SIEMENS

SINUMERIK

SINUMERIK Integrate
MMP, MMT, AMC, AMP, AMD

Operating Manual

Valid for control system:
SINUMERIK 840D, SINUMERIK 840D sl/ 840DE sl
Software
SINUMERIK Integrate, version 4.1, SP6

03/2017
A5E33520373B-AD

Legal information

Warning notice system

This manual contains notices you have to observe in order to ensure your personal safety, as well as to prevent damage to property. The notices referring to your personal safety are highlighted in the manual by a safety alert symbol, notices referring only to property damage have no safety alert symbol. These notices shown below are graded according to the degree of danger.

> ⚠️ **DANGER**
>
> indicates that death or severe personal injury **will** result if proper precautions are not taken.

> ⚠️ **WARNING**
>
> indicates that death or severe personal injury **may** result if proper precautions are not taken.

> ⚠️ **CAUTION**
>
> indicates that minor personal injury can result if proper precautions are not taken.

> **NOTICE**
>
> indicates that property damage can result if proper precautions are not taken.

If more than one degree of danger is present, the warning notice representing the highest degree of danger will be used. A notice warning of injury to persons with a safety alert symbol may also include a warning relating to property damage.

Qualified Personnel

The product/system described in this documentation may be operated only by **personnel qualified** for the specific task in accordance with the relevant documentation, in particular its warning notices and safety instructions. Qualified personnel are those who, based on their training and experience, are capable of identifying risks and avoiding potential hazards when working with these products/systems.

Proper use of Siemens products

Note the following:

> ⚠️ **WARNING**
>
> Siemens products may only be used for the applications described in the catalog and in the relevant technical documentation. If products and components from other manufacturers are used, these must be recommended or approved by Siemens. Proper transport, storage, installation, assembly, commissioning, operation and maintenance are required to ensure that the products operate safely and without any problems. The permissible ambient conditions must be complied with. The information in the relevant documentation must be observed.

Trademarks

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Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Preface

SINUMERIK documentation

The SINUMERIK documentation is organized into the following categories:

- General documentation/catalogs
- User documentation
- Manufacturer/service documentation

Additional information

You can find information on the following topics at the following address (https://support.industry.siemens.com/cs/de/en/view/108464614):

- Ordering documentation/overview of documentation
- Additional links to download documents
- Using documentation online (find and search in manuals/information)

If you have any questions regarding the technical documentation (e.g. suggestions, corrections), please send an e-mail to the following address (mailto:docu.motioncontrol@siemens.com).

mySupport/Documentation

At the following address (https://support.industry.siemens.com/My/ww/en/documentation), you can find information on how to create your own individual documentation based on Siemens' content, and adapt it for your own machine documentation.

Training

At the following address (http://www.siemens.com/sitrain), you can find information about SITRAIN (Siemens training on products, systems and solutions for automation and drives).

FAQs

You can find Frequently Asked Questions in the Service&Support pages under Product Support (https://support.industry.siemens.com/cs/de/en/ps/faq).

SINUMERIK

You can find information about SINUMERIK at the following address (http://www.siemens.com/sinumerik).

Target group

The operating manual is aimed at all machine tool users. The document provides information required by the user to understand the SINUMERIK Integrate software.

Requirements (scope of validity)

This manual is valid for use with the following product versions:

SINUMERIK Integrate version 4.1 SP6

- Manage MyPrograms (MMP) Version 02.10.00.00

- Manage MyTools (MMT) Version 02.10.00.00

- Analyze MyCondition local (AMC) Version 04.13.06.00

- Access MyData (AMD) version 01.04.00.00

- Analyze MyPerformance (AMP) version 02.10.00.00

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. Additions or revisions made by the machine manufacturer are documented by the machine manufacturer.

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

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

Technical Support

Country-specific telephone numbers for technical support are provided in the Internet at the following address (https://support.industry.siemens.com/sc/ww/en/sc/2090) in the "Contact" area.

Table of contents

Fundamental safety instructions

<div style="text-align: right; font-size: 3em;">1</div>

1.1 General safety instructions

> ⚠️ **WARNING**
>
> **Danger to life if the safety instructions and residual risks are not observed**
>
> If the safety instructions and residual risks in the associated hardware documentation are not observed, accidents involving severe injuries or death can occur.
> * Observe the safety instructions given in the hardware documentation.
> * Consider the residual risks for the risk evaluation.

> ⚠️ **WARNING**
>
> **Danger to life or malfunctions of the machine as a result of incorrect or changed parameterization**
>
> As a result of incorrect or changed parameterization, machines can malfunction, which in turn can lead to injuries or death.
> * Protect the parameterization (parameter assignments) against unauthorized access.
> * Respond to possible malfunctions by applying suitable measures (e.g. EMERGENCY STOP or EMERGENCY OFF).

1.2 Industrial security

Note

Industrial security

Siemens provides products and solutions with industrial security functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Siemens products and solutions only represent one component of such a concept.

The customer is responsible for preventing unauthorized access to its plants, systems, machines and networks. Systems, machines and components should only be connected to the enterprise network or the internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place.

Additionally, Siemens' guidance on appropriate security measures should be taken into account. For more information about industrial security, please visit:

Industrial security (http://www.siemens.com/industrialsecurity).

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends to apply product updates as soon as available and to always use the latest product versions. Use of product versions that are no longer supported, and failure to apply latest updates may increase customer's exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed at:

Industrial security (http://www.siemens.com/industrialsecurity).

⚠ **WARNING**

Danger to life as a result of unsafe operating states resulting from software manipulation

Software manipulations (e.g. viruses, trojans, malware or worms) can cause unsafe operating states in your system that may lead to death, serious injury, and property damage.

- Keep the software up to date.
- Incorporate the automation and drive components into a holistic, state-of-the-art industrial security concept for the installation or machine.
- Make sure that you include all installed products into the holistic industrial security concept.
- Protect files stored on exchangeable storage media from malicious software by with suitable protection measures, e.g. virus scanners.

Overview

2

2.1 Introduction

What is SINUMERIK Integrate?

SINUMERIK Integrate supports the maintenance, service, production planning and production for machine tool manufacturers and manufacturing companies. This is done using software services that are available both on the CNC and on the PC.

This requires both Internet access and a control system on the CNC that complies with the specifications. Further, a factory-wide network must be set up for the applications, and Internet access must be provided for the AMC applications.

SINUMERIK Integrate includes the following applications, for example:

SINUMERIK Integrate Manage MyPrograms

Manage MyPrograms (MMP) allows NC programs to be organized and managed on a network-wide basis and reduces the costs of NC data organization. As a result of managing NC programs electronically, the latest program versions are always available to the machines throughout the entire production area. Manage MyPrograms consists of software modules which can be scaled to suit functional requirements.

- Distribution of programs from servers to machines and back
- The available NC programs are displayed directly on the CNC machine screen
- Standard interface to Siemens Teamcenter
- Transfer of complete workpieces to the SINUMERIK Integrate Server
- Preview for selected NC programs on the SINUMERIK control system

SINUMERIK Integrate Manage MyTools

Tool management is one of the central tasks of CNC production. Problem-free planning processes are required as well as the provision of tools and a high degree of rationalization.

"Manage MyTools" (MMC) provides the correct connection concepts and functions for a complete overview of the tools used and to permit a closed tool data circulation in production for individual machines, flexible transfer lines or for a complete machine park.

- Availability of actual tool data throughout the network
- Operator-prompted loading and unloading with tool data import from the tool setting station
- Planning of tool demand based on current magazine assignment
- Statistical evaluations of tool use
- Interface client for connecting external tool management systems

- All available functions combined on a single server and network-wide operation of client-based interfaces
- Stand-alone non-network-compatible function package for tool planning and connection to tool setting stations

Manage MyTools makes this rationalization potential transparent and provides functions that optimize the tool circulation in the production and prevent downtimes on the machine tools due to missing tools.

The following application options are available:

- Single machine
- Flexible transfer lines
- Entire machine park
- SINUMERIK 840D sl CNC with HMI-Advanced and SINUMERIK Operate
- SIMATIC S7-based control systems
- Integration of tool setting stations
- Factory-wide tool management systems

Manage MyTools has the correct connection concepts and functions for a complete overview of the tools used and for a closed tool data circulation in the production.

SINUMERIK Integrate Analyze MyCondition

Analyze MyCondition (AMC) provides test cycles for equability, circularity and universal axis tests. The test parameters can be defined centrally and configured with appropriate warning limits. In addition, trends can be identified by way of measurement series and can be used as basis to optimize maintenance and service activities. In addition, Analyze MyCondition offers a continuous acquisition of data in the manufacturing process. It also supports the reporting of parameters about wear and tear of mechatronic components. The current machine status is documented using the following events and data:

- Alarms, PLC events, time intervals, combinations of machine signals
- Violation of the limit value and exceeding the interval value
- Measuring/test series and utilization monitors
- Manual help request by the machine operator in the event of faults
- HMI action log, machine data, NC status data
- PLC trace, PLC data blocks
- Certain files (e.g. log files) of the control system

Notifications via text message, by e-mail, or through service cases initiate service and maintenance procedures. Maintenance activities are planned, monitored and documented directly on the machine. The notifications can respond to all event sources.

SINUMERIK Integrate Analyze MyPerformance

Analyze MyPerformance (AMP) is a machine data acquisition system that is optimally integrated into the world of Siemens SINUMERIK control systems and, as such, provides high data quality and a high level of user friendliness. The objective of Analyze MyPerformance is to use the transparency afforded by this in the production environment for optimized utilization of the machinery in all areas, from production controlling through to maintenance.

- Evaluation of OEE indicators
- Statistical comparisons over time and over machine groups
- Causal analysis, including alarms and messages
- Online overview of the production

SINUMERIK Integrate Access MyData

Access MyData (AMD) is an open, flexible software interface and enables the data exchange between SINUMERIK Integrate applications and higher-level software systems.

Access MyData provides data and services for higher-level or supplementary software systems. The basis are standardized web services, e.g. on the basis of Microsoft .NET Windows Communication Foundation (WCF). The software interface Access MyData is provided by the SINUMERIK Integrate Server and is divided into functional modules.
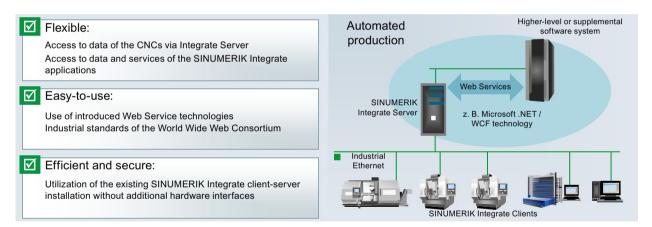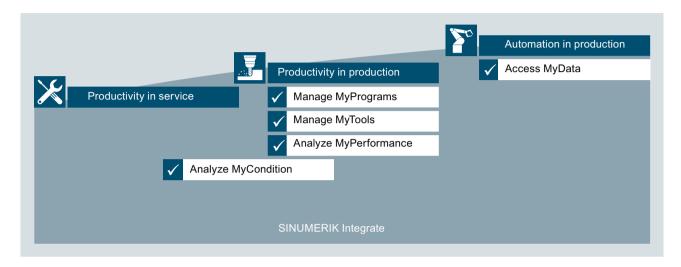
Figure 2-1   AMD overview

2.2 Product overview

As a whole, applications are available that completely cover all aspects of integrating machines into your communication, engineering and production processes.

Tailored to your particular requirements, you can access the following applications of SINUMERIK Integrate:

Delivery format

The latest packages and further information on the applications are stored on PridaNet and can be downloaded directly from there.
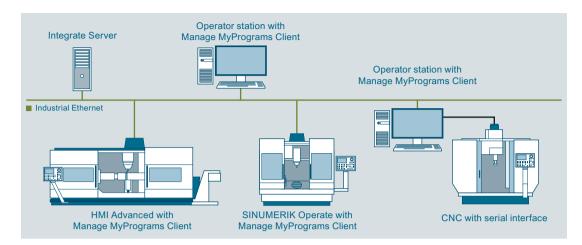
Overview of the applications

In the process of launching SINUMERIK Integrate , the previous names of the applications were combined and given standard names under the new SINUMERIK Integrate brand label.
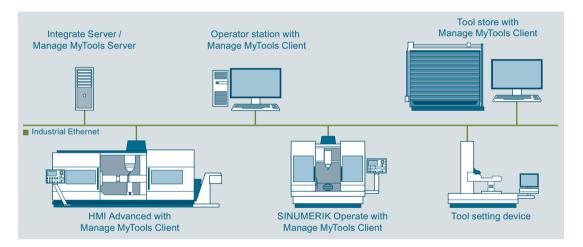
The following table provides an overview of the individual applications and a comparison of previous and new names:

Previous name	New name SINUMERIK Integrate
MCIS DNC	Manage MyPrograms (MMP)
MCIS TDI	Manage MyTools (MMT)
ePS Condition Monitoring	Analyze MyCondition (AMC)
MCIS MDA	Analyze MyPerformance (AMP)
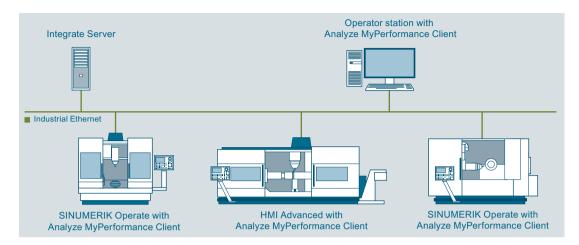
Example: Managing NC programs with Manage MyPrograms (MMP)
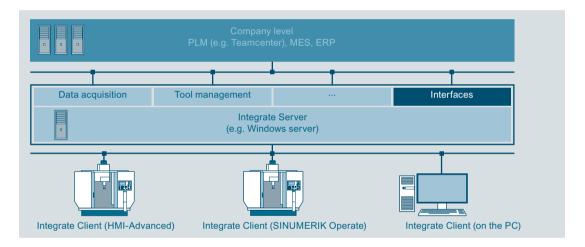
Example: Managing the tool cycle with Manage MyTools (MMT)

Example: Acquiring machine states and analyzing with Analyze MyPerformance (AMP)

Example: Open software interface Access MyData (AMD)

Logging on to SINUMERIK Integrate

3

3.1 Default setting

Overview

Important default settings are configured automatically while the server is being installed. This includes:

- Domain (depending on the application, e.g. MMP, MMT, etc.)

- Organization (ORG)

- Users of the organization (IBN, ADMIN)

You can log on immediately as user, see Chapter: Logging a user onto the PC (Page 18)

3.2 Logging a user onto the PC

Logging in a user

You can log into SINUMERIK Integrate as "IBN" or "ADMIN" user.

> **Note**
>
> The "IBN" user has administration and configuration rights.
>
> The "ADMIN" user has administration rights.

Login as "IBN" or "ADMIN"

1. Call SINUMERIK Integrate via WebService URL of your server.
   Open the web browser – and enter the following link:
   http://<ip address or hostname>/mcis_if/pc
   - OR -
   If a secured link (HTTPS) has been setup, then enter this link:
   https://<ip address or hostname>/mcis_if/pc

2. Enter "ibn" or "admin" as the password in the appropriate input field and confirm with "OK".

   Welcome to SINUMERIK Integrate

User name	
Password	
Organization	

   OK   PKI
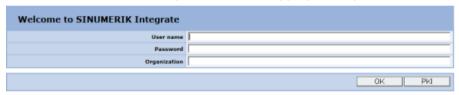
   Figure 3-1   Entering a password

3. The "Machine information" tab opens.
   Enter a new password in the "Password" input field under "User data".
   Observe the password rules specified in the left-hand window.

Change password

	What is a valid password?
1.	A password must have between 7 and 127 characters
2.	A password may only consist of the following characters: a-z, A-Z, 0-9, ` ~ ! @ # $ % ^ & * ( ) _ + - / . ? , ; ' \ : " } {] | [=
3.	A password must contain at least one of the following characters internally, that is not at the first or last position: ` ~ ! @ # $ % ^ & * ( ) _ + - / . ? , ; ' \ : " } {] | [=
4.	A new password must differ from the previous password and must not contain the user name.
5.	It is not case-sensitive

User data

User name	sg
Password	*
Organization	epsinternal
new password:	*
confirm new password:	*

OK   Cancel

Figure 3-2   Changing the password

4. Once the password has been changed successfully, an appropriate dialog box is displayed. Confirm with "OK".

- OR -

The system will issue an error message if you enter incorrect user data five times in succession. The user data can be user name, password or organization.

Your user account is then blocked for 30 seconds. Re-enter your user data once the blocking period has expired.

Figure 3-3   User data entered incorrectly

Figure 3-4   User account blocked

Note

Blocking the IP address

The blocking of the user account is linked to the currently valid IP address.

Example:

If user A at client 1 entered incorrect data five times in succession, then user A of client 1 cannot log in to the user account for 30 seconds. For the other users B and C, client 1 is also blocked.

The blocking, however, does not affect user B on client 2.

---

5. Read the privacy terms of the machine owner's organization.
   Activate checkbox "I agree" and click "OK".

   Note

   Privacy terms

   If you do not accept the privacy terms, you are automatically logged out from the server and must log in again.

Data protection guidelines

Data protection guidelines	
Version	04.13.00.00
Valid since	1/1/2015
Accepted on	12/9/2014 12:39 PM
Data protection policy	The data protection policies of the machine's owner apply.
Please select	○ I do not agree ⦿ I agree

	OK	Cancel
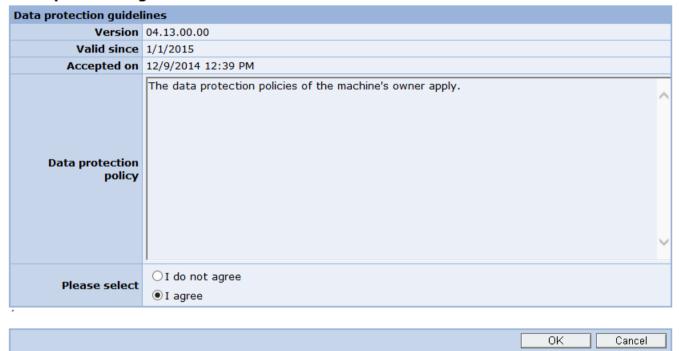
Figure 3-5   Data privacy guidelines

6. You are now logged into the server.
   The "Machine Information" window is displayed.
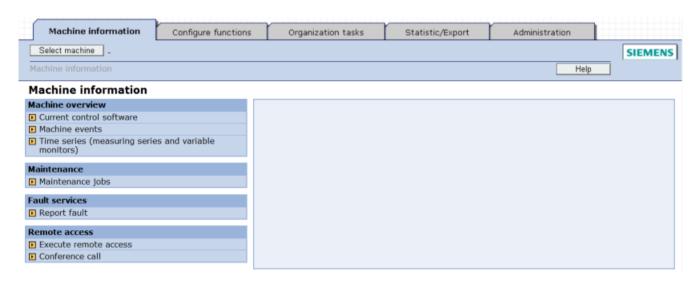
Figure 3-6   Machine information

Manage MyPrograms (MMP) 4

4.1 Prerequisite

The Manage MyPrograms interfaces have been designed to run and operate not only on a SINUMERIK control system (function keys), but also on a PC platform (menus).

- Manage MyPrograms workplace PCs must be Windows-based.

- The SINUMERIK machine must be addressable via Ethernet.

- Control systems with SINUMERIK Operate must be created not only for MMP Admin, but also on the SINUMERIK Integrate server.

Note

Hardware/software

For the hardware/software requirements, refer to the current Installation Manual "SINUMERIK Integrate for production MMP, MMT, AMC, AMP, AMD", Chapter: System requirements.

Activating SINUMERIK Integrate

SINUMERIK Integrate must be activated in order to use Manage MyPrograms on SINUMERIK Operate.

References

For information on how to activate the software, refer to the Installation Manual "SINUMERIK Integrate MMP, MMT, AMC, AMP, AMD".

Connect machine/server

For the machine/server connection, the machines and users must have been created.

References

For further information on how to create machines, refer to the Function Manual "SINUMERIK Integrate AMC" in Chapter: Management.

4.2 Overview of the MMP functions

Manage MyPrograms (MMP) has the following functions on various components.

Server functions

If MMP operates via a local server, the following tasks are performed:

- NC data management in the SQL Server
- User data management in the file system
- Data maintenance and management
- Configuration
- Import
- Export
- Data transfer to and from the CNC machine tools
- User administration
- Data filter management
- Logbook filter management
- Comparison of NC programs

SINUMERIK control systems

In addition to the active memory containing the NC data to be processed on the machines, SINUMERIK control systems also feature a passive memory, e.g. on the PCU 50. NC data in the form of NC programs, tool data or zero offset data, for example, can be stored here. This allows NC data to be made available before production starts. MMP IFC SINUMERIK makes the connection to MMP via the network. NC data can be downloaded and uploaded to the control system on the SINUMERIK operator panel.

Control systems with serial interface

Control systems with a serial interface can be connected to MMP or PCs directly or via interface converters (COM server). For this purpose, the serial interface (machine server) must be configured for each CNC machine tool. NC data is transferred to the control system via the interface of the associated station.

Machine (PCU 50) with SINUMERIK Operate / HMI-Advanced operating software

MMP can be extended by the machine with additional user interfaces.

Station PC

If MMP operates via a server, the following tasks are performed on the station PCs:

- Configuration of the connected machine interfaces
- Data maintenance and management for the connected machines

- Data transfer to and from the CNC machine tools
- Comparison of NC programs

NC programming system

NC programming systems can be integrated in the MMP network to transfer NC data. NC data can be imported to the management structure of the MMP network by NC programming systems integrated in the network.

The appropriate configuration of the MMP workplaces permits direct access to the control systems.

Tool setting station terminal

You require an additional MMP workplace to integrate a tool setting station in MMP.

The setting station is a single MMP installation on a PC.

Tool setting stations are connected as follows:

- Via the serial interface
- Via the file system

The tool offset data is transferred from the tool setting station to MMP by means of an upload at the tool setting station terminal. The appropriate file must then be transferred from MMP (not from the tool setting station terminal) to the CNC machine tool.

4.3 Machine with SINUMERIK Operate

4.3.1 Managing program data

Overview

Via the SINUMERIK Operate user interface, access the data of "Manage MyPrograms" (MMP) in the "Program Manager" operating area, "MMP DNC".

A transparent directory structure is provided to manage files and programs easily. 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.

Possible storage locations are:

- NC
- Local drive
- Network drive
- USB drive
- MMP server

Note

Directory structure for workpieces

Nested workpiece folders are not supported by "Manage MyPrograms".

Additional subfolders can be created within workpieces on the SINUMERIK Operate control system which, in turn, can contain NC programs.

This type of folder organization is not possible within "ManageMyPrograms" (MMP).

Only workpieces that exclusively contain NC files are permitted under the machine node of the MMP management. Workpieces that contain additional subfolders are rejected during the transfer to Manage MyPrograms.

Requirements

- You need the corresponding access rights if you modify, copy and delete files: The access rights are defined on the server.
- When assigning a new file name, ensure that only files with a maximum name length of 40 characters can be managed.

Procedure

[Program manager icon]	1.	Select the "Program Manager" operating area.
[MMP DNC icon]	2.	Press the "MMP DNC" softkey.
	3.	Select the desired NC data. Single and multiple selection is possible.
[Mark icon]	4.	Press the "Mark" softkey.
[Copy icon]	5.	Press the "Copy" softkey in order to copy the data to the buffer.
[Paste icon]	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.
[Delete icon]	7.	Delete programs or directories that you are no longer using in order to keep your data management transparent and clear. Highlight the data and press the "Delete" softkey. Please note when you delete a directory, that all programs, as well as sub-directories contained in this directory, are also deleted! If data cannot be deleted, for example, because it has been enabled, information is displayed in an "Error log for deletion".
	8.	Any changes in the directory contents are updated automatically.

Overview

An overview of the plant configuration is displayed in the "Manage MyPrograms" window.

Note

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

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

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

Column	Description
Name	Name of folders, NC programs, workpieces, NC packages
Type	File/program type
Version	Version identifier
Release ID	The NC program has been released
Trial cut ID	The program is only enabled for trial machining
Length	Length of the NC program in bytes
Workpiece	Designates a group of NC programs to be used for machining a workpiece

Managing the file system

The following functions are available for you to manage data:

- Switching filter on/off (Page 30)

- Transferring NC programs between the source and target.
  See Chapter: Managing program data (Page 26)

- Selecting, copying, pasting directories.
  See Chapter: Managing program data (Page 26)

- Sorting NC programs.
  See Chapter: Sorting NC programs (Page 31)

- Displaying the program content in the preview window.
  See Chapter: Preview (Page 32)

- Searching for specific files.
  See Chapter: Search function (Page 33)

- Creating filters.
  See Chapter: Filter settings (Page 34)

- Displaying data activities using a logbook.
  See Chapter: Display logbook (Page 33)

- Displaying management properties.
  See Chapter: Showing properties (Page 39)

- Deleting data.
  See Chapter: Managing program data (Page 26)
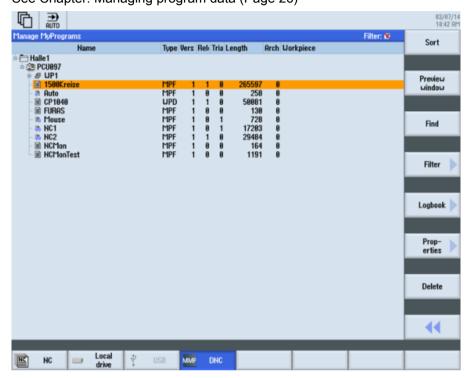
Figure 4-1   Manage MyPrograms overview
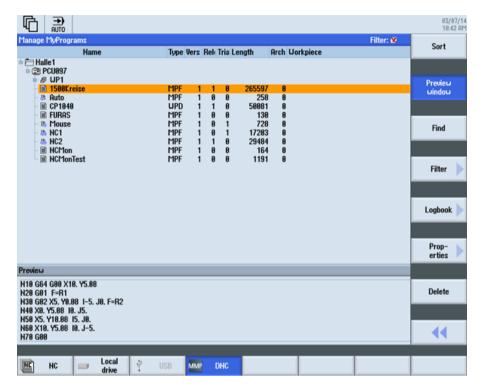
Figure 4-2   Manage MyPrograms overview extension

4.3.2   Calling Manage MyPrograms

Procedure

1. The control system has booted and the operating areas are displayed.
2. Select the "Program manager" operating area.

3. Press the "MMP DNC" softkey.
    The "Manage MyPrograms" window opens and displays an overview of the NC program data which is on the server.

4.3.3   Switching filter on/off

You can set appropriate filter conditions to influence the program list display, thus limiting the selection of visible directories/programs.

Requirements

Filter settings have already been defined.

See also:

Filter settings (Page 34)

Save filter (Page 36)

Edit filters (Page 37)

Setting a classic filter (Page 38)

Procedure

	1.	The "Manage MyPrograms" window is opened. The filter name and a filter icon are displayed in the status display.
Filter on/off	2.	Press the "Filter on/off" softkey to activate or deactivate the selected filter. If, for example, the filter is deactivated, then a crossed-out filter symbol is displayed Filter:

4.3.4 Sorting NC programs

You have the option to display the NC programs sorted individually. The criteria for sorting can be defined via the user interface.

Criteria

- Up to three sorting criteria can be defined.
- Select the criteria in the drop-down lists. The drop-down lists include the column names of the NC program list.
- The priority of the sorting order is from the upper to the middle and then to the bottom criteria.
- A checkbox is provided to select whether the sorting is to be executed in ascending or descending order.
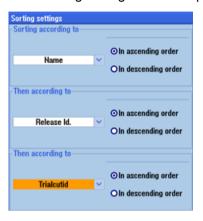
Procedure

▶▶	1.	If you press the ">>" softkey, further softkeys are displayed on the vertical bar.
Sort	2.	Press the "Sort" softkey. The "Sorting settings" window opens.

Sorting settings

3. Select the desired sorting criteria according to which you wish to display the NC programs.

✓ OK	4.	Press the "OK" softkey. The programs are displayed and sorted according to the specified criteria.
		- OR -
✗ Cancel		Press the "Cancel" softkey if no sorting is desired. The window is closed.

4.3.5 Preview

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

Procedure

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

4.3.6 Display logbook

The logbook contains all the messages and error messages that were displayed in the message line with date and time. In this way, procedures such as transfer, delete, etc. and errors that have occurred can be traced.

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	Press the ">>" softkey. The expanded menu is displayed.
Logbook	2.	Press the "Logbook" softkey. The "Logbook" window opens and displays all of the information in conjunction with how MMP handled NC program data at the machine.

Example

Each entry is marked with M (message) or E (error message) for the type of message.

This is followed by the date and time when the message occurred, the message number, and the message text.

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

4.3.7 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.	If you press the ">>" softkey, further softkeys are displayed on the vertical bar.
Search	2.	Press the "Search" softkey. The "Search" window appears.

Search

Search

3. Enter the term to be found in the "Text" entry field or click "Search text" and select one of the offered terms.

- 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 a single character.

✓ OK	4.	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 -
✗ Cancel		Press the "Cancel" softkey to stop the search.

4.3.8 Configuring filters

4.3.8.1 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 the column type:

- Activation or deactivation via a checkbox
- Detailed information

Filter processing

Save filter (Page 36)

Edit filters (Page 37)

Setting a classic filter (Page 38)

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: • 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: • 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: • 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: • Day (D): Two-digit • Month (M): Two-digit • Year (Y): Two-digit • Time of day: Hour (H), minute (M):second (S) The fields to enter dates depend on the specific language, e.g. for German DD-MM-YY, HH:MM:SS.
Length	Limit the length of NC data in bytes by entering "from" / "to".
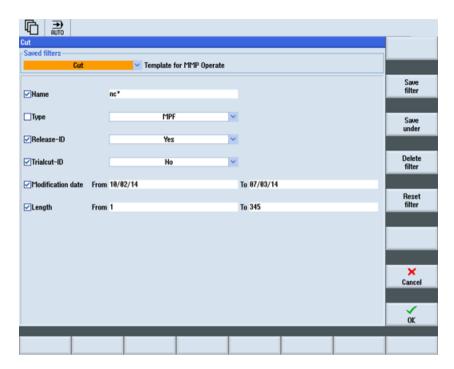
Figure 4-3   Manage MyPrograms filter settings

4.3.8.2   Activate filter

Procedure

	1. The "Manage MyPrograms" window is open.
▶▶	2. If you press the ">>" softkey, further softkeys are displayed on the vertical bar.
Filter ▶	3. Press the "Filter >" softkey. The "Saved Filters" window opens.
	4. Already defined filter settings can be selected via the selection field. In addition to the filter designation, the associated comments are also displayed.
✓ OK	5. Press the "OK" softkey to call the filter.

4.3.8.3   Save filter

You can save any individually set filter.

Functions
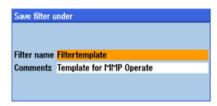
Display	Description
Filter name	Any filter name with a maximum of 40 characters.
Comment	Freely selectable text as a comment to a filter setting, see Chapter: Entering a comment (Page 41)

Procedure

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

Saving a filter

3. Enter the filter name in the "Filter name" entry field.
   A confirmation prompt is displayed if you use an existing name.
   Confirm the prompt 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.

4.3.8.4 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.

Procedure

Select filter

1. The "Saved Filters" window is open.
2. In the selection box, you can display the existing filters in alphabetical order.
3. Select the desired filter using the cursor and press 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 under" softkey.
   The "Save filter under" window opens.

Save filter under

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.

Resetting a filter

Press the "Reset filter" softkey 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.

Deleting a filter

1. Use the cursor to select the filter to be deleted in the filter list.

2. Press the "Delete filter" softkey.
   You will get a confirmation prompt asking whether the filter is to be deleted.

3. Press the "OK" softkey.
   The filter is removed from the list.

   - OR -

   Press the "Cancel" softkey to cancel the deletion operation.

4.3.8.5 Setting a classic filter

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

Use

Function	Description
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 open.
   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 set up are displayed.
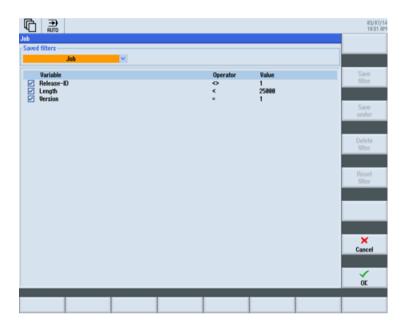
Figure 4-4   Classic filter

4.3.9   File properties

4.3.9.1   Showing properties

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 administrative data, such as author, creation date and the date of change can be displayed.

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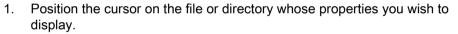
Note

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

Detailed information

Function	Description
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
Length	Length of the NC program in bytes
Archive ID	ID of the archives
Issued by	Name of the creator
Creation date	Date and time of creation
Modified by	Name of the 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
Administrator	Name of the administrator
Administration date	Date and time of the administration

Procedure

1. Position the cursor on the file or directory whose properties you wish to display.
2. Press the ">>" and "Properties" softkeys.
   The "Manage MyPrograms Properties" window opens and displays the stored properties.
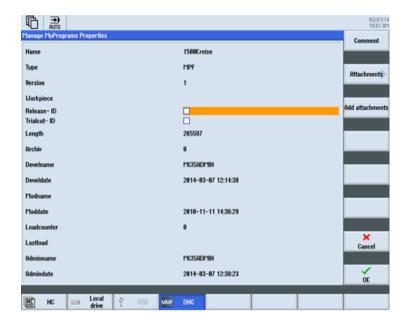
Figure 4-5   MMP properties

4.3.9.2   Entering a comment

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

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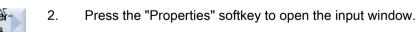
To enter a comment, you need the corresponding access rights.

The access rights are defined on the server.

Procedure
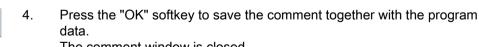
▶▶	1.	Position the cursor on the file and press the ">>" softkey.
Proper-ties	2.	Press the "Properties" softkey to open the input window.
Comment	3.	Now press the "Comment" softkey and enter a unique text.
✓ OK	4.	Press the "OK" softkey to save the comment together with the program data. The comment window is closed. - OR -
✗ Cancel		Press the "Cancel" softkey to close the input window without saving.

4.3.9.3 Display attachments

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

Note

Attachments as link

Attachments that were provided on the PC client as a "link" cannot be displayed on the controller.

You can display the files if a corresponding editor is implemented.

The following files are possible as attachments:

- 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.	Position the cursor on the desired program. The "Attachments >" softkey can be selected if additional files have been assigned to the program file.
Attachments	2.	Press the "Attachments >" softkey. A window opens 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.
Show text file	3.	Press the "Display text file" softkey in order to view the text file.
		- OR / AND -
Show PDF file		Press the "Display PDF file" softkey to display the PDF file.
		- OR / AND -
Show image		Press the "Display picture" softkey in order to view the picture file.
		- OR / AND -
Show SVG		Press the "Display SVG" softkey in order to view the graphic file.

- OR / AND -

Press the "Delete" softkey to delete the selected attachments.

4.3.9.4 Displaying a graphic

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

The following formats are supported:

- .bmp
- .jpg
- .tif

Procedure
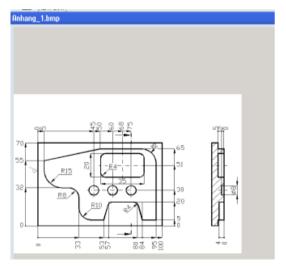
1. Position the cursor on the graphic file and press the ">>" softkey.

2. Press the "Properties" softkey.
   The system detects the graphic format and the "Display Graphic" softkey can be selected.

3. Press the "Display Graphic" softkey to open the file and display it.

Displaying a graphic

4. Press the "Back" softkey to close the graphic.
   Note:
   You can only select and open one file at a time!

4.3.9.5 Adding attachments

You can add arbitrary files as attachments to any file stored in the program system.

All formats are supported, but only the defined formats are displayed.

Requirement

You require access rights to add attachments. The access rights are stored on the server.

The attachments must not exceed 10 MB.

Procedure

1. Press the "Add attachments" softkey.
   The Explorer tree opens and displays the NCU directories.
   Select the desired files.

Name	Size	Type	Date
DHC.bmp	648056	.bmp	4/12/2013 2:05:58 PM

   Selecting files

2. Press the "OK" softkey to add the attachments to the file.

   - OR -

   Press the "Cancel" softkey to reject the action and return to the previous window.

4.4 Machine with HMI-Advanced

4.4.1 MMP SINUMERIK login

Overview

MMP SINUMERIK starts with an automatic login by default. This means that work is performed with the user and his rights that are entered in the configuration file.

Further options for the login can be set.

- If different users with different rights log in, this takes place via the Login dialog.

- It is also possible to work with the user rights that correspond to the current protection level of the SINUMERIK or the key-operated switch position.

To specify the automatic or manual login procedure, use the "DNC_IFC.INI" configuration file or the configuration dialog.

References

For further information, refer to the Installation Manual "SINUMERIK Integrate MMP, MMT, AMC, AMP, AMD", Chapter: Configuring Manage MyPrograms (MMP).

4.4.2 Structure of the user interface
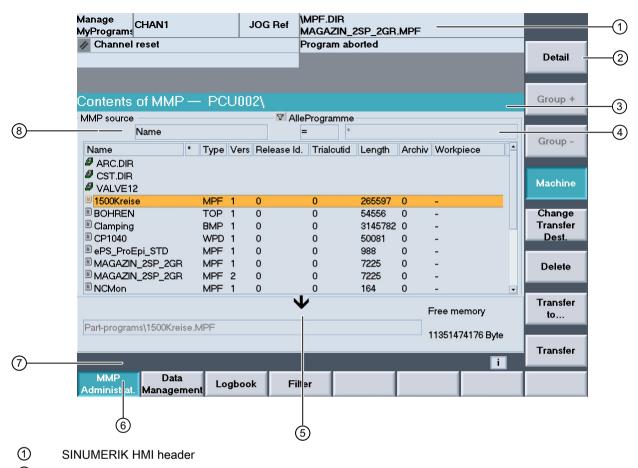
MMP SINUMERIK is integrated in the HMI-Advanced operating software and can be called via the "DNC IFC" softkey.

The following functions are available for you to manage data:

- Managing NC data in MMP und MMP SINUMERIK
  See chapter: Managing program data (Page 48)

- Calling up detailed information on the NC data
  See chapter: Detail view (Page 49)

- Transferring NC programs between the source and control system
  See Chapter: Transferring program data (Page 51)andTransferring program data back (Page 55)

- Displaying data activities using a logbook
  See chapter: Displaying the logbook (Page 57)

- Creating and changing filters
  see chapter: Setting the filter (Page 58)

General information

The MMP SINUMERIK user interface is divided into the following areas:

Figure 4-6   Structure of the MPP user interface

①	SINUMERIK HMI header
②	Vertical softkeys
②	Title line
②	Quick filter
②	Direction of transfer
②	Horizontal softkeys
②	Message line
②	MMP SINUMERIK screen contents

Operator control	Description
Header	The header is part of the SINUMERIK operating software. The most important information, such as the machine status, the status of the NC and alarms from the alarm server, is displayed here.
Title line	The title of the respective screen window is displayed in the title bar. The NC data storage structure of the machine is also displayed in MMP. **Note:** The NC data structure of the machine is performed in the "DNC_IFC.INI" configuration file on the PCU 50/70 / MMC 103.
Quick filter	The quick filter function allows you to change a filter value without having to call up the filter selection, see chapter: Setting the filter (Page 58)
Direction of transfer	A direction arrow is displayed at the interface between the upper and the lower window areas which indicates the direction for the transfer of the NC data.
Message line	Error and operation messages (e.g. for the download) are displayed in the message line.
MMP SINUMERIK screen contents	The contents consist of a source and target area. The data management of MMP is always displayed in the top area of the window. Depending on the window area, this is either the target or the source. MMP SINUMERIK has two views of the NC data available in the system: ● MMP administration ● Data management The selected NC programs can be transferred using softkeys. Further functions can also be selected via softkeys: ● Logbook ● Filter ● Detail view of NC data

Updating the displayed NC data

In active system mode, new NC programs are imported, released and deleted, etc. in MMP by the NC programmer. To ensure that these changes in MMP are also displayed refreshed in MMP SINUMERIK, a refresh is carried out:

● Automatically when MMP SINUMERIK is switched to the foreground.

● Cyclically when this has been set in the configuration user interface. The time between the last operator action and the first update as well as the time between two update cycles, can also be set.

Languages

If you change the language on the control system, MMP SINUMERIK automatically adjusts to the new language when the language is available for MMP SINUMERIK.

4.4.3 Managing program data

Overview

A transparent directory structure helps the simple management of 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.

Management interface

In MMP you can store the NC data in several hierarchy levels (group, subgroup, machine, etc.) depending on the plant topology. Navigate to these levels via the corresponding vertical softkeys. This will allow you to see the NC data of this hierarchy level and the ones above them.

Icons	Description
	Indicates that the filter function is deactivated.
	Indicates that the filter function is activated.
	Icon for NC data
	Symbol for workpiece/pseudo workpieces

Function	Description		
MMP source			
NC program name	Displays all of the available NC data and workpiece directories of MMP in alphabetical order.		
Name	Shows the icon with the name of the NC data.		
*	The hierarchy affiliation of the NC data in the plant topology:		
	*	Machine	
	**	Group	
		Higher-level group	
Type	Shows the type.		
Version	Shows the version.		
Release	Shows the release ID: 1: released 0: no release		
Trial cut ID	Shows if the program is released for a trial cut 1: Trial cut ID 0: no trial cut ID		
Length	Shows the length of the NC program in bytes.		
Target in data management	Shows the default transfer target. The target path results from the NC data type, except for workpieces and pseudo workpieces.		

Procedure

1. Press the "DNC IFC" softkey to start MMP.

2. Press the "MMP Administrat." softkey to view the data management contents.
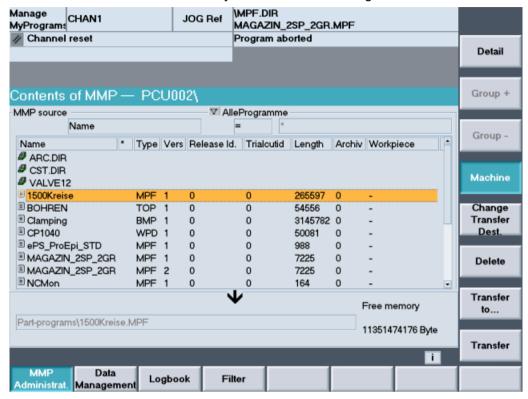
Figure 4-7   Management interface

4.4.4   Detail view

In addition to the program name for each NC program, there is further administration/detail information that you can be display.

Like for MMP, the layout of the window depends on the user and is configured in the input screen editor.

The detail dialog can contain up to four detail windows that you can call via the vertical softkeys.

You can change all of the released administrative information.

References

For further information about window structuring, see the Installation Manual "SINUMERIK Integrate MMP, MMT, AMC, AMP, AMD, AM", Chapter: Configuring Manage MyPrograms (MMP), Input screen editor.

For how to configure the detail window, see the Installation Manual "SINUMERIK Integrate MMP, MMT, AMC, AMP, AMD, AM", Chapter: Configuring Manage MyPrograms (MMP), Creating / changing administrative data

Example of a detail view

1. Press the "MMP Administrat." softkey to view the data management contents.

2. Select an NC date and press the "Detail" softkey.
   In the following, you will see an example of how the window may appear and which vertical softkeys can be configured.
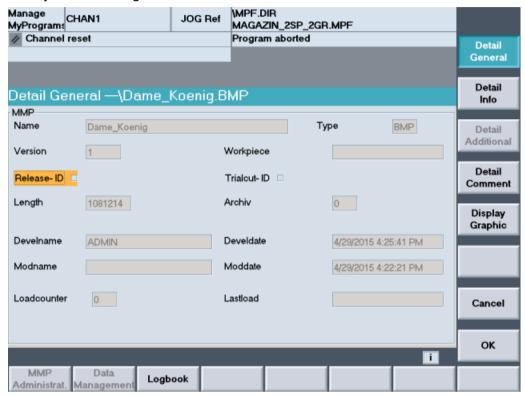
Figure 4-8   Detail view

Displaying a graphic

1. Press the "Display Graphic" softkey to display graphics such as graphical information for workpiece machining.

Note

Display of graphics

Graphics can only be displayed with PCU and access via network drives (not in conjunction with FTP protocol).

All graphic types that are supported by the Internet Explorer can be displayed (e.g. BMP, JPG). Further graphic types can be displayed when the appropriate plug-ins are installed. The graphic types must be entered in the configuration user interface.

---

2. Press the "End" softkey to close the window.
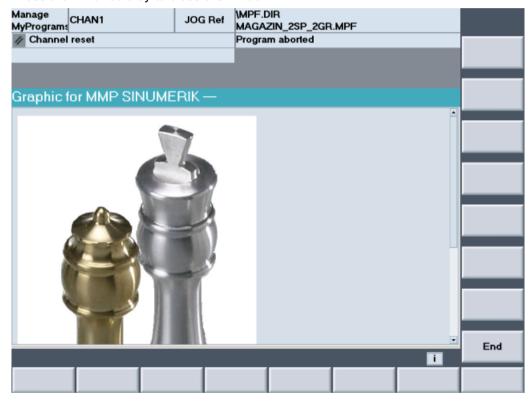
Figure 4-9   Graphic view

4.4.5   Transferring program data

You can transfer data from the MMP source to the controller via the user interface.

Requirement

You need the corresponding access rights if you modify, copy and delete files: The access rights are defined on the server.

References

For further information about access rights, refer to the Installation Manual "SINUMERIK Integrate MMP, MMT, AMC, AMP, AMD", Chapter: Configuring Manage MyPrograms (MMP), User administration

For how to configure uploading, refer to the Installation Manual "SINUMERIK Integrate MMP, MMT, AMC, AMP, AMD", Chapter: NC data management.

Procedure

1. Press the "MMP Administrat." softkey to view the data management contents.
   In the upper window area, you can see the NC data in the MMP source.

2. In the MMP source, select the NC data that you want to transfer to the controller.
   In the bottom window area, you will see the directory in the controller.

3. Press the "Transfer" softkey to save the data in the controller.
   - OR -
   Press the "Transfer & Load" softkey to load the data directly into the NC area.

4. Press softkey "Change "Transfer Dest." if you want to change the default transfer destination.
   You can perform the following with this function:

   – Name of the target file

   – Type of target file

   – Target directory

   – Storing an NC file in a workpiece directory

   – Changes of the workpiece name in the target system

   Individual NC data files from the MMP source are downloaded to the relevant type directory of the data management. NC data that belongs to a workpiece is also downloaded to the relevant workpiece directory in the controller, irrespective of their data type. Copying procedures in progress are displayed in the message line.

File type of the NC data in MMP	Target directory in the file system or in the NC
.MPF	Part programs
.SPF	Subprograms
.ARC	Archives
NC data in workpieces	Workpieces

If no pseudo workpiece is defined in the NC, files from pseudo workpieces are transferred to the respective data management directories of the same name.
If no type conversion is configured in the MMP SINUMERIK configuration user interface, the file types for the transfer to the file system or NC are changed in accordance with the conversion tables.
The download from MMP to the controller is performed irrespective of the plant topology in MMP.
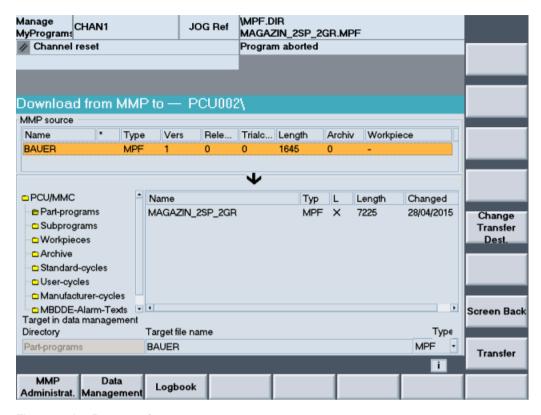
Figure 4-10   Data transfer

Deleting program data

1. Select unreleased NC data in the MMP source.

2. Press the "Delete" and "OK, Delete" softkeys to delete data.
   - OR -
   Press the "Cancel, Delete" softkey to clear the data selection.
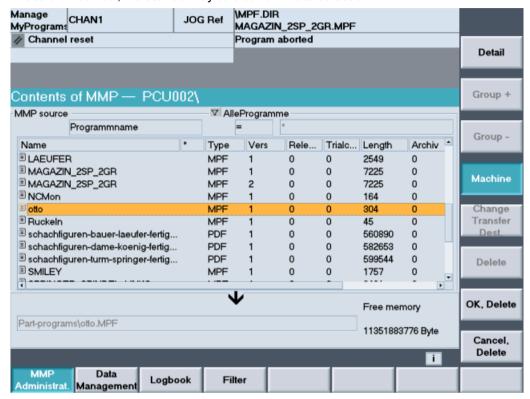
Figure 4-11   Deleting NC data

4.4.6   Transferring program data back

You can transfer NC data, e.g. optimized NC programs, from the controller back into the MMP source via the user interface.

NC data that belongs to a workpiece is also transferred to the relevant workpiece directory of the configured hierarchy level (group, machine) in the MMP, irrespective of their NC data type.

NC data from data management directories, for which a pseudo workpiece is configured in MMP, is uploaded to the relevant pseudo workpiece.

Requirement

You need the corresponding access rights if you modify, copy and delete files: The access rights are defined on the server.

Procedure

1. Press the "Data Management" softkey and the vertical "Machine" softkey.

2. In the bottom window area, you get an overview of the NC programs available in the controller.
   Select the NC data that you would like to transfer back to the MMP source.
   In the top window area you see the destination in MMP.

3. Press the "Transfer" softkey in order to save the data in MMP.

Manage MyPrograms	CHAN1		JOG Ref	\MPF.DIR MAGAZIN_2SP_2GR.MPF	
// Channel reset				Program aborted	

Inhalt der Datenhaltung — PCU002

Manage MyPrograms-Ziel
Ziel in Manage MyPrograms

PCU002\ \ MAGAZIN_2SP_2GR.MPF

Name	Typ	L	Length	Changed
MAGAZIN_2SP_2GR	MPF	X	7225	28/04/2015

- PCU/MMC
  - Part-programs
  - Subprograms
  - Workpieces
  - Archive
  - Standard-cycles
  - User-cycles
  - Manufacturer-cycles
  - MBDDE-Alarm-Texts

Softkeys: Group +, Group −, Machine, Select All, Transfer to..., Transfer

Horizontal softkeys: MMP Administrat., Data Management, Logbook, Filter

Figure 4-12   Data management

- OR -
Press the "Transfer to..." softkey in order to load data at a specific point in the plant topology. Using this function, you can change the following:

– Name of the target file

– Type of target file

– Target directory

– Storing an NC file in a workpiece directory

4. For new workpieces, there is no directory in the plant topology of MMP and it is not displayed in the list view.
Enter the workpiece name.

5. Press the "Transfer" softkey in order to save the data in MMP.
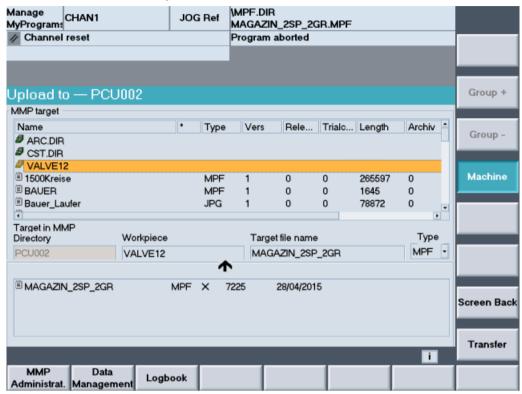
Figure 4-13   Transferring back to the MMP source

4.4.7   Displaying the logbook

The logbook contains all the errors and messages with date and time that were displayed in the message line. This enables operations, such as downloads, uploads, deletions, user logins and logouts, etc. and any errors that have occurred, to be traced.

References

For how to configure the logbook, refer to the Installation Manual "SINUMERIK Integrate MMP, MMT, AMC, AMP, AMD", Chapter: Error management

Overview

Function	Description
Type	Displays the following error messages:
	E = error
	M = message
	S = system alarm
Date	Displays the time of the error as follows:
	DD.MM.YYYY HH:mm:ss
Number	Displays the error number
Message text	Shows the error text

Procedure

1. Press the "Logbook" softkey to view all errors and messages.

2. Press the "End" softkey to exit the window.
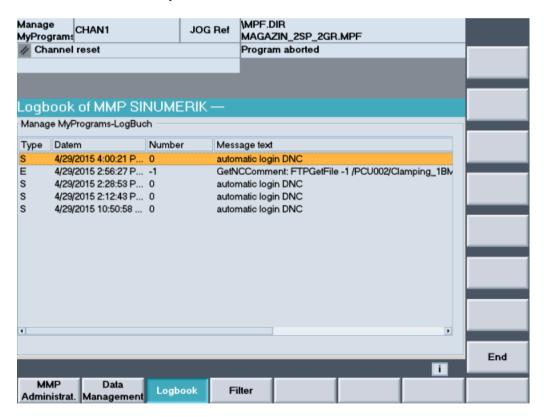
Figure 4-14   Logbook

4.4.8   Setting the filter

The filter function gives you a filtered view of the data in MMP. If the filter is activated, you will only see the data that corresponds to the filter conditions.

References

For how to configure the filter functions, refer to the Installation Manual "SINUMERIK Integrate MMP, MMT, AMC, AMP, AMD", Chapter: View filter.

Overview

Function	Description
▽	Indicates that the filter function is deactivated.
▽	Indicates that the filter function is activated.
DNC setting	Displays the name of the current filter.
MPF filter	Symbol for workpiece/pseudo workpieces

Activating/deactivating a filter

1. Press the "Filter" softkey.
   The "Setting for DNC IFC SINUMERIK" window opens.

2. Press the "Select Filter" softkey.
   An overview of all filters set up is displayed, see also the following section: "Editing filters directly".

3. Select the required filter and press the "Filter on/off" softkey.
   - OR -
   Press the <F3> key.
   The filter is activated or deactivated.

4. If you want to edit the current filter, press the "Edit current filter" softkey; see the following section: "Editing filters"
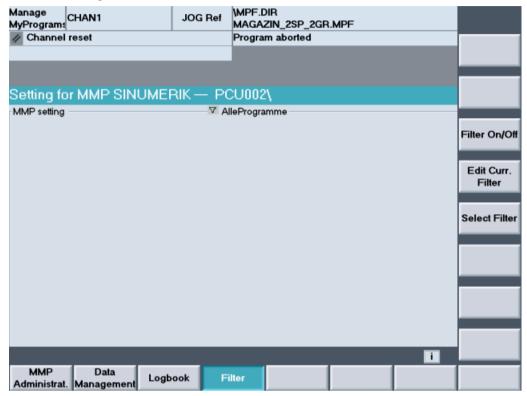
Figure 4-15   Selecting filters

Editing filters

1. The "Edit current filter of ..." window is opened and displays all filter criteria of the current filter. Activated checkboxes in front of the filter criteria indicate the active criteria.

2. Activate or deactivate the checkboxes to set the required filter criteria.

3. Select the "Change" softkey and enter the desired operand / value.

4. Select the "Accept Changes" softkey to accept the new filter criterion.
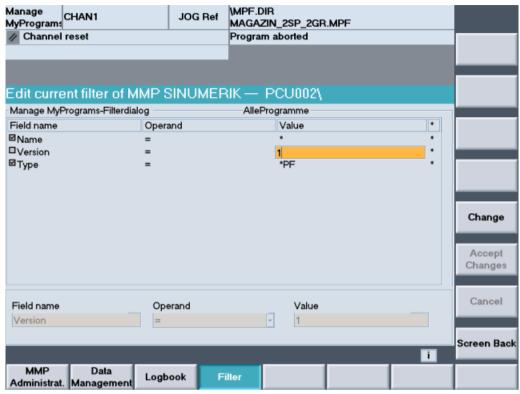
Figure 4-16   Editing filters

Editing filters directly

You can change the filter criteria directly in the appropriate line of the window without having to make the change using the "Change" and "Accept Changes" softkeys.

An additional column "*" identifies the criteria that can be changed directly. The asterisk "*" in the line of the respective filter criterion means: Can be changed directly.

Requirements

The following two conditions must be met:

1. The following parameter must be set in DNC_IFC.INI:
   [GLOBAL]

   …
   FilterInlineEdit =1

2. The "Editable" button must be activated in DNC to be able to create filter criteria.
   If the 1st criterion is not satisfied, the "*" column is not displayed.

Note

Editing filter criteria in MMP

Expansions or deletions of filter criteria are not performed in MMP SINUMERIK, but in MMP.

Procedure

1. Press the "Select Filter" softkey.
   All filters available for the machine and the user are listed.
   The message line contains a comment on the selected filter.

   ### Note

   ### Marked with an asterisk

   If a filter is marked with "*", it is a machine and user-specific filter. The filter name contains the machine and user names for the valid filter.

2. Select the "Accept" softkey to save the changes
   - OR -
   Select the "Cancel" softkey to discard the changes.
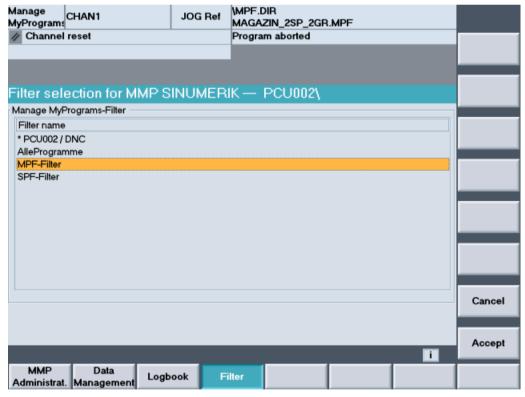
Figure 4-17   Filter selection

Quick filter

The quick filter function allows you to change a filter value without having to call up the filter selection.

Requirements

The following two requirements must be satisfied for the quick filter to be displayed:

The following parameter must be set in DNC_IFC.INI:

```
[GLOBAL]
…
Quickfilter =1
```

Procedure

1. Select a filter.
   Once the filter has been selected, the first filter condition of the current filter is displayed in three fields in the toolbar area. The first two fields contain the field name and the operand.

2. The third field can be changed. It contains the current value of the filter condition.

If you want other filter conditions to be displayed in the quick filter, change the order of the conditions by way of the MMP filter editor.

Figure 4-18   Quick filter

Example

The value of the filter condition is treated in the same way as a value with a wildcard, although the wildcards are not displayed in this field.

- Program name = "A" means that the system filters according to program names that contain an "A",
  e.g. Programm1, Appl_1, 135_A_xzy

- Program name = "A*" means that the system filters according to program names that begin with "A",
  e.g. Appl_1.

Manage MyTools (MMT)

5

5.1   Prerequisite

The Manage MyTools user interfaces have been designed to run and operate not only on a SINUMERIK control system, but also on a PC platform.

SINUMERIK controls

Standard tool management must be installed for use with SINUMERIK controls.

SINUMERIK control systems without standard tool management can be connected specifically for the project.

Third-party control system

In the case of third-party control systems, the manageable tool data is reduced to a simplified tool data structure.

Third-party control systems with machine-manufacturer-specific tool management can be connected specifically for the project.

Requirement

- Manage MyTools workplace PCs must be Windows-based.
- The control system must be addressable via Ethernet.
- The interface must be OPC-capable.
  With machine tools with a PLC tool manager, such as with Transline 2000 machines, the tool data is accessed via an OPC interface.
- If tools stored in tool cabinets are to be recorded and managed by MMT a workplace PC for loading and unloading the tools (e.g. a Windows PC integrated in the network) must be assigned to the respective storage location.
- Manage MyTools requires unrestricted administrator rights for the installation and operation.

Note

Hardware/software

For the hardware/software requirements, refer to the current Installation Manual "SINUMERIK Integrate MMP, MMT, AMC, AMP, AMD".

5.2 Icons in the system overview

Icons

The following component states are displayed as icons in the plant overview.

Component	State		
	Normal	**Fault**	**Synchronization run-ning**
Plant			
Group			
Unit/machine			
Container/magazine			
External container/magazine			
Removal container/magazine			
Setting container			

Status

Normal	The communication with this plant component is "online" and the actual tool data can be displayed and edited.
Fault	The communication with this plant component is faulted. No data can be displayed and edited.
Synchronization run-ning	All of the tool data of the respective storage location is imported once when the system is booted up.

Tool state: Meaning of abbreviation

The bit-coded tool state is represented by a letter and a color code in the "State" column.

Color	Meaning	Letter for the display
Green	Enabled	E
Red	Disabled	D
Yellow	Prewarning limit reached	V

5.3 Machine with SINUMERIK Operate

5.3.1 Prerequisite

Activating SINUMERIK Integrate

SINUMERIK Integrate must be activated in order to be able to use Manage MyTools.

References

For information on how to activate the software, refer to the Installation Manual "SINUMERIK Integrate MMP, MMT, AMC, AMP, AMD".

Connect machine/server

For the machine/server connection, the machines and users must have been created.

References

For the procedure, refer to the following manuals:

Function Manual "SINUMERIK Integrate AMC", Chapter: Management.

Installation Manual "SINUMERIK Integrate MMP, MMT, AMC, AMP, AMD", Chapter: Connecting the machine with the MMT server

5.3.2 Calling Manage MyTools

Procedure

1. The control system has booted and the operating areas are displayed.
2. Select the "MMT Manage tools" softkey.
   The "Tool actual data" window is opened.
   If no Manage MyTools window has been selected, an overview of the available magazines and containers is displayed.

5.3.3 Overview of tool data

Overview of tool data

The "Tool actual data" window displays the magazine, location and tool data of the systems networked through MMT.

The local and networked directories, such as magazines and containers, are displayed in the left-hand window area.

The data of the directories selected at the left are displayed in the right-hand window area.

The content is sorted alphanumerically in ascending or descending order.

The columns for the tables in the "Tool actual data" window are configured in the "Global settings" window, see Section: Configure global settings (Page 74)

Tool data management

The following functions are available for managing tool data:

- Importing/exporting tool data
- Sort tool data (Page 79) (only possible for the "Transfer" function)
- Configuring filters (Page 69)
- Displaying details (Page 72)
- Lock/unlock tool (Page 73)
- Changing the tool life (Page 74)
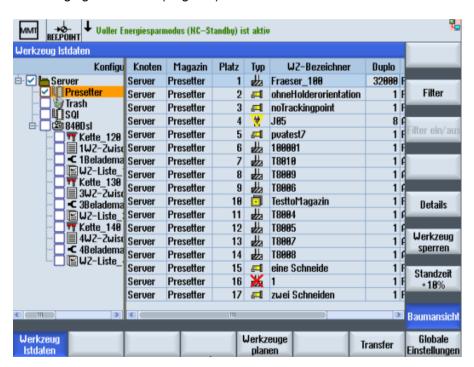
Figure 5-1   "Actual Tool Data" window

Display

Press the "Tree view" softkey to toggle between the view of the actual tool data with and without directory structure of the configuration.

5.3.3.1 Switching filter on/off

You have the option of influencing the tool display by applying filter conditions thereby restricting the selection of visible tools.

Requirement

Filter settings have already been defined.

See Chapter:

Filter settings (Page 69)

Save filter (Page 70)

Edit filters (Page 71)

Procedure

	1.	The "Actual tool data" window is opened. The filter name and a filter icon are displayed in the status display.
Filter on/off	2.	Press the "Filter on/off" softkey to activate or deactivate the selected filter. The use or non-use of a filter is visualized in the title bar.

5.3.3.2 Configuring filters

Filter settings

You can filter the data displayed by defined criteria.

The following is displayed, depending on the criterion:

- Activation or deactivation via a checkbox

- Detailed information

Filter criteria

Filtering is only possible by the criteria specified in the table below:

Filter criterion	Description
Blocked tools	Selection between locked or unlocked tools: • Locked • Not locked
Prewarning limit	Selection between tools which have reached the prewarning limit or which have not yet reached the prewarning limit: • Reached • Not reached

Filter criterion	Description
Unload identifier	Selection of tools with or without unload identifier: • Set • Not set
Load identifier	Selection of tools with or without load identifier: • Set • Not set
Tool identifier	Input of partial text with placeholder
Duplo no.	Input of partial text/number with placeholders
Locations	Selection of the tool locations: • All • Occupied • Only empty
Residual unit quantity	Limit the residual unit quantity with "from" / "to".
Residual tool life	Limit the tool life in minutes with "from" / "to".

Note

Selecting multiple filter criteria

If you activate the following filters in parallel, then only the tools that meet one or the other criterion are displayed:

- "Locked tools"
- "Prewarning limit"
- "Residual unit quantity (parts) from ... to ... "
- "Residual tool life (minutes) from ... to ... "

Save filter

You can save any individually set filter.

Overview

Display	Description
Filter name	Any filter name with a maximum of 40 characters.
Comment	Freely selectable text as a comment to a filter setting.

Procedure

1. You have selected the filter criteria and wish to save these settings.

Save filter

2. Press the "Save filter" softkey.
   The "Save filter under" window opens.

3. Enter the filter name in the "Filter name" entry field.
   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.

Note

If the changes are not saved directly for a filter with the "Save filter" softkey, these changes are used only temporarily until the original filter is reloaded.

Edit filters

You have the option of reloading filter settings that have already been saved to activate them as filter or to edit the settings.

Procedure

Loading a filter

1. The "Saved Filters" window area is open.

Saved filters

2. Select the required filter using the cursor.
   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 you can save the filter under a different name.
   Press the "Save filter" softkey.
   The "Save filter under" window opens.

Save filer as

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 current filter.
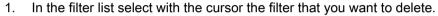
Resetting a filter

1. Press the "Reset filter" softkey to reset the filter criteria that were individually set.
    If such reset filters are saved with a name, the conditions are retained unless the filter is saved again with the "Save filter" softkey.

Deleting a filter

1. In the filter list select with the cursor the filter that you want to delete.

2. Press the "Delete filter" softkey.
    A confirmation prompt appears.

3. Press the "OK" softkey to remove the filter settings from the filter list.

5.3.3.3 Displaying details

Additional information is displayed for a tool selected in the list. In addition to the standard properties of the tool management, all supplementary management data, such as creator, creation date and the date of the last change are also displayed.

In addition to the tool data of the NC, further external tool data can also be displayed.

With the appropriate authorization, you also have the option of changing some data.

General tool data

Properties	Description
Node	File/tool name
Magazine	File/tool type
Location	Location number
Identifier	Tool name
Duplo no.	Duplo number
Tool type	Tool type number
Number of cutting edges	Specifies the number of cutting edges
Location type	Details of the location type
Size in half locations	Half location size: Left, right, top and bottom
Status	Status of the tool
Monitoring	Specification of the monitoring

Cutting-edge data

The following data can be displayed and in some cases changed for each cutting edge:

Properties	Description
Compensation	Tool length offset
Geometry	Geometry data - can be changed.
Wear	Wear data - can be changed.
Monitoring	Monitoring data (unit quantity / tool life)
	Residual value
	Setpoint
	Prewarning limit

Procedure

1. Position the cursor on the file or directory whose properties you wish to display or change.

Details

2. Press the "Details" softkey.
A scroll bar may appear depending on the number of data items.
The "Actual Tool Data - Tool Data Details" window opens and you obtain additional information on the tool data - or you can change some of the data.

Cutting edge +

3. Press the "Cutting edge +" softkey to switch to the next cutting edge.

- OR -

Cutting edge –

Press the "Cutting edge -" softkey to switch to the previous cutting edge.

Change tool type

4. Position the cursor on the tool type and press the "Change tool type" softkey.
A selection of all tool types will be displayed.

Change status

5. Position the cursor on the status and press the "Change status" softkey.
All states will be displayed for selection in a window.

OK

6. Press the "OK" softkey to save changes.

- OR -

Cancel

Press the "Cancel" softkey to reject any changes that you have made and to return to the overview of the tool data.

5.3.3.4 Lock/unlock tool

You have the option to lock a tool so that it cannot be used anymore - and also to unlock it again.

Requirement

- Check the tool before you lock it or unlock it.
- You require the following access rights: Access level 1 (password: machine manufacturer).

Procedure

	1.	Position the cursor on the tool to be locked or unlocked.
Lock tool	2.	Press the "Lock tool" softkey if you want to lock the tool.
		- OR -
Unlock tool		Press the "Unlock tool" softkey if you want to use the tool again.

5.3.3.5 Changing the tool life

You have the option to increase the life of a tool selected in the list by a certain percentage.

Precondition

Check the tool before you increase its tool life.

Procedure

	1.	Position the cursor on the tool in the tool list.
Tool life +10%	2.	Press the "Tool life +10%" softkey. The tool life is increased by 10% each time the softkey is pressed up to a maximum of 100%. You can also customize the percentage of increase for the tool lifetime. To do this, contact your local Siemens sales representative.

5.3.3.6 Configure global settings

In the "Global settings" window, configure the columns for the table in the "Actual tool data" area.

Select the columns to be displayed in the "Actual tool data" window and specify their sequence.

The maximum number of columns is limited to 20.

Settings

The "Global Settings" window is divided into three areas:

- A. Select category
- B. Select column type and accept
- C. Adapt sequence (max. 20)

A. Select category

Select the category of the columns to be displayed.

The following options are available:

A. Category	Description
Tool general	
Component	Shows the unique node name within the plant.
Location	Shows the location number.
Tool identifier	Shows the tool identifier.
Duplo number	Shows the duplo number.
State	Shows the status.
Magazine name	Shows the name of the machine magazine.
Magazine number	Shows the number of the machine magazine.
Cutting edges	Shows the number of cutting edges.
Size L/R/T/B	Shows the size of the tool in half-locations in all directions.
Size left	Shows the size of the tool in half-locations on the left-hand side.
Size right	Shows the size of the tool in half-locations on the right-hand side.
Size top	Shows the size of the tool in half-locations above.
Size bottom	Shows the size of the tool in half-locations below.
Monitoring	Shows the monitoring type.
External user data	
Tool description	Shows the description of the tool.
Comments about the tool	Shows the comment about the tool.
Assigned NC program	Shows the assigned NC program from the "Balancing".
External ID	Shows the external identification of the tool.
Access	Shows the time of the last access to the assigned NC program.
Last active cutting edge	Shows the number of the most recently used cutting edge.
Setting instant	Shows the setting instant of the tool.
Target	Shows the target from the "Balancing".
Provision	Shows the provisioning time from the "Balancing".
Reserving machining sequence	Shows the reserving machining sequence from the "Balancing".
No. of reserved workpiece	Shows the number of the reserved workpiece from the "Balancing".
Spindle no.	Shows the assigned spindle number from the "Balancing".
Monitoring	
Residual tool life	Shows the residual tool life.
Planned service life	Shows the target tool life.
Alarm limit tool life	Shows the prealarm limit for the "Tool life" monitoring type.
Residual unit quantity	Shows the residual unit quantity of the tool.
Target unit quantity	Shows the target unit quantity of the tool.
Alarm limit unit quantity	Shows the prealarm limit for the "Unit quantity" monitoring type.
Cutting edges	
Tool type	Shows the tool type.
Internal tool data	

A. Category	Description
OEM TC_TPC1 to OEM TC_TPC10	Shows the machine-specific internal tool data.
Internal user cutting edge data	
OEM TC_DPC1 to OEM TC_DPC10	Shows the machine-specific internal user cutting edge data.
Internal user data	
OEM TC_MOPC1 to OEM TC_MOPC10	Shows the machine-specific internal user data.

B. Select column type and accept

Specify the type of the column to be displayed.

C. Adapt sequence (max. 20)

Specify the sequence of the selected columns.

Procedure

Global settings	1.	The "Actual Tool Data" window is open. Press the "Global settings" softkey. The "Global settings" window opens and the column selection set currently in the "Actual Tool Data" window displayed
Change category	2.	Press the "Change category" softkey. - OR - Select the desired area in the "A. Select category" drop-down list. The content in the "B. Select column type and accept" area changes in accordance with your selection.
	3.	Select the desired column type in area "B. Select column type and accept". The accepted column is displayed in the "C. Adapt sequence (max. 20)" area.
Sequence ascending	4.	Select a column in the "C. Adapt sequence (max. 20)" area. Select the "Sequence up" softkey to move the column up a position. - OR -
Sequence descending		Press the "Sequence down" softkey to move the column down one position. - OR -
Delete column type		Press the "Delete column type" softkey to remove the selected column from the list.
OK	5.	Select the "OK" softkey to accept the column configuration. The "Tool actual data" window is displayed with the new column selection. - OR -

[Cancel]	Press the "Cancel" softkey to reject the settings after a prompt. The "Global Settings" window is closed.
[Reset]	Press the "Reset" softkey to set the column representation of the actual tool data back to the delivered state.
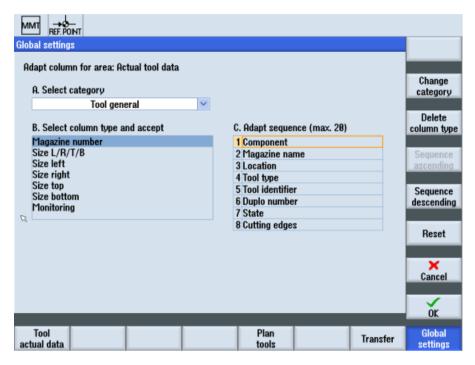
Figure 5-2   Configure global settings

5.3.4   Transferring tool data

The transfer area permits a user-friendly and clear transfer of data coupled to real tools. The tool data is transferred automatically, whereas the physical tool may need to be loaded or unloaded manually. Depending on the magazine configuration and the performed transfer, the magazines and grippers are positioned automatically.

The plant configuration can be represented differently. The appropriate machine is connected to an MMT server.

The system configuration of the upper window is extended to the containers created on the MMT server by "Manage MyTools Configuration". This allows, for example, tools that are no longer required to be transferred directly to the removal magazine. Other defined tool stores can also be used there.

Note

Loading and unloading tools in interconnected operation

The loading and unloading of tools on control systems with SINUMERIK Operate in interconnected operation is currently possible only with configured loading/unloading points.

Note

No reservation of empty locations possible

When loading/unloading tools, no empty locations are reserved in the target magazines.

Note

Further important notes

When using the "Transfer" operating area on the SINUMERIK Operate client and the PC client, please note that simultaneous loading/unloading processes on one and the same tool is not supported and can lead to errors.

Before carrying out a transfer, make sure that the given tool is not being used simultaneously for another transfer by another user or program, e.g. NC programs.

Do not carry out loading and unloading procedures of tools in or out of the spindle.

When selecting empty locations for loading and unloading, make sure that the target location is only being used by one operating client.

Transferring tools within a machine and a TOA area with magazines that do not have a loading/ unloading location assigned to them is not possible with MMT and it aborts the transfer job with errors.

Transferring tools from one magazine or tool list of a TOA area to a different TOA area is not supported by MMT.

Remedy:

Unload the tool from the source TOA area and then carry out a loading process for the target TOA area.

5.3.4.1   Preparing tool data for transfer

In the "Transfer" window you obtain an accurate overview of the tools to be moved.

The window is split into two parts:

One window is used to select the tools to be transferred, and the other window is used to select the target, magazine or target location for the transfer.

- All available storage locations, local magazines and higher-level tool magazines within the system hierarchy are displayed in the upper area of the window.

- In the lower area of the window, select the target to which the tools selected in the upper window area are to be transferred. The lower window only displays the local magazines of the machines.

Procedure

1. The "Actual Tool Data" window is open and the overview of the tool data is displayed.

Transfer

2. Press the "Transfer" softkey.
   The "Transfer" window opens.

3. As the source, select any magazines and containers. Multiple selection is also possible.
   To get a better overview, display the data filtered and sorted.
   See Section: Switching filter on/off (Page 69)
   See Section: Sort tool data (Page 79)

4. Only enter one directory folder as target (magazine/container). You can also display its file contents individually filtered and sorted.

5. For each selection of the tool data sets, press the "Accept" softkey.
   The selected tool data is added to the transfer list.
   See Chapter: Editing the transfer list (Page 81)
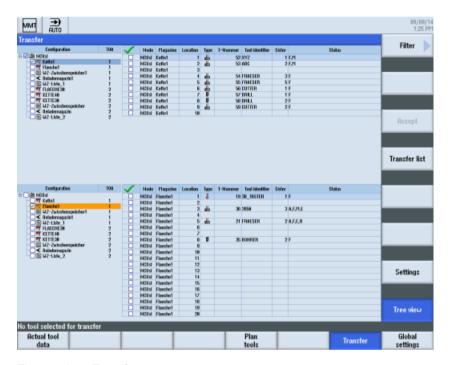
Figure 5-3   Transfer

Note

For selection in the transfer area, a plausibility check is performed in order to prevent transfer errors in advance. It is not possible, for example, to define more than one target location. The "Accept" softkey is correspondingly active or inactive.

5.3.4.2 Sort tool data

You have the option to display the tool data sorted individually. The criteria for sorting can be defined via the user interface.

Criteria

- Up to three sorting criteria can be defined.
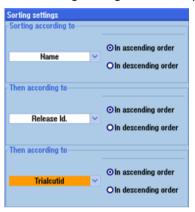
- Select the criteria in the drop-down lists. The drop-down lists contain the column designations of the tool data.

- The priority of the sorting order is from the upper, to the middle and to 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 desired directory of the tool data.

2. If you press the ">>" softkey,
   further softkeys are displayed on the vertical bar.

3. Press the "Sort" softkey.
   The "Sorting settings" window opens.

Sorting settings

4. Select the desired sorting criteria according to which you want the tool data to be displayed.

5. Press the "OK" softkey.
   The tool data will be displayed, sorted according to the specified criteria.

   - OR -

   Press the "Cancel" softkey if you want to make no sorting. The window is closed.

5.3.4.3 Setting transfer functions

In the "Settings" window, enter the default settings that become automatically active for the transfer.

Procedure

Settings	1.	Press the "Settings" softkey to define the basic functions for the transfer. The settings for the preferred loading or unloading point depend on the machine configuration.

2. The "Settings" window is open.
   Select 1 to n to manually select the preferred loading/unloading point. Access is via the indices 1 - n.

   - OR -

   Select "Auto".
   With this setting, the machine selects the preferred loading/unloading point.

   If you activate the "Force duplo number" checkbox, the available duplo number is forced.

   If you do not activate the checkbox, the assignment of the duplo numbers is automated. Starting from 1, the next available duplo number is automatically used.

Transfer settings

OK	3.	Press the "OK" softkey to confirm your selection.
		- OR -
Cancel		Press the "Cancel" softkey to reject the selection and close the window.

5.3.4.4 Editing the transfer list

In the "Transfer List" window, organize the tool data and then start the transfer.

Requirement

The "Transfer" window is open and you have already added tool data to the transfer list.

Functions

Column	Description
	Shows the status of the tools.
⬇	Loading
⬆	Unloading

Column	Description
	Relocating
Tool	Tool identifier and duplo number of the source
Source	Machine and magazine/container
Location	Location number
Target	Magazine/container
Location	Location number
Loading/unloading point	If the associated machine has more than one loading/unloading point, it is possible to make an individual setting for each entry in the "Loading/unloading point" column. The standard entry for this column is set depending on the transfer setting, see Chapter: Setting transfer functions (Page 80)
Progress	The following message is issued: • Completed • Cancel • Cancel by the user

Procedure

1. Press the "Transfer list" softkey.
   The "Transfer list" window opens and displays the imported tool data.

2. To achieve the optimum order of execution, you can you still move the tool data sets in the transfer list.
   Press the "Organize" softkey.
   Another vertical softkey bar is opened.

3. Select the tool data set using the cursor.

4. Press the "Up" softkey to move the selected data set one position upwards.

   - OR -

   Press the "Down" softkey to move the selected data set one position downwards.

5. If you want to delete a tool data set from the transfer list, position the cursor on the data and press the "Delete" softkey.

6. If you have finished editing the transfer list, press the "<<" softkey.

5.3.4.5 Starting the transfer

Requirement

The "Transfer" window is open and you have already added tool data to the transfer list.

The MMT server has not been stopped.

Procedure

Start transfer	Press the "Start transfer" softkey. The execution of the list is started. The tool data sets are moved from the specified source to the specified target as shown in the list.
Stop transfer	If you want to cancel the tool transfer, press the "Cancel transfer" softkey.
《 Back	Press the "<<Back" softkey to return to the "Transfer" window.

Possible problem

Various errors can occur during a transfer:

- No tools are displayed. The reason for this is that the MMT server was stopped during an active transfer.

- Target magazine location is full

- The selected tool has been replaced in the spindle in the meantime and is no longer available

- The loading point does not become free

A corresponding error dialog is displayed.

Press the "OK" softkey to delete the message.

- OR -

Wait approximately eight seconds until the message closes automatically.

The affected tools are given a status.
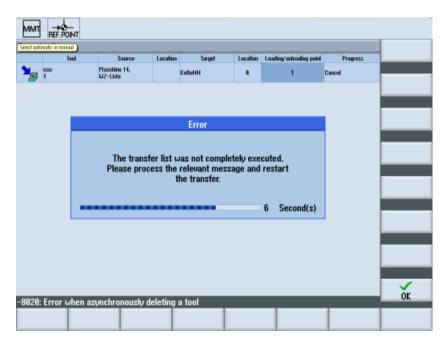
Figure 5-4   Error dialog

5.4 Machine with HMI-Advanced

5.4.1 Starting "Manage MyTools"

Procedure

1. HMI-Advanced has been started on the control system, and the operating areas are displayed.

2. Select the "MMT Manage tools" softkey.
   The "Tool actual data" window is opened, and an overview of the available magazines and containers is displayed.
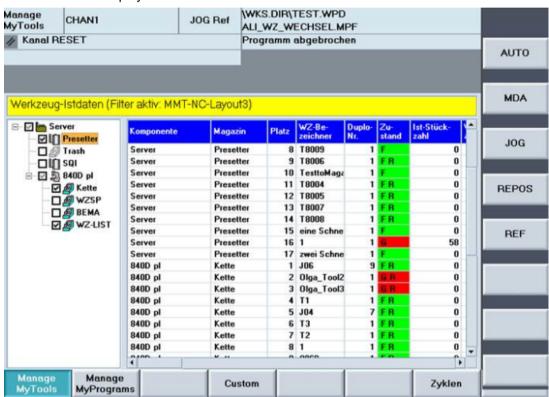
Figure 5-5   "Actual Tool Data" window

5.4.2 HMI user administration on the PCU

Access rights can be assigned to predefined users for various areas. The settings are made in "Manage MyTools Configuration".

Access rights

The access rights define the access to functions on the controller.

There are eight access levels (0 to 7). The lowest four (4 to 7) are set using the key switches on the machine.

The lower the number of the access level, the more access rights the user has.

The following access levels are defined:

Access level	Protected by	User
0	Password	System
1	Password	Machine manufacturer
2	Password	Service
3	Password	User
4	Key switch 3	Programmers
5	Key switch 2	Qualified operator
6	Key switch 1	Trained operator
7	Key switch 0	Semi-skilled operator

References

How you define the presettings is explained in the Installation Manual "SNUMERIK Integrate MMP, MMT, AMC, AMP, AMD", Chapter: Configuration with Manage MyTools Configuration, user administration

5.4.3 Enabling functions on the PCU

A distinction is made between two types of controllers when the functions on the controller are enabled:

- Solution line

- Not solution line

A different licensing procedure applies depending on the type of control.

References

How you enable of the functions is explained in the Installation Manual "SNUMERIK Integrate MMP, MMT, AMC, AMP, AMD", Chapter: Configuration with Manage MyTools Configuration, activating the product license

5.4.4   Tool actual data

Overview

The actual tool data area is used to acquire and clearly display the actual tool data of the connected machines and tool magazines/stores. Navigation is performed in an Explorer structure showing all connected plant components. The current tool data is displayed according to the selected components and the user-friendly filters.

In addition to this, various basic functions that can be used to edit the tool data are available.

The actual tool data area is available in interconnected operation with a Manage MyTools server and also on individual machines.

5.4.4.1   Displaying actual tool data

Keys and functions

The following keys are available for operation of the control system and the machine tool.

Key	Function
TAB	Press the <TAB> key to switch between the Explorer view and the table.
◄ ►	Press the left/right arrow keys to open and close the individual levels of the system components shown in the display.
▲ ▼	Press the up/down arrow keys to move the cursor up or down within the Explorer.
SELECT	Press the <SELECT> key to select or deselect the system components to be displayed. For selection, a tick is visible in the checkbox. The checkbox is empty for deselection.
▲ ▼	Press the arrow keys within actual tool data list to move the cursor up or down.
◄ ►	Displays the defined columns. The list of the available columns can, however, be larger than that of the selected columns. Press the horizontal or vertical arrow keys to view the columns that lie outside the visible area.
P	Press the <P> key to widen the Explorer window and the table column.
M	Press the <M> key to make the Explorer window and the table column narrower.

Description of the softkeys

The following functions can be executed by pressing the vertical softkeys:

Softkey	Description
Filter >>	Press the "Filter >>" softkey to define the selection filters and to select the columns shown in the list, see Section: Define filter (Page 88).
Details >>	Press the "Details ..." softkey to display the details of the selected tool, see Section Tool data details (Page 99):
	A distinction is made between NC data and PLC data. Some of the data displayed can be edited.
Cut count 100%	Press the "Cut count 100%" softkey to reset the cut count to 100% after the replacement of tools of the same type.
	The actual cut count/actual unit quantity of the selected tool is set as follows:
	• For NCU counting method: To the corresponding target cut count/target unit quantity
	• For TL2000 counting method: To zero
Block tool	Press the "Block tool" softkey to block the selected tool for further deployment.
Print	Press the "Print" softkey to print the view of the tool actual data.
Explorer on/off	Press the "Explorer On" or "Explorer Off" softkey to show or hide the tree representation of the system components.

Procedure

1. Press the "Actual tool data" softkey to open the "Actual tool data" window.
   All the tool data of the connected tool storage locations is displayed here, and the tool magazines and the external tool cabinets are displayed:

   – The plant components appear in a tree structure (Explorer view) on the left-hand side of the window.

   – The tool data for the selected plant components appears in a table on the right-hand side. The creation of the table is described in chapter: Layout filter area (Page 93).
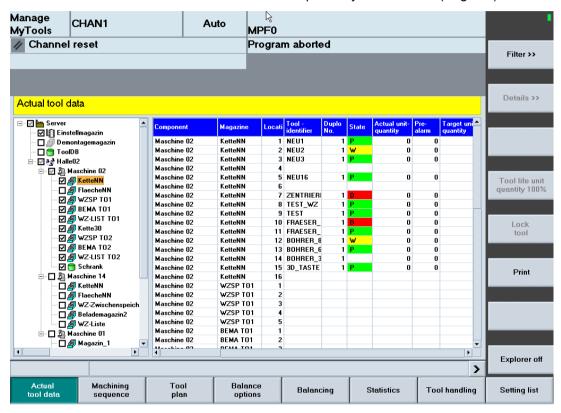
Figure 5-6   Overview of the actual tool data

5.4.4.2   Define filter

The "Actual tool data / filters" is divided into the following three areas:

● Standard filter area (Page 89)

● View filter area (Page 91)

● Layout filter area (Page 93)

Use horizontal softkeys or tabs to select the areas. All of the settings are assigned to the filter displayed in the selection box.

5.4.4.3 Standard filter area

The filter settings for the actual tool data to be displayed are defined in the "Standard" area. Apart from one exception (see below), all filter criteria are ANDed. The more criteria you define, the more refined searches for specific tools will be performed. Activate the desired checkboxes and option fields.

Actual tool data / filter

Function	Description
Blocked tools	Shows broken, worn out or blocked tools.
Prewarning limit reached	Shows all tools that reach the prewarning limit.
With unloading identifier	Shows all tools with an unloading identifier.
Tool identifier	Enter the identifier.
	You can use the asterisk character * as a wildcard for this. For example, enter "Drill* " for all tools whose identifier starts with "Drill", e.g. Drill 10 mm, Drill 14 mm, etc.
Duplo no. (1-32000)	Shows all tools with the specified duplo number.
Remaining parts (pcs) from.. to..	Shows tools with a residual unit quantity within the specified range.
Residual tool life (min.) from.. to..	Shows tools with a residual tool life within the specified range.
Locations	Shows the tools of occupied, all or empty locations.
	• Occupied
	• All (default)
	• Only empty
Show reserved tools	Shows tools that have been reserved for the machine specified in the drop-down list.
"Setting time since ... hours	Shows only tools that have been set within the specified period.

Note

Activating additional filters

If you activate the following filters in parallel, only those tools are shown that satisfy the one or the other criterion:
- Blocked tools
- Tools whose prewarning limit is reached
- Tools with unloading identifier
- Remaining parts (pcs) from.. to..
- Residual tool life (min.) from.. to..

Description of the softkeys

The following functions can be executed by pressing the vertical softkeys:

Softkey	Description
New filter	Press the "New filter" softkey to create a new filter, see Section: Creating a filter (Page 97).
Deleting a filter	Press the "Delete filter" softkey to delete the selected filter after a confirmation warning, see Section: Deleting a filter (Page 98)
Cancel	Press the "Cancel" softkey to close the window without saving the previously entered data.
OK	Press the "OK" softkey to save the settings.

Procedure

1. Choose the "Standard" tab.

2. Select a filter from the "Filter name" drop-down list.

3. Activate the desired checkboxes.

Figure 5-7   Standard filter area

Example: Search with an asterisk (wildcard)

The wildcard is used as a placeholder for any number of characters in the character string, e.g. for tool identifiers:

All tools that contain the fragment "01" in the tool identifier are displayed in the overview of the actual tool data. The following tool identifiers are available:

Available tools	Input of the search term (tool identifier)	Filtered display
0103007 0106009 0302002 0201002 TK01234	*01*	0103007 0106009 0201002 TK01234

Example: Search with question mark (?)

The question mark is used as a placeholder for exactly one character in the character string, e.g. for tool identifiers:

All tool actual data of all tools are to be displayed which contain the fragment "01" at the 3rd and 4th positions in the tool identifier.

Available tools	Input of the search term (tool identifier)	Filtered display
0103007 0106009 0302002 0201002 TK01234	??01???	0201002 TK01234

5.4.4.4   View filter area

You adapt the plant view in the "View" area.

Plant views

Function	Description
Plant view	The following plant views are available for selection: • AREA: Shows all machines without restriction. • H-UNIT: Shows the machine and all higher-level containers assigned to the machine. • UNIT: Shows only the machine you are working on.
Permissible plant view	Restrict plant view for the respective user group depending on the rights assigned (configuration). • AREA: No restrictions, all views permitted. • H-UNIT: H-UNIT and UNIT views permitted. • UNIT: Only UNIT view permitted.
Restore drop-down list in the Explorer	Activate the checkbox to save the containers selected for the call of the filter screen. The saved selection is restored when the filter is reselected.

Description of the softkeys

The following functions can be executed by pressing the vertical softkeys:

Softkey	Description
New filter	Press the "New filter" softkey to create a new filter, see Section: Creating a filter (Page 97).
Deleting a filter	Press the "Delete filter" softkey to delete the selected filter after a confirmation warning, see Section: Deleting a filter (Page 98).
Cancel	Press the "Cancel" softkey to close the window without saving the previously entered data.
OK	Press the "OK" softkey to save the settings.

Procedure

1. Choose the "User view" tab.

2. Select a filter from the "Filter name" drop-down list.

3. Select the desired area in the "System overview" drop-down list and activate the checkbox if necessary.

    Note

    Illegal view

    If an illegal view is selected, it is ignored and reset when the window is exited.
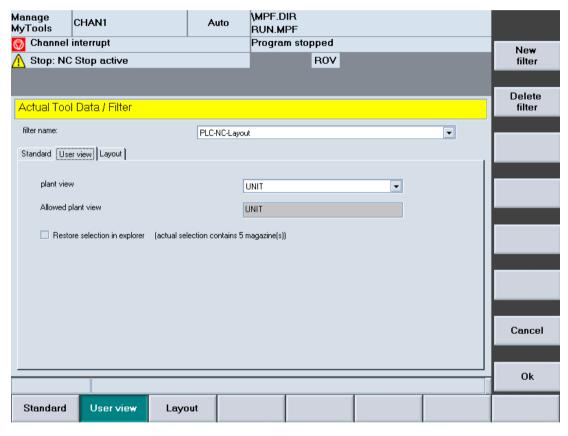
Figure 5-8   User view filter area

5.4.4.5   Layout filter area

In the "Layout" area, use filters to define the table layout for the actual tool data overview.

Defined columns

Function	Description
Available columns	The list box shows all tool data that has not been selected.
Visible columns	The list box shows the values displayed for each tool in the actual tool data overview.

The following tabular displays are predefined for the purpose of simplification.

- Component
- Magazine
- Location
- Tool identifier
- Duplo no.
- Magazine number
- State
- Actual unit quantity
- Pre-alarm
- Target unit quantity
- Extended alarm
- Residual unit quantity
- Alarm limit unit quantity
- Magazine number
- Place state
- Type
- Cutting edges
- Size
- Size left
- Size top
- Size bottom
- Monitoring
- Remaining machining operations
- Warning limit for tool life
- Planned service life

Description of the softkeys

The following functions can be executed by pressing the vertical softkeys:

Softkey	Description
New filter	Press the "New filter" softkey to create a new filter, see Section: Creating a filter (Page 97)
Deleting a filter	Press the "Delete filter" softkey to delete the selected filter after a confirmation warning, see Section: Deleting a filter (Page 98).

Softkey	Description
Up one column	Press the "Up one column" softkey to move the selected row up one position in the "Visible columns" list. This means that the appropriate column is moved by one position to the left in the table view.
Down one column	Press the "Down one column" softkey to move the selected row down one position in the "Visible columns" list. This means that the appropriate column is moved by one position to the right in the table view.
Cancel	Press the "Cancel" softkey to close the window without saving the previously entered data.
OK	Press the "OK" softkey to save the settings.

Procedure

1. Select the "Layout" tab.

2. Select a filter from the "Filter name" drop-down list.

3. Select the defined columns in the list "Available columns" or "Visible columns".
   The arrow symbol between the two lists indicates the direction in which the tool data item currently selected in the list can be moved.

Figure 5-9   Layout filter area

5.4.4.6 List display

Defined tabular displays

Various table views are predefined to simplify this task.

1. For operating with a CNC and the default tool manager, select the following views:
   – MMT-NC-Layout 1 = display of the residual unit quantity
   – MMT-NC-Layout 2 = display of the residual tool life

2. For operating with a PLC-aided tool manager (when HMI PRO is used), select the following views:
   – PLC-TL-Layout = determination of the actual unit quantity corresponds to the Transline counting method.
   – PLC-NC-Layout = determination of the actual unit quantity corresponds to the CNC counting method.

3. For hybrid operation of a CNC with a default tool manager and a PLC-aided tool manager, select this view:
   – MMT-NC-Layout 3

Predefined columns for Transline

The following tool data is created in the predefined tabular displays.

You also have the capability of adding additional columns. You can find a selection in the "Available columns" list.

PLC-TL-Layout (Transline PLC, counting method like TL2000)	PLC-NC-Layout (Transline PLC, counting method like NC)
Location	Location
Tool identifier	Tool identifier
State	State
Actual unit quantity	Residual unit quantity
Pre-alarm	Warning limit for unit quantity
Residual unit quantity	Target unit quantity
The following columns can be added:	
Component	Component
C no.	C no.
Container	Container

Predefined columns for MMT unit quantity, tool life and hybrid operation NC/PLC

MMT-NC-Layout 1 (MMT unit quantity)	MMT-NC-Layout 2 (MMT unit quantity)	MMT-NC-Layout 3 (Hybrid operation NC/PLC)
C no.	C no.	Component
Location	Location	Magazine

MMT-NC-Layout 1 (MMT unit quantity)	MMT-NC-Layout 2 (MMT unit quantity)	MMT-NC-Layout 3 (Hybrid operation NC/PLC)
Tool identifier	Tool identifier	Location
Duplo no.	Duplo no.	Tool identifier
Type	Type	Duplo no.
State	State	State
Residual unit quantity	Residual tool life	Actual unit quantity
Warning limit for unit quantity	Warning limit for tool life	Target unit quantity
Target unit quantity	Planned service life	Extended Alarm
		Residual unit quantity
		Warning limit for tool life
The following columns can be added:		
Component	Component	C no.
Container	Container	Cutting edges
Cutting edges	Cutting edges	Monitoring
Monitoring	Monitoring	Residual unit quantity
NC prog.	NC prog.	NC prog.
Residual tool life	Residual unit quantity	Access
Access	Access	Place state
Place state	Place state	U
U	B	L
L	L	R
R	R	T
O	O	Planned service life
Planned service life	Target unit quantity	
Warning limit for tool life	Warning limit for unit quantity	

5.4.4.7 Creating a filter

You can add or delete filters from any of the areas.

Procedure

1. Select an area.

2. Press the "New filter" softkey.
   The "Table Format" window opens.

3. Enter a filter name and observe the following:

   – Only letters, numbers and underscore (_) may be used.

   – The name must not be longer than 40 characters.

   – All names must be unique.

4. Press the "OK" softkey.
   The data is accepted and a new filter is created.
   If the window cannot be closed, check the filter name.
   – OR -
   Press the "Cancel" softkey.
   A new filter is not created, all entries are rejected and the "Actual Tool Data / Filter" window is opened again.
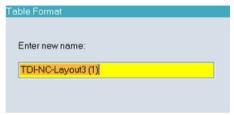
Figure 5-10   New filter

Note

Maximum number of filters reached.

If the maximum number of filters has been reached, a new filter can only be created by overwriting an existing one. If this is the case, a drop-down list with the existing filters is also displayed in addition to the input box for the name.

5.4.4.8   Deleting a filter

You can delete filters from any of the areas.

Procedure

1. Select the table format.

2. Press the "Delete filter" softkey.
   A prompt will be displayed.

3. Press the "OK" softkey to permanently delete the filter.
   - OR -
   Press the "Cancel" softkey to get the filter.

Delete

Should the filter <TDI-NC-Layout3 (1)> really be deleted ?
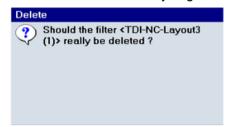
Figure 5-11   Deleting a filter

5.4.4.9   Tool data details

General tool data

Function	Description
Tool identifier	Only display, no selection possible.
Tool location type	The tool location type defines the kind of location in the magazine. The selected tool can only be loaded (changed) to a location of the appropriate type.
	For additional details, refer to the description of the standard tool management of SINUMERIK.
<Graphics>	When a SINUMERIK with standard tool management is used, a tool graphic of the selected tool is displayed depending on the tool type.

Function	Description
State	Changing the state of a tool.
	After selecting the "Change data" softkey and the state field, a window to select the state is opened when the Return key is pressed.
	See the following figure "Changing the tool state".
	You can select the following states:
	• Active tool (A)
	• Enabled (E) *)
	• Disabled (D) *)
	• Measure (M) *)
	• Prewarning limit reached (P)
	• Tool being changed (C)
	• Fixed-location-coded (F)
	• Tool has been used (E)
	• To be unloaded (U) *)
	• To be loaded (L) *)
	• Master tool
	Multiple states can be selected. The states marked with *) are represented by the letter (abbreviation) in the display field.
Monitoring	You can select from the following monitoring settings:
	• No monitoring
	• Tool life
	• Quantity
Tool size (L|R|T|B)	The tool size specifies the total number of tool half locations that the tool occupies.
	Specification of the tool size in half locations:
	L = left
	R = right
	T = top
	B = bottom

Keys and functions

The following keys are available for operation of the control system and the machine tool.

Key	Function
◄ ►	Press the arrow keys to move the cursor from input field to input field.
▲ ▼	If you are currently in edit mode for an input field, the arrow keys act like pressing the <INPUT> key.
INPUT	Press the <INPUT> key to complete your inputs in the input fields. Text fields whose associated check boxes have not been activated cannot be accessed.

Description of the softkeys

The following functions can be executed by pressing the vertical softkeys:

Softkey	Description
Previous section	Press the "Previous sector" softkey to display further data of the tool. Scroll the screen section down by one section.
Next section	Press the "Next section" softkey to display further data of the tool. Scroll the screen section up by one section.
Change data	Press the "Change data" softkey to change the data. Prerequisite: The appropriate access rights are set.
Zoom screen	Press the "Zoom screen" softkey to zoom out or zoom in the size of the tool icon.
Cancel	Press the "Cancel" softkey to close the window without saving the previously entered data.
OK	Press the "OK" softkey to save the settings.

Figure 5-12   Changing the tool state

Cutting-edge data

Function	Description/selection

Cutting-edge data	Display and partly change the following data for each cutting edge:
	• Tool type
	• Tool length compensation
	  – Geometry
	  – Wear
	  – Base (this data cannot be modified)
	  – Unit (this data cannot be modified)
	• Tool radius correction:
	  – Geometry (this data cannot be modified)
	  – Wear (this data cannot be modified)
	• Monitoring data (unit quantity / tool life)
	  – Residual value
	  – Setpoint
	  – Prewarning limit
	• Cutting edge position
	• Tool clearance angle
	• Tool angle correction
	  – Geometry
	  – Wear
	
	Depending on the number of cutting edges or the tool type, additional data may be available. A scrollbar is displayed for additional data.
	
	A sand clock will be displayed while the tool data is being loaded. An error message will be issued if an error occurs during the loading.

External tool supplementary data	Details for the following data: • Tool description • Comments about the tool • Cabinet assignment
Check limit values	The input fields can have limit values. These values are displayed in the status line. If you violate the input limit, the status line will indicate this. You can exit the input field only when the value is correct.

Figure 5-13   NC details

Internal user data

Function	Description/selection
Internal user data	The type and quantity of the data displayed here depends on the OEM data on the target machine.
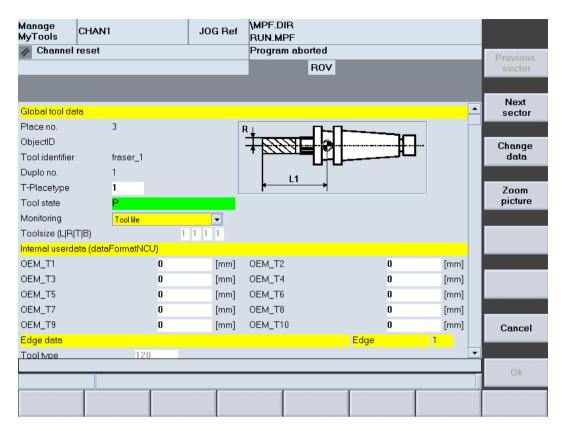
Figure 5-14   NC details

References

For a description of the individual states, refer to the following literature:

"Tool Management" Function Manual

5.4.5   Tool planning overview

Machine capacity can be utilized fully only when tools are made available for the next production period. To ensure the on-time provision of the needed tools, use the function "Tool planning".

The tool planning provides the tool requirement for the next production period based on the current tool inventory on the machine and machine environment.

Any containers can be taken into account in the planning, e.g. machine magazine, machine-related tool stores, tool default setting.

The tool planning area is available in interconnected operation with a Manage MyTools server and also on individual machines.

Subareas

Tool planning comprises the subareas:

- Machining sequence (Page 105)
- Tool plan (Page 111)
- Balance calculation with
  - Balance options (Page 124)
  - Setting list (Page 177)

5.4.6 Machining sequence

Tool planning requires a specification of the machining sequences in order to be able to determine the tools required for the next machining operations.

The machining sequence and the tool plan together form the basis for the balance calculation.

The machining sequence describes the planned sequence of:

- Workpieces to be machined (jobs)
- The number of workpieces to be manufactured

The "Machining Sequence" window is opened via the "Machining sequence" softkey on the horizontal menu bar.

Machining sequence

A user interface is provided in the "Machining Sequence" window for the specification of the jobs for planning.

You can create the jobs / NC programs for the production for each machine and assign the unit quantities to be planned.

Function	Description
No.	Consecutive number of the job.
E	Check mark set = enabled for balance calculation.
Machining	Name of the machining sequence / job.
Component	Name of the associated unit.
Target unit quantity	Maximum number of workpieces per job.
Balance batch size	Workpieces to be planned per job.
Actual unit quantity	Machined workpieces of the job.
Production job	A further possibility of identifying the machining sequence *)
Working cycle	A further possibility of identifying the machining sequence *)
Deadline	Completion deadline for the job *)
	*) Not compulsory

Note

The actual unit quantity is automatically incremented by NC end of program and the display is updated.

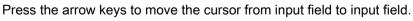
Keys and functions

The following keys are available for operation of the control system and the machine tool.

Key	Function
TAB	Press the <TAB> key to switch between the Explorer view and the table.
◄ ►	Press the left/right arrow keys to open and close the individual levels of the system components shown in the display.
▲ ▼	Press the up/down arrow keys to move the cursor up or down within the Explorer.
SELECT	Press the <SELECT> key to select or deselect the system components to be displayed. For selection, a tick is visible in the checkbox. The checkbox is empty for deselection.
▲ ▼	Press the arrow keys within the machining sequence to move the cursor up or down.
◄ ►	Displays the defined columns. The list of the available columns can, however, be larger than that of the selected columns. Press the horizontal or vertical arrow keys to view the columns that lie outside the visible area.
P	Press the <P> key to widen the Explorer window and the table column.
M	Press the <M> key to make the Explorer window and the table column narrower.

Description of the softkeys

The following functions can be executed by pressing the vertical softkeys:

Softkey	Description
Organize job >>	Press the "Organize job >>" softkey to open the sequence menu for influencing the machining sequences, see Section: Organizing the machining (Page 107).
Display / Change >>	Press the "Display / Change >>" softkey to open the window for displaying/changing the selected machining sequence, see Section: Creating/displaying/changing a machining operation. (Page 108).

Softkey	Description
Print	Press the "Print" softkey to print the list of machining sequences. Equivalent: Window display
Explorer on/off	Press the "Explorer on/off" softkey to show or hide the tree representation of the Explorer view.
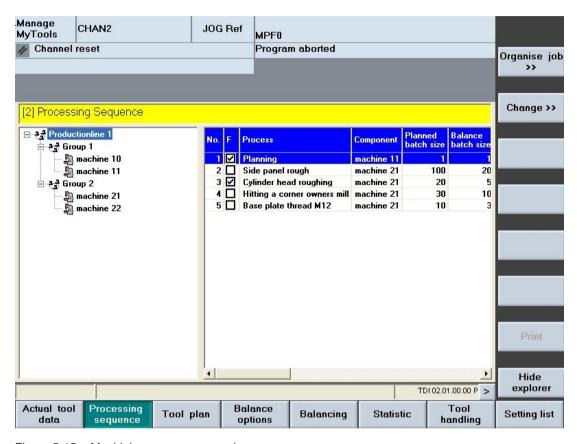
Figure 5-15   Machining sequence overview

5.4.6.1   Organizing the machining

Description of the softkeys

The following functions can be executed by pressing the vertical softkeys:

Softkey	Description
New >>	Press the "New >>" softkey to open the "Add Machining" window. You can also create a new machining sequence. The softkey is only active if a machine is selected in the Explorer tree.
Display/ Change >>	Press the "Display/Change >>" softkey to display or change the data of a selected machining sequence.
Delete	Press the "Delete" softkey to delete the selected machining operation. The machining operation can only be deleted if you respond to the conformation warning with "OK".

Softkey	Description
Advance	Press the "Advance" softkey to move the selected machining operation up one position in the overview.
	The softkey is only active if a machine is selected in the Explorer tree.
Back	Press the "Back" softkey to move the selected machining operation down one position in the overview.
	The softkey is only active if a machine is selected in the Explorer tree.
<<	Press the "<<" softkey to return to the vertical softkey bar.

Procedure

1. Press the "Organize machining>>" softkey.
   The vertical softkey bar is switched to the sequence menu.

2. Select a machining sequence.
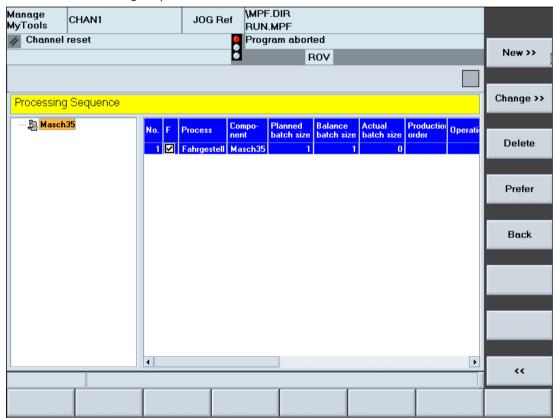
Figure 5-16   Organizing the machining

5.4.6.2   Creating/displaying/changing a machining operation.

You can re-enter all the data required for a balance calculation or display or change a previously selected machining operation.

Machining sequence

Function	Description
Machining	Enter a name for the definition of the production operation. The name of the machining operation can be assigned manually.
Tool plan name	Enter a name for machining the associated tool plan. - OR - Click the "..." button. The tool plan overview window opens where you can directly select a tool plan. Confirm the selection with "OK".
Quantity	If the machining has already started, the current number of machined work-pieces is displayed here. • Actual: When the "Update actual part counter" is set, the part counter is incremented by 1 at the end of each NC program. • Required: Planned number of workpieces that are to be produced. • Balance: Settable subset of the planned quantity for the next planning run.
NC program	Shows the name of the NC program associated with the machining sequence. Only required in conjunction with updating the "Actual unit quantity" field. Only a display field in the machining sequence. When a tool plan is transferred, this field is automatically written with the NC program stored there.
Total run time	Shows the time required to produce a part (one NC program run). Only a display field in the machining sequence. When a tool plan is transferred, this field is automatically written with the total run time stored there.
Production job	Enter another identification possibility of the machining sequence.[*)]
Working cycle	Enter another identification possibility of the machining sequence.[*)]
Deadline	Enter the completion deadline for the job (DD.MM.YY HH:MM).[*)]
Update the actual unit quantity	Select from the drop-down list the following: • Do not update • At end of program (M02 or M30 in main program)
Enable for balance calculation / OK	Activate the checkbox to consider the selected machining sequence for the next balancing run. The enable can be set/reset via the "Enable" softkey or by "setting/resetting" a selection box.
	[*)] Not compulsory

Note

The tool plan defined in the machining sequence must be available before the balance calculation starts.

Description of the softkeys

The following functions can be executed by pressing the vertical softkeys:

Softkey	Description
Tool plan selection ...	Press the "Tool plan selection..." softkey to go directly to the tool plan overview.
	Select the tool plan and press the "OK" softkey to transfer the tool plan to the "Tool plan name" input field.
Tool plan >>	Press the "Tool plan >>" softkey to display the tool plan displayed under "Tool plan name".
	For further functionalities, refer to Chapter: Display/change tool plans (Page 116).
Enable	Press the "Enable" softkey to set or reset the enable flag for the balancing.
Cancel	Press the "Cancel" softkey to close the window without saving the previously entered data.
OK	Press the "OK" softkey to save the settings.

Procedure

1. You are in the "Machining Sequence" window.

2. Press the "New>>" softkey.
   - OR -
   Press the "Display/change" softkey.
   The "Machining Sequence / Display/Change Machining Operation" window opens.
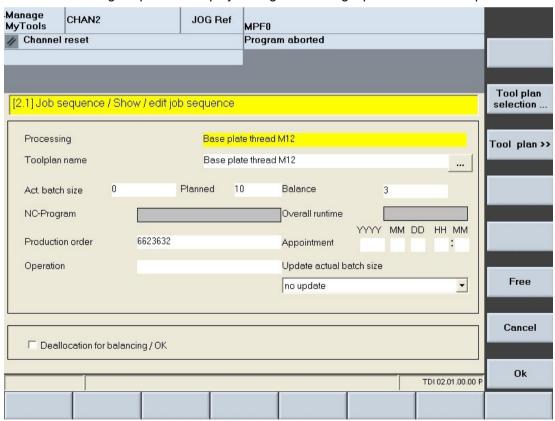
Figure 5-17   Displaying/changing a machining operation

5.4.7 Tool plan

Overview

A tool plan must be stored for the balance calculation for each job. The tool plan and the machining sequence together form the basis for the balance calculation.

These tool plans are managed using the "Tool plan" softkey on the horizontal softkey menu.

The tool plan contains all necessary tool data, e.g. the service period of the tools that are required during an NC program run. These are the basis for calculating the tool life / unit quantity required by each tool type during the balance calculation.

The tool plans can be created in different ways:

● Through manual input via the user interface.

● By importing the tool plans from a higher-level system (e.g. NC programming) via the integrated import/export interface.

5.4.7.1 Manage tool plans

The "Tool Plans" window provides an appropriate user interface for performing these management tasks.

The tool plans can be saved hierarchically. This depends on the level (AREA/GROUP/UNIT) you are assigning them. You can call the tool plans for all machines that are assigned to this area and use them for the balance calculation.

This list of tool plans is called by selecting a machine in Explorer.

Function

Function	Description
Tool plan	Name of the tool plan.
Component	Name of the machine / machine group that is assigned to this tool plan.
Date	Tool plan creation date.
Version	Version of the tool plan (index for the frequency of change, no management criterion).

Note

Tool plans that are assigned to a released machining sequence are shown in bold.

Keys and functions

The following keys are available for operation of the control system and the machine tool.

Key	Function
TAB	Press the <TAB> key to switch between the Explorer view and the table.
◄ ►	Press the left/right arrow keys to open and close the individual levels of the displayed system components.
▲ ▼	Press the up/down arrow keys to move the cursor up and down within the Explorer.
SELECT	Press the <SELECT> key to select and deselect the system components to be displayed. If you have selected a system component, the appropriate checkbox is checked by way of a tick. If you have deselected a system component, the appropriate checkbox is empty.
▲ ▼	Within the tool plan list, use the arrow keys to move the cursor up or down.
◄ ►	Only the columns selected in the layout are displayed. The list of the available columns can, however, be larger than that of the selected columns. Press the horizontal arrow keys to scroll left or right to view the columns that lie outside the visible area.
P	Press the <P> key to widen the Explorer window and the table columns.
M	Press the <M> key to make the Explorer window and the table columns narrower.

Description of the softkeys

The following functions can be executed by pressing the vertical softkeys:

Softkey	Description
Organize tool plans >>	Press the "Organize tool plans >>" softkey to open the sequence bar for influencing the tool plans, see Section: Organizing tool plans (Page 113).
Display / Change >>	Press the "Display / Change >>" softkey to open the window for displaying/changing the selected tool plan, see Section: Display/change tool plans (Page 116).
Hierarchical on/off	Press the "Hierarchical on/off" softkey to activate or deactivate the hierarchy function. • If the hierarchy function is activated, all tool plans are displayed that are on the same level or above the selected component in the Explorer tree. • If the hierarchy function is deactivated, the tool plans assigned to the selected component are displayed.

Softkey	Description
Import/ export >>	Press the "Import/export >>" softkey to open the sequence bar for importing or exporting tool plans, see Section: Import/export tool plans (Page 119).
Print	Press the "Print" softkey to print the list of machining sequences. Equivalent window representation
Explorer on/off	Press the "Explorer on/off" softkey to show or hide the tree representation of the Explorer view.
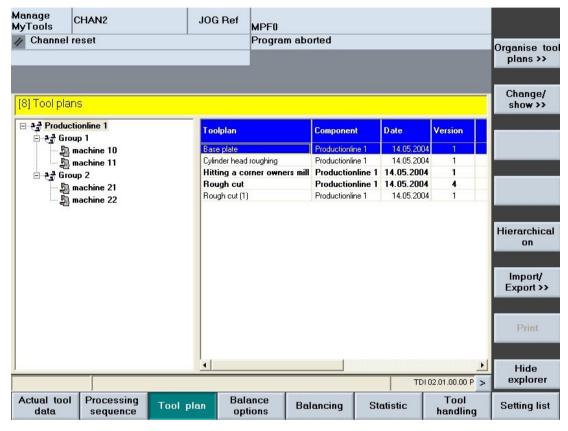
Figure 5-18   Tool plans

5.4.7.2   Organizing tool plans

You have the capability of creating a new tool plan or deleting a tool plan.

Function

Function	Description
Tool plan	Entry of the tool plan name.
Created	Tool plan creation date.
By	Creator of the tool plan.
Plant components	Storage location of the tool plan (selected plant component in Explorer).

Function	Description
NC program	Entry of the NC program.
	- OR -
	Alternatively, on the unit with SINUMERIK, incl. HMI-Advanced, it is possible to display a list of all NC programs assigned to the machine via the "Program selection" softkey (all main programs not only from the workpiece directory but also from the main program directory that are stored in the NC data management of the SINUMERIK).
	● Select an NC program.
	● Confirm with the "OK" softkey. The program will be included in the input field.
Channel	Channel details.
Total run time	Total run time of the NC program. This value is adapted automatically as soon as the sum of the tool cutting times (without downtimes) is greater than the value entered.

Description of the softkeys

The following functions can be executed by pressing the vertical softkeys:

Softkey	Description
New ...	Press the "New >>" softkey to open the "New Tool Plan" window for a new tool plan.
Display/ Change >>	Press the "Change/display >>" softkey to display or change the data of a selected tool plan in the "Change/Display Tool Plans" window.
Delete	Press the "Delete" softkey to delete the selected tool plan. The tool plan can only be deleted if you respond to the conformation warning with "OK".
Copy	Press the "Copy" softkey to copy the selected tool plan. The tool plan will be saved in the clipboard.
Paste	Press the "Paste" softkey to insert the tool plan selected in the clipboard with changed name (index added).
<<	Press the "<<" softkey to return to the vertical softkey bar.
OK	Press the "OK" softkey to accept the inputs of the tool plan.
Cancel	Press the "Cancel" softkey to quit the window without saving the previously entered data.

Procedure

Creating a tool plan

1. The "Tool Plans" window is open.

2. In the Explorer tree, select a machine.

3. Press the "Organize tool plans >>" softkey.
   The vertical softkey menu switches to the sequence menu for editing/creating the tool plans.
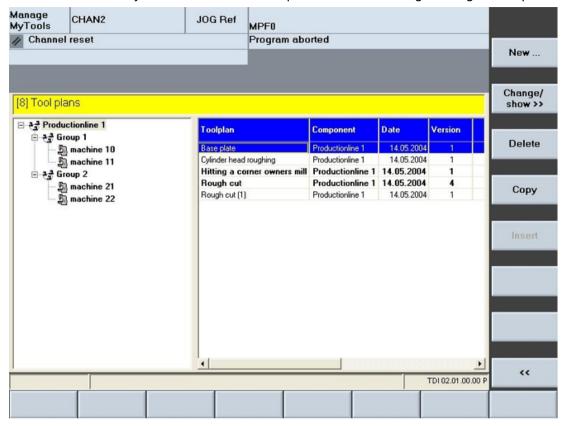
Figure 5-19   Organizing tool plans

4. Press the "New ..." softkey.
   The "New Tool Plan" window opens.
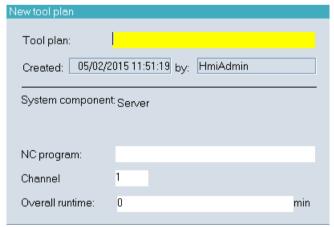
Figure 5-20   New tool plan

Procedure

Deleting a tool plan

1. In the Explorer tree, select the tool plan.

2. Press the "Delete" softkey.
   A prompt will be displayed.

3. Press the "OK" softkey to irrevocably delete the tool plan.
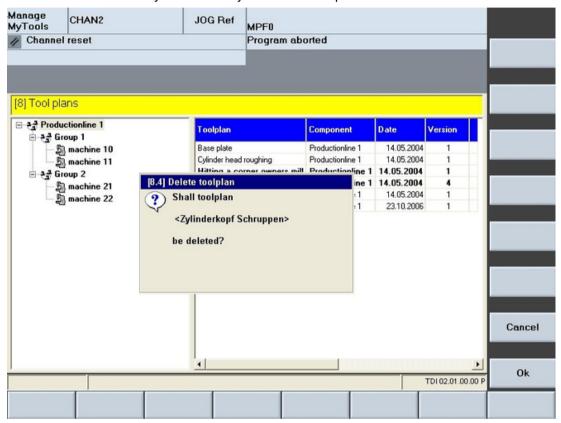
Figure 5-21 Delete tool plan

5.4.7.3 Display/change tool plans

You can change the following data of a tool plan:

- Tool plan name

- Plant components

- NC program

- Channel

- Total run time

Displaying/changing tool plans

Function	Description
Tool plan	Input field for the tool plan name.
Plant components	Storage location of the tool plan (selected plant component in Explorer).
NC program	Enter the NC program. - OR - Alternatively, on the unit with SINUMERIK, incl. HMI-Advanced, it is possible to display a list of all NC programs assigned to the machine via the "Program selection" softkey (all main programs not only from the workpiece directory but also from the main program directory that are stored in the NC data management of the SINUMERIK). • Select an NC program. • Confirm with the "OK" softkey. The program will be included in the input field.
Total run time	Total run time of the NC program. This value is adapted automatically as soon as the sum of the tool cutting times (without downtimes) is greater than the value entered.

Description of the softkeys

The following functions can be executed by pressing the vertical softkeys:

Softkeys	Description
"Add tool .."	If you would like to add another tool, press the "Add tool ..." softkey, see Section: Create new tool (Page 118).
Delete tool	Press the "Delete tool" softkey to delete the selected tool. The tool can only be deleted if you respond to the conformation warning with "OK".
Advance tool	Press the "Advance tool" softkey to move the selected tool up one position in the sequence.
Previous tool	Press the "Previous tool" softkey to move the selected tool down one position in the sequence.
Generate tools	Press the "Generate tools" softkey to determine the tools required in the NC program by way of simulation.

Procedure

1. The "Tool plans / Show/Change" window is open.

2. Select a tool plan.

3. Press the "Change tool plan ..." softkey.
   The "Change Tool Plan" window opens.
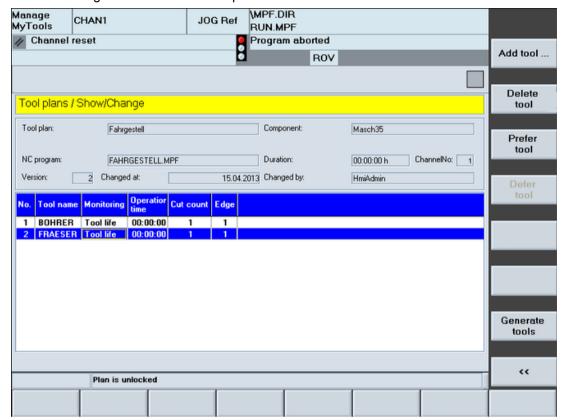
Figure 5-22   Display/change tool plans

4. Change the desired data and press the "OK" softkey in order to save the data.
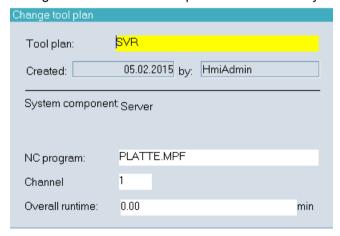
Figure 5-23   Change tool plan

5.4.7.4 Create new tool

You have the capability of creating a new tool.

Function

Function	Description
Tool	Entry for the identifier of the tool.
Cutting edge	The cutting edge used for the machining step in the NC program.
Monitoring	Balancing is performed with the monitoring method selected here. The following selection possibilities are available: • No monitoring • Tool life • Quantity The following fields will be displayed depending on the selected monitoring method: • "Cutting time" = for the tool life monitoring • "Cut count" = for unit count monitoring
Cutting time	Time in minutes for which the tool is cutting.
Consumption cut count	The cut count to be subtracted from the planned cut count per operation. Note: The cut count must match the actual unit quantity (setpiece) in the NC program.
Spindle no.	Entry of the spindle.

Procedure

1. You are in the "Tool plans" window and have selected a tool plan.

2. Press the "Organise tools >>" softkey.

3. Press the "Add tool ..." softkey.
   The "Create New Tool" window opens.
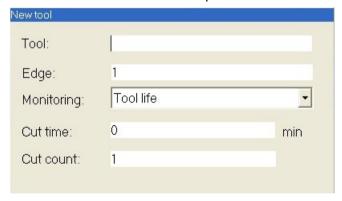
Figure 5-24   Create new tool

5.4.7.5   Import/export tool plans

You have the capability of importing tools from a drive directory into the central database. The assignment is made via the selected components in the Explorer tree.

Furthermore, you have the possibility to export tools from the central database into a drive directory. The assignment is made via the selected components in the Explorer tree and the selected tool plan.

For how to configure the settings, refer to the Installation Manual "SINUMERIK Integrate MMP, MMT, AMC, AMP, AMD", Chapter: Configuration with Manage MyTools Configuration, tool plan

Function

Function	Description
Selected component	Name of the tool plan.
Drives	Select a drive from the selection list.
Directory	The "Directory" selection list on the left below shows the selected directories on the selected drive.
Files	Select a tool plan for the import/export. After selection of the directory, the stored top files (tool plans) are displayed.

Description of the softkeys

The following functions can be executed by pressing the vertical softkeys:

Softkey	Description
OK	This softkey acts depending on the machining area, "Tool plan / import" or "Tool plan / export". • Import: The selected tool plan is transferred to the central database and assigned to the component previously selected in the Explorer tree. This component is shown under "Selected component". • Export: The selected tool plan is exported from the central database to the specified directory. This action overwrites a tool plan that already exists in the target directory.
Import all	Press the "Import all" softkey to transfer all tool plans from the directory to the central database and to assign them to the component previously selected in the Explorer tree.
Export all	Press the "Export all" softkey to export all existing tool plans to the previously selected component.

Procedure

1. The "Tool Plans" window is open.

2. Select the tool plan.

3. Press the "Import tool plan >>" or the "Export tool plan >>" softkey.
   The "Tool Plan / Import" or "Tool Plan / Export" window opens.

Note

Imported tool plans are stored in the tool plan overview with the name they had in the header data of the tool plan.

Note

Tool plans in SinTDI format (file type top) are converted to an XML-based format via the import function and stored in the database. They are transferred with the file name of the file. Such imported tool plans must still be augmented with the following missing parameters using "Display/change tool plan":

- NC program name
- Total run time
- Changed on
- Changed by

Note

Importing/exporting does not delete the tool plans in the source.

In the target directory, existing tool plans that were already exported are overwritten by another export operation.
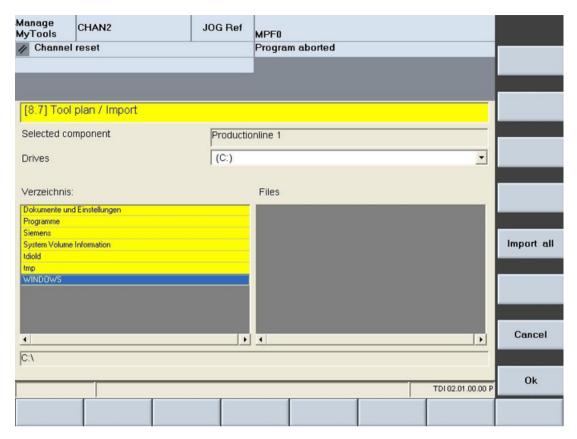
Figure 5-25   Tool plan - import
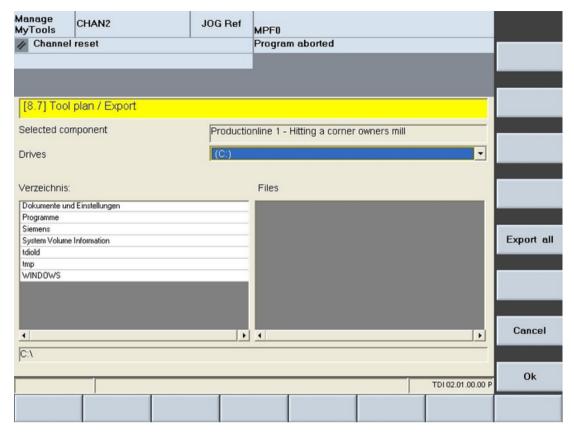
Figure 5-26   Tool plan - export

5.4.7.6   Tool plan format

Parameter description

Node identifier	Description	Example
`<ToolPlan`	Start of the tool plan.	
`id=`	Name of the tool plan.	"Rough cut"
`nodeId=`	Component to which tool plan is assigned.	"BAZ1"
`version=`	Version of the tool plan.	"4"

`prog=`	Name of NC program associated with tool plan (main program of type MPF only). Paths of the SINUMERIK data management can also be defined.
	Example:
	//MPF.DIR/ROUGHING.MPF
	- OR -
	//WKS.DIR/ ROUGHING.WPD/ ROUGHING.MPF
		"ROUGHING"
		Otherwise:
		"ROUGHING\ ROUGHING.MPF"

`duration=`	Total duration of the NC program.	"30."
`lastChangeDate=`	Date of the last change.	"2004-05-05T12:08:49"

Node identifier	Description	Example
lastChangeName=	Name of the last user.	"ADMIN"
<Tool toolId=	Name of the first tool.	"Cutter 100"
cutTime=	Cut time in minutes of the tool for the operation with monitoring method tool life.	"15."
cutCount=	Cut count in workpieces for the operation with monitoring method batch size.	"1"
mon=	Monitoring method: 0= none 1= tool life 2= unit quantity	"2"
</ToolPlan>	End of the tool plan.	

Example

```
<ToolPlan id="Rough cut" nodeId="BAZ1" version="4" prog="ROUGHING"
duration="30." lastChangeDate="2004-05-05T12:08:49"
lastChangeName="ADMIN">
    <Tool toolId="Cutter 100" cutTime="5." mon="1"/>
    <Tool toolId="test" cutTime="15." cutCount="1" mon="2"/>
    <Tool toolId="Cutter 80" cutTime="10." mon="1"/>
</ToolPlan>
```

5.4.8 Balance options

Overview

There are constraints for the balance calculation such as time limits or type of balance calculation that you must set first. This is done in the "Balance Options" window.

The "Balance Options" window is divided into the following areas:

- Balance calculation type, see Chapter: Type of balancing (Page 125)
- Balance calculation limits, see Section: Balance limit (Page 126)

- Display of the balance calculation results, see Chapter: Display balance result (Page 127)
- Selection of the plant view (only in conjunction with HMI-Advanced), see Chapter: Specify the display of the plant view (Page 127)
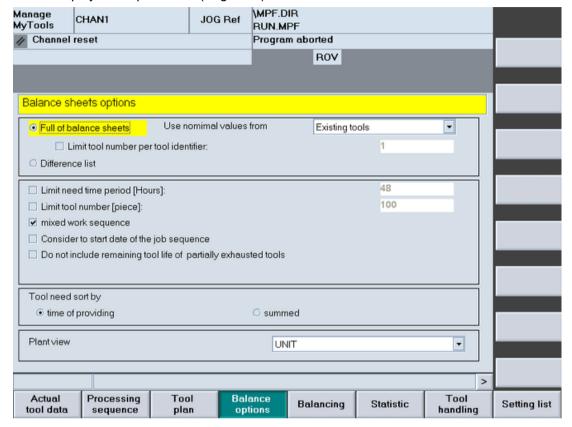
Figure 5-27   Balance options

5.4.8.1   Type of balancing

You can chose between two types of balancing:

- Full balance
- Differential balance

Balance options

Function	Description
Full balance (standard, tool life from the tool cabinet)	If activated, the balance calculation compares the planned tool life / unit quantity of the tools and the current residual tool life / unit quantity compared with the averaged required tool life / unit quantity. Thus, the cutting time per tool in the tool plan times the number of parts to be produced. The result of the balancing is the required number of tools per tool type.
Limit the tool number per tool identifier to:	The calculation of the balancing is terminated after the specified number of a tool identifier has been reached.
Difference list	If activated, the tool types used according to the tool plan are compared with the tool types in the tool magazine. The result of the balancing is a list of the tool types not available in the selected magazines.

Note

In addition to the tool magazine, other magazines can be considered as available capacity in the balancing. The selection is made in the "Balancing" window with the "Container selection …" softkey.

5.4.8.2 Balance limit

The checkboxes can be used to set the following limits:

Balance options

Function		Description
Limit required period [hours] to:		Limit the period for the balance calculation, e.g. one shift = 8 hours.
Limit tool number [piece] to:		Limit the number of tools required to a maximum number across all tool types.
Mix machining		Customize the processing behavior in the tool planning for released machining sequences with regard to the consideration of the workpieces. The option controls the time at which tools are supplied to the machine.
	Deactivated	The machining sequences are processed sequentially. Only if one machining sequence has been completed is the next one started.
	Enabled	The processing of all released machining sequences begins simultaneously. An idealized mix of workpieces is generated on the basis of the balance batch size.

5.4.8.3 Display balance result

The result of balancing can be displayed in one of two ways:

- Provision time
- Summed

Balance options

Function	Description
Provision time	This makes an entry for each tool required in the result list stating the latest time that the tool must be available to the machine without causing downtimes due to a missing tool.
Summed	This makes an entry in the result list for each tool type stating what quantity is required for the tool type in question.

5.4.8.4 Specify the display of the plant view

Balance options

Select the display for the HMI-Advanced environment in the drop-down list

The following settings are available:

Function	Description
AREA	Shows all machines without restriction.
H-UNIT	Shows the complete group of the machine where operators are presently active.
UNIT	Shows the machine where you are working.

5.4.9 Balance calculation

5.4.9.1 Displaying the balancing

In the "Balancing" window, initiate the balancing action, display the calculation and make additional settings.

Keys and functions

The following keys are available for operation of the control system and the machine tool.

Key	Function
TAB	Press the <TAB> key to switch between the Explorer view and the table.

◀ ▶	Press the left/right arrow keys to open and close the individual levels of the displayed system components.
▲ ▼	Press the up/down arrow keys to move the cursor up and down within the Explorer.
◯ SELECT	Press the <SELECT> key to select and deselect the system components to be displayed.
	If you have selected a system component, the appropriate checkbox is checked by way of a tick.
	If you have deselected a system component, the appropriate checkbox is empty.
▲ ▼	Within the tool plan list, use the arrow keys to move the cursor up or down.
◀ ▶	Only the columns selected in the layout are displayed. The list of the available columns can, however, be larger than that of the selected columns.
	Press the horizontal arrow keys to scroll left or right to view the columns that lie outside the visible area.
P	Press the <P> key to widen the Explorer window and the table columns.
M	Press the <M> key to make the Explorer window and the table columns narrower.

Description of the softkeys

The following functions can be executed by pressing the vertical softkeys:

Softkey	Description
Filter >>	Press the "Filter >>" softkey to display the balance result according to specific criteria, see Section: Filter for balance result (Page 129).
Container selection ...	Press the "Container selection ..." softkey to open the window to select the tool magazines relevant for the balance calculation, see Section Selecting a container for balance calculation (Page 130).
Balance release	Press the "Balance release" softkey to release the last created balance and save the requirements list, see Section: Balance deallocation (Page 131).
New balance	Press the "New balance" softkey to initiate a new balancing run, see Section: New balance (Page 133).
Print	Press the "Print" softkey to the print the displayed balance result.
Explorer on/off	Press the "Explorer on/off" softkey to show or hide the tree representation of the system components.

Procedure

1. Press the "Balance calculation" softkey.
   The "Balance calculation" window is opened.
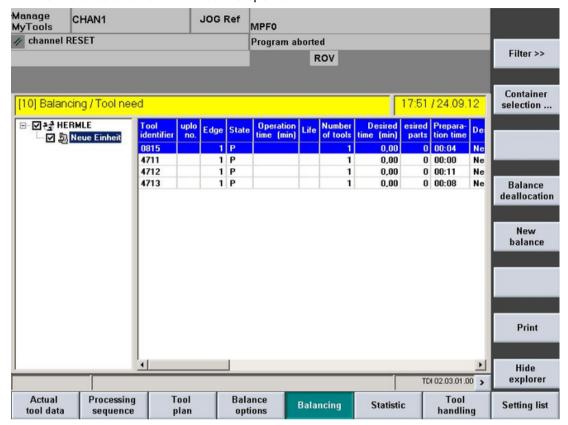
Figure 5-28   Balance calculation

5.4.9.2   Filter for balance result

The balance result display can be altered using filters.

Filtering the balance calculation

Function	Description
Requirement for new tools	Display the tools that must be set new.
Tools that can be unloaded	Display the tools that can be unloaded from the machine magazine of the machine selected in the Explorer.
Reserved and requested tools	Display the tools considered for a specific machine as available ca-pacity in the balance calculation. The tool containers to be considered are selected in the "Container Selection" window.
Tools that are no longer re-quired	Display those tools that have a reservation code from an earlier bal-ance calculation session but are no longer required in the current bal-ance calculation.

Function	Description
Display only tools from the following magazines	Further limit the hit list of the "Reserved tools" and "Tools not required" filters.
	Three settings are available:
	• Machine magazines
	• External magazines
	• Setting list
Table format	Representation of the table format using the "Table format >>" softkey on different views.
	Press the "Table format" selection field to call previously defined or default stored tables. Operating mechanisms, see Chapter: Layout filter area (Page 93).

5.4.9.3 Selecting a container for balance calculation

It is possible to assign the available magazines to each machine as available tool capacity. The tools in the activated magazines are then considered in balancing.

If tools are required in the activated magazines for the balancing period, they are identified with a reservation code by the balancing. You can display just these tools using the "Reserved tools" filter function.

Description of the softkeys

The following functions can be executed by pressing the vertical softkeys:

Softkey	Description
Cancel	Press the "Cancel" softkey to quit the window without saving the previously entered data.
OK	Press the "OK" softkey to save the settings.

Procedure

1. Press the "Container selection" softkey.
   The "Container Selection" window opens.
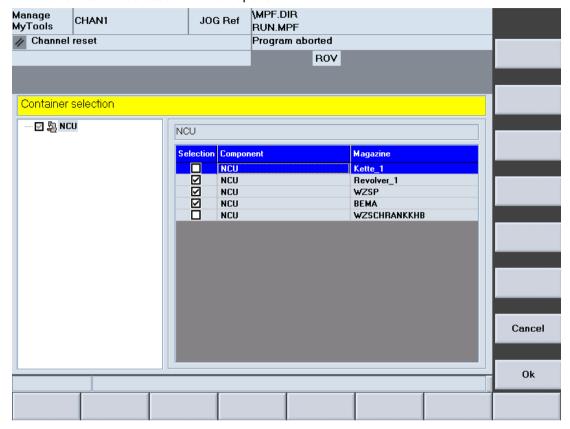
Figure 5-29   Container selection

5.4.9.4   Balance deallocation

Overview

Balance release sets or deletes the reservation codes for existing tools. If tools are missing, the relevant entry will be made in the settings list.

Tools that are no longer needed but have been set on the settings list in a previous balance calculation and have not yet been set by the tool setting station in the current balance calculation will be removed again.

If the tools that are in the settings list are to be considered during a balance calculation for the need for new tools, then the corresponding "setting magazine" must be selected in the "Container selection".

If the option "Export" has also been activated for a setting magazine via the configuration application "Manage MyTools Configuration", the need for tools is output in a file during the release of the balance calculation results. The file name starts with the prefix "toseg", followed by a 3-digit consecutive number and ends with the extension ".ini" (e.g. toseg002.ini).

To export the tool requirement to the tool setting station, a directory is created per default. On the controller, the directory "MMT_OUT.CLP" is set up in the data management "F:\dh" and the directory "MMT_OUT" is set up on the server in the installation directory.

The tool data is automatically transferred to the defined directory on release of the balance calculation by pressing the "OK" softkey. This writes all tools to be set for the current balance calculation into a file.

Note

To allow network access, this folder must be set up as a network share.

Activate the export to the "MMT_OUT" directory separately in the Manage MyTools Configuration application for the relevant removal magazine. In addition, the export path is adapted here.

For further information, refer to the Installation Manual "SINUMERIK Integrate MMP, MMT, AMC, AMP, AMD", Chapter: Configuration with Manage MyTools Configuration, external magazine/creating a database

5.4.9.5 File format of the balance result

At the release of the balance calculation result, an ASCII file is written at every release with the following parameters for each determined tool:

Example

Parameter	Description
$TDI_SETDATE	Time of request, e.g. "2016-11-28 14:12"
$TC_TP2[1]	Tool identifier, max. 32 characters, e.g. "Drill1"
$TC_TP9[1]	Tool monitoring method, e.g. "1"
	Possible values, e.g.
	Bit 0 = 1: Tool life monitoring on
	Bit 1 = 1: Workpiece count monitoring on
	Bit 2 = 1: Wear monitoring on (is not supported by MMT)
$TDI_MACHINE[1]	Machine name for assignment of the tools, e.g. "Machine1"
$TDI_WORK[1]	Name of the machining sequence, e.g. "Gearbox"
$TDI_PART[1]	Workpiece as of which the next tool of the same type is required, e.g. "20"
	• As of the 20th workpiece, this tool must be provided on the machines
$TDI_ACCESS[1]	The parameter specifies the planned operation time of the tool, e.g. "2016-11-28 14:12"
$TDI_TIME[1]	Total operation time of the tool, e.g. "4"
$TDI_TIME_EDGE[1,1]	Operation time of the tool cutting edge, e.g. "4"
$TDI_TOOL_COUNT[1]	Number of tool operations (SetPiece), e.g. "1"

5.4.9.6 New balance

Overview

You can balance the machining sequences of all selected machines that have a release code.

Procedure

1. Press the "New balance" softkey to initiate a new balancing run.
   A progress display that shows that the balancing is active appears on the screen.

2. If the balancing aborts with an error, a window with the error display will open, e.g. tool plan not present or component faulty.

   #### Note

   If, after a balancing operation, the balance result is released and then balancing is carried out again, then another balancing result is obtained as the released balance result is taken into account as the requested capacity.
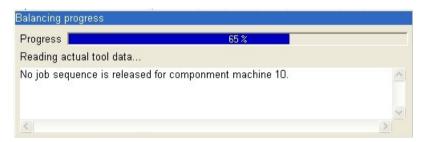
Figure 5-30   Balancing with progress bar

5.4.10 Tool handling

Overview

The "tool handling" area shows all tool transfers within and between plants. This means, for example, a tool can be moved within a magazine or transferred to another magazine of a different machine (cross-plant).

The area is available in interconnected operation with a Manage MyTools server and also on individual machines.

Loading, unloading and transfer operations are performed on the machine or a tool store.

For the unload operation, the tool data can be saved in the tool list.

For the load operation, the existing tool data can be reused.

The tool data measured by a tool setting station can be processed via the setting list.

5.4.10.1 Display tool handling

Keys and functions

The following keys are available for operation of the control system and the machine tool.

Key	Function
⇥ TAB	Press the <TAB> key to switch between the Explorer view and the table.
◀ ▶	Press the left/right arrow keys to open and close the individual levels of the displayed system components.
▲ ▼	Press the up/down arrow keys to move the cursor up and down within the Explorer.
○ SELECT	Press the <SELECT> key to select and deselect the system components to be displayed. If you have selected a system component, the appropriate checkbox is checked by way of a tick. If you have deselected a system component, the appropriate checkbox is empty.
▲ ▼	Within the tool plan list, use the arrow keys to move the cursor up or down.
◀ ▶	Only the columns selected in the layout are displayed. The list of the available columns can, however, be larger than that of the selected columns. Press the horizontal arrow keys to scroll left or right to view the columns that lie outside the visible area.
P	Press the <P> key to widen the Explorer window and the table columns.
M	Press the <M> key to make the Explorer window and the table columns narrower.

Description of the softkeys

The following functions can be executed by pressing the vertical softkeys:

Softkey	Description
Filter >>	Press the "Filter >>" softkey to specify the selection filters and to select the columns shown in the list, see Section: Defining filter areas (Page 139). The filter settings are only applicable for the area of the window on which the cursor is positioned.
Details >>	Press the "Details >>" softkey to display the data of the selected tool. A distinction is made between NC data and PLC data. Some of the data displayed can be edited, see Section: Tool data details (Page 149).

Softkey	Description
Accept	Press the "Accept" softkey to accept the selected tool movements to the tool transfer list.
Tool transfer >>	Press the "Tool transfer >>" softkey to open the list of current tool movements, see Section: Tool movement (Page 156).
Tool replacement	Press the "Tool replacement" softkey to initiate the tool replacement.
Options...	Press the "Options ..." softkey to specify the various movement sequences for the selected tool movement, see Section: Tool handling options (Page 154).
View >>	Press the "View >>" softkey to adapt the representation of the system hierarchy (PCU with HMI-Advanced).

Procedure

1. Press the "Tool handling" softkey to open the "Tool Handling / Selection" window.
   The "Tool Handling / Selection" window is divided into two areas. The representation of the plant hierarchy in the upper or lower window area differs between the PC client and the HMI-Advanced client.

   – The complete plant hierarchy, both in the upper and in the lower area, is always displayed on the PC. You cannot change this representation via "Manage MyTools Configuration".

– The representation of the plant hierarchy, however, can be customized on a PCU with HMI-Advanced. You can adapt the plant view via the "Filter >>" > "View" softkey, see chapter: View filter area (Page 141)

Prerequisite:
The "Default settings" in "Manage MyTools Configuration" under "HMI user" were set correctly. The change of the plant view always affects both areas (upper and lower).

Note

Lower window area

In the CNC version, the view of the local component (unit) is always displayed.

In the PC version, the view of the complete plant is displayed.

Note

Magazine selection on unit

In the upper window, you can set the selection checkmark on the unit to select or deselect all selection checkmarks of the magazines.

In the lower window, however, you must select or deselect the magazines individually.
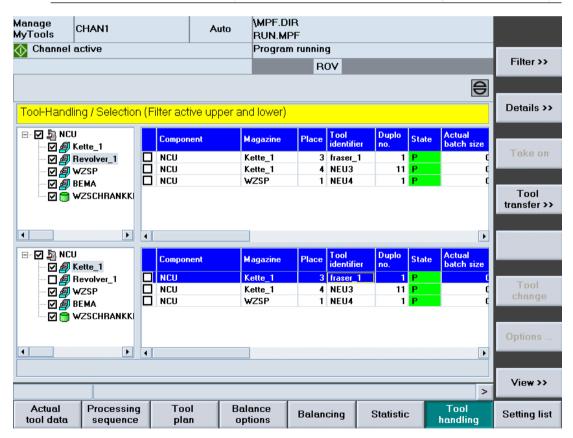
Figure 5-31   Tool handling - selection

Loading/unloading tools

Depending on the type of movement (loading or unloading), the top or bottom half of the display can be either the source or target of the movement.

● Activate the checkbox for those tools to be selected for movement.

● Press the "Accept" softkey to transfer the selected tools to the transfer list.

You can select either one or more tools for the transfer list, e.g. cartridge, tool carriage, handling target with more than one location.

If you select only one tool (source), you can specify a particular target location by activating the appropriate box in the table. This possibility is available only for single tools.

The source and target of the current movement combination are explicitly shown in the information line.

● Location

● Container

Note

● You may only specify one machine as the target for tool movements.

● Tools taken into the transfer list with "Accept" can no longer be selected. The checkmarks are grayed out.
  You make changes in the "Tool-Handling / Tool Transfer" window, see chapter Tool movement (Page 156)

● If the choice of container to be displayed is changed in the Explorer, the tool selection for the deselected container is cancelled. A tool selection can be cancelled as long as you have not yet added the tools to the transfer list.

● The checkmarks for the selected tools which you have added to the transfer list remain set until handling has been completed.

● You can expand the transfer list at any time by pressing the "Take on" softkey.

● One possible handling target is the removal container. Tools that are transferred to the removal container remain in the container list for only a limited period when the "Unload after" option is activated. You can enter the limited time on an individual basis.
  For further information, refer to the Installation Manual "SINUMERIK Integrate MMP, MMT, AMC, AMP, AMD", Chapter: Configuration with Manage MyTools Configuration, creating an external magazine/database (PC)
  This list can be made available to a higher-level tool management system for tool removal functions.

The tool data is displayed on the right-hand side of the window in the same format used for the tool actual data overview display,
see Section: Tool actual data (Page 86).
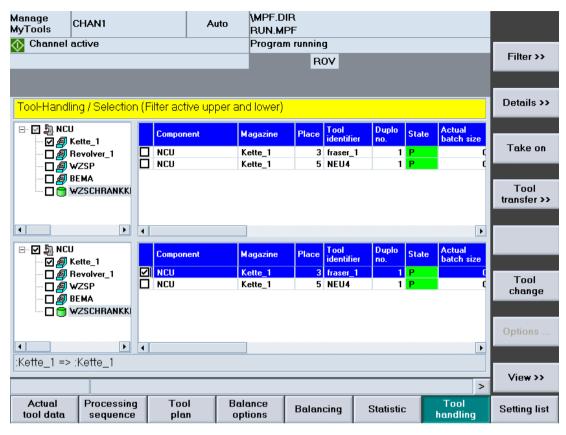
Figure 5-32   Tool handling with information line

5.4.10.2   Defining filter areas

The "Tool-Handling/Filter" window is divided into the following three areas:

- Standard filter area (Page 139)

- View filter area (Page 141)

- Layout filter area (Page 143)

Use horizontal softkeys or tabs to select the areas. All of the settings are assigned to the filter displayed in the selection box.

5.4.10.3   Standard filter area

Standard filter area

The filter settings for the tool handling data to be displayed are defined in the "Standard" area. All of the filter criteria AND-linked. The more criteria you define, the more refined searches for specific tools will be performed. Activate the desired checkboxes and option fields.

Tool handling / filter

Function	Description
Blocked tools	Shows broken, worn out or blocked tools.
Prewarning limit reached	Shows all tools that reach the prewarning limit.
With unloading mark	Shows all tools with an unloading identifier.
Tool identifier	Enter the identifier. You can use the asterisk character * as a wildcard for this. For example, enter "Drill* " for all tools whose identifier starts with "Drill", e.g. Drill 10 mm, Drill 14 mm, etc.
Duplo no. (1 - 32000)	Displays all tools with the specified duplo number.
Remaining parts (pcs) from.. to..	Shows tools with a residual unit quantity within the specified range.
Residual tool life (min.) from.. to..	Shows tools with a residual tool life within the specified range.
Locations	Shows the tools of occupied, all or empty locations. ● Occupied ● All (default) ● Empty only
Show reserved tools	Shows tools that have been reserved for the machine specified in the drop-down list.
"Setting time since ... hours	Shows only tools that have been set within the specified period.

Note

Activating additional filters

If you activate the following filters in parallel, only those tools are shown that satisfy the one or the other criterion:

● Blocked tools
● Tools whose prewarning limit is reached
● Tools with unloading mark
● Remaining parts (pcs) from.. to..
● Residual tool life (min.) from.. to..

Description of the softkeys

The following functions can be executed by pressing the vertical softkeys:

Softkey	Description
New filter	Press the "New filter" softkey to create a new filter, see Section: Creating a filter (Page 147).
Delete filter	Press the "Delete filter" softkey to delete the selected filter after a confirmation warning, see Section: Deleting a filter (Page 148).
Cancel	Press the "Cancel" softkey to quit the window without saving the previously entered data.
OK	Press the "OK" softkey to save the settings.

Procedure

1. Choose the "Standard" tab.

2. Select a filter from the "Filter name" drop down list.

3. Activate the desired checkboxes.

Figure 5-33   Standard filter area

5.4.10.4   View filter area

User view filter area

You adapt the plant view in the "User view" area.

Plant views

Function	Description
Plant view	The following plant views are available for selection: ● AREA: Shows all machines without restriction. ● H-UNIT: Shows the machine and all higher-level containers assigned to the machine. ● UNIT: Shows only the machine you are working on.
Permissible plant view	Restrict plant view for the respective user group depending on the rights assigned (configuration). ● AREA: No restrictions, all views permitted. ● H-UNIT: H-UNIT and UNIT views permitted. ● UNIT: Only UNIT view permitted.
Restore drop-down list in the Explorer	Activate the checkbox to save the containers selected for the call of the filter screen. The saved selection is restored when the filter is reselected.

Description of the softkeys

The following functions can be executed by pressing the vertical softkeys:

Softkey	Description
New filter	Press the "New filter" softkey to create a new filter, see Section: Creating a filter (Page 147).
Delete filter	Press the "Delete filter" softkey to delete the selected filter after a confirmation warning, see Section: Deleting a filter (Page 148).
Cancel	Press the "Cancel" softkey to quit the window without saving the previously entered data.
OK	Press the "OK" softkey to save the settings.

Procedure

1. Choose the "User view" tab.

2. Select a filter from the "Filter name" drop down list.

3. Activate the desired checkbox and select the system view from the drop-down menu.

Note

If an illegal view is selected, it is ignored and reset when the window is exited.
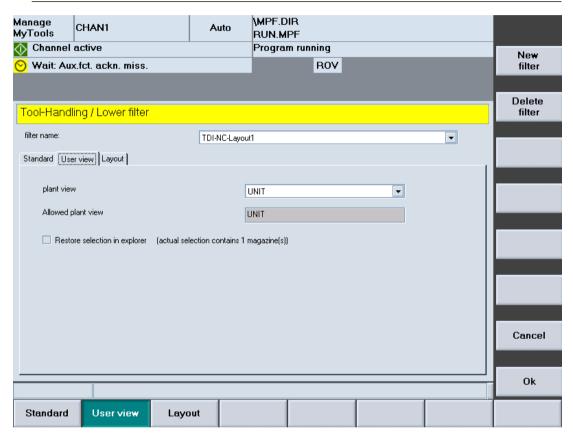
Figure 5-34   User view filter area

5.4.10.5   Layout filter area

Layout filter area

In the "Layout" area, use filters to define the table layout for the tool handling overview.

Function	Description
Existing columns	The list box shows all tool data that has not been selected.
Visible columns	The list box shows the values displayed for each tool in the tool handling.

Defined columns

Various table views are predefined to simplify this task.

- Component
- Magazine
- Location
- Tool identifier
- Duplo no.
- Magazine number
- State
- Actual unit quantity
- Pre-alarm
- Target unit quantity
- Extended alarm
- Residual unit quantity
- Alarm limit unit quantity
- Magazine number
- Place state
- Type
- Cutting edges
- Size
- Size left
- Size top
- Size bottom
- Monitoring
- Remaining machining operations
- Warning limit for tool life
- Planned service life

Description of the softkeys

The following functions can be executed by pressing the vertical softkeys:

Softkey	Description
New filter	Press the "New filter" softkey to create a new filter, see Section: Creating a filter (Page 147).
Delete filter	Press the "Delete filter" softkey to delete the selected filter after a confirmation warning, see Section: Deleting a filter (Page 148).

Softkey	Description
Up one column	Press the "Up one column" softkey to move the selected row up one position in the "Visible columns" list. This means that the appropriate column is moved by one position to the left in the table view.
Down one column	Press the "Down one column" softkey to move the selected row down one position in the "Visible columns" list. This means that the appropriate column is moved by one position to the right in the table view.
Cancel	Press the "Cancel" softkey to quit the window without saving the previously entered data.
OK	Press the "OK" softkey to save the settings.

Procedure

1. Choose the "Layout" tab.

2. Select a filter from the "Filter name" drop down list.

3. Select the defined columns in the list "Available columns" or "Visible columns".
   The arrow symbol between the two lists indicates the direction in which the tool data item currently selected in the list can be moved.
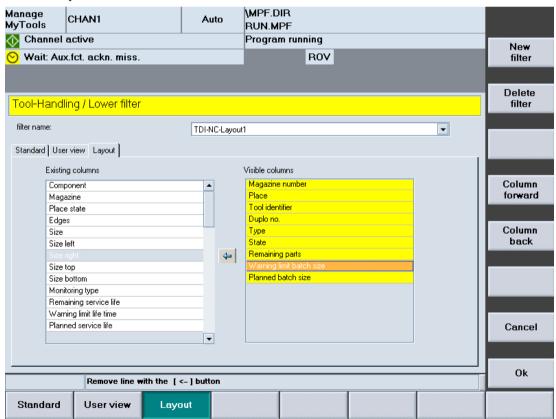
Figure 5-35   Layout filter area

5.4.10.6   List display

Defined tabular displays

Various table views are predefined to simplify this task.

1. For operating with a CNC and the default tool manager, select the following views:
   – MMT-NC-Layout 1 = display of the residual unit quantity
   – MMT-NC-Layout 2 = display of the residual tool life

2. For operating with a PLC-aided tool manager (when HMI PRO is used), select the following views:
   – PLC-TL-Layout = determination of the actual unit quantity corresponds to the Transline counting method.
   – PLC-NC-Layout = determination of the actual unit quantity corresponds to the CNC counting method.

3. For hybrid operation of a CNC with a default tool manager and a PLC-aided tool manager, select this view:
   – MMT-NC-Layout 3

Predefined columns for Transline

The following tool data is created in the predefined tabular displays.

You also have the capability of adding additional columns. You can find a selection in the "Available columns" list.

PLC-TL-Layout (Transline PLC, counting method like TL2000)	PLC-NC-Layout (Transline PLC, counting method like NC)
Location	Location
Tool identifier	Tool identifier
State	State
Actual unit quantity	Residual unit quantity
Pre-alarm	Warning limit for unit quantity
Residual unit quantity	Target unit quantity
The following columns can be added:	
Component	Component
C no.	C no.
Container	Container

Predefined columns for MMT unit quantity, tool life and hybrid operation NC/PLC

MMT-NC-Layout 1 (MMT unit quantity)	MMT-NC-Layout 2 (MMT unit quantity)	MMT-NC-Layout 3 (Hybrid operation NC/PLC)
C no.	C no.	Component
Location	Location	Magazine

MMT-NC-Layout 1 (MMT unit quantity)	MMT-NC-Layout 2 (MMT unit quantity)	MMT-NC-Layout 3 (Hybrid operation NC/PLC)
Tool identifier	Tool identifier	Location
Duplo no.	Duplo no.	Tool identifier
Type	Type	Duplo no.
State	State	State
Residual unit quantity	Residual tool life	Actual unit quantity
Warning limit for unit quantity	Warning limit for tool life	Target unit quantity
Target unit quantity	Planned service life	Extended Alarm
		Residual unit quantity
		Warning limit for tool life
The following columns can be added:		
Component	Component	C no.
Container	Container	Cutting edges
Cutting edges	Cutting edges	Monitoring
Monitoring	Monitoring	Residual unit quantity
NC prog.	NC prog.	NC prog.
Residual tool life	Residual unit quantity	Access
Access	Access	Place state
Place state	Place state	U
U	B	L
L	L	R
R	R	T
O	O	Planned service life
Planned service life	Target unit quantity	
Warning limit for tool life	Warning limit for unit quantity	

5.4.10.7 Creating a filter

You can add or delete filters from any of the areas.

Procedure for creating a filter

1. Select an area.

2. Press the "New filter" softkey.
   The "Table Format" window opens.

3. Enter a filter name and observe the following:

   – Only letters, numbers and underscore (_) may be used.

   – The name can be no longer than 40 characters.

   – All names must be unique.

4. Press the "OK" softkey.
   The data is accepted and a new filter is created.
   If the window cannot be closed, check the filter name.
   - OR -
   Press the "Cancel" softkey.
   A new filter is not created, all entries are rejected and the "Tool Handling / Filter" window reopens.

Table Format

Enter new name:

TDI-NC-Layout3 (1)
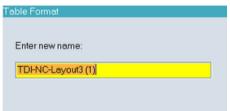
Figure 5-36   New filter

Note

Maximum filter count

If the maximum number of filters has been reached, a new filter can only be created by overwriting an existing one. A drop-down list with the existing filters is displayed next to the entry field for the name.

5.4.10.8   Deleting a filter

You can delete filters from any of the areas.

Procedure

1. Select the table format.

2. Press the "Delete filter" softkey.
   A prompt will be displayed.

3. Press the "OK" softkey to irrevocably delete the filter.
   - OR -
   Press the "Cancel" softkey to not delete the filter.
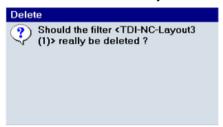
Figure 5-37   Deleting a filter

5.4.10.9   Tool data details

General tool data

Function	Description
Tool identifier	Only display, no selection possible.
Tool location type	The tool location type defines the kind of location in the magazine. The selected tool can only be loaded (changed) to a location of the appropriate type.
	For additional details, refer to the description of the standard tool management of SINUMERIK.
<Graphics>	When a SINUMERIK with standard tool management is used, a tool graphic of the selected tool is displayed depending on the tool type.

Function	Description
State	Changing the state of a tool.
	After selecting the "Change data" softkey and the state field, a window to select the state is opened when the Return key is pressed.
	See the following figure "Changing the tool state".
	You can select the following states:
	• Active tool (A)
	• Enabled (E) *)
	• Disabled (D) *)
	• Measure (M) *)
	• Prewarning limit reached (P)
	• Tool being changed (C)
	• Fixed-location-coded (F)
	• Tool has been used (E)
	• To be unloaded (U) *)
	• To be loaded (L) *)
	• Master tool
	Multiple states can be selected. The states marked with *) are represented by the letter (abbreviation) in the display field.
Monitoring	You can select from the following monitoring settings:
	• No monitoring
	• Tool life
	• Quantity
Tool size (L|R|T|B)	The tool size specifies the total number of tool half locations that the tool occupies.
	Specification of the tool size in half locations:
	L = left
	R = right
	T = top
	B = bottom

Keys and functions

The following keys are available for operation of the control system and the machine tool.

Key	Function
◀ ▶	Press the arrow keys to move the cursor from input field to input field.
▲ ▼	If you are currently in edit mode for an input field, the arrow keys act like pressing the <INPUT> key.
INPUT	Press the <INPUT> key to complete your inputs in the input fields. Text fields whose associated check boxes have not been activated cannot be accessed.

Description of the softkeys

The following functions can be executed by pressing the vertical softkeys:

Softkey	Description
Previous section	Press the "Previous sector" softkey to display further data of the tool.
	Scroll the screen section down by one section.
Next section	Press the "Next section" softkey to display further data of the tool.
	Scroll the screen section up by one section.
Change data	Press the "Change data" softkey to change the data.
	Prerequisite: The appropriate access rights are set.
Zoom screen	Press the "Zoom screen" softkey to zoom out or zoom in the size of the tool icon.
Cancel	Press the "Cancel" softkey to close the window without saving the previously entered data.
OK	Press the "OK" softkey to save the settings.

Figure 5-38   Changing the tool state

Cutting-edge data

Function	Description/selection

Cutting-edge data	Display and partly change the following data for each cutting edge:
	• Tool type
	• Tool length compensation
	  – Geometry
	  – Wear
	  – Base (this data cannot be modified)
	  – Unit (this data cannot be modified)
	• Tool radius correction:
	  – Geometry (this data cannot be modified)
	  – Wear (this data cannot be modified)
	• Monitoring data (unit quantity / tool life)
	  – Residual value
	  – Setpoint
	  – Prewarning limit
	• Cutting edge position
	• Tool clearance angle
	• Tool angle correction
	  – Geometry
	  – Wear
	
	Depending on the number of cutting edges or the tool type, additional data may be available. A scrollbar is displayed for additional data.
	
	A sand clock will be displayed while the tool data is being loaded. An error message will be issued if an error occurs during the loading.

External tool supplementary data	Details for the following data: • Tool description • Comments about the tool • Cabinet assignment
Check limit values	The input fields can have limit values. These values are displayed in the status line. If you violate the input limit, the status line will indicate this. You can exit the input field only when the value is correct.

Manage MyTools	CHAN1		JOG Ref	\MPF.DIR RUN.MPF		Previous sector
// Channel reset				Program aborted		
				ROV		Next sector

Internal userdata (dataFormatNCU)

OEM_T1	0	[mm]	OEM_T2	0	[mm]
OEM_T3	0	[mm]	OEM_T4	0	[mm]
OEM_T5	0	[mm]	OEM_T6	0	[mm]
OEM_T7	0	[mm]	OEM_T8	0	[mm]
OEM_T9	0	[mm]	OEM_T10	0	[mm]

Edge data **Edge** **1**

Tool type	120			
Tool length compensation	Geometry	Wear	Base	Unit
Length 1 (L1)	0	0	0	mm
Length 2 (L2)	0	0	0	mm
Length 3 (L3)	0	0	0	mm
Tool radius offset	Geometry	Wear		Unit
Radius 1 (R1)	0	0		
Radius 2 (R2)	0	0		
Monitoring data	Residual value	Target value	Prewarning limit	
Batch size	0	0	0	Items

Buttons: Change data, Zoom picture, Cancel, Ok

Figure 5-39　NC details

Internal user data

Function	Description/selection
Internal user data	The type and quantity of the data displayed here depends on the OEM data on the target machine.

Figure 5-40   NC details

References

For a description of the individual states, refer to the following literature:

"Tool Management" Function Manual

5.4.10.10   Tool handling options

You have the capability of specifying movement sequences for the selected tool movement.

Possible settings

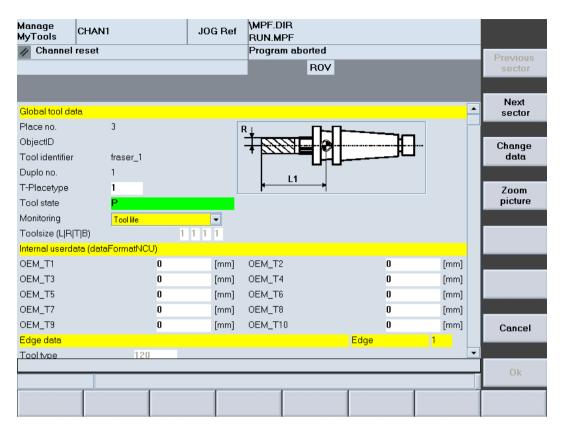| Function	Description	
Magazine-specific options	The movement is in a real magazine. Further options are available for this movement:	
	Accept source location as target location	To facilitate the handling of transport magazines (changing magazines), the location in the transport magazine can be accepted as the target location in the machine. You can either accept the location unchanged or apply an offset. Example: Transport magazine, locations 1 - 20 => with offset 100: Target magazine, locations 101 - 120.
	Data transfer without PLC acknowledgement	If you add complete tool containers, e.g. tool cartridges, to the machine or insert single tools directly in magazine locations, you can use this function to deactivate scanning of PLC acknowledgements. This means that the tool data is entered directly into the magazine list. This option is visible only if the configuration contains at least one machine magazine with activated option "Permit data transfer without PLC acknowledgement".
	Use reservation of empty locations	This option is activated by default. I.e. MMT automatically reserves empty locations using a virtual tool "MMT_Reservation" in the magazine. This option prevents problems caused by several stations attempting to load a tool to the same location simultaneously. This option is stored for each tool movement. If the reservation option is deactivated, the softkeys for empty location searches and the setting options for empty locations are not displayed for safety reasons.
Automatic duplo number assignment	Activate automatic assignment of the duplo number for duplo number conflicts in the target magazine. The next higher duplo number is assigned based on the existing duplo numbers in the SINUMERIK tool management.	
Barcode reader connection	Activate or deactivate the barcode reader by making the appropriate selection in the drop-down list: • Deactivated: Barcode reader not activated • Keyboard interface: Barcode reader activated (MMT fetches only keyboard inputs) The procedure of connecting the barcode reader is described in Chapter: Connecting and deploying barcode scanners (Page 169)	

Procedure

1. The "Tool-Handling / Selection" window is open.

2. Press the "Options..." softkey.
   The "Options" window is opened.

3. Activate the desired checkboxes.
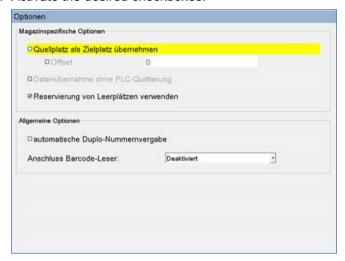
Figure 5-41   Tool handling - options

5.4.10.11   Tool movement

Overview

The "Tool Handling / Tool Transfer" window contains the list of all current tool movements.

The tool movement list can be started or cancelled and the movements can be organized individually.

Detailed information

Display	Description
Icons	Icons that represent the various movements:
	Loading
	Unloading
	Relocating
Tool identifier duplo no. tool description	Shows the tool identifier, the duplo number and the tool description.
Source	Source machine and magazine of the tool.
Source location	Current source location of the tool.

Display	Description	
Target	Target machine and magazine of the tool.	
Target location	Target location of the tool.	
	<Target location>	A specific single location has been specified.
	AUTO	An empty location search is performed automatically.
Status	Status of the movement.	
	<empty>	The movement has not been started yet.
	Initialization	The movement is being initialized.
	Set the options	The options for the movement are being set.
	Running	The movement has been started.
	Unloading active	The tool is being unloaded.
	Loading active	The tool is being loaded.
	Completed	The movement has been completed.
	Cancel (<code>)	The movement has been cancelled. The reason why it was cancelled is displayed in the status line.

Note

If the tool setting station does not specify a duplo number (0), MMT automatically assigns a free number when the tool is moved.

Finished jobs are no longer displayed when the window is displayed again. Exception: An error occurred during processing.

If the source or target is a machine magazine, then you must specify the loading/unloading points in the "Options" window if there is more than one.

If the target is a magazine without location management, e.g. an external tool magazine, an empty location search is not possible.

Tools cannot be moved directly from machine to machine, but rather only via a temporary storage location in a tool cabinet. This restriction can be disabled when user rights are configured.

You can only define the tool movement on the user interface of a machine which is involved in the movement. This restriction can be disabled via the access rights.

The following applies if the source and target of a movement are machine magazines in the same tool area (TO area):

- If at least one of the magazines involved has activated "PLC acknowledgement", the tool movements are not performed via the loading points. The tool is relocated between the magazines.
- You cannot assign a new duplo number. Any attempt to change the duplo number will be rejected and an error message displayed.

Check the movements after a power failure.
Press the "Start transfer" softkey to continue the transfer.

Description of the softkeys

Softkey	Description
Organize transfer >>	Press the "Organize transfer >>" softkey to further organize the movement, e.g.: to change the sequence, delete a movement or specify a target location.
Details >>	Press the "Details >>" softkey to display the data of the selected tool. A distinction is made between NC data and PLC data. Some of the data displayed can be edited.
New list	This softkey is only active if the option "Automatically add tools for loading/unloading to the transfer list" is set in the options.
	Press the "New list" softkey to delete the existing transfer list and automatically create a new transfer list.
Start transfer	Press the "Start transfer" softkey to start processing the transfer list.
Cancel transfer	Press the "Cancel transfer" softkey to cancel the processing of the transfer list after completion of the current movement.
Options ...	Press the "Options ..." softkey to open the window to specify the various movement operations for the selected tool transfer, see Section: Tool handling options (Page 154).
<<	Press the "<<" softkey to return to the "Tool Handling" window.

5.4.10.12 Data transfer to the magazine list option

You can make settings for the selected movement in the "Options" window.

Functions

Function	Description
Unload point Load point	If a machine has more than one loading/unloading point, you must specify which point is to be used for a tool movement. You can do this by selecting the loading/unloading point in the drop-down list.
	If one loading/unloading point is mainly used, activate the "As default" check box. All further movements are defined as default setting.
Accept source location as target location	To facilitate the handling of transport magazines (changing magazines), the location in the transport magazine can be accepted as the target location in the machine. You can either accept the location unchanged or apply an offset.
	Example: Transport magazine, locations 1 - -20 => with offset 100: Target magazine, locations 101 - 120.
Data transfer without PLC acknowledgement	If you add complete tool containers, e.g. tool cartridges, to the machine or insert single tools directly in magazine locations, deactivate scanning of PLC acknowledgements. This means that the tool data is entered directly into the magazine list.
	Note: This option is only visible if the configuration for source and/or target magazine contains a machine magazine with activated option "Permit data transfer without PLC acknowledgement".

Function	Description
Use reservation of empty locations	This option is activated by default, i.e. MMT automatically reserves empty locations using a virtual tool "TDI_Reservation in the magazine". This option prevents problems caused by several stations attempting to load a tool to the same location simultaneously. This option is stored for each tool movement.
	If the reservation option is deactivated, the softkeys for empty location searches and the setting options for empty locations are not displayed for safety reasons.
Automatic duplo number assignment	Activate the automatic assignment of the duplo number for duplo number conflicts in the target magazine. The next highest duplo number is specified in accordance with the existing duplo numbers in the SINUMERIK tool management system.

Procedure

1. The "Tool handling / Tool transfer" window is open.

2. Press the "Options..." softkey.
   The "Options" window is opened.

3. Activate the desired radio buttons and check the corresponding check boxes.
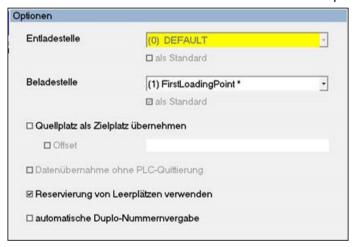
Figure 5-42   Tool movement options

5.4.10.13   Organizing the movement

Overview

You can edit the transfer list before the actual transfer.

The following functions are available:

- Changing the machining sequence by moving entries up and down in the list.

- Deletion of entries in the transfer list. Only applies for movements that have not been started.

- Option to change the duplo number and target location using "Change data", e.g. in error situations.

- Empty location search in the target magazine for the selected tool. Depending on the magazine and the assigned loading point, the first free location is entered as target location.

Note

If several magazines are assigned to one loading point and the automatic empty location search is activated, the system searches for an empty location in the other magazines if no free location can be found in the specified target magazine.

Requirement

You can change the duplo no. when you transfer tools from one unit to another unit.

Working with the softkeys

Softkey	Description
Delete	Press the "Delete" softkey to delete the selected movement in the transfer list.
Advance	Press the "Advance" softkey to move the selected movement up one place in the transfer list.
Back	Press the "Back" softkey to move the selected movement down one place in the transfer list.
Find empty location	Press the "Find empty location" softkey to search for an empty location in the target magazine for the selected movement.
Change data...	Press the "Change data..." softkey to change the duplo number and target location for the selected movement.

Procedure

1. Press the "Organize transfer >>" softkey.
   A new vertical softkey bar is displayed.

2. Press the "Change data..." softkey if you want to change the "Duplo no." and the "Target location".
   The "Tool Handling Data" window appears.

3. Enter the new number in the "Duplo no." field and select the target location in the selection box.

Figure 5-43   Changing the duplo number and target location

5.4.10.14 Tool replacement

Overview

The "Tool replacement 1:1" function facilitates the replacement of tools.

If a tool on the machine has either the "Prewarning limit" or "Blocked" status, it can be replaced by a new tool of the same type from the tool cabinet with the "Tool replacement 1:1" function. The tool must first be unloaded and then loaded.
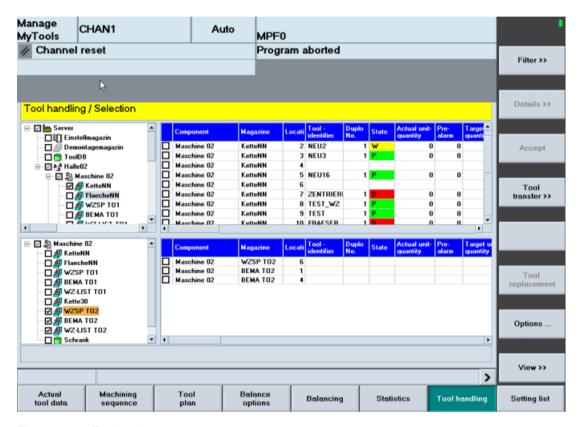
Figure 5-44   Tool replacement 1 : 1

Example of an application

Tool 5598700 on the machine with duplo no. 2 is blocked and must be replaced by a new tool. In the tool cabinet there is a tool with the same identifier 5598700, with the duplo no. 66. (It has already been reserved for the respective machine by the function "Predict tool change", see the "Destination" column in the figure: Handling list 1:1 tool replacement.)

Procedure:

1. Activate the checkbox at the new tool to be set from the tool cabinet.

2. Press the "Tool replacement" softkey.
   The tool replacement is started. MMT switches to the "Transfer list" and you can view the active handling operations.

3. First the tool is unloaded from the machine.

4. Next the tool from the tool cabinet is loaded into the machine.

Figure 5-45   Handling list tool replacement 1 : 1

5. When the tool replacement has been completed successfully, the transfer jobs are deleted automatically.

6. The "Tool replacement 1:1 completed" message appears in the status bar at the bottom of the window.

Figure 5-46   Tool replacement 1 : 1 success message

Search priority

The search function first searches for tools which are "Blocked", then for tools with the status "Prewarning limit reached".

5.4.10.15 Handling example

Unloading worn tools

1. Select the following in the "Tool Handling / Tool Transfer" window on the machine:

   – In the Explorer at the bottom: The source = machine
     - AND -

   – In the Explorer at the top: The target = removal container

2. Select the worn-out tools in the lower table.
   Set the "Blocked tools" filter for the selection.

3. Press the "Filter>>" softkey.

4. In the table at the bottom, activate the checkboxes for the tools to be unloaded.

5. Press the "Tool transfer >>" softkey.
   The marked tools are accepted and displayed in the "Tool Handling / Tool Transfer" window.

6. Press the "Start transfer" softkey to start the unloading operation.
   When the unloading operation starts, a corresponding PI service for unloading is started automatically for each tool in the transfer list.

7. Acknowledge the PI service for unloading after every operation.
   PLC: By pressing the button or automatically.

   – By pressing the button: Remove the physical tools from the unloading point.
     During this operation the tool data is transferred from the machine magazine to the removal magazine.

   #### Note

   If the source or the target is a tool directory magazine, you must also select a loading/ unloading point.

   Steps 2 - 4 can be performed several times.

5.4.10.16 Connecting tool setting stations

Overview

The tool handling module contains the interface for the transfer of tool data from a tool setting station. If a tool setting station is integrated into a network with machine tools, the tool data acquired at the tool setting station can be transferred to Manage MyTools.

The tool data is transferred via files with fixed format specifications.

● The name of the file can be freely selected, but must be unique.

● The file extension is ".ini".

The tool data files are transferred automatically from the specified directory. The tool data is entered in the tool setting station magazine. (defined via the Manage MyTools Configuration application). The file in the "MMT_IN" directory is then deleted.

You can view the tool data by selecting the tool setting station magazine in the Explorer window in the actual tool data or tool handling area.

Note

If no folder has been specified for the data exchange in the configuration, the following default settings apply:

- On the machine, the tool setting station must use folder "...\dh\tdi_in.clp" in the SINUMERIK data management.
- On a PC, the "MMT_IN" directory below the installation directory must be used.
- If another folder is specified in the configuration, the tool setting station must be configured accordingly.

The tool data contained in the file must be created by the tool setting station as follows:

Example

Program code	Comment
`%_N_SEG_001_COM`	; Program header (optional)
`$TDI_MACHINE="Machine1"`	; Machine name for assignment of tools (optional)
`$TDI_SETNAME[1] ="1234"`	; Name of tool set
`$TDI_SETDATE[1] = "2001/01/14 15:49"`	; Time of request (optional, only relevant for planning in conjunction with the setting list)
`$TDI_HOLDER="8446"`	; Holder number for clear identification of the tool within a plant (inventory number) (optional)
`$TC_TP1[1] =000`	: Duplo number; 3-digit; Duplo_Default: 000
`$TC_TP2[1] ="12345"`	; Tool identifier (32 characters)
`$TC_TP3[1] =1`	; Size on left Normal: 1 Large: 2 (as for $TC_TP7 magazine location type)
`$TC_TP4[1] =1`	; Size on right Normal: 1 Large: 2 (as for $TC_TP7 magazine location type)
`$TC_TP5[1] =1`	; Size above Normal: 1 Large: 2 (as for $TC_TP7 magazine location type)
`$TC_TP6[1] =1`	; Size below Normal: 1 Large: 2 (as for $TC_TP7 magazine location type)
`$TC_TP7[1] =1`	; Magazine location type Note: The magazine location type must match the magazine location type created in the target machine. If tools from several machines are used, then the magazine location types must be the same across all machines, e.g. 1=small; 2=medium; 3=large

Program code	Comment
`$TC_TP8[1] =10`	`; Status    Default: 10`
	The tool status results, for example, as follows:
	`2 = tool enable +`
	`8 = tool measured =10`
`$TC_TP9[1] =0`	`; Tool monitoring method`
	`Possible values, e.g.`
	` 0 = no tool monitoring`
	` 1 = tool life`
	` 2 = unit quantity`
	`...`
	`For further methods, see Description of Functions for Tool Management`
`$TC_TP10[1] =2`	`; Replacement strategy`
	`Possible values, e.g.`
	`0 = no strategy`
	`1 = next duplo no.`
	`2 = shortest path`
	`...`
	`Others: See Description of Functions for Tool Management`
`$TC_TP11[1] =0`	`; Tool info not used    Default: 0`
`$TC_TPC1[1] =1`	`; Loading/unloading identifier for TDI default: 0 Note: If the standard data "Loading/unloading identifier" is not used, OEM data can be used instead. TDI automatically uses the first free OEM data.`

Program code	Comment
`$TC_TPC2-10[1] =0`	`; Possible OEM data`
`$TC_DP1[1,1] =0`	`;Tool type`
`$TC_DP2[1,1] =0`	`;Cutting edge position`
`$TC_DP3[1,1] =0`	`; Geometry - length 1`
`$TC_DP6[1,1] =0`	`; Geometry - radius`
`$TC_DP8[1,1] =0`	`; Geometry - length 4`
`$TC_DP9[1,1] =0`	`; Geometry - length 5`
`$TC_DP10[1,1] =0`	`; Geometry - angle 1`
`$TC_DP11[1,1] =0`	`; Geometry - angle 2`
`$TC_DP12[1,1] =0`	`; Wear - length 1`
`$TC_DP13[1,1] =0`	`; Wear - length 2`
`$TC_DP14[1,1] =0`	`; Wear - length 3`
`$TC_DP16[1,1] =0`	`; Wear - groove width b / rounding radius`
`$TC_DP17[1,1] =0`	`; Wear - projection k`
`$TC_DP18[1,1] =0`	`; Wear - length 5`
`$TC_DP19[1,1] =0`	`; Wear - angle 1`
`$TC_DP20[1,1] =0`	`; Wear - angle 2`
`$TC_DP21[1,1] =0`	`; Adapter - length 1`

Program code	Comment
`$TC_DP22[1,1] =0`	`; Adapter - length 2`
`$TC_DP23[1,1] =0`	`; Adapter - length 3`
`$TC_DP24[1,1] =0`	`; Clearance angle`
`$TC_DP25[1,1] =0`	`; Reserved, default: 0`
`$TC_MOP1[1,1]=0`	`; Prewarning limit in minutes, default: 0`
`$TC_MOP2[1,1]=0`	`; Residual tool life in minutes, default: 0`
`$TC_MOP3[1.1]=0`	`; Unit quantity prewarning limit, default: 0`
`$TC_MOP4[1,1]=0`	`; Residual unit quantity, default: 0`
`$TC_MOP5[1,1]=0`	`; Wear prewarning limit - or location-dependent offset fine - prewarning limit`
`$TC_MOP6[1,1]=0`	`; Actual wear value - or location-dependent offset fine - actual value`
`$TC_MOP11[1,1]=0`	`; Target tool life`
`$TC_MOP13[1,1]=0`	`; Target unit quantity`
`$TC_MOP15[1,1]=0`	`; Wear setpoint - or location-dependent offset fine - setpoint`

Further cutting edge data, if available:

Program code	Comment
`$TC_DP1[1,2] =`	`; Cutting edge 2`
`$TC_DP2[1,2] =`	`; Cutting edge 2`
`$TC_DP3[1,2] =`	`; Cutting edge 2`
`...`	`;`
`...`	`;`
`M17`	`; File end (optional)`

Note

The parameters described for the individual sections are illustrated by examples. For a detailed list of other possible system parameters, please refer to the Description of Functions, SINUMERIK Tool Management.

Only the relevant cutting edge and monitoring data must be provided, 0 is set for data that is not required.

5.4.10.17 General conditions for location types

Location type

The location type defines the kind of location in the magazine. With the allocation of location types to magazine locations, the magazine is subdivided into different areas when the standard tool management system of the SINUMERIK is configured.

Requirement

The name and size of the location type are read from the MS Access file "WZACCESS.MDB" of the standard tool management. If this information is not available, blanks are output.

Function

It is only possible to load a tool to a location of the appropriate type. It is therefore possible to assign various types of special tools, e.g. "large", "heavy" to specific locations. There is no need to apply fixed location coding for this purpose.

When loading the tool, make sure that the type of the magazine location ($TC_MPP2) matches the magazine location type. Enter the magazine location type in the tool-specific data ($TC_TP7) of the tool setting station.

The machine manufacturer assigns location types when configuring/commissioning the machines. In this context, ambiguities may arise between individual machines and manufacturers in relation to the following definitions:

- Location type name

- Magazine location type ($TC_MPP2)

- Size and form of the location in the magazine.

The operator must check to ensure that all location types are clearly defined on all machines in the plant.

Example illustrating ambiguities in location type definition

	Location type name	Magazine location type $TC_MPP2	Size Width / total height
Machine 1	Normal	1	2/2
	Large	2	4/4
	Heavy	3	2/2
Machine 2	Normal	1	2/2
	Large	2	2/2
	Heavy	4	2/2

The example above illustrates the following problems:

- Different tool sizes are defined for the "large" location type. I.e. if a tool is set with tool-specific data $TC_DP7=2 for machine 1 and then loaded to machine 2, there is a risk of collision as the tool management in machine 2 is programmed to reserve only one magazine location for magazine location type $TC_MPP2=2.

- Different magazine location types $TC_MPP2 are defined for the "heavy" location type. I.e. if a tool is set with tool-specific data $TC_DP7=3 for machine 1 and then loaded to machine 2, it is not possible because magazine location type 3 is not defined for the tool management in machine 2.

Note

When automatic magazine identification is active, the magazine location types are identified for the standard tool management and entered in a table for the relevant magazine. This information can be used to detect conflicts within the plant.

For further information, refer to the Installation Manual "SINUMERIK Integrate MMP, MMT, AMC, AMP, AMD", Chapter: Configuration with Manage MyTools Configuration, creating a tool magazine with standard tool management, and

Creating a tool magazine with default tool management.

5.4.10.18 Tool identification

Overview

The following chapter describes the principle of operation and the connection of the "Tool identification" function by means of barcode in MMT.

The "Tool handling" function enables the tool data to be exchanged electronically between a CNC machine tool and a higher-level master computer.

The advantage compared to manual input of tool data on the CNC machine tool is the avoidance of possible error sources.

Further error sources can be excluded by so-called tool identification systems.

In these systems, unique tool identification characteristics are carried directly on the physical tool, e.g. barcode, code carrier, RFID, etc.

Generally a distinction is made between two types of tool identification systems:

- "Read only" system: A typical example of this is a barcode identification.

- "Read/write" system: Allows the writing back of tool data to an identification carrier.

The tool identification described here is restricted to the "read-only" system.

The concept for the connection of a tool identification system to MMT described in the following only takes into account identification systems that cover a production area.

The use of tool identification systems on single machines cannot be taken into account as MMT has to clearly assign each physical tool within the production in networked plants.

References

How you configure the tool identification is explained in the Installation Manual "SNUMERIK Integrate MMP, MMT, AMC, AMP, AMD", Chapter: Configuration with Manage MyTools Configuration, tool identification

Barcode identification system

Principle of operation

What must be noted if MMT is equipped with a connected barcode identification system?

● In this identification system, each physical tool must carry a unique barcode on the tool itself.

● No two tools may have the same identification characteristics within a production area, otherwise MMT cannot ensure the assignment between tool data set and physical tool.

● The uniqueness of the tool identification characteristic can be ensured through technical measures, e.g.

   – Barcode as an engraving on the tool holder, read-only RFID.
     - OR -

   – Unique assignment of the tool identification at the tool presetting and when creating the tool via master data.

● The tool identification can be generated as follows:

   – On the basis of an independent range of numbers (e.g. RFID).
     - OR -

   – On the basis of a tool identifier and duplo number

Depending on the barcode type used, only numeric values or alphanumeric values are permitted for the tool identifier, e.g. the "Code 39" barcode type supports these alphanumeric values.

Connecting and deploying barcode scanners

Because normally no HMI operator station is present at the tool changing point, tool functions, e.g. "Load tool" can be controlled with scan operations.

Connecting a barcode scanner

The barcode scanner is connected via the V24 interface to the PCU or parallel to the keyboard (however with additional activated keyboard hook). In this way, all of the entries can be made either manually or with the barcode scanner.

For state-of-the-art PCs, establish the connection via a USB connection.

For old PCs, an adapter is required to operate two devices (keyboard and barcode reader) on a single connection.

> **Note**
>
> **RS-232 interface**
>
> Barcode readers with a serial interface (RS-232) cannot be deployed for MMT!

> **Note**
>
> **Before scanning**
>
> The cursor must be positioned on the appropriate entry field in the operating software before every scanning action. MMT cannot differentiate between a manual entry and an entry via barcode scanner.

> **Note**
>
> **Ranges of values**
>
> The value range of the function barcodes must not collide with the value range of the tool identification.

Deploying a barcode scanner

Perform the following operating steps for a scanning operation:

- Find tool via filter function
- Select tool for the handling
- Add selected tool to the handling list
- Start handling

You also require immediate access to an operator station.

The data from the scanning operations is not transferred as entries to the relevant entry field on MMT, but rather as an event.

Starting the scanning operation

After a tool function (e.g. tool loading) has been triggered by a scanning operation, the operator receives an immediate reaction to the triggered function by the response of the machine (e.g. chain is positioned, tool exchange door is released). Only if an error occurs do you have to view the relevant messages at the HMI operator station.

In order to trigger various tool functions, additional function barcodes are defined. These function barcodes are scanned by the operator immediately before the relevant tool is scanned.

The following function barcodes are implemented:

- Scanner test (no tool required)
- Perform tool loading (with automatic empty location search)
- Perform tool replacement 1:1
  Prerequisite is that there is a blocked tool of the same tool group in the machine.

- Perform tool unloading
  This can be performed, for example, based on an unloading list with barcodes that you first print on the MMT.

- Perform tool unloading with specified source
  This can be performed, for example, based on an unloading list with barcodes that you first print on the MMT. The source of the tool is specified in the function barcode. This function is required for machines where the barcode scanner is connected to a PC.

After selecting a function (by scanning a function barcode), you can perform several similar tool functions in succession, e.g. loading of several tools.

In addition to the required function, the function barcode also contains the identification of the tool changing point at which the function is performed. In this way, you can operate several changing points on the machine with a barcode scanner, e.g.

- Changing point spindle

- Changing point magazine left

- Changing point magazine right

In order that the current tool storage location can be booked for the precise magazine or location, the described procedure is also valid for:

- Machine-related tool cabinets

- Central tool cabinets

- Tool transport carriers

The printing of a table with function barcodes for a specific machine / changing point is supported by the configuration or can be created with WinWord (and the corresponding barcode font).

Structure of the barcodes

BCxxyyyyzzzz

xx		01	Scanner test
		02	Load tool
		03	Tool replacement 1:1
		04	Unload tool
		05	Unload tool with source specification
	yyyy	nodeNo	
		Assigned number of the target component/container or "0000".	

If the target component/container is not defined ("0000"), then the magazines or the machine are used as loading target. If the barcode scanner is connected to an MMT PC version, the function barcode must contain the target component/container.

With function barcode "05", the node ID of the component, on which the tool is located, is specified.

zzzz Loading/unloading point / target location or "0000".

The value "zzzz" specifies the loading/unloading point ("Bzzz") or the target location ("Pzzz"). The two versions are distinguished by the letter at the first position (B or P). Simultaneous specification of the loading/unloading point and the target location is not possible.

If a loading/unloading point is not defined, the default loading/unloading point of the target container is always used.

If the target location is not defined, an automatic search for an empty location is started.

Neither the loading point nor the target location is defined with the value "0000".

Only specify the target location for the "Load tool" operation.

A location specification is ignored for the "Perform tool unloading with specified source" function.

Test whether a barcode scanner is generally available

If you want to test the basic functional capability of the barcode scanner under MMT, read-in the following function barcode with the barcode reader:

BC0100000000 |||‖|‖‖|‖‖|‖|‖‖|‖|‖‖|‖‖|‖|‖‖|‖|‖|‖‖|‖|‖‖|‖|‖‖|

The following message confirms the readiness of the scanner:
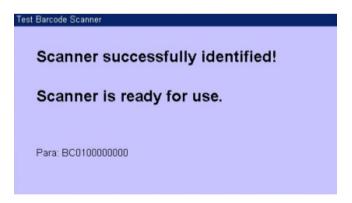
Figure 5-47   Barcode scanner

Example for barcodes via EAN 39 (barcode standard)

Barcode	Structure	Function
‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖	*BC0100000000*	Scanner test
‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖	*BC0200000000*	Load tool
‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖	*BC0300000000*	Tool replacement 1:1
‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖	*T12345678D01*	Tool "12345678" with duplo number 1
‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖	*BC0400000000*	Unload tool

Further manual adaptations are required in the "tdi_cfg.xml" file for the commissioning of the "Tool identification" function. Assign a "nodeNo" to the magazines involved. The value of the "nodeNo" describes the target component/container.

Loading a tool to the magazine of a machine tool

You can load a tool with automatic empty location search from the setting magazine to a specified magazine.

Procedure

In the following example, the setting magazine (container) is called "New magazine" with nodeNo="888" and the magazine to be loaded "KETTE_60" with "nodeNo="1".

1. Select the following barcode:

BC0200010000	‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖

2. After reading the following window opens:

Figure 5-48   Tool identification - Kette 60

3. Now select the barcode of the tool to be loaded.
   In the example, the tool with identifier "5634159" and duplo number 1 is loaded to the "KETTE_60" magazine:

T05634159D01	‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖

4. After reading-in the tool identification via barcode, a message is output for the operation. Provided the load operation completes without error, you will receive in the information line the message "Completed, waiting for tool identification" with a green background; a further tool can then be read-in via barcode without having to perform the function code again.

5. If no further tools are to be loaded, press the "<<" softkey to complete the operation.

Figure 5-49   Tool replacement completed

Note

The format of the barcode for the tool identification (T########D###) is set in the configuration.

Unloading a tool to the removal magazine

You can unload a tool from the machine tool to the removal magazine.

Procedure

In the following example, the tool has the identifier "5634159" and the removal magazine is called "Demontage" with "nodeNo="999".

1. Select the following barcode:

BC0409990000	

After reading the following window appears:

Figure 5-50   Tool identification - removal

2. Now select the barcode of the tool to be unloaded.
   In the example, the tool with identifier "5634159" and duplo number 1 is unloaded.

T05634159D01	

3. When the tool has been completely unloaded, the message "Completed, waiting for tool identification" is displayed.

4. A further tool can then be unloaded via barcode without having to perform the function code again.

5. If no further tools are to be unloaded, press the "<<" softkey to complete the operation.

Figure 5-51   Tool identification - removal completed

Error message

If an attempt is made to unload a tool that is not on the machine, the following error message appears:

Figure 5-52   Tool identification - interrupted

Tool replacement 1:1

You can perform a tool replacement 1:1 via barcode.

Requirement

- Tool with the status "Worn (W)" or "Disabled (D)" in the magazine of the machine tool
- Tool with the same tool identifier in the loading magazine

Procedure

1. Activate the following barcode for "Tool replacement 1:1":

BC0300010000	‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖

After reading the following window appears:

2. Now select the barcode of the tool to be replaced.
After reading-in the tool identification and the duplo number of the tool via barcode, MMT searches in the target using the tool identifier.
In the example, a search is performed in the "Testrack" component, in the "KETTE_60" magazine for a worn tool with the same tool identifier. If the general conditions are satisfied, the unloading of the worn tool and the loading of the new tool to the old location is started automatically.
In the example, tool "5634159" is replaced on the machine tool.

T05634159D03	‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖‖

3. When the tool has been completely replaced, the message "Completed, waiting for tool identification" is displayed.

4. A further tool can then be replaced via barcode without having to perform the function code again.

5. If no further tools are to be replaced, press the "<<" softkey to complete the operation.

Figure 5-53   Tool identification - tool replacement completed

5.4.11   Setting list

5.4.11.1   Displaying the setting list

All tools that have been defined as a new requirement by the current balancing, are transferred to the settings list with the balance deallocation.

Keys and functions

The following keys are available for operation of the control system and the machine tool.

Key	Function
TAB	Press the <TAB> key to switch between the Explorer view and the table.
◀ ▶	Press the left/right arrow keys to open and close the individual levels of the displayed system components.
▲ ▼	Press the up/down arrow keys to move the cursor up and down within the Explorer.
SELECT	Press the <SELECT> key to select and deselect the system components to be displayed. If you have selected a system component, the appropriate checkbox is checked by way of a tick. If you have deselected a system component, the appropriate checkbox is empty.
▲ ▼	Within the tool list, press the arrow keys to move the cursor up or down.
◀ ▶	Only the columns selected in the layout are displayed. The list of the available columns can, however, be larger than that of the selected columns. Press the horizontal arrow keys to scroll left or right to view the columns that lie outside the visible area.
P	Press the <P> key to widen the Explorer window and the table columns.
M	Press the <M> key to make the Explorer window and the table columns narrower.

Description of the softkeys

The following functions can be executed by pressing the vertical softkeys:

Softkey	Description
Table format >>	Press the "Table format >>" softkey to open the "Table format" window in which you can set various views, see Section: Customize the columns in the setting list (Page 179).
Print	Press the "Print" softkey to print the settings list.
Explorer on/off	Press the "Explorer on/off" softkey to show or hide the tree representation of the system components.

Procedure

1. Press the "Settings list" softkey to open the "Settings list" window.
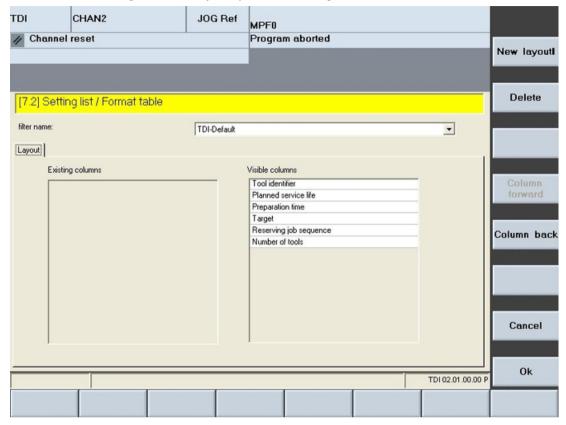
Figure 5-54   Settings list

5.4.11.2   Customize the columns in the setting list

Press the "Table format" softkey to customize the visible columns.

Setting list table format

Function	Description
Available columns	The list box shows all tool data that has not been selected.
Visible columns	The list box shows the values displayed for each tool in the tool actual data overview.

Visible columns	Description
Provision	Time when the tool must be available on the machine.
Reserving machining sequence	Machining sequence for which the tool was balanced.
Target	Component for which the tool is to be set.

Visible columns	Description
Tool identifier	Identifier of the balanced tool type.
Target tool life	Reference tool life of the balanced tool type.

Procedure

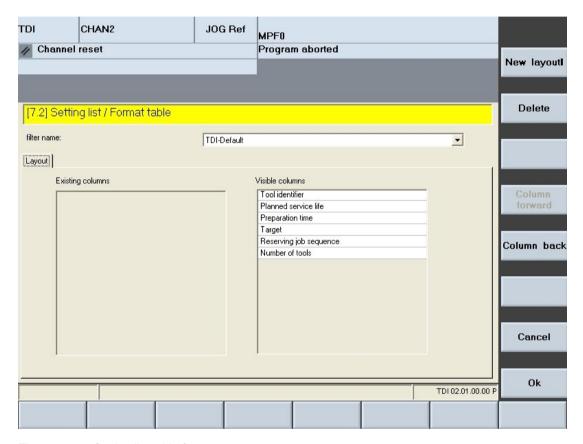Please refer to the following chapter for the procedure:

Figure 5-55   Setting list table format

5.4.12   Tool master data

Overview

Functions are available in the "Tool Master data" area for changing, creating and deleting tool data.

The "Tool master data" area is available in interconnected operation with a Manage MyTools server and also on individual machines.

5.4.12.1 Displaying the tool master data

Functions

Function	Description
Tool identifier	Displays the designation of the tool type.
Description	Displays a description for the tool type.
Type	Displays the tool type.
Monitoring	Displays the monitoring type: • No monitoring • Tool life • Quantity
Setpoint	Displays the wear setpoint.
Comment	Displays the stored comment for the tool.
Cutting edges	Displays the number of cutting edges.

Keys and functions

The following keys are available for operation of the control system and the machine tool.

Key	Function
TAB	Press the <TAB> key to switch between the Explorer view and the table.
◀ ▶	Press the left/right arrow keys to open and close the individual levels of the displayed system components.
▲ ▼	Press the up/down arrow keys to move the cursor up and down within the Explorer.
SELECT	Press the <SELECT> key to select and deselect the system components to be displayed. If you have selected a system component, the appropriate check box is checked by way of a tick. If you have deselected a system component, the appropriate check box is empty.
▲ ▼	Within the tool master data list, press the arrow keys to move the cursor up or down.
◀ ▶	Only the columns selected via the layout are displayed. The list of available columns can, however, be larger than that of the selected columns. Press the horizontal arrow keys to scroll left or right to view the columns that lie outside the visible area.

P	Press the <P> key to widen the Explorer window and the table columns.
M	Press the <M> key to make the Explorer window and the table columns narrower.

Description of softkeys

The following functions can be executed by pressing the vertical softkeys:

Softkey	Description
Find >>	Press the "Find >>" softkey to start a targeted search for the tool identifier, see Section: Search for tool (Page 183).
Filter >>	Press the "Filter >>" softkey to specify the selection filters and to select the columns shown in the list, see Section: Defining filter areas (Page 184).
Details...	Press the "Details ..." softkey to display the data for the selected tool, see Section: Tool data details (Page 190). A distinction is made between NC data and PLC data. Some of the data displayed can be edited.
Set up tool	Press the "Set up tool" softkey to set up the selected tool in the selected tool cabinet, see Section: Set up tool (Page 195). Assign a duplo number (optional). For the default setting "0", an unused Duplo number is assigned automatically.
Functions >>	Press the "Functions >>" softkey to switch to additional softkeys and carry out the following actions: • Create tool (Page 196) • Duplicate tool (Page 201) • Delete tool (Page 202) • Importing/exporting tools (Page 203)
Internal user data	Press the "Internal user data" softkey to view or change the internal user data of the selected tool, depending on the machine manufacturer, see Section: Internal user data (Page 205).

Note

Locking functions

The following functions can be locked using access rights:

- Set up tool
- Create tool
- Delete tool

Procedure

The following functions can be executed by pressing the vertical softkeys:

1. Press the menu advancing key on the horizontal softkey bar.

2. Select the "Tool master data" softkey.
   The "Tool Master Data" window is opened and the data are displayed in a table.

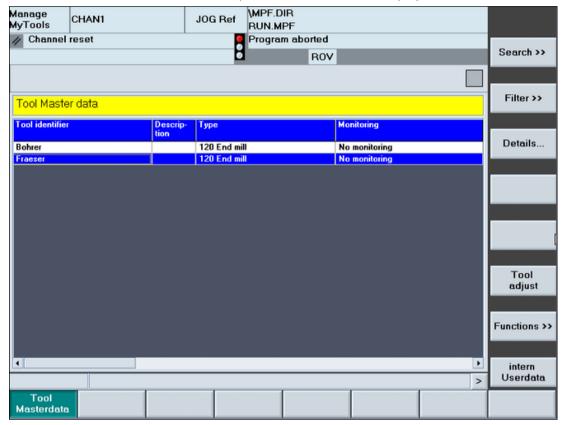

Figure 5-56   Overview of the tool master data

5.4.12.2   Search for tool

Overview

The "Find" function allows you to search for a specific tool identifier.

Procedure

1. The "Tool Master Data" window is open.

2. Press the "Find >>" softkey.
   The "Find Tool Master Data" window opens.

3. Enter the complete search term or with the "*" wildcard.

4. Press the "Find" softkey.
   The search for the specific tool identifier begins.
   If the tool identifier exists, the appropriate line will be selected. Otherwise an appropriate message appears.

5. Press the "Find next" softkey if the specified tool identifier exists more than once.
   The found entries are displayed successively.
   A message will be issued when no further tool identifier matches the search term.
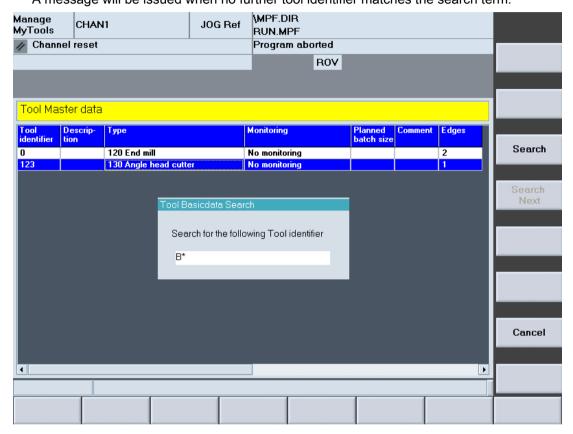

Figure 5-57   Search for tool master data

5.4.12.3   Defining filter areas

The "Tool master data - filter" window is divided into the following areas:

- Standard filter area (Page 185)
- Layout filter area (Page 186)

Use horizontal softkeys or tabs to select the areas.

5.4.12.4 Standard filter area

Standard filter area

The filter settings for the tool master data to be displayed are defined in the "Standard" area. The filter criteria are always ANDed. The more criteria you define, the more refined searches for specific tools will be performed.

Activate the desired checkboxes.

Tool master data / filter

Function	Description
Tool name	Shows the tool name.
Tool type	Shows the tool type.
Comment	Shows the comment.

Description of the softkeys

The following functions can be executed by pressing the vertical softkeys:

Softkey	Description
New filter	Press the "New filter" softkey to create a new filter, see Section: Creating a filter (Page 188).
Delete filter	Press the "Delete filter" softkey to delete the selected filter after a confirmation warning, see Section: Deleting a filter (Page 189).
Cancel	Press the "Cancel" softkey to quit the window without saving the previously entered data.
OK	Press the "OK" softkey to save the settings.

Procedure

1. Choose the "Standard" tab.

2. Select a filter from the "Filter name" drop-down list.

3. Activate the desired checkboxes.
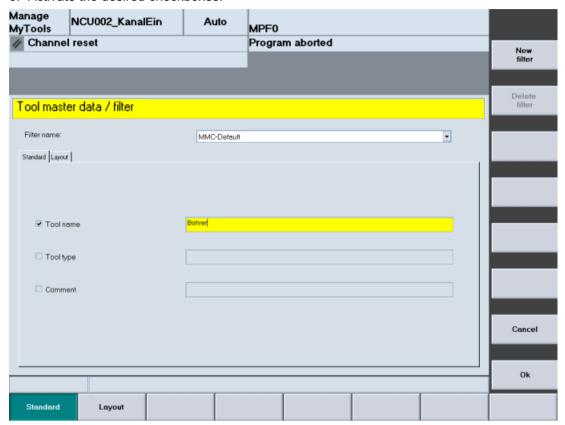
Figure 5-58   Default setting

5.4.12.5   Layout filter area

Layout filter area

In the "Layout" area, use filters to define the table layout for the tool master data overview.

The following filters are available:

- Specify the column order

- Show and hide columns

Function	Description
Available columns	The list box shows all tool data that has not been selected.
Visible columns	The list box shows the values displayed for each tool in the tool master data.

Defined columns

Various table views are predefined to simplify this task.

- Tool identifier
- Type
- Monitoring
- Setpoint
- Comments about the tool
- Cutting edges

Description of the softkeys

The following functions can be executed by pressing the vertical softkeys:

Softkey	Description
New filter	Press the "New filter" softkey to create a new filter, see Section: Creating a filter (Page 188)
Delete filter	Press the "Delete filter" softkey to delete the selected filter after a confirmation warning, see Section: Deleting a filter (Page 189).
Up one column	Press the "Up one column" softkey to move the selected row up one position in the "Visible columns" list. This means that the appropriate column is moved by one position to the left in the table view.
Down one column	Press the "Down one column" softkey to move the selected row down one position in the "Visible columns" list. This means that the appropriate column is moved by one position to the right in the table view.
Cancel	Press the "Cancel" softkey to quit the window without saving the previously entered data.
OK	Press the "OK" softkey to save the settings.

Procedure

1. Select the "Layout" tab.

2. Select a filter from the "Filter name" drop-down list.

3. Select the defined columns in the list "Available columns" or "Visible columns".
   The arrow symbol between the two lists indicates the direction in which the tool data item currently selected in the list can be moved.
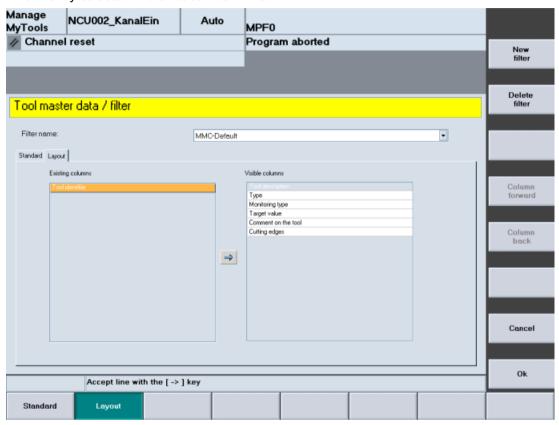

Figure 5-59   Layout settings of the tool master data

5.4.12.6   Creating a filter

You can add or delete filters from any of the areas.

Procedure

1. Select an area.

2. Press the "New filter" softkey.
   The "Table Format" window opens.

3. Enter a filter name and observe the following:

   – Only letters, numbers and underscore (_) may be used.

   – The name can be no longer than 40 characters.

   – All names must be unique.

4. Press the "OK" softkey.
   The data is imported and a new filter is created.
   If the window is not closed, check the filter name.
   - OR -
   Press the "Cancel" softkey.
   A new filter is not created, all entries are rejected, and the "Tool master data / filter" window reopens.

Figure 5-60   New filter

Note

Maximum number of filters reached.

If the maximum number of filters has been reached, a new filter can only be created by overwriting an existing one. A drop-down list with the existing filters is displayed next to the entry field for the name.

5.4.12.7   Deleting a filter

You can add or delete filters from any of the areas.

Procedure

1. Select the table format.

2. Press the "Delete filter" softkey.
   A prompt will be displayed.

3. Press the "OK" softkey to irrevocably delete the filter.
   - OR -
   Press the "Cancel" softkey to not delete the filter.
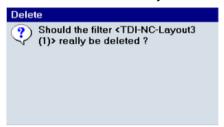
Figure 5-61   Deleting a filter

5.4.12.8   Tool data details

General tool data

Function	Description
Tool identifier	Only display, no selection possible.
Tool location type	The tool location type defines the kind of location in the magazine. The selected tool can only be loaded (changed) to a location of the appropriate type.
	For additional details, refer to the description of the standard tool management of SINUMERIK.
<Graphics>	When a SINUMERIK with standard tool management is used, a tool graphic of the selected tool is displayed depending on the tool type.

Function	Description
State	Changing the state of a tool.
	After selecting the "Change data" softkey and the state field, a window to select the state is opened when the Return key is pressed.
	See the following figure "Changing the tool state".
	You can select the following states:
	• Active tool (A)
	• Enabled (E) *)
	• Disabled (D) *)
	• Measure (M) *)
	• Prewarning limit reached (P)
	• Tool being changed (C)
	• Fixed-location-coded (F)
	• Tool has been used (E)
	• To be unloaded (U) *)
	• To be loaded (L) *)
	• Master tool
	Multiple states can be selected. The states marked with *) are represented by the letter (abbreviation) in the display field.
Monitoring	You can select from the following monitoring settings:
	• No monitoring
	• Tool life
	• Quantity
Tool size (L|R|T|B)	The tool size specifies the total number of tool half locations that the tool occupies.
	Specification of the tool size in half locations:
	L = left
	R = right
	T = top
	B = bottom

Keys and functions

The following keys are available for operation of the control system and the machine tool.

Key	Function
◀ ▶	Press the arrow keys to move the cursor from input field to input field.
▲ ▼	If you are currently in edit mode for an input field, the arrow keys act like pressing the <INPUT> key.
INPUT	Press the <INPUT> key to complete your inputs in the input fields. Text fields whose associated check boxes have not been activated cannot be accessed.

Description of the softkeys

The following functions can be executed by pressing the vertical softkeys:

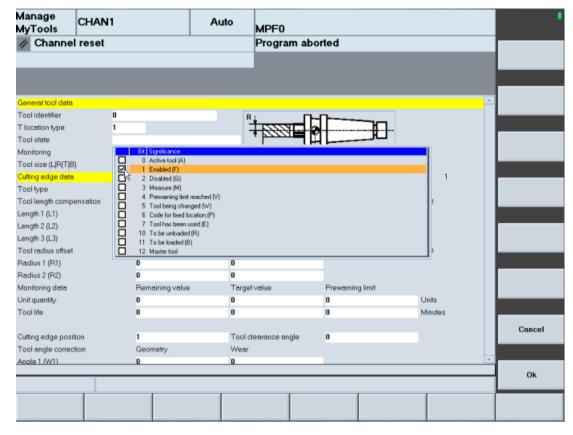| Softkey	Description
Previous section	Press the "Previous sector" softkey to display further data of the tool.
	Scroll the screen section down by one section.
Next section	Press the "Next section" softkey to display further data of the tool.
	Scroll the screen section up by one section.
Change data	Press the "Change data" softkey to change the data.
	Prerequisite: The appropriate access rights are set.
Zoom screen	Press the "Zoom screen" softkey to zoom out or zoom in the size of the tool icon.
Cancel	Press the "Cancel" softkey to close the window without saving the previously entered data.
OK	Press the "OK" softkey to save the settings.

Figure 5-62   Changing the tool state

Cutting-edge data

Function	Description/selection

Cutting-edge data	Display and partly change the following data for each cutting edge:
	• Tool type
	• Tool length compensation
	  – Geometry
	  – Wear
	  – Base (this data cannot be modified)
	  – Unit (this data cannot be modified)
	• Tool radius correction:
	  – Geometry (this data cannot be modified)
	  – Wear (this data cannot be modified)
	• Monitoring data (unit quantity / tool life)
	  – Residual value
	  – Setpoint
	  – Prewarning limit
	• Cutting edge position
	• Tool clearance angle
	• Tool angle correction
	  – Geometry
	  – Wear
	
	Depending on the number of cutting edges or the tool type, additional data may be available. A scrollbar is displayed for additional data.
	
	A sand clock will be displayed while the tool data is being loaded. An error message will be issued if an error occurs during the loading.

External tool supplementary data	Details for the following data: • Tool description • Comments about the tool • Cabinet assignment
Check limit values	The input fields can have limit values. These values are displayed in the status line. If you violate the input limit, the status line will indicate this. You can exit the input field only when the value is correct.

Figure 5-63   NC details

Internal user data

Function	Description/selection
Internal user data	The type and quantity of the data displayed here depends on the OEM data on the target machine.
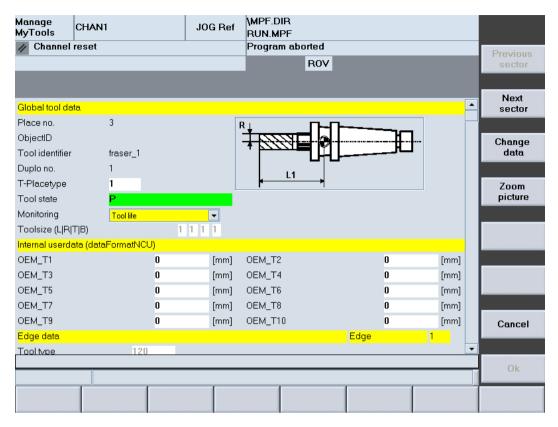
Figure 5-64   NC details

References

For a description of the individual states, refer to the following literature:

"Tool Management" Function Manual

5.4.12.9   Set up tool

You can set up tools in a tool cabinet.

Procedure

1. The "Tool Master Data" window is open.

2. Select a tool in the list.

3. Press the "Set up tool" softkey.
   The "Set Up Tool" window opens.

4. Select the tool cabinet from the selection list.

    – You can assign an optional Duplo number.

   – For the default setting "0", an unused Duplo number is assigned automatically.

5. Press the "OK" softkey to save the settings.
    - OR -
    Press the "Cancel" softkey to abort the settings action.
    You return to the tool master data overview.

Figure 5-65   Set up tool

5.4.12.10   Create tool

You have the capability of creating new tools. New tools are added in the overview table of the tool master data.

A scroll bar may appear depending on the number of data items.

Prerequisite

The selection of this window is protected with the following access rights: Access level 1 (password manufacturer).

Overview

The window is divided into a number of sections each separated with a yellow divider bar.

Function	Description
General tool data	
Tool identifier	Entry of the tool identifier.
T location type	The tool location type defines the kind of location in the magazine. The selected tool can only be loaded (changed) to a location of the appropriate type.
	For additional details, refer to the description of the standard tool management of SINUMERIK.
<Graphics>	When a SINUMERIK with standard tool management is used, a tool graphic of the selected tool is displayed depending on the tool type.

Function	Description
State	Change the state of a tool.
	After selecting the "State" field and pressing the "Change data" softkey, a window to select the status is opened when the Return key is pressed, to set the following tool
	states:
	• Code for fixed location (P)
	• To be loaded (B) [*]
	• Master tool
	The following states are displayed but cannot be selected:
	• Active tool (A)
	• Enabled (F) [*]
	• Disabled (G) [*]
	• Measure (M) [*]
	• Prewarning limit reached (V)
	• Tool being changed (W)
	• Tool has been used (E)
	• To be unloaded (R) [*]
	Multiple states can be selected. The states marked with [*] are represented by the letter (abbreviation) in the display field.
Monitoring	You can select from the following monitoring settings:
	• No monitoring
	• Tool life
	• Quantity
Tool size (L/R/T/B)	The tool size specifies the total number of tool half locations that the tool occupies. Specification of the tool size in half locations:
	L = left
	R = right
	T = top
	B = bottom

Function	Description/selection

Cutting edge data	Display and partly change the following data for each cutting edge:
	• Tool type
	• Tool length compensation
	  – Geometry
	  – Wear
	  – Base (this data cannot be modified)
	  – Unit (data cannot be modified)
	• Tool radius offset:
	  – Geometry (data cannot be modified)
	  – Wear (this data cannot be modified)
	• Monitoring data (unit quantity / tool life)
	  – Residual value
	  – Setpoint
	  – Prewarning limit
	• Cutting edge position
	• Tool clearance angle
	• Tool angle correction
	  – Geometry
	  – Wear
	
	Depending on the number of cutting edges or the tool type, additional data may be available. A scrollbar is displayed for additional data.
	
	A sand clock will be displayed while the tool data is being loaded. An error message will be issued if an error occurs during the loading.

External tool supplementary data	Details for the following data: • Tool description • Comment about the tool • Cabinet assignment
Check limit values	The input fields can have limit values. These values are displayed in the status line. If you violate the input limit, the status line will indicate this. You can exit the input field only when the value is correct.

Keys and functions

The following keys are available for operation of the control system and the machine tool.

Key	Function
▲ ▼	Press the arrow keys to move the cursor from input field to input field.

Press the left/right arrow keys to move the cursor from input field to input field.

Press the <INPUT> key to complete your inputs in the input fields.

Description of the softkeys

The following functions can be executed by pressing the vertical softkeys:

Softkey	Description
Previous section	Press the "Previous sector" softkey to display further data of the tool.
	Scroll the screen section down by one section.
Next section	Press the "Next section" softkey to display further data of the tool.
	Scroll the screen section up by one section.
Change	Press the "Change" softkey to change the data.
	Prerequisite: The appropriate access rights are set.
Zoom screen	Press the "Zoom screen" softkey to zoom out or zoom in the size of the tool icon.
Cutting menu	Press the "Cutting menu" softkey to expand the vertical softkey bar with the following functions, see Section: Add/remove cutting edge data (Page 200).
	Create or delete cutting edge.
Cancel	Press the "Cancel" softkey to quit the window without saving the previously entered data.
OK	Press the "OK" softkey to save the settings.

Procedure

1. The "Tool Master Data" window is open.

2. Press the "Functions >" softkey.
   Another softkey bar is displayed.

3. Press the "Tool" softkey.
   The window with the general tool data opens.

4. Enter the tool identifier and other values.
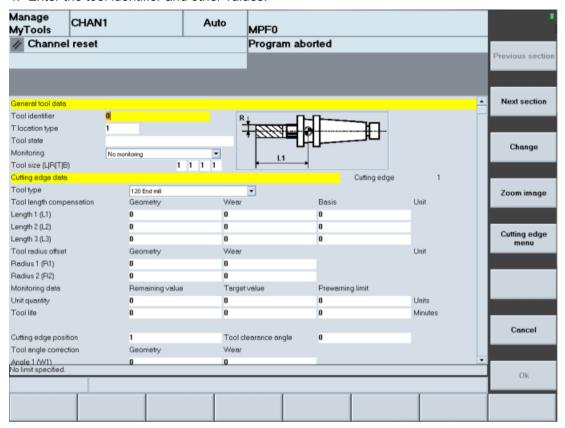
Figure 5-66   Create tool

Note

Optional function

If Duplo numbers or import interfaces have been specified for the creation of master data, the following conditions must be satisfied for the plausibility check:

- In a networked plant, the presetter in the plant configuration must lie directly below the root node.

5.4.12.11   Add/remove cutting edge data

Procedure

1. The "Global tool data" window opens.

2. Press the "Cutting menu" softkey to reach the extended softkey bar.

3. Press the "Add cutting edge" softkey.
   The "Create Cutting Edge" window opens.
   - OR -
   Press the "Delete cutting edge" softkey.

4. Use the selection list to select the cutting edge number in order to add or delete the cutting edge data.
   The details window re-opens and so refreshed. The cutting edge number is ordered appropriately in the details window.
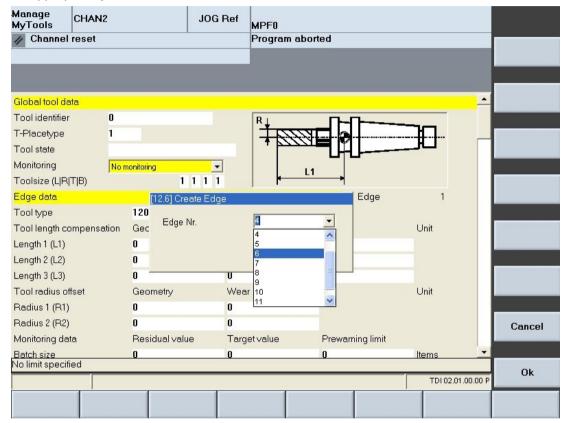
Figure 5-67   Add cutting edge

5.4.12.12   Duplicate tool

You have the capability of creating new tools with the aid of the "Duplicate" function.

A scroll bar may appear depending on the number of data items. The screen is divided into a number of sections each separated with a yellow divider bar.

Requirement

The selection of this window is protected with the following access rights: Access level 1 (password manufacturer).

Procedure

1. The "Tool Master Data" window is open.

2. Select a tool with values that are similar to those of the new tool.

3. Press the "Functions >" softkey.
   Another softkey bar is displayed.

4. Press the "Duplicate tool" softkey.
   The "Global tool data" window opens.

5. Enter the tool identifier and other values.

Note

Optional function

If Duplo numbers or import interfaces have been specified for the creation of master data, the following conditions must be satisfied for the plausibility check:

- In a networked plant, the presetter in the plant configuration must lie directly below the root node.

5.4.12.13 Delete tool

You can delete tools from the tool master data list.

Procedure

1. The "Tool Master Data" window is open.

2. Select a tool in the list.

3. Press the "Functions >" softkey.
   Another softkey bar is displayed.

4. Press the "Delete tool" softkey.
   A prompt will be displayed.

5. Press the "OK" softkey to delete the tool.
   - OR -
   Press the "Cancel" softkey to abort the delete action.
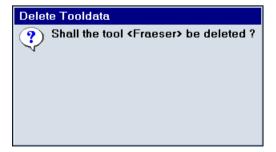   You return to the tool master data overview.

Figure 5-68   Delete tool

5.4.12.14 Importing/exporting tools

You have the capability of importing tools from a drive directory into the central database. The assignment is made via the selected components in the Explorer tree.

Furthermore, you have the possibility to export tools from the central database into a drive directory. The assignment is made via the selected components in the Explorer tree and the selected tool plan.

References

How you configure the settings is explained in the Installation Manual "SNUMERIK Integrate MMP, MMT, AMC, AMP, AMD", Chapter: Configuration with Manage MyTools Configuration, master data

Procedure

Exporting master data

1. The "Tool Master Data" window is open.

2. Select a tool in the list.

3. Press the "Functions >" softkey.
   Another softkey bar is displayed.

4. Press the "Import/export" softkey

5. Press the "Export" softkey.
   The "Export tool master data" window opens.

6. Enter the file name for the export data in the entry field.
   Press the "OK" softkey to start the export.
   - OR -
   Press the "Cancel" softkey to cancel the process.
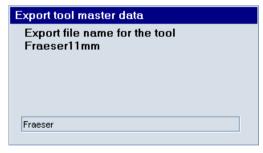

Figure 5-69   Exporting master data

Note

Importing/exporting does not delete the tools in the source.

In the target directory, existing tools that were already exported are overwritten by another export operation.

Procedure

Exporting all master data

1. The "Tool Master Data" window is open.

2. Select a tool in the list.

3. Press the "Functions >" softkey.
   Another softkey bar is displayed.

4. Press the "Import/export" softkey

5. Press the "Export all" softkey.
   The "Export tool master data" window opens.

6. Enter the file name for the export data in the entry field.
   Press the "OK" softkey to start the export.
   - OR -
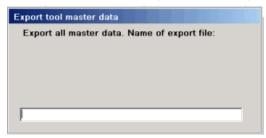   Press the "Cancel" softkey to cancel the process.

Figure 5-70   Exporting all master data

Procedure

Importing master data

1. The "Tool Master Data" window is open.

2. Select a tool in the list.

3. Press the "Functions >" softkey.
   Another softkey bar is displayed.

4. Press the "Import/export" softkey.

5. Press the "Import" softkey.
   The "Import tool master data" window opens.

6. Select the desired file from which the file is to be imported.

7. Press the "OK" softkey to start the export.
   - OR -
   Press the "Cancel" softkey to cancel the process.

Figure 5-71   Importing master data

5.4.12.15   Internal user data

You can assign internal user data to the tool selected in the tool master data overview.

References

How you configure the user data is explained in the Installation Manual "SNUMERIK Integrate MMP, MMT, AMC, AMP, AMD", Chapter: Configuration with Manage MyTools Configuration, configuring user data

Description of the softkeys

The following functions can be executed by pressing the vertical softkeys:

Softkey	Description
Previous section	Press the "Previous section" softkey to display further data of the tool.
	Scroll the screen section down by one section.
Next section	Press the "Next section" softkey to display further data of the tool.
	Scroll the screen section up by one section.
Change data	Press the "Change data" softkey to edit data.
	Prerequisite: The appropriate access rights are set.
Cancel	Press the "Cancel" softkey to quit the window without saving the previously entered data.
OK	Press the "OK" softkey to save the settings.

Procedure

1. The "Tool Master Data" window is open.

2. Select a tool in the list.

3. Press the "Internal user data" softkey.
   The window for parameterizing the internal user data opens.

4. Select the appropriate machine manufacturer from the selection list. Different machine manufacturers can include different, internal user data, i.e. after selecting the machine manufacturer, the view dynamically adapts itself to the internal user data.
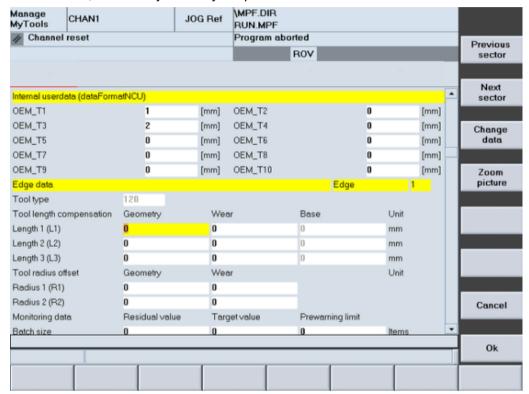

Figure 5-72   Internal user data

5.5 Manage MyTools tool statistics

5.5.1 Introduction

The statistics web interface is displayed or called from any Windows PC or server. Ensure that you have the appropriate web browser version.

A display at the machines is not supported.

For the preconditions, refer to the Installation Manual "SINUMERIK Integrate MMP, MMT, AMC, AMP, AMD", Chapter: System requirements.

Precondition

To acquire and record statistical data of the tools in MMT, you must activate the function in "Manage MyTools Configuration", see Installation Manual "SINUMERIK Integrate MMP, MMT, AMC, AMP, AMD", Chapter: Configuring Manage MyTools (MMT), configuring general options, statistics

Overview

Using the raw data that has been captured you can evaluate the following points:

● Tool consumption

● Tool movements

● Tool life cycle

● Tool failure

● Machine utilization

● Program runtime

● Active tool operating times

You can apply filter criteria to restrict the raw data to simplify evaluation. You then export the captured and filtered raw data as an Excel table (.csv). You then process the data and configure your evaluation to specifically address your requirements.

You can optimize the tool requirement and tool handling based on the results. For example, for tool usage times you can obtain information about how long a specific drill has been used.

The data is displayed in tabular form. To optimize transparency, you can apply various filters to the display, see Chapter: Filtering data sets (Page 209)

Before you export the data you have the option of checking the data in a preview. The preview is only to check whether the data or the events that you're looking for are really in the csv file to be exported, see Chapter: Data preview (Page 219).

After the data preview you can export the selected data, see Chapter: Export data (Page 220).

To avoid an excessive amount of data having a negative impact on the database, you can delete the database data. The procedure can be found in the following documentation:

References

Installation Manual "SINUMERIK Integrate MMP, MMT, AMC, AMP, AMD", Chapter: Configuring "Manage MyTools" (MMT), Tool statistics.

5.5.2 Logging in to tool statistics

Procedure

1. Open the web browser – and enter the following link:
   http://<ip address or host name of the SINUMERIK Integrate Servers>/tools/statistics.
   The login window opens.

2. To call the online help, click in the status bar on the "Help" link.

3. In the "User name" and "Password" input fields, enter the name and the password that you used previously to log into MMT or MMP.

   – The system displays an error message if you entered incorrect user data six times in succession. The user data can be user name, password or organization. Your user account is then blocked for 30 seconds. Re-enter your user data once the blocking period has expired.

4. Click the "Login" button to call "Manage MyTools - tool statistics".

Note

Automatic logout

If you do not use the program for more than 30 minutes, you will be automatically logged out.

The window remains open into the foreground. After a call-up action, you are transferred to the login page and you must log in again to carry on with your work.

Figure 5-73   Login

5.5.3 Filtering data sets

After you have successfully logged in, the window opens by select targeted data.

All of the recorded results can be displayed directly in tabular form.

You can influence the display using various filters.

Title bar

You have the following options in the "Manage MyTools - tool statistics" title bar:

Function	Description
DE | EN	Switches to the selected language.
	DE = German
	EN = English
Logout or Login	Logout or login The "Login" window is displayed.

Filtering functions

The individual filter criteria are not dependent on one another. Selecting a filter parameter does not restrict the selection option of the next or previous filter. For example, a tool selection does not minimize the selection of the machine list, although the selected tool has no reference to a machine.

Function	Description	
Reporting period	Start date to end date	
	Choose the start date and end date via the calendar function.	
Tool	Specify which tool classes you would like to evaluate. Limit the export in this way to data sets with the specified tool class.	
	Tool classes:	Selecting tool families to which all tools with the same name belong.
		The duplo number does not play a role here.
	Individual tools:	Selecting individual tools.
		An individual tool is identified by its name and duplo number, or using a unique external ID.
Event	Selecting available results	
NC program	Selection of the NC programs	
Machine	Selection of machines	

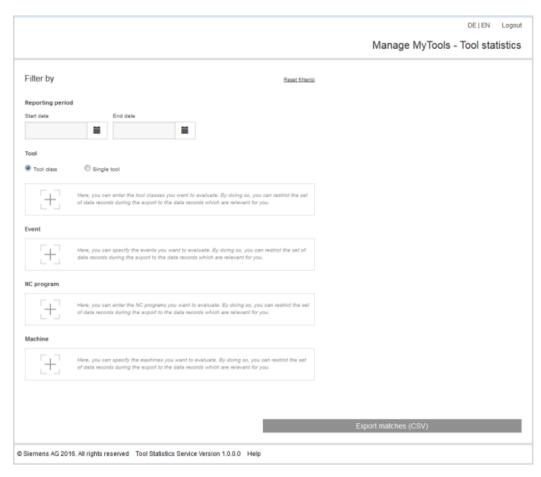| Button/link	Description
Reset filter	The complete setting is reset.
Export matches (CSV) <xx>	The number of hits is dynamically displayed on the button.
	The data sets that have been found are exported, see Chapter: Export data (Page 220)
Help	The online help is displayed.

Figure 5-74   Filter selection

Select the reporting period

1. Select the start date using the calendar function.

2. Then select the end date using the calendar function.

Figure 5-75   Period

Filter tool class

1. Under the "Tool" area, activate the "Tool class" option field.
   The "Filter by tool class" window, opens and shows all of the tools of a tool class. The search is performed using the tool identifier.
   If, for a tool, a catalog reference exists to Teamcenter, then this is displayed with a separator after the tool identifier, see below "Filter tool by Teamcenter catalog reference".
   - OR -
   Enter the text in the search field in order to search for the corresponding data from the data sets that have been saved.

2. Mark the required tool.

3. Double click the tool names.
   - OR -
   Click on "Add"
   The selected tool is displayed in the lower window area.

4. Click the "Reset selection" button to delete the selection.

5. Click "Cancel" to return to the overview.

6. Click "Apply" to apply the filter to the selected data.

Figure 5-76   Filter tool class

Filter tool by Teamcenter catalog reference

1. Enter the reference to the Teamcenter catalog in the search field in order to search for the appropriate data from the data sets that have been saved.
   All tool IDs for the reference searched for are displayed.

2. When selecting a tool with the corresponding Teamcenter reference, all tools with the same reference are selected and provided for export.

Figure 5-77   Filter tools by Teamcenter reference

Filtering individual tools

1. Under the "Tool" area, activate the "Single tool" option field.
   The "Filter by single tool" window opens and shows all of the tools of a tool class. The search is performed using the tool identifier.
   If, for a tool, a catalog reference exists to Teamcenter, then this is displayed with a separator after the tool identifier, see below "Filter tool by ExternId".
   - OR -
   Enter the text in the search field in order to search for the corresponding data from the data sets that have been saved.

2. Mark the required tool.

3. Double click the tool name.
   - OR -
   Click on the "Add" button.
   The tool selected is displayed in the lower window area.

4. Click the "Reset selection" button to delete the selection.

5. Click "Cancel" to return to the overview.

6. Click "Apply" to apply the filter to the selected data.

Filter by Single tool

		Add
🔍		

> toolid_0#2 | externId_48
> toolid_0#2 | externId_468
> toolid_1#2 | externId_309
> toolid_1#2 | externId_59
> toolid_10#2 | externId_131
> toolid_10#2 | externId_137
> toolid_10#2 | externId_302
> toolid_100#2 | externId_217
> toolid_100#2 | externId_292
> toolid_100#2 | externId_61
> toolid_100#2 | externId_76
> toolid_100#2 | externId_184
> toolid_100#2 | externId_52
> toolid_100#2 | externId_268

Reset selection
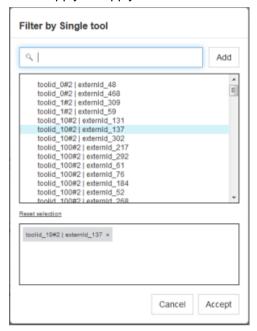
toolid_10#2 | externId_137 ×

Cancel   Accept

Figure 5-78   Filtering individual tools

Filter tool by external ID

1. Enter the requested ID in the search field in order to search for the appropriate data from the data sets that have been saved.
   All tool IDs for the ExternId searched for are displayed.

2. When selecting a tool with the corresponding ExternId, all tools with the same ExternId are selected and provided for export.

Figure 5-79   Filter tools by external ID

Filtering events

1. Select the "Event" area.
   The "Filter by event" window is opened and all of the events are displayed.

2. Mark the required event.

3. Double click the event.
   - OR -
   Click on "Add"
   The selected events are displayed in the lower window area.

4. Click the "Reset selection" button to delete the selection.

5. Click "Cancel" to return to the overview.

6. Click "Apply" to apply the filter to the selected data.
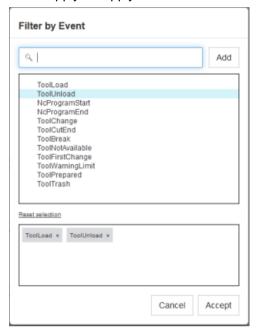
Figure 5-80   Filter events

Filter NC programs

1. Select the "NC program" area.
   The "Filter by NC program" window opens, and lists all of the NC programs.
   - OR -
   Enter a text in the search field in order to search for the appropriate data from the data sets that have been saved.

2. Mark the required NC program.

3. Double click the NC program.
   - OR -
   Click on "Add"
   The selected program is displayed in the lower window area.

4. Click the "Reset selection" button to delete the selection.

5. Click "Cancel" to return to the overview.

6. Click "Apply" to apply the filter to the selected data.

Figure 5-81   Filtering NC programs

Filter machines

1. Select the "Machine " area.
   The "Filter by machine" window opens, and lists all of the machines.
   - OR -
   Enter a text in the search field in order to search for the appropriate data from the data sets that have been saved.

2. Select the required machine.

3. Double click the machine.
   - OR -
   Click on "Add"
   The selected program machine is displayed in the lower window area.

4. Click the "Reset selection" button to delete the selection.

5. Click "Cancel" to return to the overview.

6. Click "Apply" to apply the filter to the selected data.

Filter by Machine

AFO 100/1/001
AFO 110/1/001
AFO 120/1/001
AFO 130/1/001
AFO 140/1/004
AFO 150/1/004
AFO 180/1/004
AFO 190/1/002
AFO 20/3
AFO 220/3
AFO 80/1/004
AFO 90/1/002
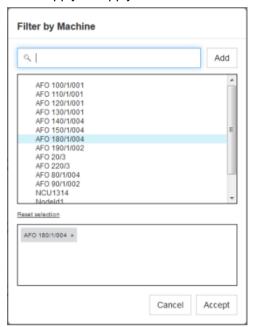NCU1314
Nodeld1

Reset selection

AFO 180/1/004 ×

Figure 5-82   Filtering a machine

Result

Click on the "Display data preview" link to display the selection of all data, see Chapter: Data preview (Page 219).
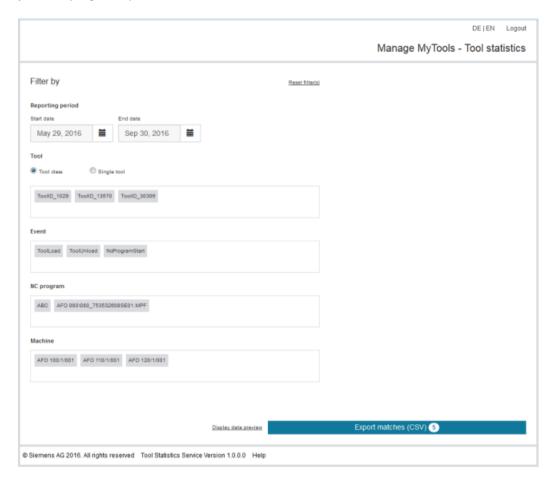
Figure 5-83   Selection result

5.5.4   Data preview

In the data preview, you can display all of the data selected using the display filters.

Note

Display of edge number 1 in case of the event "Prewarning limit" reached.

In the case of a tool with several cutting edges, only cutting edge number 1 ("Cutting edge" column) is always displayed when the warning limit is reached. The reason is that the tool status is set not specifically for the cutting edge, but for the whole tool in the standard tool management.

This display applies both for the data preview and for the export.

Procedure

1. The "Data preview" window is open and displays the individual data sets in tabular form. Only 10 data sets are displayed on a page. Navigate forward and backward to review additional data:
   Click on the "<" button to page back.
   Click on the ">" button to page forward.

2. Click on the "Close data preview" link to close the data preview.
   You return to the "Filter by" window, see Chapter: Filtering data sets (Page 209).

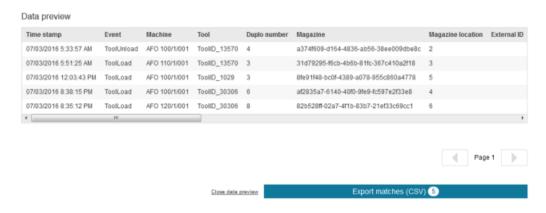3. Click on "Export matches (CSV) <xx>", to start the export, see Chapter: Export data (Page 220).

Data preview

Time stamp	Event	Machine	Tool	Duplo number	Magazine	Magazine location	External ID
07/03/2016 5:33:57 AM	ToolUnload	AFO 100/1/001	ToolID_13570	4	a374f609-d164-4836-ab56-38ee009dbe8c	2	
07/03/2016 5:51:25 AM	ToolLoad	AFO 110/1/001	ToolID_13570	3	31d79295-f6cb-4b6b-81fc-367c410a2f18	3	
07/03/2016 12:03:43 PM	ToolLoad	AFO 100/1/001	ToolID_1029	3	8fe91f48-bc0f-4389-a078-955c860a4778	5	
07/03/2016 8:38:15 PM	ToolLoad	AFO 100/1/001	ToolID_30306	6	af2835a7-6140-40f0-9fe9-fc597e2f33e8	4	
07/03/2016 8:35:12 PM	ToolLoad	AFO 120/1/001	ToolID_30306	8	82b528ff-02a7-4f1b-83b7-21ef33c69cc1	6	

◀ Page 1 ▶

Close data preview   Export matches (CSV) 5

Figure 5-84   Data preview

5.5.5 Export data

Procedure

1. The "Data preview" window is opened

2. Click on "Export matches (CSV) <xx>", to start the export.

3. The "CSV export in progress" opens and shows the progress of the export.
   Leave the window open to correctly end the download. Depending on the data that is selected, the export can take some time.
   The data are written to the following file: "toolevent-export.csv".

4. A window is opened once the data have been exported. You have the following options:

   – Click on "Open" to view the data. The file is not saved.

   – Click "Save" to save the file. You can find the exported data in the download directory that you have set.

   – Explorer is opened when you click on "Save as" Select your own directory where you can save the file.
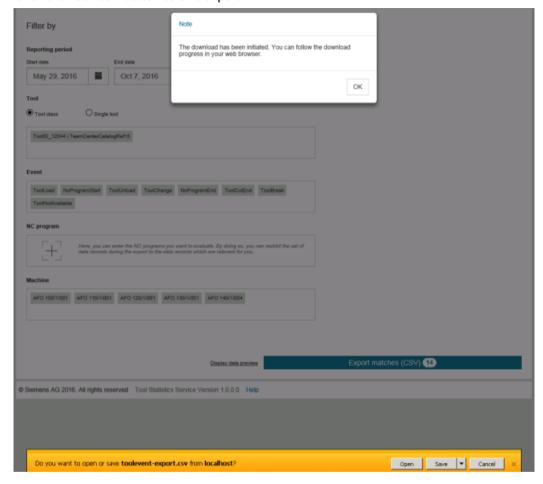
5. Click the "Cancel" button to exit export.

Figure 5-85   Opening/saving CSV export

5.5.6   Displaying the tool usage time

You have the option of displaying the usage time of a tool.

Procedure

1. In the "Report period", using the calendar function, select the start date and the end date.

2. Under "Tool", activate the option button "Tool class".

3. Click on "Export matches (CSV) <xx>", to prepare the data for export. An appropriate message is displayed.

4. The data is written to file "toolevent-export.csv" and saved to your PC.

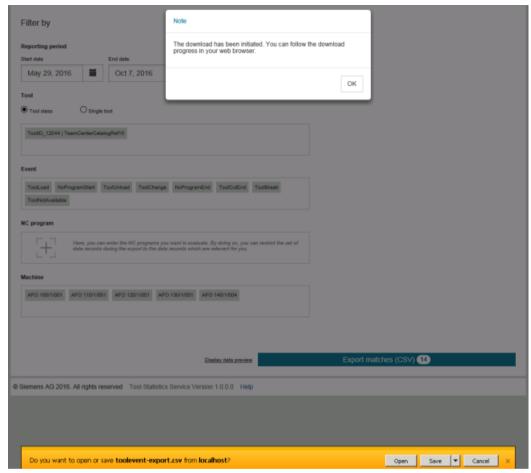

Figure 5-86   Exporting matches

5. Open the "Excel" program.

   – Open the "Data" tab.

   – Click on the "From text" option.
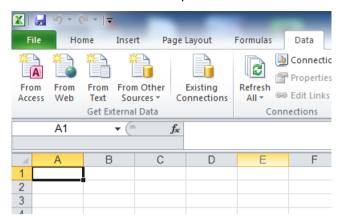
Figure 5-87   Open Excel

6. Navigate to the file that you downloaded.
Select the file and click on "Import"
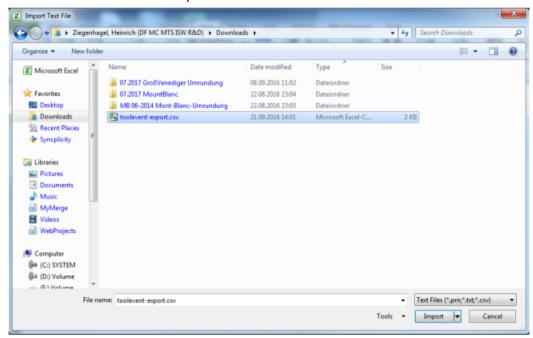
Figure 5-88   Import the file

7. Window "Text conversion wizard - step 1 of 3" opens.
   Activate the option button "Separate" and click on "Next >".
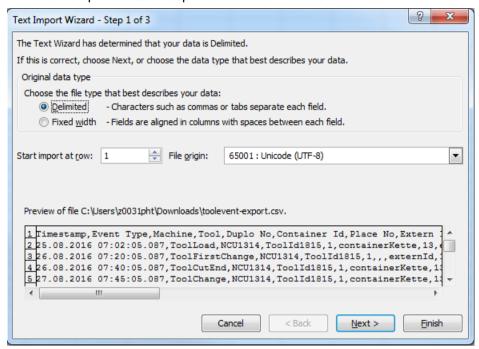
Figure 5-89   Convert text 1

8. Window "Text conversion wizard - step 2 of 3" opens.
   Under "Separator", activate the control box "Tab stop" and "Comma".
   Click on "Next >".
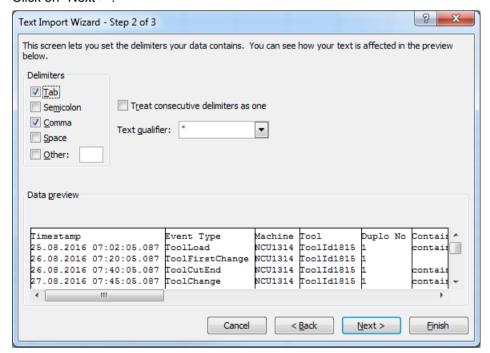
Figure 5-90   Convert text 2

9. Window "Text conversion wizard - step 3 of 3" opens.
    Activate the option button "Date", and from the drop-down list, select entry "DMY" (day/month/year).
    Then click on "Finish".
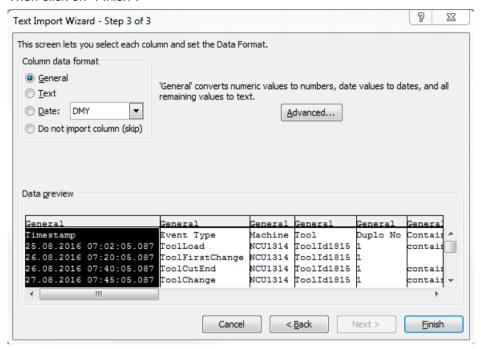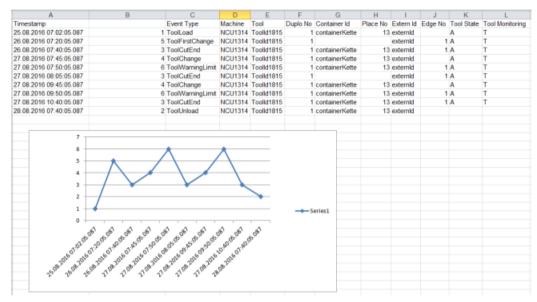
Figure 5-91   Convert text 3

10. You obtain a complete overview of the tool usage times.

1:	Tool was loaded
5:	The tool was used for the first time on the NCU
3:	Tool cut end: The usage time is also saved in this event
6:	Tool at the prewarning limit
6:	Tool again at the prewarning limit - this tool was reset again
2:	Tool was unloaded from the machine

Figure 5-92   Result – usage time

5.5.7   Setting the error-free statistical view in Internet Explorer

If you see an incomplete window after logging in, e.g. without controls, then make the appropriate settings in Windows Internet Explorer.

Figure 5-93   Incorrect view

Procedure

1. Open Internet Explorer.

2. Click on the symbol [icon]
    - OR -
    Press keys <Alt + X>.

3. Select menu command "Internet options" and open the "Security" tab.

– Select option "Internet" and click on "Adapt level...".
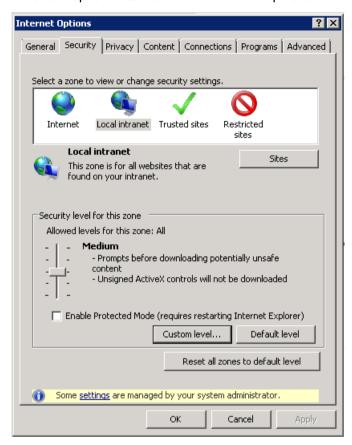
Figure 5-94   Internet options

4. The "Settings" window opens.
   Activate the following option buttons:

   – Under "Downloads":
     file download = activate
     font type download = activate

   – Under "Scripting":
     Active Scripting = activate

   Click "OK" to save the settings.
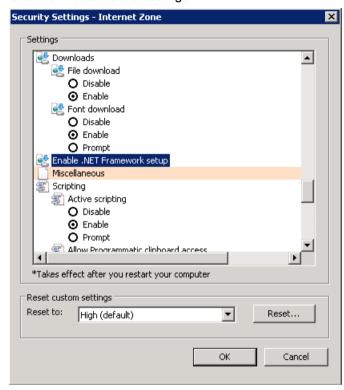
Figure 5-95   Security settings

5. Now select option "Local Intranet", and make the same settings as described above.

6. Then press key <F5>.
   - OR -
   Reopen "Manage MyTools - tool statistics" again.
   The controls are completely displayed.

Analyze MyCondition (AMC) 6

Analyze MyCondition (AMC) provides test cycles for testing synchronous axes and universal axes and for performing circularity tests, and also offers functionality for individual acquisition of CNC data.

The current machine status is acquired and documented on the basis of predefined, standardized tests and continuous recording of status parameters (traverse path, traverse time and traverse operations for one axis). The test parameters can be defined centrally and configured with appropriate warning limits.

Delivery stages

Stage 1: Control system monitors

You can configure triggers that will initiate a specific action. For example, they can be configured to send an e-mail to the machine manufacturer's service organization in response to a specific event.

Stage 2: Diagnostics data

In addition to the triggers from stage 1, diagnostics data can be gathered and sent to the machine manufacturer's service organization.

Stage 3: Maintenance functions

In addition to the functions from stages 1 and 2, the functions supplied with stage 3 can be used to set up and evaluate event-driven maintenance functions.

References

A description of the individual AMC functions is provided in the "SINUMERIK Integrate AMC" Function Manual.

Analyze MyPerformance (AMP)

<div style="text-align: right; font-size: 2em;">7</div>

7.1 Introduction

Overview

Analyze MyPerformance (AMP) is a solution in which a higher-level master computer and several controls work together.

The data acquired on the controls is transferred to the server and then fetched via the AMP server so that central evaluations can be performed there.

Analyze MyPerformance is available as networked solution via SINUMERIK Integrate Server:

- Only possible with central server and network connection to the machines
- User interface only with input dialog for manual states and part type selection

References

A description of Analyze MyPerformance is available in the descriptions under Sinumerik_Integrate\AMP\Docu\english

A description of the AMP user interface at the control is provided in the following chapters.

Security note

> **Note**
>
> **No confidential information**
>
> Please note that the system diagram does not contain any confidential information.

7.2 Machine with AMP under HMI-Advanced and recording via SINUMERIK Integrate

7.2.1 Starting AMP (HMI-Advanced)

Analyze MyPerformance for SINUMERIK with HMI-Advanced is integrated in SINUMERIK Integrate via the user interface.

1. Select "AMP" and press the "Select" softkey to change to the Analyze MyPerformance window.
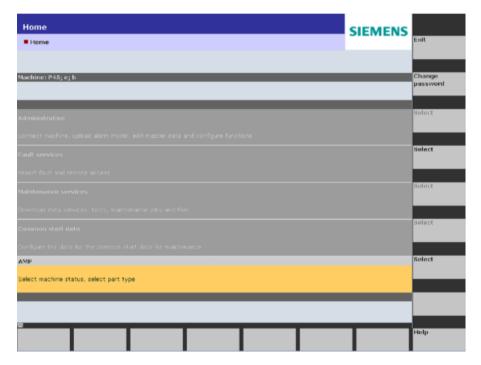
Figure 7-1   AMP access with HMI-Advanced

2. The "Analyze MyPerformance" window opens and provides the following options:

   – Select the "Select manual states" area and press the "Select" softkey. You can explain, e.g. the current machine downtime, manually via softkey.

   – Select the "Edit part type list" area and press the "Select" softkey. You can manually select part type data from the specification list.

   – Select the "Back to overview" area and press the "Select" softkey to return to the "Home" window of SINUMERIK Integrate.
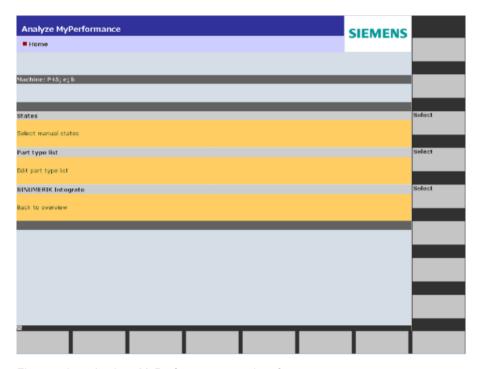
Figure 7-2   Analyze MyPerformance user interface

You can view further data via the configured interface, see chapter: AMP user interface (HMI-Advanced) (Page 233)

7.2.2   AMP user interface (HMI-Advanced)

Configure the side of the window and the labeling of the softkeys with Analyze MyPerformance (AMP).

With further configurations, more data can be displayed via the configured softkeys.

The configuration of the following horizontal and vertical softkey bars is performed in a customer-specific configuration file, in which the layout is specified permanently.

Examples of a customer-specific configuration are shown below.

Part type list

1. The "Part type list" window is open and displays the configured softkeys.

2. Select a part type for machining.

3. Press the "Select" softkey to confirm the selection.
   The selected part type is then displayed in the "Current part type" section.
   The selected part type is assigned the automatically acquired states.

4. Press the "Curr. list" softkey to update the part type list.

5. Press the "Back" softkey to return to the "Analyze MyPerformance" start window.
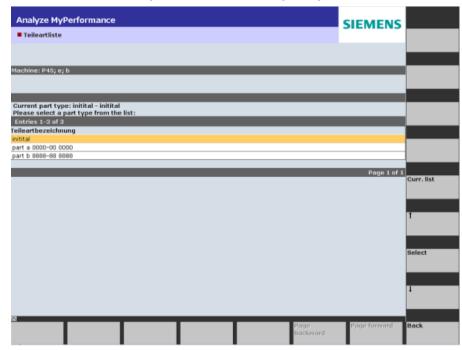
Figure 7-3   Example: "Part type list" window

The displayed part types are manually created in AMP.

For additional information, please refer to the following documentation: AMP configuration

Manual states

You can display the manually acquired machine states and faults in the "States" window. The softkeys can be configured customer-specifically.

Function	Description
Machine status:	Shows the current machine state, e.g. production, standstill, etc.
Booked manual state:	Shows the manual status currently being acquired by the AMP server.
Manual state:	Shows the status currently selected on the user interface that has not yet been acquired by the server.
	This function provides the operator with information, for example, that a key that has just been pressed on the user interface has been accepted by the system.
	When the manual status is acquired by the AMP server, the data is registered as "Booked manual status".

Configured softkeys	Description
Cleaning	Press the "Cleaning" softkey to set the manual "Cleaning" machine state.
Maintenance	Press the "Maintenance" softkey to set the manual "Maintenance" machine state.
T. Dist. Being solved	Press the "T. Dist. Being solved" softkey to set the manual "Technical disturbance is being solved" machine state.
T. Dist.: Wait for being solv	Press the softkey "T. Dist.: Wait for being solv" to set the manual "Technical disturbance: Wait for being solved" machine state.
Measurement	Press the "Measurement" softkey to set the manual "Measurement" machine state.
Set-up	Press the "Set-up" softkey to set the manual "Set-up" machine state. In this example, you can see that the selected manual state has been booked on the AMP server (booked manual state) and resulted in the machine status with the highest priority.
End manual status	Press the "End manual status" softkey to end an active manual status and return to the automatic machine status.
Update	Press the "Update" softkey to update the displayed data.

The "States" window is open and displays the configured softkeys.
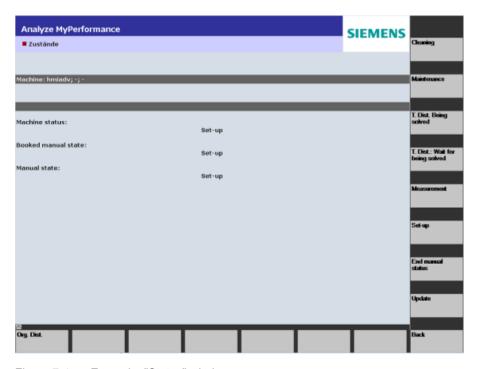
Figure 7-4   Example: "States" window

7.3 Machine with SINUMERIK Operate and recording via SINUMERIK Integrate

7.3.1 Starting AMP (SINUMERIK Operate)

Requirement

SINUMERIK Integrate must be activated to be able to use Analyze MyPerformance.

References

For information on how to activate the software, refer to the Installation Manual "SINUMERIK Integrate MMP, MMT, AMC, AMP, AMD".
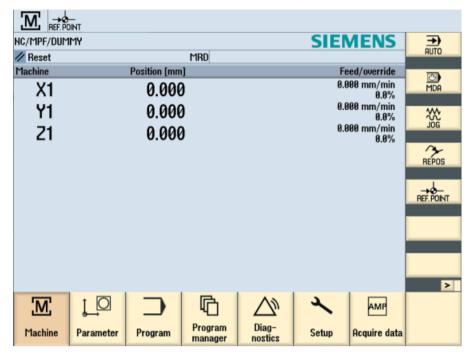
Overview

Information on the server is displayed in the "AMP" window.

Display	Description	
Server data	Overview of the configured connection to the server	
Date	Current date	
Connection to the server		
	Connected	There is an online connection to the server
	Separated	There is no connection to the server

Procedure
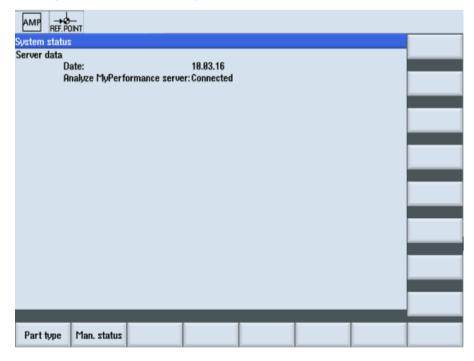
1. The control system has booted and the operating areas are displayed.

Operating areas

2. Press the "AMP" softkey.
   The "System status" window opens.

"System status" window

You can view further data via the configured softkeys "Part type" and "Man. status", see chapter: AMP user interface (SINUMERIK Operate) (Page 238).

7.3.2 AMP user interface (SINUMERIK Operate)

Configure the side of the window and the labeling of the softkeys with Analyze MyPerformance (AMP).

With further configurations, more data can be displayed via the configured softkeys.

The configuration of the following horizontal and vertical softkey bars is performed in a customer-specific configuration file, in which the layout is specified permanently.

Examples of a customer-specific configuration are shown below.

Part type list

1. The "Part type list" window is open and displays the configured softkeys.

2. Select a part type for machining.

3. Press the "Select" softkey to confirm the selection.
   The selected part type is then displayed in the "Current part type" section.
   The automatically recorded states are assigned to the part type.

4. Press the "Update" softkey to update the part type list.

5. Press the "Back" softkey to return to the start window.
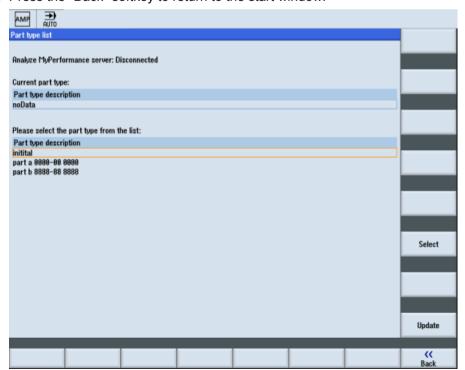
Figure 7-5   Example: "Part type list" window

The displayed part types are manually created in AMP.

For additional information, please refer to the following documentation: AMP configuration

Manual states

You can display the manually acquired machine states and faults in the customer-specific "Manual states" window.
The softkeys can be configured customer-specifically.

Function	Description
Machine status:	Shows the current machine state, e.g. production, standstill, etc.
Booked manual status:	Shows the manual status currently being acquired by the AMP server.
Manual state:	Shows the status currently selected on the user interface that has not yet been acquired by the server.
	This function provides the operator with information, for example, that a key that has just been pressed on the user interface has been accepted by the system.
	When the manual status is acquired by the AMP server, the data is registered as "Booked manual status".

Configured softkeys	Description
Cleaning	Press the "Cleaning" softkey to set the manual "Cleaning" machine state.
Maintenance	Press the "Maintenance" softkey to set the manual "Maintenance" machine status.
T. Dist. Being solved	Press the "T. Dist. Being solved" softkey to set the manual "Technical disturbance is being solved" machine state.
T. Dist.: Wait for being solv	Press the softkey "T. Dist.: Wait for being solv" to set the manual "Technical disturbance: Wait for being solved" machine state.
Measurement	Press the "Measurement" softkey to set the manual "Measurement" machine state.
Set-up	Press the "Set-up" softkey to set the manual "Set-up" machine state.
	In this example, you can see that the selected manual state has been booked on the AMP server (booked manual state) and resulted in the machine status with the highest priority.
End manual status	Press the "End manual status" softkey to end an active manual status and return to the automatic machine status.
Update	Press the "Update" softkey to update the displayed data.

Figure 7-6   Example: "Manual states" window

Access MyData (AMD) 8

The open, flexible software interface SINUMERIK Integrate Access MyData enables the data exchange between SINUMERIK Integrate applications and higher-level software systems.

SINUMERIK Integrate Access MyData provides data and services for higher-level or supplementary software systems. The basis for this are standardized web services, e.g. on the basis of Microsoft .NET Windows Communication Foundation (WCF).

The SINUMERIK Integrate Access MyData software interface is provided by the SINUMERIK Integrate Server and is divided into functional modules.

Overview

The principle of SINUMERIK Integrate Access MyData can be summarized as follows:

- Communications interface between higher-level or supplementary software systems and a SINUMERIK Integrate Server

- Defined, open communications interface in the form of standardized web services and WSDL descriptions or XML via HTTP.

- Interface modules with selected functions for SINUMERIK Integrate applications:

  - AMD access to tool information: Interface (requiring a license) to Manage MyTools (MMT)

  - AMD access to NC program data: Interface (requiring a license) to Manage MyPrograms (MMP)

  - Direct AMD access to NC/PLC: Interface to basic functions, including access to NC/PLC data of the CNCs via the Integrate Server

Introduction

You have a selected scope of functions of the particular SINUMERIK Integrate product via the particular AMD module.
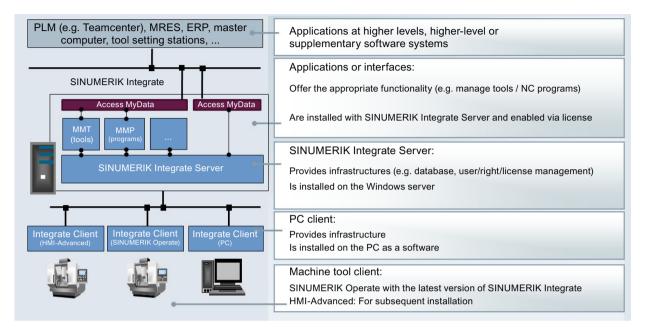
Figure 8-1   AMD overview

Note

Software must be configured

Using the Access MyData interface, end users and/or the plant operating companies must configure or program higher-level software systems. Just the same as when using MCIS RPC or Create MyInterface, they must create the actual application that processes the data read via AMD.

The individual interface modules are described in the following sections.

Direct AMD access by the interface module to NC/PLC

The Access MyData direct access to NC/PLC is also used to access the data on the CNC control systems connected to the SINUMERIK Integrate server.
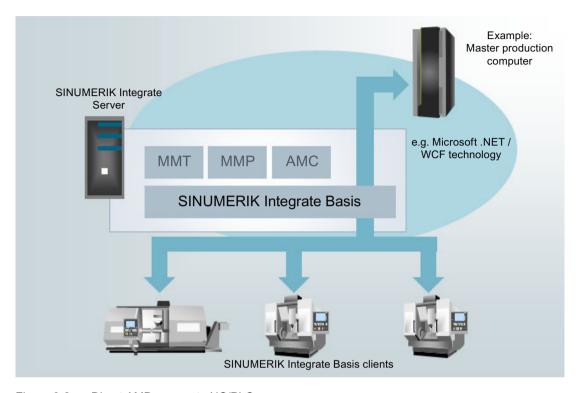
Figure 8-2   Direct AMD access to NC/PLC

Note

Notification service

A notification service (subscription, hotlink) to end users is not available in this AMD interface.
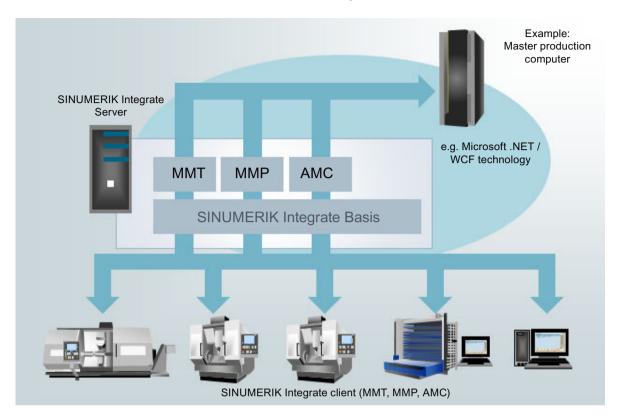
For capturing data, you can configure a monitoring function between the SINUMERIK Integrate client and SINUMERIK Integrate server via AMD. You can cyclically read the results via the AMD interface - or read them as required.

Interface modules

These interfaces involve AMD modules, which require that the appropriate SINUMERIK Integrate product is installed.

For example, the AMD access module for tool information is only available if a licensed version of Manage MyTools (MMT) is installed.

For example, the AMD access module for NC program data is only available if a licensed version of Manage MyPrograms (MMP) is installed.

The AMC interface module is currently not available.

Figure 8-3   SINUMERIK Integrate AMD

Access is realized via higher-level or supplementary software systems to data and services of SINUMERIK Integrate applications:

- MMT: Subscribing to a balancing result
- MMT: Reading out a magazine assignment
- MMP: Importing/exporting a part program
- MMP: Setting run-in and release identifiers

Scope of delivery

In addition to the overview of the appropriate interfaces in text form, a help file in the CHM format with the interface reference is provided for AMD access to NC program data and for AMD direct access to NC/PLC.

In order to simplify the entry into the development of AMD interfaces, smaller test programs are included as source code in the delivery scope.

References

You can find the following information in the AMD function manual:

- Interface activation
- Description of the interfaces
- Notes regarding test programs

Appendix

A

A.1 Formats for the actual tool data from the tool setting station

The actual tool data contained in the file must be transferred from the tool setting station to the MMT in accordance with the following scheme:

Overview

Parameter	Description
$TDI_MACHINE = "0270_1"	Machine name for assignment of tools **Note:** The assigned machine name is sent to the presetting station first via the set data file of SFI RM after the tool installation.
$TDI_SETNAME[1] = "1234"	Name of the tool set (optional) **Note:** This data is defined by the presetting station.
$TDI_SETDATE[1] = "2001/01/14 15:49"	Time of the request (optional), e.g. measuring data **Note:** This data is defined by the presetting station.
$TDI_EXTERN_ID = "12345678"	Tool identification of the complete tool Depending on the "Tool identification" configuration
$TDI_TOOLID_DESCRIPTION = "Drill 5 mm"	Tool description (optional)
$TDI_OBJECT_ID	Catalog ID from the Teamcenter MRL (only with TC connection)
$TDI_CLASS_ID	Tool classes ID from the Teamcenter MRL (only with TC connection)
$TDI_TOOL_COMMENT = "Holder with HSK 63"	Comment on the tool (optional) A comment on the tool can be transferred here.
$TC_TP1[1] = 3456	Duplo number (max. value 36000)
$TC_TP2[1] = "123456"	Tool identifier, max. 32 characters. Identifier of the complete tool as it is used in the NC program
$TC_TP3[1] = 1	Size to left 1 corresponds to 1 half location to left 2 corresponds to 2 half locations to left 3 corresponds to 3 half locations to left etc.
$TC_TP4[1] = 1	Size to right 1 corresponds to 1 half location to left 2 corresponds to 2 half locations to left 3 corresponds to 3 half locations to left etc.

Parameter	Description
$TC_TP5[1] = 1	Size to top 1 corresponds to 1 half location to left 2 corresponds to 2 half locations to left 3 corresponds to 3 half locations to left etc.
$TC_TP6[1] = 1	Size to bottom 1 corresponds to 1 half location to left 2 corresponds to 2 half locations to left 3 corresponds to 3 half locations to left etc.
$TC_TP7[1] = 1	Magazine location type **Note:** The magazine location type must match the magazine location created in the target machine. If tools from several machines are used, the magazine location types must be the same across all machines, e. g. 1 = small 2 = medium 3 = large This data depends on the tool and the machine

Parameter	Description
$TC_TP8[1] = 10	Tool status
	The tool status results as follows:
	Value 0: Not released
	Bit 0: Active tool (A)
	Bit 1: Released (F)
	Bit 2: Locked (G)
	Bit 3: Measured (M)
	Bit 4: Prewarning limit reached (V)
	Bit 5: Tool being changed (W)
	Bit 6: Code for fixed location (P)
	Bit 7: Tool has been used (E)
	Bit 8: Identifier for tools in the buffer
	Bit 9 = 1: Ignore locked state
	Bit 9 = 0: Do not ignore
	Bit 10: To be unloaded
	Bit 11: To be loaded
	Bit 1: Master tool
	Bit 13: Reserved
	Bit 14: 1:1 replacement (is not displayed in MMT)
	Bit 15: Manual tool (is not displayed in MMT)
	The letters in parentheses correspond to the designation on the HMI user interface.
	Status is specified by tool setting station with status = 10, i.e. the tool has been measured und released.
$TC_TP9[1] =1	Tool monitoring method
	Possible values, e.g.
	Bit 0 = 1: Tool life monitoring on
	Bit 1 = 1: Workpiece count monitoring on Bit 2 = 1: Wear monitoring on (is not supported by MMT)
	Bit 1 and 2 and 3 = 0: No monitoring
$TC_TP10	Replacement strategy
	Is supported by MMT on SINUMERIK Operate – data – no UI | No support of MMT on HMI-Advanced data and UI
$TC_TP11	Tool information
	Allows tool groups to be divided into subgroups. Tool selection only with tools of the subgroup (new and check)
$A_TOOLMN	Magazine assignment, tool
	As of HMI-Advanced SW4.2
	Is supported by MMT on SINUMERIK Operate – data – no UI | No support of MMT on HMI-Advanced data and UI
$A_TOOLMLN	Location assignment, tool
	As of HMI-Advanced SW4.2
	Is supported by MMT on SINUMERIK Operate – data – no UI | No support of MMT on HMI-Advanced data and UI

Parameter	Description
$P_TOOLND	Number of cutting edges
	As of HMI-Advanced SW4.2
	Is supported by MMT on SINUMERIK Operate – data – no UI | No support of MMT on HMI-Advanced data and UI
$A_MYMN	Owner magazine of the tool
	As of HMI-Advanced SW6
	Is not supported by MMT – UI and data → SINUMERIK Operate forwards the data
$A_MYMLN	Owner magazine location of the tool
	As of HMI-Advanced SW6
	Is not supported by MMT – UI and data → SINUMERIK Operate forwards the data
$TC_TP_PROTA	Name of the three-dimensional protection area for the tool or name of the file that contains the description of the protection area for the tool.
	Available as of SINUMERIK Operate
	Is not supported by MMT – UI and data → SINUMERIK Operate forwards the data
$TC_TP_MAX_VELO	Maximum speed of the tool, if the value is > 0. If a speed limit is not defined (= 0), then no monitoring is performed
	Available as of SINUMERIK Operate
	Is not supported by MMT – UI and data → SINUMERIK Operate forwards the data
$TC_TP_MAX_ACC	Maximum acceleration of the tool, if the value is > 0. If an acceleration limit is not defined (= 0), then no monitoring is performed
	Available as of SINUMERIK Operate
	Is not supported by MMT – UI and data → SINUMERIK Operate forwards the data

Table A-1   Tool OEM data (internal user data)

Parameter	Description
$TC_TPC1[1] = 1	Tool-specific OEM parameter 1 (manufacturer-specific)
$TC_TPC2[1] = 0	Tool-specific OEM parameter 2 (manufacturer-specific)
$TC_TPC3[1] = 1	Tool-specific OEM parameter 3 (manufacturer-specific)
$TC_TPC4[1] = 0	Tool-specific OEM parameter 4 (manufacturer-specific)
$TC_TPC5[1] = 0	Tool-specific OEM parameter 5 (manufacturer-specific)
$TC_TPC6[1] = 0	Tool-specific OEM parameter 6 (manufacturer-specific)
$TC_TPC7[1] = 0	Tool-specific OEM parameter 7 (manufacturer-specific)
$TC_TPC8[1] = 0	Tool-specific OEM parameter 8 (manufacturer-specific)
$TC_TPC9[1] = 0	Tool-specific OEM parameter 9 (manufacturer-specific)
$TC_TPC10[1] = 0	Tool-specific OEM parameter 10 (manufacturer-specific)
As of SINUMERIK Operate 4.7 SPx to 64 OEM data	

Table A-2   Cutting edge data

Parameter	Description
$TC_DP1[1,1] = 0	Tool type, 3-digit
$TC_DP2[1,1] = 0	Cutting edge position, if measured by the tool setting station
$TC_DP3[1,1] = 0	Geometry - length 1, if measured by the tool setting station
$TC_DP4[1,1] = 0	Geometry - length 2, if measured by the tool setting station
$TC_DP5[1,1] = 0	Geometry - length 3, if measured by the tool setting station
$TC_DP6[1,1] = 0	Geometry - radius, if measured by the tool setting station
$TC_DP7[1,1] = 0	Geometry – corner radius, if measured by the tool setting station
$TC_DP8[1,1] = 0	Geometry - length 4, if measured by the tool setting station
$TC_DP9[1,1] = 0	Geometry - length 5, if measured by the tool setting station
$TC_DP10[1,1] = 0	Geometry - angle 1, if measured by the tool setting station
$TC_DP11[1,1] = 0	Geometry - angle 2, if measured by the tool setting station
$TC_DP12[1,1] = 0	Wear - length 1, if measured by the tool setting station
$TC_DP13[1,1] = 0	Wear - length 2, if measured by the tool setting station
$TC_DP14[1,1] = 0	Wear - length 3, if measured by the tool setting station
$TC_DP15[1,1] = 0	Wear - radius, if measured by the tool setting station
$TC_DP16[1,1] = 0	Wear – groove width b / rounding radius, if measured by the tool setting station
$TC_DP17[1,1] = 0	Wear - projection k, if measured by the tool setting station
$TC_DP18[1,1] = 0	Wear - length 5, if measured by the tool setting station
$TC_DP19[1,1] = 0	Wear - angle 1, if measured by the tool setting station
$TC_DP20[1,1] = 0	Wear - angle 2, if measured by the tool setting station
$TC_DP21[1,1] = 0	Adapter - length 1, if measured by the tool setting station
$TC_DP22[1,1] = 0	Adapter - length 2, if measured by the tool setting station
$TC_DP23[1,1] = 0	Adapter - length 3, if measured by the tool setting station
$TC_DP24[1,1] = 118	Clearance angle, if measured by the tool setting station • The clearance angle is stored here for ManualTurn; tool type 5xx. Same significance as in standard cycles for turning tools. • The tip angle of the drill is stored here for ShopMill [1]; tool type 2xx. • Used in standard cycles for turning tools; tool type 5xx. This is the angle at the secondary cutting edge for these tools. When using ShopMill: Number of teeth for cutter tool type 1xx - OR - Angle of tool tip for drill tool type 2xx

Parameter	Description
$TC_DP25[1,1] = 3328	• The value for the cutting rate is stored here for ManualTurn. • A bit-coded value for various states of tool types 1xx and 2xx is stored here for ShopMill[2]. When using ShopMill: Direction of spindle rotation Bit 8 and bit 9 = 0: Spindle stop Bit 8 = 1: Spindle is turning clockwise Bit 9 = 1: Spindle is turning counterclockwise Coolant Bit 10 = 1: Cooling water 1 on Bit 11 = 1: Cooling water 2 on M functions Bit 0 = 1: M function 1 Bit 1 = 1: M function 2 Bit 2 = 1: M function 3 Bit 3 = 1: M function 4 Example based on $TC_DP25[1,1] = 3328: $3328_{10} = 110100000000_2$ Bit 8 = 1 and bit 9 = 0: Spindle is turning clockwise Bit 10 = 1: Cooling water 1 on Bit 11 = 1: Cooling water 2 on Only ISO-coded programs should run on the machine. Therefore, this data is not managed by MMT.
$TC_DPCE[1,1]	System variable of an offset data record containing cutting edge number CE (unique D no. or user assignment of D no. for cutting edge numbers). Value range for permissible cutting edge numbers: 1, 2, 3 ... MD18106. Is not supported by MMT
$TC_DPH[1,1]	H parameter (Y / extraCuttEdgeParams), Bit 0 = 1 Is not supported by MMT
$TC_DPV	Tool cutting edge orientation Is not supported by MMT
$TC_DPV3	L1 component of the tool cutting edge orientation Is not supported by MMT
$TC_DPV4	L2 component of the tool cutting edge orientation Is not supported by MMT
$TC_DPV5	L3 component of the tool cutting edge orientation Is not supported by MMT

Table A-3   Cutting edge OEM data

Parameter	Description
$TC_DPC1[1,1] = 0	Cutting edge-specific OEM parameter 1 (manufacturer-specific)
$TC_DPC2[1,1] = 0	Cutting edge-specific OEM parameter 2 (manufacturer-specific)
$TC_DPC3[1,1] = 0	Cutting edge-specific OEM parameter 3 (manufacturer-specific)
$TC_DPC4[1,1] = 0	Cutting edge-specific OEM parameter 4 (manufacturer-specific)
$TC_DPC5[1,1] = 0	Cutting edge-specific OEM parameter 5 (manufacturer-specific)
$TC_DPC6[1,1] = 0	Cutting edge-specific OEM parameter 6 (manufacturer-specific)
$TC_DPC7[1,1] = 0	Cutting edge-specific OEM parameter 7 (manufacturer-specific)
$TC_DPC8[1,1] = 0	Cutting edge-specific OEM parameter 8 (manufacturer-specific)
$TC_DPC9[1,1] = 0	Cutting edge-specific OEM parameter 9 (manufacturer-specific)
$TC_DPC10[1,1] = 0	Cutting edge-specific OEM parameter 10 (manufacturer-specific)
As of SINUMERIK Operate 4.7 SPx to 64 OEM data	
$TC_MOP1[1,1] = 0	Prewarning limit for tool life in minutes
$TC_MOP2[1,1] = 0	Residual tool life in minutes
$TC_MOP3[1,1] = 0	Prewarning limit for workpiece count
$TC_MOP4[1,1] = 0	Residual workpiece count
$TC_MOP5[1,1] = 0	Wear prewarning limit - or location-dependent offset fine - pre-warning limit Is not supported by MMT in the UI - data is forwarded
$TC_MOP6[1,1] = 0	Actual wear value - or location-dependent offset fine - actual value Is not supported by MMT in the UI - data is forwarded
$TC_MOP11[1,1] = 0	Set tool life in minutes
$TC_MOP13[1,1] = 0	Target unit quantity
$TC_MOP15[1,1] = 0	Wear setpoint - or location-dependent offset fine - setpoint Is not supported by MMT in the UI - data is forwarded

Table A-4   User cutting edge monitoring

Parameter	Description
$TC_MOPC1	Cutting edge-specific monitoring OEM parameter 1
…	
$TC_MOPC10	Cutting edge-specific monitoring OEM parameter 10
As of SINUMERIK Operate 4.7 SPx to 64 OEM data	
Is not supported by MMT in the UI - data is forwarded	

A.2 Setting machine data

Dependencies

The machine data category "Universal axis test" relates to the function of the SinuComNC Trace Server; meaning that there is a dependency on the version of the operating software and NCU software. If one of the conditions is not met, or the Trace Server is not used for other reasons, the MD19330 only has to be set if SINUMERIK powerline is used.

The machine data category "NC Monitor" only depends on the NCU software version and not on the operating software version, i.e. the function can also be used for older operating software versions.

Note

Machine data:

- A change to machine data (MDx8xxx) triggers a re-organization of the memory.
- The "Manufacturer" password must be entered in order to edit machine data.
- After editing the data:
  - Create an NC archive
  - Trigger an NC reset (Safety Integrated).
  - Read in a backed up NC archive

References

A detailed description of standard tool management is provided in the "Tool Management" Function Manual.

A detailed description of the machine data can be found in the List Manual "Machine data and parameters".

Machine data for universal axis test (HMI-Advanced ≥ 06.03.15)

General MD:

Machine data	Setting	Description	PL	SL	PL(ST)
MD11295 $MN_PROTOC_FILE_MEM[5]	1	Data buffer in DRAM	X	X	
MD18370 $MN_MM_PROTOC_NUM_FILES[5]	2	Maximum number of log files	X		
MD18371 $MN_MM_PROTOC_NUM_ETPD_STD_LIST[5]	25	Number of standard ETPD data lists	X		
MD18372 $MN_MM_PROTOC_NUM_ETPD_OEM_LIST	10	Number of ETPD OEM data lists	X		
Option data for enabling interpolation-related functions.					
MD19330 $ON_IPO_FUNCTION_MASK	Bit 3 = 1 (add 8Hex)	Unable "Polynomial interpolation (POLY)"	X		X

Channel MD:

Machine data	Setting	Description	PL	SL	PL(ST)
MD28300 $MC_MM_PROTOC_USER_ACTIVE[5]	1	Activate logging for one user	X		
MD28302 $MC_MM_PROTOC_NUM_ETP_STD_TYP[5]	20	Number of standard ETP event types	X		

Axis MD:

Machine data	Setting	Description	PL	SL	PL(ST)
MD36730 $MA_DRIVE_SIGNAL_TRACKING	1	Detection of additional drive actual values	X	X	

Machine data for variable monitor (NC axes)

General MD:

Machine data	Setting	Description	PL	SL	PL(ST)
MD18860 $MN_MM_MAINTENANCE_MON	1	Activate recording of maintenance data	X	X	X
MD19334 $ON_SYSTEM_FUNCTION_MASK	Bit 6 = 1 (add 40Hex)	Enable "data for machine maintenance (MachineMaintenance)"	X		X

Axis MD:

Machine data	Setting	Description	PL	SL	PL(ST)
MD33060 $MA_MAINTENANCE_DATA	7	Configuration, recording maintenance data	X	X	X

Machine data according to the control model:

PL(ST) = SINUMERIK powerline System NCU 840D/810D/840Di

Data logging with Servo Trace

PL = SINUMERIK powerline System with NCU 840D/810D/840Di

Data logging with Trace Server

SL = SINUMERIK solution line System with NCU 710, 720, 730, 740, 840Di sl

Data logging with Trace Server or Servo Trace

Dependency on the NCU software version:

PL = Universal axis test:

≥ NCU 06.04.15 with Trace Server or: ≥ NCU 06.03.xx with Servo Trace

NC Monitor: ≥ NCU 06.05.11

SL = Universal axis test: ≥ NCU 02.04 HF3 (NCK 67.03)

NC Monitor: ≥ NCU 02.04 HF3 (NCK 67.03)

> **Note**
>
> **Machine data**
>
> - The additional machine data listed in the "Universal axis test" is valid if the measured values are logged using Trace Server (standard as of operating software 07.03.xx saved to the MMC2 folder).

Optional setting Data storage in SRAM or DRAM

You can configure either SRAM or DRAM as the storage location for the log files (Protoc) of SinuComNC Trace Server.

The default setting for the machine data for SinuCom NC Trace Server defines SRAM as buffer for Trace data that has been acquired. However, this data can also be saved to DRAM of the NCU. You must accordingly define the maximum size of the data buffer as machine parameter (cannot be set up on solution line systems).

Machine data	Setting	Description
MD11295 $MN_PROTOC_FILE_MEM[5]	1	0=Protoc in SRAM
		1=Protoc in DRAM
MD18351 $MN_MM_DRAM_FILE_MEM_SIZE.	add 500	500 KB additionally reserved for Protoc

> **Note**
>
> The setting in MD18351 $MN_MM_DRAM_FILE_MEM_SIZE is **not**available for the solution line system. The logs for solution line systems are always saved to DRAM.

Handshake between the PLC and the axis test

The PLC user program of the machine can lock execution of external program elements. Interface signals are provided to enable the function.

> **Note**
>
> As of PLC Toolbox V7.2 those bits are reset automatically to "0" in the PLC program. If you are using a Toolbox of a lower version number you must program this initialization in the startup OB. You should also clear the bits with a RESET if necessary.

Activating tool life monitoring in the NC

Set the following machine data to activate tool life monitoring in the NC:

Machine data	Setting	Description
MD20124 $MC_TOOL_MANAGEMENT_TOOL-HOLDER	0	Tool holder number
		Influences the MD20320
MD20310 $MC_TOOL_MANAGEMENT_MASK		Activating tool management functions
	Bit 17 = 0	Tool life monitoring type NC (standard)
		Traversing blocks not equal to G00
		Allow the counter to run
	Bit 17 = 1	Tool life decrementation can be started/stopped via the PLC in channel DB2.1...DBx1.3.
MD20320 $MC_TOOL_TIME_MONITOR_MASK	0H	Time monitoring for tools in the spindle
	1H	Spindle 1
	3H	Spindles 1 and 2
		Settings are made in MD20124 $MC_TOOL_MANAGEMENT_TOOLHOLDER.

References

A detailed description of the settings is provided in the "Tool management" Function Manual

A.3 List of alarms

Overview

149000	Job execution failed
Error description:	Fatal internal error in the job execution in the Machine Handler. The job could not be started or was terminated unexpectedly.
Remedy:	---

149001	Error when executing the script
Error description:	The system was not able to retrieve the boot script from the server. The system cannot function in this state.
	If the error is not resolved, then only the "Remote Control" function can be used.
Cause:	One of the following problems can cause this error message:
	• The server is not available.
	• The URL address for MHComm.asmx specified during installation is wrong.
	• Connection problem in the Internet, e.g. an existing proxy is not configured on the PCU.
	• A connection used is incompatible with the system.
Remedy:	Check and correct connections and addresses.

149002	Error during script execution
Error description:	Internal error during script processing.
Remedy:	---

149003	Incorrect version of Internet Explorer (< 5.5)
Error description:	The Internet Explorer installed on the PCU is not supported by SINUMERIK Integrated.
Remedy:	Install a higher version of Internet Explorer (> 5.5).

149004	Missing ComScriptProcessing.dll
Error description:	The ComScriptProcessing.dll file must be available in the \add_on \mh directory.
	The error occurs if this file does not exist or is not properly registered as COM component.
Remedy:	This problem can usually be resolved by re-installing the client software of ePS Network Services on the PCU.

149005	A job could not be fetched from the server.
Error description:	The request to the SINUMERIK Integrated server to download an interactive job failed.
	One of the following problems can cause this error message:
	• The server is not available.
	• The URL address for MHComm.asmx specified during installation is incorrect.
	• A problem occurs with the connection to the Internet (e.g. a Proxy was not configured on the PCU).
	• The connection used is incompatible with the system.
Remedy:	---

149006	Job fetched from the server job does not contain any data.
Error description:	The interactive job downloaded from the ePS Network server does not contain any data or code. This could be the result of a transmission error.
Remedy:	This error can usually be resolved by repeating the download.

149007	The server certificate has expired or the time and data settings of the computer are not correct.
Error description:	The certificate downloaded from the SINUMERIK Integrated server by means of https protocol could not be validated. The machine time or date does not conform to the validation period of the certificate.
Remedy:	Set up the correct time and date for the machine.

149008	Access to the configuration list has failed because of undefined reasons.
Error description:	
Remedy:	

149009	The configuration could not be initialized.
Error description:	
Remedy:	

149010	The machine identity could not be initialized.
Error description:	
Remedy:	

149011	**The proxy identity has failed.**
Error description:	
Remedy:	

149200	**The boot script does not have a valid service script ID from the server.**
Error description:	The Machine Handler does not receive a service job ID from the server.
	One of the following problems can cause this error message:
	• The connection to the server was briefly interrupted.
	• The PCU is unknown at the SINUMERIK Integrate server, i.e it must be reconnected or activated.
Remedy:	• Perform a manual synchronization. After the connection has been recovered, the ID is fetched and the job started.
	• Re-connect the PCU (only possible if logged in as service engineer).

149201	**The boot script has not received a service script from the server.**
Error description:	The Machine Handler cannot start the service job as the program cannot be downloaded from the server.
	One of the following problems can cause this error message:
	• The connection to the server was briefly interrupted.
	• Internal error of SINUMERIK Integrated.
Remedy:	• Perform a manual synchronization. After the connection has been recovered, the ID is fetched and the job started.
	• Error in SINUMERIK Integrated which cannot be resolved by users.

149202	**The boot script could not start the service script.**
Error description:	Internal error in the Machine Handler:
	The boot script cannot start the service job.
Remedy:	---

149203	**The service script could not start the data transfer service script.**
Error description:	Internal error in the Machine Handler:
	Service script cannot start the data transfer service script.
Remedy:	---

149305	PLC monitoring aborted during access to the control.
Error description:	An attempt was made by the PLC Monitor script to read the PLC buffer (typically DB99).
	One of the following problems can cause this error message:
	● PLC Trace DB not available.
	● PLC Trace DB incorrectly parameterized in UI.
	● PLC cannot be accessed.
	A DUMMY PLC Trace is generated for the server that returns the error message bytes (6 ... 9) Hex: FF, FF, FF, 02.
Remedy:	---

149306	PLC monitoring failed during the generation of the DataAccess object or hotlink error.
Error description:	Initialization of the PLC Trace failed:
	Software objects could not be created.
	A DUMMY PLC Trace is generated for the server that returns the error message bytes (6 ... 9) Hex: FF, FF, FF, 01.
Remedy:	---

149307	PLC monitoring aborted during timeout at initial RESET.
Error description:	An attempt was made to trigger a RESET in the PLC Trace block before initial parameterization.
	Timeout of positive acknowledgment of the RESET.
	One of the following problems can cause this error message:
	● PLC Trace not loaded in PLC (FB not available).
	● Incorrect PLC Trace DB configured.
	● PLC Trace DB faulty.
	A DUMMY PLC Trace is generated for the server that returns the error message bytes (6 ... 9) Hex: FF, FF, FF, 03.
Remedy:	---

149308	PLC monitoring aborted due to faulty trigger.
Error description:	A non-existent trigger was parameterized (signal DB or input not available).
	A DUMMY PLC Trace is generated for the server that returns the error message bytes (6 ... 9) Hex: FF, FF, FF, 04.
Remedy:	---

149310	NC monitoring aborted because of access error to the control.
Error description:	An attempt was made by the NC Monitor script to read data from the NC.

The following problem can cause this error message:

• NC cannot be accessed.

Remedy:	---

149311　　　　　　　　**NC monitoring failed during the generation of the DataAccess object.**

Error description:	Initialization of NC Monitor Trace failed:
	Software objects could not be created.
Remedy:	---

149315　　　　　　　　**PLC data upload failed during the generation of the DataAccess object.**

Error description:	
Remedy:	---

149316　　　　　　　　**PLC data upload aborted because of missing parameters.**

Error description:	Initialization of PLC DataUpload failed.
	An error occurred while transferring parameters (time interval, data blocks). The script therefore has no job.
Remedy:	---

149317　　　　　　　　**PLC data upload aborted because the timer could not be started.**

Error description:	An error occurred while activating a timer for the next time interval (for the next upload).
	The script cannot execute the job.
Remedy:	---

149320　　　　　　　　**NC monitoring aborted because the generation of the DataAccess objects has failed.**

Error description:	An error occurred while activating a timer for the next time interval (for the next upload).
	The script cannot execute the job.
Remedy:	---

149321　　　　　　　　**NC monitoring aborted because of missing parameters.**

Error description:	
Remedy:	---

149322   **NC monitoring aborted because the timers could not be started.**

Error description: An error occurred while activating a timer for the next time interval (for the next upload).

                                      The script cannot execute the job.

Remedy: ---

149400   **Download successful**

Error description:

Remedy: ---

149401   **Download failed**

Error description:

Remedy: ---

149500   **An HMI restart is required to complete the installation of the application**

Error description:

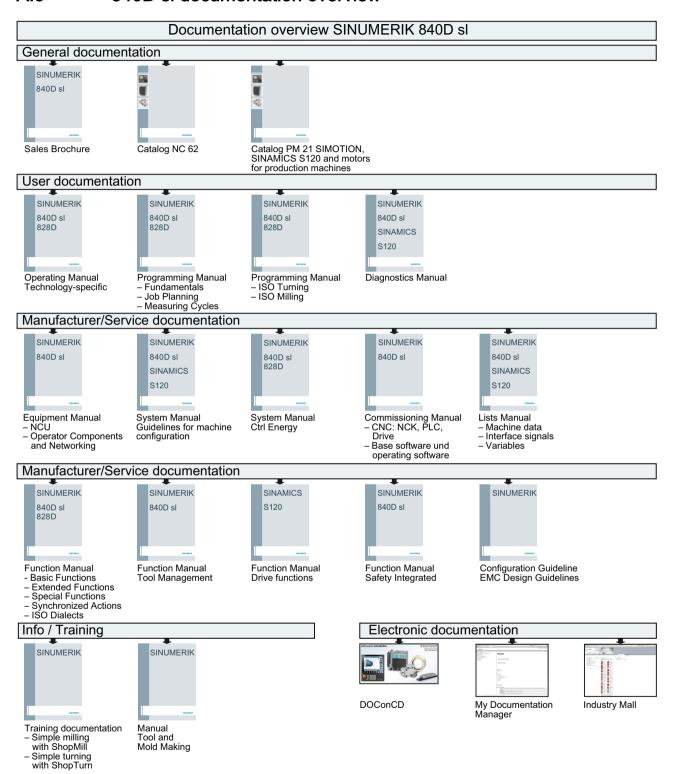Remedy: ---

A.4 List of abbreviations

Admin	Administrator (user role)
AMC	Analyze MyCondition
AMD	Access MyData
AMP	Analyze MyPerformance
AMT	Access MyTool ID
ASCII	American Standard Code for Information Interchange
ASP	Application Service Provider-Variante
BA	Operating instructions
CAM	Computer-Aided Manufacturing
CF card	CompactFlash Card: Memory card
CNC	Computerized Numerical Control:
CoL	Certificate of License
COM	Communication
COM	Component Object Protocol (programming model of Microsoft®)
CU	Control Unit
CP	Communication Processor
CPU	Central Processing Unit:
DB	Data Block (PLC)
DBB	Data Block Byte (PLC)
DBW	Data Block Word (PLC)
DCOM	Distributed Component Object Model
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:
DW	Data Word
FCC	File Client Cache
ET	Equability axis test
h	Hour
HMI	Human Machine Interface: SINUMERIK user interface
HD	Hard Disk: Hard disk
HTTP	Hypertext Transfer Protocol
HTTPS	HyperText Transfer Protocol Secure,
HW	Hardware
IAC	InterActive Client
IB	Commissioning engineer (user role)
IE	Internet Explorer
IFC	Interface Client
IH	Maintenance
IIS	Microsoft Internet Information Service
CT	Circularity Test

MB	Megabyte
MCIS	Motion Control Information System
MCIS MDA	MCIS Machine Data Aquisition: Machine data management
MCP	Machine Control Panel:
MD	Machine Data
MHComm	Machine Handler Communication
MCS	Machine Coordinate System
MLFB	Machine-Readable Product Code
MMP	Manage MyPrograms
MMP IFC	Manage MyPrograms InterFace Client
MMT	Manage MyTools
MO	Machine Operator: Machine operator (user role)
MPI	Multi Port Interface: Multiport Interface
MS	Microsoft
MSDE	Microsoft Data Engine or Microsoft Desktop Engine database software
MSI	Microsoft Software Installation
MSTT	Machine control panel
NC	Numerical Control: Numerical control
NCK	Numerical Control Kernel: Numeric kernel with block preparation
NCU	Numerical Control Unit: NCK hardware unit
NFS	Network File System
NTLM	NT LAN Manager: Authentication procedure for computer networks
OB	Organization block in the PLC
ODBC	Open Database Connectivity
OEM	Original Equipment Manufacturer
OLE	Object Linking & Embedding
OP	Operation Panel: Operating equipment
OPI	Operation Panel Interface: Interface for connection to the operator panel
OPC	OLE for Process Control
PC	Personal Computer
PCMCIA	Personal Computer Memory Card International Association (memory card standardization)
PCU	PC Unit: Computer unit
PG	Programming device
PDA	Production Data Acquisition: Production data acquisition
PLC	Programmable Logic Control: PLC
PMT	Parts Monitoring & Tracking: Parts tracking
PO	POWER ON
ProToolPro	Configuration tool
PWS	Personal Web Server
RFC	Requests for Comments
ROM	Read Only Memory
SC	Service Client
SE	Service Engineer

SEC	Service Engineer Client
SEG	Tool setting station
SFI	Shop Floor Integrate
SI	SINUMERIK Integrate
SK	Softkey
SSL	Secure Socket Layer
SW	Software
TDI	Tool Data Information
TC	Teamcenter
TCP	Transmission Control Protocol
TLCA	Tool Library CA: Tool catalog data
TLCU	Tool Library Customer: Customer tool catalog data
TLCUA	Tool Library Customer Assemblies: Tool assemblies
UAT	Universal Axis Test
UNC	Uniform naming convention
VB	Visual Basic
VC	Visual C
VNCK	Virtual numerical control core
WCS	Workpiece Coordinate System
T	Tool
TLC	Tool Length Compensation
WOP	Workshop-Oriented Programming
WPD	Work Piece Directory: Workpiece directory
TRC	Tool Radius Compensation
WSDL	Web Services Description Language
T	Tool
TO	Tool Offset
MT	Machine Tool
TM	Tool Management
TC	Tool Change
XML	Extensible Markup Language

A.5 840D sl documentation overview

Documentation overview SINUMERIK 840D sl

General documentation

SINUMERIK 840D sl		
Sales Brochure	Catalog NC 62	Catalog PM 21 SIMOTION, SINAMICS S120 and motors for production machines

User documentation

SINUMERIK 840D sl 828D	SINUMERIK 840D sl 828D	SINUMERIK 840D sl 828D	SINUMERIK 840D sl SINAMICS S120
Operating Manual Technology-specific	Programming Manual – Fundamentals – Job Planning – Measuring Cycles	Programming Manual – ISO Turning – ISO Milling	Diagnostics Manual

Manufacturer/Service documentation

SINUMERIK 840D sl	SINUMERIK 840D sl SINAMICS S120	SINUMERIK 840D sl 828D	SINUMERIK 840D sl	SINUMERIK 840D sl SINAMICS S120
Equipment Manual – NCU – Operator Components and Networking	System Manual Guidelines for machine configuration	System Manual Ctrl Energy	Commissioning Manual – CNC: NCK, PLC, Drive – Base software und operating software	Lists Manual – Machine data – Interface signals – Variables

Manufacturer/Service documentation

SINUMERIK 840D sl 828D	SINUMERIK 840D sl	SINAMICS S120	SINUMERIK 840D sl	SINUMERIK
Function Manual - Basic Functions – Extended Functions – Special Functions – Synchronized Actions – ISO Dialects	Function Manual Tool Management	Function Manual Drive functions	Function Manual Safety Integrated	Configuration Guideline EMC Design Guidelines

Info / Training

SINUMERIK	SINUMERIK
Training documentation – Simple milling with ShopMill – Simple turning with ShopTurn	Manual Tool and Mold Making

Electronic documentation

DOConCD	My Documentation Manager	Industry Mall

Index

A

Access MyData, 13
Access rights
    PCU, 85
Actual tool data, 86
    Configure window representation, 74
    Deleting a filter, 99
    Display, 88
    Display icons, 66
AMD
    Access to NC program data, 243
    Access to tool information, 243
    Direct access to NC/PLC, 243
AMP user interface
    HMI-Advanced, 233
    SINUMERIK Operate, 238
Analyze MyCondition, 12, 229
Analyze MyPerformance, 13
Attachment
    MMP, 42

B

Balance calculation
    Display result, 127
    Enable, 131
    Enter data, 108
    Limiting, 126
    New, 133
Balancing, 127
    release, 127
Barcode
    Function, 168
    Load tool, 174
    Overview, 169
    Scanner connection, 169, 170
    Structure, 171
    Tool replacement 1:1, 177

C

Calling MMP
    SINUMERIK Operate, 30
    with HMI-Advanced, 49
Calling MMT
    SINUMERIK Operate, 67

Changing the tool life, 74
Configure global settings
    MMT, 74
Configuring filters
    with HMI-Advanced, 59
    with HMI-Operate, 34
Container
    Selection, 131

D

Difference list, 126
Display graphic, 43
Displaying details, 73
Displaying the properties of MMP, 40

E

Empty location search, 160
ePS names, 14

F

File
    toseg002.ini, 131
Filter
    activate/deactivate, 69
    Activating the settings, 36
    Actual tool data layout, 93
    Actual tool data standard, 89
    Actual tool data view, 91
    Creating actual tool data, with MMT, 97
    Creating tool handling, with MMT, 147
    Criterion, 69
    Defining the sorting, 31
    delete, 38, 72
    Delete tool master data, with MMT, 190
    Deleting actual tool data, with MMT, 99
    Deleting tool handling, with MMT, 149
    on/off, 31
    Reset, 38, 72
    Save, 37, 70
    Save as, 71
    Save under, 38
    Tool handling layout, 143
    Tool handling standard, 139
    Tool handling view, 141