Application Note

FESTO

Commissioning between SRBG AS-i and CESA-GW-AS-PB

How to commission the SRBG using CESA-GW-AS-PB by Profibus in TIA Portal.

SRBG, CESA-GW-AS-PB, AS-I, PROFIBUS

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Table of contents

1 Requirements

Here you will find the main software and hardware used for this application note.

1.1 Software

Type/Name	Version Software	Date of manufacture
Siemens TIA PORTAL	V14	--

Table 1.1: Software used

1.2 Hardware

➔ **Note**

Some of products are recommendation of use.

Some items has been used as suggestion in this application description. Therefore, other parts and manufacturers whose attend the required specification can be used as well.

Doc. ID	Description/Function	Ident Code	Part Number	Manufacturer
1	Auxiliary Power Supply [1)]	CACN-3A-1-10	2247682	FESTO
2	AS-I Power supply [1)]	SVG-1/230VAC-ASI-5A	547869	FESTO
3	AS-I Bus Cable (YE) [1)]	KASI-1,5-Y-100	18940	FESTO
4	AS-I Auxiliary Power Cable (BL) [1)]	KASI-1,5-Z-100	18941	FESTO
5	PROFIBUS / AS-I gateway	CESA-GW-AS-PB	567032	FESTO
6	PROFIBUS Master Controller [1)]	CPU 1215 DC/DC/RLY (4.3)	S7-1200	SIEMENS
6.1	PROFIBUS Master Card	CM 1243-5	S7-1200	SIEMENS
7	PROFIBUS Cable [1)]	3079A.0075000	3079A	BELDEN
8	AS-I Sensor Box	SRBG-C1-N-1-AS-M12-M12	3567908	FESTO
9	Solenoid Valve Cable [1)]	NEBV-A1W3F-P-K-0.3-N-M12W3	3679771	FESTO
10	Activation Element for SRBG	SASF-S2-B-F-A34	4046082	FESTO
11	Solenoid Valve	VSNC-FC-M52-MD-G14-FN	577267	FESTO
12	Solenoid Coil	VACN-N-A1-1	8029144	FESTO
13	PROFIBUS Connector	FBS-SUB-9-WS-PB-K	533780	FESTO
14	Ethernet Cable [1)]	VS-IP20-IP20-94B-LI/5,0	1407903	PHOENIX
15	AS-I Connector for SRBG	NEFU-X22F-M12G4	572225	FESTO

1) Recommendation

Table 1.2: Components Used

1.3 Documentation

This documentation intends to deliver supplementary information regarding the following documentations:

- CESA-GW-AS-PB-EN (749962):
  Search 749962 | Festo DE

- SRBG-EN (8075401):
  Search 8075401 | Festo DE

2 Application Description

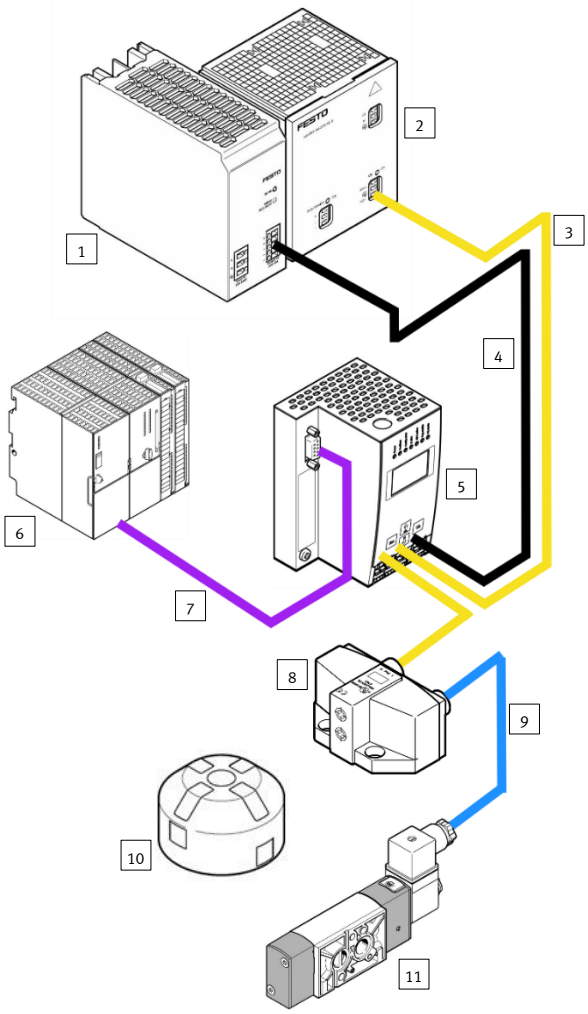
This Application note intends to show how to configure the SRBG sensorbox using our CESA-...-PB gateway for PROFIBUS.

This document as well explains how the Process Data Image works for these devices and how you can access this image using Siemens TIA Portal in your integration.

3 Installation

3.1 Hardware Setup

3.1.1 Connection Overview



1 Auxiliary Power Supply
2 AS-i Power Supply
3 AS-i Main trunk Cable
4 AS-I Auxiliary Power Cable
5 CESA-...-PB Gateway
6 Siemens Controller (illustrative drawing)
7 CANOPEN network cable
8 SRBG
9 Solenoid Cable
10 SASF Position Indicator
11 VSNC Solenoid Valve

Fig. 3.1: Connection overview

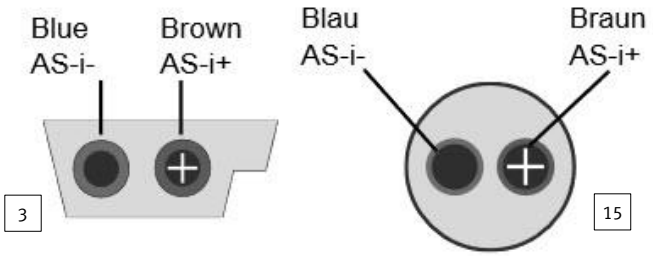
Warning
This application note is entirely based in the following HW configuration as described
Any possible modification into the hardware can be consider as a possible troubleshoot step.

Info
Depending of the power demanding from you network, some additional power cable can be necessary

3.2 Electrical Connection

3.2.1 AS-i Cables

It is rightly recommended that you use standard AS-I cabling for this application.
The recommended cables are :



[3] Flat Cable (to SRBG use with NEFU-X24F-M12G4 – [14])
[15] 2-conductor AS-i round cable (Recommended: flexible power cable H05VV-F2x1,5 per DIN VDE 0281)

Fig. 3.2: AS-i Recommended Cables

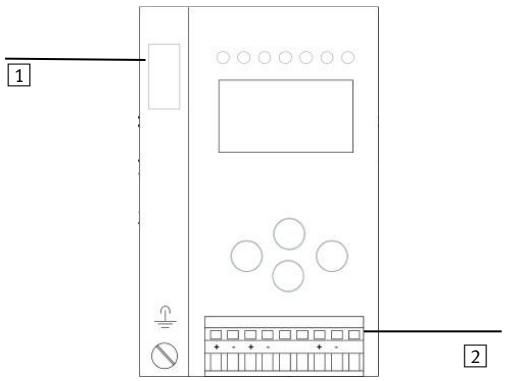
3.2.2 CESA-...-PB Connections

The CESA has 2 different places to connection where should have:

- AS-I Power Supply connection;
- PROFBUS Cable connection;
- AS-I Trunk Cable for the AS-I Slaves;

➔ **Check the manual from CESA-GW-AS-PB for details.**
The connections are mentioned at ➔ Cap.5 (Electrical Connection).
There you will find:

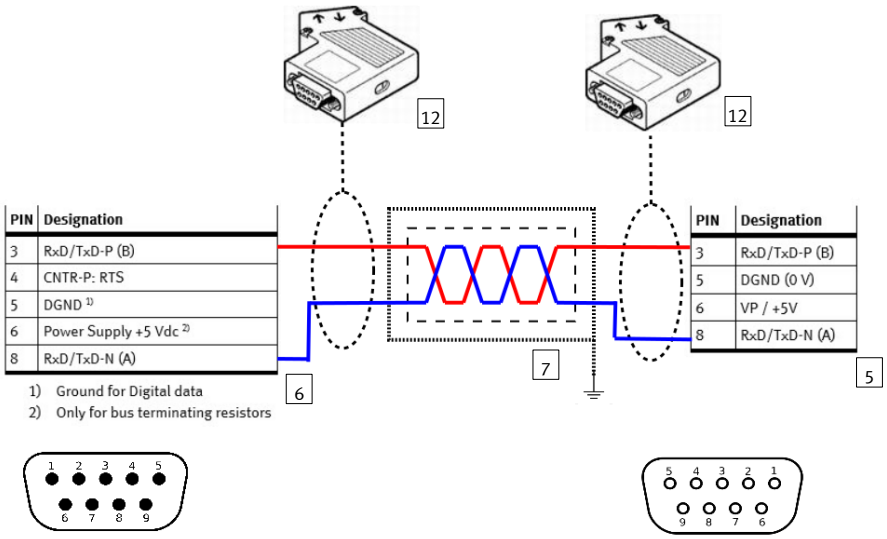
- Size of supported cables ;
- Electrical characteristics ;
- Connectors should you use.



[1] Connector X1 – PROFIBUS Cable
[2] Connector X2 – AS-i Port Connector

Fig. 3.3: Physical connections from CESA-...-PB

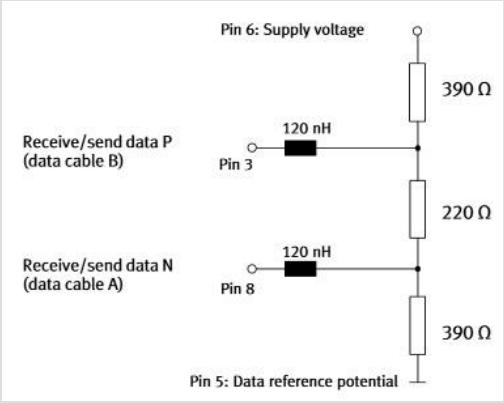
3.2.3 PROFIBUS connection with CESA-...-PB



5 CESA-...-PB Gateway (Connector X1)
6 Siemens Controller (Master 6.1 Connector)
7 PROFIBUS cable
12 PROFIBUS connector

Fig. 3.4: Electrical Connection between CESA-..-PB and S71200 CM-1243-5

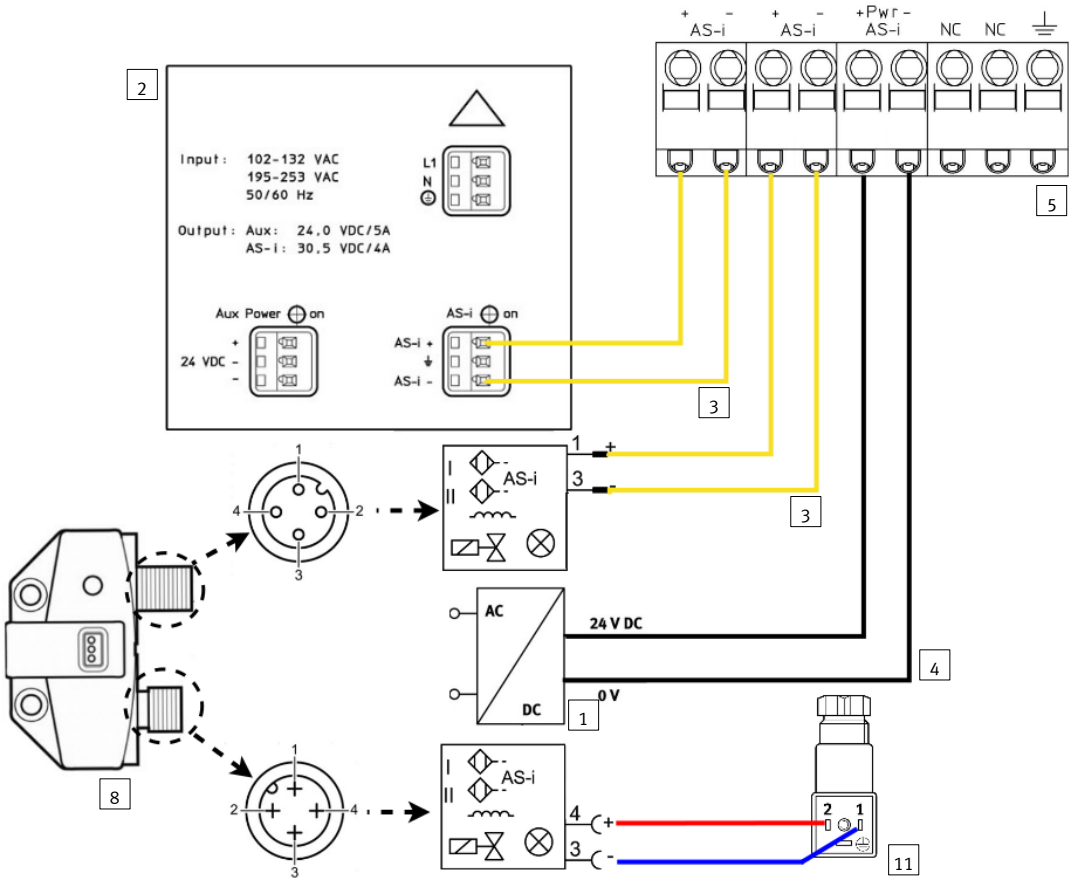
Warning
Please, check the connections for the terminal resistor on both sides.



Most of the connectors for PROFIBUS already have a switch that contains the needed resistor.

3.2.4 AS-I connection between CESA and SRBG

Here you fin how to connect you AS-I system between your SRBG and CESA :



1 Auxiliary Power Supply
2 AS-i Power Supply
3 AS-i Main trunk Cable
11 VSNC coil connector
4 AS-I Auxiliary Power Cable
5 CESA-...-PB Gateway Connector X2
8 SRBG : AS-I and Valve Connection

Fig. 3.5: Electrical Connection – AS-i network with External Power Supply

4 Commissioning

4.1 CESA-...-PB configuration

This chapter brings more knowledge about the configuration that needs to be done inside of CESA in order to have the AS-I working properly.

Note

This is a complementary documentation.

For more information about the CESA-GW-AS-PB and other configurations with the advanced display mode you find at the CESA-GW-AS-PB manual ➔ Cap. 6 (Operation in Advanced display mode).

4.1.1 Using function „Quick Setup“ for AS-i Configuration

This function allows your network to be configured automatically based on the actual network state and which devices you have.

The CESA will overwrite all the addresses in order to have an optimized use form the available memory and the components that you have in the network to his internal project.

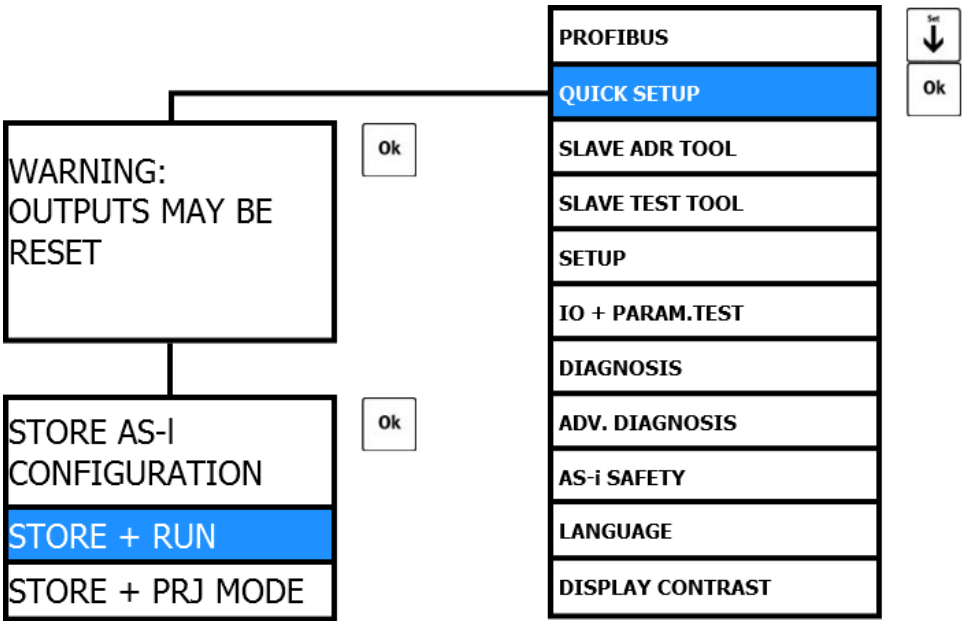


Fig. 4.1: Sequence in the “Advanced Display Mode” in CESA – Quick Setup

Warning

This procedure will overwrite all the addresses from your slaves !

If you already have an existent AS-I network and you want to add some device, be advise that using this procedure may your network experience wrong assignments for the existent devices.

4.1.2 Checking the AS-i Network

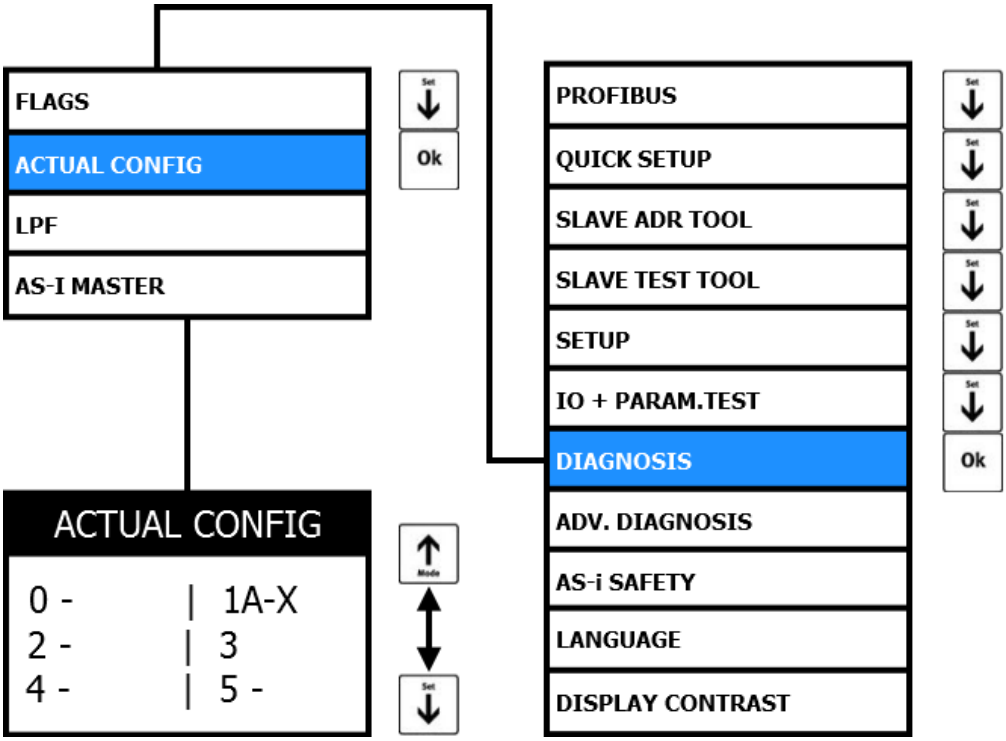


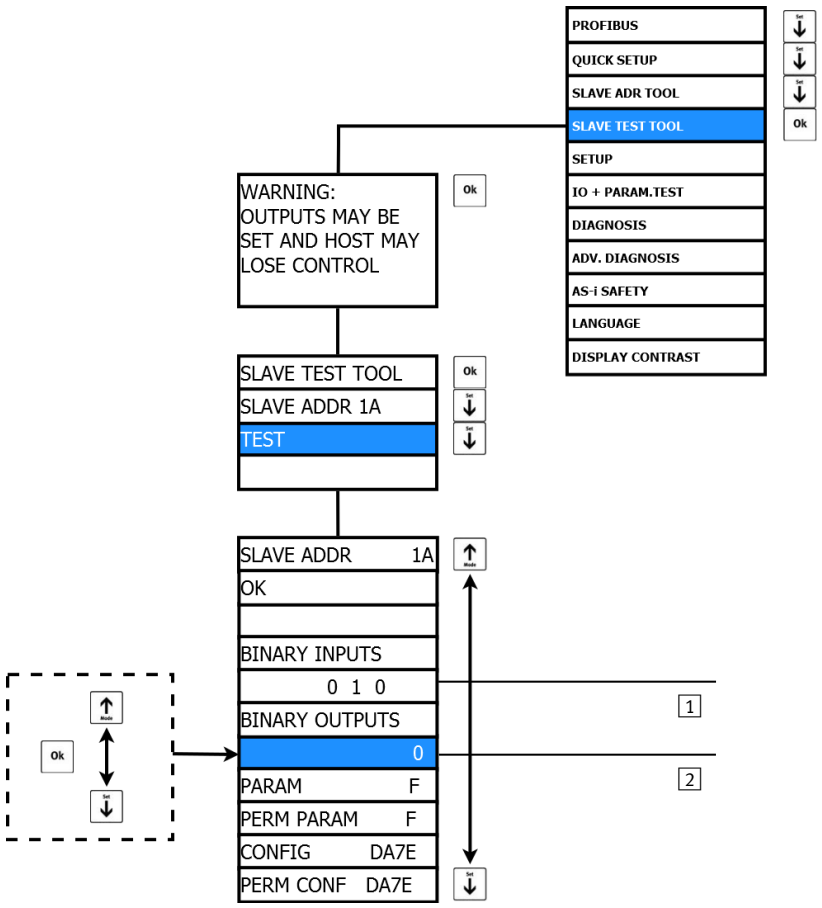
Fig. 4.2: Sequence in the “Advanced Display Mode” in CESA – Actual Configuration

In the “actual config” screen you can scroll up and down and see what are the existent configured devices and their status.

On Screen	Status	Description
X	**OK**	The configuration data for the detected AS-i slave complain with the designed configuration.
D	**Detected Only**	An AS-i slave has been detected at this address, but it was not designed in the project.
P	**Projected Only**	An AS-i Slave has been configured for this address, but it was not detected.
C	**Type Conflict**	The configuration data for the detected AS-i has no compliance with the designed configuration data. The actual existing configuration of the connected data will be shown.
F	**Peripheral Fault**	The AS-i Slave has a diagnosis .
A	**Duplicate Address**	Two or more devices have the same address.

Table 4.1: Possible Diagnosis at “Actual Configuration” in CESA

4.1.3 I/O Device Monitoring and Forcing



[1] Binary Inputs from SRBG
[2] Binary Output from SRBG

Fig. 4.3: Sequence in the “Advanced Display Mode” in CESA – Monitoring & Forcing I/O´s

4.1.4 PROFIBUSS Address

For this application, we are using Node ID 3:

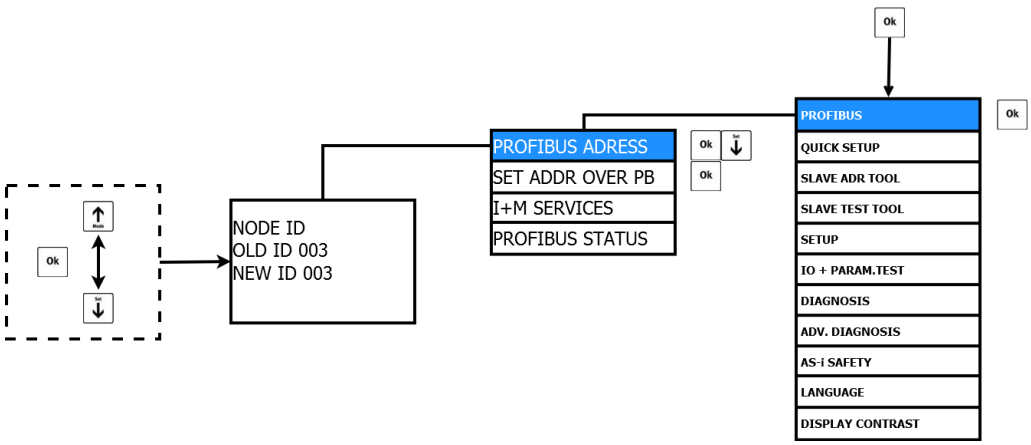


Fig. 4.4: Sequence in the “Advanced Display Mode” in CESA – PROFIBUS address

4.2 Siemens

In this part of the application note, we will provide a basic configuration to access the variables into your SIEMENS S7-1200 PLC with PROFIBUS master enabled.

4.2.1 Accessible variables

The variables that can be access through the process data are mentioned as follow:

Function	Access (R/W)	Description
Switch Output Sensor 1	Read	Returns the activation from the first sensor of the SRBG.
Switch Output Sensor 2	Read	Returns the activation from the second sensor of the SRBG.
Valve Error	Read	Returns if the valve has short circuit or wire break.
SRBG connected	Read	Check if the connection with the SRBG exists.
Valve Output activation	Write	Activates the output from the valve.

Table 4.2: Possible variables from the SRBG

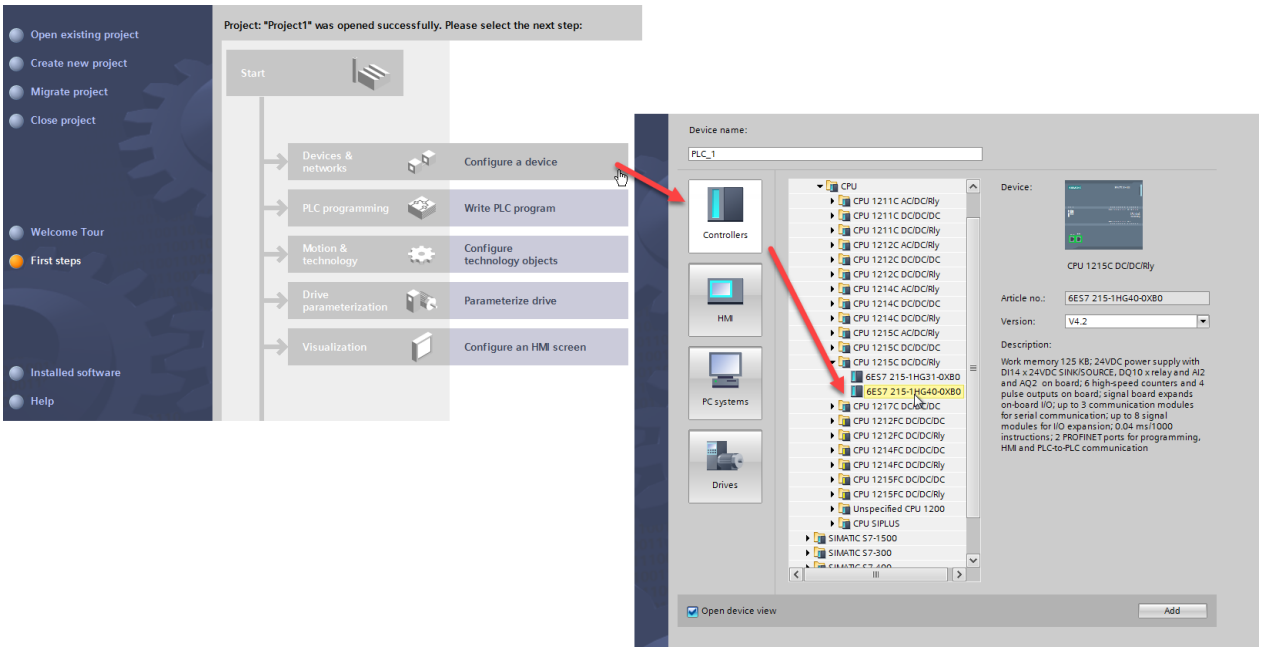
Check the manual from SRBG for details.
The possible data mentioned is at ➔ Cap.4.2 (Electrical).
There you will find also:

- Parameters from the Identification Code;
- Parameters from switching elements and watchdog.

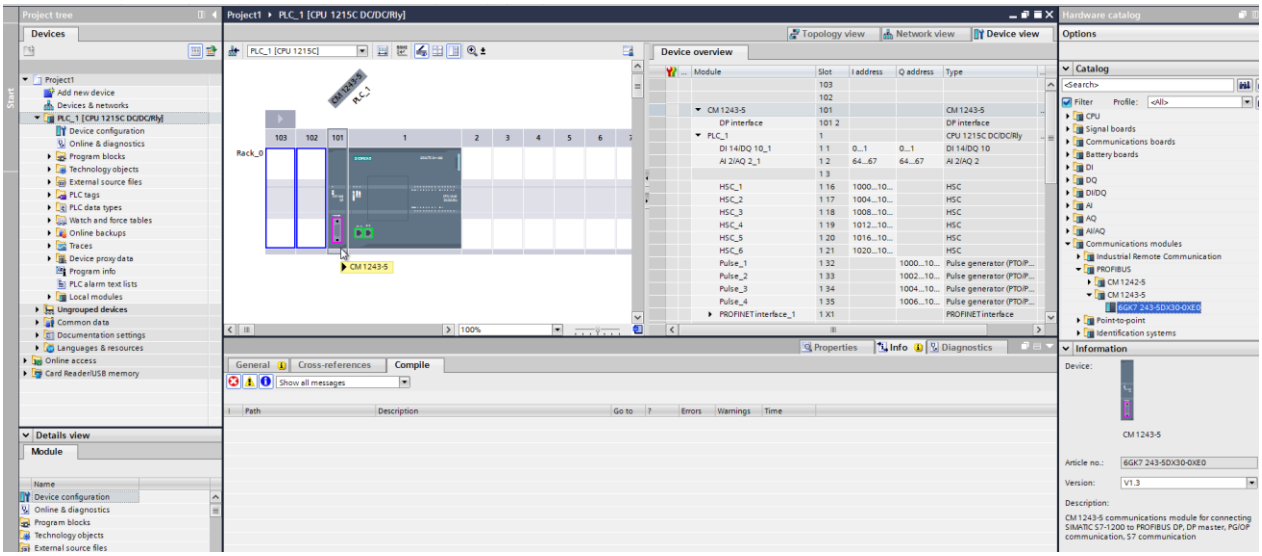
This parameters are accessible by the CESA interface.

4.2.2 Inserting new CESA-...-PB Device into S7 Project

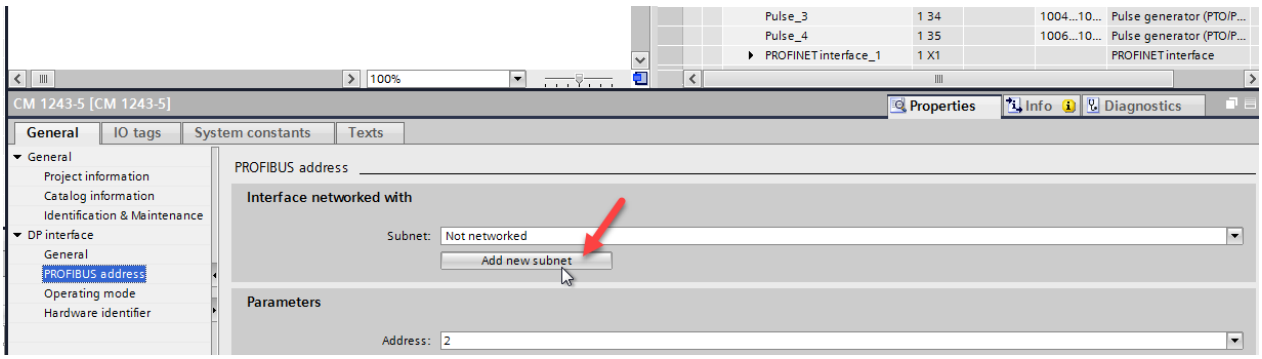
- Open a new Project in the TIA portal and add a S7-1200 System;



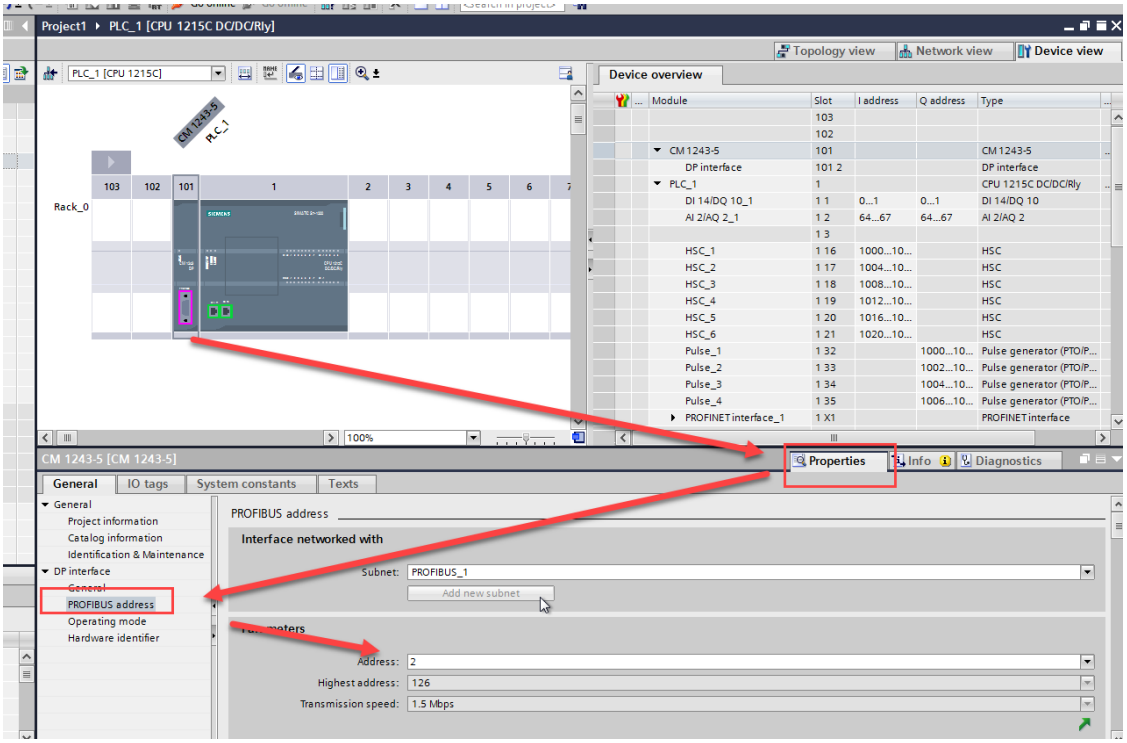
- At project tree , select Device View and Add your PROFIBUS Module;



- Select your PROFIBUS card , go to “Properties” and Select “PROFIBUS Address”
- Click on “Add Subnet” and the TIA Portal will set up you new network with the card as master;



- Therefore, you can change the parameters from your PROFIBUS Master as well;



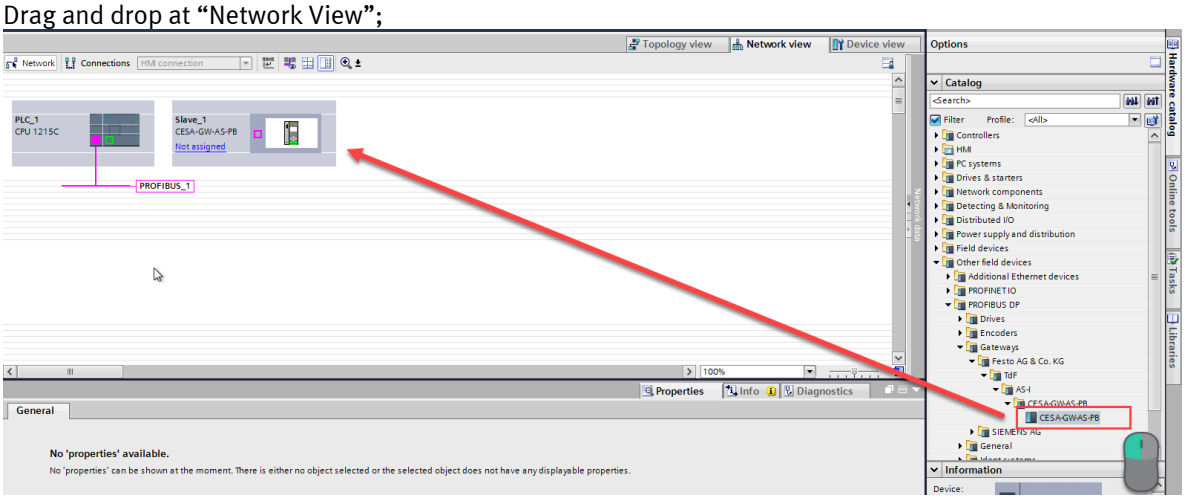
Warning

Your Address at the CESA-...-PB should not be the same.

You have to assig different addresses for each device at the Network.

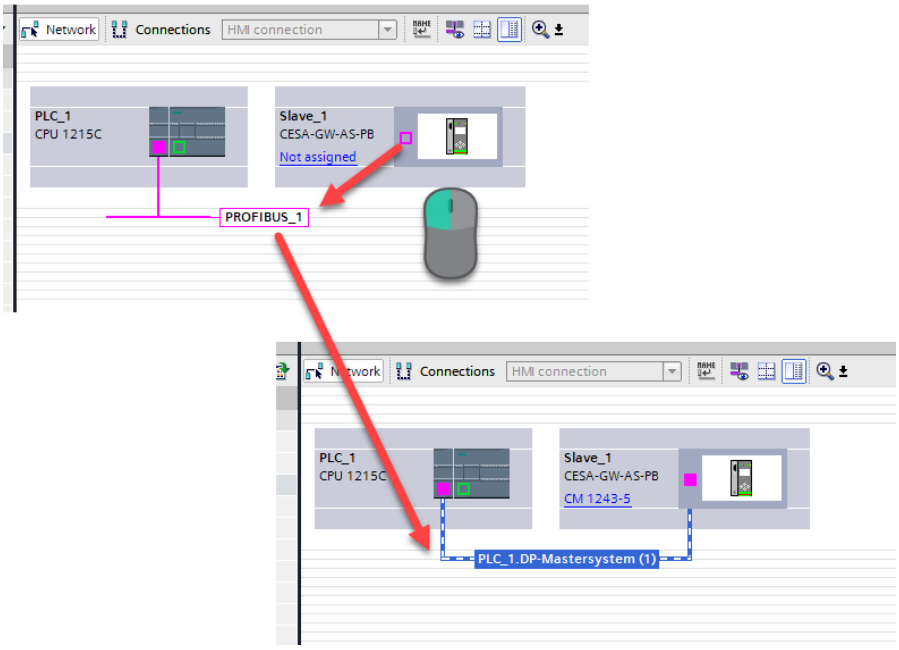
- Go to “Network View” and you will see your preset PROFIBUS network ready to deploy;

- Then, search for CESA-GW-AS-PB at “Hardware Catalog”;
- Drag and drop at “Network View”;

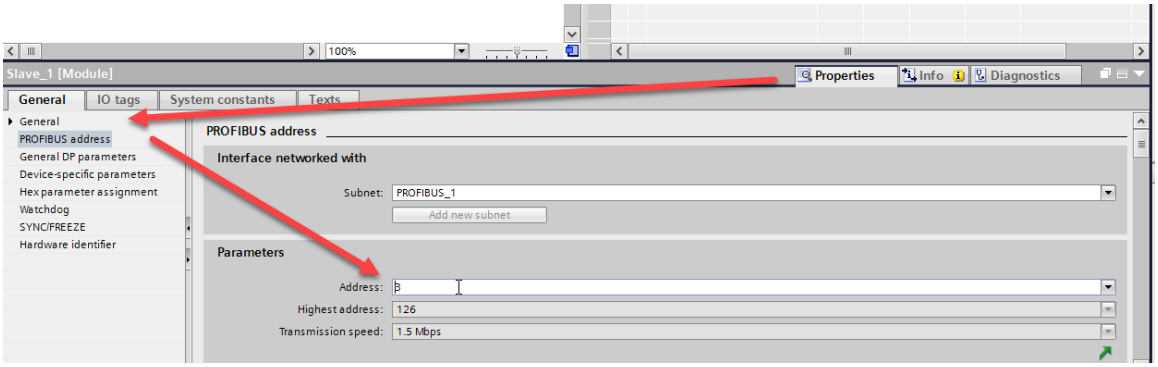


4.2.3 Configuration for PROFIBUS at S7-1200

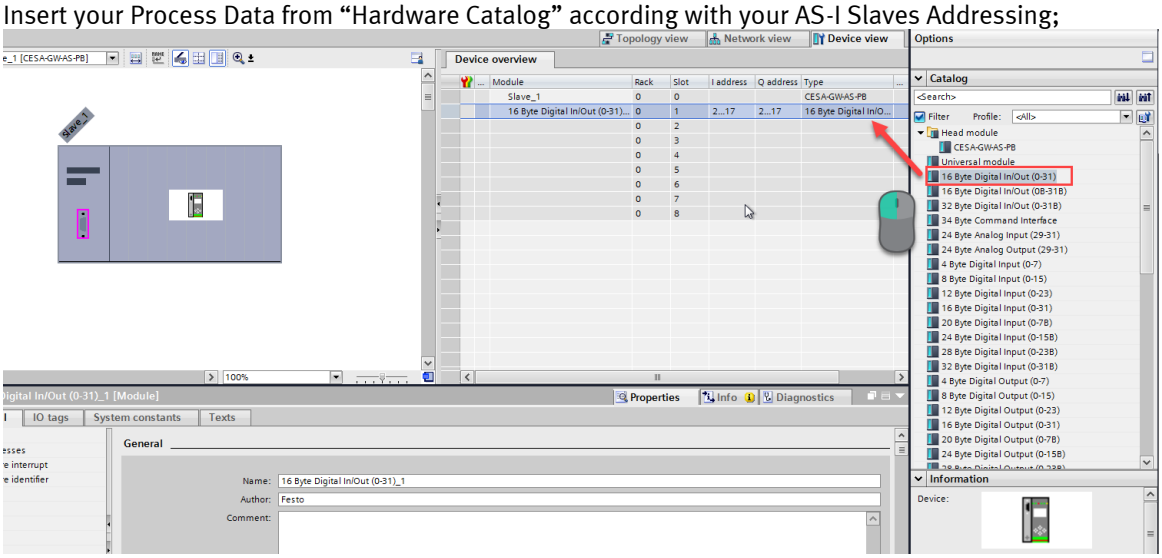
- At “Network View” Drag and Drop the CESA-...-PB PROFIBUS port into the Network to assig it as a slave ;



- To change the Address from the Slave, select “Properties” and check “PROFIBUS Address” Tab;

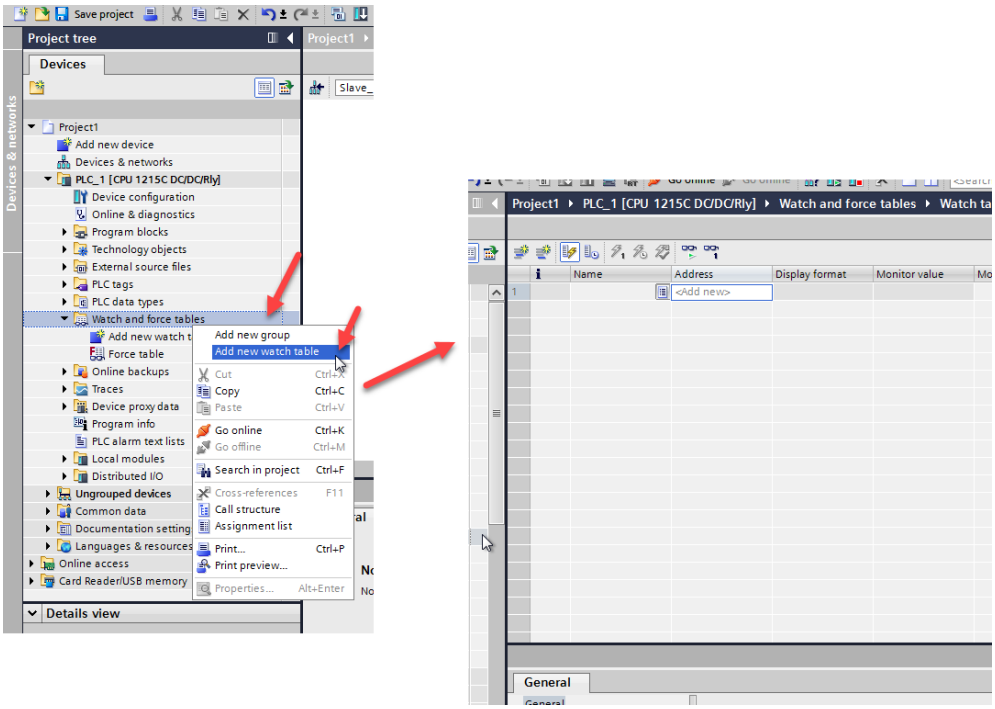


- Double Click at your Slave;
- Insert your Process Data from “Hardware Catalog” according with your AS-I Slaves Addressing;

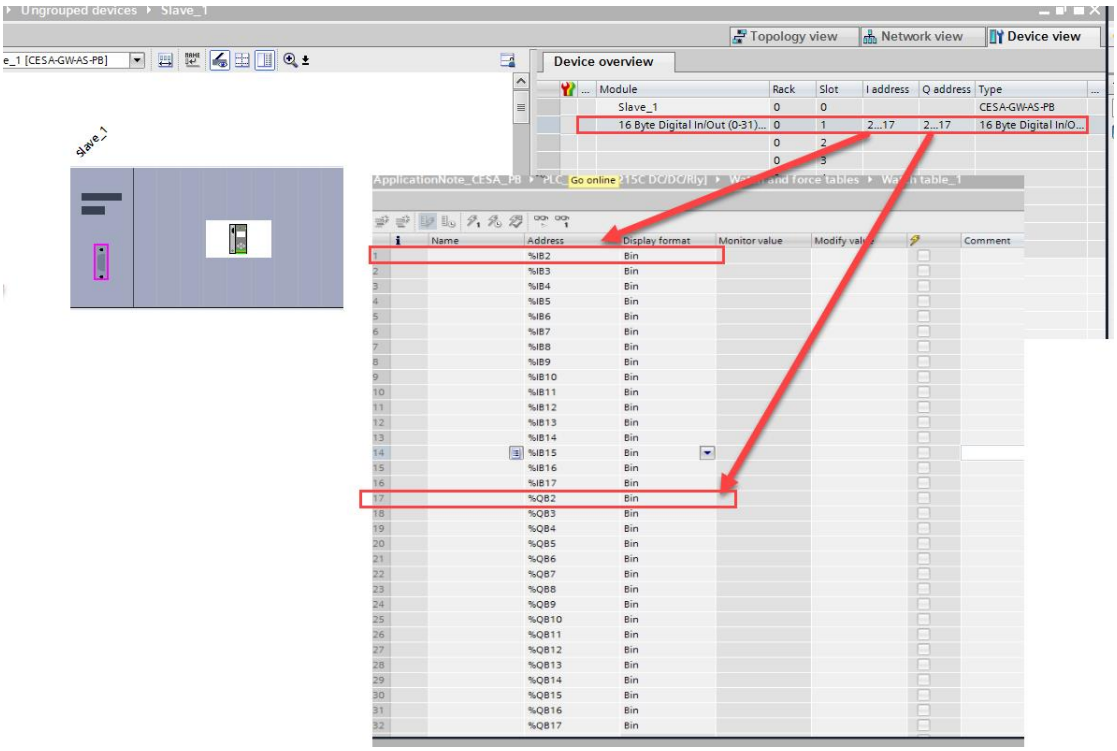


4.2.4 Watch table

- At “Project Tree” , right click on “Watch and Force Tables” ➔ “Add new watch table”;



- Mount the Table as described below, based on your address that you can collect at “Device View” in your CESA-GW-AS-PB Slave;



4.2.5 Process Image

Looking at the Watch table that you create, this is how the process image should look like:

Address	Channel	Description
%QB2 - %QB9	Digital Output Slave 1(A)-15(A)	Devices Outputs
%QB10 - %QB17	Digital Output Slave 16(A)-31(A)	
%IB2 - %IB9	Digital Input Slave 1(A)-15(A)	Devices Inputs
%IB10 - %IB17	Digital Input Slave 16(A)-31(A)	

Table 4.3: Addressing at CoDeSys from CESA.

➔ **Extended Addressing is not used in this application.**
If you need a better understanding about this configuration, please check ➔ Cap. 6.8.7 (AS-I Address assistant) in the CESA Manual.
You can use for the Extended addressing other options in “Hardware Catalog” at the

The SRBG will be mapped as follow:

VARIABLE	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
%IB2	CESA Flags for Diagnosis				Slave Address 1 Inputs			
					Switch Output Sensor 2	Switch Output Sensor 1	Valve Error	Hi-Flag from Slave[1)]
%IB3	Slave Address 3 Inputs				Slave Address 2 Inputs			
%QB2	CESA Flags for Diagnosis				Slave Address 1 Outputs			
								Valve Output
%QB3	Slave Address 3 Outputs				Slave Address 2 Outputs			

1) Acknowledges that the equipment is Alive (when connected, Always on)

Table 4.4: SRBG Mapping

Info
The diagnosis (bit 4-7) are just in the first byte and then, for the next address , the following bytes are sequential for all the address , allocating 1 nipple (4bits) for each slave.