



# MINT V3.0.0

GUIDELINE REV3.0

MICHEAS GOETHALS

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## Table of Revisions

Date	Version	Description of Changes	Status	Author
06-03-2025	1.0	Concept	Draft	Micheas Goethals
07-03-2025	2.0	Addition of MULTI PLC	Draft	Micheas Goethals
11-03-2025	2.1	Update to V2.0.1	Draft	Micheas Goethals
07-04-2025	2.2	Expansion of descriptions	Draft	Femke Parthoens
06-10-2025	2.3	Firmware change for PLC AXC 2152	Done	Micheas Goethals
20-11-2025	2.4	Basis firewall settings change	Done	Micheas Goethals
23-03-2026	3.0	Update for MINT V3.0	Done	Femke Parthoens

# 1 Terminology

- **MINT Core;** A MINT Core system is the control system responsible for continuously monitoring all defined limits.
- **MINT Advanced;** As soon as an additional feature is included in a MINT installation, it is referred to as MINT Advanced. These features may include generating optimised charging recommendations followed by the PLC, or visualisation. The MINT Core is always present and continuously monitors the fuse.
- **Multi PLC;** When the number of assets exceeds the limits for a single PLC and multiple PLCs are required for one MINT installation, this is referred to as a Multi PLC system. One PLC will act as the Main PLC, while the others are Sub PLCs.
- **Main;** Refers to the primary PLC in a Multi PLC system. This PLC is configured with the full installation to be monitored and will calculate all asset setpoints and forward them to the required Sub PLCs.
- **Sub;** Refers to PLCs subordinate to the Main PLC. A Sub PLC handles communication with part of the field devices, sends data to the Main PLC, and executes the calculated commands received from the Main PLC. A Sub PLC does not perform any calculations itself.
- **Advice;** A recommendation generated by an optimiser to control assets in an optimal way. A simple example is postponing charging sessions until solar intensity increases later in the day, resulting in lower charging costs and reduced CO<sub>2</sub> impact.
- **NTP (Network Time Protocol);** NTP defines the behaviour of systems within the same network that compare their configured time settings to ensure each device maintains accurate time. A standalone device may drift over time. Specialised NTP servers maintain accurate time and can be used for synchronisation.
- **Firewall;** A device's firewall is a network security system that determines whether specific network traffic is allowed to reach the device. In the case of a private firewall, such as that of a PLC, it can be configured directly on the device. It may also be necessary to adjust settings in the overarching network firewall in which the PLC operates to realise the project.

## 2 Required knowledge

To create MINT projects, experience with PLCnext Engineer and Code Creator, along with familiarity with firewalls, Modbus, MQTT, Linux, and the principles of electricity, is ideal.

However, using this step-by-step plan (or guideline) and the described tools, a large part of the preparations can be carried out with minimal prior knowledge.

For final verification, it is strongly recommended that someone with insight into the electrical network reviews the preparations.

## 3 MINT configuration preparation

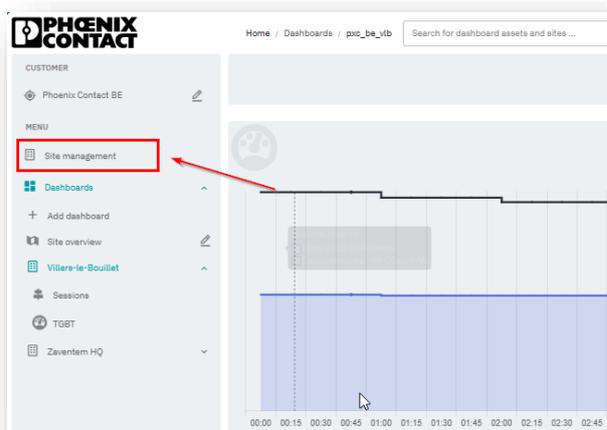
### 3.1 Download MINT configuration

The site configuration can be downloaded via the MINT Portal. Follow the steps below:

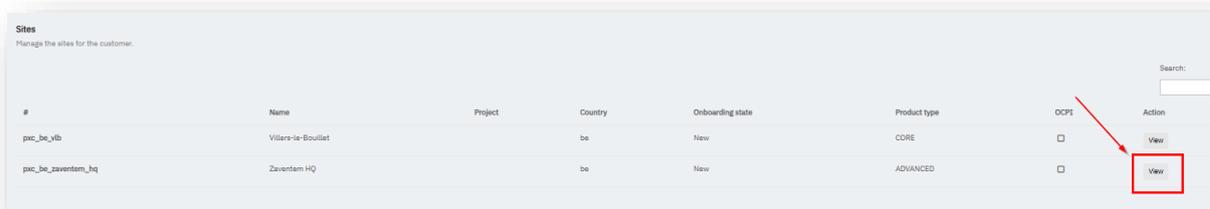
Go to the following URL to access the MINT Portal:

[| Phoenix Contact Mint](#)

Navigate to “site management”.

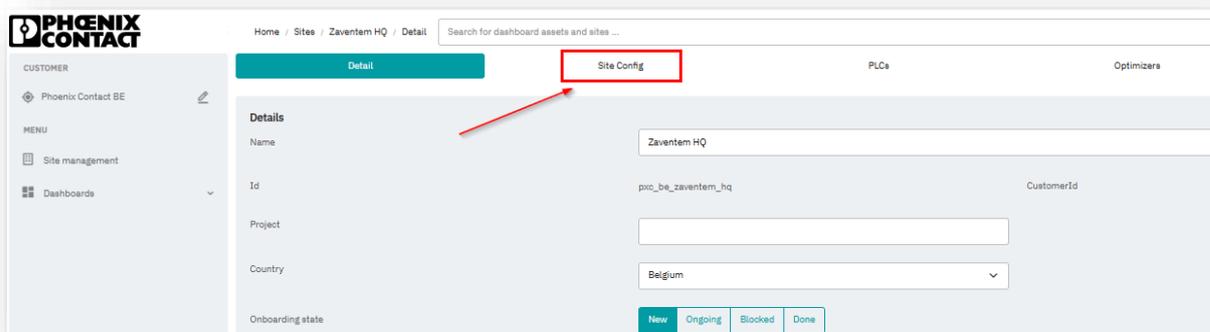


Navigate to “view”.



#	Name	Project	Country	Onboarding state	Product type	OCPI	Action
pac_be_vib	Villers-le-Bouillet		be	New	CORE	<input type="checkbox"/>	<a href="#">View</a>
pac_be_zaventem_hq	Zaventem HQ		be	New	ADVANCED	<input type="checkbox"/>	<a href="#">View</a>

Navigate to “Site Config”



Home / Sites / Zaventem HQ / Detail

Search for dashboard assets and sites ...

DETAIL | Site Config | PLCs | Optimizers

**Details**

Name: Zaventem HQ

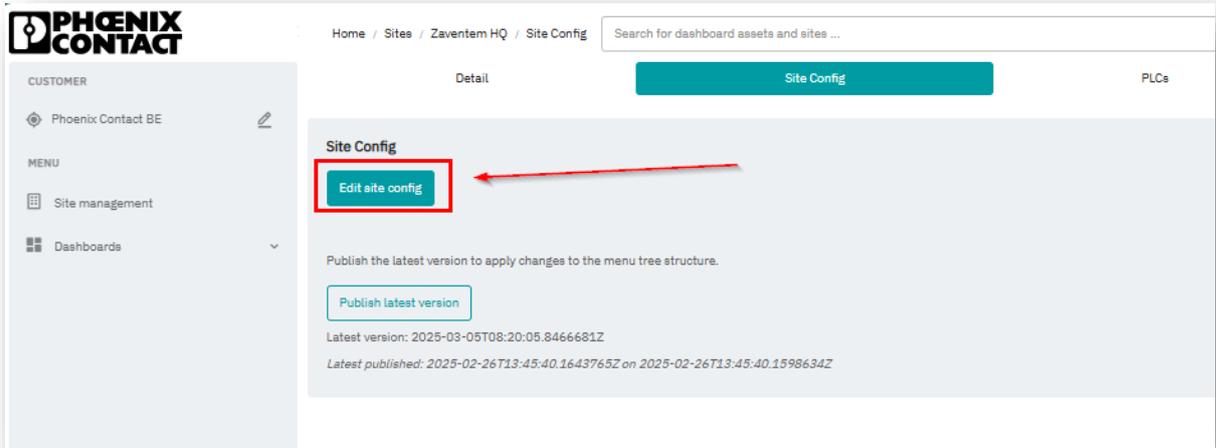
Id: pac\_be\_zaventem\_hq CustomerId

Project: [Empty field]

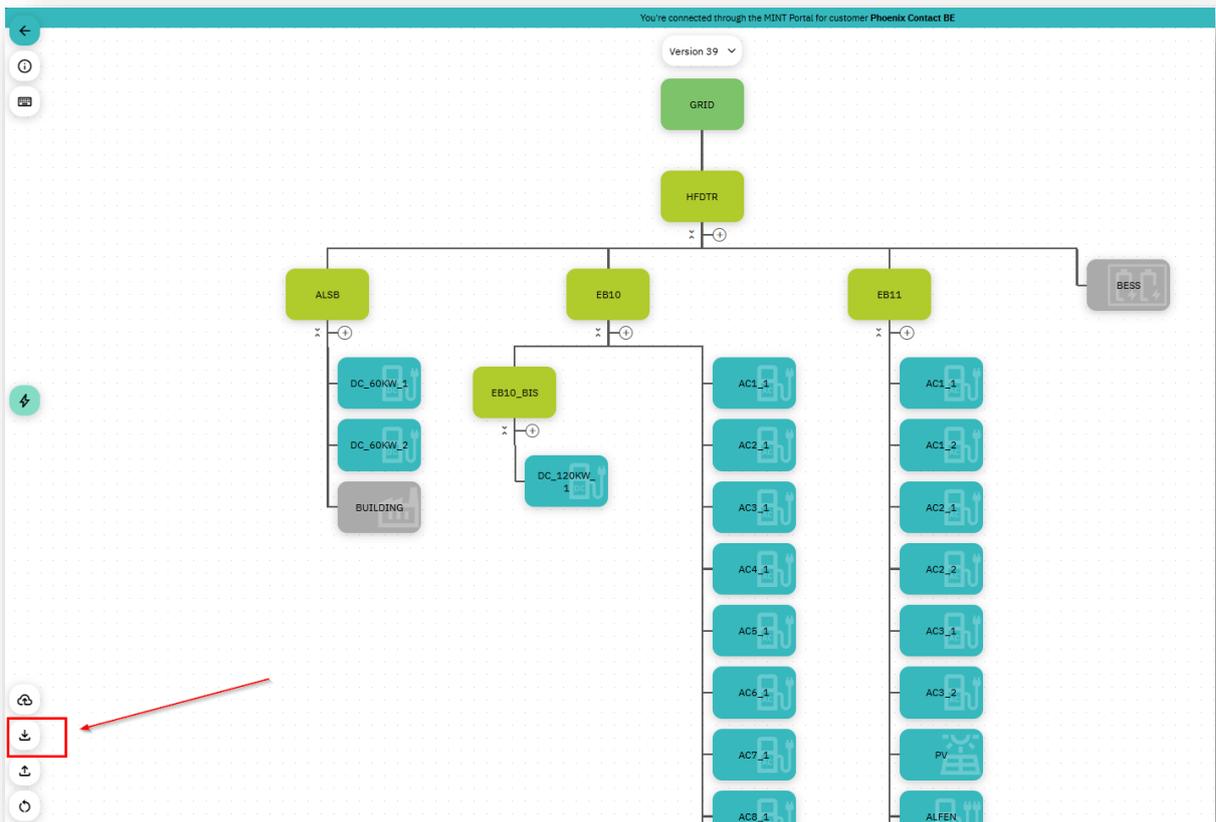
Country: Belgium [Dropdown menu]

Onboarding state: [New] [Ongoing] [Blocked] [Done]

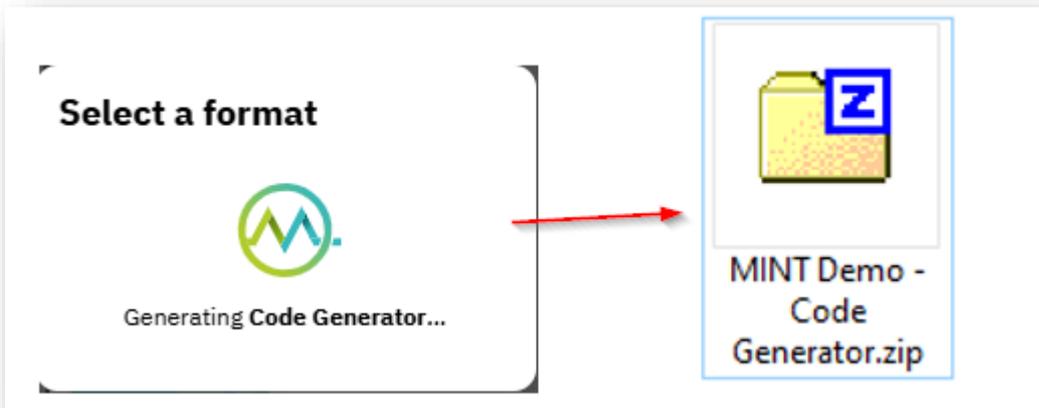
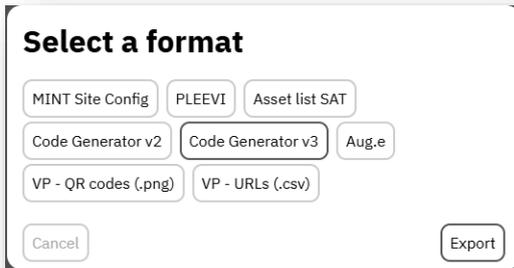
Navigate to “Edit site config”



Click on the download icon.

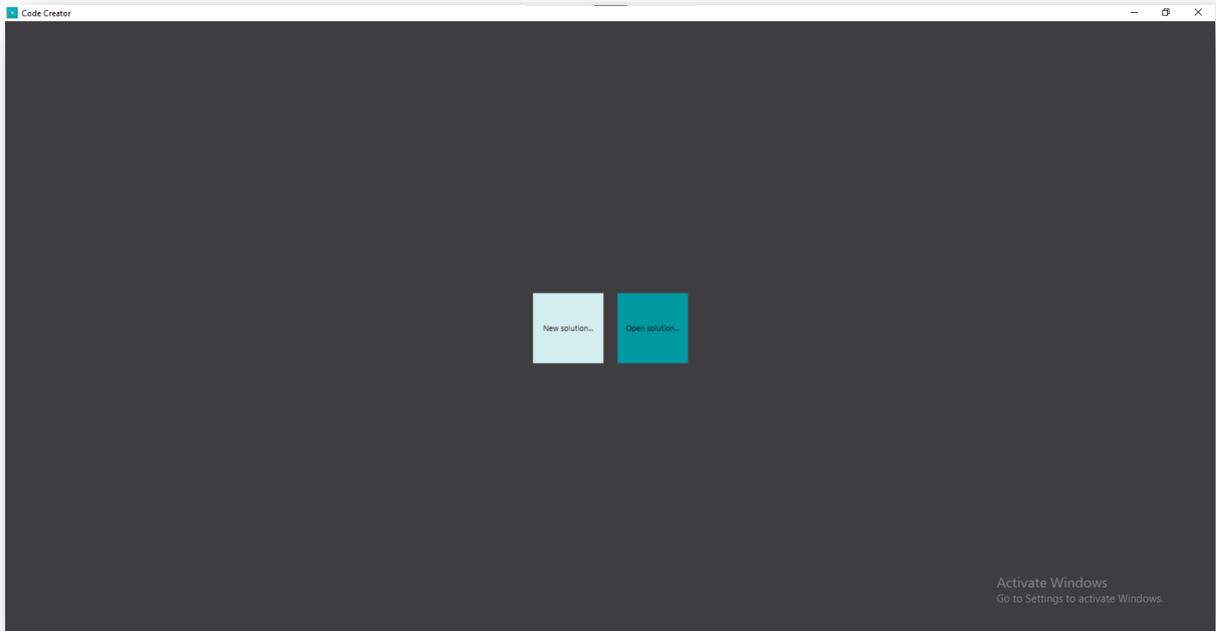


Select “Code Generator”, followed by “Export”

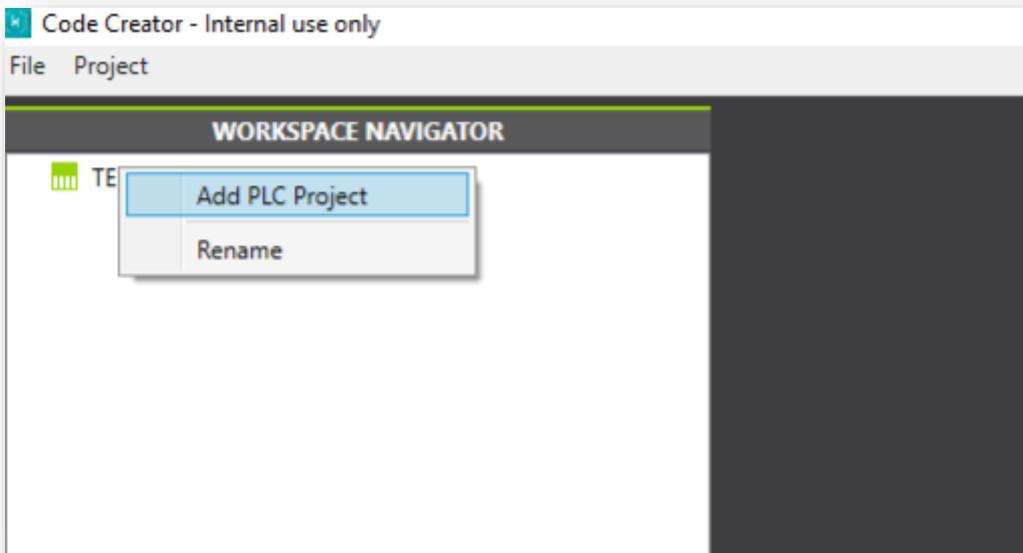


## 3.2 Creating a MINT project in CodeCreator

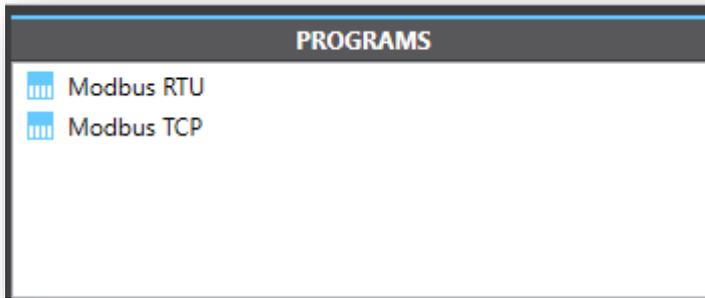
Open a new project using 'New Solution...'



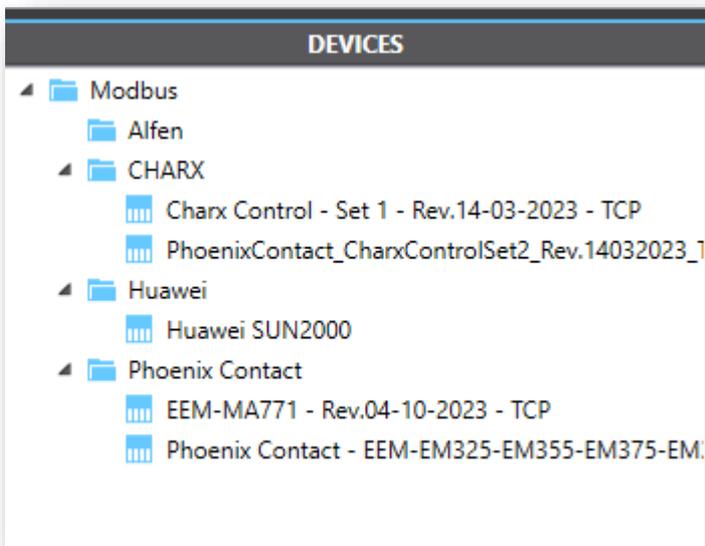
Right-click on the project name and choose 'Add PLC Project'



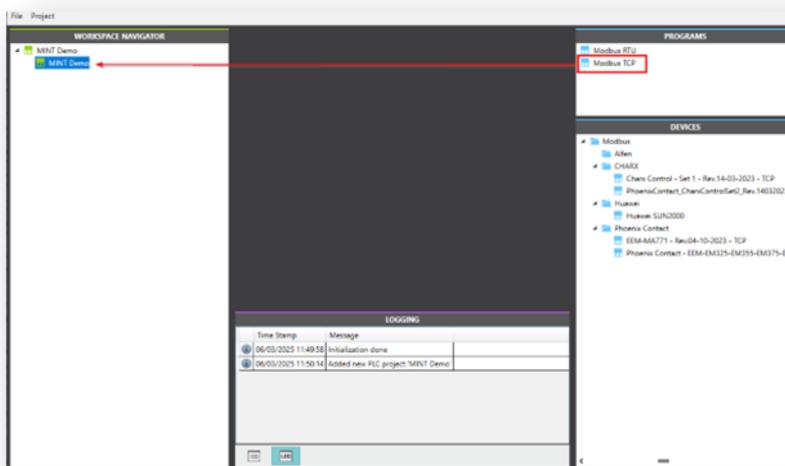
Import the programmes listed below.



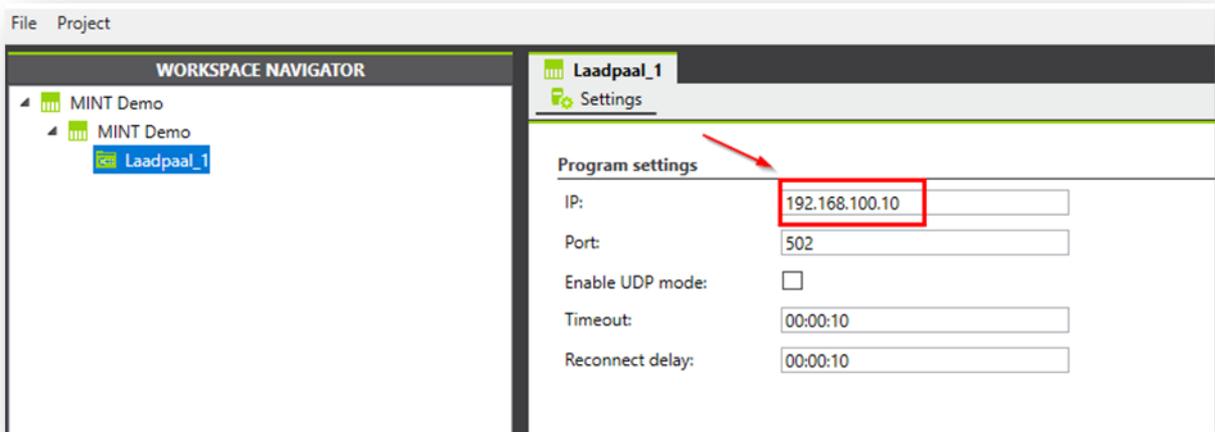
As well as the required device packages.



Add the necessary Modbus communication programme for each physical device.

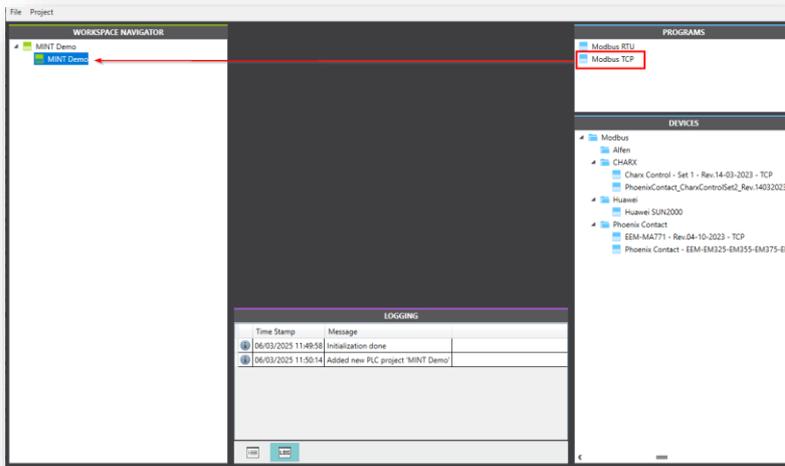


For communication via Modbus TCP, add one 'Modbus TCP' programme per IP address and enter the corresponding address.

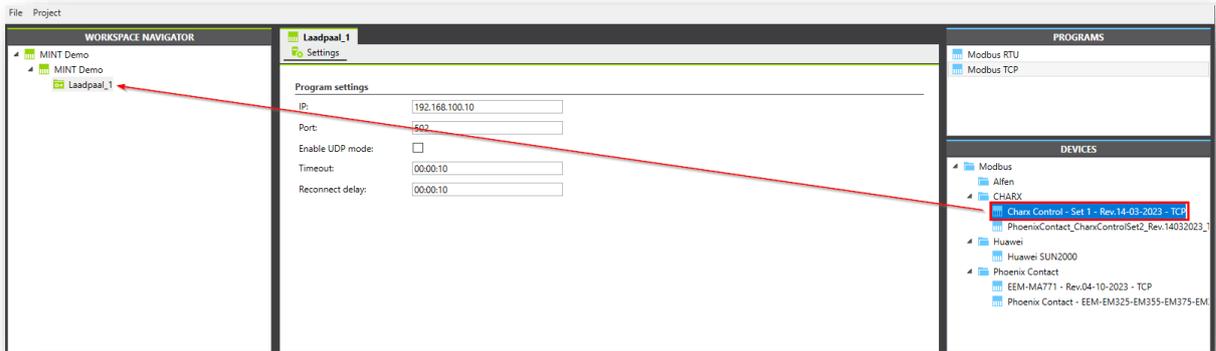


For communication via Modbus RTU, add one 'Modbus RTU' programme per serial connection. Choose the option that matches the hardware card connected to the PLC.

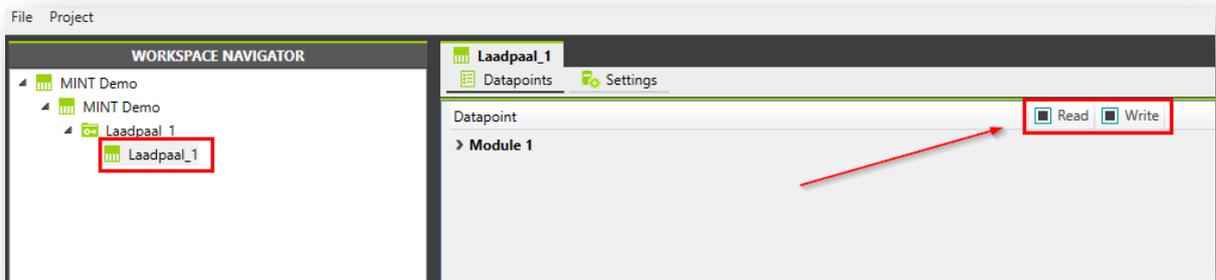
The names assigned to these blocks will be the names of the communication programmes in the PLC project. Pay close attention to naming conventions and ensure there are no spaces in the names.



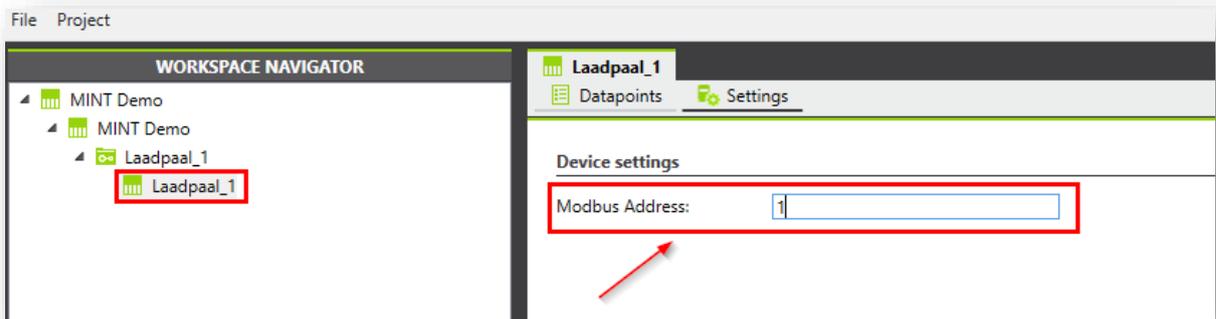
Next, add the required devices to the corresponding communication programme.



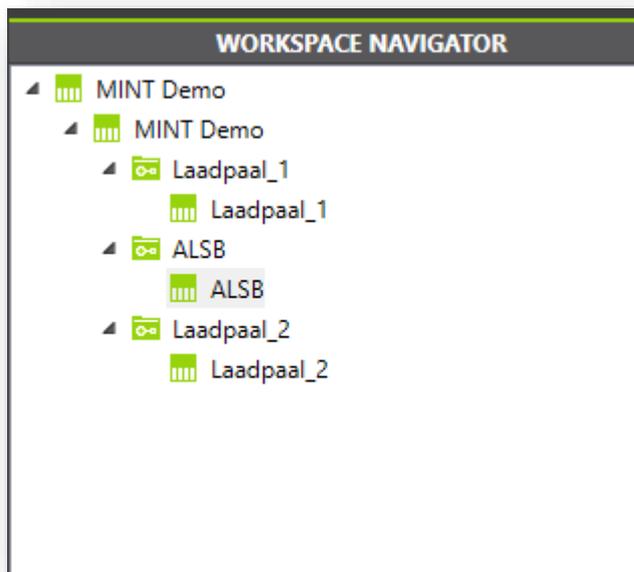
Indicate the necessary Read and Write registers.



In the Settings for each device, fill in the Modbus Address field with the corresponding unique identifier. If none exists, enter 1.



The final result should look like this:



### 3.3 Importing the “Code Generator” (.zip)

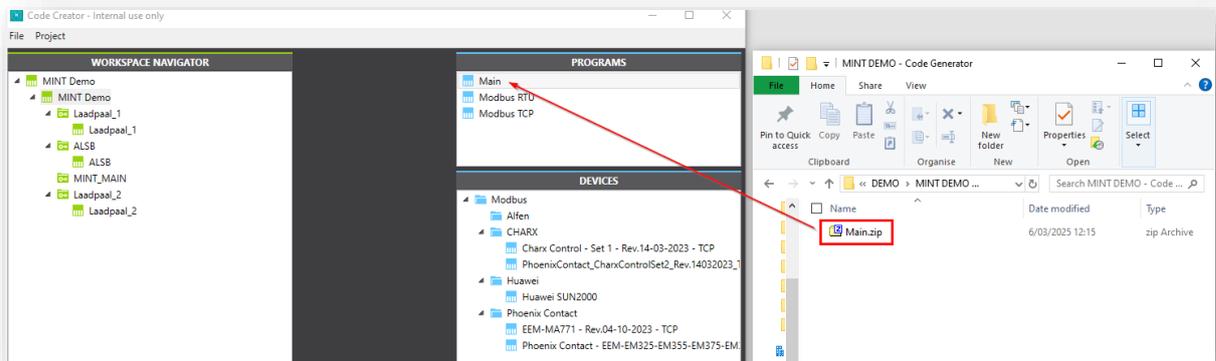
Once all steps from section 1.2 have been completed for the current setup, you can import the downloaded “Code Generator” into CodeCreator.

In the download folder, there will be one zipped folder for each required PLC project (naming convention: Main.zip, Sub X.zip).

Unpack the download folder and use these .zip folders as input files for CodeCreator.

Name	Date modified	Type	Size
MINT DEMO - Code Generator	6/03/2025 13:34	File folder	
MINT DEMO - Code Generator.zip	6/03/2025 13:34	zip Archive	6 KB

Name	Date modified	Type	Size
Main.zip	6/03/2025 12:15	zip Archive	6 KB



State	Required	Data type	Type identifier
Power L1	<input checked="" type="checkbox"/>	DINT	ActivePower1
Power L2	<input checked="" type="checkbox"/>	DINT	ActivePower2
Power L3	<input checked="" type="checkbox"/>	DINT	ActivePower3
Total Power	<input checked="" type="checkbox"/>	DINT	TotalActivePower
I L1	<input checked="" type="checkbox"/>	REAL	Current1
I L2	<input checked="" type="checkbox"/>	REAL	Current2
I L3	<input checked="" type="checkbox"/>	REAL	Current3
Reactive Power L1	<input checked="" type="checkbox"/>	DINT	ReactivePower1
Reactive Power L2	<input type="checkbox"/>	DINT	ReactivePower2
Reactive Power L3	<input type="checkbox"/>	DINT	ReactivePower3
Total Reactive Power	<input type="checkbox"/>	DINT	TotalReactivePower

Establish a link between the Code Generator input and the devices in the Workspace Navigator.

Note: It is not necessary to tick or untick any boxes in this view; they are purely informative for this application of CodeCreator.

**MINT\_MAIN**  
Device configuration

Attached device: Laadpaal\_1 Clear

State: Laadpaal\_1  
ALSB  
Laadpaal\_2

Power L1		<input checked="" type="checkbox"/>	DINT	ActivePower2
Power L2		<input checked="" type="checkbox"/>	DINT	ActivePower3
Power L3		<input checked="" type="checkbox"/>	DINT	TotalActivePower
Total Power		<input checked="" type="checkbox"/>	DINT	TotalActivePower
I L1		<input checked="" type="checkbox"/>	REAL	Current1
I L2		<input checked="" type="checkbox"/>	REAL	Current2
I L3		<input checked="" type="checkbox"/>	REAL	Current3
Reactive Power L1		<input type="checkbox"/>	DINT	ReactivePower1
Reactive Power L2		<input type="checkbox"/>	DINT	ReactivePower2
Reactive Power L3		<input type="checkbox"/>	DINT	ReactivePower3
Total Reactive Power		<input type="checkbox"/>	DINT	TotalReactivePower

**ALSB\_LAADPAAL\_1**

Attached device: Laadpaal\_1 Clear

State: Laadpaal\_1  
ALSB  
Laadpaal\_2

Total Power		<input checked="" type="checkbox"/>	DINT	ActivePower2
Max Charging Current		<input checked="" type="checkbox"/>	INT	CommandMaxChargingCurrent
I L1		<input checked="" type="checkbox"/>	REAL	Current1
I L2		<input checked="" type="checkbox"/>	REAL	Current2
I L3		<input checked="" type="checkbox"/>	REAL	Current3
Vehicle status		<input checked="" type="checkbox"/>	STRING	strVehicleStatus
Power L1		<input type="checkbox"/>	DINT	ActivePower1
Power L2		<input type="checkbox"/>	DINT	ActivePower2
Power L3		<input type="checkbox"/>	DINT	ActivePower3

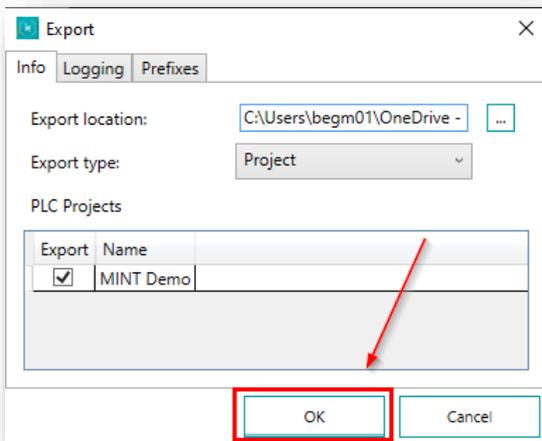
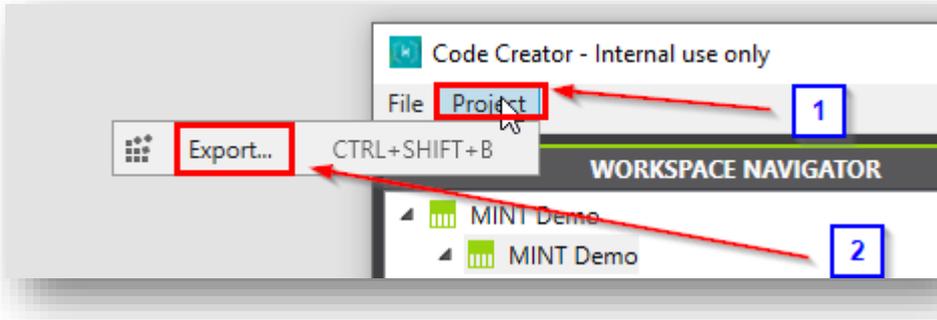
**ALSB\_LAADPAAL\_2**

Attached device: Laadpaal\_2 Clear

State: Laadpaal\_1  
ALSB  
Laadpaal\_2

Total Power		<input checked="" type="checkbox"/>	DINT	ActivePower2
Max Charging Current		<input checked="" type="checkbox"/>	INT	CommandMaxChargingCurrent
I L1		<input checked="" type="checkbox"/>	REAL	Current1
I L2		<input checked="" type="checkbox"/>	REAL	Current2
I L3		<input checked="" type="checkbox"/>	REAL	Current3
Vehicle status		<input checked="" type="checkbox"/>	STRING	strVehicleStatus
Power L1		<input type="checkbox"/>	DINT	ActivePower1
Power L2		<input type="checkbox"/>	DINT	ActivePower2
Power L3		<input type="checkbox"/>	DINT	ActivePower3
Charging Plug Capacity		<input type="checkbox"/>	INT	ChargingPlugCapacity
U L1_N		<input type="checkbox"/>	REAL	Voltage_1N
U L2_N		<input type="checkbox"/>	REAL	Voltage_2N

After completing all the steps above, export the code.



If the following “Message” appears, CodeCreator is ready.

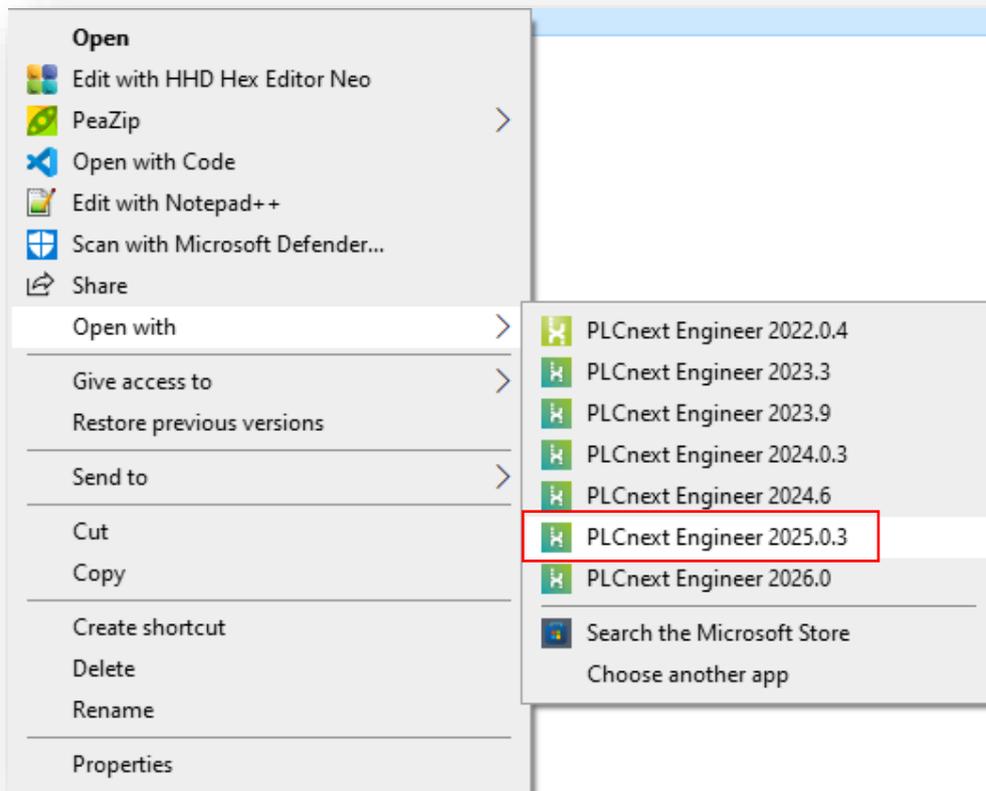
06/03/2025 13:23:20	Creating project	
06/03/2025 13:23:26	MINT Demo: Project is ready (C:\Users\begm01\OneDrive - PHOENIX CONTACT GmbH & Co. KG\Other\Desktop\MINT Demo.pcwex)	
06/03/2025 13:23:26	Done exporting	

Upon creation, a .pcwex file will be generated.

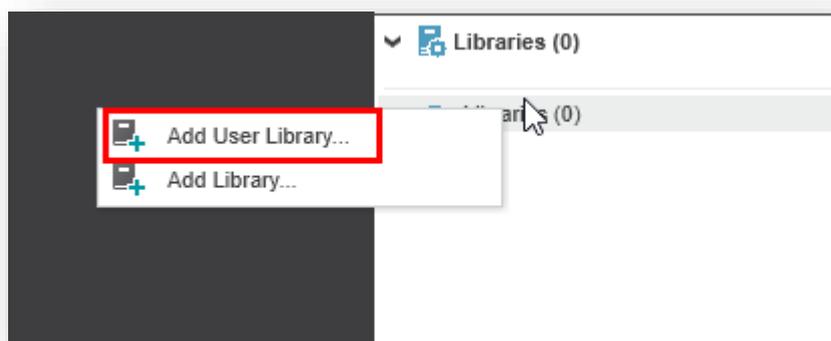
Name	Status	Date modified	Type	Size
MINT Demo.pcwex	🟢	6/03/2025 13:25	PCWEX File	157 KB

### 3.4 Creating a MINT Project

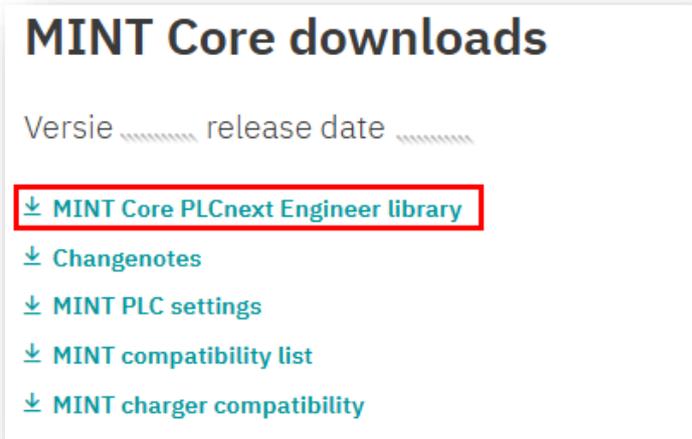
Open the generated file via CodeCreator using **PLCnext Engineer 2025.0.3 LTS**.



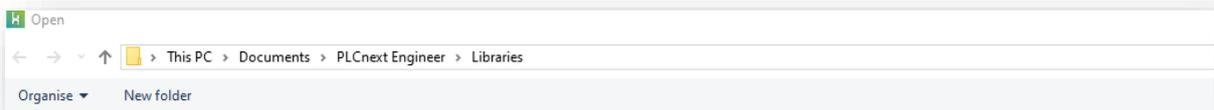
Import the correct libraries.



The required libraries for **MINT V3.0.0** can be downloaded via:  
[MINT energiebeheer met AI | Phoenix Contact](#)



Copy the path to the libraries from PLCnext Engineer.



Copy all these files (libraries).

*The example below uses version V3.0.0 – always use the latest version (!)*

Name	Date modified	Type	Size
PLCnextBase_1_7_1	23/03/2026 10:10	File folder	
IIoT_Library_5.pcwlx	27/01/2025 10:40	PCWLX File	1.531 KB
MINT_Core_v3.0.0.pcwlx	23/03/2026 09:44	PCWLX File	24.842 KB
PLCnextBase_1_7_1.pcwlx	17/02/2025 15:42	PCWLX File	1.849 KB

Return to the library path in PLCnext Engineer and place the libraries there.  
 Again, the example uses V3.0.0 – always use the latest version (!)

Name	Date modified	Type	Size
PLCnextBase_1_7_1	23/03/2026 10:10	File folder	
IIoT_Library_5.pcwlx	27/01/2025 10:40	PCWLX File	1.531 KB
MINT_Core_v3.0.0.pcwlx	23/03/2026 09:44	PCWLX File	24.842 KB
PLCnextBase_1_7_1.pcwlx	17/02/2025 15:42	PCWLX File	1.849 KB

It is also necessary to download the correct communication libraries via the PLCnext Store ([PLCnext Store | The open software store for automation](#)), such as Modbus\_TCP and Modbus\_RTU.

- Modbus\_TCP 16 has been successfully tested.
- Modbus\_RTU 17 has been successfully tested.



**Library**  
**Modbus\_RTU**  
Phoenix Contact GmbH & Co.  
KG  
Free

The Modbus\_RTU library offers function blocks for communication with the controller via Modbus RTU protocol.

Communication IO Module Functions



**Library**  
**ReSyNetM - Modbus**  
Phoenix Contact GmbH & Co. KG  
Free

Compiled in PLCnextEngineer 2025.0  
 With this library the following Modbus drivers can be realized: - Modbus RTU Client - Modbus RTU Server - Modbus TCP Client - Modbus TCP Server

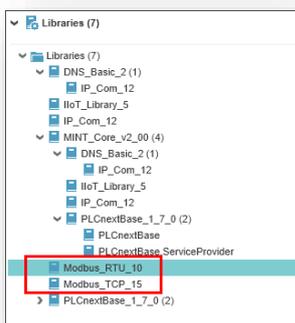
Communication IO Module Functions



**Library**  
**Modbus\_TCP**  
Phoenix Contact GmbH & Co.  
KG  
Free

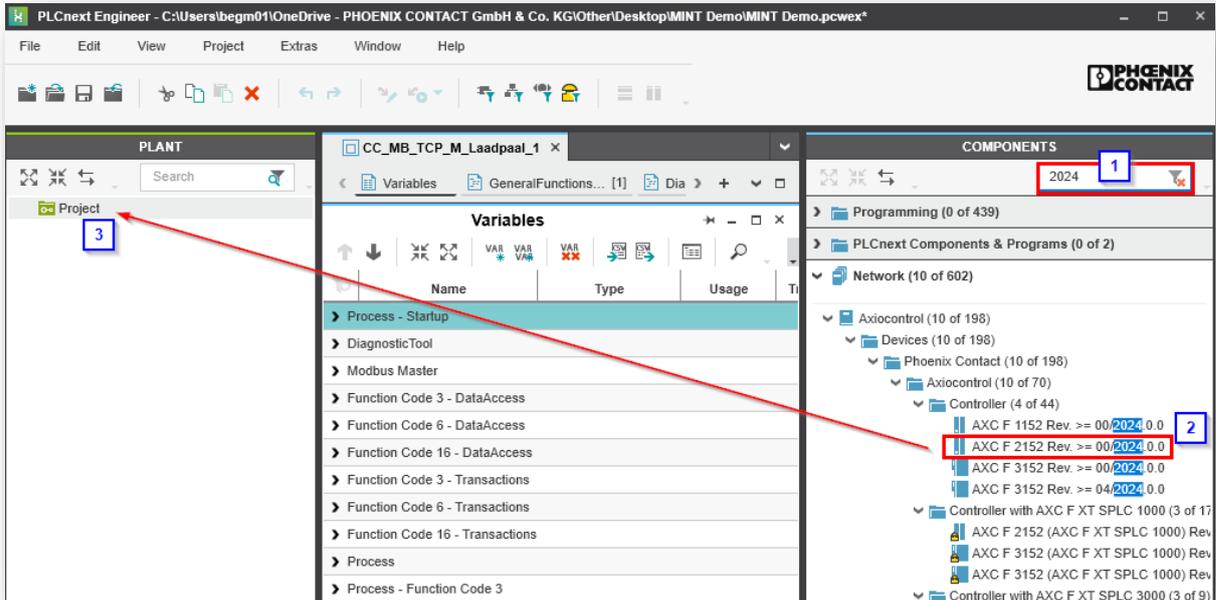
For the MB\_TCP\_Server function block, the registers used for Modbus correspond to the elements of the udtTCP\_ComData array. Each WORD array element is to be considered as a 16-bit Modbus register. The...

Communication



Adding a PLC to the project;

Use the search function to look for “2024”, then drag AXC F 2152 Rev.  $\geq$  00/2024.0.0 into the project.

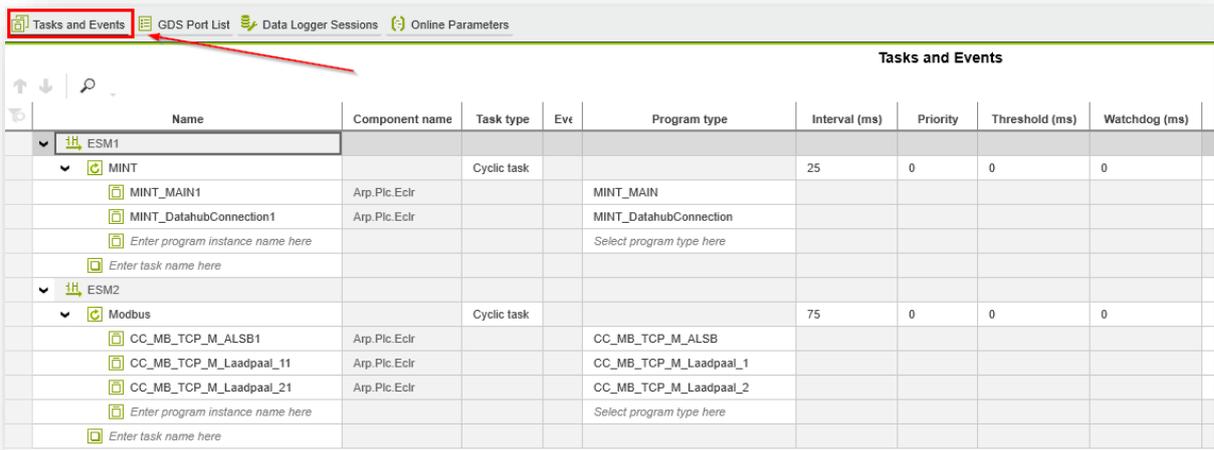


### Creating Tasks and Events

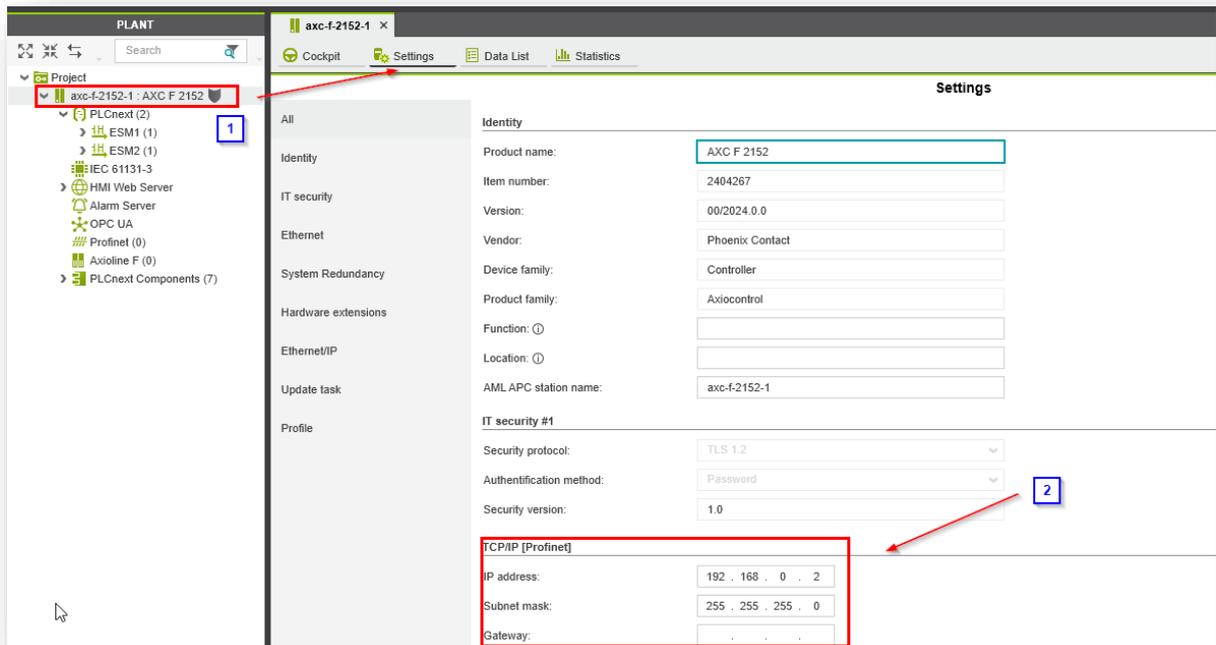
For the MINT section, a task must be created with a cycle time of 25 ms.

Add the generated MINT programme and the MINT\_DatahubConnection programme to this task to ensure they are properly aligned. Disable the watchdog by setting it to 0.

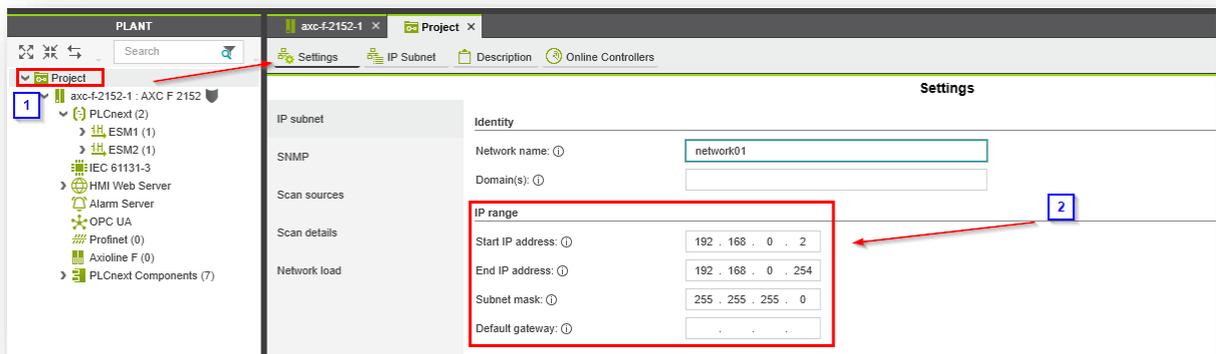
Add the communication programmes to the second core, choose a suitable cycle time, and disable the watchdog.



## Adjusting the PLC IP address



The IP range must also be updated in the project to reflect the actual situation.



In the GDS Port List, link the IN PORTS and OUT PORTS of the MINT programme to their counterparts in the communication programmes

Tasks and Events | **GDS Port List** | Data Logger Sessions | Online Parameters

### GDS Port List

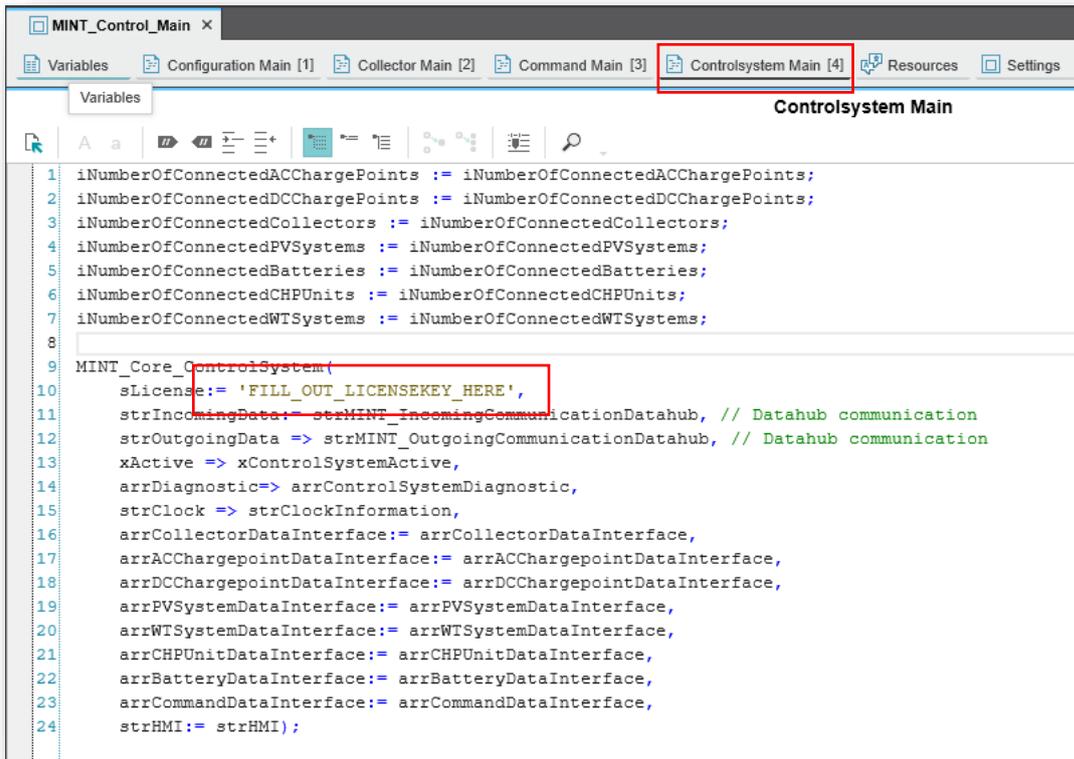
OUT Port	IN Port	Function
Arp.Plc.Eclr / MINT_MAIN1 : strMINT_OutgoingCommunicationDatahub	Select IN Port here	
Arp.Plc.Eclr / MINT_MAIN1 : OUT_ALSB_LAADPAAL_1	Select IN Port here	
Arp.Plc.Eclr / MINT_MAIN1 : OUT_ALSB_LAADPAAL_2	Select IN Port here	
Arp.Plc.Eclr / MINT_DatahubConnection1 : strMINT_Datahub_OUT	Select IN Port here	
Select OUT Port here	Arp.Plc.Eclr / MINT_MAIN1 : strMINT_IncomingCommunicationDatahub	
Select OUT Port here	Arp.Plc.Eclr / MINT_MAIN1 : IN_ALSB	
Select OUT Port here	Arp.Plc.Eclr / MINT_MAIN1 : IN_ALSB_LAADPAAL_1	
Select OUT Port here	Arp.Plc.Eclr / MINT_MAIN1 : IN_ALSB_LAADPAAL_2	
Select OUT Port here	Arp.Plc.Eclr / MINT_DatahubConnection1 : strMINT_Datahub_IN	
Arp.Plc.Eclr / CC_MB_TCP_M_ALSB1 : strCC_MB_TCP_M_NotificationSystem	Select IN Port here	
Arp.Plc.Eclr / CC_MB_TCP_M_ALSB1 : ALSB_OUT_PORT	Select IN Port here	
Arp.Plc.Eclr / CC_MB_TCP_M_Laadpaal_11 : strCC_MB_TCP_M_NotificationSystem	Select IN Port here	
Arp.Plc.Eclr / CC_MB_TCP_M_Laadpaal_11 : LAADPAAL_1_OUT_PORT	Select IN Port here	
Arp.Plc.Eclr / CC_MB_TCP_M_Laadpaal_21 : strCC_MB_TCP_M_NotificationSystem	Select IN Port here	
Arp.Plc.Eclr / CC_MB_TCP_M_Laadpaal_21 : LAADPAAL_2_OUT_PORT	Select IN Port here	
Select OUT Port here	Arp.Plc.Eclr / CC_MB_TCP_M_ALSB1 : CHARXSettings	
Select OUT Port here	Arp.Plc.Eclr / CC_MB_TCP_M_ALSB1 : ALSB_IN_PORT	
Select OUT Port here	Arp.Plc.Eclr / CC_MB_TCP_M_Laadpaal_11 : CHARXSettings	
Select OUT Port here	Arp.Plc.Eclr / CC_MB_TCP_M_Laadpaal_11 : LAADPAAL_1_IN_PORT	
Select OUT Port here	Arp.Plc.Eclr / CC_MB_TCP_M_Laadpaal_21 : CHARXSettings	
Select OUT Port here	Arp.Plc.Eclr / CC_MB_TCP_M_Laadpaal_21 : LAADPAAL_2_IN_PORT	
Select OUT Port here	Select IN Port here	

Tasks and Events | **GDS Port List** | Data Logger Sessions | Online Parameters

### GDS Port List

OUT Port	IN Port	Function
Arp.Plc.Eclr / MINT_MAIN1 : strMINT_OutgoingCommunicationDatahub	Arp.Plc.Eclr / MINT_DatahubConnection1 : strMINT_Datahub_IN	
Arp.Plc.Eclr / MINT_MAIN1 : OUT_ALSB_LAADPAAL_1	Arp.Plc.Eclr / CC_MB_TCP_M_Laadpaal_11 : LAADPAAL_1_IN_PORT	
Arp.Plc.Eclr / MINT_MAIN1 : OUT_ALSB_LAADPAAL_2	Arp.Plc.Eclr / CC_MB_TCP_M_Laadpaal_21 : LAADPAAL_2_IN_PORT	
Arp.Plc.Eclr / MINT_DatahubConnection1 : strMINT_Datahub_OUT	Arp.Plc.Eclr / MINT_MAIN1 : strMINT_IncomingCommunicationDatahub	
Arp.Plc.Eclr / CC_MB_TCP_M_ALSB1 : ALSB_OUT_PORT	Arp.Plc.Eclr / MINT_MAIN1 : IN_ALSB	
Arp.Plc.Eclr / CC_MB_TCP_M_Laadpaal_21 : LAADPAAL_2_OUT_PORT	Arp.Plc.Eclr / MINT_MAIN1 : IN_ALSB_LAADPAAL_1	
Arp.Plc.Eclr / CC_MB_TCP_M_Laadpaal_11 : LAADPAAL_1_OUT_PORT	Arp.Plc.Eclr / MINT_MAIN1 : IN_ALSB_LAADPAAL_2	
Arp.Plc.Eclr / CC_MB_TCP_M_ALSB1 : strCC_MB_TCP_M_NotificationSystem	Select IN Port here	
Arp.Plc.Eclr / CC_MB_TCP_M_Laadpaal_11 : strCC_MB_TCP_M_NotificationSystem	Select IN Port here	
Arp.Plc.Eclr / CC_MB_TCP_M_Laadpaal_21 : strCC_MB_TCP_M_NotificationSystem	Select IN Port here	
Select OUT Port here	Arp.Plc.Eclr / CC_MB_TCP_M_ALSB1 : CHARXSettings	
Select OUT Port here	Arp.Plc.Eclr / CC_MB_TCP_M_ALSB1 : ALSB_IN_PORT	
Select OUT Port here	Arp.Plc.Eclr / CC_MB_TCP_M_Laadpaal_11 : CHARXSettings	
Select OUT Port here	Arp.Plc.Eclr / CC_MB_TCP_M_Laadpaal_21 : CHARXSettings	
Select OUT Port here	Select IN Port here	

Adding the MINT licence, this can be obtained via Phoenix Contact.



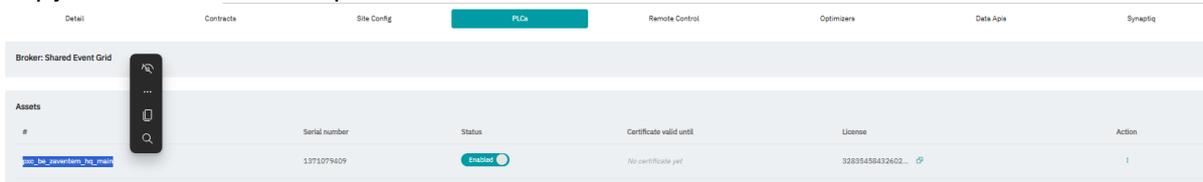
```

1 iNumberOfConnectedACChargePoints := iNumberOfConnectedACChargePoints;
2 iNumberOfConnectedDCChargePoints := iNumberOfConnectedDCChargePoints;
3 iNumberOfConnectedCollectors := iNumberOfConnectedCollectors;
4 iNumberOfConnectedPVSystems := iNumberOfConnectedPVSystems;
5 iNumberOfConnectedBatteries := iNumberOfConnectedBatteries;
6 iNumberOfConnectedCHPUnits := iNumberOfConnectedCHPUnits;
7 iNumberOfConnectedWTSystems := iNumberOfConnectedWTSystems;
8
9 MINI_Core_ControlSystem(
10   sLicense := 'FILL_OUT_LICENSEKEY_HERE',
11   strIncomingData := strMINT_IncomingCommunicationDatahub, // Datahub communication
12   strOutgoingData := strMINT_OutgoingCommunicationDatahub, // Datahub communication
13   xActive => xControlSystemActive,
14   arrDiagnostic => arrControlSystemDiagnostic,
15   strClock => strClockInformation,
16   arrCollectorDataInterface := arrCollectorDataInterface,
17   arrACChargepointDataInterface := arrACChargepointDataInterface,
18   arrDCChargepointDataInterface := arrDCChargepointDataInterface,
19   arrPVSystemDataInterface := arrPVSystemDataInterface,
20   arrWTSystemDataInterface := arrWTSystemDataInterface,
21   arrCHPUnitDataInterface := arrCHPUnitDataInterface,
22   arrBatteryDataInterface := arrBatteryDataInterface,
23   arrCommandDataInterface := arrCommandDataInterface,
24   strHMI := strHMI);

```

Adding the Site ID, this can be obtained via Phoenix Contact or via the MINT Portal. It is required to set up outbound communication from the PLC.

Copy the SiteID from the portal:



#	Serial number	Status	Certificate valid until	License	Action
1371079409	1371079409	Enabled	No certificate yet	32835458422602	!

```

MINT_Control_Main x
Variables Configuration Main [1] Collector Main [2] Command Main [3] Controlsystem Main [4] Resources Settings

Configuration Main

88 eMINT_Configuration_AC_ChargepointMaxCurrent#Max_32A,
89 'ASSETS_AC_CHARGER_1',
90 eMINT_Configuration_PhasePermutation#RST_L1L2L3,
91 eMINT_Configuration_PriorityLevel#Normal,
92 eMINT_Configuration_AC_ChargepointMaxCurrent#Max_32A,
93 'ASSETS_AC_CHARGER_2',
94 eMINT_Configuration_PhasePermutation#RST_L1L2L3,
95 eMINT_Configuration_PriorityLevel#Normal,
96 eMINT_Configuration_AC_ChargepointMaxCurrent#Max_32A);
97
98 10: MINT_Core_ControlSystem.Configuration_Connection('Sub_1','xx.xx.xx.xx',UINT#45000);
99
100 13: MINT_Core_ControlSystem.Configuration_Datahub(
101     'FILL_OUT_SITE_ID_HERE_DONT_FORGET_TO_UPLOAD_THE_CERTIFICATES',
102     eMINT_Configuration_EnergyReport#EnableArray);
103

```

For a MINT Advanced with optimised charging schedules, the working modes of the asset types must be set to Remote.  
*(See example below for AC charging stations)*

```

103
104 14: MINT_Core_ControlSystem.Configuration_AC_Chargepoint_EnableRemote();
105
106 //15: MINT_Core_ControlSystem.Configuration_DC_Chargepoint_EnableRemote();
107
108 //16: MINT_Core_ControlSystem.Configuration_PV_System_EnableRemote();
109
110 27: MINT_Core_ControlSystem.Configuration_Ready();
111
112 37: MINT_Core_ControlSystem.Control_EnableDisable(eMINT_Control#Enable);
113
114 END_CASE;

```

## 4 Preparing the PLC

For the MINT V2.0.1 update, the PLC must also undergo several updates and adjustments. These are explained below.

### 4.1 Firmware update

The PLC (or PLCs) must be updated to version 2024.0.16 LTS.

This version can be found on the Phoenix Contact website: ([AXC F 2152 - Besturing - 2404267 | Phoenix Contact](#))

+ Versie 2024.6.1		
+ Versie 2024.6		
- Versie 2024.0.16 LTS		
Bestand	Hardwareversie	Compatibele (software)tool
<a href="#">AXC_F_2152_FW_2024_0_16.zip</a> (198 MB)	02, 03, 04, 05, 06	PLCnext Engineer 2025.6 PLCnext Engineer 2021.9 PLCnext Engineer 2022.0.1 LTS PLCnext Engineer

Navigate to the WBM (Web-Based Management) interface of the PLC and go to “Firmware Update”. **(!) This update must be performed twice (!)**



Project Name: [redacted] HW: 05 FW: 2022.0.8 LTS MAC: A8:74:1D:16:52:91

**Tip of the day**

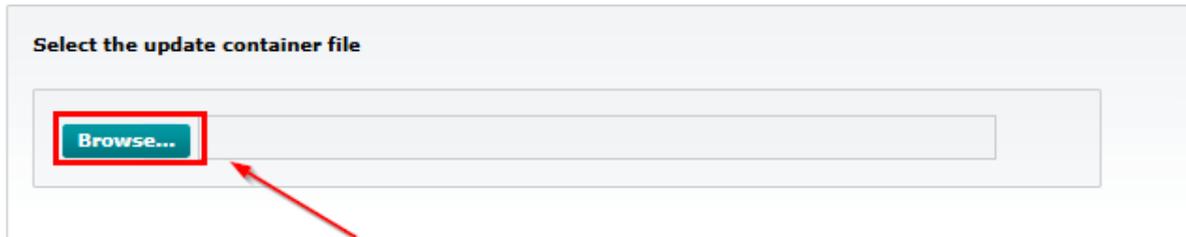
Attention! Security considerations required!

- Check the security configuration of the controller.
- Perform a security risk analysis and configure the controller accordingly.

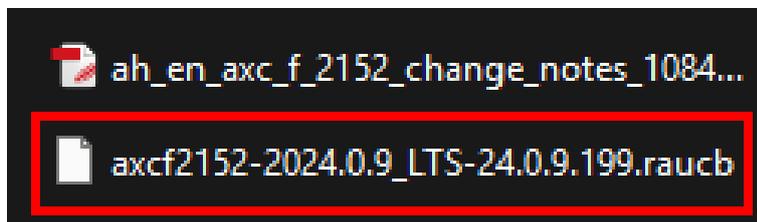
Information on security-relevant aspects can be found in the PLCnext Security Info Center (see "Help" menu).

# Administration

## Firmware Update



Select the .raucb file for version 2024.0.16 LTS.



## 4.2 System services

Navigate to “System Services” in the PLC’s WBM.  
Ensure all settings match the configuration shown below.

**Configuration**

System Services

Service ID	Service Name	Factory Default	Activation
APP MANAGER	App Manager	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
DATALOGGER	Data Logger	<input checked="" type="checkbox"/>	<input type="checkbox"/>
EHMI	PLCnext Engineer HMI	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ETHERNET IP	EtherNet/IP (slave device)	<input checked="" type="checkbox"/>	<input type="checkbox"/>
FWM	Firewall Manager	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
GPRC LOCAL SERVER	gRPC Remote Procedure Calls (Local)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
IEC	IEC 61131-3 Runtime for PLCnext Engineer	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
LINUX SYSLOG	PLCnext Syslog adapter	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
NETLOAD LIMITER	Netload Limiter	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
OPCUA	OPC UA Server	<input checked="" type="checkbox"/>	<input type="checkbox"/>
OPCUA CLIENT	OPC UA Client	<input type="checkbox"/>	<input type="checkbox"/>
OPCUA PUBSUB	OPC UA PubSub	<input type="checkbox"/>	<input type="checkbox"/>
PLCNEXT STORE	PLCnext Store Connector	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PROFICLOUD	Proficloud	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PROFINET CONTROLLER	Profinet Controller	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PROFINET DEVICE	Profinet Device	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SOFTWARE UPDATE	Software Update via Device and Update Management	<input type="checkbox"/>	<input type="checkbox"/>
TRACING	Trace Controller	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Buttons: Discard, **Apply and reboot**

## 4.3 Firewall settings

**Security**

Firewall

System Message  
Configuration status = OK

System Status  
List of activated firewall rules [Show Rules](#)

General Configuration  
Status: **Start** (Current: started)  
Activation:

Activated: Firewall is started. After system restart the firewall will be activated  
Deactivated: Firewall is stopped. After system restart the firewall will be deactivated

Basic Configuration | User Configuration

ICMP Configuration

Incoming ICMP requests accepted	When deactivated, pings to the Controller are blocked	<input checked="" type="checkbox"/>
Outgoing ICMP requests accepted	When deactivated, pings from the Controller are blocked	<input checked="" type="checkbox"/>

Basic Rules

Seq.	Direction	Protocol	To Port	Comment	Action
1	Input	UDP	123	NTP (Network Time Protocol)	Drop
2	Input	TCP	41100	Remoting (e.g. PLCnext Engineer)	Accept
3	Input	TCP	22	SSH	Accept
4	Input	TCP	80	HTTP	Drop
5	Input	TCP	443	HTTPS, Proficloud, eHMI	Accept
6	Input	TCP	4840	OPC UA	Drop
7	Input	TCP	17725	(Standard-Port) External Mode Matlab Simulink	Drop

Buttons: Discard, **Apply**

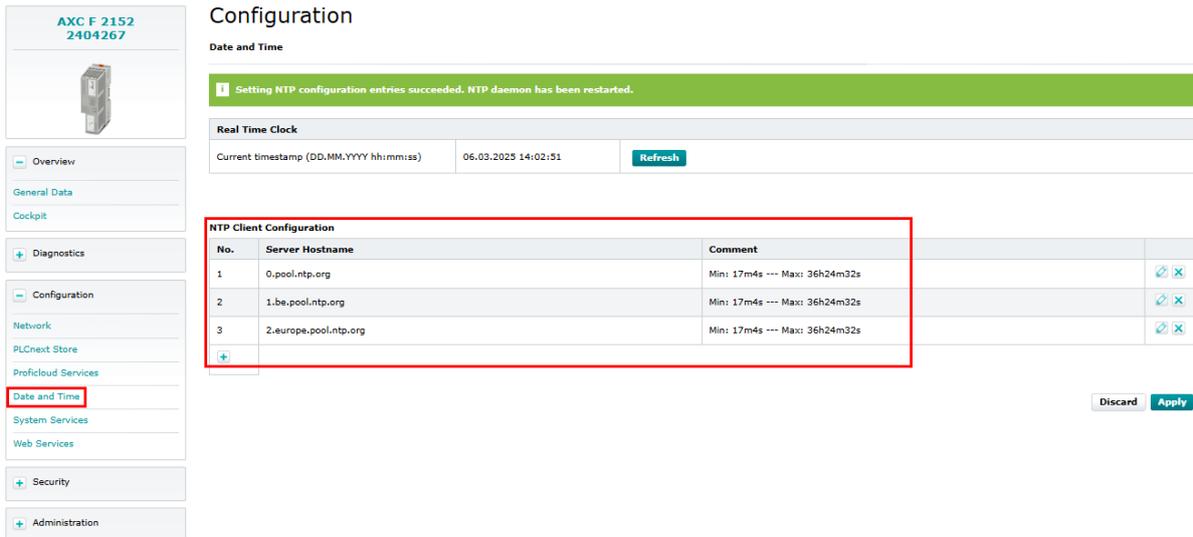
## 4.4 NTP synchronisation

Add the following NTP servers:

- 0.pool.ntp.org
- 1.be.pool.ntp.org
- 2.europe.pool.ntp.org

min. polling van: 17m4s

max. polling van: 36h24m32s



**Configuration**

**Date and Time**

Setting NTP configuration entries succeeded. NTP daemon has been restarted.

**Real Time Clock**

Current timestamp (DD.MM.YYYY hh:mm:ss) 06.03.2025 14:02:51 [Refresh](#)

**NTP Client Configuration**

No.	Server Hostname	Comment	
1	0.pool.ntp.org	Min: 17m4s --- Max: 36h24m32s	<a href="#">✎</a> <a href="#">✕</a>
2	1.be.pool.ntp.org	Min: 17m4s --- Max: 36h24m32s	<a href="#">✎</a> <a href="#">✕</a>
3	2.europe.pool.ntp.org	Min: 17m4s --- Max: 36h24m32s	<a href="#">✎</a> <a href="#">✕</a>

[Discard](#) [Apply](#)

## 4.5 Adding The Certificates to the PLC

Use the tool WinSCP to log in using the PLC's username and password.

The Eventgrid certificate and certificate key must be uploaded to the PLC.

This certificate can be downloaded via the MINT Portal.



**Assets**

#	Serial number	Status	Certificate valid until	License	Action
plc_be_paventem_hg_main	1375279409	Enabled	No certificate yet	32835458432602...	<a href="#">1</a>
plc_be_paventem_hg_sub1	1366329173	Enabled	2025-05-21	53524589420208...	<a href="#">Stream telemetry</a> <a href="#">Clear serial number</a> <a href="#">Send comment</a> <a href="#">Download certificate</a> <a href="#">Download certificate key</a>

[+ add new PLC plc\\_be\\_paventem\\_hg\\_sub2](#)

- WinSCP

Session Options Remote Help

Transfer Settings: Default

New Session

plcnext

Download Edit Properties New

/opt/plcnext/

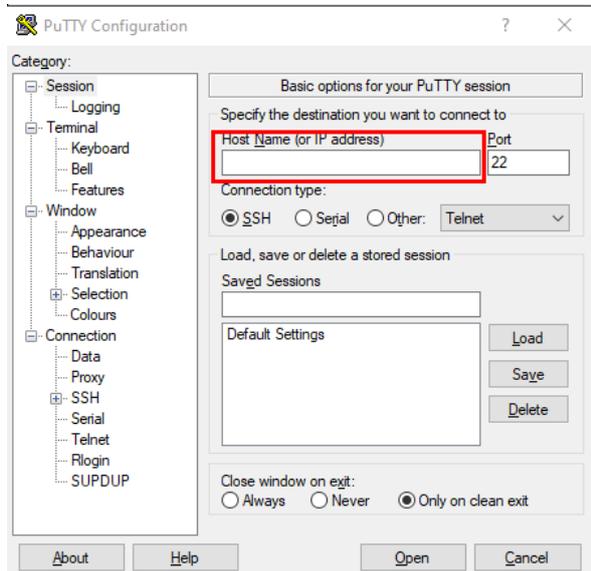
Name	Size	Changed	Rights	Owner
..		24/06/2025 08:25:28	rw-rw-r-x	admin
shadowing		17/02/2025 21:47:00	rw-rw-r-x	admin
Security		09/03/2018 13:34:56	rw-rw-r-x	admin
retaining		14/01/2025 14:40:03	rw-rw-r-x	admin
projects		09/03/2026 09:29:17	rw-rw-r-x	plcnext...
lttng		09/03/2018 13:34:56	rw-rw-r-x	admin
logs		23/03/2026 12:18:31	rw-rw-r-x	plcnext...
installed_apps		14/01/2025 14:39:27	rw-r-xr-x	root
data		20/02/2025 08:01:00	rw-rw-r-x	plcnext...
config		14/01/2025 14:39:45	rw-rw-r-x	admin
appshome		14/01/2025 14:39:57	rw-rw-r-x	plcnext...
apps		14/01/2025 14:39:47	rw-rw-r-x	plcnext...
pxc_be_zaventem_hq_main.pem	6 KB	04/08/2025 13:02:51	rw-rw-r--	admin
pxc_be_zaventem_hq_main.key	2 KB	04/08/2025 13:02:56	rw-rw-r--	admin

0 B of 6,64 KB in 0 of 13

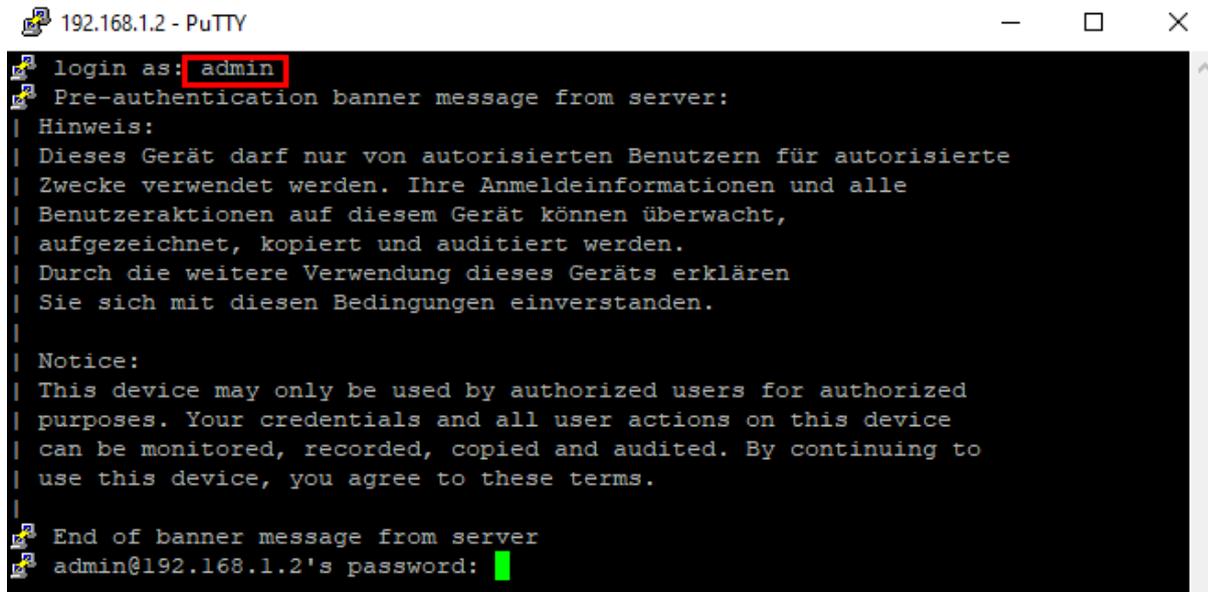
## 4.6 Checking the PLC via Linux

Use the tool 'PuTTY'.

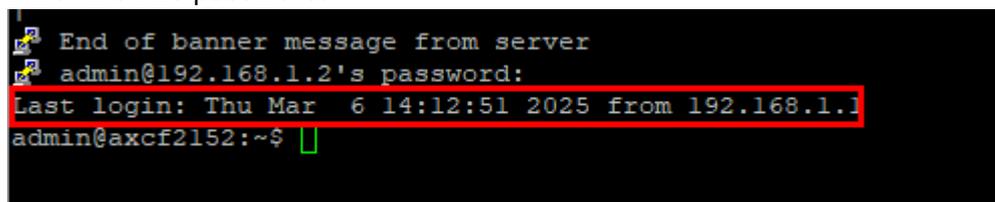
Enter the IP address of the PLC.



Log in as: 'admin'



Enter the PLC password.



## 4.6.1 Check the firmware

Current state need to be version 2024.0.16 LTS.

**Enter the command: “rauc status --detailed”**

```
admin@axcf2152:~$ rauc status --detailed
=== System Info ===
Compatible:  axcf2152_v1
Variant:
Booted from: rootfs.1 (B)
```

```
=== Slot States ===
x [rootfs.1] (/dev/mmcblk0p3, ext4, booted)
  bootname: B
  mounted: /media/rfs/ro
  boot status: good
  slot status:
    bundle:
      compatible=axcf2152_v1
      version=24.0.8.183
      description=Update container for axcf2152
      build=20241113101132
      hash=e59ba2934155c641f18dcf7d3eae4159b968c5db46f71f2e0d2c996db5973193
```

```
o [rootfs.0] (/dev/mmcblk0p2, ext4, inactive)
  bootname: A
  boot status: good
  slot status:
    bundle:
      compatible=axcf2152_v1
      version=24.0.8.183
      description=Update container for axcf2152
      build=20241113101132
```

## 4.6.2 Checking the NTP server

### Enter the command: “date”

This should return the time in UTC. The time must be accurate, otherwise outbound communications will fail. It is possible that the clock is still synchronising, but do not leave the system unattended if this has not yet occurred.

```
admin@axcf2152:~$ date
Thu Mar  6 14:23:58 UTC 2025
```

### Enter the command “ntpq -p”

This table must be filled. It is important that the system has NTP synchronisation capabilities. Over time, the clock will begin to drift, and outbound communication will eventually fail.

```
admin@axcf2152:~$ ntpq -p
      remote           refid      st t  when poll reach  delay  offset  jitter
=====
*LOCAL(0)          .LOCL.         14 l   21   64  377   0.000  +0.000  0.002
time.cloudflare   10.78.8.4      3 u   201 1024    3   31.809  -2.254  0.281
212.129-177-91.  45.87.78.35   3 u   205 1024    3   33.882  -0.517  1.752
91.109.118.94 ( 185.57.191.229 2 u   154 1024    3   38.936  -1.173  1.849
admin@axcf2152:~$
```

## 5 MULTI PLC

When more than one PLC is present in the project, it is considered a **MULTI-PLC project**. This consists of one **main** PLC and one or more **sub** PLCs.

### 5.1 Download site configuratie

The MINT Portal ([Phoenix Contact Mint](#)) also provides downloads for MULTI PLC projects. This download includes a separate configuration file for each PLC.

See example below:

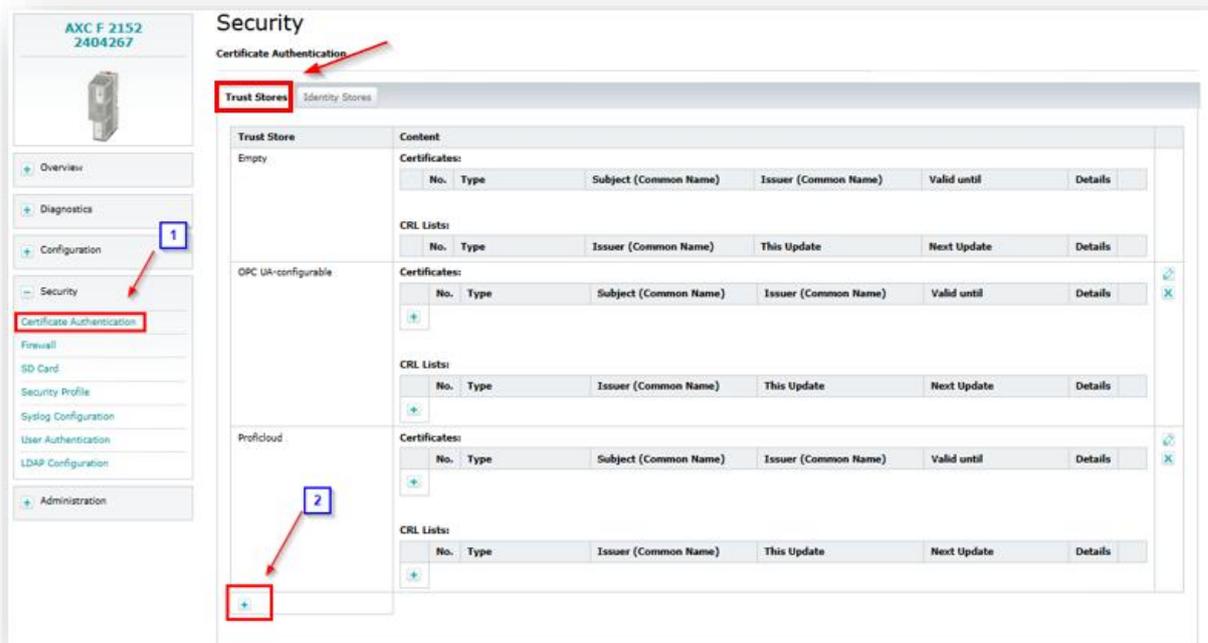


Each PLC must go through the steps outlined in sections **1.2** and **1.3**.

### 5.2 MULTI PLC certification

Navigate to the **WBM** (Web-Based Management) interface of all PLCs in the project.

#### 5.2.1 Trust Stores



### Add Trust Store

Name

MintSecureServer

Certificates:						
No.	Type	Subject (Common Name)	Issuer (Common Name)	Valid until	Details	
<input type="button" value="+"/>						

CRL Lists:						
No.	Type	Issuer (Common Name)	This Update	Next Update	Details	
<input type="button" value="+"/>						

### Add Certificate

Trust Store

Certificate Type

**Certificate content in PEM Format:**

Input Method

<input type="checkbox"/>	Name	Date modified	Type	Size
<input type="checkbox"/>	<input type="text" value="MintSecureConnection.pem"/>	7/03/2025 9:48	PEM File	3 KB

Upload the certificate, which can be downloaded via [MINT energiebeheer met AI | Phoenix Contact](#) under “MINT DataHub”.

### MINT DataHub

- ↓ Planning API
- ↓ Data API
- ↓ FTP connection
- 
- SiteConfig tool

It should appear as shown below.

Certificates:						
No.	Type	Subject (Common Name)	Issuer (Common Name)	Valid until	Details	
1	Trusted Certificate	Mint	Mint	9999-12-31T23:59:59 UTC		

CRL Lists:						
No.	Type	Issuer (Common Name)	This Update	Next Update	Details	
+						

## 5.2.2 Identity Stores

AXC F 2152  
2404267



### Security

Certificate Authentication

Trust Stores: **Identity Stores**

Identity Store	Content				
IDevID	No.	Element	Type	Description	Details
	1	Key Pair	RSA 2048 Hardware protected key	RSA Key Pair	
	2	Certificate	Key Certificate	Common Name: AXC F 2152 Valid not after: 9999-12-31T23:59:59 UTC	
	3	Certificate	Issuer Certificate	Common Name: PLCnext Device Signing CA Valid not after: 2023-11-29T23:59:59 UTC	
	4	Certificate	Issuer Certificate	Common Name: PhoenixSign License PLCnext Sub CA G1 Valid not after: 2024-09-06T23:59:59 UTC	
	5	Certificate	Issuer Certificate	Common Name: PhoenixSign License Root CA G1 Valid not after: 2024-09-06T23:59:59 UTC	
HTTPS-self-signed	1	Key Pair	RSA 2048	RSA Key Pair	
	2	Certificate	Key Certificate	Common Name: PLCnext HTTPS Interface List Valid not after: 9999-12-31T23:59:59 UTC	
OPC UA-self-signed	1	Key Pair	RSA 2048	RSA Key Pair	
	2	Certificate	Key Certificate	Common Name: eUAServer@axc-f-2152-1 Valid not after: 9999-12-31T23:59:59 UTC	
Profcloud	Error = StoreNotFound				
	1	Key Pair	Error: StoreNotFound	ECDSA Key Pair	
	2	Certificate	Key Certificate	Certificate not available. Please add a Key Certificate via the "Set" button on the right.	

### Add Identity Store

**Name**

**Key Pair**

**Key Pair in PEM Format:**

**Input Method**

MintSecureClient					
No.	Element	Type	Description	Details	
1	Key Pair	RSA 2048	RSA Key Pair		
2	Certificate	Key Certificate	Certificate not available. Please add a Key Certificate via the "Set" button on the right.		

### Set Key Certificate

Identity Store:

Certificate Source:

**Certificate content in PEM Format:**

Input Method:

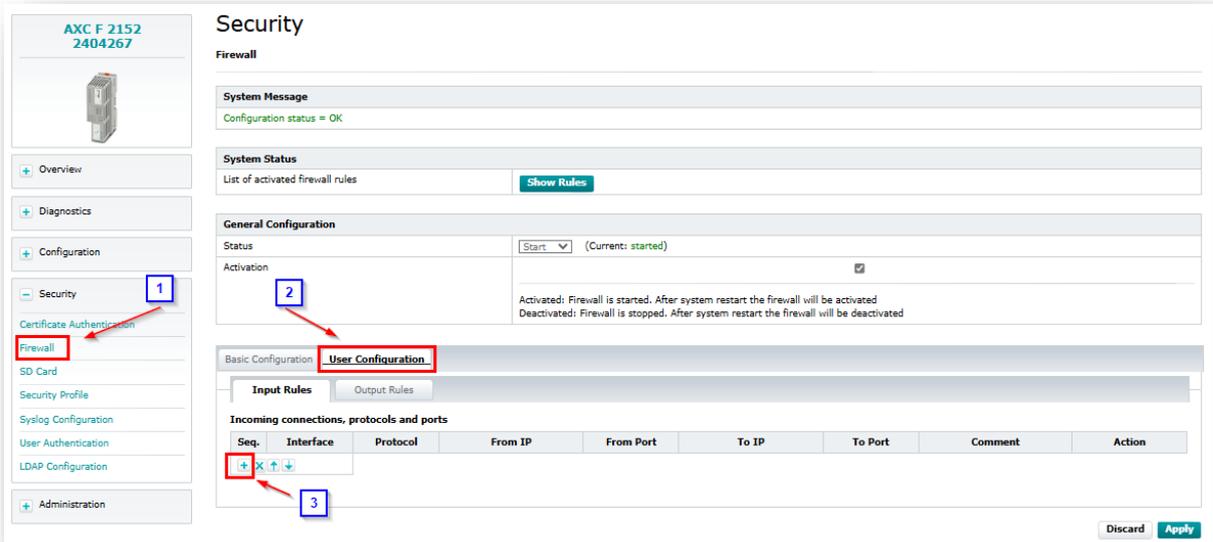
The issuer certificate(s) will also be reset or replaced.

It should appear as shown below.

MintSecureClient					
No.	Element	Type	Description	Details	
1	Key Pair	RSA 2048	RSA Key Pair		
2	Certificate	Key Certificate	Common Name: Mint Valid not after: 9999-12-31T23:59:59 UTC		
<input type="button" value="+"/>					

## 5.3 Firewall settings

To enable communication between PLCs, the following firewall settings must be adjusted on the **main PLC**.



In the example below, we assume:

- MASTER PLC = 192.168.1.2
- SLAVE PLC 1 = 192.168.1.10 (Port 45000)
- SLAVE PLC 2 = 192.168.1.30 (Port 45001)

Seq.	Interface	Protocol	From IP	From Port	To IP	To Port	Comment	Action
1	All	TCP	192.168.1.10	any	192.168.1.2	45000	MASTER - SLAVE PLC 1	Accept
2	All	TCP	192.168.1.30	any	192.168.1.2	45001	MASTER - SLAVE PLC 2	Accept



## 5.4 Changes in PLCnext Engineer

When building a MULTI PLC project, an additional line (or lines) will appear under the **“Configuration”** tab.

These lines refer to the MASTER and SLAVE PLCs.

### 5.4.1 MAIN PLC

- SUB PLC 1 “sub\_1”

MINT\_Core\_ControlSystem.Configuration\_Connection('Sub\_1','xx.xx.xx.xx',UINT#45000);  
*Replace xx.xx.xx.xx with the corresponding IP address.*

- SUB PLC 2 “sub\_2”

MINT\_Core\_ControlSystem.Configuration\_Connection('Sub\_2','xx.xx.xx.xx',UINT#45001);  
*Replace xx.xx.xx.xx with the corresponding IP address.*

```
3000: MINT_Core_ControlSystem.Configuration_Connection('Sub_1','xx.xx.xx.xx',UINT#45000);  
3001: MINT_Core_ControlSystem.Configuration_Connection('Sub_2','xx.xx.xx.xx',UINT#45001);
```

### 5.4.2 SUB PLC 1 “Sub\_1”

MINT\_Core\_ControlSystem.Configuration\_Connection('Main','xx.xx.xx.xx',UINT#45000);  
*Replace xx.xx.xx.xx with the IP address of the MASTER PLC.*

```
1: MINT_Core_ControlSystem.Configuration_Connection('Main','xx.xx.xx.xx',UINT#45000);
```

### 5.4.3 MAIN PLC 2 “Sub\_2”

MINT\_Core\_ControlSystem.Configuration\_Connection('Main','xx.xx.xx.xx',UINT#45001);  
*Replace xx.xx.xx.xx with the IP address of the MASTER PLC.*

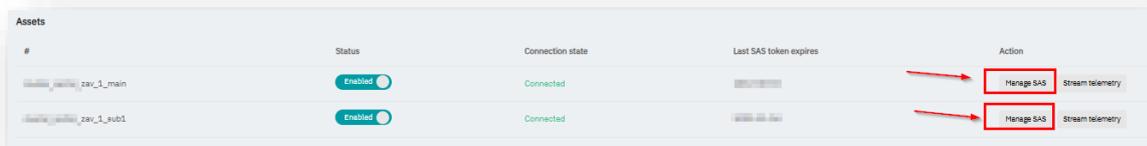
```
1: MINT_Core_ControlSystem.Configuration_Connection('Main','xx.xx.xx.xx',UINT#45001);
```

## 5.5 MUTLI PLC / MINT Licentie

Each PLC in a MULTI PLC project must have its own MINT licence.  
 The MASTER PLC will hold a licence for all assets and collectors.  
 The SLAVE PLCs will receive a SLAVE MINT licence.

## 5.6 MUTLI PLC / MQTT Credentials

Each PLC in a MULTI PLC project must have its own MQTT connection (if applicable).  
 The SAS token can be generated per PLC.

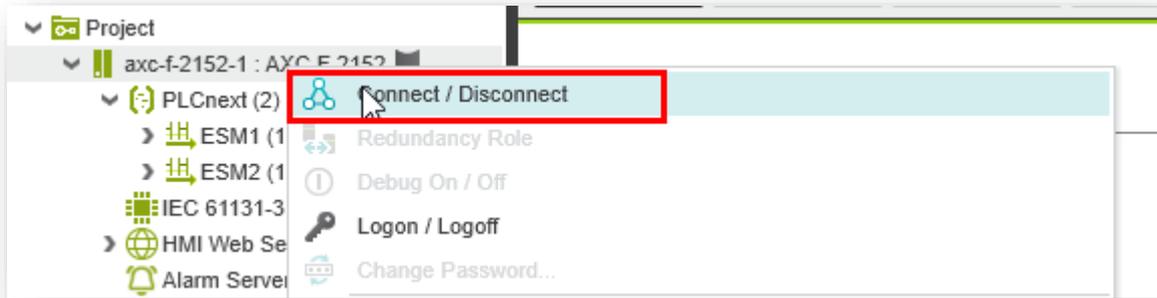


#	Status	Connection state	Last SAS token expires	Action
zav_1_main	Enabled	Connected		Manage SAS Stream telemetry
zav_1_sub1	Enabled	Connected		Manage SAS Stream telemetry

## 6 Starting a MINT project

Once all preparations are complete, the MINT software can be deployed on-site. This begins by opening PLCnext Engineer 2024.0.4 LTS with the prepared MINT software.

Right-click on “axc-f-2152-1 : AXC F 2152” and select “Connect / Disconnect”.

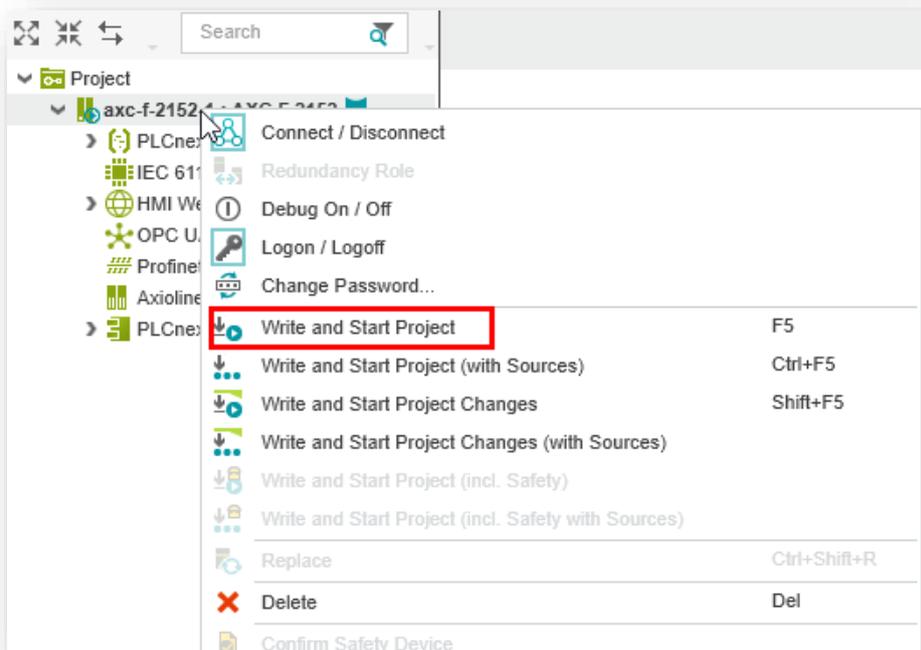


Log in using the PLC’s username and password.

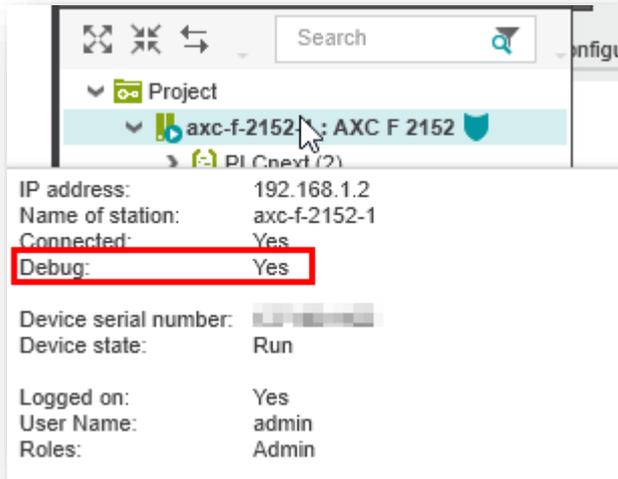
If the connection to the PLC is successful, it will appear as follows:



Write and Start Project



If the build is successful, the PLC will automatically switch to debug mode.  
You can confirm the debug status by hovering over “axc-f-2152-1 : AXC F 2152”.



## 6.1 Starting the MINT Project / MULTI PLC

For best practice, we recommend starting the **SLAVE PLCs first**, followed by the **MASTER PLC**.

## 7 Verifying the MINT Project

Nadat de MINT software is gedownload naar de PLC, dienen onderstaande checks uitgevoerd te worden om de software te valideren naar correcte werking.

### 7.1 MINT Licence Active

xControlSystemActive must be set to “TRUE”.

```

1 MINT_Core_ControlSystem(
2   sLicense:= '...',
3   strIncomingData:= strMINT_IncomingCommunicationDatahub (...), // Datahub communication
4   strOutgoingData => strMINT_OutgoingCommunicationDatahub (...), // Datahub communication
5   xActive => xControlSystemActive TRUE,
6   arrDiagnostic=> arrControlSystemDiagnostic (...),
7   arrCollectorDataInterface:= arrCollectorDataInterface (...), // Collector FB's
8   arrACChargepointDataInterface:= arrACChargepointDataInterface (...), // AC Chargepoint FB's
9   arrDCChargepointDataInterface:= arrDCChargepointDataInterface (...), // DC Chargepoint FB's
10  arrPVSystemDataInterface:= arrPVSystemDataInterface (...); // PV System FB's

```

### 7.2 MQTT Connection Active

The variable xConnect must be set to “TRUE”.

```

MINT_FB_Datahub_Interface(
  xActivate := strMINT_Datahub_IN.strSettings.xConnect TRUE,
  sHost := strMINT_Datahub_IN.strSettings.sHost,
  sUsername := strMINT_Datahub_IN.strSettings.sUserName,
  sPassword := strMINT_Datahub_IN.strSettings.sPassword,
  sPort := strMINT_Datahub_IN.strSettings.sPort,
  sClientID := strMINT_Datahub_IN.strSettings.sDatahubId,
  sPersistDir := '',
  diBufferMessages := DINT#100,
  strConnectOptions := strConnectOptions (...),
  xConnected => xConnected TRUE,
  xTimeout => xTimeout FALSE,
  xError => xError FALSE,
  strDiagnose => strDiagnose (...),
  xReadyToReceive => xReadyToReceive TRUE,
  xNewDataAvailable => xNewDataAvailable FALSE);

```

## 7.3 Collector data

Are the energy values from the collector being received correctly?

If no vehicles are currently charging, the collector may not show current values. However, voltage should always be present.

```
// *** Collector *** HFDTR *****
Collector_001.Input_Measurements(
    TO_DINT(IN_HFDTR.strRead.strInstantaneous.strData.strP.rScaledValue 19069.81),
    TO_DINT(IN_HFDTR.strRead.strInstantaneous.strData.strP1.rScaledValue 6197.94),
    TO_DINT(IN_HFDTR.strRead.strInstantaneous.strData.strP2.rScaledValue 6298.95),
    TO_DINT(IN_HFDTR.strRead.strInstantaneous.strData.strP3.rScaledValue 5972.93),
    IN_HFDTR.strRead.strInstantaneous.strData.strI1.rScaledValue 36.83,
    IN_HFDTR.strRead.strInstantaneous.strData.strI2.rScaledValue 28.57,
    IN_HFDTR.strRead.strInstantaneous.strData.strI3.rScaledValue 28.64,
    IN_HFDTR.strRead.strInstantaneous.strData.strPF.rScaledValue 0.86,
Collector_001.Input_TotalPowerFactor(
Collector_001.Input_TotalReactivePower(
Collector_001.Input_TotalEnergy(
    TO_DINT(IN_HFDTR.strRead.strInstantaneous.strData.strQ.rScaledValue -11467.81);
    TO_ULINT(IN_HFDTR.strRead.strMeterReadings.strData.strTotalActiveEnergyDemand.rScaledValue 8.105054);
    TO_ULINT(IN_HFDTR.strRead.strMeterReadings.strData.strTotalActiveEnergyDelivery.rScaledValue 99);
Collector_001.Input_ConductorVoltage(
    IN_HFDTR.strRead.strInstantaneous.strData.strU12.rScaledValue 413.26,
    IN_HFDTR.strRead.strInstantaneous.strData.strU23.rScaledValue 412.18,
    IN_HFDTR.strRead.strInstantaneous.strData.strU31.rScaledValue 413.87);
Collector_001.Input_Voltage(
    IN_HFDTR.strRead.strInstantaneous.strData.strU1.rScaledValue 239.14,
    IN_HFDTR.strRead.strInstantaneous.strData.strU2.rScaledValue 238.11,
    IN_HFDTR.strRead.strInstantaneous.strData.strU3.rScaledValue 238.27);
Collector_001.Input_ReactivePower(
    TO_DINT(IN_HFDTR.strRead.strInstantaneous.strData.strQ1.rScaledValue -5600.56),
    TO_DINT(IN_HFDTR.strRead.strInstantaneous.strData.strQ2.rScaledValue -2566.74),
    TO_DINT(IN_HFDTR.strRead.strInstantaneous.strData.strQ3.rScaledValue -3300.52);
Collector_001.Input_PowerFactor(
    IN_HFDTR.strRead.strInstantaneous.strData.strPF1.rScaledValue 0.77,
    IN_HFDTR.strRead.strInstantaneous.strData.strPF2.rScaledValue 0.93,
    IN_HFDTR.strRead.strInstantaneous.strData.strPF3.rScaledValue 0.88);
Collector_001.Input_Frequency(
    IN_HFDTR.strRead.strInstantaneous.strData.strF.rScaledValue 49.98);

Collector_001(sName:= 'HFDTR',
xCommunicationValid:= IN_HFDTR.strDiag.iSecondsSinceLastSuccessfulTransaction < 30,
arrDataInterface:= arrCollectorDataInterface {...});

Collector_001.Input_ConductorVoltage(
    IN_HFDTR.strRead.strInstantaneous.strData.strU12.rScaledValue 413.26,
    IN_HFDTR.strRead.strInstantaneous.strData.strU23.rScaledValue 412.18,
    IN_HFDTR.strRead.strInstantaneous.strData.strU31.rScaledValue 413.87);
Collector_001.Input_Voltage(
    IN_HFDTR.strRead.strInstantaneous.strData.strU1.rScaledValue 239.14,
    IN_HFDTR.strRead.strInstantaneous.strData.strU2.rScaledValue 238.11,
    IN_HFDTR.strRead.strInstantaneous.strData.strU3.rScaledValue 238.27);
```

## 7.4 Charging Station Data

Is data from the charging stations being received correctly?

If there is no active charging session at a station, no current or power will be visible. However, voltage should still be present.

```
// *** AC Chargepoint *** EB11_AC1_1 *****
AC_Chargepoint_014.Input_Measurements(
    TO_DINT(IN_EB11_AC1_1.strRead.strModule_1_Measurement.strData.strTotalActivePower.rScaledValue 0.0),
    IN_EB11_AC1_1.strRead.strModule_1_Measurement.strData.strCurrentPhase_L1.rScaledValue 0.0,
    IN_EB11_AC1_1.strRead.strModule_1_Measurement.strData.strCurrentPhase_L2.rScaledValue 0.0,
    IN_EB11_AC1_1.strRead.strModule_1_Measurement.strData.strCurrentPhase_L3.rScaledValue 0.0,
    IN_EB11_AC1_1.strRead.strModule_1_Measurement.strData.strVehicleStatus.sValue 'A1';
AC_Chargepoint_014.Input_Voltage(
    IN_EB11_AC1_1.strRead.strModule_1_Measurement.strData.strVoltagePhase_L1_N.rScaledValue 238.6,
    IN_EB11_AC1_1.strRead.strModule_1_Measurement.strData.strVoltagePhase_L2_N.rScaledValue 239.53,
    IN_EB11_AC1_1.strRead.strModule_1_Measurement.strData.strVoltagePhase_L3_N.rScaledValue 238.73);
AC_Chargepoint_014.Input_ChargingPlugCapacity(
    IN_EB11_AC1_1.strRead.strModule_1_Measurement.strData.strChargingPlugCapacity.iScaledValue 0);
AC_Chargepoint_014.Input_TotalEnergy(
    IN_EB11_AC1_1.strRead.strModule_1_Measurement.strData.strTotalActiveEnergy.uliScaledValue 573440);
AC_Chargepoint_014.Input_RFID(
    IN_EB11_AC1_1.strRead.strModule_1_Measurement.strData.strBadgeRFID.sValue 'FAE88BF5');

AC_Chargepoint_014(sName:= 'EB11_AC1_1',
xCommunicationValid:= IN_EB11_AC1_1.strDiag.iSecondsSinceLastSuccessfulTransaction < 30,
iMaxChargingCurrent => OUT_EB11_AC1_1.strWrite.strModule_1_MaxChargingCurrent.strControl.iMaxChargingCurrent 6,
arrDataInterface:= arrACChargepointDataInterface {...});

AC_Chargepoint_014.Input_Voltage(
    IN_EB11_AC1_1.strRead.strModule_1_Measurement.strData.strVoltagePhase_L1_N.rScaledValue 238.6,
    IN_EB11_AC1_1.strRead.strModule_1_Measurement.strData.strVoltagePhase_L2_N.rScaledValue 239.53,
    IN_EB11_AC1_1.strRead.strModule_1_Measurement.strData.strVoltagePhase_L3_N.rScaledValue 238.73);
```

## 7.5 MINT Scaling

The MINT software will scale up the allowed setpoint of the charging stations if sufficient power is available. See the example below:

*Setpoint of 7A:*

iMaxChargingCurrent 7,

```

AC_Chargepoint_022.Input_Measurements(
    TO_DINT(IN_EB11_ENOVATES_2.strRead.strEnovates_Wallbox_Measurements.strData.strTotalActivePower.rScaledValue 4689.0),
    IN_EB11_ENOVATES_2.strRead.strEnovates_Wallbox_Measurements.strData.strCurrentPhase_L1.rScaledValue 6.68,
    IN_EB11_ENOVATES_2.strRead.strEnovates_Wallbox_Measurements.strData.strCurrentPhase_L2.rScaledValue 6.65,
    IN_EB11_ENOVATES_2.strRead.strEnovates_Wallbox_Measurements.strData.strCurrentPhase_L3.rScaledValue 6.65,
    IN_EB11_ENOVATES_2.strRead.strEnovates_Wallbox_VehicleState.strData.strVehicleState.sValue 'C2',
AC_Chargepoint_022.Input_Voltage(
    IN_EB11_ENOVATES_2.strRead.strEnovates_Wallbox_Measurements.strData.strVoltagePhase_L1.rScaledValue 239.0,
    IN_EB11_ENOVATES_2.strRead.strEnovates_Wallbox_Measurements.strData.strVoltagePhase_L2.rScaledValue 238.0,
    IN_EB11_ENOVATES_2.strRead.strEnovates_Wallbox_Measurements.strData.strVoltagePhase_L3.rScaledValue 237.0);
AC_Chargepoint_022.Input_ActivePower(
    TO_DINT(IN_EB11_ENOVATES_2.strRead.strEnovates_Wallbox_Measurements.strData.strActivePowerPhase_L1.rScaledValue 1561.0),
    TO_DINT(IN_EB11_ENOVATES_2.strRead.strEnovates_Wallbox_Measurements.strData.strActivePowerPhase_L2.rScaledValue 1560.0),
    TO_DINT(IN_EB11_ENOVATES_2.strRead.strEnovates_Wallbox_Measurements.strData.strActivePowerPhase_L3.rScaledValue 1569.0));
AC_Chargepoint_022.Input_TotalEnergy(
    IN_EB11_ENOVATES_2.strRead.strEnovates_Wallbox_Measurements.strData.strTotalActiveEnergy.uliScaledValue 262686);
AC_Chargepoint_022.Input_RFID(
    IN_EB11_ENOVATES_2.strRead.strEnovates_Wallbox_RFID_CurrentLimit.strData.strRFID.sValue '042F73DA3E1290');

AC_Chargepoint_022.sName='EB11_ENOVATES_2',
xCommunicationValid='IN_EB11_ENOVATES_2.strDiag.iSecondsSinceLastSuccessfulTransaction 3 < 30,
iMaxChargingCurrent => OUT_EB11_ENOVATES_2.strWrite.strEnovates_Wallbox_MaxChargingCurrent.strControl.iMaxChargingCurrent 7,
arrDataInterface:= arrACChargepointDataInterface[0...3];

```

*Setpoint of 8A:*

iMaxChargingCurrent 8,

```

AC_Chargepoint_022.Input_Measurements(
    TO_DINT(IN_EB11_ENOVATES_2.strRead.strEnovates_Wallbox_Measurements.strData.strTotalActivePower.rScaledValue 5318.0),
    IN_EB11_ENOVATES_2.strRead.strEnovates_Wallbox_Measurements.strData.strCurrentPhase_L1.rScaledValue 7.42,
    IN_EB11_ENOVATES_2.strRead.strEnovates_Wallbox_Measurements.strData.strCurrentPhase_L2.rScaledValue 7.47,
    IN_EB11_ENOVATES_2.strRead.strEnovates_Wallbox_Measurements.strData.strCurrentPhase_L3.rScaledValue 7.61,
    IN_EB11_ENOVATES_2.strRead.strEnovates_Wallbox_VehicleState.strData.strVehicleState.sValue 'C2',
AC_Chargepoint_022.Input_Voltage(
    IN_EB11_ENOVATES_2.strRead.strEnovates_Wallbox_Measurements.strData.strVoltagePhase_L1.rScaledValue 237.0,
    IN_EB11_ENOVATES_2.strRead.strEnovates_Wallbox_Measurements.strData.strVoltagePhase_L2.rScaledValue 238.0,
    IN_EB11_ENOVATES_2.strRead.strEnovates_Wallbox_Measurements.strData.strVoltagePhase_L3.rScaledValue 237.0);
AC_Chargepoint_022.Input_ActivePower(
    TO_DINT(IN_EB11_ENOVATES_2.strRead.strEnovates_Wallbox_Measurements.strData.strActivePowerPhase_L1.rScaledValue 1747.0),
    TO_DINT(IN_EB11_ENOVATES_2.strRead.strEnovates_Wallbox_Measurements.strData.strActivePowerPhase_L2.rScaledValue 1769.0),
    TO_DINT(IN_EB11_ENOVATES_2.strRead.strEnovates_Wallbox_Measurements.strData.strActivePowerPhase_L3.rScaledValue 1802.0));
AC_Chargepoint_022.Input_TotalEnergy(
    IN_EB11_ENOVATES_2.strRead.strEnovates_Wallbox_Measurements.strData.strTotalActiveEnergy.uliScaledValue 262802);
AC_Chargepoint_022.Input_RFID(
    IN_EB11_ENOVATES_2.strRead.strEnovates_Wallbox_RFID_CurrentLimit.strData.strRFID.sValue '042F73DA3E1290');

AC_Chargepoint_022.sName='EB11_ENOVATES_2',
xCommunicationValid='IN_EB11_ENOVATES_2.strDiag.iSecondsSinceLastSuccessfulTransaction 0 < 30,
iMaxChargingCurrent => OUT_EB11_ENOVATES_2.strWrite.strEnovates_Wallbox_MaxChargingCurrent.strControl.iMaxChargingCurrent 8,
arrDataInterface:= arrACChargepointDataInterface[0...3];

```