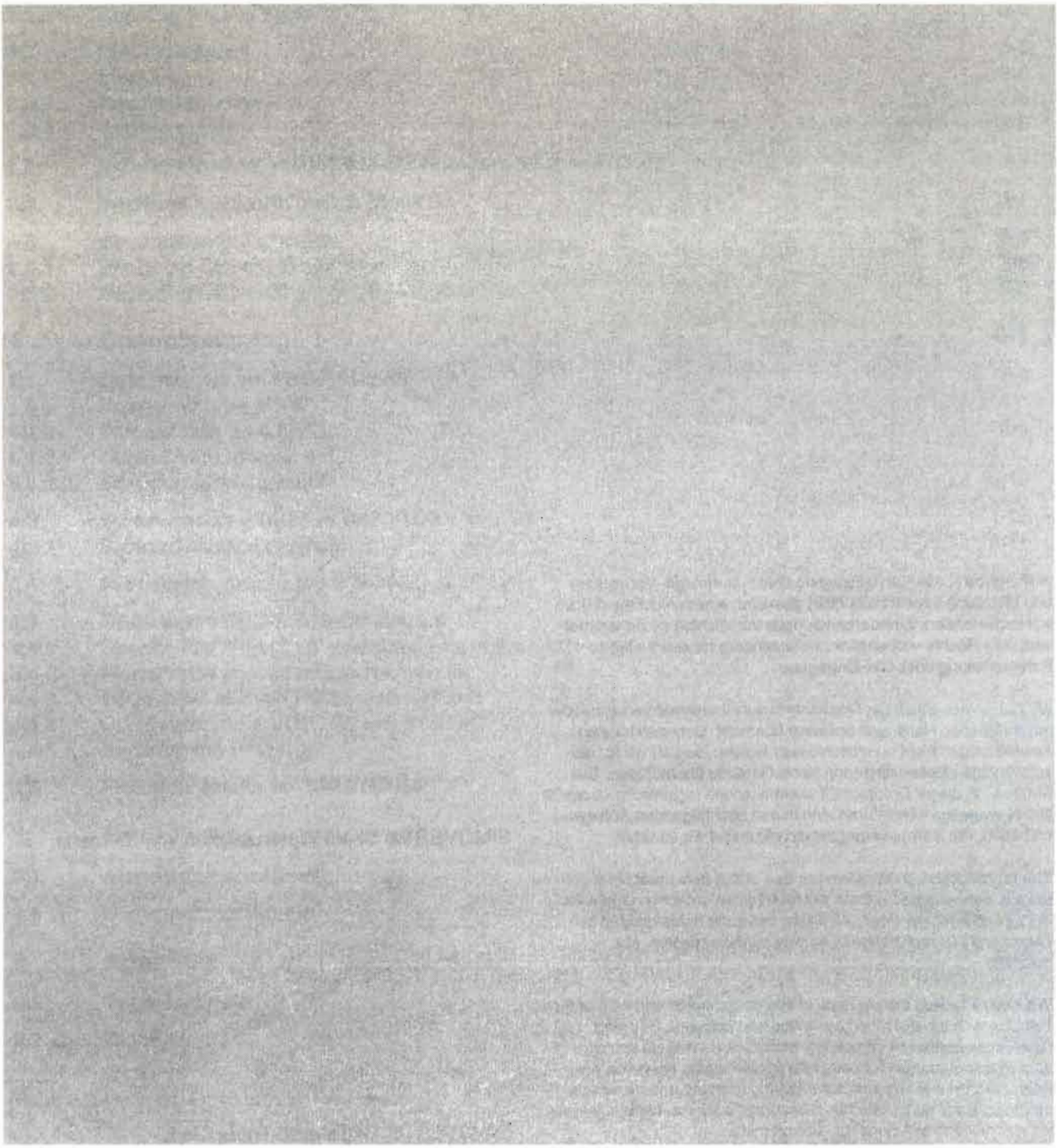
SIEMENS

SIMOREG K 6RA24
Kommunikationsbaugruppe CB24
Communications Board CB24

Betriebsanleitung
Operating Instructions



Ausgabe / Edition: 07.96

Bestell-Nr. / Order-No.: 6RX1241-0AK01

Wir haben den Inhalt der Druckschrift auf Übereinstimmung mit der beschriebenen Hard- und Software überprüft. Dennoch können Abweichungen nicht ausgeschlossen werden, so daß wir für die vollständige Übereinstimmung keine Garantie übernehmen. Die Angaben in dieser Druckschrift werden jedoch regelmäßig überprüft und notwendige Korrekturen sind in den nachfolgenden Auflagen enthalten. Für Verbesserungsvorschläge sind wir dankbar.

We have checked the contents of this document to ensure that they coincide with the described hardware and software. However, differences cannot be completely excluded, so that we do not accept any guarantee for complete conformance. However, the information in this document is regularly checked and necessary corrections will be included in subsequent editions. We are grateful for any recommendations for improvement.

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Contents

Definitions

- QUALIFIED PERSONNAL

  A "qualified person" as used in these instructions and in the warnings on the products themselves is one who is familiar with the installation, assembly, commissioning and operation of the equipment and the hazards involved. In addition, he has the following qualifications:

  1. Is trained and authorized to energize, de-energize, ground and tag circuits and equipment in accordance with established safety practices.
  2. Is trained in the proper care and use of protective equipment in accordance with established safety practices.
  3. Is trained in rendering first aid.

- DANGER

  "Danger" as used in these instructions and in the warnings on the products themselves means that death, grievous injury or extensive damage to property will occur if the appropriate precautions are not taken.

- WARNING

  "Warning" as used in these instructions and in the warnings on the products themselves means that death, grievous injury or extensive damage to property may occur if the appropriate precautions are not taken.

- CAUTION

  "Caution" as used in these instructions and in the warnings on the products themselves means that minor personal injury or damage to property may occur if the appropriate precautions are not taken.

- NOTE

  "Note" as used in these instructions highlights an important item of information about the product or a section of the instructions which requires careful attention.

NOTE

These Operating instructions do not purport to cover all details or variations in equipment, nor to provide for every possible contingency that may arise during installation, operation or maintenance.

Should further information be desired or should particular problems arise that are not covered sufficiently for the Purchaser's purposes, the matter should be referred to the local Siemens Sales Office.

The contents of this instruction manual shall not become part of or modify any prior or existing agreement, commitment or relationship. The Sales Contract contains the entire obligations of Siemens. The warranty contained in the contract between the parties is the sole warranty of Siemens. Any statements contained herein do not create new warranties nor modify the existing warranty.

CAUTION

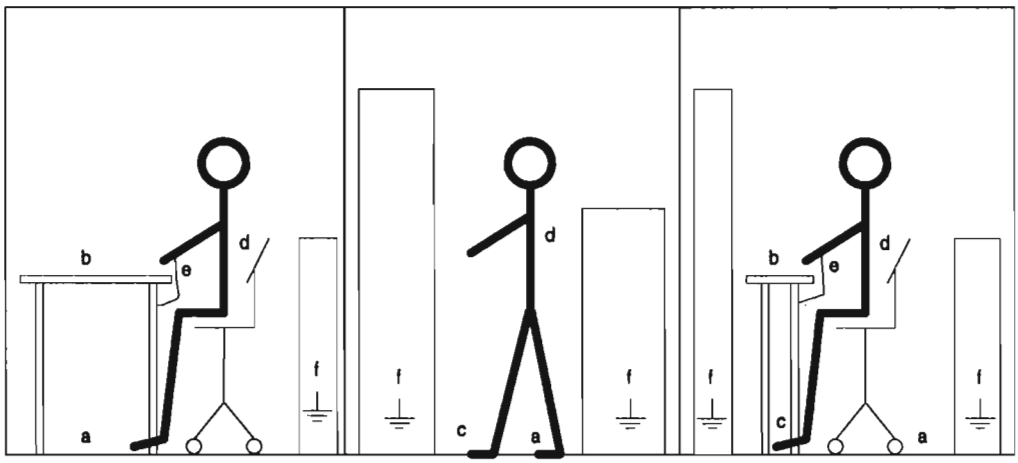
Electrostatically sensitive devices (ESD)

Electronic modules contain electrostatically sensitive devices that can easily be destroyed if they are improperly handled. However, if your work does involve the handling of such devices, please observe the following information:

- should not be touched unless work has to be carried out on them.
- If it is essential for you to touch an electronic module, make sure that your body is electrostatically discharged beforehand.
- Modules must not be allowed to come into contact with electrically insulating materials such as plastic foil, insulating table tops or clothing made of synthetic fibres.
- Modules may only be set down or stored on electrically conducting surfaces.
- The soldering tip of soldering devices must be earthed before they are used on modules.
- Modules and electronic components should generally be packed in electrically conducting containers (such as metallized plastic boxes or metal canisters) before being stored or shipped.
- If the use of non-conducting packing containers cannot be avoided, modules must be wrapped in a conducting material before being put into such containers. Examples of such materials include electrically conducting foam rubber or household aluminium foil.

For easy reference, the protective measures necessary when dealing with electrostatic sensitive devices are illustrated in the sketches below:

a	=	Conductive flooring	d	=	Anti-static overall
b	=	Anti-static table	e	=	Anti-static chain
c	=	Anti-static footwear	f	=	Earthing connections of cabinets



Seated **Standing** **Standing / sitting**

Drives and Standard Products Group
Postfach 3269, D-91050 Erlangen

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07.96

WARNING

Hazardous voltages are present in this electrical equipment during operation.

Non-observance of the safety instructions can result in severe personal injury or property damage.

Only qualified personnel should work on this equipment after becoming thoroughly familiar with all warnings, safety notices and maintenance procedures contained herein.

The successful and safe operation of this equipment is dependent on proper transportation, storage, installation and assembly, and on careful operation and maintenance.

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1 Product description

1.1 General information

CB24 board: Order No.: 6RX1240-0AK01

Operating Instructions **CB24** (Ger./Engl.): Order No.: 6RX1241-0AK01

The **CB24**[1] communications board is the PROFIBUS DP interface for SIMOREG K 6RA24 drive converters.

The **CB24** communications board allows SIMOREG K 6RA24 drive converters to be coupled to higher-level automation devices with PROFIBUS-DP interface. The PROFIBUS-DP bus system is designed for extrememly fast cycle data transfer between higher-level systems, for example SIMATIC S5, SIMATIC S7, SIMADYN D, PC/PGs and field devices, for example drives. The field devices are accessed according to the master-slave procedure, whereby the master represents the higher-level system and the field devices are the slaves connected to the bus system.

The **CB24** communications board is simply installed in the drive converter subrack.

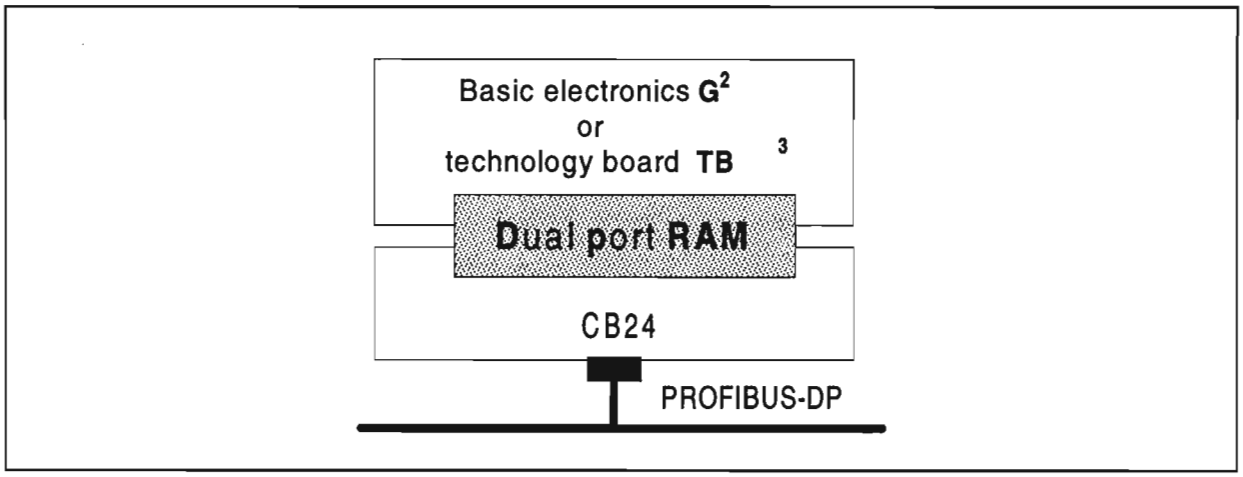

*Fig. 1-1 Coupling the **CB24** to the drive converter via the dual port RAM interface*

PROFIBUS-DP is specified as Standard Draft in DIN 19245 Part 3. Data transfer with SIMOREG K 6RA24 drive converters is realized in accordance with the specifications in the VDI/VDE Directive 3689 "PROFIBUS profile, variable-speed drives". The Directive specifies the net data structure with which the master can access drive slaves. The net data structure is sub-divided into two areas which can be transferred in each telegram:

- Process data, i.e. control words and setpoints and status information and actual values.
- Parameter area to read/write parameter values, e.g. reading-out faults, as well as reading-out information regarding the characteristics of a parameter, for example, reading-out the minimum/maximum limits, etc.

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[1] CB = Communications Board, e.g. **CB24**

[2] G = 6RA24 basic drive converter

[3] TB = Technology-Board, e.g. PT10

The net data structure is designated in the PROFIBUS profile, variable-speed drives (VDI/VDE Directive 3689) as parameter-process data objects (PPO). There are five PPO types: Net data without parameter area with two words or six words of process data or net data with parameter area and two, six or ten words of process data.

When commissioning the bus system, the specific PPO type which is used to address the drive converter from the PROFIBUS DP master, can be configured from the master. The actual PPO type selection is a function of the drive task within the automation group. Process data are always transferred. They are processed with the highest priority and in the shortest time segments. The drive is controlled in the automation group using the process data, e.g. power-on/power-off, setpoint input, etc.

Using the parameter area, the user has free access via the bus system to all of the parameters in the drive converter (G+ if relevant, TB). For example: Reading-out detailed diagnostic information, fault messages, etc. Thus, additional information to visualize a drive can be called-up from a higher-level system, e.g. a PC, without influencing the performance of the process data transfer.

1.2 General technical data

The **CB24** communications board has the following tasks:

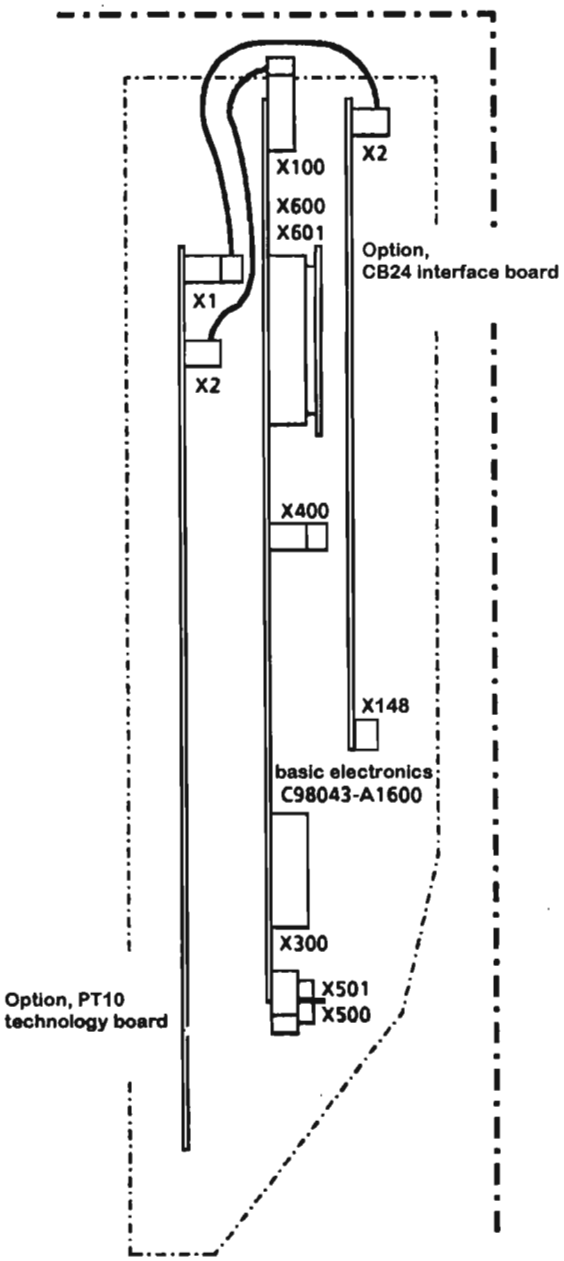
- ⇨ Short-circuit proof and floating RS485 interface.
- ⇨ Connection via plug-in terminals for „incoming" and „outgoing" bus cable. A socket connector with cable housing is included within the scope of supply of CB24.
- ⇨ An external power supply is not required.
- ⇨ Bus terminating resistors can be enabled on the board using DIP-FIX switches.
- ⇨ PPO types 1 to 5 can be supported according to the „variable-speed drives" PROFIBUS profile
- ⇨ Bus cable: Shielded, twisted two-wire cable (SINEC L2 bus cable, Order No.: 6XV1830-0AH10).
- ⇨ Max. baud rate up to 1.5 Mbits /sec.
- ⇨ Distance up to 200 m at 1.5 Mbits/sec., with repeaters, it can be extended up to max. 1000 m.
- ⇨ Maximum number of nodes: 122 (with repeaters).

2 Installation instructions

The CB24 is installed in the mounting rack of the SIMOREG K drive converter in front of the basic electronics (C98043-A1600). The basic electronics is connected through a ribbon cable (connector X100).

When a PT10 technology board is additionally used, the CB24 is connected at PT10 (connector X1)

NOTE
Please note, that for 6RA2413-6DV62-0 units (15 A rated DC current), the 6RX1240-0AM75 (code M75) mounting unit is required when installing the CB24!



Information when installing the CB24:

Before inserting the CB24, remove the support element located at the upper end of the electronics container. Press the plastic tongue, located at the lower side of the support element, towards the inside and then withdraw the support element upwards.

Insert the CB24 into the appropriate position in the electronics container and retain it using the two screws provided.

Then re-insert the support element into its original location.

The electrical connection is realized using a ribbon cable soldered-in at one end. Insert the CB24 ribbon cable into connector X100 of the board electronics.

If a PT10 technology board is already inserted, insert the CB24 ribbon cable into connector X1 of the PT10 technology board.

Fig. 2-1 Installing the CB24 in the rack

3 Connecting-up

WARNING

SIMOREG K drive converters operate at high voltages.

Only qualified personnel may carry-out work on the drive converter.

Death, severe bodily injury or significant material damage may result if these warning instructions are not observed.

After the equipment has been disconnected from the line supply, hazardous voltages can still be present in the drive converter. Thus, the unit may only be opened-up after an appropriate delay time.

The power terminals and control terminals can still be at hazardous potentials even when the motor is at a standstill.

The drive converter must be brought into a no-voltage condition before any work is commenced (power disconnected and locked-out against re-closure).

When working on an open drive converter, it should be observed that live components and parts at hazardous potentials can be touched.

CAUTION

CB24 contains devices which can be destroyed by electrostatic discharge. These components can be easily destroyed if they are incorrectly handled.

Also refer to the ESD cautionary measures in the introduction section, General information.

3.1 Connecting the bus cable

The bus is configured using RS485 technology using shielded two-conductor cables. In this case, the SIEMENS SINEC L2 bus cable should be used (Order No.: 6XV1830-0AH10)!

The bus system can be sub-divided into a maximum of 5 bus segments. The individual bus segments are connected with one another via RS 485 SINEC L2 repeaters (Order No.: 6GK1510-0AC00). A maximum of 32 stations can be connected, including repeaters, at each bus segment.

The permissible cable length of a bus cable segment is dependent on the baud rate (refer to Table 3-3).

3.1.1 Terminal strip X148

The following diagram shows the assignment and connections for terminal strip X148 on the CB24 communications board.

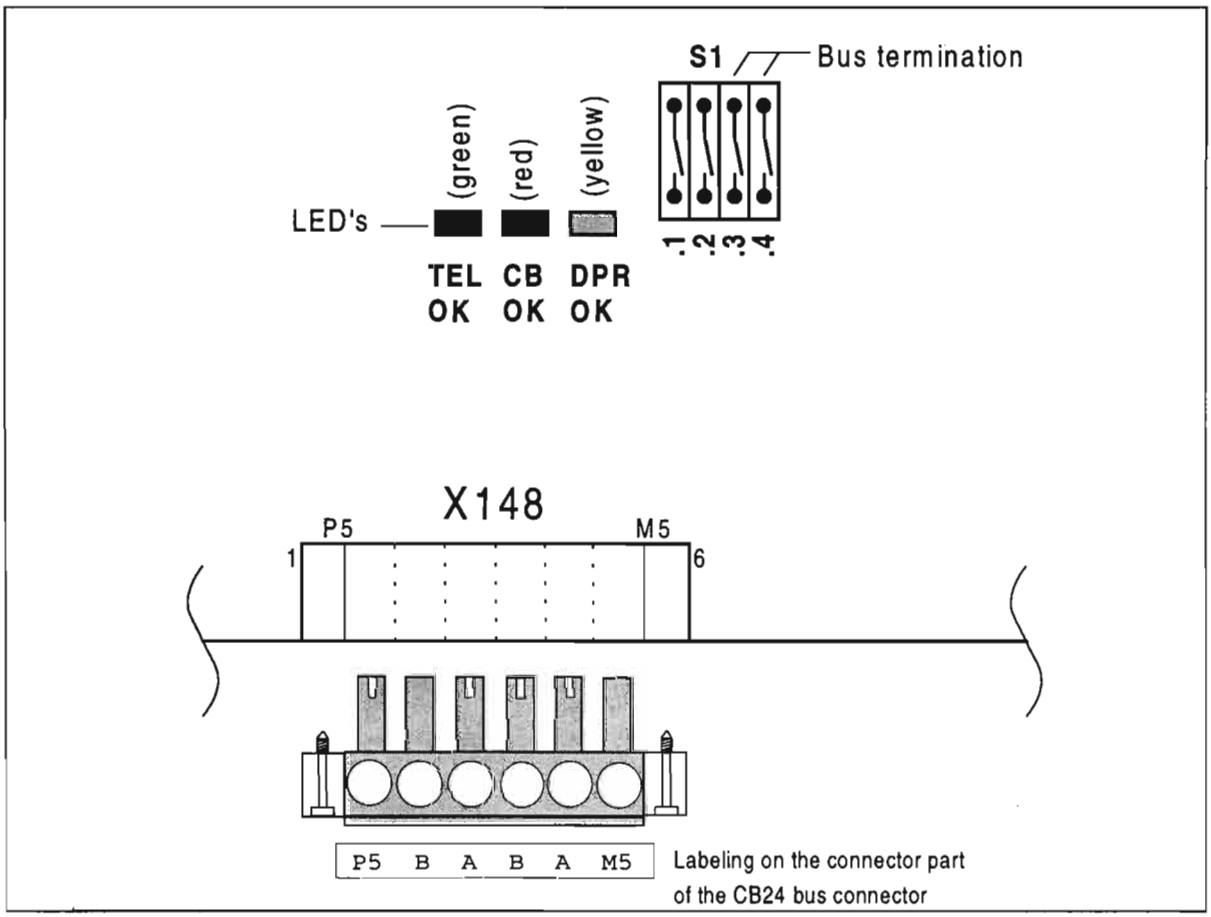


Fig. 3-1 Front view of the **CB24** with diagnostic LEDs, switch block S1, terminal strip X148 and bus connector **CB24**

Terminal	Function, information		Coding pin Terminal strip	Labeling CB24 bus connector
X148.1	P5, 10mA	(floating)		P5
X148.2	B line: RxD/TxD-P	(floating)	X	B
X148.3	A line: RxD/TxD-N	(floating)		A
X148.4	B line: RxD/TxD-P	(floating)		B
X148.5	A line: RxD/TxD-N	(floating)		A
X148.6	Ground M5	(floating)	X	M5

Table 3-1 Assignment of the terminal strip X148 and bus connector

NOTE
Terminals X148.1 (P5) and X148.6 (M5) are only used to feed power to an external bus terminating resistor. At connector X148 the load may not exceed 10 mA.

The bus connector for terminal strip X148 is included with the equipment. This can also be individually ordered from Siemens/ANL A44 Erlangen as spare part (bus connector + housing):

Order designation: Terminal **CB24** / W89070-U2321-A6

Ordering location: ANL A44 Erl. (when ordered with order form)

G391B (when ordering electronically)

The SIEMENS-SINEC-L2 bus cable (Order No.: 6XV1830-0AH10) should be used as bus cable!

3.1.2 Connector X149 (not assigned)

Slot X149 can be equipped with a 9-pin D-sub socket; however, it is not provided as standard. The signals are connected in parallel to terminal strip X148.

Socket No.	Function, information	
6	P5, 10mA	(floating)
3	B line: RxD/TxD-P	(floating)
8	A line: RxD/TxD-N	(floating)
5	Ground M5	(floating)

Table 3-2 Assignment of connector X149

3.1.3 Installing the bus cable

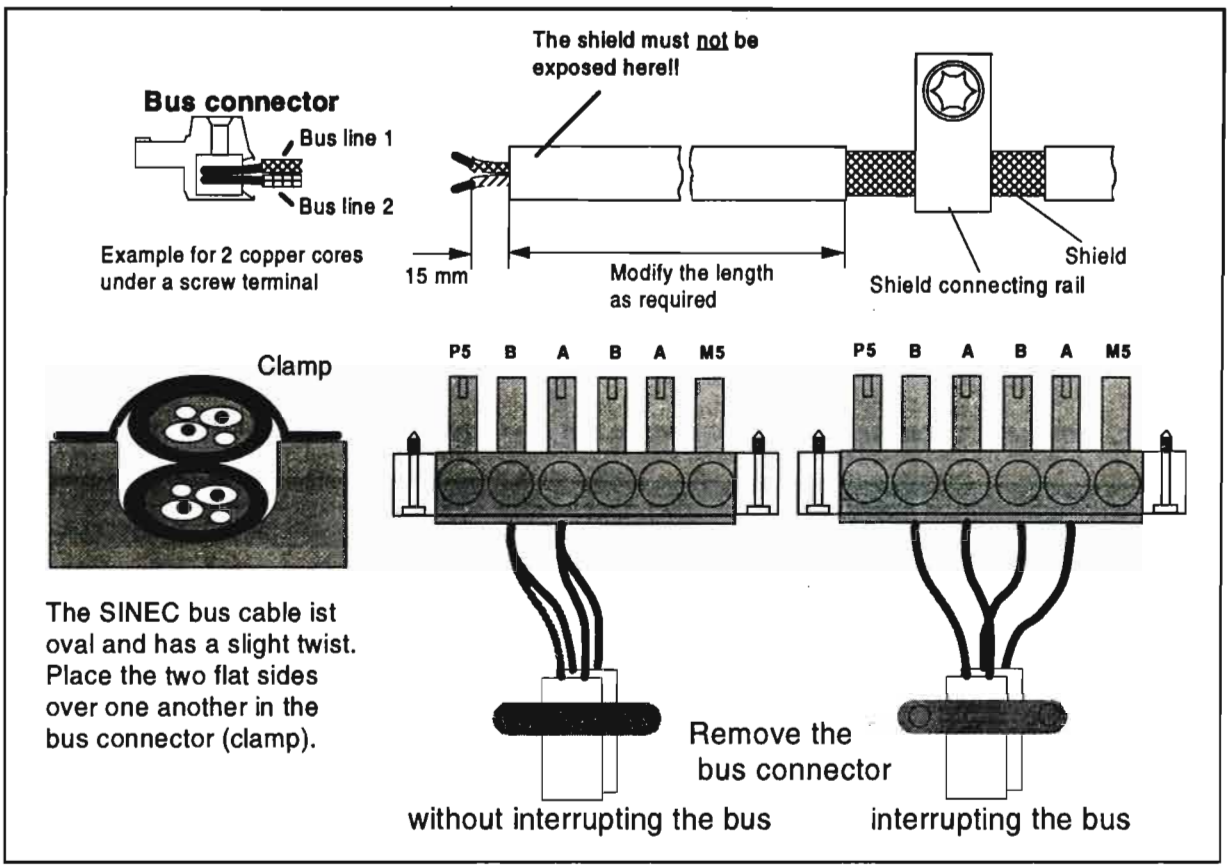


Fig. 3-2 Connecting-up the bus cables

- If two bus cables are screwed under one screw terminal, please ensure that both copper cores are correctly clamped.

Data transfer rate (in kbits/s)	Max. cable length of a segment (in m)
9.6	1200
19.2	1200
93.75	1200
187.5	1000
500	400
1500	200

Table 3-3 Cable length as a function of the data transfer rate

A segment can be extended by using RS485 repeaters.
Recommended: e.g. RS485 SINEC L2 repeater (Order No.: 6GK1510-0AC00).

3.2 EMC measures

The following measures are absolutely necessary to ensure disturbance-free PROFIBUS-DP operation:

3.2.1 Shielding

NOTE
The bus cables must be twisted and shielded and routed away from power cables - minimum 20 cm clearance. The shield must be connected at both ends throught the largest possible surface area, i.e. the shield of the bus cable between two drive converters must be connected at both ends at the drive converter housing. The same is true for the shield of the bus cable between the PROFIBUS-DP master and drive converter. Bus- and power cables may only cross at a 90° angle.

- For the SINEC-L2 bus cable, the shield in the **CB24** bus connector need not be exposed (Fig. 3-2). The shield is connected through clamps at the shield retaining bar in the drive converter housing. When removing the insulation from the conductor ends, ensure that the solid copper core is not damaged.
- Please note that the shield of each bus cable must be at shield potential, both where it enters the cabinet as well as at the drive converter housing!

3.2.2 Potential bonding

Please prevent potential differences (e.g. as a result of different supply feeds) between the drive converters and the PROFIBUS-DP master:

- Use potential bonding conductors:
  - 16 mm^2 Cu for potential bonding conductors up to 200 m
  - 25 mm^2 Cu for potential bonding conductors over 200 m
- Route the potential bonding conductors so that there is the lowest possible surface area between the potential bonding conductor and signal cables.
- Connect the potential bonding conductors to the ground/protective conductor through the largest possible surface area.

3.2.3 Routing cables

Please observe the following when routing cables:

- Never route bus cables (signal cables) close and parallel to power cables.
- Keep signal cables and associated potential bonding conductors as short as possible with the lowest possible distance between them.
- Route power- and signal cables in separate cable ducts.
- Connect shields through the largest possible surface area.

3.3 Bus termination, PROFIBUS-DP (jumpers S1.3 and S1.4)

For disturbance-free PROFIBUS-DP operation, the bus cable must be terminated at both ends using bus terminating resistors (refer to Fig. 3-3). In this case, the bus cable from the first PROFIBUS-DP node to the last PROFIBUS-DP node is considered as one bus cable, so that PROFIBUS-DP must be terminated twice.

For the first bus node (e.g. master) and last bus node (slave), the bus terminating resistors must be switched-in. If the bus-terminating node is a **CB24**, then please close jumpers S1.3 and S1.4 of the DIP-FIX switch S1 on the **CB24** board (refer to Fig. 3-1)!

NOTE
Please note that only the bus terminating resistor for the first bus node (e.g. IM308B) and the last bus node (e.g. **CB24**) are activated! The positions of jumpers S1.3 and S1.4 can easily be seen, even when the **CB24** board is inserted, and it may only be changed when the drive converter is in a **no-voltage** condition!
Data transfer disturbances can occur on the bus! For active bus operation, the devices (**CB24**) must be powered-up if the bus terminating resistor is **switched-in**. As the bus terminating resistor draws power from the connected device (**CB24**), when the device is in a no-voltage condition, the bus terminating resistor is no longer effective! Thus, please ensure that the devices (**CB24**) at both ends of the buses are powered-up! (Also refer to the product information to the Manual „ET 200 distributed peripheral system")

Switch	Function	Status when supplied
S1.3	Bus termination X148	Open (no bus termination)
S1.4	Bus termination X148	Open (no bus termination)

Table 3-4 Bus termination using switch S1

3.4 Interface X148 with switch block S1

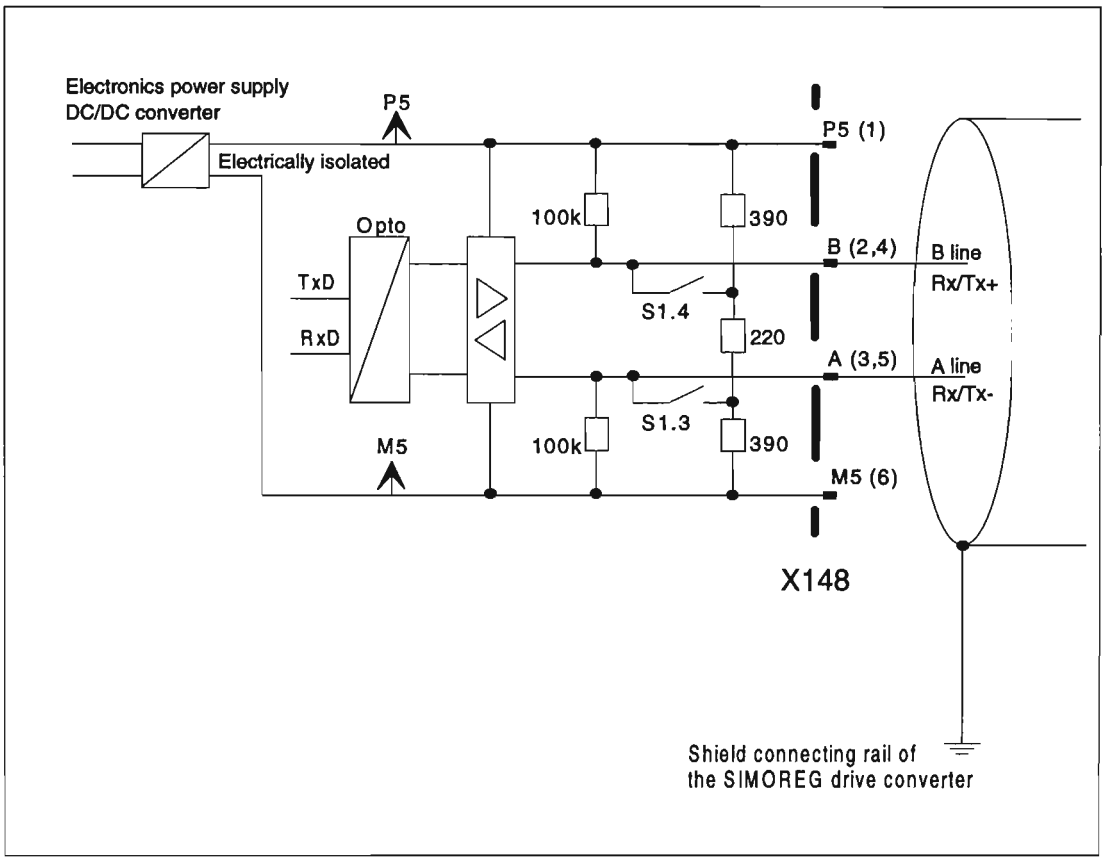


Fig. 3-3 Block diagram of interface X148

3.5 Recommended circuits

3.5.1 Replacing CB24 with bus interruption

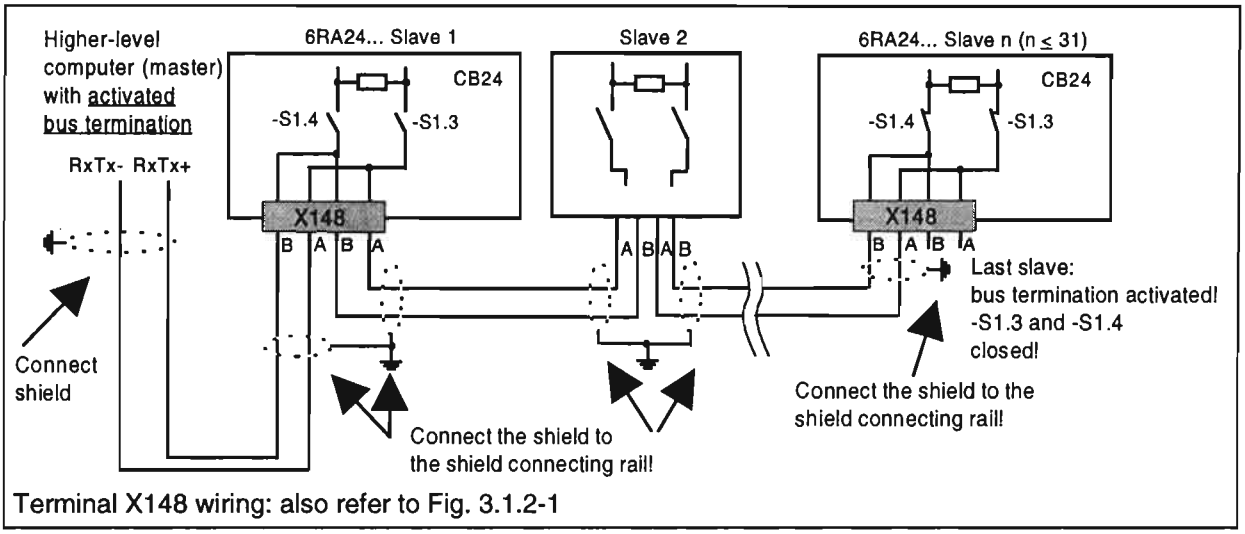


Fig. 3-4 Bus connection interrupted when connector X148 is withdrawn

3.5.2 Replacing CB24 without bus interruption

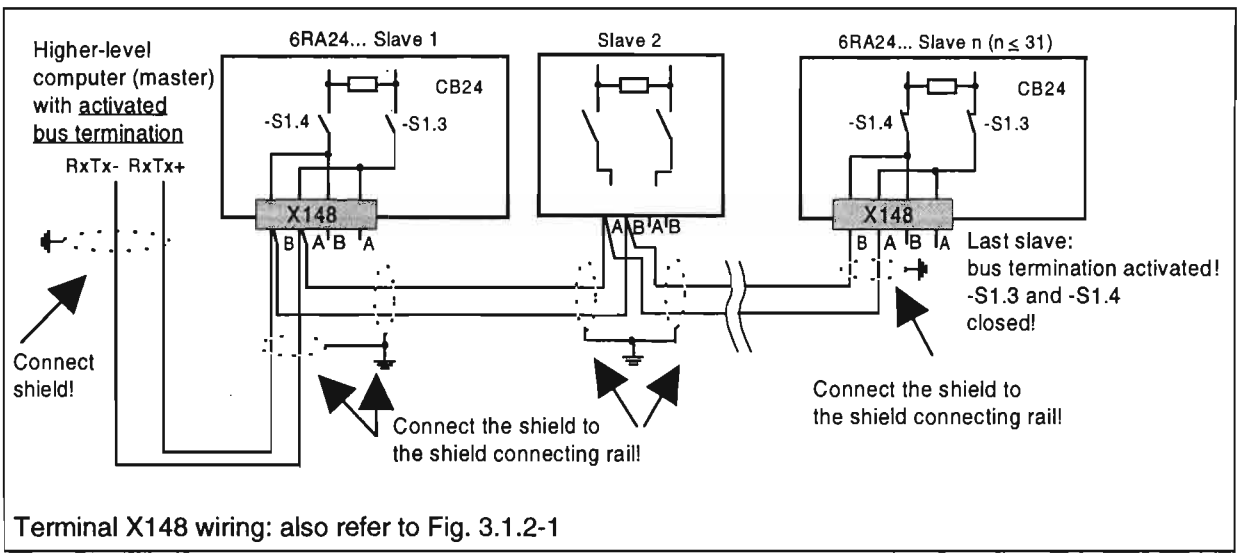


Fig. 3-5 Bus connection not interrupted when connector X148 is withdrawn

4 Commissioning

4.1 Data transfer via PROFIBUS-DP

The net data structure is designated as parameter process data object (PPO) in the "PROFIBUS profile, variable-speed drives" (also refer to Section. 1 „Product description").

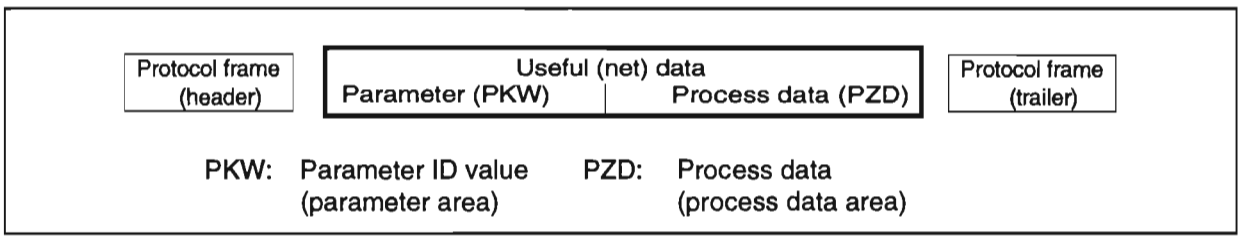


Fig. 4-1 Structure of the net data in the PROFIBUS-DP telegram

There are net data with parameter area (PKW) and process data area (PZD) as well as net data, which only consists of process data.

The PROFIBUS profile, variable-speed drives defines five PPO types. The PPO type is defined when parameterizing using the PROFIBUS-DP master (Section 4.4 CB24 in the PROFIBUS-DP system).

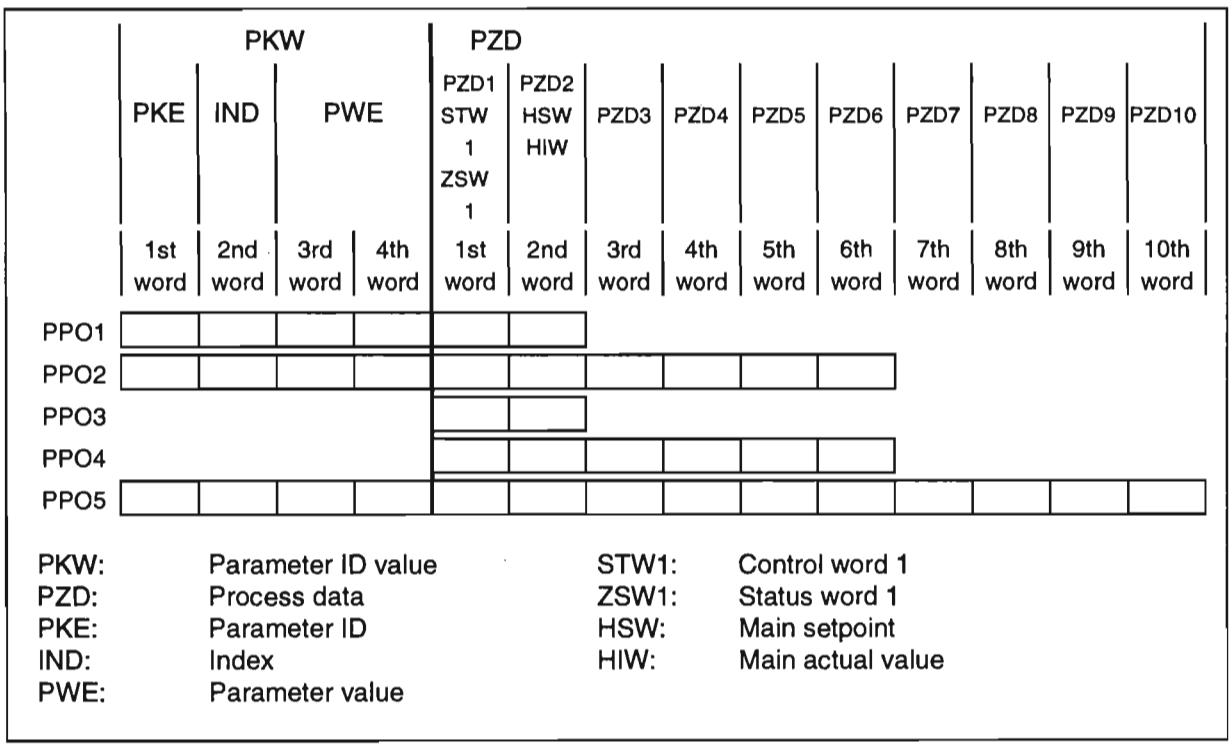


Fig. 4-2 Parameter process data object (PPO types)

The PPO type must be parameterized at the master- and slave sides (exception, refer to 4.2, parameters P924/925), and they must coincide. Several devices connected to the bus can be operated with different PPO types.

The PPO type, set for a particular device, may not be changed during operation.

Not all of the process data words in the telegram must be assigned.

The following table shows as an example for PPO type 2, the telegram contents of a task- and response telegram:

	Master → SIMOREG	**SIMOREG → Master**
PKW 1st word	Parameter ID	Parameter ID
PKW 2nd word	Index to the parameter	Index to the parameter
PKW 3rd word	for SIMOREG zero	for SIMOREG zero
PKW 4th word	Parameter value	Parameter value
PZD 1st word	Control word	Status word
PZD 2nd word	Main setpoint	Main actual value
PZD 3rd word	Setpoint 2 / control word 2	Actual value 2 / status word 2
PZD 4th word	Setpoint 3	Actual value 3 / status word 3
PZD 5th word	Setpoint 4	Actual value 4
PZD 6th word	Setpoint 5	Actual value 5

Table 4-1 Example of PPO type 2 (PKW and PZD)

4.1.1 Parameter area (PKW)

You can implement the „handling and visualizing parameters (read/write)" function using the PKW mechanism (only for PPO types 1, 2 and 5)

The parameter range always covers 4 words.

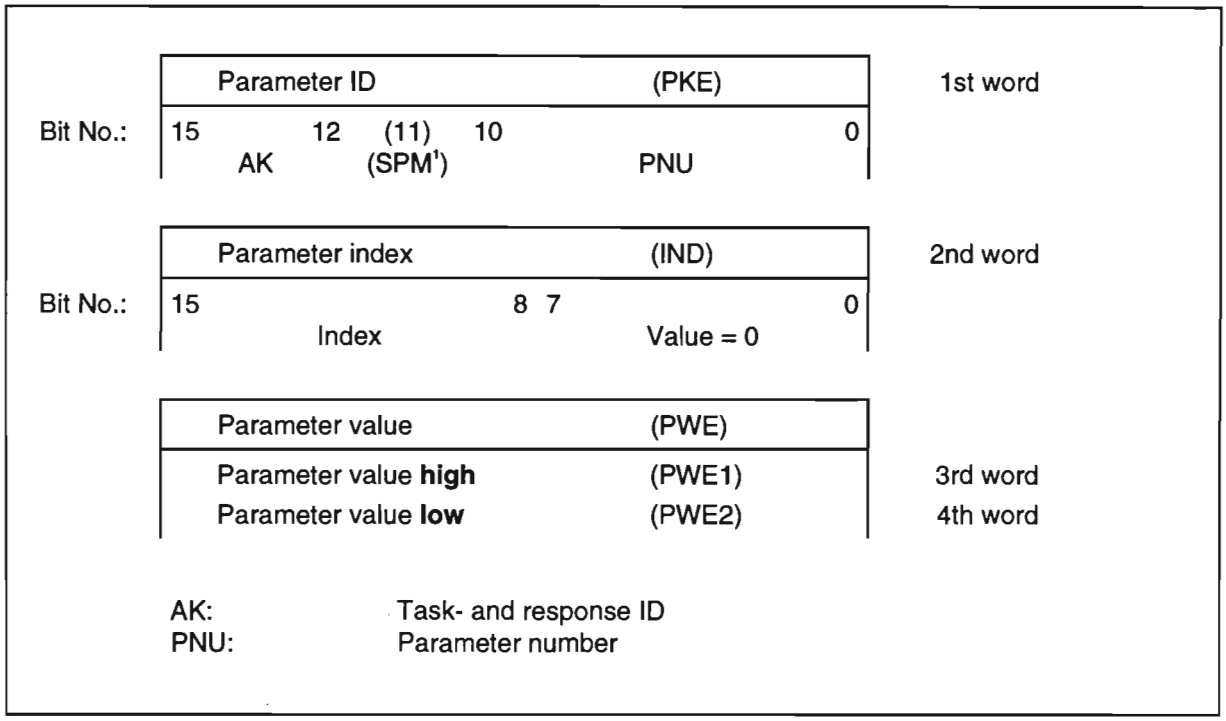


Fig. 4-3 Parameter area structure (PKW)

Parameter ID (PKE) (1st word)

The parameter ID (PKE) is always a 16-bit value.

Bits 0 to 10 (PNU) contain the number of the required parameter. The significance of the parameters can be taken from Section 9 „Parameter list" of the SIMOREG Operating Instructions.

Bits 12 to 15 (AK) contain the task- and response IDs.

For the task telegram (master → SIMOREG), you can take the significance of the task ID from Table 4-2. Task IDs 10 to 15 are device-specific, and are not defined in the PROFIBUS-DP profile.

For the response telegram (SIMOREG → master) you can take the significance of the response ID from Table 4-3. Response IDs 11 to 15 are device-specific, and are not defined in the PROFIBUS-DP profile. Only specific response IDs are possible as a function of the task ID. If the response ID has the value 7 (task cannot be executed), then an error number is deposited in parameter value 2 (PWE2).

[1] Bit 11 of the PKE is a parameter change report bit. CB24 does **not** support parameter change reports.

The subsequent table provides an overview of the task IDs:

Task ID	Significance	Response ID positive	Response ID negative
0	No task	0	7
1	Request parameter value	1	↑
2	Change the parameter value (word)	1	|
3	Illegal [3]	-	|
4	Request descriptive element[1]	3	|
5	Illegal [3]	-	|
6	Request parameter value (array)[2]	4	|
7	Change parameter value (array, word)[2]	4	|
8	Illegal [3]	-	|
9	Request the number of array elements	6	|
A	Reserved	-	|
B	Illegal [3]	-	|
C	Change parameter value (array, word) and store in the EEPROM[2]	4	|
D	Illegal [3]	-	|
E	Change parameter value (word) and store in the EEPROM[2]	1	↓
F	Illegal [3]	-	7

Table 4-2 Task IDs (master → CB24)

The subsequent table contains the possible response IDs:

Response ID	Significance
0	No response
1	Transfer parameter value (word)
3	Transfer descriptive element [1]
4	Transfer parameter value (array, word)[2]
6	Transfer the number of array elements
7	Task cannot be executed (with error number). Refer to Table 4-5

Table 4-3 Response IDs (CB24 → master)

[1] The required element of the parameter description is specified in IND (2nd word)

[2] The required element of the indexed parameter is specified in IND (2nd word)

[3] These task IDs are not permissible for CB24, and result in an error message

Index values which are different than the subsequently listed ones, are acknowledged using an error message/signal.

Task ID	IND	Significance
4	1	ID (code)
4	2	Number of array elements
4	3	Normalization
4	4	Quantity attribute and conversion index
4	5	Access rights: set to 0
4	7	Lower limit value = min. value
4	8	Upper limit value = max. value

Table 4-4 Permissible values for „IND" for the request descriptive element command

If the SIMOREG K device identifies a task as not being able to be executed, an error message is transferred in the parameter value in the response telegram (response ID = 7):

No.	Significance	Comment
0	Illegal parameter number (PNU)	If PNU does not exist
1	Parameter value cannot be changed	If the parameter is a visualization parameter
2	Lower or upper limit exceeded	-
3	Erroneous subindex	-
4	No array	-
5	Incorrect data type	-
6	Setting not permittied (can only be reset)	-
7	Descriptive element cannot be changed	Basically not possible
11	No operator control change rights	-
12	Password missing	Parameter: 'Access key' and/or 'special parameter access' not appropriately set
17	Task cannot be executed due to operating status	Presently, the converter status doesn't permit the required task
101	Parameter number presently deactivated	Parameter has no function for the selected control type
103	PKW No. incorrect	No. of words in the parameter range does not fit the task
104	Parameter value illegal	For parameters with gaps within the value range
105	Parameter is indexed	If task ID 2 or 3 and the parameter is indexed.
406	Incorrect response ID from the basic drive converter	Only when reading the parameter descriptive element (PBE)
407	Invalid response ID from the basic drive converter	
409	Erroneous subindex	Only when reading PBE
413	Illegal parameter value (PWE)	
419	The special unit, supplied from the basic drive converter, cannot be displayed	Only when reading PBE with IND=4 (standard unit)
420	Illegal task ID	
421	Illegal parameter number of the PT board	PNU > 1999
512	Subindex 9 not legal	Only when reading PBE

Table 4-5 Error numbers for response ID 7: task cannot be executed (CB24 → master)

Example: Speed controller, P-gain: P550 (=226 hex)
Read parameter (word).

Bit No.:	Parameter ID (PKE1)				1st word (PKE1) (Hex)
	15 12	(11)	10 0		
	AK	(SPM)	PNU		
	1		2	2 6	

Word 1:
Bits 12..15: Value = 1 (= „1" hex); Read parameter value (word)
Bits 0..11: Value = 550 (= „226" hex); Parameter number without set parameter report bit
Words 2, 3 and 4 are 0000 hex

Fig. 4-4 Example, parameter ID (PKE)

Parameter index (IND) (2nd word)

The parameter index (also designated as sub-index in the PROFIBUS profile), is an 8-bit value, and is always transferred, for PROFIBUS-DP in the most significant byte (bits 8 to 15) of the parameter index (IND); the least significant byte (bits 0 to 7) of the parameter index (IND) have the value 0!

For an indexed parameter, the required index is transferred. The significance of the indices can be taken from Section 9 „Parameter list" of the SIMOREG Instruction Manual.

Indexed parameters can be identified at the SIMOREG via the operator control panel when reading-out the parameters:

Pxxx.ii xxx = parameter number, ii = index, further, all parameters in the range P100 to P599 are indexed, whereby at the first parameter set, the index is not displayed at the operator control panel. The additional parameter sets are identified with index nPxxx (n for the index display on the operator control panel). Parameters P100 to P599 can have an index with values 0 to 3 (via CB24) for parameter sets 1 to 4 (for n at the operator control panel).

For a descriptive element, the number of the required element is transferred. The significance of the descriptive elements can be taken from the PROFIBUS profile variable-speed drives (VDI/VDE 3689).

Example: Read-out the fault memory: P880 (=370 hex)
Read parameter value from index 1.

Bit No.:	Parameter ID (PKE1)				1st word (PKE1) (Hex)
	15	8 7		0	
	6	3	7	0	

Bit No.:	Parameter index (IND)				2nd word (IND) (Hex)
	15	8 7		0	
	0	1	0	0	

Word 2:
Bits 8..15: Index and number of the descriptive element
Bits 0....7: Always value = 0!
Words 3 and 4 are 0000 hex

Fig. 4-5 Example, parameter index (IND)

Parameter value (PWE) (3rd and 4th word)

A parameter value (PWE) is always transferred as double word (32 bit). Only one parameter value can be transferred in a telegram.

A 16-bit parameter value is transferred in PWE2 (least significant word, 4th word). PWE1 (most significant word, 3rd word), must, in this case, be set to 0 for the PROFIBUS DP master.

The parameter value for the SIMOREG K drive converter is internally normalized; often, values with decimal places are used. For SIMOREG, only integer quantities are transferred via the serial interfaces. Thus, the parameter values must be multiplied by a factor before transfer, so that integer quantities are obtained. The value displayed at the operator control panel is divided by the appropriate step. This results in an integer value, which is transferred via the serial interface.

Parameter number	Value range	Step	Value transferred
P074	001 to 152	HEX	1 to 338
P083	0 to 4	1	0 to 4
P085	0.0 to 60.0	0.1	0 to 600
P103	0.00 to 100.00	0.01	0 to 10000

Fig. 4-6 Examples of parameter values

Example: PZD assignment ISW channel 1: P916 (=394 hex)
Change the parameter value from index 3 to 53 and save in the EEPROM.

	Parameter ID (PKE1)				
Bit No.:	15 8 7 0				1st word (PKE1) (hex)
	E	3	9	4	

	Parameter index (IND)				
Bit No.:	15 8 7 0				2nd word (IND) (hex)
	0	3	0	0	

	Parameter value (PWE1)				
Bit No.:	15 8 7 0				3rd word (PWE1) (hex)
	0	0	0	0	(for SIMOREG, always 0)

	Parameter value (PWE2)				
Bit No.:	15 8 7 0				4th word (PWE2) (hex)
	0	0	5	3	

Word 4:
Bit 0..15: Parameter value

Fig. 4-7 Example, changing indexed parameters

Rules for task/response processing

- **One** task or **one** response can only be referred to **one** parameter value.
- The master must repeat a task until it has received the appropriate response.
- The master can identify the response as a result of a task by:
  Evaluating the response ID (refer to Table 4-3)
  Evaluating the parameter number PNU
  Or, if required, by evaluating the parameter- index IND
  If required, by evaluating the parameter value PWE.
- The task must be completely sent in a telegram; split task telegrams are not permissible. The same is true for the response!
- For response telegrams (actual values), which contain the parameter values, the slave responds (**CB24**) with the current value when the response telegram is repeated.
- If information is not required from the PKW interface during cyclic operation (only PZD data are important) then the task „no task" must be set.

4.1.2 Process data area (PZD)

Control words and setpoints (tasks: Master → SIMOREG) and status words and actual values (responses: SIMOREG → Master) can be transferred with the process data.

Please refer to Table 4-6 or Table 4-7 for the significance of the bits for the control- and status words.

Note: Bit 5 in the control word has the following significance when transmitted via PROFIBUS DP:

Bit 5 = 0 Hold the ramp-function generator
Bit 5 = 1 Enable the ramp-function generator

Bit 10 = 1 Control via the interface must be set!

Normalization for setpoints and actual values:

Setpoints and actual values are transferred as 16 bit value. The standard normalization is 14 bit ($16384_{DEC} = 4000_{HEX}$) for 100% of the transferred quantity. The sign is included in the most significant bit (MSB). Thus, the possible value range which can be transferred is ± 200%, resolution, 0.006%.

All of the important control quantities are in the SIMOREG as digital values, so-called connectors, and can therefore be transferred via PROFIBUS-DP as process data. Please refer to Section 10 of the SIMOREG K Instruction Manual for the normalization of several connectors.

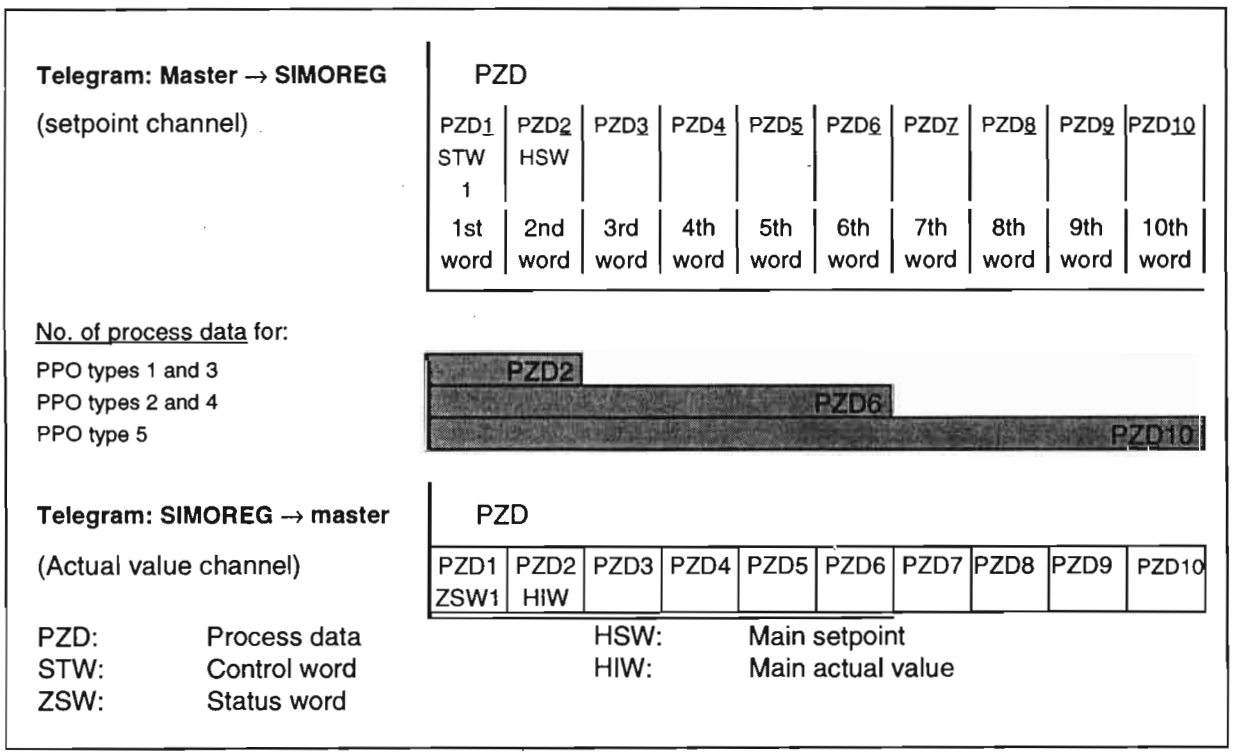


Fig. 4-8 Structure of the individual PPO types

4.1.2.1 Control word assignment

Control word bits 0 to 10 according to the PROFIBUS profile „Variable-speed drives" are defined in the following. The significance and the function of these status word bits are in conformance with the profile.

Control word			
Bit	Value	Significance	Comments
0	1	ON	Ready; power is connected to the drive converter, i.e. the main contactor is closed (if available); the field is established; pulses inhibited.
	0	OFF 1	Shutdown (return to the „ready-to-power-up" status); deceleration along the RFG ramp, power disconnected at $n < n_{min}$ and $I = 0$; rnain contactor is opened (if available).
1	1	Operating condition	"OFF 2" command is cancelled.
	0	OFF 2	Power disconnected: Pulses shifted to the inverter stability limit α_W, pulses are inhibited at $I = 0$. Main contactor is opened (if available), and the power-on inhibit output; motor coasts down.
2	1	Operating condition	"OFF 3" command is cancelled.
	0	OFF 3	Fast stop; fastest possible deceleration, pulses inhibited at $n < n_{min}$, power disconnected (contactor opened), and power-on inhibit.
3	1	Enable operation	Enable electronics + pulses, armature circuit. Then acceleration to the setpoint.
	0	Inhibit operation	Pulses shifted to the inverter stability limit α_W; pulses are inhibited at $I = 0$. Drive coasts down (ramp-function generator at 0 or tracking) and goes into the „ready" status (refer to control word bit 0).
4	1	Operating condition	
	0	Inhibit ramp-function generator	RFG output is set to 0. Main contactor remains closed, drive converter is not isolated from the supply, drive decelerates along the current limit.
5	0	Hold the ramp-function generator	The setpoint entered from the RFG is frozen.
	1	Enable the ramp-function generator	
6	1	Enable the setpoint	Value selected at the RFG input is switched-in.
	0	Inhibit the setpoint	Value selected at the RFG input is set to 0.
7	1	Acknowledge	Group signal is acknoweldged with a positive edge, the drive converter is in the „fault" condition until the fault/error has been removed, and then goes into the „power-on inhibit" condition.
	0	No significance	
8	x	Not used for 6RA24	
9	x	Not used for 6RA24	
10	1	Control from the PLC	Control via interface, process data valid
	0	No control	Process data valid, i.e. the „old" process data are retained.

Table 4-6 Control word assignment

Bits 11 are 15 are not evaluated for 6RA24 !

4.1.2.2 Status word assignment

The status word bits 0 to 10 according to the PROFIBUS profile "Variable-speed drives" is subsequently defined. The significance and the function of these status word bits are in conformance with the profile.

Status word			
Bit	Value	Significance	Comments
0	1	Ready to power-up	Power supply powered-up, electronics initialized, the main contactor opens (if available), pulses are inhibited
	0	Not ready to power-up	
1	1	Ready	Refer to control word bit 0
	0	Not ready	
2	1	Operation enabled	Refer to control word bit 3
	0	Operation inhibited	
3	1	Fault	Drive faulted, and therefore not operational, goes into switch-on inhibit after acknowledgement and after the fault has been removed. Fault/error numbers in the fault parameter
	0	Fault-free	
4	1	No OFF 2	
	0	OFF 2	"OFF 2" command present
5	1	No OFF 3	
	0	OFF 3	"OFF 3" command present
6	1	Power-up inhibit	Power-up again only using „OFF1" and then „ON"
	0	No power-up inhibit	
7	1	Alarm	Drive still operational; alarm in the alarm parameter; no acknowledgement
	0	No alarm	No alarm present or alarm has been withdrawn/disappeared.
8	1	Setpoint/actual value monitoring within the tolerance range	Actual value in a tolerance bandwidth; tolerance bandwidth can be briefly violated for t $<t_{max}$, e.g. n = n_{set} + n, t_{max} can be parameterized
	0	Not in the tolerance range	
9	1	Control requested	The automation system is requested to accept control.
	0	Local operation	Control possible at the drive converter
10	1	f or n reached	Actual value ≥ comparison value (absolute value), which can be set via the parameter number
	0	f/n fallen below	Actual value < comparison value

Table 4-7 Assignment, status word

Bits 11 to 15 are not assigned for 6RA24!

4.2 Parameterizing CB24 in SIMOREG K 6RA24

The CB24 communications board uses the SST1 dual port RAM interface of the SIMOREG drive converter and technology board.

When commissioning the CB24 communications board at the SIMOREG basic drive converter, the following parameters are relevant in the range P9xx and P6xx:

Parameter-number	Parameter-value	Significance
		Defining the hardware configuration
P900	1	only the basic drive converter without CB24/technology board
	2	Basic drive converter + CB24 communications board
	4	Basic drive converter + CB24 + technology board
		Protocol selection SST1
P902	9	PROFIBUS-DP is selected via CB24 CB24 only uses interface SST1
		Bus address SST1
P904	3 to 124	The selected bus address for PROFIBUS-DP slave, 0 to 2 may not be used for slaves. **CB24** only accepts the address, set in parameter **P904** after the power returns/reset. It is possible to change the address after **CB24** has been parameterized. The address change is only effective after the drive converter has been powered-down and powered-up again
		Baud rate SST1
P905	xx	**CB24** automatically adapts itself to the baud rate of the master
		Protocol selection SST2
P906	1	Interface 2 not operational
		PKW operator control rights [1]
P910	4	SST1 (CB24) and the basic drive converter interface. For the basic drive converter parameters, all of the interfaces have operator control rights. A setting is required for PT parameters
		Process data control
P911	1 to 3	PZD via signals at the basic drive converter terminals
	4	PZD is input from an expansion board with alarm at failure [2]
	5	PZD is input from an expansion board with fault at failure [2] for CB24: set 4 or 5

[1] Further explanations in the following text

[2] If the response monitoring from the master side is activated

Parameter-number	Parameter-value	Signficance
		Definition, process data SIMOREG ⇒ master
P916.00	325	Status word (K325 as PZD 1st word)
P916.01	167	Main actual value (speed actual value K167) as PZD 2nd word
P916.02-09	xxx	Connector number for PZD 3rd to 10th word
		Number of process data [1]
P924	2	for PPO1 and PPO3
	6	for PPO2 and PPO4
	10	for PPO5
		Number of PKW data [1]
P925	0	for PPO3 and PPO4
	4	for PPO1, PPO2 and PPO5
		Telegram failure time for SST1 [1]
P926	0	Monitoring not active
	1 to 32	Time in seconds for the PZD monitoring. If the process data still fail after 150% of the time, an alarm or fault/error message is output.
	1	Recommended setting, shortest possible time, approx. 1.5 sec.
		Telegram failure time SST2
P929	0	SST2 is not used, the monitoring function must be disabled
		Select setpoint input before setpoint enable
P628.00	53	With this setting, the 2nd word of the PZD is selected as main setpoint
		Select control word
P640	52	For this setting, the 1st word of the PZD is selected as control word for SIMOREG
	19	The control word in SIMOREG is not used

NOTE

After the above settings have been made, the **CB24** is logged-on in the SIMOREG, and is ready to establish the connection to the PROFIBUS DP master.

[1] Further explanations in the following text

You will find additional explanations to individual parameters in the following text:

- **P910** (PKW operator control rights)

  This parameter is significant if you wish to change or set parameters of the technology board via the PKW part of PPO types 1, 2 or 5 (refer to Fig. 4-2). .

  If you wish to change PT parameters, then please set parameter **P910** (also refer to the SIMOREG Instruction Manual, Sec. 9 „Parameter list") to the appropriate value. Using parameter **P910**, you can define from which positions (operator control panel, **CB24** etc.), parameters may be changed.

  Example:

  P910 = 1 SIMOREG operator control panel can change PT parameters.
  = 2: Reserved.
  = 3: PT (technology board) can change PT parameters.
  = 4: SST1 (interface 1 on the interface board) can change parameters.

  Pre-setting: 1

  Only if the **CB24** parameterizing is enabled via P910, can PROFIBUS-DP master change parameters via the bus.

- **P924/925** (number of process/PKW data)

  If you use a **PROFIBUS-DP master system**, where it is possible to set identification types (and therefore set a PPO type) (e.g. IM308 B/C for SIMATIC S5), then you must make **one** setting at **P924/925**! If the master is configured with a different setting, the PPO type is overwritten. However, parameter **P924/925 is not changed**

  If you use a **PROFIBUS-DP master system,** where it is not possible to specify the **PPO type at the SIMOREG using identification bytes** (e.g. CP5431 for SIMATIC S5), then you must specify a PPO type using parameters **P924/925** (refer to Fig. 4-2) !

  Only these settings are permissible for parameter values for the various PPO types !

P924 (PZD number)	P925 (PKW number)	PPO type
2	4	1
6	4	2
2	0	3
6	0	4
10	4	5

- When setting other parameters, which involve data transfer via PROFIBUS DP (e.g. process data (PZD combination), you must know the PPO type used for net data transfer (refer to Fig. 4-2 and Fig. 4-8).

- **P926** (telegram failure time for SST1)

  Using parameter **P926** (also refer to the SIMOREG Instruction Manual, Section. 9 „Parameter list"), you can select, whether the SIMOREG monitors process data input from the **CB24** into the dual port RAM (also refer to Fig. 4-9).

  When a connection is established, the PROFIBUS-DP master transfers a value for the response monitoring t_{WD} (watchdog time) to the **CB24**. Dependent on the value transferred, response monitoring on CB24 is activated (t_{WD}) or de-activated. When the response monitoring is activated, CB24 monitors the telegram data transfer with the PROFIBUS-DP master. When the response monitoring expires, **CB24** no longer writes process data into the dual port RAM. The last data entered into the dual port RAM remain valid.

  Refer to Fig. 4-10 for the interaction between parameter P926 and the response monitoring.

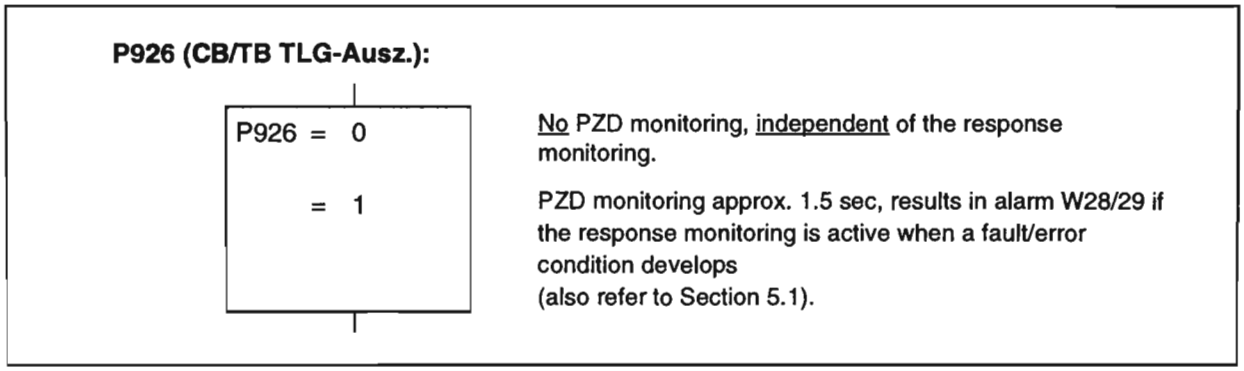


*Fig. 4-9 Telegram failure time parameter for **CB24***

NOTE

When a PT10 is used, the telegram failure monitoring is realized between the basic drive converter and PT10, and not between PT10 and CB24. Thus, when a telegram fails at PROFIBUS DP, this does not result in an automatic response at the basic drive converter.

If telegram failure monitoring is required, this must be taken into account when configuring the PT software. This monitoring function is already included in the standard application software.

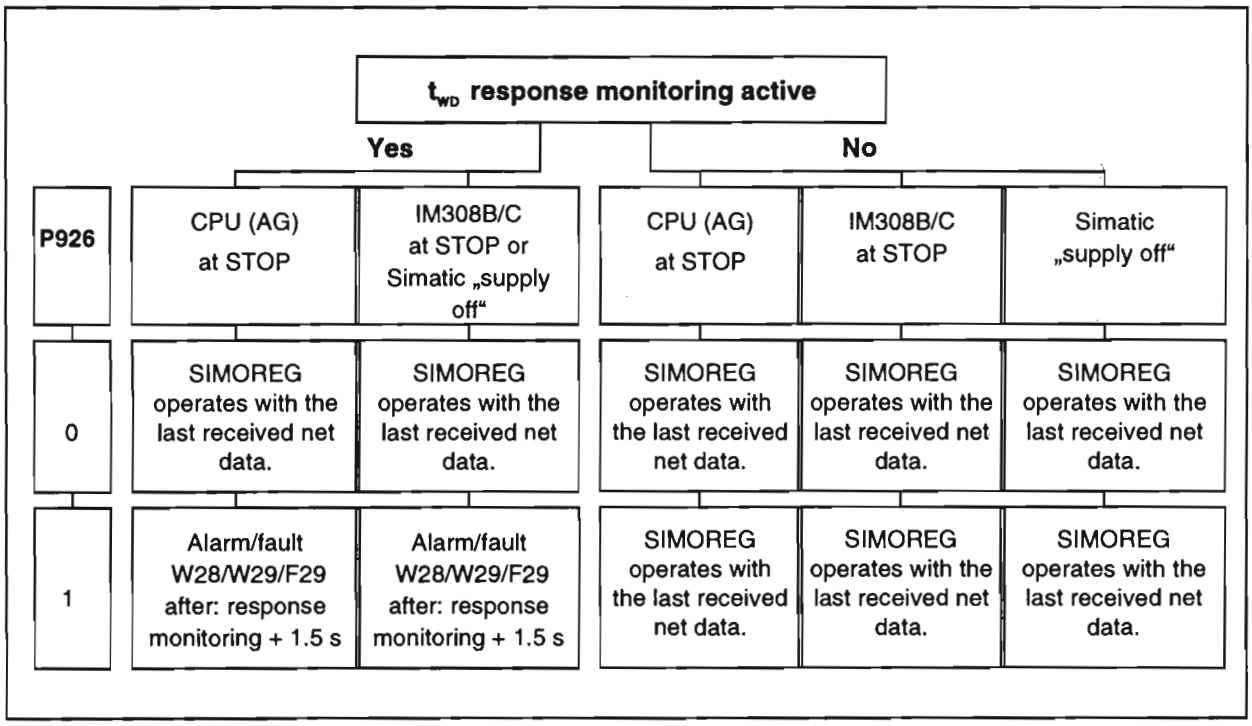


Fig. 4-10 Interaction, P926 and the response monitoring

When using **CB24**, always set parameter **P926** to 1. Thus, the process data monitoring is activated/de-activated exclusively via the PROFIBUS-DP master (refer to Fig. 4-10) by the response monitoring value! **CB24** does not transfer process data, whose control word (PZD1) has the value zero, to the dual port RAM (alarm **W28/29**)!

When a fault/error condition develops, an alarm is issued after:

Response monitoring time + (value P926 * 1.5 s)

4.2.1 Parameterization example

With the following parameterization, the SIMOREG can be controlled as station No. 3 with PPO type 3 from the PROFIBUS-DP master.

Parameter number	Parameter value	Significance
P640	52	Control via DP master
P628.0	53	Speed setpoint via DP master (4000H = 100% = calibrated max. motor speed)
P900	2	Basic drive converter + CB24 communications board
P902	9	PROFIBUS-DP via CB24
P904	3	Station No. 3 on PROFIBUS-DP
P906	1	
P911	4	Bus error alarm
P916.00	325	Status word
P916.01	167	Speed actual value
P916.02 • • • P916.32	0	
P924 P925	2 0	No. PZD No. PKW } PPO 3
P926	1	Telegram failure monitoring, approx. 1.5 sec
P929	0	Telegram failure monitoring, SST2 = "OFF"

Unlisted P9xx parameters are not relevant.

4.3 Processing data in the SIMOREG K 6RA24

All of the important arithmetic- and signal quantities of the software (approx. 300) are accessible via connectors. The quantities, available via connectors, correspond to test points, which are available in digital form, and which can be used in the software and/or output via interfaces. The connectors are designated by a „K" and a number, e.g. K167 for the speed actual value.

The inputs of software modules are defined via assigned parameters at intervention points (approx. 80). The connector number of the required signal is entered at the parameter for the appropriate intervention point, and therefore defines which signal acts as input quantity.

Data received from PROFIBUS-DP via CB24 are available in SIMOREG K at connectors for further processing. Further, the connector quantities, which are output as actual values via the bus, are entered in parameter P916.

Master	⇒ **SIMOREG**
PZD1	K52
PZD2	K53
•	•
•	•
•	•
PZD10	K61

SIMOREG	⇒ **Master**
P916.00 = xxx	PZD1
P916.01 = xxx	PZD2
•	•
•	•
•	•
P916.09 = xxx	PZD10

Process data PZD1 to PZD10, sent from the master, can be accessed in the SIMOREG via connectors K52 to K61.

The connector numbers of the quantities are entered in parameters P916.00 to .09, which are sent to the master as PZD1 to PZD10.

NOTE

Bit 5 of the control word is inverted by CB24, and transferred to the SIMOREG K drive converter (adaption between the PROFIBUS-DP standard and equipment response).

To process data on CB24, bit 10 in the control word (control via interface) must be set to „1".

Thus, it is necessary that the control word is always sent as the first PZD word.

4.4 CB24 in the PROFIBUS-DP system

4.4.1 Specific PROFIBUS-DP characteristics of the CB24 slave

The essential PROFIBUS-DP-specific characteristics of the CB24 slave are listed in the following table.

Identification number	802D hex
Permissible slave addresses	3 to 124
Data transfer speed	9.6 to 1500 kbaud; automatic baud rate identification
Bus termination	Either internally selectable via switch or external
Optional utilities	The PROFIBUS DP control command "SYNC" is supported.
Parameterization	No user-specific data are required in the master parameterizing telegram to the slave.
Certification	With certificate No.: Z00123 from 28.02.96 of the PROFIBUS User Organization (PNO). The certificate confirms that the product has successfully fulfilled the tests for conformance and interoperability for PROFIBUS DP slave devices.

Table 4-8 PROFIBUS DP -specific characteristics

4.4.2 Master drive converter data file, type file

The slave-specific master drive converter data (GSD) are required to configure a CB24 slave in a DP bus system. These describe all of the PROFIBUS-relevant characteristics of the slave according to DIN E 19245, Part 3. The GSD are transferred to the CB24 slave in a file form (designation: SIEM802D.GSD in the directory \GSD on the floppy disk supplied). Depending on the bus configuration tool type, the required slave characteristics are either transferred from the drive converter data sheet or the complete GSD file is integrated (linked-in) in the tool. Presently, for example, the NCM SIMATIC S5 tool and all non-SIEMENS tools access the drive converter master data.

Some SIMATIC configuring tools require the PROFIBUS features of the slave in a special form, the so-called type descriptive file. This file (identification code: SI802D??.200, ?? = language), provides, in comparison to the GSD file, additional information with the advantage of enhanced user-friendliness when configuring. Examples for these SIMATIC tools are COM ET200 and S7 configurator. For more recent versions of these tools, the type files are already integrated; for older versions, the type file must be downloaded.

The SIEMENS COM ET200 configuring tool uses, dependent on the particular version, the following type files:

- **COM ET200, V4.x** (required to configure an IM308-B master system), requires the type file "SI802DT?.200" (? = language: D, E, F, I, S) from the floppy disk supplied with the CB24 board (directory: \COM4X). This file must be copied into the "COM ET200" directory on the PG/PC.
- **COM ET200, Windows, V1.0,** (required to configure a master system with IM308-C, Edition 1 or 2), requires the type file „SI802DA?.200" (? = language: D, E). Dependent on the language version of the COM ET200 Windows, the „SI802DAD.200" file (German) or „SI802DAE.200" (English), supplied together with the CB24 board on floppy disk (directory: \WINCOM\SIEMENS\ANTRIEBE\WINCOM10) should be copied into the directory „TYPDAT5X" of the COM ET200 Windows, V1.0.
- **COM ET200, Windows, V2.0,** (required to configure a master system with IM308-C, version 3), requires the type file „SI802DA?.200" (? = language: D, E). Depending on the language version, the required file is already integrated in COM ET200 Windows, V2.0.

  However, if it is still necessary, file „SI802DAD.200" (German) or „SI802DAE.200" (English), from the floppy disk supplied with the CB 24 board, (directory: \WINCOM\SIEMENS\ANTRIEBE\WINCOM20) can be copied in the directory „TYPDAT5X" of COM ET200 Windows, V2.0.

The required type files are already integrated in the STEP 7 configuring tool " HWConfig" (from STEP 7, version 2.1.

NOTE

For the floppy disks supplied earlier, it is possible that the directory structure does not correspond to that described above.

All GSD- and type file certified slaves can be downloaded by modem from the SSC Fürth Mailbox. Mailbox dialog is menu-prompted. A password is not required; when first logging-on, name, company, address, are asked for.

The following settings are required:

- No parity, 8 data bits, 1 STOP bit
- The maximum baud rate when a connection is established is determined by the modem corresponding to the line quality.
- ANSI terminal emulation is recommended

Mailbox-No.: 0911-73 79 72

Schnittstellen Center Fürth (Interface Center Fürth)
Würzburger Straße 121
90766 Fürth
Tel. (..49 911) 750-2080/2072
Fax (..49 911) 750-2100

4.4.3 CB24 slave at SIMATIC S5 with IM308-B

When operating a CB24 slave, on the SIMATIC S5 side an IM308-B master interface is required, from version 5 onwards, with COM ET200, V4.x configuring software.

Configuring steps:

- Copy the type file "SI802DT?.200" from the floppy disk into the "COMET200" directory:

  C:

  CD \COMET200

  COPY A:SI802DT?.200 C:

- Complete the COM mask "ET200 system parameters " in accordance with the manual with the following special features:

Bus profile:	DP Standard
Response monitoring:	J (accept the recommended value!)
Handshake delay:	N

- Complete the „configuring" COM mask in accordance with the manual with the following special features:

  Station type: select SIMOR. 6RA24 CB24

  Enter one of the requested identification byte combinations assigned to the PPO type (refer to 4.4.4) under slots 0-3.

4.4.4 CB24 slave at SIMATIC S5 with IM308-C

- The required type file „SI802DA?.200" (? = language: D, E) is integrated into COM ET200, Windows or must be copied into the directory „TYPDAT5X" (refer to 4.4.1)
- Select the slave family „DRIVES" in the COM ET200 dialog window „master system, Station No. X", and place in the graphics
- Select and transfer the Station No.
- Select the "SIMOREG K 6RA24" station type in the „slave parameter" dialog window
- Select the „reference configuration" window via the „configuring" active field, and then select the PPO type (possible from COM ET200 Windows, V2.0) **or**
- Select the „configuring" window via the „configuring" active field and enter the required identification byte combination corresponding to the required PPO type - refer to 4.4.4 (required for COM ET200 Windows, V1.0)
- Define the SIMATIC I/O addresses in the „configuring" window.

4.4.5 Selecting the PPO type

A PPO type **in the form of an identification byte combination** must be realized explicitly, only for COM ET200 versions 4.x and Windows V1.0! The PPO type can be selected using plain text from Windows 2.0 and for STEP 7.

The structure of the net data telegram (PPO type) between the master and slave is defined when the system runs-up with the configuration telegram of the PROFIBUS DP master to the CB24 slave.The master sends a specific identification byte combination in the configuration telegram to clearly identify the PPO type.

The CB24 slave accepts the following identification byte combinations (if an unknown combination is received, CB24 sets the „parameterizing error" bit in the diagnostics telegram to the PROFIBUS DP master):

PPO Type	Identification byte 0		Identification byte 1		Identification byte 2		Identification byte 3		COMET200 Version	Recom-mended-setting
	Hex	COM[1]	Hex	COM[1]	Hex	COM[1]	Hex	COM[1]		
PPO 1	F3	4AX	F1	2AX	----	----	----	----	V4.x/Windows	
PPO 2	F3	4AX	F3	4AX	F1	2AX	0	0	V4.x/Windows	
	F3	4AX	F3	4AX	F1	2AX	----	----	V4.x/Windows	←
	F3	4AX	F5	6AX	----	----	----	----	Windows	
PPO 3	F1	2AX	0	0	----	----	----	----	V4.x/Windows	
	0	0	F1	2AX	----	----	----	----	V4.x/Windows	
	F1	2AX	----	----	----	----	----	----	V4.x/Windows	←
PPO 4	0	0	F3	4AX	F1	2AX	0	0	V4.x/Windows	
	0	0	F3	4AX	F1	2AX	----	----	V4.x/Windows	←
	0	0	F5	6AX	----	----	----	----	Windows	
	F5	6AX	0	0	----	----	----	----	Windows	
	F5	6AX	----	----	----	----	----	----	Windows	
PPO 5	F3	4AX	F3	4AX	F3	4AX	F1	2AX	V4.x/Windows	←
	F3	4AX	F3	4AX	F1	2AX	F3	4AX	V4.x/Windows	
	F3	4AX	F9	10AX	----	----	----	----	Windows	

Table 4-9 Identification byte value table

[1] Input for COM ET 200

4.5 Function blocks for SIMATIC S5

In order to simply couple SIMOREG and SIMOVERT variable-speed drives to a higher-level SIMATIC control system, various function block packages are available or are being prepared. This SIMATIC software supports data transfer with the drives via PROFIBUS DP corresponding to the „variable-speed drives" PROFIBUS profile.

Performance features:

- Setting-up and pre-assigning a data interface in the SIMATIC for communications with the configured drives.
- The „linear" or „tile" addressing type is selected for the IM 308-B/C communications board.
- Net data transfer can be parameterized corresponding to the 5 defined PPO types.
- Consistent net data transfer is guaranteed.
- Parameterizing tasks (PKW task) are administered and monitored.
- Slaves are handled according to the SIEMENS-DP standard.
- The overall system is monitored and faults/errors handled.

Presently, block packages for SIMATIC S5 with **IM308-B** are available in the following host systems:

- S5-115U with CPU 941...944
- S5-115U with CPU 945
- S5-135/155U with CPU 922, 928 or 928B
- S5-155U with CPU 948

Block packages for the following DP master are being prepared:

- SIMATIC S5 with **IM308-C**
- SIMATIC S5 - AG95U / DP master
- SIMATIC S7-300 with CPU315-2DP (integrated DP interface)
- SIMATIC S7-400 with CPU413/414-2DP (integrated DP interface)

The availability of new block packages will be announced through the „ASI 1 Infos" distribution.

Ordering data for available packages:

SIMATIC S5 software package „DVA_S5“

3.5" floppy disk + Manual (German/English)

Order No.: 6DD1800-0SW0

Ordering location: WKF RZF, Fürth Abt. B1.3

Tel.: (..49 911) 750 9382

Fax: (..49 911) 750 9155

5 Fault finding

This section only describes the alarm- and fault/error numbers generated from CB24, which are associated with the CB24. Other fault/error- and alarm messages, the fault causes and the necessary remedial measures are described in Section 8 of the Drive Converter Instruction Manual.

Section 8 Operation

Section 8.2 Fault/error messages

Section 8.3 Alarms

5.1 Alarms and error/faults

- **CB24** configuring error

  The number of identification bytes, sent from the PROFIBUS-DP master are outside the permitted value range from 1 to 4 or the PPO type is invalid (configuring error, PROFIBUS-DP master: refer to Section 4.4.5, Selecting the PPO type).

  This error is signaled to the master with the error ID „bad parameter".

  The LED TEL OK at CB24 remains dark, both of the other LEDs flash.

  Effect: A connection is not established to the PROFIBUS-DP master. A new configuring telegram from the PROFIBUS DP master is required.

- **CB24** bus error

  Telegram data transfer between **CB24** and PROFIBUS-DP master has been interrupted (e.g. a bus connector withdrawn, DP master switched-out, response monitoring expired).

  The LED TEL OK at CB24 remains dark, both of the other LEDs flash.

  Effect: The drive cannot be controlled from the master!

The response of the basic drive converter when one of the above mentioned faults/errors occur is subsequently described (also refer to Section 4/Fig. 4-10) :

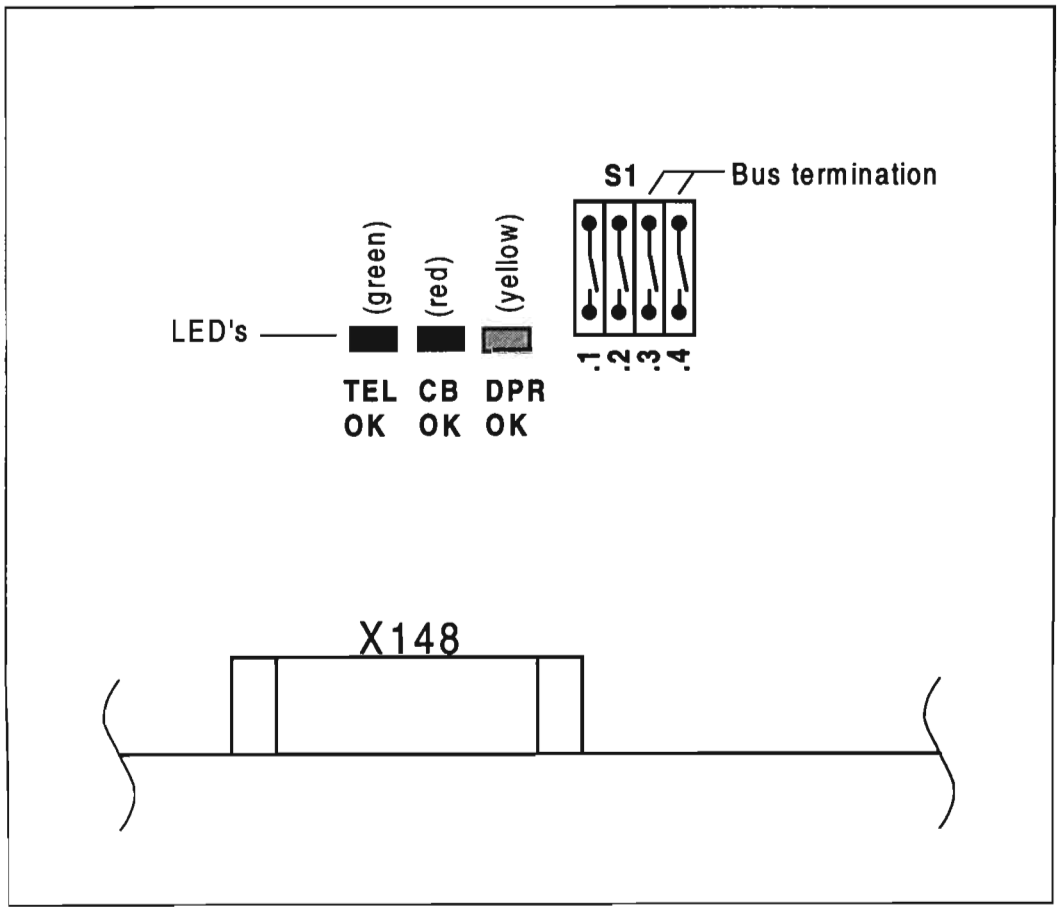
SIMOREG operating status	SIMOREG parameter setting	Response monitoring [2]	Basic drive converter response	Comment
After power-up, before the first data transfer to the master	P926 = 0	xxx	No response	
	P926 > 0, P911 = 4/5	xxx	Alarm W28	Only the basic drive converter
	P926 > 0, P911 = 4/5	xxx	Dependent on the PT10 configuring [1]	Basic drive converter + PT10
Bus error during operation Control word bit 0 = "OFF"	P926 = 0	xxx	No response	
	P926 > 0, P911 = 4	active	Alarm W28	Only the basic drive converter
	P926 > 0, P911 = 5	active	No response	
	P926 > 0, P911 = 4/5	active	Dependent on the PT10 configuring[1]	Basic drive converter + PT10
Bus error during operation Control word bit 0 = "ON"	P926 = 0	xxx	No response	
	P926 > 0, P911 = 4	active	Alarm W28	Only the basic drive converter
	P926 > 0, P911 = 5	active	Fault F29	
	P926 > 0, P911 = 4	active	Dependent on the PT10 configuring [1]	Basic drive converter + PT10
	P926 > 0, P911 = 5	active		

[2] PROFIBUS parameter

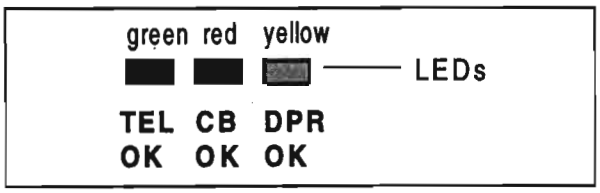
[1] Refer to the information regarding parameter P926, P. 4-15

5.2 Diagnostic LEDs

CB24 has three LEDs for fast diagnostics. The various colors make diagnostics clear.



NOTE
When an LED is in a steady-state condition (steady light or off), this means that the unit is in a non-standard state (parameterizing phase or fault/error)! At least one LED **must always flash** (otherwise: power OFF or **CB24** defective)!



CB24 self test (after power ON, reset)

green	**dark**	Fault/error cause:
red	flashing	Check sum error EPROM **CB24**
yellow	**steady light**	(replace EPROM or **CB24**)

green	**steady light**	Fault/error cause:
red	flashing	Error, RAM test **CB24**
yellow	**steady light**	(replace **CB24**)

Parameterizing from the SIMOREG basic drive converter (G) or technology board (PT)

green	**steady light**	**CB24** waits for parameterization from G or PT
red	flashing	e.g. after cancelling **CB24** (P900) or after
yellow	**dark**	G/TB Heartbeat Counter error.

green	flashing	**CB24** in the wait status until
red	**steady light**	parameterization has been completed
yellow	**dark**	from G or PT

Online operation

green	**dark**	No net data transfer via PROFIBUS-DP
red	flashing	e.g. bus connector withdrawn, EMC fault, interchanged connections,
yellow	flashing	Node address (**P904**) is not supplied with net data from the PROFIBUS-DP master.

Standard LED statuses for data transfer via PROFIBUS-DP.

green	flashing	Data transfer via PROFIBUS-DP
red	flashing	**CB24** OK
yellow	flashing	Dual port RAM interface OK (G/PT heartbeat counter)

NOTE

Normally, all three LEDs are lit (bright) in the same frequency (same „bright" period)!

When in the SYNC mode, the green LED is lit (bright) for only half the length of time as the lit (bright) period of the other LEDs.

6 Appendix

6.1 Technical data

Board name	CB24 (Communications Board for 6RA24 drive converters)
Order No.	6RX1240-0AK01
Rated input voltage	5 V ± 5 %, approx. 320 mA, internally from the drive converter
Rated output voltage	5 V ± 5 %, 10 mA, electrically isolated supply for the bus termination, RS485 interface (X148)
Operating temperature	0 °C to +55 °C (32 °F to 131 °F)
Storage temperature	–25 °C to +70 °C (–13 °F to 158 °F)
Transport temperature	–25 °C to +70 °C (–13 °F to 158 °F)
Degree of pollution	2 DIN VDE 0110 Part 1/01.89. Moisture condensation not permisible
Degree of protection	IP00 DIN VDE 0470 Part 1 / 11.92 ≙ EN 60529

Table 6-1 Technical data

6.2 Block diagram

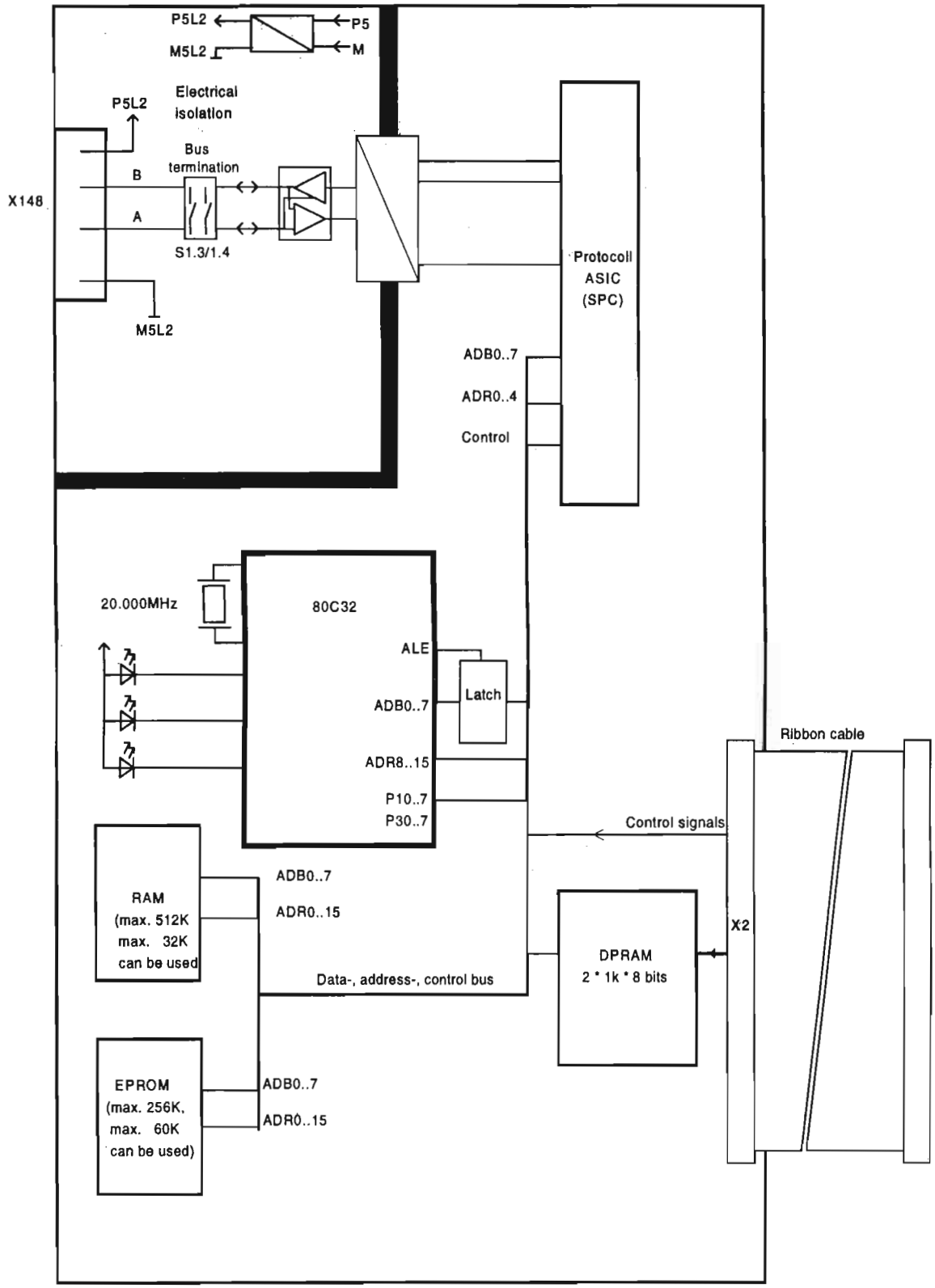


Fig. 6-1 CB24 communications board, block diagram