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SCE Training Curriculum

Siemens Automation Cooperates with Education | 05/2017

TIA Portal Module 032-600
Global Data Blocks
for the SIMATIC S7-1500

Cooperates
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Automation

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GLOBAL DATA BLOCKS FOR THE SIMATIC S7-1500

1 Goal

In this chapter, you will become acquainted with the use of global data blocks for the SIMATIC S7-1500 with the TIA Portal programming tool.

The module explains the structure and creation of and access to global data blocks for the SIMATIC S7-1500. It also shows the steps for creating a global data block in the TIA Portal and for accessing this data in the program with read and write access.

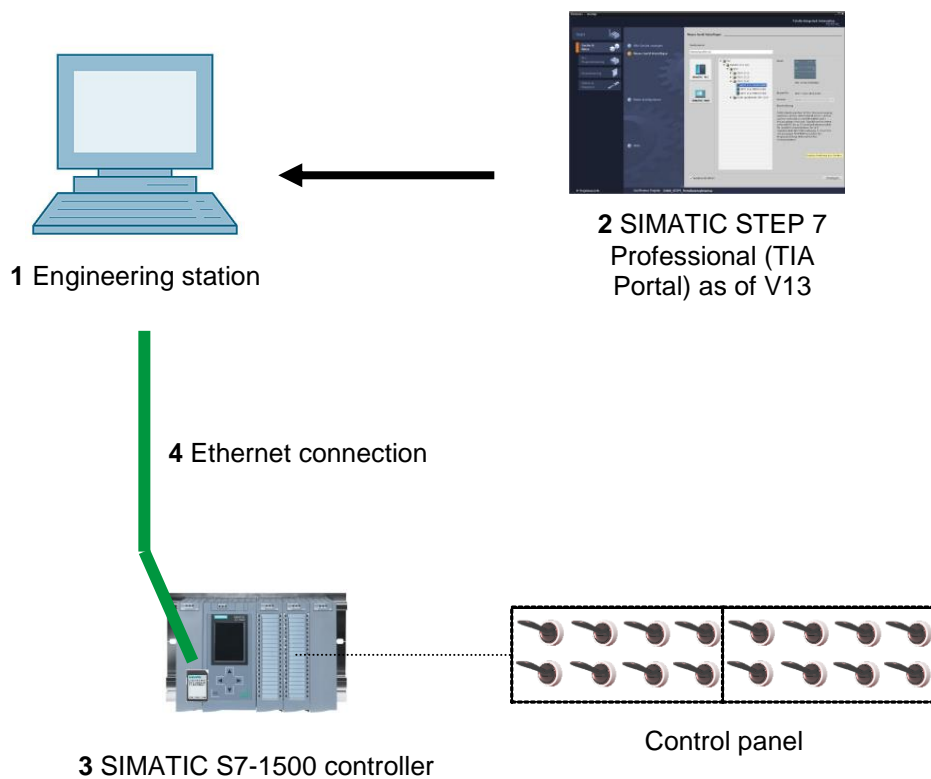
The SIMATIC S7 controllers listed in Chapter 3 can be used.

2 Prerequisite

This chapter builds on the chapter Analog Values with the SIMATIC S7 CPU1516F-3 PN/DP. You can use the following project for this chapter, for example: "SCE_EN_032-500_Analog_Values_R1508.zap13".

3 Required hardware and software

- 1 Engineering station: requirements include hardware and operating system
(for additional information, see Readme on the TIA Portal Installation DVDs)
- 2 SIMATIC STEP 7 Professional software in TIA Portal – as of V13
- 3 SIMATIC S7-1500/S7-1200/S7-300 controller, e.g. CPU 1516F-3 PN/DP –
Firmware as of V1.6 with memory card and 16DI/16DO and 2AI/1AO
Note: The digital inputs and analog inputs and outputs should be fed out to a control panel.
- 4 Ethernet connection between engineering station and controller



4 Theory

4.1 Data blocks

In contrast to logic blocks, data blocks contain no instructions. Rather, they serve as memory for user data.

Data blocks thus contain variable data that is used by the user program. You can define the structure of global data blocks as required.

Global data blocks store data that can be used **by all other blocks** (see Figure 1). Only the associated function block should access instance data blocks. The maximum size of data blocks varies depending on the utilized CPU.

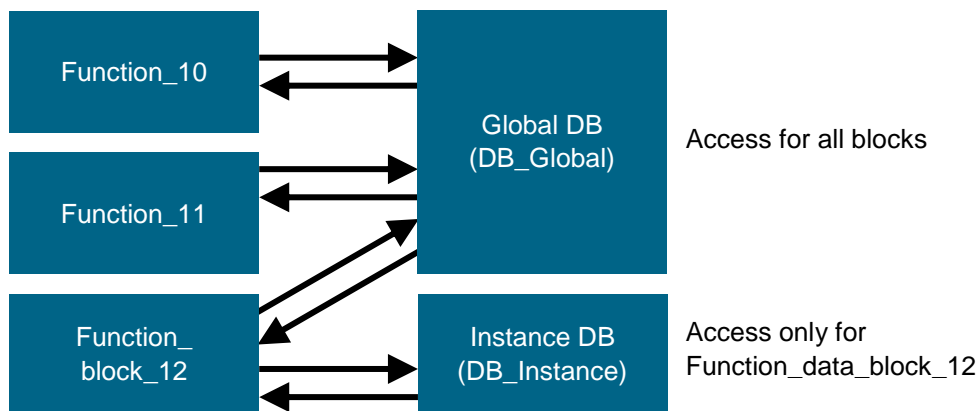


Figure 1: Difference between global DB and instance DB.

Application examples for **global data blocks** are:

- Saving of information about a storage system. "Which product is located where?"
- Saving of recipes for particular products.

The data in data blocks is stored retentively in most cases. This data is then retained in the event of a power failure or after a STOP/START of the CPU.

4.2 Data types of the SIMATIC S7-1500

The SIMATIC S7-1500 has many different data types for representing different numerical formats. A list of some of the elementary data types is given below.

Data type	Size (bits)	Range	Example of constant entry
Bool	1	0 to 1	TRUE, FALSE, 0, 1
Byte	8	16#00 to 16#FF	16#12, 16#AB
Word	16	16#0000 to 16#FFFF	16#ABCD, 16#0001
DWord	32	16#00000000 to 16#FFFFFFFF	16#02468ACE
Char	8	16#00 to 16#FF	'A', 'r', '@'
Sint	8	-128 to 127	123, -123
Int	16	-32,768 to 32,767	123, -123
Dint	32	-2,147,483,648 to 2,147,483,647	123, -123
USInt	8	0 to 255	123
UInt	16	0 to 65,535	123
UDInt	32	0 to 4,294,967,295	123
Real	32	$\pm 1.18 \times 10^{-38}$ to $\pm 3.40 \times 10^{38}$	123.456, -3.4, 1.2E+12 3.4E-3
LReal	64	$\pm 2.23 \times 10^{-308}$ to $\pm 1.79 \times 10^{308}$	12345.123456789 -1.2E+40
Time	32	T#-24d_20h_31 m_23s_648ms to T#24d_20h_31 m_23s_647ms Saved as: -2,147,483,648 ms to +2,147,483,647 ms	T#5m_30s 5#-2d T#1d_2h_15m_30x_45ms
String	Variable	0 to 254 characters in byte size	'ABC'
Array		With arrays, data of a uniform data type is arranged one after the other and addressed consecutively in the address area. The properties of each array element are identical and are configured in the array tag.	
Struct		The STRUCT data type represents a data structure that consists of a fixed number of components of different data types. Components of STRUCT or ARRAY data type can also be nested in a structure.	
...		For other data types, refer to the online help.	

4.3 Optimized blocks

S7-1500 controllers have optimized data storage. In optimized blocks all tags are automatically sorted based on their data type. The sorting ensures that data gaps between the tags are minimized and the tags are stored in a manner that optimizes their access by the controller.

- The tags are always accessed as fast as possible because the file storage by the system is optimized and is independent of the declaration.
- There is no danger of inconsistencies due to incorrect, absolute accesses because symbolic access is generally used.
- Declaration changes do not result in access errors because accesses by process visualization systems, for example, occur symbolically.
- Individual tags can be selectively defined as retentive.
- No settings are needed or possible in the instance data block. Everything will be set in the assigned FB (e.g., retentivity).
- Memory reserves in the data block enable changes to be made without loss of actual values (download without reinitialization).

4.4 Download without reinitialization

To enable the subsequent editing of user programs that are already running in a CPU, the S7-1500 controllers support the option of expanding the interfaces of optimized function or data blocks during operation. You can download the modified blocks without switching the controller to STOP mode and without affecting the actual values of previously downloaded tags.

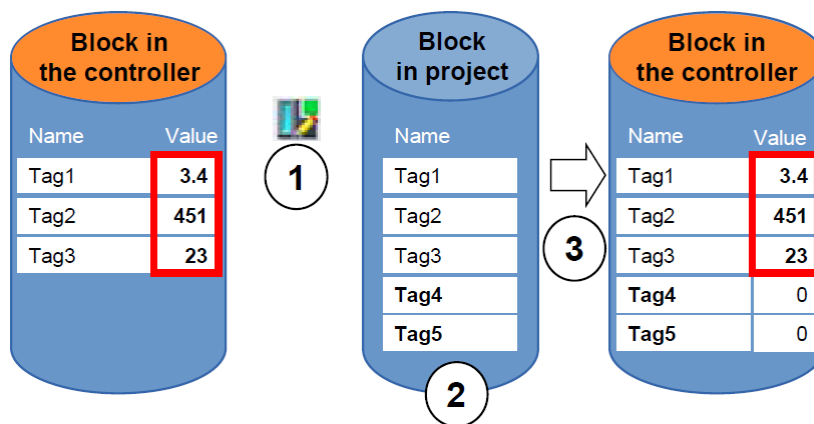


Figure 2: Download without reinitialization

The following steps can be performed while the controller is in RUN mode:

1. Activate "Download without reinitialization"
2. Insert newly defined tags in an existing block
3. Download expanded block to the controller

The newly defined tags are initialized. The existing tags retain their current value.

Prerequisite: a memory reserve must have been defined for the block beforehand and the block with this memory reserve must have been downloaded to the CPU.

5 Task

In this chapter, the program from chapter "SCE_EN_032-500 Analog Values" will be expanded to include a data block that centrally provides the parameters for the two functions "MOTOR_SPEEDCONTROL" [FC10] and "MOTOR_SPEEDMONITORING" [FC11].

6 Planning

The data management and setpoint setting for the "MOTOR_SPEEDCONTROL" [FC10] and "MOTOR_SPEEDMONITORING" [FC11] functions will be carried out using the global data block "SPEED_MOTOR" [DB2].

This will be added to the "032-500_Analog_Values" project. This project must be retrieved from the archive beforehand.

In the "Main" [OB1] organization block, the two functions "MOTOR_SPEEDCONTROL" [FC10] and "MOTOR_SPEEDMONITORING" [FC11] must then be connected with the tags from global data block "SPEED_MOTOR" [DB2].

6.1 Global data block for speed control and speed monitoring of the motor

Speed setpoint and actual speed value will be created in Real data format (32-bit floating-point number) as the first tags in the "SPEED_MOTOR" [DB2] data block. The speed setpoint is thereby given the start value + 14 U/min

A structure (Struct) 'Positive_Speed' will then be created for monitoring the positive speed limits.

This structure contains the 2 tags 'Threshold_Error' (start value + 15 rpm) and 'Threshold_Warning' (start value + 10 rpm) in Real data format (32-bit floating-point number) and the 2 tags 'Error' and 'Warning' in Bool data format (binary number).

The structure (Struct) 'Positive_Speed' will then be inserted again as a copy and renamed to 'Negative_Speed' for monitoring the negative speed limits.

The 'Threshold_Error' tag is given the start value - 16 rpm and the 'Threshold_Warning' tag the start value - 14 rpm.

6.2 Technology diagram

Here you see the technology diagram for the task.

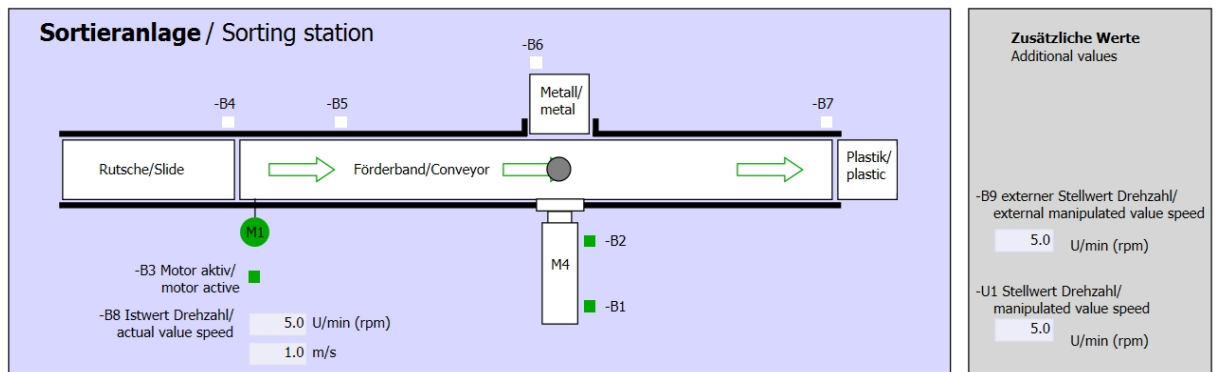


Figure 3: Technology diagram

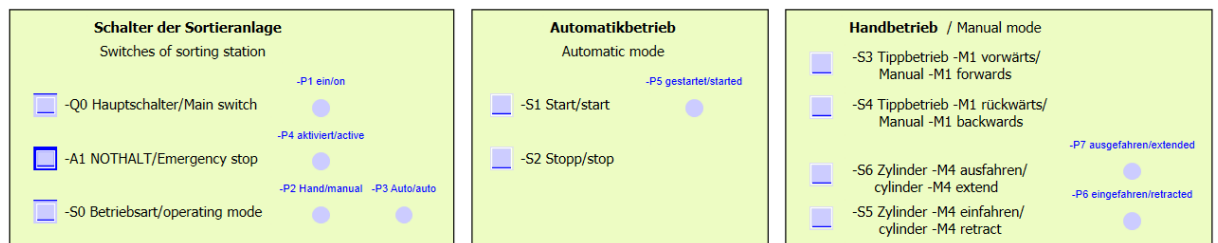


Figure 4: Control panel

6.3 Reference list

The following signals are required as global operands for this task.

DI	Type	Identifier	Function	NC/NO
I 0.0	BOOL	-A1	Return signal emergency stop OK	NC
I 0.1	BOOL	-K0	Main switch "ON"	NO
I 0.2	BOOL	-S0	Mode selector manual (0)/ automatic (1)	Manual = 0 Auto = 1
I 0.3	BOOL	-S1	Pushbutton automatic start	NO
I 0.4	BOOL	-S2	Pushbutton automatic stop	NC
I 0.5	BOOL	-B1	Sensor cylinder -M4 retracted	NO
I 1.0	BOOL	-B4	Sensor part at slide	NO
I 1.3	BOOL	-B7	Sensor part at end of conveyor	NO
IW64	BOOL	-B8	Sensor actual value speed +/-10V corresponds to +/- 50 rpm	

DO	Type	Identifier	Function	
Q 0.2	BOOL	-Q3	Conveyor motor -M1 variable speed	
QW 64	BOOL	-U1	Manipulated value speed of the motor in 2 directions +/- 10V corresponds to +/- 50 rpm	

Legend for reference list

DI Digital Input

DO Digital Output

AI Analog Input

AO Analog Output

I Input

Q Output

NC Normally Closed

NO Normally Open

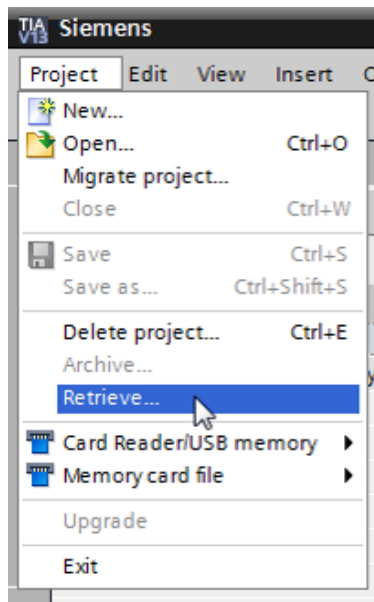
7 Structured step-by-step instructions

You can find instructions on how to carry out planning below. If you already have a good understanding of everything, it will be sufficient to focus on the numbered steps. Otherwise, simply follow the detailed steps in the instructions.

7.1 Retrieve an existing project

→ Before we can expand the "SCE_EN_032-500_Analog_Values_R1508.zap13" project from chapter "SCE_EN_032-500 Analog Values", we must retrieve this project from the archive. To retrieve an existing project that has been archived, you must select the relevant archive with → Project → Retrieve in the project view. Confirm your selection with Open.

(→ Project → Retrieve → Select a .zap archive → Open)

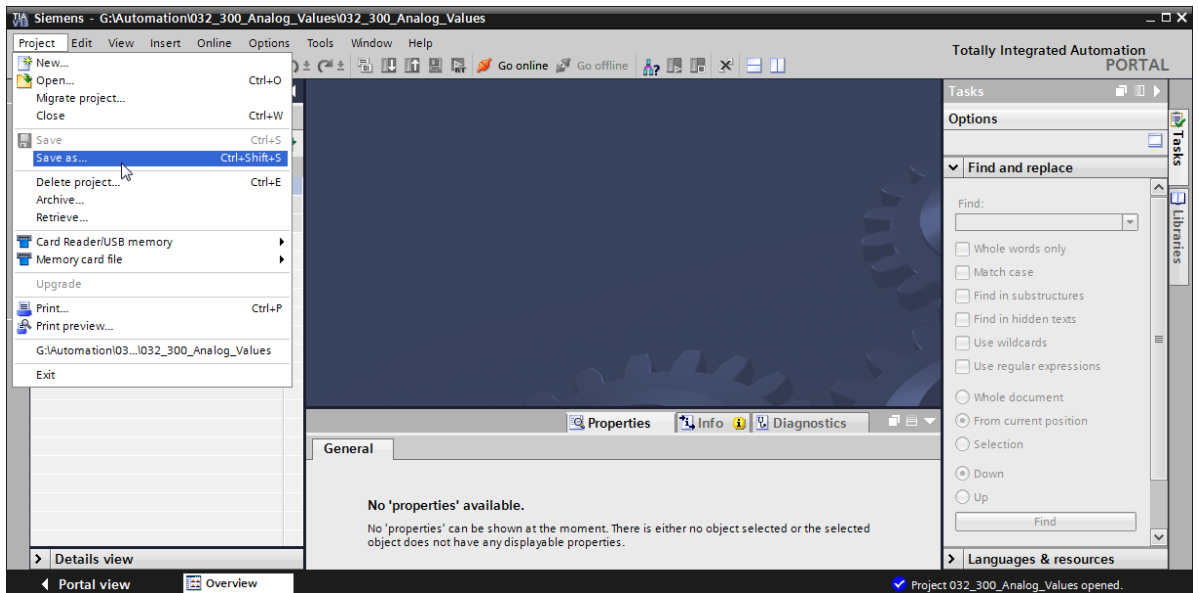


→ The next step is to select the target directory where the retrieved project will be stored. Confirm your selection with "OK".

(→ Target directory → OK)

→ Save the opened project under the name 032-600_Global_Data_Blocks.

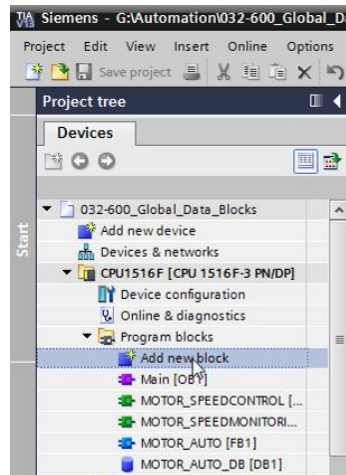
(→ Project → Save as ... → 032-600_Global_Data_Blocks → Save)




7.2 Create the global data block "SPEED_MOTOR"

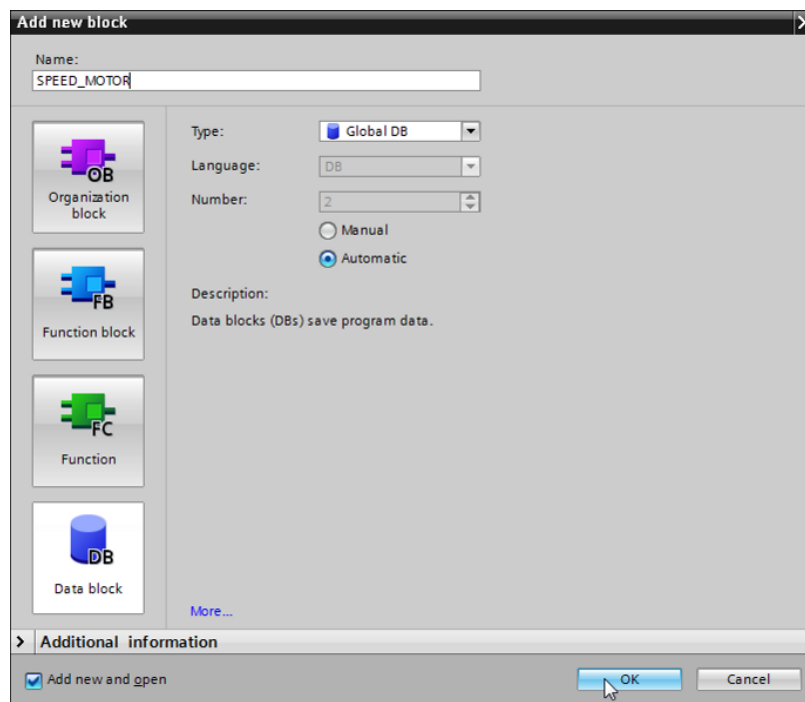
→ Select the 'Program blocks' folder of your CPU 1516F-3 PN/DP and then click "Add new block" to create a new global data block there.

(→ CPU_1516F [CPU 1516F-3 PN/DP] → Add new block)



→ Select  in the next dialog and rename your new block to: "SPEED_MOTOR". Select 'Global DB' as the type. The number '2' will be automatically assigned. Select the "Add new and open" check box. Click "OK".

(→  → Name: SPEED_MOTOR → Type: Global DB → ☒ Add new and open → OK)



→ The "SPEED_MOTOR" data block is automatically displayed. Start by creating the 'Speed_Setpoint' and 'Speed_Actual_Value' tags shown here with their associated comments. Select 'Real' as the data type. Also set a start value of 10.0 rpm for the 'Speed_Setpoint'.

(→ Speed_Setpoint → Real → 14.0 → Speed_Actual_Value → Real)

	Name	Data type	Start value	Retain	Accessible from HMI	Visible in HMI	Setpoint	Comment
1	Static							
2	Speed_Setpoint	Real	14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed set point in revolutions per minute (range: +/-50 rpm)
3	Speed_Actual_Value	Real	0.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Speed actual value in revolutions per minute (range: +/-50 rpm)

Note: Be sure to use the correct data types.

→ Next we create a tag structure 'Struct' so it can be duplicated later.

(→ Struct)

	Name	Data type	Start value	Retain	Accessible from HMI	Visible in HMI	Setpoint	Comment
1	Static							
2	Speed_Setpoint	Real	14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed set point in revolutions per minute (range: +/-50 rpm)
3	Speed_Actual_Value	Real	0.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Speed actual value in revolutions per minute (range: +/-50 rpm)
4	<Add new>							

→ Name the structure 'Positive_Speed' and enter a comment.

(→ Positive_Speed)

032-600_Global_Data_Blocks ▶ CPU1516F [CPU 1516F-3 PN/DP] ▶ Program blocks ▶ SPEED_MOTOR [DB2]

SPEED_MOTOR

	Name	Data type	Start value	Retain	Accessible from HMI	Visible in HMI	Setpoint	Comment
1	▼ Static			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2	Speed_Setpoint	Real	14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed set point in revolutions per minute (range: +/-50 rpm)
3	Speed_Actual_Value	Real	0.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Speed actual value in revolutions per minute (range: +/-50 rpm)
4	▼ Positive_Speed	Struct		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Parameters for error/warning positive speed
5	<Add new>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
6	<Add new>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

→ Create the tags for the speed monitoring below the structure as shown here.

032-600_Global_Data_Blocks ▶ CPU1516F [CPU 1516F-3 PN/DP] ▶ Program blocks ▶ SPEED_MOTOR [DB2]

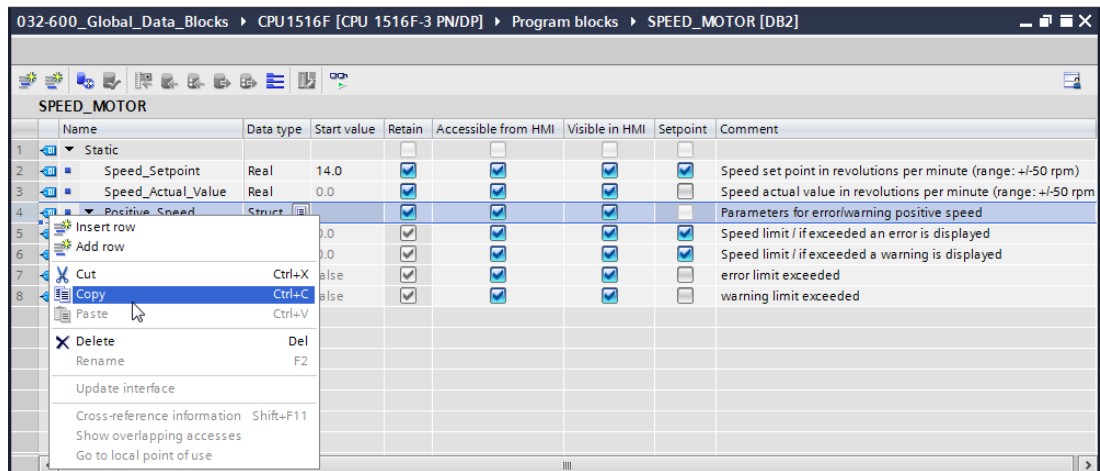
SPEED_MOTOR

	Name	Data type	Start value	Retain	Accessible from HMI	Visible in HMI	Setpoint	Comment
1	▼ Static			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2	Speed_Setpoint	Real	14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed set point in revolutions per minute (range: +/-50 rpm)
3	Speed_Actual_Value	Real	0.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Speed actual value in revolutions per minute (range: +/-50 rpm)
4	▼ Positive_Speed	Struct		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Parameters for error/warning positive speed
5	Threshold_Error	Real	0.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded an error is displayed
6	Threshold_Warning	Real	0.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded a warning is displayed
7	Error	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	error limit exceeded
8	Warning	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	warning limit exceeded

Note: Be sure to use the correct data types.

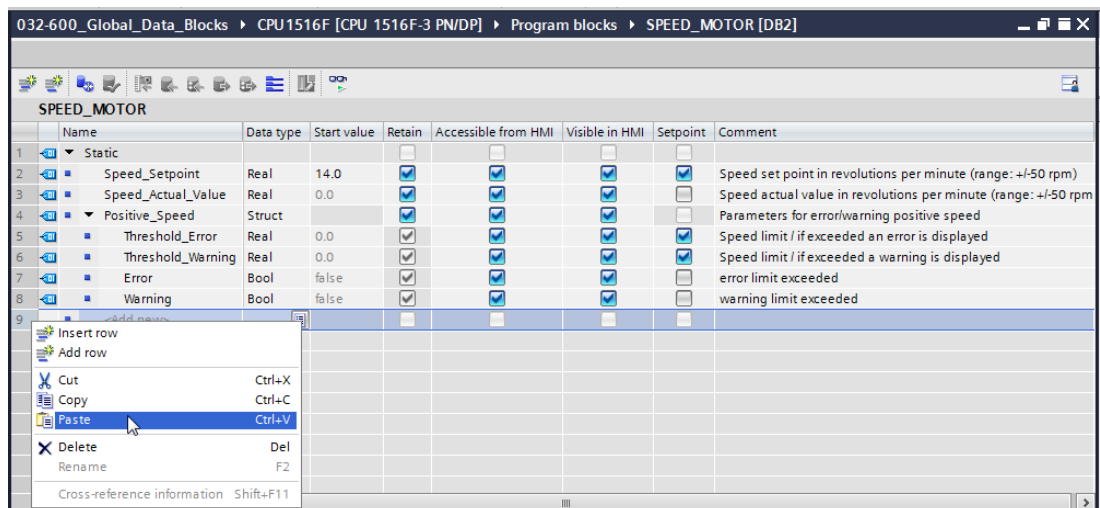
→ Then select the structure and copy it.

(→ Copy)



→ Paste the copied structure below the 'Positive_Speed' structure again.

(→ Paste)

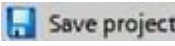


- Rename the new structure to 'Negative_Speed' and enter a comment.
(→ Negative_Speed)

032-600_Global_Data_Blocks ▶ CPU 1516F [CPU 1516F-3 PN/DP] ▶ Program blocks ▶ SPEED_MOTOR [DB2]

SPEED_MOTOR

	Name	Data type	Start value	Retain	Accessible from HMI	Visible in HMI	Setpoint	Comment
1	Static							
2	Speed_Setpoint	Real	14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed set point in revolutions per minute (range: +/-50 rpm)
3	Speed_Actual_Value	Real	0.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Speed actual value in revolutions per minute (range: +/-50 rpm)
4	Positive_Speed	Struct		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Parameters for error/warning positive speed
5	Threshold_Error	Real	0.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded an error is displayed
6	Threshold_Warning	Real	0.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded a warning is displayed
7	Error	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	error limit exceeded
8	Warning	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	warning limit exceeded
9	Negative_Speed	Struct		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Parameters for error/warning negative speed
10	Threshold_Error	Real	0.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded an error is displayed
11	Threshold_Warning	Real	0.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded a warning is displayed
12	Error	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	error limit exceeded
13	Warning	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	warning limit exceeded
14	<Add new>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Do not forget to click  **Save project**. The finished global data block "SPEED_MOTOR" [DB2] is shown below. Check to verify that Retain is selected ☒ and the corresponding start value is entered for all tags. The data will thus be retained in the data block even after a power failure or a STOP/START of the CPU. The check boxes for 'Accessible from HMI' ☒ and 'Visible in HMI' ☒ should also all have a check mark so that all tags in future expansions of this project will be accessible by the visualization systems (HMI). We will select the 'Setpoint' check box ☒ only for the default values in our data block.
(→ ☒ ☒ ☒ ☒)

032-600_Global_Data_Blocks ▶ CPU 1516F [CPU 1516F-3 PN/DP] ▶ Program blocks ▶ SPEED_MOTOR [DB2]

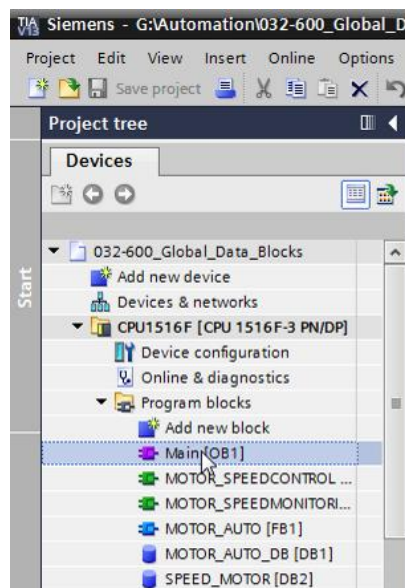
SPEED_MOTOR

	Name	Data type	Start value	Retain	Accessible from HMI	Visible in HMI	Setpoint	Comment
1	Static							
2	Speed_Setpoint	Real	14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed set point in revolutions per minute (range: +/-50 rpm)
3	Speed_Actual_Value	Real	0.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Speed actual value in revolutions per minute (range: +/-50 rpm)
4	Positive_Speed	Struct		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Parameters for error/warning positive speed
5	Threshold_Error	Real	16.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded an error is displayed
6	Threshold_Warning	Real	14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded a warning is displayed
7	Error	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	error limit exceeded
8	Warning	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	warning limit exceeded
9	Negative_Speed	Struct		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Parameters for error/warning negative speed
10	Threshold_Error	Real	-16.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded an error is displayed
11	Threshold_Warning	Real	-14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded a warning is displayed
12	Error	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	error limit exceeded
13	Warning	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	warning limit exceeded
14	<Add new>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Note: The use of setpoints is described further below in the step-by-step instructions of the module.

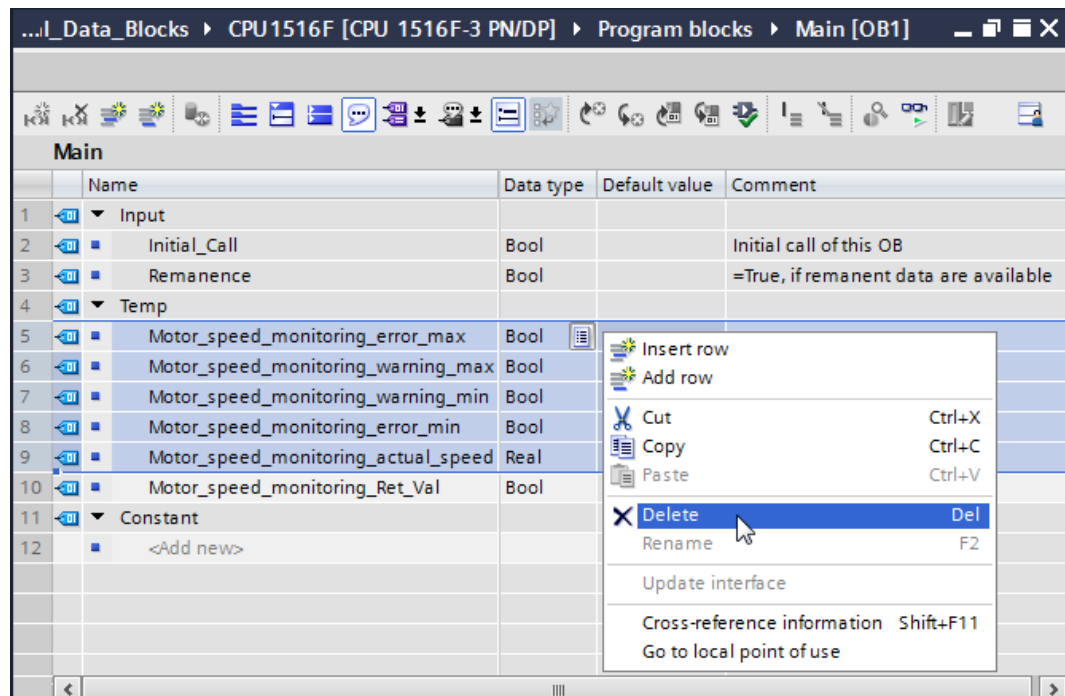
7.3 Access to data of the data block in the organization block

→ Open the "Main [OB1]" organization block with a double-click.



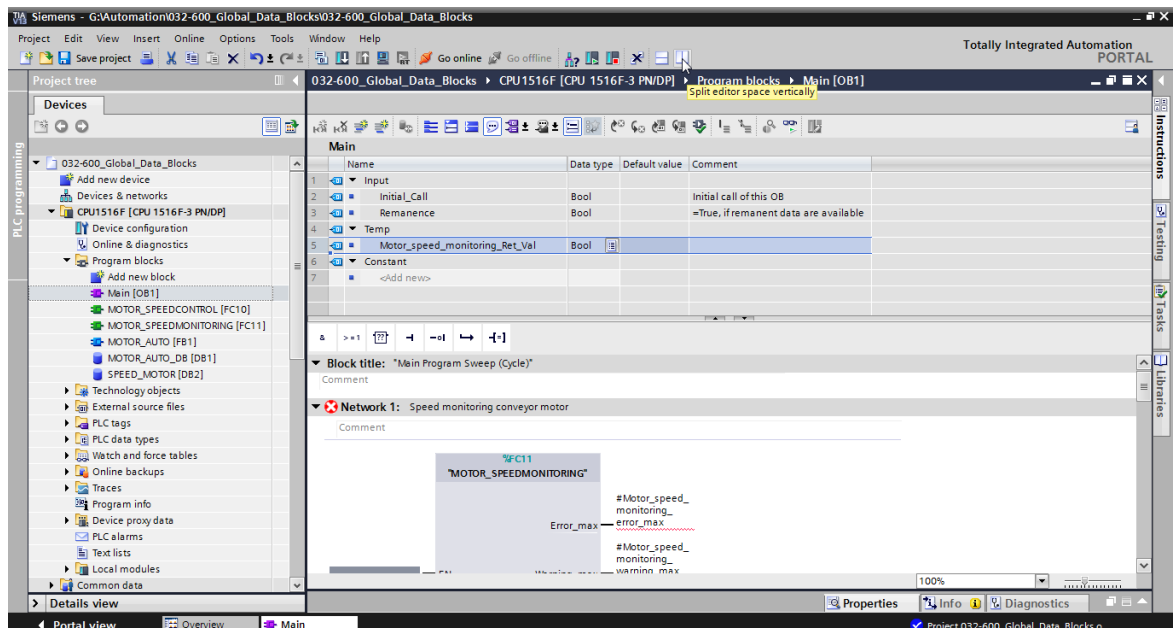
→ Delete the temporary tags in Main [OB1] that are no longer needed. Only the Boolean tag 'Motor_Speed_Control_Ret_Val' is still needed.

(→ Delete)



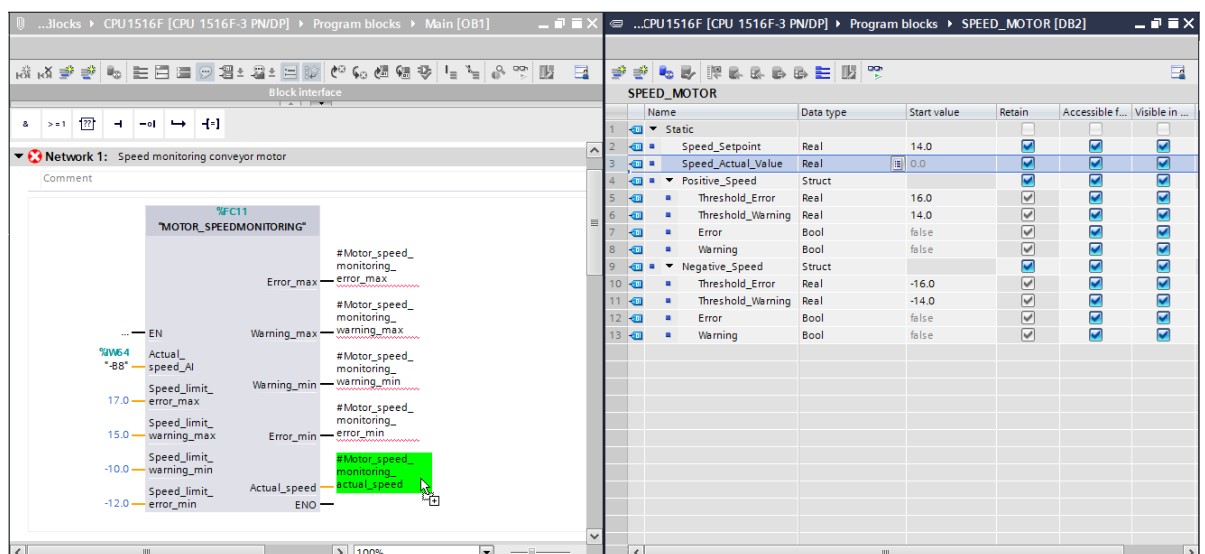
→ Have the "SPEED_MOTOR" [DB2] data block and the "Main" [OB1] organization block displayed side by side by clicking the  icon to vertically split the editor area.

(→ )

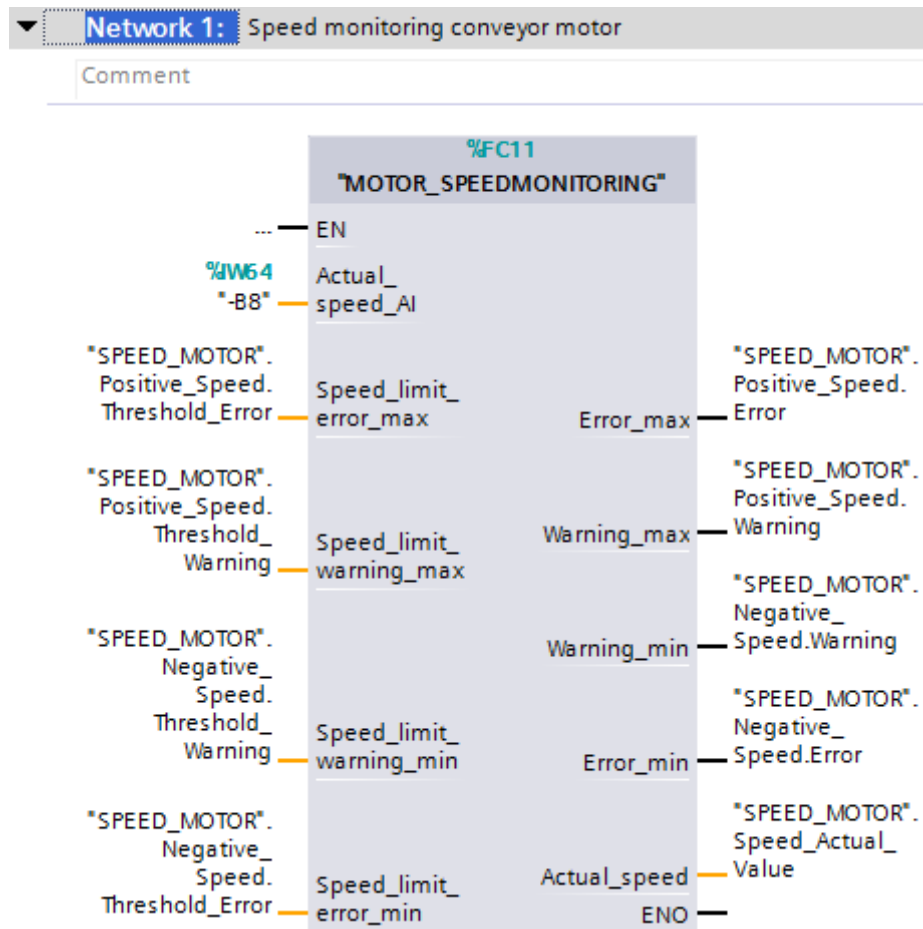


→ Use drag-and-drop to move the tags needed for the interconnection from the "SPEED_MOTOR" [DB2] data block onto the connections of the called functions and function blocks in the "Main" [OB1] organization block. First we move the 'Speed_Actual_Value' tag onto the 'Actual_speed' output of the "MOTOR_SPEEDMONITORING" [FC11] block.

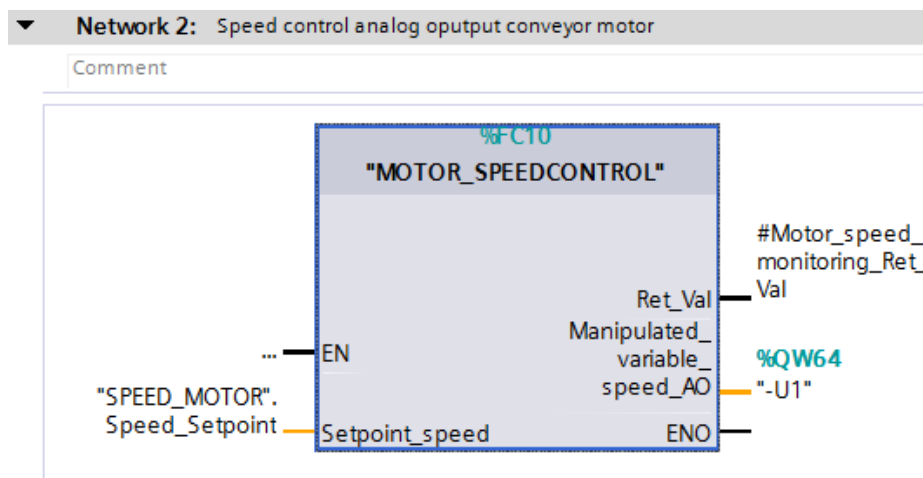
(→ Speed_Actual_Value)



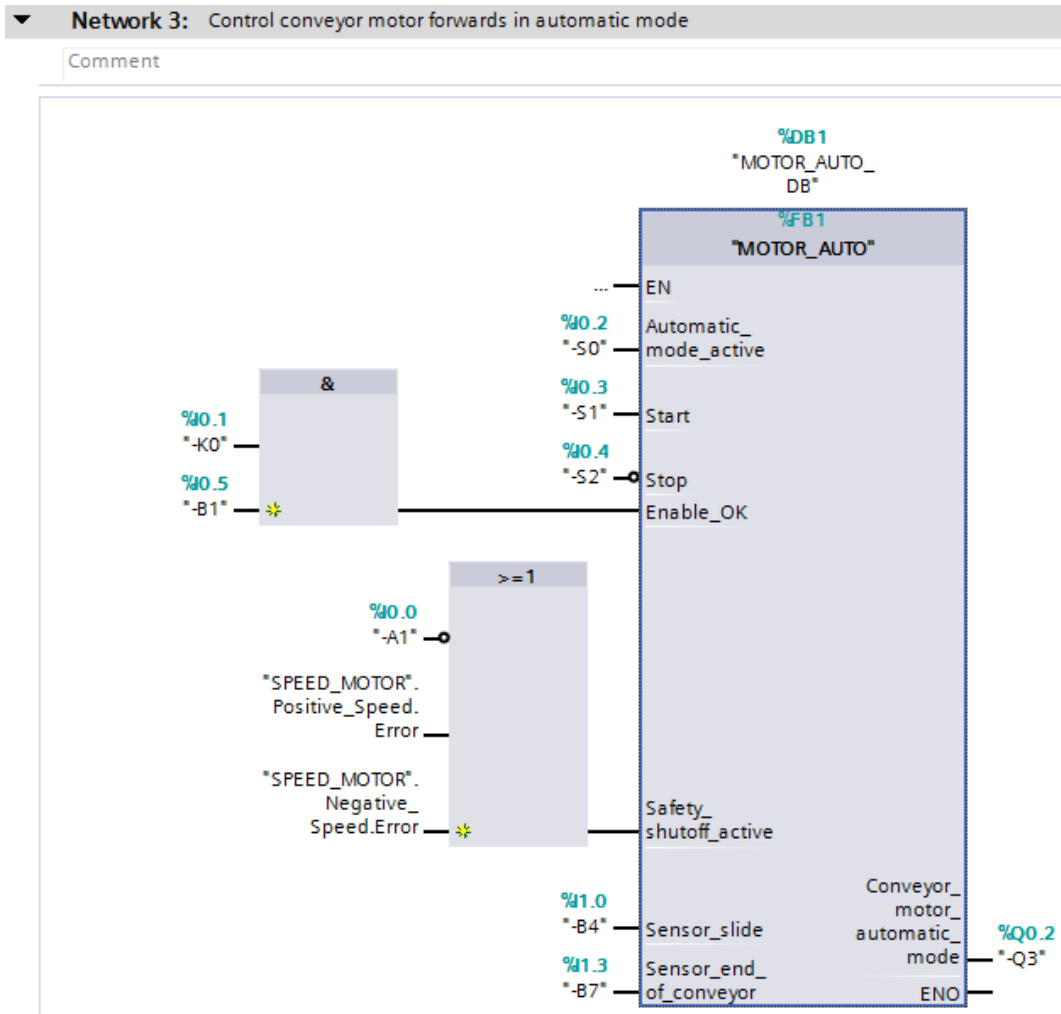
- Also connect the other contacts in Network 1 with tags from the "SPEED_MOTOR" [DB2] data block as shown here.



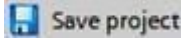

- Connect the contacts in Network 2 with tags from the "SPEED_MOTOR" [DB2] data block as shown here.

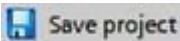



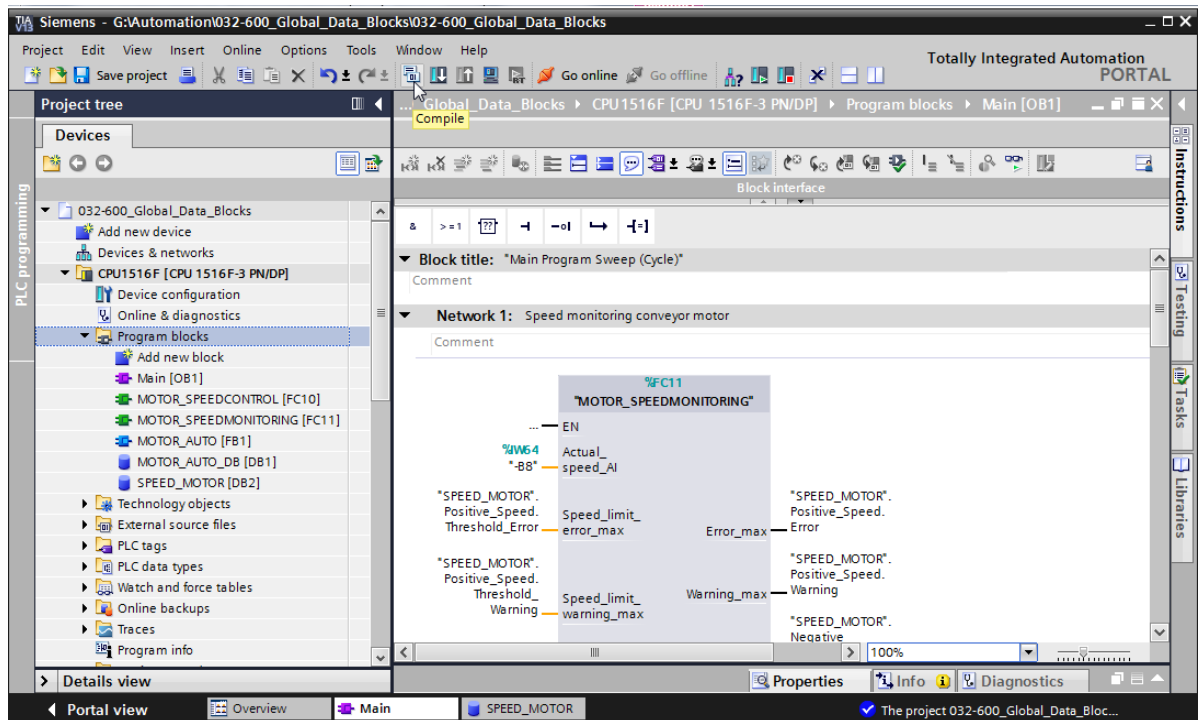
→ Connect the contacts in Network 3 with tags from the "SPEED_MOTOR" [DB2] data block as shown here.



7.4 Save and compile the program

→ To save your project, click the  button in the menu. To compile all blocks, click the "Program blocks" folder and select the  icon for compiling in the menu.

(→  → Program blocks → )

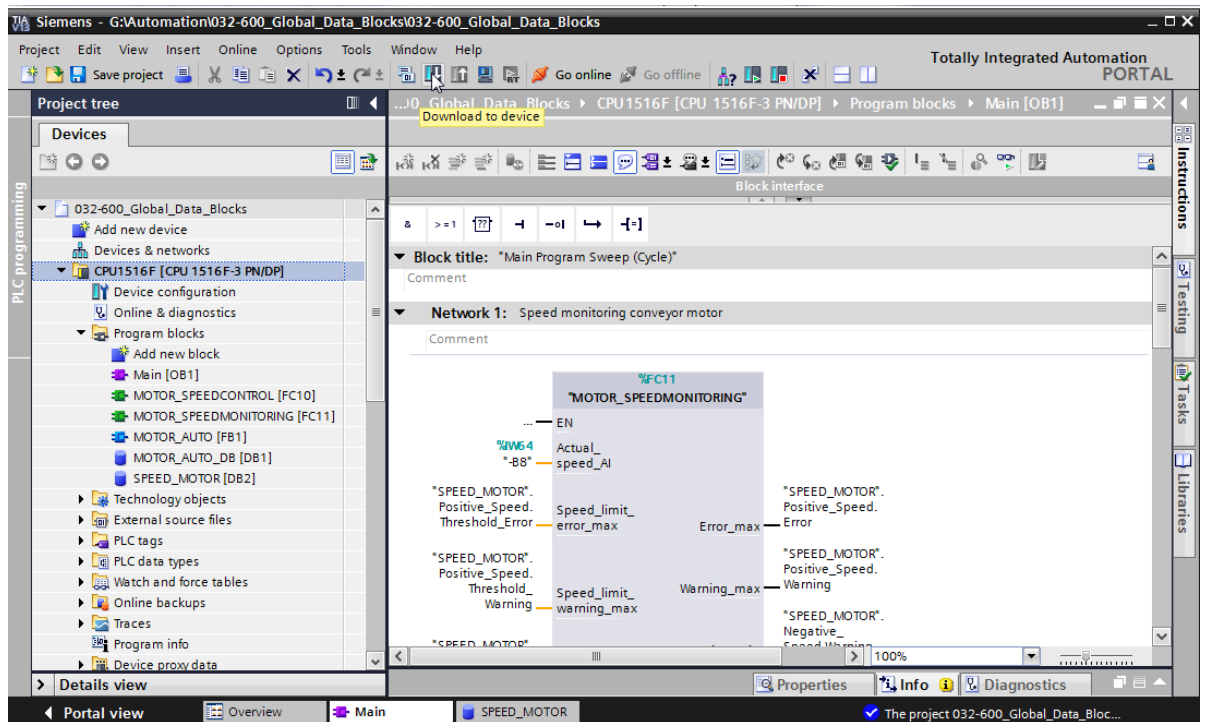


→ The "Info", "Compile" area shows which blocks were successfully compiled.


Properties Info Diagnostics							
General Cross-references Compile Syntax							
Show all messages							
Compiling completed (errors: 0; warnings: 0)							
!	Path	Description	Go to ?	Errors	Warnings	Time	
✓	▼ CPU1516F		↗	0	0	7:26:42 AM	
✓	▼ Program blocks		↗	0	0	7:26:42 AM	
✓	SPEED_MOTOR (DB2)	Block was successfully compiled.	↗			7:26:42 AM	
✓	Main (OB1)	Block was successfully compiled.	↗			7:26:44 AM	
✓		Compiling completed (errors: 0; warnings: 0)				7:26:48 AM	

7.5 Download the program

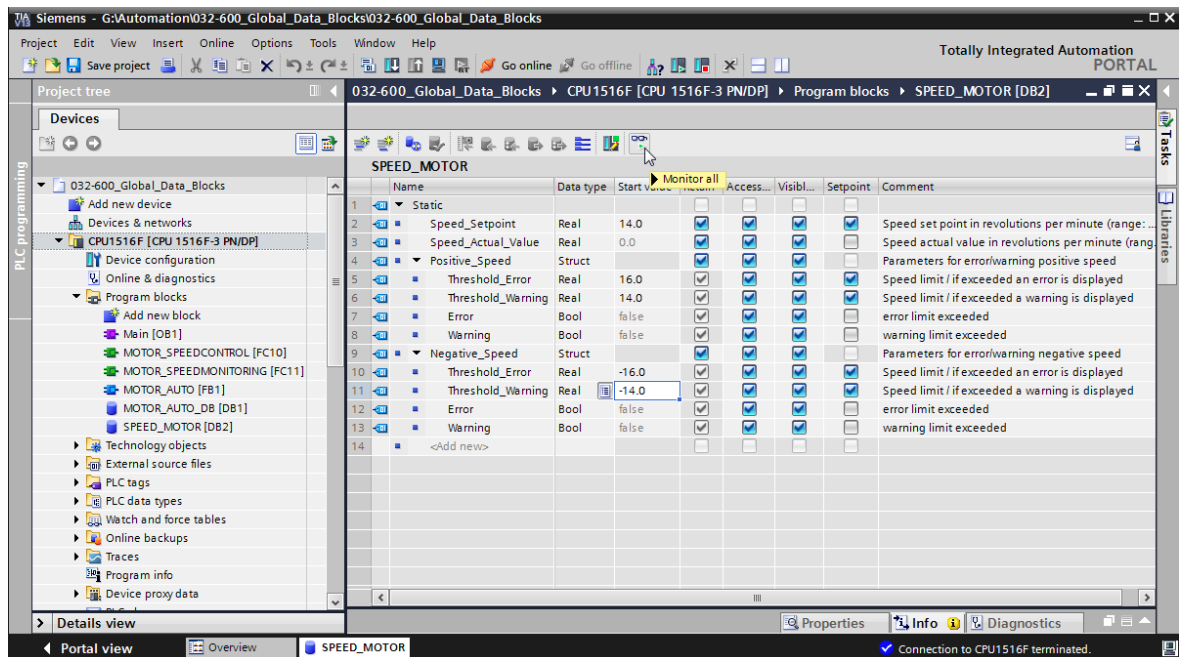
→ After successful compilation, the complete controller with the created program including the hardware configuration can, as described in the previous modules, be downloaded.



7.6 Monitor/modify values in data blocks

→ The desired block must be open for monitoring the tags of a downloaded data block. The monitoring can then be activated/deactivated by clicking the  icon.

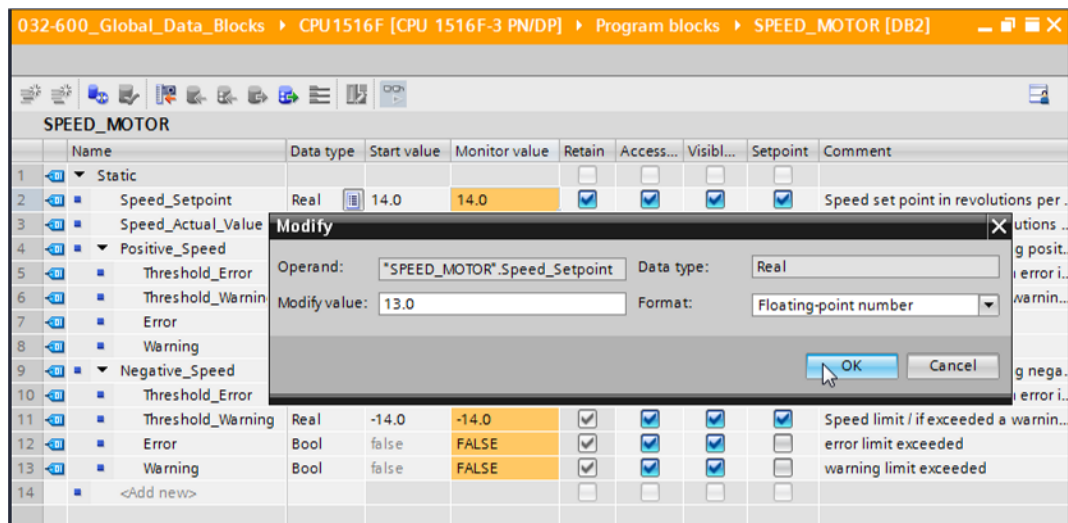
(→ SPEED_MOTOR [DB2] → )





→ In the 'Monitor value' column, the values currently available in the CPU can be monitored.

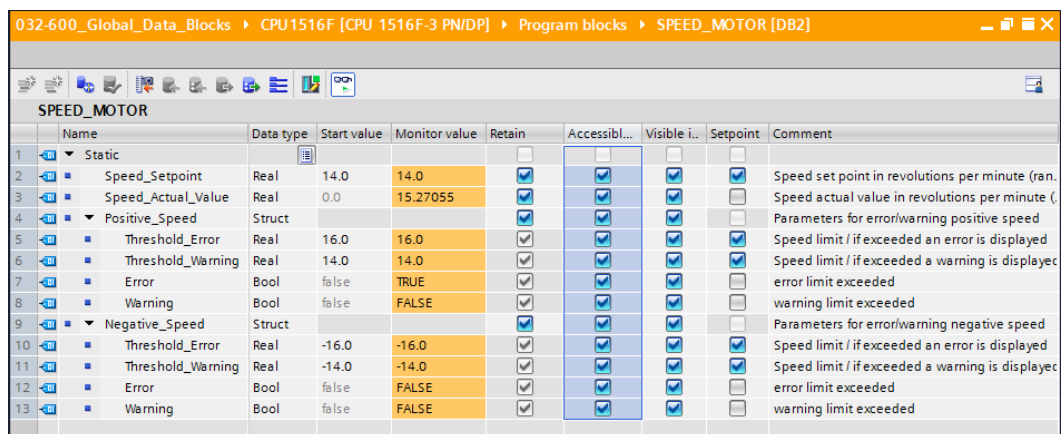
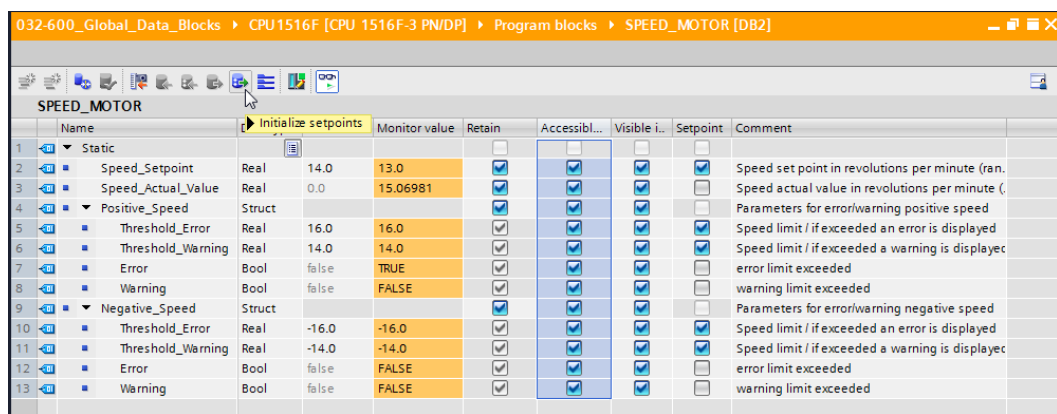
032-600_Global_Data_Blocks > CPU1516F [CPU 1516F-3 PN/DP] > Program blocks > SPEED_MOTOR [DB2]									
SPEED_MOTOR									
	Name	Data type	Start value	Monitor value	Retain	Access...	Visibl...	Setpoint	Comment
1	Static								
2	Speed_Setpoint	Real	14.0	14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed set point in revolutions per .
3	Speed_Actual_Value	Real	0.0	15.06981	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed actual value in revolutions ..
4	Positive_Speed	Struct			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Parameters for error/warning posit..
5	Threshold_Error	Real	16.0	16.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded an error i..
6	Threshold_Warning	Real	14.0	14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded a warnin...
7	Error	Bool	false	TRUE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	error limit exceeded
8	Warning	Bool	false	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	warning limit exceeded
9	Negative_Speed	Struct			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Parameters for error/warning nega..
10	Threshold_Error	Real	-16.0	-16.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded an error i..
11	Threshold_Warning	Real	-14.0	-14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded a warnin...
12	Error	Bool	false	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	error limit exceeded
13	Warning	Bool	false	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	warning limit exceeded
14	<Add new>								


- If you right-click on one of the values, the 'Modify' dialog for modifying this value opens
(→ Modify → Modify value: 14.0 → OK)



7.7 Initialize setpoints/reset start values


- The setpoints can be initialized by clicking the  icon. For the tags whose 'Setpoint' check box is selected , the start value will then be applied as the current value.



→ All start values can be reset by clicking the  icon.

(→ )

032-600_Global_Data_Blocks ▶ CPU1516F [CPU 1516F-3 PN/DP] ▶ Program blocks ▶ SPEED_MOTOR [DB2]

SPEED_MOTOR  Reset start values


	Name	Data type	Start value	Monitor value	Retain	Accessibl...	Visible i...	Setpoint	Comment
1	Static								
2	Speed_Setpoint	Real	14.0	13.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed set point in revolutions per minute (ran.
3	Speed_Actual_Value	Real	0.0	15.27055	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Speed actual value in revolutions per minute (.
4	Positive_Speed	Struct			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Parameters for error/warning positive speed
5	Threshold_Error	Real	16.0	16.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded an error is displayed
6	Threshold_Warning	Real	14.0	14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded a warning is displaye
7	Error	Bool	false	TRUE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	error limit exceeded
8	Warning	Bool	false	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	warning limit exceeded
9	Negative_Speed	Struct			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Parameters for error/warning negative speed
10	Threshold_Error	Real	-16.0	-16.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded an error is displayed
11	Threshold_Warning	Real	-14.0	-14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded a warning is displaye
12	Error	Bool	false	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	error limit exceeded
13	Warning	Bool	false	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	warning limit exceeded

032-600_Global_Data_Blocks ▶ CPU1516F [CPU 1516F-3 PN/DP] ▶ Program blocks ▶ SPEED_MOTOR [DB2]

SPEED_MOTOR

	Name	Data type	Start value	Monitor value	Retain	Accessibl...	Visible i...	Setpoint	Comment
1	Static								
2	Speed_Setpoint	Real	0.0	13.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed set point in revolutions per minute (ran.
3	Speed_Actual_Value	Real	0.0	15.27055	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Speed actual value in revolutions per minute (.
4	Positive_Speed	Struct			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Parameters for error/warning positive speed
5	Threshold_Error	Real	0.0	16.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded an error is displayed
6	Threshold_Warning	Real	0.0	14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded a warning is displaye
7	Error	Bool	false	TRUE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	error limit exceeded
8	Warning	Bool	false	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	warning limit exceeded
9	Negative_Speed	Struct			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Parameters for error/warning negative speed
10	Threshold_Error	Real	0.0	-16.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded an error is displayed
11	Threshold_Warning	Real	0.0	-14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded a warning is displaye
12	Error	Bool	false	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	error limit exceeded
13	Warning	Bool	false	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	warning limit exceeded

7.8 Snapshots in data blocks

→ If you click the  icon, a snapshot of the monitored values can be taken in order to apply these values as start values or to transfer them back to the CPU later

(→ ).

032-600_Global_Data_Blocks ▶ CPU 1516F [CPU 1516F-3 PN/DP] ▶ Program blocks ▶ SPEED_MOTOR [DB2]

SPEED_MOTOR (snapshot created: 7/29/2015 7:53:09 AM)



Snapshot of the monitored values

	Name		Start value	Monitor value	Retain	Accessible f...	Visible in ...	Setpoint	Comment
1	Static								
2	Speed_Setpoint	Real	14.0	13.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed set point in revolu..
3	Speed_Actual_Value	Real	0.0	15.19097	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed actual value in rev...
4	Positive_Speed	Struct			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Parameters for error/war...
5	Threshold_Error	Real	16.0	15.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded...
6	Threshold_Warning	Real	14.0	10.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded...
7	Error	Bool	false	TRUE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	error limit exceeded
8	Warning	Bool	false	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	warning limit exceeded
9	Negative_Speed	Struct			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Parameters for error/war...
10	Threshold_Error	Real	-16.0	-16.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded...
11	Threshold_Warning	Real	-14.0	-14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded...
12	Error	Bool	false	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	error limit exceeded
13	Warning	Bool	false	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	warning limit exceeded

032-600_Global_Data_Blocks ▶ CPU 1516F [CPU 1516F-3 PN/DP] ▶ Program blocks ▶ SPEED_MOTOR [DB2]

SPEED_MOTOR (snapshot created: 7/29/2015 7:54:43 AM)

	Name	Data type	Start value	Snapshot	Monitor value	Retain	Accessible f...	Visible in ...	Setpoint	Com...
1	Static									
2	Speed_Setpoint	Real	14.0	13.0	13.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
3	Speed_Actual_Value	Real	0.0	15.19097	15.19097	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
4	Positive_Speed	Struct				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Para...
5	Threshold_Error	Real	16.0	15.0	15.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
6	Threshold_Warning	Real	14.0	10.0	10.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
7	Error	Bool	false	TRUE	TRUE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	error ...
8	Warning	Bool	false	FALSE	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	warni...
9	Negative_Speed	Struct				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Para...
10	Threshold_Error	Real	-16.0	-16.0	-16.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
11	Threshold_Warning	Real	-14.0	-14.0	-14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
12	Error	Bool	false	FALSE	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	error ...
13	Warning	Bool	false	FALSE	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	warni...

→ Alternatively, values from the snapshot can be applied by clicking the  icon for all values or by clicking the  icon for the start values only. Only the setpoints are needed here in most cases

(→ )

032-600_Global_Data_Blocks ▶ CPU1516F [CPU 1516F-3 PN/DP] ▶ Program blocks ▶ SPEED_MOTOR [DB2]

SPEED_MOTOR (snapshot created: 7/29/2015 7:54:43 AM)

▶ Copy all values from the "Snapshot" column to the "Start value" column

	Name	Data type	Start value	Snapshot	Monitor value	Retain	Accessible f...	Visible in ...	Setpoint	Com...
1	Static									
2	Speed_Setpoint	Real	14.0	13.0	13.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
3	Speed_Actual_Value	Real	0.0	15.19097	15.64308	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Spee...
4	Positive_Speed	Struct				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Para...
5	Threshold_Error	Real	16.0	15.0	15.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
6	Threshold_Warning	Real	14.0	10.0	10.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
7	Error	Bool	false	TRUE	TRUE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	error ...
8	Warning	Bool	false	FALSE	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	warni...
9	Negative_Speed	Struct				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Para...
10	Threshold_Error	Real	-16.0	-16.0	-16.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
11	Threshold_Warning	Real	-14.0	-14.0	-14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
12	Error	Bool	false	FALSE	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	error ...
13	Warning	Bool	false	FALSE	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	warni...

032-600_Global_Data_Blocks ▶ CPU1516F [CPU 1516F-3 PN/DP] ▶ Program blocks ▶ SPEED_MOTOR [DB2]

SPEED_MOTOR (snapshot created: 7/29/2015 7:54:43 AM)


▶ Copy all setpoints from the "Snapshot" column to the "Start value" column


	Name	Data type	Start value	Snapshot	Monitor value	Retain	Accessible f...	Visible in ...	Setpoint	Com...
1	Static									
2	Speed_Setpoint	Real	14.0	13.0	13.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
3	Speed_Actual_Value	Real	0.0	15.19097	15.64308	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Spee...
4	Positive_Speed	Struct				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Para...
5	Threshold_Error	Real	16.0	15.0	15.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
6	Threshold_Warning	Real	14.0	10.0	10.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
7	Error	Bool	false	TRUE	TRUE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	error ...
8	Warning	Bool	false	FALSE	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	warni...
9	Negative_Speed	Struct				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Para...
10	Threshold_Error	Real	-16.0	-16.0	-16.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
11	Threshold_Warning	Real	-14.0	-14.0	-14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
12	Error	Bool	false	FALSE	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	error ...
13	Warning	Bool	false	FALSE	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	warni...

032-600_Global_Data_Blocks ▶ CPU1516F [CPU 1516F-3 PN/DP] ▶ Program blocks ▶ SPEED_MOTOR [DB2]

SPEED_MOTOR (snapshot created: 7/29/2015 7:54:43 AM)

	Name	Data type	Start value	Snapshot	Monitor value	Retain	Accessible f...	Visible in ...	Setpoint	Com...
1	Static									
2	Speed_Setpoint	Real	13.0	13.0	13.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
3	Speed_Actual_Value	Real	0.0	15.19097	15.64308	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Spee...
4	Positive_Speed	Struct				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Para...
5	Threshold_Error	Real	15.0	15.0	15.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
6	Threshold_Warning	Real	10.0	10.0	10.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
7	Error	Bool	false	TRUE	TRUE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	error ...
8	Warning	Bool	false	FALSE	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	warni...
9	Negative_Speed	Struct				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Para...
10	Threshold_Error	Real	-16.0	-16.0	-16.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
11	Threshold_Warning	Real	-14.0	-14.0	-14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
12	Error	Bool	false	FALSE	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	error ...
13	Warning	Bool	false	FALSE	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	warni...

→ To transfer data captured in the snapshot back to the CPU, you must click ''.

(→ )

032-600_Global_Data_Blocks ▶ CPU1516F [CPU 1516F-3 PN/DP] ▶ Program blocks ▶ SPEED_MOTOR [DB2]

SPEED_MOTOR (snapshot created: 7/29/2015 7:54:43 AM)

▶ Copy all values from the snapshot to the actual values of the CPU

	Name	Data type	Start value	Snapshot	Monitor value	Retain	Accessible f...	Visible in ...	Setpoint	Com...
1	Static									
2	Speed_Setpoint	Real	13.0	13.0	14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
3	Speed_Actual_Value	Real	0.0	15.19097	15.06981	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
4	Positive_Speed	Struct				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Para...
5	Threshold_Error	Real	15.0	15.0	15.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
6	Threshold_Warning	Real	10.0	10.0	10.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
7	Error	Bool	false	TRUE	TRUE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	error ...
8	Warning	Bool	false	FALSE	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	warni...
9	Negative_Speed	Struct				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Para...
10	Threshold_Error	Real	-16.0	-16.0	-16.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
11	Threshold_Warning	Real	-14.0	-14.0	-14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
12	Error	Bool	false	FALSE	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	error ...
13	Warning	Bool	false	FALSE	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	warni...

032-600_Global_Data_Blocks ▶ CPU1516F [CPU 1516F-3 PN/DP] ▶ Program blocks ▶ SPEED_MOTOR [DB2]

SPEED_MOTOR (snapshot created: 7/29/2015 7:54:43 AM)

	Name	Data type	Start value	Snapshot	Monitor value	Retain	Accessible f...	Visible in ...	Setpoint	Com...
1	Static									
2	Speed_Setpoint	Real	13.0	13.0	13.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
3	Speed_Actual_Value	Real	0.0	15.19097	15.06981	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
4	Positive_Speed	Struct				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Para...
5	Threshold_Error	Real	15.0	15.0	15.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
6	Threshold_Warning	Real	10.0	10.0	10.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
7	Error	Bool	false	TRUE	TRUE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	error ...
8	Warning	Bool	false	FALSE	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	warni...
9	Negative_Speed	Struct				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Para...
10	Threshold_Error	Real	-16.0	-16.0	-16.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
11	Threshold_Warning	Real	-14.0	-14.0	-14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
12	Error	Bool	false	FALSE	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	error ...
13	Warning	Bool	false	FALSE	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	warni...

→ If you want to overwrite all setpoints with the start values, you can initiate this by clicking '



. The values in the CPU for which the 'Setpoint' check box was not selected are thereby retained.



032-600_Global_Data_Blocks > CPU1516F [CPU 1516F-3 PN/DP] > Program blocks > SPEED_MOTOR [DB2]

SPEED_MOTOR (snapshot created: 7/29/2015 7:54:43 AM)


	Name	Data type	Start value	Snapshot	Monitor value	Retain	Accessible f...	Visible in ...	Setpoint	Com...
1	Static									
2	Speed_Setpoint	Real	13.0	13.0	14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
3	Speed_Actual_Value	Real	0.0	15.19097	15.06981	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Spee...
4	Positive_Speed	Struct				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Para...
5	Threshold_Error	Real	15.0	15.0	15.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
6	Threshold_Warning	Real	10.0	10.0	10.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
7	Error	Bool	false	TRUE	TRUE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	error...
8	Warning	Bool	false	FALSE	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	warni...
9	Negative_Speed	Struct				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Para...
10	Threshold_Error	Real	-16.0	-16.0	-16.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
11	Threshold_Warning	Real	-14.0	-14.0	-14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
12	Error	Bool	false	FALSE	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	error...
13	Warning	Bool	false	FALSE	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	warni...

032-600_Global_Data_Blocks > CPU1516F [CPU 1516F-3 PN/DP] > Program blocks > SPEED_MOTOR [DB2]

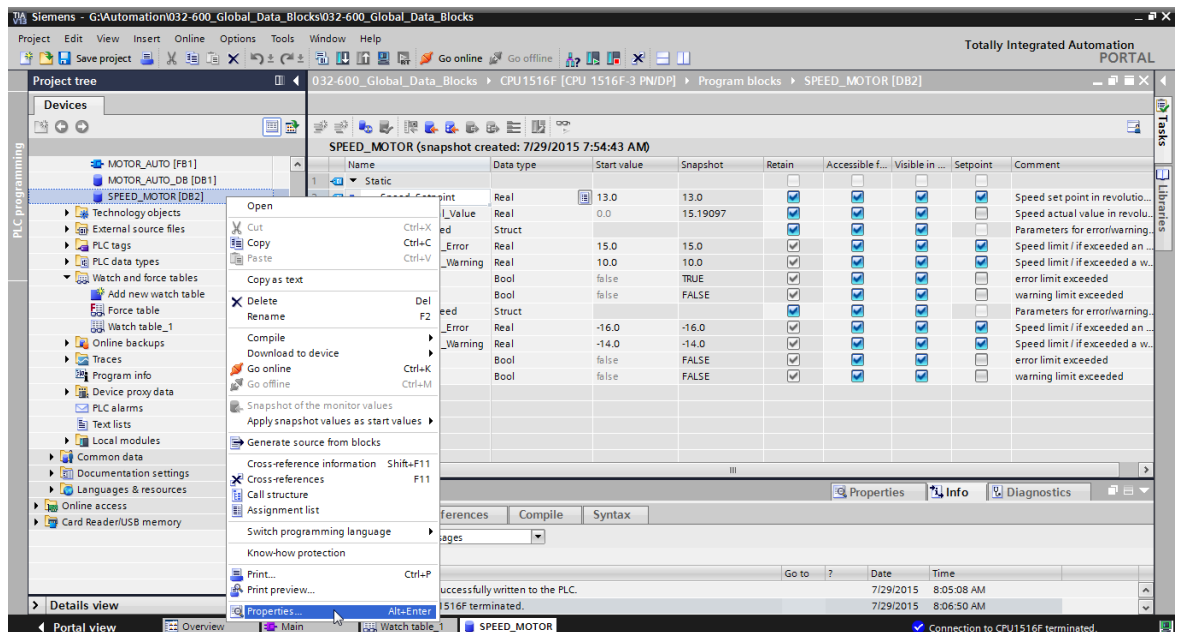
SPEED_MOTOR (snapshot created: 7/29/2015 7:54:43 AM)


	Name	Data type	Start value	Snapshot	Monitor value	Retain	Accessible f...	Visible in ...	Setpoint	Com...
1	Static									
2	Speed_Setpoint	Real	13.0	13.0	13.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
3	Speed_Actual_Value	Real	0.0	15.19097	15.06981	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Spee...
4	Positive_Speed	Struct				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Para...
5	Threshold_Error	Real	15.0	15.0	15.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
6	Threshold_Warning	Real	10.0	10.0	10.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
7	Error	Bool	false	TRUE	TRUE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	error...
8	Warning	Bool	false	FALSE	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	warni...
9	Negative_Speed	Struct				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Para...
10	Threshold_Error	Real	-16.0	-16.0	-16.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
11	Threshold_Warning	Real	-14.0	-14.0	-14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Spee...
12	Error	Bool	false	FALSE	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	error...
13	Warning	Bool	false	FALSE	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	warni...

7.9 Expand data block and download it without reinitialization

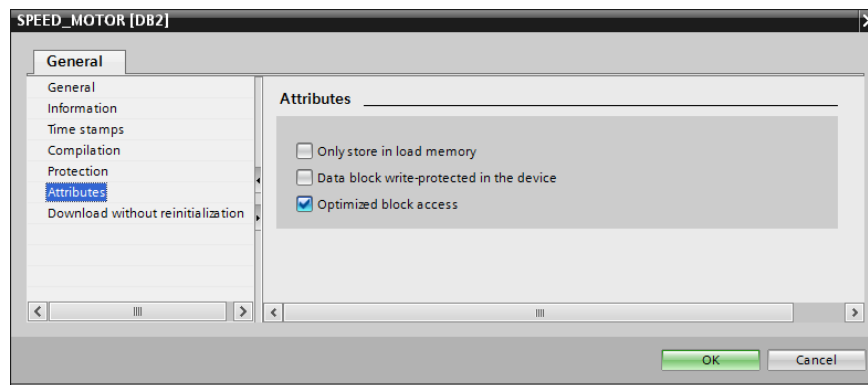
→ To enable 'Download without reinitialization' for the "SPEED_MOTOR" [DB2] data block, you must  **Go offline**, and then open the properties of the data block.

(→  **Go offline** → SPEED_MOTOR [DB2] → Properties)

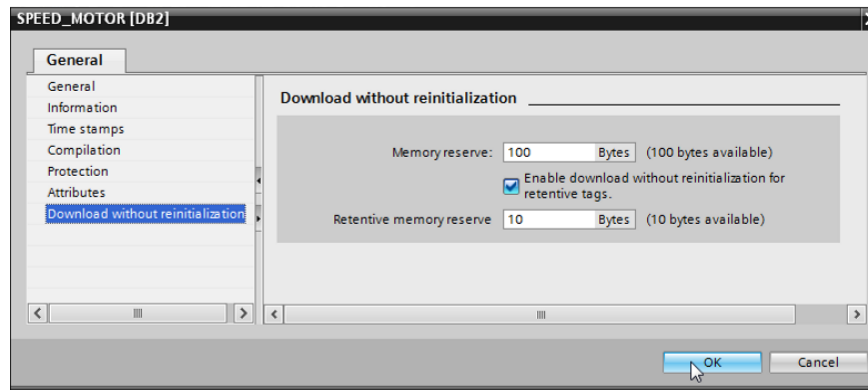


→ Select the 'Optimized block access' check box  in the properties under 'General', 'Attributes'.

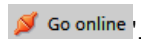
(→ General → Attributes →  Optimized block access)



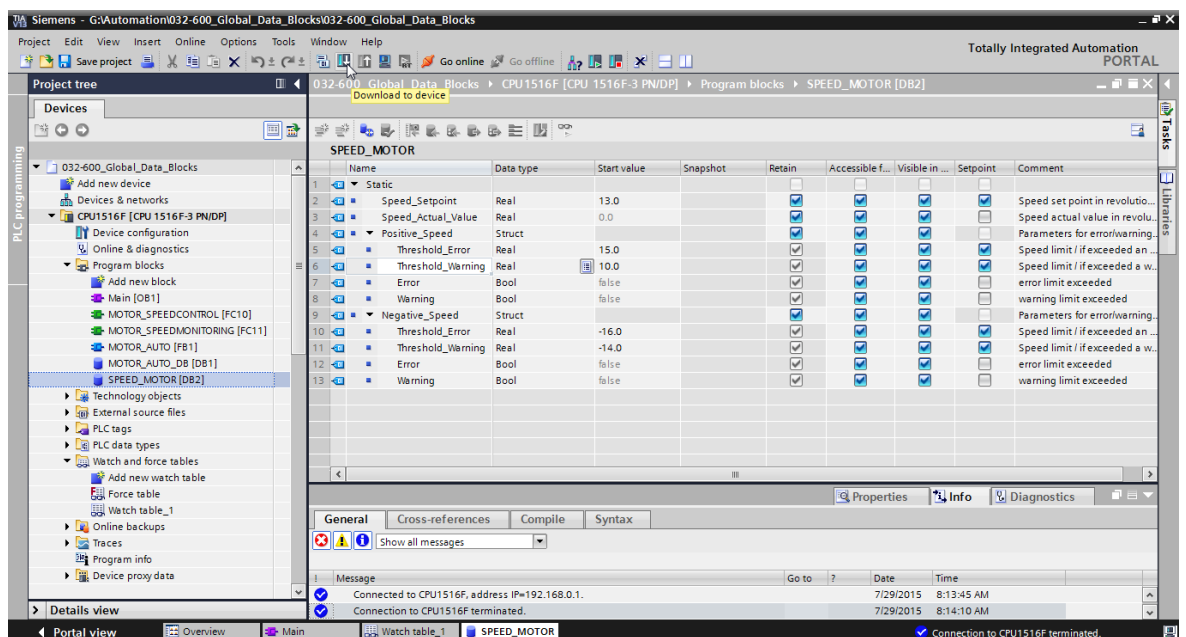
- Assign a 'Retentive memory reserve' to the data block for 'Download without reinitialization'.
- (→Download without reinitialization → Retentive memory reserve → 10 bytes → OK)




- Download your "SPEED_MOTOR" [DB] data block to the controller again and select 'Go online'.



- (→SPEED_MOTOR [DB] →  → )



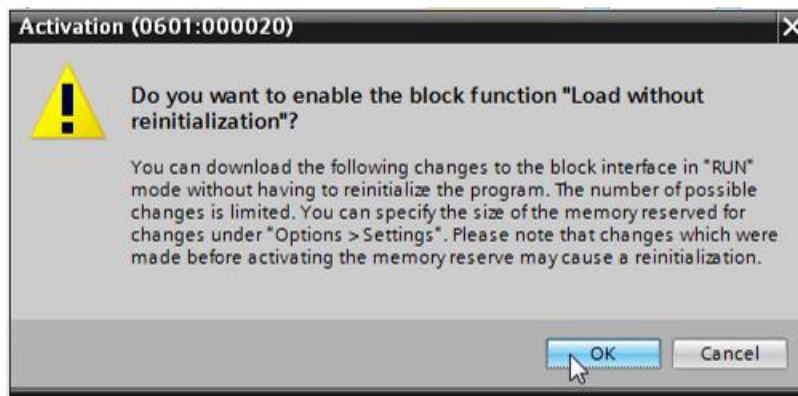
→ Then click the  icon to activate download without reinitialization and confirm the safety prompt with 'OK'.

(→  → OK)

032-600_Global_Data_Blocks ▶ CPU 1516F [CPU 1516F-3 PN/DP] ▶ Program blocks ▶ SPEED_MOTOR [DB2]

SPEED_MOTOR

	Name	Data type	Download without reinitialization	Accessibl...	Visible i...	Setpoint	Comment
1	Static						
2	Speed_Setpoint	Real	13.0	13.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed set point in revolutions per minute (ran.
3	Speed_Actual_Value	Real	0.0	15.27055	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed actual value in revolutions per minute (.
4	Positive_Speed	Struct			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Parameters for error/warning positive speed
5	Threshold_Error	Real	15.0	15.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded an error is displayed
6	Threshold_Warning	Real	10.0	10.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded a warning is displaye
7	Error	Bool	false	TRUE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	error limit exceeded
8	Warning	Bool	false	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	warning limit exceeded
9	Negative_Speed	Struct			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Parameters for error/warning negative speed
10	Threshold_Error	Real	-16.0	-16.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded an error is displayed
11	Threshold_Warning	Real	-14.0	-14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded a warning is displaye
12	Error	Bool	false	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	error limit exceeded
13	Warning	Bool	false	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	warning limit exceeded



→ Next add any tag in your data block

(→ Name: Value_test → Data type: Real → Start value: 99)

032-600_Global_Data_Blocks ▸ CPU1516F [CPU 1516F-3 PN/DP] ▸ Program blocks ▸ SPEED_MOTOR [DB2]

	Name	Data type	Start value	Retain	Accessibl...	Visible i...	Setpoint	Comment
1	Static							
2	Speed_Setpoint	Real	13.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed set point in revolutions per minute (range: +/-50 rpm)
3	Speed_Actual_Value	Real	0.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Speed actual value in revolutions per minute (range: +/-50 rpm)
4	Positive_Speed	Struct		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Parameters for error/warning positive speed
5	Threshold_Error	Real	15.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded an error is displayed
6	Threshold_Warning	Real	10.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded a warning is displayed
7	Error	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	error limit exceeded
8	Warning	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	warning limit exceeded
9	Negative_Speed	Struct		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Parameters for error/warning negative speed
10	Threshold_Error	Real	-16.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded an error is displayed
11	Threshold_Warning	Real	-14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded a warning is displayed
12	Error	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	error limit exceeded
13	Warning	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	warning limit exceeded
14	Value_Test	Real	99.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
15	<Add new>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

→ Download your "SPEED_MOTOR" [DB] data block to the controller again.

(→ SPEED_MOTOR [DB] →  → Download)

Siemens - G:\Automation\032-600_Global_Data_Blocks\032-600_Global_Data_Blocks

Project Edit View Insert Online Options Tools Window Help

Totally Integrated Automation PORTAL

Download to device Data_Blocks ▸ CPU1516F [CPU 1516F-3 PN/DP] ▸ Program blocks ▸ SPEED_MOTOR [DB2]

Project tree

- 032-600_Global_Data_Blocks
 - Add new device
 - Devices & networks
 - CPU1516F [CPU 1516F-3 PN/DP]
 - Device configuration
 - Online & diagnostics
 - Program blocks
 - Main [OB1]
 - MOTOR_SPEEDCONTROL [FC10]
 - MOTOR_SPEEDMONITORING [FC11]
 - MOTOR_AUTO [PB1]
 - MOTOR_AUTO_DB [DB1]
 - SPEED_MOTOR [DB2]**
 - Technology objects
 - External source files
 - PLC tags
 - PLC data types
 - Watch and force tables
 - Add new watch table
 - Force table
 - Watch table_1
 - Online backups
 - Traces
 - Program info
 - Device proxy data
 - PLC alarms

SPEED_MOTOR

	Name	Data type	Start value	Retain	Accessibl...	Visible i...	Setpoint	Comment
1	Static							
2	Speed_Setpoint	Real	13.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed set point in revolutions per minute (range: +/-50 rpm)
3	Speed_Actual_Value	Real	0.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Speed actual value in revolutions per minute (range: +/-50 rpm)
4	Positive_Speed	Struct		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Parameters for error/warning positive speed
5	Threshold_Error	Real	15.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded an error is displayed
6	Threshold_Warning	Real	10.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded a warning is displayed
7	Error	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	error limit exceeded
8	Warning	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	warning limit exceeded
9	Negative_Speed	Struct		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Parameters for error/warning negative speed
10	Threshold_Error	Real	-16.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded an error is displayed
11	Threshold_Warning	Real	-14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded a warning is displayed
12	Error	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	error limit exceeded
13	Warning	Bool	false	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	warning limit exceeded
14	Value_Test	Real	99.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
15	<Add new>			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

General Cross-references Compile Syntax ⓘ

⚠ Show all messages

Message	Go to	Date	Time
5 setpoint values successfully written to the PLC.		7/30/2015	6:29:17 PM
Connection to CPU1516F terminated.		7/30/2015	6:30:59 PM
Connected to CPU1516F, address IP=192.168.0.1.		7/30/2015	6:32:49 PM

Portal view Overview Watch table_1 SPEED_MOTOR

Connected to CPU1516F, address IP=1...


Load preview

Check before loading

Status	Target	Message	Action
<input checked="" type="checkbox"/>	CPU1516F	Ready for loading.	
<input checked="" type="checkbox"/>	Software	Download software to device	Consistent download
<input checked="" type="checkbox"/>	Overwrite online?	Objects that exist online and are overwritten.	
<input checked="" type="checkbox"/>	Main [OB1]		<input checked="" type="checkbox"/> Overwrite
<input checked="" type="checkbox"/>	SPEED_MOTOR [DB2]		<input checked="" type="checkbox"/> Overwrite

Refresh

Finish Load Cancel

→ If you click '' to monitor the block again, you will see that the monitored values have not been overwritten with the start values.

(→ )

032-600_Global_Data_Blocks > CPU1516F [CPU 1516F-3 PN/DP] > Program blocks > SPEED_MOTOR [DB2]

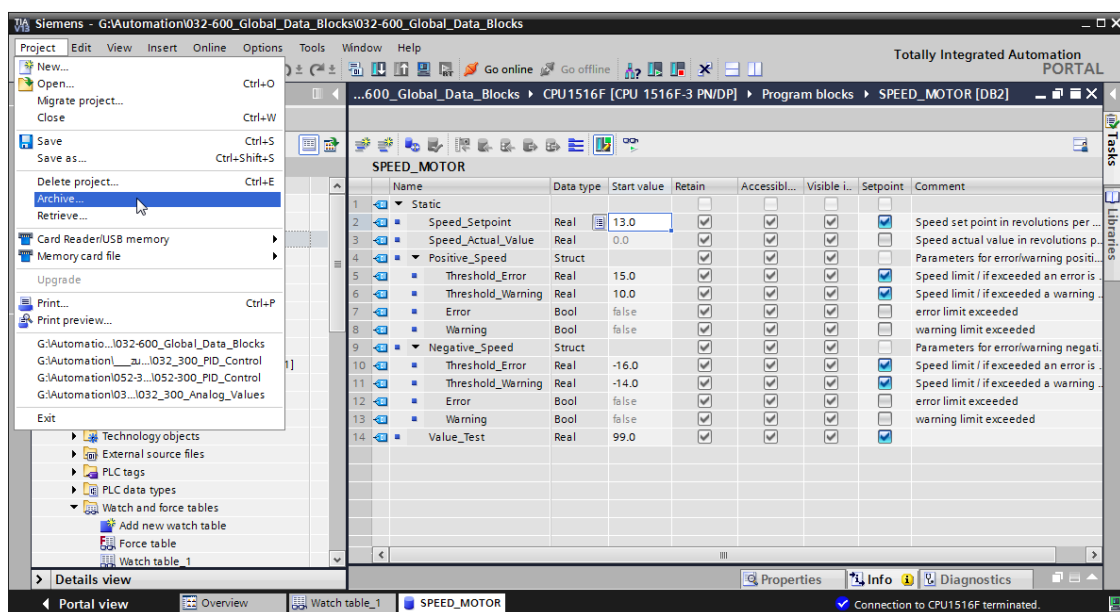
	Name	Data type	Start value	Monitor value	Retain	Accessibl...	Visible i...	Setpoint	Comment
1	Static								
2	Speed_Setpoint	Real	13.0	14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed set point in revolutions per minute (ran...
3	Speed_Actual_Value	Real	0.0	0.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed actual value in revolutions per minute (...)
4	Positive_Speed	Struct			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Parameters for error/warning positive speed
5	Threshold_Error	Real	15.0	17.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded an error is displayed
6	Threshold_Warning	Real	10.0	12.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded a warning is displayed
7	Error	Bool	false	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	error limit exceeded
8	Warning	Bool	false	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	warning limit exceeded
9	Negative_Speed	Struct			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Parameters for error/warning negative speed
10	Threshold_Error	Real	-16.0	-16.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded an error is displayed
11	Threshold_Warning	Real	-14.0	-14.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Speed limit / if exceeded a warning is displayed
12	Error	Bool	false	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	error limit exceeded
13	Warning	Bool	false	FALSE	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	warning limit exceeded
14	Value_Test	Real	99.0	99.0	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	

7.10 Archive the project

→ As the final step, we want to archive the complete project. Select the → 'Archive ...' command in the → 'Project' menu. Select a folder where you want to archive your project and save it with the file type "TIA Portal project archive".

(→ Project → Archive → TIA Portal project archive → 032-600_Global_Data_Blocks....

→ Save)



8 Checklist

No.	Description	Completed
1	Data block SPEED_MOTOR [DB2] successfully created.	
2	Program changes made in Main [OB1].	
3	Compiling successful and without error message	
4	Download successful and without error message	
5	Switch on station (-K0 = 1) Cylinder retracted / Feedback activated (-B1 = 1) EMERGENCY OFF (-A1 = 1) not activated AUTOMATIC mode (-S0 = 1) Pushbutton automatic stop not actuated (-S2 = 1) Briefly press the automatic start pushbutton (-S1 = 1) Sensor part at slide activated (-B4 = 1) then Conveyor motor M1 variable speed (-Q3 = 1) switches on and stays on. The speed corresponds to the speed setpoint in the range +/- 50 rpm	
6	Sensor part at end of conveyor activated (-B7 = 1) → -Q3 = 0 (after 2 seconds)	
7	Briefly press the automatic stop pushbutton (-S2 = 0) → -Q3 = 0	
8	Activate EMERGENCY OFF (-A1 = 0) → -Q3 = 0	
9	Manual mode (-S0 = 0) → -Q3 = 0	
10	Switch off station (-K0 = 0) → -Q3 = 0	
11	Cylinder not retracted (-B1 = 0) → -Q3 = 0	
12	Speed > Motor_speed_monitoring_error_max → -Q3 = 0	
13	Speed < Motor_speed_monitoring_error_min → -Q3 = 0	
14	Project successfully archived	

9 Exercise

9.1 Task – Exercise

In this exercise a global data block "MAGAZINE_PLASTIC" [DB3] will be created additionally.

The setpoint and actual value of the counter for the plastic parts will be specified and displayed in this data block.

A connectable input for the setpoint setting and an output for displaying the actual value will also be added to the "MOTOR_AUTO" [FB1] function block.

9.2 Technology diagram

Here you see the technology diagram for the task.

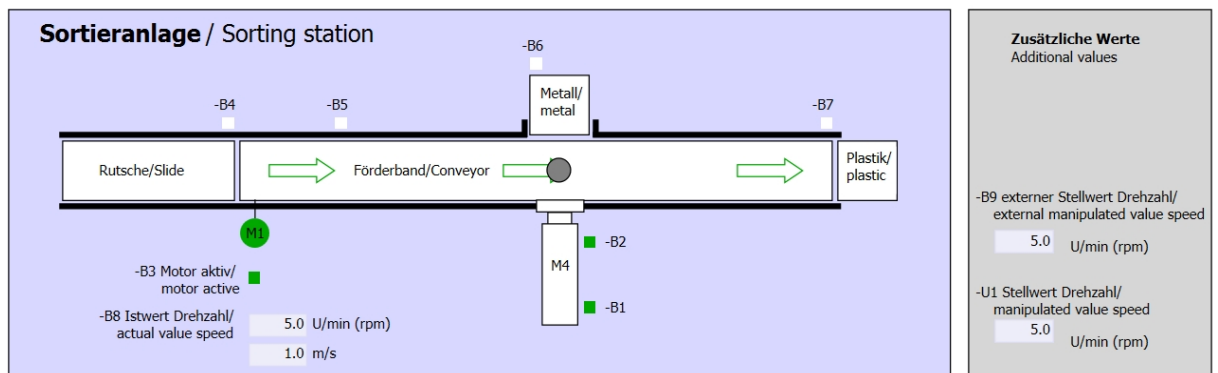


Figure 5: Technology diagram

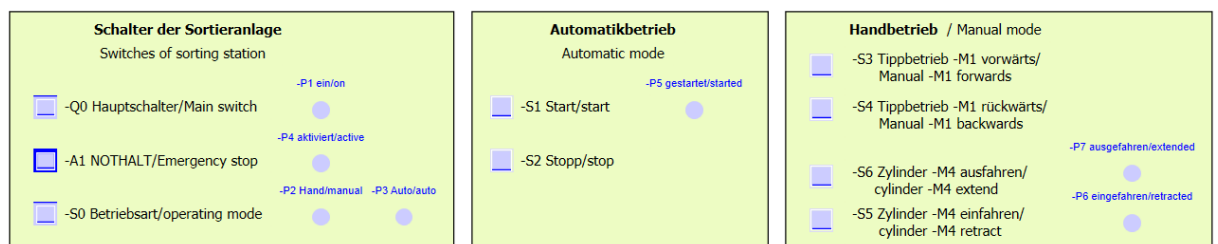


Figure 6: Control panel

9.3 Reference list

The following signals are required as global operands for this task.

DI	Type	Identifier	Function	NC/NO
I 0.0	BOOL	-A1	Return signal emergency stop OK	NC
I 0.1	BOOL	-K0	Main switch "ON"	NO
I 0.2	BOOL	-S0	Mode selector manual (0)/ automatic (1)	Manual = 0 Auto = 1
I 0.3	BOOL	-S1	Pushbutton automatic start	NO
I 0.4	BOOL	-S2	Pushbutton automatic stop	NC
I 0.5	BOOL	-B1	Sensor cylinder -M4 retracted	NO
I 1.0	BOOL	-B4	Sensor part at slide	NO
I 1.3	BOOL	-B7	Sensor part at end of conveyor	NO
IW64	BOOL	-B8	Sensor actual value speed of the motor +/-10V corresponds to +/- 50 U/min	

DO	Type	Identifier	Function	
Q 0.2	BOOL	-Q3	Conveyor motor -M1 variable speed	
QW 64	BOOL	-U1	Manipulated value speed of the motor in 2 directions +/- 10V corresponds to +/- 50 rpm	

Legend for reference list

DI Digital Input

DO Digital Output

AI Analog Input

AO Analog Output

I Input

Q Output

NC Normally Closed

NO Normally Open

9.4 Planning

Plan the implementation of the task on your own.

9.5 Checklist – Exercise

No.	Description	Completed
1	Data block MAGAZINE_PLASTIC [DB3] successfully created.	
2	Program changes made in MOTOR_AUTO [FB1].	
3	Program changes made in Main [OB1].	
4	Compiling successful and without error message	
5	Download successful and without error message	
6	Switch on station (-K0 = 1) Cylinder retracted / Feedback activated (-B1 = 1) EMERGENCY OFF (-A1 = 1) not activated AUTOMATIC mode (-S0 = 1) Pushbutton automatic stop not actuated (-S2 = 1) Briefly press the automatic start pushbutton (-S1 = 1) Sensor part at slide activated (-B4 = 1) then Conveyor motor -M1 variable speed (-Q3 = 1) switches on and stays on. The speed corresponds to the speed setpoint in the range +/- 50 rpm	
7	Sensor part at end of conveyor activated (-B7 = 1) → -Q3 = 0 (after 2 seconds)	
8	Briefly press the automatic stop pushbutton (-S2 = 0) → -Q3 = 0	
9	Activate EMERGENCY OFF (-A1 = 0) → -Q3 = 0	
10	Manual mode (-S0 = 0) → -Q3 = 0	
11	Switch off station (-K0 = 0) → -Q3 = 0	
12	Cylinder not retracted (-B1 = 0) → -Q3 = 0	
13	Speed > Motor_speed_monitoring_error_max → -Q3 = 0	
14	Speed < Motor_speed_monitoring_error_min → -Q3 = 0	
15	Project successfully archived	

10 Additional information

You can find additional information as an orientation aid for initial and advanced training, for example: Getting Started, videos, tutorials, apps, manuals, programming guidelines and trial software/firmware, at the following link:

www.siemens.com/sce/s7-1500