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BM4-O-PRO-01

Profibus DP
Slave for b maXX Controller
Programming manual

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Title	Programming manual
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INTRODUCTION

The programming manual is an important part of your b maXX® 4400 device. Please read the documentation completely for your own safety. This documentation describes how the company Baumüller Nürnberg Electronic GmbH & Co. KG has implemented the PROFIBUS DP connection on the optional module BM4-O-PRO-01 for the device series b maXX® 4400.

This introduction contains general information on the optional module BM4-O-PRO-01-00-00, which facilitates the connection of the b maXX® regulator to the Profibus.

1.1 General

Information on the optional and functional modules for the device series b maXX® 4400 is contained in the documentation 5.01040.

Information about the programming of the b maXX® 4400 regulator is contained in the parameter manual for the basic device b maXX® 4400 Firmware Version 01; 5.02017 or in the parameter manual for the basic device b maXX® 4400 Firmware Version 03; 5.03039.

NOTE
This programming manual exclusively describes the optional module BM4-O-PRO-01-00-00. The optional module BM4-O-PRO-01-00-01, which enables the connection of the b maXX® PLC to the Profibus, is described in the application manual BM4-O-PRO-01 Optional module PROFIBUS DP-Slave for b maXX® PLC 5.03058.

Numeral representation:

The following numeral representations are used in the different, tables and diagrams:

123 or 123_dezNumerals in decimal form

0x123 od. 123_hexNumerals in hex-decimal form

P123 Number of the parameter for b maXX® regulator

1.2 Assembly and installation

The assembly of the optional module BM4-O-PRO-01 is described in the documentation - Operating Instructions for PROFIBUS DP Slave for b maXX® 5.03040.

1.3 Address setting

The address setting of the optional module BM4-O-PRO-01 is described in the documentation - Operating Instructions for PROFIBUS DP Slave for b maXX® 5.03040.

1.4 GSD file

Different information about the individual Slaves must be made available to the Master for using the functions on the PROFIBUS. The supplied GSD file (Geräte-Stamm-Datei - Device Master File) is required for configuring the PROFIBUS Master systems. The GSD file was created in conformance with the *EN 50170 Volume 2 PROFIBUS* standard and contains fixed information about every slave, which helps in the configuration of data transmission and the start-up behaviour of the bus system.

It is recommended that you copy the GSD file and the two Bitmap files from the included-CDs into the respective directories for the project-planning tool of the PROFIBUS Master. A printout of the GSD file is available in the Appendix B, ▹GSD File◃ from page 41.

1.5 Copyright and trade mark

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BASIC SAFETY INSTRUCTIONS

This chapter describes the potential risks, which one is likely to encounter during the parameterisation of the Baumüller b maXX® 4400 controller and the significance of the Info sign.

2.1 Hazard information and signs

WARNING

The following **may occur**, if you do not observe this warning information:

- serious personal injury
- death

Danger: **mechanical and electrical function.** *A change in the parameters influences the working of the Baumüller device and thereby the working of the system and its components. If you change the parameter settings, the system and/or its components might function in a dangerous manner.*

The device should be re-commissioned after every modification in the parameter setting, while observing all safety instructions and guidelines.

2.2 Info sign

NOTE

The note given here is particularly important.

3

FUNDAMENTALS OF PROFIBUS

3.1 References on PROFIBUS

- Manfred Popp, PROFIBUS-DP/DPV1, fundamentals, tips and tricks for the user, Hüthig Verlag Heidelberg
- Manual “SIMATIC NET“ company Siemens
  Industrial communication networks
  PROFIBUS networks

NOTE
The PROFIBUS DP is an asynchronous bus system, which enables a precise determination of the transmission of values at specific points of time, under certain conditions. However, a time frame can be fixed, in which the setpoint and actual values can be updated via the bus system. This time frame and the maximum possible bus speed depends upon the bus slave used and the controls.
Hence, the suitability of the selected system should be checked before using the bus systems for controlling certain system functions

3.2 Settings on the Master

The PROFIBUS Master must be projected with the software supplied herewith. For this, the following information on the slave must be made available to the master:

- Slave address of the slave on the PROFIBUS
- Input and output range of the Slave (observe the limits of the maximum input and output range during consistent transmission in the PROFIBUS Master).
- Special features of the Slave.

NOTE
While changing the settings on the PROFIBUS Master, the entire system must be restarted for a renewed initialization.

3.3 GSD file

A range of information about the individual Slaves must be made available to the Master

for using the functions on the PROFIBUS. The supplied GSD file (Geräte-Stamm-Datei - Device Master File) is therefore required for configuring the PROFIBUS Master systems. The GSD file was created in conformance with the *EN 50170 Volume 2 PROFIBUS* standard and contains fixed information about every slave, which helps in the configuration of data transmission and the start-up behaviour of the bus system.
It is recommended that you copy the GSD file and the two Bitmap files from the CDs included into the respective directories for the project-planning tool of the PROFIBUS Master. A printout of the GSD file is available in the Appendix B, ▹GSD File◃ from page 41.

3.4 Address Range Determination

3.4.1 Fundamentals of data exchange

For data exchange on the PROFIBUS, the size of the data range to be transferred must be determined. This transfer range (also address range) is based on the amount of data to be transferred and must be projected in the PROFIBUS Master accordingly. No change can be made in the transfer range during the operation; the bus systems must be restarted for accepting the changes.
The size of the range to be transferred depends upon the number of cyclic setpoint and actual values, and on whether or not the service data communication should be used.
The required transfer range can be determined in the following manner:

- For every cyclic actual value, a range of 2 words must be projected as the input range on the PROFIBUS Master and for every cyclic set value, a range of 2 words must be projected as the output range on the PROFIBUS Master. A range of 2 words is always required even if the setpoint and actual value in the controller has a width of only 1 word.
  PPO types cannot be used (pre-defined transfer types for PROFIBUS), since these work with a base format of 1 word, whereas the optional module PROFIBUS-Slave for b maXX® controller requires a default of 2 words = 32 Bit.
- A range of 4 words must be defined as the input and output range for using the service data communication.

The entire address range, which includes the service data and cyclic data, is also marked as the net data block. The structure of the net data block is explained in section ▹Net data block◃ on page 27.

3.4.2 Range-consistent data transfer

Data transfer on the PROFIBUS usually takes place with a 2 word consistency. This means that all data within these 2 words definitely originate from the same Master cycle. In several Master systems, this can lead to problems in the service data communication, as a consistency of the data is not guaranteed for the entire data range of 4 words. Hence, the optional module PROFIBUS-Slave for b maXX® controller also supports the range-consistent data transfer and thereby a consistency of data over the entire transfer range. While using the consistent data transfer, the required transfer range of the inputs and outputs must also be supported by the PROFIBUS-Master. There are differences in the various PROFIBUS Masters, e.g. Siemens S7 can only transfer a transfer range of 32 bytes as range-consistent. In addition to this, the respective system functions of the Master connection must be activated so as to ensure a consistent transfer by the Master.

3.4.3 Settings of the E/A range of standard modules

The size of the required transfer range is set in the PROFIBUS Master with setting identifiers. To simplify these settings, settings that are frequently required are made available as standard modules in the GSD file. These standard modules always include the status and control word as well as a definite number of setpoint and actual values, but **no** service data communication (see also ▹Standard modules◃ on page 13 to ▹Standard modules - Range-consistent transfer◃ on page 14).
If these standard modules are used (without the service data communication), the Master must be parameterized in the following manner:

Module / Identification	Designation	E adr.	A adr.	Description
0	x Actual value(s), x Set value(s)	xxxx	xxxx	Enter the desired standard module
1				
2				
3				

However, it is possible to configure service data module in addition to a standard module. In this case, the Master must be set in the following manner:

Module / Identification	Designation	E adr.	A adr.	Description
0	Service data module	xxxx	xxxx	Enter the service data module
1	x Actual value(s), x Set value(s)	xxxx	xxxx	Enter the desired standard module
2				
3				

NOTE
It is important that the service data module be parameterized before the standard module. (See also ▹Net data block◃ on page 27).

Standard modules are also available for the range-consistent transfer. These also include the status and control word and a definite number of setpoint and actual values. Furthermore, one must observe that a combination of the modules is not possible for range-consistent transfer with additional individual modules.

While using the standard module “Consistency of the entire address range”, the Master must be set in the following manner:

Module / Identification	Designation	E adr.	A adr.	Description
0	Service data module	xxxx	xxxx	Enter the service data module
1	Range x Actual / set value	xxxx	xxxx	Enter the desired standard module
2				
3				

For using the consistent data transfer, the corresponding system functions must also be enabled in the PROFIBUS Master so that the data can be transferred according to the setting on the Slave. The range consistency only depends upon the cyclic data of the telegram.
A list of the individual modules in given in Section ▹Identification of the E/A range◃ on page 13.

3.4.4 Setting E/A range, general

Apart from the setting of the transfer range via the standard modules, a setting is also possible via the individual modules. With this, the required range can be configured exactly according to the required number of target and actual values. However, a consistency over the entire range cannot be maintained.
The following formula can be used for determining the required E/A range:

Calculation of the E/A range

Input range:
4AE word service data + 2AE status word + (number of cyclic actual values x 2AE word)
Output range:
4AA service data. + 2AA control word + (number of cyclic set values x 2AA word)
For this use, the PROFIBUS Master must be parameterized in the following manner:

Module / Identification	Designation	E adr.	A adr.	Description
0	Service data module	xxxx	xxxx	Enter the service data module
1	Status / control module	xxxx	xxxx	Enter the status/control module
2	x Actual value(s)	xxxx		Select the desired number of actual values from the list
3	x Set value(s)		xxxx	Select the desired number of set values from the list

NOTE
While configuring, the sequence of the individual modules must be maintained.

If the service data-communication is desired, the service data module must always be entered before the status / control word modules and the setpoint / actual value modules. If the status / control word module exists, it should be entered before the target / actual values. The identifications for the individual modules are given in the overview in Section ▹Identification of the E/A range◃ on page 13.
On the basis of the settings thus determined, the optional module PROFIBUS-Slave can check the configuration for b maXX® controller after start-up and identify any error in the

configuration.
The transfer format of the individual values is generally determined on 32 Bit. Likewise, the control and status word is fixed on 32 Bit for the optional module PROFIBUS-Slave for b maXX® controller.

3.5 Identification of the E/A range

The setting of the transfer range in the PROFIBUS Master takes place via the identifiers of the individual modules. To simplify project-planning, these are entered in the supplied GSD file along with their designation and regularly displayed by the operating software of the PROFIBUS Master along with the designation.
However, the arrangement of the individual selection options in the respective configuration interface of the Master system cannot be influenced by the specifications in the GSD file. Thus, for every new configuration of a slave, the selection can be sorted again and displayed thus on the PC.
The following identifications along with their respective designations give a better overview of the possible settings or also facilitates monitoring. The actual identification is given in the column *Identification PROFIBUS-DP*; It contains the information required for the Master for setting the system configuration.

3.5.1 Standard modules

Designation	Service data	Status and control word	Address range	Identification PROFIBUS-DP
1 Actual value, 1 Set value	No	Yes	4 AE/AA	0x73 (115_dez.)
2 Actual values, 2 Set value	No	Yes	6 AE/AA	0x75 (117_dez.)
4 Actual values, 4 Set value	No	Yes	10 AE/AA	0x79 (121_dez.)
7 Actual values, 1 Set value	No	Yes	16 AE, 4 AA	0xC0, 0x4F, 0x43
7 Actual values, 7 Set value	No	Yes	16 AE, 16 AA	0xC0, 0x4F, 0x4F

NOTE
The standard modules always include the status and control word and the given number of setpoint and actual values.

NOTE
Service data identification and identification for 1 cyclic set / actual value are identical. (0x73 / 0xF3)
That's why the following procedure is applied:
only one Cfg-Byte transmitted: interpretation as cyclic data
at least two Cfg-Bytes transmitted:interpretation as cyclic and service data

3.5.2 Individual modules for configuration

Designation	Address range	Identification PROFIBUS-DP
Service data	4 AE/AA	0x73 (115_dez.)
Status and control word	2 AE/AA	0x71 (113_dez.)
1 Actual value	2 AE	0x51 (81_dez.)
2 Actual values	4 AE	0x53 (83_dez.)
3 Actual values	6 AE	0x55 (85_dez.)
4 Actual values	8 AE	0x57 (87_dez.)
5 Actual values	10 AE	0x59 (89_dez.)
6 Actual values	12 AE	0x5B (91_dez)
7 Actual values	14 AE	0x5D (93_dez.)
8 Actual values	16 AE	0x5F (95_dez.)
1 Set value	2 AA	0x61 (97_dez.)
2 Set values	4 AA	0x63 (99_dez.)
3 Set values	6 AA	0x65 (101_dez.)
4 Set values	8 AA	0x67 (103_dez.)
5 Set values	10 AA	0x69 (105_dez.)
6 Set values	12 AA	0x6B (107_dez.)
7 Set values	14 AA	0x6D (109_dez.)
8 Set values	16 AA	0x6F (111_dez.)

NOTE
There is a maximum of 16 AE/AA of cyclic data allowed.

3.5.3 Standard modules - Range-consistent transfer

NOTE
The content of the standard modules is always the status and control word as well as the specified number of actual and set values.

Designation	Service data	Status and control word	Address range	Identification PROFIBUS-DP
1 Actual value, 1 Set value	No	Yes	4 AE/AA	0xF3 (243_dez.)
2 Actual values, 2 Set values	No	Yes	6 AE/AA	0xF5 (245_dez.)
4 Actual values, 4 Set values	No	Yes	10 AE/AA	0xF9 (249_dez.)
5 Actual values, 5 Set values	No	Yes	12 AE/AA	0xFB (251_dez)
6 Actual values, 6 Set values	No	Yes	14 AE/AA	0xFD (253_dez)
7 Actual values, 7 Set values	No	Yes	16 AE, 16 AA	0xFF (255_dez)

NOTE
For using the facility of range-consistent transfer, this must also be supported by the PROFIBUS Master. Here, there are differences in the maximum size of the range.
Furthermore, one must keep in mind that a combination of the modules with additional individual modules is not possible during a range-consistent transfer, excepted service data module.

3.6 Example of address allocation

Example: The following example throws light on the configuration of the transfer range.
A configuration of 3 cyclic set values and 1 cyclic actual value must be set with service data communication. The size of the address range is automatically configured by the controls in the following manner:

Input range in the Master

The input range on the PROFIBUS-DP of the PLC is made up of 8 input words (8 AE).

4 AE	Service data range
2 AE	Status word
2 AE	Actual value 1

Output range in the Master

4 AA	Service data range
2 AA	Control word
6 AA	Set value 1 to 3

The output range on the PROFIBUS-DP of the PLC is made up of 12 output words (12 AA).

Settings of E/A range

Module / Identification	Designation	E adr.	A adr.	Note
0	Service data module	xxxx	xxxx	Enter service data module
1	Status/control module	xxxx	xxxx	Enter status/control module
2	1 Actual value	xxxx		Enter 1 cyclic actual values
3	3 Set value		xxxx	Enter 3 cyclic set values

3.7 Example of configuration with a S7

The following section describes the configuration of the optional module PROFIBUS-Slave for b maXX® controller on a Siemens S7.
Before using the optional module, this must first be integrated in the programming interface of the PLC (see also the description of Siemens for the programming interface version currently used).
After this, you can create the corresponding configuration of the PROFIBUS Master system (here S7-300 DP) in order to set up a PROFIBUS communication:

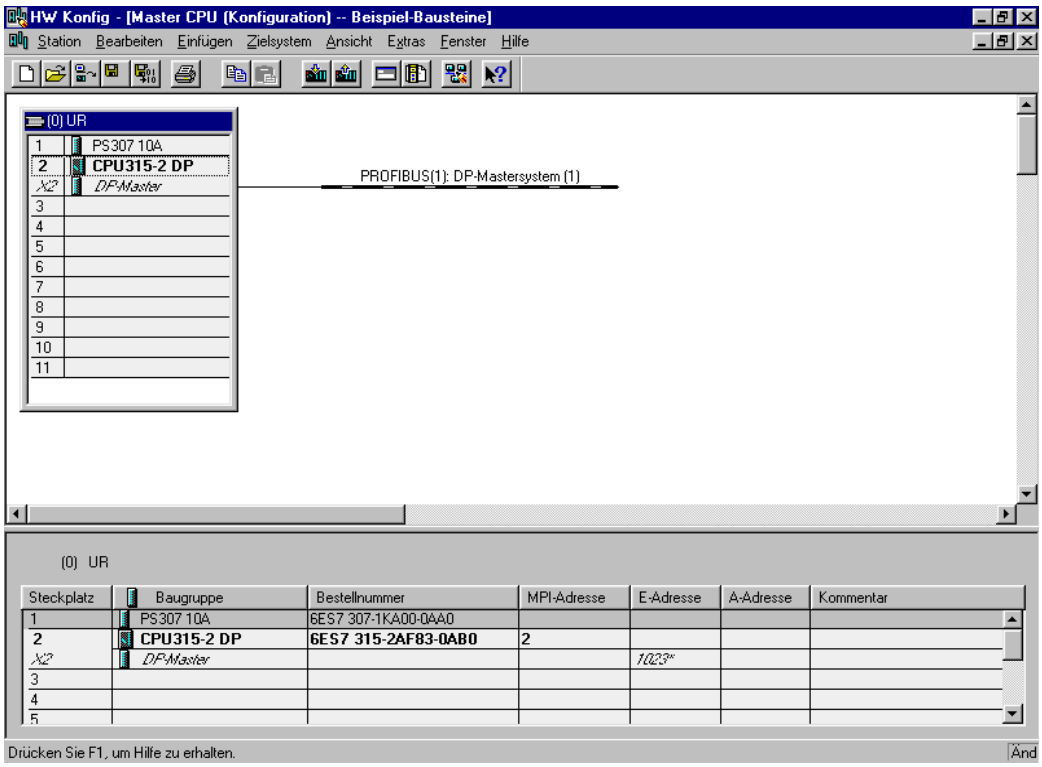

Abbildung 1: Configuration PROFIBUS Master system

By activating the hardware catalogue of the interface and successfully importing the Baumüller GSD file, you will find the BM4-O-PRO-01 module in the PROFIBUS components directory under *More field devices -> Drives*.
For installing a Baumüller PROFIBUS slave, the communication path *PROFIBUS* must be enabled (thick line below the caption PROFIBUS-DP), so that a PROFIBUS slave can be installed y double-clicking the entry BM4-O-PRO-01. After double-clicking, a window will open, where you can set the required bus address of the slave.

After the address is entered and confirmed, the following window opens in the hardware configuration of the programming interface:

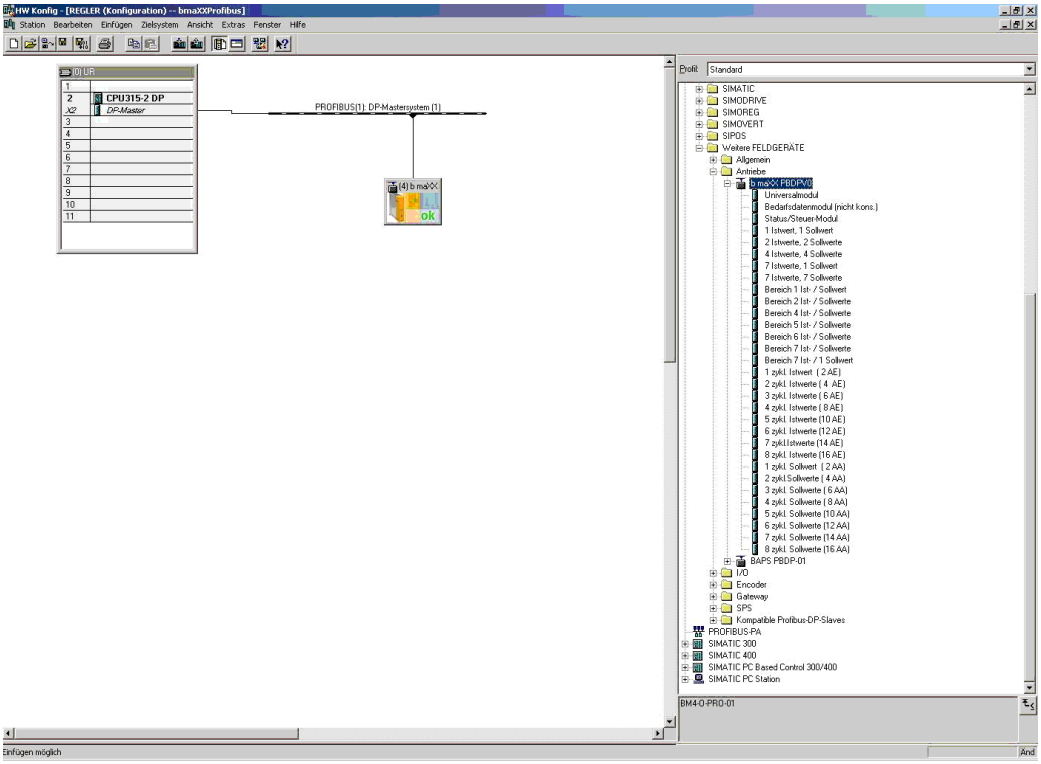

Figure 2: Configuration - Select slave

For setting the configuration of the Baumüller PROFIBUS slave, the corresponding slave must be selected with the mouse -> Window with *Slot, Module / DP identification, ...* is opened. For entering the service data (example parameterization 4 setpoint / 3 actual values and service data), the *Slot 0* must be selected with the mouse, so that this communication part can be installed by double-clicking the *Service data module* in the hardware catalogue.
After this, you can set the *status / control modules*, *3 cyclic actual values* and *4 cyclic set values* in the same manner. The address settings of the individual communication components can be freely selected by the user.

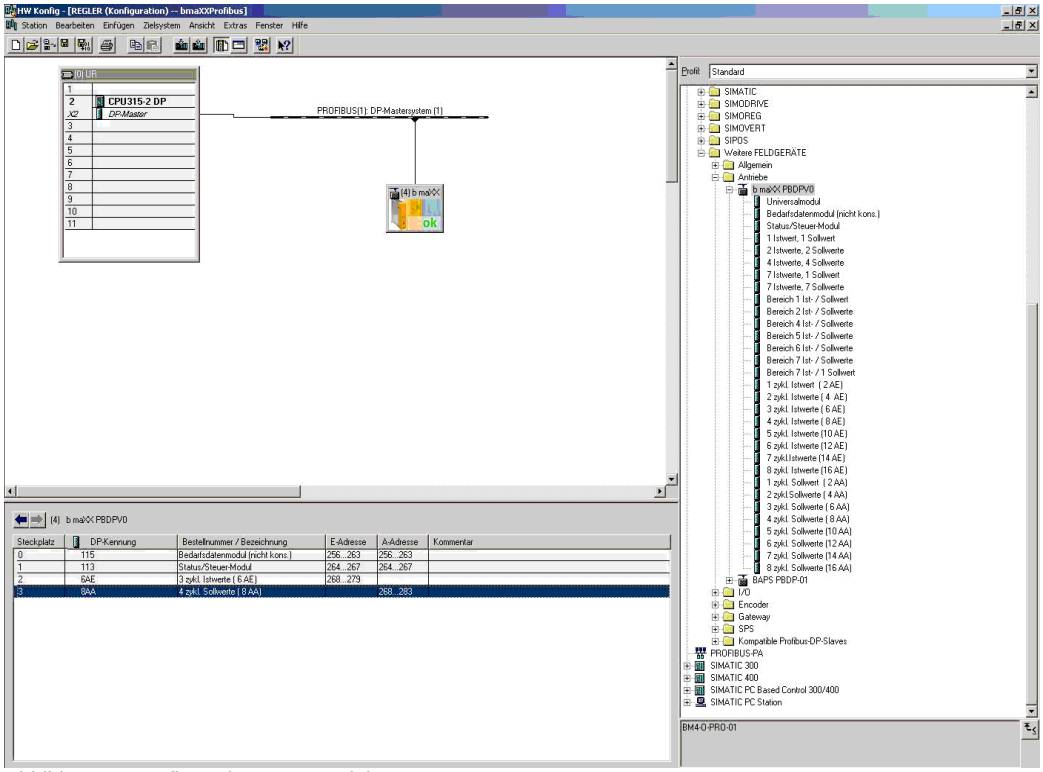

Abbildung 3: Configuration - Set modules

After completing the required parameterization, the configuration thus created must be transferred to the target system. Before the data transfer, a consistency check can be conducted in the interface, so as to find any errors in the parameterization.
After restarting the system (Master and Slaves), PROFIBUS-DP must start without any communication problems. If any errors are shown on the S7, the cause for error can be detected via online diagnosis and eliminated.
While using consistent data transfer, the corresponding SFC`s in the S7 must be used for a consistent data transfer.
For further instructions, see Section ▹Range-consistent data transfer◃ on page 10.

3.8 Initialization problems in the event of configuration errors

If the configuration of the number of setpoint and actual values in the PROFIBUS Master does not match the configuration in the BACI parameters, the card does not change over to the DataExchange status, but remains in the initialization status and no data exchange of the setpoint and actual values takes place with the b maXX® controller. A configuration error is indicated via the Profibus diagnosis.

3.9 Sensitivity check

To be able to detect a failure of the Bus master on the Slave, the sensitivity check (Watchdog) for the Slaves must be enabled during the configuration of the PROFIBUS Master. This option is not automatically enabled by all Masters. In Siemens S7, it is generally automatically enabled. This is not the case for the Beckhoff systems.
In Siemens S7, a field “Sensitivity check“ exists for each Slave for setting. This field must be enabled so that the Slave is able to detect a failure of the Bus system. The time for the sensitivity check must be set according to the bus cycle time, whereby a reserve of minimum 25 % is recommended.
To trigger off the corresponding action in the drive, the communication check must be set accordingly in the b maXX® controller (see also ▹Monitoring the process data◃ from page 24)

WARNING (WARNING)
The following **may occur**, if you do not observe this warning information:
▸ Severe material damages ▸ serious personal injury ▸ death
For monitoring the communication between b maXX® and PROFIBUS-DP, an error reaction must be set via the *BM_i_ErrReactionBaci (P 0298)* parameter, which is triggered by the controller in the drive after an adjustable period of time. This setting can be made in WinBASS on the “BACI” page under “Error reaction for BACI communication“ (see also ▹Monitoring the process data◃ from page 24). To make the communication check of the drive effective, the sensitivity check (Watchdog function) for the Slave must be enabled for the Profibus settings. If this check is not enabled, undefined system stati may occur in the drive in the event of bus errors, which are not traceable.

4

COMMUNICATION WITH THE B MAXX® CONTROLLER

This chapter describes the data communication between the optional module PROFIBUS DP Slave and the b maXX® 4400 device.

4.1 General information about communication with the b maXX® controller

The optional module PROFIBUS DP Slave for b maXX® controller exchanges data with the b maXX® 4400 controller via a dual port RAM. This data exchange takes place within a specific time slot via the BACI (BAumüller Component Interface).

The optional module initiates the communication with the b maXX® 4400 controller. During the communication, two different types of data are transferred:

- Process data
- Service data

The process data is always transferred in a cyclic manner. The service data is transferred in the residual period of a cycle. Process data is transferred in an adjustable time slot, the SYNC interval. In this process, the set value and actual values are transferred with different offset in the SYNC interval.

To enable the communication via BACI, the following settings must be made with WinBASS II on the drive manager page:

- BACI write access for service data enabled
  (must also be enabled if no service data via profibus is needed because the optional card for internal communication carries out the service data communication with the controller)
- BACI write access for process data enabled
- Control by BACI and WinBASS II

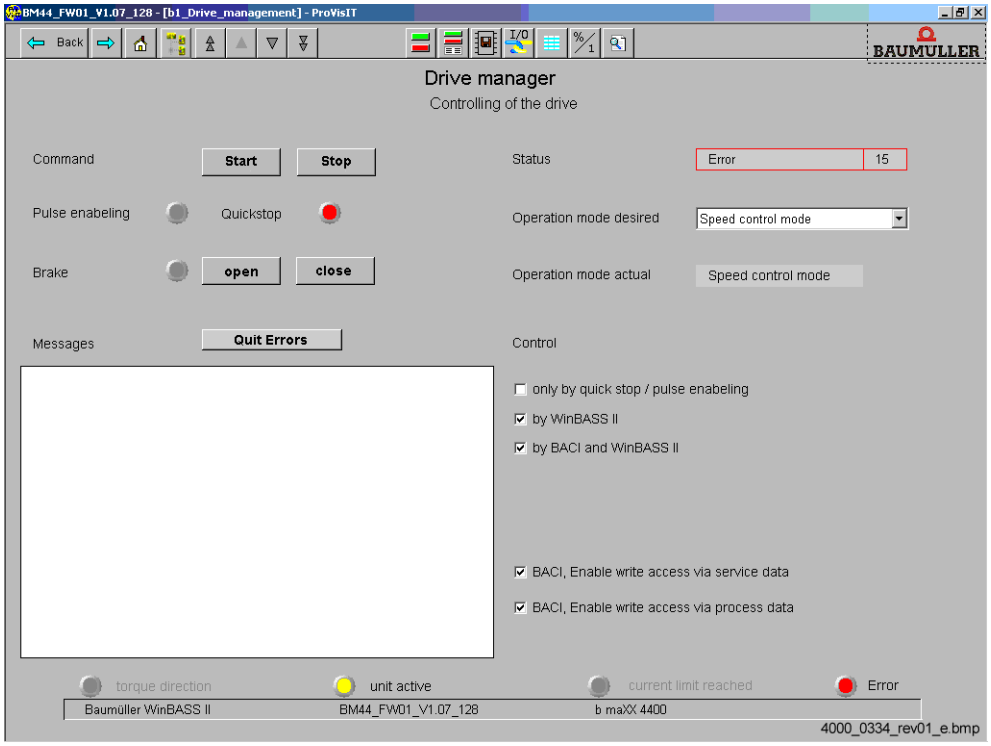

Figure 4: WinBASS II Drive manager

NOTE

The cyclic communication is only enabled in the PROFIBUS DP communication status DataExchange. If it is enabled, the green LED H1 on the front screen of the optional module PROFIBUS DP Salve for b maXX® controller blinks.

4.2 Parameterisation of the BACI communication times

8 set values and 8 actual values can be exchanged between the optional module PROFIBUS DP Slave and the b maXX® controller in a communication cycle. The setpoint and actual values to be exchanged are put down in the BACI parameters in the b maXX® controller. This chapter shows how they parameterise the communication.

The communication between the optional module PROFIBUS DP Slave and the b maXX® controller is parameterised via WinBASS II (see ▹Figure 5◃ on page 25).

On the WinBASS II "BACI" (optional module 1) page, you can set the communication cycle time via the “Rate set values, Actual values“ (P0800) parameters, the cycle offset of the set values and the cycle offset of the actual values.

The b maXX® controller has a time slice system with a time slice duration of 125 µs. One communication task can be called in each time slice; this task transfers the process data (setpoint or actual values).

The communication cycle time is a multiple of the time slice duration (125 µs). Hence, only that factor is indicated in the “Rate setpoint, actual values“ (P0800) parameter, which can be calculated in the following manner:

Rate set values, actual values (P0800) = Communication cycle time (in µs) / 125 µs

Examples:

Communication cycle time = 1000 µs ⇒ Rate set values, Actual values = 8

Communication cycle time = 4000 µs ⇒ Rate set values, Actual values = 32

The smallest value for "Rate set values, actual values" - while using the BM4-O-PRO-01 - is 8, i.e. the smallest communication cycle time is 1000 µs. The highest value for "Rate set values, actual values" is 65535, i.e. the highest communication cycle time is 8191875 µs.

NOTE

The smallest cycle time for the optional module PROFIBUS DP Slave for b maXX® controller is 1000 µs.

The process data set values and the process data actual values are transferred to different communication time slices. Hence, a cycle offset different from that of the actual values is specified for the set values. The cycle offset is nothing but the number of the communication time slice, in which the data is transferred. The following general rule applies for the setting of the cycle offset:

Cycle offset (set values) = (Rate set values, actual values) - 1

Cycle offset (actual values) = (Rate set values, actual values)/2 - 1

Examples:

Cycle	Rate Set/actual values(P800)	Cycle offset Set values(P818)	Cycle offset Actual values(P819)
1000µs	8	7	3
2000µs	16	15	7
4000µs	32	31	15

Other settings are also possible for the cycle offset of the set values and actual values

NOTE

Setpoint and actual values may not be set to identical values and the value 0.

4.3 Parameterisation of process data

On the WinBASS II "BACI" (optional module) page, you can enter the parameters to be used for the cyclic transfer. Enter the parameter numbers of the set values and actual values in the desired sequence.

NOTE

It is recommended that you enter the status and control word in the first place in the respective lists.

4.4 Monitoring the process data

The following settings must be made on the b maXX® controller for monitoring the process data:

- Error reaction for BACI communication
- Timeout for cyclic communication (P839)
- Timeout for starting phase (P838)

Error reaction for BACI communication:

This determines the reaction behaviour of the drive when an error is detected during the cyclic communication.

Default: No error reaction

Timeout for cyclic communication:

Timeout determines the duration, for which an error in cyclic communication may be kept pending, before the controller triggers the error reaction.

Default: 50 ms

Timeout for starting phase:

With this, you can set the maximum time, which the system has to put the cyclic communication into operation after it is switched on. At the end of this duration or when the regulator detects a correctly functional cyclic communication, the controller evaluates the Timeout for cyclic communication and the set error reaction.

Default: 60 s

4.5 Example of process data communication

In the process data, the control word (P0300) and position set value (P0369) must be set as the set values and the status word (P0301) and the position actual value (P0362) as the actual values.

As error reaction, a quickstop must be initiated after 50 ms. The duration from starting till the assumption of the process data monitoring function, should last not more than 60s.

The cycle time is 1ms. This will give a value of 8 for “Rate setpoint actual values“ (P0800). The acceptance offsets are determined according to the general rule.

The completely configured WinBASS II page is shown in the following diagram .

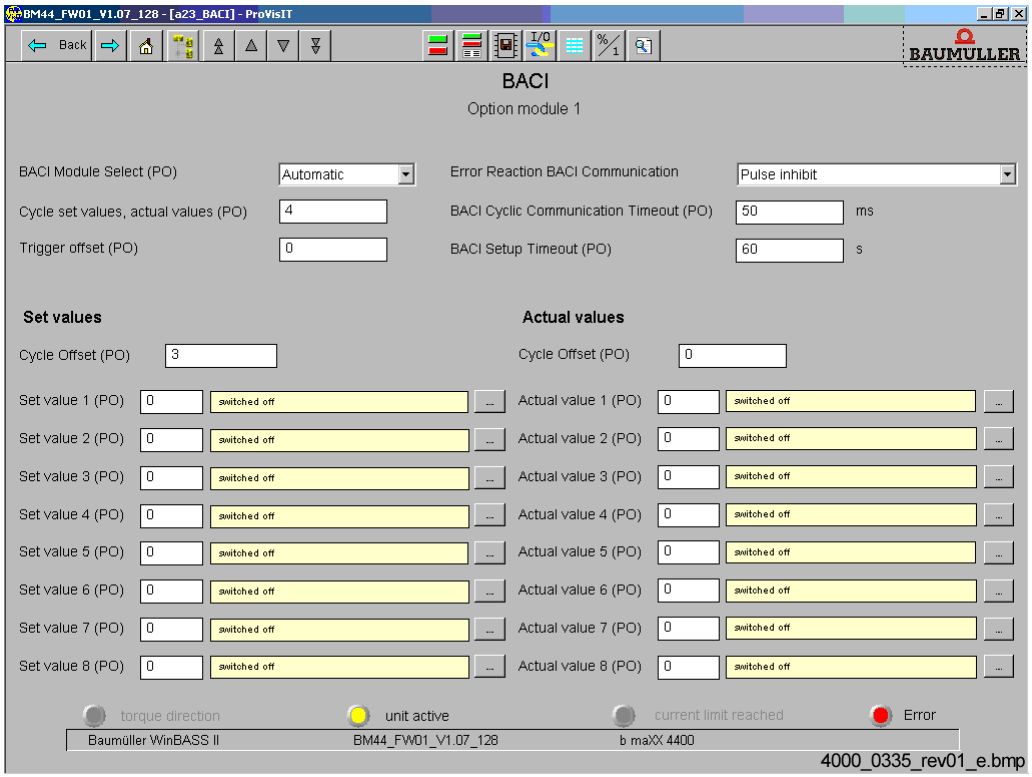

Figure 5: WinBASS II BACI configuration

NOTE

When all the settings are made, the active database must be saved and the system restarted.

4.6 Service data communication with b maXX®

The service data communication does not required a separate setting, since the release of the service data communication must be permitted for the correct functioning of the optional module (see also ▹General information about communication with the b maXX® controller◃ on page 21)

5

NET DATA BLOCK

This chapter describes the structure of the net data block and also explains the operating sequence and protocol of the service data communication.

5.1 Structure of the net data block

The net data block (corresponds to the address range in the Master) consists of two areas:

- PKW (Parameter Kennung Wert - Parameter Identification Value) = Service data range
- PZD (Process data range) = cyclic range

The PKW range is the data range for the service data communication and is available only when this data is projected in the PROFIBUS. The size of the PKW range is fixed at 4 words and cannot be changed.
The process data range serves the purpose of cyclic communication with the controller and thereby quick data transfer from the status and control word as well as the setpoint and actual values. The size of this range depends upon the selected configuration. (See also Section ▹Address Range Determination◃ on page 10).
Given below is an example of configuration with service data, status and control word and 2 cyclic setpoint and actual values.

Example: Net data block for service data, status / control word, 2 cyclic setpoint and actual values:

PKW range				PZD range					
PKE	IND	PWE 1	PWE 2	PZD 1	PZD 2	PZD 3	PZD 4	PZD 5	PZD 6
0x0000	0x0000	0x0000	0x0000	0x0000	0x0000	0x0000	0x0000	0x0000	0x0000
4 AE for response service data				Status word		Cyclic actual value		Cyclic actual value 2	
4 AA for request service data				Control word		Cyclic set value 1		Cyclic set value 2	
				6 AE / AA for request / response PZD					

Settings of the I/O range for this parameterisation

The following project planning is required in the PROFIBUS Master for this configuration:

- 4 AE/AA for the service data
- 6 AE for cyclic status word and 2 cyclic actual values
- 6 AA for cyclic status word and 2 cyclic set values

This can be achieved with the standard modules on one hand and with the compilation of individual modules on the other. The different possibilities are shown below in short under A), B) and C).

A) Using the standard modules for project planning of the address range.

Module / Identification	Designation	E adr.	A adr.	Identification PROFIBUS DP
0	Service data module	xxxx	xxxx	0x73
1	2 actual values, 2 set values (incl. status / control word)	xxxx	xxxx	0x75

B) Setting the address range with the individual modules.

Module / Identification	Designation	E adr.	A adr.	Identification PROFIBUS DP
0	Service data module	xxxx	xxxx	0x73
1	Status/control module	xxxx	xxxx	0x71
2	2 actual values	xxxx		0x53
3	2 set values		xxxx	0x63

C) Use of the range-consistent transfer

Module / Identification	Designation	E adr.	A adr.	Identification PROFIBUS DP
0	Service data module	xxxx	xxxx	0x73
0	Doamin 2 actual / set values (contains status / control word)	xxxx	xxxx	0xF5

Remarks regarding the above settings

All 3 parametrisations project the same address range for the data transfer. The above examples indicate the configuration options of the optional module.
Both the parameterisations A and B are functionally identical. However, the parameterisation as shown under B can be more easily changed to a new and different number of cyclic setpoint and actual values, since only one entry needs to be changed with the address range determination.
On the other hand, the variant C has a different function, since the data is transferred in a range-consistent manner. This must also be supported by the corresponding PROFIBUS Master.

Address allocation for a S7 for the above example

The address allocation shown here serves as an example and generally appears different for every application. The correlation between the net data block projected for the PROFIBUS and the input and output addresses of the controls must be displayed.

Input range: Actual values and response - Service data

PKW range				PZD range					
PKE	IND	PWE 1	PWE 2	PZD 1	PZD 2	PZD 3	PZD 4	PZD 5	PZD 6
0x0000	0x0000	0x0000	0x0000	0x0000	0x0000	0x0000	0x0000	0x0000	0x0000
4 AE for response - Service data				Status word		Cyclic actual value 1		Cyclic actual value 2	
ED10		ED14		ED18		ED22		ED26	
EW10	EW12	EW14	EW16						

Output range: Set values and demand - Service data

PKW range				PZD range					
PKE	IND	PWE 1	PWE 2	PZD 1	PZD 2	PZD 3	PZD 4	PZD 5	PZD 6
0x0000	0x0000	0x0000	0x0000	0x0000	0x0000	0x0000	0x0000	0x0000	0x0000
4 AE for request - Service data				Control word		Cyclic set value 1		Cyclic set value 2	
AD10		AD14		AD18		AD22		AD26	
AW10	AW12	AW14	AW16						

5.2 PKW range (Service data)

The PKW range of the net data block serves the purpose of transfer of the service data communication. This range is available only when the service data communication is projected in the PROFIBUS Master. The size of this range is fixed at 4 words and cannot be changed.

5.3 Structure of the PKW range

The entire PKW range is sub-divided into PKE (Parameter-Kennung - Parameter Identification, for the parameter number and request and/or response identification), IND (Index, for access to parameter-specific information) and PWE 1 as well as PWE 2 (for the value to be transmitted). The structure for data transfer from Master to the Slave is same as that from the Slave to the Master.
The significance of the individual sub-ranges is explained in the following. The following table gives an overview of this division.

1 word	1 word	1 word	1 word
PKE	IND	PWE 1	PWE 2

request / response identification	Index	High word value	Low word value

5.3.1 Structure of parameter identification (PKE)

PKE	
AK	PNU
15 14 13 12	11 10 9 8 7 6 5 4 3 2 1 0

The parameter identification *PKE* in the PKW range is sub-divided into the parameter number *PNU* (Bit 0 to 11) and request and/or response identification *AK* (Bit 12 to 15) as the case may be. With this sub-division of the parameter identification (PKE), every parameter in the controller can be read or described.
The parameter identification differs during sending and receipt (from the point of view of the PROFIBUS Master) only with respect to the meaning of the field AK. While sending, this field contains the request identification and for the received data, the response identification of the controller.
These request and response identifications determine the exact meaning of the other fields in the PKW range.
For the process of service data communication, it is important that the PKE field is described with the new request at the very end after the other fields (IND and PWE) have been entered. While ending a request, the PKE field must first be set to 0. This ensures that an invalid request is not sent.

5.3.2 Request identification PLC to an b maXX®

With the help of the request identification, the Master determines the required action. The following table gives an overview of the valid request identifications. A detailed description with examples is given from Section ▷Service data communication◁ on page 32 onwards.

PKE (without PNU)	Function	Description
0000_hex	No request	No request for service data
1xxx_hex	Demand PWE	Read parameters from controller
2xxx_hex	Change PWE (word)	Write parameters in Word format to the controller
3xxx_hex	Change PWE (Double word)	Write parameter double word to controller

5.3.3 Response identification b maXX® to PLC

After the processing of the optional module PROFIBUS Slave for the b maXX® controller, every request is acknowledged with a response. Corresponding response identifications are determined for this.

PKE (without PNU)	Function	Description
0000_hex	No response	No response
1xxx_hex	Transfer PWE word	Transfer Parameter word format
2xxx_hex	Transfer PWE double word	Transfer parameter double word
7xxx_hex	Request cannot be executed	Error identification in PWE -> Error list

If the request is successfully executed, the corresponding request identification is sent and the value is notified to the respective input range as reflected value.
If a request cannot be executed, the response identification “request cannot be executed” can be sent and an error identification registered in the PWE 2, which can be evaluated by the PROFIBUS Master.

5.3.4 Error identification in the PWE 2

If a request cannot be executed by the optional module PROFIBUS Slave for the b maXX® controller, the response identification *7xxx_hex* for *request cannot be executed* is sent back. Also, an error value is entered in the PWE 2 range:

Wert PWE 2	Meaning
0000_hex	Incorrect PNU
0001_hex	Parameter cannot be changed
0002_hex	Value not within limits MIN / MAX
0003_hex	Incorrect entry in the index
0004_hex	No array
0005_hex	Incorrect data type
0006_hex	No setting allowed
0008 - 0010_hex	Reserved
0011_hex	Not possible because of the operating status

5.4 Operating sequence of service data communication

The service data communication is planned as a comprehensive parameterising and diagnosing function. The service data requests are processed in the b maXX® with a low priority as a result of which, a certain processing or updating time cannot be guaranteed.

The process of service data communication must be carried out in the following sequence:

- Enter values in PWE and IND
- Subsequently (!) Enter the parameter number and request identification in PKE
- Wait for the response of the b maXX® (or error acknowledgement of the card)
- Read the values received by the b maXX®
- End the request after deleting PKE (set to zero), PWE and IND

The following principles also apply for the service data communication:

- Only one request must be enabled per Slave, i.e. the process of a service data communication must take place in the following manner:
  1. Enable the service data function from the Master.
  2. Wait for the controller response.
  3. Delete the service data function by entering zero after describing the address range *service data*.
  - A current request can always be deleted with the function *No request* (describe the address range, service data, with zero
- In the Master, ensure via the programme or via the *Control / observe variable*, that the value in PKE is entered only after the valid values in PWE and IND.
- If the Master receives a response identification different that the expected one, this must be intercepted in the Master (PLC).
- The optional module PROFIBUS Slave for the b maXX® controller does not expect any acknowledgement from the Master, whether or not the response from the controller has been received.

5.5 Service data communication

5.5.1 Read parameter (word or double word)

Structure of the sent PKW range:

PKE	IND	PWE 1	PWE 2
1xxx_hex	0000_hex	0000_hex	0000_hex

- Request identification for reading a parameter value: 1
- Parameter number in the PNU field of the PKE.
- Index field (IND) always set to 0.

If the request is successfully executed, the following replies are sent back depending upon the format of the parameter (word or double word):
For word parameters, the response identification is 1 and the content of the parameter is in PWE 2.

PKE	IND	PWE 1	PWE 2
1xxx_hex	0000_hex	0000_hex	xxxx_hex

For double word parameters, the response identification is 2 and the content of the parameter is in PWE 1 (High word) and PWE 2 (Low word).

PKE	IND	PWE 1	PWE 2
2xxx_hex	0000_hex	xxxx_hex	xxxx_hex

If an error occurs while executing the request, the response identification 7 (request cannot be executed) is sent back and the cause of error specified in detail in the PWE 2 field:

PKE	IND	PWE 1	PWE 2
7xxx_hex	0000_hex	0000_hex	xxxx_hex

Possible causes of error

- Previous service data communication was not deleted with *No request* (PKE = 0).

Example

The parameter Encoder 1 revolution actual value (P0392 => 0188_hex) should be read with the service data function. For this, the following settings are made in the output range of the service data:

PKE	IND	PWE 1	PWE 2
1188_hex	0000_hex	0000_hex	0000_hex

As an acknowledgement for *Reading without error* the following response is registered in the input range:

PKE	IND	PWE 1	PWE 2
2188_hex	0000_hex	xxxx_hex	xxxx_hex

In the PWE 1 and PWE 2, the double word value of the parameter is Encoder 1 revolution actual value (P0392).
In the event of an error, the following information is supplied:

PKE	IND	PWE 1	PWE 2
7188_hex	0000_hex	0000_hex	00XX_hex

In the PWE 2, the error identification is 00XX_hex.

5.5.2 Write parameter (word)

Structure of the sent PKW range:

PKE	IND	PWE 1	PWE 2
2xxx_hex	0000_hex	0000_hex	xxxx_hex

- Request identification for writing a word parameter: 2
- Parameter number in the PNU field of the PKE.
- Index field (IND) always set to 0.
- Value to be written in PWE 2

The error-free execution is confirmed with the response identification 1 (PWE transfer word) and the written value in the PWE 2.

PKE	IND	PWE 1	PWE 2
1xxx_hex	0000_hex	0000_hex	xxxx_hex

If an error occurs during the execution, the response identification 7 (request cannot be executed) is sent back and the cause of error specified in detail in the PWE 2 field:

PKE	IND	PWE 1	PWE 2
7xxx_hex	0000_hex	0000_hex	xxxx_hex

Possible causes of error

- The parameter to be written is parameterised as a cyclic setpoint or actual value and service data communication is not required for the time being.

- The parameter to be written has a double word format
- The previous service data communication was not deleted with *No request* (PKE = 0).

Example

The parameter - set operating mode (P1000 => 3E8_hex) should be set to the value 6 (reference travel operation).

PKE	IND	PWE 1	PWE 2
23E8_hex	0000_hex	0000_hex	0006_hex

The following response is sent back in the event of *Writing without errors*:

PKE	IND	PWE 1	PWE 2
13E8_hex	0000_hex	0000_hex	0006_hex

The PWE contains the copy of the value that was written.

The following response is sent back in the event of an error:

PKE	IND	PWE 1	PWE 2
73E8_hex	0000_hex	0000_hex	0011_hex

The PWE 2 contains the error identification 11_hex. The value cannot be written for the time being.

5.5.3 Write parameter (double word)

Structure of the sent PKW range:

PKE	IND	PWE 1	PWE 2
3xxx_hex	0000_hex	xxxx_hex	xxxx_hex

- Request identification for demanding a parameter description element: 3
- Parameter number in the PNU field of the PKE.
- Index field (IND) always set to 0.
- Value to be written in PWE 1 (High word) and PWE 2 (Low word).

The error-free execution is confirmed with the response identification 2 (PWE transfer double word) and the written value in the PWE 1 and PWE 2.

PKE	IND	PWE 1	PWE 2
2xxx_hex	0000_hex	xxxx_hex	xxxx_hex

If an error occurs during the execution, the response identification 7 (request cannot be executed) is sent back and the cause of error specified in detail in the PWE 2 field :

PKE	IND	PWE 1	PWE 2
7xxx_hex	0000_hex	0000_hex	xxxx_hex

Possible causes of error

- The parameter to be written is parameterised as a cyclic set value and a write access is presently not possible.
- The parameter to be written has a Word format

- The previous service data communication was not deleted with *No request* (PKE = 0).

5.6 Diagnostic function PROFIBUS-DP

The integrated diagnostic functions of the PROFIBUS-DP enable the reading of status information from the DP Slaves. Here, one must ensure that the cyclic communication for this function is stopped and no setpoint and actual values are transferred via the bus.

NOTE
If the communication check is enabled in the controller, an error reaction is triggered when this diagnostic function is enabled, since the cyclic transmission of the setpoint and actual values is stopped.

A

APPENDIX A - ABBREVIATIONS

A	ampere
+|IAist|	amount of rotor current actual value (pos. signal)
AA	function module Analog Outputs
Abs.	paragraph (in German text)
AC	alternating current
ADR	address byte
AE	function module Analog Inputs
AIO	analog input/output
AK	command-/knowledge ID
AM	▸ asynchronous motor ▸ function module Drive Manager
ASF	rotor contactor release
BACI	Baumüller drives communication interface
BAPS	Baumüller drives parallel interface
BASS	Baumüller drives serial interface
BB	ready-to-use
BBext	ready-to-use (external)
BBint	ready-to-use (internal)
BCC	block check character
BE	▸ construction element ▸ handling unit
BEDAS	operation data memory
BOF	begin of file
BS	function module operating system
BSA	analog reference potential
BSD	digital reference potential
BSE	external reference for 24 V controller inputs
CPU	central processing unit
DA	digital/analog
DAC	digital/analog converter
DB	data byte (8 bits)
DC	▸ direct current ▸ drive-control
DE	function module Digital Inputs
DES	digital input adjust
DIN	Deutsches Institut für Normung e.V., German standards institute
DIO	digital input/output
DOPPELW	double word (32 bits)
DSV	function module Data Set Management
DW	data word (16 bits)
DWort	double word (32 bits)
EMK	electromagnetic constant
EMC	electromagnetic compatibility
EN	european standard
EOF	end of file
ES	function module Infeed
ESD	electrostatic discharge
Ext	function module Current Monitoring
EXT, ext	external
FBS	BEDAS missing
FI	erroneous current
FLG	error position encoder signal
FPH	missing phase
FTO	error motor encoder signal
GL	technology module Synchronous Operation
GRE	rectifier end position
HE	main contactor ON

HLG	function module Ramp Generator
HM	main menu
HS	main contactor
HSE	main contactor ON
HSF	main contactor release
HW	high word
I	function module Current Control
Î	peak current, undefined curve form
I2t	function module Overload Monitoring
I_{AC}	effective value, alternating current
I_{Aist}	rotor current actual value
I_{DC}	effective value, direct current
I_{eff}	effective current, alternating current
I_F	field current
I_{Fmax}	max. field current (rated current)
I_{Fmin}	min. field current
I_{FSoll}, I_{Fset}	field current setpoint value
IEE	incremental encoder emulation
ID-Nr.	identification no.
IKG	function module Incremental Encoder
Inc	counting unit of position
IND	index
Inc	graduation of incremental encoder
INC.	incremental
IPM	intelligent power module
I_{soll}, I_{set}	rotor current setpoint value
IW	actual valuet
IWK	actual value channel
$IxR_{operation}$	IxR-compensation at “operation“
$IxR_{slow\ motion}$	IxR-compensation at “slow motion“
IZK	overcurrent in intermediate circuit
KT	function module Coordinate Transformation
L	function module Position Control
LED	light emitting diode
LGE	length of telegram
LT	function module Power Section
LW	low word
M	function module Drive Manager
M24	reference potential 24 V
MM	▸ Function module Motor Model ▸ torque encoder
$	prefix for hexadecimal number
Mot	function module Field Angle Calculation
MR1	torque direction 1
MR2	torque direction 2
MT	function module Motor Temperature
mtr.	medium fast blow
n = 0	speed = 0
N	function module Speed Control
n_{ist}, n_{act}	speed actual value
n_{max}	max. speed
n_{min}	min. speed
NMX	max. speed exceeded
NN	height above sea level
n_{SG}	slow motion speed
n_{soll}, n_{set}	speed setpoint value
OPM	optional power module
P	identification number
PBE	parameter description
PELV	protected low voltage with secure separation - earthed
PKE	parameter identifier
PKW	parameter identifier value
PNU	parameter number
POS	technology module Positioning
PWE	parameter value
PWM	function module Puls Width Modulation
PZD	process data
R	reserved
R_A	rotor resistance
RA	function module Relay Output
Res	function module Resolver Evaluation
RF	controller release
RS	controller blocking
SE	screen earth
SELV	protected low voltage with secure separation
SF	drag error, position deviation error
SGR	current limit reached
SH	quick stop

SL	protective conductor
SM	synchronous motor
STX	start of text
SV	function module Service Interface
SW	▸ setpoint value ▸ software
SWG	function module Setpoint Value Generator
SWK	setpoint value channel
TBA	overtemperature of ballast resistor
TKK	overtemperature of heatsink
TM	motor temperature probe
TMO	motor overtemperature
U	voltage
Û	peak voltage
U_A	rotor voltage
U_{AC}	effective value, alternating current
U_{DC}	effective value, direct current
U_{eff}	effective value, alternating current
UM	sub menu
USS	function module USS-protocol
UVS	supply voltage too low
USS®	Siemens trademark, universal serial interface
U_{ZK}	intermediate circuit voltage
V	volts
VBG	Verwaltungs-Berufsgenossenschaft, German administration occupation co-operative
VDE	Verband deutscher Elektrotechniker, German electrotechnical association
VE	linking element
WRE	inverter end position
X	contact bar, connector, connection
ZK	DC link, intermediate circuit

B

APPENDIX B - GSD FILE

B.1 GSD File

The GSD or type file contains all features of the PROFIBUS Slave, so that it can be projected via the operating programmes of the PROFIBUS Master. The format of the GSD file is defined in the standard *EN 50170 Volume 2 PROFIBUS* . Thus, every Master can read the information from the GSD file.

NOTE

If problems arise in the PLC interfaces while reading the GSD file, the PLC manufacturer must be contacted to get information on the known problems with his interfaces while reading GSD files.

```
;==================================================================
;
; Baumüller Nürnberg GmbH
; Ostendstr. 80 - 90
; D - 90482 Nürnberg
; Tel:      ++49 (0)911 5432-0
; Fax:      ++49 (0)911 5432-417
; Internet: http://www.baumueller.de
;
;==================================================================
; GSD-Datei für Baugruppe PROFIBUS-DPV0
;==================================================================
;
; Name  : BM4PRO.GSD
; Stand : V 01.04 (11.03.2005)
;
;==================================================================
;
; Änderungen:
; 03-09-25      OKOe        Module für Soll-/Istwert im WORDformat eingefügt
; 03-10-06      OKOe        - WORD-Formate-Module für Soll-/Istwert entfernt
;                           - CfgByte für Modul "Bedarfsdatenmodul" auf 0xF3
; 03-11-04      OKOe        - Mehrere Konfigurationsmodule geändert
; 03-11-10      OKOe        - Bereicheskonsistente Mod + Bedarfsdaten !?
; 03-12-15      OKOe        - diverse Einstellungen korrigiert
; 04-12-09      OKOe        - Soll und Istwerte in gesamtmodulen auf 7 Begrenzt
; 05-03-11      OKOe        - Bildernamen angepasst
;
;==================================================================
;
```

```
#Profibus_DP
; Unit-Definition-List:
GSD_Revision=1
Vendor_Name="BAUMUELLER"
Model_Name="b maXX PBDPV0"
Revision="REV 1.03"
Ident_Number=0x0008
Protocol_Ident=0
Station_Type=0
Hardware_Release="REV 1.00"
Software_Release="REV 1.03"
9.6_supp=1
19.2_supp=1
93.75_supp=1
187.5_supp=1
500_supp=1
1.5M_supp=1
3M_supp=1
6M_supp=1
12M_supp=0
MaxTsdr_9.6=60
MaxTsdr_19.2=60
MaxTsdr_93.75=60
MaxTsdr_187.5=60
MaxTsdr_500=100
MaxTsdr_1.5M=150
MaxTsdr_3M=250
MaxTsdr_6M=450
MaxTsdr_12M=800
Redundancy=0
Repeater_Ctrl_Sig=0
24V_Pins=0
Implementation_Type="DPC31"
Bitmap_Device="bmaXX_ok"
Bitmap_SF="bmaXX_sf"
Bitmap_Diag="bmaXX_er"
;
; Slave-Specification:
OrderNumber="BM4-O-PRO-01"
;
Freeze_Mode_supp=0
Sync_Mode_supp=1
Auto_Baud_supp=1
Set_Slave_Add_supp=1
Min_Slave_Intervall=10
Max_Diag_Data_Len=16
Slave_Family=1 ; Antriebe; wenn GSD nicht eingelesen werden kann, diese Zeile auskommentieren mit ";"
;
; UserPrmData: Length and Preset:
User_Prm_Data_Len=3
User_Prm_Data=0x00,0x00,0x00
;
Modular_Station=1
Max_Module=4
Max_Input_Len=40
Max_Output_Len=40
Max_Data_Len=80
;
; Module-Definition-List:
;
;
Module="service data (not consistent.)" 0x73
EndModule
Module="status/control module" 0x71
EndModule
```

```
;
; Standardmodule Konsistenz Wort
;
Module="1 actual value, 1 set value"   0x73
EndModule
;
Module="2 actual values, 2 set values" 0x75
EndModule
;
Module="4 actual values, 4 set values" 0x79
EndModule
;
Module="7 actual values, 1 Sollwert" 0xC0,0x4F,0x43
EndModule
;
Module="7 actual values, 7 set values" 0xC0,0x4F,0x4F
EndModule
;
; Standardmodule Konsistenz gesamter Bereich
;
Module="range 1 actual / set value"   0xF3
EndModule
;
Module="range 2 actual / set values" 0xF5
EndModule
;
Module="range 4 actual / set values" 0xF9
EndModule
;
Module="range 5 actual / set values" 0xFB
EndModule
;
Module="range 6 actual / set values" 0xFD
EndModule
;
Module="range 7 actual / set values" 0xFF
EndModule
;
Module="range 7 actual / 1 Sollwert" 0xC0,0xCF,0xC3
EndModule
;
; User Configuration
;
; Module wort-organisiert mit Sendedaten
;
Module = "1 cycl. actual value  ( 2 AE)"  0x51
EndModule
Module = "2 cycl. actual values ( 4 AE)"  0x53
EndModule
Module = "3 cycl. actual values ( 6 AE)" 0x55
EndModule
Module = "4 cycl. actual values ( 8 AE)"  0x57
EndModule
Module = "5 cycl. actual values (10 AE)" 0x59
EndModule
Module = "6 cycl. actual values (12 AE)" 0x5B
EndModule
Module = "7 cycl. actual values (14 AE)" 0x5D
EndModule
Module = "8 cycl. actual values (16 AE)" 0x5F
EndModule
;
; Module wort-organisiert mit Empfangsdaten
;
Module = "1 cycl. set value  ( 2 AA)"  0x61
```

```
EndModule
Module = "2 cycl. set values ( 4 AA)"  0x63
EndModule
Module = "3 cycl. set values ( 6 AA)"  0x65
EndModule
Module = "4 cycl. set values ( 8 AA)" 0x67
EndModule
Module = "5 cycl. set values (10 AA)" 0x69
EndModule
Module = "6 cycl. set values (12 AA) " 0x6B
EndModule
Module = "7 cycl. set values (14 AA)" 0x6D
EndModule
Module = "8 cycl. set values (16 AA)" 0x6F
EndModule
```

B.2 Bitmaps

NOTE

The names of the Bitmaps cannot be changed since these are integrated with the GSD file in some project planning interfaces of PROFIBUS Master systems.

A) Bitmap bmaXX_ok.BMP

B) Bitmap bmaXX_er.BMP

Figure 6: Icons

C

APPENDIX C - TECHNICAL DATA

In this appendix, you will find an overview of the Technical Data for the optional card Profibus Slave for b maXX® controller **BM4-O-PRO-01**.

C.1 PROFIBUS DP optional card: Technical features

Baudrates	9.6 kBit/s, 19.2 kBit/s, 31.25 kBit/s, 45.45 kBit/s, 93.75 kBit/s, 187.5 kBit/s, 500 kBit/s, 1.5 MBit/s, 3.0 MBit/s, 6.0 MBit/s, 12.0 MBit/s
Physical Layer	IEC 61158
PROFIBUS connection	DPC31
Potential isolation	Opto-electronic coupler, DC/DC converter
Connector	9-pole Sub-D socket
Operating voltage	+5 V internal
Current consumption	350 mA
Ambient conditions	Same as the basic device b maXX® 4400
Storage conditions	Same as the basic device b maXX® 4400
Transport conditions	Same as the basic device b maXX® 4400

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Revision overview

Version	Status	Modifications
5.03045.03	11.03.05	Section revision overview inserted, GSD-file changed from revision 01.03 to 01.04, number of set and actual values limited to 7

Notices:

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