SINAMICS S210 Parameter Backup/Restore

SINAMICS S210/ SIMATIC S7-1500(T)

https://support.industry.siemens.com/cs/ww/en/view/109769958

Siemens Industry Online Support

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Table of content

1 Introduction

1.1 General

The two following blocks are used to operate certain SINAMICS drives using predefined commands.

They can be used with the following drive systems:

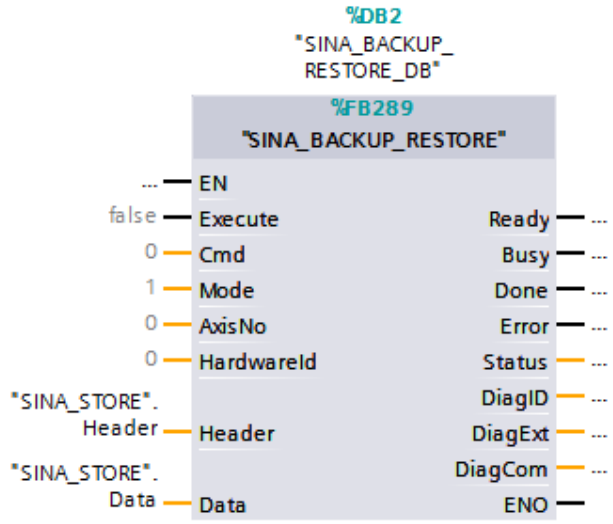
- SINAMICS S210 (Firmware - Version V5.2 or higher)

1.2 Requirements

To be able to use the blocks you need the SIMATIC STEP 7 (TIA Portal) V15.1

2 Function block SINA_BACKUP_RESTORE

Figure 2-1 Call SINA_BACKUP_RESTORE



2.1 Description

With the integration of the FB289 (SINA_BACKUP_RESTORE) the corresponding instance -DB is automatically created.

The block can be used in the following CPU: SIMATIC S7-1500

2.2 Calling OBs

The block can alternatively be installed in the following OBs:

- Cyclic task: OB1
- alarm clock-OB: z. B. OB32

2.3 Calling Blocks

- RDREC/SFB52
- WRREC/SFB53

2.4 Functional description

The block can be used to create a complete parameter subtraction of the addressed drive (CMD = 1 (backup)) or to load it into the drive (CMD = 2 (restore)). This parameter deduction is stored in a global DB in the working memory of the PLC. The library contains an example DB. Before the first "restore" of the data, a backup must be made. This is also necessary if the Global DB is re-initialized or loaded into the PLC with default values. To execute the command, a positive edge must be detected at the "Execute" input. The block supports two variants for loading the copy into the drive:

Table 2-1 Supporting mods

Mode	Description
1	The parameterization in the drive, including the communication settings (DP/PN addresses), is overwritten (cloning).
2	The parameterization in the drive is overwritten. The communication settings (DP/PN addresses) are retained (serial commissioning).

2.5 Input interface of SINA_BACKUP_RESTORE

The input interface consists of 5 inputs of different data formats. When the function block is configured for the first time, these are initialized with meaningful initial values.

In addition, there are 2 InOut parameters which must be connected to a global DB in which the data of the drive is stored.

The following is an overview of the input interface.

Table 2-2 Input interface SINA_BACKUP_RESTORE

Input signal	Type	Default	Meaning
Execute	Bool	False	Start the command specified at the input command.
Cmd	Int	0	0: Idle 1: Backup 2: Restore
Mode	Int	1	Mode to stop the download: 1: Clone-Download 2: Download series commissioning
AxisNo	USInt	0	Axis number / axis ID for the multi-axis system
HardwareId	HW_IO	0	Hardware ID of the module access point (see Chapter 4.1 Determining the hardware ID)
Header	DB_Header		Header
Data	Array [*] of DWord		Data

The global DB ("SINA_STORE") contained in the library must be connected to the two inputs "Header" and "Data", which is structured as follows:

Figure 2-2: Structure global – DB

Name	Data type
Static	
Header	"DB_Header"
MajorRelease	Int
MinorRelease	Int
ServicePack	Int
Update	Int
FileSize	DInt
DynArrayListDownload	Array[0..9] of DWord
reserve	Array[0..12] of Word
Data	Array[0..3099] of DWord

The wiring is shown in Figure 2-1. The data type "DB_Header" is part of the library. The size of the array of the variable "Data" can be adjusted by the user. If the default size of 12 kByte is not sufficient or the DB is reduced, the following describes how to calculate the size of the data arrays.

If you get the value 8007 at the output parameter "Status" when executing the command Backup (CMD = 1), then not all data can be stored in the DB. A reference value for the required size of the array can be obtained via the parameter "FileSize" which is contained in the structure "Header" of the global DB. If you divide this value by 4 and round it up to the next value of 10, you get the value for the upper array limit.

2.6 Output interface of SINA_BACKUP_RESTORE

The output interface consists of 8 outputs of different data formats. When the block is configured for the first time, these are assigned meaningful initial values. The following is an overview of the output interface:

Table 2-2 Output interface SINA_BACKUP_RESTORE

Input signal	Type	Default	Meaning
Ready	Bool	False	Feedback signal for integration in LAcycCom environment; 1 = job completed, or job interrupted (for one cycle)
Busy	Bool	False	1 = Indicates that the job is running.
Done	Bool	1	1 = Order completed
Error	Bool	False	1 = disruption
Status	Word	16#7000	16#0000 Job completed, no warning or other details 16#7000: Initial value 16#7001: First call after incoming new job (execution with rising edge) 16#7002: Subsequent call during active processing without further details 16#8001: Unknown command; 16#8002: Invalid mode for the command: Restart from file 16#8003: Axis number / axis ID for the multi-axis system <= 0 16#8004: Request error 16#8005: Watchdog time error 16#8006: Wrong version of the download - DB or parameter "FileSize" = 0 16#8007: Download - DB too small 16#8401: No connections made 16#8402: Error occurred during command execution, see also DiagExt 16#8600: Error RDREC 16#8601: Error WRREC
DiagID	Word	16#0	Extended communication error -> Error during SFB call
DiagExt	DWord	16#0	Extended communication error -> Error during command execution
DiagCom	DWord	16#0	Extended communication error -> Error during parameter access

The "Status" output displays additional information on command processing.

If the value 16#8402 is displayed here, you receive an additional error code at output "DiagExt", the meaning of which is explained in the following table.

Table 2-3 Meaning of the values at the output „DiagExt“

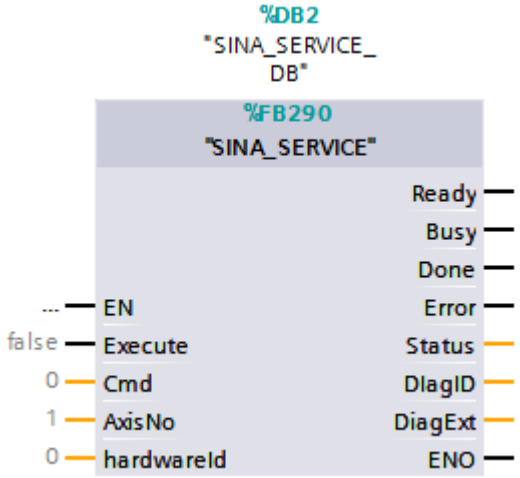
DiagExt	Description
16#01000004	Temporary resource bottleneck, re-execute command
16#01000005	Temporary resource bottleneck, re-execute command
16#01000006	Temporary resource bottleneck, re-execute command
16#01000007	Temporary resource bottleneck, re-execute command
16#0100000B	Temporary resource bottleneck, re-execute command
16#01000013	Temporary resource bottleneck, re-execute command
16#01000014	Temporary resource bottleneck, re-execute command
16#01000015	Temporary resource bottleneck, re-execute command
16#01000016	Temporary resource bottleneck, re-execute command
16#01000017	Temporary resource bottleneck, re-execute command
16#01000018	Contact your responsible Siemens contact person
16#FF008100	Contact your responsible Siemens contact person
16#FF008101	Contact your responsible Siemens contact person
16#FF008108	Action not possible at this system state, re-execute command
16#FF008109	Action currently not possible, re-execute command

If the value 16#8600 or 16#8601 is displayed, they receive additional information at the output "DiagID". The meaning of the error code displayed here can be found in the online help for the blocks "RDREC" and "WRREC".

If the value 16#8004 is displayed, you will get additional information at the output "DiagCom". The meaning of the error code displayed here can be found in the function manual "SINAMICS S120 Communication" chapter 3.4.2 "Structure of Orders and Responses" sub-item "Error Values in Parameter Responses" which can be obtained from Industry Online Support under ID 109763284.

3 Function block SINA_SERVICE

Figure 3-1: Call SINA_SERVICE



3.1 Calling OBs

The block can alternatively be installed in the following OBs:

- Cyclic task: OB1
- alarm clock-OB: z. B. OB32

3.2 Calling Blocks

- RDREC/SFB52
- WRREC/SFB53

3.3 Description

With the integration of the FB290 (SINA_SERVICE), the corresponding instance - DB is automatically created.

The block can be used in the following CPU: SIMATIC S7-1500

3.4 Functional description

The block offers 4 different commands, which are described in the following table. The different commands are given via the "Cmd" input and are triggered by a positive edge at the "Execute" input.

Table 3-1 Supported Commands

Cmd	Description
1	Saving the parameterization of the drive (power-fail-safe saving)
2	Reset the drive to factory settings
3	Acknowledge all active faults on the drive, whereby the "AxisNo" input is ignored.
4	Acknowledge faults of an axis (AxisNo = number of the axis or DriveObject).

3.5 Input interface of SINA_SERVICE

The input interface consists of 4 inputs of different data formats. When configuring the function block for the first time, these are set up with initial values. The following is an overview of the input interface

Table 3-2 Input interface SINA_SERVICE

Input signal	Type	Default	Meaning
Execute	Bool	False	Start the command specified at the input command.
Cmd	Int	0	0: Idle 1: RAM to ROM 2: Factory settings 3: Acknowledge all active faults on all drive objects 4: Acknowledge all active faults on the given drive object
AxisNo	USInt	0	Axis number / axis ID for the multi-axis system
HardwareId	HW_IO	0	Hardware ID of the module access point (see Chapter 4.1 Determining the hardware ID)

3.6 Output interface of SINA_ SERVICE

The output interface consists of 8 outputs of different data formats. When the block is configured for the first time, these are set up with initial values. The following is an overview of the output interface:

Table 3-3 Output interface SINA_SERVICE

Input signal	Type	Default	Meaning
Ready	Bool	False	Feedback signal for integration in LAcycCom environment; 1 = job completed, or job interrupted (for one cycle)
Busy	Bool	False	1 = Indicates that the job is running.
Done	Bool	1	1 = Order completed
Error	Bool	False	1 = disruption
Status	Word	16#7000	16#0000 Job completed, no warning or other details 16#7000: Initial value 16#7001: First call after incoming new job (execution with rising edge) 16#7002: Subsequent call during active processing without further details 16#8001: Unknown command 16#8002: Invalid mode for the command: Restore 16#8003: Axis number / axis ID for the multi-axis system <= 0 16#8004: Request error; 16#8005: Watchdog time error 16#8401: No connections made 16#8402: Error occurred during command execution, see also DiagExt 16#8600: Error RDREC 16#8601: Error WRREC
DiagID	Word	16#0	Extended communication error -> Error during SFB call
DiagExt	DWord	16#0	Extended communication error -> Error during command execution
DiagCom	DWord	16#0	Extended communication error -> Error during parameter access

The "Status" output displays additional information on command processing. If the value 16#8402 is displayed here, you receive an additional error code at output "DiagExt", the meaning of which is explained in the following table.

Table 3-4 Meaning of the values at the output „DiagExt“

DiagExt	Description
16#02007530	Error when saving all drive parameters in ROM
16#FF008100	Contact your responsible Siemens contact person
16#FF008101	Contact your responsible Siemens contact person
16#FF008108	Action not possible at this system state, re-execute command
16#FF008109	Action current not possible, re-execute command
16#FF00810B	Contact your responsible Siemens contact person
16#FF00810C	Contact your responsible Siemens contact person
16#FFFF8000	Contact your responsible Siemens contact person
16#FFFF8001	Execute command again
16#FFFF8002	Check whether your drive / firmware of the drive is supported by the block.
16#FFFF8003	Contact your responsible Siemens contact person
16#FFFF8004	Temporary resource bottleneck, re-execute command
16#FFFF8005	Command cannot be executed
16#FFFF8006	Drive is know-how protected
16#FFFF8007	Contact your responsible Siemens contact person

If the value 16#8600 or 16#8601 is displayed, they receive additional information at the output "DiagID". The meaning of the error code displayed here can be found in the online help for the blocks "RDREC" and "WRREC".

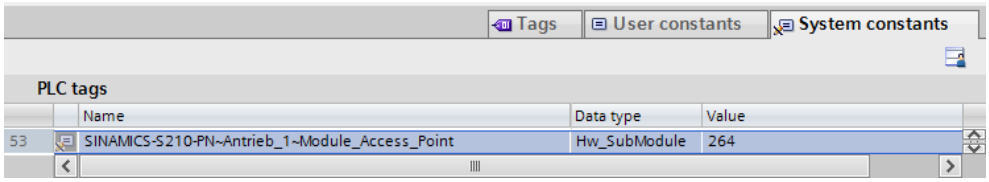
If the value 16#8004 is displayed, you will get additional information at the output "DiagCom". The meaning of the error code displayed here can be found in the function manual "SINAMICS S120 Communication" chapter 3.4.2 "Structure of Orders and Responses" sub-item "Error Values in Parameter Responses" which can be obtained from Industry Online Support under ID 109763284.

4 Additional Information

4.1 Determining the hardware – ID

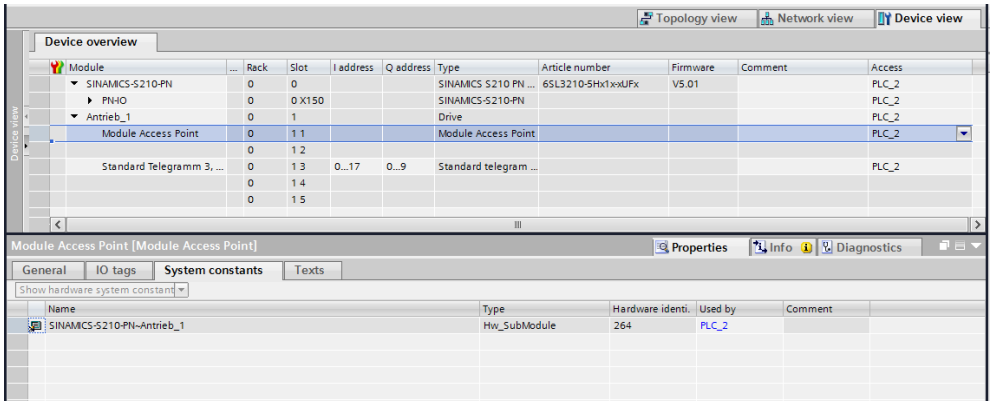
The value that must be connected or parameterized to the "HardwareId" input can be found in the PLC variables in SIMATIC STEP 7 (TIA Portal). Either the value or the name can be connected to the input. This is always the Access Point module.

Figure 4-1: Hardware ID PLC – Variables



Alternatively, you can also find the Hardware - ID in the device overview.

Figure 4-2: Hardware ID device view



4.2 Integration into the library LAcycCom

The LAcycCom libraries for SIMATIC S7-1200/S7-1500 enable collision-free coordination of communication resources in the CPU for acyclic communication via DPV1 services. Instead of the system functions, the corresponding functions in these libraries are used in the application to communicate with external devices.

The library LAcycCom can be reached via the following SIOS link:
https://support.industry.siemens.com/cs/ww/en/view/109479553

For use within the LAcycCom environment, the function block "LAcycCom_ResourceManager", the global data block "LAcycCom_RequestBuffer" and the PLC variables and PLC data types available in the library are mandatory necessary.

The connection of the "SINA_BACKUP_RESTORE" and "SINA_SERVICE" blocks takes place in interaction with the "LAcycCom_HandleResource" block. The order for acyclic communication is transferred to the HandleResource block, which controls the "SINA_BACKUP_RESTORE" / "SINA_SERVICE" block after receiving the release (from the ResourceManager).

After completion of the job, the block "SINA_BACKUP_RESTORE" / "SINA_SERVICE" reports this to the HandleResource block via the Ready output (one cycle long). This can now release the resource again.

For solid evaluation of the start and release signals, an edge evaluation for the start command and a memory element (SR Flip Flop) are used.

5 Appendix

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5.2 Links and literature

Table 5-1

No.	Topic
\1\	Siemens Industry Online Support https://support.industry.siemens.com
\2\	Link to this entry page of this application example https://support.industry.siemens.com/cs/ww/en/view/109769958
\3\	

5.3 Change documentation

Table 5-2

Version	Date	Modifications
V1.0	08/2019	First version