

PENKO Engineering B.V.

Your Partner for Fully Engineered Factory Solutions



How to...

Connect a SGM730 CANopen to a
Siemens PLC



PENKO

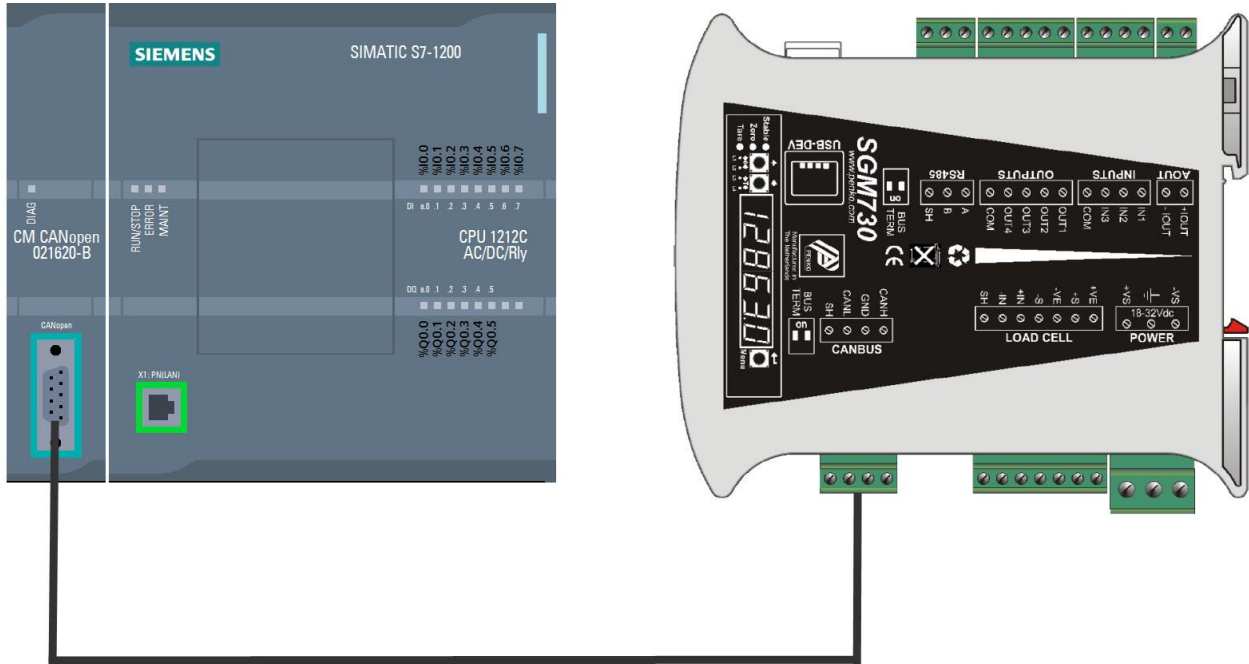
an ETC Company

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Hardware connection

Connect the HMS 021620-B CANopen module to the PLC. Connect the SGM730 to the HMS 021620-B with the cable connection below.



Cable connection

Cable between HMS 021620-B and Penko SGM730 or SGM830	
9 pin sub-D female connector	4 pin screw connector
2	CAN L
3	GND
5	SH
7	CAN H

Software

The software and files that are used in this How to:

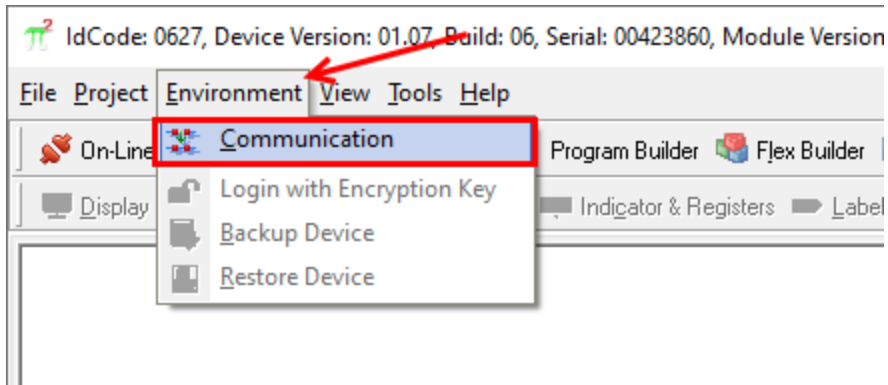
- Pi Mach II Download at <https://penko.com/Support/Software/>
- Penko USB drivers Download at <https://penko.com/Support/Software/>
- SGM730 EDS file Download at <https://penko.com/Support/Software/>
- CM CANopen Configuration Studio Download at <https://www.ixxat.com/technical-support/resources/downloads-and-documentation?ordercode=021620-B>
- HSP for TIA Portal V15.1 – Configuration File Download at <https://www.ixxat.com/technical-support/resources/downloads-and-documentation?ordercode=021620-B>
- Tia Portal V15.1

USB drivers

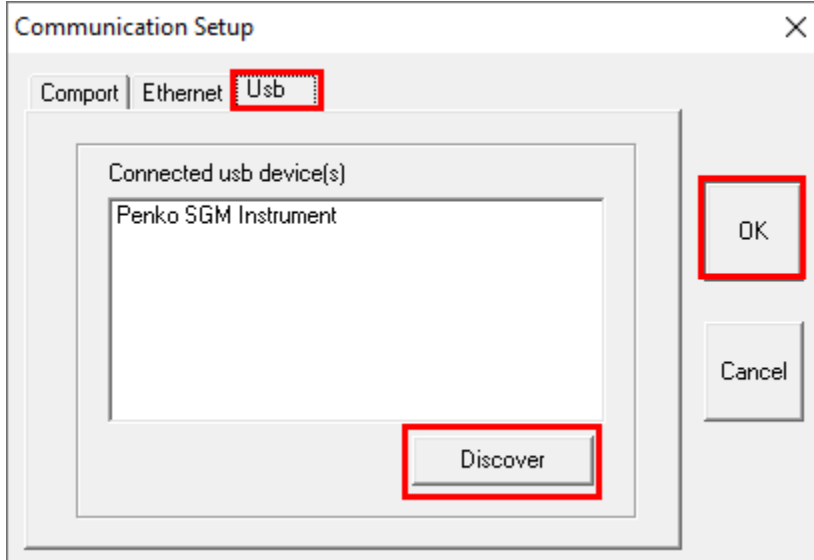
Install the USB drivers for your system.

Pi Mach II

When the USB drivers are installed, connect the SGM730 to your PC with a USB cable. Open Pi Mach II, if the SGM730 is not detected, go to Environment and click on Communication.



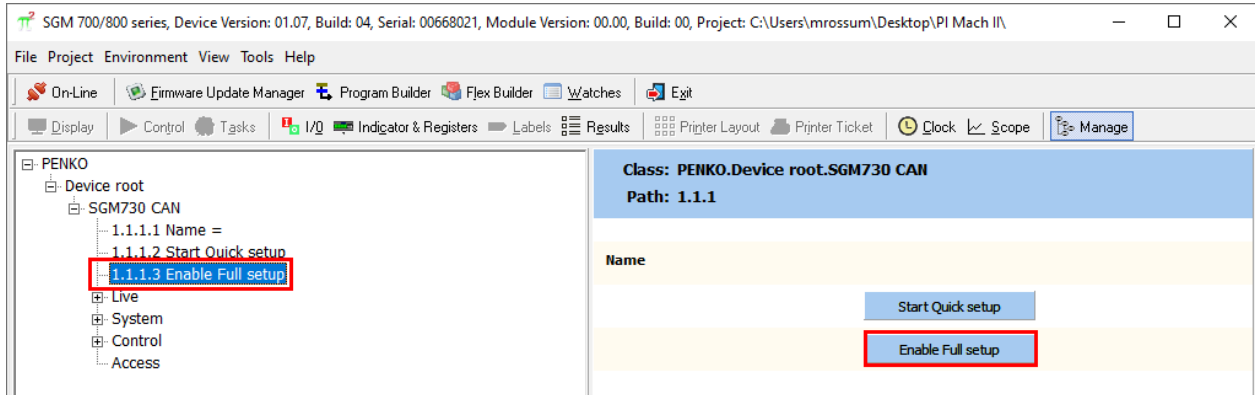
Go to the tab **Usb** and the Penko SGM Instrument is detected, if not click on Discover. Then click on **OK**.



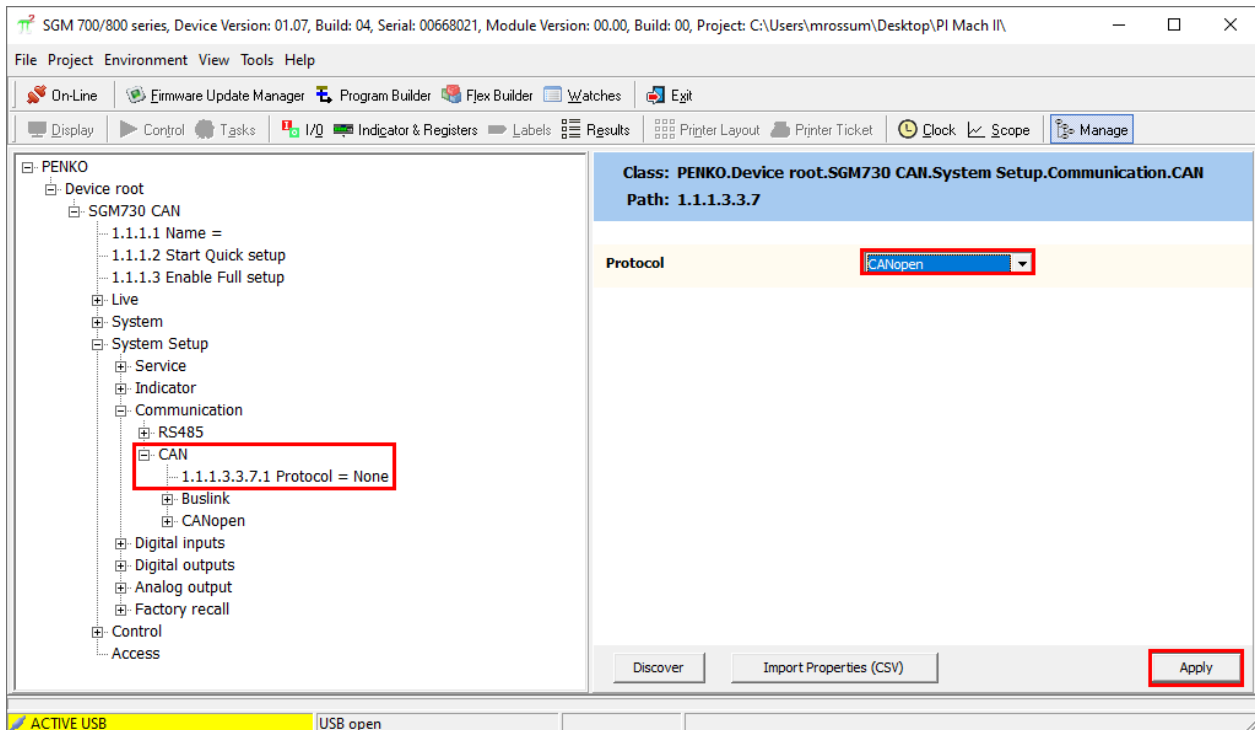
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Click on SGM730 CAN – 1.1.1.3 Enable Full Setup, then click on the Enable Full setup button.



Go to System Setup – Communication – CAN, set the protocol on CANopen and click on Apply.



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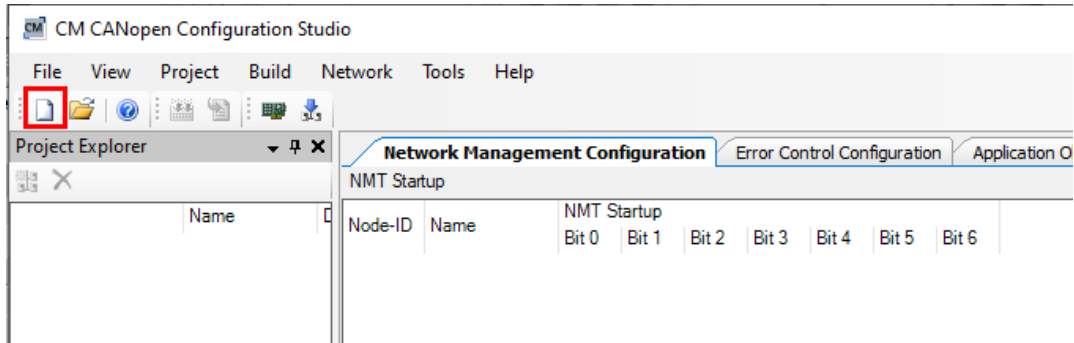
Go to CANopen and set the Node ID for the SGM730 and the baudrate, then click on Apply. In the How to the Node Id is set to 1 and the baudrate is set to 500kbs.

The screenshot shows the SIMATIC Manager configuration window for a SGM730 CAN interface. The tree view on the left is expanded to show the configuration path: PENKO > Device root > SGM730 CAN > 1.1.1.3.3.7.2.1 CANopen Address(Node Id) = 1. The right-hand pane shows the configuration fields for 'Class: PENKO.Device root.SGM730 CAN.System Setup.Communication.CAN.CANo', with 'CANopen Address(Node Id)' set to 1 and 'CANopen Baudrate' set to 500 kbs. The 'Apply' button is highlighted with a red box.

CM CANopen Configuration Studio

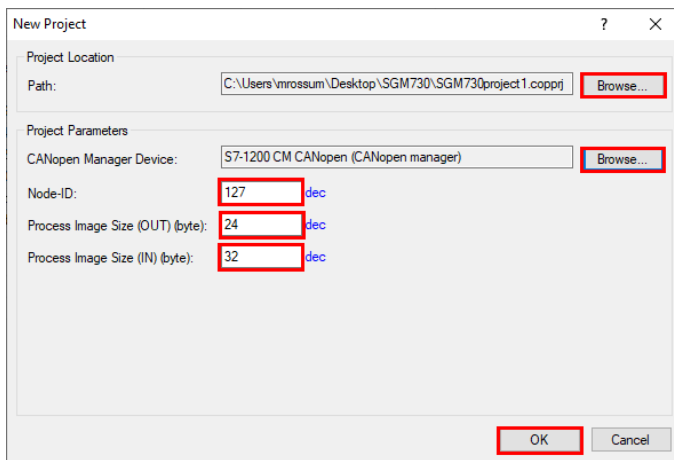
Create a project

Open the CM CANopen Configuration Studio and click on New.

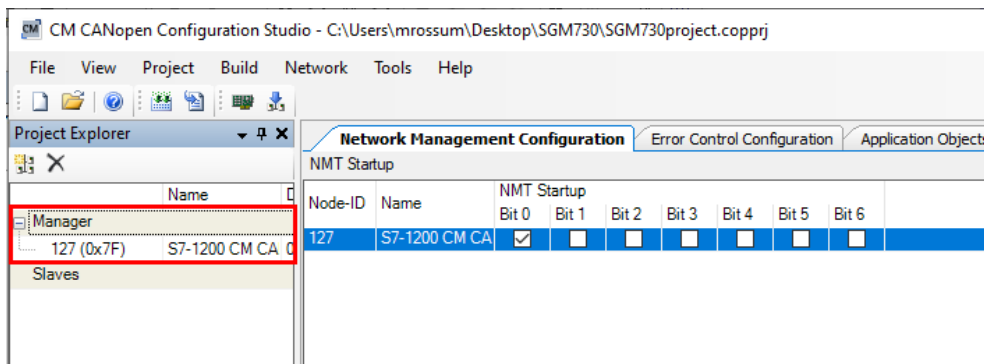


First set the project Location where you want your project to be saved, then set the Project Parameter to S7-1200 CM CANopen (CANopen Manager).

Set the Node-ID to 127, Process Image Size (OUT) (byte) to 24 and Process Image Size (IN) (byte) to 32 then click on OK.

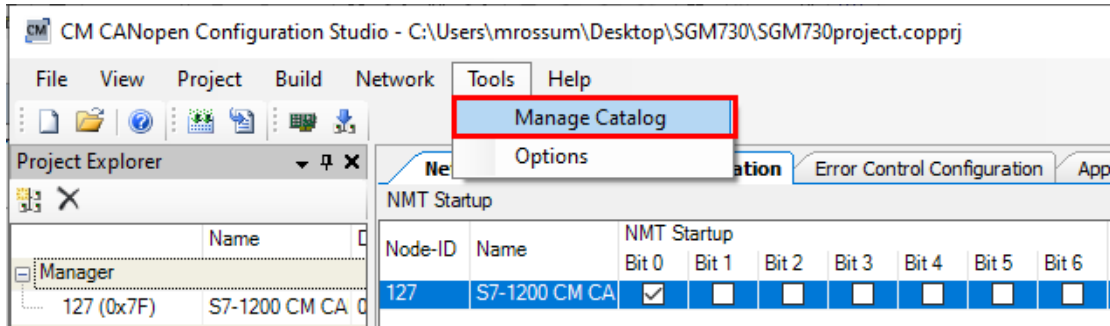


The manager device is now added into the project.

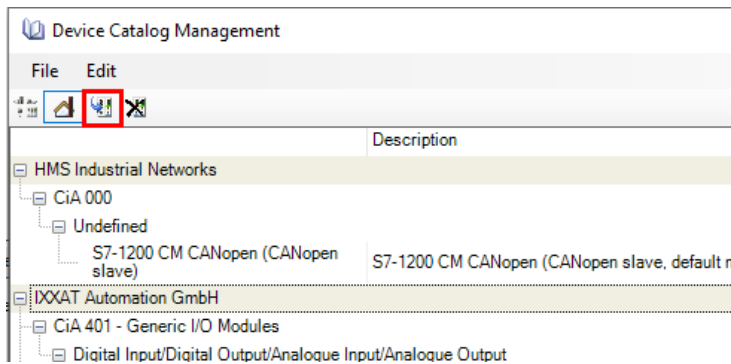


Install the EDS file

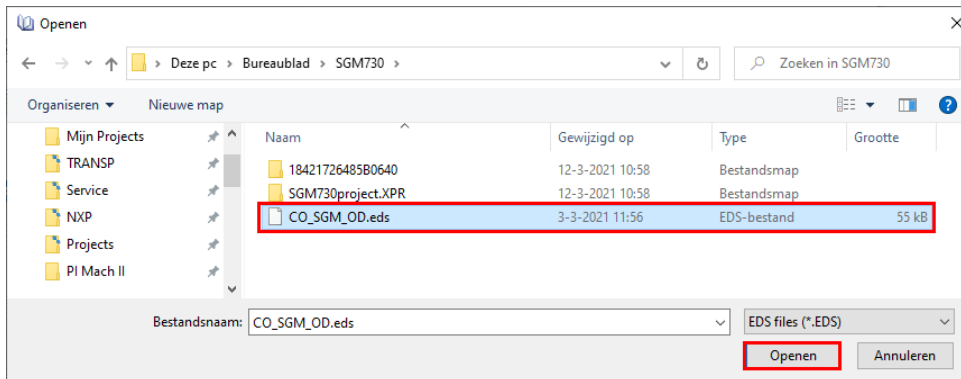
To install the SGM730 EDS file into the project, click on Tools – Manage Catalog.



Click on Import a device.



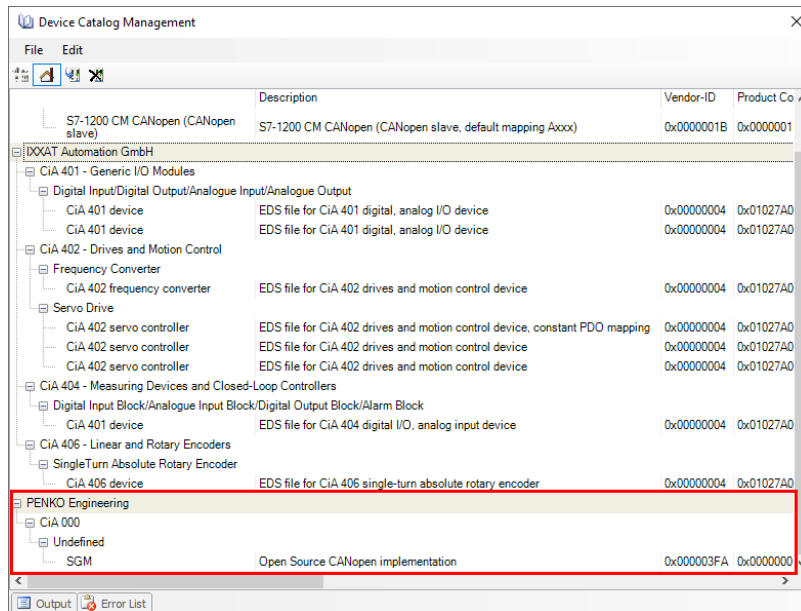
Go to the folder where the EDS file is stored, select the EDS file and click on Open.



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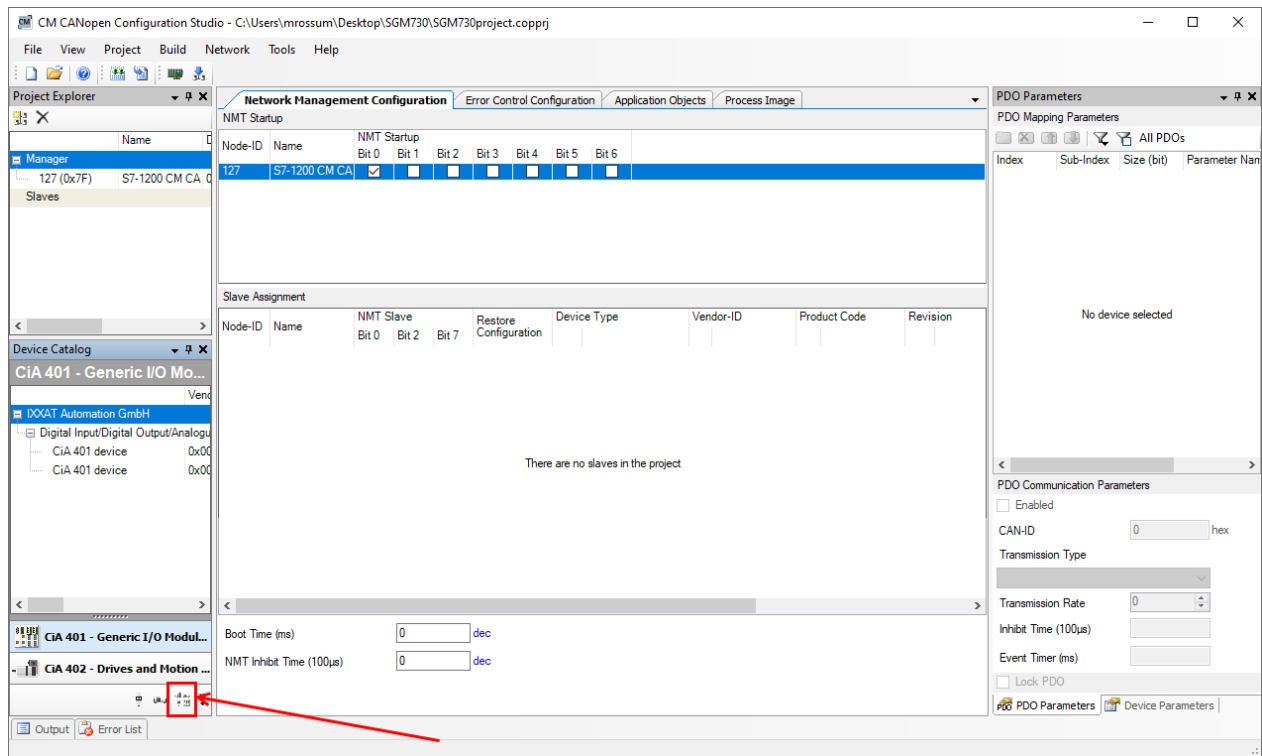
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The SGM730 is now added to the device catalog, close the Device Catalog Management window.



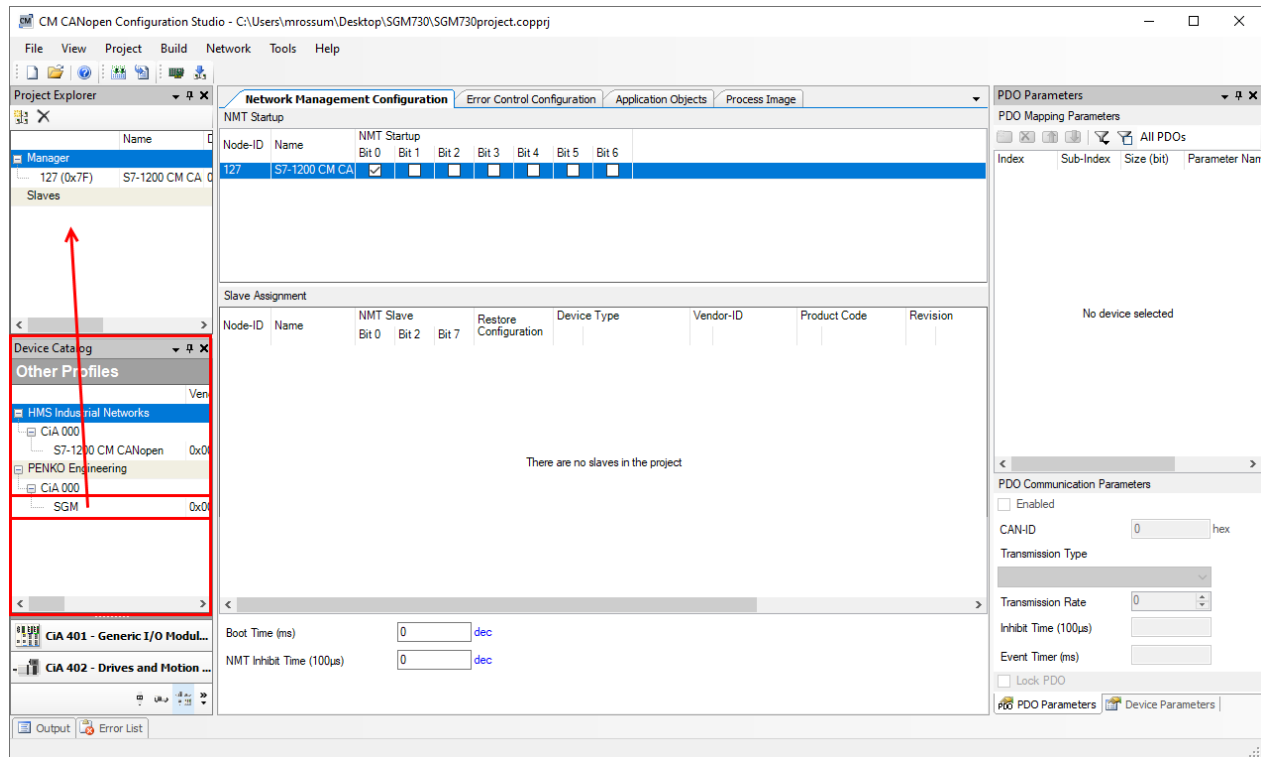
Add the SGM730 into the project

Click on Other profiles.

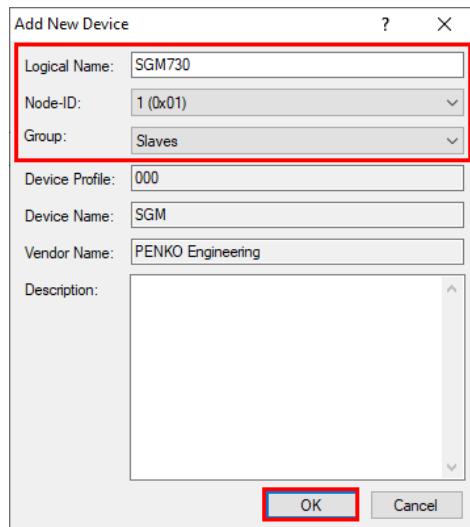


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The Device Catalog for Other Profiles is now shown, drag and drop the SGM under Slaves.



The Add New Device window is opened, set a logical name, set the Node-ID to 1 and set Group to Slaves. Then click on OK.



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The SGM730 is now added into the project.

The screenshot shows the 'Network Management Configuration' tab in the software. The 'NMT Startup' table is as follows:

Node-ID	Name	Bit 0	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6
1	SGM730	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
127	S7-1200 CM CA	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The 'Slave Assignment' table is as follows:

Node-ID	Name	Bit 0	Bit 2	Bit 7	Restore Configuration	Device Type	Vendor-ID
1	SGM730	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	01	<input type="checkbox"/> 00000000	<input type="checkbox"/> 00000000

Specify data

To specify the data that is read or written from the SGM730, first select the SGM730 under Slaves and then click on the tab Application Objects.

The screenshot shows the 'Application Objects' tab in the software. The 'Application Objects' table is as follows:

Index	Parameter Name	Mapped	Direction	Data Type	Transmission Type
Node-ID: 1 (0x01)	Name: SGM730				

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In our example not all options are used.

Index	Parameter Name	Mapped	Direction	Data Type	Transmission Type	No of SYNC
Node-ID: 1 (0x01) Name: SGM730						
1001	Error register	<input type="checkbox"/>	IN	UNSIGNED8	Event-driven (profile specific)	
1002	Manufacturer status register	<input type="checkbox"/>	IN	UNSIGNED32	Event-driven (profile specific)	
1280						
2100	Error status bits	<input type="checkbox"/>	IN	OCTET_STRING	Event-driven (profile specific)	
2107						
3000						
01	Input 1-8	<input checked="" type="checkbox"/>	IN	UNSIGNED8	Event-driven (profile specific)	
02	Input 9-16	<input type="checkbox"/>	IN	UNSIGNED8	Event-driven (profile specific)	
3001						
01	Output 201-208	<input checked="" type="checkbox"/>	IN	UNSIGNED8	Event-driven (profile specific)	
02	Output 209-216	<input type="checkbox"/>	IN	UNSIGNED8	Event-driven (profile specific)	
3002						
01	Marker 401-408	<input checked="" type="checkbox"/>	IN	UNSIGNED8	Event-driven (profile specific)	
02	Marker 409-416	<input checked="" type="checkbox"/>	IN	UNSIGNED8	Event-driven (profile specific)	
03	Marker 417-424	<input checked="" type="checkbox"/>	IN	UNSIGNED8	Event-driven (profile specific)	
04	Marker 425-432	<input checked="" type="checkbox"/>	IN	UNSIGNED8	Event-driven (profile specific)	
05	Marker 433-440	<input type="checkbox"/>	IN	UNSIGNED8	Event-driven (profile specific)	
06	Marker 441-448	<input type="checkbox"/>	IN	UNSIGNED8	Event-driven (profile specific)	
07	Marker 449-456	<input type="checkbox"/>	IN	UNSIGNED8	Event-driven (profile specific)	
08	Marker 457-464	<input type="checkbox"/>	IN	UNSIGNED8	Event-driven (profile specific)	
3100						
01	Marker 969-976	<input checked="" type="checkbox"/>	OUT	UNSIGNED8	Event-driven (profile specific)	
02	Marker 977-984	<input checked="" type="checkbox"/>	OUT	UNSIGNED8	Event-driven (profile specific)	
03	Marker 985-992	<input checked="" type="checkbox"/>	OUT	UNSIGNED8	Event-driven (profile specific)	
04	Marker 993-1000	<input checked="" type="checkbox"/>	OUT	UNSIGNED8	Event-driven (profile specific)	
3200						
01	Command	<input checked="" type="checkbox"/>	OUT	UNSIGNED32	Event-driven (profile specific)	
02	Preset Tare	<input checked="" type="checkbox"/>	OUT	UNSIGNED32	Event-driven (profile specific)	
3201						
3202						
3203						
3204						
3205						
3206						
3300						
01	index	<input checked="" type="checkbox"/>	OUT	INTEGER32	Event-driven (profile specific)	
02	Register[index]	<input checked="" type="checkbox"/>	OUT	INTEGER32	Event-driven (profile specific)	
3301						
01	Indicator index	<input checked="" type="checkbox"/>	IN	INTEGER32	Event-driven (profile specific)	

Communication Cycle Period (ms) dec SYNC Producer

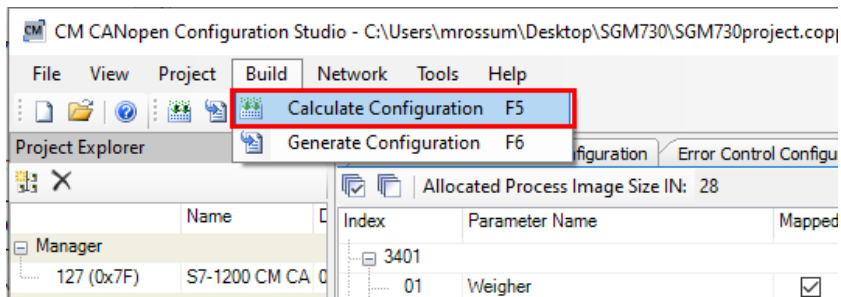
Process Image Size (OUT) (byte) dec

Process Image Size (IN) (byte) dec

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3401	01	Weigher	<input checked="" type="checkbox"/>	IN	INTEGER32	Event-driven (profile specific)		
	02	Gross	<input type="checkbox"/>	IN	INTEGER32	Event-driven (profile specific)		
	03	Net	<input type="checkbox"/>	IN	INTEGER32	Event-driven (profile specific)		
	04	Display Gross	<input type="checkbox"/>	IN	INTEGER32	Event-driven (profile specific)		
	05	Display Net	<input type="checkbox"/>	IN	INTEGER32	Event-driven (profile specific)		
	06	Tare	<input type="checkbox"/>	IN	INTEGER32	Event-driven (profile specific)		
	07	Peak	<input type="checkbox"/>	IN	INTEGER32	Event-driven (profile specific)		
	08	Valley	<input type="checkbox"/>	IN	INTEGER32	Event-driven (profile specific)		
	09	Hold	<input type="checkbox"/>	IN	INTEGER32	Event-driven (profile specific)		
	0A	Net x10	<input type="checkbox"/>	IN	INTEGER32	Event-driven (profile specific)		
	0B	Gross x10	<input type="checkbox"/>	IN	INTEGER32	Event-driven (profile specific)		
	0C	Preset tare	<input type="checkbox"/>	IN	INTEGER32	Event-driven (profile specific)		
	0D	Calculated Gross	<input type="checkbox"/>	IN	INTEGER32	Event-driven (profile specific)		
	0E	Calculated Tare	<input type="checkbox"/>	IN	INTEGER32	Event-driven (profile specific)		
	0F	Tare x10	<input type="checkbox"/>	IN	INTEGER32	Event-driven (profile specific)		
	10	Peak x10	<input type="checkbox"/>	IN	INTEGER32	Event-driven (profile specific)		
	11	Valley x10	<input type="checkbox"/>	IN	INTEGER32	Event-driven (profile specific)		
	12	Hold x10	<input type="checkbox"/>	IN	INTEGER32	Event-driven (profile specific)		
	13	Signal(mV)	<input type="checkbox"/>	IN	INTEGER32	Event-driven (profile specific)		
3402								
3403	01	Decimal	<input checked="" type="checkbox"/>	IN	INTEGER8	Event-driven (profile specific)		
	02	Range	<input checked="" type="checkbox"/>	IN	INTEGER8	Event-driven (profile specific)		
	3500	Read analog output	<input type="checkbox"/>	IN	UNSIGNED16	Event-driven (profile specific)		
3700								
3701								
3702								

Click on Build – Calculate Configuration to create the data structure.



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Click on the Process Image tab to view the data structure.

Group	Direction	Node-ID	Index	Sub-Index	Parameter Name	Denotation	Data Type	Address	Size (bit)
default	IN	1	3000	01	Input 1-8		UNSIGNED8	00000000	8
default	IN	1	3001	01	Output 201-208		UNSIGNED8	00000001	8
default	IN	1	3002	01	Marker 401-408		UNSIGNED8	00000002	8
default	IN	1	3002	02	Marker 409-416		UNSIGNED8	00000003	8
default	IN	1	3002	03	Marker 417-424		UNSIGNED8	00000004	8
default	IN	1	3002	04	Marker 425-432		UNSIGNED8	00000005	8
default	IN	1	3403	01	Decimal		INTEGER8	00000006	8
default	IN	1	3403	02	Range		INTEGER8	00000007	8
default	IN	1	3301	01	Indicator index		INTEGER32	00000008	32
default	IN	1	3301	02	Indicator[index]		INTEGER32	0000000C	32
default	IN	1	3303	01	Register index		INTEGER32	00000010	32
default	IN	1	3303	02	Register[index]		INTEGER32	00000014	32
default	IN	1	3400	00	Read indicator status		UNSIGNED32	00000018	32
default	IN	1	3401	01	Weighter		INTEGER32	0000001C	32
default	OUT	1	3100	01	Marker 969-976		UNSIGNED8	00000000	8
default	OUT	1	3100	02	Marker 977-984		UNSIGNED8	00000001	8
default	OUT	1	3100	03	Marker 985-992		UNSIGNED8	00000002	8
default	OUT	1	3100	04	Marker 993-1000		UNSIGNED8	00000003	8
default	OUT	1	3302	00	Indicator set index		UNSIGNED16	00000004	16
default	OUT	1	3304	00	Register set index		INTEGER16	00000006	16
default	OUT	1	3200	01	Command		UNSIGNED32	00000008	32
default	OUT	1	3200	02	Preset Tare		UNSIGNED32	0000000C	32
default	OUT	1	3300	01	index		INTEGER32	00000010	32
default	OUT	1	3300	02	Register[index]		INTEGER32	00000014	32

Error detection

To detect if a node becomes unresponsive a heartbeat is set up, click on the tab Error Control Configuration. Select the SGM730 and click on the .. button under Consumer Time.

Node-ID	Logical Name	Heartbeat Producer Time	Consumer Time	Node Guarding Guard Time	Life Time Factor	Guard Time	Retry Factor
1	SGM730	500	(List) ..	N/A	N/A	N/A	N/A
127	S7-1200 CM CA	500	(List)	N/A	N/A	N/A	N/A

Set the Node-ID to 127 and the Consumer Time to 1000 (msec), then click on OK.

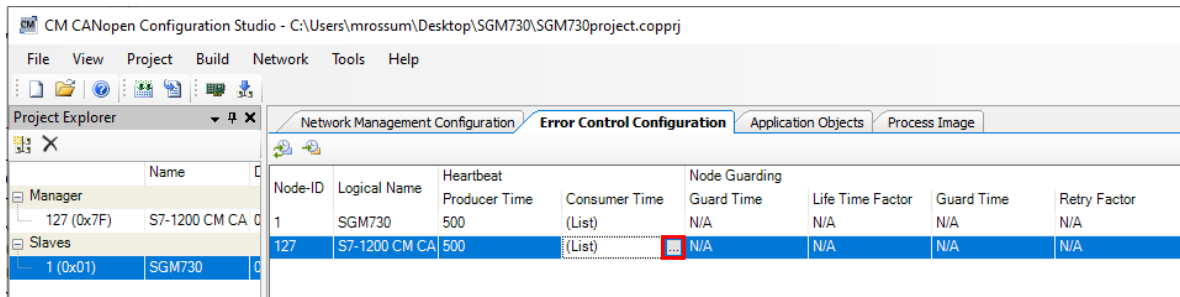
Node-ID	Consumer Time
127	1000
Not used	0
Not used	0
Not used	0

OK Cancel

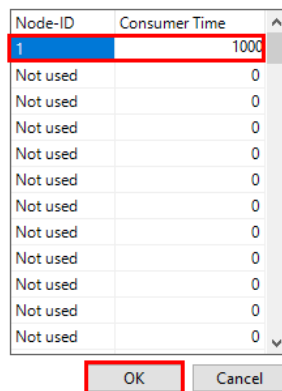
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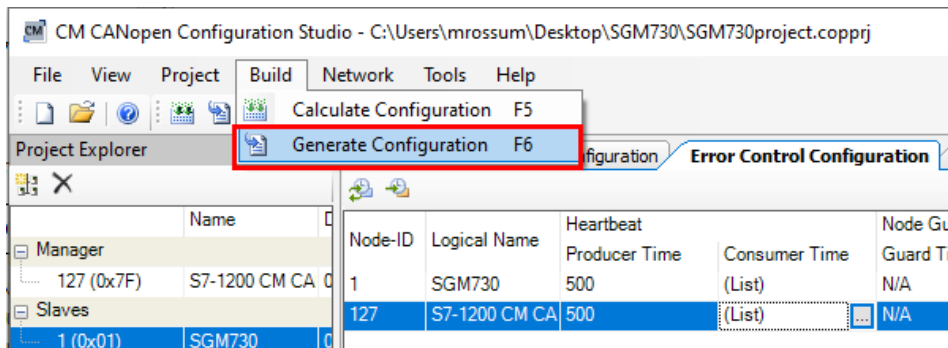
Repeat this step for the S7-1200 CM CANopen, click on the .. button under Consumer Time.



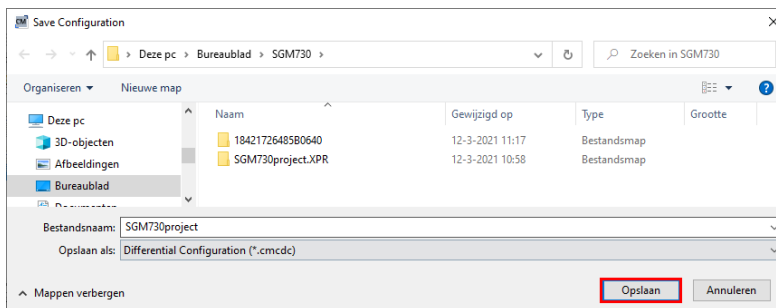
Set the Node-ID to 1 and the Consumer Time to 1000 (msec), then click on OK.



Click on Build – Generate Configuration.



Save the file into the same folder as the project.

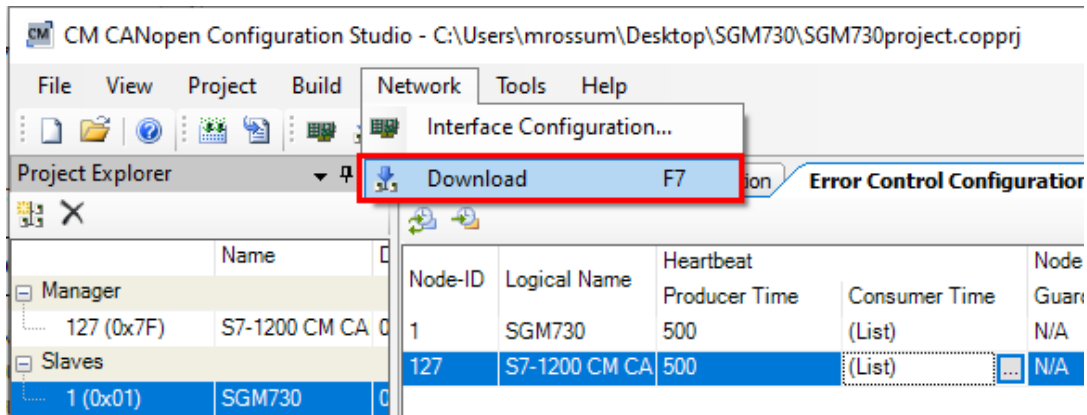


PENKO How to...

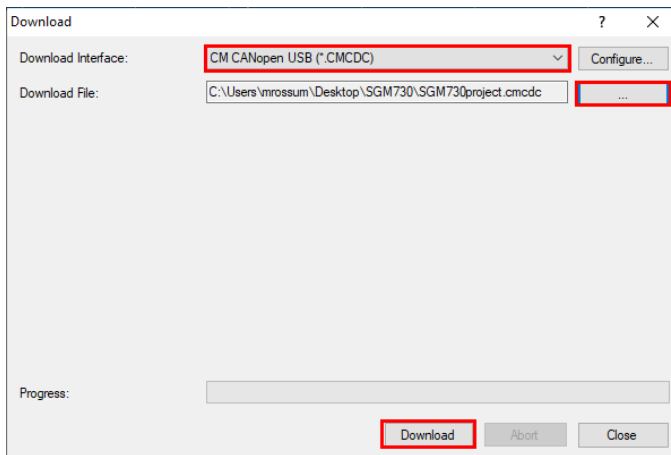
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Download the configuration into the module

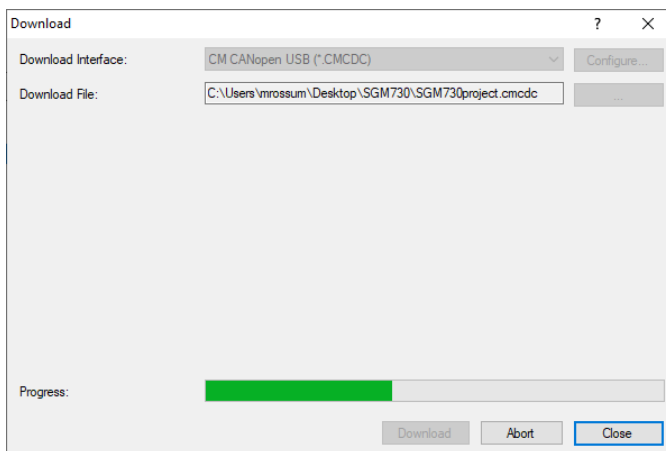
Connect the module to your PC via a mini USB cable, click on Network – Download.



Select the Download Interface, download file and click on Download.



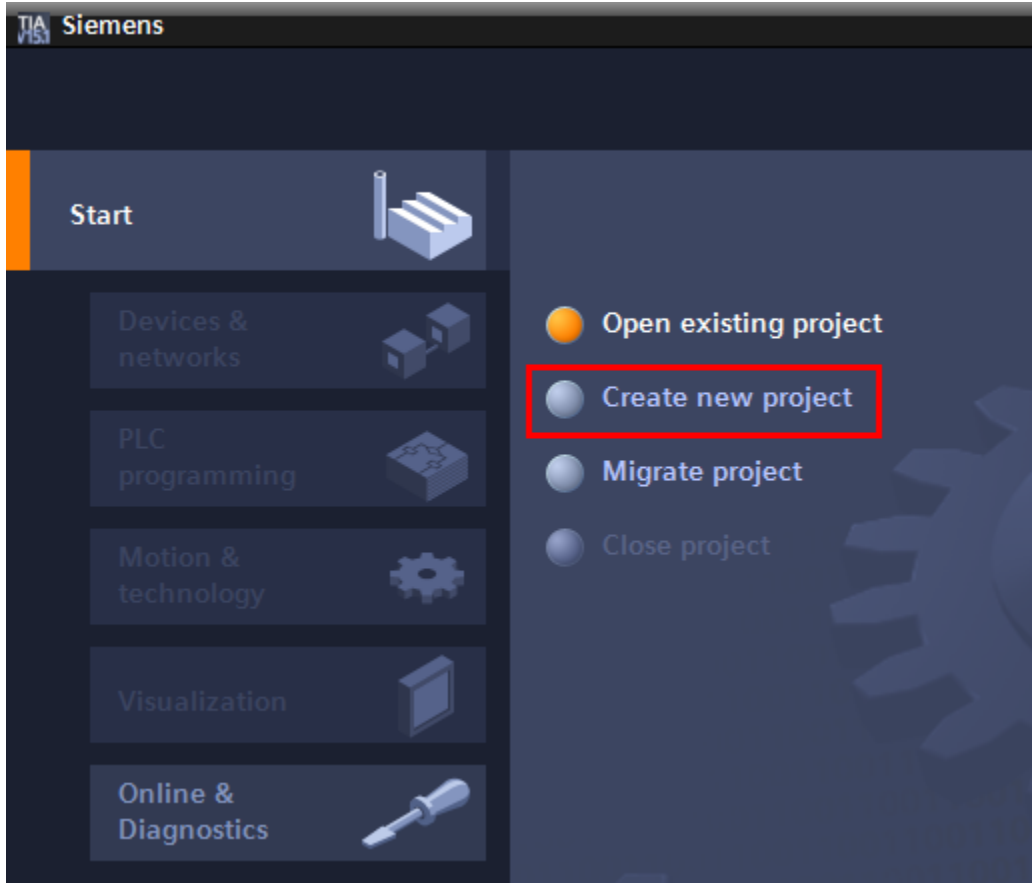
The file is downloaded into the module, when completed click close and close the CM CANopen Configuration Studio.



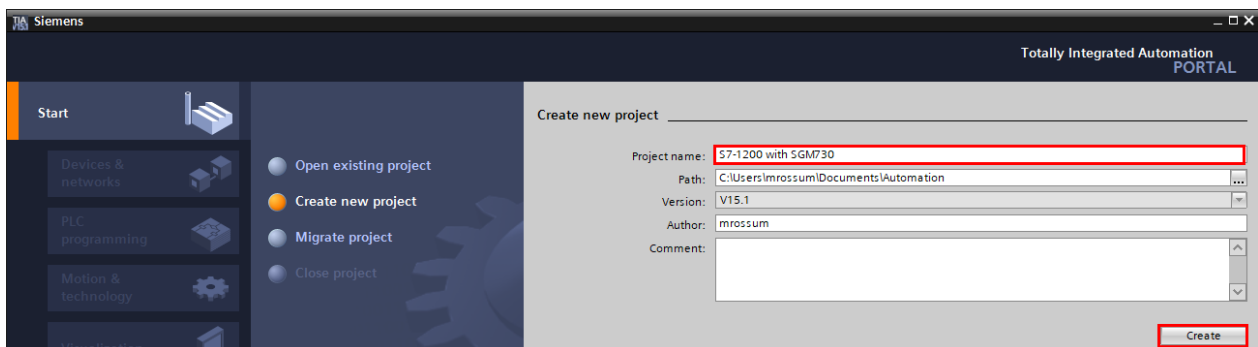
Tia Portal V15.1

Create a project

Open Tia Portal and click on Create new project.



Give the project a name and click on Create.

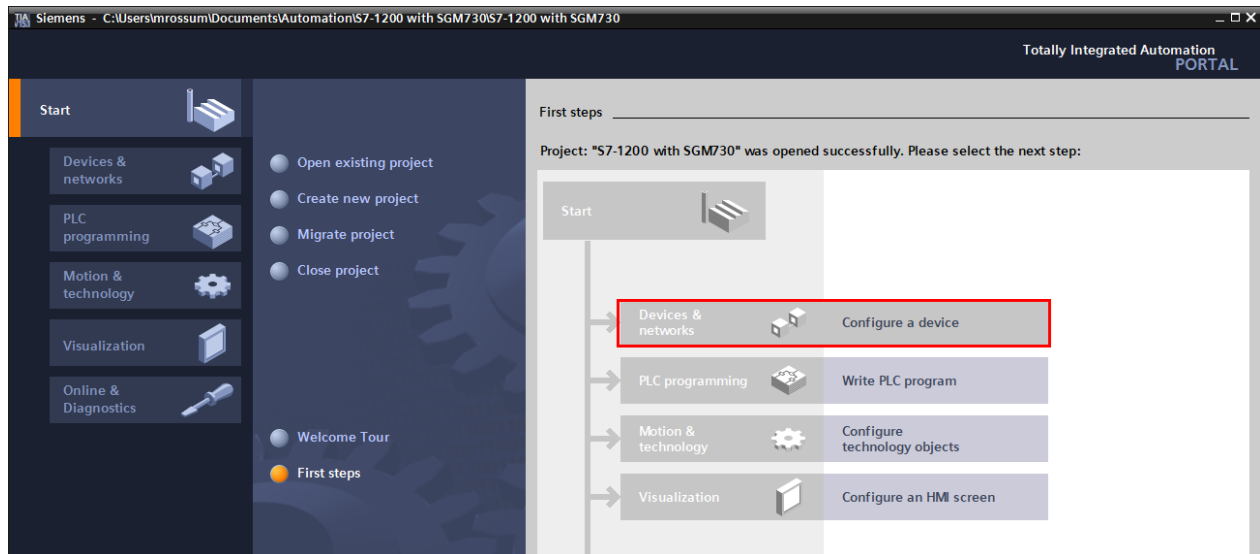


PENKO How to...

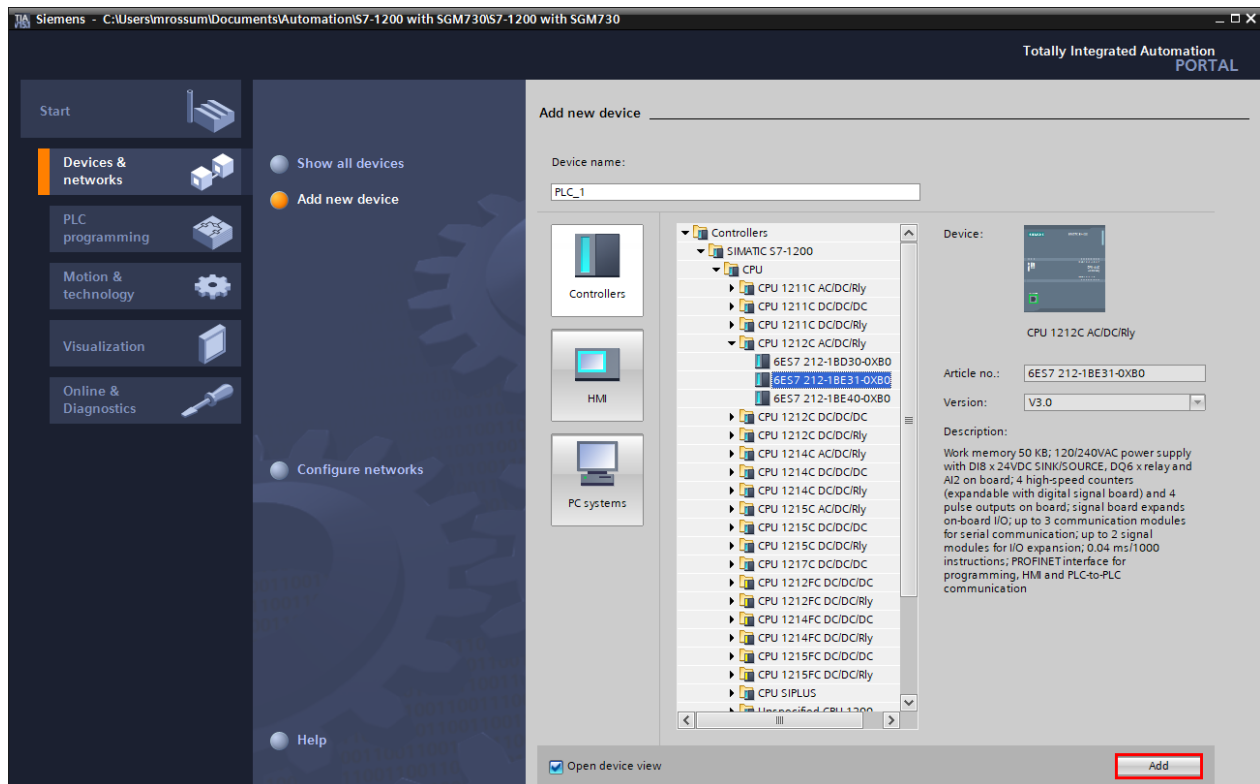
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Add a PLC to the project

Click on Configure a device.



Click on Add new device, select your PLC and click on Add.

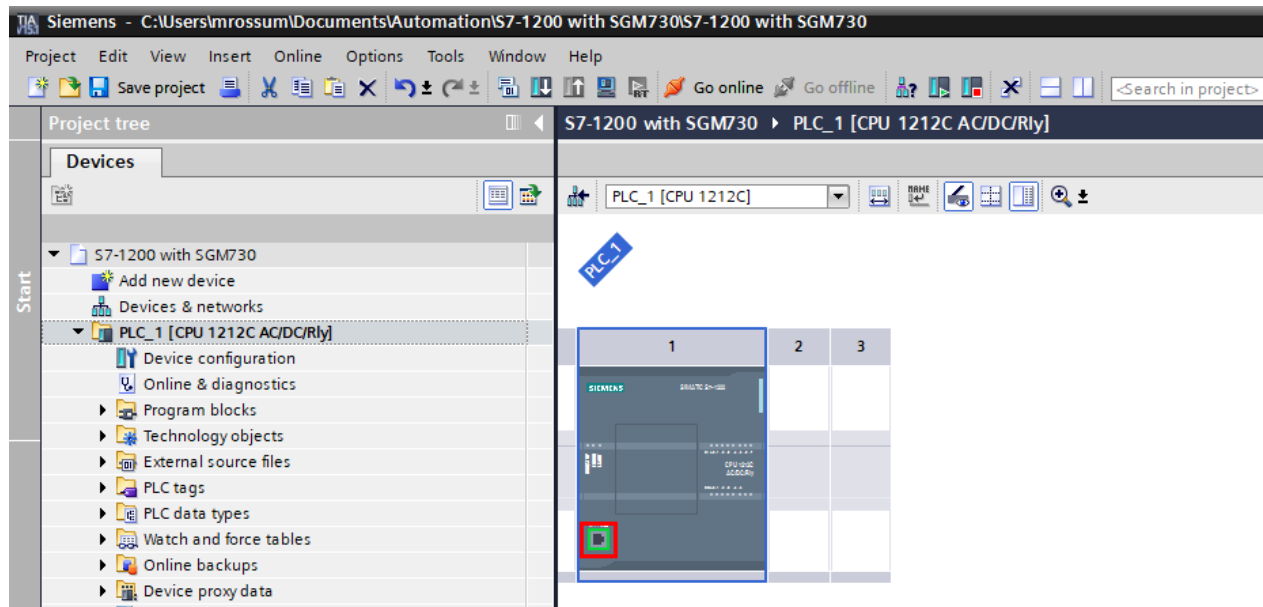


PENKO How to...

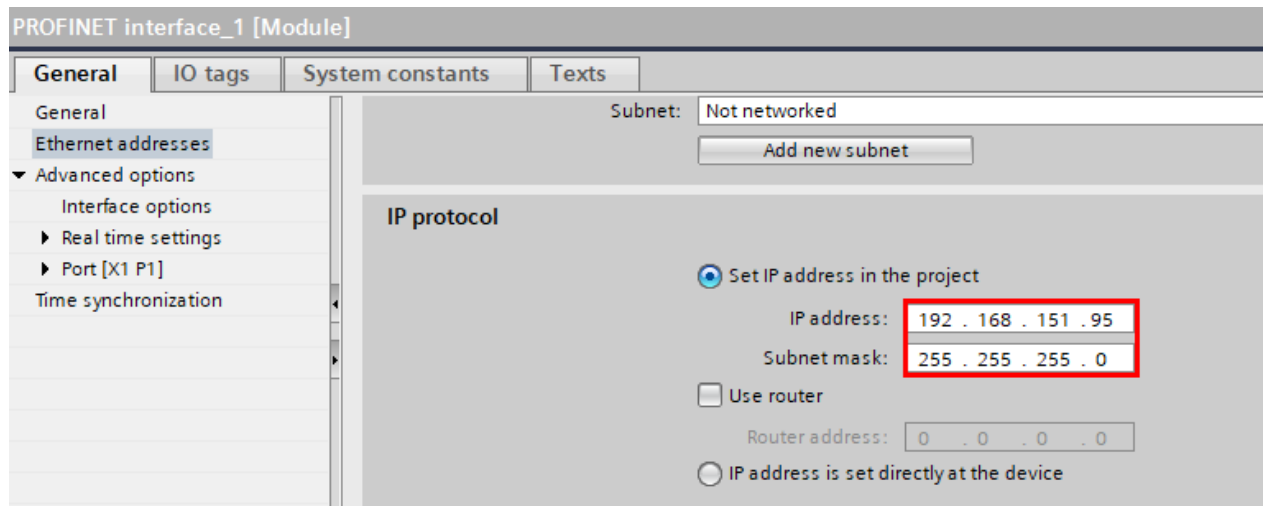
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Assign an IP address to the PLC

Double click on the green square of the PLC.



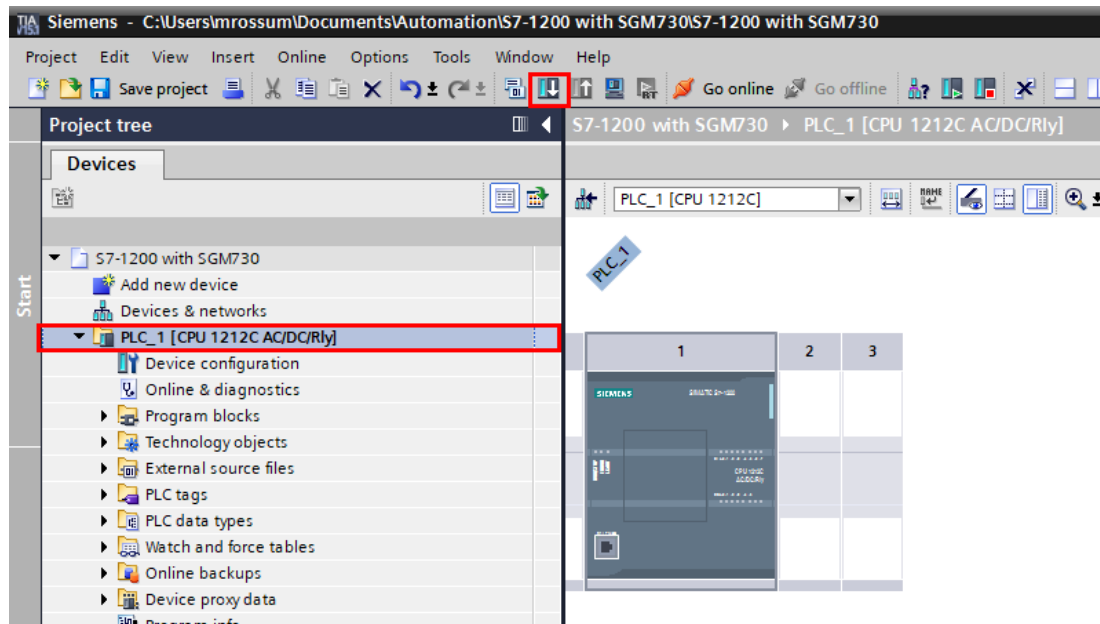
Here you can set the IP address for the PLC.



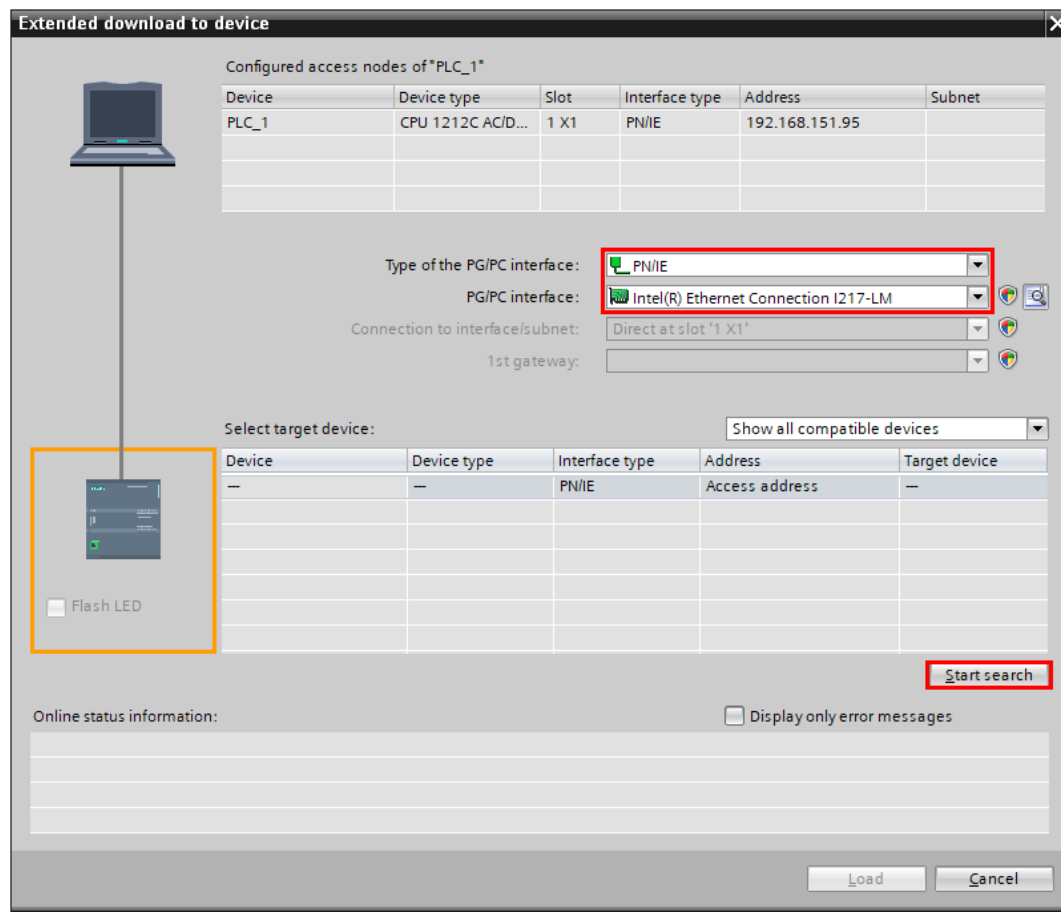
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Click on the Line PLC_1 [CPU 1212C AC/DC/Rly] and click on the button Download to device.



Select the interface that the PLC is connected to and click on Start search.



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When the PLC is found click on Load. (The example below already had the correct IP address. When the PLC doesn't have an IP address yet, the MAC Address is shown.)

The screenshot shows the 'Extended download to device' window. On the left, a laptop icon is connected to a PLC icon by a green line. Below the PLC icon is a 'Flash LED' checkbox. The main area is titled 'Configured access nodes of *PLC_1*' and contains a table with the following data:

Device	Device type	Slot	Interface type	Address	Subnet
PLC_1	CPU 1212C AC/D...	1 X1	PN/IE	192.168.151.95	

Below the table are configuration options:

- Type of the PG/PC interface:
- PG/PC interface:
- Connection to interface/subnet: **PG/PC interface**
- 1st gateway:

The 'Select target device:' section has a 'Show all compatible devices' dropdown and a table with the following data:

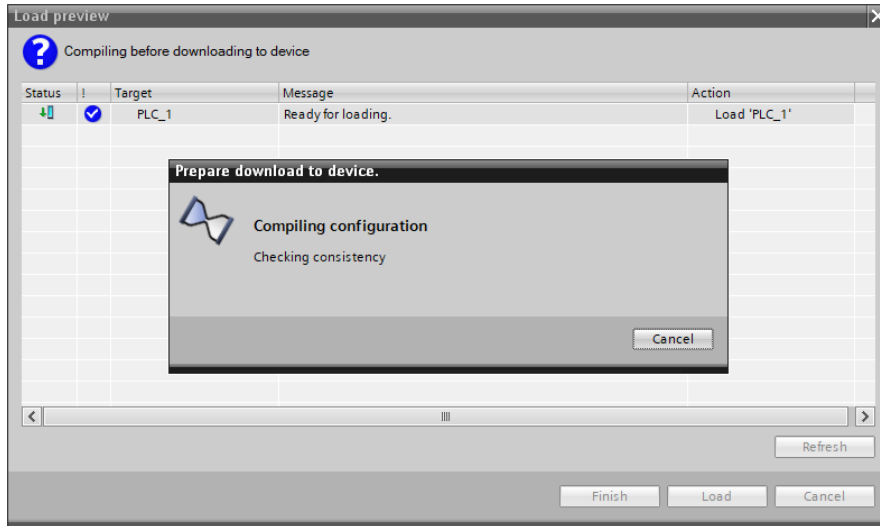
Device	Device type	Interface type	Address	Target device
PLC_1	CPU 1212C AC/D...	PN/IE	192.168.151.95	PLC_1
--	--	PN/IE	Access address	--

At the bottom right, there is a 'Start search' button and a 'Load' button (highlighted with a red box) next to a 'Cancel' button. The 'Online status information' section shows a list of messages:

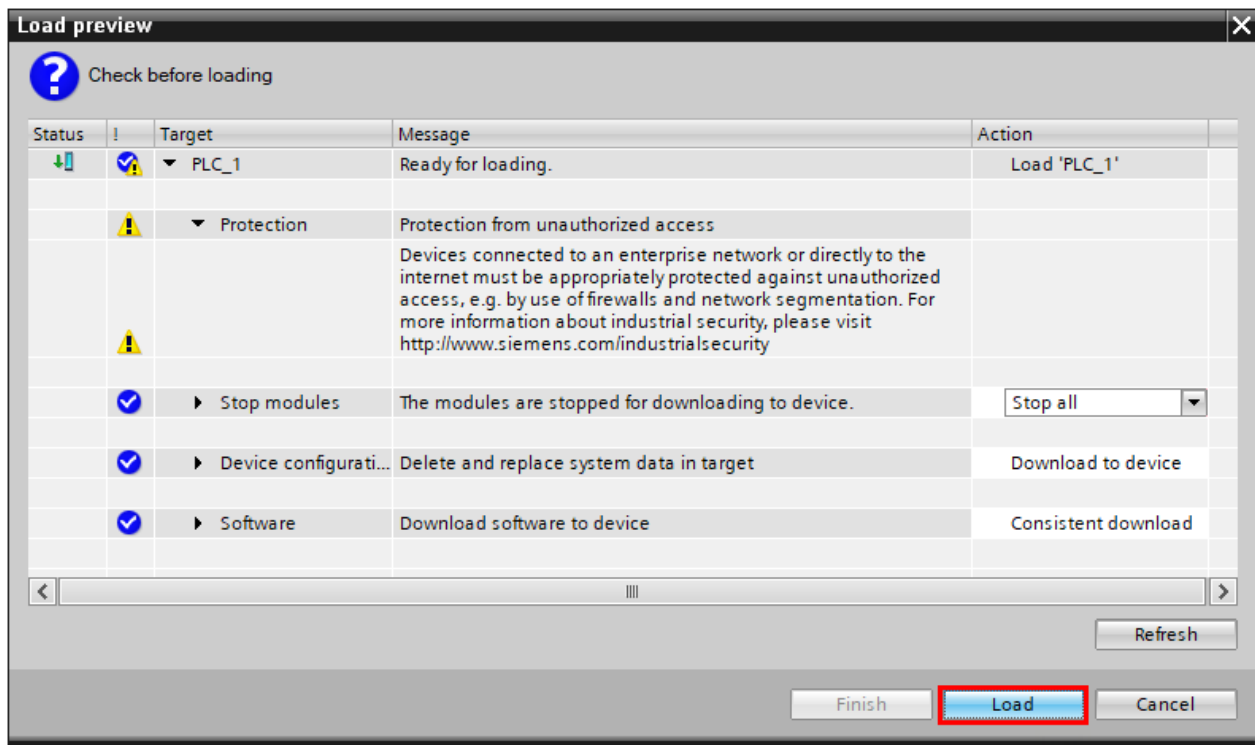
- Display only error messages
- Connection established to the device with address 192.168.151.95.
- Scan completed. 1 compatible devices of 4 accessible devices found.
- Retrieving device information...
- Scan and information retrieval completed.

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The configuration will compile.

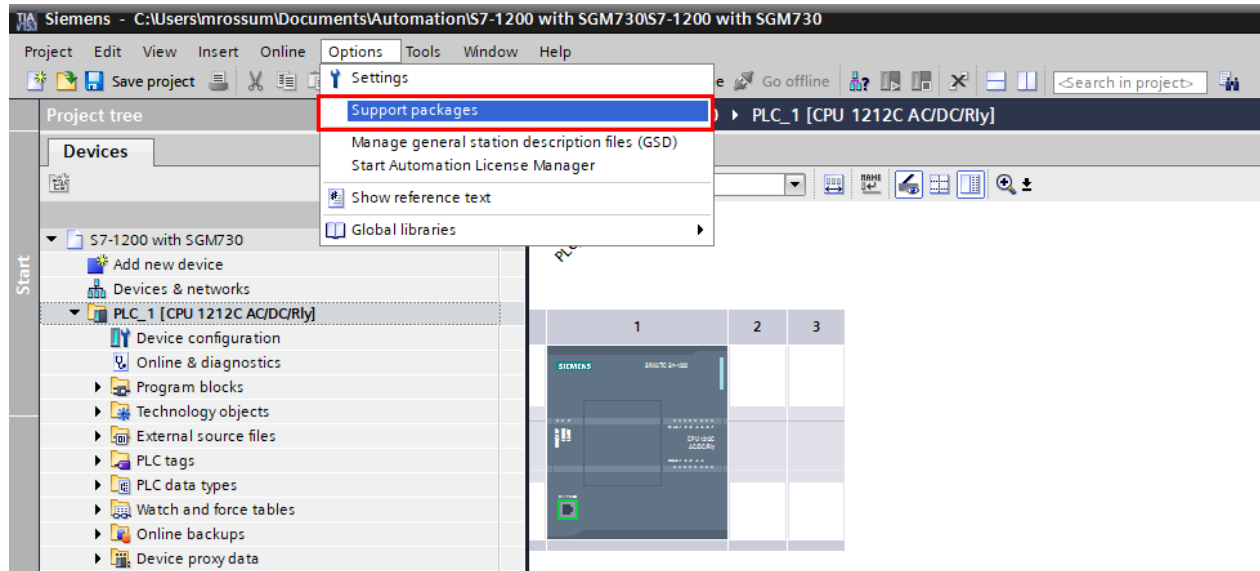


Click on Load to download the configuration into the PLC. When completed click on Finish.

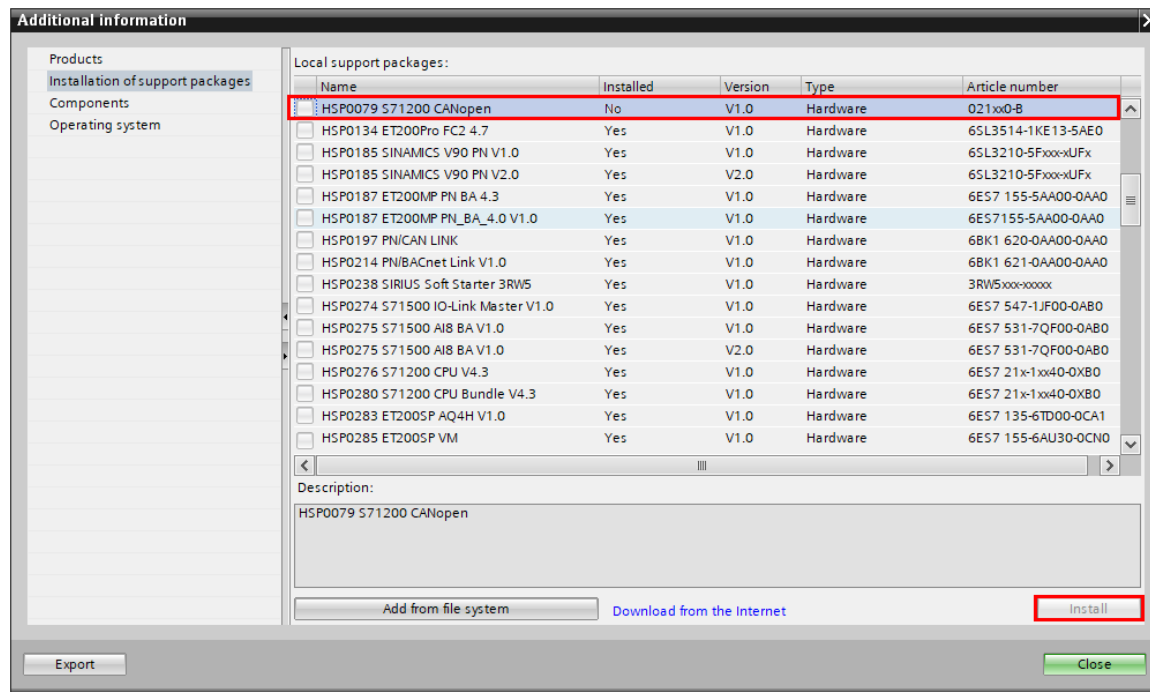


Add the HMS 021620-B support package to the project

Click on Options and click on Support packages.

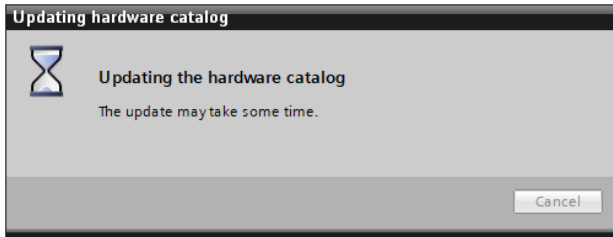


Select the HSP0079 S71200 CANopen file and click on Install. If it is not shown, click on Add from file system and locate the file. When installed, click on Close.



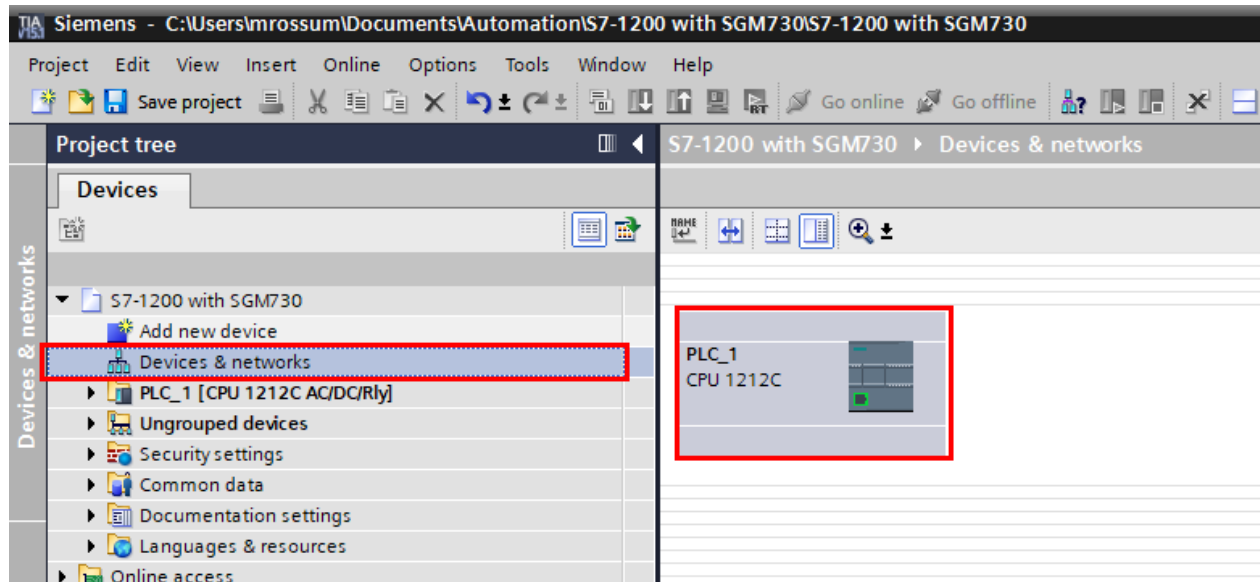
PENKO How to...
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The hardware catalog will be updated.



Devices & networks

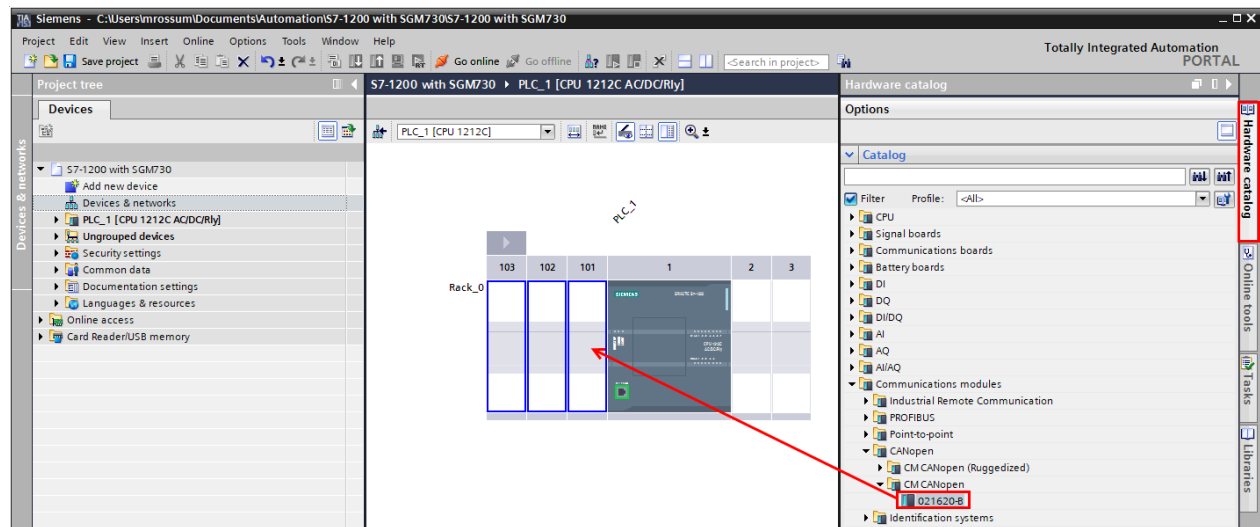
Double click on Devices & networks in the left column. It will show the PLC in the network, double click on the PLC_1.



Go to the right column and select the 021620-B in the Hardware catalog. Follow the path:

Communications modules – CANopen – CM CANopen

Drag and drop the 021620-B into Rack position 101.



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The HMS 021620-B is now added to the PLC, setup the Module parameters as below.

The screenshot displays the Siemens TIA Portal interface. The main window shows a rack configuration for PLC_1 [CPU 1212C AC/DC/Rly]. The rack contains a CPU module in slot 1 and a CM CANopen_1 module in slot 101. The module parameters for CM CANopen_1 are configured as follows:

Parameter	Value
Node number	127
Operating mode	CANopen Manager
Baudrate	500 kbits/s
CANopen input data size	32
CANopen output data size	24
CANopen Manager auto configuration	<input type="checkbox"/>

You are now ready to program the communication between the SGM730 and PLC.



About PENKO

Our design expertise include systems for manufacturing plants, bulk weighing, check weighing, force measuring and process control. For over 35 years, PENKO Engineering B.V. has been at the forefront of development and production of high-accuracy, high-speed weighing systems and our solutions continue to help cut costs, increase ROI and drive profits for some of the largest global brands, such as Cargill, Sara Lee, Heinz, Kraft Foods and Unilever to name but a few.

Whether you are looking for a simple stand-alone weighing system or a high-speed weighing and dosing controller for a complex automated production line, PENKO has a comprehensive range of standard solutions you can rely on.

Certifications

PENKO sets high standards for its products and product performance which are tested, certified and approved by independent expert and government organizations to ensure they meet – and even – exceed metrology industry guidelines. A library of testing certificates is available for reference on:

http://penko.com/nl/publications_certificates.html



PENKO Professional Services

PENKO is committed to ensuring every system is installed, tested, programmed, commissioned and operational to client specifications. Our engineers, at our weighing center in Ede, Netherlands, as well as our distributors around the world, strive to solve most weighing-system issues within the same day. On a monthly basis PENKO offers free training classes to anyone interested in exploring modern, high-speed weighing instruments and solutions. A schedule of training sessions is found on: www.penko.com/training

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PENKO's worldwide network: Australia, Belgium, Brazil, China, Denmark, Germany, Egypt, Finland, France, India, Italy, Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Syria, Turkey, United Kingdom, South Africa, Slovakia Sweden, Switzerland and Singapore. A complete overview you will find on: www.penko.com/dealers

