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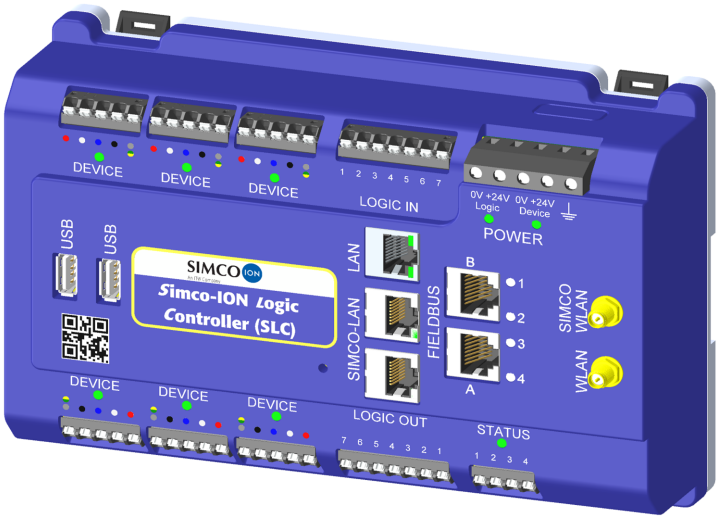
User's Manual

Simco-ION Logic Controller

Smart SLC IQ 4.0

Addition SLC IQ 4.0



simco.nl/103400

This manual was originally written in English.

The product may have undergone changes that are not reflected in this manual.

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Explanation of symbols

The following symbols may appear in this manual or on the product

WARNING Indicates special information to prevent injury or significant damage to the product or the environment

DANGER Indicates information for preventing electric shocks

NOTE Important information for making the most efficient use of the product and for preventing damage to the product or the environment

HINT Advice about the use of the product

IQ CERTIFIED This product works fully with and is certified for Simco-ION's IQ 4 platform

Preface

This manual is intended for the installation and use of the IQ 4 platform components Smart SLC IQ 4.0, Addition SLC IQ 4.0, Manager IQ 4.0 and Extension IQ 4.0.

This manual must always be accessible to the operating personnel.

Read this manual completely before installing and commissioning this product.

Instructions in this manual must be followed to ensure proper operation of the product and to make a warranty claim.
The warranty provisions are described in the General Terms and Conditions of Sale of Simco (Nederland) B.V.

NOTE

If there are any problems or doubts, please get in touch with Simco-ION Netherlands or the agent in your region.

NOTE

Product names may be abbreviated in the documentation.

Below the abbreviations and full product names with the link to the relevant documentation.

Abbreviated product name	Full Simco-ION product name	Documentation link
Smart SLC	Smart SLC IQ 4.0	1034
Addition SLC	Addition SLC IQ 4.0	1034
SLC	Smart SLC IQ 4.0 or Addition SLC IQ 4.0	1034
Manager 4	Manager IQ 4.0	1034
Extention 4	Extension IQ 4.0	1034

Introduction

Device applications

The IQ 4 platform is intended to connect Simco-ION IQ 4.0 certified devices in order to control all devices from one central place.

The core of the system consists of a Smart Simco-ION Logic Controller (Smart SLC).

The Smart SLC IQ 4.0 is a plug & play control unit. It can control up to 6 Simco-ION devices.

The Smart SLC IQ 4.0 is DIN rail mounted, and can be placed inside any electrical cabinet. Devices are connected with a push-in wire connector.

The system can be expanded with additional SLC's. Each SLC can control an additional 6 devices.

Specific conditions of use

The product is intended to be a part of a machine or process.

The product must NOT be used in a fire or explosion-hazardous environment.

Device description

The Smart SLC IQ 4.0 is a real time controller for managing up to 84 devices.

The SLC controls 6 devices and handles all communication with peripherals such as I/O ports, HMI and fieldbus. It can be extended with up to 13 SLC's with each additionally 6 device connections and separate I/O.

By connecting the LAN port with an Ethernet cable to a Local Company Network, the SLC can be monitored or controlled from any PC or laptop in that network.

The Smart SLC IQ 4.0 is powered by an external 24 V DC power supply which also provides the power to the connected devices via the SLC.

The actual status of the connected devices can be read from the Status LEDS on the SLC.

Pro-Active ionisation control (CLFB)

The IQ 4 platform allows the static electricity to be tailored to the application by adjusting the setting of the static bars or generators or by setting a Closed Loop FeedBack control.

A static device combined with a Static Sensor device downstream, can actively control the web voltage and achieve the wanted (low) charge.

User interface

The user interface is multi platform and can be opened in any browser. Multiple users can use the interface simultaneously.

All components in the systems are shown in a grid and are called “Objects”. Objects can be static neutralising, sensors or charging devices, but can also be functions or system components.

Basic IQ 4 device features

The IQ 4 platform provides the following added value to the connected IQ 4 compatible devices (depending on the connected device type):

- distribution of the 24 V power to the devices and the controller
- central status control and control of the IQ device
- closed loop feedback (CLFB)
- read out parameters
- change parameters
- calibration of efficiency indication
- operation optimalisation settings
- data logging
- data graph
- event logging
- automatic device software update

NOTE

- For individual functionality, refer to the section for the specific device.
- Some functionalities may not be implemented yet and will be commented with *future updates.
- WiFi functionality will be available from SLC software release 2.

Basic IQ 4 platform features

- Ethernet connection to a computer for visual control through the built-in HMI surface
- Analogue Input and Outputs
- LED indications of the status of each connected device
- Global status indication LED’s
- Software and firmware updates
- Data logging
- Event logging
- 6 Digital inputs (remote on/off) *future update
- 6 digital outputs (status) *future update
- 2 global outputs (status)
- Separate Device power input. It is possible to switch off all devices for safety or maintenance reason.

Optional IQ 4 platform features

- Fieldbus (Ethernet based):
  Profinet
  EtherCAT
  Ethernet IP
- WiFi access to HMI interface *future update
- WiFi connection SLC to SLC *future update
- Data-logging storage *future update
- User definable functions (e.g. additional alarms and warnings) *future update

Names and functions of the parts

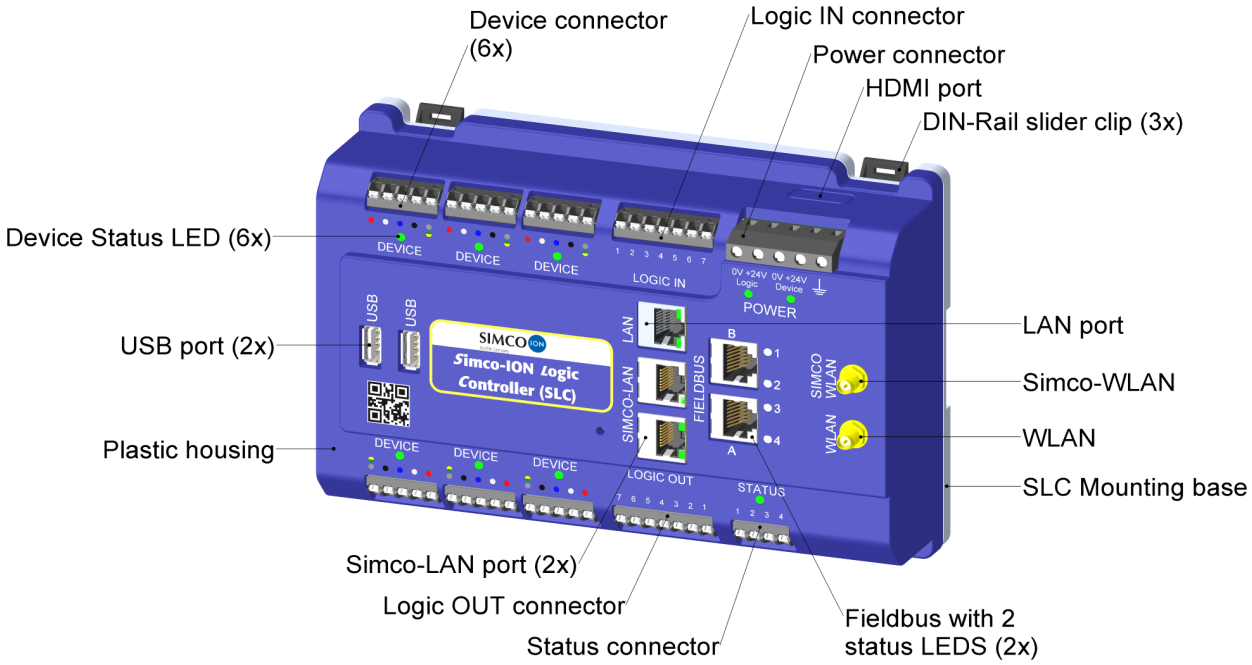


Figure: Smart SLC IQ 4.0

Available IQ 4 platform controllers

Table: *Available controllers*

Product id	Product description	Additional Product description
1034 00 0000	Smart SLC IQ 4.0	Basic device
1034 00 0020	Smart SLC IQ 4.0 Profinet	Device with fieldbus
1034 00 0030	Smart SLC IQ 4.0 EtherCAT	Device with fieldbus
1034 00 0040	Smart SLC IQ 4.0 Ethernet/IP	Device with fieldbus
1034 00 0100	Smart SLC IQ 4.0 S-WL	Device with Simco-ION WiFi network
1034 00 0120	Smart SLC IQ 4.0 S-WL & Profinet	Device with Simco-ION WiFi network & fieldbus
1034 00 0130	Smart SLC IQ 4.0 S-WL & EtherCAT	Device with Simco-ION WiFi network & fieldbus
1034 00 0140	Smart SLC IQ 4.0 S-WL & Ethernet/IP	Device with Simco-ION WiFi network & fieldbus
1034 00 1000	Addition SLC IQ 4.0	Basic device
1034 00 1100	Addition SLC IQ 4.0 S-WL	Device with Simco-ION WiFi network

Table: *IQ 4 platform communication ports*

Device Type	LAN	Simco LAN	WLAN	Simco WLAN	FIELDBUS	USB
SLC Basic	●	●	●			●
SLC Fieldbus	●	●	●		●	●
SLC S-WL	●	●	●	●		●
SLC S-WL/Fieldbus	●	●	●	●	●	●
Addition		●				
Addition/S-WL		●		●		

NOTE

WiFi functionality will be available from SLC software release 2

Available devices to connect to the IQ 4 platform

Device	Device description	Document link
EasION-A IQ 4.1	Anti static bar for neutralising applications with distance 50 - 500 mm	1546
Performax IQ Easy	Anti static bar for neutralising applications with distance 50 - 500 mm	1531
Performax IQ Easy Ex	Anti static bar for neutralising applications with distance 50-200 mm in ATEX environment	1535
ThunderION IQ	Anti static bar for neutralising applications with distance 150 - 1000 mm	1509
VicinION IQ	Anti static bar for neutralising applications with distance 5 - 75 mm	1541
Sensor IQ Easy	Measuring static electricity	0231
Sensor IQ Easy 4.0	Measuring static electricity	0234
CM Tiny IQ	Charging generator up to 20 kV	0977
CMM IQ Easy	Charging generator 20 kV for IML applications	0985
CM5 + IQ Com generator converter	Charging generator up to 60 kV	0974/1031
Blowflex IQ Easy 4.0	Ionizing air nozzle	1617
Cleanflex IQ Easy	Ionizing air gun	05096

Description and operation

Checking package contents

Device

WiFi antenna(s)*

WiFi antenna cable(s)*

Warranty card

Memory card with User Manual (Credit card format)

Device Cable splices ø0,34 mm² (100 pcs)

Device Cable splices ø2,5 mm² (??? pcs)

* Depending on type, 1 or 2 antennas and cables

Getting to know the system

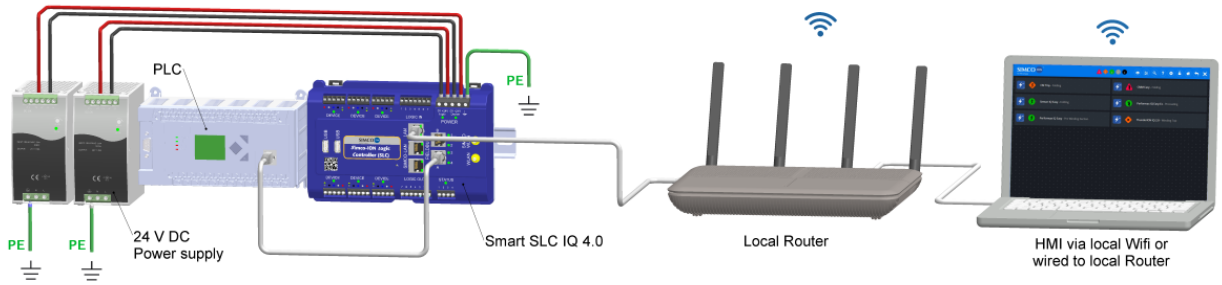


Figure: Overview of the Smart SLC IQ 4.0 system

When the IQ 4 platform is installed, with all devices connected, the user is able to control the system via the Human Machine Interface (HMI). Depending on the user access level, the devices can be viewed, managed and controlled.

The IQ 4 platform has 4 user access levels:

User Account	Level	Authorised to
Basic	View only	View the system
Advanced	Operator	Change object status Access to limited number of parameters Initiate actions
Expert	Supervisor	Access all user relevant functions Initiate actions
Admin	Administrator	Initial system configuration Full access to objects

User Account	Level	Authorised to
		Initiate actions Edit user accounts

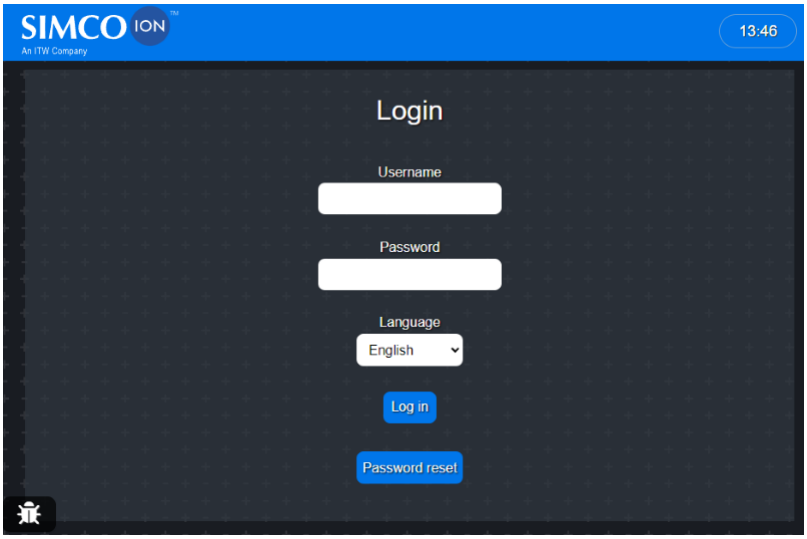
NOTE

- Multiple Basic users can be logged into the IQ 4 platform at the same time.
- Only one Administrator user can exist.
- Only one Advanced or Expert user can be logged into the IQ 4 platform at the same time.
- When an Advanced or Expert user is logged in, the Administrator can login at the same time and change parameters, the object status or initiate actions.

Logging in

- Check the type plate on the front of the Smart SLC IQ 4.0 for the 10-digit item number (1034xxxxxx) and the 8-digit serial number (yyyyyyyy).
- Type these numbers into the browser URL: *10034xxxxxxyyyyyyyy.local* and press Enter.
- A Screen saver or login screen appears.
- Once the IQ 4 platform is connected to your local network, an IP scan can be performed and the platform can be accessed directly via the IP address.

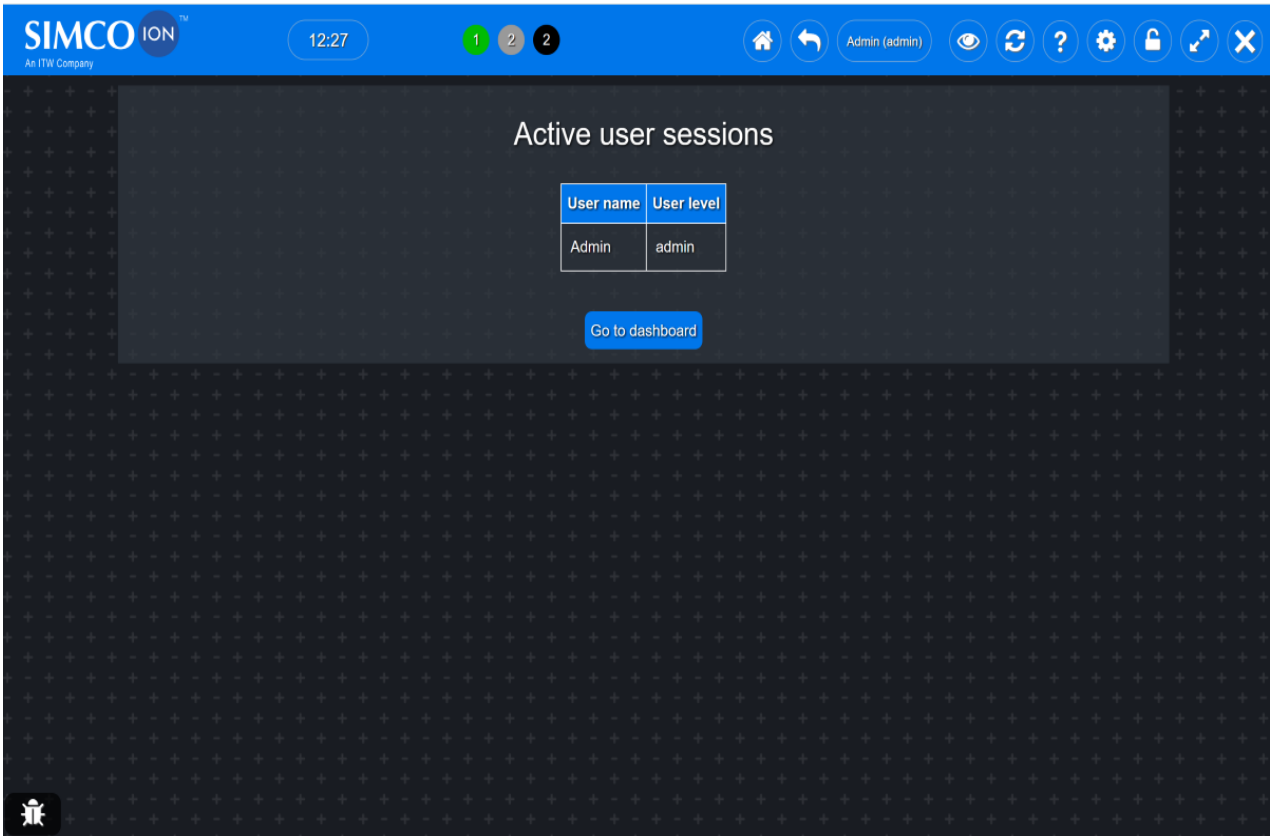
After connecting via the web browser, the user must first log in to get to the home screen.



First login with the default user account Admin.

- User: Admin
  Password: (no password)

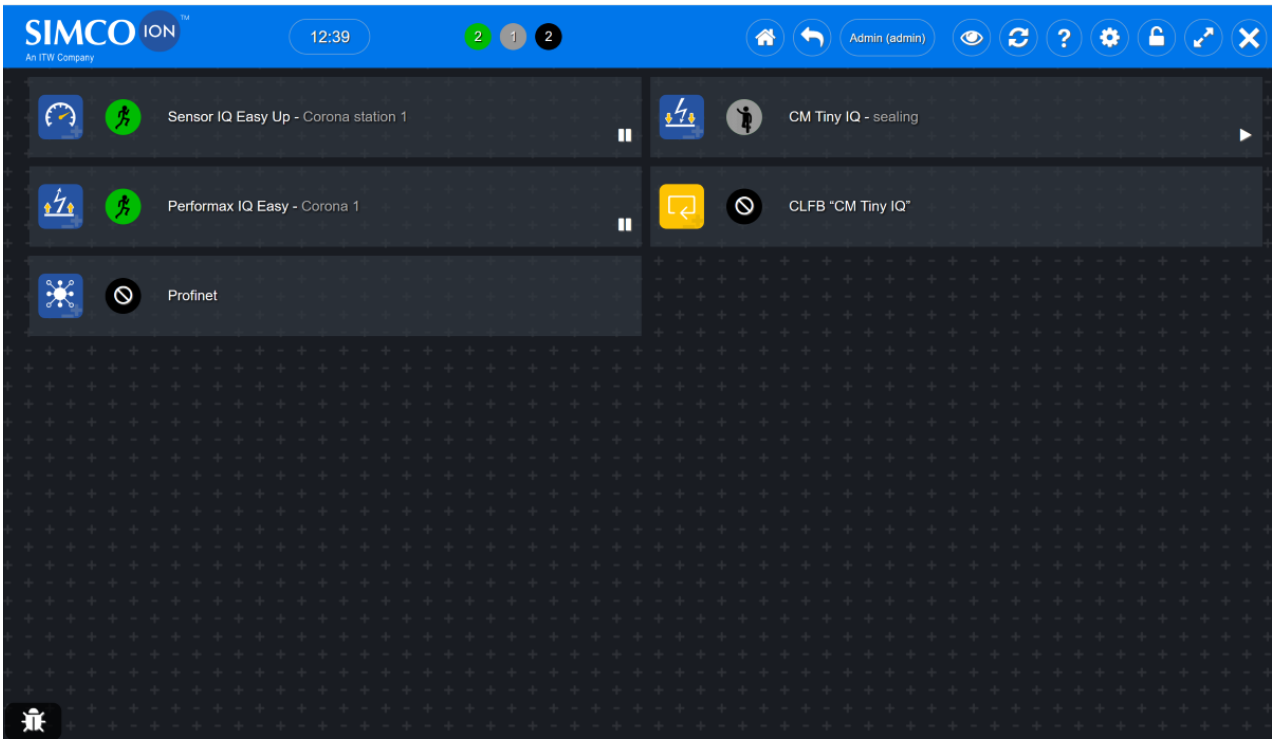
After logging in, the user can open the user's Dashboard.

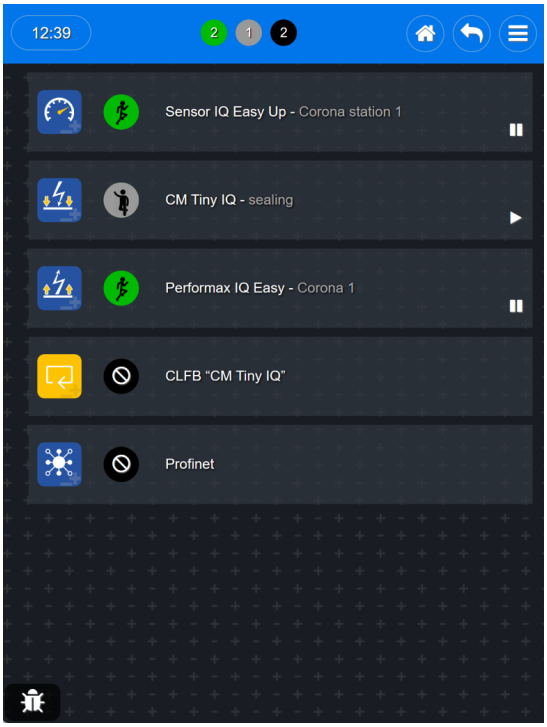


Home screen (Dashboard)

After logging in, the user will land on the home screen. From here all functions and connected devices (Objects) can be viewed, controlled and managed.

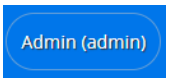
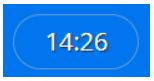
Depending on the size of the HMI screen, the menu will be positioned horizontally at the top of the screen or it will collapse and open vertically when you click on the menu at the top right.





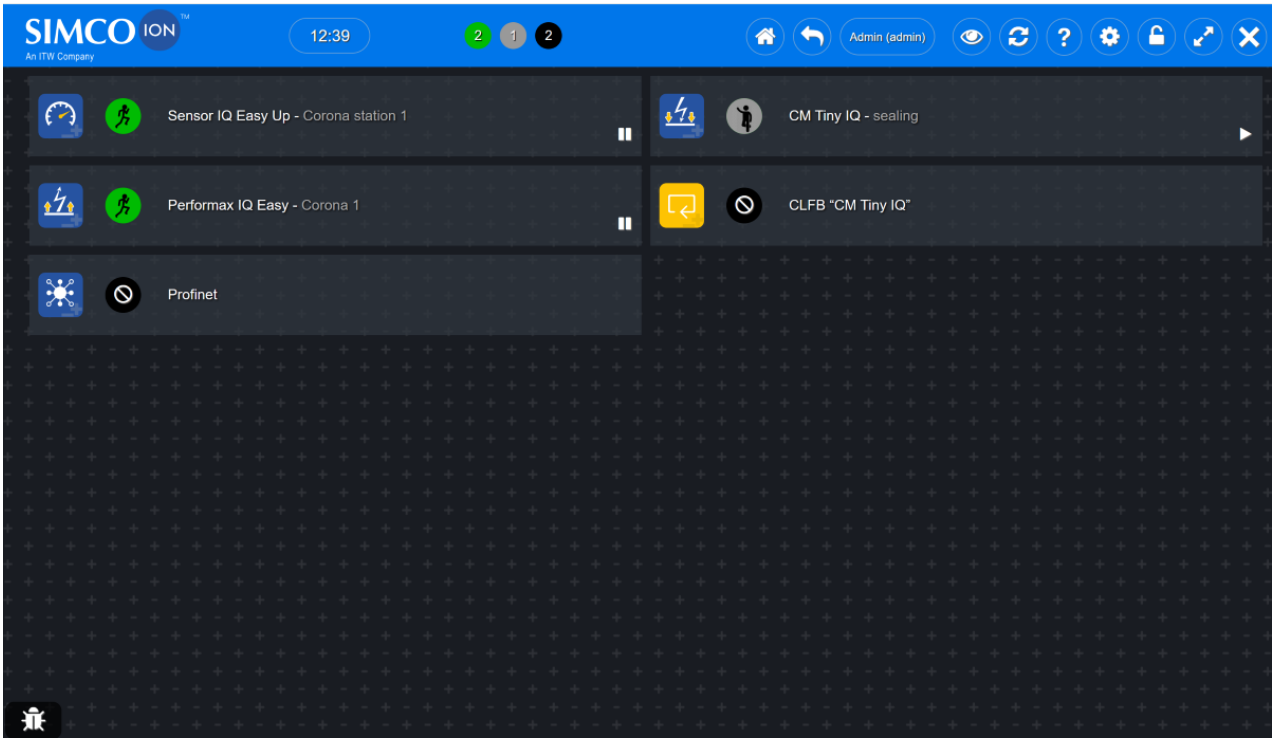
Home screen menu

The menu of the home screen has following buttons.

Symbol	Function	Description
	Close	Closes the current screen and opens the screen saver
	Full screen	Maximises the screen
	Log In/Out	Change user account
	Maintenance	Opens the Maintenance/settings page
	Help	Opens the User Manual of current function
	Refresh	Refreshes the data on the screen
	Reorder	Opens the reorder screen
	User Account	Displays the current user account
	Back	Returns to the previous screen
	Home	Jumps to the dashboard
	Home	Jumps to the dashboard
	Time	Displays the current local time

Objects

All objects are by default presented in the Home screen.



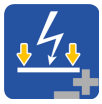
Objects are of various types:

- Devices (Neutraliser, Charger, Sensor, Perforation detector)
- Fieldbus
- IO (Input / output) (*future update)
- SLC (*future update)
- Functions
  - CLFB Closed Loop Feed Back
  - Alarms & Warning (*future update)
  - Customer function (*future update)
  - WiFi (*future update)

Opening an object will display the Parameter screen of the object.

Object types

The objects in the Home screen can be identified by their symbol.

Symbol	Object type	Description
	Neutralising device	Neutralising device with arrows pointing from the material to be neutralised
	ATEX Neutralising device	Neutralising device with arrows pointing from the material to be neutralised and an Ex icon in the corner
	Charging device	Charginging device with arrows pointing towards the material to be charged
	Sensor device	Default sensor device
	ATEX Sensor device	Sensor device to be used in Ex environments with an Ex icon in the corner
	Fieldbus	Fieldbus configuration
	SLC/Addition	Platform extended with a Smart SLC IQ 4.0 or Addition SLC IQ 4.0 (*future update)
	CLFB function	Closed Loop FeedBack configuration
	System	System configuration (*future update)

Object status

The current status of the objects is shown by the icon on the object.
The objects icon colour will change conform its status.

Icon	Object status	Description
	Running (green icon)	Object is running
	Standby (grey icon)	Object is standby
	Running with Warning (orange icon)	Object is running with a warning. User action is needed.
	Standby with Warning (orange icon)	Object is standby with a warning. User action is needed.
	Standby with Alarm (red icon)	Object is standby with an alarm. User action is needed.
	Help	Explanation about a subject.
	Disabled	Object is disabled

Object controls

When accessing the object, appropriate control buttons are shown to control the object. Clicking one of these buttons will activate the function.

Symbol	Control function	Description
	Standby object	Click this button to set the object in standby mode
	Run object	Click this button to set the object in running mode
	Disable object	Click this button to disable the object (power to the device will be switched off)
	Enable object	Click this button to enable the object
	Device dashboard	Click this button to view the device's dashboard with the most important values only
	Value view	Click this button to view all device's values
	Show Action log	Click this button to show the objects action log

Object sorting/reorder

Objects on the home screen can be reordered.

By selecting the Reorder menu item, objects can be dragged and dropped anywhere on the home screen.

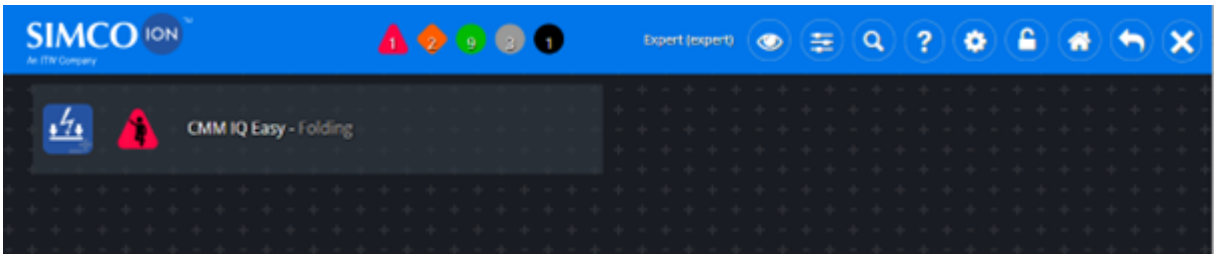
The set order is the default for the currently logged in user.

Object filter status

On the Home screen the statuses of all objects are displayed.

When selecting one of the statuses, only objects with that status will be shown.

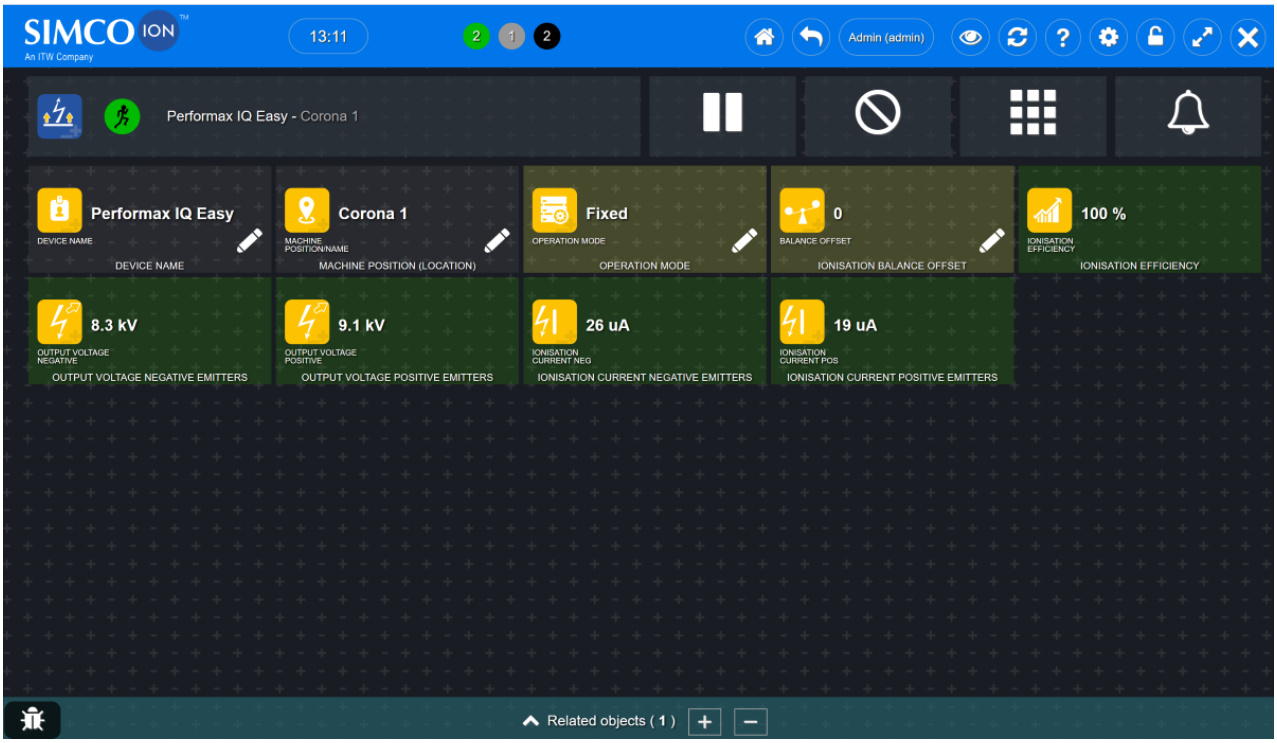
Example when clicking the red triangle, the objects with status "Alarm" wil be displayed:



Clicking the Home button or anywhere in the blue Home screen menu, will reset the display filter.

Object Parameters

When opening an object from the Home screen, the Parameter screen of the object will be shown. Each parameter has it's own button.



The icon on the buttons identify the type of parameter.

Parameter information

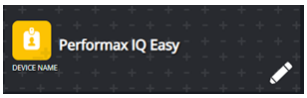
Opening a parameter will show the parameter details.

Edit parameters

Clicking a parameter button enables the user to change the parameter.

Parameter colours

Each type of parameter has a specific button background colour.

Background Colour	Background Colour	Description
	Transparent	General information about the object
	Green	Real time values
	Yellow	Settings
	Blue	Maintenance information about the object
	Brown	Actions

Action/Event logging

Opening the action log of an object displays its action or event log.

All events are displayed after opening.
With use of the Filter, only a specific type of events will be shown.

Dismiss log will clear the list and only show new events.
Refresh log will show all events.

Help function

Clicking any question mark will explain or give additional information about the current function, action or parameter.

Clicking on the question mark again, closes the help screen.

Debug screen (Admin user only)

When the Debug icon appears on the screen, additional debug information is available.

Safety

The following safety guidelines must be observed in order to avoid injuries and damage to objects or the product.

WARNING

Electrical installations and repairs must be carried out by a qualified electrician in accordance with national and local regulations.

- The product must not be used in a fire or explosion-hazardous environment.

DANGER

- The equipment must be properly earthed. Earthing is necessary to ensure proper and safe operation and to prevent electric shocks upon contact.

NOTE

- All connections to the devices and the I/O signals are made with safe 24 V DC. Connections can be made while the IQ 4 platform is running.
- Making modifications, adjustments, etc., without prior written consent or carrying out repairs using non-original parts will invalidate the equipment's guarantee and withdraw the CE approval for the product.

Technical specifications

Electrical data	
Supply voltage Logic Power	21 – 27 V DC (24 V nominal)
Supply voltage Device Power	23,5 – 27 V DC (24 V nominal)
Current consumption Logic power	Max. 1 A DC
Current consumption Device power	3 A per device port, max. 20 A DC See chapter Attachments, section Device loads per device
Connections	
Power IN	Screw terminal block (max. 4,0 mm²)
Device (6x)	Push-in terminal block (max. 1,5 mm²)
IO (Status, Logic IN/Logic OUT)	Push-in terminal block (max. 1,5 mm²)
USB	2x USB 2.0
Customer LAN (only on Smart SLC IQ 4.0)	1x RJ45 (1 Gb)
Simco-ION LAN	2x RJ45 (100 Mb)
Fieldbus (optional)	2x RJ45
Machine IO	
Logic IN (6x)	10 - 30 V, max. 0,5 mA
Logic OUT (6x)	Open emitter, supply voltage -1 V, max. 25 mA
Status (2x)	Open emitter, supply voltage -1 V, max. 25 mA

Ambient conditions	
Use	Industrial, indoor use
Ingress Protection class	IP50
Temperature Ambient (Tamb)	0-45°C
Relative Humidity (RH)	< 90%, non condensing
Installation	Free of dust and vibration

Mechanical	
Mounting	DIN rail 35 mm
Weight	1100 g
Material	Aluminium, polystyrene

Dimensions

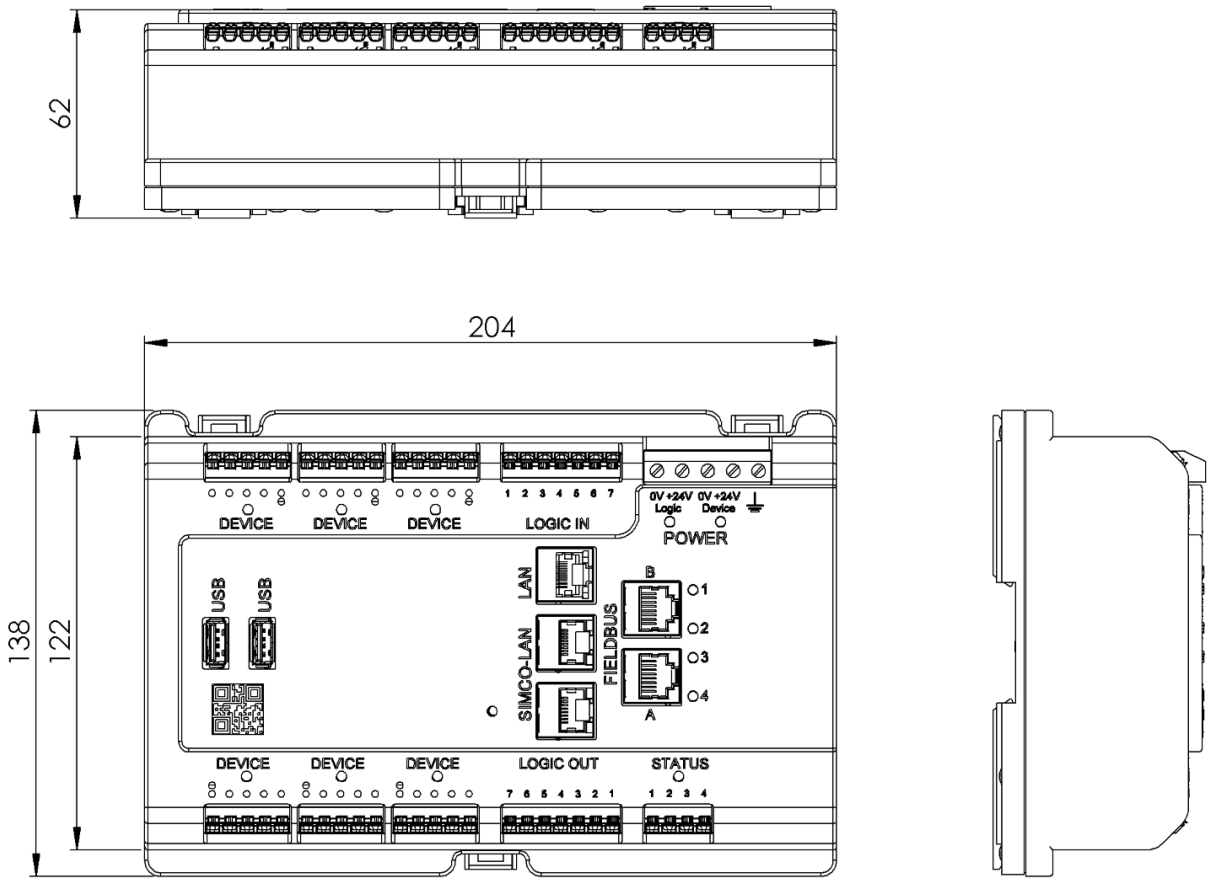


Figure: Dimensions Smart SLC IQ 4.0

Installation

Checks

- Check that the device is undamaged and that the correct version has been received.
- Check whether the necessary accessories are included.
- Check whether the details of the packing slip correspond to the details of the product received.

NOTE

If there are any problems or doubts, please get in touch with Simco-ION Netherlands or the agent in your region.

Installation precautions

Device installation location

The Smart SLC IQ 4.0 is mounted inside an electrical cabinet on a (TH/TS)35 mm DIN-rail (EN 60715).

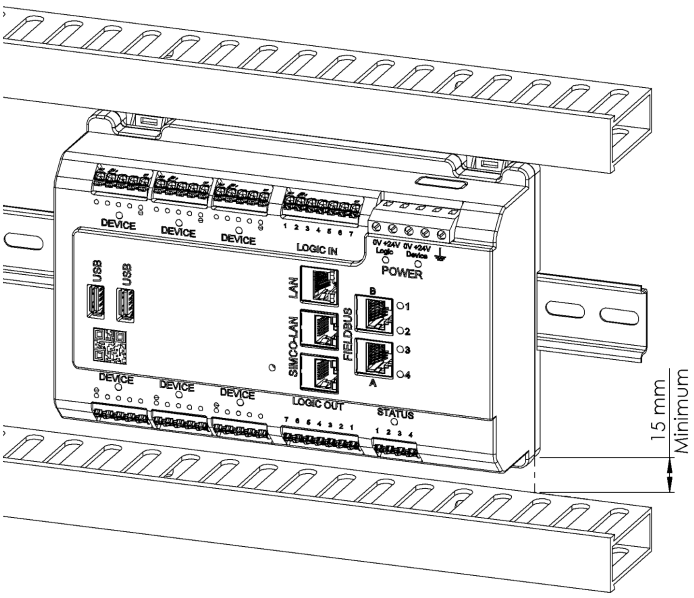


Figure: Wiring Smart SLC IQ 4.0

NOTE

- A free space of minimum 15 mm is required on the top and lower side of the SLC.
- The electrical cabinet must be within reach of the devices, taking into account the maximum cable length for the devices to be connected. See chapter Technical specifications of the connected devices for the maximum cable lengths.
- When the distance to the connected devices exceeds the maximum cable length of the devices, an Addition SLC IQ 4.0 must be used.
- The maximum distance between a Smart SLC and an Addition SLC is 100 m.

Mechanical installation

Mounting the Smart SLC IQ 4.0

The Smart SLC IQ 4.0 has 2 DIN-rail slider clips on the top side and 1 on the lower side.

- Prepare the electrical cabinet for mounting the Smart SLC IQ 4.0.
  Make sure there is enough space for the device to be mounted on the DIN-rail.
- Click the device on the DIN-rail with the lower slider clip first.
- Be sure all 3 slider clips are released and the device is properly mounted.

Detach the Smart SLC IQ 4.0

- When mounted on a high DIN rail (15 mm): only clips on one side have to be released.
- When mounted on a low DIN rail (7,5 mm): place screw drivers in all 3 slider clips and release the clips simultaneously.

Electrical connection

NOTE

- See chapter Technical specifications for electrical specifications.
- See section Wireless connecting the Smart SLC IQ 4.0 or Addition SLC IQ 4.0 for wireless connections (*future update)

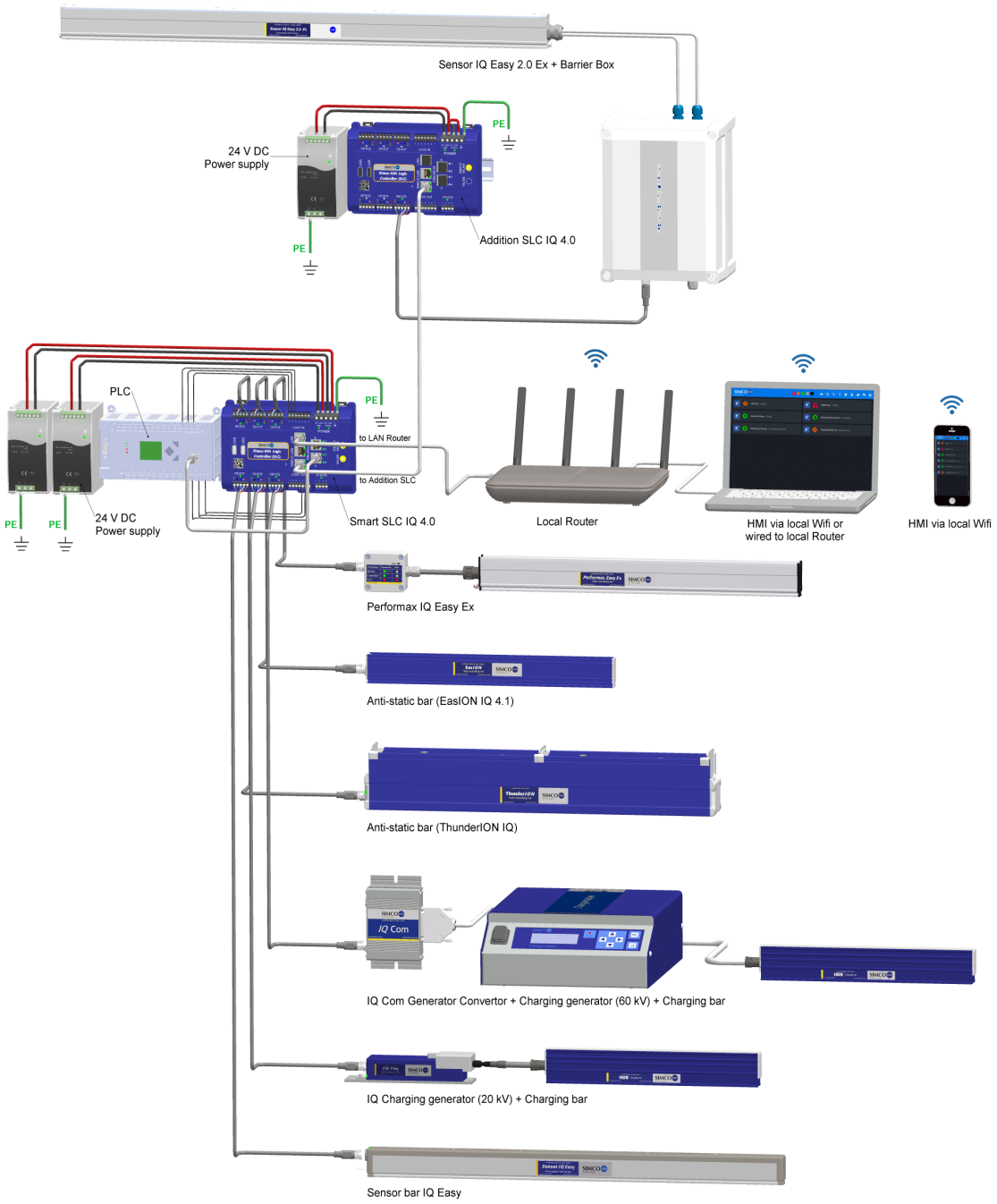


Figure: Wiring example Smart SLC IQ 4.0 platform

Wiring the Smart SLC IQ 4.0

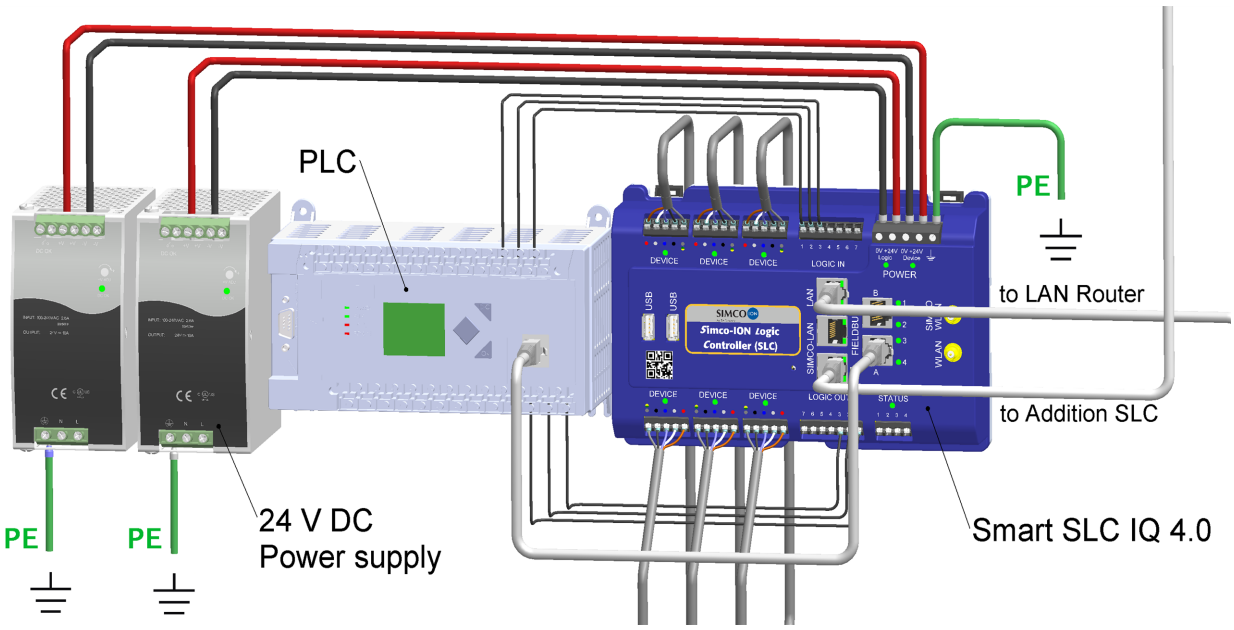


Figure: Wiring example Smart SLC IQ 4.0

Connecting devices to the SLC

NOTE

- Devices can be arbitrarily connected to any device connector block of the Smart SLC IQ 4.0 or Addition SLC IQ 4.0.
- Refer to the manuals of the devices for maximum cable lengths.
- See chapter Electrical connection in the manual of the device for wiring details when using customer cable.

- Strip the 5 individual blunt end cable wires
- Attach the cable end splices delivered with the SLC (or equivalent types) to finish the cable ends.
- Push the splices into the connectors with the corresponding colour code.

  The ground wire may be yellow/green or grey.

Table: *Device wire colours and functions*

Red	24 V DC
White	RS485 A
Blue	0 V DC
Black	RS485 B
Grey	Ground

Connecting Power wires to the SLC

The SLC has 2 Power connections.

- Logic power, that powers the electronics of the SLC.
- Device power, to power all connected devices.

NOTE

- Power wires should be at least 2,5 mm² with flexible core (AWG 13).
- Wiring for Device Power and Logic Power should be as short as possible. The Device Power lines length must not exceed 3 m.
- For safety reasons, bi-wiring to the Device power connector and the Logic power connector is recommended. This will prevent shutting down the SLC's logic power when only the Devices should shut down.
- Jumper wires may be used instead at the Power connection block. When the total load of the devices is high, wire both Power inputs separately.
- When selecting the power supply, consider the inrush current and the total continuous current of the connected devices. See chapter Attachments, section Device loads.

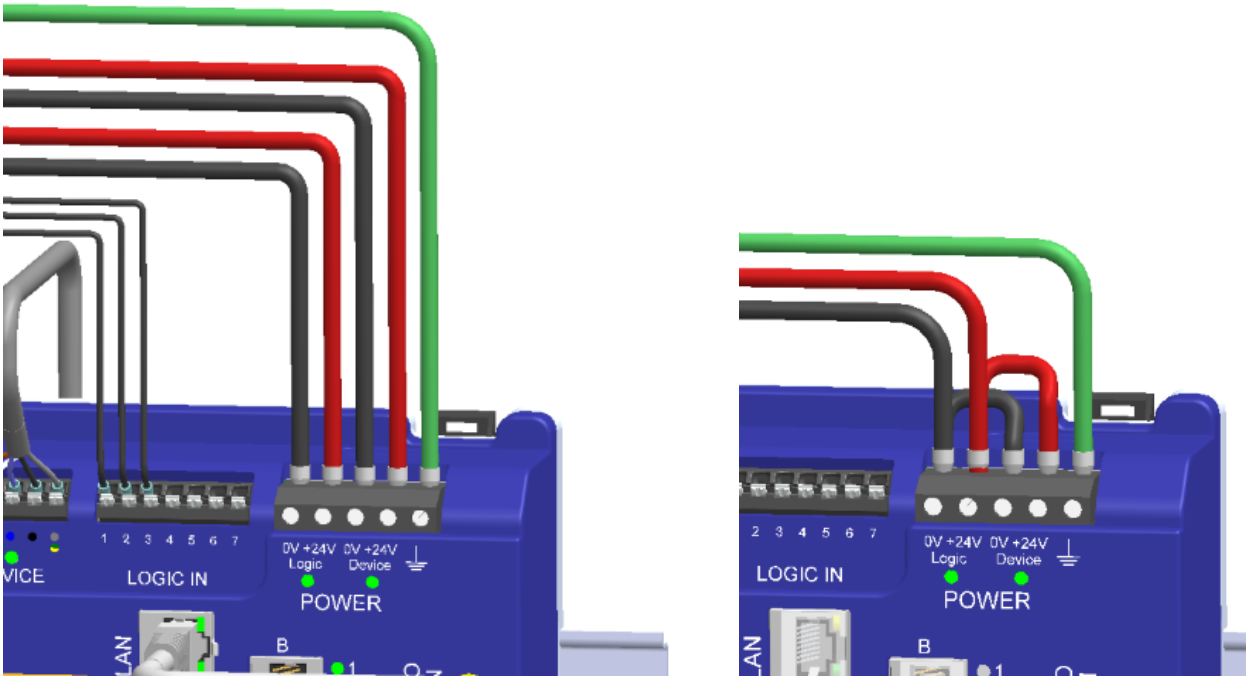


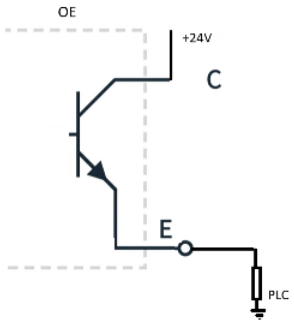
Figure: Wiring examples bi-wiring and single wiring with jumpers

- Strip the wires 10 mm.
- Attach suitable cable end splices to the wire ends.
- Push the splices into the Power connectors and screw them tight.
- Connect the Ground terminal to the Protective Earth connection of the machine.

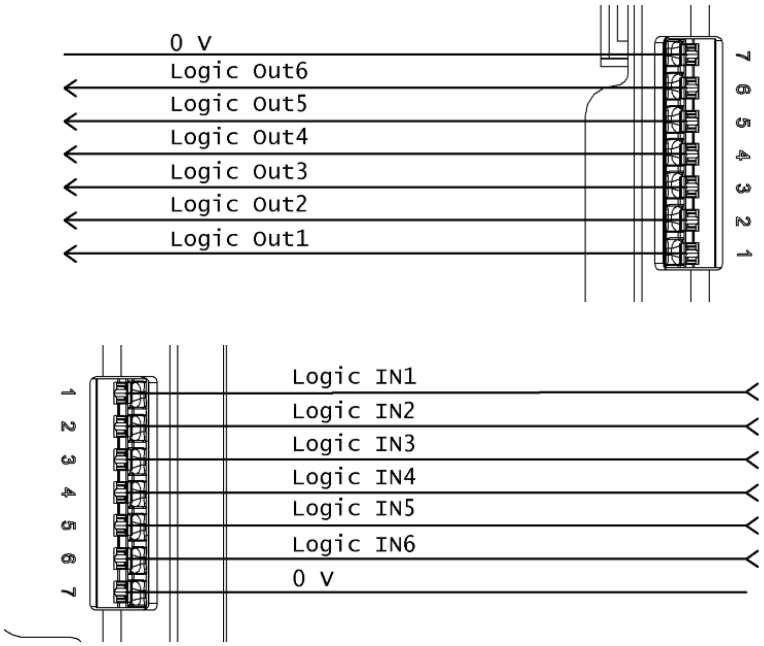
Connecting Logic IN, Logic OUT and Status wires to the IQ 4 platform

NOTE

- See chapter Technical specifications for Input and Output details.
- All Status outputs are Open Emitter outputs.



- Strip the wires.
- Attach suitable cable end splices to the wire ends.
- Push the splices into the desired Status and Logic connectors.



Global Status

The Global Status outputs provide the status of the IQ 4 platform.

#	Description
1	0 V
2	Global Alarm
3	0 V
4	Global Warning

Connecting to the HMI (Human Machine Interface)

WARNING

- Only use the **LAN** connection to connect the Smart SLC IQ 4.0 to your local network. Your network must use DHCP to apply an IP address to the Smart SLC IQ 4.0, or your local router must assign a fixed IP address.
- The SIMCO-LAN connections on the Smart SLC are behind an internal DHCP router.
  Connecting your local network to the SIMCO-LAN will disrupt your local network!

Figure: SLC connected to local router

- Connect the RJ45 Ethernet cable between the LAN port and your local router.

NOTE

- Only for servicing and configuration a peer-to-peer connection can be used to connect to one of the SIMCO-LAN ports.
- The Smart SLC IQ 4.0 will have a fixed IP address 192.168.10.199.
- To keep your laptop in your own network and IP range, an optional USB to ethernet adapter makes the configuration much easier (second IP range).
- The Ethernet cable length should not exceed 100 m.
- Only use Cat6 shielded Ethernet cables.

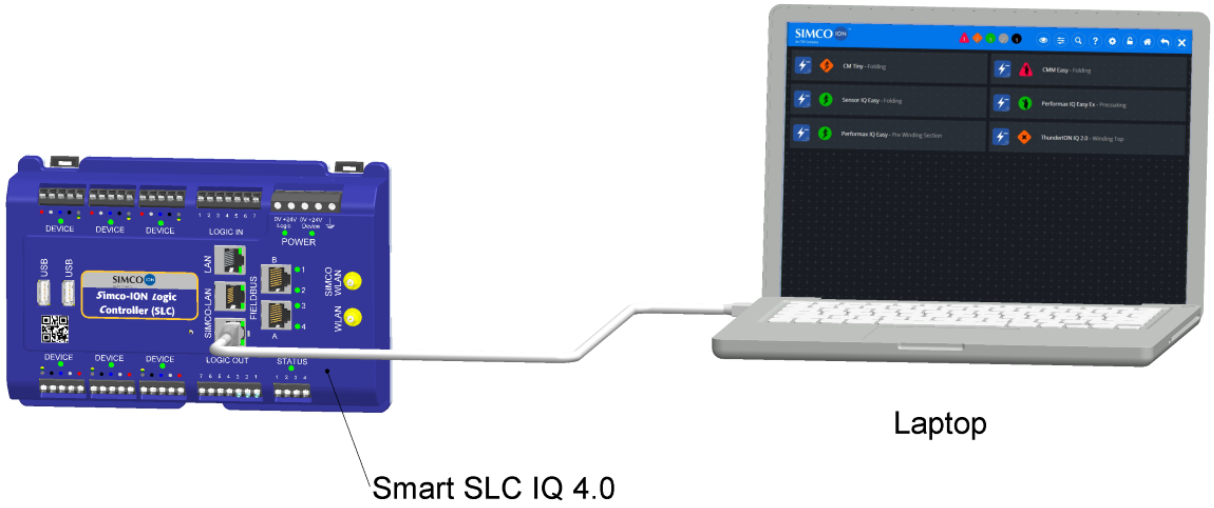


Figure: Laptop peer-to-peer connected to the Smart SLC IQ 4.0

Connecting additional Smart SLC IQ 4.0 or Addition SLC IQ 4.0 to the IQ 4 platform

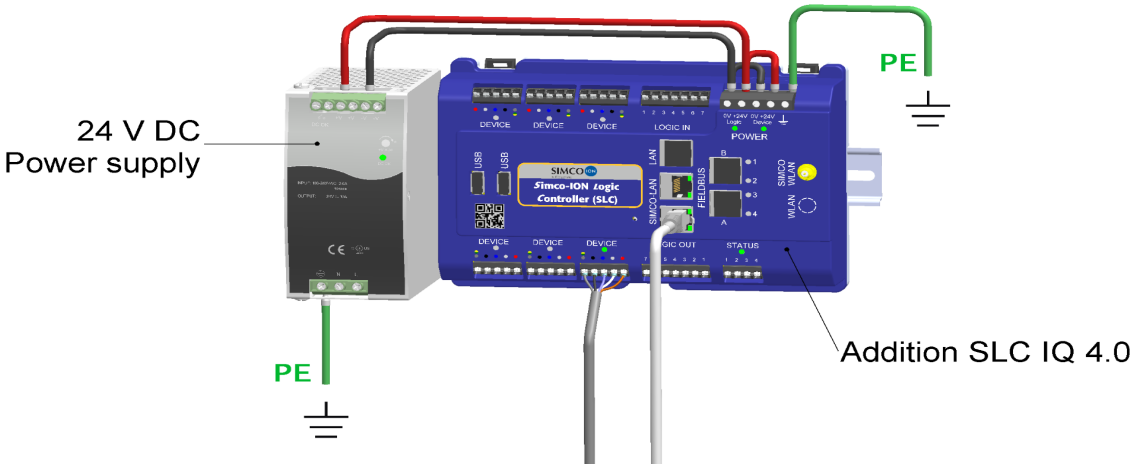


Figure: Wiring example Addition SLC IQ 4.0

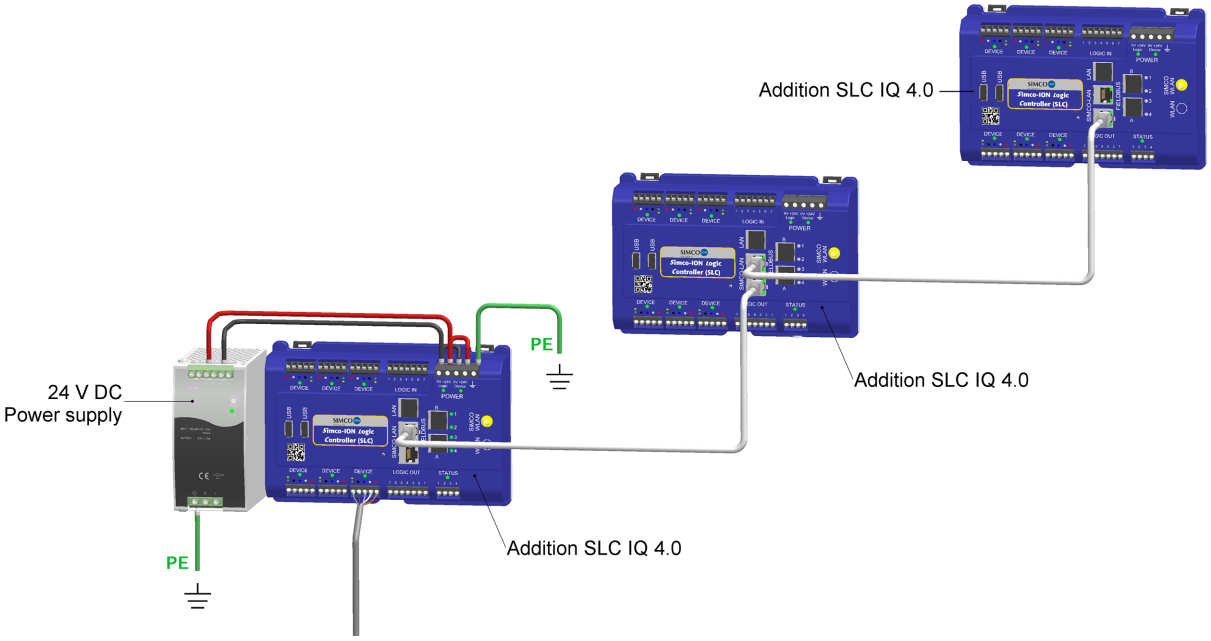


Figure: Wiring example multiple Addition SLC IQ 4.0

NOTE

- Up to 13 Smart SLC IQ 4.0 or Addition SLC IQ 4.0 devices can be added to the Smart SLC IQ 4.0 via the SIMCO-LAN ports on every device.
- The SIMCO-LAN ports can be connected arbitrarily.
- The Ethernet cable length should not exceed 100 m.
- Only use Cat6 shielded Ethernet cables.

- Connect the RJ45 Ethernet cable between the Smart SLC IQ 4.0 SIMCO-LAN port and the Addition SLC IQ 4.0 SIMCO-LAN port.

Connecting the Smart SLC IQ 4.0 to a PLC

NOTE

- Profinet and Ethernet/IP: Both fieldbus ports are identical.
- EtherCAT: Fieldbus A = INPUT, fieldbus B = OUTPUT.
- The Ethernet cable length should not exceed 100 m.
- Only use Cat6 shielded Ethernet cables.

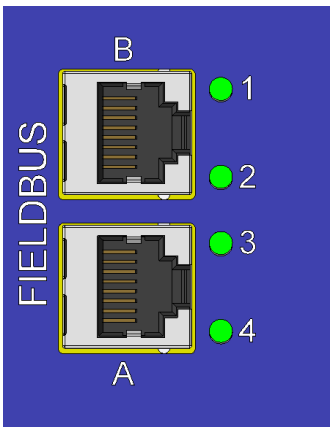


Figure: Fieldbus Smart SLC IQ 4.0

- Connect the RJ45 Ethernet cable between the Smart SLC IQ 4.0 Fieldbus and a PLC.

Wireless connecting the Smart SLC IQ 4.0 or Addition SLC IQ 4.0 (*future update)

Connecting the Smart SLC IQ 4.0 and Addition SLC IQ 4.0

Smart SLC IQ 4.0 and Addition SLC IQ 4.0 type **S-WL** are equipped with a Simco-WLAN connector. Instead of using an RJ45 cable, a WiFi antenna can be used to connect the Smart SLC IQ 4.0 and the Addition SLC IQ 4.0 with eachother.

- Make sure the antenna is placed outside the electrical cabinet, within reach of the antenna cable.
- Connect the antenna with the **SIMCO-WLAN** antenna connector using the delivered cable.

Connecting the Smart SLC IQ 4.0 to the local router

All Smart SLC IQ 4.0 devices are equipped with a WLAN antenna connector. Instead of using an RJ45 cable, a WiFi antenna can be used to connect the Smart SLC IQ 4.0. with the LAN via the local router.

- Make sure the antenna is placed outside the electrical cabinet, within reach of the antenna cable.
- Connect the antenna with the **WLAN** antenna connector using the delivered cable.

Commissioning

WARNING

- Only use the **LAN** connection to connect the Smart SLC IQ 4.0 to your local network. Your network must use DHCP to apply an IP address to the Smart SLC IQ 4.0, or your local router must assign a fixed IP address.
- The SIMCO-LAN connections on the Smart SLC are behind an internal DHCP router.
  Connecting your local network to the SIMCO-LAN will disrupt your local network!

NOTE

- Only for servicing and configuration a peer-to-peer connection can be used to connect to one of the SIMCO-LAN ports.
- The Smart SLC IQ 4.0 will have a fixed IP address 192.168.10.199.
- To keep your laptop in your own network and IP range, an optional USB to Ethernet adapter makes the configuration much easier (second IP range).

HINT

To create an additional IP range other than the local IP range, an USB to Ethernet adapter can be installed on the HMI device.
This may be useful to connect to the SIMCO-LAN without changing the default IP range of the device.

Connecting the HMI (Human Machine Interface)

The HMI is a web based application that will run on many different operating systems.

When the IQ 4 platform is connected to the LAN via an Ethernet switch or router, the user interface can be accessed via any Internet browser.

NOTE

- Static IP settings are not available.
  Changing the static IP address must be done via the local router.
- Your local network must contain a DHCP server or must provide the SLC a fixed IP address.

- Connect your login device to the same local network that the IQ 4 platform is connected to.

Login procedure

- Check the type plate on the front of the Smart SLC IQ 4.0 for the 10-digit item number (1034xxxxxx) and the 8-digit serial number (yyyyyyyy).
- Type these numbers into the browser URL: *10034xxxxxxyyyyyyyy.local* and press Enter.
- A Screen saver or login screen appears.

Once the IQ 4 platform is connected to your local network, an IP scan can be performed and the platform can also be accessed directly via the IP address.

The IQ 4 platform has 4 user access levels:

User Account	Level	Authorised to
Basic	View only	View the system
Advanced	Operator	Change object status Access to limited number of parameters Initiate actions
Expert	Supervisor	Access all user relevant functions Initiate actions
Admin	Administrator	Initial system configuration Full access to objects Initiate actions Edit user accounts

NOTE

- Multiple Basic users can be logged into the IQ 4 platform at the same time.
- Only one Administrator user can exist.
- Only one Advanced or Expert user can be logged into the IQ 4 platform at the same time.
- When an Advanced or Expert user is logged in, the Administrator can login at the same time and change parameters, the object status or initiate actions.

- To set up the system, first login with the default user account Admin.

  User: Admin

  Password: (no password)

- After first login, choose a default Admin password. The passwords needs to be at least 8 characters long.
- Once you are logged in, you can create and edit as many user accounts with lower access rights as you like.
- Each user can select its language at login.

NOTE

In case the Admin password gets lost, contact Simco-ION for a recovery key.

See chapter Maintenance for the Password reset procedure.

NOTE

- After the first log-in, the system time must be checked.
- In case the IQ 4 platform is connected to your local network with internet access, the system time will be synchronised with a NTC time server.
- In case the IQ 4 platform acts as a stand alone system, the system time will be pre set at the Simco-ION factory and this should be checked and corrected. See section Set Date and Time.

Configuring the HMI

- Rename the device names and the machine positions with a recognizable name.
- Before proceeding commissioning the system, get some quick first experience with the system.

Quick first experience operation

To make the devices run manually, use the Play button of the devices on the main screen.

When a device is up and running it will turn green with a “running person” in it's icon.

Click the device's icon to see how the device is performing and to to view all of its parameters.

When the basic system is configured, additional functions (objects) can be added as desired (for example Closed loop FeedBack).

If a fieldbus is integrated and controlling the Smart SLC with a PLC, click on the Fieldbus symbol and follow instructions. See section Fieldbus function.

Set Date and Time

NOTE

- All system loggings and events are stored in UTC time.
- When the IQ 4 platform is connected with your company network that has internet access, the system time will be synchronised with an NTC time server.
- In case you are using the IQ 4 platform as a stand alone system, the system time is pre-set at the Simco-ION factory and you will have to check and correct it.

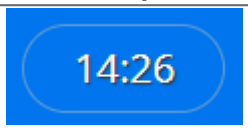
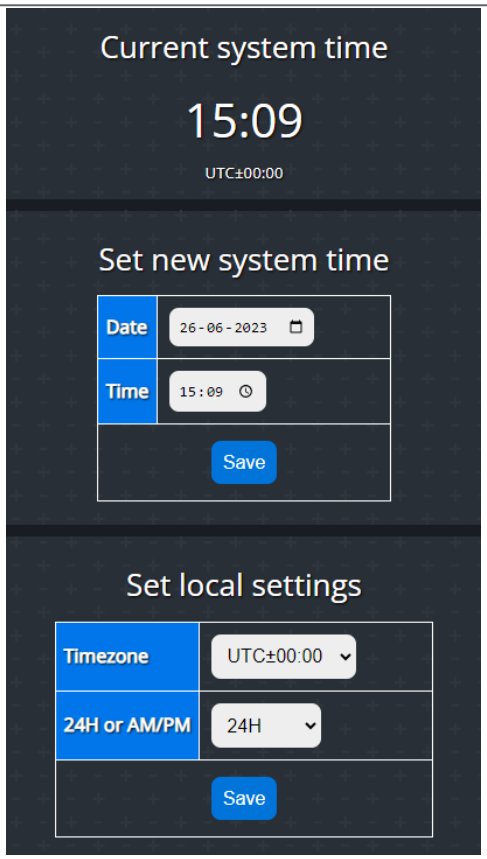
NOTE

When installing Addition SLC's

- When replacing or adding an Addition SLC IQ 4.0, plug in the Simco-LAN cable when the system is running. In that case the new Additions will automatically get the system time of the running Smart SLC IQ 4.0 and will be recognised by the system.
- If the Addition SLC IQ 4.0 is connected during power down, the system time should be checked in case the system is not connected to the Internet.

NOTE

- Each user can set it's own local time.
- The local time settings will be stored in the current user profile.
- The current system time should always be UTC time!

Action	Result/Explanation
Click on the clock in the header.	
Set new date and system time if necessary.	

Closed Loop FeedBack (CLFB) function

The Closed Loop FeedBack (CLFB) functionality allows the static charge on the production material to be automatically set to the desired level using a neutralizing or charging device with a Sensor device.

When you have a Sensor device downstream of an anti-static or charging device, you can set up a CLFB loop.

The settings of the neutralizing or charging device are adjusted by the Smart SLC IQ 4.0 to control the static charge on the web according to the set value.

Various settings for a CLFB are available.

NOTE

Be sure you know the influence of the device settings before changing them.

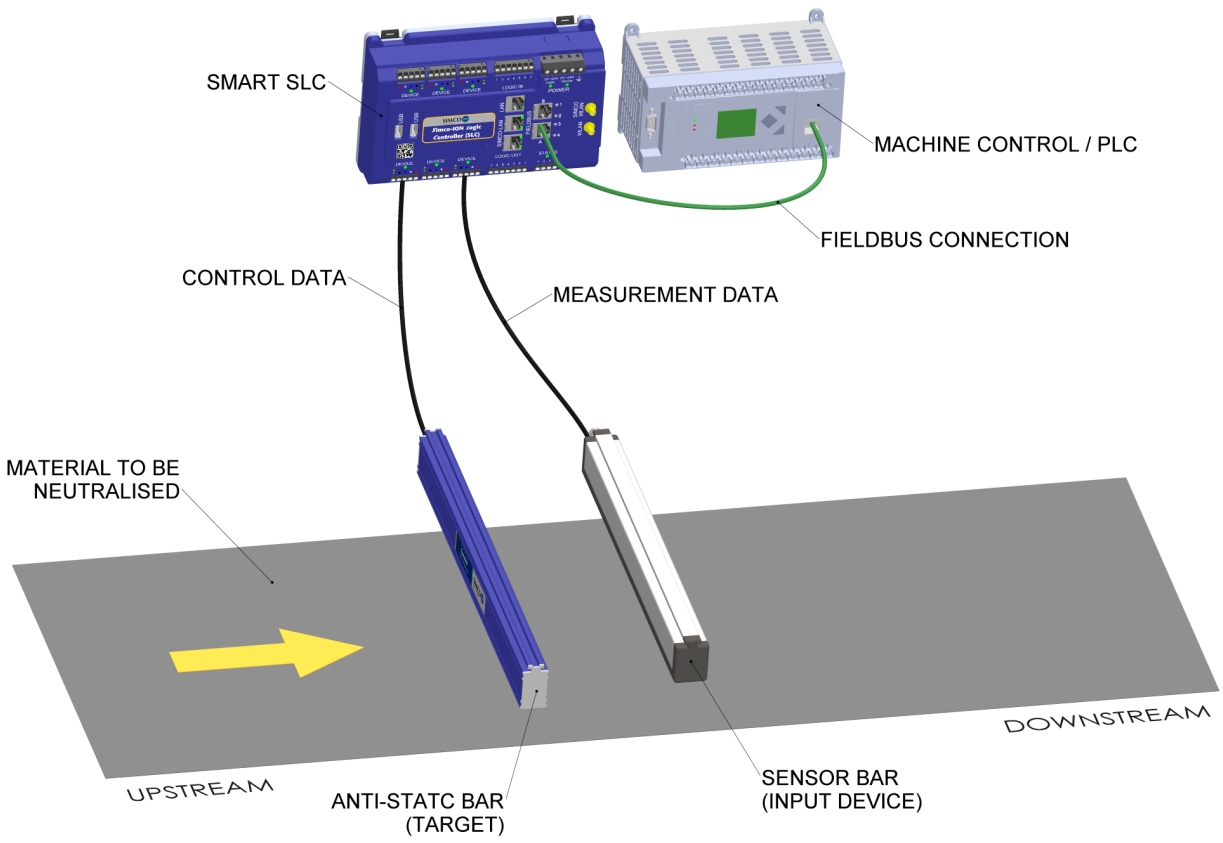
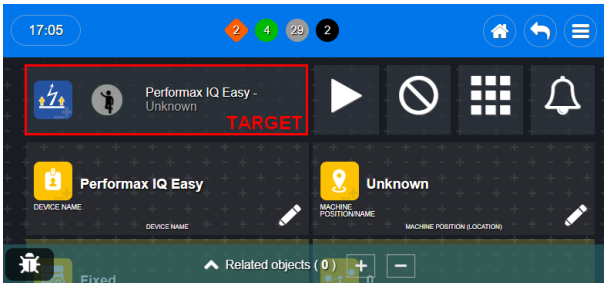
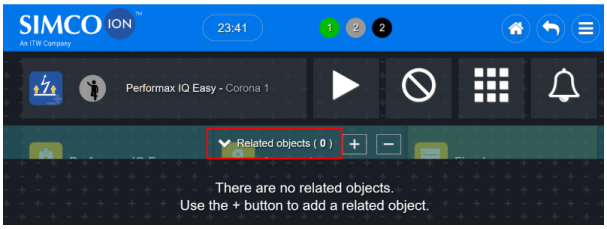
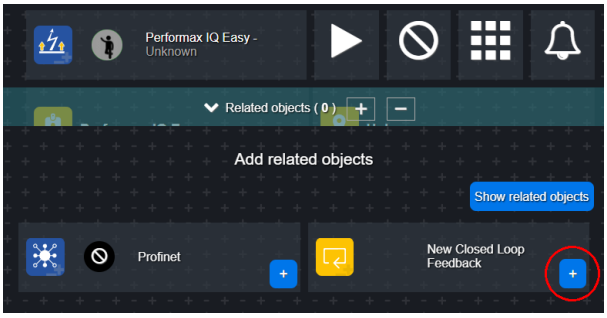
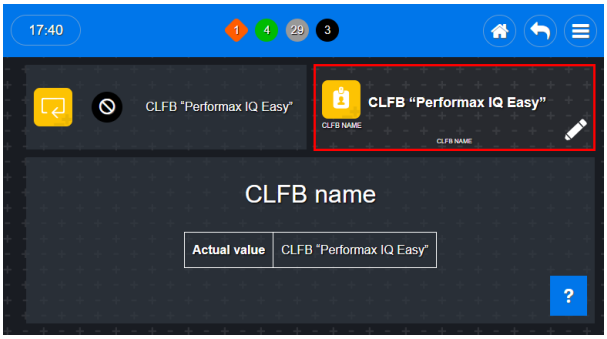
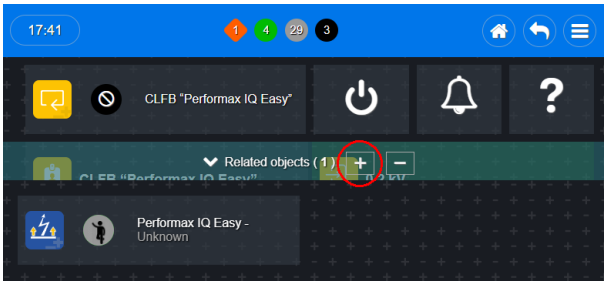
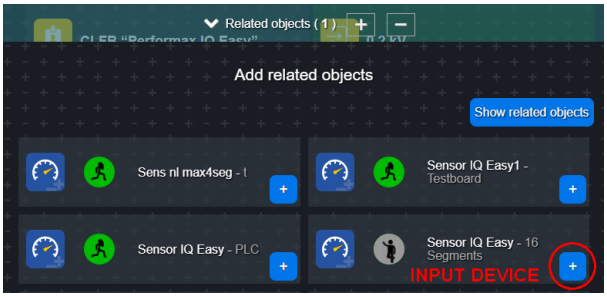
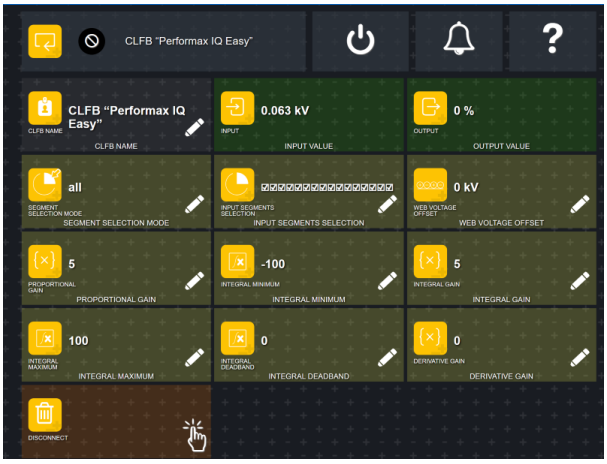
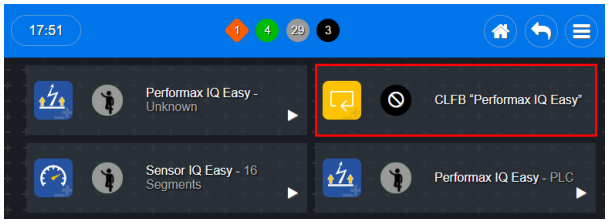


Figure: CLFB principle

Create a Closed Loop FeedBack

Action	Result/Explanation
Select a target device from the Home screen to incorporate in the CLFB. This can be a neutralising or charging device.	
Expand the Related objects pane	
Click [+] to add a New CLFB	
Eventually rename the new CLFB by changing the CLFB NAME parameter	
Click [+] in the Related objects to add an input Sensor device for the CLFB	

Action	Result/Explanation
Select the input Sensor device by clicking the blue + on the object.	 
When needed adjust the CLFB settings See section Closed Loop Feedback settings	
Return to the Home screen and find the new CLFB	

Closed Loop FeedBack settings

The most important CLFB setting is the desired web voltage.
The Web Voltage Offset parameter determines the resulting voltage on the web. For CLFB used for neutralisation this is usually 0 kV. For CLFB for charging this is the desired charge on your web.

NOTE

A Fallback is set up as security. When communication with the sensor is lost for more than 5 seconds, the set point will assume the Fallback value (default 0).

Action	Result/Explanation
Set the desired Web Voltage Offset	**NOTE** • When using a negative charging generator target, set parameter “Integral” maximum to 0. • When using a positive charging generator target, set parameter ”Integral” minimum to 0.
Choose the Sensor segments to be included in the CLFB. Start with one of the general settings. Segment selection: - All (default) - Selection - Auto (future, not implemented). The default setting is All, which used all the available segments.	
Selection, will let you choose which segments to use with setting the parameter Input Segments	

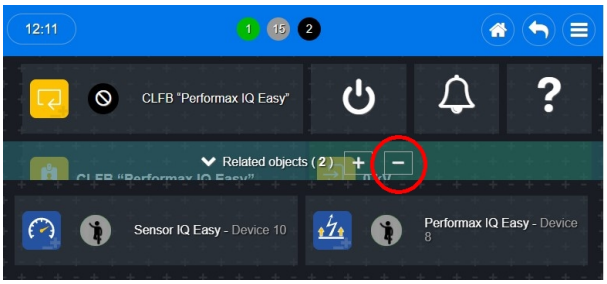
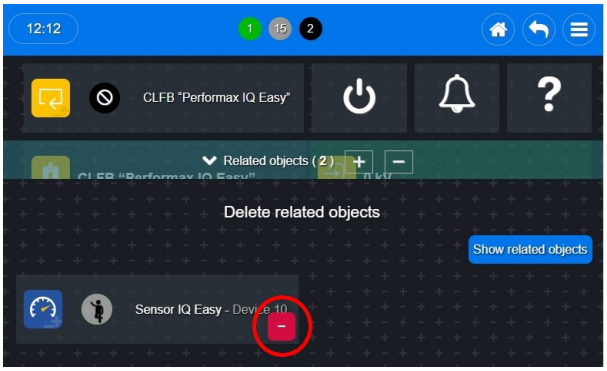
NOTE

Refer to the CLFB manual section for the specific device for default settings and fine tuning the CLFB PID controller.

Activate the Closed Loop FeedBack

Action	Result/Explanation
Click the Enable button	
If the CLFB is set up correctly, the status will become green with status running.	
In case of a warning or alarm, the target or source devices are not present or not all in run mode.	

Remove a Closed Loop FeedBack

Action	Result/Explanation
Open the Related objects of the CLFB object	
Click [-] to delete the Related input object from the CLFB object	
Click [-] on the object to delete it from the CLFB object	 **NOTE** Only input objects can be deleted from a CLFB object. The target object is deleted by disconnecting the CLFB object.
Open the CLFB object and click the disconnect button to remove the CLFB. Confirm the disconnection.	
Return to the Home screen	The CLFB is removed

Controlling the Closed Loop FeedBack via fieldbus

NOTE

- The CLFB function can be followed in the HMI by viewing the input (Sensor) parameter and the output parameter (-100 to 100).
- The CLFB function can be controlled by a fieldbus.
  See section Fieldbus function how to map to fieldbus.
- When mapped to fieldbus the default status for CLFB is disabled.
  Either the HMI or the fieldbus has to control the run/stanby status.
  See application notes for intermitting CLFB.

The fieldbus can control:

CLFB_control
CLFB_status
CLFB_Web_offset_voltage
CLFB_Input_segments
CLFB_proportional gain
CLFB_Integral gain
CLFB_Differential gain

Fieldbus function

A fieldbus connection with the machine control or a PLC offers the possibility to integrate the Simco-ION devices with the machine control and to realise control from one interface.

Fieldbus integration

The Smart SLC IQ 4.0 can be fitted with an Ethernet based fieldbus.

When a fieldbus module is integrated it is shown on the Home screen.

Fieldbus setup

The fieldbus needs setup by including all objects that are to be controlled via the fieldbus. When all objects are included, the Smart SLC can generate an integration file (XML).

GSD for ProfiNet, ESI for EtherCAT and EDS for Ethernet/IP.

NOTE

- Before setting up the fieldbus, the setup of the entire system must be completed.
- All devices and Addition SLC's should be connected.
- All related objects and functions s.a. CLFB should be configured.
- Fieldbus setup can only be performed by Admin and Expert user accounts only.
- Fieldbus enable/disable can be performed by Admin and Expert user accounts only.

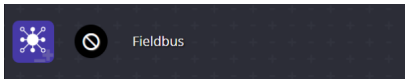
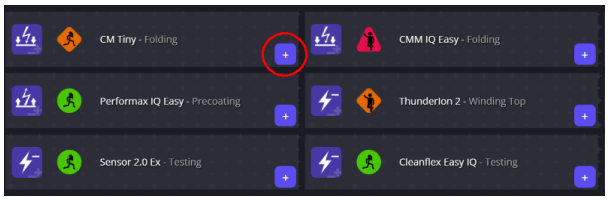
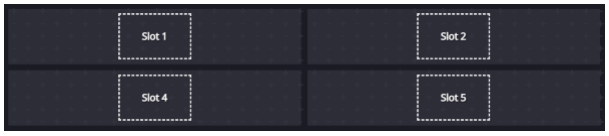
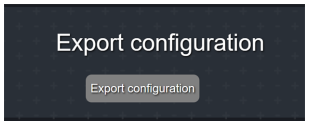
WARNING

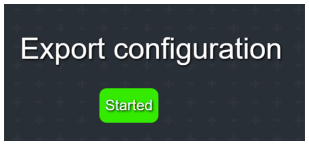
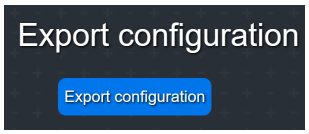
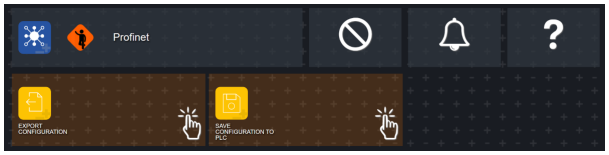
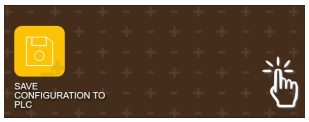
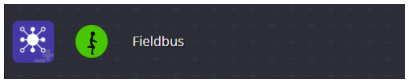
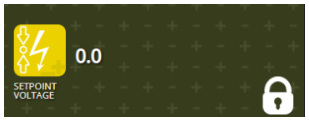
Any changes to the system will be lost after the XML file has been generated (and eventually configured in the PLC). When changes are made and saved into the Smart SLC, a new XML file must be generated. This will result in necessary reprogramming of the PLC integration.

Fieldbus configuration

NOTE

- An USB storage device is needed for exporting XML files to use in the PLC software.
- The USB storage device must be formatted in FAT32.

Action	Result/Explanation
Click the Fieldbus object on the Home screen to open it's parameter screen	
Click on the [+] button in the Related objects section	
Click on the [+] button of the object in the system to be integrated in the fieldbus	
Select the slot you want to assign to the object	
The slot corresponds to the order in which objects are listed in the XML file and displayed in the PLC portal (e.g. the Siemens TIA portal for Profinet)	
When finished selecting all objects, close the related objects section	
Enable the fieldbus by clicking the enable button	
Place the USB storage device in one of the USB ports of the Smart SLC IQ 4.0	
Click the Export configuration button	
Click on Export configuration	

Action	Result/Explanation
	
Wait until the export is finished	
Import the XML file on the USB device in your PLC configuration software and configure your PLC	
Click on the Profinet button	
If this is the final configuration, which is also configured in your PLC: Click on the Button Save configuration to SLC	
When the configuration was successful the fieldbus will show a green running status on the Home screen	
In the object parameter screen the Run/Standby button is no longer available and some parameters and actions are locked.	
To regain manual control over the objects, disable the fieldbus by clicking the disable button in the fieldbus object.	

Fieldbus parameter configuration

NOTE

Refer to the Smart SLC IQ 4.0 Fieldbus parameters document for details about the available parameters in chapter Attachments.

Fieldbus Device parameters

NOTE

For the available parameters for each device, refer to the Device parameters in chapter Attachments, section Device parameters.

Available Fieldbus configurations

1. ProfiNET
2. EtherCat
3. Ethernet/IP

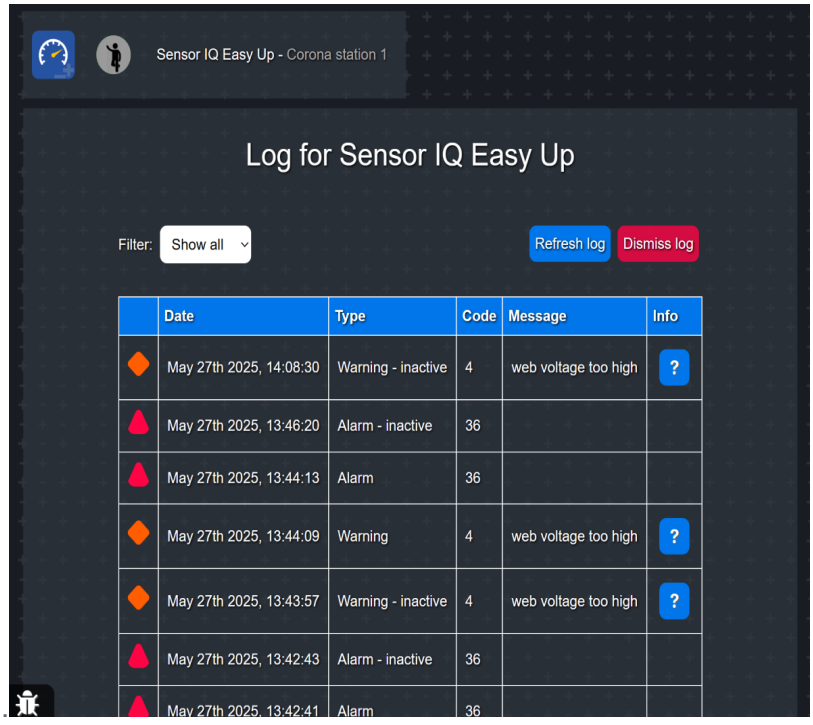
Functional check

Functional check Smart SLC IQ 4.0

- Check on the dashboard if all connected devices are visible as objects.
- Check the LED's on the front face of the Smart SLC to see if the status corresponds with the status of the device and on the HMI.

Functional check devices

- Check each individual device for operation and possible malfunctions.
  Refer to the manual for the specific device.
- Open the device real time values to check the device function (Parameters with green background).
- When a device is in a warning or an alarm state, check the Action log for the device to find the reason of the warning or alarm.



Operation

Operating objects

NOTE

- When fieldbus is active, start and standby on controlled parameters cannot be set by the HMI.
- From the Home screen all objects can be viewed and configured.
- All devices connected to the IQ 4 platform, including the ones on additional Smart SLC IQ 4.0 and Addition SLC IQ 4.0 are visible on the Home screen.

- Start a device from the Home screen by clicking the Play button.
- Standby a device from the Home screen by clicking Pause button.
- Click (open) an object to read out values or manage its settings.

Operation Control modes

The IQ 4 platform can be operated by:

- HMI, the user interface in a browser.

  Each user can operate the system depending on their access level.

- Fieldbus, the fieldbus is the master. Start and stop is disabled in the HMI.

  HMI can be used additionally for parameters and to view the operation.

Using the Closed Loop FeedBack (CLFB) Function

NOTE

For the CLFB to be fully functional, the related devices have to be in Run mode.

Check the help at the specific parameter in the HMI to get to know the CLFB and all individual settings.

NOTE

A CLFB function Object can also be mapped to a fieldbus slot.

When included in a fieldbus, the functionality CLFB standby is available when using CLFB with an intermittent process. When CLFB is in standby it will keep the last setting of the CLFB and start from that point when CLFB is set to run.

Enabling CLFB

- By default all segments are selected for calculation.

  To select individual segment(s), the parameter Segment Selection mode must be changed from “All” to “Selection” first.
- Use the parameter Segment Mask to select which Sensor segments should be used for calculating the CLFB values.
- Be sure that the CLFB is configured correctly.
- Enable the CLFB

Calibrating discharging devices

Many discharging devices have an efficiency indication. For a correct calculation sometimes they need to be calibrated for a correct calculation.

The devices can be recalibrated when:

- They are new and clean
- The devices are installed and the efficiency is not close to 100%. This could be the case when there is metal close to the device
- The machine is not running

Film or paper may stay in the machine but must be in same position (distance) as when the machine is running.

NOTE

Do not recalibrate when:

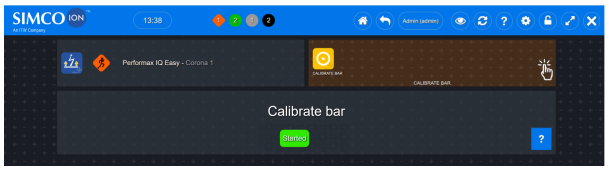
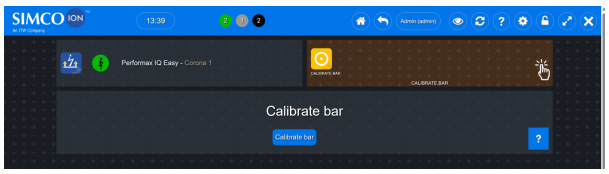
- The devices have been running for a longer time
- The devices are polluted!

Calibrating procedure

NOTE

When the device is part of Profinet or a CLFB, all relations must be removed before calibrating the device.

Devices can be calibrated wether in Running or Standby mode.

Action	Result/Explanation
Open the Extended Parameter view of the device.	
Click the Calibrate Bar button.	 Calibrate bar Started is indicated shortly and the device goes into Warning mode. 
Wait for the calibration to finish.	 Calibration is finished when the device goes into its original mode (Running or Standby). The calibration date is updated.

Disconnect devices

Disconnecting devices from the IQ 4 platform can be useful when a device is no longer needed or for maintenance reasons.

NOTE

- Disconnecting a device is only possible when it is not in use by a CLFB function or Fieldbus configuration.
- The power of the device will be completely switched off.

Action	Result/Explanation
Open the Extended Parameter view of the device.	
Click the Disconnect button in the parameter view of the device.	

Maintenance

General maintenance rules

- Keep the device clean and dry.
- Switch off the device before cleaning.
- Clean the device regularly to improve the operation.
- Check the connection cable(s) periodically for damage.

Cleaning devices

For details on cleaning and maintenance, refer to the respective device manuals.

Software updates

NOTE

- Only perform software updates when your machine or process is not operational.
- Parts of the IQ 4 platform will not be working during updating.
- A complete Smart SLC IQ 4.0 update can take up to 20 minutes.
- It is recommended to update all devices of the system to the latest software version.
- Updates can only be performed by a user with Administrator rights.
- Updates can only be performed from FAT32 formatted USB storage devices.

The platform has four software layers that may require updates. All four layers must be updated to ensure a reliably functioning system.

Layers to update:

- HMI (browser based user interface)
- Smart SLC (Operating system)
- SLC (Hardware/software communication with devices)
- Devices (All connected Simco-ION devices, for example Anti-static bars, Static Sensor, Charging generator etc.)

NOTE

Contact cs@simco-ion.nl (Customer Service) to provide an update package.

Update process

NOTE

When connecting a new device to the IQ 4 platform with a higher firmware version than similar devices in the IQ 4 platform, choose one of the 3 options:

- Update all devices in the IQ 4 platform (recommended, only updated systems can rely on Technical Service Support).
- Leave it as it is. (some functionality of your new device may not work).
- Use the update procedure to downgrade the new device to the same version of other similar devices in the current IQ 4 platform.

NOTE

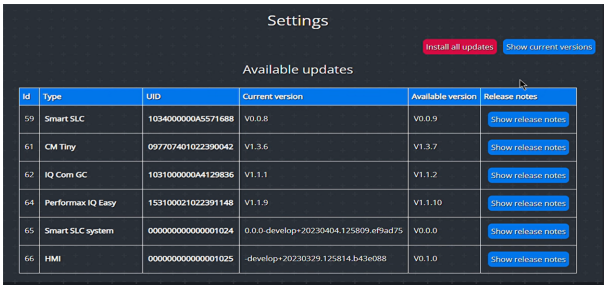
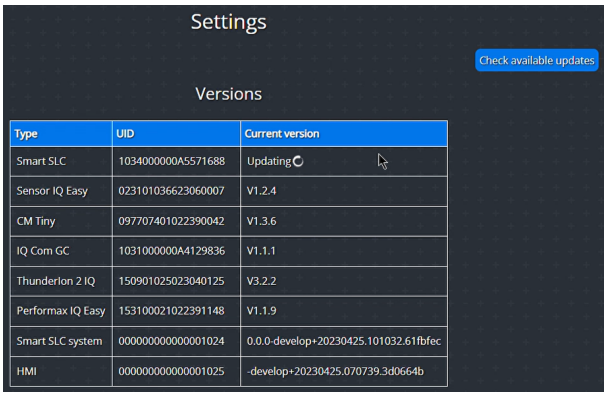
- Use a FAT32 formatted USB storage device with only the latest update package on it.
- Received Update Mender file must be saved in the root of the USB storage device.
- The installation package contains updates for the Smart SLC IQ 4.0 and all single devices as well.
- Legacy devices will not show up on the home screen before updating.
- Updating all or only updating single devices can be performed.

WARNING

When refreshing browser pages after updating, screen data may not be updated due to browser caching.
Clearing the browser history and cached files will update the data after refreshing the browser screen.

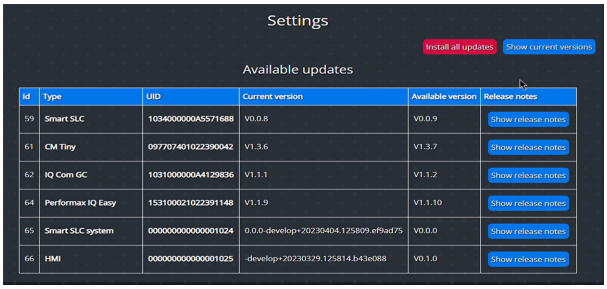
- Ask for a new full package update before staring the update process.
- Save the Update Mender file in the root of the USB storage device.

Updating all

Action	Result/Explanation
Install the USB device with the update package in the USB port	
Log in with your Administrator user name and password	
Go to Maintenance screen via the menu.	 A screen will appear with the current System configuration.
Click the button : “Check available updates”	
Check the release notes on the individual device type to see what will change	
Click “Install all updates” and wait for the updates to finish	Messages “Updating the system” followed by ”Restarting, please wait” appear
Log in as Administrator and finish the last part of the update procedure	
You can see the individual components being updated	
Wait until all components are updated and the system is restarted. In a browser interface, click Refresh to see the latest screen.	
Go back to normal operation from the Home screen	

Updating single devices

> **NOTE**
>
> Updating multiple legacy devices at once will take some time. Occasionally the update procedure must be started again.

Action	Result/Explanation
Install the USB device with update package in the USB port	
Log in with your Administrator user name and password	A screen will appear with the current System configuration. **NOTE** Legacy devices will show up in the list with ”no UID”.
Click the button: “Check available updates”	
Check the release notes on the individual device type to see what will change	
Update the selected devices and wait for the updates to finish	**NOTE** After the update, legacy devices will have an UID and it will show up on the home screen.
Wait until all components are updated. In a browser interface, click Refresh to see the latest screen.	
Go back to normal operation from the Home screen	

Device compatibility

NOTE

- Most Simco-ION devices are forward compatible.
  Refer to the compatibillity list for detailed information about the device compatibillity.
- Firmware for Segments of Sensor IQ Easy and Sensor IQ Easy 2.0 Ex can only be upgraded by Simco-ION.
- In case of a device marked as not compatible, contact cs@simco-ion.nl (Customer Service) for a solution.

Updates for systems with Fieldbus

NOTE

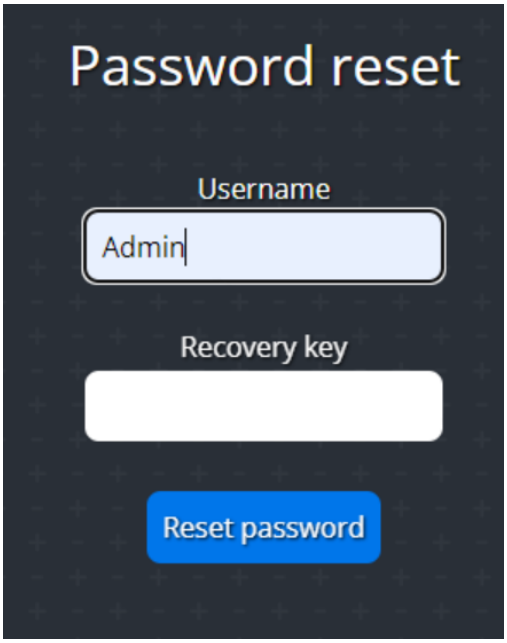
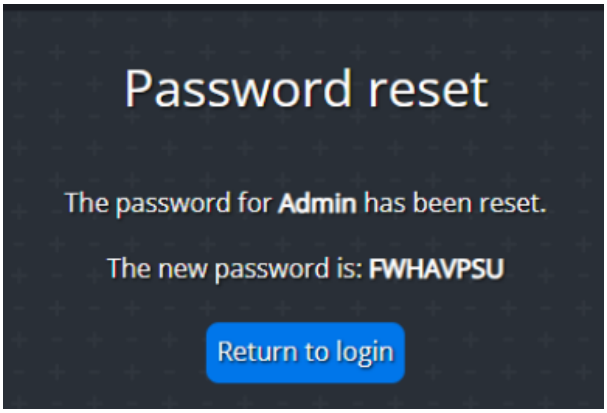
- The fieldbus will be disabled during updates.
- Manually enable the fieldbus after the updates are finished.

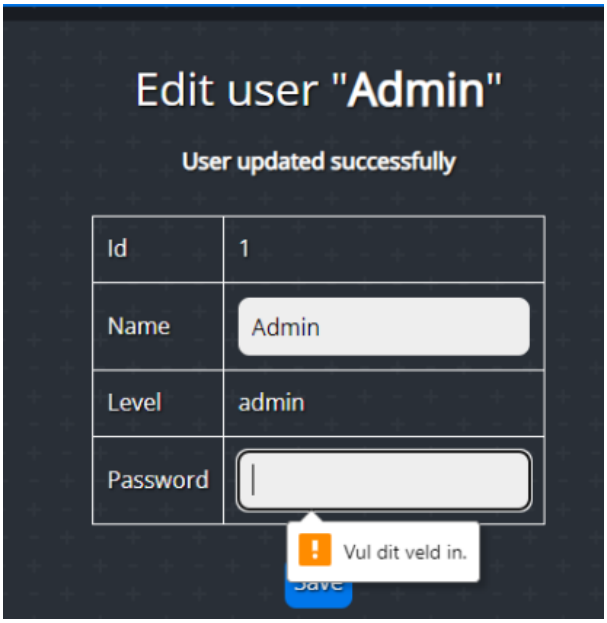
Rollback updates

If a software update is not satisfactory, a rollback can be performed.

Action	Result/Explanation
First check and note the current installed Update Package release.	
Click "Show release notes" of the Smart SLC BSP.	
Insert a USB storage device with the previous update release package and start the update procedure via "Check available updates".	

Admin Password reset

Action	Result/Explanation
Request a new recovery key from Simco-ION	Send an email to cs@simco-ion and receive a recovery key with which you can reset your password.
Go to the Login screen and press "Password reset"	
Enter the received new recovery key and press "Reset password"	
Press "Return to Login"	

Action	Result/Explanation
Change your password and press "Save"	 **NOTE** The password may not be blank, it must at least contain 8 characters
Go back to normal operation from the Home screen	

Troubleshooting

- When the Smart SLC IQ 4.0 is not responding, disconnect and connect the 24 V DC logic power or press the reset button located behind the hole on the front of the Smart SLC IQ 4.0.

NOTE

Refer to the device manual for troubleshooting the specific device.

Table: *Faults Smart SLC IQ 4.0 or Addition SLC IQ 4.0*

Signalling	Issue	Solution
Power LEDs off	No Device and/or Logic power	Check the power unit(s) and the power lines. See chapter Electrical connection
Fieldbus LEDs off	Fieldbus not installed or not configured correctly	Check the fieldbus configuration or activate the fieldbus. See chapter Commissioning, Fieldbus configuration
Device(s) not present at Home screen	Wiring fault	Check wiring of the device(s). See chapter Installation, section Electrical connection
Device does not respond to the HMI	The device is controlled via a fieldbus object	Control the device via the fieldbus
		Disable the fieldbus object
		Remove the device from the fieldbus object **WARNING** PLC must be reconfigured
Settings cannot be made	User has not enough authorisations	Login as different user with more access authorisations
Unable to login	Wrong password	Reset password by an Admin user
	Forgot password	
	Lost Admin password	Restore Admin password. See chapter Maintenance, section Admin Password reset.
USB storage device not recognised	Wrong format USB storage device	Use a FAT32 formatted USB storge device
HMI not accessible via internet browser	Wrong IP address	Find the HMI using the instructions in Chapter Commissioning, section Connecting the HMI
	IQ 4 platform connected to wrong network	Connect the IQ 4 platform to the same local network as the control device
	Outdated internet browser	Update or use another browser
	Wrong IP address or wrong item number or serial number used	Find the HMI using the instructions in Chapter Commissioning, section Connecting the HMI
	No IP address provided by the local router	Use a DHCP router
		Temporarily solution: connect your laptop or PC to the Simco-LAN output and use IP address 192.168.10.199

Warranty

The Simco-ION warranty conditions are described in and published on the internet.
These conditions can be viewed on:

https://www.simco-ion.co.uk/wp-content/uploads/Extended-warranty-conditions_GB.pdf

Simco-ION Warranty Conditions GB

Warranty Period

The device has a one-year warranty as standard, which commences on the invoice date.

The warranty becomes four years by registering the device on the Simco-ION website.

To register the device, it is necessary to state the serial number of the device. This information can be found on the device nameplate.

https://www.simco-ion.co.uk/warranty

Warranty registration site GB

Repairs

Review these conditions before submitting equipment for repair (RMA procedure) to Simco-ION.

NOTE

- Only Simco-ION can and may repair this product.
- In the event of a defect within or outside the warranty, the product can be offered to Simco-ION for repair.

- Refer to the problem analysis in chapter Troubleshooting, and follow the advice.
- If it is certain that the Simco-ION product causes the problem, offer it for repair.
- Use the RMA procedure before offering the product to Simco-ION.

Return Merchandise Authorisation

In case of problems and questions, please get in touch with Simco-ION or a Simco-ION representative in your region.

A malfunctioning or defective product can be returned to Simco-ION for repairs following the RMA (Return Merchandise Authorisation) procedure below.

RMA Request

- Fill in the Simco-ION RMA form at

  https://www.simco-ion.nl/repair or

  https://www.simco-ion.co.uk/repair
- By entering the item and serial numbers, you can determine whether your product will be repaired under warranty or if costs are involved.

Return sending

- Pack the defective product properly.
- Indicate the RMA number on the package.
- Send the package to the stated return address of Simco-ION.

Storage and disposal

Storage

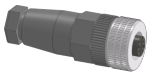
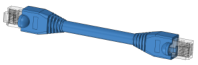
Always store the Simco-ION products in a dry and cool place.

Disposal

- When disposing of the product, follow the local environmental regulations.
- Do not dispose the product with regular waste at the end of its life, but offer it at an official point. This way, you help to protect the environment.

Spare parts

Table: *Spare parts*

No	Part number	Product image	Description	Comment
1	7519020365		Device-cable M12 female straight 5 m*	
2	7519020366		Device-cable M12 female straight 10 m*	
3	7519020375		Device-cable M12 female right angled 5 m*	
4	7519020376		Device-cable M12 female right angled 10 m*	
5	7519020350		Device connector M12 female straight, ø4-6 mm cables	
6	7519020351		Device connector M12 female straight, ø6-8 mm cables	
7	7519020355		Device connector M12 female angled, ø4-6 mm cables	
8	7519020356		Device connector M12 female angled, ø6-8 mm cables	
9	9380271020		Ethernet cable, Cat6, RJ45, 2 m	
10	9100300107		Device Cable splices ø0,5 mm²	
11	9100302520		Power Cable splices ø2,5 mm²	
12	9380271030		WiFi antenna	
13	9380273546		WiFi antenna cable 18" (457 mm)	

NOTE

* Contact Simco-ION for more cable lengths and cable options.

Register

Send an email to cs@simco-ion.nl to register for log-in to the Simco-ION service portal to get access to our knowledge base and news about future updates.

Attachments

Device parameters

Device loads

Device compatibility

Fieldbus parameter configuration

Smart SLC IQ 4.0 wire connections

Fieldbus example for Smart SLC with ProfiNET

Fieldbus example for Smart SLC with EtherCAT

Fieldbus example for Smart SLC with Ethernet/IP

Device parameters

Table: *Functional parameters of devices EasION IQ 4.0 and Performax IQ Easy*

Parameter	Functional description	Comment
Device type version	Determines the default settings for output voltage and frequency. There are 3 presets: • Speed: web speed >500 m/min, web distance 50-500 mm • Hybrid: web speed 0-500 m/min, web distance 100-500 mm This parameter can be changed from the Admin user level.	Read only
Operation mode	This parameter has 2 modes: • Fixed (default): the anti-static bar uses the default settings • Manual: parameters related to the output voltage and frequency can be changed, it is also possible to use the anti-static bar in CLFB mode This parameter can be changed from the Expert user level.	
Balance offset	Determines the ratio between positive and negative ions the anti-static bar produces. The default value is 0, producing an equal number of positive (+) and negative (-) ions. This parameter ranges from -100 (100% negative ions) to 100 (100% positive ions). This parameter can be changed from the Expert user level. The Operation mode parameter must be set to Manual.	

Table: *Functional parameters of devices* EasION IQ 4.1 *and Performax IQ Easy*

Parameter	Functional description	Comment
Device type version	Determines the default settings for output voltage and frequency. There are 3 presets: • Speed: web speed >500 m/min, web distance 50-500 mm • Hybrid: web speed 0-500 m/min, web distance 100-500 mm • Distance: web distance 100-1000 mm This parameter can be changed from the Admin user level.	
Operation mode	This parameter has 2 modes: • Fixed (default): the anti-static bar uses the default settings. • Manual: parameters related to the output voltage and frequency can be changed, it is also possible to use the anti-static bar in CLFB mode. This parameter can be changed from the Expert user level.	
Balance offset	Determines the ratio between positive and negative ions the anti-static bar produces. The default value is 0, producing an equal number of positive (+) and negative (-) ions. This parameter ranges from -100 (100% negative ions) to 100 (100% positive ions). This parameter can be changed from the Expert user level. The Operation mode parameter must be set to Manual.	
Output voltage positive set point	Determines the default positive output voltage (when the Balance offset parameter is set to 0). The default output voltage positive value is determined by the Device type version parameter. This value can be adjusted from the Admin user level for specific applications.	
Output voltage negative set point	Determines the default negative output voltage (when the Balance offset parameter is set to 0). The default output voltage negative value is determined by the Device type version parameter. This value can be adjusted from the Admin user level for very specific applications.	

Parameter	Functional description	Comment
Output voltage max.	This parameter determines the maximum output voltage (when the Balance offset parameter is set to -100 or 100). This value can be adjusted from the Admin user level for very specific applications.	
Output frequency Set point	This parameter determines the frequency of the output voltage. The default Output frequency value is determined by the Device type version parameter. This value can be adjusted from the Admin user level for very specific applications.	

Device loads

Table: *Loads per device*

Device	Current consumption	Document link
EasION IQ 4	Max. 1,0 A DC	1546
Performax IQ Easy	Max. 0.5 A DC	1531
Performax IQ Easy Ex	Max. 0,4 A DC	1535
ThunderION IQ 2	Max. 2 A DC	1509
VicinION IQ	Max. 0,2 A DC	1541
Sensor IQ Easy		0231
Sensor IQ Easy 2.0 Ex		0232
CM Tiny IQ	Max. 0,9 A	0977
CMM IQ Easy	Max. 0,9 A	0985
IQ Com generator converter	Max. 0,2 A DC	0974/1031
Blowflex IQ Easy 4.0	Max. 0,3 A DC	1617
Cleanflex IQ Easy	Max. 0.5 A DC	0509

Device compatibility

Device	Variants	Manager 1.0	Manager 2.0	Smart SLC 4.0	From serialnr	Automatically updated
Performax IQ Easy	Air, Typhoon, Airknife	yes	yes	yes		Not E versions
Performax IQ Easy Ex	Typhoon, Airknife	yes	yes	yes		
CMME IQ		yes	yes	yes	23040028 (Note 1)	V2.2.2
CM Tiny IQ		yes	yes	yes	23030001 (Note 1)	V1.3.6
IQ Com generator converter		yes	yes	yes		
VicinION IQ		yes	yes	yes		
Cleanflex IQ		yes	yes	yes		
Sensor IQ Easy (USA)		yes	yes	no		
Sensor IQ Easy		yes	yes	yes		
Sensor IQ Easy 2.0 Ex		no	yes	yes		
Sensor IQ Easy 4.0		no	no	yes		
EasION IQ 4.0	R, D, Air	no	yes	yes		
EasION IQ 4.1	R, D, Air	no	no	yes		
ThunderION IQ 2.0		yes	yes	yes	23140382	V3.0.0 (Note 2)
Blowflex IQ		no	no	yes		

Note 1: devices with a lower serial number are not compatible with the Smart SLC 4.0

Note 2: devices with a lower firmware version are compatible with the Smart SLC 4.0 but cannot be automatically updated

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Smart SLC / Manager IQ Easy 4.0

Fieldbus Description

1 Revision information

Rev.	*Date*	*Author*	*Comment*
0.1	08-12-2023	M. Jonkman	Initial version.
0.2	08-04-2024	M. Jonkman	More IQ devices added
0.3	10-04-2024	M. Jonkman	Object names changed
0.4	05-06-2024	M. Jonkman	CM Tiny IQ and CMM IQ Easy added
0.5	11-06-2024	M. Jonkman	New parameter added (for Thunderion) and parameter names changed
0.6	21-08-2024	M. Jonkman	Parameter index added
0.7	04-09-2024	M. Jonkman	More parameters are added to cyclic data
0.8	17-09-2024	M. Jonkman	Cyclic parameters Thunderion changed
0.9	13-11-2024	M. Jonkman	Minor change in description Control byte
0.10	07-02-2025	M. Jonkman	New fieldbus structure
0.11	12-02-2025	M. Jonkman	Minor change in description parameters
0.12	12-03-2025	M. Jonkman	Change in CLFB parameters
0.13	23-05-2025	M. Jonkman	Change in CLFB parameters, various naming changes
0.14	23-06-2025	M. Jonkman	Cleanflex IQ Easy and Blowflex IQ Easy added

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About this document

This document describes the Smart SLC fieldbus interface from the user point of view. It describes the implementation of the Smart SLC interface file (e.g. GSD- or EDS-file). The available command set is used to configure the Smart SLC and read several information from the Smart SLC. The implemented interface is also used to control the runtime behaviour of the Smart SLC and its connected Simco IQ devices. The communication interface meets the Profinet, EtherCAT or Ethernet/IP standard and will not be described here. The communication interface exists of 2 parts:

- Parametric Data (cyclically transmitted data) and
- Configuration Data (acyclic communication, a command / response part).

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The cyclic data

The **cyclically** transmitted data exists of the following parameters, defined in the fieldbus interface file as Module “Smart SLC”:

Object name	Parameter name	Direction	Width (byte)	Format
Simco IQ4 manager (MANAGER)	STATUS_MANAGER	Input	4	Struct
CLFB block (for each created CLFB_BLOCK)	STATUS_CLFB	Input	8	Struct
	CONTROL_CLFB	Output	8	Struct
Performax IQ Easy parameters (for each connected PERFORMAX_DEVICE)	STATUS_PERFORMAX_40	Input	24	Struct
	CONTROL_PERFORMAX_40	Output	4	Struct
Easion IQ 4.0 parameters (for each connected EASION_DEVICE)	STATUS_EASION_40	Input	24	Struct
	CONTROL_EASION_40	Output	4	Struct
Easion IQ 4.1 parameters (for each connected EASION_41_DEVICE)	STATUS_EASION_41	Input	24	Struct
	CONTROL_EASION_41	Output	4	Struct
Performax IQ Easy Ex parameters (for each connected PERFORMAXEX_DEVICE)	STATUS_PERFORMAX_EX	Input	24	Struct
	CONTROL_PERFORMAX_EX	Output	4	Struct
Thunderion 2 IQ parameters (for each connected THUNDERION_DEVICE)	STATUS_THUNDERION	Input	24	Struct
	CONTROL_THUNDERION	Output	4	Struct
Vicinion parameters (for each connected VICINION_DEVICE)	STATUS_VICINION	Input	16	Struct
	CONTROL_VICINION	Output	4	Struct
Sensor IQ Easy (Legacy sensor device) parameters (for each connected SENSOR_DEVICE)	STATUS_SENSOR length of the struct depends on the number of sensor segments. e.g Sensor IQ Easy with 1 segment has a 16 byte wide Status struct. Sensor IQ Easy with 16 segments has a 76 wide Status struct.	Input	16 – 76	Struct
	CONTROL_SENSOR	Output	8	Struct
Sensor 2.0 Ex parameters (for each connected SENSOR_EX_DEVICE)	STATUS_SENSOR_20_EX length of the struct depends on the number of sensor segments. e.g Sensor 2.0 Ex with 1 segment has a 16 byte wide Status struct. Sensor 2.0 Ex with 4 segments has a 28 wide Status struct.	Input	16 – 28	Struct
	CONTROL_SENSOR_20_EX	Output	8	Struct
IQ COM GC parameters (for each connected IQ_COM_GC_DEVICE)	STATUS_IQ_COM_GC	Input	20	Struct
	CONTROL_IQ_COM_GC	Output	12	Struct

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Object name	Parameter name	Direction	Width (byte)	Format
CM Tiny IQ parameters (for each connected CM_TINY_IQ_DEVICE)	STATUS_CMTINY	Input	20	Struct
	CONTROL_CMTINY	Output	12	Struct
CMM IQ Easy parameters (for each connected CMM_IQ_EASY_DEVICE)	STATUS_CMMEASY	Input	20	Struct
	CONTROL_CMMEASY	Output	8	Struct
Cleanflex IQ Easy (for each connected CLEANFLEX_DEVICE)	STATUS_CLEANFLEX	Input	12	Struct
	CONTROL_CLEANFLEX	Output	4	Struct
Blowflex IQ Easy (for each connected BLOWFLEX_DEVICE)	STATUS_BLOWFLEX	Input	12	Struct
	CONTROL_BLOWFLEX	Output	4	Struct

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Smart SLC parameter description

Struct name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
STATUS_MANAGER	Input	4	Struct	Cyclic	1

Byte offset	Parameter name	Description			Remarks
0	MANAGER_STATUS [byte8]	Bit 0-2: STATUS	0: NONE	Manager status unknown	
			1: STARTUP	Manager starting	
			2: RUNNING	Manager running	
			3: UPDATING	Manager updating	
			4: RESTARTING	Manager restarting	
		Bit 3-5: GLOBAL STATUS	0: OK	Status OK	
			1: WARNING	Manager has a warning	
			2: ALARM	Manager has an alarm	
			3: NONE	Unknown	
		Bit 6: HEARTBEAT	0/1: TOGGLE	Toggles each +/- 500ms to indicate the manager is alive and running	
		Bit 7: RESERVED		Reserved	for future use
1	STATUS_PAD_01 [byte8]	Reserved			for future use
2	STATUS_PAD_02 [byte8]	Reserved			for future use
3	STATUS_PAD_03 [byte8]	Reserved			for future use

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CLFB object parameter description

(for each created CLFB object)

Struct name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
STATUS_CLFB	Input	8	Struct	Cyclic	1

Byte offset	Parameter name	Description			Remarks
0	CLFB_STATUS [byte8]	Bit 0-1: MODE	0: DISABLED	CLFB is disabled	
			1: STANDBY	CLFB is standby	
			2: RUNNING	CLFB is running	
		Bit 2: ALARM	0: NO ALARM	No alarm	
			1: ALARM ACTIVE	Alarm active	
		Bit 3: WARNING	0: NO WARNING	No warning	
			1: WARNING ACTIVE	Warning active	
		Bit 4-7: RESERVED			for future use
1	STATUS_PAD_01 [byte8]	Reserved			for future use
2	STATUS_PAD_02 [byte8]	Reserved			for future use
3	STATUS_PAD_03 [byte8]	Reserved			for future use
4	CLFB_OUTPUT [float32]	READOUT	CLFB PID output		
5					
6					
7					

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Struct name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
CONTROL_CLFB	Output	8	Struct	Cyclic	2

Byte offset	Parameter name	Description			Remarks
0	CLFB_CONTROL [byte8]	Bit 0-1: MODE	0: DISABLED	Disable CLFB	
			1: STANDBY	Set CLFB to standby mode	
			2: RUN	Set CLFB to run mode	
		Bit 2-7: RESERVED			for future use
1	CLFB_SEGMENT_ SELECTION_MODE [byte8]	Bit 0-1: MODE	0: All	Select all sensor segments	
			1: Selection	Select sensor segments via parameter: CLFB_SEGMENT_MASK	
			2: Auto	Automatically select all available sensor segments	
			3: N/A		
		Bit 2-7: RESERVED			for future use
2	CLFB_SEGMENT_ MASK [word16]	Bit 0: SELECT SEGMENT 1	0: DISABLED 1: ENABLED	Select sensor segments for CLFB	
		Bit 1: SELECT SEGMEBT 2			
		Bit 2: SELECT SEGMEBT 3			
		Bit 3: SELECT SEGMEBT 4			
		Bit 4: SELECT SEGMEBT 5			
		Bit 5: SELECT SEGMEBT 6			
		Bit 6: SELECT SEGMEBT 7			
		Bit 7: SELECT SEGMEBT 8			
3		Bit 8: SELECT SEGMEBT 9			
		Bit 9: SELECT SEGMEBT 10			
		Bit 10: SELECT SEGMEBT 11			
		Bit 11: SELECT SEGMEBT 12			
		Bit 12: SELECT SEGMEBT 13			
		Bit 13: SELECT SEGMEBT 14			
		Bit 14: SELECT SEGMEBT 15			
		Bit 15: SELECT SEGMEBT 16			
4	CLFB_SETPOINT [float32]	SETPOINT	Webvoltage offset setpoint		
5					
6					
7					

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Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no
CLFB_PID_KP	Output	4	float32	Acyclic	3

Parameter name	Description			Remarks
CLFB_PID_KP	SETPOINT	Default value: 5	Proportial gain of CLFB control	

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no
CLFB_PID_KI	Output	4	float32	Acyclic	4

Parameter name	Description			Remarks
CLFB_PID_KI	SETPOINT	Default value: 5	Integral gain of CLFB control	

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no
CLFB_PID_KD	Output	4	float32	Acyclic	5

Parameter name	Description			Remarks
CLFB_PID_KD	SETPOINT	Default value: 0	Differential gain of CLFB control	

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no
CLFB_PID_I_MIN	Output	4	float32	Acyclic	6

Parameter name	Description			Remarks
CLFB_PID_I_MIN	SETPOINT	Default value: -100	Integral min of CLFB control	

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no
CLFB_PID_I_MAX	Output	4	float32	Acyclic	7

Parameter name	Description			Remarks
CLFB_PID_I_MAX	SETPOINT	Default value: 100	Integral max of CLFB control	

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no
CLFB_PID_I_DEADBAND	Output	4	float32	Acyclic	8

Parameter name	Description			Remarks
CLFB_PID_I_DEADBAND	SETPOINT	Default value: 0	Integral deadband of CLFB control	

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Performax IQ Easy parameters

(for each connected PERFORMAX_DEVICE)

Struct name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
STATUS_PERFORMAX_40	Input	24	Struct	Cyclic	1

Byte offset	Parameter name	Description			Remarks
0	STATUS [byte8]	Bit 0-1: MODE	0: DISABLED	Device is disabled	
			1: STANDBY	Device is standby	
			2: RUNNING	Device is running	
		Bit 2: ALARM	0: NO ALARM	No alarm	
			1: ALARM ACTIVE	Alarm active	
		Bit 3: WARNING	0: NO WARNING	No warning	
			1: WARNING ACTIVE	Warning active	
		Bit 4-7: RESERVED			for future use
1	IONISATION_EFFICIENCY [byte8]	READOUT	Min value: 0	efficiency in %	
			Max value: 100		
2	STATUS_PAD_02 [byte8]	Reserved			for future use
3	STATUS_PAD_03 [byte8]	Reserved			for future use
4	ACTIVE_ALARMS [dword32]	Bit 0: INTERNAL TEMPERATURE TOO HIGH		0: NO ALARM 1: ALARM ACTIVE	
5		Bit 1: PRIMARY CURRENT TOO HIGH			
6		Bit 2: OVERLOAD HIGH VOLTAGE			
7		Bit 3-31: RESERVED			
8	ACTIVE_WARNINGS [dword32]	Bit 0-1: RESERVED		0: NO WARNING 1: WARNING ACTIVE	
9		Bit 2: POWER SUPPLY TOO LOW			
10		Bit 3: CLEAN BAR / EFFICIENCY LOW			
11		Bit 4: RESERVED			
		Bit 5: CALIBRATION INVALID			
		Bit 6: CALIBRATION IN PROGRESS			
		Bit 7: OVERLOAD HIGH VOLTAGE			
		Bit 8-9: RESERVED			
		Bit 10: INTERNAL TEMPERATURE TOO HIGH			
		Bit 11-31: RESERVED			
12	IONIZATION_CURRENT_NEGATIVE [word16]	READOUT	e.g. 100 = 100µA		
13					
14	IONIZATION_CURRENT_POSITIVE [word16]	READOUT	e.g. 100 = 100µA		
15					
16	OUTPUT_VOLTAGE_NEGATIVE [float32]	READOUT	e.g 8 = 8.0 kV	Output voltage negative	
17					
18					
19					
20	OUTPUT_VOLTAGE_POSITIVE [float32]	READOUT	e.g 9 = 9.0 kV	Output voltage positive	
21					
22					
23					

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Struct name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
CONTROL_PERFORMAX_40	Output	4	Struct	Cyclic	2

Byte offset	Parameter name	Description			Remarks
0	CONTROL [byte8]	Bit 0-1: MODE	0: DISABLED	Disable device	
			1: STANDBY	Set device to standby mode	
			2: RUN	Set device to run mode	
		Bit 2: IDENTIFY	0: OFF	Switch off identify leds on device	
			1: ON	Switch on identify leds on device	
		Bit 3-7: RESERVED			for future use
1	BAR_OPERATION_MODE [byte8]	Bit 0-1: MODE	0: FIXED MODE	Set device to fixed mode	This parameter is blocked in manual mode when the bar is controlled by CLFB!
			1: N/A		
			2: MANUAL MODE	Set device to manual mode	
			3: N/A		
		Bit 2-7: RESERVED			for future use
2	BALANCE_OFFSET [int16]	SETPOINT	Default value: 0		Only applicable in Manual mode! This parameter is blocked when the bar is controlled by CLFB!
3			Min value: -100		
			Max value: 100		

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
OUTPUT_FREQUENCY_SETPOINT	Output	1	Byte	Acyclic	3

Parameter name	Description			Remarks
OUTPUT_FREQUENCY_SETPOINT	SETPOINT	Default value: 0	Output frequency setpoint	0 = not used 45 = 45Hz Only applicable in Manual mode.
		Min value: 0		
		Max value: 100		

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no
OUTPUT_VOLTAGE_NEGATIVE_SETPOINT	Output	4	Float	Acyclic	4

Parameter name	Description			Remarks
OUTPUT_VOLTAGE_NEGATIVE_SETPOINT	SETPOINT	Default value: 0	Output voltage negative setpoint	0 = not used 8 = 8.0kV Only applicable in Manual mode.
		Min value: 0		
		Max value: 15		

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
OUTPUT_VOLTAGE_POSITIVE_SETPOINT	Output	4	Float	Acyclic	5

Parameter name	Description			Remarks
OUTPUT_VOLTAGE_POSITIVE_SETPOINT	SETPOINT	Default value: 0	Output voltage positive setpoint	0 = not used 9 = 9.0kV Only applicable in Manual mode.
		Min value: 0		
		Max value: 15		

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Easion IQ 4.0 parameters

(for each connected EASION_DEVICE)

Struct name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
STATUS_EASION_40	Input	24	Struct	Cyclic	1

Byte offset	Parameter name	Description			Remarks
0	STATUS [byte8]	Bit 0-1: MODE	0: DISABLED	Device is disabled	
			1: STANDBY	Device is standby	
			2: RUNNING	Device is running	
		Bit 2: ALARM	0: NO ALARM	No alarm	
			1: ALARM ACTIVE	Alarm active	
		Bit 3: WARNING	0: NO WARNING	No warning	
			1: WARNING ACTIVE	Warning active	
		Bit 4-7: RESERVED			for future use
1	IONISATION_EFFICIENCY [byte8]	READOUT	Min value: 0	efficiency in %	
			Max value: 100		
2	STATUS_PAD_02 [byte8]	Reserved			for future use
3	STATUS_PAD_03 [byte8]	Reserved			for future use
4	ACTIVE_ALARMS [dword32]	Bit 0: INTERNAL TEMPERATURE TOO HIGH		0: NO ALARM 1: ALARM ACTIVE	
5		Bit 1: PRIMARY CURRENT TOO HIGH			
6		Bit 2: OVERLOAD HIGH VOLTAGE			
7		Bit 3-31: RESERVED			
8	ACTIVE_WARNINGS [dword32]	Bit 0-1: RESERVED		0: NO WARNING 1: WARNING ACTIVE	
9		Bit 2: POWER SUPPLY TOO LOW			
10		Bit 3: CLEAN BAR / EFFICIENCY LOW			
11		Bit 4: RESERVED			
		Bit 5: CALIBRATION INVALID			
		Bit 6: CALIBRATION IN PROGRESS			
		Bit 7: OVERLOAD HIGH VOLTAGE			
		Bit 8-9: RESERVED			
		Bit 10: INTERNAL TEMPERATURE TOO HIGH			
		Bit 11-31: RESERVED			
12	IONIZATION_CURRENT_NEGATIVE [word16]	READOUT	e.g. 100 = 100µA		
13					
14	IONIZATION_CURRENT_POSITIVE [word16]	READOUT	e.g. 100 = 100µA		
15					
16	OUTPUT_VOLTAGE_NEGATIVE [float32]	READOUT	e.g 8 = 8.0 kV	Output voltage negative	
17					
18					
19					
20	OUTPUT_VOLTAGE_POSITIVE [float32]	READOUT	e.g 9 = 9.0 kV	Output voltage positive	
21					
22					
23					

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Struct name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
CONTROL_EASION_40	Output	4	Struct	Cyclic	2

Byte offset	Parameter name	Description			Remarks
0	CONTROL [byte8]	Bit 0-1: MODE	0: DISABLED	Disable device	
			1: STANDBY	Set device to standby mode	
			2: RUN	Set device to run mode	
		Bit 2: IDENTIFY	0: OFF	Switch off identify leds on device	
			1: ON	Switch on identify leds on device	
		Bit 3-7: RESERVED			for future use
1	BAR_OPERATION_MODE [byte8]	Bit 0-1: MODE	0: FIXED MODE	Set device to fixed mode	This parameter is blocked in manual mode when the bar is controlled by CLFB!
			1: N/A		
			2: MANUAL MODE	Set device to manual mode	
			3: N/A		
		Bit 2-7: RESERVED			for future use
2 3	BALANCE_OFFSET [int16]	SETPOINT	Default value: 0 Min value: -100 Max value: 100		Only applicable in Manual mode! This parameter is blocked when the bar is controlled by CLFB!

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
OUTPUT_FREQUENCY_SETPOINT	Output	1	Byte	Acyclic	3

Parameter name	Description			Remarks
OUTPUT_FREQUENCY_SETPOINT	SETPOINT	Default value: 0 Min value: 0 Max value: 100	Output frequency setpoint	0 = not used 45 = 45Hz Only applicable in Manual mode.

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no
OUTPUT_VOLTAGE_NEGATIVE_SETPOINT	Output	4	Float	Acyclic	4

Parameter name	Description			Remarks
OUTPUT_VOLTAGE_NEGATIVE_SETPOINT	SETPOINT	Default value: 0 Min value: 0 Max value: 15	Output voltage negative setpoint	0 = not used 8 = 8.0kV Only applicable in Manual mode.

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
OUTPUT_VOLTAGE_POSITIVE_SETPOINT	Output	4	Float	Acyclic	5

Parameter name	Description			Remarks
OUTPUT_VOLTAGE_POSITIVE_SETPOINT	SETPOINT	Default value: 0 Min value: 0 Max value: 15	Output voltage positive setpoint	0 = not used 9 = 9.0kV Only applicable in Manual mode.

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Easion IQ 4.1 parameters

(for each connected EASION_41_DEVICE)

Struct name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
STATUS_EASION_41	Input	24	Struct	Cyclic	1

Byte offset	Parameter name	Description			Remarks
0	STATUS [byte8]	Bit 0-1: MODE	0: DISABLED	Device is disabled	
			1: STANDBY	Device is standby	
			2: RUNNING	Device is running	
		Bit 2: ALARM	0: NO ALARM	No alarm	
			1: ALARM ACTIVE	Alarm active	
		Bit 3: WARNING	0: NO WARNING	No warning	
			1: WARNING ACTIVE	Warning active	
		Bit 4-7: RESERVED			for future use
1	IONISATION_EFFICIENCY [byte8]	READOUT	Min value: 0	efficiency in %	
			Max value: 100		
2	STATUS_PAD_02 [byte8]	Reserved			for future use
3	STATUS_PAD_03 [byte8]	Reserved			for future use
4	ACTIVE_ALARMS [dword32]	Bit 0: INTERNAL TEMPERATURE TOO HIGH		0: NO ALARM 1: ALARM ACTIVE	
5		Bit 1: PRIMARY CURRENT TOO HIGH			
6		Bit 2: OVERLOAD HIGH VOLTAGE			
7		Bit 3-31: RESERVED			
8	ACTIVE_WARNINGS [dword32]	Bit 0-1: RESERVED		0: NO WARNING 1: WARNING ACTIVE	
9		Bit 2: POWER SUPPLY TOO LOW			
10		Bit 3: CLEAN BAR / EFFICIENCY LOW			
11		Bit 4: RESERVED			
		Bit 5: CALIBRATION INVALID			
		Bit 6: CALIBRATION IN PROGRESS			
		Bit 7: OVERLOAD HIGH VOLTAGE			
		Bit 8-9: RESERVED			
		Bit 10: INTERNAL TEMPERATURE TOO HIGH			
		Bit 11-31: RESERVED			
12	IONIZATION_CURRENT_NEGATIVE [word16]	READOUT	e.g. 100 = 100µA		
13					
14	IONIZATION_CURRENT_POSITIVE [word16]	READOUT	e.g. 100 = 100µA		
15					
16	OUTPUT_VOLTAGE_NEGATIVE [float32]	READOUT	e.g 8 = 8.0 kV	Output voltage negative	
17					
18					
19					
20	OUTPUT_VOLTAGE_POSITIVE [float32]	READOUT	e.g 9 = 9.0 kV	Output voltage positive	
21					
22					
23					

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Struct name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
CONTROL_EASION_41	Output	4	Struct	Cyclic	2

Byte offset	Parameter name	Description			Remarks
0	CONTROL [byte8]	Bit 0-1: MODE	0: DISABLED	Disable device	
			1: STANDBY	Set device to standby mode	
			2: RUN	Set device to run mode	
		Bit 2: IDENTIFY	0: OFF	Switch off identify leds on device	
			1: ON	Switch on identify leds on device	
		Bit 3-7: RESERVED			for future use
1	BAR_OPERATION_MODE [byte8]	Bit 0-1: MODE	0: FIXED MODE	Set device to fixed mode	This parameter is blocked in manual mode when the bar is controlled by CLFB!
			1: N/A		
			2: MANUAL MODE	Set device to manual mode	
			3: N/A		
		Bit 2-7: RESERVED			for future use
2 3	BALANCE_OFFSET [int16]	SETPOINT	Default value: 0 Min value: -100 Max value: 100		Only applicable in Manual mode! This parameter is blocked when the bar is controlled by CLFB!

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
OUTPUT_FREQUENCY_SETPOINT	Output	1	Byte	Acyclic	3

Parameter name	Description			Remarks
OUTPUT_FREQUENCY_SETPOINT	SETPOINT	Default value: 45 Min value: 2 Max value: 100	Output frequency setpoint	45 = 45Hz Only applicable in Manual mode.

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no
OUTPUT_VOLTAGE_NEGATIVE_SETPOINT	Output	4	Float	Acyclic	4

Parameter name	Description			Remarks
OUTPUT_VOLTAGE_NEGATIVE_SETPOINT	SETPOINT	Default value: 8 Min value: 0.1 Max value: 15	Output voltage negative setpoint	8 = 8.0kV Only applicable in Manual mode.

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
OUTPUT_VOLTAGE_POSITIVE_SETPOINT	Output	4	Float	Acyclic	5

Parameter name	Description			Remarks
OUTPUT_VOLTAGE_POSITIVE_SETPOINT	SETPOINT	Default value: 9 Min value: 0.1 Max value: 15	Output voltage positive setpoint	9 = 9.0kV Only applicable in Manual mode.

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Performax IQ Easy Ex parameters

(for each connected PERFORMAXEX_DEVICE)

Struct name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
STATUS_PERFORMAX_EX	Input	24	Struct	Cyclic	1

Byte offset	Parameter name	Description			Remarks
0	STATUS [byte8]	Bit 0-1: MODE	0: DISABLED	Device is disabled	
			1: STANDBY	Device is standby	
			2: RUNNING	Device is running	
		Bit 2: ALARM	0: NO ALARM	No alarm	
			1: ALARM ACTIVE	Alarm active	
		Bit 3: WARNING	0: NO WARNING	No warning	
			1: WARNING ACTIVE	Warning active	
		Bit 4-7: RESERVED			for future use
1	IONISATION_EFFICIENCY [byte8]	READOUT	Min value: 0	efficiency in %	
			Max value: 100		
2	STATUS_PAD_02 [byte8]	Reserved			for future use
3	STATUS_PAD_03 [byte8]	Reserved			for future use
4	ACTIVE_ALARMS [dword32]	Bit 0: INTERNAL TEMPERATURE TOO HIGH		0: NO ALARM 1: ALARM ACTIVE	
5		Bit 1: PRIMARY CURRENT TOO HIGH			
6		Bit 2: OVERLOAD HIGH VOLTAGE			
7		Bit 3-31: RESERVED			
8	ACTIVE_WARNINGS [dword32]	Bit 0-1: RESERVED		0: NO WARNING 1: WARNING ACTIVE	
9		Bit 2: POWER SUPPLY TOO LOW			
10		Bit 3: CLEAN BAR / EFFICIENCY LOW			
11		Bit 4: RESERVED			
		Bit 5: CALIBRATION INVALID			
		Bit 6: CALIBRATION IN PROGRESS			
		Bit 7: OVERLOAD HIGH VOLTAGE			
		Bit 8-9: RESERVED			
		Bit 10: INTERNAL TEMPERATURE TOO HIGH			
		Bit 11-31: RESERVED			
12	IONIZATION_CURRENT_NEGATIVE [word16]	READOUT	e.g. 100 = 100µA		
13					
14	IONIZATION_CURRENT_POSITIVE [word16]	READOUT	e.g. 100 = 100µA		
15					
16	OUTPUT_VOLTAGE_NEGATIVE [float32]	READOUT	e.g 8 = 8.0 kV	Output voltage negative	
17					
18					
19					
20	OUTPUT_VOLTAGE_POSITIVE [float32]	READOUT	e.g 9 = 9.0 kV	Output voltage positive	
21					
22					
23					

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Struct name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
CONTROL_PERFORMAX_EX	Output	4	Struct	Cyclic	2

Byte offset	Parameter name	Description			Remarks
0	CONTROL [byte8]	Bit 0-1: MODE	0: DISABLED	Disable device	
			1: STANDBY	Set device to standby mode	
			2: RUN	Set device to run mode	
		Bit 2: IDENTIFY	0: OFF	Switch off identify leds on device	
			1: ON	Switch on identify leds on device	
		Bit 3-7: RESERVED			for future use
1	BAR_OPERATION_MODE [byte8]	Bit 0-1: MODE	0: FIXED MODE	Set device to fixed mode	This parameter is blocked in manual mode when the bar is controlled by CLFB!
			1: N/A		
			2: MANUAL MODE	Set device to manual mode	
			3: N/A		
		Bit 2-7: RESERVED			for future use
2	BALANCE_OFFSET [int16]	SETPOINT	Default value: 0		Only applicable in Manual mode! This parameter is blocked when the bar is controlled by CLFB!
3			Min value: -100		
			Max value: 100		

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ThunderION 2 IQ parameters

(for each connected THUNDERION_DEVICE)

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
STATUS_THUNDERION	Input	24	Struct	Cyclic	1

Byte offset	Parameter name	Description			Remarks
0	STATUS [byte8]	Bit 0-1: MODE	0: DISABLED	Device is disabled	
			1: STANDBY	Device is standby	
			2: RUNNING	Device is running	
		Bit 2: ALARM	0: NO ALARM	No alarm	
			1: ALARM ACTIVE	Alarm active	
		Bit 3: WARNING	0: NO WARNING	No warning	
			1: WARNING ACTIVE	Warning active	
		Bit 4-7: RESERVED			for future use
1	STATUS_PAD_01 [byte8]	Reserved			for future use
2	STATUS_PAS_02 [byte8]	Reserved			for future use
3	STATUS_PAD_03 [byte8]	Reserved			for future use
4	ALARMS [dword32]	Bit 0: INTERNAL TEMPERATURE TOO HIGH		0: NO ALARM 1: ALARM ACTIVE	
		Bit 1: PRIMARY CURRENT TOO HIGH			
		Bit 2: OVERLOAD HIGH VOLTAGE			
5		Bit 3-9: RESERVED			
6		Bit 10: EEPROM FAULT			
7		Bit 11-31: RESERVED			
8	WARNINGS [dword32]	Bit 0-1: RESERVED		0: NO WARNING 1: WARNING ACTIVE	
		Bit 2: POWER SUPPLY TOO LOW			
		Bit 3: CLEAN BAR / EFFICIENCY LOW			
		Bit 4-6: RESERVED			
		Bit 7: OVERLOAD HIGH VOLTAGE			
		Bit 8-9: RESERVED			
		Bit 10: INTERNAL TEMPERATURE TOO HIGH			
9		Bit 11-16: RESERVED			
10		Bit 17-18: EEPROM FAULT			
11		Bit 19-31: RESERVED			
12	IONIZATION_CURRENT_NEGATIVE [int16]	READOUT	e.g. 1000 = 1000µA	Ionization current negative	
13					
14	IONIZATION_CURRENT_POSITIVE [int16]	READOUT	e.g. 1000 = 1000µA	Ionization current positive	
15					
16	OUTPUT_VOLTAGE_NEGATIVE [float32]	READOUT	e.g 25 = 25.0 kV	Output voltage negative	
17					
18					
19					
20	OUTPUT_VOLTAGE_POSITIVE [float32]	READOUT	e.g 30 = 30.0 kV	Output voltage positive	
21					
22					
23					

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Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
CONTROL_THUNDERION	Output	4	Struct	Cyclic	2

Byte offset	Parameter name	Description			Remarks
0	CONTROL [byte8]	Bit 0-1: MODE	0: DISABLED	Disable device	
			1: STANDBY	Set device to standby mode	
			2: RUN	Set device to run mode	
		Bit 2: IDENTIFY	0: OFF	Switch off identify leds on device	
			1: ON	Switch on identify leds on device	
		Bit 3-7: RESERVED			for future use
1	BAR_OPERATION_MODE [byte8]	Bit 0-1: MODE	0: FIXED MODE	Set device to fixed mode	This parameter is blocked in manual mode when the bar is controlled by CLFB!
			1: N/A		
			2: MANUAL MODE	Set device to manual mode	
			3: N/A		
		Bit 2-7: RESERVED			for future use
2	BALANCE_OFFSET [int16]	SETPOINT	Default value: 0	Balance offset setpoint	Only applicable in Manual mode. This parameter is blocked when the bar is controlled by CLFB!
3			Min value: -100		
			Max value: 100		

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
OUTPUT_FREQUENCY_SETPOINT	Output	1	BYTE	Acyclic	3

Parameter name	Description			Remarks
OUTPUT_FREQUENCY_SETPOINT	SETPOINT	Default value: 5	HV output frequency in Hz	Only applicable in Manual mode.
		Min value: 1		
		Max value: 10		

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
OUTPUT_VOLTAGE_MAX	Output	1	BYTE	Acyclic	4

Parameter name	Description			Remarks
OUTPUT_VOLTAGE_MAX	SETPOINT	Default value: 100	Max. output voltage in %	Only applicable in Manual mode.
		Min value: 15		
		Max value: 100		

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Vicinion parameters

(for each connected VICINION_DEVICE)

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
STATUS_VICINION	Input	16	Struct	Cyclic	1

Byte offset	Parameter name	Description			Remarks
0	STATUS [byte8]	Bit 0-1: MODE	0: DISABLED	Device is disabled	
			1: STANDBY	Device is standby	
			2: RUNNING	Device is running	
		Bit 2: ALARM	0: NO ALARM	No alarm	
			1: ALARM ACTIVE	Alarm active	
		Bit 3: WARNING	0: NO WARNING	No warning	
			1: WARNING ACTIVE	Warning active	
		Bit 4-7: RESERVED			for future use
1	STATUS_PAD_01 [byte8]	Reserved			for future use
2	STATUS_PAS_02 [byte8]	Reserved			for future use
3	STATUS_PAD_03 [byte8]	Reserved			for future use
4	ALARMS [dword32]	Bit 0: INTERNAL TEMPERATURE TOO HIGH		0: NO ALARM 1: ALARM ACTIVE	
5		Bit 1-9: RESERVED			
6		Bit 10: EEPROM FAULT			
7		Bit 11-31: RESERVED			
8	WARNINGS [dword32]	Bit 0-1: RESERVED		0: NO WARNING 1: WARNING ACTIVE	
		Bit 2: POWER SUPPLY TOO LOW			
		Bit 3-6: RESERVED			
		Bit 7: OVERLOAD HIGH VOLTAGE			
		Bit 8-9: RESERVED			
		Bit 10: INTERNAL TEMPERATURE TOO HIGH			
9		Bit 11-16: RESERVED			
10		Bit 17-18: EEPROM FAULT			
11		Bit 19-31: RESERVED			
12	OUTPUT_VOLTAGE_FEEDBACK [float32]	READOUT	e.g 6 = 6.0 kV	Output voltage	
13					
14					
15					

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Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
CONTROL_VICINION	Output	4	Struct	Cyclic	2

Byte offset	Parameter name	Description			Remarks
0	CONTROL [byte8]	Bit 0-1: MODE	0: DISABLED	Disable device	
			1: STANDBY	Set device to standby mode	
			2: RUN	Set device to run mode	
		Bit 2: IDENTIFY	0: OFF	Switch off identify leds on device	
			1: ON	Switch on identify leds on device	
		Bit 3-7: RESERVED			for future use
1	CONTROL_PAD_01 [byte8]	Reserved			for future use
2	CONTROL_PAD_02 [byte8]	Reserved			for future use
3	CONTROL_PAD_03 [byte8]	Reserved			for future use

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
BAR_OPERATION_MODE	Output	1	BYTE	Acyclic	3

Parameter name	Description			Remarks
BAR_OPERATION_MODE	Bit 0-1: MODE	0: FIXED MODE	Set device to fixed mode	
		1: N/A		
		2: MANUAL MODE	Set device to manual mode	
		3: N/A		
	Bit 2-7: RESERVED			for future use

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
OUTPUT_VOLTAGE_SETPOINT	Output	4	FLOAT	Acyclic	4

Parameter name	Description			Remarks
OUTPUT_VOLTAGE_SETPOINT	SETPOINT	Default value = 6 (6.0 kV)	Output voltage setpoint in kV	Only applicable in Manual mode.
		Min value: 4		
		Max value: 7		

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
OUTPUT_FREQUENCY_SETPOINT	Output	2	WORD	Acyclic	5

Parameter name	Description			Remarks
OUTPUT_FREQUENCY_SETPOINT	SETPOINT	Default value = 150 (150 Hz)	Output frequency setpoint in Hz	Only applicable in Manual mode.
		Min value: 0		
		Max value: 5000		

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Sensor IQ Easy (Legacy sensor devices) parameters

(for each connected SENSOR_DEVICE)

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
STATUS_SENSOR	Input	16-76	Struct	Cyclic	1

Byte offset	Parameter name	Description			Remarks
0	STATUS [byte8]	Bit 0-1: MODE	0: DISABLED	Device is disabled	
			1: STANDBY	Device is standby	
			2: RUNNING	Device is running	
		Bit 2: ALARM	0: NO ALARM	No alarm	
			1: ALARM ACTIVE	Alarm active	
		Bit 3: WARNING	0: NO WARNING	No warning	
			1: WARNING ACTIVE	Warning active	
		Bit 4-7: RESERVED			for future use
1	STATUS_PAD_01 [byte8]	Reserved			for future use
2	AVAILABLE SEGMENTS [word16]	Bit 0: SEGMENT 1	0: Not available 1: Available	Sensor segments available	
		Bit 1: SEGMENT 2			
		Bit 2: SEGMENT 3			
		Bit 3: SEGMENT 4			
		Bit 4: SEGMENT 5			
		Bit 5: SEGMENT 6			
		Bit 6: SEGMENT 7			
		Bit 7: SEGMENT 8			
3		Bit 8: SEGMENT 9			
		Bit 9: SEGMENT 10			
		Bit 10: SEGMENT 11			
		Bit 11: SEGMENT 12			
		Bit 12: SEGMENT 13			
		Bit 13: SEGMENT 14			
		Bit 14: SEGMENT 15			
		Bit 15: SEGMENT 16			
4	ALARMS [dword32]	Bit 0-3: RESERVED		0: NO ALARM 1: ALARM ACTIVE	
		Bit 4: WEB VOLTAGE TOO HIGH			
		Bit 5: SENSOR MALFUNCTION			
		Bit 6: WEB VOLTAGE OVERLOAD			
5		Bit 7: RESERVED			
6		Bit 8: WEB VOLTAGE TOO LOW			
7		Bit 9-31: RESERVED			
8	WARNINGS [dword32]	Bit 0-3: RESERVED		0: NO WARNING 1: WARNING ACTIVE	
		Bit 4: WEB VOLTAGE TOO HIGH			
		Bit 5-8: RESERVED			
		Bit 9: SEGMENT CALIBRATION INVALID			
		Bit 10-15: RESERVED			
		Bit 16: WEB VOLTAGE TOO LOW			
9		Bit 17-22: RESERVED			
10		Bit 23: NO SEGMENTS SELECTED			
11		Bit 24-31: RESERVED			
12	HIRES_WEB_VOLTAGE_SEG1 [float32]	READOUT	Min value: -128 Max value: 128	Web voltage measured in kV	
13					
14					
15					

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16 17 18 19	HIRES_WEB_VOLTAGE_SEG2 [float32]	READOUT	Min value: -128 Max value: 128	Web voltage measured in kV	Only available on the fieldbus if the segment is also present in the Sensor IQ Easy
20 21 22 23	HIRES_WEB_VOLTAGE_SEG3 [float32]				
24 25 26 27	HIRES_WEB_VOLTAGE_SEG4 [float32]				
28 29 30 31	HIRES_WEB_VOLTAGE_SEG5 [float32]				
32 33 34 35	HIRES_WEB_VOLTAGE_SEG6 [float32]				
36 37 38 39	HIRES_WEB_VOLTAGE_SEG7 [float32]				
40 41 42 43	HIRES_WEB_VOLTAGE_SEG8 [float32]				
44 45 46 47	HIRES_WEB_VOLTAGE_SEG9 [float32]				
48 49 50 51	HIRES_WEB_VOLTAGE_SEG10 [float32]				
52 53 54 55	HIRES_WEB_VOLTAGE_SEG11 [float32]				
56 57 58 59	HIRES_WEB_VOLTAGE_SEG12 [float32]				
60 61 62 63	HIRES_WEB_VOLTAGE_SEG13 [float32]				
64 65 66 67	HIRES_WEB_VOLTAGE_SEG14 [float32]				
68 69 70 71	HIRES_WEB_VOLTAGE_SEG15 [float32]				
72 73 74 75	HIRES_WEB_VOLTAGE_SEG16 [float32]				

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Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
CONTROL_SENSOR	Output	8	Struct	Cyclic	2

Byte offset	Parameter name	Description			Remarks
0	CONTROL [byte8]	Bit 0-1: MODE	0: DISABLED	Disable device	
			1: STANDBY	Set device to standby mode	
			2: RUN	Set device to run mode	
		Bit 2: IDENTIFY	0: OFF	Switch off identify leds on device	
			1: ON	Switch on identify leds on device	
		Bit 3-7: RESERVED		Reserved for future use	for future use
1	CONTROL_PAD_01 [byte8]	Reserved			for future use
2	MOUNTING_DISTANCE [word16]	SETPOINT	Default value: 50	Mounting distance sensor bar in mm	
			Min value: 10		
3			Max value: 1000		
4	ENABLED SEGMENTS [word16]	Bit 0: SEGMENT 1	0: Not enabled 1: Enabled	Sensor segments enabled	
		Bit 1: SEGMENT 2			
		Bit 2: SEGMENT 3			
		Bit 3: SEGMENT 4			
		Bit 4: SEGMENT 5			
		Bit 5: SEGMENT 6			
		Bit 6: SEGMENT 7			
		Bit 7: SEGMENT 8			
5		Bit 8: SEGMENT 9			
		Bit 9: SEGMENT 10			
		Bit 10: SEGMENT 11			
		Bit 11: SEGMENT 12			
		Bit 12: SEGMENT 13			
		Bit 13: SEGMENT 14			
		Bit 14: SEGMENT 15			
		Bit 15: SEGMENT 16			
6	CONTROL_PAD_06	Reserved			for future use
7	CONTROL_PAD_07	Reserved			for future use

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
WARNING MAXIMUM LEVEL	Output	4	FLOAT	Acyclic	3

Parameter name	Description			Remarks
WARNING MAXIMUM LEVEL	SETPOINT	Default value: 5	Warning maximum web voltage level in kV	
		Min value: 1		
		Max value: 64		

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
ALARM MAXIMUM LEVEL	Output	4	FLOAT	Acyclic	4

Parameter name	Description			Remarks
ALARM MAXIMUM LEVEL	SETPOINT	Default value: 10	Alarm maximum web voltage level in kV	
		Min value: 1		
		Max value: 80		

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Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
WARNING MINIMUM LEVEL	Output	4	FLOAT	Acyclic	5

Parameter name	Description			Remarks
WARNING MINIMUM LEVEL	SETPOINT	Default value: 0 Min value: 0 Max value: 64	Warning minimum web voltage level in kV	

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
ALARM MINIMUM LEVEL	Output	4	FLOAT	Acyclic	6

Parameter name	Description			Remarks
ALARM MINIMUM LEVEL	SETPOINT	Default value: 0 Min value: 0 Max value: 80	Alarm minimum web voltage level in kV	

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Sensor 2.0 Ex parameters

(for each connected Sensor 2.0 Ex)

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
STATUS_SENSOR_20_EX	Input	16-28	Struct	Cyclic	1

Byte offset	Parameter name	Description			Remarks
0	STATUS [byte8]	Bit 0-1: MODE	0: DISABLED	Device is disabled	
			1: STANDBY	Device is standby	
			2: RUNNING	Device is running	
		Bit 2: ALARM	0: NO ALARM	No alarm	
			1: ALARM ACTIVE	Alarm active	
		Bit 3: WARNING	0: NO WARNING	No warning	
			1: WARNING ACTIVE	Warning active	
		Bit 4-7: RESERVED			for future use
1	STATUS_PAD_01 [byte8]	Reserved			for future use
2	AVAILABLE SEGMENTS [word16]	Bit 0: SEGMENT 1	0: Not available 1: Available	Sensor segments available	
3		Bit 1: SEGMENT 2			
		Bit 2: SEGMENT 3			
		Bit 3: SEGMENT 4			
4	ALARMS [dword32]	Bit 0-3: RESERVED		0: NO ALARM 1: ALARM ACTIVE	
		Bit 4: WEB VOLTAGE TOO HIGH			
		Bit 5: SENSOR MALFUNCTION			
		Bit 6: WEB VOLTAGE OVERLOAD			
5		Bit 7: RESERVED			
6		Bit 8: WEB VOLTAGE TOO LOW			
7		Bit 9-31: RESERVED			
8	WARNINGS [dword32]	Bit 0-3: RESERVED		0: NO WARNING 1: WARNING ACTIVE	
		Bit 4: WEB VOLTAGE TOO HIGH			
		Bit 5-8: RESERVED			
		Bit 9: SEGMENT CALIBRATION INVALID			
		Bit 10-15: RESERVED			
		Bit 16: WEB VOLTAGE TOO LOW			
9		Bit 17-22: RESERVED			
10		Bit 23: NO SEGMENTS SELECTED			
11		Bit 24-31: RESERVED			
12	HIRES_WEB_VOLTAGE_SEG1 [float32]	READOUT	Min value: -128 Max value: 128	Web voltage measured in kV	
13					
14					
15					
16	HIRES_WEB_VOLTAGE_SEG2 [float32]				Only available on the fieldbus if the segment is also present in the Sensor 2.0 Ex
17					
18					
19					
20	HIRES_WEB_VOLTAGE_SEG3 [float32]				
21					
22					
23					
24	HIRES_WEB_VOLTAGE_SEG4 [float32]				
25					
26					
27					

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Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
CONTROL_SENSOR_20_EX	Output	8	Struct	Cyclic	2

Byte offset	Parameter name	Description			Remarks
0	CONTROL [byte8]	Bit 0-1: MODE	0: DISABLED	Disable device	
			1: STANDBY	Set device to standby mode	
			2: RUN	Set device to run mode	
		Bit 2: IDENTIFY	0: OFF	Switch off identify leds on device	
			1: ON	Switch on identify leds on device	
		Bit 3-7: RESERVED			for future use
1	COINTROL_PAD_01 [byte8]	Reserved			for future use
2	MOUNTING_DISTANCE [word16]	SETPOINT	Default value: 50	Mounting distance sensor bar in mm	
3			Min value: 10		
			Max value: 1000		
4	ENABLED SEGMENTS [word16]	Bit 0: SEGMENT 1	0: Not enabled 1: Enabled	Sensor segments enabled	
		Bit 1: SEGMENT 2			
5		Bit 2: SEGMENT 3			
		Bit 3: SEGMENT 4			
6	CONTROL_PAD_06 [byte8]	Reserved			for future use
7	CONTROL_PAD_07 [byte8]	Reserved			for future use

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
WARNING MAXIMUM LEVEL	Output	4	FLOAT	Acyclic	3

Parameter name	Description			Remarks
WARNING MAXIMUM LEVEL	SETPOINT	Default value: 5	Warning maximum web voltage level in kV	
		Min value: 1		
		Max value: 64		

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
ALARM MAXIMUM LEVEL	Output	4	FLOAT	Acyclic	4

Parameter name	Description			Remarks
ALARM MAXIMUM LEVEL	SETPOINT	Default value: 10	Alarm maximum web voltage level in kV	
		Min value: 1		
		Max value: 80		

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
WARNING MINIMUM LEVEL	Output	4	FLOAT	Acyclic	5

Parameter name	Description			Remarks
WARNING MINIMUM LEVEL	SETPOINT	Default value: 0	Warning minimum web voltage level in kV	
		Min value: 0		
		Max value: 64		

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Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
ALARM MINIMUM LEVEL	Output	4	FLOAT	Acyclic	6

Parameter name	Description			Remarks
ALARM MINIMUM LEVEL	SETPOINT	Default value: 0	Alarm minimum web voltage level in kV	
		Min value: 0		
		Max value: 80		

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IQ COM GC parameters

(for each connected IQ_COM_GC_DEVICE)

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
STATUS_IQ_COM_GC	Input	20	Struct	Cyclic	1

Byte offset	Parameter name	Description			Remarks
0	STATUS [byte8]	Bit 0-1: MODE	0: DISABLED	Device is disabled	
			1: STANDBY	Device is standby	
			2: RUNNING	Device is running	
		Bit 2: ALARM	0: NO ALARM	No alarm	
			1: ALARM ACTIVE	Alarm active	
		Bit 3: WARNING	0: NO WARNING	No warning	
			1: WARNING ACTIVE	Warning active	
		Bit 4-7: RESERVED			for future use
1	STATUS_PAD_01 [byte8]	Reserved			for future use
2	STATUS_PAD_02 [byte8]	Reserved			for future use
3	STATUS_PAD_03 [byte8]	Reserved			for future use
4	ALARMS [dword32]	Bit 0-1: RESERVED		0: NO ALARM 1: ALARM ACTIVE	
		Bit 2: OVERLOAD HIGH VOLTAGE			
		Bit 3: RESERVED			
		Bit 4: OUTPUT CURRENT LEVEL TOO HIGH			
		Bit 5-6: RESERVED			
		Bit 7: TOO MANY ARCS DETECTED			
		Bit 8: OUTPUT CURRENT LEVEL TOO LOW			
5		Bit 9: RESERVED			
6		Bit 10: EEPROM FAULT			
7		Bit 11-31: RESERVED			
8	WARNINGS [dword32]	Bit 0-1: RESERVED		0: NO WARNING 1: WARNING ACTIVE	
		Bit 2: POWER SUPPLY TOO LOW			
		Bit 3: RESERVED			
		Bit 4: OUTPUT CURRENT LEVEL TOO HIGH			
		Bit 5-6: RESERVED			
		Bit 7: OVERLOAD HIGH VOLTAGE			
		Bit 8: CHARGEPULSE TOO LONG			
		Bit 9-14: N/A			
		Bit 15: ARC DETECTED			
		Bit 16: OUTPUT CURRENT LEVEL TOO LOW			
		Bit 17-18: EEPROM FAULT			
		Bit 19: 24V OUTPUT OVERLOAD			
		Bit 20: CM5 GENERATOR NOT CONNECTED			
9		Bit 21: RESERVED			
10		Bit 22: DEVICE NEEDS REBOOT			
11		Bit 23-31: RESERVED			
12	OUTPUT_CURRENT_FEEDBACK [float32]	READOUT	e.g 5 = 5.0 mA	Output current in mA	
13					
14					
15					

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16	OUTPUT_VOLTAGE_FEEDBACK [float32]	READOUT	e.g 30 = 30.0 kV	Output voltage in kV	
17					
18					
19					

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Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
CONTROL_IQ_COM_GC	Output	12	Struct	Cyclic	2

Byte offset	Parameter name	Description			Remarks
0	CONTROL [byte8]	Bit 0-1: MODE	0: DISABLED	Disable device	
			1: STANDBY	Set device to standby mode	
			2: RUN	Set device to run mode	
		Bit 2: IDENTIFY	0: OFF	Switch off identify leds on device	
			1: ON	Switch on identify leds on device	
		Bit 3-7: RESERVED			for future use
1	OPERATION_MODE [byte8]	Bit 0-1: MODE	0: VC-mode	Voltage control mode	This parameter is blocked in VC-mode when the bar is controlled by CLFB!
			1: CC-mode	Current control mode	
		Bit 2-7: RESERVED			for future use
2	CHARGE_PULSE_SINGLE_ SHOT_TIME [int16]	SETPOINT	Default value: 0	Charge pulse in ms	
3			Min value: 0		
			Max value: 5000		
4	OUTPUT_VOLTAGE_SETPOINT [float32]	SETPOINT	e.g 30 = 30.0 kV	Output voltage setpoint in kV	Used in VC mode. This parameter is blocked when the bar is controlled by CLFB!
5					
6					
7					
8	OUTPUT CURRENT SETPOINT [float32]	SETPOINT	e.g 5 = 5.0 mA	Output current setpoint in mA	Used in CC mode.
9					
10					
11					

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
OUTPUT_CURRENT_LIMIT_SETPOINT	Output	4	FLOAT	Acyclic	3

Parameter name	Description			Remarks
OUTPUT_CURRENT_LIMIT_SETPOINT	SETPOINT	5 = 5.0 mA	Output current limit in mA	Used in VC mode only

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
OUTPUT_VOLTAGE_LIMIT_SETPOINT	Output	4	FLOAT	Acyclic	4

Parameter name	Description			Remarks
OUTPUT_VOLTAGE_LIMIT_SETPOINT	SETPOINT	30 = 30.0 kV	Output voltage limit in kV	Used in CCC mode only

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CM Tiny IQ parameters

(for each connected CM_TINY_IQ_DEVICE)

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
STATUS_CMTINY	Input	20	Struct	Cyclic	1

Byte offset	Parameter name	Description			Remarks
0	STATUS [byte8]	Bit 0-1: MODE	0: DISABLED	Device is disabled	
			1: STANDBY	Device is standby	
			2: RUNNING	Device is running	
		Bit 2: ALARM	0: NO ALARM	No alarm	
			1: ALARM ACTIVE	Alarm active	
		Bit 3: WARNING	0: NO WARNING	No warning	
			1: WARNING ACTIVE	Warning active	
		Bit 4-7: RESERVED			for future use
1	STATUS_PAD_01 [byte8]	Reserved			for future use
2	STATUS_PAD_02 [byte8]	Reserved			for future use
3	STATUS_PAD_03 [byte8]	Reserved			for future use
4	ALARMS [dword32]	Bit 0-1: RESERVED		0: NO ALARM 1: ALARM ACTIVE	
		Bit 2: OVERLOAD HIGH VOLTAGE			
		Bit 3-6: RESERVED			
		Bit 7: TOO MANY ARCS DETECTED			
5		Bit 8-9: RESERVED			
6		Bit 10: EEPROM FAULT			
7		Bit 11-31: RESERVED			
8	WARNINGS [dword32]	Bit 0-1: RESERVED		0: NO WARNING 1: WARNING ACTIVE	
		Bit 2: POWER SUPPLY TOO LOW			
		Bit 3-6: RESERVED			
		Bit 7: OVERLOAD HIGH VOLTAGE			
		Bit 8: CHARGEPULSE TOO LONG			
		Bit 9-14: RESERVED			
		Bit 15: ARC DETECTED			
9		Bit 16: RESERVED			
10		Bit 17-18: EEPROM FAULT			
11		Bit 19-31: RESERVED			
12	OUTPUT_CURRENT_FEEDBACK [float32]	READOUT	e.g 0.4 = 0.40 mA	Output current in mA	
13					
14					
15					
16	OUTPUT_VOLTAGE_FEEDBACK [float32]	READOUT	e.g -20 = -20.0 kV	Output voltage in kV	
17					
18					
19					

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Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
CONTROL_CMTINY	Output	12	Struct	Cyclic	2

Byte offset	Parameter name	Description			Remarks
0	CONTROL [byte8]	Bit 0-1: MODE	0: DISABLED	Disable device	
			1: STANDBY	Set device to standby mode	
			2: RUN	Set device to run mode	
		Bit 2: IDENTIFY	0: OFF	Switch off identify leds on device	
			1: ON	Switch on identify leds on device	
		Bit 3-7: RESERVED		Reserved for future use	
1	OPERATION_MODE [byte8]	Bit 0-1: MODE	0: VC-mode	Voltage control mode	This parameter is blocked in VC-mode when the bar is controlled by CLFB!
			1: CC-mode	Current control mode	
		Bit 2-7: RESERVED			for future use
2	CONTROL_PAD_02 [byte8]	Reserved			for future use
3	CONTROL_PAD_03 [byte8]	Reserved			for future use
4 5 6 7	OUTPUT_VOLTAGE_SETPOINT [float32]	SETPOINT	e.g -20 = -20.0 kV	Output voltage setpoint in kV	Used in VC mode. This parameter is blocked when the bar is controlled by CLFB!
8 9 10 11	OUTPUT CURRENT SETPOINT [float32]	SETPOINT	e.g 0.4 = 0.40 mA	Output current setpoint in mA	Used in CC mode

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
OUTPUT_CURRENT_LIMIT_SETPOINT	Output	4	FLOAT	Acyclic	3

Parameter name	Description			Remarks
OUTPUT_CURRENT_LIMIT_SETPOINT	SETPOINT	0.4 = 0.40 mA	Output current limit in mA	Used in VC mode only

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
OUTPUT_VOLTAGE_LIMIT_SETPOINT	Output	4	FLOAT	Acyclic	4

Parameter name	Description			Remarks
OUTPUT_VOLTAGE_LIMIT_SETPOINT	SETPOINT	-20 = -20.0 kV	Output voltage limit in kV	Used in CC mode only

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CMM IQ Easy parameters

(for each connected CMM_IQ_EASY_DEVICE)

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
STATUS_CMMEASY	Input	20	Struct	Cyclic	1

Byte offset	Parameter name	Description			Remarks
0	STATUS [byte8]	Bit 0-1: MODE	0: DISABLED	Device is disabled	
			1: STANDBY	Device is standby	
			2: RUNNING	Device is running	
		Bit 2: ALARM	0: NO ALARM	No alarm	
			1: ALARM ACTIVE	Alarm active	
		Bit 3: WARNING	0: NO WARNING	No warning	
			1: WARNING ACTIVE	Warning active	
		Bit 4-7: RESERVED			for future use
1	STATUS_PAD_01 [byte8]	Reserved			for future use
2	STATUS_PAD_02 [byte8]	Reserved			for future use
3	STATUS_PAD_03 [byte8]	Reserved			for future use
4	ALARMS [dword32]	Bit 0-1: RESERVED		0: NO ALARM 1: ALARM ACTIVE	
		Bit 2: OVERLOAD HIGH VOLTAGE			
		Bit 3: RESERVED			
		Bit 4: OUTPUT CURRENT LEVEL TOO HIGH			
		Bit 5-7: RESERVED			
		Bit 8: OUTPUT CURRENT LEVEL TOO LOW			
5		Bit 9: RESERVED			
6		Bit 10: EEPROM FAULT			
7		Bit 11-31: RESERVED			
8	WARNINGS [dword32]	Bit 0-1: RESERVED		0: NO WARNING 1: WARNING ACTIVE	
		Bit 2: POWER SUPPLY TOO LOW			
		Bit 3: RESERVED			
		Bit 4: OUTPUT CURRENT LEVEL TOO HIGH			
		Bit 5-6: RESERVED			
		Bit 7: OVERLOAD HIGH VOLTAGE			
		Bit 8: CHARGEPULSE TOO LONG			
		Bit 9-15: RESERVED			
9		Bit 16: OUTPUT CURRENT LEVEL TOO LOW			
10		Bit 17-18: EEPROM FAULT			
11		Bit 19-31: RESERVED			
12	OUTPUT_CURRENT_FEEDBACK [float32]	READOUT	e.g 0.4 = 0.40 mA	Output current in mA	
13					
14					
15					
16	OUTPUT_VOLTAGE_FEEDBACK [float32]	READOUT	e.g -20 = -20.0 kV	Output voltage in kV	
17					
18					
19					

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Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
CONTROL_CMMEASY	Output	8	Struct	Cyclic	2

Byte offset	Parameter name	Description			Remarks
0	CONTROL [byte8]	Bit 0-1: MODE	0: DISABLED	Disable device	
			1: STANDBY	Set device to standby mode	
			2: RUN	Set device to run mode	
		Bit 2: IDENTIFY	0: OFF	Switch off identify leds on device	
			1: ON	Switch on identify leds on device	
		Bit 3-7: RESERVED			for future use
1	CONTROL_PAD_01 [byte8]	Reserved			for future use
2	CHARGE PULSE SINGLE SHOT TIME [int16]	SETPOINT	Default value: 0	Charge pulse in ms	
3			Min value: 0		
			Max value: 5000		
4	OUTPUT_VOLTAGE_SETPOINT [float32]	SETPOINT	e.g -20 = -20.0 kV	Output voltage setpoint in kV	This parameter is blocked when the bar is controlled by CLFB!
5					
6					
7					

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
OUTPUT_CURRENT_LIMIT_SETPOINT	Output	4	FLOAT	Acyclic	3

Parameter name	Description			Remarks
OUTPUT_CURRENT_LIMIT_SETPOINT	SETPOINT	0.4 = 0.40 mA	Output current limit in mA	

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
TIME_TO_CYCLE_OK	Input	2	WORD	Acyclic	4

Parameter name	Description			Remarks
TIME_TO_CYCLE_OK	READOUT	e.g. 50 = 50 ms	Time to cycle OK in ms	

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Cleanflex IQ Easy parameters

(for each connected CLEANFLEX_DEVICE)

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
STATUS_CLEANFLEX	Input	12	Struct	Cyclic	1

Byte offset	Parameter name	Description			Remarks
0	STATUS [byte8]	Bit 0-1: MODE	0: DISABLED	Device is disabled	
			1: STANDBY	Device is standby	
			2: RUNNING	Device is running	
		Bit 2: ALARM	0: NO ALARM	No alarm	
			1: ALARM ACTIVE	Alarm active	
		Bit 3: WARNING	0: NO WARNING	No warning	
			1: WARNING ACTIVE	Warning active	
		Bit 4-7: RESERVED			for future use
1	STATUS_PAD_01 [byte8]	Reserved			for future use
2	STATUS_PAS_02 [byte8]	Reserved			for future use
3	STATUS_PAD_03 [byte8]	Reserved			for future use
4	ALARMS [dword32]	Bit 0: RESERVED		0: NO ALARM 1: ALARM ACTIVE	
5		Bit 1: PRIMARY CURRENT TOO HIGH			
6		Bit 2-9: RESERVED			
7		Bit 10: EEPROM FAULT			
		Bit 11-31: RESERVED			
8	WARNINGS [dword32]	Bit 0-1: RESERVED		0: NO WARNING 1: WARNING ACTIVE	
9		Bit 2: POWER SUPPLY TOO LOW			
10		Bit 3-16: RESERVED			
11		Bit 17-18: EEPROM FAULT			
		Bit 19-31: RESERVED			

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Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
CONTROL_CLEANFLEX	Output	4	Struct	Cyclic	2

Byte offset	Parameter name	Description			Remarks
0	CONTROL [byte8]	Bit 0-1: MODE	0: DISABLED	Disable device	
			1: STANDBY	Set device to standby mode	
			2: RUN	Set device to run mode	
		Bit 2: IDENTIFY	0: OFF	Switch off identify leds on device	
			1: ON	Switch on identify leds on device	
		Bit 3-7: RESERVED			for future use
1	CONTROL_PAD_01 [byte8]	Reserved			for future use
2	CONTROL_PAD_02 [byte8]	Reserved			for future use
3	CONTROL_PAD_03 [byte8]	Reserved			for future use

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
AIR_PRESSURE	Input	4	FLOAT	Acyclic	3

Parameter name	Description			Remarks
AIR_PRESSURE	READOUT	e.g 1 = 1.0 bar	Air pressure	

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
TRIGGER_LEVEL	Output	4	FLOAT	Acyclic	4

Parameter name	Description			Remarks
TRIGGER_LEVEL	SETPOINT	Default value = 0.5 (0.5 bar) Min value: 0 Max value: 10	Trigger level in bar	

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
SETPOINT_CURRENT	Output	2	WORD	Acyclic	5

Parameter name	Description			Remarks
SETPOINT_CURRENT	SETPOINT	Default value = 300 (300 mA) Min value: 200 Max value: 350	Setpoint current in mA	

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Blowflex IQ Easy parameters

(for each connected BLOWFLEX_DEVICE)

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
STATUS_BLOWFLEX	Input	12	Struct	Cyclic	1

Byte offset	Parameter name	Description			Remarks
0	STATUS [byte8]	Bit 0-1: MODE	0: DISABLED	Device is disabled	
			1: STANDBY	Device is standby	
			2: RUNNING	Device is running	
		Bit 2: ALARM	0: NO ALARM	No alarm	
			1: ALARM ACTIVE	Alarm active	
		Bit 3: WARNING	0: NO WARNING	No warning	
			1: WARNING ACTIVE	Warning active	
		Bit 4-7: RESERVED			for future use
1	STATUS_PAD_01 [byte8]	Reserved			for future use
2	STATUS_PAS_02 [byte8]	Reserved			for future use
3	STATUS_PAD_03 [byte8]	Reserved			for future use
4	ALARMS [dword32]	Bit 0: INTERNAL TEMPERATURE TOO HIGH		0: NO ALARM 1: ALARM ACTIVE	
5		Bit 1: PRIMARY CURRENT TOO HIGH			
6		Bit 2: RESERVED			
7		Bit 3: INPUT VOLTAGE TOO HIGH			
		Bit 4-8: RESERVED			
		Bit 9: AIR PRESSURE TOO HIGH			
		Bit 10-31: RESERVED			
8	WARNINGS [dword32]	Bit 0-1: RESERVED		0: NO WARNING 1: WARNING ACTIVE	
9		Bit 2: POWER SUPPLY TOO LOW			
10		Bit 3-31: RESERVED			
11					

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Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
CONTROL_BLOWFLEX	Output	4	Struct	Cyclic	2

Byte offset	Parameter name	Description			Remarks
0	CONTROL [byte8]	Bit 0-1: MODE	0: DISABLED	Disable device	
			1: STANDBY	Set device to standby mode	
			2: RUN	Set device to run mode	
		Bit 2: IDENTIFY	0: OFF	Switch off identify leds on device	
			1: ON	Switch on identify leds on device	
		Bit 3-7: RESERVED			for future use
1	CONTROL_PAD_01 [byte8]	Reserved			for future use
2	CONTROL_PAD_02 [byte8]	Reserved			for future use
3	CONTROL_PAD_03 [byte8]	Reserved			for future use

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
AIR_PRESSURE	Input	4	FLOAT	Acyclic	3

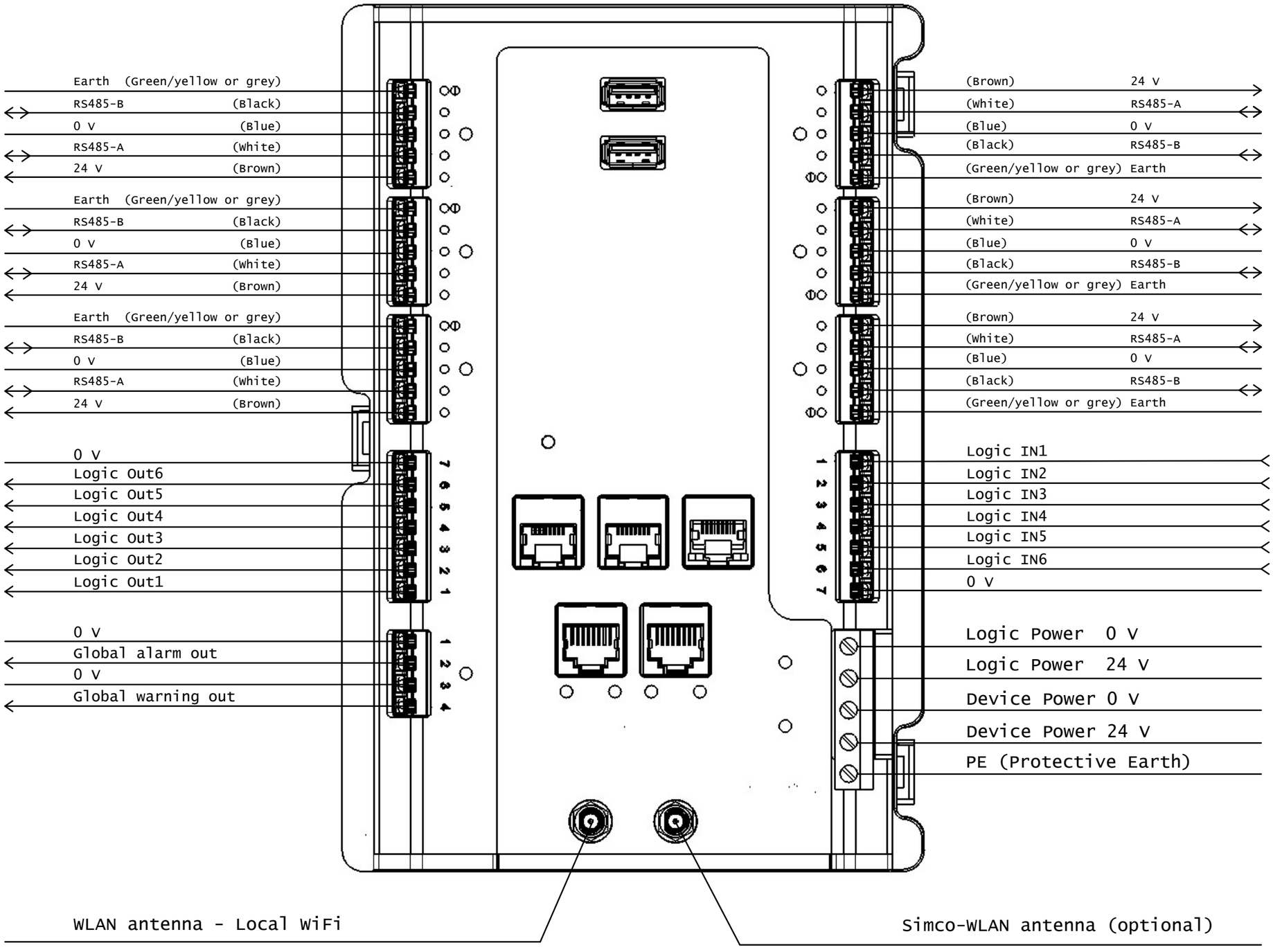
Parameter name	Description			Remarks
AIR_PRESSURE	READOUT	e.g 1 = 1.0 bar	Air pressure	

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
TRIGGER_LEVEL	Output	4	FLOAT	Acyclic	4

Parameter name	Description			Remarks
TRIGGER_LEVEL	SETPOINT	Default value = 0.5 (0.5 bar) Min value: 0 Max value: 5	Trigger level in bar	

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
SETPOINT_CURRENT	Output	4	FLOAT	Acyclic	5

Parameter name	Description			Remarks
SETPOINT_CURRENT	SETPOINT	Default value = 0.300 (0.3 A) Min value: 0.200 Max value: 0.350	Setpoint current in A	



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Name: (Smart) SLC IQ 4.0 Wire connections

Drawn: RJ

Part no.:

CAD GENERATED
NOT AUTO UPDATED

Dimensions in mm

Date: 17-10-2023

A3

M: 1:1

ECN-1034

Check: HS

Dwg. no.: 10345000/A

1/1

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Fieldbus example for Smart SLC with ProfiNET

Simple example how to set up an ProfiNET connection between a Siemens PLC and a Simco-Ion Smart SLC.

Used devices:

- Smart SLC with ProfiNET
- Siemens PLC S7-1200 (1211C DC/DC/RLY 6ES7 211-1HE40-0XB0)
- Sensor IQ Easy with 2 sensor segments
- Easion IQ 4.0
- Close Loop Feedback object between Sensor IQ Easy and Easion IQ 4.0
- ThunderIon 2 IQ
- CM Tiny IQ

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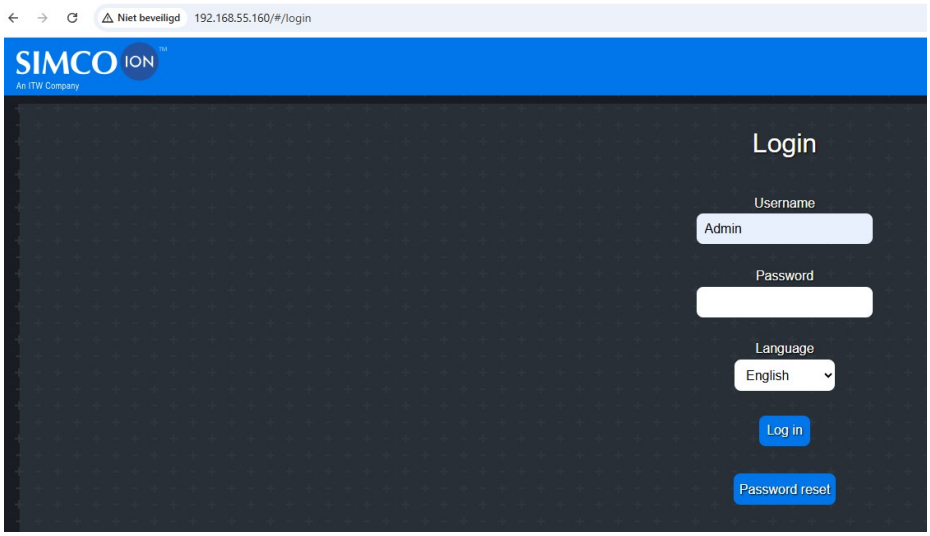
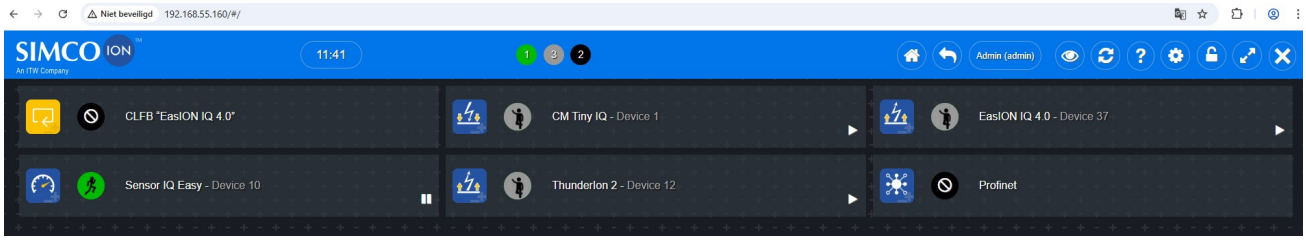
• Setup Siemens PLC	Step 6 - 8	Page 4
• Add Smart SLC with custom gsd file	Step 9 – 10	Page 5
• Add Smart SLC with generic gsd file	Step 9a – 11a	Page 6
• Setup simple PLC program	Step 12 – 21c	Page 8

Setup Simco-Ion Smart SLC

1 Log in to the Smart SLC on Expert or Admin level.



2 Add the Simco IQ devices as related objects to the fieldbus. Click the Profinet icon.



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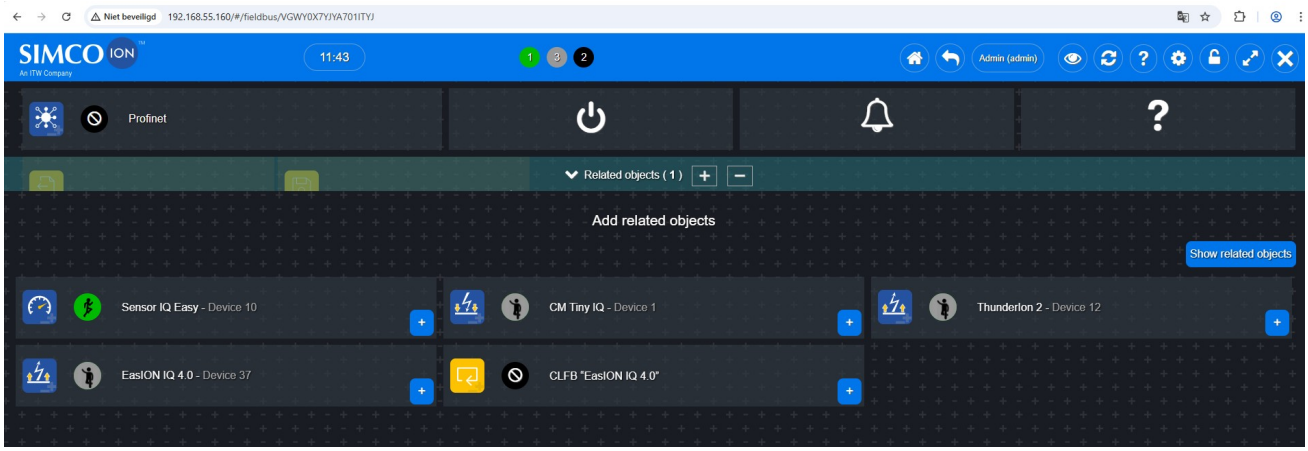
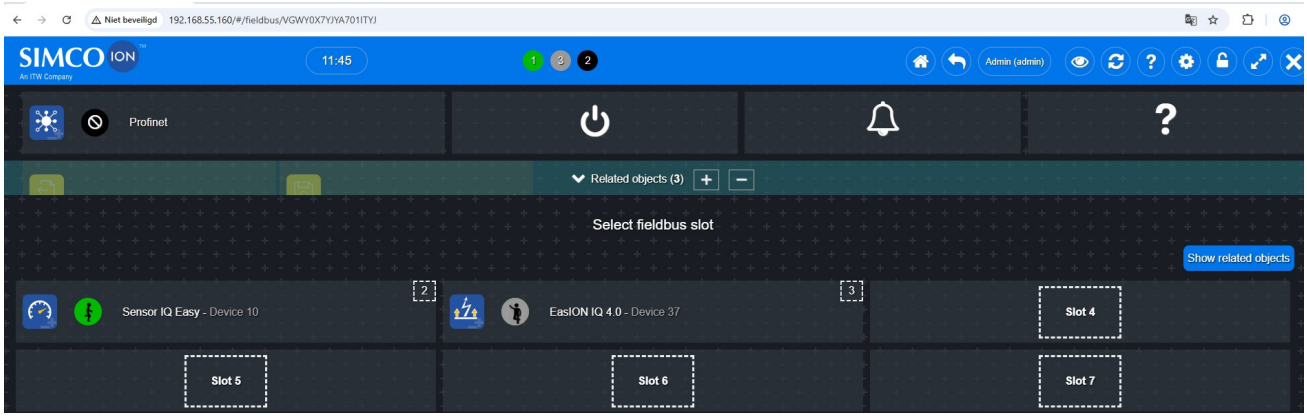
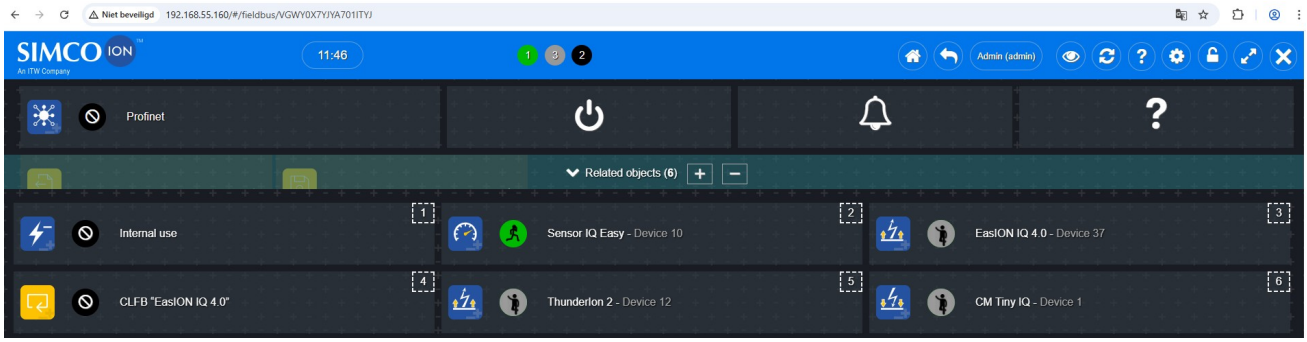
2a Click the + icon next to Related objects. Select the devices.



2b Choose Slot number.





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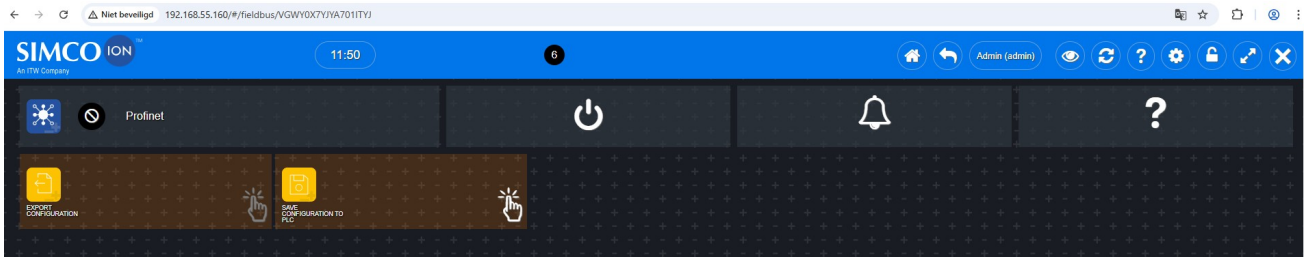
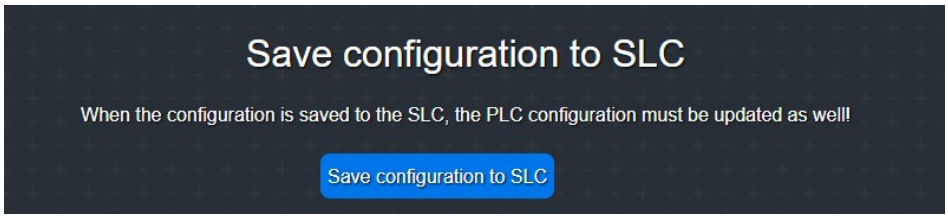
3 Enable the fieldbus



4 Put an usb stick in the usb slot of the Smart SLC and click on the icon EXPORT_CONFIGURATION.

5 Press the icon SAVE CONFIGURATION TO SLC.



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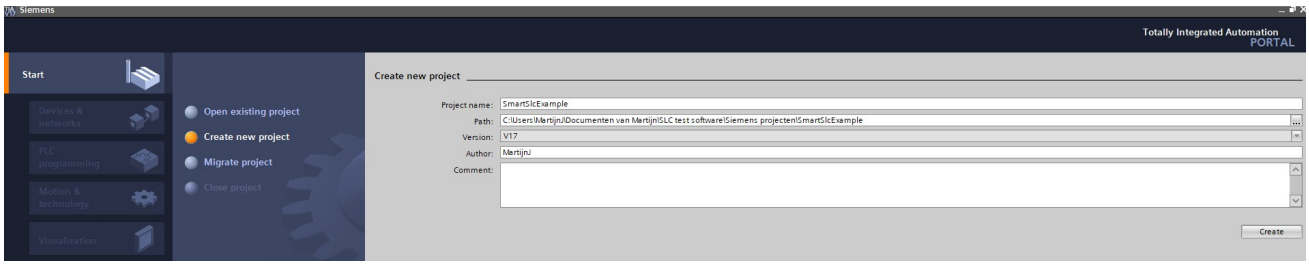
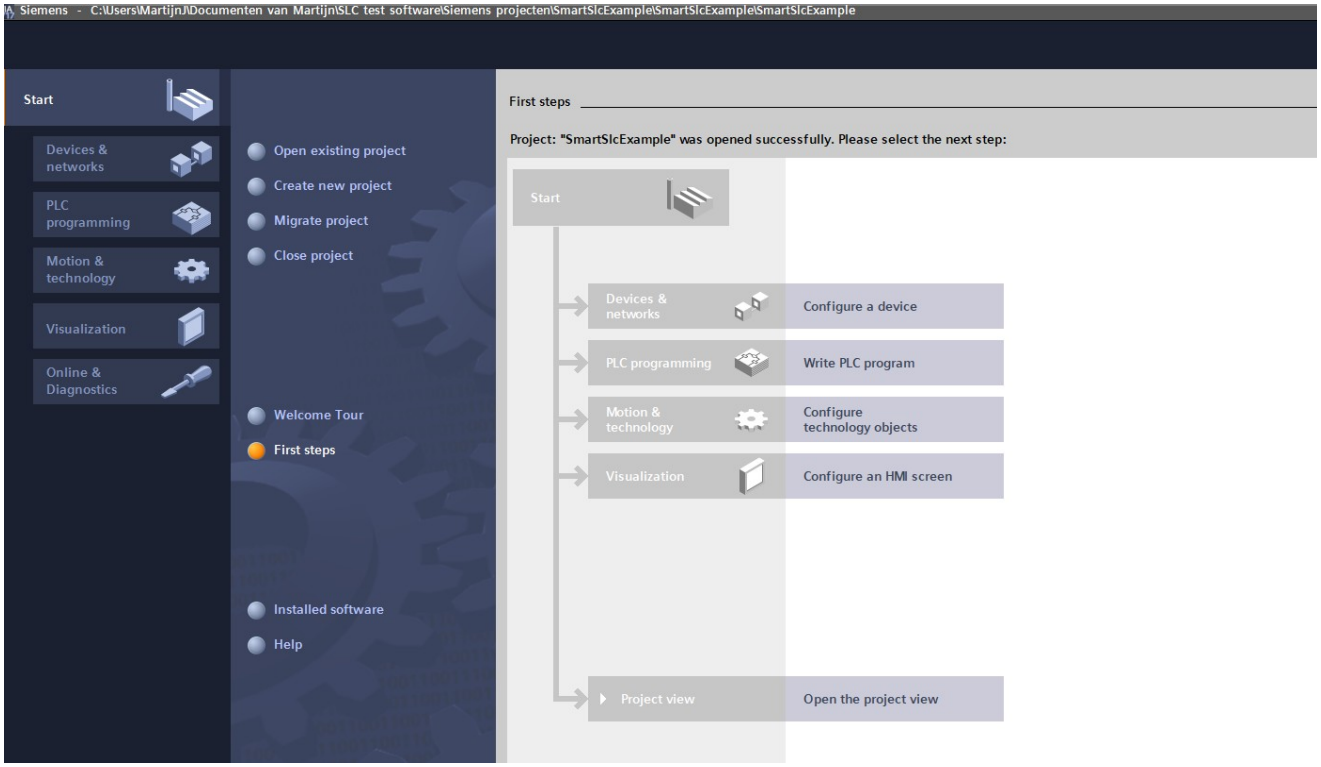
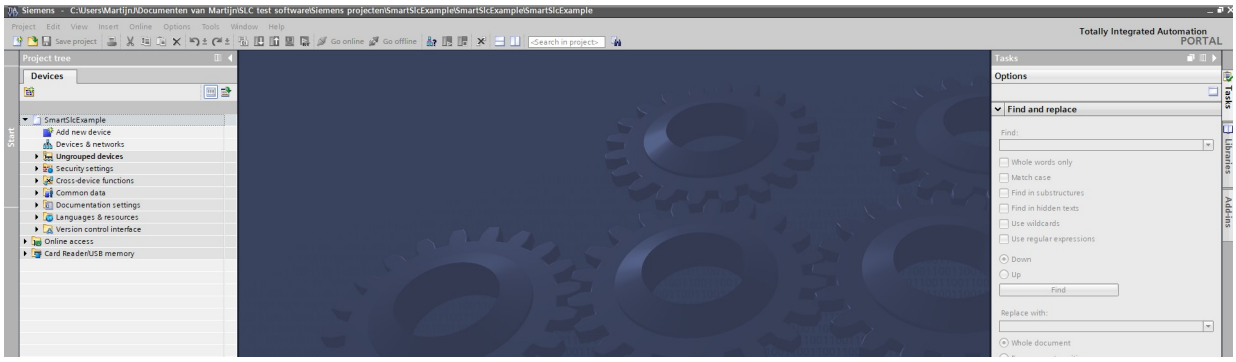
Setup Siemens PLC

6 Start Tia portal and select Create new project, fill in the fields and press Create.



7 Press Open project view.





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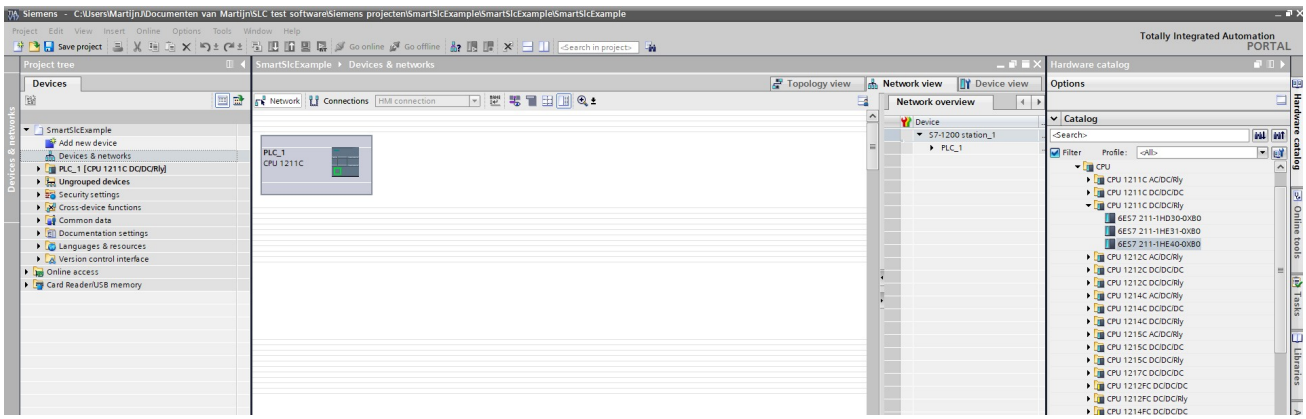
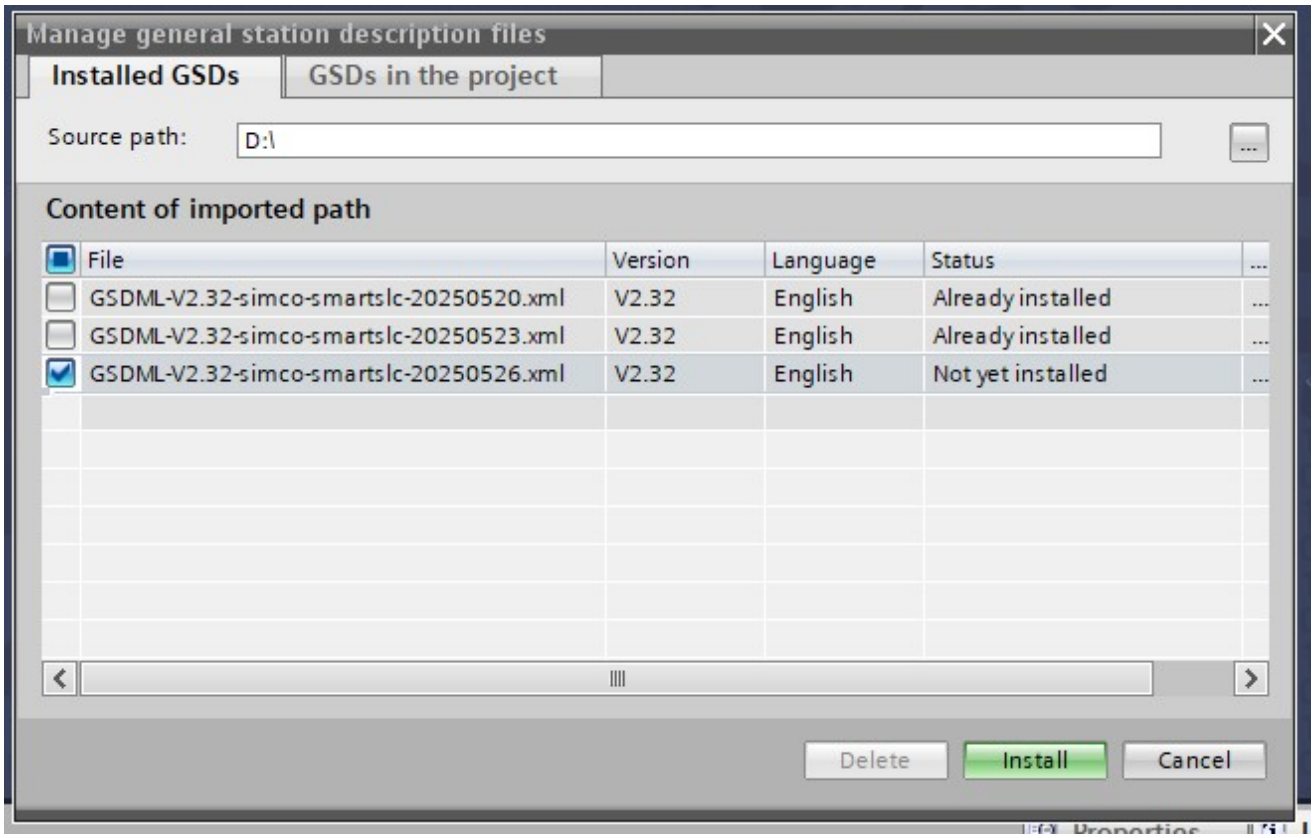
8 Double click on Devices & networks. Select the correct PLC (under Catalog) and double click on it.



Add Smart SLC with custom gsd file (go to step 9A if you want to use the generic gsd)

9 Install the GSD file (exported configuration from the Smart SLC) in Tia portal.

- Put the usb stick with the generated gsd file from the Smart SLC in the computer.
- Select Options/Manage general station description files (GSD).
- Select the usb stick and the correct file then press Install.



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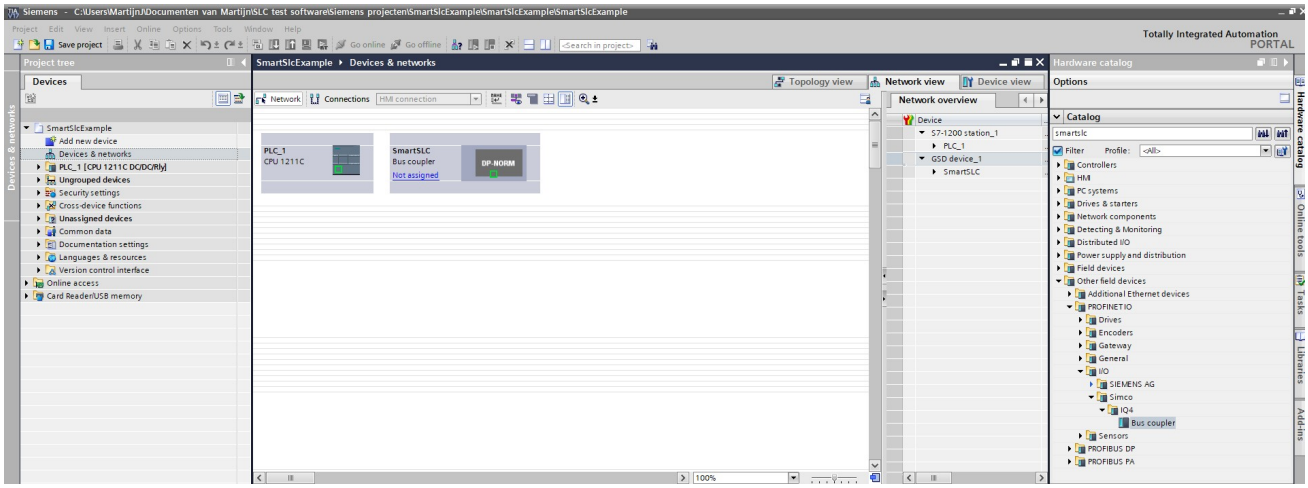
10 Add the Smart SLC.

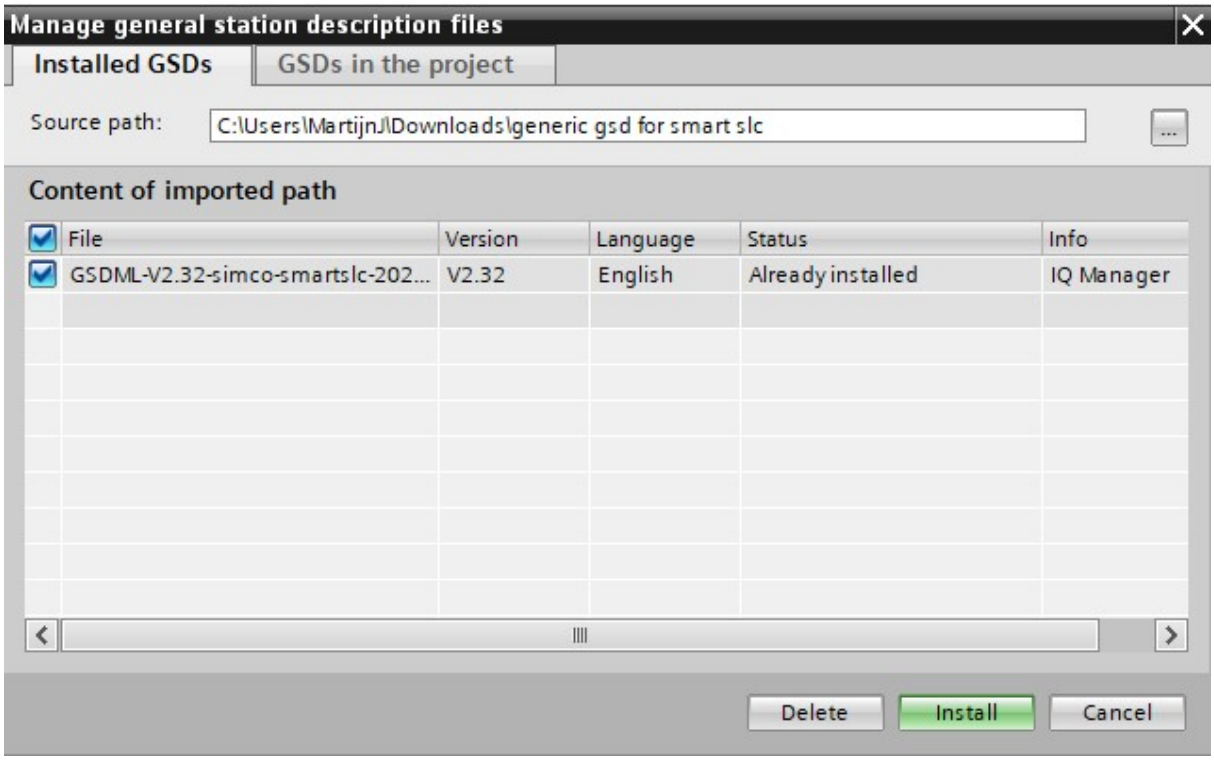
- Type smartslc in the search box (under Catalog).
- Select the correct version (the custom GSD file you installed in step 9) under Information.
- Double click on the Bus coupler (Smart SLC).



Add Smart SLC with generic gsd file

9a Install the generic GSD file

- Select Options/Manage general station description files (GSD).
- Select the location where the generic GSD file is stored and the correct file then press Install.



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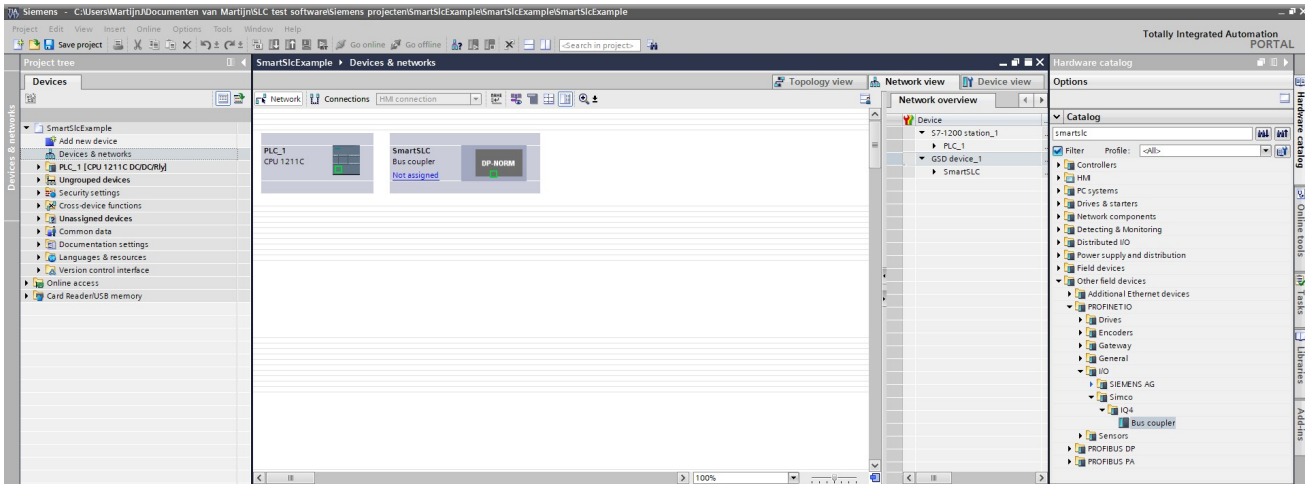
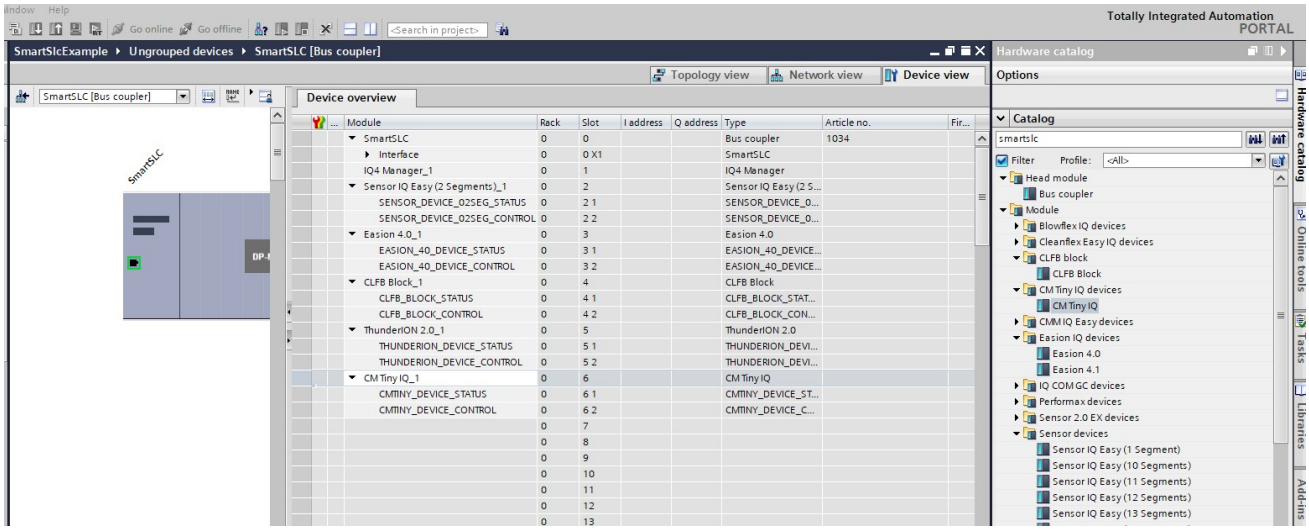
10a Add the Smart SLC.

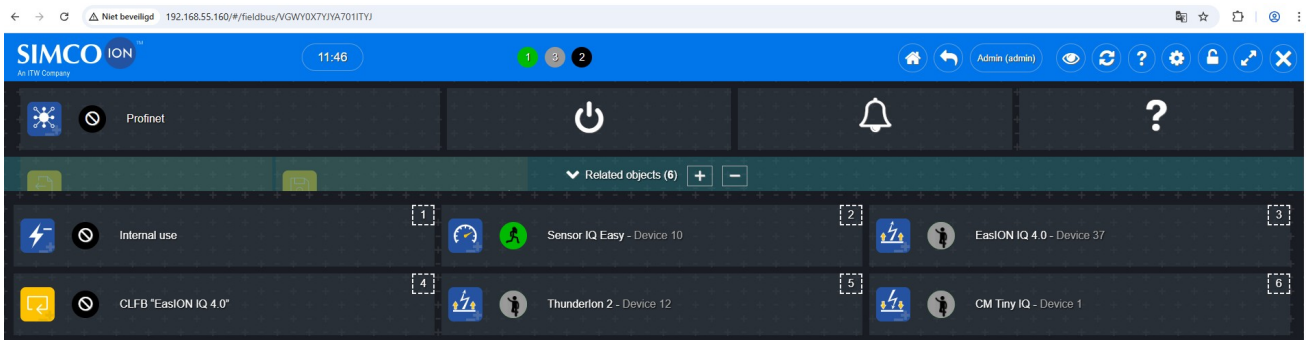
- Type smartslc in the search box (under Catalog).
- Select the correct version (the generic GSD file you installed in step 9a) under Information.
- Double click on the Bus coupler (Smart SLC).



11a Drag and drop the IQ devices and/or CLFB objects that are connected to the Smart SLC to the correct Slots.

- Right click on the SmartSLC and select Device Configuration.
- On the right side in the Catalog open the Module selection.
- Drag and drop the devices/objects to the correct slots in Device overview, use the same Slot sequence here as on the Smart SLC.





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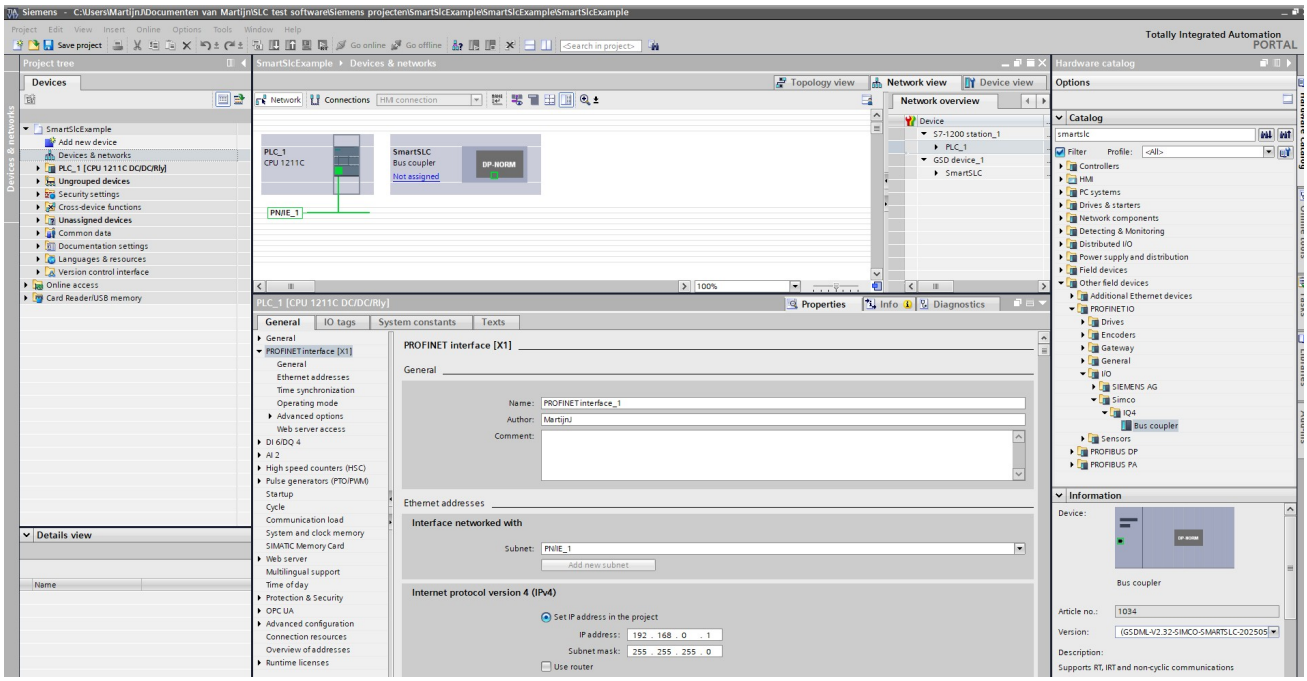
Setup simple PLC program

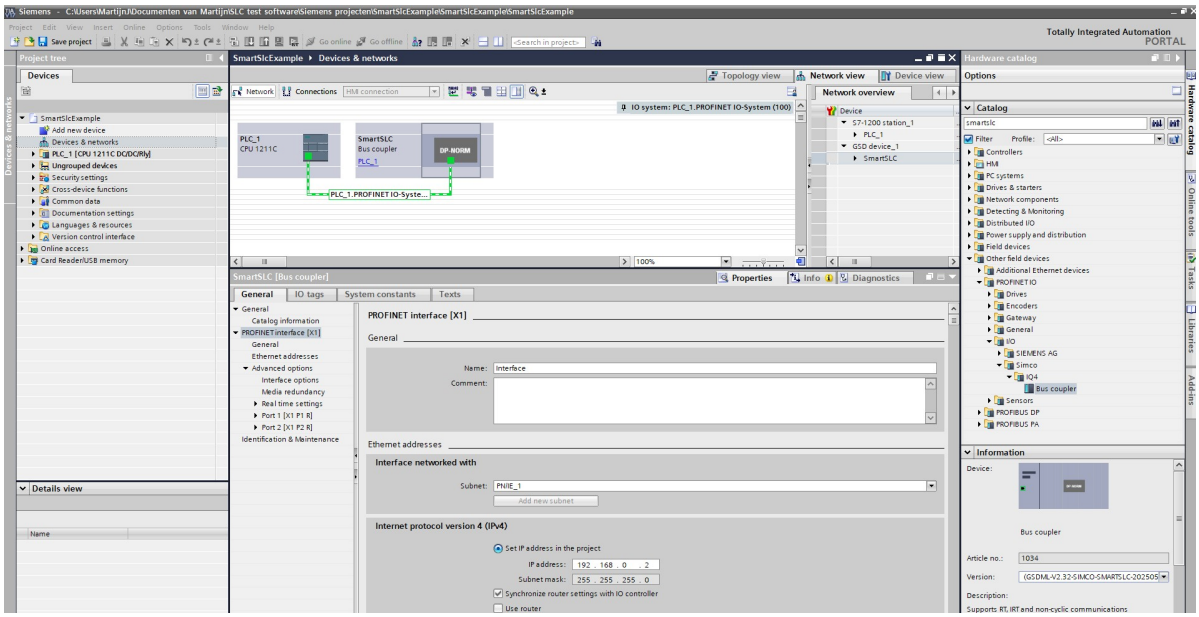
12 Configure the Siemens PLC.

- Click on the box inside the PLC to show its properties
- Select PROFINET interface [X1]
- Click Add new subnet
- Fill in the IP address



13 Configure the Smart SLC

- Click on Not assigned in the SmartSLC and select: PLC_1.PROFINET Interface_1
- Click on the box inside the SmartSLC to show its properties.
- Select PROFINET interface [X1]
- Fill in the ip address for the Smart SLC



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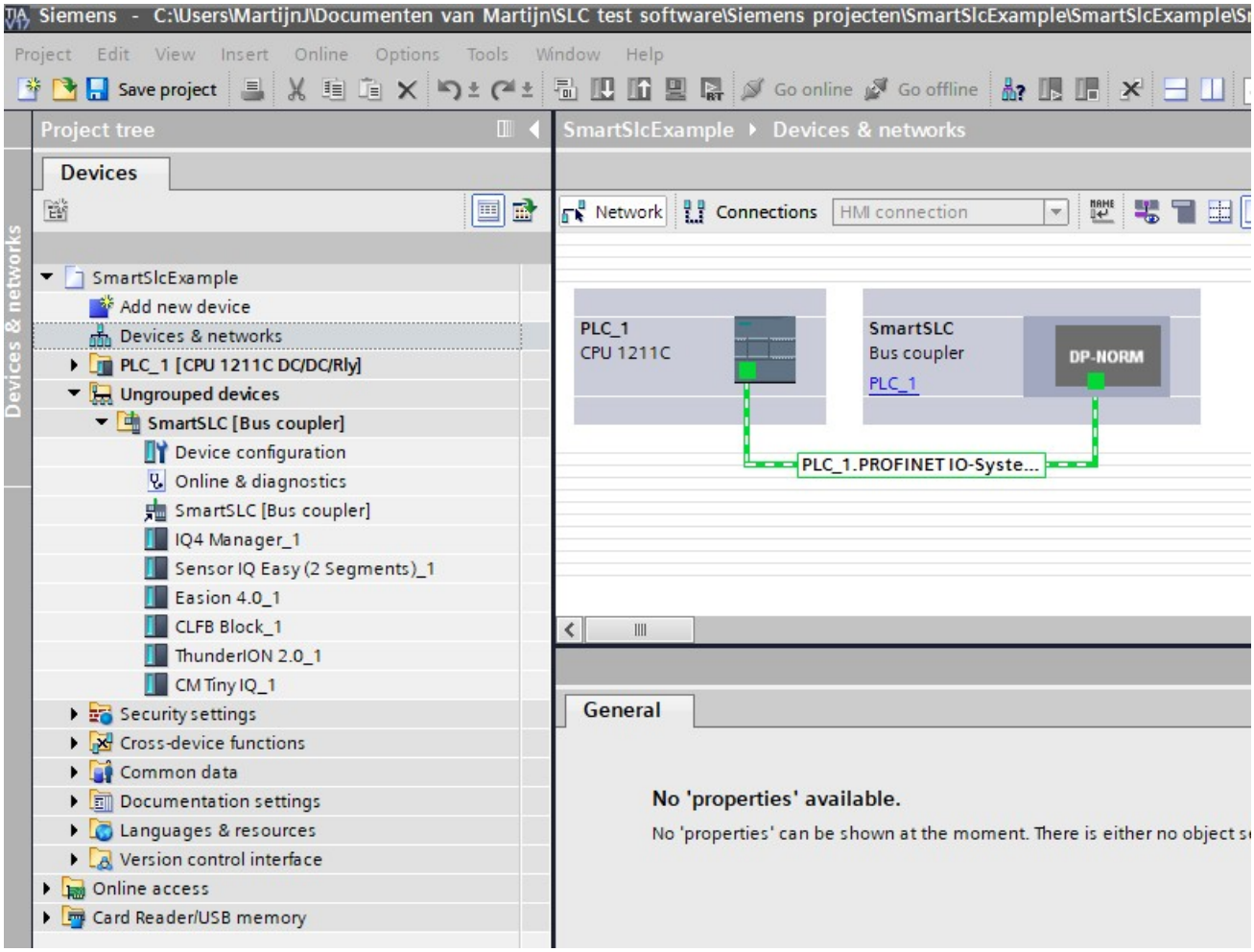
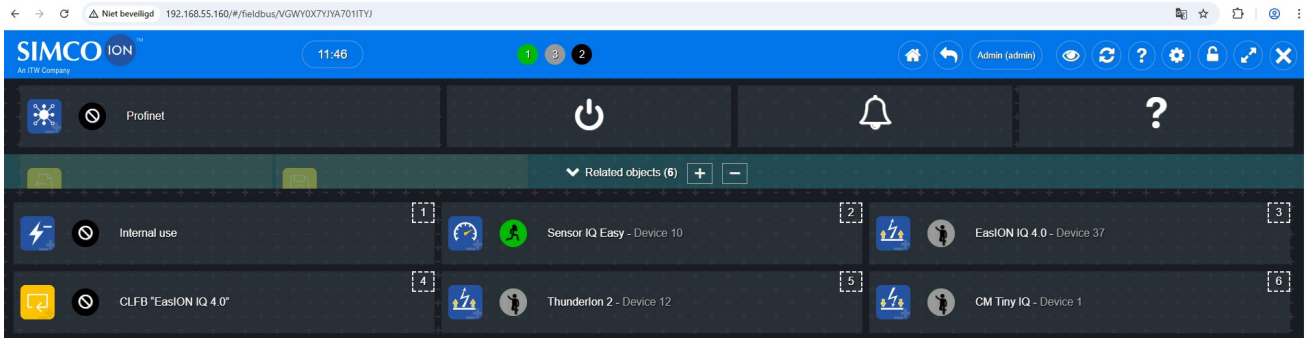
14 Now the connection is made between the Siemens PLC and Simco-Ion Smart SLC. The Smart SLC can be found in Ungrouped devices/SmartSLC [Bus coupler]. The available Simco-Ion IQ devices are visible in the same order as the slot order in the Smart SLC.





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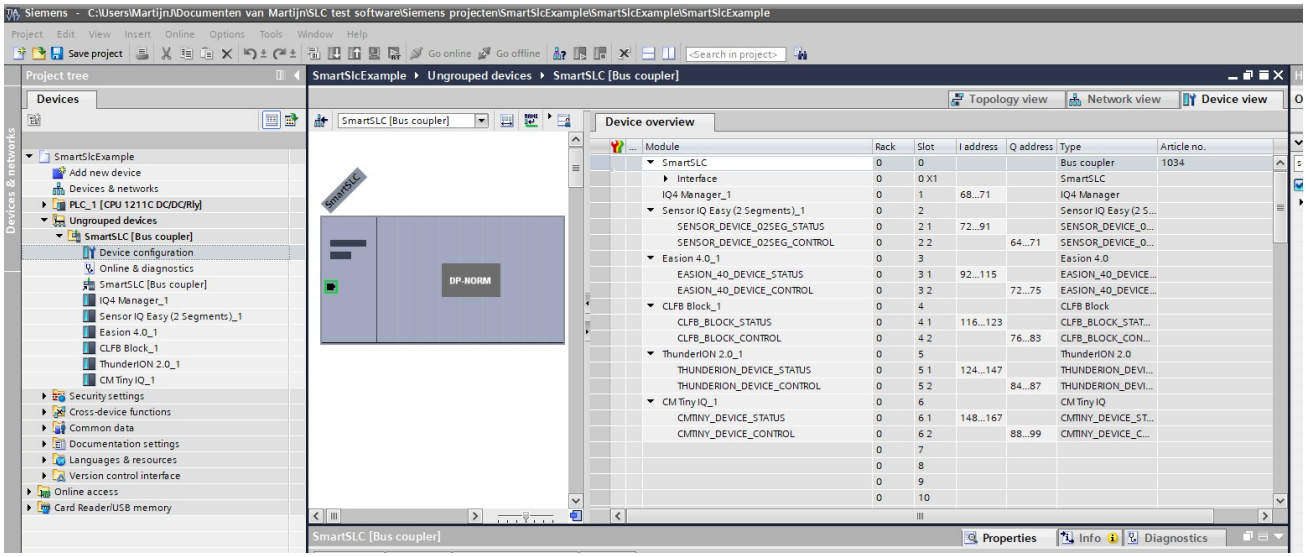
15 Double click on Ungrouped devices/SmartSLC [Bus coupler]/Device configuration. Here you can see the cyclic fieldbus parameters and the input- and output addresses. These fieldbus parameters are described in the document: SmartSLC_FieldbusParameters_GB.



The cyclic data

The **cyclically** transmitted data exists of the following parameters, defined in the fieldbus interface file as Module "Smart SLC":

Object name	Parameter name	Direction	Width (byte)	Format
Simco IQ4 manager (MANAGER)	STATUS_MANAGER	Input	4	Struct
CLFB block (for each created CLFB_BLOCK)	STATUS_CLFB	Input	8	Struct
	CONTROL_CLFB	Output	8	Struct
Performax IQ Easy parameters (for each connected PERFORMAX_DEVICE)	STATUS_PERFORMAX_40	Input	24	Struct
	CONTROL_PERFORMAX_40	Output	4	Struct
Easion IQ 4.0 parameters (for each connected EASION_DEVICE)	STATUS_EASION_40	Input	24	Struct
	CONTROL_EASION_40	Output	4	Struct
Easion IQ 4.1 parameters (for each connected EASION_41_DEVICE)	STATUS_EASION_41	Input	24	Struct
	CONTROL_EASION_41	Output	4	Struct
Performax IQ Easy Ex parameters (for each connected PERFORMAXEX_DEVICE)	STATUS_PERFORMAX_EX	Input	24	Struct
	CONTROL_PERFORMAX_EX	Output	4	Struct
Thunderion 2 IQ parameters (for each connected THUNDERION_DEVICE)	STATUS_THUNDERION	Input	24	Struct
	CONTROL_THUNDERION	Output	4	Struct
Vicinion parameters (for each connected VICINION_DEVICE)	STATUS_VICINION	Input	16	Struct
	CONTROL_VICINION	Output	4	Struct
Sensor IQ Easy (Legacy sensor device) parameters (for each connected SENSOR_DEVICE)	STATUS_SENSOR length of the struct depends on the number of sensor segments. e.g Sensor IQ Easy with 1 segment has a 16 byte wide Status struct. Sensor IQ Easy with 16 segments has a 76 wide Status struct.	Input	16 – 76	Struct
	CONTROL_SENSOR	Output	8	Struct
Sensor 2.0 Ex parameters (for each connected SENSOR_EX_DEVICE)	STATUS_SENSOR_20_EX length of the struct depends on the number of sensor segments.	Input	16 – 28	Struct

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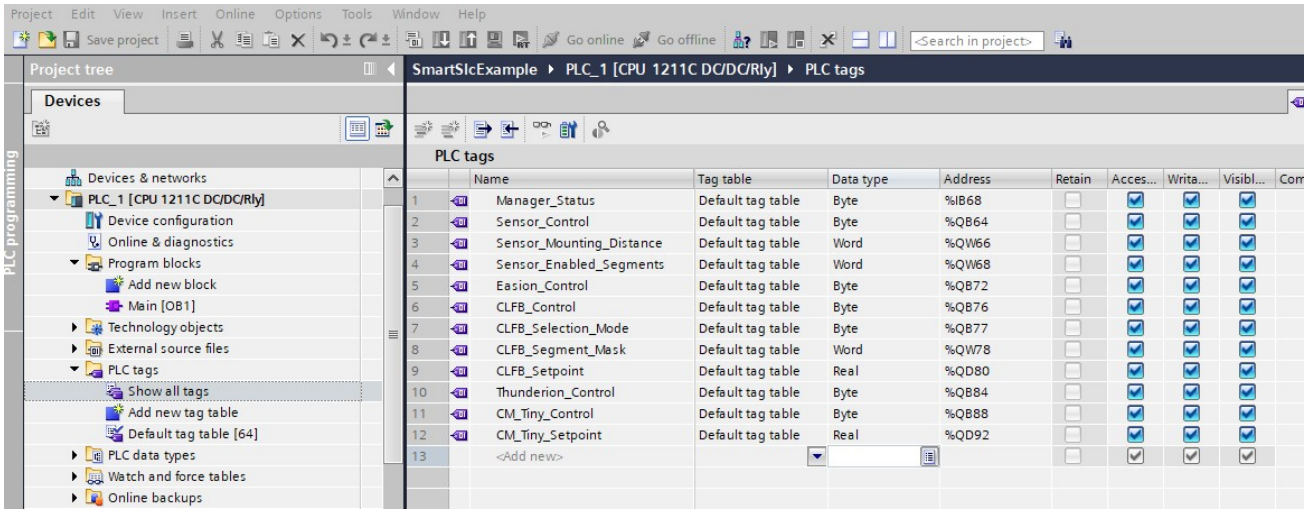
16 Make PLC tags under PLC tags/Show all tags. Smart SLC fieldbus parameters are described in the document: SmartSLC_FieldbusParameters_GB. Input- and output addresses of the Smart SLC can be found under Devices & networks/SmartSLC/Device configuration (see also step 15).



Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
CONTROL_SENSOR	Output	8	Struct	Cyclic	2

Byte offset	Parameter name	Description			Remarks
0	CONTROL [byte8]	Bit 0-1: MODE	0: DISABLED	Disable device	
			1: STANDBY	Set device to standby mode	
			2: RUN	Set device to run mode	
		Bit 2: IDENTIFY	0: OFF	Switch off identify leds on device	
			1: ON	Switch on identify leds on device	
		Bit 3-7: RESERVED		Reserved for future use	for future use
1	CONTROL_PAD_01 [byte8]	Reserved			for future use
2	MOUNTING_DISTANCE [word16]	SETPOINT	Default value: 50	Mounting distance sensor bar in mm	
3			Min value: 10		
			Max value: 1000		
4	ENABLED SEGMENTS [word16]	Bit 0: SEGMENT 1	0: Not enabled 1: Enabled	Sensor segments enabled	
		Bit 1: SEGMENT 2			
		Bit 2: SEGMENT 3			
		Bit 3: SEGMENT 4			
		Bit 4: SEGMENT 5			
		Bit 5: SEGMENT 6			
		Bit 6: SEGMENT 7			
		Bit 7: SEGMENT 8			
5		Bit 8: SEGMENT 9			
		Bit 9: SEGMENT 10			
		Bit 10: SEGMENT 11			
		Bit 11: SEGMENT 12			
		Bit 12: SEGMENT 13			
		Bit 13: SEGMENT 14			
		Bit 14: SEGMENT 15			
		Bit 15: SEGMENT 16			
6	CONTROL_PAD_06	Reserved			for future use
7	CONTROL_PAD_07	Reserved			for future use

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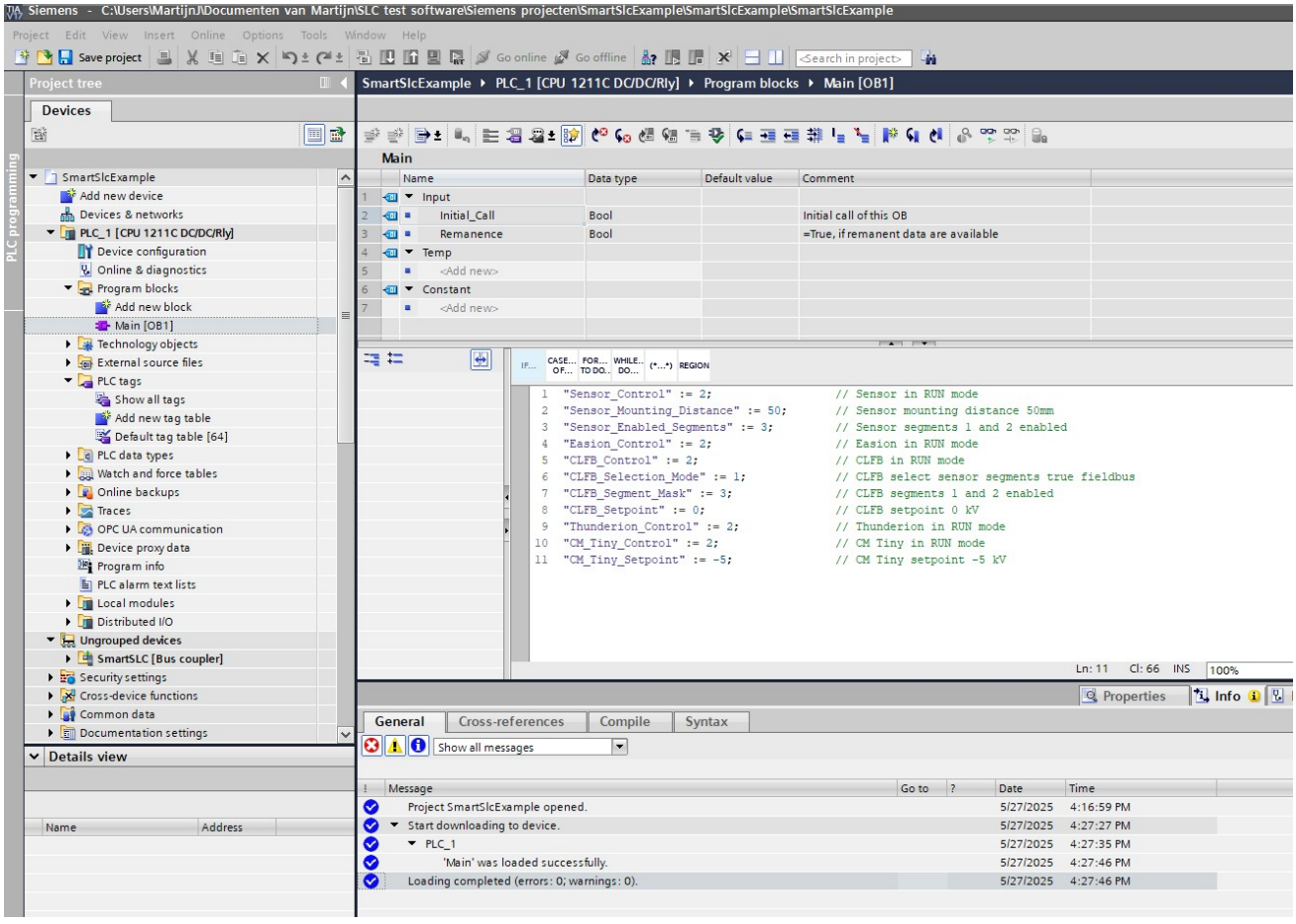
17 Make a simple PLC program under Program blocks/Main [OB1]. Smart SLC fieldbus parameters are described in the document: SmartSLC_FieldbusParameters_GB.

```
"Sensor_Control" := 2;                  // Sensor in RUN mode
"Sensor_Mounting_Distance" := 50;       // Sensor mounting distance 50mm
"Sensor_Enabled_Segments" := 3;         // Sensor segments 1 and 2 enabled
"Easion_Control" := 2;                  // Easion in RUN mode
"CLFB_Control" := 2;                    // CLFB in RUN mode
"CLFB_Selection_Mode" := 1;             // CLFB select sensor segments via fieldbus
"CLFB_Segment_Mask" := 3;               // CLFB segments 1 and 2 enabled
"CLFB_Setpoint" := 0;                   // CLFB setpoint 0 kV
"Thunderion_Control" := 2;              // Thunderion in RUN mode
"CM_Tiny_Control" := 2;                 // CM Tiny in RUN mode
"CM_Tiny_Setpoint" := -5;               // CM Tiny setpoint -5 kV
```



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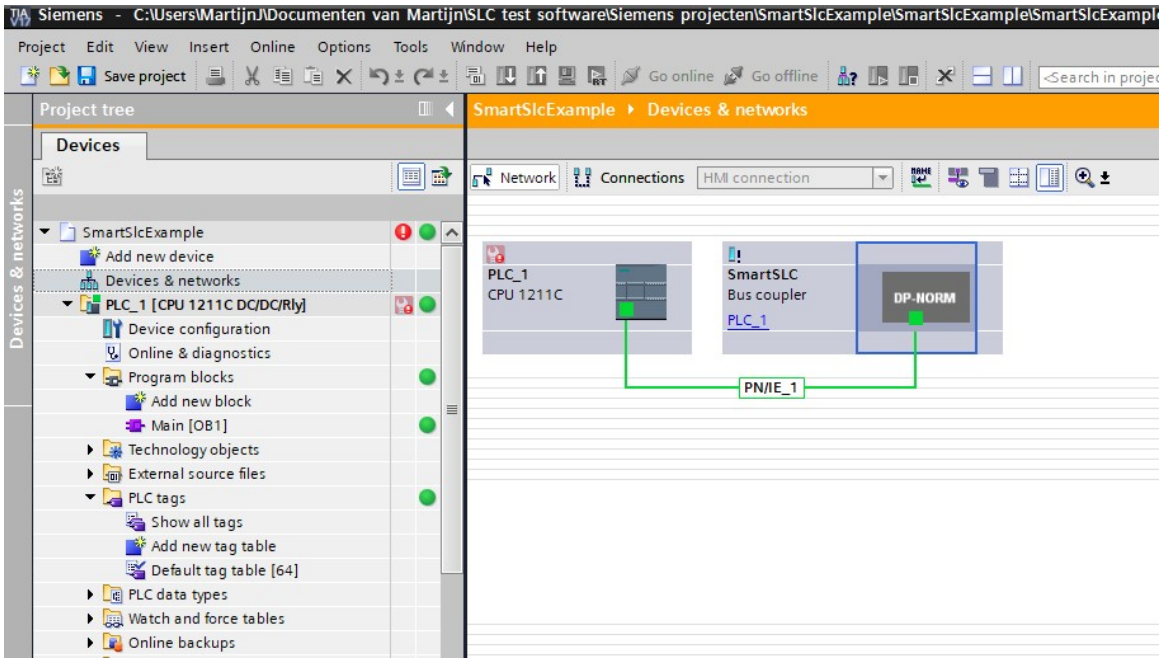
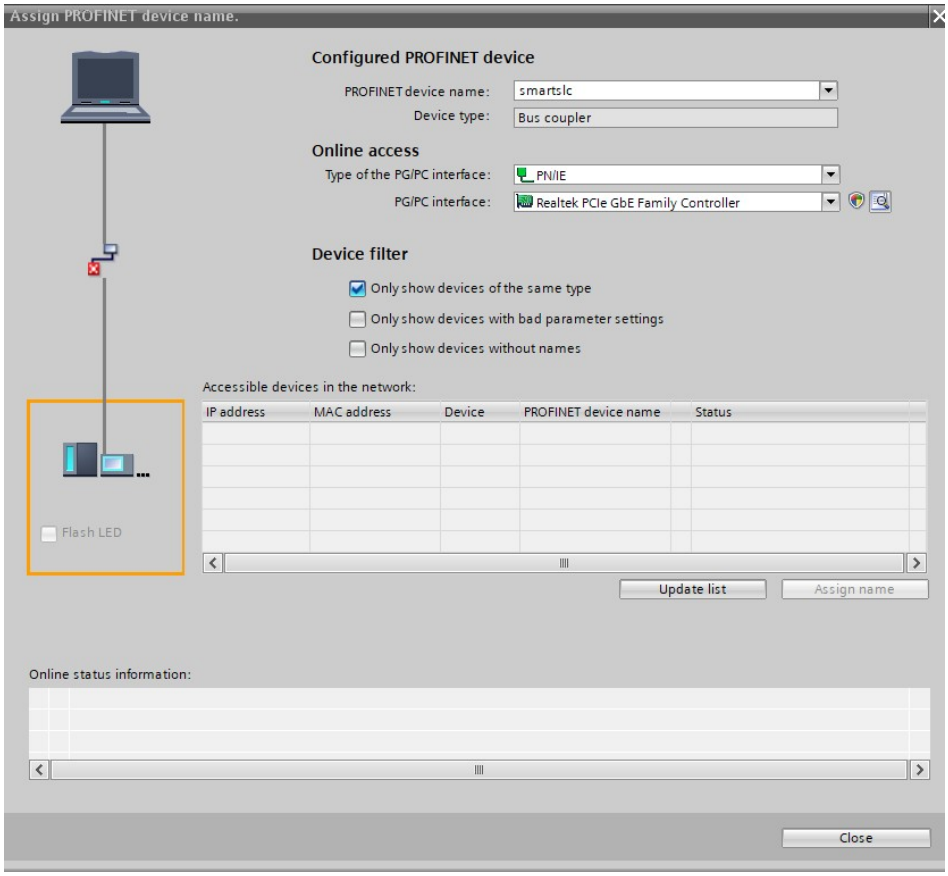
18 Click Edit/Compile and go to the next step if there are no errors and warnings.

19 Click Online/Download to device.

20a This step is only necessary if the PLC flash its error LED. Right click on the SmartSLC under Device & networks en select Assign device name.



20b Press Update list.



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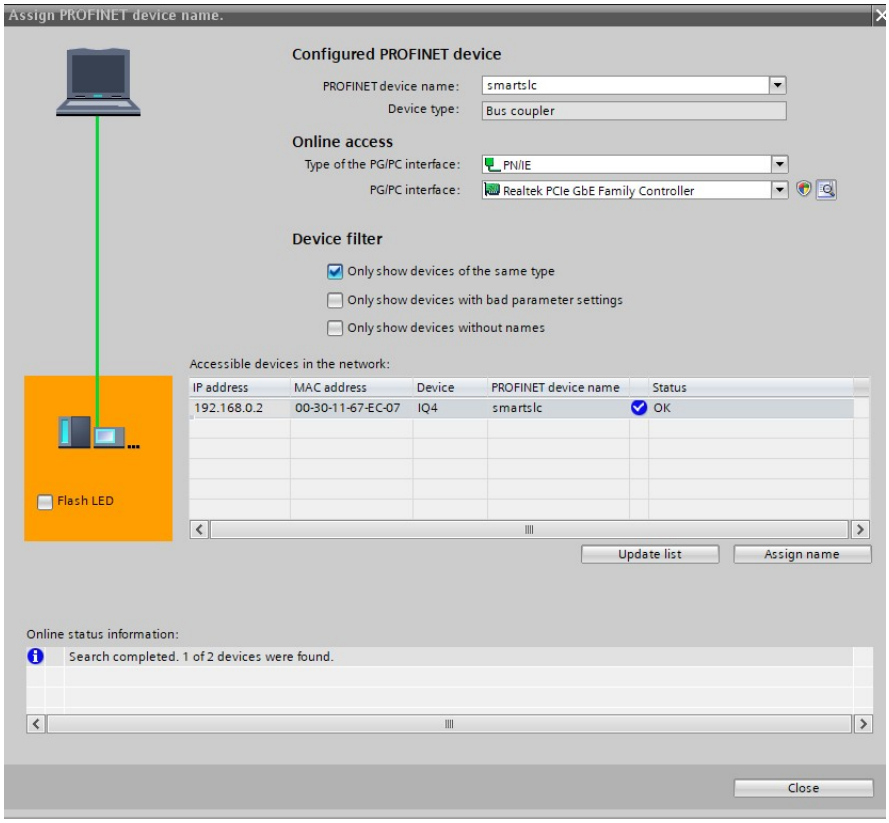
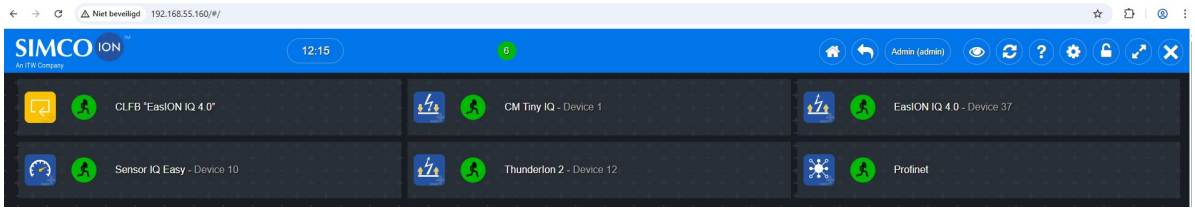
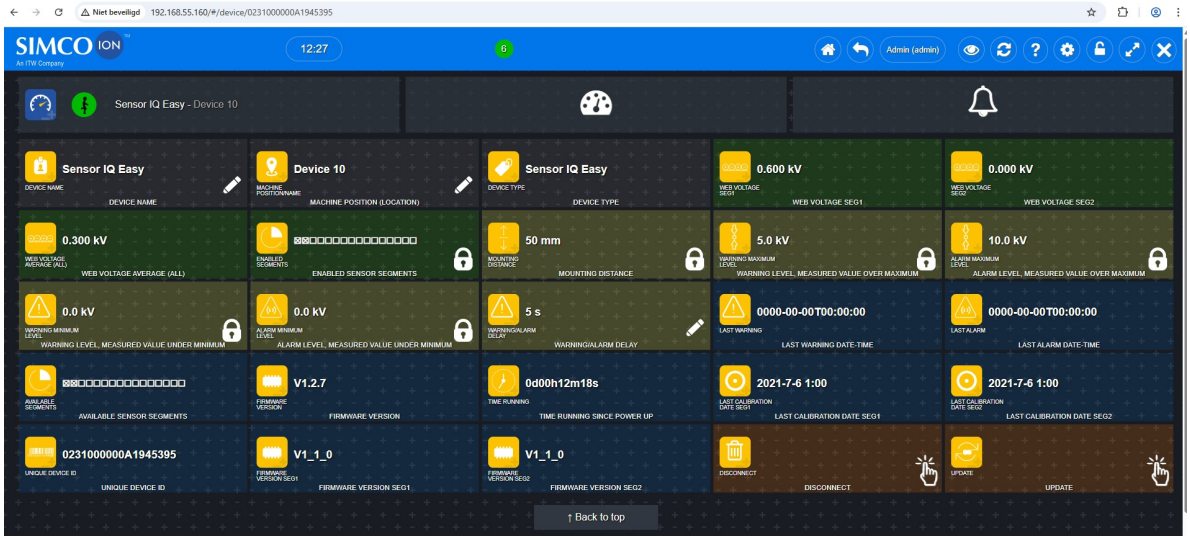
20c Select the found smartslc and press Assign name.



21 If all steps have been completed correctly, this is the result. All devices are in RUN mode.



21a The Sensor IQ Easy is in RUN mode, the mounting distance is 50mm, segment 1 and segment 2 are enabled.



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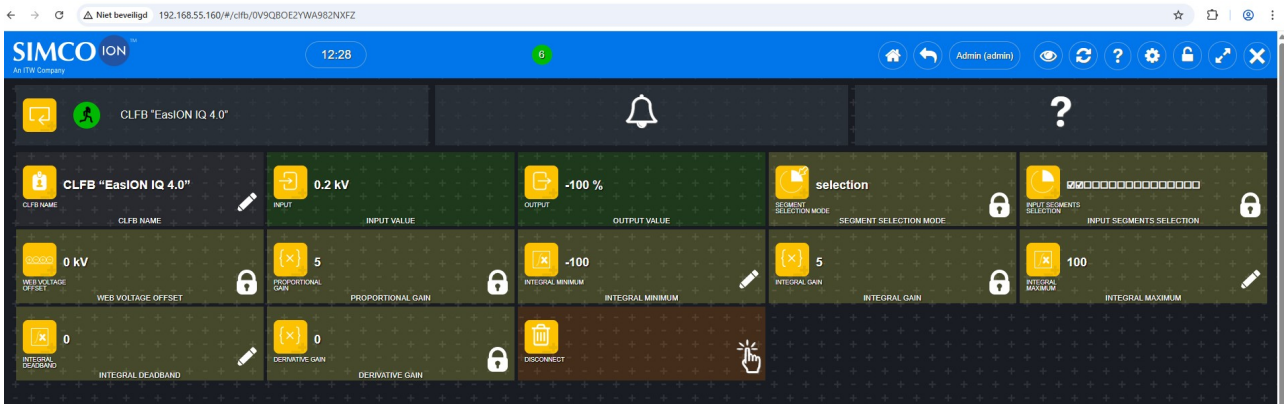
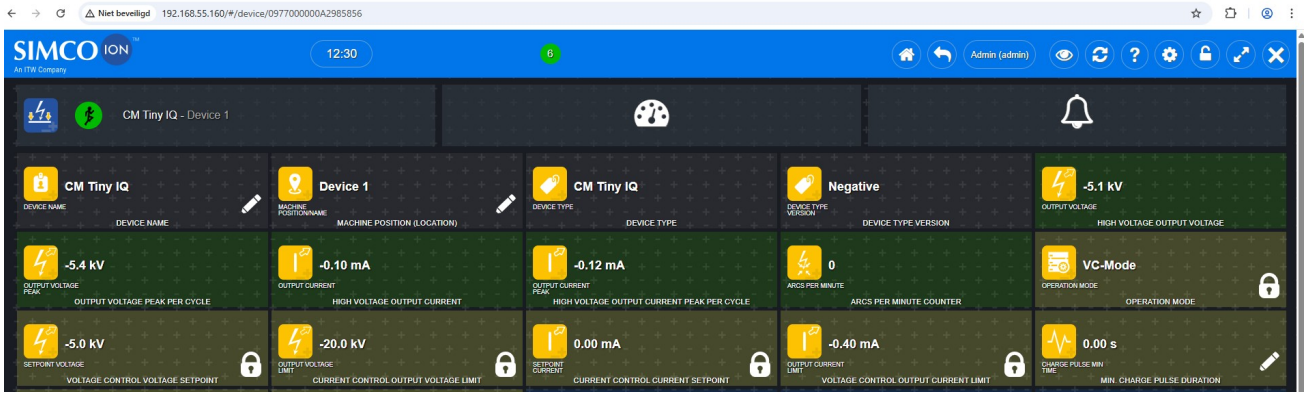
21b The CLFB object is in RUN mode, the sensor segments are controlled via the fieldbus, sensor segment 1 and sensor segment 2 are enabled, the CLFB setpoint (web voltage offset) is 0 kV.



21c The CM Tiny is in RUN mode, the voltage setpoint is -5kV



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Fieldbus example for Smart SLC with EtherCAT

Simple example how to set up an EtherCAT connection between a Beckhoff PLC and a Simco-Ion Smart SLC.

Used devices:

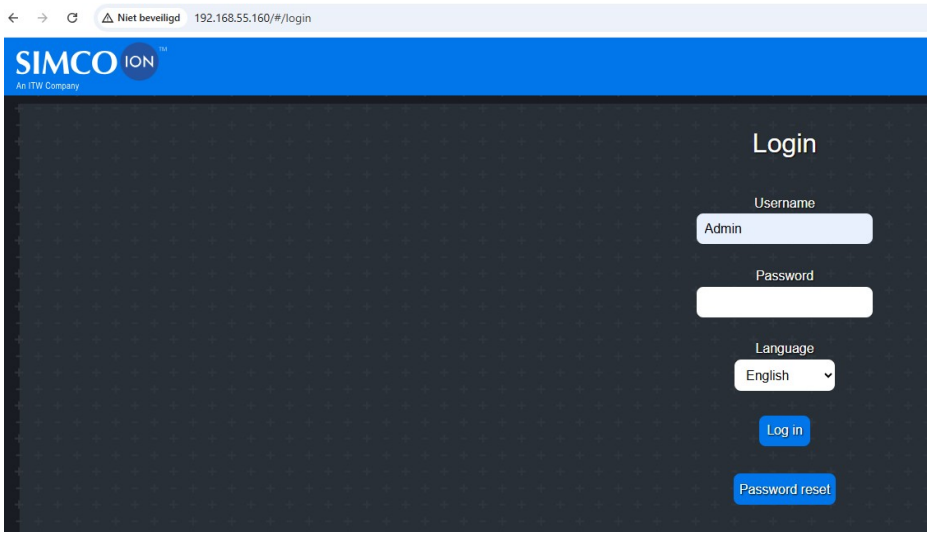
- Smart SLC with EtherCAT
- Beckhoff PLC CX9020 with EK1122 EtherCAT junction
- Sensor IQ Easy with 2 sensor segments
- Easion IQ 4.0
- Close Loop Feedback object between Sensor IQ Easy and Easion IQ 4.0
- ThunderIon 2 IQ
- CM Tiny IQ

Tabel of contents:

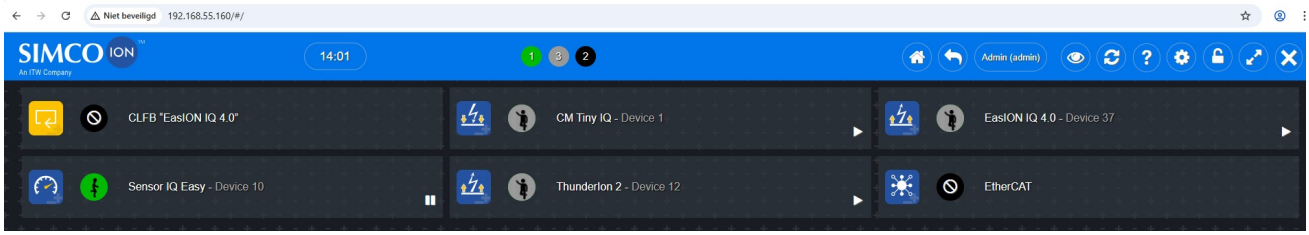
• Setup Simco-Ion Smart SLC	Step 1 – 6	Page 1
• Setup Beckhoff PLC	Step 7 – 8	Page 4
• Add Smart SLC with esi file (preferred method)	Step 9 – 18	Page 5
• Add Smart SLC without esi file	Step 9a – 16a	Page 9
• Setup simple PLC program	Step 19 – 25c	Page 11

Setup Simco-Ion Smart SLC

1 Log in to the Smart SLC on Expert or Admin level.



2 Add the Simco IQ devices as related objects to the fieldbus. Click the EtherCAT icon.



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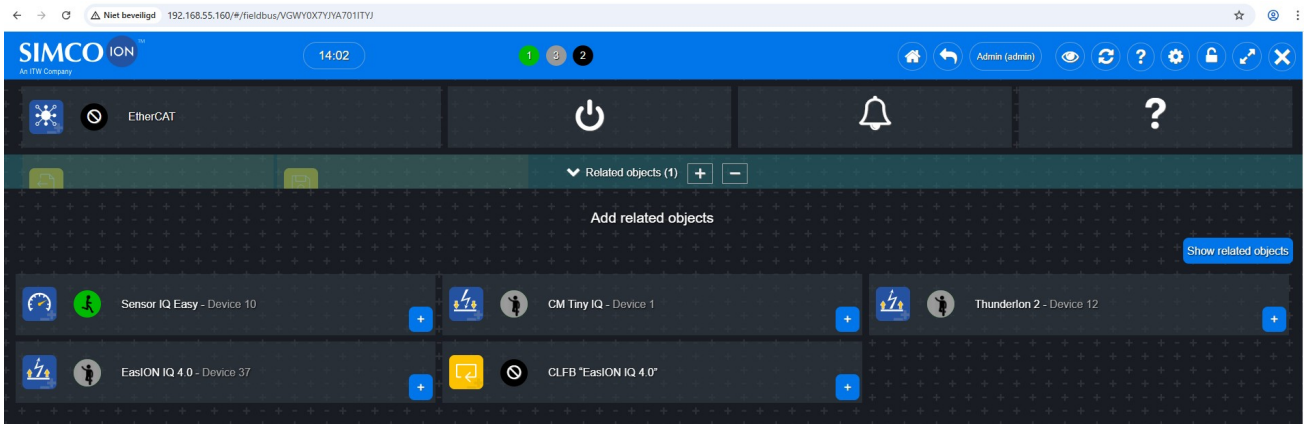
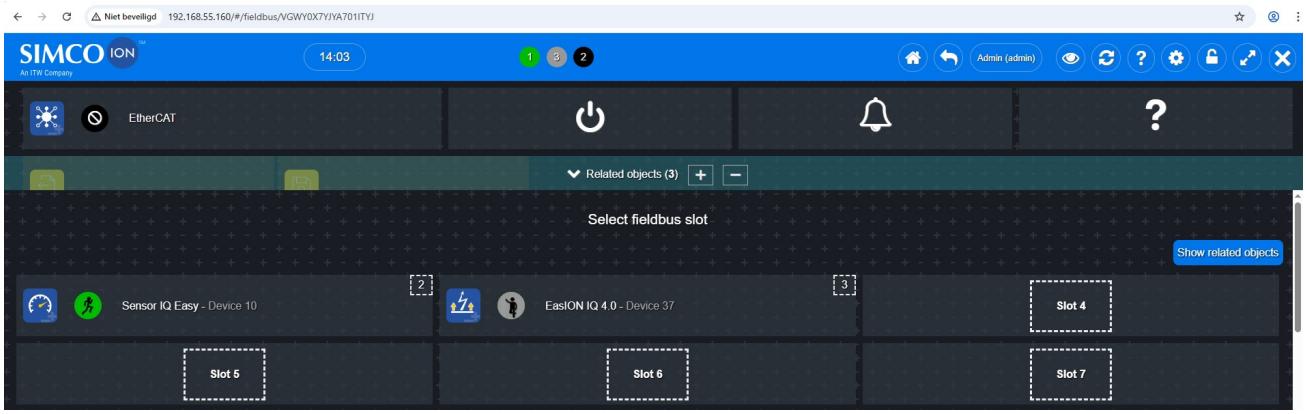
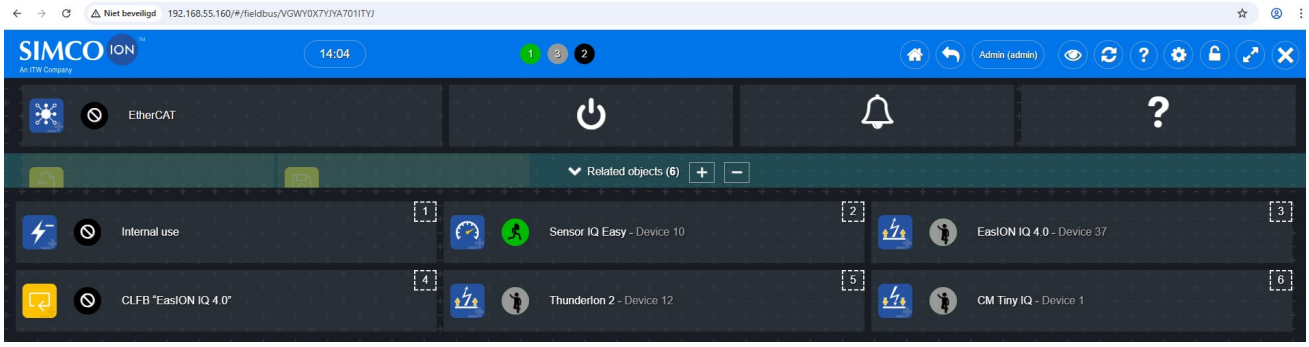
2a Click the + icon next to Related objects. Select the devices.

.



2b Choose Slot number.





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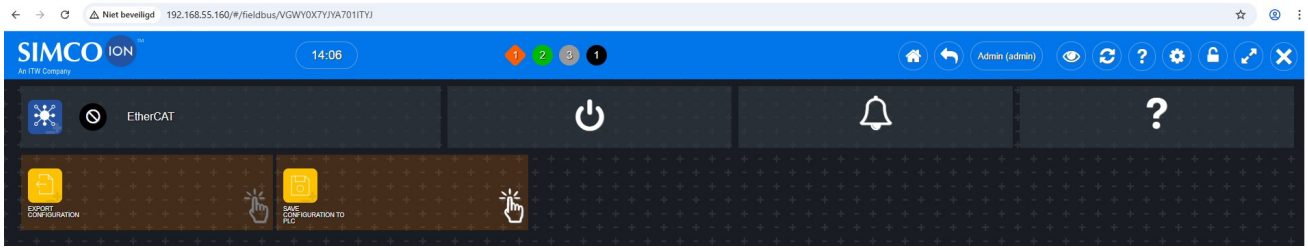
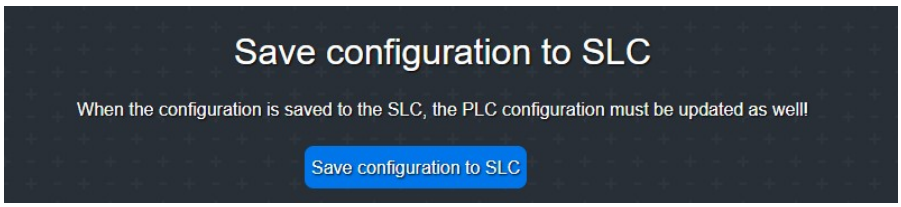
3 Enable the fieldbus



4 Put an usb stick in the usb slot of the Smart SLC and click on the icon EXPORT_CONFIGURATION.

5 Press the icon SAVE CONFIGURATION TO SLC.



6 Disable the fieldbus

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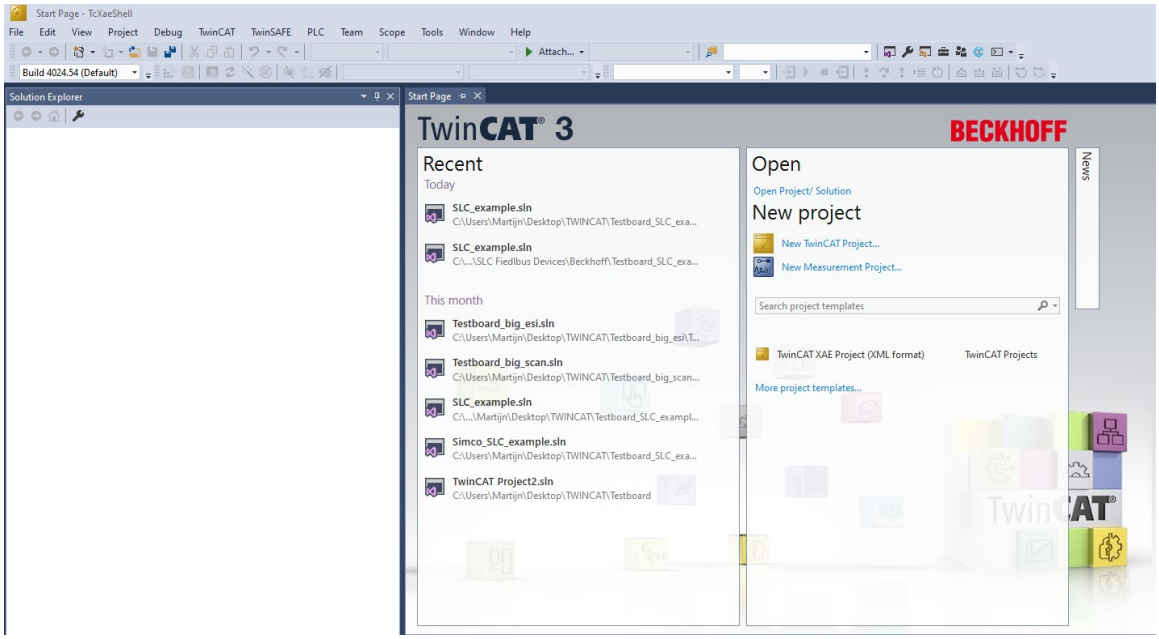
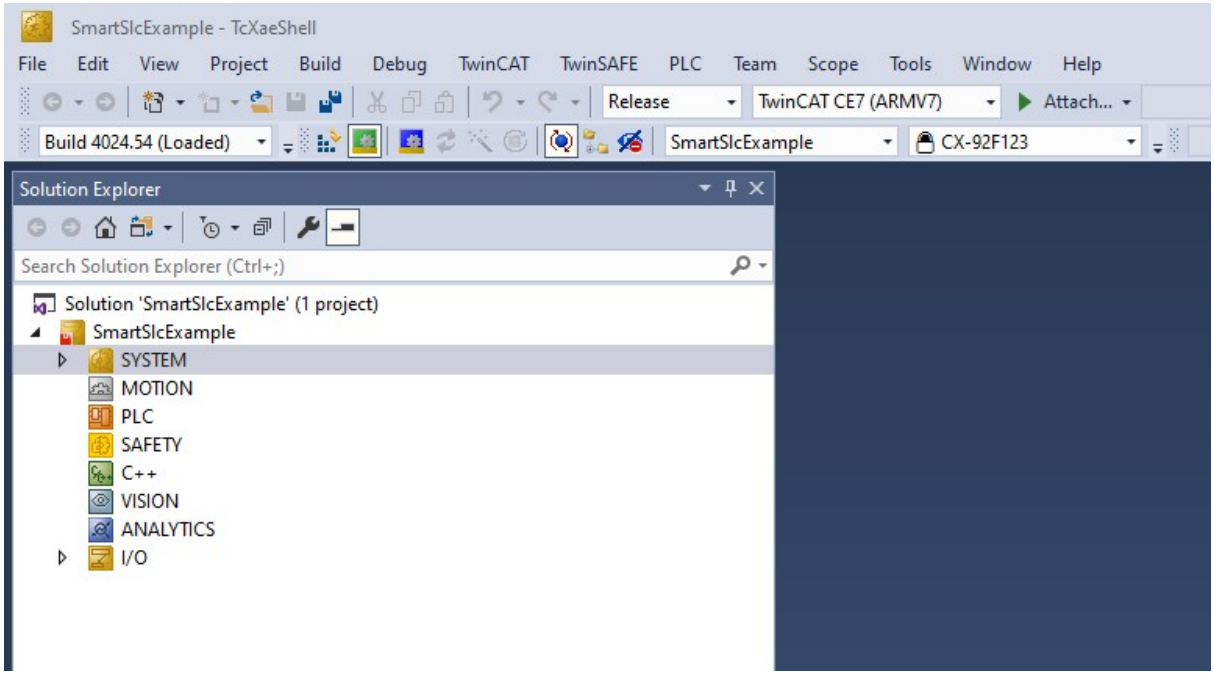
Setup Beckhoff PLC

7 Start TwinCAT and select New TwinCAT Project, fill in the fields and press OK.



8 Connect TwinCAT with the PLC



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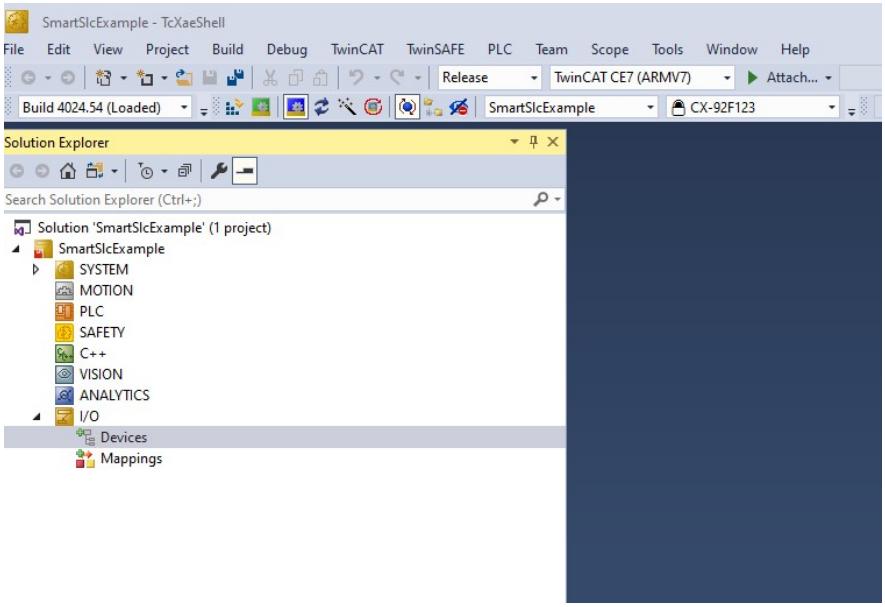
Add Smart SLC with esi file (preferred method)

9 Install the ESI file (exported configuration from the Smart SLC) in TwinCAT.

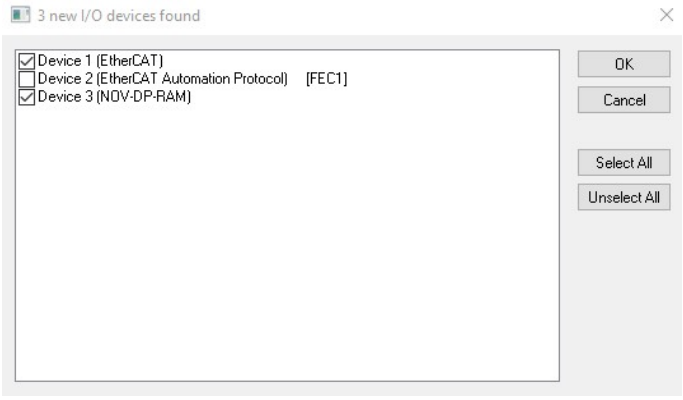
- Put the usb stick with the generated esi file from the Smart SLC in the computer.
- Copy the esi file from the usb stick to the following location: TwinCAT/3.1/Config/Io/EtherCAT
- Select TwinCAT/EtherCAT Devices/Reload Device Descriptions or restart TwinCAT

10 Select TwinCAT/Restart TwinCAT (Config Mode)

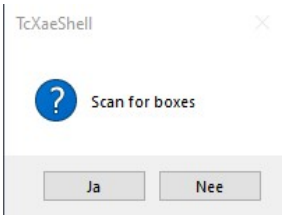
11 Right mouse click on Devices and select Scan.



12 Click OK



13 Click Ja (Yes)



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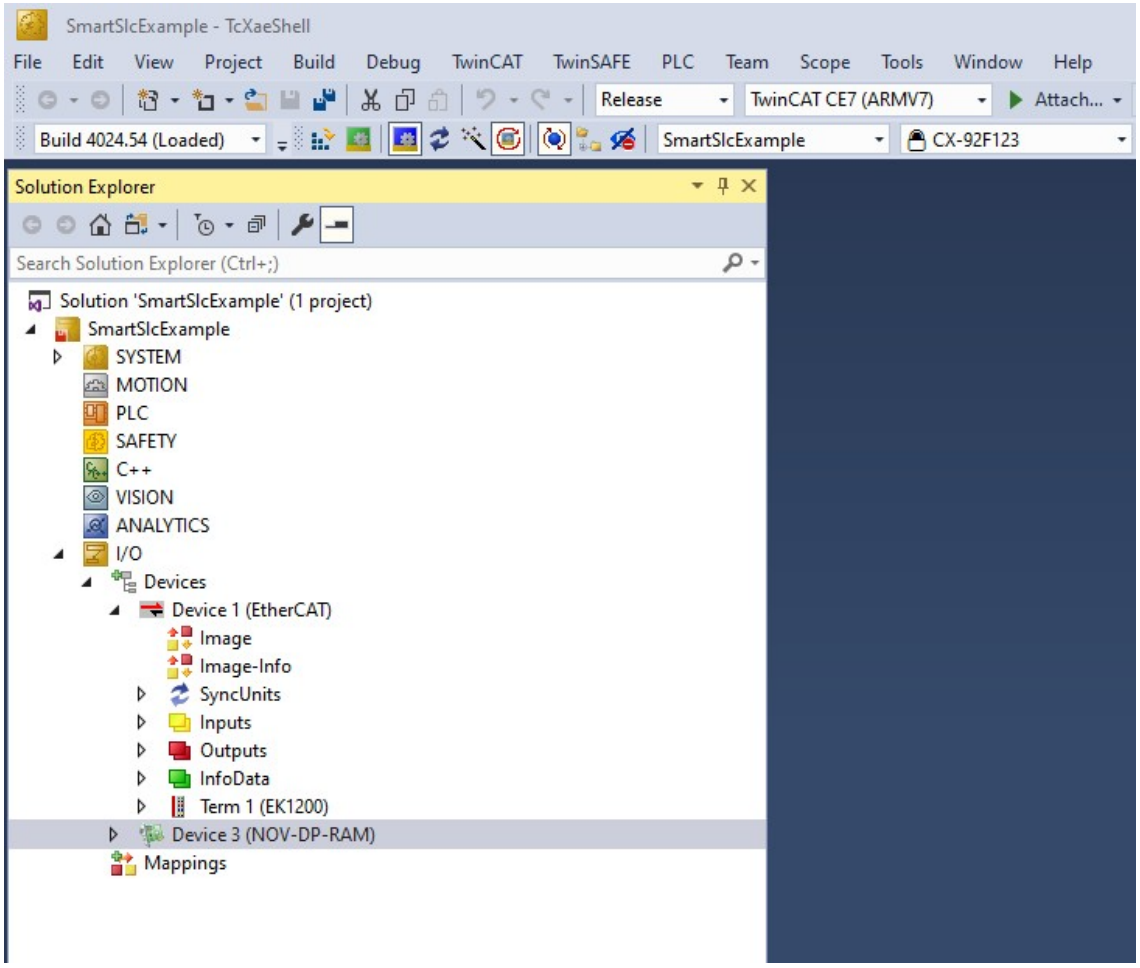
14 Click Ja (Yes)



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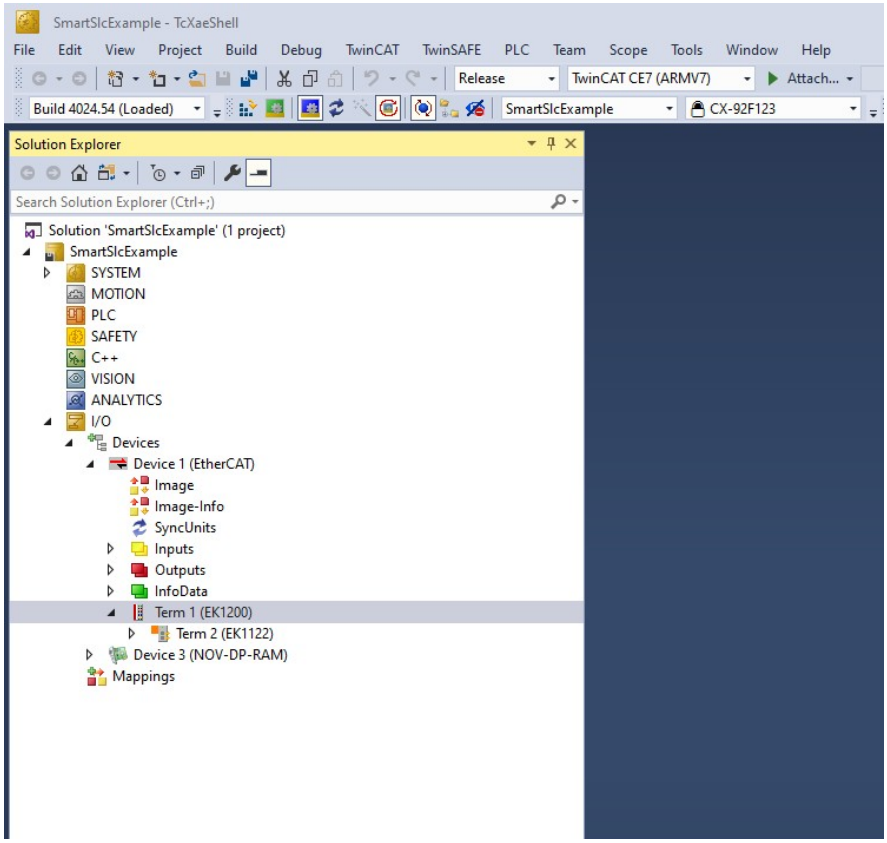
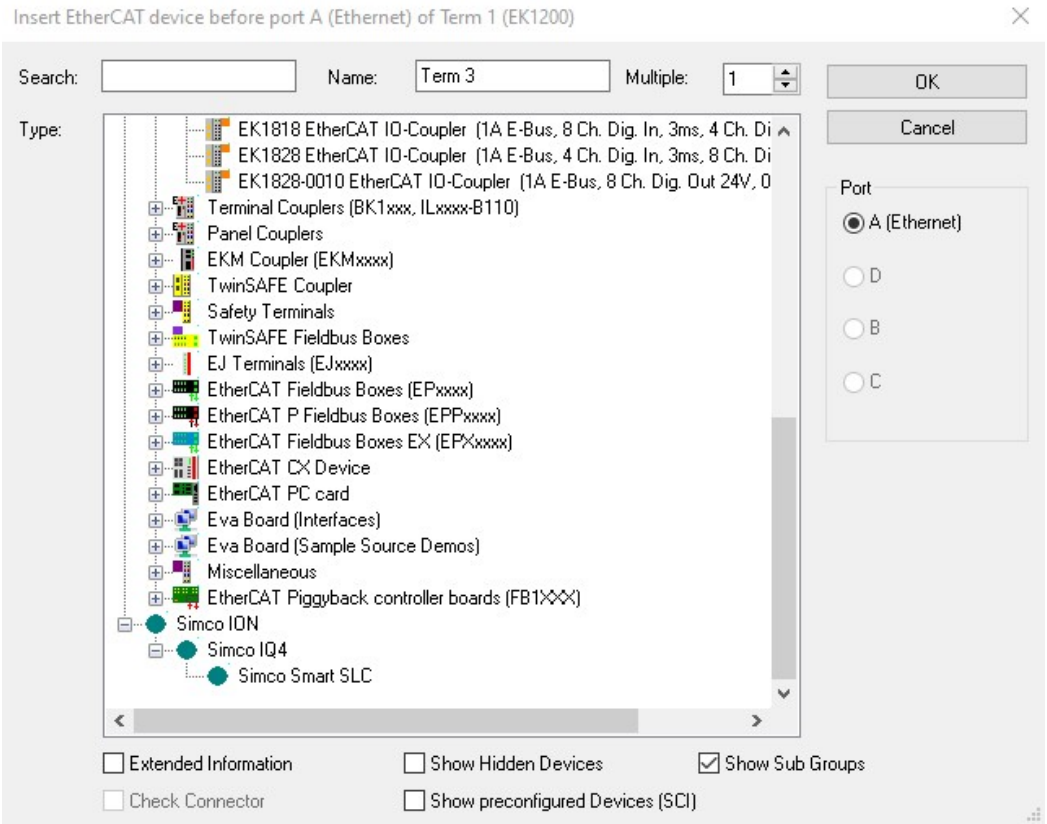
15 Right mouse click on Term 1 (EK1200) and select Insert New Item.



16 Select Simco Smart SLC



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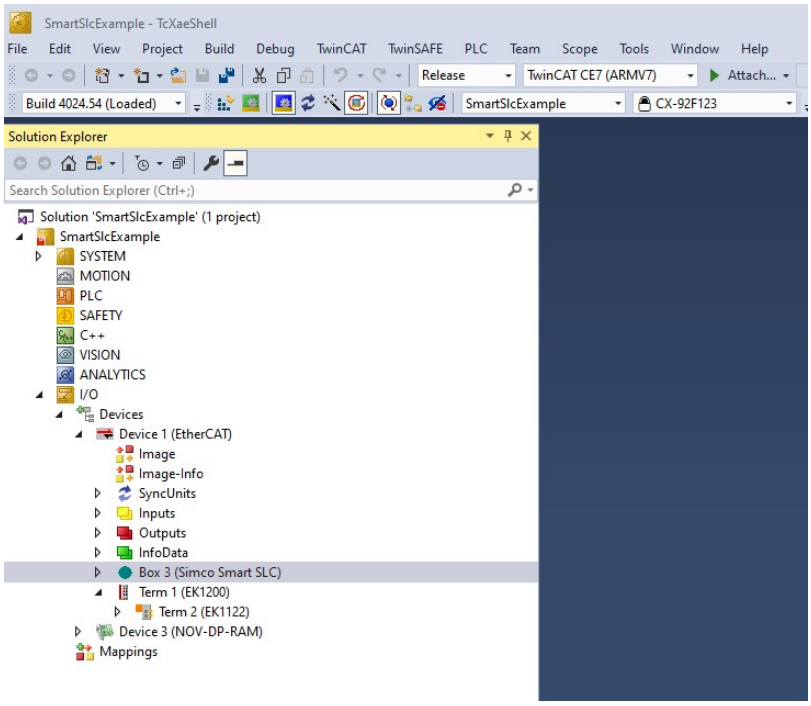
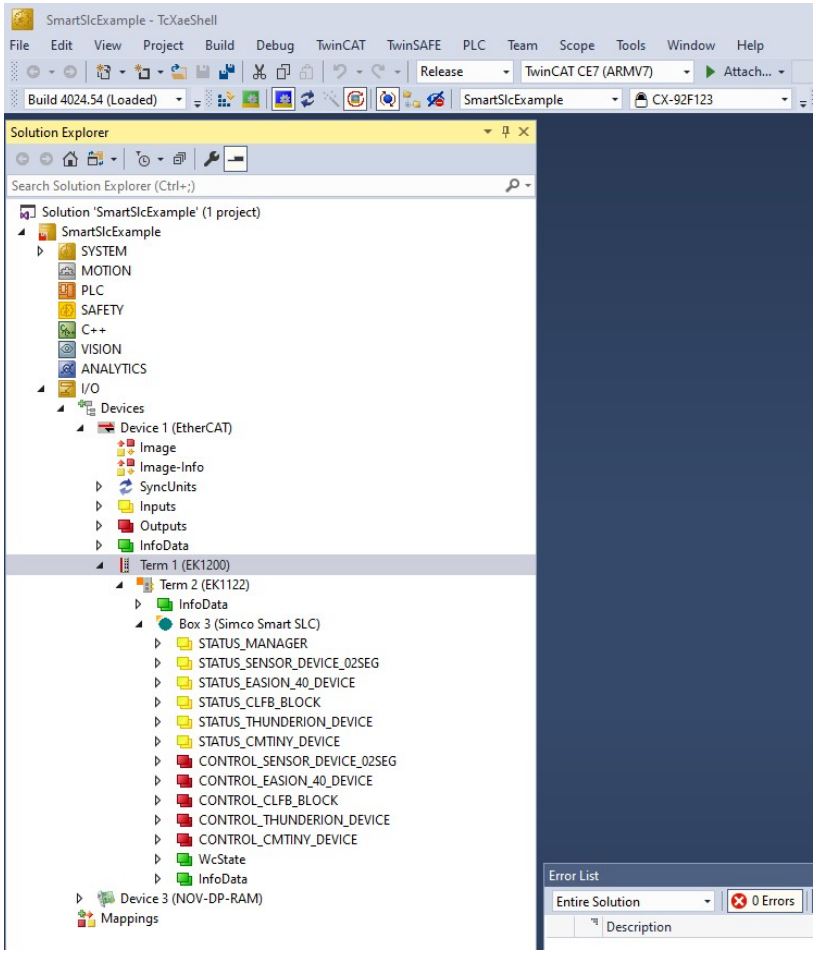
17 Drag and drop Box 3 (Simco Smart SLC) to Term 2 (EK1122)



Wrong location!



Good location 😊

The available Simco-Ion IQ devices are visible in the same order as the slot order in the Smart SLC.

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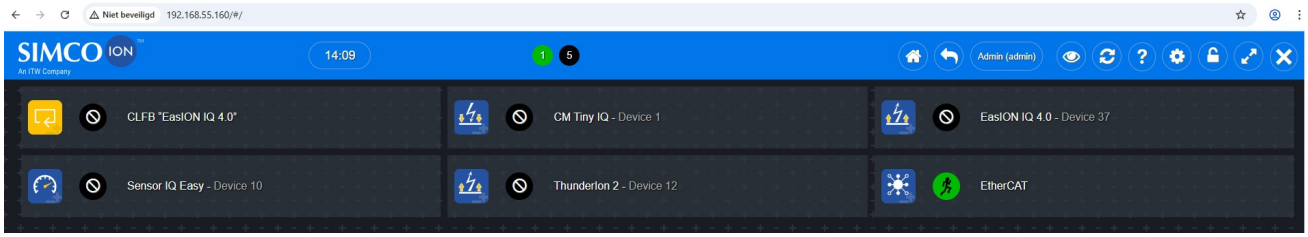
18 Enable the fieldbus on the Smart SLC and Select TwinCAT/Restart TwinCAT (Config Mode).
The EtherCAT icon on the Smart SLC is now running.



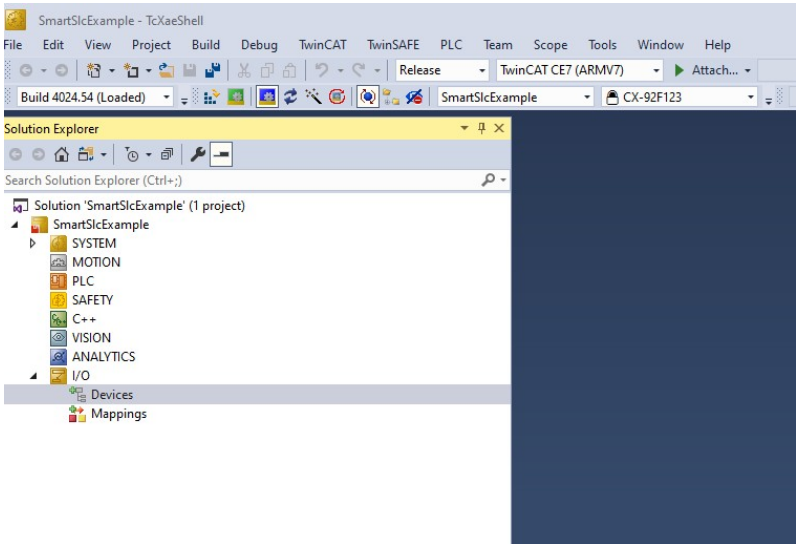
Add Smart SLC without esi file (skip step 9A – 16A if you used an esi file)

Remark: this method only works with a Smart SLC with a maximum of 5 fieldbus objects! The preferred method to add a Smart SLC is by using an esi file!

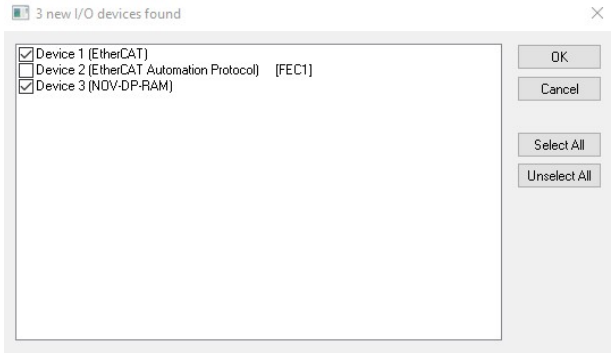
9a Enable the fieldbus on the Smart SLC.

10a Select TwinCAT/Restart TwinCAT (Config Mode)

11a Right mouse click on Devices and select Scan.



12a Click OK



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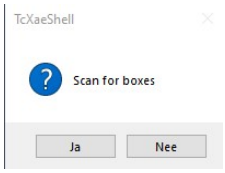
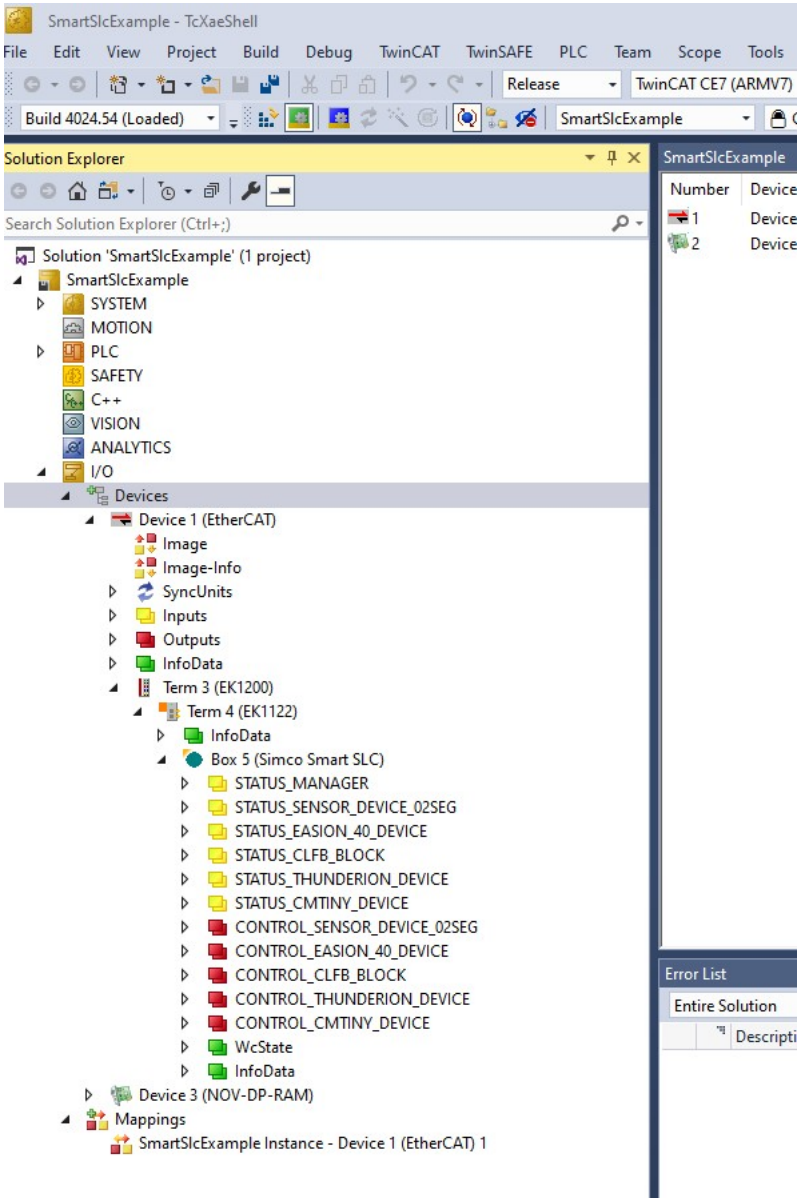
13a Click Ja (Yes)



14a Click Ja (Yes)

15a The available Simco-Ion IQ devices are visible in the same order as the slot order in the Smart SLC.



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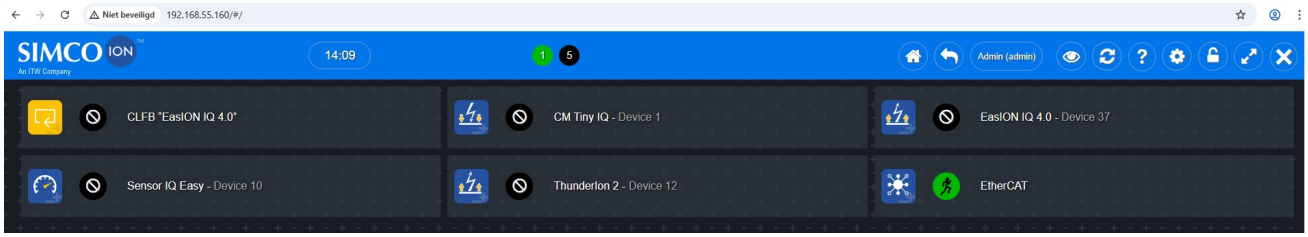
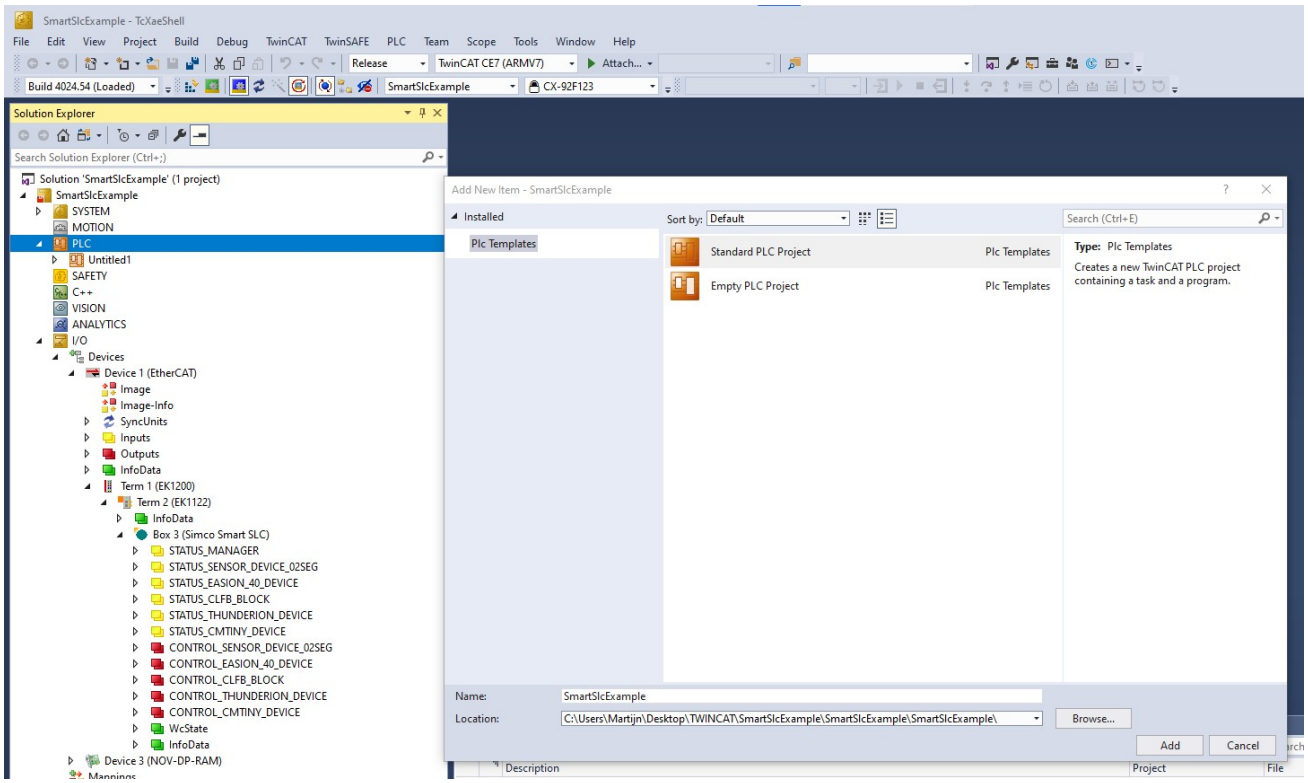
16a Enable the fieldbus on the Smart SLC and Select TwinCAT/Restart TwinCAT (Config Mode). The EtherCAT icon on the Smart SLC is now running.



Setup simple PLC program

19 Right mouse click in TwinCAT on PLC and select Add New Item. Choose Standard PLC Project and fill in the fields. Press Add.



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20 Select the file PLC/SmartSlcExample/SmartSlcExample Project/POUs/MAIN (PRG). Create variables:

```
PROGRAM MAIN
VAR
        Manager_Status AT %I*:USINT;
        Sensor_Control AT %Q*:USINT;
        Sensor_Mounting_Distance AT %Q*:UINT;
        Sensor_Enabled_Segments AT %Q*:UINT;
        Easion_Control AT %Q*:USINT;
        CLFB_Control AT %Q*:USINT;
        CLFB_Selection_Mode AT %Q*:USINT;
        CLFB_Segment_Mask AT %Q*:UINT;
        CLFB_Setpoint AT %Q*:REAL;
        Thunderion_Control AT %Q*:USINT;
        CM_Tiny_Control AT %Q*:USINT;
        CM_Tint_Setpoint AT %Q*:REAL;
END_VAR
```

Smart SLC fieldbus parameters are described in the document: SmartSLC_FieldbusParameters_GB.

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
CONTROL_SENSOR	Output	8	Struct	Cyclic	2

Byte offset	Parameter name	Description			Remarks
0	CONTROL [byte8]	Bit 0-1: MODE	0: DISABLED	Disable device	
			1: STANDBY	Set device to standby mode	
			2: RUN	Set device to run mode	
		Bit 2: IDENTIFY	0: OFF	Switch off identify leds on device	
			1: ON	Switch on identify leds on device	
		Bit 3-7: RESERVED		Reserved for future use	for future use
1	CONTROL_PAD_01 [byte8]	Reserved			for future use
2	MOUNTING_DISTANCE [word16]	SETPOINT	Default value: 50	Mounting distance sensor bar in mm	
3			Min value: 10		
			Max value: 1000		
4	ENABLED SEGMENTS [word16]	Bit 0: SEGMENT 1	0: Not enabled 1: Enabled	Sensor segments enabled	
		Bit 1: SEGMENT 2			
		Bit 2: SEGMENT 3			
		Bit 3: SEGMENT 4			
		Bit 4: SEGMENT 5			
		Bit 5: SEGMENT 6			
		Bit 6: SEGMENT 7			
		Bit 7: SEGMENT 8			
5		Bit 8: SEGMENT 9			
		Bit 9: SEGMENT 10			
		Bit 10: SEGMENT 11			
		Bit 11: SEGMENT 12			
		Bit 12: SEGMENT 13			
		Bit 13: SEGMENT 14			
		Bit 14: SEGMENT 15			
		Bit 15: SEGMENT 16			
6	CONTROL_PAD_06	Reserved			for future use
7	CONTROL_PAD_07	Reserved			for future use

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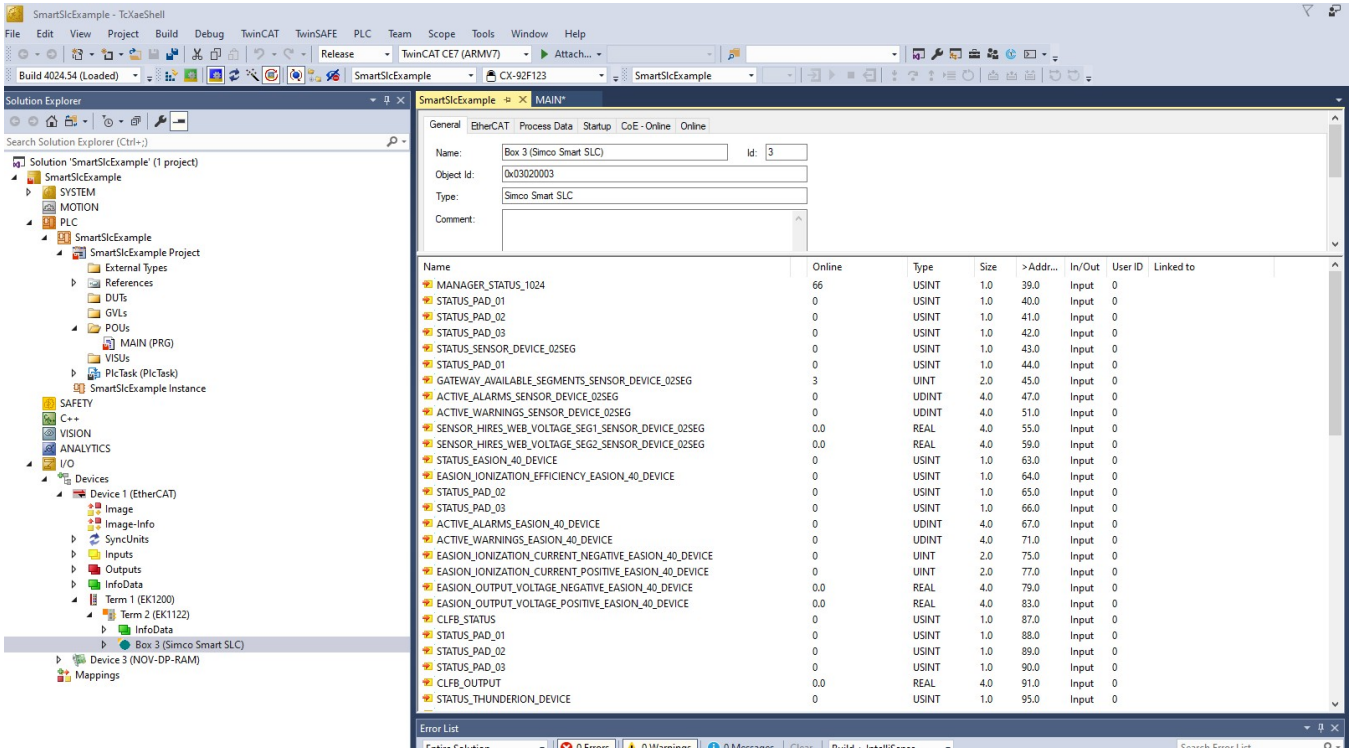
Double click Box 3 (Simco Smart SLC) for information about the fieldbus parameters.



Make a simple PLC program:

```
Sensor_Control := 2;                    // Sensor in RUN mode
Sensor_Mounting_Distance := 50;         // Sensor mounting distance 50mm
Sensor_Enabled_Segments := 3;           // Sensor segment 1 and 2 enabled
Easion_Control := 2;                    // Easion in RUN mode
CLFB_Control := 2;                      // CLFB in RUN mode
CLFB_Selection_Mode := 1;               // CLFB select sensor segments via fieldbus
CLFB_Segment_Mask := 3;                 // CLFB segments 1 and 2 enabled
CLFB_Setpoint := 0;                     // CLFB setpoint 0 kV
Thunderion_Control := 2;                // Thunderion in RUN mode
CM_Tiny_Control := 2;                   // CM Tiny in RUN mode
CM_Tiny_Setpoint := -5;                 // CM Tiny setpoint -5 kV
```

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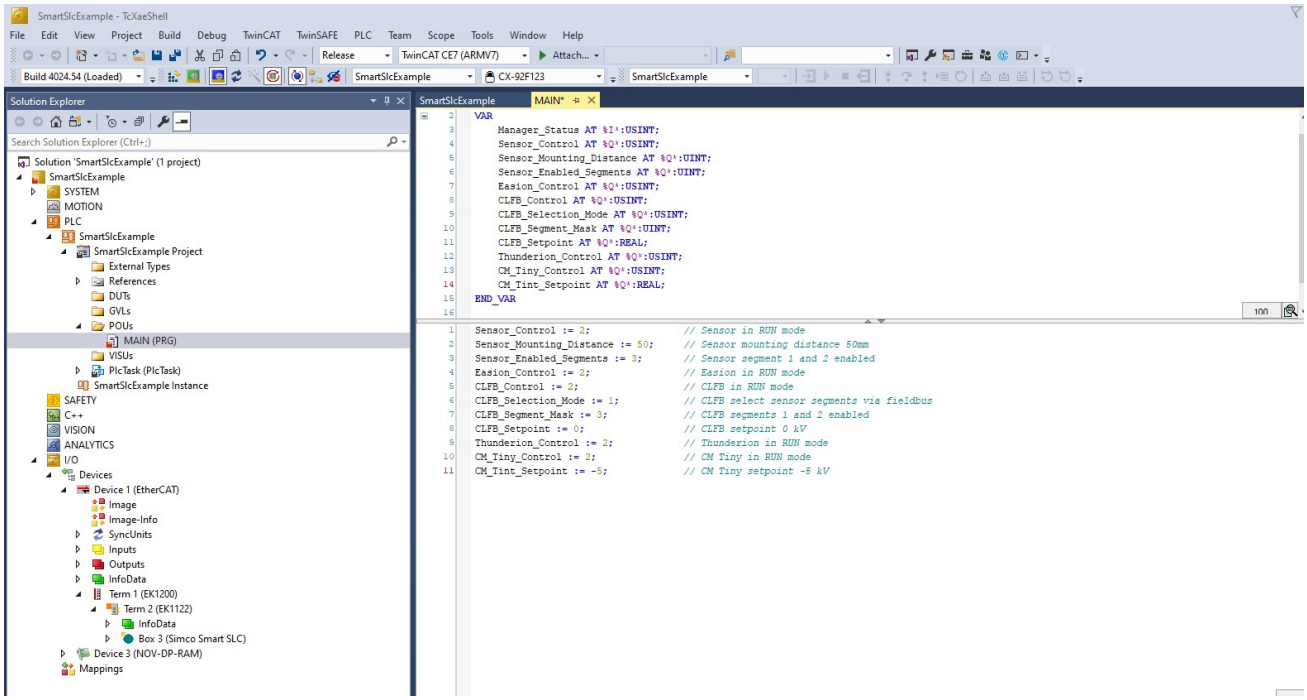
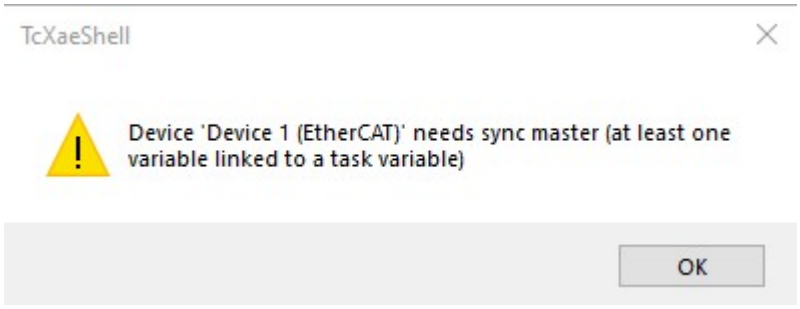


21 Select Build/Rebuild Solution. Click OK.



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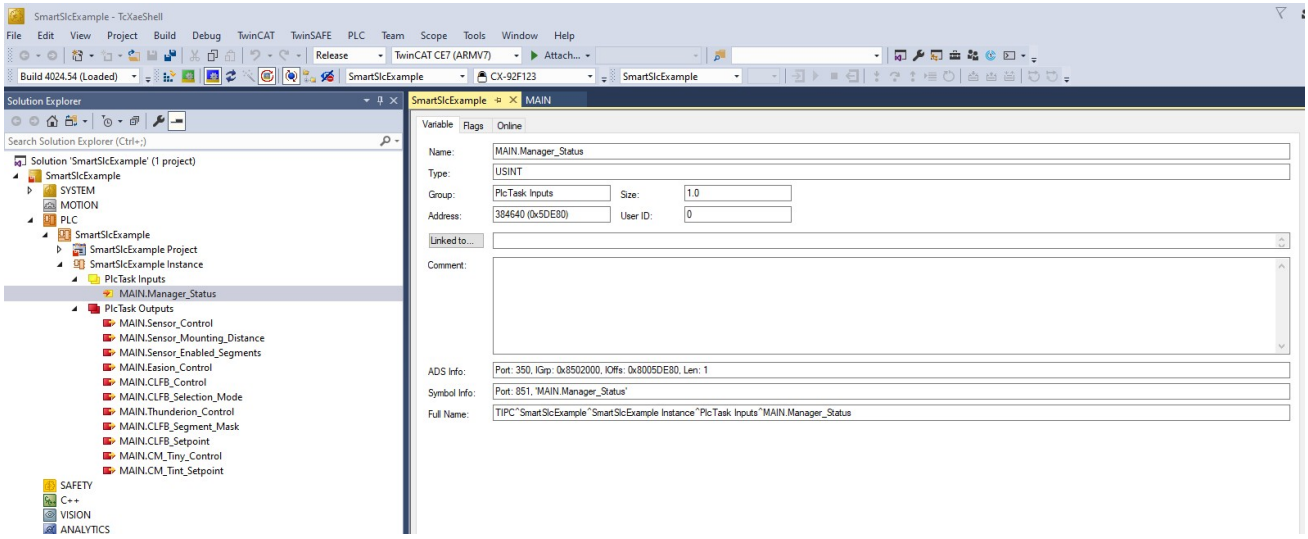
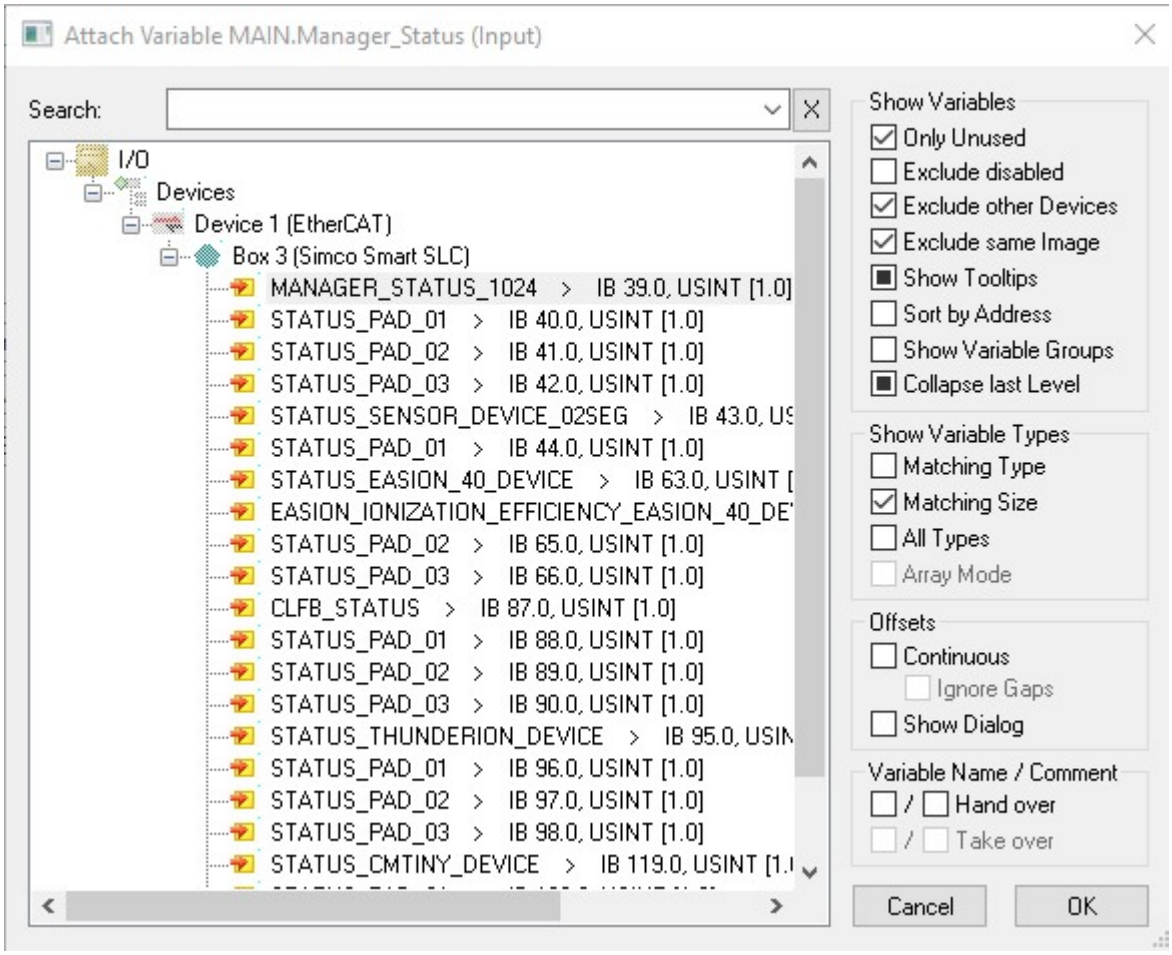
22 Attach the fieldbus parameters to the variables in your program.

- Select PLC/SmartSlcExample/SmartSlcExample Instance.
- Double click on MAIN.Manager_Status.
- Click Linked to..



- Select the correct fieldbus parameter en click OK.
- Do the same for all other parameters.



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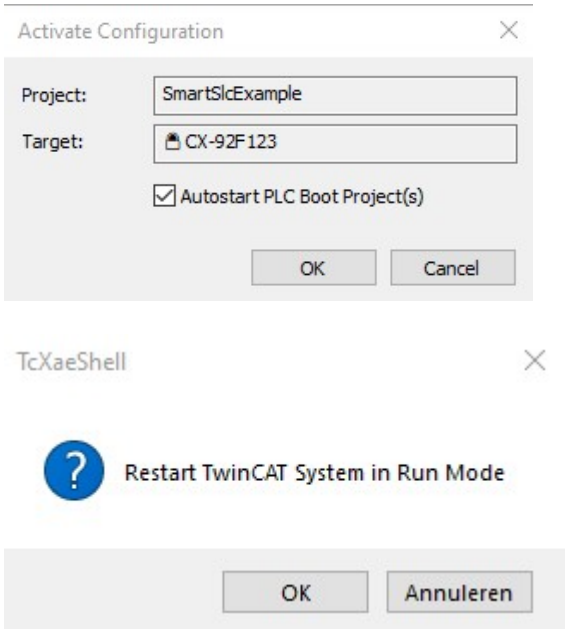
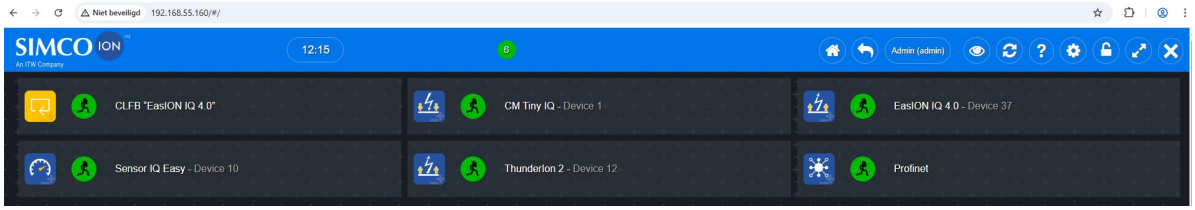
23 Click again Build/Rebuild Solution.

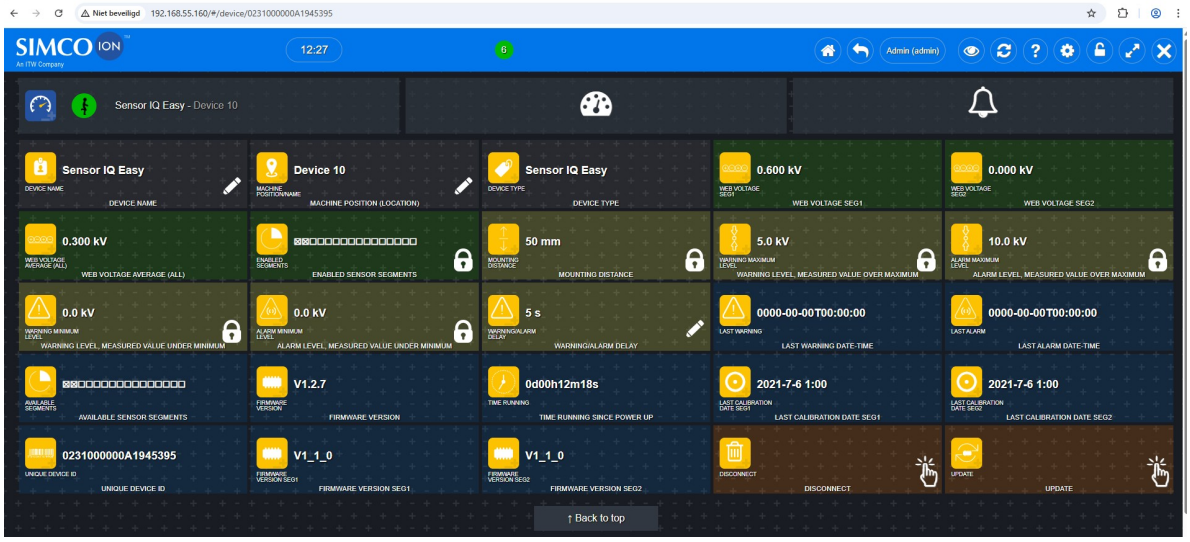
24 Click TwinCAT/Activate Configuration. And click OK twice.



25 If all steps have been completed correctly, this is the result. All devices are in RUN mode.



25a The Sensor IQ Easy is in RUN mode, the mounting distance is 50mm, segment 1 and segment 2 are enabled.



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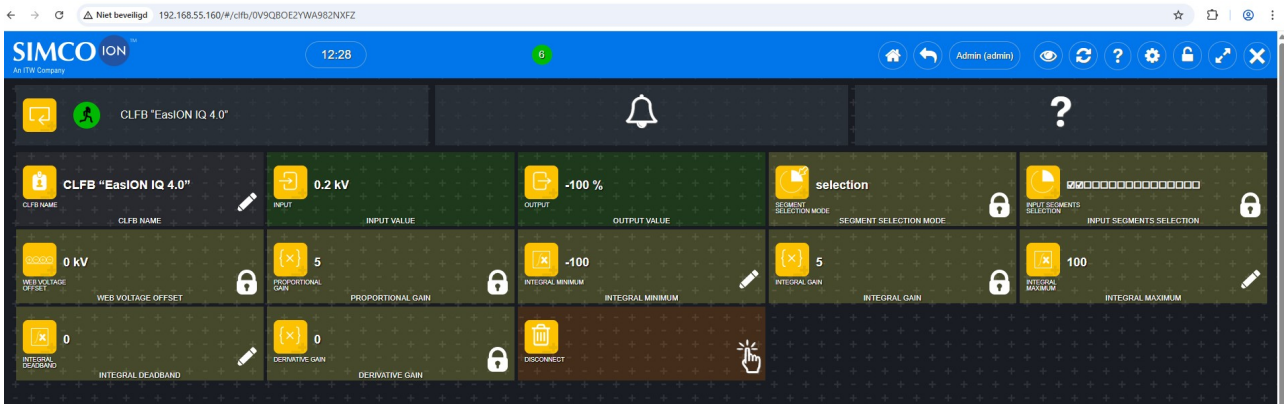
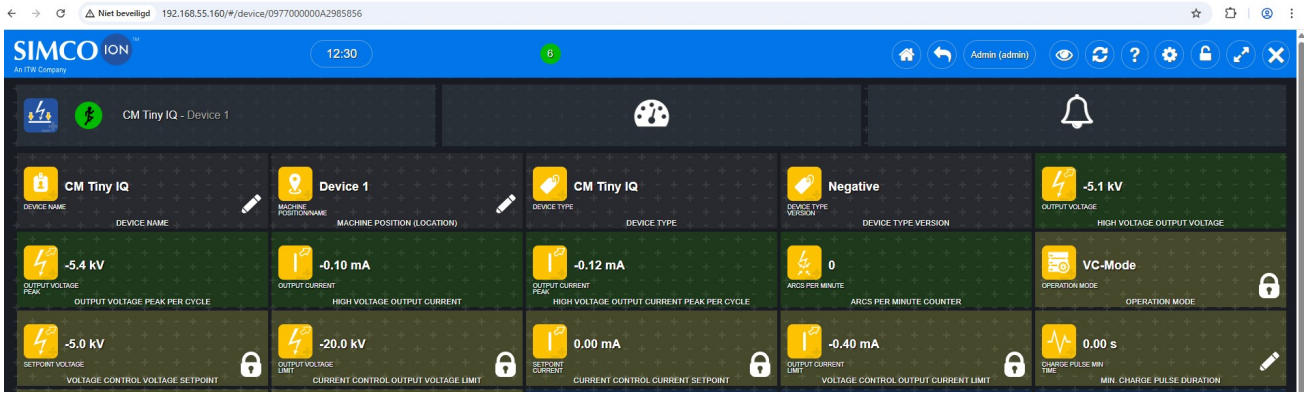
25b The CLFB object is in RUN mode, the sensor segments are controlled via the fieldbus, sensor segment 1 and sensor segment 2 are enabled, the CLFB setpoint (web voltage offset) is 0 kV.



25c The CM Tiny is in RUN mode, the voltage setpoint is -5kV



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Fieldbus example for Smart SLC with Ethernet/IP

Simple example how to set up an Ethernet/IP connection between a Allen Bradley PLC and a Simco-Ion Smart SLC.

Used devices:

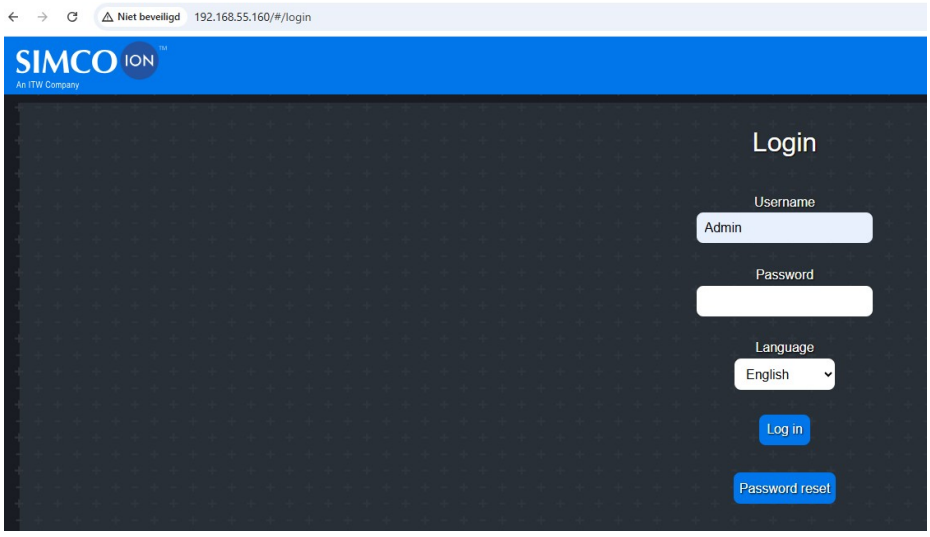
- Smart SLC with Ethernet/IP
- Allen-Bradley PLC CompactLogix 5380 (5069-L306ER)
- Sensor IQ Easy with 2 sensor segments
- Easion IQ 4.0
- Close Loop Feedback object between Sensor IQ Easy and Easion IQ 4.0
- Thunderlon 2 IQ
- CM Tiny IQ

Tabel of contents:

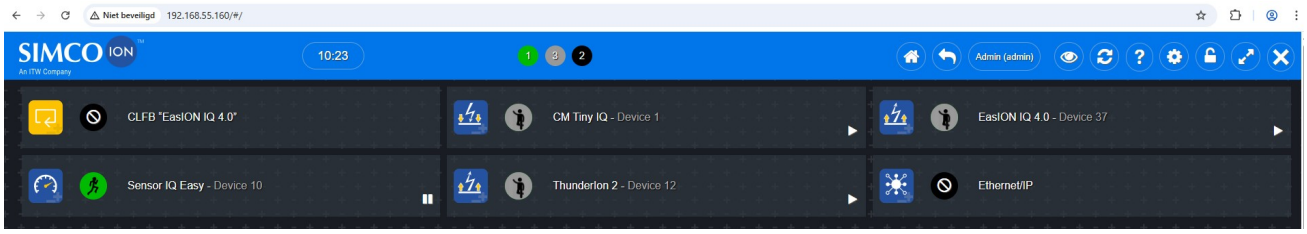
• Setup Simco-Ion Smart SLC	Step 1 – 5	Page 1
• Setup Allen-Bradley PLC	Step 6 - 8	Page 4
• Add Smart SLC with esd file	Step 9 – 12	Page 7
• Setup simple PLC program	Step 13 – 18c	Page 13

Setup Simco-Ion Smart SLC

1 Log in to the Smart SLC on Expert or Admin level.



2 Add the Simco IQ devices as related objects to the fieldbus. Click the Ethernet/IP icon.



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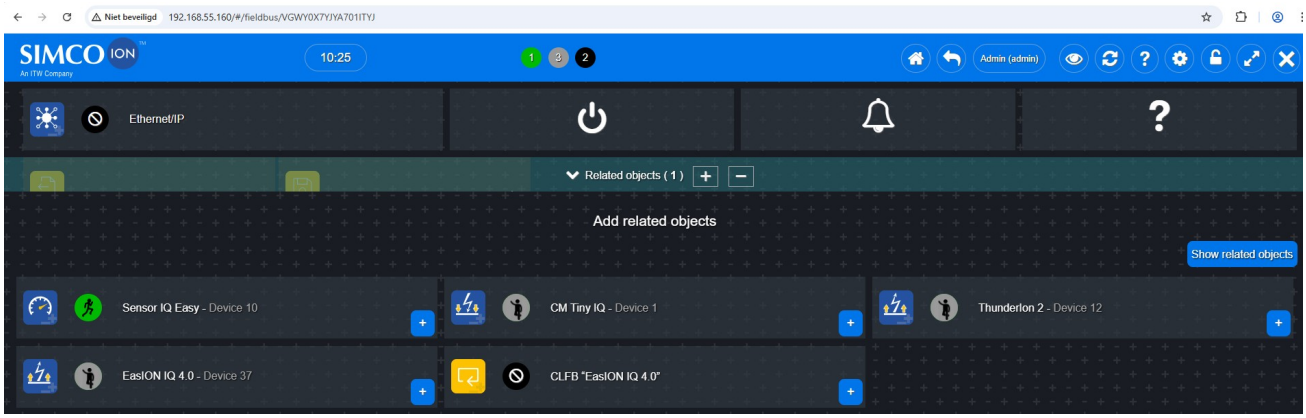
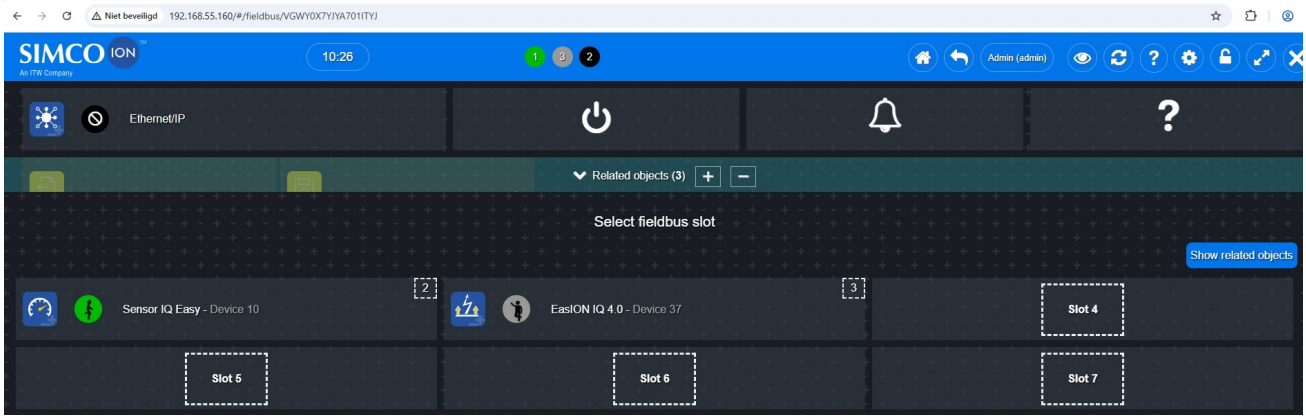
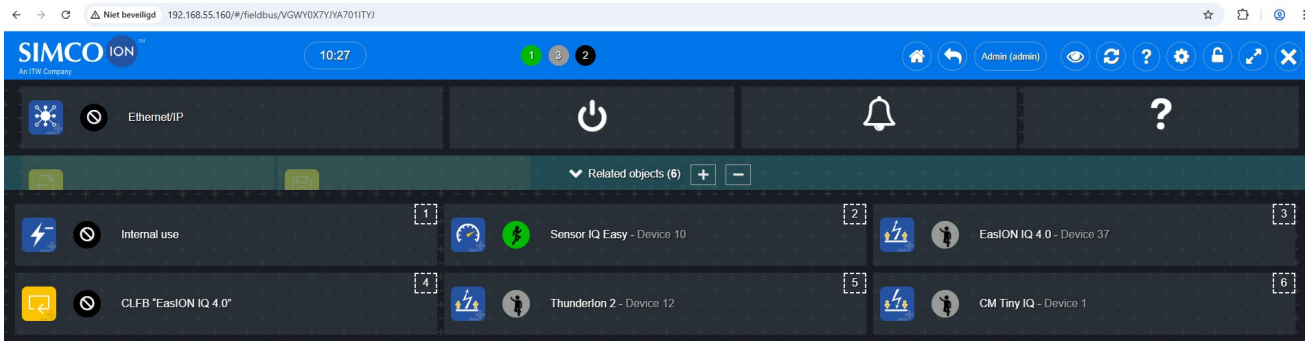
2a Click the + icon next to Related objects. Select the devices.



2b Choose Slot number.





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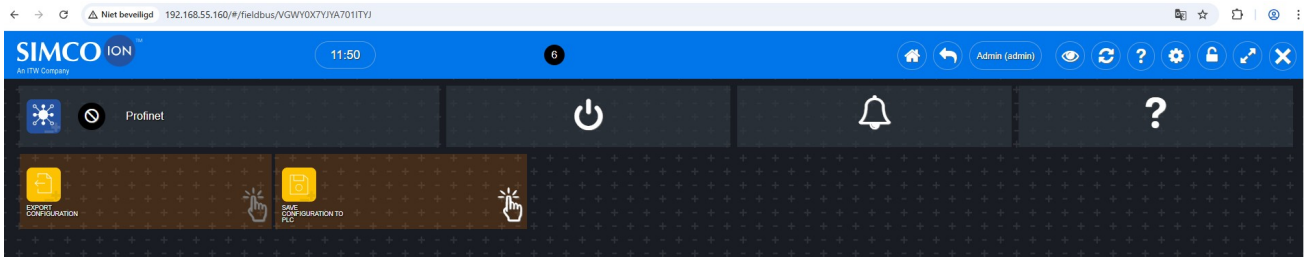
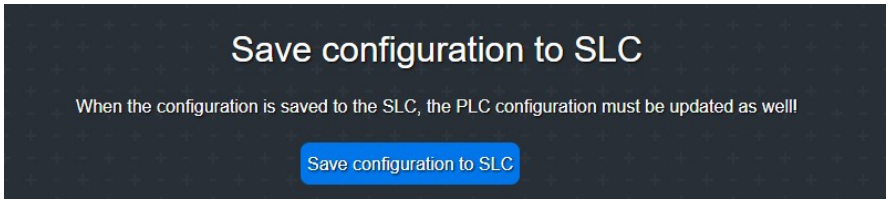
3 Enable the fieldbus



4 Put an usb stick in the usb slot of the Smart SLC and click on the icon EXPORT_CONFIGURATION.

5 Press the icon SAVE CONFIGURATION TO SLC.



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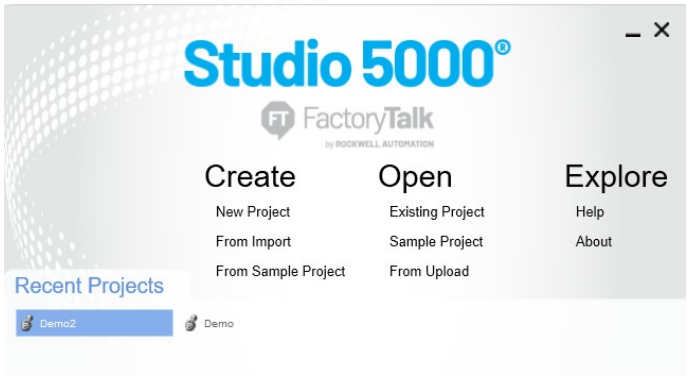
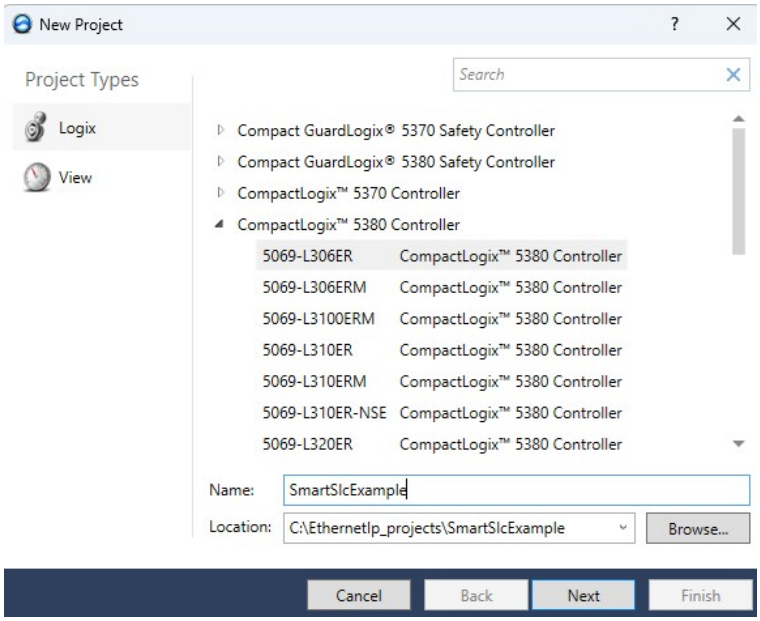
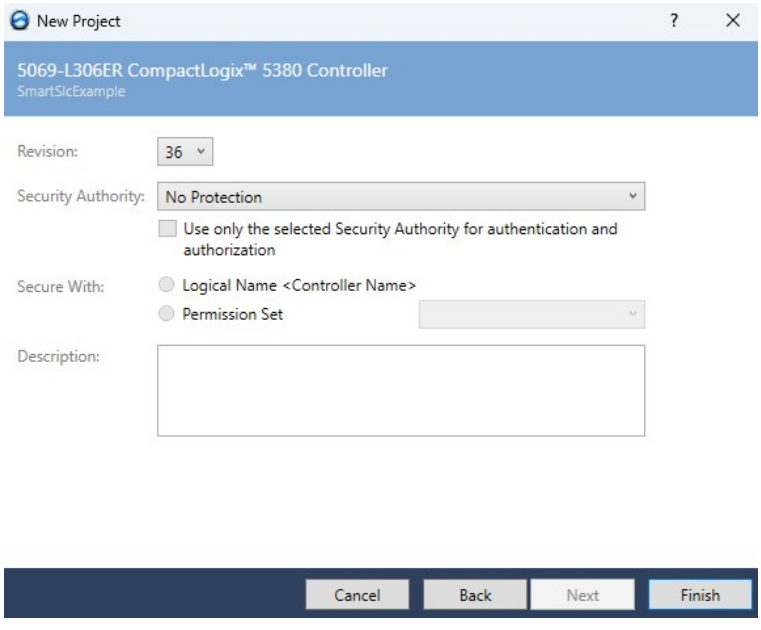
Setup Allen-Bradley PLC

6 Start Studio 5000 and select Create New Project. Select the correct PLC, fill in the fields and press Next. Press Finish.







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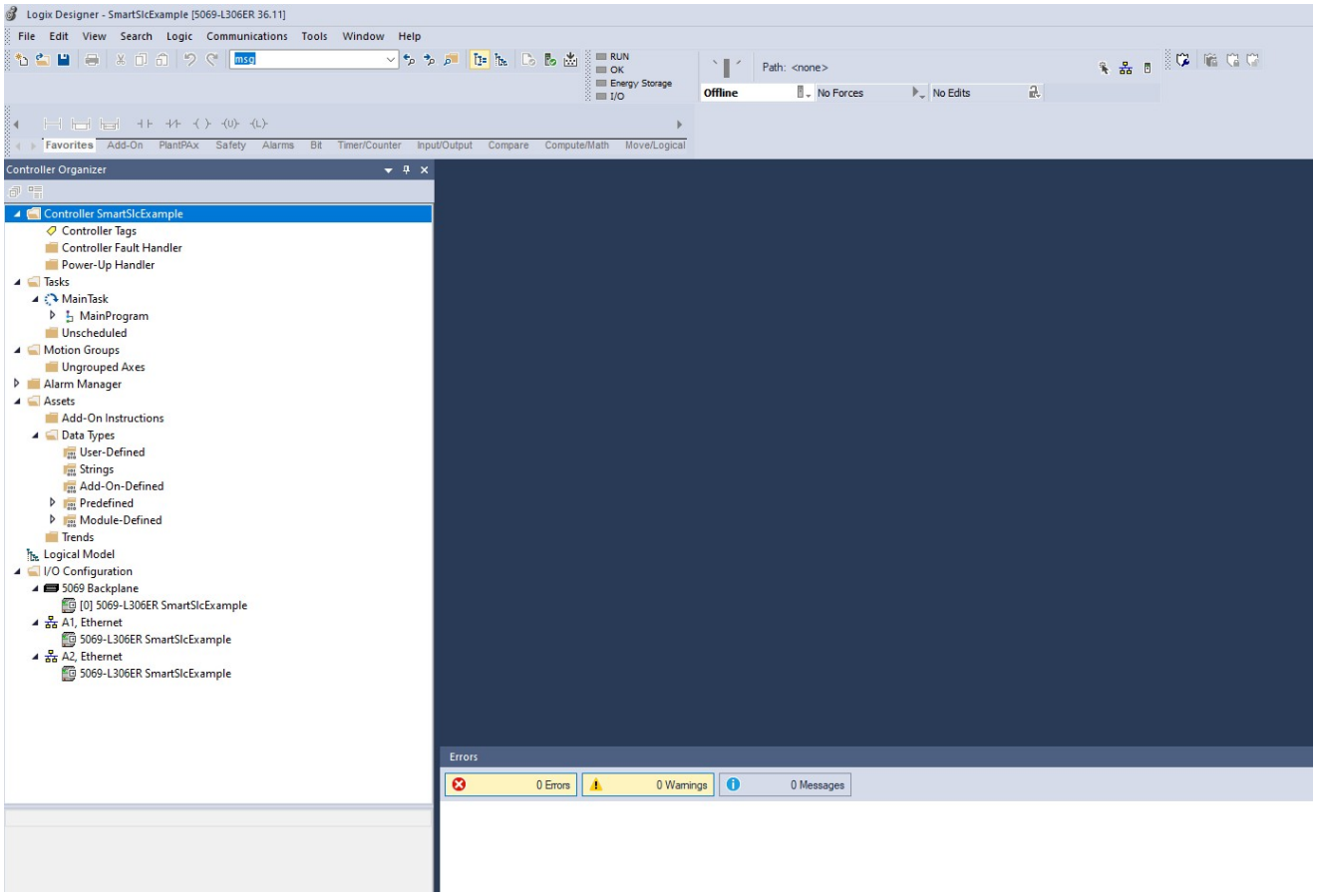
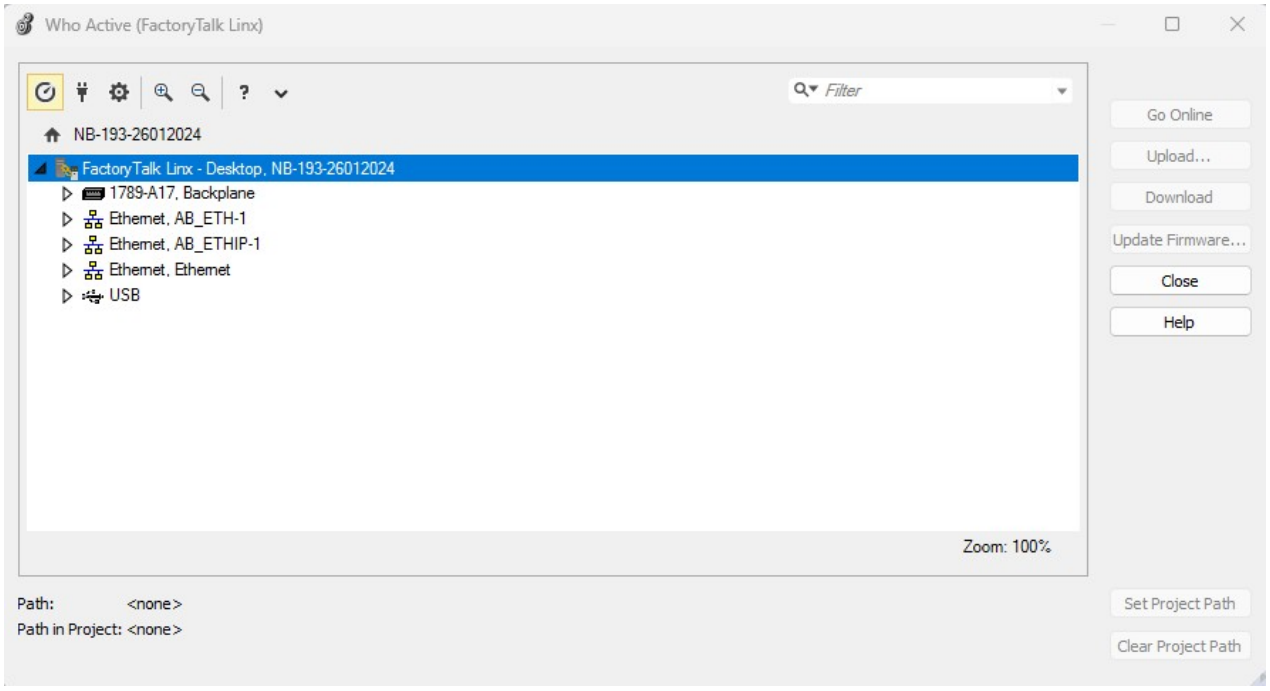
7 Select Communication/Who Active.



7a Select the PLC connection and Click Go Online.



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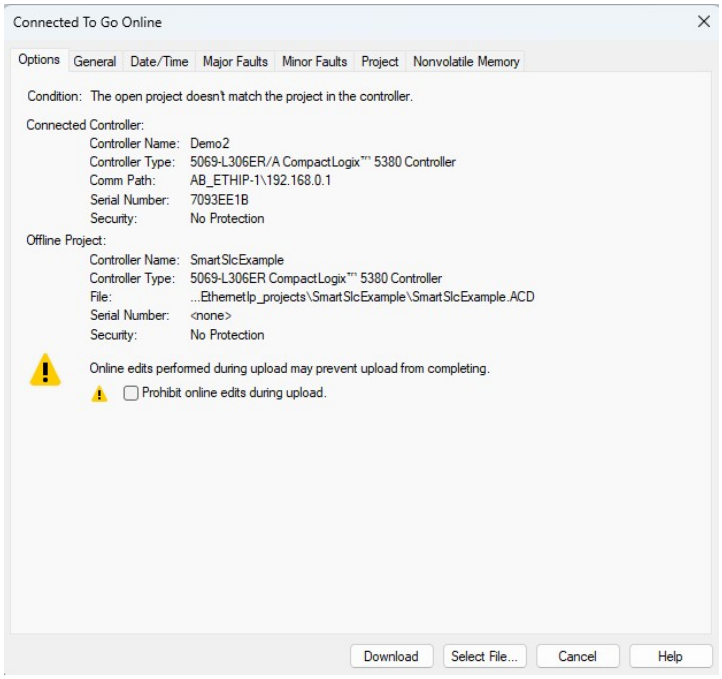
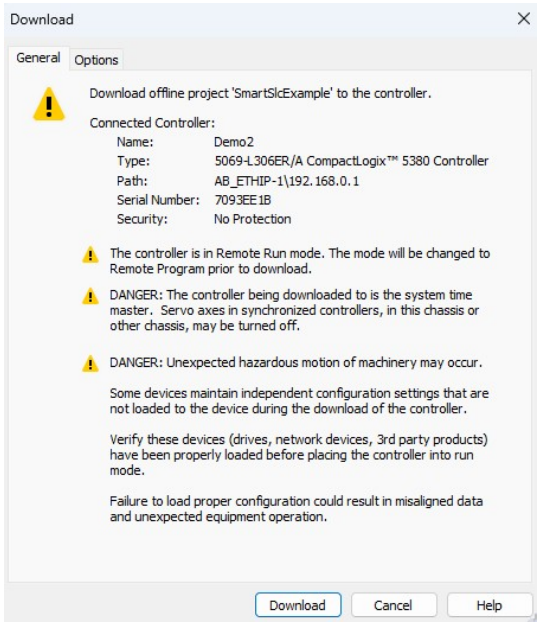
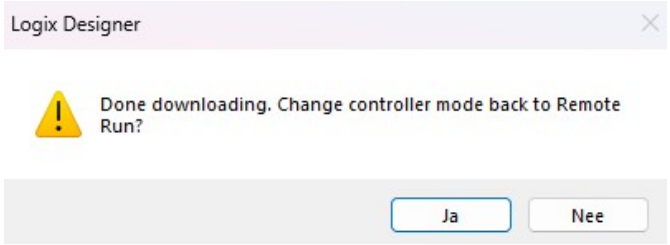
7b Click Download.



7c Click Download again.



7d Click Ja (Yes).



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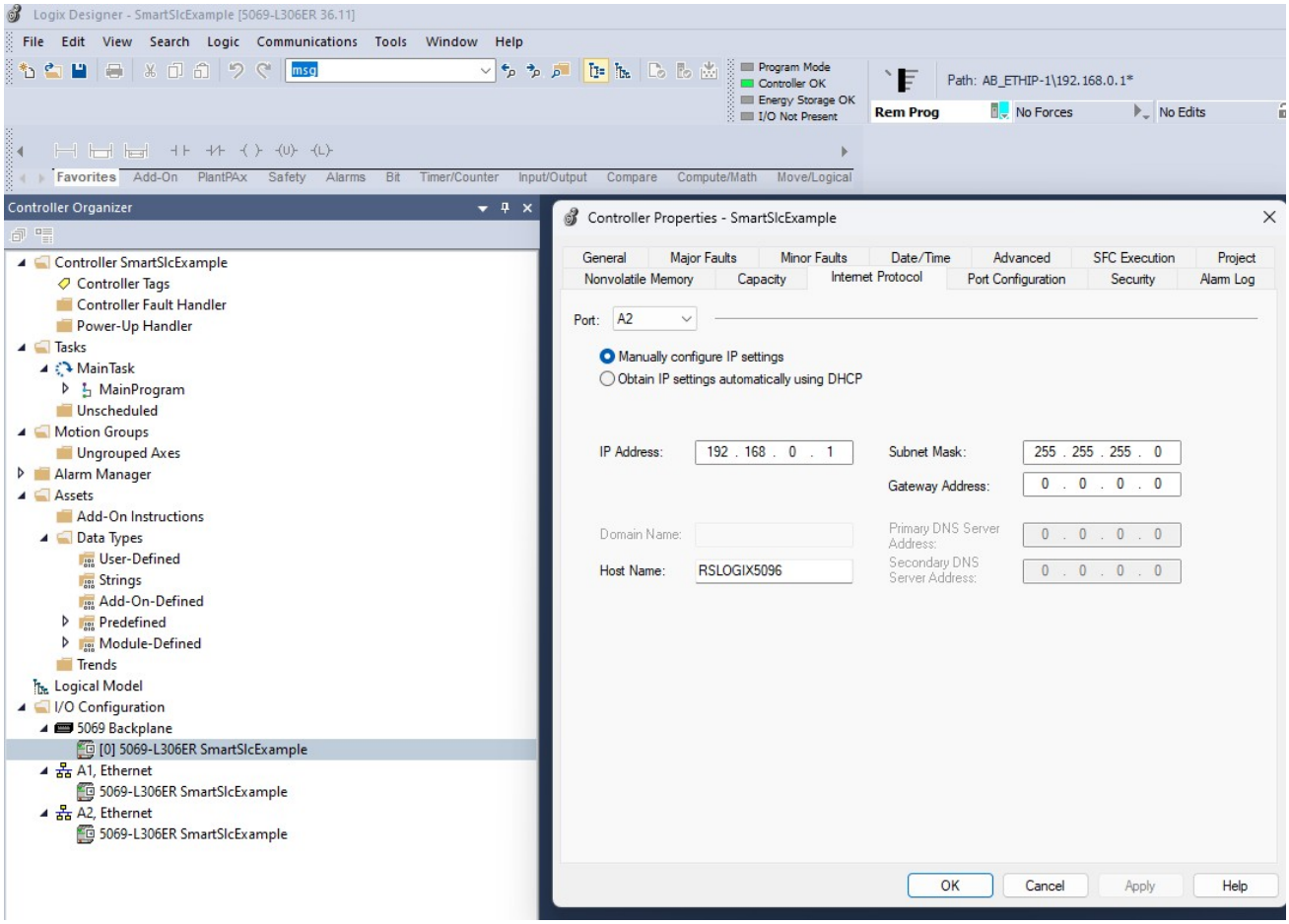
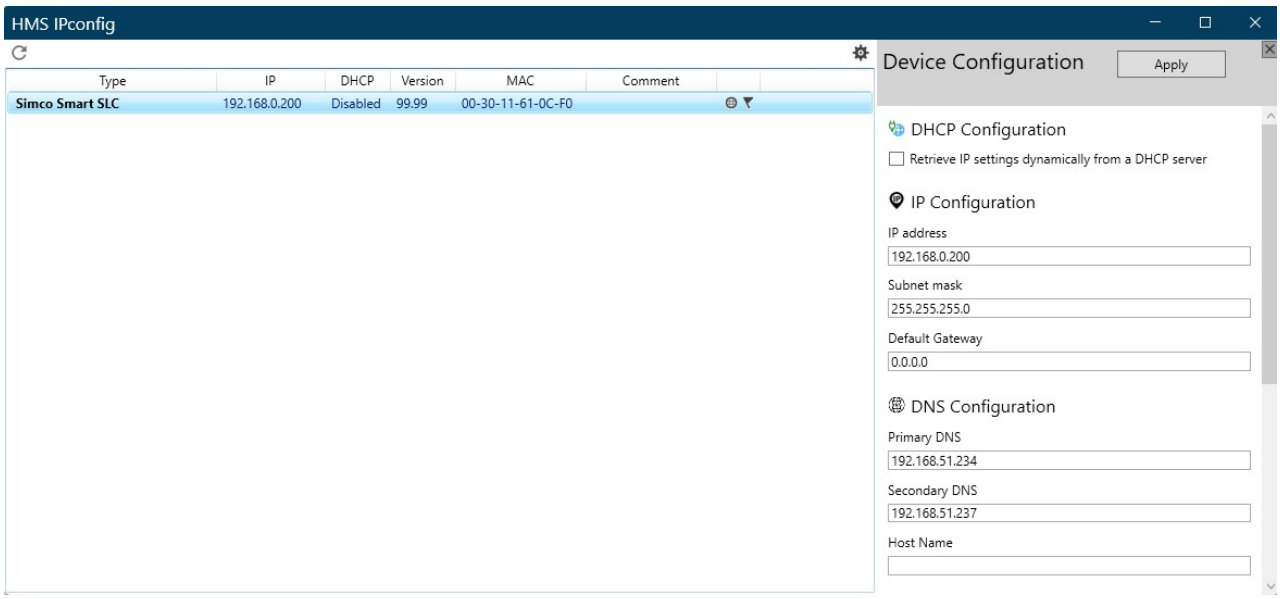
8 Right mouse click on 5069-L306ER SmartSlcExample and select Properties. Fill in the IP settings that are used for the project. In our case 192.168.0.1 for port A2.



Add Smart SLC with eds file

9 Configure the IP settings for the Smart SLC. Start the program HMS IPconfig. Click the found Simco Smart SLC. Fill in the correct IP settings.



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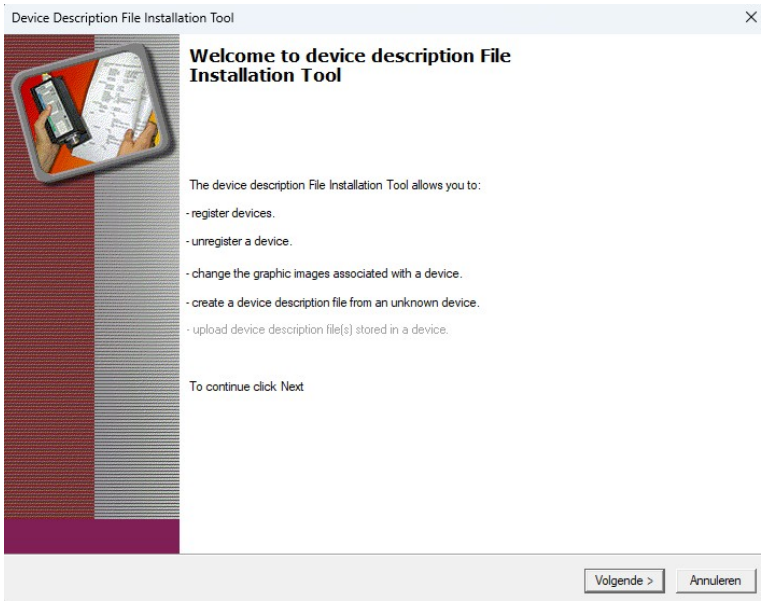
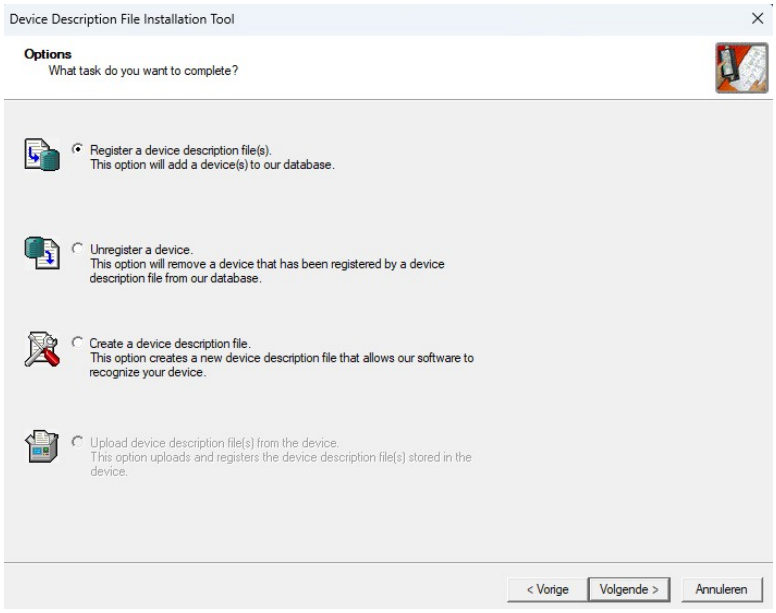
10 Install the EDS file (exported configuration from the Smart SLC) in Studio 5000.

- Put the usb stick with the generated eds file from the Smart SLC in the computer.
- Select Tools/Device Description Installation Tool.
- Press Volgende (Next).



10a Select Register a device description file(s) and press Volgende (Next).



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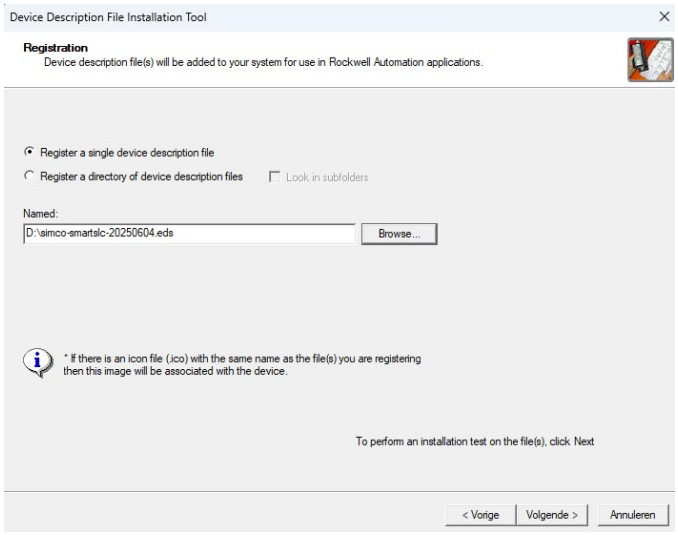
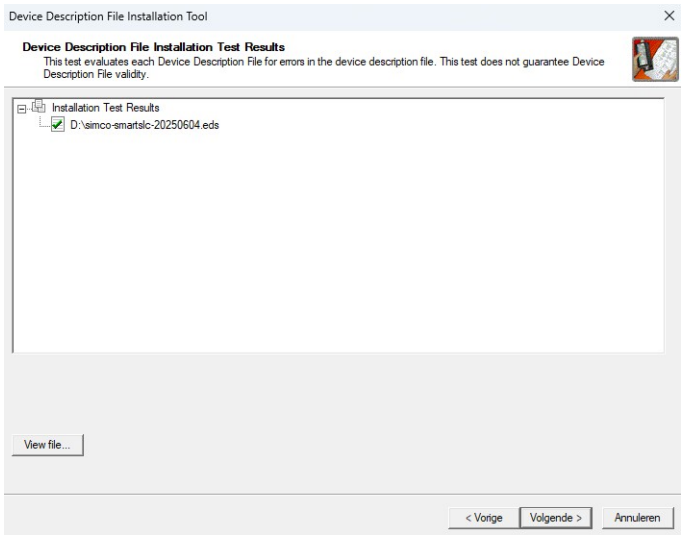
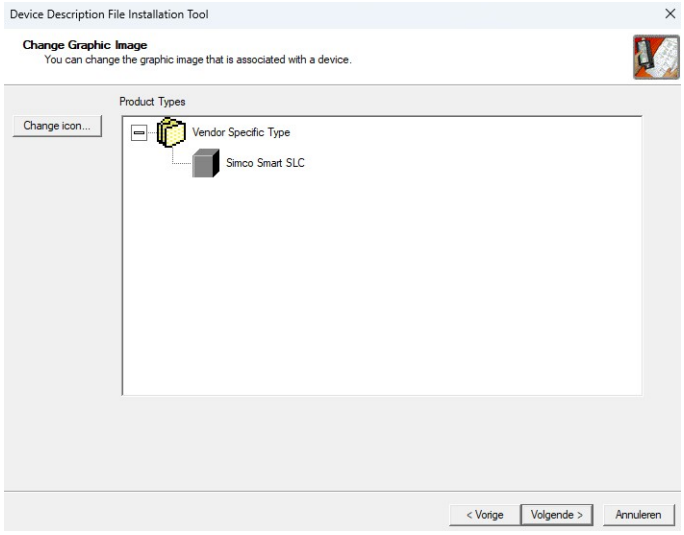
10b Browse to the eds file on the usb stick and press Volgende (Next).



10c Press Volgende (Next).



10d Press Volgende (Next).



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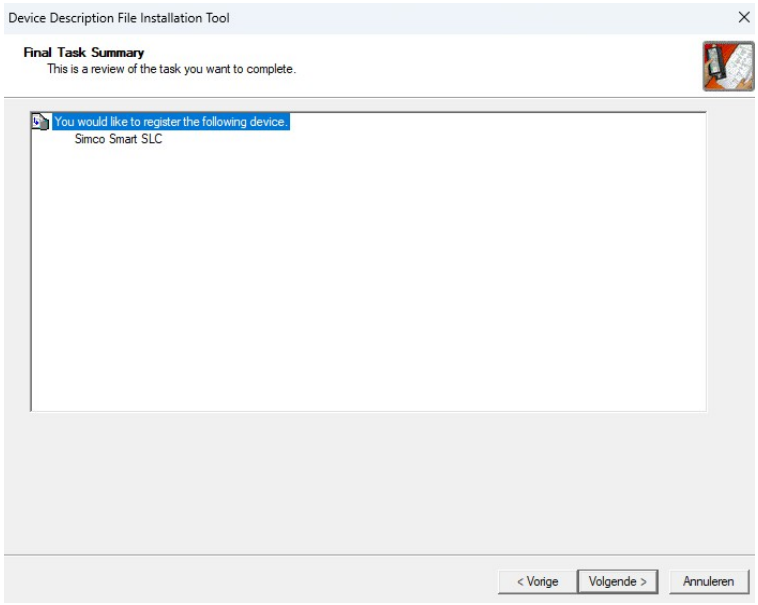
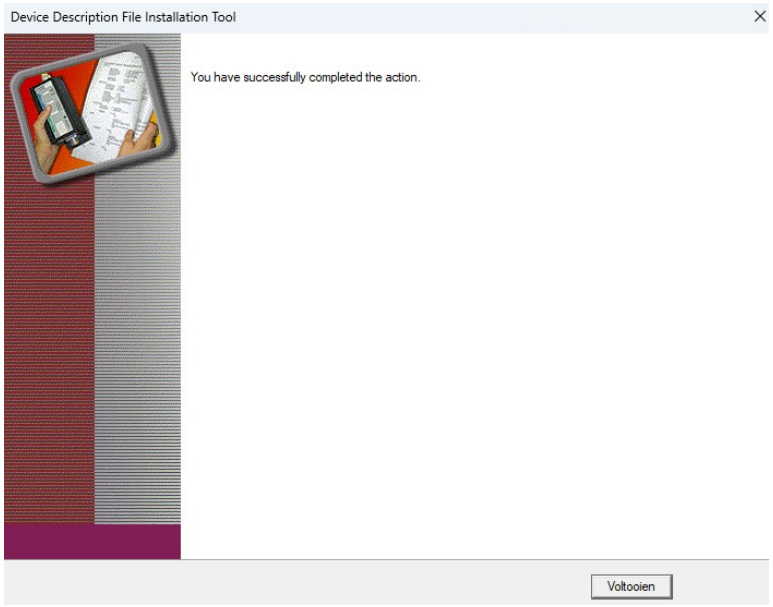
10e Press Volgende (Next).



10f Press Voltooien (Finish).



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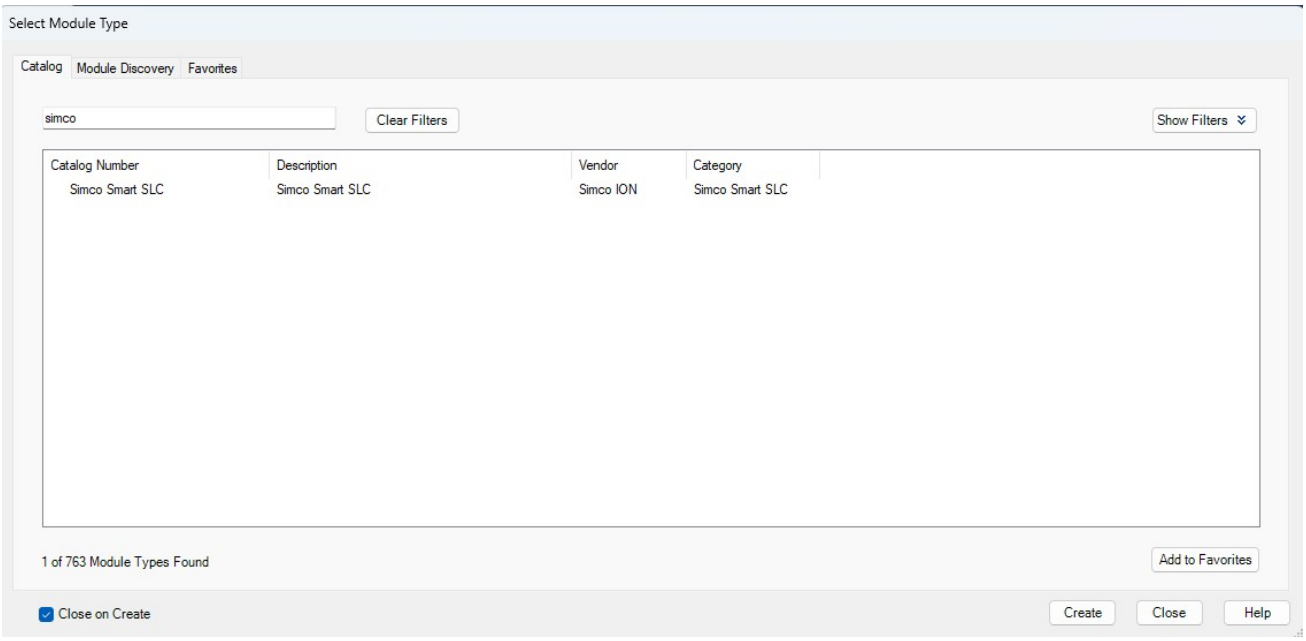
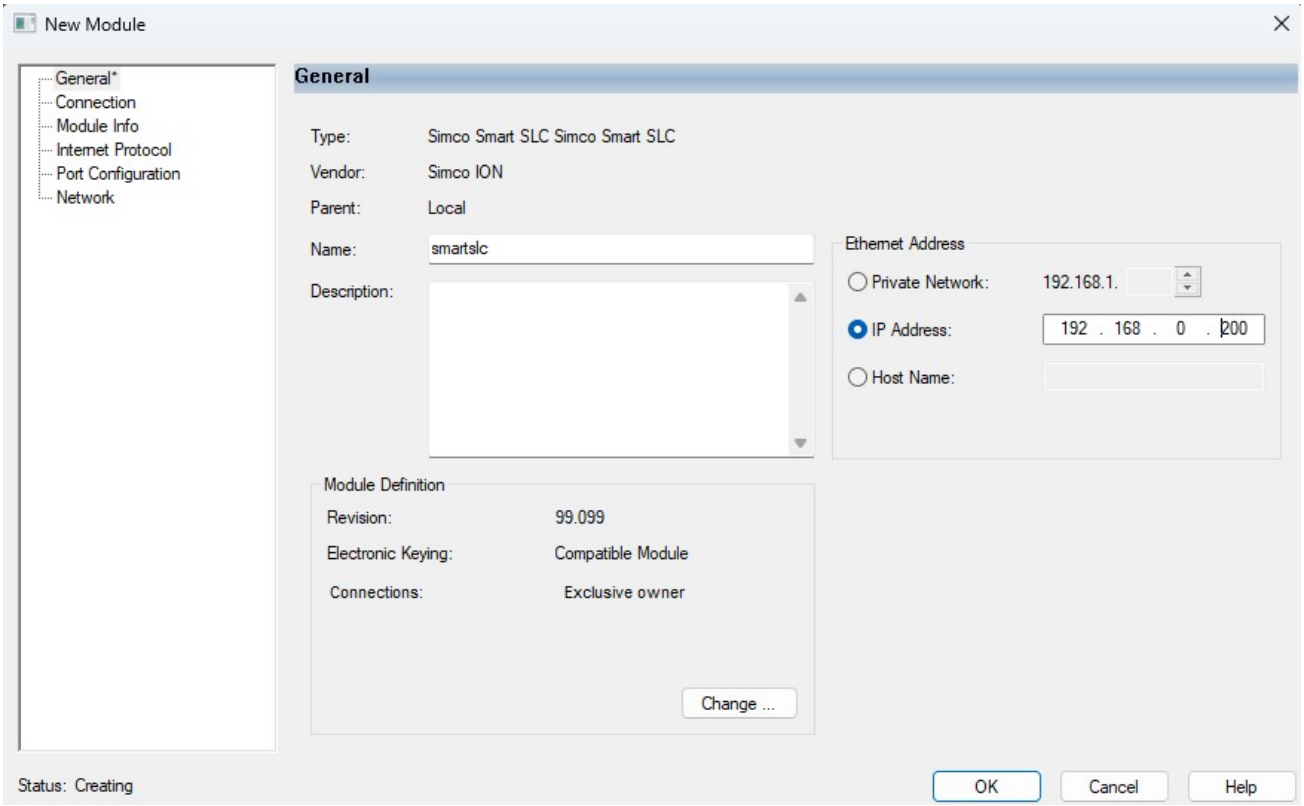
11 Add the Smart SLC.

- Right mouse click on the ethernet port where the Smart SLC is connected and select New Module.
- Type simco in the search box.
- Select the Simco Smart SLC and press Create.



11a Fill in a Name (e.g smartslc) and IP Address (the IP address you specified in step 9) and press OK.



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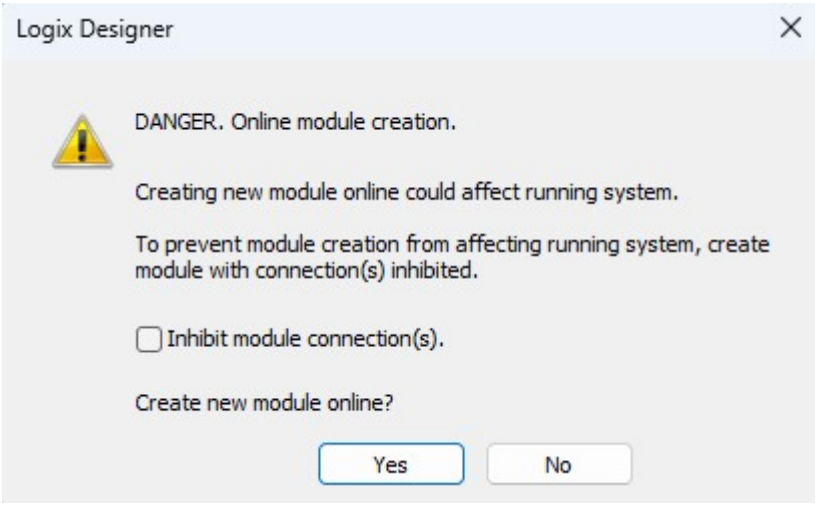
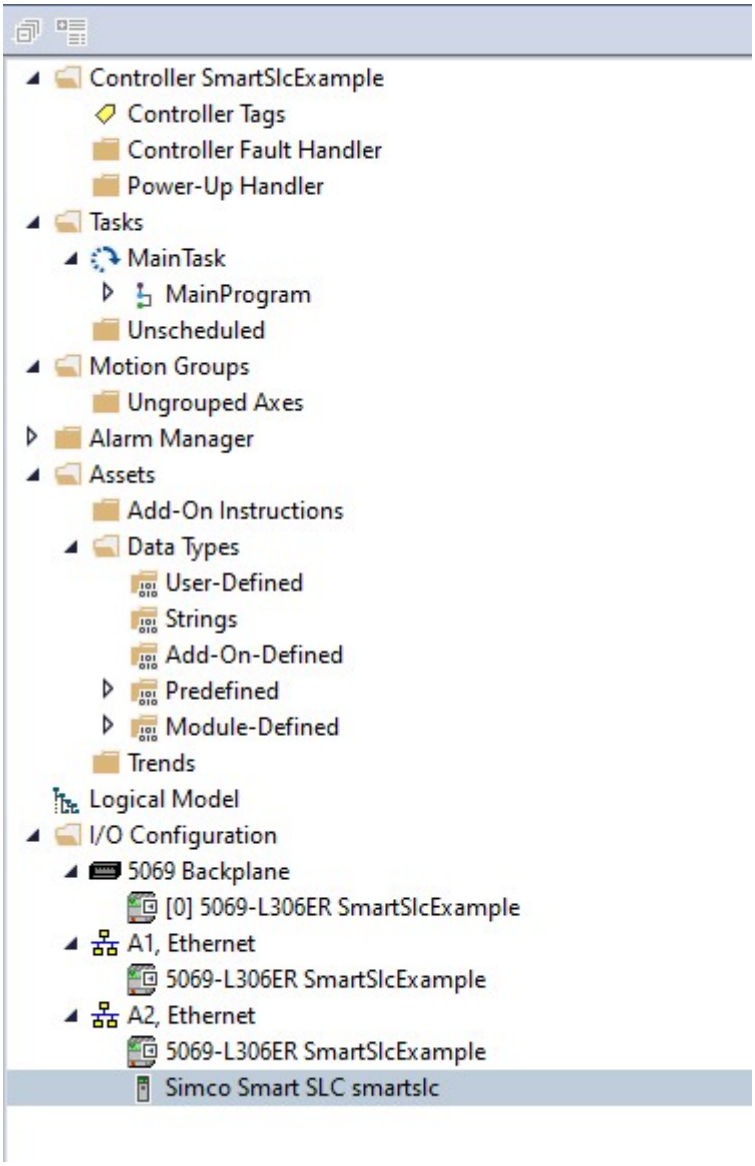
11b Press Yes.





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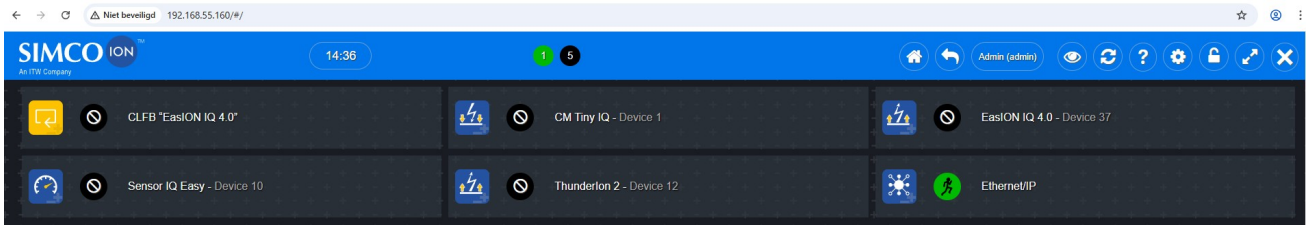
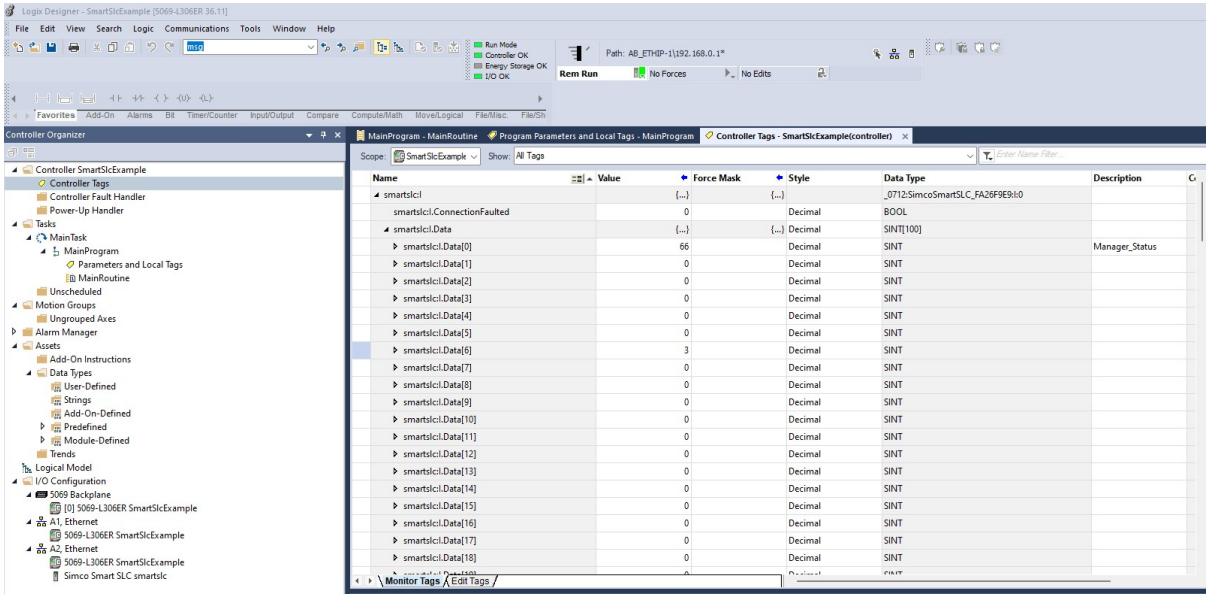
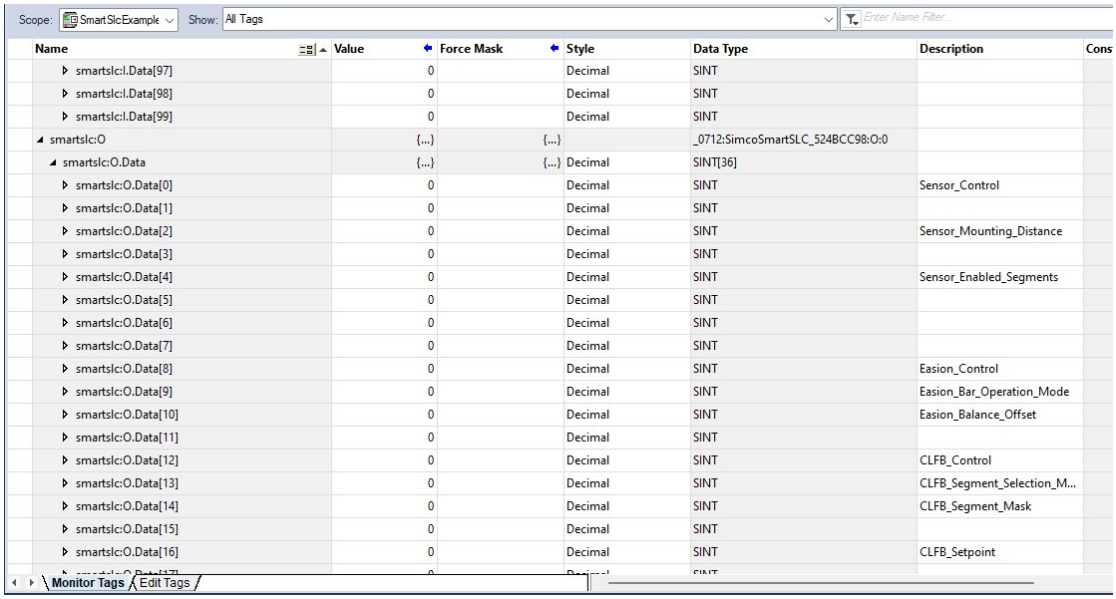
12 Select Communications/Run Mode. The Ethernet/IP icon on the Smart SLC is now running.



Setup simple PLC program

13 Double click on Controller SmartSlcExample/Controller Tags. Here you see all cyclic input data and cyclic output data of the Smart SLC, unfortunately without parameter names and further information. In our example there are 100 input bytes and 36 output bytes.
You can add parameter information yourself in the Controller Tags under Description.





Name	Value	Force Mask	Style	Data Type	Description
smartslc:I.Data[97]	0		Decimal	SINT	
smartslc:I.Data[98]	0		Decimal	SINT	
smartslc:I.Data[99]	0		Decimal	SINT	
smartslc:O	{...}	{...}		_0712:SimcoSmartSLC_524BCC98:O:0	
smartslc:O.Data	{...}	{...}	Decimal	SINT[36]	
smartslc:O.Data[0]	0		Decimal	SINT	Sensor_Control
smartslc:O.Data[1]	0		Decimal	SINT	
smartslc:O.Data[2]	0		Decimal	SINT	Sensor_Mounting_Distance
smartslc:O.Data[3]	0		Decimal	SINT	
smartslc:O.Data[4]	0		Decimal	SINT	Sensor_Enabled_Segments
smartslc:O.Data[5]	0		Decimal	SINT	
smartslc:O.Data[6]	0		Decimal	SINT	
smartslc:O.Data[7]	0		Decimal	SINT	
smartslc:O.Data[8]	0		Decimal	SINT	Easion_Control
smartslc:O.Data[9]	0		Decimal	SINT	Easion_Bar_Operation_Mode
smartslc:O.Data[10]	0		Decimal	SINT	Easion_Balance_Offset
smartslc:O.Data[11]	0		Decimal	SINT	
smartslc:O.Data[12]	0		Decimal	SINT	CLFB_Control
smartslc:O.Data[13]	0		Decimal	SINT	CLFB_Segment_Selection_M...
smartslc:O.Data[14]	0		Decimal	SINT	CLFB_Segment_Mask
smartslc:O.Data[15]	0		Decimal	SINT	
smartslc:O.Data[16]	0		Decimal	SINT	CLFB_Setpoint

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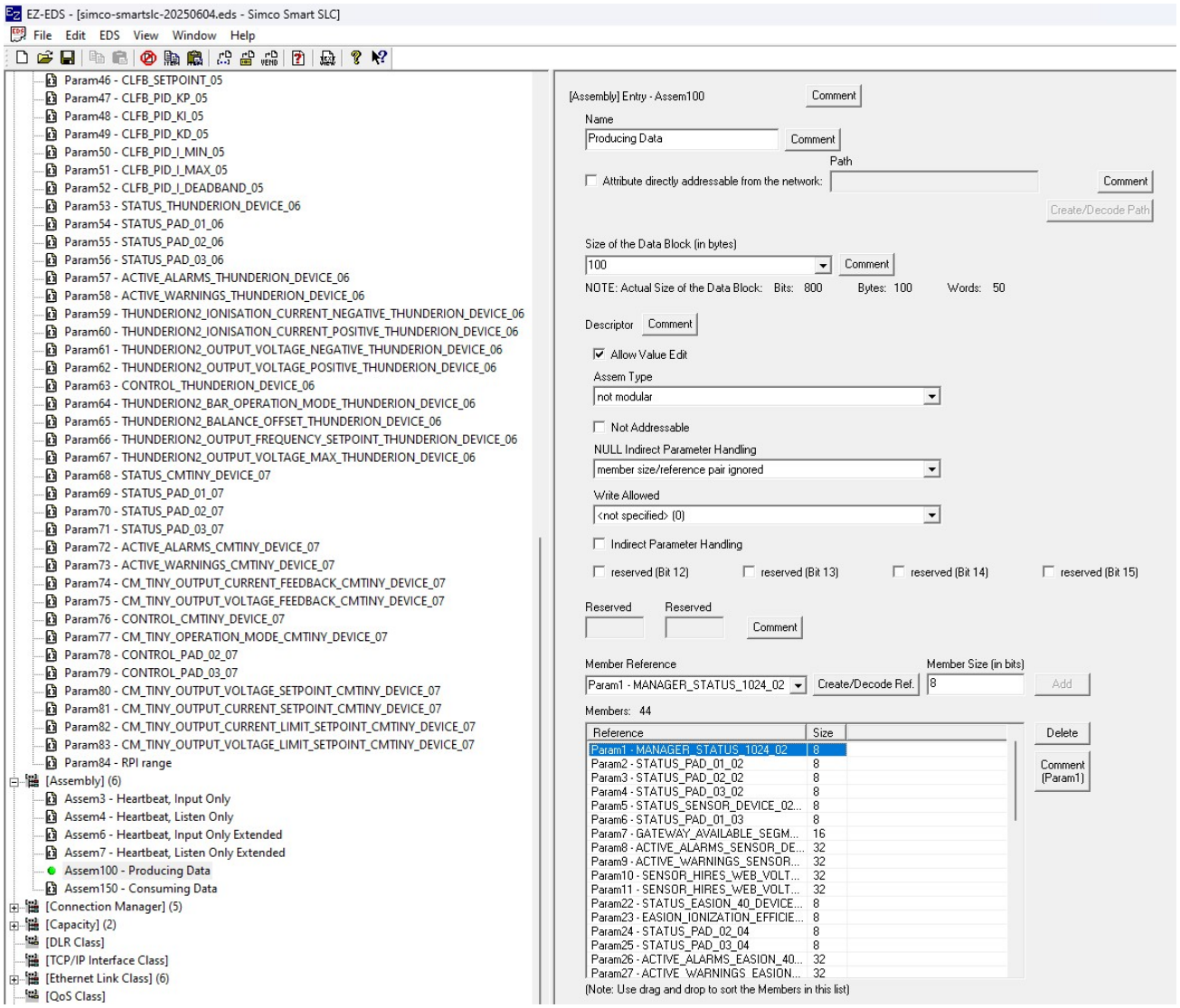
You can use the program EZ-EDS to read the eds file (which you created in step 4 of this manual). This program can be downloaded from the following location:
https://www.odva.org/subscriptions-services/additional-tools/ez-eds-download/
This program provides information about parameters such as parameter order, parameter name, parameter size and parameter type. This information can also be obtained from the following document: SmartSLC_FieldbusParameters_GB.

The parameters are in the following order: first the parameters of the device from slot 1 of the fieldbus (Smart SLC), then slot 2, ten slot 3 and so on (you set this in the Smart SLC, step 2 of this manual).



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The cyclic data

The **cyclically** transmitted data exists of the following parameters, defined in the fieldbus interface file as Module "Smart SLC":

Object name	Parameter name	Direction	Width (byte)	Format
Simco IQ4 manager (MANAGER)	STATUS_MANAGER	Input	4	Struct
CLFB block (for each created CLFB_BLOCK)	STATUS_CLFB	Input	8	Struct
	CONTROL_CLFB	Output	8	Struct
Performax IQ Easy parameters (for each connected PERFORMAX_DEVICE)	STATUS_PERFORMAX_40	Input	24	Struct
	CONTROL_PERFORMAX_40	Output	4	Struct
Easion IQ 4.0 parameters (for each connected EASION_DEVICE)	STATUS_EASION_40	Input	24	Struct
	CONTROL_EASION_40	Output	4	Struct
Easion IQ 4.1 parameters (for each connected EASION_41_DEVICE)	STATUS_EASION_41	Input	24	Struct
	CONTROL_EASION_41	Output	4	Struct
Performax IQ Easy Ex parameters (for each connected PERFORMAXEX_DEVICE)	STATUS_PERFORMAX_EX	Input	24	Struct
	CONTROL_PERFORMAX_EX	Output	4	Struct
Thunderion 2 IQ parameters (for each connected THUNDERION_DEVICE)	STATUS_THUNDERION	Input	24	Struct
	CONTROL_THUNDERION	Output	4	Struct
Vicinion parameters (for each connected VICINION_DEVICE)	STATUS_VICINION	Input	16	Struct
	CONTROL_VICINION	Output	4	Struct
Sensor IQ Easy (Legacy sensor device) parameters (for each connected SENSOR_DEVICE)	STATUS_SENSOR length of the struct depends on the number of sensor segments. e.g Sensor IQ Easy with 1 segment has a 16 byte wide Status struct. Sensor IQ Easy with 16 segments has a 76 wide Status struct.	Input	16 – 76	Struct
	CONTROL_SENSOR	Output	8	Struct
Sensor 2.0 Ex parameters (for each connected SENSOR_EX_DEVICE)	STATUS_SENSOR_20_EX length of the struct depends on the number of sensor segments.	Input	16 – 28	Struct

Parameter name	Direction	Width (byte)	Format	Cyclic / Acylic	Index no.
CONTROL_SENSOR	Output	8	Struct	Cyclic	2

Byte offset	Parameter name	Description			Remarks
0	CONTROL [byte8]	Bit 0-1: MODE	0: DISABLED	Disable device	
			1: STANDBY	Set device to standby mode	
			2: RUN	Set device to run mode	
		Bit 2: IDENTIFY	0: OFF	Switch off identify leds on device	
			1: ON	Switch on identify leds on device	
		Bit 3-7: RESERVED		Reserved for future use	for future use
1	CONTROL_PAD_01 [byte8]	Reserved			for future use
2	MOUNTING_DISTANCE [word16]	SETPOINT	Default value: 50	Mounting distance sensor bar in mm	
3			Min value: 10		
			Max value: 1000		
4	ENABLED SEGMENTS [word16]	Bit 0: SEGMENT 1	0: Not enabled 1: Enabled	Sensor segments enabled	
		Bit 1: SEGMENT 2			
		Bit 2: SEGMENT 3			
		Bit 3: SEGMENT 4			
		Bit 4: SEGMENT 5			
		Bit 5: SEGMENT 6			
		Bit 6: SEGMENT 7			
		Bit 7: SEGMENT 8			
5		Bit 8: SEGMENT 9			
		Bit 9: SEGMENT 10			
		Bit 10: SEGMENT 11			
		Bit 11: SEGMENT 12			
		Bit 12: SEGMENT 13			
		Bit 13: SEGMENT 14			
		Bit 14: SEGMENT 15			
		Bit 15: SEGMENT 16			
6	CONTROL_PAD_06	Reserved			for future use
7	CONTROL_PAD_07	Reserved			for future use

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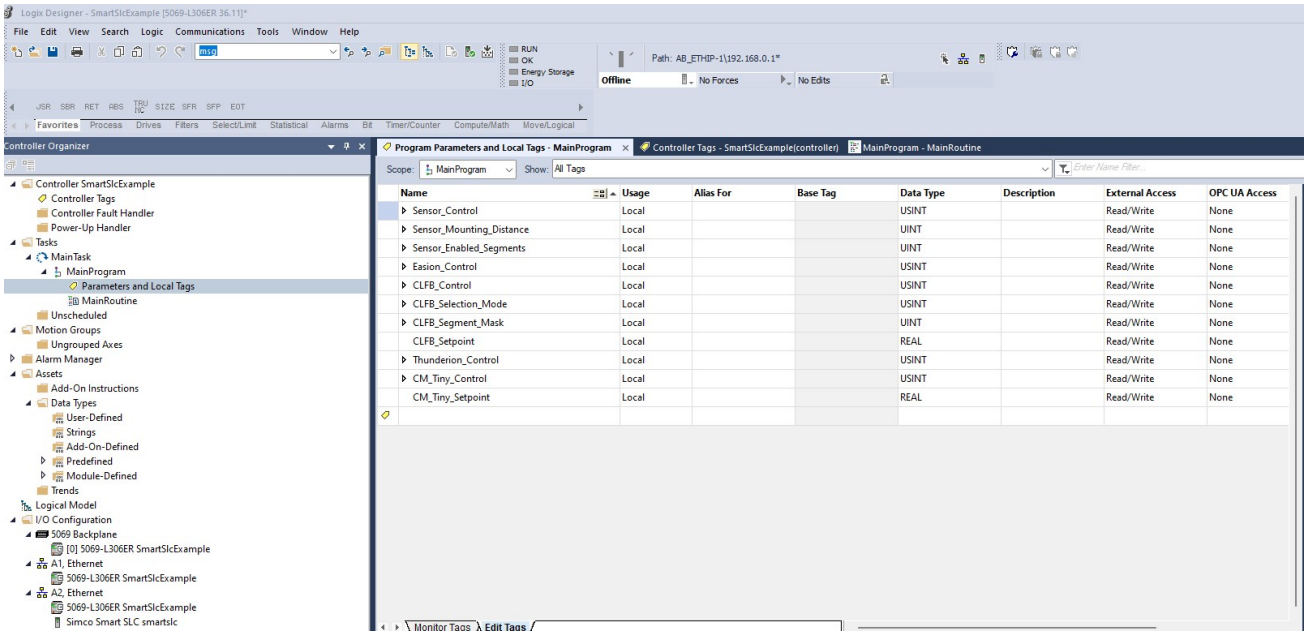
14 Select Communications/Go Offline. Make PLC tags under Tasks/MainTask/MainProgram/Parameters and Local Tags.
Smart SLC fieldbus parameters are described in the document: SmartSLC_FieldbusParameters_GB.



15 Make a simple PLC program under Tasks/MainTask/MainProgram/MainRoutine.

```
Sensor_Control := 2;                    //Sensor in RUN mode
Sensor_Mounting_Distance := 50;         //Sensor mounting distance 50mm
Sensor_Enabled_Segments := 3;           //Sensor segments 1 and 2 enabled
Easion_Control := 2;                    //Easion IQ in RUN mode
CLFB_Control := 2;                      //CLFB in RUN mode
CLFB_Selection_Mode := 1;               //CLFB select sensor segments via fieldbus
CLFB_Segment_Mask := 3;                 //CLFB segments 1 and 2 enabled
CLFB_Setpoint := 0;                     //CLFB setpoint 0 kV
Thunderion_Control := 2;                //Thunderion in RUN mode
CM_Tiny_Control := 2;                   //CM Tiny in RUN mode
CM_Tiny_Setpoint := -5;                 //CM Tiny setpoint -5 kV

//Copy local tags to output
COP(Sensor_Control,smartslc:O.Data[0],1);
COP(Sensor_Mounting_Distance,smartslc:O.Data[2],2);
COP(Sensor_Enabled_Segments,smartslc:O.Data[4],2);
COP(Easion_Control,smartslc:O.Data[8],1);
COP(CLFB_Control,smartslc:O.Data[12],1);
COP(CLFB_Selection_Mode,smartslc:O.Data[13],1);
COP(CLFB_Segment_Mask,smartslc:O.Data[14],2);
COP(CLFB_Setpoint,smartslc:O.Data[16],4);
COP(Thunderion_Control,smartslc:O.Data[20],1);
COP(CM_Tiny_Control,smartslc:O.Data[24],1);
COP(CM_Tiny_Setpoint,smartslc:O.Data[28],4);
```

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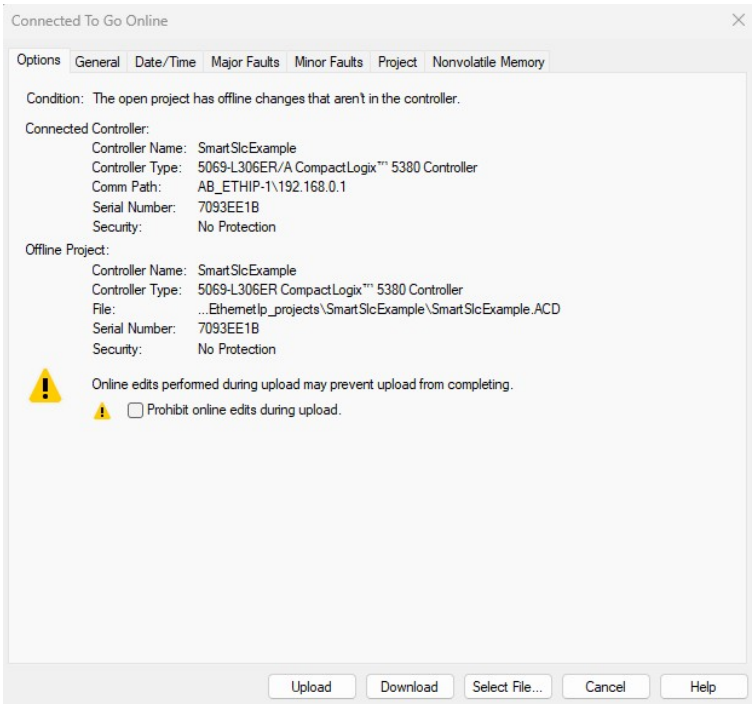
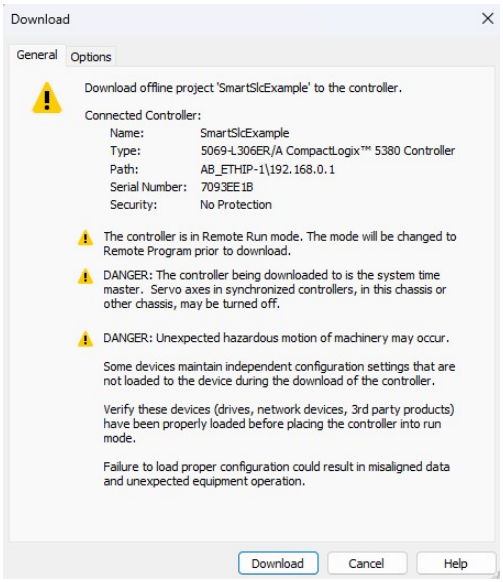
16 Click Logic/Build and go to the next step if there are no errors and warnings.

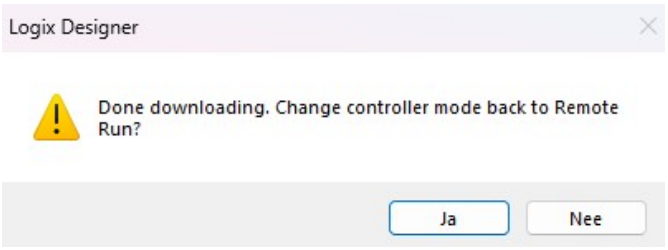
17 Click Communications/Go Online. Click Download.



17a Click Download again.



17b Click Ja (Yes).



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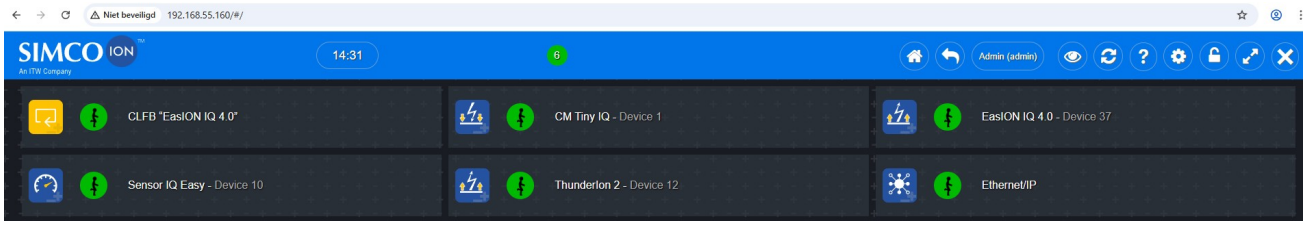
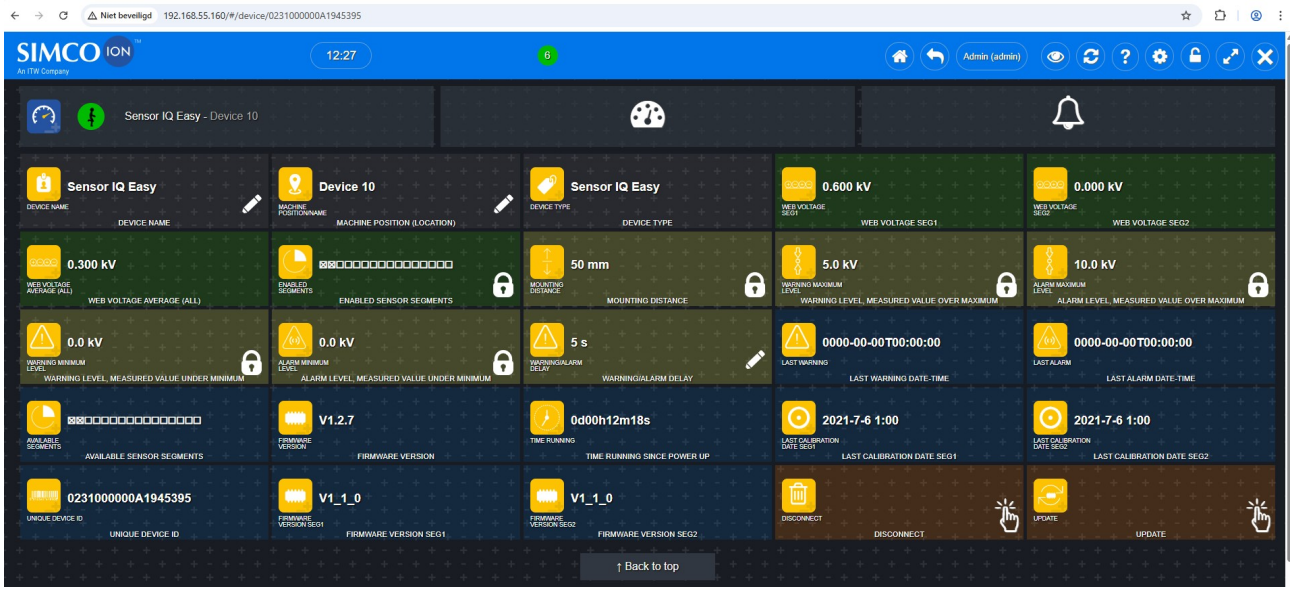
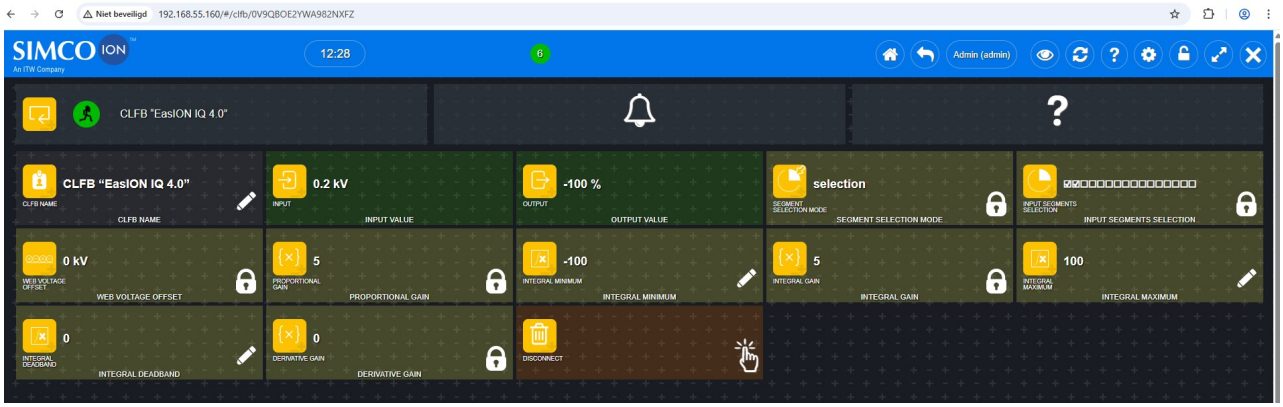
18 If all steps have been completed correctly, this is the result. All devices are in RUN mode.



18a The Sensor IQ Easy is in RUN mode, the mounting distance is 50mm, segment 1 and segment 2 are enabled.



18b The CLFB object is in RUN mode, the sensor segments are controlled via the fieldbus, sensor segment 1 and sensor segment 2 are enabled, the CLFB setpoint (web voltage offset) is 0 kV.



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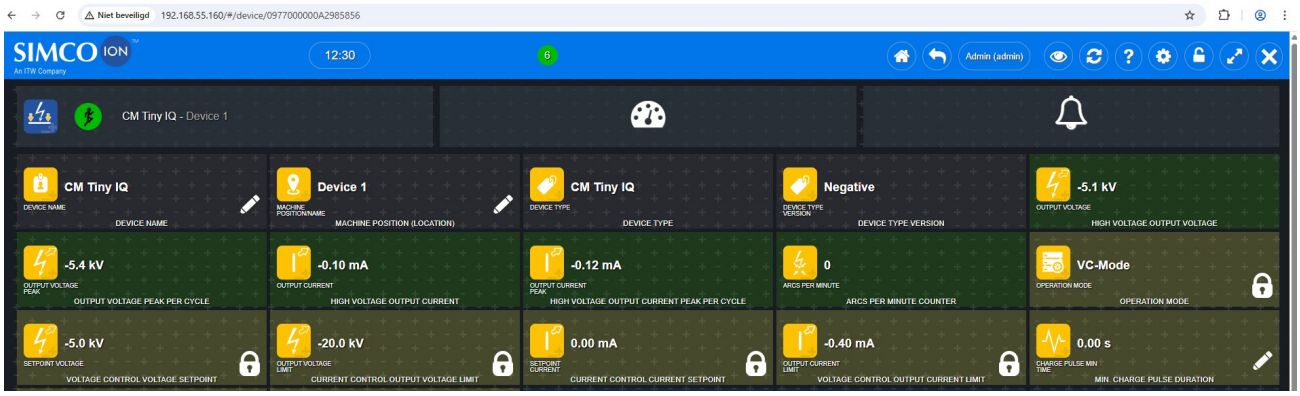
18c The CM Tiny is in RUN mode, the voltage setpoint is -5kV



Closing

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