

SIEMENS

SINUMERIK

Motion Control Information System MCIS DNC - Direct Numerical Control

Operating Manual

Preface

Introduction	1
Overview of the program data	2
Managing program data	3
Appendix A	A

Valid for:

SINUMERIK 840D sl / 840DE sl controller

Software	Version
MCIS DNC IFC	2.4.1
MCIS DNC Cell/Plant	2.4.1
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as from SINUMERIK Operate on the NCU	2.6 SP1 HF6




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Preface

SINUMERIK documentation

The SINUMERIK documentation is organized in the following categories:

- General documentation
- User documentation
- Manufacturer/service documentation

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Target group

The operating manual is aimed at all machine tool users. The document describes all the facts the user needs to know.

Benefits

The operating manual allows the target group to get familiar with the software user interface. Based on the manual, the target group is capable of responding to problems and to take corrective action.

Standard scope

This documentation describes the functionality of the standard scope. Extensions or changes made by the machine manufacturer are documented by the machine manufacturer.

Other functions not described in this documentation might be executable in the control. This does not, however, represent an obligation to supply such functions with a new controller or when servicing.

Furthermore, for the sake of clarity, this documentation does not contain all detailed information about all types of the product and cannot cover every conceivable case of installation, operation or maintenance.

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Table of contents

	Preface	3
1	Introduction.....	7
1.1	Product Overview.....	7
1.2	Calling DNC	7
2	Overview of the program data.....	9
2.1	Switching filter on/off.....	11
2.2	Sorting NC programs	12
2.3	Preview	14
2.4	Search function	14
2.5	Configuring filters	15
2.5.1	Filter settings.....	15
2.5.2	Activate filter.....	17
2.5.3	Save filter	18
2.5.4	Edit filters	19
2.5.5	Setting a classic filter	20
2.6	Display logbook.....	21
2.7	File properties	22
2.7.1	Showing properties	22
2.7.2	Entering a comment.....	24
2.7.3	Display attachments.....	24
2.7.4	Displaying a graphic.....	26
3	Managing program data.....	27
A	Appendix A	29
A.1	List of abbreviations	29
	Index.....	33

Introduction

1.1 Product Overview

Product Overview

DNC (Direct Numeric Control) is a function block of the Motion Control Information System (MCIS) and is used to integrate CNC and machine tools into the production system.

DNC is an NC program management and supply system for CNC controls for archiving and transferring NC programs.

From MCIS DNC V2.4 and higher it is now also possible to connect controls equipped with SINUMERIK Operate to a DNC server.

1.2 Calling DNC

Precondition

In order to make use of DNC, various basic functions of the ePS Network Services are used.

The necessary users have to be registered to link machine and server.

You can find additional information in the "ePS Network Services Function Manual".

Procedure



1. The control system has booted and the operating areas are displayed.
2. Select the "Program manager" operating area.
3. Press the "DNC" softkey.
The "DNC" window is opened and displays an overview of the NC program data.

Overview of the program data

Overview of the program data

An overview of the plant or system configuration is emulated in the "DNC" window.

Note

You can individually configure the sequence and selection of the columns to be displayed on the DNC server.

The system structure together with the directories is displayed in the left-hand window area.

The contents of the directories are displayed in the right-hand window area.

Column	Meaning
Name	Name of folders, NC programs, workpieces, NC packages
Type	File/program type
Version	Version identifier
Release ID	Released NC program with version number
Trial cut ID	Trial cut ID - the program is only enabled for trial machining
Length	Length of the NC program in bytes
Modification date	Time of change
Archive	Designation of the NC archive
Workpiece	Designates a group of NC programs to be used for machining a workpiece,

Manage file system

The following functions are available for you to manage data:

- Switching filter on/off (Page 11)
- Transferring NC programs between the source and target.
See reference: Function Manual NC Program Management DNC Machine
- Selecting, copying, inserting directories.
See chapter: Managing program data (Page 27)
- Updating the directory structure.
See Chapter: Managing program data (Page 27)
- Sorting NC programs.
See Chapter: Sorting NC programs (Page 12)
- Displaying the program content in the preview window.
See Chapter: Preview (Page 14)

- Searching for specific files.
See Chapter: Search function (Page 14)
- Creating filters.
See Chapter: Filter settings (Page 15)
- Displaying data activities using a logbook.
See Chapter: Display logbook (Page 21)
- Displaying management properties.
See Chapter: Showing properties (Page 22)
- Deleting data.
See Chapter: Managing program data (Page 27)

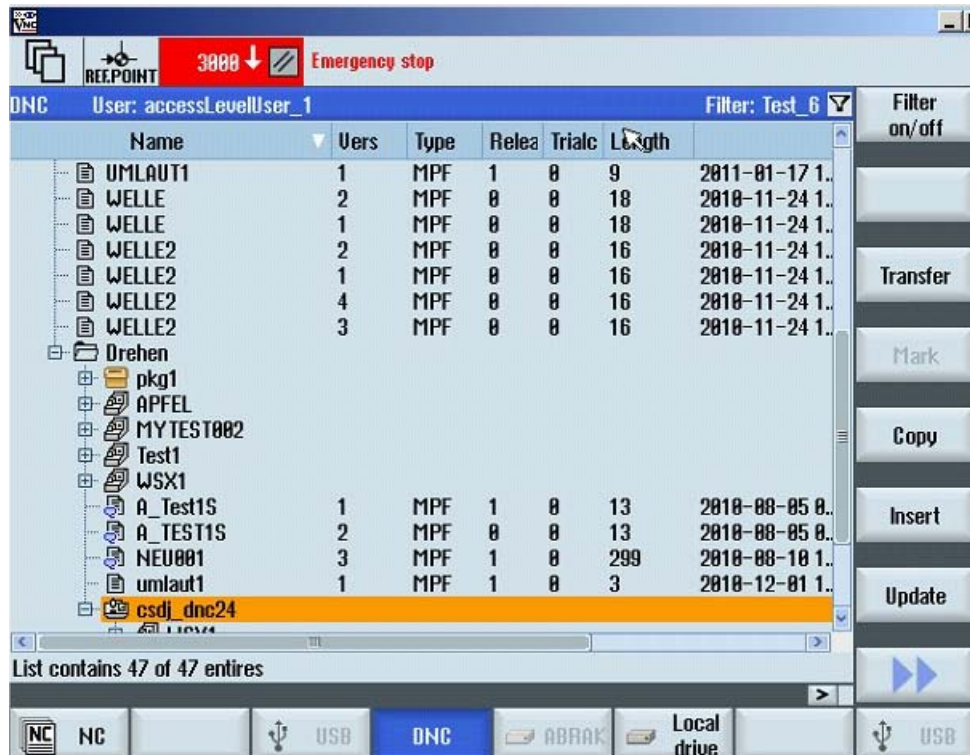


Figure 2-1 DNC overview

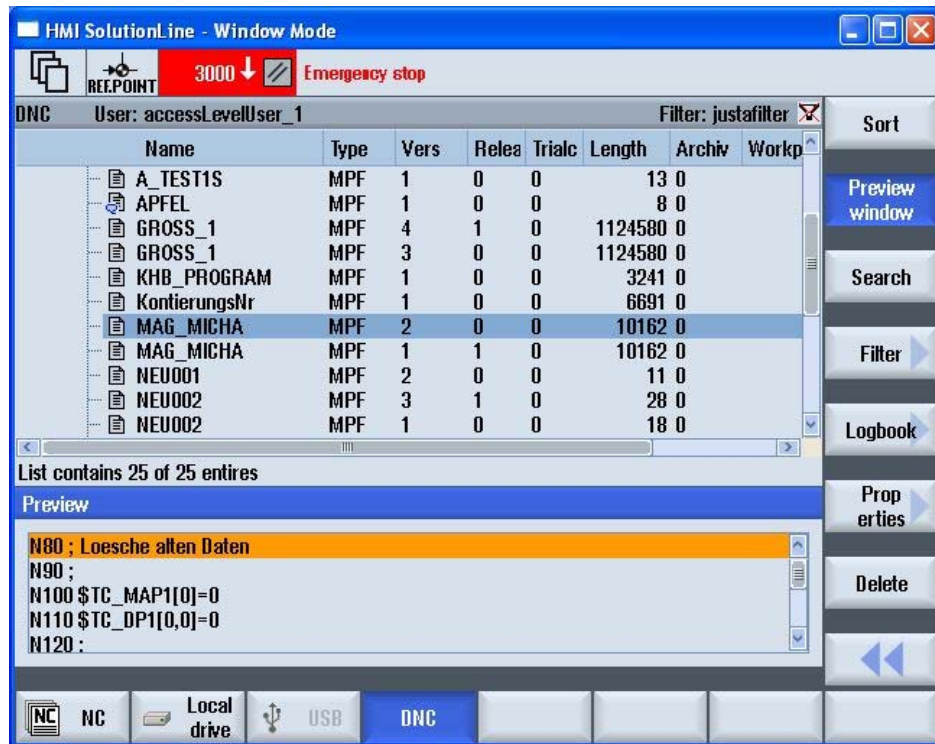


Figure 2-2 DNC overview_expansion

2.1 Switching filter on/off

You have the option of influencing the program list display by applying filter conditions therefore restricting the selection of visible directories/programs.

Precondition

Filter settings have already been defined.

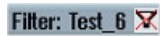
See also:

- Filter settings (Page 15)
- Save filter (Page 18)
- Edit filters (Page 19)
- Setting a classic filter (Page 20)

Procedure



1. The "DNC" window is opened.
The filter name and a filter symbol are displayed in the status display.
2. Press the softkey "Filter on/off", to activate or deactivate the selected filter.
If, for example, the filter is deactivated, then a filter symbol with a slash through it is displayed.



2.2 Sorting NC programs

You have the option to display the NC programs sorted individually. You can define the criteria of the sort order via the user interface.

Criteria

- You can define up to three sort criteria.
- The criteria are selected via a drop-down list box. The drop-down lists include the column designations of the NC program list.
- The priority of the sort order is from the upper, to the medium and the bottom criterion.
- You can select via an option field whether the sorting is to be executed in ascending or descending order.

Procedure



1. Position the cursor on the required directory of the NC programs.
2. Press the ">>" softkey.
Additional softkeys are displayed on the vertical bar.
3. Press the "Sort" softkey.
The "Sort settings" window opens.



4. Select the desired sort criteria according to which you wish to display the NC programs.
5. Press the "OK" softkey.
The programs are displayed and sorted according to the specified criteria.
- OR -
Press the "Cancel" softkey if you wish to make no sorting. The window is closed.

2.3 Preview

You have the option of displaying a preview of the program content.

Procedure



1. Place the cursor on the desired program.
2. Press the ">>" softkey.
Additional softkeys are displayed on the vertical bar.
3. Press the "Preview window" softkey.
The "Preview" area is displayed in the lower window together with the file content.
4. Press the "Preview window" softkey again to close the window area.

See also

Overview of the program data (Page 9)

2.4 Search function

You have the option for searching for specific entries using the search function. The search function is a partial text search and is executed across all columns.

Procedure



1. Press the "Search" softkey.
The "Search for" window appears.



2. Enter the term that you're looking for in the "Search text" entry field.
 - The text can be up to 256 characters long.
 - Use the asterisk ("*") as wildcard for any character string.
 - Use the question mark ("?") as wildcard for one character.
 - Activate the check box "same word", to search precisely for this term that has been entered.



3. Press the "OK" softkey to start the search.

The search starts from the current cursor position. The next hit is the new cursor position. This means that the search can be continued from the actual position - and if required can also be started from the beginning again.

- OR -



Press the "Cancel" softkey to stop the search.

See also

Overview of the program data (Page 9)

2.5 Configuring filters

2.5.1 Filter settings

You can influence the program list display using filter conditions and therefore restrict the selection of visible directories/programs.

You have the option of using each column in the displayed program list as filter criterion.

The following options are offered depending on column type:

- Selecting or deselecting using a checkbox
- Detailed information

Filter processing

Save filter (Page 18)

Edit filters (Page 19)

Setting a classic filter (Page 20)

Filter criteria

Filter criterion	Description
Program name	Name of the program with a maximum of 255 characters.
Program type	The following program types are available for selection: <ul style="list-style-type: none">• MPF for main programs• SPF for subprograms• TXT, PDF, ... for text files• JPG, PNG; ... for graphic files• Freely editable data that you can save on the server in the program type table.
Release ID	Selection of: <ul style="list-style-type: none">• No• Yes The release identifier acts only on NC programs for execution in the NC. Programs with the same name can only be allocated a "YES" release once.
Trial cut ID	Selection of: <ul style="list-style-type: none">• No• Yes The trial cut ID acts only on NC programs for execution in the NC.
Modification date	Limit the change date of NC data by entering "from" / "to". Specify the date as a contiguous number: <ul style="list-style-type: none">• Year: four-digit• Month: two-digit• Day: two-digit
Length	Limit the length of NC data in bytes by entering "from" / "to".

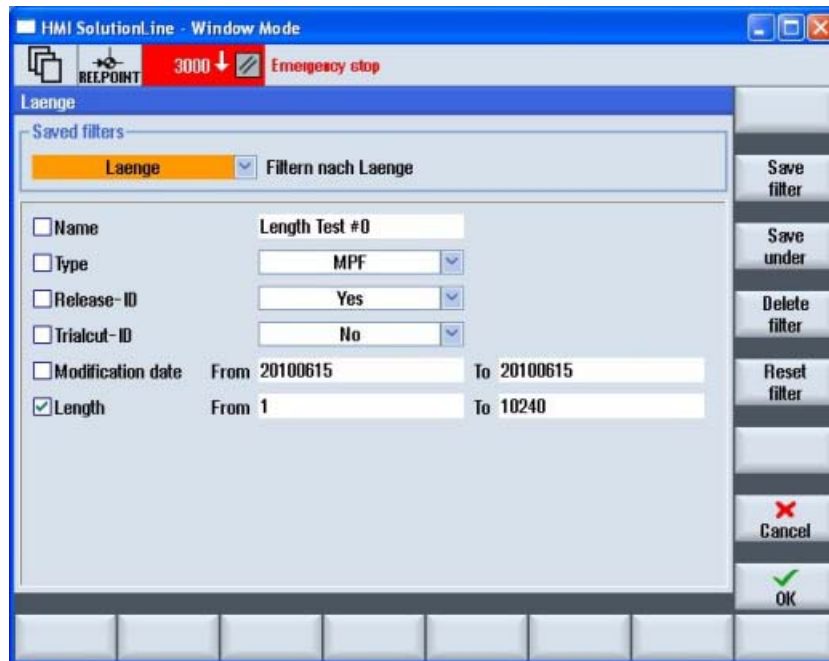


Figure 2-3 DNC filter settings

2.5.2 Activate filter

Procedure



1. The "DNC" window is opened.
2. If you press the ">>" softkey, further softkeys are displayed on the vertical bar.
3. Press the "Filter >" softkey.
The "Saved filters" window is opened.
4. Already defined filter settings can be selected via the selection field.
In addition to the filter designation, the associated comments are also displayed.

2.5.3 Save filter

You can save any individually set filter.

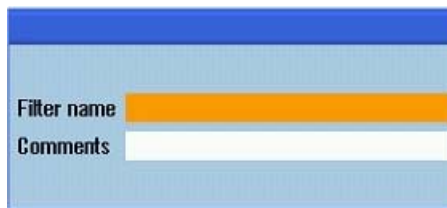
Save filter

Display	Description	
Filter name	Any filter name with a maximum 40 characters.	
Comment	Freely selectable text as a comment to a filter setting. See Chapter: Entering a comment (Page 24) Enter comment	
Application	Global	Filter can be used in the entire DNC system.
	Local	A filter can only be used on the machine for which it was originally created.
	User defined	A filter can only be used by the user who created it.

Procedure



1. You have selected the filter criteria and wish to save these settings.
2. Press the "Save filter" softkey.
The "Save filter" window is opened.



3. Enter the filter name into the entry field "Filter name".
You obtain a confirmation prompt if you use an existing name.
Confirm the query in order to overwrite the name.
- OR -
Cancel the action in order to change the name.
Enter the new name and optionally a comment in the entry field.
4. Press the "OK" softkey to save the filter.



- OR -



Press the "Cancel" softkey to reject the settings.

2.5.4 Edit filters

You have the option of recalling already saved filter settings in order to use them for filtering or to edit the filter settings.

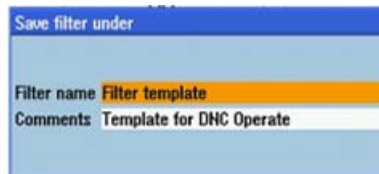
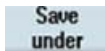
Select filter

1. The "Saved filters" window is opened.
2. In the selection box, you can display the existing filters in alphabetical order.
3. Select the desired filter using the cursor and click the "OK" softkey.
The filter settings are displayed.



Saving the filter under a different name

1. If you changed the settings of a filter that has been saved, then save the filter under a different name.
Press the "Save as" softkey.
The "Save filter as" window is opened.



2. Enter the new filter name and optionally a new comment.
3. Press the "OK" softkey to confirm your entry.
The filter settings are applied and activated as a temporary filter.

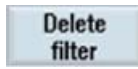


Reset filter

1. Press the softkey "Reset filter", to reset the filter criteria that were individually set.
If you saved the filter that was reset under the same name, then the conditions are retained.



Delete filter



1. Use the cursor to select the filter to be deleted in the filter list.
2. Press the "Delete filter" softkey.
You obtain a confirmation prompt as to whether the filter should be deleted.
3. Press the "OK" softkey.
The filter is removed from the list.

- OR -
Press the "Cancel" softkey to cancel the delete operation.

2.5.5 Setting a classic filter

In addition to the option of directly defining the filter at the control using SINUMERIK Operate, there are filter links, which are created at the DNC server. The display of such filter configurations are the classic filters. The variables are only displayed, but cannot be modified.

For a detailed description of the filters created on the DNC server, please refer to the following description:

Reference

Function Manual NC Program Management DNC; view filter

Use

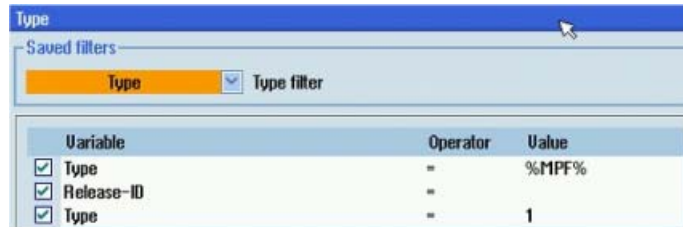
Column	Meaning
Variable	Individually set-up variable.
Operator	Specifies how the variable is linked with the value to the filter condition.
Value	Specifies what the variable is processed with as filter condition.

Classic filter upload

1. The "Saved filters" window is opened.
In the selection box, you can select the desired filter.
The saved filters are displayed in alphabetical order.
2. Select the required filters, e.g. "classic1".
The associated comments are displayed next to the filter designation.



3. Press the "OK" softkey.
The variables that have been created are displayed.
4. Place a checkmark in the checkbox of the variables to activate the filter condition.



2.6 Display logbook

Use

All NC data activities are chronologically recorded in the log book. An identifier specifies whether an action has been automatically or manually executed.

The action that was performed is listed in a table together with the time stamp, the name of the NC data and the operator station.

As an option, the user that executed the action can also be recorded.

The archiving time for the data that has been recorded can be permanently set, in order, when required, to fulfill the obligation of guaranteeing proof over a lifetime (traceability).

Procedure



1. Select the NC file.
2. Press the ">>" softkey.
The expanded menu is displayed.



3. Press the "Logbook" softkey.
The "Logbook" window opens and displays all of the information in conjunction with how DNC handled NC program data at the machine.

Example

Type	Date	Number	Message text
M	17.09.2010 14:49:54	0	KHBTEST.MPF downloaded
M	16.09.2010 13:39:45	0	MYTEST043.MPF downloaded
M	16.09.2010 13:38:53	0	FACE_MILLING_3.MPF downloaded
M	15.09.2010 08:19:47	0	HGFGH.SPF uploaded
M	14.09.2010 15:56:59	0	test.MPF uploaded
E	14.09.2010 15:56:58	0	Invalid uploadtarget-NodeID: 7 changed to: 4

Type M indicates that the activity was manually executed with the NC data.

Type E indicates that the activity was automatically executed with the NC data.

Overview of the program data

2.7 File properties

2.7.1 Showing properties

Use

You can display additional information for a program data file selected from the list. In addition to the standard details, such as the name and type, all management data, such as creator, creation date and the date of the last change can be displayed.

With the exception of setting and resetting the trial cut and release ID, the data cannot be changed.

Note

You can individually configure the sequence and selection of the columns to be displayed on the DNC server.

Features

Features	Meaning
Name	Name of folders, NC programs, workpieces, NC packages
Type	File/program type
Version	Version identifier
Workpiece	Workpiece
Release ID	Released NC program with version number
Trial cut ID	To run-in an NC program with version number that has been released

Features	Meaning
Length	Length of the NC program in bytes
Archive ID	Designation of the NC archive
Issued by	Name of the creator
Creation date	Date and time of creation
Modified by	Name of person that made the last change
Modification date	Date and time of last change
Number of accesses	Number of accesses
Last access	Date and time of the last access

Procedure

1. Position the cursor on the file or directory whose properties you wish to display.
2. Press the ">>" and "Properties" softkeys.



The "DNC properties" window opens and displays the stored properties.



See also

- Display attachments (Page 24)
- Entering a comment (Page 24)
- Displaying a graphic (Page 26)

2.7.2 Entering a comment

For every file saved in the DNC program system, you can enter any comment as remark.

Precondition

To enter a comment, you need the corresponding access rights.

The access rights are defined on the DNC server.

Procedure



1. Select the file.

Press the softkey "comment", in order to open the input window.

Enter a unique text.



2. Press the "OK" softkey to save the comment together with the program data.

The comment window is closed again.

- OR -



Press the "Cancel" softkey to close the input window without saving.

See also

Showing properties (Page 22)

2.7.3 Display attachments

For each file to be stored in the DNC program system, additional files can be assigned as so-called "Attachments".

You can view the files if an appropriate editor has been implemented.

Following attachments are possible:

- Text files
- PDF files
- Graphics
- SVG

Column	Meaning
Name	Name of the attachment
Size	File size
Type	File type
Date	Time stamp with the date and time

Procedure

1. Place the cursor on the desired program.
The "Attachments>" softkey can be selected if additional files have been assigned to the program file.



2. Press the "Attachments>" softkey.

A window is opened in which the stored files are listed. In addition, a new vertical softkey bar is displayed.

The following softkeys can only be selected if the appropriate file is selected.



3. Press the softkey "Display text file" in order to view the text file.

- OR / AND -



Press the softkey "Display PDF file" to display the PDF file.

- OR / AND -



Press the softkey "Display picture" in order to view the picture file.

- OR / AND -



Press the softkey "Display SVG" in order to view the graphic file.

See also

Showing properties (Page 22)

2.7.4 Displaying a graphic

You have the option of displaying graphics on the user interface.

Procedure

1. Position the cursor on the graphic file.
The system detects the graphic format and the softkey "Display graphic" can be selected.
2. Press the softkey "Display graphic", to open the file and display it.
3. Press the softkey again to close the graphic.



Note:

You can only select and open one file at a time!

See also

Showing properties (Page 22)

Managing program data

Overview

You can access programs from DNC in the operating area "Program manager", "DNC" from the user interface of the SINUMERIK Operate.

A transparent directory structure helps you to simply manage files and programs. You can select and copy data and insert this data into other directories. Programs that you no longer require can be deleted to release storage space that they are taking up for other data.

Possible storage locations are:

- NC
- Local drive
- Network drive
- USB drive
- DNC server

Precondition

- You need the corresponding access rights if you modify, copy and delete files: The access rights are defined on the DNC server.
- When assigning a new file name, ensure that only files with a maximum name length of 24 characters can be managed.

Procedure



1. Select the "Program Manager" operating area.



2. Press the "DNC" softkey.



3. Select the desired NC data. Single and multiple selection is possible.
4. Press the "Select" softkey.



5. Press the "Copy" softkey in order to copy the data to the buffer memory.



6. Then select the target directory and press the "Paste" softkey.
An appropriate note is displayed if this directory already includes a directory/program with the same name. You are requested to assign a new name, otherwise the directory/program is assigned a name by the system.



7. Delete programs or directories that you are no longer using in order to keep your data management transparent and clear.
Select the data and press the "Delete" softkey.
Please note when you delete a directory, that all programs, as well as subdirectories contained in this directory, are also deleted!



8. Changes to the directory contents are not automatically updated.
Press the softkey "Update", to reestablish the window view.

See also

Overview of the program data (Page 9)

Appendix A

A.1 List of abbreviations

C	
CAM	Computer-Aided Manufacturing
CF Card	CompactFlash Card: Memory card
CNC	Computerized Numerical Control: Computer-supported numerical control
CoL	Certificate of License
COM	Communication
CU	Control Unit
CP	Communication Processor
CPU	Central Processing Unit: Central processing unit

D	
DB	Data Block (PLC)
Dbxy	Data block (e.g. B 59)
DHCP	Dynamic Host Configuration Protocol: Dynamic assignment of an IP address and other configuration parameters on a computer in a network
DNC	Direct Numeric Control
DIR	Directory: Directory

H	
h	Hour
HMI	Human Machine Interface, SINUMERIK user interface
HW	Hardware

I	
IH	Maintenance
IIS	Microsoft Internet Information Service

M	
MCI	Motion Control Interface
MCIS	Motion Control Information System
MCIS MDA	MCIS Machine Data Acquisition
MCP	Machine Control Panel

Appendix A

A.1 List of abbreviations

MD	Machine data
MLFB	Machine-Readable Product Code
MPI	Multi Port Interface: Multiport Interface
MS	Microsoft
MSDE	Microsoft Data Engine
MCP	Machine Control Panel

N	
NC	Numerical Control: Numerical control
NCK	Numerical Control Kernel: Numeric kernel with block preparation
NCU	Numerical Control Unit: NCK hardware unit

O	
OB	Organization block in the PLC
ODBC	Open Database Connectivity
OEM	Original Equipment Manufacturer
OLE	Object Linking and Embedding
OP	Operator Panel: Operating equipment
OPI	Operator Panel Interface: Interface for connection to the operator panel
OPC	OLE for Process Control

P	
PC	Personal Computer
PCMCIA	Personal Computer Memory Card International Association
PCU	PC Unit: Computing unit
PG	Programming device
PDA	Production Data Acquisition: Production data acquisition
PLC	Programmable Logic Control: PLC
PMT	Parts Monitoring and Tracking: Parts tracking
PN	PROFINET
PO	POWER ON
ProToolPro	Configuration tool
PWS	Personal Web Server

S	
SK	Softkey
TSS	Tool Setting Station
SW	Software

T	
TDI	Tool Data Information
TLCA	Catalog Data Tool Library CA
TLCU	Tool Library Customer
TLCUA	Tool Library Customer Assemblies, complete tools

W	
WCS	Workpiece Coordinate System
T	Tool
TLC	Tool Length Compensation
WOP	Workshop-Oriented Programming
WPD	WorkPiece Directory: Workpiece directory
TRC	Tool Radius Compensation
T	Tool
TO	Tool Offset
TM	Tool Management
TC	Tool Change

X	
XML	Extensible Markup Language

Index

C

Calling DNC, 7, 17

D

Defining the sorting, 12

Displaying a graphic, 26

Displaying an attachment, 25

E

Entering a comment, 24

F

Filter

- activate/deactivate, 12

- Activating the settings, 17

- Criterion, 15

- Deleting, 20

- Reset, 19

- Save, 18

- Save as, 19

L

Logbook, 21

P

Preview, 14

S

Search function, 14

Showing properties, 23