SIEMENS

SIMOTION

Supplement to SIMODRIVE POSMO A Positioning Motor

Function Manual

03/2009 Edition

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

⚠DANGER
indicates that death or severe personal injury **will** result if proper precautions are not taken.

⚠WARNING
indicates that death or severe personal injury **may** result if proper precautions are not taken.

⚠CAUTION
with a safety alert symbol, indicates that minor personal injury can result if proper precautions are not taken.

CAUTION
without a safety alert symbol, indicates that property damage can result if proper precautions are not taken.

NOTICE
indicates that an unintended result or situation can occur if the corresponding information is not taken into account.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The device/system may only be set up and used in conjunction with this documentation. Commissioning and operation of a device/system may only be performed by **qualified personnel**. Within the context of the safety notes in this documentation qualified persons are defined as persons who are authorized to commission, ground and label devices, systems and circuits in accordance with established safety practices and standards.

Proper use of Siemens products

Note the following:

⚠WARNING
Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be adhered to. The information in the relevant documentation must be observed.

Trademarks

All names identified by ® are registered trademarks of the Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Siemens AG
Industry Sector
Postfach 48 48
90026 NÜRNBERG
GERMANY

Ⓟ 03/2009

ntroduction

Contents of the function manual

This document is part of the SIMOTION Programming - References documentation package.

This documentation serves as a supplement to the documentation on SIMODRIVE POSMO A in the *Distributed Positioning Motor on PROFIBUS DP* user manual.

This documentation is included in the SIMOTION SCOUT scope of delivery as electronic documentation!

This manual describes how you can use function blocks to control and assign parameters for a POSMO A drive from a SIMOTION program.

This manual describes differences in handling that arise when controlling and assigning parameters for a POSMO A drive from the SIMOTION system as compared to the SIMATIC system.

Function block

The function blocks for communication between the SIMOTION system and the distributed SIMODRIVE POSMO A positioning motor are part of the program library of the "SIMOTION SCOUT" engineering system.

SIMOTION Documentation

An overview of the SIMOTION documentation can be found in a separate list of references.

This documentation is included as electronic documentation with the supplied SIMOTION SCOUT.

The SIMOTION documentation consists of 9 documentation packages containing approximately 80 SIMOTION documents and documents on related systems (e.g. SINAMICS).

The following documentation packages are available for SIMOTION V4.1 SP3:

- SIMOTION Engineering System
- SIMOTION System and Function Descriptions
- SIMOTION Diagnostics
- SIMOTION Programming
- SIMOTION Programming - References
- SIMOTION C
- SIMOTION P350
- SIMOTION D4xx
- SIMOTION Supplementary Documentation

Hotline and Internet addresses

Technical support

If you have any technical questions, please contact our hotline:

	Europe / Africa
Phone	+49 180 5050 222 (subject to charge)
Fax	+49 180 5050 223
Internet	http://www.siemens.com/automation/support-request

	Americas
Phone	+1 423 262 2522
Fax	+1 423 262 2200
E-mail	mailto:techsupport.sea@siemens.com

	Asia / Pacific
Phone	+86 1064 719 990
Fax	+86 1064 747 474
E-mail	mailto:adsupport.asia@siemens.com

Note

Country-specific telephone numbers for technical support are provided under the following Internet address:

http://www.siemens.com/automation/service&support

Calls are subject to charge, e.g. 0.14 €/min. on the German landline network. Tariffs of other phone companies may differ.

Questions about this documentation

If you have any questions (suggestions, corrections) regarding this documentation, please fax or e-mail us at:

Fax	+49 9131- 98 63315
E-mail	mailto:docu.motioncontrol@siemens.com

Siemens Internet address

The latest information about SIMOTION products, product support, and FAQs can be found on the Internet at:

- General information:
  - http://www.siemens.de/simotion (German)
  - http://www.siemens.com/simotion (international)
- Product support:
  - http://support.automation.siemens.com/WW/view/en/10805436

Additional support

We also offer introductory courses to help you familiarize yourself with SIMOTION.

Please contact your regional training center or our main training center at D-90027 Nuremberg, phone +49 (911) 895 3202.

Information about training courses on offer can be found at:

www.sitrain.com

Table of contents

Description 1

1.1 General

Overview

SIMODRIVE POSMO A is an intelligent distributed positioning drive on the PROFIBUS DP field bus (DP standard slave).

The power unit and all of the motion control are located in the motor.

All of the signals and data for commissioning and operating the drive are transferred via the PROFIBUS DP.

The operating energy is supplied by a 24 VDC connection (for a 75 W motor) or a 48 VDC connection (for a 300 W motor).

The integrated positioning functionality is suitable for a variety of simple single-axis applications, such as adjusting endstops and formats.

Note

Hardware and software requirements

The following requirements apply for the functionalities described in this manual:

- Hardware release POSMO A 75 W: As of O
- Software release POSMO A 75 W: As of V3.0
- Hardware release POSMO A 300 W: As of G
- Software release POSMO A 300 W: As of V3.0

POSMO A positioning motors with different hardware and software requirements can be controlled with function blocks integrated in SIMOTION SCOUT V4.1. The functionality is restricted by the hardware/software release of the POSMO A positioning motor used.

Requirement

The following software versions are required for the standard functions described in this documentation:

- SIMOTION SCOUT V4.1 or higher
- SIMOTION Kernel V4.1 or higher
- SIMOTION technology packages V4.1 or higher

Communication

The PROFIBUS DP field bus allows rapid cyclical data exchange between the DP slave (POSMO A) and the higher-level DP master (SIMOTION hardware platform, such as SIMOTION C2xx).

Further information

Note

For more information, refer to the "Product brief" section of the *Distributed Positioning Motor on PROFIBUS DP* user manual.

This documentation is included in the SIMOTION SCOUT scope of delivery as electronic documentation!

Installation and connection

For a description of how to install and connect a SIMODRIVE POSMO A and points you must be aware of when doing so, refer to the "Installation and connection" section of the *Distributed Positioning Motor on PROFIBUS DP* user manual. On the SIMOTION device (hardware platform), connect SIMODRIVE POSMO A to one of the PROFIBUS DP interfaces.

The following figure shows how to connect a SIMODRIVE POSMO A drive to a SIMOTION hardware platform (such as SIMOTION C2xx).

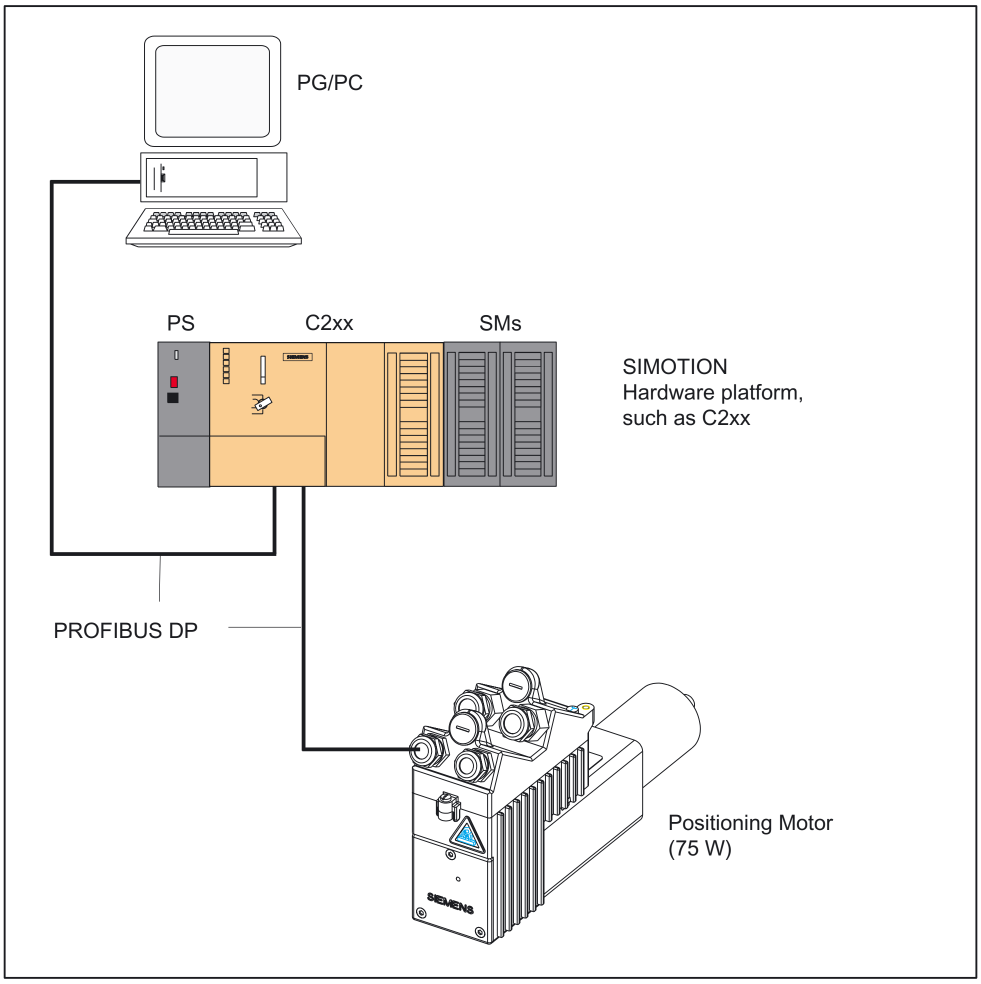


Figure 1-1 Connection of SIMODRIVE POSMO A to the SIMOTION C2xx hardware platform

1.2 Installation and startup

Overview

You must perform the following steps to commission the SIMODRIVE POSMO A and control it from the SIMOTION system:

1. Mount and wire the SIMODRIVE POSMO A positioning motor.
2. Set the PROFIBUS DP node address on the connection cover of the SIMODRIVE POSMO A.
3. Switch on the terminating resistor at the first and last bus node.

Note

For steps 1 to 3, refer to *Section "Installation and Connection"* of the *Distributed Positioning Motor on PROFIBUS DP* user manual.

---

4. You can use any of the following to commission the SIMODRIVE POSMO A:
   - C1 master "SIMODRIVE POSMO A PROFIBUS MASTER"
   - Commissioning tool "SimoCom A"

     Note

     Refer to the *Distributed Positioning Motor on PROFIBUS DP* user manual, *Section "Commissioning of DP Master".*

   - "Drive ES" tool. This tool includes "SimoCom A"

     Note

     Refer to the *Drive ES Basic* function description.

     ---

5. Insert the SIMODRIVE POSMO A into the SIMOTION project (refer to Section Inserting a SIMODRIVE POSMO A positioning motor into a SIMOTION project (Page 12)).
6. Control the SIMODRIVE POSMO A from the SIMOTION system using function blocks, see Section Function blocks (Page 15).

Note

Refer to the *Distributed Positioning Motor on PROFIBUS DP* user manual for more information on the following topics:

- Axis commissioning
- Communication via PROFIBUS DP
- Description of functions
- Error handling and diagnostics
- Assembly and service

1.3 Inserting a SIMODRIVE POSMO A positioning motor into a SIMOTION project

Requirement

The following requirements must be met:

1. You have created a project in SIMOTION SCOUT and have inserted a rack with a SIMOTION hardware platform in the hardware configuration.
2. You have configured a PROFIBUS subnet.

Note

For information on creating a project and configuring a PROFIBUS subnet, refer to the online help for SIMOTION SCOUT.

Inserting SIMODRIVE POSMO A

To integrate the SIMODRIVE POSMO A into the PROFIBUS subnet of your project, proceed as follows:

1. In SIMOTION SCOUT, open the **User Projects** dialog box with the **Project > Open** menu command. In this dialog box, select your project and confirm your choice with **OK**.
2. Open **HW Config** (by double-clicking the SIMOTION device in the project navigator of SIMOTION SCOUT).
3. In the **HW Config** window, open the **hardware catalog** with the **View > Catalog** menu command.
4. In the hardware catalog, open the **PROFIBUS DP** folder and the **SIMODRIVE** subfolder and select **SIMODRIVE POSMO A**.
5. Use a drag-and-drop operation to move the SIMODRIVE POSMO A onto the PROFIBUS subnet of your project.

   The **Properties - PROFIBUS Interface SIMODRIVE POSMO A** dialog box is displayed. In this dialog box, you select the address you set in the connection cover of POSMO A (see *Section "Installation and Connection" of the Distributed Positioning Motor on PROFIBUS DP* user manual) and confirm with **OK**.

   The SIMODRIVE POSMO A positioning motor you have selected is inserted into the project.
6. Input and output addresses of the POSMO A.

   When you insert the POSMO A into your SIMOTION project, the input and output addresses are assigned default values. You can see these values when you select the inserted POSMO A. You can read the input and output addresses in the lower part of the **HW Config** window.

   You must create these addresses as I/O variables in the symbol browser before calling the function blocks; see Section Creating I/O Variables (Page 14).

1.4 Integrating the function blocks in the user project

Creating the instance of the FBs in the user project

The function blocks are part of the program library of the SIMOTION SCOUT engineering system. For working with the blocks, an instance has to be created in the user project for each function block used and if using the **_POSMOA_rwAllParameter** function block, a variable of type **Struct_POSMOA_params**.

Example:

```
VAR_GLOBAL
...
 myPosmoAControl        : _POSMOA_control;         // FB for controlling of POSMO A
 myPosmoArwParameter    : _POSMOA_rwParameter;     // FB for handling single parameter
 myPosmoArwAllParameter : _POSMOA_rwAllParameter;  // FB for handling parameterset
 myAllParaPosmoA        : Struct_POSMOA_params;    // Variable for structure of all
                                                   // parameters POSMO A
...
END_VAR
```

Call (LAD representation)

The LAD representation of the individual function blocks can be found in the respective function block descriptions.

Example of an application

The application example is contained on the "SIMOTION Utilities & Applications" CD-ROM and is available for various SIMOTION hardware platforms.

The "SIMOTION Utilities & Applications" CD-ROM is provided free of charge and part of the SIMOTION SCOUT scope of delivery.

1.5 Creating I/O Variables

Overview

Communication between the SIMOTION hardware platform and the SIMODRIVE POSMO A takes place through direct access to the I/O. I/O variables are used to address the direct read/write access to the I/O.

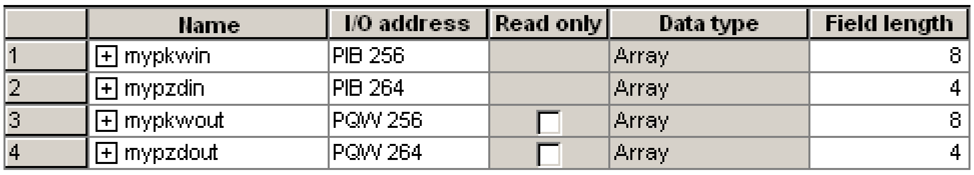
You can freely assign the names of I/O variables in SIMOTION SCOUT. You must define the I/O variables as ARRAY [0..7] and [0..3] of BYTE. You assign the address settings in the hardware configuration to these I/O variables.

The names of the I/O inputs must be transferred to the function blocks as call parameters. The prepared data for the I/O outputs are provided by the function block as in/out parameters. The in/out parameters must be be supplied with variables of type ARRAY [0..7] of BYTE and [0..3] of BYTE. Once the block has been called, these variables must be assigned to the I/O variables for the I/O outputs; see call example in Section Calling function blocks (Page 38).

Note

The variable for supplying the in/out parameters must not be created as a temporary variable (VAR_TEMP or local variable of a function).

The following example shows how to assign the module addresses to the I/O variables in SIMOTION SCOUT.



	Name	I/O address	Read only	Data type	Field length
1	⊞ mypkwin	PIB 256		Array	8
2	⊞ mypzdin	PIB 264		Array	4
3	⊞ mypkwout	PQW 256	☐	Array	8
4	⊞ mypzdout	PQW 264	☐	Array	4

Figure 1-2 Address assignment in SIMOTION SCOUT

Each input and output address has a range of 8 bytes (which corresponds to the parameter identifier value (PKW) range of POSMO A) and a range of 4 bytes (which corresponds to the process data (PZD) range of POSMO A).

Note

For additional information, refer to:

- *SIMOTION SCOUT* online help
- Programming Manual of the corresponding programming language, e.g.:
  - *SIMOTION ST, Structured Text* Programming Manual
  - *SIMOTION MCC, Motion Control Chart Programming Manual*
  - *SIMOTION LAD/FBD, Ladder Diagram and Function Block Diagram Programming Manual*

These documents are shipped with SIMOTION SCOUT in electronic form!

Function blocks 2

2.1 Overview of function blocks

This section contains a description of all of the function blocks (FBs) and the data structure you need for communication between a SIMOTION hardware platform and the SIMODRIVE POSMO A.

The function blocks form the software interface between the SIMOTION system and the SIMODRIVE POSMO A positioning motor.

These function blocks make it easier to control and assign parameters for a SIMODRIVE POSMO A positioning motor from the SIMOTION program.

For example, you can assign parameters for a POSMO A without being familiar with PROFIBUS parameter formats and request specifiers.

The function blocks must be called repeatedly (in cycles) from the user program.

The following function blocks are available:

- Function block _POSMOA_control (Page 16)
- Function block _POSMOA_nControl (Page 22) (V4.1 and higher):
- Function block _POSMOA_rwParameter (Page 28)
- Function block _POSMOA_rwAllParameter (Page 31)

Note

For the complete control and communication of the SIMODRIVE POSMO A from the SIMOTION program, an instance must be created for each _POSMOA_rwParameter and _POSMOA_rwAllParameter function block and, depending on the parameterized operating mode (speed or position control mode), an instance of the _POSMOA_control or _POSMOA_nControl function block.

Note

If the SIMODRIVE POSMO A is disconnected and then reconnected to the power system, any MDI traversing block data (see the table titled "Parameters of the _POSMOA_control function block") that had been transferred previously must be transferred to the POSMO A again.

2.2 Function block _POSMOA_control

Task

You can control the connected SIMODRIVE POSMO A with the **_POSMOA_control** function block.

The functions are as follows:

- Initialize

  Sets the drive in "ready to operate" mode.

  Requirements:

  – A drive fault has not been signaled (**driveError** = FALSE)

  – Fault acknowledgement is not active (**resetError** = FALSE)
- Referencing

  Sets the home position for the drive.
- Tippen

  The drive travels at a controlled speed in a plus or minus direction.
- Program execution

  Starts, stops, or aborts a single block addressed by **blockNumber** or a block within the program.
- MDI

  The drive travels at the assigned speed and acceleration to an assigned position.

  The MDI parameters are transferred in block 3.

  The MDI block can be started with **blockNumber** = 3 and **start** = TRUE.
- Fault acknowledgement

  Acknowledges a fault in the drive.

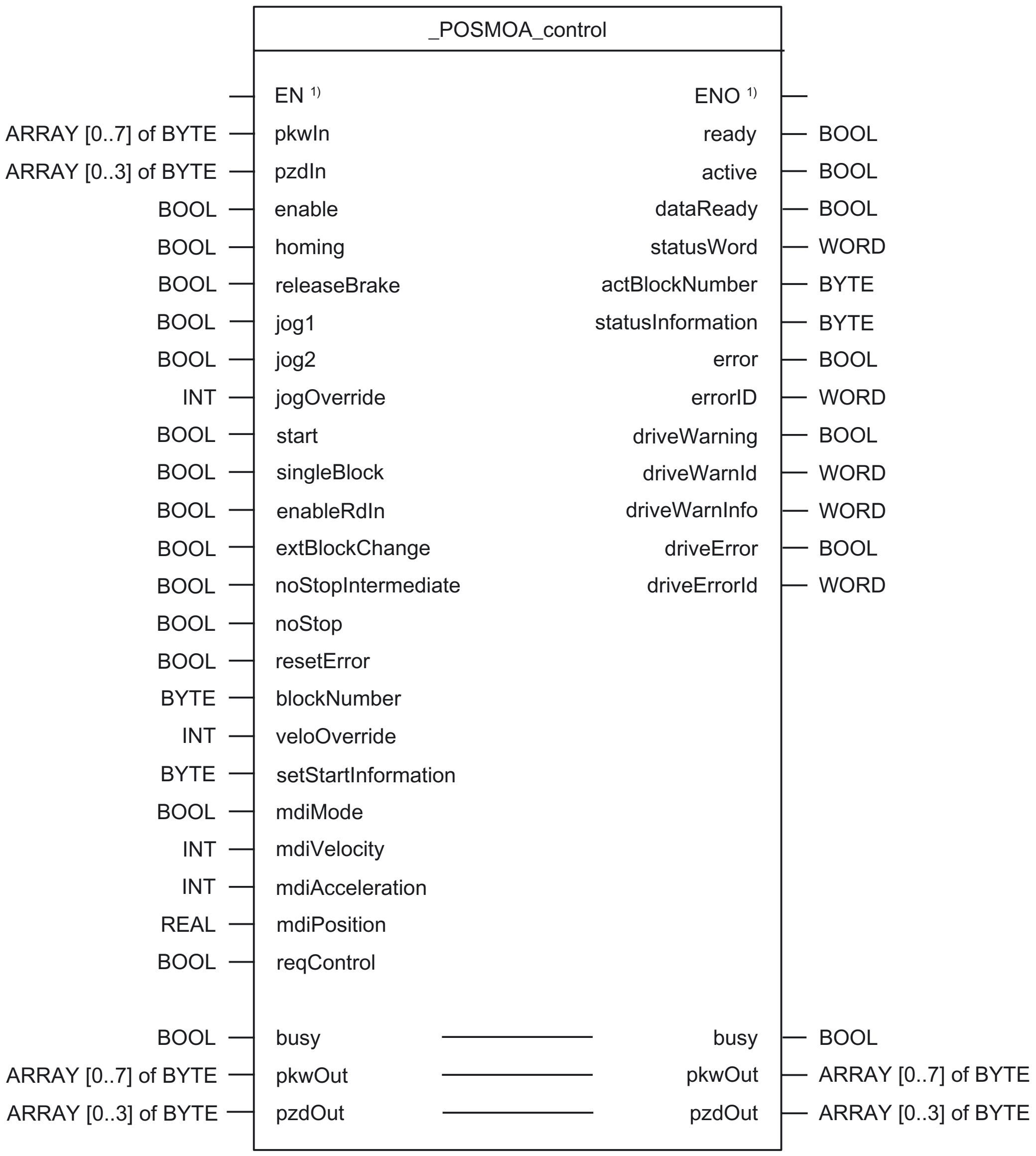
  Note

  A fault must be acknowledged before the drive can move. This requires that parameter **enable** = TRUE.
- Automatic single-block operation/automatic control

Checkback signals are as follows:

- Current traversing block
- Data Set Ready
- Warning and fault information
- Complete status (status word and checkback signal byte)
- Data transfer status

Call (LAD representation)



1) LAD-specific parameters

Parameter description

Note

The SIMOTION identifiers have changed as of V4.0.

You can find a comparison of SIMOTION and SIMATIC names in the Appendix SIMOTION and SIMATIC names (Page 51).

The **busy** parameter must **not** be overwritten by the user. It is supplied and checked by the function block, and must be supplied with a global variable created by the user only when the respective function block is called. This parameter coordinates the individual function blocks for the POSMO A. This ensures that no more than one function block can access a POSMO A at the same time.

Table 2- 1 Parameters of the _POSMOA_control function block

Name	P type [1]	Data type	Default	Meaning
pkwIn	IN	ARRAY [0..7] of BYTE	8(16#00)	Transfer I/O inputs of POSMO A to FB
pzdIn	IN	ARRAY [0..3] of BYTE	4(16#00)	Transfer I/O inputs of POSMO A to FB
enable	IN	BOOL	FALSE	Sets drive to ready for operation The drive is now ready for operation provided there are no faults.
homing	IN	BOOL	FALSE	Sets the home position This signal must be present for at least 50 ms.
releaseBrake [4]	IN	BOOL	FALSE	= TRUE: Release holding brake = FALSE: Brake sequence control effective
jog1	IN	BOOL	FALSE	Selection of jog 1 If jog 1 and 2 are set simultaneously, a warning is issued and the drive does not move.
jog2	IN	BOOL	FALSE	Selection of jog 2 If jog 1 and 2 are set simultaneously, a warning is issued and the drive does not move.
jogOverride [3]	IN	INT	20	Speed override of jogging (0 to 100%) The override can also be changed during travel.
veloOverride [3]	IN	INT	20	Velocity override (0 to 100%) This override can also be changed during travel.
start	IN	BOOL	FALSE	= edge FALSE → TRUE: The traversing block specified in **blockNumber** is started. Once a block has been selected in **blockNumber**, the **start** parameter cannot be set until the next block call.
singleBlock[4]	IN	BOOL	FALSE	= TRUE: Automatic single block. Each block has to be re-started. = FALSE: AUTOMATIC mode
enableRdIn[4]	IN	BOOL	TRUE	= TRUE: Read-in enable. Next block is enabled for execution. = FALSE: Read-in disable
extBlockChange [4]	IN	BOOL	FALSE	= Edge FALSE → TRUE: The active block is interrupted and the next block is selected. = FALSE: No external block change
noStopIntermediate	IN	BOOL	FALSE	= TRUE: No intermediate stop or block in intermediate stop is resumed = FALSE: Intermediate stop Interruption of current travel request**start** is not accepted
noStop	IN	BOOL	FALSE	= TRUE: No stop = FALSE: Stop Abort of current travel request If **start** parameter is set at the same time, **start** is not accepted.

Name	P type [1)]	Data type	Default	Meaning
blockNumber	IN	BYTE	16#00	Traversing block numbers 3 to 27 Single block or program **blockNumber** = 3 → MDI operation
resetError	IN	BOOL	FALSE	Acknowledges fault 1. Remedy cause of fault. 2. FALSE → TRUE edge 3. Parameter must remain set to TRUE until **driveError** = FALSE.
setStartInformation	IN	BYTE	16#00	Start byte Bit combination transmitted to the drive as an additional start requirement. [2)]
mdiMode [3)]	IN	BOOL	FALSE	= TRUE: MDI relative The value in the **mdiPosition** parameter is evaluated relative to the current position = FALSE: MDI absolute The value in the **mdiPosition** parameter is evaluated in absolute terms relative to the drive zero position set by homing.
mdiVelocity [3)]	IN	INT	0	Velocity of MDI travel (0 to 100%)
mdiAcceleration [3)]	IN	INT	0	Acceleration of MDI travel (0 to 100%)
mdiPosition [3)]	IN	REAL	0	Target position of MDI travel Value range: $-2 \cdot 10^5$ to $2 \cdot 10^5$
reqControl [4)]	IN	BOOL	FALSE	Control requested by the open-loop control p701 = 1: Message frame substitution active = TRUE: PROFIBUS data are taken over by the POSMO A = FALSE: Data from the PROFIBUS are frozen; the data last received are used p701 = 0: Message frame substitution inactive. Behavior as for POSMO A before software version V3.0
pkwOut	IN/OUT	ARRAY [0..7] of BYTE	-	Prepared FB data for I/O outputs of the POSMO A
pzdOut	IN/OUT	ARRAY [0..3] of BYTE	-	Prepared FB data for I/O outputs of the POSMO A
busy	IN/OUT	BOOL	-	Coordination of the FBs
ready	OUT	BOOL	FALSE	Drive ready for operation Logic operation: Status word bits 2 to 0 [2)]
active	OUT	BOOL	FALSE	= TRUE: Axis in motion
dataReady [4)]	OUT	BOOL	FALSE	Several cycles are required for the transfer , for example, of **mdiPosition** and **jogOverride** = TRUE: Data transfer completed (e.g. **mdiPosition**, **jogOverride**,...) = FALSE: Data transfer in progress (ramp-up time) or data transfer not yet started
statusWord	OUT	WORD	16#0000	Read out of status word [2)]
actBlockNumber	OUT	BYTE	16#00	Readout of current block number

Name	P type [1]	Data type	Default	Meaning
statusInformation	OUT	BYTE	16#00	Checkback signal byte Bit combination as additional status signal. [2]
driveWarning	OUT	BOOL	FALSE	A drive warning is pending (refer to parameter **driveWarnId**).
driveWarnId	OUT	WORD	16#0000	Reason for the warning Bit format Value corresponds to parameter 953 (warnings) [2]
driveWarnInfo [4]	OUT	WORD	16#0000	Warnings or supplementary information, corresponds to p954 of the POSMO A
driveError	OUT	BOOL	FALSE	A drive error is pending (refer to the **driveErrorId** parameter)
driveErrorId	OUT	WORD	16#0000	Reason for the error Bit format Value corresponds to parameter 947 (errors) [2]
error	OUT	BOOL	FALSE	= TRUE: Request completed with error (refer to the **errorID** parameter)
errorID	OUT	WORD	16#0000	Number of the parameter assignment error signaled by the drive (parameter identifier value (PKW) range) [2]

[1] Parameter types: IN = input parameter, OUT = output parameter, IN/OUT = in/out parameter

[2] See *Distributed Positioning Motor on PROFIBUS DP*user manual

[3] This parameter is only transferred when the value of the parameter changes.

[4] As of SIMOTION V4.1, this parameter is part of the **_POSMOA_control**FB and can only be operated with POSMO A as of software version V3.0.

Message frame substitution (POSMO A as of software version V3.0)

For specific applications it is necessary that under no circumstances the drive comes undesirably to a standstill or the drive state can be configured to "freeze" to run-down the master (SIMOTION device).

The "Message frame substitution" function can be activated with the reqControl input parameter using software version V3.0 or higher of the POSMO A, with parameter p701 = TRUE set.

The process data sent by the SIMOTION device are taken over by the POSMO A with reqControl = TRUE. When the transition from TRUE to FALSE occurs on the reqControl input parameter, the POSMO A uses the process data received most recently (control word, block selection and start byte). If parameter P701 = FALSE, the status of the reqControl input parameter is not evaluated.

Note

The "Message frame substitution" function takes immediate effect when p701 = 1.

Make sure that it is possible to shut down the drive at any time using an EMERGENCY STOP.

For additional information, refer to the SIMODRIVE POSMO A user manual, *Distributed Positioning Motor on PROFIBUS DP*.

Task integration (call)

The _POSMOA_control function block must be called cyclically in the BackgroundTask or in the TimerInterruptTask. Calling in the SystemInterruptTask is not permitted. Calling the function block in synchronous tasks (e.g. IPOSynchronousTask) is not recommended for runtime reasons.

Note

The functionality of the _POSMOA_control FB has been expanded with V4.1. To enable you to use the newly implemented functions, you must add the new input parameters when calling the _POSMOA_control FB. If you want to work with the previous functions (< V4.1), you can leave out the new input parameters with a detailed notation when calling the FB.

Error messages, faults and warnings

The TRUE value at the error output parameter indicates a parameterization error. The errorID output parameter provides more detailed information on the parameterization error that has occurred or has been signaled by POSMO A. Parameterization errors do not need to be acknowledged. Changed parameters (e.g. ramp-up time) can be transferred again.

Faults on the POSMO A are signaled in the driveError output parameter with the value TRUE. The reason for the fault can be read out in the driveErrorId output parameter (value corresponds to P947). Drive faults have to be acknowledged and must be reset in the resetError input parameter with the rising edge!

Warnings pending from the POSMO A and the associated information are output in the driveWarning, driveWarnId (value corresponds to P953) and driveWarnInfo (value corresponds to P954) output parameters.

2.3 Function block _POSMOA_nControl

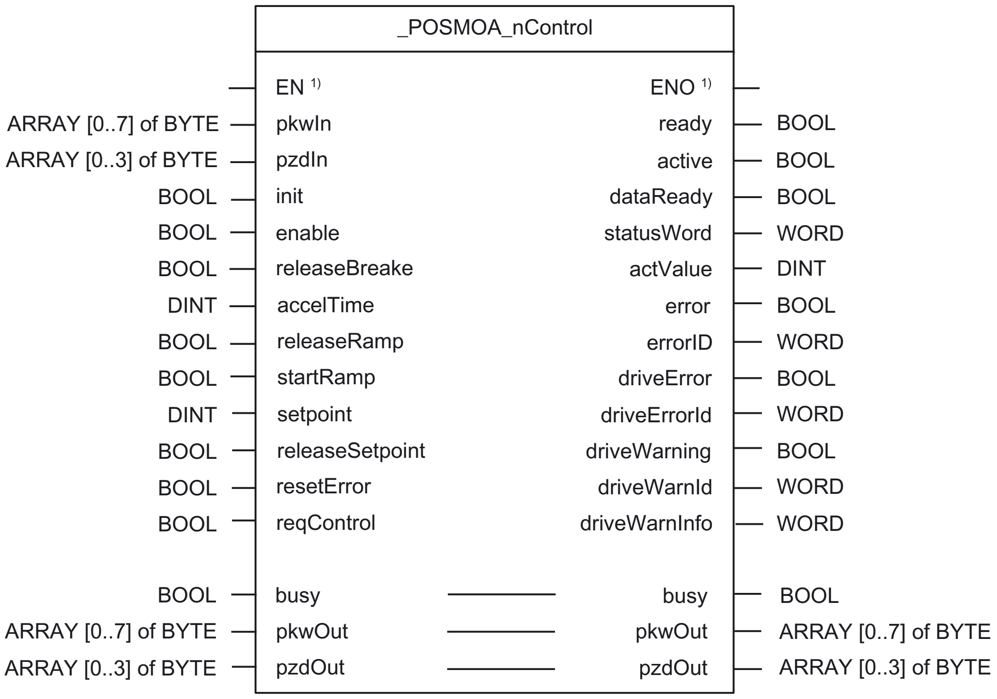
Task

You can control the connected SIMODRIVE POSMO A in speed-controlled mode with the **_POSMOA_nControl** function block.

Note

The **_POSMOA_nControl** function block is contained in SIMOTION SCOUT as of V4.1. The technology objects (TOs) cannot be used to operate the POSMO A via the speed setpoint interface.

Call (LAD representation)



1) LAD-specific parameters

Parameter description

Note

The **busy** parameter must **not** be overwritten by the user. It is supplied and checked by the function block, and must be supplied with a global variable created by the user only when the respective function block is called. This parameter coordinates the individual function blocks for the POSMO A. This ensures that no more than one function block can access a POSMO A at the same time.

Table 2- 2 Parameters of the _POSMOA_nControl function block

Name	P type 1)	Data type	Default	Meaning
pkwIn	IN	ARRAY[0..7] of BYTE	8(16#00)	Transfer I/O inputs of POSMO A to **_POSMOA_nControl** FB
pzdIn	IN	ARRAY[0..3] of BYTE	4(16#00)	Transfer I/O inputs of POSMO A to FB
init	IN	BOOL	FALSE	= TRUE: Sets the drive to "Ready to start" STW = 0x040E
enable	IN	BOOL	FALSE	= TRUE: Sets the drive to "Ready for operation" The drive is now ready for operation (provided there are no errors).
releaseBrake	IN	BOOL	FALSE	= TRUE: Release holding brake = FALSE: Brake sequence control effective
accelTime	IN	DINT	0	Ramp-up/ramp-down time [ms] During this time, the setpoint is adjusted in speed-controlled mode as follows: • Ramp-up: From zero to the maximum permissible actual speed • Ramp-down: From the maximum permissible actual speed to zero
releaseRamp	IN	BOOL	FALSE	= TRUE: Release ramp-function generator output
startRamp	IN	BOOL	FALSE	= Edge FALSE → TRUE: Start ramp-function generator
setpoint	IN	INT	0	Speed setpoint
releaseSetpoint	IN	BOOL	FALSE	Setpoint release = TRUE: Setpoint released
resetError	IN	BOOL	FALSE	Acknowledge error 1. Remedy cause of error 2. FALSE → TRUE edge 3. Parameter must remain set to TRUE until **driveError** = FALSE.
reqControl	IN	BOOL	FALSE	Control requested by the open-loop control p701 = 1: Message frame substitution active = TRUE: PROFIBUS data are taken over by the POSMO A = FALSE: Data from the PROFIBUS are frozen; the most recent data received are used p701 = 0: Message frame substitution inactive. Behavior as with POSMO A before software version V3.0
busy	IN/OUT	BOOL	-	Coordination of the function blocks
pkwOut	IN/OUT	ARRAY[0..7] of BYTE	-	Prepared FB data for I/O outputs of the POSMO A (parameter identifier value interface)
pzdOut	IN/OUT	ARRAY[0..3] of BYTE	-	Prepared FB data for I/O outputs of the POSMO A (process data interface)
ready	OUT	BOOL	FALSE	Drive ready for operation, AND operation: Status word bit 2, bit 1, bit 0
active	OUT	BOOL	FALSE	= TRUE: Drive traveling (n > 0)

Name	P type 1)	Data type	Default	Meaning
dataReady	OUT	BOOL	FALSE	Several cycles are required for transferring the ramp-up time, for example. Completion of the data transfer is indicated by a rising edge. = TRUE: Data transfer finished, data have been transferred = FALSE: Data transfer in progress (e.g. ramp-up time)
statusWord	OUT	WORD	16#0000	Display of status word
actValue	OUT	DINT	0	Actual speed
error	OUT	BOOL	FALSE	= TRUE: Request completed with error (refer to the **errorID** parameter)
errorID	OUT	WORD	16#0000	Number of the parameter assignment error signaled by the drive (parameter identifier value (PKW) range) 2)
driveError	OUT	BOOL	FALSE	Drive error is pending
driveErrorId	OUT	WORD	16#0000	Reason for the error Bit format Value corresponds to parameter 947 (errors) 2)
driveWarning	OUT	BOOL	FALSE	A drive warning is pending (refer to parameter **driveWarnId**).
driveWarnId	OUT	WORD	16#0000	Reason for the warning Bit format Value corresponds to parameter 953 (warnings) 2)
driveWarnInfo	OUT	WORD	16#0000	Supplementary information for warnings (for POSMO A, firmware version 1.4 and higher) Bit format The value corresponds to P954, (supplementary information for warnings)

1) Parameter types: IN = input parameter, OUT = output parameter, IN/OUT = in/out parameter

2) See *Distributed Positioning Motor on PROFIBUS DP*user manual

Function description

The POSMO A is set to the "ready to start" state (control word 0x040E) with the **TRUE** level on the **init** input parameter. The "ready to start" state is displayed in the output parameter **statusWord**, bit 0 = **TRUE**. When the transition from **FALSE** to **TRUE** level occurs at the input parameter **enable**, the drive is set to "ready for operation". The POSMO A changes to the "ready for operation" state, which can be read out on the output parameter **ready** = **TRUE**. Traversing is started when the input parameters **enableSetpoint** = **TRUE**, **enableRamp** = **TRUE**, (enable ramp-function generator) **execRamp** = **TRUE** (start ramp-function generator) with a positive edge, and **setpoint** > 0.

The order in which the input parameters **enable**, **enableSetpoint**, **enableRamp**, and **execRamp** are set for starting traversing is at the user's discretion. The input parameters specified above have equal status. Traversing stops when the input parameters **enable**, **enableSetpoint**, **enableRamp**, and **execRamp** are reset.

Transferring parameters (e.g. ramp-up time - input parameter **accelTime**) requires several task cycles. If a new value is parameterized at the **accelTime** input parameter, the output parameter **dataReady** is set to **FALSE**. Any pending parameter errors (output parameter **error** = **TRUE**) are reset. Data transfer is performed as soon as the in/out parameter **busy** = **FALSE**. If data transmission was active when the **accelTime** input parameter was newly parameterized (e.g. read parameter with **_POSMOA_rwParameter** FB), data transfer is suspended until **busy** = **FALSE**. The value which was parameterized when **busy** = **TRUE** changed to **busy** = **FALSE** at the input parameter **accelTime** is transferred. Completion of data transfer is displayed with a rising edge at the output parameter **dataReady** and stays at **TRUE** until the next data transfer is started.

Message frame substitution (POSMO A, software version V3.0 and higher)

With certain applications, it is essential that the drive be prevented from coming to an undesirable standstill under all circumstances, or that "freezing" of the drive status can be configured for the purpose of shutting down the master (SIMOTION device).

The "Message frame substitution" function can be activated with the **reqControl** input parameter as of software version V3.0 of the POSMO A with set parameter **p701** = **TRUE**.

The process data sent by the SIMOTION device are taken over by the POSMO A with **reqControl** = **TRUE**. With the transition from **TRUE** to **FALSE** on the **reqControl** input parameter, the POSMO A uses the process data received last (control word, block selection and start byte). If parameter **P701** = **FALSE**, the status of the **reqControl** input parameter is not evaluated.

Note

The "Message frame substitution" function takes effect immediately with p701 = 1!

Make sure that the drive can be shut down at any time by an EMERGENCY STOP.

For more information, refer to the SIMODRIVE POSMO A user manual, *Distributed Positioning Motor on PROFIBUS DP*.

Graphical overview of the functionality

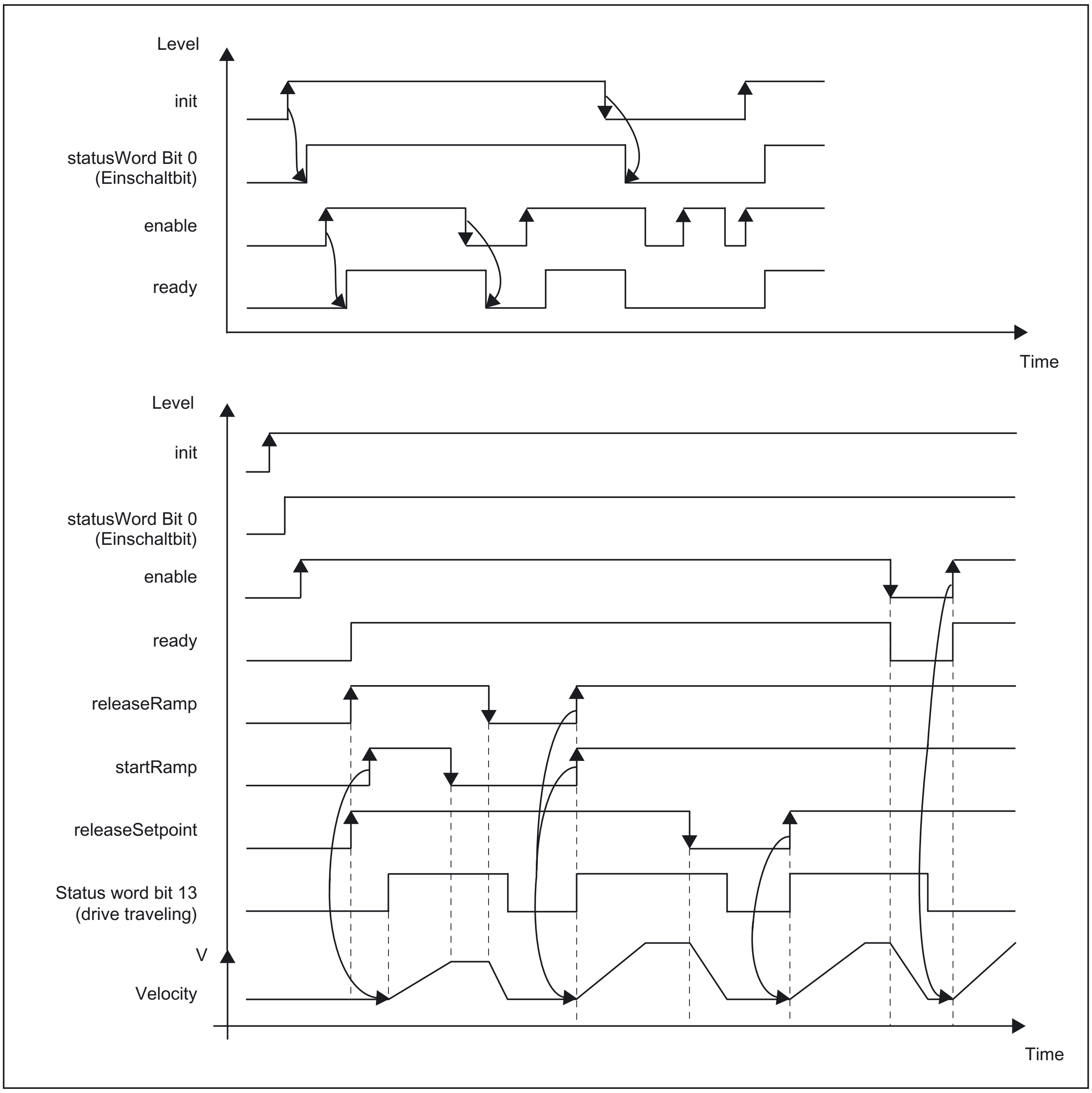


Figure 2-1 Signal propagation diagram

Task integration (call)

The **_POSMOA_nControl** function block must be called cyclically in the **BackgroundTask** or in the **TimerInterruptTask**. Calling in the **SystemInterruptTask** is not permitted. Calling the function block in synchronous tasks (e.g. **IPOSynchronousTask**) is not recommended for runtime reasons.

Error messages, errors, and warnings

The **TRUE** value at the **error** output parameter indicates a parameterization error. The **errorID** output parameter provides more detailed information on the parameterization error that has occurred. Parameterization errors do not need to be acknowledged. Parameters that have been changed (e.g. ramp-up time) can be transferred again.

Errors in the POSMO A are signaled in the **driveError** output parameter with the value **TRUE**. The reason for the error can be read out in the **driveErrorId** output parameter (value corresponds to P947). Drive errors have to be acknowledged and must be reset in the **resetError** input parameter with a rising edge.

Warnings from the POSMO A that are pending, and their associated information, are output in the **driveWarning**, **driveWarnId** (value corresponds to P953), and **driveWarnInfo** (value corresponds to P954) output parameters.

2.4 Function block _POSMOA_rwParameter

Task

The **_POSMOA_rwParameter** function block enables parameters to be assigned for the connected SIMODRIVE POSMO A.

The functions are as follows:

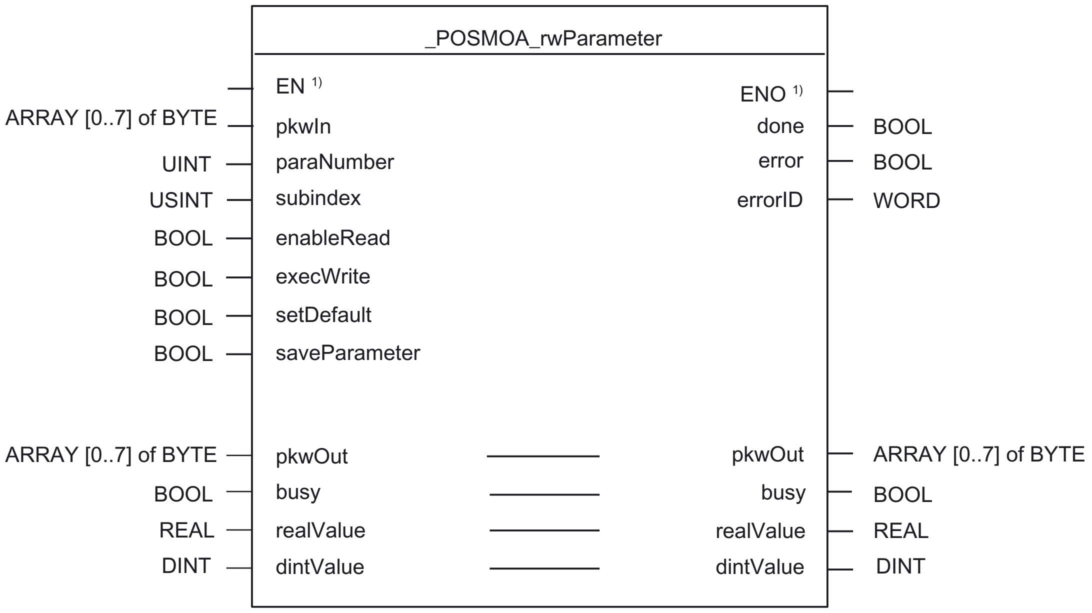
- Reading a parameter: Provides the value of the specified parameter.
- Writing a parameter value: Sets the specified parameter to the specified value.
- Loading factory settings: Resets the parameter configuration to the factory settings.
- Saving a parameter: Saves the current parameter configuration in non-volatile memory.

The following parameters can be read/written with this function block:

Parameter numbers	Read from POSMO A	Write to POSMO A (positioning mode)	Write to POSMO A (speed-controlled mode)
1...5	Yes	Yes	Yes
6...7	Yes	Yes	No
9...23	Yes	Yes	Yes
24	Yes	Yes	No
25...38	Yes	Yes	Yes
39...53	Yes	No	No
54	Yes	Yes	Yes
55	Yes	No	No
56...61	Yes	Yes	Yes
62	Yes	No	No
80:28...87:28	Yes	Yes	Yes
99:21	Yes	Yes	Yes
100	Yes	Yes	No
101:11	Yes	Yes	No
700 1)	Yes	Yes	Yes
701 1)	Yes	Yes	Yes
880 1)	Yes	Yes	Yes
918...928	No	No	No
930	Yes	No	No
947...954	No	No	No
964:8	Yes	No	No
967...990:78	No	No	No
1426 1)	Yes	Yes	Yes
1427 1)	Yes	Yes	Yes

1) This parameter is new or extended with SIMOTION V4.1.

Call (LAD representation)



1) LAD-specific parameters

Parameter description

Note

The SIMOTION identifiers have changed as of V4.0.

You can find a comparison of SIMOTION and SIMATIC names in the Appendix SIMOTION and SIMATIC names (Page 51).

The **busy** parameter must **not** be overwritten by the user. It is supplied and checked by the function block, and must be supplied with a global variable created by the user only when the respective function block is called. This parameter coordinates the individual function blocks for the POSMO A. This ensures that no more than one function block can access a POSMO A at the same time.

Table 2- 3 Parameters of the _POSMOA_rwParameter function block

Name	P type 1)	Data type	Default	Meaning
pkwIn	IN	ARRAY [0..7] of BYTE	8(16#00)	Transfer I/O inputs of POSMO A to FB
paraNumber	IN	UINT	0	Parameter number to be read or written
subindex	IN	USINT	0	Subindex = 0 for parameters with no index This value is the array index for parameters with an array. 2)
enableRead	IN	BOOL	FALSE	= TRUE: Reads parameter cyclically = edge FALSE → TRUE: Reads parameter one time
execWrite	IN	BOOL	FALSE	= edge FALSE → TRUE: Writes parameter When set simultaneously with **enableRead**, read is executed.
setDefault	IN	BOOL	FALSE	= edge FALSE → TRUE: Loads factory settings When set simultaneously with **enableRead**, read is executed.
saveParameter	IN	BOOL	FALSE	= edge FALSE → TRUE: Saves parameter When set simultaneously with **enableRead**, read is executed.
pkwOut	IN/OUT	ARRAY [0..7] of BYTE	-	Prepared FB data transferred to the I/O outputs of the POSMO A
busy	IN/OUT	BOOL	-	Coordination of the FBs
realValue	IN/OUT	REAL	-	Write → value to be written (data types C4 and N2) 2) Read → value to be read (data types C4 and N2) 2)
dintValue	IN/OUT	DINT	-	Write → value to be written (data types I2, T2, V2 and T4) 2) Read → value to be read (data types I2, T2, V2 and T4) 2)
done	OUT	BOOL	FALSE	= TRUE: When current request has been completed = FALSE: There is no request pending, or a request is being executed.
error	OUT	BOOL	FALSE	= TRUE: Request completed with error (refer to the **errorID** parameter)
errorID	OUT	WORD	16#0000	Number of the parameter assignment error signaled by the drive (parameter identifier value (PKW) range) 2)

1) Parameter types: IN = input parameter, OUT = output parameter, IN/OUT = in/out parameter
2) See *Distributed Positioning Motor on PROFIBUS DP* user manual

Task integration (call)

The **_POSMOA_rwParameter** function block must be called cyclically in the **BackgroundTask** or in the **TimerInterruptTask**. Calling in the **SystemInterruptTask** is not permitted. Calling the function block in synchronous tasks (e.g. **IPOSynchronousTask**) is not recommended for runtime reasons.

Fault messages

The **TRUE** value at the **error** output parameter indicates a parameterization error. The **errorID** output parameter provides more detailed information on the parameterization error that has occurred or has been signaled by POSMO A. Parameterization errors do not need to be acknowledged. Changed parameters (e.g. ramp-up time) can be transferred again.

2.5 Function block _POSMOA_rwAllParameter

Task

The **_POSMOA_rwAllParameter** function block enables reading and writing of the parameter block of the connected SIMODRIVE POSMO A.

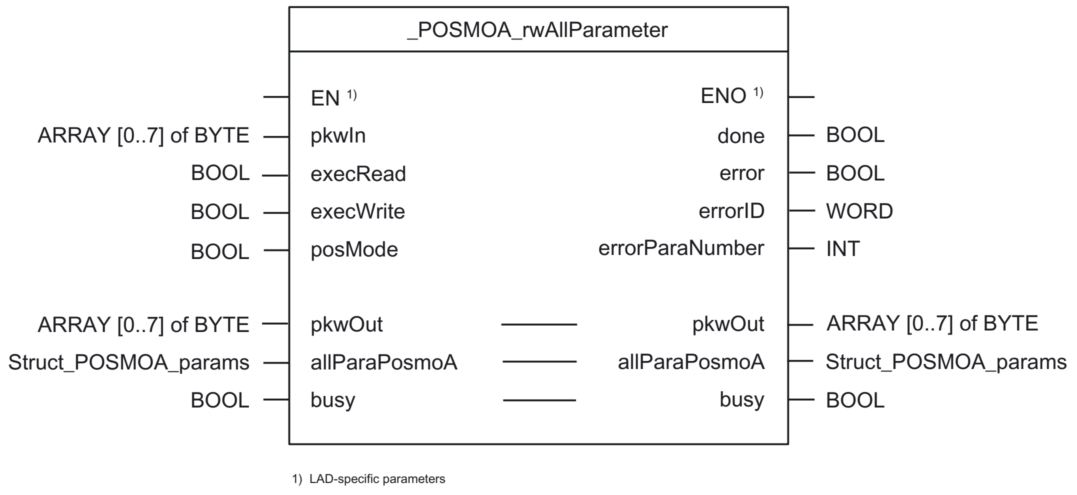
The data to be read or written are saved in a variable created by the user with the **Struct_POSMOA_params** data structure when the associated function block instance is called.

The following parameters are read/written with this function block:

Parameter numbers	Read from POSMO A	Write to POSMO A (positioning mode)	Write to POSMO A (speed-controlled mode)
1...5	Yes	Yes	Yes
6...7	Yes	Yes	No
9...23	Yes	Yes	Yes
24	Yes	Yes	No
25...38	Yes	Yes	Yes
39...53	Yes	No	No
54	Yes	Yes	Yes
55	Yes	No	No
56...61	Yes	Yes	Yes
62	Yes	No	No
80:28...87:28	Yes	Yes	Yes
99:21	Yes	Yes	Yes
100	Yes	Yes	No
101:11	Yes	Yes	No
700 1)	Yes	Yes	Yes
701 1)	Yes	Yes	Yes
880 1)	Yes	Yes	Yes
918...928	No	No	No
930	Yes	No	No
947...954	No	No	No
964:8	Yes	No	No
967...990:116	No	No	No
1426 1)	Yes	Yes	Yes
1427 1)	Yes	Yes	Yes

1) This parameter is new or extended with SIMOTION V4.1.

Call (LAD representation)



Parameter description

Note

The SIMOTION identifiers have changed as of V4.0.

You can find a comparison of SIMOTION and SIMATIC names in the Appendix SIMOTION and SIMATIC names (Page 51).

The **busy** parameter must **not** be overwritten by the user. It is supplied and checked by the function block, and must be supplied with a global variable created by the user only when the respective function block is called. This parameter coordinates the individual function blocks for the POSMO A. This ensures that no more than one function block can access a POSMO A at the same time.

Table 2- 4 Parameters of the _POSMOA_rwAllParameter function block

Name	P type [1)]	Data type	Default	Meaning
pkwIn	IN	ARRAY [0..7] of BYTE	8(16#00)	Transfer I/O inputs of POSMO A to FB
execRead	IN	BOOL	FALSE	= edge FALSE → TRUE: Reads all data one time The start takes place on a positive edge.
execWrite	IN	BOOL	FALSE	= edge FALSE → TRUE: Writes all data one time The start takes place on a positive edge.
posMode [3)]	IN	BOOL	TRUE	= TRUE: Positioning mode of the POSMO A = FALSE: Speed-controlled mode
pkwOut	IN/OUT	ARRAY [0..7] of BYTE	-	Prepared FB data for I/O outputs of the POSMO A
allParaPosmoA	IN/OUT	Struct_POSMOA_params	-	Data structure for all parameters of the POSMO A
busy	IN/OUT	BOOL	-	Coordination of the FBs
done	OUT	BOOL	FALSE	= TRUE: When current request has been completed = FALSE: There is no request pending, or a request is being executed.
error	OUT	BOOL	FALSE	= TRUE: Request completed with error (refer to the **errorID** parameter)
errorID	OUT	WORD	16#0000	Number of the parameter assignment error signaled by the drive (parameter identifier value (PKW) range) [2)]
errorParaNumber	OUT	INT	0	Number of the parameter that caused the error [2)]

1) Parameter types: IN = input parameter, OUT = output parameter, IN/OUT = in/out parameter

2) See *Distributed Positioning Motor on PROFIBUS DP*user manual

3) As of SIMOTION V4.1, this parameter is part of the **_POSMOA_rwAllParameter** FB and can only be operated with POSMO A software version 3.0 and higher.

Data structure of Struct_POSMOA_params

The data structure of type **Struct_POSMOA_params** contains all of the parameters for controlling the SIMODRIVE POSMO A.

This data structure is used by the **_POSMOA_rwAllParameter** function block. Self-defined variables of data type **Struct_POSMOA_params** are used to access data structure elements.

The following table contains the **Struct_POSMOA_params** data structure.

Note

The SIMOTION identifiers have changed as of V4.0.

You can find a comparison of SIMOTION and SIMATIC names in the Appendix SIMOTION and SIMATIC names (Page 51).

Table 2- 5 Data structure of Struct_POSMOA_params

Name	Type	Initial value	Comment	r/w [1)]
p1	REAL	0.0	Linear/rotary axis	r/w
p2	REAL	10.0	Travel per gear revolution	r/w
p3	REAL	1.0	Gear reduction factor	r/w
p4	INT	0	Unit of measure	r/w
p5	REAL	0.0	Position at home position	r/w
p6	REAL	-200000.0	Start of software limit switch	r/w
p7	REAL	200000.0	End of software limit switch	r/w
p8	REAL	3000.0	Maximum rotation speed	r/w
p9	INT	10	Rampup time	r/w
p10	DINT	30000	Maximum velocity	r/w
p11	REAL	2.0	Target area	r/w
p12	REAL	20000.0	Maximum following error	r/w
p13	DINT	50	Monitoring time	r/w
p14	REAL	20000.0	Zero speed area	r/w
p15	REAL	0.0	Backlash on reversal compensation	r/w
p16	REAL	9.0	Maximum overcurrent	r/w
p17	DINT	20	P-gain of speed controller	r/w
p18	INT	22	Integral time of speed controller	r/w
p19	REAL	1.0	K_V factor	r/w
p20	REAL	30.0	Current setpoint smoothing	r/w
p21	REAL	2.0	Rotation speed setpoint smoothing	r/w
p22	REAL	1000.0	Maximum acceleration	r/w
p23	DINT	0	Jerk time constant	r/w
p24	INT	100	Override	r/w
p25	INT	100	Acceleration override	r/w
p26	INT	20	Rotation speed override for jogging	r/w
p27	INT	50	Acceleration override for jogging	r/w
p28	REAL	9.0	Maximum current	r/w
p29	DINT	12000	Electronics temperature tolerance time	r/w
p30	INT	0	Interference suppression	r/w
p31	INT	0	Terminal 1 function	r/w
p32	INT	0	Terminal 2 function	r/w
p33	DINT	0	Address for measurement output 1	r/w
p34	INT	7	Shift factor for measurement output 1	r/w
p35	INT	128	Offset for measurement output 1	r/w
p36	DINT	0	Address for measurement output 2	r/w
p37	INT	0	Shift factor for measurement output 2	r/w
p38	INT	128	Offset for measurement output 2	r/w
p39	REAL	0.0	Position reference value	r
p40	REAL	0.0	Actual position value	r
p41	REAL	0.0	Speed setpoint	r

Name	Type	Initial value	Comment	r/w 1)
p42	REAL	0.0	Actual speed	r
p43	REAL	0.0	Current setpoint	r
p44	REAL	0.0	Actual current value	r
p45	DINT	0	Timer status	r
p46	REAL	0.0	Following error	r
p47	REAL	0.0	Electronics temperature	r
p48	INT	0	Current traversing block number	r
p49	INT	0	Subsequent block number	r
p50	DINT	0	Speed setpoint	r
p51	DINT	0	Actual velocity value	r
p52	DINT	0	HW version	r
p53	DINT	0	Firmware version	r
p54	DINT	5	P-gain of speed controller zero speed	r/w
p55	REAL	0.0	Signal position	r
p56	INT	0	Operating position	r/w
p57	DINT	20	P-gain of stop controller zero speed (HW Version F and higher)	r/w
p58	DINT	100	Holding brake release time	r/w
p59	REAL	10.0	Holding brake closure speed	r/w
p60	DINT	400	Holding brake deceleration time	r/w
p61	DINT	100	Holding brake controller disable time	r/w
p62	REAL	0.0	Measuring position	r
p80	ARRAY[0..27] of Array_POSMOA_prgCtrlInfo		Traversing blocks 1 to 27 see Table "Structure of Array_POSMOA_prgCtrlInfo"	r/w
p81	ARRAY[0..27] of REAL	28(0.0)	Target position for traversing blocks 1 to 27	r/w
p82	ARRAY[0..27] of INT	28(100)	Velocity or speed for traversing blocks 1 to 27	r/w
p83	ARRAY[0..27] of INT	28(100)	Acceleration for traversing blocks 1 to 27	r/w
p84	ARRAY[0..27] of DINT	28(0)	Timer value for traversing blocks 1 to 27	r/w
p85	ARRAY[0..27] of REAL	28(0.0)	Signaling position for traversing blocks 1 to 27	r/w
p86	ARRAY[0..27] of INT	28(0)	SMStart MMStart for traversing blocks 1 to 27	r/w
p87	ARRAY[0..27] of INT	28(0)	MMStop MMPos for traversing blocks 1 to 27	r/w
p99	ARRAY[0..20] of INT	13,18,23,0,0,0,0,0,0, 0,0,0,0,0,0,0,0,0,0,0	Program management (see *Distributed Positioning Motor on PROFIBUS DP* user manual)	r/w
p100	INT	0	Control word simulation	r/w
p101	ARRAY[0..10] of INT	10(0)	Blocks 1 to 10 of the data structure for the POSMO A parameters	r/w
p700 2)	INT	2	Operating mode 1 = speed-controlled mode 2 = positioning mode	r/w
p701 2)	INT	0	Message frame substitution	r/w
p880 2)	REAL	4096	Normalizing of the speed at the gear output when a setpoint of 4096 decimal is specified via the control word (STW)	r/w

Name	Type	Initial value	Comment	r/w [1]
p930	INT	0	Current mode 1 = speed-controlled mode 2 = positioning mode	r
p964	ARRAY[0..7] of INT	8(0)	Drive identification	r
p1426 [2]	REAL	100	Tolerance band for actual speed value	r/w
p1427 [2]	INT	0	Delay time for "Ramp-up completed" signal	r/w

[1] r - read, w - write

[2] This parameter is new or extended with SIMOTION V4.1.

Structure of "Array_POSMOA_prgCtrlInfo"

"Array_POSMOA_prgCtrlInfo" contains the program control word. Here, you can define the behavior of a traversing block (see *Distributed Positioning Motor on PROFIBUS DP* user manual).

Table 2- 6 Structure of Array_POSMOA_prgCtrlInfo

Array element	Data type	Initial value	Comment
0	BOOL	TRUE	Type of motion
1	BOOL	TRUE	Type of positioning
2	BOOL	FALSE	Type of timer
3	BOOL	FALSE	Connection between timer and start byte
4	BOOL	FALSE	Program return
5	BOOL	FALSE	Type of traversing
6	BOOL	FALSE	Invert start byte condition
7	BOOL	FALSE	SM start type
8	BOOL	FALSE	Program stop
9	BOOL	FALSE	Set actual value

Task integration (call)

The **_POSMOA_rwAllParameter** function block must be called cyclically in the **BackgroundTask** or in the **TimerInterruptTask**. Calling in the **SystemInterruptTask** is not permitted. Calling the function block in synchronous tasks (e.g. **IPOSynchronousTask**) is not recommended for runtime reasons.

Note

The functionality of the **_POSMOA_rwAllParameter** FB has been expanded with V4.1. To enable you to use the newly implemented functionality, you must add the new **posMode** input parameter when calling the **_POSMOA_rwAllParameter** FB.

If you want to work with the previous functionality (< V4.1), you can leave out the new input parameter with a detailed notation when calling the FB.

Fault messages

The **TRUE** value at the **error** output parameter indicates a parameterization error. The **errorID** output parameter contains more detailed information on the parameterization error that has occurred or has been signaled by POSMO A. The **errorParaNumber** output parameter supplies the number of the parameter that has caused the error.

Parameterization errors do not need to be acknowledged. Changed parameters (e.g. ramp-up time) can be transferred again.

2.6 Calling function blocks

In order to be able to work with the function blocks in your user program, proceed as follows (The numbers shown in the following program segment correspond to the steps below.):

1. Create the function block instances (see the following program segment, e.g. create instance for the **_POSMOA_control** function block).
2. Create a variable for the data structure (for FB **_POSMOA_rwAllParameter** only).
3. Create an array for the in/out parameters of the FB.
4. Call instance of the function block.
5. Transfer input parameters.
6. The output parameters of the FB are accessed with <instance name of FB>. <name of output parameter>.
7. Data prepared by the FB for the I/O outputs are assigned to the I/O variables from the array created in step 3 (see the following program segment).

Note

If you want to control more than one SIMODRIVE POSMO A, you must create a new variable for the data structure (FB **_POSMOA_rwAllParameter**) and FB instances with new names for each POSMO A you use.

Call example

```
UNIT E_posmoA;
INTERFACE

// Definition of global variables for demo program
 VAR_GLOBAL
  myPosmoAControl  : _POSMOA_control;   // create "_POSMOA_control" instance              (1)
  myEnable         : BOOL;              // enable posmoA
  myHoming         : BOOL;              // homing posmoA
  myJogPositive    : BOOL;              // jog positive posmoA
  myJogNegative    : BOOL;              // jog negative posmoA
  myBusy           : BOOL;              // coordination bit
  myError          : BOOL;              // variable created by user for accessing
                                        // an output variable of the function block
 END_VAR

 PROGRAM ExamplePosmoA;                 // Program of BackgroundTask
END_INTERFACE
IMPLEMENTATION

PROGRAM ExamplePosmoA                   // Program of BackgroundTask
  VAR
  //    temporary array for outputs of FBs                                                (3)
        tmpPkwOutput : ARRAY[0..7] of BYTE;
        tmpPzdOutput : ARRAY[0..3] of BYTE;
  END_VAR

// INSTANCE CALL of FB _POSMOA_control                                                    (4)
    myPosmoAControl  (    pkwIn    := myPkwIn,                                            (5)
                          pzdIn    := myPzdIn,
                          enable   := myEnable,
                          homing   := myHoming,
                          jog1     := myJogNegative,
                          jog2     := myJogPositive,
                          busy     := myBusy,
                          pkwOut   := tmpPkwOutput,
                          pzdOut   := tmpPzdOutput
                     );
// an output variable in the "_POSMOA_control" function block is assigned to a           (6)
// "myError" variable created by the user.
    myError := myPosmoAControl.error;

// Assignment of intermediate buffer byte arrays to I/O addresses
    myPkwOut := tmpPkwOutput;                                                             (7)
    myPzdOut := tmpPzdOutput;

END_PROGRAM             // ExamplePosmoA
END_IMPLEMENTATION
```

Note

The ExamplePosmoA program must be assigned in the execution system.

Application example 3

3.1 General information on the application example

Task

The application example shows how POSMO A can be controlled with the help of the function blocks and how POSMO A drive parameters can be read and written.

Ther is a command interface **enumCommands** for starting the desired action, e.g. jogging.

The **Struct_checkbacks** data structure shows the status of the actions and additional information.

The following operating modes and functionalities are implemented:

- Homing

  Option: "Approach using visual axis marking and assign actual value"
- Jogging

  Move in positive or negative direction
- MDI

  Travel to the required position
- Parameter handling
  - Write or read individual parameters
  - Save all parameters in the EEPROM of the POSMO A
- Read out current actual position
- The current actual position of the POSMO A is read cyclically in jog mode and in MDI and stored in a variable.

Hardware platform

The application example is available for various SIMOTION hardware platforms.

Note

If the application example is not available for your SIMOTION hardware platform, you must adapt the hardware configuration.

Adapting the application example

The configuration in the example and its available hardware must be adapted.

The following options are available:

1. The configuration in the example can be adapted to suit the available hardware (commission drive, PROFIBUS DP address).
2. The hardware configuration can be adapted to the example (commission drive, PROFIBUS DP address).

Note

Please observe the drive documentation when commissioning the drive.
This documentation is included in the SIMOTION SCOUT scope of delivery in electronic format.

Calling the application example

The application example can be found on the "SIMOTION Utilities & Applications" CD-ROM. The "SIMOTION Utilities & Applications" CD-ROM is provided free of charge and part of the SIMOTION SCOUT scope of delivery.

1. De-archive and open the project containing the application example.
2. Check the hardware configuration: PROFIBUS DP addresses.
3. Save and compile the example project. You can then download the example to the SIMOTION device and switch to **RUN** mode.

Additional handling steps for the example are carried out using the Enums in the symbol browser within the **myCommand** structure. This requires that the "E_posmoA" element be selected from the **Programs** container in the project navigator. Values from the "Control value" column are assigned to the corresponding variables by clicking **Immediate control**.

Error messages

Pending errors and warnings (for example, reading during jogging or of individual parameter) are displayed in the following variables:

- myCheckbacks.error = TRUE
  An error has occurred (request canceled; a POSMO A error is pending).
- myCheckbacks.ctrlErrorID
  Error specification of the **_POSMOA_control**
  function block. Number of the parameter assignment error signaled by POSMO A.
- myCheckbacks.driveErrorID
  Error specification of POSMO A
  Reason for an error signaled by POSMO A
- myCheckbacks.rwErrorID
  Error specification of the **_POSMOA_rwParameter**
  function block. Error has occurred during reading or writing.
- myCheckbacks.driveWarning = TRUE
  POSMO A warning is pending.
- myCheckbacks.driveWarningID = TRUE
  Warning number of an alarm signaled by POSMO A.

3.2 Operator control and monitoring of the application example in the detail view

POSMO A will be automatically initialized when your SIMOTION hardware platform changes from STOP to RUN mode. The POSMO A provides feedback that the drive is ready to operate with the following variable:

- myCheckbacks.driveReady = TRUE

Select operating mode

You can choose between "Jog", "Homing", "MDI", or "Parameter handling" modes. This is done via the **myCommand** variable.

"Jog" mode

In the "Jog" mode, the POSMO A can be moved in positive and negative direction. "Jogging" is implemented with the following parameter settings on the instance created of the **_POSMOA_control** function block:

• jogOverride = 100	
• veloOverride = 100	
• noStopIntermediate = TRUE	No intermediate stop
• noStop = TRUE	No stop

In the "Control value" column of the symbol browser, select the check boxes for the following variables and select the values to be assigned.

• myCommand = START_JOG_POSITIVE	Jogging in positive direction
• myCommand = START_JOG_NEGATIVE	Jogging in negative direction

Clicking on **Immediate control** assigns the value to the variable, and the POSMO A is moved in the respective direction.
The current "Jog" state can be read in the symbol browser as follows:

- myCheckbacks.actCommand = JOG_POSITIVE_ACTIVE
  Jogging in positive direction activated
- myCheckbacks.actCommand = JOG_NEGATIVE_ACTIVE
  Jogging in negative direction activated
- myCheckbacks.jogPositiveBusy = TRUE
  POSMO A moves in position direction
- myCheckbacks.jogNegativeBusy = TRUE
  POSMO A moves in negative direction

The current actual position of POSMO A can be read in the symbol browser in the **myCheckbacks.actPosition** variable.

Note
The "Jog" mode may be terminated only after the POSMO A is stopped (myCommand = STOP)!

"Homing" mode

The "approach using visual axis marking and assign actual value" options have been implemented. For homing, POSMO A must be switched to closed-loop control and zero speed. The actual value (parameter 40 of POSMO A) can be set via the "Parameter handling", write individual parameter operating mode.

In the "Control value" column of the symbol browser, select the check boxes for the following variables and select the values to be assigned.

- myCommand = START_HOMING

Clicking Immediate control assigns the value to the variable, and the POSMO A is homed to the value set in parameter 40 of POSMO A.

Note

For more information on the homing of the POSMO A, refer to the *Distributed Positioning Motor on PROFIBUS DP* user manual.

This documentation is included in the SIMOTION SCOUT scope of delivery as electronic documentation!

The current "Homing" state can be read in the symbol browser as follows:

- myCheckbacks.actCommand = HOMING_ACTIVE
  Homing activated
- myCheckbacks.actCommand = NO_COMMAND_ACTIVE
  myCheckbacks.done = TRUE
  Homing completed without error

"MDI" mode

Requirement: The POSMO A is homed!

In the "MDI" mode, one MDI block absolute can be moved.

"Jogging" of the MDI block is implemented with the following parameter settings on the instance created of the **_POSMOA_control** function block:

• mdiMode = FALSE	MDI absolute
• mdiVelocity = 100	
• mdiAcceleration = 100	
• veloOverride = 100	
• noStopIntermediate = TRUE	No intermediate stop
• noStop = TRUE	No stop

The target position of the MDI block is specified in the **myAbsolutePosition** variable.

In the "Control value" column of the symbol browser, select the check boxes for the following variables and select the values to be assigned.

- myCommand = START_MDI_BLOCK_ABSOLUTE
- myAbsolutePosition = ... The target position of the MDI block is specified here.

  (Default = 0.0)

Clicking on **Immediate control** assigns the values to the variables, and the POSMO A moves the MDI block absolute.

The current state of the "MDI" mode can be read in the symbol browser as follows:

- myCheckbacks.actCommand = MDI_BLOCK_ACTIVE

  Move MDI block absolute activated
- myCheckbacks.actCommand = NO_COMMAND_ACTIVE
- myCheckbacks.done = TRUE
- myCheckbacks.positionReached = TRUE

  MDI block traversed without error

The current actual position of POSMO A can be read in the symbol browser, from the **myCheckbacks.actPosition** variable.

Note

The "MDI" mode may be terminated only after the POSMO A is stopped (myCommand = STOP)!

"Parameter handling" mode

In the "Parameter handling" mode you can read and write individual parameters and save all parameters in the EEPROM of POSMO A.

Read individual parameter

In the **myRdParaNumber** variable you state the parameter you want to read. In the **myRdSubIndex** variable, you state the subindex for the parameter you wish to read (indexed parameters only). In the "Control value" column of the symbol browser, select the check boxes for the following variables and select the values to be assigned.

- myCommand = READ_ONE_PARAMETER

  Read individual parameter
- myRdParaNumber = ...

  You state the number of the parameter to be read here.
- myRdSubIndex = ...

  You state the subindex of the parameter to be read here (for indexed parameters only)

The value read is saved in the **myReadValue** variable.

Write individual parameter

In the **myWrParaNumber** variable you state the parameter you want to write. In the **myWrSubIndex** variable, you state the subindex for the parameter you wish to write (indexed parameters only). In the **myWrRealValue** variable (data types C4 and N2) [2)] or **myWrDintValue** (data types I2, T2, V2, and T4) [2)], you state the value for the parameter to be written. In the "Control value" column of the symbol browser, select both the check boxes for the following variables and the values to be assigned.

- myCommand = WRITE_ONE_PARAMETER

  Write individual parameter
- myWrParaNumber = ...

  You state the number of the parameter to be written here.
- myWrSubIndex = ...

  You state the subindex of the parameter to be written here (for indexed parameters only)
- myWrRealValue = ...

  You state the value of the parameter to be written here (data types C4 and N2) [2)].
- myWrDintValue = ...

  Here, you state the value of the parameter to be written (data types I2, T2, V2, and T4) [2)].

[2)] Refer to the *Distributed Positioning Motor on PROFIBUS DP* user manual.
This documentation is included in the SIMOTION SCOUT scope of delivery as electronic documentation!

Saving all parameters in the EEPROM

In the "Control value" column of the symbol browser, select the check boxes for the following variables and select the values to be assigned.

Clicking **Immediate control** assigns the value to the variable; this activates saving of all parameters in the EEPROM.

• myCommand = SAVE_PARAMETER	Saving all parameters in the EEPROM

The current "Parameter handling" state can be read in the symbol browser as follows:

- myCheckbacks.actCommand = READ_PARA_ACTIVE

  Read individual parameter activated
- myCheckbacks.actCommand = WRITE_PARA_ACTIVE

  Write individual parameter activated
- myCheckbacks.actCommand = SAVE_PARAMETER_ACTIVE

  Save all parameters of the POSMO A activated
- myCheckbacks.actCommand = NO_COMMAND_ACTIVE

  myCheckbacks.done = TRUE

  Parameter handling completed without error

Acknowledging faults on POSMO A

Faults on POSMO A are acknowledged as follows:

- myCommand = RESET_ERRORS

The current fault acknowledgement state can be read in the symbol browser as follows:

- myCheckbacks.actCommand = RESET_ERRORS_ACTIVE

  Fault acknowledgement active
- myCheckbacks.actCommand = NO_COMMAND_ACTIVE

  myCheckbacks.done = TRUE

  Fault acknowledgement completed

Note

A POSMO A fault can only be acknowledged successfully when the cause of the error no longer exists.

3.3 Variables used in application example

Table 3- 1 Overview of the variables used

Symbol	Data type	Initial value	Meaning
myCommand	enumCommands	NO_COMMAND	Command interface
myCheckbacks	Struct_Checkbacks	NO_COMMAND_ACTIVE	Command status Additional information

Table 3- 2 Overview of the enums enumCommands

Symbol	Enum Value	Meaning
START_HOMING	0	Start homing of POSMO A
START_JOG_NEGATIVE	1	Start jogging in negative direction
START_JOG_POSITIVE	2	Start jogging in positive direction
START_MDI_BLOCK_ABSOLUTE	3	Start moving MDI block absolute
STOP	4	Stop all actions
RESET_ERRORS	5	Acknowledge faults on POSMO A
READ_ONE_PARAMETER	6	Start reading individual parameter
WRITE_ONE_PARAMETER	7	Start writing individual parameter
SAVE_PARAMETER	8	Save all parameters in the EEPROM of POSMO A
NO_COMMAND	9	No action to be carried out

Table 3- 3 Overview of the enums enumActCommand

Symbol	Enum Value	Meaning
HOMING_ACTIVE	0	Homing of POSMO A activated
JOG_NEGATIVE_ACTIVE	1	Jogging in negative direction activated
JOG_POSITIVE_ACTIVE	2	Jogging in positive direction activated
MDI_BLOCK_ACTIVE	3	Moving MDI block absolute activated
STOP_ACTIVE	4	Stop all actions activated
RESET_ERRORS_ACTIVE	5	Acknowledge faults on POSMO A active
READ_PARA_ACTIVE	6	Read individual parameter active
WRITE_PARA_ACTIVE	7	Write individual parameter active
SAVE_PARAMETER_ACTIVE	8	Save all parameters in the EEPROM of POSMO A active
NO_COMMAND_ACTIVE	9	No action active

Table 3- 4 Data structure Struct_checkbacks

Symbol	Data type	Meaning
actCommand	enumActCommand	Enums active actions
done	BOOL	Action completed
driveReady	BOOL	Drive (POSMO A) ready for operation
jogPositiveBusy	BOOL	Jogging positive active
jogNegativeBusy	BOOL	Jogging negative active
actPosition	REAL	Current actual position of POSMO A
positionReached	BOOL	Position when moving MDI block absolute reached
error	BOOL	Error has occurred (request canceled; a POSMO A error is pending)
ctrlErrorID	WORD	Error specification of the **_POSMOA_control** block. Number of the parameter assignment error signaled by POSMO A
driveErrorID	WORD	Error specification of the POSMO A Reason for an error signaled by POSMO A
rwErrorID	WORD	Error specification of the **_POSMOA_rwParameter** block. Error during reading or writing has occurred
driveWarning	BOOL	POSMO A warning is pending
driveWarningID	WORD	Warning number

Appendix A

A.1 SIMOTION and SIMATIC names

The table below contains a comparison of SIMOTION and SIMATIC names.

Table A- 1 SIMOTION and SIMATIC names for SIMODRIVE POSMO A

Name in the SIMOTION system as of V4.1 (command library in SCOUT)	Name in the SIMATIC system	Name in the SIMOTION system up to V3.2 (SIMOTION function library)
Function block parameters		
_POSMOA_control	**FB 10**	**_FB_posmoA_control**
pkwIn	I_O_address	PKWInputInterface
pzdIn	I_O_address	PZDInputInterface
enable	Initialization	initialize
homing	Referencing	homing
releaseBrake	Brake_release	-
jog1	Jogging_1	jog1
jog2	Jogging_2	jog2
jogOverride	Jogging_override	jogOverride
start	Start	start
singleBlock	Automatic_operation	-
enableRdIn	Read_in_enable	-
extBlockChange	External_blockchange	-
noStopIntermediate	No_intermediate_stop	intermediateStop
noStop	No_stop	stop
resetError	Fault_acknowledgement	resetError
blockNumber	Block_number	blockNumber
veloOverride	Override	velocityOverride
setStartInformation	Start_byte	setStartInformation
mdiMode	MDI_type	MDIMode
mdiVelocity	MDI_velocity	MDIVelocity
mdiAcceleration	MDI_acceleration	MDIAcceleration
mdiPosition	MDI_position	MDIPosition
reqControl	Ctrl_Req	-
pkwOut	I_O_address	PKWOutputInterface
pzdOut	I_O_address	PZDOutputInterface
busy	FB_coordination	busy
ready	Ready	ready
active	-	-

Name in the SIMOTION system as of V4.1 (command library in SCOUT)	Name in the SIMATIC system	Name in the SIMOTION system up to V3.2 (SIMOTION function library)
dataReady	Data_transfer_ready	-
statusWord	Status_word	statusWord
actBlockNumber	Actual_block	actualBlockNumber
statusInformation	Checkback_signal_byte	statusInformation
driveWarning	Warning	driveWarning
driveWarnId	Warn_number	driveWarningNumber
driveWarnInfo	Warn_info	-
driveError	-	driveError
driveErrorId	-	driveErrorNumber
error	Fault	error
errorID	Fault_number	errorNumber
_POSMOA_nControl	FB 9	-
enable	-	-
pkwIn	-	-
pzdIn	-	-
init	Initialization	-
releaseBrake	Brake_release	-
accelTime	Acc_Time	-
releaseRamp	Ramp_en	-
startRamp	Ramp_on	-
setpoint	Sp	-
releaseSetpoint	Sp_en	-
resetError	Fault_acknowledgement	-
reqControl	Ctrl_req	-
busy	FB_coordination	-
pkwOut	-	-
pzdOut	-	-
ready	Ready	-
active	-	-
dataReady	Data_transfer_ready	-
statusWord	Status_word	-
actValue	Pv	-
error	-	-
errorID	-	-
driveError	Fault	-
driveErrorId	Fault_number	-
driveWarning	Warning	-
driveWarnId	Warn_number	-
driveWarnInfo	Warn_info	

Name in the SIMOTION system as of V4.1 (command library in SCOUT)	Name in the SIMATIC system	Name in the SIMOTION system up to V3.2 (SIMOTION function library)
_POSMOA_rwParameter	**FB 11**	**_FB_posmoA_readWriteParameter**
pkwIn	I_O_address	PKWInputInterface
paraNumber	Number	parameterNumber
subindex	Index	subindex
enableRead	Read	read
execWrite	Write	write
setDefault	Factory_default	setFactorySettings
saveParameter	Parameter_save	saveParameter
pkwOut	I_O_address	PKWOutputInterface
busy	FB_coordination	busy
realValue	Value	REALValue
dintValue	Value	DINTValue
done	Task_completed	done
error	Fault_present	error
errorID	Fault_number	errorNumber
_POSMOA_rwAllParameter	**FB 12**	**_FB_posmoA_readWriteAllParameter**
pkwIn	I_O_address	PKWInputInterface
execRead	Read_all	read
execWrite	Write_all	write
posMode	Pos_en	-
pkwOut	I_O_address	PKWOutputInterface
allParaPosmoA	-	allPosmoAParameter
busy	FB_active	busy
done	Task_complete	done
error	Fault_present	error
errorID	Fault_number	errorNumber
errorParaNumber	Fault_parameter_number	errorParameterNumber
Data structure elements		
Struct_POSMOA_params		**Struct_posmoA_parameter**
p1	p1	parameter1
p2	p2	parameter2
p3	p3	parameter3
p4	p4	parameter4
p5	p5	parameter5
p6	p6	parameter6
p7	p7	parameter7
p8	p8	parameter8
p9	p9	parameter9

Name in the SIMOTION system as of V4.1 (command library in SCOUT)	Name in the SIMATIC system	Name in the SIMOTION system up to V3.2 (SIMOTION function library)
p10	p10	parameter10
p11	p11	parameter11
p12	p12	parameter12
p13	p13	parameter13
p14	p14	parameter14
p15	p15	parameter15
p16	p16	parameter16
p17	p17	parameter17
p18	p18	parameter18
p19	p19	parameter19
p20	p20	parameter20
p21	p21	parameter21
p22	p22	parameter22
p23	p23	parameter23
p24	p24	parameter24
p25	p25	parameter25
p26	p26	parameter26
p27	p27	parameter27
p28	p28	parameter28
p29	p29	parameter29
p30	p30	parameter30
p31	p31	parameter31
p32	p32	parameter32
p33	p33	parameter33
p34	p34	parameter34
p35	p35	parameter35
p36	p36	parameter36
p37	p37	parameter37
p38	p38	parameter38
p39	p39	parameter39
p40	p40	parameter40
p41	p41	parameter41
p42	p42	parameter42
p43	p43	parameter43
p44	p44	parameter44
p45	p45	parameter45
p46	p46	parameter46
p47	p47	parameter47
p48	p48	parameter48
p49	p49	parameter49
p50	p50	parameter50

Name in the SIMOTION system as of V4.1 (command library in SCOUT)	Name in the SIMATIC system	Name in the SIMOTION system up to V3.2 (SIMOTION function library)
p51	p51	parameter51
p52	p52	parameter52
p53	p53	parameter53
p54	p54	parameter54
p55	p55	parameter55
p56	p56	parameter56
p57	p57	parameter57
p58	p58	parameter58
p59	p59	parameter59
p60	p60	parameter60
p61	p61	parameter61
p62	p62	parameter62
p80	p80	parameter80
p81	p81	parameter81
p82	p82	parameter82
p83	p83	parameter83
p84	p84	parameter84
p85	p85	parameter85
p86	p86	parameter86
p87	p87	parameter87
p99	p99	parameter99
p100	p100	parameter100
p101	p101	parameter101
p700	p700	-
p701	p701	-
p880	p880	-
p930	p930	parameter930
p964	p964	parameter964
p1426	p1426	-
p1427	p1427	-
Program control word		
Array_POSMOA_prgCtrlInfo		Array_posmoA_programControlInformation

A.2 List of abbreviations

Table A- 2 Abbreviations

Abbreviation	Meaning
DC	Direct current
DP	Distributed I/O
EEPROM	Electrically Erasable Programmable Read-Only Memory
ES	SIMOTION SCOUT
FB	Function block
FW	Firmware
HW	Hardware
IN	Input parameters
IN/OUT	In/out parameter
LAD	Ladder diagram
MDI	Manual Data Input
OUT	Output parameters
PIV	Parameter identification value: Parameter part of a PPO
POSMO A	Positioning Motor Actuator
PPO	Parameter Process data Object: Cyclic data message frame when transferring data with PROFIBUS DP and the "variable-speed drives" profile
PZD	Process data: Process data part of a PPO
ST	Structured text
STW	Control word
SW	Software
TO	Technology object

Index