Belt Scale SFB22
Profinet Integration Guide

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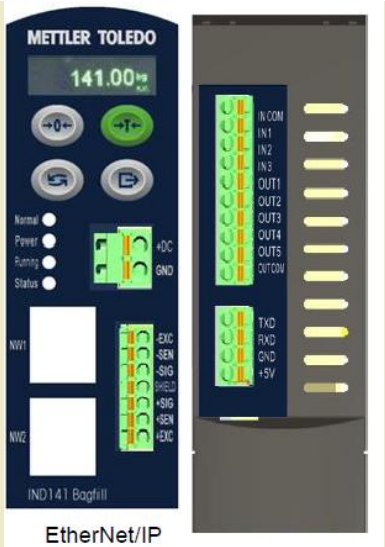

Applied programs/software/hardware and versions

SIMATIC Manager: Version 5.6

Siemens CPU: CPU315-2 PN/DP

Firmware IND141: IND141 Belt Scale V2.6

GSD-Datei IND141: GSDML-V2.33-MT-IND141 Belt Scale-20180404

FB1: Version 1.1

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Basic Information

A PLC module is available for integrating the SFB22 for the Profinet network of any existing project. The module defines the polling data traffic between a Siemens PLC and the IND141 terminal. Read and write processes are treated cyclically by using a control variable. PLC knowhow and basic usage of the SIMATIC Manager are required.

1 Installation of GSD file and hardware configuration

Launch the PLC project by starting the program SIMATIC Manager

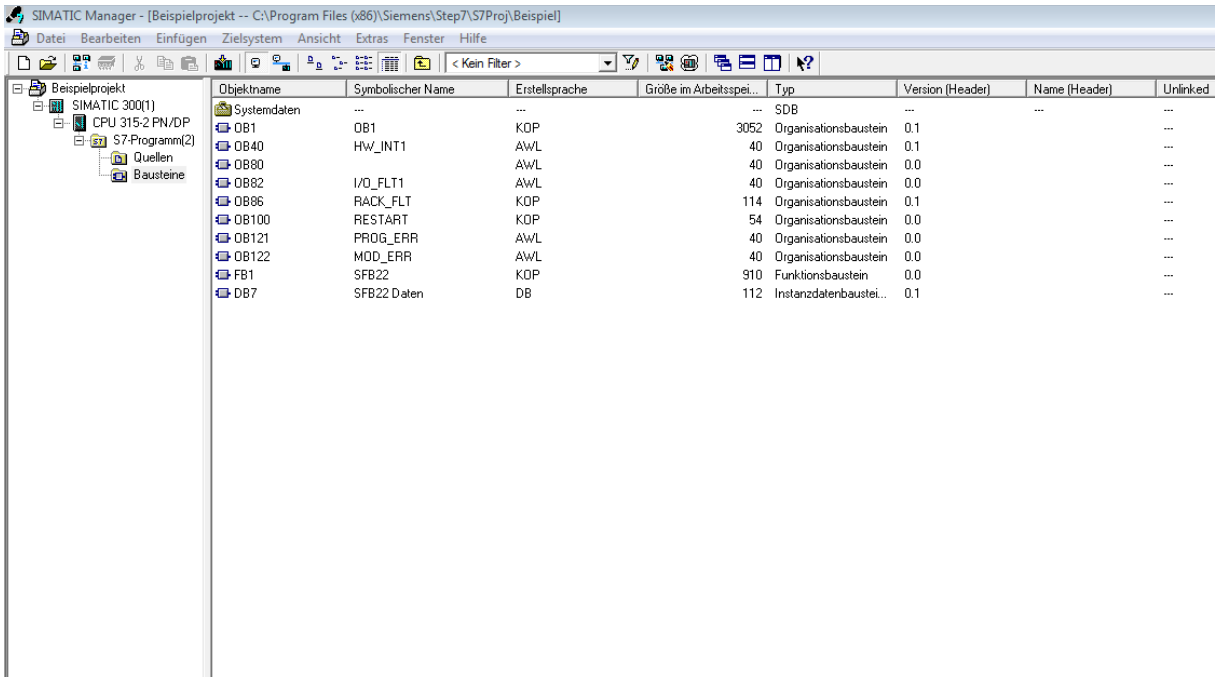

Image 1

The example function block FB1 is important for the integration into the project.

Referring to image 1 click on the subordinated level of the PLC project, then on Hardware to enter the hardware configuration. Select the menu command "Options > Manage general station description files (GSD)" where the GSD file (included in scope of delivery) will be installed.

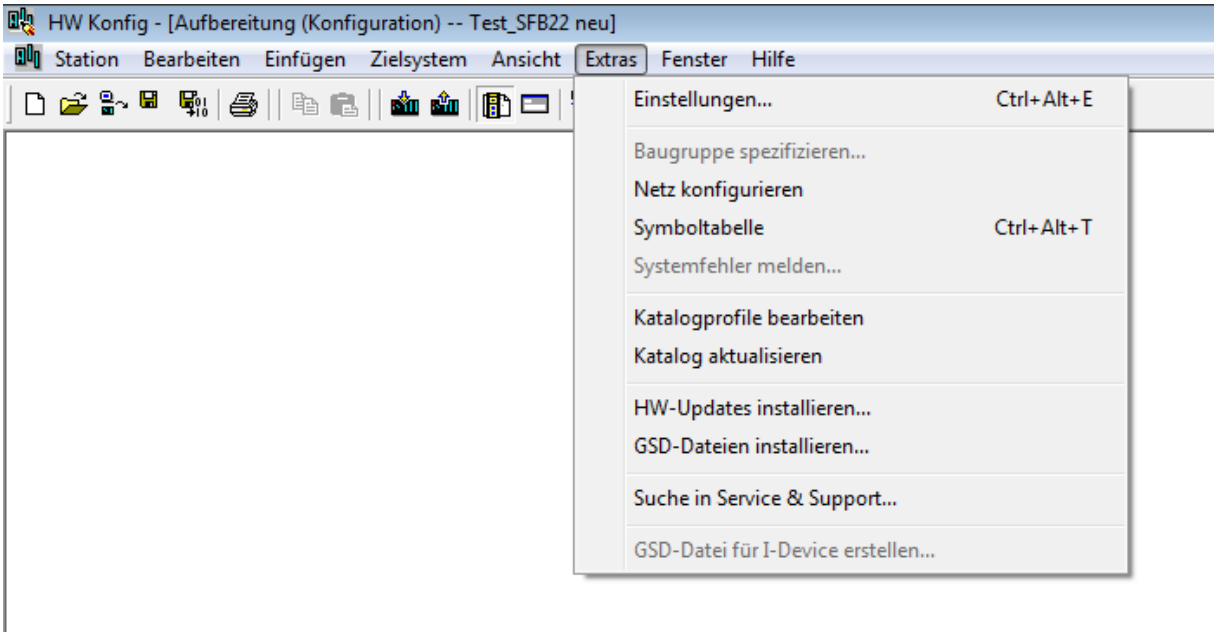

Image 2

After successful installation of the GSD file, the I/O device is usually displayed in the hardware catalog view in the right area of the window under Profinet > Additional Field Devices > General > IND141 Belt Scale. The device can now be added to the hardware configuration. Since the Profinet version of this device is used in this example, the device can only be attached to Ethernet(1) in the hardware configuration on the network view.

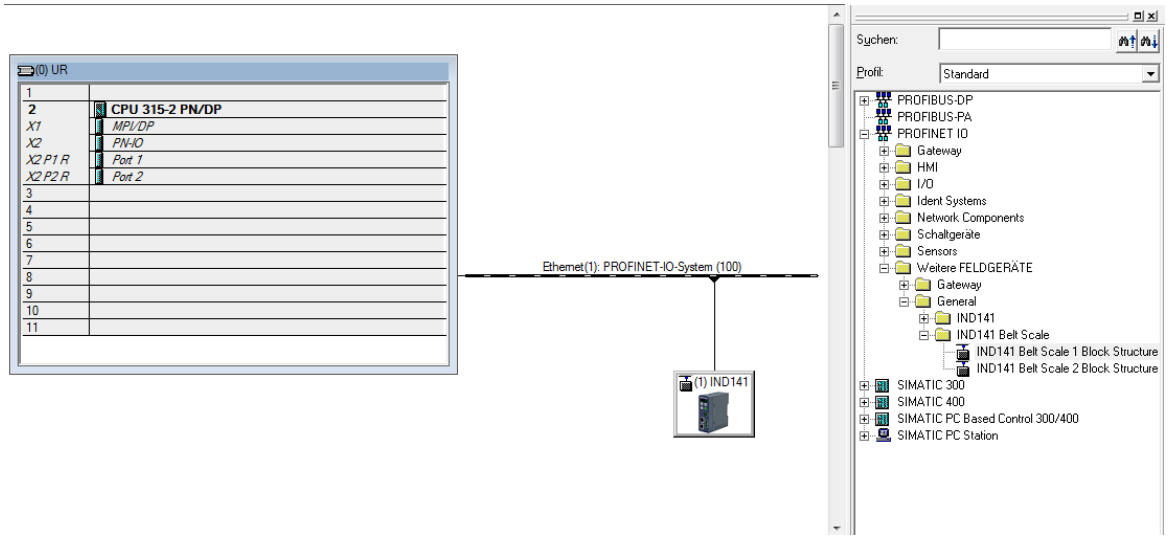

Image 3

REMARK: The “IND141 Belt Scale 1 Block Structure” was selected. Make sure that the settings of this format are also used for the web server settings.

NOTICE: It should be mentioned here that the following GSD file version was used for the integration: GSDML-V2.33-MT-IND141 Belt Scale-20180404.

A double click on IND141 in the hardware configuration opens a pop-up window with the device properties. In this window, the IP address and the device name of the IND141 in the connected network can be set.

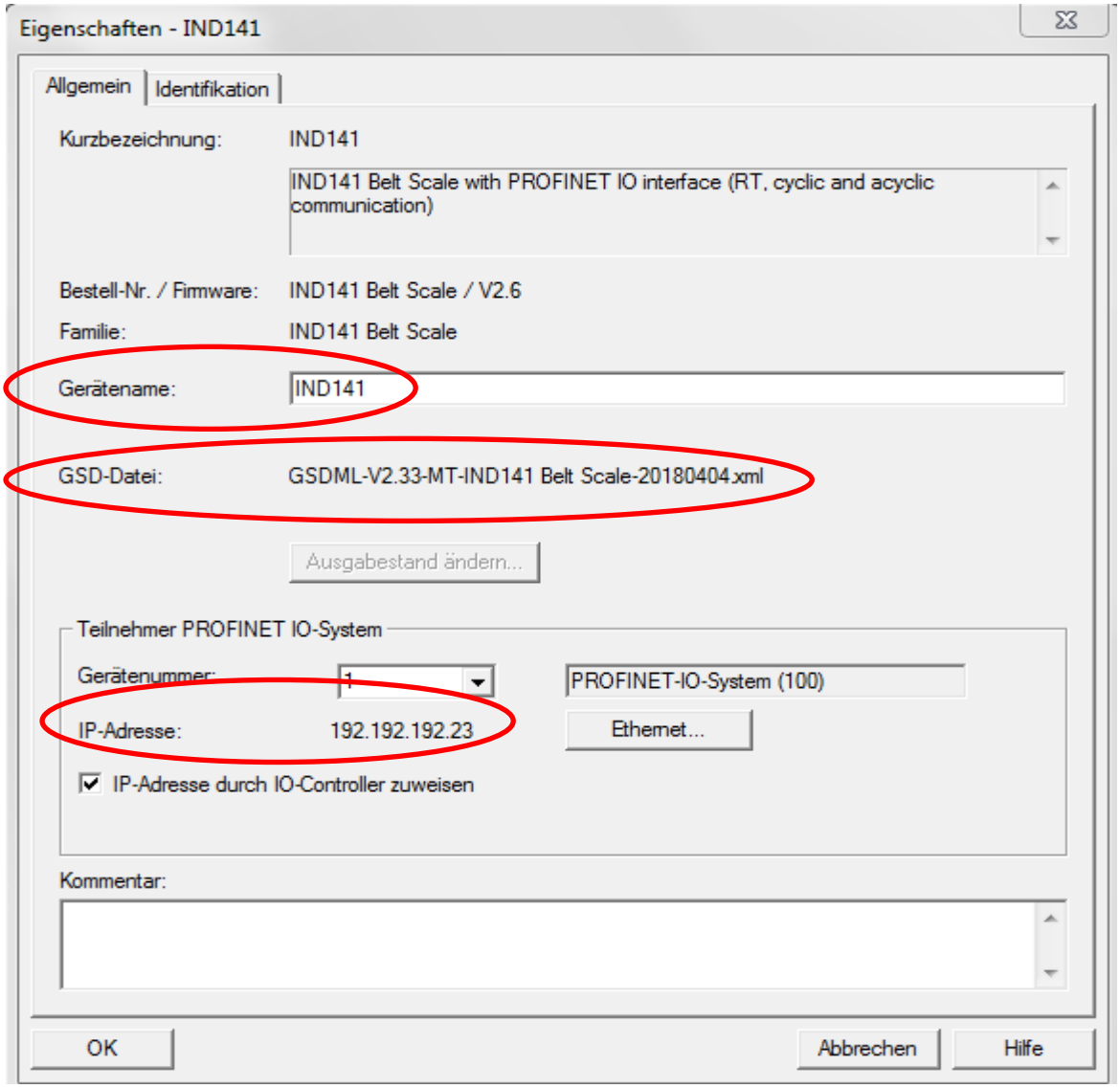

Image 4

All settings must be saved to the hardware configuration, compiled and loaded into the CPU.

Important:
IP address and device name must be identical to the settings of the SFB22 under **Web server -> Communication -> PROFINET**.

2 Monitoring by Web Server

In order to access the Web Server, enter the IP address of the IND141 into the address field of any web browser and press ENTER. The PC must be in the same IP address area as the IND141. The manufacturer's default IP address is 192.168.0.2.

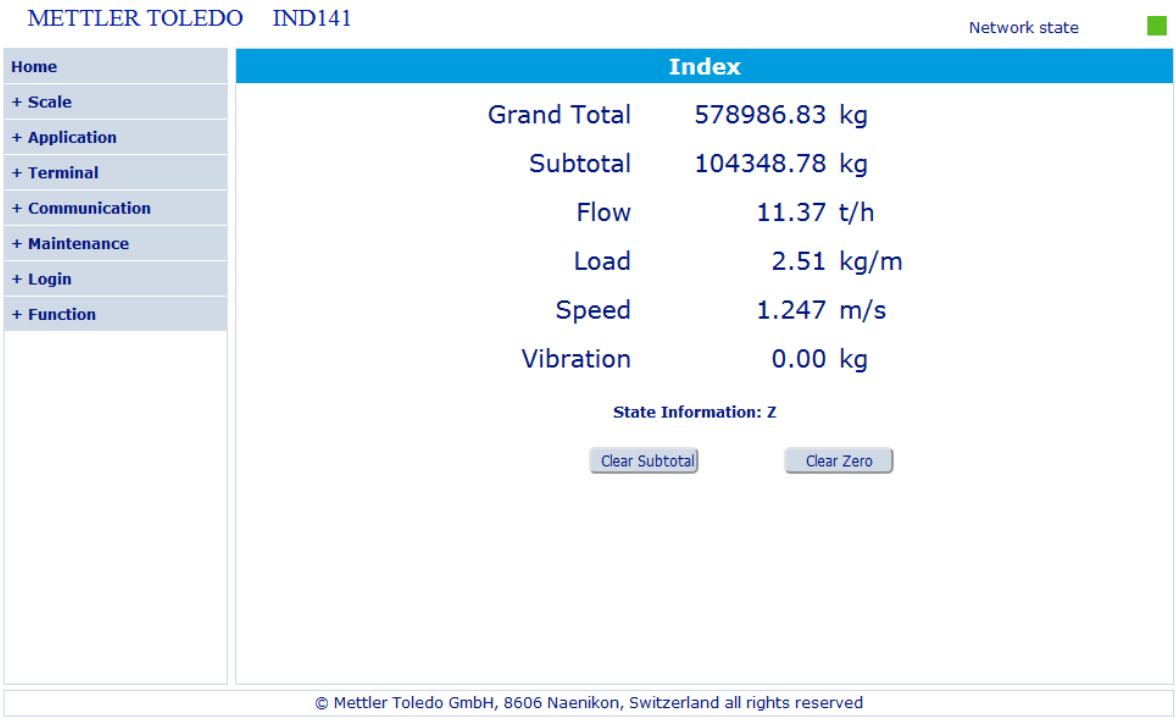

Image 5

The device name for the IND141 must be identical to the device name in the project, otherwise it must be changed on the web server window. Special attention must be given to the Block Format, which must be the same as for the device in the Siemens hardware catalog. The IP address of the device should be changed, either directly at the device or on the web server window. The above listed settings must be changed under the menu item **Communication** -> **PROFINET**.

3 Integration of the created function block

The FB1 block must be used for the integration into an existing PLC project, For example, the function can be called in OB1.
The function parameters correspond to all display parameters of the IND141 on the Web Server.

Calling for the function block in OB1

An instance data block assigned to this function block is required. Refer to the Image and click on **Insert** in the menu bar, navigate to and click on S7 Blocks, click on **data block** and a pop-up window opens where you can select the instance data block.

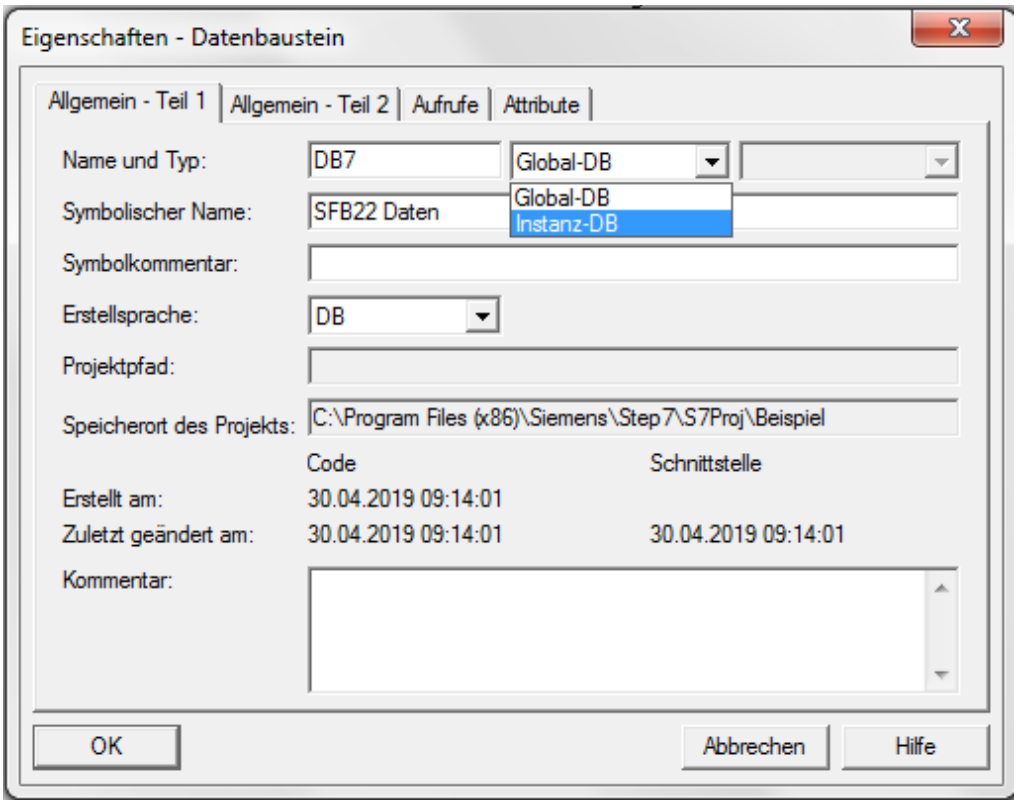

Image 6

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Connecting inputs/outputs

After calling the FB1 in the organization block (OB), an instance data block must be assigned to it. How to connect the inputs is shown on the following image.

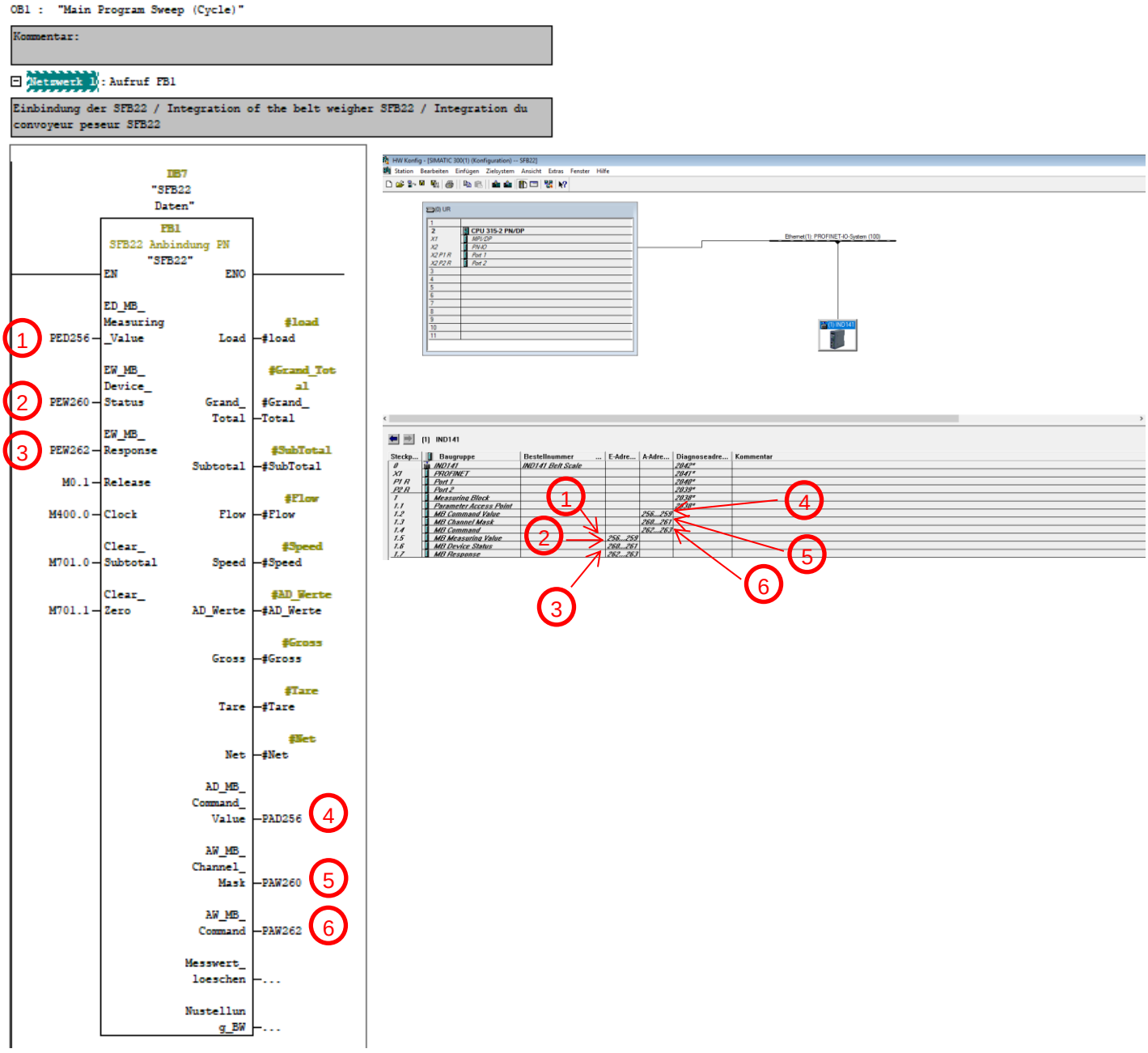

Image 7

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The CLOCK input is assigned to a clock memory. On the image below it is clock memory M400.0. The memory byte 400 was assigned to the clock memory in the hardware configuration settings for the CPU.

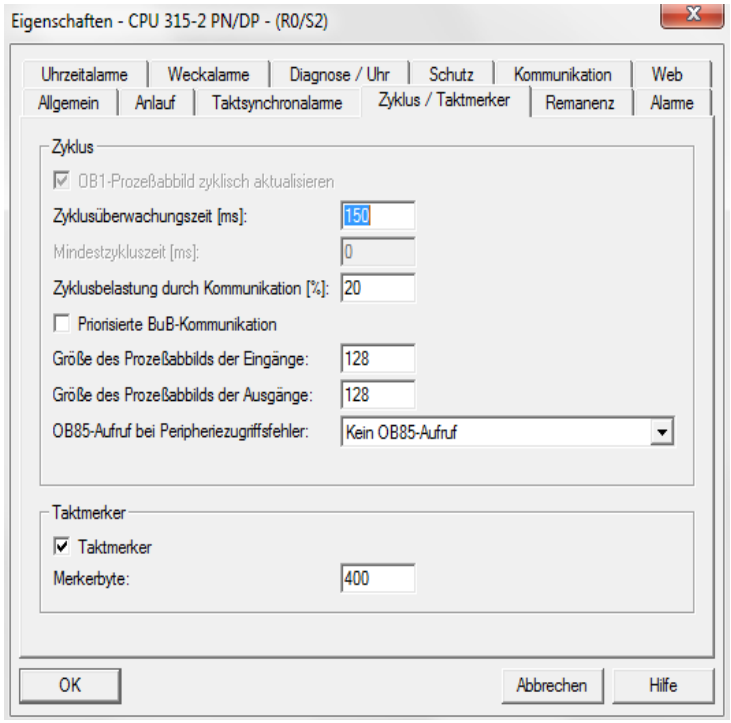

Image 8

Description of FB1

Function block FB1 processes the read and write commands of the SFB22.

The block processes step by step the following requests transmitted to the SFB22 and saves the responses. The data are then made available as block outputs for further processing by the specific program.

Sequence of processing:

Output tag	Description	MB Command (Control word)
Flow	Flow rate in [t/h]	8
Load	Weight in [Kg/m]	101
Sub Total	Measured Weight in [Kg]	102
Speed	Belt speed in [m/S]	103
Grand Total	Total weight in [Kg]	104
AD_Values	AD_values of bending beam	10
Gross	Gross weight in [Kg]	5
Tare	Tare weight in [Kg])	6
Net	Net weight in [Kg]	7
Erase measured value	Do not use	
Zeroing Belt Scale	Do not use	

In addition, commands can be issued.

In order to execute the functions **Clear_Subtotal** and **Clear_Zero,** the relevant block input must be set to **true** or 1.

Clear_Zero	Belt Scale is set to zero	1201
Clear_Subtotal	Subtotal totalizer is set to zero	1202

The block has an enable input. Set the input to true or 1.

4 Profinet Commands (Write and Read)

Cyclic Reading: I/O input area

Floating point data **Cyclic Read** format:

Read（IND141transfer to PLC）				
Bit	Word0	Word1	Word2	Word3
0	Floating point data		2 bits form a Sequence Bit, when receive a new command, this word plus 1	16 bit Response value (The same with command value)
1				
2			Heart beat(this status bit will change to 0 or 1)	
3			Normal data:1, data exception: 0	
4			Application Alarm	
5			Zero	
6			Stable	
7			Net	
8			Unit Transfer	
9			SpeedOkay(word 2 bit 9)	
10			Zero required(word 2 bit 10)	
11			Legal for Trade LTF Bit(word 2 bit 11)	
12			Flow rate okay(word 2 bit 12)	
13			LoadOkay(word 2 bit 13)	
14			Running	
15			Reserved	

MB Measuring Value MB Device Status MB Response

Image 9

Cyclic Writing: I/O output area

Floating point data **Cyclic Write** format:

Write（PLC transfer to IND141）			
Word 0	Word 1	Word 2	Word 3
Floating point data		Data channel	Write command

MB Command Value MB Channel Mask MB Command

Image 10

Commands (General)

IND141 Floating point data **Cyclic Write** command list

Type	Command	Description	Value
Weight report	Report Default Data	For terminals & sensors this is Gross weight data in displayed resolution	0
	Report Rounded Gross Weight	Gross Weight data is displayed resolution	1
	Report Rounded Tare Weight	Tare weight data in displayed resolution	2
	Report Rounded Net Weight	Net weight data in displayed resolution	3
	Report Rounded Rate	Rate (change in gross weight over time) in displayed resolution	4
	Report Gross Weight	Gross weight data in internal resolution	5
	Report Tare Weight	Tare weight data in internal resolution	6
	Report Net Weight	Net weight data in internal resolution	7
	Report Rate	Rate (change in gross weight over time) in internal resolution	8
	Report Weight Units		9
	Report raw counts	Unprocessed weight data (no filter or unit calculation)	10
Custom Application Report	Report weight per unit length	Belt load per unit length	101
	Report Totalizer	Report partial totalization	102
	Report belt speed	Report belt speed	103
	Report Grand Totalizer	Report grand totalization	104
Weight Write Immediate	Write Preset Tare Weight	Sets Preset Tare to Value provided	201
Custom Application Write Immediate	Set Running flag	Set Running flag (only valid in constant speed) 0 - not running 1 - Running	301
Weight	Tare	Tare executed with motion check	400

Image 11

Operation Immediate	Zero	Zero executed with motion check	401
	Clear Tare	Motion not checked, clear tare executed	402
	Tare Immediate	Motion not checked, tare executed	403
Print / Communication Operation Immediate Commands	Print	Demand Print executed	410
Display / Keyboard Operation Immediate	Disable Keypad		632
	Enable Keypad		633
Discrete Output Operation Immedia	Turn all internal & external outputs OFF	Forces all outputs OFF	1000
Custom Application Operation Immediate	Belt zero commnad	Zero the belt scale(at least 3 minutes)write 1 to trigger belt zero-setting	1201
	Totalizer set zero	Clear the totalizerwrite 1 to trigger clear work totalizer(if belt is stoping command will be performed, if belt is running command only be performed while the flow is less than Lockout-flow AND in non-appproved)	1202
	Grand Totalizer set zero	Clear the grand totalizerwrite 1 to trigger clear grand totalizer(if belt is stoping command will be performed, if belt is running command only be performed while the flow is less than Lockout-flow AND in non-appproved)	1203

Image 12