AMKASYN
Servo inverters KU and KE/KW option card PROFIBUS-DP

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AMKmotion
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About this documentation

Name: PDK_025835_KUKW_Option_PB1_en

Use: Hardware and connection description for option card KU-PB1 and KW-PB1

What has changed:

Version	Change	Subject	Letter symbol
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Content

1 Option card PROFIBUS-DP

The option card PROFIBUS-DP allows the communication between the PROFIBUS MASTER and the inverter via the AMK Fieldbus Protocol AFP for drive commanding.

The option card PROFIBUS-DP can be installed on KU compact inverters (option KU-PB1) and KW compact inverters (option KW-PB1).

The option card is installed:

On KU:	KU-PB1 (Order no.O566) on controller card in option slot 2
On KW:	KW-PB1 (Order no. O667) on controller card in option slot 1 or option slot 2

1.1 PROFIBUS specific features:

Through the Option card PROFIBUS-DP the inverter is connected to a PROFIBUS MASTER according to DIN 19245, section 3 (DP: Decentralized Peripherals).

Systems with parallel connected I/O signals can be simplified by use of the Option card PROFIBUS-DP and serial transmission via PROFIBUS:

- Line topology: Two-wire transmission according to RS485, with surge impedance termination on both ends (no termination resistors on board!).
- Maximum 32 stations per line (can be expanded by a REPEATER to a maximum of 4 lines → max. 122 stations)
- Maximum Baud rate: 12 Mbit/s (with automatic adaption to the MASTER Baud rate)
- Cable length depending on cable type and Baud rate (see DIN 19245, section 3: e. g. 200 m with cable type A and 1,5 Mbit/s).
- Filter connectors must be used for Baud rates above 3 Mbit/s. PROFIBUS termination connectors from ERNI (ID-No.: 103648) are recommended by AMK.
- Setting of a two-digit user address number is possible via two hexadecimal coded rotary switches S1/S2. The useful address rang is 00...7Ehex (0...126). The least significant digit is set at S1, the most significant digit at S2. If setting of the user address is required by software then on the rotary switches „13“ hex must be selected (S2: 1, S1; 3). The user address number now must be entered into ID34023 (see below).
- SLAVE Interface for 32 INPUT / 32OUTPUT bytes maximum (defined in ID32425, see below).
- All required characteristic values for the MASTER configuration, e. g. PNO ID-No. = 1355hex (PNO → PROFIBUS USER ORGANISATION), automatic Baud rate adaption to the MASTER Baud rate (up to 12 Mbd), … are described in File *:gsd according to the PROFIBUS Standard (GSD → “GeräteStammDaten” Basic Profibus Device Description”, see appendix: PROFIBUS-DP Gerätestammdaten).

1.2 Parameters used for communication:

ID34023: BUS station address

For station address setting by software in ID34023 the rotary address switches S1/2 must be set to “13” (S2: “1”, S1: ”3”). All permissible switch values different from “13” are directly specifying the BUS station address

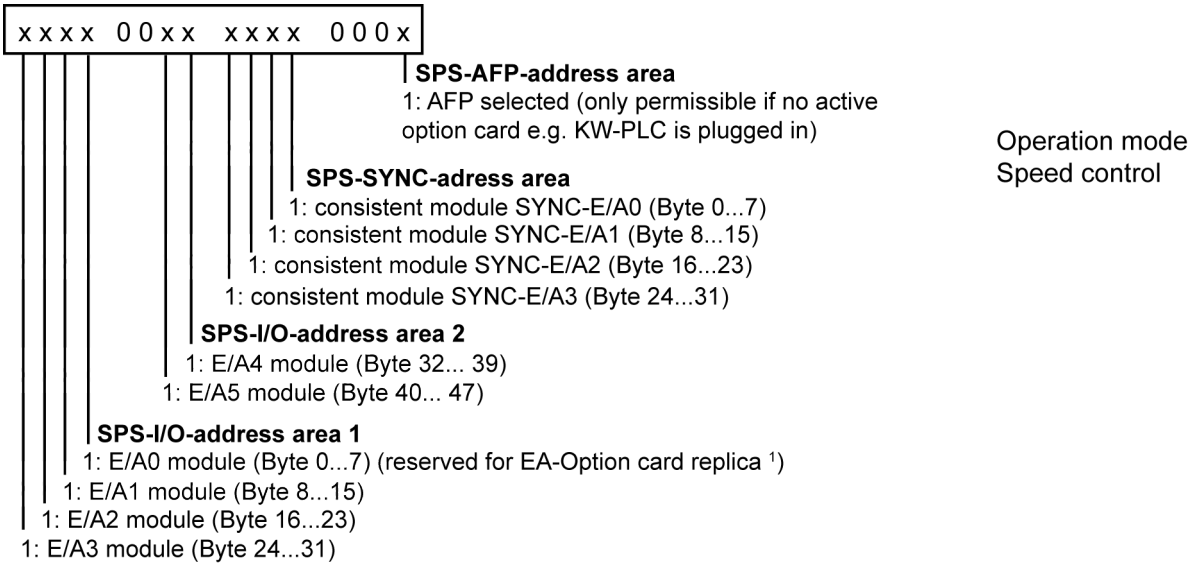
Permissible value range: 0...126 (Values > 126 generate „0“)

ID34024: BUS transmission rate

0: Automatic adaption to the MASTER Baudrate

ID34025: BUS mode

(Default value = 1: AFP selected, I/O modules not activated)



The I/O model of I/O option cards in slot 1 or 2 is always copied to the PLC I/O address area (byte 0...7). If no PLC card is inserted but instead an I/O and a Profibus option card the I/O module can be addressed via Profibus as an external I/O module, i.e. outputs can be written to and inputs read.

- E/I Inputs → E-PDP, A-PDP → A/O Outputs
- The modules serve the internal I/O structures via the PROFIBUS: A-PDP → Inputs, Outputs → E-PDP
- For the PROFIBUS MASTER the AFP module is the 1st module, the SYNC-I/O0 module is the 2nd module, ... (not activated modules are ignored at counting!)
- A maximum of 4 modules are selectable simultaneously. Only 2 of these modules may be consistent modules (1 Module → 8 INPUT and 8 OUTPUT bytes)

Examples:

With ID34025 = 0001hex:	Only the AFP module is selected (default setting).
With ID34025 = 4130hex:	Es sind die Module SYNC-E/A0 und SYNC-E/A1, das Modul lHW-E/A1 und das Modul E/A2 angewählt. Aus Sicht des Masters ist das Modul SYNC-E/A0 das erste Modul, SYNC-E/A0 das zweite, HW-E/A0 das dritte und E/A2 das vierte Modul.The modules SYNC-I/O0, SYNC-I/O1, HW-I/O1 and I/O2 are selected. For the MASTER SYNC-I/O0 is the 1st module, SYNC-I/O1 is the 2nd, HW-/O1 module is the 3rd and I/O2 is the 4th module.

ID34026: **BUS Mode attribute**

0:AFP Module in INTEL format

1:AFP Module in MOTOROLA format

With the change between INTEL and MOTOROLA format the two bytes in data words and all four bytes in data double words are swapped.

ID34027: **BUS failure behaviour**

Inverter behaviour in case of BUS errors (for class 8 errors see below)

0:No reaction at BUS errors

1:Warning message at BUS errors

2:Error message at BUS errors

The default values must be kept for all communication parameters not used!

After changes of communication parameters the power for the drive system must be turned OFF completely! Wait approx. 30s, then Power UP again. During booting the new data become active.

Errors

Display	E-class	Display text	Cause
2600	1	PDP: Memory space not sufficient	Memory space for PROFIBUS adapter too small (KU/KW module RAM Array too small)
2601	2	PDP: Initialization error	Adapter initialization not possible Additional information via “F2” / ZI ZI = 0: Memory space error ZI = 1: Number of modules not permissible (>4) ZI = 2: Required SPC3 buffer size is not possible ZI = 3: Initialization error (e.g. module address jumper is set) ZI = 4: Parameter reading error ZI = 5: AFP configuration not permissible because of active option card, e. g. PLC card ZI = 6: Number of SYNC-I/O modules > 2
2602	8	PDP: Line interruption	Line is interruped (inverter reaction according to ID34027)
2603	8	PDP: MASTER inactive	Out of data exchange mode (e.g. after a watch dog error. inverter reaction according to ID34027)
2604	4	PDP: Illegal Fieldbus handshake code	Illegal fieldbus handshake code (e.g. SERVERERROR, SERVERWARNING, ...) Additional information = 1: Input handshake Additional information = 2: Output handshake
Comment for error classes (E class): 1 = FATAL_ERROR_OPT_MODUL 3 = ERROR_OPT_MODUL 8 = BUSFAIL_OPT_MODUL			

Please refer also to the “AMKASYN Diagnostic Messages”

1.3 PROFIBUS-DP interface on KU-PB1 / KW-PB1

- 2-wire bus interfacing with electrical isolation. Connection through 9 pole D-SUB socket connector (X47)

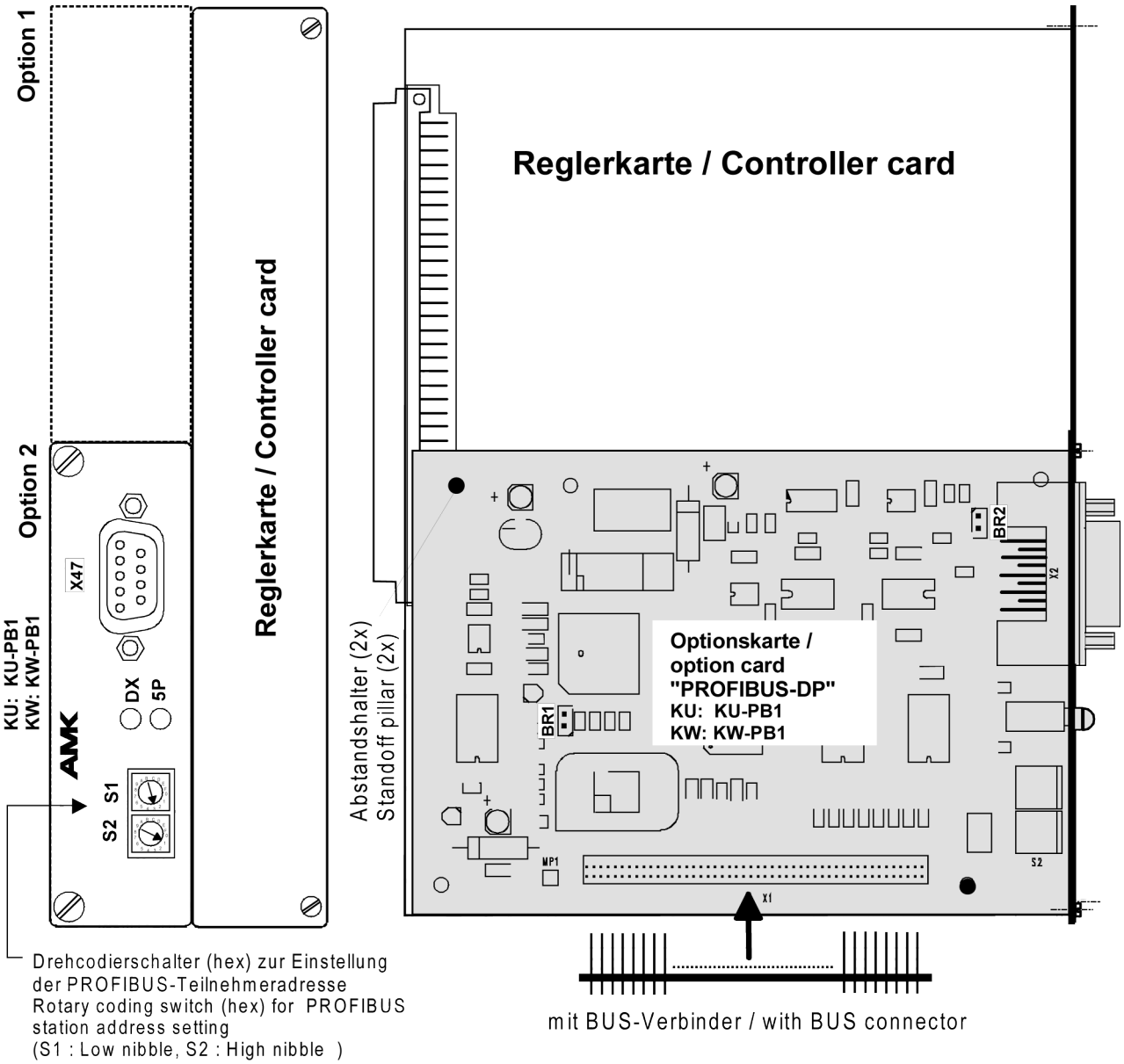
Connector pin assignment X47: RS485 IN/OUT

PIN	Signal	Meaning
1	SHIELD	Shield/PE[1)]
2	N.C.	Not used
3	RxD/TxD-P	Receive/Transmit data P
4	CMTR-P	Repeater control signal
5	DGND	Data signal common
6	VP	Positive supply voltage
7	N.C.	Not used
8	RxD/TxD-N	Receive/Transmit data N
9	DGND*	Repeater control signal (with 300 Ohm to DGND)

1) If Jumper BR2 is set,else N.C.

1.4 Option card PROFIBUS-DP Front view and component mounting diagram

(on KU / KW controller card)



LED (green):	„DXCHG“: User data exchange activated by MASTER.
	“5P”: Option card PROFIBUS-DP ready
Jumpers:	BR1 open, not used
	BR2 Not set:→ X47, PIN 1 open, not connected
	Set:→ X47, PIN 1 connected to option card cable shield
Rotary switch:	S1: User address number (least significant digit)
	S2: User address number (most significant digit)

1.5 Important notes on handling

Because of possible destruction of components by static discharge, touching the electrical connections and the contacts on the solder and mounting side of the option card must be avoided. For discharge first touch PE before handling the option card!

1.6 Installation instructions for ”Option card PROFIBUS-DP”

NOTICE

Electronic components could be destroyed through static discharge!

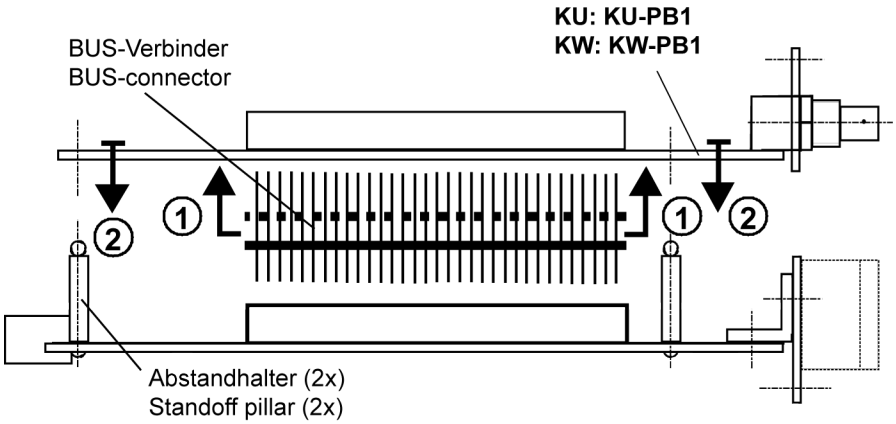
Therefore touching of the electrical connections (e.g. signal and power supply cable or option and controller cards) must be avoided.

Steps to prevent:

- Avoid touching electrical connections and contacts
- During handling the electronic component discharge yourself by touching PE
- Pay attention to the ESD-notes (electrostatic discharge)

The Option card PROFIBUS-DP must be inserted in the appropriate slot on the KU / KW controller card.

1. Ensure that the AMKASYN system is disconnected from the power supply and that the DC BUS capacitors are discharged.
2. Remove blanking plate at the selected slot by loosening the two captive screws.
3. If existing: Loosen the captive screws at the left edge of the option card in the other slot.
4. Loosen the two captive screws at the right edge of the controller card frontplate, then unplug the controller card together with the possible option card as one unit carefully. Place the card only on a non-conductive, padded surface.
5. Press the two snap-in plastic standoff pillars in the corresponding holes on the controller card (assigned to the selected slot 1 or 2).
6. Press the BUS connector with the longer pins fully into the socket connector of Option card PROFIBUS-DP (BUS connector pins must be flush with socket connector).
7. Insert the BUS connector on the Option card PROFIBUS-DP with the short pins into the socket connector on the controller card and at the same time snap in the standoff pillars into the holes of the Option card PROFIBUS-DP.



8. Plug-in the controller card with Option card PROFIBUS-DP as a whole carefully into the card shaft until the controller card is plugged securely in the mating connector.
9. Tighten the captive screws at the front panel of the controller card and of the option card(s).

2 Attached: PROFIBUS-DP Gerätestammdaten Datei - Basic Profibus Device Description”

The characteristics of a Profibus participant are defined in the “Gerätestammdatendatei-Basic Profibus Device Description” *.gsd. Different functionality is available for the option card KU/KW-PB1 depending on the AMKASYN controller card. It is different if KU-R01, KW-R02 or controller card KU-R03, KU-R03P, KW-R03, KW- R03P is used.

The following table shows the link between the “*.gsd-file” and the controller card

controller card	gsd-file	explanation*
KU-R01	KUPB1_101_0051_ 28744.gsd	8 byte data exchange for drive commanding via AFP AMK field bus protocol
KU-R02 KW-R02	AEPB1_200_0203_ 29385.gsd	8 byte data exchange for drive commanding via AFP AMK field bus protocol
KU-R03 KW-R03 from software: 301 03/15 KW-R03P KU-R03P from software: 501 03/15	AEPB1_300_0315_ 29986.gsd	2 possibilities for use : 1. 8 byte data exchange for drive commanding via AFP AMK field bus protocol 2. Data exchange with the AMK plc (up to 6 modules á 8 byte)

* Configuration of the data exchange (8Byte modules) in ID34025 „Bus Mode“.

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