TECH NOTE :: DSE_Checkweigher with PLC (S7-PLC)

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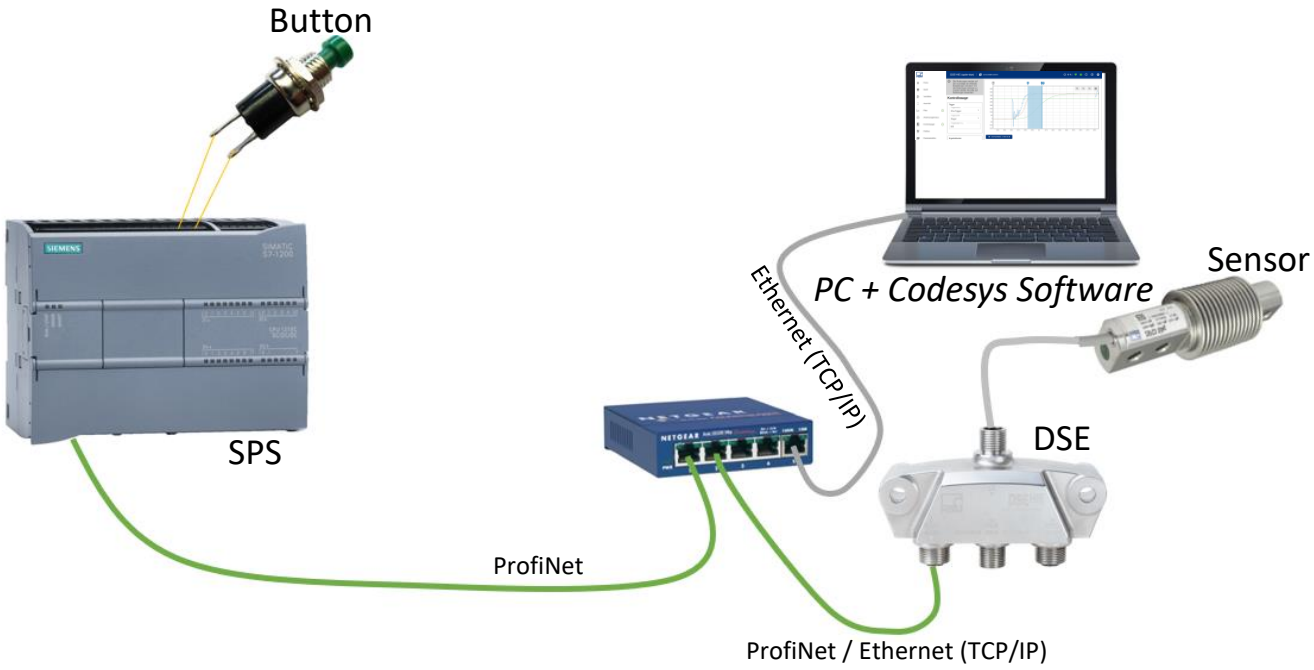
Status: HBM: Public

Brief description

This is a quick start guide for setting up a checkweigher with the DSEs (from FW 2. 0). The control scale can be controlled in two ways, on the one hand via a level and on the other via an external signal (in this example a pushbutton). The DSE has no hardware DIO's, so the trigger signals are captured by a PLC and transmitted to the DSE, here a S7-1200 with TIA-Portal as PLC, via PROFINET.

Hardware configuration



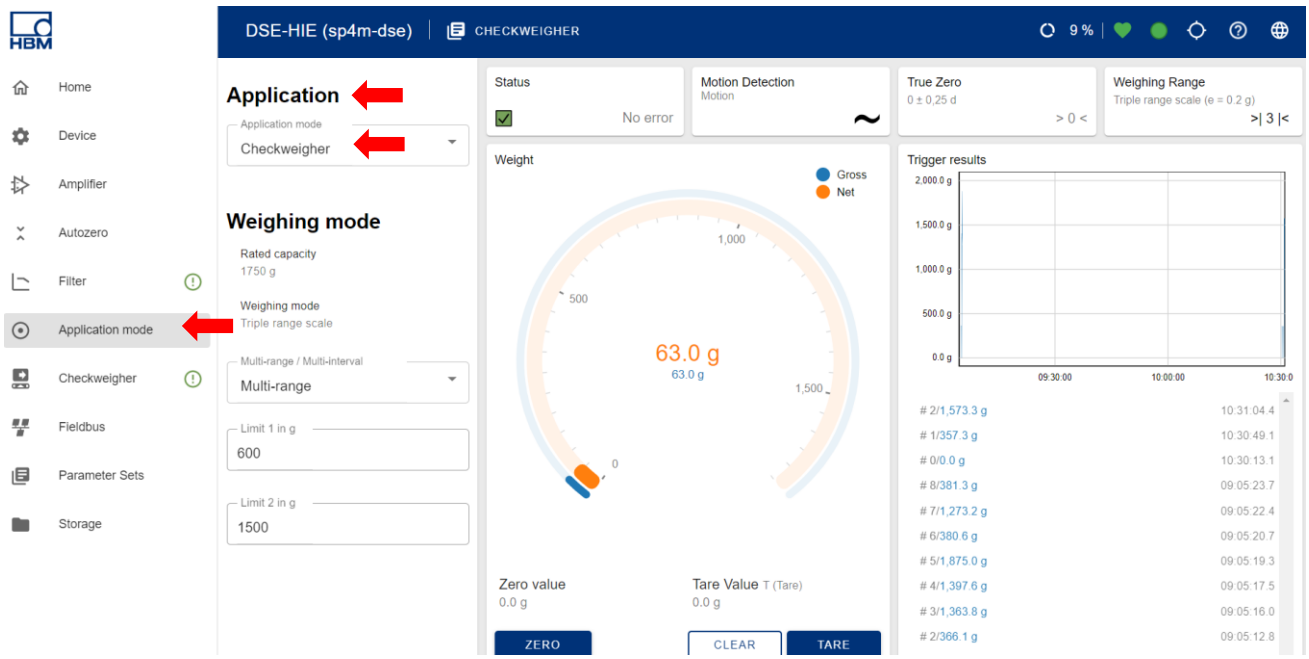
Layout sketch

Components required

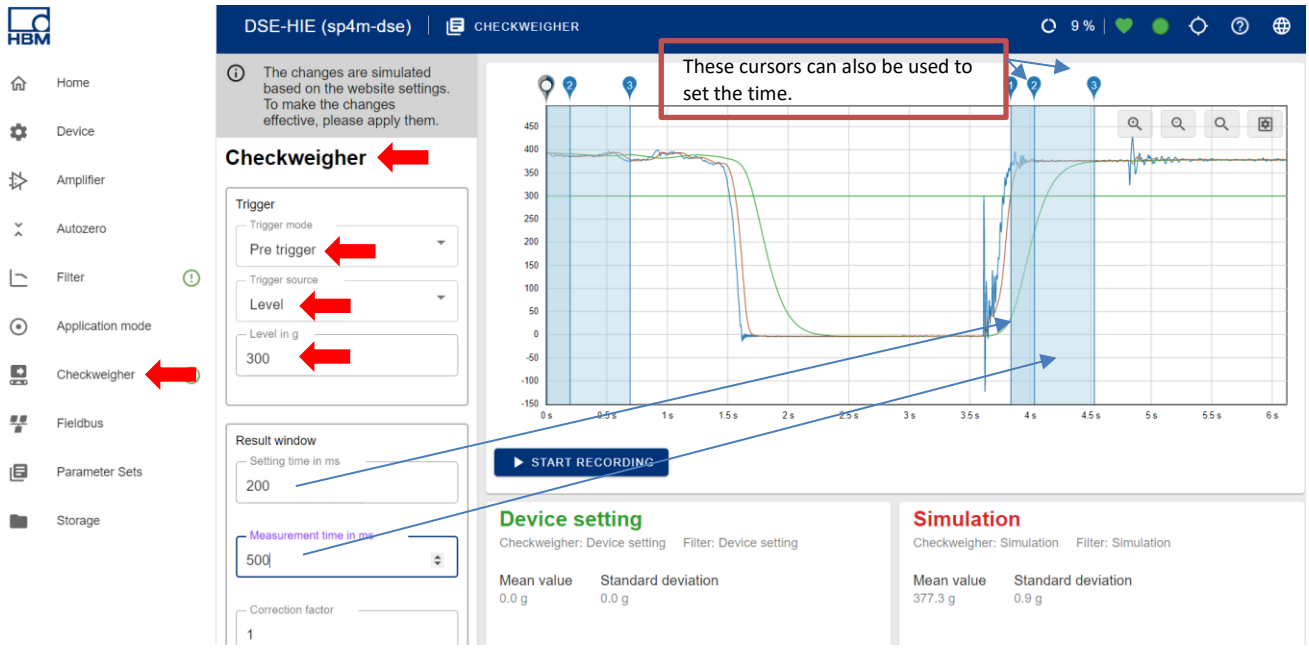
- 1x DSE system (incl. power pack and Ethernet cable)
- 1x TIA Portal software
- 1x Ethernet switch
- 1x SPS, S7-1200
- 2x Switch button
- 1x load cell

Level controlled

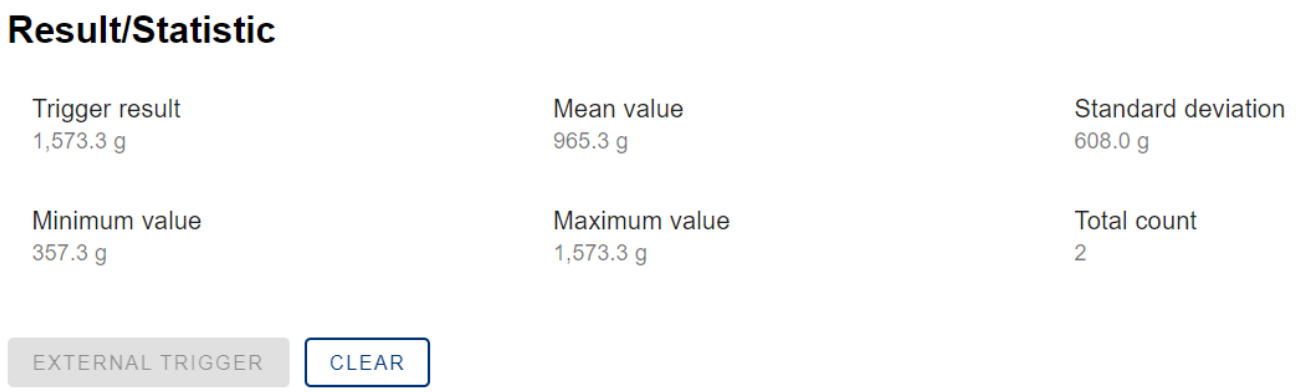
With level control, the measurement process is started when a certain value (level) is above or below. This means when the measurement starts depends very much on the preconfigured parameters.



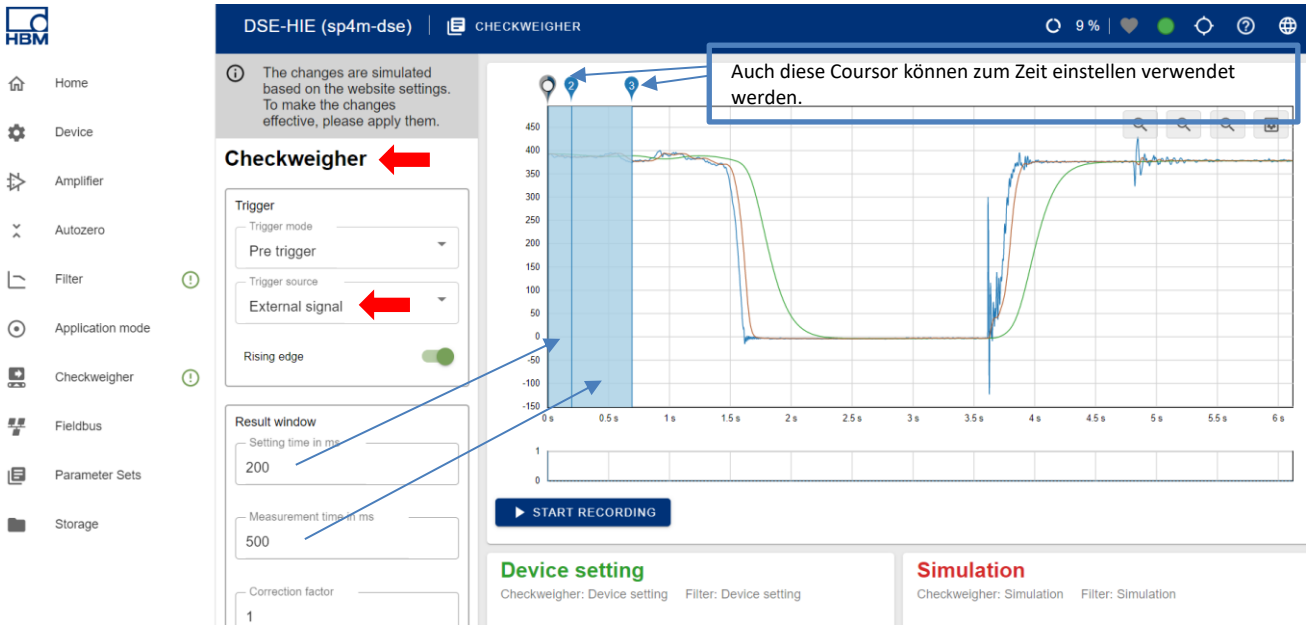
Now switch to the checkweigher. Under “Trigger source”, “Level” must be set. The height of the level shall be set in the following field. A low level is recommended for testing, which is definitely exceeded at the expected load. The level is shown in green in the diagram. In the result window you can first set the vibration time. This starts with the exceeding of the filter result (brown) and should end after the switching, this time must be determined by test runs. Next, the measurement time can be created, which should be as short as possible but still long as possible to obtain a correct result.



In the **“Results/Statistics”** window, you can visualize the different values that can be recorded with the system.



Control via external signal (button or light barrier)



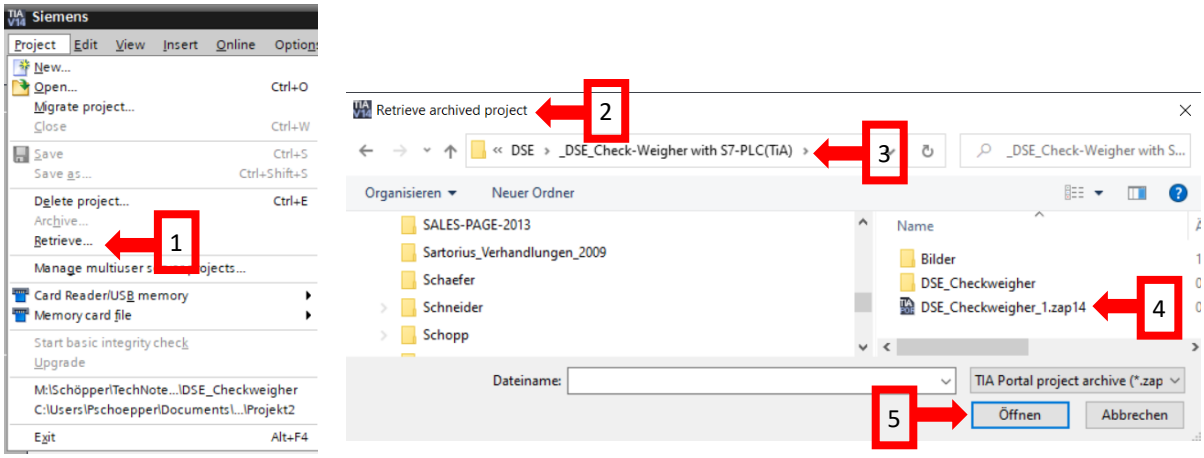
When using an external signal trigger, the start of the measurement process is detached from the course of the measurement signal. The external signal can be generated in many ways, e. g. by a light barrier or a button, but it is always the data type Bool, which means “true or false” or “1 or 0 ”. In the example above you can see that the measurement process was started together with the recording, even if there has not yet been any change in the course.

The check-weighing process can be triggered with a pre-trigger before the load cell is loaded or with a post-trigger after the load cell is loaded.

Import Project (one-time need)

The project contains all necessary libraries including the device description file (GSDML V2.0) of the DSE and only needs to be imported once.

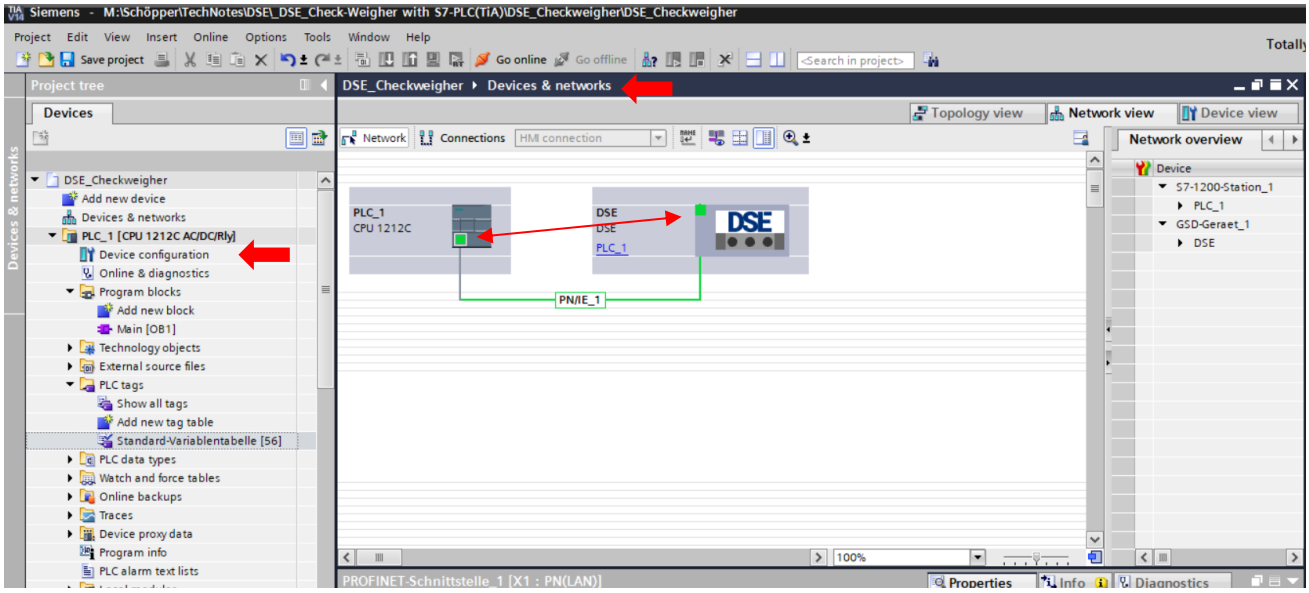
Open the TIA portal on your computer.



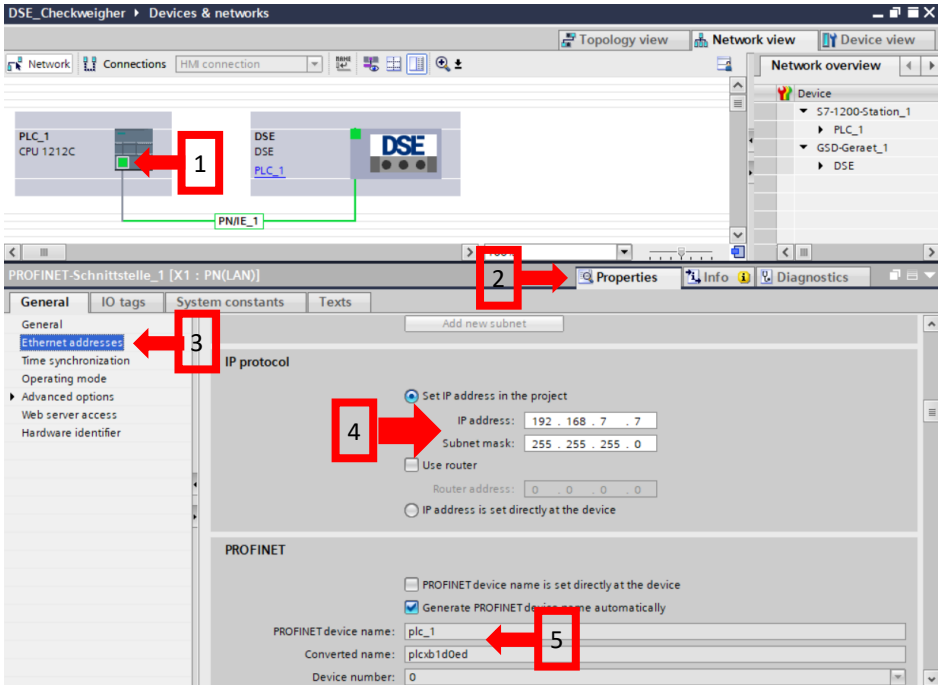
After clicking Open, the project is imported into TIA-Portal with all libraries and devices.

Network configurations

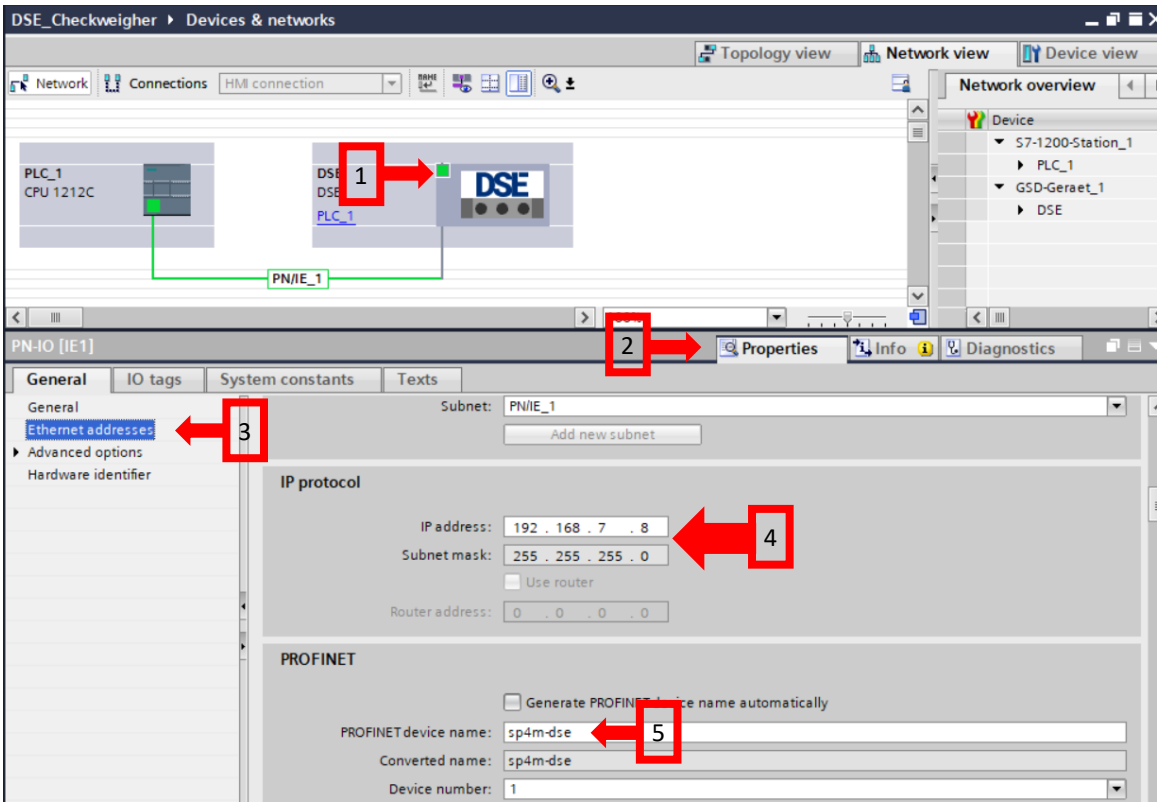
Due to the prefabricated project, the DSE is already inserted and the connection is already established. Now only the IP addresses, network masks and device names have to be adapted to the local network.



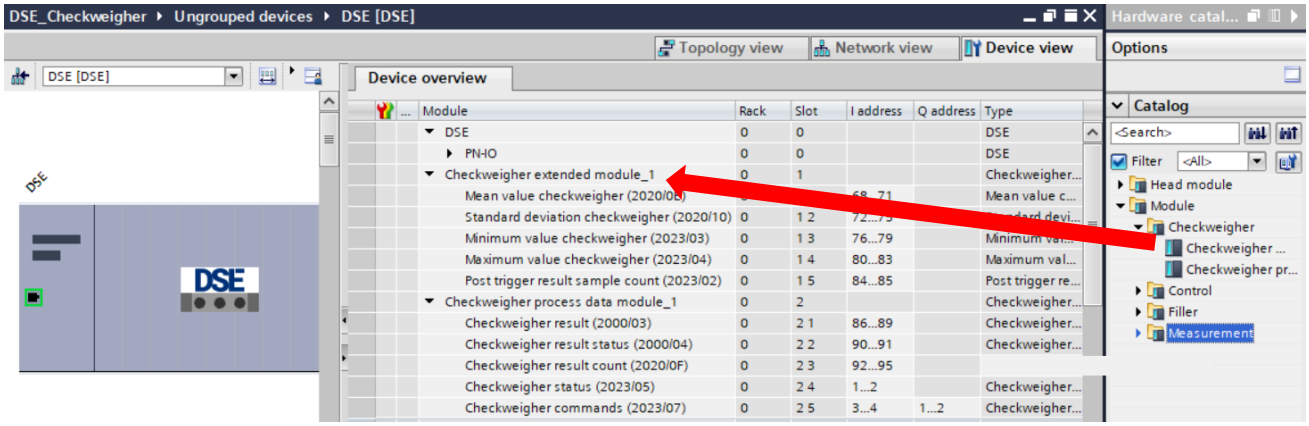
- Select the green input of the PLC
- Select the item "Ethernet addresses" in the "Properties" tab.
- Enter the IP address of the control



- Now select the green input of the DSE
- Select the item "Ethernet addresses" in the "Properties" tab.
- Enter the IP address of the DSE and (if different) the station name of the DSE.

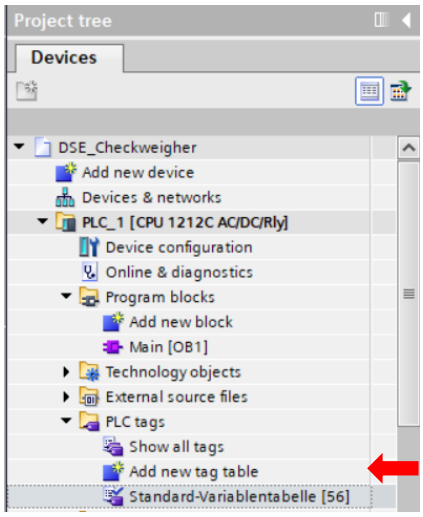


- Switch to the device view of the DSE (double-click on the device or switch in the tab at the top).
- The Checkweigher modules are already added in the device view..



The addresses of the measured values can be taken directly from the list.

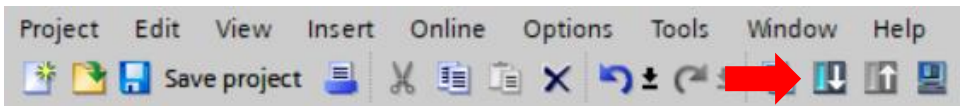
- Under "PLC variables", all necessary variables are stored in the "standard variable table".



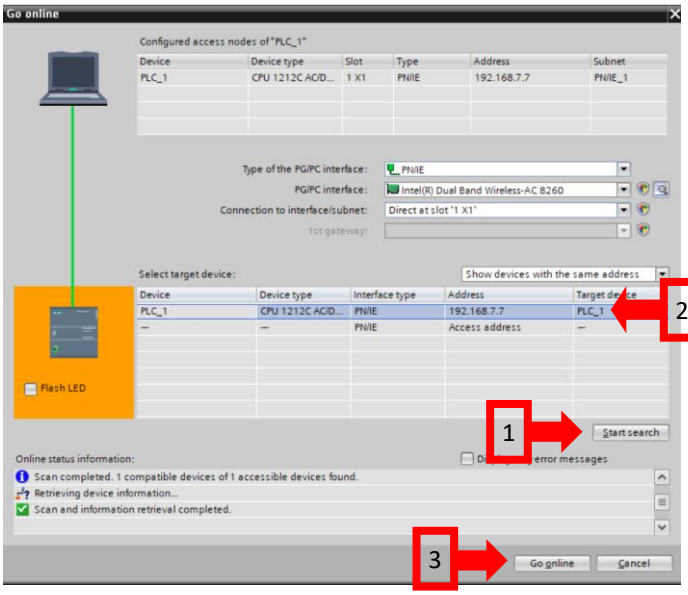
- Add both values as a variable with the specified addresses (start address is specified and the length is determined by the data type).

	Name	Data type	Address	Retain	Acces...	Writa...	Visibl...
1	start	Bool	%I0.0	☐	☑	☑	☑
2	reset	Bool	%I0.1	☐	☑	☑	☑
3	external_trigger	Bool	%Q2.0	☐	☑	☑	☑
4	external_reset	Bool	%Q2.1	☐	☑	☑	☑
5	status_external_trigger	Bool	%I4.0	☐	☑	☑	☑
6	status_external_reset	Bool	%I4.1	☐	☑	☑	☑
7	Zähler	Bool	%I2.0	☐	☑	☑	☑
8	Einschwingen	Bool	%I2.1	☐	☑	☑	☑
9	Messen	Bool	%I2.2	☐	☑	☑	☑
10	<Add new>			☐	☑	☑	☑

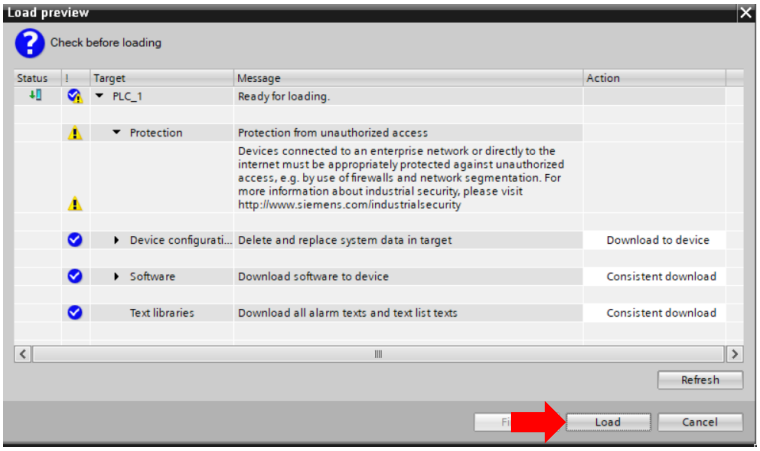
- Load the programme into the control unit (control unit must be selected).



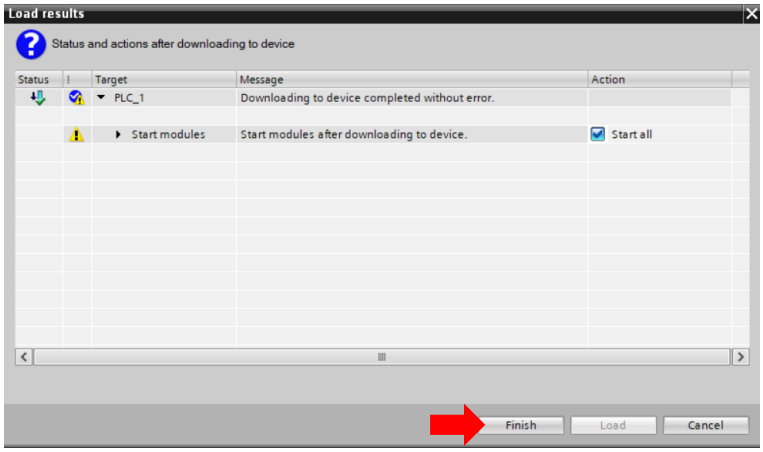
- Search for the control in the dialogue



- Select „Load“

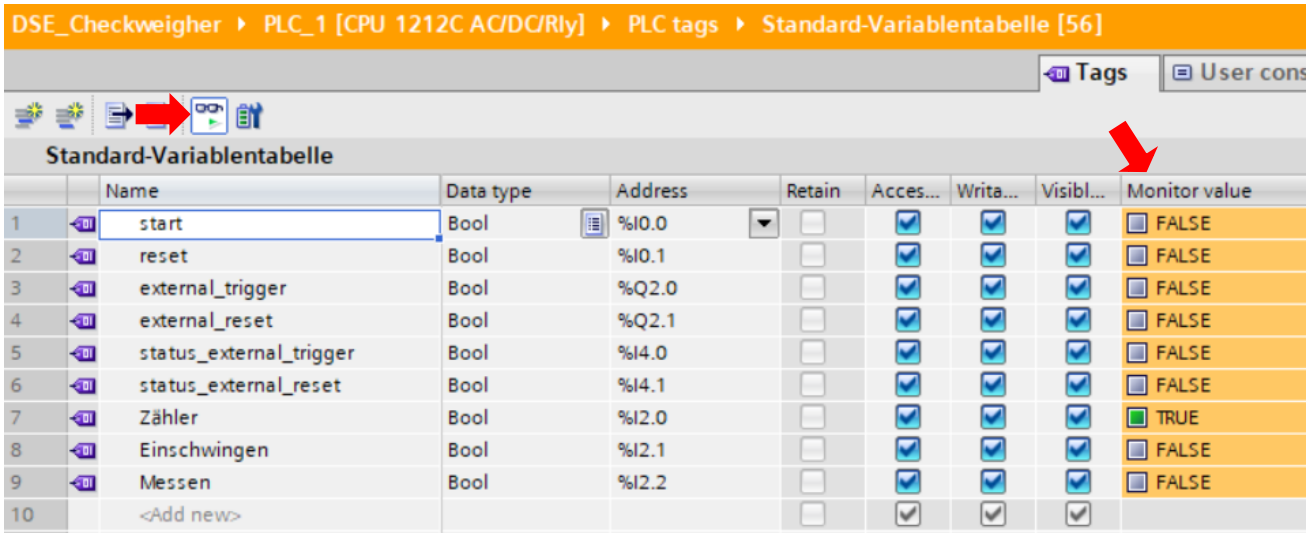


- "Select "Start assembly”
- Confirm with "Finish”



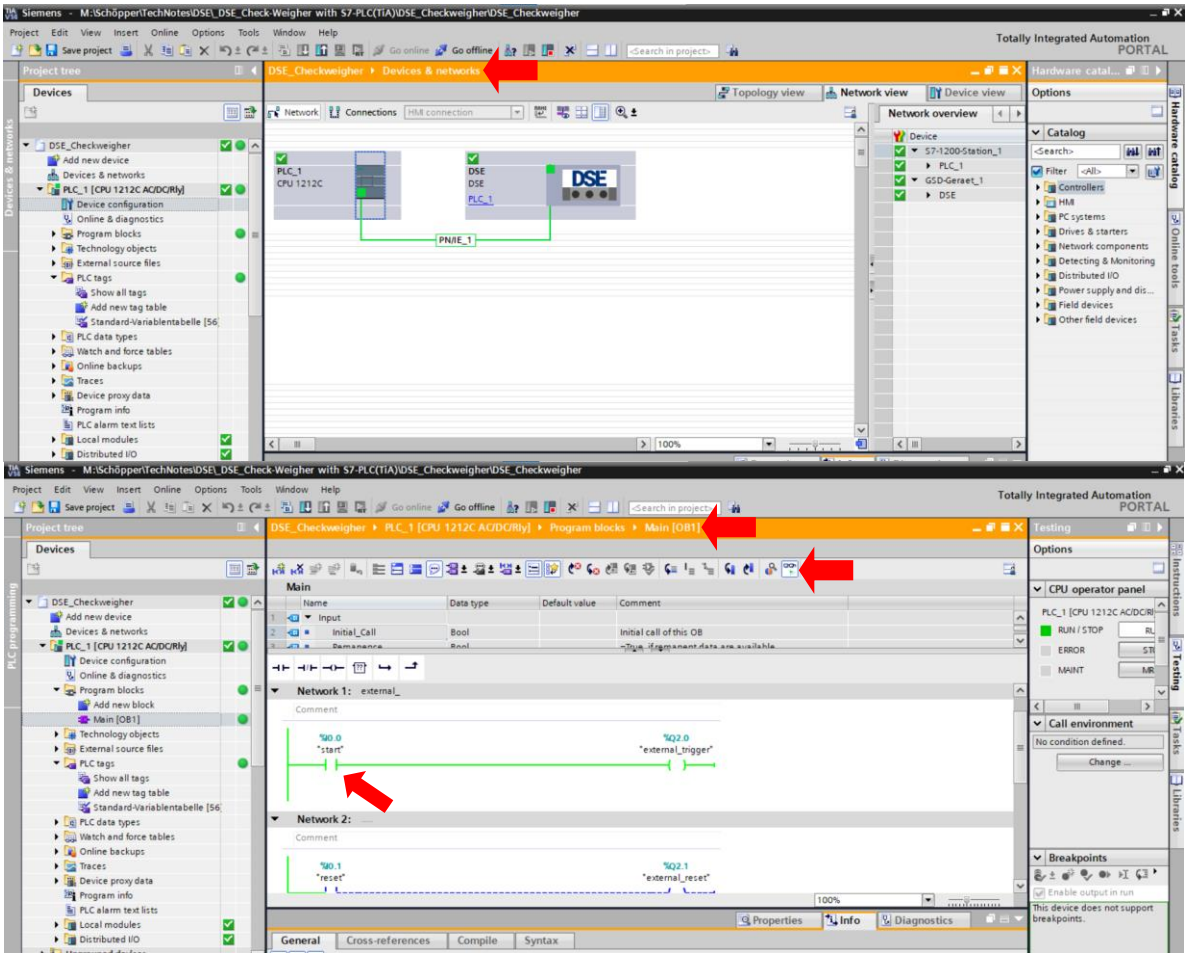
- Connecting to the control unit online

- Display live values

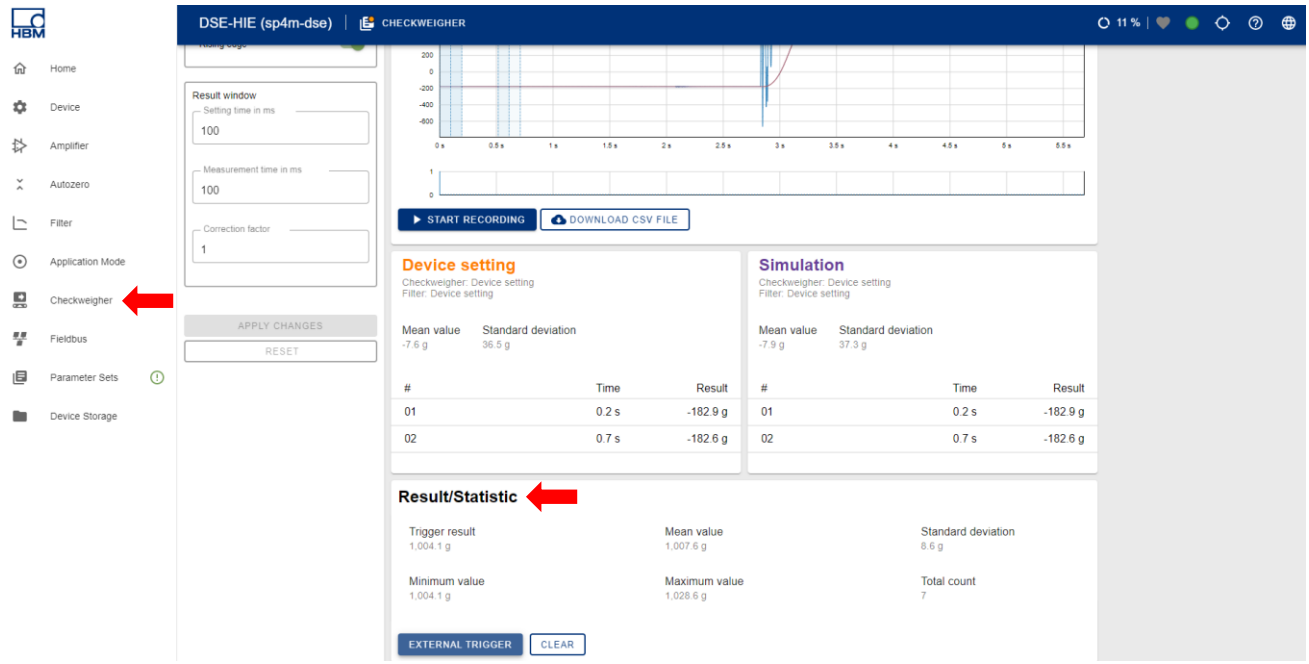


	Name	Data type	Address	Retain	Acces...	Writa...	Visibl...	Monitor value
1	start	Bool	%I0.0		☑	☑	☑	FALSE
2	reset	Bool	%I0.1		☑	☑	☑	FALSE
3	external_trigger	Bool	%Q2.0		☑	☑	☑	FALSE
4	external_reset	Bool	%Q2.1		☑	☑	☑	FALSE
5	status_external_trigger	Bool	%I4.0		☑	☑	☑	FALSE
6	status_external_reset	Bool	%I4.1		☑	☑	☑	FALSE
7	Zähler	Bool	%I2.0		☑	☑	☑	TRUE
8	Einschwingen	Bool	%I2.1		☑	☑	☑	FALSE
9	Messen	Bool	%I2.2		☑	☑	☑	FALSE
10	<Add new>				☑	☑	☑	

- In the following picture you can see the interface after a successful connection and a simple programme that transfers data.

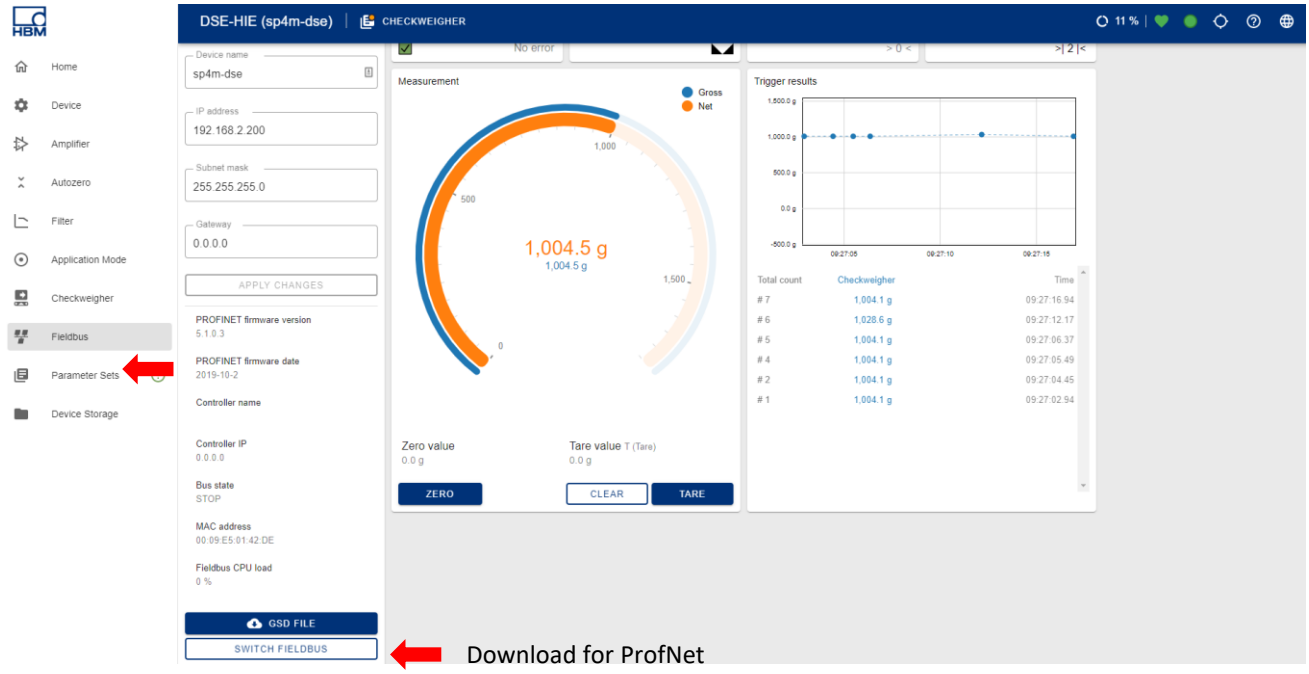


Now the DSE receives the signals from the button and counts up with each press (only recognises button presses outside the measuring process). This can be observed in the web interface of the DSE.



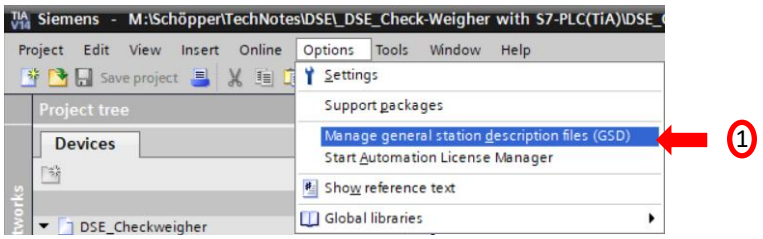
Additional information: the Codesys program code used

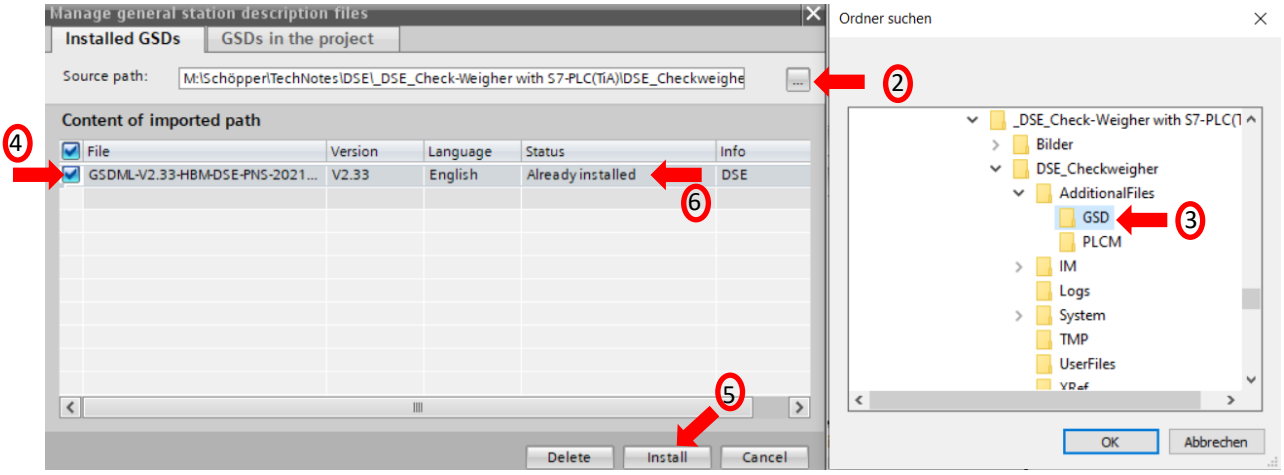
The Profinet GSDML file is a device description file. These include all device functionalities required for implementation in programming environments such as TIA Portal or Codesys. This is the only way to add the devices that are not stored in the standard catalog to the virtual setup and can also be controlled by the controllers.



Download for ProfNet

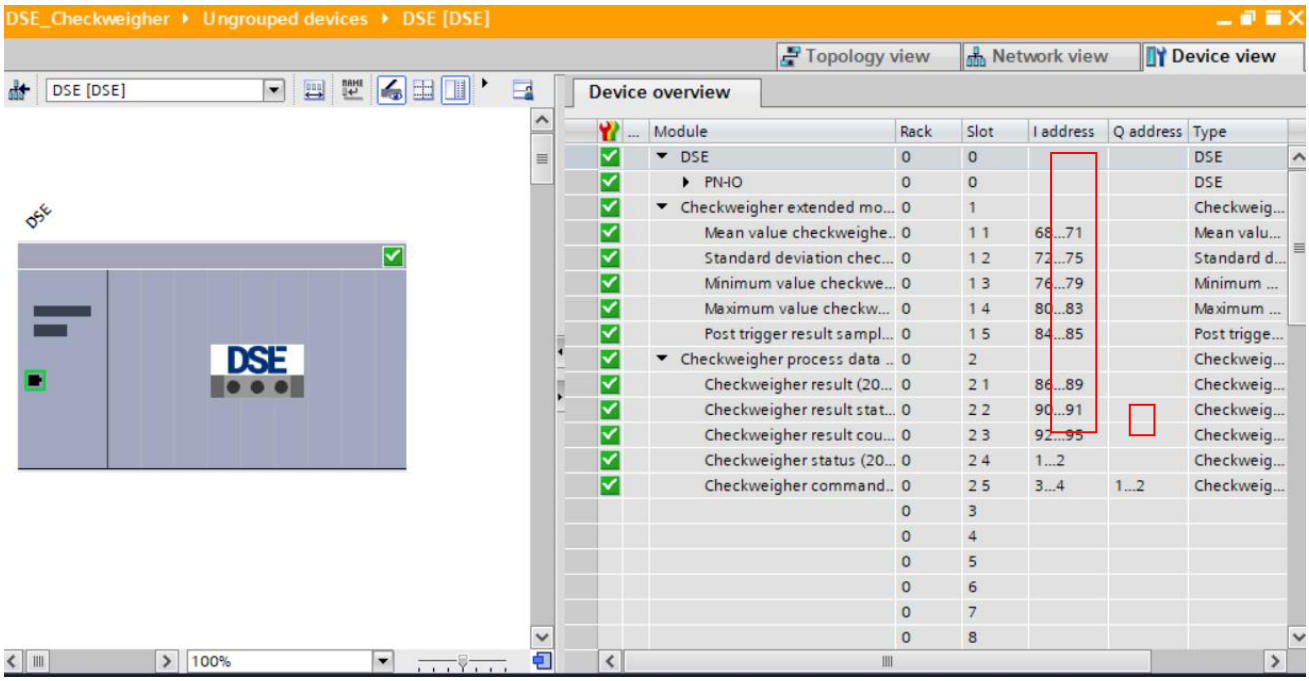
The GSD file is uploaded in the programming environment, with TIA this is done as follows:





Find out the correct address

To reach the DSE, the addresses of the DSE module, which are already pre-configured, must be used. These can be found under the DSE.



Important: Use the higher value byte. The lower-value bytes are not recorded. As described in the example "Network configurations", all important functions should be accessible.

Legal note

This example is for illustrative purposes only. It is not subject to any warranties or liability claims.