

## TIA Module Description



Sample module

**Acyclical parameter access**

Individual parameter access via PROFINET IO



### Foreword

This documentation has been drawn up to support the work of the sales teams by answering current and general questions on the technology and project planning phase of products.

Please do not hesitate to contact the author if you have any questions or suggestions.

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This documentation has been prepared based on current knowledge. Future communications may differ if new facts come to light. As a result, the possibility of misinterpretations or mistakes in the technical data cannot be ruled out.



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# 1. Introduction

## 1.1. Exclusion of liability

The TIA module "SEW\_MOVI-C\_SingleParameterAccess" [FB200] (V1.5) only shows the basic procedure. Neither legal nor any kind of liability can be inferred from faulty program functions and the consequences thereof.

## 1.2. Important information

A Siemens PLC S7-1200 or later is required for integration of the module. The module "SEW\_MOVI-C\_SingleParameterAccess" [FB200] (V1.5) was created in the TIA portal V14, V15 and V15.1. The function cannot be guaranteed with older control models or software versions.

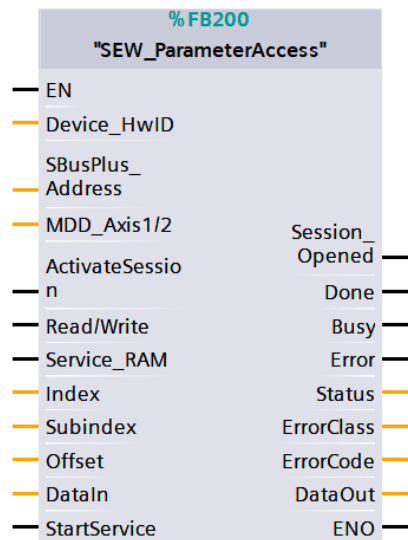
The sample module comprises the read and write operation for individual parameters.

Data for individual parameters is transmitted in big endian format via the inputs and outputs "DataIn" and "DataOut".






The module "SEW\_MOVI-C\_SingleParameterAccess" [FB200] (V1.5) is suitable for direct addressing. Single-stage routing for SBus+ stations is also included in the module.



## 2. Description of the module



The hardware ID of the communication slave must be applied at the input "Device\_HwID". It is important to specify the hardware ID for the head of the submodule from the system constants. The address can be read out from the hardware configuration of the configured device.

General	IO tags	System constants	Texts		
Show hardware system constant					
	Name	Type	Hardware identi.	Used by	Comment
	SEWEURODRIVE-DFC2xX-PNHO-Port_1_-_RJ45_(X4233_1)	Hw_Interface	260	PLC_3	
	SEWEURODRIVE-DFC2xX-PNHO-Port_2_-_RJ45_(X4233_2)	Hw_Interface	261	PLC_3	
	SEWEURODRIVE-DFC2xX-PNHO	Hw_Interface	259	PLC_3	
	SEWEURODRIVE-DFC2xX-Proxy	Hw_SubModule	258	PLC_3	
	SEWEURODRIVE-DFC2xX-Head	Hw_SubModule	262	PLC_3	

"ActivateSession" opens a session at the Data Streaming level. Multiple data exchange operations can take place within one session. When you activate the "ActivateSession" input, the open session will be also be closed again. A session must be open in order to exchange data. No more than five sessions can be open simultaneously on one device.

The address of the SBus+ station for single-stage routing is entered at the input "SBusPlus\_Address". "MDD\_Axis1/2" should only be used for double-axis modules. You must specify which axis is to be used. A zero at the input is the default setting and must also remain in place for single-axis modules. When you use a double-axis module, for access to axis 1, a one must be specified at the input. A two must be transmitted for access to axis 2.

"Read/Write" specifies whether a read or write access should be started. When there is a positive signal at "Service\_RAM", the volatile memory RAM is used. If this value is 0, the selected value is written to the axis remanently or read from the NV memory.

The address of the parameter in the device is transferred to the module via "Index" and "Subindex".

"Offset" is used for access to a position in a data array. The first position in the array has the offset 0.



## Description of the module

The data must be transferred via "DataIn" for the write operation of an individual parameter. This input is ignored during read operation.

After input of the previous data, data exchange must be started via "StartService". When data is exchanged successfully or if an error occurs, "StartService" is automatically reset.

The current status of the module is transmitted via "Done", "Busy" and "Error". When data exchange is successful, "Done" takes on the value "true". During this operation, the module has the status "Busy". If an error occurs during data exchange, "Error" is set to "true".

Error evaluation is done via "ErrorClass" and "ErrorCode". In the event of a PROFINET error, detailed information can be found at the status output. Chapter 4 contains more detailed information on possible errors.

After a successful read operation, the data of the individual parameter is written to "DataOut". During the write operation, this value is 0.

### 2.1. Inputs

The inputs of the sample module are described in the following table.

Parameter	Type	Initial value	Description
Service_RAM	Boolean	False	True at input: writing to RAM or reading from RAM False at input: writing to the NV memory or reading from the NV memory
Index	UInt	16#00	Index for reading and writing parameters in the device
Subindex	USInt	16#00	Subindex for reading and writing parameters in the device
Offset	UDInt	0	Offset for reading individual elements of a group parameter in the device
DataIn	DWord	16#00	Data to be transmitted during the write operation. Is ignored during read operation.



## 2.2. InOut

The inputs and outputs of the sample module are described in the following table.

Parameter	Type	Initial value	Description
StartService	Boolean	False	Starts a read or write operation. Is automatically reset once the operation ends or an error occurs.

## 2.3. Outputs

The outputs of the sample module are described in the following table.

Parameter	Type	Initial value	Description
Session_Opened	Boolean	False	Is set when a session has been successfully opened.
Done	Boolean	False	Is set when the task has been successfully completed.
Busy	Boolean	False	Is set as long as the task is being completed.
Error	Boolean	False	Is set when an error occurs while the task is being completed. Error evaluation using: <ul style="list-style-type: none"> <li>• Status</li> <li>• ErrorClass</li> <li>• ErrorCode</li> </ul>
Status	DWord	16#00	Status functions of the system function module SFB52(RDREC)/SFB53(WRREC) Error evaluation in the event of a PROFINET error
ErrorClass	Word	16#00	Specifies the type of error that has occurred: 01 – PROFINET 02 – Data Streaming 03 – ApplicationData See chapter 4 (Error description) for more information
ErrorCode	DWord	16#00	See error description (chapter 4)
DataOut	DWord	16#00	Receive data of the read request



### 2.4. Stages of an operation

The "SBusPlus\_Address" of the device used must be specified in order to configure the routing. When using a double-axis module, the axis of the double-axis module that should be used for access is specified via "MDD\_Axis1/2".

"True" at the input "ActivateSession" opens a session and allows for reading/writing of a parameter. Successful opening of the session is communicated through "true" at the output "Session\_Opened".

Read/write must be also set to "true" for a write request. For volatile writing or reading, the input "Service\_RAM" must also be set.

Then the values for "Index", "Subindex" and "Offset" must be specified. For an individual parameter, it is important to set "Offset" to 0. During a write operation, the data to be written must also be transmitted in "DataIn".

A "true" at "StartService" will then start the read or write operation.

During the operation, the output byte "Busy" is set to "true".

If an error occurs during this operation, "Error" is set. "StartService" is then reset. The error is evaluated via the outputs "Status", "ErrorCode" and "ErrorClass".

When the operation has been successfully completed, the output "Done" is set to "true" and "StartService" is set to "false". The data of the individual parameter are saved when read at the output "DataOut".

In order to start a new operation, the value must first be entered again at the inputs "Index", "Subindex" and "Offset". A new read or write operation can then be started again via "StartService".

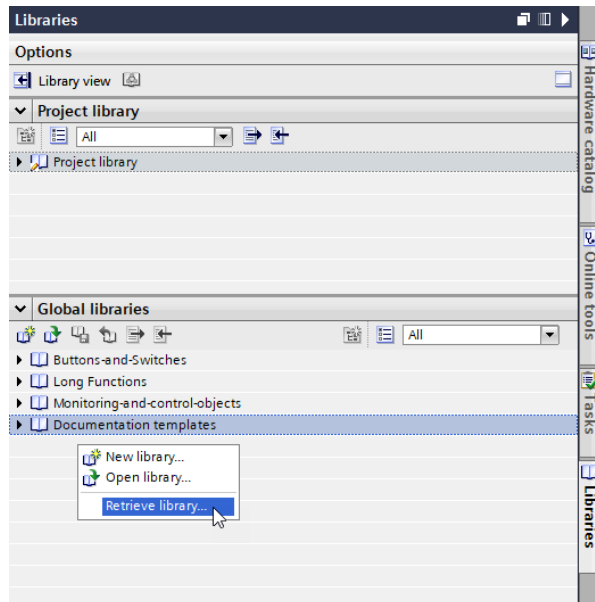
After successful exchange of all requested data, "ActivateSession" should be set to "false" to close the Datastream session.





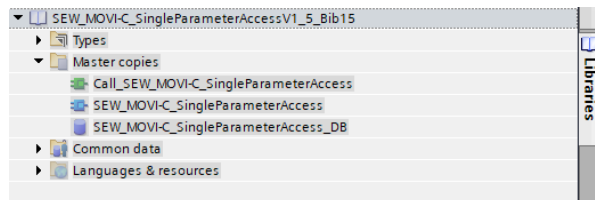
### 3. Integrating the library

To integrate the archived library into your project, open the "Libraries" window on the right edge of the screen of the TIA portal.



Right-click in the global libraries window to open a drop-down menu. "Retrieve library..." opens Windows Explorer.

Then select the desired library and choose the target directory where you want to save it.



After you have retrieved the library, the sample module appears in the master copies. From here you can integrate it into the current project using drag and drop.

For full functionality, all three templates (function, function block and data block) must be copied into your project.



### 4. Fault description

#### 4.1. ErrorClass description

The various error types is described in the following table.

ErrorClass	Designation	Description
16#0001	PROFINET error	The error occurred in the PROFINET layer. You can find a detailed description in the status.
16#0002	Data Streaming error	The error occurred in the Data Streaming layer. You can find a detailed error description in chapter 4.2.2.
16#03xx	Application data error	The error occurred in the application data during data transmission. You can find a detailed error description in chapter 4.2.3.

#### 4.2. ErrorCode description

##### 4.2.1. Error in PROFINET

When an error occurs on the PROFINET layer, the error description is communicated via the status. A detailed error description of this parameter is stored in the Help section of the TIA portal and not described further here.

##### 4.2.2. Error in the Data Streaming layer

In the event of an error in the Datastream layer, the "ErrorClass" output has the value 16#0002. The Data Streaming error in question is described in the "ErrorCode". The error codes are described below:

ErrorCode	Designation	Description
16#0001	Invalid session ID	An invalid session ID has been received and the frame has not been processed.
16#0002	No resource available	The resources required to carry out the task could not be provided.
16#0003	Wrong transaction ID	A frame with an unknown transaction ID was received.
16#0004	Wrong fragment toggle	A frame with the wrong fragment toggle was received.
16#0005	Invalid route	An open session with an unknown route was received.



ErrorCode	Designation	Description
16#0006	Path not available	A communication interface is not currently available.
16#0007	Duplicate session ID	The currently used session ID occurs multiple times in the system.
16#0008	Invalid sequence	An unexpected frame type was detected by the receiver.
16#0009	Response timeout	No response from the lower-level server.
16#000A	Invalid version	The version in the protocol header is invalid.
16#000B	Invalid frame	The frame structure is incorrect.
16#000C	Invalid frame content	The content of a received frame is invalid.

## 4.2.3. Error in the application service

If an error occurs in the application service, this is described via the "ErrorClass" and "ErrorCode". The high word of the "ErrorClass" output has a 16#03 and the error level is described in the low word.

The individual error levels are:

ErrorClass	Designation	Description
16#0301	Warning	For information only. The error was corrected independently by the system.
16#0302	Error	The service could not be fully executed. For more information, see the ErrorCode.
16#0303	Fatal	Fatal system error. The system cannot continue running. User interaction required.

You can find more detailed information about the errors in the "ErrorCode". The possible errors are:

ErrorCode – high word	ErrorCode – low word	Designation	Description
01	00	Illegal type	The data type in the data block header is unknown or is not supported.
02		Illegal service	Service not supported.



## Fault description

ErrorCode – high word	ErrorCode – low word	Designation	Description
	01		The service code in the service header is unknown or is not supported.
	02		Filter in sequence header not supported.
03	00	Illegal service destination	Service destination not available for combination of service and ID.
04	00	Illegal ID	Unknown combination of ID/Sub-ID/Offset
05	00	Sequence error	Error while executing the sequence
06		Illegal device state	The value in the data block is not within the permitted value set
	01		Hardware missing
	02		Parameter lock active
	03		Configuration state required
	04		Initialization in progress
	05		Data flexibilization layer running
	06		Auto setup active
	07		PLC state
	08		Hash value calculation running
	09		Data download in progress
	>0A		Startup state required
	0B		Energy-saving mode active
	0C		Parameter cannot be set when the function is active
	0D		Invalid device state
07		Illegal value	You do not have permission to perform the requested service
	01		Value too great
	02		Value too small

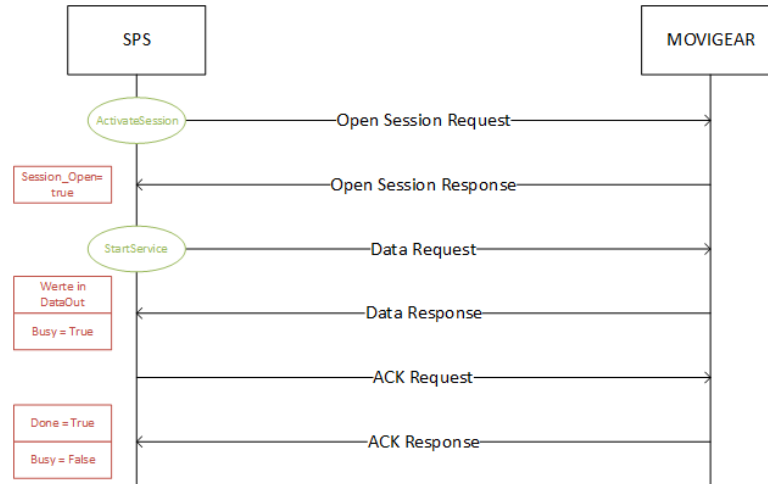


ErrorCode – high word	ErrorCode – low word	Designation	Description
	03		Invalid value
	04		Maximum value length exceeded
08		No permission	Resource not available on server
	01		Read only
	02		Access denied
	03		Access not possible using this interface
	04		Incompatible parameter set
	05		Incompatible option cards
	06		Inconsistent parameter set
09	01	Resource error	Maximum buffer length exceeded
	02		The specified granularity is not supported
	03		The maximum number of error info items exceeded
FF	FF	Internal error	Internal software error



### 5. Examples

#### 5.1. Individual parameter access



The sequence of the individual telegrams for individual parameter access are demonstrated using a read operation as an example. A session in Datastream is started via "ActivateSession". "StartService" is activated after entering the required information at the corresponding inputs. The following telegrams are issued in the correct sequence automatically. After successful execution, the output "Done" is set to "true". "Busy" is set during the operation.

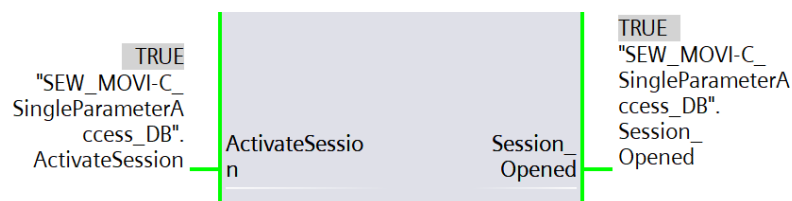
#### 5.2. Example at parameter 8368.3 (process input data) without routing

The sequence of a write operation is demonstrated using parameter 8368.3 offset 5 as an example.

4.3.1 PI data

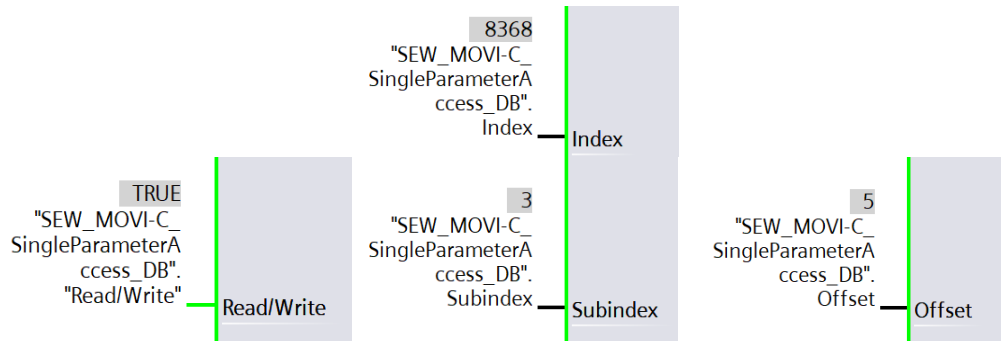
Basic settings		Data sources (16-bit words)	
		Source	Value
<input checked="" type="checkbox"/> Update		PI 1	Data Flexibility output data[16] Low word 0x1802
Number of data words	16	PI 2	Data Flexibility output data[17] Low word 0x0000
		PI 3	Data Flexibility output data[18] Low word 0x0001
		PI 4	Data Flexibility output data[19] Low word 0x0000
		PI 5	Data Flexibility output data[20] Low word 0x0001
		PI 6	No function 0x0000
		PI 7	No function 0x0000
		PI 8	No function 0x0000

In the following example, the process input data word should be assigned with the transparent mode status word 0.

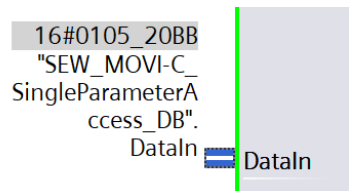




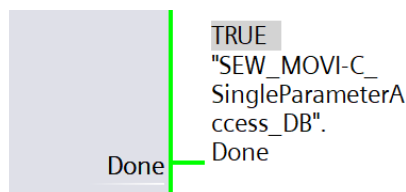
First a session must be opened via "ActivateSession". Successful opening will be communicated via the output "Session\_Open". A data transfer can take place once the session is open.



A 1 at input "Read/Write" initializes a write operation. The address that should be described below is specified via "Index" and "Subindex". The position of the arrays are defined via the input at "Offset".



The value to be written is transferred via "DataIn". The value must either be specified by SEW or read out via MOVISUITE®.



The data transmission is started with a "true" at the input "StartService". A successful write operation is signaled with a "true" at the output "Done".

4.3.1 PI data

Basic settings		Data sources (16-bit words)		Value
Update		Source		
Number of data words	16	PI 1	Data Flexibility output data[16]	Low word 0x1802
		PI 2	Data Flexibility output data[17]	Low word 0x0000
		PI 3	Data Flexibility output data[18]	Low word 0x0001
		PI 4	Data Flexibility output data[19]	Low word 0x0000
		PI 5	Data Flexibility output data[20]	Low word 0x0001
		PI 6	Transparent mode status word [0]	Saturated to 16 bits 0x0000
		PI 7	No function	0x0000
		PI 8	No function	0x0000

The transparent mode status word is now in the sixth process input data word.



## Examples

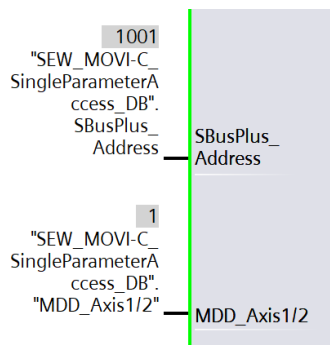
### 5.3. Example at parameter 8357.10 (Application limit – positive velocity) with routing

A double-axis module is controlled via the standard controller UHX25A. In the following example, axis 1 of the double-axis module is controlled.

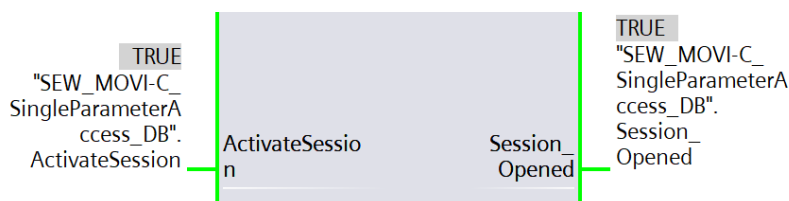
4.6.3 Limit values

Application limits	DT1
Positive speed	4100 Umdr/min
Negative speed	4100 Umdr/min
Acceleration	3000 Umdr/(min*s)
Deceleration	3000 Umdr/(min*s)
Jerk time	0 ms
Torque	150.0 % nominal motor torque
Apparent output current	9.600 A

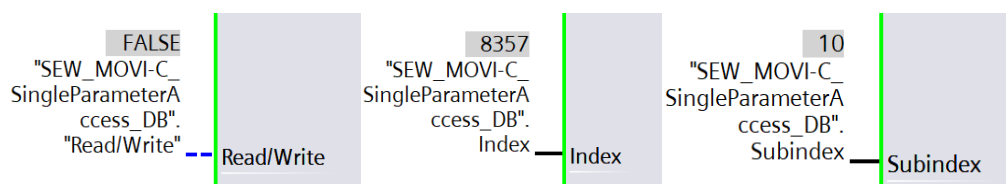
The framed limit value for the speed in figure 3 should now be read out in the following sequence.



The "SBusPlus\_Address" of the double-axis module in the example is 1001. Since the parameter at axis 1 of a double-axis module should be read out, a 1 is transferred at the input "MDD\_Axis\_1/2".

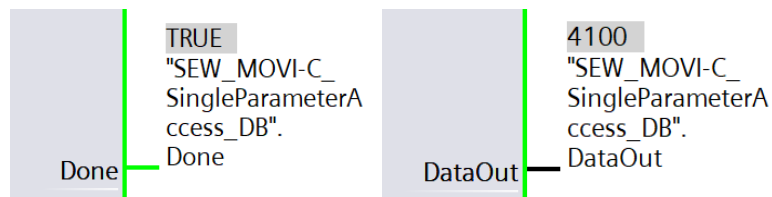


Next, a new session will be opened on axis 1 via "ActivateSession". A successfully opened session will be communicated via the output byte "Session\_Opened".



Next, the desired "Index" and "Subindex" must be specified. Because a read access is to be displayed here, the input "Read/Write" is set to "false". The read operation is started via "StartService".





The successful read operation is signaled with a "true" at the output "Done". The read value can be found in "DataOut".



## Contact persons

### 6. Contact persons

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