PacDrive™ M
- Field Bus PROFIBUS-DP -
Operating Manual

Imprint

Trademarks

PDM_OpMaProfi_00_us.FM

Contents

PDM_OpMaProfibus_usIVZ.fm

1   Safety

This chapter describes the general requirements for working safely. If the work involves any remaining risk, we will

- point this out in the respective passages,
- warn you of any possible danger and
- describe how the danger can be avoided.

1.1   Depiction of Safety Notes

Risk categories

We differentiate between different categories of safety notes. The table below shows which danger and possible consequences the symbols (pictographs) and keywords point out.

Pictograph	Keyword	Definition
⚠	**DANGER!**	Indicates an immediately dangerous situation that will result in death or very serious injuries if the safety rules are not observed.
	WARNING!	Indicates a possibly dangerous situation that can result in serious injuries or large material damage if the safety rules are not observed.
	CAUTION!	Indicates a possibly dangerous situation that might result in material damage if the safety rules are not observed.

Notes

Information and notes are marked by a symbol (pictograph) and a signal word as well.

Pictograph	Keyword	Definition
ⓘ	**NOTE**	Tips for usage and other important or useful information and notes

1.2 Use as Directed

The components of the PacDrive™ system may only be used for the applications described in this manual and only in combination with third-party devices and components recommended or approved by ELAU.
Any other application is not regarded as "Use as directed".

WARNING!

Risk of injury due to use other than directed!
If the components of the PacDrive™ system are used in a different way than described above or modified without ELAU's approval, persons may be injured and material damage may occur.

"Use as directed" includes that you

- observe the Operating Manual,
- observe the instructions for inspection and maintenance.

1.3 General Safety Instructions

In addition to this manual, please observe

- the prohibiting, warning and mandatory signs as well as the warnings on the components in the switching cabinet,
- the corresponding laws and regulations,
- the legal requirements concerning accident prevention,
- the operating instructions for the other components.

Always keep the operating manuals close to the machine.

PDM_SicherhStd_us.FM

2 Use of This Operating Manual

2.1 Target Group

This operating manual is aimed exclusively at technically qualified staff with detailed knowledge in the field of automation technology.

Only qualified staff can understand the significance of the safety notes and act accordingly.

This operating manual is aimed primarily at design and application engineers specializing in mechanical and electrical engineering, at programmers, service and commissioning engineers.

NOTE

Should you not be able to solve problems with the help of this manual, please contact

ELAU AG
- Abteilung Kundendienst -
Postfach1255
D-97821 Marktheidenfeld
Telefon: 09391/606-142
Fax: 09391/606-300

2.2 Depiction Conventions

Symbol	Meaning
▪	Marks the first level of an enumeration.
–	Marks the second level of an enumeration.
➢	Marks instructions for an action.
normal	Normal text.
italics	Marks a special term (e.g. parameter).
Code	Program code

Table 2-1: Depiction conventions

PacDrive™ M

3   Overview

3.1   In General

PROFIBUS

PROFIBUS is a manufacturer-independent open field bus standard for various applications in production, process and building automation. The international norm EN 50 170 guarantees that PROFIBUS is manufacturer-independent and open. PROFIBUS enables the flawless communication between appliances from different manufacturers without requiring any special interface modifications. PROFIBUS is suitable for quick, time-critical data transfer as well as for complex communication jobs. PROFIBUS consists of a family of three compatible variants, with 90% of applications preferring PROFIBUS-DP.
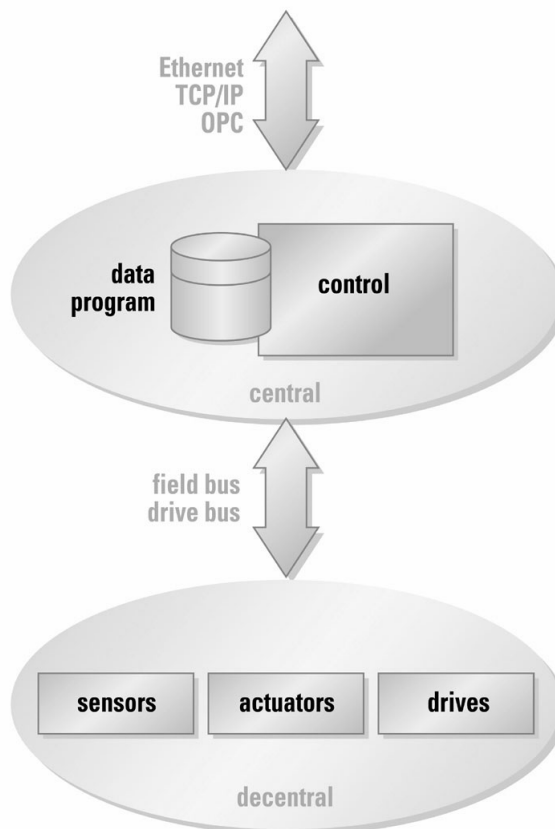

Fig. 3-1: Automation concept for food and packaging machines

PROFIBUS-DP

This PROFIBUS variant, which is optimized for speed and low connection costs, is designed especially for the communication between automation systems and decentralized peripherals on field level. PROFIBUS-DP is suitable as a substitute for conventional parallel signal transmission with 24 Volt or 0-20 mA.

Basic features

PROFIBUS determines the technical and functional features of a serial field bus system in which automation appliances located in different places can be networked from field level to cell level. PROFIBUS differentiates between master and slave units.

Master units determine the data transfer on the bus. A master may send messages without external request if it has a bus token. In the PROFIBUS protocol, masters are also called active participants.

Slave units are peripherals. Typical slave units are input/output devices, valves, drives and measuring transducers. They have no bus token, i.e. they can only acknowledge received messages or transmit messages to the master on request. They require only a small part of the bus protocol, which makes the implementation fairly simple.

The MAx-4 PacController can be a master and/or slave.

The PROFIBUS module is plugged into the MAx-4 PacController and served from there.

3.2 PROFIBUS-DP

PROFIBUS-DP is designed for fast data exchange on field level. The central control units, such as PLC/PC, communicate with decentralized field units such as I/O, drives and valves via a fast serial connection. The necessary communication functions are determined by the PROFIBUS-DP basic functions according to EN 50 170.

For parameter setting, diagnosis and alarm handling while cyclic data transfer is in progress, additional acyclic communication functions are needed for intelligent field units. They are defined in the PROFIBUS directive no. 2.042 and will be explained in chapter 3.2.

Basic Functions of PROFIBUS-DP

The central control (master) cyclically reads the input information from the slaves and writes the output information to the slaves. Besides the cyclical transfer of useful data, PROFIBUS-DP also features efficient functions for diagnosis and commissioning. Data

transfer is monitored by monitoring functions on the sides of both master and slaves.

table 3-1 summarizes the basic functions of PROFIBUS-DP.

Transmission technology:
■ RS-485 twisted two-wire circuit or beam waveguide ■ Baud rates of 9.6 kbit/s up to 12 Mbit/s
Bus access:
■ Master-Slave method ■ master and slave units, max. 126 participants per bus
Communication:
■ point to point (useful data) or multicast (control commands) ■ cyclic master-slave useful data transfer
Operating states:
■ Operate: cyclic transmission of input and output data ■ Clear: inputs are read, outputs remain in safe state ■ Stop: only master-master data transfer possible
Synchronization:
■ control commands enable synchronization of inputs and outputs ■ Sync mode: outputs are synchronized ■ Freeze mode: inputs are synchronized
Functionality:
■ cyclic transfer of useful data between DP master and DP slave(s) ■ configuration check for DP-Slaves ■ efficient diagnosing functions, 3 graduated diagnosis message levels ■ synchronization of inputs and/or outputs ■ max. 244 bytes input and output data per DP slave
Protective functions:
■ all messages are transmitted with hamming distance HD=4 ■ response monitoring at DP slaves ■ access protection for inputs/outputs of DP slaves ■ monitoring of useful data transfer with adjustable monitoring timer in master

Device types:

- DP masters class 1 (DPM1), e.g. central automation devices such as PLC, PC ...
- DP slaves, e.g. devices with binary or analog inputs/outputs, drives, valves

Table 3-1: Basic functions of PROFIBUS-DP
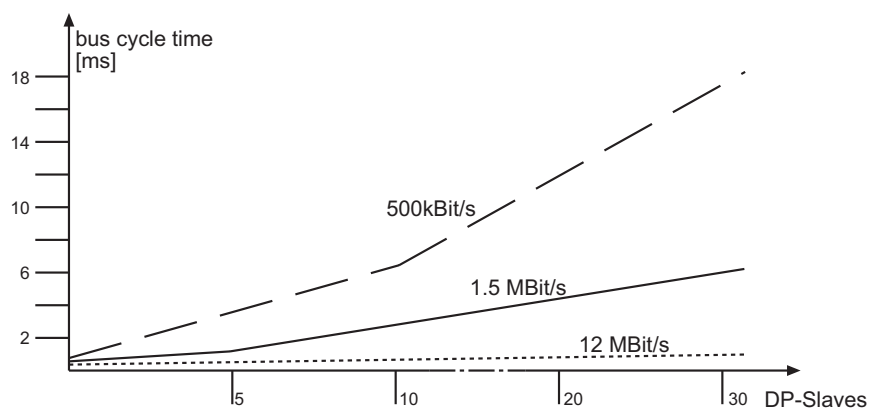
Fig. 3-2: Bus cycle time of a PROFIBUS-DP mono master system

Note on figure 3-2

Marginal conditions: each slave ahs 2 bytes input and 2 bytes output data; the minimum slave interval time is 200 microseconds; $TSDI = 37$ bit times, $TSDR = 11$ bit times

4 Diagnosis

4.1 In General

The PacDrive™ system supports the user with its extensive diagnosis system.

The diagnosis messages can be read out with the Windows program EPAS-4. The PacDrive™ M system also contains a powerful message logger, which records additional diagnosis messages.

Normally the diagnosis messages are shown via an operating unit on the machine.

In case of an error, read this diagnosis message and contact your machine producer.

NOTE

For further details on the diagnosis, see the Programming Manual - Reference - for the PacDrive™ M system.

4.2 Example for a Diagnosis Message

The diagnosis message 4731 „automatic bus deactivation" is shown.

Meaning of the diagnosis message:

- class 4 error
- diagnosis code 731

The meaning of the diagnosis code is further explained in the Pro-gramming Manual - Reference - as shown below.

731 automatic bus deactivation	
The Auto Clear bit in the master is set and at least one slave is not exchanging cyclic I/O data. The error code entered after "Err=" is equivalent to the error code of the parameter *ErrorCode*.	
Cause: Handling:	Slave was switched off. Reactivate slave.
Cause: Handling:	Faulty configuration of at least one slave. Check configuration.
Cause: Handling:	Wiring error: Cable problem in the bus. Check cable
Cause: Handling:	Wiring error: Faulty bus topology. Check terminations,stubs, ...

5 Transportation, Storage, Unpacking

5.1 Transportation

- ➤ Avoid shocks.
- ➤ Immediately check units for transport damage and inform your transport company, if necessary.

5.2 Storage

- ➤ Store units in a clean, dry place.

Storage conditions:

- ■ air temperature between - 25 °C and + 70 °C.
- ■ temperature fluctuations max. 30 K per hour.

5.3 Unpacking

> ➢ Check whether the delivery is complete.
> ➢ Check all units for transport damage.

Type plate

The type plate contains all necessary information:

product name ———→ MAX-4/11/01/008/99/1/1/00
article number ———→ 13130255-008   HW: B43275
serial number ———→ 518541.0010   T37   SW: 00.10.00
                                                00209D00-63FF   Made in Germany
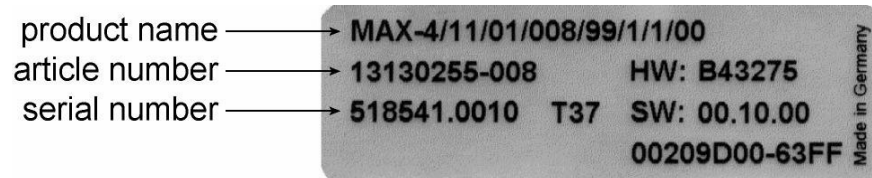
Fig. 5-1: Type plate of a MAx-4 PacController

module type ———→ OPT-2/002   HW: 00
                                              SW: xx.xx.xx
                                    T35   Made in Germany
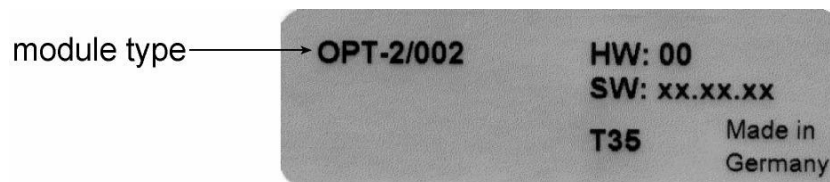
Fig. 5-2: Type plate of a PROFIBUS-DP master optional module

6 Configuration, Parametrization

6.1 In General

The PacDrive M system is adapted to your task with the help of ELAU's programming and archiving software EPAS-4.

In EPAS-4, the system is configured and programmed according to IEC 61131-3.

ATTENTION!

Detailed knowledge of the system and the IEC program is required to make changes in the PacDrive M system. Therefore changes should only be made by your machine supplier or ELAU staff.

6.2 Overview

6.2.1 System Structure

The image below shows the correlation of the individual components (parameters, IEC program, field bus card, external PROFIBUS-DP assembly group).

MAx-4

Buszyklus fertig
sercos cycle

IOTrigger
2 1 3

IEC program

PrMaTrigger();

call in IEC prg cycle

wTmpln : WORD;
wIn : AT I%B0;
wOUT : AT Q%B0;

wTmpln := WIn;
wOUT := 1234;

IO Server

exchange in trigger cycle

IO range

field bus card

bus cycle in IO trigger cycle

PB Bus controller

DataExMode
2
0
1

IO data exchange in Pb bus cycle

internal buffer

PROFIBUS-DP

bus coupler

clamps

input

output

IO clamp

→ control signals
- - - → IO data

Fig. 6-1: Overview of PROFIBUS-DP communication

Access to IO data

The cyclic IEC program exchanges data with the IO range (direct reading and writing).
The IO server matches this IO range against the field bus card. When this matching takes place it is controlled via the parameter *IOTrigger*. The matching is done with every trigger signal.
The field bus card exchanges data with the respective nodes in the Profibus cycle. The Profibus cycle is influenced via the parameter *DataExMode*. The Profibus cycle runs as fast as possible with *DataExMode* = 0 or 1. With *DataExMode* = 2 the Profibus cycle runs with the *IOTrigger*.

6.2.2   Data Consistency

In case of access via the IO range, observe the following in terms of data consistency:

Data consistency by priority control

To achieve data consistency across the entire IO range, the priority of the IEC program task <u>must</u> be lower than that of the IO server (IO map update). By default, the IO server has the priority 4. Moreover, *IOTrigger* <u>must</u> be standing on 2 (IO matching by IEC program) and DataExMode <u>must</u> be on 1 (synchronous buffered firmware access to PB data) or 2 (synchronous direct firmware access to PB data with cycle control).

NOTE

The data consistency can only be achieved for the IEC program task that controls the triggering of the IO server.

Data consistency by checking the IO server state

To achieve data consistency across the entire IO range, you have to use the function *PrMaGetServerState* or *PrSlGetServerState*. Proceed as follows:

- Trigger IO server.
- Check IO server state.
- If the IO server is waiting for the trigger, then data can be written and read in the IEC program.

Moreover, *IOTrigger* <u>must</u> be standing on 2 (IO matching by IEC program) and DataExMode <u>must</u> be on 1 (synchronous buffered firmware access to PB data) or 2 (synchronous direct firmware access to PB data with cycle control).

NOTE

The data consistency can only be achieved for the IEC program task that controls the triggering of the IO server.

6.2.3 Information on the WAGO Bus Coupler

System structure

PROFIBUS-DP

bus coupler

K-Bus

clamps

input

output

IO clamp

- - - - - → IO data
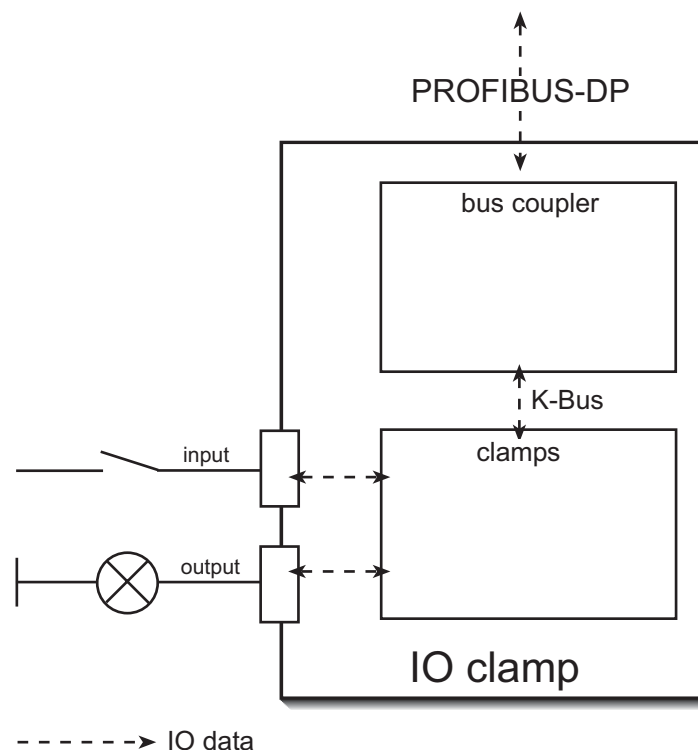
Fig. 6-2: Structure of a WAGO connector block

There are two cycles in which a data exchange is taking place. The data are exchanged between the IO clamps and the bus coupler via the internal K bus. This bus runs with a cycle time of typically 2 ms with purely digital IO clamps. With analog clamps, this cycle takes at least 5 to 10 ms. In addition, the cycle time rises with the number of configured clamps on the bus coupler. The cycle of the K bus can be synchronized with the Profibus cycle by means of the Profibus parameter *Process image update* = "cycle synchronous".
The Profibus cycle is given by the master. With each Profibus cycle, the data of the output clamps are received and the data of the input clamps are sent.

Example on reaction time

In synchronous mode at least three Profibus cycles are necessary to bring a reaction of an output value via a bridge to an input back

to MAx-4, as the output data sent on the PROFIBUS-DP are always the output data of the last K bus cycle.
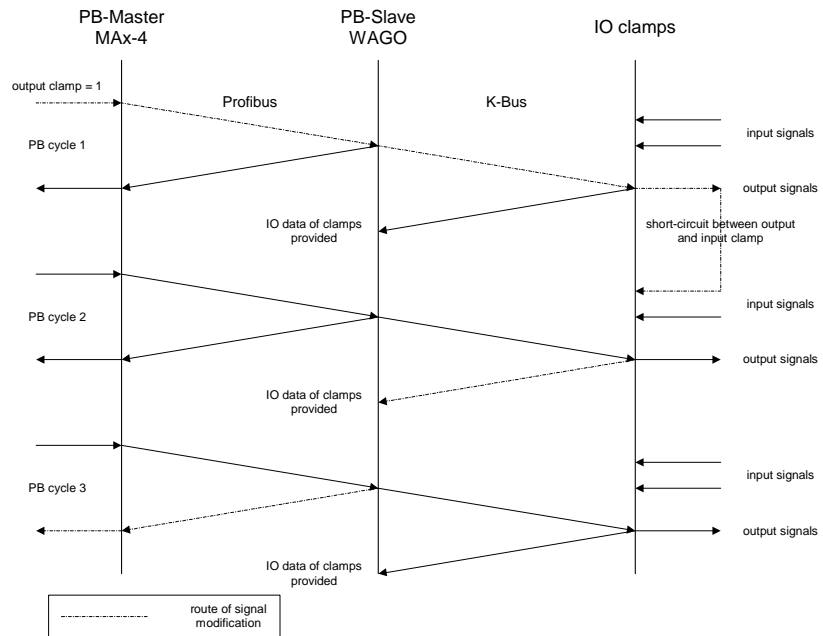
Fig. 6-3: Time diagram of the data flow between master and bus clamp

6.3 PROFIBUS-DP Master

6.3.1 Configuration

Basic configuration of the master

To be able to use the PROFIBUS module, it has to be entered in the control configuration of the MAx-4 PacController.

If a PROFIBUS-DP master is entered in the control configuration a selection box appears.
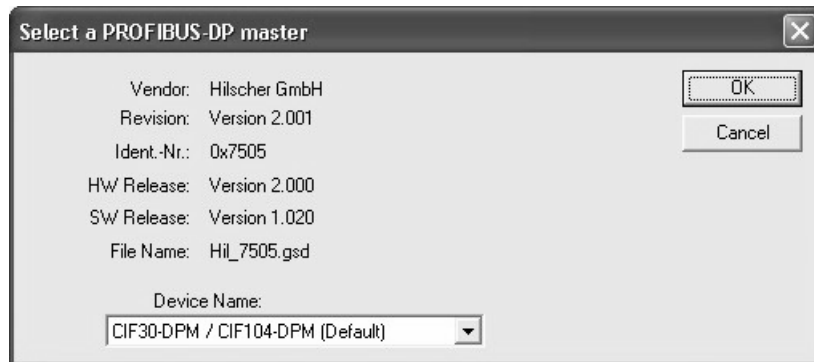
Fig. 6-4: Selecting the PROFIBUS-DP master

After confirming with OK, the PROFIBUS-DP master is taken over in the control configuration.
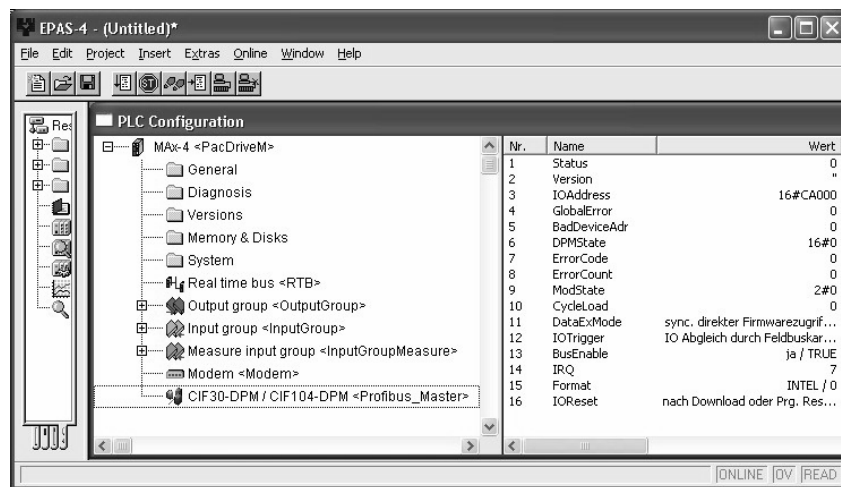
Fig. 6-5: PROFIBUS-DP master in the control configuration

Now you have to configure the PROFIBUS-DP master. You can call up the properties of the master by clicking the right mouse button.

Basic parameters
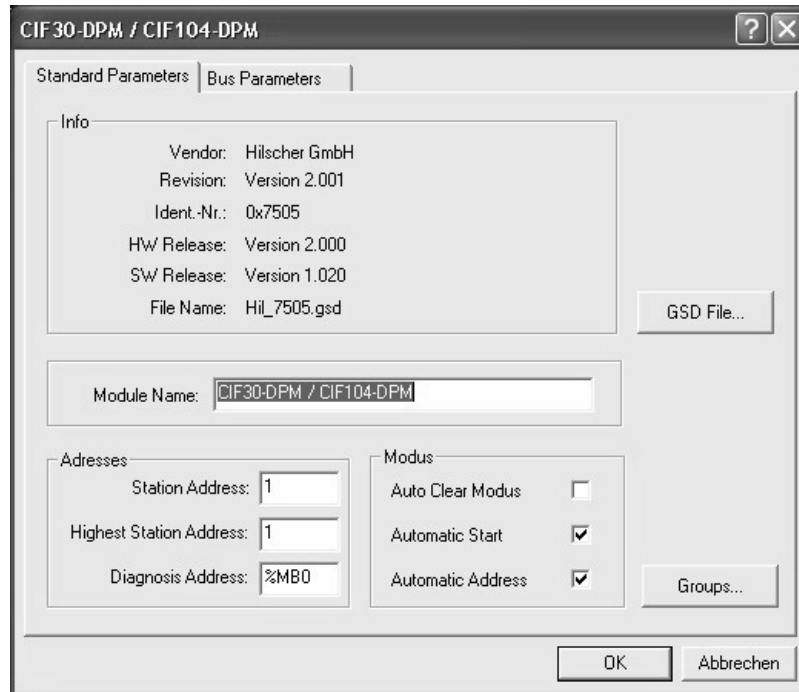
Fig. 6-6: Configuring the PROFIBUS-DP master / Basic parameters

Module name

You can enter any text here.

Addresses

Station address:

The PROFIBUS-DP address of the master is entered here.

Highest station address:

The highest station address in PROFIBUS is entered here.

Diagnosis address:

Currently not supported.

Mode

Auto clear mode ON:

Selected: If at least one slave does not enter into the cyclic data exchange mode or terminates that mode and does not resume cyclic operation within the period determined in 'watchdog time' (see image below), the cyclic data transfer to all slaves is terminated and the master changes to STOP state. The bus can only be restarted by resetting the control.
Not selected: The system attempts to keep all slaves in cyclic data transfer mode, even if individual slaves quit that mode. The slaves dropped out are polled, so that they can be automatically restarted after clearing the error.

Automatic start:

Functionality is replaced by the parameter BusEnable.

Automatic addresses:

Selected: The IEC start addresses for the input and output ranges are calculated automatically. The start addresses for the first configured slave can be entered. These addresses serve as starting values for the whole automatic calculation.
Not selected: The IEC start addresses are not calculated automatically. Calculation must be done manually by the user. The IEC addresses resulting from that calculation must be set manually for each slave.

Bus parameters
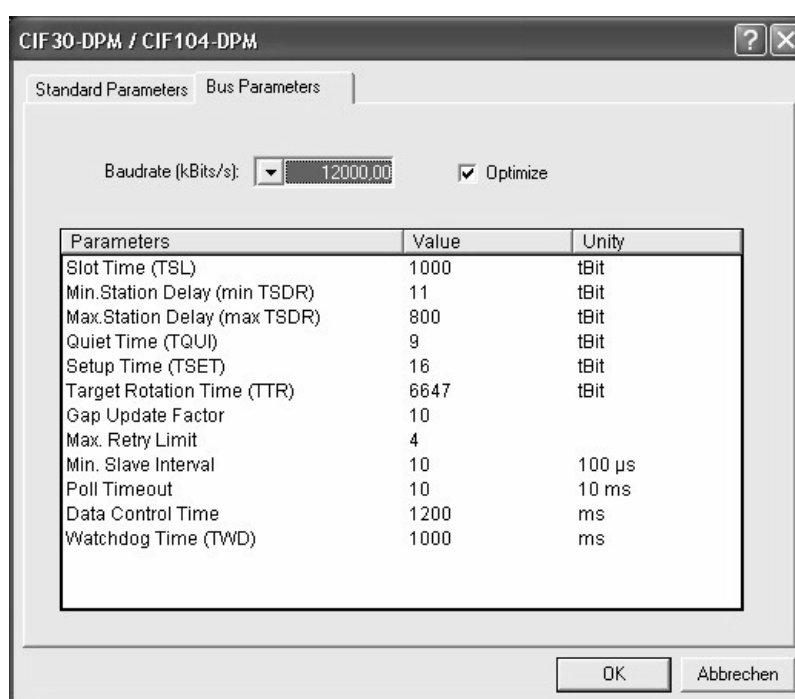
Fig. 6-7: Configuring the PROFIBUS-DP master / Bus parameters

Baud rate (kBits/s)

The baud rate setting must be selected at least once in order to activate automatic optimization.

Automatic optimization

Selected: The universal bus parameters are calculated.
Not selected: The universal bus parameters can be entered or modified by the user.

Watchdog Time

Determines after which time a slave is recognized as faulty.

PDM_OpMaProfi_06_us.fm

Configuring the connected slaves

Now the PROFIBUS slaves need to be entered in the control configuration. After selecting 'Add profibus module', the following selection box appears.

Fig. 6-8: Selecting the PROFIBUS-DP slave

Select the desired PROFIBUS-DP slave from the dialog box 'device name'. The slaves available are determined by the gsd files in the subdirectory plcconf. This directory can be found in the given library directory of the project. To configure additional Profibus slave modules, copy the new gsd file to the corresponding subdirectory plcconf and restart EPAS-4. The language of the selected gsd file is shown in brackets.

After the entry is confirmed with OK, the PROFIBUS slave is taken over in the control configuration.
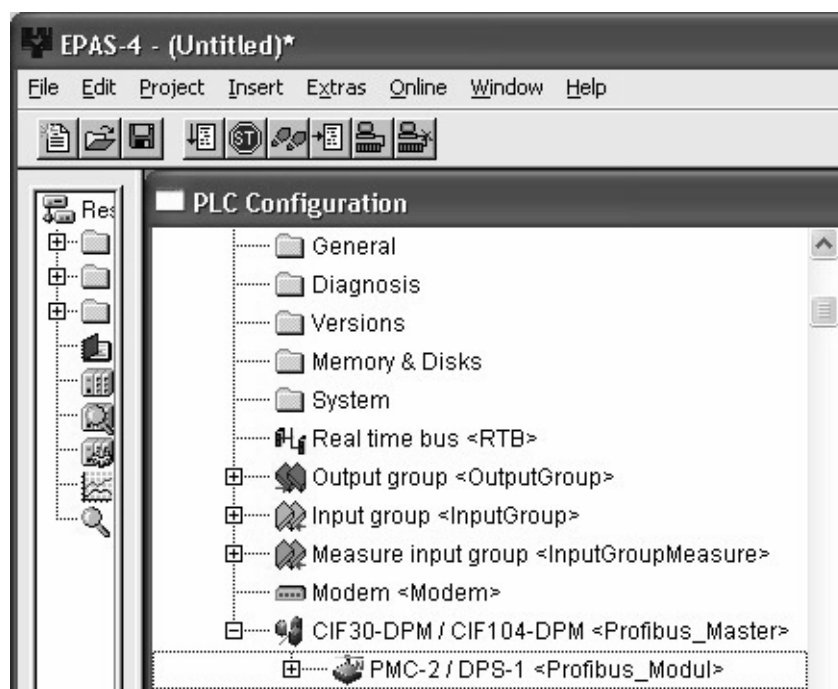
Fig. 6-9: PROFIBUS-DP master and slave in the control configuration

Use the right mouse button to call up the properties of the
PROFIBUS-DP slaves.

Basic parameters

Fig. 6-10: Configuring the PROFIBUS-DP slave / Basic parameters

IEC addresses

Output address:

IEC start address of the Profibus output files of that slave
participant.
See also „Calculation of IEC addresses" on page 28.

Input address:

IEC start address of the Profibus input files of that slave participant.
See also „Calculation of IEC addresses" on page 28.

Diagnosis address:

The diagnosis address is not supported.

Standard parameters

TSDR (TBit):

The setting should not be modified.

Lock/Unlock:

The setting should not be modified.

Identification

Station address:

Profibus address of the slave within the Profibus data traffic.

Station name:

Any text can be entered here.

Watchdog

Watchdog Control:

Selected: Control of the master by the slave is active.

Not selected: Control of the master by the slave is not active.

Time (ms):

Monitoring time of the slaves for the master. If the master does not send the next Profibus telegram within this time, the output data are set to a safe state.

Activation

Slave in actual configuration active:

This setting should not be modified.

Calculation of IEC addresses

Input address of a slave = input address of the last calculated slave + input data length of last calculated slave

Output address of a slave = output address of the last calculated slave + output data length of the last calculated slave

Gaps between the address ranges of individual slaves are admissible. The maximum size of the I/O ranges must not be exceeded. The standard setting is 65536 bytes for both ranges. The size is laid down in the file EPAS-4.ini. This file can be found in the system directory WINDOWS or WINNT.

Input range adjustable by entering:

EPAS_InputSize=
Output range adjustable by entering:

EPAS_OutputSize=

Example:
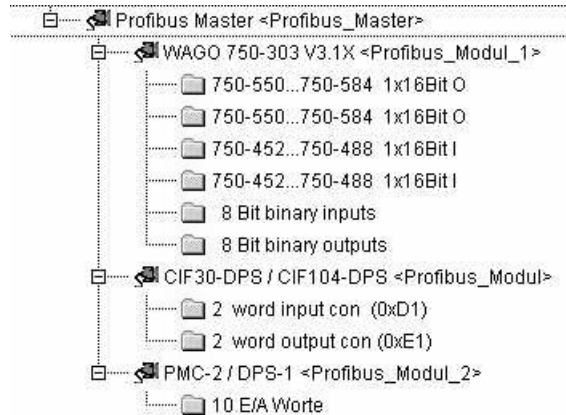
Fig. 6-11: Configuration in Epas-4
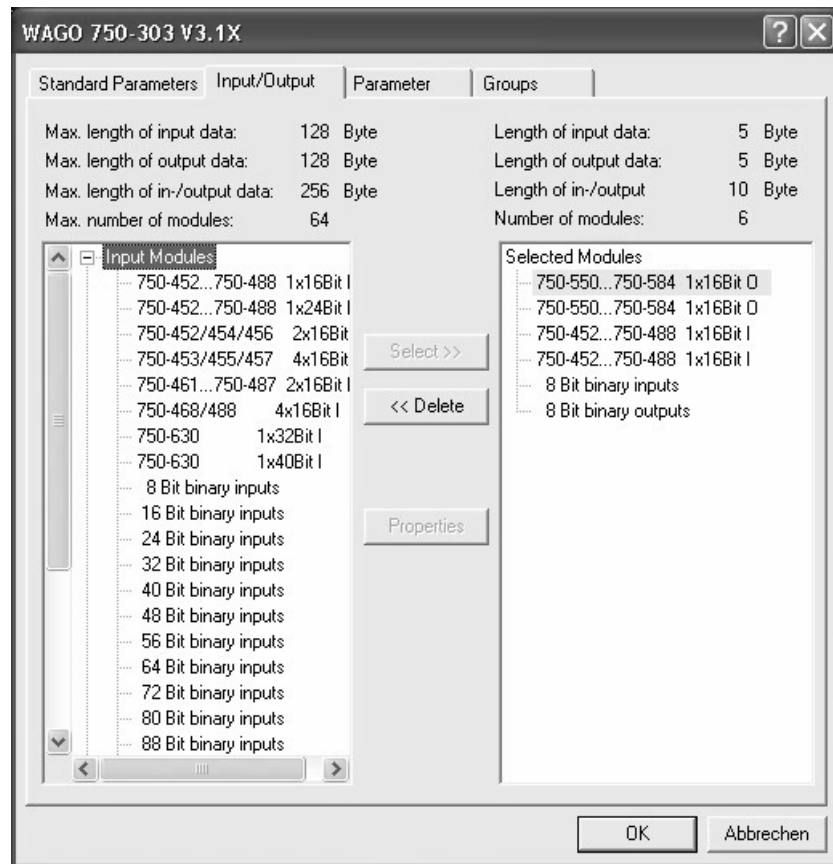
Fig. 6-12: WAGO module

5 bytes input data and 5 bytes output data

> next possible IEC address for the next module (e.g. CIF30-DPS / CIF104-DPS):

output address: %QB5
input address: %IB5
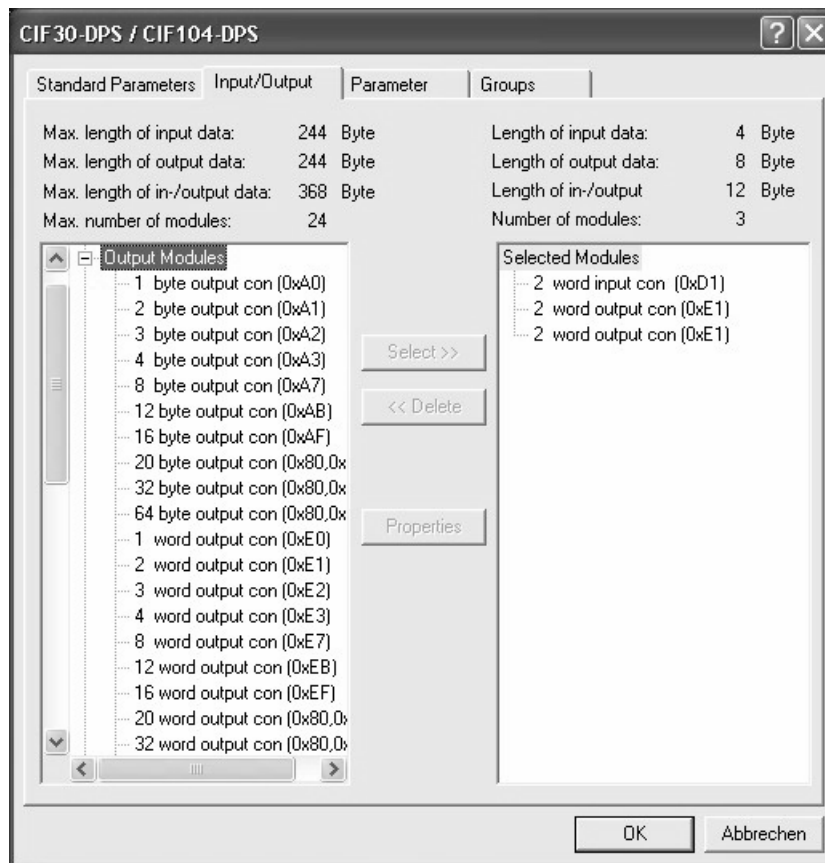
Fig. 6-13: Module CIF30-DPS / CIF104-DPS

4 bytes input data and 8 bytes output data

➢ next possible IEC address for the next module (e.g. PMC-2 /
DPS-1):
output address: %QB5
input address: %IB5

PDM_OpMaProfi_06_us.fm
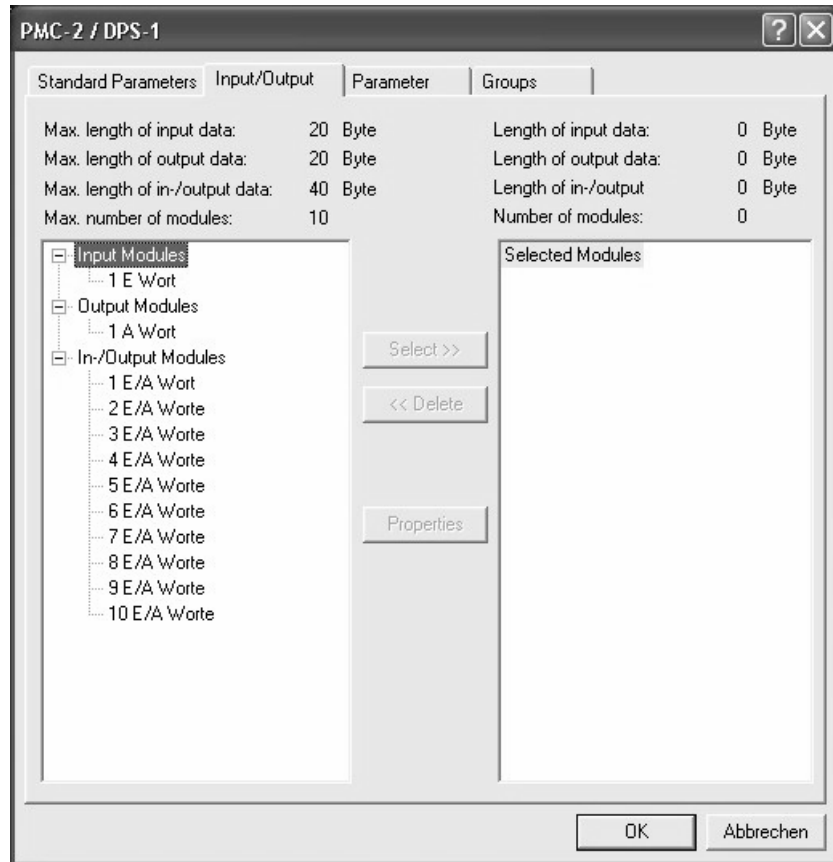
Inputs/Outputs

Fig. 6-14: Configuring the PROFIBUS-DP slave / Inputs/outputs

The left upper segment shows the maximum possible configuration.

The right upper segment numerically shows the actual configuration.

In the left lower window you can select modules configurable for this slave and take them over in the actual configuration using the >> button.

The right lower window shows the structure and sequence of the actual configuration. The modules selected there can be removed by clicking on the 'Delete' button.

NOTE

The structure and sequence of the modules must be conform with the modules actually existing in the slave! An exception are slaves taking over the configuration of the master (e.g. PMC-2).

NOTE

With non-modular slaves, all available modules are automatically taken over in the 'selected modules' window. Likewise, it is only possible to delete modules.

NOTE

The total data length of the input and output modules must not exceed 512 bytes! This can be checked by controlling the next higher input or output address after the last slave. If the addresses are calculated as described in 'Calculation of IEC addresses', the result must not be greater than %IB511 or %Qb511. Likewise, the size of the input or output modules must not exceed 244 bytes per slave.

The Profibus slave nodes should be connected one after the other, so as to determine the utilization of the I/O updating task. Thus you can avoid that this task uses up the whole CPU time and thus blocks TCPIP communication. 1 byte of I/O data requires approx. 1.5 µs.

Properties

Some Profibus modules have further adjustable properties.
To set these properties, click on "selected module" and click on the button Properties.
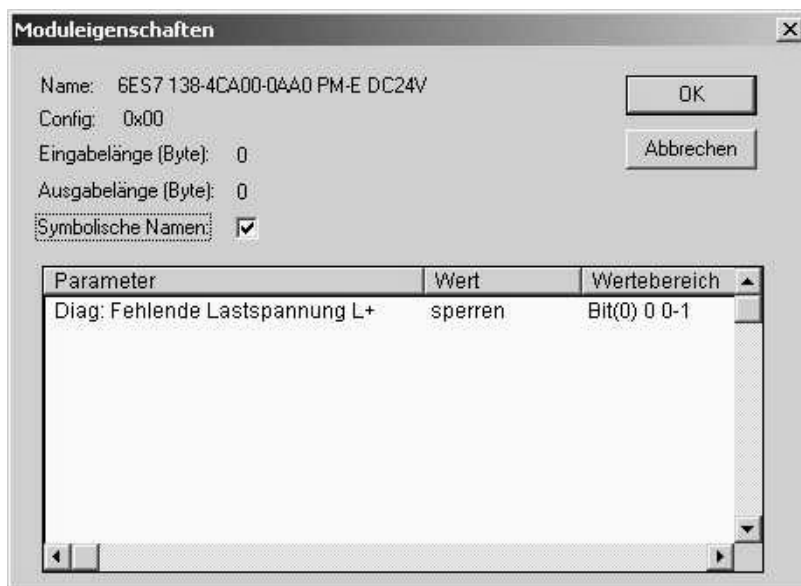
Fig. 6-15: Showing/modifying the properties of a module

In some modules a "symbolic name" is saved for the value. This display of this symbolic name can be activated by a tick behind *Symbolic name*.

Parameters described in plain text can be modified by a double click or a by single click and the right mouse button.

Numerical parameters can be entered by selecting them and then clicking with the left mouse button.

Parameters
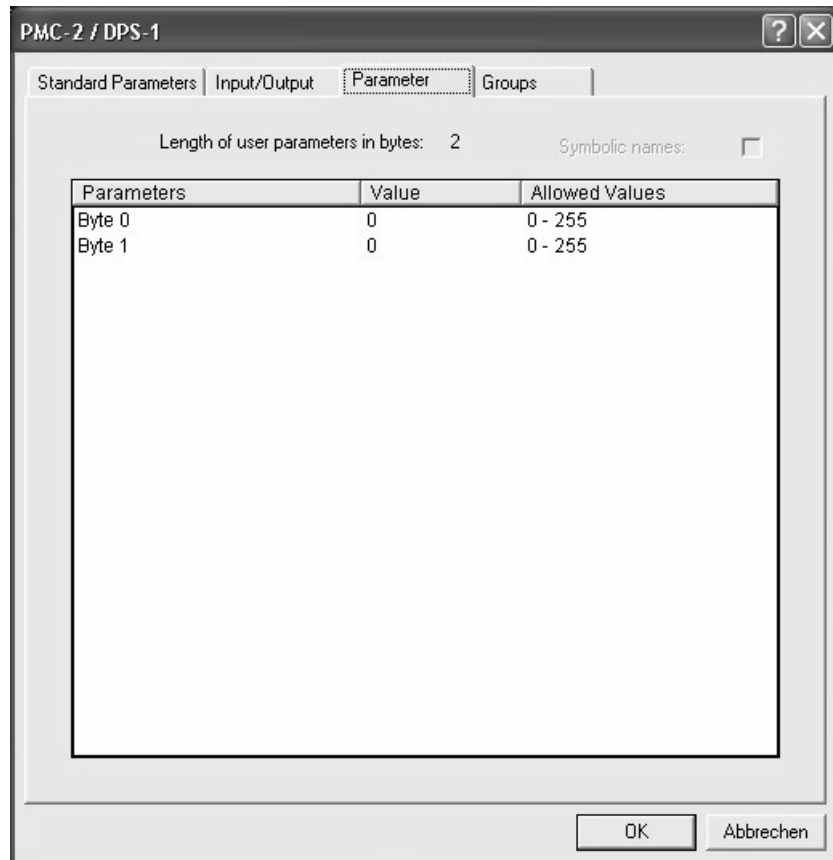
Fig. 6-16: Configuring the PROFIBUS-DP slave / Parameters / Without plain-text description

The parameters can be entered numerically in decimal code, by selecting them and then clicking again (no double click).
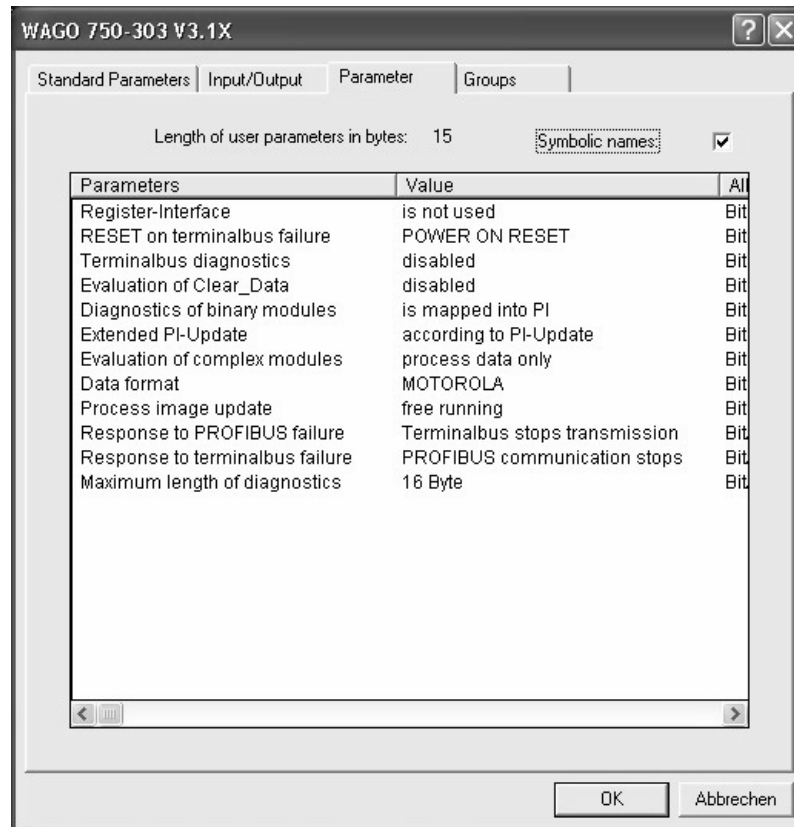
Fig. 6-17: Configuring the PROFIBUS-DP slave / Parameters / With plain-text description

Parameters described in plain text can be changed by a double click or by a single click and the right mouse button.

Group allocation
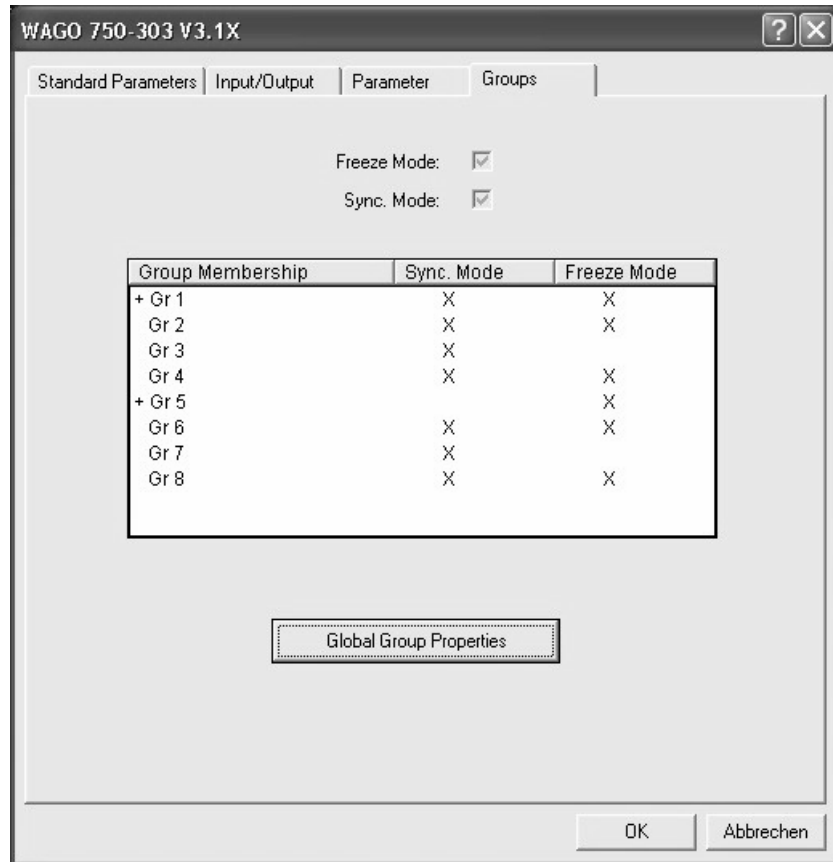
Fig. 6-18: Configuring the PROFIBUS-DP slave / Group allocation

The group allocation determines to which group commands the slave is to react. A slave can be allocated to several groups. The group commands are *PrMaSync*, *PrMaUnSync*, *PrMaFreeze* and *PrMaUnFreeze*. For a detailed description of those group commands, please consult the description of system components. The ticks or empty boxes next to '*Freeze* Mode:' and '*Sync*. Mode:' in the upper part of the screen show whether the actual slave supports those modes.

Global group properties
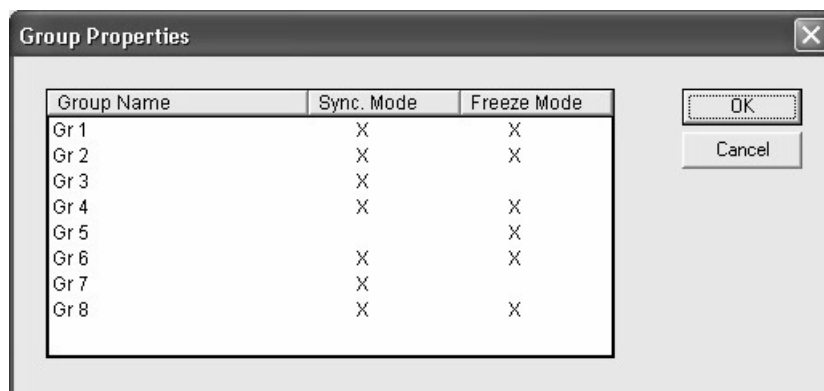
Fig. 6-19: Configuring the PROFIBUS-DP slave / Group allocation / Group properties

In *Group properties*, it is determined which group commands are admissible for this group.

Sync. Mode:

selected: PrMaSync and PrMaUnSync can be used for this group.

not selected: PrMaSync and PrMaUnSync cannot be used for this group.

Freeze. Mode:

selected: PrMaFreeze and PrMaUnFreeze can be used for this group.

not selected: PrMaFreeze and PrMaUnFreeze cannot be used for this group.

6.3.2   Parametrization

No	Designation	Unit	Data type	I/O	Default
1	State		DINT	AD	
2	Version		String(33)	AF	
3	IOAddress		DINT	AK	
4	GlobalError		USINT	AD	
5	BadDeviceAdr		USINT	AD	
6	DPMState		USINT	AD	
7	ErrorCode		USINT	AD	
8	ErrorCount		USINT	AD	
9	ModState		USINT	AD	

No	Designation	Unit	Data type	I/O	Default
10	CycleLoad		DINT	AD	
11	DataExMode		DINT	ERC	1
12	IOTrigger		DINT	ERC	3
13	BusEnable		BOOL	EFC	yes/TRUE
14	IRQ		DINT	ERC	7
15	Format		DINT	ERC	INTEL
16	IOReset		DINT	EDC	2

Table 6-1: Parameters of the PROFIBUS-DP master

State

State of the Profibus module. The firmware-internal error codes of the Profibus object are shown.

Error code	Meaning
-900	When accessing the dpm range of the Profibus, the admissible range was exceeded. It was attempted to send or receive a byte with a number greater than 511.
-901	No Profibus recognized (CIF not found). Either no module is plugged, or a wrong address was set.
-902	A timeout occurred when waiting for the ready bit of the module after initializing the Profibus hardware.
-903	Cyclic data exchange was broken off. Either the master is not sending cyclic data, or the cable connection is disturbed or interrupted, or the same slave address is used twice.
-904	Watchdog monitoring for the Profibus module has triggered. Module is not reacting within the given monitoring time (see default configuration).
-907	In mailbox communication between MAx4 firmware and Profibus card, the reply came with a faulty message ID. Communication between MAx4 firmware and Profibus card failed. Module defective. Software error MAx4.
-908	It was attempted to configure a save with an inadmissible slave address in the Profibus master.Wrong configuration in Epas4. Software error Max4.
-909	Timeout occurred when waiting for an empty send mailbox of the Profibus module. Communication between MAx4 firmware and Profibus card failed. Should not happen. Module defective. Software error MAx4.

Error code	Meaning
-910	Timeout occurred when waiting for a mailbox reply from the Profibus module. Communication between MAx4 firmware and Profibus card failed. Should not happen. Module defective. Software error MAx4.
-911	No configuration file found on MAx4 disc for a Profibus master object. Communication problems in the transmission of the control configuration from EPAS4. Hardware error on MAx4 (disc). Retransmit control configuration.
-912	Faulty slave data in configuration file. Communication problems in the transmission of the control configuration from EPAS4. Hardware error on MAx4 (disc). Retransmit control configuration.
-913	Faulty master bus data in configuration file. Communication problems in the transmission of the control configuration from EPAS4. Hardware error on MAx4 (disc). Retransmit control configuration.
-914	Timeout occurred when waiting for init bit of the module after initializing the Profibus hardware. Module defective. Software error MAx4.
-915	Mailbox message for downloading the configuration to the card is too long. Software error MAx4.
-916	Faulty slave or master bus data in configuration file. Communication problems in the transmission of the control configuration from EPAS4. Hardware error on MAx4 (disc). Retransmit control configuration.
-917	Master bus data are too long. Faulty master bus data in control configuration. Communication problems in the transmission of the control configuration from EPAS4. Hardware error on MAx4 (disc). Retransmit control configuration.
-918	NO access to I/O range. Software error in MAx4 or EPAS4.
-920	Duplication of IEC or DPM offset addresses. See diagnosis message.
-921	Input data of the configured slaves exceed the maximum admissible range of the master. Configure less input data and transmit this configuration.
-922	Output data of the configured slaves exceed the maximum admissible range of the master. Configure less input data and transmit this configuration.
-923	Duplication of slave Profibus addresses within the master configuration. Change Profibus addresses and retransmit configuration.
-924	Message length of DDLM_Slave_Diag message is too long. Software error on MAx4.

Table 6-2: PROFIBUS-DP master / Parameter State

PDM_OpMaProfi_06_us.fm

Version

Version of the Profibus DP master module firmware

IOAddress

IO address under which the Profibus module was recognized.

GlobalError

Global state bits of the Profibus master card. The cause of the errors shown may be found in the master or in the slaves.

D7	D6	D5	D4	D3	D2	D1	D0
0	TOUT	NRDY	EVE	FAT	NEXC	ACLR	CTRL

CONTROL-ERROR: parameterization error

AUTO-CLEAR-ERROR: DEVICE stopped the comm- unication to all slaves and reached the auto-clear end state

NON-EXCHANGE-ERROR: At least one slave has not reached the data exchange state and no process data are exchange with

FATAL-ERROR: Because of heavy bus error, no further bus communication is possible

EVENT-ERROR: The DEVICE has detected bus short circuits. The number of detected events are fixed in the bus_error_cnt variable. The bit will be set when the first event was detected and will not be deleted any more

HOST-NOT-READY-NOTIFICATION: Indicates if the HOST program has set its state to operative or not. If the bit is set the HOST program is not ready to communicate

TIMEOUT-ERROR: The DEVICE has detected an overstepped timeout supervision time because of rejected PROFIBUS telegramms. It‚s an indication for bus short circuits while the master interrupts the communication. The number of detected timeouts are fixed in the bus_error_cnt variable. The bit will be set when the first timeout was detected and will not be deleted any more

reserved

Fig. 6-20: PROFIBUS-DP master / Parameter GlobalError

BadDeviceAdr

Shows the Profibus address of the Profibus slave that caused the error (0-125). If the value 255 is shown, the error lies on the master card.

DPMState

Shows the actual state of the state machine of the Profibus master.

00H: state OFFLINE
40H: state STOP
80H: state CLEAR
C0H: state OPERATE

In the state 'Operate' cyclic messages are exchanged.

ErrorCode

Error codes for *BadDeviceAdr* 0-125, i.e. for the corresponding Profibus slave

err_event	Signification	error Source	Help
2	station reports overflow	master telegram	check length of configured slave configuration or parameter data
3	request function of master is not activated in the station	master telegram	check slave if PROFIBUS_DP norm compatible
9	no answer-data, although the slave must response with data	slave	check configuration data of the station and compare it with the physical I/O data length
17	no response of the station	slave	check bus cable, check bus address of slave
18	master not into the logical token ring	DEVICE	check FDL-Address of master or highest-station-Address of other master systems. examine bus cabling to bus short circuits
21	faulty parameter in request	master telegram	contact hotline

Table 6-3: PROFIBUS-DP master / Parameter ErrorCode 1

Error codes for *BadDeviceAdr* 255, i.e. for Profibus master

err_event	signification	error source	help
0	no mistakes appear		
50	USR_INTF-Task not found	DEVICE	contact technical support
51	no global data-field	DEVICE	contact technical support
52	FDL-Task not found	DEVICE	contact technical support
53	PLC-Task not found	DEVICE	contact technical support
54	non existing master parameters	DEVICE	execute download of data base again
55	faulty parameter-value in the master parameters	project planning	contact technical support

err_ event	signification	error source	help
56	non existing slave parameters	project planning	execute download of data base again
57	faulty parameter-value in a slave parameters datafile	project planning	contact technical support
58	double slave address	project planning	check projected addresses
59	projected send process data offset address of a participant outside the allowable border of 0 - 255	project planning	check projected addresses
60	projected receive process data offset address of a participant outside the allowable border of 0-255	project planning	check projected addresses
61	data-areas of slaves are overlapping in the send process data	project planning	check projected addresses
62	data-areas of slaves are overlapping in the receive process data	project planning	check projected addresses
63	unknown process data handshake	project planning	check warmstart parameters
64	free RAM exceeded	DEVICE	contact technical support
65	faulty slave parameter data sets	project planning	contact technical support
202	no segment for the treatment free	DEVICE	contact technical support
212	faulty reading of a data base	DEVICE	execute download of data base again
213	structure-surrender to operating system faulty	DEVICE	contact technical support

Table 6-4: PROFIBUS-DP master / Parameter ErrorCode 2

ErrorCount

Number of heavy bus errors, e.g. short circuits in the bus.

ModState

Module state is shown in 8 bit.

Bit	Meaning
7	Ready Bit: 1: Firmware of the module is running and default initialization is completed. 0: Initialization not completed
6	Run Bit: 1: Communication is enabled (in Init function of the Profibus object) and parameters set are correct 0: Communication not enabled (in Init function of the Profibus object) and/or parameters set are not correct
5	COM Bit: 1: cyclic data exchange takes place 0: cyclic data exchange does not take place
4	not used
3	not used
2	PdAck Bit: With every changing bit, a data exchange between module and Dpm is indicated. Data exchange is triggered by the real-time process. The cycle is equivalent to the real-time bus interval
1	DevAck Bit: Handshake bit for controlling mailbox communication between MAx-4 PacController firmware and Profibus module
0	HostCom Bit: Handshake bit for controlling cyclic Profibus process data communication between MAx-4 PacController firmware and Profibus module

Table 6-5: PROFIBUS-DP master / Parameter ModState

CycleLoad

Duration of I/O data matching for this master in ns. The data from the IEC output ranges are copied to the data range (DPM) of the Profibus card and the input data of the Profibus card are copied to the IEC input range. 1 byte I/O data need a CPU time of approx. 1.5 µs.

DataExMode

Access mode for Profibus data:

Parameter values	Meaning
Async. direct firmware access to PB data / 0	Access from the IEC program to the Profibus data is not synchronized. This means that only byte consistent access is possible. For write/read operations with larger data, it is not guaranteed that the data bytes were received/sent in the same data cycle.You should only use the system components PrMaReceiveBYTE and PrMaSendBYTE.
Sync. buffered firmware access to PB data/ 1	Access from the IEC program to the Profibus data is synchronized. This means that consistent access via system components is possible.
sync. direct firmware access to PB data with cycle control / 2	Access from the IEC program to the Profibus data is synchronized. This means that consistent access via system components is possible. The Profibus cycle is synchronous to the update of IO data.

Table 6-6: PROFIBUS-DP master / Parameter DataExMode

IOTrigger

Source giving the start signal for I/O data matching between Profibus card and IEC address ranges.

Trigger source	Meaning
no automatic IO image matching / 0	No matching between IEC I/O ranges and DPM data on Profibus card.
IO matching by field bus card IRQ / 1	Matching is done by the interrupt of the field bus card. The interrupt takes place as soon as the DPM of the card is no longer used by the Profibus card software and access by MAx4 firmware is admissible. At the end of the copying process, a receipt for MAx4 firmware's enabling of the DPM range is sent at the end of the task started by the trigger. It reads the DPM and sends the data to the bus or writes the data received into the Dpm. The card enables the DPM and triggers an interrupt. This procedure repeats cyclically. The frequency depends on the data volume to be transmitted, the baud rate and the DataExMod set.

Trigger source	Meaning
IO matching by IEC program / 2	Matching is done by the IEC program. The copying task is started by calling the system component PrMaTrigger(). The copying task carries out a copying procedure and waits for the next PrMaTrigger() call. With the parameter setting DataExMode = , sync. direct firmware access to PB data with cycle control / 2', the maximum time between two PrMaTrigger() calls must be shorter than the shortest watchdog time of all configured slaves, since otherwise that slave terminates the cyclic communication with an error message. A jitter within this watchdog time is admissible.
IO matching by real-time bus / 3	Matching is done by the real-time bus tact. The trigger signals are sent with the intervals laid down in the CycleTime parameter of the real-time bus.

Table 6-7: PROFIBUS-DP master / Parameter IOTrigger

NOTE

Not all combinations of *DataExMode* and *IOTrigger* are sensible.

DataExMode	IOTrigger	Explanations
sync. direct firmware access to PB data with cycle control / 2	IO matching by IEC program / 2	<u>IEC control active</u>; i.e. the IEC function *PrMaTrigger* is used-> IEC program triggers IO match. After the IO match the Profibus is triggered, i.e. a Profibus cycle is started. + minimal jitter for output signals; data consistency - complex See also PROFIBUS-DP libraries / IEC examples in the EPAS-4 online help. <u>IEC control active / asynchronous</u>; as above. In addition, the IEC function *PrMaGetServerState()* is used. + consistent data can be reached even in case of an IEC task priority greater than the priority of the IO server. See also PROFIBUS-DP libraries / IEC examples in the EPAS-4 online help.

DataExMode	IOTrigger	Explanations
sync. buffered firmware access to PB data / 1	IO matching by IEC program / 2	<u>IEC control active</u>; i.e. the IEC function *PrMaTrigger* is used-> IEC program triggers IO match. After the IO match the Profibus is triggered, i.e. a Profibus cycle is started. + minimal average jitter; data consistency; no influence on Profibus cycle - complex See also PROFIBUS-DP libraries / IEC examples in the EPAS-4 online help. <u>IEC control active / asynchronous</u>; as above. In addition, the IEC function *PrMaGetServerState()* is used. + consistent data can be reached even in case of an IEC task priority greater than the priority of the IO server. See also PROFIBUS-DP libraries / IEC examples in the EPAS-4 online help.
sync. direct firmware access to PB data with cycle control / 2	IO matching by field bus card IRQ / 1	<u>no IEC control</u>; i.e. no IEC function is used + very easy handling - relatively large jitter
sync. direct firmware access to PB data with cycle control / 2	IO matching by field bus card IRQ / 1	<u>IEC control passive</u>; i.e. the IEC function *PrMaWaitOnTrigger* is used-> awaiting for IRQ of the field bus card + minimal jitter - unfavorable in cyclic programs, due to waiting function See also PROFIBUS-DP libraries / IEC examples in the EPAS-4 online help.

Table 6-8: Sensible combinations of DataExMode and IOTrigger

BusEnable

Used to block the automatic Profibus start in cyclic operation after switching on or resetting MAx4. The bus is blocked if this parameter is set to FALSE in the MAx4 boot procedure. Now the parameter can be set to TRUE at any position in the IEC program. As soon as this happens, Profibus will enter into cyclic operation. Any subsequent change of this parameter will have no effect. If the parameter is TRUE at the point of booting, Profibus is switched to cyclic operation in the booting phase. In this case any change of this parameter will have no effect.

IRQ

The interrupt chosen in the interrupt jumper setting on the Profibus hardware must be entered here. You should always use interrupt 7 or 9.

NOTE

If you do not want to use the interrupt (*IOTrigger* <> "IO matching by field bus card IRQ/ 1") you can switch it off with "-1" in the parameter IRQ.
The customer should only change this setting after consultation with ELAU's application department.

Format

Here you can determine the data format.
INTEL: Word elements are sent and received in Intel format (Low Byte, High Byte)
MOTOROLA: Word elements are sent and received in Motorola format (High Byte, Low Byte)

IOReset

no reset / 0 : The outputs of the object are not reset
after download / 1 :The outputs of the object are reset after a reset of the IEC program
after download and prg. reset / 2 : The outputs of the object are reset after a download or reset of the IEC program
after download, prg. reset and prg. stop / 3 :The outputs of the object are reset after a download, reset or stop of the IEC program

Parameterization of the connected slaves

Now you have to parameterize the PROFIBUS-DP slaves in the control configuration.

No	Designation	Unit	Data type	Typ	Default
1	Activation		BOOL	ERC	yes / TRUE

Table 6-9: Parameter PROFIBUS-DP master configuration / Slaves

Activation (V00.11.00 or higher)

With this parameter, slave modules can be hidden from the configuration. This is necessary e.g. if only one IEC project is to be used for a modular machine. With the help of the IEC program the slave modules can then be activated or deactivated.

TRUE: Module is searched on the PROFIBUS and parameterized.
IO data are transmitted to the IEC IO range according to the master
parameters.

FALSE: Module is not searched on the PROFIBUS. IO data are
reserved in the IEC IO range, but not exchanged. No diagnosis
messages are generated for this slave module.

NOTE

The order of the configured slaves in the control configuration must
be equivalent to the order of the PROFIBUS addresses. (First top
slave has the lowest Profibus address, last slave has the highest
Profibus address)
This parameter is only active in firmware versions V01.146
18.01.00 of the Profibus master module.

6.4 PROFIBUS-DP Slave

6.4.1 Configuration

When a PROFIBUS-DP slave is entered in the control
configuration, a selection box appears.
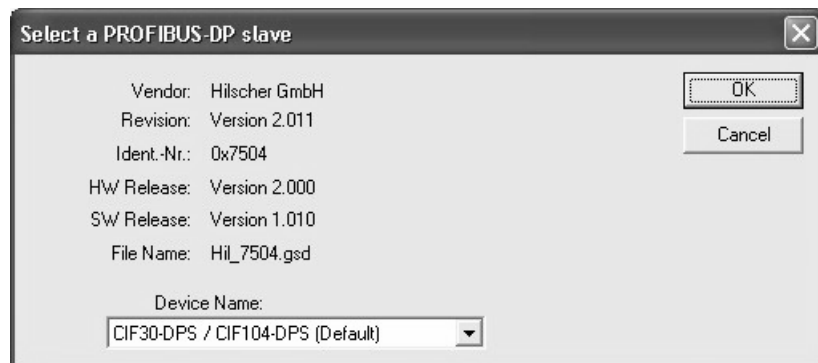
Fig. 6-21: Select PROFIBUS-DP slave

After confirming the entry with OK, the PROFIBUS slave is taken
over in the control configuration.
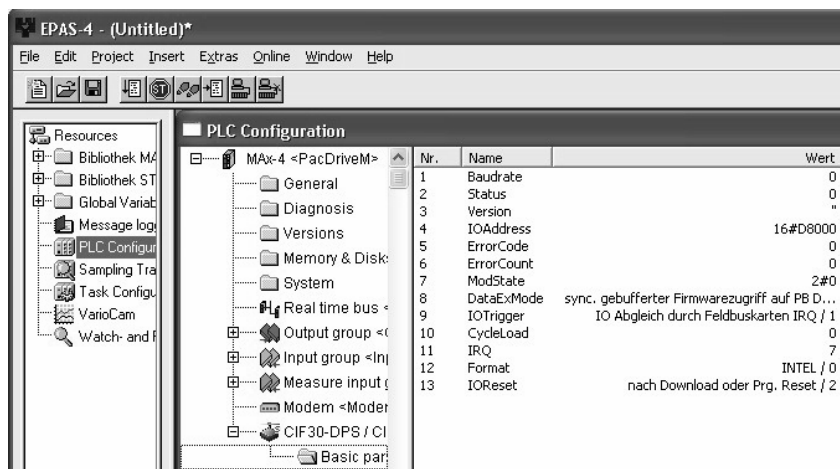
Fig. 6-22: PROFIBUS-DP slave in the control configuration

Now you have to configure the PROFIBUS-DP slave. Use the right mouse button to call up the properties of the slave.

Basic parameters
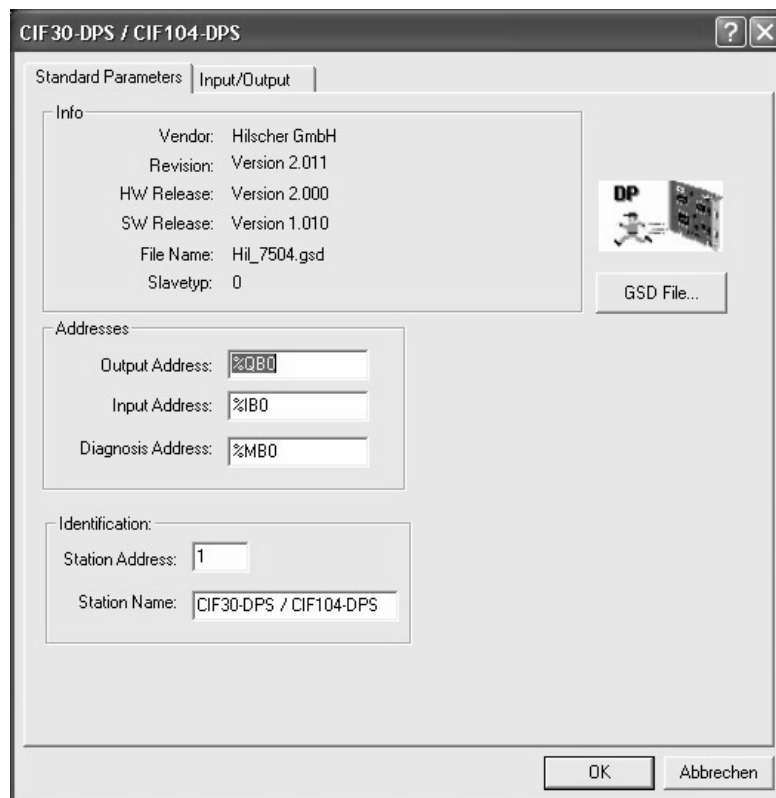
Fig. 6-23: Configure PROFIBUS-DP slave / Basic parameters

<u>Addresses</u>

Output address:

IEC start address of the Profibus output data of this slave. The IEC output data range set here must not overlap with the ranges of other modules (e.g. with the range of a PROFIBUS DP master module).

Input address:

IEC start address of the Profibus input data of this slave. The IEC input data range set here must not overlap with the ranges of other modules (e.g. with the range of a PROFIBUS DP master module).

Diagnosis address:

The diagnosis address is not supported.

Identification

Station address:

Profibus address of the slave within the Profibus data traffic.

Station name:

Any text can be entered here.

Inputs/outputs
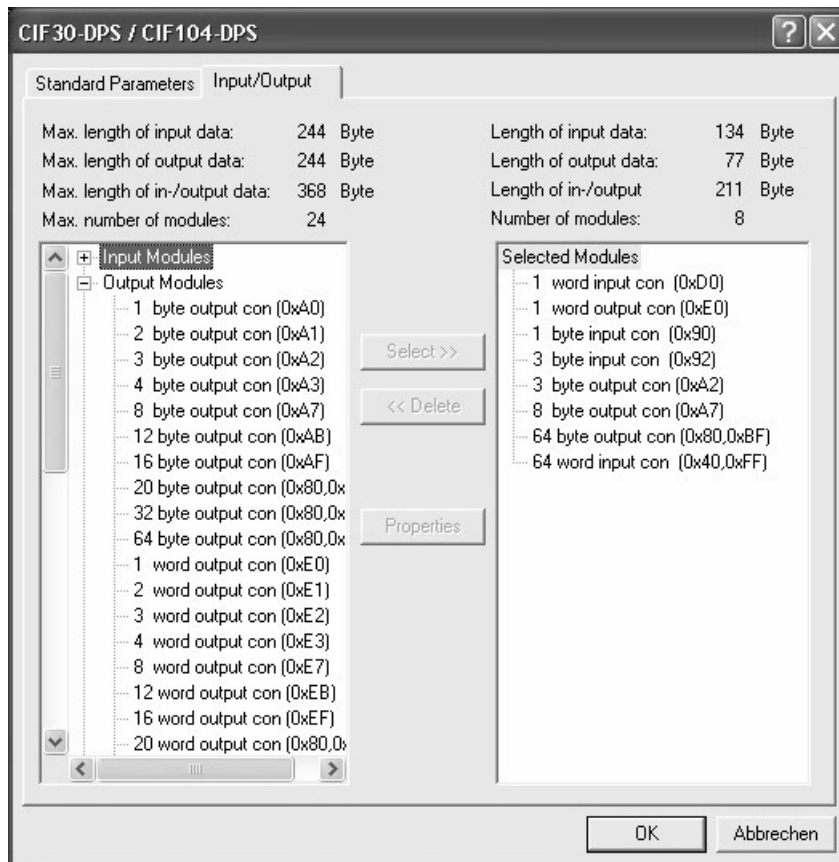
The left upper segment shows the maximum possible configuration.

The right segment range numerically shows the actual configuration.

In the left lower window you can select configurable modules and take them over in the actual configuration using the >> button.

The right lower window shows the structure and sequence of the actual configuration. The modules selected there can be removed by clicking on the 'Delete' button.

NOTE

The structure and sequence of the modules must be conform with the structure and sequence of this slave in the master.

6.4.2 Parametrization

No	Designation	Unit	Data type	E/A	Default
1	Baudrate	kBaud	DINT	AF	
2	State		DINT	AD	
3	Version		String(33)	AF	
4	IOAddress		DINT	AK	16#D8000
5	ErrorCode		USINT	AD	
6	ErrorCount		UINT	AD	
7	ModState		USINT	AD	
8	DataExMode		DINT	ERC	2
9	IOTrigger		DINT	ERC	3
10	CycleLoad	ns	DINT	AD	
11	IRQ		DINT	ERC	7
12	Format		DINT	EDC	INTEL
13	IOReset		DINT	EDC	2

Table 6-10: Parameters of the PROFIBUS-DP slave

Baudrate

Functional starting parameter; the baud rate is determined automatically. If this is not possible, the system shows 0. Possible values in kBaud: 12000(12 MBaud), 6000(6 MBaud), 3000(3 MBaud), 1500(1.5 MBaud), 500(500 kBaud), 187(187.5 kBaud), 93(93.75 kBaud), 9(9600 Baud), 0(automatic termination not possible).

State

State of the Profibus module. The firmware-internal error codes of the Profibus object are shown.

Error code	Meaning
-900	When accessing the dpm range of the Profibus, the admissible range was exceeded. It was attempted to send or receive a byte with a number greater than 511.
-901	No Profibus recognized (CIF not found). Either no module is plugged, or a wrong address was set.
-902	A timeout occurred when waiting for the ready bit of the module after initializing the Profibus hardware.

Error code	Meaning
-903	Cyclic data exchange was broken off. Either the master is not sending cyclic data, or the cable connection is disturbed or interrupted, or the same slave address is used twice.
-904	Watchdog monitoring for the Profibus module has triggered. Module is not reacting within the given monitoring time (see default configuration).
-914	Timeout occurred when waiting for init bit of the module after initializing the Profibus hardware. Module defective. Software error MAx4.
-919	Configuration file for a Profibus slave object not found on MAx4 disc. Communication problems in the transmission of the control configuration from EPAS4. Hardware error on MAx4 (disc). Retransmit control configuration.

Table 6-11: PROFIBUS-DP slave / Parameter State

Version

Version of PROFIBUS-DP slave module firmware.

IOAddress

IO address, where PROFIBUS-DP module was recognized.

ErrorCode

Error code	Meaning
52	Invalid Bus Address. Configured Valid addresses are between 1 and 126
53	Waiting for Warmstart. The parameter 'starting mode' in the table 'setup' is configured to the value 'configuration by application' but the application did not make a warmstart to the device at all.
54	Invalid Module Type Configured The configured code for the module type is not defined. If this error happens after a warmstart check also the buffer_len and contact the developer of the user program.
55	Invalid Module Length The code for the parameter module length is not defined.
61	No Address-Switches Available The configuration tells the firmware to select the bus address from address-switches, but the hardware has no address-switches.
70	I/O-Data too Long The maximum size of I/O-data has been exceeded. Please check the length of all modules.
71	SPC3 Initialization Error The SPC3 return an error during initialization. Please contact your distributor.
210	Data Base Access Error The access to the data base failed. Please check if data base is loaded correctly.

Table 6-12: PROFIBUS-DP slave / Parameter ErrorCode

ErrorCount

Number of errors mentioned in the ErrorCode parameter since last module initialization.

ModState

Module state is shown in 8 bit.

Bit	Meaning
7	Ready Bit: 1: Firmware of the module is running and default initialization is completed. 0: Initialization not completed
6	Run Bit: 1: Communication is enabled (in Init function of the Profibus object) and parameters set are correct 0: Communication not enabled (in Init function of the Profibus object) and/or parameters set are not correct
5	COM Bit: 1: cyclic data exchange takes place 0: cyclic data exchange does not take place

Bit	Meaning
4	not used
3	not used
2	PdAck Bit: With every changing bit, a data exchange between module and Dpm is indicated. Data exchange is triggered by the real-time process. The cycle is equivalent to the real-time bus interval
1	DevAck Bit: Handshake bit for controlling mailbox communication between MAx-4 PacController firmware and Profibus module
0	HostCom Bit: Handshake bit for controlling cyclic Profibus process data communication between MAx-4 PacController firmware and Profibus module

Table 6-13: PROFIBUS-DP Slave / Parameter ModState

DataExMode

Access mode to Profibus data:

Parameter values	Meaning
sync. buffered firmware access to PB data / 0	Access from the IEC program to the Profibus data is synchronized. This means that consistent access via system components is possible.
async. direct firmware access to PB data / 1	Access from the IEC program to the Profibus data is not synchronized. This means that only byte consistent access is possible. For write/read operations with larger data, it is not guaranteed that the data bytes were received/sent in the same data cycle.You should only use the system components PrMaReceiveBYTE and PrMaSendBYTE.

Table 6-14: PROFIBUS-DP slave / Parameter DataExMode

IOTrigger

Source giving the start signal for I/O data matching between Profibus card and IEC address ranges.

Trigger source	Meaning
no automatic IO image matching / 0	No matching between IEC I/O ranges and DPM data on Profibus card.

Trigger source	Meaning
IO matching by field bus card IRQ / 1	Matching is done by the interrupt of the field bus card. The interrupt takes place as soon as the DPM of the card is no longer used by the Profibus card software and access by MAx4 firmware is admissible. At the end of the copying process, a receipt for MAx4 firmware enabling of the DPM range is sent at the end of the task started by the trigger. It reads the DPM and sends the data to the bus or writes the data received into the Dpm. The card enables the DPM and triggers an interrupt. This procedure repeats cyclically. The frequency depends on the data volume to be transmitted, the baud rate and the DataExMod set.
IO matching by IEC program / 2	Matching is done by the IEC program. The copying task is started by calling the system component PrSlTrigger(). The copying task carries out a copying procedure and waits for the next PrSlTrigger() call.
IO matching by real-time bus / 3	Matching is done by the real-time bus tact. The trigger signals are sent with the intervals laid down in the CycleTime parameter of the real-time bus.

Table 6-15: PROFIBUS-DP slave / Parameter IOTrigger

NOTE

Not all combinations of *DataExMode* and *IOTrigger* are sensible.

DataExMode	IOTrigger	Explanations
sync. buffered firmware access / 0	IO matching by IEC program / 2	<u>IEC control active</u>; i.e. the IEC function *PrMaTrigger* is used-> IEC program triggers IO match. After the IO match the Profibus is triggered, i.e. a Profibus cycle is started. + minimal average jitter; data consistency - complex See also PROFIBUS-DP libraries / IEC examples in the EPAS-4 online help. <u>IEC control active / asynchronous</u>; as above. In addition, the IEC function *PrMaGetServerState()* is used. + consistent data can be reached even in case of an IEC task priority greater than the priority of the IO server. See also PROFIBUS-DP libraries / IEC examples in the EPAS-4 online help.
sync. buffered firmware access / 0	IO matching by field bus card IRQ / 1	<u>no IEC control</u>; i.e. no IEC function is used + very easy handling - relatively large jitter

DataExMode	IOTrigger	Explanations
sync. buffered firmware access / 0	IO matching by field bus card IRQ / 1	IEC control passive; i.e. IEC function PrSlWaitOnTriggeris used -> awaiting IRQ of the field bus card + minimal jitter - unfavorable in cyclic programs, due to waiting function See also PROFIBUS-DP libraries / IEC examples in the EPAS-4 online help.

Table 6-16: Sensible combinations of DataExMode and IOTrigger

CycleLoad

Duration of I/O data matching for this slave in ns. The data from the IEC output ranges are copied to the data range (DPM) of the Profibus card and the input data of the Profibus card are copied to the IEC input range. 1 byte I/O data need a CPU time of approx. 1.5 µs.

IRQ

This is where you enter the interrupt selected by the interrupt jumper setting on the Profibus. You should always use interrupt 7. If interrupt 7 is already occupied, you can also use interrupt 9 in exceptional cases.

NOTE

If you do not want to use the interrupt (*IOTrigger* <> "IO matching by field bus card IRQ/ 1") you can switch it off with "-1" in the parameter IRQ.
The customer should only change this setting after consultation with ELAU's application department.

Format

Here you can determine the data format.
INTEL: Word elements are sent and received in Intel format (Low Byte, High Byte)
MOTOROLA: Word elements are sent and received in Motorola format (High Byte, Low Byte)

NOTE

If possible, you should only use the new INTEL format, as this brings the lowest CPU strain due to the IO server. The format change has no effect on data transmitted with the system components, i.e. if system components and the IEC IO ranges are used, you always have to set INTEL.

no reset / 0 : The outputs of the object are not reset
after download / 1 :The outputs of the object are reset after a
reset of the IEC program
after download and prg. reset / 2 : The outputs of the object are
reset after a download or reset of the IEC program
after download, prg. reset and prg. stop / 3 :The outputs of the
object are reset after a download, reset or stop of the IEC
program

PDM_OpMaProfi_06_us.fm

field bus PROFIBUS-DP PacDrive™ M

7 Maintenance

Recognizing and clearing an error quickly helps to keep the related production loss down to a minimum.

The diagnosis messages of the PacDrive™ M system, which can be checked using EPAS-4, make it possible to look for errors deliberately and effectively.

In case of an error, defective components can be exchanged with no problem. This ensures that the problem can be solved quickly and operation can be resumed soon. This work must be done by qualified maintenance staff only.

When returning a defective unit to the ELAU customer service, please complete the attached error report form.

ATTENTION!

Device compatibility!
Only units with identical hardware configuration and identical software version may be exchanged.

7.1 Spare Parts, Components

Stock keeping of spare parts:

Keeping a stock of the essential components is a key prerequisite for the permanent functionality of the equipment.

When ordering spare parts, please give the following data:

product name: e.g. MAx-4 / 10 / 01 / 008 / 99 / 1 / 1 /00

article number: e.g. 13130255-008

hardware version: e.g. HW: 630062

softwarev ersion: e.g. SW: 00.05.00

You can find this information on the type plate of the equipment (see also Transportation, Storage, Unpacking) or in the configuration of your PacDrive™ M system.

7.2 Repair

By all means complete the attached error report form when returning defective components.

You can also make a photocopy of the error report form and use it as a fax message.

ATTENTION!

Electro static discharge!

Components may be damaged!

➢ Electronic parts may only be returned in the original or a comparable pakkaging. In any case the components must be wrapped in an ESD packaging/foil. Otherwise you will lose your warranty rights.

7.3 Service Addresses

For ordering spare parts

ELAU AG
Postfach 1255
97821 Marktheidenfeld

Phone: +49 (0) 93 91 / 606 - 0
Fax: +49 (0) 93 91 / 606 - 300

For repair

Please send the components to be repaired or checked, along with the error report, to this address:

ELAU AG
Abt. Kundendienst
postal address: house address:
Postfach 1255   Dillberg 12
97821 Marktheidenfeld   97828 Marktheidenfeld

Service team

Should you need to talk to a member of our service team or require on-site service, please contact:

ELAU AG
Abt. Kundendienst / Applikation
Postfach 1255
97821 Marktheidenfeld

Phone: +49 (0) 93 91 / 606 - 142
Fax: +49 (0) 93 91 / 606 - 300

7.4 Exchanging Units

DANGER!

High Voltage!

Life Hazard!

> Before working on electrical units, disconnect from mains supply and secure against switch-on.

> The drives must be standing safely because life-threatening voltages can occur on the motor cables of servo motors in generator operation.

> Do not disconnect connector plugs while they are carrying voltage.

CAUTION!

Electro static discharge!

Components may be damaged!

> Only touch the boards on the edges. Do not touch any connections or components.

> Before touching the boards, discharge any possible static charge. For this purpose, touch an earthed metal surface, e.g. the casing.

> Do not place the boards on a metal surface.

> Move the boards as little as possible to avoid the creation of electro static charge due to clothing, carpets or furniture.

Exchange PROFIBUS-DP module in the MAx-4 PacController

If the MAx-4 PacController is ordered with optional functions, it is delivered with the optional modules already installed.

CAUTION!

Loss of warranty!
Optional modules may be installed only by ELAU staff. If the user himself installs an optional module and/or opens the MAx-4 PacController, he will lose any warranty rights.

As the MAx-4 must be opened to install optional modules, the ESD measures must absolutely be observed.

It is possible to install one PROFIBUS slave optional module and/or one PROFIBUS master.

7.4.1 Procedure for PROFIBUS-DP master module

> Open and prepare MAx-4
  – Remove cover (4 recessed head screws)
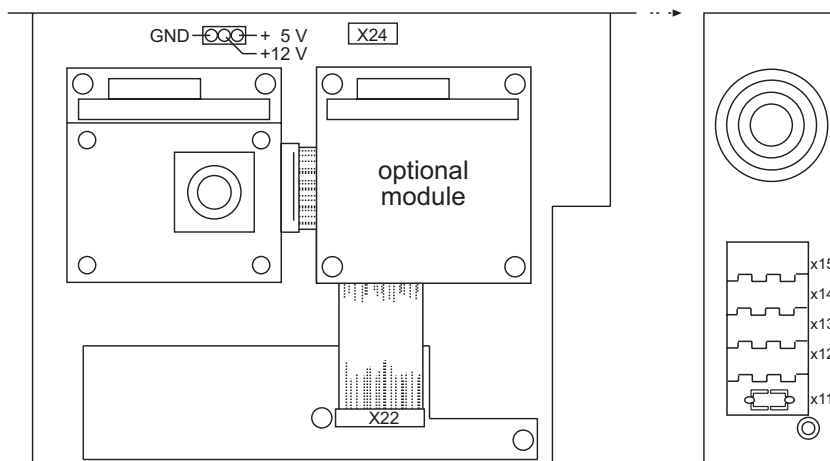
Fig. 7-1: Optional module place in MAx-4

> Uninstall module
  – Disconnect connectors from module
  – Open 4 fixing screws (M 3 x 6) of the module
  – Remove module
> Prepare module
  – Set interrupt level:
    You should always use interrupt 7 (plug I7 on the jumper bar).
    If there are several modules in the PacController, you can
    also use interrupt 9 (I9). Only one jumper may be used!

NOTE

If two PROFIBUS-DP modules are connected (master and slave),
they must have different interrupt settings.

– Set IO address via jumpers:
(0xCA000)

Jumper	Adjustment
ADR 11	plugged
ADR 12	plugged
ADR 13	open
ADR 14	plugged
ADR 15	open
ADR 16	plugged
ADR 17	plugged
ADR 18	open
ADR 19	open

Table 7-1: Jumper for IO - addresses of the PROFIBUS-DP master module
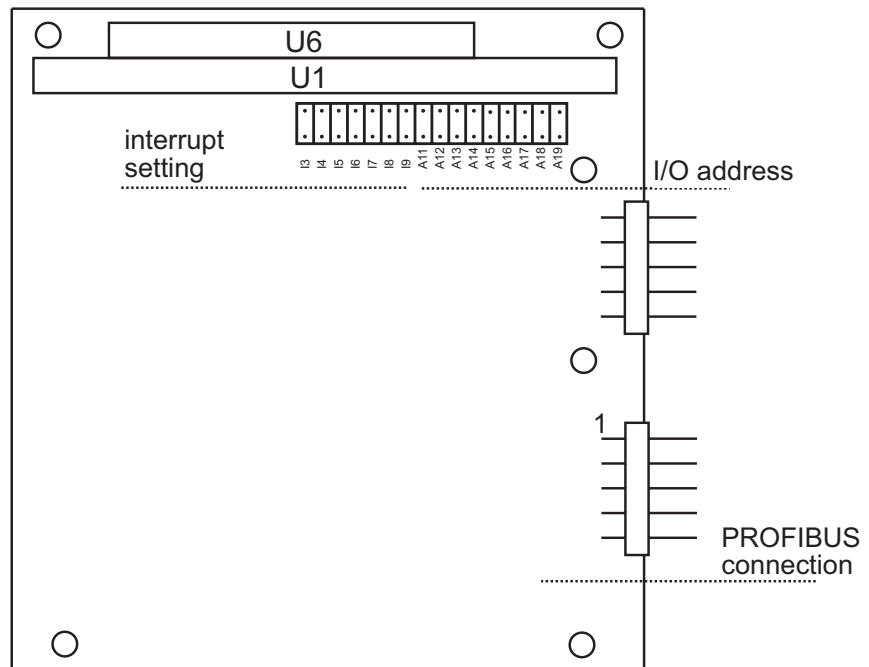
Fig. 7-2: Sketch of the PROFIBUS-DP master module

> Install module
>
> – Insert module
>
> – Fix module with the 4 screws (M3 x 6)
>
> – Reconnect connectors to the module

PDM_OpMaProfi_07_us.FM

> Close MAx-4
  – Replace cover of the MAx-4 PacController and fix with screws M3 x 4

> Check in the control configuration whether the module is recognized correctly. The module must be recognized as OPT-2 under Versions MAx-4 / Versions / *Opt1Type* or *Opt2Type* or *Opt3Type*.

7.4.2 Procedure for PROFIBUS-DP slave module

> Open and prepare MAx-4
  – Remove cover (4 recessed head screws)
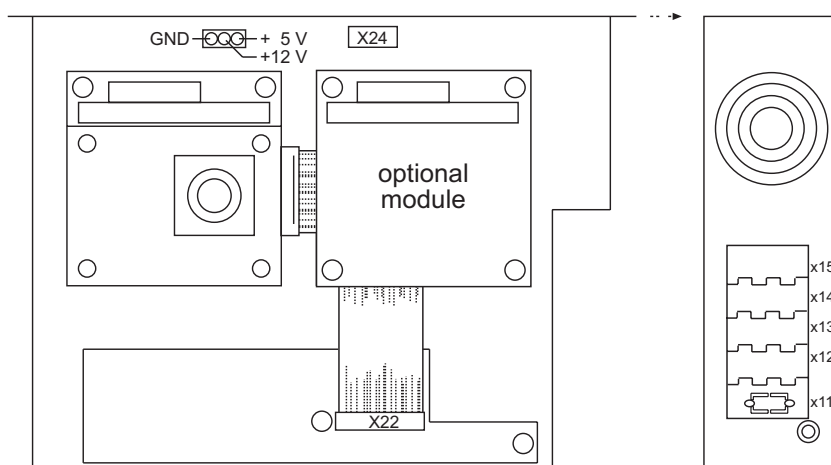
Fig. 7-3: Optional module place in MAx-4

> Uninstall module
  – Disconnect connectors from module
  – Open 4 fixing screws (M 3 x 6) of the module
  – Remove module

> Prepare module
  – Set interrupt level:
    You should always use interrupt 7 (plug I7 on the jumper bar). If interrupt 7 is already occupied, you can also use interrupt 9 (I9) in exceptional cases. Only one jumper may be used!

NOTE

If two PROFIBUS-DP modules are connected (master and slave), they must have different interrupt settings.

– Set IO address via jumpers:
  (0xD8000)

Jumper	Adjustment
ADR 11	plugged
ADR 12	plugged
ADR 13	plugged
ADR 14	plugged
ADR 15	open
ADR 16	open
ADR 17	plugged
ADR 18	open
ADR 19	open

Table 7-2: Jumper for IO - addresses of the PROFIBUS-DP slave module
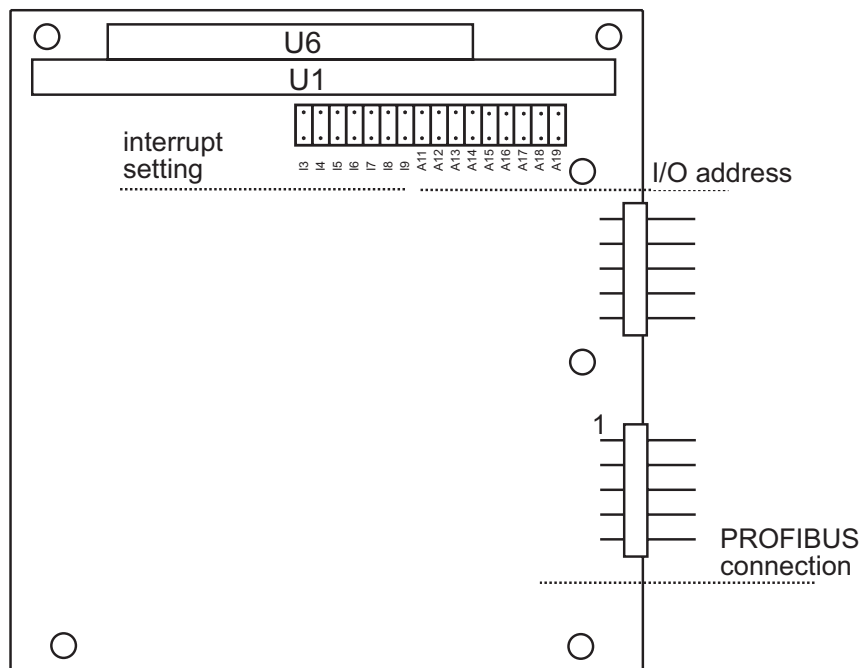
Fig. 7-4: Sketch of the PROFIBUS-DP master module

- ➢ Install module
  - – Insert module
  - – Fix module with the 4 screws (M3 x 6)
  - – Reconnect connectors to the module
- ➢ Close MAx-4
  - – Replace cover of the MAx-4 PacController and fix with screws M3 x 4
- ➢ Check in the control configuration whether the module is recognized correctly. The module must be recognized as OPT-2 under Versions MAx-4 / Versions / *Opt1Type* or *Opt2Type* or *Opt3Type*.

8 Technical Data

8.1 In General

8.1.1 RS-485 Transmission for PROFIBUS-DP

Transmission according to RS-485 is the most frequently used method with PROFIBUS. Transmission behavior is often called H2. The application range comprises all areas where high transmission speed and simple, low-cost installation technology are required. Uses a twisted, shielded copper cable with a conductor pair.

RS-485 transmission technology is very easy to handle. The installation of the twisted cable requires no expert know-how. The bus structure permits the reactionless connection and disconnection of stations or the gradual commissioning of the system. Later extensions will have no effect on stations already in operation.

The transmission speed can be chosen in a range of between 9.6 kbit/s and 12 MBit/s. The speed is selected once for all units at the bus during commissioning.

Installation notes for RS-485

All units are connected in a bus structure (line). Up to 32 participants (masters or slaves) can be connected in one segment.
At the beginning and end of each segment, the bus is closed with an active close statement. For flawless operation, it must be made sure that the two bus closures are always supplied with power. Many manufacturers realized the bus closure optionally in the units or connectors.
In case of more than 32 participants, use repeaters to connect the bus segments.

network topology	linear bus, active bus closure on both ends,stubs are only admissible with baud rates of <=500 kbit/s.
medium	shielded twisted cable,shielding may be omitted depending on ambient conditions (EMC).
number of stations	32 stations per segment without repeater. with repeaters expandable up to 126.
connectors	9-pin D-sub connectors

Table 8-1: Basic features of RS-485 transmission technology

The maximum cable length depends on the transmission speed. The given cable length can be increased using repeaters. It is recommended to switch not more than 3 repeaters in series.

baud rate [kBit/s]	9,6	19,2	93,75	187,5	500	1500	12000
range/seg-ment [m]	1200	1200	1200	1000	400	200	100

Table 8-2: Range in dependence of transmission speed for cable type A

The cable length data in the table refer to cable type A with the following parameters:

- impedance level: 135 ... 165 Ω
- capacitance per unit length: < 30 pf/m
- loop resistance: 110 Ω/km
- core diameter: 0,64 mm
- core cross section: > 0,34 mm^2

When connecting the participants, make sure that the data lines are not twisted. To achieve a high distortion-resistance of the system in an environment with high electromagnetic distortion radiation (e.g. in car production), absolutely use a shielded data line. The shield will improve electromagnetic compatibility (EMC). The braided shield and the film shield below (if any) should be connected to the earth on both sides, with good conducting ability and on the largest possible surface. Also make sure that the data line is, if possible, laid separately from all cables carrying high voltage.

With data rates of > 500 kbit/s, avoid installation with stubs. Commercially available connectors offer the possibility to connect the incoming and outgoing data cables directly in the connector plug. Thus stubs can be avoided and the bus connector plug can be connected and disconnected at any time without interrupting the data transfer to other participants.

For further information, please see PROFIBUS installation instructions.

8.1.2 PROFIBUS-DP Master

Parameter	Value
product name	PROFIBUS DP Master optional module
order number	51 13 02 37
number of slaves	max. 125
inputs/outputs	max. 244 bytes per slave
process mapping	max. 1 kByte
size (L x B x H)	90 x 96 x 23 mm PC/104
admissible ambient temperature - during operation - for storage and transport	0 ... +55 °C -20 °C ... +80 °C
power supply	DC 5 V +/- 5 %, typ. 650 mA, internal from basic unit
interface	RS485, max. 12 MBaud, potential-free according to EN 50170
approbation	CE sign EN 55011 Kl. B for emission EN 50082-2 for interference immunity

Table 8-3: Technical data PROFIBUS DP master optional module

ELAU

8.1.3 PROFIBUS-DP Slave

Parameter	Value
product name	PROFIBUS DP Slave optional module
order number	51 13 02 32
inputs/outputs	max. 244 bytes
process mapping	max. 368 byte
size (L x B x H)	90 x 96 x 23 mm PC/104
admissible ambient temperature - during operation - for storage and transport	0 ... +55 °C -20 °C ... +80 °C
power supply	DC 5 V +/- 5 %, typ. 650 mA, internal from basic unit
interface	RS485, max. 12 MBaud, potential-free according to EN 50170
approbation	CE sign EN 55011 Kl. B for emission EN 50082-2 interference immunity

Table 8-4: Technical data PROFIBUS DP slave optional module

8.2 Electrical Connections

The PROFIBUS optional module has a 9-pole D-sub socket for connection to PROFIBUS.

X11-PROFIBUS
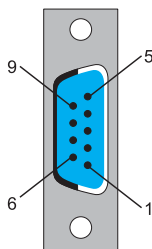
Pin	Designation	Meaning	Range	max. cross section
1	SHIELD	earth connection (shield)		$0,25 \text{ mm}^2$
2	-	not used		$0,25 \text{ mm}^2$
3	RxD/TxD-P	received/transmitted data - P (B / B´)	RS 485	$0,25 \text{ mm}^2$
4	CNTR-P	control signal P	TTL	$0,25 \text{ mm}^2$
5	DGND	PROFIBUS data receive potential (C / C´)		$0,25 \text{ mm}^2$
6	VP	supply voltage Plus	5 V +/- 10 %	$0,25 \text{ mm}^2$
7	-	not used		$0,25 \text{ mm}^2$
8	RxD / TxD-N	receive/transmitted data - N(A / A´)	RS 485	$0,25 \text{ mm}^2$
9	-	not used		$0,25 \text{ mm}^2$

Table 8-5: Connections PROFIBUS optional module

Connector plug

The lines must be connected via the PROFIBUS connector plug, since this plug contains the bus closing resistors.
The possible PROFIBUS connector plugs with different cable lengths are shown below.
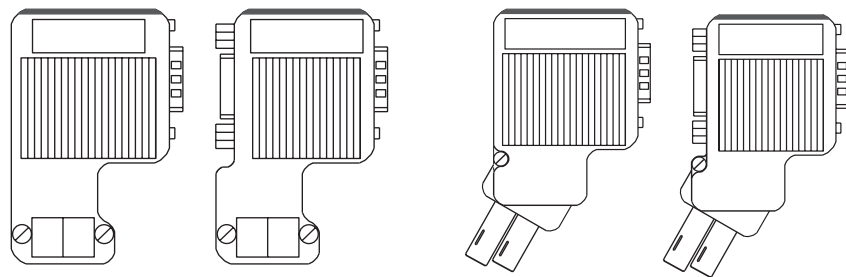
Fig. 8-1: PROFIBUS connector plugs

Bus closing resistors

The bus closing resistors must be switched on in the first and last bus participant. Otherwise data transfer will not work correctly.
The power shield must be laid on a large surface and on both ends.
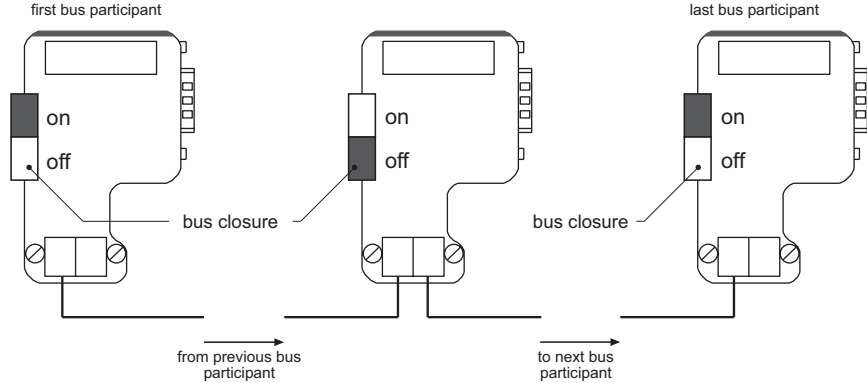
Fig. 8-2: Position of bus closing resistors

9 Appendix

9.1 Contact

For repair

Please send the components to be repaired or checked, along with the error report, to this address:

ELAU AG

Abt. Kundendienst	house address:
Postfach 1255	Dillberg 12
97821 Marktheidenfeld	97828 Marktheidenfeld

Phone: +49 (0) 93 91 / 606-142
Fax: +49 (0) 93 91 / 606-300

Service team

Should you need to talk to a member of our service team or require on-site service, please contact:

ELAU AG

Dillberg 12
D-97828 Marktheidenfeld
Phone: +49 (0) 9391 / 606 - 0
Fax: +49 (0) 9391 / 606 - 300
e-mail: info@elau.de
Internet: www.elau.de

ELAU, Inc.

4201 West Wrightwood Avenue
Chicago, Illinois 60639 - USA
Phone: +1 773 342 8400
Fax: +1 773 342 8404
e-mail: sales@elau.com
Internet: www.elau.com

ELAU SYSTEMS ITALIA S.r.l.

Via Tosarelli 300
I-40050 Villanova di Castenaso (BO)
Phone: +39 051 / 7818 70
Fax: +39 051 / 7818 69
e-mail: info@elau.it
Internet: www.elau.it

NOTE

Further contact addresses you can find on the ELAU homepage (www.elau.de).

9.2 Contract on the Use of Software Products

General Terms and Conditions for the Use of Software Products ELAU AG, Dillberg 12, 97828 Marktheidenfeld, Germany

The following terms and conditions define the rights and obligations of ELAU and its customers for licenses to ELAU software, granted by means of contract. This includes in particular the projecting and programming environment for controls, so-called firmware, which is implemented in ELAU hardware, as well as software for advertising purposes and marketing support. Any general terms and conditions the customer may use are void in so far as they contradict these General Terms and Conditions, unless agreed otherwise in writing between the customer and ELAU.

I. Transfer and use of software products and documentation

1.   General provisions:

ELAU grants the customer the unlimited, non-exclusive right to use the software products and documentations included in the delivery (in short: "software") according to these General Terms and Conditions for the Use of Software Products. The user has no right to grant sub-licenses. The concrete extent of use and the transferability of the right of use result from the kind of license (1.2 - 1.5).

2.   Transfer in the form of a single license

The customer has the right to load the software contained in the data media received into one computer and to use it (so-called single license). The customer is free to decide on which device he uses the software. However, the software must not be loaded into or used on two or several computers at the same time. This also applies if the delivery comprises several copies of the same software on different data media. The restriction of use also applies if the delivery contains several software versions adapted to different operating systems. Resellers who purchased a single license have the right to transfer this single right of use to the end customer.

If the software is to be used within a network, a site license is required.

3.   Transfer in the form of a site license

The customer has the right to load the software contained in the data media received into one or several computers within one site of the company. The customer is free to decide on which computers he uses the software. The right of use includes portable computers of field service staff of the same site. The software can also be used within a local area network (LAN). Access to and use of the software from other sites via wide area networks (WAN), even by other sites of the same company or its employees, is not permitted. Transfer to other companies is forbidden.

4.   Firmware

Firmware in the sense of these General Terms and Conditions for the Use of Software Products is software implemented in ELAU hardware supplied to the user. The buyer of the hardware has the unrestricted right to use the included software anytime and anywhere for the operation of the purchased hardware during the entire lifetime of that hardware (simple right of use / run time license). Resellers have the right to transfer this simple right of use together with the hardware within the scope described above.

5.   Advertising software / sales support / training

For software made available to the customer for advertising purposes (advertising software) or for sales and/or purchasing support or for training purposes, the customer has only a simple right of use which ELAU may revoke at any time. For lack of other agreements, this right of use is granted as a single license in the sense of section 1.2. Further rights can be granted on the software itself or on its packaging or by other written agreement. For advertising software or sales support software or training software made available free of charge, ELAU is only liable within the scope of due care in its own matters. Any warranty is excluded.

6.   Documentation

ELAU will supply the documentation for the software either in the form of written documentation or on a data medium. The customer must not modify the software or the documentation in any way. This applies to all countries and in particular to translations into other languages. Any duplication is prohibited. Free software, firmware and sales support may be supplied without additional documentation.

7.   Business secrets, recompilation, reverse engineering, copy protection

The software and its documentations must be regarded as business secrets of ELAU and/or its licensors and are protected by copyright. Copyright marks and product identifications must not be modified or deleted, even if they are no registered trademarks. Software and documentation must not be made available to third parties who are not licensees. The recompilation of the program codes into other code formats and other kinds of reverse engineering, including program modifications, are prohibited in any case and may only be done by the developing engineer. Copy protection or similar protection routines may only be removed if that particular protection mechanism would impair or prevent the smooth use of the program.

8.   Copyrights and rights of use to software products of other producers

In so far as the scope of delivery includes software products from other companies, the copyright and right of use conditions of those producers must be observed.

II. Export restrictions

The customer undertakes to observe the German export regulations and will make sure that neither the software nor direct products thereof will be exported directly or indirectly, if this would violate export regulations, and that they will not be used for a purpose which the export regulations prohibit, in particular the distribution of nuclear, chemical or biological weapons.

III. Warranty

1.   Please note that it is impossible to develop data processing software in such a way that it is error-free for any feasible combination of application conditions. ELAU warrants that the program is serviceable in the sense of the program description in the sense of the program description issued by ELAU and valid at the time of delivery to the customer and that it runs on the hardware mentioned in the product specification/documentation and that it has the properties described there. A minor impairment of serviceability is left out of consideration. This passage represents no warranty of a quality.

2.   ELAU warrants that the data media are free from errors and that the documentation belonging to the software was written with due care. This warranty is fulfilled by substitute delivery.

3.   For software errors, i.e. deviations from the corresponding product description, ELAU will provide warranty by supplying a corrected software version or new software.

It is at ELAU's discretion to diagnose and clear the error at the customer's site or at ELAU's.

The prerequisite for clearing an error is that the error is reproducible and that it occurred in the latest product version supplied to the customer. The customer has to prove that the error lies in the software supplied by ELAU. The customer provides all documents and information required to clear the error. If the error is diagnosed or cleared at the customer's site, the customer also provides the hardware and software free of charge for the period of time it takes to solve the problem. In particular, the customer will take the safety measures required on the site and by law and provide the operating conditions necessary for the execution of such work, as well as suitable personnel, free of charge.

If ELAU is unable to supply the customer with a replacement of data media that are free of material and production errors or to provide such substitute or rectification that the customer can use the software according to the valid product description, the customer

can demand a reduction of the royalties or cancel the license for the program without notice.

4.   The warranty period is subject to the law. It is six (6) months, starting on the day of delivery to the customer.

5.   If the customer is facing claims or expects to face claims in the Federal Republic of Germany due to industrial property right or copyright violations resulting from the use conformable to the agreement of licensed software, ELAU can modify the licensed software at its own cost within a scope that is reasonable for the customer or ELAU can exchange that software. If this is not possible or a right of use cannot be obtained with appropriate effort or cost, either contracting party can terminate the license for that software without notice. Any further claims, in particular for damages, can be made only in accordance with section VI of these General Terms and Conditions for the Use of Software Products.

IV. Impairment of functions

It is the customer's/user's responsibility to make sure that no other programs or software products impair the functions of the software mentioned in the scope of delivery.

V. Charges/royalties

The fees for the use of software products are contained in the price list valid at the respective time.

Additional charges apply for:

- support in software commissioning,
- support in analysis and clearance of software malfunctions due to inexpert handling or other circumstances that are not due to the software,
- services provided outside ELAU's usual working hours.

Those charges are due without any deductions immediately after receipt of the invoice.

VI. Liability

1.   Liability for ordinary negligence applies only in the case of violation of essential contractual obligations. In this case, ELAU is liable according the legal provisions for personal damage for which the company is responsible. For material damage, ELAU is only liable for typical and predictable material damage and only for a maximum amount of DM 300,000.00 for each event.

2.   ELAU is not liable for lack of economic success, consequential or secondary damage and for damage resulting from claims of third parties, with the exception of claims from the infringement of industrial property rights of third parties. In so far as the customer is held liable by a third party for infringement of an industrial property right by the software which is the subject of this agreement, ELAU

has to be notified immediately. ELAU will release the customer from such claims, in so far as ELAU retains the right of legal representation and of the negotiation of a settlement and in so far as the customer provides ELAU with the necessary information and support for such legal defense in good time. Any further claims for infringement of industrial property rights are excluded, unless legal provisions require otherwise.

A release from claims due to an infringement of industrial property rights is also excluded if that infringement is due to software use not conformable to the agreement or the use of an outdated or modified program and the customer refuses to use an up to date version of the program, although, under such circumstances, he could be reasonably expected to do so in order to avoid damage.

3.   In so far as ELAU is liable for damages, this liability includes the restoration of data only if and in so far as the customer made sure that such data can be reproduced with reasonable effort in the sense of due data processing from data storage provided in machine readable form. ELAU is only obliged to restore lost data on the basis of the last data backup made by the customer.

4.   Any further damage claims other than those mentioned above, no matter on what legal basis, arise only in case of premeditation, gross negligence or the lack of a warranted quality.

5.   For advertising software or sales support software or training software made available free of charge, ELAU is only liable within the scope of due care in its own matters.

VII. Termination of the agreement

1.   If the customer fails to fulfill an essential point of these General Terms and Conditions for the Use of Software Products, ELAU can terminate the license agreement. The royalties are due in full or pro rata until the termination is pronounced. A one-off license fee will lapse without any entitlement to refund.

2.   In case of notice or other termination of the agreement, the supplied software and documentation, including any backup copies, must be returned to ELAU immediately, entirely and without explicit request. In so far as software and documentations were stored on hardware, those data must be deleted irrestorably.

3.   In the case of any violations of the agreement, ELAU reserves itself all rights to claim damages. In so far as a violation of copyright law can be detected, ELAU also reserves itself the right to bring charges against the violator.

VIII. Other terms and conditions

1.   Transfer of rights and obligations on the part of ELAU

ELAU is entitled to transfer rights and obligations resulting from this agreement to a third party or legal successor.

2.   Collateral agreements, written form

This agreement finally determines the obligations of the parties. Verbal collateral agreements are void. Collateral agreements, changes or additions to this agreement must be made in writing. This also applies to any exception from the written form.

3.   Legal system

Beside the terms and conditions outlined above, this agreement is subject to the laws of the Federal Republic of Germany.

4.   Place of jurisdiction

If the customer is a fully qualified merchant, the agreed place of jurisdiction is at ELAU's headquarters.

5.   Other

Should one or several terms or conditions of these General Terms and Conditions for the Use of Software Products be or become void, the other terms and conditions will nevertheless remain in place. The term or condition that is or has become void shall be substituted by a term or condition that reflects the intention of the original phrase.

9.3 Further Literature

ELAU can provide you with these manuals and instructions on the PacDrive™ M-System:

Project Manual

German	Art.No. 17 13 00 58 - 000
English	Art.No. 17 13 00 58 - 001
French	Art.No. 17 13 00 58 - 003

Programming Manual

German	Art.No. 17 13 00 61 - 000
English	Art.No. 17 13 00 61 - 001

Operating Manual MC-4 MotorController

German	Art.No. 17 13 00 62 - 000
English	Art.No. 17 13 00 62 - 001
Italian	Art.No. 17 13 00 62 - 002
French	Art.No. 17 13 00 62 - 003

Operating Manual CAN L2

German	Art.No. 17 13 00 66 - 000
English	Art.No. 17 13 00 66 - 001

Operating Manual PROFIBUS-DP

German	Art.No. 17 13 00 67 - 000
English	Art.No. 17 13 00 67 - 001

Operating Manual SM Motor

German	Art.No. 17 13 00 68 - 000
English	Art.No. 17 13 00 68 - 001
Italian	Art.No. 17 13 00 68 - 002
French	Art.No. 17 13 00 68 - 003

Operating Manual EPAS-4

German	Art.No. 17 13 00 70 - 000
English	Art.No. 17 13 00 70 - 001

Operating Manual MAx-4 PacController

German	Art.No. 17 13 00 71 - 000
English	Art.No. 17 13 00 71 - 001
Italian	Art.No. 17 13 00 71 - 002
French	Art.No. 17 13 00 71 - 003

Operating Manual OPC-Server

German	Art.No. 17 13 00 73 - 000
English	Art.No. 17 13 00 73 - 001

Operating Manual PLC Library

    German   Art.No. 17 13 00 74 - 000
    English   Art.No. 17 13 00 74 - 001

Operating Manual VarioCam® Library

    German   Art.No. 17 13 00 75 - 000
    English   Art.No. 17 13 00 75 - 001

Operating Manual Device Net

    German   Art.No. 17 13 00 76 - 000
    English   Art.No. 17 13 00 76 - 001

Operating Manual HMI Libraries

    German   Art.No. 17 13 00 77 - 000
    English   Art.No. 17 13 00 77 - 001

Operating Manual INC-4 Incremental Encoder Module

    German   Art.No. 17 13 00 78 - 000
    English   Art.No. 17 13 00 78 - 001

Operating Manual CANopen

    German   Art.No. 17 13 00 79 - 000
    English   Art.No. 17 13 00 79 - 001

Operating Manual VarioCam® Editor ECAM-4

    German   Art.No. 17 13 00 80 - 000
    English   Art.No. 17 13 00 80 - 001*

Operating Manual PacNet Module PN-4

    German   Art.No. 17 13 00 81 - 000
    English   Art.No. 17 13 00 81 - 001

Operating Manual SR Motor

    German   Art.No. 17 13 00 82 - 000
    English   Art.No. 17 13 00 82 - 001

Operating Manual BusTerminal BT-4/DIO1

    German   Art.No. 17 13 00 83 - 000
    English   Art.No. 17 13 00 83 - 001

* = in preparation

9.4 Product Training

We offer practical workshops and seminars.

Our experienced seminar leaders will enable you to make optimum use of the vast possibilities of the PacDrive™ M system.

NOTE

Please contact us for further information or to order our seminar program. See also our homepage (www.elau.de).

9.5 Modifications

07 / 1999

- Table for IO address in section 'Prepare PROFIBUS optional module' on page 18
- 'Format' parameter for PROFIBUS master optional module supplemented
- Group allocation in Chapter 8.2.1 PROFIBUS DP Master supplemented
- Global group characteristics added in Chapter 8.2.1 PROFIBUS DP Master
- System component description of Profibus slave extended by PrSlTrigger() and PrSlWaitOnTrigger()
- Diagnosis messages737, 738 and 739 supplemented
- Object parameter DataExMode of Profibus slave modified
- Object parameters SlaveAddress, InputModulNum, OutputModulNum, OutputModulNum and OutputModulLength of Profibus slave removed
- Object parameters IOTrigger, CycleLoad, IRQ and Format of Profibus slave added
- Profibus slave IEC sample program modified
- Description of configuration procedure for the Master extended by selection box for Profibus DP slaves
- Comments on 'automatic addresses' in the description of the Profibus configuration procedure modified
- Description of the slave configuration procedure supplemented
- Chapter 'Correlation between configuration and IEC access' supplemented

10 / 2000

- adaptation to version 00.10.00

06 / 2002

- Chapter „Configuring and Parameterizing / Programming" sections Programming now in EPAS-4 online help
- New parameter Activation in master configuration / slave

NOTE

The latest documentation and modification service on this product are available on the ELAU Homepage (www.elau.de).

9.6 Index

PDM_OpMaProfibus_usSIX.fm

field bus PROFIBUS-DP

PacDrive™ M

9.7 Form for Error Report

This error report is absoluteley necessary in order to enable efficient processing.

Send the error report to your ELAU representative or to:

ELAU AG, Abt. Kundendienst
Dillberg 12, D-97828 Marktheidenfeld
Fax: 09391/606-340

Sender:

Company:	City:	Date:
Department:	Name:	Phone:

Details on the defective product

Product name: ....

Article number: ....

Serial number: ....

Software version: ....

Hardware code: ....

Parameter enclosed: yes   [ ]   no   [ ]

IEC program enclosed: yes   [ ]   no   [ ]

Details of the machine on which the problem occurred:

Machine producer: ....

Type: ....

Hours of operation: ....

Machine number: ....

Date of commissioning: ....

Producer/Type of machine control:

....

Description of the problem:

....

....

....

Additional information:

Problem state:

[ ] persistent

[ ] when commissioning

[ ] occurs sporadically

[ ] occurs after about.....hours

[ ] occurs in case of shocks

[ ] depends on temperature

[ ] foreign object inside unit

Causes:

[ ] unknown

[ ] wiring error

[ ] mechanical damage

[ ] moisture inside the unit

[ ] encoder defective

Concomitant phenomena:

[ ] mechanical problems

[ ] failure of mains supply (24V)

[ ] failure of PMC-2

[ ] motor failure

[ ] broken cable

[ ] insufficient ventilation

Does the switching cabinet have an air conditioning system?Y/N [ ]

Have similar problems occurred before on the same axis?
How often: ....

Did the problems occur on certain days or times of day?

....

further information:

....

....

....

....

....

....

....

....

....

....

....

....

....