

Rexroth PNC V7.3

Operating Instructions

Standard Operator Interface

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Operator's Manual



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Record of Revisions

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1 Safety Instructions

Please read this manual before you start working with the PNC control unit. Store this manual in a place to which all users have access at any time.

1.1 Intended use

This manual contains all information required for the proper use of the control units. For reasons of clarity, however, it cannot contain each and every detail about each and all combinations of functions. Likewise, it is impossible to consider each and any aspect of integration or operation.

The PNC control is used to


- activate feed drives, spindles and auxiliary axes of a machine tool via SERCOS interface for the purpose of guiding a processing tool along a programmed path to process a workpiece (CNC). Furthermore, I/O components are required for the integrated PLC which – in communication with the actual CNC – controls the machine processing cycles holistically and acts as a technical safety monitor.
- program contours and the processing technology (path feedrate, spindle speed, tool change) of a workpiece.

Any other application is deemed improper use!

The products described

- have been developed, manufactured, tested and documented in compliance with the safety standards. These products normally pose no danger to persons or property if they are used in accordance with the handling stipulations and safety notes prescribed for their configuration, mounting, and proper operation.
- comply with the requirements of
 - the EMC Directives (89/336/EEC, 93/68/EEC and 93/44/EEC)
 - the Low-Voltage Directive (73/23/EEC)
 - the harmonized standards EN 50081-2 and EN 50082-2
- are designed for operation in industrial environments, i.e.
 - no direct connection to public low-voltage power supply,
 - connection to the medium- or high-voltage system via a transformer.

In residential environments, in trade and commerce as well as small enterprises class A equipment may only be used if the following warning is attached:

 **This is a Class A device. In a residential area, this device may cause radio interference. In such case, the user may be required to introduce suitable countermeasures, and to bear the cost of the same.**

The faultless, safe functioning of the product requires proper transport, storage, erection and installation as well as careful operation.

Safety Instructions

1.2 Qualified personnel

The requirements as to qualified personnel depend on the qualification profiles described by ZVEI (central association of the electrical industry) and VDMA (association of German machine and plant builders) in:

Weiterbildung in der Automatisierungstechnik

edited by: ZVEI and VDMA

MaschinenbauVerlag

Postfach 71 08 64

D-60498 Frankfurt.

The present manual is designed for **NC professionals** who need special knowledge and skills with regard to operating processing functions.

Programming, start and operation as well as the modification of program parameters is reserved to properly trained personnel! This personnel must be able to judge potential hazards arising from programming, program changes and in general from the mechanical, electrical, or electronic equipment.

Interventions in the hardware and software of our products, unless described otherwise in this manual, are reserved to specialized Rexroth personnel.

Tampering with the hardware or software, ignoring warning signs attached to the components, or non-compliance with the warning notes given in this manual may result in serious bodily injury or damage to property.

Only electrotechnicians as recognized under IEV 826-09-01 (modified) who are familiar with the contents of this manual may install and service the products described.

Such personnel are

- those who, being well trained and experienced in their field and familiar with the relevant norms, are able to analyze the jobs being carried out and recognize any hazards which may have arisen.
- those who have acquired the same amount of expert knowledge through years of experience that would normally be acquired through formal technical training.

With regard to the foregoing, please note our comprehensive range of training courses. Please visit our website at <http://www.boschrexroth.com> for the latest information concerning training courses, teachware and training systems. Personal information is available from our Didactic Center Erbach, Telephone: (+49) (0) 60 62 78-600.

Safety Instructions

1.3 Safety markings on products

Warning of dangerous electrical voltage!



Warning of danger caused by batteries!



Electrostatically sensitive components!



Warning of hazardous light emissions
(optical fiber cable emissions)!



Disconnect from mains power before opening!



Lug for connecting PE conductor only!



Connection of shield conductor only

Safety Instructions

1.4 Safety instructions in this manual



DANGEROUS ELECTRICAL VOLTAGE

This symbol is used to warn of a **dangerous electrical voltage**. The failure to observe the instructions in this manual in whole or in part may result in **personal injury**.



DANGER

This symbol is used wherever insufficient or lacking compliance with instructions may result in **personal injury**.



CAUTION

This symbol is used wherever insufficient or lacking compliance with instructions may result in **damage to equipment or data files**.

☞ This symbol is used to draw the user's attention to special circumstances.

★ This symbol is used if user activities are required.

Safety Instructions

1.5 Safety instructions for the described product**DANGER**

Danger of life through inadequate EMERGENCY-STOP devices! EMERGENCY-STOP devices must be active and within reach in all system modes. Releasing an EMERGENCY-STOP device must not result in an uncontrolled restart of the system! First check the EMERGENCY-STOP circuit, then switch the system on!

**DANGER**

Incorrect or undesired axis movement! First, new programs should be tested carefully without axis movement! For this purpose, the control offers the possibility of inhibiting axis movements and/or auxiliary function outputs by appropriate softkeys in the 'Automatic' mode.

**DANGER**

Incorrect or undesired control unit response! Rexroth accepts no liability for damage resulting from the execution of an NC program, an individual NC block or the manual movement of axes!

Furthermore, Rexroth accepts no liability for consequential damage which could have been avoided by programming the PLC appropriately!

**DANGER**

Retrofits or modifications may adversely affect the safety of the products described!

The consequences may include severe injury, damage to equipment, or environmental hazards. Possible retrofits or modifications to the system using third-party equipment therefore have to be approved by Rexroth.

**DANGEROUS ELECTRICAL VOLTAGE**

Unless described otherwise, maintenance works must be performed on inactive systems! The system must be protected against unauthorized or accidental reclosing.

Measuring or test activities on the live system are reserved to qualified electrical personnel!

Safety Instructions

**DANGER****Tool or axis movements!**

Feed and spindle motors generate very powerful mechanical forces and can accelerate very quickly due to their high dynamics.

- **Always stay outside the danger area of an active machine tool!**
- **Never deactivate safety-relevant functions!**
- **Report any malfunction of the unit to your servicing and repairs department immediately!**

**CAUTION**

Use only spare parts approved by Rexroth!

**CAUTION****Danger to the module!**

All ESD protection measures must be observed when using the module! Prevent electrostatic discharges!

The following protective measures must be observed for modules and components sensitive to electrostatic discharge (ESD)!

- Personnel responsible for storage, transport, and handling must have training in ESD protection.
- ESD-sensitive components must be stored and transported in the prescribed protective packaging.
- ESD-sensitive components may only be handled at special ESD-workplaces.
- Personnel, working surfaces, as well as all equipment and tools which may come into contact with ESD-sensitive components must have the same potential (e.g. by grounding).
- Wear an approved grounding bracelet. The grounding bracelet must be connected with the working surface through a cable with an integrated 1 M Ω resistor.
- ESD-sensitive components may by no means come into contact with chargeable objects, including most plastic materials.
- When ESD-sensitive components are installed in or removed from equipment, the equipment must be de-energized.

Safety Instructions

1.6 Documentation, software release and trademarks

Documentation

The present manual provides the user with comprehensive information about the PNC control unit.

Overview of available documentation	Part no.			
	German	English	French	Italian
PNC-R – Connectivity Manual for project engineering and maintenance	1070 073704	1070 073736	–	–
PNC-R – Software installation	1070 073796	1070 073797	–	–
PNC-P – Connectivity Manual	1070 073880	1070 073881	–	–
PNC-P – BF2xxT/BF3xxT Control Panel Connectivity Manual	1070 073814	1070 073824	–	–
PNC-P – Software installation	1070 073882	1070 073883	–	–
Description of functions	1070 073870	1070 073871	–	–
MACODA Operation and configuration of the machine parameters	1070 073705	1070 073742	–	–
Operating instructions – Standard operator interface	1070 073726	1070 073739	1070 073876	1070 073887
Operating instructions – Diagnostics Tools	1070 073779	1070 073780	–	–
Error Messages	1070 073798	1070 073799	–	–
PLC project planning manual, Software interfaces of the integrated PLC	1070 073728	1070 073741	–	–
iPCL system description and programming manual	1070 073874	1070 073875	–	–
ICL700 system description (PNC-R only), Program structure of the integrated PLC ICL700	1070 073706	1070 073737	–	–
DIN programming manual for programming to DIN 66025	1070 073725	1070 073738	1070 073888	1070 073886
CPL programming manual	1070 073727	1070 073740	1070 073877	1070 073885
CPL Debugger Operating Instructions	1070 073872	–	–	–
Tool Management – Parameterization	1070 073782	1070 073793	–	–
Drive oscilloscope, Operation and programming	1070 073878	–	–	–
Software PLC Development environment for Windows NT	1070 073783	1070 073792	–	–
Measuring cycles for touch-trigger switching probes	1070 073788	1070 073789	–	–
Universal Milling Cycles	–	1070 073795	–	–

 **In this manual the floppy disk drive always uses drive letter A:, and the hard disk drive always uses drive letter C:.**

Safety Instructions

Special keys or key combinations are shown enclosed in pointed brackets:

- Named keys: e.g., <Enter>, <PgUp>,
- Key combinations (pressed simultaneously): e.g., <Ctrl> + <PgUp>

Release

 **This manual refers to the following version:**
Software release: V7.3

The current release number of the individual software modules can be viewed by selecting the 'Control-Diagnostics' softkey in the 'Diagnostics' operating mode.

The software version of Windows may be displayed as follows:

1. Click the right mouse button on the **My Computer** icon on your desktop.
2. Select **Properties**.

Trademarks

All trademarks of software installed on Rexroth products upon delivery are the property of the respective manufacturer.

Upon delivery, all installed software is copyright-protected. The software may only be reproduced with the approval of Rexroth or in accordance with the license agreement of the respective manufacturer.

MS-DOS® and Windows™ are registered trademarks of Microsoft Corporation.

PROFIBUS® is a registered trademark of the PROFIBUS Nutzerorganisation e.V. (user organization).

SERCOS interface™ is a registered trademark of Interessengemeinschaft SERCOS interface e.V. (Joint VDW/ZVEI Working Committee).

Introduction

2 Introduction

Declarations

Symbol "▶":

The 'Right arrows' ▶ in the operating manual indicate that the description follows a specific method.

Example: Data output

▶ Data output

- Defining the interface parameters
- Creating the output list
- Starting the data output on the control unit

Selecting functions with the softkeys:

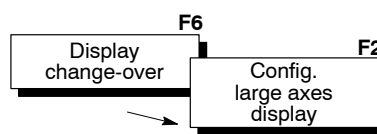
Softkeys are displayed from left to right (corresponding to the operational sequence) to show the selection of a function on the control unit. The function key number of a softkey (F1, F2, ...) is also displayed.

Example:

Function selection "Function selection "Configure Large Axes Display", starting from the **highest level** of an operating mode:



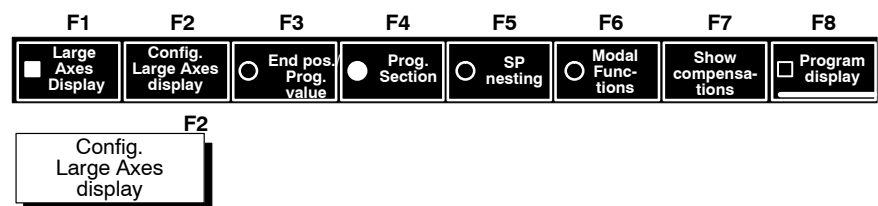
Selecting an operating range



Selecting the function

Example:

Function selection "Configure Large Axes Display", starting from a **particular operating level** :



Introduction

Key operation:

Reference to a special key or key combination is displayed with an angle bracket and the name of the key:

Examples of "special keys": <enter>, <pgup> ,

Examples of key combinations: <ctrl>+<pgup>
(Keys <ctrl> und <pgup> must be pressed at the same time in this example)

Programming examples:

Programming examples or programming entries are displayed with a grey background.

```
N10 G1 F8000 S2000 M3  
N20 G8 X100  
N30 ...
```

Example of an input

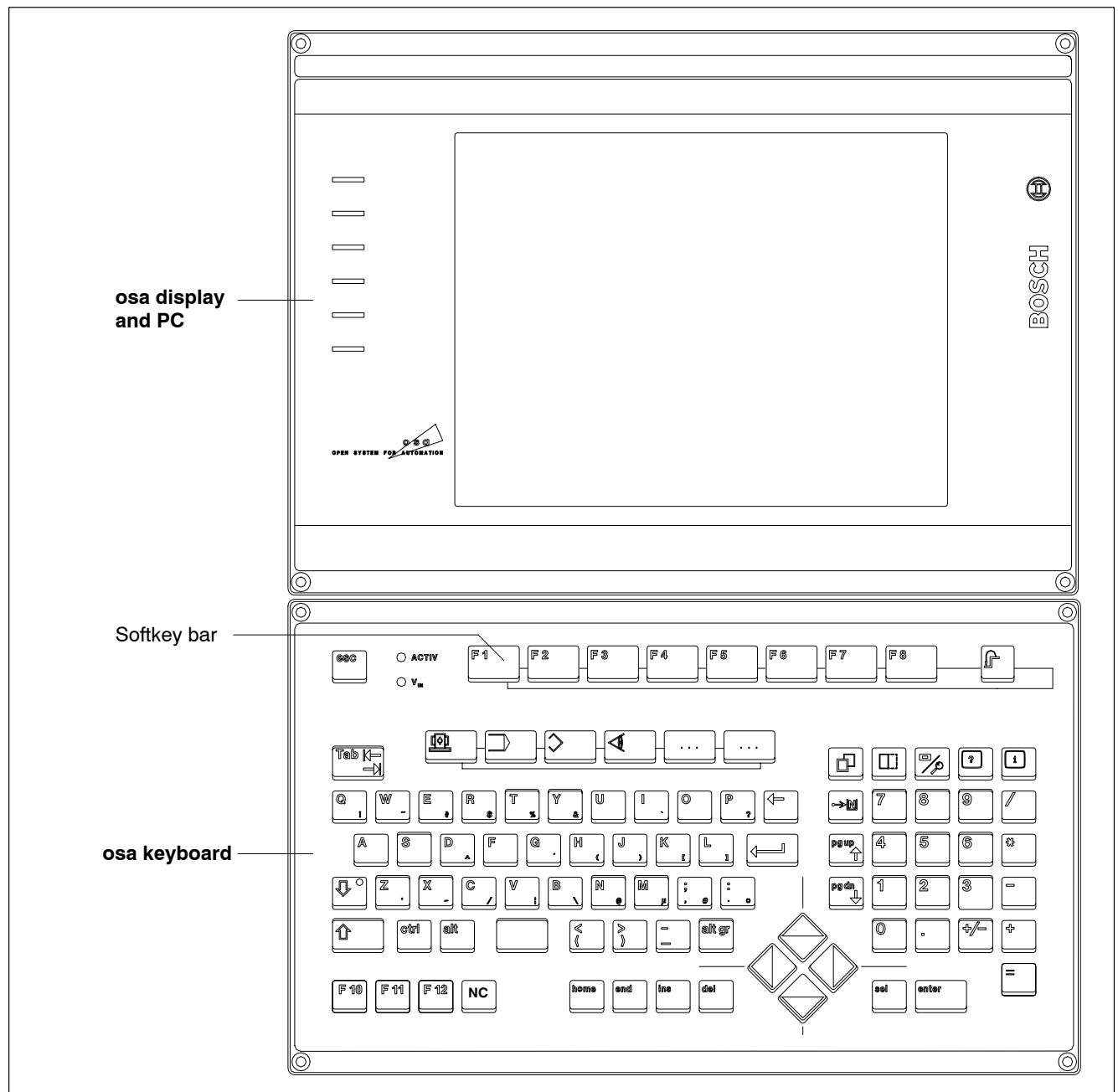
PC control panel and keyboard elements

3 PC control panel and keyboard elements


The PC control panel consists of a **flat screen** (osa display), the **integrated PC** behind the display, and the **keyboard unit** (osa keyboard). A machine operating panel option (osa switch) is also available.

The keyboard unit is used to give instructions to the control unit; PC, CNC and machine functions are displayed via the flat screen.

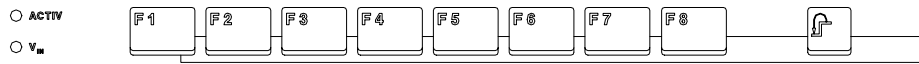
The keyboard unit consists of a film keyboard in QWERTY format, a separate number block, CNC-specific keys with 3 CNC-function keys (F10–F12) for free assignment of functions.



PC control panel and keyboard elements

 **The operator interface (BOF) can also be installed in an Indravis P16/P40, IPC300, BT155 and BT205 (if necessary, with an additional MF2 keyboard).**

3.1 Function keys F1 through F8 and level return key F9



Function keys F1 to F8

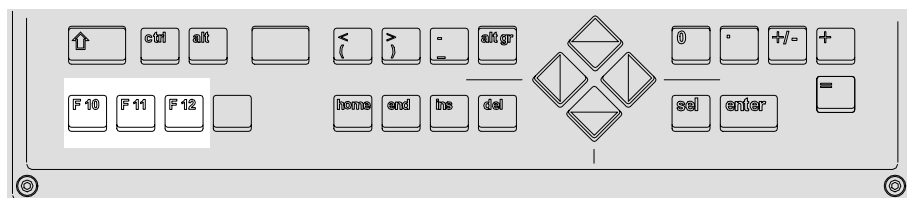
The “softkeys” are operated by pressing keys <F1> to <F8>. Softkeys are function keys whose effect or meaning is not always constant but rather depends on the current status of the control unit. Those functions which can be executed at a particular time by pressing the F1 to F8 function keys are graphically displayed by the CNC at the bottom edge of the screen directly above the F1 to F8 keys. Therefore, the keyboard unit should always be immediately below the TFT flat screen to improve operating ease.

Level return key F9



The level return key reduces the depth of the interactive tree by one level. This allows you to “jump” back to the previous operator or softkey level.

3.2 Configurable function keys (F10 to F12)



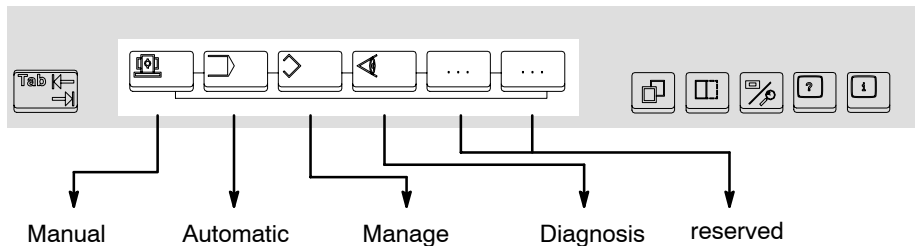
You can assign these keys different softkey levels from the “Manage” or “Diagnostics” group operating modes. By pressing just one key, you can reach, for example, a frequently required softkey level. For changing the assignments, refer to section 9.6.

PC control panel and keyboard elements

3.3 Main menus

A "Main menu" is a summary display of all operating levels and functions which could be required or could be useful for performing a specific task on the machine or control system.

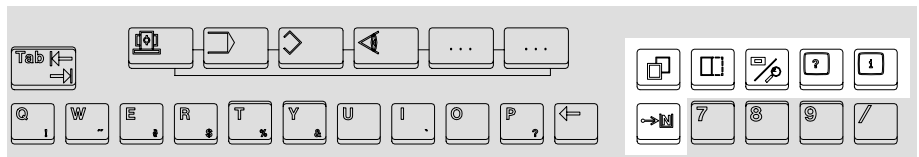
An overview of functions of the individual main menus can be found from section 5.1 onwards.



With these keys you can directly select the **highest** softkey level of a main menu.

If you want to switch to the **last active** softkey level of a main menu, simply keep the <shift> key (refer to section 3.6) pressed and then press the corresponding operating mode key.

3.4 "Push/Pop", "Mode", "Zoom", "Channel dialog", "Help", "Information" keys



Push/Pop

Changes between the NC display windows "A" and "B" (also refer to section 4.3). You bring the window in the foreground into the background and simultaneously bring the window from the background to the foreground.

In case of a two-part screen (NC display windows "A" and "B" each cover one half of the screen area), alternately activate window "A" or window "B" (also refer to section 4.3.3).



Mode

An NC display window can be allocated the entire screen, or one half of the screen only. Using this key, you can switch between both these conditions (also refer to section 4.3.3). If an NC window is only allocated half of the screen, the CNC automatically displays the second NC display window in the other half of the screen.

PC control panel and keyboard elements



Magnify / Window

This key reduces/enlarges a graphic display (e.g. in the display of the axis diagnostics).

The key has an additional function if the screen is divided into two:

If the screen is divided into two (“A” and “B” NC display windows each take up half of the screen), you will only see the left half of the “A” and “B” NC display windows. With Magnify key, you can switch the currently active NC display window between its right and left halves (also refer to section 4.3.3).

Additional function with dialog boxes:

Moving dialog boxes (refer to section 4.5.3, “Moving a dialog box”).



Channel dialog

The control system can administer several channels (Channel: All axes that belong to one single machining process) completely independent of one another. This key is used to select the “Channel dialog” where any desired channel can be displayed for making operations or entries. Furthermore, you can press hotkeys to switch between channels (also refer to section 4.8).



Help (currently unavailable)

This key is used to open/close a window containing context-sensitive auxiliary information.



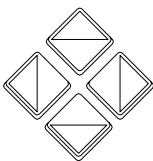
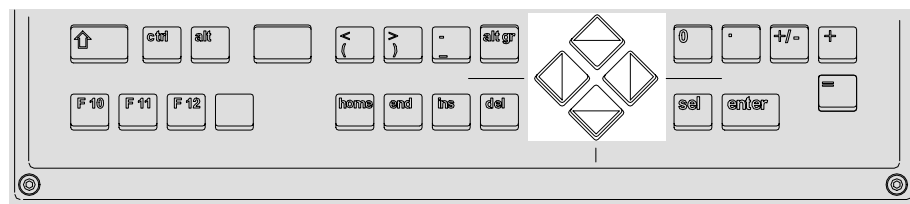
Information

This key opens/closes the Info window.

You will find further information on error, warning or message symbols in the Info window, should one appear in the NC status display.

Please refer to section 4.7 for further information on the Info window.

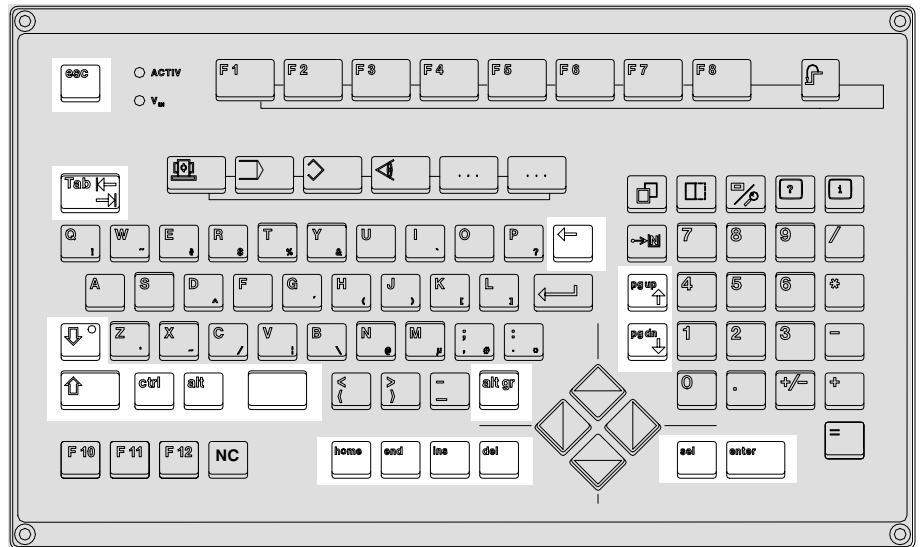
3.5 Cursor keys












<⬅> <➡> <⬇> <⬆> Keys for moving the screen cursor or the focus (within a dialog box, refer to section 4.5.1) towards left/right/top/bottom.








PC control panel and keyboard elements

3.6 Control keys



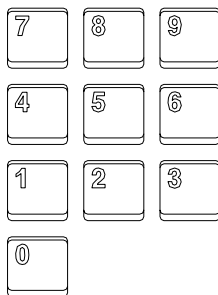
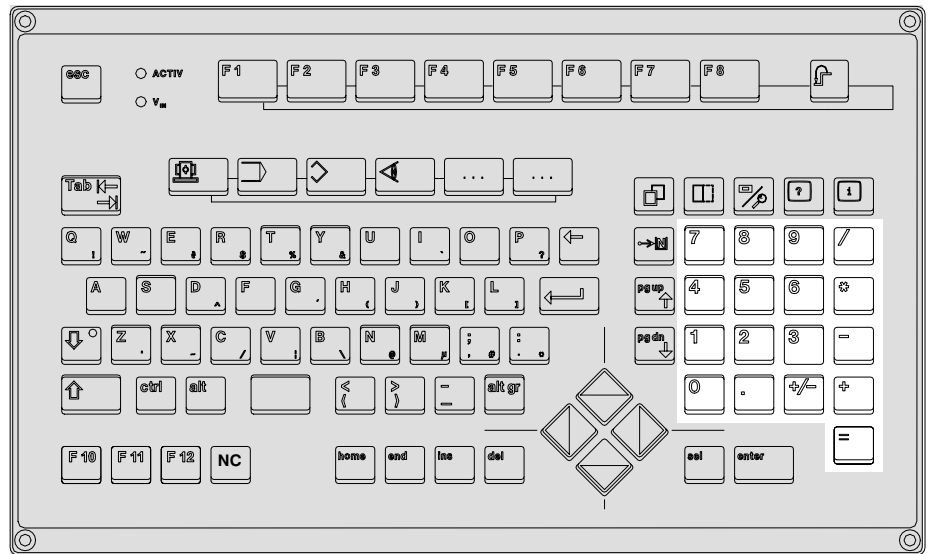
	<esc>	Cancelling a current action (currently unavailable)
	<tab>	Horizontal tab in the editor. Can be used to select fields in a dialog box (refer to section 4.5, "Dialog box").
	<backspace>	Deleting one character to left of cursor.
	<pgup>, <pgdn>	In a list field or in a file, skip a page: upwards (<pgup> key: (towards the top of the list) downwards (<pgdn> key: towards end).
		
	<sel>	Selecting/deselecting a marked object (e.g. to select one or more files in the list field). You select the object beforehand with the cursor keys and then press the <sel> key. A marked object is highlighted.
	<enter>	Confirming an entry. This key triggers a line break in the NC editor. This key also initiates the function of an "Enter" softkey (refer to page 4.4.1).
		Text editor: Overwrite mode Deleting the character behind the cursor. Text editor: Insert mode Delete one character to the right of the cursor.
	<ins>	Switching between the insert mode and the overwrite mode. You can see from the shape of the cursor which mode you are currently in: Bar cursor ' ': Insert mode Block cursor '█': Overwrite mode

PC control panel and keyboard elements

	<end>, <home>	Going directly to end of list/end of file (with the <end> key) or directly to top of list/top of file (with the <home> key) in a select list or file.
		
	<ctrl>	Generating a control symbol. You must press another key while keeping the <ctrl> key pressed down.
	<altgr>	Some keys on your keyboard have multiple functions. If you keep the <alt> or <altgr> key pressed down and then press a key which has several functions, you will obtain the character which is shown on the bottom-right of this key.
	<space>	Generating a blank space in character entry fields or in the editor. Otherwise the key functions like <sel>.
	<shift>	If you keep the <shift> key pressed down and then press another key, you will obtain the character which is shown on the top-left of the key you pressed.
	<shift lock>	You can toggle between two keyboard modes by pressing the <shift lock> key. Yellow LED on the <shift lock> key is on: You will obtain the character shown on the top-left of a key. Yellow LED on the <shift lock> key is dark: You will obtain the character shown on the bottom-left of a key or (in the case of a letter key) the lower-case letter.

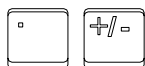
PC control panel and keyboard elements

3.7 Numerical keys



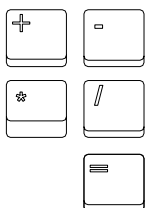
Numerical keyboard

Numeric keypad: Numeric characters 0 to 9



Decimal point and change sign

Decimal point; change sign (e.g. entry of neg. numbers).



Basic arithmetic operations

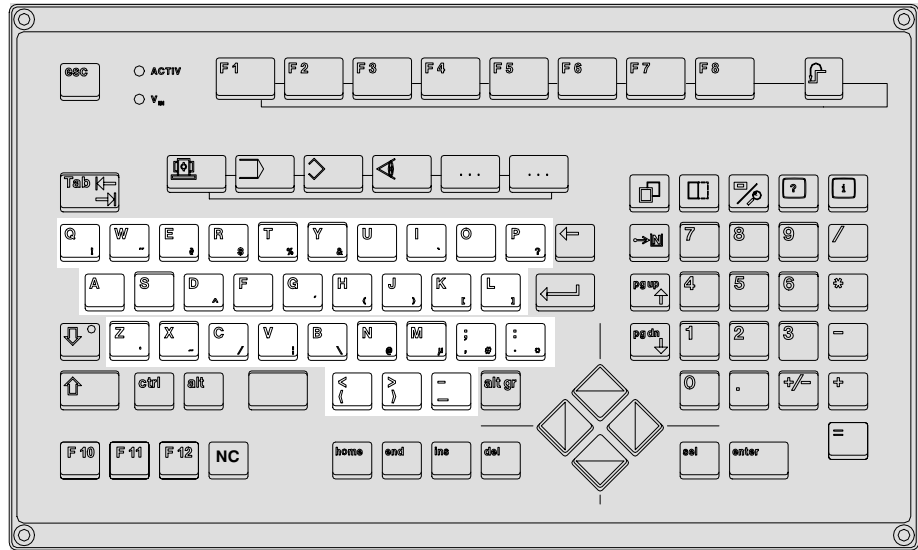
Add; Subtract

Multiply; Divide

Display/assign result

PC control panel and keyboard elements

3.8 Multi-function keys



Some keys are assigned several characters, i.e. different characters can be generated by one key. The following description shows you how to generate the individual characters of a multi-function key on the passive operator panel using the <M> and <,> keys as examples:

If the LED on the <shift lock> key is on:



- Character "M": Press key <M>.
- Character "m": Press <shift lock> key. LED goes off. Now press key <M>.
- Character "µ": Press <alt gr> key and hold it down. Now press key <M>.



- Character ","": Press key <,>.
- Character "’": Press <shift lock> key. LED goes off. Now press key <,>.
- Character "#": Press <alt gr> key and hold it down. Now press key <,>.

If the LED on the <shift lock> key is **not** on:



- Character "m": Press key <M>.
- Character "M": Press <shift> key and hold it down. Now press key <M>.
- Character "µ": Press <alt gr> key and hold it down. Now press key <M>.













- Character "，“": Press <shift> key and hold it down. Now press key <,>.
- Character "’”": Press key <,>.
- Character "#”": Press <alt gr> key and hold it down. Now press key <,>.

PC control panel and keyboard elements

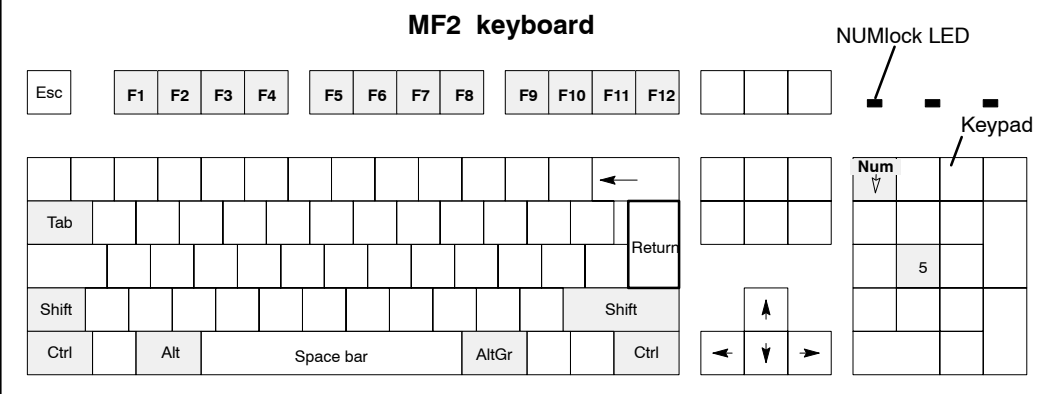
3.9 MF2 PC keyboard

Instead of an osa keyboard, an **MF2 PC keyboard** can be connected to the osa display. Because an MF2 keyboard has no NC-specific keys, the following key combinations may be used to access NC functions.

 **PC operation using an MF2 keyboard is analogous to the operation using an osa keyboard.**

Main menus:		Special keys:	
MF2 key	CNC key	MF2 key	CNC key
Shift + F1	 Manual	Shift + F7	 Push/Pop
Shift + F2	 Automatic	Alt + F8	 Mode
Shift + F3	 Manage	Shift + F9	 Magnify / Window
Shift + F4	 Diagnosis	Shift + F11	 Information
		Shift + F12	 Channel dialog
		Num ↓	} Select: Key <5> on the keypad (the <NUMlock> key must be active = LED is on)
		Ctrl + 5	
Softkey:			
F1 F2 F3 F4	= Softkeys 1..4		
F5 F6 F7 F8	= Softkeys 5..8		
F9	=  Level return		
Other shortcuts:			
AltGr + Return	= LF	AltGr + 7	= {
AltGr + Q	= @	AltGr + 0	= }
AltGr + 8	} = [AltGr + β	= \
Ctrl + Ü		AltGr + +	= ~
AltGr + 9	=]	AltGr + <	=

MF2 keyboard



The diagram shows a keyboard layout with the following features:


- Top row: Esc, F1, F2, F3, F4, F5, F6, F7, F8, F9, F10, F11, F12, and three unlabeled keys.
- Second row: Tab, 12 alphanumeric keys, and Return.
- Third row: Shift, 12 alphanumeric keys, and Shift.
- Bottom row: Ctrl, Alt, Space bar, AltGr, and Ctrl.
- Right side: A numeric keypad with a NUMlock LED above it. The keypad includes Num ↓, 5, and other numeric keys.

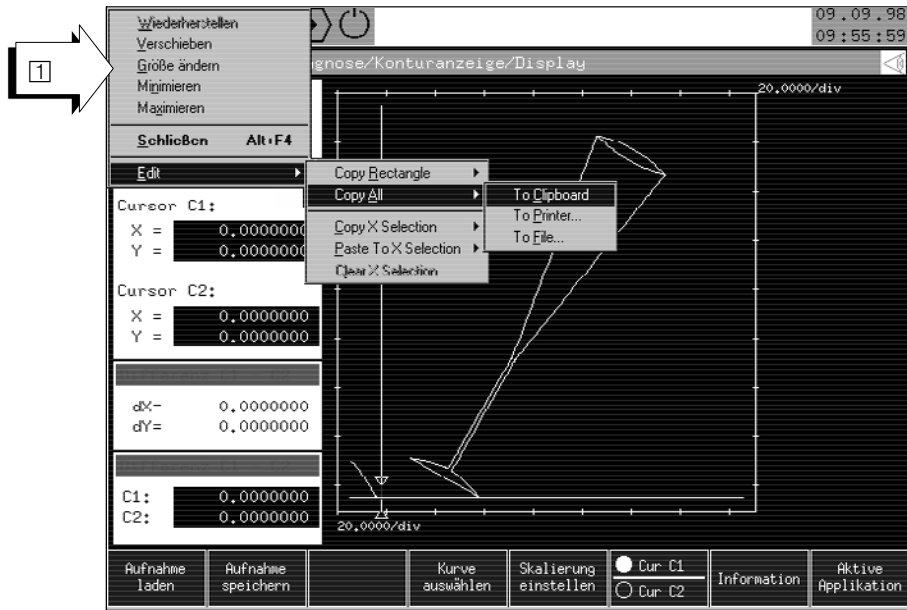
PC control panel and keyboard elements

3.10 Print Screen function

To document MTB-specific functions, diagnostics recordings, or error messages, you can print a hard copy of the active screen of the NC man-machine interface:

 **Condition: The NC user interface must be active and the function "Hide Windows" must not be active.**

<Alt> + <Space bar> Opening the menu window 
 "E" = Edit Opening the submenu window



With "Copy All", you select the whole screen.

"A" = Copy All The whole screen is selected and a submenu appears where you may select the destination (clipboard, printer, or file).

There are three different ways to copy the screen dump:

"C" = Copy to Clipboard The graph is copied to the clipboard (for further processing in a word processing program, e.g. "Wordpad", or a graphics program, e.g. "Paint").

"P" = Copy to Printer The graph is printed directly (on the condition that a printer is connected to the osa display PC or in the network).

"F" = Copy to File The graph is written to a bitmap file, (e.g. Graph.bmp). The path and the file name may be selected.

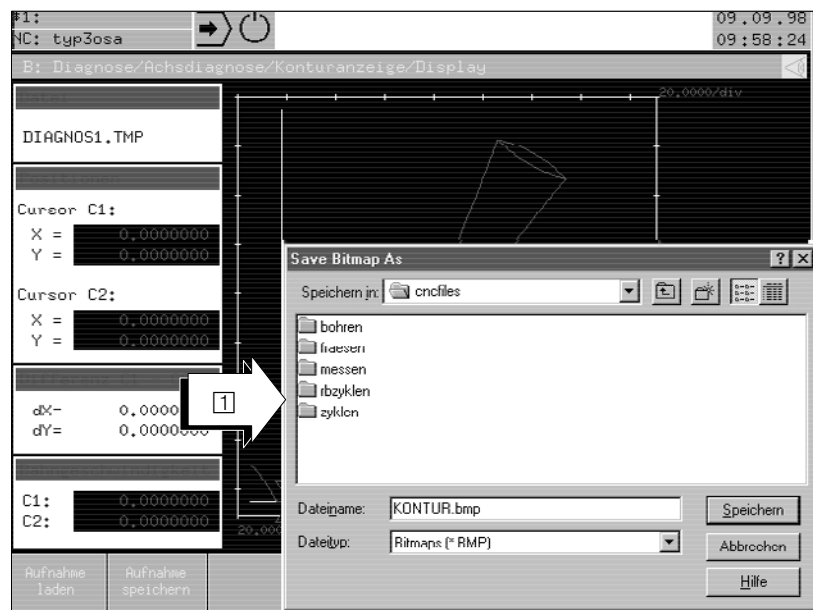
PC control panel and keyboard elements

With **"Copy to Clipboard"**, the contents of the screen are written to the clipboard. From there they can be inserted in any program (text editor or graphics program).

☞ **The graph from the screen remains on the clipboard until it is overwritten by another document copied there or until the PC is switched off.**

With **"Copy to Printer"**, the contents of the screen are directly sent for printing to a printer capable of printing graphics (connected to LPT1 of the osa display PC or via network to a network printer. In a menu window, you can also select the respective printer.

With **"Copy to File"**, the contents of the screen are copied into a file. A window **1** opens where you can state the path and the name of the file to which the contents is to be copied. This file is saved as a bmp file (bit-map). For further processing, this bmp file can be edited with a suitable graphics program.



☞ **The Print Screen function is available in Windows95 and WindowsNT.**

PC control panel and keyboard elements

Notes:

Man-machine interface (MMI)

4 Man-machine interface (MMI)

This chapter describes the **Standard-Man-Machine-Interface (MMI)**:

- the concept of the man-machine-interface
- the structure of the screen display
- the meaning of all of the symbols used (pictographs)
- the softkey types
- the dialog boxes and pop-up windows
- the Info window


It is the function of the standard man-machine-interface to mutually relay all information between the operator and the control system.

This includes:

- application-specific display of all machining data such as machine position and status, process and compensation data
- Extensive system-supported selection or activation of the information required by the control system.
- warning and error messages which are as precise as possible after a fault has occurred

The MMI contains a series of dialog elements and symbols. Their knowledge is essential for understanding and operating the control system! Please read this chapter carefully before working on the control unit!

The operator interface was implemented on the basis of "X-Window" to leave it open for future requirements or expansions. The operator interface and the "PXROS" real-time operating system installed in the CNC form the basis for an efficient, flexible and up-to-date interface between man and machine.

 **The modular structure of the control system software enables you to modify or redesign the user interface. This, however, requires an exact knowledge of system interaction. Rexroth offers the option of special development tools and documentation which you can use to create an alternative operator interface.**

So-called display windows are used for the display of information on the screen and for the relevant operator entries.

The MMI was designed such that two separate functional NC display windows are available, whereby you can switch over from one to the other as and when you want.

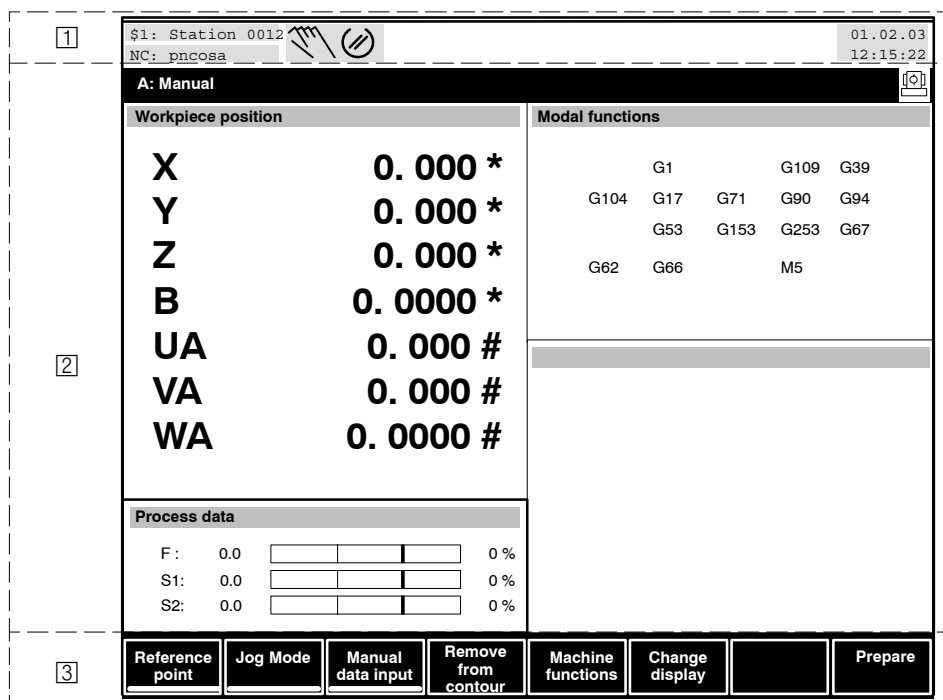
This allows two different processes which are running simultaneously on the control unit to be displayed and operated in separate windows (e.g. Process 1: machining a work piece, Process 2: loading/outputting files or creating/changing a program).

Man-machine interface (MMI)

Structure of the standard man-machine-interface:

- 1 NC status line
- 2 NC display window, and
- 3 Softkey range

The screen contents and the softkey assignment depend on the current status or mode of the control unit and may therefore be different from your current control unit display.



Man-machine interface (MMI)

4.1 Symbols used on the MMI

Depending upon the current status, the control system display symbols (pictograms) in the NC status bar and at other places of the user interface. These symbols are supposed to draw the user's attention to specific features.

Channel-independent symbols



System error has occurred



Warning has occurred



Message has occurred



Data output is active



Data loading is active



The control unit is currently not capable of immediately processing operator inputs. Key strokes made during this time are not lost, however, but will be processed sequentially afterwards.

By pressing the "Info" key the control unit opens the Info window which contains detailed information of the events.



Symbols of NC modes (channel-specific)



Traverse to reference point



Jog in machine coordinates



Jog in working coordinates



Manual data input (MDI)



MDI without axis movement



Execute program in automatic



Execute program in automatic (without machine function)



Execute program in single block



Execute program in single block (without machine function)



Execute program in a single step



Execute program in a single step (without machine function)







Execute program block














Execute program block (without machine function)

Man-machine interface (MMI)




Symbols of channel wait states (channel-specific)

-  Programmed dwell time currently running
-  Block transfer inhibit is active
-  Auxiliary function with compulsory acknowledgement
-  Channel waiting








Symbols of NC conditions (channel-specific)

-  NC/program **ready** (for processing)
-  NC/program **running** (being processed)
-  NC/program **halted** (e.g. by feed hold)
-  **interrupted** (error has occurred)
-  NC/program **in preparation** (NC-internal program linking)
-  NC/program **inactive** (i.e. has been reset)
-  Reset **active** (e.g. during control reset)
-  Skip block
-  Optional Stop
-  Return To Path is active
-  Inch programming is active

Symbols for axis states (axis-dependent)

-  Reference point not traversed to (is only visible in channel dialog!); (axis-dependent)
-  **Travel command** (for processing) (axis-dependent)
-  **Forward feed inhibit** (axis-dependent)

Symbols for spindle conditions (spindle-dependent)

-  Clockwise run with/without coolant
-  Counter-clockwise run with/without coolant
-  Spindle stop
-  Spindle orientation
-  Gear stage selection, manual
-  Gear stage selection, automatic
-  Spindle inhibit

Man-machine interface (MMI)

4.2 NC status line



Apart from the display of the current date and time to the right, the NC status line includes important higher-level (channel-dependent and independent) information about the overall status of the control system:

4.2.1 Channel display (channel-specific)

Display channel number and channel name



\$1: Station 0012
NC: pncosa


Every channel number “\$x” can be assigned an independent channel name via the file “channname.xxx”. This name is used in the NC status line and in certain dialog boxes:

Example:

Channel no.	Name of the channel/processing unit
\$1	Station 0012

The name of the channel/processing unit is displayed in the NC status line by 12 characters. It can be changed depending upon the language if text files specific to the country are available. In the country-specific text file “channname.xxx”, the length of the name can have up to 32 characters.

For the definition of the channel name or the name of the processing unit with the text file “channname.xxx”, refer to section 10.1.

 **Adjust the syntax of the file “channname.xxx” if several control systems can be operated from one PC control panel. For this feature, refer to the detailed section 10.1.**

Display control system designation

\$1: Station 0012
NC: pncosa

The display of the channel/processing unit includes the designation of the currently selected control system. The designation is stored in the host file of the control unit.

Example:

Type	Control unit name
NC	pncosa

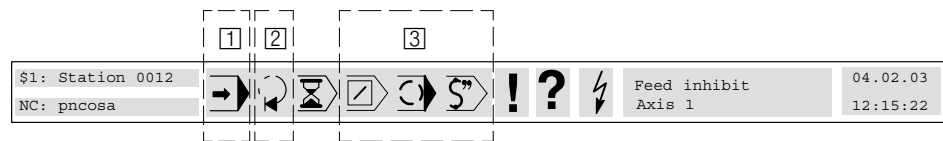
Man-machine interface (MMI)

The name is displayed in the NC status line as a 12-character name. In the country-specific text file "channame.xxx", the length of the name can have up to 16 characters.

For the definition of the control unit name with the text file "channame.xxx", refer to section 10.1.

- ☞ **If no such name has been defined, enter the Internet address (IP address).**

Function/Mode and NC state display



- ① **Function/Mode** in the currently selected channel.
Possible states: refer to section 4.1.
- ② **NC states** in the currently selected channel.
"ready", "running", "stopped", "interrupted", "prepared", "inactive", "active".
- ③ **Other NC states** in the currently selected channel.
"Skip block", "Optional stop", "Return to path is active", "Inch programming is active"

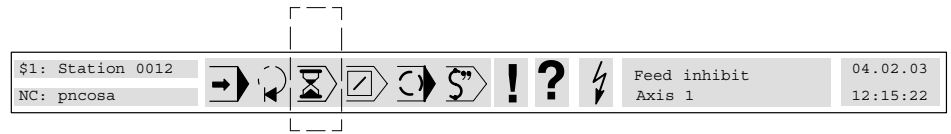
The background colour of the symbols in the positions ①, ②, ③ also has the following meaning:

- **green:** General inhibit is active. Axes are not in operation
- **yellow:** Warning! Axes can be operated

- ☞ **The "Inch programming is active" symbol always appears on a green background.**

Man-machine interface (MMI)

Display of the channel waiting states



Channel waiting states are displayed by 4 different symbols on a yellow or green background:



Dwell time is active,



Block transfer inhibit is active,




Auxiliary function with compulsory acknowledgement is active



one of the following states is active, or more than one state has occurred.

- Channel feedrate 0
- Program stop (M0/M1)
- Feed hold
- Feed inhibit
- Customer stop
- Movement stop for channel synchronization
- Waiting for axis during axis transfer
- Waiting for permanent variables
- Waiting for interface signal (active block)
- Waiting for interface signal (block preparation)
- Waiting for MCODES command

To determine which of these states is active, switch over to the channel dialog using the dialog key .

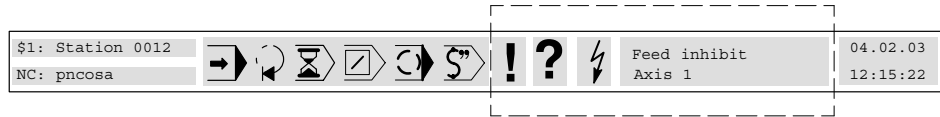
Select the “Channel waiting states” soft key. A list of all active waiting states is displayed (refer to section 4.8.2).

Man-machine interface (MMI)

4.2.2 Information on the overall status (all channels)

In the event of an error, the NC status line shows symbols for all channels, regardless of any filter functions, together with a text from the machine status display (MSD) area.

Detailed information can be called up in the Info window.



Message is active,

Field with **green** background
– flashing or static –



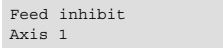
Warning is active,

Field with **yellow** background
– flashing or static –



error or system error is active,

Field with **red** background
– flashing or static –



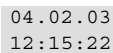
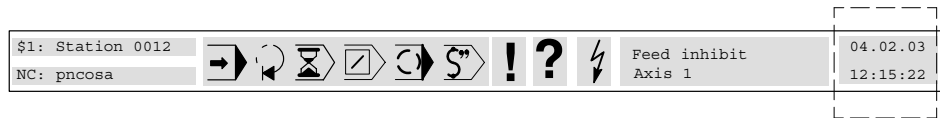
Instruction window

for the pending messages (field with green background); warnings (field with yellow background), or errors (field with red background)

Meaning of the **static** or **flashing** displays:

- **flashing:** The info window has not yet been opened after the event has occurred.
- **static:** The info window has already been opened and closed again after the event has occurred.

4.2.3 General information (date, time)



Field with green background:

- current date and time stored in the control unit




If the user level is higher than “User” the current user level replaces the date.

Example: Developer 12:34:43

Man-machine interface (MMI)

4.3 NC display window

 The purpose of the following screen displays is to explain the structure of the windows only. The contents of the display or the softkey layout depends on the current status or operating mode of the control unit and can therefore differ from your current control unit display.

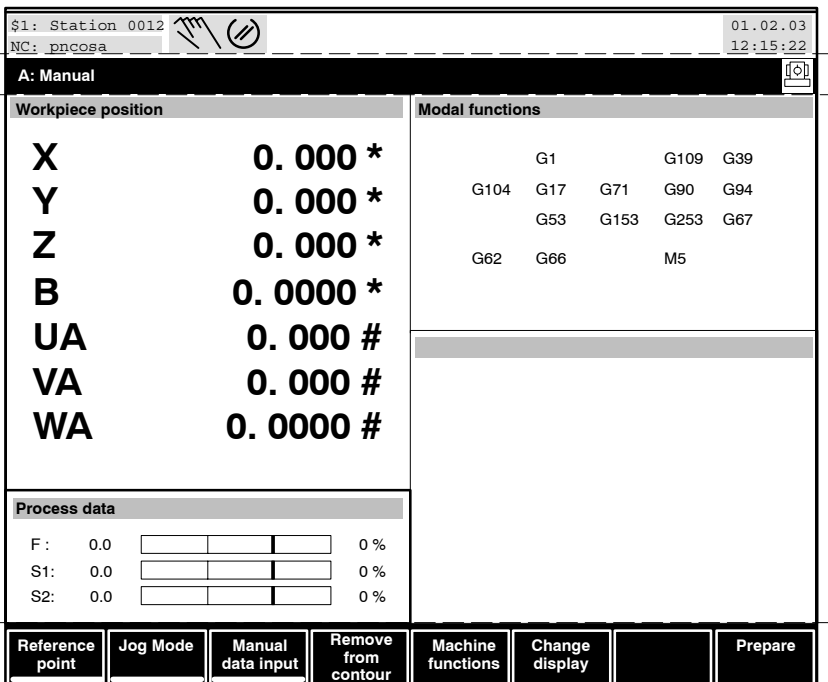
The user interface of the control system has two completely separated NC display windows (Window "A:" and "B:"). You can toggle between these windows as required.

Thus, it is possible to display and also operate 2 processes on the CNC in different windows (e.g. process 1: machining a work piece, Process 2: loading/outputting files or creating/changing a program). For alternating between the two windows, refer to section 4.3.3.

Every NC display window is divided into 2 main areas:

- 1 header line and
- 2 Data area.

NC display window



The screenshot shows the 'A: Manual' window with the following content:


Workpiece position		Modal functions		
X	0.000 *	G1	G109	G39
Y	0.000 *	G104	G17	G71 G90 G94
Z	0.000 *	G53	G153	G253 G67
B	0.0000 *	G62	G66	M5
UA	0.000 #			
VA	0.000 #			
WA	0.0000 #			

Process data				
F:	0.0	<input type="text"/>	<input type="text"/>	0%
S1:	0.0	<input type="text"/>	<input type="text"/>	0%
S2:	0.0	<input type="text"/>	<input type="text"/>	0%

Reference point	Jog Mode	Manual data input	Remove from contour	Machine functions	Change display		Prepare
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Man-machine interface (MMI)

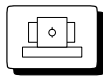
4.3.1 Title bar of an NC display window

A: Diagnosis / Machine / MSD 

In the title bar, the control unit displays the name of the NC display window ("A:" or "B:"), the "path" up to the currently active softkey level and the currently set main menu (to the right, as symbol).

A "Path" in this sense refers to the sequence of the softkeys to be pressed in order to reach the active level. Only the last softkeys are displayed if there is not enough space for the complete path display. The path entry, in this case, is prefixed by "...".

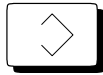
Symbols of the main menus:



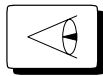
MANUAL



AUTOMATIC




MANAGE



DIAGNOSIS

An overview of functions of the individual main menus can be found from section 5.1 onwards, "Main menus".

 **Generally, the main menus "MANUAL" and "AUTOMATIC" contain channel-specific information. The main menus "MANAGE" and "DIAGNOSIS" contain information about all channels.**

4.3.2 Data area of an NC display window

The data area is designed according to the set size of the NC display window, the current main menu and partially also the active softkey level. You can find out how to change the size of an NC display in section 4.3.4.

Man-machine interface (MMI)

4.3.3 Change-over between the NC display windows “A” and “B”

Generally, after the start-up of the control system, the main menu “MANUAL” is displayed in the NC display window. The NC display window takes up the entire width of the screen. The second NC display window (“B:”) remains covered by window “A” in this state.



The “Push/Pop” key always brings the NC window which is currently not visible into the foreground.

If both NC display windows are reduced to the size of half of the screen and consequently simultaneously displayed, this key activates the currently inactive window.



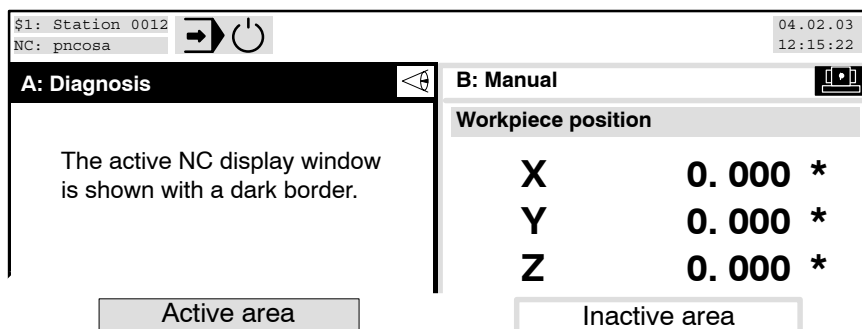
Keyboard entries and the softkey line displayed always apply to the active NC display window. An active window is displayed with a bold outline (also refer to the following monitor display).

4.3.4 Changing the size of the NC display window (mode change-over)



You can switch between the “entire screen width” and “half screen width” of the NC display windows.

“Half screen width” displays both NC windows side by side. “Entire screen width” displays one window behind the other (the window in the background is covered by the one in the foreground in this state).



The control unit normally only displays the left half of the NC display window in the “half screen width” state.



If you wish to see the right half of an NC display window, you must first activate the NC display window with the “Push/Pop” key.



You can then alternate between the left and right half with the “Zoom/Window function key”.



Note that 2 NC display windows are generally available.

Man-machine interface (MMI)

4.4 Softkey area

The control unit always displays the current layout of the F1 to F8 function keys in the softkey area **in relation to the active NC display window**. This display of the softkeys is called the “softkey line”, “softkey level” or “operating level”.



When a softkey is pressed, the relevant display area appears for a short time in reverse video to signal the execution of a command. Not all of the softkeys in a softkey line have to be assigned functions.

4.4.1 Softkey types

The response of the control unit to a softkey which has been pressed varies depending on the function of a softkey. The way in which a softkey is displayed can help you to obtain general information about its function.

Hence, the control system can display softkeys of the control system in different ways (for example, the following softkey labels represent other possible texts):



Normal softkey

The control unit jumps to a different softkey level or opens a dialog box after you press a softkey of this type.



Enter Softkey

Softkeys with a double frame can also be operated by pressing the <enter> key.



Function softkey

The softkey text is underlined. You directly trigger a function with this softkey.



CAUTION

Data can thus be modified or deleted. The function is executed without any previous request for confirmation!

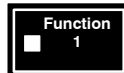
Man-machine interface (MMI)



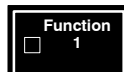
Combination of an **Enter softkey** and a **Function softkey**

**CAUTION**

Data could be changed or deleted in some form or other here. The function is executed without any previous request for confirmation!

**Check softkey**

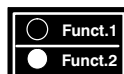
You select or deselect a function by pressing this softkey. '■' indicates the selected function.



An operating level (softkey line) can contain several check softkeys whose functions can be selected or deselected independent of each other (m from n selection).

**Radio Softkey**

You can only select one from several of these softkeys at an operating level (1 from n selection). '●' indicates the selected function.

**Example:****Toggle Softkey**

You can switch between two functions by pressing this key. '●' indicates the selected function.

**Dimmed softkey**

This function is basically permitted, but cannot be executed in the current control unit status.

4.4.2 Standard softkeys

The softkeys listed below are those which have been assigned standard functions:

**"OK" softkey**

The response depends on the current state. This key is usually used to acknowledge an entry. The control unit checks internally whether the entry appears to be logical. The control unit issues an error message if this is not the case. This softkey can also be activated by pressing Enter.

**"Yes" softkey**

You answer a query with "Yes".

Man-machine interface (MMI)



”No” softkey

You answer a query with “No”.



”Cancel” softkey

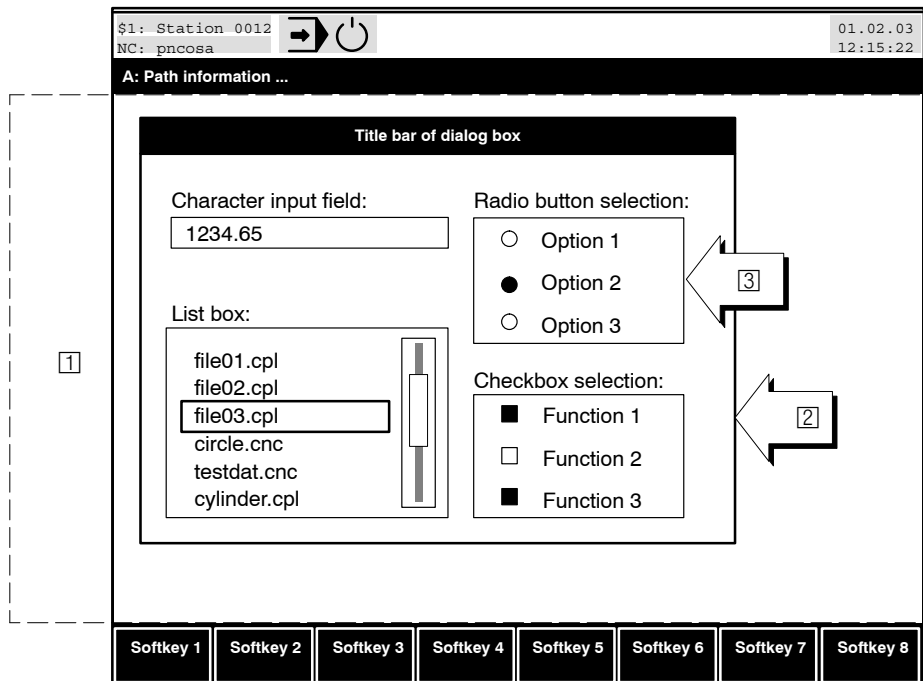
You discard an entry which you have just made or cancel an action which you have selected and return again to the defined initial status. Entry changes are not activated.

4.5 Dialog box

You may have to enter more precise specifications for the control system for executing a softkey function. For this purpose, the control system opens a “Dialog box” (2) in the data area (1) of the NC display window. You can make the entries in this box. The structure and contents of a dialog box vary from case to case, depending on the information required.

The dialog box contains either one or several objects. A number of objects between which, from the user’s point of view, a logical connection exists (e.g. radio button selection), can be combined within an “object group”(3). This may possibly be indicated by a surrounding rectangle in the screen display. In section 4.5.2, “Components of a dialog box” you can find a description of all the objects or object groups used.

The dialog box displayed below is just an example.



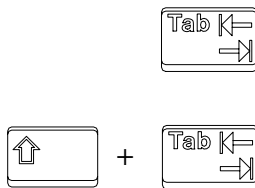
Man-machine interface (MMI)

4.5.1 Navigation within a dialog box

Since a dialog box contains one or more objects that can be influenced (text entries, selection of files or functions etc.), you must first select the desired object (set focus).

An object, on which a focus has been set, is framed by a black rectangle. Character input fields are displayed with a bold outline.

The focus can be set in different ways:



<tab>

You select all available objects in succession. The control unit internally decides the sequence of selection of the objects. You cannot change it.

<shift>+<tab>

Functions like <tab>, but with one difference: If there are several object groups in a dialog box, you always select, in sequence, the first object of an object group only. This facilitates a more rapid selection of the required object in a dialog box containing many object groups.

The control unit internally decides the sequence of selection of the objects. You cannot change it.

<left> <right>

You select each neighbouring object.

<down> <up>

 **Some objects may be dimmed in the display. This indicates that their function cannot be executed in the current condition of the control system. Objects such as these cannot be selected.**

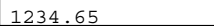
Example: normal object: Function 4 dimmed object: Function 4

There are several ways of quitting a dialog box:

- Save entries: Press the “OK” softkey or the <enter> key
- Discard changes: Press the “Cancel” softkey or the level return key

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4.5.2 Components of a dialog box



Character input field: Entering text or numbers.
This field is used to enter file names or numerical values.

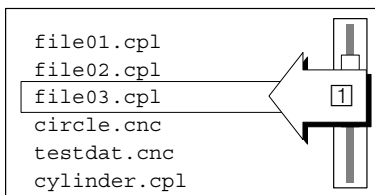
The <ins> key allows you to switch between the overwrite mode and the insert mode in the input field:

Bar cursor '|': Insert mode

Block cursor '■': Overwrite mode

The <backspace> key deletes the character to the left of the cursor.

The key deletes the character behind or to the right of the cursor.



List box: One or several lines can be selected from a list. Preference is given to the use of list boxes if you are selecting from a **variable** number of options (e.g. selection of one or several files within a file directory).

★ Selecting/deselecting a number of list lines in sequence:

3. Position the focus on the list box (only necessary in the case of dialog boxes containing a number of object groups)
4. Press $\blacktriangledown\blacktriangleup$, <pgup>, <pgdn>, <home> or <end> to move the focus (\square) to the desired line within the list.
5. Select/deselect the line with the <sel> or <space> keys (a line that has been selected from a list is displayed in reverse video)
1. In the case of active Multiple Selection (refer to “Multiple Selection” softkey, section 8.2.1) continue with point 2 until all desired entries have been selected.

If multiple selection is not active, only “Single selection” is possible. The control unit then automatically selects the line on the list to which the focus has been set.

\square **A number of selected lines can be deselected all at once by pressing the key.**
If in the case of active multiple selection a list line has not yet been selected, you can select all lines by pressing the key combination <shift>+<space>.

★ Selecting a complete range of lines from a list (only possible in the case of active multiple selection):

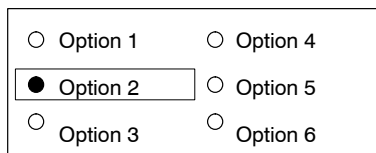
1. Position the focus on the list box (only necessary in the case of dialog boxes containing a number of object groups)
2. Press $\blacktriangledown\blacktriangleup$, <pgup>, <pgdn>, <home> or <end> to move the focus (\square) to the beginning of the desired range of lines within the list.

Man-machine interface (MMI)

3. Select the line with the <sel> or <space> keys (a line that has been selected from a list is displayed in reverse video)
4. Press \blacktriangleup , <pgup>, <pgdn>, <home> or <end> to move the focus (\square) to the end of the desired range of lines within the list.
5. All of the list entries in the specified range are now selected when you press the <shift> + <space> keys

★ **Deselecting a complete area of list lines (only possible in the case of active multiple selection):**

1. Position the focus on the list box (only necessary in the case of dialog boxes containing a number of object groups)
2. Press \blacktriangleup , <pgup>, <pgdn>, <home> or <end> to move the focus (\square) to the beginning of the desired range of lines within the list.
3. Deselect the line with the <sel> or <space> keys (a line that has been deselected from a list is displayed normally again)
4. Press \blacktriangleup , <pgup>, <pgdn>, <home> or <end> to move the focus (\square) to the end of the desired range of lines within the list.
5. All of the list entries in the specified range are deselected when you press the <shift> + <space> keys

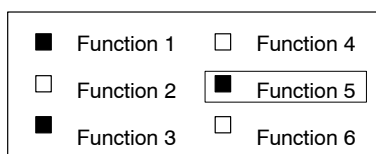


Radio buttons: Only one function can be selected here from a number of options which always remain constant ("1 from n" selection).

★ **Selection:**

1. Set the focus accordingly with the \blacktriangleup \blacktriangledown \blacktriangleleft \blacktriangleright cursor keys or with the <tab> key.
2. Select the option with the <sel> or <space> keys (is indicated by ●).

Another previously selected object is automatically deselected.



Checkbox(es): One or several (e.g. varied) functions can be activated or deactivated completely separately of each other from a list of options which always remains constant. This corresponds to an "m from n" selection.

★ **Activating/deactivating functions:**

1. Set the focus accordingly with the \blacktriangleup \blacktriangledown \blacktriangleleft \blacktriangleright cursor keys or with the <tab> key.
2. Activate/deactivate the function with the <sel> or <space> keys (an activated function is marked by a ■)
3. Continue with 1 if other functions are to be activated or deactivated.





Man-machine interface (MMI)

4.5.3 Moving a dialog box

Sometimes it is necessary to shift a dialog box on a screen (e.g. if the appearance of the dialog box covers the information).

★ **Proceed as follows to move the dialog box:**



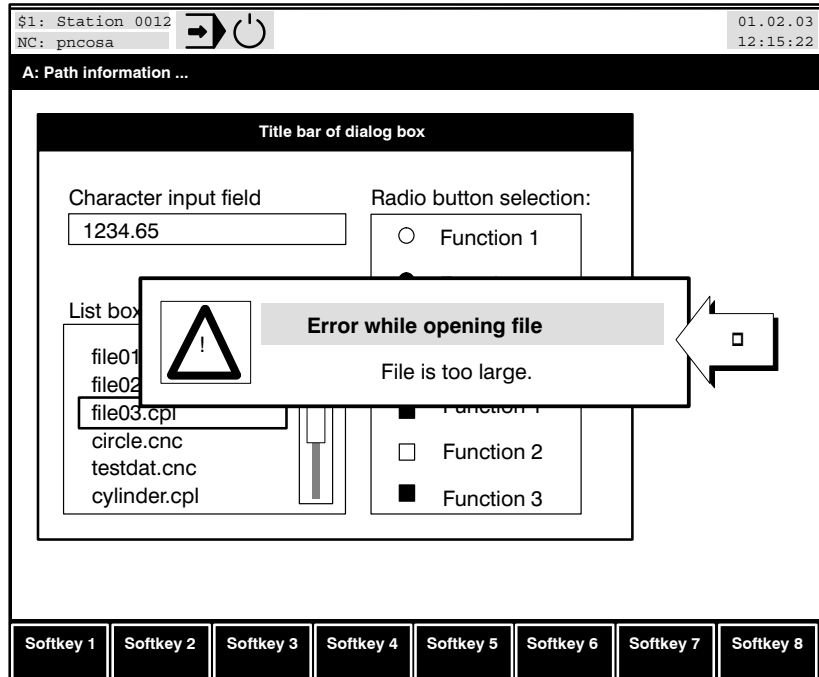
1. Press the “Zoom/Window” function key while the dialog box is being displayed
2. In the softkey line, choose the size of the steps in which the dialog box is to be moved (“>“: small; “>> ”: medium; “>>>”: large)
3. Position the dialog box appropriately with the     cursor keys
3. Press the “Zoom/Window” key again to exit the move mode.

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4.6 Pop-up windows

“Pop-Up windows“ [1] are used by the control unit to display errors, warnings and messages that were triggered by active entries.

Example:



The way in which a pop-up window is closed depends on the type of information contained in this window:

- **The user should not take any decision.** He is only to be informed of the facts. Closing the pop-up windows by:
 - pressing the “OK” softkey or
 - pressing level return key, or
 - changing to an other group operating mode.

Examples:

- While opening a file, the control unit establishes that the file is too big for the editor.
- While trying to print, the system establishes that the printer is not switched on.

- **The user must take a decision.**

Close the pop-up windows by:

- selecting one of the responses displayed in the softkey line (e.g. softkey “Yes”, “No”, “Cancel”) or
- changing to an other group operating mode.

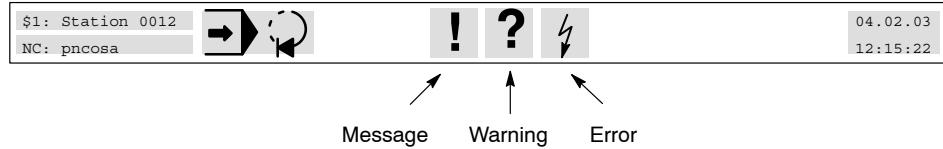
Example:

- You have changed a file, for example, and leave the editor. In this case, the control unit queries if you really wish to discard the changes or not.

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4.7 Info window

During an error, a warning or a message, the corresponding symbol is displayed independent of the selected channel and the filter function (refer to section 4.7.3) in the NC status line. Detailed information can be called up in the Info window.



- Flashing symbol: The Info windows was not opened after the occurrence of the event.
- Symbol is not flashing: The Info windows was already opened after the occurrence of the event.



Press the „Info“ button to open the Info window [1].

The screenshot shows the 'Info' window interface. At the top, it displays '\$1: Station 0012', 'NC: pncosa', a power button icon, a question mark icon, and the date/time '01.02.03 12:15:22'. Below this is a header 'Info' with sub-headers 'Errors', 'Warnings', and 'Messages'. A table lists events with columns: No, \$, Date, Time (ms), and Description. The first row is highlighted in black. Below the table is a section 'Selected information item' showing details for the selected event. At the bottom are buttons for 'Error', 'Warning', 'Message', 'Update', 'Display details', 'Display last info', 'Delete info', and 'Set filter'. Annotations on the left side point to various parts of the window:

- Indicates which event groups are displayed (also refer to page 4-25) - points to the sub-headers.
- Column headers - points to the table headers.
- No: Error number
- \$: Channel in which the event has occurred
- Date: Date on which the event has occurred
- Time: Time at which the event has occurred
- (ms): Milliseconds. Additional time information
- Description: Information for the event

Numbered callouts in the screenshot: [1] points to the 'Info' button in the top bar; [2] points to the table of events; [3] points to the 'Selected information item' section; [4] points to the details of the selected event.

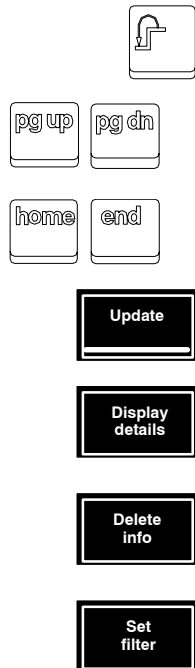
Several events that have occurred are presented in the form of a list in the display area [2]. Select a list entry with the \blacktriangleup \blacktriangledown cursor keys. Additional information about the selected event in the list is displayed in the area [3] and [4].

At this point you can

- **exit** the Info window by confirming a main menu key.
- **close** the Info window with the “Info” key (the control unit returns to the operating level which was last active)



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- **return** to the **start screen** of the Info window using the level return key
- **browse** with the keys <pgup> or <pgdn> **page by page** through the list if all entries do not fit on one single screen.
- **jump** to the **top of the list** or to the **end of the list** with the <home> or <end> keys
- **update the screen** by means of the “Update” softkey (if new events have occurred since the Info window was opened)
- with “Display details” softkey, refer to section 4.7.2
- **delete** warnings, messages or even all list entries by means of the “Delete Info” softkey.
- with “Set filter” softkey, refer to section 4.7.3 and section 10.3.

4.7.1 Display the events that occurred last

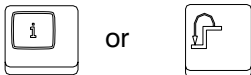


Using the “Display last info” softkey in the highest operating level of the Information window, the control system displays the errors, warnings and messages that occurred **last** together with:

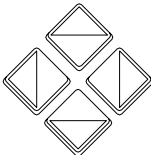
- Events in plain text
- Event number
- Event class in plain text
- Channel in which the event occurred and
- Time the event occurred.

 **This display is automatically updated when a new error occurs.**

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or



At this point you can

- **close** the Info window with the level return key or the "Info" key (the control unit returns to the operating level which was last active)
- **exit** the Info window by confirming a main menu key.
- **select** one of the info windows "Last error", "Last warning", or "Last message" (marked by a frame around the window in question) and move the cursor keys within the window text in order to read information outside the visible range.

Returning to the highest operating level of the Information window by pressing the "OK" softkey.



For more information on "Display error details" softkey, refer to section 4.7.2



For more information on "Display warning details" softkey, refer to section 4.7.2

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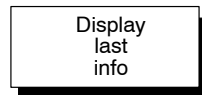
4.7.2 Display details

Details of the last occurred events

Selection:



F6



For detailed information about the last occurred events, select the soft-keys:

“Display error details”, or

“Display warning details”.

The “Display details” window appears:

Selected information item

The screenshot shows the 'Display details' window with the following content:

Last error	
⚡	<p>Program selection error "/usr/user" is a file directory. -> RESET</p> <p>Number: 1341 Class: Part program error Channel: * 1 Date: 30.07.01 Time: 12:14:22</p>
Reason	
An inexistent part program was selected	
Recovery	
Repeat program selection for a program	

The window also features a status bar at the top with station information (\$1: Station 0012, NC: pncosa) and a date/time display (01.02.03, 12:15:22). At the bottom, there is an 'OK' button and several other unlabeled buttons.

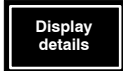
The control system provides more information on **errors** and **warnings** in the form of

- explanation of the **reason**
- instructions for **recovery**.

Man-machine interface (MMI)

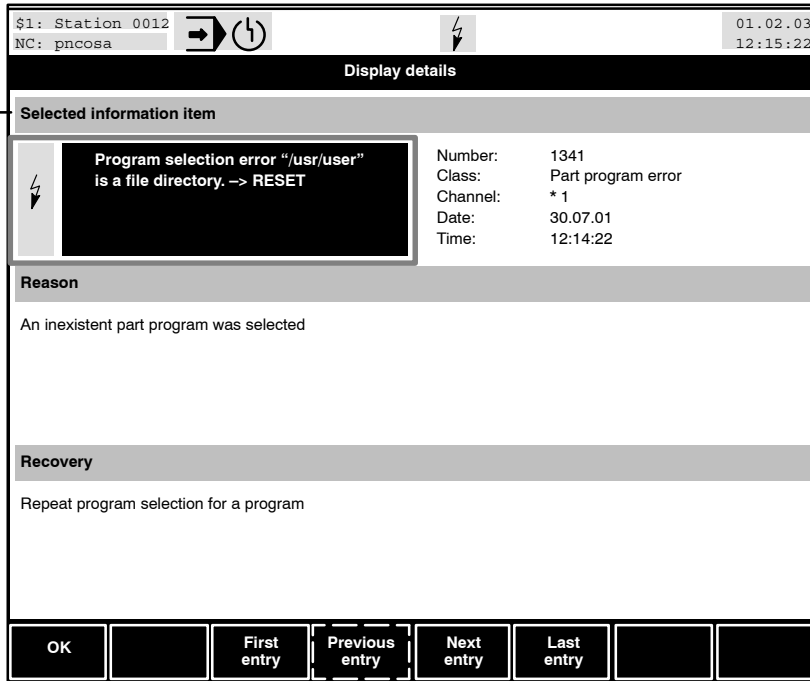
Details of messages, errors and warnings in the Info window

Selection:



Select an event in the list of events in the Information-window and press the "Display details" softkey. You will then get additional information about the reason and recovery:

Selected information item



At this point you can



Return to the highest operating level of the Information window by pressing the "OK" softkey.



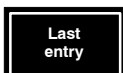
Go to the beginning of the events list with the "First entry" softkey and have detailed information about the first event displayed.



Have detailed information about the previous event displayed with the "Previous entry" softkey.



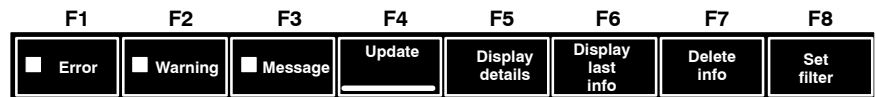
Have detailed information about the next event displayed with the "Next entry" softkey.



Go to the end of the events list with the "Last entry" softkey and have detailed information displayed.

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4.7.3 Configuring the scope of the display



At this point you can



- display or mask **errors** in the list



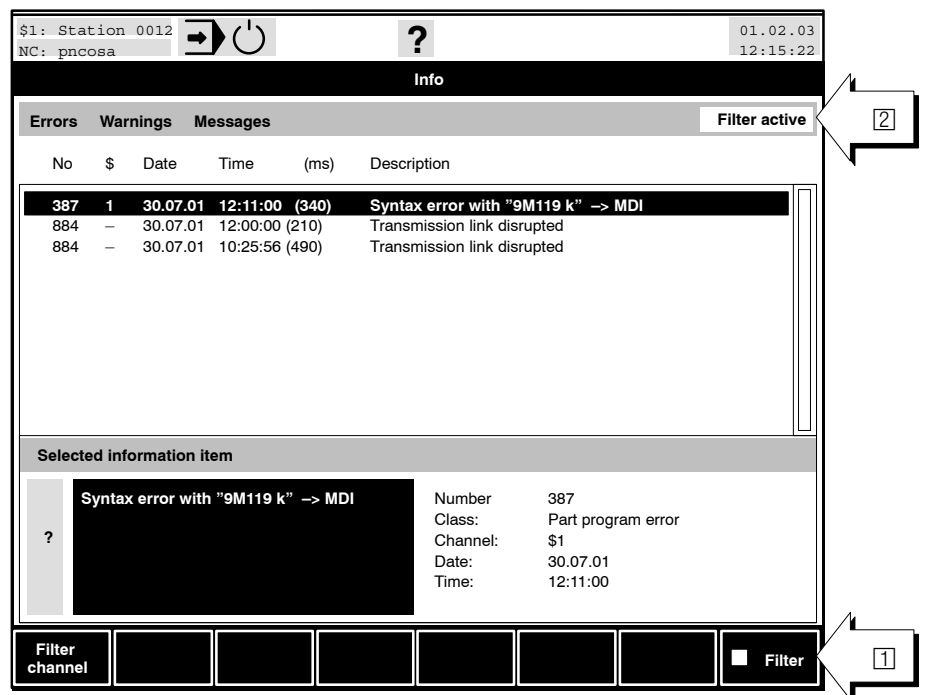
- display or mask **warnings** in the list



- display or mask **messages** in the list



- The "Set filter" softkey determines the scope of display specific to the channel. You can select whether the events of **all** or **individual channels** should be displayed. You reach the next softkey level (see diagram):



At this point you can

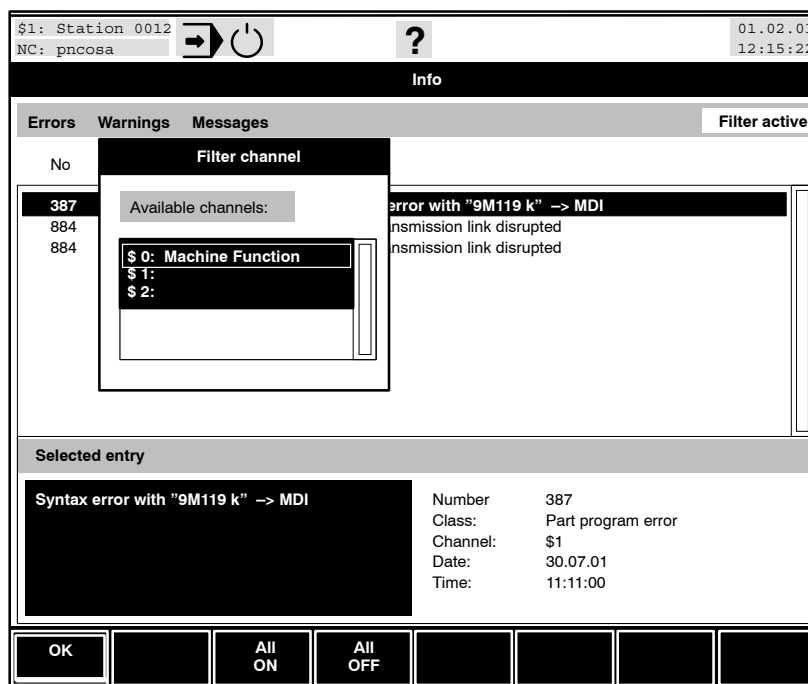


- determine the channel(s), for which the events should be displayed in the Information window using the "Filter channel" softkey. The selection is not active as long as the "Filter" softkey is inactive. Select **individual** channels in the dialog menu "Filter channel" with the \blacktriangledown \blacktriangle cursor keys and the <space> key.



- activate the filter with the "Filter" 1 softkey. In addition to this, the **active** filter function is displayed in the right corner of the "Event group display" (errors, warnings,...) with the note "Filter active" 2.

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
By pressing the “Filter channel” softkey “you can

- **confirm all changes** in the dialog box with the “OK” key, close the dialog box and **return to the previous operating level**
- select all channels in the list
- disable all selections.

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4.8 Channel dialog

The control unit can manage several channels (channel: all axes belonging jointly to one machining process) entirely independent of each other in terms of control. With the channel dialog key you enter the "Channel dialog". You can switch over to every desired channel for executing operations or making entries.

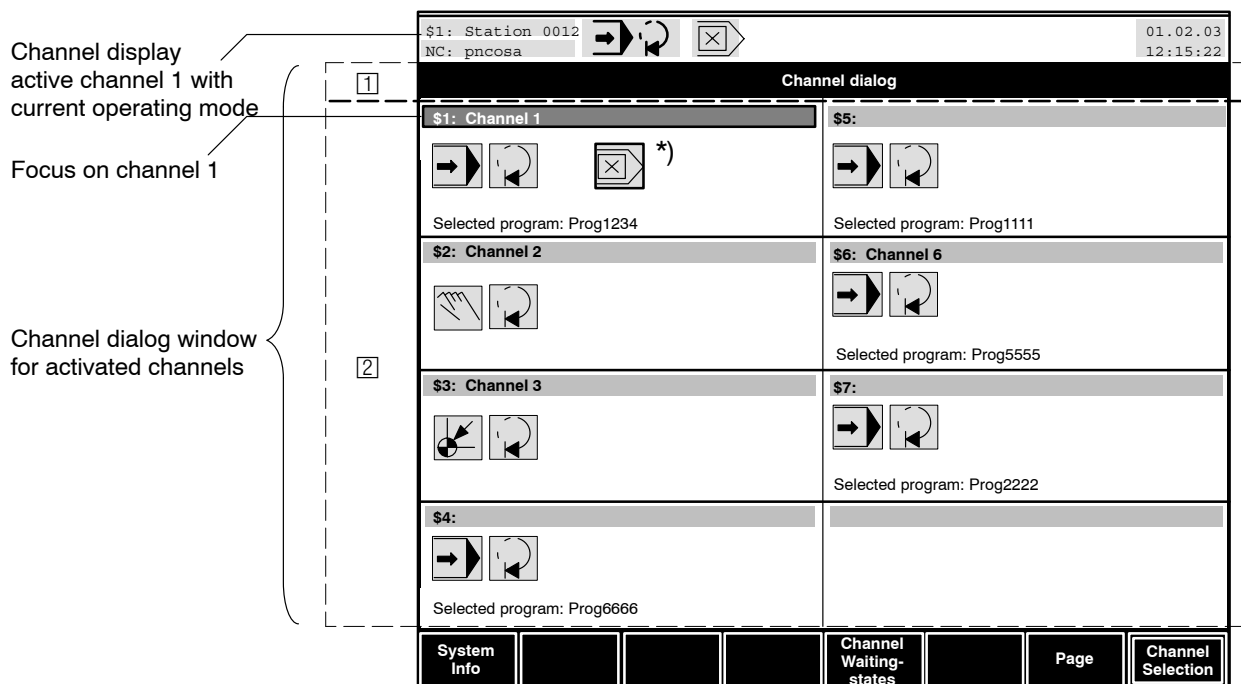
- **Select** channel dialog with the key 

- **Deselect** channel dialog with the key  .

4.8.1 Channel dialog window

Pressing the channel dialog key will open the channel dialog window. It is divided into 2 areas:

- 1 header line and
- 2 channel display



*) Block transfer inhibit



If more than 8 channels are available, these are displayed with the "Page" softkey.

All applied channels (up to 8 channels per page) are displayed in the channel dialog window.

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While opening the channel dialog window, the focus is set on that particular channel, which is currently active with reference to the user interface (can be identified with the channel display to the top left side!) The focused channel is symbolised with a rectangle having a black border and a coloured background.

All the displayed channels provide information about the current status:

- Display of the channel number and channel name/processing unit
- Display of the current main menu and operating condition for every channel
- Display of the channel-specific waiting states via the “waiting states channel x” dialog menu (e.g. dwell time, block transfer inhibit, auxiliary functions with compulsory acknowledgement, ..).
- Display of the name of a currently running NC program in every channel, in which such a program is selected.
- Display of part program messages if less than 5 channels are available
- Display of the symbols during general inhibit:
active: green
Inactive: yellow

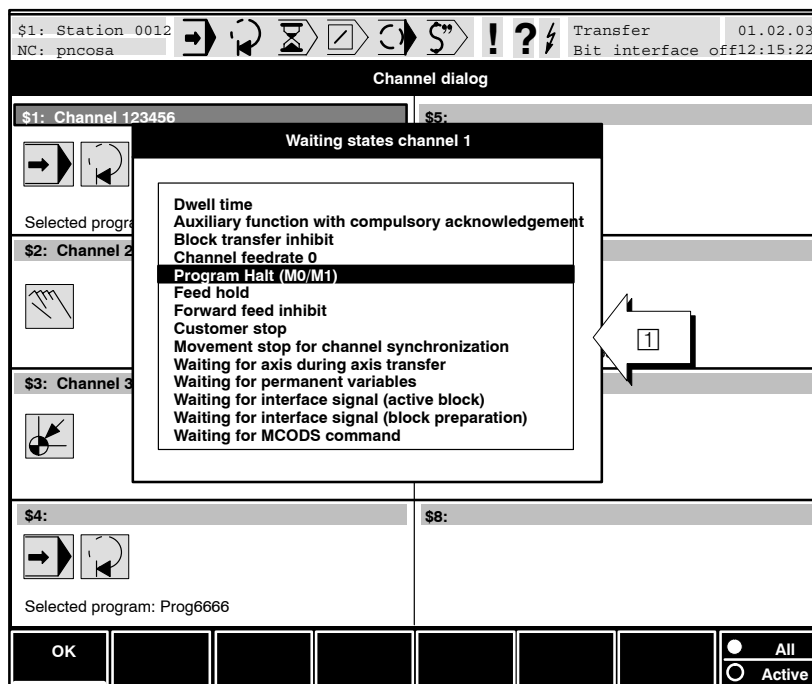
Man-machine interface (MMI)

4.8.2 Display channel waiting states

When the symbol “**Channel waiting**” appears, you can display the active channel waiting states in a list.



The waiting states of the channel in focus are displayed with the “channel waiting states” softkey :



You may:



press the „All/Active“ toggle softkey to

- display **all** waiting states that can currently be presented, where the active waiting states are highlighted
- display only **active** waiting states

By pressing the key, you can alternate between the two modes.






By pressing the “OK” softkey you can return to the uppermost operating level of the channel dialog window.

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4.8.3 Switching over to another channel

Changing channel over in channel dialog window

In the channel dialog window, **select** the channel, to which you wish to

switch over with the cursor keys, the tab key  or  + . After the selection is complete, the focus is set on the new channel.





 **You cannot switch over to the channel by merely selecting the same!**



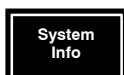
You can switch over from one channel to another only with the “**Channel selection**” softkey or with the **Enter key**. The channel dialog window then closes automatically and the display returns to the dialog status of the previously selected channel.

Change over channel from other operating levels

You may switch between channels at **any** operating level

- Call the “Select channel” dialog menu with the  +  keys, and enter the “channel number” **or**
- press the channel dialog key  and further operations in the channel dialog window **or**
- directly via hotkeys with the  + <number of the channel> for channels 1 to 4.
- in the main menu DIAGNOSIS via the “Select channel” softkey or via <alt> + <channel key>, refer to section 10.2.

4.8.4 System Info



On pressing the “System Info” softkey in the channel dialog, the system Information window  appears.

The following are displayed depending upon the selection (axes or spindles):

- The applied axes (SK: system axes)
- The applied spindles (SK: system spindles)
- The applied channels (SK: channel overview)

Man-machine interface (MMI)

You can call up:

- **system axes:** The system information window shows the allocation:
Axes → physical and logical addresses → channels

System axes

Channel display: active channel 1 with current operating mode

\$1: Station 0012
01.02.03

NC: pncosa
12:15:22

Channel dialog

Existing system axes

Axis no.	Phys.name	Log.name	Channel no.	Mach.pos.
1	X	X	1	0.000
2	Y	Y	1	0.000
3	Z	Z	1	0.000
4	X2	X2	2	0.000
5	Y2	Y2	2	0.000
6			-	0.000

Axis state Axis: X

▶
⏪
⏩
⏹

Rest: 0.000

Actual pos.: 0.000

Lag: 0.000

F: %

Axis configuration Axis: X

Chan.name: Chan.: 1

Axis move. type: linear

Axis funct. type: Feed axis

System axes

System spindles

Channel overview

Symbols 1..4

Window 2: "Axis state Axis" with axis-specific information:

- Symbol 1: Current mode
- Symbol 2: Travel command
- Symbol 3: Feed inhibit
- Symbol 4: Axis has been referenced
- Distance to go
- Actual position
- Lag
- Axis override

Window 3: "Axis configuration Axis" with axis-specific and channel-specific information:

- Name of channel, on which the axis runs
- Number of channel, on which the axis runs ("—" = auxiliary axis)
- Type of axis movement (linear, rotary, endless, ...)
- Axis function type (feed axis, auxiliary axis, ...)

☞ **Information about the system of physical and logical addressing of axes in different channels is available in the "DIN Programming manual".**

Man-machine interface (MMI)



- **System spindles:** The system information window shows the allocation:
Spindle no. → Drive function type → Drive no. → Spindle group.

Channel display:
active "channel 1" with
current operating mode

Existing spindles				
Spindle no.	Drive funct. type	Drive no.	Spindle group	Sp. speed
1	Spindle/C axis	7	1	0.0
2	Spindle	8	0	0.0

Status		Spindle 1		Utilization rate		Spindle 1	
S1:	0.0		0%				%
S1i:	0.0		0%				%

Symbols 1..4

Window [2]: "State spindle n" with spindle-specific information:

- Symbol 1: Movement function (Clockwise/counter-clockwise run with/without cooling, stop, orientation)
- Symbol 2: Spindle inhibit (on/off)
- Symbol 3: Gear range selection (automatic/manual)
- Symbol 4: Gear range (1-4, neutral)
- Programmed speed
- Override
- Actual speed

Window [3]: "Utilization rate spindle n" displays the utilization rate of spindle motors when the Servodyn-D drives are used.

Man-machine interface (MMI)

- Channel overview: provides information on available channels.

Channel display: active channel 1 with current operating mode

Focus on channel 1

Channel dialog window for activated channels

Channel ID	Selected program
\$1: Channel 1	Prog1234
\$2: Channel 2	
\$3: Channel 3	
\$4:	Prog6666
\$5:	Prog1111
\$6: Channel 6	Prog5555
\$7:	Prog2222

System Info | Active Funct. | Process state | Program Status | Channel state | Page | Channel Selection

Man-machine interface (MMI)

4.9 Controlling the behavior of the standard man-machine interface (MMI)

 **Settings on the standard MMI are reserved to qualified personnel.**

4.9.1 Start parameters of the MMI

The standard man-machine interface of the PNC is started in MS-Windows using the **startbof.bat** batch file.

“startbof.bat” first calls up the X Server (**xsvstart**) which is required for the man-machine interface, and then activates the actual MMI application **dabwin32**.

“dabwin32” controls the behavior of the standard MMI through the following **call parameters**:

Standard parameter	Meaning	Comment
-target	<Host name or IP address of the PNC>	–
-bwm -nc1[:channel no.] -nc2[:channel no.]	Starts the MMI with the window manager (bwm) and the NC display windows: nc1: NC display window A nc2: NC display window B The channel no. indicates the channel to be generally visualized in an NC display window after booting.	If only one NC display window is needed, call parameter -nc2 need not be entered. If no channel no. is specified, the NC display window shows channel 1.
-restart	When the connection has been interrupted by the PNC after a system restart or turning the PNC off, the “dabwin32” application is automatically restarted.	
-size <Window size in pixels>	Visualisation of the man-machine interface with the following resolutions: ● 640 x 480 or ● 800 x 600 pixels	Default: 640 x 480 pixels, unless another parameter has been specified.
“ -? or -h	Displays a dialog box containing a description of the call parameters in abbreviated form.	

Man-machine interface (MMI)

Standard parameter	Meaning	Comment
-port <Port number>	Port number of the PNC to which you want to connect. This parameter is used to distinguish between several PNC emulations running on a single PC. Each emulation is started with its own port number.	Default: Port 10099, unless another parameter has been specified. The PNC's port number is always 10099.
-timeout <Timeout in seconds >	Timeout for synchronous NCS requests (1..32767)	Default: 300 seconds, unless another parameter has been specified. For standard applications, this parameter should not be modified.
-display <Display name of the PC panel >	Display MMI on another PC.	This parameter is not needed, unless the MMI is not to be displayed on the same PC on which it is started.
-nox	Prevents dabwin32 from starting the X Server.	For service purposes only
-notimesync	Prevents the MMI from synchronizing the PNC system time with the system time of the PC panel.	
-nonfsmount	Prevents the MMI from performing NFS mounting during start-up.	The PNC tries to connect the specified NFS directories during start-up. If this is not possible for some reason (e.g. NFS server not available), mounting is attempted again while starting the MMI.
-nomsgicon	Prevents the display of "Programmed operating instructions" (MSG) through the Information symbol in the NC status line.	
-markeractchan <marker>	This parameter has the effect of informing the PLC through the channel active in the MMI. For this purpose, a byte containing the respective channel number is written to the specified marker.	The MMI and the active channel might not be visible: <ul style="list-style-type: none"> • A menu might currently be active in the MMI that applies to all channels • The MMI window may be covered up by other windows or minimized in the status line. • The MMI might already have been exited.

Man-machine interface (MMI)

Standard parameter	Meaning	Comment
-noexitbox	Immediately exits the MMI without an additional query or confirmation when the PNC has cut off the link (system restart or PNC has been switched off). This is relevant only if no automatic restart (-restart) has been configured for the MMI.	Default: Parameter "-noexitbox" is not set: The MMI displays a dialog box containing the message "Stream connect closed from server at ..." when the link has been interrupted. MMI is exited upon acknowledgement of this dialog box.
-keybox	The MMI window is supplemented by a box containing the special keys of the PC control panel. Clicking on a button in this box has the same effect as operating the corresponding key.	This box may be used if no osa keyboard is available.
-keybox2	Identical function as -keybox, but larger with additional special keys.	
-logsync	Records all synchronous NCS requests (communication test with PNC).	A separate file is generated for each process in the MMI to which the recording data is written. <ul style="list-style-type: none"> • Window manager (Dab_BWM), • NC display window A (Dab_NC1), and • NC display window B (Dab_NC2) The filename consists of the PNC host name and the name of the MMI process. Example: pncDab_BWM
-logasync	Records all asynchronous Ncs requests (communication test with PNC).	The same data is recorded as for synchronous recording.

Example:

```
dabwin32 -target pncosa -bwm -nc1 -nc2 -restart
```


Man-machine interface (MMI)

4.9.2 Configuring customer-specific softkeys

In the DIAGNOSIS menu, the first softkey can be assigned customer-specific functions. For this purpose, one of the following three functions and a suitable text are input for the softkey.

Parameterizing the **function**:

Parameter	Meaning	Comment
-custmin	Minimize MMI window	
-custexit	Exit MMI	
-custforeground <Window title>	Gets the window into the foreground whose title bar contains the string specified in <Window title>.	The <Window title> string must be unique , otherwise, several windows would be brought into the foreground one after the other. Rules applying to <Window titles> <ul style="list-style-type: none"> • The first character must not be “-“ • The text must not contain any blanks.

Parameterizing the **softkey text**:

Parameter	Meaning	Comment
-custsfk <Softkey text>	Entering text in <Softkey text>: Example: -custsfk Exit\nDialog	Rules applying to the softkey text: <ul style="list-style-type: none"> • The first character must not be “-“ • The text must not contain any blanks. • Maximally 3 lines, line feed is programmed as “\n”. • 11 characters per line at maximum • 35 characters for the entire string at maximum

Example 1:

Exiting the man-machine interface:

```
dabwin32 -target pncosa -bwm -nc1 -nc2 -restart -custexit -custsfk Exit\nDialog
```

Example 2:

Get window entitled “MyWindow” into the foreground:

```
dabwin32 -target pncosa -bwm -nc1 -nc2 -restart -custforeground MyWindow -custsfk Get\nMyWindow
```

Man-machine interface (MMI)

Notes:

Main menus

5 Main menus

The operating level structure of the control system is subdivided into **Main menus**. A main menu includes all operating levels or functions which can be required or could be useful for a specific task on the machine or the control system.

Different main menus may be active in the two NC display windows (refer to page 4–9).

You can always alternate between the menus by pressing the "menu keys".

The information shown in the main menus

- MANUAL
- AUTOMATIC

is (generally) **channel-specific**.

The information shown in the main menus

- MANAGE
- DIAGNOSIS

applies to **all channels**.

 **Using the menu keys you directly select the highest softkey level of a menu.**

If you want to switch to the last active softkey level of a main menu, simply keep the <shift> key pressed and then press the corresponding menu key.

Main menus

5.1 Overview of main menus

The following illustrations show the highest operating level of the individual menus in each case. Some details of these displays may deviate from the displays on your control unit. Moreover, the most important functions within a main menu are listed.



MANUAL

Functions:

- Traverse to reference point
- Jog axes
- Manual data input
- Return to path
- Machine Functions
- Change screen display
- Prepare

NC display window for channel 1 (example)

Caution:
Spindles are always shown!

Workpiece position		Active functions		
X	0.000 *	G1	G109	G39
Y	0.000 *	G104	G17	G71 G90 G94
Z	0.000 *	G53	G153	G253 G67
B	0.0000 *	G62	G66	M5
UA	0.000 #			
VA	0.000 #			
WA	0.0000 #			
Process data				
F:	0.0	<input type="text"/>	<input type="text"/>	0%
S1:	0.0	<input type="text"/>	<input type="text"/>	0%
S2:	0.0	<input type="text"/>	<input type="text"/>	0%

The following applies to the position display of **referenced** axes:

- "*" behind the position data = feed axis (synchronous) is in position
- "#" behind position data = auxiliary axis (asynchronous) is in position

The following applies to the position display of **non-referenced** axes:

- "\$" behind the position data = feed axis (synchronous) is in position
- "@" behind position data = auxiliary axis (asynchronous) is in position

Immediately behind the position data (in front of in-position identification), the unit is displayed:

- " " " for inch

Main menus

- "°" for degrees (in the case of rotary axes)
- no unit in the case of metric units

☞ **All displays and operations in this NC display window, except the spindle, depend on the currently active channel.**

**AUTOMATIC**

Functions:

- Program selection
- Execute program (with or without machine functions)
- Run program section (search block)
- Program test (execute step-by-step; with or without machine functions)
- Change screen display
- Channel reset

NC display window
for Automatic mode

Workpiece position		Distance to go		File: /usr/user/Teil-1234
X	0.000	X	0.000 *	N10 G0 X0 Y0 Z0 M3 S1000
Y	0.000	Y	0.000 *	> N20 G1 X40 F2000
Z	0.000	Z	0.000 *	N30 X40 Z 10.22
B	0.0000	B	0.0000 *	N40 G3 X21 Y5 R100
UA	0.000	UA	0.000 #	...
VA	0.000	VA	0.000 #	
WA	0.0000	WA	0.0000 #	

Compensations + Process data		Program
V: /database/V1	G53 G153	Group: User
K: /database/K4	D0: 0.000	Sel. program: Part-1234
G145	H: 0.000	Subprogram :
G147 D: 0.000	H: 0.000	Execution mode: Automatic
		Active Block: N20

MSG		
F: 0.0	<input type="text"/>	0 %
S1: 0.0	<input type="text"/>	0 %
S2: 0.0	<input type="text"/>	0 %

Select program	Prepare machining	<input checked="" type="radio"/> Auto <input type="radio"/> Semiauto	Check program	Show compensations	Change display	Channel Control Reset
----------------	-------------------	---	---------------	--------------------	----------------	-----------------------

The following applies to the position display of **referenced** axes:

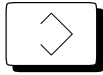
- "*" behind the position data = feed axis (synchronous) is in position
- "#" behind position data = auxiliary axis (asynchronous) is in position

The following applies to the position display of **non-referenced** axes:

- "\$" behind the position data = feed axis (synchronous) is in position
- "@" behind position data = auxiliary axis (asynchronous) is in position

Main menus

- ☞ In the field "Compensations + Process data", there is an option to directly display values from the PLC (e.g. active tool or tool life). Please contact our customer advisory service for more details. All displays and operations in this NC display window, except the spindle, depend on the currently active channel.

**MANAGE**

Functions:

- General file management (deleting, copying, renaming, protecting...)
- Management functions for main programs and subprograms
- Creating/editing DIN and CPL programs
- Data exchange between CNC and external periphery (save, archive, load)
- General table management functions (deleting, copying, protecting...)
- Editing geometry compensation and zero offset tables

NC display window
for Manage mode

\$1: Station 0012 01.02.03
NC: pncosa 12:15:22

A: Manage

Group: User

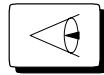
Name	Size	Date	Access
Part_1234	2010	30.07.01 12.10.00	rwX
SP1	291	01.10.97 12:42:20	rwX

Filter: * Directory: /usr/user/TEIL_1234/
Number: 2 Size: 2301 Free memory: 68069

Edit Edit New File Generate main program File operations Save Files Switch directory Tables

- ☞ File management is not channel-specific, i.e. all displays and operations in this NC display window are independent of the currently active channel.

Main menus

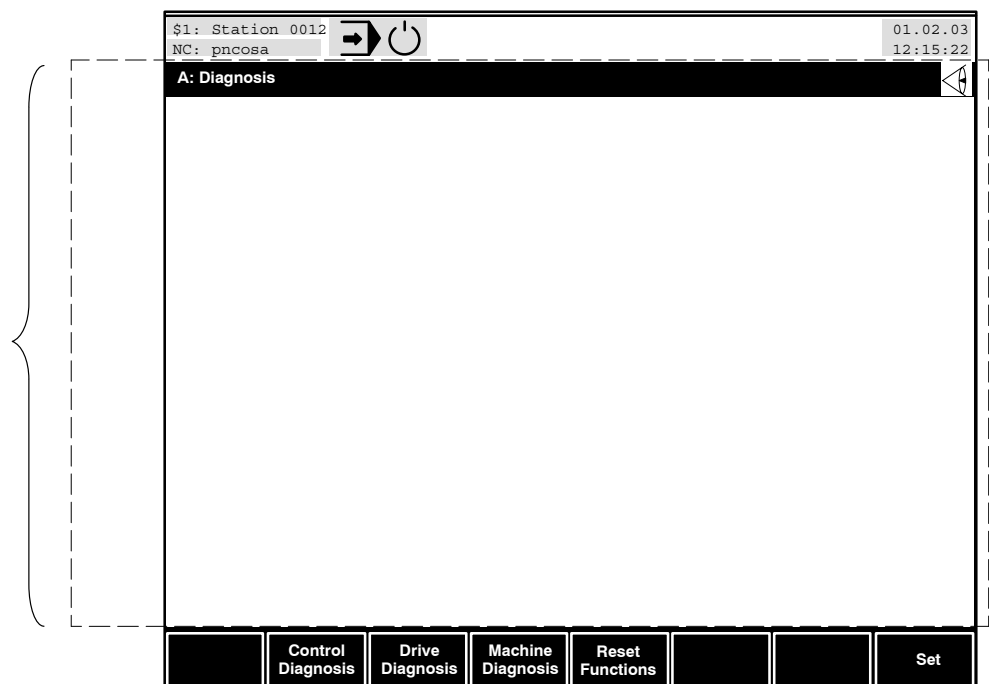



DIAGNOSIS

Functions:

- Display Software version
- Logbook (display logbook of registered system errors)
- Trigger the initial state of the control unit
- Set the time, screen colours, functions assigned to function keys, language
- Adaptation of the CNC to the system environment (MACODA)
- Machine Status Display:MSD
- Display I/O status of PLC and CNC signals
- Axis oscilloscope (refer to “Diagnostics tools” operating instructions)
- Contour display (refer to “Diagnostics tools” operating instructions)
- Logic analyzer (refer to “Diagnostics tools” operating instructions)
- Drive oscilloscope (refer to “Diagnostics tools” operating instructions)
- SERCOS monitor (refer to “Diagnostics tools” operating instructions)
- PLC monitor (currently unavailable)
- Memory diagnosis

NC display window
for Diagnosis



 **Diagnosis is not channel-specific, i.e. all displays and operations in this NC display window are independent of the currently active channel.**

Main menus

The following functions of the “DIAGNOSIS“ menu are described in detail in the “PNC operating manual diagnostics tools”:

- Logic analyzer
- Axis oscilloscope
- Contour display
- Drive oscilloscope
- SERCOS monitor

Main menus

5.2 All menu levels (softkey levels) at a glance

<p>Manual</p> <p>Reference point</p> <p>Jog Mode Jog axes Jog coordinates</p> <p>Manual data input Activate input Change input Delete input Channel reset</p> <p>Remove from contour Remove from contour OK Fix strategy OK Return to path</p> <p>Machine Functions Activate input OK Change input Delete input Control reset machine functions</p> <p>Change display</p> <p>Prepare Online correction Activate correction Direct. coordinate Direct. tool Correction delete Correction off</p> <p>Tool setup Show tool OK Update Tool ID OK Process tool OK Tool ID OK Load tool OK Tool ID OK Unload tool OK Machine diagnosis Execute function Update Table operations Read OK Write Tools in magazine Tools in machine</p>	<p>Automatic</p> <p>Select program OK CPL program / DIN program Switch directory OK Groups Main programs Directory structure Parent directory (-) Subdirectory (+)</p> <p>Prepare machining Search block OK Skip block Auto/Semiauto Single block Single step Program Block Optional Stop General inhibit</p> <p>Auto/Semiauto</p> <p>Check program Permanent variables Definable permanent variables Display array Page up Page down</p> <p>Return to path</p> <p>Change display Large axes display Configure Axes Display Configure Large Axes Display OK Configure Axes Names OK OK End pos./Prog. value Program Section SP chain Active functions Show compensations Overview compensations Cancel Program Display</p> <p>Channel control reset</p>
--	---

Main menus

<p>Manage</p> <p>Edit</p> <p>File</p> <ul style="list-style-type: none"> Close editor <ul style="list-style-type: none"> yes no New <ul style="list-style-type: none"> yes no Save as ... <ul style="list-style-type: none"> OK Switch directory (-> "Switch directory") Save <ul style="list-style-type: none"> yes no <p>Edit</p> <ul style="list-style-type: none"> Search <ul style="list-style-type: none"> Search string forward/backward Find line or NC-block Next First Last Search upp'case/low case Replace <ul style="list-style-type: none"> Search string forward/backward Replace all Next replace Replace to top Replace to end Search upp'case/low case with acknowledgement Cut Cut/Append Copy Copy/Append Insert Configuration <ul style="list-style-type: none"> Auto. block number replace/insert Show special characters Change TAB <ul style="list-style-type: none"> OK NC/ASCII Cursor Navigation <ul style="list-style-type: none"> Begin of line End of line Top of file End of file next word previous word CPL dialog <p>Edit New File</p> <ul style="list-style-type: none"> OK (select file type) (otherwise as Edit) 	<p>Generate main program</p> <ul style="list-style-type: none"> OK (create new main program) <p>File operations</p> <ul style="list-style-type: none"> Copy <ul style="list-style-type: none"> OK All All no confirm Switch destination directory <ul style="list-style-type: none"> OK Groups Main programs Directory structure Parent directory (-) Subdirectory (+) Skip Cancel Rename <ul style="list-style-type: none"> same as copying Delete <ul style="list-style-type: none"> OK All Skip Cancel Access rights <ul style="list-style-type: none"> OK All Confirm file info Skip Cancel File filter <ul style="list-style-type: none"> OK All files Switch directory" (-> "Switch directory") Multiple selection Select <ul style="list-style-type: none"> Select Cancel <p>Save Files</p> <ul style="list-style-type: none"> File transfer <ul style="list-style-type: none"> Load <ul style="list-style-type: none"> All files Search DFS file Load file <ul style="list-style-type: none"> Start Interface parameters <ul style="list-style-type: none"> OK Cancel Save <ul style="list-style-type: none"> Start Further files <ul style="list-style-type: none"> OK Enter into list Select remove DFS identifier Interface parameters <ul style="list-style-type: none"> OK Cancel
---	---

(continued on next page, top left)

Main menus

("Manage", continued from previous page)

File filter

OK

All files

Switch directory

(-> "Switch directory")

Select

Select

Cancel

Archives

Create Archives

OK

Switch directory

(-> "Switch directory")

Extract archives

OK

Error protocol

OK

Switch directory

(-> "Switch directory")

Switch directory

OK

Groups

Main programs

Directory structure

Parent directory (-)

Subdirectory (+)

Tables

Edit (**Zero shift table**)

Change value

OK

Clear value

Configure table

Append column

OK

Insert column

OK

Modify column

OK

Delete column

Yes

No

Strict assignment

Configure editor

absolute/incremental

mm / inch

Edit new file (Zero shift table)

OK

OK

Yes

continue as for "Tables" -> "Edit"

No

Switch directory

(-> "Switch directory")

Strict assignment

File operation (refer to File operations)

File transfer (refer to File transfer)

Edit (**GEO table**)

Change value

OK

Clear value

Radius compensation

Tool length compensation

Configure editor

absolute/incremental

mm / inch

Edit new file (GEO table)

OK

Yes

continue as for "GEO Tables" -> "Edit"

No

Switch directory" (-> "Switch directory")

File operation (refer to File operations)

File transfer (refer to File transfer)

Main menus

Diagnosis		Machine diagnosis
Control diagnosis	Set scaling	MSD
OK	Curve x	First page
Page	OK	Previous page
Subsystem	Automatic scaling	Next page
OK	Cur C1 / Cur C2	Previous group
Memory	Information	Next group
OK	OK	All/Active
Logbook	Active application	Search group
OK	Contour display	OK
Drive diagnosis	(same as axis oscilloscope)	I/O status PLC
Axis oscilloscope	Drive oscilloscope	Search signal
Load settings	Load settings	Inputs
OK	(same as axis oscilloscope)	Outputs
Cancel	Save settings	Markers
Save settings	(same as axis oscilloscope)	OK
OK	Change setting	Inputs
Cancel	Set signals	Outputs
Change setting	(same as axis oscilloscope)	Markers
Set signals	Set sample time	I/O status CNC
Signal x	(same as axis oscilloscope)	Previous channel/axis/spindle
Delete signal x	Start Trigger	Next channel/axis/spindle
Set sample time	OK	Channel signals
OK	First condition	OK
Cancel	OK	Axis signals
Start Trigger	Cancel	OK
OK	Set trigger position	Spindle signals
First condition	(same as axis oscilloscope)	OK
OK	Select axis	General signals
Cancel	OK	CNC inputs
AND/OR	Setup axis parameters	CNC outputs
Second condition	Activate data	PLC monitor
OK	Select axis	Logic analyzer
Cancel	OK	Change setting
Set trigger position	Select parameter	Set trigger
OK	OK	OK
Cancel	Softkey Trigger	Set trigger position
Softkey Trigger	Start recording/cancel	OK
Start recording/cancel	Display recording	Connect trigger
Display recording	(same as axis oscilloscope)	OK
Load recording	SERCOS monitor	Delete trigger
OK	SERCOS runup	Set measure points
Cancel	Set phase	OK
Save recording	OK	Delete measure points
OK	Abort	Delete all measure points
Cancel	Process ident no.	Yes
Calculate curve	RESET Diag. Cl. 1	No
(not with contour display)	Display recording	Set sample time
Curve x		OK
OK		Trigger Info
Select curve		OK
Curve x		Manual Trigger
OK		Start recording/cancel
Active/Inactive		Display recording
		Cursor step large
		Cursor step medium
		Cursor step small
		Cur C1 / Cur C2
		Set cursor
		Logic analyzer

(continued on next page, top left)

Main menus

Diagnosis (continued)**Reset functions**

LSV2-DNC

System control reset

System restart

Yes

No

Set

Set colors

Table 1

Table 2

Table 3

User table

Modify user table

Table 1

Save user table

Set color

OK

Display color

Increase content

Decrease content

Set increment

OK

Reset color

Table 2

(refer to Table 1)

Table 3

(refer to Table 1)

User table

(refer to Table 1)

Set function keys

Activate keys

Change definition

OK

Set language

OK

Set locked directories

OK

Set user

OK

Change password

OK

Select channel

OK

MACODA → refer to "MACODA

Operation and configuration of the
machine parameters" manual

Main menus

<p>Info key</p> <p>Error Warning Message Update Display details OK First entry Previous entry Next entry Last entry Display last info OK Display error details OK Display warning details OK Delete info Delete all Delete warnings Delete messages Set filter Filter channel OK All ON All OFF Filter</p>	<p>Channel dialog key</p> <p>System Info System axes System spindles Channel overview Channel waiting states OK All/Active Page Channel selection → Activation of the selected channel</p>
---	---

Manual

6 Manual


This chapter discusses the functionality of the control system from the machine operator's point of view. Questions such as "What must I do in order to ..." or "How can I ..." are answered here.

For this purpose, the softkey operating sequence ("softkey-path") taking you through individual operating levels to the desired function is indicated.

This chapter discusses the "MANUAL" mode.

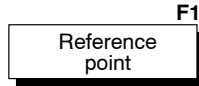
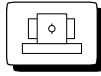
The detailed structure of the table of contents gives you a concise overview.

If you require information **only about one particular softkey**, please look it up in the index under "softkey". The page on which the respective softkey is described can be found there.

 **To facilitate proper handling and operation of the control unit, user knowledge in respect of the hierarchy of softkeys and structure of dialog boxes is an indispensable prerequisite. To this end, also read the chapter "Man-machine interface".**

6.1 Traverse to reference point

Selection:



The CNC is synchronized to the coordinate system of the machine by means of “Traverse to the reference point”. The positional data on the man-machine interface are not valid until this has taken place.

- **Referenced** axes are shown with “*” (synchronous) or “#” (asynchronous).
- **Axes that have not been referenced** are shown with “\$” (synchronous) or “@” (asynchronous).

The control unit displays this operating mode as a pictograph in the NC status line. You are also requested to start the “Traverse to the reference point” of the individual axes using the jog buttons on the machine control panel.

\$1: Station 0012		01.02.03	
NC: pncosa		12:15:22	
A: Manual			
Workpiece position		Active functions	
X	0.000 \$	G1	G109 G39
Y	0.000 \$	G104 G17	G71 G90 G94
Z	0.000 \$	G53 G153	G253 G67
B	0.0000 \$	G62 G66	M5
UA	0.000 #	Traverse to reference point	
VA	0.000 #	<input type="text"/>	
WA	0.0000 #		
Process data			
F :	0.0 <input type="text"/>	<input type="text"/>	0 %
S1:	0.0 <input type="text"/>	<input type="text"/>	0 %
S2:	0.0 <input type="text"/>	<input type="text"/>	0 %
Reference point	Jog Mode	Manual data input	Remove from contour
Machine functions	Change display		Prepare

You must normally traverse to reference points when

- the control unit/machine is switched on and **no** absolute measuring systems are used on the axes or in the drives or
- the control system/machine is switched on and the power supply to an absolute measuring system was broken in the meantime.

Manual

It is the responsibility of the manufacturer to decide whether the axes are started together or individually.

If the reference points cannot be traversed to, check:

- Have the DRIVE ON signals of the axes been set ?
- Is the feed potentiometer on "zero"?
- "General Inhibit" softkey still activated?

 **Traversing to the reference point is a drive-controlled function, i.e. the interpolation takes place in the drive.**

In order to ensure that the axis potentiometer can work with these drive-controlled movements, it must be transferred to the drive by SERCOS parameter S-0-0108 (feedrate override)

- **by the PLC through the service channel in 500 ms intervals, or**
- **within the cyclic telegram (MDT). For this purpose, S-0-0108 must be entered in the MDT configuration list (S-0-0024).**

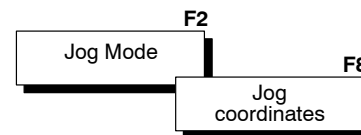
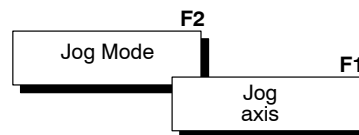
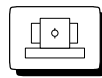
6.2 Jog Mode

Axes can be **manually** traversed in jog mode by means of the jog buttons on the machine control panel.

This menu level can be reached by pressing the “Jog mode” softkey that may be set to one of the following options in MACODA parameter 6001 00030:

- Jogging active in machine coordinates (axes)
- Jogging active in working coordinates
- another softkey level containing the “Jog axis” and “Jog coordinates” softkeys is opened to provide for both options.

Selection:



General conditions

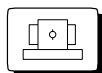
- For moving in the jog mode reference points should not be approached. The NC positional displays do not correspond to the actual machine positions in such cases.
- Selecting other softkey levels or another menu level does not break the jog mode (except for program selection or “traverse to reference point”)!
- The traversing speed of the axes depends on the manual feed switch setting on the machine control panel.
- The length of the travel path for every actuation of a touch key depends upon the set step size switch on the control panel of the machine.


6.2.1 Jog axes in machine coordinates

The operating sequence may vary, depending on the setting in MP 6001 00030:

- if “**Jog in machine coordinates**“ has been preset, operating the “Jog Mode“ softkey will already activate the “Jog“ function.

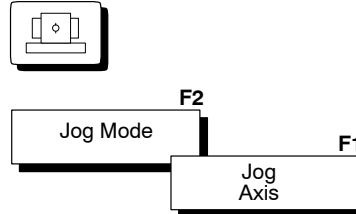
Selection:



 The “Jog Mode” softkey is a function softkey, refer to [2](#).

Manual

- If “Jog in machine coordinates“ and “Jog in working coordinates” has been preset, you first activate the “Jog Mode“ softkey and then choose the “Jog axis” function softkey (refer to picture on page 6–7):

Selection:

A message 1 informs you that jog mode is now active. The control unit indicates the “Jogging in machine coordinates” mode by the pictograph in the NC status line.

Machine position		Active functions		
X	0.000 *	G1	G109	G39
Y	0.000 *	G104	G17	G71 G90 G94
Z	0.000 *	G53	G153	G253 G67
B	0.0000 *	G62	G66	M5
UA	0.000 #			
VA	0.000 #			
WA	0.0000 #			

Process data		
F:	0.0	0 %
S1:	0.0	0 %
S2:	0.0	0 %

If the axes cannot be traversed, check:

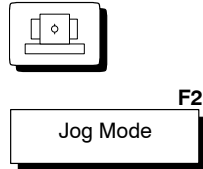
- Have the DRIVE ON signals of the axes been set ?
- Is the feed potentiometer on “zero”?
- “General Inhibit” softkey still activated?

6.2.2 Jog in working coordinates

The operating sequence may vary, depending on the setting in MP 6001 00030.

- If only “**Jog in working coordinates**” has been preset, operating the “Jog Mode” softkey will already activate the “Jog” function.

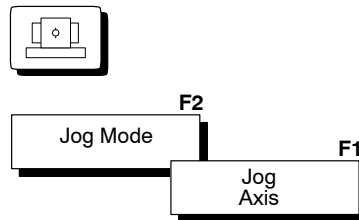
Selection:




 The “Jog Mode” softkey is a function softkey.

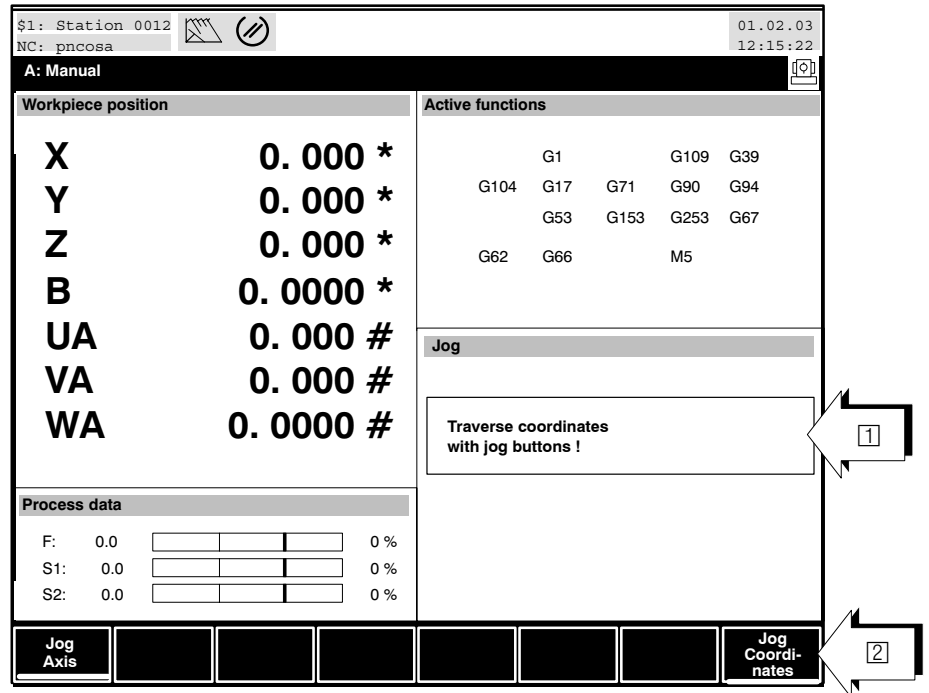
- If “**Jog in working coordinates**” and “**Jog in machine coordinates**” has been preset, you first activate the “Jog Mode” softkey and then choose the “Jog coordinates” function softkey, refer to [2](#):

Selection:



A message [1](#) informs you that jog mode is now active. The control unit indicates the “Jogging in working coordinates” mode by the  pictograph in the NC status line.

Manual



The display 2 of the softkey bar appears if “Jog working coordinates” and “Jog machine coordinates” have both been preset in MACODA.

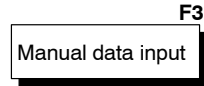
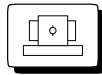


If the coordinates cannot be traversed, check:

- Have the DRIVE ON signals of the axes been set ?
- Is the feed potentiometer on “zero”?
- “General Inhibit” softkey still activated?

6.3 Manual data input (MDI)

Selection:



You can enter NC addresses (X..., F..., S..., T..., M... etc.) into a character input field (1) in the **Manual data input** operating mode. These NC addresses are executed after you press the “Activate Input” softkey followed by “Cycle Start”.

Examples of NC addresses:

- X (position values on X axis)
- F (feedrate)
- S (speed selection)
- T (tool selection)
- M (machine functions)

Manual data input for the axes of channel 1 and for asynchronous axes only (no parallel jobs, i.e. no part program selected)

synchronous axes (channel 1)

asynchronous axes (not assigned to any channel)

Caution: Spindles are always shown!

The screenshot shows the MDI screen for station 0012. It is divided into several sections:

- Header:** Station 0012, NC: pncosa, Date/Time: 01.02.03 12:15:22.
- Mode:** A: Manual/Manual data input.
- Workpiece position:**

X	0.000 *
Y	0.000 *
Z	0.000 *
B	0.0000 *
UA	0.000 #
VA	0.000 #
WA	0.0000 #
- Active functions:**

G1	G109	G39
G104	G17	G71
G90	G94	
G53	G153	G253
G67		
G62	G66	M5
- Manual data input:** A text field containing "G1X130Y200F250|". A callout box labeled '1' points to the cursor position at the end of the input.
- Process data:**

F:	0.0			0%
S1:	0.0			0%
S2:	0.0			0%
- Bottom bar:** Activate input, Change input, Delete input, Channel control reset.



At this point you can

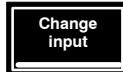


- **return to the previous operating level** with the level-return key. All changes made in the character input field will be saved.
- enter NC addresses in the character input field.

Manual




- **confirm all entries or changes** in the character input field using the “Activate Input” softkey. The block is transferred to the CNC for internal processing. The symbol for manual data input  in the NC status line is then complemented by the “Ready”  symbol. The commands are executed after you press the Start key on the machine control panel.



- change an entry which has already been confirmed.



- delete the entire character input field 



- deactivate the NC “Ready” status for “MDI” mode. A previously activated entry is deactivated.

 **When a program is active in a channel, i.e. selected, simultaneous manual data input is not possible in this channel.**

- Principally, you may enter multiple addresses (e.g.: “M55M13T5”). The control unit issues an error message for multiple entries which are not permitted (e.g. “..X10X100” or “..F1000F2000..”). You can have the cause of the error message displayed by pressing the Info key.
- The symbol for manual data input is not displayed in the NC status bar until the entry is activated (“Activate Input” softkey). Note that the symbols for “Manual data input **with** machine function” and “Manual data input **without** machine function” are different!

 **If axes cannot be traversed, check:**

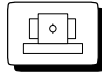
- Have the DRIVE ON signals of the axes been set ?
- Is the feed potentiometer on “zero”?
- “General Inhibit” softkey still activated?

 **If auxiliary functions or machine functions are not output, check:**

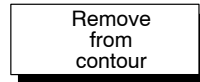
- Is the feed/spindle potentiometer still on “zero”?
- Are the softkeys “General inhibit”, “Auxiliary functions inhibit” or “Axis inhibit” still activated?

6.4 Remove from contour / Return to contour

Selection:



F4



The screenshot shows the CNC control interface in Manual mode. The top status bar displays '\$1: Station 0012', 'NC: pncosa', and the date/time '01.02.03 12:15:22'. The main display area is divided into several sections:

- Workpiece position:** A table showing coordinates for X, Y, Z, B, UA, VA, and WA, all set to 0.000 with various units (* or #).
- Active functions:** A list of active G and M codes including G1, G104, G17, G53, G62, G71, G71, G90, G94, G153, G253, G67, and M5.
- Jog:** A section with a warning message: "Traverse axes with jog buttons !".
- Process data:** Fields for F (0.0), S1 (0.0), and S2 (0.0) with input boxes and a 0% indicator.
- Bottom navigation bar:** Buttons for Reference point, Jog Mode, Manual data input, Remove from contour (highlighted with a circled '1'), Machine functions, Change display, and Prepare.

You need to use the function "Remove from contour" 1 whenever the execution of a part program is to be interrupted. After this travel, the system can execute the tasks for interrupting the program.

Subsequently, the contour can be approached again in the operating mode "AUTOMATIC" or "MANUAL" with the "Return to path" softkey.

A program interruption may be necessary in the following cases:

- tool breakage
- manual workpiece measuring or tool gauging
- optical check, etc.

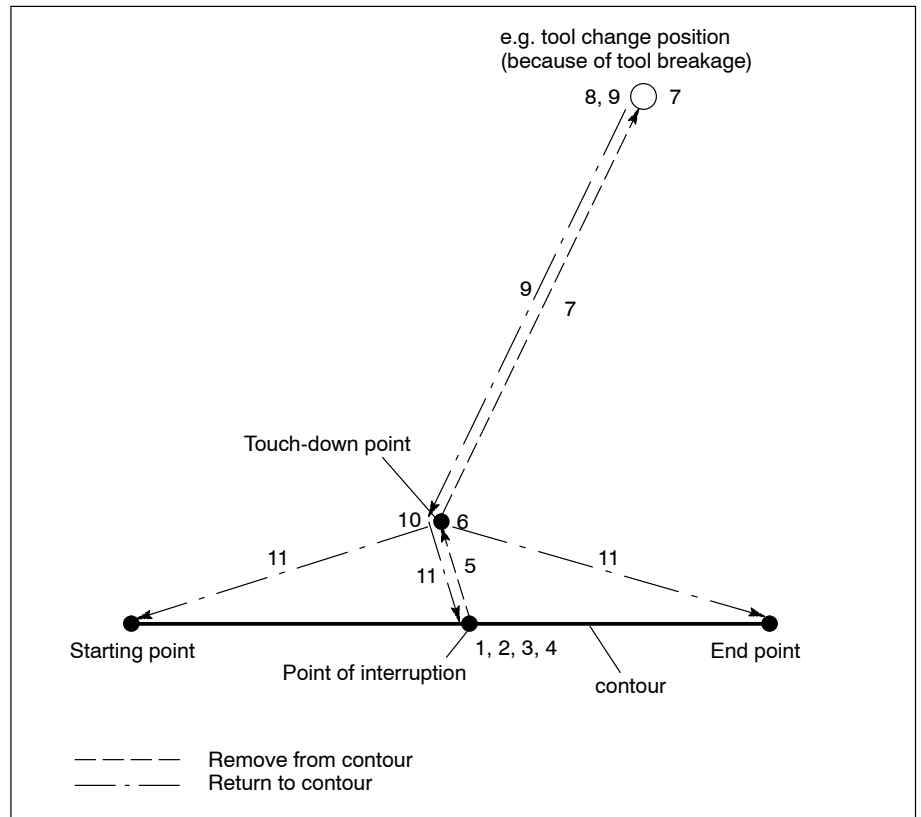
Various **strategies** may be applied to return to the contour:

- Return to path mode
 - manual ReturnToPath
 - automatic ReturnToPath
 - ReturnToPath with single block
- Return to path point
 - to the breakpoint

Manual


- to the beginning of interrupted block
- to the end of interrupted block

Procedures for "Remove from contour" and "Return to contour" in general:



Operating steps for "Remove from contour"

Stop the operation before remove from contour:

1. Activate "Feed hold" to interrupt the program.
2. Change over to the operating mode "MANUAL" (highest level) and press SK "Remove from contour" .



- At the softkey level that now appears by pressing the "Fix strategy" softkey [4], various options are offered for how to return to the contour later.

Fix strategy

Return mode

Manual

Automatic

Single block

Return point

Breakpoint

Begin of block

End of block

For the effects of the respective strategy selected, refer to step 7.



- In order to record the path of removing from the contour, press softkey "Remove from contour" [2]. The previously dimmed, 'Return to Path' softkey [3] is activated.

\$1: Station 0012 01.02.03
 NC: pncosa 12:15:22

A: Manual/Return to path

Workpiece position		Active functions		
X	48.000 *	G1	G109	G39
Y	101.001 *	G104	G17	G71 G90 G94
Z	0.000 *	G53	G153	G253 G67
B	0.0000 *	G62	G66	M5
UA	0.000 #			
VA	0.000 #			
WA	0.0000 #			

Return to path

Jog axes with jog keys from contour!

Return mode: Automatic

Return point: Breakpoint

Process data

F: 0.0 [] [] [] 0 %

S1: 0.0 [] [] []

S2: 0.0 [] [] []

[2] Remove from contour [4] Fix strategy [3] Return to path

- Remove from contour: "**Jog**" the required axi(e)s for this purpose. The end point of the first jog movement will be used as the preset touch-down point when automatic return to path is used later. As long as you keep traversing the axis/axes involved by jog movements, the path thus traversed is recorded.



- Recording is terminated when you press the "Return to Path" softkey [3], or the signal "Return to contour" is given.

Manual

☞ It is recommended that the jog button be set to "continuous", since the end point of the first jogging movement is also the touch-down point for automatic return to path. If the jog button is kept pressed, you can move the axis sufficiently far from the breakpoint before the first end point is saved.

7. After the recording is complete (recorded jogging movements), you can approach any position of the machine without the paths being recorded.

Between the commands "Remove from contour" and "Return to Path", you may carry out any necessary jobs (e.g. tool changes, inputs of compensation data, etc.).

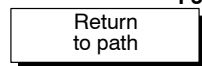
Subsequently, you can start the process of returning to the contour (see the following procedure):

Operating steps "Return to contour"

Selection:



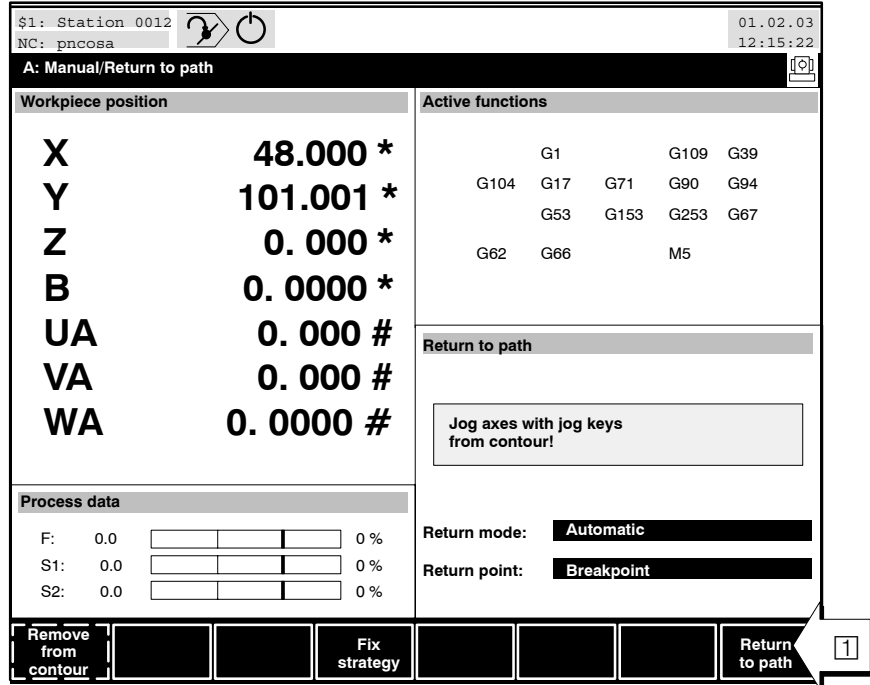
F5



8. Switch to the "AUTOMATIC" menu level (highest level).

Workpiece position		Distance to go		Program Section
X	0.0000	X	0.0000 *	N10 G0 X0 Y0 Z0 M3 S1000 > N20 G1 X40 F2000 N30 X40 Z 10.22 N40 G3 X21 Y5 R100 ...
Y	0.0000	Y	0.0000 *	
Z	0.0000	Z	0.0000 *	
B	0.0000	B	0.0000 *	
Compensations				Program
V: 1	G54	G154	G254	Directory :usr/user
K: 4				Sel. program :Part-1234
D =		H =		Subprogram :
				Execution mode :Automatic
				Active block :N20
Process data				MSG
F: 2000.0				90 %
S1: 1000.0				100 %
S2: 0.0				0 %
Select program	Prepare machining	<input checked="" type="radio"/> Auto <input type="radio"/> Manual	Check program	Return to path
				Change display
				Channel control reset

- Press the "Return to path" SK 1, if this has not been done already in the operating mode "MANUAL". Use Cycle Start to return pursuant to the selected strategy to the touch-down point with automatic Return to Path:



The touch-down point is first approached before the actual approach to the contour, (setting with the SK "fix strategy" in the operating mode "MANUAL" ; also refer to point 3). This is carried out by applying one of the following strategies:

- Manual return to path:** Using jog movements, any touch-down point can be approached. The signals "Ready" and "Ready for Re-entry" are set. Use 'Cycle Start' (see step 10) to continue the machining process.
- Automatic return to path:** Using 'Cycle Start', the touch-down point is approached automatically when the signal "Return to Contour" is set. The signal "Re-entry active" is set in this process. The movement ends at the touch-down point. As soon as "Ready" and "Ready for Re-entry" are displayed, machining can be continued with the next "Cycle Start" (see step 10). With the next "Cycle Start" and the "Return to Contour" signal **reset**, machining can be continued without having previously selected the automatic return mode.

During automatic return to path, the touch-down point lies at the end of the first movement when removing from the contour. During automatic Return to Path, you can change to "Single Block". In the single block mode or jogging mode, you can still modify the touch-down point.

Manual

- **ReturnToPath with single block** When the signal "Return to Contour" is set, a return movement is started with "Cycle Start", which triggers the signal "Re-entry active". At the end of each movement, the NC status is set to "Ready", and the signal "Ready for Re-entry" is set. The touch-down point can be freely selected by repeated "Cycle Start". With the next "Cycle Start" (see step 10) and the signal "Return to Contour" **reset**, machining can be continued.

☞ **Correcting the touch-down point in automatic return mode/
single block:**

Using jog movements, the position of the touch-down point can be modified. Subsequently, the NC status is set to "Ready".

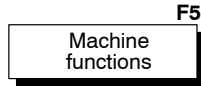
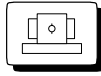
10. Use "Cycle Start" to continue machining:
When the signal "Return to Contour" is set, machining is continued from the touch-down point.
11. Compensations are implemented with the first movement made between the touch-down point and the return-to-contour point (starting point, end point or breakpoint). Any channel functions that were active before the interruption are active again.

Restrictions

- The return-to-path function cannot be executed in more than one channel at the same time.
- Return to path is not possible during thread-cutting (G32).
- After an interruption, the spindle should be stopped and restarted.
- You can return to path while channel is busy waiting in CPL only when the wait state is over.


6.5 Machine Functions

Selection:



Using the machine functions mode, you may output the following functions **in parallel to the active program** ("Ready" or "Running") **in the same channel**:

- **Auxiliary functions:**
 - S (speed selection)
 - T (tool selection)
 - M (machine functions)
- other machine-dependent functions
- traverse **asynchronous axes**

Activation of the machine functions (Channel \$0 is shown in display field 1), is indicated by the MDI symbol  above the character input field 3.

The machine functions are entered in the character input field 2 and will be executed when the "Activate input" softkey has been depressed with subsequent "Cycle Start".

\$1: Station 0012 01.02.03
 NC: pncosa 12:15:22

A: Manual/Machine Functions

Workpiece position		Active functions	
X	0.000 *	G1	G109 G39
Y	0.000 *	G104 G17 G71	G90 G94
Z	0.000 *	G53 G153	G253 G67
B	0.0000 *	G62 G66	M5
UA	0.000 #		
VA	0.000 #		
WA	0.0000 #		

Process data

F:	0.0		0 %
S1:	50.0		50 %
S2:	0.0		0 %

Machine Functions, Channel: \$0


S1=150|

Press start key!

Activate input Change input Delete input Control Reset Machine Fct

At this point you can



- **return to the previous operating level** with the level-return key.
- **confirm all entries or changes** in the character input field using the “Activate Input” softkey. The block is transferred to the CNC for internal processing. The field for machine functions then displays the “Ready” symbol next to the symbol for manual data input. The commands are executed after you press the Start key on the machine control panel.
- change an entry which has already been confirmed.
- delete the entire character input field 
- deactivate the NC “Ready” status for “Machine functions” mode. A previously activated entry is deactivated.
- Principally, you may enter multiple addresses (e.g.: “UA=150 S1=200”). In case of multiple entries (e.g. “UA=150 S1=50”) only the last entry in the input field is taken into consideration (i. example S1=50).
- Note that the symbols for “Manual data input **with** machine function” and “Manual data input **without** machine function” are different!

 **If axes cannot be traversed, check:**

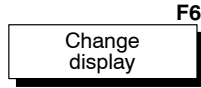
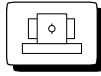
- Have the DRIVE ON signals of the axes been set?
- Is the feed potentiometer on “zero”?
- “General Inhibit” softkey still activated?

 **If auxiliary functions or machine functions are not output, check:**

- Is the feed/spindle potentiometer still on “zero”?
- Are the softkeys “General Inhibit”, “Auxiliary Function Inhibit” or “Axis Inhibit” still activated?

6.6 Changing the screen display in manual mode

Selection:



In the Manual mode, the control system offers the option of displaying different information on the screen.

By pressing the "Change display" softkey, you can alternate between the two screen displays shown below.

- Large display (type of values displayed can be configured)
 - active functions
 - Process data (programmed feedrate "F", programmed spindle speed "S")
- } refer to "Large display" figure
- and
- Workpiece position and distance to go
 - End position and program value
 - Process data (programmed feedrate "F", programmed spindle speed "S") and actual spindle speed "Si")
- } refer to figure "Spindle display"

Large display (axis address):

\$1: Station 0012		➔ ⏻	01.02.03			
NC: pncosa			12:15:22			
A: Manual [i] [o]						
Workpiece position			Active functions			
X	0.0000 *		G1	G109 G39		
Y	0.0000 *		G104 G17 G71	G90 G94		
Z	0.0000 *		G53 G153	G253 G67		
B	0.0000 *		G62 G66	M5		
Process data						
F:	0.0	[] [] [] []	0 %			
S1:	0.0	[] [] [] []	0 %			
S2:	0.0	[] [] [] []	0 %			
Reference point	Jog Mode	Manual data Input	Remove from contour	Machine functions	Change display	Prepare

Manual

- ☞ In the operating mode "AUTOMATIC", you can decide which information should be displayed in the large display with the **CHANGE DISPLAY → CONFIG. LARGE AXES DISPLAY** softkey sequence, also refer to section 7.6.

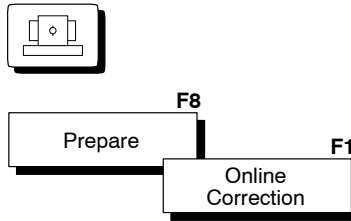
Spindle display:

\$1: Station 0012		01.02.03					
NC: pncosa		12:15:22					
A: Manual							
Workpiece position		Distance to go		End position		Program value	
X	0.0000	X	0.0000 *	X	0.0000	X	0.0000
Y	0.0000	Y	0.0000 *	Y	0.0000	Y	0.0000
Z	0.0000	Z	0.0000 *	Z	0.0000	Z	0.0000
B	0.0000	B	0.0000 *	B	0.0000	B	0.0000
Process data							
F:	0.0	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	0 %	
S1:	0.0	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	0 %	
S1i:	0.0						
S2:	0.0	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	0 %	
S2i:	0.0						
Reference point	Jog Mode	Manual data input	Remove from contour	Machine functions	Change display		Prepare

- ☞ The actual speed of max. 2 internal spindles can be displayed in the spindle display.
For an external spindle, a percent display can be shown. The value is taken from the PLC marker range and can be set with machine parameter 2060 00003.

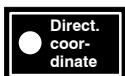
6.7 Online correction in working coordinates

Selection:



\$1: Station 0012		01.02.03	
NC: pncosa		12:15:22	
A: Manual			
Workpiece position		Online correction	
X	0.0000 *	X	0.0000
Y	0.0000 *	Y	0.0000
Z	0.0000 *	Z	0.0000
B	0.0000 #		
Process data			
F:	0.0	<input type="text"/>	0 %
S1:	0.0	<input type="text"/>	0 %
S2:	0.0	<input type="text"/>	0 %
<input type="button" value="Activate correction"/>	<input type="button" value=""/>	<input checked="" type="radio"/> Direct coordinate	<input type="radio"/> Direct tool
<input type="button" value="Correction delete"/>	<input type="button" value="Correction off"/>		

At this point you can



- activate the online correction after having selected:
 - **Coordinate direction**(e.g. axis coordinate X) or
 - **Tool direction** (TCS Z direction with active axis transformation).
- select a coordinate direction from the coordinates of the active channel.
- select the tool direction (axis transformation must be active). This corresponds to the TCS z direction acting on the corresponding space coordinates, e.g., x, y, z, phi, theta.

A compensation in tool direction is translated into an online correction of the linear space coordinates (normally x, y, z).

**CAUTION**

Possible damage to tools or workpieces!

When performing a compensation in tool direction, no orientation movements may be carried out in the part program.



- delete an active online correction.

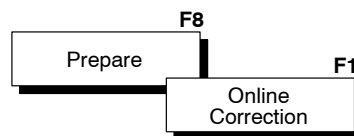
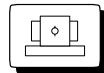



- deactivate an active online correction.

6.7.1 Displaying and activating an online correction

Displays in the "Manual" menu level

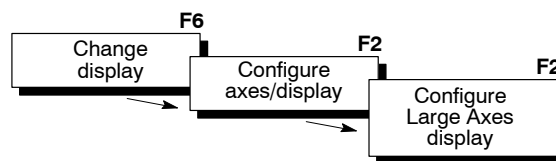
Selection:



The correction values are shown in the "Large axes display"  in the right half of the NC display window.

or

Selection:

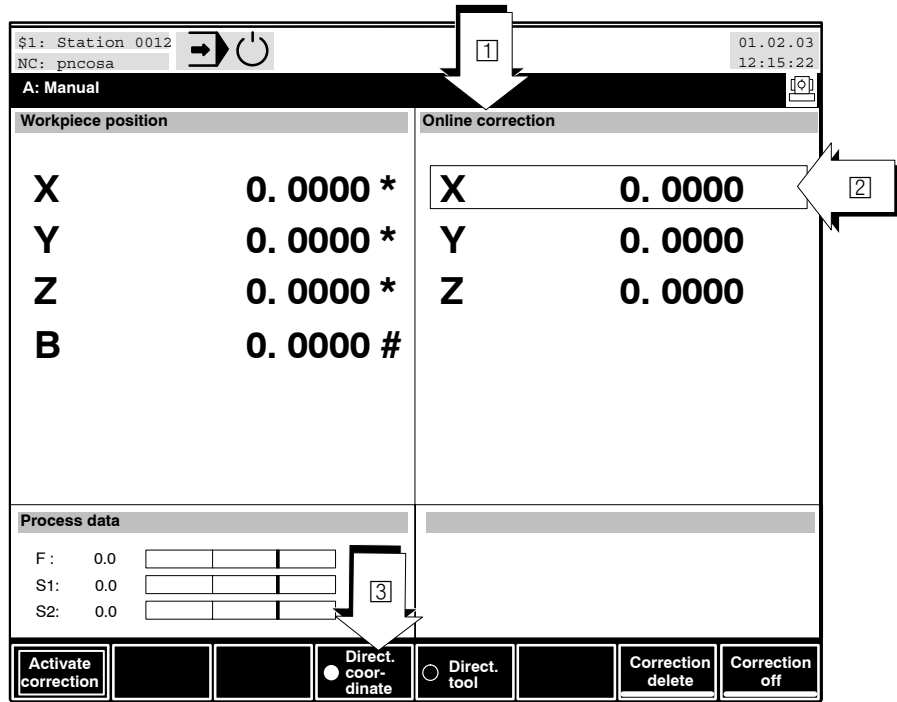


In this case, the correction values are shown in the left NC display window after selection of the online correction.

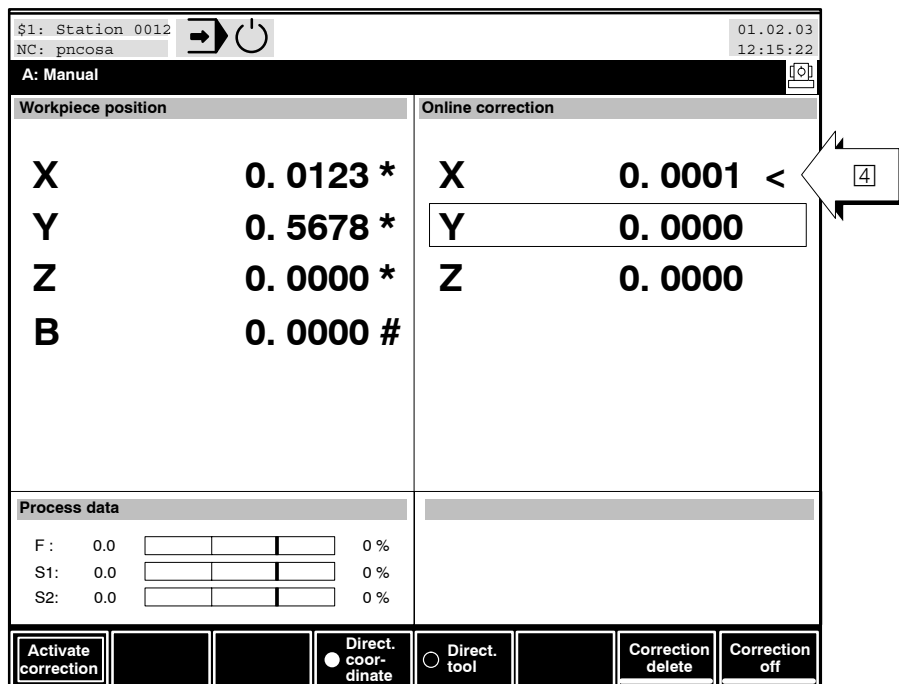
Manual

Activation in "coordinate direction"

- ★ Select the "Coordinate direction" toggle soft key [3].
- ★ Move the cursor bar [2] with the cursor keys and select a coordinate. On-line correction can then be activated for this coordinate by pressing the "Activate correction" softkey.



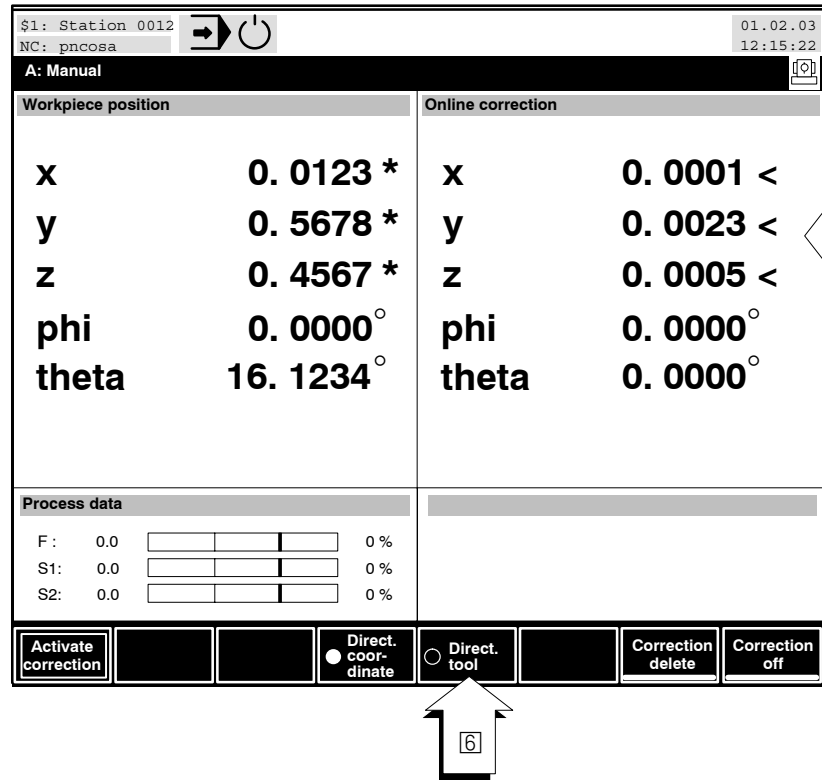
Coordinates for which online correction has been activated are marked by an "<" [4].



Manual

Activation in "tool direction"

- ★ Select the "Tool direction" toggle soft key **[6]**.
If a suitable 5-axis transformation is available, the online correction may also act in the direction of the tool (TCS-Z). Depending on the coordinate position, coordinate correction acts on one or several coordinates (marked by <" **[7]**).



6.8 Tool management

This section only describes the **standard** softkeys and dialog boxes which are available in the operator interface for tool management.

For adjusting tool management in terms of operator interface and PLC interface, please refer to the "Tool management" manual.

The functional scope of tool management itself depends on the PLC functionality, therefore, it may vary between machines. Refer to the relevant documentation of the machine manufacturer.

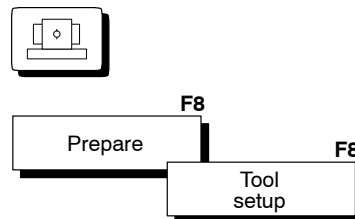
Within the standard man-machine interface, the control system has the following features:

- Display of tools in the magazine: Magazine capacity: 24 tools
- Display of tools in the machine: spindle, gripper 1 and gripper 2, loading and unloading position
- Dialog for displaying, entering, changing and storing various tool data in a tool table
- Options for loading and outputting a tool table from/to external peripheral units.

 **Tool management is not channel-specific.**

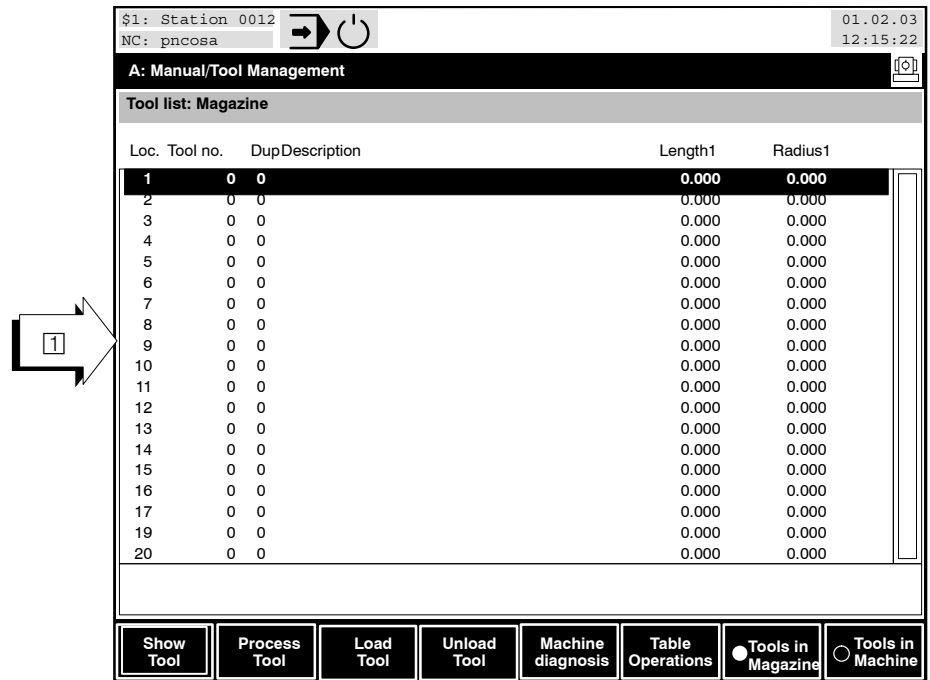
6.8.1 Displaying and changing tool data

Selection:



The tool data is selected by pressing the "Tool setup" softkey.

Manual



Loc.	Tool no.	DupDescription	Length1	Radius1
1	0	0	0.000	0.000
2	0	0	0.000	0.000
3	0	0	0.000	0.000
4	0	0	0.000	0.000
5	0	0	0.000	0.000
6	0	0	0.000	0.000
7	0	0	0.000	0.000
8	0	0	0.000	0.000
9	0	0	0.000	0.000
10	0	0	0.000	0.000
11	0	0	0.000	0.000
12	0	0	0.000	0.000
13	0	0	0.000	0.000
14	0	0	0.000	0.000
15	0	0	0.000	0.000
16	0	0	0.000	0.000
17	0	0	0.000	0.000
19	0	0	0.000	0.000
20	0	0	0.000	0.000

At this point you can



- return to the previous operating level with the level-return key.



- display the current **tool magazine assignment** in area 1.

Magazines with up to 24 positions (position number 1 to 24) can be managed in the internal standard tool table.



- display the **tools in the machine** in area 1. The tools in the machine are identified by the positions “Spin” (spindle), “Grf1” (gripper 1), “Grf2” (gripper 2), “BePl” (loading position) and “Enpl” (unloading position).

- **select** the desired **position** (and thus the corresponding tool) from the displayed list (magazine or machine) by using the \blacktriangledown / \blacktriangleup , \langle pgdn/ \rangle / \langle pgup/ \rangle , \langle home/ \rangle / \langle end/ \rangle cursor keys.



- **display** the **tool data in the selected position** on the screen.



- input or change the **tool data in the selected position**.



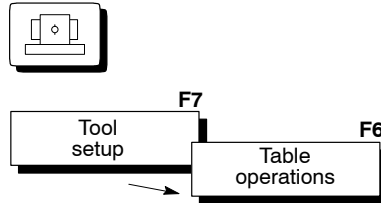
- convert the internal tool table to an ASCII file or convert an ASCII file to an internal tool table. Refer to sections 6.8.2 and 6.8.3 for further information.

6.8.2 Outputting the tool table

It is sometimes necessary to save the tool table on external storage media (e.g. for back-up purposes) or to transfer it to a computer (e.g. PC) for processing.

In the latter case, the internal format of the table must be prepared such that the table can be processed on an external computer.

Selection:



► Outputting the tool table



- Press the “Write” softkey. The control unit converts the internal tool table to an ASCII file and stores this ASCII file in one of the “database” group directories under the name “W6”. The original table remains unchanged during this event.
If a file with the same name already exists in the directory, the control unit re-names the existing file to “W6old”.
- Use the “Output File” function to subsequently transfer the file to a connected peripheral unit or to a PC. Proceed as described in section 8.12.5.

6.8.3 Loading the tool table

Tool tables that have previously been output as ASCII file can be loaded in the controls in the following manner.

 **All data which already exists in the current tool table is completely overwritten during loading.**

- In order to load a tool table from a connected peripheral device or a PC into the control unit, first change to the “database” group directory and rename any existing “W6” file to “W6sic” (refer to section 8.1 for further information regarding the structure of and changing directories).
Thus, you can avoid overwriting a currently available (and perhaps still required!) tool table by a new table to be loaded.
- Use the “Load File” function to transfer the tool table (ASCII file) from a connected peripheral unit or a PC to the control unit. Proceed as described in section 8.12.1. Select the directory of the “database” group as target directory.
- Rename the loaded file to “W6”.

Manual



- Enter the operating mode "MANUAL" and press the softkeys in the sequence TOOL SETUP ➔ TABLE OPERATIONS.
- Press the "Read" softkey. The control unit loads the ASCII file data "W6" into the current tool table.

Manual

Notes:

Automatic

7 Automatic


This section discusses the functionality of the control unit from the machine operator's point of view. Questions such as "What must I do in order to ..." or "How can I ..." are answered here.

For this purpose, the softkey operating sequence ("softkey path") taking you through individual operating levels to the desired function is indicated.

This section discusses the "AUTOMATIC" menus.

The detailed structure of the table of contents gives you a concise overview.



If you require information **only about one particular softkey**, please look it up in the index under "softkey". The page on which the respective softkey is described can be found there.

 **To facilitate proper handling and operation of the control unit, user knowledge in respect of the hierarchy of softkeys and structure of dialog boxes is an indispensable prerequisite. To this end, also read the section "Man-machine interface".**

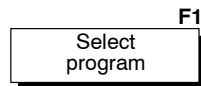
Automatic

7.1 Selecting a program


For every channel, only one program may be activated. The channel must be assigned to those synchronous axes which are programmed and addressed by this program. Therefore, program selection also requires the appropriate channel selection.

 **First select the required channel (key ) in which your program can be executed!**
Press the "Channel dialog" key again after having selected the channel in order to exit the channel dialog.

Selection:



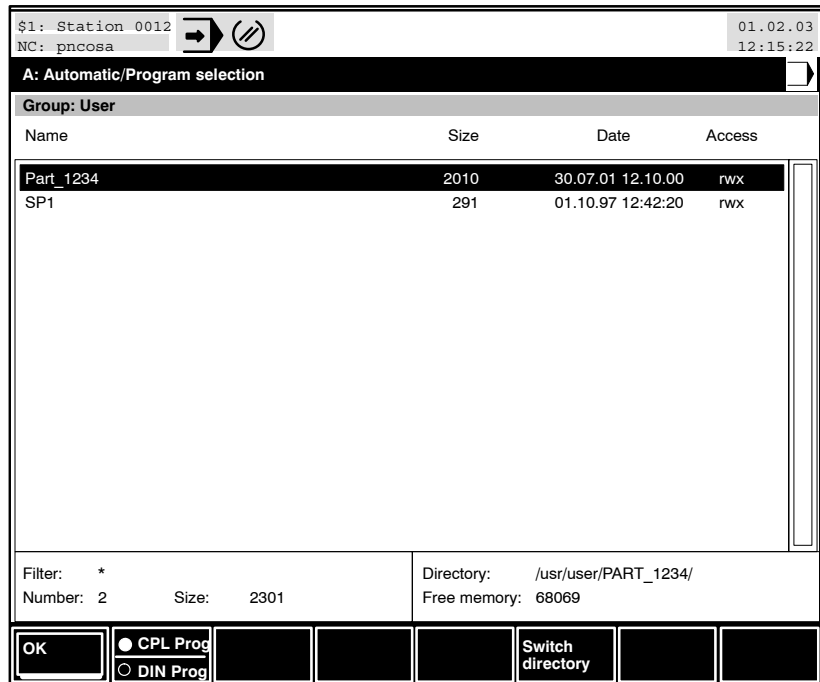
The following illustration shows the operating interface **before** the selection:

\$1: Station 0012				01.02.03	
NC: pncosa				12:15:22	
A: Automatic					
Workpiece position		Distance to go		File:	
X	0.000	X	0.000 *		
Y	0.000	Y	0.000 *		
Z	0.000	Z	0.000 *		
B	0.0000	B	0.0000 *		
UA	0.000	UA	0.000 #		
VA	0.000	VA	0.000 #		
WA	0.0000	WA	0.0000 #		
Compensations + Process data				Program	
V: /database/V1				Group:	
G53 G153 G253				Sel. program:	
K: /database/K4				Subprogram :	
D0: 0.000 H0: 0.000				Execution mode:	
				Active block:	
MSG					
F: 0.0 <input type="text"/> 0 %					
S1: 0.0 <input type="text"/> 0 %					
S2: 0.0 <input type="text"/> 0 %					
Select program	Prepare machining	<input checked="" type="radio"/> Auto <input type="radio"/> Semiauto	Check program	Show compensations	Change display
				Channel control reset	

Select a program before machining or testing it in the control unit.





Automatic

To this end, the control unit displays the available files in the current file directory on the screen.



At this point you can



- **return to the previous operating level** with the level-return key.
- Press the \blacktriangledown , \blacktriangle , <home> or <end> cursor keys to **select** the desired **program** from the list.
- **transfer** the **selected program** for CNC-internal block processing using the "OK" softkey. The "Ready"  symbol is displayed beside the symbol for "Execute Program"  in the NC status bar. The program is executed after you press the Start key on the machine control panel and the "Ready"  symbol changes to the "Running"  symbol.

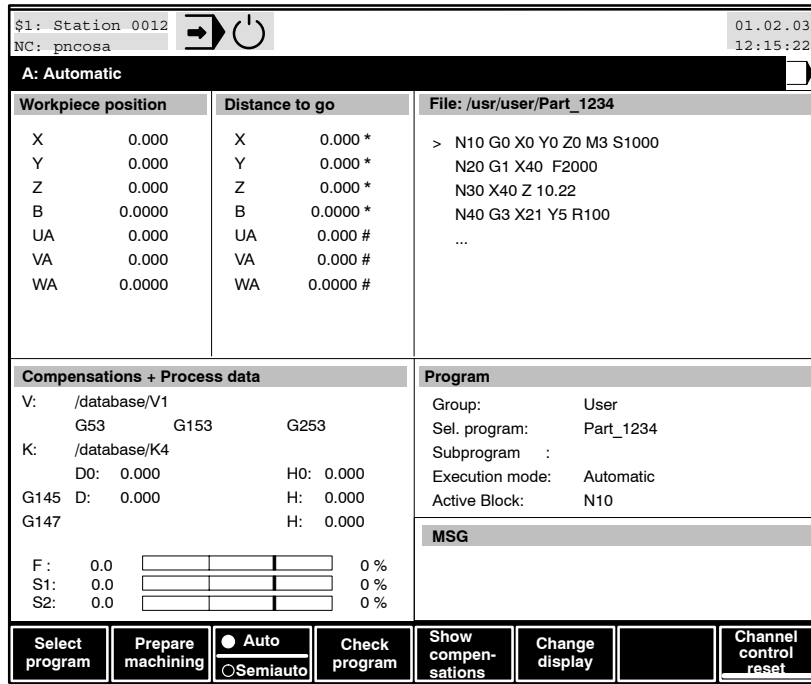
**DANGER**

Programs that have not been properly tested may pose a hazard to operators and the machine!

Test new or modified programs thoroughly before executing them on the machine! For information on program testing, refer to section 7.3.4.

Automatic

The following diagram shows the man-machine interface **after** the selection of the program:



- To process the program **completely and with machine function**, switch **off** the program test (for program test refer to section 7.3.4) and set the "Auto/Semiauto" toggle softkey at the highest menu level of the "AUTOMATIC" main menu to "**Auto**".
- determine whether a **program** should first be **linked** ("CPL Prog" active) before it is transferred to CNC-internal block processing or whether linking is not necessary ("DIN Prog" active). As long as the CNC is preparing a program, the NC status line shows the symbol $\langle \rangle$. During "linking", the CNC generates files which are stored in the "/usr/lnk" directory. Their filenames consist of the name of the program file and the extension ".1".

Automatic

**CAUTION**

Improper program linking (preparation) may lead to poor machining quality!

Preparation means that the CNC calculates all the data required for the process before executing the program. If a program is not prepared before the machining, there may be a time delay in the process flow during program execution (since the program has to be prepared for the runtime), which could have adverse effects on the machining quality.

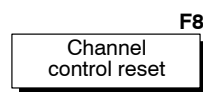
Programs which only consist of DIN blocks do not have to be linked before program execution. If (sub-) programs are called up with the "DIN" parameter, or programming takes place in the first program line "(DIN)", the control unit does not prepare the corresponding program! The toggle softkey "CPL/DIN Prog" is not relevant in this case, i.e. preparation does not take place regardless of its position.



- switch directories. The control unit opens the "Switch Directory" dialog box and displays all existing groups. For a detailed description of this softkey, refer to sections 8.1.1 and 8.1.5. This softkey is only needed if the desired program is not included in the file list shown above for selecting programs.

7.2 Channel control reset

Deselects a previously selected program on the currently active channel. All active functions will be reset to their default status.

Selection:

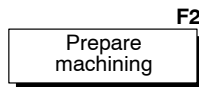
Automatic

7.3 Prepare machining

Preparation of program execution includes:

- searching for a block if the program is to be executed **section by section**;
- **testing** axis movements **without** machine movements/auxiliary function outputs;
- executing programs **block by block**;
- setting the program to **Automatic**, i.e. executing it with/without machine movements/auxiliary function outputs.

Selection:



\$1: Station 0012		01.02.03	
NC: pncosa		12:15:22	
A: Automatic/Preparation			
Workpiece position		Distance to go	
X	0.000	X	0.000 *
Y	0.000	Y	0.000 *
Z	0.000	Z	0.000 *
B	0.0000	B	0.0000 *
UA	0.000	UA	0.000 #
VA	0.000	VA	0.000 #
WA	0.0000	WA	0.0000 #
		File: usr/user/Part_1234	
		> N10 G0 X0 Y0 Z0 M3 S1000	
		N20 G1 X40 F2000	
		N30 X40 Z 10.22	
		N40 G3 X21 Y5 R100	
		...	
Compensations + Process data		Program	
V: /database/V1		Group: User	
G53 G153 G253		Sel. program: Part_1234	
K: /database/K4		Subprogram :	
D0: 0.000 H0: 0.000		Execution mode: Automatic	
		Active Block: N10	
		MSG	
F: 0.0	<input type="text"/>	<input type="text"/>	0 %
S1: 0.0	<input type="text"/>	<input type="text"/>	0 %
S2: 0.0	<input type="text"/>	<input type="text"/>	0 %
<input type="button" value="Search block"/>	<input type="checkbox"/> Block skip	<input checked="" type="radio"/> Auto	<input checked="" type="radio"/> Single block
		<input type="radio"/> Semiauto	<input type="radio"/> Single step
		<input type="radio"/> Progr. block	<input type="checkbox"/> Optional stop
			<input type="checkbox"/> General inhibit

The various execution procedures, test modes without axis movement and modified execution procedures can be combined with each other.

Automatic

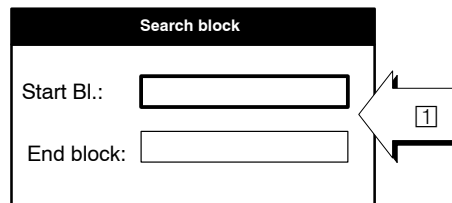
7.3.1 Running program sections

The control unit can process programs completely and also **section by section**. If you want to run a section only, you can define this program section exactly by means of the “Search Block” softkey. As a prerequisite for this function, the corresponding program must have been selected.



The control unit opens a dialog box (1) in which you can enter the start and end block of a program section. Please refer to section 4.5.1 for more information on selecting an object in a dialog box and entering data.

You can acknowledge your entry with the “OK” softkey or cancel the entry with the level return key. The program is executed after you press the Start key on the machine control panel.

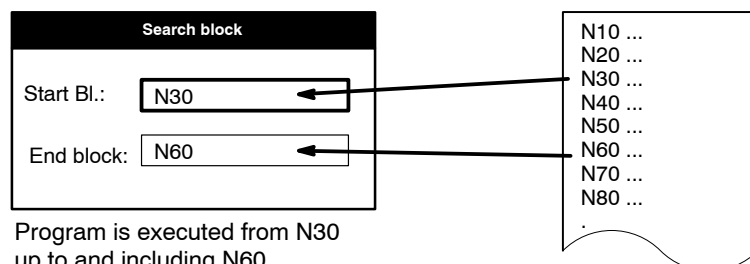


CAUTION

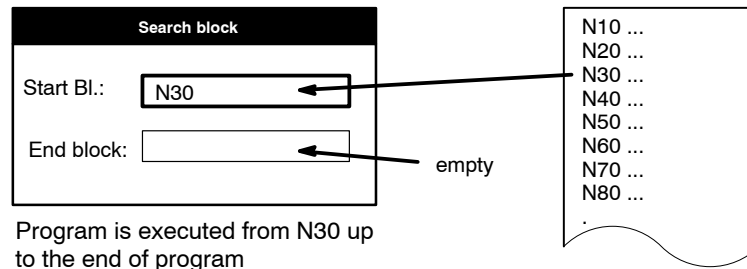
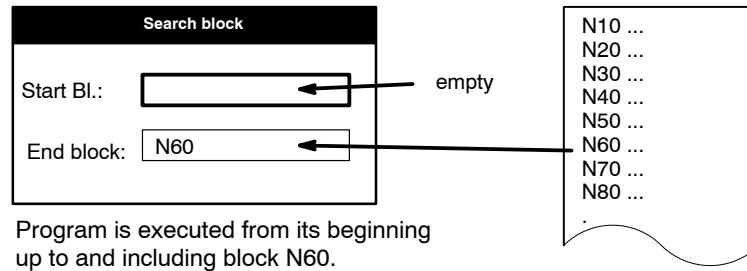
All program blocks preceding the specified start block are skipped (e.g. zero shifts, tool compensations etc.) and their functions are therefore not taken into account!

The axes move from the current position directly to the next programmed position! As possible obstacles cannot be avoided (during this process), collisions may occur! The control unit does not check the traversing paths for a possible collision!

You obtain the following results depending on the input:



Automatic



7.3.2 Axis movements without machine movements

New programs written or modified programs should initially be tested without axis movements.



- In order to set the general inhibit, first deselect all the selected programs.
- The movement of all machining axes in all channels is enabled/disabled using the "General inhibit" softkey.

Auxiliary functions will always be output, regardless of the condition of "General inhibit".

 **General inhibit can only be set if "No program" has been selected in the current channel or in another channel of the system.**



DANGER

Process errors on the machine pose a risk to man and machine! Some unexpected errors may occur while deselecting programs in other channels if the processes running in these channels have not been properly terminated.

Therefore, test programs taking all channels into account where machine-related parts are in action or may be activated!

Automatic

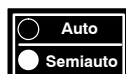
7.3.3 Executing a program “block by block”

In normal operation, programs are executed in **Automatic** mode, i.e. upon cycle start, the program is executed continuously. No cycle start is required when the program switches from one block to the next. By contrast, the program must be restarted by cycle start each time in **single block, single step and program block mode**.

Machining in single block mode, single step mode or program block mode:

Especially in the test phase it may be necessary to run programs block by block. This will allow you to check each element of a program (by pressing the start key on the machine operating panel) to see whether the program run meets your expectations.

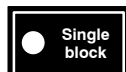
 **For testing purposes, you may also execute programs with General Inhibit activated (no machine movements).**



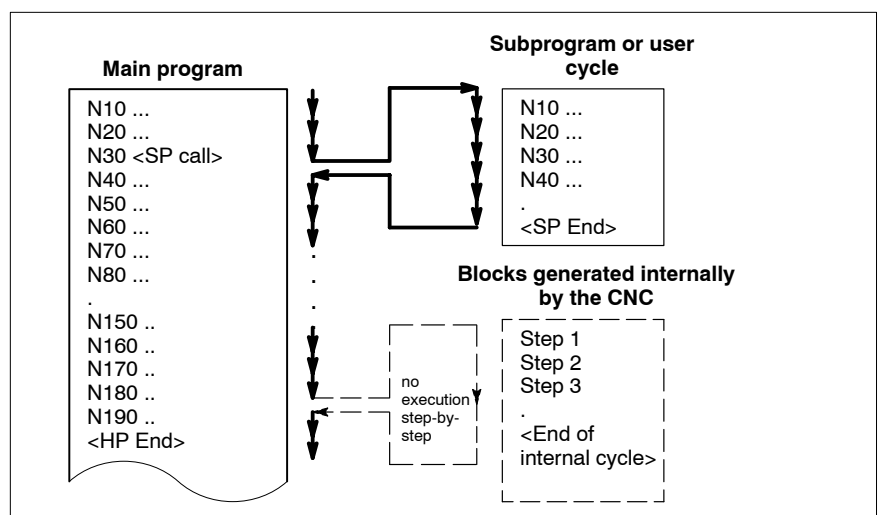
In order to set the functions described below, the toggle softkey “Auto/Semiauto” must be set to “Semiauto”. The “Single Block”, “Single Step” and “Program Block” softkeys at the next softkey level are not enabled until this toggle key has been appropriately set.

The current setting of the functions is displayed by the control unit as a symbol in the NC status line, for an explanation of the symbols, refer to page 4-3.

Single block



- Use the “Single Block” softkey to execute single blocks of a main program, subprogram, or a user cycle every time the Start key on the machine control panel is pressed.

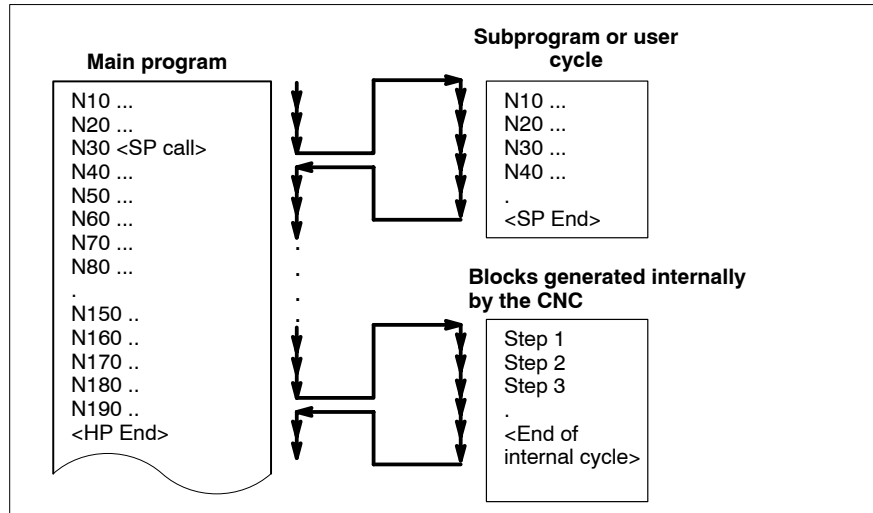


Automatic

Single step



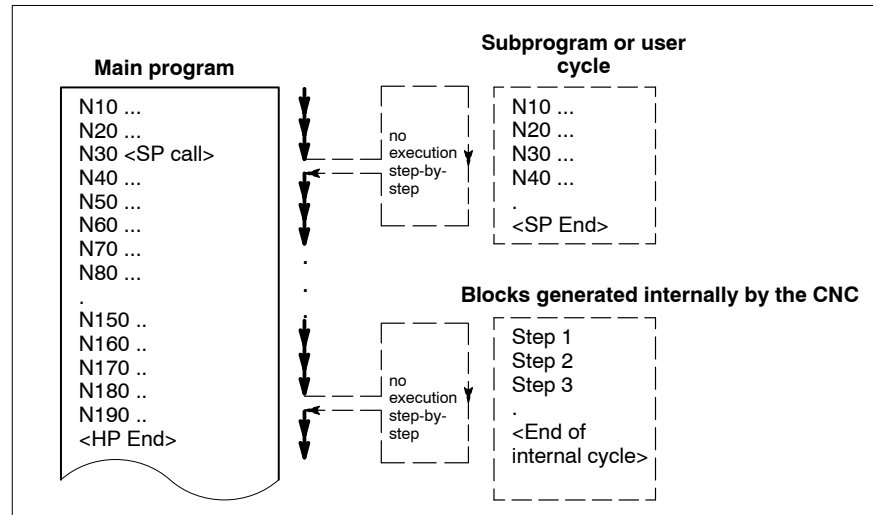
- Use the “Single step” softkey to execute single blocks of a main program, subprogram, or a user cycle every time the Start key on the machine control panel is pressed, as for “Single block” SK, but additionally with the compensation blocks inserted by the NC (e.g. when activating cutter radius compensation) or with internal cycles of the NC.



Program Block



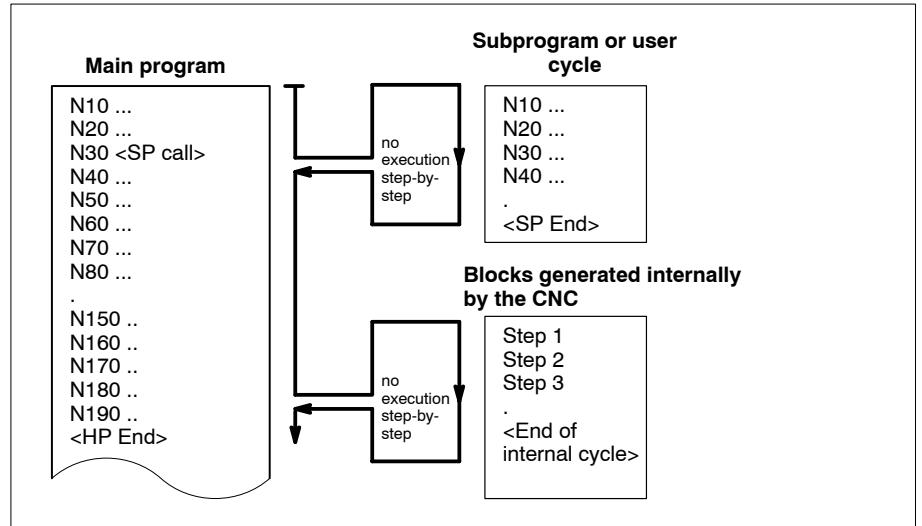
- Use the “Program Block” softkey to execute single blocks of a main program or subprogram every time the Start key on the machine control panel is pressed. The blocks will be executed individually as with manual data input. Block preview is not possible!



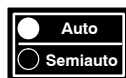
Automatic

7.3.4 Executing programs in Automatic mode (continuously)

In normal operation, programs are executed in **Automatic** mode, i.e. upon cycle start, the program is executed continuously.



The text “Automatic” appears at 1 if the “Auto/Semiauto” toggle softkey is set to “Auto”. The subprogram called will be executed completely.



Workpiece position		Distance to go		File: usr/user/Part_1234	
X	0.000	X	0.000 *	N10 G0 X0 Y0 Z0 M3 S1000	
Y	0.000	Y	0.000 *	> N20 G1 X40 F2000	
Z	0.000	Z	0.000 *	N30 X40 Z 10.22	
B	0.0000	B	0.0000 *	/N40 G3 X21 Y5 R100	
UA	0.000	UA	0.000 #	...	
VA	0.000	VA	0.000 #		
WA	0.0000	WA	0.0000 #		

Compensations + Process data				Program	
V:	/database/V1			Group:	User
	G53 G153	G253		Sel. program:	Part_1234
K:	/database/K4			Subprogram:	
	D0: 0.000	H0: 0.000		Execution mode:	Automatic 1
				Active Block:	N20

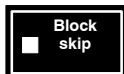
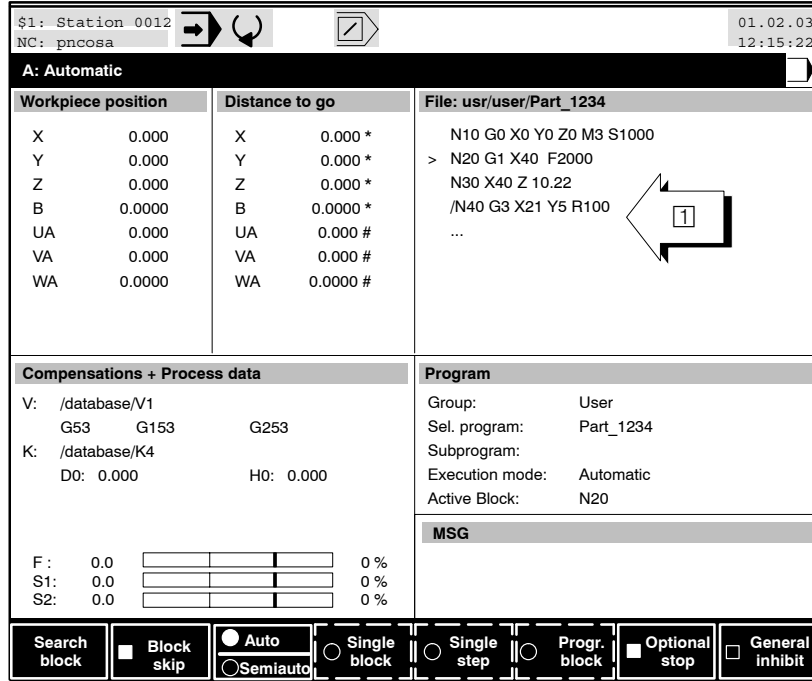
Search block	Block skip	<input checked="" type="radio"/> Auto	<input type="radio"/> Single block	<input type="radio"/> Single step	Progr. block	<input type="checkbox"/> Optional stop	<input type="checkbox"/> General inhibit
--------------	------------	---------------------------------------	------------------------------------	-----------------------------------	--------------	--	--

For testing purposes, you may also execute programs with General Inhibit activated (no machine movements).

Automatic

7.3.5 Block skip

The user can activate or deactivate "Block skip" for the currently displayed channel from the user interface.



Skip all blocks [1] of a part program marked with "/" depending on the interface signal "Block Skip" (NC input 3.4) with the toggle softkey "Block Skip".

The NC input 3.4 "Block Skip" represents the current NC status. Apart from the presentation in the IO status display, this status is also displayed with symbols in the NC status display.

The NC input signal is evaluated at the time of preparation of the block.

Automatic

7.3.6 Optional Stop

The user can activate or deactivate "Optional stop" for the currently displayed channel from the user interface.

The screenshot shows the CNC control interface with the following data:

Workpiece position		Distance to go		File: usr/user/Part_1234
X	0.000	X	0.000 *	N10 G0 X0 Y0 Z0 M3 S1000
Y	0.000	Y	0.000 *	> N20 G1 X40 F2000
Z	0.000	Z	0.000 *	N30 X40 Z 10.22
B	0.0000	B	0.0000 *	N40 M01G3 X21Y5 R100
UA	0.000	UA	0.000 #	N45 M01
VA	0.000	VA	0.000 #	...
WA	0.0000	WA	0.0000 #	

Compensations + Process data			Program
V:	/database/V1		Group: User
	G53 G153	G253	Sel. program: Part_1234
K:	/database/K4		Subprogram:
	D0: 0.000	H0: 0.000	Execution mode: Automatic
			Active Block: N40

MSG		
F:	0.0	0 %
S1:	0.0	0 %
S2:	0.0	0 %

Control Panel Softkeys:

- Search block
- Block skip
- Auto
- Semiauto
- Single block
- Single step
- Prog. block
- Optional stop** (highlighted with a red box)
- General inhibit



The toggle softkey "Optional Stop" stops processing of an NC part program depending on the interface signal "Optional Stop" (NC input 1.6) at NC blocks containing M01.

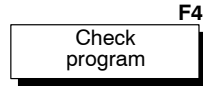
The NC input 1.6 "Optional stop" represents the current NC status. Apart from the presentation in the IO status display, this status is also displayed by symbols in the NC status display.

The NC input signal is evaluated at the time of preparation of the block.

Automatic

7.4 Check program

Selection:



The "Check Program" softkey provides access to the display functions "Permanent Variables" and "Definable Permanent Variables".

☞ For information on how to display "Permanent Variables", refer to the "CPL Programming Manual".

The screenshot shows the CNC control interface during a program test. At the top, it displays '\$1: Station 0012' and 'NC: pncosa'. The main display area is titled 'A: Automatic/Program Test' and contains a table with three columns: 'Workpiece position', 'Distance to go', and 'File:'. The 'Workpiece position' column shows X, Y, Z, and B axes with values of 0.0000. The 'Distance to go' column shows X, Y, Z, and B axes with values of 0.0000 *. The 'File:' column shows program lines: N10 G0 X0 Y0 Z0 M3 S1000, N20 G1 X40 F2000, N30 X40 Z 10.22, and N40 G3 X21 Y5 R100. Below this table is a section for 'Definable permanent variables' with two rows: 'DOUBLE @DOUBLEVAR2 (1, 1) 0.000000' and 'DOUBLE @DOUBLEVARARR2 (2, 22) ———> ARRAY'. At the bottom of the screen, there are several softkeys: 'Permanent variables', 'Definable permanent variables', 'Display array', 'Page up', and 'Page down'. An arrow labeled '1' points to the 'Definable permanent variables' section.

Workpiece position	Distance to go	File:
X 0.0000	X 0.0000 *	N10 G0 X0 Y0 Z0 M3 S1000
Y 0.0000	Y 0.0000 *	> N20 G1 X40 F2000
Z 0.0000	Z 0.0000 *	N30 X40 Z 10.22
B 0.0000	B 0.0000 *	N40 G3 X21 Y5 R100
		...

Definable permanent variables			
DOUBLE	@DOUBLEVAR2	(1, 1)	0.000000
DOUBLE	@DOUBLEVARARR2	(2, 22)	————> ARRAY

At this point you can



- return to the previous operating level with the level-return key.



- use the "Permanent variables" softkey to display the variable names and the values of the permanent variables in the display array "Permanent variables"



- use the "Definable permanent variables" softkey to display the variable names and the types of the definable permanent variables in the display array "Definable permanent variables"



- use the "Display array" softkey to display the values and types of the corresponding variable array that is selected with the cursor

Automatic

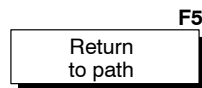


- use the "Page up" softkey to browse back through the display page by page, if the entries go beyond the display array.
- use the "Page down" softkey to browse forward through the display page by page, if the entries go beyond the display array.

The variable values are updated only after the display changes (test level return key and SK "Check program").

7.5 Return to contour

Selection:



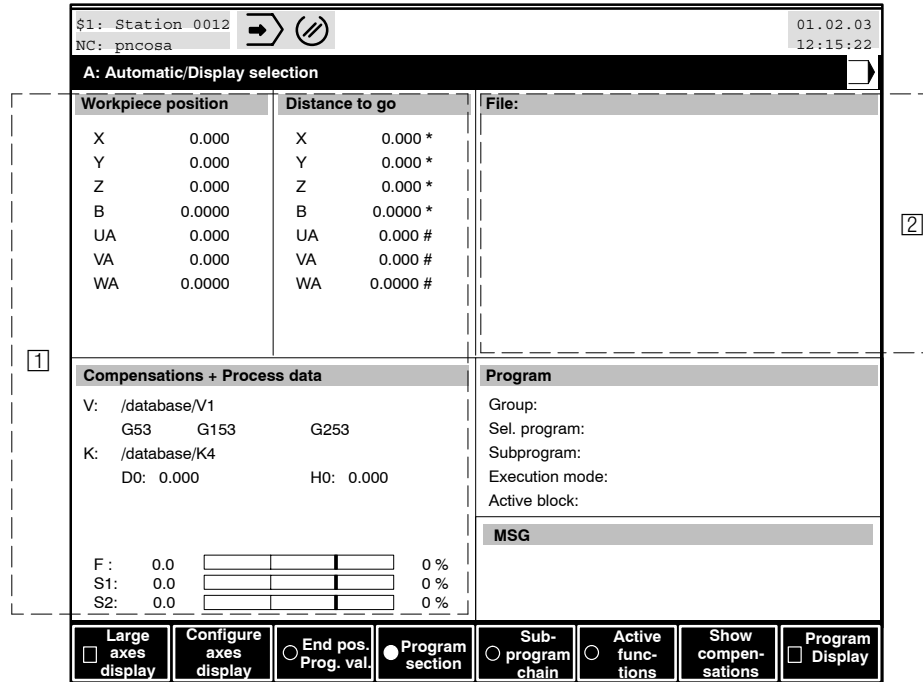
If an interruption of a program is followed by "Remove from contour" softkey, the touch-down point will be approached again and processing of the program will be restarted from this point if you press the "Return to path" softkey. Also refer to the description of "Remove from contour" at the "MANUAL" menu level, section 6.4.

If "Remove from contour" was not selected at the "MANUAL" menu level, the "Return to path" SK will be dimmed.

Automatic

7.6 Screen displays

You can configure the screen displays of the “AUTOMATIC” and “MANUAL” menus by setting individual display options.



At this point you can



- change the **display** in the area 1:
 - display the workpiece position, Distance to go and "Compensations + Process data" or
 - Large Axes Display and "Process data"



- change the **display** in the area 2 between the following types of information:
 - end position and program value,
 - "Program Section"
 - Subprogram chain and
 - "active Functions"

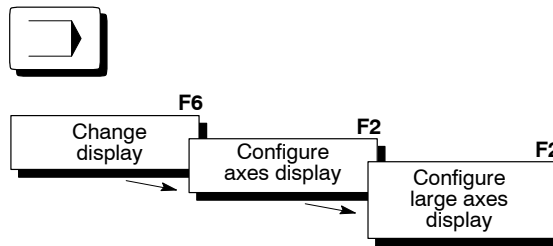


- return to the previous operating level with the level-return key.

Automatic

7.6.1 Configuring the large axes display

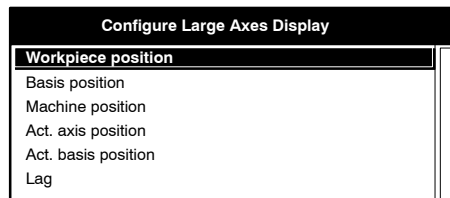
Selection:



At this point you can

Configure large axes display

- decide, **which information** should be displayed in large format.
 - Workpiece position (default)
 - Basis position
 - Machine position
 - Act. axis position
 - Act. basis position
 - Lag
 - Distance to go
 - End position
 - Program value
 - Online correction

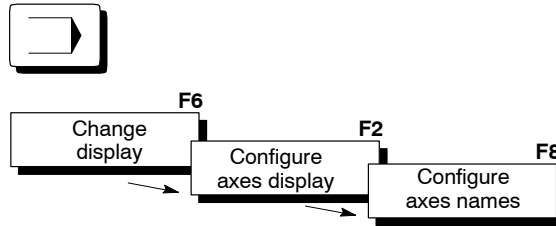


☞ The “Configure Large Axes Display” softkey also influences the large format display in manual mode.

Automatic

7.6.2 Configuration of axis names

Selection:



”Configure axes names” determines whether logical or physical axis names are used for the main menus “MANUAL” and/or “AUTOMATIC”. The settings are made separately for each menu (refer to illustration).

Configure axis names

Manual menu level

Logical axes names
 Physical axes names

Menu level Automatic

Logical axes names
 Physical axes names

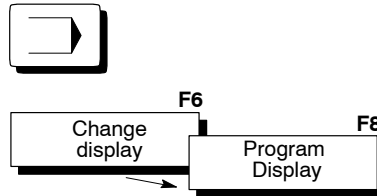
Default setting:

- Manual: Physical axes names
- Automatic: Logical axes names

Automatic

7.6.3 Displaying program

Selection:

The program is shown in the area 1.

Station 0012
NC: pncosa

01.02.03
12:15:22

A: Automatic/Display selection

File: /usr/user/prg_1

```

N10 G0 X0 Y0 Z0 M3 S1000
> N20 G1 X40 F2000
N30 X40 Z 10.22
N40 G3 X21 Y5 R100
...

```

Process data		MSG	
F:	0.0		0 %
S1:	0.0		0 %
S2:	0.0		0 %

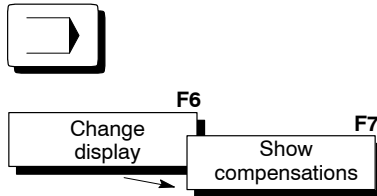
Large Axes display | Configure axes display | End pos. Prog. val. | **Program section** | Sub-program chain | Active functions | Show compensations | Program Display

When a protected subprogram is called, the program display stops at this point. As soon as the subprogram has been executed, the display of the main program is continued.

Automatic

7.6.4 Show compensations

Selection:



You can show the following information:

In the area 1:

- active zero shift table (V)
- active G functions of the zero shift table (as well as external zero shifts, if programmed)
- active geometry table (K)
- active radius and length compensations
- Data for external and universal tool correction, if programmed

In the area 2:

- Total of zero shifts for every axis

In the area 3:

- you can directly display up to 8 values from the PLC (e.g. active tool or tool life).

Workpiece position		Distance to go		File:
X	0.000	X	0.000 *	
Y	0.000	Y	0.000 *	
Z	0.000	Z	0.000 *	
B	0.0000	B	0.0000 *	
UA	0.000	UA	0.000 #	
VA	0.000	VA	0.000 #	
WA	0.0000	WA	0.0000 #	

Compensations + Process data				Total zero shift	
V:	/database/V1			X	0.0000
	G53	G153	G253	Y	0.0000
			G160	Z	0.0000
K:	/database/K4			B	0.0000
	D0:	0.000	H0:	0.000	
	G145 D:	0.000	H:	0.000	
	G147		H:	0.000	
F:	0.0				
S1:	0.0				
S2:	0.0				

Automatic

At this point you can



- use the "Overview compensations" softkey to display the overview of currently active compensation addresses, their values, the total zero shifts and also external zero shifts.

\$1: Station 0012						01.02.03
NC: pncosa						12:15:22
A: Automatic/Display selection/Compensations display/Overview						
V: /database/V1						
	G54	G154	G254	G160	Total	
X	10.0000	0.5000	1.0000	0.0000	11.5000	
Y	0.0000	0.0000	0.0000	0.0000	0.0000	
Z	0.0000	0.0000	0.0000	0.0000	0.0000	
B	0.0000	0.0000	0.0000	0.0000	0.0000	
K: /database/K4						
	D0: 0.000	H0: 0.000				
	G145 D: 0.000	H: 0.000				
	G147	H: 0.000				
						Cancel

The "Cancel" SK takes you back to the "Display selection" softkey level.



The compensations shown may also include external tool and zero shift compensations.

Automatic

Notes:

Manage

8 Manage


This section discusses the functionality of the control unit from the machine operator's point of view. Questions such as "What must I do in order to ..." or "How can I ..." are answered here.

For this purpose, the softkey operating sequence ("softkey-path") taking you through individual operating levels to the desired function is indicated.

This section discusses the "MANAGE" menu level.

The detailed structure of the table of contents gives you a concise overview.

If you require information **only about one particular softkey**, please look it up in the index under "softkey". The page on which the respective softkey is described can be found there.

 **To facilitate proper handling and operation of the control unit, user knowledge in respect of the hierarchy of softkeys and structure of dialog boxes is an indispensable prerequisite. To this end, also read the section "Man-machine interface".**

Manage

8.1 Directories

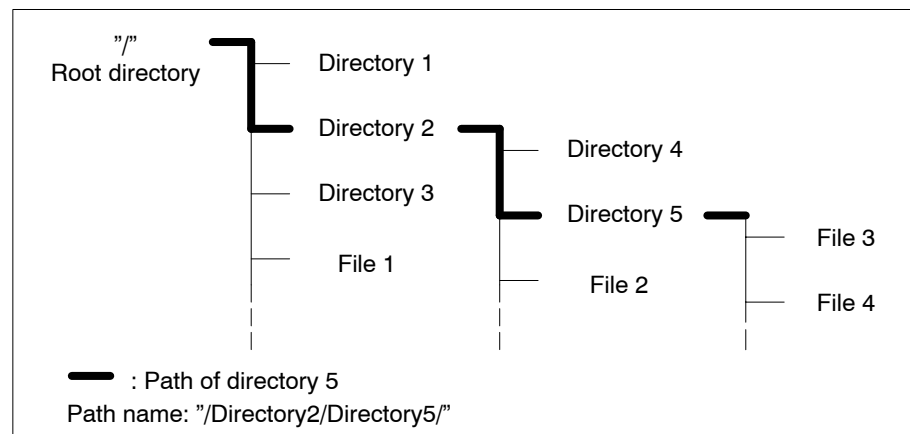
For saving all the necessary data, a predefined directory structure exists within the control unit, which helps in organising the available memory in a neat fashion. Starting from the root directory, there are various subdirectories which can be extended individually.

In addition, it is possible to use the hard disk of the relevant PC control panel or a network computer connected via network. For this purpose you must mount the directories on the external computers (also refer to section 8.1.3).

In order to access files, the path must be entered starting from the root directory. It contains the names of all directories which must be “passed through” in order to arrive at the desired information. The individual directory names are separated by the “/” character.

Example:

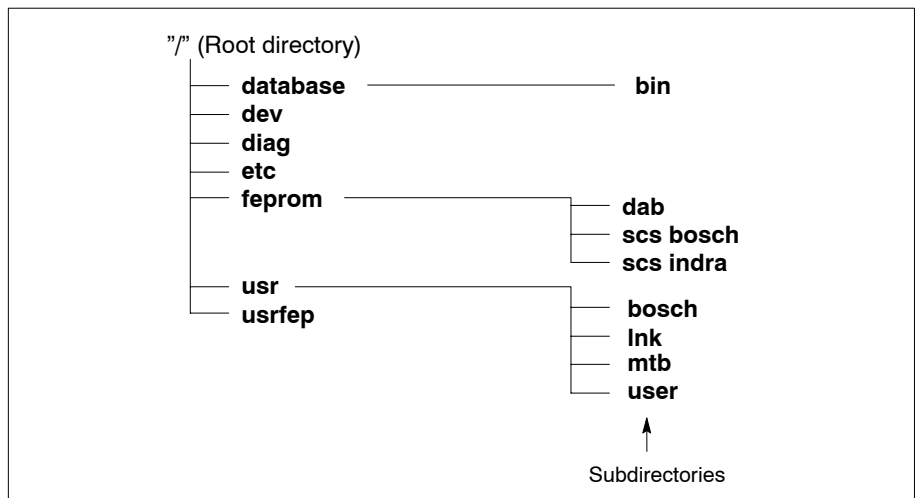
In order to gain access to file 3 or 4, you must first switch to directory 5 via the path `"/directory2/directory5/"`. Access to information within directory 5 is only then possible.



Manage

8.1.1 Directory structure of the control unit

The control unit contains the following channel-independent standard directory structure:



The standard directory structure contains directories which:

- are assigned to different **users** in order to separate user data ("/usr/bosch", "/usr/mtb", "/usr/user")
- are assigned to different **memory areas** ("/feprom", "/usrfep")
- contain **system files** of the control unit ("/database", "/dev", "/diag", "/etc")

The control unit displays the "Switch Directory" softkey at the appropriate time so that you do not have to enter the complete path each time you want to switch over to a different directory. You can therefore call up the "Select Directory" dialog box in which you can select the desired directory and change directly to this directory simply by pressing a key.

The control unit displays the directories in the dialog box according to various criteria, depending on the "Groups", "Main Program" and "Directory Structure" radio softkeys. For this feature, refer to section 8.1.5.

The standard directory structure can be extended in two ways:

- by **creating new directories** (refer to section 8.1.4).
- by **mounting**: freely selectable directories on another computer or a disk are added to the directory structure of the control unit (refer to section 8.1.3).

Manage

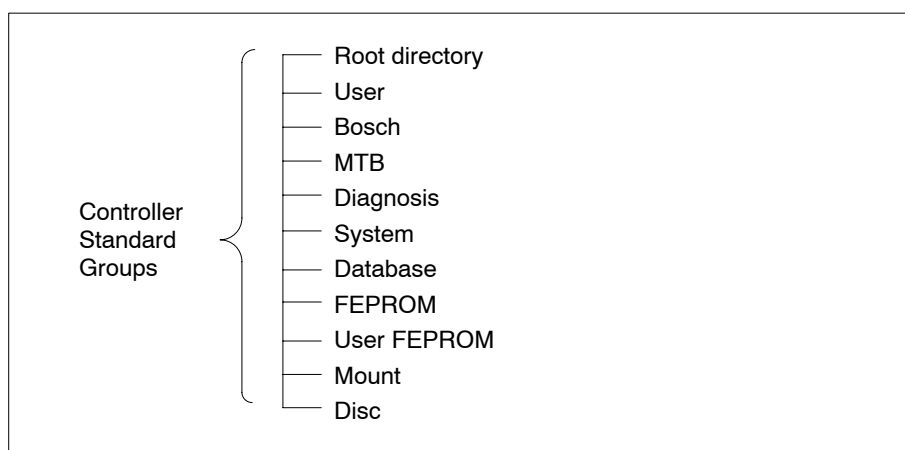
8.1.2 Groups

A group is an identifier for a directory path. It simplifies the process of changing over to another directory, refer to page 8–13.

Standard groups

In the control unit, the following **standard groups** are preset:

Example: Group: **User**
Directory path: **/usr/user**



Self-defined groups

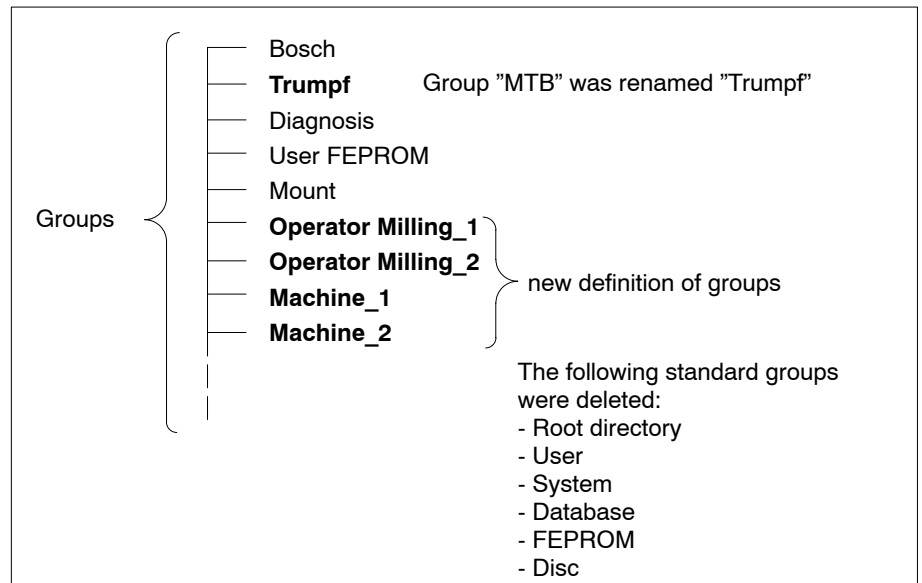
The standard groups can be **renamed, deleted** and extended **using the self-defined groups**.

Example:

Self-defined group: **Operator Cutting_1**
corresponds to path: **/usr/user/Miller**

Self-defined group: **Machine_1**
corresponds to path: **/mnt/Workshop/Cutting_1**

Manage



Self-defined groups are defined in a country-specific text file "dab_ini.<country code>".

You can create this file with the help of the sample file "dab_ini.dat", which was copied to directory "<PNC Installation path>\text" together with the PC control panel software. This file is edited with a normal **Windows Editor** (e.g. "Notepad"), the <country code> is determined from the language-specific string of numbers for the respective country:

Examples:

German: "049" —>dab_ini.049

English: "044" —>dab_ini.044

☞ **No option is offered within the standard user interface for editing the textfile "dab_ini.dat".**

The "dab_ini<country code>" file must be stored in the directory "<PNC Installation path>\text" on the PC control panel.

☞ **If the file corresponding to the language setting is not available the standard groups are displayed.**

Manage

Creating the file**"dab_ini.<country code>"**

The definition of the group names is initiated by the keyword [GROUPS].

The **default entries** of the file dab_ini.dat are:

```
[GROUPS]
"Root directory"    "/"
"User"              "/usr/user"
"Bosch"             "/usr/bosch"
"MTB"               "/usr/mtb"
"Diagnosis"         "/diag"
"Datenbase"         "/database"
"FEEPROM"           "/feprom"
"User FEEPROM"     "/usrfep"
"Mount"             "/mnt"
"Disc"              "/mnt2"
```

These group definitions can be changed, deleted and extended in any way.

Syntax:

```
"<Group name>" "<directory path>"
```

where

<Group name>	name of the group (max. 32 characters)
<Directory path>	directory the group points to (max. 99 characters)


Comment lines:

Lines starting with a semicolon are interpreted as comment lines and disregarded.

Manage

Example: dab_ini.044

```
[GROUPS]
"Root directory"      "/"
"User"                "/usr/user"
"Bosch"               "/usr/bosch"
;
; the following group was renamed: MTB -> Trumpf
"Trumpf"              "/usr/mtb"
;
"Diagnosis"           "/diag"
"Database"            "/database"
"FEPROM"              "/feprom"
"User FEPROM"         "/usrfep"
"Mount"               "/mnt"
"Disc"                "/mnt2"
;
; the newly defined groups start from this point onwards:
"Operator Cutting_1"  "/usr/user/Miller"
"Operator Cutting_2"  "/usr/user/Smith"
"Machine_1"           "/mnt/Workshop/Machine_1"
"Machine_2"           "/mnt/Workshop/Machine_2"
```

 **The directories listed for the defined groups must be available in the directory structure of the control unit or in the mount directory in order to be accessible by the user.**

For this purpose, create the necessary directories in the "MANAGE" menu of the standard user interface (refer to section 8.1.4).

Manage

8.1.3 Linking the mount directory

**CAUTION**

Mount directories may be set up by authorized expert personnel with administrator privileges only. Expertise in network handling and software configuration is required. Non-compliance with this requirement may result in malfunctions of the machine, the power system or data loss.

The file system used by the PNC is available in the RAM memory of the control unit. Furthermore, the PNC can also access directories located externally, e.g., on the hard disk of the PC control panel or in the network.

Mount directories should be used to backup system data, CNC files or other files external to the control unit, or to access large program libraries. For example, a very large program, which exceeds the storage capacity of the NC and must therefore be executed from the hard disk can be selected at the "AUTOMATIC" menu level using this functionality.

The NFS (Network Filesystem) of Sun, Inc., is used to import ("mount") directories into the control unit.

- The NFS server is installed in the location that exports or shares directories. It may be run on different operating systems e.g. Windows, UNIX, Linux.
- The NFS client of the PNC control imports the mount directories, thus providing the link.

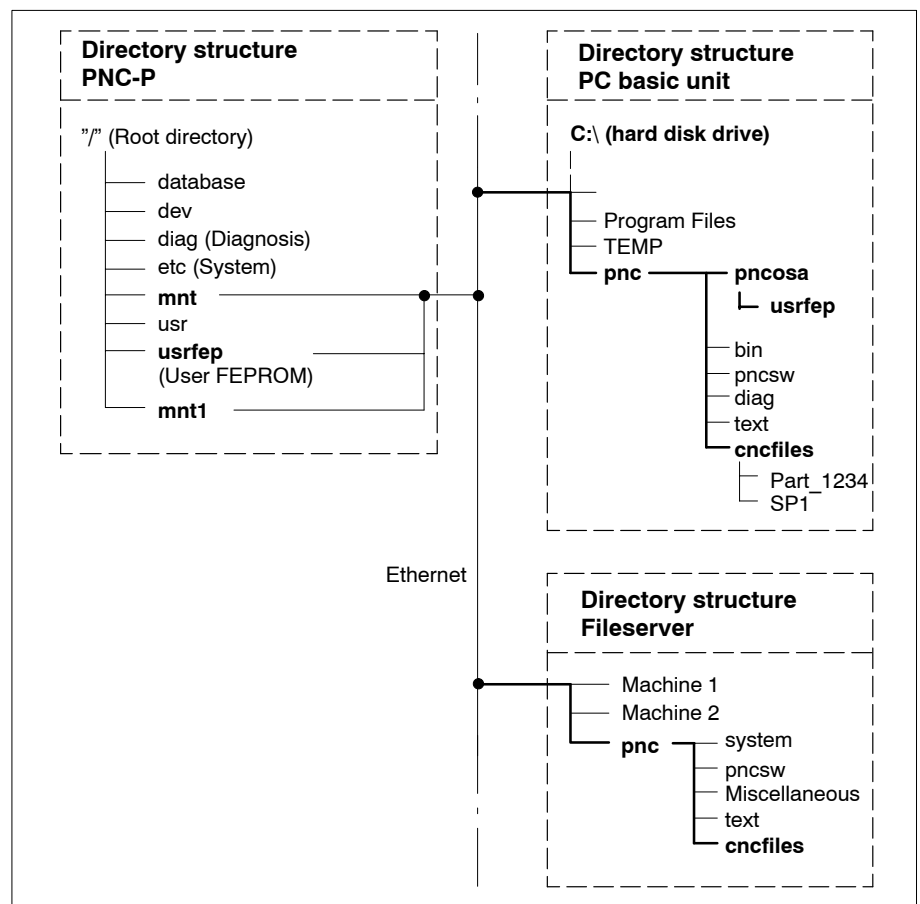
Manage

PNC-P

As a plug-in adapter for the PC basic unit, the PNC-P always needs the following mount directories which cannot be removed:

- Mount item "User FEPROM":
the name of the user FEPROM directory is **/usrfep** which is available in the path **c:\pnc\pncosa\usrfep** in the PC basic unit as a factory default.
- Mount item "Mount":
the default name of the mount directory is **/mnt** which is available in the path **c:\pnc\cncfiles** in the PC basic unit as a factory default.

Furthermore, a total of 10 mount directories may be additionally linked. For the procedure to be applied in connection with the Software PNC Control, refer to manual "PNC-P Software Installation", part number on page 1-7.



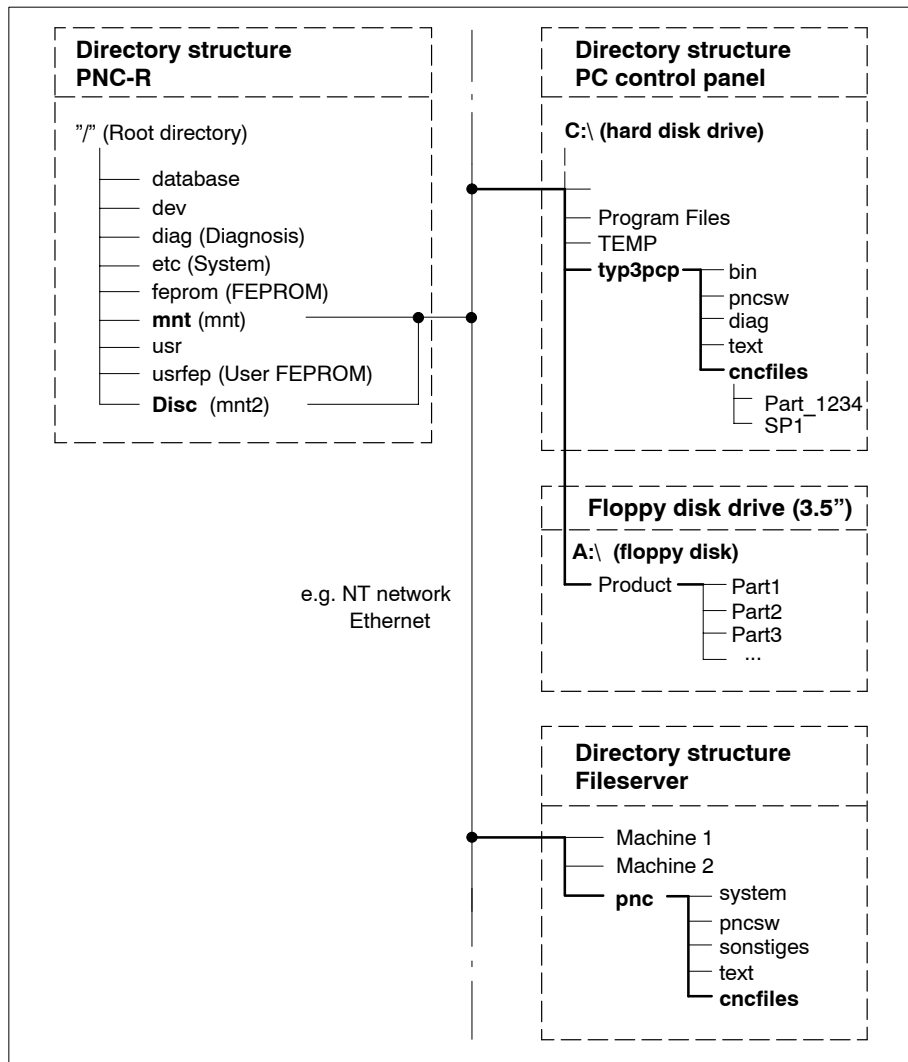
Manage

PNC-R

In the PNC-R, the following mount directory of the PC control panel has been set in the factory:

- Mount item "Mount":
the default name of the mount directory is **/mnt** which is available in the path **c:\typ3pcp\cncfiles** in the PC control panel as a factory default.

Furthermore, **/mnt2** may be linked as an additional mount directory. For the procedure to be applied in connection with the Software T3 Configuration, refer to manual "PNC-R Software Installation", part number on page 1-7.

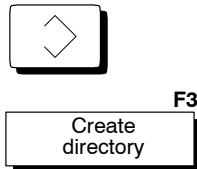


Manage

8.1.4 Create directory

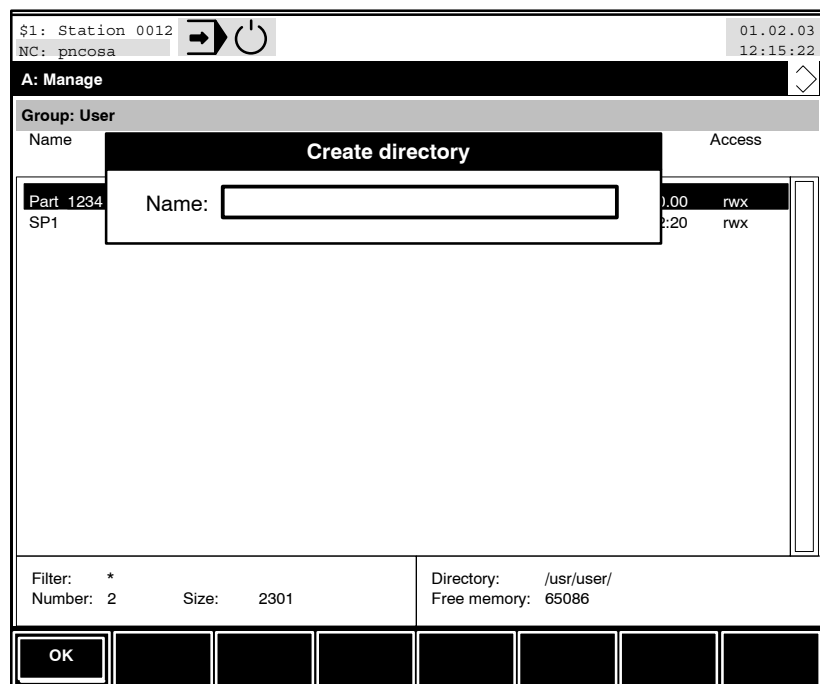
It is recommended that you file all programs which are required for a specific workpiece in one common directory in order to obtain the best possible clarity in managing part programs. The function “Create directory” of the control unit simplifies the handling necessary while creating a new part program.

Selection:



Using this function, a subdirectory is created in the active directory. Before pressing the softkey “Create directory”, the active directory must be set accordingly.

☞ **With the exception of the FEPROM (/feprom) group, you can add new directories in every other group of the directory structure of the control unit.**



At this point you can

- **enter the directory name.** Distinction is made here between uppercase and lowercase letters! (Max. 29 characters).

Manage



- close the dialog box and **return to the previous operating level** with the level-return key. Changes within the dialog box are not saved. The “Create directory” function is aborted.
- **Create directory** assigning it the name specified in the dialog box.

8.1.5 Switch directory

There are various points on the operator interface where it may be necessary to switch to other directories. The control unit offers the “Switch Directory” function on the F6 softkey at these points.

Another option for changing directories without the “Switch Directory” softkey is provided by the following:

- ”_” key: Change from the current directory to the parent directory (one level up).
- ”+” key: Change from the current directory to a subdirectory. For this purpose, the focus within the file display must be set on a directory name (access information contains the letter “d”)

The screen structure shown below and the function of the “Switch Directory” softkey are basically identical whenever displayed.



When you press this softkey, the control unit opens the “Select Directory” dialog box, in which you can select a desired directory. Refer to section 4.5.2 to find out how to select a line from a list box.

The screenshot shows the operator interface with a 'Select directory' dialog box open. The dialog box contains a list of directories: Root directory, User, Bosch, MTB, Diagnosis, System, Database, FEPROM, User FEPROM, Mount, and Disc. The 'Root directory' is currently selected. The background interface shows a file list with columns for Name, Date, and Access. The status bar at the bottom of the screen displays 'Filter: *', 'Number: 2', 'Size: 2301', 'Directory: /usr/user/PART_1234/', and 'Free memory: 68069'. The bottom navigation bar includes buttons for 'OK', 'Groups', 'Main programs', 'Dir. structure', 'Parent Directory (-)', and 'Sub Directory (+)'.

Manage

At this point you can



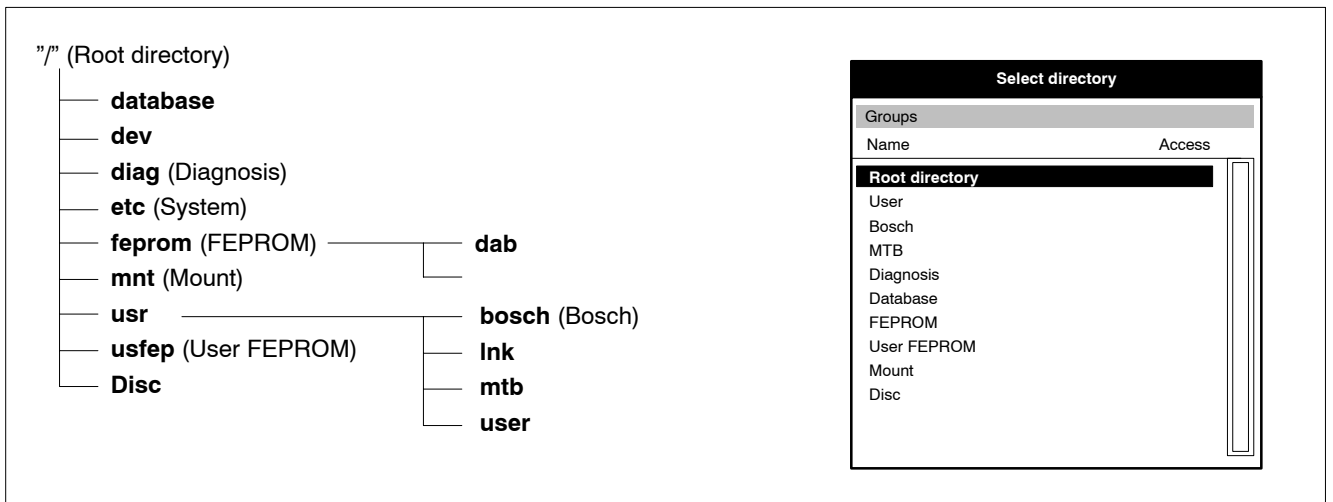
- **exit the dialog box** with the level-return key. The current directory remains unchanged.



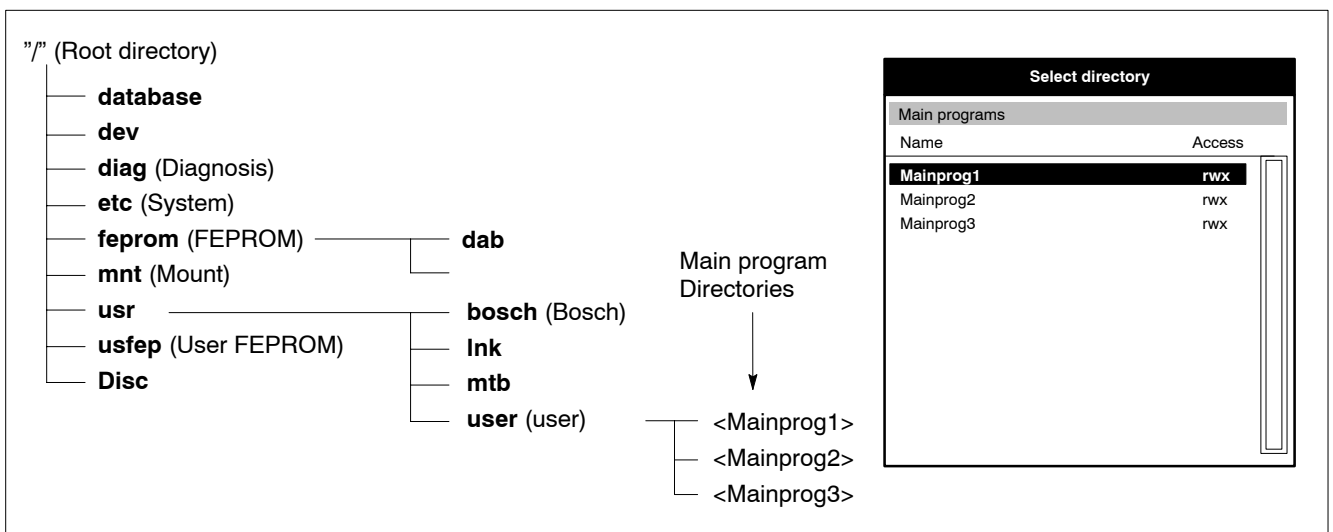
- use the “OK” softkey to change to the **selected directory and close the dialog box**.



- set a **group-oriented display of directories** in the dialog box. You can select a group and change directly to this group directory. The use of groups supports quick switchover between the directories. The figure below illustrates the directories which are normally assigned to the individual groups.

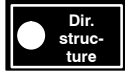


- set the **display of all main program directories** in the dialog box. You can select a main program and change directly to the directory of this program. The figure below illustrates where main program directories are stored.

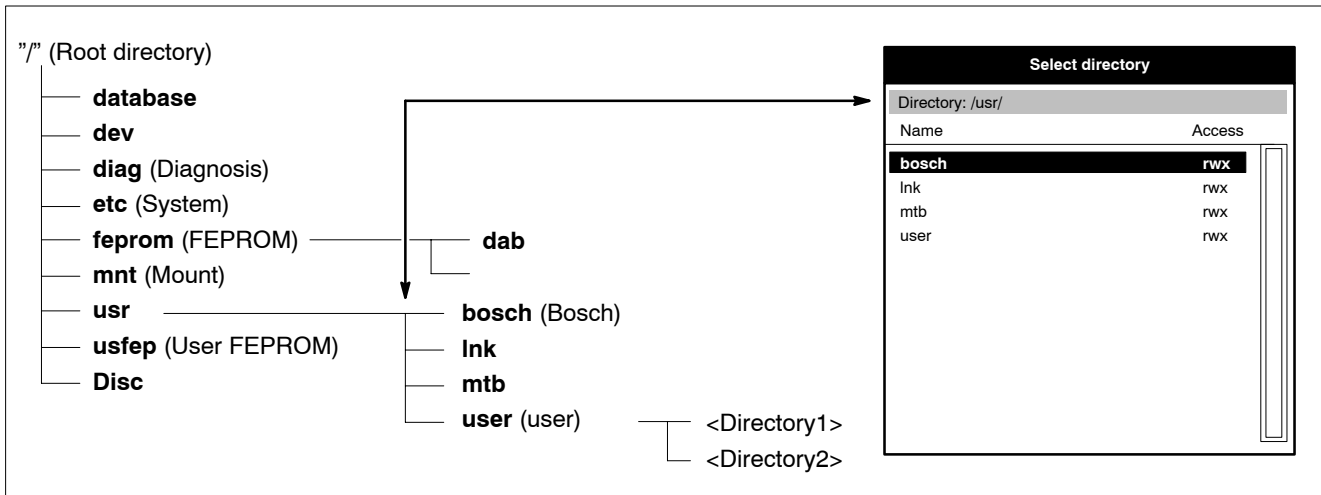


Manage

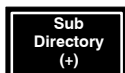
By specifying main program directories, you have the option to store all programs in one common directory while creating part programs. For creating a common directory, refer to the "Create directory" softkey (refer to section 8.1.4).



- set a **system-oriented display of directories** in the dialog box. The control unit displays all existing subdirectories of a given directory in this case. You can now sequentially move through the directory structure of the control unit by using the Parent Directory and Subdirectory softkeys. The "OK" softkey must be pressed in order to change to the currently selected directory.



- display all the directories on the higher next level. This does not change the currently active directory. The control unit always switches the display in the dialog box to "Directory Structure" when this function is used. You can also use the "-" key instead of the "Parent Directory" softkey to do this.



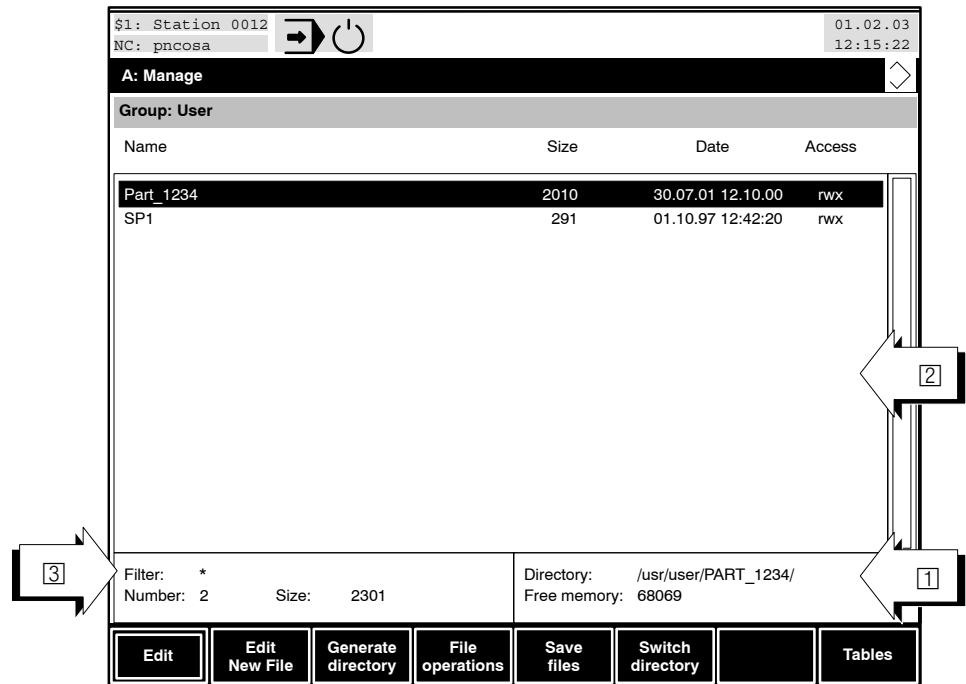
- display all the subdirectories of the currently selected directory. The dialog box remains empty if no other directories exist (for example, if only files exist). The control unit always switches the display in the dialog box to "Directory Structure" when this function is used. You can also use the "+" key instead of the "Subdirectory" softkey.

Manage

8.2 Displaying files in a directory

The user interface of the control unit displays all files contained in the current directory at various positions on the user interface.

The following display illustrates the highest operating level of the Manage menu as an example. The screen structure illustrated also applies for all other positions.



The control unit displays the current directory and the remaining free memory area for files at position 1 as well as all files which are contained in this directory in area 2. The number line illustrates the total number and size of files contained in this directory.

- ☞ Please note that the display in area 2 is controlled by the currently active file filter (refer to item 3). Therefore, not all existing files may be shown.
For information on the file filter function, refer to section 8.7.

Manage

File information

In addition to the file name, the size of file in bytes, the date/time the file was modified and the access to the file are displayed.

The display of the file size, the date/time the file was modified and access rights can be enabled and suppressed for a file by pressing <Ctrl> + <i> simultaneously. In the event of large directories (many programs), the display may be built up **faster** if file information is **suppressed**.

With <Ctrl> + <r>, you can refresh the directory display in "Manage" GOM.

The "Access" column has a special meaning. Here, the access information for each file is displayed.

Each individual character is assigned a specific meaning:


- d: the "file" is (a reference to) a directory
- r: the file can be read or displayed (e.g. with an editor)
- w: the file can be changed (e.g. with an editor) or deleted
- x: the file can be executed (e.g. program execution).


Please refer to section 8.6 for more information on setting table access rights.


8.2.1 Selecting files

In order to apply a function (e.g. copy, delete, rename, output etc.) to one or several files, you must first select the relevant file(s).

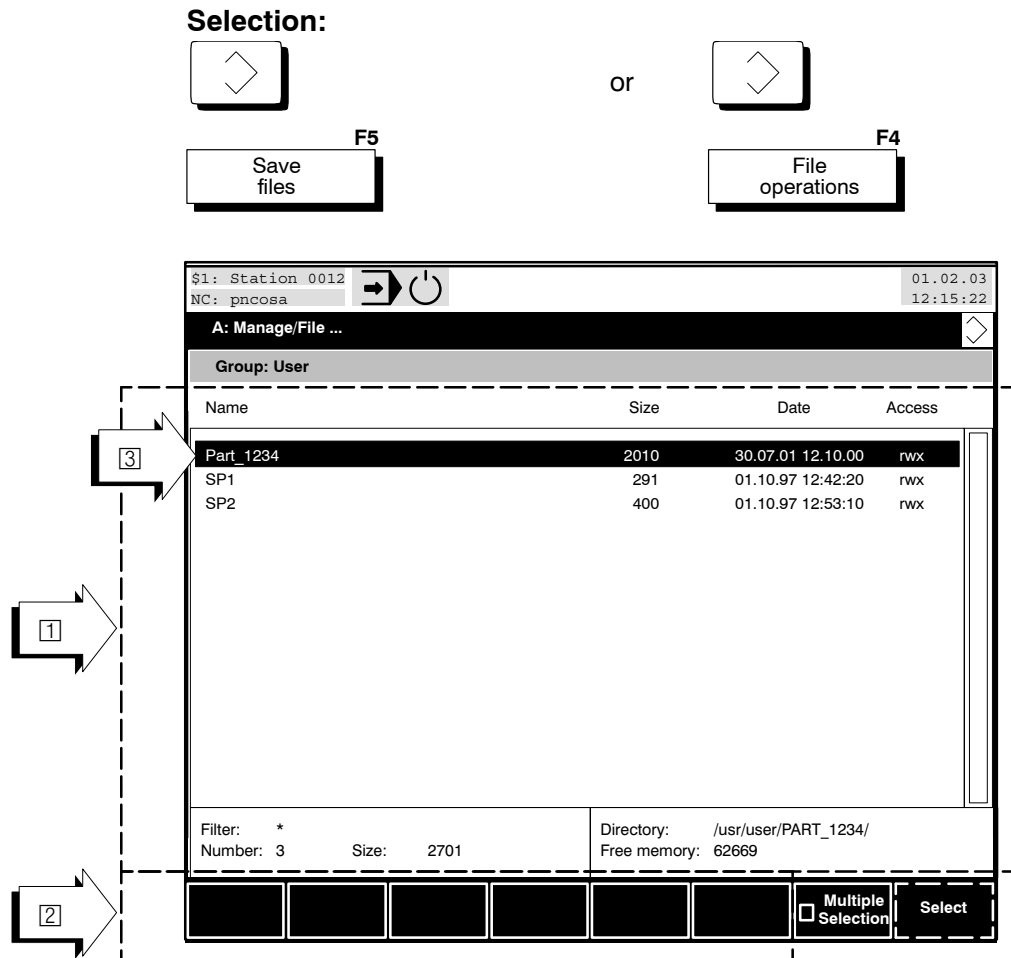
Switch – if necessary – to the directory in which the desired file(s) is/are stored (refer to section 8.1.3). The control unit lists all the files that exist in the current directory.

 **Note that the display of files in a directory is controlled by the currently active file filter. Some of the available files may therefore not be displayed. The control unit displays the current file filter setting on the bottom left of the screen after the text "Filter". For the functioning of the file filters, refer to section 8.7.**

The structure of the screen in area  as illustrated below is basically the same for all positions from which files can be selected. The "Select" softkey is available in the "Manage" menu, both at the "File Operations" softkey level and under "File Transfer". The "Multiple Selection" softkey is available only at the "File Operations" softkey level.

The softkeys in section  are not relevant to the "Select Files" function and are therefore not shown in this example.

Manage



At this point you can

► **select/deselect a single file or several files in succession**

- Press \blacktriangledown , \blacktriangle , \langle pgup \rangle , \langle pgdn \rangle , \langle home \rangle or \langle end \rangle to move the focus $\boxed{3}$ to the desired line within the list.
- Select/cancel the line with the \langle sel \rangle or \langle space \rangle keys (a line that has been selected from a list is displayed in reverse video)
- In the case of active multiple selection (refer to “Multiple Selection” softkey) continue with point 1 until all desired files have been selected.

If multiple selection is not active, only “**Single selection**” is possible. The control unit then automatically selects the line on the list to which the focus has been set.



A number of selected files can be deselected all at once by pressing the \langle del \rangle key.

If in the case of active multiple selection no file has been selected yet, you can select all files displayed by pressing the key combination \langle shift \rangle + \langle sel \rangle .

Manage



► **select a complete section** of list lines

(only possible where multiple selection is active)

- Press  , <pgup>, <pgdn>, <home> or <end> to move the focus (3) to the beginning of the desired range of lines within the list.
- Select the line with the <sel> or <space> keys (a line that has been selected from a list is displayed in reverse video).
- Press  , <pgup>, <pgdn>, <home> or <end> to move the focus (3) to the end of the desired range of lines within the list.
- All of the list entries in the specified range are now selected when you press the <shift> + <space> keys.

► **Deselect a complete section** of lines

(only possible where multiple selection is active)

- Press  , <pgup>, <pgdn>, <home> or <end> to move the focus (3) to the beginning of the desired range of lines within the list.
- Deselect the line with the <sel> or <space> keys (a line that has been deselected from a list is displayed normally again).
- Press  , <pgup>, <pgdn>, <home> or <end> to move the focus (3) to the end of the desired range of lines within the list.
- All of the list entries in the specified range are now deselected when you press the <shift> + <space> keys.

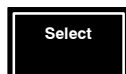


- **return to the previous operating level** with the level-return key. Files which have already been selected remain selected.



- enable or disable the **option to select multiple files** by means of the "Multiple Selection" softkey. The control unit automatically selects that file on which the focus is positioned if "Multiple Selection" is **disabled**.

This softkey only appears in the "File operations" softkey level.



- simultaneously select or deselect **all files which correspond to a selection filter** using the "Select" softkey. The control unit opens a dialog box in which you can enter the filter string. You can use the same special characters as for file filter setting (refer to section 8.7). The filter string is normally set at "*" (= all files).

Use the "Select" or "Cancel" softkeys to select or deselect all files which correspond to the set selection filter.

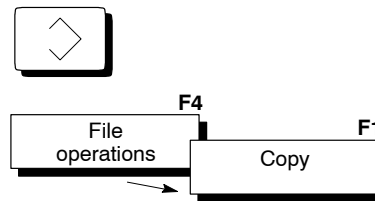
The "Select" softkey can only be activated at the "File operations" softkey level if the "Multiple selection" check softkey is active.

**Filter string input is case-sensitive!****The selection filter only affects those files which are not suppressed by the file filter.****All selected files will be cancelled if you press a main menu key!**

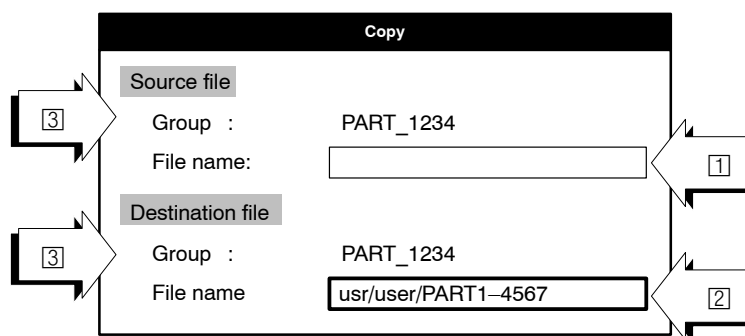
Manage

8.3 Copying files

Selection:



The control unit opens the “Copy” dialog box when you press the “Copy” softkey. The text which appears in position [3] depends on the current directory and on the directory display mode (refer to section 8.1.5).



The following options are available, depending on the previous file selection (refer to section 8.2.1):

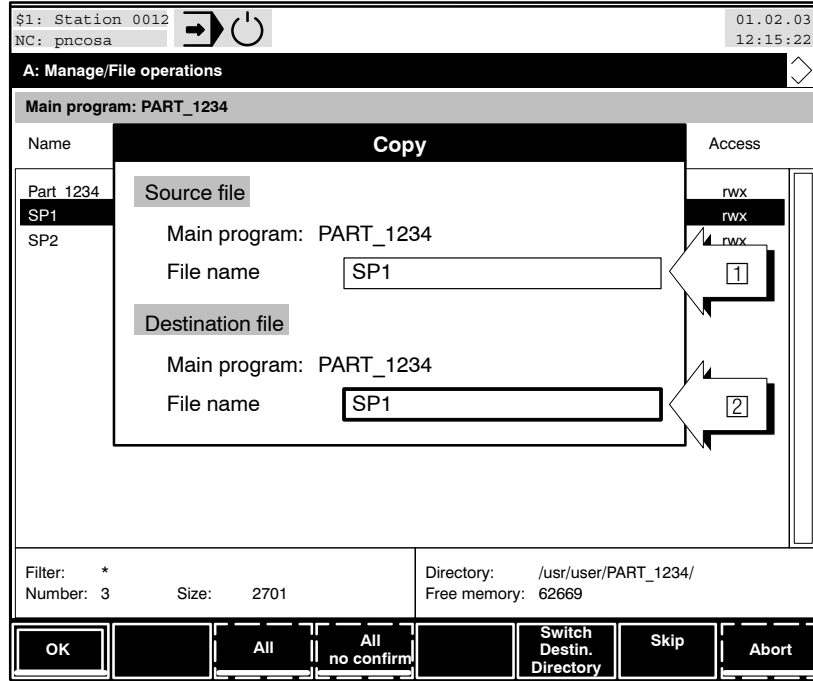
Both input fields are empty if **no file has been selected**. Enter the name of the file to be copied in the source file input field [1]. Change to the destination file input field [2] using the cursor keys \blacktriangledown \blacktriangle or <tab>. Enter the file name that is to be assigned to the destination file.

 **The maximum file name length is 30 characters. Furthermore, you may specify a path in the input field (e.g. usr/user/Prog1, i.e. Prog1 in the usr/user directory).**

The source file name and the destination file name must be different. This does not apply if the destination file is to be copied to a different directory. Use the “Switch Destination Directory” softkey if you want to copy a file to another directory (refer to the following screen display).

If some **files were already selected**, both input fields ([1] and [2]) will be given the name of the first file selected. You must now enter the file name that is to be assigned to the destination file in the input field [2].

Manage



At this point you can

- use the cursor keys \blacktriangledown \blacktriangleup or $\langle \text{tab} \rangle$ to **toggle between the two dialog box input fields**, provided that no file(s) had been selected at the time the copy function was called up.



- **close the dialog box and return to the previous operating level** with the level-return key. Changes within the dialog box are not saved. The “Copy” function is aborted, however, selected files remain selected.



- **start copying a single file.** If several files have been selected, the control unit first copies only the file that is displayed in the dialog box . This allows you to copy all selected files consecutively and, if necessary, to use the “Skip” softkey to omit a file.



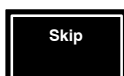
- **start copying all files.** This softkey is only available when several files have been selected. In contrast to the “OK” softkey, the “Skip” softkey **cannot** be used to omit a file.



- **start copying all files.** This softkey is only available when several files have been selected. In contrast to the ”All” softkey, files already existing in the destination directory will be replaced without a warning.



- **change the destination directory.** The resulting dialog and functionality have already been described in section 8.1.5 (“Switch Directory” softkey).



- leave the file displayed in the dialog box **uncopied**. The control unit then displays the next selected file in the dialog box.

Manage



- **cancel copying**. This softkey can only be selected if several files are being copied (with multiple selection).

Manage

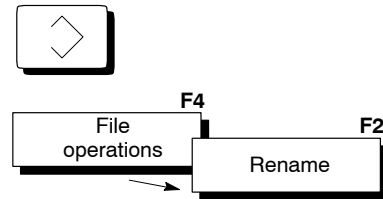
8.4 Renaming or moving files



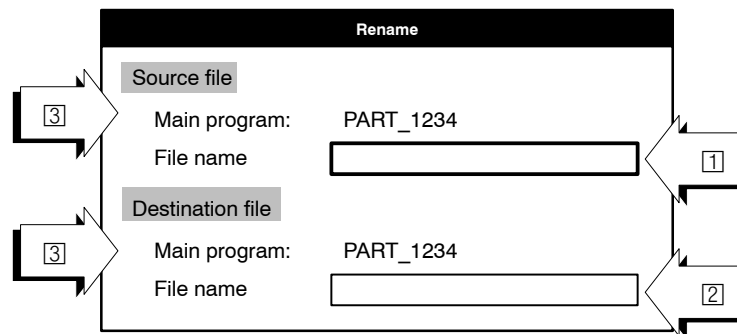
CAUTION

Ensure that the file is no longer required under the original name or in the original directory before you rename or move it (a file is, for example, called up as a subprogram from a main program)!

Selection:




The control unit opens the “Rename” dialog box when you press the “Rename” softkey. The text which appears in position [3] depends on the current directory and on the directory display mode (refer to section 8.1.5).



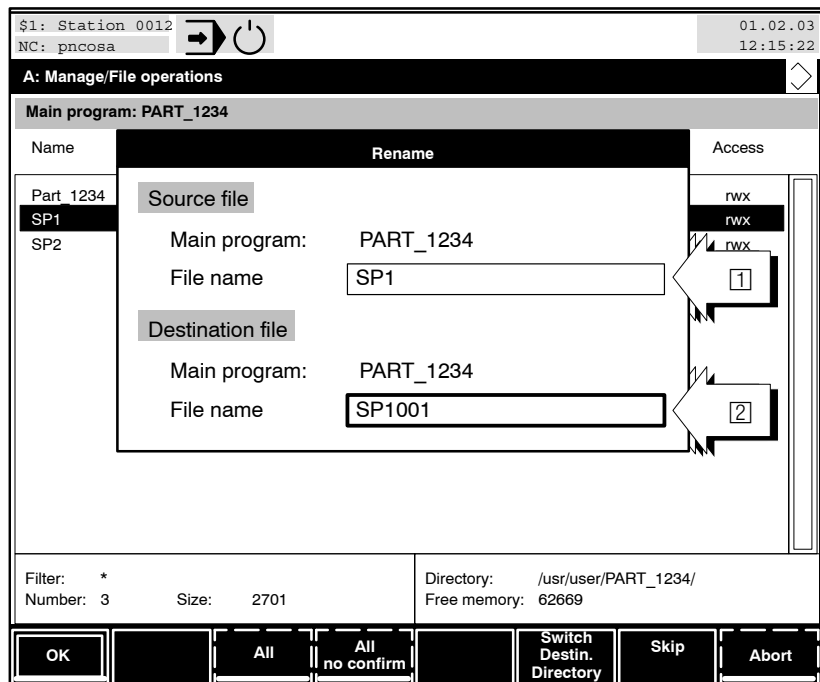
The following options are available, depending on the previous file selection (refer to section 8.2.1):

Both input fields are **empty** if **no file has been selected**. Enter the name of the file to be renamed or moved in the source file input field ([1]). Change to the destination file input field ([2]) using the cursor keys \blacktriangledown \blacktriangle or <tab>. Enter the desired new file name.

 **The source file name and the destination file name must be different. This does not apply if you want to move the file to a different directory. Use the “Switch Destination Directory” softkey if you want to move a file to another directory (refer to the following screen display).**

Manage

If some **files were already selected**, both input fields (1 and 2) will be filled with the name of the first file selected. You must enter the desired new file name in the input field 2.



At this point you can

- use the cursor keys \downarrow \uparrow or $\langle \text{tab} \rangle$ to **toggle between the two dialog box input fields**, provided that no file(s) had been selected at the time the “rename” function was called up.
- **close the dialog box and return to the previous operating level** with the level-return key. Changes within the dialog box are not saved. The “Rename” function is aborted, however, selected files remain selected.
- **start renaming/moving a single file.** If several files have been selected, the control unit first processes only the file that is displayed in the dialog box. This allows you to rename or move all selected files consecutively and, if necessary, to use the “Skip” softkey to omit a file.
- **start processing all files.** This softkey is only available when several files have been selected. In contrast to the “OK” softkey, the “Skip” softkey **cannot** be used to omit a file.
- **start processing all files.** This softkey is only available when several files have been selected. In contrast to the “All” softkey, files already existing in the destination directory will be replaced without a warning.



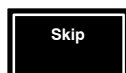
Manage



- **change the destination directory.** The resulting dialog and functionality has already been described in section 8.1.5 ("Switch Directory" softkey).



Selected files are always moved after a directory has been changed and either the "OK" or "All" softkey has been pressed. The same applies where the destination file name no longer corresponds to the source file name! The file is moved to the new directory and at the same time the file name is changed in this case.



- maintain the same name/location (i.e. **not rename or move** a file) for the file which is displayed in the dialog box. The control unit then displays the next selected file in the dialog box.



- **cancel this process.** This softkey can only be selected if several files are being renamed (with multiple selection).

Manage

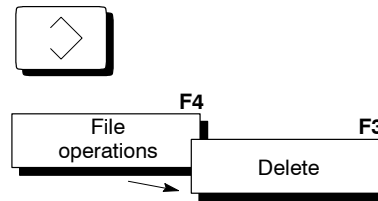
8.5 Deleting files



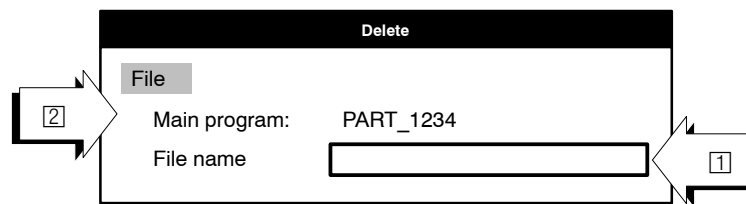
CAUTION

Files that have been deleted cannot be recovered! You should therefore ensure that files which you intend to delete are no longer required. Make a back up copy of the files on an external storage medium if you are unsure. Use the “Save Files” function for this purpose (refer to section 8.12.5).

Selection:



The control unit opens the “Delete” dialog box when you press the “Delete” softkey. The text which appears in position ② depends on the current directory and on the directory display mode (refer to section 8.1.5).

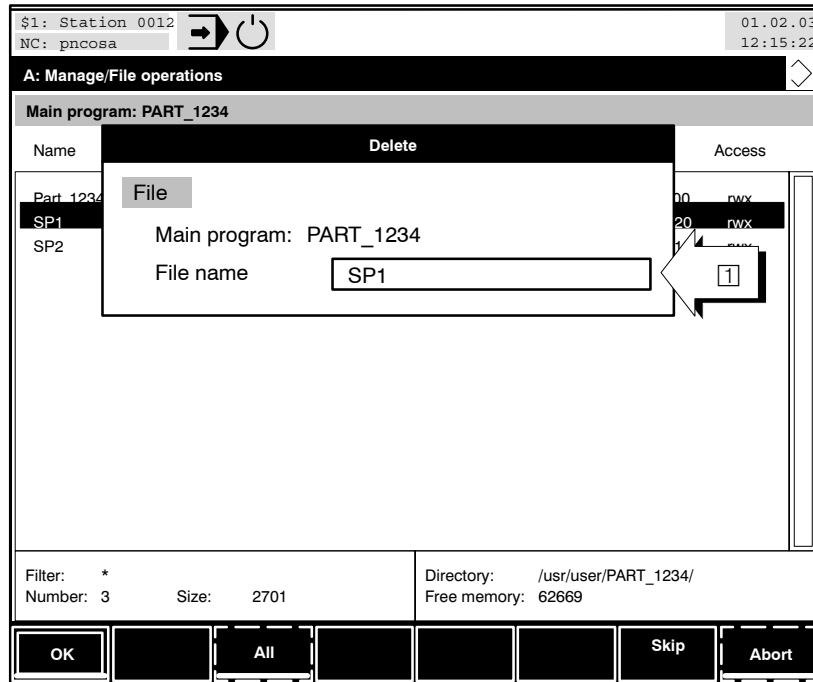


The following options are available, depending on the previous file selection (refer to section 8.2.1):

The input field ① is empty if **no file has been selected**. Enter the name of the file to be deleted. Note that filename input is case-sensitive!

If some **files were already selected**, the input field ① will contain the name of the first file selected.

Manage



At this point you can

- **enter the file name using the keyboard**, if no file(s) had been selected before the delete function was called up.
- **close the dialog box and return to the previous operating level** with the level-return key. Changes within the dialog box are not saved. The “Delete” function is aborted, however, selected files remain selected.
- **start deleting a single file**. If several files have been selected, the control unit first deletes only the file that is displayed in the dialog box . This allows you to delete all files consecutively and, if necessary, to use the “Skip” softkey to omit a file.
- **start deleting all files**. This softkey is only available when several files have been selected. In contrast to the “OK” softkey, the “Skip” softkey **cannot** be used to omit a file.
- **maintain (i.e. not delete) the file displayed in the dialog box**. The control unit then displays the next selected file in the dialog box.
- **cancel the process of deleting files**. This softkey can only be selected during a deletion process.



Manage

8.6 Determining access rights to files

Access rights serve to protect information. Every file which is saved in the control unit therefore has an identifier which controls access to the file.

The letters “r”, “w” and “x” in the “Access” column 1 denote the access rights:

Name	Size	Date	Access
Part_1234	2010	30.07.01 12.10.00	rwx
SP1	291	01.10.97 12:42:20	rwx
SP2	400	01.10.97 12:53:10	rwx

Filter: * Directory: /usr/user/PART_1234/
Number: 3 Size: 2701 Free memory: 63069

Copy Rename Delete Access rights File Filter Switch Directory Multiple Selection Select

Each individual character is assigned a specific meaning:

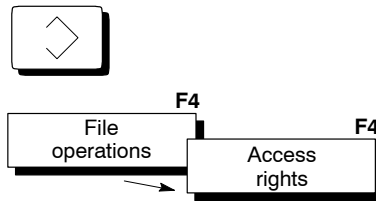
- r: the file can be read or displayed (e.g. with an editor)
- w: the file can be changed / overwritten (e.g. with an editor) or deleted
- x: the file can be executed (e.g. program execution).

Files can also be assigned the character “d”. Such entries are no files in the conventional sense (e.g. part programs), but are rather references to a subordinate directory.

The corresponding access to the file is denied if any of the characters “r”, “w” or “x” is not displayed.

Proceed as follows to change file access rights:

Manage

Selection:

The control unit opens the "Determine access rights" dialog box when you press the "Access Rights" softkey. The dialog box display varies depending on the previous file selection (refer to section 8.2.1).



If **no file has been selected** yet, the control unit prompts the name of the file for which the access rights are to be changed in a dialog box. Enter the file name and acknowledge with the



"OK" softkey or abort with the level return key or change the directory with the "Switch Directory" softkey.

The following display appears where **only one file has been selected**.

The screenshot shows the "Determine access rights" dialog box. It has a title bar "Determine access rights". Under the "File" section, it displays "Main program: Part_1234" and "File name: SP1". Under the "Access rights" section, there are three checkboxes: "Read" (checked), "Write" (unchecked), and "Execute" (unchecked). A cursor is positioned over the "Read" checkbox, and a small box with the number "1" is next to it, indicating the current focus.

At this point you can






- **select specific access rights** by shifting the focus 1 using the cursor keys \blacktriangledown \blacktriangleup or $\langle \text{tab} \rangle$.
- **change the selected access right** using the $\langle \text{sel} \rangle$ or $\langle \text{space} \rangle$ key. The corresponding access to the file is permitted if the checkbox is checked.
- **simultaneously cancel all 3 access rights** using the $\langle \text{del} \rangle$ key (the checkboxes are no longer checked).
- **close the dialog box and return to the previous operating level** with the level-return key. Changes within the dialog box are not saved. The "Determine Access Rights" function is aborted, however, selected files remain selected.
- **assign the currently displayed access rights** to the file.
- open an **Info box** which contains information on the selected file.



Manage

The following display appears if **several files have been selected**:

At this point you can

- **select the individual actions for changing the access rights** by shifting the focus  using the cursor keys     or <tab>.
- **activate or deactivate the selected action** using the <sel> or <space> key. The corresponding action is activated if a radio button is checked. Only one action (“do not change”, “Set” or “Delete”) per access right can be activated.
- **close the dialog box and return to the previous operating level** with the level-return key. Changes within the dialog box are not saved. The “Determine Access Rights” function is aborted, however, selected files remain selected.
- **execute the currently displayed actions for the selected file.**
- **change the access rights for all selected files.** This softkey is only available when several files have been selected. In contrast to the “OK” softkey, the “Skip” softkey **cannot** be used to omit a file.
- **open an Info box** which contains information on the file currently displayed.
- leave the access rights of the file shown in the dialog box **unchanged**. The control unit then displays the next selected file in the dialog box.
- **cancel this process.** This softkey can only be selected if the access rights of several files are currently being changed.



You will find general explanations in respect of the selection of objects within a dialog box in Section 4.5 ff.

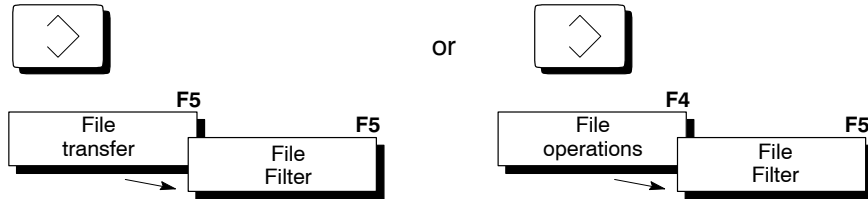
Manage

8.7 Setting a file filter

In order to influence the display of files (e.g. within list field) according to specific criteria, the control unit offers the option to:

- display sorted file lists
- display only specific files.

Selection:



The following dialog box is displayed:

File filter

Selection criterion

Filter:

Sort criterion

<input checked="" type="radio"/> Name	<input checked="" type="radio"/> ascending
<input type="radio"/> Type	<input type="radio"/> descending
<input type="radio"/> Size	
<input type="radio"/> Date	

Refer to section 4.5 onwards for more information on selecting an object in a dialog box and entering data.

Filter string input is case-sensitive!

Inputs:

Filter: Enter a string. Only those file names which correspond to this string are displayed. The special characters “*” and “?” can be used as well as letters, numbers and the “\$” and “_” characters.

Meaning of these special characters:

- * Wildcard character for any string
- ? Wildcard character for any character

Manage

Examples:

- * all file names are displayed
- test? only file names which begin with the “test” string and consist of 5 characters are displayed
- test* only file names which begin with the “test” string are displayed regardless of their length
- *e* only file names which contain the “e” character at any position are displayed
- *?e* only file names which contain the “e” character in the second position are displayed

Name,
Type, Size,
Date:

You choose whether files should be sorted according to name, type (= file extension, e.g. “.cnc” or “.cpl”), size or date in this radio button group.

ascending,
descending:

to display files according to the specified sort criterion in an ascending or descending order.

At this point you can



- **exit the dialog box** with the level-return key. Changes are not accepted.



- **leave the dialog box and acknowledge all changes** by means of the “OK” softkey.



- enter the “*” character in the “Filter” input field by means of the “All Files” softkey. All file names are displayed.

Manage

8.8 Creating/editing new programs/text files

☞ **Before calling this function, you may switch from the current directory to another one if you want to generate programs there. Please refer to section 8.1.5 for more information.**

There are various ways of editing or creating programs/subprograms/CPL programs/text files:

- use the "Edit New File" softkey if the text editor is not yet active (refer to section 8.8), or
- press the "New" softkey if you are currently in the text editor and assign a new name to the file by using the "Save as" function. Now, you can edit this file without overwriting the original file.

Edit New File

Creating a new file with the editor deactivated 1:

The control unit starts the text editor **without** loading an existing **file** 2. Unlike the "Generate Main Program" function, this function creates **neither** a new directory **nor** a new file.

Selection:



F2




Name	Access	
P1	11:12:13	rwX
P11	11:12:13	rwX
P12	15:00:00	rwX
P101	10:30:40	rwX

Filter: * Number: 4 Size: 7788 Directory: /usr/user/ Free memory: 445952


Manage

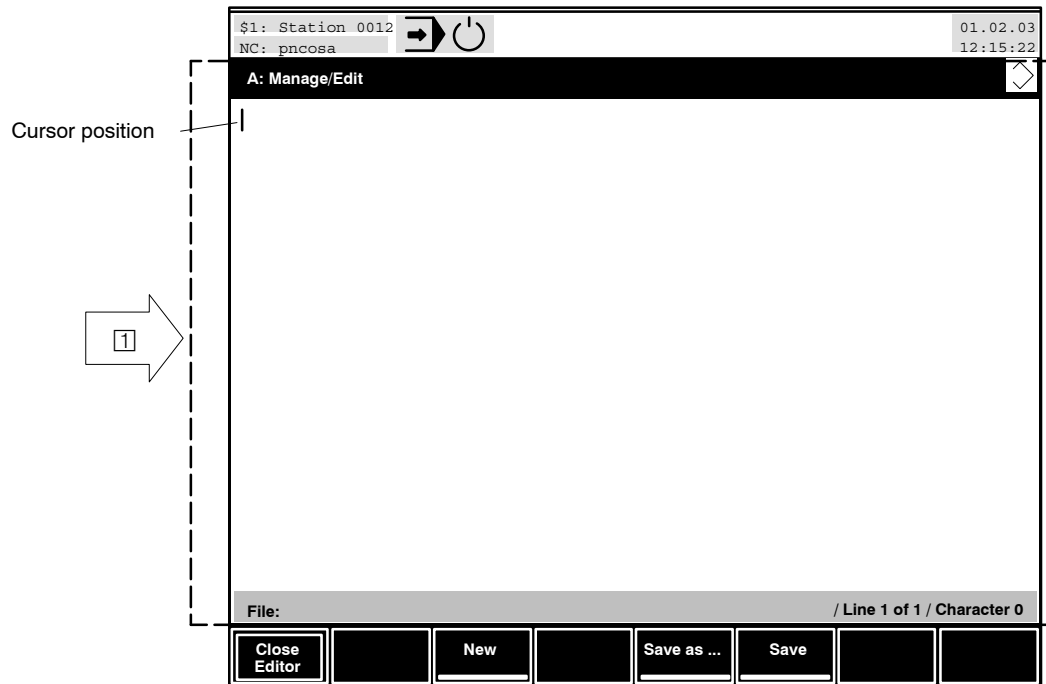
At this point you can




- press the "Edit New File" softkey. A dialog window appears where you select file type  for the file to be created.



- select "Textfile/NC Program" and close the dialog window by confirming with "OK". Next, you will get to the editor (editor window )!



 **For editor functions using the available softkeys, please refer to section 8.10, "Editing Programs (text files)".**

New

Creating a new file with the editor activated:



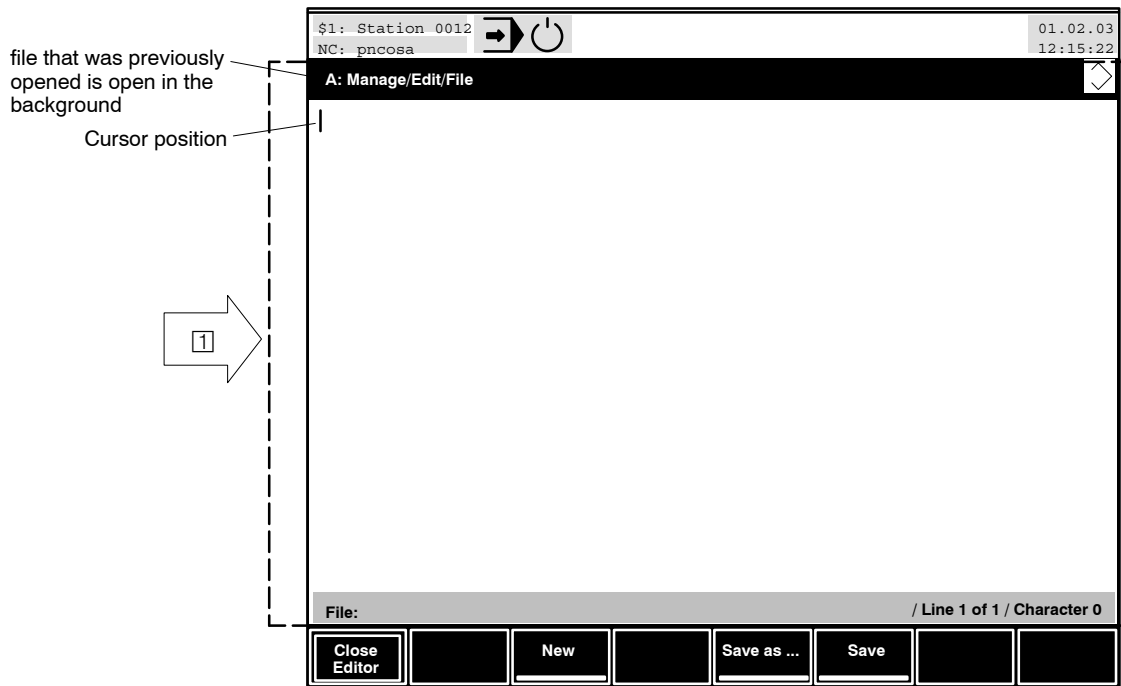
- The fact that you are in the editor means that an existing file has been opened in the editor. Therefore, press the "New" softkey. If any changes have been made in the open file, a pop-up window appears where you are asked whether you want to reject the changes or save them:
 - By pressing "Yes", you will reject any changes made. The original file is not changed during this process. The editor loads a new empty text file.

 **The existing file remains unchanged.**

- By pressing "No", you will cancel the process of creating a "New" file and get back to the file first opened.

Manage

If you have pressed "Yes", you can write new texts/NC programs. To save them, you must create a new file with the "Save as" function. For details, refer to section 8.9.



Manage

8.9 Saving programs / text files (save as)

You can save a currently open file at various stages of the process:

- when closing the editor if the file has been changed (cf. "Closing the text editor" section) and
- while in the editor, e.g. to save any changes made.

While you are in the editor, you can

- save the currently open file under its current name. In this case, the original file will be replaced, or
- save the currently open file under a different name (max. 29 characters). In this case, the original file will be retained.
- You can save a currently open file that you have created by pressing the "New" softkey.



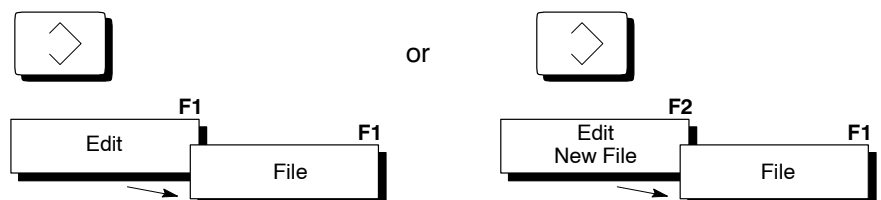
DANGER

Do not replace any original files still used for the production process on the machine with new versions that have not been tested!

Errors in the new version may cause damage to the machine, workpieces or tools or even have negative effects on the production process.

Therefore, you should first save new versions under a different name. Test your new versions before using them on the machine for processing. Always keep a backup of old versions.

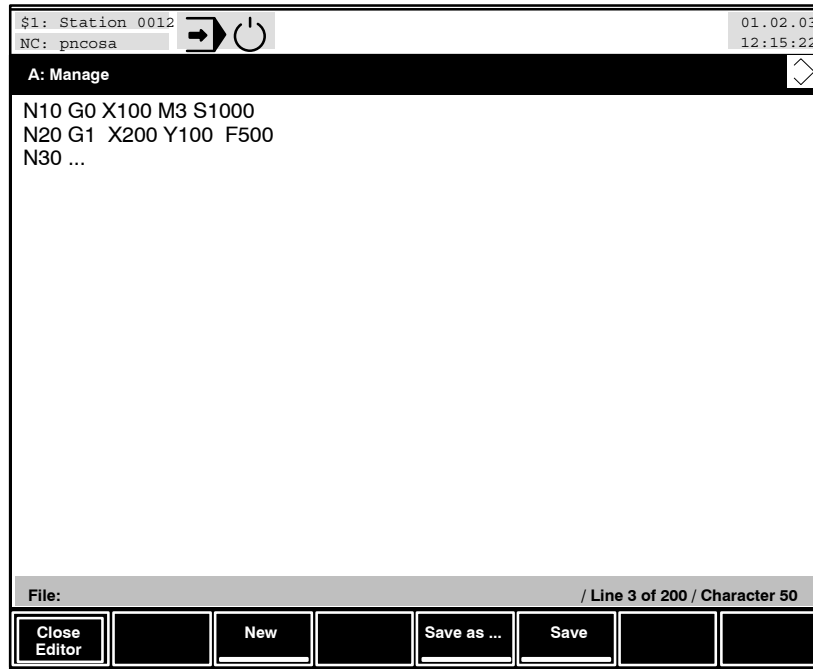
Selection:



► File "Save as" :

- ☞ Save the currently loaded file under a new name. The original file will remain unchanged.

Manage



- Press the "Save as" softkey. Enter a new file name in the dialog box. Note that character input is case-sensitive! (Max. 29 characters).



- If you want to save the file in another directory, you may change the current directory by pressing the "Switch Directory" softkey.



- When you press the "OK" softkey, the control unit will save the file under the name you have entered, provided this name does not yet exist. If there is a file with the very same name, you will be asked whether or not you want to overwrite the existing file with the new one. By pressing the "Yes" softkey, you will overwrite the old file. By pressing the "No" softkey, the old file will remain unchanged.

In either case, your changes will be retained in the editor.

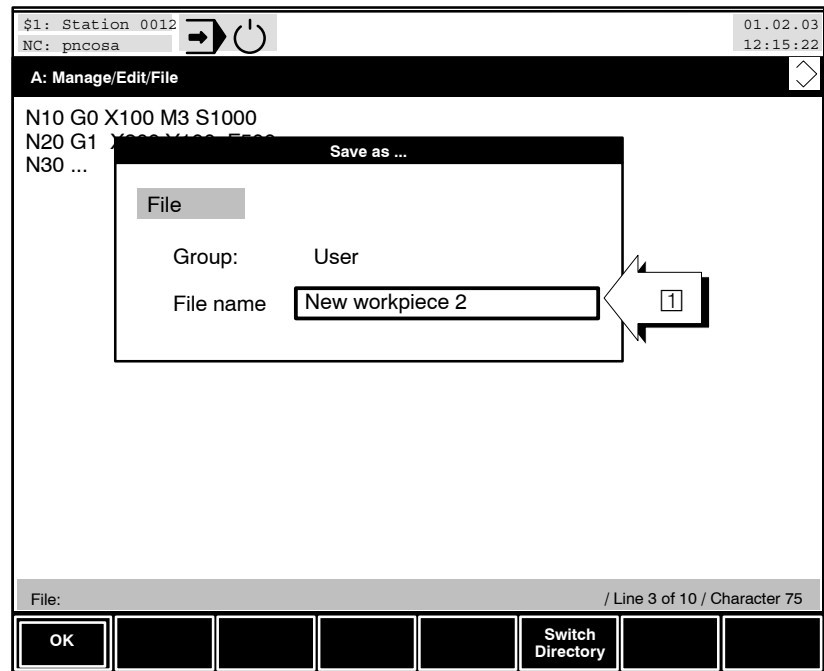
► File "Save as", having previously selected "New":

The fact that you are in the editor means that an existing file has been opened in the editor. Therefore, press the "New" softkey.

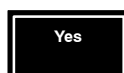
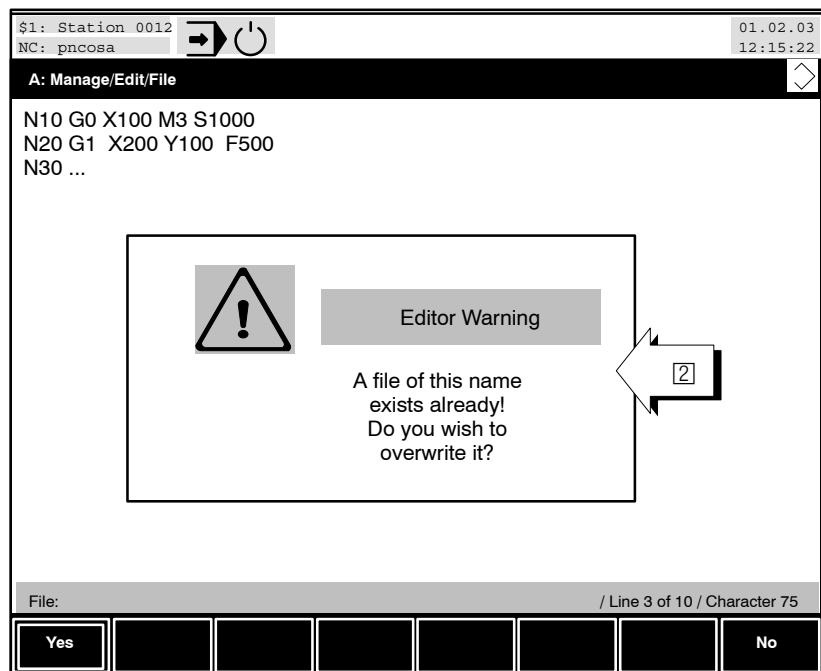


Enter new texts/NC programs. To save them, you must create a new file with the "Save as" function. The system proposes to save the new text/NC program under the name of the file that is still open in the background (e.g. workpiece 1).

Manage



If you choose an existing name, a warning message 2 appears on the screen, telling you that "A file of this name exists already. Do you wish to overwrite it?".



- Press "Yes" if you want to overwrite the old file (e.g. workpiece 1).

Manage



- Press "No" if you want to save the new text/NC program as a file with a new name. You will return to the main window where you press the "Save as" softkey. From there press the softkey "Save As" and enter a file name of your choice in the "Save As" selection window, (e.g., "New workpiece 2") (the entry is case-sensitive! Max. 29 characters).

Confirm by pressing "OK". The control unit checks again whether the file name already exists. If this is not the case, the new text/NC program will be saved.

► "Save" file:



Save currently loaded file under its current name. The original file will be replaced.

With this simple "Save" function, **no** new file is created.



- To **save** the file, press the "Save" softkey. If you have made any changes to the contents of the file, a warning message appears once again. You can still decide whether you actually want to save the text you have just written and thus **overwrite** the original contents of this file.

Press the "Yes" softkey to save the changed file. The original file will be replaced.

Press the "No" softkey to keep the original file.


In either case, your changes will be retained in the editor.

If the currently open file has never been saved before, you must use the "Save as" softkey instead of "Save".

Whether or not the currently active file has already been saved, is indicated by the Editor status line. If there is **no** path and filename behind the "File" text, the current file has never been saved before.

Manage


8.10 Editing programs (text files)

 **If a program (in Debug Mode, single step, single statement, ...) which is active on several channels, is edited and saved, automatic program reselection takes place only on the first channel!**

You can edit:

- an existing text/program file or
- a new, empty text/program file.

Use the “Edit” softkey to change an **existing** text file (or a part program file).

Select the program/text file that is to be edited from the displayed file list using the , <home>/<end> oder <pgup>/<pgdn> cursor keys at the highest softkey level of the “Manage” mode. The selected file is highlighted.


A **new, empty** text file is created and opened with the help of the “Edit new file” Softkey (refer to section 8.8). After this, you can create texts or programs in the file.



CAUTION

Only appropriately trained or authorized personnel may edit files! Changes to program or text files can affect the tool processing path, processing technology, program execution itself, and even the control unit configuration (e.g. in the case of files for SERCOS or tool management configuration)!

To ensure protection against unauthorized file access, use the “Determine access rights of files” function (refer to section 8.6), or the “Edit Inhibit” function (refer to section 9.1.4)!

 **You can change the current directory, if necessary, in order to edit programs in a different directory. Please refer to section 8.1.5 for more information.**

Note that the display of files in a directory is controlled by the currently active file filter. Therefore, not all existing files may be shown. The control unit displays the current file filter setting on the bottom left of the screen after the text “Filter”.

For information on the file filter function, refer to section 8.7.

Files which are displayed with the “d” character in the “Access” column cannot be edited. Such entries are no files in the conventional sense (e.g. part programs), but are rather references to a subordinate directory.

Manage

Files whose access right "w" (write) has been deactivated can be edited, however, they cannot be saved under the same name. For changing and saving such files in the text editor, you must save the file under a new name.

For more information on access rights, refer to section 8.6, "Determining access rights to files".

Selecting a file for editing:



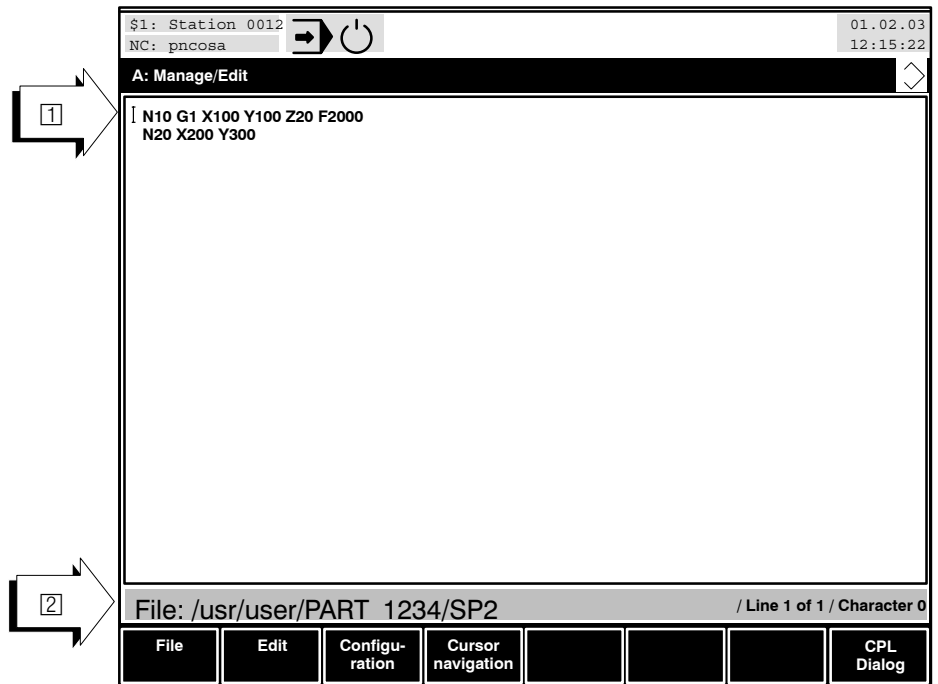
Name	Size	Date	Access
Part_1234	2010	30.07.01 12:10:00	rwX
SP1	291	01.10.97 12:42:20	rwX
SP2	400	01.10.97 12:53:10	rwX

Filter: * Number: 3 Size: 2701 Directory: /usr/user/PART_1234/ Free memory: 68069

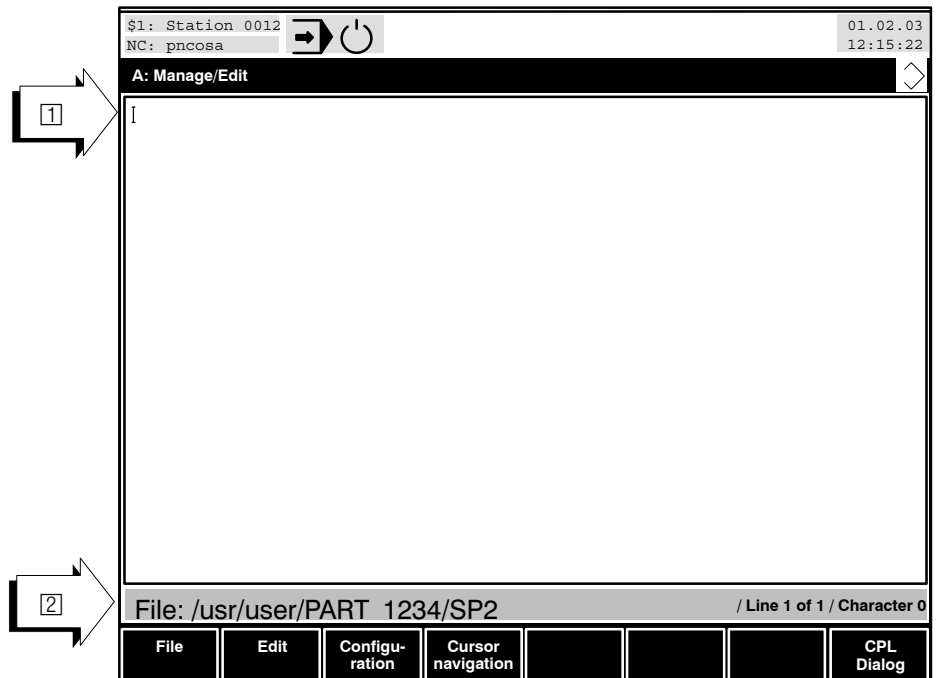


- Press the "Edit" softkey. The control unit starts the integrated text editor. In the [1] area of the following diagram area, the file contents are shown. The editor status line shows the path and file name as well as the current cursor line position, the total number of lines and characters in position [2]. The cursor marker is at the beginning of the file.

Manage




- Press the "Edit New File" softkey. The control unit starts the integrated text editor. The file contents that are still empty are displayed in area 1. The editor status line shows the path and file name as well as the current cursor line position, the total number of lines and characters in position 2. The cursor marker is at the beginning of the file.



Manage

8.10.1 Text editor functions

Regardless of the currently active softkey level within the text editor, you may

- **move the cursor** in the respective direction using the  cursor keys if characters already exist.
- **enter characters** from the keyboard (for syntax and available commands, please refer to the "DIN programming instructions" and "CPL programming instructions" manuals). Some keys on the keyboard are assigned several characters. Please refer to section 3.8 for more information on how to generate the individual characters.

A maximum of 79 characters can be displayed in one screen line. If you enter more characters, additional characters will be displayed in the next line. This automatic line feed is marked by the "#" character at the beginning of the new line by the control unit.

After a maximum of 255 characters, a line break must be inserted using the <enter> key.



- **1 screen page** up (<pgup> key: to the top of the file) or downwards (<pgdn> key: to the bottom of the file).
- **jump** directly to **the end of the file** (with the <end> key) or directly to **the beginning of the file** (with the <home> key).
- **delete the character** after the cursor in the overwrite mode and **delete the character** to the right of the cursor in the insert mode.

You can see from the shape of the cursor which mode you are currently in:

Bar cursor '|': Insert mode

Block cursor '■': Overwrite mode

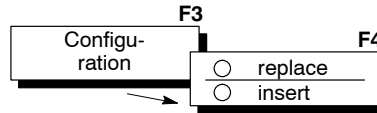
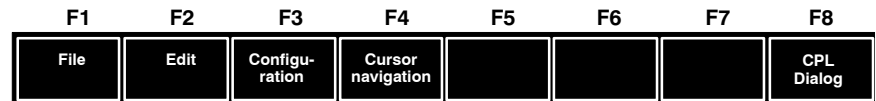


- **Delete one character** to left of cursor.
- insert a **line break** (new line).

Manage

8.10.2 Changing between overwrite mode and insert mode

Selection:



The current mode is indicated by the toggle softkey (for the function of a toggle softkey, refer to section 4.4.1) and the cursor shape:

Bar cursor '|': Insert mode

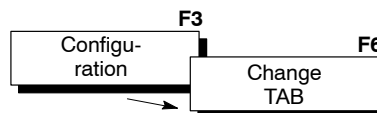
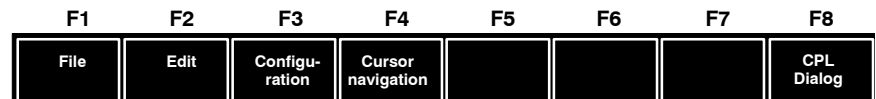
Block cursor '■': Overwrite mode

Overwrite mode You replace the character already existing at the cursor position.

Insert mode You insert a new character at the cursor position. All characters to the right of the cursor will be moved to the right by one space.

8.10.3 Changing tab settings

Selection:

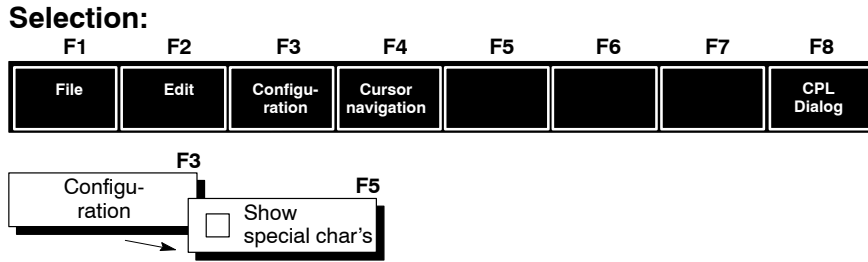


Enter the desired tab spacing in the dialog box. By this setting, you influence the distance (number of characters) by which the cursor is moved to the right when the <tab> key is pressed.

Press the "OK" softkey to activate your input. Cancel the function with the level return key.

Manage

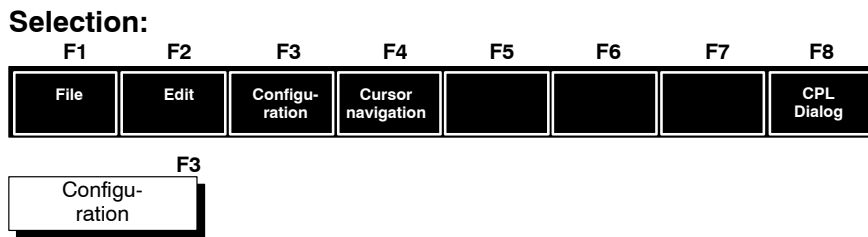
8.10.4 Displaying special characters in the editor



You specify whether the text editor should display invisible special characters, such as umlauts, by their decimal ASCII value in angle brackets.

8.10.5 Generating automatic block numbers

The text editor can automatically generate NC or CPL block numbers in a new line by pressing the <enter> key.



► Create NC block numbers



- Set the toggle softkey to "NC".
- Activate the "auto block number" check softkey.
- Make sure that the line in which the cursor is currently positioned starts with an NC block number (e.g., "N10"). The N address must be programmed as a capital letter.

Please note that the step size of block numbers generated automatically depends on the following factors:

Before the <enter> key is pressed, if the cursor is located

- at the file end: step size 5
- not at the file end: step size 0.1

- Then press the <enter> key. The editor now inserts a new line with an NC block number.

Manage

► Create CPL block numbers



- Set the toggle softkey to "ASCII".



- Activate the "auto block number" check softkey.
- Make sure that the line in which the cursor is currently positioned starts with a CPL block number (e.g., "10"). The N address must not be programmed in this case.

Please note that the step size of block numbers generated automatically depends on the following factors:

Before the <enter> key is pressed, if the cursor is located

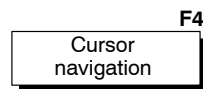
at the end of file: step size 5
not at the end of file: step size 0.1

- Then press the <enter> key. The editor now inserts a new line with a CPL block number.

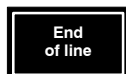
8.10.6 Navigation within the file using softkeys

Selection:

F1	F2	F3	F4	F5	F6	F7	F8
File	Edit	Configu- ration	Cursor navigation				CPL Dialog



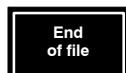
- jump to beginning of the current line.



- jump to end of the current line.



- jump to beginning of file.



- jump to end of file.



- jump to next word.



- jump to previous word.

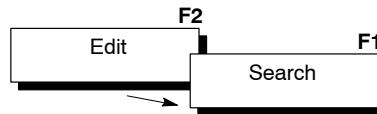
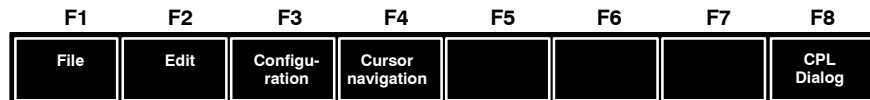
Manage

8.10.7 Search functions

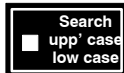
The control unit can search the loaded text file according to specific criteria.

For this purpose, you first have to specify **how** the search is to be performed. Then enter the search string or word and start searching.

Selection:



► Searching characters or strings



- Use the "Search upp'case low case" softkey to define whether or not a distinction between upper-case and lower-case letters shall be made during the search.
Check softkey active: no distinction

Check softkey not active: distinction between upper-case and lower-case letters.



- Specify – starting from the **current cursor position** – whether the search shall be performed forward (towards end of file) or backward (towards top of file).



- Enter the character or the string to be searched by the control unit.
- Activate your input by pressing the "OK" softkey. The control unit searches the text file for the specified string **starting from the current cursor position**. When the character or string has been found, the search is interrupted, and the item found is displayed in a different color (selected). Otherwise, the message "Search string not found" will be output in the editor status line.

"Block functions" can be applied to selected items. Please refer to the "Block functions of the text editor" section.



- You may check whether the character or string is contained several times in the current text file by pressing the softkeys
 - searches the first matching item from the top of file



- searches the last matching item from the top of file

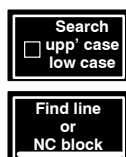


- searches the next matching item in the search direction ("forward/backward" softkey) from the current cursor position.
You may also press the following keys simultaneously instead of the softkey:

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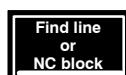
<ctrl>+<s>: search next matching item in forward direction.
<ctrl>+<r>: search next matching item in backward direction.

► Searching NC block numbers



- Deactivate the "Search upp'case low case" softkey.
- Make sure that the "NC/ASCII" toggle softkey is set to "NC".
- Enter the desired NC block number **without the address letter N** in the dialog box.
- Activate your input by pressing the "OK" softkey. The control unit searches the **entire** text file for the specified NC block number. When the NC block number has been found, the corresponding item is displayed in a different color (selected).

► Searching a line



- Make sure that the "NC/ASCII" toggle softkey is set to "ASCII".
- Enter the desired line number of the text file in the dialog box.
- Activate your input by pressing the "OK" softkey. The control unit searches the corresponding line and positions the cursor to the beginning of the line.

8.10.8 Replacing text

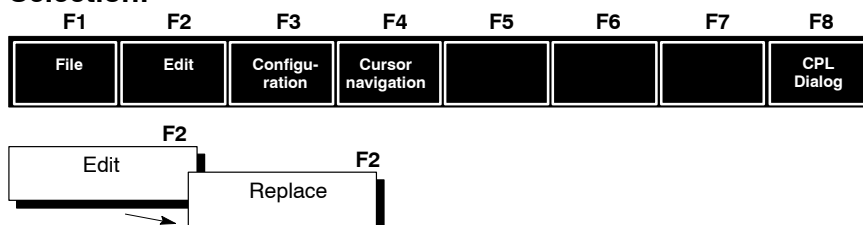
The control unit can search characters or strings in the opened text file and replace them with other characters or strings.

For this purpose, you first have to specify **how** the search is to be performed. Then enter the search string and the replacement string and start searching.

☞ **Any text that has been replaced cannot be automatically recovered!**

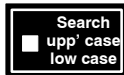
Therefore, you should activate the "With acknowledgment" check softkey. This enables you to decide whether the function should actually be performed for the item found whenever an item is proposed for replacement.

Selection:



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► Search and replace characters or strings



- Use the "Search upp'case low case" softkey to define whether or not a distinction between upper-case and lower-case letters shall be made during the search.

Check softkey active: no distinction

Check softkey not active: distinction between upper-case and lower-case letters.



- Specify – starting from the **current cursor position** – whether the search shall be performed forward (towards end of file) or backward (towards top of file).



- Use the "With acknowledgement" check softkey to specify whether a safety query should be output before an item is replaced:

Check softkey not active: no additional query

Check softkey active: The control unit displays an additional softkey bar before replacing text. By pressing the appropriate softkey, you decide that you:

- actually want to replace ("Replace" softkey), or
- do not want to replace and continue searching ("Next" softkey), or
- want to cancel the "Replace" function ("Cancel" softkey)



- Enter the character or the string to be searched by the control unit (search string). Press the "OK" softkey.
- Enter the replacement string. Press the "OK" softkey.
- Start the replacement process. Various softkeys are available for this purpose:



- replace all items matching the "search string" by the "replacement string" starting from the top of file. Whether or not a safety query will be made before the string is replaced depends on the current status of the "With acknowledgement" softkey.



- replace all items matching the "search string" by the "replacement string" starting from the cursor position up to the beginning of the file. Whether or not a safety query will be made before the string is replaced depends on the current status of the "With acknowledgement" softkey.



- replace all items matching the "search string" by the "replacement string" starting from the cursor position up to the end of the file. Whether or not a safety query will be made before the string is replaced depends on the current status of the "With acknowledgement" softkey.



- replace the next item matching the "search string" by the "replacement string" starting from the cursor position in the defined search direction ("forward/backward" softkey). Whether or not a safety query will be made before the string is replaced depends on the current status of the "With acknowledgement" softkey.

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8.10.9 Block functions of the text editor

Within the text editor, you may select continuous strings (a "block") and apply the "Copy" and "Cut" functions to this block.

Copied or cut blocks are stored temporarily and can be inserted in any position within the text file for any number of times.

► Selecting a block

- Move the cursor to the text position where the block is to begin.
- Then press the <sel> key.
If an MF2 keyboard is used ("NumLock" must be lit): Press the <ctrl> and "5" ("5" key on the numeric keypad) keys simultaneously. Now the beginning of the block has been marked.
- Move the cursor with the cursor keys to the text position where the block is to end. In addition to the cursor keys, you may also use the <home>, <end>, <pgup> and <pgdn> keys for selecting a larger block.

The selected block is displayed in a different color.

Characters or strings found in a search process (refer to the "Search functions" section) will be automatically selected by the control unit.

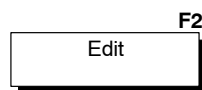
► Deselecting a selected block

- Press key <sel> again.
If an MF2 keyboard is used ("NumLock" must be lit): Press the <ctrl> and "5" ("5" key on the numeric keypad) keys again simultaneously. No part of the text will be displayed in a different color any more.

► Copying a selected block

Selection:

F1	F2	F3	F4	F5	F6	F7	F8
File	Edit	Configu- ration	Cursor navigation				CPL Dialog



- Press the "Copy" softkey. The selected block is stored temporarily. Any existing contents of the clipboard will be deleted by the control unit.

No part of the text will be displayed in a different color any more.

In place of the "Copy" softkey, you can also use the key combination <ctrl>+<c>.

- Move the cursor to the position within the text where the block is to be inserted.



- Press the "Insert" softkey. The control unit inserts the contents of the clipboard at the current cursor position.

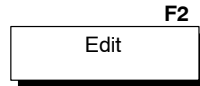
In place of the "Insert" softkey, you can also use the key combination <ctrl>+<v>.

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► **Deleting a selected block**

Selection:

F1	F2	F3	F4	F5	F6	F7	F8
File	Edit	Configu- ration	Cursor navigation				CPL Dialog

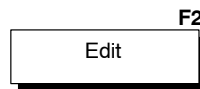


- Press the "Cut" softkey. The selected block will be deleted and stored temporarily. Any existing contents of the clipboard will be deleted by the control unit.
No part of the text will be displayed in a different color any more.

► **Moving a selected block**

Selection:

F1	F2	F3	F4	F5	F6	F7	F8
File	Edit	Configu- ration	Cursor navigation				CPL Dialog



- Press the "Cut" softkey. The selected block will be deleted and stored temporarily. Any existing contents of the clipboard will be deleted by the control unit.
No part of the text will be displayed in a different color any more.
In place of the "Cut" softkey, you can also use the key combination <ctrl>+<x>.

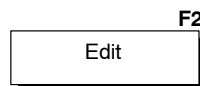


- Move the cursor to the position within the text where the cut-out block is to be inserted.
- Press the "Insert" softkey. The control unit inserts the contents of the clipboard at the current cursor position.

► **Selecting and copying several blocks**

Selection:

F1	F2	F3	F4	F5	F6	F7	F8
File	Edit	Configu- ration	Cursor navigation				CPL Dialog



- Select the first block as described for "Selecting a block".
- Press the "Copy" softkey. The selected block is stored temporarily. Any existing contents of the clipboard will be deleted by the control unit.
No part of the text will be displayed in a different color any more.
- Select the next block as described for "Selecting a block".

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- Press the "Copy Append" softkey. The selected block is appended to the contents of the clipboard.

No part of the text will be displayed in a different color any more.

- Repeat steps 3 and 4 until you have copied all desired blocks into the clipboard.
- Move the cursor to the position within the text where all copied blocks are to be inserted.

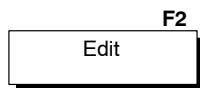


- Press the "Insert" softkey. The control unit inserts the contents of the clipboard at the current cursor position.

► **Selecting and moving several blocks**

Selection:

F1	F2	F3	F4	F5	F6	F7	F8
File	Edit	Configu- ration	Cursor navigation				CPL Dialog



- Select the first block as described for "Selecting a block".
- Press the "Cut" softkey. The selected block is cut out and stored temporarily. Any existing contents of the clipboard will be deleted by the control unit.



No part of the text will be displayed in a different color any more.

- Select the next block as described for "Selecting a block".
- Press the "Cut Append" softkey. The selected block is cut out and appended to the contents of the clipboard.



No part of the text will be displayed in a different color any more.

- Repeat steps 3 and 4 until you have cut out and transferred all desired blocks into the clipboard.
- Move the cursor to the position within the text where all cut-out blocks are to be inserted.

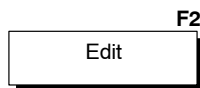


- Press the "Insert" softkey. The control unit inserts the contents of the clipboard at the current cursor position.

► **Inserting the contents of the clipboard at the current cursor position**

Selection:

F1	F2	F3	F4	F5	F6	F7	F8
File	Edit	Configu- ration	Cursor navigation				CPL Dialog



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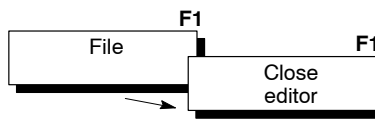
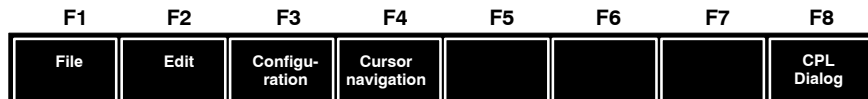
- Whenever you cut out or copy blocks, the selected text is transferred to a clipboard. Whether or not the existing contents of the clipboard are deleted or retained depends on the function used (e.g. "Copy" or "Copy Append").

The current contents of the clipboard can be inserted at the current cursor position by pressing the "Insert" softkey.

The contents of the clipboard are not affected by this procedure.

8.10.10 Closing the text editor

Selection:



The text editor is closed. If the currently loaded file has been changed, the control unit prompts you whether you want to save the changes. Press the "Yes" softkey to save the changed file. The original file will be replaced. Press the "No" softkey to discard all changes. The original file is retained.

If you want to save the active file without replacing the original file when pressing the "Close editor" softkey, proceed as follows:

- Press the MANAGE menu key.
- Press the "Edit" softkey.

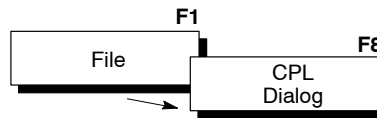
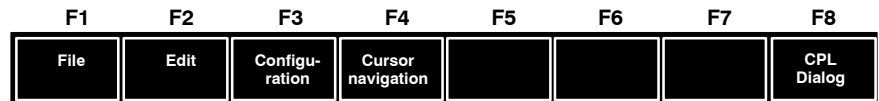
You are back in the editor. The changes you made to your file are still available.

Now save the file under a different name (refer to "Saving a text file" section).

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8.10.11 CPL Dialog

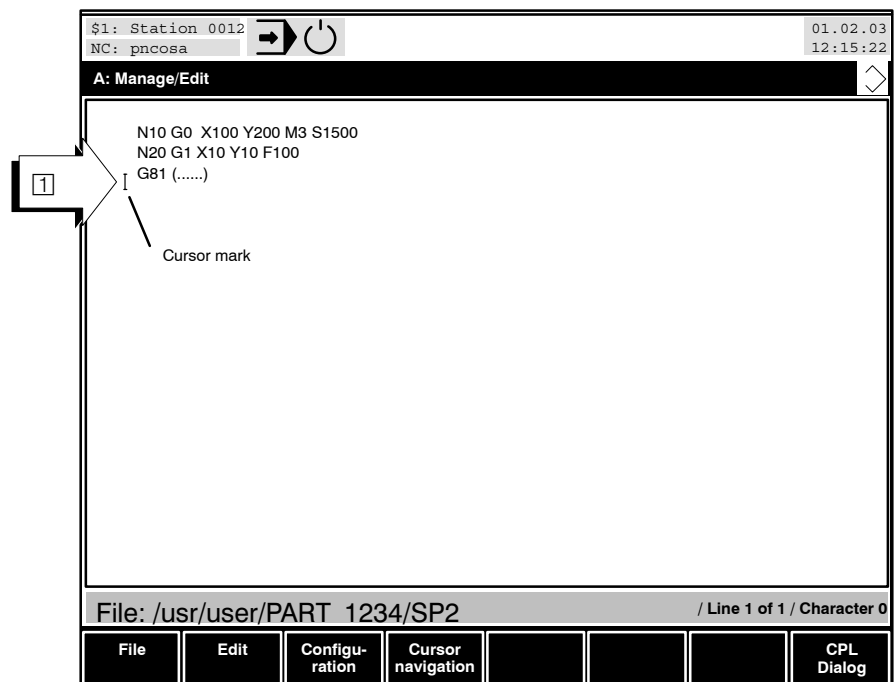
Selection:




CPL Dialog is a special type of editor operation. You can call CPL Dialog only while in the editor. Therefore, you must have opened an existing or a new file/program before calling CPL Dialog.



- Press the "CPL Dialog" softkey. Special CPL Dialog programs are opened. By means of these programs you can automatically generate the CPL program code  for the CPL cycle required for your program by selecting the proper cycle and entering suitable parameters. This code will be inserted at the respective cursor position in the open file when you close the CPL Dialog.

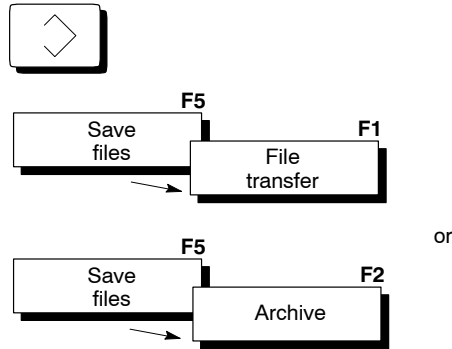


 The "CPL Dialog" softkey is shown only if the file "cpdlg05.dlg" exists in the root directory. As an additional requirement, the CPL cycle programs must be stored in a directory whose search path has been entered in MACODA. For installation, please refer to the CPL Programming Manual.

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8.11 Save Files

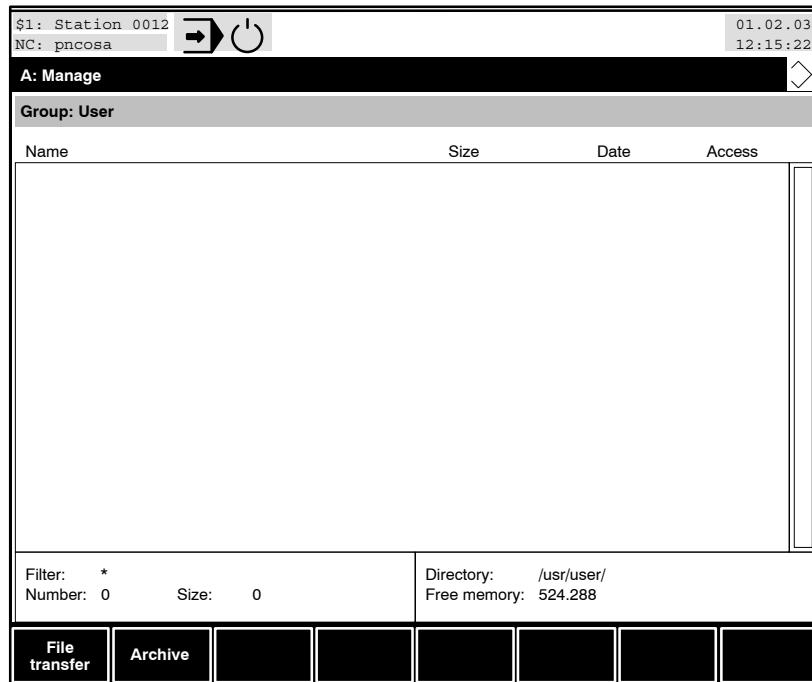
Selection:



The control unit uses the following functions to back up user and system files:



- File Transfer (refer to section 8.12)**: The “File Transfer “ function can be used for bidirectional backup and restoration of individual files between the control unit and a connected peripheral device. The transfer is handled only via the X35 interface on the osa master.
- Archive (refer to section 8.13)**: The “Archive” function facilitates a complete backup (or partial backups) and restoration of control unit data via the X52 Ethernet interface on the osa master and a connected PC control panel.



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8.12 Load/save files via interfaces (File Transfer)

You can select the interface and peripheral unit you want to use from a dialog box.

The actual interfaces (data transfer rate, number of data bits, parity, handshake, protocol, timeout period etc.) are configured using the “MACODA” program. Certain settings are stored in this program for all interfaces and peripheral units offered in the dialog box. Consult your system supervisor if changes or expansions are necessary.

The “PNC-P Connectivity manual” or “PNC-R Connectivity manual” contain exact specifications on the interfaces of the control unit.

 **Rexroth offers readymade connection cables for the connection of external units. Consult our Customer Services if necessary.**



CAUTION

You must ensure absolute equipotential bonding between the units to be connected when interfaces which connect units in different locations – irrespective of the distance or feeding network – are used for the first time. Connect the data terminal unit to the mains.

An incorrect assignment of interface leads can destroy the interface chip! You will find the pin assignments, including permitted cable lengths, in the “PNC-P Connectivity manual” or the “PNC-R Connectivity manual”.

Static discharges can destroy the interface chip! For this reason, ensure equipotential bonding before touching the module/interface!

Inadequate screening reduces interference immunity and can lead to system faults.

Observe the connection conditions of the data terminal unit! If the data terminal unit does not allow the interface cable to be connected or disconnected when voltage is applied, then the CNC and the data terminal unit must also be switched off!

Recommendation: Only connect or disconnect connection cables when voltage is not applied.

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- ☞ **The function "Load/Save files via interface" can not be used for the X52 Ethernet interface of the PNC-R.**
Files can be loaded/saved or copied via the Ethernet interface only if a directory on an external computer (e.g., PC control panel or file server) has been previously mounted (refer to section 8.1.3).

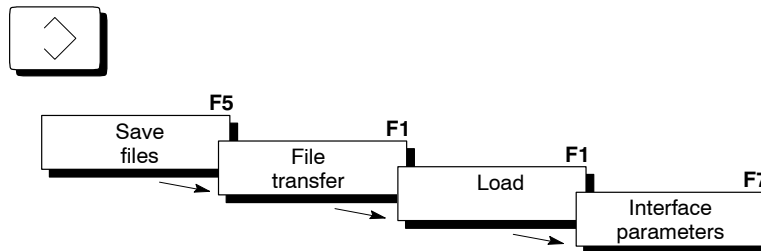
8.12.1 Loading files

Proceed as described in the following steps to load files into the control unit:

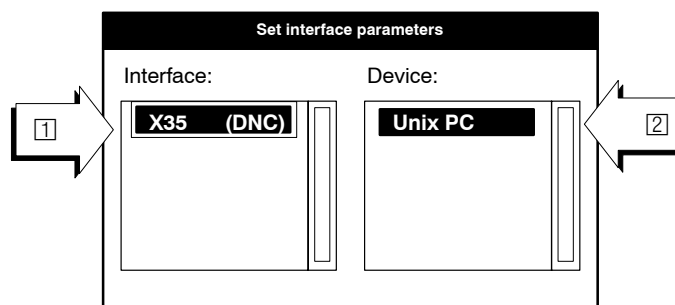
- Connect the CNC and the respective peripheral unit with a suitable cable. Observe the safety notes on the previous page!
- Select the interface and peripheral unit
- Set up the destination directory in which the files are to be stored.
- Start the transfer

8.12.2 Select the interface and peripheral unit

Selection:



The control unit opens a dialog box in which you can select the desired interface (1) and (provided it is defined in MACODA) a particular peripheral unit (2):



Please note that the selection options displayed above can vary between control units!

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► Set interface parameters

- Select the interface
- Select the desired peripheral unit
- Confirm the selection with the “OK” softkey or cancel with the level return key.

Refer to page 4.5 onwards for more information on selecting an object in a dialog box and entering data.

Default settings for a ”Unix PC” at X35:

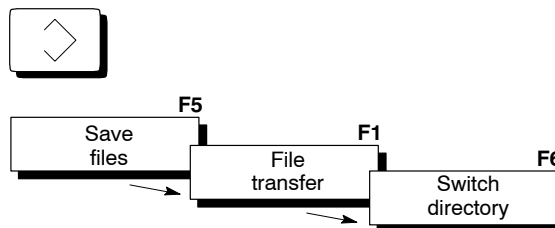
Interface:	V24
Baudrate:	9600 bps
Data bits:	8
Parity:	none
Stop bits:	1
Handshake:	X _{ON} /X _{OFF}
Timeout:	10s

☞ **The interface of the connected unit must be parameterized with the same values to enable communication!**

8.12.3 Setting the destination directory

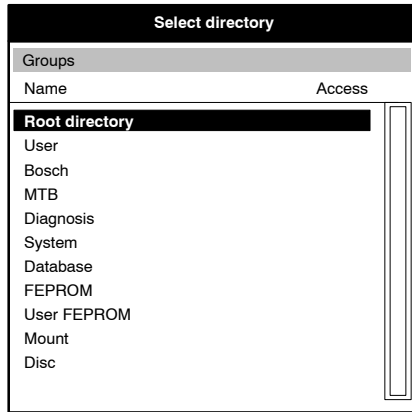
You must enter the desired destination directory if you do not want to store the files to be loaded in the current directory.

☞ **If you want to load files in a new directory, you have to create it first. For more information on how to create a new directory, please refer to Section 8.1.4, “Generate main program”.**

Selection:

The control unit opens the “Select Directory” dialog box.

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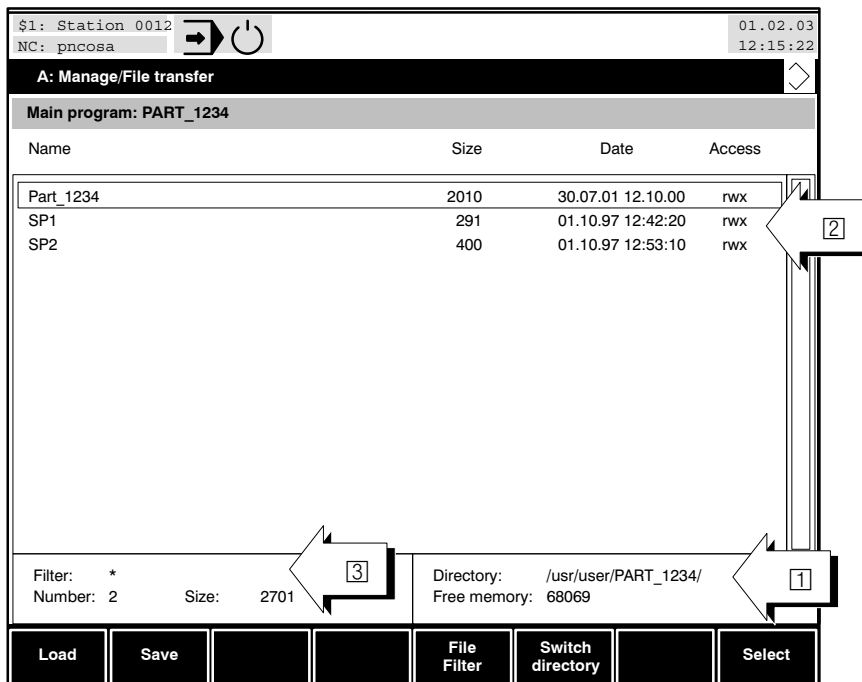


You can set the form in which the control unit displays directories in a dialog box by means of the “Group”, “Main programs” and “Directory Structure” radio softkeys. For explanations on the directory structure, refer to section 8.1.1, for an explanation of the radio softkeys, refer to section 8.1.5.

The control unit displays all available main program directories when you activate the “Main Programs” softkey. Select the desired destination directory and acknowledge with the “OK” softkey or abort the function with the level return key.

The control unit changes to the specified directory, the current directory is displayed on the screen at position 1 and all the files that are contained in this directory are displayed in screen area 2.

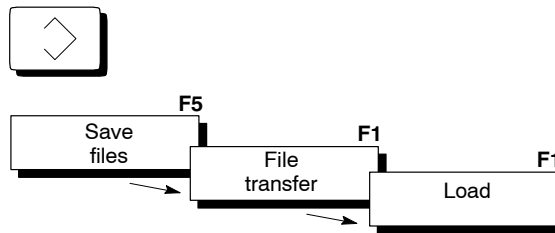
The display of files contained in a directory is controlled by the file filter setting (for file filters, please refer to section 8.7). The current file filter is indicated by the entry in line 3.



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8.12.4 Starting loading

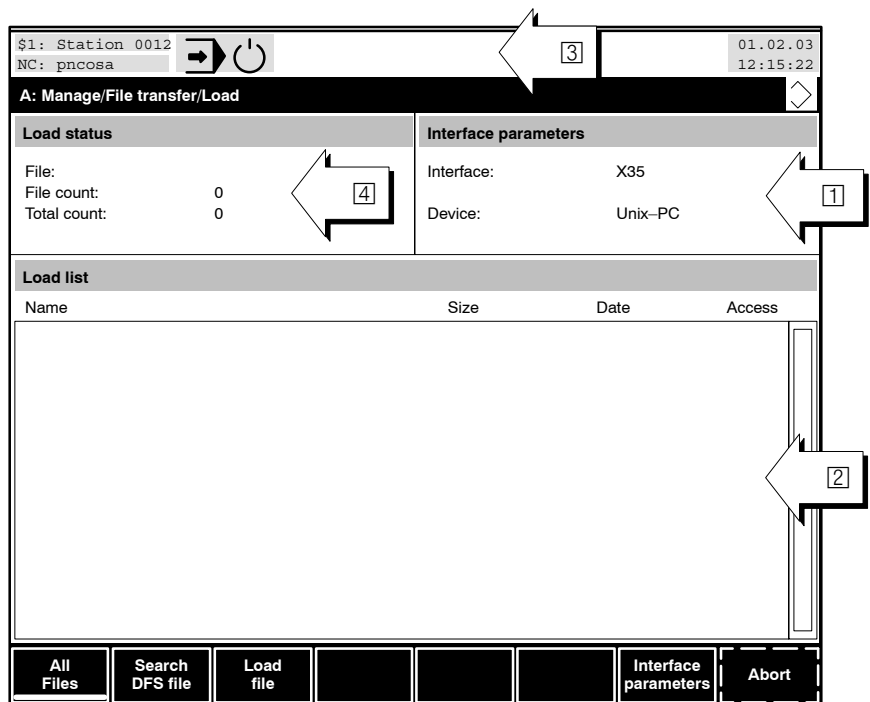
Selection:



The control unit displays the active interface in screen area 1. All transferred files are listed in area 2 (after they have been loaded).

The control unit also displays the following information in screen area 4:

- the files which are currently being loaded
- the number of file bytes which have already been loaded and
- the total number of bytes which have already been loaded (if several files are being transferred).



At this point you can



- **return to the previous operating level** with the level return key, without starting a file loading process.



- use the “All Files” softkey to start **loading several files** which must contain a **DFS identifier** (DFS header) as file header. All of the files transferred by the connected unit are loaded into the control unit. The CNC assigns the name contained in the respective DFS header to the file.

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- **load a defined file.** Enter the name of the desired file in a dialog box. Start loading by means of the “Start” softkey. The control unit checks the incoming data stream for a file which contains the previously entered file name in its **DFS header**. Only this file is loaded into the control unit.

- **load any desired file.** Enter the file name under which all transferred data are to be saved into a dialog box. Start the loading process by means of the “Start” softkey. Note that the file to be loaded must not contain a DFS header in this case. If a file with a DFS header is nevertheless transferred, the file name contained in the header must correspond to the name which was previously entered in the dialog box!

The control unit returns to the previous operating level after a loading process has been completed or the “Cancel” softkey has been pressed (during the loading process).

A flashing error symbol appears in the NC status line if errors occur during the loading process, or the text “Error” appears after the “File” field in the “Load Status” screen area. You can use the Info key to display more information about the error which occurred (refer to section 4.7 “Info Window”).

☞ **Only the “Load File” softkey is available when you load via the DNC interface.**

The PNC waits for the receipt of data after the loading process has been started on the control unit. The length of time the control unit should wait for data to arrive can be determined in the MACODA program as a timeout. The control unit reports an error and aborts loading if you do not start the data transfer on the peripheral unit within the specified time.

DFS header and structure of files to be loaded

Files to be loaded into the control unit usually have to be in ASCII format with the following structure:

- The file must start with the <STX> ASCII character and end with the <ETX> character.
- Every line must be finished with the <CR><LF> ASCII characters (<CR>: optional).
- A “DFS header” may be contained in the second line.

Structure of the DFS header:

(DFS,<Filename>,<Comment>,<Access rights>)

Example: (DFS,Test1.cnc,Testprogramm,RWED)

Comment entry is optional, but all 3 commas have to be written.

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8.12.5 Saving files

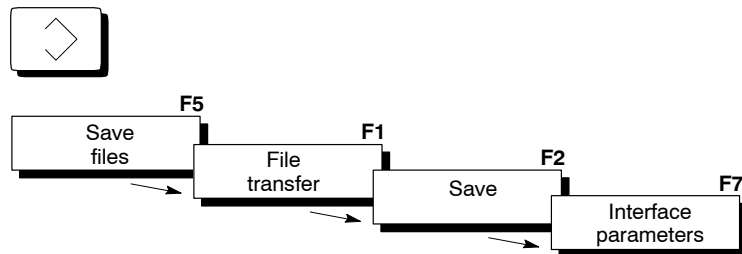
Proceed as described in the following steps to transfer files from the control unit to a connected peripheral unit or to a PC:

► Saving files

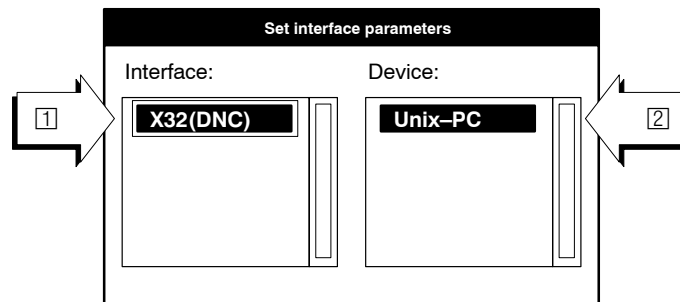
- Connect the CNC and the respective unit with a suitable cable. Observe the safety notes at the beginning of this section!
- Select the interface and peripheral unit
- Select the files to be transmitted
- Start the transfer

8.12.6 Select the interface and peripheral unit

Selection:



The control unit opens a dialog box in which you can select the desired interface 1 and (provided it has been defined in MACODA) a particular peripheral unit 2:



Please note that the selection options displayed above can vary between control units!

► Set interface parameters

- Select the interface
- Select the desired peripheral unit
- Confirm the selection with the “OK” softkey or cancel with the level return key.

Please refer to section 4.5 for more information on selecting an object in a dialog box and entering data.

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Default settings for a "Unix PC" at X35:

Interface: V24
 Baudrate: 9600 bps
 Data bits: 8
 Parity: none
 Stop bits: 1
 Handshake: X_{ON}/X_{OFF}
 Timeout: 10s

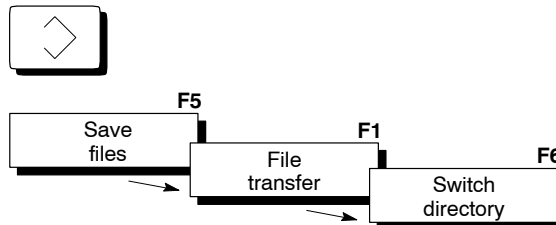
 **The interface of the connected unit must be parameterized with the same values to enable communication!**

8.12.7 Selecting files for transfer

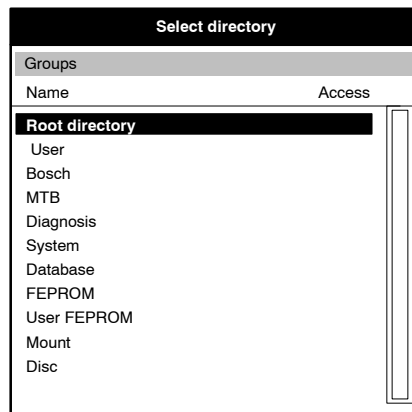
One or several files can be selected for transfer. The control unit stores all selected files in an output list. You can change the output list before transfer.

You must change to the appropriate directory if the files to be output are not available in the current directory.

Selection:



The control unit opens the "Select Directory" dialog box.




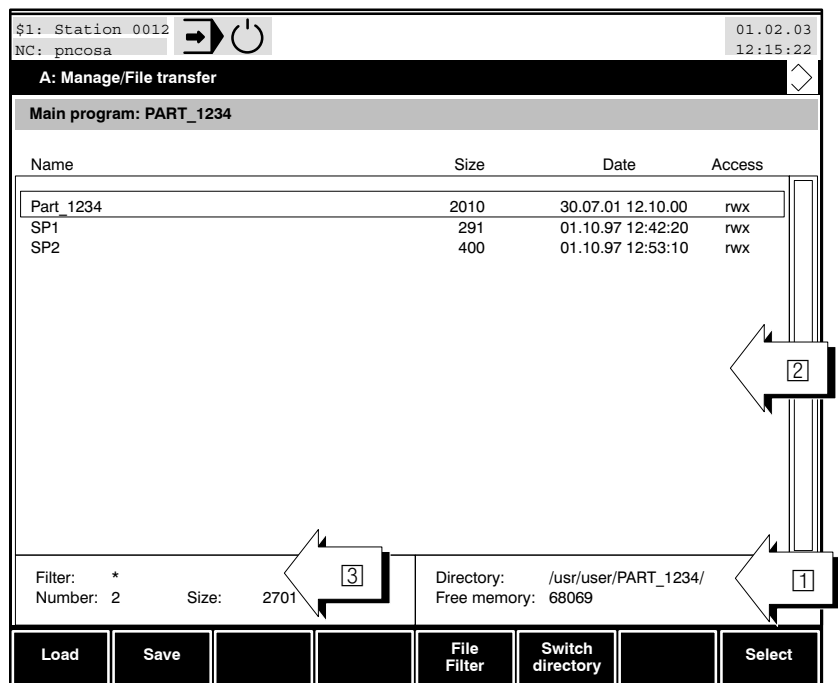
Manage

You can set the form in which the control unit displays directories in a dialog box by means of the “Group”, “Main programs” and “Directory Structure” radio softkeys. For explanations on the directory structure, refer to section 8.1.1, for an explanation of the radio softkeys, refer to section 8.1.5.

The control unit displays all available main program directories when you activate the “Main Programs” softkey. Select the desired destination directory and acknowledge with the “OK” softkey or abort the function with the level return key.

The control unit changes to the specified directory, the current directory is displayed on the screen at position [1] and all the files that are contained in this directory are displayed in screen area [2].

 **The display of files contained in a directory is controlled by the current file filter setting (for file filters, please refer to section 8.7). The current file filter is indicated by the entry in line [3].**




► Selecting files for transfer

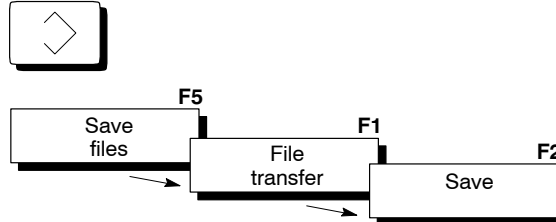
- Select all of the desired files in this directory and press the “Save” softkey. The control unit copies the files selected in the output list. Please refer to section 8.2.1 for selection of one or multiple files.
- Then press the level return key. You are now located in the softkey level which is displayed above.
- If you want to add files from another directory to the output list, use the “Switch Directory” softkey to change to the respective directory and select the files to be transferred.

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8.12.8 Starting saving data

 **The connected unit must be set to the ready-to-receive mode before you can start output on the control unit!**

Selection:

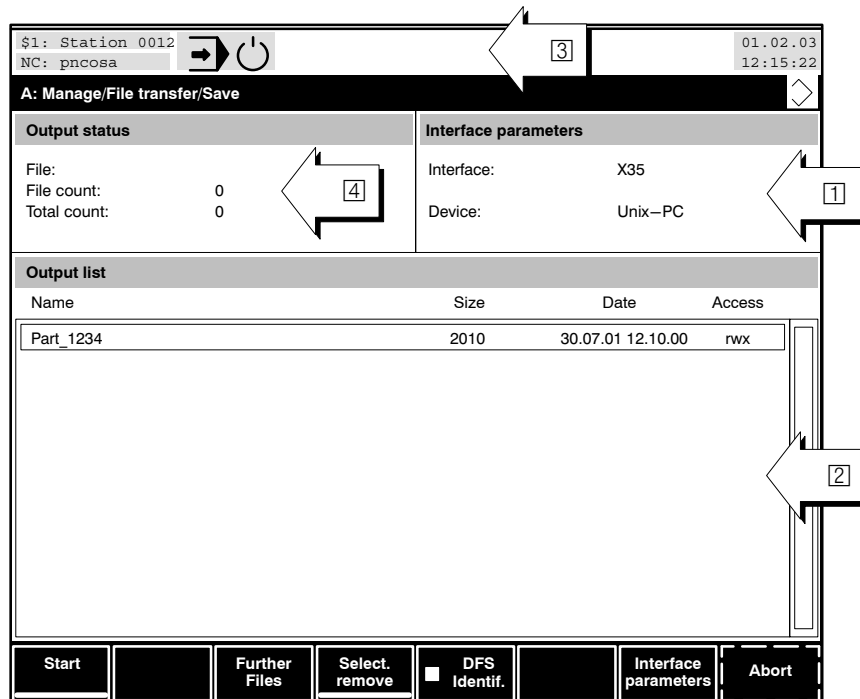


The control unit displays the active interface in screen area 1. All files which were previously selected for output are listed in area 2.

The symbol for “Data saving is active” is displayed in the status line 3 during the saving process.

The control unit also displays the following information in screen area 4:

- the files which are currently being saved.
- the number of file bytes which have already been saved and
- the total number of bytes which have already been saved (if several files are being transferred).



At this point you can

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- **return to the previous operating level** with the level return key, without starting the file output.



- **start saving** with the “Start” softkey. **All files** displayed by the control unit in the output list are saved one by one. A transferred file is automatically removed from the list.



- **include further files** in the output list. Enter the relevant file name in a dialog box.



- **remove files** which had previously been selected **from the output list** (choose these by means of the \blacktriangledown \blacktriangleleft cursor keys and select them with the <sel> or <space> key).



- activate or deactivate the **creation of the DFS header** during saving by means of the “DFS Identifier” softkey.

The control unit returns to the previous operating level after the saving process has been completed or the “Abort” softkey has been pressed (during the saving process).

A flashing error symbol appears in the NC status line if errors occur during the saving process, or the text “Error” appears after the “File” field in the “Output Status” screen area. You can use the Info key to display more information about the error which occurred (refer to section 4.7 “Info Window”).



You can determine in the MACODA program how long the control unit should wait before it issues an error message if data output stops. The control unit reports an error and aborts the output process if the data transfer on the peripheral unit is not resumed or continued within this specified timeout period.

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8.13 Archiving (central data backup)

All data in the RAM file system and/or the usrfep file system (user FEPRM) can be saved in a **tar archive**. After a software swap or hardware replacement, the files can be extracted from the archive, thus restoring the above-mentioned file systems.

8.13.1 Creating Archives

The archiving function writes the data being backed up into a tar archive. The default filename extension used by the control unit for archive files is ".tar".

Normally, the archive is created in a mounted NFS file system (directory) of the PC control panel. The backup directory is freely selectable.

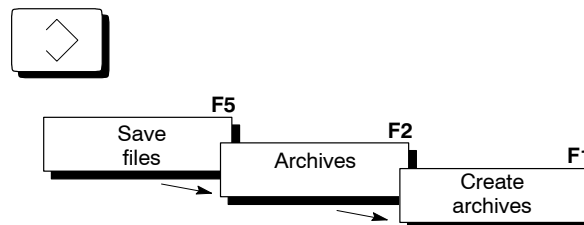
The archiving process can be effected for **entire file systems** or **selectively** with the use of the following partial archiving options:


- RAM file system
- User FEPRM (including PLC application program if present)
- Permanent CPL variables (values plus definitions)
- Tool tables (from database)
- MACODA (from database)
- Remanent data modules and software PLC markers


The archiving process does **not** account for the following files:

- Various system data, e.g., GESDAT_VW, PRINTC, DBSYS-ERR.DAT, etc.
- All files in the **/dev** directory
- all files on mounted NFS file systems on the PC control panel
- all files in the FEPRM file system

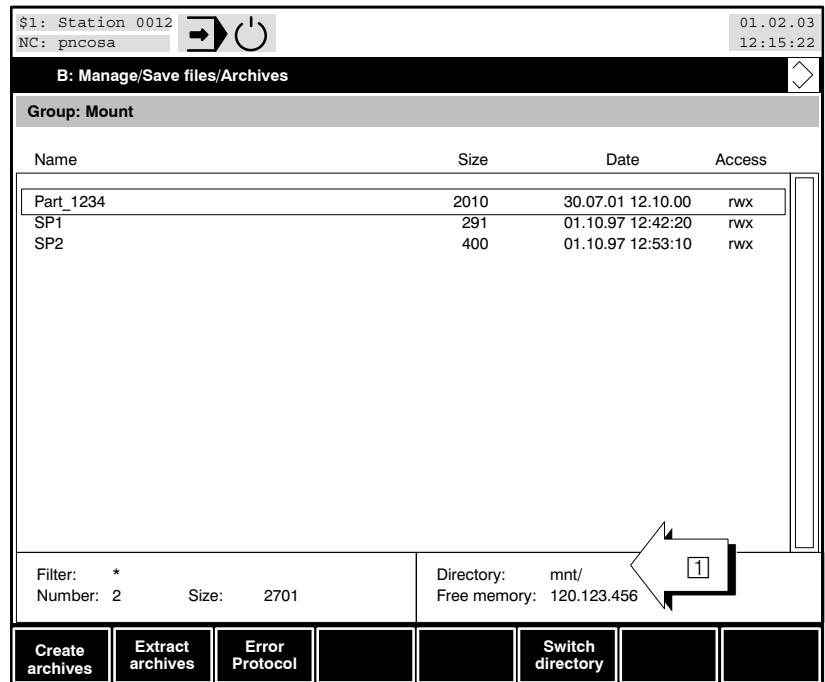
Selection:



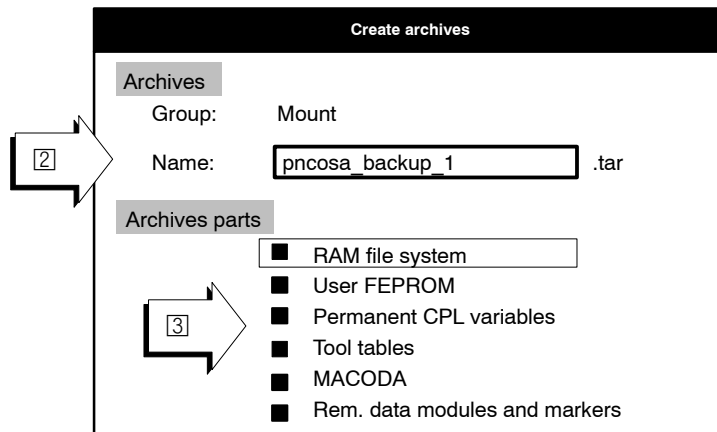
1. Press the "Switch Directory" softkey to select the destination directory  (group) in which the archive is to be stored.

 **When the "Archives" function is used for the first time, the file selection list will show the contents of the /mnt directory. When used again, the last directory used for the archive will be displayed.**

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2. Press the “Create Archives” softkey.
The control unit opens the “Create Archives” dialog menu:



3. Enter a name for the tar archive in the “Name” field **2** (omitting the filename extension). You can also enter the path in addition to the name.
At this point you still have the option to change the desired destination directory (Group) by pressing the “Switch Directory” softkey.
4. Select all archives parts to be backed up **3**. The <Tab> key takes you to the archives parts which you can select by pressing the <Space> key.
To perform a complete backup of the control unit, all archive parts checkboxes must be checked.


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5. Press the "OK" softkey to start the archiving process which is indicated by an active hourglass in the top right corner of the screen. Once archiving is completed, you are returned to the Archives level. In the event that an error was detected during the archiving process, the control unit automatically displays the "Error Protocol" (refer to section 8.13.3).

8.13.2 Extracting (restoring) archives

To restore data subsequent to a software swap or hardware replacement, the previously backed-up system and application data of a control unit is extracted from an existing tar archive. As with the original archiving process, the filename and directory are freely selectable. The extraction of an existing archive can also be performed selectively because the user has the same selection options as when creating the archive.

 **Only those archives may be restored which had previously been created from the PNC-P. The same applies for PNC-R.**



CAUTION
Loss of data!
The restoration process may overwrite existing files!
Back up your files before starting a restoration!



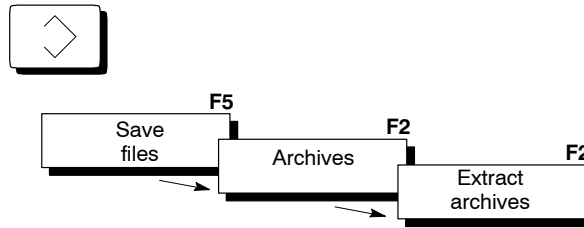
CAUTION
Restoration of a tool table may fail if the number of data records in the tool table deviates from the default value.

When performing a "software swap", the user FEPROM is normally retained, and the first start-up with switch position 6 will cause a blank tool table of the desired size to be created. This tool table can be accepted when the archive is subsequently restored.

When performing a "hardware replacement", and restoring a complete archive, the tool table cannot be taken over. In this case, the first step must consist of restoring only the user FEPROM. Afterwards, a startup with switch position 6 is required. A tool table with the desired size is set up. The second step will then consist of restoring the additional subarchives including the tool table, which can be accepted without errors.

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Selection:



To perform the “Extract Archives” function, the user must at least have “Machine Setter” privileges.



1. Press the “Switch Directory” softkey to select the source directory (Group) from which the archive is to be extracted.
For example, the \mnt... directory [1] on the PC control panel.
2. Select the desired archive in the file display [2] (in the illustration below, this is the “pncosa_backup_1.tar”).

Station: Station 0012 | 01.02.03
 NC: pncosa | 12:15:22

B: Manage/Save files/Archives

Group: Mount

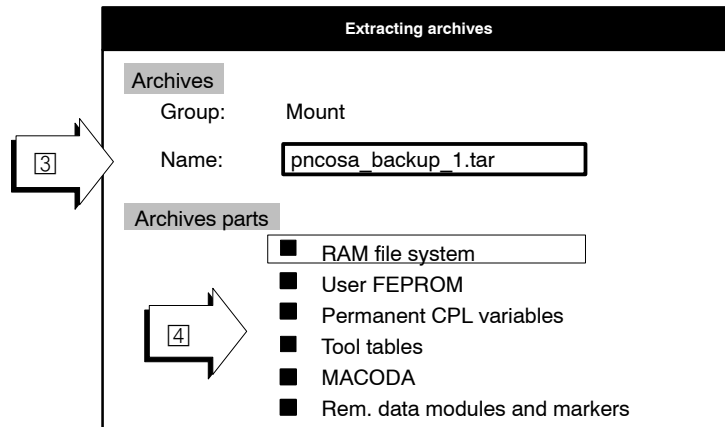
Name	Size	Date	Access
Part_1234	2010	30.07.01 12:10:00	rwX
SP1	291	01.10.97 12:42:20	rwX
pncosa_backup_1.tar	443904	15.03.00 14:43:00	rwX
pncosa_backup_1_c.tar	3028	15.03.00 12:20:00	rwX

Filter: * | Directory: mnt/ | Free memory: 120.123.456
 Number: 4 | Size: 449233

Buttons: Create archives | Extract archives | Error Protocol | Switch directory

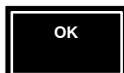
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The selected archive [3] is automatically entered in the “Extract Archives” dialog menu:



- The Archives parts section enables you to select which data areas of the control unit are to be restored. The <Tab> key takes you to the archives parts [4] which you can select by pressing the <Space> key. In the event that the selected archive does not contain the archives parts that you have selected, this will be displayed in the Error Protocol. If you have not selected any archives parts, all data areas contained in the archive will be restored.

Please note that archive backups of the MACODA archives part depends on the version. Extracting the MACODA archives part is only possible if the archive had been created with the same or an older software version.

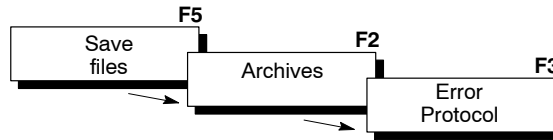
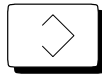


- Press the “OK” softkey to start extracting the archives which is indicated by an active hourglass in the top right corner of the screen. Once extraction is completed, you are returned to the Archives level. In the event that an error was detected during extraction, the control unit automatically displays the “Error Protocol” (refer to section 8.13.3).

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8.13.3 Error Protocol

Selection:



In the event that errors occur during the generation or extraction of an archive, the function will not be interrupted but the error logged in a protocol file (".pro" filename extension).

Once processing has concluded, the protocol file is analyzed and errors, if any, are displayed. The protocol files are stored in the same directory in which the archive file has been created or is to be created.

The name of the protocol file is based on the archive name.



Select the protocol file in the backup directory, and press the "Error Protocol" softkey to display the file.

Name	Size	Date	Access
Part_1234	2010	30.07.01 12:10:00	rwX
SP1	291	01.10.97 12:42:20	rwX
pncosa_backup_1.tar	443904	15.03.00 14:43:00	rwX
pncosa_backup_1_c.tar	3028	15.03.00 12:20:00	rwX
pncosa_backup_1_x.tar	2547	15.03.00 12:20:00	rwX

Filter: * Directory: mnt/
Number: 5 Size: 451780 Free memory: 119.671.676

Buttons: Create archives, Extract archives, Error Protocol, Switch directory

File identifier of the protocol file 1:

When an archive is first created the protocol file is given the filename extension "c.pro", and when an archive is extracted, the extension will be "x.pro".

Example: Name of archive= pncosa_backup_1.tar

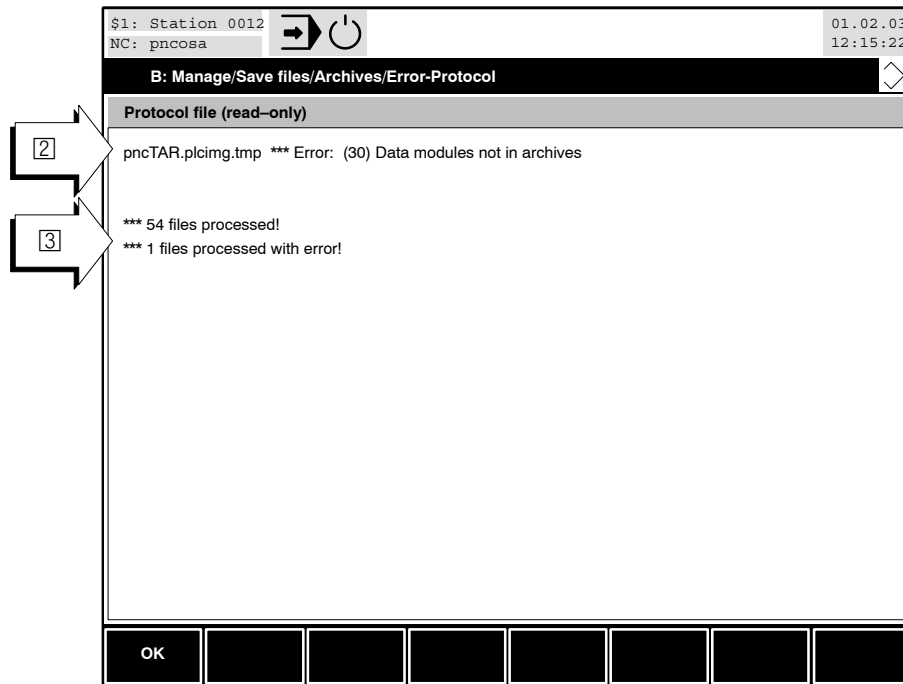
- Name of protocol file after **creating**:
pncosa_backup_1_c.pro

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- The Error-Protocol file saved during the “Extract Archives” function is given the extension “_x.pro” in addition to the filename.
Name of protocol file after restoring:
pncosa_backup_1_x.pro

Protocol structure

- Incorrect entries [2] will generate the erroneous file, an error number, and a suitable error message to be returned.
- The end of the protocol [3] shows the number of files processed and the number of files with errors.



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The protocol file may contain the following error messages:

	Error message	Cause	Remedial measure
1	Error getting file info	internal	Call service
2	File or path not found	internal	refer to item 1
3	Error during reading of file!	internal	refer to item 1
4	No access authorization	Read protected file	Change file protection
5	File already exists	refer to item 4	refer to item 1
6	File not found	refer to item 4	refer to item 1
7	Low of memory	Memory full	Delete unused files
8	File system only readable	internal	refer to item 1
9	Date/Protection not restored	internal	refer to item 1
10	Error creating a directory	internal	refer to item 1
11	Unknown error	internal	refer to item 1
12	Error during transfer of MACODA	internal	refer to item 1
13	Error during transfer of tool table	internal	refer to item 1
14	Error during transfer of data modules	internal	refer to item 1
15	Error during transfer of marker	internal	refer to item 1
16	Error during transfer of CPL variables	internal	refer to item 1
17	RAM – File system not in archives	The RAM file system was not found in the selected archive.	Try selecting another archive, or change the selection of archives parts in the dialog box.
18	User FEPR0M not in archives	refer to item 17	refer to item 17
19	MACODA not in archives	refer to item 17	refer to item 17
20	Tool table not in archives	refer to item 17	refer to item 17
21	Data modules not in archives	refer to item 17	refer to item 17
22	Markers not in archives	refer to item 17	refer to item 17
23	CPL – variables not in archives	refer to item 17	refer to item 17
24	File destroyed.	A file to be archived was modified during the archiving process. This may have been caused by a CPL program.	Ensure that files are not changed during the archiving process, e.g., deselect all CPL programs.
25	Write protection changed	One of the files in the archive is write protected. Once the file has been restored in the control unit, the write protection is no longer active and, if desired, must be set manually by the user.	This is a reminder to the user to help him decide on what to do about write protection.

Manage

8.14 Tables

The following information must be available in the control unit if you want to process a workpiece:

- the tool dimensions (length and radius) and
- the program zero

This is the only way to guarantee that the tool cutting edge can be guided exactly along the desired workpiece contours.

Two different types of tables are therefore available in control unit in which these values can be stored and activated at a later stage if necessary.

A **geometry compensation table** (GEO table) may contain the length and radius compensation values of a maximum of 48 tools. The "Tools" section in the "DIN Programming Instructions" manual explains these compensation values and their application in detail.

An **axis zero shift table** (zero shift table) may contain compensation values for all machining axes. A maximum of 18 compensation groups can be entered in this table each of which can be activated separately by means of the G54–G59, G154–G159 or G254–G259 G functions. The section "Zero Shifts" of the "DIN Programming Instructions" manual explains these compensation values and their application in detail.

 **All tables are stored in file form.**



CAUTION

**Files containing tables and the table data may be modified by properly trained and authorized personnel only because any changes made there will have an effect on tool paths!
Always use the "Protect Tables" function to protect important tables (refer to section 8.6)!**

Manage

8.14.1 Names and file information of tables

Name and filename extension of tables

The table name consists of the freely selectable **name** and the filename extension that can be set in MACODA:

Examples:

- Toolblock_1.geo (Geometry table)
- NPV_Part4711_1.npv (axis zero shift table)

The table names may have a length of max. 29 characters:

- up to 26 characters for the actual name,
- and 3 characters for the filename extension.

In order to allow the table editors to recognize that a certain file is a zero shift or GEO table, they are given a specific **filename extension**. The filename extensions for various types of tables is fixed in MACODA parameter 3080 00200:

- e.g. "geo" for geometry tables
- e.g. "npv" for zero shift tables

The filename extensions "geo" and "npv" are preset ex-works.

 **Geometry tables and zero shift tables in the former "V" and "K" table formats can still be used!**

File information of tables

In addition to the table name, the information displayed includes the table size in bytes, date/time of the last change and access rights.

By pressing ctrl + "i" simultaneously, you can view or hide the information on table size, date/time of last change and last access. In the event of large directories (many programs), the display may be built up **faster** if file information is **suppressed**.

With ctrl + "r", you can refresh the directory display in "Manage" GOM.

The column "Access" has a special meaning. Here, the access information for each table is displayed. Each individual character is assigned a specific meaning:

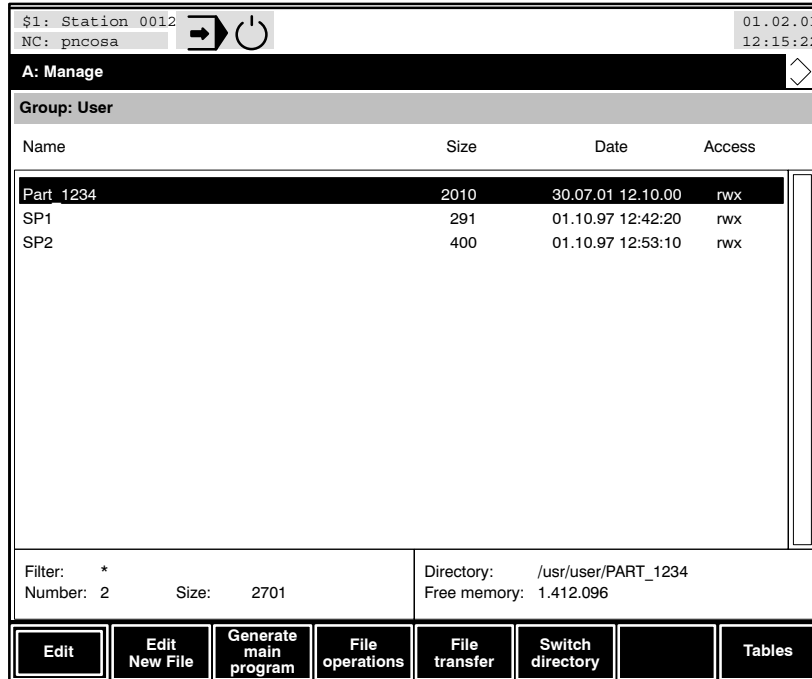
- d: the file in the table is (a reference to) a directory
- r: the table can be read or displayed (e.g. with an editor)
- w: the table can be changed (e.g. with an editor) or deleted
- x: the table can be executed (e.g. program execution)

Please refer to section 8.6 for more information on setting table access rights.

Manage

8.14.2 Table management functions

In terms of management functions, tables are treated as files. With the exception of the editor functions, all management functions for files are the same as for tables. You call up the table management functions from the main menu of the “Manage” mode using the “Tables” softkey.



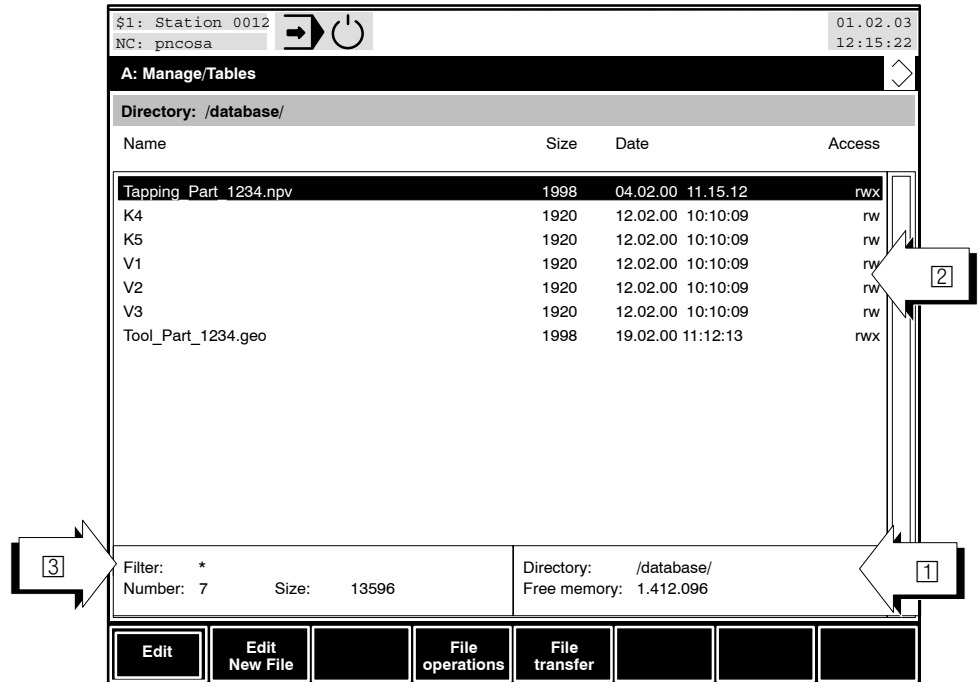
Selection:



F8



Manage




- ① The current directory (/database/) and the free memory for tables are shown on the control unit display.
- ② Display of all tables and files contained in this directory.
- ③ In the "Number" line, the total number and size of the tables in the respective directory /database/ are shown.

☞ **Tables can be edited and managed also outside the "Table Dialog". They may be stored in any directory. Please note that the display in area ② depends on the file (table) filter currently active (refer to area ③). Therefore, not all existing files may be shown. For information on the file filter function, refer to section 8.7.**

Before you can apply a management function (e.g. copy, delete, rename, save, etc.) to one or several tables, you must select the respective table(s).

The functions for tables are the same as for files. Also refer to the relevant section on file functions:

Manage

File
operations

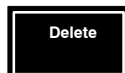
► Table Operations:

Copy

- Copy: Section 8.3

Rename

- Rename or move: Section 8.4

Delete

- Delete: Section 8.5

Access
rights

- Determine access rights: Section 8.6

File
Filter

- Set table filter: Section 8.7

Switch
directory

- Switch directory: Section 8.1.5

Multiple
Selection

- Multiple Selection: Section 8.2.1

8.14.3 Loading/Saving tables

Table data transfer to and from the control unit can be performed via the X35 interface on the osa master.

The functions for tables are the same as for files. Also refer to the relevant section on file functions:

Data
transfer

► Data transfer via X35:

- via interface X35
osa master (Load/Save): From section onward 8.12

Manage

8.14.4 Calling up and creating zero shift tables



CAUTION

Files containing tables and the table data may be modified by properly trained and authorized personnel only because any changes made there will have an effect on tool paths!

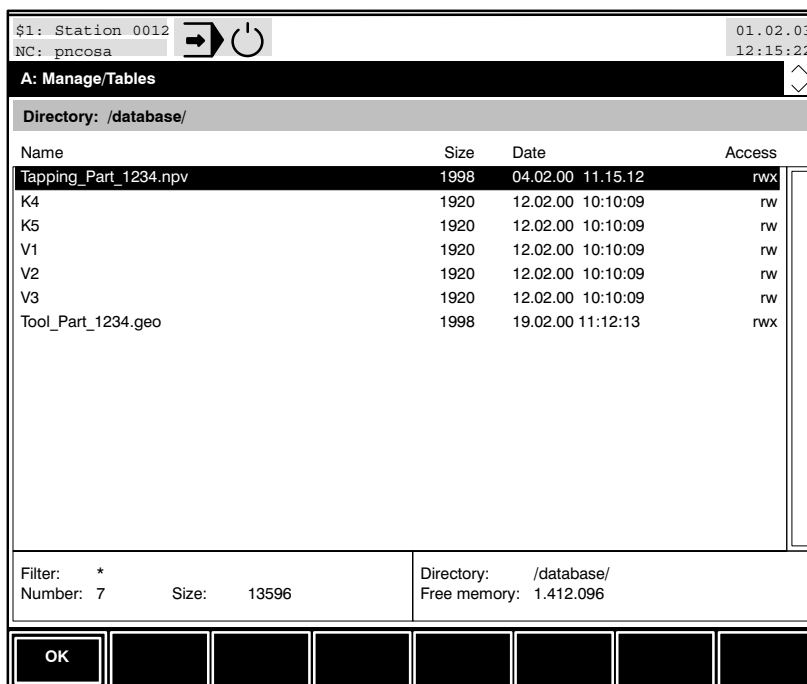
Always use the "Protect Tables" function to protect important tables!

The "w" and "r" (write and read) access rights must be displayed in order to be able to edit a table. Refer to section 8.6 for a description.

For details about the meaning and application of table values, please refer to the "Tools" and "Axis zero shifts" sections of the "DIN Programming Instructions" manual.


 The tables for the "Inclined plane" function are only available as ASCII tables ("ID").

Calling up an existing zero shift table (for axis zero shifts):



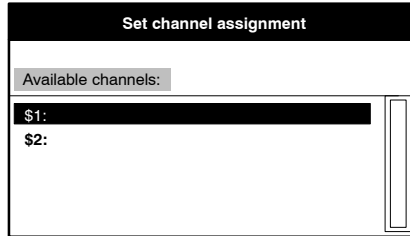
Name	Size	Date	Access
Tapping_Part_1234.npv	1998	04.02.00 11.15.12	rwX
K4	1920	12.02.00 10:10:09	rw
K5	1920	12.02.00 10:10:09	rw
V1	1920	12.02.00 10:10:09	rw
V2	1920	12.02.00 10:10:09	rw
V3	1920	12.02.00 10:10:09	rw
Tool_Part_1234.geo	1998	19.02.00 11:12:13	rwX



- Select the desired table 
- Press the "Edit" softkey.
 - The following applies to zero shift tables with a filename extension (e.g. "npv"):
The control unit starts the zero shift table editor (refer to section 8.14.5).

Manage

- The following applies to zero shift tables V1, V2 or V3 (axis zero shift tables created with an older software version):
During **first time** selection of an axis zero shift table (V1, V2 or V3), the **assignment** to a channel must be set (refer to the following diagram).

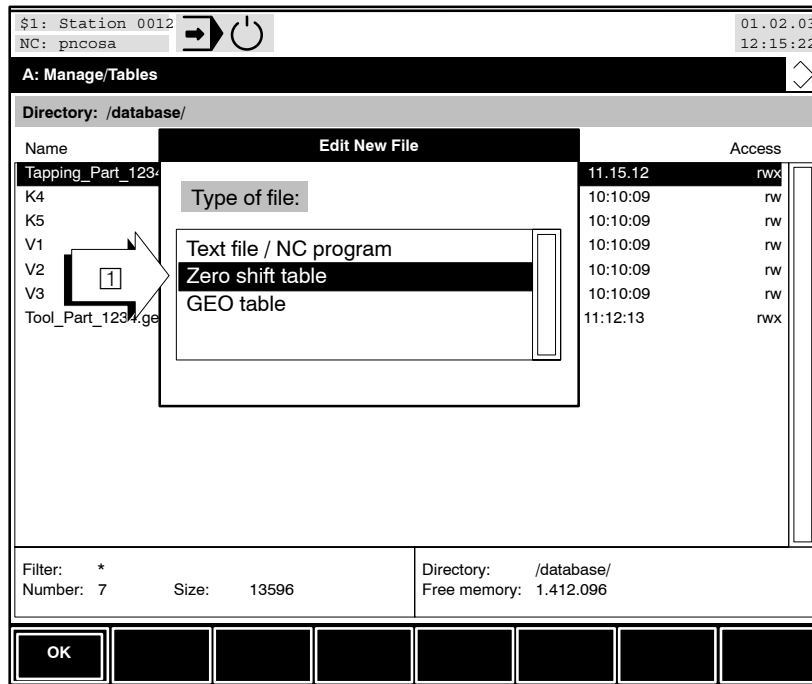


Select a channel and accept using “OK” softkey. After this, the table (V1, V2 or V3) can be edited.

Generating a new zero shift table (for axis zero shifts):



- Press the ” Edit New File” softkey. A dialog box appears in which you can select the type of the file for the “zero shift table” ① to be created.

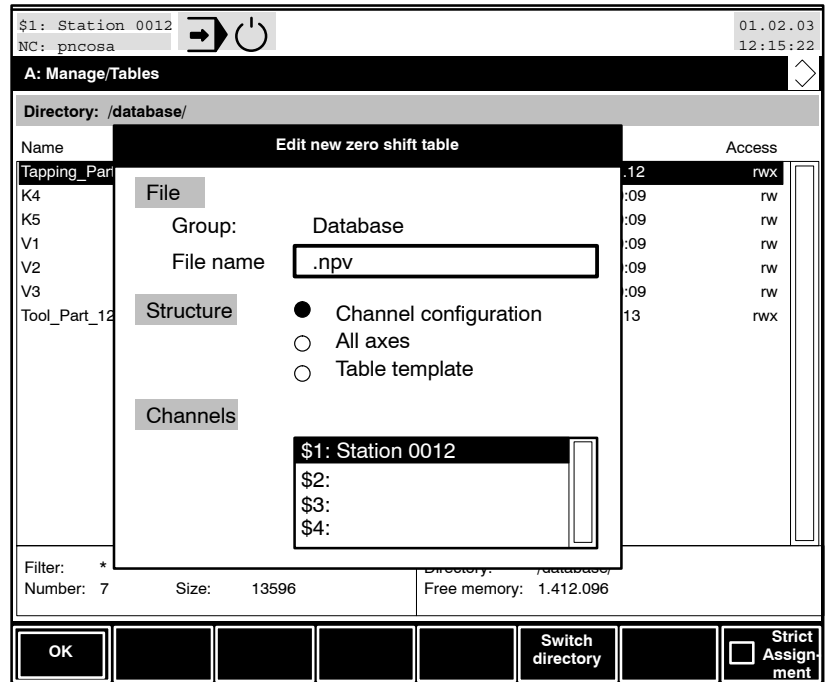


- The next window that opens is the “Edit new zero shift table” window, in which the name for the new table is entered. The filename extension shown corresponds to the identifier for zero shift tables and must **not** be changed.

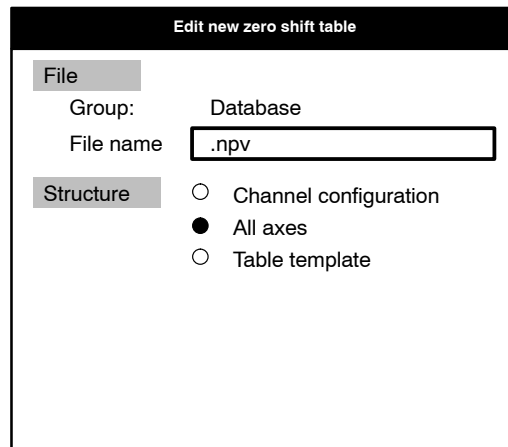
You can select one of three options in the Structure option group:

- **Channel configuration:** Creates a table containing the default axis configuration of the respective channel.

Manage



- **All axes:** Creates a table containing **all** axes within the system.



- **Table template:** Uses the specified template as a sample for the zero shift table to be created. The display shows suitable templates, all of which have the .npv filename extension, and are located in the user FEPRM (e.g., "TAPPING_1.npv, etc.).

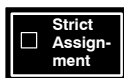
Manage

Edit new zero shift table

File
 Group: Database
 File name: .npv

Structure
 Channel configuration
 All axes
 Table template

Templates
 TAPPING_1.npv
 TAPPING_2.npv



- By pressing the “Strict Assignment” softkey you can specify that the axes contained in the table must be exactly identical to the axes which are currently available in the channel when activating the table.



- By pressing the “Switch Directory” softkey you can define the directory in which the table is to be created.



- Press the “OK” softkey to start the control unit’s table editor (for zero shift table) for the entry of new table values.



Please refer to section 8.14.1 for explanations concerning the definition of the table name and filename extension.

Manage

8.14.5 Zero shift table editor

The table editor can also handle zero shift tables from earlier software versions:

- A table which has not yet been assigned to a channel will require a channel assignment before it can be converted to the new format for editing (refer to section 8.14.4).
- Zero shift tables which already contain a channel assignment will be automatically converted to the new format during the editing process.



CAUTION

Once a zero shift table has been assigned to a channel, this assignment cannot be changed any more.

	X	Y	Z	B	C°
G54	0.000	0.000	0.000	0.000	0.000
G55	0.000	0.000	0.000	0.000	0.000
G56	0.000	0.000	0.000	0.000	0.000
G57	0.000	0.000	0.000	0.000	0.000
G58	0.000	0.000	0.000	0.000	0.000
G59	0.000	0.000	0.000	0.000	0.000
G154	0.000	0.000	0.000	0.000	0.000
G155	0.000	0.000	0.000	0.000	0.000
G156	0.000	0.000	0.000	0.000	0.000
G157	0.000	0.000	0.000	0.000	0.000
G158	0.000	0.000	0.000	0.000	0.000
G159	0.000	0.000	0.000	0.000	0.000
G254	0.000	0.000	0.000	0.000	0.000
G255	0.000	0.000	0.000	0.000	0.000
G256	0.000	0.000	0.000	0.000	0.000
G257	0.000	0.000	0.000	0.000	0.000
G258	0.000	0.000	0.000	0.000	0.000
G259	0.000	0.000	0.000	0.000	0.000

The control unit displays the following information at positions 1 to 6:

- 1 Table group (zero shift table) path and designation. In this example: “/database/wst-1.npv”.
- 2 Axis zero shift values of all machining axes, allocated to NC addresses G54–G59, G154–G159 and G254–G259. The related shift values become effective by programming the respective NC address (e.g. “G54”) in the part program.
- 3 Settings of the editor:
 - Unit: metric or inch
 - Input: absolute or incremental
- 4 Zero shift value selected

Manage

- 5 NC address of the zero shift function, and selected axis with selected zero shift value.
- 6 Number of axes, plus information on additional sheets on which zero shift values are displayed (e.g., Sheet 1/2, Sheet 2/2, etc.) if more than 5 axes are present.

Select a compensation value:

To change or delete a compensation value, use the cursor keys \leftarrow , \rightarrow , \uparrow , \downarrow , \blacktriangleright , \blacktriangleleft , \blacktriangledown , \blacktriangleup , $\langle \text{tab} \rangle$, $\langle \text{home} \rangle$ and $\langle \text{end} \rangle$ to select a compensation value (highlighted field).

The selected compensation value is displayed in the input field 1.

	X	Y	Z	B	C_
G54	0.000	0.000	0.000	0.000	0.000
G55	0.000	0.000	0.000	0.000	0.000
G56	0.000	0.000	0.000	0.000	0.000
G57	0.000	0.000	0.000	0.000	0.000
G58	0.000	0.000	0.000	0.000	0.000
G59	0.000	0.000	0.000	0.000	0.000
G154	0.000	0.000	0.000	0.000	0.000
G155	0.000	0.000	0.000	0.000	0.000
G156	0.000	0.000	0.000	0.000	0.000
G157	0.000	0.000	0.000	0.000	0.000
G158	0.000	0.000	0.000	0.000	0.000
G159	0.000	0.000	0.000	0.000	0.000
G254	0.000	0.000	0.000	0.000	0.000
G255	0.000	0.000	0.000	0.000	0.000
G256	0.000	0.000	0.000	0.000	0.000
G257	0.000	0.000	0.000	0.000	0.000
G258	0.000	0.000	0.000	0.000	0.000
G259	0.000	0.000	0.000	0.000	0.000

No. of axes: 6
Sheet: 1/2

G45 X: mm absolute 1

Change value | Delete value | Configure Table | previous Sheet | next Sheet | Configure Editor

Enter a compensation value:

At this point you can



- press the “Change Value” softkey to change the specified zero shift value for the currently selected G address in the input field 1. The input field 1 can also be activated by pressing the $\langle \text{Enter} \rangle$ key, a numerical key or the $\langle . \rangle$ key. To accept (activate) the entered value, press $\langle \text{Enter} \rangle$ or the “OK” softkey. If the level return key is pressed before the “OK” softkey, the value will not be accepted.



- press the “Clear Value” softkey to delete the zero shift value of the currently selected G address. Select a zero shift value. The value is set to “0” (zero).



- in tables containing more than 5 columns, press the “Next sheet” softkey to advance to the next display containing additional zero shift values.

Manage



- In tables containing more than 5 columns, press the “previous sheet” softkey to return to the preceding display.



- close the dialog box and return to the previous operating level with the level-return key. When closing the table, modifications to the current compensation values which were not accepted will be ignored.



- press the “Configure Editor” softkey to call up the selection of **metric/inch** and **absolute/incremental** options for the values to be entered:

Zero shift table: /database/wst-1.npv					
	X	Y	Z	B	C_
G54	0.000	0.000	0.000	0.000	0.000
G55	0.000	0.000	0.000	0.000	0.000
G56	0.000	0.000	0.000	0.000	0.000
G57	0.000	0.000	0.000	0.000	0.000
G58	0.000	0.000	0.000	0.000	0.000
G59	0.000	0.000	0.000	0.000	0.000
G154	0.000	0.000	0.000	0.000	0.000
G155	0.000	0.000	0.000	0.000	0.000
G156	0.000	0.000	0.000	0.000	0.000
G157	0.000	0.000	0.000	0.000	0.000
G158	0.000	0.000	0.000	0.000	0.000
G159	0.000	0.000	0.000	0.000	0.000
G254	0.000	0.000	0.000	0.000	0.000
G255	0.000	0.000	0.000	0.000	0.000
G256	0.000	0.000	0.000	0.000	0.000
G257	0.000	0.000	0.000	0.000	0.000
G258	0.000	0.000	0.000	0.000	0.000
G259	0.000	0.000	0.000	0.000	0.000

No. of axes: 6
Sheet: 1/2

G45 X: mm absolute

absolute
 increm.

mm
 inch

At this point the following editor configurations are possible:



- The zero shift values (parameters) are currently shown in the metric unit, “mm”.

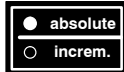
Pressing the mm/inch toggle softkey changes the unit of measure to “inch”, with automatic conversion of **all** values in the table to the new notation. Pressing the mm/inch toggle softkey again converts all table values from “inch” notation to “metric” measure.

Pressing the level return key exits the selection level.

Example: switching from “metric” to “inch” unit of measure
G54: X= 1.000 [mm] ———> X= 0.0394 [inch]

Example: switching from “inch” to “metric” unit of measure
G54: X= 1.000 [inch] ———> X= 25.400 [mm]

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- The zero shift value can be entered:
 - **absolute**
(the value entered in the input field is directly taken over into the table)
or
 - **incremental**
(the value entered in the text input field is added to the value of the selected compensation).

8.14.6 Configuring zero shift tables



- Press the "Configure Table" softkey to configure the selected table. This includes inserting, appending, deleting or modifying columns for new or existing axes.

If the table is active, the configuration cannot be changed!

\$1: Station 0012 01.02.03
 NC: pncosa 12:15:22

A: Manage/Tables/Edit

Zero shift table: /database/wst-1.npv

	X	Y	Z	B	C_
G54	0.000	0.000	0.000	0.000	0.000
G55	0.000	0.000	0.000	0.000	0.000
G56	0.000	0.000	0.000	0.000	0.000
G57	0.000	0.000	0.000	0.000	0.000
G58	0.000	0.000	0.000	0.000	0.000
G59	0.000	0.000	0.000	0.000	0.000
G154	0.000	0.000	0.000	0.000	0.000
G155	0.000	0.000	0.000	0.000	0.000
G156	0.000	0.000	0.000	0.000	0.000
G157	0.000	0.000	0.000	0.000	0.000
G158	0.000	0.000	0.000	0.000	0.000
G159	0.000	0.000	0.000	0.000	0.000
G254	0.000	0.000	0.000	0.000	0.000
G255	0.000	0.000	0.000	0.000	0.000
G256	0.000	0.000	0.000	0.000	0.000
G257	0.000	0.000	0.000	0.000	0.000
G258	0.000	0.000	0.000	0.000	0.000
G259	0.000	0.000	0.000	0.000	0.000

No. of axes: 6
 Sheet: 1/2

G45 X: mm absolute

Append column
Insert column
Modify column
Delete column
previous Sheet
next Sheet
 Strict Assignment

At this point you can



- press the "Append Column" softkey to generate a new column at the end of the table. This opens a dialog menu in which you can select a column name (i.e., logical or physical axis name), and the axis type (linear or rotary).

Manage

Append column

Name:

Type: ● linear axis
 ○ circular axis



- Press the "OK" softkey to create the new column.



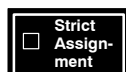
- press the "Insert Column" softkey to insert a new column to the left of the cursor position.
The procedure is identical to that of the "Append Column" softkey.



- Press the "Modify Column" softkey to change the properties (axis name, axis type) of the column in which the cursor is positioned.
The procedure is identical to that of the "Append Column" softkey.



- Press the "Delete Column" softkey to delete – after responding to a security query – the column in which the cursor is positioned. The values contained in the column are discarded.



- Press the "Strict Assignment" softkey to specify that the axes contained in the table must be exactly identical to the axes which are present in the channel softkey

Manage

8.14.7 Calling up and creating GEO tables



CAUTION

Files containing tables and the table data may be modified by properly trained and authorized personnel only because any changes made there will have an effect on tool paths!
Always use the "Protect Tables" function to protect important tables!

Calling up an existing GEO table (for tool compensations):

Name	Size	Date	Access
Tapping_Part_1234.npv	1998	04.02.00 11.15.12	rwX
K4	1920	12.02.00 10:10:09	rw
K5	1920	12.02.00 10:10:09	rw
V1	1920	12.02.00 10:10:09	rw
V2	1920	12.02.00 10:10:09	rw
V3	1920	12.02.00 10:10:09	rw
Tool_Part_1234.geo	1998	19.02.00 11:12:13	rwX

- Select the desired table 1



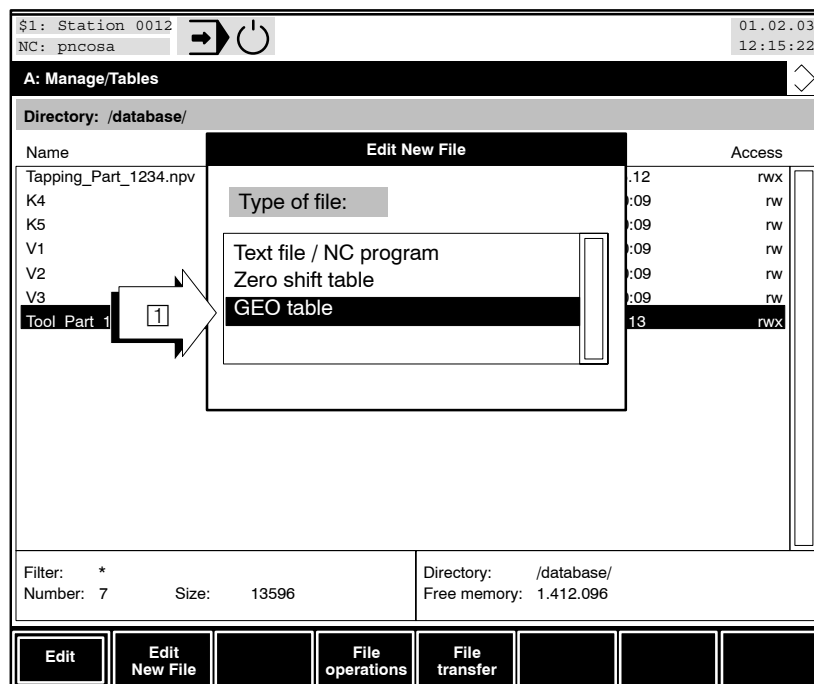
- Press the "Edit" softkey.
The control unit starts the geo table editor (refer to section 8.14.8).

Manage

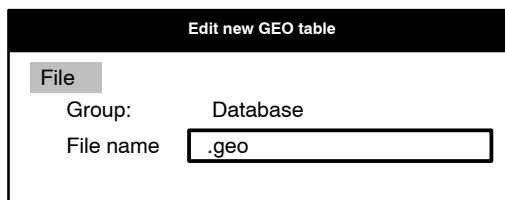
Creating a new GEO table (for tool compensations):



- Press the "Edit New File" softkey. A dialog box appears in which you can select the type of the file for the "GEO table" ① to be created.



- The next window that opens is the "Edit New GEO table" window, in which the name for the new table is entered. The filename extension shown corresponds to the identifier for GEO tables and must **not** be changed.



- By pressing the "Switch Directory" softkey you can define the directory in which the GEO table is to be created.




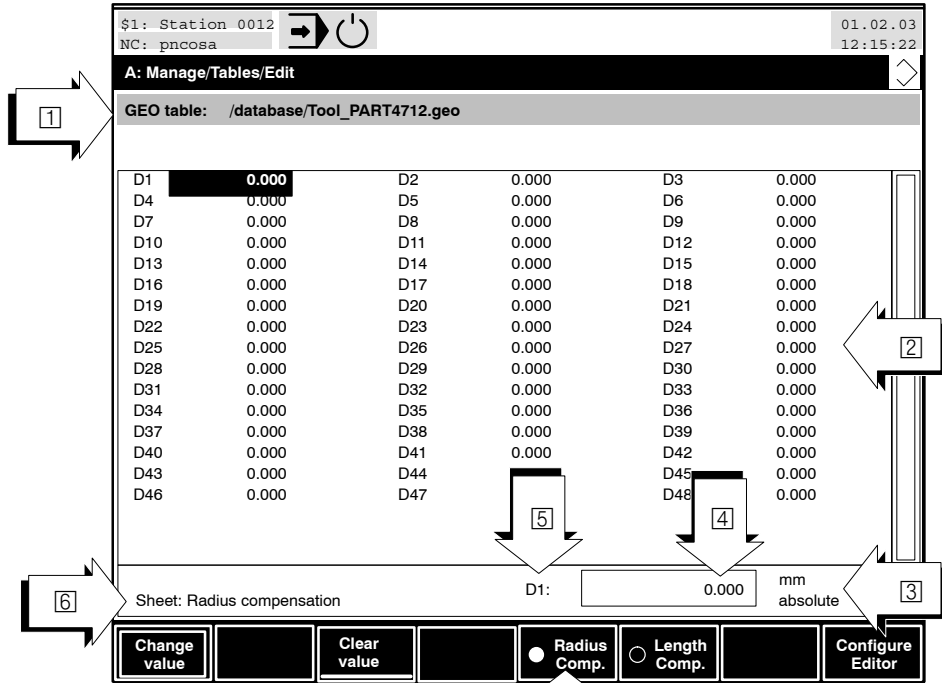
- Press the "OK" softkey to start the control unit's GEO table editor for the entry of new table values (refer to section 8.14.8).

☞ Please refer to section 8.14.1 for explanations concerning the definition of the table name and filename extension.

Manage

8.14.8 GEO table editor

 The GEO and Zero shift (NPV) editors use identical procedures for navigating and changing table values in entry mode.



Station: 0012, NC: pncosa, 01.02.03, 12:15:22

A: Manage/Tables/Edit

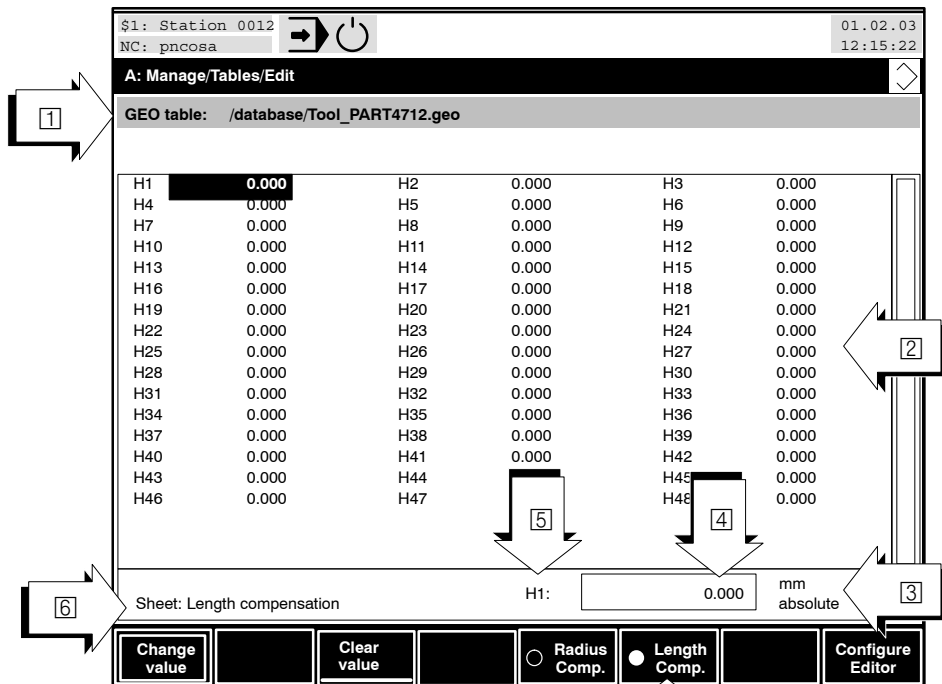
GEO table: /database/Tool_PART4712.geo

D1	0.000	D2	0.000	D3	0.000
D4	0.000	D5	0.000	D6	0.000
D7	0.000	D8	0.000	D9	0.000
D10	0.000	D11	0.000	D12	0.000
D13	0.000	D14	0.000	D15	0.000
D16	0.000	D17	0.000	D18	0.000
D19	0.000	D20	0.000	D21	0.000
D22	0.000	D23	0.000	D24	0.000
D25	0.000	D26	0.000	D27	0.000
D28	0.000	D29	0.000	D30	0.000
D31	0.000	D32	0.000	D33	0.000
D34	0.000	D35	0.000	D36	0.000
D37	0.000	D38	0.000	D39	0.000
D40	0.000	D41	0.000	D42	0.000
D43	0.000	D44	0.000	D45	0.000
D46	0.000	D47	0.000	D48	0.000

Sheet: Radius compensation D1: 0.000 mm absolute

Change value Clear value Radius Comp. Length Comp. Configure Editor

Input sheet for radius compensation values



Station: 0012, NC: pncosa, 01.02.03, 12:15:22

A: Manage/Tables/Edit

GEO table: /database/Tool_PART4712.geo

H1	0.000	H2	0.000	H3	0.000
H4	0.000	H5	0.000	H6	0.000
H7	0.000	H8	0.000	H9	0.000
H10	0.000	H11	0.000	H12	0.000
H13	0.000	H14	0.000	H15	0.000
H16	0.000	H17	0.000	H18	0.000
H19	0.000	H20	0.000	H21	0.000
H22	0.000	H23	0.000	H24	0.000
H25	0.000	H26	0.000	H27	0.000
H28	0.000	H29	0.000	H30	0.000
H31	0.000	H32	0.000	H33	0.000
H34	0.000	H35	0.000	H36	0.000
H37	0.000	H38	0.000	H39	0.000
H40	0.000	H41	0.000	H42	0.000
H43	0.000	H44	0.000	H45	0.000
H46	0.000	H47	0.000	H48	0.000

Sheet: Length compensation H1: 0.000 mm absolute

Change value Clear value Radius Comp. Length Comp. Configure Editor

Input sheet for length compensation values

Manage

The control unit displays the following information at positions ① to ⑥:

- ① Table group (GEO) path and designation. In this example here "/database/Tool_Part_1234.geo".
- ② A maximum of 48 radius or length compensation values (to be changed over using radio softkeys ⑦ "Radius Comp." and "Length Comp.") The corresponding compensation values become effective when the relevant NC address is programmed in the part program (e.g. "D1" for radius compensation value 1 and "H1" for length compensation value 1).
- ③ Settings of the editor:
 - Unit: metric or inch
 - Input: absolute or incremental
- ④ GEO value selected
- ⑤ NC address of the GEO function
- ⑥ Information concerning the current input sheet: Display of the radius or length compensation values
- ⑦ Radio softkeys for changing over between radius and length compensation entry

Select a compensation value:

To change or delete a compensation value, use the cursor keys \blacktriangleleft , \blacktriangleright , \blacktriangleup , \blacktriangledown , \blacklozenge , <tab>, <home> and <end> to select a compensation value (field with dark border).

The selected compensation value is displayed in the input field ④.

Enter a compensation value:

At this point you can



- press the "Change Value" softkey to assign a value to the selected **D or H address** ②.

The input field ④ **can also** be activated by pressing the <Enter> key, a numerical key **or the** <.> key.

To accept (activate) the entered value, press <Enter> or the "OK" softkey. If the level return key is pressed before the "OK" softkey, the value will not be accepted.



- Depending on whether the "Radius Compensation" or "Length Compensation" softkey has been selected, the value of the **D or H address** will be deleted. Also refer to the explanations in Section 8.14.5, "Zero shift table editor".



- **change over between the radius and length compensation values (D or H addresses)**, using the "Radius Compensation" and "Length Compensation" softkeys.

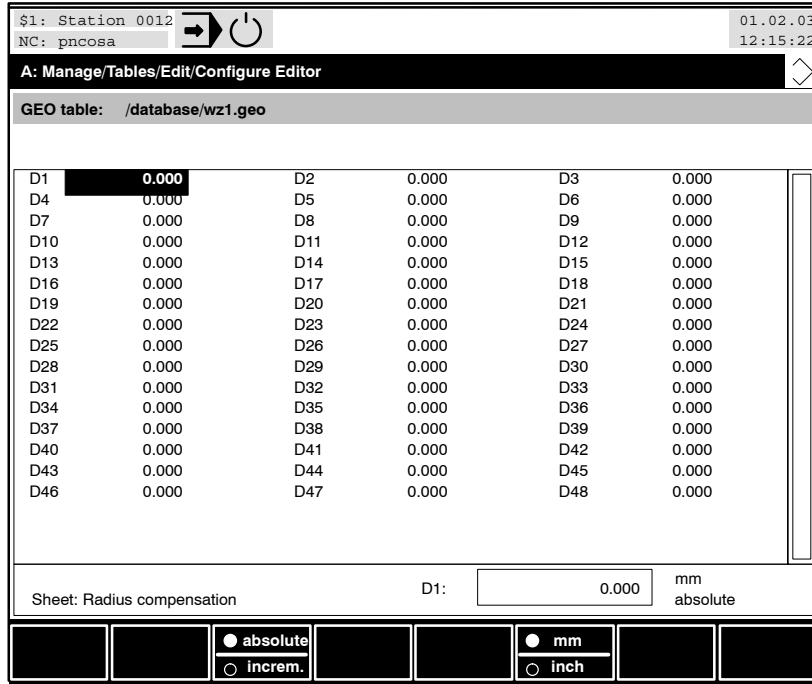


- close the GEO table and return to the previous operating level with the level-return key. When closing the table, modifications to the current compensation values which were not accepted will be ignored.

Manage



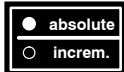
- press the “Configure Editor” softkey to get to the selection of **inch/metric** and **absolute/incremental** options for the values to be entered:



At this point the following editor configurations are possible:



- Display the current GEO values (parameters) in the metric unit, “mm” or in “inch”. Also refer to the explanations in Section 8.14.5, “Zero shift table editor”.



- The GEO value can be entered as an **absolute** or an **incremental** value. Also refer to the explanations in Section 8.14.5, “Zero shift table editor”.

The settings made with the “Configure Editor” softkey apply equally to radius and length compensation.

Diagnosis

9 Diagnosis

This section discusses the functionality of the control unit from the machine operator's point of view. Questions such as "What must I do in order to ..." or "How can I ..." are answered here.

For this purpose, the softkey operating sequence ("softkey path") taking you through individual operating levels to the desired function is indicated.

This section discusses the "DIAGNOSIS" menu.

The detailed structure of the table of contents gives you a concise overview.

If you require information **only about one particular softkey**, please look it up in the index under "softkey". The page on which the respective softkey is described can be found there.



To facilitate proper handling and operation of the control unit, user knowledge in respect of the hierarchy of softkeys and structure of dialog boxes is an indispensable prerequisite. To this end, also read the section "Man-machine interface".

Please note that the following diagnosis tools are only described in the "Diagnostics Tools" manual:

- Logic analyzer
- Axis oscilloscope
- Contour display
- Drive oscilloscope
- SERCOS monitor

Diagnosis

9.1 Inhibiting user access

In the control unit, you can influence the user access to functions via:

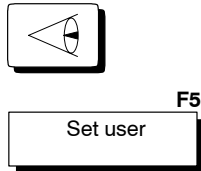
- the **user level** (for user groups)
- **function inhibiting** (for “User”, the lowest user level).

The control unit has five user levels, four of which are password-protected.

Function inhibition blocks the access to functions for a particular user group.

9.1.1 User level

Selection:



Five user levels hierarchical in structure are defined in the control unit. The lowest level is “User” and is not protected by a password. All other user levels (refer to following table) can be allocated to certain authorized, password-protected user groups who are allowed to make changes in special safety-relevant parameters.

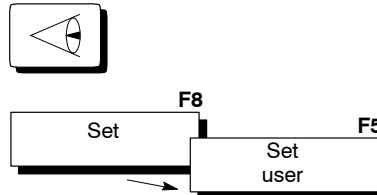
The following table shows the user levels in the control unit:

Level	User level	protected by	Access	User level active until
Highest	System	Password	For the persons in charge of the system; for defining and changing the MACODA parameters within the system	date change or until the manual selection of another user level.
	Developer	Password	For developers at Rexroth and platform customers; for defining new MACODA parameters	date change or until the manual selection of another user level.
	MTB	Password	for commissioning the machine	date change or until the manual selection of another user level.
	Machine setter	Password	for privileged users of the machine who want to use password-protected functions	date change or until the manual selection of another user level.
Lowest	User (standard level!)	no password necessary	for users of the machine for manufacturing parts	until the manual selection of another user level.

Diagnosis

Setting of the user level (manual change-over)

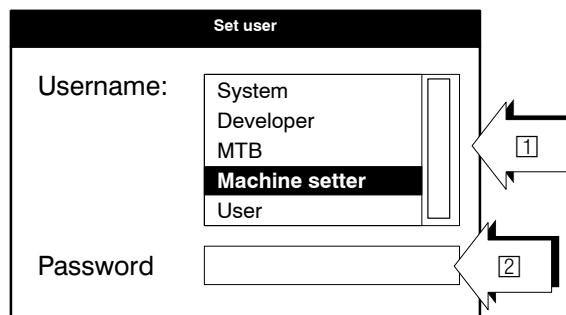
The **standard user level** is "User" which is active when the man-machine interface is called up for the first time on a PC control panel.

Selection:

You can manually change the user level in the "DIAGNOSIS" menu with the "Set user" softkey .

- Select the desired user level (1). The user level is changed on entering the correct password (2).

The user level "User" does not require any password, i.e. you can directly switch over to "User" from another level without entering a password.



- Pressing "OK" takes you back to the previous operating level.

Consequences of changing the user level

Ending the Bosch man-machine interface or switching the control unit on and off of does **not** change the user level. It remains unchanged until you change it **manually** or until it is **automatically** changed.

- ☞ **The set user level is saved on the PC control panel and basically affects all MMI's (user interfaces) that are started on the control panel of this PC (refer to section 10.4 for several user interfaces on a PC control panel).**

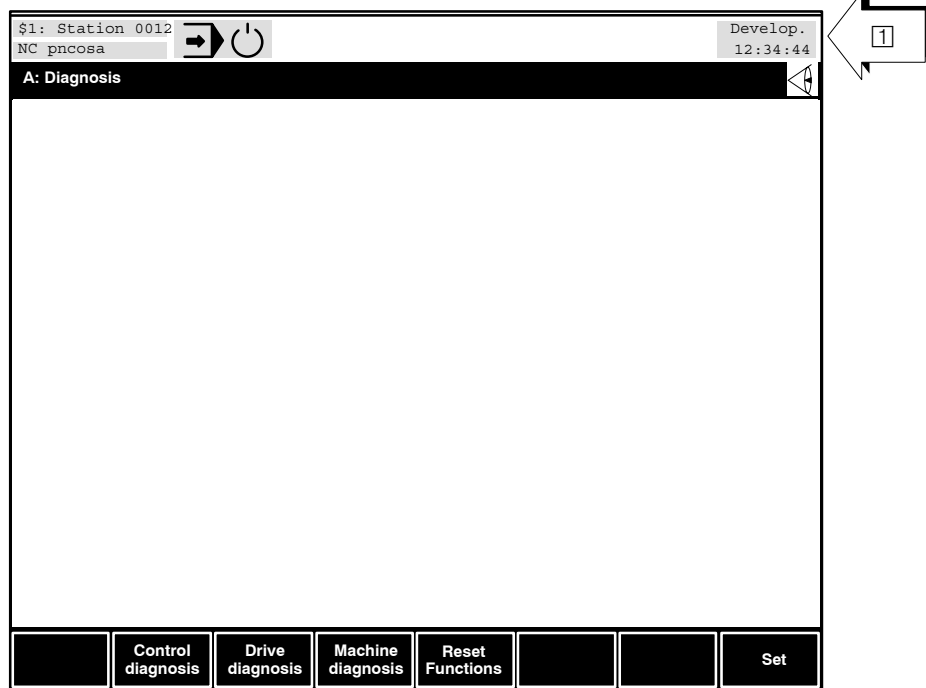
Diagnosis

Automatic change-over of the higher user levels

Automatic change-over of a higher user level to the “User” user level **always** takes place during a date change. This prevents the higher user level, which was not reset to “User” by mistake, from remaining active.

Visualization of the current user level

A user level **higher** than “User” is shown in the NC status line in place of date 1.

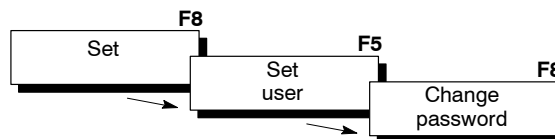
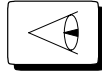


Diagnosis

Passwords

No password is required for the “User” level. All other user levels are protected with an optional password.

Passwords can be changed in the “Change password” dialog menu.

Selection:

Select the desired user level [1]. You can specify a new password [3] after entering the old one [2].

A password can have a maximum of 8 characters.



- Pressing “OK” takes you back to the previous operating level.

**CAUTION****Unauthorized access to safety-relevant data!**

If the control unit returns to a user level higher than “User”, unwanted changes may be made on the running system as a result of unauthorized access!

After working at a higher user level, you should always set the control unit back to the user level “User”!

Forgot user-defined password?

The passwords assigned by Rexroth may be reactivated at any time. For doing so, delete the following entry in the Windows registry:

```
\\HKEY_LOCAL_MACHINE\\SOFTWARE\\Bosch\\PC-Panel\\Current-Version\\ UserManager.
```

Diagnosis

9.1.2 Locking functions for the “User”

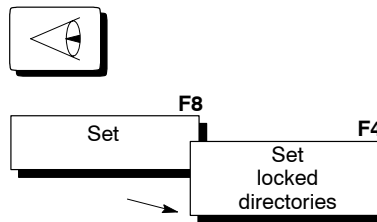
The MTB can activate the **Protect password function** and thus lock the following functions for the user level “User”:

- Write access to SERCOS parameters
- Reading tool tables
- Changing access rights for files and directories
- Extracting archives
- Loading the MACODA configuration parameters

Password protection is normally switched off.

It is activated under Windows by changing the Registry entry \\HKEY_LOCAL_MACHINE\\SOFTWARE\\Bosch\\PC-Panel\\Current-Version\\MMI_PwdProtActive to “1”.

Diagnosis

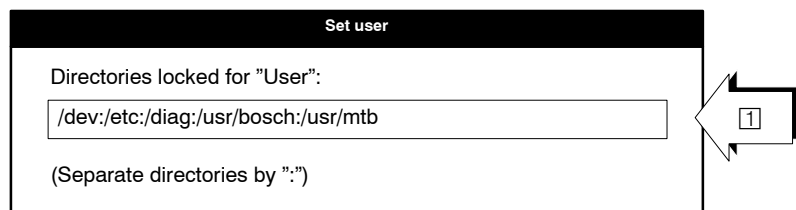
9.1.3 Locking file directories**Selection:**

File system: You can **lock directories** for the user level “User”.

The locked directories are specified by the “Set locked directories” soft-key in the “DIAGNOSIS” menu. This functionality is available for a user level higher than “User” only.

Enter the name of this directory in the form of a string [1], where the individual directory paths are separated by a colon “:”.

Example: The following directories are to be locked
/dev:/etc:/diag:/usr/bosch:/usr/mtb



Pressing “OK” takes you back to the previous operating level.

Please note:

- In the user level “User”, you **cannot** branch to a locked directory with the “+” and “-” keys (**Error message:** “The directory is locked for the current user.”).
- Locked directories are not shown in the group display for “Switch directory”.
- Activating a user level higher than “User” displays all directories.

Diagnosis

9.1.4 Edit inhibit

Using edit inhibit, you can disallow certain NC **operations** for the “User” on the lowest user level. Only user reactions directly related to the production process are allowed.

For example, you can activate an edit inhibit via a key switch (general signal: Input CNC 0.1).

The edit inhibit depends upon the channel and acts on all processing units of an active man-machine interface of a PC control panel in a uniform manner.

Locked or restricted functional units for the user level “User” with the edit inhibit:

File management/Editor:

- When opening an existing file with the Editor, the note “Edit inhibit activated, read only” appears since the “Save” and “Save under” options are not allowed.
- Creation of a new file is locked.
- File operations “Copy, rename and delete files” are locked.
- Directories cannot be generated (generate main program).
- Loading and saving files under file transfer is locked.
- All Archives functions are locked.

Table management/Table editor:

- All functions that result in a change in the value in the table (change value, delete value ..) are not allowed for zero shift tables and geometry compensation tables.
- File operations for tables and the creation of a new table are locked.

MACODA

- The MACODA record functions “Save”, “Save completely” and “Save in FEPRM” and loading of a record are locked.
- Changing MACODA parameter values is not permitted.

SERCOS monitor:

- Data entry for SERCOS parameters is locked.
Affected softkey levels:
 - SERCOS monitor: Process ident no.
 - Drive oscilloscope: Set axis parameters

Irrespective of the current user level, read access to the SERCOS parameters is always allowed.

- It is not possible to start up the SERCOS ring at the man-machine interface while edit inhibit is active (SERCOS parameter and SERCOS ring: also refer to “Diagnosis tools operating instructions” in section **SERCOS monitor**)

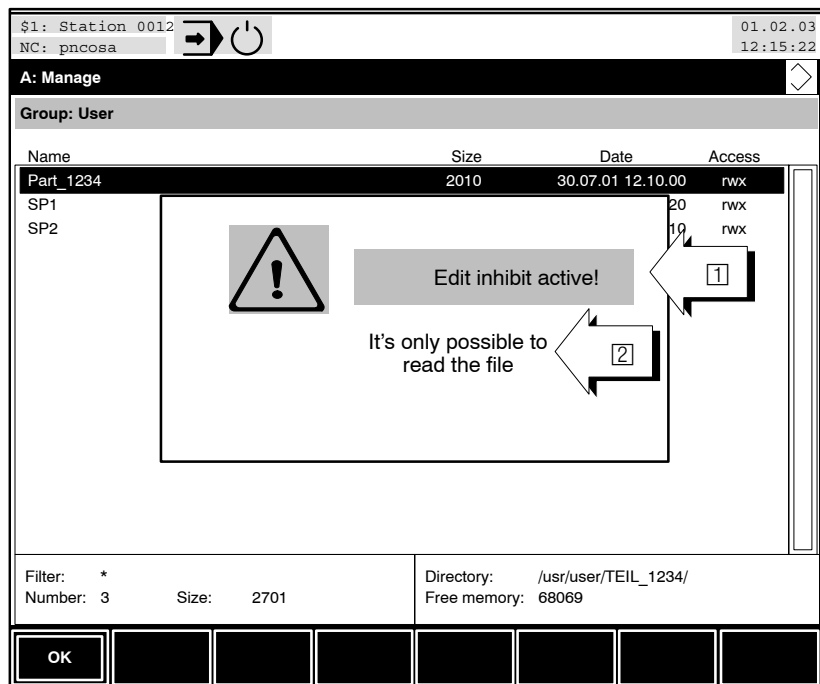
Diagnosis

Tool management:

Edit inhibit does **not** affect tool management (also refer to section 9.1.2).

Display of the edit inhibit:

When the "User" activates a locked function, an information window "Edit inhibit active" is displayed [1] together with a reference to the function concerned [2]. The user must acknowledge the information window before proceeding with the dialog. No error message or warning is generated in the NC status line.

Example: Edit inhibit "Edit file"

The activated edit inhibit does not restrict the visualization of the file contents, but prevents modification of the file data.

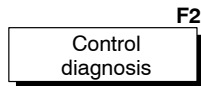
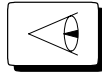
When pressing "OK", the file is opened for "read access".
The level-return key takes you back to the previous operating level.

Diagnosis

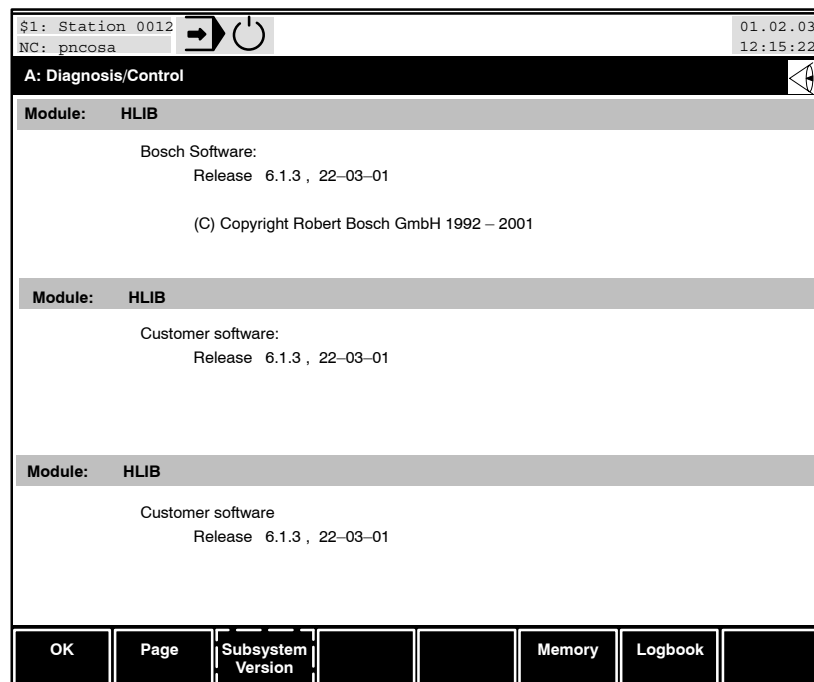
9.2 Display Software version

You can get information about the status of the currently loaded software version and individual software modules in the control unit using the diagnosis function “Control diagnosis”.

Selection:

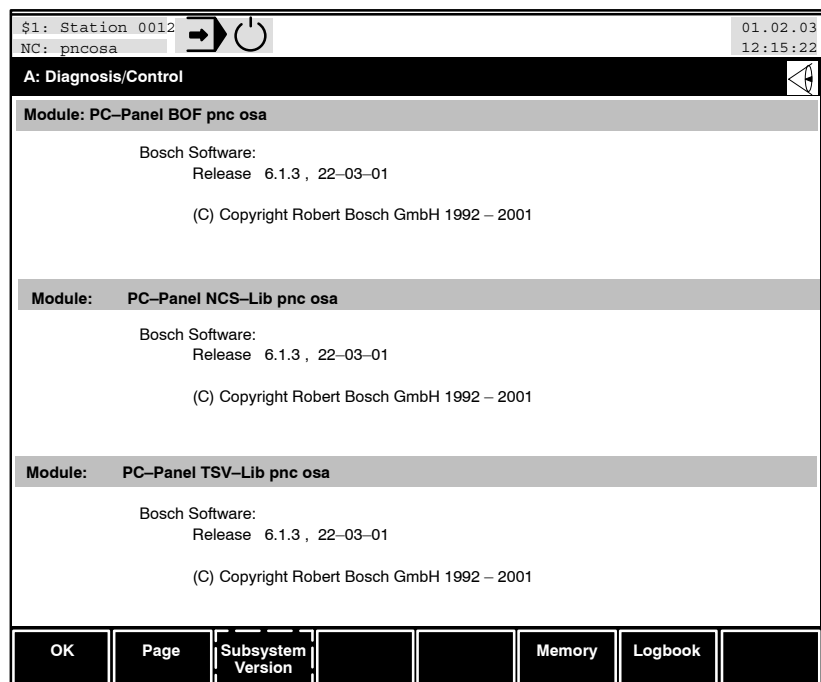


The currently active software is displayed:



Diagnosis

The PC control panel software is displayed while paging:



At this point you can



- **return to the previous operating level** with the level-return key.



- return to the previous operating level by pressing OK.



- **page through each screen page** to display data of other software modules. If there are no more modules in the control unit, the softkey is dimmed.



- display the memory sizes of the system.



- display the logbook file of the system (also refer to section 8.2.1).



- have the versions of all subsystems including a possible existing patch number and the respective date of creation displayed by the "Subsystem version" softkey. You can navigate through the list of subsystems using the \blacktriangledown , \blacktriangle , \langle home \rangle and \langle end \rangle keys.

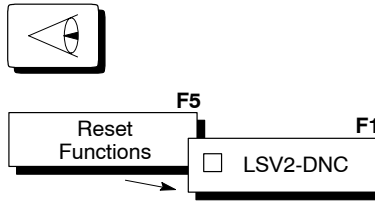
Diagnosis

Subsystem versions				
Subsystem	Version		Patch	created at
CSI	: 5.1.18	–	0	Wed Nov 24
PXR	: 5.1.18	–	0	Wed Nov 24
NCB	: 5.1.18	–	0	Wed Nov 24
LBC	: 5.1.18	–	0	Wed Nov 24
NCS	: 5.1.18	–	0	Wed Nov 24
TCP	: 5.1.18	–	0	Wed Nov 24
FSR	: 5.1.18	–	0	Wed Nov 24
APS	: 5.1.18	–	0	Wed Nov 24
TDS	: 5.1.18	–	0	Wed Nov 24
DIO	: 5.1.18	–	0	Wed Nov 24

Diagnosis

9.3 Activating LSV2-DNC

Selection:



If the check softkey is active, the X35 interface is used for DNC (with LSV2 protocol).

The following default values have been specified by Rexroth for the DNC interface:

Interface: V24;
 Baudrate: 19200 bps;
 Data bits: 8;
 Parity: even;
 Stop bits: 1;
 Max. telegram length: 256;
 Timeout: 1s

The interface of the connected unit must be assigned the same parameter values!



Please note that the data exchange between the CNC and the connected unit takes place via the LSV2 protocol. If the connected device does not support this protocol, the check softkey must not be activated.



When you have made all the settings, you may return to the previous operating level with the level return key.

Diagnosis

9.4 Releasing control reset



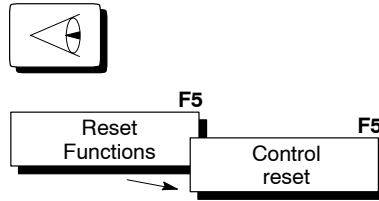
DANGER

A control reset may cause damage to workpieces and pose a hazard to operators!

Do not initiate "Control Reset" during a machining process. This may break the tool or the workpiece!

Chips of fragments hurled around may cause injuries!

Selection:



Using "Control Reset" you can reset the control unit to its power-up state and simultaneously delete diagnostics class 1 errors in the connected Servodyn-D drives. Please note:

- Reference points which have already been traversed to are not changed by this process.
- All axes are stopped.
- "Jog" and "Traverse to Reference Point" are aborted if previously active.
- The active program is cancelled and internal buffers and G functions are first reset and then set to power-up state. Exception: G70/G71. The G function which was programmed last remains active. The power-up state depends on machine parameter 3030 00001.



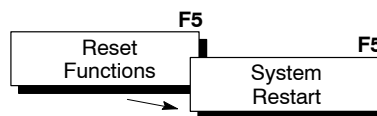
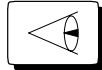
After "Control Reset" is initiated, return to the previous operating level with the level-return key.

Diagnosis

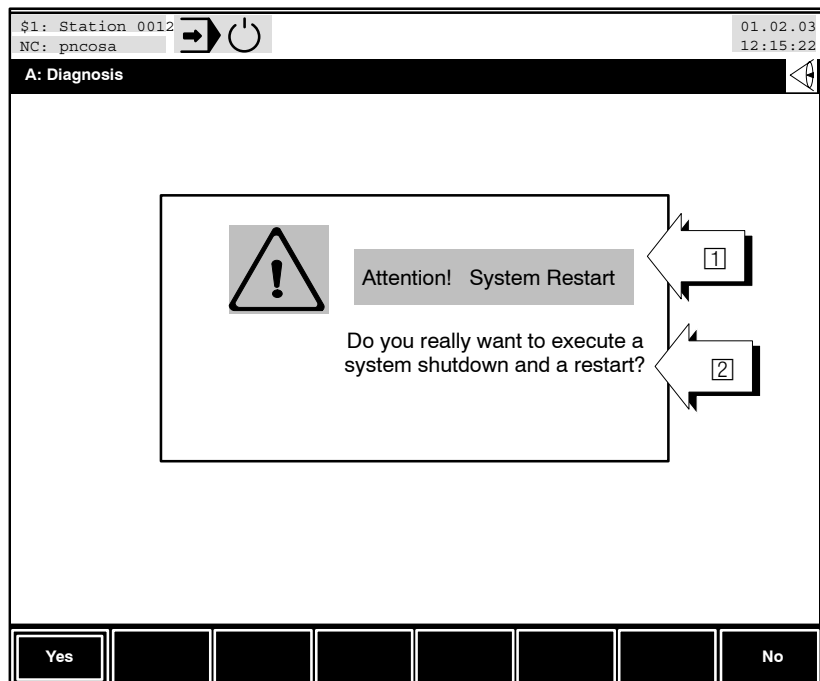
9.5 System restart**DANGER**

Possibility of damages to workpieces and hazards to operators because of pieces ejected from the machine!!

Do not initiate "System restart" during a machining process. This may break the tool and/or the workpiece!

Selection:

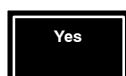
After an inquiry [2], "System restart" [1] restarts the system. The S1 switch on the osa module must be in <0> position. An error message is output if the position of the switch is not correct. Subsequently, the man-machine interface is restarted.



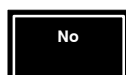
At this point you can



- **return to the previous operating level** with the level-return key.



- Click "Yes" to restart the system



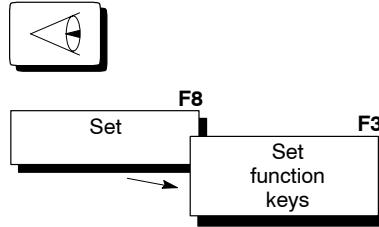
- Click "No" to avoid restarting the system and return to the previous operating level.

Diagnosis

9.6 Setting the assignment of the F10 to F12 function keys

The assignment of the F10 to F12 function keys can be altered according to your requirements. Certain softkey levels which are frequently required can thus be directly activated by pressing a key.

Selection:



The control unit opens the "Set function keys" dialog box:

Set function keys		
Key	Main menu	Softkey level
F10	Diagnosis	– Reset functions
F11:	Diagnosis	– Drive diagnosis
F12:	Manage	– File operations

At this point you can




- **select the function key to be assigned** by shifting the focus using the cursor keys \blacktriangleleft \blacktriangleright or <home>/<end>.
- **close the dialog box and return to the previous operating level** with the level-return key. Changes to function key assignment, which have not been confirmed (refer to "Activate Keys" softkey), are not saved.
- **save and activate** the currently selected **assignment**, **close the dialog box** and **return to the previous operating level**.
- call up the "Select Entry Point" dialog box where you can **change the assignment** of the currently selected function key:



Diagnosis

Select entry point	
Main menu	Softkey level
	— not defined —
Manage	– File operations
Manage	– Load
Manage	– Save
Manage	– Edit
Manage	– Tables
Diagnosis	– Reset functions
Diagnosis	– Macoda
Diagnosis	– MSD
Diagnosis	– I/O status PLC
Diagnosis	– I/O status CNC
Diagnosis	– Drive diagnosis
Diagnosis	– SERCOS-Monitor

At this point you can

- **select the the desired softkey level** by shifting the focus  using the cursor keys   or <home>/<end>.
- **close the dialog box and return to the previous operating level** with the level-return key. Changes to the function key assignment, which have not been confirmed (refer to “OK” softkey), are not saved.
- Set the currently displayed **softkey levels as the new valid assignments for the time being, close the dialog box and return to the previous operating level.**



The setting of the function keys is saved in the “Registration database” of the PC control panel and is thus identical for all “man-machine interfaces” on the PC control panel.

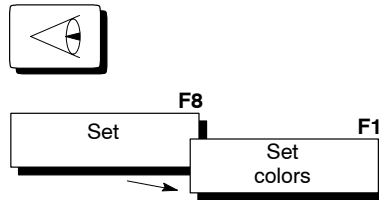
Diagnosis

9.7 Setting screen colors

The colors of various objects on the screen can be altered according to your requirements.

The colors can be set for the following:

- Standard foreground and background colors (Fg, Bg)
- Softkey foreground and background colors (Fg, Bg)
- Highlights such as the color of titles, foreground and background (Fg, Bg1, Bg2). You can set two different background colors here.
- Foreground and background colors of error messages (Fg, Bg)
- The color of the focus frame
- The background color of dialog boxes (Hg)
- The color of the flashing cursor
- The color of flashing error symbols

Selection:

At this point you can

- **return to the previous operating level** with the level-return key.
- switch **between 3 different system color settings** with the radio softkeys "Table 1" through "Table 3". You cannot change these system tables. You can switch over to a color table you can edit using the "User table" softkey.

This user table can be adapted to meet your special requirements with the "Modify user table" softkey.



Diagnosis

**CAUTION**

An object which is assigned the same foreground and background color may no longer be visible (e.g. black text on a black background)! Communication between the operator and the control unit is greatly limited in this case. This can result in incorrect operating steps, incorrect input and perhaps undecipherable error messages! There is thus a greatly increased risk of accidents for both persons and objects!

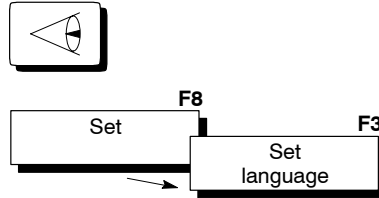
We recommend that you do not change the default colors. If colors have been set incorrectly, a clear color setting can be reestablished by selecting one of the three system color settings.

Diagnosis

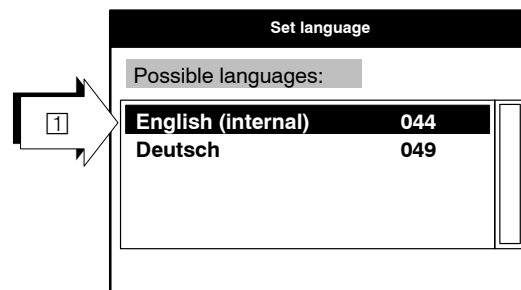
9.8 Set language

You can easily adapt the user interface of the control unit to the required user language by simply pressing a softkey. The corresponding language files must, however, be available in the control unit.

Selection:



The control unit opens the "Set language" dialog box:



At this point you can



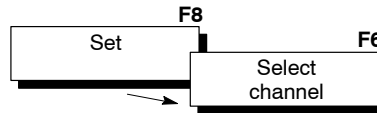
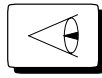
- **select the the desired language** by shifting the focus 1 using the cursor keys \blacktriangledown / \blacktriangleup or \langle home \rangle / \langle end \rangle .
- **close the dialog box and return to the previous operating level** with the level-return key. Language changes, which have not been confirmed (refer to "OK" softkey), are not saved.
- change to the currently selected **language**, **close the dialog box** and **return to the previous operating level**.

1 Within the dialog box, the control unit displays the corresponding language code for every language (e.g. for German: 049, for English: 044). Generally, the code corresponds to the internationally valid telephone code numbers of the respective countries.

If you use this code at the end of an MSD file (e.g. "msdtexte.044"), the control unit can automatically switch over to the relevant MSD file when the language has been changed.

Diagnosis

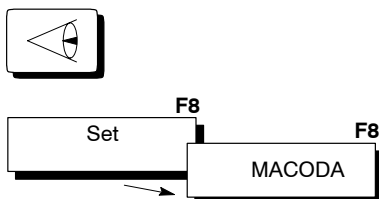
9.9 Select channel

Selection:

With the “Select channel” softkey you can select and display the processing units (channels) connected to the PC control panel. For more information, refer to section 10.2.

Diagnosis

9.10 Starting MACODA

Selection:

A number of configuration parameters are used for adapting the control unit to the most varied requirements, e.g. machines, peripheral equipment, operating processes or operating personnel. These are administered with the help of a central database system.

The **MACODA** tool (Machine Parameter and Configuration-Data Administration) is integrated in the system software to allow the operator safe and simple access to the configuration parameters.



CAUTION

Starting and operating the MACODA tool and modifying parameters should only be carried out by appropriately trained specialists! This personnel must be able to identify risks that could arise as a result of parameter changes and due to mechanical, electric or electronic equipment in general.

Operation of MACODA by inadequately trained or untrained personnel can result in serious damage to machines and drives, loss of software or even injury to persons!

Rexroth accepts no liability for damage resulting from incorrectly programmed, calculated or optimized configuration parameters, or from the non-observance of data limits!

The "Configuration parameters and MACODA parameter description" manual provides more information about the MACODA tool. Also refer to page 1-7.

Diagnosis

9.11 Machine status display (MSD)

The machine status display displays max. 2048 machine errors and statuses (Text length per error/status: max. 38 characters).

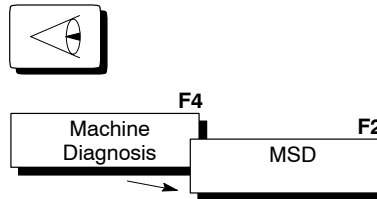
All messages must be defined in plain text in the file "msdtext.xxx". The extension "xxx" is the symbol of the language, in which the file is written (e.g. "044" for English). Refer to section 9.8 for the identification codes of other languages.

The file can be edited in the same way as an NC part program and should be stored in the "/usrfep" directory (a "User FEPROM" group directory).

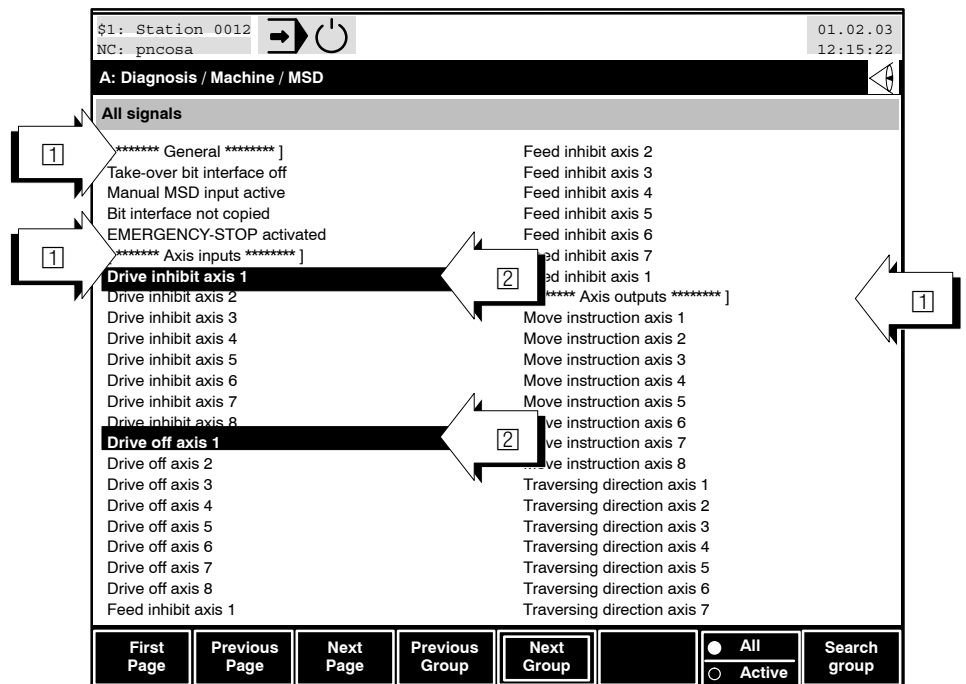
Messages are activated or deleted via markers in the PLC program. As soon as the corresponding status/error on the machine becomes logically true, the control unit displays the relevant line as highlighted within the MSD display.

For the structure of the MSD file, please refer to the "PLC Configuration" manual, page 1-7.

Selection:



The contents of the screen display below only serve as an example as MSD texts are always dependant on the functionality of the connected machine.



Diagnosis

- ①: Group headings
- ②: Error/condition is logically true

At this point you can

- **browse** the MSD display **forward and backward line by line** using the **↕** cursor keys.
- **return to the previous operating level** with the level-return key.



- **skip to the first page** of the MSD display.



- scroll **one page backward** from the currently displayed screen page.

You will skip directly to the last page if the first page is currently displayed.



- scroll **forward one page** from the currently displayed screen page.

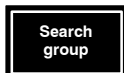
You will skip directly to the first page if the last page is currently displayed.



- **skip directly to the next group heading** (for group headings, refer to position ① on the screen display described above). The next error/status group is displayed starting at the top left of the screen.



- **scroll back one group heading** from the currently displayed group heading. The “previous” error/status group is displayed, again starting at the top left of the screen.



- open the “Select Group” dialog box to **search for a specific group heading**. In this dialog box, the control unit displays all the existing group titles.

Select the desired group using the cursor keys **↕** or **<home>/<end>**. Skip directly to the selected group by pressing the “OK” softkey or abort the function by pressing the level return key.



- determine whether **all** MSD texts or only those where the status is **logically true** should be displayed.


Diagnosis

The screenshot displays a diagnostic software interface. At the top, it shows the station ID '\$1: Station 0012' and the NC code 'pncosa'. The date and time are '01.02.03' and '12:15:22'. The main title is 'A: Diagnosis / Machine / MSD'. Below this, the section 'Active signals' is highlighted. Underneath, there is a header '[***** Axis inputs *****]' and two active signals: 'Drive inhibit axis 1' and 'Drive off axis 1'. At the bottom, there is a navigation bar with buttons for 'First Page', 'Previous Page', 'Next Page', 'Previous Group', 'Next Group', a filter section with 'All' (radio button) and 'Active' (radio button), and a 'Search group' button.

Signal Name	Status
Drive inhibit axis 1	Active
Drive off axis 1	Active

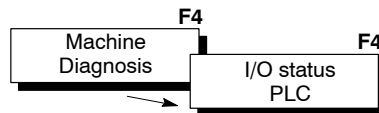
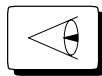
Diagnosis

9.12 Display PLC signals

 This section only explains the operation necessary to display PLC signals on the CNC screen. Further information on internal PLC and the meaning of individual signals is available in the "PNC, PLC Configuration" and the "PNC, iPCL System Description and Programming" manuals.

Using the "IO Status PLC" function you can display all input/output signals and markers **from the point of view of the internal PLC** on the CNC screen (display: binary, least significant bit to the right).

Selection:






The screenshot shows the CNC interface with the following data:

A: Diagnosis/Machine/I/O Status PLC		
Inputs	Outputs	Markers
Byte 7654 3210	Byte 7654 3210	Byte 7654 3210
I0 0000 0000	O0 0000 0010	M0 0000 0011
I1 0000 0000	O1 0000 0000	M1 0000 0000
I2 0000 0000	O2 0000 0000	M2 0000 0000
I3 0000 0000	O3 0000 0000	M3 0000 0000
I4 0000 0000	O4 0000 0000	M4 0000 0000
I5 0000 0000	O5 0000 0000	M5 0000 0000
I6 0000 0000	O6 0000 0000	M6 0000 0000
I7 0000 0000	O7 0000 0000	M7 0000 0000
I8 0000 0000	O8 0000 0000	M8 0000 0000
I9 0000 0000	O9 0000 0000	M9 0000 0000
I10 0000 0000	O10 0000 0000	M10 0000 0100
I11 0000 0000	O11 0000 0000	M11 0000 0000
I12 0000 0000	O12 0000 0000	M12 0000 0100
I13 0000 0000	O13 0000 0000	M13 0000 0000
I14 0000 0000	O14 0000 0000	M14 0000 0000
I15 0000 0000	O15 0000 0000	M15 0000 0000
I16 0000 0000	O16 0000 0000	M16 0000 0000
I17 0000 0000	O17 0000 0000	M17 0000 0000
I18 0000 0000	O18 0000 0000	M18 0000 0100
I19 0000 0000	O19 0000 0000	M19 0000 0000
I20 0000 0000	O20 0000 0000	M20 0000 0000
I21 0000 0000	O21 0000 0000	M21 0000 0001



At the bottom of the screen, there are three radio buttons labeled "Inputs", "Outputs", and "Markers". The "Inputs" button is selected. A search bar is located on the left, and a "Search signal" button is on the right.

At this point you can



- return to the previous operating level with the level-return key.
- select the desired signal group (inputs, outputs, markers) using the cursor keys  or <tab>. The focus  and radio softkeys  indicate the currently selected signal groups.

Diagnosis

- **scroll forward and backward line by line** through the selected signal group (inputs, outputs, markers) using the   cursor keys.
- **skip directly to the first or last screen page** of the selected signal group using the <home> or <end> key.
- **scroll backward to the previous screen page or forward to the next screen page** using the <pgup> or <pgdn> key.
- **search for a specific signal.** For this purpose, you must know the corresponding signal number.



The control unit opens the "Search signal" dialog box.

Select the desired signal group using the radio softkeys. Enter the signal number or abort the "Search Signal" function with the level return key.


Signal numbers:



Inputs: 0 to 255

Outputs: 0 to 255

Markers: 0 to 6143




- **select the desired signal group.** The currently selected signal group is displayed on the screen by the focus () and by the activated radio softkey.

You can also select a signal group with the cursor keys   or <tab> .

Diagnosis

9.13 Display CNC signals

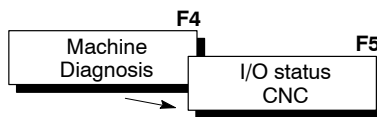
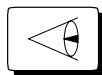
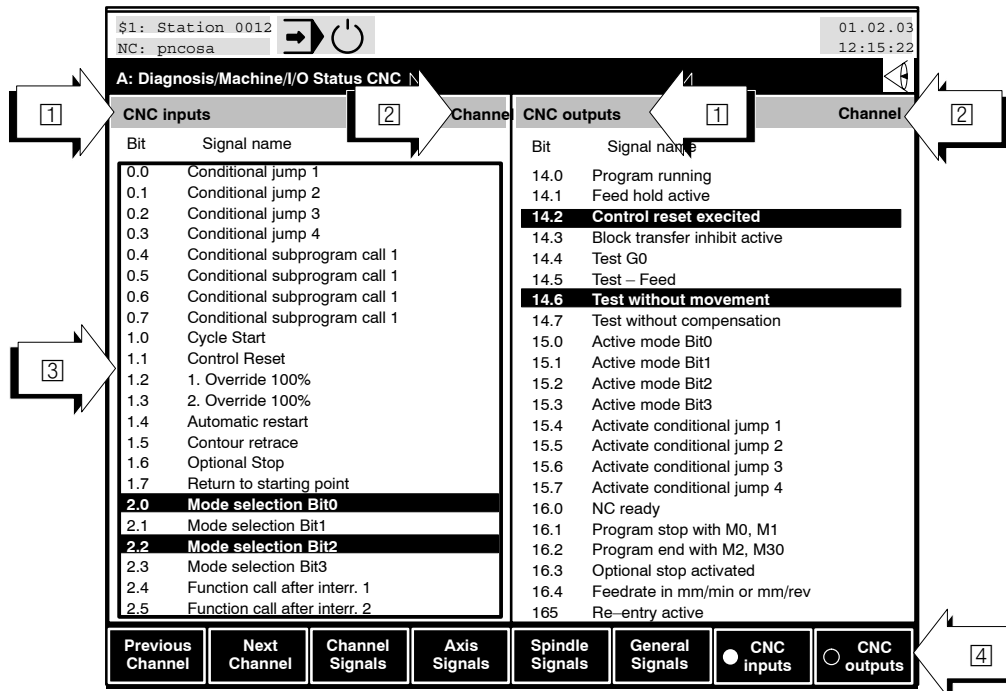
 This section only explains the operation necessary to display CNC signals on the NC screen. Further information about the individual signals is available in the "PNC, PLC configuration" manual, refer to page 1-7.

Using the "IO Status CNC" function, you can display the status of all **input and output signals (1)** of the control unit (digital interface) on the CNC screen.

For clarity, input and output signals are arranged according to the signal groups "Channel", "Axis", "Spindle" signals and General signals. Select the group to be displayed with the "Channel", "Axis", "Spindle" or "General" signals softkeys.

Within a group the control unit displays all signals in plain language arranged according to bytes. Signals which are logically true at the moment are highlighted.

Selection:


A: Diagnosis/Machine/I/O Status CNC

Bit	Signal name	Bit	Signal name
0.0	Conditional jump 1	14.0	Program running
0.1	Conditional jump 2	14.1	Feed hold active
0.2	Conditional jump 3	14.2	Control reset executed
0.3	Conditional jump 4	14.3	Block transfer inhibit active
0.4	Conditional subprogram call 1	14.4	Test G0
0.5	Conditional subprogram call 1	14.5	Test - Feed
0.6	Conditional subprogram call 1	14.6	Test without movement
0.7	Conditional subprogram call 1	14.7	Test without compensation
1.0	Cycle Start	15.0	Active mode Bit0
1.1	Control Reset	15.1	Active mode Bit1
1.2	1. Override 100%	15.2	Active mode Bit2
1.3	2. Override 100%	15.3	Active mode Bit3
1.4	Automatic restart	15.4	Activate conditional jump 1
1.5	Contour retrace	15.5	Activate conditional jump 2
1.6	Optional Stop	15.6	Activate conditional jump 3
1.7	Return to starting point	15.7	Activate conditional jump 4
2.0	Mode selection Bit0	16.0	NC ready
2.1	Mode selection Bit1	16.1	Program stop with M0, M1
2.2	Mode selection Bit2	16.2	Program end with M2, M30
2.3	Mode selection Bit3	16.3	Optional stop activated
2.4	Function call after interr. 1	16.4	Feedrate in mm/min or mm/rev
2.5	Function call after interr. 2	165	Re-entry active

Navigation buttons: Previous Channel, Next Channel, Channel Signals, Axis Signals, Spindle Signals, General Signals, **CNC inputs**, **CNC outputs**

Diagnosis

At this point you can

- determine the desired **signal group** and display it in position . If you select channel, axis or spindle signals and if more than one channel, axis or spindle is applied, first of all the dialog box "Select channel", "Select axis" or "Select spindle" opens. Enter the number of the channel, axis or spindle, whose signals should be displayed and confirm your entry with the "OK" softkey.

Channel
Signals

Selecting the signal group **channel signals** with the specifications of the n^{th} channel:

Select channel

Channel: (0..2)

The following are displayed:

CNC channel signal inputs: 0.0 to 13.7

CNC channel signal outputs: 14.0 to 25.7

Axis
Signals

Selecting the signal group **axis signals** with the specification of the n^{th} axis:

In the "Select axis" dialog box, you can alternatively specify an axis by selecting from a list of the available axes. Using the **axes list** radio softkey you can alternate between "the entry of an axis number" and "the selection from the axis list":

Select axis

Axis: (1..7)

Select axis

Axis no.	Phys.name
1	X
2	Y
3	Z
4	XA
5	XB
6	VA
7	C

The following are displayed:

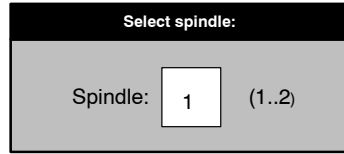
CNC axis signal inputs: 0.0 to 13.7

CNC axis signal outputs: 14.0 to 21.7

Diagnosis



Selecting the signal group **spindle signals** with the specification of the nth spindle:



The following are displayed:

CNC spindle signal inputs: 0.0 to 13.7
 CNC spindle signal outputs: 14.0 to 21.7



Displaying the signal group **general signals** (2):

CNC general signal inputs: 0.0 to 3.7
 CNC general signal outputs: 4.0 to 7.7



- select the **CNC input** or **CNC output signals** (1) for all of the signal groups listed above. The focus (3) also illustrates the signals which are currently selected.



- Go to the next channel/axis/spindle to display their respective signals.



- Go to the previous channel/axis/spindle to display their respective signals.



- return to the previous operating level with the level-return key.
- select the input or output signals with the cursor keys \leftarrow , \rightarrow oder <tab>. The focus (3) and radio softkeys (4) indicate the currently selected signals.
- browse through the input and output signals of the CNC line by line using the cursor keys \downarrow , \uparrow .
- directly go to the first or last screen of the input or output signals with the <home> or <end> keys.

Diagnosis

- scroll backward to the previous screen page or forward to the next screen page using the <pgup> or <pgdn> key.

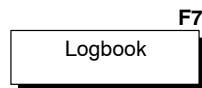
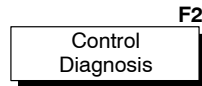
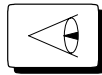
Example: Searching for a specific signal. For this purpose, you must know the corresponding signal number.

1. Select the signal group.
2. If required, enter the number of the channel, the axis or spindle or the general signals in the signal group.
3. Use the radio softkeys to select whether you want to search for an input or output signal of the CNC.
4. Browse through the input or output signals in the CNC focus field to find the desired signal number.

Diagnosis

9.15 Logbook

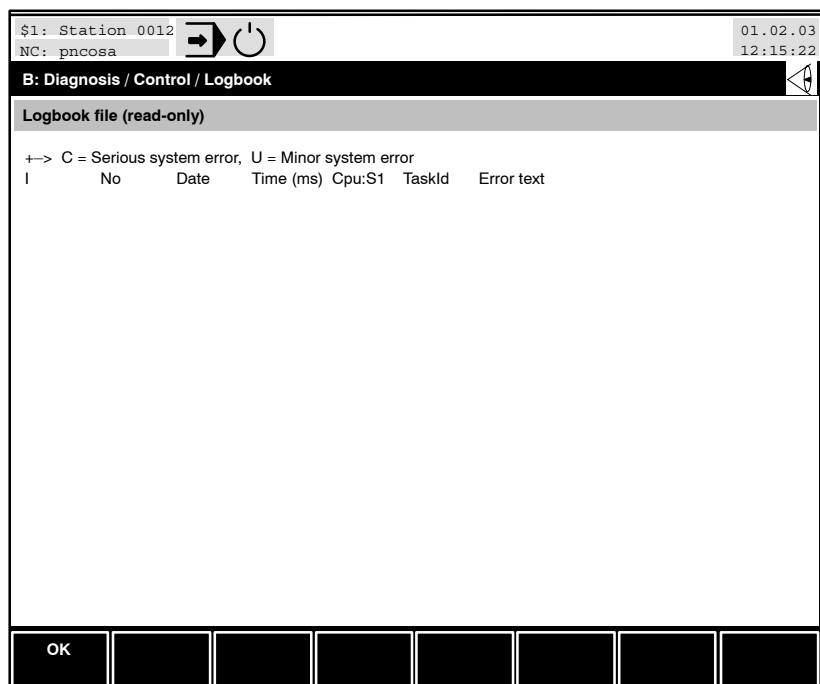
Selection:



The control unit saves all system errors in an internal ring memory.

Using the "Logbook" softkey, you can write the contents of this ring memory in a log file in chronological order. The latest entry is at the beginning of the file. The file contents are displayed.

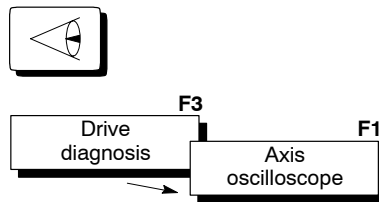
In the case of control unit troubles, this data facilitates troubleshooting at the systems level.



Diagnosis

9.16 Axis oscilloscope

Selection:



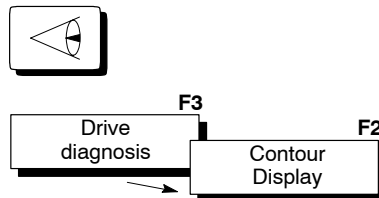
For the purpose of testing or optimization, with the help of axis oscilloscope

- **all data** which is transferred in **cyclic operation** (cyclic SERCOS message) via the SERCOS interface (e.g. position data) and
- **interpolator internal data** (e.g. path speed, lag) can be recorded **as function of time**.

Additional external measuring instruments and their wiring are not required. This greatly simplifies the commissioning of a machine or axis. The "Operating Instructions for Diagnostic Tools" manual contains more information about the **axis oscilloscope** tool. Also refer to page 1–7.

9.17 Contour display

Selection:



A comparison of the command contour and the actual contour of a workpiece is often required. The position values of both axes of the contour, which are specified by the CNC interpolator, and their position data feedback are necessary for this comparison.

The first machine axis can then be assigned to one coordinate axis and the second machine axis to the other in a two-dimensional coordinate system. This provides you with an exact representation of the command and actual tool paths on one plane following the recording.

For testing purposes, therefore, you can use the contour display

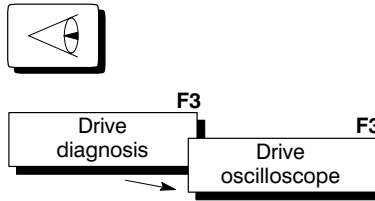
- to record **position data** which is transferred in the **cyclic operation** (cyclic SERCOS message) via the SERCOS interface.

Additional external measuring instruments and their wiring are not required. This greatly simplifies the commissioning of a machine or axis. The "Operating Instructions for Diagnostic Tools" manual contains more information about the **contour display** tool. Also refer to page 1–7.

Diagnosis

9.18 Drive oscilloscope

Selection:



Only possible in conjunction with Servodyn-D drives. ■

For the purpose of testing or optimization, the drive oscilloscope may be used

- to record internal **drive data as a function of time**.
- For this purpose, the drive first stores measured data in a separate diagnostic memory and transfers it to the control unit after the measurement within the SERCOS service channel is complete.
- Furthermore, up to 6 pre-defined **drive parameters** can be read from a drive, **or transferred** to a drive. The SERCOS service channel is also used for this purpose.

Additional external measuring instruments and their wiring are not required. This greatly simplifies the commissioning of a machine or axis.



CAUTION

Drive parameters may only be set or changed by qualified personnel! They should have exact knowledge of automation control and drive engineering and must know the functionality of the SERCOS interface.

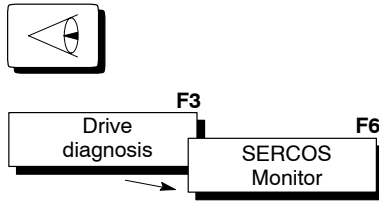
If caution is not exercised, damage to drives, machines, tools or work pieces could occur.

The "Diagnostic Tools" operating instructions manual contains more information about the **drive oscilloscope** tool. Also refer to page 1–7.

Diagnosis

9.19 SERCOS monitor

Selection:



You may use the SERCOS monitor

- to manually set the individual SERCOS phases
- to read out drive parameters from a drive or transfer them to a drive.



CAUTION

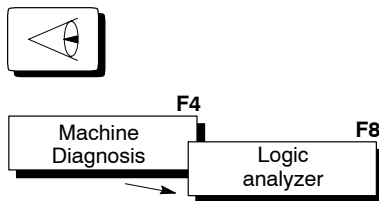
Drive parameters may only be set or changed by qualified personnel! This is also valid for the setting of a SERCOS phase. They should have exact knowledge of automation control and drive engineering and must know the functionality of the SERCOS interface.

If caution is not exercised, damage to drives, machines, tools or work pieces could occur.

The "Diagnostic Tools" operating instructions manual contains more information about the **SERCOS Monitor** tool. Also refer to page 1-7.

9.20 Logic analyzer

Selection:



The logic analyzer is used for the **diagnosis or troubleshooting within the PLC adaptive control**.

Additional external measuring instruments and their wiring are not required. This simplifies, to a great extent, the commissioning or troubleshooting at a machine.

The "Diagnostic Tools" operating instructions manual contains more information about the **logic analyzer** tool.

Visualising multiple control units

10 Visualising multiple control units

On a PC control panel, you can visualize and operate the man-machine interfaces (MMI_1, MMI_2,..) of multiple control systems. For this purpose, precisely one MMI is started on the PC control panel for every control system.

On the other hand, you can also operate one control unit simultaneously from multiple PC control panels.

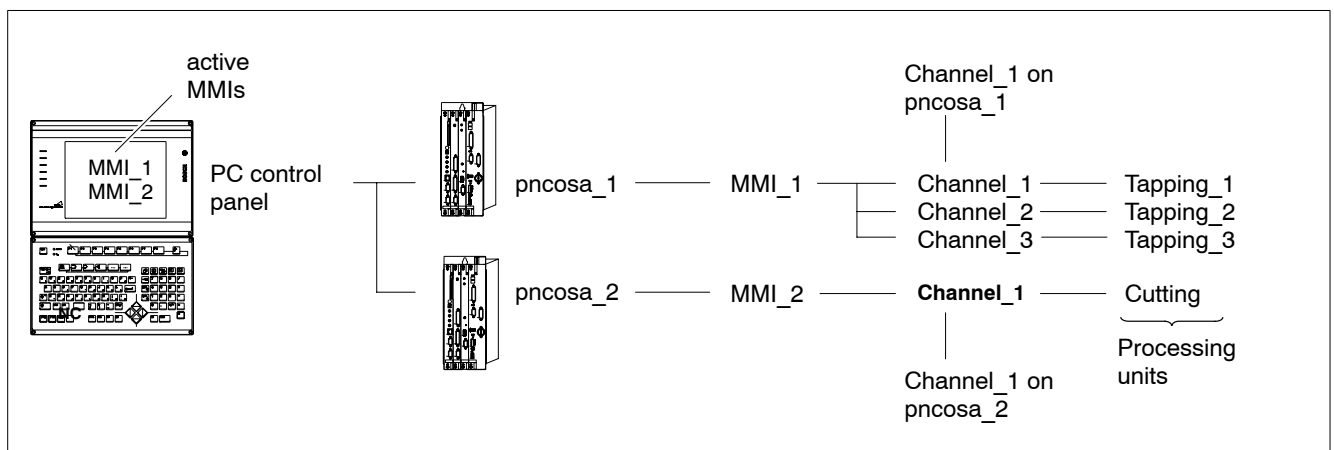
In order to avoid confusion (same channel numbers are available on different control systems), the control system defines the so-called **processing units**. A processing unit is a specific channel on a specific control unit.

The name of the processing units can be freely selected and is dependent upon the control panel. For example, you can name them according to the assigned operations (drilling, cutting ...).

Example:

One PC control panel displays two control units.

The pncosa_1 control unit has three channels whereas the pncosa_2 has two:



Visualising multiple control units

10.1 Definition of processing units (channel name) in the file “channame”

Create the file “channame.xxx”

The designation of the processing unit (channel) and its channel number assignment with respect to a control unit is saved in the text file “**channame.xxx**” specific to that country in the “**text**” directory (e.g.: c:\pncpcp\text) on the PC control panel.

When selecting the country-specific extension (“xxx”) for the file **channame**, select the extension of the file “oemtexte.0xx” (files “oemtexte.0xx” in the “c:\pncpcp\text” directory of the PC control panel), which is used on the control unit (language-specific).

For checking, the name of the “country”, to which the file extension “oemtexte.0xx” belongs, is indicated in the respective file.

Generally, all country-specific files of the languages to be delivered with the control system are selected.


The “channame.xxx” file must be marked with its “xxx” extension according to the country:

Example of country-specific identifications:

German: 049

English: 044

e.g. channame.049 = German

 **As long as the “channame.xxx” file is available in the corresponding country-specific variant, you can change the designation of the processing unit (channel) “depending upon the language”!**

Create the “channame.xxx” file, if it does not yet exist. The “**channame.dat**” file in the \text\ directory (e.g.: c:\pncpcp\text) serves as a model for a user-defined text file.

Syntax of the “channame.xxx” file

The syntax for designation of channel/processing unit in the file “channame.xxx” is as follows:

”<Identifier>” <Control unit> <Channel> {”<Commands>”}

where

”<Identifier>” **Designation** of processing unit (channel) (max. 32 characters, of which the first 12 characters can be displayed in the NC status line).

<Control unit> **Name** of control unit (max. 16 characters, of which the first 12 characters can be displayed in the NC status line).

Visualising multiple control units

<Channel> Channel no. within the control unit.
 {<Commands>} **Optional** parameter with additional commands for calling up dabwin32 (max. 64 characters), e.g. restarting user interface.
 ; A line beginning with a **semicolon** is interpreted as a comment line and disregarded.

Enter a **name** for every "processing unit" to be operated from a specific PC control panel in the "channame.xxx" file.

Example: Contents of the file "channame.049" (Germany)

```
"Grinding" pnc01 1 "--restart"
```

```
"Tapping 123456789" pnc02 1 "--restart"
```

```
"Cutting" pnc02 2 "--restart"
```

A **new** MMI is started on switching over to a channel of **another control unit**:

Example: With the following process, you can switch over to the processing unit "Tapping 123456789" typ302 in the example:

```
dabwin32 -target pnc02 -bwm -nc2:1 --restart
```

Saving the file "channame.xxx"

Save the completed file "channame.xxx" in the \text\ directory (Example: "c:\pncpcp\text") on that PC control panel, from where the processing units must be controlled.

Display the contents of the file "channame.xxx"

In the display (e.g.: NC status line) the name of the processing unit defined in the file "channame.xxx" is used (also refer to section 4.2).

Example:

Designation in the file "channame.xxx":

```
"Tapping 12345_Works_1" typ302 1 "--restart"
```

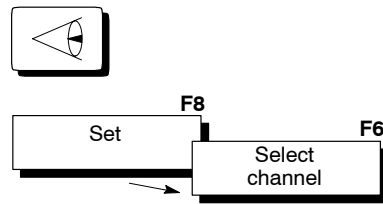
Display of **first 12 characters** in the NC status line:

```
$1: Tapping 12345 \
NC pnc02
```

Visualising multiple control units

10.2 Changing over between processing units

Selection:

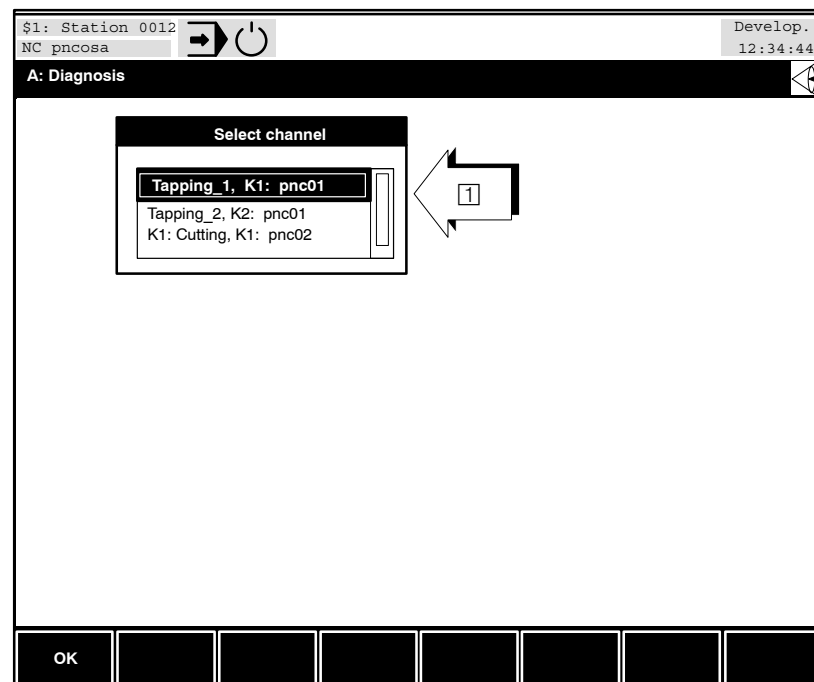


Using the dialog “Select channel” on the “**DIAGNOSIS**” menu level you can alternate between several **processing units** (channels) of different control units. If required, **activate** the corresponding user interface (MMI).

The names of the **processing units** as they appear in the file “chan-name.xxx” are listed in the dialog box “Select channel”.

☞ **If the processing unit (channel) of a control unit is not listed, it is not entered in the file “channame.xxx” (the corresponding control unit must also be connected to the PC control panel!). Thus, this processing unit is not available for selection! Reenter the name and open the dialog box.**

Select the “Select channel” soft key.
Select the processing unit in the “Select channel” dialog menu.



You can select the processing unit (channel) with the cursor keys.

Visualising multiple control units



- Pressing “OK” selects the processing unit and opens the **new** user interface if required.
Under certain circumstances, it takes more time to start a new user interface.

Changing via key combination:

With the following key combination you can switch over to another processing unit:

- **<Alt> + <Channel key>**: You can select the “processing unit” in the dialog menu “Select channel”.



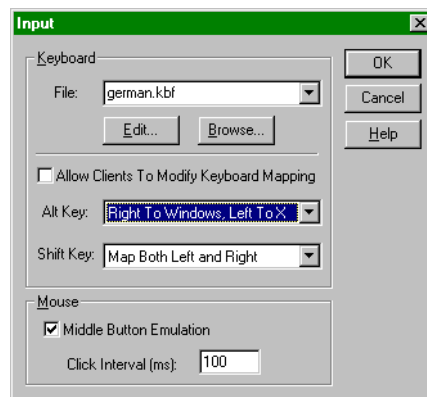
In the standard configuration <alt> is only used for Windows applications and therefore cannot be used for changing the processing unit.

Prior to this, you will have to change the standard setting of the left <alt> key in “Exceed”.

Changing the <alt> key in Exceed:

Select the following menu “Input” of the “Exceed” application in the Windows interface:

Start ► Programs ► Exceed ► Xconfig ► Input

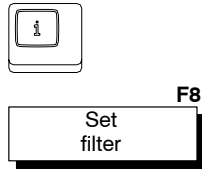


In the list field “Alt key”, select “**Right To Windows, Left To X**”. Close with “OK”. Restart user interface of the control unit.

Visualising multiple control units

10.3 Setting filters for processing units

Selection:



Using the "Set filter" softkey in the **INFO dialog**, it is possible to select the **channels** for which the "errors", "warnings" and "messages" should be displayed.

If the desired processing unit is not shown in the dialog box "Filter channel", the processing unit is not available in the control unit to which the user interface is linked. As discussed in section 10.2, you must switch over to the respective processing unit. The user interface now activated shows the processing unit being searched in the INFO dialog under "Set filter".

 **In the INFO dialog of a user interface only those events of the processing units are shown that are available on the respective control unit.**

Visualising multiple control units

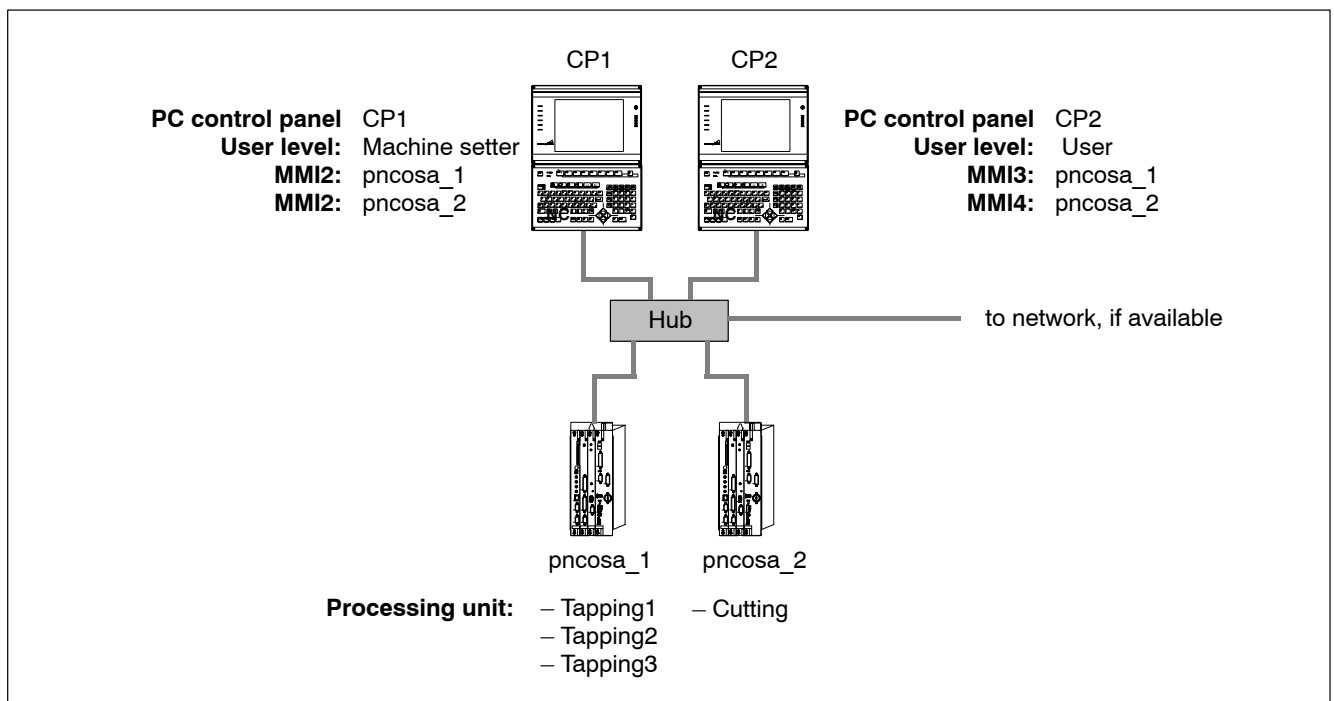
10.4 Change user level

The user level setting is saved on the PC control panel. As a result, the same user level applies to all the user interfaces running on the PC control panel.

If multiple control panels are available, different user levels can be activated.

Below, you will find an example of two PC control panels and two control systems:

The user level "User" on the "CP2" control panel restricts the functions of both the control systems on **this** control panel.



Visualising multiple control units

Notes:

Appendix

A Appendix

A.1 Abbreviations

Abbreviation	Description
C	Bosch Standard Operator Interface
C:	Drive name, in this case drive C (hard disk drive)
ESD	Electrostatic Discharge Abbreviation for all terms relating to electrostatic discharge, e.g. ESD protection, ESD hazards, etc.
Fx	Function key with number x
HP	Main Program ('Hauptprogramm')
LSEC	Lead Screw Error Compensation
MDI	"Manual Data Input" mode
MMI	Man-Machine-Interface (see 'BOF')
MP	Machine parameter
MSD	Machine-Status Display
MTB	Machine-Tool Builder
NC, CNC	Control Unit
OM	Operating Mode
PE	Protective Earth
PLC	Programmable Logic Controller
SK	Softkey
SP	Subprogram

Appendix

A.2 Glossary

Term	Description
Axis state:	Possible axis states <ul style="list-style-type: none">• Feed inhibit active• Travel command active• Axis not referenced
Machining unit:	A specific group of axes (→ <i>channel</i>) operated on a specific NC control unit.
Operating level:	The operational functions of the NC control unit are subdivided along essential task-oriented activities into individual operating levels (also known as Group Operating Modes = GOM): <ul style="list-style-type: none">• Manual<ul style="list-style-type: none">• Approaching/traversing to reference point• Jogging axes• Manual data input (MDI)• Tool management etc.• Automatic<ul style="list-style-type: none">• Preparing machining• Checking program• Selecting program etc.• Manage<ul style="list-style-type: none">• File operations• Table operations• Editing etc.• Diagnosis<ul style="list-style-type: none">• Control unit diagnosis• Machine tool diagnosis• Drive diagnosis etc.• Info Display<ul style="list-style-type: none">• Machine and system errors, warnings and messages• Filter functions• Help and troubleshooting information
Operator interface (BOF):	Software implementation of interface for the interaction between operator and machine (Man-Machine-Interface = MMI).
Group Operating Mode (GOM):	→ <i>Operating level</i>
Channel:	A channel represents a task-specific collection, or grouping, of axes and spindles on an NC control unit. Part programs of various channels can either be processed independently of each other, or coordinated through synchronization.

Appendix

Term	Description
NC operating mode:	Defined mode of an NC control unit, the selection of which depends on the task to be carried out (refer to examples below): <ul style="list-style-type: none">• Automatic mode, with/without machine functions• Single Block / Single Step mode, with/without machine functions• Program Block mode, with/without machine functions• Manual data input, with/without machine functions• Axis referencing traversal• Jog mode
NC status:	Momentary “snapshot” of the operating status of a channel on the NC control unit. Possible NC states: <ul style="list-style-type: none">• Ready (for processing in Automatic mode)• Running (machining in progress)• Stopped (Bearbeitung)• Faulty (error is present)• Prepare machining (internal programm linking in NC control unit)• Reset (program disabled/inactive, or control reset)
PC-based control panel:	Integrated operating and display unit, containing the following components: <ul style="list-style-type: none">• Display• Control keys and keyboard• Integrated PC with network connection• Software for operator interface (BOF)
Spindle status:	Possible states which a spindle may assume on the machine: <ul style="list-style-type: none">• Turn Right/Turn Left (clockwise/counter-clockwise) rotation active• Spindle Stop• Spindle Orientation• Transmission gear selection manual/automatic• Spindle Inhibit active

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Appendix

Notes:

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