bus Network

The CAN-bus protection has to be connected to the GND from a single point.

The CAN-bus (and protection) have to be chained to each other, the bus cannot be branched off.

A CAN-bus does not circle around. The CAN-bus signal is terminated with a resistor at both ends (the resistor is placed with the CAN-bus jumper or switch on the PCB).

A Boutronic CAN-bus network is shown schematically in the figure below.



Hint: For more information you can download the CAN-bus installation manual from the website.

In-/Outputs

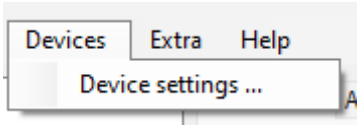
The SNI has one input and one output. Neither holds any functions and are reserved for future functionalities.

Adding a SNI to the Boutronic Studio 3

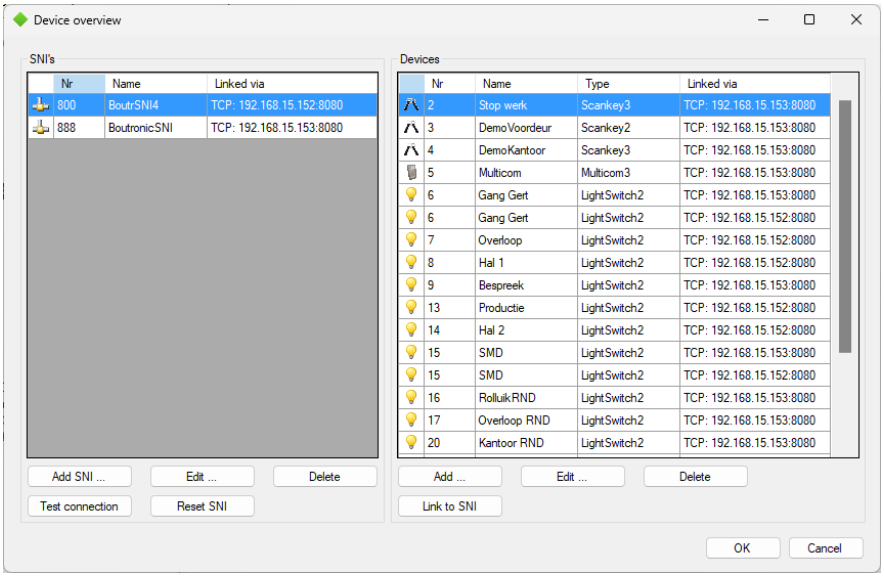
All steps on how to add a SNI will be covered in this chapter.

Searching for the SNI

After the new SNI has been installed, connected to the LAN and has been supplied with power. You can start searching for the new SNI. Start the Boutronic Studio 3 and click on ***Devices*** and then ***Device settings***.



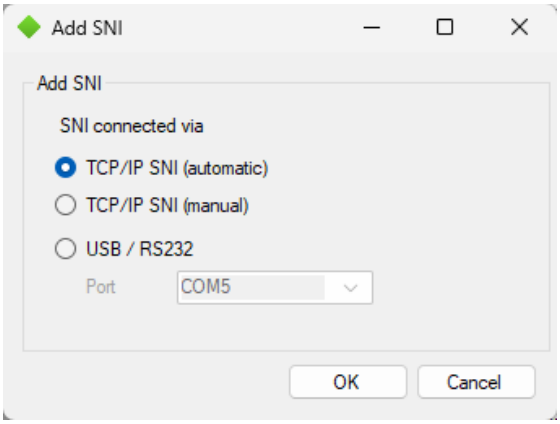
The following window will pop-up.



This window shows an overview of all currently installed Boutronic devices. The left side shows the installed SNI's and the right side show all installed devices.

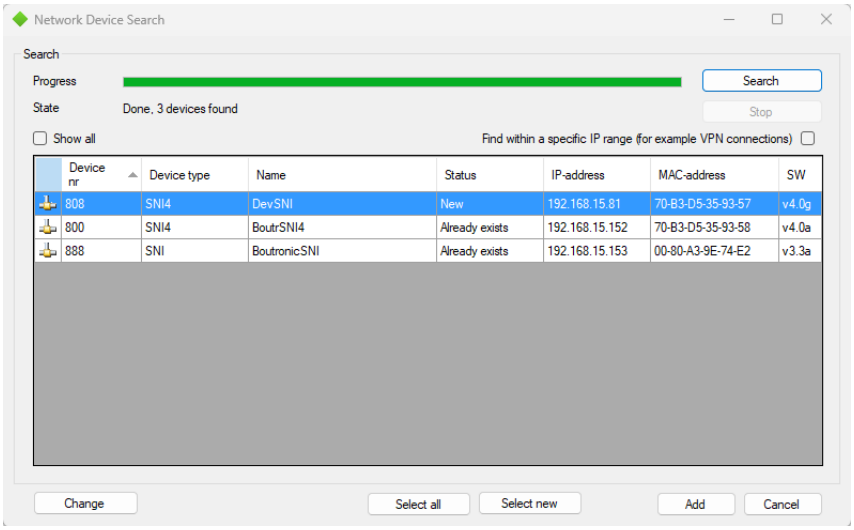
To add a new SNI, press the button ***Add SNI*** on the bottom left.

A new window pops up in which you can select how you want to add the SNI.



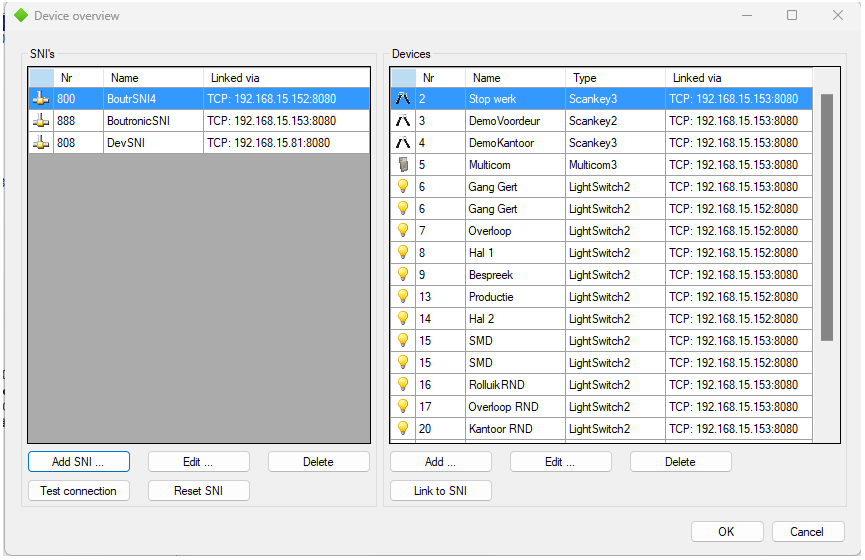
Select ***TCP/IP SNI (automatic)*** and click ***OK***. The Boutronic Studio 3 starts searching for all present Boutronic SNI's in the network.

After the Boutrnic Studio 3 has finished scanning. An overview of all detected SNI's will be shown.



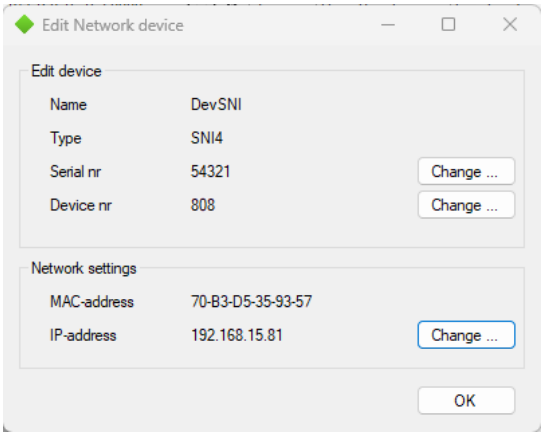
Select the desired SNI from the list and click on ***add*** to actually add the SNI. A
(hint: write down the MAC-address of the SNI beforehand as a way of identification)

After the SNI has been added it will appear in the list on the left of the screen.

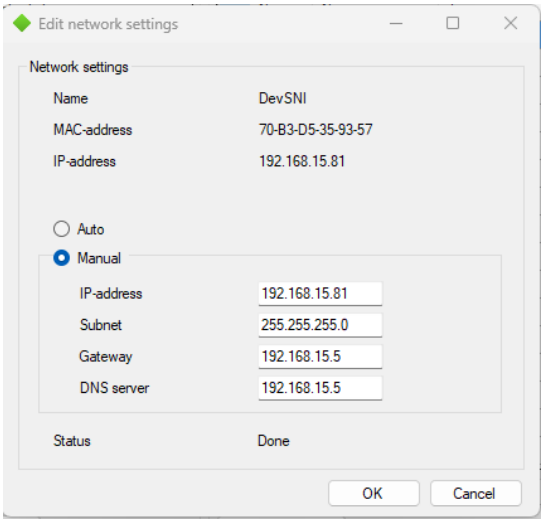


Changing network settings

If you want to change the IP-address, select the SNI and click on ***Edit*** under SNI overview. The following window will pop-up:



To change the network settings, click on ***Change*** under Network settings (next to IP-address).

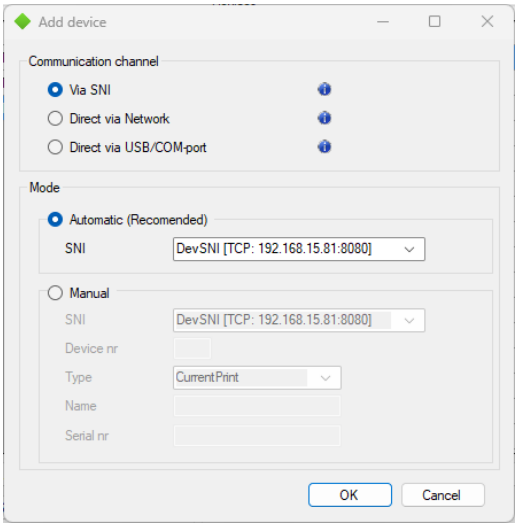


When it's desired to use a specific IP-address, select manual. It's now possible to enter all the network settings. After all the settings have been entered, press **OK**.

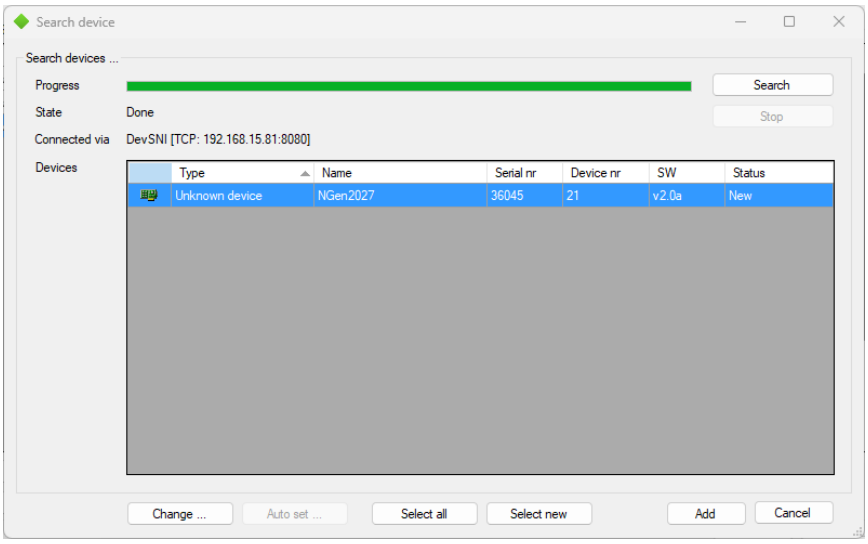
Linking devices to the SNI

To indicate that devices can be found through the SNI in the Boutronic Studio 3, you will have to link the present devices to the CAN-bus of the SNI. On the left hand side, you can select the SNI to be used for the linking.

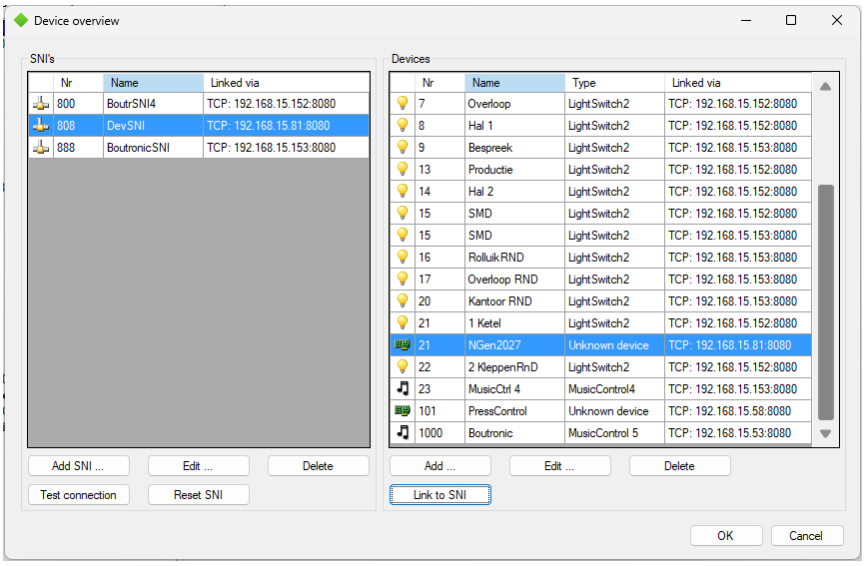
Next up, click **Add** on the right.



Click in the ***Communication*** **channel** on **Via SNI** and select **Automatic(recommended)** under ***Mode***. Select if required, the right SNI. Afterwards click on **OK**. The Boutronic Studio 3 will now start searching for all present devices on the CAN-bus linked to the SNI.



After the Boutrnonic Studio 3 has finished searching, all the devices that have to be linked can be selected. When everything has been selected press ***Add***.

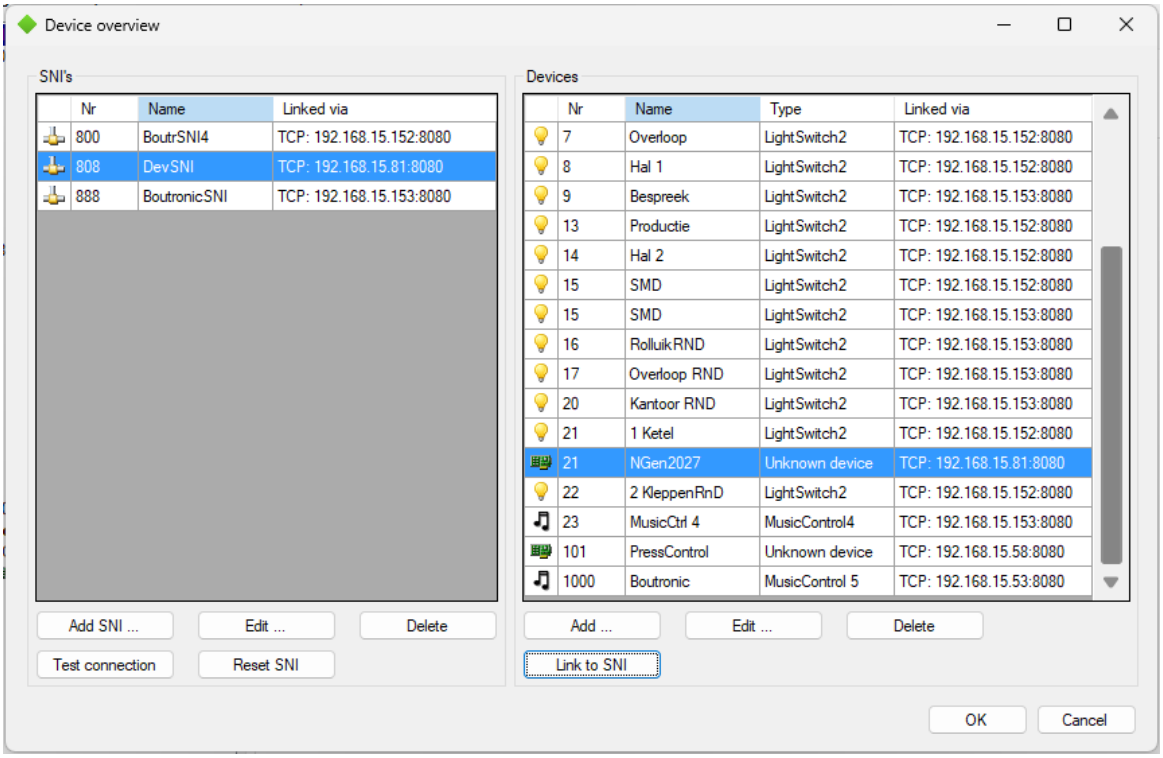


When you click the ***OK*** button in the Device Overview menu, the changes will be saved and all devices can be approached through the new SNI.

Linking devices to a new SNI replacing an old SNI

When an old SNI is replaced for a new SNI, you will have to link all present devices to this new SNI. This can be done in the menu Device Overview by selecting the new SNI on the left side. The next step is to select all the desired devices to be linked on the right. Finally, you press the button ***Link to SNI*** on the bottom right.

The Boutronic Studio 3 will ask for a confirmation. After confirming the action, all devices will be linked to the SNI.



When you click the ***OK*** button in the Device Overview menu, the network will be saved and all devices can be approached through the new SNI.

Boutronic Studio 3

If the SNI has been added to the Boutronic Studio 3, the following menus will be available. In this chapter each menu will be further explained.

Menu	Description
Device info	General informatie about the SNI
Errors	Current errors, reset errors
Smart filter	Smart filter settings
Connections	CAN-bus and ethernet connections
Network settings	Network settings; automatic IP-address (DHCP) of manual IP-address
Time	Time info and time settings
License code	Setting license codes
Backup	Backup creation and recovery
System	Factory and system settings

Device info

General

Basic information about the SNI4 is shown under general. The name of the SNI4 can be changed.

Name	Description	Standard
Name	The name of the SNI, 12 characters maximum.	SNI4

Network

The actual network settings are shown under network.

Load

The actual load of the CAN-bus, UART and ethernet connections are shown here.

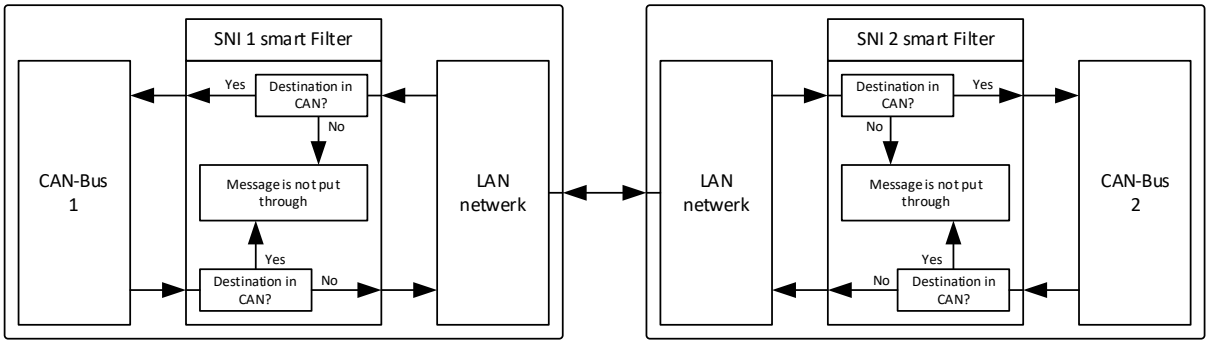
Errors

The current errors are shown here.

When errors are solved than they can be reset using the available reset button. Unresolved errors will remain or return.

Smart Filter

The Smart Filter manages which devices are connected to the SNI. The SNI does this by periodically checking which devices are present on the CAN-bus. The moment the SNI sees a device it will be added to the smart filter.



When after a while a device stops responding (device time-out), the Smart filter will indicate that the device can no longer be reached in its network.

Messages destined for this device are no longer sent to the CAN-bus.

When the smart filter is disabled, all messages will be sent through.

The list with known devices can be erased using the button ‘Erase’.

Settings

Several settings can be changed in this menu.

Name	Description	Standard
Activated	Show whether the Smart Filter is activated.	Active
Scan interval	The interval at which the SNI scans for devices in its CAN-bus network.	30 sec.
Device time-out	If a device does not respond within this time, then the smart filter will indicate that it can no longer be reached.	70 sec.

Connections

All settings for the connections are shown in this menu.

CAN-bus

The CAN-bus status, double detection and speed are show here. The CAN-bus speed and error delay can be set for each CAN-bus.

Note: The CAN-bus speed has to be the same for each device on the CAN-bus.

Settings

Name	Description	Standard
Speed	The speed of CAN-bus x	100 kbps
Error delay	The error delay of CAN-bus x in sec	60 sec.

TCP and UDP connections

The TCP and UDP connections can be set here.

If a Multiuser license is applied, a maximum of 3 TCP connections can be made at the same time. Otherwise, a maximum of 1 TCP connection can be made.

Settings

Name	Description	Standard
TCP connection x type	The type of TCP connection - No function - PC - Tunnel slave - Tunnel master	PC or No function
TCP connection x IP-address	The IP-address of the TCP connection	No IP-adres
UDP gate	The gate number of the UDP gate	8085
UDP interval	The interval of the UDP connection in ms	50 ms.

Tunnel

Both tunnel functions are only for customer specific applications and not for the standard Boutronic devices!

The tunnel connects 2 or more SNI's with each other through the computer network.

This can be used when devices connected through the CAN-bus have to communicate with each other. It might be desired when too many devices are connected to the CAN-bus network, the CAN-bus becomes too long or there is already a LAN connection available between two locations.

When the CAN-bus network becomes too long or too many devices are connected, then the CAN-bus can be lengthened via the computer network. This is called a tunnel

There are 2 different tunnels available in the SNI.

1. UDP [Plug and Play] tunnel;
2. TCP [1 on 1] tunnel.

UDP [Plug and Play] tunnel

The Plug and Play tunnel is a tunnel where you don't have to set any settings.

When a SNI sees a message that's not destined for one of the devices within its CAN-bus network*, it will send the message through using the Plug and Play tunnel. Other SNI's in the network will then receive the message and scan to determine if the message is meant for one of the devices within its own CAN-bus network*. If the device is present then the message will be sent to that CAN-bus.

* This is determined by the 'Smart Filter' of the SNI.

Note: This tunnel only works when the 'Smart Filter' is activated and the gate numbers are the same.

Settings

You can set via which UDP gate the messages will be sent.

The standard gate is set to 8085. You can change the setting in the menu.

Note: If you change this game, you will have to change the gate for every SNI in the same network.

Requirements

When you want to use this tunnel you have to be sure that the UDP network supports broadcast messages. Another requirement is that no other systems are communication on UDP gate 8085. The information of that network can be requested from the system provider.

TCP [1 on 1] tunnel

With a 1 on 1 tunnel the SNI is directly connected to another SNI.

This tunnel relays messages from both CAN-busses.

Settings

1. Both SNI's have to be set to static IP-address (see chapter Network settings);
2. SNI 1 set as ***tunnel master;***
3. SNI 2 set as ***tunnel slave;***
4. Write the settings to the devices;
5. Devices that have to communicate via the tunnel have to be set to ***Connect via tunnel.***

When to use this tunnel?

It is advised to use this tunnel when you want to connect to a SNI that is not in the current network or in case that a SNI has to be reached via a VPN connection. (Usually, the UDP broadcast is not supported, therefor the Plug and Play tunnel doesn't work)

Network Settings

Network info

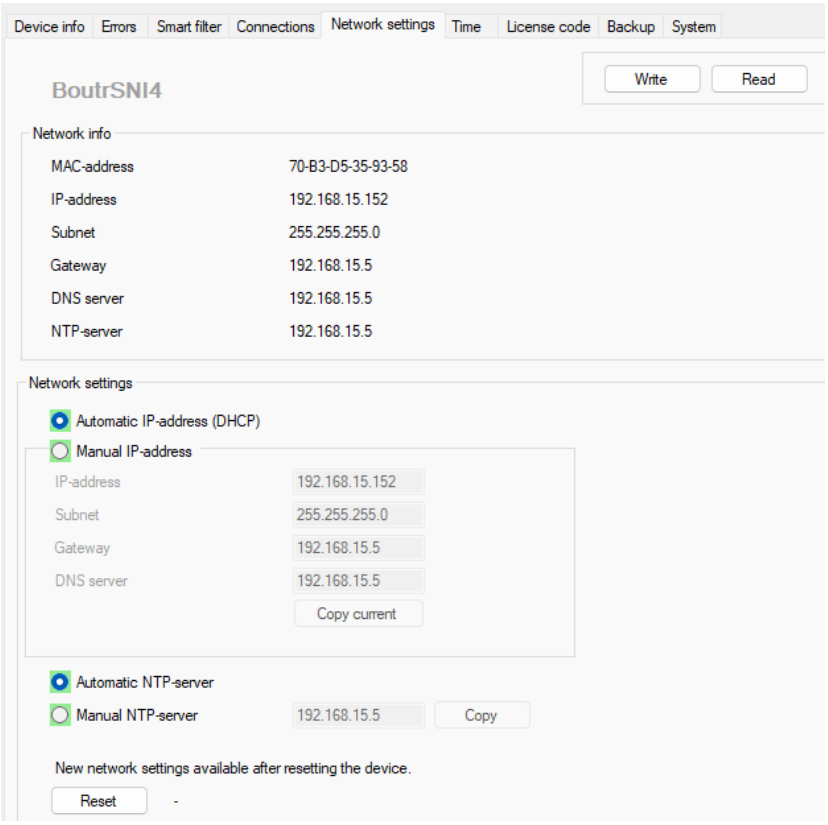
All current network settings are shown beneath ‘Network info’.

Network Settings

If the SNI is connected to the TCP/IP network, it needs an IP-address. This address can be set in two ways:

1. Automatically (DHCP) with a DHCP-server in the network
2. Manually

The standard setting is for the SNI to receive it’s address automatically.



Remark: To enter settings, a connection between the Studio and the SNI has to be made, see chapter connections for information.

Automatic (DHCP)

If a connection between the SNI and the LAN-network has been made, the SNI will ask for an IP-address from the DHCP-server. After the SNI has received an IP-address it can then be found with the Boutronic Studio 3.

Note: When the router restarts it might distribute new IP-addresses. This means the SNI also gets a new IP-address. The new address also has to be changed in the Boutronic Studio. To prevent this from happening it is advised to manually set the IP-address for the SNI.

Manually

By manually setting an IP-address, the mechanic (in combination with the IT) determine with which IP-address the SNI communicates. To prevent IP-conflict, each IP-address can only be distributed ones.

To manually set the IP-address, a connection has to be made with the SNI. As previously explained, this can be done in two ways: via the TCP/IP network or with the Boutronic USB dongle.

NOTE: If the SNI was already communication via TCP/IP before the IP-change, then the connection will be lost after setting the new IP. The 'old' IP-address has to be change to the 'new' IP-address.
Device overview -> select the SNI on the left and press 'change …'.

Settings

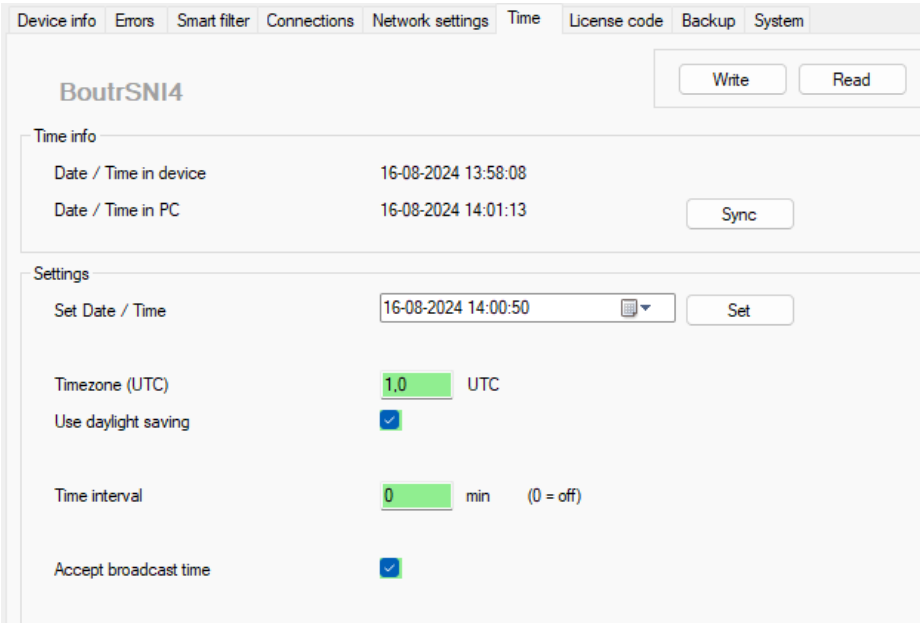
Name	Description	Standard
Automatic IP-address (DHCP)	If this setting is active, the SNI expects an IP-address from the router. No extra settings have to be set.	Active
Manual IP-address	If this function is active, the IP-settings have to be manually entered. This has to be done for the 4 settings below:	Inactive
IP-address	Manual IP-address	-
Subnet	Manual Subnet	-
Gateway	Manual Gateway	-
DNS-server	Manual DNS-server	-
Copy current	Copy the settings from automatic IP-address (DHCP) to manual IP-address.	-
Automatic NTP-server	If this function is active then the NTP-server will be automatically chosen.	Active
Manual NTP-server	If this function is active than the NTP-server has to be manually entered. Enter the IP-address of the NTP-server here.	Inactive
Reset	A button to reset the SNI, this has to be done to use the new network settings.	-

Time

The SNI synchronises its current internal time every 15 minutes with the time of the PC or with a timeserver. For the last option the SNI needs to have a connection with the timeserver. When both times are used (PC time and internet time), the PC will always have the priority. Communication has to be possible between the Boutronic Studio 3 and the SNI to synchronise the time.

In the menu Time, several settings can be changed:

Name	Description	Standard
Date / Time in device	This is the current date and time of the SNI.	-
Date / Time in PC	This is the current date and time of the PC.	-
Sync. Button	Button to synchronise the time of the PC and the device.	-
Set Date / Time	Used to manually set the date and time.	
Time zone (UTC)	Used to set the UTC time zone of the device.	1,0 UTC
Use daylight saving	Automatic conversion to the summer/wintertime.	Active
Time interval	Time interval at which the Boutronic devices on the CAN-bus are synchronised with the time of the SNI.	0 min. (Off)
Accept broadcast time	Accept the time received by the broadcast as the new time. (One product is time transmitter on the network)	Active



To reach the timeserver, the timeserver has to be set in the network settings.

It can be automatically received via the DHCP server. It's also possible to manually set an IP-address of the timeserver.

Note: The timeserver has to support the NTP (Network Time Protocol). The SNI4 supports the NTP version 3 and 4.

Daylight saving

The SNI4 can automatically adjust it's time to summer/wintertime.

By using the setting "Use daylight saving", the option can be activated or deactivated.

To summertime

On the last Sunday of March at 02.00, the clock will be advanced by one hour. The new time will now become 03.00.

To wintertime

On the last Sunday of October at 03.00, the clock will be reduced by one hour. The new time will now become 02.00.

Sharing the time

The SNI4 can share it's time through the CAN-bus network. The interval at which the time is shared can be set using the setting "Time interval".

By setting the interval at 0 minutes, the time will not be shared.

Accepting broadcast time

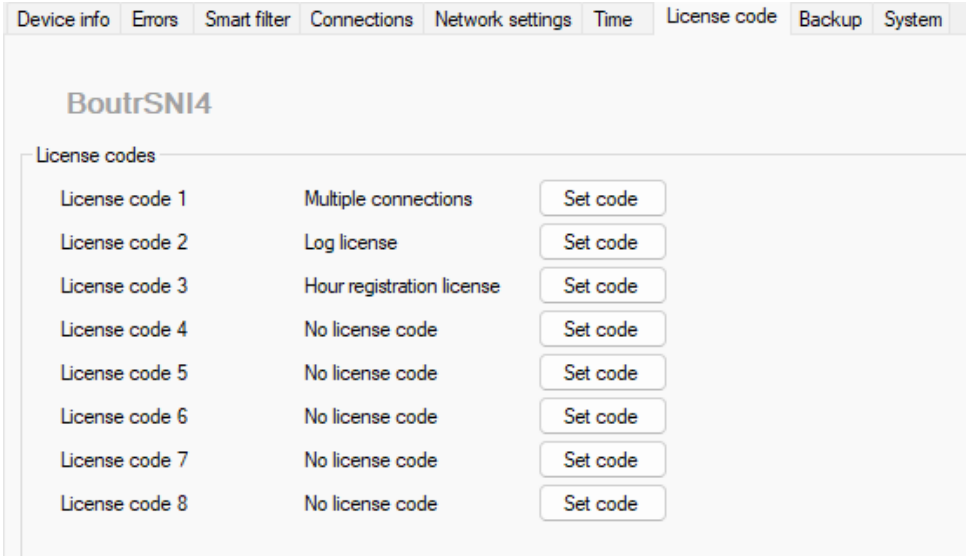
There are Boutronic devices that periodically share their time through the CAN-bus network. This is done using a broadcast message (a message to everybody). To accept their time as the new time, you can use the setting "Accept broadcast time".

License codes

Each SNI in combination with the Boutronic Studio 3 contains multiple extra possibilities/functions which can be activated using a license. Examples of these functions are:

- A logging license
- Multiple connections
- App license
- Hour registration license

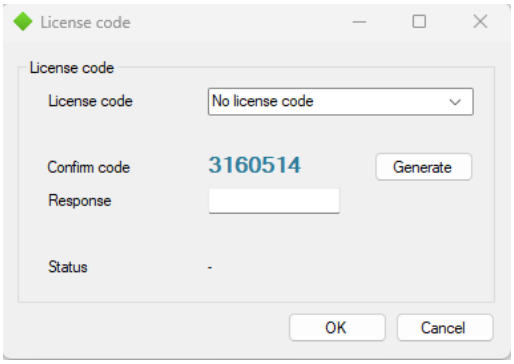
For more information about the licenses, you can look in the Boutronic product catalogue.



Adding a license code

When you want to add a license, you'll have to call your supplier. During the call, you'll go to the Boutronic Studio 3 'license code' menu. When inside the menu, press the 'set code' button. A menu pops up in which you can select the desired license. After the desired license has been selected, the confirmation code has to be generated and forwarded to the supplier. The supplier will give a 'Response' which has to be entered. Afterward you can press the button 'OK' and the license will be added to the SNI.

Each license only has to be bought a single time and does not have to be renewed.

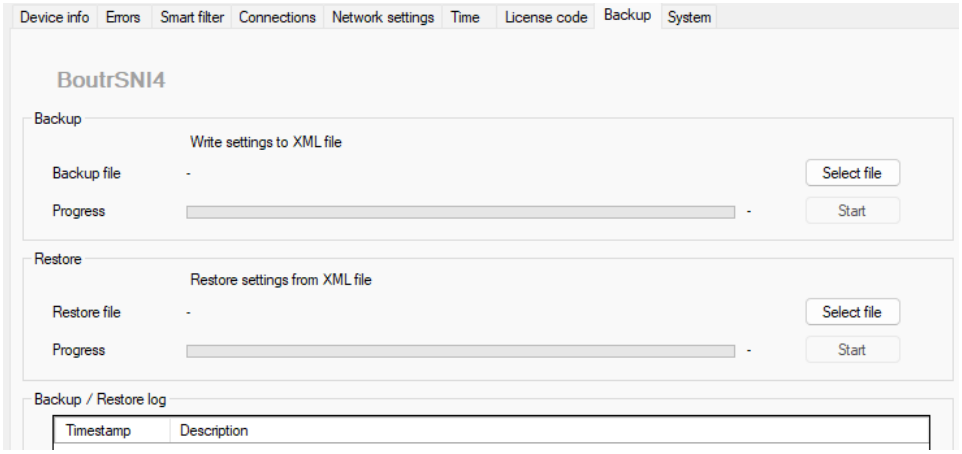


Backup

All settings can be saved into a backup file. The backup will be saved as a .xml file on the PC.

The settings can also be restored using the backup file in this menu. The backup file can be used to restore the settings in any SNI4.

NOTE: The device has to be connected in order to create or restore a backup

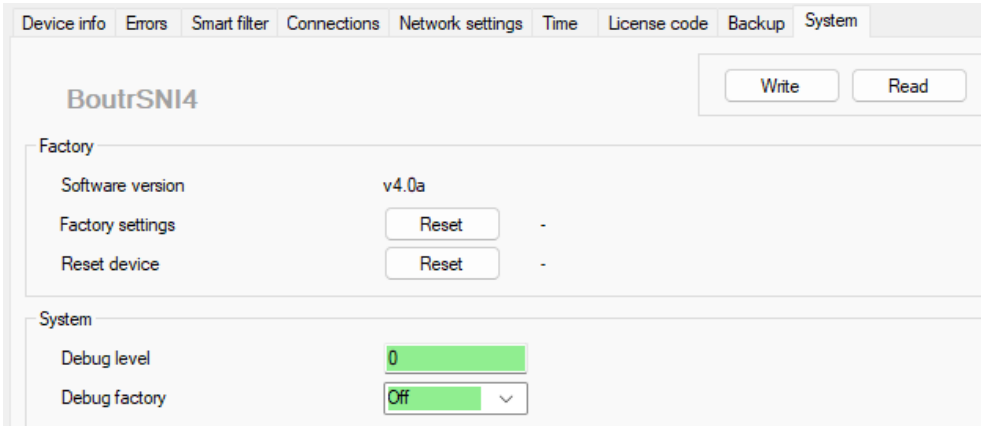


System

It is possible to revert the SNI4 back to its factory settings.

To put the factory settings back into the SNI4, press the button ‘Reset’. It’s also possible to restart the SNI by pressing the button ‘Reset’ next to ‘Reset device’.

The settings ‘Debug level’ and ‘Debug factory’ are used for factory purposes.



Technical specifications

General

Description	Value	Remark
Power supply	10 ... 30 VDC	Standard 12 VDC 600mA
Temperature	0°C … 70°C	
IP Protection	IP20	

Communication

Description	Value	Remark
UART	38400 BAUD, 8N1	
CAN-bus	20 ... 100 kbps (can be set)	Standard 100 kbps
LAN / Ethernet	10 of 100 Mbit/s (RJ45)	

I/O

Description	Value	Remark
Input 1	0,5 mA	Contact current (Drive to GND)
Output 1	100 mA	Switch current (Open collector output)

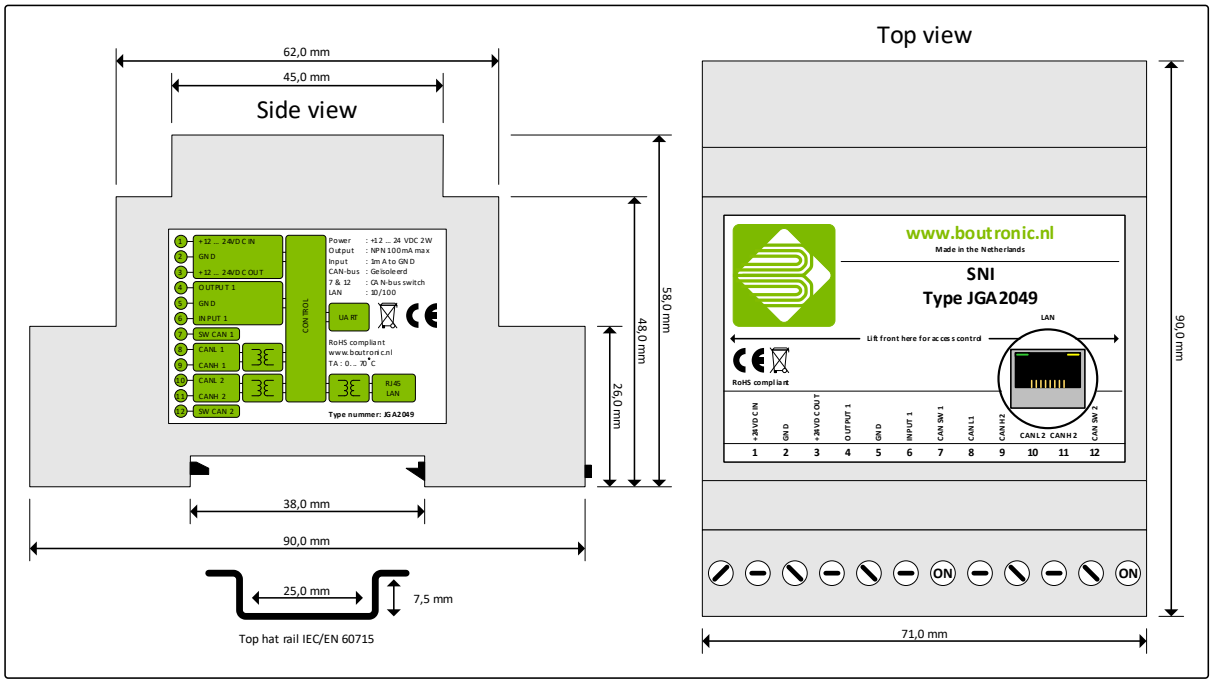
Switches

Description	Value	Remark
Firmware switch	Is used to put the SNI in the 'update firmware' position.	ON = Update firmware position OFF = Standard
CAN 1 switch	Is used to enable the resistor for CAN-bus 1.	ON = 120E OFF = Open
CAN 2 switch	Is used to enable the resistor for CAN-bus 2.	ON = 120E OFF = Open

Connection cables

Description	Value
CAN-bus cables	100 kBit/s : 0,6 mm², twisted pair, max 500 mtr
	20 kBit/s : 0,8 mm², twisted pair, max 1000 mtr

Measurements



Appendix A: Problems and solutions

Problem	Possible causes and solutions
The SNI can't be found while searching with the Boutronic Studio 3.	Most likely cause is lack of connection between the SNI and the PC. Check the connections of the SNI and the PC. Make sure both are using the same network connection.
A connection can no longer be made with the SNI and/or Boutronic products. A '!' appears behind the device name / device names on the left side.	Check to determine that the power supply for the SNI is correct. The green 3V3 LED should be lit up. Determine how the SNI is connected to the PC, via ethernet or via a USB/RS232 cable. Check the physical connection between the SNI and the PC. If the SNI is connected via ethernet: Check whether the current IP-address of the SNI is the same as the IP-address with which the SNI has been added. The IP-address is visible in the device overview menu. The network will be scanned after pressing 'Add SNI', is the SNI being found? Is the IP-address the same as the IP-address in the Boutronic Studio 3?