

# HGW-BWH

## Configuration

## Quick Guide



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## 1 HGW-BWH Configuration

This document explains the configuration of a HGW and BWH with the associated components. A suitable training video can be found here: [Initial startup of the cable-free HGW 1033 operating panel](#)

## 2 General Information

This document serves as the instructions for commissioning and connecting to LASAL CLASS 2.

Detailed information can be found in the following documentation:

- Connection Cables for Operating Devices
- Technical Manual HGW
- Technical Manual BWH
- HGW IP Configurator.xlsx (= Configuration file)
- Safety System Handbook

This and additional documents can be downloaded from our website or obtained through SIGMATEK Support ([www.sigmatek-automation.com](http://www.sigmatek-automation.com)).

## 3 Required Components

### 3.1 Hardware

- HGW & BWH
- 1 CPU
- 1 SAFETY CPU

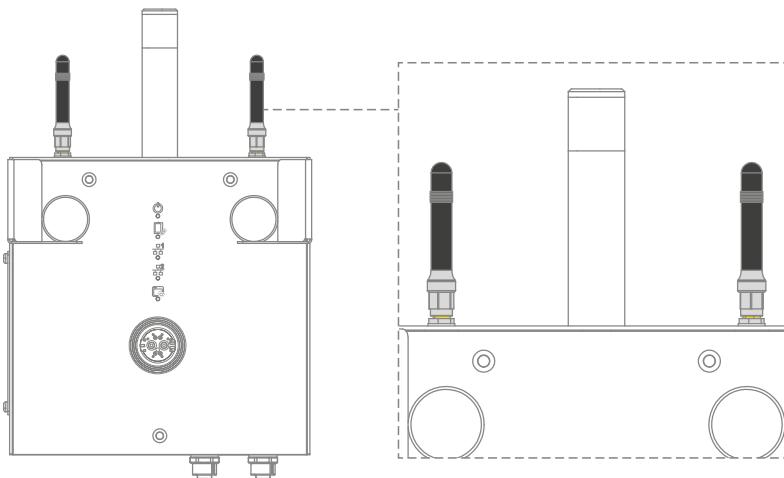
### 3.2 Software

- LASAL CLASS

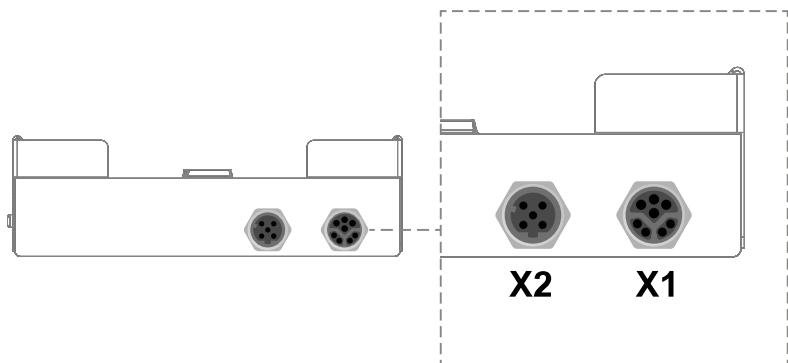
## 4 Hardware Configuration

### 4.1 BWH

- Unpack the BWH
- The antenna are pre-mounted and must tightened by hand. Otherwise unpack the antenna mount them and screw them down hand-tight. For SMA connectors, a special torque wrench with a maximum of 1 Nm is recommended.



- Connect the cable (available as an accessory) to X1: M12 Y-coded (right lower socket)



- Connect the open end of the cable to the +24 V supply.

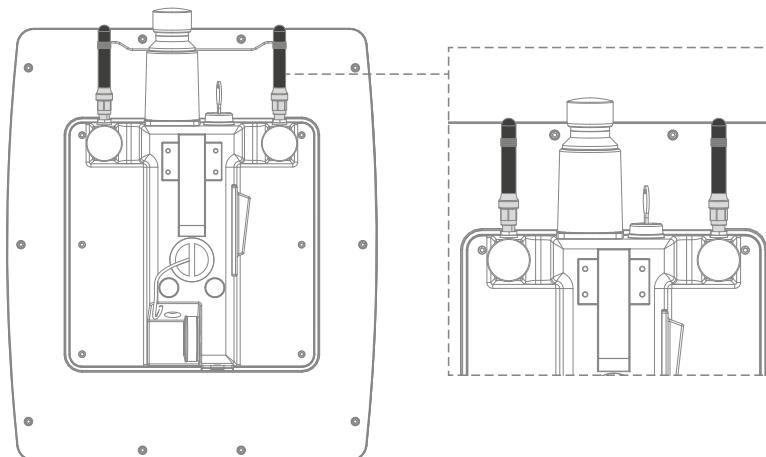
Wire color	Function
blue	VCC/+24 V
black	GND

- The LEDs on the BWH begin to light as soon as it is powered. The base station is now active.

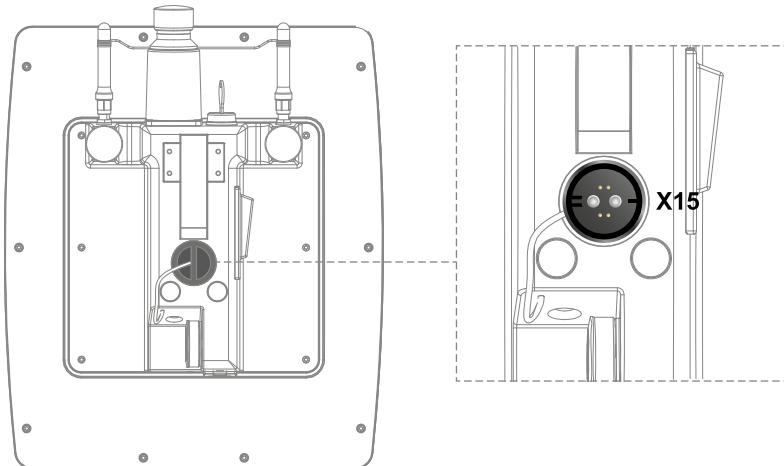
The next steps are described in chapter 5 Software Configuration.

## 4.2 HGW

- Unpack the HGW
- The antenna are pre-mounted and must tightened by hand. Otherwise unpack the antenna mount them and screw them down hand-tight. For SMA connectors, a special torque wrench with a maximum of 1 Nm is recommended.

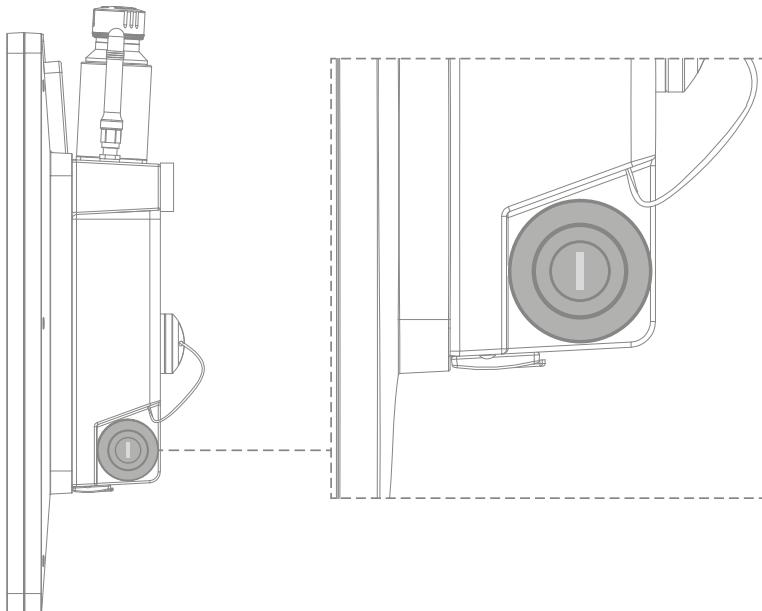


- Remove the protective cap from the rear magnet connector.



- Mount the HGW onto the active base station and wait for at least 5 seconds. During this time, battery data is exchanged and the battery is calibrated. To avoid interrupting this process, wait until the specified time has elapsed before removing the HGW from the base station. The transport mode is hereby ended.

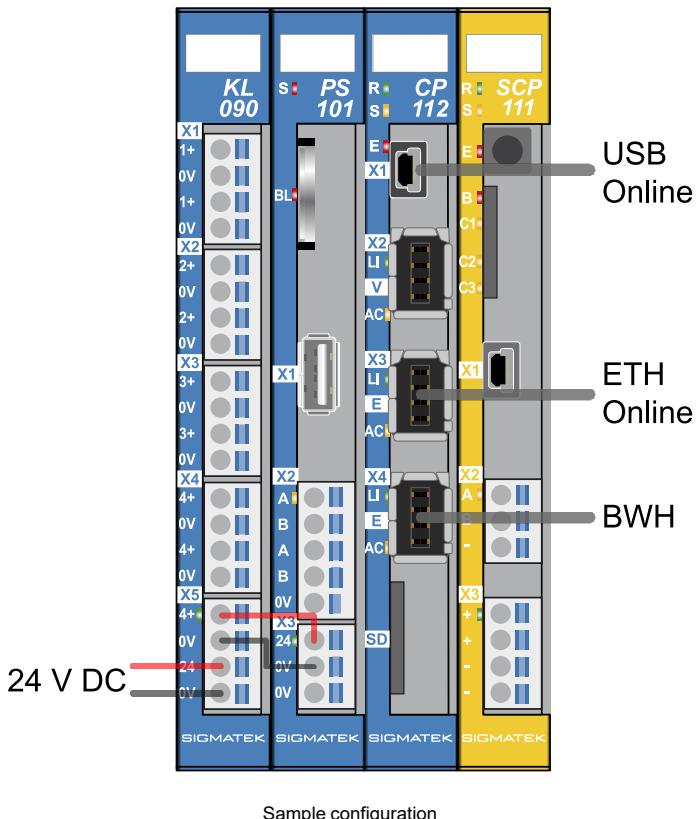
- If the HGW is charging, the On button blinks in the charging rhythm.



- After at least 5 seconds, the HGW can be turned on with a press of the On/off button.
- The HGW starts.

## 4.3 PLC

This description is based on the following example configuration.



## 5 Software Configuration

### 5.1 Create Connection to the Device

There are several options with which to connect the device via LASAL CLASS. In this document, the quickest method is described.

#### INFORMATION



Alternative connection and configuration options, as well as additional information can be found in the following document: [WLAN-Configuration](#)

#### 5.1.1 USB Cable

SIGMATEK uses USB-C sockets in the HGW and BWH product series. Connect an appropriate USB cable with the device to configure (HGW/BWH) and your computer.

#### INFORMATION



Under some circumstances, it may be necessary to install the required USB drivers for the SIGMATEK devices. If needed, contact SIGMATEK support.

After successful configuration, a new device is found in the device manager is found under "Connections" (COM & LPT) with label "Sigmatek PLC (COMx)". The port number assigned depends on your system.

#### 5.1.2 Network Cable

As a second option, it is also possible connect with the device using a network cable.

#### 5.1.3 WLAN Access Point

The PC can also be connected with the device (BWH, HGW) via WLAN.

On the PC, select the WLAN network with the corresponding SSID/serial number.

For more help, follow the steps in "WLAN Configuration".

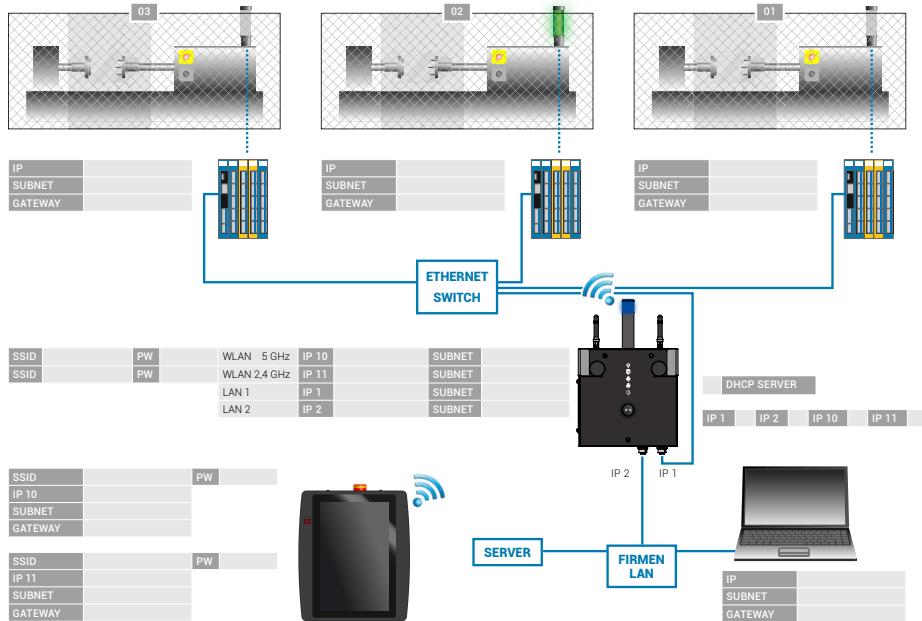
## 5.2 Software

- LASAL Machine Manager – Software and project management
- LASAL CLASS 2 – control programming
- LASAL SCREEN – visualization
- LASAL SAFETYDesigner – safety technology

## 5.3 Templates

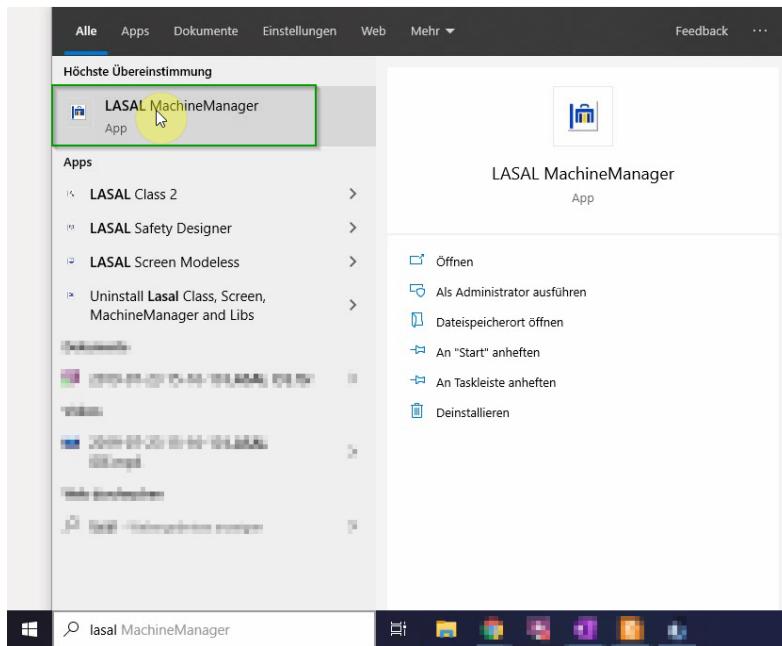
To make the setup comfortable, we will use the “HGW Template” provided in the Machine Manager.

## 5.4 Planning Help

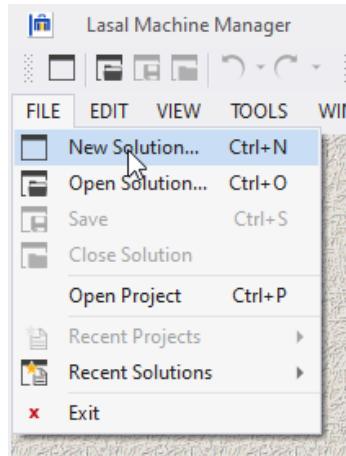


## 5.5 Loading the Project

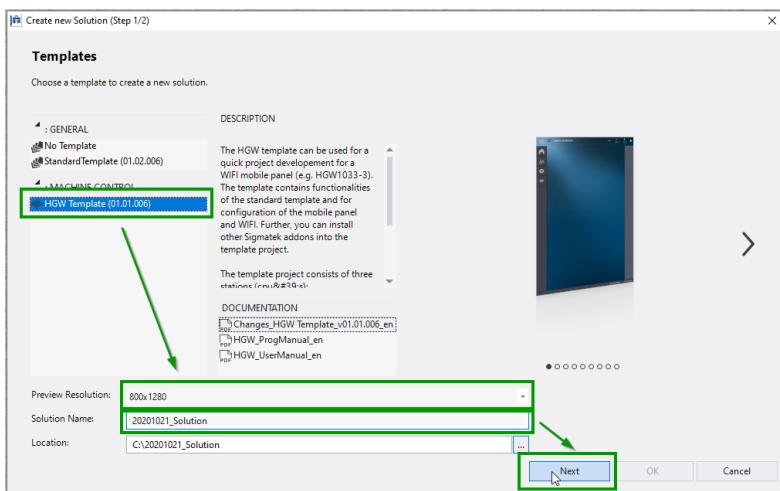
Start the LASAL Machine Manager.



In the Machine Manager, create a new solution.

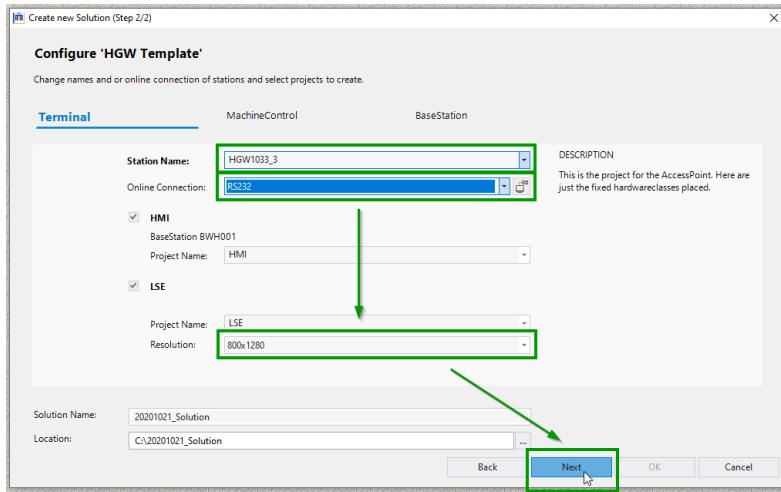


Select the HGW template.



Click on “Next” to continue.

Next, select the online connection and resolution.



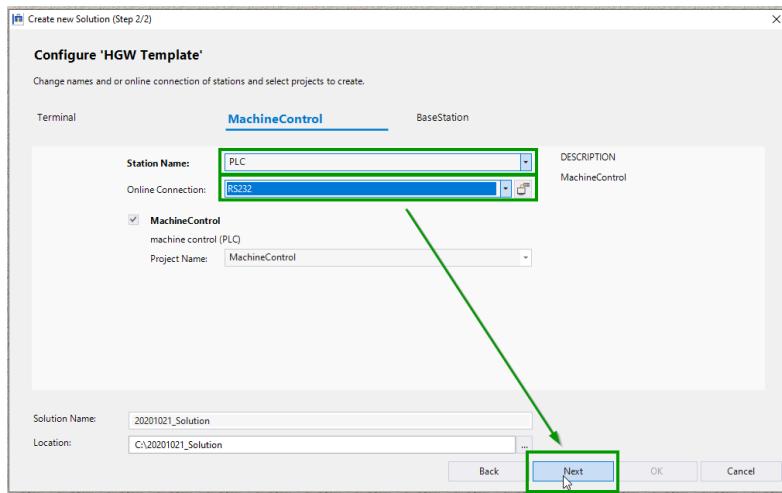
## INFORMATION



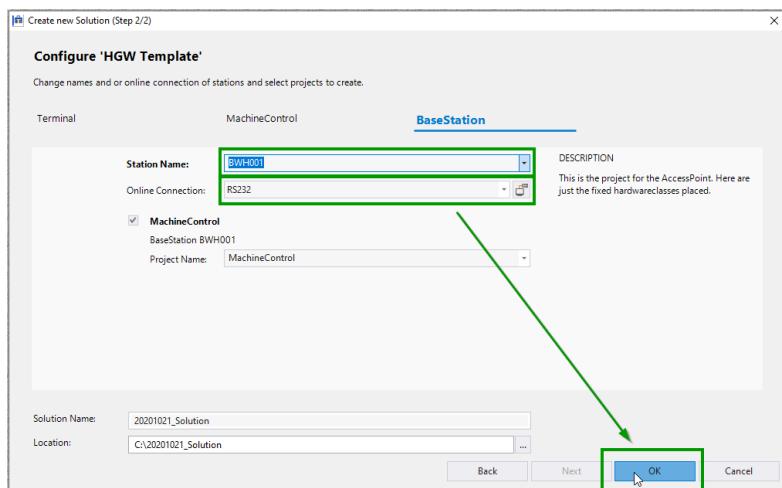
### Special characters

- Note that in the station name, no special characters are allowed.  
If special characters are used in the name, the “Next” button is not enabled.

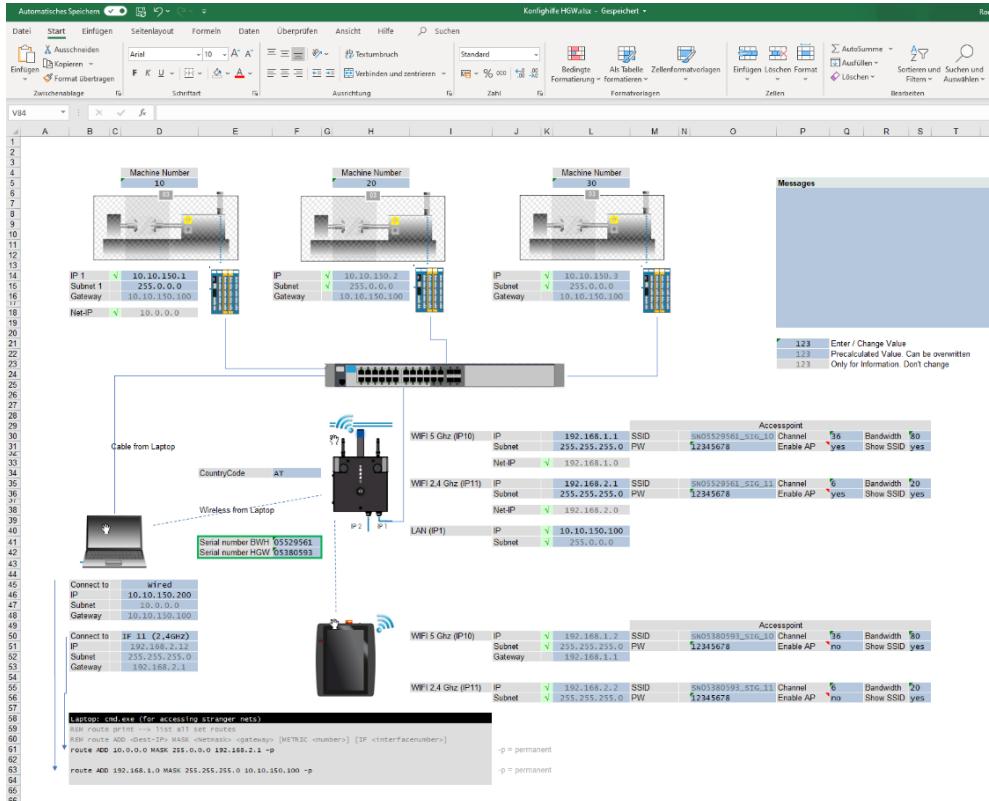
S-DIAS-PLC:



### 5.5.1 BWH Configuration



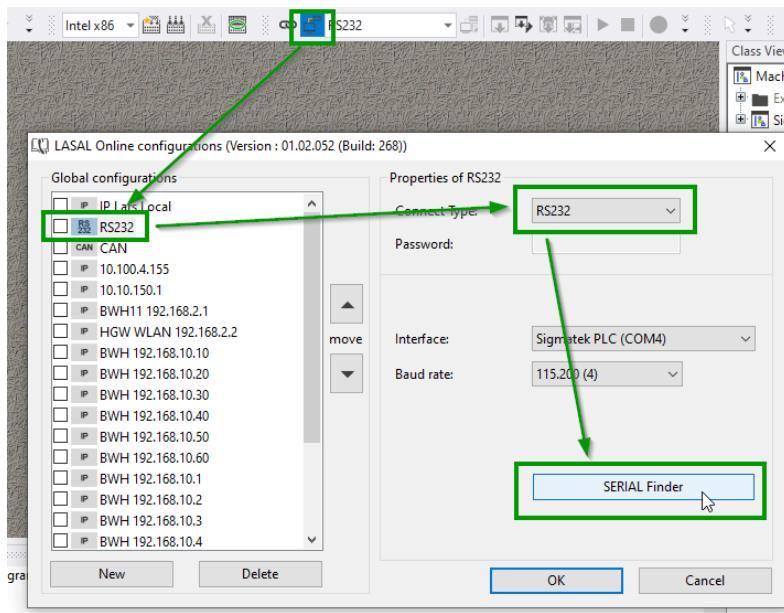
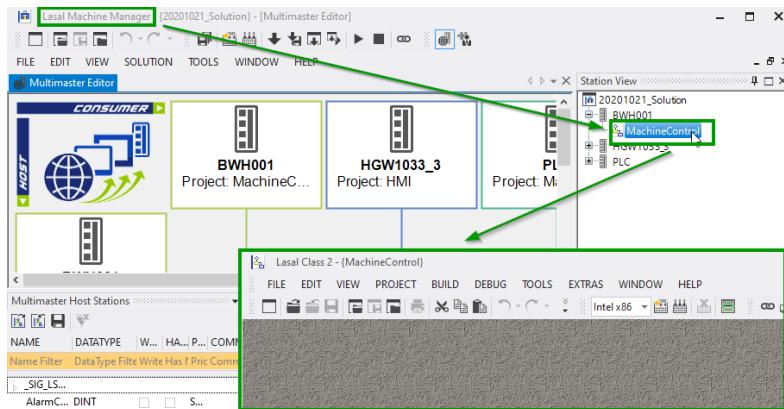
Create the network configuration using the HGW IP Configurator.xlsx.

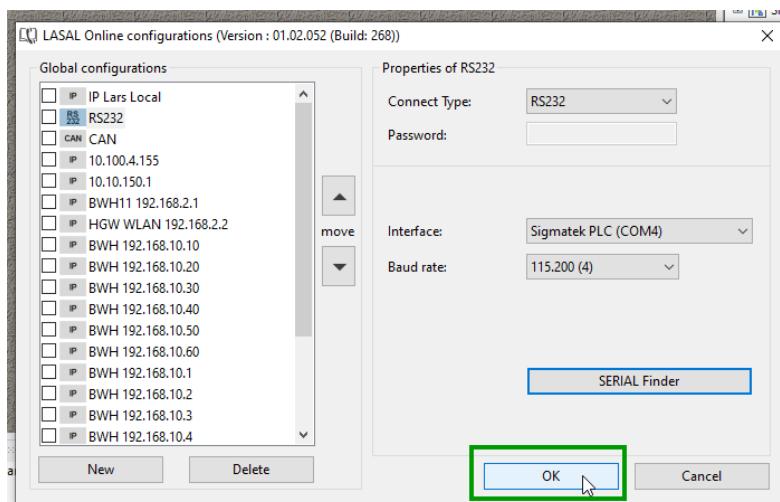
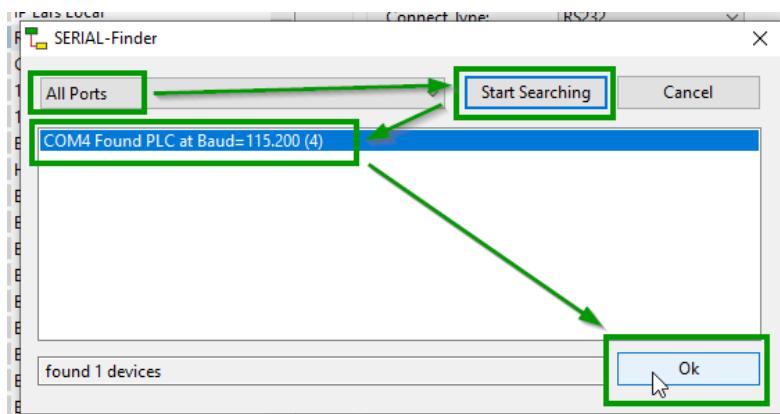


Normally, the suggested configuration can be used unchanged for a quick initial start-up. Only the serial number of your device (BWH, HGW) has to be entered. This is required since many settings, such as SSIDs are matched to it.

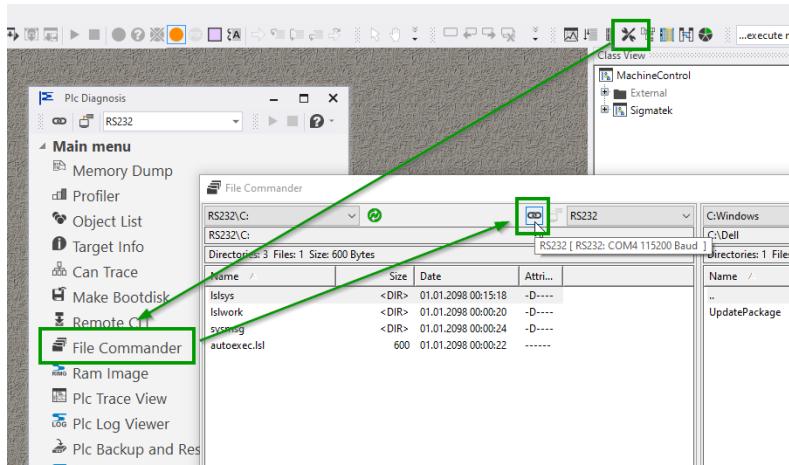
Connect the BWH with the computer via USB. After the template has been automatically created in the solution, open the BWH in the Station View (+) and with a double click on MachineControl LASAL CLASS 2.

Next, check the connection and if needed configure it as follows.

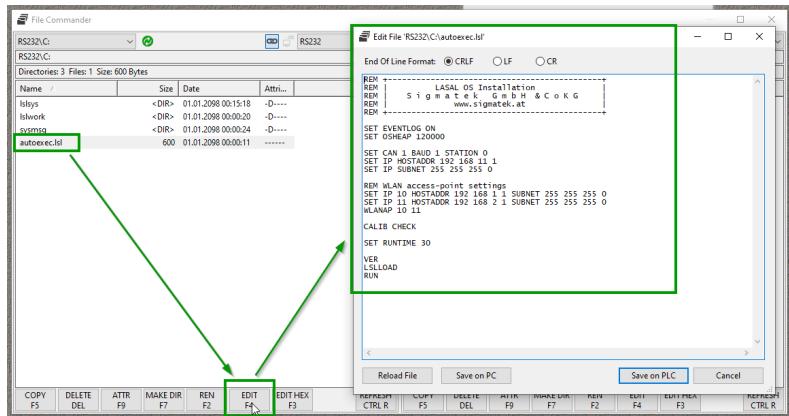




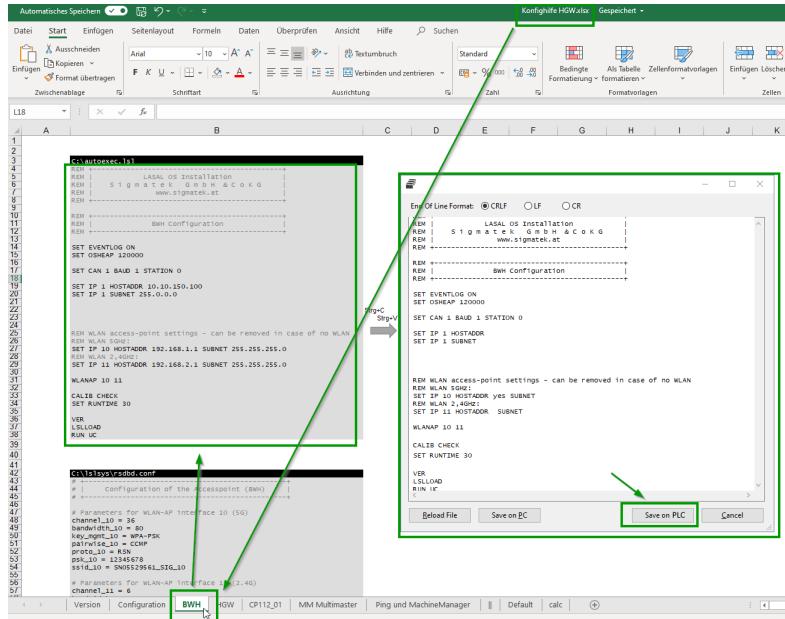
Using the file commander, connect to the BWH.



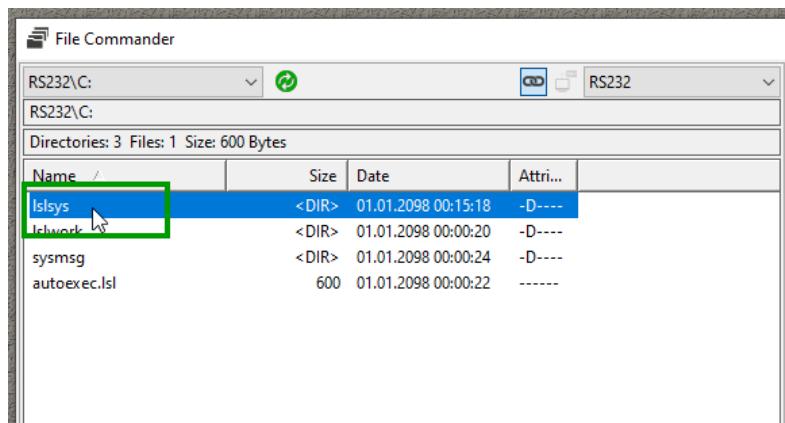
Select the autoexec.lsl file and open it using the F4 key.



Check the contents with the BWH tab in the HGW IP Configurator.xlsx and copy the content from the Config file to the autoexec.lsl file of the control. With "Save on PLC", save the contents to the control.



Copy the xls report contents to the PLC for the corresponding file as follows. Open the `lslsys` folder on the device.



Open rsdbd.conf with the F4 button.

```
C:\lslsys\rsbdbd.conf
# -----
# | Configuration of the Accesspoint (BWH) |
# +-----+
# Parameters for WLAN-AP interface 10 (5G)
channel_10 = 36
bandwidth_10 = 80
key_mgmt_10 = WPA-PSK
pairwise_10 = CCMP
proto_10 = RSN
psk_10 = 12345678
ssid_10 = SN05529561_SIG_10

# Parameters for WLAN-AP interface 11 (2.4G)
channel_11 = 6
bandwidth_11 = 20
key_mgmt_11 = WPA-PSK
pairwise_11 = CCMP
proto_11 = RSN
psk_11 = 12345678
ssid_11 = SN05529561_SIG_11

# General WLAN-AP parameters
country_code = AT
# ssid_invisible_10=0
# ssid_invisible_11=0
```



With C:\lslsys\wireless.conf and wireless2, follow the same process shown in the configuration file. Next, connect the PC with the HGW via USB cable.

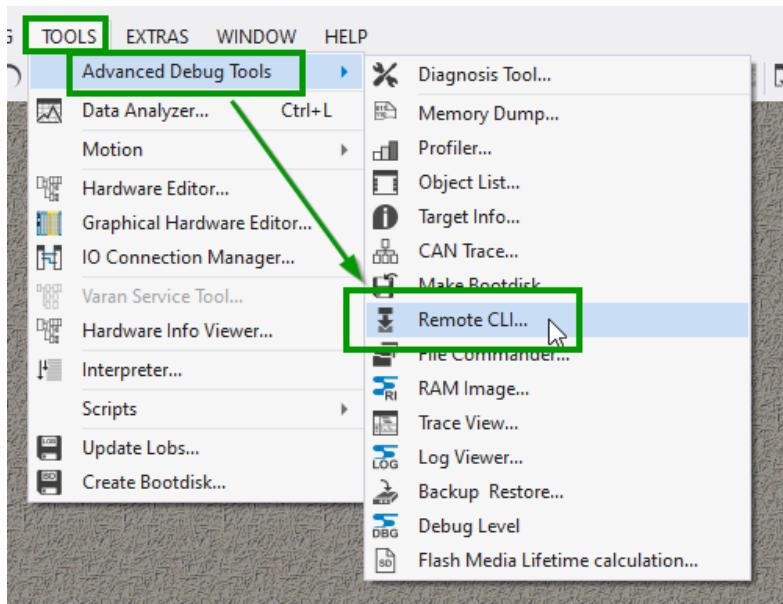
Compare and update the files in the HGW with the files specified in the configuration file under the tab “HGW”.

- Autoexec.lsl
- lslsys/rsbdbd.conf
- lslsys/wireless.conf
- lslsys/wireless2.conf

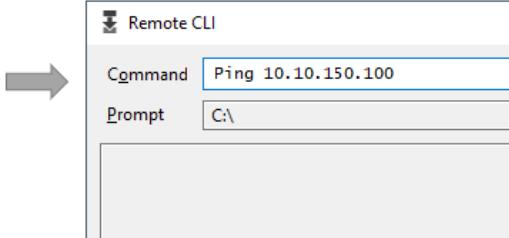
Next, connect the computer with the CP via USB and update the autoexec.lsl file therein with the contents specified in the configuration file under the “CP112\_01” Tab.

Restart all devices (turn off and then on again).

The CP is still online via USB. Next, start the remote CLI via TOOL > ADT > RCLI or connect by clicking . This can be used to check the accessibility between the devices with a ping.



Prüfen per Remote-CLI  
Ping 10.10.150.100  
Ping 192.168.1.1  
Ping 192.168.2.2  
Ping 192.168.1.2



Ping all configured devices to check their accessibility.

Enter the next address (from the configuration - in our example 10.10.150.100). If the specified address can be reached, an success message is displayed.

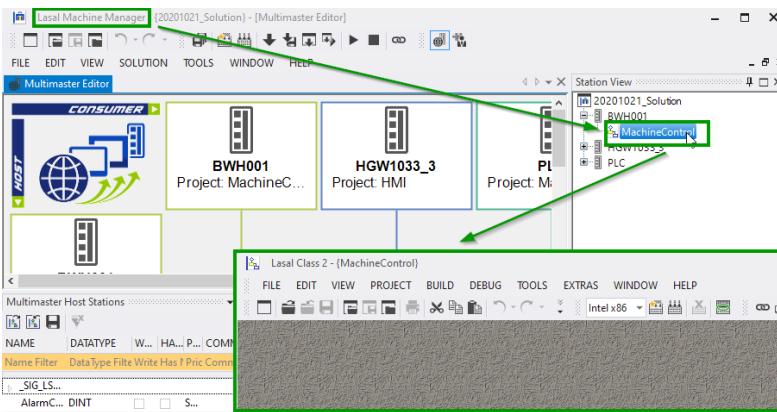
If the directly "neighboring" device is reachable, whether devices in other networks (e.g. the CP) are also reachable can be checked. In our example, with the IP address 192.168.1.1.

If you should get a timeout instead of the bytes sent and received, compare the IP addresses of the files on the devices with those in the „HGW IP Configurator.xlsx“.

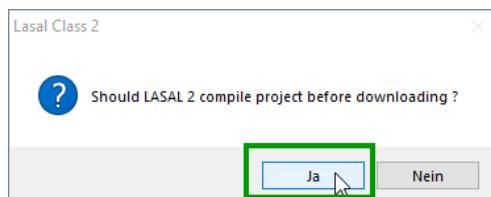
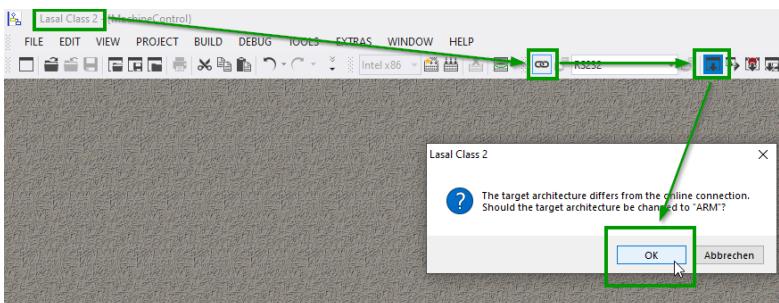
If all other devices are accessible, restart the device. If this is also successful, the configuration is complete.

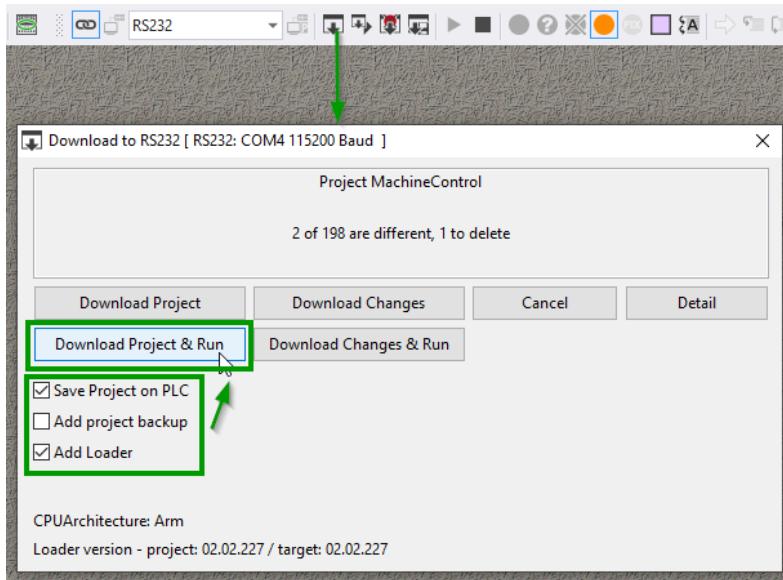
The individual projects of the template are now loaded into the devices.

Connect The PC to the BWH via USB. Open the Machine Manager and open the Machine Control project of the BWH contained therein. The LASAL CLASS 2 program then opens.



Go online via RS232 (USB cable).

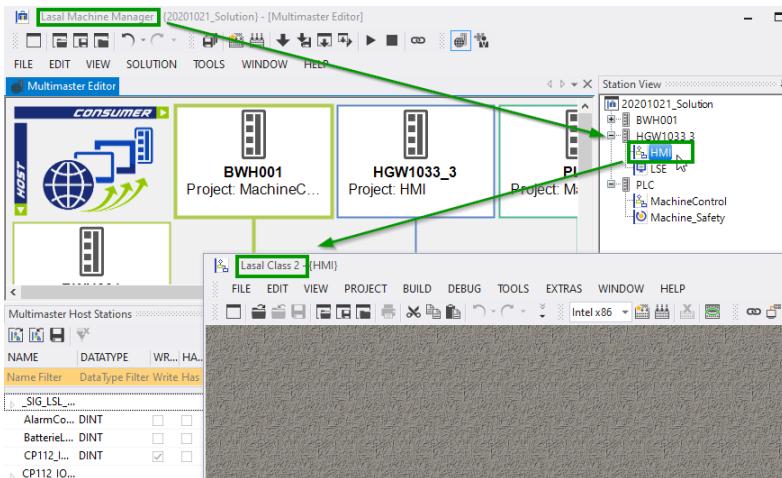




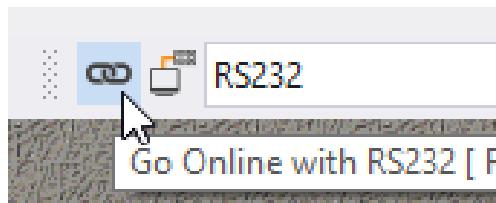
The BWH is now configured.

## 5.5.2 HGW Configuration

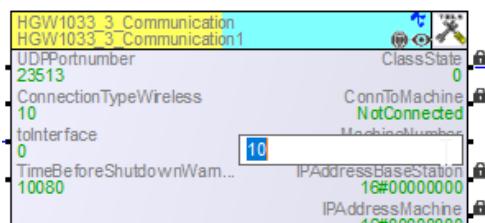
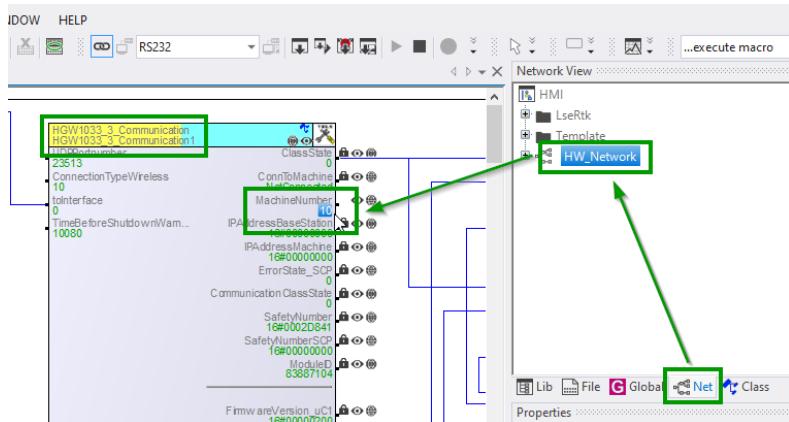
The HGW is now connected with the computer via USB and in the Machine Manager, the control project of the HGW is started. If necessary, first end the online connection to the Machine Manager by clicking the  icon.



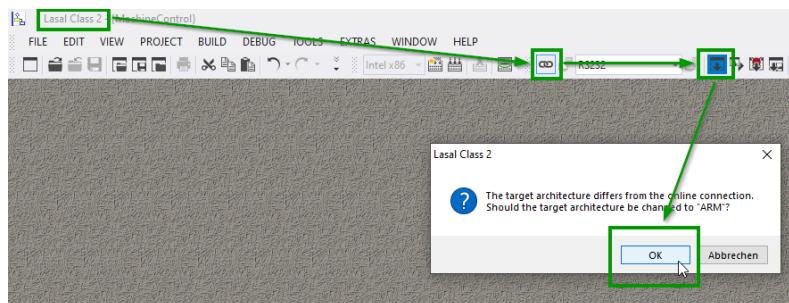
Insert the appropriate USB cable into the PC/HGW and connect to the HGW via LC2.

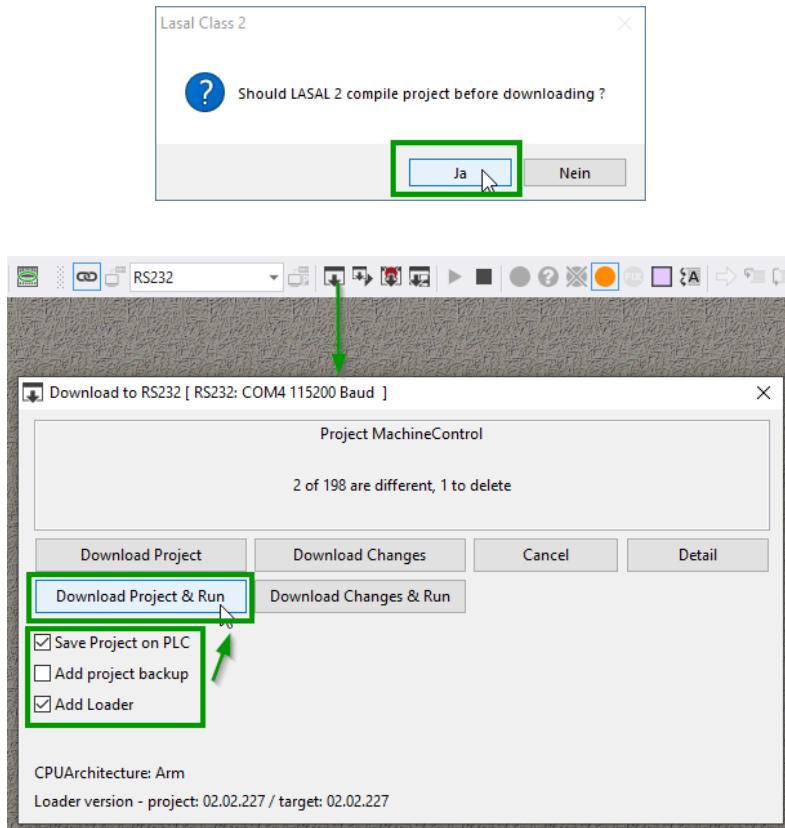


Under the “Net” tab, open the HGW network with a double-click on “HW\_Network” and enter the desired machine number into the HGW Communication class with a double-click.

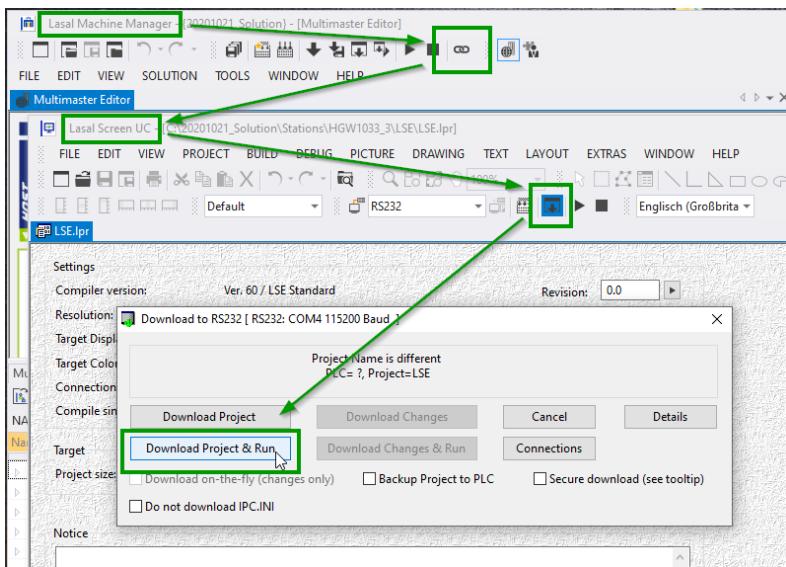
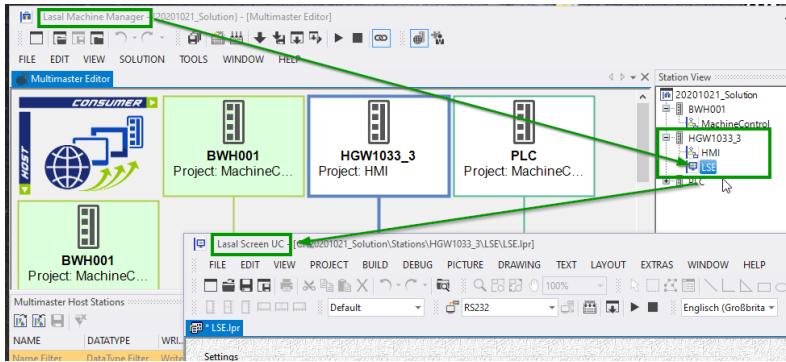


Next, load the process project into the operating device.





The visualization project is now also loaded into the HGW.

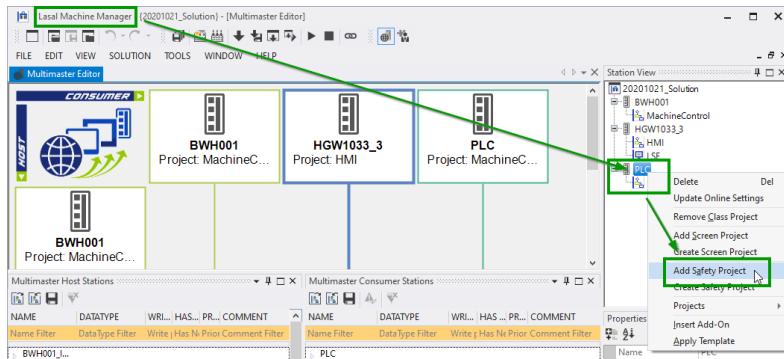


The same process is now used to connect with the control (CP) via USB and load the control project (PLC).

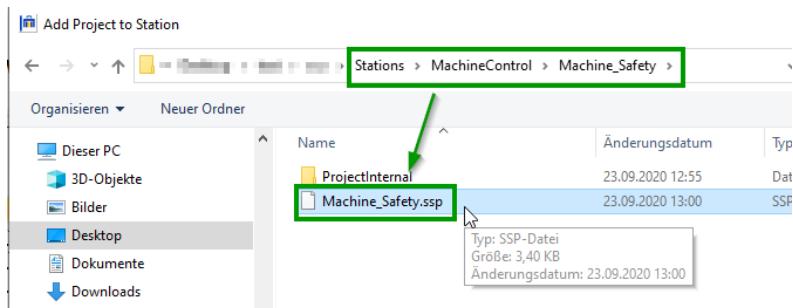
### 5.5.3 Loading the Safety Project

Once the above is completed, the Safety project must then be loaded. This is integrated into the template but for safety reasons, it must be manually added to the solution.

To add a Safety project, expand the “Control Project” in the Machine Manager – called “PLC” in this case – on the right side in the Station View on the right side by right-clicking on the station.



Next add the prepared Safety project in the Project folder to your solution.

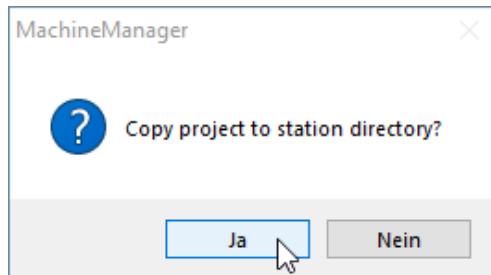


The Safety project does is preconfigured by default, because a Safety project requires a particular focus and a default configuration can lead to a false sense of “security”.

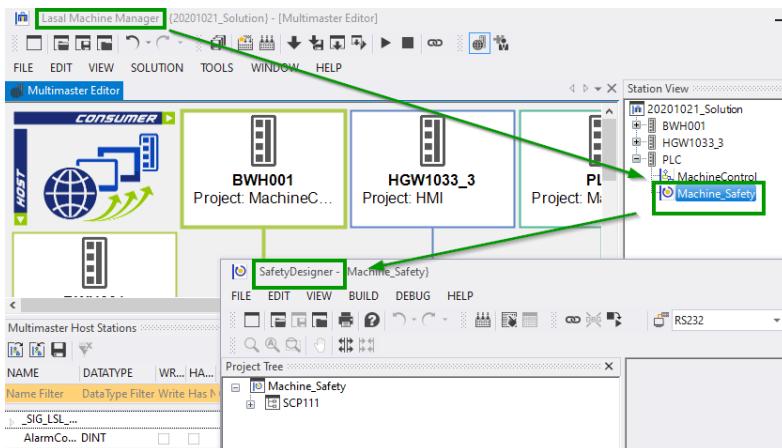
#### INFORMATION



The Safety application contained in the template is for demonstration purposes only and the basis for your project. However, it does not ensure the correct implementation of any standards.

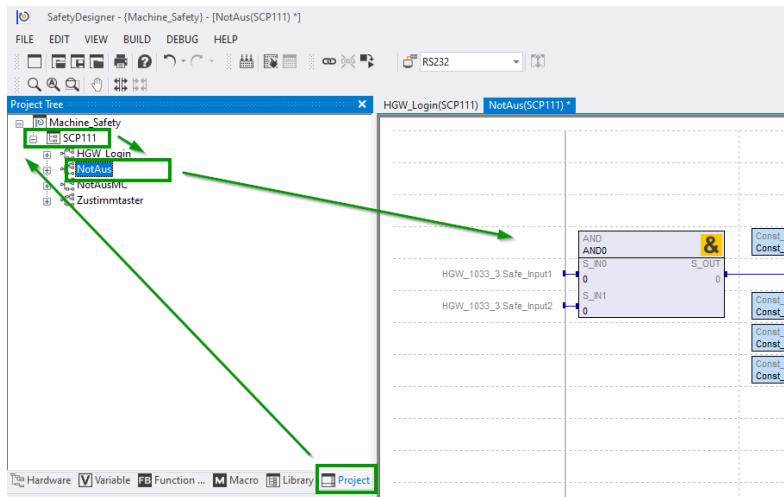


The Safety project is now located in your solution. With a double-click on the Safety project, the Safety Designer is opened.

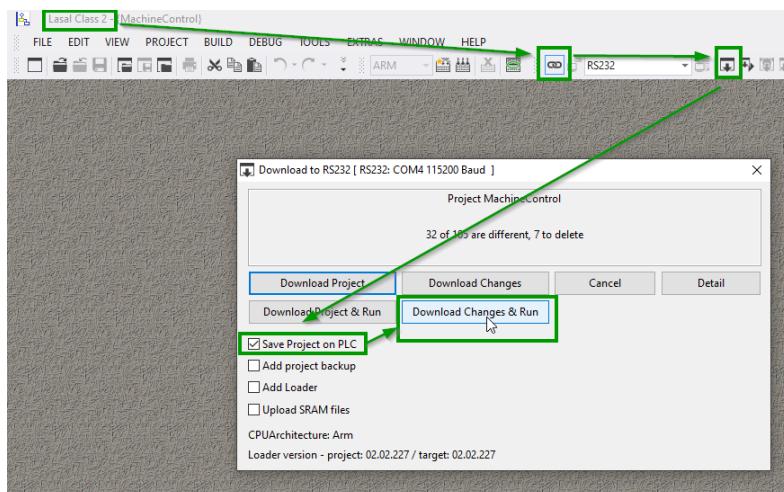


Here, open the SCP111 (+) as needed and with a double-click on NotAus, the Safety network of the emergency stop. A double click on HGW\_Login opens the network responsible for coupling with the machine.

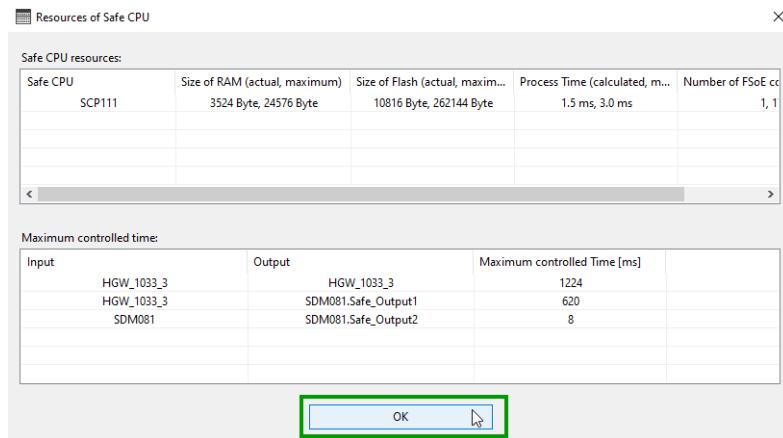
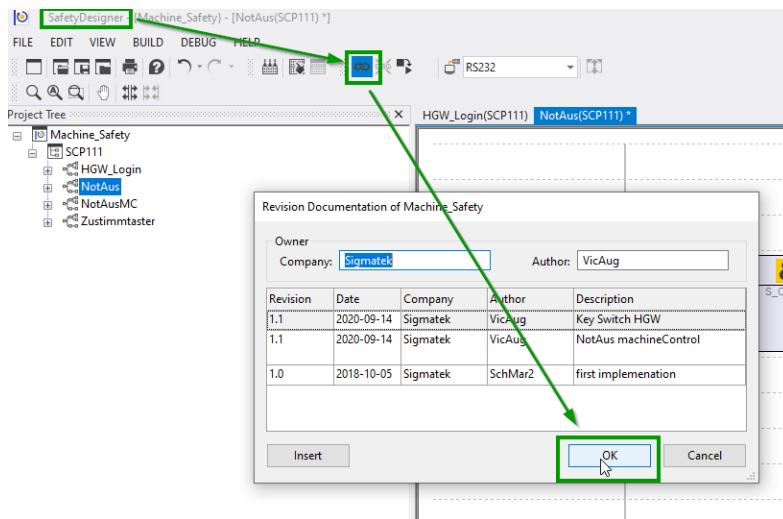
You can create your own logic according to the Safety System Handbook.



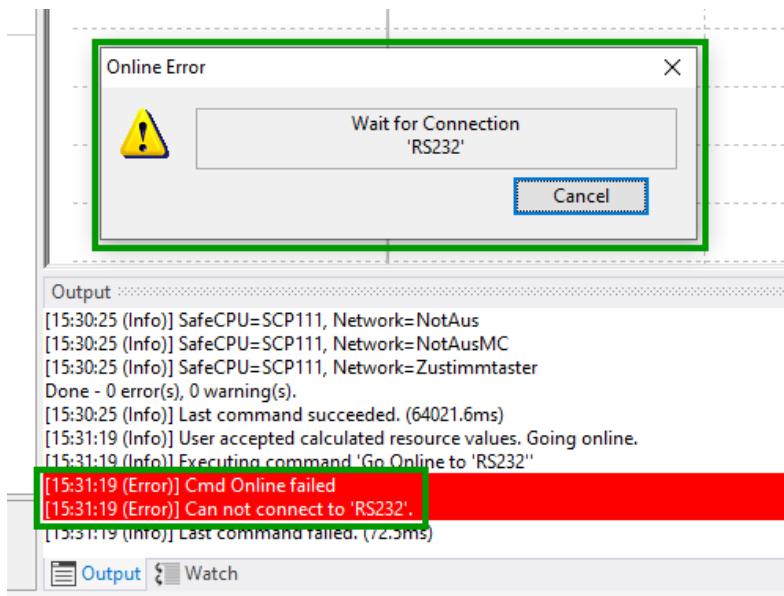
To now load the LASAL CLASS 2 project into the hardware, open LASAL CLASS 2, connect with the device and click Download. If a message is displayed, asking whether the architecture should be changed to "ARM", confirm it with "OK", check the box for "Save Project on PLC" and load the project to the hardware with a click on "Download Changes & Run". With this download variation, this device starts after the download automatically.



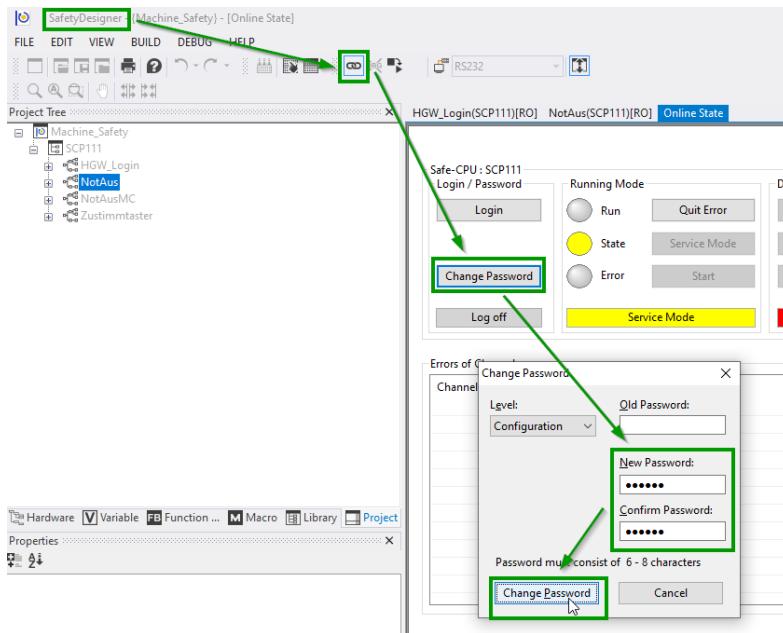
Follow the steps below to load the Safety project:



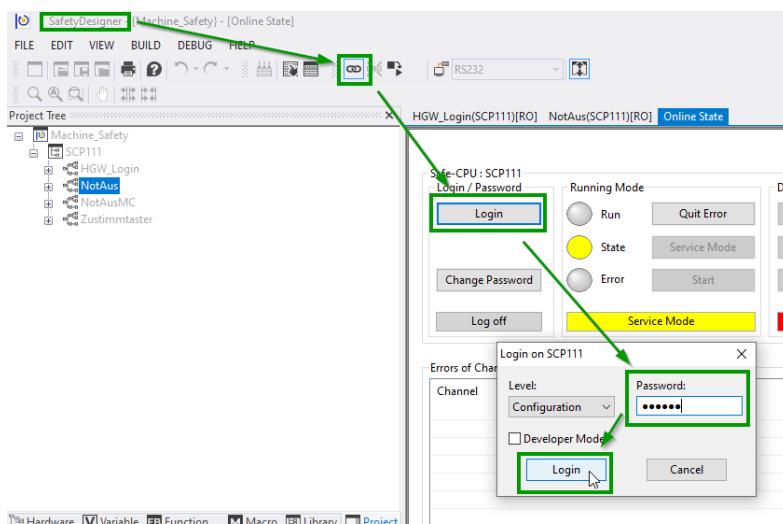
If this error message is shown, there is an RS232 connection still open in another LASAL tool. Close this connection and run the last step again.



If you did not assign a password for the Safety control, assign one now as follows. By default, no password is assigned.

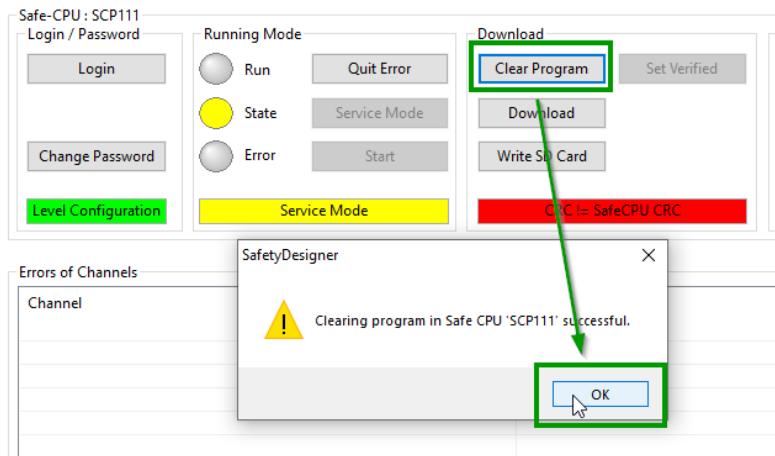


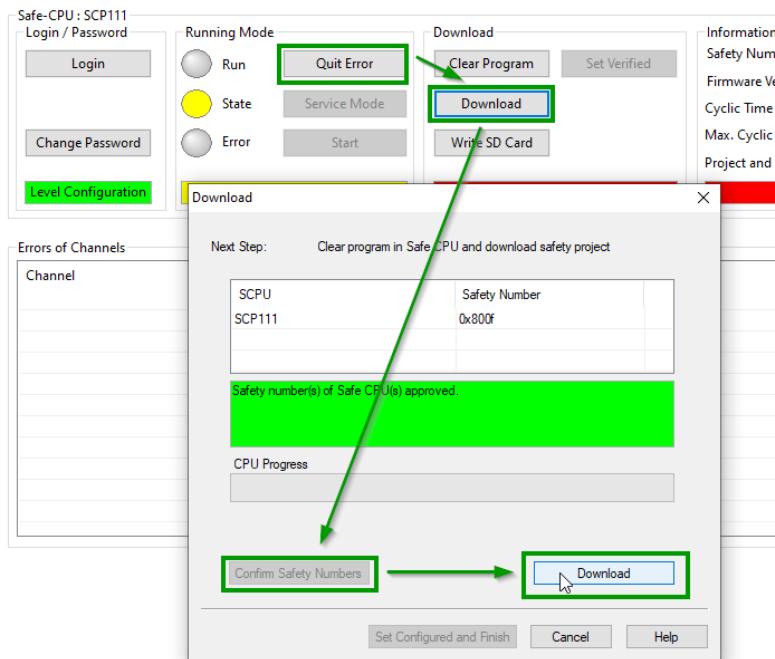
Log into the Safety control (HW) as follows. Enter your selected password here.



If a hardware error occurs, ensure that the Safety module is supplied with power correctly. If this is not the case, a hardware error is detected. (also if you only want to use one channel). (e.g. with STO 081)

Value of HS signal: 1  
Possible cause(s): Hardware error, external voltage supply is not connected

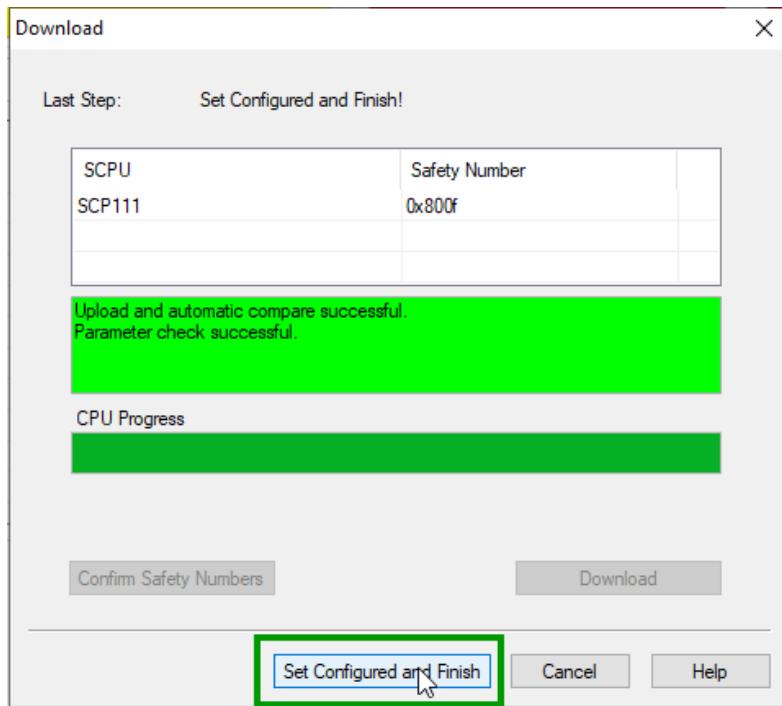


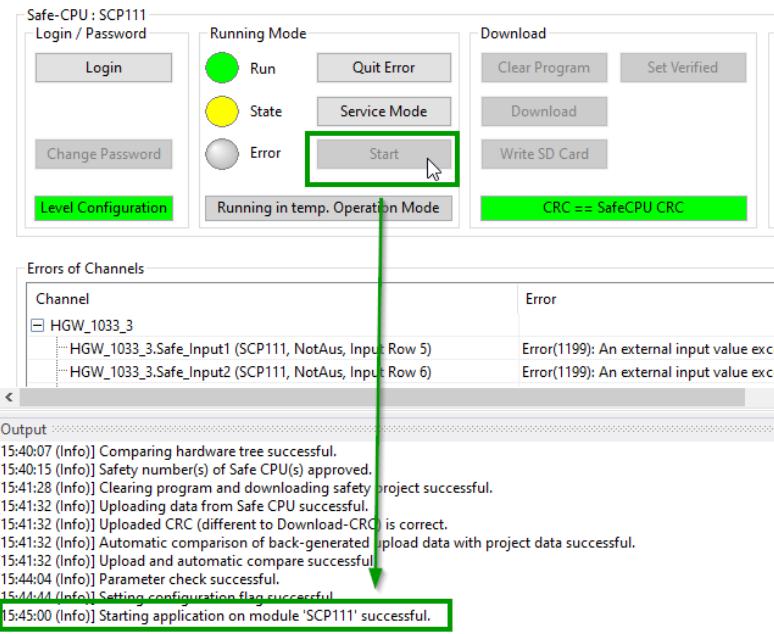


Compare Parameter of SCP111	
Parameter	Project
SCP111/HGW_Login/Const_DINT0.Value	200000
SCP111/HGW_Login/Const_DINT1.Value	123456
SCP111/HGW_Login/Const_DINT2.Value	5
SCP111/HGW_Login/Const_DINT3.Value	10
SCP111/HGW_Login/Const_DINT4.Value	60000
SCP111/NotAusMC/SDM081.Safe_Input1.Cross Circuit Detection	0
SCP111/NotAusMC/SDM081.Safe_Input1.Filter Time	0
SCP111/NotAusMC/SDM081.Safe_Input1.Cross Circuit Detection 2	0
SCP111/NotAusMC/SDM081.Safe_Input1.Filter Time 2	0

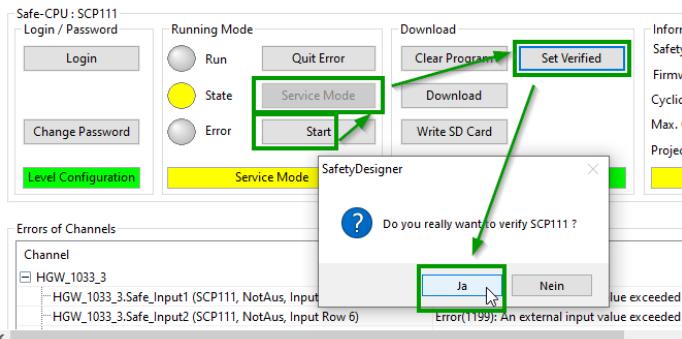
All parameters checked and all parameters correct

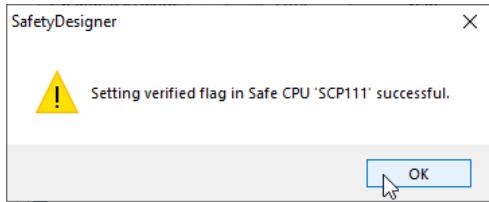
OK      Cancel





The project now runs in the safe control (however, only for 1 hour since it is not yet "set verified"). To permanently install your program, you must mark the download as verified. For this purpose, the application must run in the module. Next, proceed as follows:





This process stops the active program. The application must therefore be restarted. After downloading, an existing connection to the HGW is lost. Restart the control and devices.

Your project is now correctly loaded in the device and can now be used.

## 6 Configuring WLAN Interfaces

This document describes the use and configuration of WLAN interfaces, which are integrated in SIGMATEK controls.

### 6.1 Term Definition

Term	Explanation
RSDB	RSDB ( <b>R</b> ealtime <b>S</b> imultaneous <b>D</b> ual <b>B</b> and), this technology allows the simultaneous use of WLAN bands (2.4 GHz and 5 GHz).
WPA (2)	WPA ( <b>W</b> i- <b>F</b> i <b>P</b> rotected <b>A</b> ccess) is the implementation of a security standard.
DHCP	" <b>D</b> ynamic <b>H</b> ost <b>C</b> onfiguration <b>P</b> rotocol" is a network protocol used to assign a network configuration through a server.

### 6.2 Important Guidelines for WLAN Security

SIGMATEK recommends the use of WPA2 encryption. The longer the password that is selected, the more secure the connection. Passwords must have a length of at least 8 characters and a maximum of 63 characters.

WPA2 is the recommended encryption with the current technology.

Change the pre-set default password in the control during the initial start-up of the system. When possible, assign an individual password for each access point.

### 6.3 Regulatory Limitations and Legislation

Before the initial start-up of wireless networks, check the regulatory and legal requirements. Limitations and guidelines vary depending on the country (e.g. channels, maximum RF power). Compliance with regulations and guidelines is mandatory!

### 6.4 User Guidelines

#### INFORMATION



#### Loss of Radio License

- Technical changes to the device (such as different antennae), as well as improper use can lead to the loss of the FCC license and generate interference. This can affect the function of the device, as well as nearby devices.

Observe national standards when operating the wireless device!

## 7 Factory Settings

### 7.1 5 GHz (IP 10) Default Values

SSID	SN<serial number>_SIG_10
Password	12345678
IP	192.168.1.1
Subnet mask	255.255.255.0

### 7.2 2.4 GHz (IP 11) Default Values

SSID	SN<serial number>_SIG_11
Password	12345678
IP	192.168.2.1
Subnet mask	255.255.255.0

#### INFORMATION



SIGMATEK products are delivered without an ac and installed DHCP server.

How to install and use the DHCP server is explained in this document.

---

### 7.3 Ethernet IP 1 Default Values

IP	10.10.150.1
Subnet mask	255.255.255.0

## 8 Create Connection to the Device

### 8.1 Connecting the Panels in Delivery Condition

#### 8.1.1 Connecting via WLAN

SIGMATEK products are delivered with a predefined configuration to enable quick initial-access to the device for defining the basic configuration, or adapting it to your environment and networks.

1. Configure the network interface of your PC/Laptop to a fixed IP address.

Example:

192.168.2.100 for connecting to the **2,4 GHz** network

192.168.1.100 for connecting to the **5 GHz** network

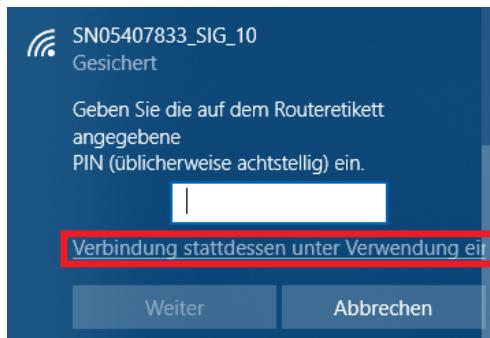
2. Connect to one of the two available WLAN networks of the control. The default network name is described in the chapter 7 Factory Settings.

#### INFORMATION



Do not use an identical IP address for Laptop/PC as for the device (see 7 Factory Settings).

#### Special Note with Connecting with Windows 10.



Under Windows 10, a PIN input is continuously suggested. Here the field “Create a connection instead of using a password” (marked red) must be clicked.

Afterwards, the regular password input opened. The text above the input mask changes from “PIN” to “Network Encryption key”.

### 8.1.2 Connecting via Ethernet

If your device has an Ethernet connection, it can also be connected via this interface.

The default settings can be found in 7 Factory Settings. Here, the Ethernet cable must be connected through a switch or directly to your PC/Laptop.

#### INFORMATION



When connecting through a switch, ensure that other connected participants are not using an identical IP address. This can otherwise lead to an address conflict and no connection will be made.

### 8.1.3 Connecting via USB

Connect an appropriate USB cable with the control and your computer.

SIGMATEK uses USB Type C connectors for products of the HGW and BHW series.

The required cable type can be found in the product handbook.

#### INFORMATION



Under certain conditions, it may be necessary to install the required drivers for the SIGMATEK controls.

After successfully configuring, a new panel with the designation “Sigmatek Plc (COMx)” can be found in the Windows device manager under “Connections (COM & LPT)”. The port number assigned depends on your system.

## 8.2 Connecting with LASAL CLASS 2

To adapt the device configuration, the files must be edited via the LASAL CLASS 2 File Commander.

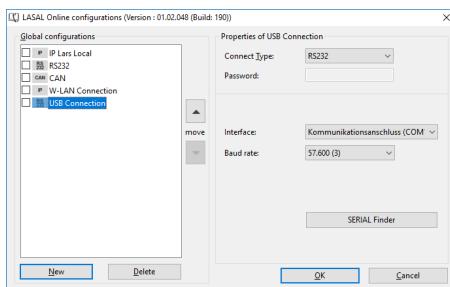
## 8.2.1 Connecting over a Network Interface

To create a connection to the device through a network interface (WLAN or Ethernet), perform the following steps in LASAL CLASS 2:

1. Open LASAL CLASS 2
2. In the menu tab select the item “tools” -> “Advanced Debug Tools” and open the item “Diagnosis Tool...”
3. In the “Plc Diagnosis” window that opens, select the item “Change Online Settings”



4. A configuration window then opens:



5. With the “New” button, create a new connection and assign it a unique name.
6. Ensure that the “Connection Type” is set to TCP/IP.
7. The password field must remain empty.
8. Enter the IP address of the device to configure (see 7 Factory Settings for the default settings).

9. Close the window with the “OK” button
10. After successfully defining the connection parameters, the new connection is already selected in the selection list (**marked in blue**) shown in the “Plc Diagnosis” window. If not, you can then select it.



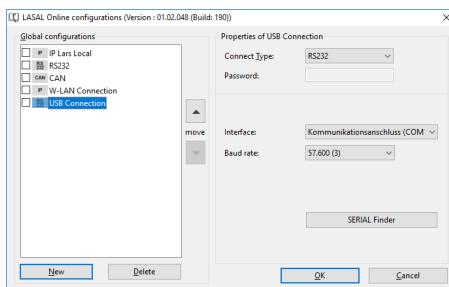
11. The Link button (marked red) can now be used to create a connection to the device. If the connection is successfully created, the display of the switching element changes.

## 8.2.2 Connecting via USB

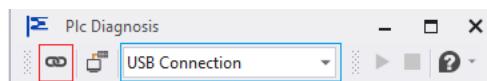
To create a connection to the device through a USB interface, perform the following steps in LASAL CLASS 2:

1. Open LASAL CLASS 2.
2. In the menu tab select the item “tools” -> “Advanced Debug Tools” and open the item “Diagnosis Tool...”
3. In the “Plc Diagnosis” window that opens, select the item “Change Online Settings”  

4. A configuration window then opens:



5. With the “New” button, create a new connection and assign it a unique name.
6. Ensure that the “Connection Type” is set to RS232.
7. Select the COM port of device to configure. Alternatively, you can also use the “SERIAL Finder” tool.
8. Close the window with the “OK” button”
9. After successfully setting the connection parameters, the new connection is already selected in the selection list (marked in blue) shown in the “Plc Diagnosis” window. If not, you can then select it.
10. The Link button (marked red) can now be used to create a connection to the device. If the connection is successfully created, the display of the switching element changes.



## 9 Configuring the Device

With an active online connection, open the “File Commander” to make the necessary changes to the files.

### 9.1 File Structure and Paths

The following files must be modified to create a network connection or individualize the access point.

Network Mode	File:	Function
Accesspoint	C:\autoexec.lsl	IP settings and WLAN configuration
	C:\lslsys\rsbdb.conf	Access point configuration of the network
Client	C:\autoexec.lsl	IP settings and WLAN configuration
	C:\lslsys\wireless.conf	WLAN network settings for IP 10
	C:\lslsys\wireless2.conf	WLAN network settings for IP 11

#### INFORMATION



In the RSDB module (2 WLAN networks simultaneously), IP 10 is for the 5 GHz WLAN and IP 11 for the 2.4 GHz Network.

#### 9.1.1 WLAN and IP Parameters in the Autoexec.lsl

Parameters	Description
WLANAP 10	starts a 5 GHz access point
WLANAP 11	Starts a 2.4 GHz access point
WLANAP 10 11	starts 2 access points (2.4 GHz and 5 GHz)
SET IP 10 HOSTADDR xxx.xxx.xxx.xxx	Sets the IP for the interface 10 / 5 GHz network
SET IP 11 HOSTADDR xxx.xxx.xxx.xxx	Sets the IP for the interface 11 / 2.4 GHz network
SET IP 10 SUBNET xxx.xxx.xxx.xxx	Sets the subnet mask of the IP 10 interface
SET IP 11 SUBNET xxx.xxx.xxx.xxx	Sets the subnet mask of the IP 11 interface

#### 9.1.2 File Structure and Parameters rsbdb.conf

The rsbdb.conf is the central file for configuring the access points. It contains all relevant settings.

Parameters	Description													
channel_10 / 11	Channel for the 2.4 GHz network (11) or 5 GHz network (10)													
bandwidth_10 / 11	With the "bandwidth" parameter, the bandwidth used by the network (2.4 or 5 GHz) can be connected. If the parameter is commented out, the default values are used here which are marked in green in the following table. Example: channel_10 = 36bandwidth_10 = 80Here, the 5 GHz WLAN channel 36 (5180 MHz) is set with a bandwidth of 80 MHz.													
	<table border="1"> <thead> <tr> <th>Band</th><th>Possible values</th></tr> </thead> <tbody> <tr> <td>5 GHz</td><td>20 MHz 40 MHz <b>80 MHz</b></td></tr> <tr> <td>2,4 GHz</td><td>20 MHz <b>40 MHz (not currently supported)</b></td></tr> </tbody> </table>		Band	Possible values	5 GHz	20 MHz 40 MHz <b>80 MHz</b>	2,4 GHz	20 MHz <b>40 MHz (not currently supported)</b>						
Band	Possible values													
5 GHz	20 MHz 40 MHz <b>80 MHz</b>													
2,4 GHz	20 MHz <b>40 MHz (not currently supported)</b>													
country_code	Country code according to ISO/IEC 3166-1DE = GermanyUS = USAAT = AustriaWhen the country code is changed, limitations regarding the channel selection and maximum RF power may be applied that are required by law in the respective country. If the WLAN does not start, it could be possible that a channel or combination is not allowed.													
key_mgmt_10 / 11	Sets the encryption method for WPA-based passwords													
	<table border="1"> <thead> <tr> <th>Encoding</th><th>Value to Enter</th></tr> </thead> <tbody> <tr> <td>No Encoding</td><td>NONE:</td></tr> <tr> <td>WPA-TKIP</td><td>WPA-PSK</td></tr> <tr> <td>WPA-AES</td><td>WPA-PSK</td></tr> <tr> <td>WPA2-TKIP</td><td>WPA-PSK</td></tr> <tr> <td><b>WPA2-AES</b></td><td>WPA-PSK</td></tr> </tbody> </table>		Encoding	Value to Enter	No Encoding	NONE:	WPA-TKIP	WPA-PSK	WPA-AES	WPA-PSK	WPA2-TKIP	WPA-PSK	<b>WPA2-AES</b>	WPA-PSK
Encoding	Value to Enter													
No Encoding	NONE:													
WPA-TKIP	WPA-PSK													
WPA-AES	WPA-PSK													
WPA2-TKIP	WPA-PSK													
<b>WPA2-AES</b>	WPA-PSK													
pairwise_10 / 11	Sets the encryption algorithm													
	<table border="1"> <thead> <tr> <th>Encoding</th><th>Value to Enter</th></tr> </thead> <tbody> <tr> <td>No Encoding</td><td>LEER</td></tr> <tr> <td>WPA-TKIP</td><td>TKIP</td></tr> <tr> <td>WPA-AES</td><td>CCMP</td></tr> <tr> <td>WPA2-TKIP</td><td>TKIP</td></tr> <tr> <td><b>WPA2-AES</b></td><td>CCMP</td></tr> </tbody> </table>		Encoding	Value to Enter	No Encoding	LEER	WPA-TKIP	TKIP	WPA-AES	CCMP	WPA2-TKIP	TKIP	<b>WPA2-AES</b>	CCMP
Encoding	Value to Enter													
No Encoding	LEER													
WPA-TKIP	TKIP													
WPA-AES	CCMP													
WPA2-TKIP	TKIP													
<b>WPA2-AES</b>	CCMP													
proto_10 / 11	Sets the selected encryption for WPA2													
	<table border="1"> <thead> <tr> <th>Encoding</th><th>Value to Enter</th></tr> </thead> <tbody> <tr> <td>No Encoding</td><td>LEER</td></tr> <tr> <td>WPA-TKIP</td><td>LEER</td></tr> <tr> <td>WPA-AES</td><td>LEER</td></tr> <tr> <td>WPA2-TKIP</td><td>WPA2</td></tr> <tr> <td><b>WPA2-AES</b></td><td>WPA2</td></tr> </tbody> </table>		Encoding	Value to Enter	No Encoding	LEER	WPA-TKIP	LEER	WPA-AES	LEER	WPA2-TKIP	WPA2	<b>WPA2-AES</b>	WPA2
Encoding	Value to Enter													
No Encoding	LEER													
WPA-TKIP	LEER													
WPA-AES	LEER													
WPA2-TKIP	WPA2													
<b>WPA2-AES</b>	WPA2													
psk_10 / 11	PSK is the WLAN password for the network. This must have a minimum length of 8, and a maximum of 63 characters.													
ssid_10 / 11	Displays the visible name of the WLAN network. This can have a length of up to 31 characters.													
tx_power	Via the parameter, the maximum RF power for the set for the 2.4 GHz and 5 GHz network. The value is defined in dBm. If lower regulatory limitations apply (e.g. 31 dBm is													

Parameters	Description
	set, but 20 dBm is allowed), the RF power is automatically reduced. This parameter is commented out by default and the device operates with the maximum RF power permitted according to the country code.
radio	With this parameter, sending via WLAN can be disabled. Possible values: 0 = sending disabled 1 = sending enabled This parameter is commented out by default and sending enabled.
ssid_invisible_10 / 11	<p>Using this optional parameter, the SSID can be hidden. It is important to note that this is not a safety mechanism.</p> <p>When ssid_invisible_xx=1 is set, the operating device (the client) can no longer find the WLAN network. For this reason, use the ssid_scan parameter in the client as described below.</p> <p>0 = WLAN network remains visible      1 = WLAN network is hidden. SSID is not visible during a WLAN scan      For these parameters, an OS version &gt;= 09.03.150 is required</p>

The values marked in green correspond to the delivery condition or the recommended encryption. If only one access point is configured, the setting is enabled according to the configured network (2.4 or 5 GHz).

### 9.1.3 File Structure and Parameters wireless.conf and wireless2.conf

The wireless.conf and wireless2.conf files are used to configure the control as a WLAN client. In these files, the parameters required for the connection to the access point are defined in an infrastructure network.

The configuration file contains a global variable, which cannot be changed. This line must be the first ,non-commented out, line in the wireless(2).conf file:

```
ctrl_interface=/var/run/wpa_supplicant
```

The networks are configured as a block system. These “network” blocks have the following syntax, see example:

```
# Configuration for WPA/WPA2 Networks
network={
    ssid="WirelessNetworkName"
    psk="SecurityKey"
}
```

Parameters	Description
ssid	Here, the network name of the access point (BWH 001) is entered. This entry can have a maximum length of 31 characters (see Configuration Access Point)
psk	PSK is the WLAN password for the network. This must have a minimum length of 8, and a maximum of 63 characters.
key_mgmt	The entry „key_mgmt“ is added with “NONE” if the network has no password or encryption. Otherwise, this parameter is not available in the “network”!
scan_ssid	<p>So that a WLAN station (client) can connect to an access point with a hidden SSID, scan_ssid must be set to 1 in the network block:</p> <p>0 = deactivates the network scan for hidden SSIDs 1 = activates the network scan for hidden SSIDs</p> <p>This command makes the scan process slower. Only use it when you have to connect with hidden SSIDs.</p> <p>If there are no access points with a hidden SSID with which you should connect your client, set scan_ssid=0 (default)</p> <p>For these parameters, an OS version &gt;= 09.03.150 is required</p>

### INFORMATION



When creating the configuration, ensure the that the syntax is correct. The curly brackets must be included as shown in the example.

## 9.2 Configuring a Dual WLAN (RSDB) Access Points

To configure an access point in dual WLAN mode (RSDB), follow the steps below:

1. Open the “C:\autoexec.lsl” file and if not available, insert the following lines in the file:

```

SET IP 10 HOSTADDR 192.168.1.1
SET IP 10 SUBNET 255.255.255.0

SET IP 11 HOSTADDR 192.168.2.1
SET IP 11 SUBNET 255.255.255.0

WLANAP 10 11

```

The IP address for the IP 10 and IP 11 must be adapted according to your requirements and the network environment. Ensure that the IP 10 and IP 11 networks are provided in different subnetworks (see example).

In the above configuration, IP 10 is the 5 GHz network and IP 11 is the 2.4 GHz network.

Save the changes using the “Save onPlc”. button.

2. Open the “C:\lslsys\rsdbd.conf” file

The possible configurations and parameters are described under 9.1.2 File Structure and Parameters rsdbd.conf

Save the settings using the “Save on PLC” button.

3. The settings are then enabled with the next restart.

### 9.3 Configuring a Dual WLAN (RSDB) Client Device

To configure client in dual WLAN mode (RSDB), follow the steps below:

1. Open the “C:\autoexec.lsl” file and if unavailable, insert the following lines into the file:

```
SET IP 10 HOSTADDR 192.168.1.2  
SET IP 10 SUBNET 255.255.255.0  
  
SET IP 11 HOSTADDR 192.168.2.2  
SET IP 11 SUBNET 255.255.255.0
```

The IP address for IP 10 and IP 11 must be adapted to your requirements and the network environment accordingly. In this configuration, IP 10 is the 5 GHz network and IP 11 is the 2.4 GHz network.

Ensure that the entry “WLANAP x” no longer appears in the autoexec.lsl.

Save the changes using the “Save on Plc” button.

2. Open the “C:\lslsys\wireless.conf” file

The “wireless.conf” file is used to configure interface 10 for the 5 GHz network. Here, change the required connection parameters. Information on the file structure and parameters can be found under: 9.1.3 File Structure and Parameters wireless.conf and wireless2.conf

Save the changes using the “Save on Plc” button.

3. Open the “C:\lslsys\wireless2.conf” file

The “wireless.conf” file is used to configure interface 11 for the 2.4 GHz network. Here,

change the required connection parameters. Information on the file structure and parameters can be found here: 9.1.3 File Structure and Parameters wireless.conf and wireless2.conf

Save the changes using the “Save on Plc” button.

4. Restart the device for all settings to take effect.

## 9.4 Configuring a Single WLAN Access Point

To configure an access point in single WLAN mode, follow the steps below:

1. Open the „C:\autoexec.lsl“ file and if not available, insert the following lines at the end of the file:

Example 2.4 GHz:

```
SET IP 11 HOSTADDR 192.168.2.1  
SET IP 11 SUBNET 255.255.255.0  
  
WLANAP 11
```

Example 5 GHz:

```
SET IP 10 HOSTADDR 192.168.1.1  
SET IP 10 SUBNET 255.255.255.0  
  
WLANAP 10
```

The IP address for IP 10 must be adapted to your requirements and the network environment accordingly.

The access point can be configured for 2.4 or 5 GHz, this is set via the parameters WLANAP 10 for 5 GHz and WLANAP 11 for 2.4 GHz. The settings for the network from the rsdbd.conf are used based on the network.

Save the changes using the “Save onPlc”. button.

2. Open the „C:\ls\lsys\rsdbd.conf“ file.

The possible configurations and parameters are described under 9.1.2 File Structure and Parameters rsdbd.conf

Save the settings using the “Save on PLC” button.

The settings are then enabled with the next restart.

## 9.5 Configuring a Single WLAN Client Device

To configure an access point in single WLAN mode (for IP 10 in this example), follow the steps below:

1. Open the “C:\autoexec.lsl” file and if not available, insert the following lines at the end of the file:

```
SET IP 10 HOSTADDR 192.168.1.2  
SET IP 10 SUBNET 255.255.255.0
```

The IP address for IP 10 must be adapted to your requirements and the network environment accordingly.

Ensure that the entry “WLANAP x” no longer appears in the file.  
Save the changes using the “Save on Plc” button.

2. Open the “C:\lslsys\wireless.conf” file

The “wireless.conf” file is used to configure interface 10 for the 5 GHz network. Here, change the required connection parameters. Information on the file structure and parameters can be found under: 9.1.3 File Structure and Parameters wireless.conf and wireless2.conf

Save the changes using the “Save on Plc” button.

3. Restart the device for all settings to take effect.

## 9.6 Restoring Default Settings

To restore the factory settings, the following files must be deleted:

C:\lslsys\rsbdb.conf  
C:\lslsys\wireless.conf  
C:\lslsys\wireless2.conf

The factor settings are restored after a reboot.

## 10 Miscellaneous Settings

Here, optional settings not required for operating the system are documented.

### 10.1 DHCP Server

#### 10.1.1 Installing the DHCP Server

The DHCP server is not installed in SIGMATEK controls by default. The installation packet can be requested via SIGMATEK support.

Installation:

1. Unpack the file **dhcpsvr.zip** file onto your PC
2. Copy the unpacked files (dhcp-server-config\_xxx\_armel.db, dhcp-server\_xxx\_armel.deb) to the **C:\lslsys\packages** directory via the LASAL CLASS File Commander.
3. In devices with a touch display, enter the installation command via the touchscreen.

The command can also be given via the Remote CLI, which is a component of the toolbox “Plc Diagnosis” toolbox.

```
CLI command: package install dhcp-server
```

This process can require up to 1 minute.

4. After successfully installing the packet, the output is shown on the display or in the remote CLI window.

```
Installing Package 'dhcp-server' .....
Command successfully completed
```

The DHCP server is successfully installed and the required configuration steps described in the next chapter can be taken.

#### 10.1.2 The “**dhcpd.conf**” File Structure and Parameter

The “**dhcpd.conf**” file is the global configuration for the DHCP server in SIGMATEK controls. The following settings and parameters are available:

Here, the parameters required for simple operation of the DHCP server are described.

Parameters	Description
default-lease-time Required parameters Global entry	Indicates how long a queried IP address is reserved for a client in seconds, before it should request an extension.
max-lease-time Required parameters Global entry	Indicates how long a queried IP address can be possessed by a client in seconds, before it must request an extension.
subnet	The “Subnet” parameter defines the assigned DHCP settings. Here, such an entry must be added for each IP interface/network to operate. The description can be found in a separate chapter.

Example of a subnet block and the included parameters and their description:

```
subnet 192.168.2.0 netmask 255.255.255.0 {
    range 192.168.2.100 192.168.2.200;
    default-lease-time 600;
    max-lease-time 7200;
}
```

Parameters	Description
subnet xxx.xxx.xxx.xxx netmask xxx.xxx.xxx.xxx{....}	Provides the IP address range of the network, including the network mask. The IP address for “subnet” must be entered with the end digit 0.
range	Defines the range of IP address, which the DHCP server can assign to the clients. This range cannot contain the IP address of the server. If a range from 192.168.2.100 to 192.168.2.200 is allocated, a range of 101 IP addresses is available to assign. To avoid collisions, ensure that these addresses are not permanently assigned.
default-lease-time	Indicates how long a queried IP address is reserved for a client in seconds, before it should request an extension. In the subnet configuration, this is only valid for the specified subnet! If no entry is available, the global variable is used.
max-lease-time	Indicates how long a requested IP address can be possessed by a client in seconds, before it must request an extension. In the subnet configuration, this is only valid for the specified subnet! If no entry is available, the global variable is used.
option routers	With option routers, where to send server data packets that cannot be delivered in local networks (due to the address of the source and destination host, as well as the subnet mask) is defined.  This corresponds to the Autoexec command SET IP GATEWAY

### 10.1.3 Configuring the DHCP Server

To use the DHCP server, the following settings are necessary. These must be adjusted to the desired application, as well as to the requirements of your system.

1. Open the “C:\autoexec.lsl” file and if not available, insert the following lines at the end of the file:

```
SET IP 10 HOSTADDR 192.168.1.1
SET IP 10 SUBNET 255.255.255.0

SET IP 11 HOSTADDR 192.168.2.1
SET IP 11 SUBNET 255.255.255.0

DHCPUSR START 10 11
```

#### INFORMATION



The IP Addresses of interfaces IP 10 and IP 11 must be determined, these cannot be within the range of the DHCP assignment pool and can only occur once in the network. If only one DHCP server is desired in the network, the appropriate IP network number must be assigned (e.g. DHCPUSR START 11) for interface 11.

2. Open the “C:\lsly\dhcpd.conf” file and edit it as follows to configure the networks:

#### INFORMATION



The factory settings (default) can be copied back to “C:\lsly\” from the folder “C:\lsly\default-configurations” if the file was deleted.

```
subnet 192.168.2.0 netmask 255.255.255.0 {
    range 192.168.2.100 192.168.2.200;
    default-lease-time 600;
    max-lease-time 7200;
}

subnet 192.168.1.0 netmask 255.255.255.0 {
    range 192.168.1.100 192.168.1.200;
    default-lease-time 600;
    max-lease-time 7200;
}
```

The example shows the basic configuration of the system. An additional change in the parameters is possible, however, not required for simple operation. The settings are first enabled after a restart.

## 10.2 DHCP Client

The DHCP client is installed as a standard element in every SIGMATEK control and is always available.

### 10.2.1 Configuring the DHCP Client

1. Open the “**C:\autoexec.lsl**” file and if interfaces IP 10 and IP 11 are not available, insert the following lines at the end of the file:

```
set ip 10 hostaddr dhcp  
set ip 11 hostaddr dhcp
```

2. For each IP interface that uses DHCP as the source for the IP address, a "set ip" entry must be created as described in the example.
3. The documented entries are provided for the basic configuration only. More information can be found in the “DHCP CLIENT” documentation, which can be acquired from SIGMATEK support.

## 11 Configurations Examples

### 11.1 Dual WLAN (RSDB) Access Point with DHCP Server for the BWH 001

#### 11.1.1 C:\autoexec.ls1

```
REM +-----+
REM |          LASAL OS Installation      |
REM |      S i g m a t e k   G m b H & C o K G   |
REM |          www.sigmatek.at           |
REM +-----+  
  
SET EVENTLOG ON  
SET OSHEAP 120000  
  
SET IP 1 HOSTADDR 192.168.10.80  
SET IP 1 SUBNET 255.255.255.0  
  
REM 5GHz WLAN IP Settings  
SET IP 10 HOSTADDR 192.168.1.1  
SET IP 10 SUBNET 255.255.255.0  
  
REM 2,4GHz WLAN IP Settings  
SET IP 11 HOSTADDR 192.168.2.1  
SET IP 11 SUBNET 255.255.255.0  
  
REM Starte Dual Access Point 5G + 2,4G  
WLANAP 10 11  
  
REM Start DHCP Server for IP10 and IP11  
DHCPNSR START 10 11  
  
CALIB CHECK  
  
SET RUNTIME 30  
  
VER  
LSLLOAD  
RUN
```

#### 11.1.2 C:\ls\sys\rsdbd.conf

```
# Parameters for WLAN interface 10 (5G)  
channel_10 = 36
```

```
bandwidth_10 = 80
key_mgmt_10 = WPA-PSK
pairwise_10 = CCMP
proto_10 = WPA2
psk_10 = 12345678
ssid_10 = MASCHINE1_SIG_10

# Parameters for WLAN interface 11 (2.4G)
channel_11 = 6
bandwidth_11 = 20
key_mgmt_11 = WPA-PSK
pairwise_11 = CCMP
proto_11 = WPA2
psk_11 = 12345678
ssid_11 = MASCHINE1_SIG_11

# General WLAN parameters
country_code = US
# TX power in dBm - max. 20dBm in this Case
tx_power = 20
```

### 11.1.3 C:\lsisys\dhcpd.conf

```
# Sample DHCP configuration for Dual WLAN Access Point
subnet 192.168.2.0 netmask 255.255.255.0 {
    range 192.168.2.100 192.168.2.200;
    default-lease-time 600;
    max-lease-time 7200;
}
subnet 192.168.1.0 netmask 255.255.255.0 {
    range 192.168.1.100 192.168.1.200;
    default-lease-time 600;
    max-lease-time 7200;
}
```

## 11.2 Dual WLAN (RSDB) Client with DHCP Client for the HGW 1033-3

### 11.2.1 C:\autoexec.lsl

```
REM +-----+
REM |          LASAL OS Installation           |
REM |      S i g m a t e k   G m b H & C o K G   |
REM |          www.sigmatek.at                  |
REM +-----+
```

```
SET EVENTLOG ON
SET OSHEAP 120000

REM 5GHz WLAN IP Settings
SET IP 10 HOSTADDR DHCP

REM 2,4GHz WLAN IP Settings
SET IP 11 HOSTADDR DHCP

CALIB CHECK

SET RUNTIME 30

VER
LSLLOAD
RUN
```

### 11.2.2 C:\lsisys\wireless.conf

```
ctrl_interface=/var/run/wpa_supplicant

# Configuration for the 5GHz WLAN Client Network
network={
    ssid="SN12345678_SIG_10"
    psk="12345678"
}
```

### 11.2.3 C:\lsisys\wireless2.conf

```
ctrl_interface=/var/run/wpa_supplicant

# Configuration for the 2,4GHz WLAN Client Network
network={
    ssid="SN12345678_SIG_11"
    psk="12345678"
}
```

## 12 Channel Settings for Accesspoint

### 12.1 EU/RED Channel Settings

#### 12.1.1 2.4 GHz WLAN

Frequency (GHz)	2.412	2.417	2.422	2.427	2.432	2.437	2.442	2.447	2.452	2.457	2.462	2.467	2.472
Channel / 20 MHz	1	2	3	4	5	6	7	8	9	10	11	12	13

#### 12.1.1.1 20 MHz bandwidth

Example entry in rsbdbd.conf:

```
channel_11 = 6  
bandwidth_11 = 20
```

Terms of Use:

Channel 1-13: max. 100 mW

**INFORMATION**

To optimally utilize the available frequency band, the WLAN channels and channel width must be selected correctly.

For a WLAN with IEEE 802.11g or 802.11n, the channels are arranged according to the 5- or 6-interval rule to operate several access points next to each other optimally.

1+6+11 (channel assignment for USA)

1+7+13 (channel assignment for Europe)

The reason for this is that the defined channels interfere with the neighboring channels in a reduced form. If access points are placed farther than 30 meters apart, the channel selection can be set tighter e.g.: (1+3). At this distance, interference is already very low.

With a denser channel assignment:

Two WLAN networks with the same channel interfere with each other the least. If the channels half overlap, one WLAN perceives the other as interference and tries to suppress the other with low modulation and maximum transmission power.

### 12.1.2 5 GHz WLAN

Frequency (GHz)	5.150	5.250	5.725
802.11 Allocations	UNII-1	UNII-2a	UNII-3
Center Frequency	5180 5200 5220 5240	5260 5280 ... 5700 5720	5745 5765 5785 5805
20 MHz	[36] [40] [44] [48]	52 56 ... 140 144	[149] [153] [157] [161] [165]
40 MHz	[36+40] [44+48]	54 ... 142	[149+153] [157+161]
80 MHz	[36+40+44+48]	58 ... 138	[149+153+157+161]

Please note that in our devices, DFS/TPC is inactive and the corresponding channels are not recommended!

### 12.1.2.1 20 MHz bandwidth

Adjustable channels in rsdbd.conf:

36,40,44,48,149,153,157,161,165

Example Configuration:channel\_10 = 36bandwith\_10 = 20

Terms of Use

Channel 36-48: indoor use only and max. 200 mW(Channel 0 -11) Short Range Devices max. 25 mW

### 12.1.2.2 40 MHz bandwidth

WLAN channels in the 40 MHz band are usually assigned the channel numbers in intervals of 8 (38, 46, 151, 159).

These channels can be set by entering the corresponding 20 MHz band and the appropriate bandwidth. Use the following adjustable channels only.

Adjustable channels in rsdbd.conf:

36,44,149,157

Example Configuration:channel\_10 = 36bandwith\_10 = 40

Terms of Use

Channel 36.44 indoor use only and max. 200 mW

Channel 149.157 Short Range Devices max. 25 mW

### 12.1.2.3 80 MHz bandwidth

WLAN channels in the 80 MHz band are usually assigned the channel numbers 42, 155.

These channels can be set by also entering the corresponding 20 MHz band and the appropriate bandwidth. Use the following adjustable channels only.

Adjustable channels in rsdbd.conf:

36, 149

Example Configuration:

channel\_10 = 36

bandwith\_10 = 80

Terms of Use:

Channel 36 indoor use only and max. 200 mW

Channel 149 Short Range Devices max. 25 mW

**INFORMATION**

These tables were created with the highest care. Legislative authorities may make regulatory changes at any time, whereby the terms of use may also change.

In addition to the national standards and laws, observe special regional regulations.

---

Currently, 2.4 GHz channels with a bandwidth of 20 MHz are supported.

Incorrect setting (country, bandwidth and channel) can, due to regulatory limitations, cause the WLAN in the defined configuration not to function!

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