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How to…

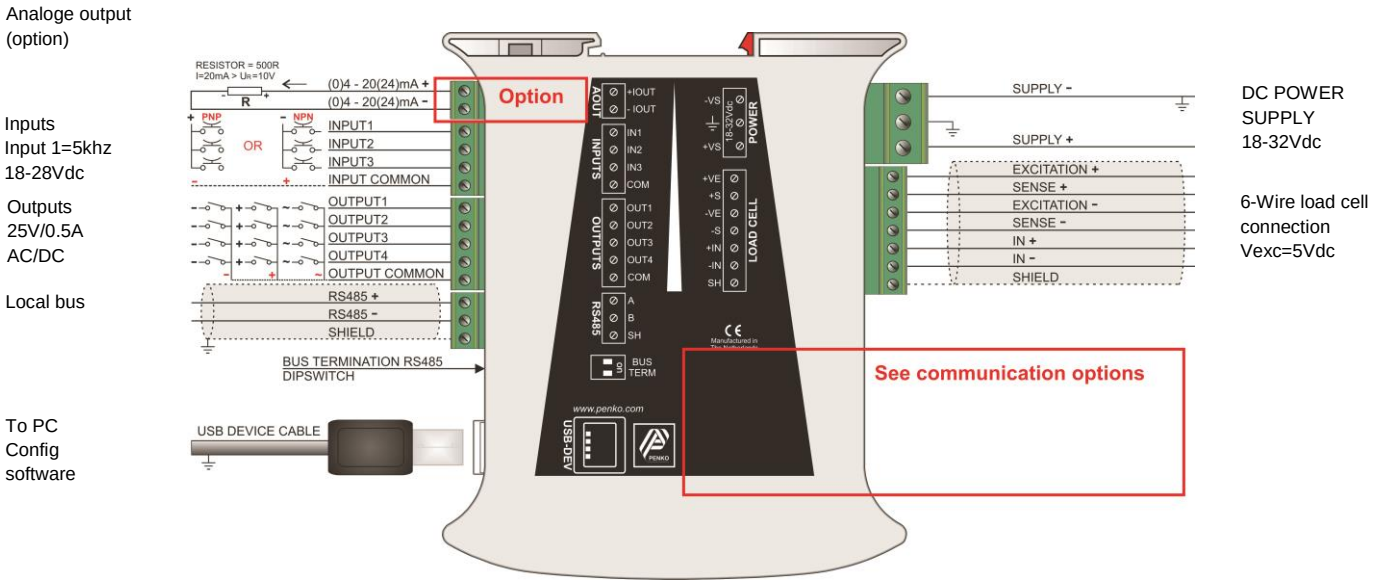
Connect a SGM720 or SGM820 to a Omron PLC with Ethernet IP

PENKO
an ETC Company

Table of Contents

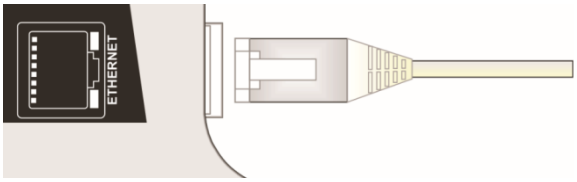
General information

When the SGM720 or SGM820 is powered by USB (not 24Vdc) the load cell interface, analog output and the Ethernet port will not work.



SGM720

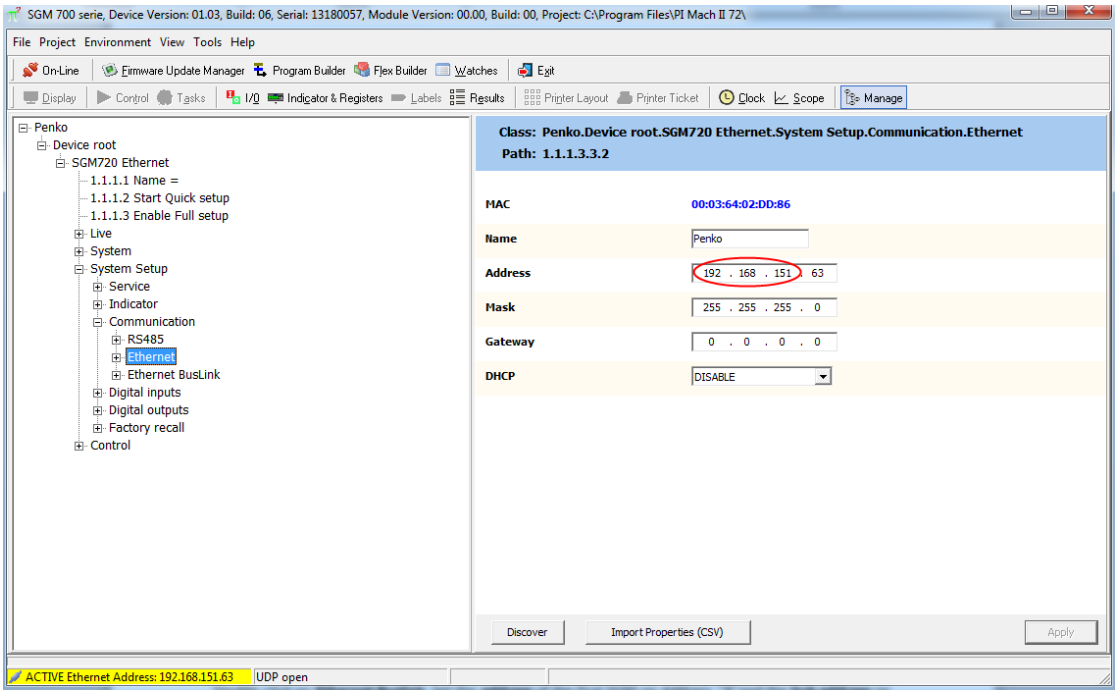
Ethernet connection



Setup the SGM720 or SGM820

Connect the SGM720 or SGM820 to a PC using a USB-cable and open Pi Mach II and double click on **SGM720** or **SGM820**, then double click on **System Setup**, then double click on **Communication**, then double click on **Ethernet**, set the **Ethernet address**. Click on **Apply** to save settings.

Note: the first 3 numbers of the IP address must be the same as the PLC.



Wiring

Connect the SGM720 or SGM820 directly to the Omron PLC with a Ethernet cross cable. Or connect the SGM720 or SGM 820 with a switch to the Omron PLC.

EDS file

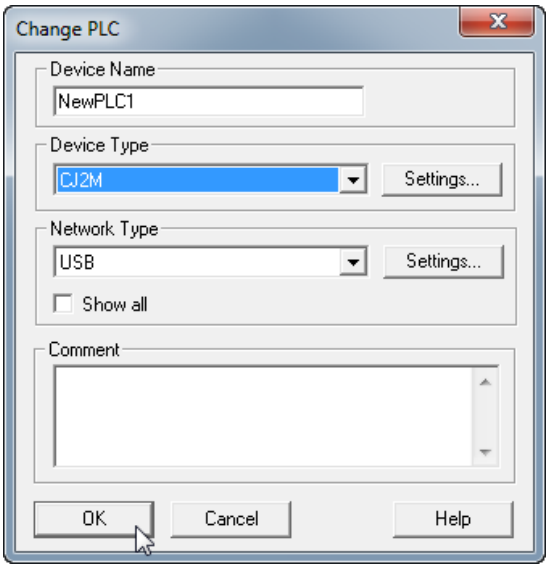
The EDS File can be downloaded from our website www.penko.com. The zip folder contains the EDS file and a PDF file explaining the EDS file.

CX-Programmer part 1

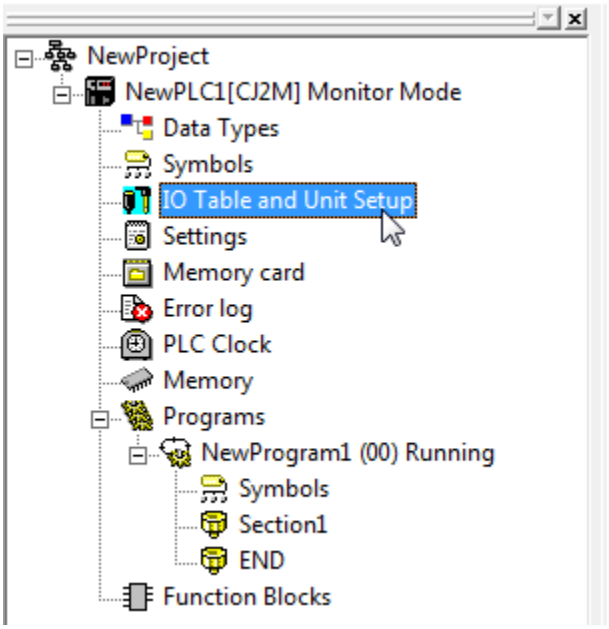
Open a new project

Open CX-Programmer to set up the PLC. In the example we use an **Omron CJ2M-CPU31 PLC**.

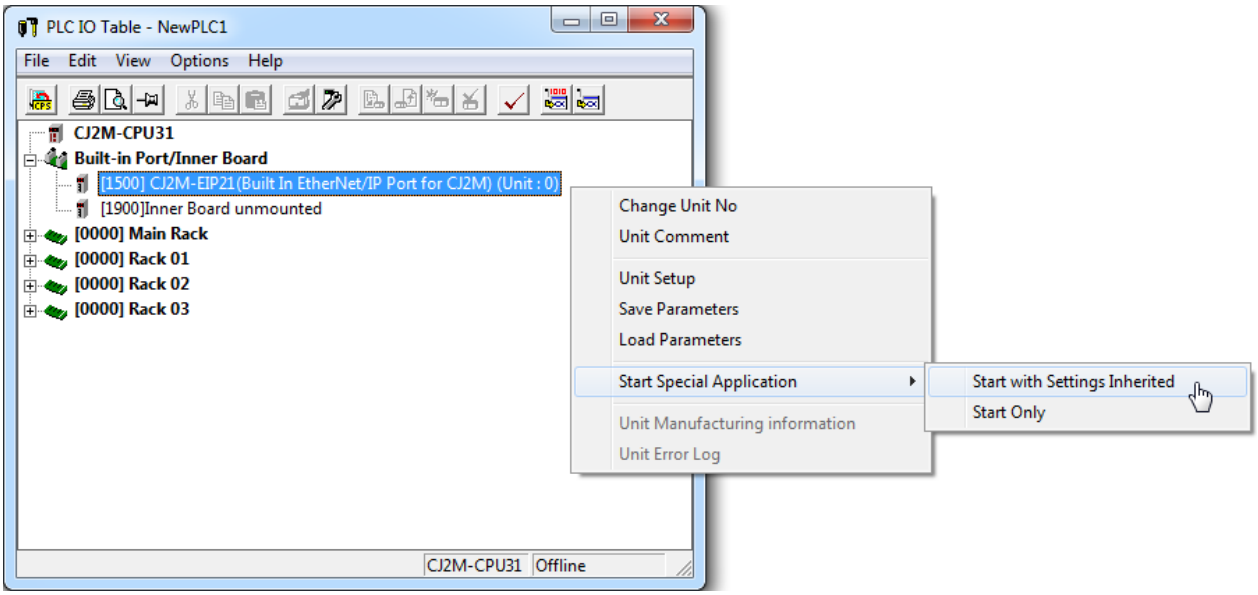
Click on **New** and set the **Device Type** and **Network Type** and click on **OK**.



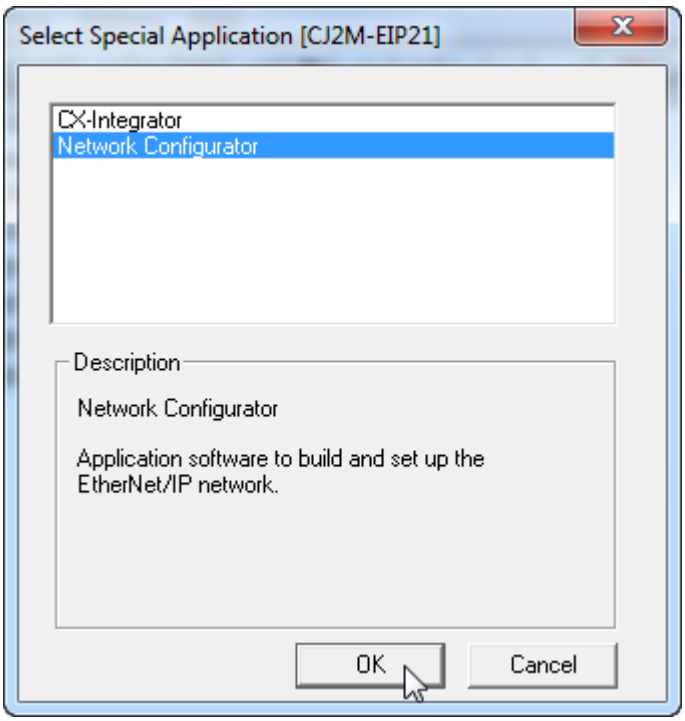
Double click on **IO Table and Unit Setup**.



Open the **Build-in Port/Inner Board** and right click on the **CJ2M-EIP21(Built In EtherNet/IP Port for CJ2M) (Unit:0)**. Go to **Start Special Application** and click on **Start with Settings Inherited**.



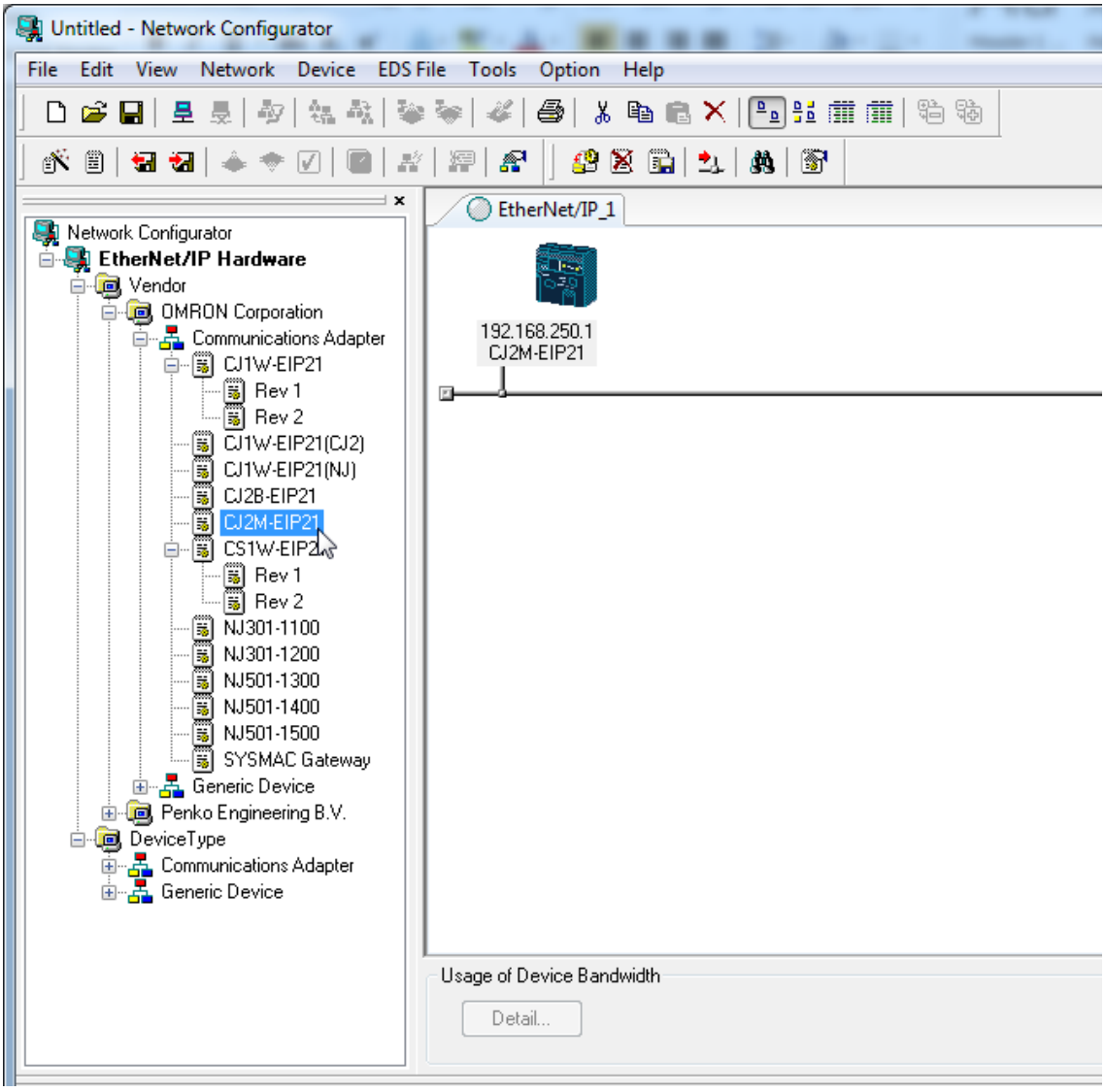
Select **Network Configurator** and click on **OK**.



Network Configurator

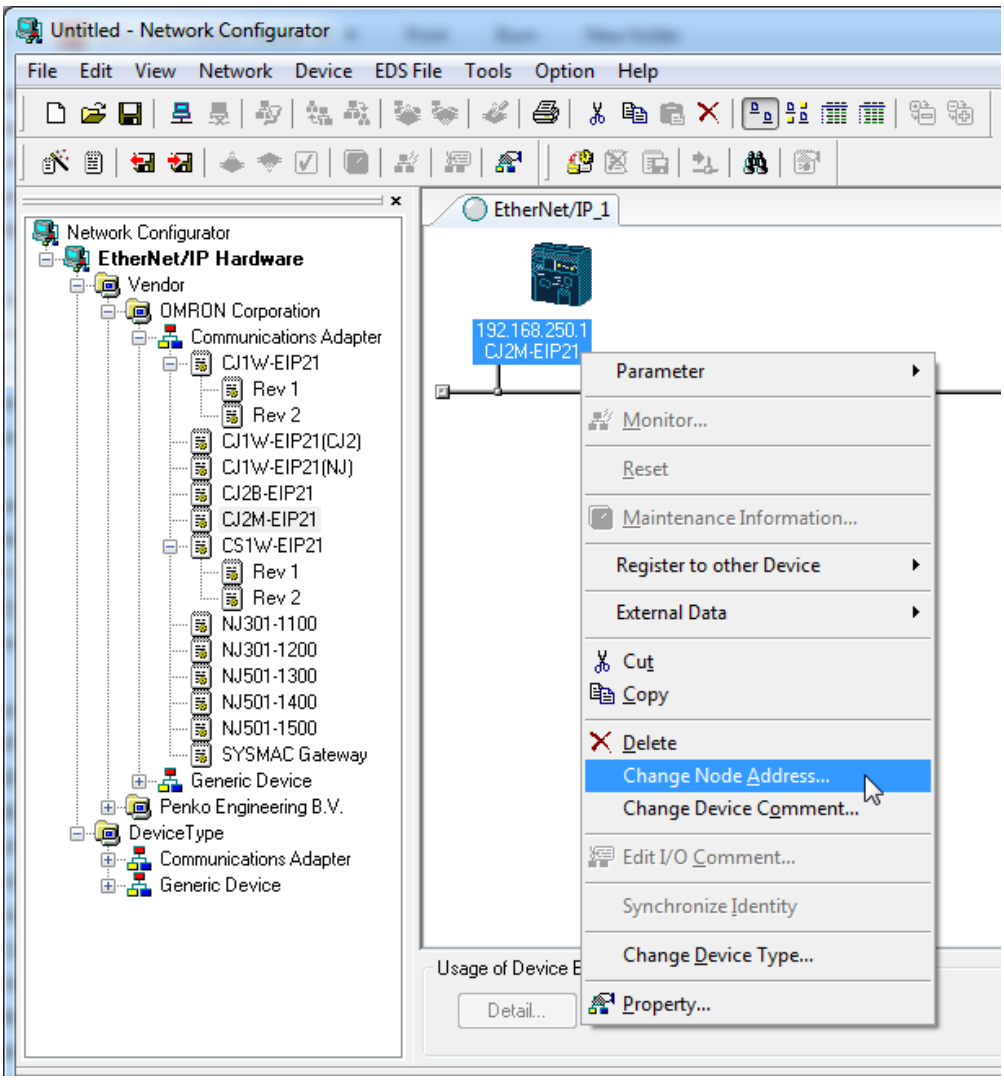
Add the PLC to the Ethernet IP network

Network Configurator will start. Select the correct Ethernet IP Module and double click on it. The module is now added to the Ethernet IP network.



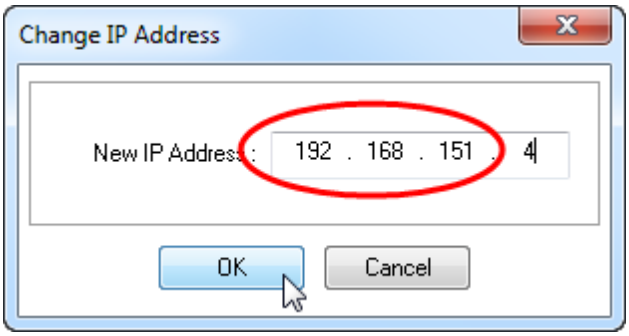
Change Node Address of PLC

Right click on the PLC icon and click on **Change Node Address…**.



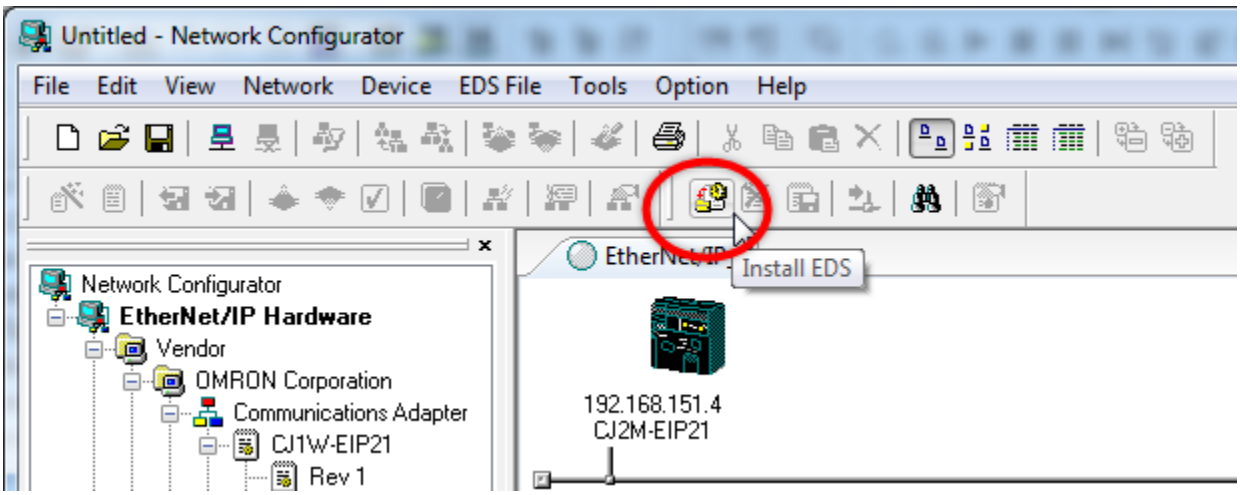
Give the PLC an IP address and click on **OK**.

Note: the first 3 numbers of the IP address must be the same as the SGM720 or SGM820.

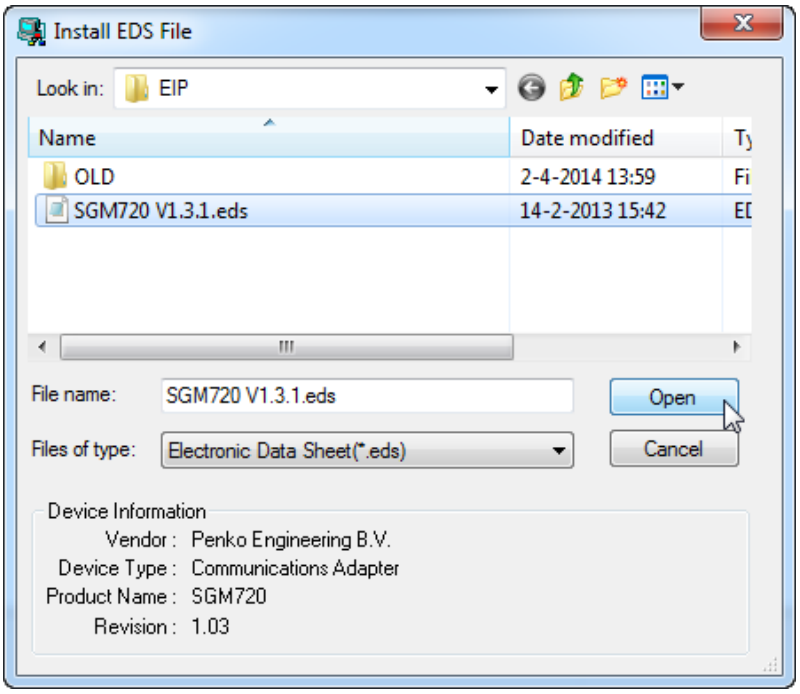


Install EDS file

Click on the button **Install EDS** to install the SGM720 or SGM820 EDS file.

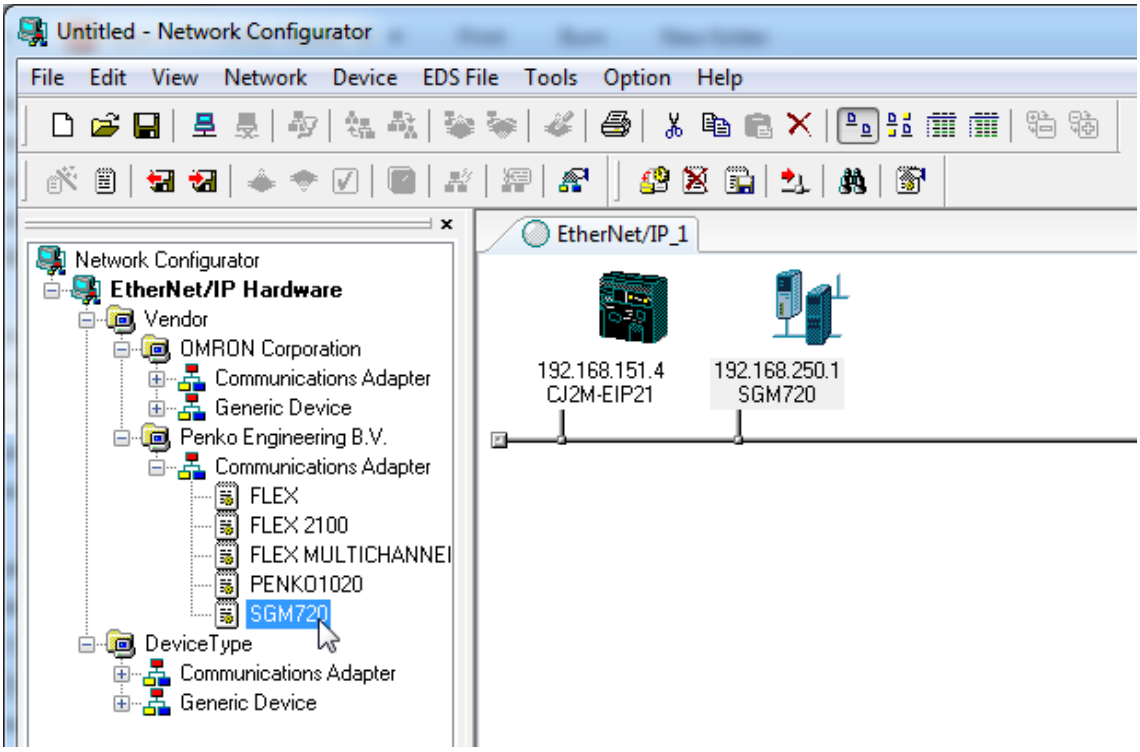


Go to the folder where the EDS file is downloaded, select the file and click on **Open**.



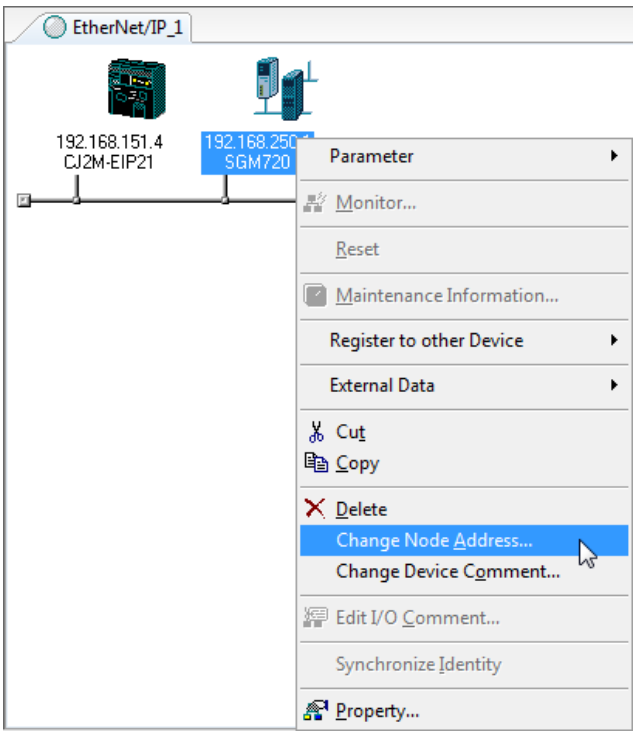
Add the SGM720 or SGM820 to the Ethernet IP network

The SGM720 or SGM820 is now added to the list. Double click on **SGM720** and the SGM720 or SGM820 is added to the Ethernet IP Network.



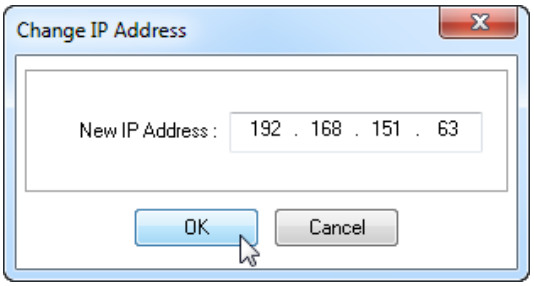
Change Node Address of the SGM720 or SGM820

Right click on the SGM720 or SGM820 and click on **Change Node Address…**.



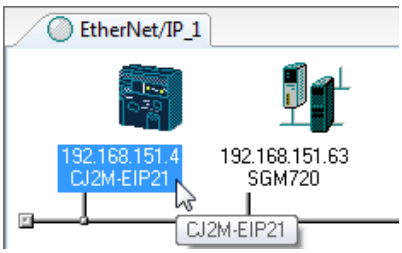
Give the SGM720 or SGM820 an IP address (the same IP address as configured in Pi Mach II) and click on **OK**.

Note: the IP address must be identical as the IP address of the SGM720 or SGM820.

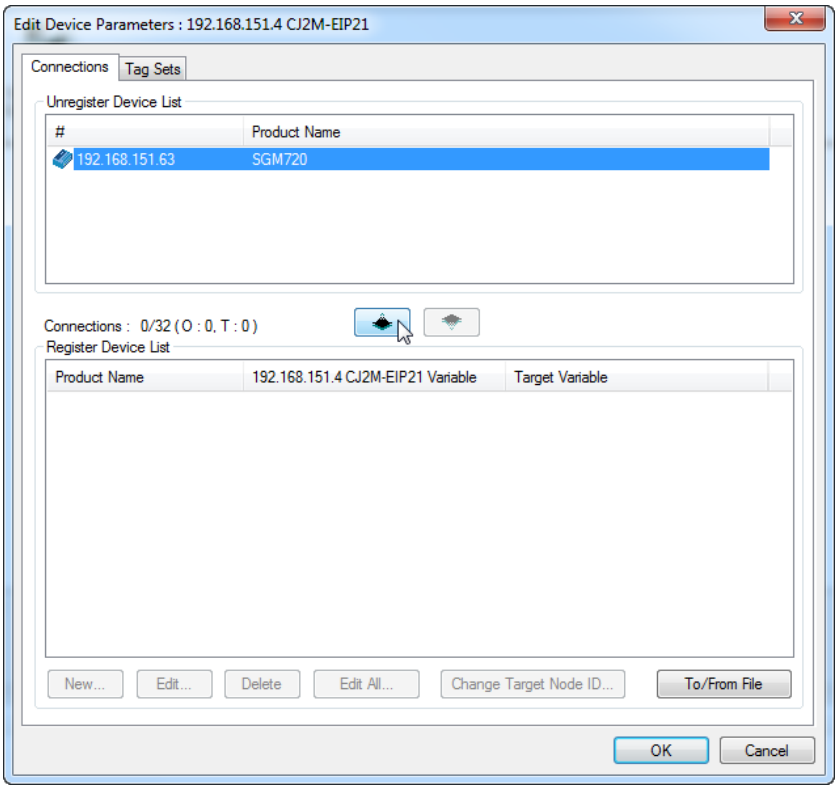


Set up the Ethernet IP network

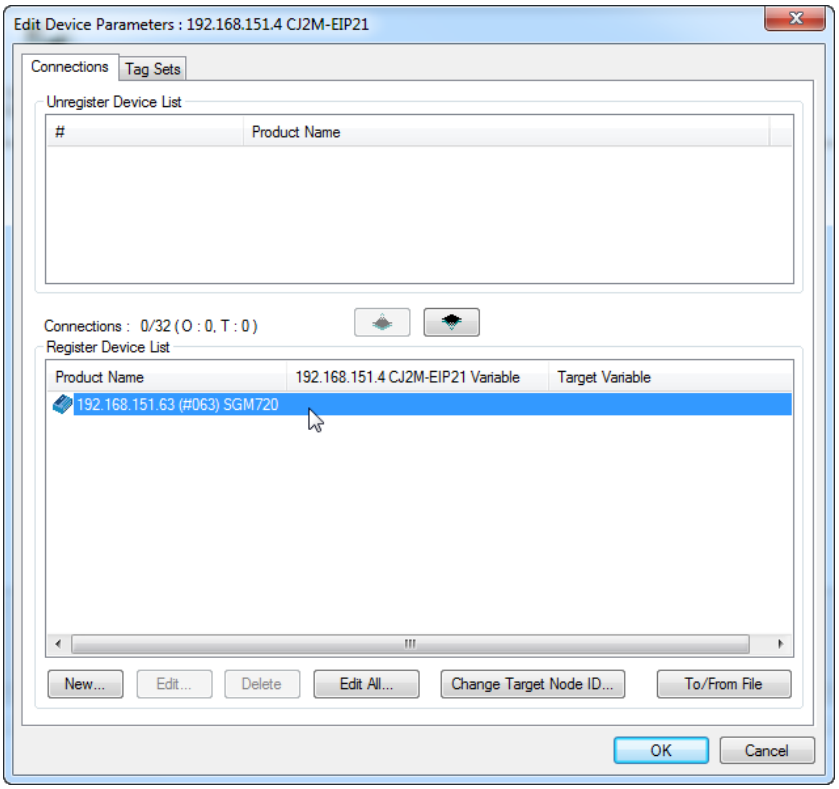
Double click on the PLC icon.



Select the SGM720 or SGM820 in the “Unregister Device List” and click on the arrow button.

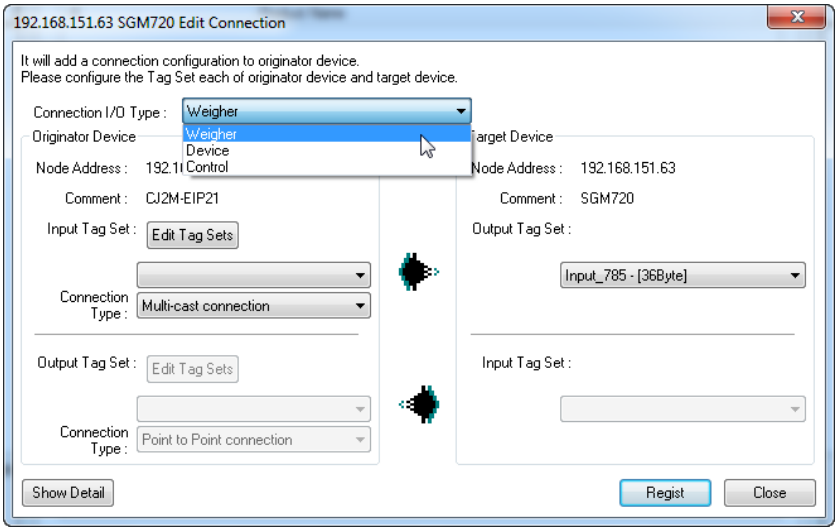


The SGM720 or SGM820 is now added to the “Register Device List. Double click on the SGM720 or SGM820.



Select Connection I/O Type

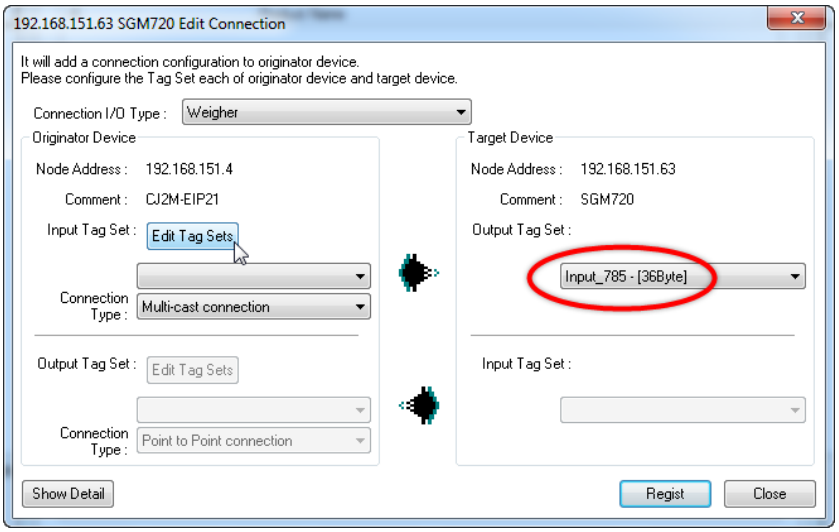
Select a “Connection I/O Type” in the example the connection “Weigher” is used.



Set up the Input Tag Set

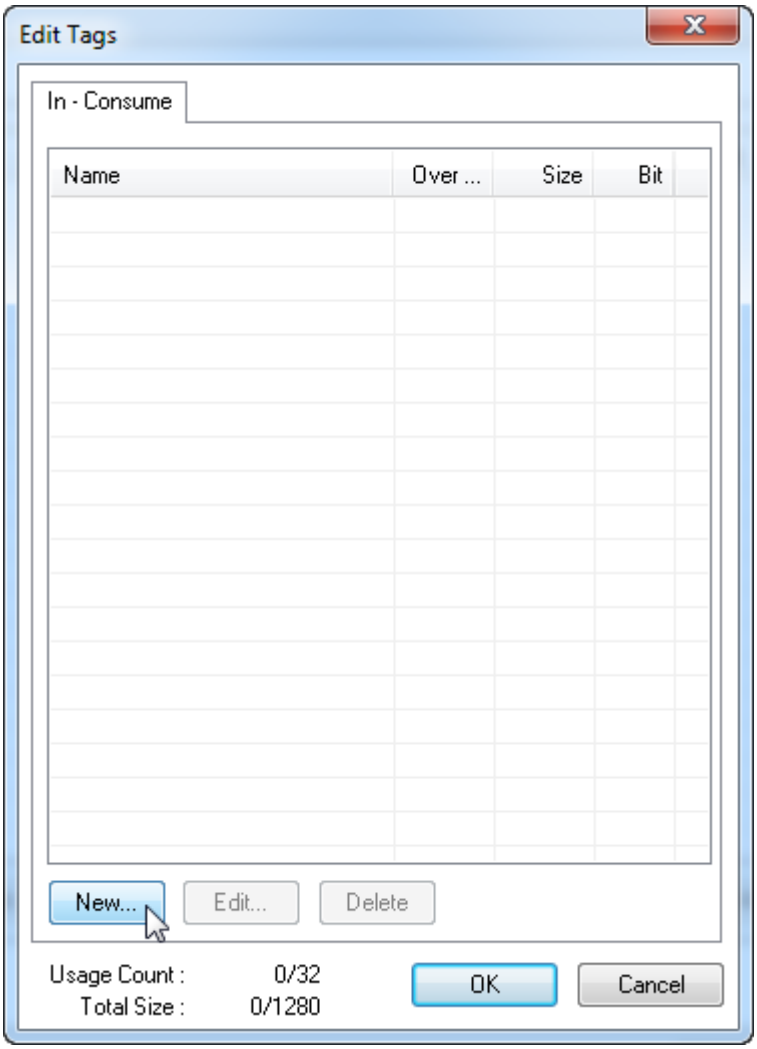
To set up the Input Tag Set, click on the button **Edit Tag Sets**.

Note: The length of the SGM720 or SGM820 output tag set is 36 Bytes. The length of the bytes is needed to set up the Input Tag Set.

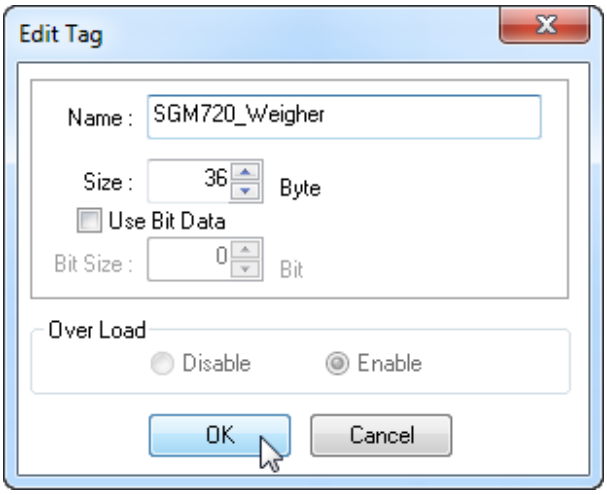


Click on **Edit Tags…** to configure a new Tag.

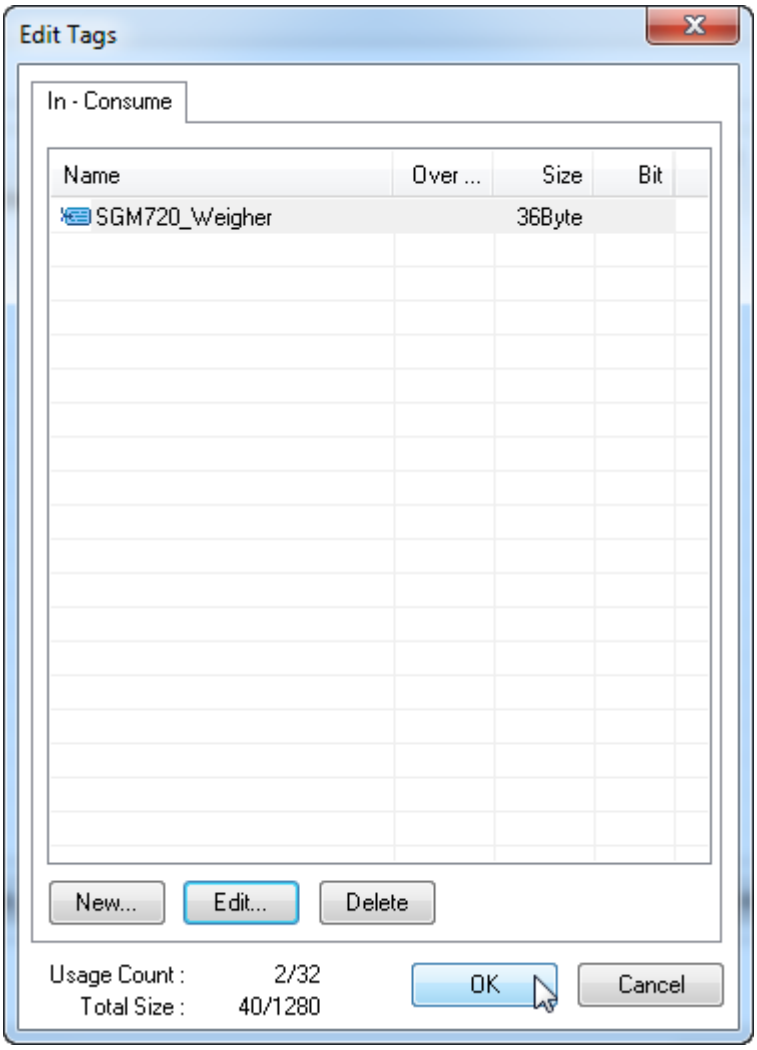
Click on **New**.



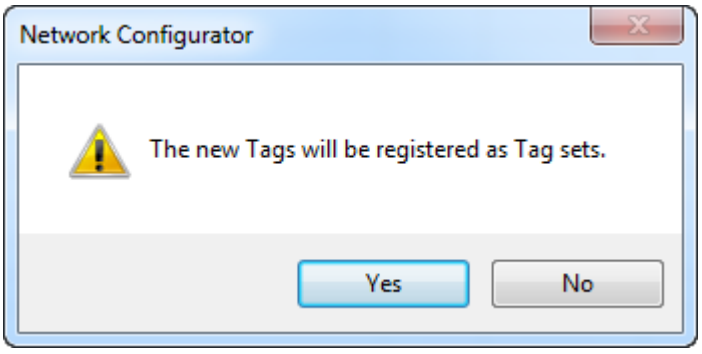
Give the Tag a name and set the byte size. Click on **Regist**.



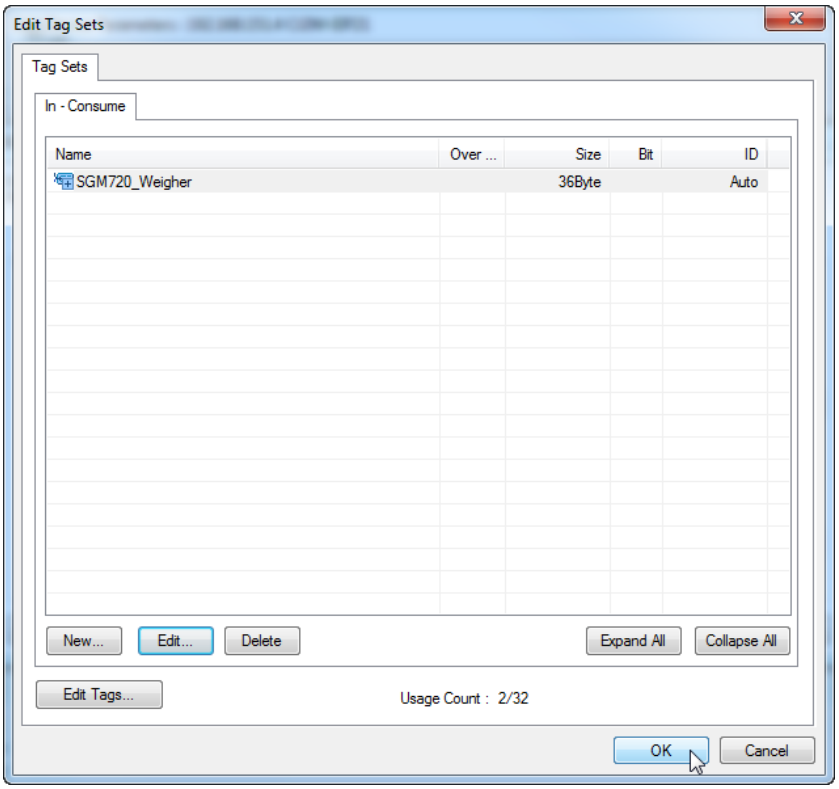
The Tag is added to the list, click on **OK**.



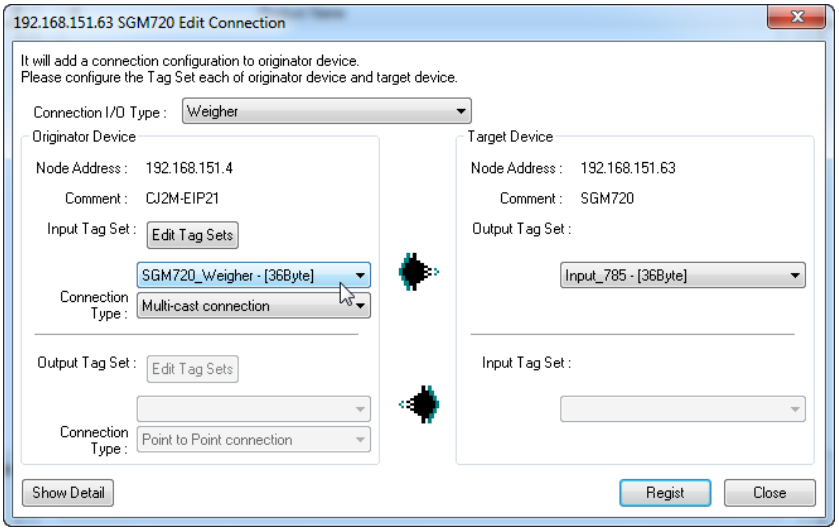
Click on **Yes**.



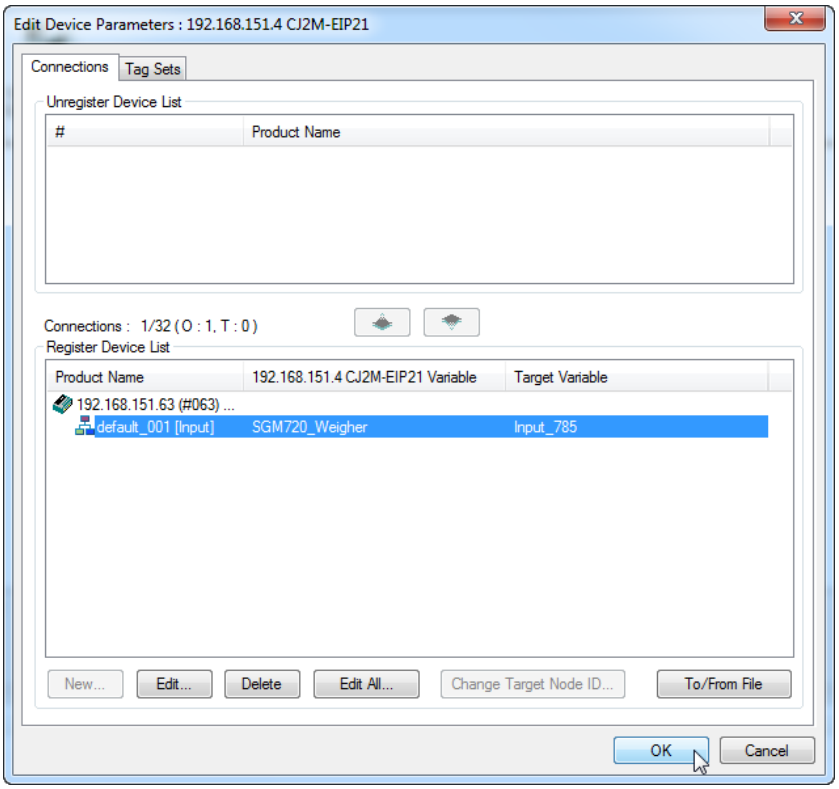
Click on **OK**.



The Input Tag Set can now be selected. After the **Input Tag Set** is done, click on **Regist**.



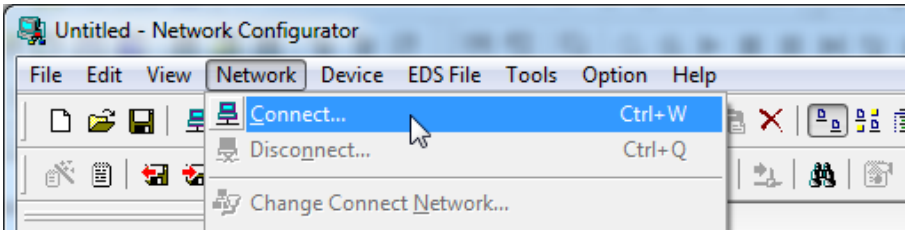
The Input tag is now visible in the "Register Device List". Click on **OK** to close the window.



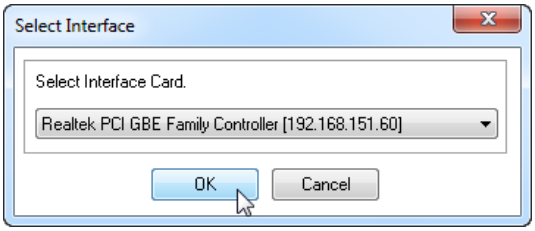
Download settings to the PLC

Note: check if the PLC is in the Stop/Program mode, otherwise it's not possible to download the settings to the PLC.

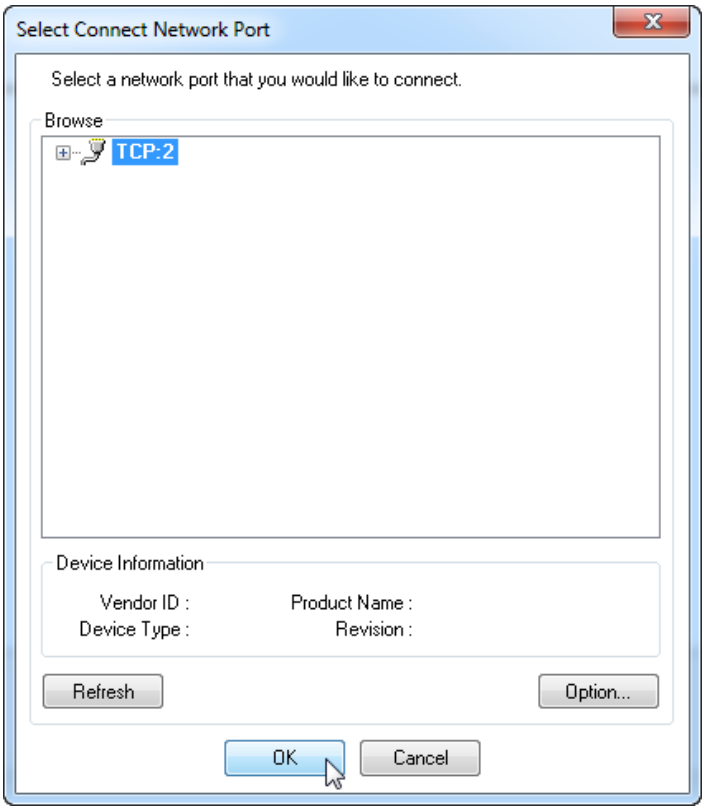
Go to **Network** and click on **Connect…**.



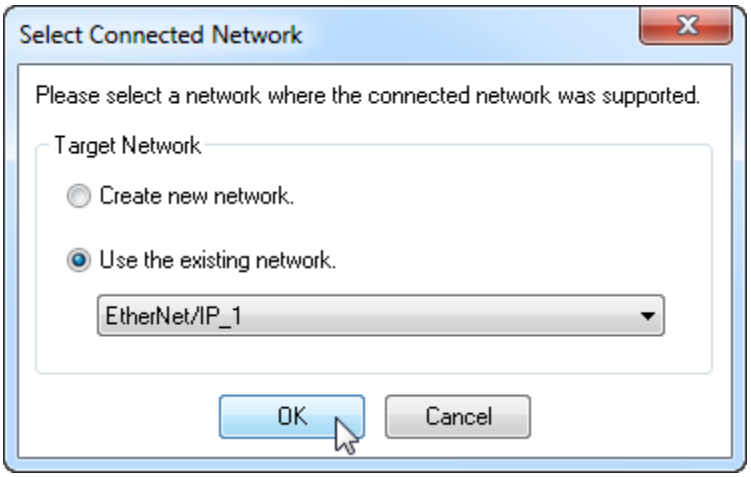
Select an interface card. The selected interface card must be in the same range as the PLC and the SGM720 or SGM820.



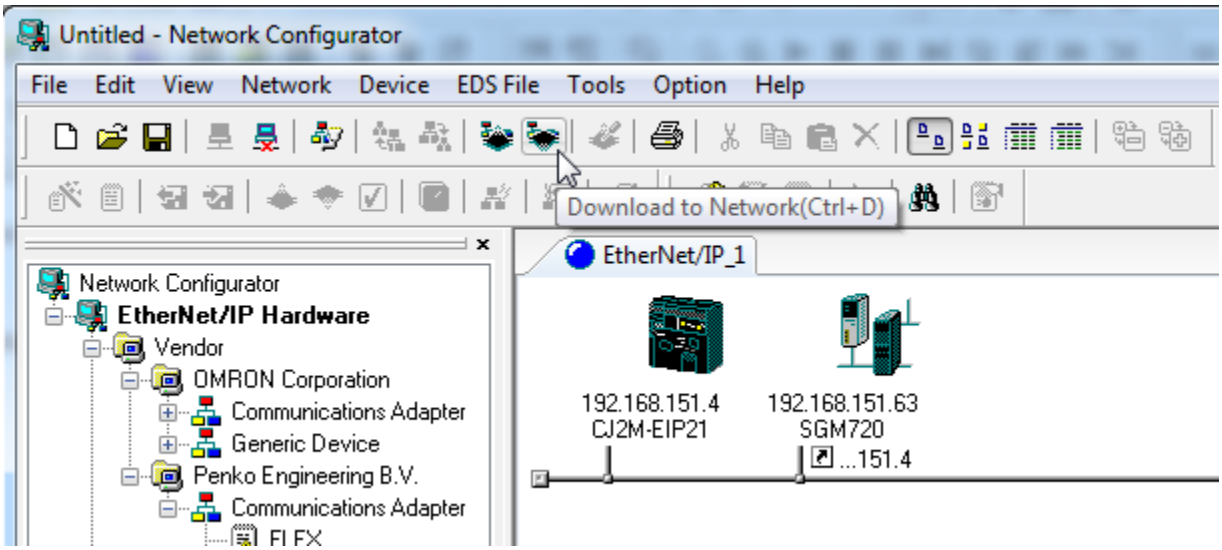
Select the network port that you would like to connect and click on **OK**.



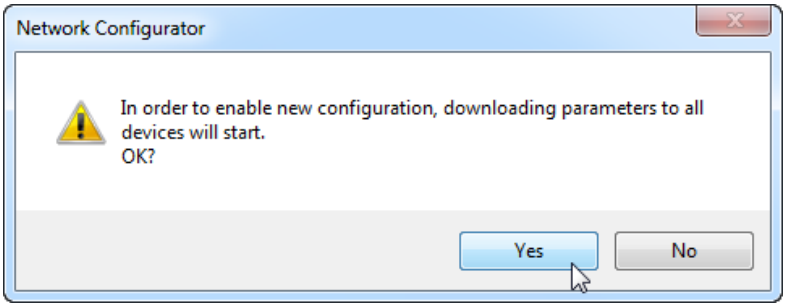
Select **Use the existing network** and click on **OK**.



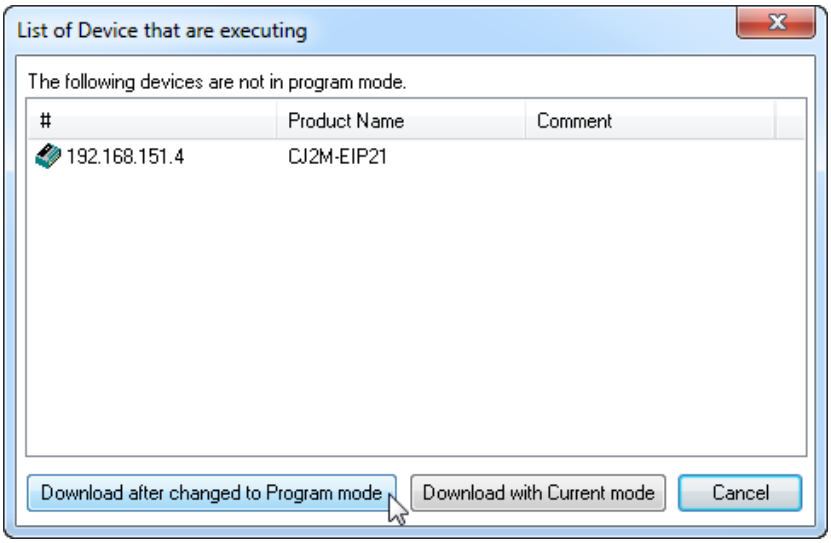
Click on the button **Download to Network**.

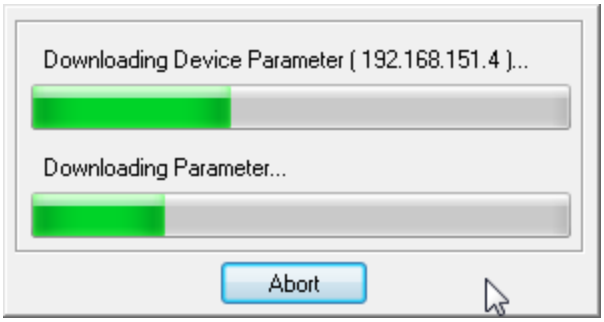


The following screen will appear. Click on **Yes**.

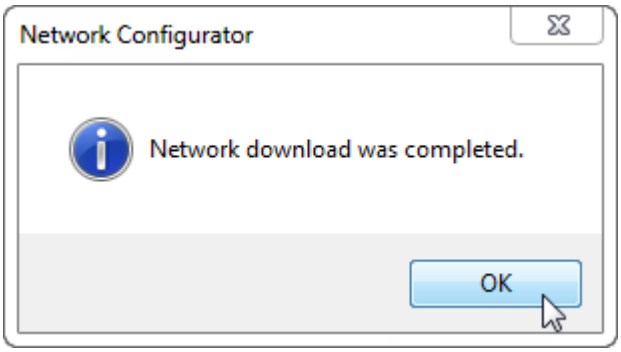


If the PLC is in Stop/Program mode, the downloading will start. If the PLC is in another mode press **Download after changed to Program mode**.

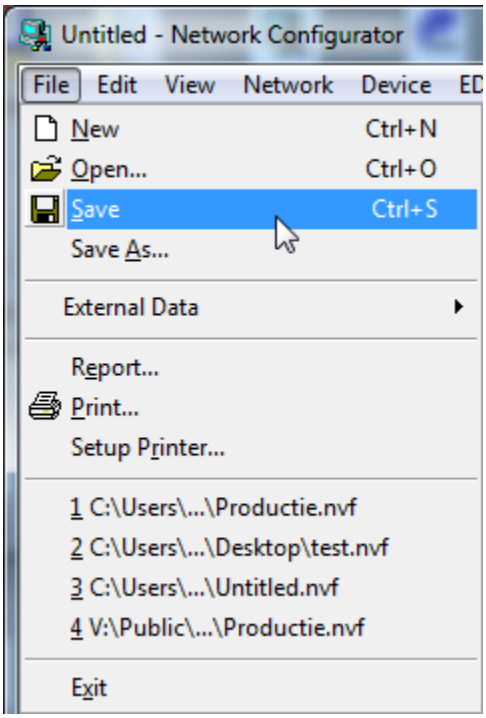




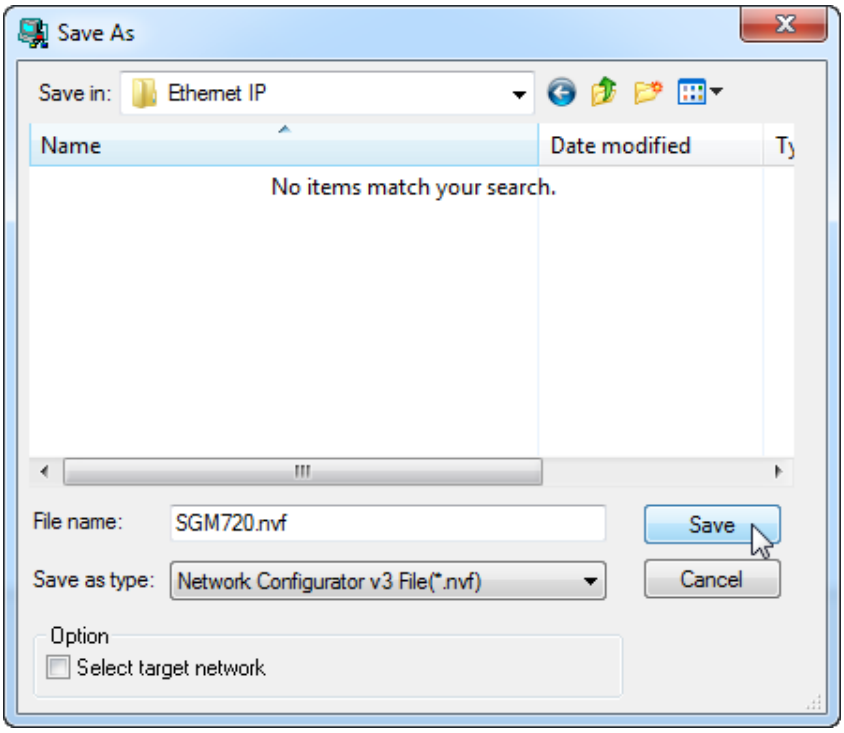
When the downloading is completed, click on **OK**.



Save the **Network Configurator**, go to **File** and click **Save**.



Set a file name and click **Save**.

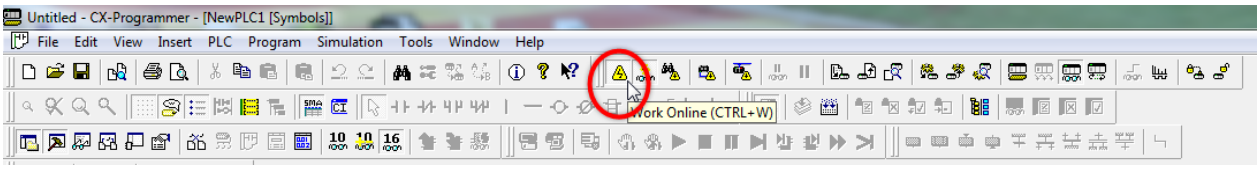


The Network Configurator is now completed and can be closed.

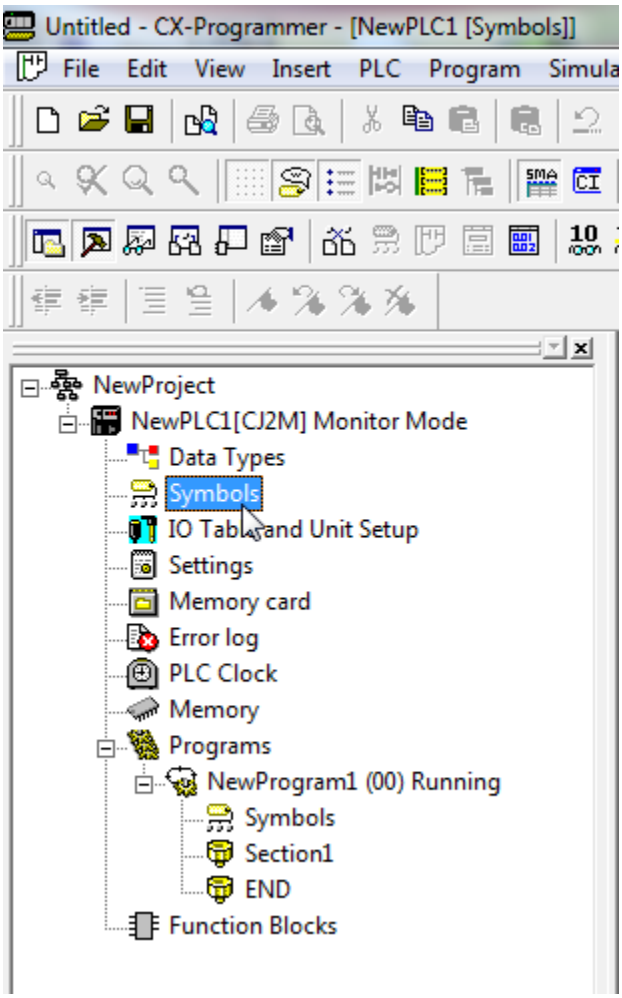
CX-Programmer part 2

Add symbols

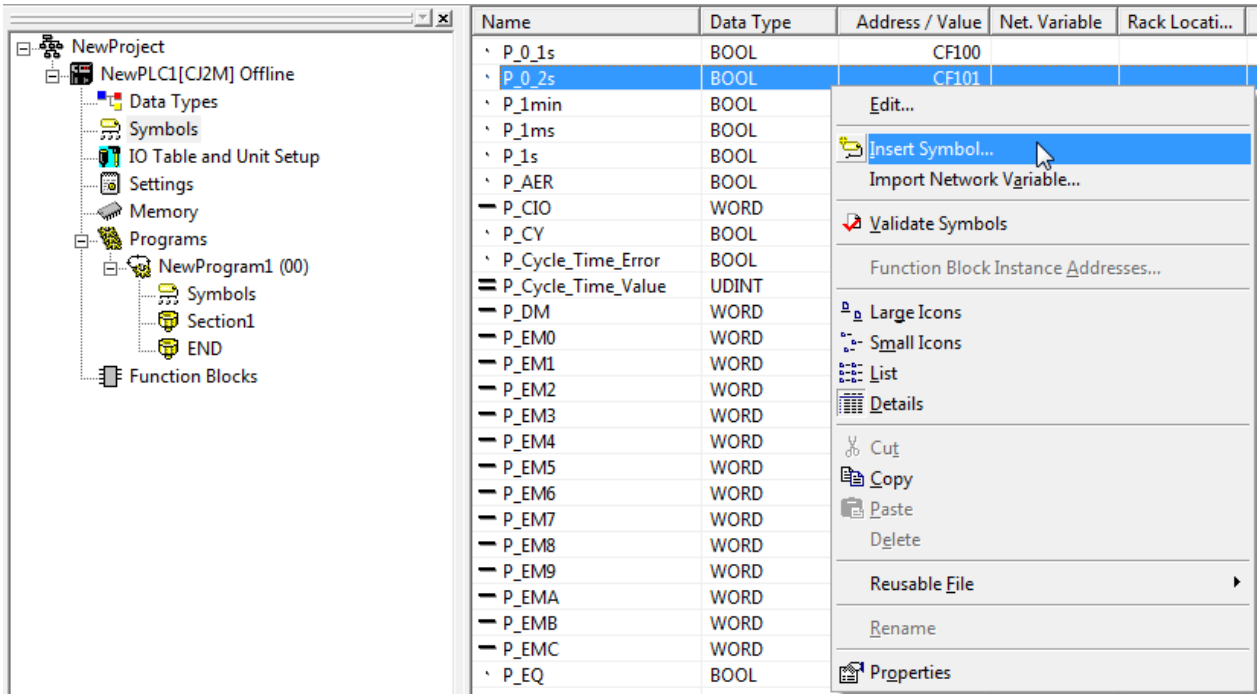
Go back to CX-Programmer, make sure that the PLC is offline. The PLC can be set offline by clicking on the button **Work Online**.



To add the symbol, double click on **Symbols**.

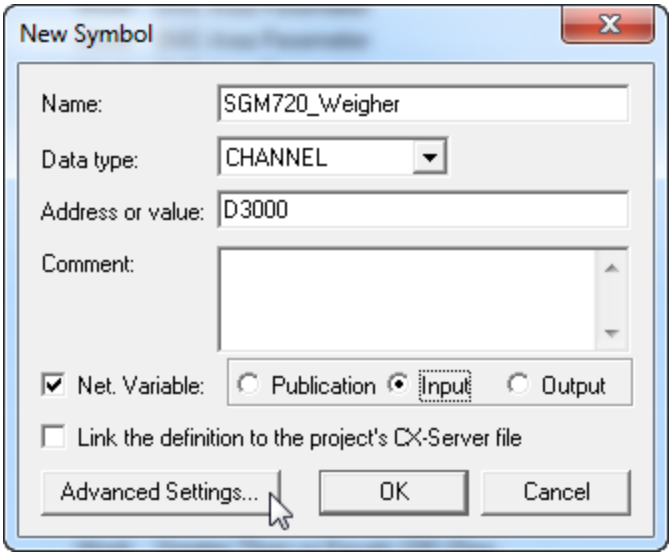


Right click on the symbols and click on **Insert Symbol…**.

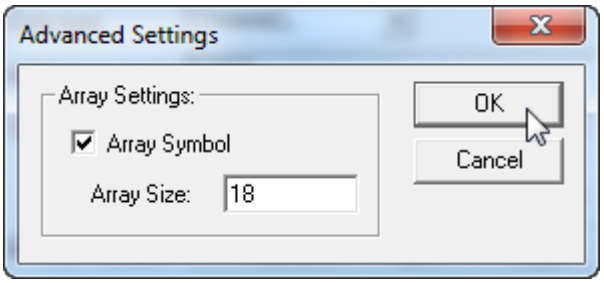


Configure the Symbols

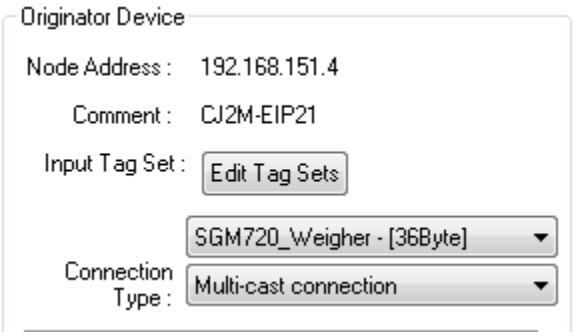
Give the Symbol a name (this must be the same name as used in the **Network Configurator**). Set **Data type** on **CHANNEL**. Set the start address of the SGM720 or SGM820 data. Check the box **Net. Variable** and select **Input**.



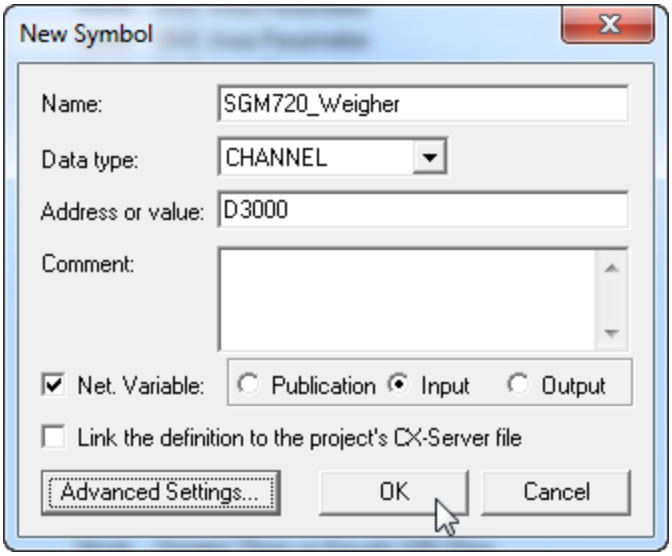
Click on **Advanced Settings**, check the box **Array Symbol** and set the **Array Size**. Then click on **OK**.



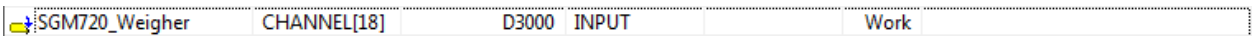
Note: The array size is set in words. Divide the number of bytes by two to get the number of words (36 bytes / 2 = 18 words. The byte size can be found in the ***Network Configurator program****.*



The symbol is now set up, so click on **OK** to complete the setup.

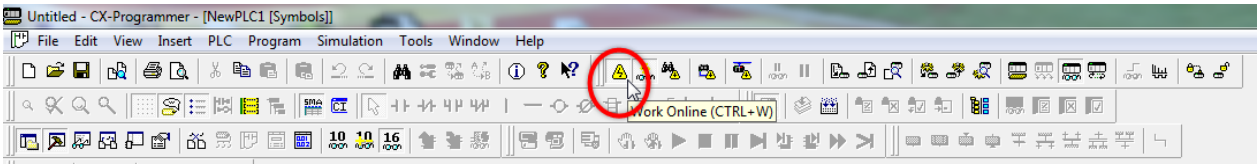


The Symbols is added to the symbols list.

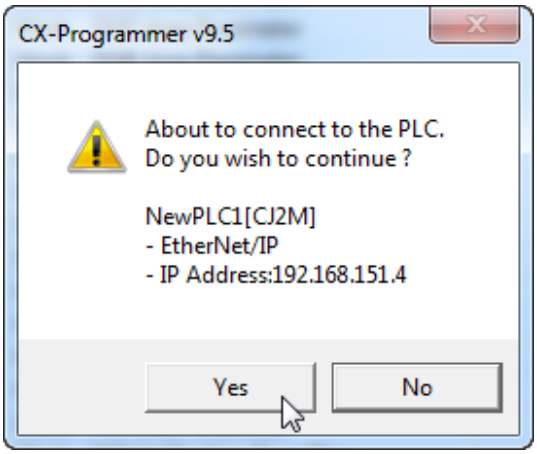


Transfer the symbols to the PLC

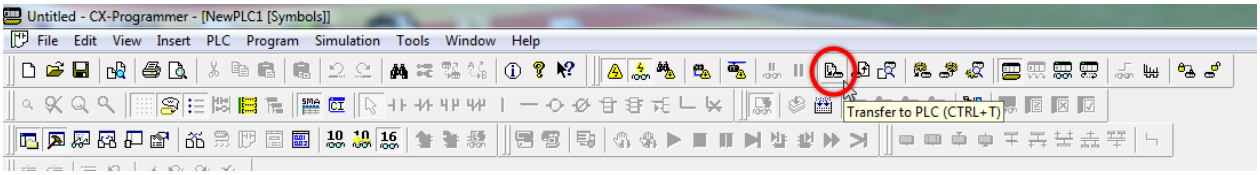
To transfer the symbols into the PLC, the PLC must be connected to the PC. Click on the button **Work Online**.



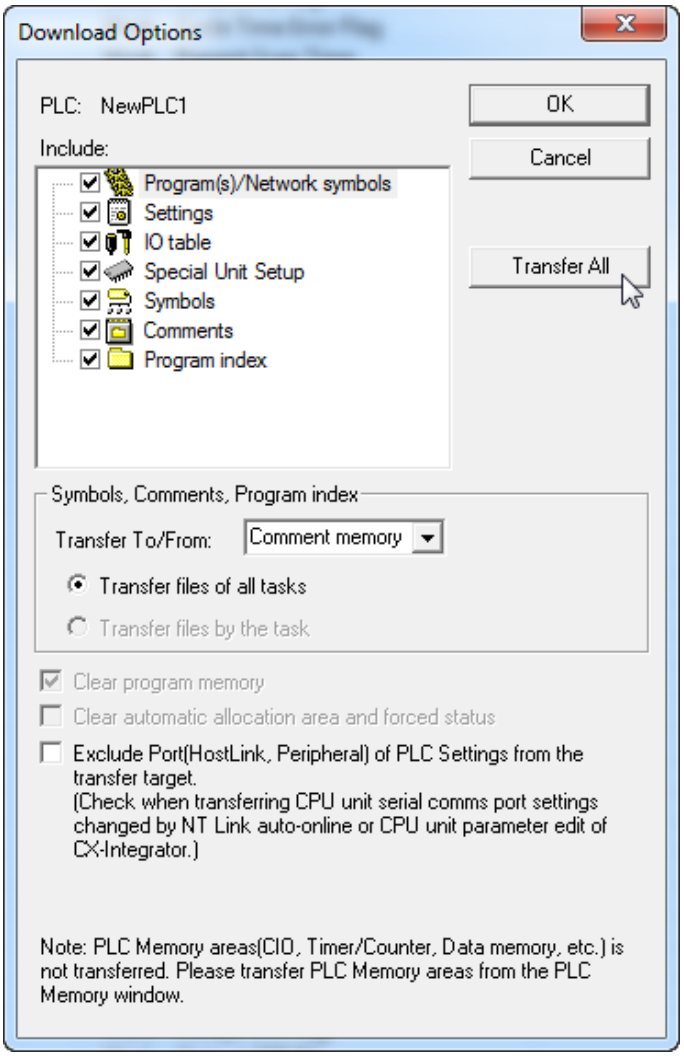
Click on **Yes** to connect the PLC to the PC.



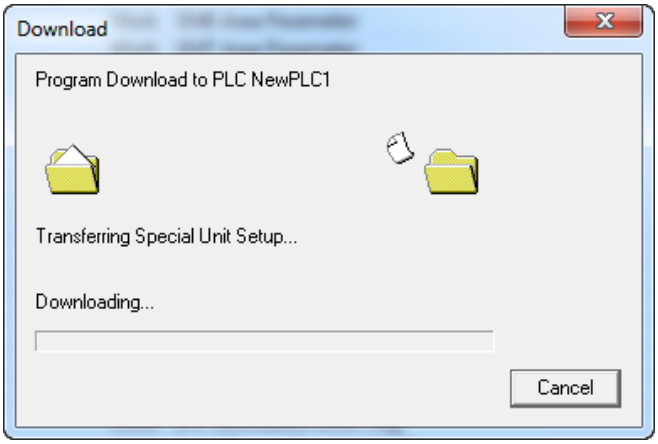
Click on the button **Transfer to PLC**.



Click on the button **Transfer All** and all the data will transfer to the PLC.

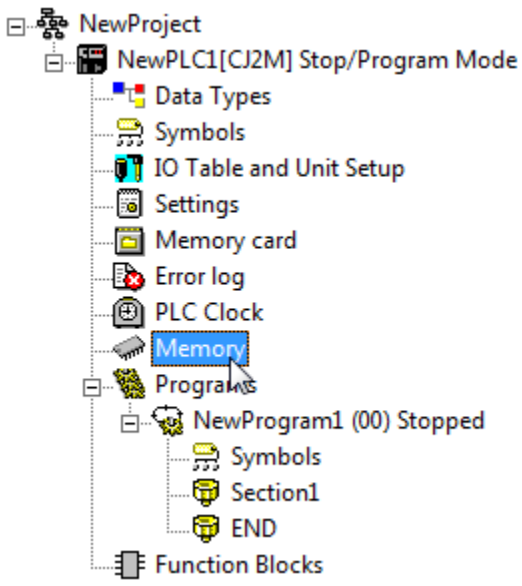


Say **Yes** to all the pop-ups and the downloading will start.

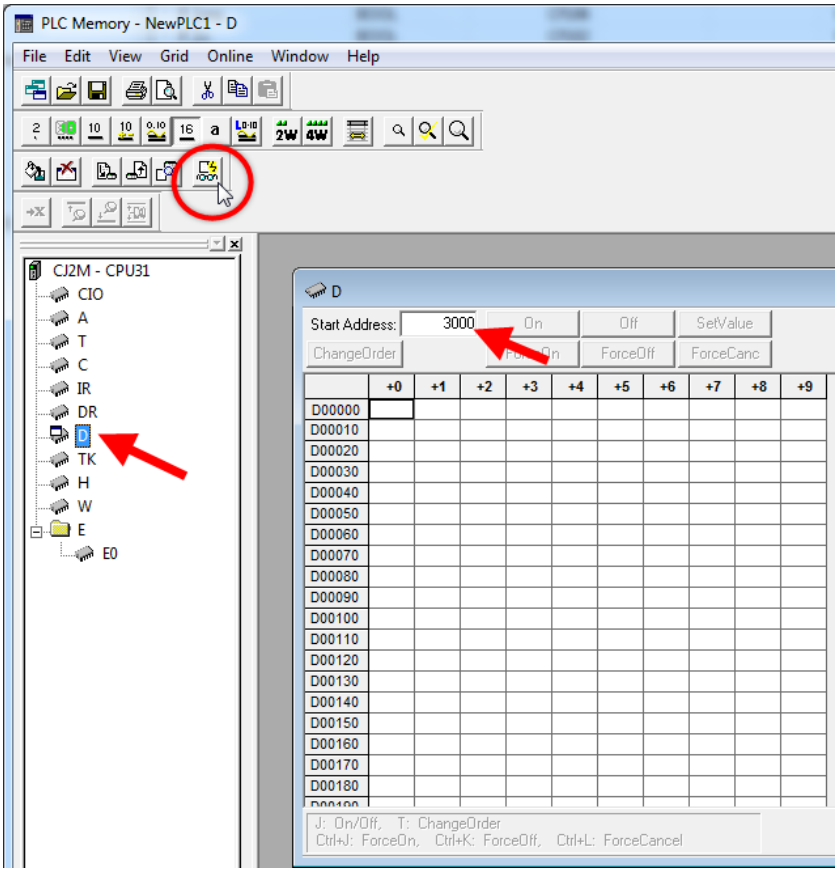


View the SGM720 or SGM820 weight values

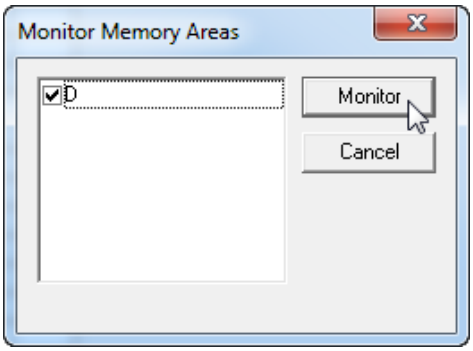
To view the SGM720 or SGM820 weight values, double click on **Memory**.



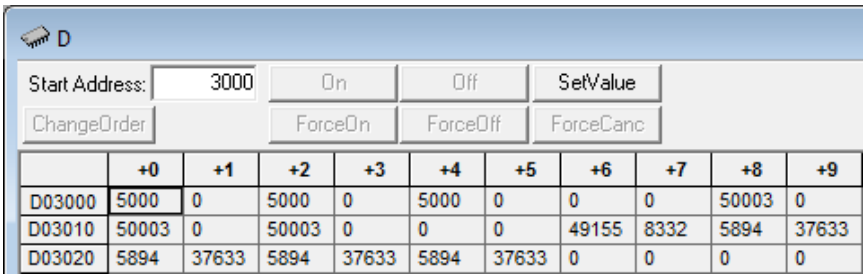
To view the D area, double click on **D**, set the **Start address** on **3000** and click on the button **Monitor**.



Click on **Monitor**.



The live data is now shown.



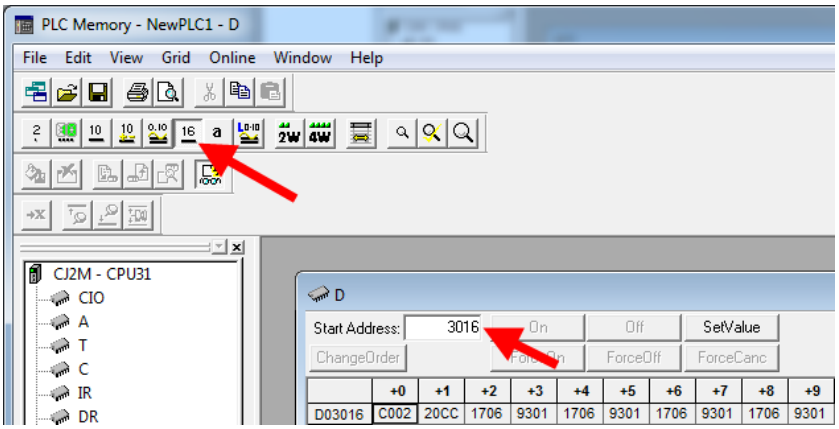
	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9
D03000	5000	0	5000	0	5000	0	0	0	50003	0
D03010	50003	0	50003	0	0	0	49155	8332	5894	37633
D03020	5894	37633	5894	37633	5894	37633	0	0	0	0

Open the PDF file EIP SGM720 V1.3.3.pdf (downloaded with the EDS file) and scroll down to the following section. All the weight values have a length of 2 words (Double integer) except the Format and Status (1 word length).

0x311, 785	Get	Weigher	STRUCT OF	
			DINT WEIGHER	Display rate weigher data
			DINT GROSS	Fast Gross weight
			DINT NET	Fast Net weight
			DINT TARE	Active Tare weight
			DINT WEIGHERx10	Display rate weigher data x10
			DINT GROSSx10	Fast Gross weight x10
			DINT NETx10	Fast Net weight x10
			DINT TARE	Active Tare weight x10
			WORD FORMAT	Step size formatting
			WORD STATUS	Status bits, see also Weigher-Status word

Address	Description
D3000 – D3001	DINT Weigher
D3002 – D3003	DINT Gross
D3004 – D3005	DINT Net
D3006 – D3007	DINT Tare
D3008 – D3009	DINT Weigher x 10
D3010 – D3011	DINT Gross X 10
D3012 – D3013	DINT Net X 10
D3014 – D3015	DINT Tare X 10
D3016	WORD Format
D3017	WORD Status

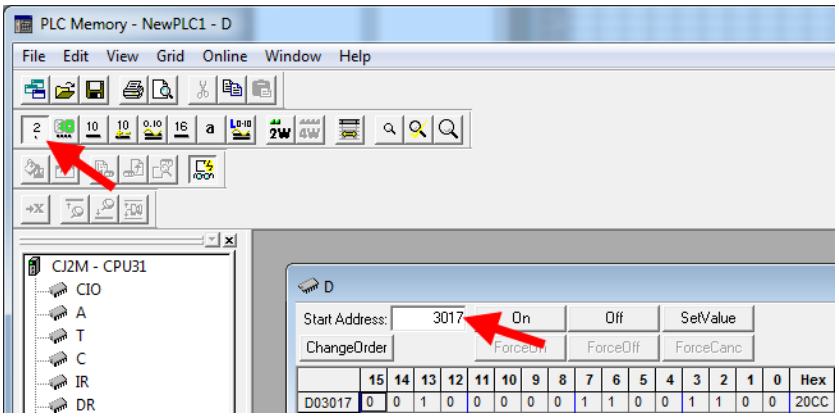
The **Format** can be viewed best in hex. Click on the **Hex** button and set the **Start address** on 3016. The high byte will show the Stepsize and the low byte will show the Decimal point.



Used the table below we can see that the value of D3016 (C002) means that the Stepsize is 1 and the Decimal point is 0000.00.

Stepsize	High byte value	Decimal point	Low byte value
1	C0	000000	00
2	C1	00000.0	01
5	C2	0000.00	02
10	C3	000.000	03
20	C4	00.0000	04
50	C5	0.00000	05
100	C6		
200	C7		

The **Status** can be viewed best in binary. Click on the **Binary** button and set the **Start address** on 3017. The status bits D3017.02, D3017.03, D3017.06, D3017.07 and D3017.13 are one.



Using the Weigher-Status word table in the EIP SGM720 V1.3.3.pdf file it's possible to see that Stable, Stable Range, Zero Range, Zero Track and Industrial mode are on.

Weigher-Status word

Bit #	Called	Definition
0	OVERLOAD	Hardware overload/underload detected on loadcell
1	MAXLOAD	Overload detected on loadcell
2	STABLE	Weigher signal is stable
3	STABLE RANGE	Weigher signal is in stable range
4	ZERO SET	Weigher zero is corrected
5	ZERO CENTER	Weigher in center of zero range
6	ZERO RANGE	Weigher is in zero range, zero is possible
7	ZERO TRACK	Weigher signal is in zero tracking range, zero tracking is possible
8	TARE	Weigher tare is active
9	PTARE	Weigher preset tare is active
10	SAMPLE	Used by internal process handling
11	BAD CAL	Calibration is bad, invalid, not available
12	CAL ENABLED	Calibration is enabled, used by internal process handling
13	INDUSTRIAL	If set weigher runs in industrial mode, if reset weigher runs certified operation mode
14	NOT LEVEL	Weigher system in blocking, warming up or scale is not level
15	RESERVED	Reserved mode always 0

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**

PENKO Alliances

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.
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