PacDrive™

- EPAS-4 -

Operating Manual

Imprint

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Contents

1 On this manual

1.1 Introduction

Before using ELAU components for the first time, you should familiarize yourself with this operating manual.

In particular, observe the safety notes described in chapter 2.

Only persons who meet the criteria for "Selection and Qualification of Staff" (see chapter 2.4) are allowed to work on ELAU components.

One copy of this manual has to be available for staff working on the components with access at any time.

This manual is to help you use the component safely and expertly and to use it as directed.

Observe this manual. This will help to avoid risks, reduce repair costs and down times and increase the lifetime and reliability of the products.

You also need to observe the valid rules for the prevention of accidents and for environmental protection in the country and place where the device is used.

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1.2 Symbols, Signs and Forms of Depiction

The following symbols and signs are used in this document:

Depiction	Meaning
■	First level enumeration sign.
–	Second level enumeration sign.
▶	**Action symbol**: The text following this symbol includes an instruction for action. Execute the instruction actions in the given order, from top to bottom.
✓	**Result symbol**: The text following this symbol contains the result of an action.
Italics	If the describing text contains special terms (e.g. parameters) these are written in italics.
Serif font	If the manual contains program code, this is marked by Serif font.
	Information symbol: This symbol marks notes and useful tips for using the product.
	Warning sign: Safety notes can be found in the relevant places. They are marked by this symbol.

Table 1-1: Symbols, signs and forms of depiction

2   General Safety Notes

This chapter contains general requirements for working safely. Every person using ELAU components or working on ELAU components has to read and observe these general safety notes.

If activities involve a residual risk, you will find a clear note in the respective places. The note describes the risk that may occur and preventive measures to avoid that risk.

2.1   Basics

The ELAU components are built according to the state of technology and generally accepted safety rules. Nevertheless, their use may cause a risk to life and limb or material damage if:

- you do not use the components as directed
- work on the components is not done by experts or instructed staff
- you inexpertly alter or modify a component
- you fail to test the protective measures in place after installation, commissioning or servicing
- you do not observe the safety notes and regulations.

Only operate the components in perfect technical condition, as directed, with regard to safety and risks and observe this manual.

The flawless and safe operation of the components requires appropriate transport, storage, mounting and installation as well as careful maintenance.

In case of any circumstances that impair the safety and cause changes in the operating behavior, immediately put the component(s) to a stop and inform the service staff in charge.

In addition to this manual, observe

- the prohibiting, warning and mandatory signs on the component, the connected components and in the switching cabinet
- the relevant laws and regulations
- the operating manuals of the other components
- the universally valid local and national rules for safety and the prevention of accidents.

2.2 Depiction of Safety Notes

Risk categories

The safety notes in this manual are grouped into different risk categories. The table below shows which risk and possible consequences the symbol (pictograph) and the signal words indicate.

Pictograph	Signal word	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 major 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.

Table 2-1: Risk categories

PacDrive™

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2.3 Use as Directed

The ELAU components are designed for installation in a machine/
plant or for combination with other components to form a machine/
plant. The components may only be used under the installation and
operating conditions described in this documentation. You must use
the accessories and ancillary parts (components, cables, etc.)
mentioned in the documentation. You must not use any foreign
objects or components that are not explicitly approved by ELAU.

"Use as directed" also means that you

- observe the Operating Manuals and other documentations (see
  appendix),
- observe the instructions for inspection and maintenance.

Use other than directed The operating conditions at the place where the device is used
must be checked on the basis of the given technical data
(performance information and ambient conditions) and observed.

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2.4 Selection and Qualification of Staff

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

Only qualified staff can recognize the significance of safety notes and implement them accordingly.

This manual is aimed in particular at design and application engineers in the fields of mechanical and electrical engineering, at programmers, service and commissioning engineers.

Working on electrical equipment

Work on electrical equipment must only be done by qualified electricians or by instructed staff supervised by an electrician according to the electrotechnical rules.

An electrician is a person who, due to his vocational training, know-how and experience as well as knowledge of the valid regulations, is able to:

- evaluate the work he is supposed to do
- identify potential risks
- implement suitable safety measures.

3 Overview

3.1 What is EPAS-4?

EPAS-4 is a complete development environment for the PacDrive™ system.

EPAS-4 puts a simple approach to the powerful IEC language at the disposal of the PLC programmer. Use of the editors and debugging functions is based upon the proven development program environments of advanced programming languages (such as Visual C++).

The PacControl CD contains the documentation for the PacDrive™ system in Portable Document Format (*.PDF). The document can be read and printed with the enclosed Acrobat Reader program.

3.2 EPAS-4 components

The following table gives you an overview of the components of the EPAS-4 professional version.

Components	Explanation
Message Logger	
Trace Recorder	
Editors for	structured text (ST)
	function plan (FBD)
	instruction list (IL)
	ladder diagram (LD)
	sequential function chart (SFC)
	Continuous Function Chart (CFC)
Visualization	commissioning visualization
Configurators	PROFIBUS-DP master and slave
	CANopen master and slave
IEC libraries	
- Standard.lib	standard IEC library with elementary functions (e.g. counter, string functions, timer, etc.)

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Components	Explanation
- MAx-4.lib	interface library for - AxisBuf functions - COM IEC functions - control functions - diagnosis - encoder manipulations - file services - IEC task - message logger - overload functions - standard VarioCam® motion functions - system functions - measuring functions (touchprobe)
- Check.lib	interface library for checking ARRAYs, divide by zero, string functions (debugging functions)
- Basic.lib	IEC library with motion functions. It is based on the functions of MAx-4.lib auf.
- IECsfc.lib	use of IEC interfaces with SFC for V00.06.00 or higher
- CSpline.lib	interface library for VarioCam® CSpline function to convert supporting point data into cam data online.
- TorqueCam.lib	interface library for torque cams.
- CANL2.lib	interface library for CAN layer 2
- CANopen_M.lib	interface library for CANopen master
- CANopen_S.lib	interface library for CANopen slave
- PBDP_M.lib	interface library for PROFIBUS-DP master
- PBDP_S.lib	interface library for PROFIBUS-DP slave
- DNet_S.lib	interface library for Device Net slave (in preparation)
- HMI_pcs.lib	interface library for connection to Lauer PCS
- HMI_Simatic.lib	interface library for connection to Simatic
- ModBus.lib	interface library for connection to ModBus
- TSC.lib	interface library for connection to ModBus (see also Operating Manual HMI Libraries)
- remote diagnosis	modem connection EPAS-4 <-> MAx-4

Table 3-1: Overview of components for EPAS-4

Order number	Product name	Explanation
20 63 00 31 -001	EPAS-4 professional	company licence
20 63 00 31 - 003	EPAS-4 upgrade basic to professional	company licence
20 63 00 31 - 004	EPAS-4 upgrade professional to new version	company licence
20 63 00 31 - 005	EPAS-4 professional for end user	single licence

Table 3-2: EPAS-4 order numbers and variants

3.3 Overview of EPAS-4 functionality

3.3.1 How is a project structured?

EPAS-4 differentiates between the different kinds of objects in a project: POUs, data types, display elements (visualisations) and resources.

The Object Organiser contains a list of all the objects in your project.

3.3.2 How do I set up my project?

First you should configure your PLC in order to check the accuracy of the addresses used in the project.

Then you can create the POUs needed to solve your problem.

Now you can program the POUs you need in the desired languages.

Once the programming is complete, you can compile the project and remove errors if there should be any.

3.3.3 How can I test my project?

Once all errors have been removed, log in to the PLC and "load" your project in the PLC. Now EPAS-4 is in Online mode.

Now open the window with your PLC Configuration and test your project for correct sequence. To do this, enter input variables manually and observe whether outputs are as expected. You can also observe the value sequence of the local variables in the POUs. In the Watch and Receipt Manager you can configure data records whose values you wish to examine.

3.3.4 Debugging with EPAS-4

In case of a programming error you can set breakpoints. If the process stops at such a breakpoint, you can examine the values of all project variables at this point in time. By working through sequentially (single step) you can check the logical correctness of your program.

3.3.5 Additional online functions

An additional EPAS-4 debugging function: You can set program variables and inputs and outputs at certain values. You can use the flow control to check which program lines have been run. The Sampling Trace allows you to trace and display the actual course of variables over an extended period of time.

3.3.6 Conclusion

EPAS-4 is a complete development tool used to program your PLC which will save you a measurable amount of time setting up your applications.

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4 Installation of EPAS-4

4.1 System requirements

Before installing EPAS-4, please check if your system meets the following minimum requirements.

minimum requirements

- Windows 98, Windows NT 4.0 (Service Pack 5 or higher recommended) or Windows 2000/XP Prof.
- Pentium 200 MMX or higher
- 64 MB RAM
- free serial interface or TCP/IP network connection (10 Mbps)
- free hard disk memory > 100 MB
- colour screen with a resolution of 800x600 pixel
- CD-ROM drive

recommended configuration

- Windows 2000/XP Prof. or Windows NT 4.0 (Service Pack 5 or higher recommended)
- Pentium II 350 or higher
- 128 MB RAM
- free serial interface and TCP / IP network connection (10 Mbps)
- free hard disk memory > 500 MB
- colour screen with a resolution of 1024x768 pixels
- CD-ROM drive

4.2 Installation procedure

4.2.1 Method

NOTE

Switch off the energy saving mode of your PC. Otherwise communication errors may occur between EPAS-4 and MAx-4 PacController.

How to install EPAS-4:

▸ Insert the PacControl CD into the CD-ROM drive of your PC.
✓ The PacControl CD menu will be startet automatically.
▸ Click on the button "Software".

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✓ The installation starts with the dialog window "Choose Setup Language".

▸ Follow the instructions of the installation program.

NOTE

To install EPAS-4 on a PC with Windows NT / Windows 2000/XP operating system, you need administrator rights. If necessary, contact your system administrator.

You can also proceed as follows:

▸ Select "Run..." from the start menu.

▸ In the dialog window "Run" enter the following line:
d:\setup.exe(if d: is your CD-ROM drive)

✓ The installation starts with the dialog window "Choose Setup Language".

▸ Follow the instructions of the installation program.

4.3 Starting EPAS-4

▸ Double-click with the left mouse button on the EPAS-4 icon on your desktop.

NOTE

Please check whether the following settings exist in "Project->Options->Directories" under the field name "Common" and adjust them, if necessary:
Libraries: C:\Program Files\ELAU\EPAS-4\V14\Library\
Compilation files: C:\Program Files\ELAU\EPAS-4\V14\Obj\

4.4 Language settings in Windows NT

NOTE

If you want to change the language in Versions earlier then V14, a project must be opened.

Dialog boxes provided by the functions of the operating system will remain in the Language of the operating system.

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5 Communication EPAS-4 / MAx-4 PacController

5.1 Principle of Communication

In principle, there are two ways of establishing a connection between EPAS-4 and MAx-4 Pac-Controller:

- serial or
- TCP / IP

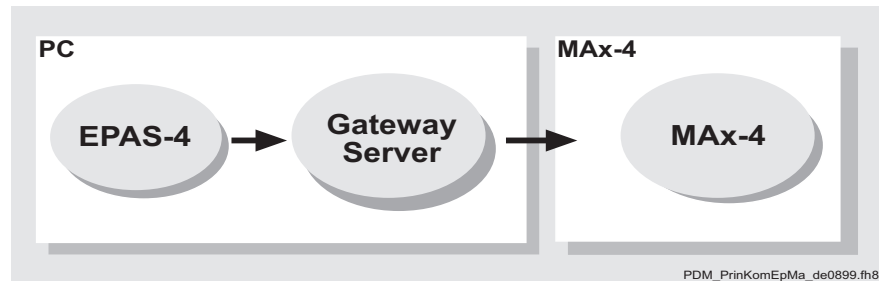The principle of how to establish a connection is always the same.

Fig. 5-1: Principle of communication

NOTE

As all connections, both serial and TCP/IP, are done via the gateway server, the PC must have a network card, or a virtual network card must be set up.
In versions 00.06.00 or higher, a serial connection can be established without a network card and without TCP/IP on the EPAS-4 PC. To do this, you need to select Gateway -> local when setting up a communcation channel in EPAS-4.

The further steps are described separately for Win 98 and Win NT (or Windows 2000/XP Prof.).

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> **NOTE**
>
> The TCP/IP address can be an internet address (e.g.
> 190.205.100.1) or a symbolic name (e.g. max-4-pc-01) "target
> name". The target name must be an unique name for an also
> unique IP address. If a target name is used, it must be entered in
> the "hosts" file in the "Windows" directory, so that the target name
> can be allocated to the corresponding IP address.
> It is common usage that the IP address 127.0.0.1 corresponds to
> the target name localhost. This is always your own computer.
> Example for "hosts" file:
> 127.0.0.1   localhost
> 190.205.100.1   max-4-pc-01

5.2 Set up TCP/IP Protocol on the PC

5.2.1 Operating System Windows 98

(A) Set up "virtual" network device

(if you have a network device, you can skip this point)

Fig. 5-2: Control Panel Win 98
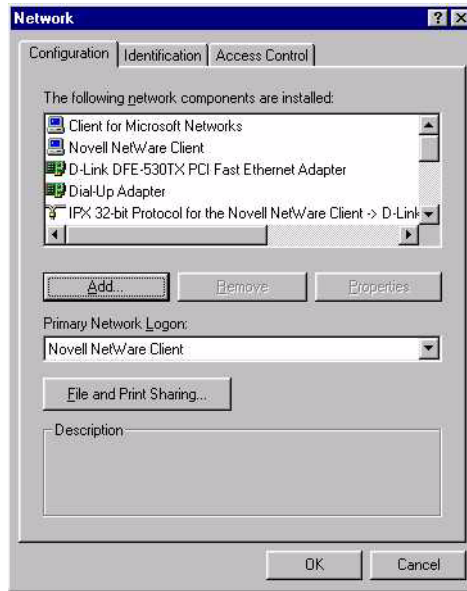
▸ From the "Control Panel", select "Network".

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Fig. 5-3: Panel / Network Win 98

▸ In the dialog window "Network" select "Add"
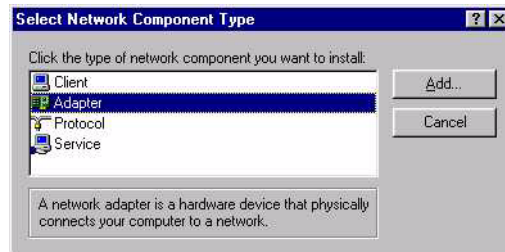(If there is already a Dial-Up Adapter installed proceed with (**B**).)

Fig. 5-4: Control Panel / Network / Add network card

▸ Now select "Adapter" and then click on "Add...".
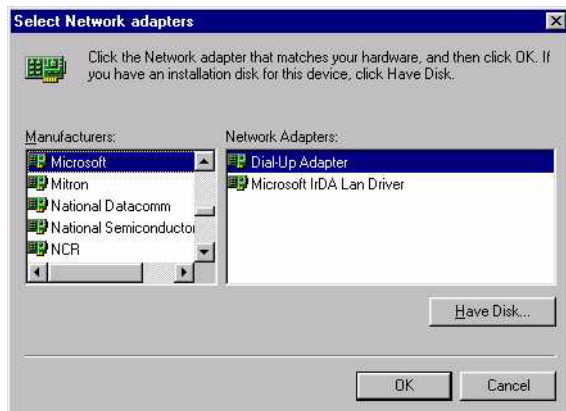
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▶ Under "Microsoft", select "Dial-Up Adapter".

Fig. 5-5: Control Panel / Network / Select network card

▶ In the selection field "Manufacturers" choose "Microsoft"
▶ In the selection field Network Adapters click on "Dial-Up Adapter".
▶ Confirm with "OK".

(B) Set up TCP/IP protocol

Fig. 5-6: Control Panel Win 98

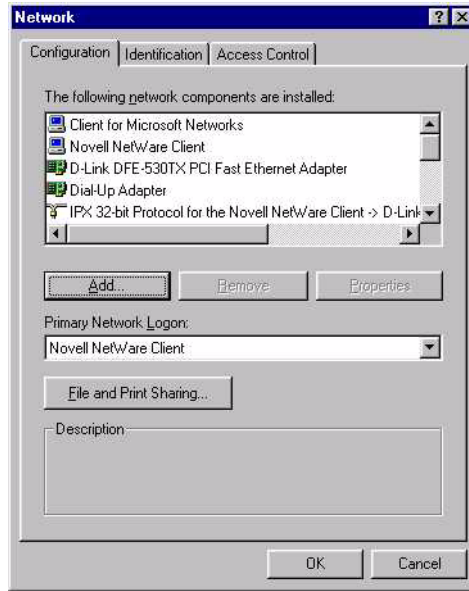▶ From the "Control Panel", select "Network".

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Fig. 5-7: Control Panel / Network Win 98

▸ In the dialog window "Network" select "Add...".
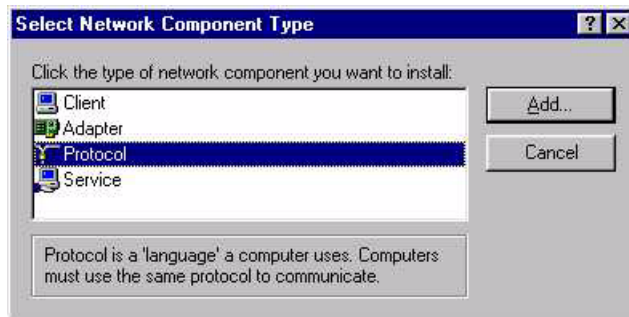 (If the TCP/IP protocol is already installed proceed with (**C**).)

Fig. 5-8: Control Panel / Network / add protocol

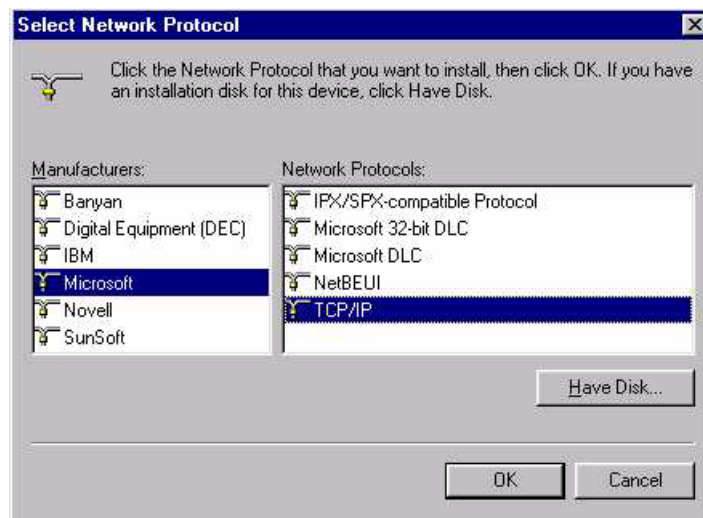▸ Select "Protol" and then click on "Add...".

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Fig. 5-9: Control Panel / Network / select protocol

- ▶ Under "Manufacturers", select "Microsoft"
- ▶ Under "Network Protocols" select "TCP/IP".
- ▶ Confirm with "OK".
- ▶ In the dialog window "Network", confirm again with "OK".
- ✓ The message "Please insert your Windows CD" appears.
- ▶ Insert the Windows CD into the CD Rom drive.
- ✓ Some files will be copied from the Windows installation CD to the PC.
- ▶ Now you will be asked to restart your computer.
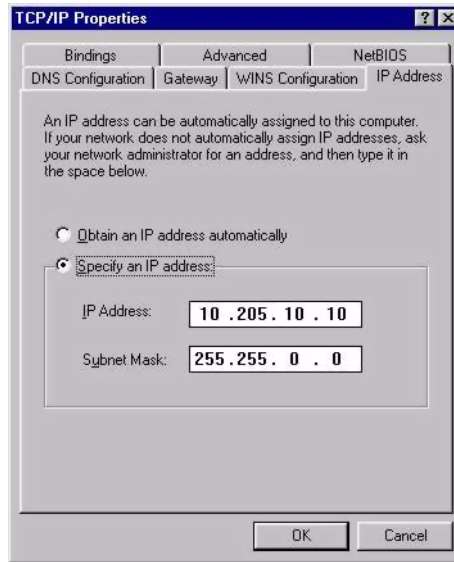
(C) Properties of TCP/IP

Fig. 5-10: Control Panel / Network / TCP/IP Protocol / Properties

▸ In the dialog window "Network" doubleclick the TCP/IP protocol.

▸ Select "Specify an IP address"

▸ In the input field "IP Addess" enter the desired IP address.

NOTE

You will have to ask your system administrator or IT department for the IP address of your computer!
If you connect a computer to a MAx-4 PacController via TCP/IP network directly via the RJ45 cable (without network), you can use any IP address. But you may not use identical IP adresses! The same goes for a connection via the RS 232 interface with MAx-4.

▸ In the input field "Subnet Mask", enter e.g. 255.255.0.0 (depending on the network).

▸ Under the Gateway tab, enter the gateway number.

NOTE

You will have to ask your system administrator or IT department for the gateway number!

▸ Confirm with OK.

▸ In the network configuration, click OK.

▸ Restart the computer.

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5.2.2 Operating system Windows NT 4.0

(A) Set up "virtual" network card (RAS service)

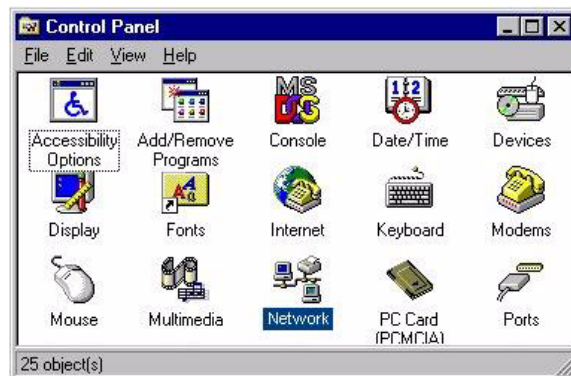(if you have a network card, you can skip this point)

Fig. 5-11: Control Panel Win NT
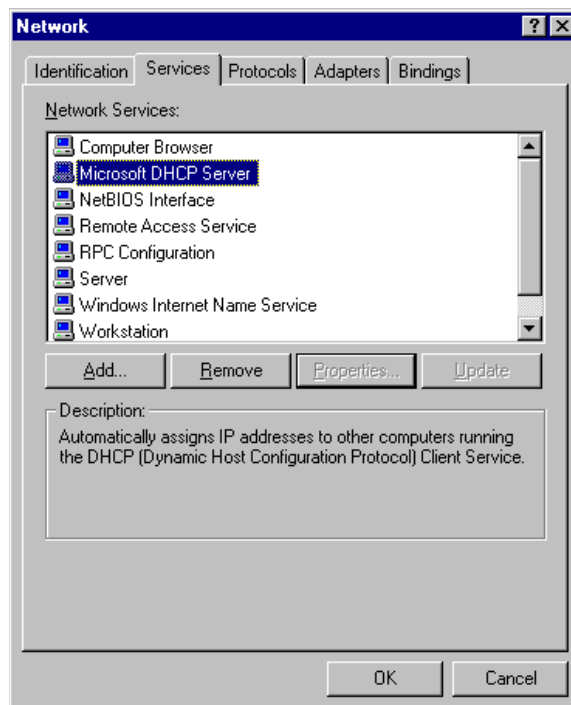
▸ From the Control Panel, select Network.

Fig. 5-12: Control Panel / Network Win NT

▸ In the "Network" dialog box, select "Add..." under "Services", if there is no Remote Access Service installed. (Else proceed with (B).)
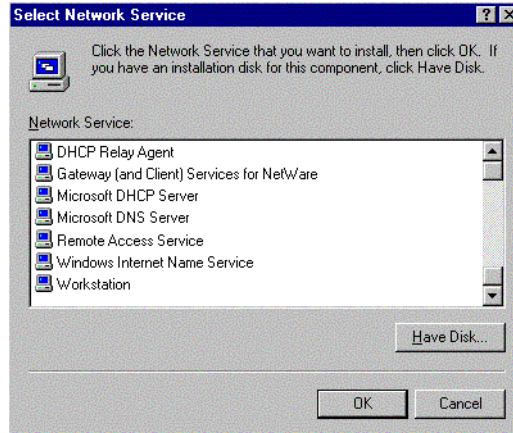
Fig. 5-13: Control Panel / Network / RAS service

‣ Now select RAS Service (Remote Access Service) and confirm with OK.
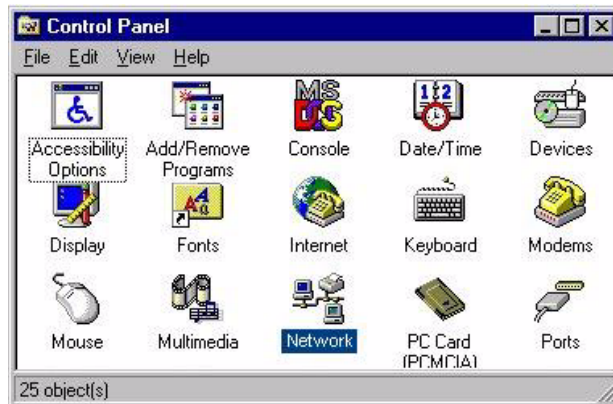
(B) Set up TCP / IP protocol

Fig. 5-14: Control Panel Win NT

‣ From the Control Panel, select Network.
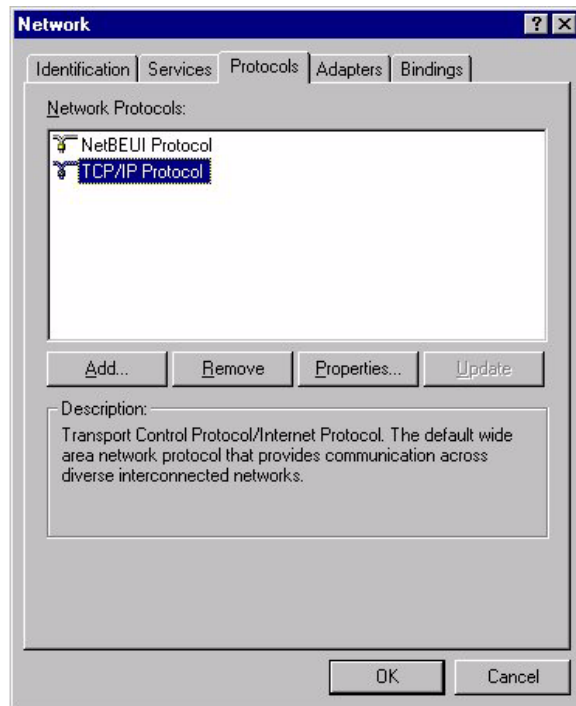
Fig. 5-15: Control Panel / Network / add protocol

▸ In the "Network" dialog box, select "Add..." under "Protocols", if no TCP/IP protocol has been set up (else proceed with (C).)

Fig. 5-16: Control Panel / Network / Select Network Protokol

▸ Select TCP/IP protocol and confirm with OK.

▸ Click again on the button OK.

✓ The message "Please insert your Windows CD" appears.

▸ Insert the Windows CD in your CD drive.

✓ Some files will be copied from the Windows installation CD to the PC.

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(C) Properties for TCP/IP
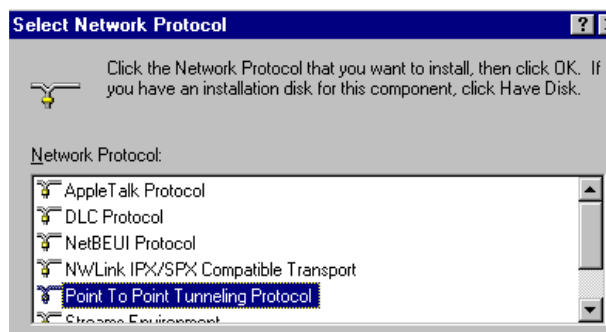
‣ In the "Network" dialog window, mark the TCP/IP protocol and click on the button "Properties".

‣ Select the TCP/IP protocol and click on Properties.
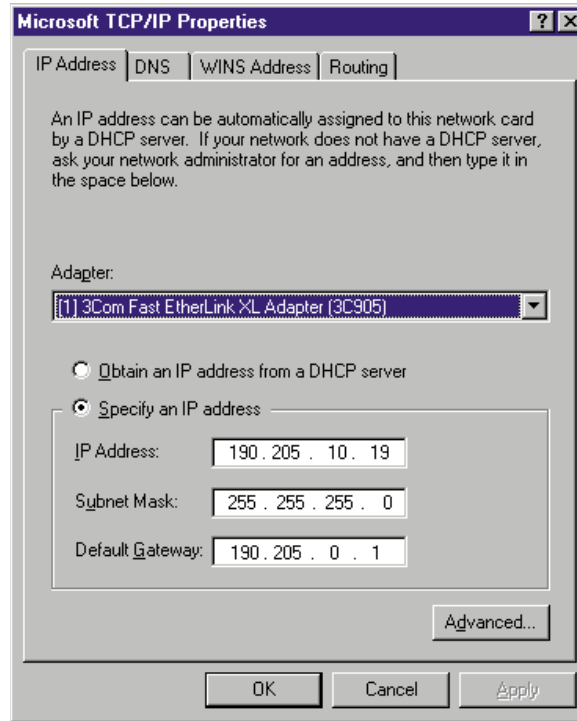
Fig. 5-17: Properties TCP/IP

‣ Select the desired network card (if several cards are installed).

‣ Select "Specify an IP address.

‣ Select the input field "IP address".

‣ Enter the IP address.

NOTE

You will have to ask your system administrator or IT department for the IP address of your computer!
If you connect a computer to a MAx-4 PacController via TCP/IP protocol directly via RJ45 cable (without network), you can use any IP addresses. But you may not use identical IP adresses! The same goes for a connection via the RS 232 interface with MAx-4.

‣ In the input field "Subnet Mask", enter e.g. 255.255.0.0 (depending on the network).

‣ In the "Default Gateway" field, enter the gateway number.

NOTE

You will have to ask your system administrator or IT department for the gateway number!

▸ Click OK.

▸ In the network configuration, click OK.

▸ Restart the computer.
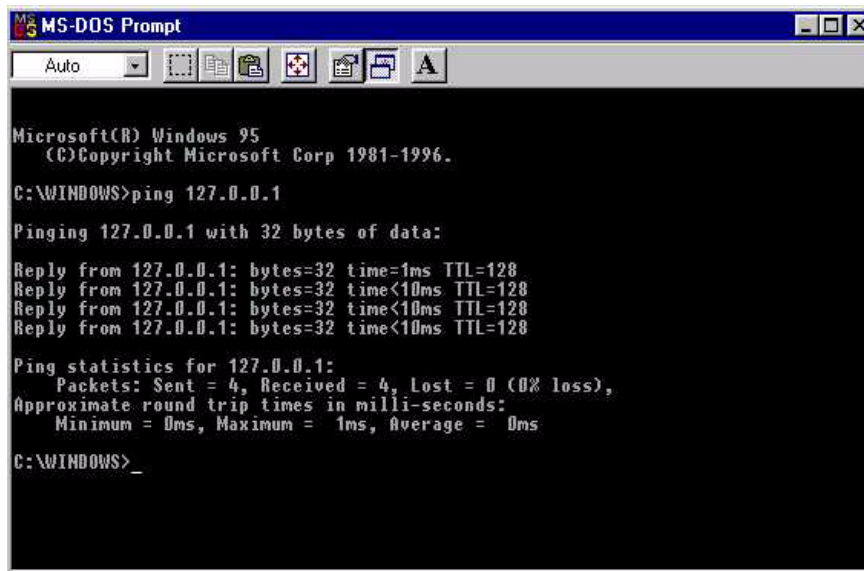
5.2.3 Operating system Windows 2000/XP Professional

To use EPAS-4 with Windows 2000/XP Prof. you don´t have to do any additional installation. The network protokol TCP/IP is aktivated as a standard.

5.3 Checking the TCP/IP Connection

Check the proper installation of the network connection. Make sure that the connection between the PacController MAx-4 and the PC has been established via Ethernet. First start to send a request to the PC:

▸ Change to MS-DOS promt.

▸ Enter the command "ping 127.0.0.1" (see picture below). Enter IP address <u>without</u> leading zeroes.

Fig. 5-18: MS DOS prompt

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If the reply is as shown in the picture, the TCP/IP connection to your own computer (localhost) is up and running.

Fig. 5-19: MS DOS prompt / ping

▸ Now enter the command "ping localhost".

▸ "Ping" now additionally shows its own PC identification.

▸ If the reply is as shown in the picture, the basic TCP/IP connection has been established.

▸ If a connection to the MAx-4 is to be established via TCP/IP protocol, now ping the standard address 190.201.100.100 of the MAx-4.

NOTE

The factory default IP address of the PacController MAx-4 is "190.201.100.100".

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Fig. 5-20: MS DOS prompt / ping error

If, as shown in the picture, there is no reply from the PacController MAx-4, check the physical connection.
See also Checking the Physical Connection, page 39.

If the MAx-4 replies correctly, you can now start connecting the MAx-4 to a network, if you wish to integerate it in a network. If the MAx-4 is operated as a stand-alone unit, you can now establish the connection in EPAS-4 (see Kapitel: 5.4 Setting up the Gateway Server).

If there is no reply from the MAx-4, this can be due to the following reasons:

■ The IP address of the MAx-4 is not set to 190.201.100.100

■ The physical connection to the MAx-4 is not correct.

NOTE

If the IP address of the MAx-4 is not known or no TCP/IP connection to the MAx-4 can be established, you should establish a serial connection to the MAx-4, and then read or change the IP address in the Control Configuration.

5.4 Setting up the Gateway Server

5.4.1 Installation

The gateway server is automatically installed when installing EPAS-4. All necessary EXE and DLL files of the gateway server are installed in the Windows system directory.

NOTE

In case of problems (e.g. no connection with localhost), check whether the following files can be found in the Windows system directory:

- CommSym.dll
- CommUsr.dll
- Gateway.exe
- GClient.dll
- GDrvBase.dll
- GDrvStd.dll
- GSymbol.dll
- GUtil.dll

5.4.2 Setting or Changing the Password

With EPAS-4 versions 00.05.00 or higher, you can set a password for the gateway server. All clients that want to connect to the gateway server have to transmit the correct password. In EPAS-4, this is set in the dialog "Communication Parameters / Gateway".

The password for the gateway server is set on the computer on which the gateway server is installed.

To change the password do the following steps:
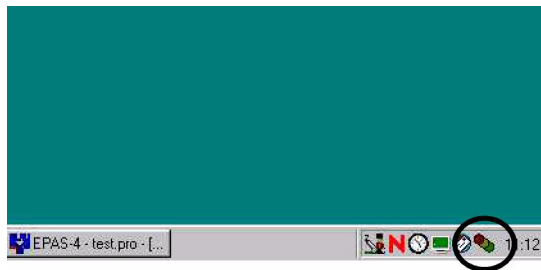
Fig. 5-21: Gateway server icon

▸ Start the gateway server by starting EPAS-4.
▸ Try to establish a connection.

✓ This action will automatically start the gateway server and an icon will appear in the task bar on the right hand side.

▸ Click on the gateway server icon in the task bar with the right mouse button.

▸ Select "Change password..." to open the following dialog box:

EPAS-4 Gateway Server: Change password

Current password: [   ]

New password: [   ]

Confirm password: [   ]

OK

Cancel

Fig. 5-22: Change gateway server password

✓ The dialog window "EPAS-4 Gateway Server: Change password" opens.

▸ Enter the current password in the input field "Current password". (If no password has been set, leave the field blank.)

▸ Enter the new password at "New password" and "Confirm password" with "OK".

Gateway connection: Password

Password: [   ]

OK

Cancel
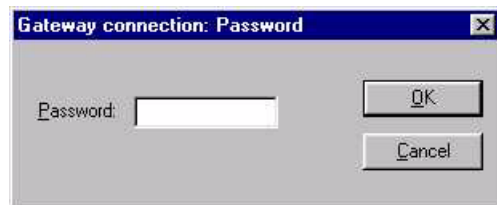
Fig. 5-23: Gateway connection: Password

When EPAS-4 first connects with the gateway, the password will be requested, if a password has been allocated. Login is only possible with the correct password.

NOTE

If you fogot the password, contact a member of our application department.

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5.5   Setting up a Communication Channel

5.5.1   Establish Connection with Gateway Server

If EPAS-4 has not been installed, first install EPAS-4 using the setup program.

▸ Start EPAS-4 via the file manager or the shortcut on the desktop.

▸ Create a new project by navigating to the menu "File" and choose "New" (this opens the Communication Parameter dialog).

or

▸ in the menu "Online" choose "Communication Parameters..." while a project is open.

✓ The following dialog appears.
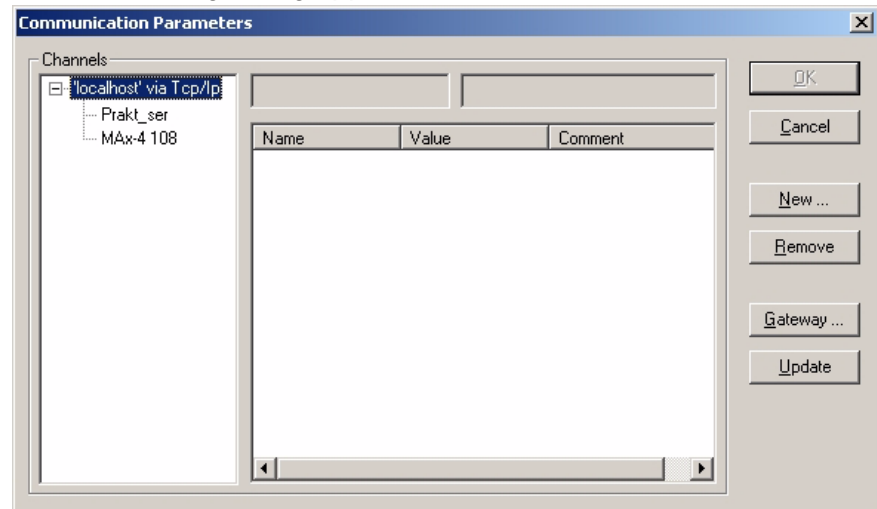
Fig. 5-24: Communication parameter dialog

If the TCP/IP protocol has been set up correctly, as described in the above chapters, the entry "localhost" will appear under "Channels". This channel is connected with the gateway server on your own computer.

Opening the dialog box also starts the gateway server on the computer (three honeycombs in the task bar on the right hand side).

NOTE

If you get a message "localhost (not connected)", EPAS-4 could not establish a connection with the gateway server. This can be due to several reasons:

▪ The TCP/IP protocol has not been set up correctly. Check the configuration of the TCP/IP protocol.

▪ Gateway.exe cannot be found in the folder "..\Windows\System".

ELAU

5.5.2   Set up New TCP/IP Connection

‣ Select "New..." in the "Communication Parameters" window.

✓ The following dialog box will appear.
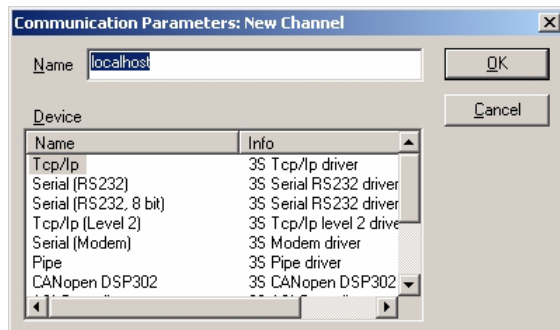
Fig. 5-25: Communication parameter: New channel

‣ Change name to a significant name, e.g. as shown below.
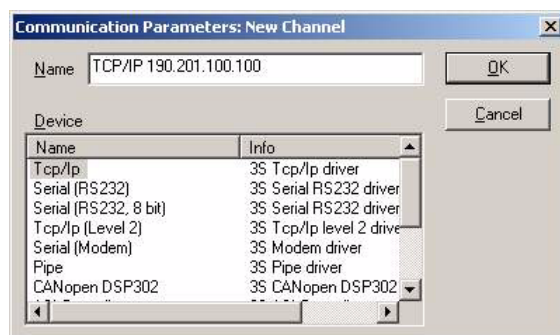
Fig. 5-26: Communication parameter: New channel / Name

‣ Click the "OK" button.

Under "localhost", the entry is inserted as follows:
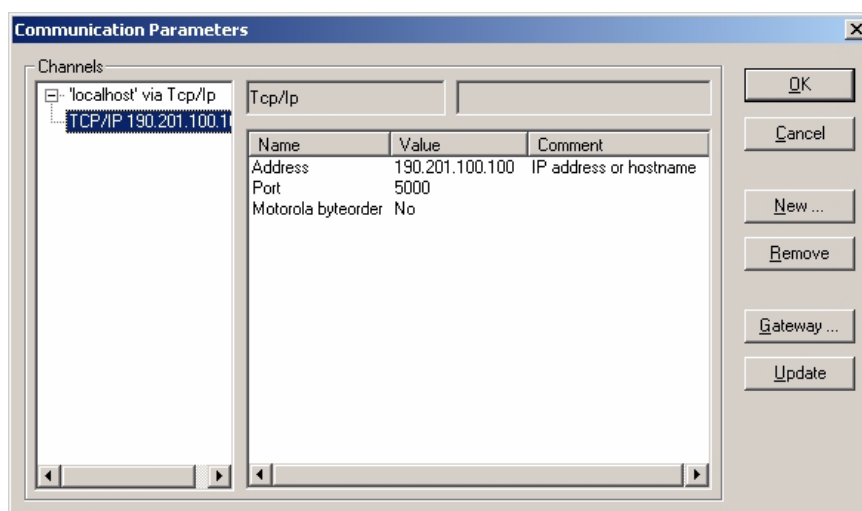
Fig. 5-27: "Communication parameter: New channel" inserted

How to change the IP address:

▸ Click on the Value "190.201.100.100" ('Fig. 5-27:) in the "Address" line. The address will be marked.

▸ Double-click to change it to an input field in which you can change the IP address.

▸ Complete the entry by pressing the return button or clicking outside the entry field.

Port <u>must be set to 5000</u> (standard setting; do not change), <u>Motorola byteorder is "No"</u>.

5.5.3 Set up New Serial Connection

▸ Select "New..." in the "Communication Parameters" window.

▸ The following dialog box will appear:
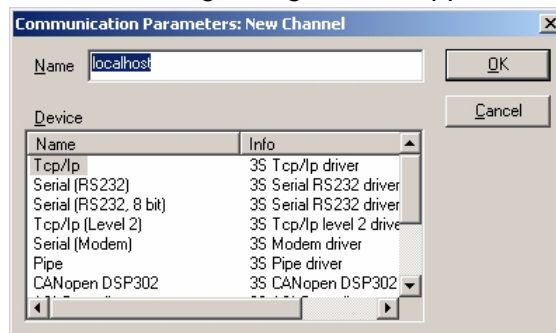
Fig. 5-28: Communication parameter: New channel

▸ In the "Name" field change the name to a significant name, e.g. as shown below.
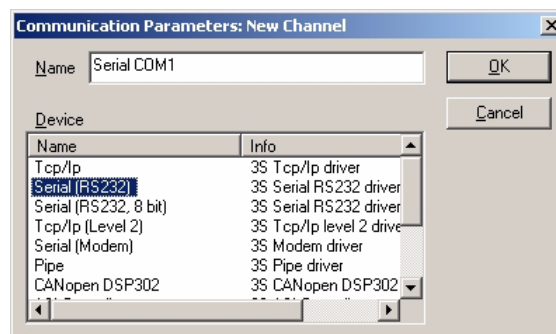
Fig. 5-29: Communication parameter: New channel / Name

▸ From the "Device" tab choose "Serial (RS232)".

▸ Click the "OK" button.
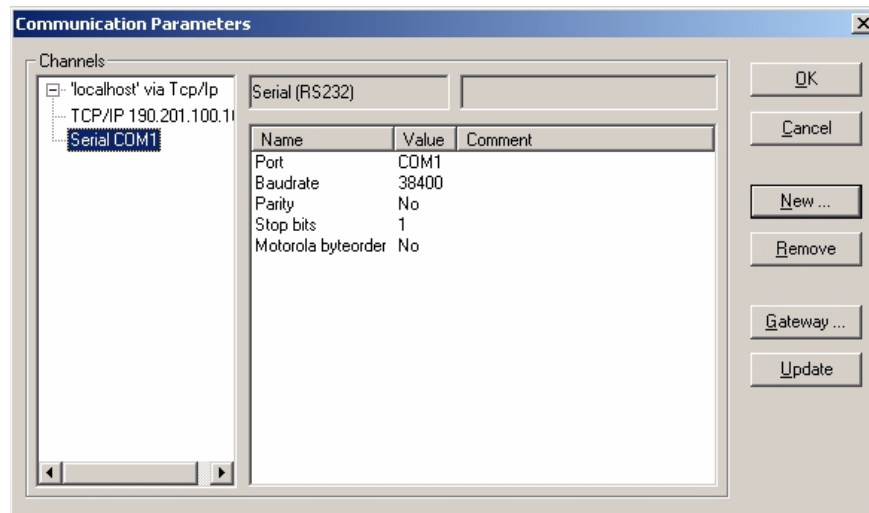
Fig. 5-30: Communication parameter

✓ The new connection will be entered under "localhost".

For the serial interface COM1 standard settings are given and should not be changed here. To choose a different interface (e.g. COM2), change the column "Value" in the line "Port".

NOTE

The communication parameter dialog box will automatically detect the available COM ports and display them, i.e. if only COM1 and COM2 are available on the PC, only COM1 and COM2 will be shown.

5.5.4 Selecting the Connection
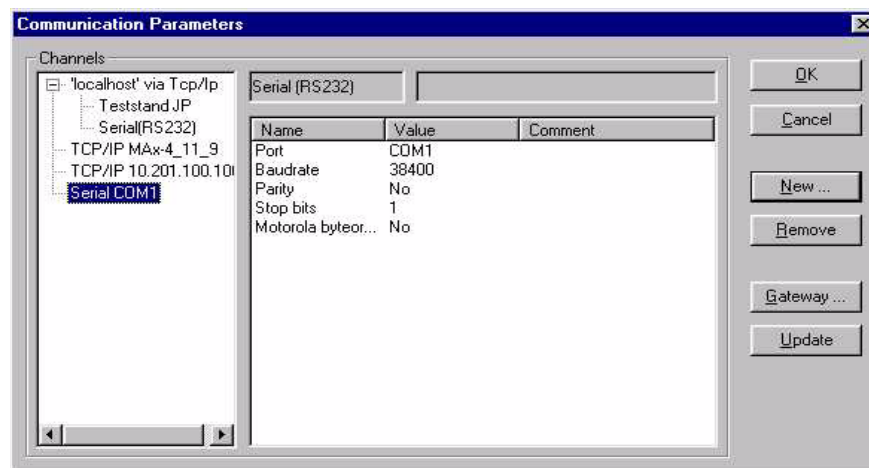
Fig. 5-31: Communication parameters

▸ In the left field, select the connection (marked in blue).

▸ Click the "OK" button.

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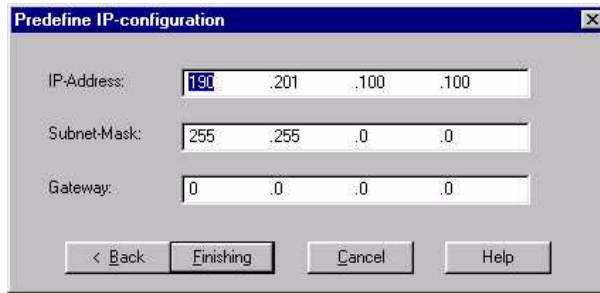
Fig. 5-32: Input assistant for TCP/IP parameters

✓ The input assisstant for entering TCP/IP parameters will appear
  (V00.10.00 or higher).

▸ Confirm with "Finishing".

▸ In the menu "Online" choose menu item "Login" to establish a
  connection to the PacController MAx-4.
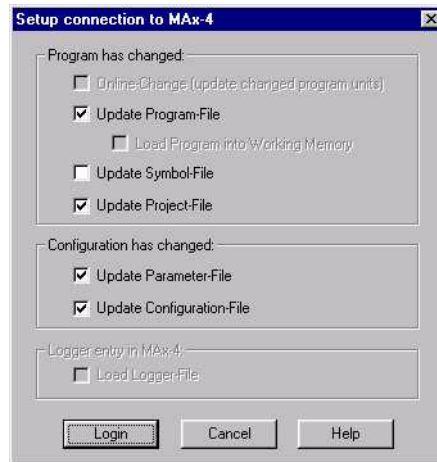
Fig. 5-33: Dialog: Establish connection with MAx-4

✓ If the above box appears, the connection with the MAx-4 Pac-
  Controller has been set up and established.

✓ The gatway server will indicate an active connection in the task
  bar (three honeycombs in light color).

Fig. 5-34: Dialog: Communication error

The above dialog box will appear if no connection could be esta-
blished with the MAx-4 PacController.

▸ Quit the dialog box and check the following settings:

  – In case of serial connection check the serial connection set-
    tings, such as port, baud rate, etc.

  – In case of TCP/IP connection check the settings for IP
    address, port, etc.

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5.5.5 Selecting a Connection Globally or in the Project

If a connection to the MAx-4 PacController could be established with a selected connection, the Gateway server will add it to the Windows registry. It will be shown in an indented line under "Channels" in the Communication Parameter dialog (see below).
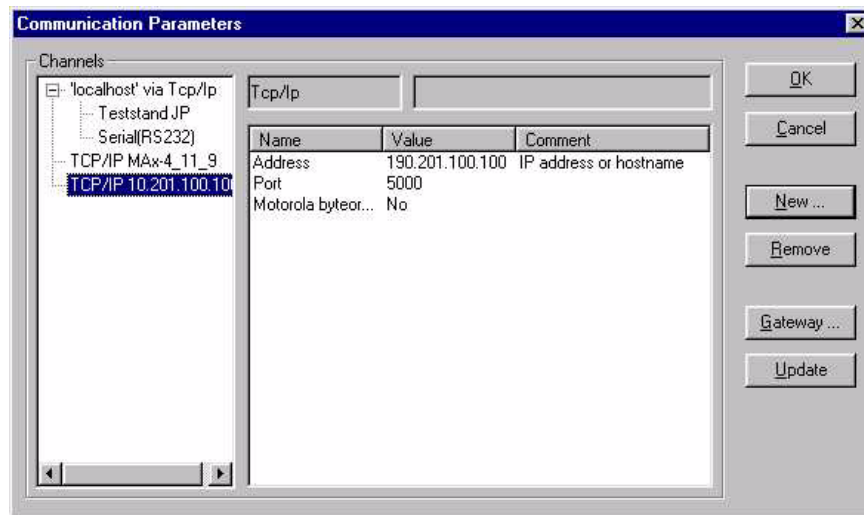
Fig. 5-35: Communication parameter

The entries under localhost are stored in the Windows registry of the computer. The other entries are stored in the project.

To create the communication connection in the project, make your selection, confirm with OK and save the project. If a connection could be established, it is stored in the windows registry.

NOTE

If you are using the indented connection and want to transfer the project to another computer, make sure that the connection is already stored in the registry of that computer. Otherwise a communication error will occur if you open the project and establish an online connection.

NOTE

If there are two connections with different names that uses the same COM port or IP address, no second connection will be stored in the registry.

5.5.6 Delete Connection Entries

If a connection is no longer needed, delete it in the Communication Parameter dialog, using the button "Delete".

NOTE

There will be no safety check. The delete action cannot be reversed. In this case, you will have to set up the connection anew.

5.5.7 Setting up a New Gateway

If the gateway server is located on another computer, you will have to enter the IP address of the computer on which the gateway server has been set up.

For this purpose:

▸ Click on the "Gateway" button in the "Communication Parameters" dialog window.

✓ The following dialog box appears.
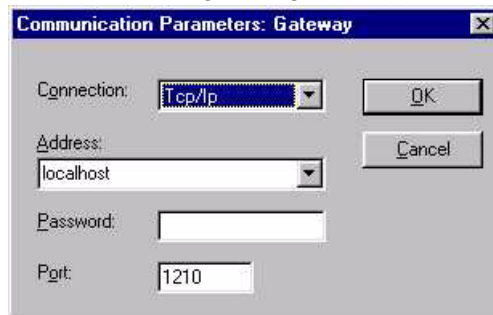
Fig. 5-36: Dialog: Communication parameter: Gateway

▸ In ther "Address" field, enter the symbolic name of the gateway or the IP address. (Do not change the entries under "Data Port" and "Service Port".)

▸ Under "Passwort", enter the password of the gateway, if a password was set in the gateway server on the other computer.

5.6 Checking the Physical Connection

In case of communication problems, check the following points of the physical connection:

■ Was the network card inserted correctly in the PC and is it working?

■ Are the plug and socket connections okay?

- Is the network cable okay?
- In case of BNC connection:
  – Are the terminal resistors in place?
- In case of RJ45 connection on the PC:
  – Is the hub okay?
  – Is the hub carrying voltage?
  – Is the RJ45 cable correct (transposed/non-transposed version?)

5.7 Connector Occupation of the RS232 Interface
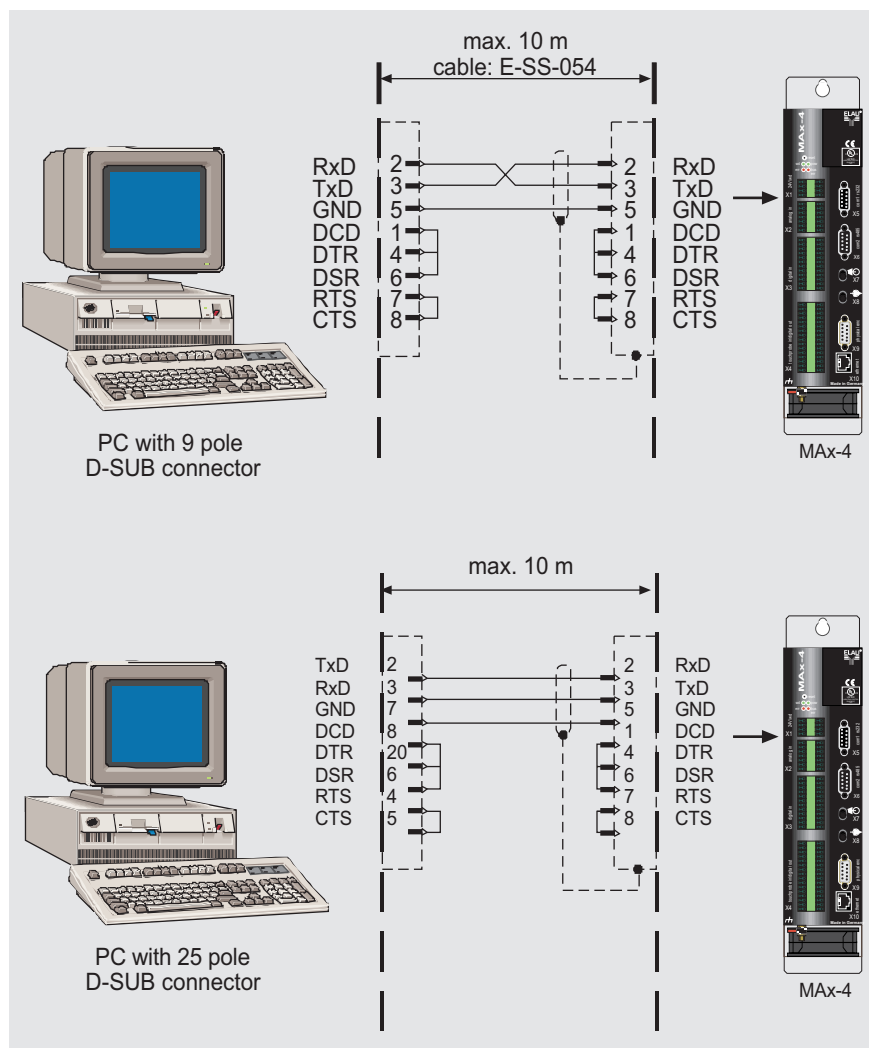
Fig. 5-37: Connector occupation of the RS232 interface

6 Working with EPAS-4

6.1 Project Components

The following chapters contains the most importent terms to facilitate the EPAS-4 introduction.

6.1.1 Project

A project contains all of the objects in a PLC program. A project is saved in a file named after the project. The following objects are included in a project:

POUs (Program Organisation Units), data types, visualisations, resources, and libraries.

6.1.2 POU (Program Organisation Unit)

Functions, function blocks and programs are POUs.

Each POU consists of a declaration part and a body. The body is written in one of the IEC programming languages, which include IL, ST, SFC, FBD, LD and CFC.

EPAS-4 supports all IEC standard POUs. If you want to use these POUs in your project, you must include the library standard.lib in your project.

POUs can call up other POUs. However, recursions are not allowed.

6.1.3 Function

A function is a POU which yields exactly one data element (which can consist of several elements, such as fields or structures) when it is processed, and whose call in textual languages can occur as an operator in expressions.

When declaring a function, do not forget that the function must receive a type. This means that, after the function name, you must enter a colon followed by a type.
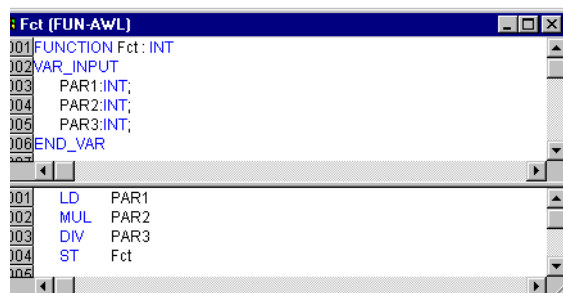
A correct function declaration can look like this example:

```
FUNCTION Fct:INT
```

In addition, a result must be assigned to the function. That means that function name is used as an output variable.

A function declaration begins with the keyword FUNCTION and ends with END_FUNCTION.

Example in IL of a function that takes three input variables and returns the product of the first two divided by the third:

Fig. 6-1: Function

The call of a function in ST can appear as an operand in expressions.

Functions do not have any internal conditions. That means that calling up a function with the same argument (input parameters) always produces the same value (output).

Example Calling up the function described above:

<u>in IL</u>

```
LD    7
Fct   2,4
ST         Result
```

<u>in ST</u>

```
  Result := Fct(7, 2, 4);
```

<u>in FBD</u>
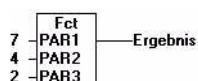
In SFC a function call can only take place within a step or a transition.

NOTE

If you define a function in your project with the name CheckBounds, you can use it to check for range overflows in your project! If you define a function in your project with the name CheckBounds, you can use it to check for range overflows in your project! The name of the function is defined and may have only this identifier. An example of how this function is implemented is shown below:

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Fig. 6-2: Example of the Implementation of the CheckBounds

The following typical program for testing the CheckBounds function goes beyond the boundaries of a defined array. The CheckBounds function makes sure that the value TRUE is not assigned to the position A[10], but rather to the upper area boundary A[7] which is still valid. Therefore, the CheckBounds function can be used to correct extensions beyond array boundaries..
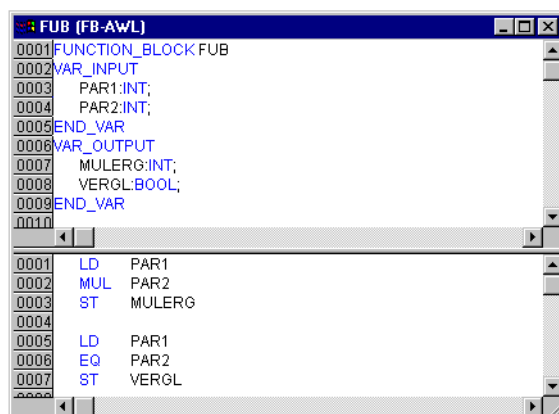
Fig. 6-3: Program for the CheckBounds Function

6.1.4   Function block

A function block is a POU which provides one or more values during the procedure. As opposed to a function, a function block provides no return value.

A function block declaration begins with the keyword FUNCTION_BLOCK and ends with END_FUNCTION_BLOCK.

Example in IL of a function block with two input variables and two output variables. One output is the product of the two inputs, the other a comparison for equality:

Fig. 6-4: Function Block

Function Block Instances Reproductions or instances (copies) of a function block can be created.

Each instance possesses its own identifier (the instance name), and a data structure which contains its inputs, outputs, and internal variables. Instances are declared locally or globally as variables, whereas the name of the function block is indicated as the type of an identifier.

Example of an instance with the name INSTANCE of the FUB function block:

```
INSTANCE: FUB;
```

Function blocks are always called through the instances described above.

Only the input and output parameters can be accessed from outside of an function block instance. This means the internal variables of the function blocks remain invisible to the user of the function block.

Example - Accessing an input variable:

The function block FB has an input variable in1 of the type INT.

```
PROGRAM prog
VAR
   inst1:fb;
END_VAR
LD   17
ST   inst1.in1
CAL  inst1
END_PROGRAM
```

The declaration parts of function blocks and programs can contain instance declarations. Instance declarations are not permitted in functions.

Access to a function block instance is limited to the POU in which it was declared unless it was declared globally.

The instance name of a function block instance can be used as the input for a function or a function block.

NOTE

All values are retained after processing a function block until the next it is processed. Therefore, function block calls with the same arguments do not always return the same output values!

Calling a function block You can use the variables of the function block by entering the instance name, a point, and then the variable name.

If you would like to set the input parameters when you open the function block, you can do this in the text languages IL and ST by assigning values to the parameters after the instance name of the function block in parentheses (this assignment takes place using ":=" just as with the initialisation of variables at the declaration position).

Examples for calling function block FUB described above. The multiplication result is saved in the variable ERG, and the result of the comparison is saved in QUAD. An instance of FUB with the name INSTANCE is declared:

In IL the function block is implemented as follows:

Fig. 6-5: Function Block Call in IL

In the screenshot below the call is shown in ST The declaration part is the same as with IL:
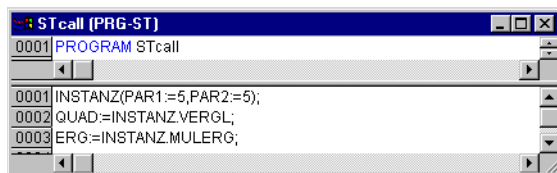
Fig. 6-6: Function Block in Call in ST

In FBD it would look as follows (declaration part the same as with IL):
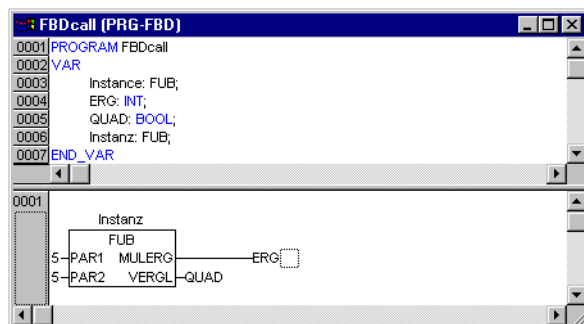
Fig. 6-7: Function Block Call in FBD

In SFC function block calls can only take place in steps.

6.1.5 Program

A program is a POU which returns several values during operation. Programs are recognised globally throughout the project. All values are retained from the last time the program was run until the next.
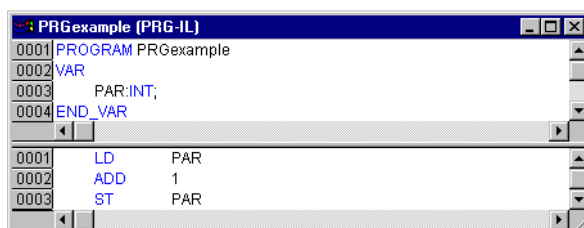
Fig. 6-8: Example of a program

Programs can be called by programs and function blocks. A program call in a function is not allowed. There are also no instances of programs.

If a POU calls a program, and if thereby values of the program are changed, then these changes are retained the next time the pro-

gram is called, even if the program has been called from within another POU.

This is different from calling a function block. There only the values in the given instance of a function block are changed.

These changes therefore play a role only when the same instance is called.

A program declaration begins with the keyword PROGRAM and ends with END_PROGRAM.

Examples: Calls of the program described above:

In IL:

```
CAL  PRGExample
LD   PRGexample.PAR
ST       ERG
in ST:
PRGExample;
Erg := PRGexample.PAR;
```

In FBD::

Example: A possible call sequence for PLC_PRG:

```
LD   0
ST   PRGexample.PAR(*Default setting for PAR is 0*)
CAL  IL call(*ERG in IL call results in 1*)
CAL  ST call(*ERG in ST call results in 2*)
CAL  FBD call(*ERG in FBD call results in 3*)
```

If the variable PAR from the program PRGexample is initialised by a main program with 0, and then one after the other programs are called with above named program calls, then the ERG result in the programs will have the values 1, 2, and 3. If one exchanges the sequence of the calls, then the values of the given result parameters also change in a corresponding fashion.

PLC_PRG The PLC_PRG is a special predefined POU. This POU is triggered all 10 ms (from V00.10.00), if you don´t use the task configuration.

The first time the PROJECT | OBJECT | ADD command is used after a new project has been created, the default entry in the POU dialog box will be a POU named PLC_PRG of the program type. You should not change this default setting!

If tasks have been defined, then the project may not contain any PLC_PRG, since in this case the procedure sequence depends upon the task assignment.

> **NOTE**
>
> The POU PLC_PRG should not be used by you in the normal case. Use the Taskkonfiguration to steer the program-calls.

6.1.6 Resources

You need the resources for configuring and organising your project and for tracing variable values:

- Global Variables which can be used throughout the project
- Message logger to show and archive system messages and diagnostic messages
- PLC Configuration for configuring your hardware
- Task Configuration for guiding your program through tasks
- Sampling Trace for graphic display of variable values
- VarioCam functions to execute motion tasks
- Watch and Receipt Manager for displaying variable values and setting default variable values
- Library manager
- Log

More information concerning resources see the online help section "The Resources".

6.1.7 Libraries

You can include in your project a series of libraries whose POUs, data types, and global variables you can use just like user-defined variables. The library "Standard_V00XXXX.lib" and "MAX4_V00XXXX.lib" are a standard part of the program and are always at your disposal.

More information concerning libraries see the online help section "Library Manager".

6.1.8 Data types

Along with the standard data types the user can define his own data types. Structures, enumeration types and references can be created.

More information concerning data types see the online help sections "Standard" and "Defined data types".

6.1.9 Visualization

EPAS-4 provides visualisations so that you can display your project variables. You can draw geometric elements off-line with the help of the visualization. They can then change their form online, depending upon certain variable values.

6.2 Help When You Need It

Should you encounter any problems with EPAS-4 during your work, online help is available to help to solve them. There you will find all the information contained in this manual.

The Help menu

The menu "help" contains the "contents..." command to open the help topics window.
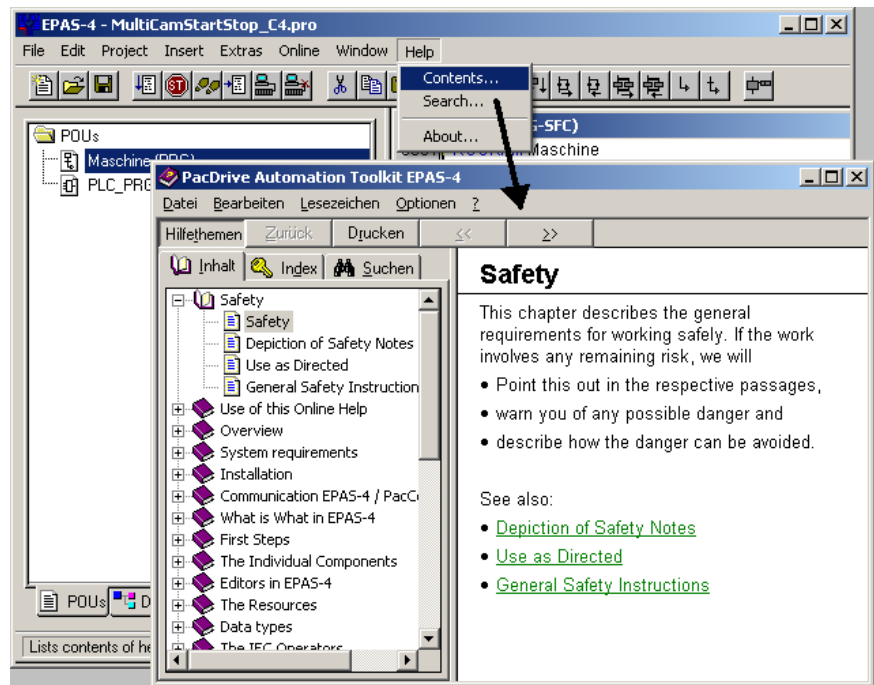
Fig. 6-9: EPAS-4 Windows Help

The help window is divided into three main components. The navigation bar, the navigation window and the text window. You don´t have to switch between navigation window and text window like earlier help systems.

The "Contents" tab displays the chapters of the help file in a folder structure. You can open or close the books by a double click.

With a click on a specific topic its content will be displayed in the text window.

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A click on the Index tab shows a input field to search for a keyword and with a click on the search tab you can perform a fulltext search.

Windows help buttons

The following buttons are available:

- "Help topics" opens the help topics window
- "Back" shows the help entry displayed previously
- "Print" opens the dialog box for printing
- "<<" shows the help entry that comes prior in sequence to the present entry
- ">>" shows the help entry that is next in sequence

In addition you can use the following menu commands:

- With "File" -> "Print Topics" command you can print out the present help entry.
- If you use the "Edit" -> "Copy" command, the selected text will be copied to the clipboard. From here you can insert the text into other applications and use it there.
- If you use the "Edit" -> "Annotate" command, a dialog box will be opened. There is an editing field on the left side of the dialog box in which you can enter an annotation to the help page. On the right side there are buttons for storing the text, for cancelling the program, for deleting the notation, for copying a highlighted text to the clipboard, and for pasting a text from the clipboard. If you have made an annotation to a help entry, a small green paper clip will appear in the upper left-hand corner. By clicking the mouse on the paper clip, you can open the dialog box with the annotation that has been made.
- If you would like to mark a page from help, then you can set a bookmark. To do so, in the menu "Bookmark" choose the "Define" command. A dialog box will appear in which you can enter a new name (The name of the page can serve as a starter) or can delete an old bookmark. If bookmarks were defined, then these will be displayed in the "Bookmark" menu. By choosing these menu items, you can access the desired page.
- Under "Options", you can define whether the help window always appears in the foreground or in the background or in the standard setting.
- With the command "Display Previous Topics" under "Options", you are furnished with a selection window with the previously displayed help topics. Double-click the entry you wish to view.
- Under "Options", you can select the desired "Font" in small, normal, or large.

- If "Options" -> "Use System Colors" has been chosen, help will not be displayed in the colours that were set, but in the system colours instead.

Context Sensitive Help

Shortcut: <F1>

You can use the <F1> key in an active window, in a dialog box, or above a menu command. When you perform a command from the menu, the help for the command called up at that time is displayed.

You can also highlight a text (for example, a key word or a standard function) and have the help displayed for that item.

6.3 Adaptation of EPAS-4 to PacController MAx-4 Firmware Version

6.3.1 Manually Adaption of the Firmware (V00.11.00 and higher)

The EPAS-4 Version 00.11.00 and higher contains a command to choose the firmware version under "Extras" -> "Select MAx4 Version...".

You can only switch to an other firmware if there is no project opened in EPAS-4.

6.3.2 Automatically Adaption of EPAS-4 to MAx-4 Firmware

When logging into the MAx-4 PacController, EPAS-4 recognizes the firmware version and automatically adapts to it. However, you will have to end EPAS-4 and restart it.

Fig. 6-10: Dialog to adjust firmware versions

6.3.3 EPAS-4 Does Not Support MAx-4 Firmware

The first four digits of the EPAS-4 firmware version must be equal to or greater than the firmware version of the MAx-4 PacController.

If this is not the case, the following error message will be generated when logging into the MAx-4 PacController.
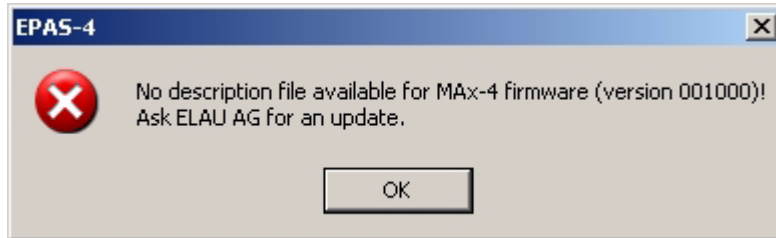
Fig. 6-11: Dialog if firmware version is not supported

NOTE

Description files are files stored in the *ConfigFiles* directory

EPAS-4	PacController MAx-4	
00.10.00	00.10.00	OK
00.07.00	00.10.00	update EPAS-4 version!

Table 6-1: Examples for firmware compatibility

6.4 Using the Keyboard

6.4.1 Shortcuts

If you would like to run CoDeSys using only the keyboard, you will find it necessary to use a few commands that are not found in the menu.

■ The function key <F6> allows you to toggle back and forth within the open POU between the Declaration and the Instruction parts.

■ <Alt>+<F6> allows you to move from an open object to the Object Organiser and from there to the Message window if it is open. If a Search box is open, <Alt>+<F6> allows you to switch from Object Organiser to the Search box and from the there back to the object.

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- Press <Tab> to move through the input fields and buttons in the dialog boxes.
- The arrow keys allow you to move through the register cards and objects within the Object Organiser and Library Manager.

All other actions can be performed using the menu commands or with the shortcuts listed after the menu commands. <Shift>+<F10> opens the context menu which contains the commands most frequently used for the selected object or for the active editor.

6.4.2　Key Combinations

The following is an overview of all key combinations and function keys:

General Functions	Keys
Move between the declaration part an the instruction part of a POU	<F6>
Move between the Object Organiser, the object and the message window	<Alt> + <F6>
Context Menu	<Shift> + <F10>
Shortcut mode for declarations	<Ctrl> + <Enter>
Move from a message in the Message window back to the original position in the editor	<Enter>
Open and multi-layered variables	<Enter>
Open and close folders	<Enter>
Switch register cards in the Object Organiser and the Library Manager	<Arrow keys>
Move to the next field within a dialog box	<Tab>
Context sensitive Help	<F1>

Table 6-2: Key combinations for general operation

General Commands	Keys
„File" „Save"	<Ctrl>+<S>
„File" „Print"	<Ctrl>+<P>
„File" „Exit"	<Alt>+<F4>
„Project" „Delete Object"	<Del>
„Project" „Add Object"	<Ins>
„Project" „Rename Object"	<Spacebar>
„Project" „Open"	<Enter>
„Edit" „Undo"	<Ctrl> + <Z>
„Edit" „Redo"	<Ctrl> + <Y>
„Edit" „Cut"	<Ctrl> + <X> or <Shift> + <Del>
„Edit" „Copy"	<Ctrl> + <C>
„Edit" „Paste"	<Ctrl> + <V>
„Edit" „Delete"	<Del>
„Edit" „Find next"	<F3>
„Edit" „Input Assistant"	<F2>
„Edit" „Next Error"	<F4>
„Edit" „Previous Error"	<Shift> + <F4>
„Online" „Run"	<F5>
„Online" „Toggle Breakpoint"	<F9>
„Online" „Step over"	<F10>
„Online" „Step in"	<F8>
„Online" „Single Cycle"	<Ctrl> + <F5>
„Online" „Write Values"	<Ctrl> +<F7>
„Online" „Force Values"	<F7>
„Online" „ Release Force"	<Shift> + <F7>
„Window" „Messages"	<Shift> + <Esc>

Table 6-3: Key combinations for general commands

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FBD Editor Commands	Keys
„Insert" „Network (after)	<Shift> + <T>
„Insert" „Assignment	<Ctrl> + <A>
„Insert" „Jump"	<Ctrl> + <L>
„Insert" „Return"	<Ctrl> + <R>
„Insert" „Operator"	<Ctrl> + <O>
„Insert" „Function"	<Ctrl> + <F>
„Insert" „Function Block"	<Ctrl> + <B>
„Insert" „Input"	<Ctrl> + <U>
„Extras" „Negate"	<Ctrl> + <N>
„Extras" „Zoom"	<Shift> + <Enter>

Table 6-4: Key combinations for commands of the FBD editor

LD Editor Commands	Keys
„Insert" „Network" (after)	<Shift> + <T>
„Insert" „Contact"	<Ctrl> + <O>
„Insert" „Parallel Contact	<Ctrl> + <R>
„Insert" „Function Block"	<Ctrl> + <B>
„Insert" „Coil"	<Ctrl> + <L>
„Extras" „Paste below	<Ctrl> + <U>
„Extras" „Negate"	<Ctrl> + <N>

Table 6-5: Key combinations for commands of the LD editor

SFC Editor Commands	Keys
„Insert" „Step-Transition (before)"	<Ctrl> +<T>
„Insert" „Step-Transition (after)	<Ctrl> +<E>
„Insert" „Alternative Branch (right)"	<Ctrl> +<A>
„Insert" „Parallel Branch (right)"	<Ctrl> +<L>
„Insert" „Jump" (SFC)	<Ctrl> +<U>
„Extras" „Zoom Action/Transition"	<Alt> +<Enter>
Move back to the editor from the SFC Overview	<Enter>

Table 6-6: Key combinations for commands of the SFC editor

Work with the PLC	Keys
Open and close organisation	<Enter>
Place and edti control box around the name	<Spacebar>
„Extras" „Edit Entry"	<Enter>

Table 6-7: Key combinations for operating the control configuration

Work wirth the Task Configuration	Keys
Place an edit control box around the task or program name	<Spacebar>

Table 6-8: Key combinations for operating the task configuration

6.5 Special settings in EPAS-4.ini

EPAS-4.ini is an initialization file for EPAS-4. The standard settings of EPAS-4 can be modified here. The EPAS-4.ini file is stored in the program folder. Using versions earlier than V00.11.00 you can find the EPAS-4.ini in the Windows directory (e.g. C:\Windows).

Almost every data entry you modify in the EPAS-4.ini, you can also change very easy via the menu "Project" -> "Options" in EPAS-4 and that should be the preferred way. Anyhow, if you modify the file, make sure not to damage the file by incorrect data entries. Always create a copy of the EPAS-4.ini before you modify it.

Below you will find a list of the most important entries:

Keyword	Default	Description
Autodeclare	no	automatic variable declaration
Autoformat	Yes	automatic formating
Autoload	Yes	automatically load last project
Autosave	No	automatically store the project when compiling
AutosaveInterval	10	interval time for Autosave in minutes
AutoScroll	Yes	
Backup	No	backup copy
CompareDir	*empty*	directory for comparing projects
CompileDir	*empty*	compilation directory
DisplayMode	1	1=DEC_MODE; 2=BIN_MODE; 3=HEX_MODE
DocuframeDir	*empty*	directory for document frames
Documentation-Frame	DEFAULT.DFR	document frame file
EPAS_Standard-Timeout	5	standard communication timeout in seconds
EPAS_Extended-Timeout	20	timeout for specific services - compare parameters (LZS_OBJ_VERIFY_PAR) - set parameters (LZS_OBJ_SET_PAR) - program download (LZS_BOOT_PROJECT)
EPAS_Comm-Retries	3	number of tries when establishing communication
EPAS_FileTransferBlockSize	4096	Block size for seriel file transfer
EPAS_RetainSize	1024	retain variable range (entry only up to V00.04.00, then in OV-INI RetainArea)
EPAS_Memory-Size	1024	marker range (default up to V00.07.00 = 256)
EPAS_OutputSize	1024	output range
EPAS_ProgramFileDownload	Yes	Setting for login dialog project file
EPAS_LogFileUpload	Yes	load message logger in case of error
EPAS_InputSize	1024	input range

Keyword	Default	Description
EPAS_Segment-Size	0x7FFF	size of data segment
EPAS_DumpSourceDownload	No	load project sources into control
EPAS_SendASCIISymbolFile	No	transmit ASCII symbol file to gateway
EPAS_OnlineChange	Yes	
ImportExportDir	*empty*	import/export directory
Language	German	German English
LibraryDir	*empty*	library directory
MaxNumOfPOUs	*1024*	max. number of Program Organisation Units
ProjectInfoAuto	No	automatically open project information dialog
ProjectsDir	*empty*	project directory
SDBVersion	-	Version of the created symbol file 0 = compatibility with V6/V7/SP2 (see also problem report)
TabWidth	4	tab width
TraceDir	*empty*	save/load trace directory
UserCompany	*empty*	company name for documentation
UserInitals	*empty*	initials for documentation
UserName	*empty*	name for documentation
WatchDir	*empty*	variable list directory
WatchPercent	50	width of variable window in percent

Table 6-9: Settings in EPAS-4.ini file

NOTE

The default value is always used if there is no entry in EPAS-4.ini.

7 Appendix

7.1 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 / 606-340

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).

ELAU

7.2 Further Literature

ELAU can provide you with these manuals and instructions on the PacDrive™ 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 Device Net

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

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PacDrive™

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 |

Operating Manual TTS

| German | Art.No. 17 13 00 88 - 000 |
| English | Art.No. 17 13 00 88 - 001* |

User Manual Automatic Controller Optimization

| German | Art.No. 17 13 00 89 - 000 |
| English | Art.No. 17 13 00 89 - 001 |

Operating Manual Servo Drive SCL

German	Art.No. 17 13 00 93 - 000*
English	Art.No. 17 13 00 93- 001*
Italian	Art.No. 17 13 00 93- 002*

Operating Manual Power Supply PS-4

German	Art.No. 17 13 00 94 - 000*
English	Art.No. 17 13 00 94- 001*
Italian	Art.No. 17 13 00 94- 002*

* = in preparation

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7.3 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™ system.

NOTE

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

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7.4 Modifications

07 / 1998

- Manual created

03 / 2000

- Manual restructured
- Corrections of various mistakes and amendments
- Update to Version 00.07.00

10 / 2000

- Update to Version 00.10.00

04 / 2003

- Correction of various mistakes and amendments

NOTE

The latest documentation, application notes and the revision service for this product can be found on ELAU's Homepage (http://www.elau.de).

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