SIEMENS

Mcenter

Manage MyResources

Operating Manual

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Valid for control:
SINUMERIK 840D, 840D sl/ 840DE sl,
SINUMERIK 828D, SINUMERIK ONE
Software
Mcenter, version 5.3.2.0
Manage MyResources, version 2.0.0.0

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Introduction

1

1.1 About SINUMERIK

From simple, standardized CNC machines to premium modular machine designs – the SINUMERIK CNCs offer the right solution for all machine concepts. Whether for individual parts or mass production, simple or complex workpieces – SINUMERIK is the highly dynamic automation solution, integrated for all areas of production. From prototype construction and tool design to mold making, all the way to large-scale series production.

Visit our website for more information SINUMERIK (https://www.siemens.com/sinumerik).

1.2 About Mcenter

About Mcenter

The open, on-premise shopfloor platform Mcenter ensures full transparency and data consistency. It provides information about tools, NC programs and machine utilization and connects the machine tools with your IT landscape.
This is possible due to deep integration of higher-level systems with the CNC.
With Mcenter, you can manage different types of machines. You can also work with a range of third-party controllers via the Machine agent application.

1.3 About Manage MyResources

Overview of Manage MyResources /Tools

For CNC machines, the Manage MyResources /Tools product manages the complete tool circuit within a production operation.

Manage MyResources /Tools facilitates resource optimization and reduces machine downtimes by providing optimized master data, correction (offset) data and OEM tool data. It also supports tool management, component management and tool handling.

Further, Manage MyResources /Tools facilitates access to APIs. Solution partners as well as customers can integrate Manage MyResources /Tools into their processes and, based on the interfaces, develop their own applications.

Overview of Manage MyResources /Programs

The Manage MyResources /Programs product ensures that NC programs are transferred to and from various CNC controllers. Additional information is provided in the system prerequisites of the Installation Manual "Mcenter, Manage MyResources, Optimize MyProgramming /NX-Cam Editor, Analyze MyPerformance /OEE, Access MyData /Collector".

Manage MyResources /Programs manages a machine assignment and a status of NC packages to ensure that the correct NC programs are always available at defined machines.

Manage MyResources /Programs provides a comment function. As a consequence, information can be directly exchanged between machine operators and programming engineers.

Further, Manage MyResources /Programs facilitates access to APIs. Solution partners as well as customers can integrate Manage MyResources /Programs into their processes and, based on the interfaces, develop their own applications.

1.4 About this documentation

Target group

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

Scope of validity

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

- Mcenter, version 5.3.2.0
- Manage MyResources /Tools, version 2.0.0.0
- Manage MyResources /Programs, version 2.0.0.0

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 only describes the functionality of the standard version. This may differ from the scope of the functionality of the system that is actually supplied. Please refer to the ordering documentation only for the functionality of the supplied drive system.

It may be possible to execute other functions in the system which are not described in this documentation. This does not, however, represent an obligation to supply such functions with a new control or when servicing.

For reasons of clarity, this documentation cannot include all of the detailed information on all product types. Further, this documentation cannot take into consideration every conceivable type of installation, operation and service/maintenance.

The machine manufacturer must document any additions or modifications they make to the product themselves.

Websites of third-party companies

This document may contain hyperlinks to third-party websites. Siemens is not responsible for and shall not be liable for these websites and their content. Siemens has no control over the information which appears on these websites and is not responsible for the content and information provided there. The user bears the risk for their use.

1.5 Documentation on the internet

1.5.1 Documentation overview SINUMERIK ONE

Comprehensive documentation about the functions provided in SINUMERIK ONE Version 6.13 and higher is provided in the Documentation overview SINUMERIK ONE (https://support.industry.siemens.com/cs/ww/en/view/109768483).

You can display documents or download them in PDF and HTML5 format.

The documentation is divided into the following categories:

- User: Operating
- User: Programming
- Manufacturer/Service: Functions
- Manufacturer/Service: Hardware
- Manufacturer/Service: Configuration/Setup
- Manufacturer/Service: Safety Integrated
- Information and training
- Manufacturer/Service: SINAMICS

1.5.2 Documentation overview SINUMERIK 840D sl

Comprehensive documentation about the functions provided in SINUMERIK 840D sl Version 4.8 SP4 and higher is provided in the Documentation overview SINUMERIK 840D sl (https://support.industry.siemens.com/cs/ww/en/view/109766213).

You can display the documents or download them in PDF and HTML5 format.

The documentation is divided into the following categories:

- User: Operating
- User: Programming
- Manufacturer/Service: Functions
- Manufacturer/Service: Hardware
- Manufacturer/Service: Configuration/Setup
- Manufacturer/Service: Safety Integrated
- Manufacturer/Service: SINUMERIK Integrate/MindApp
- Information and training
- Manufacturer/Service: SINAMICS

1.5.3 Documentation overview SINUMERIK 828D

Comprehensive documentation about the functions provided in SINUMERIK 828D Version 4.8 SP4 and higher is provided in the 828D documentation overview (https://support.industry.siemens.com/cs/ww/en/view/109766724).

You can display documents or download them in PDF and HTML5 format.

The documentation is divided into the following categories:

- User: Operating
- User: Programming
- Manufacturer/Service: Configuring
- Manufacturer/Service: Commissioning
- Manufacturer/Service: Functions
- Manufacturer/Service: Safety Integrated
- SINUMERIK Integrate/MindApp
- Info & Training

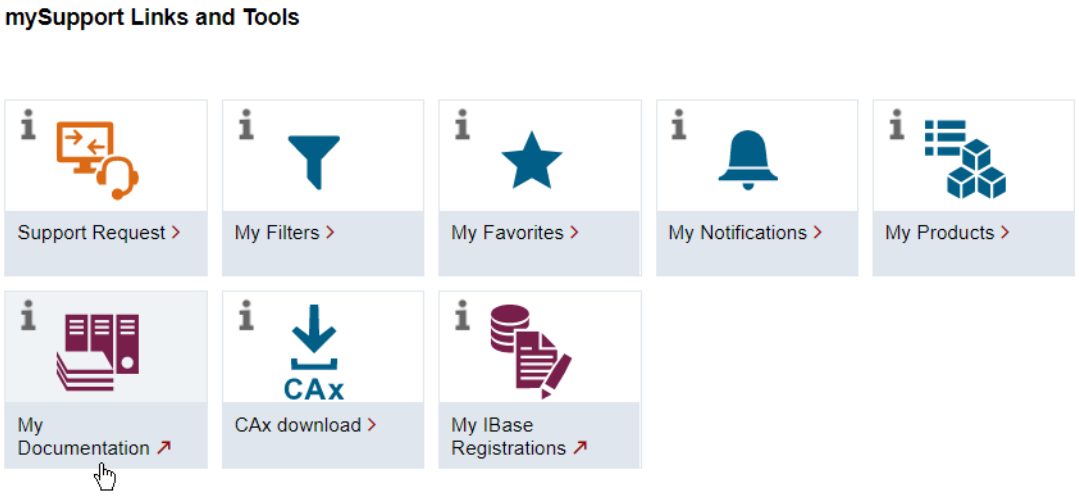
1.6 Feedback on the technical documentation

If you have any questions, suggestions or corrections regarding the technical documentation which is published in the Siemens Industry Online Support, use the link "Provide feedback" which appears at the end of the entry.

1.7 mySupport documentation

With the "mySupport documentation" web-based system you can compile your own individual documentation based on Siemens content, and adapt it for your own machine documentation.

To start the application, click on the "My Documentation" tile on the mySupport homepage (https://support.industry.siemens.com/cs/ww/en/my):



The configured manual can be exported in RTF, PDF or XML format.

Note

Siemens content that supports the mySupport documentation application can be identified by the presence of the "Configure" link.

1.8 Service and Support

Product support

You can find more information about products on the internet:

Product support (https://support.industry.siemens.com/cs/ww/en/)

The following is provided at this address:

- Up-to-date product information (product announcements)
- FAQs (frequently asked questions)
- Manuals
- Downloads
- Newsletters with the latest information about your products
- Global forum for information and best practice sharing between users and specialists
- Local contact persons via our Contacts at Siemens database (→ "Contact")
- Information about field services, repairs, spare parts, and much more (→ "Field Service")

Technical support

Country-specific telephone numbers for technical support are provided on the internet at address (https://support.industry.siemens.com/cs/ww/en/sc/4868) in the "Contact" area.

If you have any technical questions, please use the online form in the "Support Request" area.

Training

You can find information on SITRAIN at the following address (https://www.siemens.com/sitrain).
SITRAIN offers training courses for automation and drives products, systems and solutions from Siemens.

Siemens support on the go

With the award-winning "Industry Online Support" app, you can access more than 300,000 documents for Siemens Industry products – any time and from anywhere. The app can support you in areas including:

- Resolving problems when implementing a project
- Troubleshooting when faults develop
- Expanding a system or planning a new system

Furthermore, you have access to the Technical Forum and other articles from our experts:

- FAQs
- Application examples
- Manuals
- Certificates
- Product announcements and much more

The "Industry Online Support" app is available for Apple iOS and Android.

1.9 OpenSSL

Using OpenSSL

This product can contain the following software:

- Software developed by the OpenSSL project for use in the OpenSSL toolkit
- Cryptographic software created by Eric Young.
- Software developed by Eric Young

You can find more information on the internet:

- OpenSSL (https://www.openssl.org)
- Cryptsoft (https://www.cryptsoft.com)

1.10 Compliance with the General Data Protection Regulation

Siemens observes standard data protection principles, in particular the data minimization rules (privacy by design).

For this product, this means:

The product does not process or store any personal data, only technical function data (e.g. time stamps). If the user links this data with other data (e.g. shift plans) or if he/she stores person-related data on the same data medium (e.g. hard disk), thus personalizing this data, he/she must ensure compliance with the applicable data protection stipulations.

Fundamental safety instructions 2

2.1 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

Malfunctions of the machine as a result of incorrect or changed parameter settings

As a result of incorrect or changed parameterization, machines can malfunction, which in turn can lead to injuries or death.

- Protect the parameterization against unauthorized access.
- Handle possible malfunctions by taking suitable measures, e.g. emergency stop or emergency off.

2.2 Warranty and liability for application examples

Application examples are not binding and do not claim to be complete regarding configuration, equipment or any eventuality which may arise. Application examples do not represent specific customer solutions, but are only intended to provide support for typical tasks.

As the user you yourself are responsible for ensuring that the products described are operated correctly. Application examples do not relieve you of your responsibility for safe handling when using, installing, operating and maintaining the equipment.

2.3 Cybersecurity information

Siemens provides products and solutions with industrial cybersecurity 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 cybersecurity concept. Siemens' products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial cybersecurity measures that may be implemented, please visit
https://www.siemens.com/global/en/products/automation/topic-areas/industrial-cybersecurity.html.

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

To stay informed about product updates, subscribe to the Siemens Industrial Cybersecurity RSS Feed under
https://new.siemens.com/global/en/products/services/cert.html.

Further information is provided on the Internet:

Industrial Security Configuration Manual (https://support.industry.siemens.com/cs/ww/en/view/108862708)

⚠ WARNING

Unsafe operating states resulting from software manipulation

Software manipulations, e.g. viruses, Trojans, 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 state-of-the-art, integrated industrial cybersecurity concept for the installation or machine.
- Make sure that you include all installed products in the integrated industrial cybersecurity concept.
- Protect files stored on exchangeable storage media from malicious software by with suitable protection measures, e.g. virus scanners.
- Carefully check all cybersecurity-related settings once commissioning has been completed.

Operating on the server

3

3.1 Compatibility with other tool management applications

Overview

The control units of the machines have a default tool management application, which is independent from the MMR /Tools application.

Note

It is strongly discouraged to use both applications for daily work.

Performing the same tasks (e.g. creating tool instances with the same parameters in both application) can and probably will cause unforeseen errors later.

3.2 Introduction

Overview

The start page is called up after logging on.

Displaying information about the product and the version (Page 41)

The following applications can be started:

- Manage MyResources /Tools
  - Tool component master data (Page 135)
  - Tool component stacks (Page 144)
  - Tool master data (Page 195)
  - Tool stock (Page 159)
  - Provide tools (Page 239)
  - Monitoring tools (Page 260)
  - Tools on managed machines (Page 270)
  - Plan manufacturing equipment (Page 277)
  - Tool lifecycle distribution (Page 148)
  - Tool statistics (Page 312)
  - OEM data sets (Page 298)
  - Master data for additional resources (Page 349)
  - Additional resources (Page 370)
  - Storage locations (Page 152)
  - Configure MMR Tools (Page 419)
- Manage MyResources /Programs
  - NC program package overview (Page 681)
  - Programs on managed machines (Page 748)
- Manage MyResources /Orders
  - Manage tasks
- Mcenter
  - Manage machines (Page 72)
  - Manage users (Page 56)
  - Administration Overview (Page 53)
  - Manage applications on machines (Page 90)
  - Manage openness clients (Page 103)
  - Manage adapters (experimental) (Page 111)

Calling applications with HTTP communication

This Operating Manual only describes using applications via HTTPS protocol.

The applications are also available via HTTP protocol if configured during the installation. In this case, the start page is available on port ":8090" after the IP address.

Additional information is provided in the Installation Manual "Mcenter, Manage MyResources, Optimize MyProgramming /NX-Cam Editor, Analyze MyPerformance /OEE, Access MyData / Collector".

3.3 Logging in and logging out from Mcenter

3.3.1 Without an external authentication provider

Prerequisite

You have set up your user account.

Procedure

1. Open the following URL: Start page (https://{ServerIP}/start-page)
   The login window opens.
   - Enter your user credentials.
   - Click on the "Login" button.

Note

Invalid login attempt

The error message "Invalid login attempt" is displayed when you enter incorrect credentials.

After the fifth unsuccessful attempt, your user account is locked for 5 minutes.

2. The start page opens.
   To use the functions, click on the required application. If the required application is not displayed, the user does not have the necessary role to view it. To use certain Mcenter functions administrator rights are required, for example, "Administrate Mcenter".

Logging out

1. To log out from the application, open the drop-down menu in the upper right section of the window.
2. Click "Logout" to log out from all applications.

3.3.2 With an external authentication provider

Prerequisite

The user account for the external user has been set up.

Note

Login as an external user

You must configure an external authentication provider to log in as an external user. Additional information is provided in the Installation Manual "Mcenter, Manage MyResources, Optimize MyProgramming /NX-Cam Editor, Analyze MyPerformance /OEE, Access MyData / Collector".

Procedure

1. Open the following URL: Start page (https://{ServerIP}/start-page)
   The external authentication provider login window opens.
2. Enter your user credentials.

   Note

   Invalid login attempt

   The error message "Invalid login attempt" is displayed when you enter incorrect credentials or no user with a matching external user ID exists.

   After the fifth unsuccessful attempt, your user account is locked for 5 minutes.

3. The Mcenter start page opens.
   To use the functions, click on the required application.
   You need administrator rights to use certain Mcenter functions, for example "Administrate Mcenter".

Logging out

1. To log out from the application, open the drop-down menu in the upper right section of the window.
2. Click "Logout" to log out from all applications.

Authentication with an internal user

Logging in with an external authentication provider depends on the configuration. Follow the file path "Siemens\Mcenter\Platform\SinInt.Identity.Service\appsettings.production.json" and check the "UseExternalUserManagement" value: "UseExternalUserManagement": {value}.

"UseExternalUserManagement": false

If the value is "false", logging in with an internal user is allowed.

Open the following URL: Start page (https://{ServerIP}/int/identity/account/login/start-page)

Follow the steps as described in Without an external authentication provider (Page 36).

"UseExternalUserManagement": true

If the value is "true", logging in with an internal user is not allowed.

3.4 Displaying information about the product and the version

The following Mcenter data is displayed:

- Product version
- Build identifier

Prerequisite

The start page is open.

Procedure

1. In the header of the Mcenter window, click on the hamburger menu ☰ (upper left corner).
2. The "Main menu" window pane opens.
3. Click on entry "Mcenter".
   The "Product information" dialog box opens and shows the installed version.
   Click on the "OK" button to close the dialog box.

3.5 Switch language

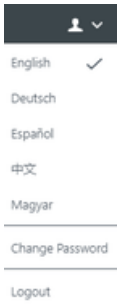
The user interface is available in the following languages:

- English
- German
- Spanish
- Chinese
- Hungarian

If you select a language in a server application, this language is used for the GUI of any other application even if you log out.

Procedure

1. Open the drop-down menu in the upper right section of the window.
2. Click on your chosen language.
   The user interface is displayed in the desired language.



3.6 Password change

You have the possibility to change your password at regular intervals.

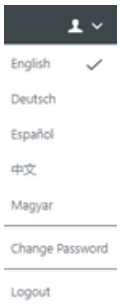
This function is not available for external users.

Prerequisites

This function only applies to internal users.

Procedure

1. In the header of the Mcenter window, click the user icon (upper right corner).
   A drop-down menu opens.
2. Click "Change Password".



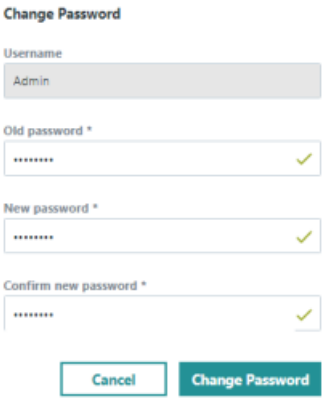
3. The "Change Password" window opens.
   – Enter your current password in the "Old password *" input field.
   – Enter a new password in the "New password *" input field.

   Note

   Properties of a strong password

   - Use at least 8 characters
   - Contains at least one uppercase letter
   - Contains at least one lowercase letter
   - Contains at least one special character
   - Contains at least one numerical character

   – Repeat the new password in the "Confirm new password *" input field.
   – To change the password, click on "Change Password".
   - OR -
   To cancel processing without saving, click on "Cancel".
   The window is closed.



Error messages

An appropriate error message is displayed below the input field if the entries are not correct.

- Input required.
  Enter a password.
- The old and the new password must be different.
  Enter a new password that is different from the old one.
- The new passwords must be identical.
  Enter the new password and confirm it by entering it again, exactly as before.
- An error message is displayed in the top-right window area: "The old password may be wrong or the new password is too weak."
  - Enter the correct password.
  - Enter a password that satisfies the security criteria.

3.7 Filtering

3.7.1 List filtering

On many overview pages, you can use the filter function to reduce the amount of displayed data.

When you save a filter, it is stored even if you refresh the page.

When, on logout, you have active filters set for an application, the filters remain active when you log in again and open the application. The saved filters are stored, even after logout.

Symbols

The filter symbols are the following:

Symbol	Description
	Opens or closes the "My Filters" window.
	Copies the selected filter to the "My Filters" list.
	Removes the selected filter criterion from the current filter. Removes the corresponding filter from the "My Filters" list.
	Adds additional criteria to the current filter.
	Shows that a filter is active.

Operators

The following operators are taken into account when filtering text fields:

- is equal
- includes
- starts with
- ends with
- empty
- not empty

The following operators are taken into account when filtering datetime fields:

- is equal
- before
- after
- between
- outside of
- empty
- not empty

The following operators are taken into account when filtering numbers:

- is equal
- larger than
- smaller than
- empty
- not empty

The following operators are taken into account when filtering enum fields:

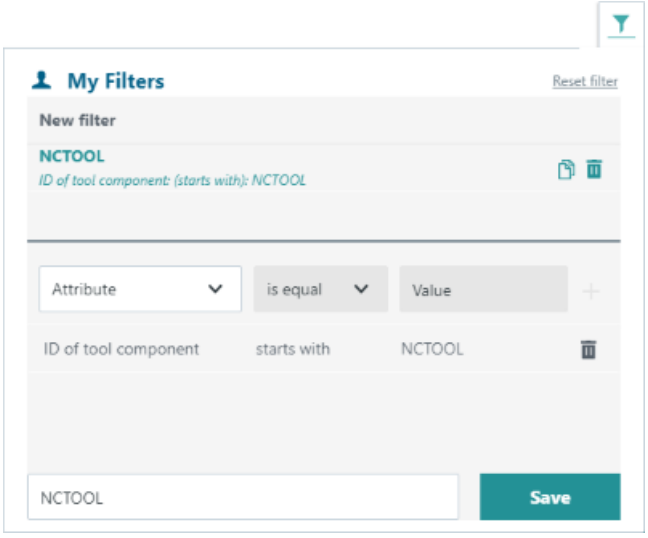
- is equal

The following operators are taken into account when filtering location fields:

- is at
- is under

Procedure

1. Click the "Filter" symbol.
   The "My Filters" window opens.



2. Select a filter from the "My Filters" list.
   - OR -
   Define a new filter.
3. To do this, select the filter criterion from the "Attribute" drop-down list.
   Each filter criterion can be used multiple times, but only once with the same operator.
4. Select the desired filter operator from the drop-down list.
5. In the "Value" field, precisely enter the text, and in its full length, for which a search is to be made.
6. Add the filter criterion for the current filter using the "+" character.
   Remove the corresponding filter criterion using the "Delete" symbol.

7. If you wish to reuse the filter:
   – Enter a filter name.
   – Click on "Save".
     The filter is displayed in the "My Filters" list.
8. Click on "Reset filter" to redisplay all of the data.

Note

Filters

The filters are saved in your user profile. Once you have selected a filter, it remains active until you deactivate it.

3.7.2 Quick filtering

The Quick filter is an additional filter function. You can use it to reduce the amount of displayed data.
You can use the general and quick filters simultaneously.

The conditions from both filters are applied to the set of records.

The Quick filter resets when the page is reloaded, for instance when you switch between pages or press the <F5> button.

According to the column, you can enter
- String values
- Yes/No values
- Context-based values
- Numbers

Prerequisite

You have selected the columns to display in the three dots drop-down list.

For more information, see List filtering (Page 46).

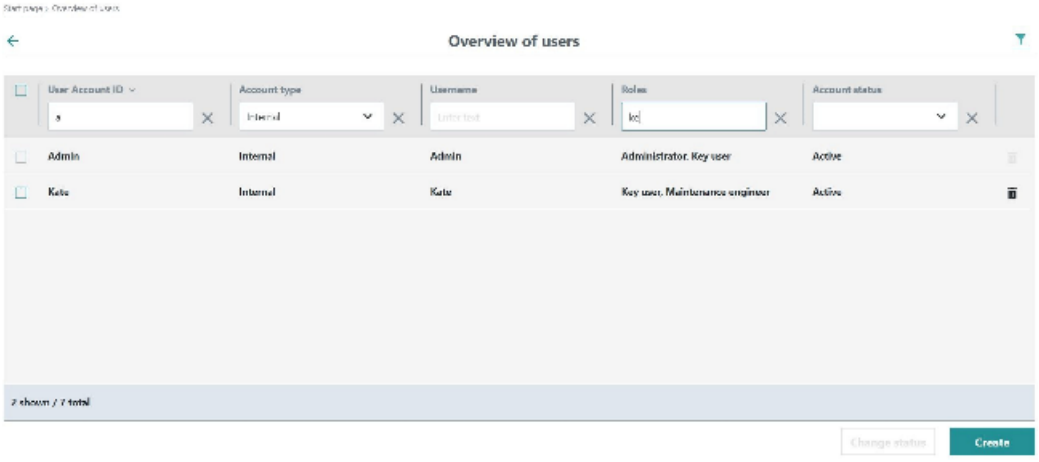
Symbols

The filter symbols are the following:

Symbol	Description
	When the green filter icon is active, the general and the quick filter work simultaneously.
	Opens the drop-down list in the column header. This functionality does not apply to all columns.
	Clears the entry and resets filtering on the column.

Procedure

1. The overview page, with a table that supports the quick filtering functionality, is open.
   Select a column.
   Enter a text in the header of the selected column or choose an option from the drop-down list.
   The quick filtering results are displayed immediately.
   Click the cross symbol to clear an entry and reset the filtering on the column.



2. In addition, you can filter the other columns, to display only the data you need.

Note

Entering a string

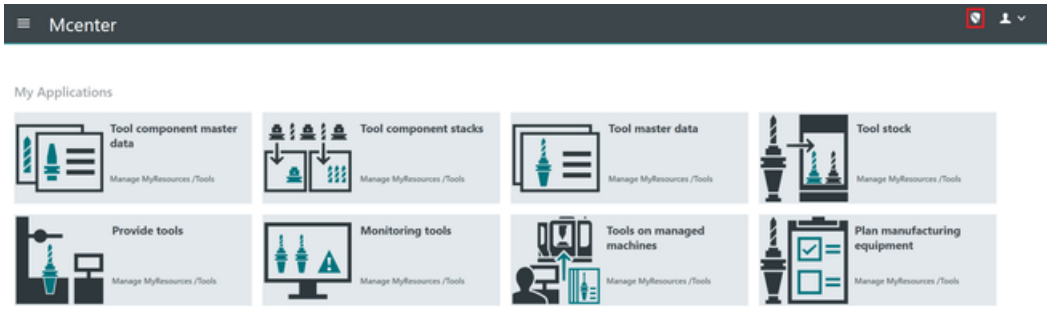
When entering text, you can use

- the complete term
- part of the term
- the letters at the beginning or end of the term

3.8 File scan indicator

Overview

The Application frame contains information about the status of the file scan feature by showing the appropriate icon on the left of the User menu in the header.



The following options are possible:

Icon	Description
	Disabled state: is shown when the file protection is disabled A tooltip displays the information "File protection is disabled"
	Enabled state: is shown when the file protection is enabled A tooltip displays the information "File protection is enabled"
	Unknown state: is shown when there was a problem to acquire the virus scan state (e.g. SinInt.FileStorage.Service isn't working) A tooltip displays the information "File protection state is unknown"

Change file scan indicator state

The icon state depends on the configuration. Follow the file path "Siemens\Mcenter\Platform\SinInt.FileStorage.Service\appsettings.production.json" and check the "VirusScanOptions " value: "EnableVirusScan": {value}.

"EnableVirusScan": false

If the value is "false", the virus scan is disabled and the icon will be in disabled state.

"EnableVirusScan": true

If the value is "true", the virus scan is enabled and the icon will be in enabled state.

The predefined value is false.

Note

Regardless of the value of the EnableVirusScan property, the icon is displayed in an unknown state if there is a problem determining the status of the virus scan.

Using Mcenter on the server

4

4.1 Administration Overview

The "Administration overview" window allows administration with the following option:

- Managing the hierarchy of the plant.
  For more information, see Managing plant hierarchy (Page 54).

Prerequisite

You need the rights of the Administrator or Key user role to access the "Administration overview" window.

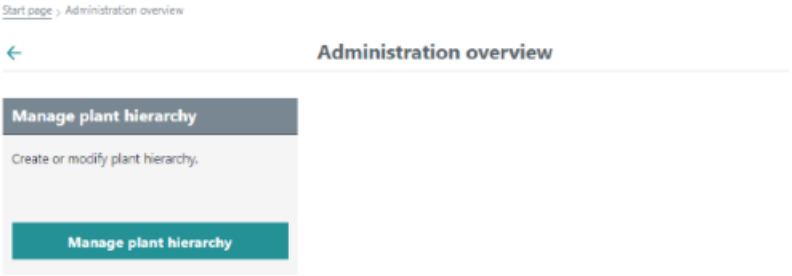
Procedure

1. On the start page of Mcenter, click on "Administrate Mcenter"

   - OR -
   Open the following URL: Administration overview (https://{ServerIP}/admin-overview)

   – Enter a username and password.

2. The "Administration overview" window opens.



4.2 Managing plant hierarchy

Prerequisite

You need rights of the Administrator or Key user role to access the "Plant management" window.

Parameter

The following parameters are available:

Parameter	Description
Hierarchy path *	Select the hierarchy path from the drop-down list. If you do not select a path, the displayed path is adopted.
Node name *	Enter a unique name. A maximum of 30 characters can be entered.
Node type *	Select the node point from the drop-down list. The following node points can be selected: • Enterprise • Site • Area • Production line • Work cell • Storage zone • Storage unit
ⓘ	Shows further information.

*) All fields with an asterisk are mandatory. If you enter a value that does not comply with the rules, a red warning symbol and a corresponding red highlighted error message below the input field are displayed.

Definition of node types

Enterprise: The Enterprise is a collection of one or more plants, connected within the given installation. An alternative interpretation is about the owner of the installation. There can only be one single enterprise node.
Example: Siemens AG

Site: The site is a structural, logical or geographical arrangement that is determined by the enterprise. The delimitation of a plant is usually based on organizational and entrepreneurial criteria as opposed to technical criteria.
Example: Factory at a given address

Area: The area complex is a structural, geographical, or logical arrangement that is determined by the site. The areas may represent different stages, steps, or processes in the production lifecycle of the product.
Example: Preprocessing Area

Production line: The production line contains all sub-areas, technical facilities and individual machines that are required to manufacture one or more batches. A batch does not always have to use all facilities within the production line, but it will usually perform the same

operation on the products in the production. Additionally production planning is usually done on line level based on the capacity of the underlaying working cells.
Example: Manufacturing of Servomotors

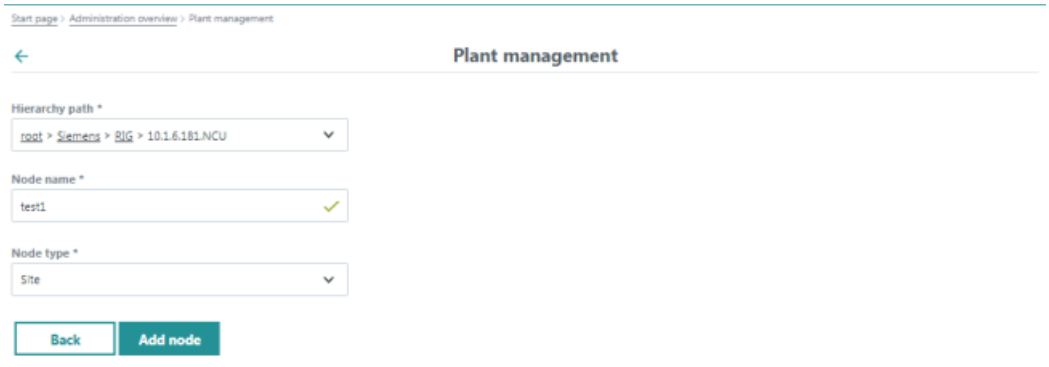
Work cell: A cell consists of technical equipment and machines. The parts that make up the working cell, can be part of the subsystem or can be used temporarily to perform certain tasks. A cell can perform one or more major processing activities. It combines all the necessary process engineering and I&C equipment needed to carry out these activities as an independent facility group. Often most of the machines within a cell are able to process the very same manufacturing process.
Example: Drilling holes in shafts

Storage zone: The storage zone is a designated location within the area, which holds the materials that are required for the production, or the already manufactured products.

Storage unit: A physical unit which is located in the storage zone. This can usually be a desk or shelves to store the required parts or produced products.
Example: Tool cabinets

Procedure

1. Click "Administrate Mcenter" on the Mcenter start page.
2. In the "Administration overview" window, click on "Manage plant hierarchy".
3. The "Plant management" window opens.
4. Fill in the required fields.
5. To create a node, click "Add node".
   - A success message is displayed in the upper right corner of the window.
     - OR -
   - To return to the "Administration overview" window, click "Back".



Note

Nodes

You cannot delete or update the nodes you created.

4.3 Manage users

Note

External user management

When you use the external user management, the functionalities of "Manage users" are not usable.

Additional information is provided in the Installation Manual "Mcenter, Manage MyResources, Optimize MyProgramming /NX-Cam Editor, Analyze MyPerformance /OEE, Access MyData / Collector".

4.3.1 Overview of the users

The "Overview of users" window allows administration with the following options:

- Create users
  - internal
  - external
- Update users
  - account status
  - roles
- Delete users

When your session expires, press the <F5> button and you are redirected to the login page.

Prerequisite

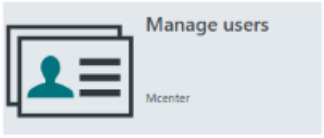
You need an administrator or key user role to manage users.

Parameters

Parameter	Description
∨	This symbol appears when you click on the column heading. Click on the symbol to sort the elements alphabetically/numerically, either in ascending or descending order.
User Account ID	Provides user identification. • Displays the username of internal users. • Displays the external user Id with the prefix "extId". The external users are displayed at the top of the list. You can create, disable and delete users. For more information, see • Creating new users (Page 61) • Updating the account status (Page 63) • Deleting user accounts (Page 66)
Account type	Shows the account type:· • Internal: Internal user • External: External user
Username	Shows the name of the user. **Note:** The currently logged in <Admin> user with the administrator role can disable another administrator, but not himself/herself.
Roles	Shows the roles. You cannot sort the elements in this column. For more information, see Users and functions (Page 58)
Account status	Shows the account status: • Active • Disabled
🗑	Deletes the user account. **Note:** When you delete a user account, you cannot use the same username to create a new one.
⏷	Opens the "My Filters" window and filters the user table according to the following criteria: • User Account ID • Account type • Username • Roles • Account status For more information, see List filtering (Page 46). Click on the filter icon again to close the filter window.

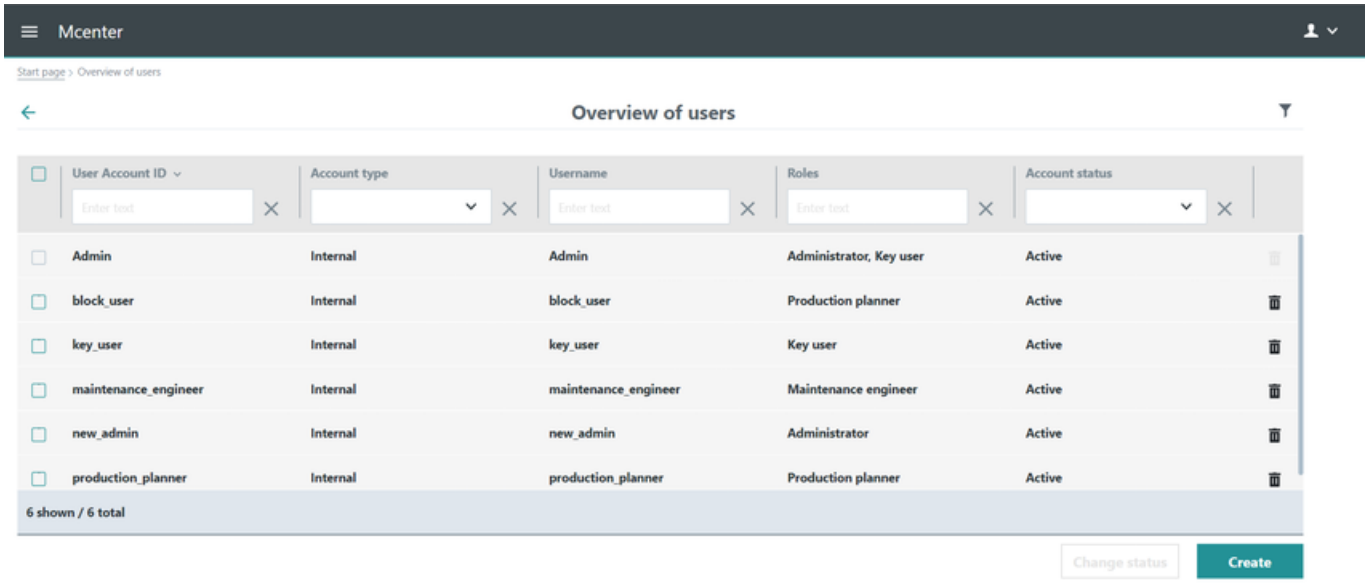
Procedure

1. On the start page of Mcenter click on "Manage users".



   - OR -
   Open the following URL: Manage users (https://{ServerIP}/user-overview)

2. The "Overview of users" window opens and displays an overview of all users with their rules. In order to set your preferred column width, press the left mouse button and drag the column edges to the left or to the right. The respective parameters are automatically saved when you release the mouse button. The next time you log in with your user Id, the columns are displayed with the width you opted for.



4.3.2 Users and functions

The following users are available in the Mcenter:

- The user "Admin" is set up during the installation.
- The "Admin" user can create further users.

4.3.3 Users and functions MMR

Overview MMR

Users have access to the following functions:

- Write: The user has writing rights.
- Read: The user has only reading rights.
- Read+: The user has reading rights and can, in addition, assign or write the sistertool for a greenfield tool.

Mcenter	**Roles**										
Views	**Administrator**	**Key user**	**Manufacturing engineer**	**Technologist**	**NC Programmer**	**Production planner**	**Tool presetting operator**	**Logistician**	**NC Programmer expert**	**Machine operator**	**Maintenance engineer**
Manage applications on machines	write	write				read			read		read
Manage openness clients	write										
Administrate/ Manage plant hierarchy	write	write				read			read		read
Manage users	write	write									
Manage machines	write	write				read			read		read
Manage tasks	write	write				read			read		read
Manage NC Packages	write	write	write	write	write				write	read	
Storage locations	write	write						write	write	write	write
Tool component stacks	write	write						write	write	write	write
Plan manufacturing equipment /Add	write	write	write	write	read	write	read		read	read	
Plan manufacturing equipment /Balancing	write	write	write	write	read	write	read		read	read	
Monitoring tools change lifetime	write	write				write		read	write	read	read
Monitoring tools add sister tool	write	write				write		write	write	write	write
Set Trial tool	write	write				write					

Mcenter	**Roles**										
Views	**Administrator**	**Key user**	**Manufacturing engineer**	**Technologist**	**NC Programmer**	**Production planner**	**Tool presetting operator**	**Logistician**	**NC Programmer expert**	**Machine operator**	**Maintenance engineer**
Update Trial tool life	write	write				write				write	
Provide tools	write	write		write		write	write		write		
Tool stock	write	write		read	read	read		write	write	write	write
Tool master data	write	write	write	write	read		read		write	read	
OEM tool data sets	write	write	write	write	read		read		write	read	
Tool component master data	write	write	write	write	read		read		write	read	
Tools on Managed Machines	write	write	read	read	read	write	read	read	read	write	read
Programs on Managed Machines	write	write	write		write	write			write	write	
Tool lifecycle distribution	read	read				read					
Tool scheduling	write	write			read	write	read		read	read	
Tool statistics	read	read				read					
Additional resources master data	write	write	write	write			read		write	read	
Additional resources instances	write	write		write		write	write	write	write	write	write
Request orders	write	write				write					

Note

Users with multiple roles

If you are assigned multiple roles, you receive the rights for each respective role. There is no hierarchical relationship between the roles.

Note

Password policy

The password policy you set can be customized. For information on how to change password policy, please refer to the Installation Guide.

4.3.4 Creating new users

Parameters

The following parameters are available:

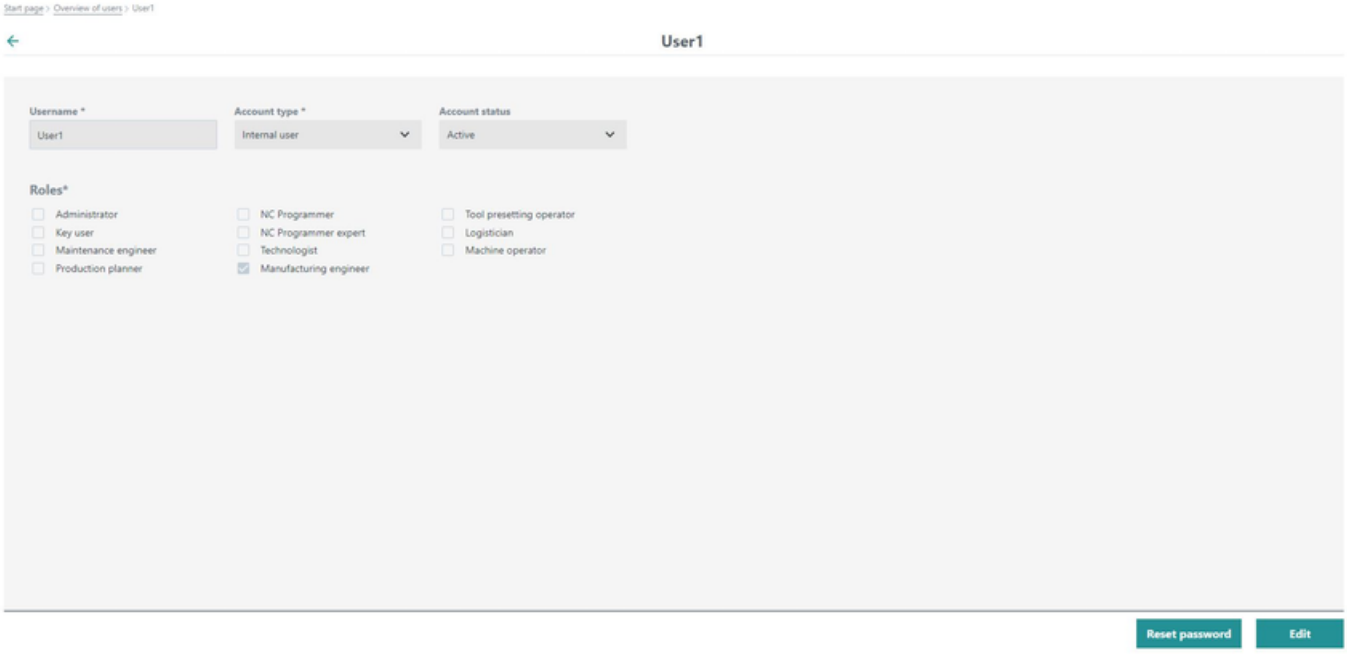
Parameter	Description
Username *	Enter the username. You can enter a maximum of 50 characters. The following characters are permitted for user names: [a...z], [A...Z], [0...9], [-]; [_]
Account type *	You can choose the following type: • Internal user • External user
Account status	You can choose the following status: • Active • Disabled
External ID *	• Enter the unique identifier used in the external authentication provider. You can enter a maximum of 255 characters. • Only visible and mandatory if the account type is: External User
Roles *	Set role(s) to the new user. You can choose the following roles: • Administrator • Key user • Maintenance engineer • Production planner • NC Programmer • NC Programmer expert • Technologist • Manufacturing engineer • Tool presetting operator • Logistician • Machine operator For more information, see Users and functions (Page 58)
Password *	• Enter a secure password. Password criteria: – Use at least 8 characters – Contains at least one uppercase letter – Contains at least one lowercase letter – Contains at least one special character – Contains at least one numerical character • Only requested and mandatory if the account type = Internal user

Parameter	Description
Confirm password *	Re-enter the password.
ⓘ	Shows further information.

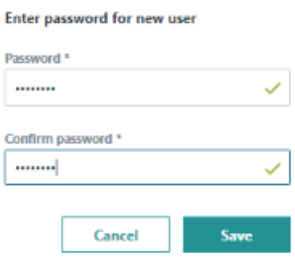
*) The fields marked with an asterisk are mandatory and must be completed. An error message is output if you make an erroneous entry.

Procedure

1. Click "Create" on the "Overview of users" window.
   The "New user account" window opens.
2. Enter the required information.
3. Click "Save" to create a new user.
   - OR -
   Click "Cancel" to discard the inputs.



4. Enter a password for the new user.
   Confirm the password and click "Save".



5. You receive the message "User created successfully" in the top-right window area.
   The users created are displayed in the " Overview of users" window.

4.3.5 Updating the account status

You can enable and disable existing users. Users that have been 'disabled' cannot log in to Mcenter applications but can use any currently open applications until they log out.

Note

Administrator or Key user rights

Users that are currently logged in and have "Administrator" or "Key user" rights cannot disable their own user accounts.

Parameters

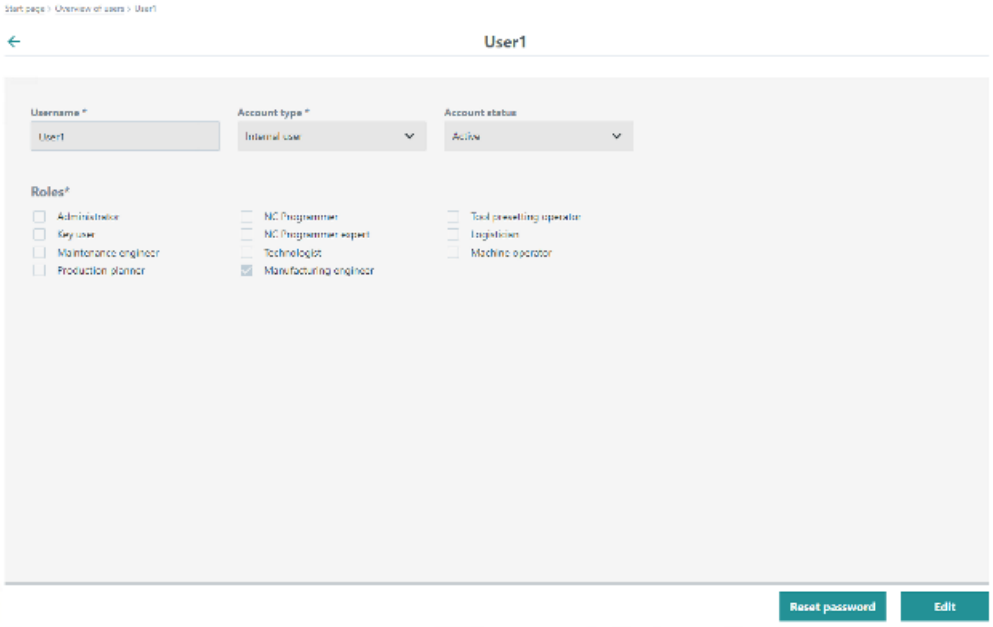
The following parameters are available:

Parameter	Description
Username *	Shows the username. The username must be unique. You cannot use the name of a deleted user account.
Account type *	Shows the Account type: • Internal user - OR - • External user
Account status	You can choose the following status: • Active • Disabled
Roles *	You can choose the following roles: • Administrator • Key user • Maintenance engineer • Production planner • NC Programmer • NC Programmer expert • Technologist • Manufacturing engineer • Tool presetting operator • Logistician • Machine operator For more information, see Users and functions (Page 58)
ⓘ	Shows further information.

*) The fields marked with an asterisk are mandatory and must be completed. An error message is output if you make an erroneous entry.

Procedure

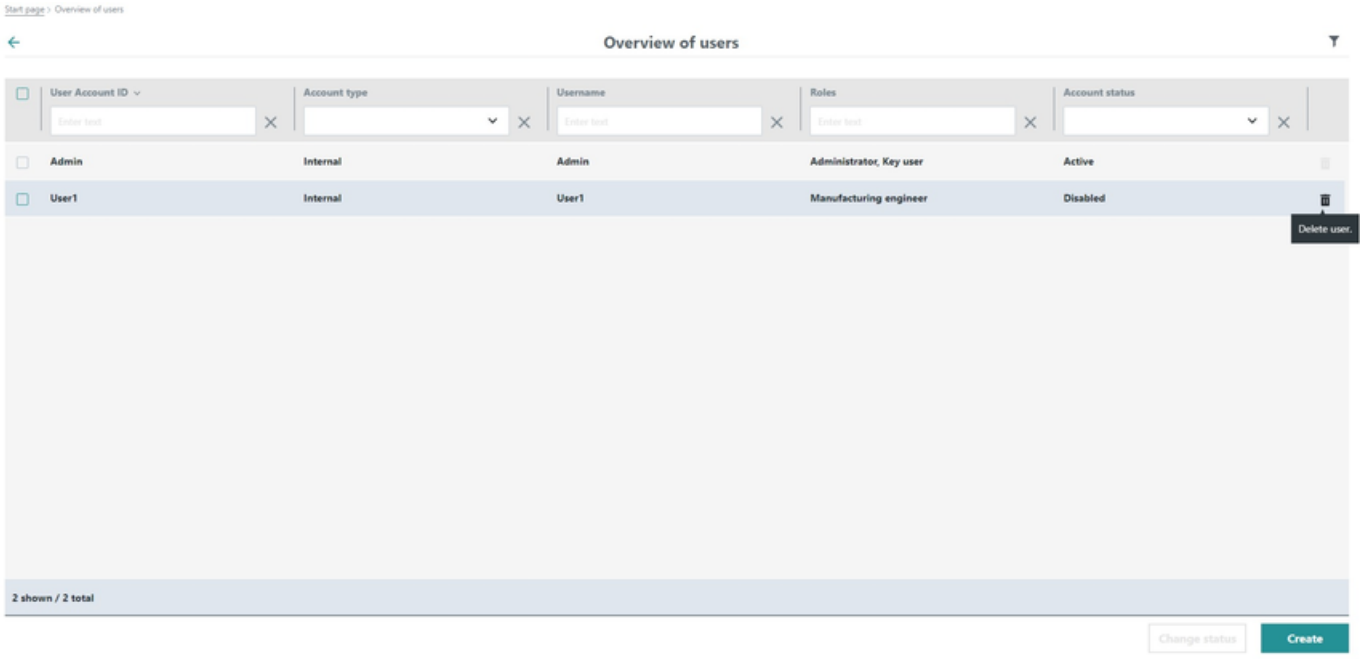
1. Click on the underlined name of the user in the "Overview of users" window.
   The "<username>" window opens.
   – Click "Edit".
   – Enter the required information.
   – Click "Save" to change the user.
   - OR -
   Click "Cancel" to discard the inputs.



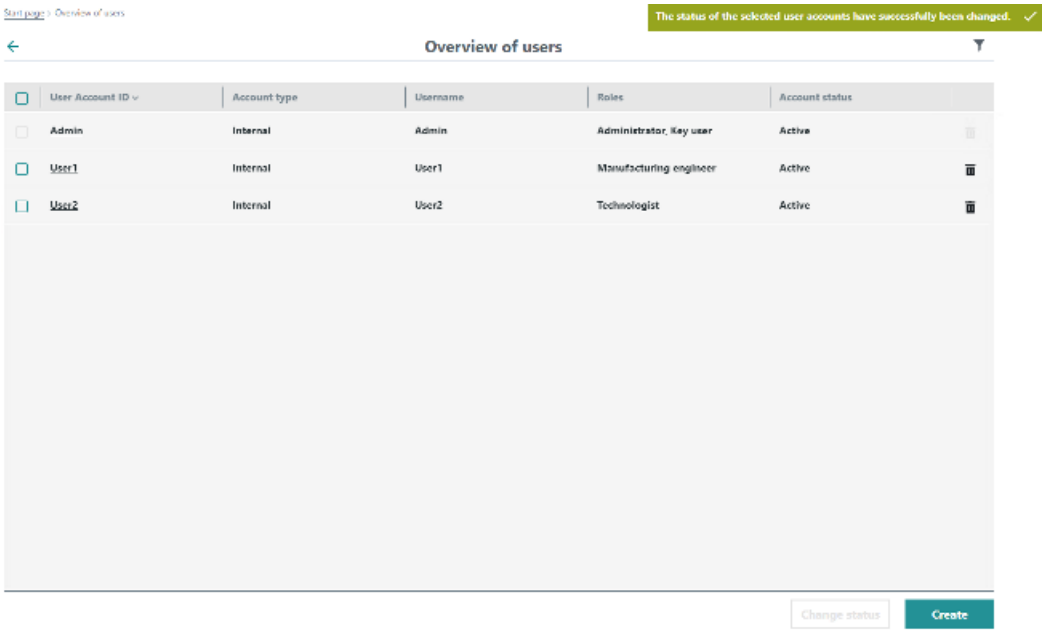
- OR -

2. Open the "Overview of users" window.

3. Activate the checkbox in front of the User Account ID.
   You have two possibilities:
   - Activating individual checkboxes.
   - Activating the column header checkbox in order to select all users except the logged-in admin.



4. Click "Change status".
   The message "The status of the selected user accounts have successfully been changed" is displayed in the top-right window area.



Note

Change status button

The "Change status" button is only activated if

- you activate one or several checkboxes and
- all selected user checkboxes have the same account status.

5. If you want to change the password, see further information in Chapter: Password change (Page 43)

4.3.6 Deleting user accounts

You have the possibility to delete user accounts.

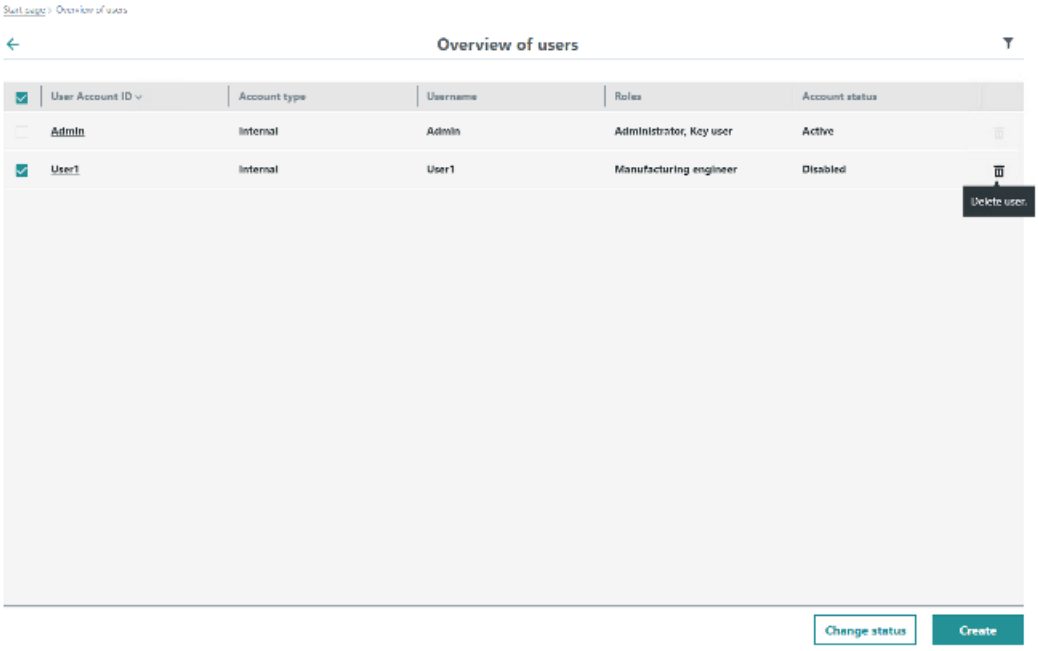
Parameters

The following parameters are available:

Parameter	Description
∨	This symbol appears when you click the column heading. Click the symbol to sort the elements alphabetically/numerically, either in ascending or descending order.
User Account ID	Provides user identification. • Displays the username of internal users. • Displays the external user Id with the prefix "extId".
Account type	Shows the account type:· • Internal: Internal user • External: External user
Username	Shows the username. **Note:** The currently logged in <Admin> user with the administrator role can disable another administrator, but not himself/herself.
Roles	Shows the roles. For more information, see List filtering (Page 46).
Account status	Shows the account status: • Active • Disabled
🗑	Deletes the user account.
⏷	Opens the "My Filters" window and filters the user table according to the following criteria: • User Account ID • Account type • Username • Roles • Account status For more information, see Users and functions (Page 58). Click on the filter icon again to close the filter window.

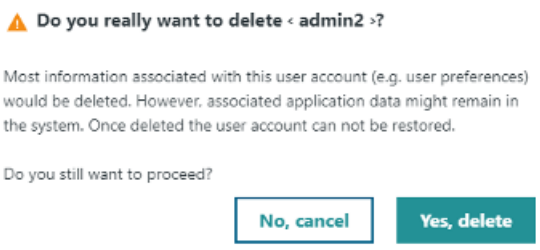
Procedure

1. Open the "Overview of users" window.



2. Click the "Delete" symbol next to the user account you wish to delete..
   A dialog box appears.
   - Click "Yes, delete" to delete the user account.
     - OR -
   - Click "No, cancel" to cancel the operation.

   Once a user account has been deleted, the message "Invalid log-in attempt" appears if the user tries to log in again.



Note

Deleted user accounts

Once you have deleted user accounts, the respective users have a time slot to finish ongoing operations, and can log out. By default, the time slot is 10 minutes and the count-down starts with the user log-in. If the administrator deletes an account 5 minutes after the user has logged in, the user has 5 minutes left to work on an open application. If the user clicks another application, the message "Access denied. You do not have access to this resource" is displayed. You can change the default time slot within Consul.

Note

User account data

The data from deleted user accounts is permanently erased from the system.

4.3.7 Resetting the password

You have the possibility to reset the password if it has been deactivated after a long absence. You can enter a new password or the user's old one which is thus reactivated.
The administrator sends the reset password to the user via a communication channel outside Mcenter. The system does not automatically notify the user.

Prerequisites

- In order to reset a password, you need the following rights:
  - Administrator rights
    - OR -
  - Key user rights
- You can reset the password only for the internal users.
  When you select an external user, there is no "Reset" button on the detail page.

Parameters

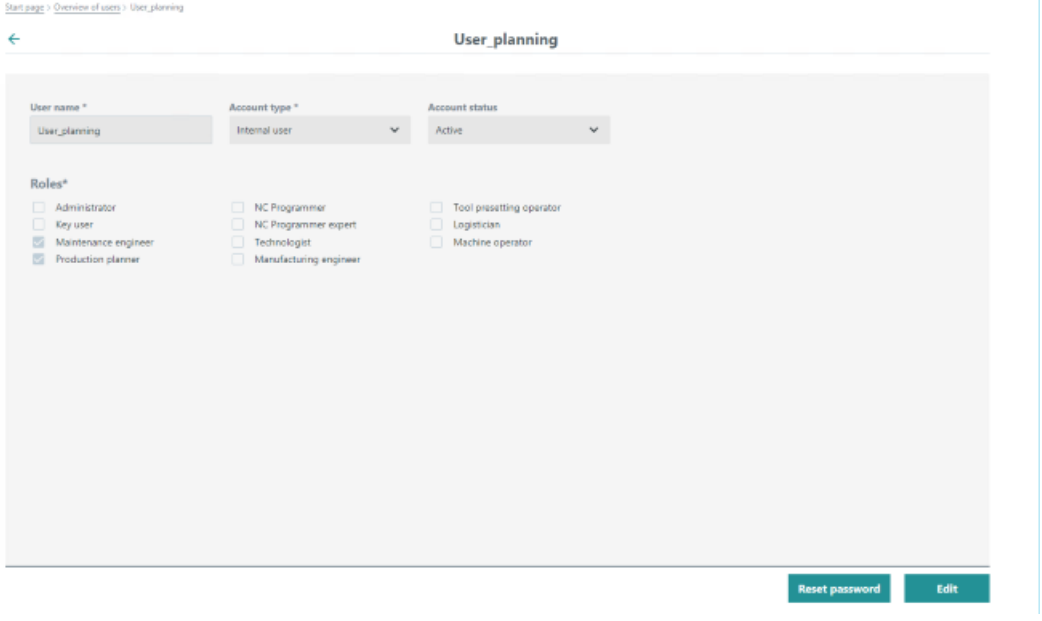
The following parameters are available:

Parameter	Description
Account status	You can choose the following status: • Active • Disabled
Password *	Enter a secure password. Password criteria: • Use at least 8 characters • Contains at least one uppercase letter • Contains at least one lowercase letter • Contains at least one special character • Contains at least one numerical character
Confirm password *	Re-enter the password.
ⓘ	Shows further information.

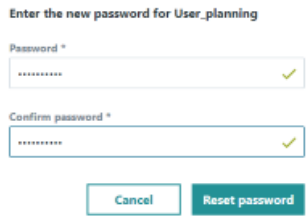
*) The fields marked with an asterisk are mandatory and must be completed. An error message appears if you make an erroneous entry.

Procedure

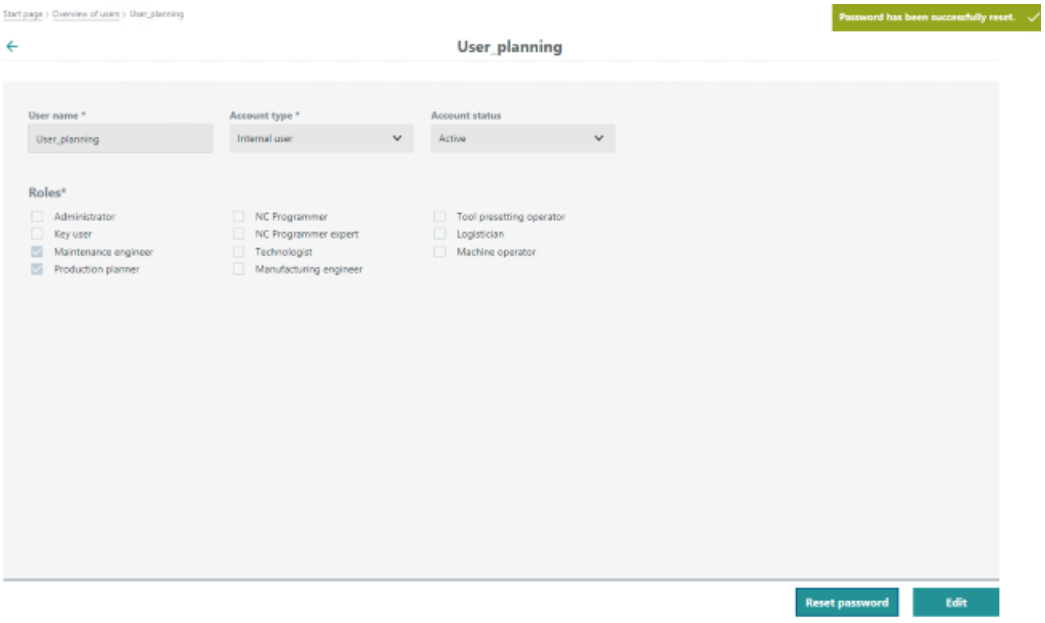
1. Log in as Administrator or Key user.
2. Click "Manage users".
3. The window "Overview of users" is open. Select the user who needs a password reset.
4. Click on the username and open the detail page.
5. Click on the button "Reset password" in the bottom-right window area.



6. Enter the new password and confirm it by retyping it in the line underneath.
   Click on "Reset password" to save the new password.
   - OR-
   Click "Cancel" to discard to cancel the operation.



7. A green message appears in the top-right window area indicating that the operation was successful.



4.4 Manage machines

4.4.1 Overview of machines

The "Manage machines" window shows an overview of all created machines.

Parameter

The following information is displayed for machines:

Parameter	Description
∨	This symbol appears when you click on the column heading. Click on the symbol to sort the elements alphabetically/numerically, either in ascending or descending order.
☐	Activate the column header checkbox to select all machines. - OR - Activate the checkbox in the first column to select the desired machines. Only the "Machine Agent" type machines have this option.
	Shows a managed machine.
	Shows an onboarded and online machine.
	Shows an onboarded and offline machine.
	Shows a not onboarded machine.
Connectivity type	Shows the supported connectivity types: • SINUMERIK Integrate • Machine Agent • Managed Client
Onboard state	Shows the onboard state: • Onboarded: The machine has been connected to the server at least once. It does not indicate whether there is a continuous connection between the machine and the server, at any given point in time. • Not onboarded: The machine has not yet been connected to the server. • Not applicable : The machine connection is not defined. In this column, you can sort the onboard connection state alphabetically, either in an ascending or descending order.
Connection state	Shows the connection state between the machine and the server: • Online • Offline • <empty> = The machine has not yet been connected to the server. The machine is not onboarded • Undefined In this column, you can sort the state alphabetically in an ascending or descending order.

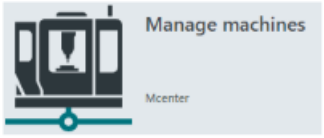
Parameter	Description
Machine type	Shows the type of the machine. You can create, edit and delete machine types. In this column, you can sort the machine types alphabetically, either in an ascending or descending order.
Autoconnect address	Shows the IP or MAC address or None, if the machine connection is not defined. In this column, you can sort the autoconnect address alphabetically, either in an ascending or descending order. The sort works inside in groups (IP or MAC or "other").
Machine agent version	• Not applicable: Those machines with connectivity type other than Machine Agent. • Not available: Those machines which have Machine Agent connectivity type, but the version is not available for some reason. • <empty>: Those machines which have Machine Agent connectivity type, but the connection is not defined. • Version (e.g.: 1.5.5): Shows the machine agent version of machine. In this column, you can sort the machine agent version, either in an ascending or descending order. The right ordering: <empty>, "Not applicable", "Not available" and the concrete versions as alphabetically.
Hierarchy path	Shows the path of the hierarchy. In this column, you can sort the hierarchy paths, either in an ascending or descending order.

Parameter	Description
Software updates	• Not applicable: Is shown for machines that have machines that have a connectivity type other than Machine Agent. • Not onboarded: Is shown for machines that have machines that have Machine Agent connectivity type but in Onboard state Not onboarded. • Up-to-date: Is shown for machines that have machines that have Machine Agent connectivity type and are in Onboard state Onboarded. No higher version of Machine Agent Core and corresponding adapter (adapter which belongs to the same adapter family) is availbale on the server. If the Machine Agent Core and/or adapter is newer than the latest on the server it also shows Up-to-date. • Update available: Is shown for machines that have Machine Agent connectivity type and are in the Onboard state Onboarded. In this case there is a newer version of Machine Agent Core and/or corresponding adapter available on the server. • Update in progress: Is shown when a Machine Agent Core and/or adapter update is in progress for machines that have Machine Agent connectivity type and are in Onboard state Onboarded. • Update failed: Is shown for machines that have Machine Agent connectivity type and are in Onboard state Onboarded. In this case a previously requested Machine Agent Core and/or adapter update has failed. • Installation in progress: Is shown when an update is in progress for machines that have Machine Agent connectivity type and are in Onboard state Onboarded. • Installation failed: Is shown for machines that have Machine Agent connectivity type and are in the Onboard state Onboarded. In this case, the previously requested adapter installation has failed. • Not Updatable: Is shown for machines that have Machine Agent connectivity type and are in the Onboard state Onboarded. The Machine Agent Core is up-to-date and there is a newer adapter from the same adapter family on the server, but not compatible with the current adapter on the machine. Two adapters are not compatible, if the default configuration of the newer adapter has more properties than the configuration of the current adapter or the properties are not the same. • Not available due to an error: Is shown for machines that have Machine Agent connectivity type and are in the Onboard state Onboarded. For some reason, the software update state cannot be read.

Parameter	Description
•••	Opens a window in which you select additional columns to be displayed in the overview. These columns can optionally be configured to show further information: • Connectivity type • Onboard state • Connection state • Machine type • Autoconnect address • Machine agent version • Hierarchy path • Software updates You can sort the individual columns in the overview. The next time you log in with your user Id, the selected columns are on display.
▼	Opens the "My Filters" window and filters the machine table according to the following criteria: • Machine name • Connectivity type • Onboard state • Connection state • Machine type • Autoconnect address • Machine agent version • Hierarchy path • Software updates For more information, see List filtering (Page 46). Click on the filter icon again to close the filter window.
⋮	Deletes the machine after a confirmation prompt.

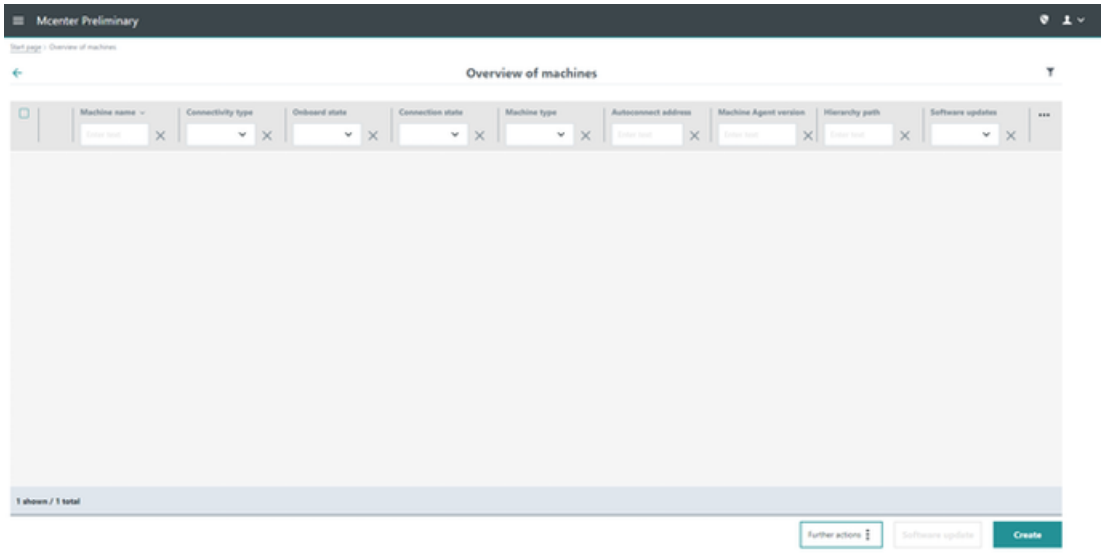
Procedure

1. On the start page of the Mcenter, click on "Manage machines".



   - OR -
   Open the following URL: Overview of machines (https://{ServerIP}/machine-overview)

2. The "Overview of machines" window opens and displays an overview of all created machines with their respective properties.
   To set your preferred column width, press the left mouse button and drag the column edges to the left or to the right. The respective parameters are automatically saved when you release the mouse button. The next time you visit the "Overview of machines" page, the columns are displayed with the width you opted for.
   You can create, edit, or delete a machine:
   - Creating a machine (Page 79)
   - Editing a machine (Page 84)
   - Deleting a machine (Page 87)
   - Updating Machine Agent Core and adapter on machine (Page 88)



3. If you click the underlined name of the machine with the right mouse button, you have the following options:
   - Open in a new tab
   - Open link in new window
   - Open link in incognito window
   - Save link as ...
   - Copy link address

– Inspect

Download "Machine Agent installer"

If you connect the machine and the server via the Machine Agent, you need the "Download Machine Agent installer".

User rights are important because the admin, key user, production planner, NC programmer expert and maintenance engineer can download.

1. Click on the "Further actions" button.
2. Click on "Download Machine Agent installer".
3. The browser opens. The file "machineagent_v...tar.gz" is displayed in the default directory.

Additional information about installing and configuring the Machine Agent client is provided in the Installation Manual "Mcenter, Manage MyResources, Optimize MyProgramming /NX-Cam Editor, Analyze MyPerformance /OEE, Access MyData /Collector".

Download "onboarding keys"

If you connect the machine and the server via the Machine Agent, you need the "onboarding keys".

At least 1 not onboarded Machine Agent type machine must be selected for this feature. If no Machine Agent is selected, the item is disabled.

User rights are important because the admin, key user, production planner, NC programmer expert, maintenance engineer can download.

1. In the "Overview of machines", select the machine(s)/the key(s) of which can be downloaded. You can only select machine(s) with "Machine Agent" connectivity type and "Not onboarded" onboard state.
2. Click on "Further actions".
3. Click on "Download onboarding keys".
4. Depending on your browser settings, you have the following options:
   – The download starts and the file "onboardingkeys.zip" is displayed in the lower left window area.
   – The file "save dialog" is open. You can select where the file is saved to.
5. Transfer the onboarding key to your Machine Agent client.

Additional information is provided in the Installation Manual "Mcenter, Manage MyResources, Optimize MyProgramming /NX-Cam Editor, Analyze MyPerformance /OEE, Access MyData / Collector".

4.4.2 Creating a new machine type

You can create a new machine type and it is added to the machine type list.

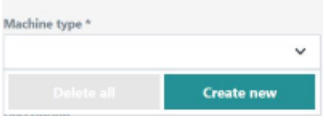
Parameters

Parameters	Description
Machine type *	
✓	Indicates that the input is correct.
✗	Cancels the data you entered into the field.
	Edits the machine type name.
	Deletes a machine type.

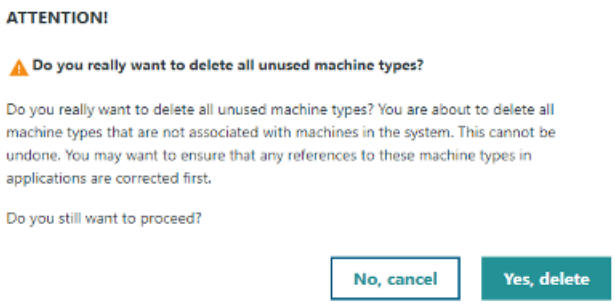
Procedure

1. Open the "Overview of machines" window.
2. Click on the "Create" button.
   The dialog window "Please select the connectivity type for your machine" opens.
   – Select the desired connectivity type and click on the "Select" button.

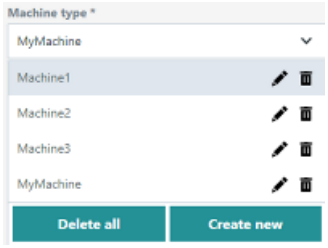
   The "Create new machine" window opens.
   – Click the "Machine type" field to display the "Create new" and "Delete all" button.
3. Click on the "Create new" button.
   – Enter the machine type into the "Machine type" field.
   – Click the check symbol to save the new machine type. The check symbol turns green when you click it.



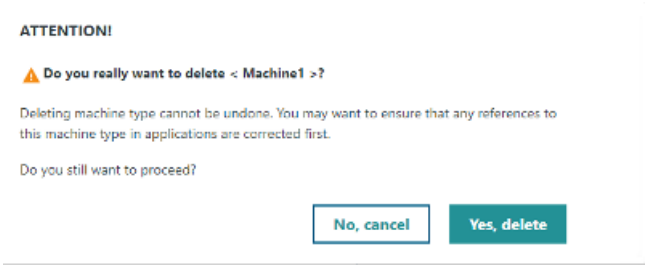
4. The new machine type becomes part of the drop-down list and can be selected.
   It is displayed in the "Overview of machines" window.
5. To delete the unused machine types, click the "Delete all" button in the activated "Machine type" menu.
   A dialog box appears.
   – Click "Yes, delete" to delete all unused machine types.
   - OR -
   – Click "No, cancel" to cancel the operation.



6. To delete an individual machine type, click the "Machine type" field.
   – The drop-down list displaying the machine types opens.
   – Select a machine type and click the "Delete" symbol.



7. A dialog box appears.
   – Click "Yes, delete" to delete the selected machine type.
   - OR
   – Click "No, cancel" to cancel the operation.



8. To change the name of a machine type, click the "Machine type" field. The drop-down list opens. Click the "Edit" symbol and enter the new name. Confirm the new name by clicking the check symbol.

Note

List filtering

You can search for a specific machine type by entering the name into the "Machine type" field.

4.4.3 Creating a machine

Create a machine in the "Create new machine" window.

With the Mcenter, machine tools with different controller manufacturers can be connected. The controller manufacturer must be specified when creating a machine.

Connectivity types have a physical connection between the machine tool and the Mcenter Server.
The following connectivity types are supported:

- SINUMERIK Integrate: Machine Tools with Siemens SINUMERIK controllers
- Machine Agent: Other controller manufacturers.
- Managed Client: Other unsupported controller manufacturers
  Connectivity types which do not have a physical connection between the machine tool and the Mcenter server.

Parameter

The following parameters are available:

Parameter	Description
Connectivity type	Activate the connection type: • SINUMERIK Integrate • Machine Agent • Managed Client
Machine name *	Enter a unique name for the machine. You can enter up to 50 characters.
Machine type *	Create a new machine type if the required type does not exist. Click the "Machine type" field in the "Create new machine" window to add a new machine type. The application recognizes whether the machine type exists while you fill in the input field. It displays an error message if the machine type is not unique. When you enter a new machine type, you need to save it to add it to the machine type list. For further information, see Creating a new machine type (Page 77).
Controller type *	Open the drop-down list and select the controller type of the machine. The controller type is a mandatory field which must be specified when creating the machine. The content must match the controller type of the machine to be connected to the server. If the correct controller type is not in the list, you should choose a similar controller type or the "Other" option. The controller type can influence which applications can be assigned or installed to the given machine.
Hierarchy path	Open the drop-down list and select the hierarchy path. A newly created machine can be assigned to an existing hierarchy path. The machine can be assigned to only one parent.
Description	Enter a detailed description of the machine. You can enter a maximum of 280 characters.
Connection details	
Connectivity type	Shows the connectivity type you have selected.
Onboard state	Shows the onboarded state.

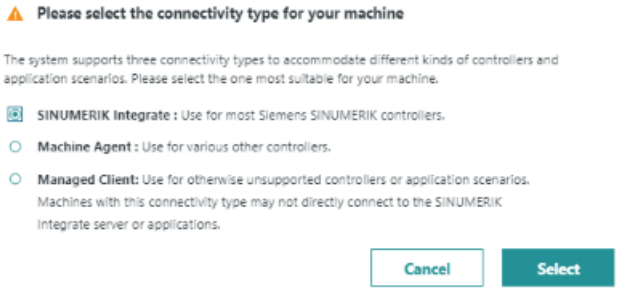
Parameter	Description
Autoconnect address *	For the connectivity type "SINUMERIK Integrate", enter the IP address or MAC address. Enter the unique and valid IP address or MAC address. • IP addresses consist of 4 decimal integers between 0 and 255. Separate each of the numbers with a period, for example 192.168.0.254. • MAC addresses consist of six two-digit hexadecimal numbers separated consistently by colons or hyphens, for example 00:A0:C9:14:C8:29.
Machine agent version	Shows the machine agent version of machine.
Connection state	Shows the connection state.
MAC address *	For the connectivity type "Machine Agent", enter the MAC address of the system or the IPC on which the Machine Agent is running. Enter a unique and valid MAC address. MAC addresses consist of 6 two-digit hexadecimal numbers separated consistently by colons or hyphens, for example 00:A0:C9:14:C8:29.
Adapter details - If the connectivity type is "Machine Agent"	
Adapter type *	Open the drop-down list and select the adapter of machine.
Adapter configuration *	Enter the adapter configuration of machine. The configuration depends on the adapter.
ⓘ	Shows further information.
⚠	Indicates that input is required in the field. - OR - Shows that the input is incorrect and provides a short description.
✓	Indicates that the input is correct.

*) All fields with an asterisk are mandatory. If you enter a value that does not comply with the rules, a red warning symbol and a corresponding red highlighted error message below the input field are displayed.

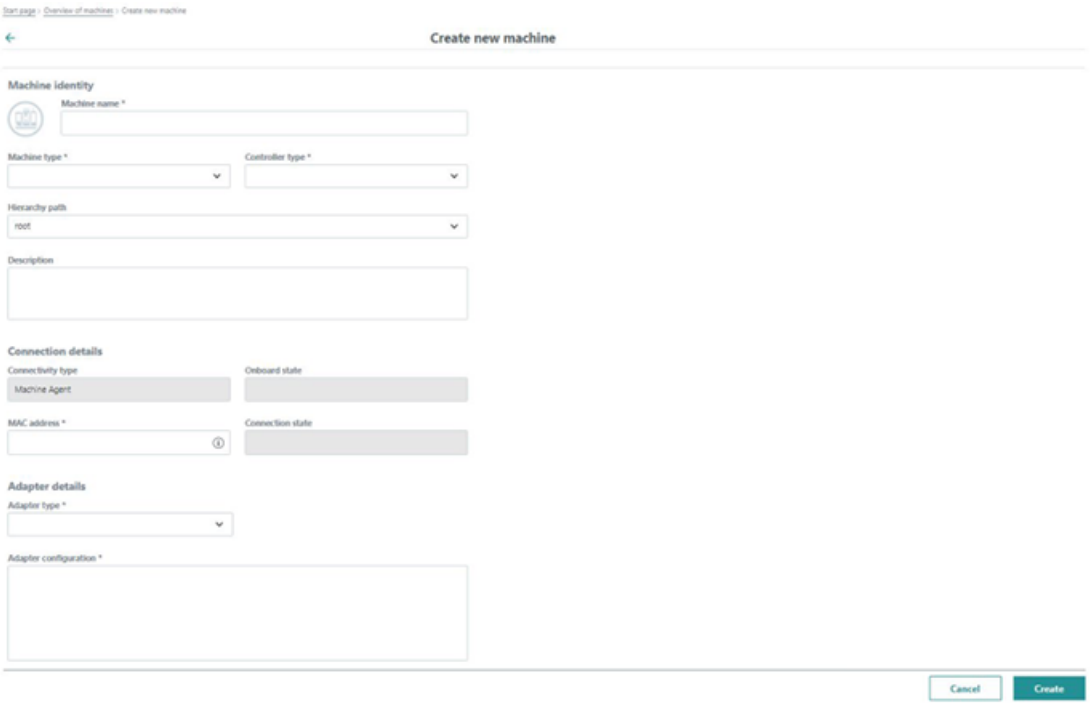
Procedure

1. Click "Create" in the "Overview of machines" window.
2. The dialog window "Please select the connectivity type for your machine" opens.
   Select the connection between the machine and the server.
   The following options are available:
   - SINUMERIK Integrate
   - Machine Agent
   - Managed Client

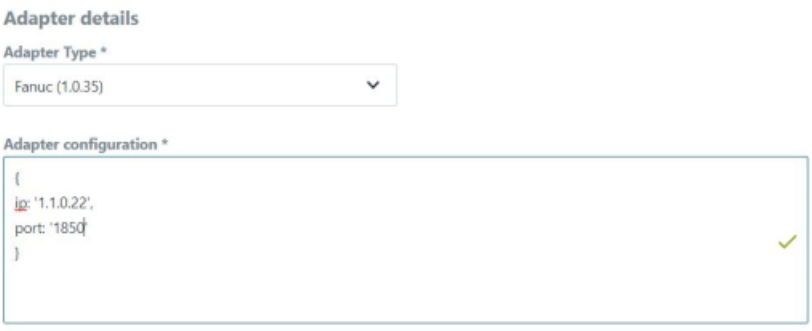
   Activate the option "SINUMERIK Integrate" and click "Select" button.



3. The "Create new machine" window opens.
   - Enter the required information.
   - Click "Create" to create the machine.
     The machine is shown in the "Overview of machines": Overview of machines (Page 72)
     - OR -
     Click "Cancel" to discard the inputs.



For the Machine Agent machines, you can enter the adapter details, adapter type and adapter configuration.



License management

After a machine is successfully connected, a license is issued.

The Managed machines are not required licenses.

If problems occur at this point, the following error messages are displayed:

Error message "Problem: New machine could not be created. Reason: There is no connection to the license server or the license server actively refused it."

The new machine cannot be created, because there is no connection to the license server.

Remedy: Additional information on resolving the error is available under:

- "Siemens PLM user guide"
- "Flexera manual"
- Installation Manual "Mcenter, Manage MyResources, Optimize MyProgramming /NX-Cam Editor, Analyze MyPerformance /OEE, Access MyData /Collector"

Error message "Problem: New machine could not be created. Reason: No more licenses left."

The new machine cannot be created because no further licenses are available.

Remedy: Additional Information on resolving the error is available under:

- "Siemens PLM user guide"
- "Flexera manual"

Error message "Problem: New machine could not be created. Reason: No valid license found."

The new machine cannot be created because the license file is invalid or does not contain Mcenter license.

Remedy: Additional information on resolving the error is available under:

- "Siemens PLM user guide"
- "Flexera manual"

Error message "Problem: New machine could not be created. Reason: The license has expired."

The new machine cannot be created because the license has already expired.

Remedy: Additional information on resolving the error is available under:

- "Siemens PLM user guide"
- "Flexera manual"
- Contact the Mcenter sales representative

Error message "Problem: New machine could not be created. Reason: No valid Mcenter license found.The new machine could not be created because it has no valid Mcenter license.

Remedy: Additional information on resolving the error is available under:

- "Siemens PLM user guide"
- "Flexera manual"
- Contact the Mcenter sales representative

4.4.4 Editing a machine

Once a machine has been created the associated data can be edited at any time, as long as no update or installation is in progress. You can also display the controller details.

Prerequisite

The machine is onboarded. No update or installation is currently in progress.

Parameter

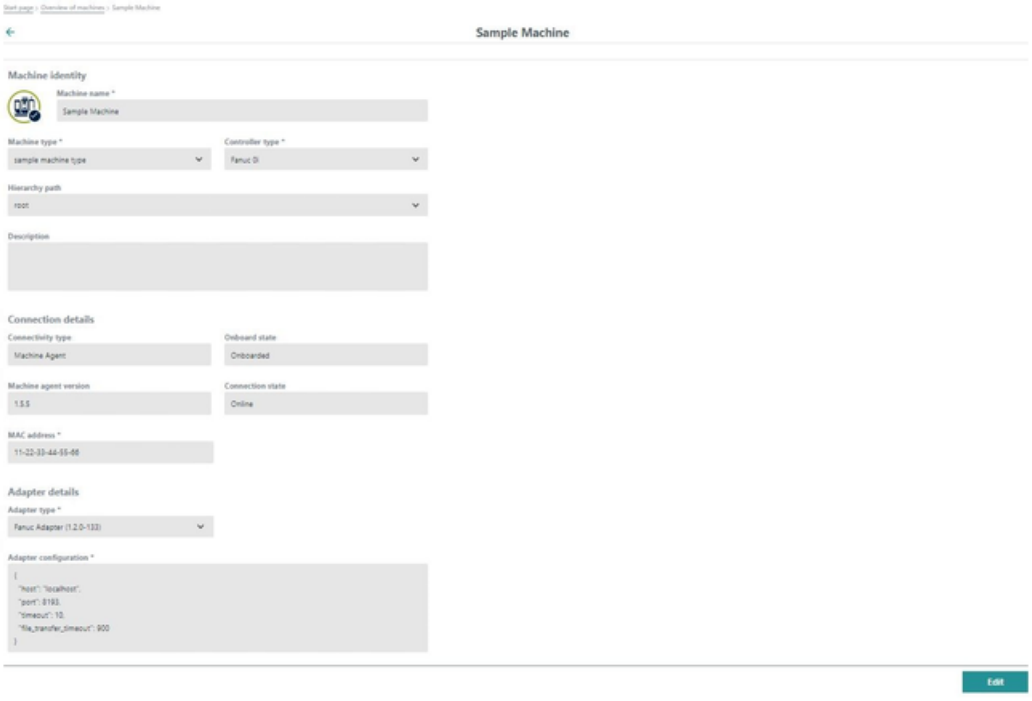
The following parameters are available:

Parameter	Description
Machine identity	
Machine name *	Enter a unique name for the machine. You can enter up to 50 characters.
Machine type *	Open the drop-down list and select the type of machine or create a new machine type.
Controller type *	It is not editable, but displays the selected controller type of machine.
Hierarchy path	Open the drop-down list and select the hierarchy path. The machine can be assigned to an existing hierarchy path. The machine can be assigned to only one parent.
Description	Enter a detailed description of the machine. A maximum of 280 characters can be entered.
✓	Indicates that the input is correct.
Connection details - The following parameters are not editable	
Connectivity type	Displays the connectivity type.
Onboard state	Displays the onboarded state.
Autoconnect address *	Displays the autoconnect address
Machine agent version	Displays the machine agent version.
Connection state	Displays the connection state.
Controller details	
PCU	Displays the version of the connected PCU hardware component. The property is displayed, when a PCU is connected to the server.
NCU	Displays the version of the connected NCU hardware component.
Operating system	Displays the operating system and version.
HMI	Displays the SINUMERIK Operate type and version.
HMI components	Displays information about an additional software that is running on the machine, e. g. SINUMERIK Integrate client version or Machine Handler version.
Adapter details - If the connectivity is "Machine Agent". These parameters are not editable	
Adapter type *	Displays the selected adapter of the machine
Adapter configuration *	Displays the entered adapter configuration of the machine.

*) All fields with an asterisk are mandatory. If you enter a value that does not comply with the rules, a red warning symbol and a corresponding red highlighted error message below the input field are displayed.

Procedure

1. Click the underlined name of the desired machine in the "Overview of machines" window.
2. The window "<Machine name>" opens and displays the machine data.
   Click on "Edit".



3. The input fields can be edited.
   – Enter the new data and select the desired changes from the drop-down lists.
     You cannot enter any changes in the "Connection details" section!
   – To save the changes, click on "Save".
     The "Overview of machines" window opens and displays the changed machine in the list.
     - OR -
     Click on "Cancel" to cancel the editing without saving and to return to the "Overview of machines" window.

4.4.5 Deleting a machine

You can delete superfluous machines from the "Overview of Machines".

Note

Deleting machines without installed applications

Delete only machines without Mcenter applications.

If you have deleted a machine with such an application, uninstall it later manually. This can result in full or partial loss of the HMI functionality.

For information about uninstalling an application from a machine, see Changing assignments (Page 94).

Note

Deleting machines without tools

Only delete machines that are not equipped with tools.

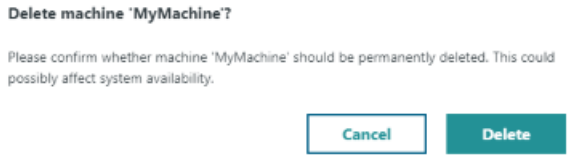
If necessary, shift the tools to "Assembly" or "Cabinet".

If you have deleted a machine equipped with tools, you must subsequently delete the tools in the Manage MyResources /Tools, Tool stock application. As these tools are still known to Manage MyResources /Tools, they are shown in the following location: <hierarchy of the deleted machine>-LostMagazine.
For more information about containers, see Container (Page 131).

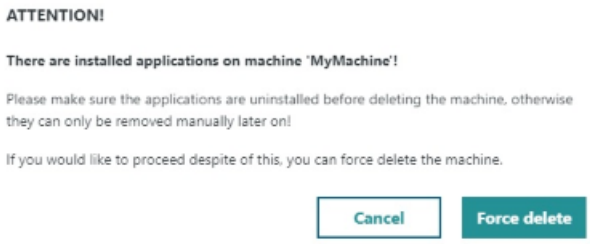
Procedure

1. Select the desired machine in the "Overview of machines" window.
2. Click the ⋮ menu symbol.
3. Click the delete symbol that is shown.

4. If there is no application on the machine, the following dialog box appears.
   – Click "Cancel" to cancel the operation.
   - OR -
   Click "Delete" to delete the machine.



   - OR -
   If at least one application is installed on the machine, the following dialog box appears.
   – Click "Cancel" to cancel the operation.
   - OR -
   Click "Force delete" to delete the machine.



5. A success message is displayed in the upper right corner of the window.

4.4.6 Updating Machine Agent Core and adapter on machine

Once a machine with Machine Agent connectivity type has been successfully created and onboarded and if there is newer Machine Agent Core or adapter on the server, it can be selected for software update.

Note

Machine Agent Core and adapters can only be updated to the latest versions on the server. If you want to update to a different version, you need to delete the greater versions(already assigned versions can not be deleted) or delete the machine and recreate with the desired version.

Prerequisite

- The machine has Machine Agent connectivity type
- The machine has Onboarded onboard state
- There is a newer Machine Agent Core or adapter or both on the server

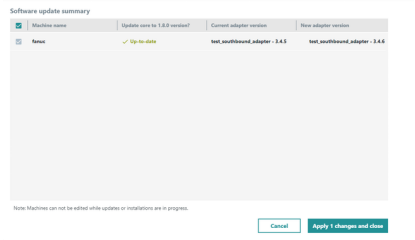
If only the assigned adapter has a newer version, it should be compatible. Two adapters are compatible if the configuration of the adapter on the machine has all the properties of the default configuration of the latest adapter on the server.

Parameter

Parameter	Description
Update core to xyz version?	xyz is the latest machine agent core version on the server. This column contains a toggle button with no and yes values. If no value is selected, the Machine Agent Core won't be updated. If the Machine Agent Core is up-to-date, it shows up-to-date.
New adapter version	Shows the name and version of the latest adapter on the server. If the adapter assigned to the machine is newer or the same as the latest adapter on the server, it shows up-to-date. If the latest adapter is no compatible with the current adapter, it shows a warning symbol. In this case the adapter won't be updated.
Machine name	Displays the name of the machine selected for update.
Current adapter version	Shows the adapter name and version which is assigned to the machine.
☐	Activate the column header checkbox to select all machines. OR Activate the checkbox in the first column to select the desired machines for update.

Procedure

1. Select the desired machine(s) on the "Overview of machines" window
2. Click on the "Software update" button.
   A dialog box appears with the data of the selected machine(s).



3. Click the "Apply x changes and close" button to initiate the update(s) with the selected options. Note: all machines are selected by default.
   You can deselect individual machines by clicking the checkbox next to the machines you want to deselect.

After completing these steps and refreshing the "Overview of machines" window the changes are shown in the software updates column.

4.5 Manage applications on machines

4.5.1 Overview of assignments

You can assign Mcenter applications to the connected machines. The assigned applications are installed automatically. The only necessary user interaction on the machine's side is a reboot.

The "Overview of assignments" window shows an overview of all created machines from "Manage machines".

Prerequisites

- The connection between the server and the machine is configured.
- Appropriate roles are required to open the "Overview of assignments" page".
  For more information, see Manage users (Page 56).
- The connections between the server and the machines must be established to use the application assignment.
  For more information, see Manage machines (Page 72).
- Before installing any applications using the Mcenter Server, uninstall all applications, which were installed with the SINUMERIK Integrate 4.1 Installer. If you do not do this, the installation using "Manage applications on machines" fails, and neither of the installed applications works properly.
- Applications that were installed with the SINUMERIK Integrate 4.1 Installer are not recognized and displayed on the Application assignment page.
- If HMI-Advanced machines are connected to the server, check the configuration in the Installation Manual.
  For more information, see the chapter "Manage applications on the machines" in the Installation Manual "Mcenter, Manage MyResources, Optimize MyProgramming /NX-Cam Editor, Analyze MyPerformance /OEE, Access MyData /Collector".

Parameter

The following information is displayed for machines:

Parameter	Description
∨	This symbol appears when you click on the column heading. Click on the symbol to sort the elements alphabetically/numerically, in ascending or descending order.
Machine name	Shows the name of the machine.
Machine type	Shows the type of the machine.
Hierarchy path	Shows the path of the hierarchy.
Number of assignments	Shows the number of assigned client applications.

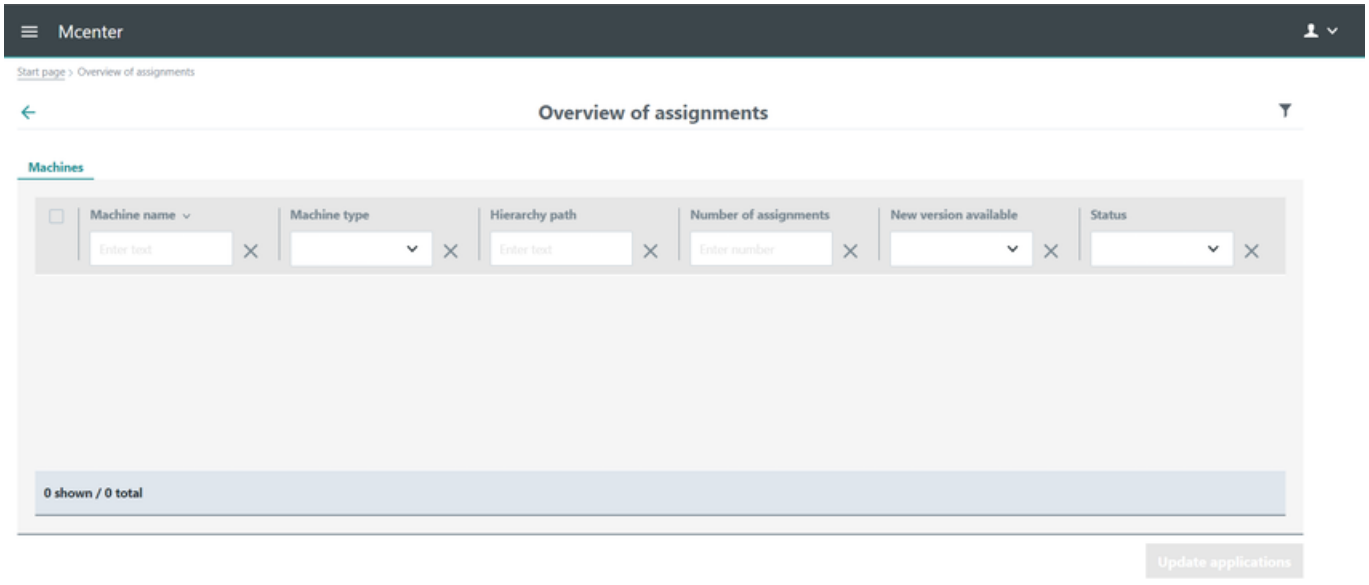
Parameter	Description
New version available	Shows the availability of a new version: • "Yes"- A new version is available on the server. You can select the machine for an update if the client of the target machine meets the update requirements. • "No"- No new version is available on the server. • "Unknown"- The machine cannot be updated. The server did not receive the hardware or software information from the machine or the machine is switched off and is in an unknown state. Restart the machine and try again later.
Status	Shows the application status: • "No changes in progress" for one of the following reasons: – No application has been assigned yet – No installation is in progress – No uninstallation is in progress – No update is in progress • "Changes in progress" for one of the following reasons: – Installation is in progress – Uninstallation is in progress – Update is in progress • "Manual action required" for one of the following reasons: – Machine or HMI needs to be restarted to complete the install/uninstall/update operation – Error during the install/uninstall/update operation
	Opens the "My Filters" window and filters the machine table according to the following criteria: • Machine name • Machine type • Hierarchy path • Number of assignments • New version available • Status For more information, see List filtering (Page 46). Click on the filter icon again to close the filter window.

Procedure

1. On the start page of Mcenter, click on "Manage applications on machines".

   - OR -
   Open the following URL: Manage applications on machines (https://{ServerIP}/appassignment-overview)

2. The "Overview of assignments" window opens and displays an overview of all machines with their properties.
   In order to set your preferred column width, press the left mouse button and drag the column edges to the left or to the right. The respective parameters are automatically saved when you release the mouse button. The next time you log in with your user Id, the columns are displayed with the width you opted for.



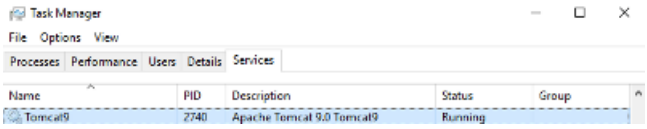
3. When you select a machine for the first time, an update is carried out and the following message appears: "Post update information: Any actions regarding the application assignments are not possible due to performed Mcenter update. Please, wait a few minutes until the machine is ready to use and try again."

4.5.2 Machine overview of applications

The "<Machine name>" window shows details of the application assignments on the selected machine. If no application is assigned to the machine, the table is empty.

Prerequisites

- The proper rights are required to open the "Overview of assignments".
  For more information, see Manage users (Page 56).
- The connection between the server and the machine is configured.
  For more information, see Manage machines (Page 72).
- Tomcat9 service must be running before assigning and updating the application to the client.
  You can check the service status under "Task Manager - Services".



Parameter

The following information is displayed for machines:

Parameter	Description
Application name	Shows the name of the assigned software application.
Client application state	Shows the application state, for example: • Waiting for machine client to install • Installing • Installed • Uninstalling • Downloading • Error occurred during installation
Client application version	Only contains information when "Client application state" of this application is "Installed". Version can be: • Up-to-date • Not updatable • Update available For more information, see Updating assignments (Page 98). The tooltip shows the version of the applications that is available on the server and the version of the assigned and installed application.

Procedure

1. Click on the underlined name of the machine in the "Overview of assignments" window. The "<Machine name>" window opens and displays an overview of assigned software packages with their properties.

2. Click on "Change assignments" to add or delete assignments for the machine:
   – Changing assignments (Page 94)
3. If the machine is stuck in state "Installing" more than 5 minutes, check whether the machine is connected to the server.
4. If the application is in state "Reboot required on machine client ...", then:
   – Reboot the HMI to successfully complete the installation. For an HMI-Advanced machine, you must switch to the service mode configuration to reboot the PCU.
   - OR -
   – Restart the Machine Agent client. Additional information is provided in the Installation Manual "Mcenter, Manage MyResources, Optimize MyProgramming /NX-Cam Editor, Analyze MyPerformance /OEE, Access MyData /Collector".
5. If the application is in state "Uninstall failed", the application has to be removed manually.
6. You can change the assignments at any time before the HMI is rebooted. Even if an assignment is already in the "Reboot required..." state.
   – Apply the changes of the assignments.
   – Wait until the assignment are in the "Reboot required..." state again.
   – Reboot the HMI.

4.5.3 Changing assignments

In "Change assignment of <Machine name>" window, select applications for installation and uninstallation on the machine.

Prerequisites

- The proper rights are required to open the "Overview of assignments".
  For more information, see Manage users (Page 56).
- The machine model of the machine is available on the server. If the machine's machine model is not available, a message is displayed. Wait until the machine uploads its machine model to the server. If the problem persists, contact your system administrator.
- The connection between the server and the machine is configured.
  For more information, see Manage machines (Page 72).

Parameter

The following parameters are available:

Column	Description
Available applications	Displays the applications and their versions which are available on server. • the application name • the version which is avaiilable on the server • the available assignment types
Applications assigned to the machine	Displays the applications and their versions which are assigned to the machine. • the application name • the version which is assigned to the machine • the assignment type which is configured for the machine

Note

Not all applications have SINUMERIK Operate and HMI-Advanced compatible versions, so the application list depends on the software version.

For example, if an application is only compatible with SINUMERIK Operate, this application does not appear in the "Available applications" column, for HMI-Advanced machines.

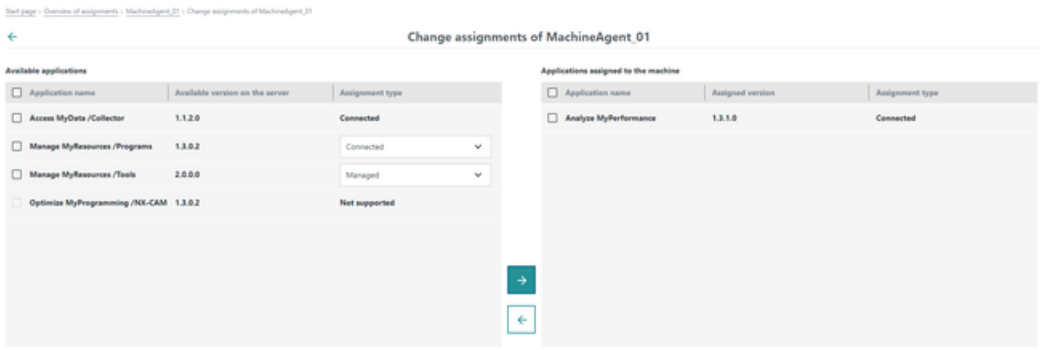
Note

Changing assignments on Managed machines

In case of machines with a Managed Client connectivity type, the changing assignments procedure is the same. However, the client application state is installed immediately.

Assignment type

It is possible to assign an application to a machine either as "Connected" or "Managed".



Available applications panel

- In case of “Connectivity type” of the selected machine is SINUMERIK Integrate or MachineAgent and the checkbox is active, the "Assignment type" can be set for the new application assignment.
  The available values are the following:
  - **Connected**
    This option will be available if the given application has a client package for the given machine.
  - **Managed**
    This option will be available if the given application supports **Managed** machines. This means the application will behave as there is no physical connection between the machine tool and the Mcenter server.
- If an application doesn't have a client package for the given machine and does not support **Managed** machines either:
  - The checkbox for the application will be disabled.
  - **Not supported** label will be displayed as assignment type.
  - The application can not be assigned to the machine.

Applications assigned to the machine panel

This panel only contains the actual assignment type, it can not be changed without un-assigning the application first.

Note

Changing assignment of already assigned applications

When moving an already assigned application from right to left, the assignment type can not be changed until the assignment itself is not removed.

- It is not allowed to change the assignment type during a temporal operation.
- To change the assignment type, you should finalize the assignment change operation by clicking on "Apply changes". After the operation is done, the application can be assigned to the given machine again with a potentially different assignment type.

Note

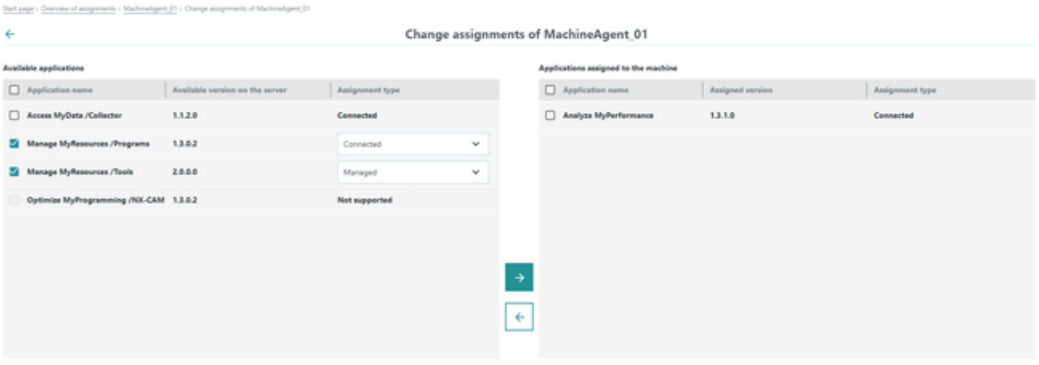
Changing assignment of application that is being uninstalled

It is not allowed to change the assignment type of an application that is being uninstalled.

To understand this consider the use-case:

- The application supports both "Connecte" and "Managed" assignments
- The application is assigned to the machine with the "Connected" assignment type
- You un-assign the application
- While the operation is in progress the application can not be reassigned with a different type (e.g. "Managed")
- The system will force the application assignment type to be the same ("Connected") as it was before until the uninstall operation is finished.
- After the operation is finished (i.e. the application state is set to "Uninstalled"), the application can be assigned with a different assignment type

Procedure with an activated checkbox



1. Click on "Change assignment" button in the "<Machine name>" window.
   The "Change assignments of <machine name>" window opens.
2. In the column "Assignment type" in the "Available applications" panel, set the desired assignment type for the applications you want to assign.
3. In the panel "Available applications", select the applications, that you want to assign to the machine. Click the arrow button that points to the right.
   To select all applications, activate the checkbox in the column header.
4. In the panel "Applications assigned to the machine", select the applications, that you want to delete from the machine and click the arrow button that points to the left.
5. Click "Apply changes"
   - OR -
   Click "Cancel" to discard the changes.

6. The "Summary of changes" windows reopens. Click "Apply" to confirm the changes.
7. Click on the "Back" symbol .
   For "Connected" type assignments the "Client application state" is "Waiting for machine client to install". The "Client application version" is empty.
   For "Managed" type assignments, the "Client application state" is "Installed". The "Client application version" is "Up-to-date".

Note

Inactive checkbox

The checkbox is inactive when the machine is unavailable. A tooltip displays the information "The application cannot be assigned to the machine due to incompatible hardware or software."

4.5.4 Updating assignments

In the "Overview of assignments" window, select machines to update their applications. On the selected machines, all previously installed applications are updated.

Prerequisites

- The proper rights are required to open the "Overview of assignments".
  For more information, see Manage users (Page 56).
- Applications are installed on the machine.
  Server update is required to get new version of applications on server.

Note

Updating assignments on Managed machines

After the Mcenter server update, the client application version is "Up-to-date" instead of "Update available".

Note

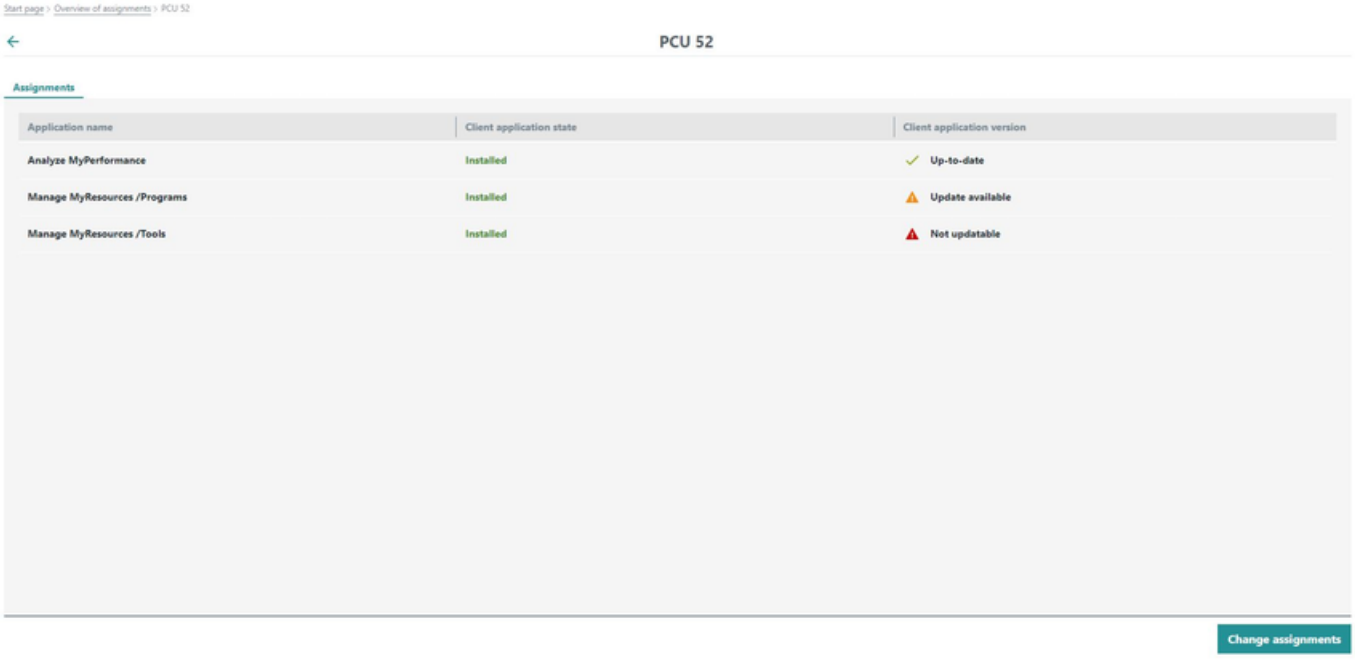
Updating Analyze MyPerformance /OEE

Updating Analyze MyPerformance /OEE assignment is possible if the client has one of the following versions:

- 1.3.0.0
- 1.3.0.1
- 1.3.0.2

Procedure

1. In the "Overview of assignments" window, updatable machines are indicated with a "Yes" value in the "New version available" column.
   To display the status of the individual applications of a machine, click on the name of a machine.

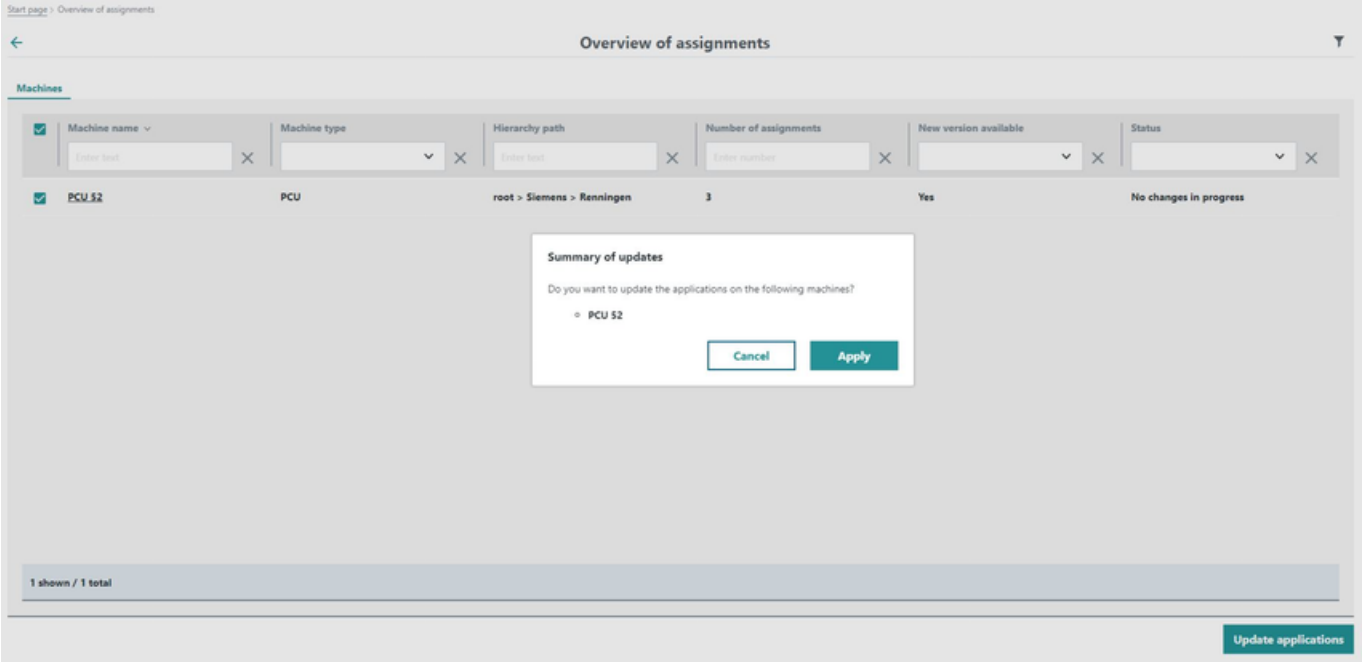


   An application with the status "Update available" can be updated.
   An application with the status "Not updatable" must be uninstalled and a new version of the application must be installed.

2. In the "Overview of assignments" window, select the checkboxes for those machines that should be updated.

3. Click on the "Update applications" button.
   The "Summary of updates" window opens and displays all machines that will be updated.
   If you update a machine, all installed applications will be updated.

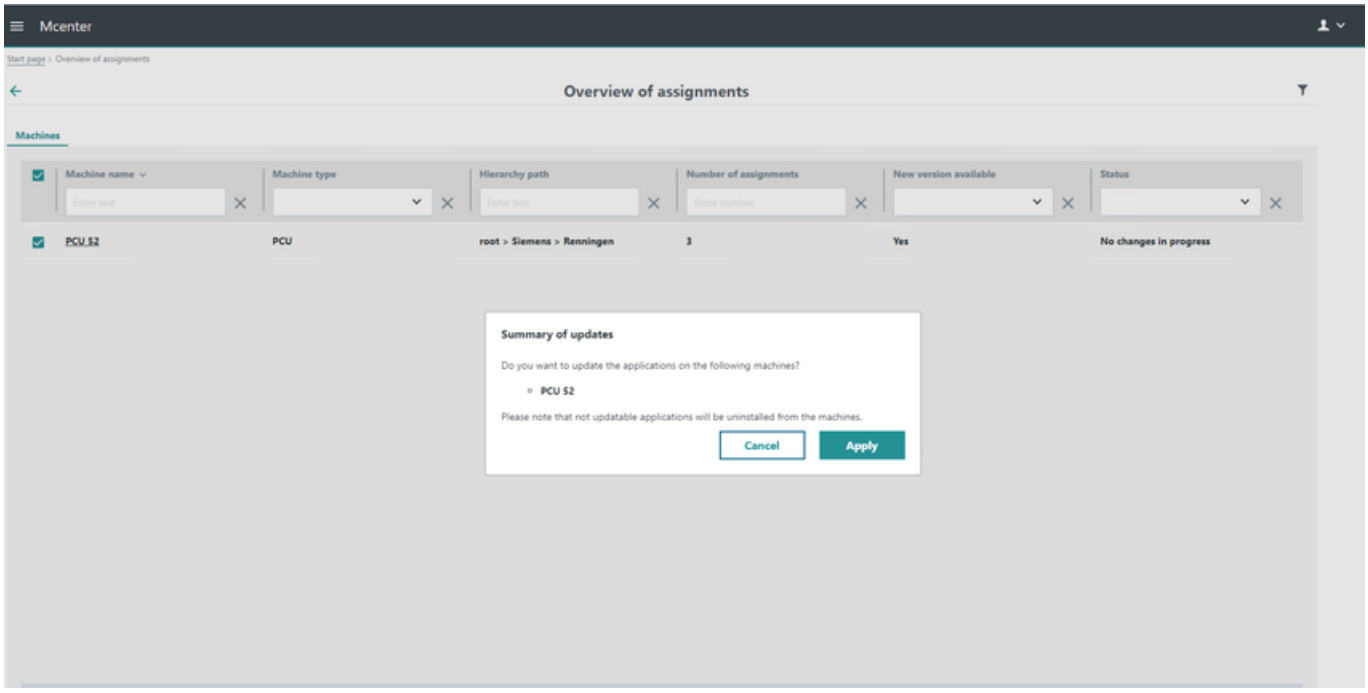
4. Click on the "Apply" button to continue.
   For the affected machines, the value in the "Updates available" column changes to "No" and the value in the "Status" column changes to "Changes in progress".
   - OR-
   Click the "Cancel" button to abort the process.



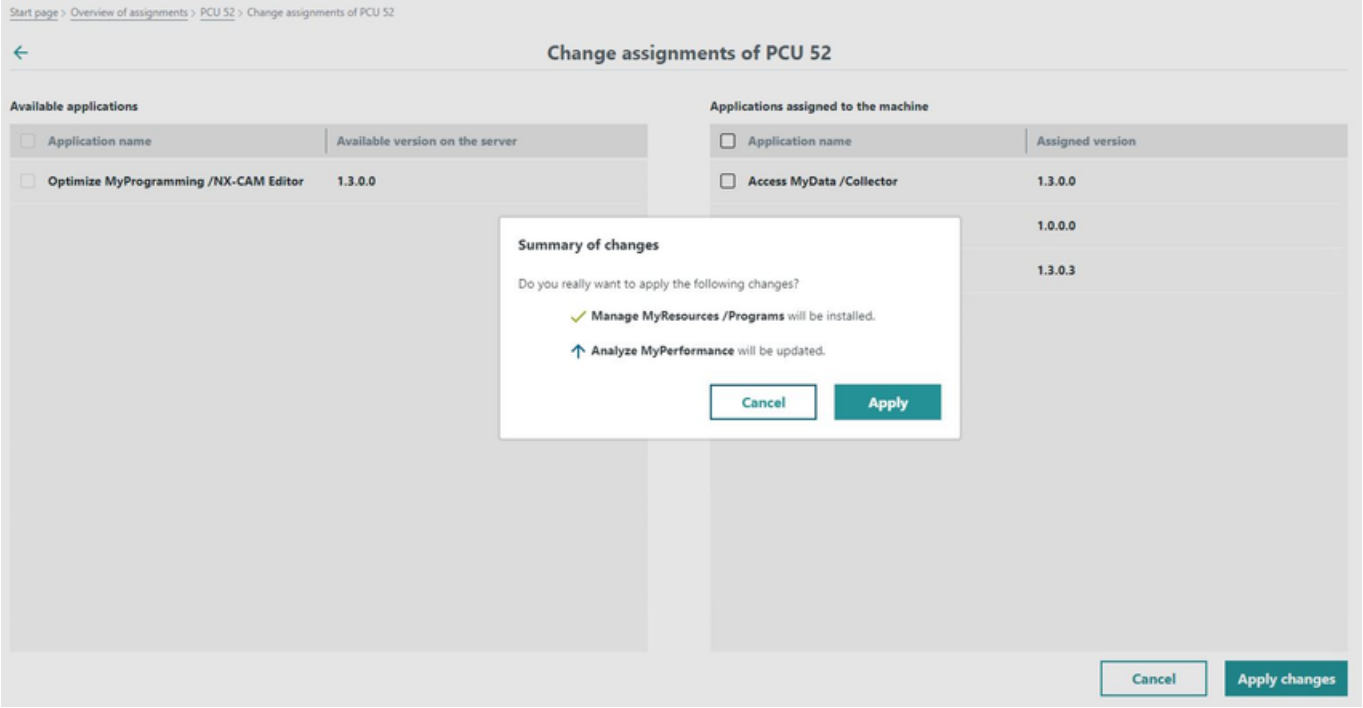
5. Click on the name of a machine.
   During the update process, the "Client application state" is "Download pending" and the "Client application version" is empty.
6. As soon as all applications of the affected machines have the state "Reboot required on machine client after installation", reboot the HMI.

Forced update or uninstall

If you have applications with the "Update available" version and you want to install a new so previously not installed application, you are informed that during the installation an update process also will start for the applications with the "Update available" version.



If there are applications with outdated or previous versions and the user starts an update process, the “Summary of changes” window comes up. The window informs the user about the applications with outdated versions that will be uninstalled and applications with previous versions that will be updated.



Note

Machines with a Machine Agent connectivity type

Concerning machines with a Machine Agent connectivity type, additional information is provided in the Operating manual "Mcenter, Analyze MyPerformance /OEE".

4.6 Manage openness clients

Prerequisite

You need administrator rights to manage openness clients.

Software products from third-party suppliers can access data or functions from the Mcenter via its open interfaces. As a first step, external clients must authenticate themselves with Mcenter. An access token obtained from the Identity service is used for identification.

Use the Manage openness clients application to create an openness client. The created openness client includes all information you require to get an access token. With such a token you are able to use MMR-API and instantiate tools with geometry data, for example. You must create a dedicated openness client for each client.

For more information about a token for the openness interface (extension interface), for example for the Swagger UI, see Token for the openness interface (extension interface) (Page 891).

Validity of openness clients

Newly created openness clients are valid for one year. After this period, you must change the secret or create a new client.

Note

Expiration of openness API client

The expiration date of the openness API client for which an access token was requested is checked.

If the client secret expires within the next 31 days (compared to the server time), a warning level entry is written to the Identity service log.

4.6.1 Overview of Manage openness clients

The "Manage openness clients" window shows an overview of all created openness clients. It provides the following functions:

- Listing openness clients
- Create a new openness client
- Edit the name of an openness client
- Change the secret of an openness client
- Delete one or multiple openness clients
- Changing the API rights of an openness clients

Parameters

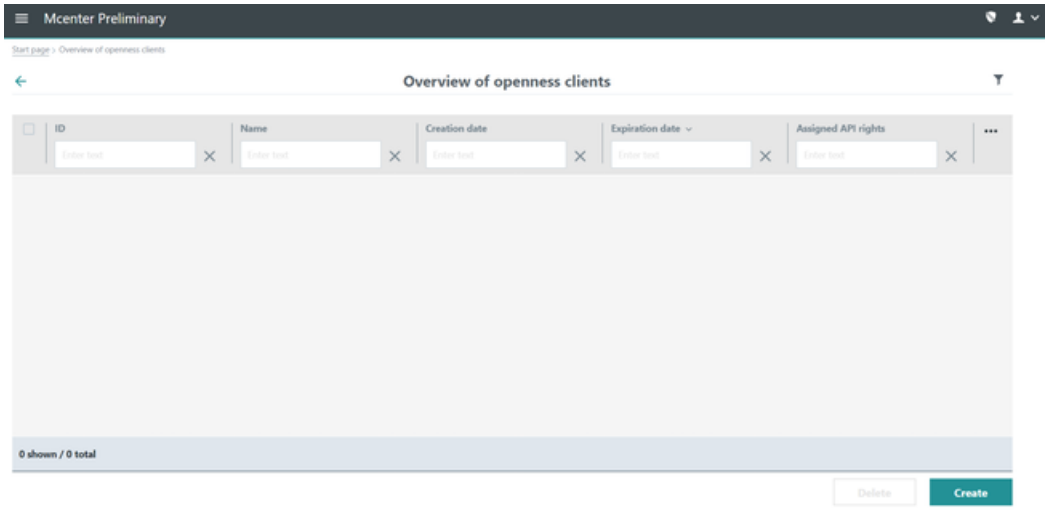
Parameter	Description
ID	Shows the Client-Id of the openness client.
Name	Shows the name of the openness client.
Creation date	Shows the creation date of the openness client.
Expiration date	Shows the expiration date of the openness client.
Assigned API rights	Shows the assigned API rights of the openness client. Previously created openness clients (when it was not an option to add API rights to openness client), have every previously available right assigned.
•••	Opens a window in which you select additional columns to be displayed in the overview. Only ID can be optionally configured to show further information. The next time you log in with your user Id, the selected columns are on display.

Procedure

1. On the start page of Mcenter, click on "Manage openness clients".

   - OR -
   Open the following URL: Overview of openness clients (https://{ServerIP}/openness client-overview).

2. The "Overview of openness clients" window opens and displays an overview of all created openness clients with their properties.



4.6.2 Creating a new openness client

You can create openness clients in the "Overview of openness" window.

Note

Openness client name

The name of the openness client does not have to be unique.

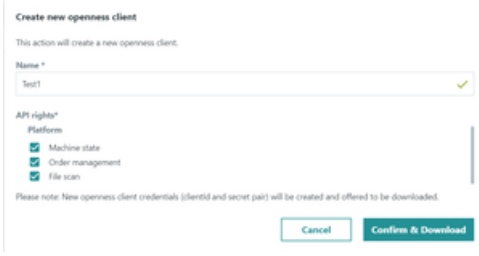
Parameter

Parameter	Description
Create new openness client	
Openness client*	Enter the name of the openness client
API rights*	Choose the API rights of the openness client

*) The fields marked with an asterisk are mandatory and must be completed. An error message is output if you make an erroneous entry.

Procedure

1. Click on the "Create" button in the "Overview of openness clients" window.
   The "Create new openness client" window opens.
2. Enter the name of the openness client.
3. Click on the "Confirm & Download" button to create an openness client.
   - OR -
   Click on the "Cancel" button to discard the inputs.

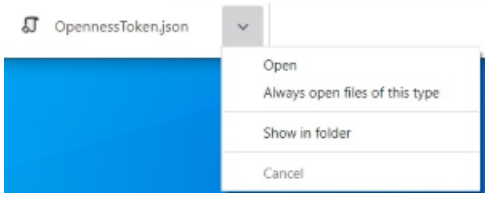


4. The created openness client is displayed in the " Overview of openness clients" window.
   The "OpennessToken.json" file is created. This file contains all information required to receive an access token from the Identity service.
   Depending on the browser you use, the file is shown in the status bar.
   Click the checkmark, to access the following options:
   - Open: To open the file select the corresponding program, for example the Editor.
   - Always open files of this type: The generated file is always opened.
   - Show in folder: Open the "Downloads" directory in which all previously generated files are stored with their dates.

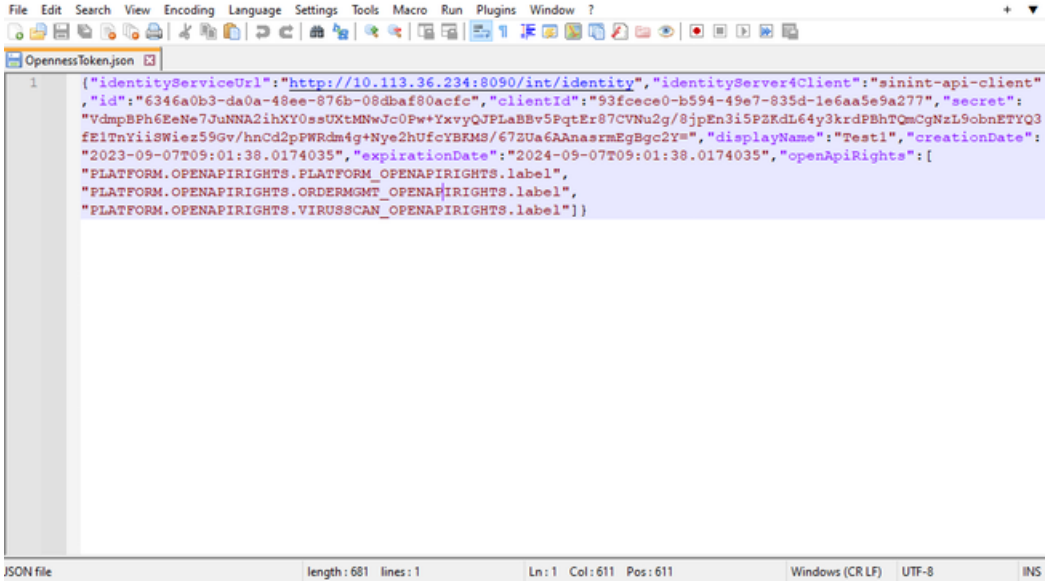
Note

"OpennessToken.json" file

If the "OpennessToken.json" file has been created, it is not possible to create a new file again. If the file is missing, you can change the token, which will invalidate the previously created file.



5. Open the file, you will receive the access token with the information from the secret generator.



4.6.3 Editing an openness client

You can rename existing openness clients.

Note

Openness client name

The name of the openness client does not have to be unique.

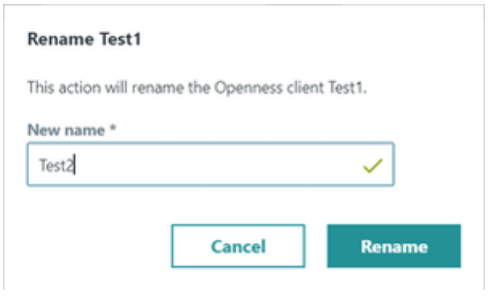
Parameter

Parameter	Description
Rename <openness client name>	
New name*	Enter the name of the openness client.

*) The fields marked with an asterisk are mandatory and must be completed. An error message is output if you make an erroneous entry.

Procedure

1. Click on the ⋮ button that is in the row of the machine you would like to edit in the "Overview of openness clients" window.
2. Click on "Edit"
   The "Rename <openness client name>" window opens
3. Enter the name of the openness client.
   Click on the "Rename" button to rename the selected openness client.
   - OR -
   Click on the "Cancel" button to discard the inputs.



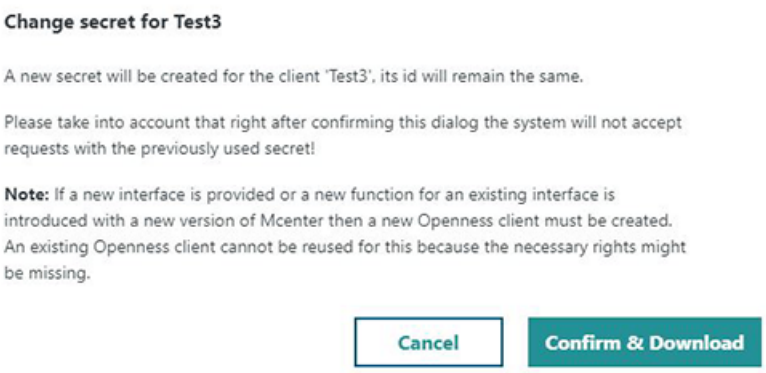
4. The renamed openness client is displayed in the "Overview of openness clients" window.

4.6.4 Changing the secret of an openness client

You can change the secret of a selected openness client.

Procedure

1. Click on the ⋮ button that is in the row of the machine you would like to change the secret of in the "Overview of openness clients" window.
2. Click on "Change secret
   The "Change secret for <openness client name>" window opens.
3. Click on the "Confirm & Download" button to change the secret of the selected openness client.
   - OR -
   Click on the "Cancel" button to cancel the operation.



4. The "OpennessToken.json" file is created. If you open the file, you receive the access token with the information from the secret generator.

Note

Change secret

If the secret has been changed, the previous secret and json file do not work anymore. Only the newly regenerated secret will be accepted.

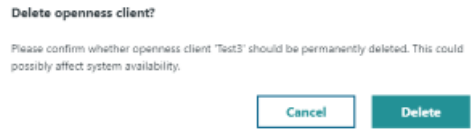
4.6.5 Deleting openness clients

You can delete unnecessary openness clients from the "Overview of openness clients" window.

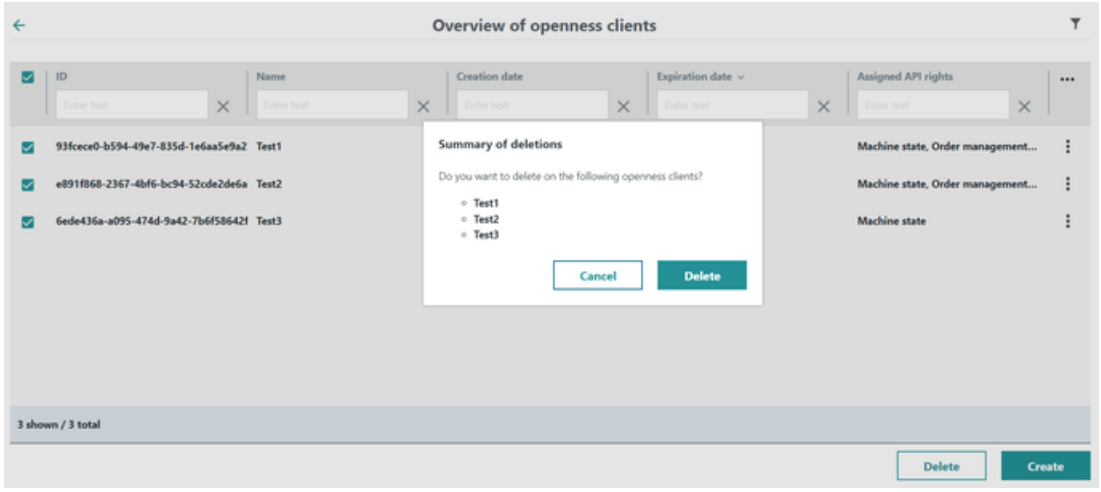
Procedure

1. Click on the "Actions" button in the "Overview of openness clients" window.
2. Click on "Delete".
   The "Delete openness client?" window opens.

3. Click on the "Delete" button to delete the openness client.
   - OR -
   Click on the "Cancel" button to cancel the operation.



4. Activate the checkbox of the desired openness client in the "Overview of openness clients" window.
5. Activate individual checkboxes.
   - OR -
   Activate the column header checkbox to select all openness clients.
6. Click on the "Delete" button.
   The "Summary of deletions" window opens.
7. Click on the "Delete" button to delete the selected openness clients.
   - OR -
   Click on the "Cancel" button to cancel the operation.



The selected openness clients are deleted.

4.6.6 Changing the API rights of an openness client

Changing the API rights of an openness client

If you want to restrict a client's rights:

1. Create a new client with the corresponding rights
2. Delete the original client at a later date if it is no longer required

Procedure

For a detailed instructions, refer to sections:

4.6.2 Creating a new openness client" to create a new client (Page 105)

4.6.5 Deleting openness clients chapter" to delete an openness client (Page 108)

4.7 Manage adapters (experimental)

4.7.1 Overview of adapters

The "Overview of adapters" window shows an overview of all uploaded Machine Agent adapters. It provides the following functions:

- Listing adapters both provided by Siemens and uploaded by users
- Displaying adapter package info content (pkginfo.json)
- Uploading new adapters
- Deleting user-uploaded adapters if those are not assigned to any machine (Generic adapters cannot be deleted)

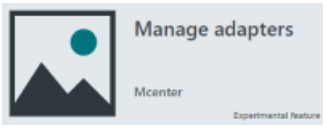
Parameters

The following information is displayed for adapters:

Parameter	Description
∨	This symbol appears when you click on the column heading. Click on the symbol to sort the elements alphabetically/numerically, either in ascending or descending order.
›	Click on the symbol to expand the actual row and show the adapter package info content (pkginfo.json). Click again on the symbol to collapse the row.
ⓘ	Shows that the adapter is a generic adapter, meaning it is provided by the installer.
Adapter name	Shows the name of the adapter.
Adapter version	Shows the version of the adapter.
🗑	Deletes the adapter after a confirmation prompt.
▼	Opens the "My Filters" window and filters the adapters table according to the following criteria: • Adapter name • Adapter version • Generic adapter For more information, see List filtering (Page 46). Click on the filter icon again to close the filter window.

Procedure

1. On the start page of Mcenter, click on "Manage adapters".



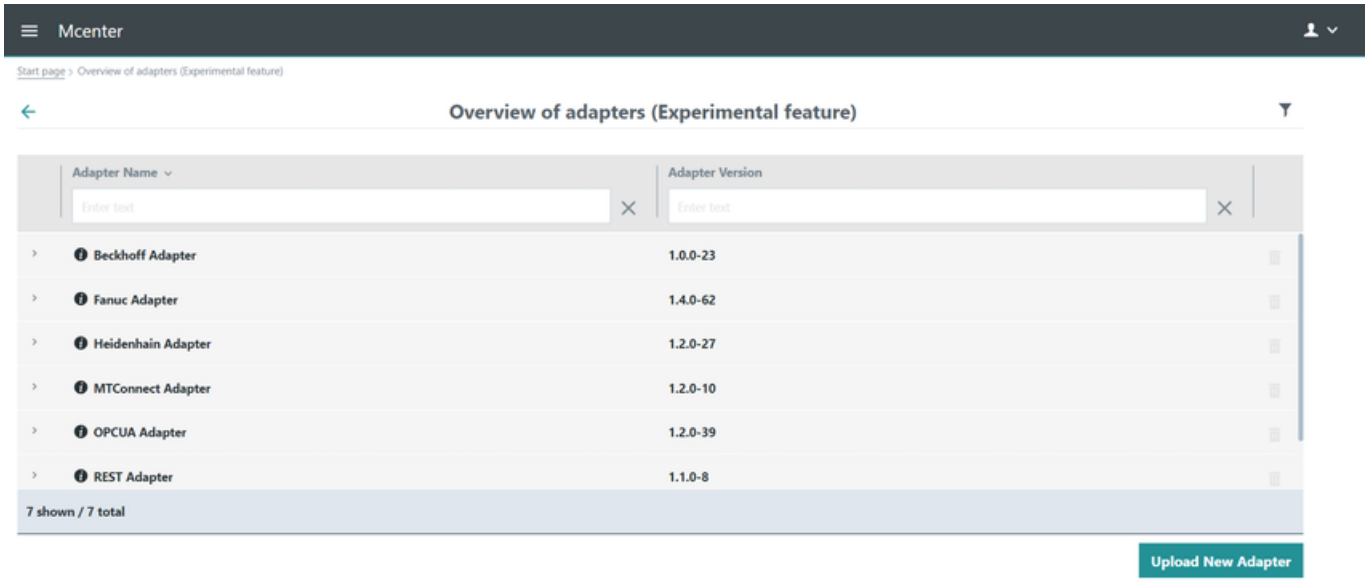
   - OR -
   Open the following URL: Overview of adapters (https://{ServerIP}/adapter-overview).

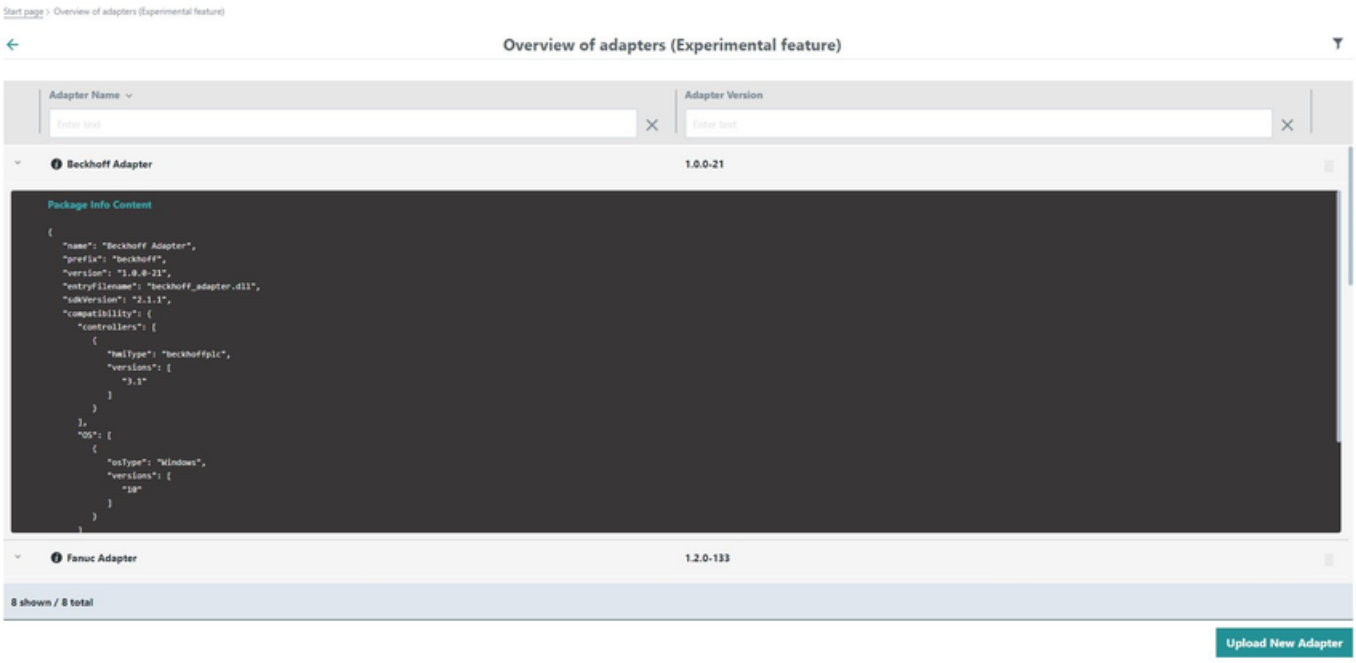
2. The "Overview of adapters" window opens and displays an overview of all uploaded adapters with their properties.
   In order to set your preferred column width, press the left mouse button and drag the column edges to the left or to the right. The respective parameters are automatically saved when you release the mouse button. The next time you open the "Overview of adapters" window, the columns are displayed with the width you opted for.
   You can upload or delete an adapter.

   Note

   Black info icons

   Black info icons are only shown for generic adapters which are installed during setup. Generic adapters cannot be deleted.



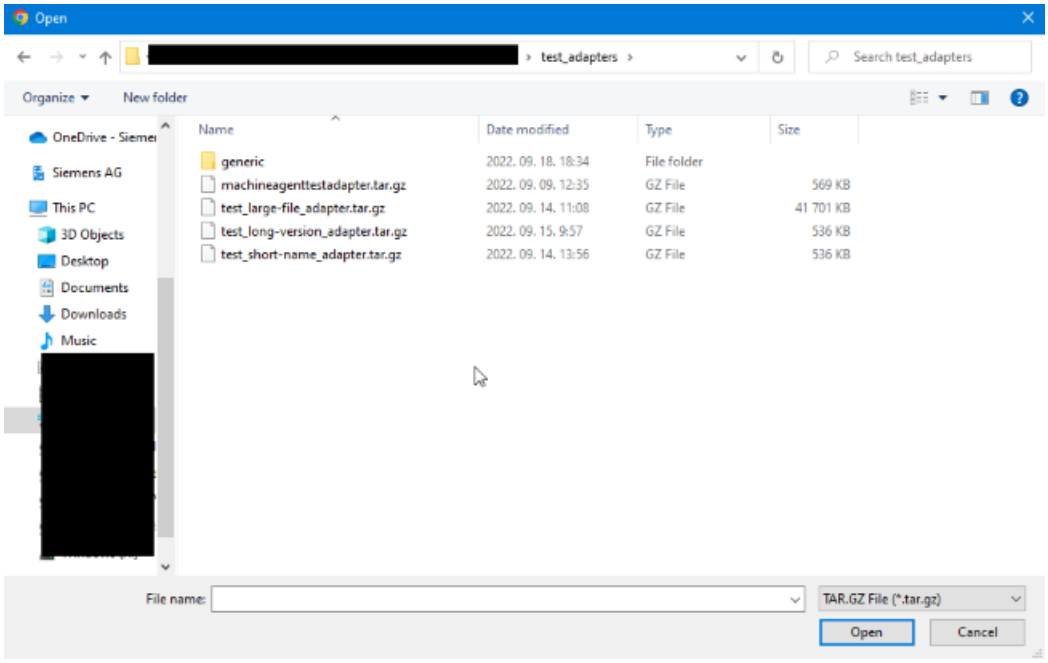


4.7.2 Uploading an adapter

You can create a new adapter by uploading its package file.

Procedure

1. Click the "Upload New Adapter" button in the "Overview of adapters" window to install a new adapter.
   The file selection dialog opens.
2. Select the desired adapter file and click on the "Open" button.
   - Multiple file selection is not allowed.
   - During the upload process, user interactions are disabled on the page.
   - If the extension of the selected file is not ".tar.gz", the following error message is displayed: "File extension must be '.tar.gz'!".
   - If the selected adapter file has an incorrect content, its size is too big, there is a version mismatch or 'pkginfo.json' is missing, error messages are displayed.
   - If there is already an adapter installed with the same name and version, the following error message is displayed: "Problem: The adapter could not be created. Reason: Adapter with the same name and version already exists for this user.".



4.7.3 Deleting an adapter

You can delete adapters from the "Overview of adapters" window

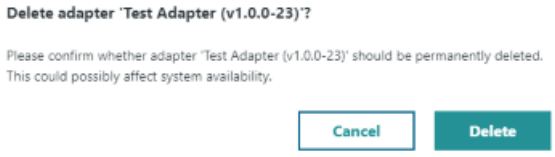
Note

"Delete" symbol not enabled for generic adapters

The "Delete" symbol is not enabled for generic adapters, because they cannot be deleted. Deleting an adapter is only possible if the adapter is not assigned to any machine.

Procedure

1. Open the Overview of adapters" window.
2. Click the "Delete" symbol in the "Actions" column to delete an adapter.
3. The following dialog box appears.
   Click on the "Delete" button.
   - OR -
   Click on the "Cancel" button to abort the process.



4. If deletion is successful, a success message is displayed in the upper right corner of the window.
5. If the adapter cannot be deleted, an error message is displayed in the upper right corner of the window.

4.8 Platform Open API

4.8.1 Prerequisites

You need to create a new openness client to use the platform's open API. It is not possible to reach the new endpoints with existing openness clients. This external client must authenticate itself with Mcenter. To authenticate on the swagger page use the access token received from the Identity service.

For more information, see:

- Manage openness clients (Page 103)
- Using the token in the Swagger UI (Page 893)
- Logging in and logging out from Mcenter (Page 36)

4.8.2 Retrieve machine states

GET /machinestate/v1/machines

⚠ CAUTION
"/machines/v1" endpoint is deprecated and will be removed in a future release. Please use the latest endpoint as described below.

- Retrieves the state of all machines.
- The full URL depends on your protocol settings:
  - http://<IP address of the Mcenter server>:8090/platform/api/machinestate/v1/machines

  or

  - https://<IP address of the Mcenter server>/platform/api/machinestate/v1/machines

Restrictions

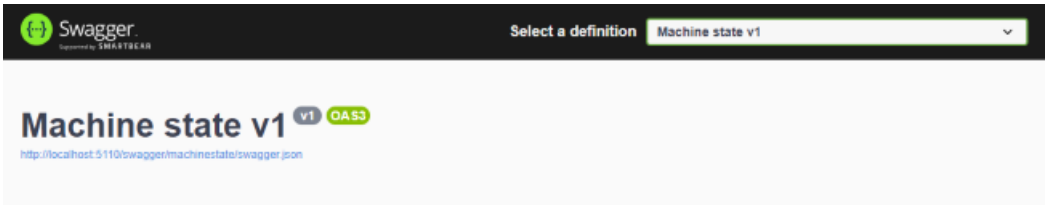
- The online status for machines with connectivity type "Managed Client" is always "Undefined".

Procedure

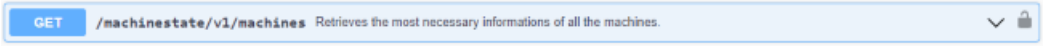
1. Open the Swagger page depending on your protocol settings:
   – http://<IP address of the Mcenter server>:8090/platform/api/swagger/index.html

   or

   – https://<IP address of the Mcenter server>/platform/api/swagger/index.html



2. Select definition "Machine state v1"
3. Scroll to the area titled "MachineState".



4. Open the field "GET" and click on "Try it out".
5. Click on "Execute" to start the request.

Example: Server response for "Get /machinestate/v1/machines" in json string

```
{
  "collection": [
    {
      "id": "48691a62-2426-4ce8-86e1-0126518b8f2f",
      "name": "machine1",
      "connectivityType”: 1,
      "isOnboarded": true,
      "onlineState": 2,
      "lastSeen": "2023-01-05T12:45:02.2970876"
    },
    {
      "id": "c74cfee5-fd2c-4615-b935-1029a98d147f",
      "name": " machine2",
      "connectivityType”: 1,
      "isOnboarded": true,
      "onlineState": 1,
      "lastSeen": "2022-12-15T10:32:28.3702985"
    },
    {
      "id": "7a29f987-7fd0-4575-9ce7-2a1651bb7ec5",
      "name": "machine3",
      "connectivityType”: 1,
      "isOnboarded": false,
      "onlineState": 1,
      "lastSeen": null
    }
  ]
}
```

Parameters

Parameters	Type	Description
id	string	ID of the machine in GUID format
name	string	Name of the machine
connectivityType	number	Connectivity type of the machine 1 = SINUMERIK Integrate 2 = Machine Agent 3 = Managed Client
isOnboarded	"true" or "false"	Onboarded state of the machine
onlineState	number	Online state of the machine 0 = Undefined 1 = Offline 2 = Online
lastSeen	string or "null"	The last time when the machine communicated with the server in DateTime format. "null" value indicates that the machine has not been onboarded yet.

Note

Online state for connectivity type SINUMERIK Integrate

If the connectivity type is "SINUMERIK Integrate", the parameter "onlineState" is "online", if "lastSeen" is no longer than 10 minutes before the time of the request. The machine communicated with the server in the last 10 minutes. This threshold is configurable. Check the threshold in Consul. Use following path:

key / Values > Processes > SinInt.Machine.Service > isOnlineSection

Service responses

- The request does not contain a valid token
  - status code 401: unauthorized - invalid or expired token.
  - status code 403: forbidden - You do not have the permission for the requested endpoint.
- An error occurred during the request
  - status code 500: an internal error has occurred. The error is described in the SinInt.PlatformOpenAPI.Service log file
- Platform Open API service unavailable:
  - status code 503: the service is unavailable. Platform Open API service is down or unreachable due to some network issue

System performance

As with every request made to the server, calling this endpoint too many times can impact system performance. Thus monitor the system for degradation. The endpoint should not be called more than once every minute by a client.

4.8.3 Order management

4.8.3.1 Retrieve machines

GET /ordermgmt/v1/machines

Work sequences and work sequence events could be managed via Mcenter open API. The following functionalities are available on the open API:

- Retrieving all in Mcenter existing machines
- The full URL depends on the protocol settings: Creating work sequence
- Retrieving all work sequences
- Retrieving a work sequence by id

- Retrieving a work sequence by unique key
- Retrieving all work sequence events
- Deleting a work sequence event by id

At the endpoint specification a relative path is used, the full URL depends on the protocol settings, for example:

http://<IP address of the Mcenter server>:8090/platform/api/ordermgmt/v1/worksequences

or

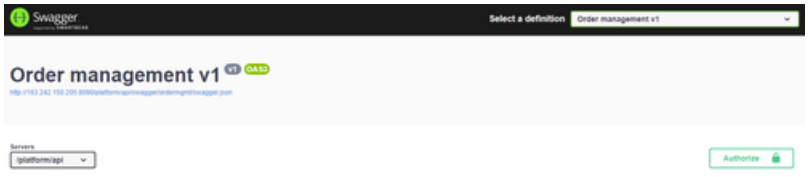
https://<IP address of the Mcenter server>/platform/api/ordermgmt/v1/worksequences

Procedure

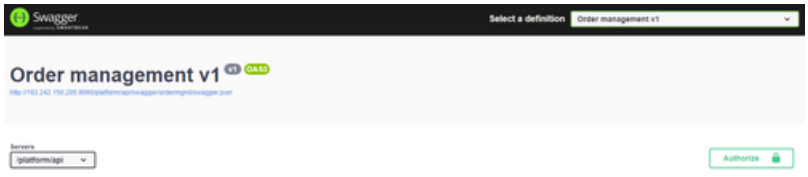
1. Open the Swagger page depending on the protocol settings:
   – http://<IP address of the Mcenter server>:8090/platform/api/swagger/index.html

   or

   – https://<IP address of the Mcenter server>/platform/api/swagger/index.html
2. Select the definition "Order management v1".



3. Scroll to the area titled "OrderManagement".



4. Open the desired field "GET", "POST", "PATCH", "DELETE" and click on "Try it out".
5. Enter the appropriate values for parameters.
6. Click "Execute" to start the request.

GET /ordermgmt/v1/machines

- Retrieves the list of machines
- A machine id in the list can be assigned to a work sequence

Parameters

Parameters	Type	Description
id	string	ID of the machine in GUID format
name	string	Name of the machine

Endpoint responses

The endpoint response could be one of the following:

- The request was processed successfully
  - 200 status code: ok - The machine list returned
- If the request did not contain a valid token, the following responses can received:
  - 401 status code: unauthorized - Invalid or expired token
  - 403 status code: forbidden - You do not have the permission for the requested endpoint
- If any error occurred during the request:
  - 500 status code: internal error - An error occurred trying to acquire the machines. The error is described in the SinInt.PlatformOpenAPI.Service log file.

Example server response for "GET /ordermgmt/v1/machines" in json string

```
{
  "collection": [
     {
         "id": "60b66798-a0ef-4bf0-9824-49da26d9a2d0",
         "name": "Managed_01"
     },
     {
         "id": "78dc9e27-a22f-48e2-9021-cdcf5a8d55e8",
         "name": "Sinumerik_01"
     },
     {
         "id": "ac047d6a-3850-4436-aead-f1503e9855b7",
         "name": "MachineAgent_01"
     }
  ]
}
```

4.8.3.2 Creating a new work sequence

POST /ordermgmt/v1/worksequences

This creates a work sequence assigned to a machine.

Parameters

Parameter	Type	Description
workOrderId	string	Work order provided for example via MES The work order is typically split in steps named "work sequences"
sequenceNumber	string	Work sequence number within a given work order
description	string	Details about the work sequence, which is a step within a given work order
plannedStartDateMin	string	The earliest planned start of production in ISO8601 format
plannedStartDateMax	string	The latest planned start of production in ISO8601 format
plannedEndDateMin	string	The earliest planned end of production in ISO8601 format
plannedEndDateMax	string	The latest planned end of production in ISO8601 format
minutesPerUnit	number	Minutes it takes to produce / manufacture a unit
minutesForPreparation	number	Minutes needed to prepare the machine, that the work sequence can be produced
actualStartDate	string	Actual start of production in ISO8601 format
actualEndDate	string	Actual end of production in ISO8601 format
numberOfPartsProduced	number	Number of parts of production
numberOfScrapParts	number	Number of scrap parts
state	number	Possible states: 1 - created 2 - accepted 3 - in preparation 4 - prepared 5 - started 6 - partial acknowledged 7 - acknowledged 8 - cancelled 9 - on hold 10 - deleted In the request the 'state' must be '1' (created) Other values result in a validation error
confirmationNumber	string	Identifier to report state changes back to external MES or ERP system
priority	number	Defines the priority of the work sequence
lotSize	number	Defines how many work pieces must be created This value is provided in conjunction with the work order
materialId	string	ID of the material the work piece is generated from
materialDescription	string	Name or description of the material the work piece is generated from
assignedMachineId	string	Reference to an Mcenter registered machine's unique identifier in GUID format

Validation

This endpoint contains validation rules for work sequence to be created.

- **workOrderId, sequenceNumber** and properties are required
- assignedMachineId need to be an id of an existing machine
- the 'state' must be '1' (created)

- value of WorkOrderId, SequenceNumber, Description, ConfirmationNumber, MaterialId and MaterialDescription properties must not exceed 255 characters
- **minutesForPreparation** and **minutesPerUnit** need to be greater than zero or equal to zero
- **priority** needs to be between 1 and 5
- **lotSize** needs to be greater than zero,
- for dates:
  - dates could be null, otherwise
  - dates need the format **yyyy-MM-ddThh:mm:ss.fff[zone - offset]**, according to ISO8601
  - if **plannedStartDateMin** has a value, the **plannedStartDateMax** nedds to be set as well and **plannedStartDateMin** value must be before **plannedStartDateMax** value, same also in case of **plannedEndDateMin**-**plannedEndDateMax** and **actualStartDate**-**actualEndDate**
  - if **plannedStartDateMin** and **plannedEndDateMin** are set the **plannedStartDateMin** must be before **plannedEndDateMin**, same also in case of **plannedStartDateMax**-**plannedEndDateMax**

Endpoint responses

The endpoint response can be one of the following:

- The work sequence in the request was successfully created
  - 201 status code: created - The work sequence was created
- The body of the request was incorrectly parameterized
  - 400 status code: bad request - The body of the request was empty or invalid or a work sequence with the same workOrderId and sequenceNumber already exists
- If the request did not contain a valid token, the following responses are shown:
  - 401 status code: unauthorized - Invalid or expired token
  - 403 status code: forbidden - You do not have the permission for the requested endpoint
- If any error occurred during the request:
  - 500 status code: internal error - An error occurred trying to create the work sequence. The error is described in the SinInt.PlatformOpenAPI.Service log file

Example request body for "POST /ordermgmt/v1/worksequences" in json string


```
{
  "workOrderId": "90003",
  "sequenceNumber": "10002",
  "description": "new worksequence",
  "plannedStartDateMin": "2023-03-10T13:08:32.812Z",
  "plannedStartDateMax": "2023-03-20T13:08:32.812Z",
  "plannedEndDateMin": "2023-04-10T13:08:32.812Z",
  "plannedEndDateMax": "2023-04-20T13:08:32.812Z",
  "timePerUnit": 0,
  "timeForPreparation": 0,
  "actualStartDate": "2023-03-09T13:08:32.812Z",
  "actualEndDate": "2023-03-09T13:08:32.812Z",
  "state": 1,
  "confirmationNumber": "12345",
  "priority": 1,
  "lotSize": 1,
  "material": "string",
  "assignedMachineId": "A6274021-2E68-4291-AFD5-3ED2D312893D"
}
```


Example server response for "POST /ordermgmt/v1/worksequences" in json string


```
{
  "workOrderId": "90003",
  "sequenceNumber": "10002",
  "description": "new worksequence",
  "State": 1,
  "plannedStartDateMin": "2023-03-10T13:08:32.812Z",
  "plannedStartDateMax": "2023-03-20T13:08:32.812Z",
  "plannedEndDateMin": "2023-04-10T13:08:32.812Z",
  "plannedEndDateMax": "2023-04-20T13:08:32.812Z",
  "timePerUnit": 0,
  "timeForPreparation": 0,
  "actualStartDate": "2023-03-09T13:08:32.812Z",
  "actualEndDate": "2023-03-09T13:08:32.812Z",
  "numberOfPartsProduced": 3,
  "numberOfScrapParts":0,
  "confirmationNumber": "12345",
  "priority": 1,
  "lotSize": 1,
  "materialId": "id of material"
  "materialDescription": "description of material"
  "assignedMachineId": "A6274021-2E68-4291-AFD5-3ED2D312893D"
}
```

4.8.4 Virus scan

In Mcenter, you have the option of introducing additional information into the system via files at various points. These files could be infected with viruses. To protect Mcenter from viruses, you now have the option of using your existing virus scanner with this interface.

The virus scan functionality is disabled by default and can be enabled manually. You can enable it as described in the Installation Manual "Mcenter, Manage myResources, Optimize MyProgramming /NX-Cam Editor, Analyze MyPerformance /OEE, Access MyData /Collector".

The following open APIs are still available regardless of this setting, so files still can be downloaded and their state can be updated. However if this setting is disabled applications can access not scanned or unsafe files as well.

4.8.4.1 Retrieve scanable files

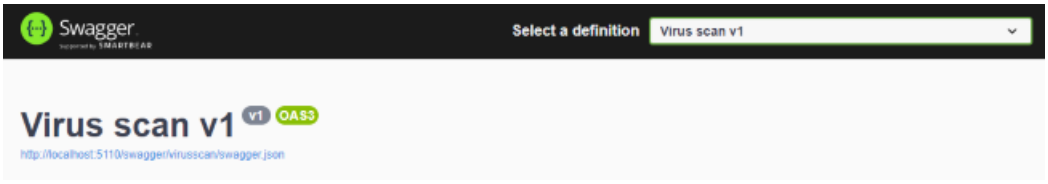
GET /virusscan/v1/files

One time URLs give you access to one specific file to download it. You can acquire a one time URL using the following endpoint supplied with the Id of a file. File Ids can be acquired via the "GET /virusscan/v1/files" endpoint.

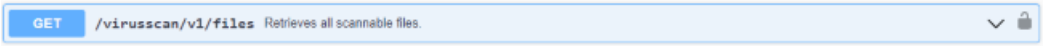
- Retrieves the scanable files
- The full URL is
  - http://<IP address of the Mcenter server>:8090/platform/api/virusscan/v1/files
- or
  - https://<IP address of the Mcenter server>/platform/api/virusscan/v1/files

Procedure

1. Open the Swagger page depending on your protocol settings:
   - http://<IP address of the Mcenter server>:8090/platform/api/swagger/index.html
     or
   - https://<IP address of the Mcenter server>/platform/api/swagger/index.html



2. Select the definition "Virus scan v1".
3. Scroll to the area titled "VirusScan".



4. Open the field "GET" and click on "Try it out".
5. Click "Execute" to start the request.

Example server response for "GET /virusscan/v1/files" in json string

```
{
  "collection":
 [
    {
      "rowId": "3fa85f64-5717-4562-b3fc-2c963f66afa6",
      "hash": "string",
      "localPath": "string"
      "scanableFileSate": number
    }
  ]
}
```

Parameters

Parameters	Type	Description
rowId	string	Id of the file in GUID format
hash	string	The hash of the file
localPath	string or "null"	The path of the file or null
scannableFileState	number	Possible states: 0 - New: The files was never scanned before 1 - RescanNeeded: The file was scanned before and the elapsed day between the last scan and the current server datetime is within the days configured with the value of "RequestRescanAfterDays" 2 - ScanExpired: The file was scanned earlier then the configured latest date so the last scan result is now invalid.

Service responses

- The scannable files in the request are successfully retrieved
  - 200 status code: the scannable files are retrieved
- If the request did not contain a valid token, you can receive the following responses:
  - 401 status code: unauthorized - invalid or expired token
  - 403 status code: forbidden - You do not have the permission for the requested endpoint

- If any error occurred during the request:
  - 500 status code: An error occurred triying to acquire the scannable files. The error is described in the SinInt.PlatformOpenAPI.Service log file
- Platform Open API service unavailable:
  - 503 status code: the service is unavailable The Platform Open API service is down or unreachable due to some network issue.

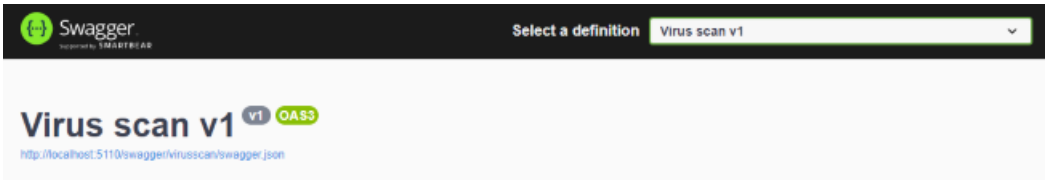
4.8.4.2 Update the state of a file

PUT /virusscan/v1/files/{rowId}

- Updates the state of a file with the result of the scan
- The full URL is
  - http://<IP address of the Mcenter server>:8090/platform/api/virusscan/v1/files/{rowId}
- or
  - https://<IP address of the Mcenter server>/platform/api/virusscan/v1/files/{rowId}

Procedure

1. Open the Swagger page depending on your protocol settings:
   - http://<IP address of the Mcenter server>:8090/platform/api/swagger/index.html
     or
   - https://<IP address of the Mcenter server>/platform/api/swagger/index.html



2. Select the definition "Virus scan v1".
3. Scroll to the area titled "VirusScan".
4. Open the field "PUT" and click on "Try it out".
5. Click "Execute" to start the request.

Example request body for "PUT /virusscan/v1/files/{rowId}" in json string

```
{
  "fileState": 0,
  "virusScanDescription": "string"
}
```

Parameters

Parameters	Type	Description
fileState	number	State of the file: 0 - no result 1 - unsafe 2 - safe
virusScanDescription	string or "null"	Any additional notes regarding to the virus scan

The rowId in the URL is the id of the file. You can get the value from the response of the GET /virusscan/v1/files API.

Service responses

- The state of the file was successfully updated
  - 200 status code
- If the request did not contain a valid token, you can receive the following responses:
  - 401 status code: unauthorized - invalid or expired token
  - 403 status code: forbidden - You do not have the permission for the requested endpoint
- If any error occurred during the request:
  - 400 status code: bad request- The request body is invalid: {error reason}
  - 404 status code: not found - File is not found with the given Id: {rowId}
  - 500 status code: An error occurred when tried to update the state of the files. - the error is described in the SinInt.PlatformOpenAPI.Service log file
- Platform Open API service unavailable:
  - 503 status code: the service is unavailable - Platform Open API service is down or unreachable due to some network issue

4.8.4.3 Get a one time URL for downloading a file

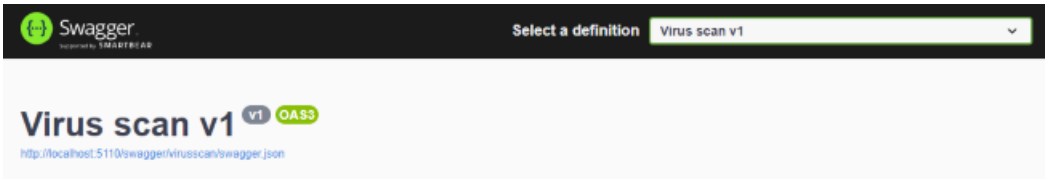
GET /virusscan/v1/files/{rowId}/downloaduri

- Get a one time URL that allows you to download the content of the requested file
- The full URL is
  - http://<IP address of the Mcenter server>:8090/platform/api/virusscan/v1/files/{rowId}/downloaduri
- or
  - https://<IP address of the Mcenter server>/platform/api/virusscan/v1/files/{rowId}/downloaduri

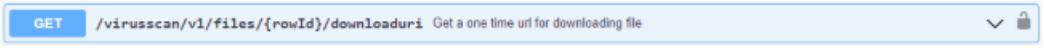
The rowId in the URL is the id of the file. You can get the value from the response of the GET /virusscan/v1/files API.

Procedure

1. Open the Swagger page depending on your protocol settings:
   - http://<IP address of the Mcenter server>:8090/platform/api/swagger/index.html
     or
   - https://<IP address of the Mcenter server>/platform/api/swagger/index.html



2. Select the definition "Virus scan v1".
3. Scroll to the area titled "VirusScan".



4. Open the field "GET" and click on "Try it out".
5. Click "Execute" to start the request.

Service response

- The state of the file was successfully updated
  - 200 status code: the content of the requested file
- If the request did not contain a valid token, you can receive the following responses:
  - 401 status code: unauthorized - invalid or expired token
  - 403 status code: forbidden - You do not have the permission for the requested endpoint
- If any error occurred during the request:
  - 400 status code: bad request- The request body is invalid: {error reason}
  - 404 status code: not found - File is not found with the given Id: {rowId}
  - 500 status code: An error occurred when tried to update the state of the files. - the error is described in the SinInt.PlatformOpenAPI.Service log file
- Platform Open API service unavailable:
  - 503 status code: the service is unavailable - Platform Open API service is down or unreachable due to some network issue

4.8.4.4 Changing virus scan options

Procedure

You can change the virus scan options on the configuration. Follow the file path "Siemens\Mcenter\Platform\SinInt.FileStorage.Service\appsettings.production.json" and check the "VirusScanOptions" value:

"EnableVirusScan": {value}:

- "EnableVirusScan": false

If the value is "false", the virus scan is disabled.

- "EnableVirusScan": true

If the value is "true", the virus scan is enabled.

The predefined value is false.

"RequestRescanAfterDays": {value}:

- "RequestRescanAfterDays": 14

The file was scanned before and the elapsed days between the last scan and the current server date time is within the days configured with the value of "RequestRescanAfterDays". You can change this value here, the predefined value is 14 days.

"ScanExpirationInDays ": {value}:

- "ScanExpirationInDays ": 28

You can change the file scan expiration in days here. The predefined value is 28 days.

Using Manage MyResources /Tools on the server 5

5.1 Container

Within Manage MyResources /Tools there are two general options to store a complete tool. The tool can either be located on a machine, and there on a place in a magazine. Other complete tools can be stored in containers. Possible containers are:

- Assembly
- Cabinet or cabinet-containers
- <Machine>-container, where <Machine> is the name of the machine
- AtMachine,
- LostMagazine

The following sections summarize the types of existing containers in Manage MyResources / Tools and describes them as well as possible interactions and restrictions. For completeness reasons the location magazine on a machine is listed, too.

Note

Disassembly container

Disassembly container is no longer available since Manage MyResources /Tools version 5.0.5.0. Disassembling of a tool can be done with Assembly container.

Assembly

As soon as a tool is created in presetting, the tool is placed in the assembly container. Currently, there is one assembly container within a Manage MyResources installation.

The Kanban-board indicates the assembly state of a tool (to be obtained, to be overhauled, to be assembled, to be measured, to be provided).

Entering the container

- On creation of a new tool
- After unloading a tool from a machine into assembly
- In "Tool stock" a tool can be transferred to assembly from cabinet-container.

Leaving the container

- To a cabinet-container, when the tool reaches the state “provided”

Restrictions and further aspects

Tools in assembly can be deleted via “Tool stock” and then “Provide tools”.

Containers in cabinets

At the end of presetting, tools can be provided and simultaneously stored into containers of cabinets.

Tools can also be unloaded from machines to containers of cabinets.

Entering the container

- When providing a tool at the end of presetting
- Unloading a tool from a machine to cabinet.

Leaving the container

- On loading of a tool on a machine.
- In "Tool stock", a tool can be transferred between containers and to assembly.

Restrictions and further aspects

- Cabinets need to be configured, before.
- Tools in cabinet-container can be deleted via "Tool stock" and then "Provide tools".

<Machine>-container

At the end of presetting, tools can be provided and simultaneously stored into a <Machine>-container, when they should directly and quickly be transferred to a machine.
Note that those <Machine>-containers need to be created first using the storage location application.
For more Information, see Storage locations (Page 152).

Entering the container

- When providing a tool at the end of presetting

Leaving the container

- On loading of a tool on a machine
- In “Tool Stock”, a tool can be transferred between containers and to assembly

Restrictions and further aspects

- One virtual container per machine.
- Tools in <Machine>-container can be deleted via “Tool stock” and then “Provide tools”.
- A transfer back to assembly is not possible.

AtMachine

Tools are moved to this container when they are unloaded without specifying their new location. Also tools that are unloaded while the machine/client is offline (or not running) are moved to this container when the client goes online (or started).

Entering the container

- Temporarily unloaded tools ("Exchange / Check")
- Unloaded tools as part of the “unloading list”
- Tools which are unloaded while the client is offline (or not running)
- When the standard tool management is used for unloading or delete (online), then the tool is placed in AtMachine.
- Tools which are unloaded from a machine with the option "AtMachine"

Leaving the container

- "Exchange / Check": the tool is either reloaded or moved to assembly
- In "Tool stock", the tool can be transferred to assembly or it can be moved to a cabinet-container
- The tool can be transferred to a machine on
  - Loading
  - 1:1 Exchange
  - Exchange/Check

Restrictions and further aspects

- One virtual container per machine
- Tools in AtMachine can be deleted via “Tool stock” and then “Provide tools”.

LostMagazine

This container represents all magazine containers that have lost their parent machine (because the machine was deleted).

Entering the container

- When the owner machine is deleted

Leaving the container

- In "Tool Stock", greenfield tools can be transferred to assembly or to a cabinet-container

Restrictions and further aspects

- One container per installation
- Brownfield tools in LostMagazine can be deleted via “Tool stock” and then “Provide tools”.
- Greenfield tools in LostMagazine can be transferred to assembly or to a cabinet-container.

Magazine on a machine

Tools can be loaded to a magazine via HMI and they can be unloaded from a magazine via HMI.

Entering the container

- With loading a tool is placed in a magazine

Leaving the container

- With unloading a tool can be placed in:
  - Assembly
  - Cabinet
  - AtMachine
- When the standard tool management is used for unloading or deletion, then the tool is placed in AtMachine (when client is connected with server – online).
- When the machine/client is offline during unloading or deletion, then the tools are placed in AtMachine.

Restrictions and further aspects

- Tools on the machine cannot be deleted with Manage MyResources /Tools. They need to be unloaded, first.

5.2 Tool component master data

5.2.1 Overview of Tool Component Master Data

The "Overview of Tool Component Master Data" window shows an overview of master data for tool components created. You can sort the individual columns in the overview.

You can create new, edit, copy, delete existing master data for tool components.

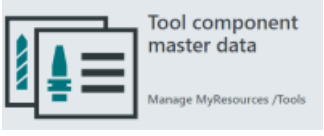
Parameter

Parameter	Description
∨	This symbol appears when you click on the column heading. Click on the symbol to sort the elements alphabetically/numerically, either in ascending or descending order.
ID of tool component	Shows the identifier of the component. Click the link to display the detailed information within the open window. If you press the right mouse button, you open the drop-down list. You can • open a new window - OR - • open a new tab In the latter case, you do not need to reload the "Overview of master data for tool components" page.
DIN-Norm — Tabular layouts of properties	Shows the identifier of corresponding DIN norm.
PictureID	Shows the picture identifier of selected DIN norm.
Order number	Shows the order number.
Supplier	Shows the supplier.
Last change	Shows the date of the last change in the format "dd.mm.yyyy".
Resharpening supplier	Shows the resharpening supplier.
Wear part	Shows whether the component is a wear part or not.
<User-defined attributes>	Displays the user-defined attributes.
Minumum order amount	Indicates the multiplier to define the amount when creating an purchase order request for the relevant tool component
	Defines the number of listed tool component master data.

Parameter	Description
•••	Opens a window in which you select additional columns to be displayed in the overview. These columns can optionally be configured to show further information: • Order number • Resharpening supplier • Wear part • <User-defined attributes> • Minimum order amount The maximum number of additional columns is limited to 5. The next time you log in with your user Id, the selected columns are on display.
	Copies the data of the previously created tool component master data.
	Opens the "My Filters" window and filters tool components master data according to the following criteria: • ID of tool component • DIN-Norm — Tabular layouts of properties • PictureID — Base • Order number • Resharpening supplier • Wear part • Supplier • Last change • <User-defined attributes> • Minimum order amount For more information, see List filtering (Page 46). Click on the filter icon again to close the filter window.

Procedure

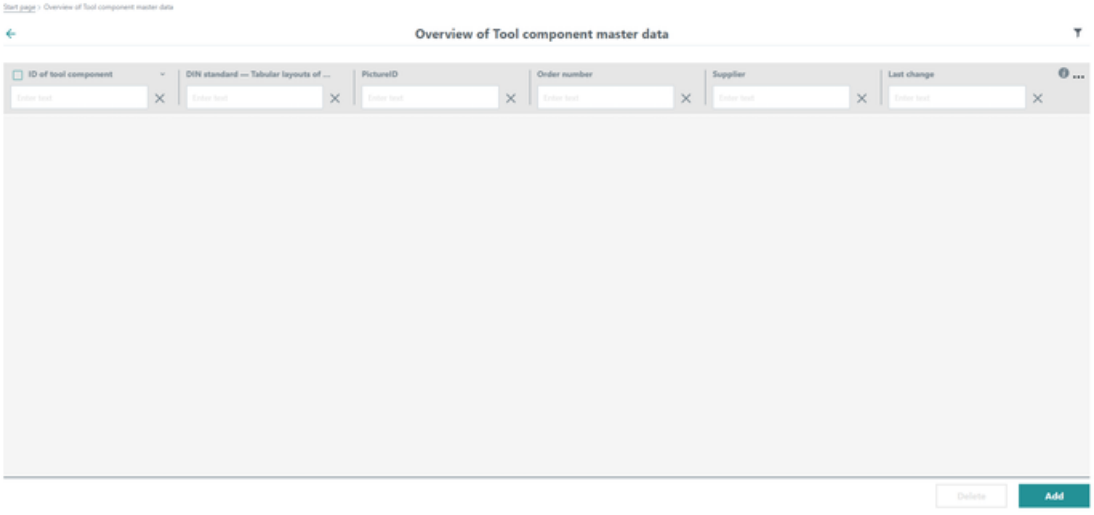
1. On the Mcenter start page, click on "Tool component master data".



   - OR -
   Open the following URL: Tool component master data (https://{ServerIP}/mmr/tools/component)

2. The "Overview of Tool Component Master Data" window opens, and displays the master data of all created tool components.
3. Click "Add" to create a new tool component.

4. To copy the data set of a previously created tool component:
   - Click on "Copy" symbol.
   - Enter name of new tool component.
   - Click "Apply".
     The new created tool component is opened in view mode.
   - If necessary, click "Edit" to switch to the edit mode and change the copied entries.
   - Navigate back to the overview page.
5. Click on the underlined name to show more details of an existing tool component.
   The "<ID of tool component>" window opens and you can edit the data set:
   - Creating or editing tool component data (Page 137)
   - Creating or editing user-defined data (Page 139)
   - Adding files (Page 141)



5.2.2 Creating or editing tool component data

In the "<ID for tool component>" window in the "General Properties" tab, create new tool component master data or change the data of existing components.

Parameters

The following parameters are available:

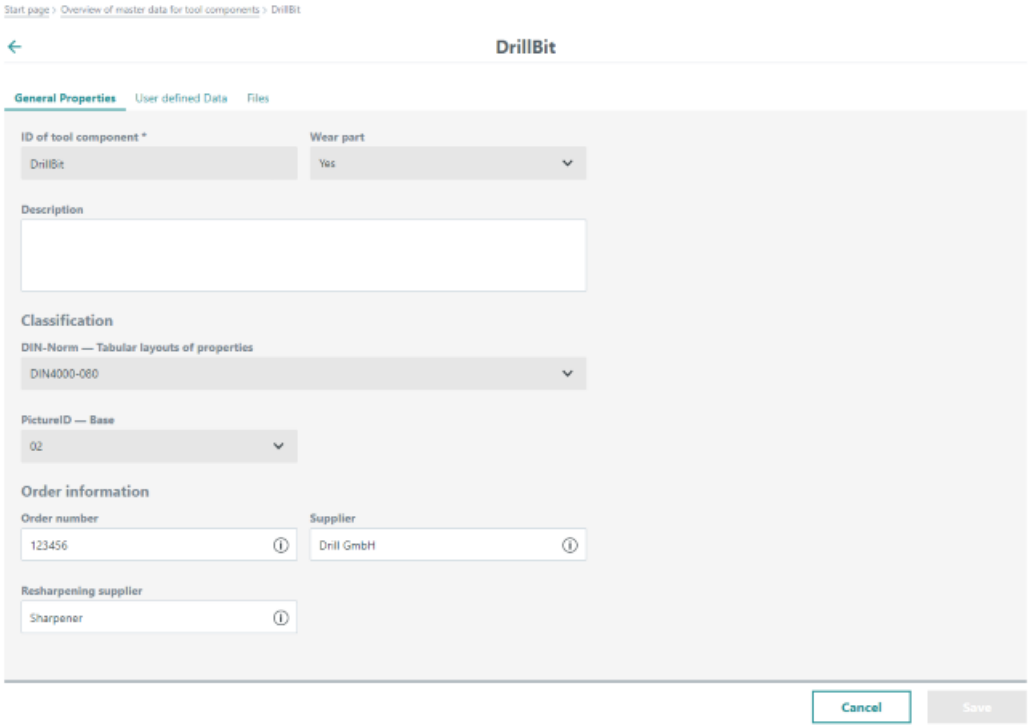
Parameter	Description
ID of tool component *	Enter the identifier of the component. A maximum of 250 characters can be entered. This field is only allowed to be changed, if the tool component is not used in any tool master data set.
Wear part	Select whether the component is a wear part or not. This field is only released for changes, if the tool component is not used in any tool master data set.
Minumum order amount	Enter the minumum order number
Description	Enter any description or remark.
Classification	
DIN-Norm — Tabular lay-outs of properties	Select corresponding DIN norm. This field is only released for changes, if the tool component is not used in any tool master data set.
PictureID — Base	Select the picture identifier of selected DIN norm. Note: When holders are selected by the DIN-Norm DIN4000-089, then there are two pictureID — Bases: • PictureID — Base (Machine-Side) • PictureID — Base (Workpiece-Side) In the component overview, the two values are shown concatenated. This field is only released for changes, if the tool component is not used in any tool master data set.
Order information	
Order number	Enter the order number. A maximum of 250 characters can be entered.
Supplier	Enter the supplier. A maximum of 250 characters can be entered.
Resharpening supplier	Enter the resharpening supplier. A maximum of 250 characters can be entered.
ⓘ	Shows further information, e.g. what you must observe for the input.

*) The fields marked with an asterisk are mandatory and must be completed. An error message is output if you make an erroneous entry.

Procedure

1. Open the "General Properties" tab in "<ID for tool component>" window.
2. Click "Edit".
   The input fields are released for changes and additions.

3. Enter the required information.
4. The "Save" button can only be selected if the mandatory fields of all tabs are filled.
   Click "Save" to create or change the general properties.
   - OR -
   click "Cancel" to discard the entries.



5.2.3 Creating or editing user-defined data

In "<ID for tool component>" window in "User defined Data" tab, create additional tool component data.

Parameters

The following parameters are available:

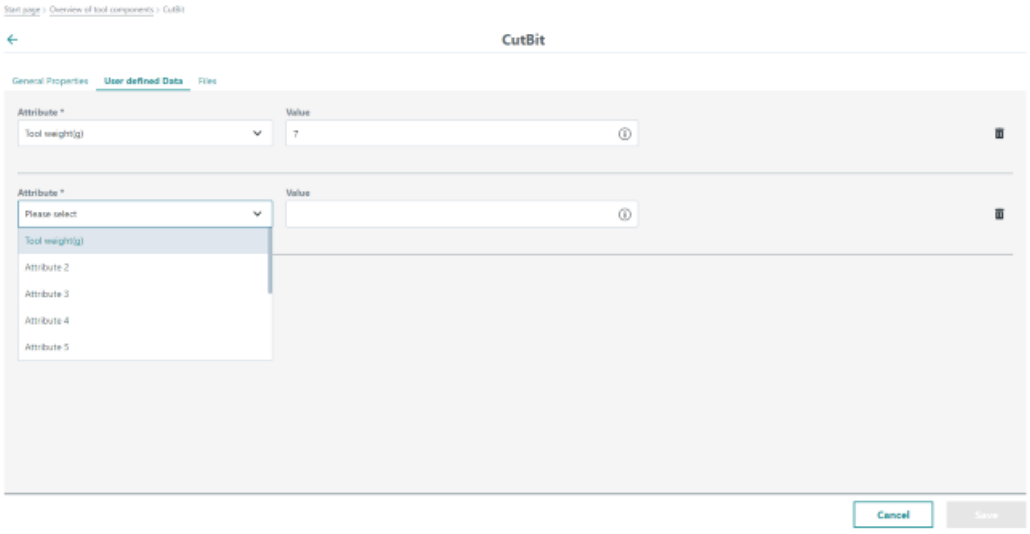
Parameter	Description
Attribute *	Select the attribute from the drop-down list. Generic attributes with the names "Attribute 1", "Attribute 2"... are available. The default number of attributes is 10, but you can change it via the Openness API. The maximum number you can add is the number of configured attributes. For more information, see Modifying user-defined attributes (Page 946). You can replace the name "Attribute 1" etc. by another name. You can assign the name with, for example Swagger UI. For more information, see Creating attribute names (Page 948). All the generic attributes can be selected, as well as individual ones, such as attribute 2 and attribute 5. Assign a value to each attribute. The meaning of the attribute is not defined. This allows using variables with defined values in Manage MyResources /Tools.
Value	Enter the value of the attribute. A maximum of 250 characters can be entered.
ⓘ	Shows further information, for example what you must observe for the input.
🗑	Deletes the attribute and the value.
+	Creates further attributes. You can create a maximum of 10 attributes.

*) The fields marked with an asterisk are mandatory and must be completed. An error message is output if you make an erroneous entry.

Procedure

1. Open the "User defined Data" tab in "<ID for tool component>" window.
2. Click "Edit".
   The input fields are released for changes and additions.
3. Select the desired attribute and enter the corresponding value.

4. Click on symbol "+" to add further attributes.
5. The "Save" button can only be selected if the mandatory fields of all tabs are filled.
   Click "Save" to create or change the user-defined data.
   - OR -
   click "Cancel" to discard the entries.



5.2.4 Adding files

In window "<ID for tool component>", in tab "Files", load up to 10 files for the tool component master data to the database. This means that files are available on every operating PC.

Parameters

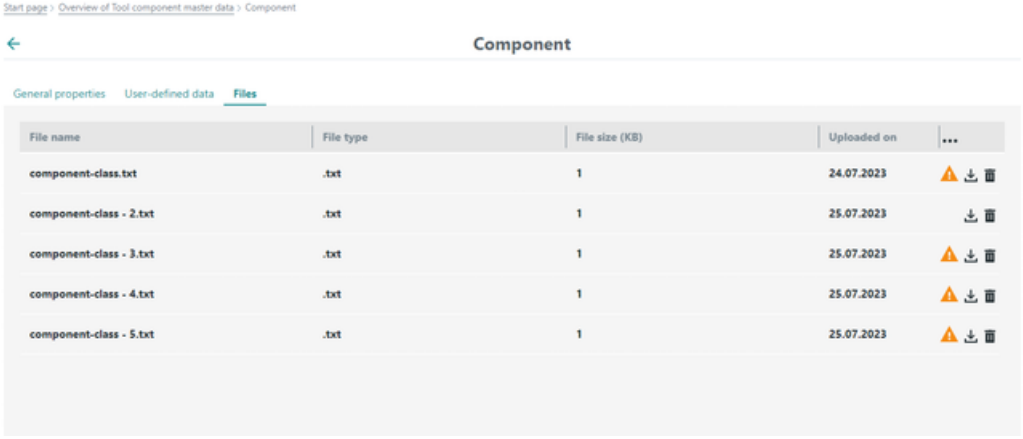
The following parameters are available:

Parameter	Description
File name	Name of the file that was added
File type	File extension Every file type is supported.
File size (KB)	Size of the file Every file may be a maximum of 50 MB.
Uploaded on	Date of the upload.
	Loads the file to the standard download directory of the Internet browser.
	Deletes the file from the database.

Parameter	Description
Viru scan status	The actual status according to latest virus scan result For the time being it can be one of the followings: • Missing file content • No valid scan result • Safe • Not safe • Scan disabled
	If this alert icon shows, it means that the file is not downloadable as the virus protection has some problem with the file. The tooltip gives hints why the download is disabled it can be one of the followings: • The content of the file does not exist • The file hasn't been scanned yet or the scan result has been expired • The virus scan found some malwares in the file

Procedure

1. Open the "Files" tab in the "<ID for tool component>" window.
2. Click on "Add".
3. Navigate to the required file.
4. Click on "Open" to load the selected file to the database.



Swagger UI

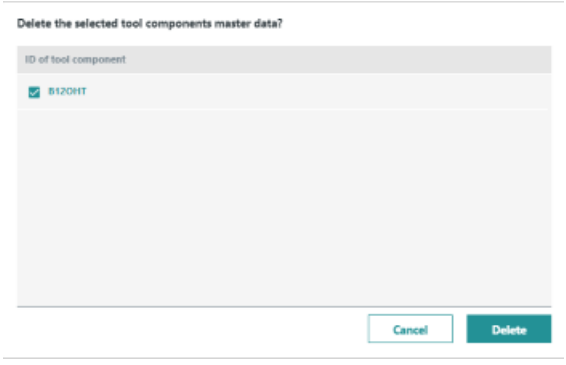
You also have the option of loading the files to the database using Swagger-UI. For more information, see Adding files to the tool master data components (Page 917).

5.2.5 Deleting tool component master data

Delete the tool component master data you no longer require in the "Overview of master data for tool components" window.

Procedure

1. In the "Overview of tool component master data" window, activate the checkboxes to select one or several components.
   You can only select tool component master data, which are not used in any bill of material in tool master data.
2. Click "Delete".
3. The "Delete the selected tool component master data?" window opens.
   All tool component master data to be deleted are displayed.
   If you do not want to delete certain individual tool component master data, uncheck the corresponding checkboxes.
   – To delete the tool component master data click "Delete".
   - OR -
   Click on "Cancel" if you do not want to delete any tool component master data.



5.3 Tool component stacks

5.3.1 Overview of tool component stack

You can see the tool component stacks that have already been created in the "Overview of tool component stacks" window. There can be multiple stacks for the same tool component.

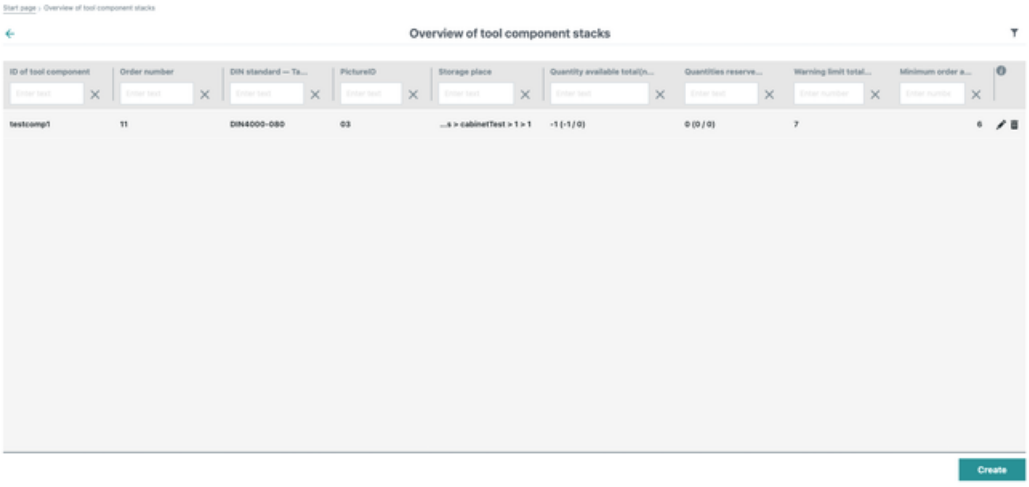
You can create new component stacks and also delete existing stacks. In case the amount of tool components is to be changed (e.g. increased due to a new delivery), you can edit quantities.

Parameter

The following information is displayed:

Parameter	Description
∨	This symbol appears when you click on the column heading Click on the symbol to sort the elements alphabetically/numerically, either in ascending or descending order
ID of tool component	Shows the name of the tool component Underlined names indicate that further information is available If you click the link, a new window opens showing all the detailed information. If you press the right mouse button and select "Open tab in new window", a new browser page with the details opens. In this case, you do not need to reload the "Overview of tool component stacks" page.
Order number	Shows the order number
DIN-Norm — Tabular layouts of properties	Shows the identifier of corresponding DIN norm
PictureID	Shows the picture identifier of corresponding DIN norm
Storage place	Shows the storage location of component: • Hierarchical path to the box in a cabinet
Quantity available total(new/used)	Quantity available total shows the current stock of tool component The quantity is automatically decreased by assembling a tool In pranthesis, "new" number indicates the number of tool components which are new Quantity can be automatically increased by disassembling a tool In pranthesis, "used" number indicates the number of tool components which were already used in a tool, but can be reused again Quantity can be automatically increased by disassembling a tool
Quantity reserved total(new/used)	Shows the current number of reserved tool component "new" number indicates the number of reserved tool components which are new "used" number indicates the number of reserved tool components which were used and can be reused
Warning limit total(new)	Shows the minimum stock of tool component
Minumum order amount	Indicates the multiplier to define the amount when creating an purchase order request for the relevant tool component

Parameter	Description
	Enables to edit quantities and warning limit.
	Saves edited values.
	Aborts editing.
	Deletes the tool component after a confirmation prompt.
	Shows the number of tool component stacks.
	Opens window "My Filters" and you can then filter the tool components according to the following criteria: • ID of tool component • Order number • DIN-Norm — Tabular layouts of properties • PictureID • Storage place • Quantity unused • Quantity used • Warning limit • Minimum order amount • Quantity reserved unused • Quantity reserved used For more information, see List filtering (Page 46). Click on the filter icon again to close the filter window.



Procedure

1. On the Mcenter start page, click on "Tool component stacks".

   - OR -
   Open the following URL: Tool component stacks (https://{ServerIP}/mmr/tools/componentstack)

2. The "Overview of tool component stacks" window opens.
   In an overview, you can see stacks that have already been created.
3. To change quantities in an existing stack, click on "Edit" symbol.
   The entries in "Quantities unused /used / warning limit" column are released for editing.
   Enter desired values and click on "Save" symbol.
4. To create a component stack, click "Create component stack".
   For more information, see Stocking up components (Page 146).

5.3.2 Stocking up components

In the "Stock up tool components" window, create a new tool component stack.

Parameter

The following parameters are available:

Parameter	Description
ID of tool component *	Open the drop-down list and select the ID of tool component.
Cabinet *	Open the drop-down list and select the cabinet.
Container *	Open the drop-down list and select the container.
Box *	Enter the box the tool components should be stored.
Quantity unused *	Enter the number of the tool components which are placed in the storage.
Quantity used *	Enter the number of the tool components which were already used in a tool, but can be reused again. The default value is 0.
Warning limit *	Enter a lower limit for quantity.

*) The fields marked with an asterisk are mandatory and must be completed. An error message is output if you make an erroneous entry.

Note

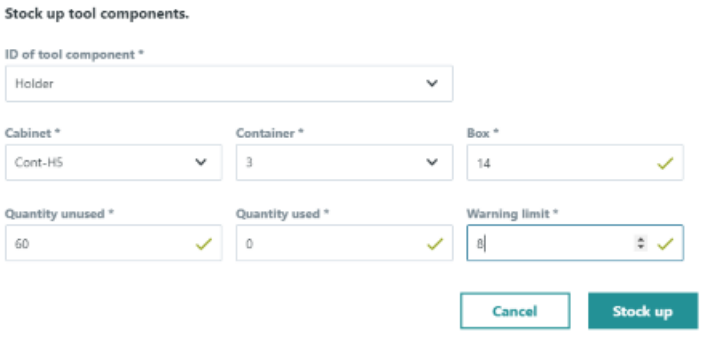
Unique tool component path

The whole path of a tool component, and accordingly of the storage place, is always unambiguous and unique, for instance:
Siemens > Renningen > CAB! > newbox1

There can only be one newbox1 in the given path.

Procedure

1. In the "Overview of tool component stacks" window, click "Create component stack".
   The "Stock up tool components" window opens.
2. Enter the required data.
3. To create the tool component stack, click "Stock up".
   - OR -
   To discard the entries, click "Cancel".



5.4 Tool lifecycle distribution

5.4.1 Overview of tool lifecycle distribution

The "Tool lifecycle distribution" window provides analytics data of tools such as number of tools on cabinet or on magazine used within a factory. You can visualize the distribution of tools within different phases.

Brownfield tools are not supported in the tool lifecycle distribution.

Data gathering/aggregation for tool lifecycle distribution is disabled by default. Additional information to enable the aggregation is provided in Installation Manual "Mcenter, Manage MyResources, Optimize MyProgramming /NX-Cam Editor, Analyze MyPerformance / OEE, Access MyData /Collector".

Parameters

Note

Recommended aggregation time

When you turn on the aggregation, all three aggregation periods are immediately activated:

- hourly
- daily
- weekly

The recommended aggregation time for daily and weekly intervals is during periods with a low manufacturing load.

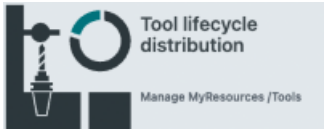
Use the Windows task scheduler for your planning.

Parameter	Description
Select Tool Type	Select a tool type name from the drop-down list or enter a specific tool type name in the input field.
Select Tool Instance	Select a tool instance name from the drop-down list or enter a specific tool instance name in the input field.
Select Date	Select the time interval which should be visualized. The selection is disabled for single tool instances.
Select the tool lifecycle phase which should be visualized:	
Decide further processing	Former undefined state
Picking	Duration of the time in between a tool is created and moved out of the "to be obtained" column in MMR /T task Kanban
Assemble	Duration that a tool instance stayed on the "assemble" column in MMR /T task Kanban
Measure	Duration that a tool instance stayed on the "measure" column in MMR /T task Kanban
Provide	Duration that a tool instance stayed on the "provide" column in MMR /T task Kanban

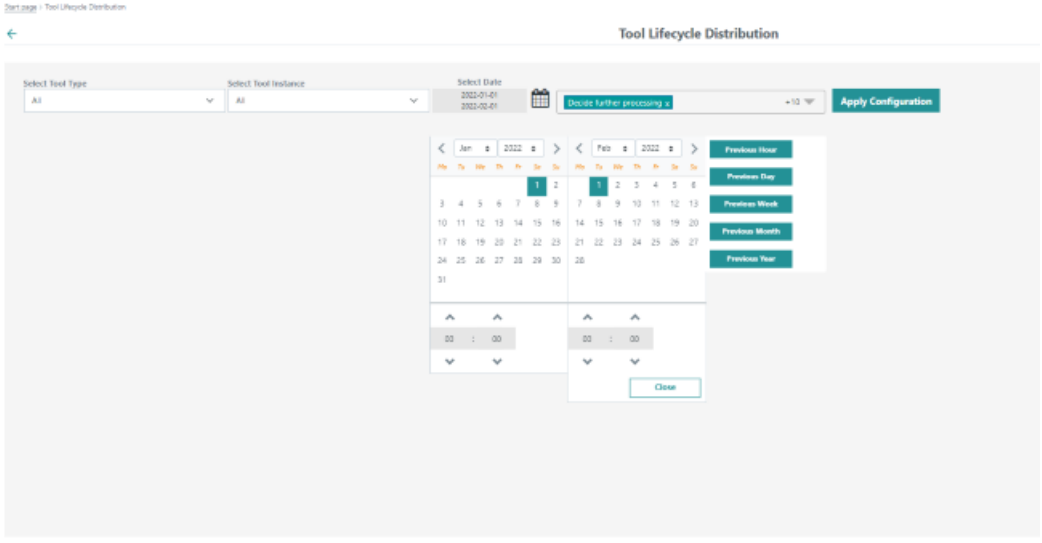
Parameter	Description
On cabinet	Duration that a tool instance has been assigned to a cabinet and stayed there
Manufacture	Sum of cutting times
Idle in spindle	Sum of times that a tool is in the spindle but is not cutting
On magazine	Duration that a tool is in the magazine
Overhaul	Duration that a tool instance stayed on the "overhaul" column in MMR /T task Kanban
Disassemble	Duration of the disassemble process

Procedure

1. On the Mcenter start page, click on "Tool lifecycle distribution".



   - OR -
   Open the following URL: Tool lifecycle distribution (https://{ServerIP}/mmr/tools/distribution)
2. The "Tool lifecycle distribution" window opens.
3. Select a tool type and a tool instance from the drop-down lists.
4. Click on the "Calendar" icon (if enabled) to select a date.

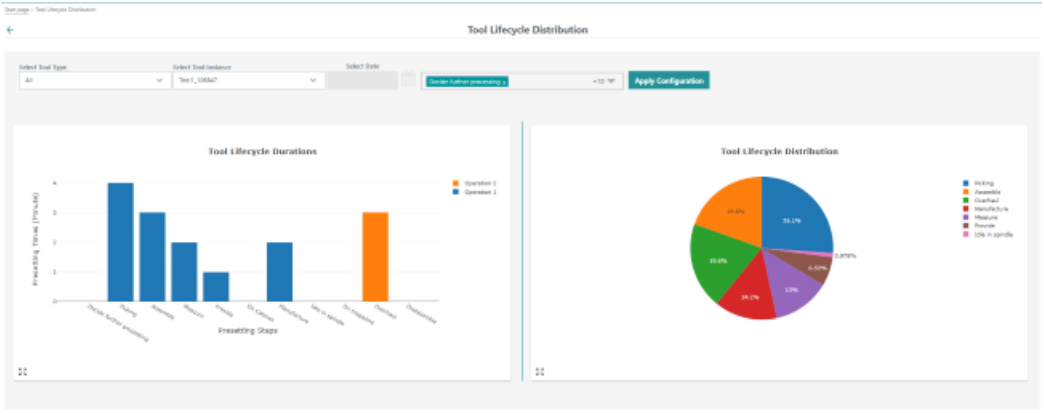


5. Select a tool lifecycle phase from the drop-down list.
6. Click on "Apply Configuration".
7. The tool lifecycle distribution is shown in charts:
   - Tool lifecycle distribution for a single instance (Page 150)
   - Tool lifecycle distribution for multiple instances (Page 150)

5.4.2 Tool lifecycle distribution for a single instance

Procedure

1. The "Tool lifecycle distribution" window is opened.
2. Select "All" or a specific tool type name from the "Select Tool Type" drop-down list.
3. Select a specific tool instance name from the "Select Tool Instance" drop-down list.
4. Select a tool lifecycle phase from the drop-down list.
5. Click on "Apply Configuration".
6. The tool lifecycle durations is shown in a bar chart.
   The tool lifecycle distribution is shown in a pie chart.



5.4.3 Tool lifecycle distribution for multiple instances

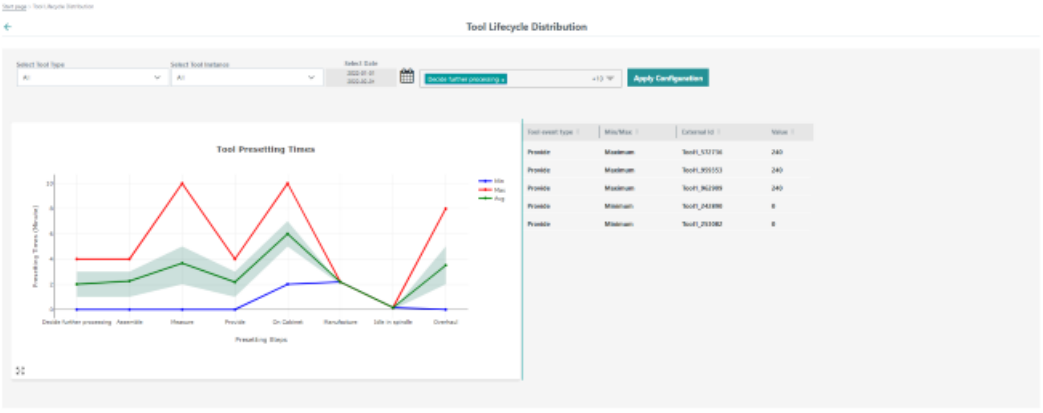
Parameters

Parameter	Description
Tool event type	Shows the selected tool lifecycle phase.
Min/Max	Shows if it is the minimum or maximum duration of the selected tool lifecycle phase.
External Id	Shows the tool instance name.
Value	Shows the duration of the selected tool lifecycle phase in minutes.

Procedure

1. The "Tool lifecycle distribution" window is opened.
2. Select "All" or a specific tool type name from the "Select Tool Type" drop-down list.
3. Select "All" from the "Select Tool Instance" drop-down list.

4. Click on the "Calendar" icon to select a date.
5. Select a tool lifecycle phase from the drop-down list.
6. Click on "Apply Configuration".
7. The distribution of the selected tool types and all tool instances is shown in a line chart. When you click on the points of the line chart, you can see the detailed description of the tool instances in the table located on the right-hand side.



5.5 Storage locations

5.5.1 Overview of storage locations

You can see the tool cabinets that have already been created in the "Overview of storage locations" window.

You can create new tool cabinets, open them for processing and also delete them.

Parameter

The following information is displayed:

Parameter	Description
∨	This symbol appears when you click on the column heading. Click on the symbol to sort the elements alphabetically/numerically, either in ascending or descending order.
Cabinet	Shows the name of the tool cabinet. Click the link to display the detailed information within the open window. If you press the right mouse button, you open the drop-down list. You can • open a new window - OR - • open a new tab In the latter case, you do not need to reload the "Manage tools cabinet" page.
Hierarchical path	Shows the hierarchical path.
Number of locked containers	Displays the number of locked containers.
Number of component boxes	Displays the number of component boxes.
Number of tools	Displays the number of tools.
Number of containers	Shows the number of containers that are in the cabinet.
Number of adapters	Displays the number of adapters.
Number of clampings	Displays the number of clampings.
Number of Measuring devices	Displays the number of Measuring devices.
🗑	The symbol is displayed if tool cabinets do not contain any tools. Deletes the tool cabinet after a confirmation prompt.
ⓘ	Shows the number of tool cabinets.

Parameter	Description
•••	Opens a window in which you select additional columns to be displayed in the overview. These columns can optionally be configured to show further information: • Number of locked containers • Number of component boxes • Number of tools • Number of adapters • Number of clampings • Number of Measuring devices The next time you log in with your user Id, the columns you selected are displayed.
▼	Opens window "My Filters" and you can then filter the tool cabinets according to the following criteria: • Cabinet • Hierarchical path • Number of locked containers • Number of component boxes • Number of tools • Number of adapters • Number of clampings • Number of Measuring devices • Number of containers For more information, see List filtering (Page 46). Click on the filter icon again to close the filter window.

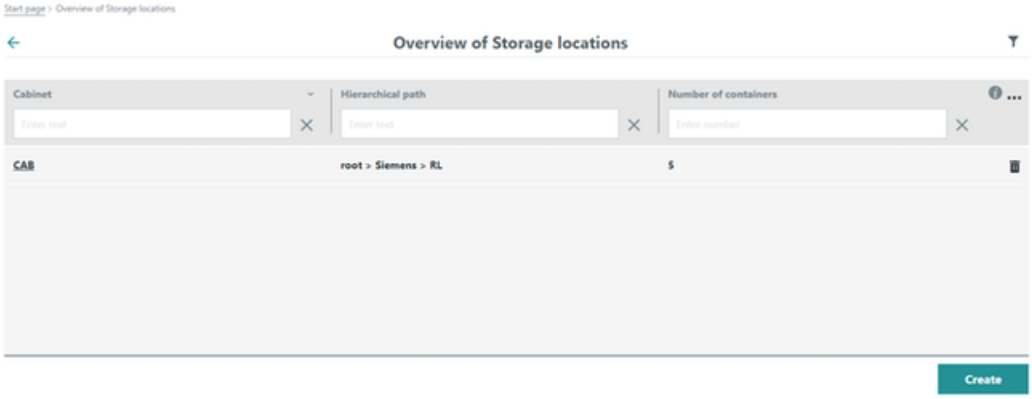
Procedure

1. On the Mcenter start page, click on "Storage locations".

   - OR -
   Open the following URL: Storage locations (https://{ServerIP}/mmr/tools/location)

2. The "Overview of Storage locations" window opens.
   In an overview, you can see storage locations that have already been created.

3. To create a tool cabinet, click "Create".
   For more information, see Creating a tool cabinet (Page 154).



4. To view further data of a tool cabinet, click the underlined name of cabinet in the list.
   The "<Tool cabinet name>" window opens.
   For more information, see Editing a tool cabinet (Page 155).

5.5.2 Creating a tool cabinet

In the "Create new tool cabinet" window, create a new tool cabinet.

Parameter

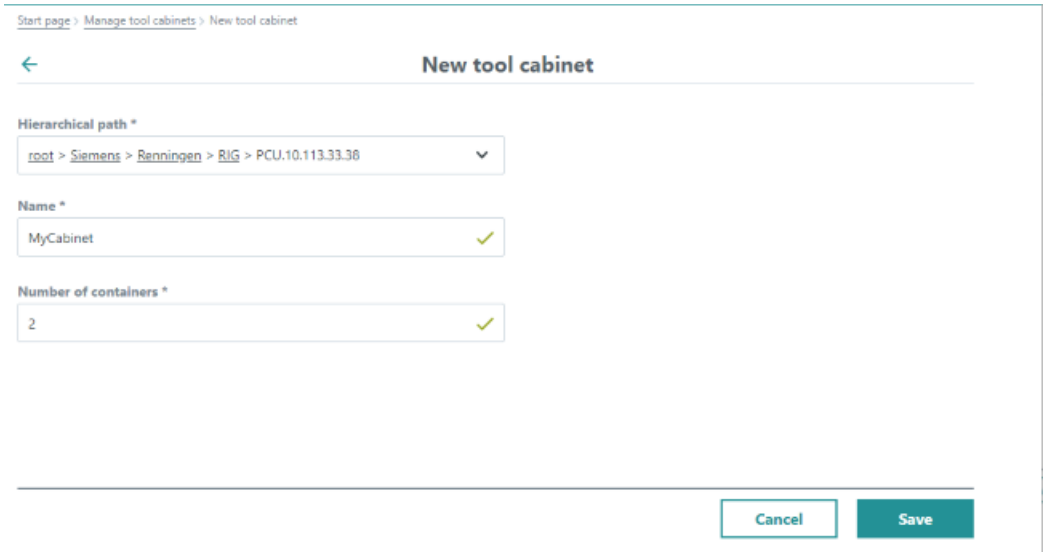
The following parameters are available:

Parameter	Description
Hierarchical path *	Open the drop-down list and select the hierarchical path.
Name *	Enter the name of the cabinet.
Number of containers *	Enter the number of containers the tool cabinet should have.

*) The fields marked with an asterisk are mandatory and must be completed. An error message is output if you make an erroneous entry.

Procedure

1. In the "Manage tool cabinets" window, click "Create".
   The "New tool cabinet" window opens.
2. Enter the required data.
3. To create the tool cabinet, click "Save".
   The message "Cabinet data set was saved successfully" appears in the top-right window area.
   - OR -
   To discard the entries, click "Cancel".



5.5.3 Editing a tool cabinet

You display and change the data of a tool cabinet in the "<Tool cabinet name>" window.

Parameter

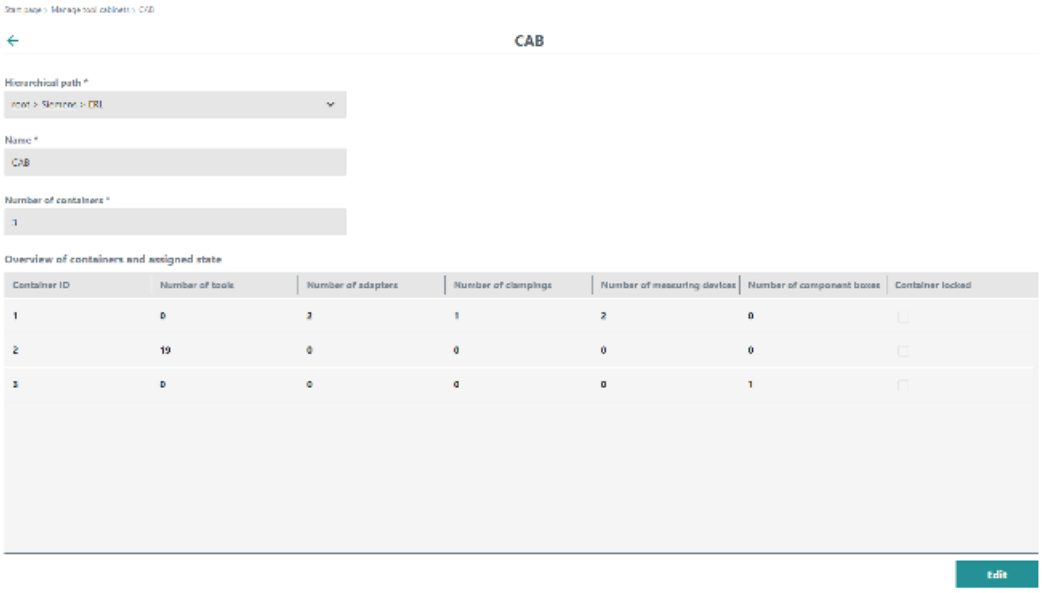
The following parameters are available:

Parameter	Description
Hierarchical path *	You can only change the hierarchical path if there are no tools in the tool cabinet.
Name *	Enter the name of the cabinet.
Number of containers *	Use the spin box to select the number of containers the tool cabinet should have. The number can be increased further after saving, as soon as the edit mode is selected.
Overview of the containers and assigned status	
Container ID	Shows the identifier of the container.
Number of tools	Shows the number of tools in the container.
Number of adapters	Shows the number of adapters.
Number of clampings	Shows the number of clampings.
Number of measuring devi-ces.	Shows the number of measuring devices.
Number of component boxes	Displays the number of component boxes.
Container locked	Activate the checkbox to lock the container. You can only disable empty containers.

*) The fields marked with an asterisk are mandatory and must be completed. An error message is output if you make an erroneous entry.

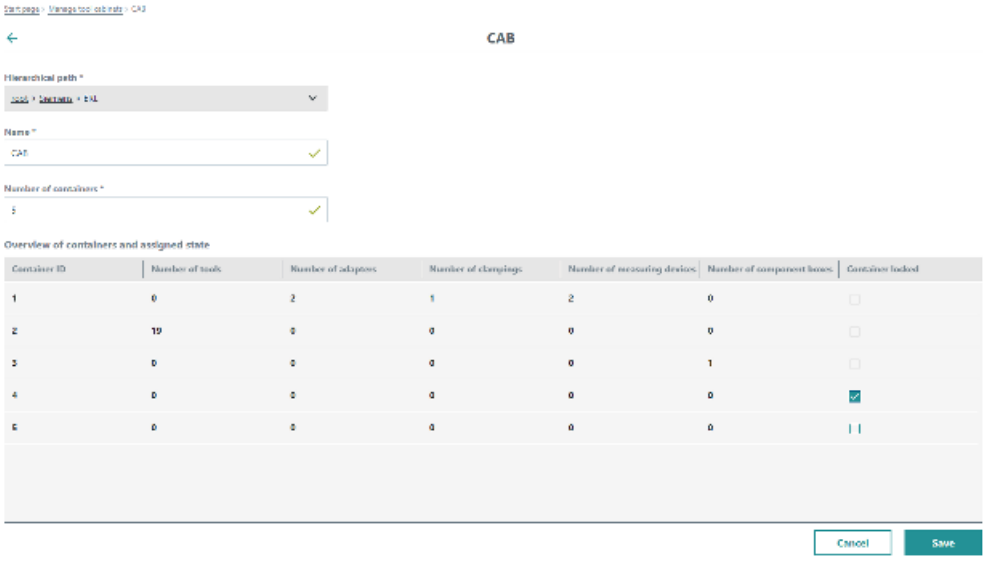
Procedure

1. In the "Manage tool cabinets" window, click the underlined name of tool cabinet in the overview.
   The "<Tool cabinet name>" window opens.



2. Click on "Edit".

3. Enter the new data.
4. To save the changes, click "Save".
   The message "Tool cabinet successfully saved" appears in the top-right window area.
   - OR -
   To discard the entries, click "Cancel".
   A prompt appears asking whether you want to discard the changes.
   – Click "No, go back" if you want to save the changes.
   – Click "Yes, proceed" if you want to discard the changes.



5.5.4 Displaying tool cabinet information

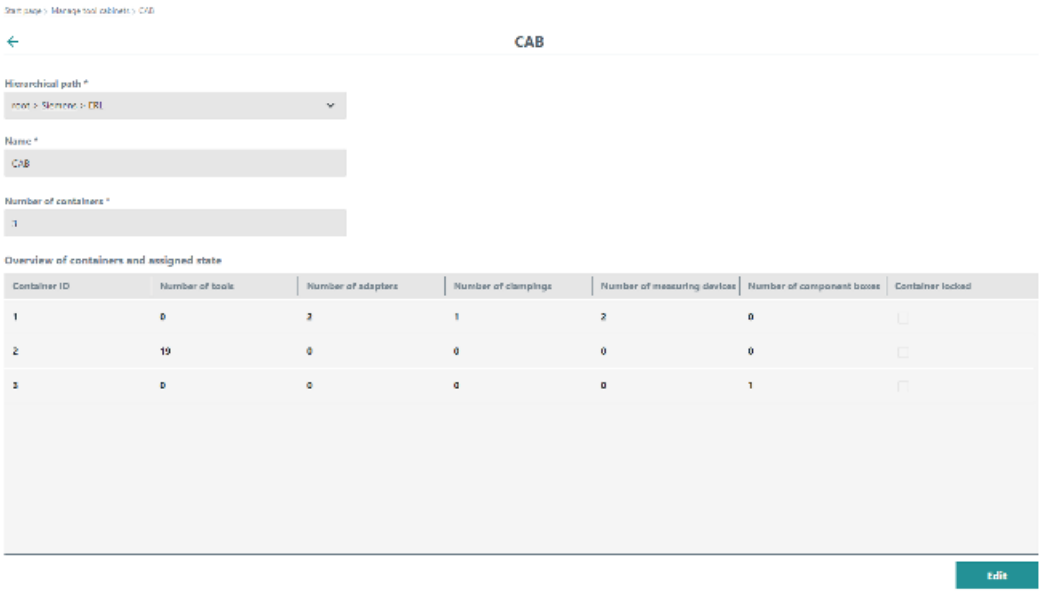
You can display tool cabinet information:

- Number of tools
- Number of adapters
- Number of clampings
- Number of measuring devices
- Number of component boxes

Procedure

Click on a cabinet in the "Manage tool cabinets" window.

The "Overview of containers and assigned state" window with the cabinet information opens.


CAB
Hierarchical path *
Name *
CAB
Number of containers *
1
Overview of containers and assigned state
Container ID
Number of tools
Number of adapters
Number of clampings
Number of measuring devices
Number of component boxes
Container locked
1 0 3 1 2 0
2 19 0 0 0 0
3 0 0 0 0 1
Edit

5.6 Tool stock

5.6.1 Tools overview

The window "Overview of tool stock" shows an overview of the tool stock. You can sort the individual columns in the overview.

Assembly storage locations

Assembly (mount and measure tools) is a virtual container provided by the application. It digitally emulates the workstations to measure tools or to disassemble the tools into components that can be scrapped or stored.

After measurement, a tool is automatically assigned to the Assembly storage location. From here, the tool can be manually located to a real cabinet location.

If a tool is exchanged in the machine (1:1 exchange or check), the original tool is automatically assigned to the Assembly location with a "Disassemble" action flag. The tool can then be manually moved in Provide tools.

For more information, see Container (Page 131).

Parameter

The following data is displayed for the tools:

Parameter	Description
∨	This symbol appears when you click on the column heading. By clicking on the symbol the elements are sorted alphabetically/numerically, either in ascending or descending order.
ID for tool instance data	Shows the identifier for tool instance data. By clicking the link the window opened to display the detailed information. If you press the right mouse button, you open the drop-down list. You can • open a new window - OR - • open a new tab In the latter case, you do not need to reload the "Overview of tool stock" page. For more information, see Tool details (Page 165). When you check the box in the column header, all tools ready for disassembly are activated. However, you can only relocate tools that are in a cabinet.
ID for tool master data	Shows the identifier of the master data.
	Indicates a new revision of a tool instance with a breaking change.
	Converts a brownfield tool to a greenfield tool. For more information see Converting brownfield tools to greenfield tools (Page 188).
Tool name in NC program	Shows the name of the tool in the NC program.

Parameter		Description
Status		Shows the tool state as a user-friendly information. Hover the cursor over the status information to display a tooltip with the status details.
		Hover the curser over the "Information" icon in the column header to display the list of all possible tool states: • A: Assembled • C: Tool being changed • D: Disabled • I: Ignore disabled state • L: Fixed • M: Measured • N: Tool is new • U: Used tool • O: Overhaul • P: Picked • R: Released • T: Trial tool • W: Warning limit reached • X: To be disassembled • ' ': Further processing to be decided
Location		Shows the storage location: • Assembly (action flag) • Hierarchical path (when the tool is located in a cabinet, in a magazine or AtMachine) • Tools located within an adapter are marked with an "A"
<User-defined attributes>		Displays the user-defined attributes.
Revision of TMD-ID		Shows the Revision of TMD-ID.
Last release		Shows the Last release.
Last load		Shows the Last load.
Last unload		Shows the Last unload.
Last state change		Shows the most recent events date time from last load, unload or released column. With this tooltip the type of the last state change is also shown.
		Indicates that the column shows the latest values of Last release, Last load and Last unload events.
Lifetime / workpieces		Shows the Lifetime / workpieces: • remaining • target • warning

Parameter	Description
Unload reason	Shows the Unload reason: • Unknown • Broken tool • Worn out tool • Loud noise of tool • Empty place needed • Tool is needed on another machine • Bad workpiece quality • <User-defined reason> You can extend and shorten the list. The number of entries is not limited. For more information, see: Configuring Unload reasons and their action flags (Page 955) You can configure this column according to the respective Unload reasons.
Reserved	Shows the Reserved status.
Reserved for machine	Shows the "Reserved for machine" status.
Reachable spindle(s)	Shows the reachable spindle(s).
	Shows the number of tools in the inventory.

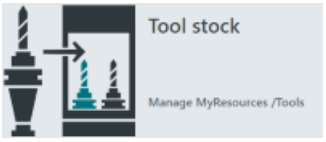
Parameter	Description
	Opens a window in which you select additional columns to be displayed in the overview. These columns can optionally be configured to show further information: • Lifetime (remaining/target/warning) • Unload reason • Reserved • Reserved for machine • Reachable spindle(s) Only directly linked spindles and magazines on the machine can be displayed. If the following variables exist in the magazine configuration, a reachable spindle can be displayed: – $TC_MDP1[#mag,#lp] for loading point [9999,#lp] – $TC_MDP2[#mag,#sp] for spindle [9998,#sp] • Location • Revision of TMD-ID • <User-defined attributes> • Last release Shows when the tool was last measured • Last load Shows the loading time at machine • Last unload Shows the unloading time at machine • Last state change Shows the status change of the tool The maximum of additional columns is limited to 5. The next time you log in with your user Id, the selected columns are on the display.
	Indicates that there is currently no connection to the machine. The displayed data may be outdated. For more information about offline handling, see Creating tools on an offline machine (Page 524).
	Opens the "Change reservation of selected tool" window to change the reservation settings.
	Relocate selected tool.

Parameter	Description
Active filter: NCTOOL	Next to the filter icon Text is visible, if a filter is activated showing the active filter's name. If a filter is activated and not yet saved then the name 'Unsaved filter' is visible
	Opens the window "My Filters" and filters tools according to the following criteria: • ID for tool instance data • ID for tool master data • Revision of TMD-ID • Tool name in NC program • Status • Attributes 1 to 10 • Lifetime (remaining/target/warning) • Unload reason • Reserved • Reserved for machine • Reachable spindle(s) • Location • Last release • Last load • Last unload • Last state change For more information, see List filtering (Page 46). Click on the filter icon again to close the filter window.

NOTICE
Loading time To avoid time differences, synchronize the time registration of the server and the machine.

Procedure

1. On the Mcenter start page, click on "Tool stock".



   - OR -
   Open the following URL: Tool stock (https://{ServerIP}/mmr/tools/stock)

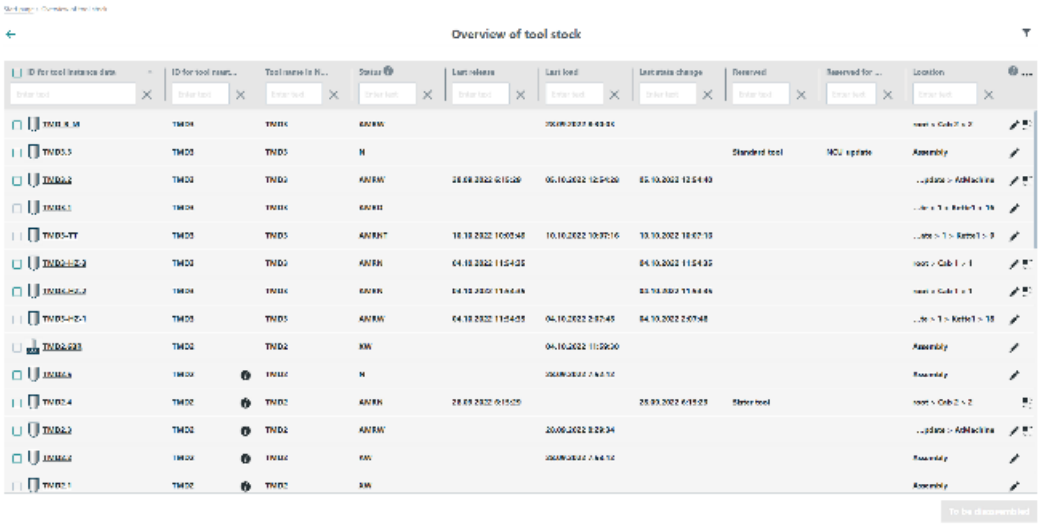
2. The window "Overview of tool stock" opens, and you can see the tools that are in the inventory.

   Note

   Refresh with the <F5> button

   When you reduce the window size, the icons on the right-hand side disappear. Press the <F5> button to refresh the view and display the symbol.

3. To remove tools that are no longer needed from the overview, activate the checkbox and click on the "To be disassembled" button.
   The tool is shifted to "Task overview to provide tools" with "Disassemble" action flag.
   For more information, see Task overview to provide tools (Page 239).



5.6.2 Tool details

5.6.2.1 Select mapping

In the Tool details of "Tool stock", you can select different mappings for the tool related information:

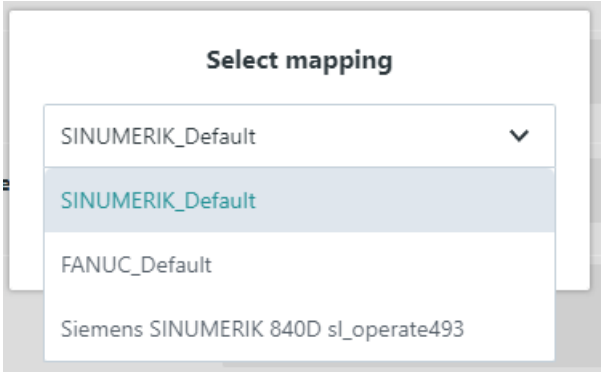
- Standard View
- SINUMERIK Controller View
  - OR -
- any other mapping that you have created, if the UI descriptor files are provided

When opening the "<Tool name>" window, the "Standard View" is the default view.

Procedure

1. Click on the underlined name of the tool in the "Overview of tool stock" window.
2. The "<Tool name>" window opens.
3. Click on the "Show mapping" button in the bottom-right window area.

4. The "Select mapping" window opens. Select the "SINUMERIK Controller View" to change the mapping.

5. The "Show mapping" button is changed to "Standard View" button. If you want to return to Standard View, click on the "Standard View" button.

5.6.2.2 Standard View

Basic data

The tool data is displayed in the "<Tool name>" window in the "Basic data" tab.

Parameters

Note

For more information , the notation in brackets is described in Standard Tool data model (Page 394)

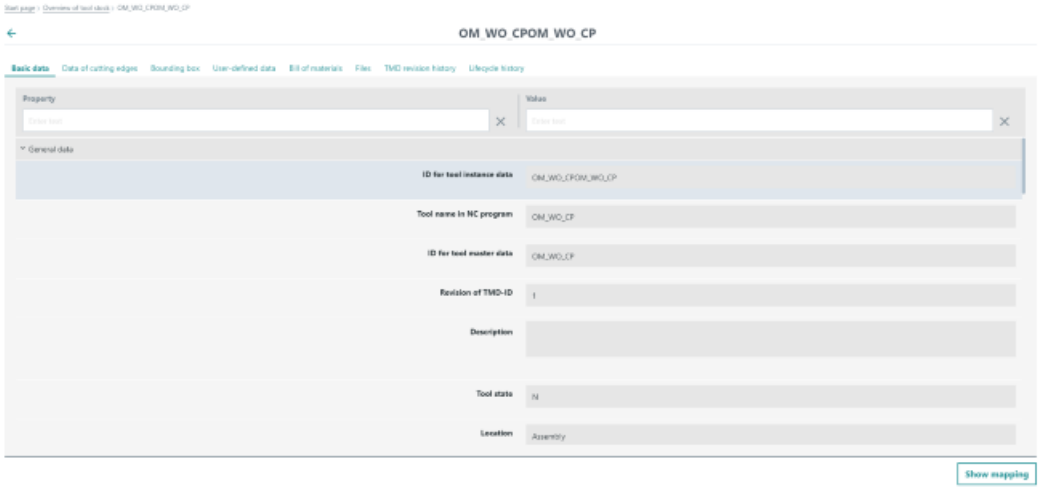
Depending on the tool, you are shown e.g. the following data:

Parameter	Description
General data	
ID for tool instance data	Shows the identifier for tool instance data.
Tool name in NC program	Shows the tool name in the NC program.
ID for tool master data	Shows the identifier for tool master data.
Revision of TMD-ID	Revision number.
Description	Shows an additional description for the master data.
Tool state	Shows the status.
Location	Shows the storage location.
Desired Duplo No.	Shows the desired duplo number.
Duplo No.	Shows the duplo number.
Number of cutting edges	Displays the number of cutting edges.
Additional data	
Rotation speed max [D6]	Shows the maximum rotation speed (rpm).
Max. acceleration [D6_ACC]	Shows the maximum acceleration (rps^2).
Balancing quality [D5]	Shows the balancing quality.
Cooling lubricant entrance [H21]	Shows the cooling lubricant entrance.
Drive diameter [C47], size [C43], type [C41]	Shows the drive related measures.
Lock [C49]	Displays the lock.
Mass [D7]	Displays the mass.
Mounting execution, machine-side [C14]	Shows Mounting related informations.
Mounting form, machine-side [C12]	
Mounting size, machine-side [C2]	
Mounting species, machine-side [C15]	
Mounting type, machine-side [C11]	
Normnumber characteristic identifier [NSM]	Displays the normnumber characteristic identifier.
Number adjustment dimensions [A01]	Shows the number adjustment dimensions.
Number of adjustment options [A08]	Shows the number of adjustment options.
Number of drives [C44]	Shows the number of drives.
Product name [J22]	Displays product name.
Product description [J23]	Displays product description.
Replacement coding, torque support [J51]	Shows the replacement coding, torque support.

Parameter	Description
Separation point coding, machine-side [J6]	Shows the separation point coding, machine-side.
Separation point coding, machine-side in accordance with ISO TS 13399-60 [J61]	Shows the separation point coding, machine-side in accordance with ISO TS 13399-60.
Separation point, drive [J9]	Shows the separation point, drive.
Tilting moment [M8]	Shows the tilting moment.
Extension length [V1]	Shows the length of extension.
Projection length, tool assemblies [V2]	Shows the projection length, tool assemblies.
Total length [B5]	Shows the total length of tool.
Total width [B91]	Shows the total width of tool.
Supplier	Shows the supplier.
Identifying order-number [J21]	Displays the Identifying order number.
⚠	Indicates that there is currently no connection to the machine. The displayed data may be out of date. For more information about offline handling, see Creating tools on an offline machine (Page 524).

Procedure

1. Click on the underlined name of the tool in the "Overview of tool stock" window.
2. The "<Tool name>" window > "Basic data" tab opens.
   You see all the information about the tool.



Data of cutting edges

In the "Data of cutting edges" tab in the "<Tool name>" window, you can see the data for the cutting edges, along with the classification picture for the selected picture ID.

Parameter

Depending on the tool, you see following data:

Parameter	Description
General Data	
Picture ID [BLD]	Shows the ID of picture displayed on the right.
Cutting Edge index [IND]	Shows the Cutting Edge index.
Tool material type [H11]	Shows the tool material type.
Target tool life time [T10]	Shows the target tool life time.
Target tool life time warning limit [T10W]	Shows the target tool life time warning limit.
Residual tool life [T10R]	Shows the residual tool life.
Cutting edge position [T13]	Shows the cutting edge position.
Coolant pressure [K15]	Shows the coolant pressure.
Machining method [J8]	Shows the machining method.
Expected geometry data	
Expected adjustment dimension X[X0], Y[Y0], Z[Z0]	Shows the expected adjustment dimensions for X, Y and Z.
Expected blade Diameter [A1]	Shows the expected blade Diameter.
Expected cutting radius [D1]	Shows the expected cutting radius.
Expected cutting edge length [A5]	Shows the cutting edge length.
Expected cutting insert width [G2]	Shows the expected cutting insert width.
Expected cutting edge angle [E1]	Shows the expected cutting edge angle.
Expected tip angle [E44]	Shows the expected tip angle.
Tolerance of geometry data	
Tolerance lower/upper adjustment dimension X [X011], X [X010], Y [Y011], Y [Y010], Z [Z011], Z [Z010]	Shows the tolerance values for lower/upper adjustment dimensions X, Y and Z.

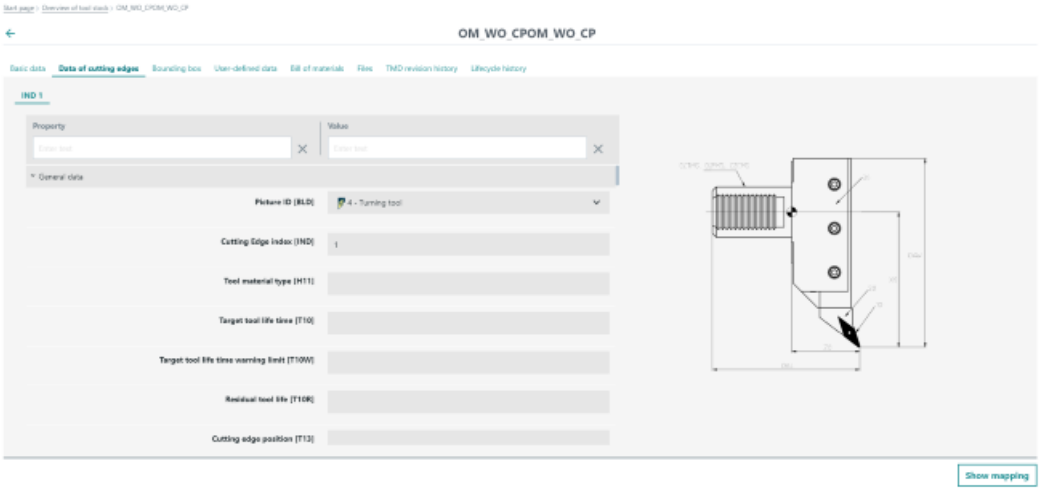
Parameter	Description
Tolerance lower blade diameter [A111] Tolerance upper blade diameter [A110] Tolerance lower cutting radius [D111] Tolerance upper cutting radius [D110] Tolerance lower cutting edge length [A511] Tolerance upper cutting edge length [A510] Tolerance lower cutting insert width [G211] Tolerance upper cutting insert width [G210] Tolerance lower cutting edge angle [E111] Tolerance upper cutting edge angle [E110] Tolerance lower tip angle [E4411] Tolerance upper tip angle [E4410]	Shows the tolerance related measures.
Actual geometry data	
Actual adjustment dimension X [X0], Z [Z0], Y [Y0]	Shows the actual adjustment in relation to X, Z and Y dimensions.
Actual blade diameter [A1]	Shows the actual blade diameter.
Actual cutting radius [D1]	Shows the actual cutting radius.
Actual cutting edge length [A5]	Shows the actual edge length.
Actual cutting insert width [G2]	Shows the actual insert width.
Actual cutting edge angle [E1]	Shows the actual cutting edge angle.
Actual tip angle [E44]	Shows the actual tip angle.
Geometry data wear	
Wear adjustment dimension Correction value X [A92], Correction value Y [A93], Correction value Z [A94]	Shows the wear adjustments for X, Y and Z dimensions.
Wear blade diameter [A1W]	Shows the wear blade diameter.
Wear cutting radius [D1W]	Shows the wear cutting radius.
Wear cutting insert width [G2W]	Shows the wear cutting insert width.
Wear cutting edge angle [E1W]	Shows the wear cutting edge angle.
Wear tip angle [E44W]	Shows the wear tip angle.
Wear cutting edge length [A5W]	Shows the wear cutting edge length.
Edge transformation data*	
Transformed adjustment dimension* X T[X0], Z T[Z0], Y T[Y0]	Shows the transformed adjustment dimensions.
Additional data	
Corner angle [E3]	Shows the corner angle.
Cutting direction [F1]	Shows the cutting direction.
Cutting insert angle left [B2]	Shows the cutting insert angle left.
Cutting insert design [E7]	Shows the cutting insert design.

Parameter	Description
Cutting width min. [B11]	Shows the minimum cutting width.
Feeler element diameter [A2]	Shows the feeler element diameter.
Holder rotation angle A axis [E30], B axis [E31], C axis [E32]	Shows the holder rotation angle for axis A, B and C.
Insert angle right [B1]	Shows the insert angle right.
Mounting tolerance class, machine-side [C16]	Shows the mounting tolerance class, machine-side.
Nominal thread diameter, as fraction [D36], Inch [D35], metrisch [D34]	Shows the nominal thread diameter as fraction, inch and metrisch.
Number swivel angle around x-axis [A05], y-axis [A06], z-axis [A07]	Shows the number swivel angle around X, Y and Z axis.
Plunge angle, max. [E40]	Shows the maximum plunge angle.
Profile distance X [A9], Y [A91]	Shows the profile distance.
Setting angle [E10]	Shows the setting angle.
Swivel angle X1 [X1], X2 [X2], X3 [X3], X4 [X4] Y1 [Y1], Y2 [Y2], Y3 [Y3], Y4 [Y4] Z1 [Z1], Z2 [Z2], Z3 [Z3], Z4 [Z4]	Shows the swivel angle for X, Y and Z related values.
Thread pitch [D32] max. [A62], min. [A61]	Shows the maximum, minimum and current thread pitch.
Thread type [D31]	Shows the thread type.
Tolerance, 1st stage [A81] last stage [A84]	Shows the tolerance for first and last stage.
Profile shape [J28]	Shows the profile shape.
User-defined edge data	
Actual adapter lenght 1 Actual adapter lenght 2 Actual adapter lenght 3 Actual free cutting angle Expected adapter length 1 Expected adapter length 2 Expected adapter length 3 Expected free cutting angle Tolerance adapter length 1 Tolerance adapter length 2 Tolerance adapter length 3 Tolerance free cutting angle Actual TC_DP25 Tool type	For cutting edges these attributes are available. The attributes are used for persisting SINUMERIK specific tool data in the DIN 4000 - 180 based new tool model.
	If you click the "i" symbol, further information is displayed.

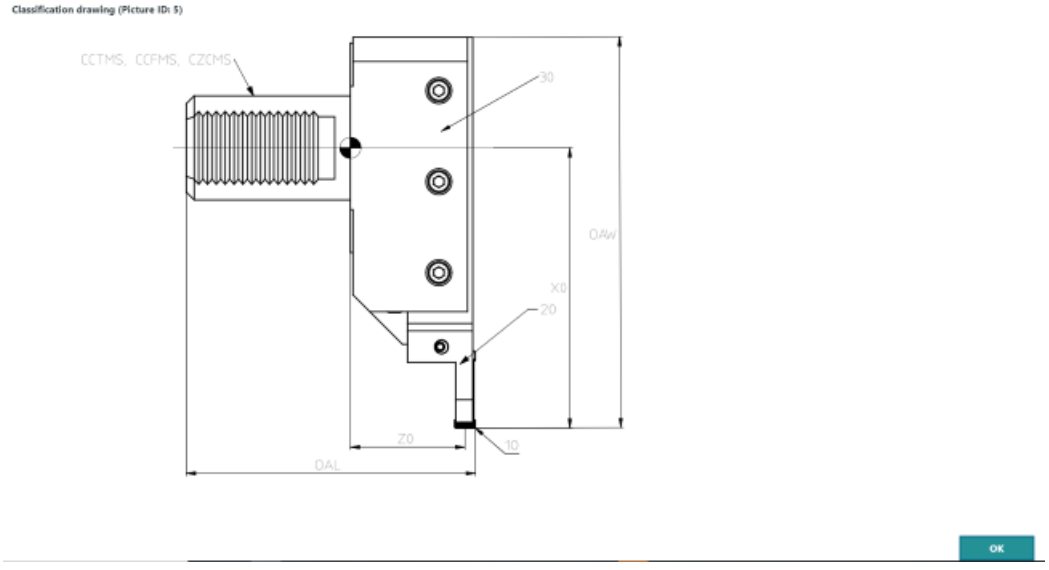
*These variables are only available if transformation values are defined for an unconnected machine.

Procedure

1. The "<Tool name>" window opens.
2. Click on the "Data of cutting edges" tab.
   You see all of the information about the tools cutting edges.
   Cutting edges are listed above the screen in different tabs.



3. Click on the classification drawing on the right to open it in a separate popup window.
   - Click on the "OK" button to close the popup window.
   - If the classification drawing is not available for the selected picture ID, the following warning message is displayed: "The picture belonging to the selected picture ID is not yet available!"



Bounding box

In the "<Tool name>" window in the "Bounding box" tab, you can see the space that the tool requires.

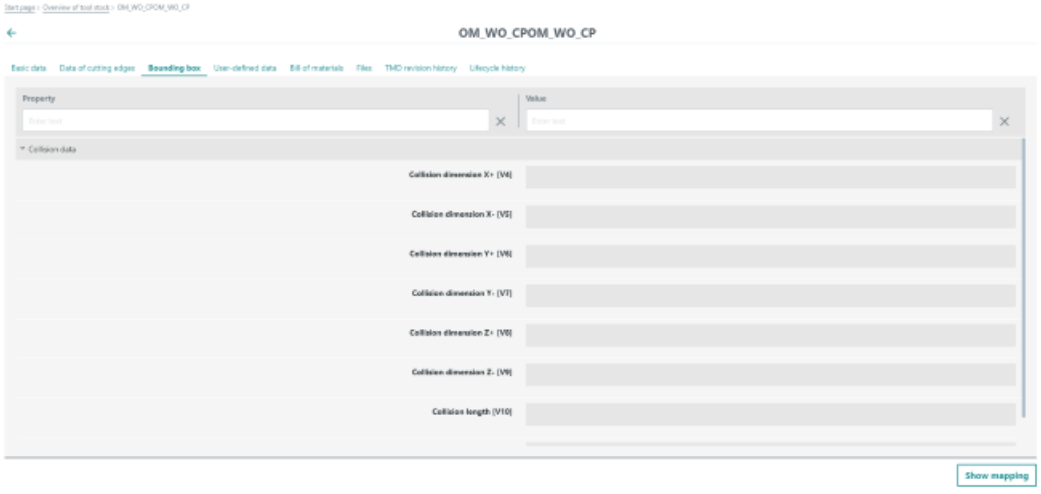
Parameters

The following data are displayed:

Parameter	Description
Collision data	
Collision dimension X+ [V4], X- [V5], Y+ [V6], Y- [V7], Z+ [V8], Z- [V9]	Shows the collision related to X, Y and Z dimensions.
Collision length [V10]	Shows the collision length.
Collision diameter [V3]	Shows the collision diameter.

Procedure

1. The "<Tool name>" window opens.
2. Click on the "Bounding box" tab.
   You see all of the information about the tool.



User-defined data

You can see additional tool data in the "<Tool name>" window in the "User defined data" tab.

Parameter

The following data are displayed:

Parameter	Description
Attribute	For master data 5 generic attributes are available. These attributes are used to support SINUMERIK data model. • Tool size left in half places • Tool size right in half places • Tool size above in half places • Tool size under in half places • Place type in magazine You can create additional attributes with SWAGGER UI. For more information, see Creating attribute names (Page 948).
Value	Shows the value of the attribute.

Procedure

1. The "<Tool name>" window opens.
2. Click on the "User defined data" tab.
   You see all of the user-defined information about the tool.

Bill of materials

You can see additional tool data in "<Tool name>" window in the "Bill of materials" tab.

Parameter

The following data are displayed:

Parameter	Description
Tool Components (<number of tool components>)	
ID of tool component	Shows the identifier of the tool component.
DIN-Norm — Tabular layouts of properties	Shows the identifier of corresponding DIN norm.
PictureID — Base	Shows the picture identifier of selected DIN norm. Depending on the selected DIN norm there can be two parameters: • PictureID — Base (Machine-Side) • PictureID — Base (Workpiece-Side)
Quantity	Shows the number of tool components used in tool.

Procedure

1. The "<Tool name>" window opens.
2. Click on the "Bill of materials" tab.
   You see all components of this tool.

Files

You can see files that belong to the tool master data in the "<Tool name>" window in the "Files" tab. You can download these files to the operating PC.
For more information about uploading or deleting files, see Adding files (Page 209).

Parameters

The following parameters are available:

Parameter	Description
File name	Name of the file that was added
File type	File extension Every file type is supported.
File size (KB)	Size of the file Every file may be a maximum of 50 MB.
Uploaded on	Date of the upload
	Loads the file to the standard download directory of the Internet browser.

Procedure

1. The "<Tool name>" window opens.
2. Click on the "Files" tab.
   You see all files of tool.

Lifecycle history

You can see which life cycles the selected tool has passed when this tool was created, loaded, unloaded, assembled, measured.

You can switch the information on and off by using the close cross next to the tag.

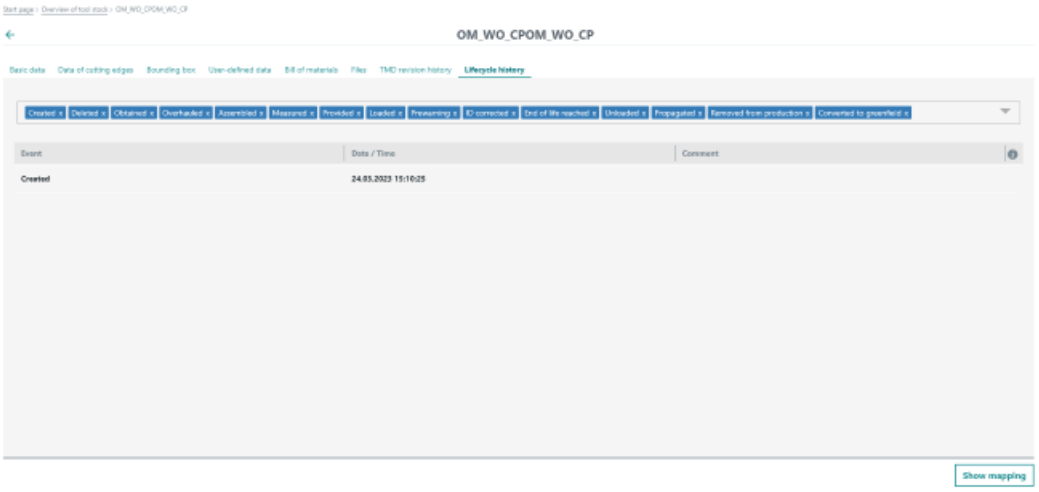
All events also display date and time. Events can display more than one time because the tool can be loaded and unloaded to different machines.

Parameters

Parameter	Description
Event	Event type which occurred for this tool In Provide tools: • Created: The tool was created. • Deleted: The tool was disassembled. You can only see the deleted state with direct http request or using swagger. • Obtained: The tool was moved from "To be obtained" column. • Overhauled: The tool was moved from "To be overhauled" column. • Assembled: The tool was moved from "To be assembled" column to the right. • Measured: The tool was moved from "To be measured" column to "To be provided" column, or tool was moved from To be obtained or to be overhauled column directly to "To be provided" column. • Provided: The tool was moved to a cabinet in finish provision. On the machine: • Loaded: The tool was loaded into the magazine • Unloaded: The tool was unloaded from the magazine • Prewarning: The lifetime of the tool reached the warning limit. • ID corrected: – A tool was created on the server and placed into a cabinet. On the machine in offline state, an identical tool is created with a different name and loaded into the magazine. The machine is online again. It detects that the new tool in the magazine does not exist on the server. – Solution: Machine > offline handling > fix ID button > rename the tool. The server gets the information that the tool in the magazine is the one that was created earlier on the server. – Converting a brownfield tool to a greenfield tool also triggers this event. • EndOfLife: the lifetime of the tool reached the lifetime limit or the tool is blocked. Other: • Propagated: The tool master data were edited. The modifications were propagated to existing tools. • Removed from production: The tool was relocated to assembly on the server in tool stock or on the machine by unloading it to assembly. • Converted to greenfield: The tool was created on the machine via Standard Tool management, not via MMR Tools. On the server, in tool stock, a matching TMD is assigned to the tool.
Date / Time	Date and time for the event. Date and time for the events from a machine are using the date and time of the machine and not of the server.
Comment	Comment which was given by the user when unloading a tool or comment where the tool was loaded to
	If you click the "i" symbol, further information is displayed of how many events are shown.

Procedure

1. The "<Tool name>" window opens.
2. Click on the drop-down list to select tags.
   - OR -
   Click on the close cross of the desired tag to deselect the tag.



5.6.2.3 SINUMERIK Controller View

SINUMERIK_Default is the only default mapping provided for the new DIN 4000 - 180 based data mode, with Mcenter installation.

You can define your own mappings and Ui descriptors.

Basic data

The tool data is displayed in the "<Tool name>" window in the "Basic data" tab.

Parameters

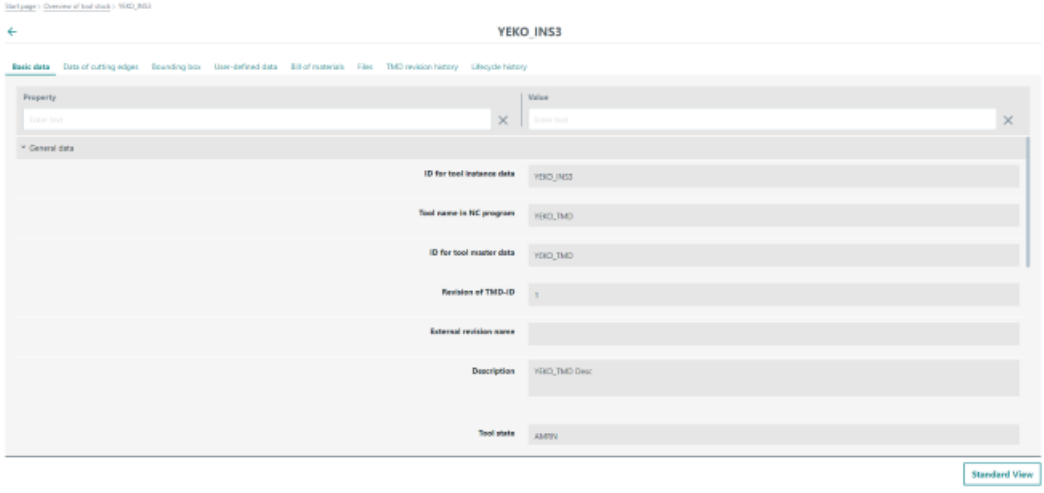
Depending on the tool, you are shown e.g. the following data:

Parameter	Description
General data	
ID for tool instance data	Shows the identifier for tool instance data.
Tool name in NC program	Shows the tool name in the NC program.
ID for tool master data	Shows the identifier for tool master data.
Revision of TMD-ID	Revision number.
External revision name	Shows the external revision name.
Description	Shows an additional description for the master data.
Tool state	Shows the status.
Location	Shows the storage location.
Desired Duplo No.	Shows the desired duplo number.

Parameter	Description
Duplo No.	Shows the duplo number.
Sinumerik Tool state	Shows the current state of SINUMERIK Tool.
Basic technological data	
Max. revolution	Shows the maximum speed (rpm).
Max. acceleration	Shows the maximum acceleration (rps^2).
Place type in magazine	Shows the magazine location type.
Order related information	
Supplier	Shows the supplier.
Identifying order-number [J21]	Shows the order number.
⚠	Indicates that there is currently no connection to the machine. The displayed data may be out of date. For more information about offline handling, see Creating tools on an offline machine (Page 524).

Procedure

1. Click on the underlined name of the tool in the "Overview of tool stock" window.
2. The "<Tool name>" window > "Basic data" tab opens.
   You see all the information about the tool.



Data of cutting edges

In the "Data of cutting edges" tab in the "<Tool name>" window, you can see the data for the cutting edges.

Parameter

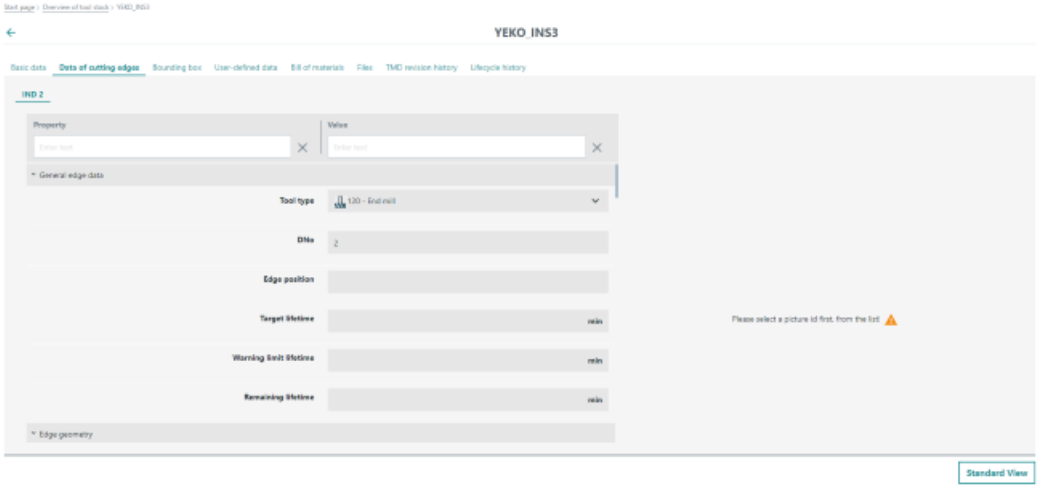
Depending on the tool, you see for example following data:

Parameter	Description
General Edge Data	
Tool type	Shows the symbol and the tool type name.
DNo	The cutting edge number DNo can be entered in exponential notation, e. g. 1e1.
Edge position	Shows the edge position.
Target lifetime	Shows the tool life in minutes for the service life of the tool.
Warning limit lifetime	Shows the tool life in minutes for the warning limit.
Remaining lifetime	Shows the residual tool life in minutes.
Edge Geometry	
Expected/ Tolerance/ Actual/ Adapter Length 1 to 3	Shows the geometry of the following adapter lengths 1 to 3: • Expected adapter length • Tolerance adapter length • Actual adapter length
Expected/ Tolerance/ Actual/ TC_DP25	Shows the geometry of the following TC_DP25: • Expected TC_DP25 • Tolerance TC_DP25 • Actual TC_DP25
Expected/ Tolerance/ Actual/ Angle 1	Shows the geometry of the following angle 1: • Expected angle 1 • Tolerance angle 1 • Actual angle 1
Expected/ Tolerance/ Actual/ Angle 2 for tapered milling tools	Shows the geometry of the following angle 2 for tapered milling tools: • Expected angle 2 • Tolerance angle 2 for tapered milling tools • Actual angle 2
Expected/ Tolerance/ Actual/ Wear Corner radius	Shows the geometry of the following corner radius: • Expected corner radius • Tolerance corner radius • Actual corner radius • Wear corner radius
Expected/ Tolerance/ Actual/ Wear Radius	Shows the geometry of the following radius: • Expected radius • Tolerance radius • Actual radius • Wear radius

Parameter	Description
Expected/ Tolerance/ Actual/ Wear Length 1 to 5	Shows the geometry of the following lengths 1, 2, 3, 4, 5: • Expected length • Tolerance length • Actual length • Wear length
Expected/ Tolerance/ Actual/ free cutting angle	Shows the geometry of the following free cutting angles: • Expected free cutting angle • Tolerance free cutting angle • Actual free cutting angle
	If you click the "i" symbol, further information is displayed.

Procedure

1. The "<Tool name>" window opens.
2. Click on the "Data of cutting edges" tab.
   You see all of the information about the tools cutting edges.
   Cutting edges are listed above the screen in different tabs.



Bounding box

In the "<Tool name>" window in the "Bounding box" tab, you can see the space that the tool requires.

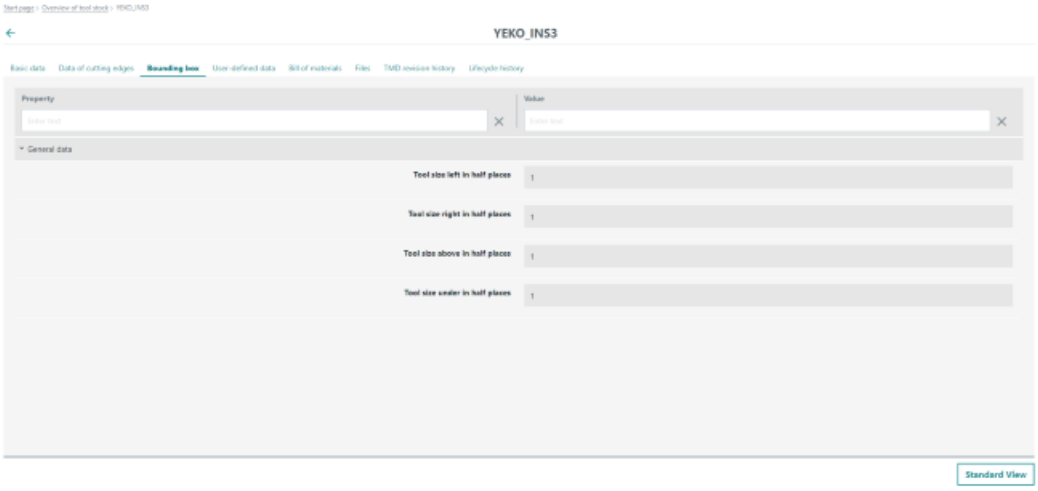
Parameters

The following data are displayed:

Parameter	Description
All tool size attributes	Show the integer value between 1 and 7.
Tool size under in half places	The default value is 1. If it is not explicitly set and the Place size of the magazine is specified (as described in section 5.18.1 of the Overview of Configure MMR Tools), the program will check the "Collision dimension Y+ [V7]" parameter of the standard data set. If it is set, the value will be rounded up to the nearest whole number obtained by dividing [V7] by the place size. If this parameter is not set, the program will check the "Collision diameter [V3]" parameter of the standard data set. If it is set, the value will be rounded up to the nearest whole number obtained by dividing [V3]/2 by the place size.
Tool size above in half places	The default value is 1. If it is not explicitly set and the Place size of the magazine is specified (as described in section 5.18.1 of the Overview of Configure MMR Tools), the program will check the "Collision dimension Y- [V6]" parameter of the standard data set. If it is set, the value will be rounded up to the nearest whole number obtained by dividing [V6] by the place size. If this parameter is not set, the program will check the "Collision diameter [V3]" parameter of the standard data set. If it is set, the value will be rounded up to the nearest whole number obtained by dividing [V3]/2 by the place size.
Tool size left in half places	The default value is 1. If it is not explicitly set and the Place size of the magazine is specified (as described in section 5.18.1 of the Overview of Configure MMR Tools), the program will check the "Collision dimension X- [V5]" parameter of the standard data set. If it is set, the value will be rounded up to the nearest whole number obtained by dividing [V5] by the place size. If this parameter is not set, the program will check the "Collision diameter [V3]" parameter of the standard data set. If it is set, the value will be rounded up to the nearest whole number obtained by dividing [V3]/2 by the place size.
Tool size right in half places	The default value is 1. If it is not explicitly set and the Place size of the magazine is specified (as described in section 5.18.1 of the Overview of Configure MMR Tools), the program will check the "Collision dimension X+ [V4]" parameter of the standard data set. If it is set, the value will be rounded up to the nearest whole number obtained by dividing [V4] by the place size. If this parameter is not set, the program will check the "Collision diameter [V3]" parameter of the standard data set. If it is set, the value will be rounded up to the nearest whole number obtained by dividing [V3]/2 by the place size.

Procedure

1. The "<Tool name>" window opens.
2. Click on the "Bounding box" tab.
   You see all of the information about the tool.



User-defined data

You can see additional tool data in the "<Tool name>" window in the "User defined data" tab.

Parameter

The following data are displayed:

Parameter	Description
Attribute	For master data 5 generic attributes are available. These attributes are used to support SINUMERIK data model. • Tool size left in half places • Tool size right in half places • Tool size above in half places • Tool size under in half places • Place type in magazine You can create additional attributes with SWAGGER UI. For more information, see Creating attribute names (Page 948).
Value	Shows the value of the attribute.

Procedure

1. The "<Tool name>" window opens.
2. Click on the "User defined data" tab.
   You see all of the user-defined information about the tool.

Bill of materials

You can see additional tool data in "<Tool name>" window in the "Bill of materials" tab.

Parameter

The following data are displayed:

Parameter	Description
Tool Components (<number of tool components>)	
ID of tool component	Shows the identifier of the tool component.
DIN-Norm — Tabular layouts of properties	Shows the identifier of corresponding DIN norm.
PictureID — Base	Shows the picture identifier of selected DIN norm. Depending on the selected DIN norm there can be two parameters: • PictureID — Base (Machine-Side) • PictureID — Base (Workpiece-Side)
Quantity	Shows the number of tool components used in tool.

Procedure

1. The "<Tool name>" window opens.
2. Click on the "Bill of materials" tab.
   You see all components of this tool.

Files

You can see files that belong to the tool master data in the "<Tool name>" window in the "Files" tab. You can download these files to the operating PC.
For more information about uploading or deleting files, see Adding files (Page 209).

Parameters

The following parameters are available:

Parameter	Description
File name	Name of the file that was added
File type	File extension Every file type is supported.
File size (KB)	Size of the file Every file may be a maximum of 50 MB.
Uploaded on	Date of the upload
	Loads the file to the standard download directory of the Internet browser.

Procedure

1. The "<Tool name>" window opens.
2. Click on the "Files" tab.
   You see all files of tool.

Lifecycle history

You can see which life cycles the selected tool has passed when this tool was created, loaded, unloaded, assembled, measured.

You can switch the information on and off by using the close cross next to the tag.

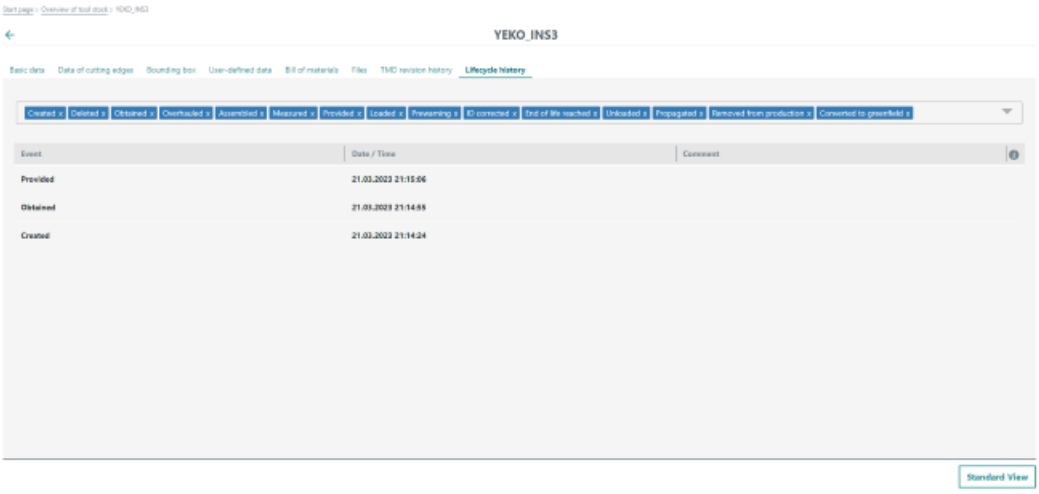
All events also display date and time. Events can display more than one time because the tool can be loaded and unloaded to different machines.

Parameters

Parameter	Description
Event	Event type which occurred for this tool In Provide tools: • Created: The tool was created. • Deleted: The tool was disassembled. You can only see the deleted state with direct http request or using swagger. • Obtained: The tool was moved from "To be obtained" column. • Overhauled: The tool was moved from "To be overhauled" column. • Assembled: The tool was moved from "To be assembled" column to the right. • Measured: The tool was moved from "To be measured" column to "To be provided" column, or tool was moved from To be obtained or to be overhauled column directly to "To be provided" column. • Provided: The tool was moved to a cabinet in finish provision. On the machine: • Loaded: The tool was loaded into the magazine • Unloaded: The tool was unloaded from the magazine • Prewarning: The lifetime of the tool reached the warning limit. • ID corrected: – A tool was created on the server and placed into a cabinet. On the machine in offline state, an identical tool is created with a different name and loaded into the magazine. The machine is online again. It detects that the new tool in the magazine does not exist on the server. – Solution: Machine > offline handling > fix ID button > rename the tool. The server gets the information that the tool in the magazine is the one that was created earlier on the server. – Converting a brownfield tool to a greenfield tool also triggers this event. • EndOfLife: the lifetime of the tool reached the lifetime limit or the tool is blocked. Other: • Propagated: The tool master data were edited. The modifications were propagated to existing tools. • Removed from production: The tool was relocated to assembly on the server in tool stock or on the machine by unloading it to assembly. • Converted to greenfield: The tool was created on the machine via Standard Tool management, not via MMR Tools. On the server, in tool stock, a matching TMD is assigned to the tool.
Date / Time	Date and time for the event
Comment	Comment which was given by the user when unloading a tool or comment where the tool was loaded to
	If you click the "i" symbol, further information is displayed of how many events are shown.

Procedure

1. The "<Tool name>" window opens.
2. Click on the drop-down list to select tags.
   - OR -
   Click on the close cross of the desired tag to deselect the tag.



5.6.3 Relocating tools

You can relocate tools to different storage locations in the "Overview on tool stock" window.

Prerequisite

You can only relocate measured tools.

If tools have not yet been measured, no symbol is displayed in the right-hand column.

The 'Relocate' button is only activated when the selected tools are located

- In Assembly

- OR -

- In a tool cabinet

The "Relocate" button is deactivated

- If the selected tools are in another place.
- If you have selected a brownfield tool.

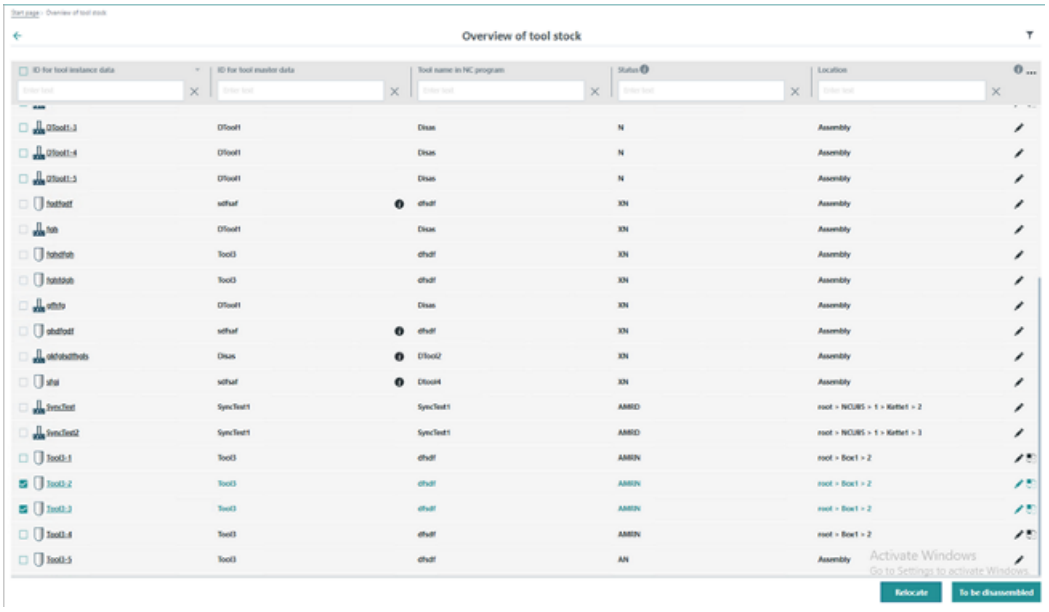
Parameter

Parameter	Description
	Relocates a tool. When a tool is selected, the checkbox, names, locations and icons in the row turn green.
ID for tool instance data	Shows the tool instance data.
Relocate	Click "Relocate" to relocate the selected tools. You must select at least one tool to activate the "Relocate" button.
To be disassembled	Click "To be disassembled" to disassemble the selected tools.
Assembly	Activate the checkbox to relocate the tool to the Assembly container.
Action flag *	Select how to proceed with the tool: • Disassemble • Overhaul • Decide further processing
Comment	Enter an optional comment
To a cabinet	Activate the checkbox to relocate the tool to a cabinet.
Cabinet *	Select the tool cabinet from the drop-down list.
Container*	Select the container from the drop-down list.

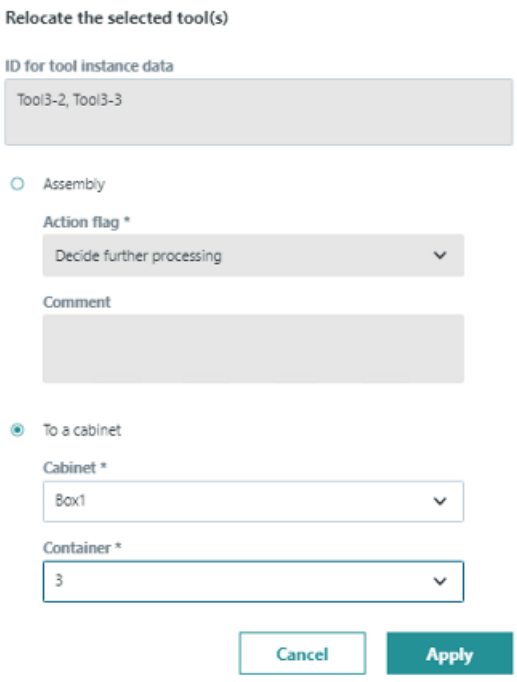
*) The fields marked with an asterisk are mandatory and must be completed.

Procedure

1. The "Overview of tool stock" window is open.
   Check the checkboxes of the tools you want to relocate.
   You have two relocation options:
   - One by one
     Click on the "Relocate" icon of the tool, on the right-hand side of the row.
   - In batches
     To relocate the selected tools, click on the "Relocate" button in the bottom-right window area.



2. The "Relocate the selected tool(s)" window opens.
   The "ID for tool instance data" of the selected tool is automatically displayed in the ID field.
   If you want to relocate the tool to the Assembly container:
   - Activate the "Assembly" option button.
   - Select how to proceed with the tool in the "Action flag" drop-down list.
   - Enter a comment if required.
3. If you want to relocate the tool to a cabinet:
   - Activate the "To a cabinet" checkbox.
   - Select the desired cabinet and the container in the drop-down lists.
4. To relocate the tool, click "Apply".
   - OR -
   Click on "Cancel" if you do not wish to relocate the tool.



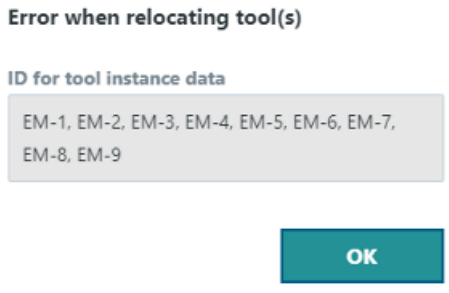
Note

Duration

It can take some minutes to relocate hundreds or thousands of tools.

Error message

In case relocating tools is not possible, the following error message appears. It contains a list of the tools which cannot be relocated.



5.6.4 Converting brownfield tools to greenfield tools

You can convert brownfield tools to greenfield tools.

Prerequisites

The following tool master data of the brownfield tool must be identical to the tool data provided on the machine:

- Tool name in NC program
- Number of edges
- Types of edges
- DNo-Type

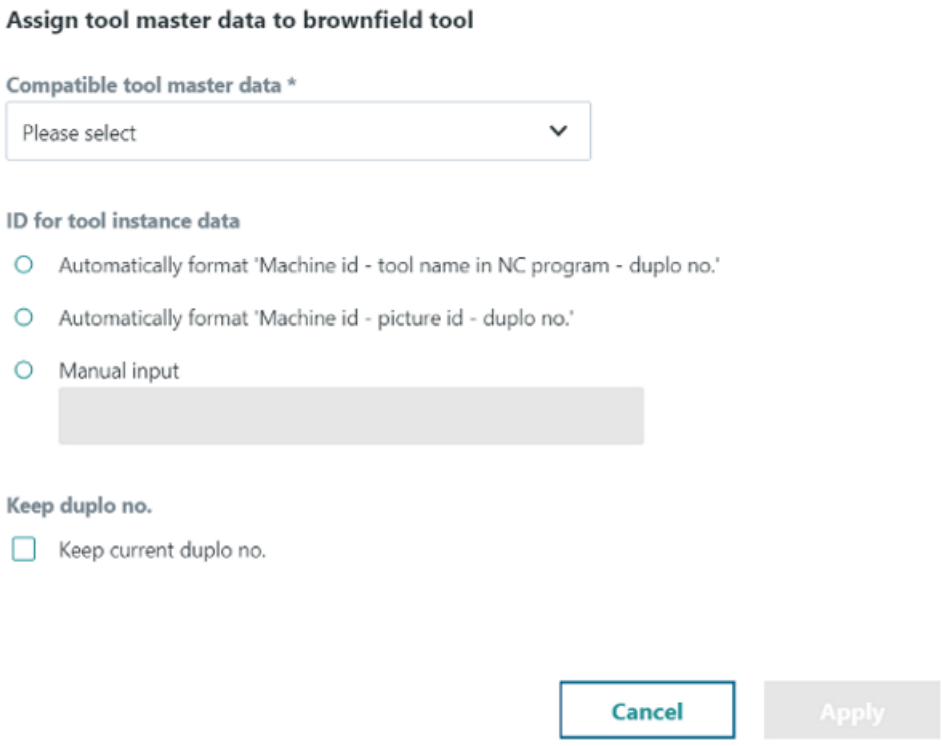
Parameters

Parameter		Description
ID for tool master data		Shows the identifier of the master data. Does not show data for brownfield tools before the conversion.
		Converts a brownfield tool to a greenfield tool.

Procedure

1. In the "Overview of tool stock" window, click on the "Edit" symbol in the "ID for tool master data" column of the desired brownfield tool.
2. The "Assign tool master data to brownfield tool" window opens.

3. Select a "Compatible tool master data" and the format for the "ID for tool instance data".
Select Manual input for providing a custom name.
Click "Apply".
- OR -
Click "Cancel" to cancel the process.



Note

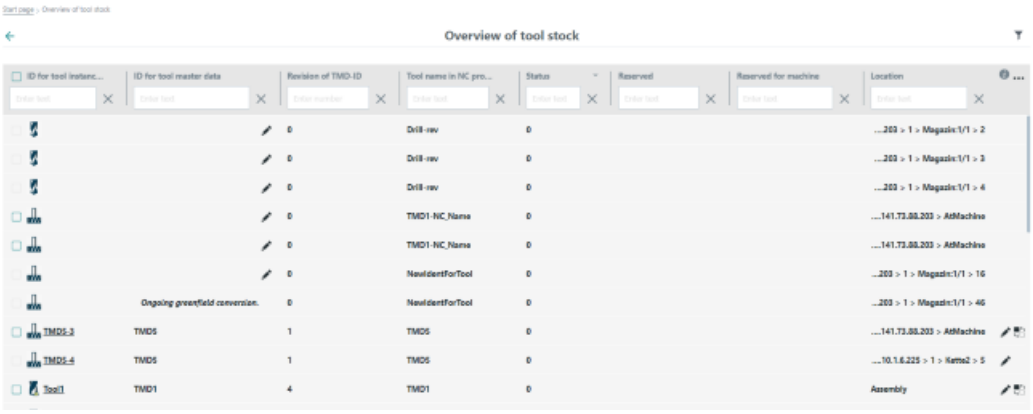
By selecting option "Keep current Duplo Nr." the desired Duplo Nr. option from server is set and the current Duplo Nr of the tool is kept for later to loads.

4. The conversion is started and shown in the "ID for tool master data" column.

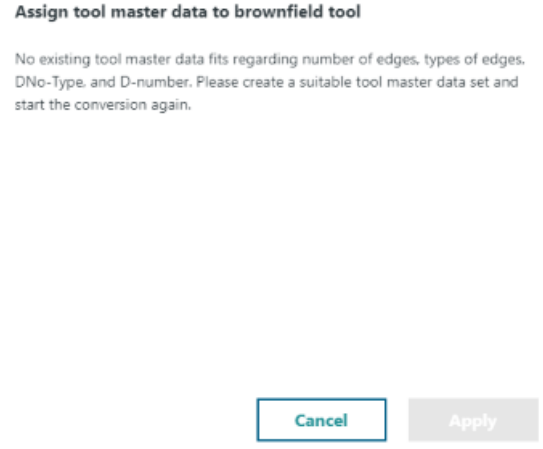
Note

Refresh with the <F5> button

The data overview is not automatically updated. Press the <F5> button to refresh the view and display the changed tool.



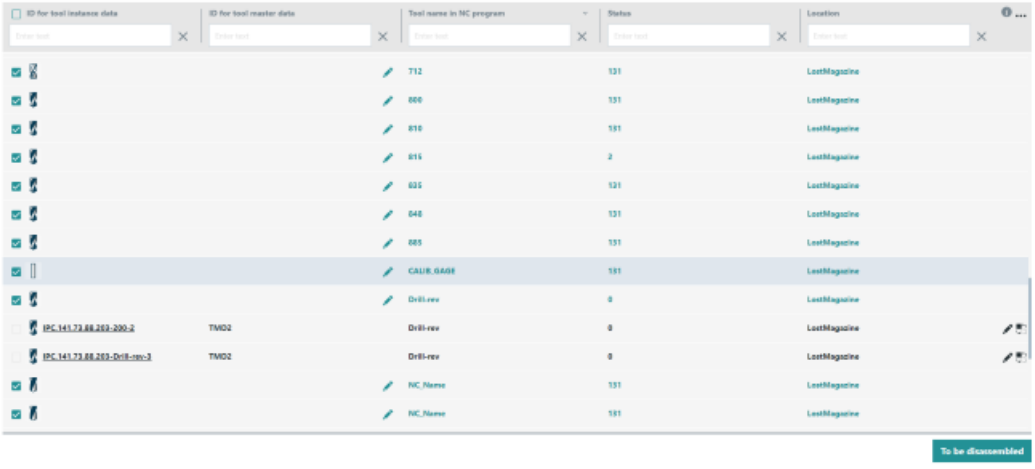
5. If no existing tool master data fits the data on the machine, the "Assign tool master data to brownfield tool" window opens with an error message.
Click "Cancel".
Create suitable tool master data and start the conversion again.



5.6.5 Disassembling tools for deleted machines

Procedure

1. Before deleting a machine, uninstall Manage MyResources /Tools. For more information, see Manage applications on machines (Page 90).
2. In the "Overview of tool stock" window, you can still see the machine and its tools that are in the inventory.
   The machine is still online, but does not send updates on the tool state.
3. Delete the machine.
4. The storage location of the corresponding tools is displayed as "LostMagazine" in the "Location" column.
5. To remove brownfield tools, activate the checkbox and click on "To be disassembled" button. The selected tools are deleted.
   To remove greenfield tools, click on "Relocate" icon. For more information, see Relocating tools (Page 185).



5.6.6 Changing reservations

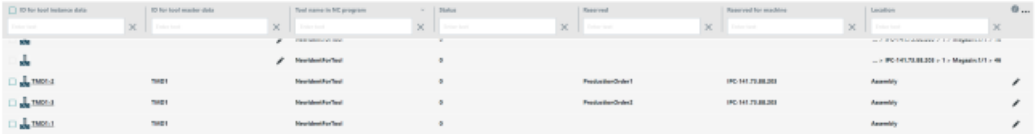
You can change the reservation of tools and you can delete reservations that are no longer needed.

Parameters

Parameter	Description
•••	Opens a window in which you select additional columns to be displayed in the overview. These columns can optionally be configured to show further information: • Lifetime (remaining/target/warning) • Unload reason • Reserved • Reserved for machine • Reachable spindle(s) • Location • Revision of TMD-ID • <User-defined attributes> The maximum of additional columns is limited to 5. The next time you log in with your user Id, the selected columns are on display.
	Opens the "Change reservation of selected tool" window to change the reservation settings.

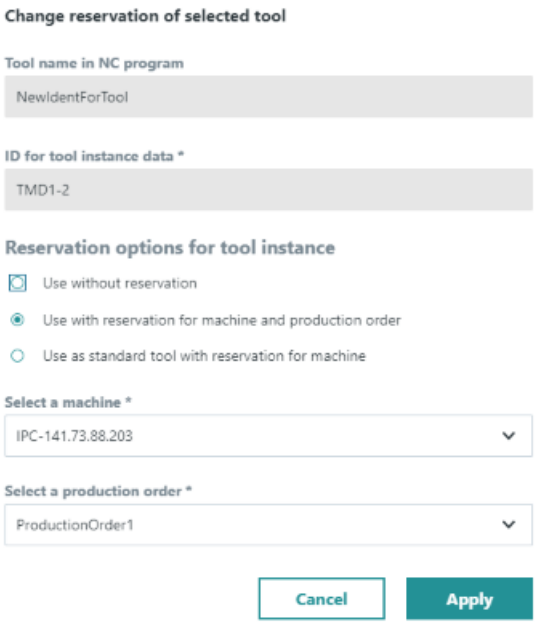
Procedure

1. If the "Reserved" and "Reserved for machine" columns are not visible in the "Overview of tool stock" window, configure the table to view the columns.



2. Click on "Edit" symbol in the last column of the desired tool.
3. The "Change reservation of selected tool" window opens.
4. If you want to change the reservation, activate one of the following option buttons:
   – "Use with reservation for machine and production order"
   - OR -
   – "Use as standard tool with reservation for machine"

5. If you want to delete the reservation, activate the "Use without reservation" option button.
6. To apply the selected reservation option for the tool, click "Apply".
   - OR -
   Click "Cancel" to cancel the process.



5.7 Tool master data

5.7.1 Overview of tool master data

The "Overview of tool master data" window shows an overview of the created tool master data. You can sort the individual columns in the overview.

You can create, edit, copy and delete master data.

Parameter

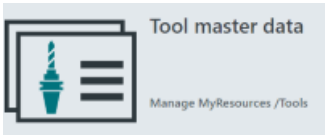
The following information is displayed:

Parameter	Description
∨	This symbol appears when you click on the column heading. Click on the symbol to sort the elements alphabetically/numerically, either in ascending or descending order.
ID for tool master data	Shows the Identifier of the master data with a symbol. If all cutting edges are of the same type, the symbol of the tool type is displayed, otherwise a standard (default) symbol is displayed. Shows the name of the tool plan. Click the link to display the detailed information within the open window. If you press the right mouse button, you open the drop-down list. You can • open a new window - OR - • open a new tab In the latter case, you do not need to reload the "Overview of tool master data" page. For more information, see Tool master data details (Page 198).
Current revision	Shows the updated number of revisions.
	Indicates that there is no OEM data for the current revision. See Overview of OEM data sets (Page 298).
Tool name in NC program	Shows the name of the tool in the NC program.
State	Displays the status.
Last change	Shows the date of the last change in the format "dd.mm.yyyy".
Supplier	Shows the supplier.
Description	Displays a description of the tool.
Order number	Shows the order number.
Max. revolution	Shows the maximum speed.
Max. acceleration	Displays the maximum acceleration.
Number of cutting edges	Displays the number of cutting edges.
<User-defined attributes>	Displays the user-defined attributes.
	Shows the number of listed tool master data.

Parameter	Description
...	Opens a window in which you select the columns to be displayed in the overview. These columns can optionally be configured to show further information: • Supplier • Description • Order number • Max. revolution • Max. acceleration • Number of cutting edges • Tool size (above, under, left, right) in half places • <User-defined attributes> The maximum of additional columns is limited to 5. The next time you log in with your user Id, the columns you selected are displayed.
	Copies the master data of a previously created data set.
	Opens the "My Filters" window and filters tool master data according to the following criteria: • ID for tool master data • Current revision • Tool name in NC program • State • Last change • Supplier • Description • Order number • Max. revolution • Max. acceleration • Number of cutting edges • <User-defined attributes> For more information, see List filtering (Page 46). Click on the filter icon again to close the filter window.

Procedure

1. On the start page of the Mcenter, click on "Tool master data".



   - OR -
   Open the following URL: Tool master data (https://{ServerIP}/mmr/tools/masterdata)

2. The "Overview of tool master data" window opens, and displays all created tool master data.

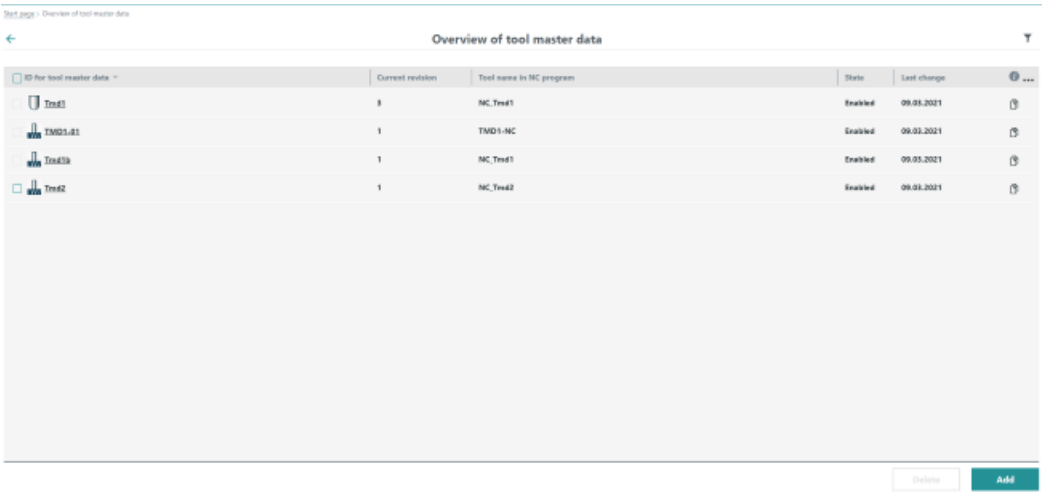
   Note

   Refresh with the <F5> button

   When you reduce the window size, the icons on the right-hand side disappear. Press the <F5> button to refresh the view and display the symbol.

3. To copy the data set of previously created tool master data:
   - Click on "Copy" symbol.
   - Enter name of new tool master data.
   - Click "Apply".
     The new created tool master data are opened in view mode.
   - If necessary, click "Edit" to switch to edit mode and change the copied entries.
   - Navigate back to the overview page.

4. Click "Add" to create new tool master data.
   - OR -
5. Click on the underlined name to edit existing tool master data.
   The "<ID for tool master data>" window opens and you can edit tool master data in the different views:
   – Standard View (Page 199)
   – SINUMERIK Controller View (Page 212)



5.7.2 Tool master data details

5.7.2.1 Select mapping

In the Tool master data details of "Tool master data", you can select different mappings for the tool related information:

- Standard View
- SINUMERIK Controller View
  - OR -
- any other mapping that you have created, if the Ui descriptor files are provided. .

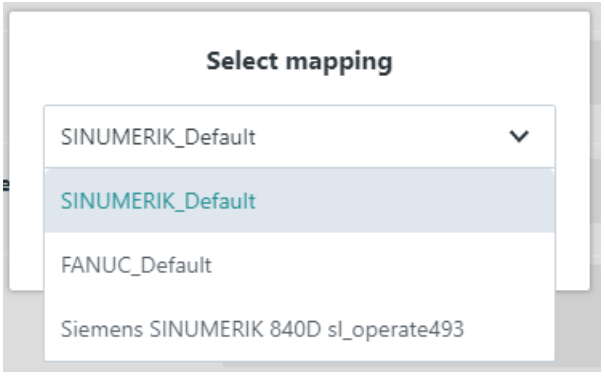
When opening the "<ID for tool master data>" window, the "Standard View" is the default view.

Procedure

1. Click on the underlined name of the tool in the "Overview of tool master data" window.
2. The "<ID for tool master data>" window opens.

3. Click on the "Show mapping" button in the bottom-right window area.

4. The "Select mapping" window opens. Select the "SINUMERIK Controller View" to change the mapping.



5. The "Show mapping" button is changed to "Standard View" button. If you want to return to Standard View, click on the "Standard View" button.

5.7.2.2 Standard View

Creating or editing tool master data

You can create new tool master data or change this data in "<ID for tool master data>" window under the "Basic data" tab.

You can change master data independent of whether instances already exist.

If instances exist, changes made to the master data are inherited to the instance or overwritten, provided the tool is not yet in the machine. This means the tool is either still in the presetting, being transported, in a cabinet or being disassembled.

Parameters

The following parameters are available:

Parameter	Description
General data	
ID for tool master data	Shows the identifier for the tool master data.
Revision of TMD-ID	Revision number.
State	Shows the status.
Tool name in NC program	Shows the tool name in NC program.
Description	Shows an additional description for the master data.

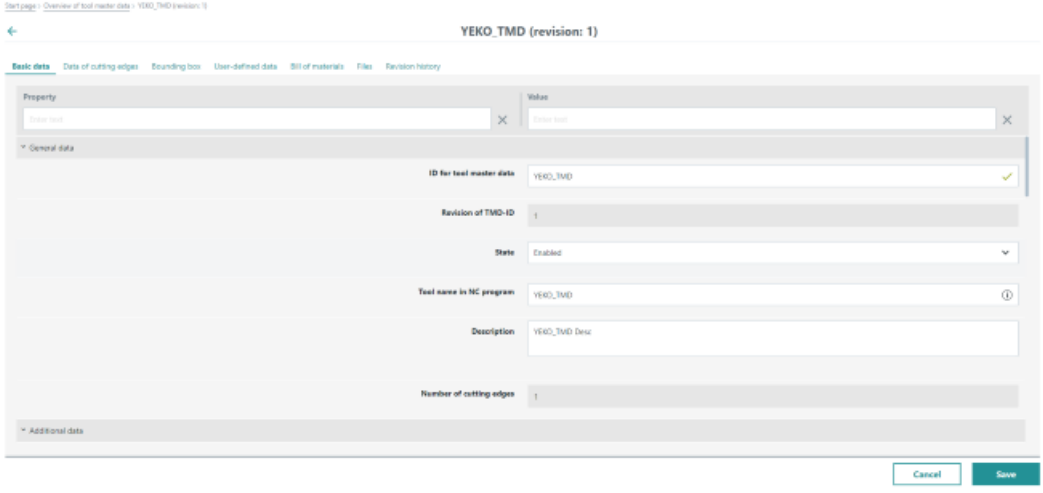
Parameter	Description
Number of cutting edges	Displays the number of cutting edges.
Additional data	
Rotation speed max [D6]	Shows the maximum rotation speed (rpm).
Max acceleration [D6_ACC]	Shows the maximum acceleration (rps^2).
Balancing quality [D5]	Shows the balancing quality.
Cooling lubricant entrance [H21]	Shows the cooling lubricant entrance.
Drive diameter [C47], size [C43], type [C41]	Shows the drive related measures.
Lock [C49]	Displays the lock.
Mass [D7]	Displays the mass.
Mounting execution, machine-side [C14]	Shows Mounting related informations.
Mounting form, machine-side [C12]	
Mounting size, machine-side [C2]	
Mounting species, machine-side [C15]	
Mounting type, machine-side [C11]	
Normnumber characteristic identifier [NSM]	Displays the normnumber characteristic identifier.
Number adjustment dimensions [A01]	Shows the number adjustment dimensions.
Number of adjustment options [A08]	Shows the number of adjustment options.
Number of drives [C44]	Shows the number of drives.
Product name [J22]	Displays product name.
Product description [J23]	Displays product description.
Replacement coding, torque support [J51]	Shows the replacement coding, torque support.
Separation point coding, machine-side [J6]	Shows the separation point coding, machine-side.
Separation point coding, machine-side in accordance with ISO TS 13399-60 [J61]	Shows the separation point coding, machine-side in accordance with ISO TS 13399-60.
Separation point, drive [J9]	Shows the separation point, drive.
Tilting moment [M8]	Shows the tilting moment.
Extension length [V1]	Shows the length of extension.
Projection length, tool assemblies [V2]	Shows the projection length, tool assemblies.
Total length [B5]	Shows the total length of tool.
Total width [B91]	Shows the total width of tool.
Marker for rare tool [ISRARE]	Can be chosen as "No" or "Yes".
Supplier	Shows the supplier.

Parameter	Description
Identifying order-number [J21]	Displays the Identifying order number.
⚠	Indicates that there is currently no connection to the machine. The displayed data may be out of date. For more information about offline handling, see Creating tools on an offline machine (Page 524).

*) The fields marked with an asterik are mandatory and must be completed. An error message is output if you make an erroneous entry.

Procedure

1. Open the "Basic data" tab in "<ID for tool master data>" window.
2. Click "Edit".
   The input fields are released for changes and additions.
3. Enter the required information.
4. The "Save" button can only be selected if the mandatory fields of all tabs are filled.
   Specify all the data for at least one cutting edge.
   Click "Save" to create or change the tool data.
   In the top-right window area, you receive the message "Master data set has been successfully saved".
   - OR -
   Click "Cancel" to discard the entries.
   A prompt appears asking whether you want to discard the changes.
   – Click "No, return to site", if you want to save the changes.
   – Click "Yes, leave the site", if you want to reset the changes.



Creating or editing cutting edge data

In the "<ID for tool master data>" window in the "Data of cutting edges" tab, create or edit the cutting edge data for the tool.

Prerequisite

The mandatory fields in the "Basic data" tab must be filled to save master data.

At least one cutting edge must be created in order to save master data.

Parameter

The following parameters are available:

Parameter	Description
General data	
Picture ID [BLD]	Shows the ID of picture displayed on the right.
Cutting Edge index [IND]	Shows the Cutting Edge index.
Tool material type [H11]	Shows the tool material type.
Target tool life time [T10]	Shows the target tool life time.
Target tool life time warning limit [T10W]	Shows the target tool life time warning limit.
Cutting edge position [T13]	Shows the cutting edge position.
Coolant pressure [K15]	Shows the coolant pressure.
Machining method [J8]	Shows the machining method.
Expected geometry data	
Expected adjustment dimension X[X0], Y[Y0], Z[Z0]	Shows the expected adjustment dimensions for X, Y and Z.
Expected blade Diameter [A1]	Shows the expected blade Diameter.
Expected cutting radius [D1]	Shows the expected cutting radius.
Expected cutting edge length [A5]	Shows the cutting edge length.
Expected cutting insert width [G2]	Shows the expected cutting insert width.
Expected cutting edge angle [E1]	Shows the expected cutting edge angle.
Expected tip angle [E44]	Shows the expected tip angle.
Tolerance of geometry data	
X [X011], X [X010], Y [Y011], Y [Y010], Z [Z011], Z [Z010]	Shows the tolerance values for lower/upper adjustment dimensions X, Y and Z.

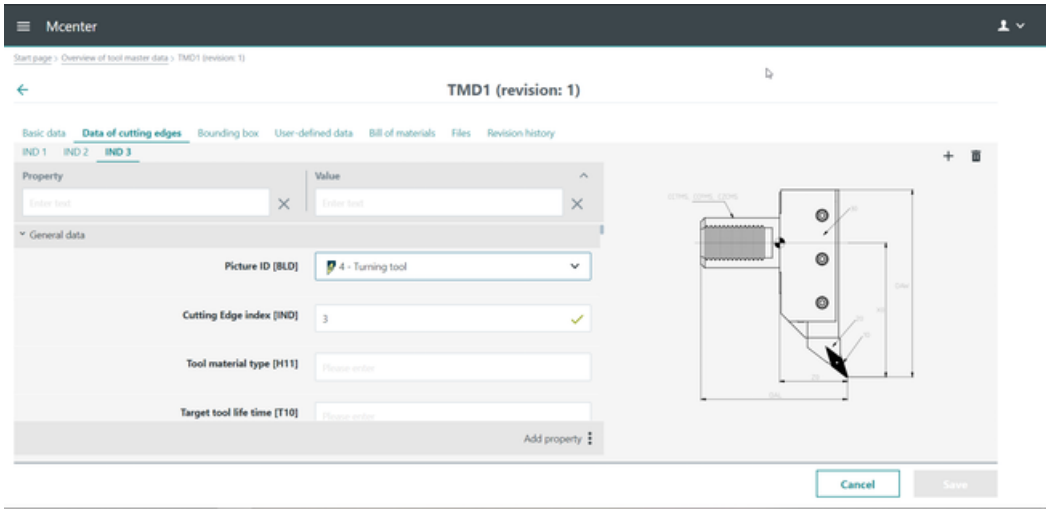
Parameter	Description
lower blade diameter [A111], upper blade diameter [A110], lower cutting radius [D111], upper cutting radius [D110], lower cutting edge length [A511], upper cutting edge length [A510], lower cutting insert width [G211], upper cutting insert width [G210], lower cutting edge angle [E111], upper cutting edge angle [E110], lower tip angle [E4411], upper tip angle [E4410]	Shows the tolerance related measures.
Additional data	
Corner angle [E3]	Shows the corner angle.
Cutting direction [F1]	Shows the cutting direction.
Cutting insert angle left [B2]	Shows the cutting insert angle left.
Cutting insert design [E7]	Shows the cutting insert design.
Cutting width min. [B11]	Shows the minimum cutting width.
Feeler element diameter [A2]	Shows the feeler element diameter.
Holder rotation angle A axis [E30], B axis [E31], C axis [E32]	Shows the holder rotation angle for axis A, B and C.
Insert angle right [B1]	Shows the insert angle right.
Mounting tolerance class, machine-side [C16]	Shows the mounting tolerance class, machine-side.
Nominal thread diameter, as fraction [D36], Inch [D35], metrisch [D34]	Shows the nominal thread diameter as fraction, inch and metrisch.
x-axis [A05], y-axis [A06], z-axis [A07]	Shows the number swivel angle around X, Y and Z-axis.
Plunge angle, max. [E40]	Shows the maximum plunge angle.
Profile distance X [A9], Y [A91]	Shows the profile distance.
Setting angle [E10]	Shows the setting angle.

Parameter	Description
Swivel angle X1 [X1], X2 [X2], X3 [X3], X4 [X4] Y1 [Y1], Y2 [Y2], Y3 [Y3], Y4 [Y4] Z1 [Z1], Z2 [Z2], Z3 [Z3], Z4 [Z4]	Shows the swivel angle for X, Y and Z related values.
Thread pitch [D32] max. [A62], min. [A61]	Shows the maximum, minimum and current thread pitch.
Thread type [D31]	Shows the thread type.
Tolerance, 1st stage [A81] last stage [A84]	Shows the tolerance for first and last stage.
Profile shape [J28]	Shows the profile shape.
User Defined Data	
	Shows further information, e.g. what you must observe for the input. You can only edit user defined edge data that are configured for the corresponding Tool Master Data.

Procedure

1. Open the "Data of cutting edges" tab in "<ID for tool master data>" window.
2. Click "Edit".
   The input fields are released for changes and additions.
3. Enter the required information.
   To create more than one cutting edge for the tool, use "+".
   To delete a cutting edge use

4. Click "Save" to create or change the cutting edge data.
   The message "Tool master data was saved successfully" appears in the top-right window area.
   - OR -
   Click "Cancel" to discard the entries.



5. Click on the classification drawing on the right to open it in a separate popup window.
   - Click "OK" to close the popup window.
   - If the classification drawing is not available for the selected picture ID, the following warning message is displayed: "The picture belonging to the selected picture ID is not yet available!"
   - If no picture ID is selected, the following message is displayed: "Please select a picture id first, from the list!".

Creating or editing dimensions

In "<ID for tool master data>" window in the "Bounding box" tab, create or edit the space required for the tool.

Prerequisite

The mandatory fields in the "Basic data" tab must be filled to save master data.

At least one cutting edge must be created.

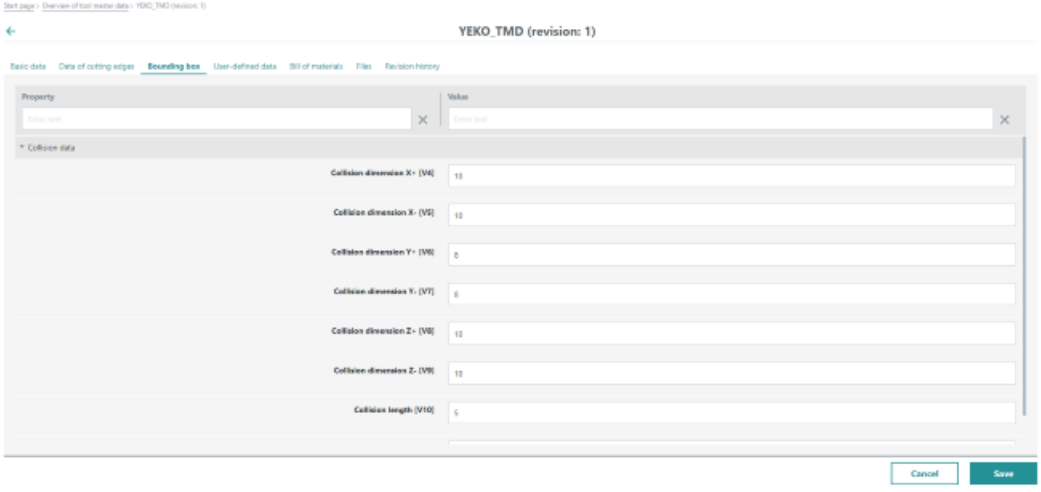
Parameters

The following parameters are available:

Parameter	Description
Collision data	
Collision dimension X+ [V4], X- [V5], Y+ [V6], Y- [V7], Z+ [V8], Z- [V9]	Shows the Collision related to X, Y and Z dimensions.
Collision length [V10]	Shows the collision length.
Collision diameter [V3]	Shows the collision diameter.

Procedure

1. Open the "Bounding box" tab in "<ID for tool master data>" window.
2. Click "Edit".
   The input fields are released for changes and additions.
3. Define the necessary space requirement of the tools.
4. Click "Save" to create or change the dimensions data.
   The message "Tool master data was saved successfully" appears in the top-right window area.
   - OR -
   To discard the entries, click "Cancel".



Creating or editing user-defined data

In "<ID for tool master data>" window in the "User defined Data" tab, create or edit additional tool data.

Parameters

The following parameters are available:

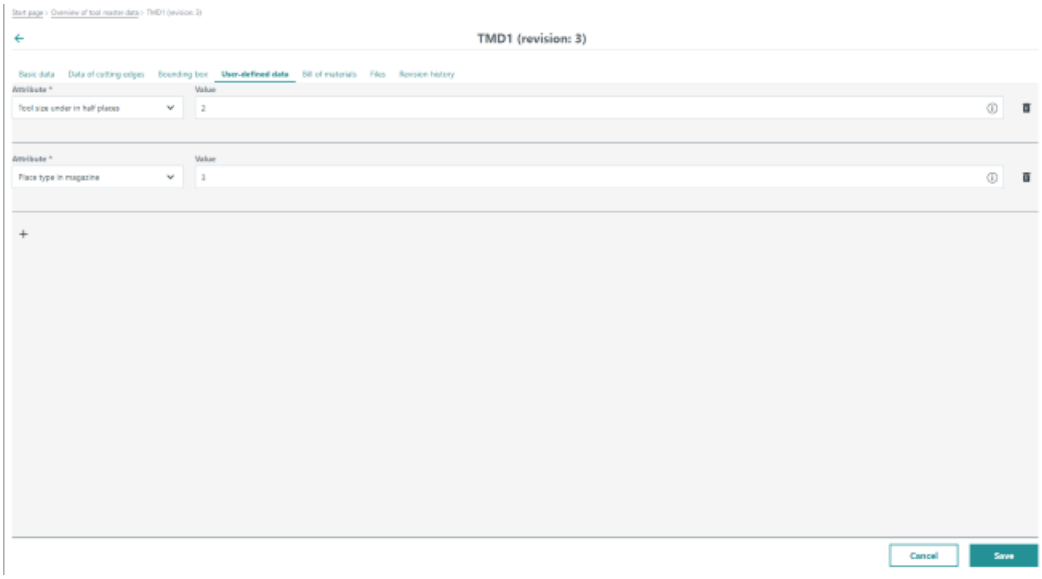
Parameter	Description
Attribute *	Select the attribute from the drop-down list. The default attribute "Place type in magazine" is available to support the SINUMERIK data model. You can also create an attribute with the SWAGGER UI. For more information, see Creating attribute names (Page 948). The meaning of the newly created attribute is not defined. This allows using variables with defined values in Manage MyResources /Tools.
Value	Enter the value of the attribute. A maximum of 50 characters can be entered.
Value provided by TMD	You can overwrite or keep the values in the "Value" field in the "Provide tools" function. For more information, see Create tool (Page 242).
ⓘ	Shows further information, for example what you must observe for the input.
🗑	Deletes the attribute and the value.
+	Create further attributes. A maximum of 10 attributes can be created.

*) The fields marked with an asterisk are mandatory and must be completed. An error message is output if you make an erroneous entry.

Procedure

1. Open the "User defined data" tab in "<ID for tool master data>" window.
2. Click "Edit".
   The input fields are released for changes and additions.
3. Select the desired attribute and enter the corresponding value.

4. Click on symbol "+" to add further attributes.
5. The "Save" button can only be selected if the mandatory fields of all tabs are filled. Enter all the data for at least one cutting edge.
   Click "Save" to create or change the user-defined data.
   - OR -
   click "Cancel" to discard the entries.



Creating or editing bill of materials

In "<ID for tool master data>" window in the "Bill of materials" tab, add or delete tool components to/from bill of materials.

Parameters

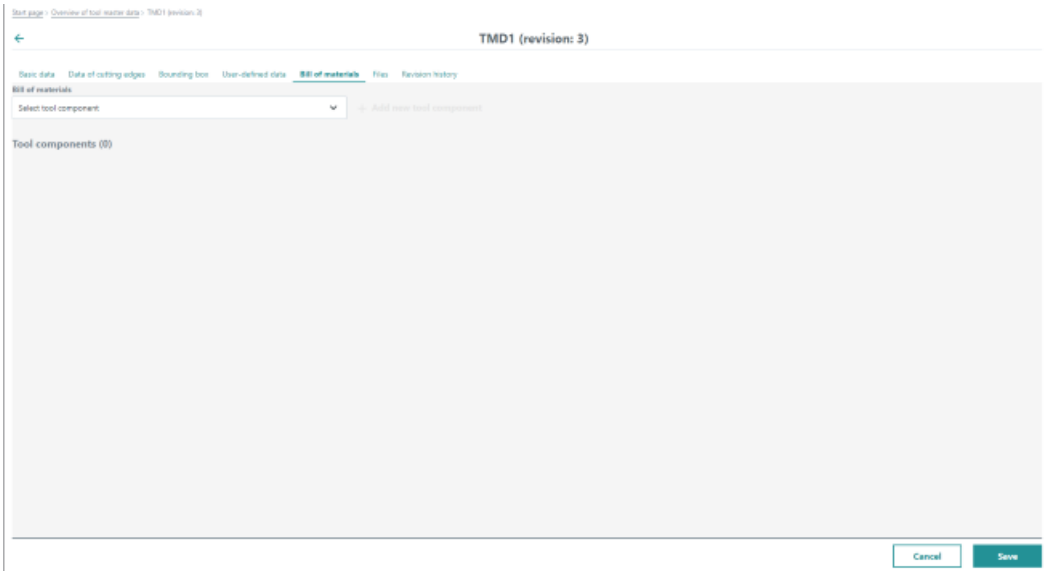
The following parameters are available:

Parameter	Description
Bill of materials	Select tool component from drop-down list.
Tool Components (<number of tool components>)	
ID of tool component	Shows the identifier of the component.
DIN-Norm — Tabular layouts of properties	Shows the identifier of corresponding DIN norm.
PictureID — Base	Shows the picture identifier of selected DIN norm. Depending on the selected DIN norm there can be two parameters: • PictureID — Base (Machine-Side) • PictureID — Base (Workpiece-Side)
Quantity	Select the number of tool components from the spin box.

Parameter	Description
🗑	Deletes the tool component from bill of materials.
+	Adds new tool component to bill of materials.

Procedure

1. Open the "Bill of materials" tab in "<ID for tool master data>" window.
2. Click "Edit".
   The input fields are released for changes and additions.
3. Select the desired tool component from drop-down list.
4. Click on symbol "+ Add new tool component" to add the selected tool component to the bill of materials.
5. Enter the required quantity.
6. The "Save" button can only be selected if the mandatory fields of all tabs are filled. Enter all the data for at least one cutting edge.
   Click "Save" to create or change the bill of materials.
   - OR -
   click "Cancel" to discard the entries.



Adding files

In window "<ID for tool master data>", in tab "Files", load up to 10 files for the tool to the database. This means that files are available on every operating PC.

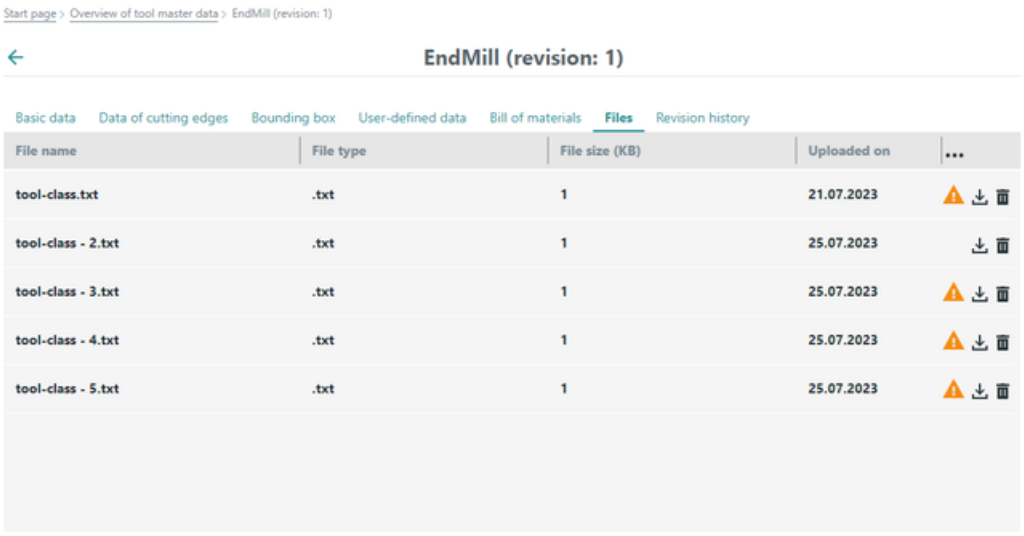
Parameters

The following parameters are available:

Parameter	Description
File name	Name of the file that was added
File type	File extension Every file type is supported.
File size (KB)	Size of the file Every file may be a maximum of 50 MB.
Uploaded on	Date of the upload.
Virus scan (optional)	The actual status according to latest virus scan result. For the time being it can be one of the followings: • Missing file content • No valid scan result • Safe • Not safe • Scan disabled
	If this alert shows, it means that the file is not downloadable as the virus protection has some problem with the file. The tooltip gives hints why the download is disabled It can be one of the followings: • The content of the file does not exist • The file hasn't been scanned yet or the scan result has been expired • The virus scan found some malwares in the file
	Loads the file to the standard download directory of the Internet browser.
	Deletes the file from the database.

Procedure

1. Open the "Files" tab in "<ID for tool master data>" window.
2. Click on "Add".
3. Navigate to the required file.
4. Click on "Open" to load the selected file to the data base.



Swagger UI

You also have the option of loading the files to the database using Swagger-UI. For more information, see Adding files to the tool master data (Page 915).

Displaying the revision history

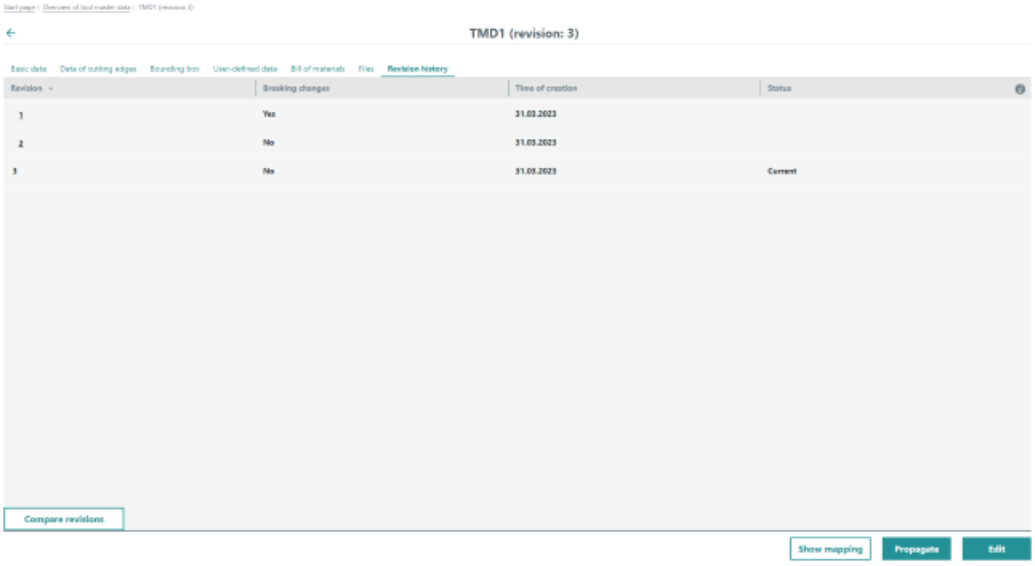
You have an overview of the revision history.

Parameters

Parameters	Description
Revision	Shows the revision number in chronological order. Click on the link to open a new browser tab with the details of the selected revision.
Breaking changes	Shows whether there are breaking changes: • Yes • No
Time of creation	Shows the creation date.
Status	Shows the status. • Current

Procedure

1. Open the "Revision history" tab in the "<ID for tool master data (revision:)>" window.
2. The "Revision history" window opens and displays the revision history data.



5.7.2.3 SINUMERIK Controller View

Creating or editing tool master data

You can create new tool master data or change this data in "<ID for tool master data>" window under the "Basic data" tab.

You can change master data independent of whether instances already exist.

If instances exist, changes made to the master data are inherited to the instance or overwritten, provided the tool is not yet in the machine. This means the tool is either still in the presetting, being transported, in a cabinet or being disassembled.

For more information see New tool instance (Page 244).

Parameters

The following parameters are available:

Parameter	Description
ID for tool master data *	Enter the identifier for tool master data. The input is limited to 250 characters.
Revision of TMD-ID	Revision number.
State *	Select the state of the tool master data set: • Enabled • Disabled

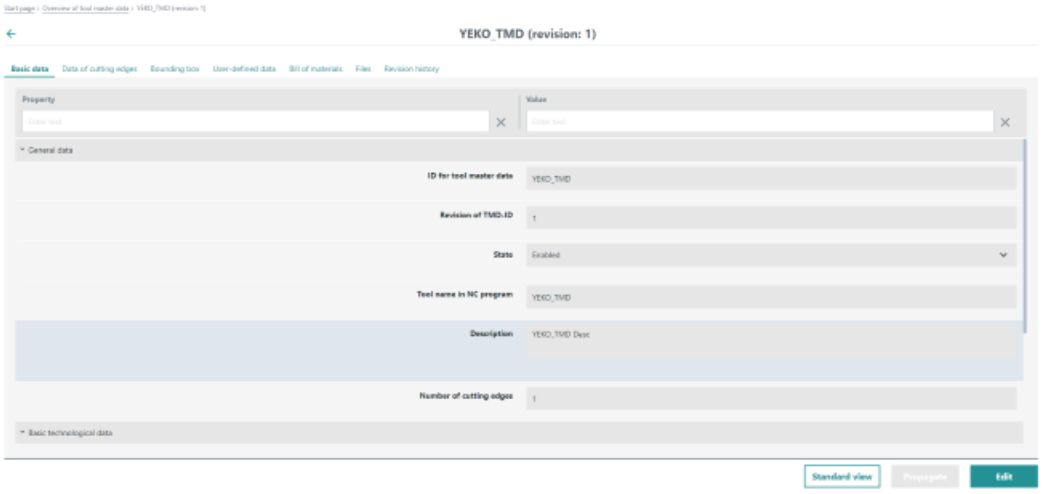
Parameter	Description
Tool name in NC program *	Enter the tool name in the NC program. The input is limited to 32 characters. The following characters are permitted for the tool name: [a...z], [A...Z], [0...9], [+ - _ . ,] Additional information on tool names in the NC program is available in the Tool Management Function Manual.
Description	Enter an additional description for the master data. A maximum of 250 characters can be entered.
Number of cutting edges	The number of cutting edges is automatically determined according to the number of created cutting edges.
Basic technological data	
Max. revolution	Enter the maximum speed (rpm).
Max. acceleration	Enter the maximum acceleration (rps^2).
Order related information	
Supplier	Enter the supplier. A maximum of 250 characters can be entered.
Order number	Enter the order number of the tool. A maximum of 250 characters can be entered.
ⓘ	Shows further information, for example what you must observe for the input.

*) The fields marked with an asterisk are mandatory and must be completed. An error message is output if you make an erroneous entry.

Procedure

1. Open the "Basic data" tab in "<ID for tool master data>" window.
2. Click "Edit".
   The input fields are released for changes and additions.

3. Enter the required information.
4. The "Save" button can only be selected if the mandatory fields of all tabs are filled.
   Specify all the data for at least one cutting edge.
   Click "Save" to create or change the tool data.
   In the top-right window area, you receive the message "Master data set has been successfully saved".
   - OR -
   Click "Cancel" to discard the entries.
   A prompt appears asking whether you want to discard the changes.
   – Click "No, return to site", if you want to save the changes.
   – Click "Yes, leave the site", if you want to reset the changes.



Creating or editing cutting edge data

In the "<ID for tool master data>" window in the "Data of cutting edges" tab, create or edit the cutting edge data for the tool.

Prerequisite

The mandatory fields in the "Basic data" tab must be filled to save master data.

At least one cutting edge must be created in order to save master data.

Parameter

The following parameters are available:

Parameter	Description
General edge data	
Tool type *	Select the tool type from the drop-down list. For more information about the available tool types, see Tool types (Page 233).

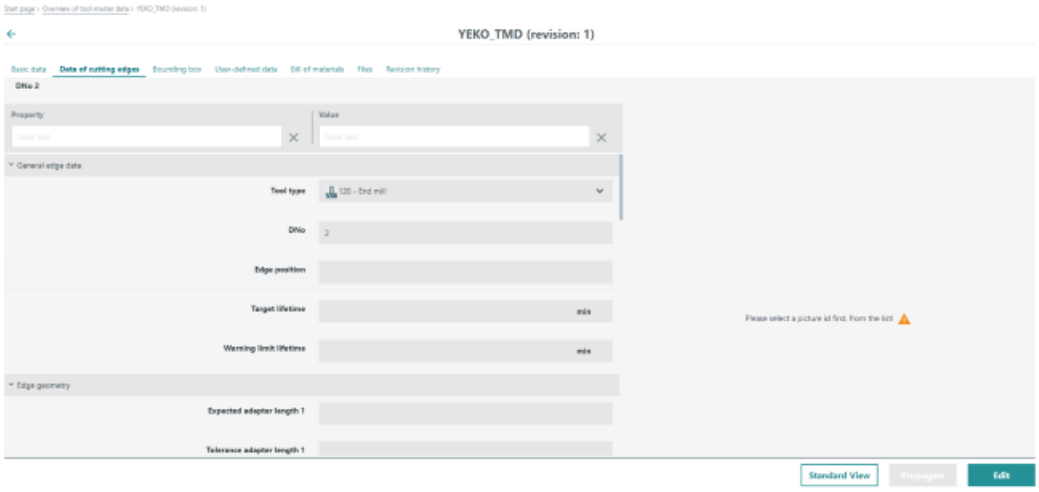
Parameter	Description
DNo *	Select a valid cutting edge number between 1 and 12 from the spin box. For SINUMERIK Operate, the input is limited to a maximum of 12 cutting edges.
Edge position	Enter the edge position.
Target lifetime	Enter the tool life in minutes for the service life of the tool. Select a value greater than or equal to 0.
Warning limit lifetime	Enter the tool life in minutes for the warning limit. Select a value greater than or equal to 0.
Edge geometry	
Expected /Tolerance adapter lengths 1 to 3	Enter the geometry of the following adapter lengths 1, 2, 3: • Expected adapter lengths • Tolerance adapter lengths
Expected /Tolerance angle 1	Enter the geometry of the following angle: • Expected angle 1 • Tolerance angle 1
Expected /Tolerance angle 2 for tapered milling tools	Enter the geometry of the following angle 2 for tapered milling tools: • Expected angle 2 • Tolerance angle 2 for tapered milling tools
Expected /Tolerance corner radius	Enter the geometry of the following corner radius: • Expected corner radius • Tolerance corner radius
Expected /Tolerance radius	Enter the geometry of the following radius: • Expected radius • Tolerance radius
Expected /Tolerance Lengths 1 to 5	Enter the geometry of the following lengths 1, 2, 3, 4, 5: • Expected length • Tolerance length
Expected /Tolerance free cutting angle	Enter the geometry of the following free cutting angle: • Expected free cutting angle • Tolerance free cutting angle
User Defined Data	
	Shows further information, e.g. what you must observe for the input.
	Creates additional cutting edges. A maximum of 12 cutting edges can be created.
	Deletes the cutting edge data.

*) The fields marked with an asterisk are mandatory and must be completed. An error message is output if you make an erroneous entry.

Procedure

1. Open the "Data of cutting edges" tab in "<ID for tool master data>" window.
2. Click "Edit".
   The input fields are released for changes and additions.

3. Enter the required information.
4. Click "Save" to create or change the cutting edge data.
   The message "Tool master data was saved successfully" appears in the top-right window area.
   - OR -
   Click "Cancel" to discard the entries.



Creating or editing dimensions

In "<ID for tool master data>" window in the "Bounding box" tab, create or edit the space required for the tool.

Prerequisite

The mandatory fields in the "Basic data" tab must be filled to save master data.

At least one cutting edge must be created.

Parameters

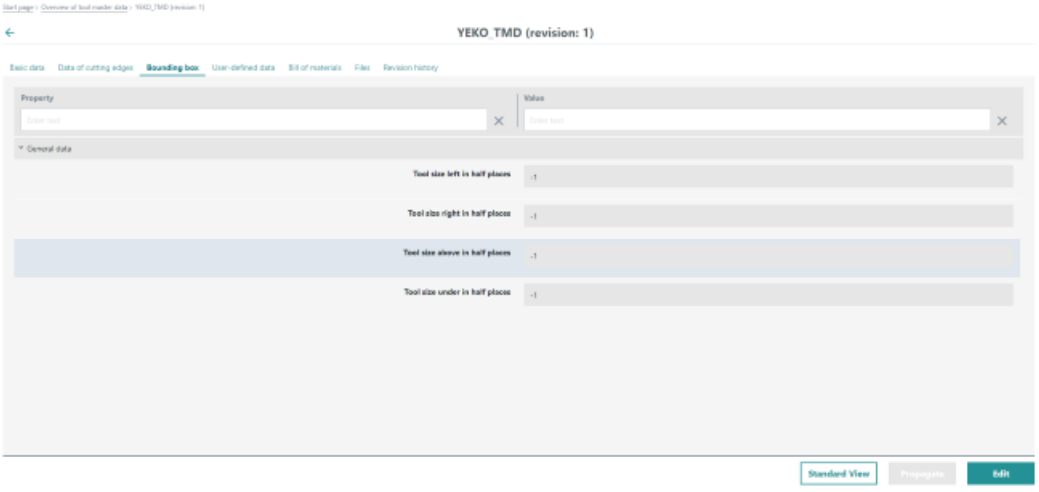
The following parameters are available:

Parameter	Description
Tool size above in half places*	Select an integer value between 1 and 7 from the spin box. "1" is specified by default.
Tool size under in half places*	
Tool size left in half places*	
Tool size right in half places*	
ⓘ	Shows further information, e.g. what you must observe for the input.

*) The fields marked with an asterisk are mandatory and must be completed. An error message is output if you make an erroneous entry.

Procedure

1. Open the "Bounding box" tab in "<ID for tool master data>" window.
2. Click "Edit".
   The input fields are released for changes and additions.
3. Define the necessary space requirement of the tools.
4. Click "Save" to create or change the dimensions data.
   The message "Tool master data was saved successfully" appears in the top-right window area.
   - OR -
   To discard the entries, click "Cancel".



Creating or editing user-defined data

In "<ID for tool master data>" window in the "User defined Data" tab, create or edit additional tool data.

Parameters

The following parameters are available:

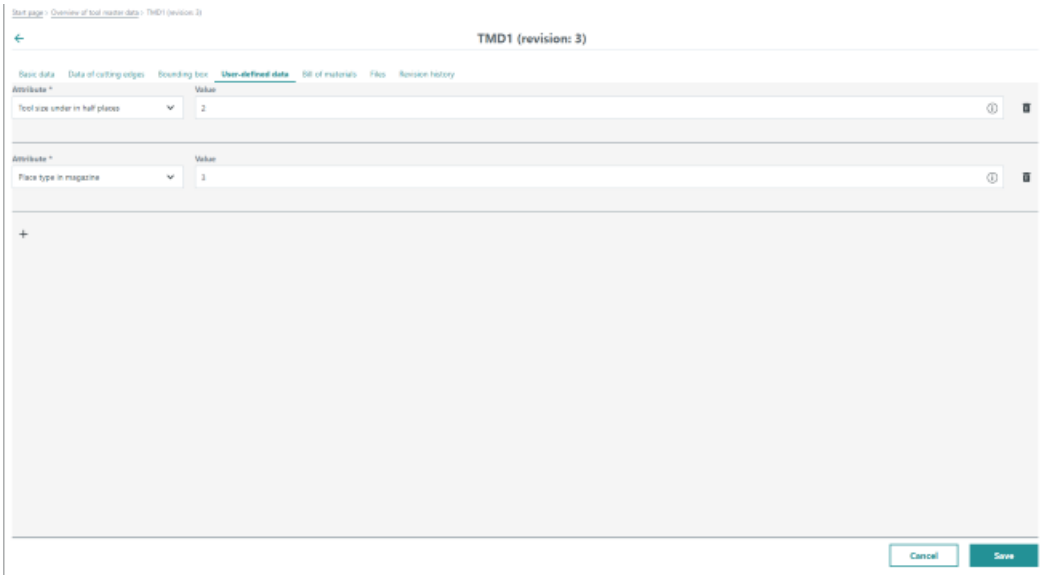
Parameter	Description
Attribute *	Select the attribute from the drop-down list. The default attribute "Place type in magazine" is available to support the SINUMERIK data model. You can also create an attribute with the SWAGGER UI. For more information, see Creating attribute names (Page 948). The meaning of the newly created attribute is not defined. This allows using variables with defined values in Manage MyResources /Tools.
Value	Enter the value of the attribute. A maximum of 50 characters can be entered.
Value provided by TMD	You can overwrite or keep the values in the "Value" field in the "Provide tools" function. For more information, see Create tool (Page 242).

Parameter	Description
ⓘ	Shows further information, for example what you must observe for the input.
🗑	Deletes the attribute and the value.
+	Create further attributes. A maximum of 10 attributes can be created.

*) The fields marked with an asterisk are mandatory and must be completed. An error message is output if you make an erroneous entry.

Procedure

1. Open the "User defined data" tab in "<ID for tool master data>" window.
2. Click "Edit".
   The input fields are released for changes and additions.
3. Select the desired attribute and enter the corresponding value.
4. Click on symbol "+" to add further attributes.
5. The "Save" button can only be selected if the mandatory fields of all tabs are filled. Enter all the data for at least one cutting edge.
   Click "Save" to create or change the user-defined data.
   - OR -
   click "Cancel" to discard the entries.



Creating or editing bill of materials

In "<ID for tool master data>" window in the "Bill of materials" tab, add or delete tool components to/from bill of materials.

Parameters

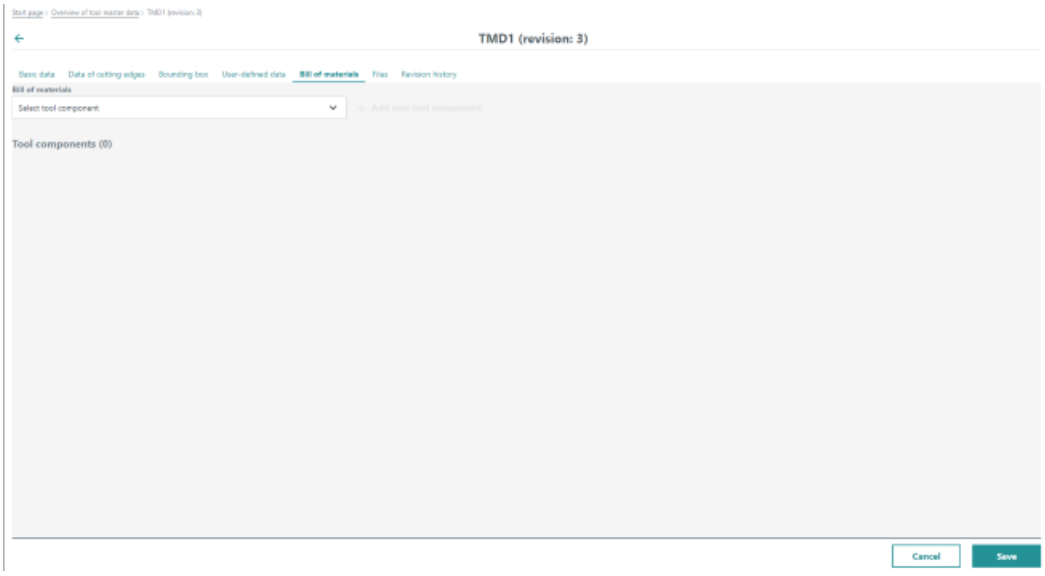
The following parameters are available:

Parameter	Description
Bill of materials	Select tool component from drop-down list.
Tool Components (<number of tool components>)	
ID of tool component	Shows the identifier of the component.
DIN-Norm — Tabular layouts of properties	Shows the identifier of corresponding DIN norm.
PictureID — Base	Shows the picture identifier of selected DIN norm. Depending on the selected DIN norm there can be two parameters: • PictureID — Base (Machine-Side) • PictureID — Base (Workpiece-Side)
Quantity	Select the number of tool components from the spin box.
🗑	Deletes the tool component from bill of materials.
+	Adds new tool component to bill of materials.

Procedure

1. Open the "Bill of materials" tab in "<ID for tool master data>" window.
2. Click "Edit".
   The input fields are released for changes and additions.
3. Select the desired tool component from drop-down list.
4. Click on symbol "+ Add new tool component" to add the selected tool component to the bill of materials.

5. Enter the required quantity.
6. The "Save" button can only be selected if the mandatory fields of all tabs are filled. Enter all the data for at least one cutting edge.
   Click "Save" to create or change the bill of materials.
   - OR -
   click "Cancel" to discard the entries.



Adding files

In window "<ID for tool master data>", in tab "Files", load up to 10 files for the tool to the database. This means that files are available on every operating PC.

Parameters

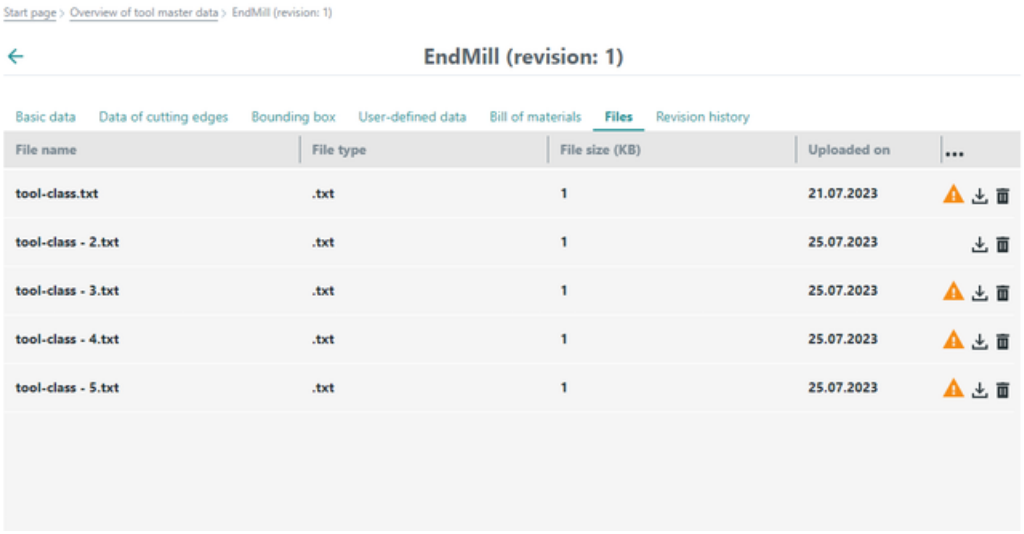
The following parameters are available:

Parameter	Description
File name	Name of the file that was added
File type	File extension Every file type is supported.
File size (KB)	Size of the file Every file may be a maximum of 50 MB.
Uploaded on	Date of the upload.
Virus scan (optional)	The actual status according to latest virus scan result. For the time being it can be one of the followings: • Missing file content • No valid scan result • Safe • Not safe • Scan disabled

Parameter	Description
	If this alert shows, it means that the file is not downloadable as the virus protection has some problem with the file. The tooltip gives hints why the download is disabled It can be one of the followings: • The content of the file does not exist • The file hasn't been scanned yet or the scan result has been expired • The virus scan found some malwares in the file
	Loads the file to the standard download directory of the Internet browser.
	Deletes the file from the database.

Procedure

1. Open the "Files" tab in "<ID for tool master data>" window.
2. Click on "Add".
3. Navigate to the required file.
4. Click on "Open" to load the selected file to the data base.



Swagger UI

You also have the option of loading the files to the database using Swagger-UI. For more information, see Adding files to the tool master data (Page 915).

Displaying the revision history

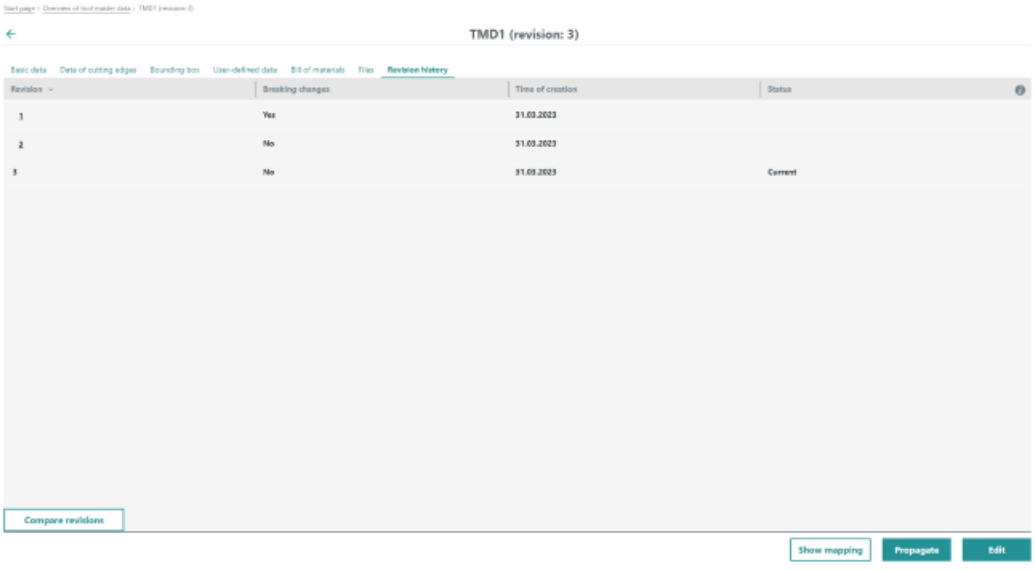
You have an overview of the revision history.

Parameters

Parameters	Description
Revision	Shows the revision number in chronological order. Click on the link to open a new browser tab with the details of the selected revision.
Breaking changes	Shows whether there are breaking changes: • Yes • No
Time of creation	Shows the creation date.
Status	Shows the status. • Current

Procedure

1. Open the "Revision history" tab in the "<ID for tool master data (revision:)>" window.
2. The "Revision history" window opens and displays the revision history data.



5.7.3 Tool master data revision

5.7.3.1 Comparing revisions

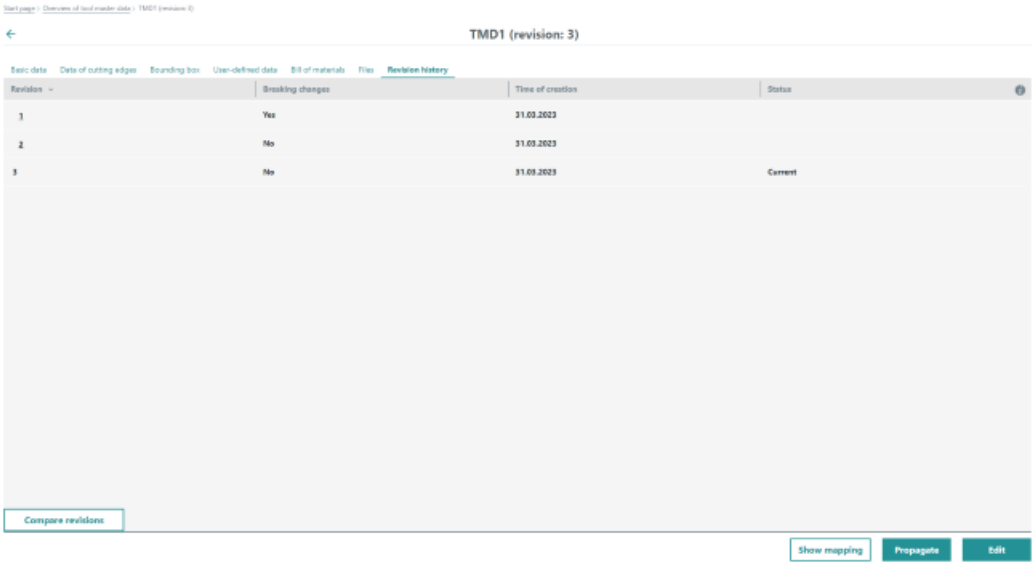
To see the differences between two revisions, you can use the "Compare revisions" function.

Parameters

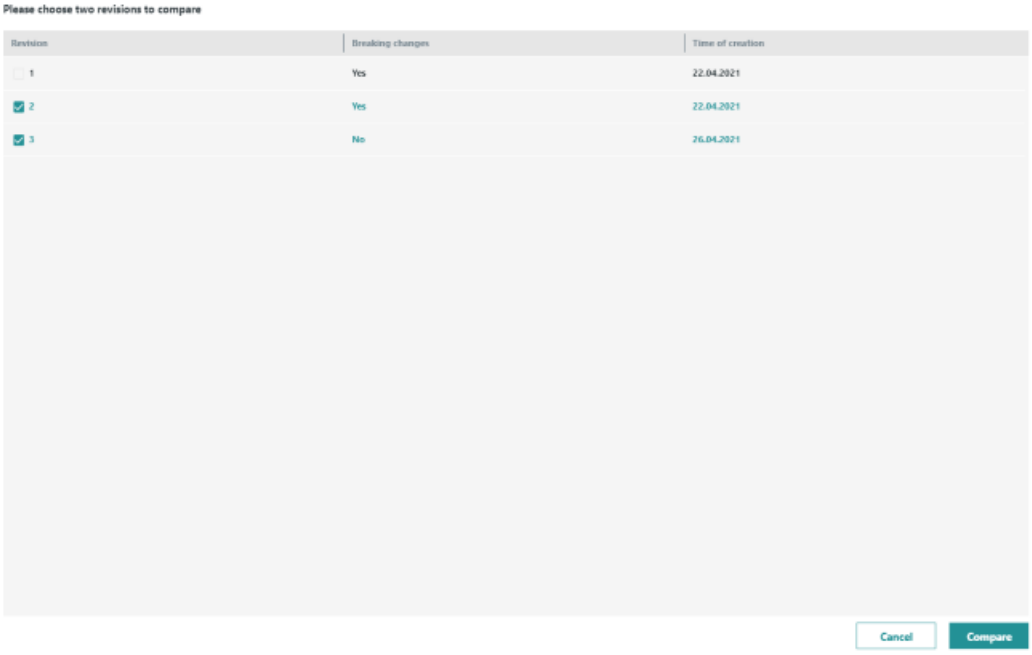
Parameter	Description
"Please choose two revisions to compare" window	
Revision	Shows the revision number.
Breaking changes	Shows whether there is a breaking change: • Yes • No
Time of creation	Shows the date of creation.
"Overview of differences between revisions" window	
Properties with differences	Shows the differing property.
Revision <number> (middle column)	Shows the value of the less recent revision.
Revision <number> (right column)	Shows the value of the more recent revision.

Procedure

1. Open the "<ID for tool master data (revision:)>" window and select the "Revision history" tab.
   Click "Compare revisions".



2. The "Please choose two revisions to compare" window opens.
   Choose two revisions and activate the respective checkboxes.
   Click "Compare".
   - OR -
   Click "Cancel" to cancel the operation.

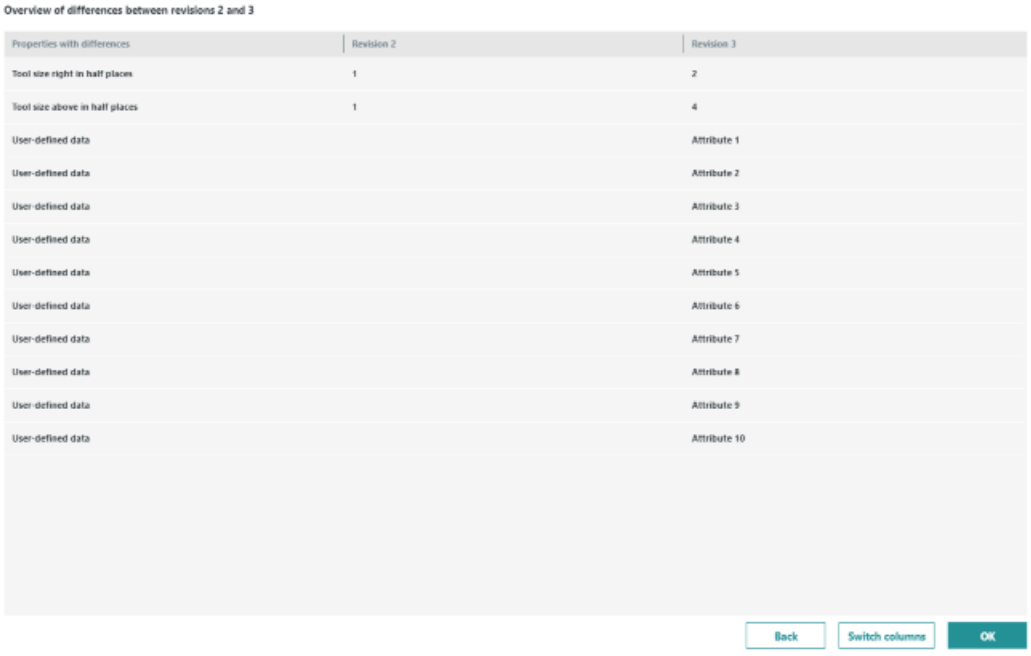


Note

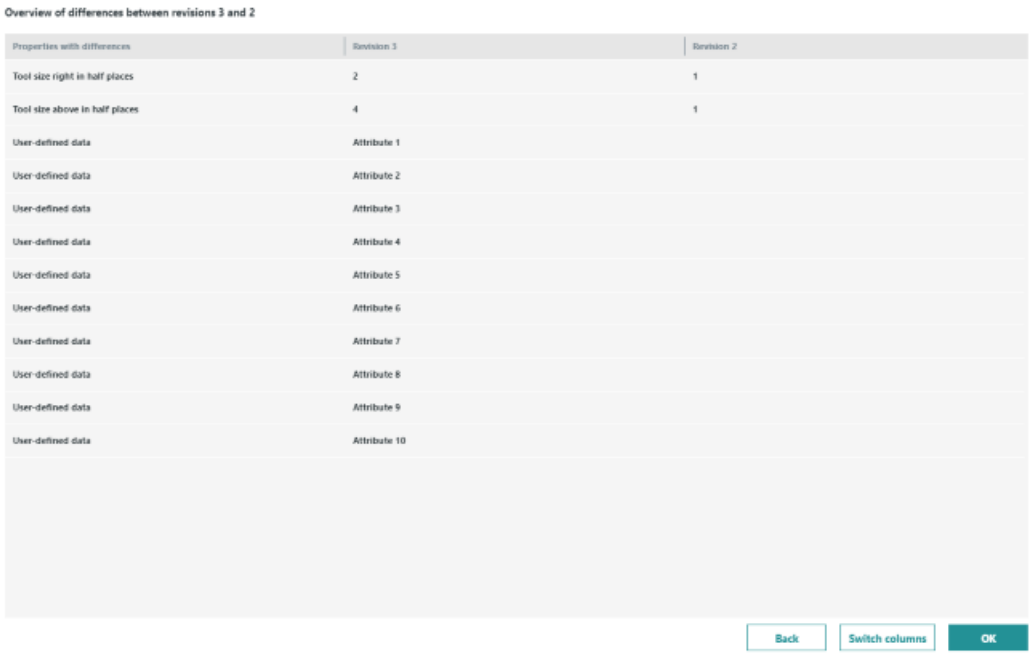
Changing your selection

If you have activated two checkboxes for a revision comparison and you want to change the selection, you first have to deselect the checkbox(es) you do not need.

3. The "Overview of differences between revisions <number> and <number>" window opens and displays a detailed comparison of the values and properties .



4. Click "Switch columns" to switch the right and the middle column.
   - OR -
   Click "Back" to go back to the "Please choose two revisions to compare" window.
   - OR -
   Click "OK" to go back to the "Revision history" window.



Note

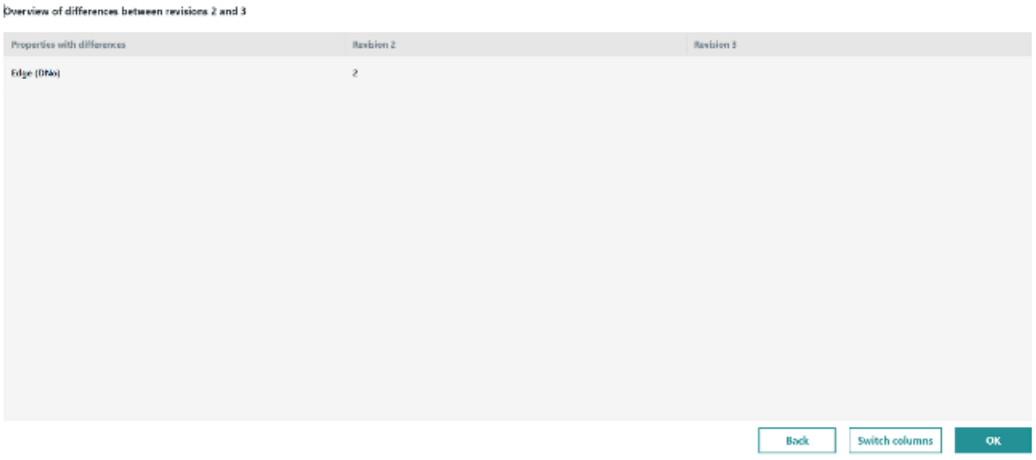
Breaking changes

When you compare revisions, you can also see whether a change is a breaking change.
In case of a breaking change, the new exchange tools for 1:1 processing tools are no longer sister tools, but replacement tools.

Examples: Revisions with empty value fields

When you compare revisions, there can be empty value fields. This is the case when no values have been set. Instead of properties, there are blanks. The values you see show the difference between Revision 1 and Revision 2.

If you delete edge 2 with Revision 3, the content of Revision 2 does not change, but the DNo field of Revision 3 is empty.



5.7.3.2 Displaying an external revision

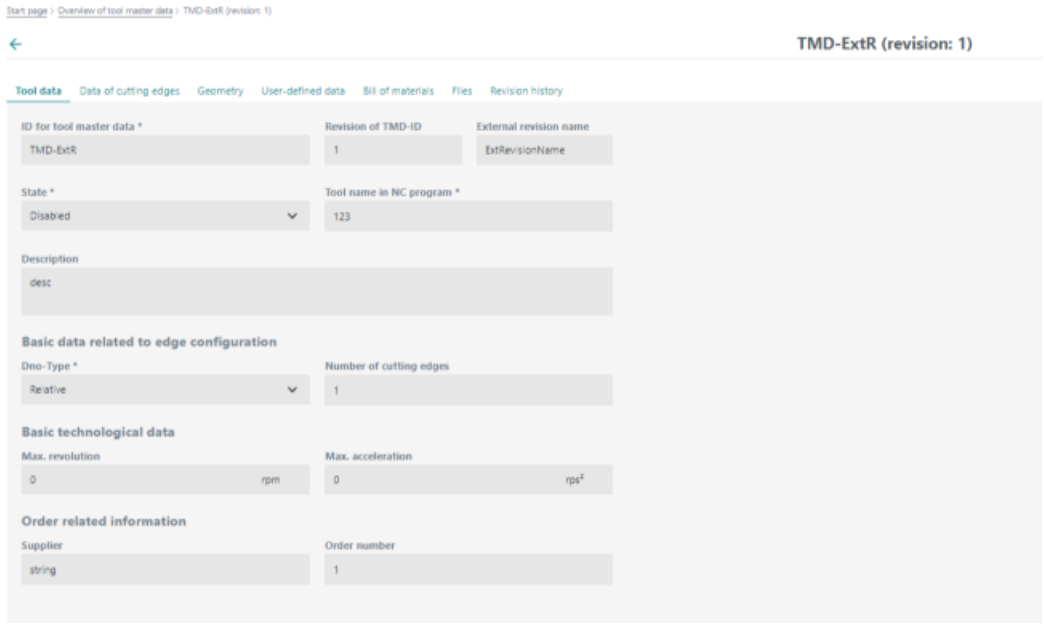
You can assign external revision names provided by external systems.

Procedure

Go to the following API endpoint:

For more information, see Import tool master data (Page 924).

Once you have created an external revision via API, an additional field with the heading "External revision name" is displayed in the "Tool data" tab.



5.7.3.3 Creating a non-breaking change

You can change the tool master data even if you have already created instances.
You have two options for changes:

- Non-breaking revision change: The created tool can be used as a sister tool.
- Breaking revision change: The created sister tool becomes a replacement tool.
  For more information, see Exchanging internal tools (Page 460).

Prerequisite

The tool must have an instance.

Properties

In order to make a non-breaking change, you can overwrite the following properties:

- Tool data
  - ID for tool master data
  - State
  - Description
  - Max. revolution
  - Max. acceleration
  - Supplier
  - Order number
- Data of cutting edges
  - Target lifetime
  - Warning limit lifetime
  - Tolerance values
  - Expected values
- Geometry
  - Tool sizes in half places
- User defined data□
- Bill of materials

Procedure

1. The "Overview of tool master data" window is open.
2. Select a tool master data set and click on the <ID for tool master data>.
3. The "<Tool name (revision:)>" window opens.
4. Click "Edit".
   The input fields are released for changes and additions.
5. Overwrite the properties you need to change in the different tabs and click "Save".
6. The message "Due to the changed property values a new revision will be created" appears.
7. Click on the "Confirm" button.
   - OR -
   Click "Cancel" to discard the entries.
8. A new revision instance is created. The updated revision number appears in the column "Current revision" in the "Overview of tool master data" window.

For more information, see:

- Overview of Monitoring tools (Page 260)
- Creating a breaking change (Page 230)

5.7.3.4 Creating a breaking change

You can change the tool master data even if you have already created instances.
You have two options for changes:

- Non-breaking revision change: The created tool can be used as sister tool.
- Breaking revision change: The created sister tool becomes replacement tool.
  For more information, see Exchanging internal tools (Page 460).

Prerequisite

The tool must have an instance.

Properties

In order to make a breaking change, you can overwrite the following properties:

- Tool data
  - Tool name in NC program
  - DNo-Type
  - Number of cutting edges
- Data of cutting edges
  - Tool type
  - DNo
  - Edge position

Procedure

1. The "Overview of tool master data" window is open.
2. Select a tool master data set and click on the <ID for tool master data>.
3. The "<Tool name (revision:)>" window opens.
4. Click "Edit".
   The input fields are released for changes and additions.
5. Overwrite the properties you need to change in the different tabs.
6. The message "Due to the changed property values the current revision contains breaking change(s)" appears.
7. Click on the "Confirm" button.
   - OR -
   Click "Cancel" to discard the entries.

For more information, see:

- Reverting a breaking change (Page 231)
- Creating a non-breaking change (Page 228)

5.7.3.5 Reverting a breaking change

Prerequisite

As long as no tool instance has been created, you can revert the breaking change.

Procedure

1. The "Overview of tool master data" window is open.
2. Select a tool master data set and click on the <ID for tool master data>.
3. The "<Tool name (revision:)>" window opens.
4. Click "Edit".
   The input fields are released for changes and additions.
5. Overwrite the property you want to revert.
6. Click "Save".
7. The message "Due to the changed property values the breaking change(s) is revoked" appears.
8. Click on the "Confirm" button.
   - OR -
   Click "Cancel" to discard the entries.

5.7.3.6 Propagating changes

You can propagate changed values of the tool master data to the tools independently of the version.

Tools and values on the machine will not be changed. If the tool details of a tool are opened on the machine, this tool will still show the old version and revision.

In "<ID for tool master data>" window in the "User-defined Data" tab, the value you specified in the "Value to be taken (TMD value is taken when empty)" field when creating a new tool will not be changed by the propagation.

Note:

If you change components of the tool master data in the "Bill of materials" tab, you also need to physically change the components.

Changes to lifetime and number of pieces can only be propagated for new or overhauled tools.
The lifetime or values of the pieces will not be overwritten by the propagation. Only tools which already use cutting egdes will be propagated, when residual and target life/pieces are not matching.

Propagation can also be done via API. For more information, see Import tool master data (Page 924).

Prerequisite

Propagating values is only possible for non-breaking changes. For more information on which properties can be overwritten, see Creating a non-breaking change (Page 228).

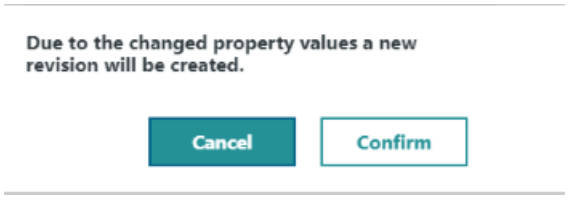
Note

New non-breaking changes not propagated

If a new non-breaking master version exists, but the changes are not propagated to the specific tools, these tools will not be taken into the balancing. For these tools, a replacement tool is created.

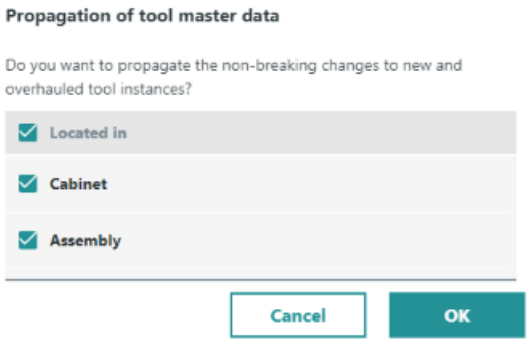
Procedure

1. The "Overview of tool master data" window is open.
2. Select a tool master data set and click on the <ID for tool master data>.
3. The "<Tool name (revision:)>" window opens.
4. Click "Edit".
   The input fields are released for changes and additions.
5. Overwrite the properties you need to change in the different tabs and click "Save".
6. The message "Due to the changed property values a new revision will be created" appears.
7. Click on the "Confirm" button.
   - OR -
   Click "Cancel" to discard the entries.

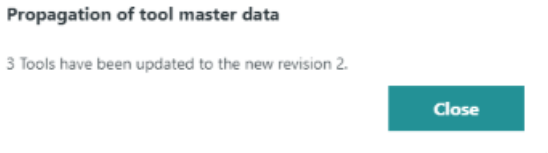


8. The "Propagation of tool master data" window opens.

9. Click the "OK" button to propagate the non-breaking changes to new and overhauled tool instances.
   - OR -
   Click "Cancel" to cancel the process.



10. A message shows how many tools have been updated.



5.7.4 Tool types

Overview

The following tool types are available for SINUMERIK controllers and for the SINUMERIK_Default mapping:

Symbol	Tool type
	100 - milling tool
	110 - ball nose end mill
	111 - conical ball end
	120 - end mill
	121 - end mill corner rounding
	130 - angle head cutter
	131 - angle head cutter with corner rounding

Symbol	Tool type
	140 - facing tool
	145 - thread cutter
	150 - side mill
	151 - saw
	155 - beveled cutter
	156 - beveled cutter corner
	157 - tap. die-sink. cutter
	160 - drill and thread milling cutter
	200 - twist drill
	205 - solid drill
	210 - boring bar
	220 - center drill
	230 - countersink
	231 - counterbore
	240 - tap
	241 - fine-thread tap
	242 - WW tap
	250 - reamer
	400 - circumference grinding wheel
	410 - face grinding wheel
	490 - dressing tool
	494 - dressing roll
	495 - dressing roll with auxiliary axis
	496 - dressing wheel
	497 - dressing wheel with rotation axis

Symbol	Tool type
	500 - roughing tool
	510 - finishing tool
	520 - plunge cutter
	530 - cutting tool
	540 - threading tool
	550 - button tool
	560 - rotary drill
	580 - 3D turning probe
	585 - calibrating tool
	700 - slotting saw
	710 - 3D milling probe
	711 - edge finder
	712 - mono-probe
	713 L-probe
	714 - star-type probe
	725 - calibrating tool
	730 - stop
	731 - mandrel
	732 - steady rest
	900 - auxiliary tool

The following tool types are available for FANUC controllers and for the FANUC_Default mapping:

Symbol	Tool type
	11 - threading
	12 - grooving
	13 - round-nose
	14 - point-nose
	15 - versatile
	20 - drill
	21 - counter sink
	22 - flat end mill
	23 - ball end mill
	24 - tap
	25 - reamer
	26 - boring
	27 - face mill

Note

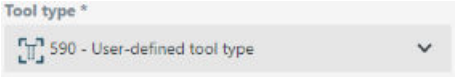
Customer-specific tools

You can create and then use a customer-specific tool (Page 236).

5.7.5 Creating customer-specific tool types

A customer-specific tool is displayed with the following attributes:

- Number of the tool type (as specified by the customer)
- Default icon for a customer-specific tool
- "User-defined tool type" as localized text



Prerequisite

Authenticate using the token so that you can use the various functions in Swagger UI.

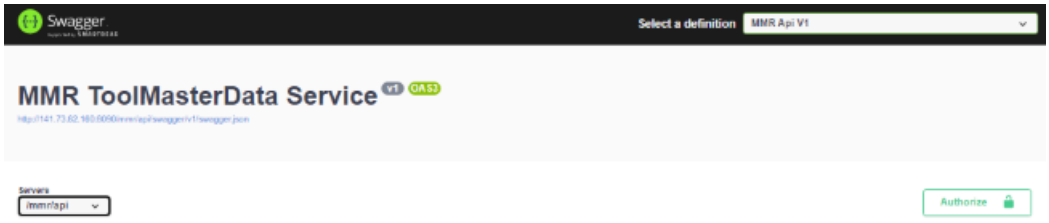
For more information, see:

- Manage openness clients (Page 103)
- Manage MyResources API (Page 891)
- Using the token in the Swagger UI (Page 893)
- Logging in and logging out from Mcenter (Page 36)

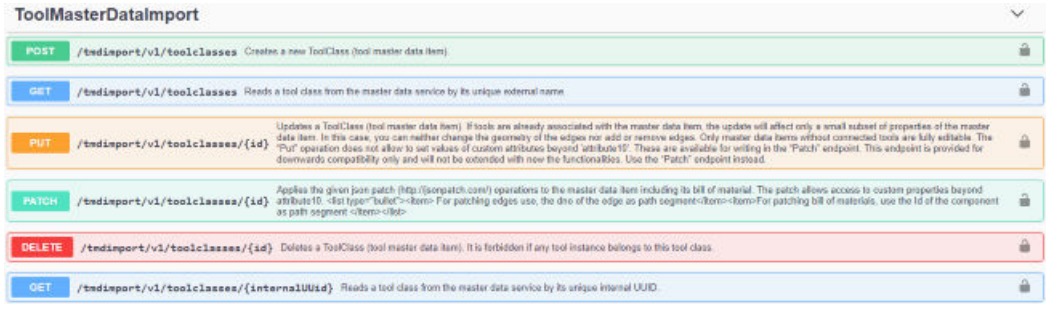
Procedure

You can create a tool master data set for a customer-specific tool type via the Manage MyResources API.

1. Call the following address: Swagger UI (http://<IP adress of the MMR server>:8090/mmr/api/swagger/index.html)
   The "Swagger" > "MMR ToolMasterData Service" window opens.



2. Scroll to the "ToolMasterDataImport" area.



3. Open the "POST /tmdimport/v1/toolclasses" field and click on "Try it out".
4. Configure the "Request body" field according to your needs.

   Note

   toolType

   For the "toolType" parameter, select a value between 1 and 999.

   Otherwise, an error message is output and a tool type with the number 9999 and the localized text "Unknown" is created.

5. Click "Execute" to start the request.

5.7.6 Deleting tool master data

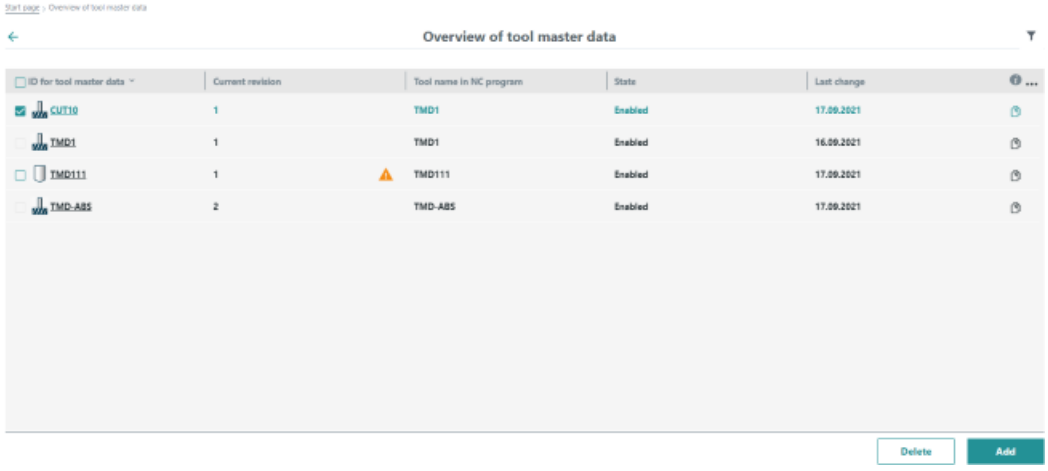
You can delete a tool master data.

Prerequisite

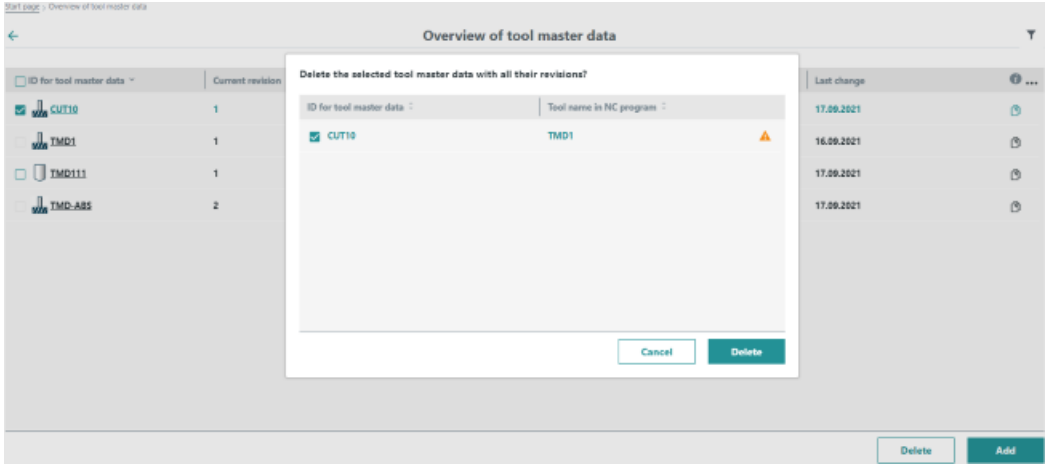
An instance of the tool master data that should be deleted has not been created.

Procedure

1. In the "Overview of tool master data" window, select the tool master data that should be deleted.



2. Click the "Delete" button.
3. In the "Delete selected tool master data with all their revisions" window, make sure that the correct tool master data is selected. Click the "Delete" button.
   The tool master data is deleted.
   An orange warning triangle indicates that the tool master data is linked to OEM data.



5.8 Provide tools

5.8.1 Task overview to provide tools

In the window "Task overview to provide tools" you find all the tools involved in the providing process and the associated tasks. You can sort the individual columns in the overview.

Create new tools from master data or change existing tasks.

Parameter

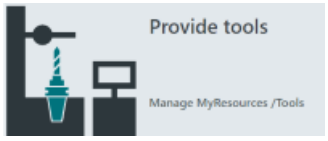
Parameter	Description
∨	This symbol appears when you click on the column heading. Click on the symbol to sort the elements alphabetically/numerically, either in ascending or descending order.
ID for tool instance data	Shows the identifier for tool instance data. Click the link to display the detailed information within the open window. If you press the right mouse button, you open the drop-down list. You can • open a new window - OR - • open a new tab In the latter case, you do not need to reload the "Task overview to provide tools" page. For more information, see Tool details (Page 165).
Processed by	Shows the task owner.
	A red icon next to the username indicates that the user has been deleted. When you hover the cursor over the icon, the following tooltip appears: "The assigned user is no longer existing. You can reassign the tool instance by pressing 'taking over the processing'."
	A yellow icon next to the username indicates that the user is inactive. When you hover the cursor over the icon, the following tooltip appears: "The assigned user is no longer active. Re-activate or reassign the tool instance so that you can proceed."
Unload reason	Shows the Unload reason: • Unknown • Broken tool • Worn out tool • Loud noise of tool • Empty place needed • Tool is needed on another machine • Bad workpiece quality • <User-defined reason> You can extend and shorten the list. The number of entries is not limited.

Parameter	Description
Action flag	Shows how to proceed with the tool instance: • Disassemble • Measure • Overhaul • Decide further processing If a "Comment on unloading reason" has been set when unloading a tool, an info icon is displayed on the left side of the action flag. The tooltip of the info icon shows the content of "Comment on unloading reason".
	Enables the action flag for editing.
	Saves edited values.
	Aborts editing.
	Opens window "Disassemble tools and manage components".
	Shows the number of listed tool instances.
	Opens a window in which you select the columns to be displayed in the overview. These columns can optionally be configured to show further information: • Tool name in NC program • Unload reason • Reserved for machine • Reserved • <User-defined attributes> The maximum number of additional columns is limited to 6.
	Opens the window "My Filters" and you can then filter the tools according to the following criteria: • ID for tool instance data • Processed by • Tool name in NC program • Unload reason • Action flag • Reserved for machine • Reserved • Attribute 1...10 <User-defined attributes> For more information, see List filtering (Page 46). Click on the filter icon again to close the filter window.
	Generates a tool from tool master data.
	Disassembles the selected tool or tools and manages its components.
	Assigns the tasks to other users.

Parameter	Description
Take over processing	Assigns the responsibility of a task to you.
Personal tasks	Performs the tasks that are assigned to you.

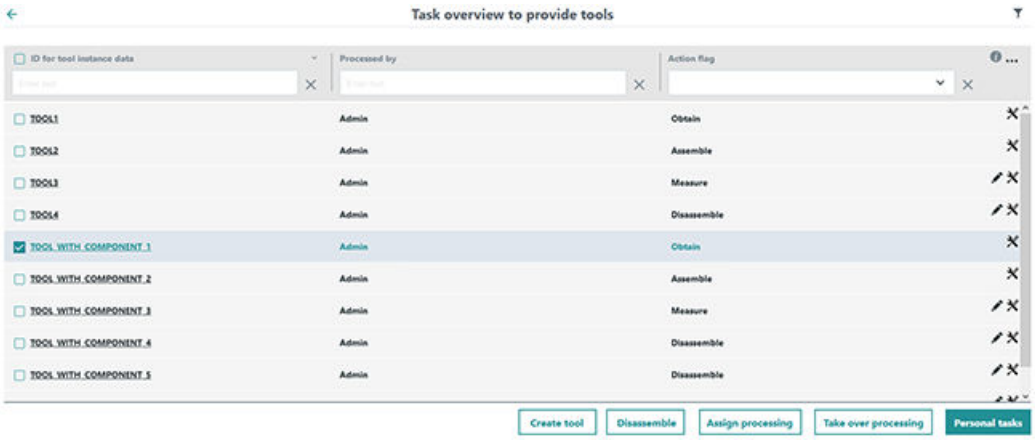
Procedure

1. On the start page of the Mcenter, click on "Provide tools".



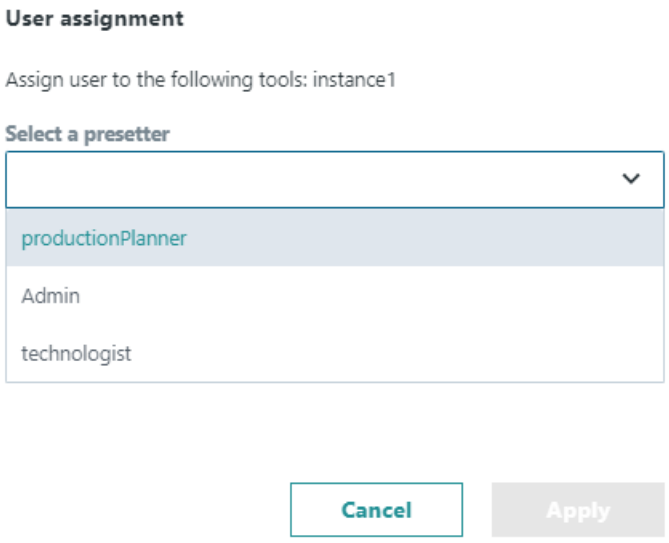
   - OR -
   Open the following URL: Provide tools (https://{ServerIP}/mmr/tools/presetting)

2. The window "Task overview to provide tools" opens and shows all tools in providing process. For each tool the required action and the task owner are listed.



- To generate a tool from tool master data, click on the "Create tool" button.
  For more information, see Create tool (Page 242).
- To disassemble an existing tool and manage its components, select "Disassemble tool".
  For more information, see Disassembling tools (Page 247).
- To perform a task you must accept the responsibility. Therefore activate one or more checkboxes and click on the "Take over processing" button.
  Your username is listed in the "Proceed by" column. The tools are moved to the window "Provide tools".

- To perform tasks assigned to you click on "Personal tasks" button.
  For more information, see Overview for providing tools (Page 250).
- To assign a task to another user, select "Assign processing".
  The dialog "User assignment" opens.
  Select the user in the drop-down menu.
  Only users with the roles of key user and tool presetting operator are listed.
  Select "Apply".



5.8.2 Create tool

Prerequisite

The tool master data has already been created.

For more information, see Tool master data details (Page 198).

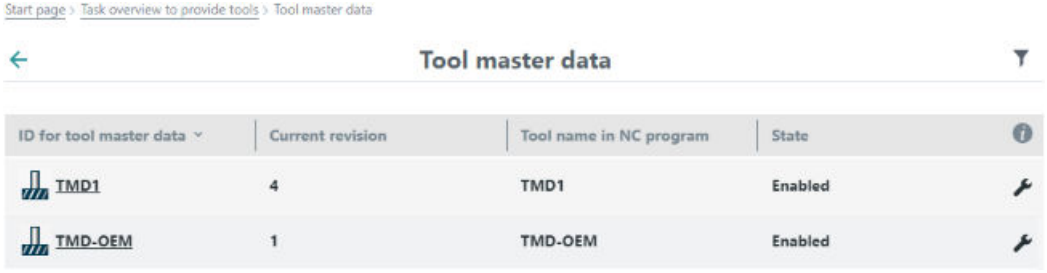
Parameter

Overview	Description
ID for tool master data	Shows the identifier of the master data.
Current revision	Version assignment of the tool master data. Shows the latest revision of the tool master data.
Tool name in NC program	Shows the tool name in the NC program.
State	Shows the status of tool master data set with the following options: • Enabled • Disabled
	Specifies the number of tool master data sets.

Overview	Description
	To creates new tool instance click the wrench symbol.
	Opens the "My Filters" window and filters tools according to the following criteria: • ID for tool master data • Current revision • Tool name in NC program • State For more information, see List filtering (Page 46). Click on the filter icon again to close the filter window.

Procedure

1. In the "Task overview to provide tools", click the "Create tool" button. For mor information see Task overview to provide tools (Page 239).
2. The "Tool master data" window opens.
3. For the required tool, click on the wrench symbol to create a new tool instance.
   For more information, see New tool instance (Page 244).



4. Click "Task overview to provide tools" in navigation path (upper left).
   The "Task overview to provide tools" window reopens, and the new tool is displayed with "Obtain" action flag.
5. If you wish to assign a fixed preassigned duplo number to the tool, then you can assign this via the openness interface (expansion interface).
   For more information, see Generating and modifying tool instances (Page 902).
6. After the tool was created, accept the responsibility to be able to perform a task.
   Activate the checkboxes of the created tools and click on "Take over processing".
   – Your username is listed in the "Processed by" column.
   – The tools are moved to the "Provide tools" window.

5.8.3 New tool instance

Prerequisite

The tool master data has already been created.

For more information, see Tool master data (Page 195).

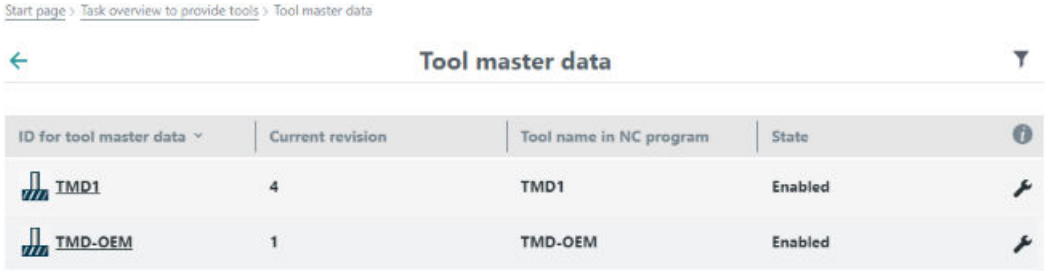
Parameter

Overview	Description
	Click the wrench symbol to create a new tool instance.
"New tool instance" windows	
Tool name in NC program	Shows the tool name in the NC program.
ID for tool instance data *	Enter the ID for the tool instance data. Maximum: 250 characters.
Reservation options for the tool instance	
• Use without reservation	No further settings necessary.
• Use with reservation for machine and production order	• Select the machine. Only machines that are "online" are displayed for selection. • Select the production order of the selected machine.
• Use as standard tool with reservation for machine	Select the machine. Only machines that are "online" are displayed for selection.
Select a machine *	Select the machine according to the activation of the options.
Select a production order *	Select the production order according to the activation of the options.

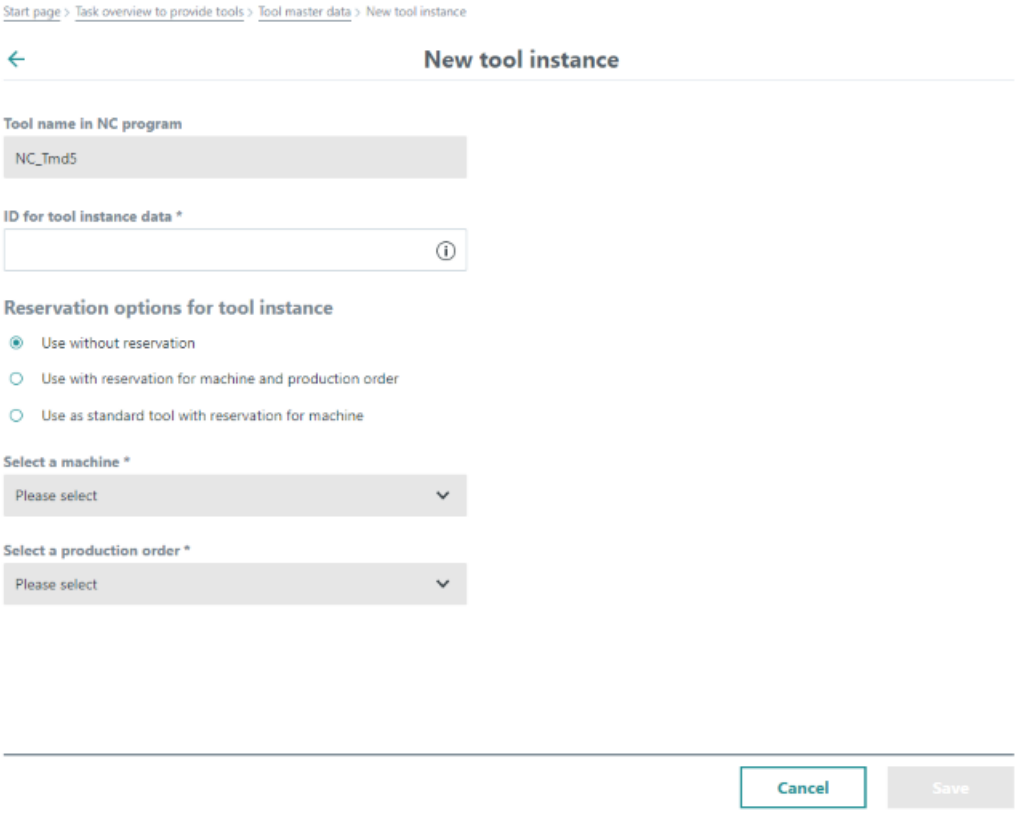
*) All fields with an asterisk are mandatory. If you enter a value that does not comply with the rules, a red warning symbol and a corresponding red highlighted error message below the input field are displayed.

Procedure

1. Open the "Task overview to provide tools" window and click "Create tool". The "Tool master data" window opens.

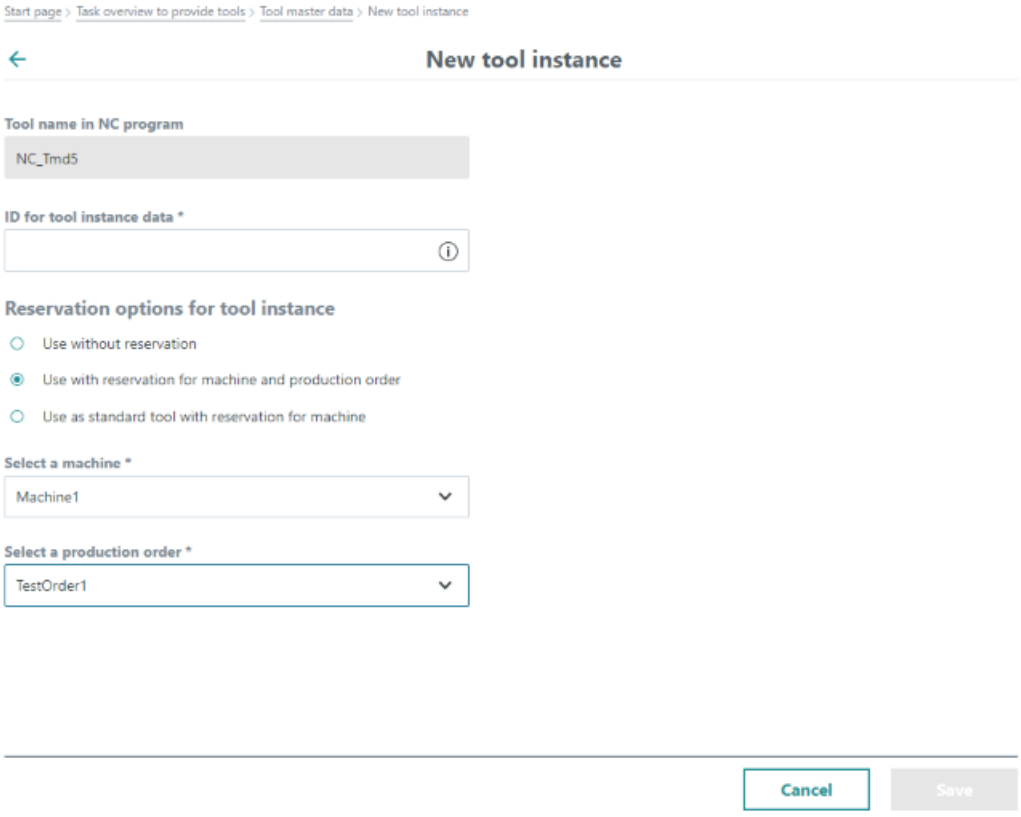


2. Select a tool and click the wrench symbol to create a new tool instance. The "New tool instance" window opens.
   - The "Use without reservation" option is the default selection.
   - Enter a new identification into the "ID for tool instance data *" input field.



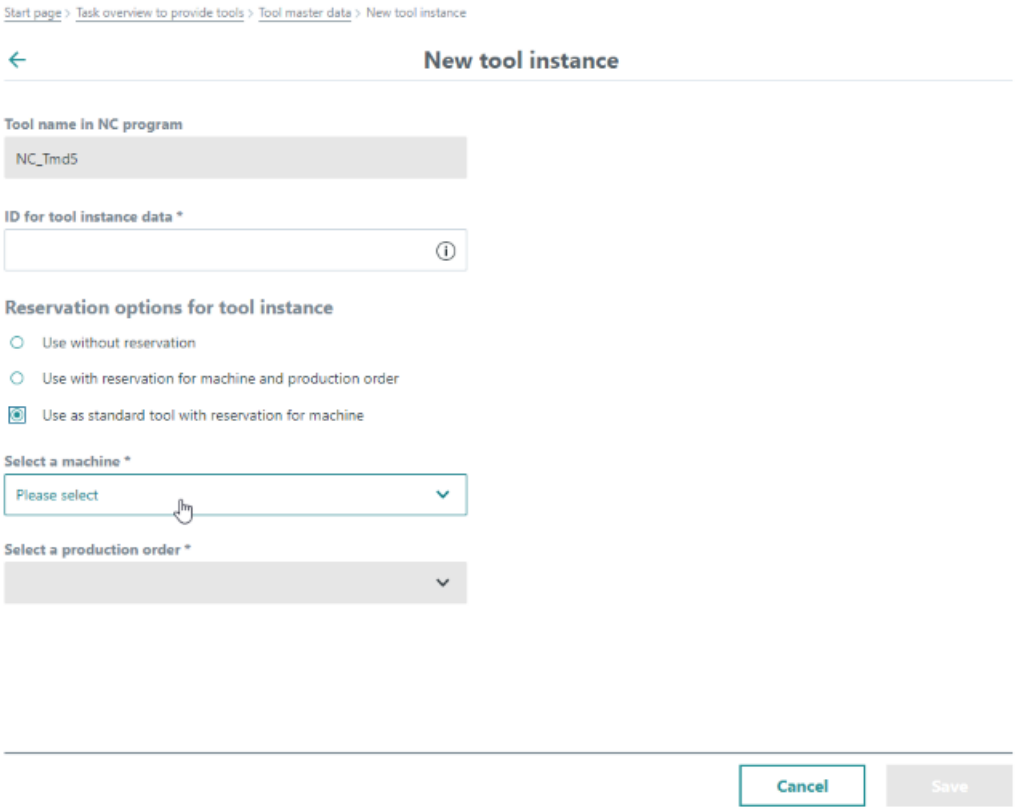
- OR -

– Activate the option button "Use with reservation for machine and production order".
Open the drop-down list "Select a machine *" and select a machine. All production orders for this machine are scanned.
Open the drop-down list "Select a production order *" and select a production order from this machine.



- OR -

– Activate the option button "Use as standard tool with reservation for machine".
Open the drop-down list and select a machine.



– Click the "Save" button to save the new tool instance.
- OR -
Click the "Cancel" button.
You receive the confirmation prompt "Reset changes?"
Click "No, return to site".
- OR -
Click "Yes, leave the site".

3. The "Tool master data" window reopens, and the message "Tool was saved successfully" is displayed in the top-right window area.
4. Reopen the "Task overview to provide tools" window and the new tool instance is displayed in the overview.

5.8.4 Disassembling tools

Disassemble the tools you no longer require.

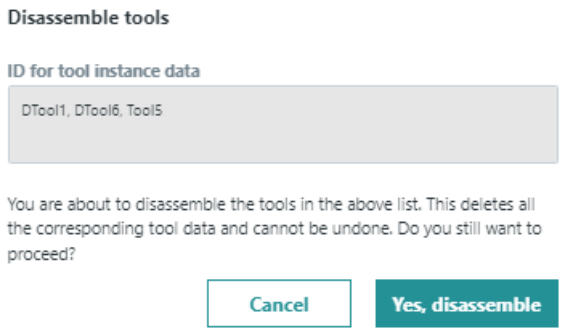
Parameter

The following data is displayed for the tools:

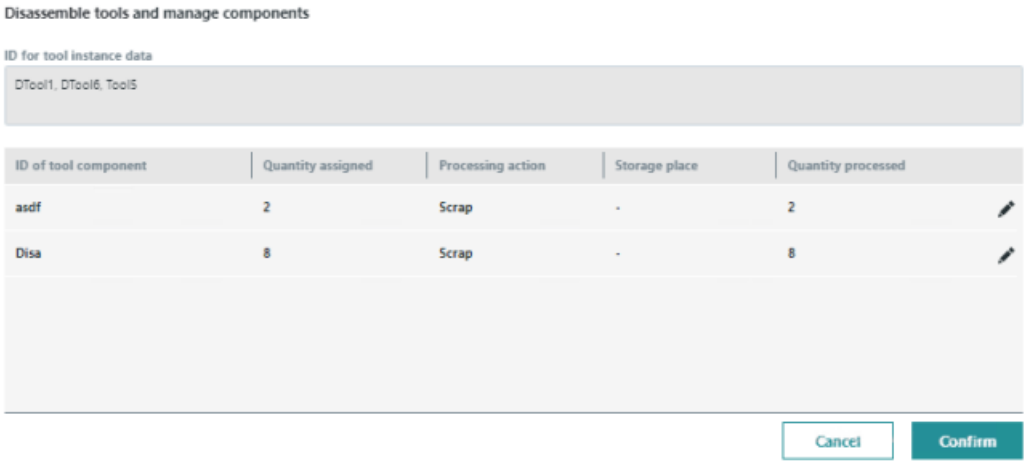
Parameter	Description
ID of tool component	Shows the identifier of tool component.
Quantity assigned	Shows the quantity of tool components used in the tool.
Processing action	Select the processing action for the tool component: • Scrap • Store In this case the component stock is increased automatically.
Storage place	Hierarchical path to a box in a cabinet, where the components are stored.
Quantity processed	Shows the quantity of tool components for the selected processing action.
	Releases following entries for editing: • Processing action • Storage place • Quantity processed
	Applies edited values.
	Aborts editing.

Procedure

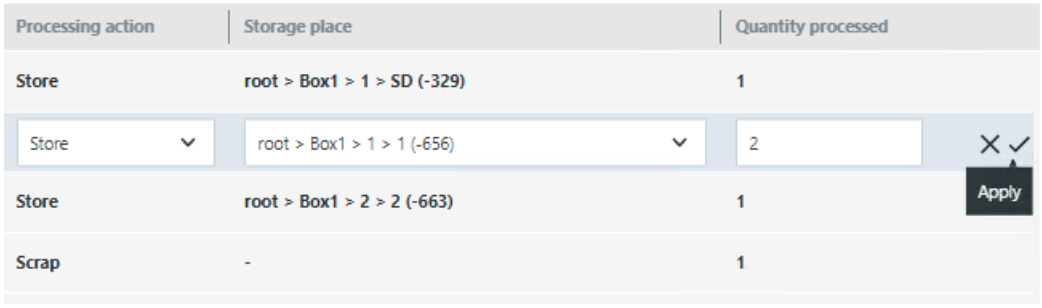
1. In the "Task overview to provide tools" window click on the "Disassemble tool" symbol next to the tool that you want to disassemble.
   - OR -
   To disassemble multiple tools, select the checkboxes of the tools that you want to disassemble in the "Task overview to provide tools" window. Select "Disassemble".
   - OR -
   If the tool has components, move the desired tool in the "Provide tools" window from the area "To be measured" to the area "To be obtained" per Drag&Drop.
   For more information see Task overview to provide tools (Page 239) and Overview for providing tools (Page 250).
2. If none of the tools has components, select "Yes, disassemble" in the dialog box. The tool is disassembled and the associated tool data is deleted.



If at least one of the tools has components, the "Disassemble tools and manage components" window opens. All tool components used in the selected tool are displayed. The processing action is set to "Scrap".



3. To change processing:
   - Click on the "Edit" symbol in the row of desired tool component.
   - Select the processing action for the component from the drop-down list.
   - If the tool component should be stored select the storage place.
   - If selected processing action or storage place are only valid for a part of assigned quantity, enter the quantity processed.
     A new row for remaining tool components is generated.
   - Click on the "Apply" symbol.



4. To disassemble the tool click "Confirm".
   - OR -
   Click "Cancel" if you do not want to disassemble the tool.

5.8.5 Overview for providing tools

In the "Provide Tools" window, you can assemble, disassemble, or overhaul tools. Additionally you can add correction data to a tool and finish provision.

For more information, see:

- Assemble tools (Page 252)
- Disassembling tools (Page 247)
- Overhaul tools (Page 255)
- Finish provision (Page 258).

Prerequisite

The tasks to provide tools are assigned to you.

For more information, see Task overview to provide tools (Page 239).

Parameters

The following areas are available:

Area	Description
To be obtained	Displays an overview of all tools that have been taken over for processing from the "Task overview to provide tools" window. You can start performing a task with these tools.
To be assembled	Displays an overview of all tools that have not been assembled.
To be overhauled	Displays an overview of all tools where tool components have to be exchanged.
To be measured	Displays an overview of all of the tools that have not been measured.
To be provided	Displays all tools that have already been measured, which contain correction data. These tools can be stored in a cabinet by clicking "Finish provisioning".

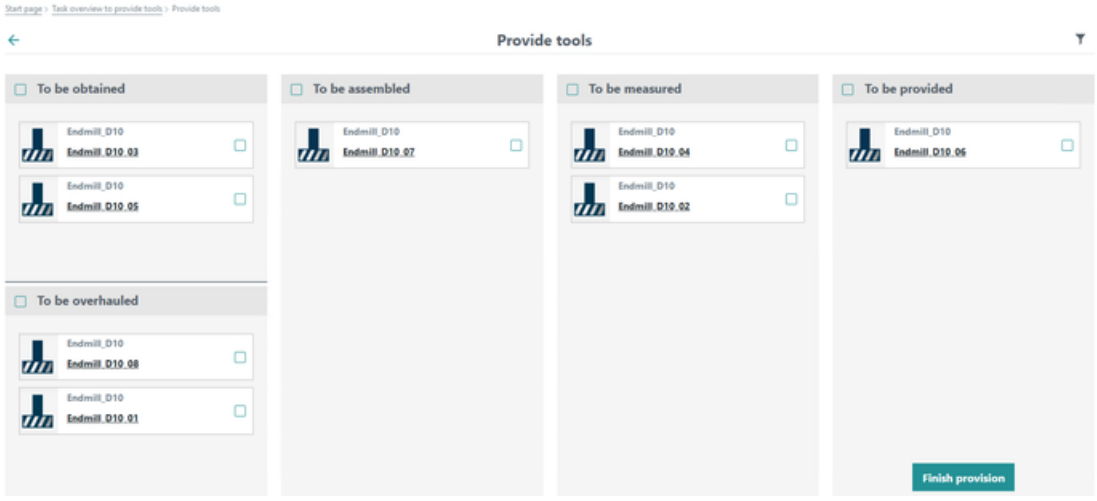
For each tool in "Provide tools" window the following data are available:

Parameter	Description
Tool	The following data are displayed: • Tool name in the NC program • Identifier for tool instance data If the tool instance was created using balancing, the following additional data are displayed: • Machine • Production order
	Opens the "My Filters" window and filters tools according to the following criteria: • Tool name • ID for tool instance data • Machine • Production order For more information, see List filtering (Page 46). Click on the filter icon again to close the filter window.

Underlined names indicate that further information is available. Click on the link. A new window opens, showing all of the detailed information.

Procedure

1. In the "Task overview to provide tools" window, click on "Personal tasks".
   The "Provide tools" window opens.
2. Move tools via Drag&Drop to another column.
   So you can use the options described above.



5.8.6 Assemble tools

In the "Provide tools" window, an assembled tool changes from the column "To be assembled" to the column "To be measured". The tool component stock is managed automatically.

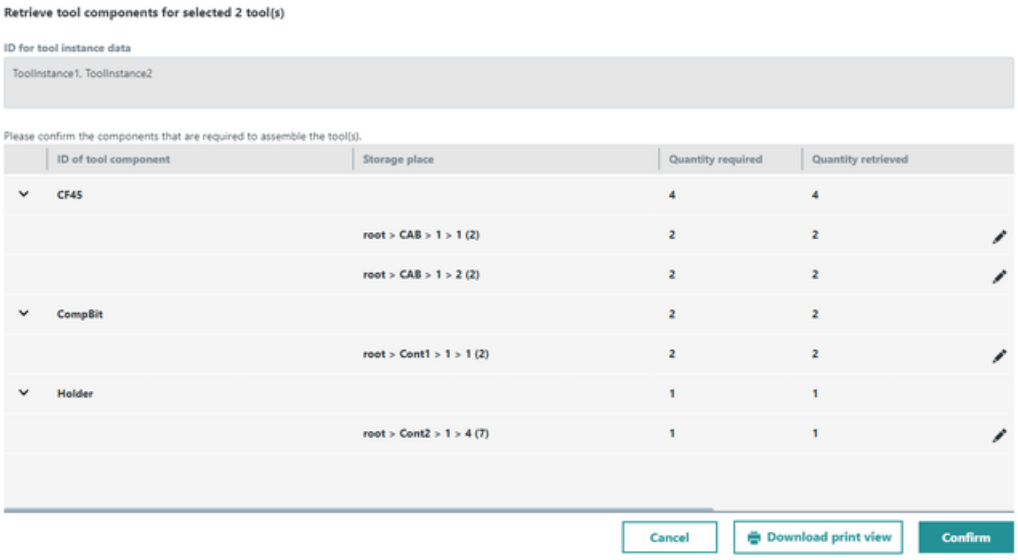
Parameter

The following data is displayed for the tools:

Parameter	Description
ID of tool component	Shows the identifier of tool component.
Storage place	Hierarchical path to a box in a cabinet, where the components are stored.
Quantity required	Shows the quantity required for assembling the tool.
Quantity retrieved	Shows the quantity retrieved from stock.
	Releases storage place and quantity retrieved for editing.
	Saves edited values.
	Aborts editing.

Procedure

1. Move the desired tools the from "To be obtained" area to the "To be assembled" area per Drag&Drop.
   A window opens with the header "Retrieve tool components for selected <number> tool(s)".
   The selected tool instance IDs and the required tool components for assembling are shown.

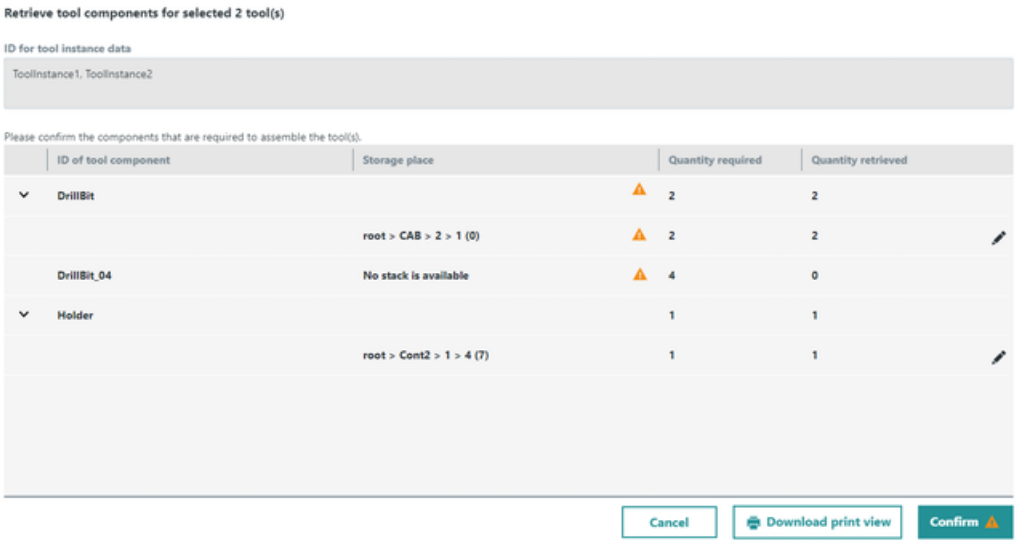


2. To change storage place:
   - Click on the "Edit" symbol in the row of desired tool component.
   - Select the storage place for the component.
   - If selected storage place is only valid for a part of required quantity, enter the quantity retrieved.
     A new row for remaining tool components is generated.
   - Click on the "Apply" symbol.
3. Click on "Confirm".
   The tool component stocks is reduced by listed quantities.
4. When the tools are assembled, move the tool from the "To be assembled" area to the "To be measured" area per Drag&Drop.

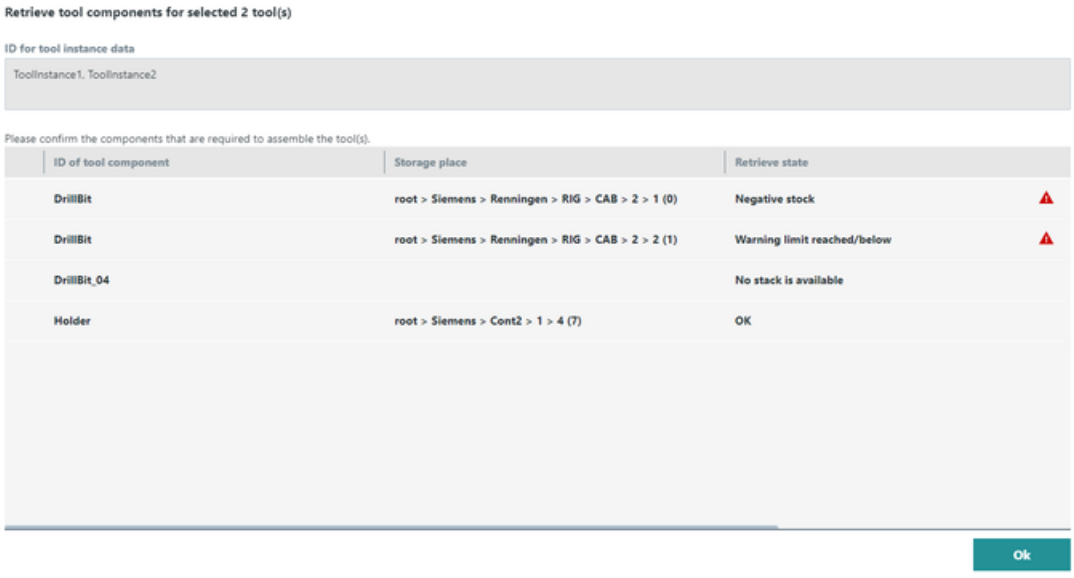
Inadequate stock

The following errors can occur if you assemble a tool:

- No stack exists for a required tool component.
  The corresponding row will be marked with a yellow explanation mark in the "Retrieve tool components for selected <number> tool(s)" window. This row cannot be edited.
  In case a missing stack should not be ignored, click on "Cancel" to stop the process. Create the missing stack(s) including the right amount of components. Then the canceled step can be repeated.



- A selected stack does not contain an adequate quantity of tool components.
  After clicking on "Confirm" an additional window opens. Tool component stacks which have reached the warning limit or have a negative stock are marked with a red explanation mark.



In both cases the tool is moved to the "To be assembled" area after confirmation. The missing stack or the missing components are ignored, so that the tool pre-setting can

continue assuming the component is available for the pre-setter. But you have to adapt the corresponding tool component stacks manually.

For more information, see Overview of tool component stack (Page 144).

5.8.7 Overhaul tools

In the window "Provide tools" tools change from the left column "To be overhauled" to the column "To be measured" or to the column "To be assembled". The tool component stock is managed automatically. The window "Overhaul selected <number> tool(s)" is displayed.

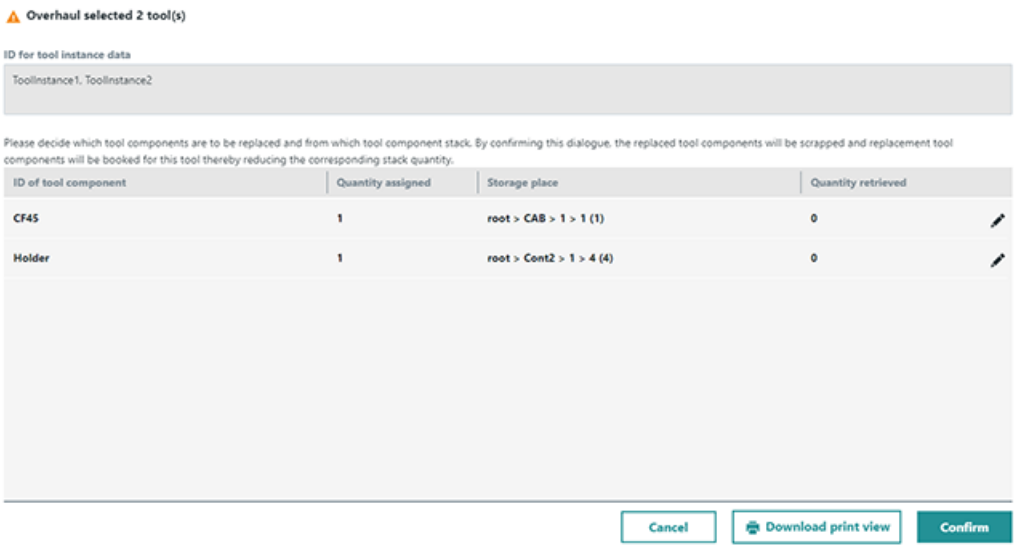
Parameter

Parameter/element	Description
ID of tool component	Shows the identifier of tool component.
Quantity assigned	Shows the quantity of tool components used in the tool.
Storage place	Hierarchical path to a box in a cabinet, where the components are stored.
Quantity retrieved	Shows the quantity retrieved from stock.
	Releases storage place and quantity for editing.
	Saves edited values.
	Aborts editing.
	Downloads a .txt file with the list of the components

Procedure

1. In the window "Provide tools" move the desired tools from the area "To be overhauled" to the area "To be measured" per Drag&Drop.
2. The window "Overhaul selected <number> tool" opens and shows the used tool components.
3. Click on the "Edit" symbol for the component which should be exchanged.
4. Select storage place and enter quantity.

5. Click on the "Save" symbol.
6. Click on "Confirm".
   The tool component stocks is reduced by entered quantity.
   The worn tool components are scrapped.



Download print view

To download a .txt file with the list of components, select "Download print view". The list includes

- Name of the component
- Location of the component
- Amount that is needed from the location

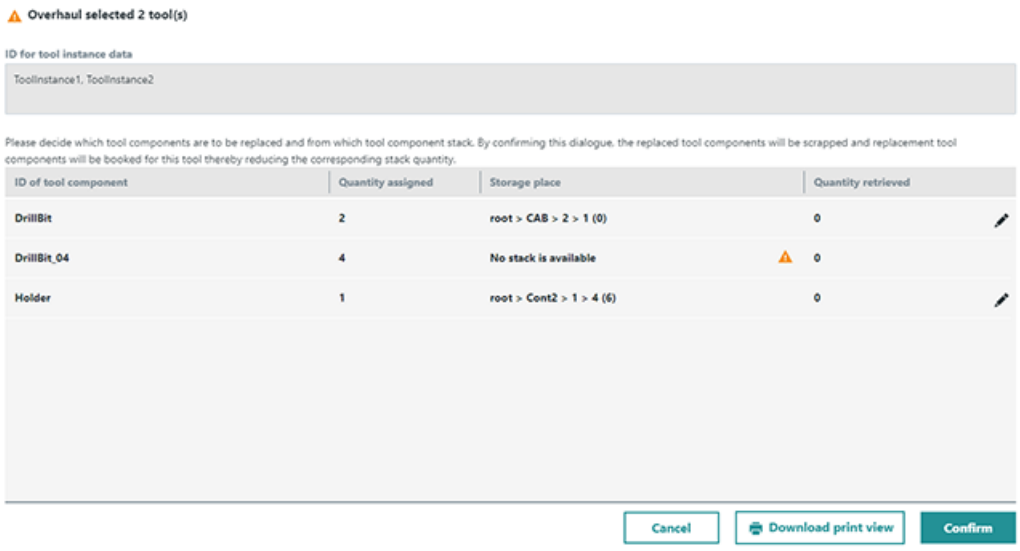
Example:

```
--------------------------------------
comp1                                 1
root>cabinet>1>1
--------------------------------------
comp2                                 1
root>cabinet>1>2
--------------------------------------
```

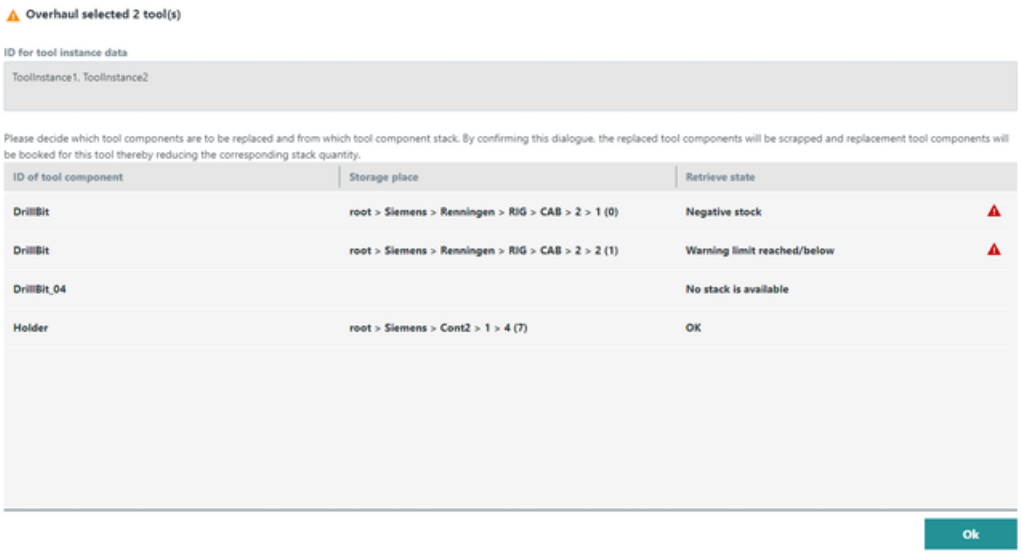
Inadequate stock

The following errors can occur if you assemble a tool:

- No stack exists for a required tool component.
  The corresponding row is marked with a yellow explanation mark in the window "Overhaul selected <number> tool(s)". This row can not be edited.
  In case a missing stack should not be ignored, click on "Cancel" to stop the process. Create the missing stack(s) including the right amount of components. Then the canceled step can be repeated.



- A selected stack does not contain an adequate quantity of tool components.
  After clicking on "Confirm" an additional window opens. Tool component stacks which have reached the warning limit or have a negative stock are marked with a red explanation mark.



In both cases the tool is moved to the area "To be measured" after confirmation. The missing stack or the missing components are ignored, so that the tool pre-setting can

continue assuming the component is available for the pre-setter. But you must adapt the corresponding tool component stacks manually.

For more information, see Overview of tool component stack (Page 144).

5.8.8 Finish provision

In "Provide tools" window, a tool that has been measured changes from the middle column "To be measured" to the right column "To be provided".

If a tool was measured, then it includes correction (offset) data, and is available for the machine.

Measured tools can be assigned correction (offset) data, e.g. using Swagger-UI.
For more information, see Generating and modifying tool instances (Page 902).

Procedure

Note

If you select a tool in the "To be measured" column, edit and save the data, then the tool is not automatically moved to the "To be provided" column.

1. In the "Provide tools" window, click on the required tool in the "To be measured" area.
   - OR -
   Move the desired tool from the "To be measured" area to the "To be provided" area per Drag&Drop.
2. The "<Tool name>" window opens and shows the details for the tool instance.
   For more information, see Tool details (Page 165).
3. Refresh the data, for example cutting edge data.

   Note

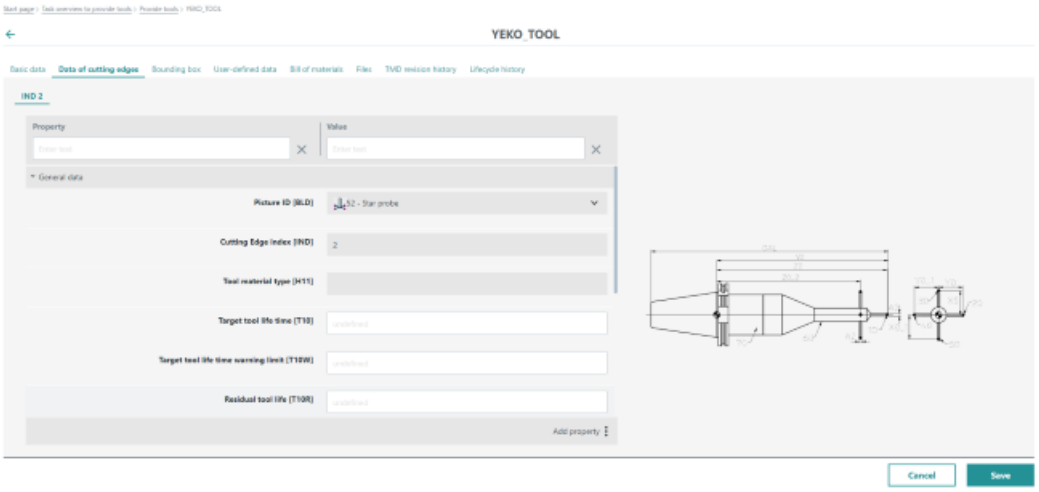
   Editing correction (offset) data via the extension interface

   If you create correction (offset) data of a tool using Manage MyResources API, then the tool is automatically switched over to provide.

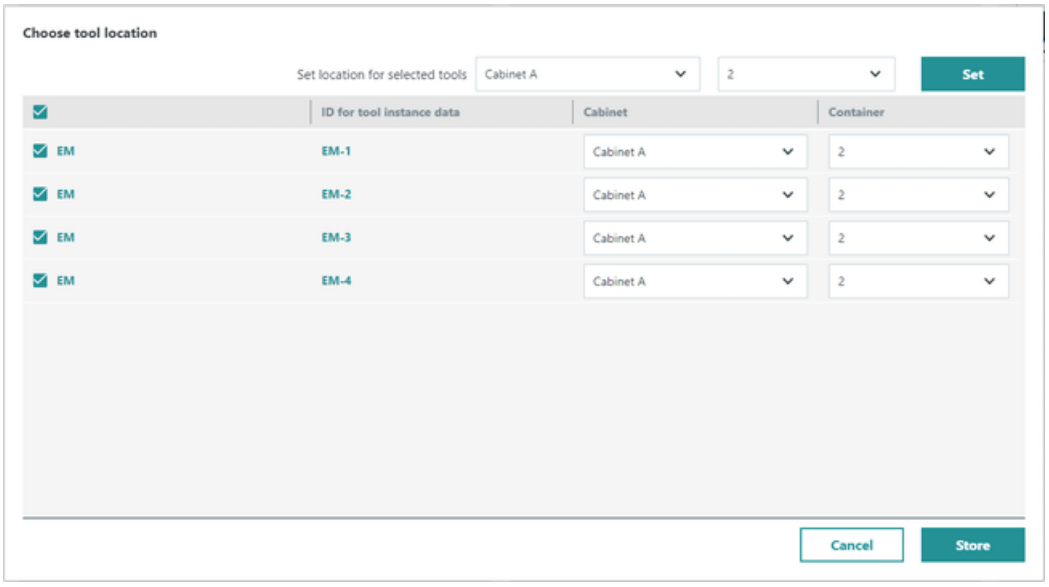
   For more information, see Generating and modifying tool instances (Page 902).

   Enter the data under: /toolassembly/v1/toolinstances/ {toolInstanceId}/location.

4. Click "Save".
   The message "Tool instance data was successfully stored" is displayed.



5. You see the newly created tool in the "To be provided" column.
6. Check the checkbox of the desired tool. Click on the "Finish provision" button.
7. The "Choose tool location" window opens.
   - Choose a location for the selected tools and click on the 'Set' button
   - Open the "Cabinet" and "Container" drop-down list and select the provision location.
   - To store the tools, click on the "Store" button.



5.9 Monitoring tools

5.9.1 Overview of Monitoring tools

The "Monitoring tools" window shows in an overview all tools according to the residual tool life of a machine.

A tooltip is opened and you obtain more information if you move the mouse pointer over the various parameters.

Parameter

The following information is displayed for the tools:

Parameter	Description
Tools by remaining lifetime	
Machine	Shows the machine name. The tooltip shows the hierarchical path.
ID for tool instance data	Shows the tool ID data.
	Indicates a tool master data with a breaking change.
Tool name	Shows the tool name and the icon. The tooltip lists the cutting edges.
	Shows that the tool is blocked.
	Shows that the tool has reached the prewarning limit.
	Indicates that there is currently no connection to the machine. The displayed data may be out of date. For more information about offline handling, see Creating tools on an offline machine (Page 524).
Lifetime (remaining/target) or Workpieces (remaining/target)	Shows the remaining life time in minutes or in workpieces. If the monitoring type is not set, a single "-" character is displayed.
	Opens the "Edit lifetime of tool instance 'extID' window.
Sister tool	
ID for tool instance data	Shows the sister tool ID data.
Location	Shows the storage location of the sister tool.
	Selects the sister tool.
	Switches the machine in the "Select Machine" window.

Parameter	Description
	Opens the "My Filters" window and filters tools according to the following criteria. • Machine • ID for tool instance data • Tool name • Lifetime (remaining/target) or Workpieces (remaining/target) • Remaining lifetime or Remaining workpieces • Target lifetime or Target workpieces For more information, see List filtering (Page 46). Click on the filter icon again to close the filter window.
	Opens a window in which you select an additional column to be displayed in the overview. This column can optionally be configured to show further information: • Location of TI • Reachable spindle(s) Only directly linked spindles and magazines on the machine can be displayed. If the following variables exist in the magazine configuration, a reachable spindle can be displayed: – $TC_MDP1[#mag,#lp] for loading point [9999,#lp] – $TC_MDP2[#mag,#sp] for spindle [9998,#sp] • First Load This column displays the tool's loading time to the machine.
	Specifies the number of tools on the selected machines.
"Select machines" window	
Machine	Shows the created machines.
Hierarchical path	Shows the path of the hierarchy.
	Specifies the number of shown machines.
	Indicates Trial tool

NOTICE
Loading time To avoid time differences, synchronize the time registration of the server and the machine.

Note

Flashing Monitoring tools

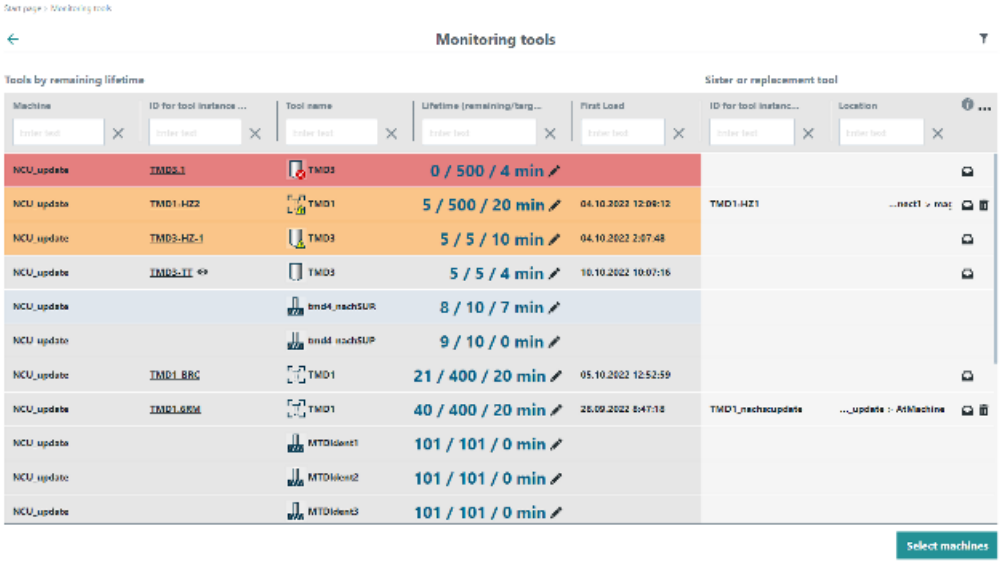
If Monitoring tools remains open for a long time and the browser setting at start is set to "open last viewed Tabs at the start of browser", this setting can result in flashing of Monitoring tools and not showing any tools. If you want to open Monitoring tools for a long time, you have to change the setting to "open new Tab and restart the browser".

Procedure

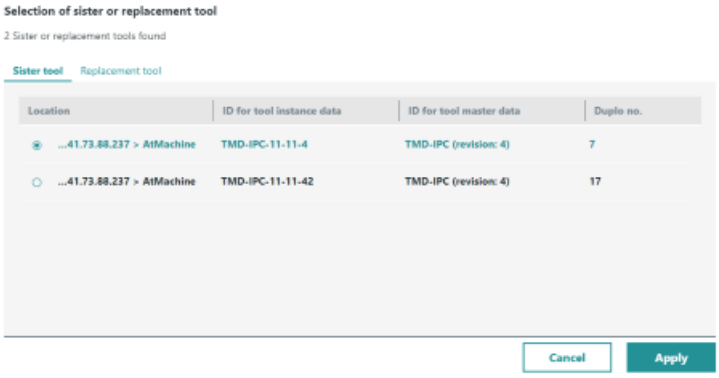
1. On the start page of the Mcenter, click "Monitoring tools".

   - OR -
   Open the following URL: Monitoring tools (https://{ServerIP}/mmr/mmo).

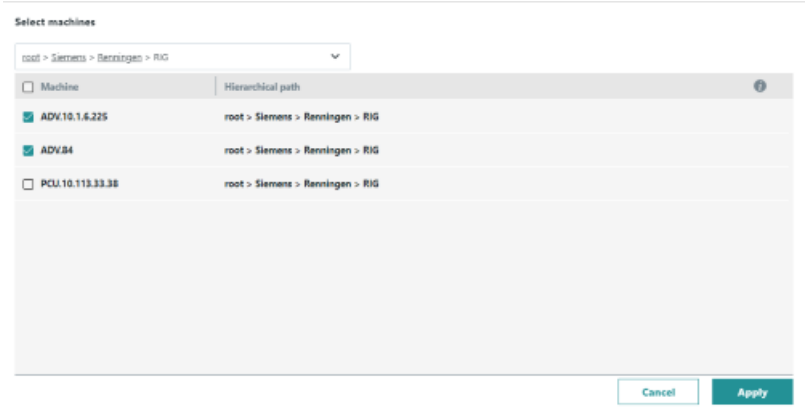
2. The "Monitoring tools" window opens and you see the tools of the selected machine.



3. If you want to select a sister tool for a tool, click the sister tool icon on the right-hand side of the window.
   The "Selection of Sistertool" window opens.
   Select the option and click the "Apply" button.
   The sister tool is displayed in the "Monitoring tools" overview in the "Sistertool" column.
   To select a replacement tool, use the "Replacement tool" tab.



4. If you want to view the tools of other machines, click the "Select machine" button.
   The "Select machines" window opens.
   Select the required machines and click "Apply".

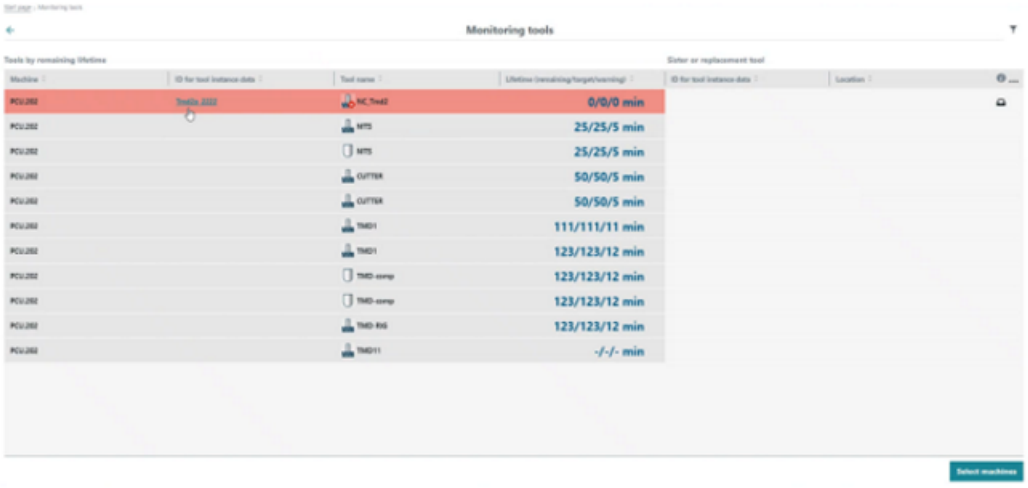


5.9.2 Reserving tools

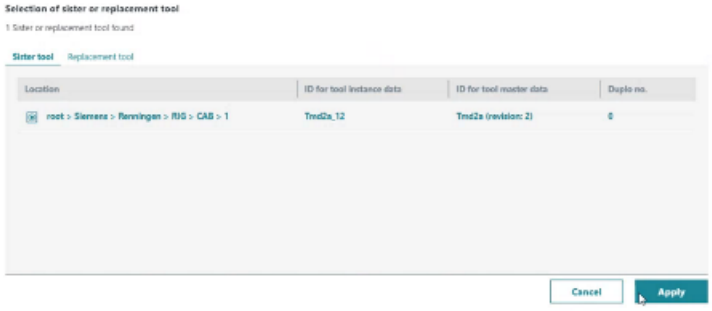
You can reserve a specific sister tool for a greenfield tool.

Procedure

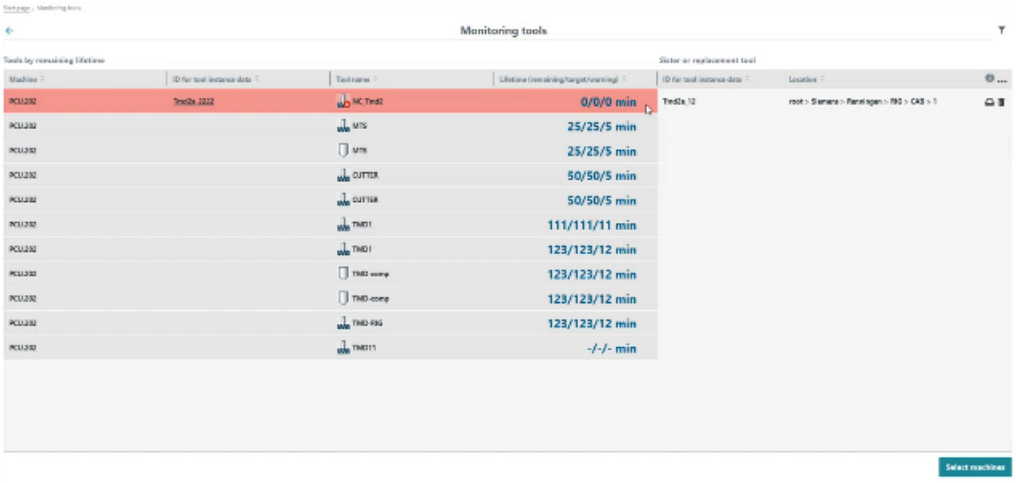
1. Open the "Monitoring tools" window and select a machine.



2. Select a greenfield tool and click the respective sister tool icon.
   The "Selection of Sistertool" window opens.
   Select a sister tool.



3. Click the "Apply" button to reserve this sister tool exclusively for the respective greenfield tool.
   The sister tool is neither available nor displayed on other machines.
   The reserved tool is shown in the "Location" column of the "Monitoring tools" window.



4. The only possibility to make the reserved sister tool available for other machines again is to click the "Delete" symbol next to the tool. The reservation is deleted.

5.9.3 Trial tool

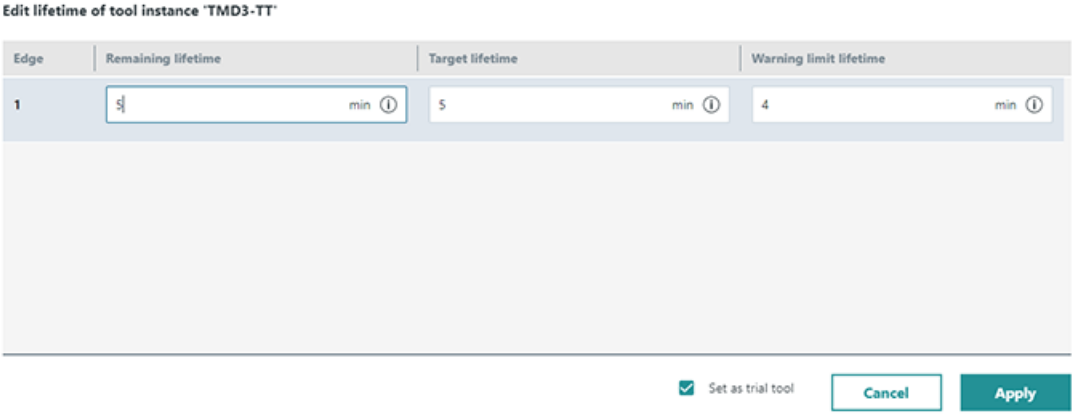
You can use a trial tool. Set this option in the "Monitoring tool" application.

Prerequisite

The tool is loaded to the machine.

Procedure

- Open the "Monitoring tools" window.
- Click on the pen to open the "Edit lifetime of tool instance" window.



- Select the checkbox "Set as trial tool".
- The eye symbol next to the external ID indicates this information in the application "Monitoring tools".

- A "[T]" within the external ID indicates that the tool is a trial tool on the tool stock.

1/13				CENTERDRILL	-/-	1
1/9			[T]TMD3-TT	TMD3	5/5	3
1/11				tmd4_nachSUP.	8/10	1

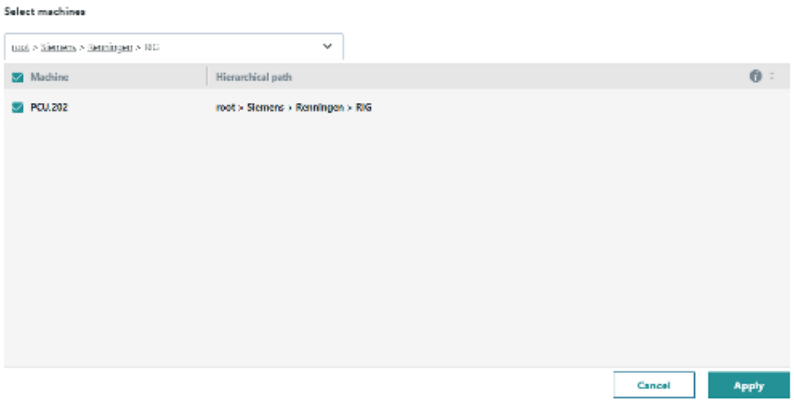
- The information if a tool is a trial tool is saved with the statistics.

5.9.4 Changing the residual lifetime on the server

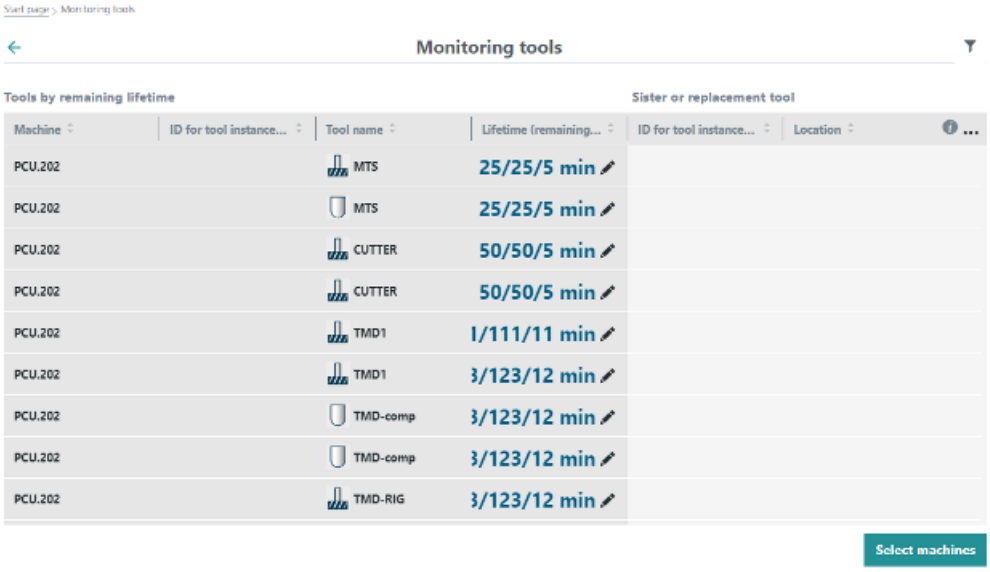
You can change the residual lifetime of a tool instance on the server.

Procedure

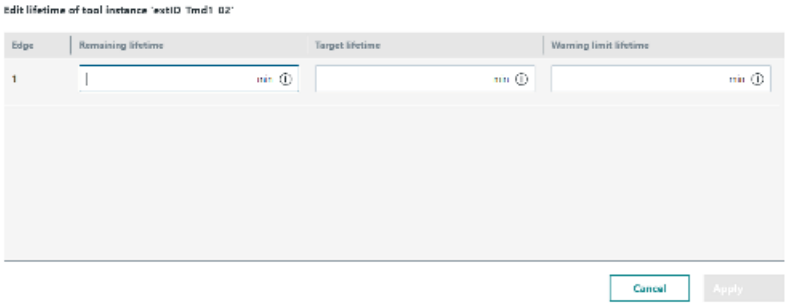
1. The "Monitoring tools" window is open. Click the "Select machines" button to select a machine.
   The "Select machines" window opens.



2. Select a machine and click the "Apply" button.
   The "Tools by remaining lifetime" window opens.



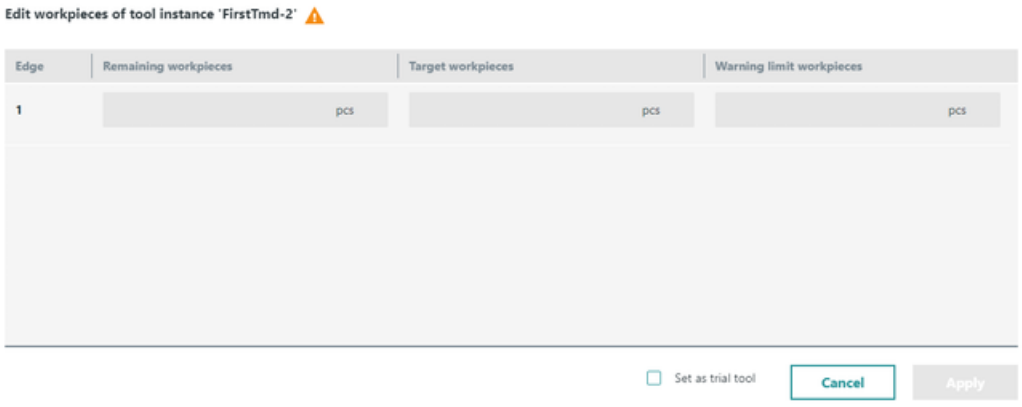
3. Click the pencil icon to open the "Edit lifetime of tool instance '{{value}}" window.
   Change the remaining lifetime in the "Remaining lifetime" input field and click the "Apply" button.



The new value is displayed on the server and on the machine.

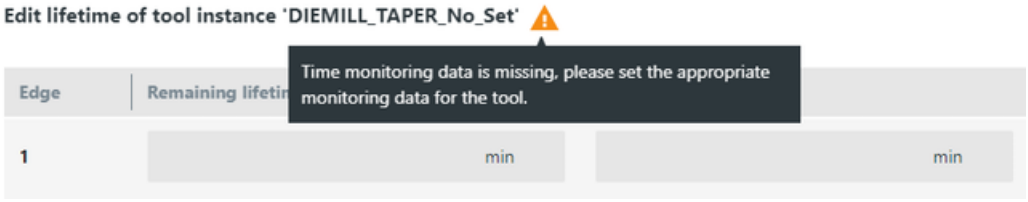
Brownfield tool

The Brownfield tool monitoring values can be edited in default setting. You have to configure the machine. Otherwise the tools monitoring type is different from the machines monitoring type.

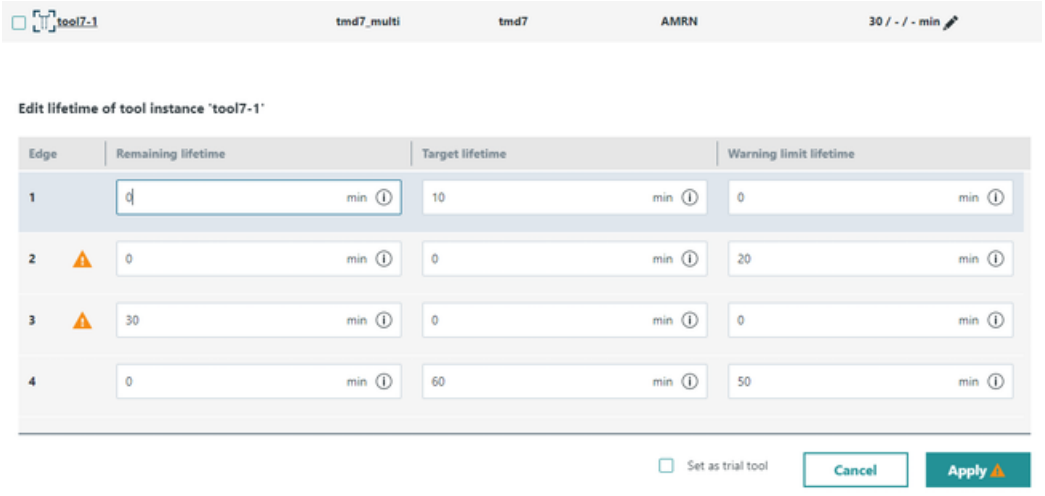


In the window "Edit lifetime/workpieces of tool instance" only the trial tool check box is selectable, if the monitoring type of the tool is not corresponding to the machines monitoring type.
The editing option for the fields "Remaining", "Target", "Warning" is disabled.

To enable the edit window fields, the monitoring type must be set on the machine first in the standard tool management, or if the tool is offloaded from the Internal view and reloaded, it is set automatically, as the tool is greenfield tool from now on.



On the application "ToolStock" or "Managed Machine", missing fields in the edit window are preset with the default value 0, if the tool monitoring data is set only partially.



Note

For machines that may get offline

If the network connection of a machine breaks down or a machine is switched off, the server needs up to 10 minutes to recognize that the machine is offline. During this time period, the user is able to change the value of the residual lifetime via the above described workflow. In this case, the value is not sent to the machine and the user input is overwritten by the old value. When the machine is offline, the Edit button is disabled and the user is informed that the machine is offline.

5.10 Tools on managed machines

5.10.1 Overview of tools on managed machines

With the "Tools on managed machines" function, it is possible to manage tools and adapters from machines other than SINUMERIK machines.

When creating or editing a magazine for the managed machine, you can enter magazine information.

Parameter

The following parameters are available:

Parameter	Description
Overview of managed machines	
Machine	Shows the generated machine
Hierarchical path	Shows the path of the hierarchical
Machine type	Shows the type of machine
⚠	If there is a yellow icon next to the hierarchical path, the machine is unconnected

Procedure

1. Click "Tools on managed machines" on the start page of the Mcenter.

- OR -
Open the following URL: Tools on managed machines (https://{ServerIP}/mmr/unconnected/overview)
The "Overview of managed machines" window opens and shows all machines.

5.10.2 Loading tools

Prerequisite

The machine is created and connected to the server.

For more Information, see Manage machines (Page 72)

Parameter

The following parameters are available:

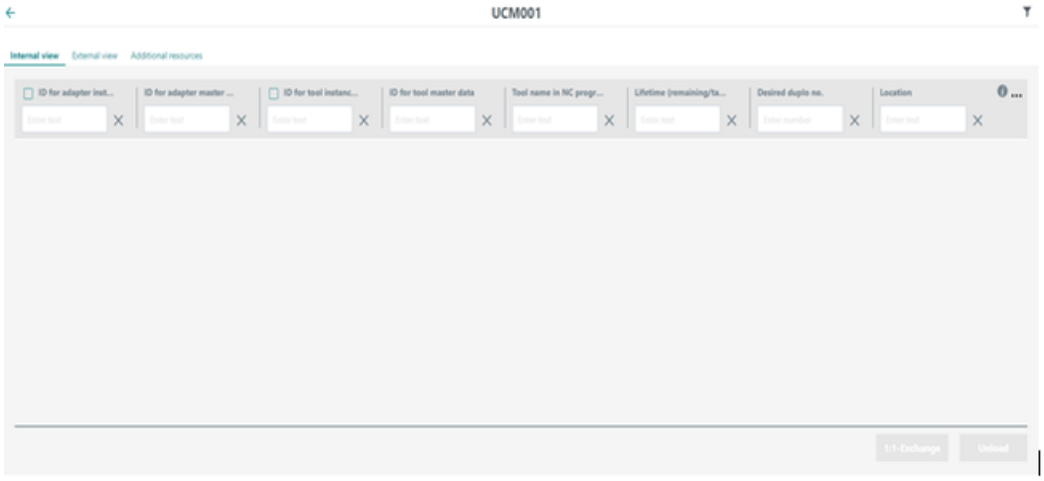
Parameter		Description
Internal view / external view		
ID for adapter instance		Shows the identifier for adapter instance data
ID for adapter master data		Shows the identifier for adapter master data
ID for tool instance data		Shows the identifier for tool instance data
ID for tool master data		Shows the identifier for tool master data
Tool name in NC program		Shows the tool name in the NC program
Lifetime (remaining/ target/warning)		Shows the residual, target, prewarning tool life in minutes or workpieces
Desired duplo No.		Shows the desired duplo number
Location		Shows the storage location
Target place		Shows the target place before loading a tool or adapter
		Displays further information
		Opens a window in which you select additional columns to be displayed in the overview These columns can optionally be configured to show further information The maximum number of additional columns is limited to 5 You can sort the individual columns in the overview The next time you log in with your user Id, the selected columns are on display
		Relocates a tool
		Deletes the tools after a confirmation prompt
Relocate the selected tool		
Unload reason		Select following unload reason: • Unknown • Broken tool • Worn out tool • Loud noise of tool • Empty place needed • Tool is needed on another machine • Bad workpiece quality • <User-defined reason>
Assembly		Activate the checkbox to relocate the tool to Assembly container
	Action flag *	Select how to proceed with the tool: • Decide further processing • Obtain • Overhaul • Assemble • Measure
	Comment	Enter an optional comment

Parameter		Description
To a cabinet		Activate the checkbox to relocate the tool to a cabinet
	Cabinet *	Select the tool cabinet from the drop-down list
	Container *	Select the container from the drop-down list

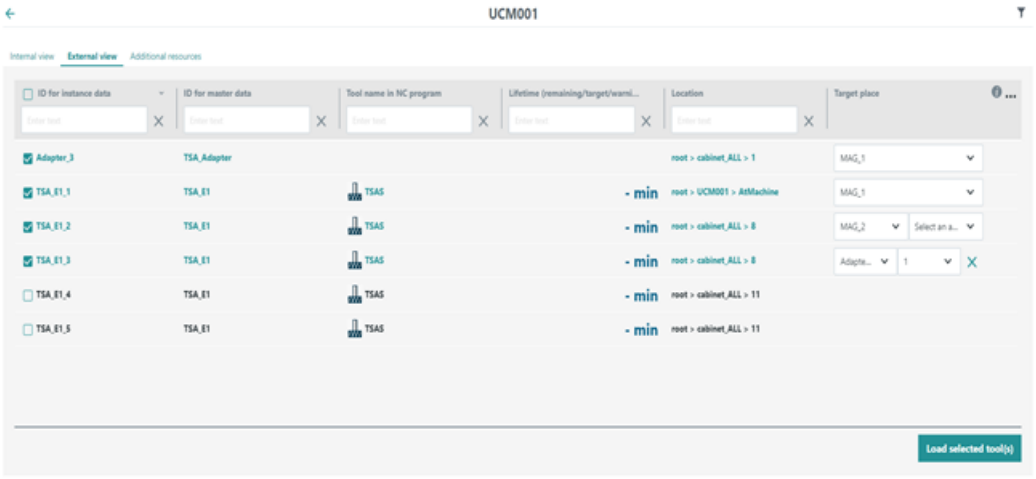
*) The fields marked with an asterisk are mandatory and must be completed.

Procedure

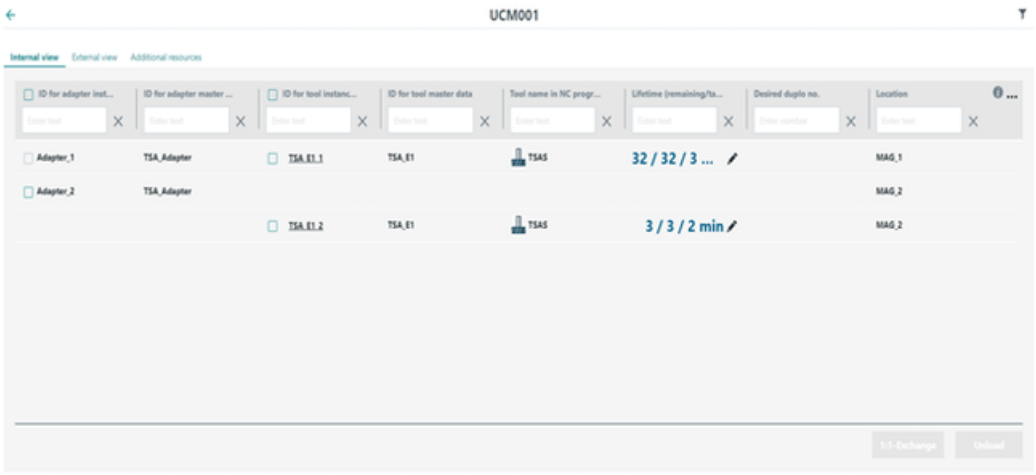
1. Click on the machine name of the "Overview of managed machines" window.
2. The "<Managed machines>" window "Internal view" tab opens and no tools and magazines are displayed.



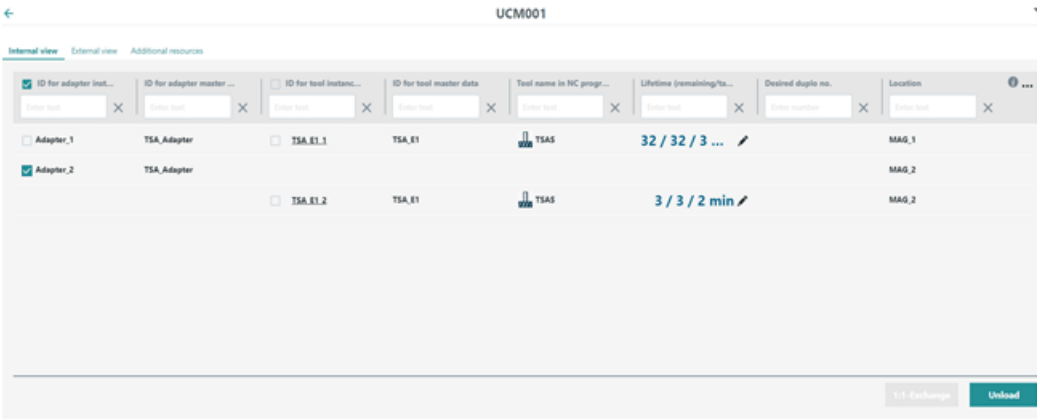
3. Click on the "External view" tab.
   You can see all tools available for loading the machine.
   - Activate the tools and/or adapters you want to load
   - Specify the target magazine
   - Also, you can specify target adapter and pocket index for tools
   - Click the "Load selected tool(s)"

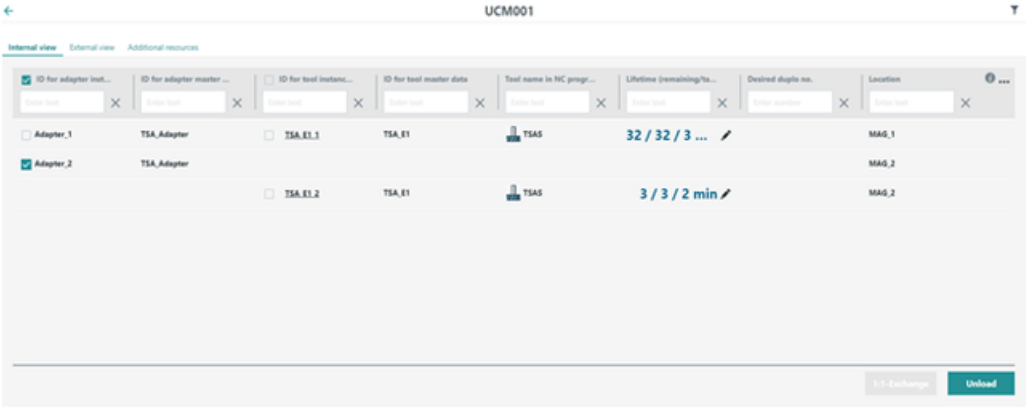


The "<Managed machines>" window "Internal view" tab opens and all selected tools, adapters and magazines are displayed.



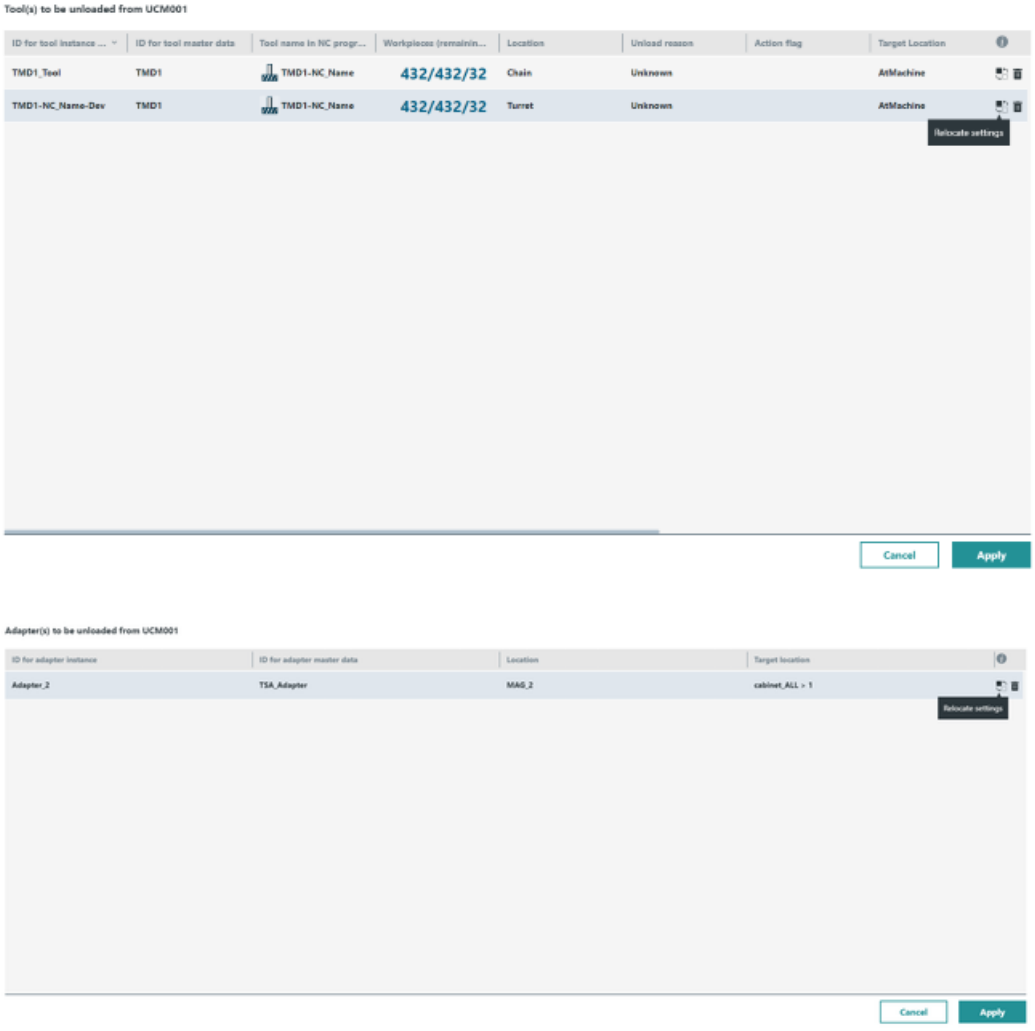
4. Activate the corresponding tools, if you want to unload tools or adapters.
   - Click on "Unload tools" to unload the tools.
     Adapters must be empty before unloading. Tools and adapters cannot be unloaded at the same time.
     - OR -
   - Click on "1:1-Exchange" to exchange the tools.
     Only tools can be exchanged.



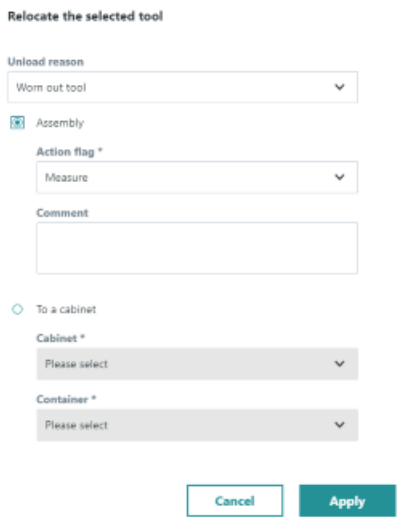


The "Tool(s)/Adapter(s) to be unloaded from <Manage machines>" window opens and you see all tools/adapters to be unloaded.

5. Click "Apply".



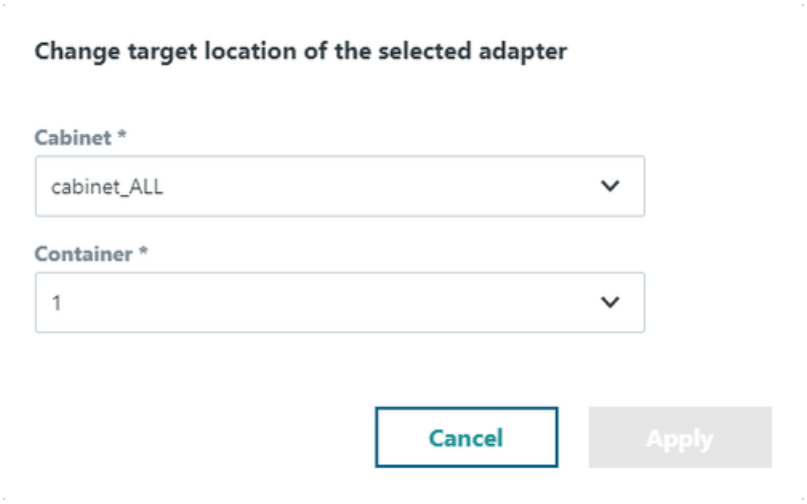
6. Click on "Relocate settings" to relocate the selected tool or adapter.
   The "Relocate the selected tool" window or "Change target location of the selected adapter" window opens.
   For tools:
   - Select the unload reason from the "Unload reason" drop-down list
   - Activate the location and select the appropriate details
   - Click "Apply" to relocate the tool
     - OR -
     Click "Cancel" if you do not wish to relocate the tool



For adapters:

– Select the target cabinet and container

– To relocate the adapter, click the "Apply" button.



5.11 Plan manufacturing equipment

5.11.1 Overview of tool plans

The "Overview of tool plans" window shows the tool plans created. You can sort the individual columns in the overview.

You can edit, add and delete tool plans or start balancing.

Tool plans can be imported from json files.
For an example, see Example for tool plan (Page 1061).

Tool plans can also be created and added to the overview using Swagger-UI.
For more information, see Import tool plan V1 (Page 932).

Parameter

The following information is displayed:

Parameter	Description
∨	This symbol appears when you click on the column heading. Click on the symbol to sort the elements alphabetically/numerically, either in ascending or descending order.
Tool plan name	Shows the name of the tool plan. Click the link to display the detailed information within the open window. If you press the right mouse button, you open the drop-down list. You can • open a new window - OR - • open a new tab In the latter case, you do not need to reload the "Overview of tool plans" page.
Workpiece name	Shows the name of the workpiece.
Number of tools	Shows the number of tools described in the tool plan
Uploaded on	Shows the date of upload in the format "dd.mm.yyyy".
	Specifies the number of tool plans.
	Deletes the tool plan.

Parameter	Description
	Meaning of the red warning symbol: • The tool master data are not available. • Indicates that there is currently no connection to the machine. The displayed data might be out of date. For more information about offline handling, see Creating tools on an offline machine (Page 524).
	Opens the "My Filters" window and filters tool plans according to the following criteria: • Tool plan name • Workpiece name • Number of tools • Uploaded on For more information, see List filtering (Page 46). Click on the filter icon again to close the filter window.

Procedure

1. On the start page of the Mcenter, click on "Plan manufacturing equipment".

   - OR -
   Open the following URL: Plan manufacturing equipment (https://{ServerIP}/mmr/tools/balancing/overview)

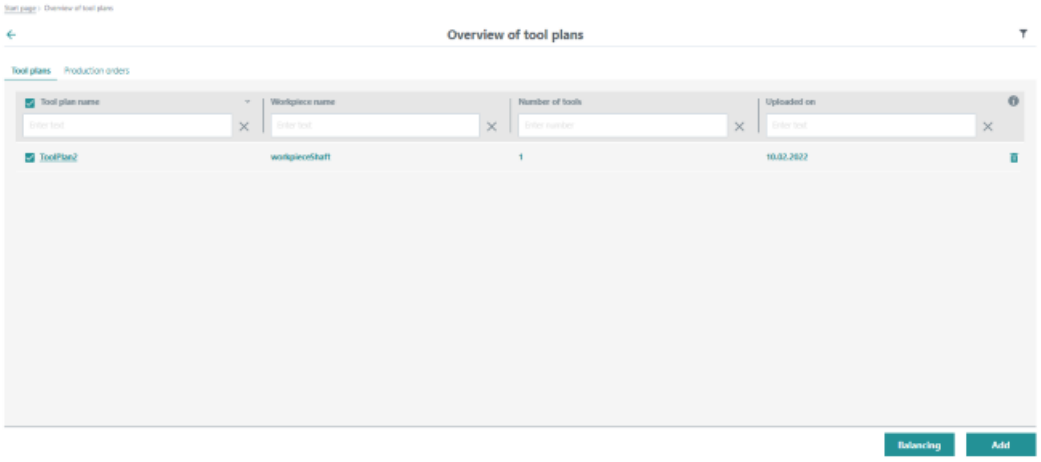
2. The "Overview of tool plans" window opens, and displays all uploaded tool plans.

   Note
   Refresh with the <F5> button

   When you reduce the window size, the icons on the right side disappear. Press the <F5> button to refresh the view and display the symbol.

3. Click "Add" to upload new tool plan.
   - The "Open" window appears.
   - Navigate to the path in which you saved the tool plan.
   - Select the desired json file and click "Open".
     The tool plan is imported. The progress is displayed on a progress bar.
     See the following example: Example of a json file.
   - You can change the tool plan parameters.
     For more information, see Editing a tool plan (Page 284).
4. Click the "Delete" symbol to delete a tool plan.

5. To view further data of a tool plan, click the underlined tool plan name in the list.
   For more information, see Displaying tool plan details (Page 282).
6. Click the "Balancing" button to start balancing.
   For more information, see Balancing (Page 286).



7. Open the "Production orders" tab to view or delete an order.
   For more information, see Deleting a production order (Page 296).

Example of a json file without additional resources

You can overwrite the following tool master data features by importing a json file:

- Lifetime
  - "targetToolLifeTime" overwrites the tool lifetime for tools which are in assembly or in cabinet.
- Prewarning limit
- Tool Id
  - "value":"NewToolIdent" overwrites the tool name for tools which are in assembly or in cabinet.

```
{
 "name": "ToolPlan2",
 "workpieceName": "workpieceShaft",
 "description": "ShaftX",
 "items": [
  {
   "toolClassName": "TMD1",
   "dNo": 1,
   "workingTimeProPiece": 10.1
  }
 ],
  "overwrites": [
  {
   "toolClassName": "TMD1",
   "cuttingEdgeOverwrites": [
    {
```

```
      "dNo": 1,
      "targetToolLifeTime": 777,
      "targetToolLifeTimeWarningLimit": 77
     }
   ],
   "toolValueOverwrites": [
    {
                "op": "Replace",
                "path": "/toolIdent",
                "value": "NewToolIdent"
           }
    ]
   }
  ]
}
```

Example of a json file with additional resources

```
{
  "name": "Import tool plan1",
  "description": "Description of toolplan",
  "workpieceName": "NameOfWorkpiece",
  "workPieceMaterialType": "TestWorkPieceMaterialType",
  "items": [
    {
      "dNo": "1",
      "toolClassName": "TCM_1",
      "referencedResourceId": 1,
      "workingTimeProPiece": "0.5"
    },
    {
      "dNo": "2",
      "toolClassName": "ATCM_3",
      "workingTimeProPiece": "0.4",
      "overwrites": {
        "toolIdent": ""
      }
    },
    {
      "dNo": "1",
      "toolClassName": "TCM_2",
      "workingTimeProPiece": "0.5"
    }
  ],
  "resources": [
    {
      "masterDataName": "Adp1",
      "referenceId": 1,
      "type": "Adapter"
    },
    {
      "masterDataName": "Cla1",
      "type": "Clamping"
    },
    {
      "masterDataName": "Cla1",
      "type": "Clamping"
    },
    {
      "masterDataName": "Mes1",
      "type": "MeasurementDevice"
    }
  ],
  "overwrites": [
    {
      "toolClassName": "TCM_2",
      "cuttingEdgeOverwrites": [
        {
          "dNo": "1",
```

```
            "targetToolLifeTime": "1299",
            "targetToolLifeTimeWarningLimit": "155",
            "targetToolLifePieces": "199",
            "targetToolLifePiecesWarningLimit": "15",
            "toolMaterialType": "TestToolMaterialType"
          }
        ],
        "toolValueOverwrites": [
          {
            "path": "/toolIdent",
            "value": "identB"
          }
        ]
      }
    ],
    "resourceOverwrites": [
      {
        "masterDataName": "Cla1",
        "resourceType": "MeasurementDevice",
        "overwrites": [
          {
            "path": "ppp",
            "value": "value1"
          }
        ]

      }
    ]
}
```


5.11.2 Displaying tool plan details

In the "<Tool plan ID>" window you can see all tools of a tool plan with their properties.

Parameter

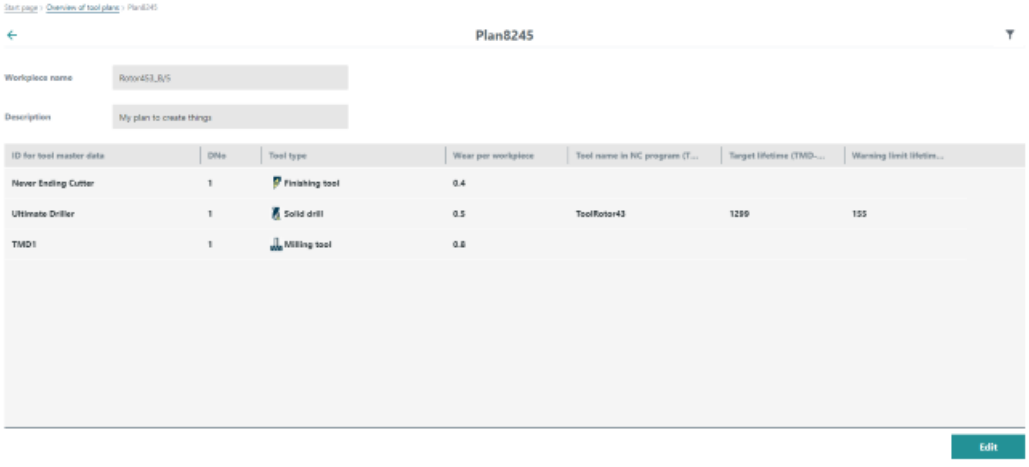
The following information is displayed:

Parameter	Description
Workpiece name	Shows the name of the workpiece.
Description	Shows remarks to the tool plan.
ID for tool master data	Shows the identifier of the master data.
DNo	Shows the cutting edge number.
Tool type	Shows the tool type and the corresponding symbol.
Wear per workpiece	Shows the wear per workpiece.
Tool name in NC program (TMD-Property will be over-written)	Shows the name of the tool in NC program. An entry in this field overwrites the value which was inherited from tool master data.

Parameter	Description
Target lifetime (TMD-Property will be overwritten) / Target workpieces (TMD-Property will be overwritten)	Shows the expected total lifetime of the tool in minutes or in workpieces.
Warning limit lifetime (TMD-Property will be overwritten) / Warning limit workpieces (TMD-Property will be overwritten)	Shows the lifetime in minutes or in workpieces at which a warning is displayed.
	Opens the "My Filters" window and filters tools in tool plan according to the following criteria: • ID for tool master data • DNo • Tool type • Wear per workpiece For more information, see List filtering (Page 46). Click on the filter icon again to close the filter window.

Procedure

1. Click on the underlined name of the tool plan in the "Overview of tool plans" window.
   The "<Tool plan ID>" window opens and displays an overview of needed tools with their properties.
2. Click on "Edit" to add or delete tools in tool plan:
   – Editing a tool plan (Page 284)
3. Click "Overview of tool plans" in the upper left navigation path.
   - OR -
   Click arrow "Back".



5.11.3 Editing a tool plan

You can change the data of an existing tool plan in the "<Tool plan name>" window.

Parameter

The following information is displayed:

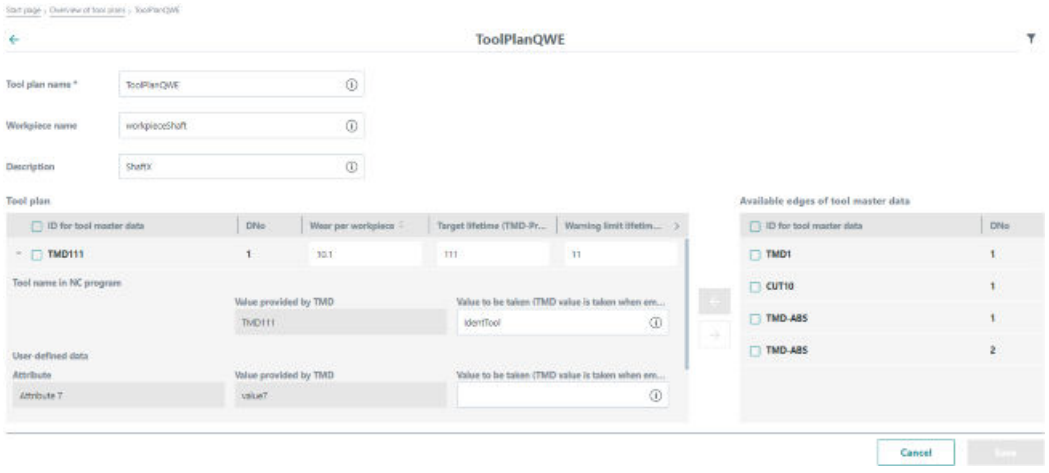
Parameter	Description
Tool plan name *	Shows the name of the tool plan.
Workpiece name	Shows the name of the workpiece.
Description	Shows remarks to the tool plan.
Tool plan	
ID for tool master data	Shows the identifier of the master data.
>	Possibility to overwrite the following parameters: • Tool name in NC program • If specified, User-defined data, see Creating or editing user-defined data (Page 139)
⚠	Meaning of the red warning symbol: • The tool master data are not available. • Indicates that there is currently no connection to the machine. The displayed data might be out of date. For more information about offline handling, see Creating tools on an offline machine (Page 524).
DNo	Shows the cutting edge number.
Wear per workpiece	Shows the wear per workpiece.
Tool name in NC program (TMD-Property will be over-written)	Shows the name of the tool in NC program. An Entry in this field overwrites the value which was inherited from tool master data.
Target lifetime (TMD-Property will be overwritten)	Shows the expected total lifetime of the tool in minutes.
Warning limit lifetime (TMD-Property will be overwritten)	Shows the lifetime in minutes at which a warning is displayed.
▼	Opens the "My Filters" window and filters available edges of tool master data according to the following criteria: • ID for tool master data • DNo For more information, see List filtering (Page 46). **Note:** The tools in the "Tool plan" table are not affected. Click on the filter icon again to close the filter window.
Available edges of tool master data	
ID for tool master data	Shows the identifier of the master data.
DNo	Shows the cutting edge number.
›	Maximizes "Tool plan" table. "Available edges of tool master data" table will be overlapped.
‹	Restores "Tool plan" table. "Available edges of tool master data" table will be visible again.

Parameter	Description
→	Deletes selected edges from tool plan.
←	Adds selected edges to tool plan.

*) The fields marked with an asterisk are mandatory and must be completed. An error message is output if you make an erroneous entry.

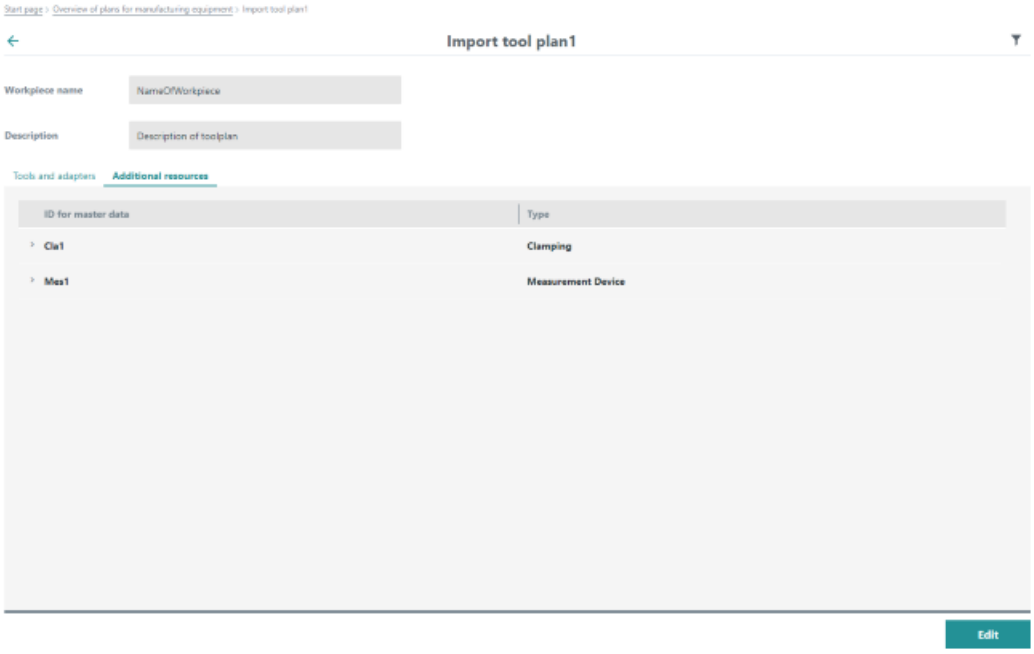
Procedure

1. Click on "Edit" button in the "<Tool plan name>" window.
   The "Tool plan" table is released for changes and additions. Additionally the "Available edges of tool master data" table is displayed.



2. In the "Available edges of tool master data" table, select the edges you want to add to tool plan. To select all edges, activate the checkbox in the table header.
   Click the arrow button to left.
3. In the "Tool plan" table, select the edges, that you want to delete from tool plan. To select all edges, activate the checkbox in the table header.
   Click the arrow button to right.
4. Type a new tool plan name if applicable.
5. Change the values in the other fields where required.

6. Click "Save".
   - OR -
   Click "Cancel" to discard the changes.
   The "<Tool plan name>" window reopens in view mode. The previously changed data are displayed.
7. You can edit a tool plan with additional resources (adapters, clampings and measurements). Adapters are used in the same tab as tools. Measurement and clamping devices are used in the separate tab "Additional resources".



5.11.4 Balancing

In the "Overview of tool plans", you can automatically create tool instances for a production order on a specific machine.

You have the possibility to select several tool plans.

The balancing takes place in 4 steps.

Prerequisite

A tool master data set has already been created for each referenced tool.

The "Balance" button is displayed after you have selected at least one plan.

Parameters

Step 1/4	Description
Tool planning - Choose a machine for the production sequence	
Selection	Open the drop-down list and select the hierarchical path.
Machine	Shows the associated names of the machines.
Hierarchical path	Shows the hierarchical path.

Step 2/4	Description
Tool planning - Order assignment	
Production order *	Enter the name of the production order.
Tool plan name	Shows the name of the tool plans.
Workpiece name	Shows the name of the respective workpiece.

Step 3/4	Description
Tool planning - Choose criteria for tool instance search	
Hierarchical path	Shows the hierarchical path. The first line shows the target machine entered in step 1/4. If you change the target machine in step 1/4, the path in step 3/4 is adjusted.
Location	Shows the names of the machine and the storage places.
Selection	Open the drop-down list and select the hierarchical path of the storage place. Subsequently, all storage places belonging to the path can be selected in the drop-down list.
Please select	Select places you wish to scan for existing tools. The target machine and Assembly are displayed by default.
✕	Deletes the respective line.

Step 4/4	Description
Tool planning - Check results and finish tool planning Tab "Tools to prepared"	
ID for tool master data	Shows the identifier of the tool master data.
DNo	Shows the cutting edge number.
Target lifetime	Shows the expected total lifetime of the tool in minutes or in workpieces.
Wear per workpiece	Shows the wear time of workpiece.
Wear time from reservation	Shows the added wear of all reserved tools found.
New tool instances required	Shows the number of tools to be created. 0 = A tool for the master data set has been found. 1 = No tool for the master data set has been found and a new tool is created by default.
Tool planning - Check results and finish tool planning Tab "Tools reservation (x)"	

Step 4/4	Description
ID for tool instance data	Shows the identifier of the tool instance data.
ID for tool master data	Shows the identifier of the tool master data.
Location	Shows the storage place, e. g. Assembly or the hierarchical path to a box in a cabinet, where the components are stored.
DNo	Shows the cutting edge number.
Remaining lifetime	Shows the residual tool life in minutes.
Wear per workpiece	Shows the wear time of workpiece.

(x) Shows the number of tools

Note

Balancing

Tools without remaining lifetime, or which are not subject to standard monitoring, are considered as not operational. For these tools a replacement tool is automatically generated.

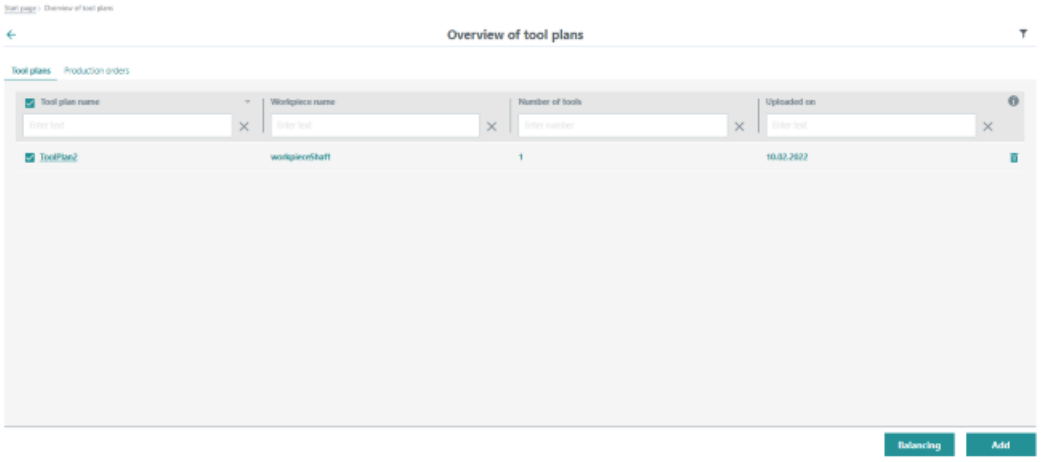
Note

New non-breaking changes not propagated

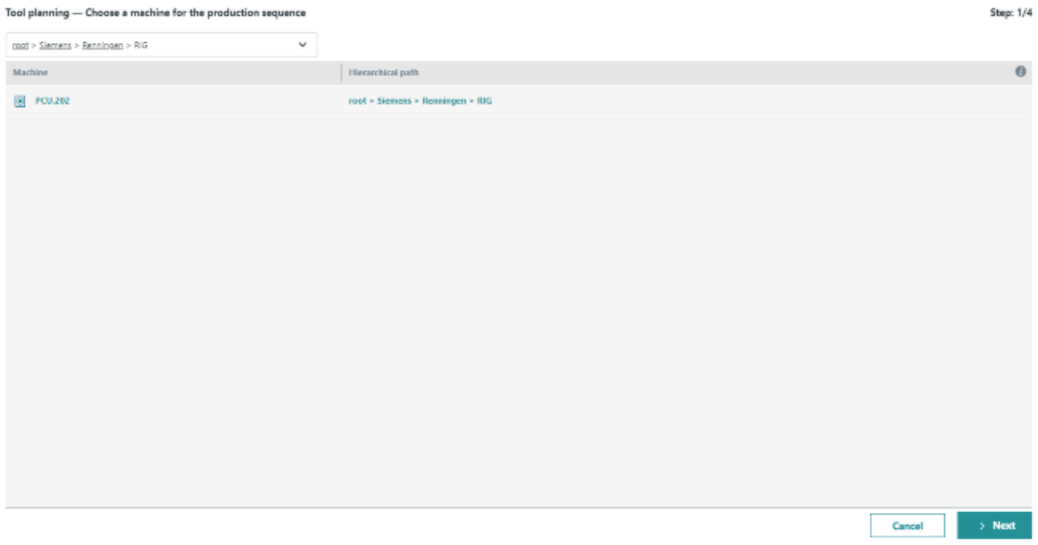
If a new non-breaking master version exists, but the changes are not propagated to the specific tools, these tools will not be taken into the balancing. For these tools, a replacement tool is created.

Procedure

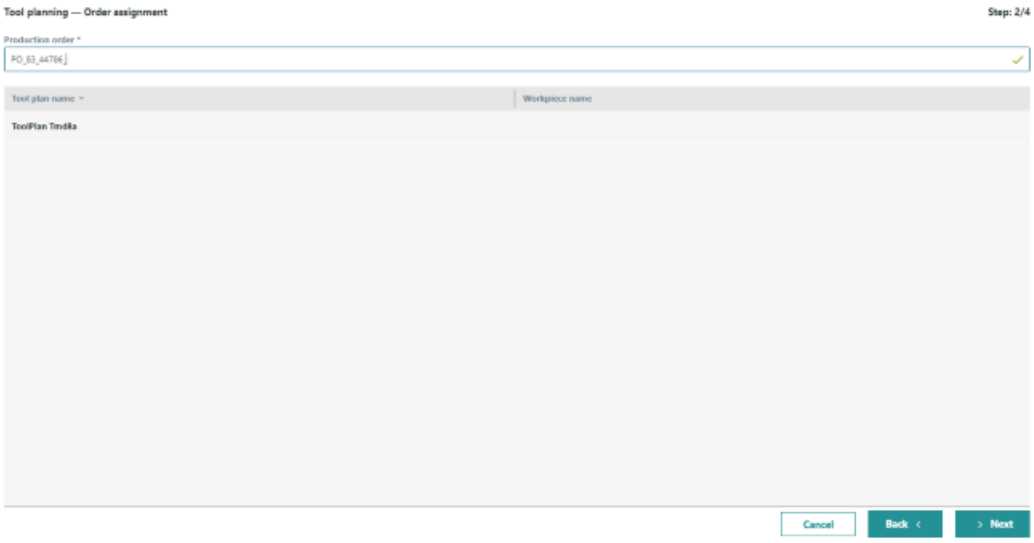
1. Select at least one tool plan in the "Tool plans" tab of the "Overview of tool plans" window and click on the "Balancing" button.
   To select all tool plans, activate the checkbox in the table header.



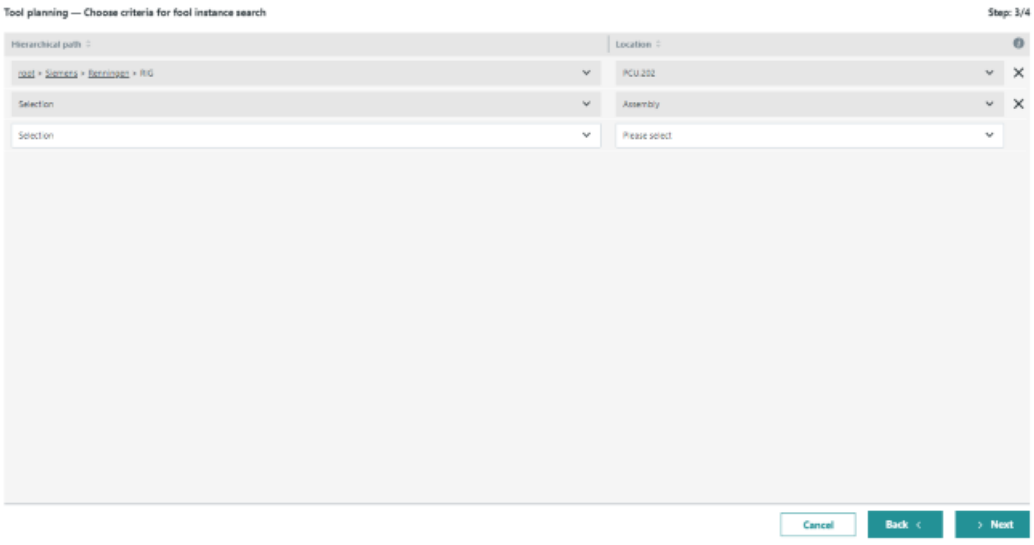
2. The "Tool planning - Choose a machine for the production sequence", "Step 1/4" window opens.
   - Open the "Selection" drop-down list and select the hierarchical path for the desired machine.
     The machines belonging to the path are displayed.
     Activate the desired machines.
   - Click on the "> Next" button to continue.
     - OR -
     Click on the "Cancel" button to reset the selection.



3. The "Tool planning -Order assignment", "Step 2/4" window opens.
   – Enter the name of the order in the "Production order *" input field.
   – Click the "Next" button to continue.
     - OR -
     Click the "Back <" button to return to the previous window.
     - OR -
     Click the "Cancel" button to finish the process.

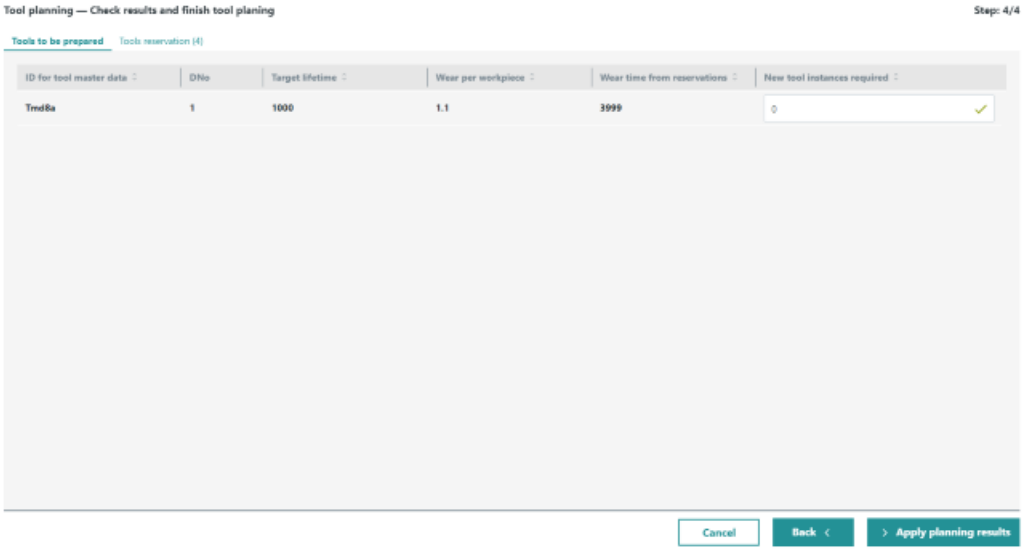


4. The "Tool planning - Choose criteria for tool instance search", "Step 3/4" window opens. Select the places to search for existing tools:
   - If you need a place with a path, e. g. for machines or cabinets, select the hierarchy path in the "Selection" drop-down list. Then all storage locations belonging to this path are entered in the selection box for "Selection".
   - If you need a location without a path, e.g. for assembly, start the selection directly in the "Storage location" column. The column "Hierarchy path" remains empty.
   - Click the "> Next" button to continue.
     - OR -
     Click the "Back <" button to return to the previous window.



5. The "Tool planning - Check results and finish tool planning", "Step 4/4 ", tab "Tools to be prepared" window opens.
   Check the search result.

   – Click the "> Apply planning results" button to continue.
     - OR -
     Click the "Back <" button to return to the previous window.



6. Open the tab "Tools reservation (x)".

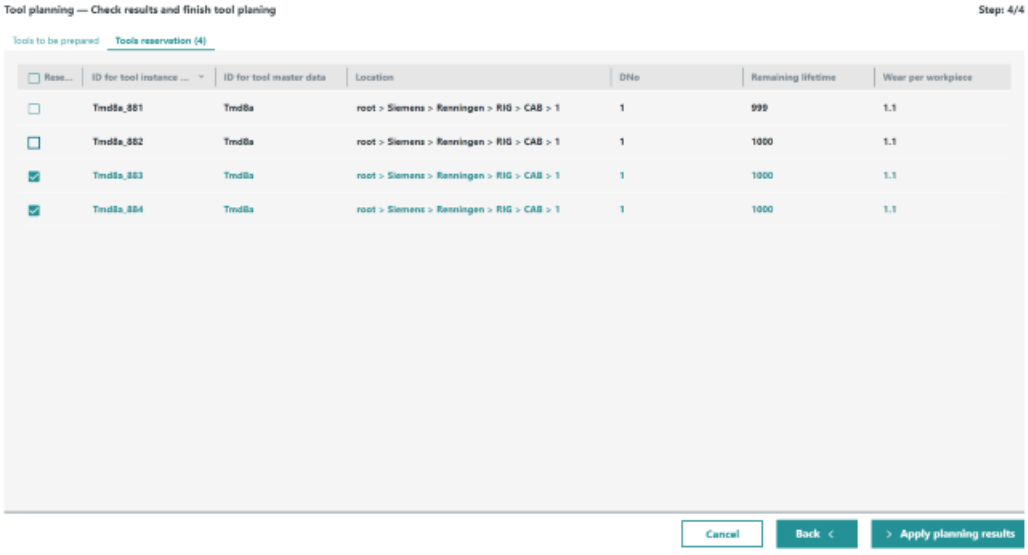
Note

Tools with the right type of monitoring

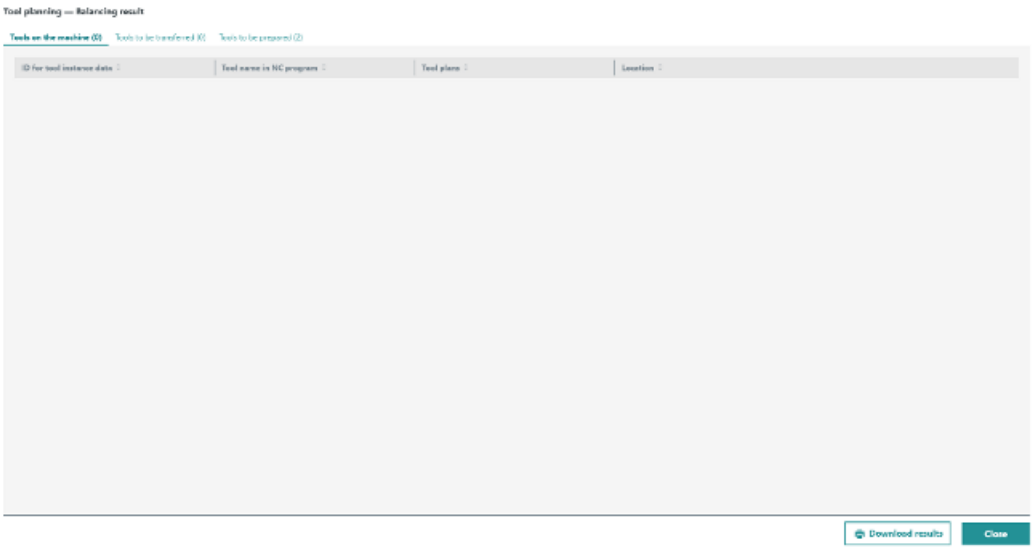
Tools are only displayed if the residual value of the number of pieces or service life is above zero. Other tools, i. e. tools for which the monitoring type is not the same as the globally defined monitoring type and/or for which the residual value is zero, cannot be reserved.

For more information, see Configuring tool life observation method (Page 953).

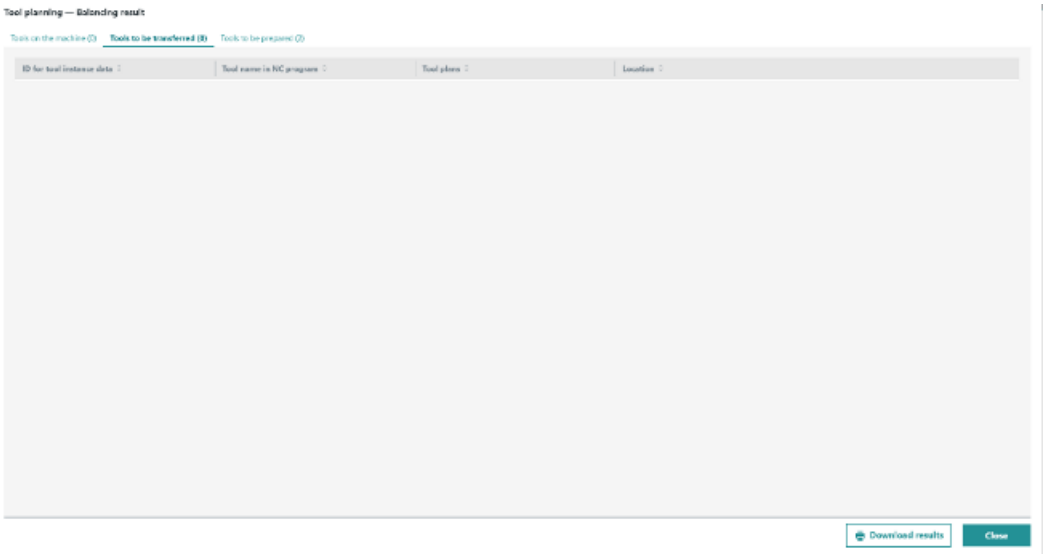
– All tools for reservation are preselected.
  You can deactivate the check box of a tool. The "Remaining tool life from reservation" also changes afterwards.
– Click the "> Apply planning results" button to continue.
  All selected tools will receive the name that is defined in the tool plan. Only the name of tools which are already used on a machine will not be changed.
  - OR -
  Click the "Back <" button to return to the previous window.



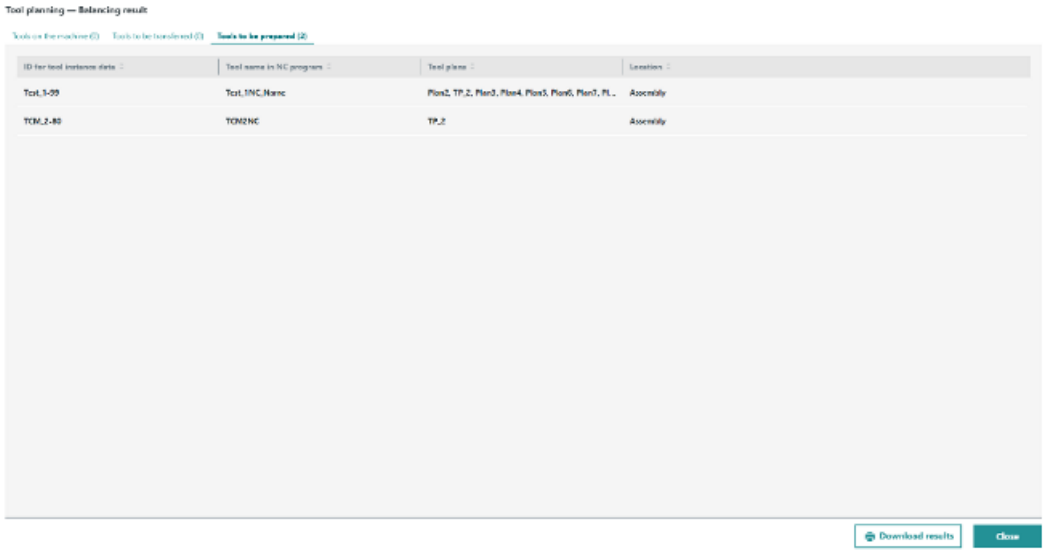
7. The "Tool planning - Balancing result" tab window opens.
   The results can be found in the following tabs:
   – Tools on the machine (x): Displays the reserved tools on the machine.



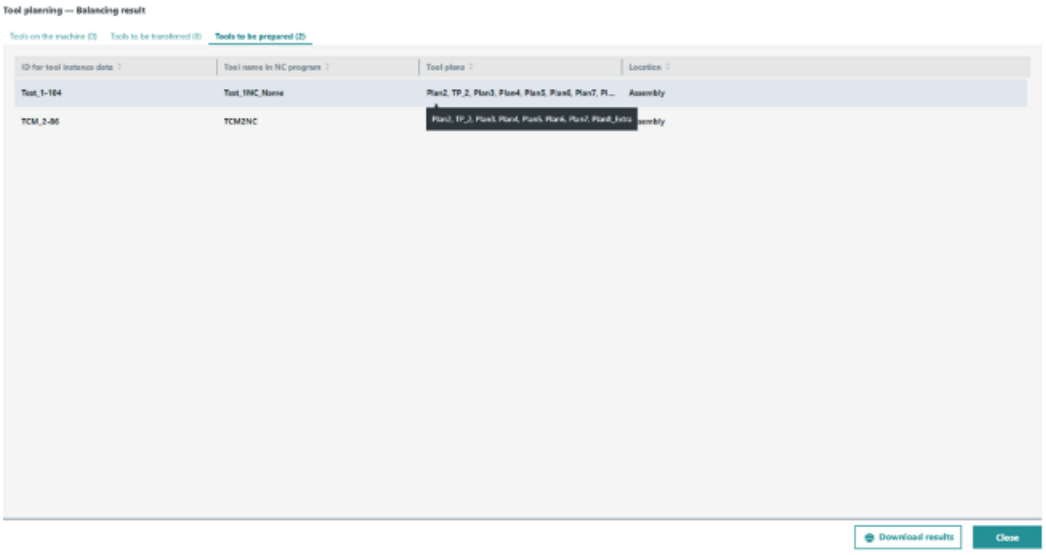
– Tools to be transferred (x): Displays the tools that have to be moved to the machine (e.g. from a cabinet).



– Tools to be prepared (x): Displays the tools that must be prepared in "Presetting".



The tool plans are listed in the "Tool plans" column.
If there are too many tool plans to be displayed, the 3 dots show that there is additional data.
You can display the complete tool plan list via the tooltip:



– Missing components (x): On display if components (such as holders) are missing for newly created tools in presetting. This tab is only displayed if components are found.

Click the "Download results" button to generate a report from tools to be transferred, the Tool names in NC program, the Tool plans and the missing components.
Click the "Close" button to complete the balancing process.

Automatically created tools are listed in the window Task overview to provide tools (Page 239). The production order is displayed in the "Reserved" column.

5.11.5 Deleting a production order

You can delete an existing production order without deleting a tool plan.

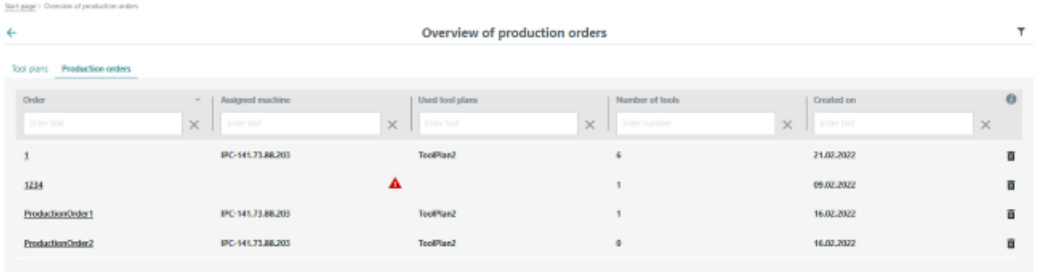
Parameters

The following information is displayed:

Parameter	Description
Order	Shows the name of the production order.
Assigned machine	Shows the associated names of the assigned machines.
Used tool plans	Shows the tool plan in which the order is used.
Number of tools	Shows the number of tools included in the order.
Created on	Shows the date when the order was created.
	Specifies the number of orders.
	Deletes the order.

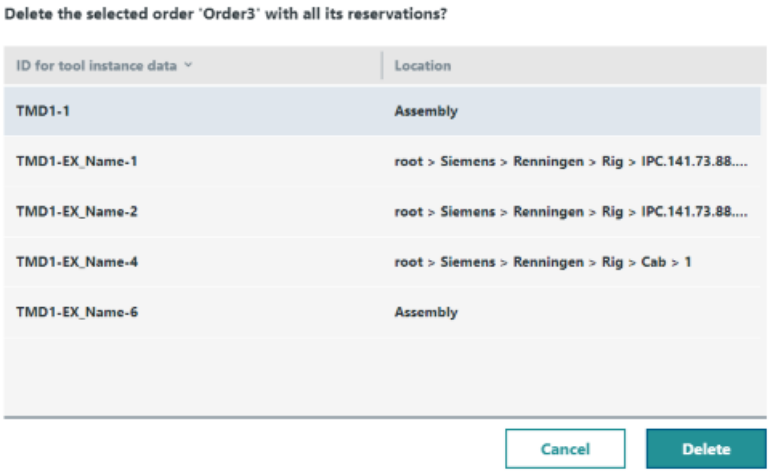
Procedure

1. Open the "Production orders" tab of the "Overview of tool plans" window.



2. To view further data of an order, click the underlined order name in the list.
3. Click the "Delete" symbol to delete an order.

4. The "Delete the selected order <order name> with all its reservations?" window opens and shows all existing reservations.
5. Click "Delete" to delete the order with all its reservations.
   - OR -
   Click "Cancel" to cancel the process.



5.12 OEM data sets

5.12.1 Overview of OEM data sets

The "Overview of OEM tool data sets" window shows the OEM-specific tool data sets.

In order to create new and additional OEM data sets, you have the following options:

- Creating OEM tool data sets by importing INI files (Page 300)
- Creating OEM tool data sets via a template (Page 303)
- Copying OEM tool data sets (Page 307)

You can change the data of an OEM tool data set in the "<OEM tool data sets>" window.

You can sort the individual columns.

For more information, see Editing OEM tool data sets (Page 309).

Note

To configure the machine client, the user should always correlate the adequate controllers user manual.

Parameter

The following information is displayed:

Parameter	Description
∨	This symbol appears when you click on the column heading. Click on the symbol to sort the elements alphabetically/numerically, either in ascending or descending order.
OEM tool data set	Shows the name of the OEM-specific tool data set. Click the link to display the detailed information within the open window. If you press the right mouse button, you open the drop-down list. You can • open a new window - OR - • open a new tab In the latter case, you do not need to reload the "Overview of OEM tool data sets" page.
Machine type	Shows the machine type.
Referenced tool master data	Shows the name of the referenced tool master data set.
Revision(s) of TMD-ID	Shows the affected revisions of the tool master data for this OEM data set.
⚠	Indicates that there is a newer tool master data revision. To remove this warning symbol, click "Bulk copy". See Copying OEM tool data sets (Page 307).
Source file	Shows the INI file from where the tool data comes.
Last change	Shows the date of the last change in the format "dd.mm.yyyy".

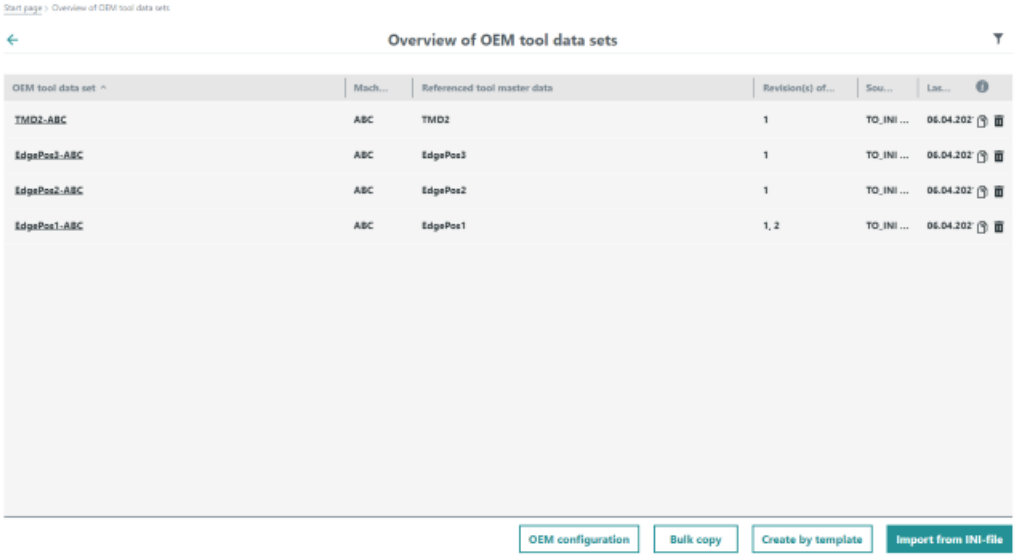
Parameter	Description
	Specifies the number of tool data sets.
	Copies a OEM data set.
	Edits the number of OEM data sets.
	Deletes the OEM tool data sets.
	Opens the "My Filters" window and filters OEM data according to the following criteria: • OEM tool data set • Machine type • Referenced tool master data • Revision of TMD-ID • Revisions of the tool master data • Source file • Last change For more information, see List filtering (Page 46). Click on the filter icon again to close the filter window.

Procedure

1. On the start page of the Mcenter, click on "OEM tool data sets".

   - OR -
   Open the following URL: Overview of OEM tool data sets (https://{ServerIP}/mmr/oemdata/overview).

2. The "Overview of OEM tool data sets" window opens.



5.12.2 Creating OEM tool data sets by importing INI files

Under "OEM configuration", you set the number of data elements that is used for TPC, DPC, or MOPC.

These settings also affect the data amount when you import OEM data:

- If the INI file contains more data than defined under "OEM configuration", only the configured number is imported. The remaining data is trimmed.
- If the INI file contains less data than defined under "OEM configuration", the data set is filled up with zeros.

Prerequisite

Before you add data from an INI-file, a tool master data set must be created.
For more information, see Tool master data (Page 195).

At least one machine type must be configured.
For more information, see Manage machines (Page 72).

The INI-file with the OEM data should be stored in some directory.
For an example, see Example for OEM tool data set (Page 1062).

Parameter

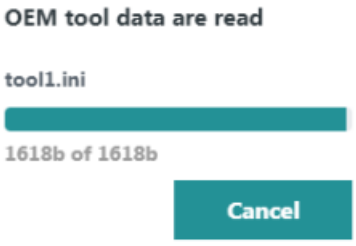
The following information is displayed:

Parameter	Description
For machine type	Select a machine type from the drop-down list.
Name of OEM tool data	Activate the option button: • Automatically in format "ID for tool master data - Machine type" • Without identifier
Select read out data set and link with the tool master data	Activate the check box: • Loaded tool name • Corresponding tool master data
	Specifies the number of listed tool names.

Procedure

1. The "Overview of OEM tool data sets" is open.
   If you have already saved an INI-file with configured data to a drive, then click on "Import from INI-file".
2. A window opens in which you can select the directory in which the INI-file was stored.

3. Select the file.
   The OEM tool data sets are imported and the progress is displayed on a progress bar.



Note

INI file data

Only "." is accepted as decimal separator for numbers. Otherwise, the import fails. Until 1.2.1.0 release, "," was considered as the valid decimal separator. With the upgrade of MMR / Tools to 1.3.0.0, all "," characters contained in the values of previously created OEM tool data sets are automatically converted to "." character.

If the INI file contains more data, the exceeding data items are not incorporated.

If the INI file contains less data, the other values are automatically set to zero.

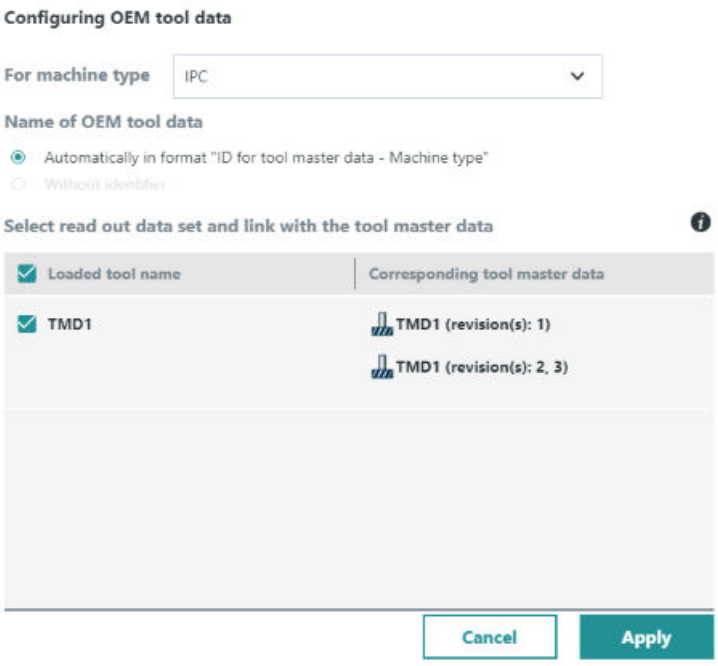
4. After the data have been imported, the "Configuring OEM tool data" window opens.
   - Select the machine type from the drop-down list "For machine type".
   - The option button "Automatically in format ID for tool master data - machine type" is automatically selected to define the name of OEM tool data .

     Note

     Assigning an OEM data set

     The OEM data set can be assigned to a master data set only when the following data sets have the same name:
     - Tool name in the NC program
     - Tool name, "$TC_TP2" in the OEM file to be imported
     - Tool type, "$TC_TP8"

   - Activate the checkbox for the desired Tool ident.ID
   - To accept the tool master data, click on "Apply" and the tool overview is displayed.
     - OR -
     To cancel the operation, click on "Cancel".



5.12.3 Creating OEM tool data sets via a template

Prerequisite

At least one machine type must be configured.
For more information, see Manage machines (Page 72).

Only existing machine types can be used for the OEM data assignment.

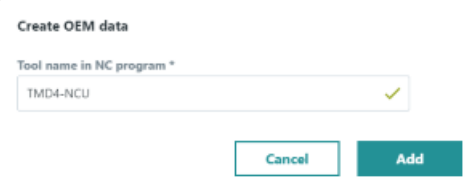
Parameter

The following information is displayed:

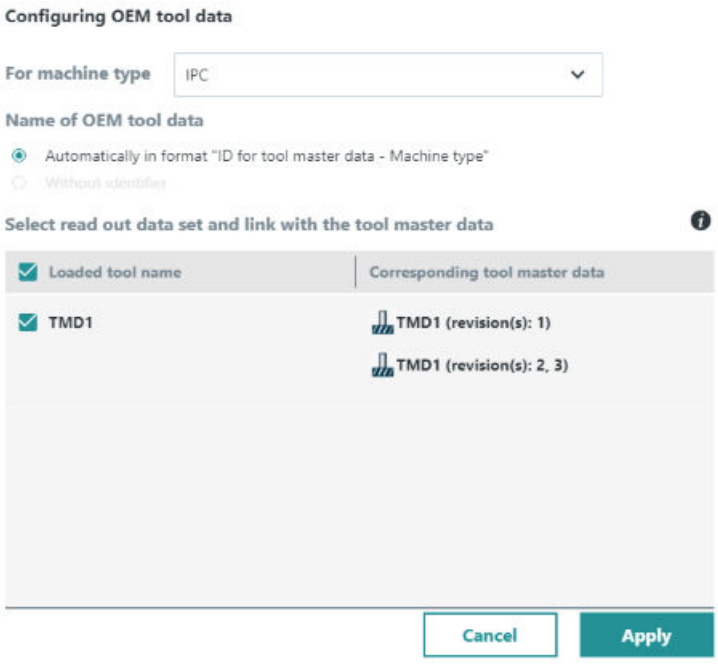
Parameter	Description
For machine type	Select a machine type from the drop-down list.
Name of OEM tool data	Activate the option button: • Automatically in format "ID for tool master data - Machine type" • Without identifier
Select read out data set and link with the tool master data	Activate the check box: • Loaded tool name • Corresponding tool master data
	Specifies the number of listed tool names.

Procedure

1. The "Overview of OEM tool data sets" is open.
   If you create an OEM data set using the user interface, click on "Create by template".
2. The "Create OEM Data" window opens.
   - Enter the tool names in the NC_program, e.g. FACE_MILL32.
   - Click on "Add".



3. The "Configuring OEM tool data" window opens.
   - Select the type from the drop-down list "For machine type".
   - The option field "Automatically in format "Identifier for tool master data - machine type"" is selected to define the name of OEM tool data automatically.
   - Activate the checkbox for the desired Tool.
   - Click on "Apply" and the tool overview is displayed.
     - OR -
     To cancel the operation, click on "Cancel".



Note

Number of property values

The creation of OEM data via UI provides values for 64 TPC properties. You can specify another 64 DPC and 64 MOPC-properties for each edge.

5.12.4 Configuring OEM tool data sets

Note

Modifying the data set amount

If you change the number of TPCs, DPCs, or MOPCs for a machine type, the number of data elements in existing data sets is also modified:

- If the number of data elements is reduced, the data set is trimmed.
- If the number of data elements is increased, the data set is filled up with zeros.

Prerequisites

In order to configure OEM tool data sets, you need to have one of the following roles:

- Administrator
- Key user
- Manufacturing engineer
- Technologist
- NC Programmer expert

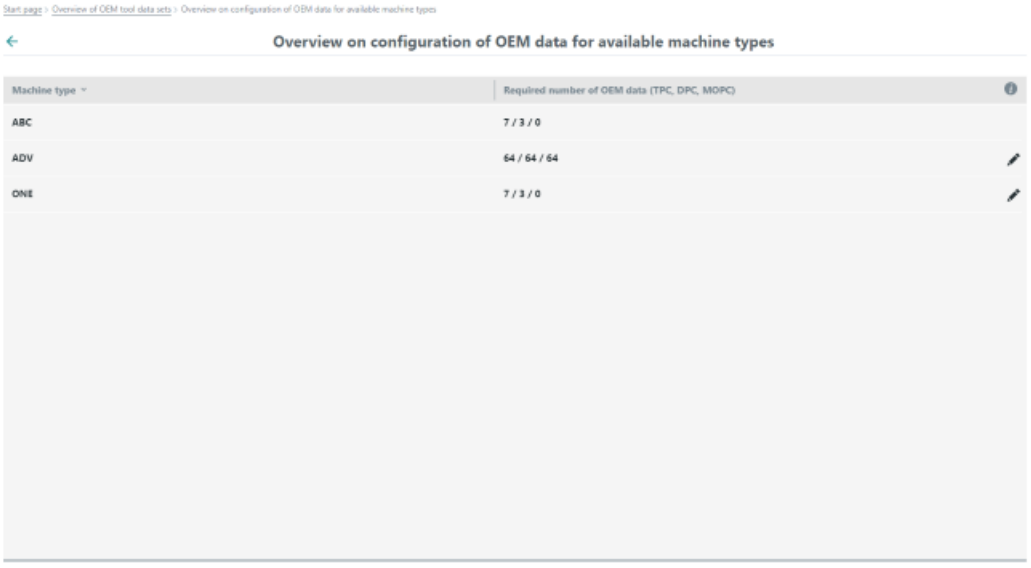
The machine must be connected.

Parameters

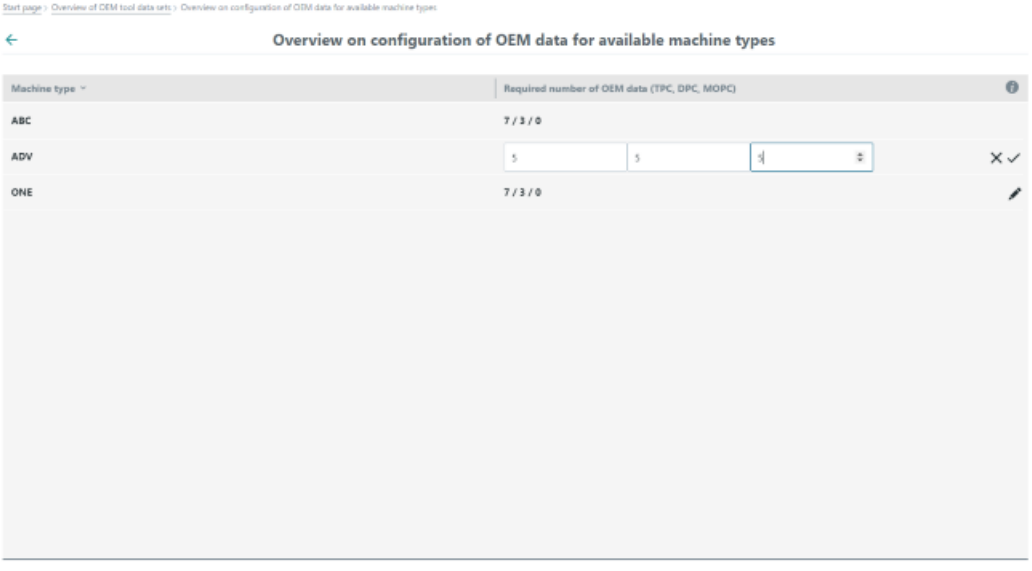
Parameters	Description
Machine type	Specifies the machine type.
Required number of OEM data	Specifies the OEM data for TPC, DPC and MOPC • User-specific tool data • User-specific edge data • User-specific monitoring data The maximum number of data is 64 for each category.
	Cancels the editing of the configuration.
	Saves the configuration.
	Edits the configuration.

Procedure

1. Click on the "OEM configuration" button. The "Overview on configuration of OEM data for available machine types" window opens.
   For a new machine type, the default configuration is used. A corresponding entry is displayed with a yellow exclamation mark. The following tooltip is shown when hovering the mouse over such an entry:
   The standard configuration with the maximum amount of OEM data is used
   To remove the yellow exclamation mark, edit and then save the configuration.



2. Click the pencil icon to open the configuration fields. Enter the number of OEM data items and click "Save" to save the configuration.
   You can change the configuration of machine types that has related OEM data sets. In this case, the following confirmation prompt is displayed after clicking "Save":
   When there are too many OEM-data, then they are deleted. When there are additional OEM-data required they are generated with zeroes.



Note
OEM data verification

When you carry out the OEM data configuration, the OEM data is verified when you load a tool.

For more information, see:

Creating OEM tool data sets by importing INI files (Page 300)

Creating OEM tool data sets via a template (Page 303)

5.12.5 Copying OEM tool data sets

The "Overview of OEM tool data sets" window shows the OEM-specific tool data sets.

You have the following options to copy OEM tool data sets:

- Copy single OEM data sets
- Copy bulk data sets for all machine types

Prerequisite

At least one machine type must be configured.
For more information, see Manage machines (Page 72).

You can copy the respective property values of OEM data sets from a similar machine of a different type or production line. The number of edges must be equal.

Parameter

The following information is displayed for copying single OEM data sets:

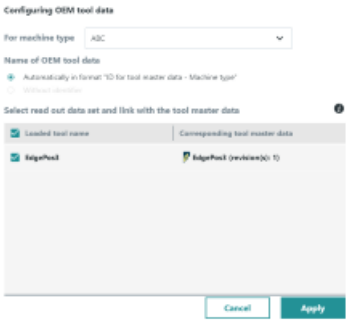
Parameter	Description
For machine type	Select a machine type from the drop-down list.
Name of OEM tool data	Activate the option button: • Automatically in format "ID for tool master data - machine type" • Without identifier
Select read out data set and link with the tool master data	Activate the check box: • Loaded tool name • Corresponding tool master data

The following information is displayed for copying bulk data sets for all machine types:

Parameter	Description
Select source tool master data	Select the data via the drop-down list. You can also filter the available tool master data by typing text.
Select source revision(s)	Select the source revision(s) via the drop-down list.
Select destination revision(s)	Select the destination revision(s) via the drop-down list.

Procedure for copying a single data set

1. The "Overview of OEM tool data sets" window is open.
2. Select a data set and click on the "Copy" symbol on the right-hand side to copy the set with the respective values. The "Configuring OEM tool data" window opens.



3. Select a machine type, activate the checkbox "Loaded tool name - Corresponding tool master data" and click on the "Apply" button.
4. A green field with the message "OEM data was copied successfully " appears in the top right window area.

Note

Assignment to the same machine type

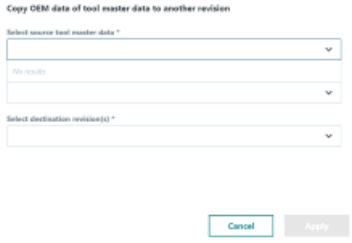
If you assign the OEM data set to a machine type for which the OEM data set already exists, the error message "Error already exists, OEM data could not be created" appears in the top right window area.

Copying bulk data sets for all machine types

You can copy OEM data for new tool master data revisions in order to reuse the OEM data on all the assigned machines.

Procedure

1. The "Overview of OEM tool data sets" window is open.
2. Click on the "Bulk copy" button to copy the data for all the machine types. The "Copy OEM data of tool master data to another revision" window opens.



3. Select the required information in the respective drop-down list and click on "Apply".

5.12.6 Editing OEM tool data sets

You have options for processing the OEM tool data sets.

You can enter up to 64 tool (TC_TPC) and edge properties (TC_DPC and TC_MOPC) for the machine type.

For more information, see Example for OEM tool data set (Page 1062).

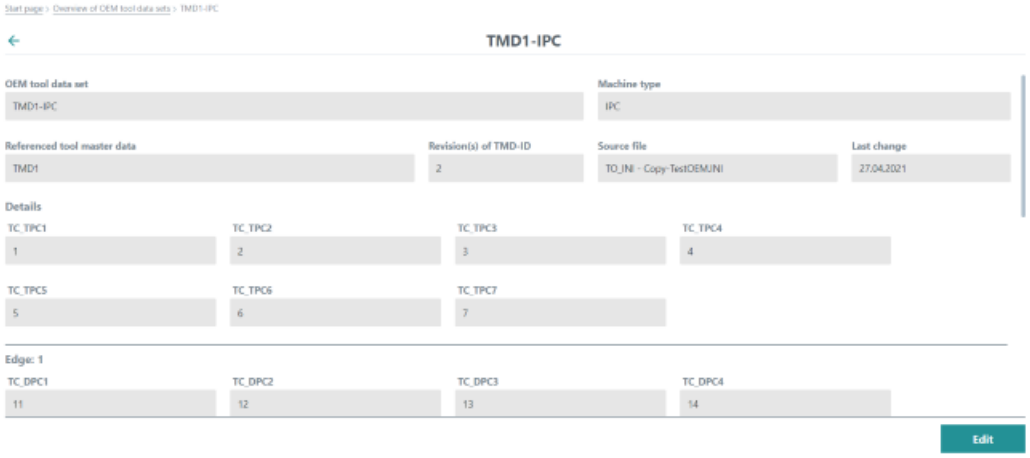
Parameter

Depending on the OEM tool, you are shown the following data:

Parameter	Description
OEM tool data set	Shows the OEM tool data set name.
Machine type	Shows the machine type name.
Referenced tool master data	Shows the referenced tool master data.
Revision(s) of TMD-ID Description	Revisions of the referenced tool master data
Source file	Shows the source file.
Last change	Shows the date of the last change in the format "dd.mm.yyyy".
Details	
TC_TPC1 to TC_TPC64	
TC_DPC1 (Edge 1) to TC_DPC64 (Edge 1)	
TC_MOPC1 (Edge 1) to TC_MOPC64 (Edge 64)	
	Click on the "Edit" button to edit the data.

Procedure

1. Click on the underlined name of the desired tool data set in the "Overview of OEM tool data sets" window.
2. The "<ID for OEM dataset>" window opens.
   Click on "Edit".



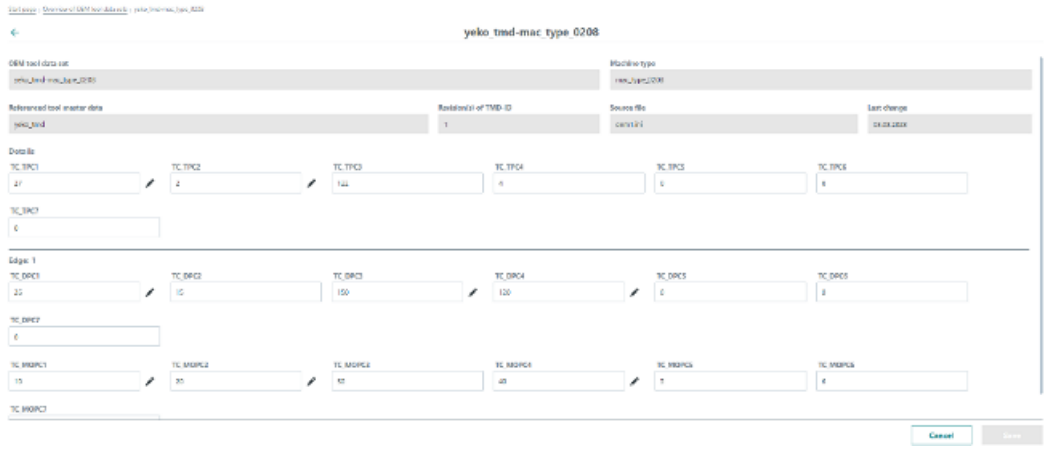
3. The input fields are active, and you can enter the required values.

Note

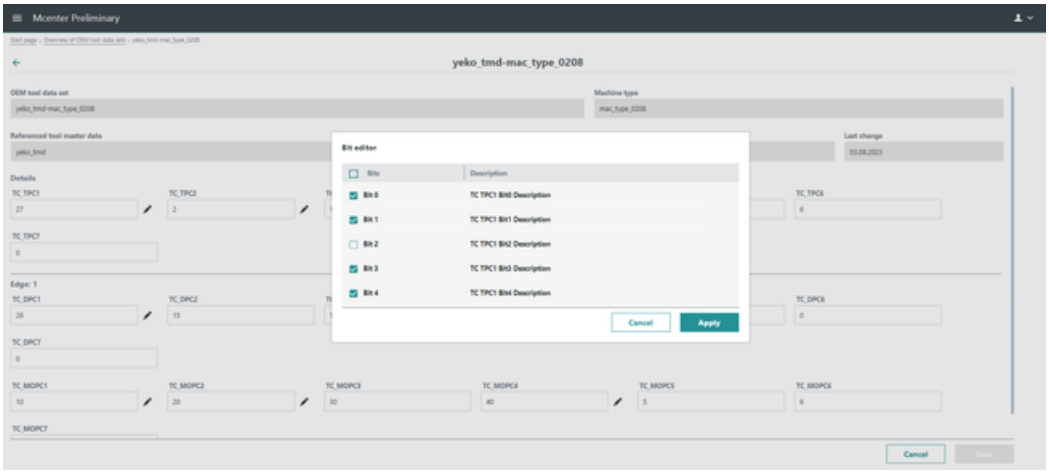
TC_MOPC values

Both the TC_TPC (tool OEM) and the TC_DPC (cutting edge OEM) values accept also decimal fractions, but only with a "." (dot) as decimal separator). The TC_MOPC (cutting edge monitoring) values can be integers only.

4. If there is an available OEM bitmapping configured for any of the OEM values, a pen icon serving as "Edit" button is displayed next to the respective entry field.



5. Click the "Edit" symbol to open the "Bit editor".
   The "Bit editor" window opens, converting the decimal value into a binary representation for the chosen OEM value. Digits corresponding to "1" in the binary value are treated as selected. The description of the bits are also displayed, as they are set via Swagger UI..
   Click the checkboxes to set the desired Bits.
   Click on"Apply"
   - OR -
   Click on "Cancel" to cancel the operation.



6. Click "Save" in the OEM tool data set window to save the data
   - OR -
   Click "Cancel" to cancel the operation.

5.13 Tool statistics

5.13.1 Activating Tool statistics

Tool statistics is an application designed to record tool and NC program related events which you can use for tool lifecycle management. This is supported with functionalities such as export to CSV or filtering.

Prerequisite

To activate Tool statistics, modifications are needed on the control systems, SINUMERIK Operate and HMI-Advanced, as well as on the server.

- At the SINUMERIK control system, using the SINUMERIK Operate and HMI-Advanced operating software:
  To capture program run and tool usage times for the configured channel, bits of machine data must be set (MD27860 $MC_PROCESSTIMER_MODE).
  Additional information to activate Tool statistics is provided in the Installation Manual "Mcenter, Manage MyResources, Optimize MyProgramming /NX-Cam Editor, Analyze MyPerformance /OEE, Access MyData /Collector".
- To get the correct ToolCutEnd events, define the tool edge to be used with the D-command in the NC program.
  The D-command defines the tool edge to be used for the next operation.
- On the server:
  Generate an access token to read tool events from the Tool statistics database.
  Use an access token from the Identity Service for identification.
  For more information, see Manage openness clients (Page 103).
- Synchronous double spindle machines:
  Tool statistics only works correctly on synchronous double spindle machines, if configured. ToolChange and ToolCutEnd events are generated for both spindles, which are in the same channel. In case of double spindles, all of the ToolCutEnd events have the same cutting and idle times in both spindles.
  To configure the machine to support double spindle configuration, open the mmrConfig.json on the machine and add the attribute "simultaneousSpindlesEnabled" with the value "true". The location of the attribute must be in the root level. The default value of this attribute is “false”.

Recorded events

The following events are recorded and stored in the database:

Event	Description
`NcProgramStart`	The start of the NC program in the assigned channel.
`NCProgramEnd`	The NC program execution has ended in the channel, or the channel status is changed to reset. Multiple NC program end events can occur at the end of the NC program. This event also occurs when the channel is interrupted.

Event	Description
`ToolLoad`	This event is triggered when a tool is loaded successfully into the machine.
`ToolUnload`	This event is triggered when a tool is unloaded successfully from the machine.
`ToolChange` *)	This event is triggered when a tool is moved into the spindle or the NC program starts with the tool in the spindle.
`ToolCutEnd` *)	This event is triggered when • the tool has been moved out of the spindle • the cutting edge of the tool in the spindle has been changed • the NC program ends with the tool in the spindle. This event helps you to determine how many seconds the tool edge has been used and how long the tool edge was in an idle state.
`ToolNotAvailable`	This event is triggered when loading a tool onto the spindle is not possible during a running NC program.
`ToolIdCorrected`	This event is triggered when the tool Id is corrected. If a user changes the `ExternalID` of an offline tool, the tool is synchronized with the server and gets the server tool `Instance Id`. For more information about the tool event properties, see the "Tool event type parameters" table below.
`ToolWarningLimit`	This event is triggered when the tool lifetime reaches the tool life prewarning limit.
`ToolEndOfLife`	This event is triggered when the tool is disabled. This is if the tool runs out of life or the event is disabled manually, appeared as ToolEndOfLife event.

*) When Tool statistics cannot determine the program position of the recorded event, the application records the program position for the event as "Program position could not be determined"

Note

Recorded events

The recorded events are not lost when the machine is offline, e.g. when there is a server connection problem. They are stored locally on the machine and, as soon as the connection is reestablished, they are uploaded to the server and stored in the database.

There is a possibility to store events locally for 8 hours.

Tool event properties:

Property*)	Type	Description	Filtering property
`Timestamp`	Date	Timestamp of the created event, based on the time zone of the machine.	`Timestamp`
`Event`	String (number is not supported)	The types of events: • ToolLoad • ToolUnload • NcProgramStart • NcProgramEnd • ToolChange • ToolCutEnd • ToolNotAvailable • ToolIdCorrected • ToolWarningLimit • ToolEndOfLife	`ToolEventType`
`Machine`	String	Machine name	`NodeId` Max. length: 128
`Tool`	String	Tool name as defined in the SINUMERIK tool management	`ToolId` Maximum length: 64
`Duplo number`	Number	Duplo number of the tool as defined in the SINUMERIK tool management.	`DuploNo`
`Magazine`	String	Name of the magazine/container where the tool is currently located. This is the same name as defined in the SINUMERIK tool management.	`ContainerName` Max. length: 128
`Magazine location`	Number	Place number of the tool within the magazine.	`PlaceNo`
`External ID`	String	Unique external tool name as used in Manage MyResources/Tools. This is not part of the SINUMERIK tool management data.	`ExternId` Max. length: 128
`Old External id`	String	Previous identifier of the external unique name of the tool. It contains the old External ID, if the identifier of the external unique name of the tool gets a new value. This is not part of the SINUMERIK tool management data.	`OldExternId` Max length: 128
`Cutting edge`	Number	Indicates the edge number/index as used in the spindle	`EdgeNo`

Property*)	Type	Description	Filtering property
`Tool Statuses`	String	Tool status • A = Tool activated • F = Tool enabled • G = Tool disabled • M = Measure tool • V = Tool has reached prewarning limit • W = Tool being changed • P = Tool at fixed location • E = Tool was in use • Z = Tool in the buffer • IG = Ignore locked • R = To be unloaded • B = To be loaded • S = Master tool • X = 1:1 exchange • N = Manual tool The status can contain any combination of these statuses (bitmask).	`ToolState`
`Tool monitoring`	String	Tool monitoring type • T = Tool life • C = Quantity • W = Wear	`ToolMonMode`
`Spindle`	Number	Index or place number of the spindle, where the tool was loaded.	`SpindleNo`
`Operating mode`	String	Current operating mode of the machine • Jog • MDA • Auto	`OpMode`
`Channel`	Number	Number of the channel • where the event occurred • in which the NC program is running	`ChannelNo`

Property*)	Type	Description	Filtering property
`NC Program`	String	Path and name of the NC program which is running in the current channel. Not only the program names are provided, but also the whole NC program paths within the NC. • Program names: Supported up to 4 levels • Separator character between the program name levels: [;] • The value is based on the **/Channel/ProgramPointer/workPandProgName[ux,y]** NC variable with x = channel number y = level Example: /_N_WKS_DIR/_N_TOOLINSPINDLE_MPF In case that the NC program name cannot be read from the NC, that level is stored as an empty string. Example: ;/_N_WKS_DIR/_N_TOOLINSPINDLE_MPF	`ProgName` Max. length: 128
`Program position`	String	Line identifier in the NC code where the event was created. This is only supported if the NC program contains the line numbering in the form of "N<number>". • Up to 4 levels or the program positions supported. • Separator character between program position levels: [;] • The value is based on the **/Channel/ProgramPointer/blockNoStr[ux,y]** NC variable with – x = channel number – y = level Example: • N200 In case of problems with the program position reading, the missing part remains empty. Example: • ;N200	`ProgPosition` Max. Length: 512
`Program execution time`	Number	The number of seconds since the NC program has been started. This always restarts with the start of the NC program. The value is read from the **/Channel/ChannelDiagnose/cycleTime** NC variable	`ProgExecution Time`

Property*)	Type	Description	Filtering property
`Time of tool use`	Number	The number of seconds of the current tool/edge was in the spindle and it was working on the current workpiece. The value is based on the **/Channel/ChannelDiagnose/cuttingTime** NC variable. Calculating mode: **ProcessTime** = **cuttingTimeEnd** – **cuttingTimeStart** • **cuttingTimeStart** = Value of the **/Channel/ChannelDiagnose/cuttingTime** NC variable, when – a new tool is loaded into the spindle - OR - – the used edge changed OR - – an NC program starts with a tool in a spindle. • **cuttingTimeEnd** = Value of the **/Channel/ChannelDiagnose/cuttingTime** NC variable, when – the usage of the tool/edge is finished -OR - – an NC program ends with a tool in a spindle. When an error occurs during the calcutation of the time of tool use and the value would be less than 0, a NULL is put into the database.	`CutTime`

Property*)	Type	Description	Filtering property
`Tool downtime`	Number	The number of seconds the current tool/edge was in the spindle, but not in use. The value is based on the **/Channel/ChannelDiagnose/operatingTime** NC variable and on ProcessTime. Calculating mode: **IdleTime = operatingTimeEnd – operatingTimeStart – ProcessTime** • **operatingTimeStart** = Value of the **/Channel/ChannelDiagnose/operatingTime** NC variable when – a tool is loaded to the spindle - OR - – the cutting edge changes - OR - – an NC program starts with a tool in a spindle • **operatingTimeEnd** = Value of the **/Channel/ChannelDiagnose/operatingTime** NC variable when – a tool is unloaded from the spindle - OR - – the cutting edge changes - OR – an NC program ends with a tool in a spindle. When an error occurs during the calcutation of the time of tool use and the value would be less than 0, a NULL is put into the database.	`IdleTime`
`TeamCenter ID`	-	Not used.	`ObjectId` Max. length: 128
`Instance Id`	String	Part of the tool instance which helps to identify it. This unique identifier is in string format (guid).	`InstanceId` Max length: 36
`Old Instance id`	String	• Previous tool instance identifier • Contains the old tool Instance Id • In string format (guid) • Not part of the SINUMERIK tool management data.	`OldInstanceId` Max length: 36
`Unload reason`	String	The unload reason provides additional information for the ToolUnload analysis. For more information, see Unloading internal tools (Page 464) The format of it is the following: <UnloadReasonName>;<UnloadReasonText in the HMI language> If a user has defined a new unload reason since the last event, a Tool statistics request from the server can produce an unload reason text which is not up to date. It shows the original unload reason selected at the HMI in the language used at the HMI.	`UnloadReason` Max length: 66

Property*)	Type	Description	Filtering property
`Is triggered by MMR /Tools`	Bool	• `True` if the tool load/unload has been triggered by MMR / Tools • `False` if the tool load/unload has not been triggered by MMR /Tools	`IsTriggeredByMMRT`
`Is Trial tool`	Bool	• `True` - the tool with the property "trial tool" is loaded or unloaded by MMR /Tools • `False` - for all other actions	`IsTrialTool`

*) Do not use for the filtering

Note

Too long string values

Too long string values are truncated, e.g. if the NC Program (ProgName) parameter is longer than 128 characters.

If there was a cut, the following marker characters are inserted at the end of the parameter: ".." (dotdot). This means the parameter is changed because of the truncating.

The details of the truncating are in the log files (warning level):

e.g. 2022-03-07 05:20:47 [WRN] [SinInt.ToolStatistics.Service.Controllers.ToolEventController] The property (ProgName) of the tool event (3/7/2022 2:17:51 PM +00:00, NcProgramStart, Machine1) is changed from /_N_WKS_DIR/_N_MACHINE1_WPD/_N_MAIN_MPF;/_N_WKS_DIR/_N_MACHINE1_WPD/_N_SUB1_SPF;/_N_WKS_DIR/_N_MACHINE1_WPD/_N_SUB2_SPF;/_N_WKS_DIR/_N_MACHINE1_WPD/_N_SUB3_SPF to /_N_WKS_DIR/_N_MACHINE1_WPD/_N_MAIN_MPF;/_N_WKS_DIR/_N_MACHINE1_WPD/_N_SUB1_SPF;/_N_WKS_DIR/_N_MACHINE1_WPD/_N_SUB2_SPF..

Original parameter (159 characters long - the max length of this parameter is 128 characters):

/_N_WKS_DIR/_N_MACHINE1_WPD/_N_MAIN_MPF;/_N_WKS_DIR/_N_MACHINE1_WPD/_N_SUB1_SPF;/_N_WKS_DIR/_N_MACHINE1_WPD/_N_SUB2_SPF;/_N_WKS_DIR/_N_MACHINE1_WPD/_N_SUB3_SPF

Truncated parameter (121 characters long):

/_N_WKS_DIR/_N_MACHINE1_WPD/_N_MAIN_MPF;/_N_WKS_DIR/_N_MACHINE1_WPD/_N_SUB1_SPF;/_N_WKS_DIR/_N_MACHINE1_WPD/_N_SUB2_SPF..

The ".." marker characters are inserted at the end of the string, which means the string has been truncated.

Available event type parameters

	NcPrgramStart	NcProgramEnd	ToolLoad	ToolUnload	ToolChange	ToolCutEnd	ToolNotAvailable	ToolIdCorrected	ToolWarninglimit	ToolEndOfLife
Timestamp	X	X	X	X	X	X	X	X	X	X
Event	X	X	X	X	X	X	X	X	X	X

	NcPrgramStart	NcProgramEnd	ToolLoad	ToolUnload	ToolChange	ToolCutEnd	ToolNotAvailable	ToolIdCorrected	ToolWarninglimit	ToolEndOfLife
Machine	X	X	X	X	X	X	X	X	X	X
Tool			X	X	X	X			X	X
Duplo number			X	X	X	X		X	X	X
Magazine			X	X	X	X			X	X
Magazine Location			X	X	X	X	X	X	X	X
External ID			(X)	(X)	(X)	(X)		(X)	(X)	(X)
Old External id								X		
Cutting edge						X				
Tool Statuses			X		X	X			X	X
Tool monitoring					X	X			(X)	(X)
Spindle					X	X			(X)	(X)
Operating mode	X	X			X	X	X		(X)	(X)
Channel	X	X			X	X	X		(X)	(X)
NC Program	X	X			X	X	X		(X)	(X)
Program position		(X)			X	X	X		(X)	(X)
Program execution time	X	X			X	X	X		(X)	(X)
Time of tool use						X				
Tool downtime						X				
TeamCenter ID										
Instance Id			X	X	X	X		X		
Old Instance id								X		
Unload reason				X						
Is triggered by MMR /Tools			X	X						
Is Trial tool			X	X					X	X

(X) Optional

Further information

You can find application and code examples in the **Examples** folder.

Procedure

1. Request the tool events from the server.
   For more information, see Requesting tool events from the server (Page 325).
2. Filter the tool events.
   For more information, see Filtering tool data (Page 326).
3. Download the CSV file.

Note

Tool event properties

The properties of the tool events contain the following marker in the exported CSV file: "" .

5.13.2 Overview Tool statistics

The "Tool Statistics" application provides analytics data for tools, such as the usage frequency. The statistical data are based on different NC programs and machines.

The "Tool Statistics" application can only display greenfield tools. Toolstatistics events are gathered for both greenfield and brownfield tools and are accessible via the Toolstatistics openness API.

Data gathering and aggregation for Tool statistics is disabled by default. Additional information to enable the aggregation is provided in the Installation Manual "Mcenter, Manage MyResources, Optimize MyProgramming /NX-Cam Editor, Analyze MyPerformance / OEE, Access MyData /Collector".

Parameters

NOTICE
Recommended aggregation time When you turn on the aggregation, all three aggregation periods are immediately activated: • hourly • daily • weekly The recommended aggregation time for daily and weekly intervals is during periods with a low manufacturing load. Use the Windows task scheduler for your planning.

Parameter	Description
Filters	
Select date	Select the time interval you wish to visualize. You can select the beginning and the end of a time period • by clicking on the dates in the calendars • by clicking on one of the following buttons: – previous hour – previous day – previous month – previous year

Parameter	Description
Machine	Select the machine the tool data comes from.
NC program	Select the NC program the tool data comes from
Aggregate By	Select • Time-based aggregation • Event-based aggregation
Charts	
Tool Usage Frequency	
NC Program Distribution chart	Shows the percentage of tool instance amounts for a specific Tool master data Id in relation to the NC program.
Machine Distribution chart	Shows the percentage of tool instance amounts for a specific Tool master data Id in relation to different machines.
Tool Lifetime Distribution	Shows the instance count of a tool master Id over duration of usage.
	Displays the chart in full screen mode.
Item per page	Shows the number of items per page.
	Click on the down arrow to select the number of items per page.

Procedure

1. On the Mcenter start page, click on "Tool statistics UI".

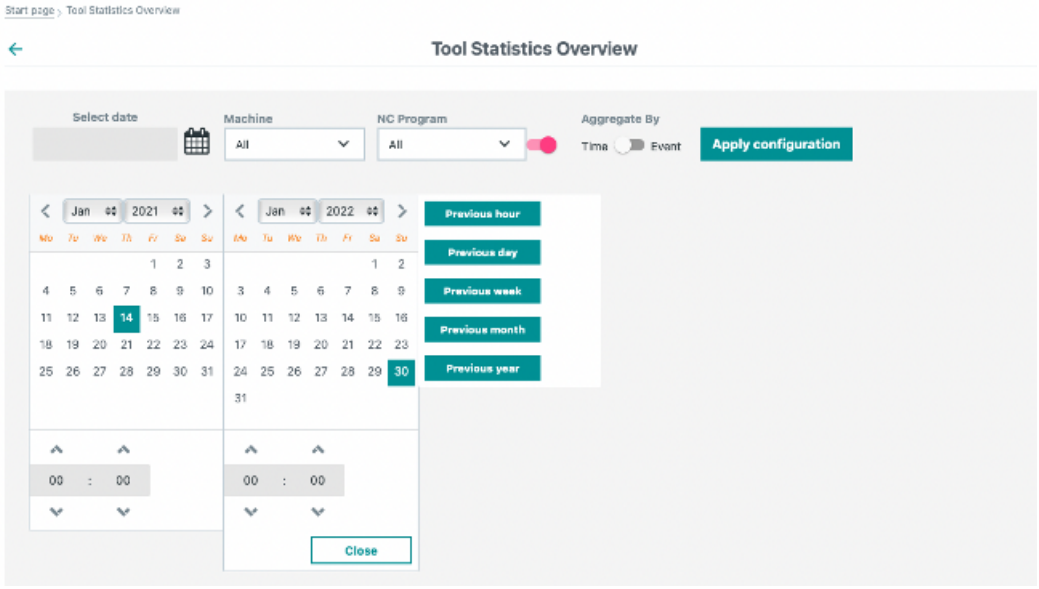
   - OR -
   Open the following URL: Tool statistics (https://{ServerIP}/mmr/tools/usagestatistics).

2. The "Tool statistics Overview" window opens.
   Select the time interval

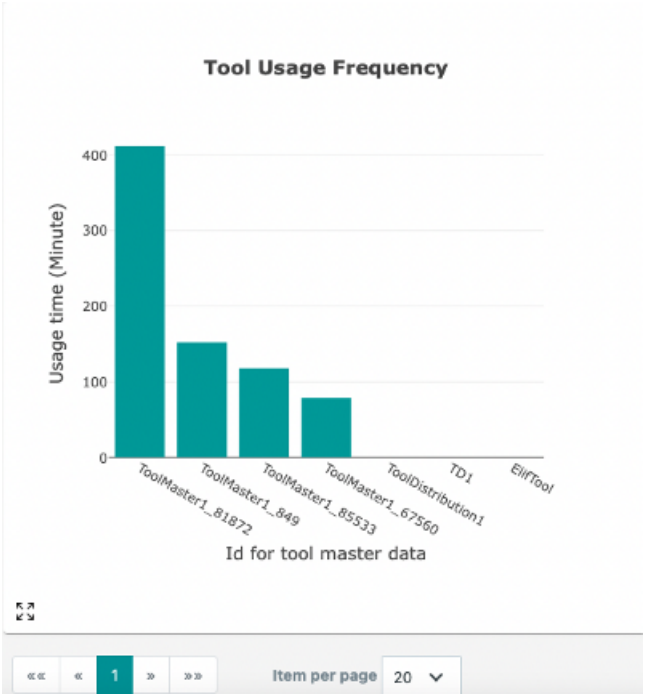
   – by using the calendars
     - OR -

   – by clicking on one of the green buttons with preselected intervals.

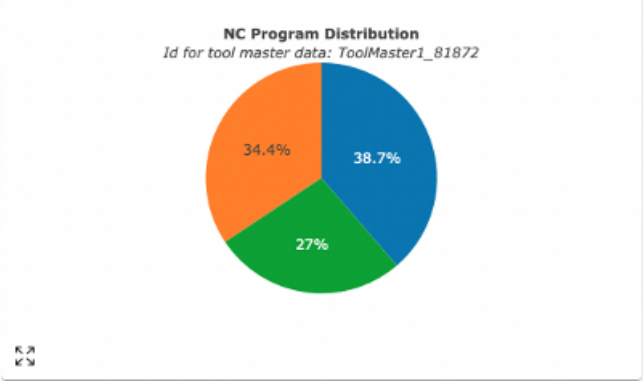
   Click on "Close" to close the calendars.
   Select the machine and the NC program from the drop-down lists in the top-left window area.
   Use the slider to aggregate the data by the time or the event.
   Click on "Apply configuration".



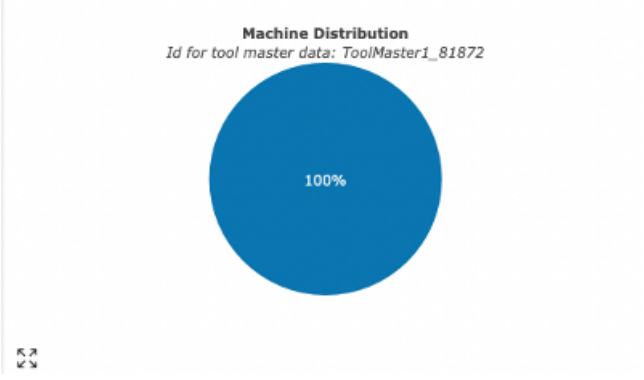
3. The "Tool Usage Frequency" window opens displaying the requested chart.



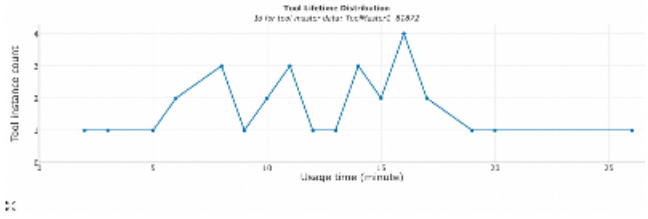
4. Click on the bar within the chart to display the charts for a specific Tool master data Id:
   - NC Program Distribution



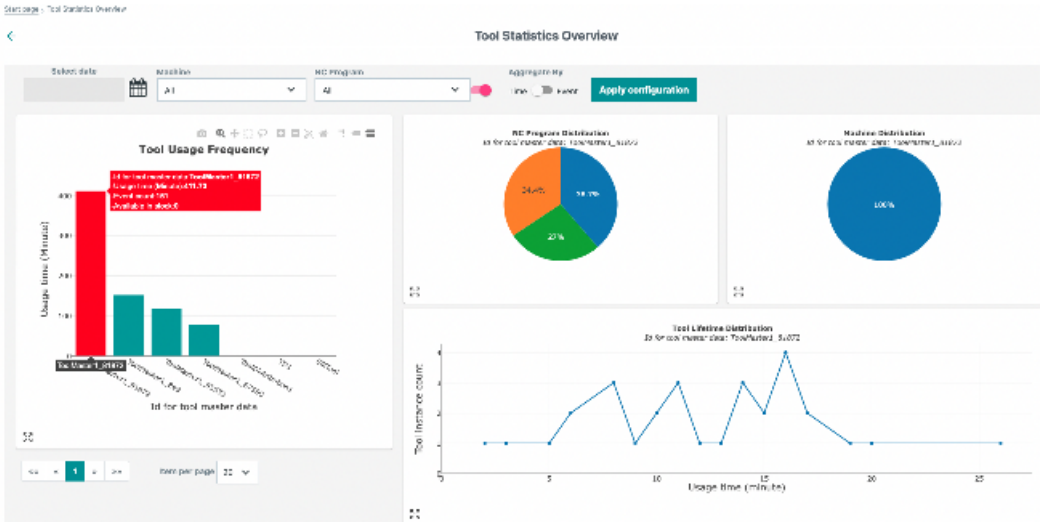
   - Machine Distribution



– Tool Lifetime Distribution



When you mouse over a bar, you see a popup window with information about the Tool Master Id , Usage Time , Event Count and Available stock information.



5.13.3 Requesting tool events from the server

Requesting tool events from the server

Use the following HTTP request form:

```
GET {ServerIP}:{ServerPort}/mmr/toolstatistics/tools/statistics-api/
odata/ToolEventCsvExport
```

These are the possible answers to your request:

- OK (200)
  The request was successfully processed.
  A CSV file is returned with corresponding tool data.
  The properties of the tool events contain the following marker in the exported CSV file: ""
- Unauthorized (401)

- Request timeout (408)
  - If the tool events query cannot be finished in **100 seconds**, you receive a timeout exception with the following text:
    "CSV generation took too long: requested data amount too big, try with more specific filters".
- Bad request (400)
  Invalid filter criterion with a message:
  - "The string '2ToolUnload' is not a valid enumeration type constant".
  - "The string 'ToolCutEn' is not a valid enumeration type constant".
  - "Could not find a property named timestamp".
  - "Could not find a property named 'Noded'".
  - "Syntax error at position 215 in '<filter>'".

  Maximum number and/or size of the events exceeded:
  - "Maximum number (1 000 000) and / or size (200 MB) of the events exceeded".
- Internal server error (500)
  This error is displayed in the following cases:
  - Incorrect configuration of Tool statistics services.
  - An unexpected event occurs for which there is no specific message.

5.13.4 Filtering tool data

Filtering tool data

You can use filters the following way for limiting the amount of incoming tool data:
`GET {ServerIP}:{ServerPort}/mmr/toolstatistics/tools/statistics-api/odata/ToolEventCsvExport?%24filter=`**`<filter>`**

Notation of the special characters

The following shows the characters as used in the filter options described below.

Character	Description	Encoded
=	equals	eq
!=	not equals	ne
>	greater than	gt
>=	greater than or equal to	ge
<	less than	lt
<=	(less than or equal to)	le
&	and	and
|	or	or
!	not	not

Character	Description	Encoded
	space	%20
:	colon	%3A
+	plus sign	%2B
/	slash	%2F
'	apostrophe	%27

For more information about design rules, see OData-ABNF (http://docs.oasis-open.org/odata/odata/v4.01/cs01/part2-url-conventions/odata-v4.01-cs01-part2-url-conventions.html#ABNF).

5.13.5 Filter examples

Overview

Filters could be used the following way for limiting the amount of received tool data:
`GET {ServerIP}:{ServerPort}/mmr/toolstatistics/tools/statistics-api/odata/ToolEventCsvExport?%24filter=<filter>`

Note

Use properties

Use the properties from the "**Property for the filtering**" column of the "**Properties of the tool events**" table to define the filters.

Time range

<filter>:
`Timestamp%20ge%202022-02-10T08%3A15%3A30%2B02%3A00%20and%20Timestamp%20lt%202022-02-12T09%3A30%3A30%2B02%3A00%20`

Explanation:
`Timestamp >= 2022-02-10T08:15:30+02:00 & Timestamp <= 2022-02-12T09:30:30+02:00`

Full URL:
`{ServerIP}:{ServerPort}/mmr/toolstatistics/tools/statistics-api/odata/ToolEventCsvExport?%24filter=Timestamp%20ge%202022-02-10T08%3A15%3A30%2B02%3A00%20and%20Timestamp%20lt%202022-02-12T09%3A30%3A30%2B02%3A00%20`

Note

TimeStamp corresponds to timestamp in the CSV file of the results.

- Format of the time (in UTC):
  - YYYY-MM-DDThh%3Amm%3Ass%2Bhh%3Amm (e.g. 2022-02-10T08:15:30+02:00)
- The local time is shown on the 24-hour timekeeping system with UTC offset

Tool

<filter>:
`ToolId%20eq%20%27DRILL1%27%20or%20ToolId%20eq%20%27DRILL2%27`

Explanation:
`ToolId = 'DRILL1' | ToolId = 'DRILL2'`

Full URL:
`{ServerIP}:{ServerPort}/mmr/toolstatistics/tools/statistics-api/odata/ToolEventCsvExport?%24filter=ToolId%20eq%20%27DRILL1%27%20or%20ToolId%20eq%20%27DRILL2%27`

Note

- **ToolId** is **Tool** in the result CSV file

Tool, duplo number

<filter>:
`ToolId%20eq%20%27DRILL1%27%20and%20DuploNo%20eq%201`

Explanation:
`ToolId = 'DRILL1' & DuploNo = 1`

Full URL:
`{ServerIP}:{ServerPort}/mmr/toolstatistics/tools/statistics-api/odata/ToolEventCsvExport?%24filter=ToolId%20eq%20%27DRILL1%27%20and%20DuploNo%20eq%201`

Note

- **ToolId** is **Tool** and **DuploNo** is **Duplo number** in the result CSV file

Event

<filter>:
`ToolEventType%20eq%20%27NcProgramStart%27%20or%20ToolEventType%20eq%20%27NcProgramEnd%27`

Explanation:
`ToolEventType = 'NcProgramStart' | ToolEventType = 'NcProgramEnd'`

Full URL:
`{ServerIP}:{ServerPort}/mmr/toolstatistics/tools/statistics-api/odata/ToolEventCsvExport?%24filter=ToolEventType%20eq%20%27NcProgramStart%27%20or%20ToolEventType%20eq%20%27NcProgramEnd%27`

Note

- **ToolEventType** is **Event** in the result CSV file
- The value of the Event parameter must be in string format, e.g. 'NcProgramStart', 'NcProgramEnd', etc. (so number is not supported)

NC Program

<filter>:
ProgName**%20eq%20%27%2F**_N_MPF_DIR**%2F**_N_TOOLINSPINDLE_MPF**%27%20or%20**ProgName**%20eq%20%27%2F**_N_MPF_DIR**%2F**_N_TOOLLOADUNLOAD_MPF**%27**

Explanation:
```
ProgName = '/_N_MPF_DIR/_N_TOOLINSPINDLE_MPF' | ProgName = '/
_N_MPF_DIR/_N_TOOLLOADUNLOAD_MPF'
```

Full URL:
```
{ServerIP}:{ServerPort}/mmr/toolstatistics/tools/statistics-api/
odata/ToolEventCsvExport?
%24filter=ProgName%20eq%20%27%2F_N_MPF_DIR%2F_N_TOOLINSPINDLE_MPF%27
%20or%20ProgName%20eq%20%27%2F_N_MPF_DIR%2F_N_TOOLLOADUNLOAD_MPF%27
```

Note

- **ProgName** is **NC Program** in the result CSV file

Machine

<filter>:
NodeId**%20eq%20%27**M**%2F**1**%2F**001**%27%20or%20**NodeId**%20eq%20%27**M**%2F**2**%2F**001**%27**

Explanation:
```
NodeId = 'M/1/001' | NodeId = 'M/2/001'
```

Full URL:
```
{ServerIP}:{ServerPort}/mmr/toolstatistics/tools/statistics-api/
odata/ToolEventCsvExport?
%24filter=NodeId%20eq%20%27M%2F1%2F001%27%20or%20NodeId%20eq%20%27M%
2F2%2F001%27
```

Note

- **NodeId** is **Machine** in the result CSV file

Combined

<filter>:
(Timestamp**%20ge%20**2022-02-10T08**%3A**15**%3A**30%2B02**%3A**00**%20and%20**Timestam
p**%20lt%20**2022-02-12T09**%3A**30**%3A**30**%2B**02**%3A**00)**%20and%20**NodeId**%20eq%20%2**

7M**%2F**1**%2F**001**%27%20and%20**(ToolEventType**%20eq%20%27**ToolLoad**%27%20or%20**ToolEventType**%20eq%20%27**ToolUnload**%27%20or%20**ToolEventType**%20eq%20%27**ToolCutEnd**%27**)

Explanation:
```
(Timestamp >= 2022-02-10T08:15:30+02:00 & Timestamp <=
2022-02-12T09:30:30+02:00) & NodeId = 'M/1/001' & (ToolEventType
= 'ToolLoad' | ToolEventType = 'ToolUnload' | ToolEventType =
'ToolCutEnd')
```

Full URL:
```
{ServerIP}:{ServerPort}/mmr/toolstatistics/tools/statistics-api/
odata/ToolEventCsvExport?
%24filter=(Timestamp%20ge%202022-02-10T08%3A15%3A30%2B02%3A00%20and%
20Timestamp%20lt%202022-02-12T09%3A30%3A30%2B02%3A00)%20and%20NodeId
%20eq%20%27M%2F1%2F001%27%20and%20(ToolEventType%20eq%20%27ToolLoad%
27%20or%20ToolEventType%20eq%20%27ToolUnload%27%20or%20ToolEventType
%20eq%20%27ToolCutEnd%27)
```

Note

- TimeStamp corresponds to timestamp
- **NodeId** is **Machine** and **ToolEventType** is **Event** in the result CSV file

5.13.6 Ordering tool data

You can order the received tool data via
```
GET {ServerIP}:{ServerPort}/mmr/toolstatistics/tools/statistics-api/
odata/ToolEventCsvExport?%24orderby=<criterion>
```

Ordering

Order by examples

Note

<criterion> described in the examples is the value of the <criterion> in the URL from above

Timestamp

<criterion>:
```
Timestamp
```

Full URL:
```
GET {ServerIP}:{ServerPort}/mmr/toolstatistics/tools/statistics-api/
odata/ToolEventCsvExport?%24orderby=Timestamp
```

Note

TimeStamp corresponds to timestamp in the CSV file of the results.

Tool

<criterion>:
`ToolId`

Full URL:
```
GET {ServerIP}:{ServerPort}/mmr/toolstatistics/tools/statistics-api/
odata/ToolEventCsvExport?%24orderby=ToolId
```

Note

The **ToolId** is **Tool** in the result CSV file.

Machine

<criterion>:
`NodeId`

Full URL:
```
GET {ServerIP}:{ServerPort}/mmr/toolstatistics/tools/statistics-api/
odata/ToolEventCsvExport?%24orderby=NodeId
```

Note

The **NodeId** is **Machine** in the result CSV file.

5.13.7 CSV header language

You can change the language of the header of the result CSV file. Use the "language=en" (for English header) or the "language=de" (for German header) parameter in the URL. It is an optional parameter. The default language is German.

Example

English header:

```
GET {ServerIP}:{ServerPort}/mmr/toolstatistics/tools/statistics-api/
odata/ToolEventCsvExport?
%24filter=Timestamp%20ge%202022-02-10T08%3A15%3A30%2B02%3A00%20and%2
0Timestamp%20lt%202022-02-12T09%3A30%3A30%2B02%3A00%20&language=en
```

German header:
```
GET {ServerIP}:{ServerPort}/mmr/toolstatistics/tools/statistics-api/
odata/ToolEventCsvExport?
```

```
%24filter=Timestamp%20ge%202022-02-10T08%3A15%3A30%2B02%3A00%20and%2
0Timestamp%20lt%202022-02-12T09%3A30%3A30%2B02%3A00%20&language=de
```

or (without the parameter):

```
GET {ServerIP}:{ServerPort}/mmr/toolstatistics/tools/statistics-api/
odata/ToolEventCsvExport?
%24filter=Timestamp%20ge%202022-02-10T08%3A15%3A30%2B02%3A00%20and%2
0Timestamp%20lt%202022-02-12T09%3A30%3A30%2B02%3A00%20
```

5.13.8 Database maintenance

5.13.8.1 Overview

For database maintenance purposes, Mcenter, Manage MyResources /Tools contains precreated SQL-stored procedures.

Available Stored procedures

The following Stored procedures are available for Mcenter, Manage MyResources /Tools.

These Stored procedures delete ToolEvents which exceed defined time periods from the database.

Stored procedure name	Required migration state	Details	Availability
DeleteToolEventsOlderThanOneDay	201610061215142_StoredProcedures	Deletes all tool events older than one day	Available from 5.0.1.0
DeleteToolEventsOlderThanOneMonth	201610061215142_StoredProcedures	Deletes all tool events older than one month	Available from 5.0.1.0
DeleteToolEventsOlderThanOneWeek	201610061215142_StoredProcedures	Deletes all tool events older than one week	Available from 5.0.1.0
DeleteToolEventsOlderThanOneYear	201610061215142_StoredProcedures	Deletes all tool events older than one year	Available from 5.0.1.0
DeleteToolEventsOlderThanSpecifiedDay	202001130735292_AddDeleteToolEventsOlderThanSpecifiedDay_StoredProcedure	Deletes all tool events older than a specified number of days. The number is defined in an int parameter: @day	Available from 5.0.4.0
DeleteToolInstanceAggregationsOlderThanTwoDay	20220204085555_AddDeleteAggregationServiceTables	Deletes all aggregation records older than two days for tool lifecycle distribution	Available from 5.2.0.0
DeleteToolInstanceAggregationsOlderThanOneWeek	20220204085555_AddDeleteAggregationServiceTables	Deletes all aggregation records older than one week (7 days) for tool lifecycle distribution	Available from 5.2.0.0
DeleteToolInstanceAggregationsOlderThanOneMonth	20220204085555_AddDeleteAggregationServiceTables	Deletes all aggregation records older than one month for tool lifecycle distribution	Available from 5.2.0.0
DeleteToolInstanceAggregationsOlderThanOneYear	20220204085555_AddDeleteAggregationServiceTables	Deletes all aggregation records older than one year for tool lifecycle distribution	Available from 5.2.0.0

Stored procedure name	Required migration state	Details	Availability
DeleteToolInstanceAggregationsOlderThanSpecifiedDay	20220204085555_AddDeleteAggregationServiceTables	Deletes all aggregation records older than a specified number of days for tool lifecycle distribution	Available from 5.2.0.0
DeleteToolMasterInstanceHistory	20220204085555_AddDeleteAggregationServiceTables	Deletes all tool master and tool instance history records from history tables if they got delete event and there are no related records in aggregation tables. This cleanup is based on aggregation tables, so cleanup procedures for aggregation must be executed first.	Available from 5.2.0.0

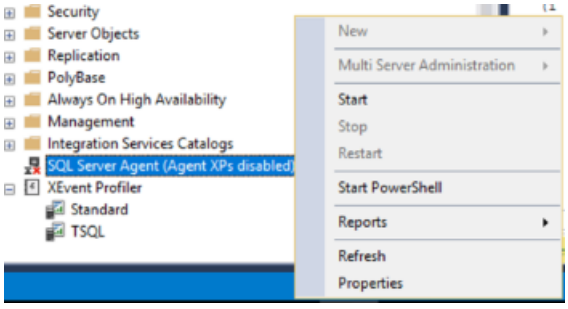
5.13.8.2 Create a job for scheduled database maintenance

Prerequisites

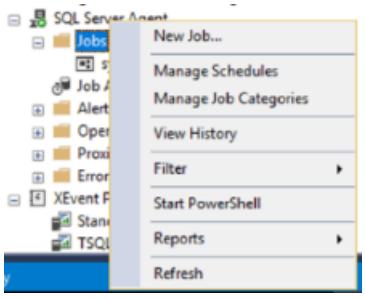
- SQL Server Management Studio (SSMS)
- Tool events are explicitly deleted from ToolEvents table
- The Database version should be migrated at least to 201610061215142_StoredProcedures
  - OR -
  202001130735292_AddDeleteToolEventsOlderThanSpecifiedDay_StoredProcedure

Procedure

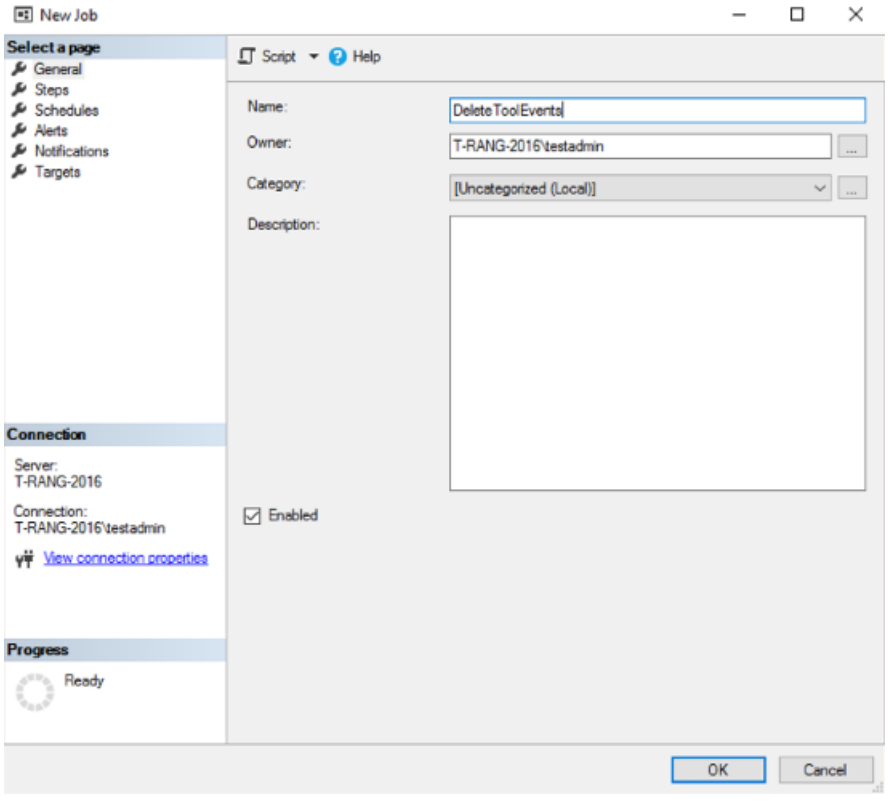
1. Start the SQL Server Agent in SQL Server Management Studio.



2. Add a new job under SQL Server Agent - Jobs.



3. Enter the job name and a short description.



4. Select the "Steps" page.

5. Add a new step.
   - Enter the step name.
   - Select the "ToolStatistics" database.
   - Enter the command and click "OK".
     Example for DeleteToolEventsOlderThanSpecifiedDay stored procedure
     This example deletes all toolevents that are older than 100 days from the ToolEvents table. To change the period, modify the @day variable should be modified.

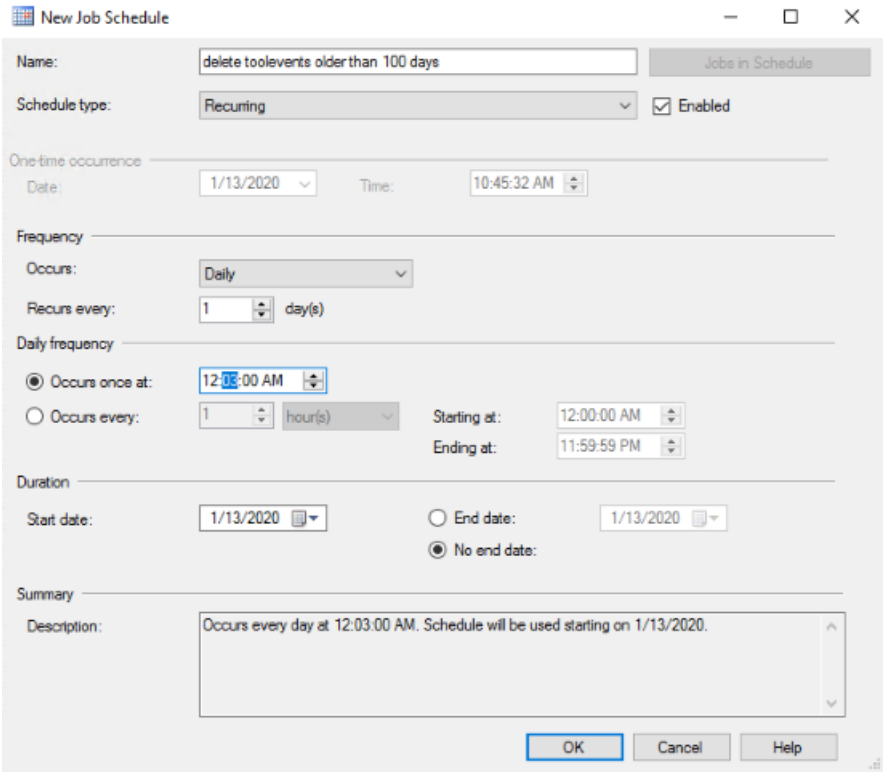
```
USE [ToolStatistics]
GO
DECLARE @return_value int
EXEC @return_value = [DeleteToolEventsOlderThanSpecifiedDay]
@day = 100
SELECT 'Return Value' = @return_value
GO
```

     Example for DeleteToolEventsOlderThanOneWeek stored procedure
     This example deletes all toolevents that are older than one week from the ToolEvents table.

```
USE [ToolStatistics]
GO
DECLARE @return_value int
EXEC @return_value = [DeleteToolEventsOlderThanOneWeek]
SELECT 'Return Value' = @return_value
GO
```

6. Select the "Schedule" page.

7. Create a schedule for the job execution.
   Define the frequency and duration.
   Click "OK".



8. To save the job, click "OK".

5.14 Tool scheduling

The "Tool scheduling" functionality helps to optimize the preparation and usage of tools. While for balancing it is assumed that the preparation process is started immediately, the scheduling ensures that the preparation is planned ahead of time. The scheduling allows to make sure that tools for a work sequence are available when they are needed. If it is not possible to get the complete tool in time, for example due to missing components, a feedback is given. Scheduling reduces the waiting times for the tools before they are used within the production. It provides required input for the task overview of tool presetting to fulfill the work sequence.

5.14.1 Tool scheduling overview

The "Overview of tool scheduling" page shows the list of work sequences and their scheduling status. The work sequences are provided via MMR /Orders openness API.

You can sort or filter the individual columns in the overview. You can schedule a work sequence and view the scheduling results. You can also delete the scheduling results.

Scheduling considers the combination of work order and work sequence. The relation is only unique with the combination. For simplification the scheduling is described by using "work sequence".

Note

Squeezed in new work sequences

You can schedule work sequences with a start date between work sequences that are already scheduled.

Note

Sending events to work sequence in the mcenter

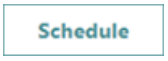
When scheduling is executed, the result is being sent to mcenter platform(work sequence service) as events. In case scheduling is successfull , "scheduled" event is sent.

In case of scheduling failure, the "ScheduleFailed" event is sent along with the fail reason within the description.

Prerequisite

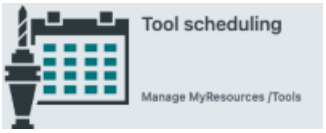
Historical data is available for a tool master data. This data is needed to calculate the presetting duration for picking, assembling, measuring and providing. If the data is not available, the maximum presetting value of any tool master data is assumed as the presetting durations for this tool master data. If no data is available in the system, it is also possible to configure average times in the "Confirm tool scheduling view" or the "Schedule orders" view. See Manual scheduling of work sequences (Page 339).

Parameters and elements

Parameter	Description
Work order ID	ID of work order provided by MMR/O from a third party sofware like an MES
Work sequence number	ID of work sequence
Status of order	Status of order based on scheduling • Available • Not_Ready_For_Scheduling • Scheduled • Locked • Done • Processing • ScheduleFailed • Timeout • NeedReschedule • OperationIdDeleted • InQueue • WorkSequenceDeletedOrCanceled • WorkSequenceOnHold
Assigned machine	Target machine for the work sequence
Lot size	Amount of work pieces to be produced
Used tool plans	Tool plan information for the work sequence
Start date	Planned time for starting the work sequence. A minimum and maximum value can be provided.
End date	Planned time for finishing the work sequence. A minimum and maximum value can be provided.
	Delete the scheduling results for a work sequence.
	Schedule the work sequence.
	Opens the "Scheduling results" view.
	Schedules the selected work sequences.
	Deletes the selected scheduling results.

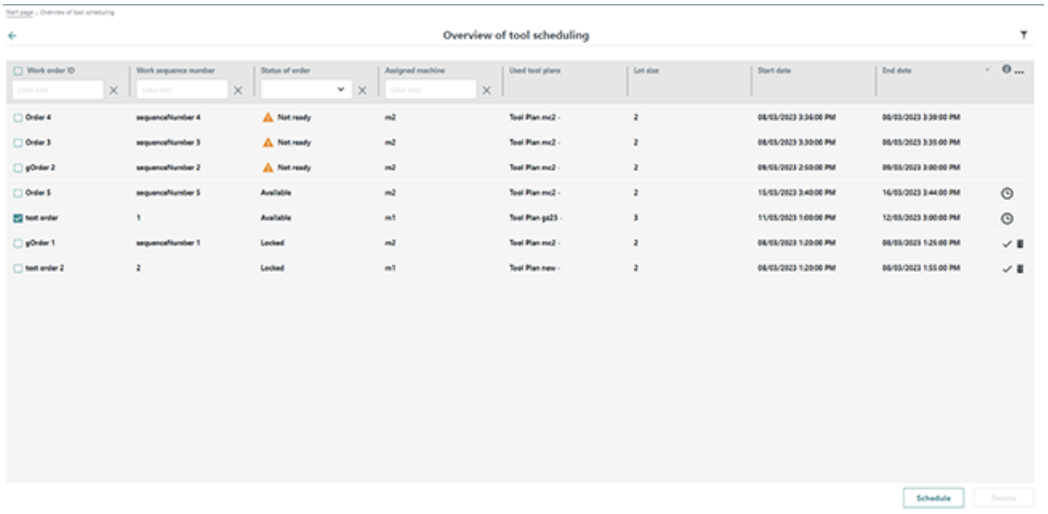
Procedure

On the start page of MMR /Tools, click on "Tool scheduling".



- OR -

Open the following URL: https://<ServerIP>/mmr/tools/scheduling/overview
The "Overview of tool scheduling" window opens.



5.14.2 Manual scheduling of work sequences

Tool sources for manual scheduling

Work sequences can manually be scheduled.

Tools can be retrieved from following sources for manual scheduling:

- Tools within the assembly area (picking, assembling, measuring), if enabled by the user
- Tools from the machines with the same parent node of the target machine, if enabled by the user
- Tools from cabinets in the same hierarchy path
- Rare or expensive tool instances are not created but transferred from relevant areas such as cabinets.

Assumptions for rare or expensive tools

- The main reason for rare tools is that they are expensive.
- Rare tools are released in the system. You do not have to create them via scheduling.
- When a rare tool is worn out, the system expects that it is rather directly replaced. Tool scheduling does not create a new instance. You can get a new instance using the manual "singe tool creation".

- As long as a rare tool is loaded to a machine which is in another hierarchy path, it cannot be scheduled for the considered machine. A rare tool must be unloaded into the root cabinet after it is used. A tool in the root cabinet can be seen. It can be made available for any machine.
- In case of a conflict regarding the usage time of rare or expensive tools between work sequences, the work sequence with the later start date is not scheduled.

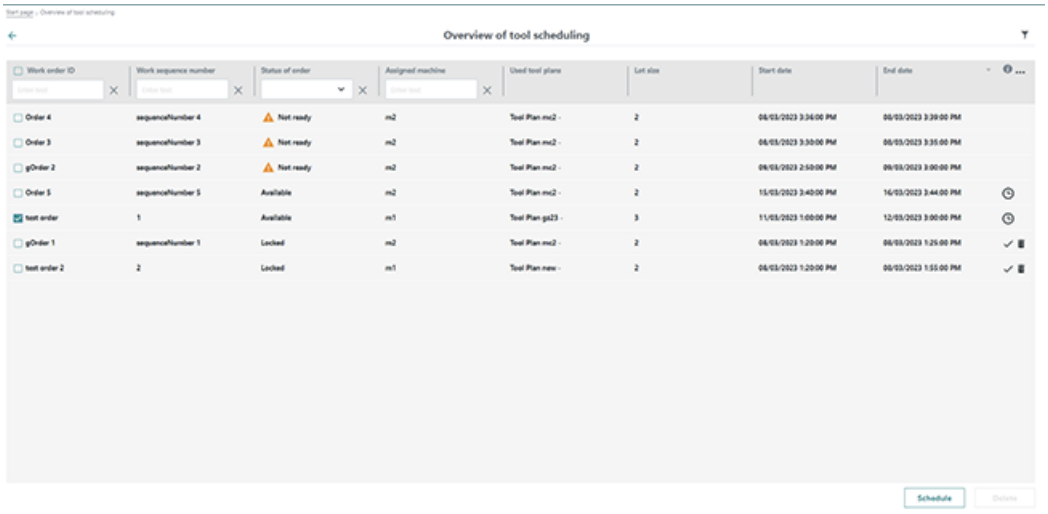
Parameter

Following parameters are displayed in the "Scheduling results view":

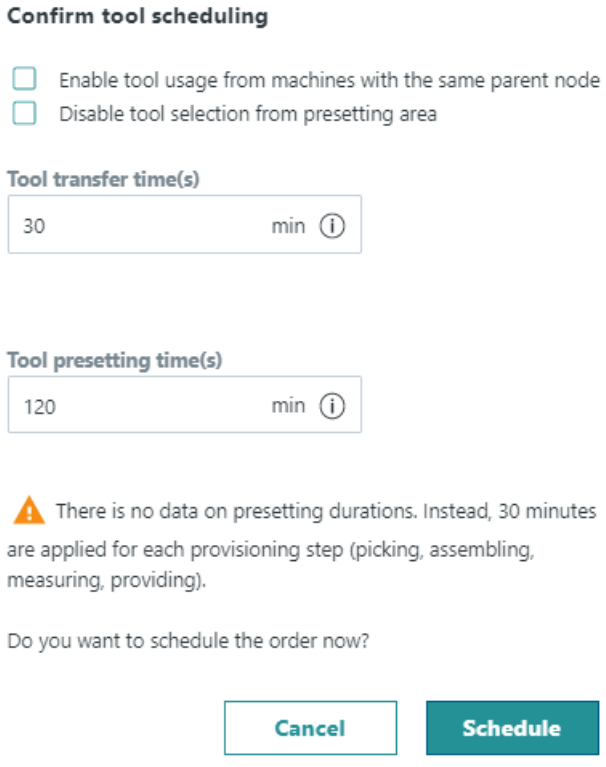
Parameters/elements	
ID for tool instance data	Shows the identifier of the instance data.
ID for tool master data	Shows the identifier of the master data.
Deadline for action flag	Shows the target time to complete the next action step.
Latest load time	Shows the time that the tool should be on the machine.
Action flag	Shows the action to be completed for the specific tool.
From	Shows the source location of the tool.
To	Shows the target location of the tool.
Close	Closes the scheduling view.

Procedure

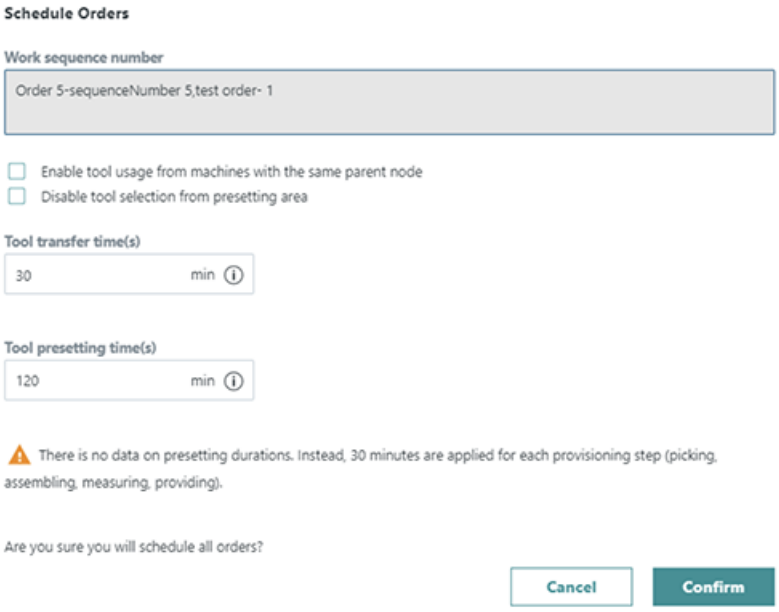
1. Open the "Overview of tool scheduling" window. For more information, see Tool scheduling overview (Page 337).



2. To schedule one work sequence, click on the scheduling icon. The "Confirm tool scheduling" view opens.



- OR -
To schedule several work sequences, check the selection boxes.
Click on "Schedule".
The "Schedule Orders" window opens.



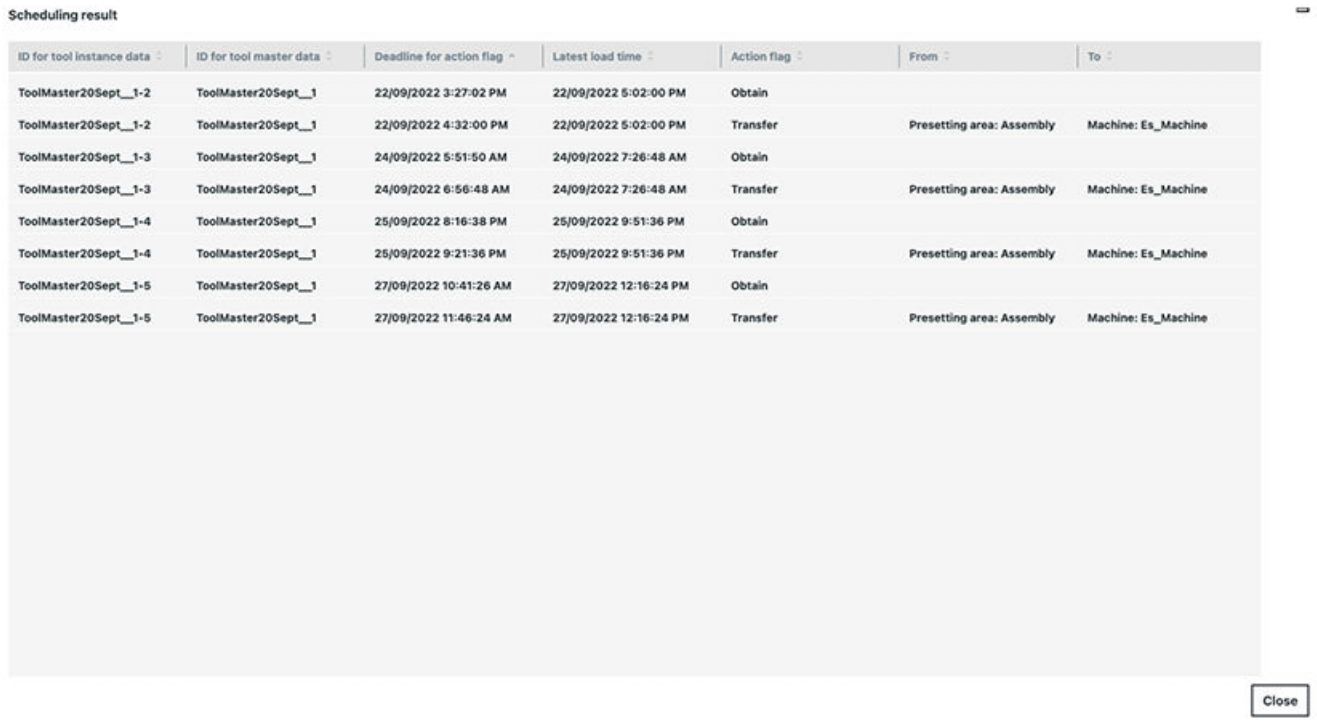
3. Configure following items
   - Which tool resources you want to use
     Besides from the target machine, tools can taken from neighboring machines or from the presetting area.
   - Average value of tool transfer time from presetting area to machine
     The default value is 30 per each presetting step.
   - Average value of tool presetting time
     Set the value if no historical data is available for any tool master data.
4. To schedule one work sequence, click on "Schedule" to start scheduling process.
   - OR -
   If you selected several sequences, click on "Confirm" to start the scheduling process.
   - OR -
   Click on "Cancel" to return to the overview.

   Note

   Status of work sequence

   Only work sequences with status "available" can be scheduled. Check the information by hovering over the status of the order column for a detailed explanation.

5. Click on the "Delete" icon to delete the scheduling results for a work sequence. For more information see Deleting the results of work sequences (Page 346).
6. Click on the "See scheduling results" icon to open the "Scheduling results" view.



Constraints to the manual tool scheduling

- Updated orders are considered within manual scheduling if one of the following parameters has changed. The state is changed to "NeedReschedule":
  - LotSize
  - PlannedStartDateMin
  - PlannedEndDateMin
  - PlannedStartDateMax
  - PlannedEndDateMax
  - AssignedMachineId
  - AssignedMachineName
  - ToolPlanCount
  - ToolPlanName
  - ToolPlanItems
- Tool scheduling relies on the remaining life time of a tool, which is typically provided by the controller.
- The duration of raw material change is not considered.
- Tool scheduling has no information about the status of the target machines. The scheduling of the machines is not done by MMR /Tools. It needs to be provided via the openness API from an MES for example.

- The tool component stock size is provided by MMR /Tools. It is assumed that enough components and tools exist within the factory to fulfill a work sequence. If there are not enough tool components in MMR /Tools, a warning appears.
- Broken tools, bad parts and special tools are not considered.
- Brownfield tools are not supported. Change them into greenfield tools before the scheduling is triggered.
- There is no special treatment for tool instances which are defined as measuring probes, In case you want to use them, please provide all data as for standard tools. A simple approach for measuring probes is to set the target lifetime to a large value.
- If the number of tool instances of a Tool Master exceeds 1000 during the manual scheduling of a work sequence, scheduling of the relevant work sequence is not possible. The number is configurable via API. For more information see Maximum tool instance configuration (Page 988).
- Tool scheduling is not available if worksequence state is OnHold, Deleted or Cancelled.
- If Tool Scheduling has been executed and the worksequence state is OnHold, Deleted or Cancelled, only the delete icon is visible in the interface, the Scheduling results are deleted manually.
- If a lotsize change is made in a scheduled order, its state becomes "NeedReschedule" and the delete icon appears in the UI. Delete operation is done manually and can be rescheduled if needed.

5.14.3 Regular scheduling of work sequences

You can configure tool scheduling in a way that it runs automatically to schedule the work sequences in a specific time frame based on a period.

The scheduling can be executed once a shift, day or week based on this configuration. The configuration can adapt to changes that happened in this time interval.

Configure the required parameters with the openness API. For more information, see Regular scheduling configuration (Page 986).

Regular scheduling continues until you stop it via the same API.

Note

Tool transfer and tool presetting times

Tool transfer and tool presetting times are used as they are configured within manual scheduling.

Average value of tool transfer time from presetting area to the machine:

- The default value is 30 per each presetting step.

Average value of tool presetting time:

- Set the value if no historical data is available for any tool master data.

Tools consideration for regular tool scheduling

- Tools within the assembly area as picking, assembling and measuring are used by default.
- Tools from cabinets in the same hierarchy path are used by default.
- New tool instance creation is preferred for regular scheduling in case of squeeze in scenarios.
- New tool instance creation is preferred for the work sequences which are in the buffer area during regular scheduling.
- Rare or expensive tool instances are not created but transferred from relevant areas such as cabinets and if it is possible regarding availability.

Assumptions for rare or expensive tools

- The main reason for rare tools is that they are expensive.
- Rare tools are released in the system. You do not have to create them via scheduling.
- When a rare tool is worn out, the system expects that it is rather directly replaced. Tool scheduling does not create a new instance. You can get a new instance using the manual "singe tool creation".
- As long as a rare tool is loaded to a machine which is in another hierarchy path, it cannot be scheduled for the considered machine. A rare tool must be unloaded into the root cabinet after it is used. A tool in the root cabinet can be made available for any machine.
- In case of a conflict regarding the usage time of rare or expensive tools between work sequences, the work sequence with the later start date is not scheduled.

Constraints to the regular tool scheduling

- Regular tool scheduling does not consider the tools within a machine. Even tools on machines which have the same parent node with the target machine are not considered.
- Regular tool scheduling relies on the remaining life time of a tool which is typically provided by the controller.
- The duration of raw material change is not considered.
- Tool scheduling has no information about the status of the target machines. The scheduling of the machines is not done by MMR /Tools. It needs to be provided via the openness API.
- The tool component stock size is provided by MMR /Tools. It is assumed that enough tools exist within the factory to fulfill a work sequence. If there are not enough tool components in MMR /Tools, a warning appears.
- Broken tool, bad parts and special tools are not considered.
- Brownfield tools are not supported. Change them into greenfield tools before the scheduling is triggered.
- There is no special treatment for tool instances which are defined as measuring probes, In case you want to use them, please provide all data as for standard tools. A simple approach for measuring probes is to set the target lifetime to a large value.
- If the number of tool instances of a tool master exceeds 1000 during the regular scheduling of a work sequence, scheduling of the relevant work sequence is not possible. The number is configurable via API.

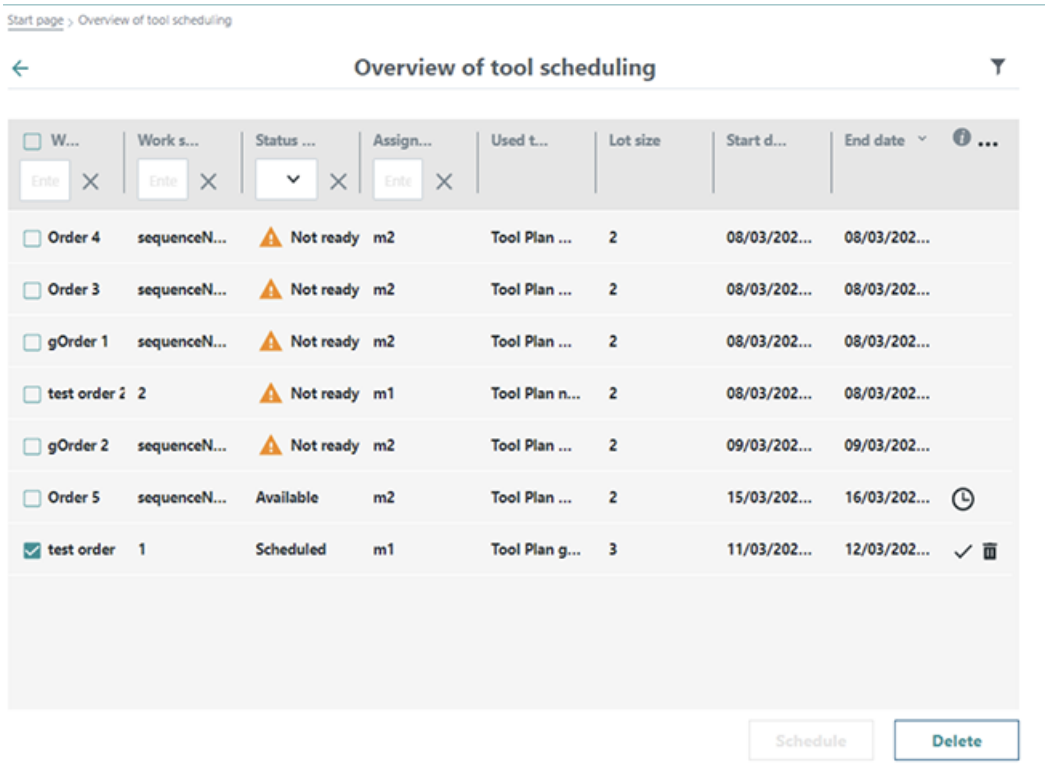
- If a work sequence is updated after it is scheduled, delete operation is done on results and rescheduled again automatically.
- Updated orders are considered within regular scheduling if one of the following parameters has changed. The state is changed to "NeedReschedule":
  - LotSize
  - PlannedStartDateMin
  - PlannedEndDateMin
  - PlannedStartDateMax
  - PlannedEndDateMax
  - AssignedMachineId
  - AssignedMachineName
  - ToolPlanCount
  - ToolPlanName
  - ToolPlanName

5.14.4 Deleting the results of work sequences

You can delete the results of work sequences from the tool scheduling overview page.

Procedure

1. Open the "Overview of tool scheduling" window. For more information see Tool scheduling overview (Page 337).



2. To delete the results of one work sequence click on the "Delete" icon.
   - OR -
   To delete the results of multiple work sequences check the selection boxes.
   Click on the "Delete" button on the tool scheduling overview page.
3. The "Delete Orders" view opens.
4. Click on "Confirm" to delete the results of the work sequences.

Note

Reservation status of tool instances after the deletion of scheduling results

If you delete scheduling results, then the reservation of the tool instances for the corresponding work order or sequence is deleted. The tool instance is kept in the system. If the tool instance is reserved by another work sequence in the same machine, the reservation of the tool instance is kept until the relevant work sequences are handled.

5.15 Master data for additional resources

5.15.1 Overview of master data for additional resources

The overview of master data for additional resources shows the resources you can use and manage with Mcenter.

These additional resources are:

- Tool adapters
- Clamping devices
- Measuring devices

Once you have generated a template, you can create instances.
For more information, see Additional resources (Page 370).

You can use and manage these instances for the loading and unloading to machines.

You can create, edit, copy and delete master data for additional resources.

Parameters

Parameter	Description
Adapters	Shows the adapter master data.
Clampings	Shows the Clamping devices master data.
Measuring Devices	Shows the master data of the measuring devices
∨	This symbol appears when you click on the column heading. Click on the symbol to sort the elements alphabetically/numerically, either in ascending or descending order.
ID of master data	Shows the name of a specific master data set for additional resources . Depending on the tab you have opened, it shows the data set of • Adapters • Clamping • Measuring Devices Click the link to display the detailed information within the open window.
DIN Standard	The supported DIN Standard is DIN4000-89.
Picture ID	Defines the machine side holder based on DIN4000-89
Order Number	Shows the order number.
Supplier	Shows the supplier.
Last change	Shows the date of the last change in the format "dd.mm.yyyy".

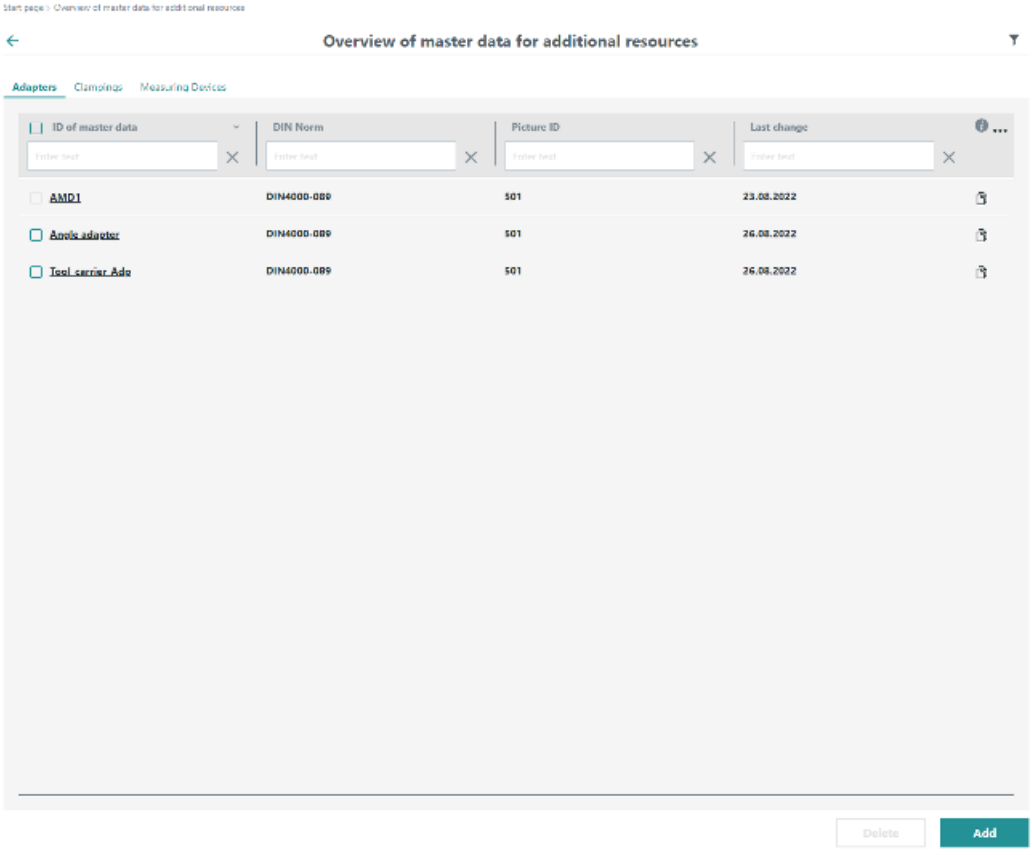
Parameter	Description
	Opens the "My Filters" window and filters additional resources master data according to the following criteria: • Attribute • DIN Standard • Picture ID • Order Number • Supplier • Last change For more information, see List filtering (Page 46). Click on the filter icon to close the filter window.
	Displays the tooltip "Configure table columns".
	Opens a window in which you select the columns to be displayed in the overview. These columns can optionally be configured to show further information: • Supplier • Order number The maximum of additional columns is limited to 6. The next time you log in with your user Id, the columns you selected are displayed.
	Click the "Copy" symbol to copy a data set.

Procedure

1. On the Mcenter start page, click on "Additional resources master data".

- OR -
Open the following URL: Additional resources master data (https://{ServerIP}/ mmr/resources/masterdata/overview)

2. The "Overview of master data for additional resources" window opens.



NOTICE
Tabs The "Adapters" tab is open by default. When you leave the application and return to it, the last tab you were working on is open.

5.15.2 Adapters Definition

Adapters

Adapters are used in turning machines. They take into account orientation changes of tools in 90° steps, in relation to their neutral position. Depending on the magazine, a tool or adapter-tool combination is displaced in relation to the machine's coordinate system. This combination of rotation and displacement is called “adapter transformation”. In case a tool is used in a machine with a different coordinate system, the neutral orientation of the tool must be adapted as well. This is also the case if the machine has multiple magazines with different orientations. This "magazine transformation" applies to both tools and adapters. This magazine configuration is only supported for managed machines currently.
In Industrial production environments, adapters are handled similarly to tool assembly. Like other resources, tool assemblies and adapters have a life cycle and there are different possibilities to use them. You can measure them, put them in a pocket, in a magazine or a spindle, which accepts holders of a certain type and holds a tool which is used in the chipping process.

NOTICE
Transformation calculation Mcenter supports 90° adapters and extensions. The transformation is calculated when the tool and the adapter are loaded to the machine together.

5.15.3 Clampings Definition

Clampings

Clamping devices are used to hold the workpiece in the machine during the production process.

All clamping devices defined via DIN 4000 - 190 and DIN 4000 - 191 are supported.

When you load clamping devices to a machine, they are assigned to the new container named "InMachine".

5.15.4 Measuring Devices Definition

Measuring Devices

In Industrial production, there are different types of measuring devices. Some of them are used as process probe for the machine. Manual measuring tools are often used for connections to data processing.

Advanced measuring tools are in a fixed location and used for manual operations. In many cases, there is a digital documentation of the results.

You can create master data for measuring devices. In a second step, you can create instances to manage your device within the production workflow.

Mcenter supports Measuring Devices ranging from DIN 4000 - 166 to 169.

5.15.5 Creating and editing master data for adapters

You can create master data for adapters.

You can modify the master data with or without an existing instance.

Parameters

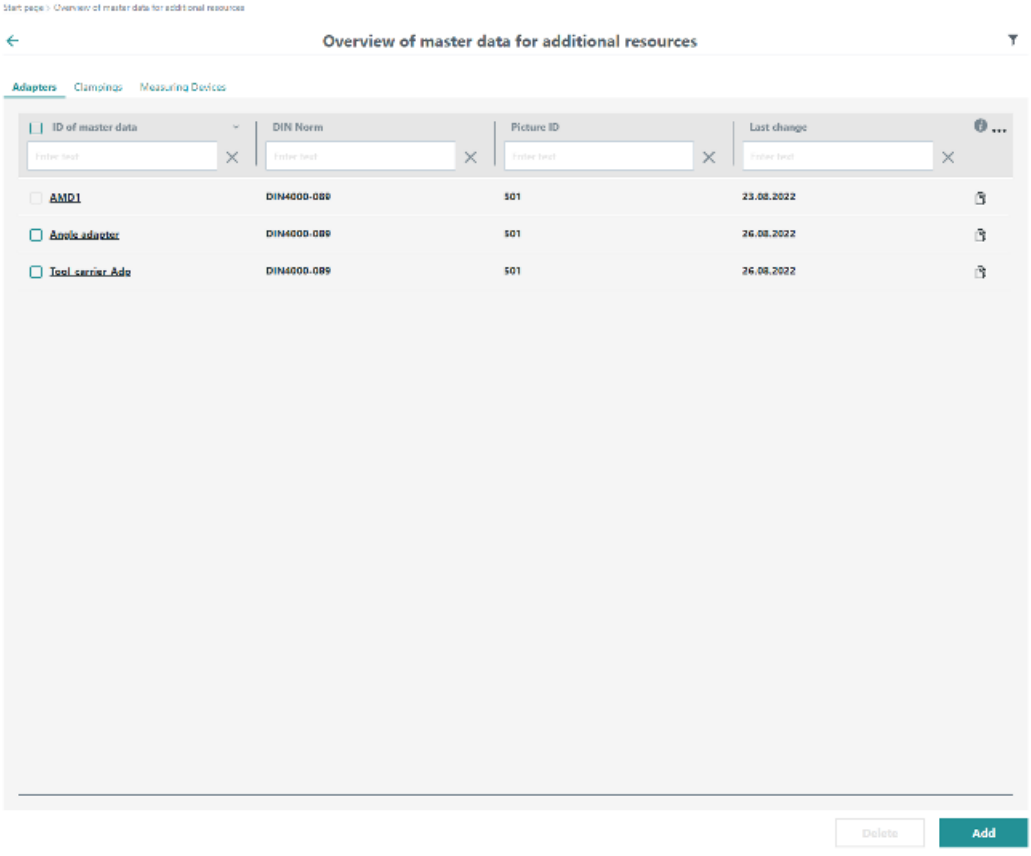
Parameter	Description
"New adapter master data" window	
Adapter data	
ID for adapter master data*	Shows the adapter's unique identifier or name.
State*	Select the state of the tool master data set: • Enabled • Disabled
Number of pockets	Shows the number of pockets the adapter provides to hold tools.
Classification	
DIN-Norm*	Shows the identifier of the corresponding DIN standard. DIN4000-089 is supported
Picture ID - Base (Machine-Side)*	
Adapter type*	Shows the adapter type • Radial driven (90 ° rotating) • Radial (90 ° not rotating) • Axial driven (0° rotating) • Extension (0° not rotating) • Axial • Custom • Adjustable
Description	Enter a description of the adapter type.
Weight	Shows the adapter weight.
Order-related information	
Supplier	Shows the supplier.
Order number	Shows the supplier's order number.
Pocket Info	
Index*	Shows the number of the pocket. Currently only one pocket is supported.
Picture ID Base (Workpiece-Side)*	Shows the type of the machine side holder, based on DIN 4000-89

Parameter	Description
Transformation number *	Shows the transformation number.
Offset X* Offset Y* Offset Z*	Shows the offset vector which is applied after the rotation of the tool geometry.
+	Adds a new pocket to an adapter.
🗑	Deletes the new pocket.

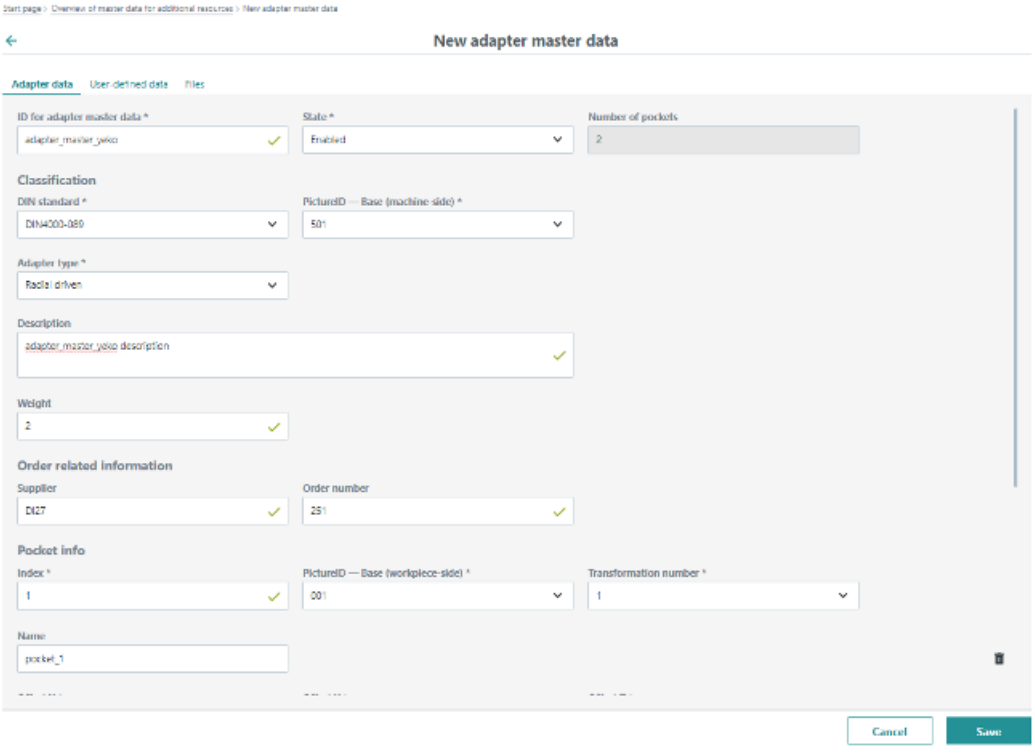
*) All fields with an asterisk are mandatory. If you enter a value that does not comply with the rules, a red warning symbol and a corresponding red highlighted error message below the input field are displayed.

Procedure

1. "The "Overview of master data for additional resources" is open.
   The "Adapters" tab is open by default when you open the "Overview of master data for additional resources" page.
2. Click on the "Add" button.



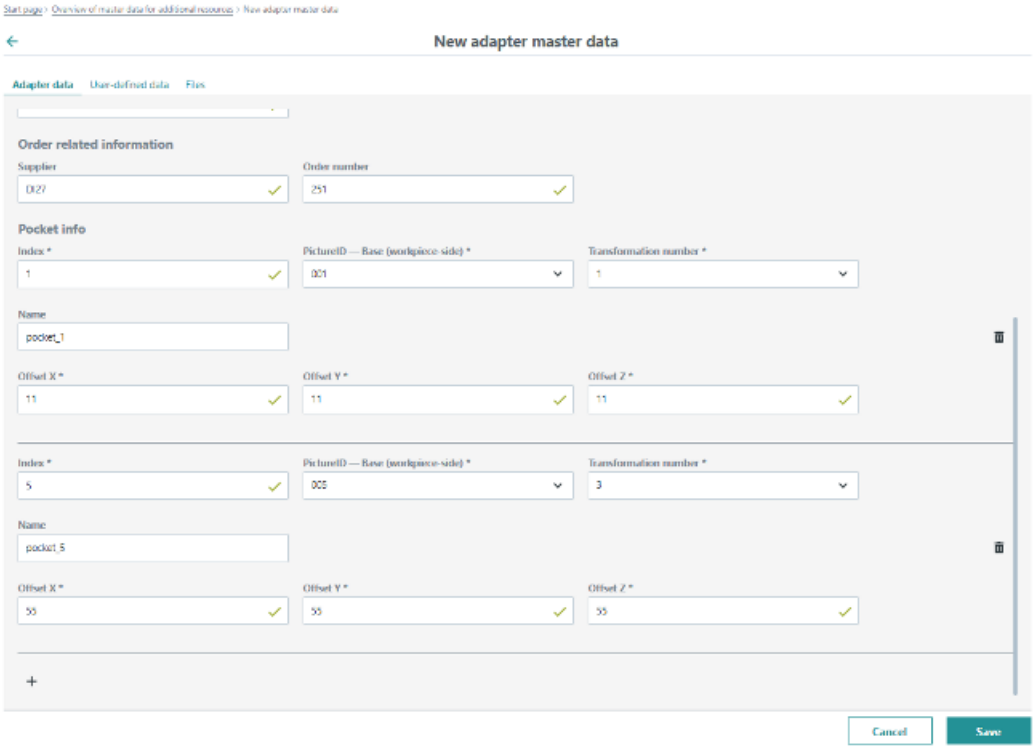
3. The "New adapter master data" window opens.



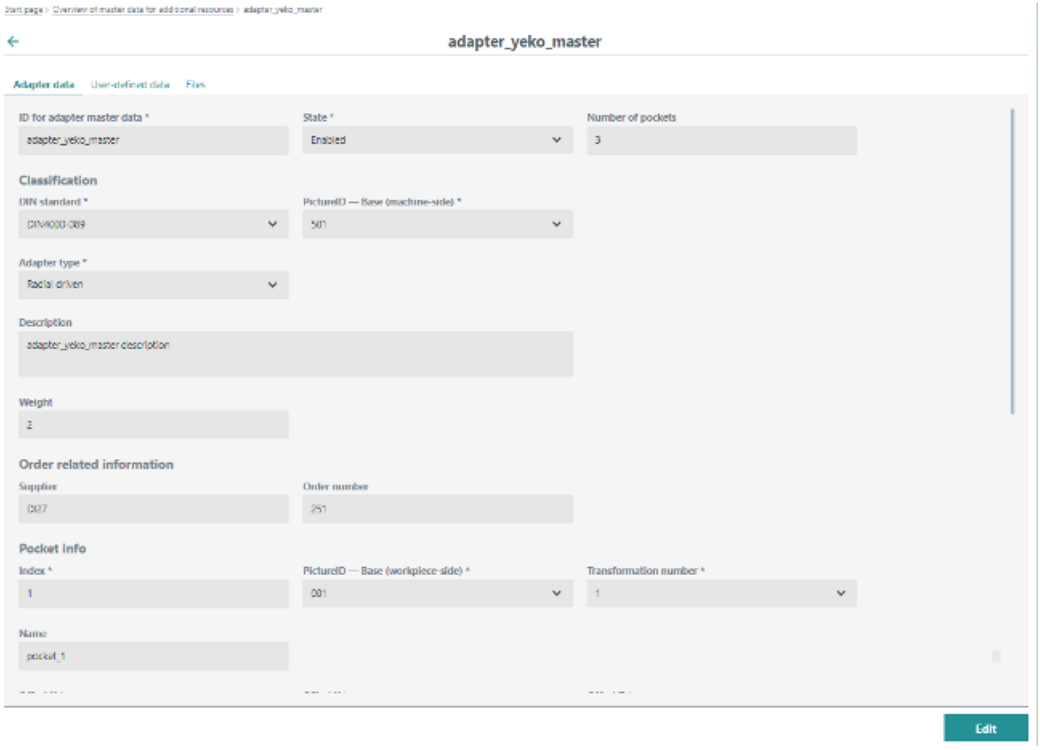
You can add and remove pockets, and edit the pocket-related information:

- Index
- PictureID
- Transformation number
  For more information about the "Transformation number", see Selecting the transformation number (Page 358).
- Name

– Offset X, Y, Z
  To remove a pocket, press the "Delete" symbol.
  To add a new pocket, "press the "+" icon in the in the bottom-right corner.
  The three new fields "Offset X", "Offset Y" and "Offset Z" are added.
  Update the information.
  The"Number of pockets" in the top-right corner is automatically updated.
  Click "Save".
  - OR -
  Click "Cancel" to cancel the operation.
  A green confirmation message "Measuring device master data was successfully saved" is displayed in the top-right window area.

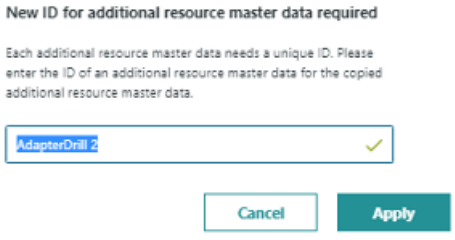


4. To edit the data, click on the underlined data set in the "Overview of master data for additional resources" window.
   Click on the "Edit" button.
   The "<adapter name>" window opens.
   Edit the data and click "Save".
   - OR -
   Click "Cancel" to cancel the operation.



   Click "Cancel" to cancel the operation.

5. To copy a data set, click the "Copy" symbol on the right-hand side.
   The dialog box "New ID for additional resource master data required" opens.
   Enter the ID for the copied additional master data set and click "Apply".
   - OR -
   Click "Cancel" to cancel the operation.

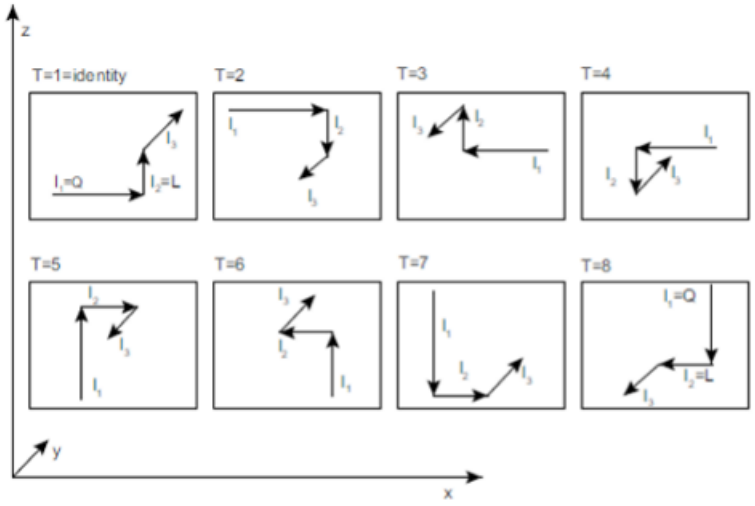


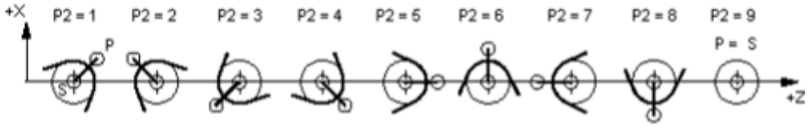
6. You can delete master data if no adapter instances have been created.
   Check the check box at the beginning of each line to delete the master data for additional resources.
   If no check box is displayed in front of the data set, this master data already has instances and you cannot delete it.

5.15.6 Selecting the transformation number

Selecting the transformation number

Consult the following tables to select the transformation number, based on the coordinate system.





Transformation-number	X (L1)	Y (L3)	Z (L2)	Rotation
1	+L1	+L3	+L2	-
2	+L1	-L3	-L2	ROT X 180
3	-L1	-L3	+L2	ROT Z 180
4	-L1	+L3	-L2	ROT X 180 Z 180
5	+L2	-L3	+L1	ROT Y 90 Z 180
6	-L2	+L3	+L1	ROT Y -90
7	+L2	+L3	-L1	ROT Y 90
8	-L2	-L3	-L1	ROT Y -90 Z 180

Transformation-number	Cutting edge position								
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**

1	1	2	3	4	5	6	7	8	9
2	2	1	4	3	7	6	5	8	9
3	4	3	2	1	5	8	7	6	9
4	3	4	1	2	7	8	5	6	9
5	1	4	3	2	6	5	8	7	9
6	4	1	2	3	8	5	6	7	9
7	2	3	4	1	6	7	8	5	9
8	3	2	1	4	8	7	6	5	9

5.15.7 Creating and editing master data for clampings

You can create and edit master data for clampings.

You can modify the clampings master data with or without an existing instance.

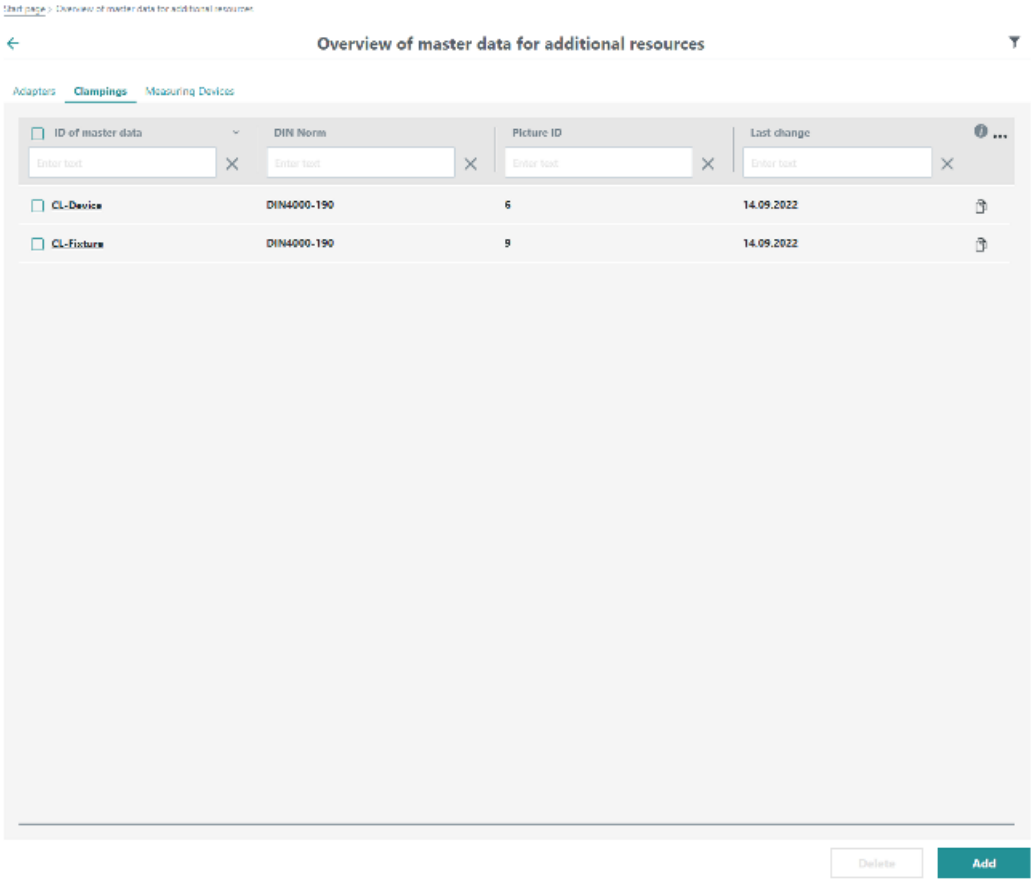
Parameters

Parameter	Description
ID for clamping master data	Shows the clamping's unique identifier or name of the master data.
Classification	
DIN-Norm*	Shows the identifier of the corresponding DIN standard.
Picture ID - Base*	Shows the picture identifier of the selected DIN standard.
State*	Select the state of the clamping: • Enabled • Disabled
Type of clamping*	Shows the clamping type.
Description	Enter a description of the clamping.
Geometrical Size	
Width	Shows the width.
Height	Shows the height.
Depth	Shows the depth.
Weight	Shows the adapter weight.
Order-related information	
Supplier	Shows the supplier.
Order number	Shows the supplier's order number.

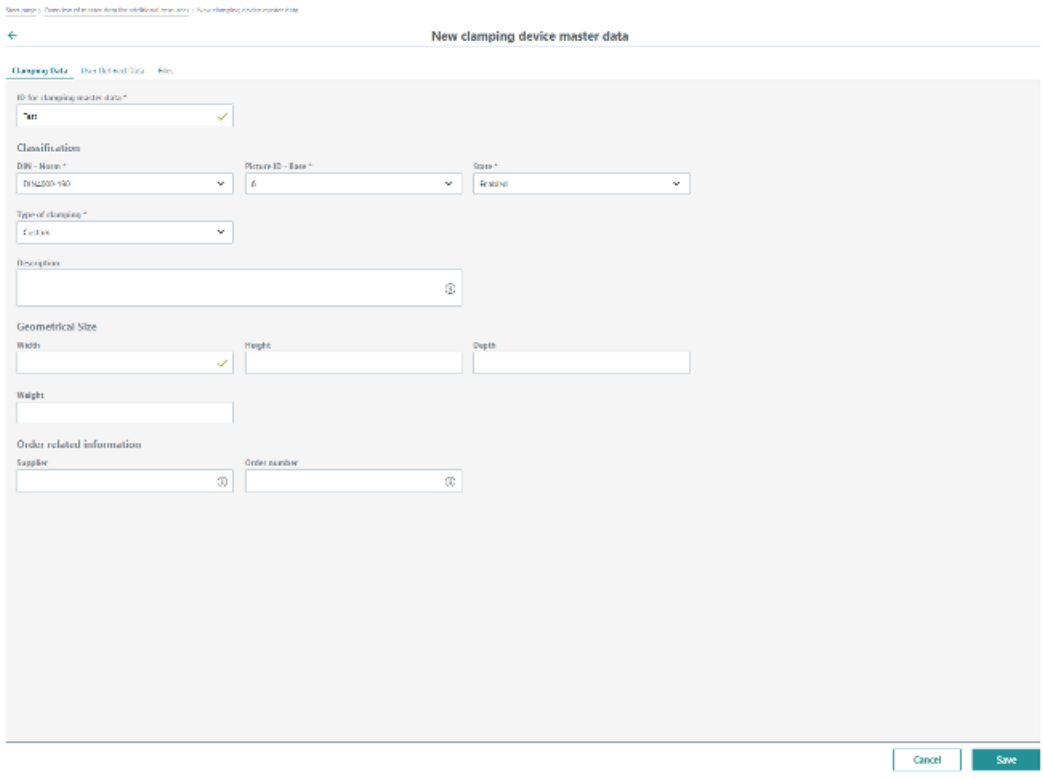
*) All fields with an asterisk are mandatory. If you enter a value that does not comply with the rules, a red
warning symbol and a corresponding red highlighted error message below the input field are displayed.

Procedure

1. Click on the "Clampings" tab in the "Overview of master data for additional resources" window.



2. Click on the "Add" button in the bottom-right window area.
   The "New clamping device master data" window opens.
   Enter the required information and click "Save".
   - OR -
   Click "Cancel" to cancel the operation.



3. To edit the data, click on the underlined clamping and click on the "Edit" button.
   The "<clamping name> window opens.
   Edit the data and click "Save".
   - OR -
   Click "Cancel" to cancel the operation.
4. You can delete master data if no adapter instances have been created.
   Check the check box at the beginning of each line to delete the master data for additional resources.
   If no check box is displayed in front of the data set, this master data already has instances and you cannot delete it.

5.15.8 Creating and editing master data for Measuring Devices

You can create master data for Measuring Devices.

Measuring devices are loaded into the „AtMachine“ container.

You can modify the master data with or without an existing instance.

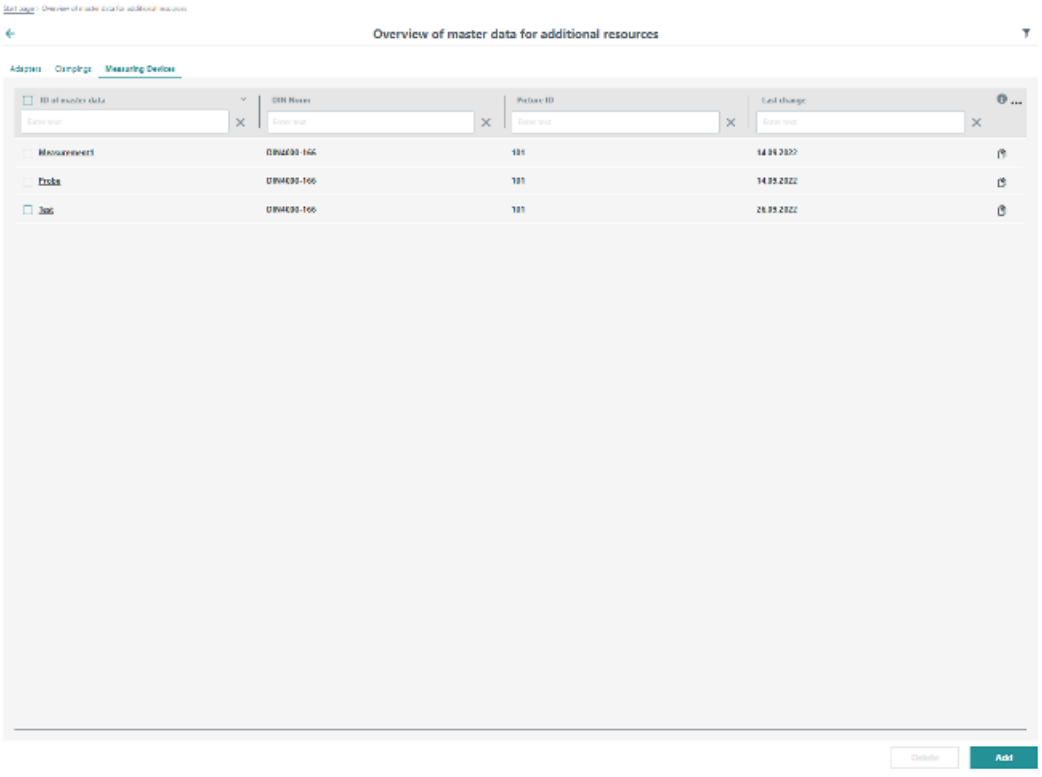
Parameter

Parameter	Description
ID for measuring device master data*	Shows the measuring device's unique identifier.
Classification	

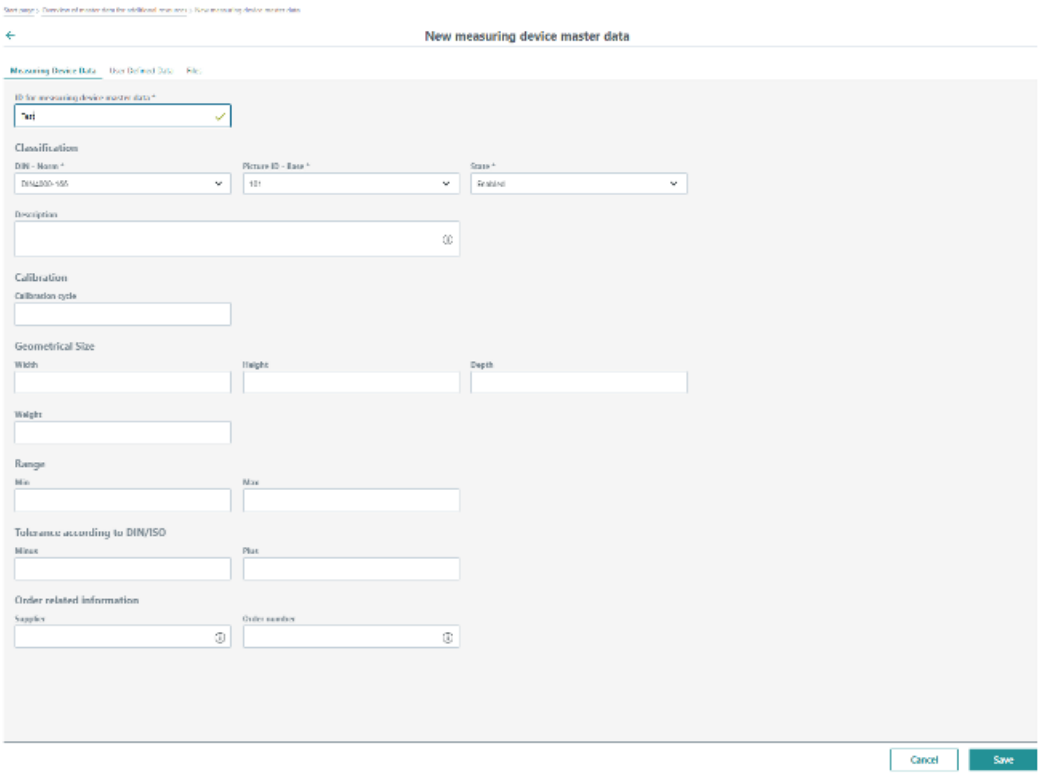
Parameter	Description
DIN Standard*	Shows the identifier of the corresponding DIN standard.
Picture ID - Base*	Shows the picture identifier of the selected DIN standard.
State*	Select the state of the measuring device: • Enabled • Disabled
Description	Enter a description of the measuring device.
Calibration	
Calibration cycle	
Geometrical Size	
Width	Shows the width.
Height	Shows the height.
Depth	Shows the depth.
Weight	Shows the weight.
Range	
Min	Shows the minimum size.
Max	Shows the maximum size.
Tolerance according to DIN/ISO	
Minus	Shows the tolerance.
Plus	Shows the tolerance.
Order-related information	
Supplier	Shows the supplier.
Order number	Shows the supplier's order number.

Procedure

1. Click on the "Measuring Devices" tab in the "Overview of master data for additional resources" window.
   Click on the "Add" button.



2. Click on the "Add" button in the bottom-right window area.
   The "New measuring device master data" window opens.
   Enter the required information and click "Save".
   - OR -
   Click "Cancel" to cancel the operation.



A green confirmation message "Measuring device master data was successfully saved" is displayed in the top-right window area.

3. To edit the data, click on the underlined clamping and click on the "Edit" button.
   The "<measuring device name> window opens.
   Edit the data and click "Save".
   - OR -
   Click "Cancel" to cancel the operation.
4. You can delete master data if no adapter instances have been created.
   Check the check box at the beginning of each line to delete the master data for additional resources.
   If no check box is displayed in front of the data set, this master data already has instances and you cannot delete it.

5.15.9 Creating User-defined Data

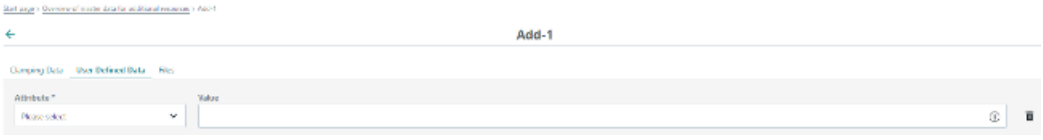
You can enter User-defined Data.

Parameter

Parameter	Description
Attribute*	Select the attribute from the drop-down list. Generic attributes with the names "Attribute 1", "Attribute 2"... are available. The default number of attributes is 10, but you can change it via the Openness API. The maximum number you can add is the number of configured attributes. For more information, see Modifying user-defined attributes (Page 946). You can replace the name "Attribute 1" etc. by another name. You can assign the name with, e.g. Swagger UI. All the generic attributes can be selected, as well as individual ones, such as attribute 2 and attribute 5. Assign a value to each attribute.
Value	Enter the value of the attribute. A maximum of 250 characters can be entered.
ⓘ	Displays the information about the 250 characters limitation.
✓	Confirms the validity of your entry.
+	Adds a User-defined data set.
⌄	Opens the drop-down list with the attributes.
🗑	Deletes a data set.

Procedure

1. Click on the underlined data set in the "Overview of master data for additional resources" window.
   The "<Additional resource> window opens.
   Open the "User-defined data" tab.
2. To open the "Add" window, click on the "Edit" button.
   To add the data set, click on the "Plus" symbol.
   Enter the required information and click "Save".



5.15.10 Adding files

You can add files to the additional resources master data, for instance

- PDF files
- images

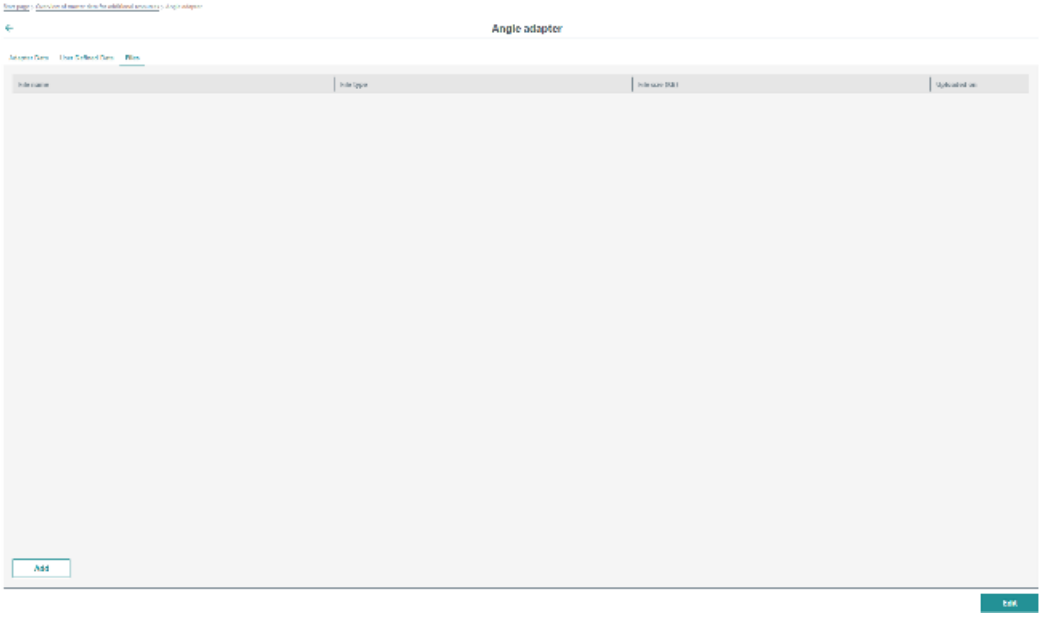
You can open and use the files from the instance.

Parameters

Parameter	Description
File name	Shows the file name.
File type	Shows the file type.
File size (KB)	Shows the file size (KB).
Uploaded on	Shows the upload date.
Virus scan status (optional)	Shows the actual virus scan status.

Procedure

1. Click on the underlined data set in the "Overview of master data for additional resources" window.
   The "<Additional resource> window opens.
   Open the "Files" tab.

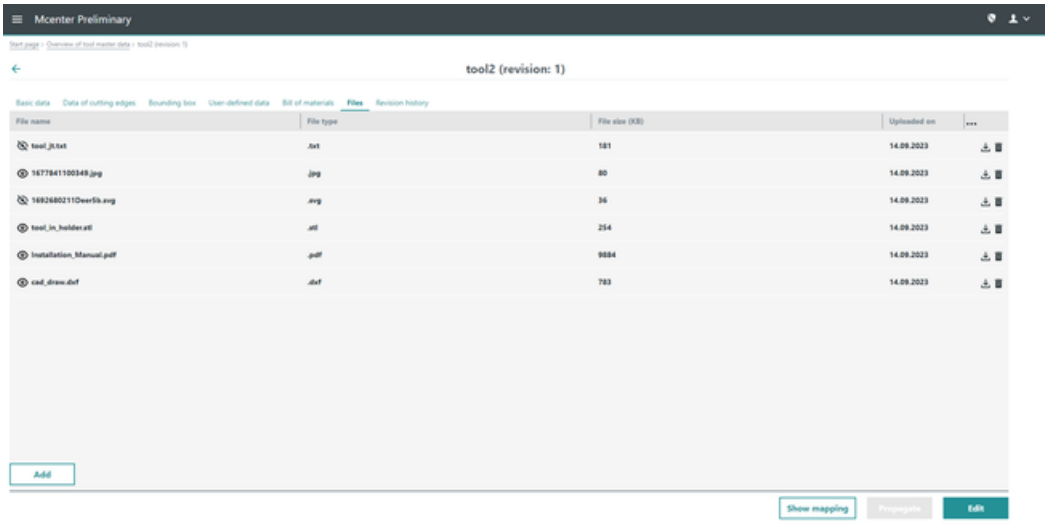


2. Click on the "Add" button.
   The Explorer window opens.
   Select a file and click on the "Open" button.
   The uploaded file is displayed in the list.

5.15.11 Previewing files

Procedure

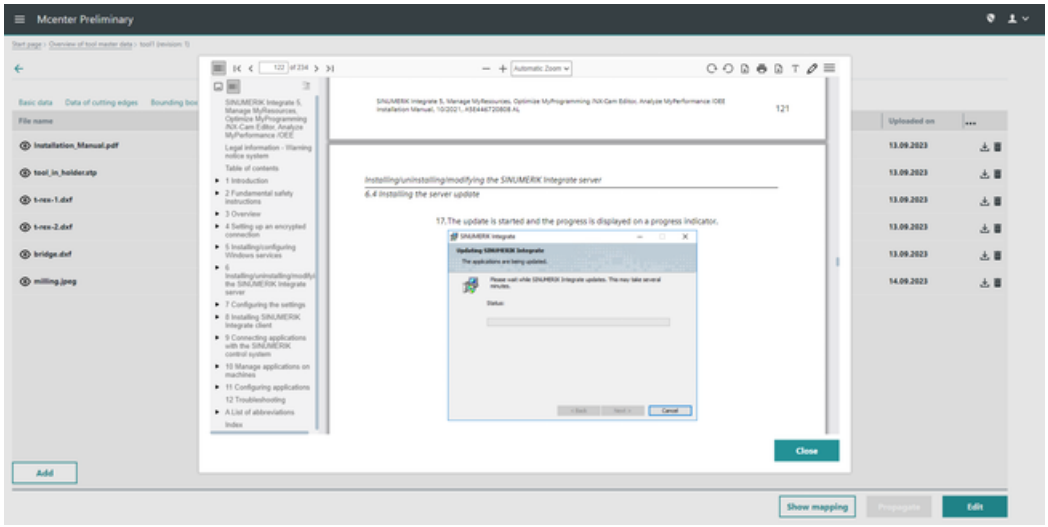
1. Open the "Files" tab. Before the file names there are new eye icons. Eye icon means the file is viewable, crossed eye icon means the file is not viewable.
   Currently supported file formats are:
   A file is only openable if the file has a supported format and the virus scan returned "Safe" or it is "Unchecked".
   - image: .jpg, .jpeg, .png, .gif
   - document: .pdf
   - CAD:
     2D: .dxf
     3D: .stl, .stp, .step, .glb



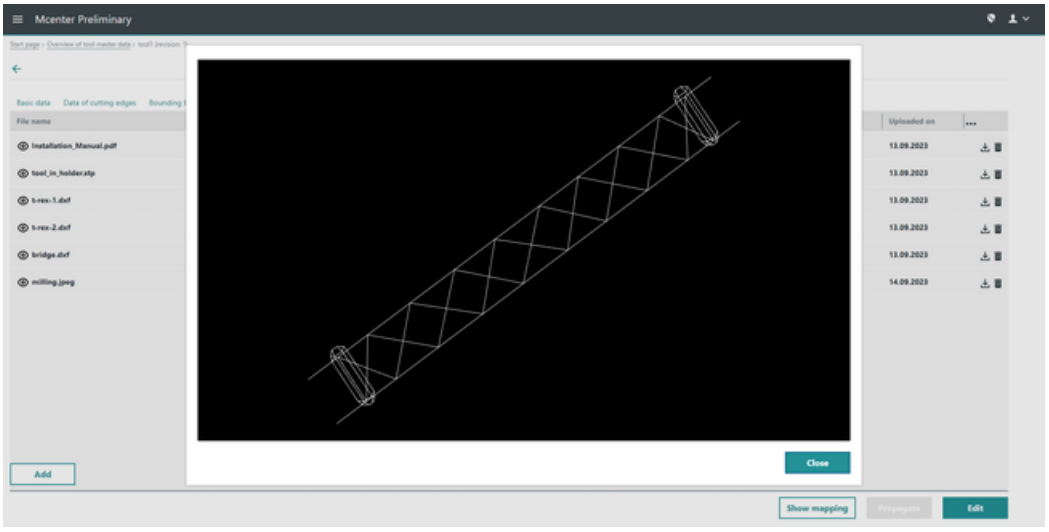
2. Click on the eye icon next to the file name.
   A modal window opens with the selected file displayed in it.

- In case of image files, it simply shows the image in the modal window.

- In case of pdf, a pdf viewer is loaded in the window with some simple features, like paging, scrolling and zooming.



- In case of 2D CAD files, a dxf viewer shows the content that can be zoomed and dragged.



- In case of 3D files, a 3D viewer shows the content that can be zoomed, dragged and rotated.

5.16 Additional resources

5.16.1 Overview of additional resources

The "Overview of additional resources" shows different Mcenter-managed resources created from master data.
You can create instances for tool adapters, clamping devices and measurement devices. Once a template for a resource is available, you can create instances you can use and manage for machine loading and unloading.

Parameters

Parameter	Description
Tabs	
Adapters	Shows an overview of the adapter instances.
Clamping	Shows an overview of the clamping instances.
Measuring Devices	Shows an overview of the measuring devices.
˅	This symbol appears when you click on the column heading. Click on the symbol to sort the elements alphabetically/numerically, either in ascending or descending order.
ID of instance	Shows the identical ID of the additional resource according to the tab you open: • for adapters • for clampings • for measuring devices
ID of master data	Shows the name of a specific additional resources master data set according to the tab you open: • for adapters • for clampings • for measuring devices Click the link to display the detailed information within the open window.
DIN Standard	Shows the supported DIN standard.
Picture ID	Shows the Picture ID available for this instance.
Reserved	Shows the reservation which was valid during the creation of the Production Order plan and Balancing.
Reserved for machine	Indicates whether an additional resource is reserved for a specific machine.

Parameter	Description
	Opens a window in which you can select the columns to be displayed. You can add • Picture ID • Reserved • Reserved for machine
	Displays a tooltip with the number of listed "Additional resources" data items.
	Click on the "Edit" symbol to change the reservation of the selected "Additional resource" instance.
	Click on the "Relocate" symbol to relocate the item.

5.16.2 Creating a new additional resource instance

You can create additional adapter instances.

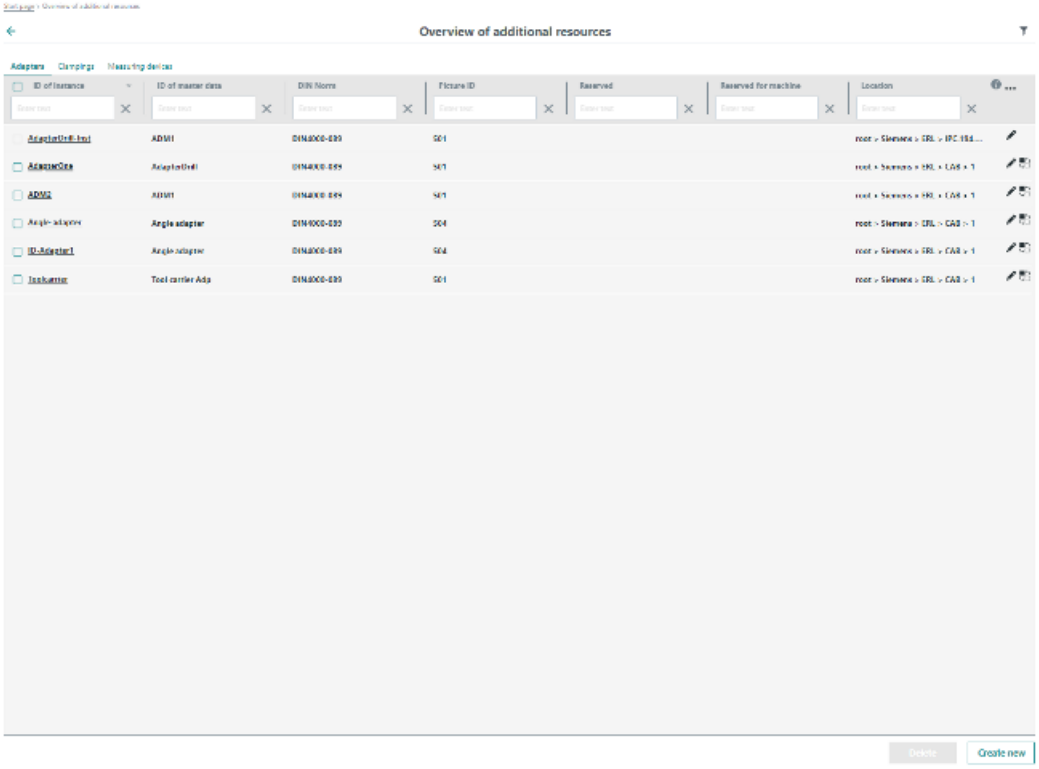
Parameters

Parameter	Description
	Click on the wrench symbol to create a new adapter instance.
Create new additional resource instance	
ID for additional resource*	Enter the additional resource ID.
Cabinet*	Select the cabinet
Container*	Select the container.

Procedure

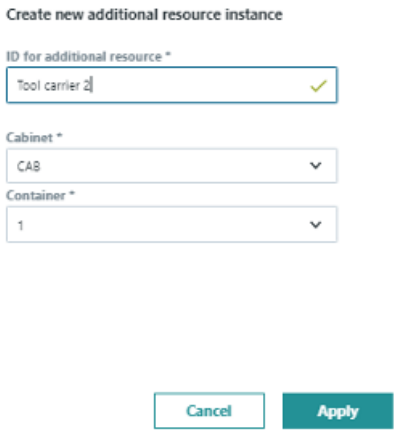
1. On the Mcenter start page, click on "Additional resources".

2. The "Overview of additional resources" window opens.
   The Adapters tab is open by default.
   For more information, see Master data for additional resources (Page 349).



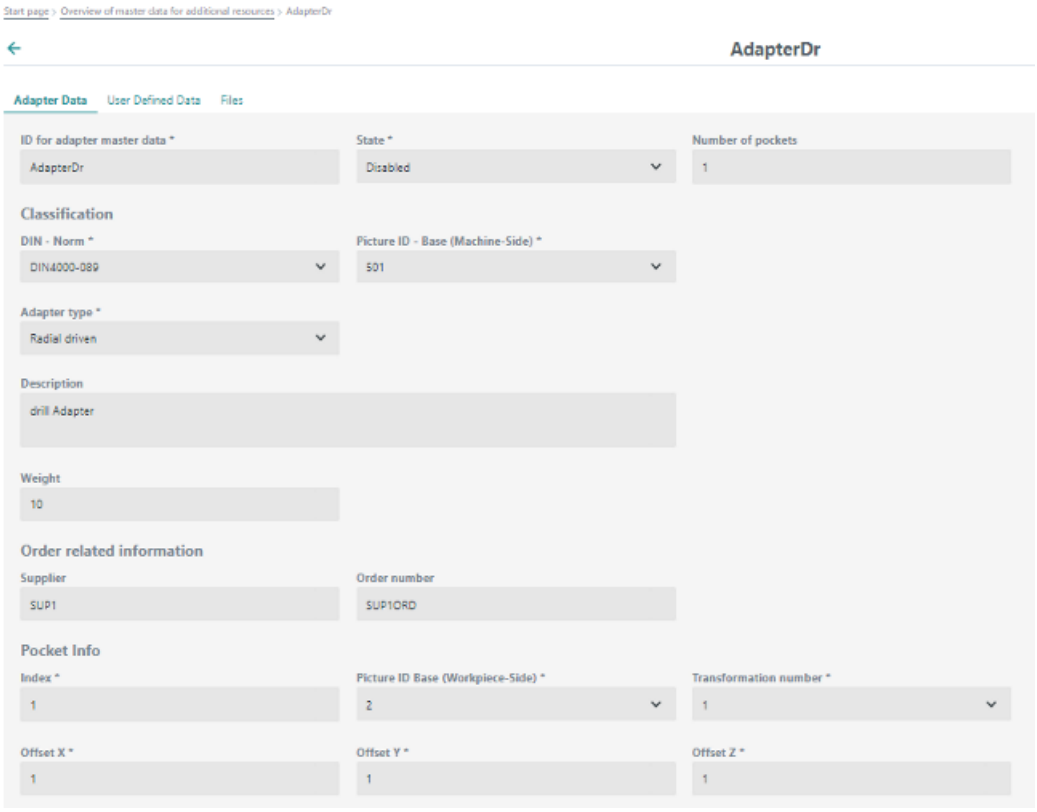
3. Click on the "Create new" button in the bottom-right window area.
   The "Overview of master data for additional resources" opens.
   The additional resources master data you have created is displayed.

4. Click on the wrench symbol on the right-hand side.
   The "Create new additional resource instance" dialog box opens.
   Enter a unique external ID.
   If the ID has already been assigned, you get an error message.
   Select a cabinet.
   The cabinets are displayed in hierarchical order.
   Select a container.
   Click "Apply".
   - OR
   Click "Cancel" to cancel the operation.

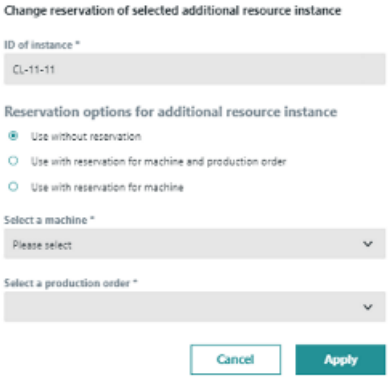


   A green confirmation message "Additional resource tool instance was created successfully" is displayed in the top-right window area.
   The new additional resource is displayed in the list.

5. In order to display the master data, click on the underlined ID in the list.

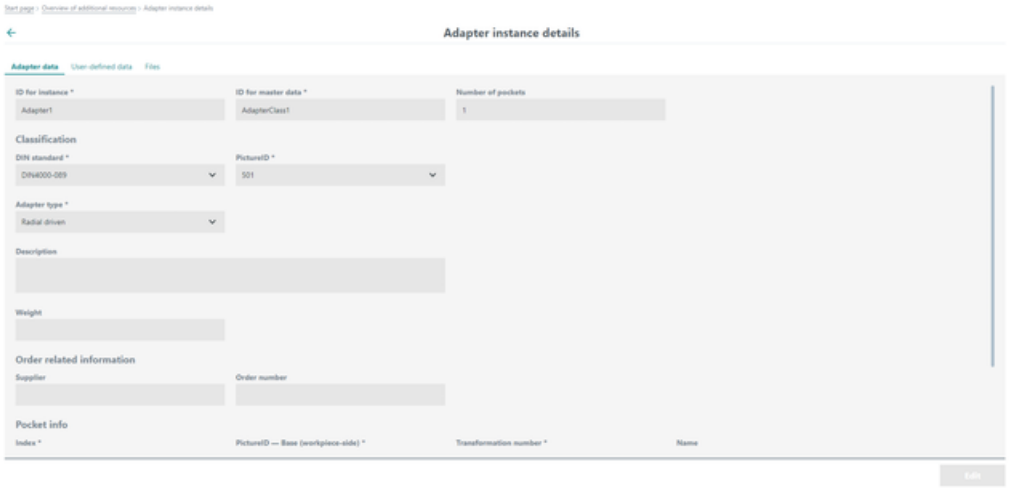


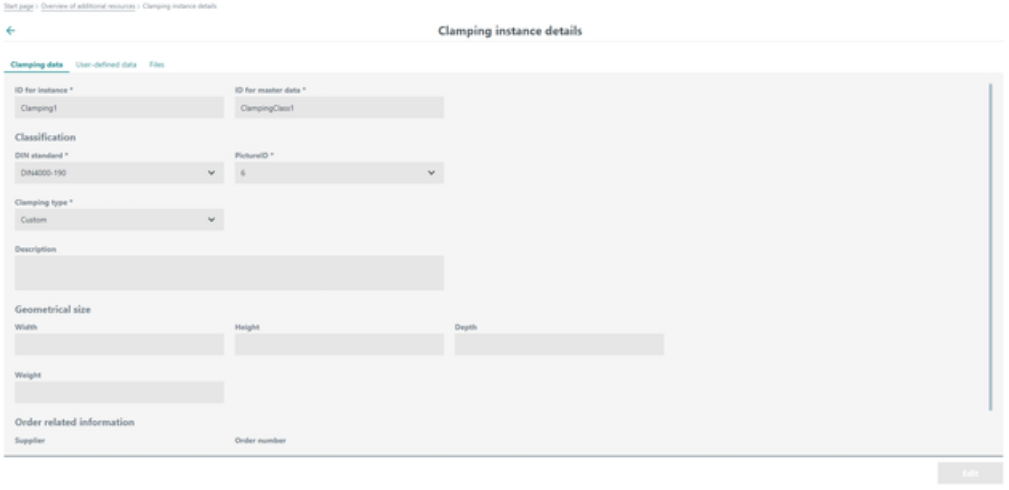
6. To change the reservation, click on the "Edit" symbol in the "Overview of additional resources" view.
   The "Change reservation of selected additional resource instance" dialog box opens.
   For more information, see Relocating tools (Page 185).



   Enter the required information and click "Apply".
   - OR -
   Click "Cancel" to cancel the operation.

7. To see the details of an additional resource, select this resource in the "Overview of additional resources" view. The "Edit" button is disabled, if an adapter is loaded in a machine's magazine or a clamping instance is loaded in the "InMachine" container.
8. You can delete an additional resource as long as it is in a cabinet.





Errors

If an instance is loaded in the machine while it is edited, an error message is displayed on the UI. No changes are saved.

If the location information is missing for an instance, the following message occurs: "Clamping instance was not found. Location information is missing."

Set the location information. Then you can edit the data.

5.17 Standard data model

5.17.1 Controller specific tool data mapping

Tool data model

From version 5.3.0.0, the system uses the standard data model that is based on DIN 4000-180. In older versions the data model is based on SINUMERIK. The controller specific data is mapped to the data model.

This section describes the model, the differences between standard and implemented model, and possible configuration capabilities.

The data model includes two types of elements:

- Process elements
- Non-process elements

Process elements are needed for the internal functionalities of the system. Some of the elements are visible for the user mapper logic.

Note

The system does not allow to change or write back process elements while a transformation is running.

Non-process elements are stored, but not used by internal logic. You can change the data during the transformation process.

The mapping is done with two functionalities:

- Mapping to a known model (for example SINUMERIK or standard model)
- Mapping to an unknown model

The mapping is done in two directions:

- From the standard model to the controller specific model
- From the controller specific model to the standard model

The standard model is a known model. The controller specific model can be unknown.

The logic must use the proper naming:

- If the standard model is the source or the destination for the mapping
- If the controller specific model is used for communication, for example with a SINUMERIK Integrate machine or with API

Note

Unknown models do not have any naming convention.
If you want to use the model on the UI, you must follow the UI rules.

Note

Mapping of machine to DIN standard classification

When machines are mapped with DIN standard classification, data that has to be editted, can emerge.

1. Classification
   When tools are classifyed there can arise 1:n relations. That means the sandard class will be added to DIN 4000, which maybe has to be customized.
   Example: The twist drill is tool typ 200. In DIN there are 5 typs of drills (31-35). It may be necessary to choose the correct classification of the drill on the base of DIN 4000 to picture everything correctly.
2. Calculating
   When data fields are calculated there can arise 1:n relations. That means in the data field of DIN 4000 has to make customizations.
   Example: The correction angle of the milling probe in SINUMERIK is displayed with the variable STC_DP10. In the format of DIN 4000 are the parameters A84 for Z-correction und A93 for Y-correction. The assignment can be changed manually.

Note

Calculations over mapping table

5.17.2 Selecting a mapper

Prerequisites

- The supported controller does not use the DIN standard tool data model
- Mapping between the controller specific data model and the standard data model is necessary

You can add a mapping

- specific for only this machine
- for a machine type
- for a controller type

Procedure

An algorithm selects the best mapping for the machine. The first existent mapping in the priority list is used:

- a given mapping for this machine
- a given mapping for this machine type and this controller type
- a given mapping for this controller type for only one machine

- if the connection type is "SINUMERIK Integrate: SINUMERIK Integrate default mapper"
- the system does not report, that the mapper is missing

The mapping is bidirectional. It supports mapping from the standard model to the controller specific model and vice versa. The same result should always be returned/displayed, when both ways are mapped. If the mapper is not bidirectional, for example because of a controller specific update, non-expected side effects can occur.

Note

Non-reversible default mapping

Default mapping is not reversible in case of "ToolType - BLD Conversion". This concerns a standardized tool and master data on a SINUMERIK machine or using V1 openessAPI. Check if your mapping uses "ToolType - BLD Conversion".

The system provides a default mapper for SINUMERIK and V1 OpenessAPI. If you remove the default mapper or the flag, it is restored after restart.

5.17.3 Functional overview

Rules

The mapping is based on XSLT 1.0 data transormations technology. For more information see https://www.w3.org/TR/xslt-10/

The process consists of two steps:

1. The mapper transforms the input data to the output data using the XSLT logic
2. The system adds, fills or overrides process related data

Follow the rules for the mapper logic implementation:

- The template must match to the root element and return with the root base element. An example is shown below.
- The template must handle missing and nullable values. The result xml does not contain missing or NULL values. An example is shown below.
- The template has two parts, one for the tool and one for the master data. These two templates are used sequentially, not together.
  Following high level templates are shown below
  - Standard model tool data
  - Standard model master data
  - SINUMERIK Integrate tool data
  - SINUMERIK Integrate master data

Standard data model – which is based on DIN-4000 – is introduced to the system and replace old Sinumerik based model. This section

describes the model, differences between standard model and implemented model, and possible configuration capabilities.

Model contains two types of elements:

- Process elements, which are needed for system internal functionalities
- Non-process element, which are stored but are not needed for internal logic

Process related elements are handled differently. Even if some of them are visible for the user mapper logic, system will not allow to
change during transformation between models and it write back these values. Non-process related data allow to change.

System has 2 main functionality.

- Mapping to known model (eg.: Sinumerik- or Standard model)
- Mapping to unknown
  and 2 way
- TO Controller specific model from Standard model
- FROM Controller specific model to Standard model

Standard model is a known model. In case this is the source or the destination of the mapping, logic must use the proper naming.

Controller specific model should be unknown, but in case it is used for communication (eg.: With a Sinumerik Integrate machine or with
API) model must use the provided naming. Unknown model has no naming convention, but if user want to use it on the UI it should follow
UI rules.

Examples

The Template must match to the "Root element" and return with "Root base element":

```
<?xml version='1.0' encoding='utf-8'?>
    <xsl:stylesheet version="1.0"
        xmlns:xsl='http://www.w3.org/1999/XSL/Transform'
        xmlns:mc='http://mcenter.siemens.com/Mapper'
        xmlns:xsi='http://www.w3.org/2001/XMLSchema-instance' >
    <xsl:template match='/Root'>
    <Root>
    ...
```

The template must handle missing and nullable values. The result xml does not contain missing or NULL values:

```
<xsl:if test = 'not(Tool/D6="")'>
     <TC_TP_MAX_VELO>
     <xsl:value-of select='Tool/D6'/>
     </TC_TP_MAX_VELO>
</xsl:if>

<xsl:template match='A1'>
     <xsl:param name='TOOLTYPE' />
     <xsl:if test = '. and not(.="")'>
```

```
          <xsl:choose>
               <xsl:when test='$TOOLTYPE >= 500 and $TOOLTYPE <=
599'>
                    <TC_DP7>
                         <xsl:value-of select='. div 2'/>
                    </TC_DP7>
               </xsl:when>
               <xsl:otherwise>
                    <TC_DP6>
                         <xsl:value-of select='. div 2'/>
                    </TC_DP6>
               </xsl:otherwise>
          </xsl:choose>
     </xsl:if>
</xsl:template>
```

The Template has 2 parts. One for "Tool Data" and one for "Master Data". The system uses these two templates one after the other, not together.

The "Standard Model" sends the tool data with the following high level template:

```
<Root>
  <Tool>
     <D6>5</D6>
     <D6_ACC>4</D6_ACC>
     <ToolState>8</ToolState>
                                                  ...Further tool data...
     <CuttingEdges>
        <CuttingEdgeDto>
        <IND>1</IND>
        <BLD>25</BLD>
                                                  ... Further cutting
edge data...
        <CuttingEdgeCorrection>
            <X0>1014</X0>
            <Z0>1015</Z0>
            <Y0>1016</Y0>
                                                  ... Further cutting
edge correction data...
        </CuttingEdgeCorrection>
        <CustomProperties>
            <CustomPropertyDto>
                 <Key>attribute1ce</Key>
                 <Value>value1</Value>
            </CustomPropertyDto>
                                                  ... Further cutting
edge custom property...
     </CustomProperties>
     </CuttingEdgeDto>
     <CuttingEdgeDto>
                                                  ... Further cutting
edges ...
     </CuttingEdgeDto>
```

```
   </CuttingEdges>
   <CustomProperties>
     <CustomPropertyDto>
       <Key>attribute1</Key>
       <Value>value1</Value>
     </CustomPropertyDto>
                                                    ... Further tool
custom property...
   </CustomProperties>
  </Tool>
  <Magazine>
     <PlaceSize>10</PlaceSize>
  </Magazine>
  <Oem>
     <OEMDataElementDto>
         <Name>TC_TPC1</Name>
         <Value>65</Value>
     </OEMDataElementDto>
                                                    ... Further OEM Data
  </Oem>
</Root>
```

The "Standard Model" sends the "Master data" with the following high level template:

```
<Root>
  <MasterData>
     <D6>2</D6>
     <D6_ACC>1</D6_ACC>
                                                    ... Further Master
data properties ...
     <CuttingEdges>
       <CuttingEdgeDto>
         <BILD>21</BILD>
         <IND>2</IND>
                                                    ... Further Cutting
edge properties ...
       <CuttingEdgeGeometry>
         <X0>9</X0>
         <Z0>10</Z0>
         <Y0>11</Y0>
                                                    ... Further Cutting
edge geometries ...
       </CuttingEdgeGeometry>
       <CuttingEdgeTolerance>
         <X011>9</X011>
         <Z011>10</Z011>
         <Y011>11</Y011>
                                                    ... Further Cutting
edge tolerances
       </CuttingEdgeTolerance>
       <CustomProperties>
         <CustomPropertyDto>
            <Key>attribute1</Key>
```

```
            <Value>Value</Value>
          </CustomPropertyDto>
                                                    ... Further Cutting
edge custom properties ...
     </CustomProperties>
       <CuttingEdgeExtension>
          <E3>1</E3>
                                                    ... Further Cutting
edge extended properties ...
       </CuttingEdgeExtension>
     </CuttingEdgeDto>
                                                    ... Further Cutting
edges
  </CuttingEdges>
  <CustomProperties>
     <CustomPropertyDto>
          <Key>attribute1</Key>
          <Value>Value</Value>
     </CustomPropertyDto>
                                                    ... Further Custom
properties ...
  </CustomProperties>
 </MasterData>
</Root>
```

The "Sinumerik tool result" follows the following high level template. The namespace is used for the attribute identification. There is no
content behind the address:

```
<Root xmlns:mc="http://mcenter.siemens.com/Mapper">
<TC_TP_MAX_VELO>5</TC_TP_MAX_VELO>
                                                   ... Further Tool
Properties ...
  <TC_TPC mc:list="true">
   <MappedOemData>
     <Name>TC_TPC1</Name>
     <Value>123</Value>
   </MappedOemData>
                                                   ... Further TC_TPC OEM
Data ...
  </TC_TPC>
  <CustomProperties mc:list="true">
   <MappedCustomProperty>
      <Key>attribute1</Key>
      <Value>value</Value>
   </MappedCustomProperty>
                                                    ... Further custom
properties ...
  </CustomProperties>
  <CuttingEdges mc:list="true" mc:key="DNo">
   <MappedCuttingEdge>
       <DNo>1<7DNo>
                                                    ... Further cutting
```

```
edge ...
       <TC_DPC mc:list="true">
         <MappedOemData>
            <Name>TC_DPC1</Name>
            <Value>DCValue</Value>
         </MappedOemData>
                                                    ... Further TC_DPC OEM
Data ...
   </TC_DPC>
   <TC_MOPC mc:list="true">
         <MappedOemData>
             <Name>TC_MOPC1</Name>
             <Value>MOCValue</Value>
         </MappedOemData>
                                                    ... Further TC_MOPC
OEM Data ...
   </TC_MOPC>
  </MappedCuttingEdge>
                                                    ... Further
CuttingEdges ...
 </CuttingEdges>
</Root>
```

The "Sinumerik Master data result" follows the following high level template:

```
<Root xmlns:mc="http://mcenter.siemens.com/Mapper">
  <TC_TP_MAX_VELO>2</TC_TP_MAX_VELO>
                                                     ... Further Tool
Properties ...
  <CustomProperties mc:list="true">
    <MappedCustomProperty>
       <Key>attribute1</Key>
       <Value>Value1</Value>
    </MappedCustomProperty>
                                                     ... Further Custom
Properties ...
  </CustomProperties>
  <CuttingEdges mc:list="true" mc:key="DNo">
    <MappedToolMasterDataCuttingEdge>
       <DNo>2</DNo>
                                                     ... Further Cutting
edge Properties ...
       <CuttingEdgeGeometry>
         <TC_DP3>9</TC_DP3>
                                                     ... Further
CuttingEdgeGeometry Properties ...
       </CuttingEdgeGeometry>
       <CuttingEdgeTolerance>
         <TC_DP3>9</TC_DP3>
                                                     ... Further
CuttingEdgeTolerance Properties
       </CuttingEdgeTolerance>
   </MappedToolMasterDataCuttingEdge>
```

```
                                                    ... Further
CuttingEdges ...
  </CuttingEdges>
</Root>
```

If "Controller specific view" is used, which should be used on the detail view of the Ui, the following constraint must be addressed:

1. The Tool level must have:
   – "CuttingEdges" node with the attributes "mc:list" and "mc:key"
     - mc:list attribute identifies that the given object is a list
     - mc:key attribute identifies which property is the cutting edge tab key
   – "CustomProperties" node with the attribute "mc:list"
2. "CuttingEdge level" must have "CustomProperties" node
3. "CustomProperty" node must have the nodes "Key"and "Value"

5.17.4 Mapper usage in workflows

Mapper usage in workflows

When the system uses "mapping transformation" in the following usecases:

API:

Method	Endpoint	Mapper - Direction	Comment
GET	toolassembly/v1/toolinstances	(Default API - To)	
GET	toolassembly/v1/toolinstances/ownership/none	(Default API - To)	
GET	toolassembly/v1/toolinstances/ownership/any	(Default API - To)	
GET	toolassembly/v1/toolinstances/ownership/{ownerId:Guid}	(Default API - To)	
GET	toolassembly/v1/toolinstances/disassembling	(Default API - To)	
POST	toolassembly/v1/toolinstances/{id:Guid}/addcorrection	(Default API - From/To)	Correction calculation is based on a full model. Transformer could need additional information, not only the corrected values
GET	toolassembly/v1/toolclasses/{toolClassId:Guid}	(Default API - To)	
GET	tmdimport/v1/toolclasses/{internalUUid:Guid}	(Default API - To)	
GET	toolassembly/v1/toolclasses	(Default API - To)	
GET	tmdimport/v1/toolclasses	(Default API - To)	
POST	tmdimport/v1/toolclasses	(Default API - From/To)	

Meth-od	Endpoint	Mapper - Direction	Comment
PUT	tmdimport/v1/toolclasses/{id:Guid}	(Default API - From)	
PATCH	tmdimport/v1/toolclasses/{id:Guid}	(Default API - From/To)	Patch calculation based on a full model. Transformer could need additional information, not only the patch. If mapper/transformation is not reversible, it could overwrite not expected elements.

UI:

- Controller specific detail view of tool master data
- Controller specific detail view of tool instances

Machine:

- External Tool View and Detail view
- Load/Exchange/Unload Tool scenarios
- Update tool data

Note

Refresh mapper settings

The machine communication does not reload the mapper every time. It stores the matched mapper after first usage. If you want to refresh the mapper settings of a machine, restart the machine. The restart synchronizes all tool data based on the new mapper. System/IIS recycling reloads the new mapper automatically.

5.17.5 Limitation

Limitation

The system does not use mapping every time when it communicates with the machine. There are some functionalities where only process
related data is used. In this case these data will be not converted via controller specific mapper, but direct assignment.

5.17.6 Process related data

Process related data

The following list contains process related data types, which are necessary for the system to fulfill internal requirements.

- Tool data and Master data identifications:
  - External ID
  - Tool name in NC Program
  - Internal ID
  - Revision informations
  - T100/P (aka Duplonumer)
- Life and informations:
  - Tool/Cutting edge Target life time and pieces
  - Tool/Cutting edge Warning limits
  - Tool/Cutting edge Residual life time and pieces

5.17.7 Controller specific user defined data

Controller specific user defined data

Because the standard - or the standard data model - does not contain every data which could be needed for a controller of a controller process
or a user process, user defined attributes are used to extend model with specific data. By default a new model introduces several user
defined attributes on many levels, which store non-standard controller specific data:

Key	Usage	Level
sinumerik_tc_tp3	ToolSizeLeft	Tool
sinumerik_tc_tp4	ToolSizeRight	Tool
sinumerik_tc_tp5	ToolSizeAbove	Tool
sinumerik_tc_tp6	ToolSizeUnder	Tool
sinumerik_tc_tp7	MagazineType	Tool
sinumerik_ce_tc_dp1	ToolType	CuttingEdge
sinumerik_ce_tc_dp21	Adapterlength1 - Correction	CuttingEdge
sinumerik_ce_tc_dp22	Adapterlength2 - Correction	CuttingEdge
sinumerik_ce_tc_dp23	Adapterlength3 - Correction	CuttingEdge
sinumerik_ce_tc_dp24	FreeCutAngle - Correction	CuttingEdge
sinumerik_ce_tc_dp21_exp	Adapterlength1 - Geometry	CuttingEdge
sinumerik_ce_tc_dp22_exp	Adapterlength2 - Geometry	CuttingEdge

Key	Usage	Level
sinumerik_ce_tc_dp23_exp	Adapterlength3 - Geometry	CuttingEdge
sinumerik_ce_tc_dp24_exp	FreeCutAngle - Geometry	CuttingEdge
sinumerik_ce_tc_dp21_tol	Adapterlength1 - Tolerance	CuttingEdge
sinumerik_ce_tc_dp22_tol	Adapterlength2 - Tolerance	CuttingEdge
sinumerik_ce_tc_dp23_tol	Adapterlength3 - Tolerance	CuttingEdge
sinumerik_ce_tc_dp24_tol	FreeCutAngle - Tolerance	CuttingEdge
sinumerik_ce_tc_dp25	Reserved25	CuttingEdge

Service seeds these information into the system, additional to the original attributes of the user.

Note

In case of UI use cases, the You must pay attention to add these user defined attirbutes to the created master data, if You want to use it later, eg. during measuring tool.

If some property from the correction is mapped to the user specific attribute, the system cannot identify this as correction data. So the system will stay as it
is, even if correction data is removed during presetting.

5.17.8 UI Description

UI Description

This UI description supports content for the detail page generation. On the detail page, the user can define the following tabs:

- Basic Tab
- Bounding box / Tool Geometry Tab
- Bounding box / Tool Geometry Tab
- Element group (unique group key which is also the localization key for group)
- Element name (name key of localization, title of the field)
- Placeholder of an element (key of localiztaion, if empty)
- Element hint (additional information key)
- Element suffix (suffix key)
- Visibility (condition of visibility, currently only for life monitoring)
- Input validation
- Validation mesage
- Element type

- Element path, which is matching the generated content path
- Selectable list, in case of Selectable element type
- "Read only" flag

The "Details view UI" will select the controller specific UI Description, if:

1. The tool is on a magazine or at machine container
2. The tool is reserved for a machine (via "Balancing", via "Tool Scheduling" or as "Standard tool")
3. The tool is reserved as a sister tool (the system will select the target machine)
4. The tool was loaded on a machine

For localization, the user can use the predefined set of localization or use "ToolMasterData service Localization API" to introduce new sets.

Examples

Example for the options for the tabs

```
{
  "BaseTabElements": [
    <list of elements>
  ],
  "GeometryElements": [
    <list of elements>
  ],
  "CuttingEdgeElements": [
    <list of elements>
  ]
}
```

Example for a single element

```
{
  "BaseTabElements": [
    {
      "NameKey": "toolinstance.GLOBAL.SINUMERIKTOOLSTATE.text",
      "GroupKey": "toolmasterdata.GLOBAL.GENERAL_DATA.text",
      "ElementType": 0,
      "Validations": null,
      "Path": [ "TC_TP8" ],
      "SuffixUnitKey": null,
      "Visibility": null,
      "SelectableValues": null,
      "Placeholder": null,
      "ValidationMessageKey": null,
      "Hint": null,
      "IsReadonly": true
    }
  ]
}
```

5.17.9 Use cases

With the data mapper and the dynamic UI, you get tools to finetune the MMR workflows. You can change calculations, localizations and redefine the UI for own propose.

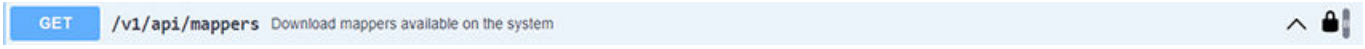
Following example describes a theoretical use case.

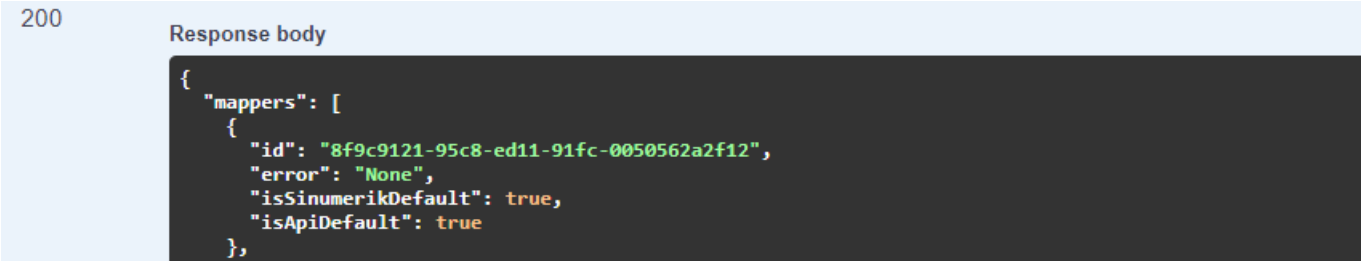
- Simplify the UI and display only the relevant property for the tool type
- Add a calculated property and display it on the UI

A new mapper is created. It is better to use the default one as a source.

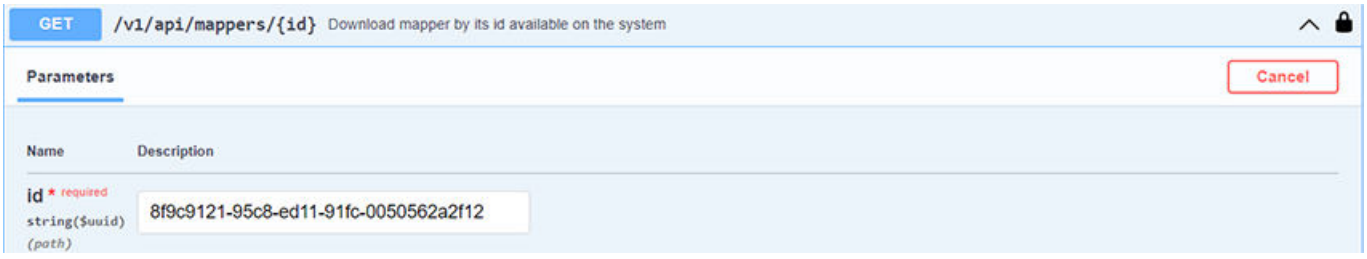
Procedure

1. Use GET API to find the Sinumerik Default mapper via Swagger (<<Protocol>>:// <<Server>>:<<Port>>/mmr/int/datamappers/swagger/index.html).





2. Download the content via Swagger.



3. Format and separate the downloaded content
   - toolUiDescription into a json file (Tools.json)
   - masterUiDescription into a json file (Master.json)
   - MapTo must be formatted and saved into an Xslt file (MapTo.xslt)
   - MapFrom must be formatted and saved into an xslt file (MapFrom.xslt)

4. Add the new field calculation into the MapTo.xsl file. The new field is a flag. If X0 is longer than 100, it is a Long Tool. There are several way to solve this in XSLT. Modify the original X0 template by adding one additional field with name: TC_DPLT into the result.

```
<xsl:template match='X0'>
    <xsl:param name='TOOLTYPE' />
    <xsl:call-template name='NullableHide'>
        <xsl:with-param name='node'>
            <xsl:choose>
                <xsl:when test='$TOOLTYPE &gt;= 400 and $TOOLTYPE &lt;= 599'>TC_DP5</xsl:when>
                <xsl:otherwise>TC_DP3</xsl:otherwise>
            </xsl:choose>
        </xsl:with-param>
    </xsl:call-template>
</xsl:template>
```

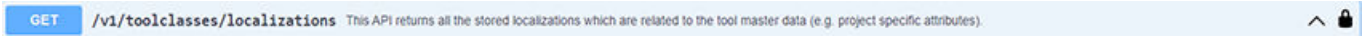
The original template creates a TC_DP5 or TC_DP3, based ont eh tool type. Add an additional field into this template.

```
<xsl:template match='X0'>
    <xsl:param name='TOOLTYPE' />
    <xsl:call-template name='NullableHide'>
        <xsl:with-param name='node'>
            <xsl:choose>
                <xsl:when test='$TOOLTYPE &gt;= 400 and $TOOLTYPE &lt;= 599'>TC_DP5</xsl:when>
                <xsl:otherwise>TC_DP3</xsl:otherwise>
            </xsl:choose>
        </xsl:with-param>
    </xsl:call-template>
    <xsl:if test = '. and not(.="")'>
        <TC_DPLT>
            <xsl:choose>
                <xsl:when test='. &gt;= 100'>1</xsl:when>
                <xsl:otherwise>0</xsl:otherwise>
            </xsl:choose>
        </TC_DPLT>
    </xsl:if>
</xsl:template>
```

5. Modify the Master Data UI.
   - Remove almost all content from cuttingEdgeElements. Keep ToolType, DNO, TC_DP5 and TC_DP3 in this example.
   - Add the new content with condition. It is displayed only for ToolType 100.

```
{
  "nameKey": "toolclass.longtool.CUSTOM_DATA.text",
  "groupKey": "toolmasterdata.GLOBAL.CUTTING_EDGE_DATA.GENERAL_HEADING.text",
  "elementType": 3,
  "path": [
    "CuttingEdgeGeometry",
    "TC_DPLT"
  ],
  "visibility": {
    "propertyName": "TC_DP3",
    "value": "75"
  },
  "selectableValues": [
    {
      "value": "0",
      "nameKey": "toolclass.longtool_0.CUSTOM_DATA.text"
    },
    {
      "value": "1",
      "nameKey": "toolclass.longtool_1.CUSTOM_DATA.text"
    }
  ],
  "isReadonly": true
},
```

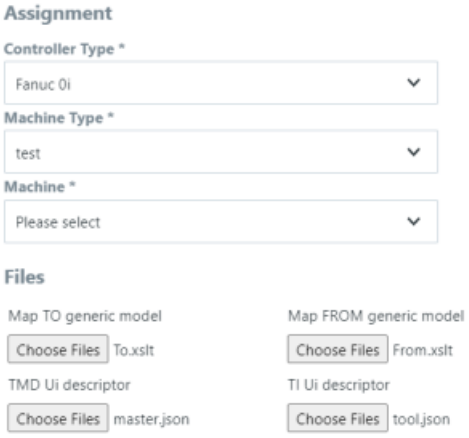
6. You must add the 3 new localization keys to the tool class domain service viea Localization Swagger (<<Protocol>>://<<Server>>:<<Port>>/mmr/int/masterdata/swagger/index.html).



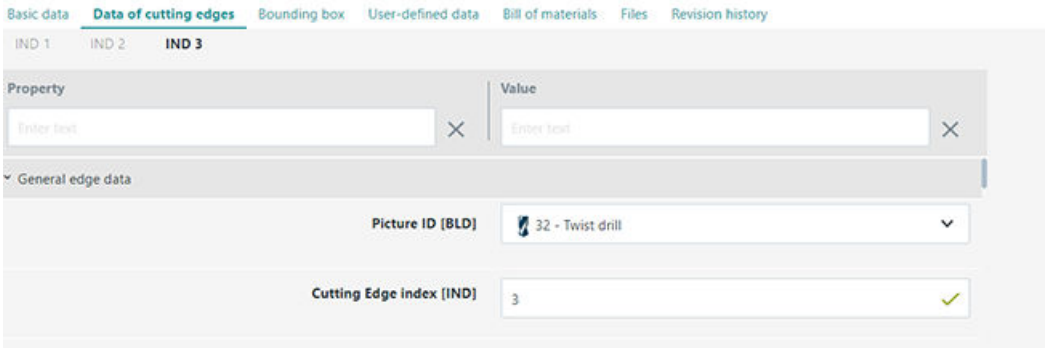
7. Extentd the downloaded content with 3 additional attributes: longtool, longtool_0, longtool_1.
   Be aware that the keys must be deployed for every localization in the localization array.

```
"localizations": [
  {
    "language": "en",
    "attributes": [
      {
        "name": "longtool",
        "localization": "Is tool long?"
      },
      {
        "name": "longtool_0",
        "localization": "Short tool"
      },
      {
        "name": "longtool_1",
        "localization": "Long tool"
      },
```

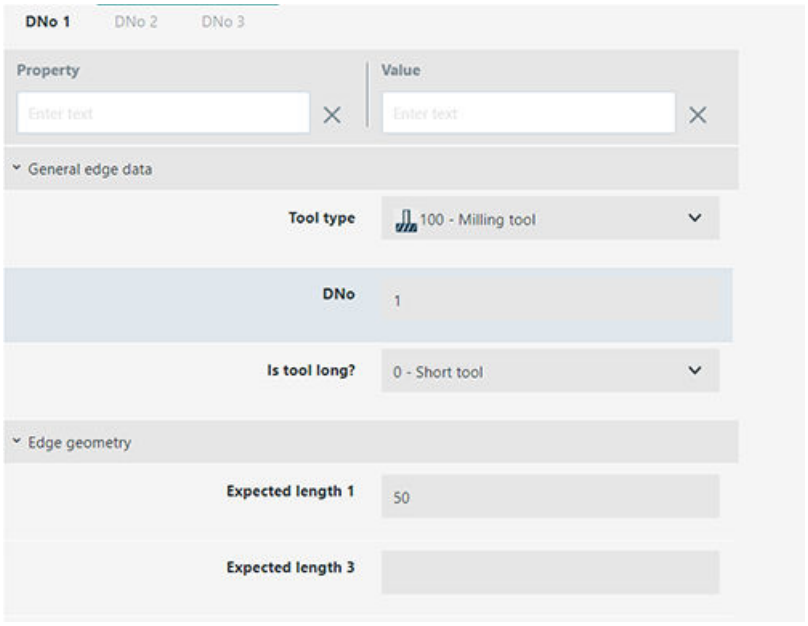
8. Upload the new mapper via UI or Swagger.

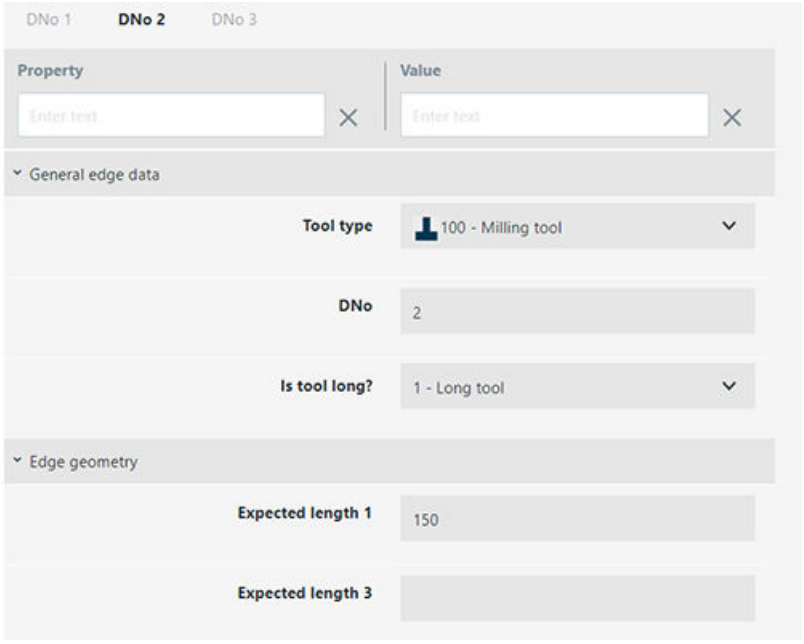


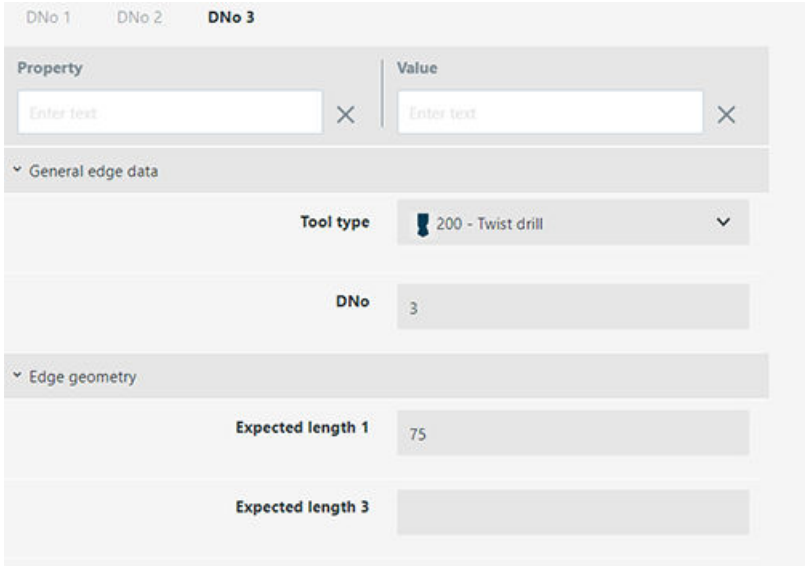
9. Test it. For example, create a tool master data with 3 edges.
   - BLD: 22, X0: 50
   - BLD: 22, X0: 150
   - BLD: 32, X0: 75



10. Save and open in controller specific view wtih the defined controller type
    The UI content is reduced. New fields are added with the custom localization based on the defined condition.







5.17.10 Standard Tool data model

Standard Tool data model

Name	Type	Key
RotationSpeedMax	double?	D6
MaxAcceleration	double?	D6_ACC

Name	Type	Key
ToolState	int?	ToolState
Balancing quality	string	D5
Cooling lubricant entrance	int?	H21
Drive diameter	string	C47
Drive size	string	C43
Drive type	string	C41
Lock	int?	C49
Mass	double?	D7
Mounting execution, machine-side	string	C14
Mounting form, machine-side	string	C12
Mounting size, machine-side	string	C2
Mounting species, machine-side	string	C15
Mounting type, machine-side	string	C11
Normnumber characteristic identifier	string	NSM
Number adjustment dimensions	int?	A01
Number of adjustment options	int?	A08
Number of drives	int?	C44
Identifying order-number	string	J21
Product name	string	J22
Product description	string	J23
Replacement coding, torque support	string	J51
Seperation point coding, machine-side	string	J6
Seperation point coding, machine-side in accordance with ISO TS 13399-60	string	J61
Seperation point, drive	string	J9
Tilting moment	double?	M8
Extension length	double?	V1
Projection length, tool assemblies	double?	V2
Total length	int?	B5
Total width	double?	B91
Collision dimension X+	double?	V4
Collision dimension X-	double?	V5
Collision dimension Y+	double?	V6
Collision dimension Y-	double?	V7
Collision dimension Z+	double?	V8
Collision dimension Z-	double?	V9
Collision length	double?	V10
Collision diameter	double?	V3
CuttingEdges	CuttingEdgeDto[]	CuttingEdges
Custom properties	CustomPropertyDto[]	CustomProperties

5.17.11 CustomPropertyDto

CustomPropertyDto

Name	Type	Key
Custom Property Key	string	Key
Custom Property Value	string	Value

5.17.12 CuttingEdgeDto

CuttingEdgeDto

Name	Type	Key
CuttingEdge index	int	IND
Correction	CuttingEdgeCorrectionDto	CuttingEdgeCorrection
Geometry	CuttingEdgeGeometryDto	CzttingEdgeGeometry
CustomProperties	CustomPropertyDto[]	CustomProperties
Buildnumber	int	BLD
ToolMaterialType	string	H11
ResidualToolLife	double?	T10R
ResidualWorkpieces	double?	T11R
TargetToolLifeTime	int?	T10
TargetToolLifeTimeWarningLimit	int?	T10W
TargetToolLifePieces	int?	T11
TargetToolLifePiecesWarningLimit	int?	T11W
CuttingEdgePosition	int?	T13
Coolant pressure	double?	K15
Machining method	string	J8
Cuttingedgeextensions	CuttingEdgeExtensionDto	CuttingEdgeExtension

5.17.13 CuttingEdgeCorrectionDto

CuttingEdgeCorrectionDto

Name	Type	Key
CuttingEdge index	int	IND
AdjustmentDimensionX	double	X0
AdjustmentDimensionZ	double	Z0
AdjustmentDimensionY	double	Y0
BladeDiameter	double	A1
CuttingRadius	double	D1
CuttingEdgeLength	double	A5
Cutting insert width	double	G2
CuttingEdgeAngle	double	E1
TipAngle	double	E44
WearAdjustmentDimensionX	double	A92
WearAdjustmentDimensionZ	double	A94
WearAdjustmentDimensionY	double	A93
WearBladeDiameter	double	A1W
WearCuttingRadius	double	D1W
Wear Cutting insert width	double	G2W
WearCuttingEdgeAngle	double	E1W
WearTipAngle	double	E44W
WearCuttingEdgeLength	double	A5W

5.17.14 Cutting edge extension

Cutting edge extension

Name	Type	Key
Corner angle	double?	E3
Cutting direction	string	F1
Cutting insert angle left	double?	B2
Cutting insert design	string	E7
Cutting width min.	double?	B11
Feeler element diameter	double?	A2
Holder rotation angle A axis	double?	E30
Holder rotation angle B axis	double?	E31
Holder rotation angle C axis	double?	E32

Name	Type	Key
Insert angle right	double?	B1
Mounting tolerance class, machine-side	string	C16
Nominal thread diameter, as fraction	string	D36
Nominal thread diameter, Inch	string	D35
Nominal thread diameter, metrisch	string	D34
Number swivel angle around x-axis	int?	A05
Number swivel angle around y-axis	int?	A06
Number swivel angle around z-axis	int?	A07
Plunge angle, max.	double?	E40
Profile distance X	double?	A9
Profile distance Y	double?	A91
Setting angle	double?	E10
Swivel angle X1	double?	X1
Swivel angle X2	double?	X2
Swivel angle X3	double?	X3
Swivel angle X4	double?	X4
Swivel angle Y1	double?	Y1
Swivel angle Y2	double?	Y2
Swivel angle Y3	double?	Y3
Swivel angle Y4	double?	Y4
Swivel angle Z1	double?	Z1
Swivel angle Z2	double?	Z2
Swivel angle Z3	double?	Z3
Swivel angle Z4	double?	Z4
Thread pitch	double?	D32
Thread pitch, max.	double?	A62
Thread pitch, min.	double?	A61
Thread type	string	D31
Tolerance, 1st stage	string	A81
Tolerance, last stage	string	A84
Profile shape	string	J28

5.17.15 Standard master data model

Standard master data model

Name	Type	Key
Identifying order-number	string	J21
RotationSpeedMax	double?	D6

Name	Type	Key
MaxAcceleration	double?	D6_ACC
Balancing quality	string	D5
Cooling lubricant entrance	int?	H21
Drive diameter	string	C47
Drive size	string	C43
Drive type	string	C41
Lock	int?	C49
Mass	double?	D7
Mounting execution, machine-side	string	C14
Mounting form, machine-side	string	C12
Mounting size, machine-side	string	C2
Mounting species, machine-side	string	C15
Mounting type, machine-side	string	C11
Normnumber characteristic identifier	string	NSM
Number adjustment dimensions	int?	A01
Number of adjustment options	int?	A08
Number of drives	int?	C44
Product name	string	J22
Product description	string	J23
Replacement coding, torque support	string	J51
Seperation point coding, machine-side	string	J6
Seperation point coding, machine-side in accordance with ISO TS 13399-60	string	J61
Seperation point, drive	string	J9
Tilting moment	double?	M8
Extension length	double?	V1
Projection length, tool assemblies	double?	V2
Collision diameter	double?	V3
CollisionDimensionX+	double?	V4
CollisionDimensionX-	double?	V5
CollisionDimensionY+	double?	V6
CollisionDimensionY-	double?	V7
CollisionDimensionZ+	double?	V8
CollisionDimensionZ-	double?	V9
Collision length	double?	V10
Total length	int?	B5
Total width	double?	B91
Marker for Rare tool	bool	IsRare
CuttingEdges	CuttingEdgeDto[]	CuttingEdges
CustomProperties	CustomPropertyDto[]	CustomProperties

5.17.16 CuttingEdgeDto

CuttingEdgeDto

Name	Type	Key
CuttingEdge index	int	IND
Buildnumber	int	BLD
ToolMaterialType	string	H11
ResidualToolLife	double?	T10R
ResidualWorkpieces	double?	T11R
TargetToolLifeTime	int?	T10
TargetToolLifeTimeWarningLimit	int?	T10W
TargetToolLifePieces	int?	T11
TargetToolLifePiecesWarningLimit	int?	T11W
CuttingEdgePosition	int?	T13
Coolant pressure	double?	K15
Machining method	string	J8
CuttingEdgeGeometry	CuttingEdgeGeometryDto	CuttingEdgeGeometry
CuttingEdgeTolerance	CuttingEdgeToleranceDto	CuttingEdgeTolerance
CustomProperties	CustomPropertyDto[]	CustomProperties
CuttingEdgeExtension	CuttingEdgeExtensionDto	CuttingEdgeExtension

5.17.17 CuttingEdgeGeometry

CuttingEdgeGeometry

Name	Type	Key
AdjustmentDimensionX	double	X0
AdjustmentDimensionZ	double	Z0
AdjustmentDimensionY	double	Y0
BladeDiameter	double	A1
CuttingRadius	double	D1
CuttingEdgeLength	double	A5
Cutting insert width	double	G2
CuttingEdgeAngle	double	E1
TipAngle	double	E44

5.17.18 CuttingEdgeToleranceDto

CuttingEdgeToleranceDto

Name	Type	Key
AdjustmentDimensionX_Lower	double?	X011
AdjustmentDimensionZ_Lower	double?	Z011
AdjustmentDimensionY_Lower	double?	Y011
BladeDiameter_Lower	double?	A111
CuttingRadius_Lower	double?	D111
CuttingEdgeLength_Lower	double?	A511
Cutting insert width_Lower	double?	G211
CuttingEdgeAngle_Lower	double?	E111
TipAngle_Lower	double?	E4411
CuttingEdgeAngle_Upper	double?	E110
TipAngle_Upper	double?	E4410
CuttingRadius_Upper	double?	D110
CuttingRadius_Upper	double?	X010
AdjustmentDimensionY_Upper	double?	Y010
AdjustmentDimensionZ_Upper	double?	Y010
CuttingEdgeLength_Upper	double?	A510
Cutting insert width_Upper	double?	G210
BladeDiameter_Upper	double?	A110

5.17.19 SINUMERIK tool model

Sinumerik tool model

Name	Type	Key
MaxRotSpeed	double?	TC_TP_MAX_VELO
MaxAcceleration	double?	TC_TP_MAX_ACC
ToolSizeLeft	int?	TC_TP3
ToolSizeRight	int?	TC_TP4
ToolSizeAbove	int?	TC_TP5
ToolSizeUnder	int?	TC_TP6
Magazine Type	int?	TC_TP7
Tool State	int?	TC_TP8
TPC Oem Data	MappedOemData[]	TC_TPC

Name	Type	Key
Custom	MappedCustomProperty[]	CustomProperties
Cutting edges	MappedCustomProperty[]	CuttingEdges

5.17.20 SINUMERIK tool model - MappedOemData

MappedOemData

Name	Type	Key
Oem Data Name	string	Name
Oem Data Value	string	Value

5.17.21 SINUMERIK tool model - MapCustomProperty

MapCustomProperty

Name	Type	Key
Custom Property Key	string	Key
Custom Property Value	string	Value

5.17.22 SINUMERIK tool model - MappedCuttingEdge

MappedCuttingEdge

Name	Type	Key
DNo	int	DNo
TargetToolLifeTimeWarningLimit	int?	TC_MOP1
ResidualToolLife	double?	TC_MOP2
TargetToolLifePiecesWarningLimit	int?	TC_MOP3
ResidualWorkpieces	double?	TC_MOP4
TargetToolLifeTime	int?	TC_MOP11
TargetToolLifePieces	int?	TC_MOP13
ToolType	int	TC_DP1
Position	int?	TC_DP2

Name	Type	Key
GeoLength1	double?	TC_DP3
GeoLength2	double?	TC_DP4
GeoLength3	double?	TC_DP5
GeoRadius	double?	TC_DP6
GeoCornerRadius	double?	TC_DP7
GeoLength4	double?	TC_DP8
GeoLength5	double?	TC_DP9
GeoAngle1	double?	TC_DP10
GeoAngle2	double?	TC_DP11
WearLength1	double?	TC_DP12
WearLength2	double?	TC_DP13
WearLength3	double?	TC_DP14
WearRadius	double?	TC_DP15
WearCornerRadius	double?	TC_DP16
WearStickOut	double?	TC_DP17
WearLength5	double?	TC_DP18
WearAngle1	double?	TC_DP19
WearAngle2	double?	TC_DP20
AdapterLength1	double?	TC_DP21
AdapterLength2	double?	TC_DP22
AdapterLength3	double?	TC_DP23
FreeCutAngle	double?	TC_DP24
Reserved25	double?	TC_DP25
DPC Oem Data	MappedOemData[]	TC_DPC
MOPC Oem Data	MappedOemData[]	TC_MOPC

5.17.23 SINUMERIK master model

Sinumerik master model

Name	Type	Key
MaxRotSpeed	double?	TC_TP_MAX_VELO
MaxAcceleration	double?	TC_TP_MAX_ACC
ToolSizeLeft	int?	TC_TP3
ToolSizeRight	int?	TC_TP4
ToolSizeAbove	int?	TC_TP5
ToolSizeUnder	int?	TC_TP6
Magazine Type	int?	TC_TP7
Custom	MappedCustomProperty[]	CustomProperties
Cutting	MappedToolMasterDataCuttingEdge[]	CuttingEdges

5.17.24 SINUMERIK master model - MappedToolMasterDataCuttingEdge

MappedToolMasterDataCuttingEdge

Name	Type	Key
DNo	int	DNo
TargetToolLifeTimeWarningLimit	int?	TC_MOP1
TargetToolLifePiecesWarningLimit	int?	TC_MOP3
TargetToolLifeTime	int	TC_MOP11
TargetToolLifePieces	int	TC_MOP13
ToolType	int	TC_DP1
Position	int	TC_DP2
Geometry data	CuttingEdgeGeometryObject	CuttingEdgeGeometry
Tolerance data	CuttingEdgeToleranceObject	CuttingEdgeTolerance

5.17.25 SINUMERIK master model - CuttingEdgeGeometryObject and CuttingEdgeToleranceObject

CuttingEdgeGeometryObject and CuttingEdgeToleranceObject

Name	Type	Key
GeoLength1	double?	TC_DP3
GeoLength2	double?	TC_DP4
GeoLength3	double?	TC_DP5
GeoRadius	double?	TC_DP6
GeoCornerRadius	double?	TC_DP7
GeoLength4	double?	TC_DP8
GeoLength5	double?	TC_DP9
GeoAngle1	double?	TC_DP10
GeoAngle2	double?	TC_DP11
AdapterLength1	double?	TC_DP11
AdapterLength2	double?	TC_DP22
AdapterLength3	double?	TC_DP23
FreeCutAngle	double?	TC_DP24
Reserved25	double?	TC_DP25

5.17.26 Default Sinumerik Logic

Default Sinumerik Logic

The following transformations are used by default in the system. The fields are described, because most of them are equivalent in tool master data and tool instance mapping as well.

To Sinumerik

Standard	Sinumerik	Details	Comment
D6	TC_TP_MAX_VELO		
D6_ACC	TC_TP_MAX_ACC		
ToolState	TC_TP8		Equivalent to Sinumerik TP8 bitmap
CustomProperties	TC_TP3	with key 'sinumerik_tc_tp3'	-1 if does not exist (only in case of master data. In case of Tool check V5)
CustomProperties	TC_TP4	with key 'sinumerik_tc_tp4'	-1 if does not exist (only in case of master data. In case of Tool check V4)
CustomProperties	TC_TP5	with key 'sinumerik_tc_tp5'	-1 if does not exist (only in case of master data. In case of Tool check V6)
CustomProperties	TC_TP6	with key 'sinumerik_tc_tp6'	-1 if does not exist (only in case of master data. In case of Tool check V7)
CustomProperties	TC_TP7	with key 'sinumerik_tc_tp7'	
CustomProperties	CustomProperties		Exclude previously mentioned keys
V5	TC_TP3	RoundUp(V5 / (magazine-size/2))	if correspoind custom property does not exsist,and magazine configuration is set
V4	TC_TP4	RoundUp(V4 / (magazine-size/2))	if correspoind custom property does not exsist,and magazine configuration is set
V6	TC_TP5	RoundUp(V6 / (magazine-size/2))	if correspoind custom property does not exsist,and magazine configuration is set
V7	TC_TP6	RoundUp(V7 / (magazine-size/2))	if correspoind custom property does not exsist,and magazine configuration is set
CuttingEdge.IND	Dno		
CuttingEdge.T10W	TC_MOP1		
CuttingEdge.T10	TC_MOP11		
CuttingEdge.T10R	TC_MOP2		only in case of tool
CuttingEdge.T11W	TC_MOP3		
CuttingEdge.T11	TC_MOP13		
CuttingEdge.T11R	TC_MOP4		only in case of tool
CuttingEdge.BLD	TC_DP1		see ToolType mapping
CuttingEdge.J8	TC_DP1		see ToolType mapping
CuttingEdge.T13	TC_DP2		
CuttingEdge.Transformed-T13	TC_DP2_T		Used only on Tool UI to show transformed value (by adapter or magazine transformation)
CuttingEdge.Custom-Properties	TC_DP21	with key 'sinumerik_ce_tc_dp21'	only in case of tool

Standard	Sinumerik	Details	Comment
CuttingEdge.Custom-Properties	TC_DP22	with key 'sinumerik_ce_tc_dp22'	only in case of tool
CuttingEdge.Custom-Properties	TC_DP23	with key 'sinumerik_ce_tc_dp23'	only in case of tool
CuttingEdge.Custom-Properties	TC_DP24	with key 'sinumerik_ce_tc_dp24'	only in case of tool
CuttingEdge.Custom-Properties	TC_DP25	with key 'sinumerik_ce_tc_dp25'	only in case of tool
CuttingEdge.Custom-Properties	CuttingEdgeGeometry.TC_DP21	with key 'sinumerik_ce_tc_dp21_exp'	only in case of master data
CuttingEdge.Custom-Properties	CuttingEdgeGeometry.TC_DP22	with key 'sinumerik_ce_tc_dp22_exp'	only in case of master data
CuttingEdge.Custom-Properties	CuttingEdgeGeometry.TC_DP23	with key 'sinumerik_ce_tc_dp23_exp'	only in case of master data
CuttingEdge.Custom-Properties	CuttingEdgeGeometry.TC_DP24	with key 'sinumerik_ce_tc_dp24_exp'	only in case of master data
CuttingEdge.Custom-Properties	CuttingEdgeGeometry.TC_DP25	with key 'sinumerik_ce_tc_dp25_exp'	only in case of master data
CuttingEdge.Custom-Properties	CuttingEdgeTolerance.TC_DP21	with key 'sinumerik_ce_tc_dp21_tol'	only in case of master data
CuttingEdge.Custom-Properties	CuttingEdgeTolerance.TC_DP22	with key 'sinumerik_ce_tc_dp22_tol'	only in case of master data
CuttingEdge.Custom-Properties	CuttingEdgeTolerance.TC_DP23	with key 'sinumerik_ce_tc_dp23_tol'	only in case of master data
CuttingEdge.Custom-Properties	CuttingEdgeTolerance.TC_DP24	with key 'sinumerik_ce_tc_dp24_tol'	only in case of master data
CuttingEdge.Custom-Properties	CuttingEdge.CustomProperties		Exclude previously mentioned keys
CuttingEdge.X0	(CuttingEdgeGeometry).TC_DP5		400 <= TC_DP1 <=599
CuttingEdge.X0	(CuttingEdgeGeometry).TC_DP3		otherwise
CuttingEdge.Z0	(CuttingEdgeGeometry).TC_DP3		400 <= TC_DP1 <=599
CuttingEdge.Z0	(CuttingEdgeGeometry).TC_DP4		otherwise
CuttingEdge.Y0	(CuttingEdgeGeometry).TC_DP4		400 <= TC_DP1 <=599
CuttingEdge.Y0	(CuttingEdgeGeometry).TC_DP5		otherwise
CuttingEdge.TransformedX0	(CuttingEdgeCorrection).TC_DP5_T		400 <= TC_DP1 <=599 Used only on Tool UI to show transformed value (by adapter or magazine transformation - based on correction value)

Standard	Sinumerik	Details	Comment
CuttingEdge.TransformedX0	(CuttingEdgeCorrection).TC_DP3_T		otherwise Used only on Tool UI to show transformed value (by adapter or magazine transformation - based on correction value)
CuttingEdge.TransformedZ0	(CuttingEdgeCorrection).TC_DP3_T		400 <= TC_DP1 <=599 Used only on Tool UI to show transformed value (by adapter or magazine transformation - based on correction value)
CuttingEdge.TransformedZ0	(CuttingEdgeCorrection).TC_DP4_T		otherwise Used only on Tool UI to show transformed value (by adapter or magazine transformation - based on correction value)
CuttingEdge.TransformedY0	(CuttingEdgeCorrection).TC_DP4_T		otherwise Used only on Tool UI to show transformed value (by adapter or magazine transformation - based on correction value)
CuttingEdge.TransformedY0	(CuttingEdgeCorrection).TC_DP5_T		otherwise Used only on Tool UI to show transformed value (by adapter or magazine transformation - based on correction value)
CuttingEdge.A1	(CuttingEdgeGeometry).TC_DP6	divide by 2	
CuttingEdge.D1	(CuttingEdgeGeometry).TC_DP7		
CuttingEdge.A5	(CuttingEdgeGeometry).TC_DP8		
CuttingEdge.G2	(CuttingEdgeGeometry).TC_DP9		
CuttingEdge.E1	(CuttingEdgeGeometry).TC_DP10		
CuttingEdge.E44	(CuttingEdgeGeometry).TC_DP11		
CuttingEdge.X011	CuttingEdgeTolerance.TC_DP5		400 <= TC_DP1 <=599, only in case of master data
CuttingEdge.X011	CuttingEdgeTolerance.TC_DP3		otherwise, only in case of master data
CuttingEdge.Z011	CuttingEdgeTolerance.TC_DP3		400 <= TC_DP1 <=599, only in case of master data
CuttingEdge.Z011	CuttingEdgeTolerance.TC_DP4		otherwise, only in case of master data
CuttingEdge.Y011	CuttingEdgeTolerance.TC_DP4		400 <= TC_DP1 <=599, only in case of master data
CuttingEdge.Y011	CuttingEdgeTolerance.TC_DP5		otherwise, only in case of master data

Standard	Sinumerik	Details	Comment
CuttingEdge.A111	CuttingEdgeTolerance.TC_DP6	divide by 2	only in case of master data
CuttingEdge.D111	CuttingEdgeTolerance.TC_DP7		only in case of master data
CuttingEdge.A511	CuttingEdgeTolerance.TC_DP8		only in case of master data
CuttingEdge.G211	CuttingEdgeTolerance.TC_DP9		only in case of master data
CuttingEdge.E111	CuttingEdgeTolerance.TC_DP10		only in case of master data
CuttingEdge.E4411	CuttingEdgeTolerance.TC_DP11		only in case of master data
CuttingEdge.A92	TC_DP14		400 <= TC_DP1 <=599, only in case of tool
CuttingEdge.A92	TC_DP12		otherwise, only in case of tool
CuttingEdge.A94	TC_DP12		400 <= TC_DP1 <=599, only in case of tool
CuttingEdge.A94	TC_DP13		otherwise, only in case of tool
CuttingEdge.A93	TC_DP13		400 <= TC_DP1 <=599, only in case of tool
CuttingEdge.A93	TC_DP14		otherwise, only in case of tool
CuttingEdge.A1W	TC_DP15	divide by 2	only in case of tool
CuttingEdge.D1W	TC_DP16		only in case of tool
CuttingEdge.A5W	TC_DP17		only in case of tool
CuttingEdge.G2W	TC_DP18		only in case of tool
CuttingEdge.E1W	TC_DP19		only in case of tool
CuttingEdge.E44W	TC_DP20		only in case of tool

Tool type mapping:

BLD	J8	Additional condition	ToolType	Comment
ignored	ignored	If 'sinumerik_ce_tc_dp1' cutting edge custom property is exist	integer value of sinumerik_ce_tc_dp1	
4	(J8=DSP)		500	
4	(J8=DST)		510	
4	(J8=DPL)		550	
5	(J8=DEA/DIE)		520	
5	(J8=DAA)		530	
6			540	
7			500	
8		E44 is not set or 0	500	If a correction is not available, the mapper has to use geometry data.
21	(J8=FFO, E44=null/0)	E44 is set	110	If a correction is not available, the mapper has to use geometry data.

BLD	J8	Additional condition	ToolType	Comment
21	(J8=FFO, E44<>0)	A1 is set	111	If a correction is not available, the mapper has to use geometry data.
21	(J8=FSN)		121	
21	(J8=FPL)		140	
21	(J8=FNU/FNT)		150	
21	(J8=FKF)		155	
21	(J8=FKE)		156	Otherwise
21	(J8=FSE)		157	
21			100	
22			100	
23			100	
24			120	
25	(A1=null/0)	A1 is not set or 0	130	If a correction is not available, the mapper has to use geometry data.
25	(A1<>0)	A1 is set	131	If a correction is not available, the mapper has to use geometry data.
31	(J8=BPB)		200	
31	(J8=BVB)		205	
31	(J8=BAB)		210	
31	"BZB"(J8=BZB)		220	
31	(J8=SPR)		230	
31	(J8=SPL)		231	
31	(J8=DDA)		560	
31	(J8=DPK)		590	Otherwise
31			200	
32			200	
33			200	
34			200	
51	(J8=DDA)		580	
51	(J8=DKW)		585	
51	(J8=M3D)			
51	(J8=MKT)			
51	(J8=MMT)			
51	(J8=MKW)			
52			714	
53			713	
61	(J8=BPB)		160	
100			145	

BLD	J8	Additional condition	ToolType	Comment
101	(D32=null/0, D31=null/0)	D32 and D31 is not set	240	
101	(D32<>0)	D32 is set and D31 is not "G/Rp"	241	
101	(D31="G/Rp")	D31 is "G/Rp"	242	
110			250	
140			151	
140	(J8=FNS)			
160			900	
170			731	
180			732	
190			730	
*			*	Otherwise

If a correction is not available, the mapper has to use geometry data.

From Sinumerik

Sinumerik	Standard	Details	Comment
TC_TP_MAX_VELO	D6		
TC_TP_MAX_ACC	D6_ACC		
TC_TP8	ToolState		Equivalent to Sinumerik TP8 bit-map
TC_TP3	CustomProperties	with key 'sinumerik_tc_tp3'	if it has value
TC_TP4	CustomProperties	with key 'sinumerik_tc_tp4'	if it has value
TC_TP5	CustomProperties	with key 'sinumerik_tc_tp5'	if it has value
TC_TP6	CustomProperties	with key 'sinumerik_tc_tp6'	if it has value
TC_TP7	CustomProperties	with key 'sinumerik_tc_tp7'	if it has value
CustomProperties	CustomProperties		
Dno	CuttingEdge.IND		
TC_MOP1	CuttingEdge.T10W		
TC_MOP11	CuttingEdge.T10		
TC_MOP2	CuttingEdge.T10R		only in case of tool
TC_MOP3	CuttingEdge.T11W		
TC_MOP13	CuttingEdge.T11		
TC_MOP4	CuttingEdge.T11R		only in case of tool
TC_DP1	CuttingEdge.BLD		see ToolType mapping
TC_DP1	CuttingEdge.J8		see ToolType mapping
TC_DP1	CuttingEdge.CustomProperties	with key 'sinumerik_ce_tc_dp1'	

Sinumerik	Standard	Details	Comment
TC_DP21	CuttingEdge.CustomProperties	with key 'sinumerik_ce_tc_dp21'	only in case of tool
TC_DP22	CuttingEdge.CustomProperties	with key 'sinumerik_ce_tc_dp22'	only in case of tool
TC_DP23	CuttingEdge.CustomProperties	with key 'sinumerik_ce_tc_dp23'	only in case of tool
TC_DP24	CuttingEdge.CustomProperties	with key 'sinumerik_ce_tc_dp24'	only in case of tool
TC_DP25	CuttingEdge.CustomProperties	with key 'sinumerik_ce_tc_dp25'	only in case of tool
CuttingEdgeGeometry.TC_DP21	CuttingEdge.CustomProperties	with key 'sinumerik_ce_tc_dp21_exp	only in case of master data
CuttingEdgeGeometry.TC_DP22	CuttingEdge.CustomProperties	with key 'sinumerik_ce_tc_dp22_exp'	only in case of master data
CuttingEdgeGeometry.TC_DP23	CuttingEdge.CustomProperties	with key 'sinumerik_ce_tc_dp23_exp'	only in case of master data
CuttingEdgeGeometry.TC_DP24	CuttingEdge.CustomProperties	with key 'sinumerik_ce_tc_dp24_exp'	only in case of master data
CuttingEdgeGeometry.TC_DP25	CuttingEdge.CustomProperties	with key 'sinumerik_ce_tc_dp25_exp'	only in case of master data
CuttingEdgeTolerance.TC_DP21	CuttingEdge.CustomProperties	with key 'sinumerik_ce_tc_dp21_tol'	only in case of master data
CuttingEdgeTolerance.TC_DP22	CuttingEdge.CustomProperties	with key 'sinumerik_ce_tc_dp22_tol'	only in case of master data
CuttingEdgeTolerance.TC_DP23	CuttingEdge.CustomProperties	with key 'sinumerik_ce_tc_dp23_tol'	only in case of master data
CuttingEdgeTolerance.TC_DP24	CuttingEdge.CustomProperties	with key 'sinumerik_ce_tc_dp24_tol'	only in case of master data
CuttingEdge.CustomProperties	CuttingEdge.CustomProperties		
(CuttingEdgeGeometry).TC_DP3	CuttingEdge.Z0		400 <= TC_DP1 <=599
(CuttingEdgeGeometry).TC_DP3	CuttingEdge.X0		otherwise
(CuttingEdgeGeometry).TC_DP4	CuttingEdge.Y0		400 <= TC_DP1 <=599
(CuttingEdgeGeometry).TC_DP4	CuttingEdge.Z0		otherwise
(CuttingEdgeGeometry).TC_DP5	CuttingEdge.X0		400 <= TC_DP1 <=599
(CuttingEdgeGeometry).TC_DP5	CuttingEdge.Y0		otherwise
(CuttingEdgeGeometry).TC_DP6	CuttingEdge.A1	multiply by 2	
(CuttingEdgeGeometry).TC_DP7	CuttingEdge.D1		
(CuttingEdgeGeometry).TC_DP8	CuttingEdge.A5		

Sinumerik	Standard	Details	Comment
(CuttingEdgeGeometry).TC_DP9	CuttingEdge.G2		
(CuttingEdgeGeometry).TC_DP10	CuttingEdge.E1		
(CuttingEdgeGeometry).TC_DP11	CuttingEdge.E44		
CuttingEdgeTolerance.TC_DP3	CuttingEdge.Z011		400 <= TC_DP1 <=599, only in case of master data
CuttingEdgeTolerance.TC_DP3	CuttingEdge.X011		otherwise, only in case of master data
CuttingEdgeTolerance.TC_DP4	CuttingEdge.Y011		400 <= TC_DP1 <=599, only in case of master data
CuttingEdgeTolerance.TC_DP4	CuttingEdge.Z011		otherwise, only in case of master data
CuttingEdgeTolerance.TC_DP5	CuttingEdge.X011		400 <= TC_DP1 <=599, only in case of master data
CuttingEdgeTolerance.TC_DP5	CuttingEdge.Y011		otherwise, only in case of master data
CuttingEdgeTolerance.TC_DP6	CuttingEdge.A111	multiply by 2	only in case of master data
CuttingEdgeTolerance.TC_DP7	CuttingEdge.D111		only in case of master data
CuttingEdgeTolerance.TC_DP8	CuttingEdge.A511		only in case of master data
CuttingEdgeTolerance.TC_DP9	CuttingEdge.G211		only in case of master data
CuttingEdgeTolerance.TC_DP10	CuttingEdge.E111		only in case of master data
CuttingEdgeTolerance.TC_DP11	CuttingEdge.E4411		only in case of master data
TC_DP12	CuttingEdge.A94		400 <= TC_DP1 <=599, only in case of tool
TC_DP12	CuttingEdge.A92		otherwise, only in case of tool
TC_DP13	CuttingEdge.A93		400 <= TC_DP1 <=599, only in case of tool
TC_DP13	CuttingEdge.A94		otherwise, only in case of tool
TC_DP14	CuttingEdge.A92		400 <= TC_DP1 <=599, only in case of tool
TC_DP14	CuttingEdge.A93		otherwise, only in case of tool
TC_DP15	CuttingEdge.A1W	multiply by 2	only in case of tool
TC_DP16	CuttingEdge.D1W		only in case of tool
TC_DP17	CuttingEdge.A5W		only in case of tool
TC_DP18	CuttingEdge.G2W		only in case of tool
TC_DP19	CuttingEdge.E1W		only in case of tool
TC_DP20	CuttingEdge.E44W		only in case of tool

Tool Type:

ToolType	BLD	Additional information
100	22	
110	21	(J8=FFO)
111	21	(J8=FFO)
120	24	
121	21	(J8=FSN)
130	25	
131	25	
140	21	(J8=FPL)
145	100	
150	21	(J8=FNU)
151	140	
155	21	(J8=FKF)
156	21	(J8=FKE)
157	21	(J8=FSE)
160	61	(J8=BPB)
200	32	
205	31	(J8=BVB)
210	31	(J8=BAB)
220	31	(J8=BZB)
230	31	(J8=SPR)
231	31	(J8=SPL)
240	101	
241	101	
242	101	
250	110	
500	7	
510	4	(J8=DST)
520	5	(J8=DEA)
530	5	(J8=DAA)
540	6	
550	4	(J8=DPL)
560	31	(J8=DDA)
580	51	(J8=DDA)
585	51	(J8=DKW)
590	31	(J8=DPK)
700	140	(J8=FNS)
710	51	(J8=M3D)
711	51	(J8=MKT)
712	51	(J8=MMT)
713	53	
714	52	

ToolType	BLD	Additional information
725	51	(J8=MKW)
730	190	
731	170	
732	180	
900	160	

5.17.27 FANUC tool model

FANUC tool model

FANUC tool model

Name	Type	Key
Tool name	string	TCode
Tool number	int?	ToolNumber
Spindle speed	int	SpindleSpeed
Tool info	string	ToolInfo
Feedrate	int?	Feedrate
W code	int?	WCode
G code	int?	GCode
Custom bits	int?	CustomBits
Cutting edges	FanucCuttingEdge[]	CuttingEdges
TPC Oem Data	MappedOemData[]	TC_TPC
Custom properties	MappedCustomProperty[]	CustomProperties

FANUC tool model

MappedOemData

Name	Type	Key
Oem Data Name	string	Name
Oem Data Value	string	Value

FANUC tool model

FanucCuttingEdge

Name	Type	Key
DNo	int	DNo
Tool type	int	ToolType
Tool max life	double	ToolMaxLife

Name	Type	Key
Tool life warning limit	double	ToolRemainingLife
Geometry X	double?	GX
Geometry Y	double?	GY
Geometry Z	double?	GZ
Geometry R	double?	GR
Wear X	double?	WX
Wear Y	double?	WY
Wear Z	double?	WZ
Wear R	double?	WR

FANUC tool model

MappedCustomProperty

Name	Type	Key
Custom property key	string	Key
Custom property value	string	Value

FANUC master model

Fanuc master model

Name	Type	Key
Tool name	string	TCode
Spindle speed	int	SpindleSpeed
Tool info	string	ToolInfo
Feedrate	int?	Feedrate
W code	int?	WCode
G code	int?	GCode
Custom bits	int?	CustomBits
Cutting edges	FanucMappedCuttingEdge[]	CuttingEdges
TPC Oem Data	MappedOemData[]	TC_TPC
Custom properties	MappedCustomProperty[]	CustomProperties

FANUC master model

MappedOemData

Name	Type	Key
Oem Data Name	string	Name
Oem Data Value	string	Value

FANUC master model

FanucMappedCuttingEdge

Name	Type	Key
DNo	int	DNo
Tool type	int	ToolType
Tool max life	double	ToolMaxLife
Tool life warning limit	double	ToolRemainingLife
Cutting edge geometry	FanucCuttingEdgeGeometryObject	CuttingEdgeGeometry

FANUC master model

MappedCustomProperty

Name	Type	Key
Custom property key	string	Key
Custom property value	string	Value

FANUC master model

FanucCuttingEdgeGeometryObject

Name	Type	Key
Geometry X	double?	GX
Geometry Y	double?	GY
Geometry Z	double?	GZ
Geometry R	double?	GR

Default Fanuc Logic

Default Fanuc Logic

The following transformations are used by default in the system.

The fields are described, because most of them are equivalent in tool master data and tool instance mapping as well.

To Fanuc

Standard	Fanuc	Details	Comment
ToolIdent	TCode		
T100	ToolNumber		
D6	SpindleSpeed		
J23	ToolInfo		

Standard	Fanuc	Details	Comment
CustomProperties	Feedrate	with key 'fanuc_feedrate'	null if does not exist
CustomProperties	WCode	with key 'fanuc_wcode'	null if does not exist
CustomProperties	GCode	with key 'fanuc_gcode'	null if does not exist
CustomProperties	CustomBits	with key 'fanuc_custombits'	null if does not exist
CuttingEdge.DNo	DNo		
CuttingEdge.BLD	ToolType		
CuttingEdge.T10	ToolMaxLife		
CuttingEdge.T10W	ToolRestLife		
CuttingEdge.T11	ToolRemainingLife		
CuttingEdge.X0	GX		
CuttingEdge.Z0	GZ		
CuttingEdge.Y0	GY		
CuttingEdge.D1	GR		
CuttingEdge.A92	WX		only in case of tool
CuttingEdge.A94	WZ		only in case of tool
CuttingEdge.A93	WY		only in case of tool
CuttingEdge.D1W	WR		only in case of tool

Tool type mapping

BLD	J8	Additional condition	ToolType	Comment	Name
4			13		round-nose
5			12		grooving
6			11		threading
7			14		point-nose
21		D1 is not set or 0	23		ball end mill
21	FPL		27		face mill
24			22		flat end mill
31	SPR		21		counter sink
31	BAB		26		boring
32			20		drill
101			24		tap
110			25		reamer
120			15		versatile
*			999	Otherwise	unknown

From Fanuc

Fanuc	Standard	Details	Comment
TCode	ToolIdent		
ToolNumber	T100		

Fanuc	Standard	Details	Comment
SpindleSpeed	D6		
ToolInfo	J23		
Feedrate	CustomProperties	with key 'fanuc_feedrate'	null if does not exist
WCode	CustomProperties	with key 'fanuc_wcode'	null if does not exist
GCode	CustomProperties	with key 'fanuc_gcode'	null if does not exist
CustomBits	CustomProperties	with key 'fanuc_custom-bits'	null if does not exist
DNo	CuttingEdge.DNo		
ToolType	CuttingEdge.BLD		
ToolMaxLife	CuttingEdge.T10		
ToolRestLife	CuttingEdge.T10W		
ToolRemainingLife	CuttingEdge.T11		
GX	CuttingEdge.X0		
GZ	CuttingEdge.Z0		
GY	CuttingEdge.Y0		
GR	CuttingEdge.D1		
WX	CuttingEdge.A92		only in case of tool
WZ	CuttingEdge.A94		only in case of tool
WY	CuttingEdge.A93		only in case of tool
WR	CuttingEdge.D1W		only in case of tool

Tool type mapping

ToolType	BLD	Additional Information	Name
11	6		threading
12	5		grooving
13	4		round-nose
14	7		point-nose
15	120		versatile
20	32		drill
21	31	(J8=SPR)	counter sink
22	24		flat end mill
23	21		ball end mill
24	101		tap
25	110		reamer
26	31	(J8=BAB)	boring
27	21	(J8=FPL)	face mill

5.18 Configure MMR Tools

5.18.1 Overview of configure MMR Tools

The "Overview of configure MMR Tools" window shows all connected and managed machines in the system.

Prerequsite

- At least one integrated or managed machine is created or connected to Mcenter.
- MMR Tools is assigned to the machine.

Parameter

The following parameters are available:

Parameter	Description
Overview of configure MMR Tools	
Magazine configuration	
Machine	Shows the generated machine.
Hierarchical path	Shows the hierarchical path of the selected machine.
Connectivity type	Shows the connectivity type of the machine.
Machine type	Shows the type of machine.
	If there is a yellow icon next to the hierarchical path, the machines is unconnected.
	Switches the machine in the "Settings" window to configure.
Settings	
Machine	Shows the path of the hierarchical and the name of the machine
Number of magazines	Shows • in case of integrated machines: the number of magazines that are configured on the machine • in case of managed machines: the number of created magazines
Name	Shows the name of the magazine.
TOA	Shows TOA of the magazine. This column is not displayed when there is a single TOA in the machine.
Number of pockets	Shows the number of pockets within the magazine.
Number of occupied pockets	Shows the number of occupied pockets when loading tools to the machine.
Number of available pockets	Shows the number of available pockets when loading tools to the machine.

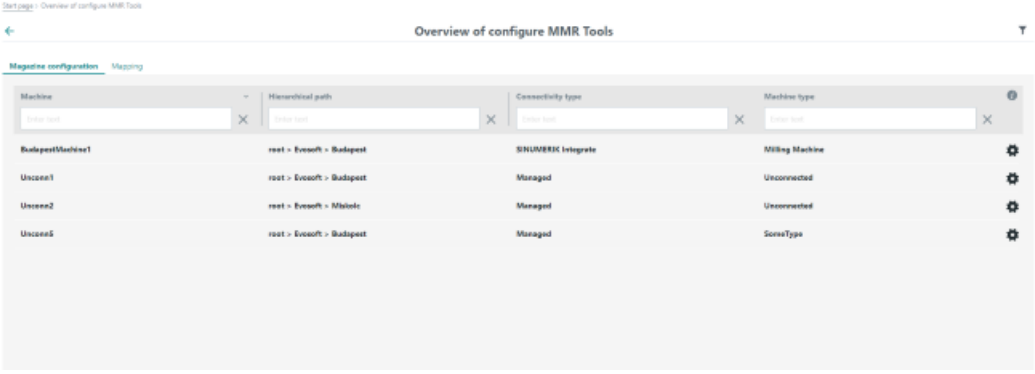
Parameter	Description
Transformation information	Shows the transformation information • transformation number • offset X • offset Y • offset z You need this information if the tool axis is not perpendicular to the workpiece axis.
Place size	The diameter of the magazine place can be defined by this parameter.
Description	Shows a description
	Edits the configuration.
	Deletes the magazine/revolvers after a confirmation prompt.
	Saves edited values.
	Aborts editing.
Mapping	
Mapping name	Shows the name of the mapping.
Machine name	Shows the name of the machine.
Machine type	Shows the type of machine.
Controller type	Shows the type of controller.
	Copies a mapping.
	Deletes the mapping after a confirmation prompt.

Procedure

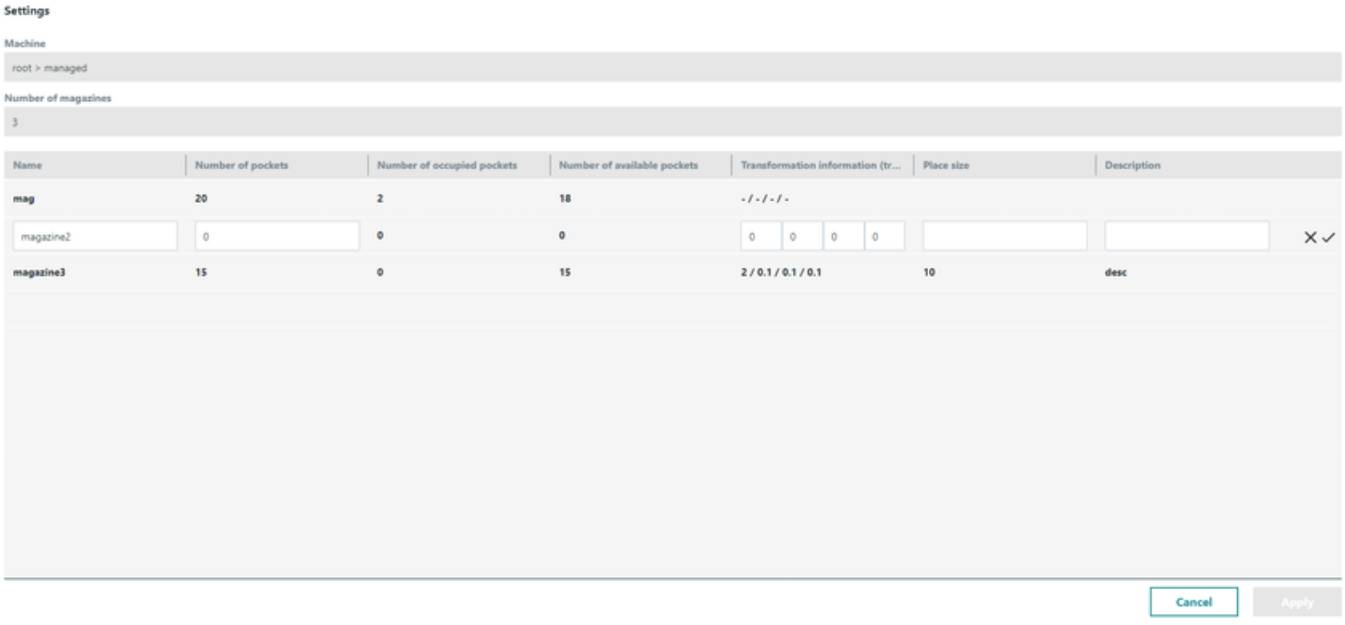
1. On the start page of the Mcenter, click "Configure MMR Tools".

   - OR -
   Open the following URL: https://{Server:IP}/mmr/tools/configuremmrt/overview

2. The "Overview of configure MMR Tools" window opens and shows all machines.



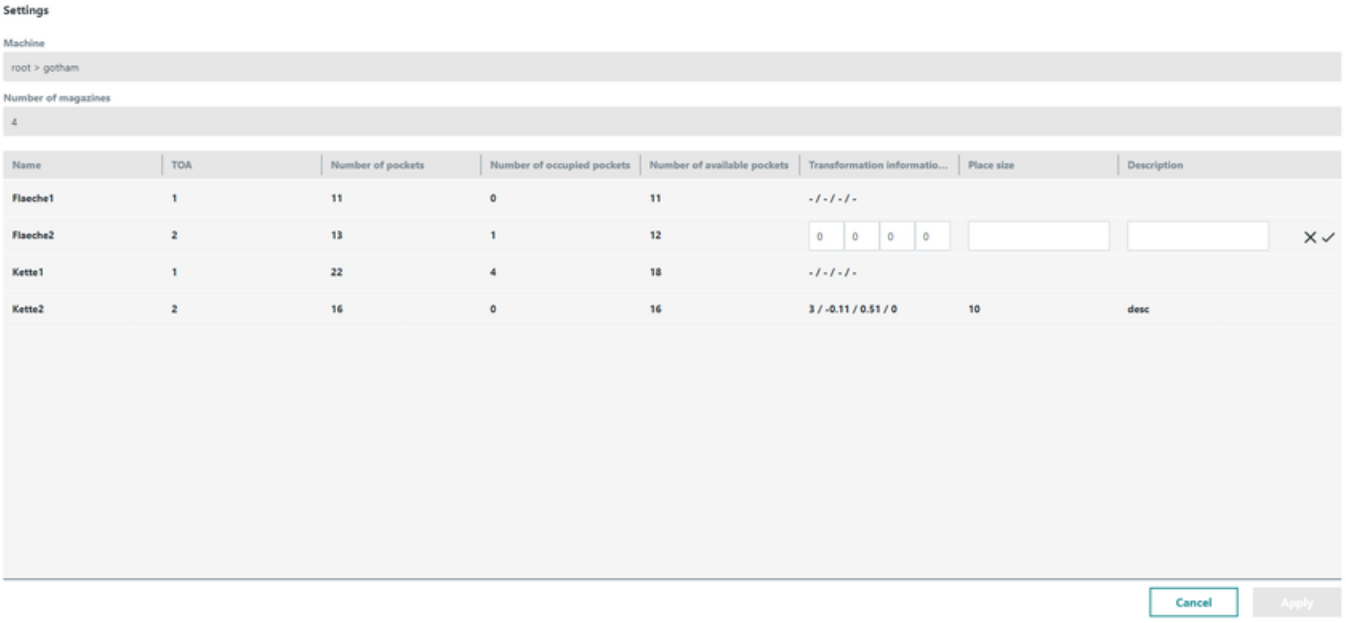
3. Click on the "gear" symbol to configure the machine.
   The "Settings" window opens.
   For managed machines:
   - Click the "+" symbol and add magazines.
   - Edit the name, number of pockets, transformation information and description.
   - Click the "Apply" button to save the configuration.



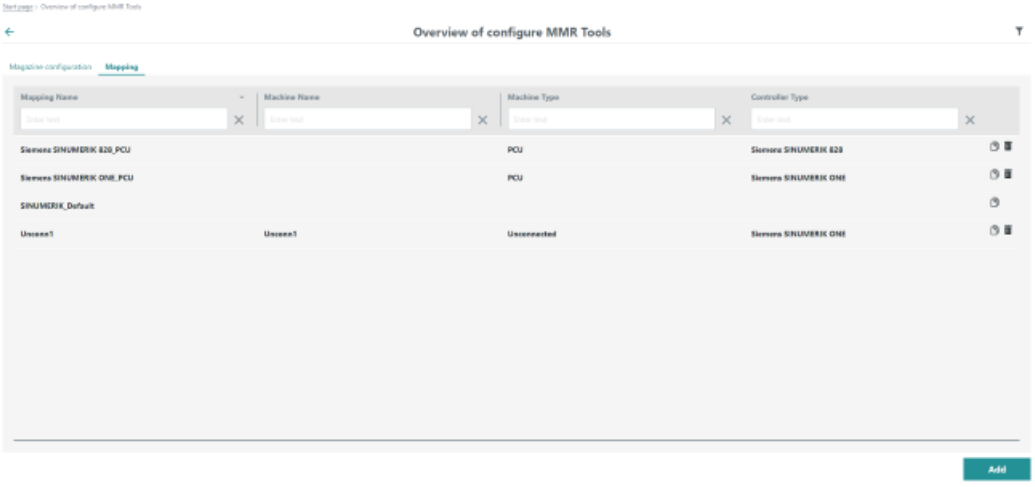
For SINUMERIK machines:

- New magazines can not be added.
- Special places like "spindle" and "beladestelle" are not listed.
- Edit the transformation information and description.

– Click the "Apply" button to save the configuration.



4. Open the "Mapping" tab to add, copy or delete mappings of the machines.



5.18.2 Creating a mapping

Parameter

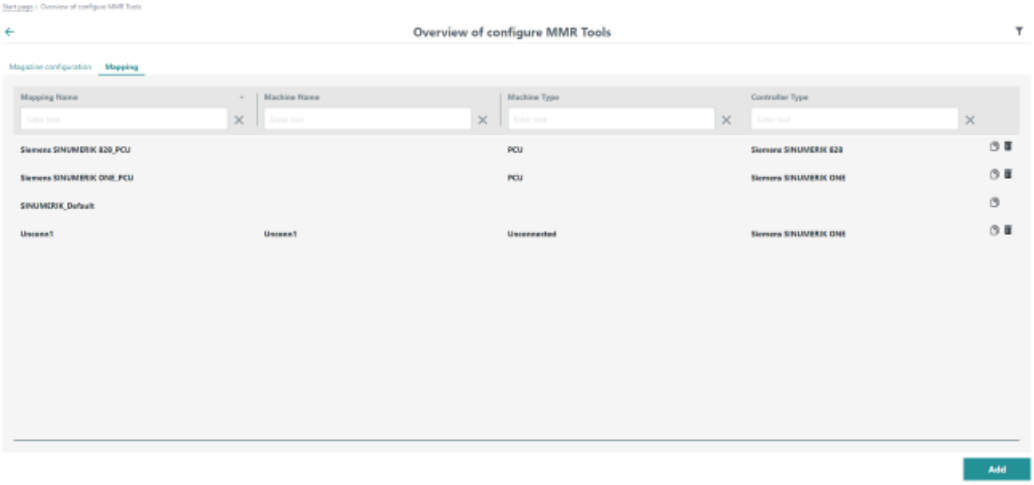
The following information is displayed:

Parameter	Description
Name	Enter a name for the mapping.
Assignment	

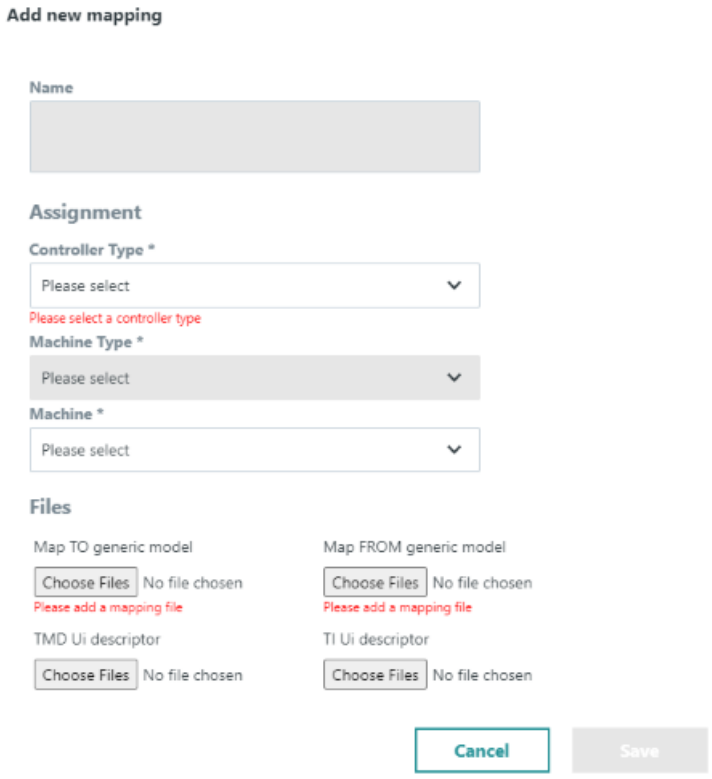
Parameter	Description
Controller Type*	Select a controller type from the drop-down list.
Machine Type*	Select a machine type from the drop-down list.
Machine*	Select a machine from the drop-down list.
Files	
Map TO generic model	Add a mapping file (in XSLT format).
Map FROM generic model	Add a mapping file (in XSLT format).
TMD Ui descriptor	Add an optional UI descriptor file (in JSON format).
Ti Ui descriptor	Add an optional UI descriptor file (in JSON format).

Procedure

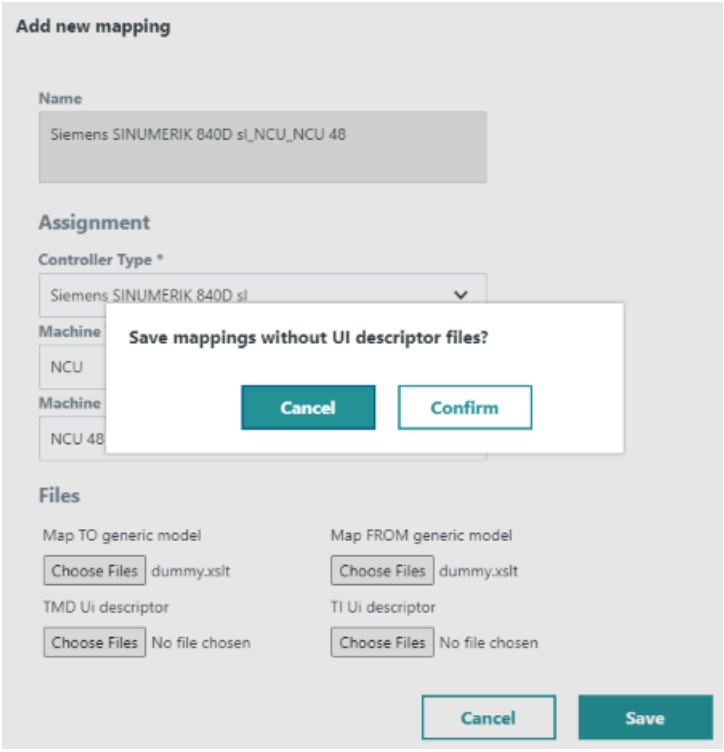
1. The "Mapping" tab of the "Overview of configure MMR Tools" window is open.
   Click on "Add" in the bottom-right window area.



2. The "Add new mapping" window opens.
   - Enter a name for the mapping.
   - Select the controller type and machine type or select the machine.
   - Add "Map TO generic model" and "Map FROM generic model" mapping files.
   - Optionally, add UI descriptor files.
   - Click on "Save" to save the mapping.
     - OR -
     Click on "Cancel" to cancel the process.



3. If you do not add any UI descriptor files, the confirmation prompt "Save mappings without UI descriptor files?" opens.
   - Click on "Confirm" to save the mapping.
     - OR -
   - Click on "Cancel" to cancel the process.



5.18.3 Copying a mapping

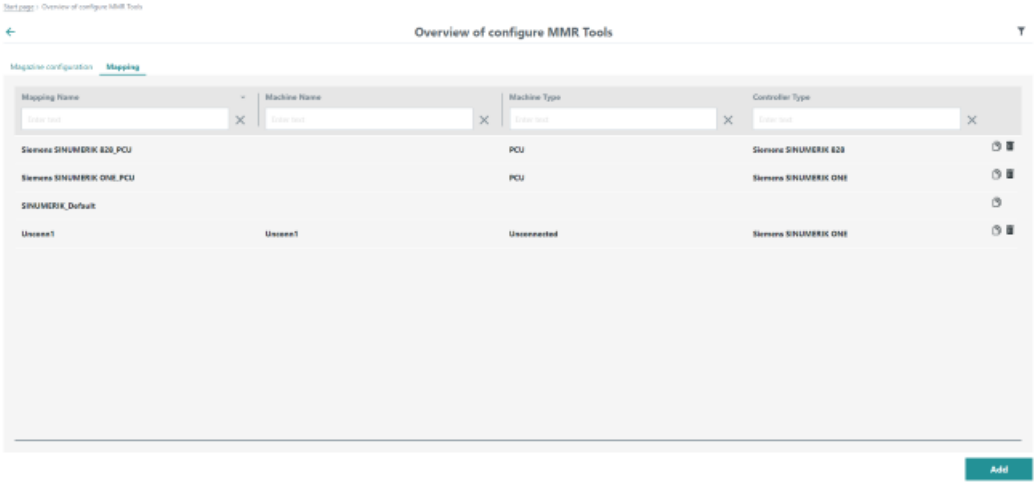
Parameter

The following information is displayed:

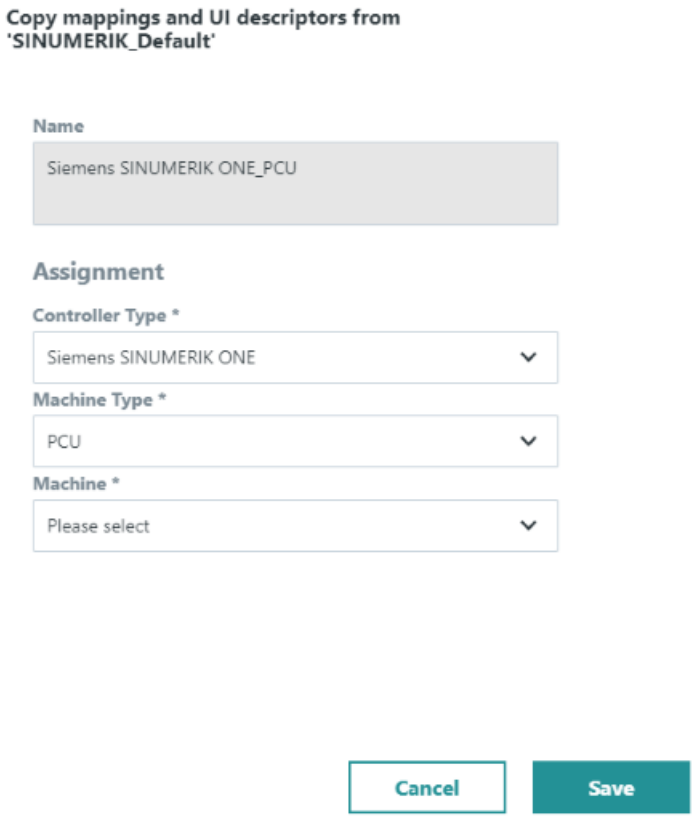
Parameter	Description
Copy mappings and UI descriptor from <Mapping Name>	
Name	Enter a name for the mapping.
Assignment	
Controller Type*	Select a controller type from the drop-down list.
Machine Type*	Select a machine type from the drop-down list.
Machine*	Select a machine from the drop-down list.

Procedure

1. The "Mapping" tab of the "Overview of configure MMR Tools" window is open.
   Click on the "Copy" symbol on the right hand-side.



2. The "Copy mappings and UI descriptors from <Mapping Name>" window opens.
   - Enter a name for the mapping.
   - Select the controller type and machine type or select the machine.
   - Click on "Save" to save the mapping.
     - OR -
     Click on "Cancel" to cancel the process.



3. The mapping is copied and the overview is refreshed automatically.

5.18.4 Deleting a mapping

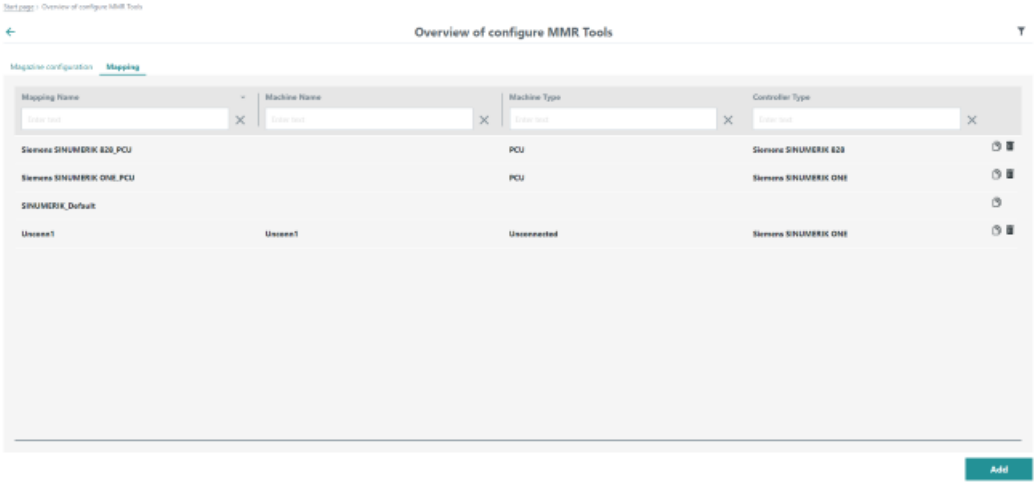
Note

"Delete" symbol not enabled for default mappings

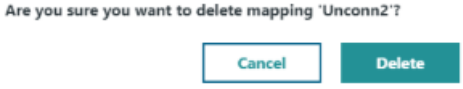
The "Delete" symbol is not enabled for default mappings because they cannot be deleted.

Procedure

1. The "Mapping" tab of the "Overview of configure MMR Tools" window is open.
   Click on the "Delete" symbol on the right hand-side.



2. A confirmation dialog opens.
   – Click on "Delete" to delete the mapping.
   - OR -
   Click on "Cancel" to cancel the process.



3. The mapping is deleted and the overview is refreshed automatically.

5.19 Component purchase order requests

5.19.1 Overview

The "Tool component purchase order" functionality allows to create purchase order requests. A main reason to create them is that during single tool creation, tool balancing or tool scheduling the defined warning limits are reached. Openness APIs are provided so that 3rd party applications can query, update and delete the component purchase order requests as well. The purchase orders themselves are to be created by e.g. an ERP system that is connected utilizing the MMRT openness API for ERP. State changes of orders can be provided by an ERP system via the openess API, also MMRT allows to inform on state changes of the purchse order related to the corresponding request.

Overview

The "Overview of purchase order requests" window shows the purchase order list.

- You can sort or filter the individual columns in the overview.
- You can create new purchase order requests manually and edit the existing purchase orders (requests).
- You can change the status of the orders so that they can be submitted to external ERP systems via Openness APIs.
- You can delete the purchase orders within MMRT

Note

Tool components

A purchase order can consist of many tool components. However, these appear in the overview page as different rows.

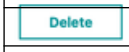
Prerequisite

The tool components are available within Manage MyResources /Tools.

Parameters

The following parameters are displayed:

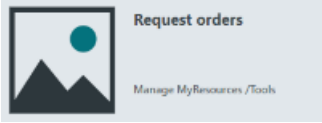
Parameter	Description
Order request	Purchase order request ID, created automatically.by Manage MyResources /Tools
ID of order	Purchase order ID provided by an ERP system
Created by	Name of the user who created the purchase order

Parameter	Description
Status	Status of the purchase order • Initial • Requested • Ordered • Committed • Cancelled • Partially delivered • Delivered • Delayed • Completed
Wished delivery date	Shows the desired delivery date.
Planned delivery date	Shows the date of the planned delivery as provided by the ERP.
Committed delivery date	Shows the committed delivery date as provided by the supplier.
Requested quantities	Shows the amount of requested components.
Ordered quantities	Shows the amount of ordered components.
ID of component	Shows the ID for the component to be purchased.
Supplier	Shows the supplier of the component.
Sliding average price	This value is provided by the ERP via the openness API.
Minimum delivered quantities	Shows the minimum amount for requests.
Delivery number	Shows the delivery number provided by the ERP system for each delivery.
Delivery date	Shows the latest delivery date.
Delivered quantitiy	Shows the total amount delivered, based on the total of all partial deliveries.
Delivered good quantitiy	Shows the amount of good deliveries, based on the total of all partial deliveries.
Delivered location	Shows the location of the latest delivery.
	Configures the attributes displayed on the overview page.
	Edits purchase order requests.
	Publishes purchase order requests.
	Updates the purchase order request.
	Add a new purchase order request
	Delete purchase orders
Detailed partial delivery info of <Order request>	
	Opens the info list displaying the detailed partial deliveries.
Delivery number	Shows the delivery number of the partial delivery.
Partial delivery date.	Shows the delivery date of the partia delivery.
Partial delivery quantity	Shows the amount of partial deliveries.

Parameter	Description
Partial delivery good quantity	Shows the amount of goods partial delivery.
Partial delivery location	Shows the location of the partial delivery.

Procedure

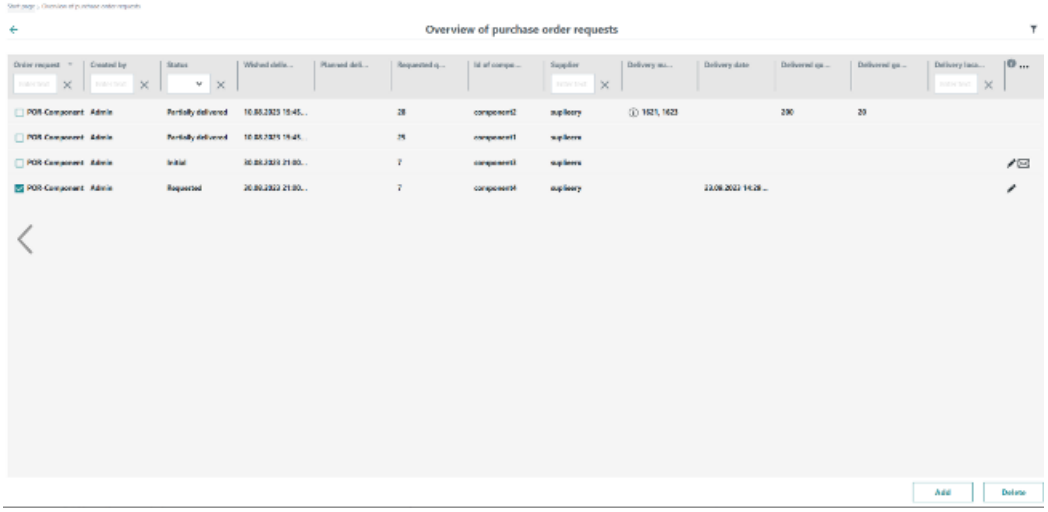
On the start page of MMR /Tools, click on "Request orders".



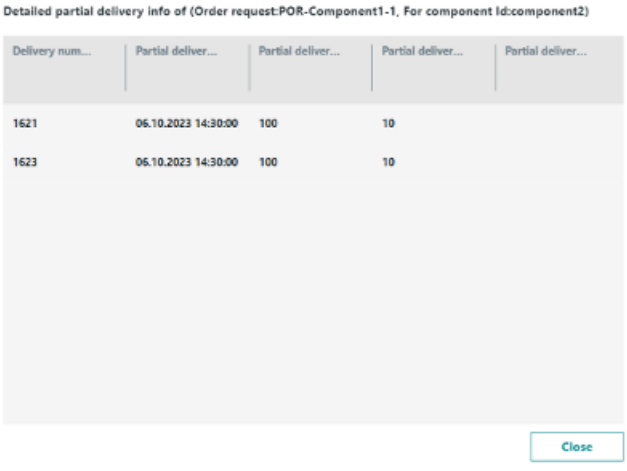
- OR -

Open the following URL: Request orders (https://<ServerIP>/mmr/requestorders/overview)

The "Overview of purchase order requests" window opens.



When you click on the "Info" symbol, the "Detailed partial delivery" window opens.



5.19.2 Creating new component purchase order requests

You can create component purchase orders requests

- manually from the WebUI
  - OR -
- automatically during Single tool creation, tool balancing and tool scheduling processes

Automatic creation of purchase orders

To trigger a component purchase order request, a "warning limit" is defined for each component . In the stack, the component numbers have the status "new" or "used".For example, during a single tool creation process, when you create a single tool based on the "Bill of Material" data of a tool, you can retrieve the component needs. If the availabe amount is underneath the defined "warning limit" for the relevant tool component, a purchase order request is automatically created, based on the minumum order amount of the component. This calculation also applies to the "Tool balancing" and "Tool scheduling" applications, which need a tool instance creation.

The requested amount is calculated to ensure that the "warning limit" for the relevant tool component is passed. All stacks are considered for the available numbers.

Note

Multiple components within one purchase order

You can to add multiple components. There is a seperate row for each component you add to the respective purchase order requests in the "Overview of tool component purchase order" window.

Prerequisites

- The components are defined within the system.
- The Bill of material (BOM) for a tool master is available.

Prinzip

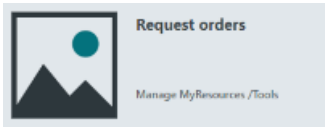
The following parameters are displayed:

Parameter	Description
MMR Username	By default the logged-in user
ID for new purchase order request	This ID is generated automatically.
For component ID	Opens the dropdown list based on the defined tool components created in the system.
Requested quantities	Amount of tool components you want to order. This value can only be the factor of the "Minumum order amount" parameter defined for this component.
Wished delivery date	Date of your desired delivery time.

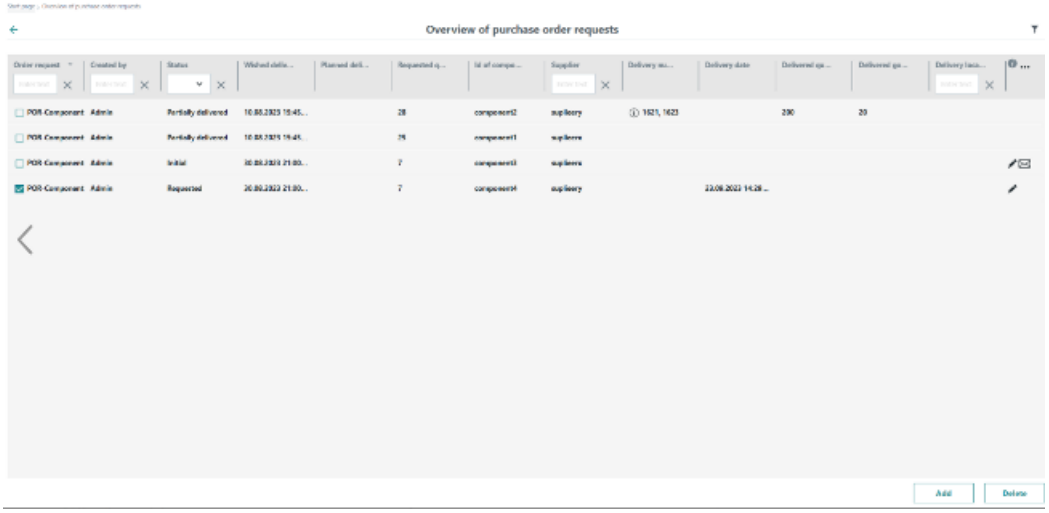
Parameter	Description
Supplier	Desired supplier of the tool component.
+	Adds the relevant component to the purchase list.

Procedure

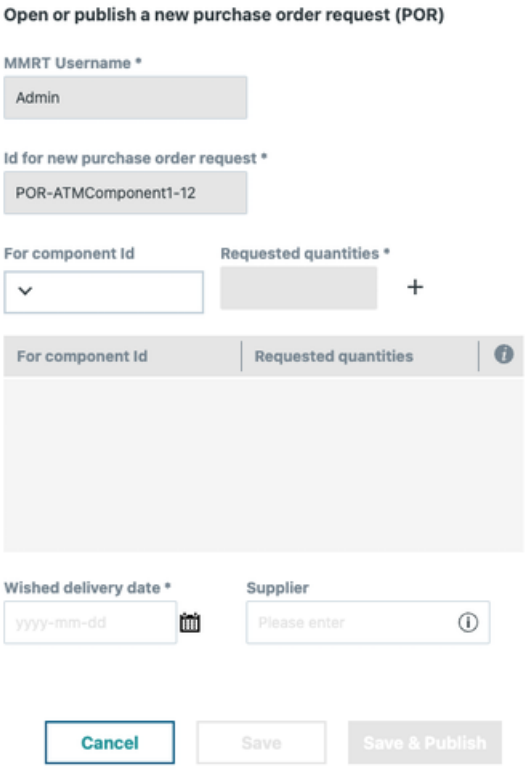
1. On the start page of MMR /Tools, click on "Request orders".



Open the following URL: Request orders (https://<ServerIP>/mmr/tools/requestorders/overview)
The "Overview of purchase order requests" window opens.



2. Click on the "Add" button in the bottom-right window area.
The "Open or publish a new purchase order" window opens.



3. Select the "For component ID" from the dropdown list.
   Fill in the following fields:
   - "Requested quantities"
   - "Wished delivery date"
   - Supplier"
4. Click on the "+" button to add the relevant component to the purchase list.
   - OR -
   Click on "Cancel" to return to the overview.

Note

Status of the component purchase order

Newly created component purchase order requests have the "Initial" status. As soon as a component purchase order request is published, its status changes to "Requested".

5. Click on "Save" to create the component purchase order request.
6. Click on "Save & Publish" to create and publish the component purchase order request.

Note

Component purchase orders
Component purchase orders are only realized if they are published by the relevant user in the system. Only PoRs with the state "Requested" need to be ordered. Purchase order requests which are in a "Requested" state are ready for ordering.

Constraints to the tool component purchase order requests creation

- Tool scheduling, tool balancing and single tool creation does not keep track of the final states of the purchase order requests they created. They rely on available numbers in the stacks and create purchase order requests based on warning limit of the relevant components. Final decision of realizing the purchase order requests is responsibility of the purchase expert at the factory. Based on his/her insight , the pruchase order requests can be published or deleted.
- Misuse of reserved components can happen. It is the user's responsibility to handle the tools and its components in a proper way.
- Single tool creation, tool balancing and tool scheduling may create component purchase order requests but submitting the created orders is user's responsibility.
- Different stacks are considered as a sum for availability, reservation and warning limit numbers of a component. Components may be gathered from different stacks.

5.19.3 Publishing component purchase order requests

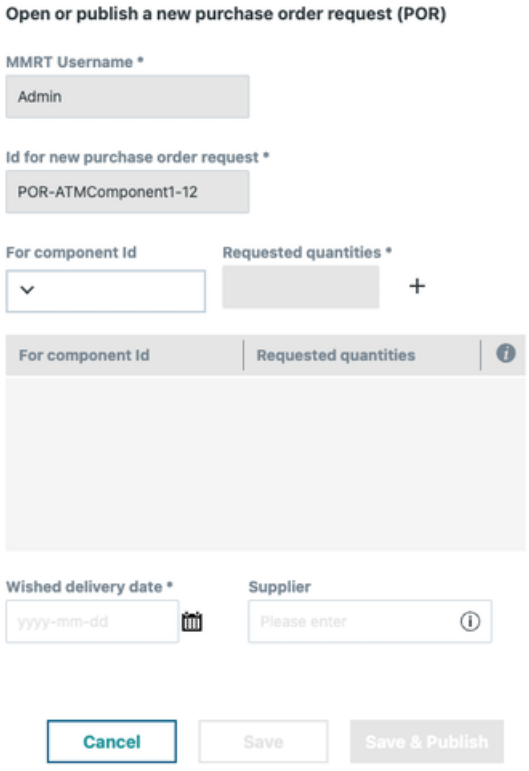
You can publish a component purchase order request. After the publication, the created purchase order is ready to be submitted to ERP systems from the WEB-UI.

Parameters

Parameters	Description
For component ID	Shows the "For component ID".
Requested quantities	Shows the requested quantities.
	Opens the info list.
	Deletes the purchase order.

Procedure

1. The "Overview of purchase order requests" window is open.
   Select an order request and click the "Publish" icon on the right-hand side of the row.
   The "Open or publish a new purchase order request (POR)" window opens.
2. Click "Save & Publish" to publish the relevant component purchase order request.



In the "Overview of purchase order requests" window, the "Status" column of the component purchase order request changes to "Requested".

5.19.4 Updating component purchase order requests

You can update a component purchase order requests on the UI or via the Openness APIs.

UI Restrictions

Note

Restrictions to updates from WEB UI

For the component purchase order request with state "initial", it is possible to update "order request", "wished delivery date", "requested quantities", "ID of component", "suplier" columns.

For the component order request with state "committed", "partially delivered" and "delivered", it is possible to update "Status", "Partial delivery date", "Partial delivered quantity", "Partial delivered good quantity", "Partial delivered location" columns.

You can update the following columns for a purchase order request with the state "Initial":

- Order request
- Wished delivery date
- Requested quantities
- ID of component
- Supplier

You can update the following columns for a purchase order request with the state "Committed" or "Partially delivered":

- Status
- Partial delivery date
- Partial delivered quantity
- Partial delivered good quantity
- Partial delivered location

Procedure

1. The "Overview of purchase order requests" window is open.
   Click the "Edit" symbol.
2. According to the status of the relevant purchase order request, the input field is activated in the editable columns.
   Edit the fields you wish to update.
3. Click on the "Check" symbol to save the changes.

5.19.5 Updating partial delivery information of a purchase order request

It is possibe to add partially delivery information from MMRT via WEB UI when there are partial deliveries from suppliers without notifying ERP systems.

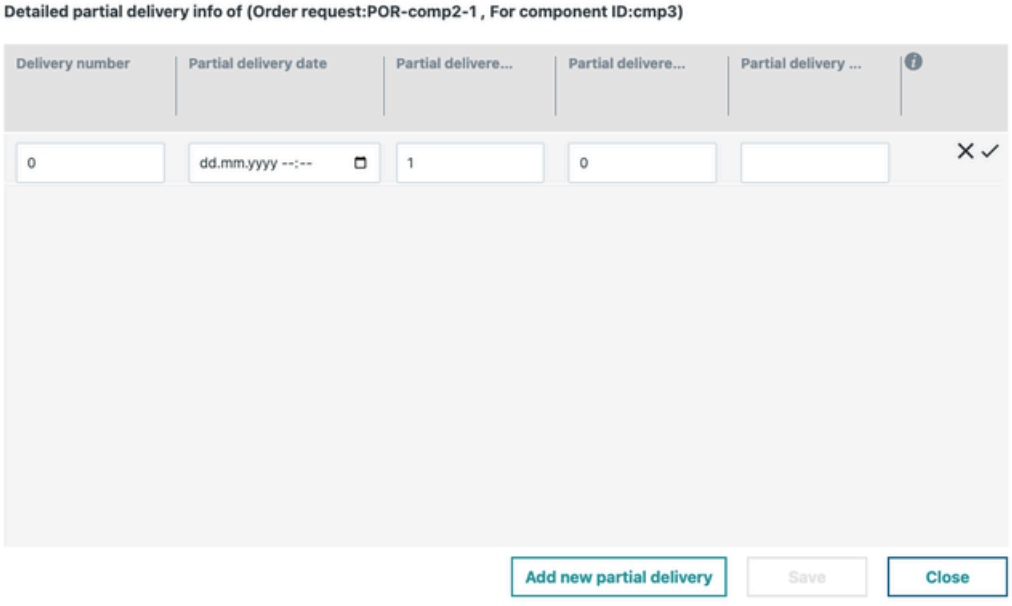
Note

It is possible to multiple items of partial delivery information from the WEB UI

Procedure

1. On the "Overview of purchase order requests" page click the icon.
   The input field will be activated for the editable columns.
2. Edit the fields that you want to update.

3. Click the + icon, which opens partial delivery info page to add partial delivery information.



4. Click the ✓ icon to save the information.

5.19.6 Deleting component purchase order requests

You as a purchaser can delete component purchase order requests from the UI, which have the "Initial", "Cancelled" or "Completed" state.

You can also delete component purchase order requests via the Opennes API.

Deleted component purchase order requests via the UI

Once a component purchase order request is deleted, the data is not stored anymore and cannot be retrieved.

If the purchase order request is in the "Requested" state, you cannot delete it from the UI.

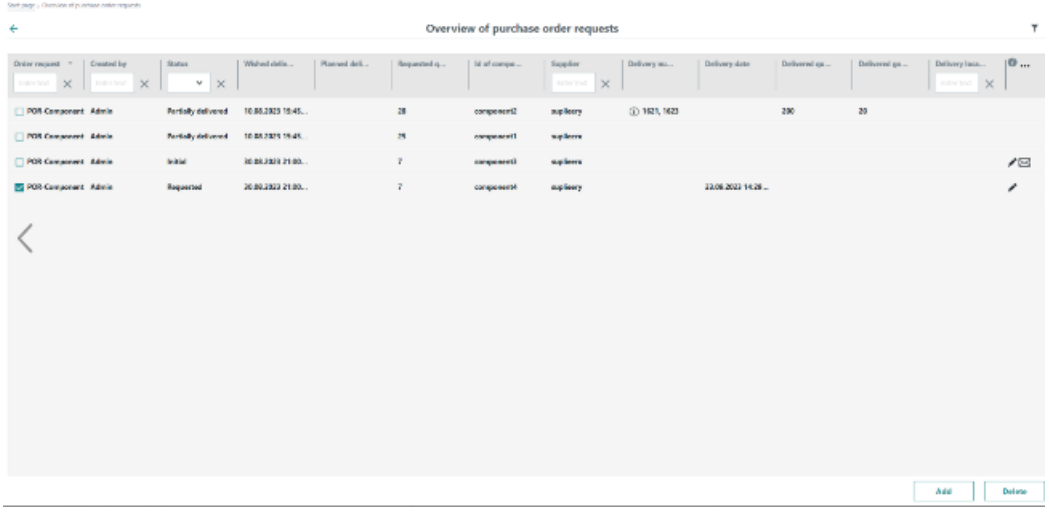
Deleted component purchase order requests via the Openness API

You can delete each component purchase order request independently of its state via the Opennes API. However, the deletion depends on the delivery dates.

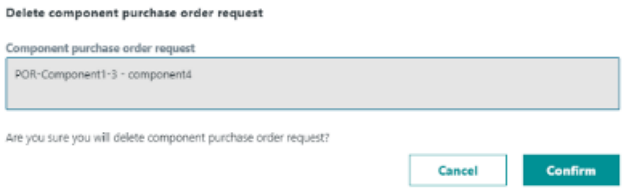
When the purchase order request is in the "Committed" state, or in a state after the "Committed" status, the "Committed delivery date" is relevant for the deletion. As to the "Ordered" state, the "Planned delivery date" is the relevant one. For the states before the "Ordered" state, the "Wished delivery date" is relevant.

Procedure

1. The "Overview of purchase order requests" window is open.
   Select a component purchase order request.



2. Click the "Delete" button in the bottom-right window area.
   The "Delete component purchase order request" window opens.
   Click on the "Confirm" button to confirm the operation
   - OR -
   Click on "Cancel" to cancel the operation.



Using Manage MyResources /Tools at a SINUMERIK control system

6

6.1 Overview of supported operating modes

A SINUMERIK control can work in three different operating modes:

- Automatic mode (AUTO)
- Setup mode (JOG)
- Process monitoring (MDA)

Manage MyResources /Tools provides different functionality for each operating mode.

Automatic mode (AUTO)

Machine produces fully automatically. In this operating mode, protective devices prevent the machining area from being entered, such as loading and unloading of tools. Doors of the loading points and processing rooms are locked with protective switch and cannot be opened.

In this operating mode, no tools can be loaded / unloaded / exchanged via Manage MyResources /Tools. Viewing and editing values is basically possible.

Setup mode (JOG)

Setup mode is provided to prepare the machine for automatic operation.

To do this, setup mode must be selected on the machine using a keyswitch or PLC button. In order to be able to use this operating mode, machine operators must be trained for this.

In this operating mode, tools can be loaded / unloaded / exchanged via Manage MyResources /Tools. For this, the machine elements such as the magazine, tool transport slide and spindle must be in the home position. In order to put the machine in the home position, the machine manufacturer can provide a special PLC button, which must be selected before the changeover processes.

The automatic tool change in the spindle has no function in this operating mode.

Process monitoring (MDA)

The process monitoring operating mode in production allows manual intervention under restricted operating conditions.

This operating mode is used, for example, for processing a complex workpiece. In this operating mode, the standard provides for additional manual intervention. Unlike in automatic mode, the user can observe and control the machining process when the safety guards (doors) are open.

To do this, it is necessary for the operator to be able to take an alternatively effective safety device in form of a handheld device or a swiveling control panel into the work area. This means that he can quickly shut down the machine in an emergency. In addition to an

emergency stop switch, these operator panels must also have an enabling button. When you release this consent button, all movements of the machine are stopped immediately. The rotation of the spindle must have come to a standstill within five revolutions.

In this operating mode, no tools can be loaded / unloaded / exchanged via Manage MyResources /Tools. Viewing and editing values is basically possible.

6.2 Protection levels

There are 8 hierarchical user protection levels on a SINUMERIK control, that can limit the access to programs, data and functions for specific users. These levels are subdivided into:

- Four password levels for SIEMENS, machine manufacturers and end users
- Four keyswitch positions for end users

User protection levels on a SINUMERIK control

Protection level	Locked by	User
0	Password	SIEMENS
1	Password	Machine manufacturer: Development
2	Password	Machine manufacturer: Commissioning engineer
3	Password	End user: Service
4	Keyswitch, position 3	End user: Programmer, machine setter
5	Keyswitch, position 2	End user: Qualified operator, who does not program
6	Keyswitch, position 1	End user: Selected operator, who does not program
7	Keyswitch, position 0	End user: Semi-skilled operator

Tool Management protection levels used by Manage MyResources /Tools

A SINUMERIK control further limits access to different Tool Management functions by specifying Tool Management protection levels. Some of them are used by Manage MyResources /Tools.

Tool Management protection level	Machine data (SINUMERIK Operate)	ACCESSLEVEL section entry (HMI-Advanced)	Description	Value range
ACCESS_TM_TOOL_CREATE	MD51216	SKTLNEWTOOL	Create tool	0-7
ACCESS_TM_TOOL_DELETE	MD51217	SKNCDELTOOL	Delete tool	0-7
ACCESS_TM_TOOL_LOAD	MD51218	SKTOOLLOAD	Load tool	0-7
ACCESS_TM_TOOL_UNLOAD	MD51219	SKTOOLUNLOAD	Unload tool	0-7
ACCESS_TM_TOOL_MEASURE	MD51222	SKTLNEWTOOL	Measure tool	0-7

SINUMERIK Operate

Manage MyResources /Tools on SINUMERIK Operate gets Tool Management protection levels from the corresponding machine data.

HMI-Advanced

Manage MyResources /Tools on HMI-Advanced gets Tool Management protection levels from corresponding [ACCESSLEVEL] section entries of paramtm.ini configuration file.

Configuration files paramtm.ini could exist in the following directories:

- F:\hmi_adv
- F:\mmc2
- F:\user

- F:\oem
- F:\addon

The default entries are defined in directory F:\hmi_adv.
Entries in F:\user directory override entries in the other directories.

Note

File F:\user\PARAMINI.OUT created after paramtm.ini files are processed by the HMI-Advanced Tool Management software at the HMI start may contain errors from processing the files.

Functions of Manage MyResources /Tools limited by Tool Management protection levels

		Functions of Manage MyResources /Tools					
		Exchange/ Check softkey	1:1-Exchange softkey	(Tool) Unload softkey	(Tool) Load softkey	(Edge-details) Geometry data Is Value column	(Edge-details) Wear data Value column
Tool Management protection levels	Create tool	X	X		X		
	Delete tool	X	X	X			
	Load Tool	X	X		X		
	Unload Tool	X	X	X			
	Measure Tool					X	X

The current user protection level and Tool Management protection levels determine if the above Manage MyResources /Tools functions are enabled:

- If the current user protection level is the same as or stronger than all Tool Management protection levels limiting a function above, then the corresponding function softkey/column is enabled.
- If the current user protection level is weaker than any of the Tool Management protection levels limiting a function above, then:
  - the corresponding function column is disabled
  - if a password is configured for any of the Tool Management protection levels limiting the function (i.e., Tool Management protection level is 0-3), then the corresponding function softkey is hidden
  - if a password is not configured for all Tool Management protection levels limiting the function (i.e., Tool Management protection level is 4-7), then the corresponding function softkey is disabled

Example SINUMERIK Operate

If on SINUMERIK Operate Machine data are set as follows:

```
MD51216=4
MD51217=4
MD51218=4
```

```
MD51219=4
MD51222=3
```

and current user protection level is: 4 (Keyswitch, position 3),

then the following Manage MyResources /Tools softkeys are enabled:

- Exchange/Check softkey
- 1:1-Exchange softkey
- (Tool) Unload softkey
- (Tool) Load softkey

and the following Manage MyResources /Tools columns are disabled:

- (Edge-detail) Geometry data Is Value column
- (Edge-detail) Wear data Value column

Example 1 HMI-Advanced

If on HMI-Advanced, the file F:\user\paramtm.ini contains the following section:

```
[ACCESSLEVEL]
SKTOOLLOAD=5
SKTOOLUNLOAD=5
SKNCDELTOOL=5
SKTLNEWTOOL=6
```

and current user protection level is: 6 (Keyswitch, position 1),

then the following Manage MyResources /Tools softkeys are disabled:

- Exchange/Check softkey
- 1:1-Exchange softkey
- (Tool) Unload softkey
- (Tool) Load softkey

Example 2 HMI-Advanced

If on HMI-Advanced, the file F:\user\paramtm.ini contains the following section:

```
[ACCESSLEVEL]
SKTOOLLOAD=4
SKTOOLUNLOAD=4
SKNCDELTOOL=3
SKTLNEWTOOL=2
```

and current user protection level is: 3 (End-user: Service),

then the following Manage MyResources /Tools softkeys are enabled:

- (Tool) Unload softkey

and the following Manage MyResources /Tools softkeys are disabled:

- Exchange/Check softkey
- 1:1-Exchange softkey
- (Tool) Load softkey

6.3 With SINUMERIK Operate

6.3.1 Starting Manage MyResources /Tools

Procedure

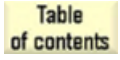
1. The control has ramped-up and the operating areas are displayed.
2. Press softkey "MMR /Tools".
   The "Tool overview" window opens.

6.3.2 Calling online help

You can call a context-sensitive online help.

Procedure

1. Press the <F12> key to activate the online help menu.
   The help menu opens on the right-hand side of the window.



2. Press the "Table of contents" softkey to display the help topics.
   - OR -

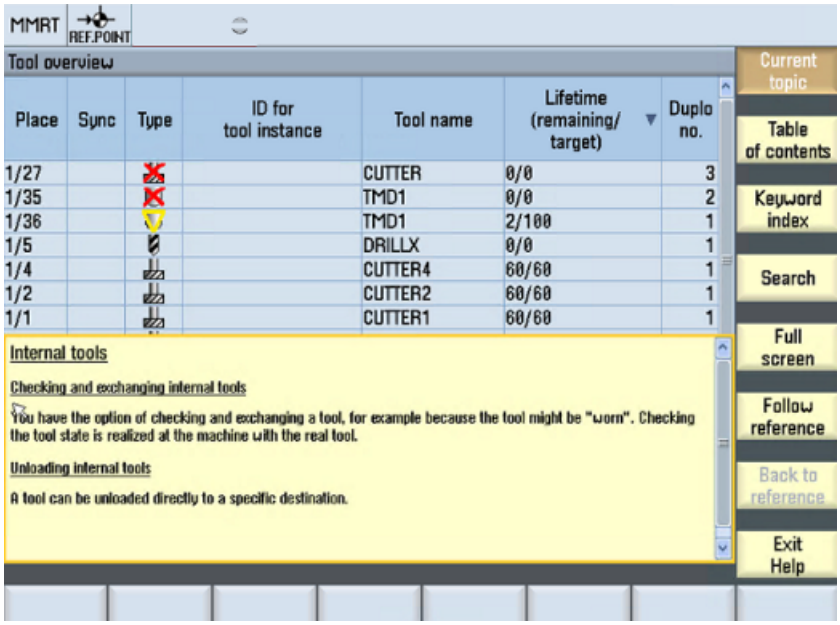
   If you are searching for a specific index item, click the "Keyword index" softkey.
   - OR -

Search

If you are searching for a particular term, press the "Search" softkey".
- OR -

Exit Help

3. To close the online help, click the "Exit Help" softkey.



6.3.3 Syncing the server configuration

On the "Settings" page, the following data can be synced with the server configuration:

- Monitoring type
- Unload reasons
- Localization of the User-defined attributes and the Unload reasons
- Default presetting of action flags for the Unload reasons
- Magazine configuration
- OEM bitmap

Note

Unload reason changes

In the rare event of Unload reason changes, you must synchronize each client before unloading further tools. This needs to be done to avoid that wrong or obsolete reasons are provided.

Note

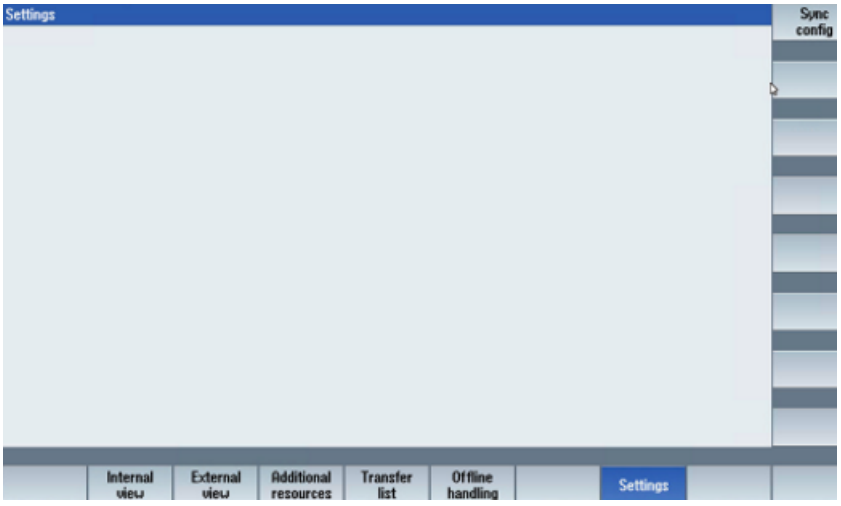
OEM bitmapchanges

In the rare event of OEM bitmap changes, you must synchronize each client before checking OEM related Tool details and Edge details sections. This needs to be done to avoid any possible misinformation.

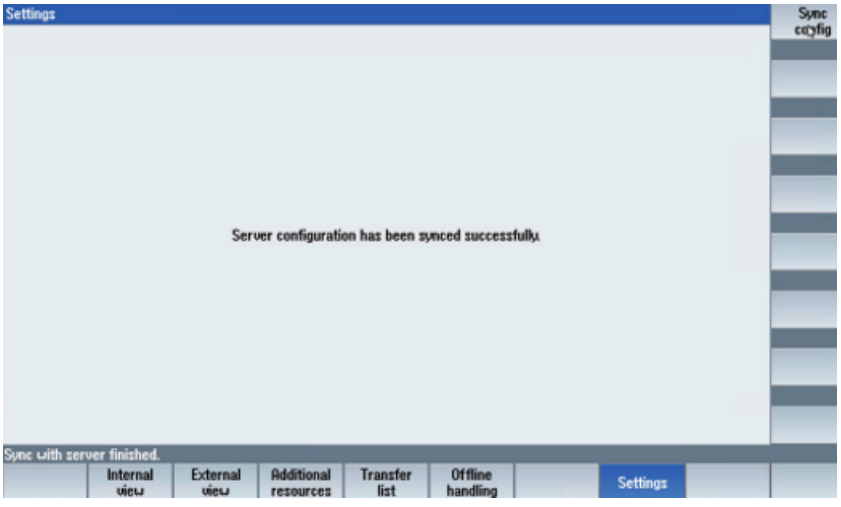
For more information, see Configuring Unload reasons and their action flags (Page 955).

Procedure

1. Press
   The window "Settings" opens

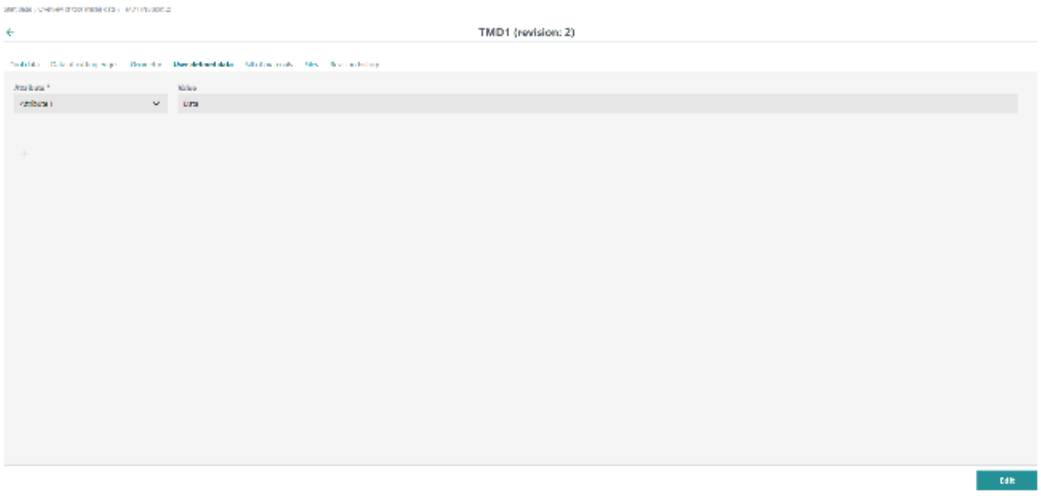


2. Press "Sync config" to synchronize the server configuration.
   The data is synced and the confirmation message "Server configuration has been synced successfully" appears.



Displaying changes of the User-defined data on the server

You can display changes of the User-defined attributes in the tool master data application via the User defined data" tab in the "<ID for tool master data>" window:



6.3.4 Checking and exchanging internal tools

You have the option of checking and exchanging a tool, for example because the tool might be "worn". Checking the tool state is realized at the machine with the real tool.

Note

Using a tool after the check

If you do not exchange the tool after the check and you go on using it, statistical data is generated for "Load" and "Unload". The "Unload reason" is empty.

Prerequisite

This functionality is only enabled if the user has at least protection level 4.

Parameter

The following parameters are displayed in the tool overview:

Parameter	Description
"Tool overview" window	
Place	Shows the magazine and place. Machines with turning technology without a configured magazine, shows the T-number.

Parameter		Description
Sync	Shows the following icons:	
		Shows that the tool is not yet synchronized with the server.
		Shows that the tool contains incorrect data and cannot be synchronized with the server data. For more information, see Correcting tool properties (Page 529).
Type		Shows the tool type symbol.
ID for tool instance		Shows the identifier for tool instance data.
Tool name		Shows the tool name.
Lifetime (remaining/ target) /Workpieces (remaining/ target)		Shows the residual and target tool life in minutes or in workpieces.
Duplo No.		Shows the duplo number.
"Exchange / Check" window - overview of the sister or replacement tools		
R		Shows the reservation for a tool instance if there is one.
ID for tool instance		Displays the identification of the instance data of the sister or replacement tool.
Tool name		Shows the name of the tool in the NC program.
ID master data		Shows the identifier for tool master data.
Location		Shows the storage location of the sister or replacement tool.
Assignments for tools		
Unload reason		Select an Unload reason in the drop-down list. • Unknown • Broken tool • Worn out tool • Loud noise of the tool • Empty place needed • Tool is needed on another machine • Bad workpiece quality • <User-defined Unload reason>
Choose action flag		Shows the action flag drop-down list.
Comment on unloading reason		For the comment, a maximum of 128 characters are available.
"General - <ID for tool instance>" window		
DNo		Shows the cutting edge number. The tools on display are those you selected in your default settings. • Relative DNo-Type: DNo between 1 and 12 • Absolute DNo-Type: DNo between 1 and 32000 • Flat DNo-Type: DNo is T-number
Type		Shows the cutting edge type.
Remaining lifetime / Remaining workpieces		Shows the residual tool life in minutes or in workpieces. You can change the value to define a new value for this cutting edge.

Parameter	Description
Target lifetime / Target workpieces	Shows the planned tool life in minutes or in workpieces. You can change the value to define a new value for this cutting edge.
Tool life prewarning limit / Workpieces prewarning limit	Shows the prewarning limit in minutes or in workpieces. You can change the value to define a new value for this cutting edge.

Note

Machines without a configured magazine

On machines without a configured magazine, i.e. turning machines, the first column of the internal view shows the T-number.

Procedure: Exchange / Check the tool

Note

Machines without configured magazines

On machines without a configured magazine, i.e. turning machines, the "Exchange / Check" functionality is not supported.

Note

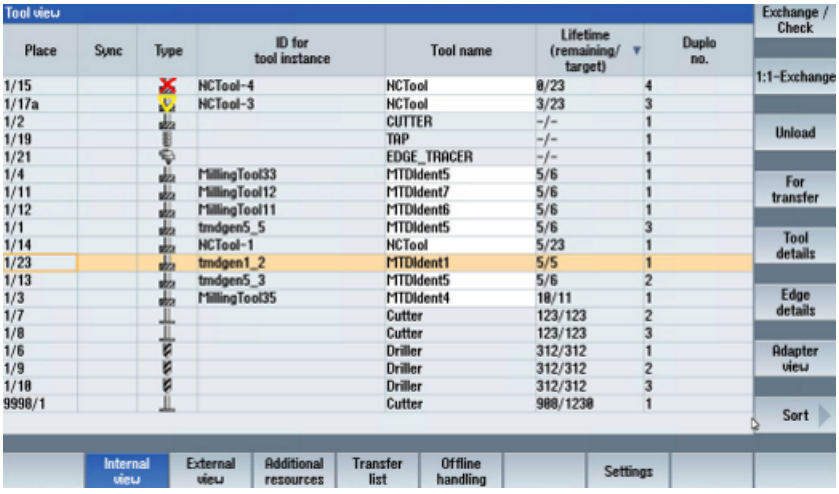
Residual Lifetime and Residual pieces values rounded off to 3 digits after the dot

Unlike the values in Tool management, the values in MMR /Tools are rounded off to three decimal places after the dot.

Additional information about configuring the number of decimal places after the dot in Tool management is provided in the Function manual "SINUMERIK 828D, Tool management".

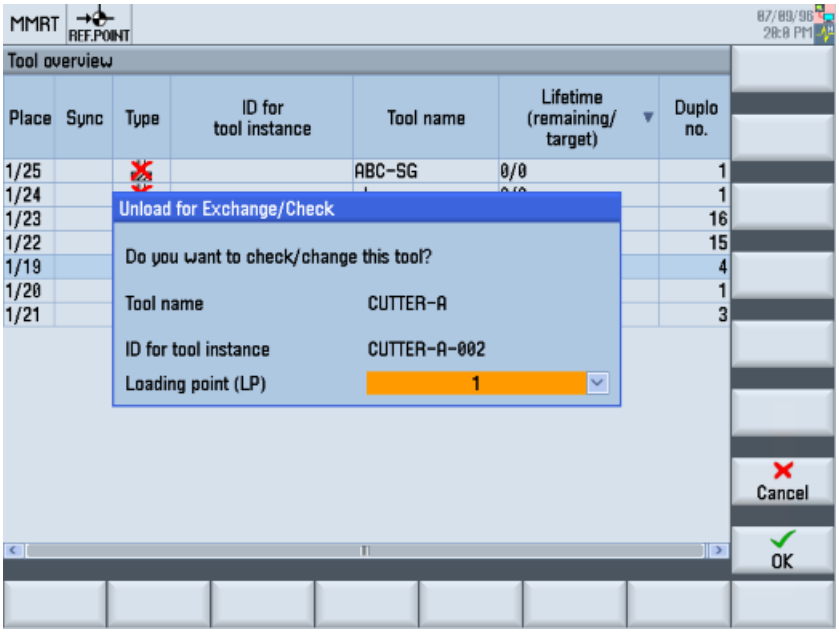
Internal view

1. Press the "Internal view" softkey.
   The "Tool overview" window opens and shows the overview of the tools.

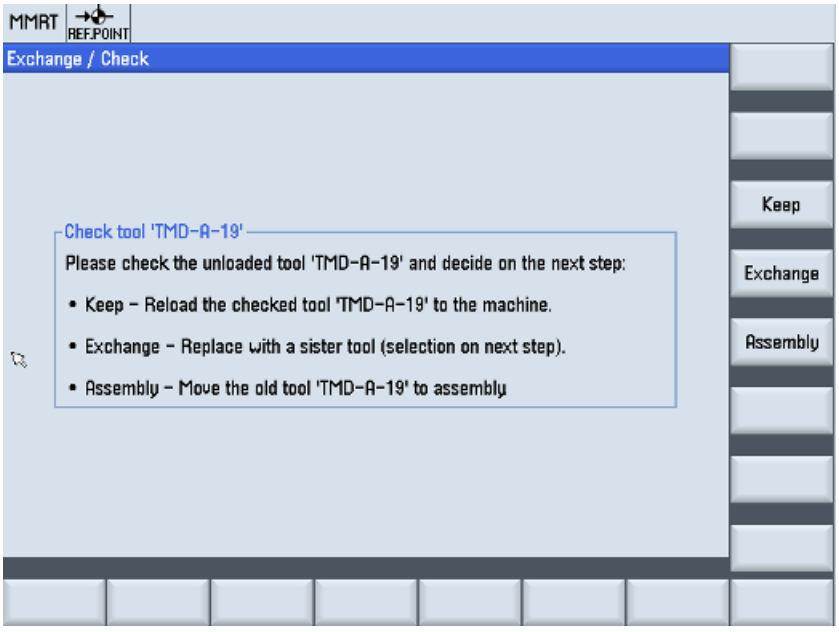


Exchange / Check

2. Select a tool from the overview and press the softkey "Exchange / Check".
   The "Unload for Exchange / Check" window opens. Confirm the selected tool and choose the loading point.
   Press the "OK" softkey to continue.
   - OR -
   Press the "Cancel" softkey to cancel the operation.



3. The "Check 'tool ID'" window opens.
   The tool is provided at the loading point.
   Check the tool. You can continue to use the original tool or swap it with a sister tool.



Note

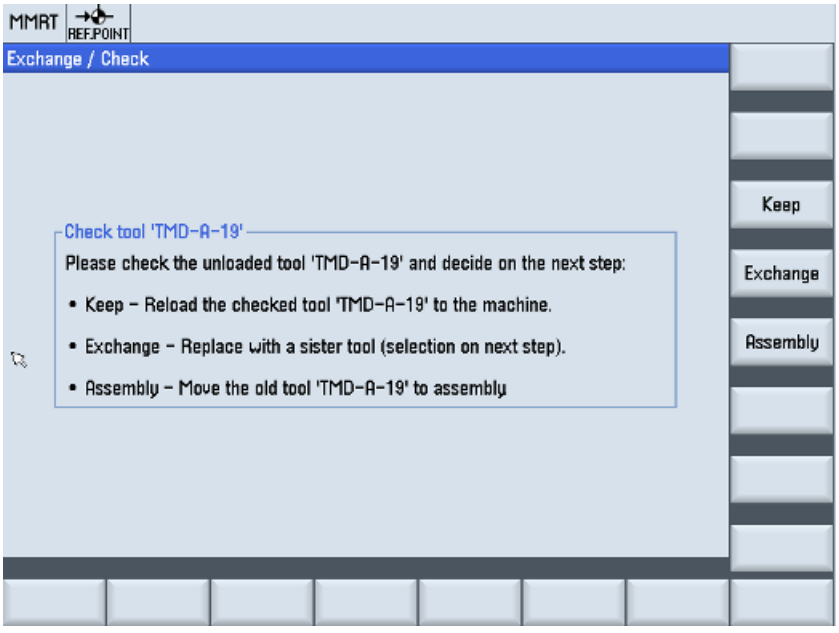
Assembly softkey

The "Assembly" softkey is only available if it is configured in the mmrConfig.json file on the machine.

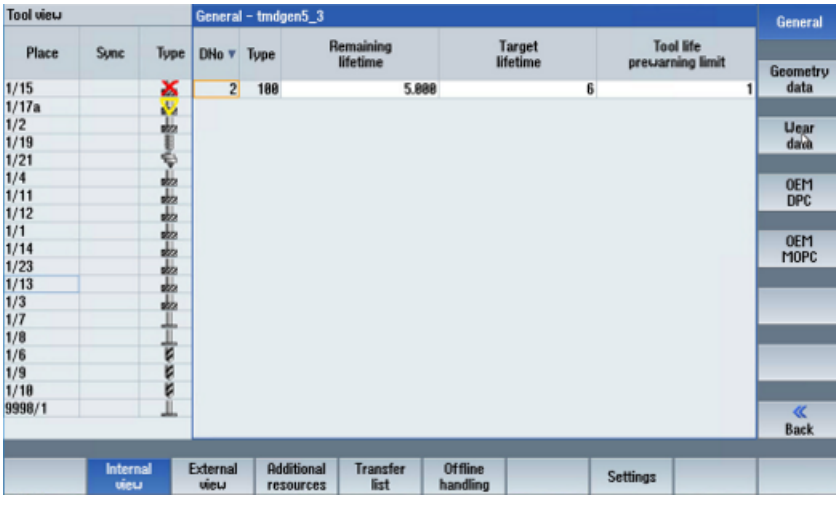
Procedure: Keeping the original tool

Keep

1. Insert the original tool into the loading point again.
   You can carry out a tool check online and offline even if the tool has no sister or replacement tool.
   Press the "Keep" softkey.



2. The "General - <ID Instance data>" window opens and shows cutting edge data.
   If applicable, enter new values for remaining and target lifetime / workpieces and prewarning limit.
   Press the "Back" softkey.



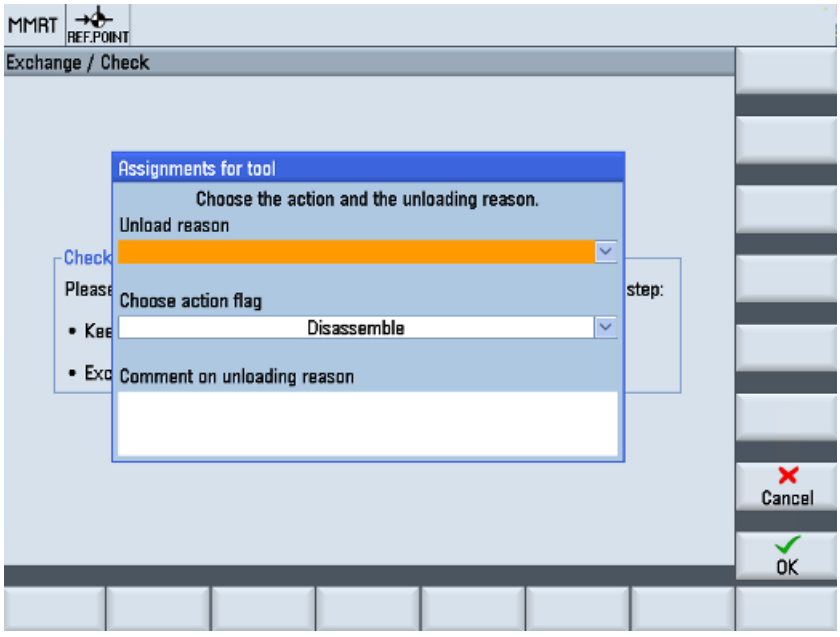
Procedure: Displaying and exchanging a sister tool

Exchange

1. Press the "Exchange" softkey.
   The "Assignments for tool" window opens.
   You can choose the "Unload reason" and the "action flag" and add a comment regarding the original tool to be exchanged.
   Press the "OK" softkey to proceed

   - OR -

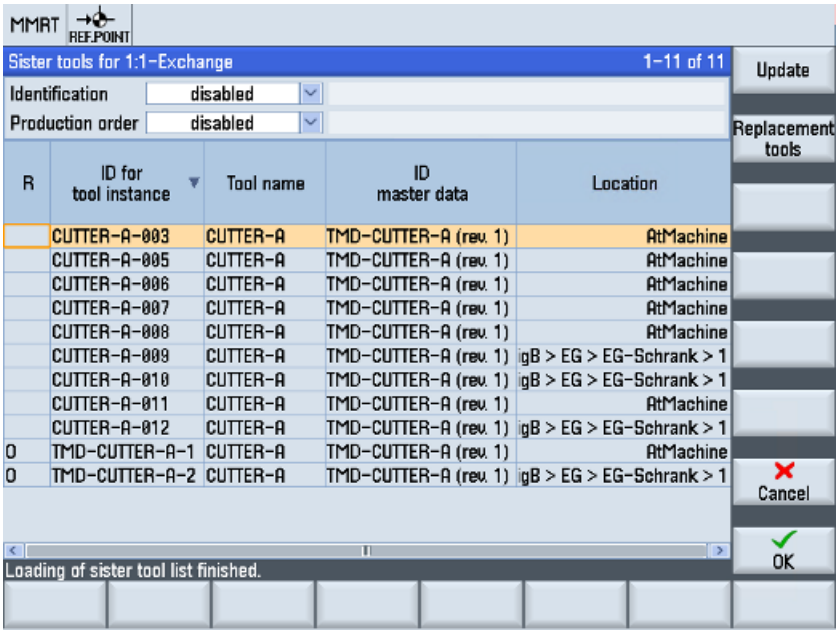
   Press the "Cancel" softkey to cancel the operation.



2. The window "Sister tools for 1:1 Exchange" opens.
   You can filter for a specific tool or production order. You just need to select "equals", includes", "starts with" or "ends with" in the drop-down list behind "Identification" or "Production order". Type the complete term, a part of the term, the beginning, or ending letters of the term.
   Select a sister tool and press the "OK" softkey.

   - OR -

   Press the "Cancel" softkey to cancel the operation.



Note

Preselected sister tools

If a sister tool has already been assigned in "Monitoring tools", it is automatically preselected.

Procedure: Displaying and exchanging a replacement tool

Replacement tools

1. Press the "Replacement tools" softkey to display the replacement tools.

2. Select a replacement tool and press the "OK" softkey.

   - OR -

   Press the "Cancel" softkey to cancel the operation.

Note

Preselected replacement tools

If sister or replacement tools have already been assigned in "Monitoring tools", they are automatically preselected.

For more information, see Overview of Monitoring tools (Page 260).

Error messages

Errors can occur during the actions "Unload original tool", "Reload original tool" and "Load sister tool".

For more information, see Error messages (Page 538).

6.3.5 Exchanging internal tools

You can exchange a tool.

Prerequisite

This functionality is only enabled if the user has at least protection level 4.

Parameter

The following parameters of the sister tools are displayed to you in the "1:1 Exchange" window:

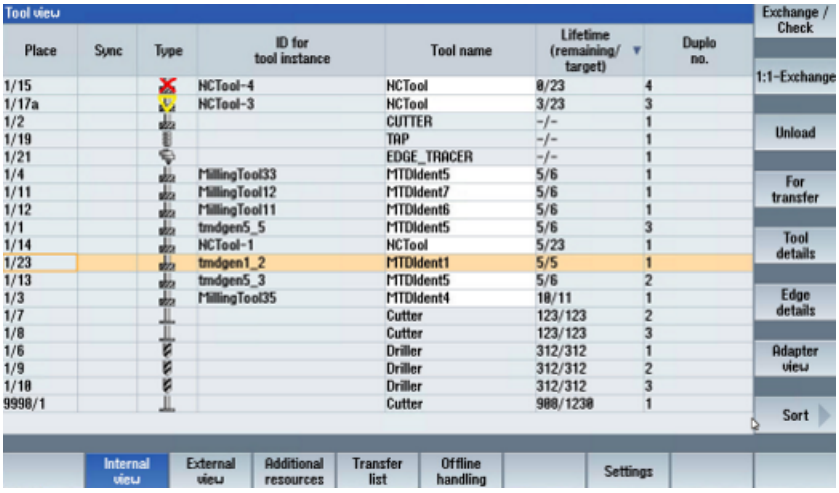
Parameter	Description
Assignments for tool	
Unload reason	Select an Unload reason in the drop-down-list: • Unknown • Broken tool • Worn out tool • Loud noise of the tool • Empty place needed • Tool is needed on another machine • Bad workpiece quality • <User-defined Unload reason>
Choose action flag	Shows the action flag drop-down list.
Comment on unloading reason	For the comment, a maximum of 128 characters are available.
Sister tools for 1:1 exchange	

Parameter	Description
R	• Stands for "Reservation" • Shows one of the following tool states: – O (Order). The tool belongs to a production order. – FM (Fixed on machine) The tool is reserved for this machine. – ST (Sister tool) The tool is the pre-assigned sister tool. – RT (Replacement tool) The tool is the pre-assigned replacement tool.
ID instance data	Displays the identification of the instance data of the sister tool.
Tool name	Shows the name of the tool in the NC program.
ID master data	Shows the identifier for tool master data.
Location	Shows the storage location of the sister tool.

Procedure

Internal view

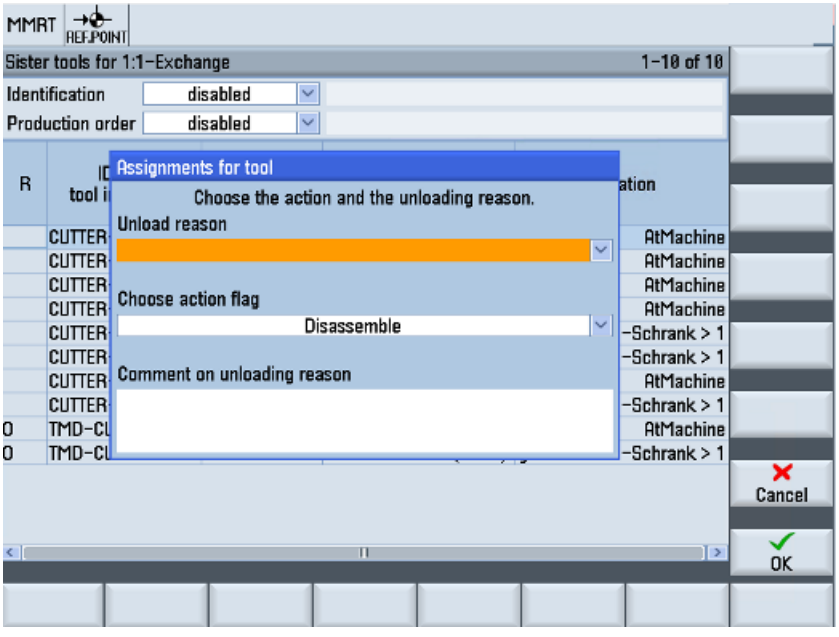
1. Press the "Internal view" softkey.
   The "Tool overview" window opens and shows the overview of the tools.



1:1-Exchange

2. Select a tool with the cursor and press the "1:1 Exchange" softkey.
   The "1:1 Exchange" window opens. The sister tools are loaded and displayed in a list. You can refresh the list by pressing the "Update"-Softkey.
   Select the desired sister tool and press the "OK" softkey.
   The "Assignment for tool" window opens. Select an Unload reason and press the "OK" softkey. If the selected Unload reason has no default action flag, "Disassemble" is preselected.

   For more information, see Configuring Unload reasons and their action flags (Page 955)

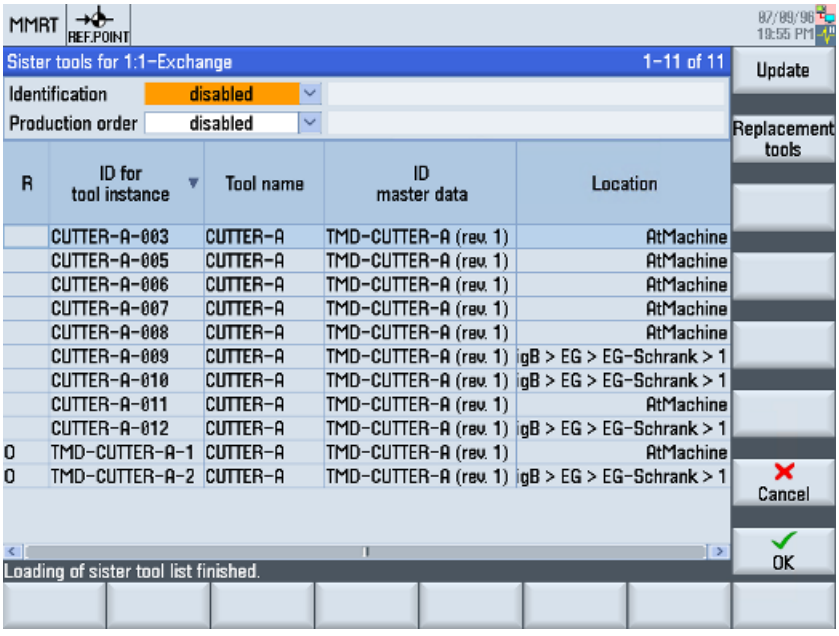


- OR -

Replacement tools

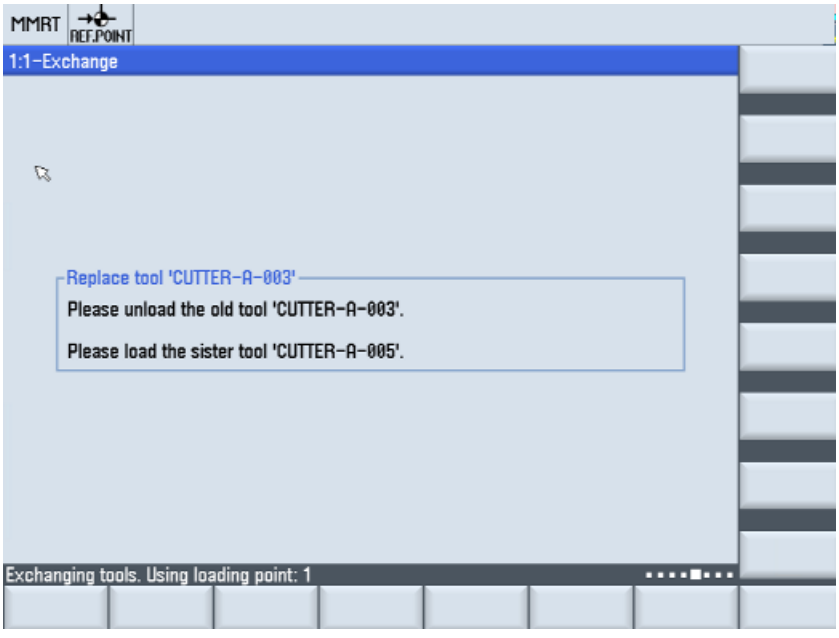
3. Click on the "Replacement tools" softkey to display the replacement tool created via a breaking change.

   You can filter for a specific tool or production order. You just need to select "equals", includes", "starts with", or "ends with" in the drop-down list behind "Identification" or "Production order" and then type the complete term, a part of the term, the beginning, or ending letters of the term.



   For more information, see Creating a non-breaking change (Page 228).

4. The 1:1-Exchange window opens.



Error messages

Errors can occur during the actions "Unload original tool" and "Load sister tool".

For more information, see Error messages (Page 538).

6.3.6 Unloading internal tools

A tool can be unloaded directly to a specific destination.

Prerequisite

This functionality is only enabled if the user has at least protection level 4.

Parameter

The following parameters are displayed in the "Unload tool" window:

Parameter	Description
Unload tool	
Choose the destination of the tool:	
Tool name	Shows the tool name.
ID for tool instance	Shows the identifier for tool instance data.
Loading point (LP)	Select a loading point from the drop-down list.
Unload reason	Select one of the following Unload reasons: • Unknown • Broken tool • Worn out tool • Loud noise of the tool • Empty place needed • Tool is needed on another machine • Bad workpiece quality • <User-defined Unload reason>
Unload tool to Assembly	

Parameter	Description	
Choose action flag	Choose one of the following action flags to specify the reason for unloading the tool:	
	Decide further processing	A tool can be unloaded on the machine without an action suggested. After unloading, the tool is listed on the server. The presetter must decide on further action of the tool.
	Overhaul	After unloading the tool to overhaul, the tool is placed in "Kanban" in the column "To be overhauled" on the server. The replacement of the tool edge is enabled.
	Remeasure	The tool is placed in "Kanban" in the column "To be measured" on the server. The tool looses previous correction data.
	Recheck	The presetter provides the tool again after a check. The tool is placed in "Kanban" in the column "To be provided" that keeps the original correction data.
	Disassemble	The tool is removed from the client. Reloading is not possible.
Comment on unloading reason	For the comment, a maximum of 128 characters are available.	
Unload tool to cabinet		
Tool name	Shows the tool name.	
ID for tool instance	Shows the identifier for tool instance data.	
Cabinet	Select the required cabinet from the drop-down list.	
Container	Select the required container from the drop-down list.	

Note

Unloading new and old tools

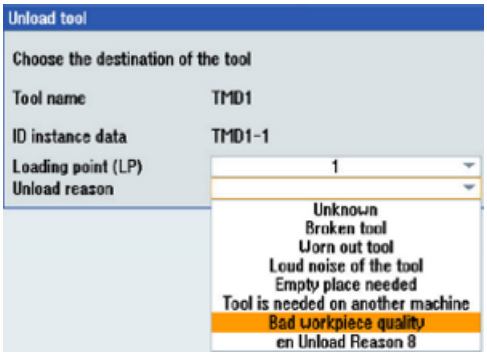
- You can unload new tools (greenfield tools) with "Assembly", "Cabinet", or "AtMachine".
- You can only unload old tools (brownfield tools) with "AtMachine".

Procedure

1. Press the "Internal view" softkey.
   The "Tool overview" window opens.

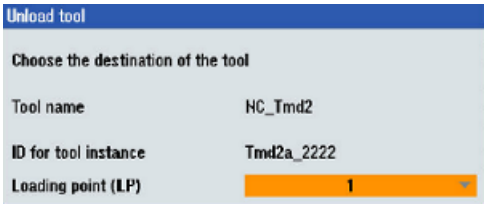
Unload

2. Select a tool from the overview and press the "Unload" softkey.
The "Unload tool" window opens.
Select the destination of the tool.
Select an Unload reason in the drop-down-list "Unload reason".



If you have deleted the Unload reasons, they are not displayed in the dialog box. The Unload reasons are deleted via the API.

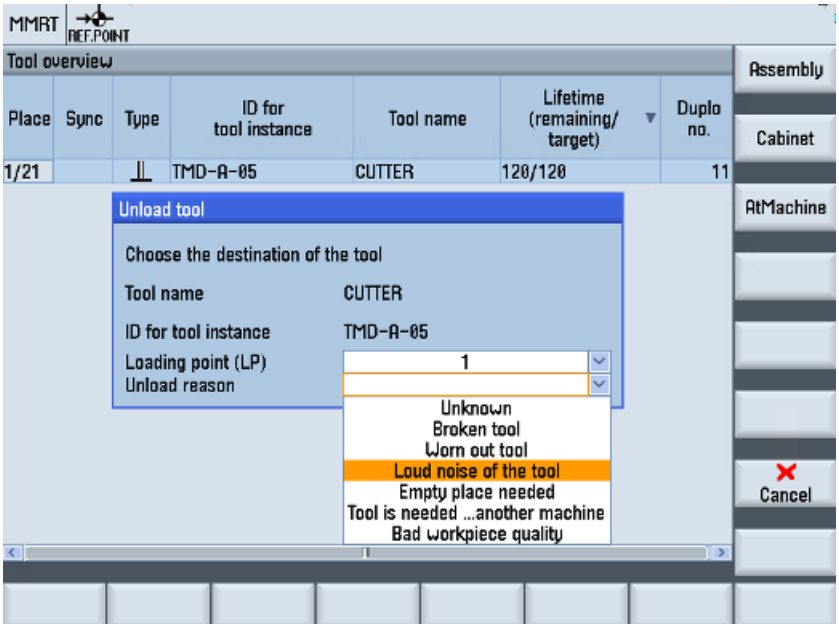
For more information, see Configuring Unload reasons and their action flags (Page 955).



Press one of the following softkeys:

- Assembly (only available for greenfield tools)
  If you unload to Assembly and have deleted the Unload reasons, the default action flag is "Disassemble".
- Cabinet (only available for greenfield tools)
- AtMachine
  If you unload brownfield tools in offline mode, this can only happen when the machine is online. Therefore, the following message is displayed in

offline mode:
"Move of the tool will be completed when the machine goes online."

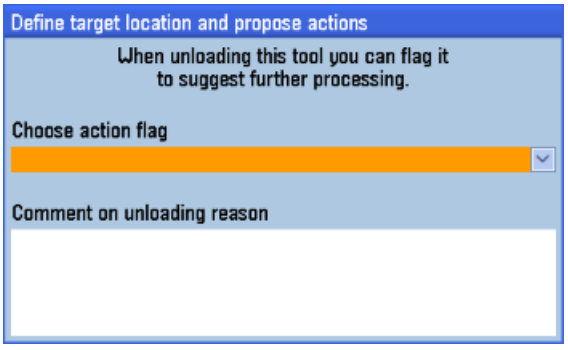


Assembly

3. Press the "Assembly" softkey to unload the tool (new tool - greenfield tools) to the assembly location.

   The “Define target location and propose actions” window opens.

   - Select an action flag in the drop-down list
   - Write a comment in the text field below (optional)
     After writing a comment, press "Enter" to store the comment.



   In the dialog line, you receive a message that the selected tool has been successfully unloaded.

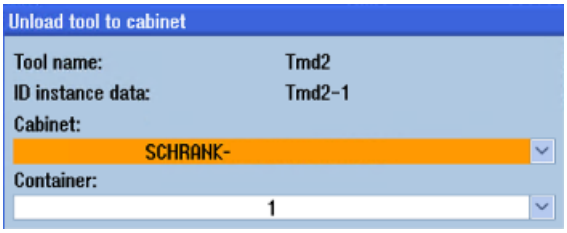
   - OR -

Cabinet

Press the "Cabinet" softkey to unload the tool (new tool - greenfield tools) to the cabinet.

The "Unload tool to cabinet" window opens.

- Select the desired cabinet from the drop-down list.
- Select the tool size from the "Container" drop-down list.



In the dialog line, you receive a message that the selected tool has been successfully unloaded, e.g. into the cabinet.

- OR -

AtMachine

Press the "AtMachine" softkey to unload the tool (old tool - brownfield tools) to the AtMachine location.

You receive the message "The tool has been successfully unloaded and moved to the AtMachine target location" in the dialog line.

4. The unloaded tool is supplied to the desired unloading point.
   - Open the door.
   - Remove the tool.
   - Close the door again.

6.3.7 Displaying details of internal tools

6.3.7.1 Tool details

You can display further data of a tool.

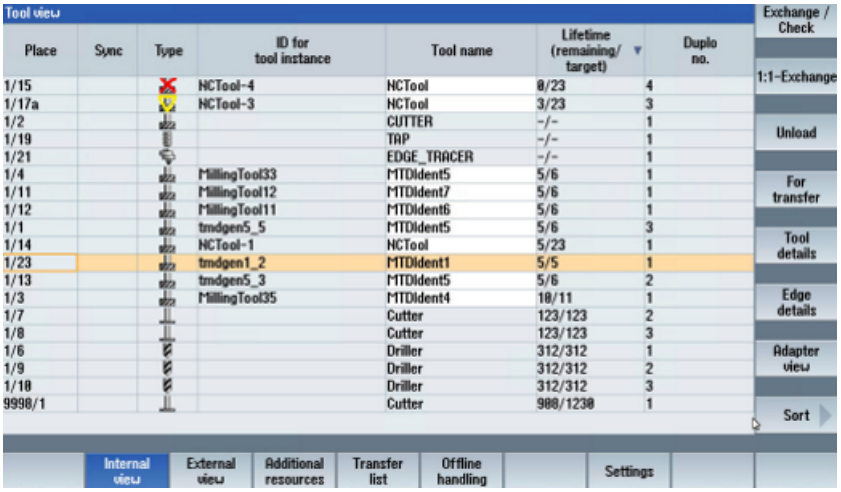
Parameter

Parameter	Description
General – <ID Instance data>" window	
ID master data	Shows the name of the master data set.
Tool name	Shows the name of the tool.
T-Number	Shows the internal T number in the NC.
Duplo No.	Shows the duplo number.
TOA	Shows the TOA unit.
Place type	Shows the place type.
Num. cutting edges	Displays the number of cutting edges.
Max. revolution	Shows the maximum speed.

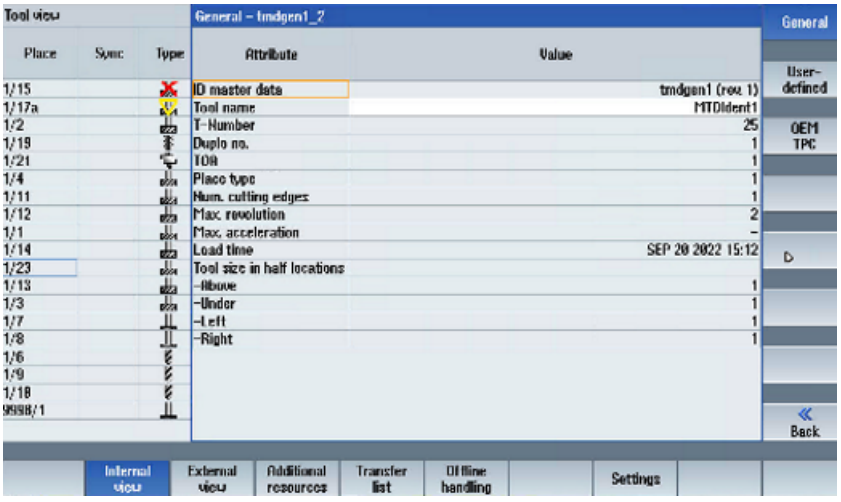
Parameter	Description
Max. acceleration	Displays the maximum acceleration.
Load time	Shows the point in time when the tool was loaded.
Tool size in half locations - Above	Shows the size of the tool in half-locations above.
Tool size in half locations - Under	Shows the size of the tool in half-locations under.
Tool size in half locations - Left	Shows the size of the tool in half-locations on the left-hand side.
Tool size in half locations - Right	Shows the size of the tool in half-locations on the right side.
"User-defined – <ID Instance data>" window	
Attributes 1 to x	Shows the user-defined attributes of a tool, which were assigned to the tool instance on the server side. You can overwrite the attribute names on the server. The new name is displayed.
"OEM TPC – <ID Instance data>" window	
TC_TPCxy	Shows the tool-specific OEM data of the tool. It can be either a standard numerical value or a bitmask (a bitmapped parameter).

Procedure

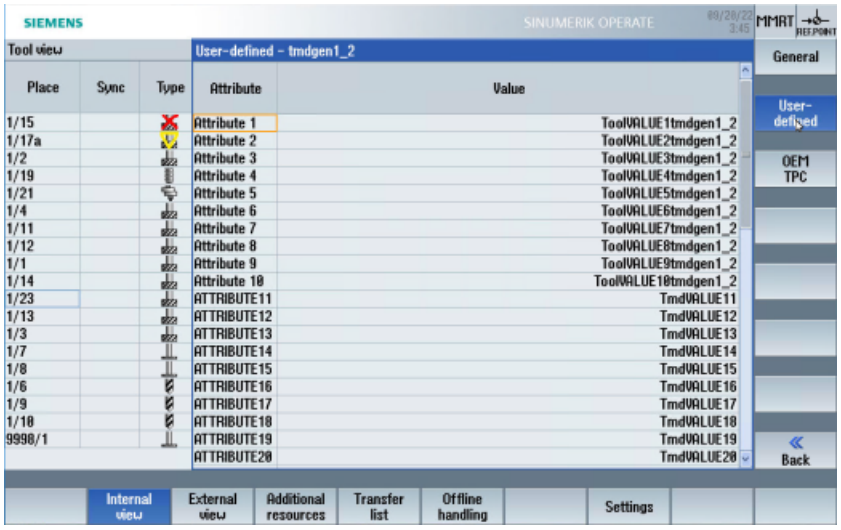
1. Press "Internal view".
   The "Tool overview" window opens and shows the overview of the tools.



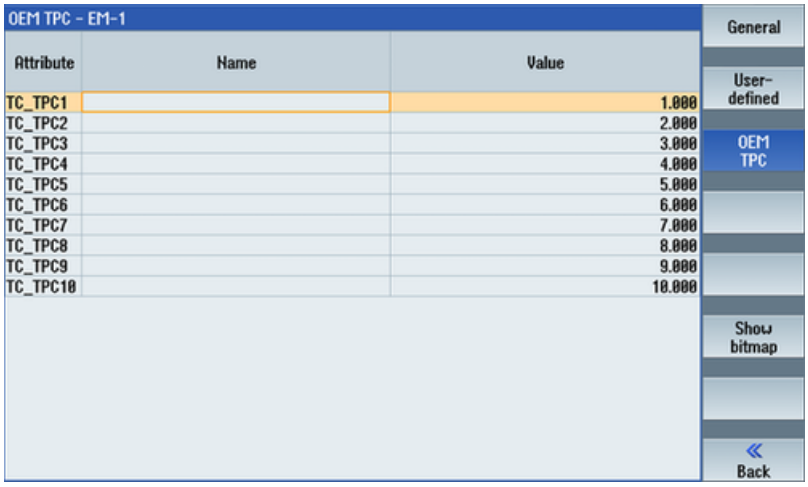
2. Select a tool from the overview and press "Tool-details".
   The "General - <ID Instance data>" window opens and displays the tool details.

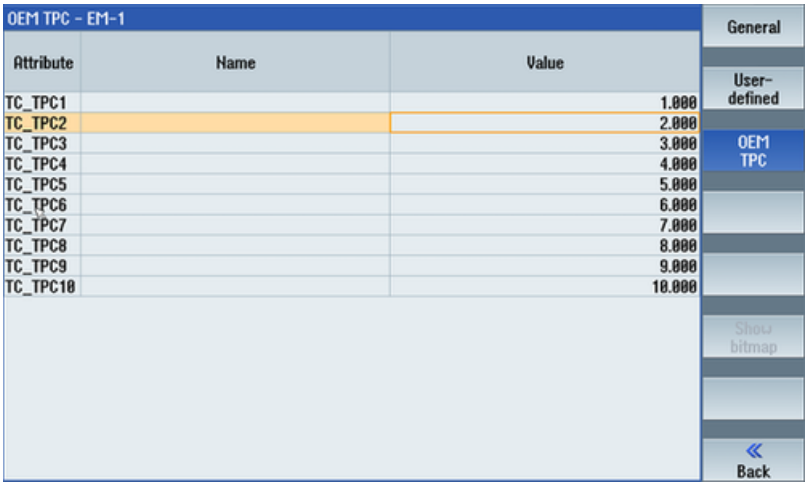


   - OR -
   Press "User-defined".
   The "User-defined - <ID Instance data>" window opens and displays the user-defined attributes of the tool.



- OR -
Press "OEM TPC ".
The "OEM TPC - <ID Instance data>" window opens and displays the tool-specific OEM data of the tool. Users can select any row. The 'Show bitmap' buttons are enabled if OEM data is a bitmask, disabled if not.





3. Press "<< Back" to xclose the detailed view.

6.3.7.2 Cutting edge details

You have the option of displaying the cutting edge details for a tool.

Parameter

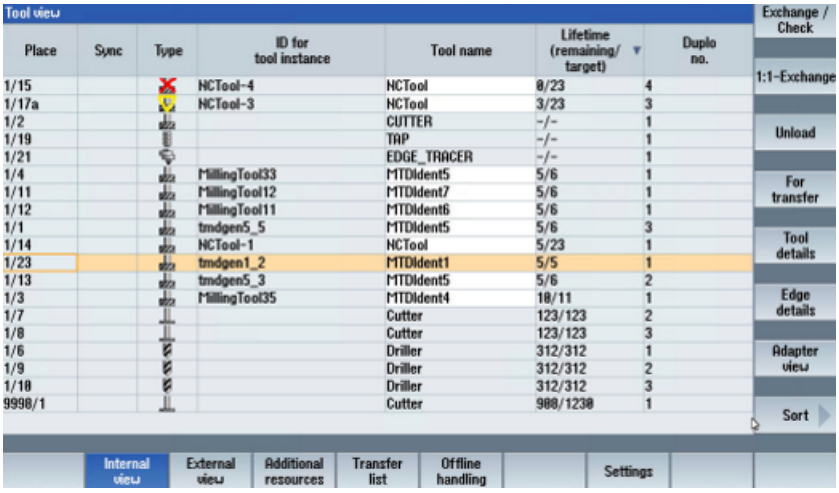
Parameter	Description
"General – <ID Instance data>" window	
DNo	Shows the cutting edge number.
Type	Shows the cutting edge type.
Remaining lifetime / Remaining workpieces	Shows the residual tool life in minutes or in workpieces. You can change the value to define a new value for this cutting edge.
Target lifetime / Target workpieces	Shows the planned tool life in minutes or in workpieces. You can change the value to define a new value for this cutting edge.
Tool life prewarning limit /Workpieces prewarning limit	Shows the prewarning limit in minutes or in workpieces. You can change the value to define a new value for this cutting edge.
"Geometry data – <ID Instance data>" window	
Attribute name	For each of these parameters, shows the expected value, the tolerance and the actual value. Only the data of a cutting edge are displayed. Select the cutting edge under "Cutting edge DNo".

Parameter	Description
Edge position	
Length 1	
Length 2	
Length 3	
Radius	
Corner radius	
Length 4	
Length 5	
Angle 1	
Angle 2	
Adapter length 1	
Adapter length 2	
Adapter length 3	
Free cutting angle	
TC_DP25	
"Wear data – <ID Instance data>" window	
Attribute	Shows the cutting-edge-specific wear data of a tool. Only the data of a cutting edge are displayed. Select the cutting edge under "Cutting edge DNo".
Wear length 1	
Wear length 2	
Wear length 3	
Wear radius	
Wear corner radius	
Wear length 5	
Wear angle 1	
Wear angle 2	
Wear length 4	
"OEM DPC – <ID Instance data>" window	
Attribute	Shows the cutting-edge-specific OEM data of a tool. Only the data of a cutting edge are displayed. Select the cutting edge under "Cutting edge DNo".
TC_DPC1 to x	Shows the tool-specific OEM data of the cutting edge It can be either a standard numerical value or a bitmask (a bitmapped parameter)
"OEM MOPC – <ID Instance data>" window	
Attributes	Shows the cutting-edge-specific OEM monitoring data of a tool. Only the data of a cutting edge are displayed. Select the cutting edge under "Cutting edge DNo".
TC_MOPC1 to x	Shows the tool-specific OEM data of the cutting edge It can be either a standard numerical value or a bitmask (a bitmapped parameter)

Procedure

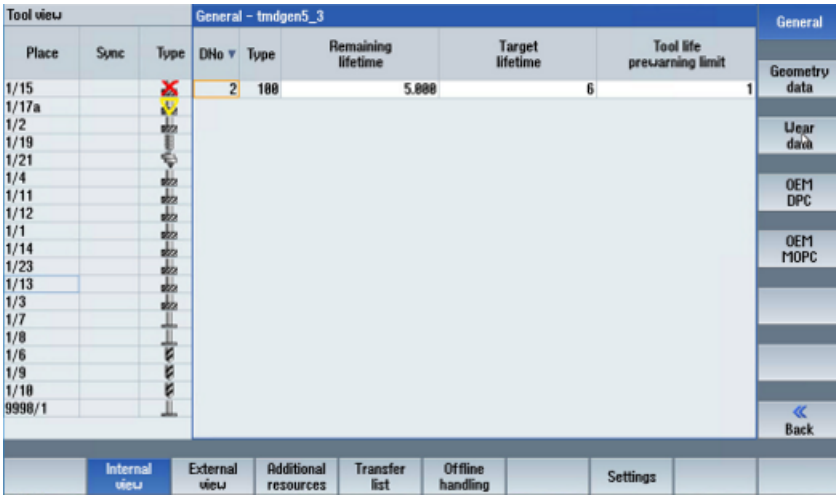
Internal view

1. Press the "Internal view" softkey.
   The "Tool overview" window opens and shows the overview of the tools.



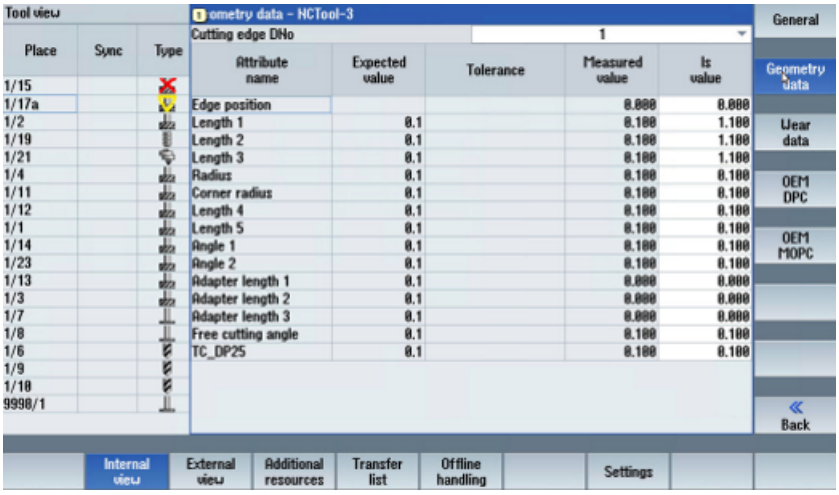
Edge details

2. Select a tool from the overview and press the "Edge details" softkey.
   The "General - <ID Instance data>" window opens and shows cutting edge data.



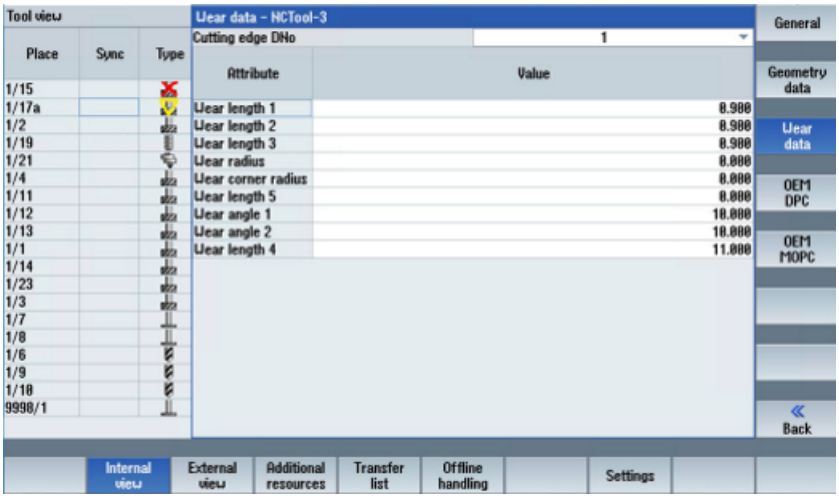
Geometry data

3. Press the "Geometry data" softkey.
The "Geometry data - <ID Instance data>" window opens and shows cutting-edge-specific geometry data.
From the drop-down list, select the cutting edge under "Cutting edge DNo".



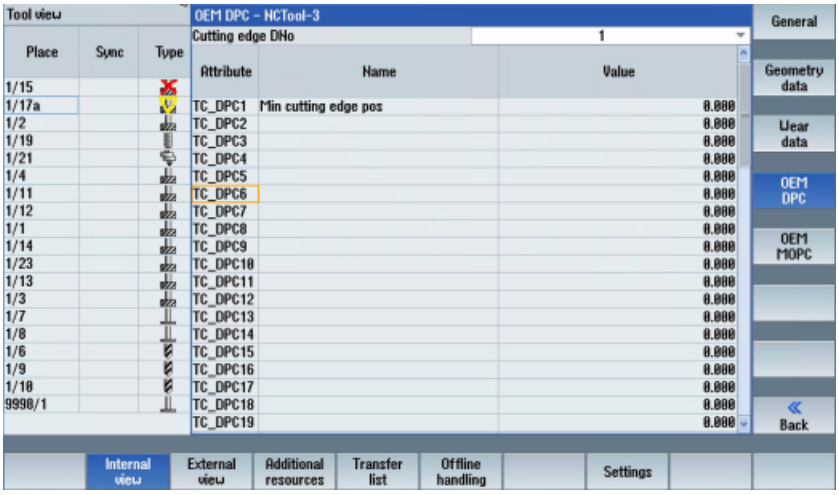
Wear data

4. Press softkey "Wear data".
The "Wear data - <ID Instance data>" window opens and shows the cutting-edge-specific wear data of the tool.
From the drop-down list, select the cutting edge under "Cutting edge DNo".



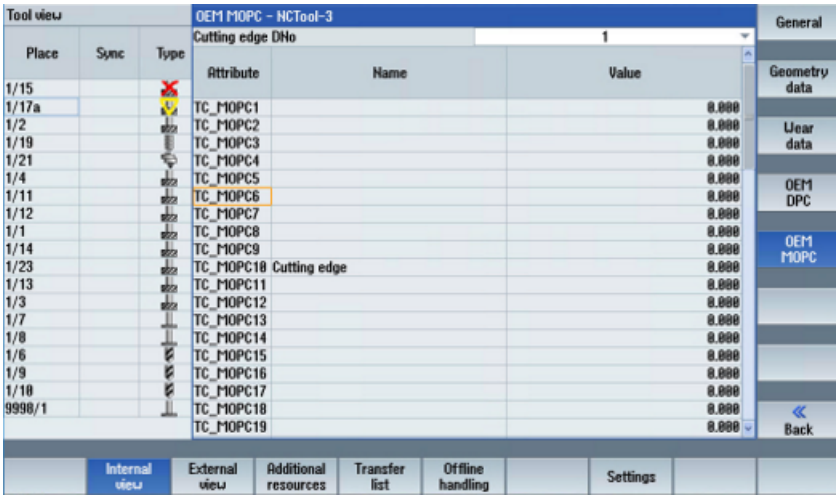
OEM DPC

5. Press softkey "OEM DPC".
The "OEM DPC - <ID Instance data>" window opens and shows the cutting-edge-specific OEM data of the tool.
From the drop-down list, select the cutting edge under "Cutting edge DNo".



OEM MOPC

6. Press softkey "OEM MOPC".
The "OEM DPC - <ID Instance data>" window opens and shows the cutting-edge-specific OEM monitoring data of the tool.
From the drop-down list, select the cutting edge under "Cutting edge DNo".



<< Back

7. To exit the detailed view, press the "<< Back" softkey.

6.3.8 Displaying details of external tools

6.3.8.1 Tool details

You can display further tool data details.

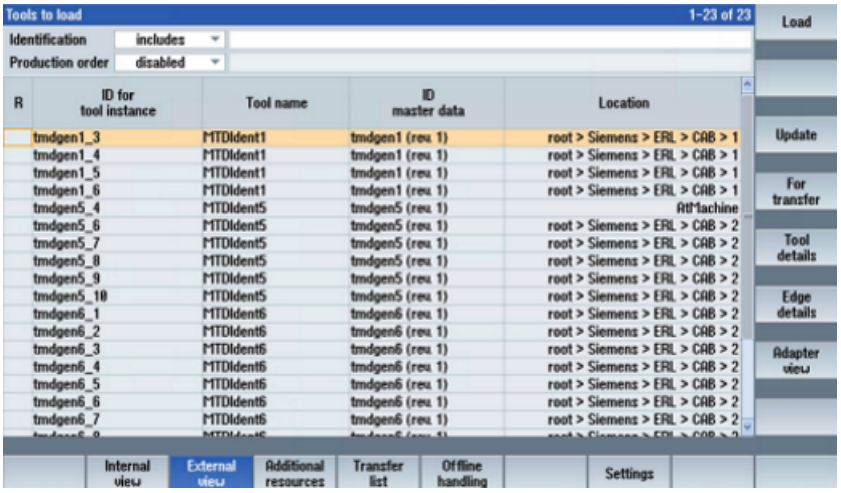
Parameter

Parameter	Description
"General - <Identifier instance data>" windows	
ID master data	Shows the name of the master data set.
Tool name	Shows the name of the tool.
T-Number	Shows the internal T number in the NC.
Duplo No.	Shows the duplo number.
TOA	Shows the TOA unit.
Place type	Shows the place type.
Num. cutting edges	Displays the number of cutting edges.
Max. revolution	Shows the maximum speed.
Max. acceleration	Displays the maximum acceleration.
Load time	Shows the point in time when the tool was loaded.
Size in half locations - Above	Shows the size of the tool in half-locations above.
Size in half locations - Under	Shows the size of the tool in half-locations under.
Size in half locations - Left	Shows the size of the tool in half-locations on the left-hand side.
"User-defined – <ID Instance data>" window	
Attributes 1 to x	Shows the user-defined attributes of a tool, which were assigned to the tool instance on the server side. You can overwrite the attribute names on the server. The new name is displayed.
"OEM TPC - <Identifier instance data>" window	
TC_TPCxy	Shows the tool-specific OEM data of the tool It can be either a standard numerical value or a bitmask (a bitmapped parameter)

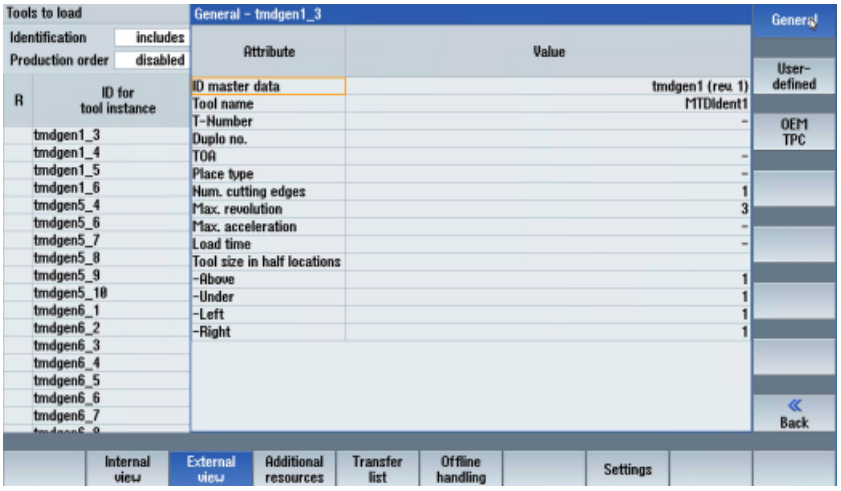
Procedure

External view

1. Press "External view".
   The "Tools to load" window opens and shows the overview of the tools.
2. Select a tool from the overview and press "Tool details".

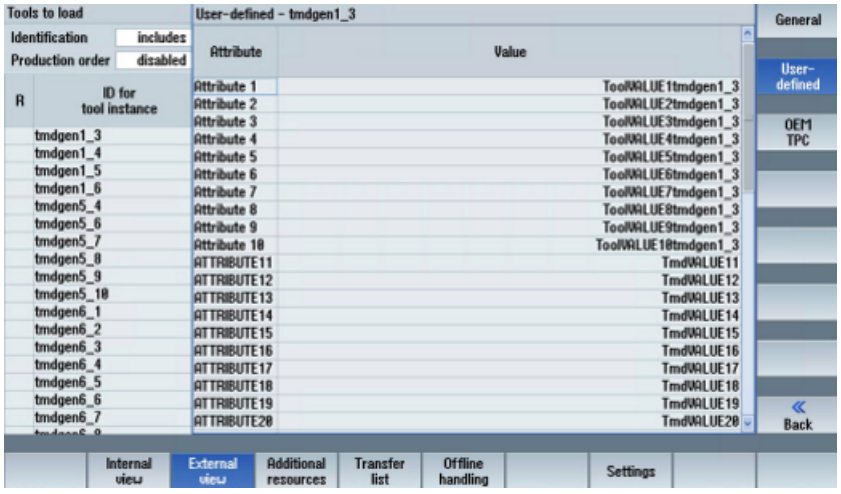


The "General - <Identifier instance data>" window opens and displays the tool details.



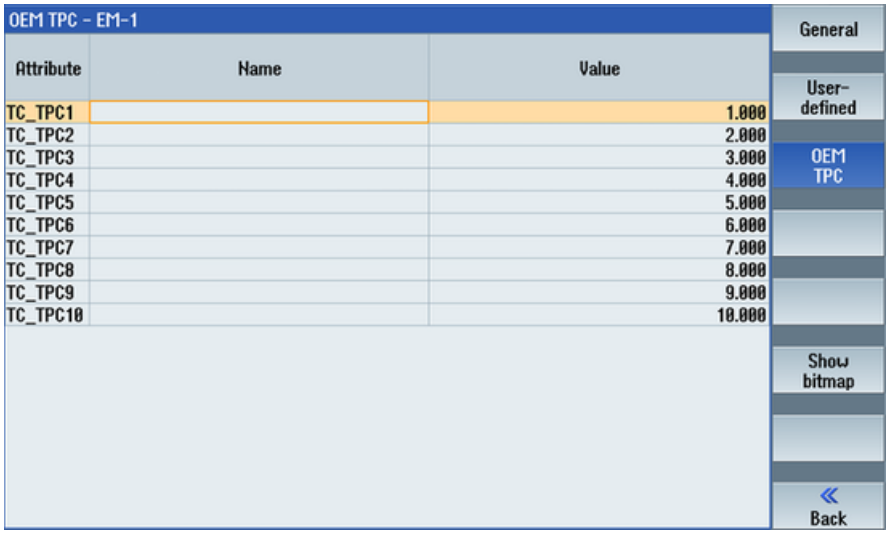
User-defined

3. Press "User-defined".
   The User-defined - <Identifier instance data> window opens and displays the user-defined attributes of the tool.

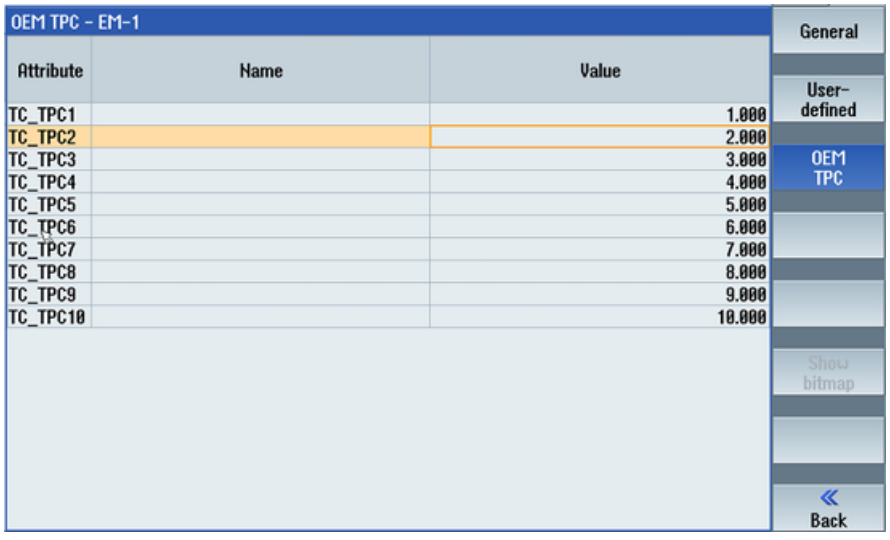


OEM TPC

4. Press "OEM TPC".
   The "OEM TPC - <ID instance data>" window opens and displays the tool-specific OEM data of the tool.
   TC_TPC1 is a bitmapped parameter:



   TC_TPC2 is not a bitmapped parameter:



5. Press "Back" to exit the detailed view.

« Back

6.3.8.2 Cutting edge details

You have the option of displaying the cutting edge details of a tool.

Parameters

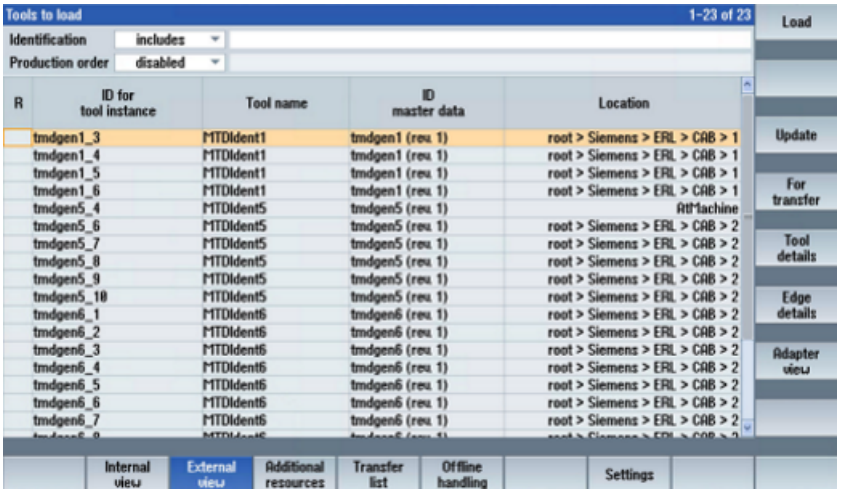
Parameter	Description
"General - <ID Instance data>" window	
DNo	Shows the cutting edge number.
Type	Shows the cutting edge type.
Remaining lifetime / Remaining workpieces	Shows the residual tool life in minutes or in workpieces.
Target lifetime / Target workpieces	Shows the planned tool life in minutes or in workpieces.
Tool life prewarning limit /Workpieces prewarning limit	Shows the prewarning limit in minutes or in workpieces.
"Geometry data - <ID Instance data>" window	
Attribute name	For each of these parameters, shows the expected value, the tolerance and the actual value. Only the data of a cutting edge are displayed. Select the cutting edge under "Cutting edge DNo".
Edge position	
Length 1	
Length 2	
Length 3	
Radius	
Corner radius	
Length 4	
Length 5	
Angle 1	
Angle 2	
Adapter length 1	
Adapter length 2	
Adapter length 3	
Free cutting angle	
TC_DP25	
"Wear data - <ID Instance data>" window	
Attribute	Shows the cutting-edge-specific wear data of a tool. Only the data of a cutting edge are displayed. Select the cutting edge under "Cutting edge DNo".
Wear length 1	
Wear length 2	
Wear length 3	
Wear radius	
Wear corner radius	
Wear length 5	
Wear angle 1	
Wear angle 2	
Wear length 4	

Parameter	Description
"OEM DPC - <ID Instance data>" window	
Attribute	Shows the cutting-edge-specific OEM data of a tool. Only the data of a cutting edge are displayed. Select the cutting edge under "Cutting edge DNo".
TC_DPC1 to x	Shows the tool-specific OEM data of the cutting edge. It can be either a standard numerical value or a bitmask (a bitmapped parameter).
"OEM MOPC - <ID Instance data>" window	
Attributes	Shows the cutting-edge-specific OEM monitoring data of a tool. Only the data of a cutting edge are displayed. Select the cutting edge under "Cutting edge DNo".
TC_MOPC1 to x	Shows the tool-specific OEM data of the cutting edge. It can be either a standard numerical value or a bitmask (a bitmapped parameter).

Procedure

External view

1. Press "External view".
   The "Tools to load" window opens and shows the overview of the tools.



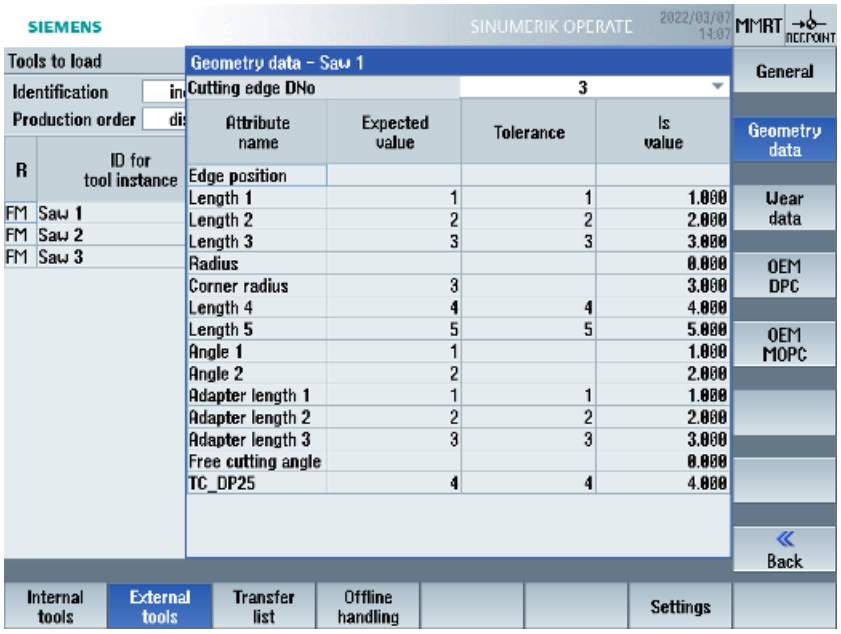
Edge details

2. Select a tool from the overview and press "Edge details".
   The "General - <ID Instance data>" window opens and shows cutting edge data.

Geometry data

3. Press "Geometry data".
   The "Geometry data - <ID Instance data>" window opens and shows cutting-edge-specific geometry data.

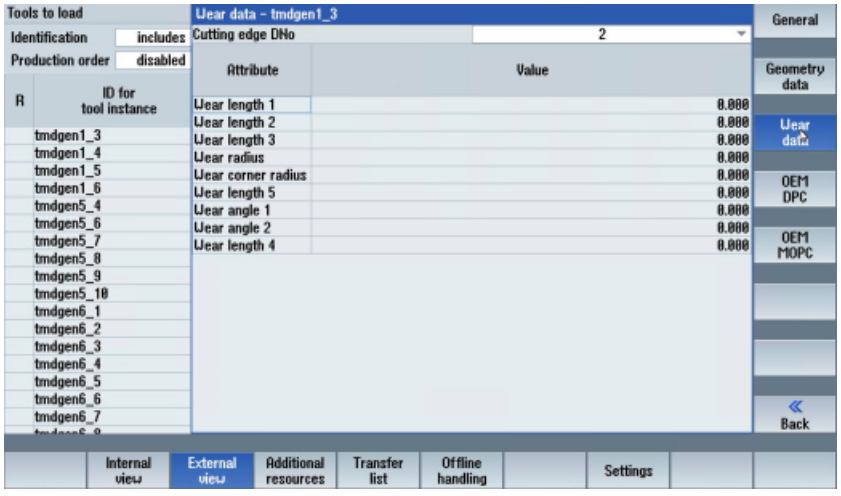
4. Select the "Cutting edge DNo" in the drop-down list.



5. Press "Wear data".
   The "Wear data - <ID Instance data>" window opens and shows the cutting-edge-specific wear data of the tool.

Wear data

6. Select the "Cutting edge DNo" in the drop-down list.

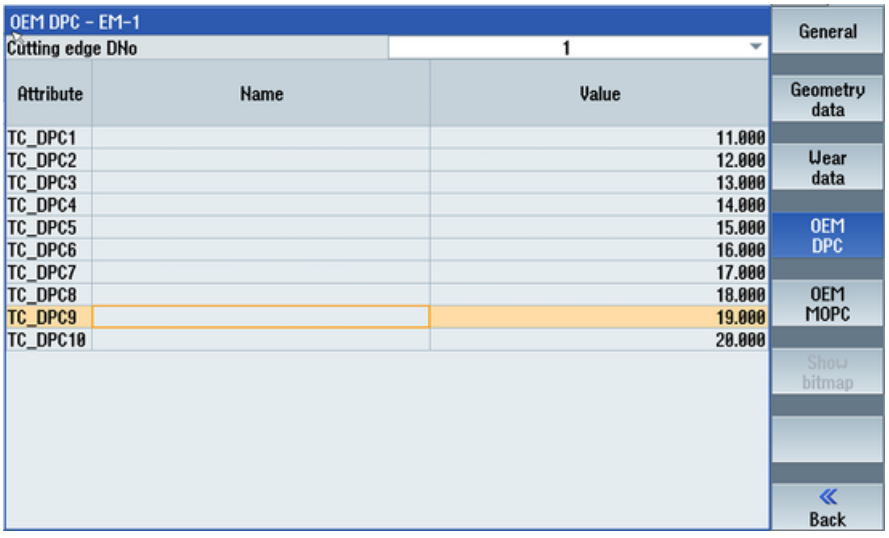


7. Press "OEM DPC".
   The "OEM DPC - <ID Instance data>" window opens and shows the cutting-edge-specific OEM data of the tool.

OEM DPC

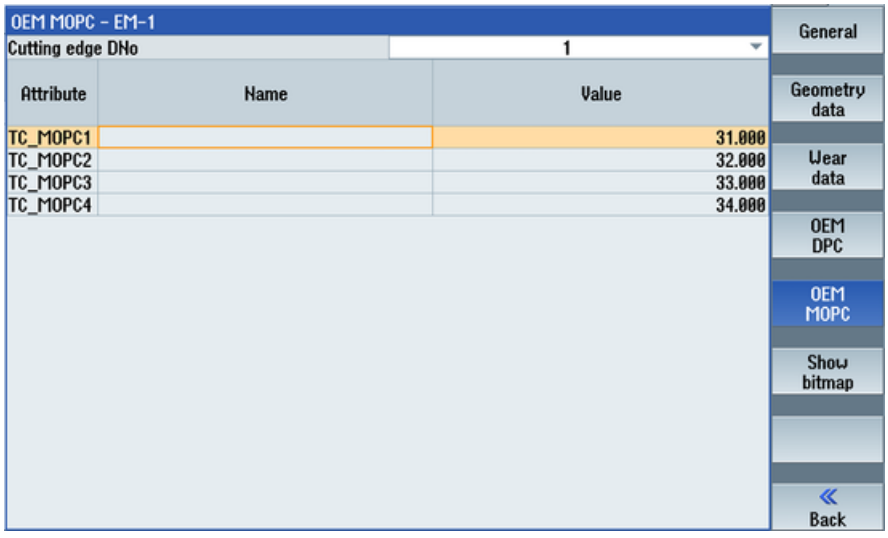
8. Select the "Cutting edge DNo" in the drop-down list.
'Show bitmap' is enabled, if OEM data is bitmask, disabled if not.
TC_DPC1 is a bitmapped parameter:

TC_DPC9 is not a bitmapped parameter:

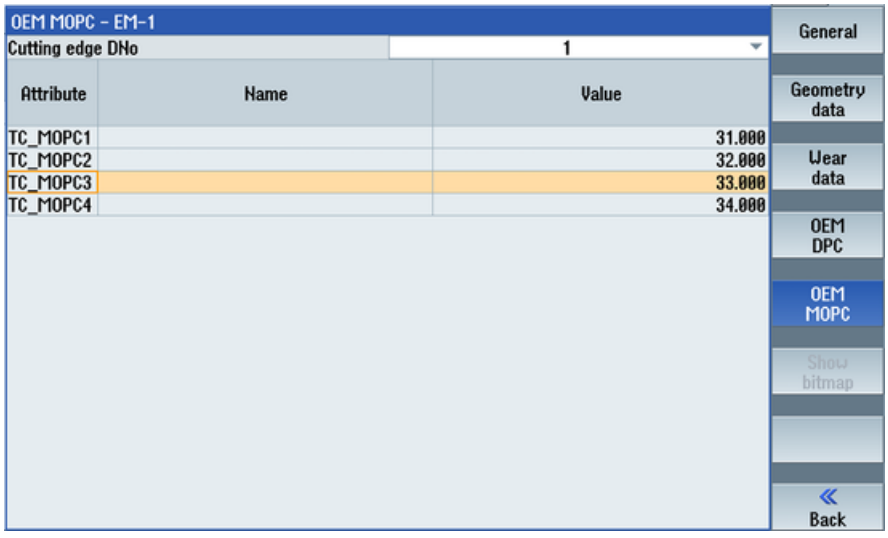


9. Press "OEM MOPC".
The "OEM MOPC - <ID Instance data>" window opens and shows the cutting-edge-specific OEM monitoring data of the tool.

10. Select the "Cutting edge DNo" in the drop-down list.
'Show bitmap' is enabled, if OEM data is a bitmask, disabled if not.
TC_MOPC1 is a bitmapped parameter:



TC_MOPC3 is not a bitmapped parameter:



11. Press "Back" to exit the detailed view.

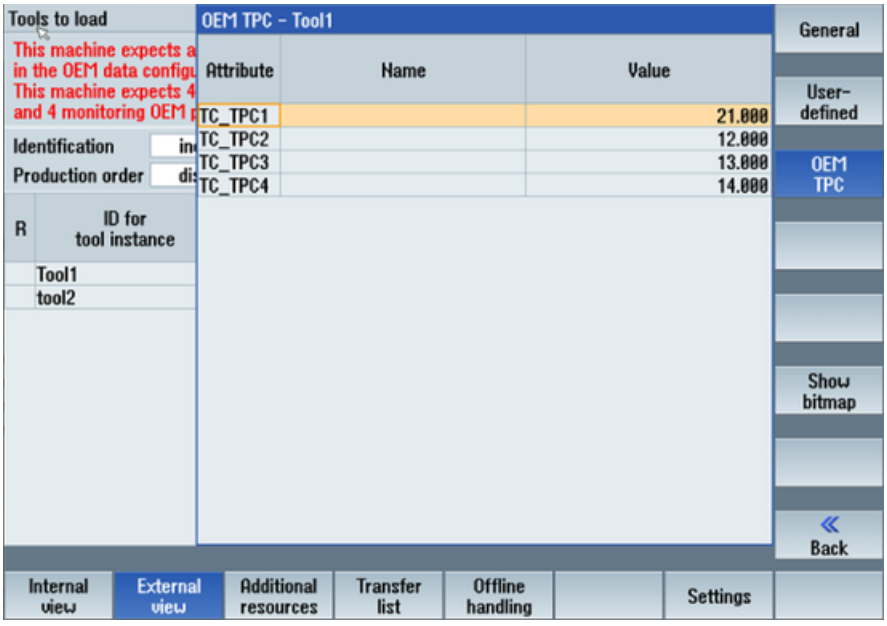
6.3.9 OEM Bitmask on Operate

Overview

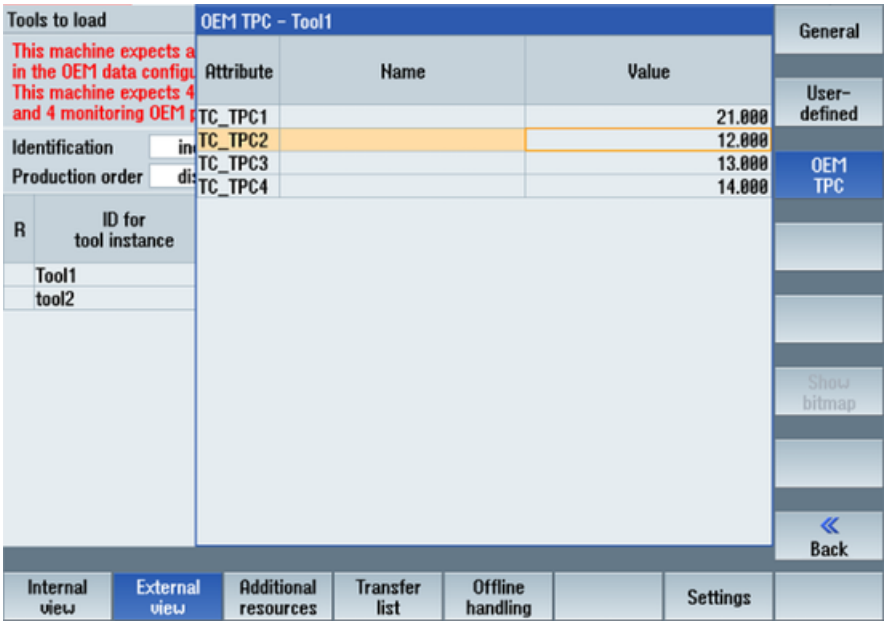
Further information can be displayed related to OEM Values.

Procedure

1. Select a tool from displayed tool list on "Internal view" or "External view".
2. Click "Tool details".
3. Click "OEM TPC".
   The button "Show bitmap" is visible.

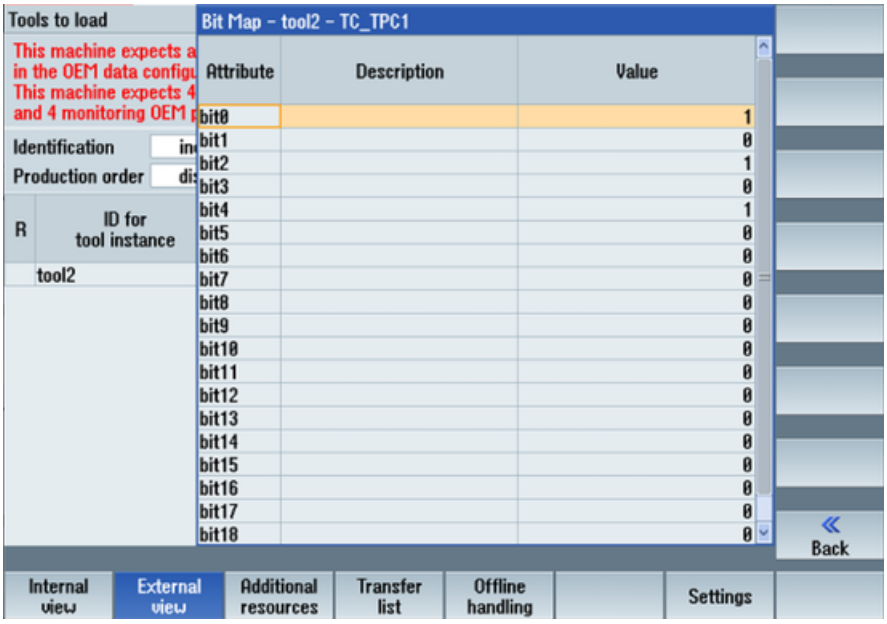


The button "Show bitmap" is not activated, if the selected "OEM Value" has no OEM Bitmapping.

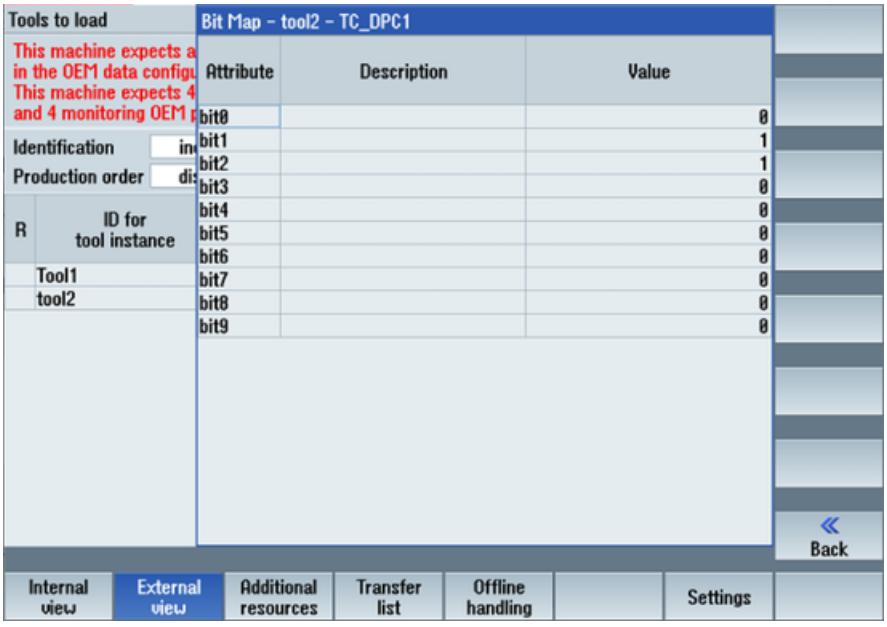


Show bitmap

Select an OEM Value from the overview and click "Show bitmap".



Activated and deactivated bits for the selected OEM Value is displayed. Descriptions for each bit are visible, if they are set on server.



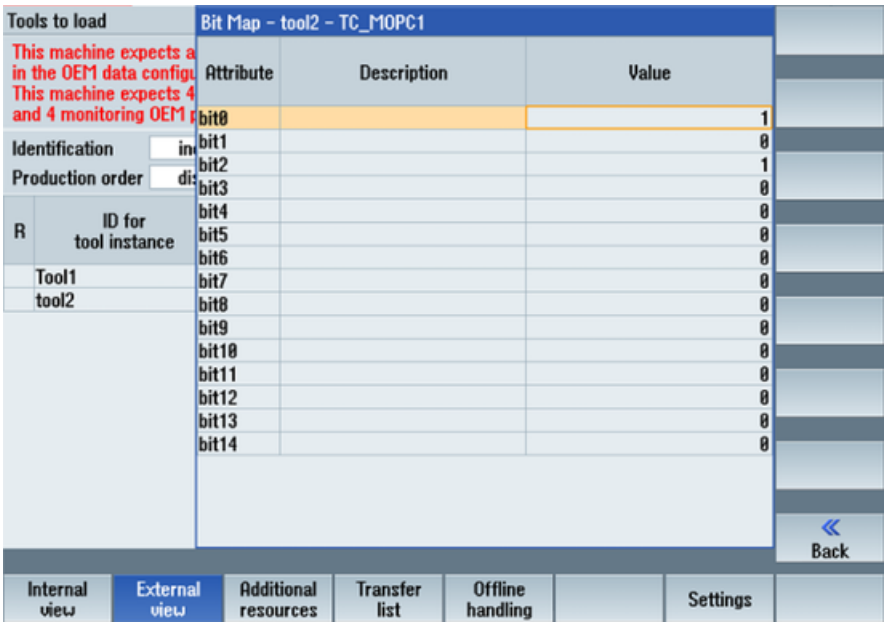
Close

OEM DPC

Click "Close" to exit the OEM Bitmap.

OEM MOPC

For "OEM DPC" and "OEM MOPC" the same procedure is available in "Edge Details".



6.3.10 Sorting tools

In the Tool overview, tools can be sorted according to the following criteria:

- Location
- ID
- Name
- Lifetime

Procedure

Internal view

1. Press the "Internal view" softkey.
   The "Tool overview" window opens

Sort

2. Press the "Sort" softkey.
   An additional vertical softkey bar appears and offers you the various sorting options.

By place

3. Press the "By place" softkey.
   The tools are shown in numerically ascending order in the "Place" column.
   A small arrow on the right in the column header indicates the sorting.
   - OR -

Press the "By ID" softkey.

The tools are shown in ascending alphabetical order in the "ID instance data" column.

A small arrow on the right in the column header indicates the sorting.

- OR -

Press the "By name" softkey.

The tools are shown in ascending alphabetical order in the "Tool name" column.

A small arrow on the right in the column header indicates the sorting.

- OR -

Press the "By lifetime" softkey.

The tools are shown in numerically ascending order in the "Lifetime (remaining/target)" column.

A small arrow on the right in the column header indicates the sorting.

When tools are sorted "By ID", "By name", or "By lifetime", disabled tools are shown first, followed by tools in pre-warning state, which in turn are followed by the remaining tools.

4. Press the "<<" softkey to return to the "Tool overview" window.

6.3.11 Loading external tools

The tool data can be loaded from the central database. The assignment is made via the selected components in the tool overview.

External tools are not stored on the machine, but, for example, in a cabinet which can be seen from the machine. For information about loading tools into adapters see Loading tools into adapters (Page 502).

Prerequisite

This functionality is only enabled, if the user has at least protection level 4. Users with protection level 5 or higher are still able to see the external tool list but are not able to load a tool.

Before a tool is loaded, the tool must be measured and the correction data must be imported.

Parameter

The following parameters are available:

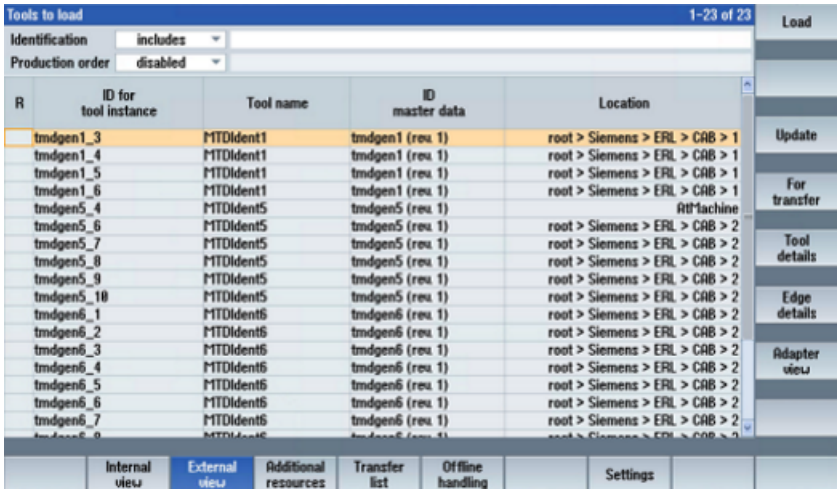
Parameter	Description
Filter "Identification"	Filters external tools by the identifier of the instance data: • disabled • includes • equals • starts with • ends with
Filter "Production order"	• disabled • empty • not empty • includes • equals • starts with • ends with
R	• Stands for "Reservation" • Shows one of the following tool states: – O (Order) The tool belongs to a production order. – FM (Fixed on machine) The tool is reserved for this machine. – ST (Sister tool) This tool is only shown in the "Sister tools for 1:1 Exchange" window. It is preselected as a Sister tool on the server. – RT (Replacement tool) This tool is only shown in the "Sister tools for 1:1 Exchange" window. It is preselected as a Replacement tool on the server. • For more information, see Monitoring tools (Page 260).
ID instance data	Shows a unique identifier for tool instance data. The identification was already generated from the master data. Manage MyResources /Tools checks the identifier of the instance data.
Tool name	Shows the tool name.
ID master data	Shows the identifier for tool master data.
Location	Shows the storage location.
"Destination of the tool" window	
Place type	Enter the location type.
TOA	Select the TOA unit from the drop-down list.
Magazine	Select the required magazine from the drop-down list.
Loading point (LP)	Select a loading point from the drop-down list.
Place	Enter the location number of the tool. If the input field remains empty, then SINUMERIK Operate assigns a Location.
TOA Description	Select the TOA unit from the drop-down list.

Parameter	Description
T-Number Description	Select the internal T number in the NC.
DNo Description	Select the cutting edge number.

Procedure

External view

1. Press the "External view" softkey.



2. The "Tools to load" window opens and displays the external tools in an overview.

   You can filter for a specific tool or production order. You just need to select "equals", includes", "starts with", or "ends with" in the drop-down list behind "Identification" or "Production order" and then type the complete term, a part of the term, the beginning, or ending letters of the term.

   Select the tool.

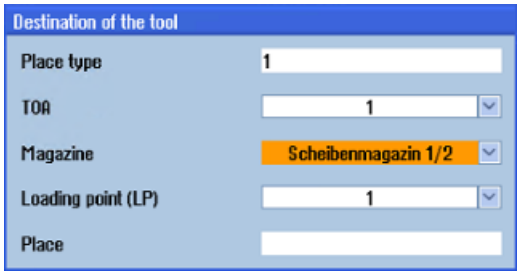
Load

3. Press the "Load" softkey.

4. The "Destination of the tool" window opens.

   Specify the target of the external tool instance on the machine.

   Press the "OK" softkey to load the tool into the selected magazine.

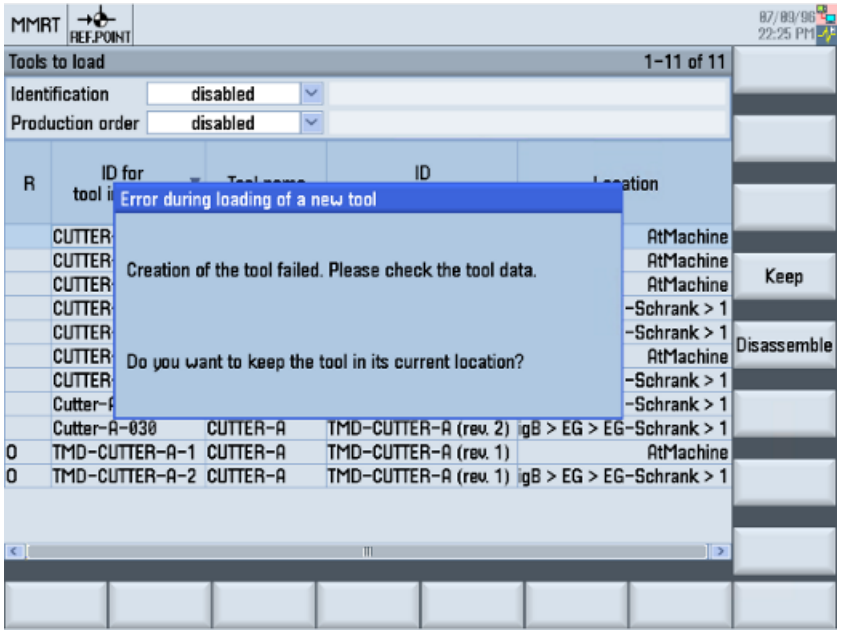


Error messages

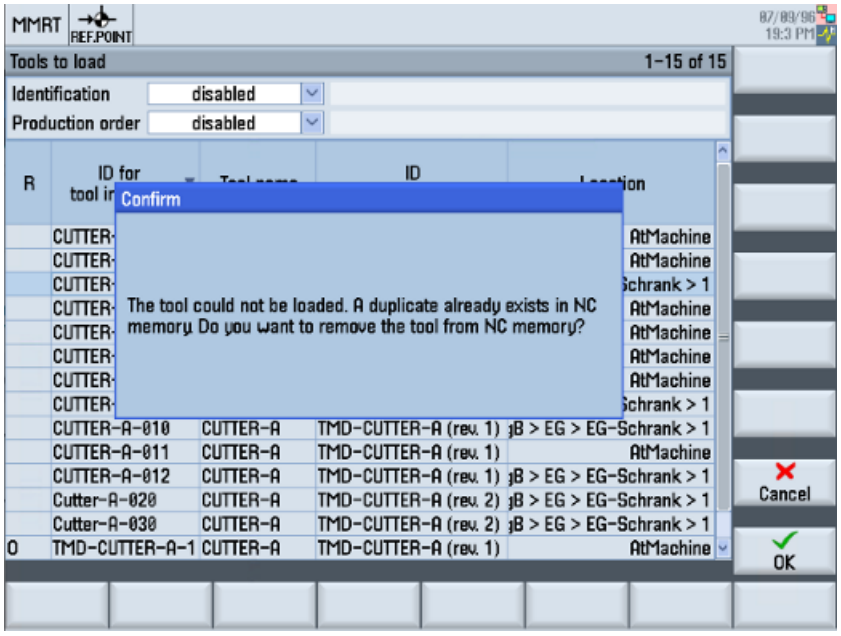
If an error occurs after loading an external tool and you press the "Cancel" softkey , instead of switching back to the list of internal tools, an error message appears.

You have the following options:

- In order to move the tool back to the original location, press the "Keep" softkey.
- In order to move the tool to Assembly with a "Disassemble" action flag, press the "Disassemble" softkey.



When loading or exchanging an external, sister or replacement tool with a predefined duplo number, a tool with the same tool name and duplo number could already be stored in the NC memory. In this case, the following popup message appears:



You have the following options:

- In order to delete the duplicate tool in the NC memory, press the "OK" softkey.
  After the deletion, you can load the external, sister or replacement tool.
- In order to close the popup, press the "Cancel" softkey.

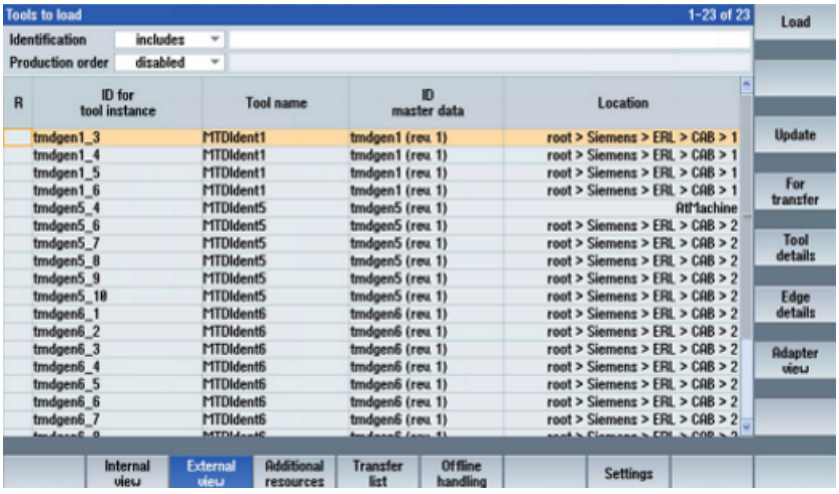
6.3.12 Filtering external tools

You can filter external tools that are displayed in the "External tools" window for a specific tool or Production order.

Procedure

External view

1. Press the "External view" softkey.
2. The "Tools to load" window opens and displays the external tools in an overview.



3. To filter for a specific tool, open the drop-down list behind "Identification". Select "includes", "equals""starts with" or "ends with".
   Enter the complete term, a part of the term, the beginning, or ending letters of the term into the field. The default value is "includes".

   When you select the "includes", "starts with" or "ends with" filter and the search text is empty, all tool instances are displayed.
   If you select the value "disabled", the text in the input field is automatically deleted.

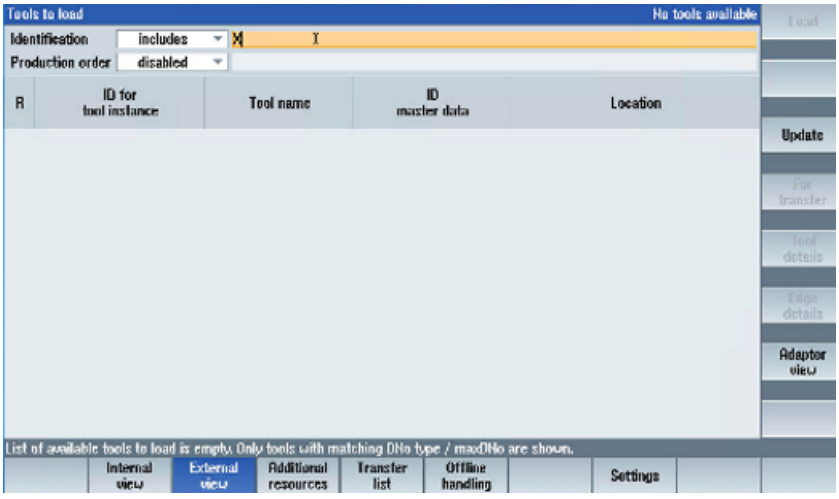
To filter for a specific Production order, open the drop-down list behind "Production order". Select "empty", "not empty", "includes", "equals", "starts with" or "ends with". Enter the complete term, a part of the term, the beginning, or ending letters of the term into the field. The default value is "disabled".

When you select the "includes", "starts with" or "ends with" filter and the search text is empty, only the tool instances with assigned production orders are displayed.

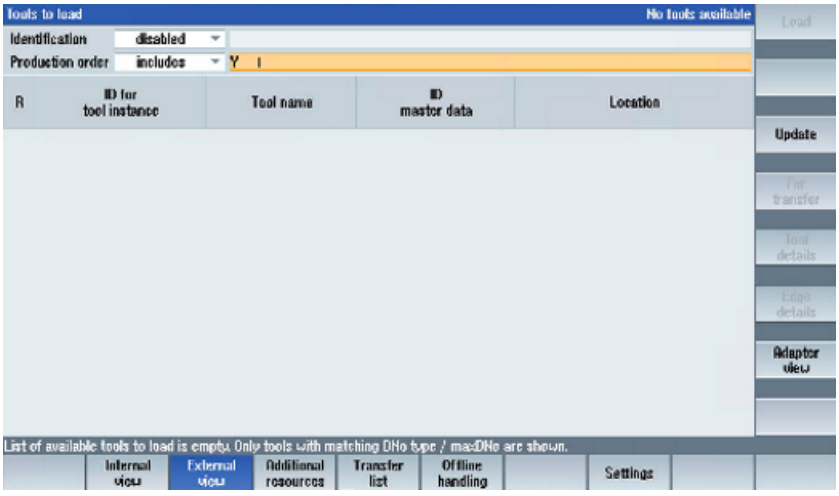
If you select the values "disabled", "empty" or "not empty", the text in the input field is automatically deleted.

4. Confirm the input using the <Enter> key.
   All external tools to which the filter terms apply are displayed.

5. If there is no match for the terms you enter into the input field "Identification", the information "No tools available" and "List of available tools to load is empty" is displayed.



If there is no match for the terms you enter into the input field "Production order", the information "No tools available" and "List of available tools to load is empty" is displayed.



6.3.13 Working with additional resources

6.3.13.1 Working with additional resources

You can load Additional resources like adapters to the machine, into the magazine. Resources like clampings and measuring devices can be loaded into the machine.

Update on the server

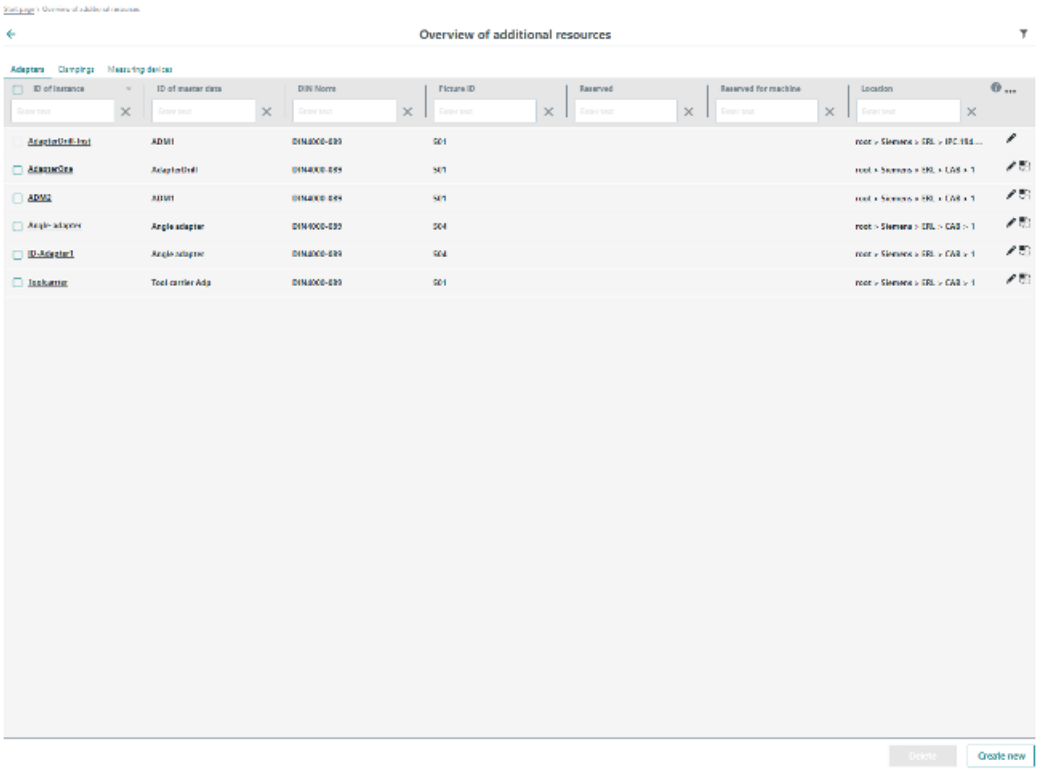
After having loaded Additional devices to the machine, open the "Additional resources" application on the server.

The information for the following instances is displayed on the server:

- Adapters
- Clampings
- Measuring devices

You have an overview over all the assignments.

For more information, see Additional resources (Page 370).



6.3.13.2 Loading adapters onto the machine

You can load adapters onto the machine.

Parameters

The following parameters are displayed in the "Adapter view":

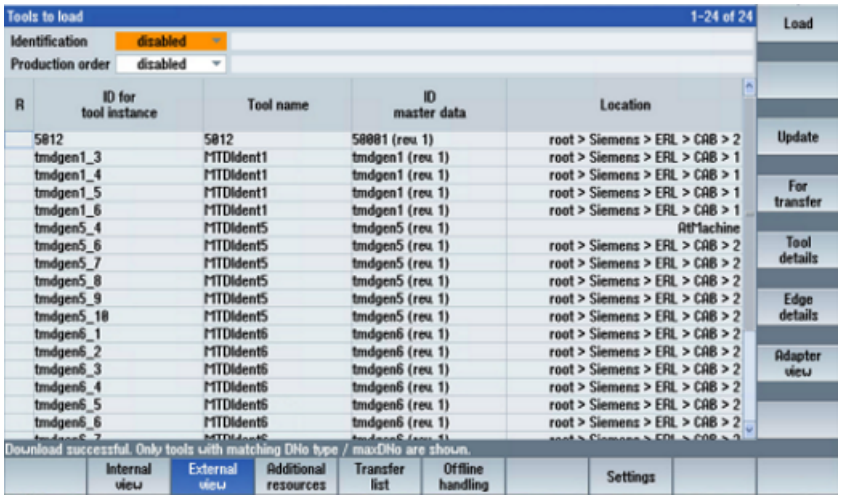
Parameter	Description
"Adapter view" window	
Place	Shows the place

Parameter	Description
Type	Shows the adapter type
ID of adapter/ID for tool instance - Tool name	Shows the adapter ID, the tool instance ID and the tool name
Production order	Shows the production order
Number of pockets	Shows the number of pockets

Procedure

1. Press "External view".

   The "Tools to load" window opens.

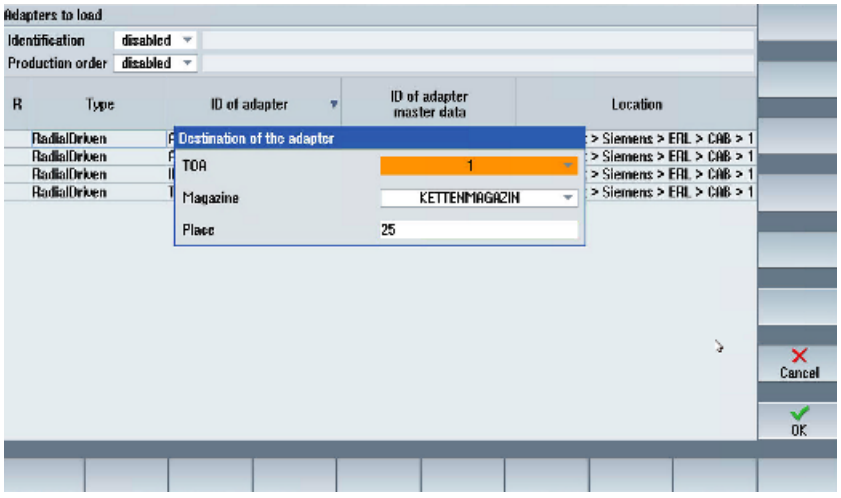
   

2. Press vertical "Adapter view".

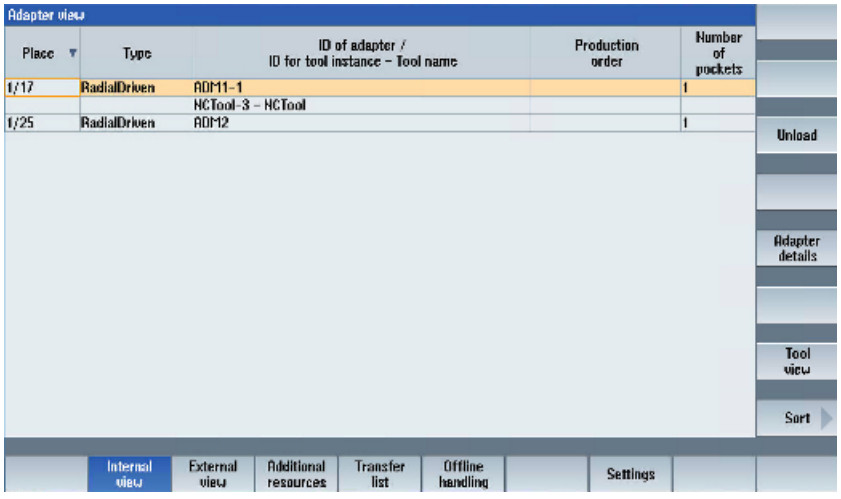
   You see the available adapters in the cabinets from which they can be loaded.
   The softkey toggles between the external adapter view and the external "Tool view".

3. Press "Load" to load an adapter.

   The "Destination of the adapter" dialog box opens.

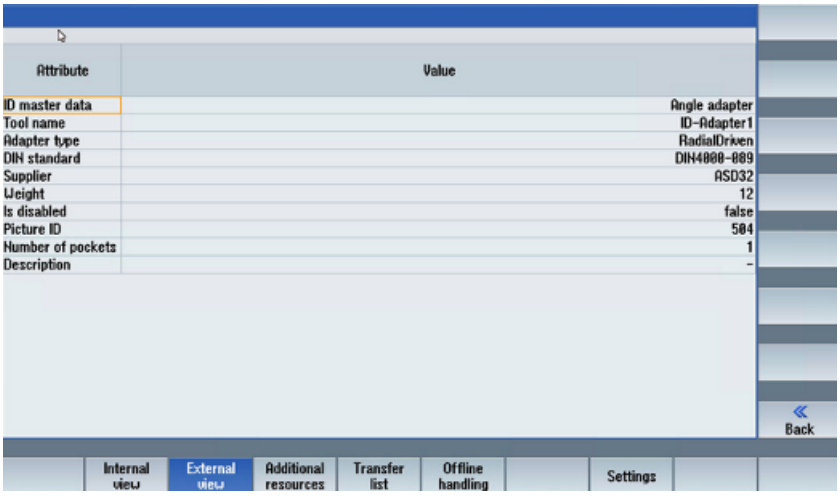


4. Define an empty place to which you can load the adapter.
5. Click "OK"
   - OR -
   Click "Cancel" to cancel the operation.
   If the space is already occupied by another tool or adapter, you get an error message.
   If you do not specify the place, the adapter loading is not completed and you get an error message.
   When the adapter is loaded, the view switches to "Internal view".
   You see the adapters loaded into the machine and whether a tool is loaded into the adapter pocket.



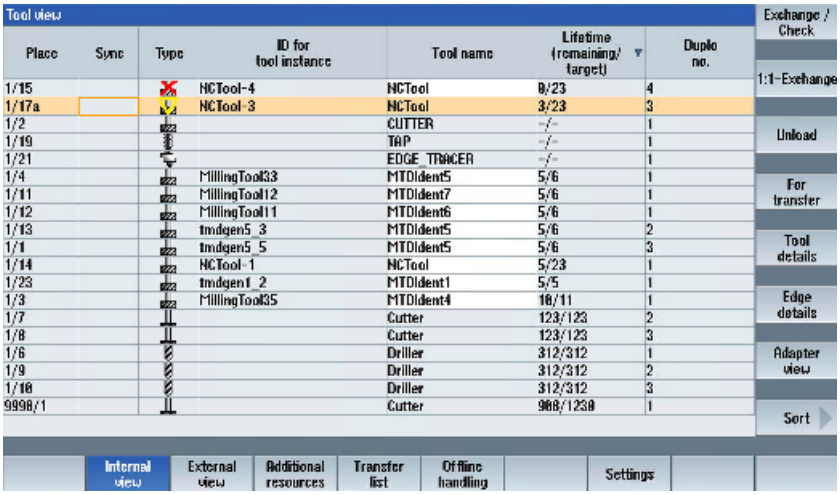
6. Press "Adapter details" to display the adapter details.

7. To exit the detailed view, press "<< Back".



8. Press vertical "Tool view" to switch from "Internal view" to "Tool view".

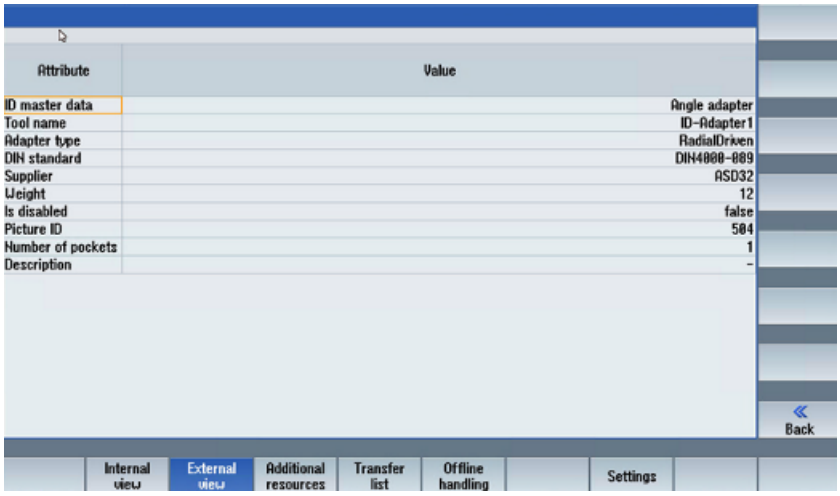
The tools loaded into an adapter pocket are marked with an "a" in the "Place" column.



9. Press "Update" to display the new adapters you have created.

10. Press "Adapter details" to display the adapter details.

11. To exit the detailed view, press "<< Back".



6.3.13.3 Loading tools into adapters

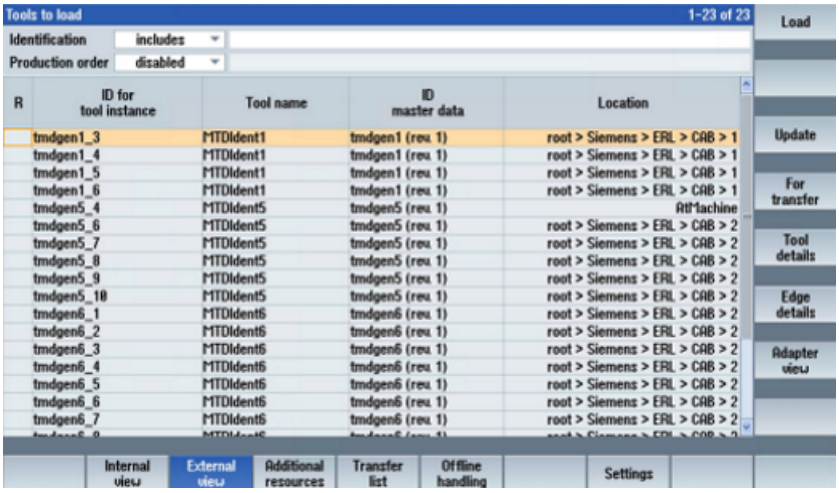
You can load a tool into an adapter.

Procedure

External view

1. Press the "External view" softkey.

   The "Tools to load" window opens and displays the external tools in an overview.

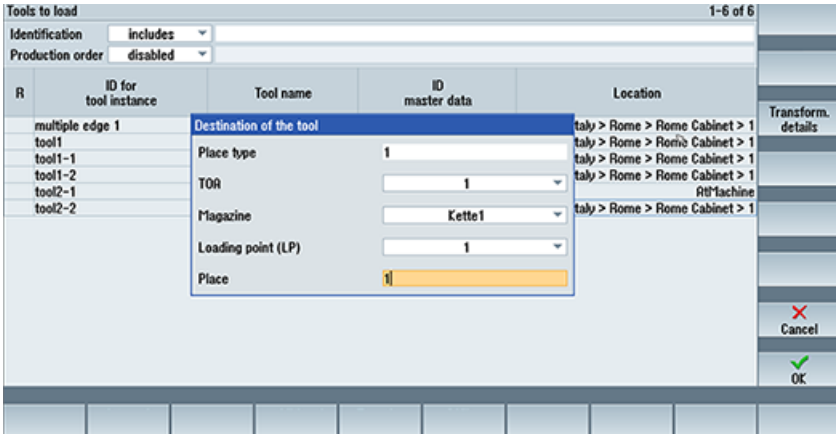


Load

2. Press the "Load" softkey.

   The "Destination of the tool" dialog box opens.

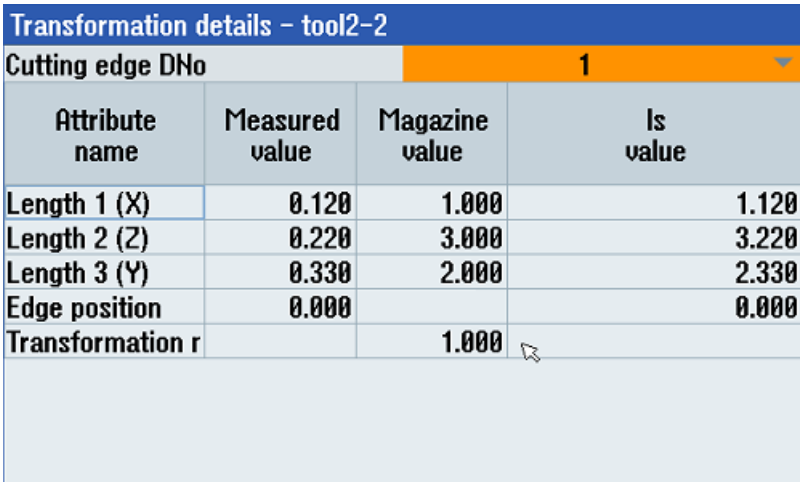
   Enter the loading place of the adapter.
   To find the adapter place, press the "Adapter view" softkey in the "Internal view" window.



Transform. details

3. If you load a tool into a magazine place, you can check the transformation details before completing the loading process. Select "Transform. details". The "Transformation details" button is active
   - if the selected magazine has transformation information.
   - if the tool is loaded into an adapter.
   - if the tool is loaded into an adapter and the magazine has transformation information.

   The appropriate columns are shown.

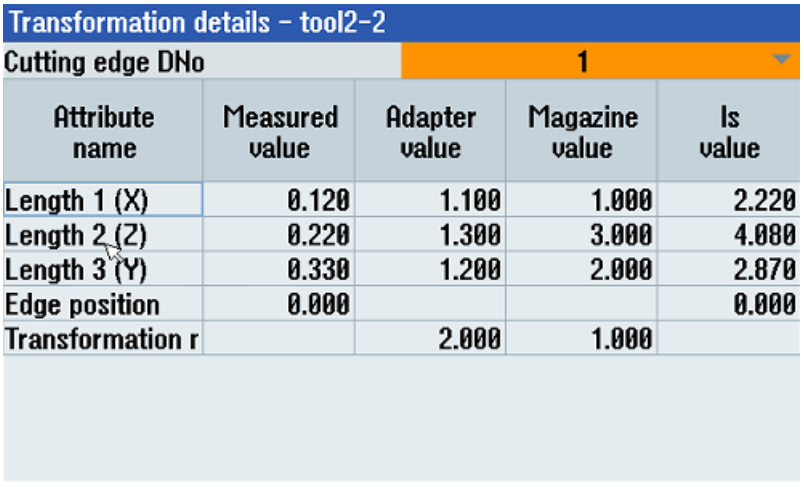


Transformation details – tool2-2

Cutting edge DNo: 1

Attribute name	Measured value	Magazine value	Is value
Length 1 (X)	0.120	1.000	1.120
Length 2 (Z)	0.220	3.000	3.220
Length 3 (Y)	0.330	2.000	2.330
Edge position	0.000		0.000
Transformation r		1.000	

   In case of adapter and magazine transformation, the order of the columns is reflecting the order of the transformation.



Transformation details – tool2-2

Cutting edge DNo: 1

Attribute name	Measured value	Adapter value	Magazine value	Is value
Length 1 (X)	0.120	1.100	1.000	2.220
Length 2 (Z)	0.220	1.300	3.000	4.080
Length 3 (Y)	0.330	1.200	2.000	2.870
Edge position	0.000			0.000
Transformation r		2.000	1.000	

4. Click "OK" to load the tool to the adapter.

   - OR -

   Click "Cancel" to cancel the operation.

6.3.13.4 Unloading adapters

You can unload adapters from the machine.

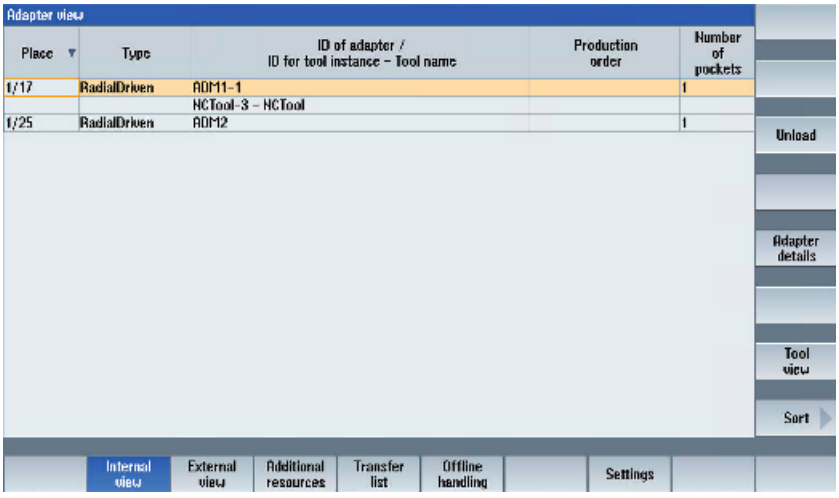
Prerequisite

- To unload an adapter, you first unload the tool from the adapter if it carries tools.

Procedure

Adapter view

1. Press the "Adapter view" softkey.
   The "Adapter view" window opens.

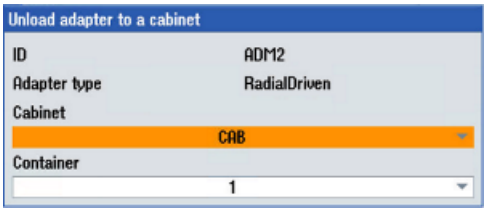


Unload

2. Press the "Unload" softkey.
   Any tools in the adapter are on display.
   You can unload the adapter
   - into a Cabinet
   - AtMachine

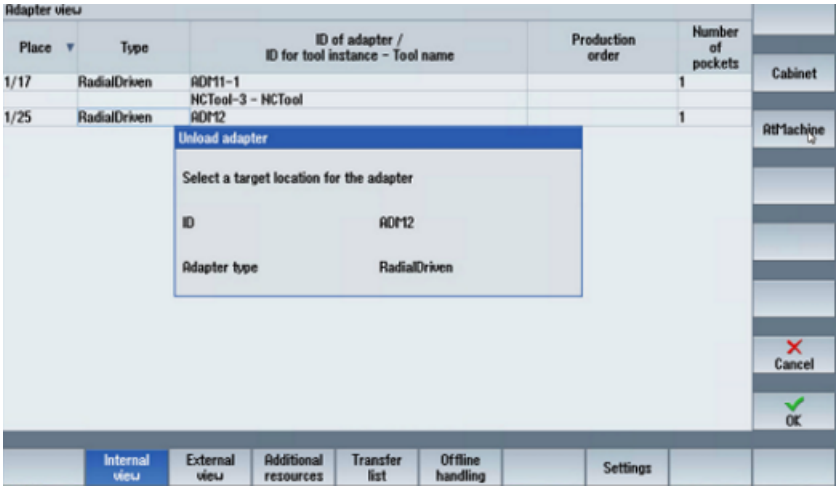
Cabinet

3. To unload the adapter into a cabinet, press the "Cabinet" softkey.
   The "Unload adapter to a cabinet" dialog box opens.
   Select the Cabinet and Container where the adapter is unloaded.
   Click "OK" to start the operation
   - OR -
   Click "Cancel" to cancel the operation.



AtMachine

4. To unload the adapter AtMachine, press the "AtMachine" softkey.
   If you unload the adapter AtMachine, you cannot load it to other machines. The adapter does not appear in the hierarchy path.
   Click "OK" to start the operation
   - OR -
   Click "Cancel" to cancel the operation.



Tool view

5. Press the "Tool view" softkey to switch back to the "Internal view".

6.3.13.5 Loading clampings

You can load clampings into the machine.

Parameters

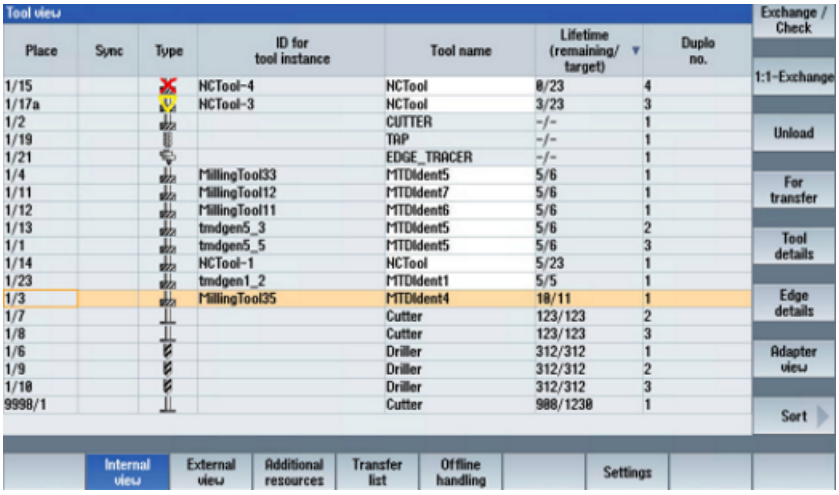
The following parameters are displayed:

Parameter	Description
"Clamping view" window	
Type	Shows the type.
ID of additional resource	Shows the additional resource ID:
Production order	Shows the production order.
Description	Shows the description.
"Available clamping devices" dialog box	
Identification	Displays the "Identification" filter.
Production order	Displays the "Production order" filter
ID of additional resource	Shows the ID of the additional resource.
Production order	Shows the production order.
Description	Shows the description.
Location	Shows the location.

Procedure

Internal view

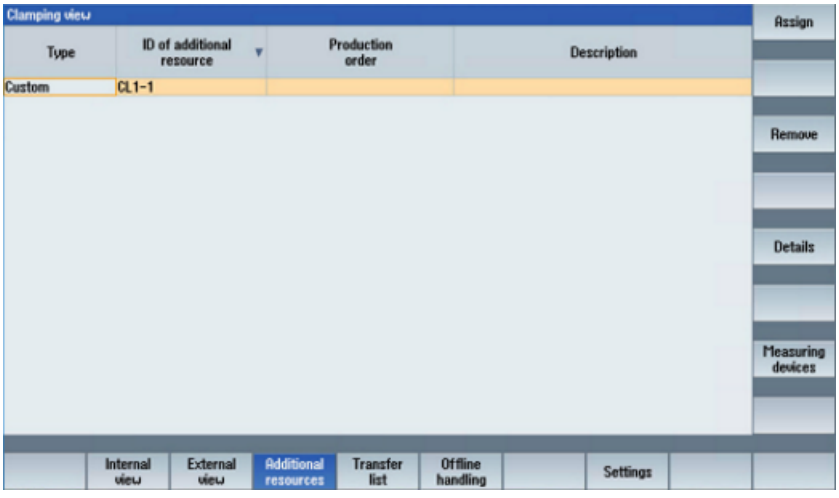
1. Press the "Internal view" softkey.
   The "Tool view" window opens.



Place	Sync	Type	ID for tool instance	Tool name	Lifetime (remaining/ target)	Duplo no.
1/15			NCTool-4	NCTool	0/23	4
1/17a			NCTool-3	NCTool	3/23	3
1/2				CUTTER	-/-	1
1/19				TAP	-/-	1
1/21				EDGE_TRACER	-/-	1
1/4			MillingTool33	MTDIdent5	5/6	1
1/11			MillingTool12	MTDIdent7	5/6	1
1/12			MillingTool11	MTDIdent6	5/6	1
1/13			tmdgen5_3	MTDIdent5	5/6	2
1/1			tmdgen5_5	MTDIdent5	5/6	3
1/14			NCTool-1	NCTool	5/23	1
1/23			tmdgen1_2	MTDIdent1	5/5	1
1/3			MillingTool35	MTDIdent4	18/11	1
1/7				Cutter	123/123	2
1/8				Cutter	123/123	3
1/6				Driller	312/312	1
1/9				Driller	312/312	2
1/10				Driller	312/312	3
9998/1				Cutter	988/1238	1

Additional resources

2. Press the "Additional resources" softkey.
   The "Clamping view" window opens displaying the clampings loaded to the machine.



Type	ID of additional resource	Production order	Description
Custom	CL1-1		

You cannot select these clampings on other machines. They are assigned to this particular machine and loaded to the container "InMachine".

Assign

3. Press the vertical "Assign" softkey to load a clamping to the machine.

   A popup window opens with the list of all the available clampings in the hierarchy path for the machine.

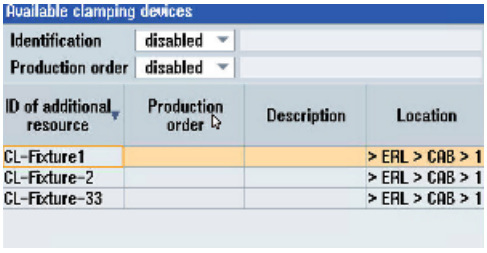
   You can filter for

   - ID
   - Production order

   Select a clamping and press "OK" to load it to "InMachine".

   - OR -

   Press "Cancel" to cancel the operation.



   The loaded clamping is displayed in the "Additional resources" view.

Details

4. Press the "details" softkey to display the details of a loaded clamping.

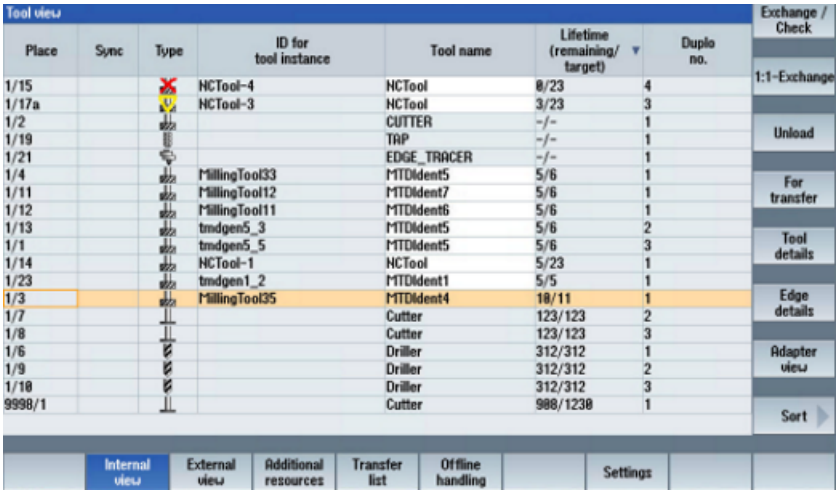
6.3.13.6 Unloading clampings

You can unload clampings.

Procedure

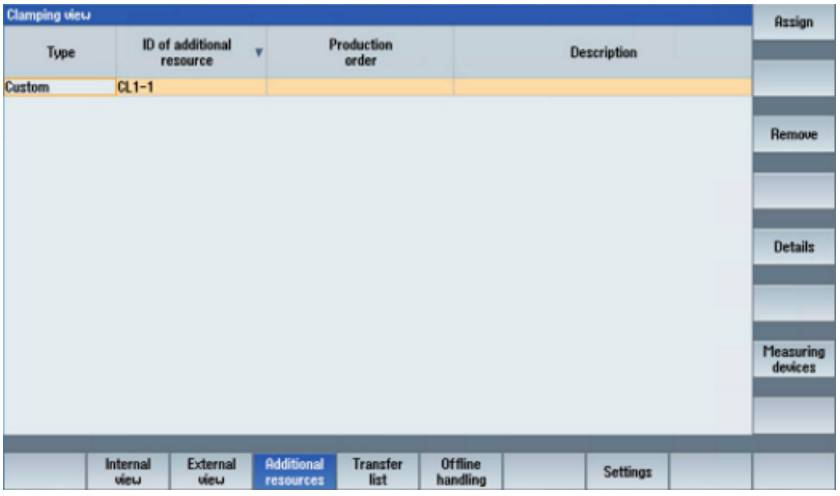
Internal view

1. Press the "Internal view" softkey.
   The "Tool view" window opens.



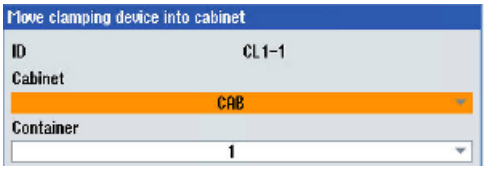
Additional resources

2. Press the "Additional resources" softkey.
   The "Clamping view" window opens displaying the clampings loaded to the machine.



You cannot select these clampings on other machines. They are assigned to this particular machine and loaded to the container "InMachine".

3. Press the vertical "Remove" softkey to unload the clamping from the machine.
   The "Move clamping device into cabinet" dialog box opens.
   Select the Cabinet and Container where the clamping is unloaded.
   All available Cabinets are listed in the drop-down list.
   Click "OK" to start the operation
   - OR -
   Click "Cancel" to cancel the operation.



6.3.13.7 Loading Measuring devices

You can load Measuring devices.

Once you have loaded a Measuring device, it is displayed as "reserved".

Parameters

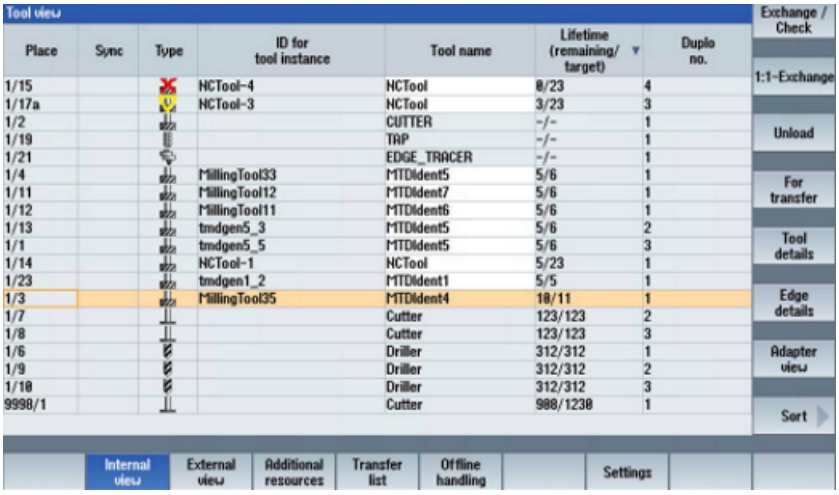
The following parameters are displayed:

Parameter	Description
"Measuring devices view" window	
ID of additional resource	Shows the additional resource ID.
Production order	Shows the production order.
Description	Shows the description.
"Available measuring devices" dialog box	
Identification	Displays the "Identification" filter.
Production order	Displays the "Production order" filter
ID of additional resource	Shows the ID of the additional resource.
Production order	Shows the production order.
Description	Shows the description.
Location	Shows the location.

Procedure

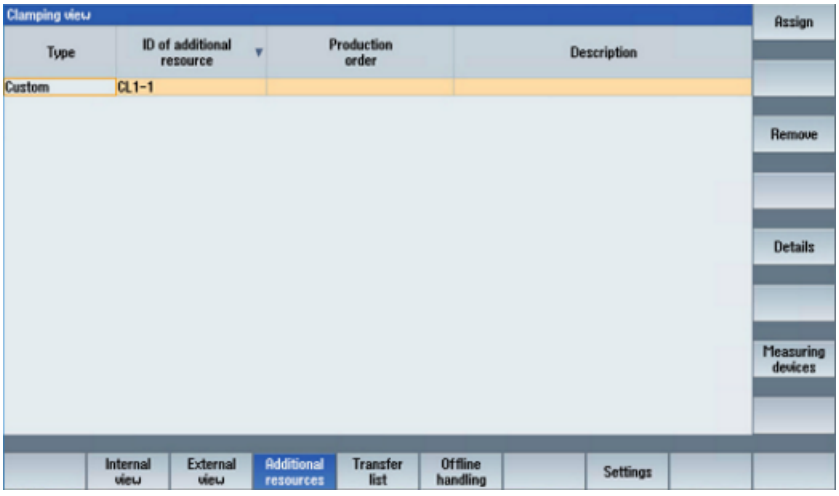
Internal view

1. Press the "Internal view" softkey.
   The "Tool view" window opens.



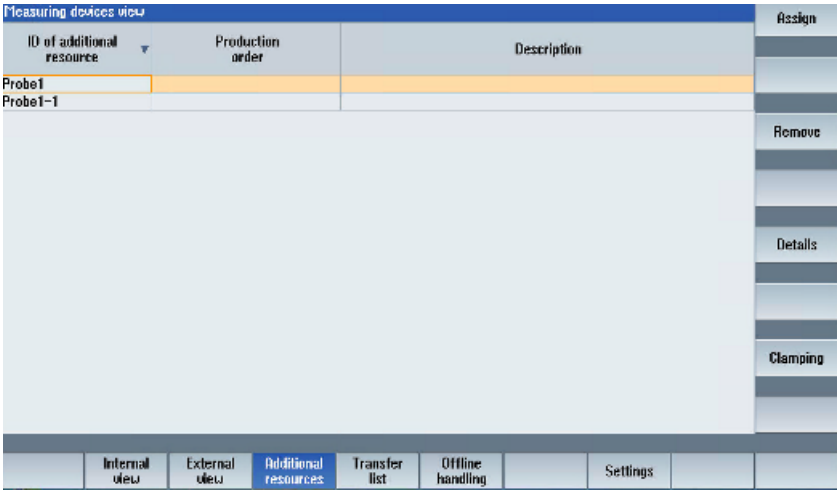
Additional resources

2. Press the "Additional resources" softkey.
   "The Clamping view" window opens.



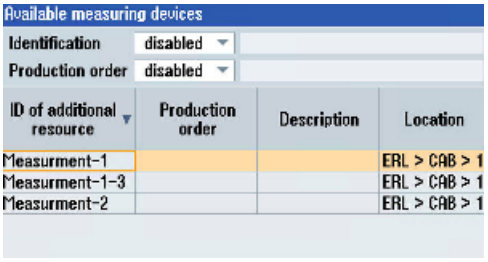
Measuring devices

3. Press the vertical "Measuring devices" softkey.
   With this softkey, you can toggle between the "Measuring devices" and the "Clampings".
   The "Measuring devices view" window opens displaying the measuring devices loaded to the machine.



Assign

4. Press the "Assign" softkey to load a new Measuring device.
   A popup window opens with the list of all the available Measuring devices.
   Select the Measuring device you wish to load onto the machine and press "OK".
   - OR -
   Press "Cancel" to cancel the operation.



Details

5. Press the "details" softkey to display the details of a loaded Measuring device.

   After having loaded the measuring device, you can switch to "Clampings" by toggling the softkey "Clampings".
   - OR -
   You can go back to the "Internal view".

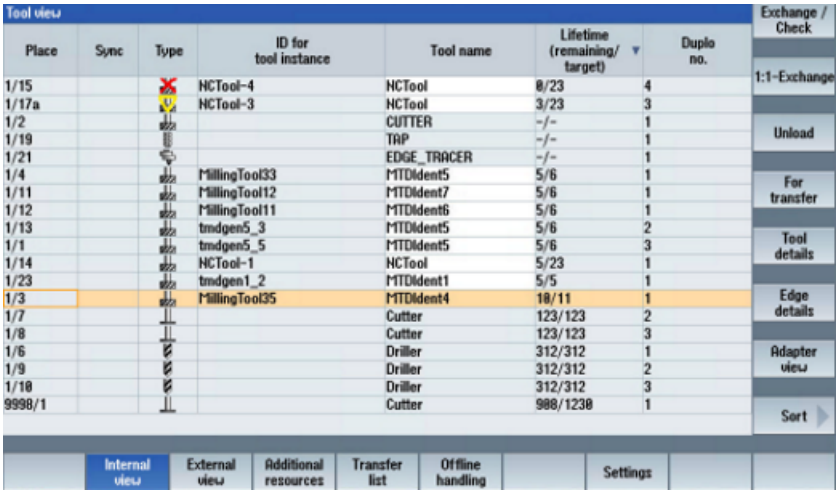
6.3.13.8 Unloading Measuring devices

You can unload Measuring devices.

Procedure

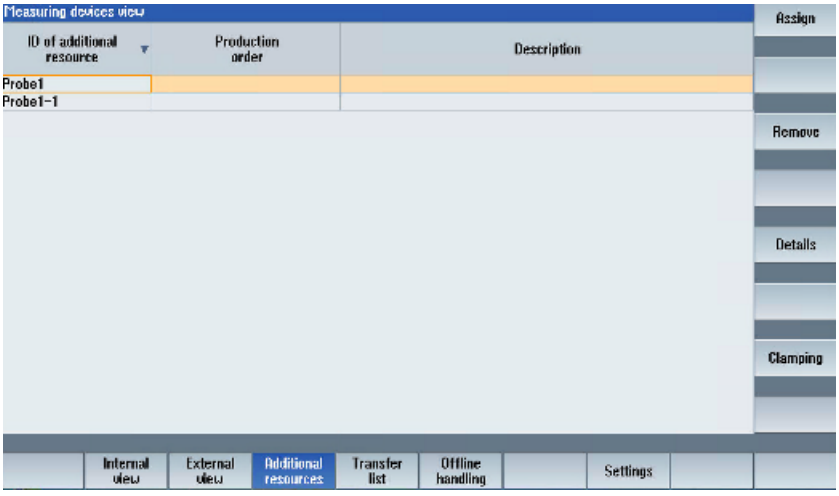
Internal view

1. Press the "Internal view" softkey.
   The "Tool view" window opens.



Additional resources

2. Press the "Additional resources" softkey.
   The "Measuring devices view" window opens displaying the loaded Measuring devices.
   You can toggle between "Clampings" and "Measuring devices".



Remove

3. Press the vertical "Remove" softkey to unload the Measuring device.
   The "Move Measuring device into cabinet" dialog box opens.
   Select the Cabinet and Container where the Measuring device is unloaded.
   All available Cabinets are listed in the drop-down list.
   Click "OK" to start the operation
   - OR -
   Click "Cancel" to cancel the operation.

Details

4. Press the "Details" softkey to display the details of a loaded Measuring device.

6.3.14 Scanning external tools

You can scan the IDs of external tools in the following ways:

- Using the PLC code scanner (recommended)
- Using the USB code scanner

6.3.14.1 Using PLC code scanner

Prerequisite

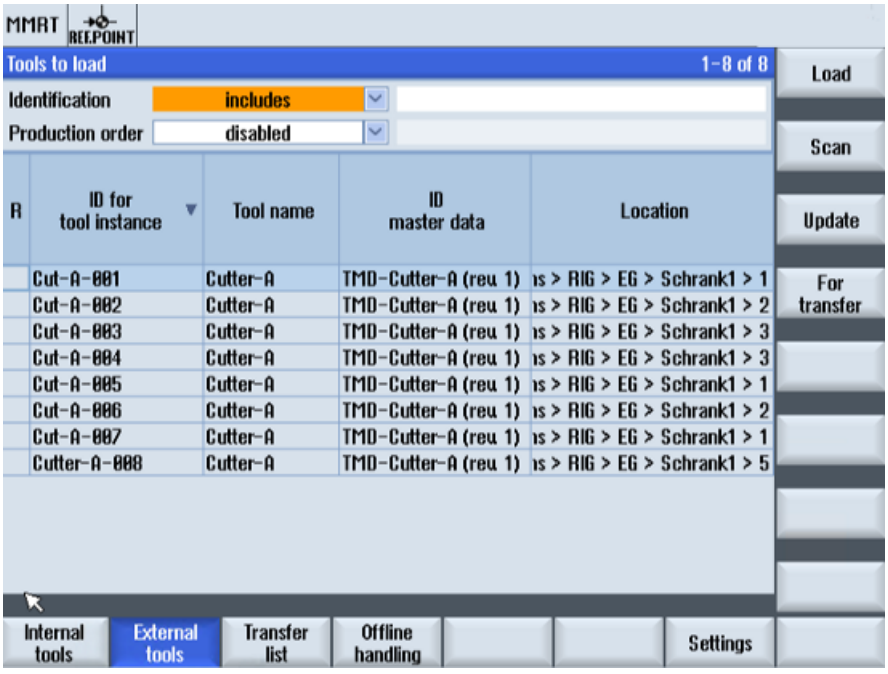
- The functionality of the PLC code scanner is only available, if the scanner configuration is enabled in the ”mmrConfig.json” file.
  Additional information to enable the scanner configuration is provided in the Installation Manual "Mcenter, Manage MyResources, Optimize MyProgramming /NX-Cam Editor, Analyze MyPerformance /OEE, Access MyData /Collector"
- You have a hand scanner, for example, Balluff-RFID-Chip, that is connected to the PLC.

Procedure

External view

1. Press the "External view" softkey.

2. The "Tools to load" window opens.
   If only the “Identification” field has to be considered during the update, the “Production order” field has to be empty.



Scan

3. Press the "Scan" softkey.
   A dialog with the message "Please scan tool identification ..." opens to inform that code scanning is initiated.
4. Wait for the scanner to scan the data.
   - OR -
   Press the "Cancel" softkey to stop scanning.
5. The dialog disappears when the scan is complete or canceled.
   The tool list in the "Tools to load" window is updated with the external tools from the server having the scanned ID instance data.

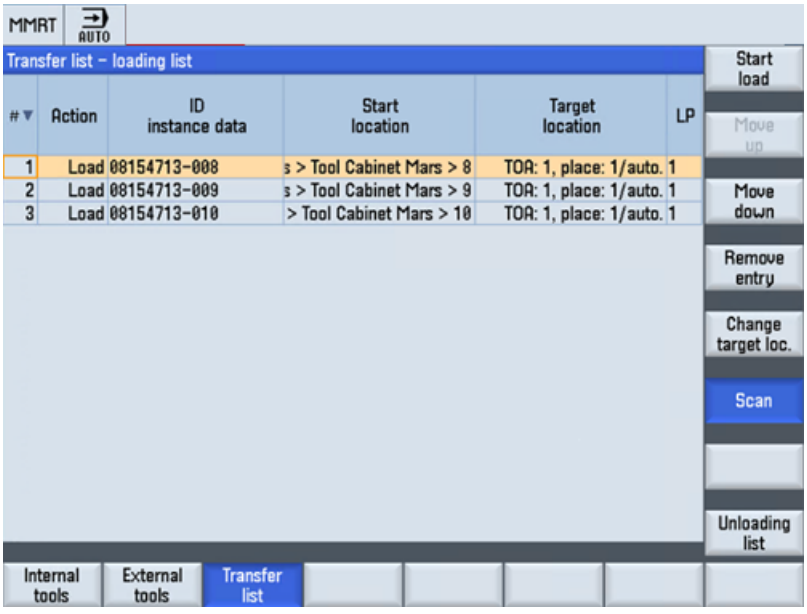
Scanning in transfer list

The PLC code scanner could also be used to load tools in the "Transfer list - loading list":

1. Open the "Transfer list - loading list".

Scan

2. Press the "Scan" softkey.
   The softkey remains highlighted.



3. The PLC scanner could be used several times. All scanned tools are added to the loading list, if the tools are defined on the server.
4. Press the "Scan" softkey again to stop scanning.

6.3.14.2 Using USB code scanner

USB code scanners can also be used with MMR /Tools. A USB code scanner, when connected to SINUMERIK via USB, acts as a secondary keyboard and the scanned values appear in MMR /Tools as if being typed in with a regular keyboard.

USB code scanner scans an ID of a tool instance, when the focus is set on the “Identification” field of the “Tools to load” window. The scanned value appears in the field and the tool list is

updated with the external tool from the server having the scanned ID instance data. If only the "Identification" field has to be considered during the update, the "Production order" field has to be empty.

6.3.15 Loading or unloading multiple tools

6.3.15.1 Displaying transfer lists

In Manage MyResources /Tools it is possible to load or unload multiple tools in a sequence so that you do not need to trigger multiple processes one by one via SINUMERIK Operate. Therefore the following transfer lists are used:

- Loading list
- Unloading list

Note

Number of displayed tools

In the loading and unloading list, only the first 100 tools are displayed and loaded/unloaded.

Parameter

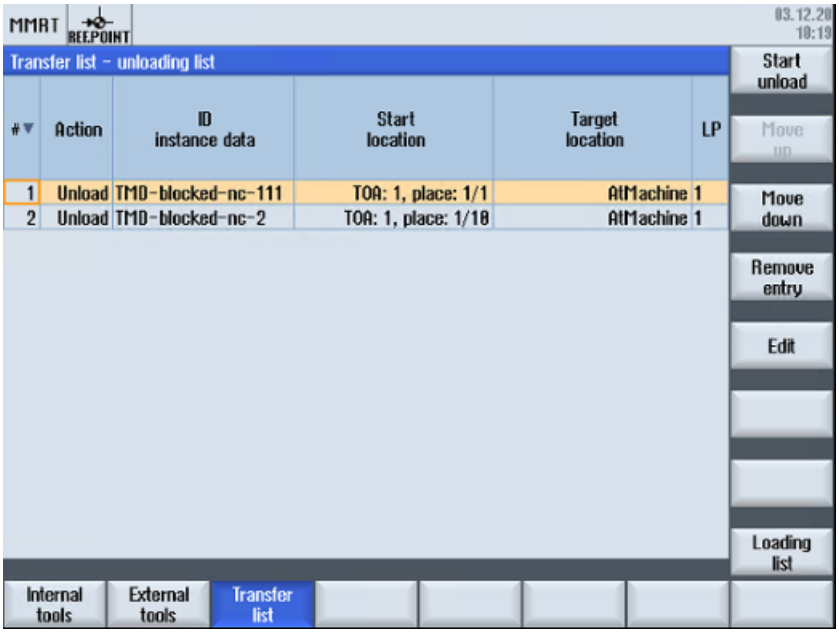
The following parameters are displayed in the "Transfer list" window:

Parameter	Description
Rank (#)	Displays the order in which the tools is loaded or unloaded.
ID for tool instance	Shows the external identifier of the tool. For brownfield tools, the tool name is shown.
Tool name	Shows the tool name.
Start location	For Loading list: Shows the location where the tool is currently located. For Unloading list: Shows the TOA, magazine, and place where the tool is currently located. For machines with turning technology and without a configured magazine: Shows the TOA and T-number.
Target location	For Loading list: Shows the TOA, magazine, and place where the tool should be moved. For machines with turning technology and without a configured magazine: Shows the TOA and T-number. For Unloading list: Shows the location to which the tool should be moved.
Loading point (LP)	Shows the loading point which should be used. This parameter is only available for machines with a configured magazine. If there is an Unloading list, the column tooltip also shows the selected Unload reason for the tool.

Procedure

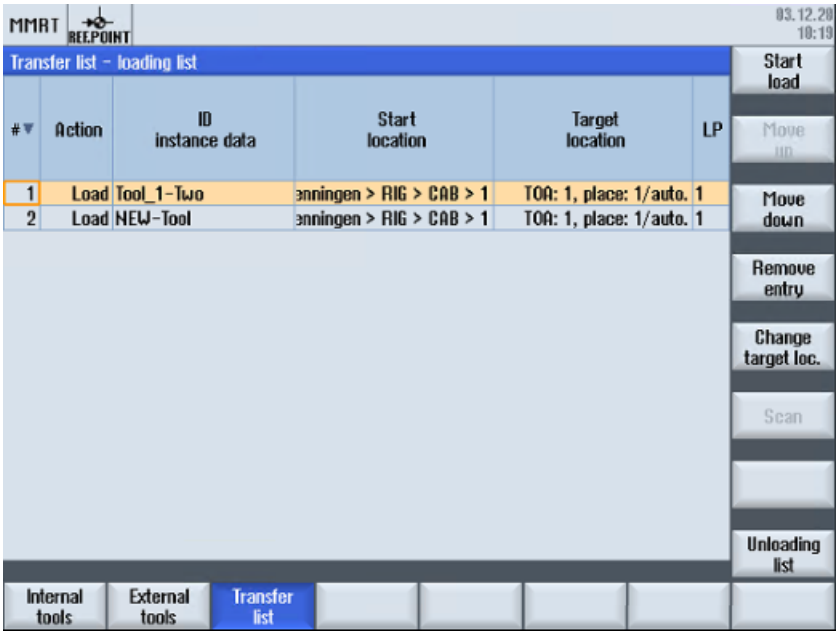
Transfer list

1. Press the "Transfer list" softkey.
   The "Transfer list - unloading list" window opens by default.



Loading list

2. To change over to loading list, press the "Loading list" softkey.
   The "Transfer list - loading list" window opens.



Unloading list

3. To display unloading list again, press the "Unloading list" softkey.

6.3.15.2 Changing transfer lists

In Manage MyResources /Tools transfer lists are used to load or unload multiple tools. You can add or remove tools from the lists and change the transfer order.

Procedure: Add tools to transfer list

1. To add tools to the unloading list, press the "Internal view" softkey.
   The "Tool overview" window opens.
   - OR -

   To add tools to the loading list, press the "External view" softkey.
   The "Tools to load" window opens.

2. Select a tool in the list and press the "For transfer" softkey.
   The tool is added to the end of the transfer list. The "For transfer" softkey remains highlighted.

3. To remove this tool from the transfer list, press the "For transfer" softkey again.

Note

Default settings

When you add a tool to an unloading list, the default settings are the following:

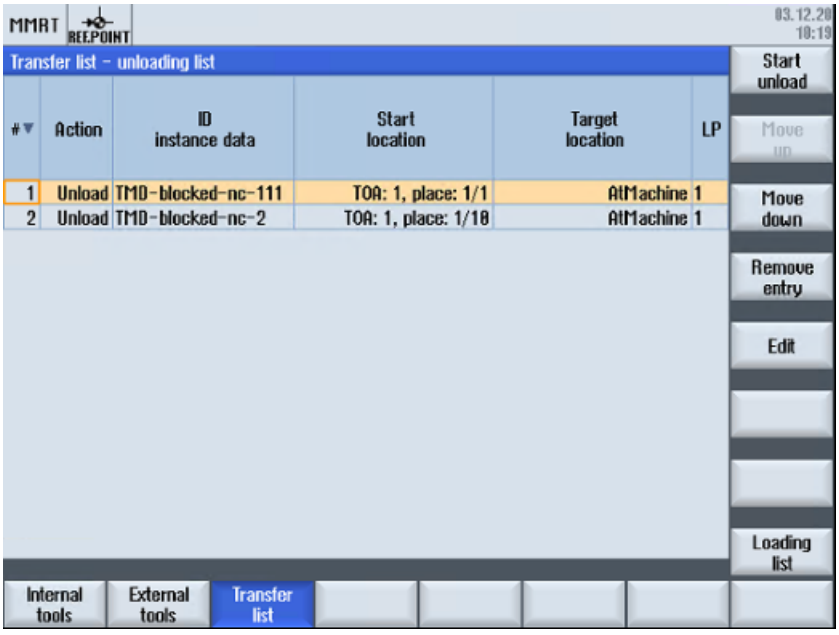
The target location is "AtMachine".
The loading point is the first one available.

The displayed Unload reason is the first one on the list.

Procedure: Change the transfer list

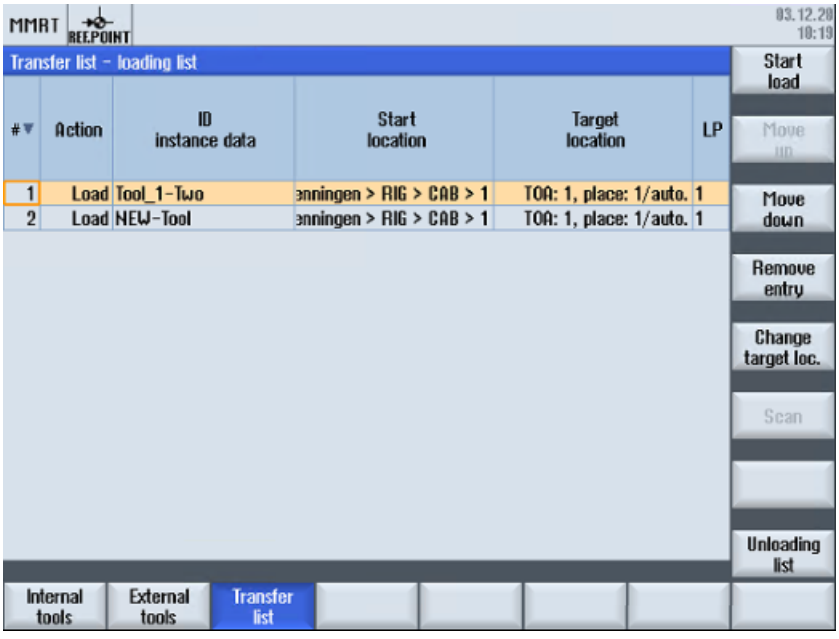
Transfer list

1. Press the horizontal softkey "Transfer list".
   The "Transfer list - unloading list" window opens by default.



Loading list

2. To change over to the loading list, press the "Loading list" softkey.
   The "Transfer list - loading list" window opens.



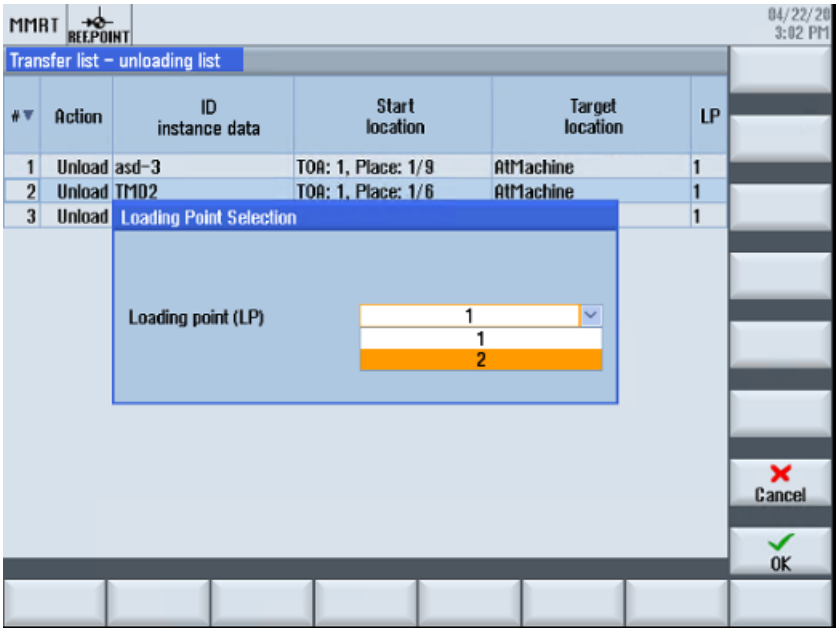
Move up

Move down

3. To change the order in which the tools are loaded or unloaded:
   - Select a tool in the list.
   - Press the "Move up" or "Move down" softkey.

Remove entry

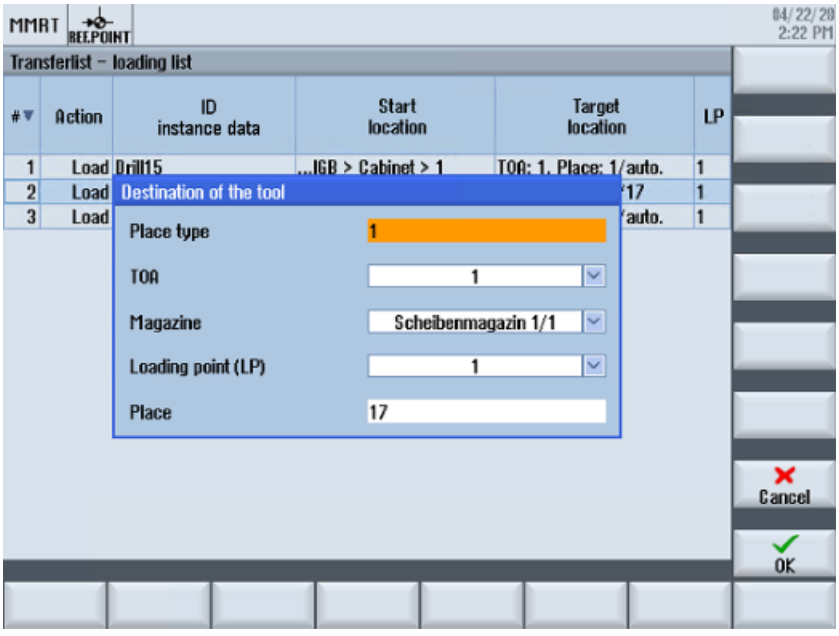
4. To remove a tool from transfer list, select the tool and press the "Remove entry" softkey.
5. To change the loading point, target location or Unload reason, which should be used for unloading:
   - Select a tool in the unloading list.
   - Press the "Edit" softkey.
   - Select the desired loading point in the drop-down list.
     Select the desired Unload reason in the drop-down list.
     Select the target location by pressing the softkeys "Assembly", "Cabinet" or "AtMachine".



- OR -

Edit

6. To change the target location which should be used for loading:
   - Select a tool in the loading list.
   - Press the "Edit" softkey.
   - Enter the desired place type (Default: 1).
   - Select the desired TOA and magazine in the drop-down lists.
   - Select the desired loading point in the drop-down list.
   - Enter the desired place, or leave this field empty to use automatic place search.
   - Press “OK” to save the changes.



Note

For machines with turning technology and without a configured magazine, select the desired TOA and T-number.

6.3.15.3 Unloading multiple tools

You can unload all tools which are stored in the "Transfer list - unloading list".

Prerequisite

This functionality is only enabled, if the user has at least protection level 4.

Parameter

The following parameters are displayed in the "Transfer Progress" window:

Parameter	Description
Rank (#)	Displays the order in which the tools are unloaded.
ID instance data	Shows the external identifier of the tool. For brownfield tools, the tool name is shown.
State	Shows the current state during transfer. Possible values are: • Unloading: The tool is currently being unloaded. • Waiting: The tool is waiting to be unloaded. • Success: The tool has been successfully unloaded. • Failed: An error occurred while unloading this tool. • Canceled: The transfer has been aborted due to an occurred error. This tool won't be unloaded anymore.

Procedure

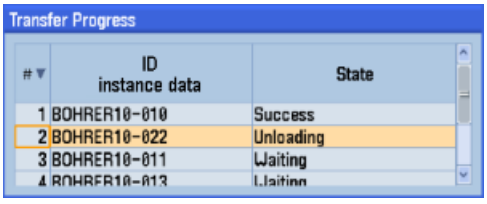
1. Press the horizontal softkey "Transfer list".

2. If the "Transfer list - loading list" window opens, press the "Unloading list" softkey.

   The "Transfer list - unloading list" window opens.

3. Press the "Start unload" softkey.

   The "Transfer Progress" window opens and shows the current state of the unload process.



4. If the whole transfer process was successful, the "Tool overview" window opens.

Error-Case

After start of the unloading process, the places of the tools are checked. If a place is locked, an error message is shown before the first tool is unloaded and the transfer is be started.

If an error occurs while the transfer is ongoing, an error message is also shown. The transfer stops at this point. Tools that have not been unloaded until then, are not unloaded anymore and stay in the transfer list. Tools that are already unloaded are removed from the transfer list.

6.3.15.4 Loading multiple tools

You can load all tools which are stored in the "Transfer list - loading list".

Prerequisite

This functionality is only enabled, if the user has at least protection level 4.

Parameter

The following parameters are displayed in the "Transfer progress" window:

Parameter	Description
Rank (#)	Displays the order in which the tools are loaded.
ID instance data	Shows the external identifier of the tool. For brownfield tools, the tool name is shown.
State	Shows the current state during transfer. Possible values are: • Loading: The tool is currently being loaded. • Waiting: The tool is waiting to be loaded. • Success: The tool has been successfully loaded. • Failed: An error occurred while loading this tool. • Canceled: The transfer has been aborted due to an occurred error. This tool won't be loaded anymore.

Procedure

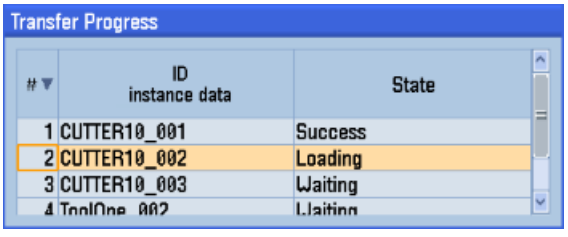
1. Press the horizontal softkey "Transfer list".

2. If the "Transfer list - unloading list" window opens, press the "Loading list" softkey.

   The "Transfer list - loading list" window opens.

3. Press the "Start load" softkey.

   The "Transfer Progress" window opens and shows the current state of the load process.



4. If the whole transfer process was successful, the "Tool overview" window opens.

Error-Case

If an error occurs while the transfer is ongoing, an error message is shown. The transfer stops at this point. Tools that were not loaded until then, are not loaded anymore and stay in the transfer list. Tools that are already loaded are removed from the transfer list.

6.3.16 Tools on an offline machine

6.3.16.1 Creating tools on an offline machine

When the machine has no connection to the server, i. e. the machine is "offline", you have the possibility to continue to work.

You can create tools and sister tools on an offline machine with the three D-number types relative, absolute and flat. You can load the tools to a machine.

The interruption of the connection is displayed in the application "Tool Stock" and "Monitoring tools" on the server.

- Tools which are in the cabinet cannot be loaded. You must create a new tool.
- You can directly load tools with the location "AtMachine".

After a successful synchronization with the server, no further corrections are necessary.

Parameter

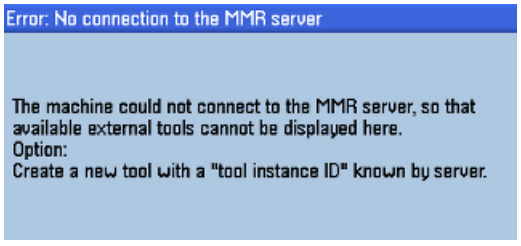
The following parameters are available:

Parameter	Description
"Tools in cache" window	
ID instance data	Shows the instance data ID.
Tool name	Shows the tool name.
ID master data	Shows the master data ID.
Location	Shows the locations.
"Create tool" window	
ID for tool instance	Enter a unique identifier for tool instance data.
Tool name	Enter the tool name.
Number of cutting edges	Select the number of cutting edges from the drop-down list.
"Destination of the tool" window	
Place type	Enter the location type.
TOA	Select the TOA unit from the drop-down list.
Magazine	Select the required magazine from the drop-down list.
Loading point (LP)	Select a load point from the drop-down list
Place	Enter the location number of the tool. If the input field remains empty, SINUMERIK Operate assigns a location.
Tool overview column "Sync"	

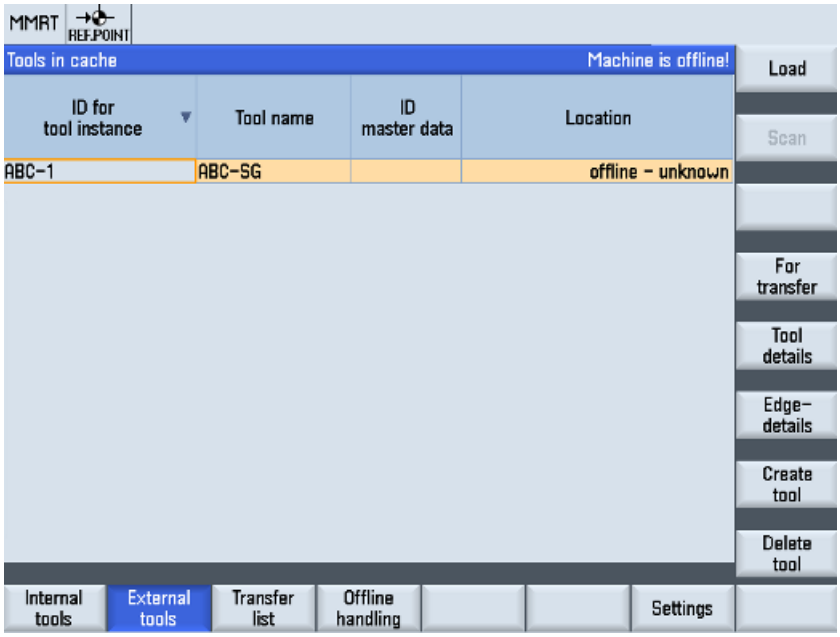
Parameter	Description
	A yellow icon in the column "Sync" indicates that the synchronization has not taken place.
	Data of the tool on the machine do not correspond with data on server.

Procedure on the machine

1. Press the "External view" softkey.
   The "External Tools: Tool Overview" window opens.
   If the connection to the server is interrupted, the message “Machine is offline!” is displayed in the top-right window area. The following popup message appears:

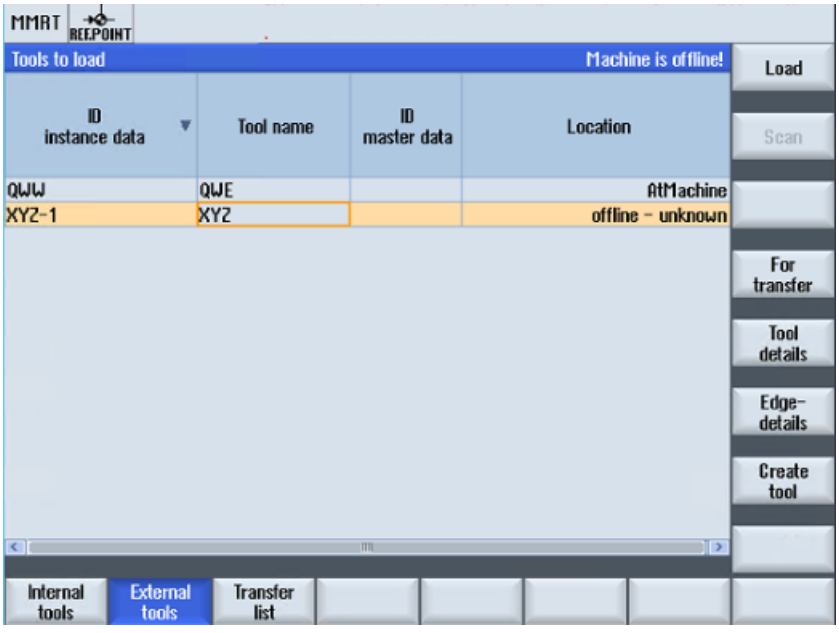


   Press the "OK" softkey.
2. The "Tools in cache" window opens.



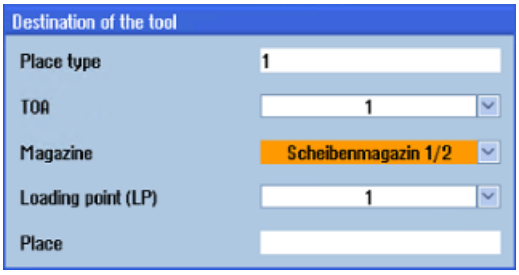
3. Press the "Create tool" softkey.
   The "Create tool" window opens.
   Enter the respective values in the input fields.
   Write down the tool data to create this tool on the server. This is necessary to synchronize the data when the connection to the server is restored.
   Press the "OK" softkey.

4. Enter a type for each edge of the tool.
   Allowed tool types are not checked when an offline tool is created.
   You can also enter lifetime values for the offline tool.
   Press the "OK" softkey.
5. The new tool is displayed in the overview. The information "offline-unknown" appears in the column "Location".



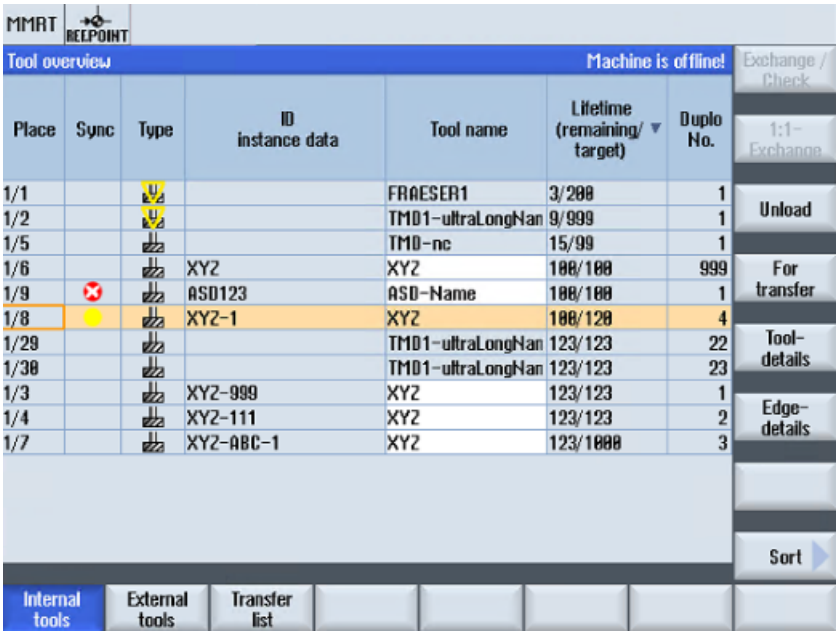
Load

6. Press the "Load" softkey.
   The "Destination of the tool" window opens.
   Specify the target of the external tool instance on the machine.
   Press the "OK" softkey to load the tool into the selected magazine.



7. The tool is displayed in the "Tool overview" window.
   - The yellow icon appears when the tool data has not yet been synchronized with the server.
   - The red icon appears if the data on the machine does not match the data on the server.

   Delete the tool and create a new tool.

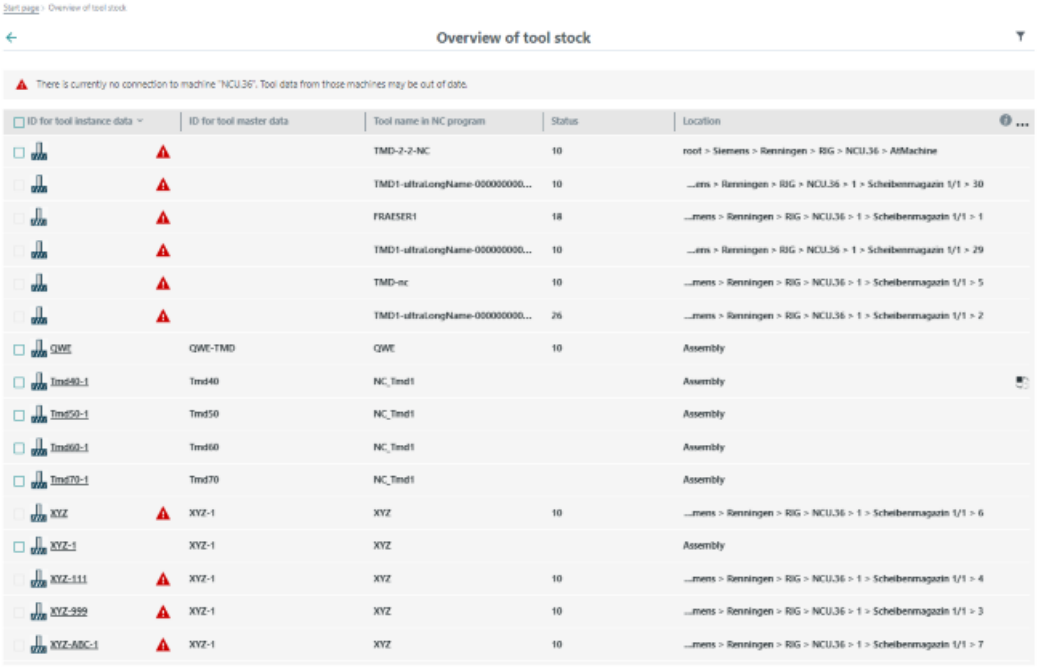


8. Synchronization is done automatically when the machine is reconnected to the server. The yellow icon is no longer displayed.

Procedure on the Server

1. On the start page of the Mcenter, click on "Tool master data".
   - Create a new tool with the same data as on the machine
     For more information, see Creating or editing tool master data (Page 212).
2. On the start page of the Mcenter, click on "Provide Tools".
   - Click on "New tool". The "Tool master data" window opens.
   - Enter the same data as on the machine for "ID for tool master data*", "Tool name in NC program*" and "Number of cutting edges".
   - The tool is displayed in the overview.
   - Click on "Personal tasks".
   - Move the new tool via Drag&Drop to the "To be provided" column.
     Measure the tool and choose the tool location.
     For more information, see Overview for providing tools (Page 250).

3. In the "Overview of tool stock" and "Monitoring tools" windows, red warning symbols appear to indicate that the data has not yet been synchronized.



4. Synchronization is done automatically when the machine is reconnected to the server. The red warning symbols are no longer displayed.

6.3.16.2 Correcting tool properties

If a tool was created while the machine was in the "Offline" state and was not synchronized with the server, you can correct the properties.

Prerequisite

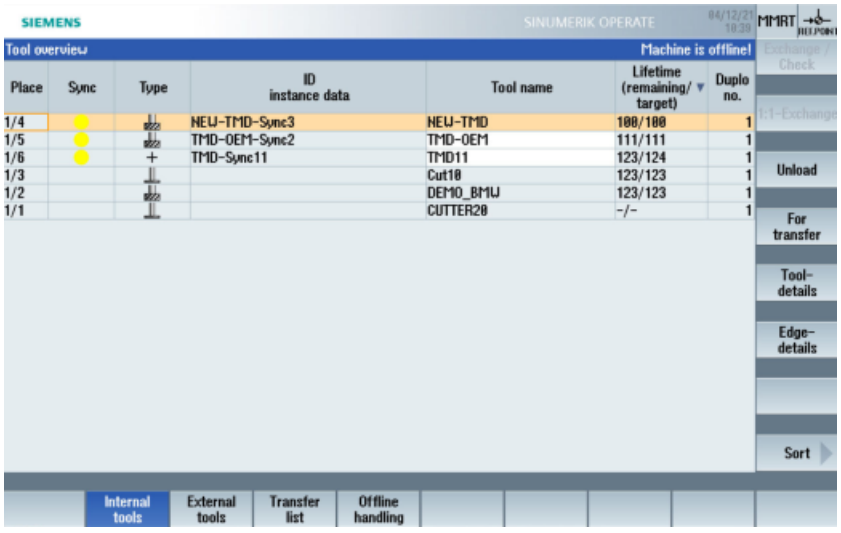
This functionality is only enabled if the user has at least protection level 4.

The offline handling view contains two views, "Offline Tools" and "Sync-Errors" that can be reached and changed via the toggle button.

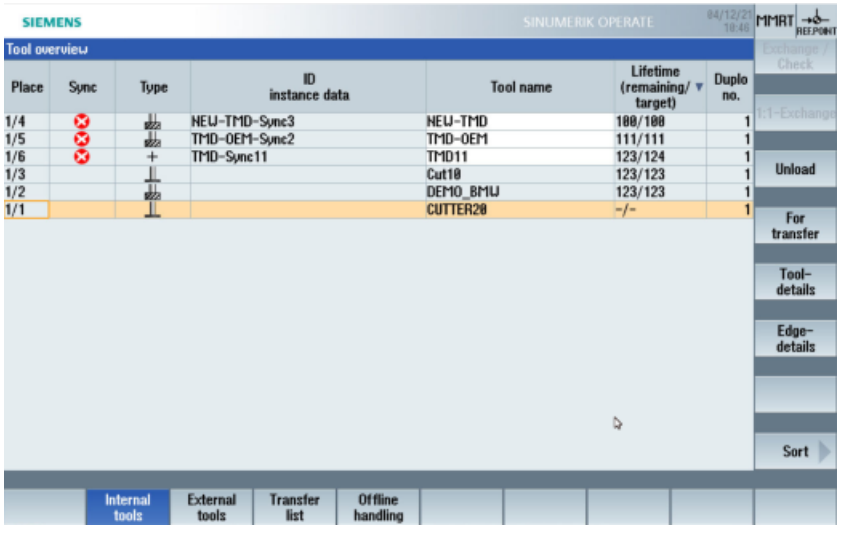
"Offline tools" view: Procedure

Internal view

1. Press the "Internal view" softkey.
   The "Tool overview" window opens.
   If the connection to the server is interrupted, the message “Machine is off-line!” is displayed in the top-right window area.

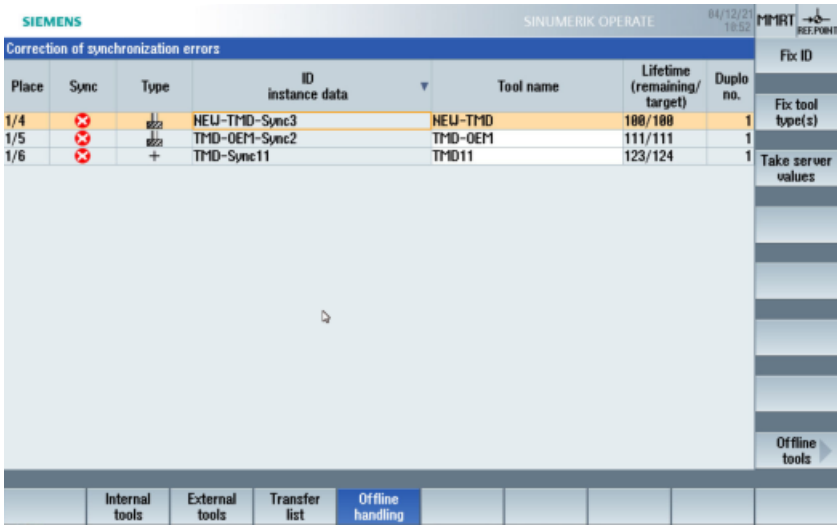


In the "Sync" column, you see the red icon that indicates the tool with the incorrect data.



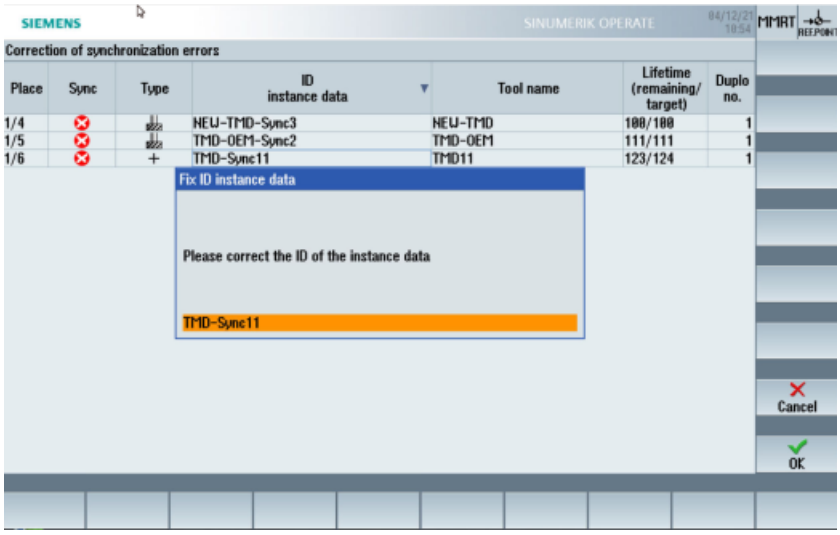
Offline handling

2. Press the "Offline handling" softkey. The "Correction of synchronization errors" window opens.
   All the tools with incorrect data are displayed in the list.



Fix ID

3. Choose a tool and press the "Fix ID" softkey.
   The "Fix ID instance data" window opens. Correct the ID of the instance data.
   Press the "OK" softkey.



4. The "Confirm" window opens and you receive a message about your input.
   Press the "OK" softkey.

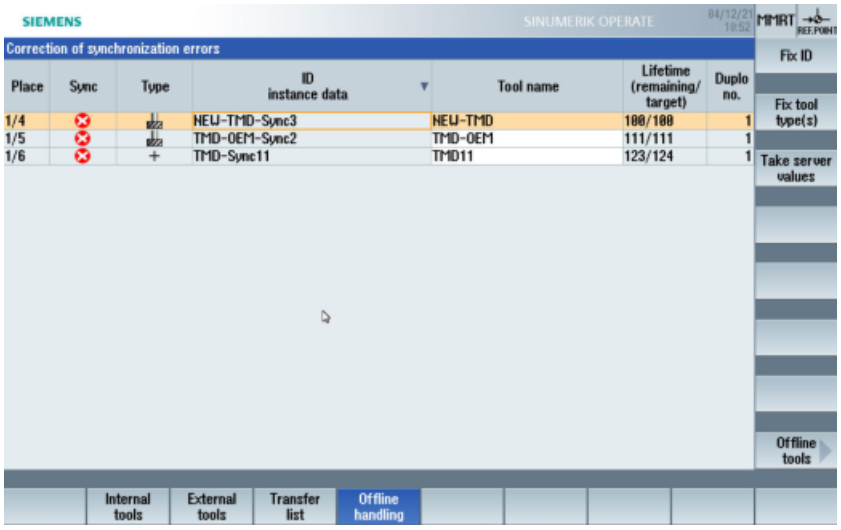
Edge conflicts

In case of an edge conflict, there are two options:

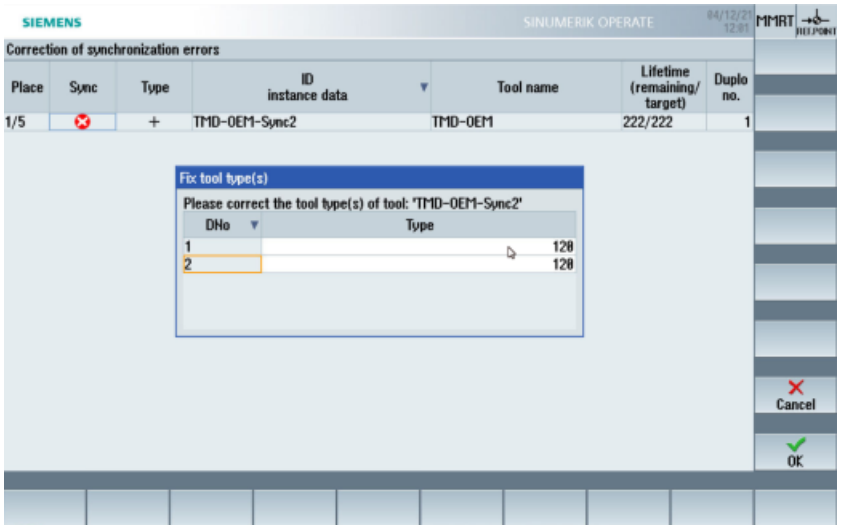
Option 1:

Fix tool type(s)

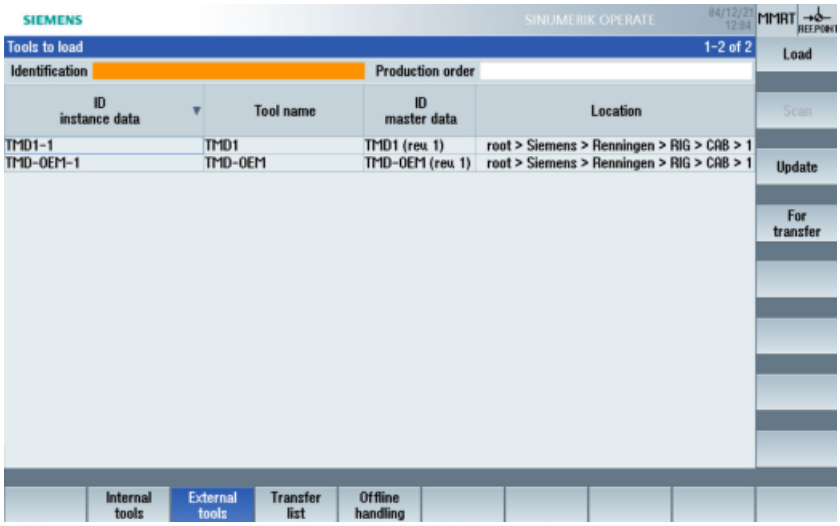
1. The "Fix tool type(s)" softkey is activated when the edge-conflict involves an equal number of edges on the client and the server.
   Flat and relative D-numbers:
   You can correct the tool type on each edge.
   Absolute D-numbers:
   You can correct the tool type on each edge as well as the D-number (DNo).
   Press the "Fix tool type(s)" softkey.



2. The "Fix tool type(s)" window opens.
   Enter new data e. g.the "DNo" and press the "OK" softkey.



3. The corrected data of the tool are displayed in the list and can be processed.



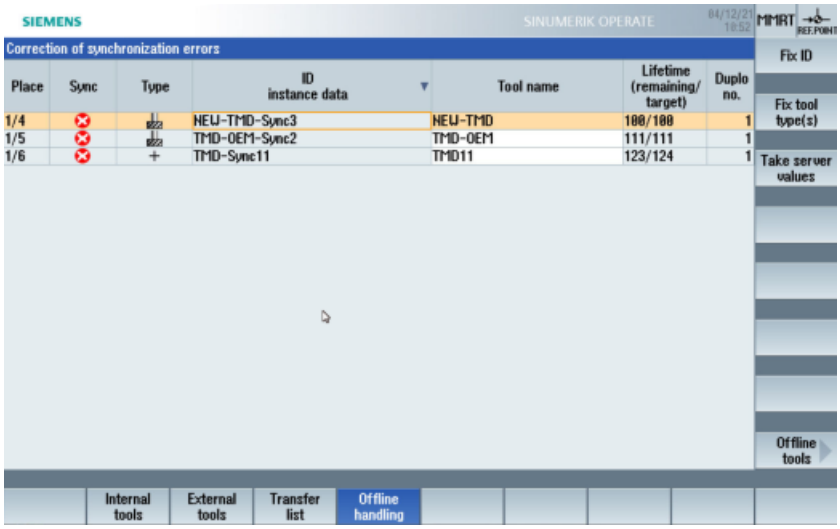
- OR -

Option 2:

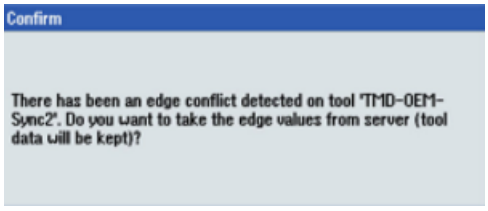
Take server values

1. The "Take server values" softkey is activated when the edge-conflict involves an equal or a different number of edges on the client and the server.
   This option is always available except if the ID does not match. You can take all the values from the tool on the server including the DNo.

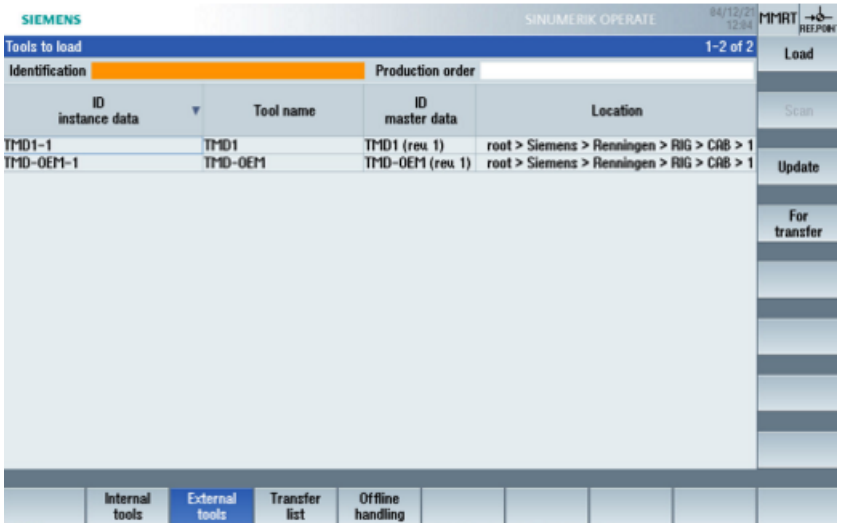
   Press the "Take server values" softkey.



2. The "Confirm" popup message appears. Press the "OK" softkey to overwrite the property values with the server values.



3. The "Tools to load" window opens.
The corrected data of the tool are displayed in the list and can be processed.



For more information, see Checking and exchanging internal tools (Page 452).

"Offline tools" view: Procedure

Change to the "Offline tools" view by pressing the toggle button.
The "Offline created tools and tools in AtMachine" window opens.

6.3.16.3 Exchanging tools on an offline machine

You can load and unload sister tools on machine which is offline.

Procedure

Internal view

1. Press the "Internal view" softkey.
The "Tool overview" window opens and shows the overview of the tools.
2. Select a tool.

1:1-Exchange

3. Press the "1:1-Exchange" softkey. The "Sister tools for 1:1-Exchange" window opens.

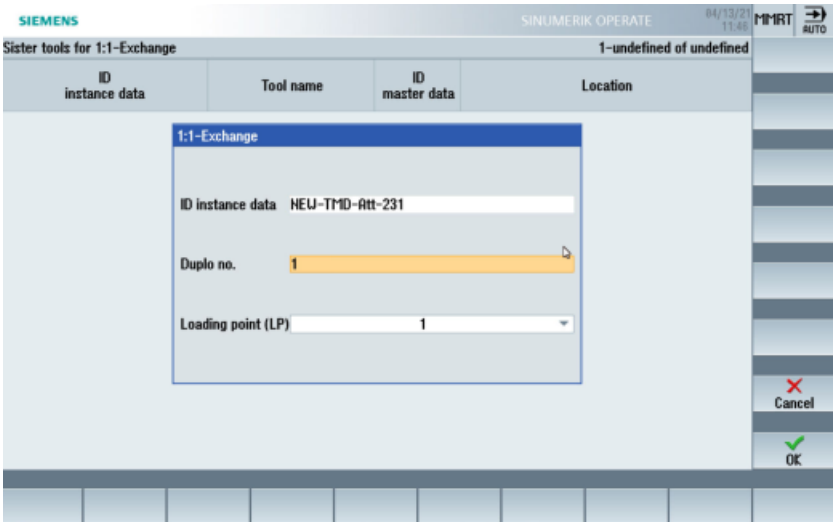
   Enter the following data:

   - ID instance data
     This data item is important for the synchronization.
   - Duplo No.
   - Loading point (LP)

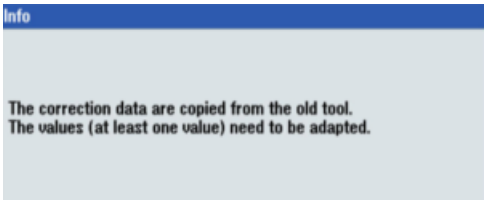
   Press the "OK" softkey to unload the tool and to create a sister tool.

   - OR -

   Click "Cancel" to cancel the operation.



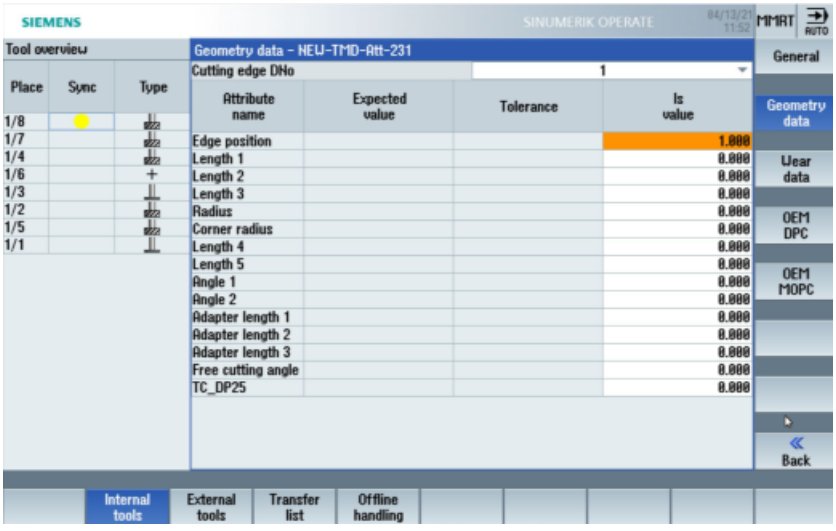
The OEM and correction data from the original tool is copied and applied to the sister tool. The "Geometry data" window opens displaying the following popup message:



Press the "OK" softkey.

4. The "Geometry data - <ID Instance data>" window remains open.
   The "Back" softkey is inactive until you click on at least one of the fields in the "Is value" column. You must adapt at least one property.

   The yellow icon is displayed in the "Sync" column. The synchronization with the server cannot start as long as the machine is offline.



Note

Unloading brownfield tools

You can unload brownfield tools to "AtMachine" when the machine is offline. The tool is not displayed in the "External tools" view and can only be disassembled from "Tool stock" when the machine is synchronized with the server.

For more information, see Unloading internal tools (Page 464).

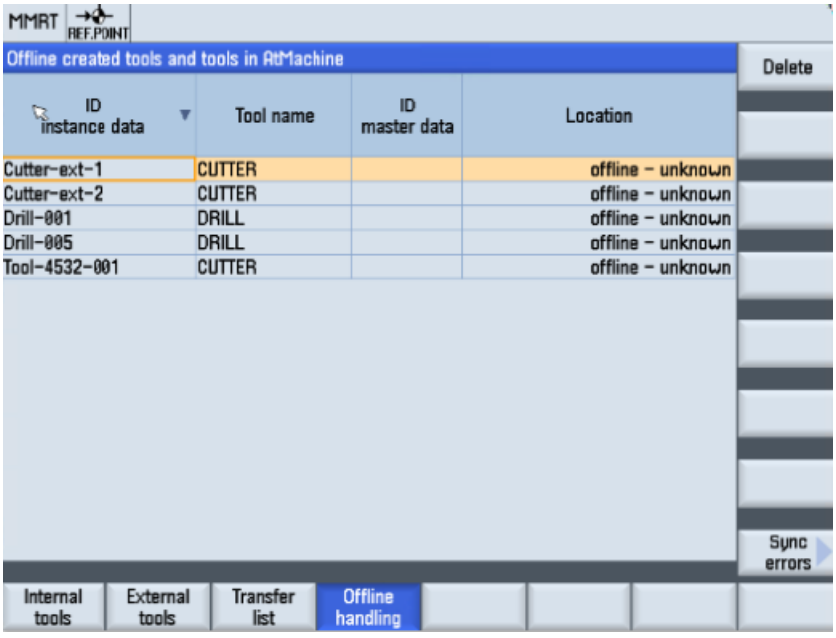
6.3.16.4 Deleting offline created tools

You can display and delete the offline created tools not only on an offline, but also on an online machine.

Procedure

Offline handling

1. Press the "Offline handling" softkey.
   Select the "Offline tools" softkey.
   The "Offline created tools and tools in AtMachine" window opens.
   Select the tool you wish to delete.

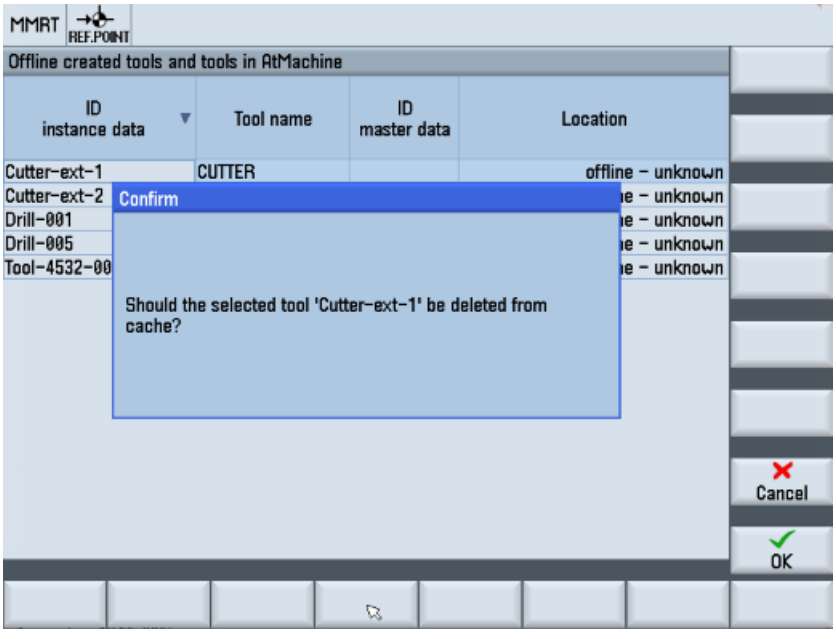


Delete

2. Press the "Delete" softkey.

   The "Confirm" window opens.
   Press the "OK" softkey to confirm the deletion of the selected tool.
   - OR -

   Press the "Cancel" softkey to cancel the operation.



6.3.17 Error messages

Error messages are displayed for the following actions:

- Loading a tool
- Unloading an original tool
- Reloading an original tool
- Loading a sister tool
- Loading an external tool

Error messages and error source

If you load a tool, then the following errors can occur:

Error message	Error source
There are no OEM data configured for the master data of the selected tool	The configured machine type does not fit the OEM data.
This machine expects a different number of OEM parameters than what is currently configured in the OEM data configuration for this machine type	The number of configured and expected OEM parameters is different.

If you unload an original tool, then the following errors can occur:

Error message	Error source
Original tool could not be loaded. Place is locked.	The location where the tool is located is locked.
The original tool could not be unloaded due to an unknown error.	Unknown

If you reload an original tool, then the following errors can occur:

Error message	Error source
Original tool could not be unloaded. Place is locked.	The location where the tool is located is locked.
Original tool could not be loaded. Wear of the tool is out of range.	Tool wear data is outside the permissible range.
Original tool could not be loaded due to an unknown error.	Unknown

The following errors can occur if you load a sister tool:

Error message	Error source
Sister tool could not be loaded. A duplicate already exists.	A duplicate of the tool is already in the magazine with the same tool name and duplo number.
Sister tool could not be loaded. Place is locked.	Location, where the tool is to be loaded, is locked.
Sister tool could not be loaded. Wear of the tool is out of range.	Tool wear data is outside the permissible range.
Sister tool could not be loaded. The data of the tool could not be found.	Correction (offset) data for the tool missing.

Error message	Error source
Sister tool could not be loaded. The data of the tool could not be found.	The tool data were not able to be found.
Sister tool could not be loaded due to an unknown error	Unknown

The following errors can occur if you load an external tool:

Error message	Error source
Loading of the tool failed. A duplicate already exists.	A duplicate of the tool is already in the magazine with the same tool name and duplo number.
Loading of the tool failed. The specified place is not empty.	Location, where the tool is to be loaded, is occupied by another tool.
Create tool failed. Please check the tool data.	Tool could not be created on the machine. Tool data should be checked.
Search empty place failed. No free places available in the chosen magazine.	No place for the tool available in the magazine.
Loading of the tool failed. Magazine location not suitable for this tool.	The size of the tool does not fit in this magazine location.
Loading of the tool failed. Wear data is out of range.	Tool wear is outside the permissible range.
Loading of the tool failed. The specified place is locked.	Location, where the tool is to be loaded, is locked.
Loading of the tool failed. The specified place is invalid.	Location, where the tool is to be loaded, does not exist.
Loading of the tool failed. Correction data is missing for one or more edges.	Correction (offset) data for the tool missing.
Loading of the tool failed. The location of the tool or the machine has changed.	Either the tool was already moved to another location or the machine was moved in the plant configuration.
Loading of the tool failed. Could not find the data of the selected tool.	The tool data were not able to be found.
Loading of the tool failed due to an unknown error.	Unknown

The following error messages appear when the machine is in the "offline" state.
This messages is shown for MMR /Tools External Tools.

Error message	Error source
No connection to MMR Server.	Server down, physical connection to the server, network issues

6.4 With HMI-Advanced

6.4.1 Starting Manage MyResources /Tools

Procedure

1. The control has ramped-up and the operating areas are displayed.
2. Press softkey "MMR /Tools".
   The "Tool view" window opens.

6.4.2 Syncing the server configuration

On the "Settings" page, the following data can be synced with the server configuration:

- Monitoring type
- Unload reasons
- Localization of the User-defined attributes and the Unload reasons
- Default presetting of action flags for the Unload reasons
  OEM bitmap

Note

Unload reason changes

In the rare event of Unload reason changes, you must synchronize each client before unloading further tools. This needs to be done to avoid that wrong or obsolete reasons are provided.

Note

OEM bitmap changes

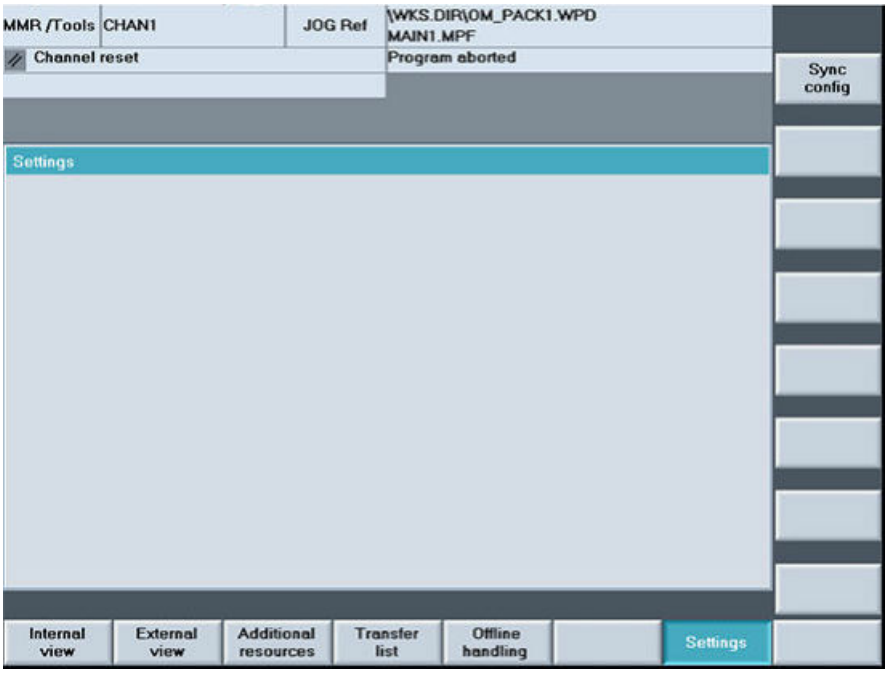
In the rare event of OEM bitmap changes, you must synchronize each client before checking OEM related "Tool details" and "Edge details" sections. This needs to be done to avoid any possible misinformation.

For more information, see Configuring Unload reasons and their action flags (Page 955) .

Procedure

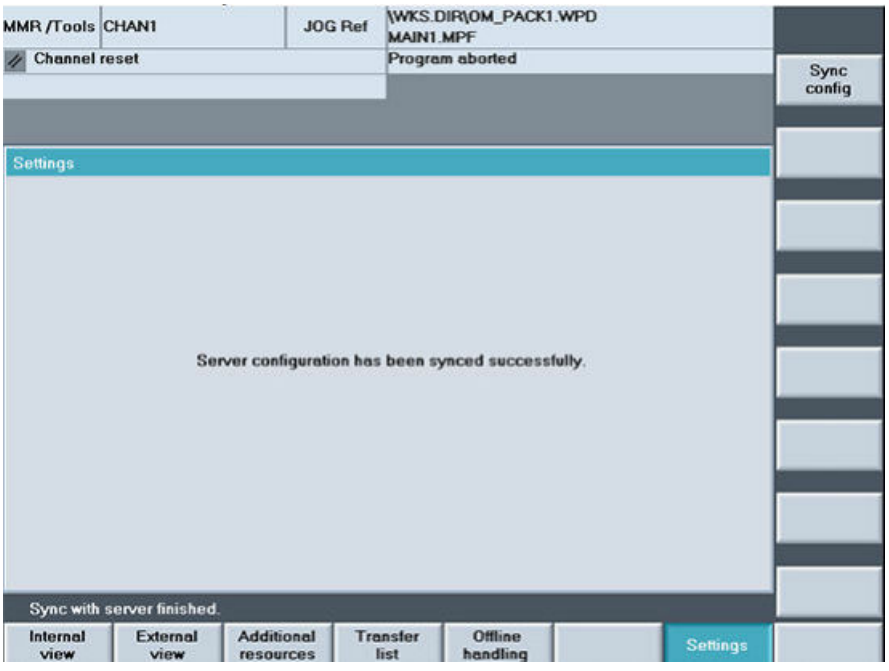
Settings

1. Press "Settings".
   The "Settings" window opens.



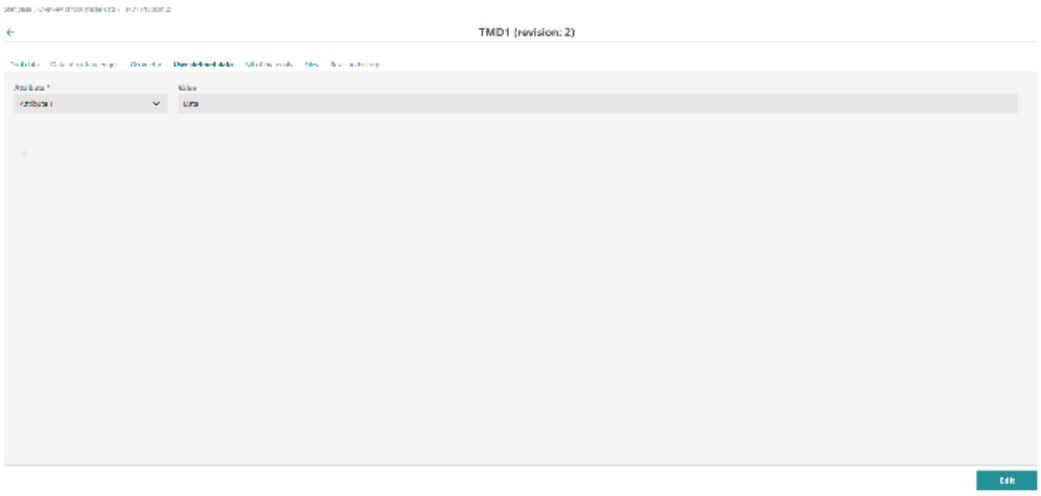
Sync config

2. Press "Sync config" to synchronize the server configuration.
   The data is synced and the confirmation message "Server configuration has been synced successfully" appears.



Displaying changes of the User-defined data on the server

You can display changes of the User-defined attributes in the tool master data application via the User defined data" tab in the "<ID for tool master data>" window:



6.4.3 Checking and exchanging internal tools

You have the option of checking and exchanging a tool, for example because the tool might be "worn". Checking the tool state is realized at the machine with the real tool.

Note

Using a tool after the check

If you do not exchange the tool after the check and you go on using it, statistical data is generated for "Load" and "Unload".

Prerequisite

This functionality is related to the standard protection level of HMI-Advanced.

Parameter

The following parameters are displayed in the tool view:

Parameter	Description
"Tool view" window	
Place	Shows the magazine and place. Machines with turning technology without a configured magazine, shows the T-number.

Parameter	Description
Sync	Shows the synchronization status of a tool. Possible values: • P (Pending): Shows that the tool is not yet synchronized with the server. • E (Error): Shows that the tool contains incorrect data and cannot be synchronized with the server data.
T	Shows the tool status: D = Tool disabled W = Tool is in prewarning limit P = Tool is freely available
ID for tool instance	Displays the identification of the instance data for the sister tool or for the replacement tool.
Tool name	Shows the tool name.
Remaining lifetime / Remaining workpieces	Shows the remaining and target lifetime of the tool in minutes or in workpieces.
Dupl	Shows the duplo number of the tool.
TOA	Shows the TOA unit.
"Exchange / Check" window - Overview of the sister or replacement tools	
Ident. instance data	Displays the identification of the instance data of the sister or replacement tool.
Tool name	Shows the name of the tool in the NC program.
Ident. master data	Shows the identifier for tool master data.
Location	Shows the storage location of the sister tool or the replacement tool.
Edge-details "General - <ID for tool instance>" window	
DNo	Shows the cutting edge number.
Type	Shows the cutting edge type.
Remaining lifetime / Remaining workpieces	Shows the residual tool life in minutes or in workpieces. You can change the value to define a new value for this cutting edge.
Target lifetime / Target workpieces	Shows the planned tool life in minutes or in workpieces. You can change the value to define a new value for this cutting edge.
Tool life prewarning limit / Workpieces prewarning limit	Shows the prewarning limit in minutes or in workpieces. You can change the value to define a new value for this cutting edge.

Note

Machines without a configured magazine

On machines without a configured magazine, i.e. turning machines, the first column of the internal view shows the T-number.

Procedure: Exchange/Check the tool

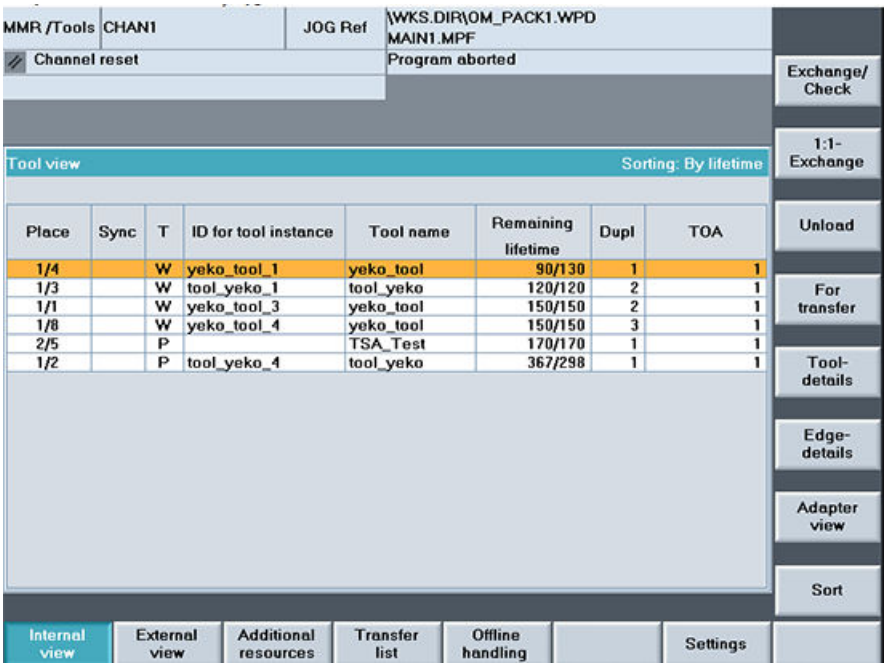
Note

Machines without configured magazines

On machines without a configured magazine, i.e. turning machines, the "Exchange / Check" functionality is not supported.

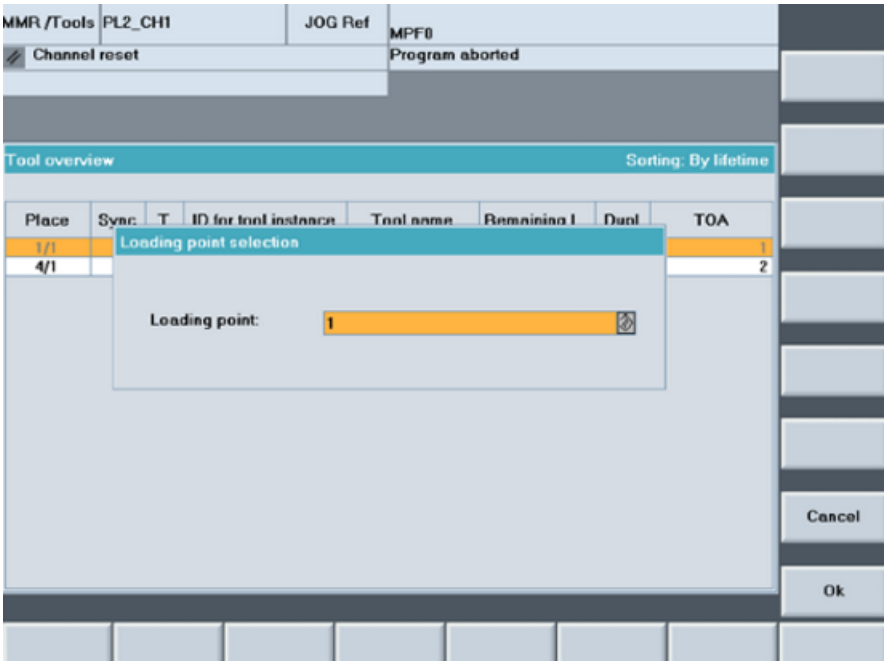
Internal view

1. Press the "Internal view" softkey.
   The "Tool view" window opens and shows the overview of the tools.

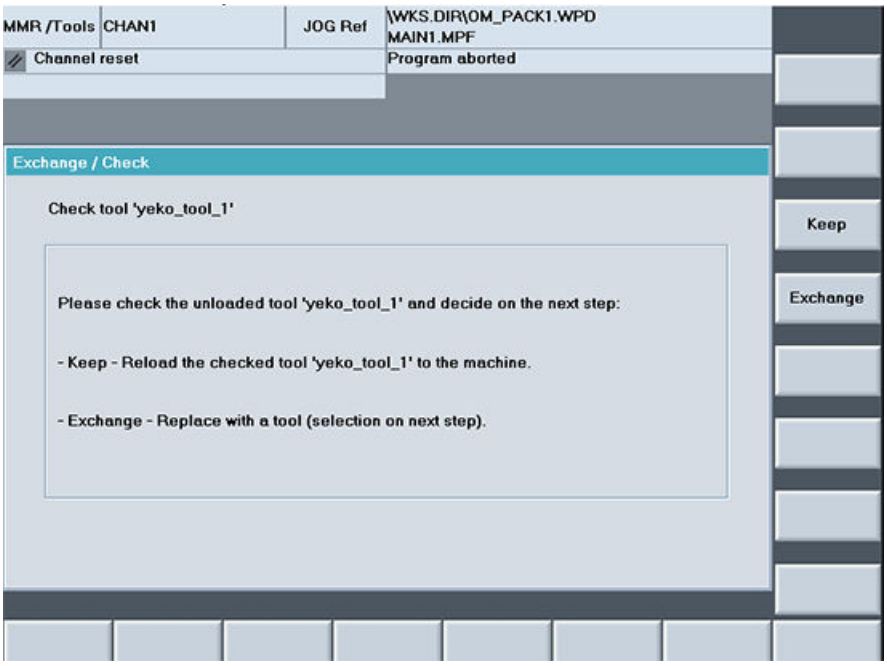


Exchange/ Check

2. Select a tool from the overview and press the "Exchange/Check" softkey.
   The "Loading point selection" window opens.
   Confirm the selected tool and choose the loading point.
   Press the "Ok" softkey to continue.
   - OR -
   Press the "Cancel" softkey to cancel the operation.



3. The "Check tool <ID>'" window opens.
   The tool is provided at the loading point.
   Check the tool. You can continue to use the original tool or swap it with a sister tool.



Note

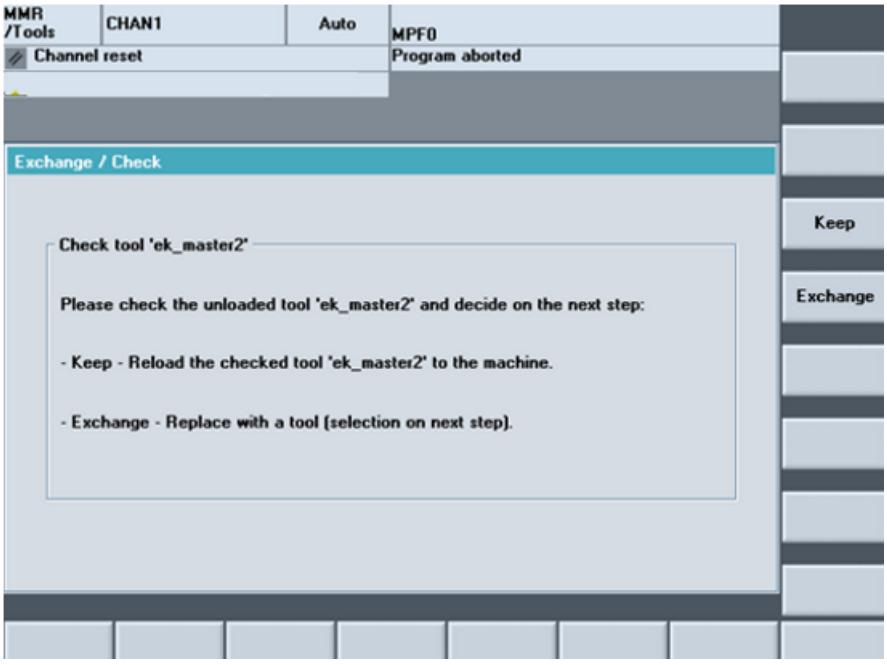
Assembly softkey

The "Assembly" softkey is only available if it is configured in the "mmrConfig.json" file on the machine.

Procedure: Retaining the original tool

Keep

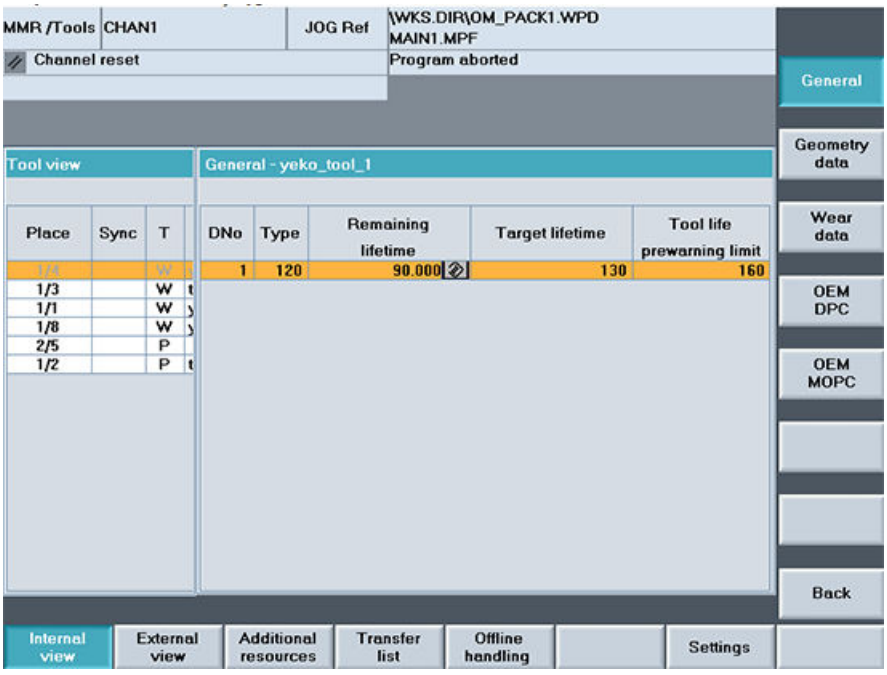
1. Insert the original tool into the loading point again.
   You carry out a tool check even if the tool has no sister tool and replacement tool.
   Press the "Keep" softkey to reload the checked tool to the machine.



2. The "General - <ID Instance data>" window opens and shows cutting edge data.

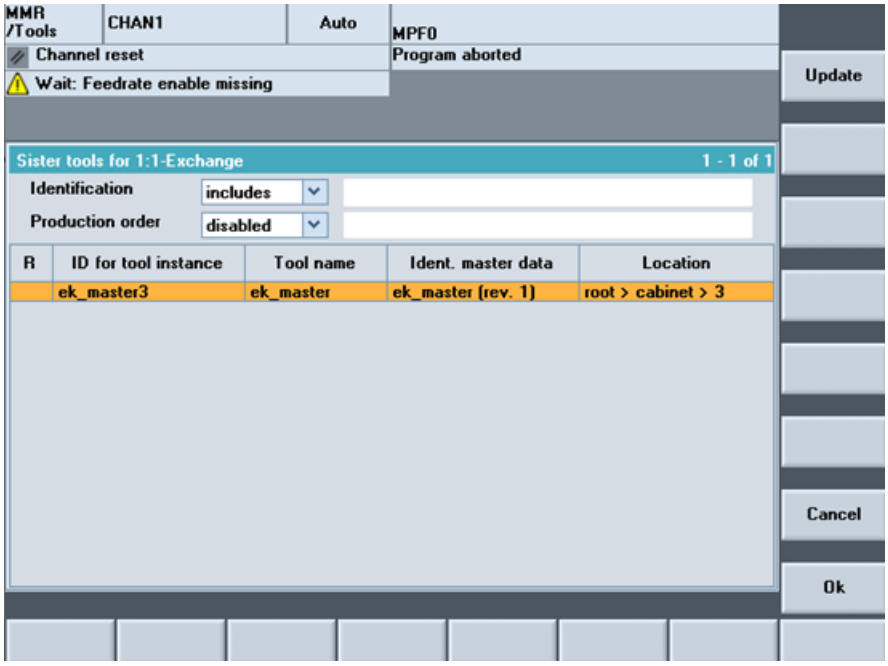
   Change the Remaining lifetime/workpiece of the tool:

   - Select the input filed on the Controller.
   - Enter the desired lifetime/workpiece of the tool.
   - Press the "Back" softkey.



Procedure: Displaying and exchanging a sister tool

1. Press the "Exchange" softkey.
   The "Assignment for tool" window opens.
   You can choose the "Unload reason" and "action flag" and add a comment regarding the original tool to be exchanged.
   Press the "Ok" softkey to proceed.
   - OR -
   Press the "Cancel" softkey to cancel the operation.
2. The window "Sister tools for 1:1 Exchange" opens.
   Select a sister tool and press the "Ok" softkey.
   - OR -
   Press the "Cancel" softkey to cancel the operation.



Note

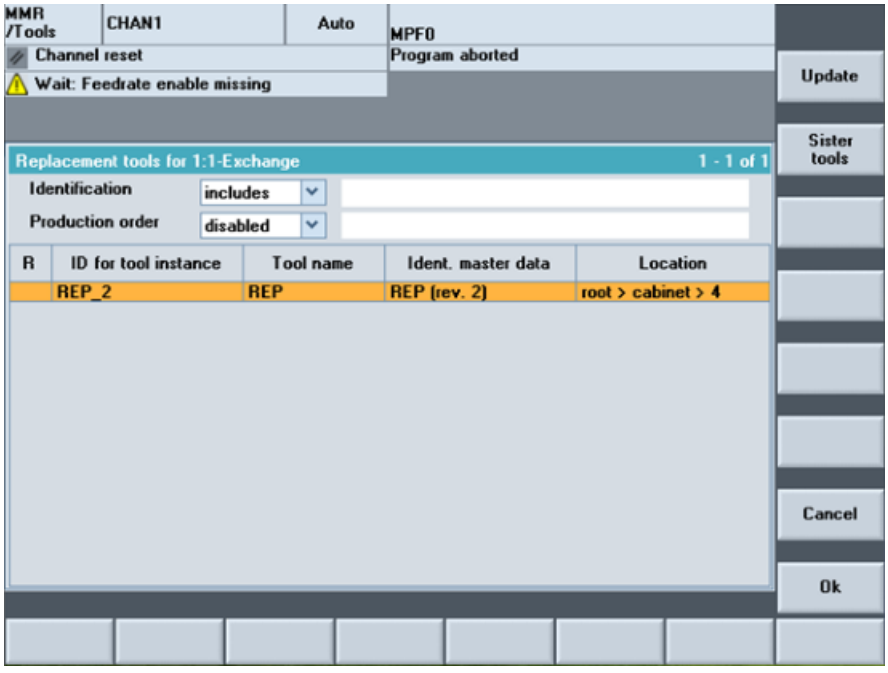
Preselected sister tools

If a sister tool has already been assigned in "Monitoring tools", it is automatically preselected.

Procedure: Displaying and exchanging a replacement tool

Click on the "Replacement tools" softkey to display the replacement tools created via a breaking change.
The "Replacement tools" softkey is only visible if there is an available replacement tool.

- Select the replacement tool.
- To cancel the operation, press the "Cancel" softkey.
  - OR -
  Press the "Ok" softkey.
- To update the list, press the "Update" softkey.



Note

Sister- and replacement tool window display

On the right-hand side of the header, you see the number of tools in regards to the total tool inventory. The format is the following:
"1 - <the number of tools sent by the server> of <the total number of suitable tools on the server>.
The total number of sister and replacement tools sent by the server cannot exceed the maximum number of tools to display. The list contains an equal number of each tool type. If there are fewer tools of one type, more tools of the other type are displayed.

Cancel current operation

During tool load, unload, exchange or check/exchange the machine operator is able to break the current action by pushing the reset button on the Machine Control Panel (MCP). As a result the tool load/unload action is aborted at the current position and a modal dialog is shown, which the operator has to acknowledge by pressing the "Ok" softkey.
Further information about the configuration of the cancelation PLC address bit is provided in the Installation Manual "Mcenter, Manage MyResources, Optimize MyProgramming /NX-Cam Editor, Analyze MyPerformance /OEE, Access MyData /Collector".

6.4.4 Exchanging internal tools

You can exchange a tool.

Prerequisite

This functionality is related to the standard protection level of HMI-Advanced.

Parameter

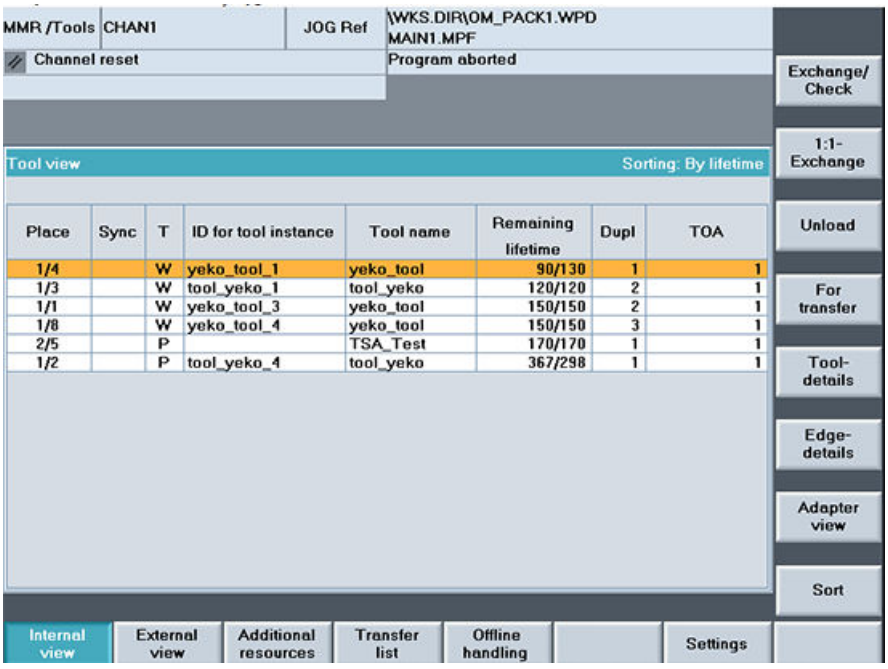
The following parameters of the sister tools are displayed to you in the "Exchange" window:

Parameter	Description
Assignments for tool	
Unload reason	Select an Unload reason in the drop-down-list: • Unknown • Broken tool • Worn out tool • Loud noise of the tool • Empty place needed • Tool is needed on another machine • Bad workpiece quality • <User-defined Unload reason>
Choose action flag	Shows the action flag drop-down list.
Comment on unloading reason	For the comment, a maximum of 128 characters are available.
Sister tools for 1:1 exchange	

Parameter	Description
R	• Stands for "Reservation" • Shows one of the following tool states: – O (Order). The tool belongs to a production order. – FM (Fixed on machine) The tool is reserved for this machine. – ST (Sister tool) The tool is the pre-assigned sister tool. – RT (Replacement tool) The tool is the pre-assigned replacement tool.
ID instance data	Displays the identification of the instance data of the sister tool.
Tool name	Shows the name of the tool in the NC program.
ID master data	Shows the identifier for tool master data.
Location	Shows the storage location of the sister tool.

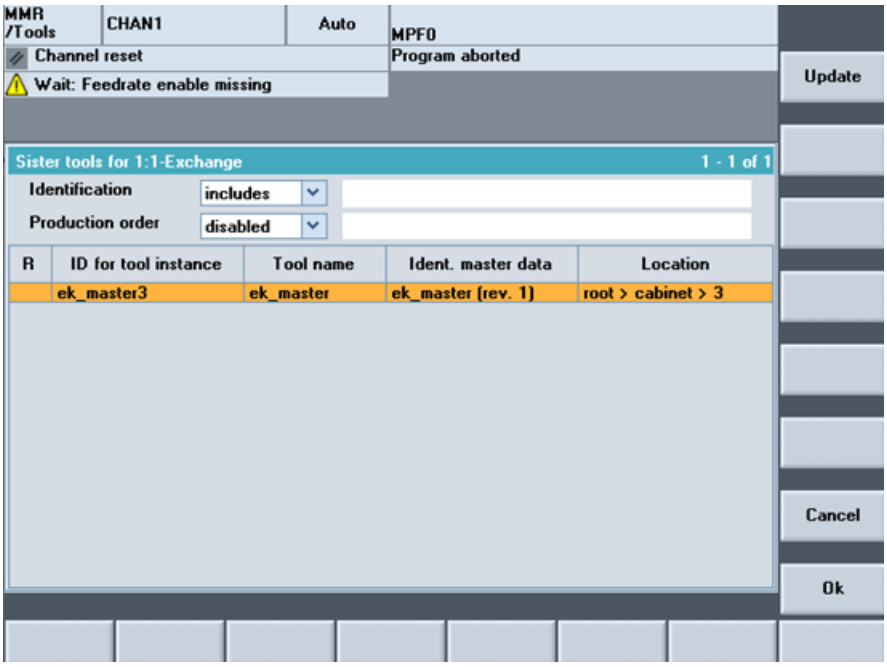
Procedure

1. Press the "Internal view" softkey.
   The "Tool view" window opens and shows the overview of the tools.



1:1 - Exchange

2. Select a tool with the cursor and press the "1:1 - Exchange" softkey.
   The "Sister tools for 1:1 Exchange" window opens.
   The sister tools and their revision numbers are loaded and displayed in a list if you have created a sister tool via a non-breaking change.



   You can refresh the list by pressing the "Update" softkey.
   Choose a sister tool for the exchange and click "Ok".
   The "Assignment for tool" window opens.
   Select an Unload reason and press the "Ok" softkey. If the selected Unload reason has no default action flag, "Disassemble" is preselected.
   For more information, see Configuring Unload reasons and their action flags (Page 955).
   - OR -

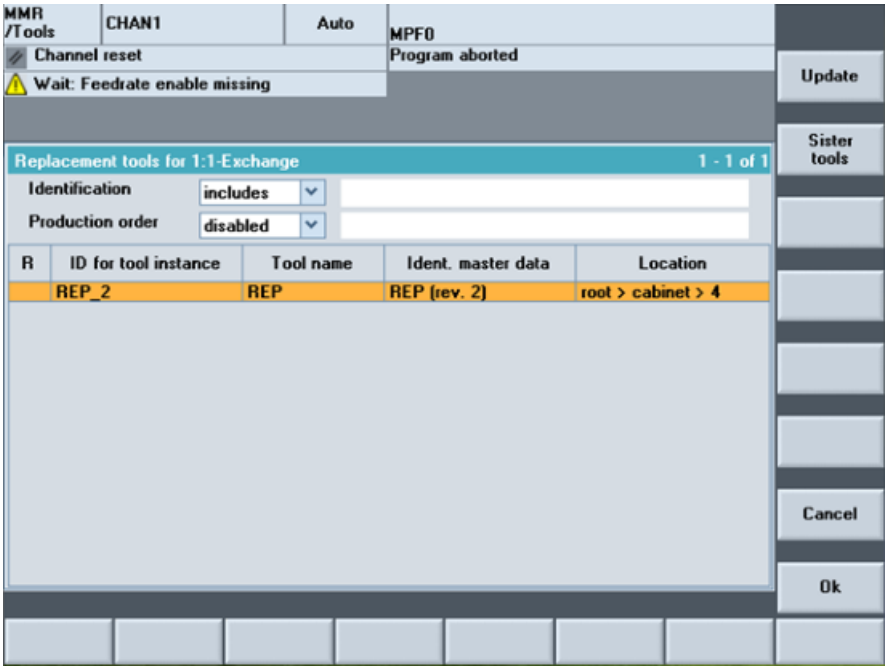
Replace-ment tools

3. Press the "Replacement tools" softkey to display the replacement tool created via a breaking change.

   In the upper right corner of the "Replacement tools for 1:1 Exchange" window, the number of tools according to the following pattern is displayed:
   1 - <Number of tools that were sent by the server> of <Total number of suitable tools stored on the server>

   The sum of sister and replacement tools that were sent by the server must not exceed the maximum allowed limit of tools that can be displayed.

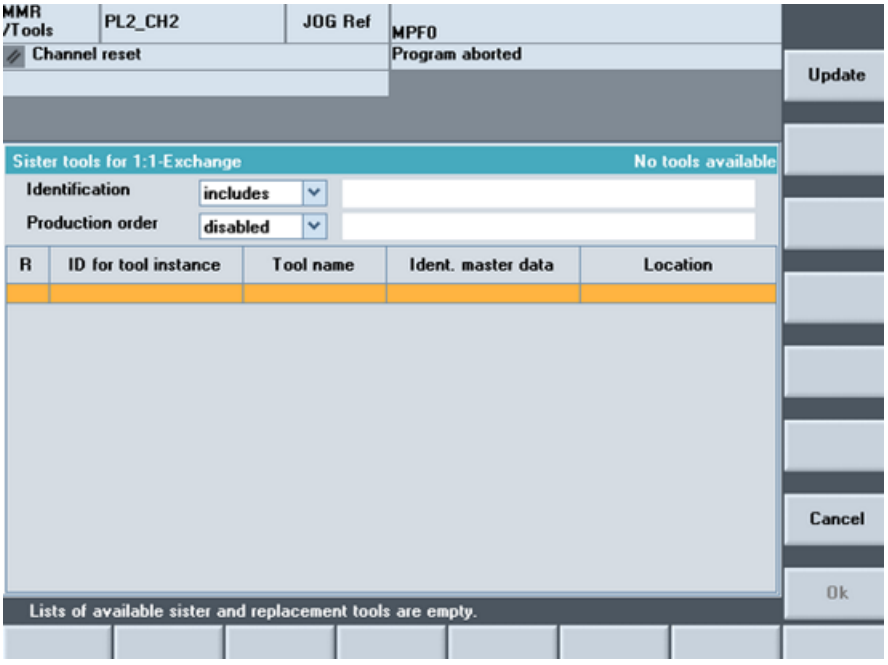
   If no replacement tool is available, the Replacement softkey is not displayed.



- OR -

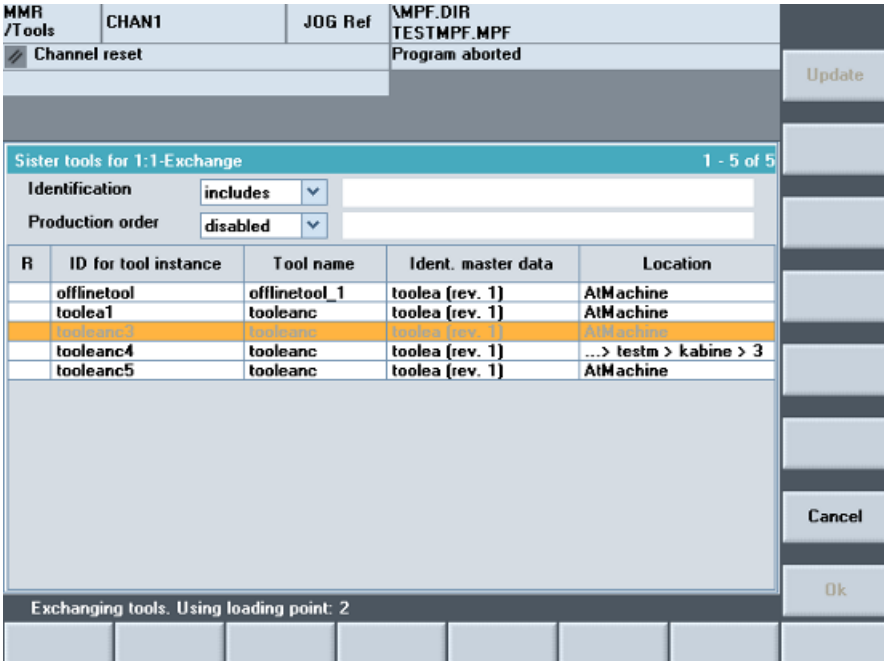
If no sister and replacement tools are available, the list is empty.
In the header line, the message "No tools available" is displayed.

In the dialog line, the message "Lists of available sister and replacements tools are empty" is displayed.



For more information, see Creating a non-breaking change (Page 228).

4. The "Exchanging tools. Using loading point <loading point number> text appears in the dialog line.



Cancelling the current operation

During tool load, unload, exchange or check/exchange the machine operator is able to break the current action by pushing the reset button on the Machine Control Panel (MCP). As a result the tool load/unload action is aborted at the current position and a modal dialog is shown, which the operator has to acknowledge by pressing the "Ok" softkey.
Further information about the configuration of the cancelation PLC address bit is provided in the Installation Manual "Mcenter, Manage MyResources, Optimize MyProgramming /NX-Cam Editor, Analyze MyPerformance /OEE, Access MyData /Collector".

6.4.5 Unloading internal tools

A tool can be unloaded directly to a specific destination.

Prerequisite

This functionality is related to the standard protection level of HMI-Advanced.

Parameter

The following parameters are displayed in the "Unload tool" window:

Parameter	Description
Unload tool	
Choose the destination of the tool:	
Tool name	Shows the tool name.
ID for tool instance	Shows the identifier for tool instance data.
Loading point	Select the required loading point from the drop-down list.
Unload reason	Select one of the following Unload reasons: • Unknown • Broken tool • Worn out tool • Loud noise of the tool • Empty place needed • Tool is needed on another machine • Bad workpiece quality • <User-defined Unload reason>
Unload tool to Assembly	

Parameter	Description	
Choose action flag	Choose one of the following action flags to specify the reason for unloading the tool:	
	Decide further processing	A tool can be unloaded on the machine without an action suggested. After unloading, the tool is listed on the server. The presetter must decide on further action of the tool.
	Overhaul	After unloading the tool to overhaul, the tool is placed in "Kanban" in the column "To be assembled" on the server. The replacement of the tool edge is enabled.
	Remeasure	The tool is placed in "Kanban" in the column "To be measured" on the server. The tool looses previous correction data.
	Recheck	The presetter provides the tool again after a check. The tool is placed in "Kanban" in the column "To be provided" that keeps the original correction data.
	Disassemble	The tool is removed from the client. Reloading is not possible.
Comment on unloading reason	For the comment, a maximum of 128 characters are available.	
Unload tool to cabinet		
Tool name	Shows the tool name.	
ID for tool instance	Shows the identifier for tool instance data.	
Cabinet	Select the required cabinet from the drop-down list.	
Container	Select the required container from the drop-down list.	

Note

Machines without a configured magazine

On machines without a configured magazine, i.e. turning machines, the Loading point is not required for the unloading.

Note

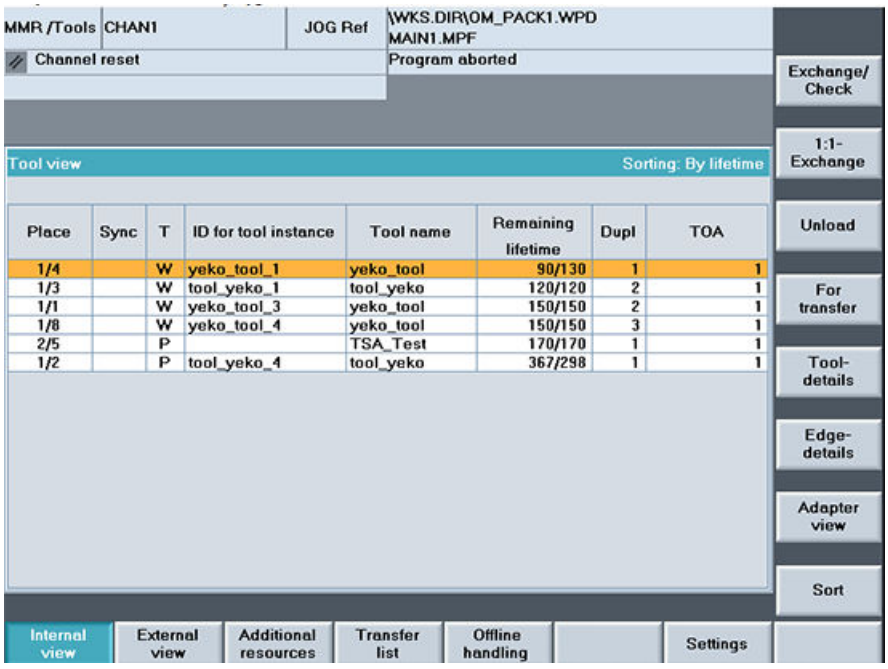
Unloading new and old tools

- You can unload new tools (greenfield tools) with "Assembly", "Cabinet", or "AtMachine".
- You can only unload old tools (brownfield tools) with "AtMachine".

Procedure

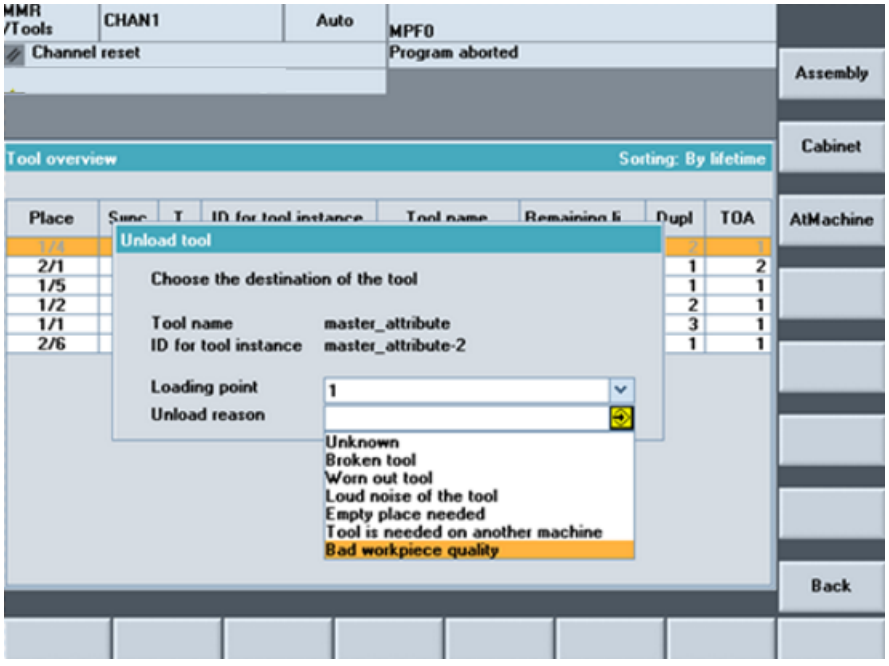
Internal view

1. Press the "Internal view" softkey.
   The "Tool view" window opens.



Unload

2. Select a tool from the overview and press the "Unload" softkey.
The "Unload tool" window opens.
Select the destination of the tool.
Select an Unload reason in the drop-down list "Unload reason".



If you have deleted the Unload reasons, they are not displayed in the dialog box. The Unload reasons are deleted via the API.

For more information, see Configuring Unload reasons and their action flags (Page 955).

Press one of the following softkeys:

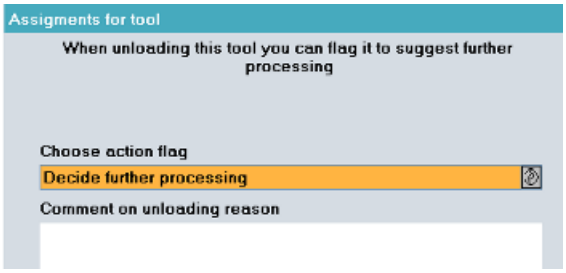
- Assembly (only available for greenfield tools)
  If you unload to Assembly and have deleted the Unload reasons, the default action flag is "Disassemble".
- Cabinet (only available for greenfield tools)
- AtMachine
  If you unload brownfield tools in the offline mode, the operation is carried out as soon as the machine goes online again. Therefore, the following message is displayed in the offline mode:
  "Move of the tool will be completed when the machine goes online."

Assembly

3. Press the "Assembly" softkey to unload the tool (new tool - greenfield tools) to the assembly location.

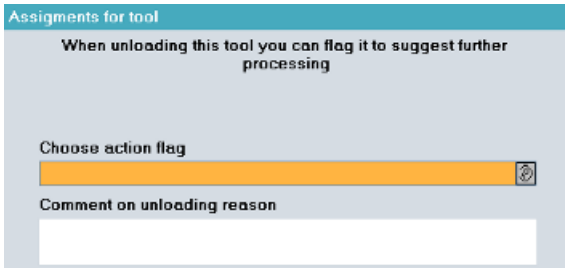
   The "Assignments for tool" window opens.

   - Select an action flag in the drop-down list.
   - Write a comment in the text field below (optional).
     After you write a comment, press "Enter" to store the comment.



   In the dialog line, you receive a message that the selected tool has been successfully unloaded.

   If no action flag has been configured to go with the Unload reason, the "Choose action flag" field is empty.



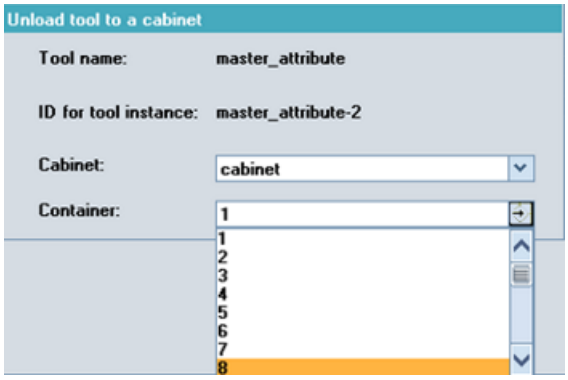
   - OR -

Cabinet

   Press the "Cabinet" softkey to unload the tool (new tool - greenfield tools) to the cabinet.

   The "Unload tool to a cabinet" window opens.

   - Select the desired cabinet from the drop-down list.
   - Select the target container from the "Container" drop-down list.



   In the dialog line, you receive a message that the selected tool has been successfully unloaded, e.g. into the cabinet

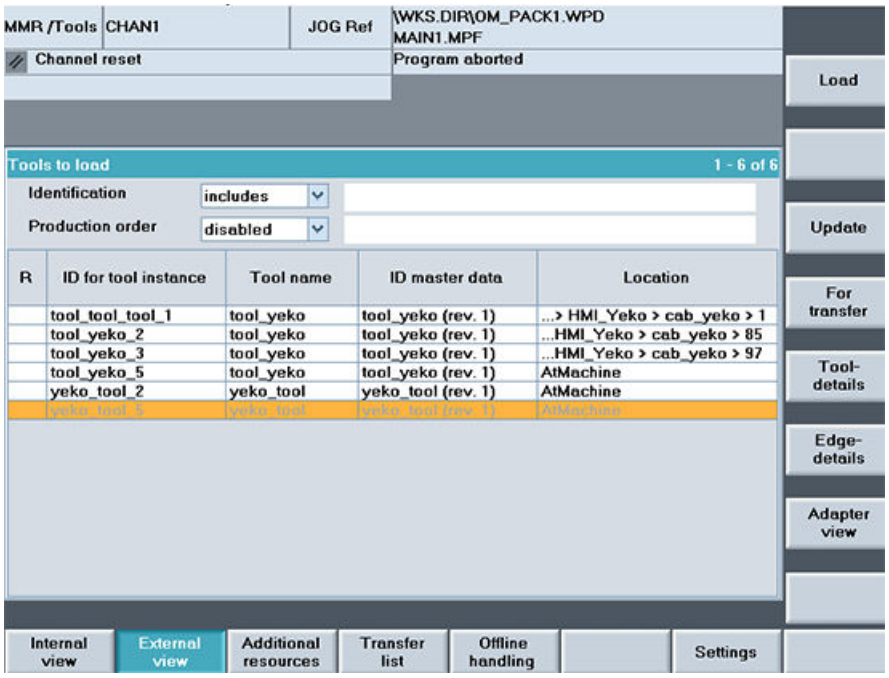
- OR -

AtMachine

Press the "AtMachine" softkey to unload the tool to the AtMachine location.

There are two possibilities:

- If the tool is a greenfield tool and was unloaded AtMachine, the operator can load the tool again.
- If the tool is a brownfield tool and was unloaded AtMachine, the operator cannot load the tool anymore.



You receive a success message in the dialog line.

4. The unloaded tool is supplied to the desired unloading point.
   - Open the door.
   - Remove the tool.
   - Close the doors.

Cancel the current operation

During tool load, unload, exchange or check/exchange the machine operator is able to break the current action by pushing the reset button on the Machine Control Panel (MCP). As a result the tool load/unload action is aborted at the current position and a modal dialog is shown, which the operator has to acknowledge by pressing the "Ok" softkey.
Further information about the configuration of the cancelation PLC address bit is provided in the Installation Manual "Mcenter, Manage MyResources, Optimize MyProgramming /NX-Cam Editor, Analyze MyPerformance /OEE, Access MyData /Collector".

6.4.6 Displaying details of internal tools

6.4.6.1 Tool details

You can display further data of a tool.

Parameter

The following parameters are displayed in the "Tool details" window:

Parameter	Description
"General <Identifier instance data>" windows	
ID master data	Shows the name of the master data set.
Tool name	Shows the name of the tool.
T-Number	Shows the internal T number in the NC.
Duplo No.	Shows the duplo number.
TOA	Shows the TOA unit.
Place type	Shows the place type.
Num. cutting edges	Displays the number of cutting edges.
Max. revolution	Shows the maximum speed.
Max. acceleration	Displays the maximum acceleration.
Load time	Shows the point in time when the tool was loaded.
Size in half locations - Above	Shows the size of the tool in half-locations above.
Size in half locations - Under	Shows the size of the tool in half-locations under.
Size in half locations - Left	Shows the size of the tool in half-locations on the left-hand side.
Size in half locations - Right	Shows the size of the tool in half-locations on the right-hand side.
"User defined <Identifier instance data>" window	
attribute 1 to X	Shows the user-defined attributes of a tool, which were assigned to tool instance on the server side.
"OEM TPC <Identivier instance data>" window	
TC_TPCxy	Shows the tool-specific OEM data of the tool.

Restriction

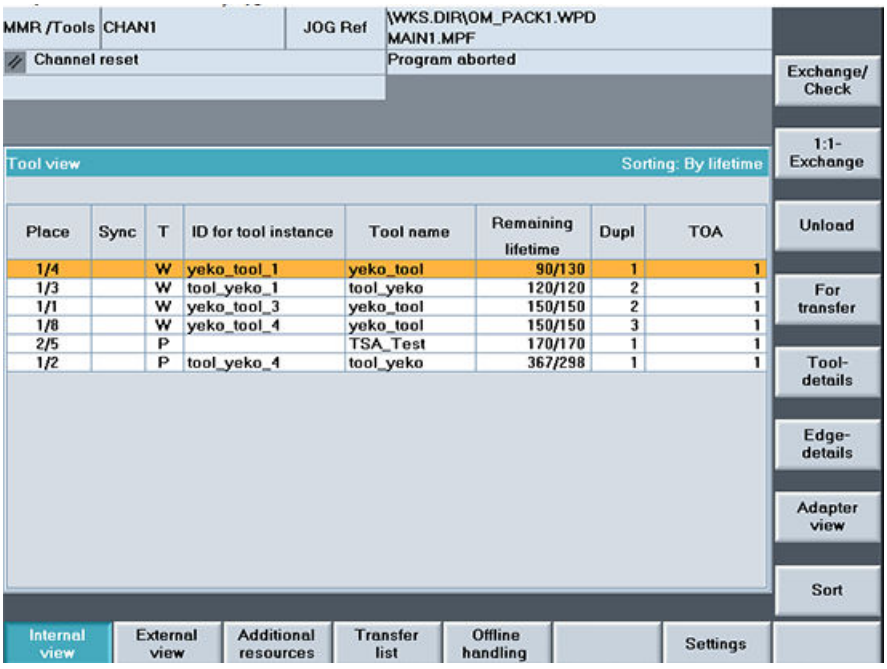
Maximal revolution and maximal acceleration of tool details only available from NCK Version 7.5.

Example: On Windows NT these two values are unavailable.

Procedure

Internal view

1. Press the "Internal view" softkey.
   The "Tool view" window opens and shows the overview of the tools.

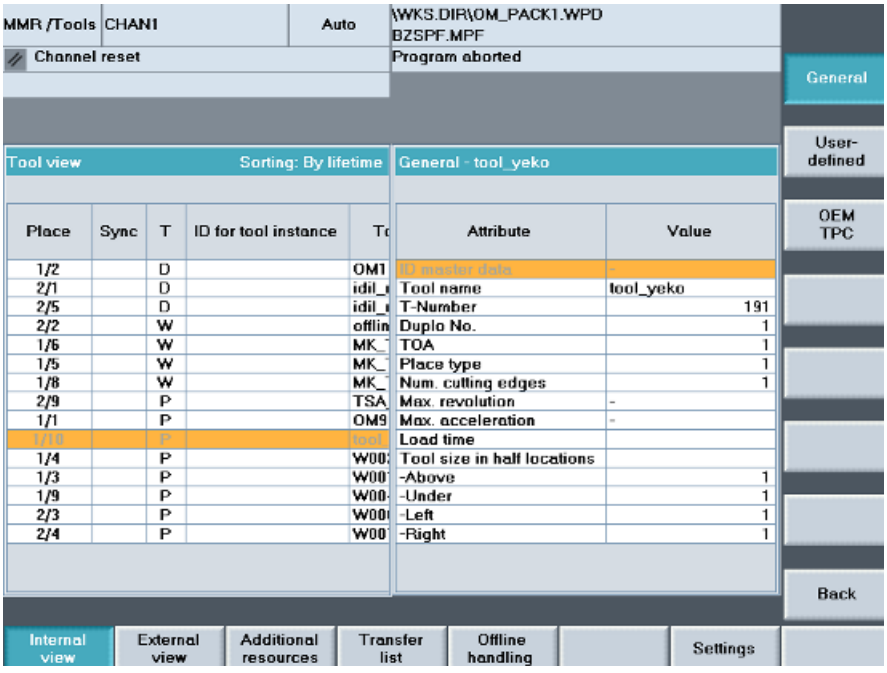


Tool-details

2. Select a tool from the overview and press the "Tool-details" softkey.

General

The "General - <Identifier instance data>" window opens and displays the tool details.

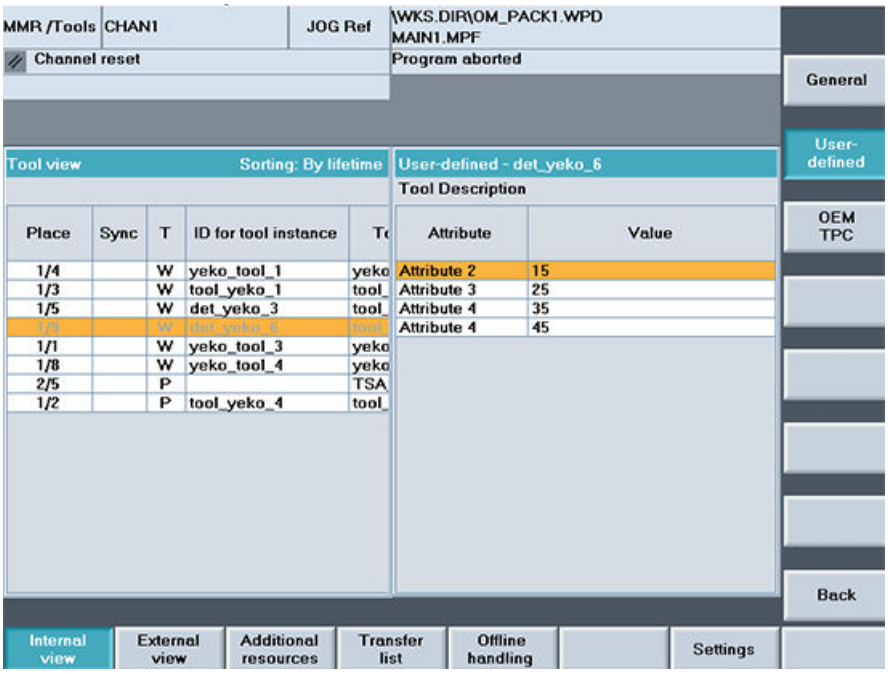


- OR -

User-defined

Press the "User-defined" softkey.

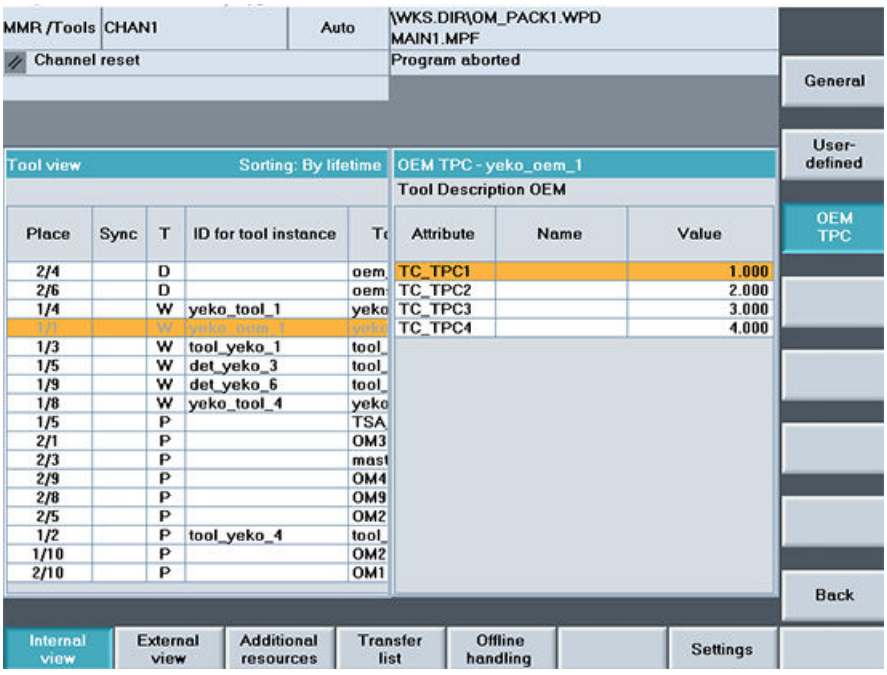
An additional window opens and displays the user-defined attributes of the tool.



- OR -

OEM TPC

Press the "OEM TPC" softkey.
An additional window opens and displays the OEM TPC attributes of the tool.



Back

3. To exit the detailed view, press the "Back" softkey.

6.4.6.2 Cutting edge details

You can display further data of a tool.

Prerequisite

If you want to see the tool monitoring of the workpiece you have to change the monitoring type on the server.

For more information, see Configuring tool life observation method (Page 953).

Parameter

The following parameters are displayed in the "Details" window:

Parameter	Description
"General - <ID Instance data>" window	
DNo	Shows the cutting edge number.
Type	Shows the cutting edge type.
Remaining lifetime / Remaining workpieces	Shows the residual tool life in minutes or in workpieces. You can change the value to define a new value for this cutting edge.

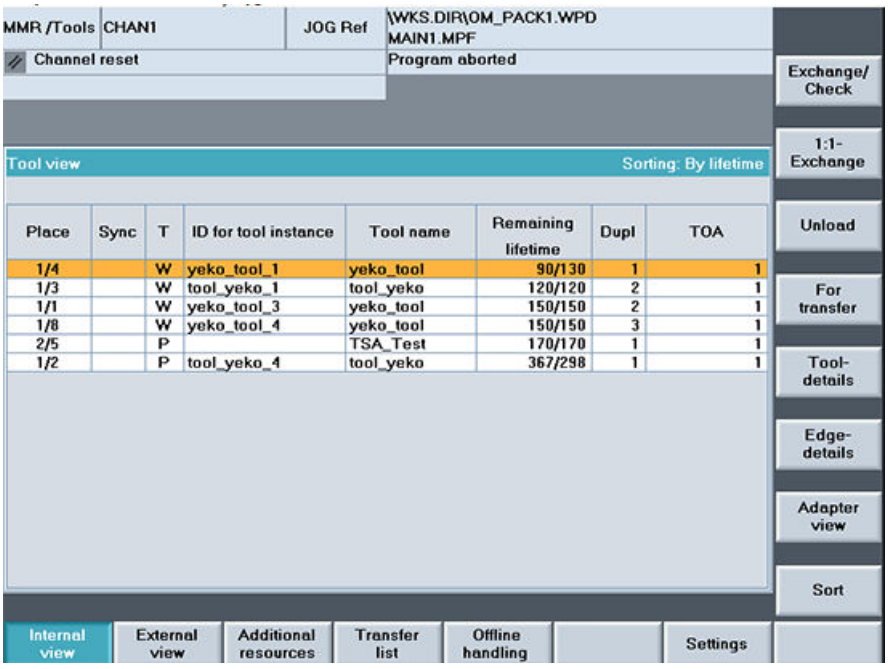
Parameter	Description
Target lifetime / Target workpieces	Shows the planned tool life in minutes or in workpieces. You can change the value to define a new value for this cutting edge.
Tool life prewarning limit /Workpieces prewarning limit	Shows the prewarning limit in minutes or in workpieces. You can change the value to define a new value for this cutting edge.
"Geometry data - <ID Instance data>" window	
Attribute name	For each of these parameters, shows the expected value, the tolerance and the actual value. Only the data of a cutting edge are displayed. Select the cutting edge under "Cutting edge DNo:".
Edge position	
Length 1	
Length 2	
Length 3	
Radius	
Corner radius	
Length 4	
Length 5	
Angle 1	
Angle 2	
Adapter length 1	
Adapter length 2	
Adapter length 3	
Free cutting angle	
TC_DP25	
"Wear data - <ID Instance data> window	
Attribute	Shows the cutting-edge-specific wear data of a tool. Only the data of a cutting edge are displayed. Select the cutting edge under "Cutting edge DNo:".
Wear Length 1	
Wear Length 2	
Wear Length 3	
Wear Radius	
Wear Corner radius	
Wear Length 5	
Wear Angle 1	
Wear Angle 2	
Wear Length 4	
"OEM DPC: <ID Instance data>" window	
Attribute	Shows the cutting-edge-specific OEM data of a tool. Only the data of a cutting edge are displayed. Select the cutting edge under "Cutting edge DNo:".
TC_DPC1 to x	
"OEM MOPC - <ID Instance data>" window	

Parameter	Description
Attributes	Shows the cutting-edge-specific OEM monitoring data of a tool. Only the data of a cutting edge are displayed. Select the cutting edge under "Cutting edge DNo:".
TC_MOPC1 to x	

Procedure

Internal view

1. Press the "Internal view" softkey.
   The "Tool view" window opens and shows the overview of the tools.

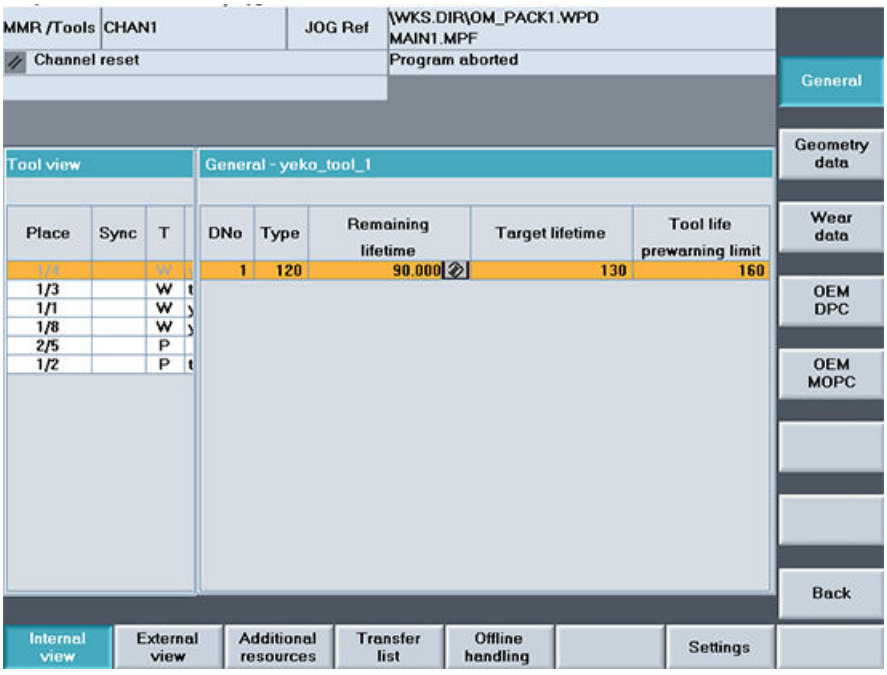


Edge-details

2. Select a tool from the overview and press the "Edge-details" softkey.
The "General - <ID Instance data>" window opens and shows cutting edge data.

   If required, change the Remaining lifetime/workpiece of the tool:

   - Select the input filed on the Controller
   - Enter the desired lifetime/workpiece of the tool.

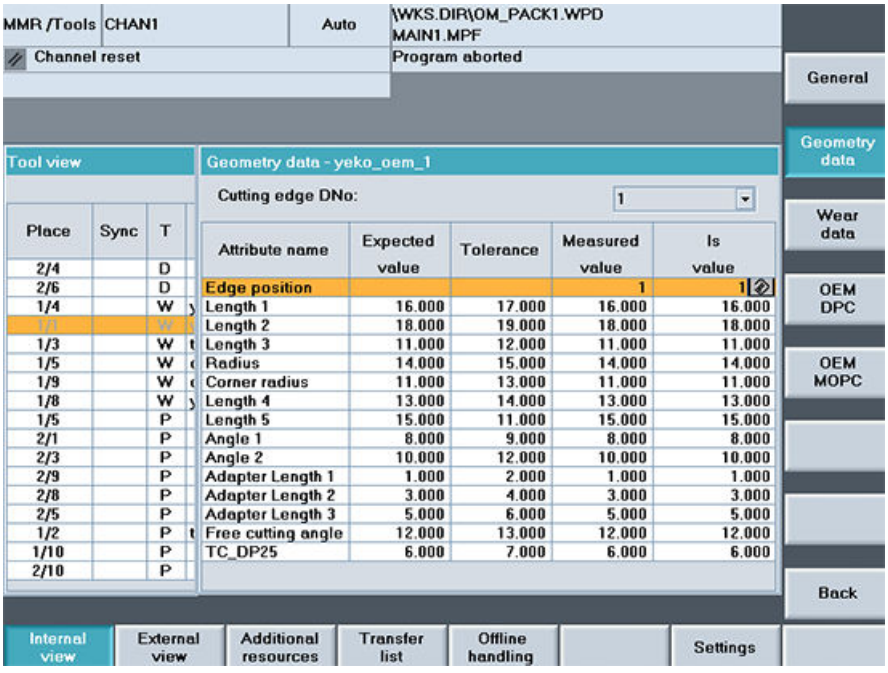


Geometry data

3. Press the "Geometry data" softkey.

   The "Geometry data - <ID Instance data>" window opens and shows cutting-edge-specific geometry data.

   Select the "Cutting edge DNo:" in the drop-down list.

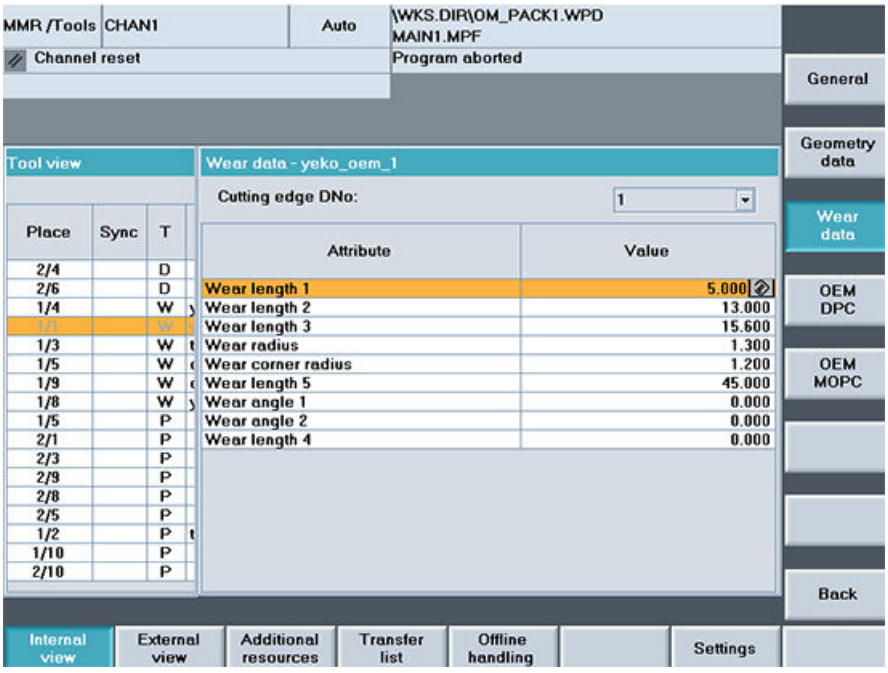


Wear data

4. Press softkey "Wear data".

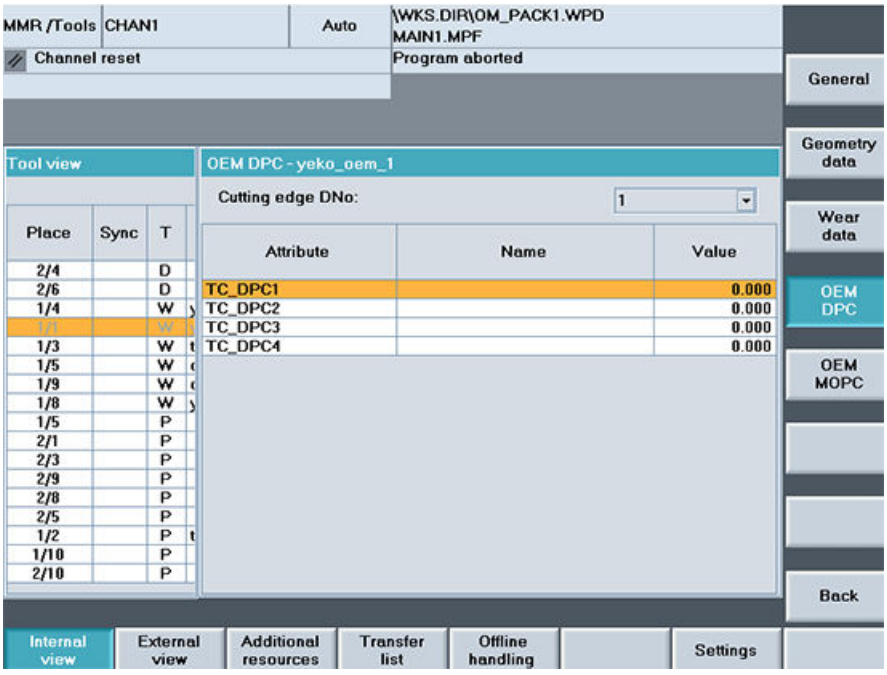
   The "Wear data - <ID Instance data>" window opens and shows the cutting-edge-specific wear data of the tool.

   Select the "Cutting edge DNo:" in the drop-down list.



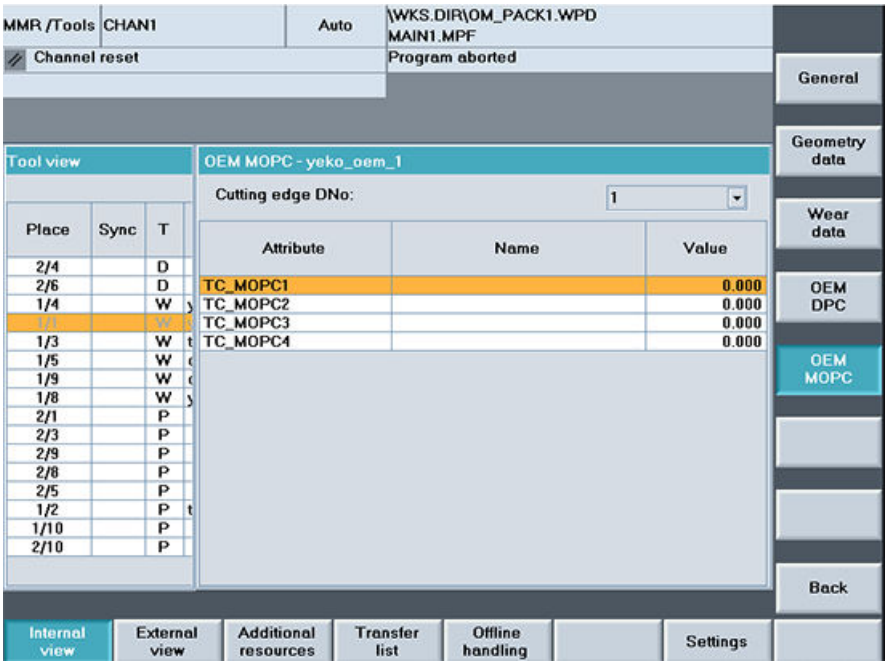
OEM DPC

5. Press softkey "OEM DPC".
   The "OEM DPC - <ID Instance data>" window opens and shows the cutting-edge-specific OEM data of the tool.
   Select the "Cutting edge DNo:" in the drop-down list.



OEM MOPC

6. Press softkey "OEM MOPC".
   The "OEM MOPC - <ID Instance data>" window opens and shows the cutting-edge-specific OEM monitoring data of the tool.
   Select the "Cutting edge DNo:" in the drop-down list.



Back

7. To exit the detailed view, press the "Back" softkey.

6.4.7 Displaying details of external tools

6.4.7.1 Tool details

You can display further tool data details.

Parameter

Parameter	Description
"General - <Identifier instance data>" windows	
ID master data	Shows the name of the master data set.
Tool name	Shows the name of the tool.
T-Number	Shows the internal T number in the NC.
Duplo No.	Shows the duplo number.
TOA	Shows the TOA unit.
Place type	Shows the place type.
Num. cutting edges	Displays the number of cutting edges.

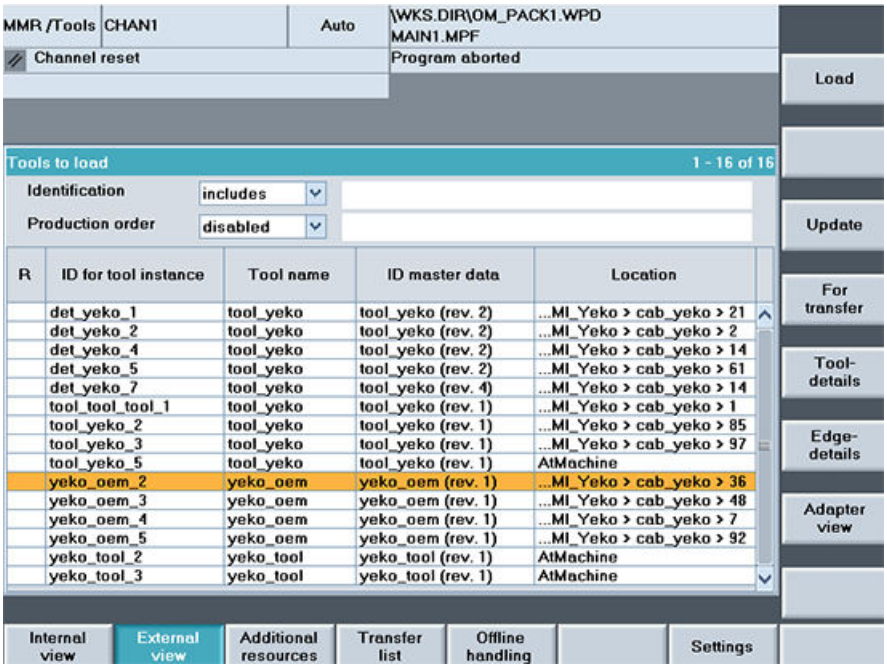
Parameter	Description
Max. revolution	Shows the maximum speed.
Max. acceleration	Displays the maximum acceleration.
Load time	Shows the point in time when the tool was loaded.
Size in half locations - Above	Shows the size of the tool in half-locations above.
Size in half locations - Under	Shows the size of the tool in half-locations under.
Size in half locations - Left	Shows the size of the tool in half-locations on the left-hand side.
Size in half locations - Right	Shows the size of the tool in half-locations on the right side.
"OEM TPC - <Identivier instance data>" window	
TC_TPCxy	Shows the tool-specific OEM data of the tool.

Procedure

External view

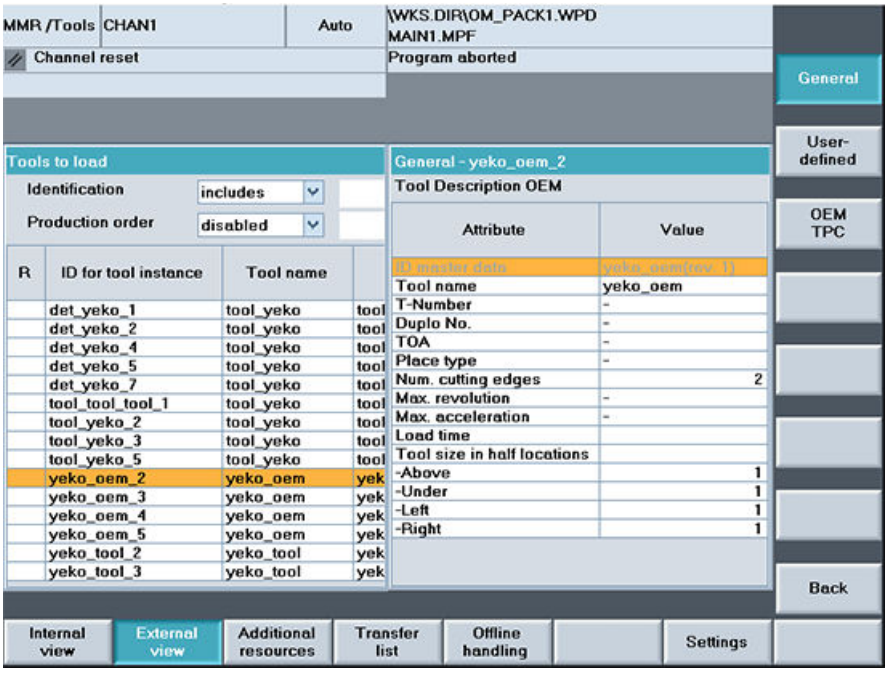
Tool-details

1. Press the "External view" softkey.
   The "Tools to load" window opens and shows the overview of the tools.
2. Select a tool from the overview and press the "Tool-details" softkey.



General

The "General - <Identifier instance data>" window opens and displays the tool details.

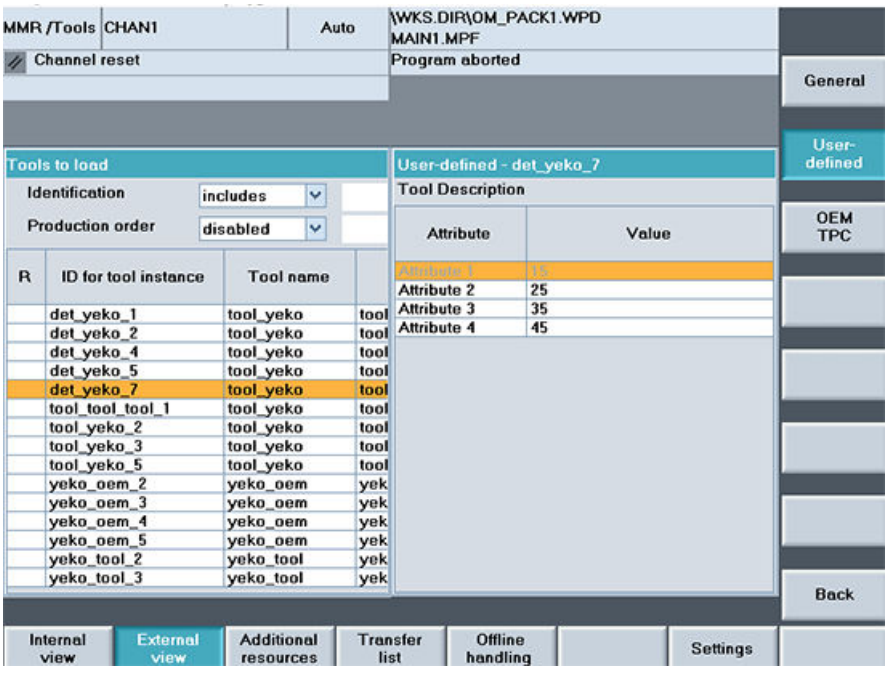


User-defined

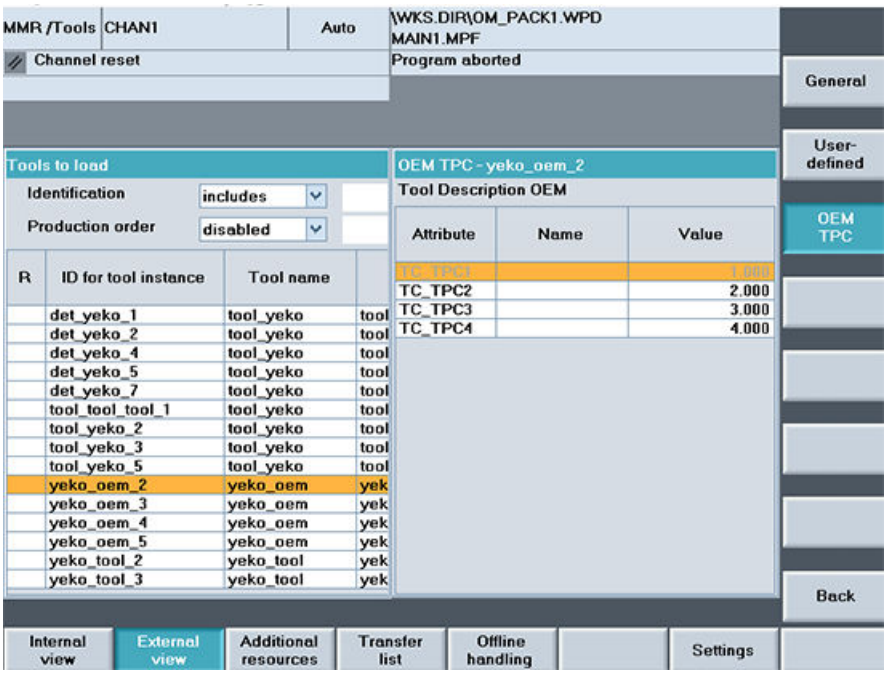
Press the "User defined" softkey. An additional window opens and displays the user de attributes of the tool.

Note:

Do not use vertical bar "|" or colon ":" characters for the user defined values on tool master data.



Press the "OEM TPC" softkey.
An additional window opens and displays the OEM TPC attributes of the tool.



3. To exit the detailed view, press the "Back" softkey.

6.4.7.2 Cutting edge details

You can display further tool data.

Prerequisite

If you want to see the tool monitoring of the workpiece, you have to change the monitoring type on the server.
For more information, see Configuring tool life observation method (Page 953).

Parameters

Parameter	Description
"General - <ID Instance data>" window	
DNo	Shows the cutting edge number.
Type	Shows the cutting edge type.
Remaining lifetime / Remaining workpieces	Shows the residual tool life in minutes or in workpieces. You can change the value to define a new value for this cutting edge.

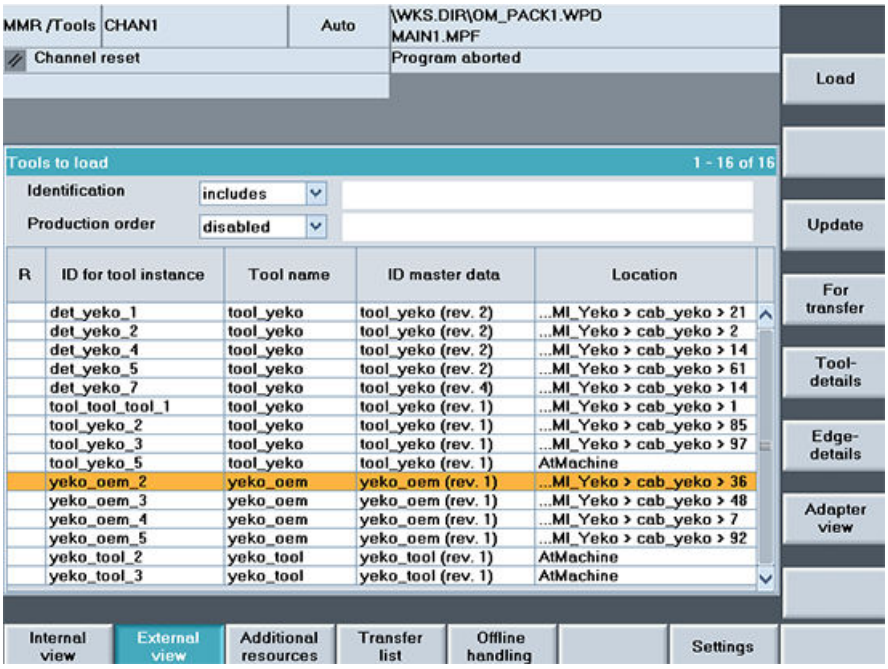
Parameter	Description
Target lifetime / Target workpieces	Shows the planned tool life in minutes or in workpieces. You can change the value to define a new value for this cutting edge.
Tool life prewarning limit /Workpieces prewarning limit	Shows the prewarning limit in minutes or in workpieces. You can change the value to define a new value for this cutting edge.
"Geometry data - <ID Instance data>" window	
Attribute name	For each of these parameters, shows the expected value, the tolerance and the actual value. Only the data of a cutting edge are displayed. Select the cutting edge under "Cutting edge DNo:".
Edge position	
Length 1	
Length 2	
Length 3	
Radius	
Corner radius	
Length 4	
Length 5	
Angle 1	
Angle 2	
Adapter length 1	
Adapter length 2	
Adapter length 3	
Free cutting angle	
TC_DP25	
"Wear data - <ID Instance data> window	
Attribute	Shows the cutting-edge-specific wear data of a tool. Only the data of a cutting edge are displayed. Select the cutting edge under "Cutting edge DNo:".
Wear Length 1	
Wear Length 2	
Wear Length 3	
Wear Radius	
Wear Corner radius	
Wear Length 5	
Wear Angle 1	
Wear Angle 2	
Wear Length 4	
"OEM DPC - <ID Instance data>" window	
Attribute	Shows the cutting-edge-specific OEM data of a tool. Only the data of a cutting edge are displayed. Select the cutting edge under "Cutting edge DNo:".
TC_DPC1 to x	
"OEM MOPC - <ID Instance data>" window	

Parameter	Description
Attributes	Shows the cutting-edge-specific OEM monitoring data of a tool. Only the data of a cutting edge are displayed. Select the cutting edge under "Cutting edge DNo:".
TC_MOPC1 to x	

Procedure

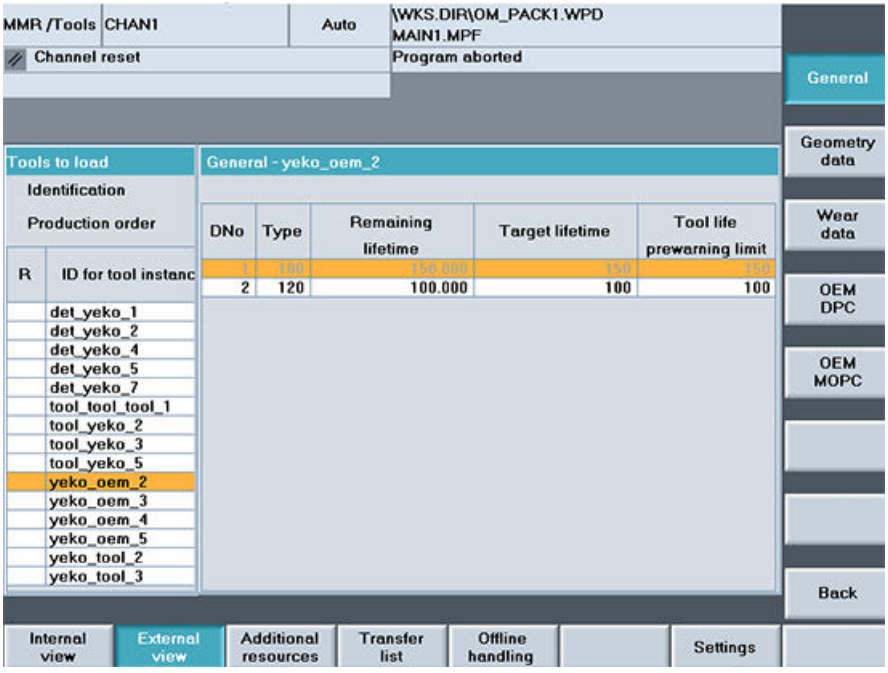
External view

1. Press the "External view" softkey.
   The "Tools to load" window opens and shows the overview of the tools.



Edge-details

2. Select a tool from the overview and press the "Edge-details" softkey.
   The "General - <ID Instance data>" window opens and shows cutting edge data.

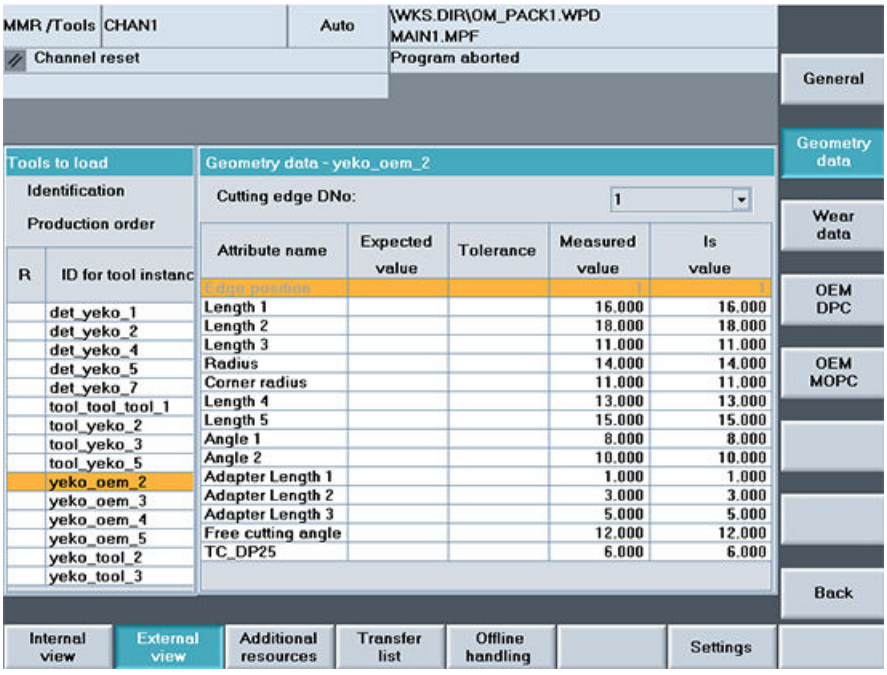


Geometry data

3. Press the "Geometry data" softkey.

   The "Geometry data - <ID Instance data>" window opens and shows cutting-edge-specific geometry data.

   Select the "Cutting edge DNo:" in the drop-down list.

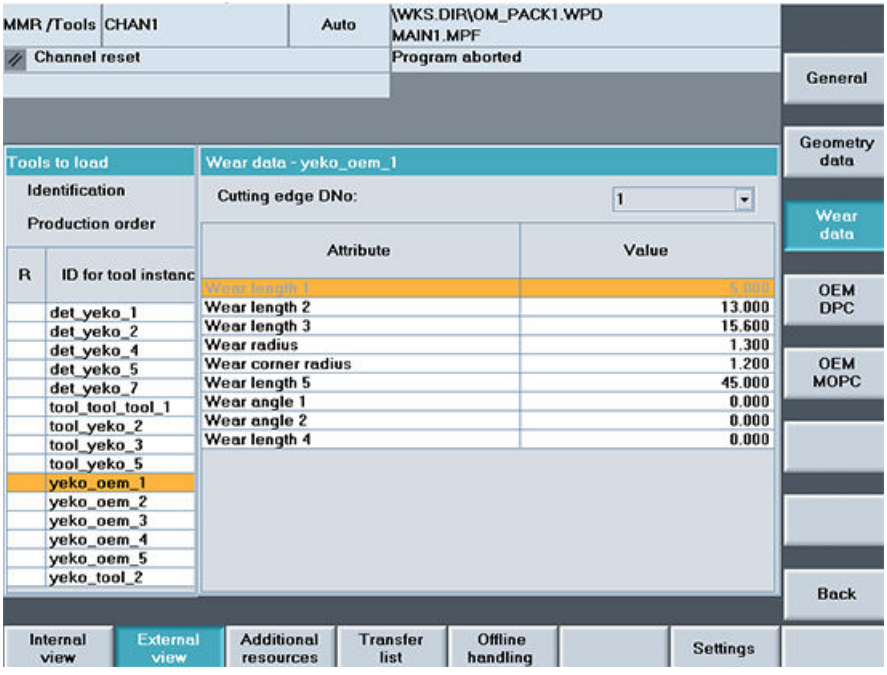


Wear data

4. Press softkey "Wear data".

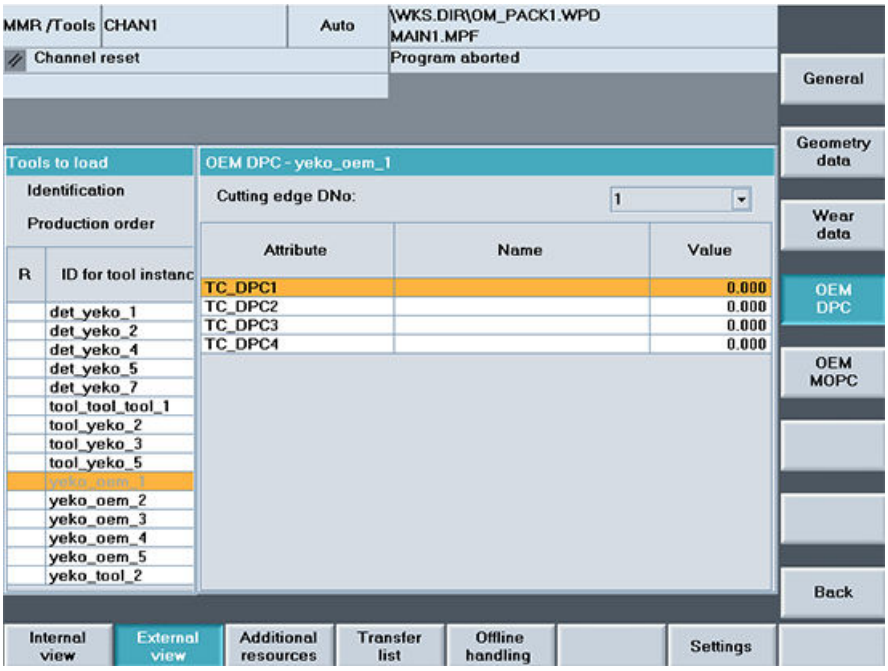
   The "Wear data - <ID Instance data>" window opens and shows the cutting-edge-specific wear data of the tool.

   Select the "Cutting edge DNo:" in the drop-down list.

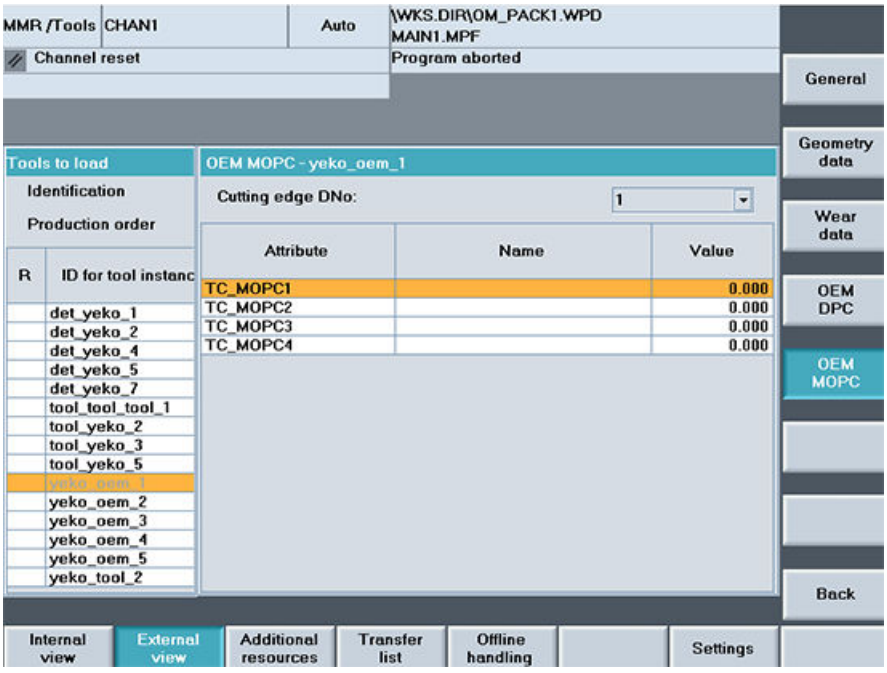


OEM DPC

5. Press "OEM DPC" softkey.
   The "OEM DPC - <ID Instance data>" window opens and shows the cutting-edge-specific OEM data of the tool.
   Select the "Cutting edge DNo:" in the drop-down list.



6. Press "OEM MOPC" softkey.
   The "OEM MOPC - <ID Instance data>" window opens and shows the cutting-edge-specific OEM monitoring data of the tool.
   Select the "Cutting edge DNo:" in the drop-down list.



7. To exit the detailed view, press the "Back" softkey.

6.4.8 OEM Bitmap

Overview

Further information related to OEM Values can be displayed.

Procedure

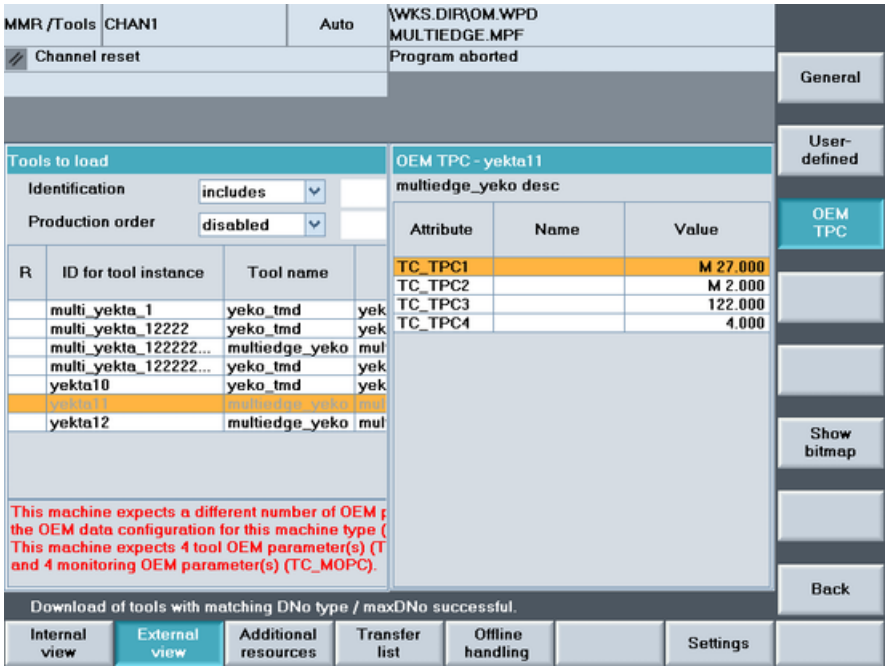
1. Select a tool from displayed tool list on "Internal view" or "External view".

2. Click "Tool details".

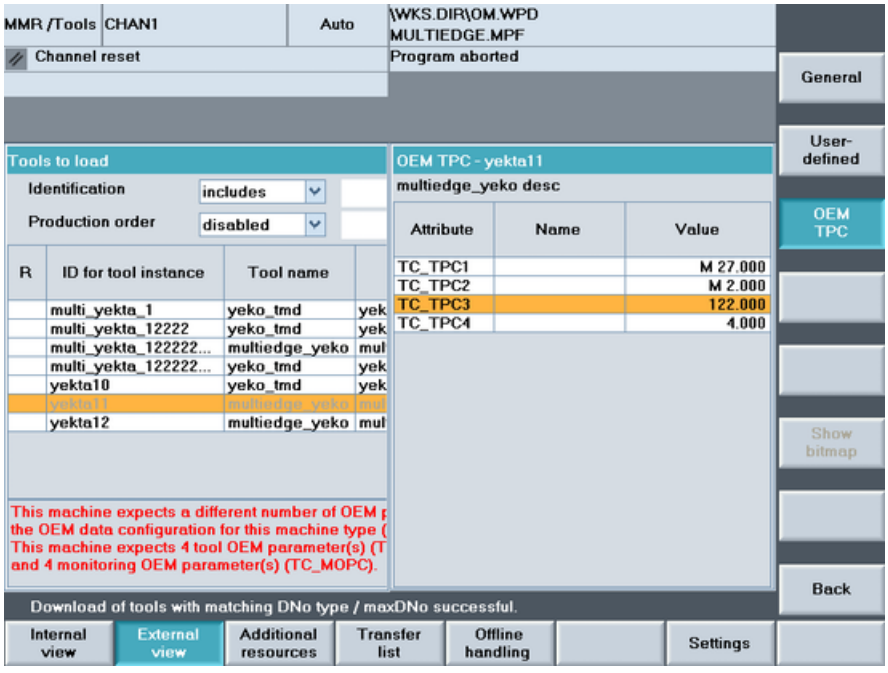
Tool-details

OEM TPC

3. Click "OEM TPC".
   The button "Show bitmap" is visible.

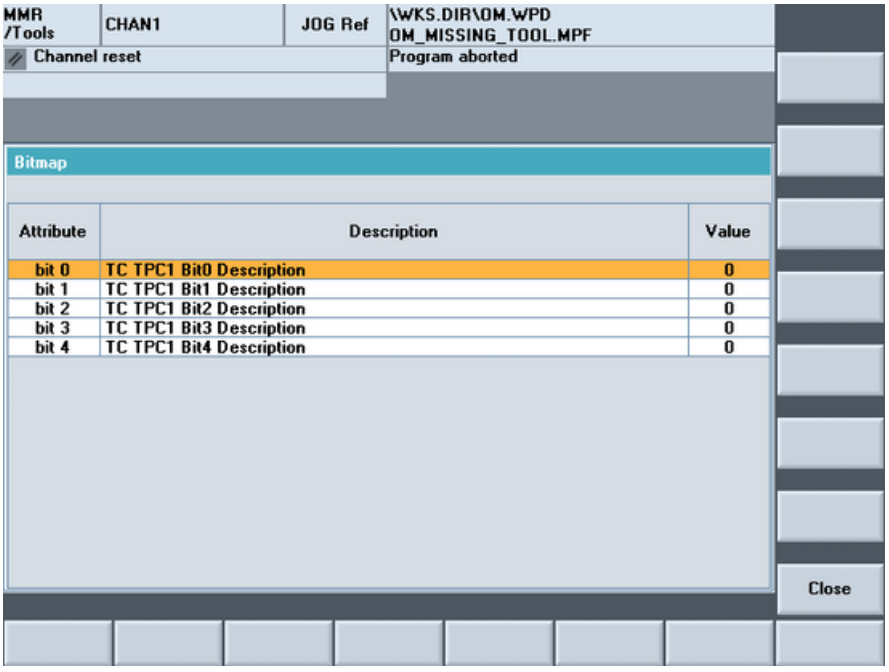


The button "Show bitmap" will not be activated, if the selected "OEM Value" has no OEM Bitmapping.



In the overview, the actual value is preceded by an "M", if Bitmapping is available for an OEM Value.

4. Select an OEM Value from overview and click "Show bitmap".

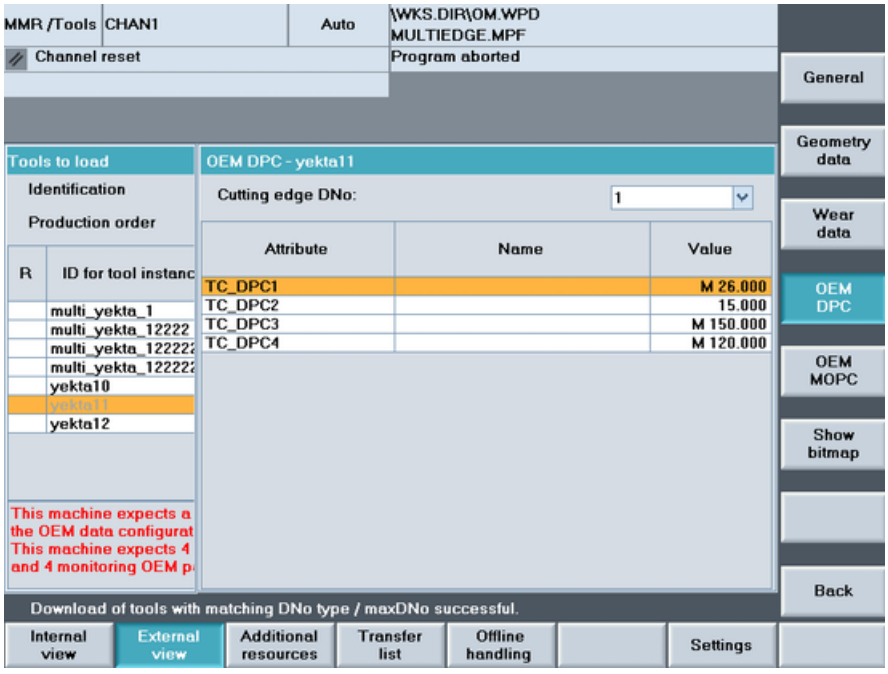


Activated and deactivated bits for selected OEM Value is displayed. Descriptions for each bit are visible, if they are set on server.

5. Click "Close" to exit the OEM Bitmap.

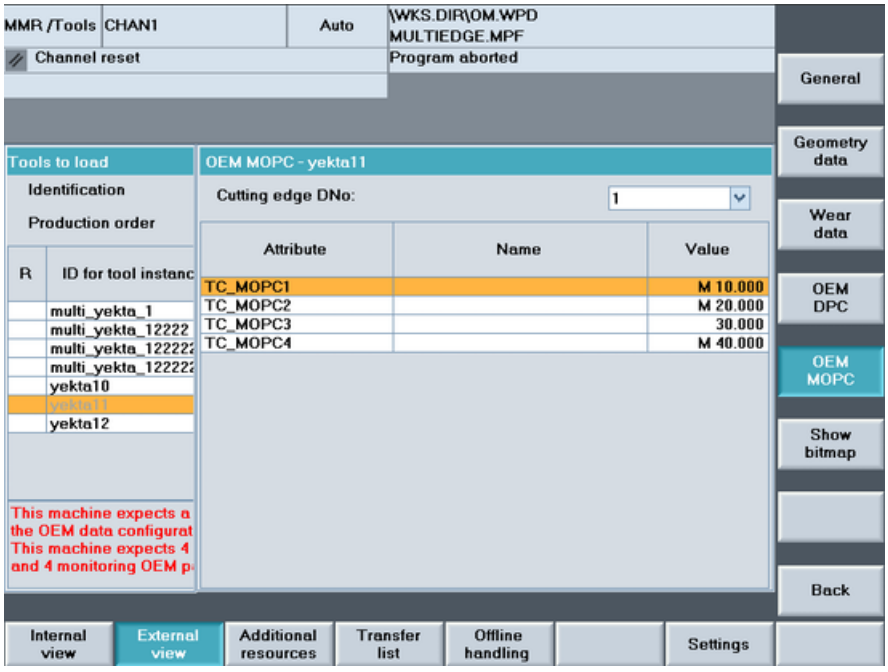
Close

For "OEM DPC" and "OEM MOPC" the same procedure is available in "Edge Details".



OEM DPC

OEM MOPC



6.4.9 Sorting tools

In the Tool view, tools can be sorted in ascending numerical or alphabetical order in the following columns:

- Place
- Ident. instance data
- Tool name
- Remaining lifetime / Remaining workpieces

Procedure

Internal view

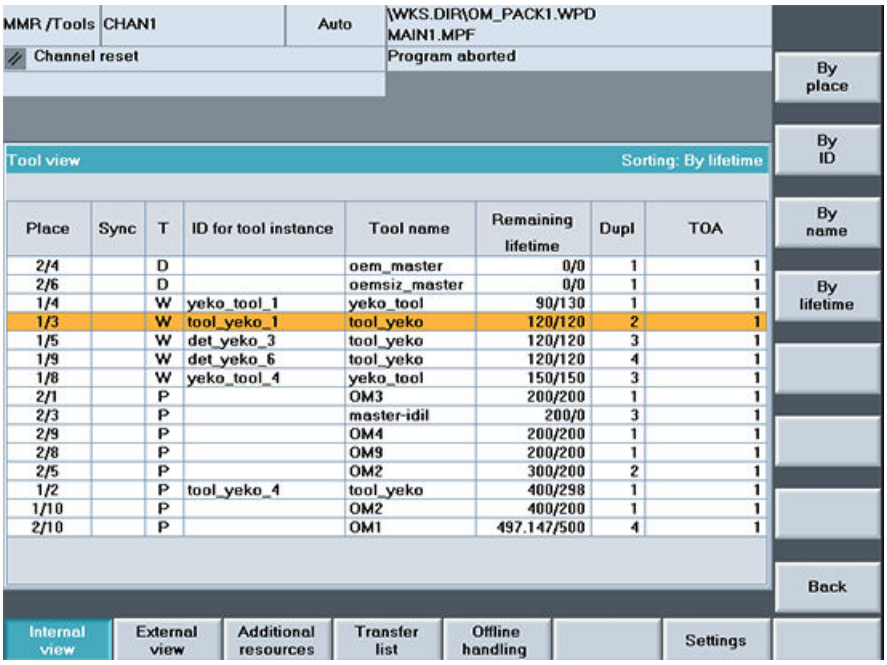
1. Press the "Internal view" softkey.
   The "Tool view" window opens

Sort

2. Press the "Sort" softkey.
   An additional vertical softkey bar appears and offers you the various sorting options.

By place

3. Press the "By place" softkey.
   The tools are shown in numerically ascending order in the "Place" column.



Place	Sync	T	ID for tool instance	Tool name	Remaining lifetime	Dupl	TOA
2/4		D		oem_master	0/0	1	1
2/6		D		oemsiz_master	0/0	1	1
1/4		W	yeko_tool_1	yeko_tool	90/130	1	1
1/3		W	tool_yeko_1	tool_yeko	120/120	2	1
1/5		W	det_yeko_3	tool_yeko	120/120	3	1
1/9		W	det_yeko_6	tool_yeko	120/120	4	1
1/8		W	yeko_tool_4	yeko_tool	150/150	3	1
2/1		P		OM3	200/200	1	1
2/3		P		master-idil	200/0	3	1
2/9		P		OM4	200/200	1	1
2/8		P		OM9	200/200	1	1
2/5		P		OM2	300/200	2	1
1/2		P	tool_yeko_4	tool_yeko	400/298	1	1
1/10		P		OM2	400/200	1	1
2/10		P		OM1	497.147/500	4	1

- OR -

By ident.

Press the "By ID." softkey.

The tools are displayed in the "Ident. instance data" column in ascending alphabetical order.

- OR -

By name

Press the "By name" softkey.

The tools are shown in ascending alphabetical order in the "Tool name" column.

- OR -

By lifetime

Press the "By lifetime" / "By pieces" softkey.

The tools are shown in numerically ascending order in the "Remaining lifetime" / "Remaining workpieces" column.

When tools are sorted "By ID", "By name", or "By lifetime" / "By pieces", disabled tools are shown first, followed by tools in pre-warning state, which in turn are followed by the remaining tools.

Back

4. Press the "Back" softkey to return to the "Tool view" window.

6.4.10 Loading external tools

The tool data can be loaded from the central database. The assignment is made via the selected components in the tool view.

External tools are tools not stored on the machine, but, for example, in a cabinet which can be seen from the machine.

Prerequisite

This functionality is related to the standard protection level of HMI-Advanced.

Before a tool is loaded, the tool must be measured and the correction data must be imported.

Parameter

The following parameters are available:

Parameter	Description
"Tools to load" window	
	The number of tools is displayed in the header line. Download information is displayed in the dialog line.
Filter "Identification"	• disabled • includes • equals • starts with • ends with
Filter "Production order"	• disabled • empty • not empty • includes • equals • starts with • ends with
R	• Stands for "Reservation" • Shows one of the following tool states: – O (Order) The tool belongs to a production order. – FM (Fixed on machine) The tool is reserved for this machine. – ST The tool is a sister tool. – RT The tool is a replacement tool.
ID for tool instance	Shows a unique identifier for the instance data. The identification was already generated from the master data. Manage MyResources checks the identifier of the instance data.
Tool name	Shows the tool name.
Ident. master data	Shows the identifier for tool master data.
Location	Shows the storage location.
"Destination of the tool" window	
Place type	Enter the location type of the tool.
TOA	Select the TOA unit from the drop-down list.
Magazine	Select the required magazine from the drop-down list.

Parameter	Description
Loading point	Select the required loading point from the drop-down list.
Place	Enter the location number of the tool. If the entry field remains empty, a "Place" is assigned.

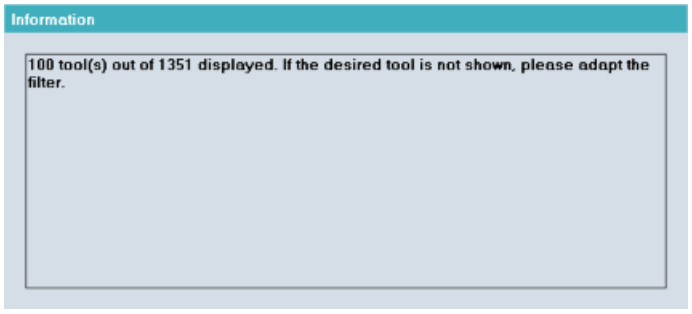
Note

Machines without a configured magazine

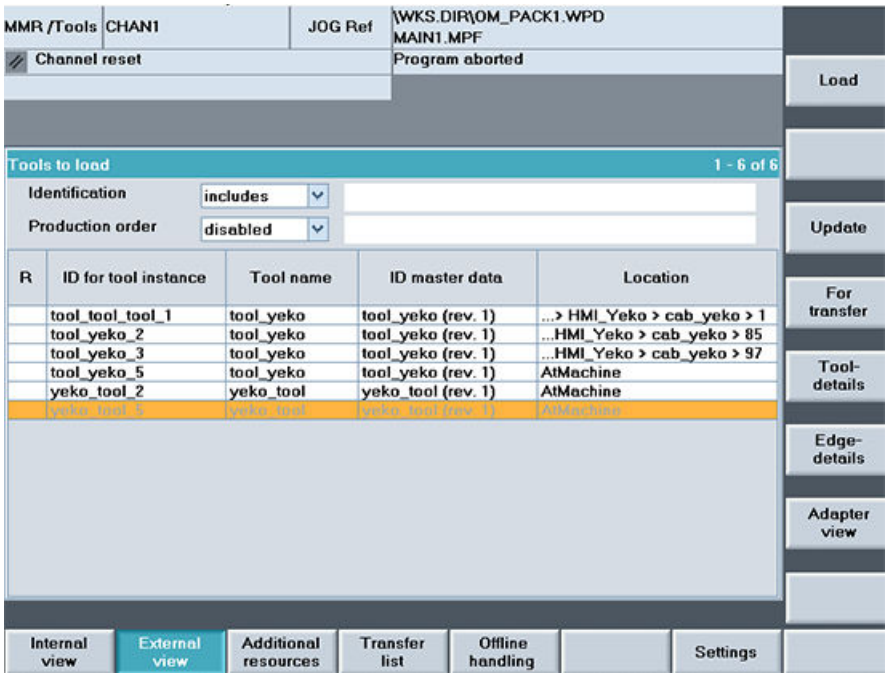
On machines without a configured magazine, i.e. turning machines, Place type, TOA, Place, , Magazine, Loading Point and Place are not required. Instead, you must enter the T-Number.

Procedure

1. Press "External view".
   The "Tools to load" window opens.
   If the number of available external tools exceeds the maximum allowed number of tools to display, the following message is shown:



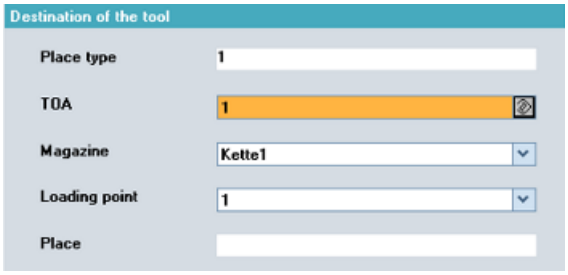
2. Press "Ok" to close the "Information" window.
   The "Tools to load" window opens and displays the external tools in an overview.



3. Select the tool.
   For more information about filters, see Filtering external tools (Page 591).
   For more information about how to create a storage location, see Storage locations (Page 152).

4. Press "Load".
   The "Destination of the tool" window opens.

5. Specify the target of the external tool instance on the machine.#
6. Press "Ok" to load the tool into the selected magazine.



NOTICE
Display of the "Information" window The "Information" window does not appear before the expiration of the time period specified in "mmrConfig.json" file via the parameter "incompleteListInfoIntervalInHours". This parameter can be defined as integer or decimal value. In case the parameter is not defined, the default duration is 8 hours.

Note

Restricted characters

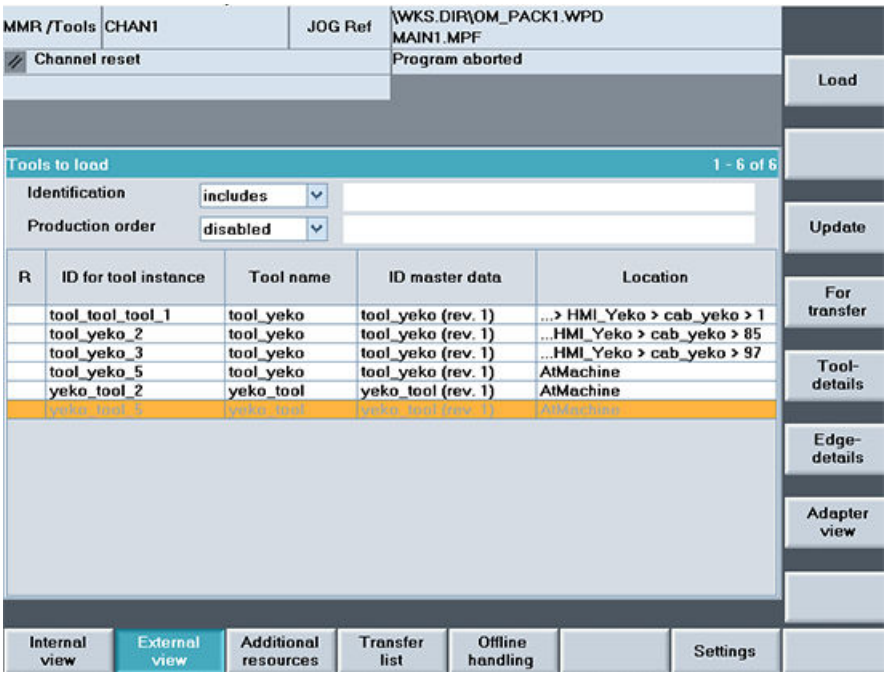
Tools that have Chinese characters or ',' (comma) character in their Instance Id cannot be loaded.

6.4.11 Filtering external tools

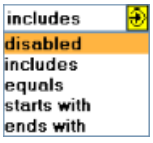
You can filter external tools that are displayed in the "Tools to load" window for a specific tool or Production order.

Procedure

1. Press the "External view" softkey.
2. The "Tools to load" window opens and displays the external tools in an overview.

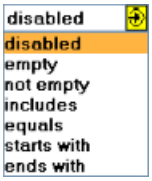


3. To filter for a specific tool, open the drop-down list behind "Identification". Select "includes", "equals", "starts with" or "ends with".
Enter the complete term, a part of the term, the beginning, or ending letters of the term into the field. The default value is "includes".
If you select the value "disabled", the text in the input field is automatically deleted.



To filter for a specific Production order, open the drop-down list behind "Production order". Select "empty", "not empty", "includes", "equals", "starts with" or "ends with". Enter the complete term, a part of the term, the beginning, or ending letters of the term into the field. The default value is "disabled".

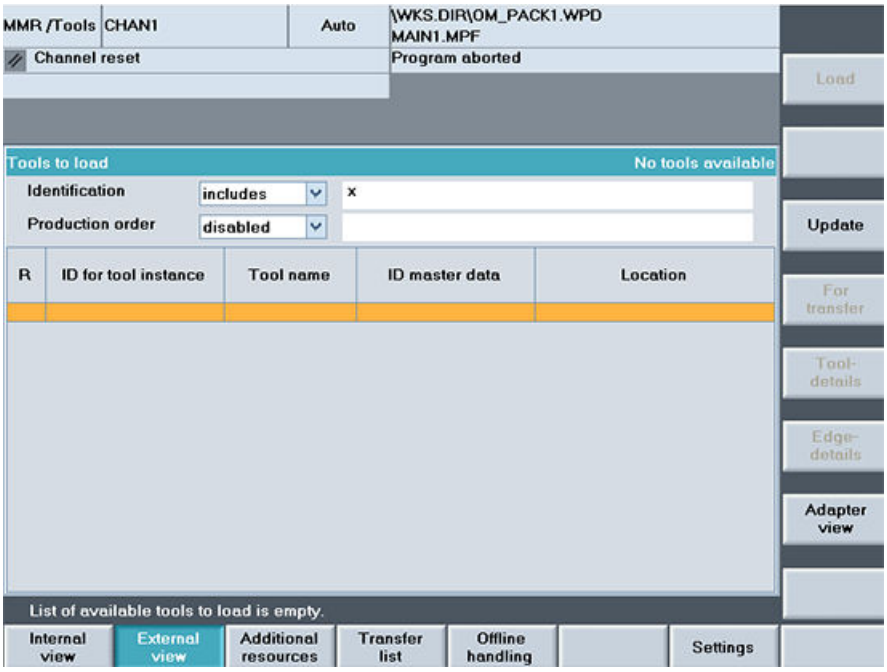
If you select the values "disabled", "empty" or "not empty", the text in the input field is automatically deleted.



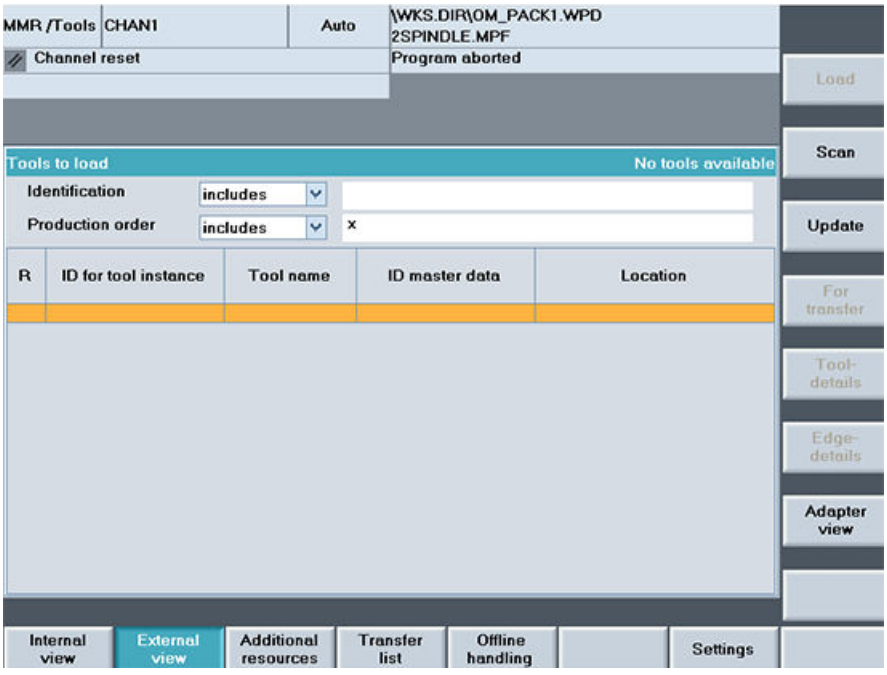
4. Confirm the input using the <Enter> key.

   All external tools to which the filter terms apply are displayed.

5. If there is no match for the terms you enter into the input field "Identification", the information "No tools available" and "List of available tools to load is empty" is displayed.



If there is no match for the terms you enter into the input field "Production order", the information "No tools available" and "List of available tools to load is empty" is displayed.



Note

Removing Production order related UI elements

It is possible to remove Production order related UI elements via configuration. The productionOrderFilterEnabled flag must be set to false in mmrConfig.json. Likewise, the R column can be removed from the grid in case toolReservationEnabled flag is set to false in mmrConfig.json.

6.4.12 Working with additional resources

6.4.12.1 Working with additional resources

You can load Additional resources like adapters to the machine, into the magazine. Resources like clampings and measuring devices can be loaded into the machine.

Update on the server

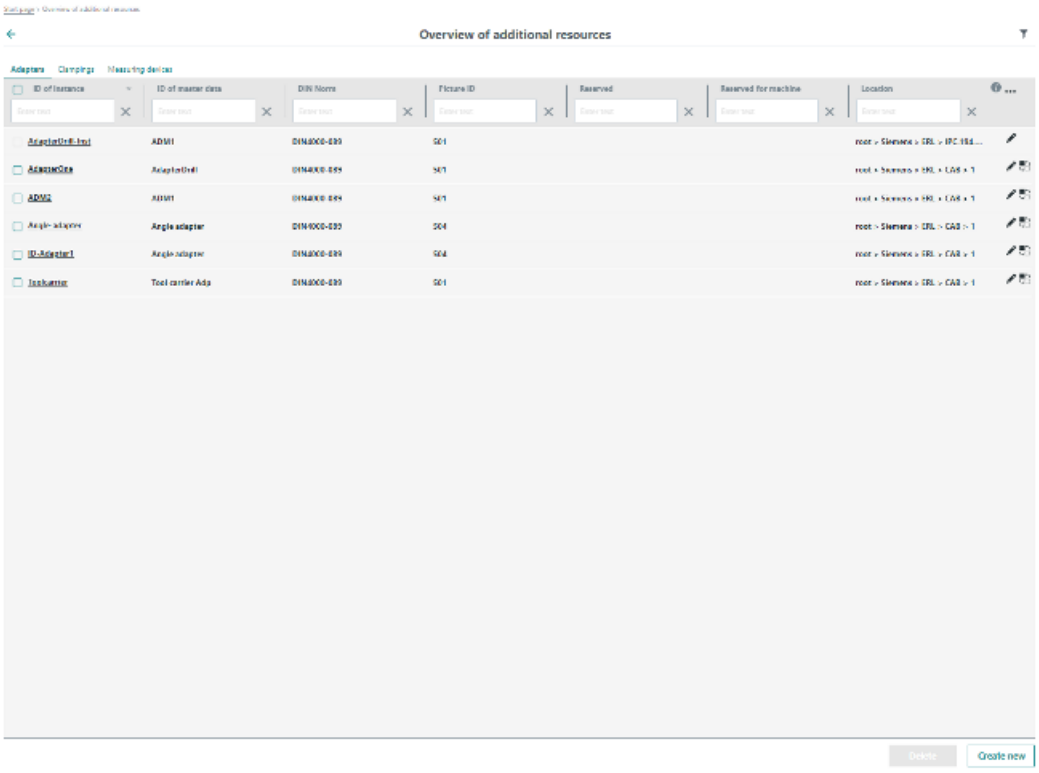
After having loaded Additional devices to the machine, open the "Additional resources" application on the server.

The information for the following instances is displayed on the server:

- Adapters
- Clampings
- Measuring devices

You have an overview over all the assignments.

For more information, see Additional resources (Page 370).



6.4.12.2 Loading adapters onto the machine

You can load adapters onto the machine.

Parameter

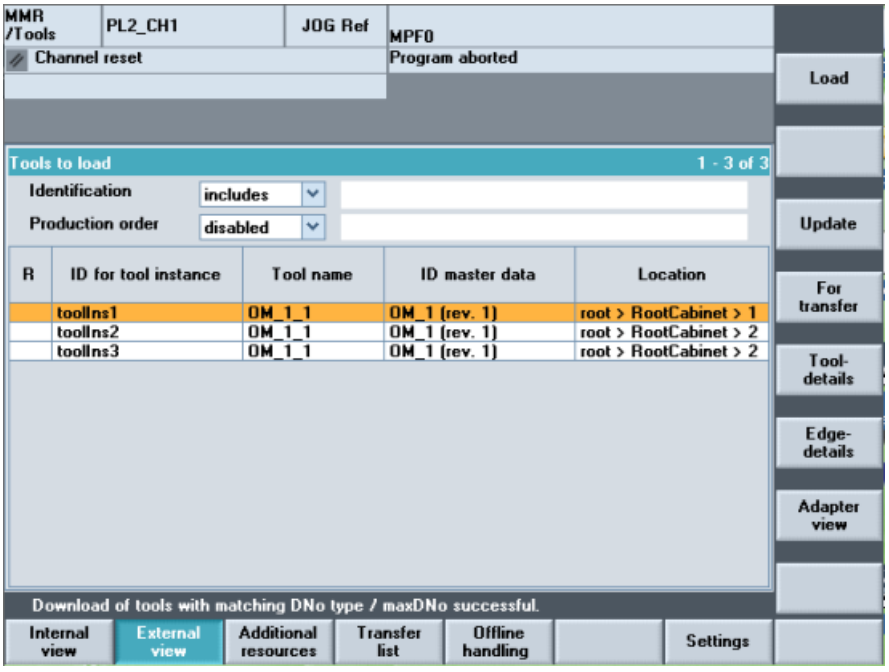
The following parameters are displayed:

Parameter	Description
"Adapter view" window	
Place	Shows the place
Type	Shows the adapter type
ID of adapter/ID for tool instance - Tool name	Shows the adapter ID, the tool instance ID and the tool name
Number of pockets	Shows the number of pockets
TOA	Shows the TOA

Procedure

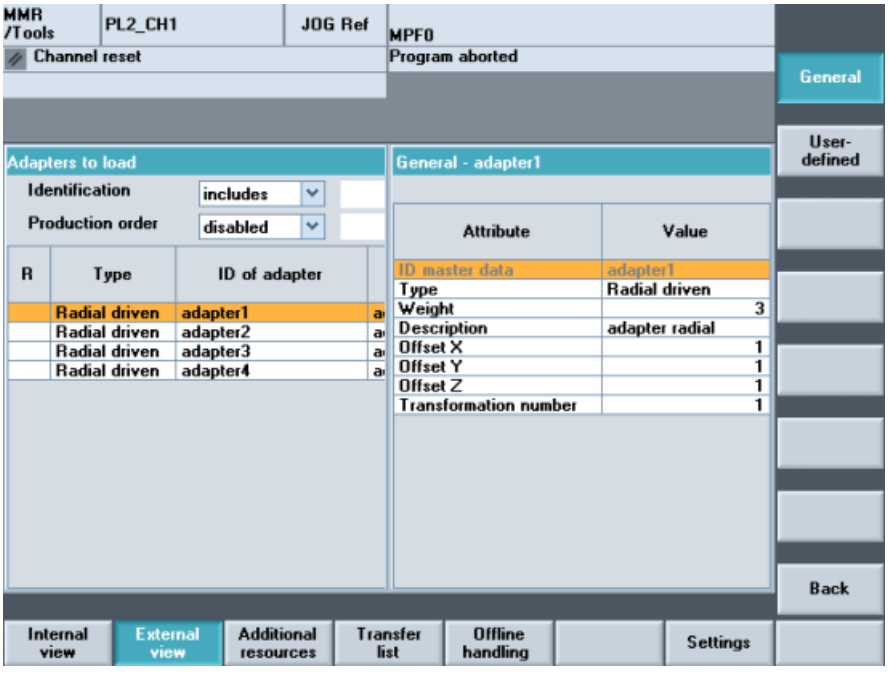
External view

1. Press "External view".
   The "Tools to load" window opens.
   The softkey "Adapter view" toggles between the external "Adapter view" and the external "Tool view".



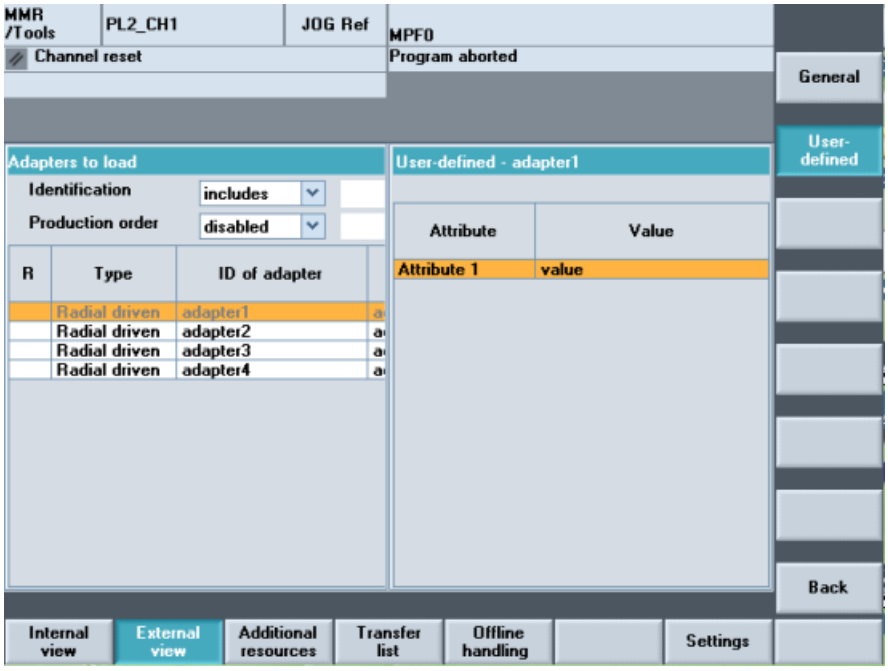
Adapter view

2. Press "Adapter view".
   You see the available adapters in the cabinets from which they can be loaded.



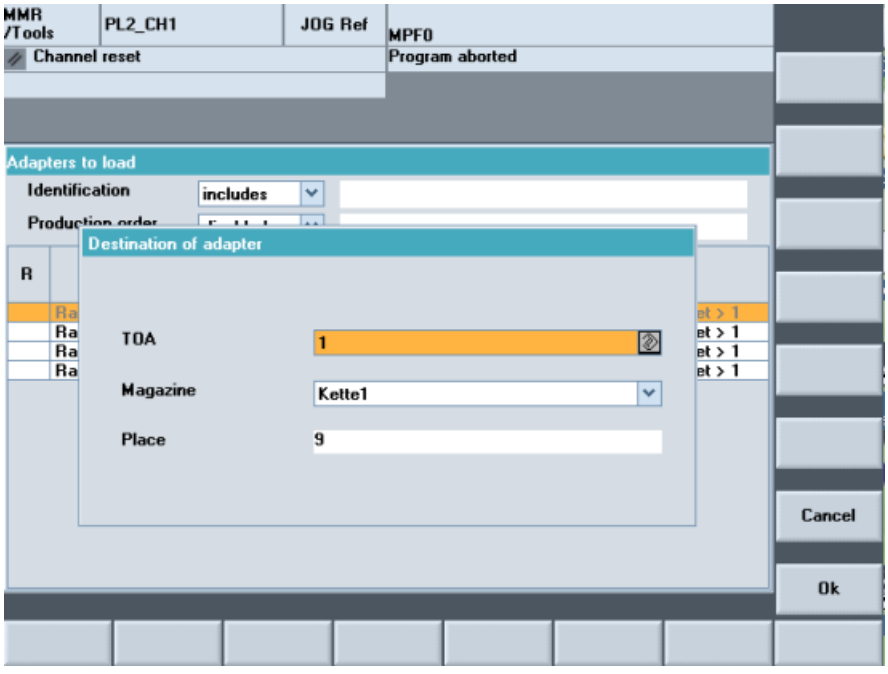
General

3. Press "General".
   - OR -
   Press "User-defined".



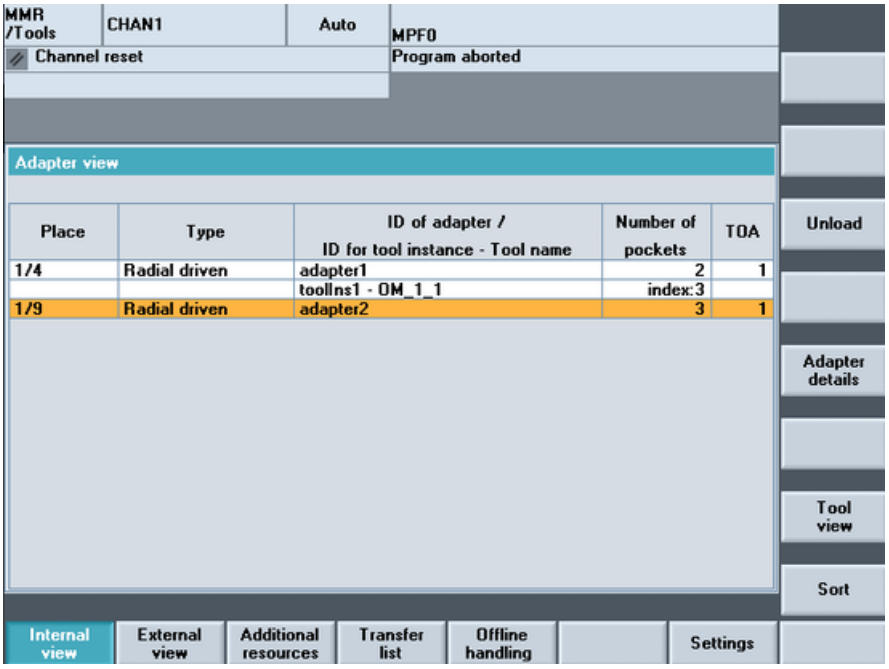
Load

4. Press "Load" to load an adapter.
   The "Destination of the adapter" dialog box opens.



5. Define an empty place to which you can load the adapter.

6. Click "OK"
   - OR -
   Click "Cancel" to cancel the operation.
   If the space is already occupied by another tool or adapter, you get an error message.
   If you do not specify the place, the adapter loading is not completed and you get an error message.



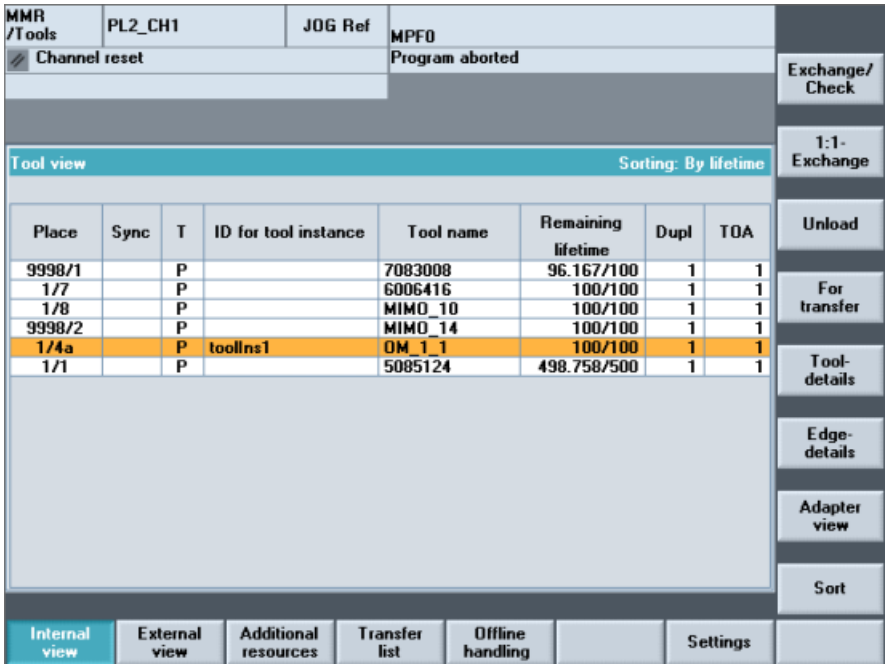
   When the adapter is loaded, the view switches to "Internal view" .
   You see the adapters loaded into the machine and whether a tool is loaded into the adapter pocket.

7. Press "Adapter details" to display the adapter details.

8. To exit the detailed view, press "<< Back".

Tool view

9. Press vertical "Tool view" to switch from "Internal view" to "Tool view".
   The tools loaded into an adapter pocket are marked with an "a" in the "Place" column.



10. Press "Update" to display the new adapters you have created.

Update

6.4.12.3 Loading tools into adapters with transformation information

You can load a tool into an adapter.

Parameters

Parameter	Description
Transformation details	
Attribute name	Shows the attribute name
Old value	Shows the old value
Adapter value	Shows the adapter value
New value	Shows the new value

Procedure

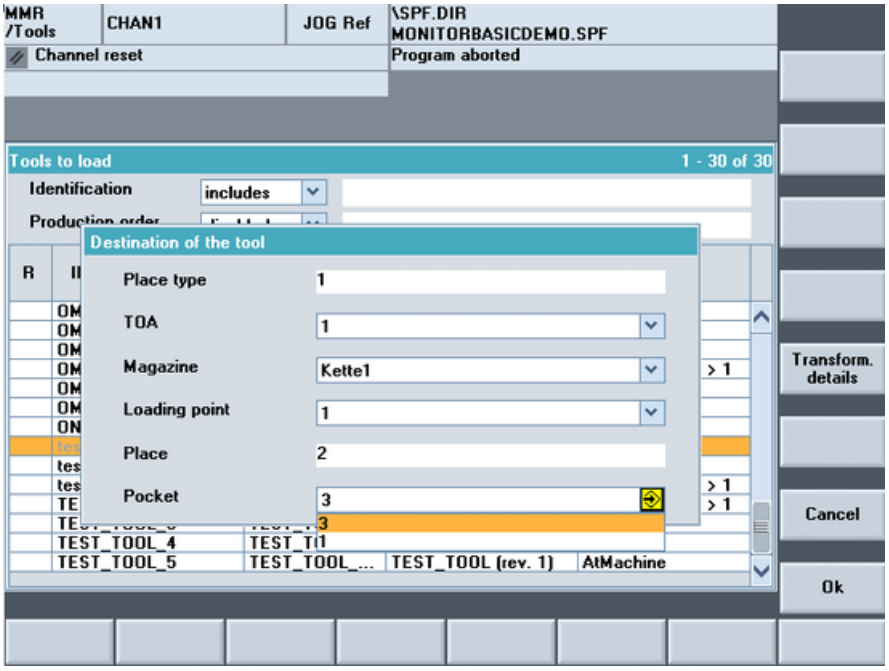
External view

1. Press "External view".
   The "Tools to load" window opens and displays the external tools in an overview.
2. Press "Load".

   Load

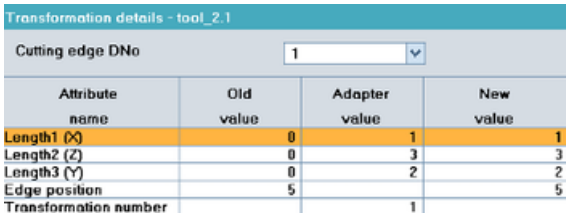
   The "Destination of the tool" dialog box opens.

3. Enter the loading place of the adapter.
   The pocket number to be loaded can be selected from the pocket field. A tool cannot be loaded into the vacant pockets of an adapter once the first tool has been loaded, unless the first tool is unloaded. To find the adapter place, press "Adapter view" in the "Internal view" window.
4. Click "OK" to load the tool to the adapter.
   - OR -
   Click "Cancel" to cancel the operation.



You can check the transformation details before completing the loading process of a tool into an adapter.
"Transform. details" is only active if transformation information is available at the destination location.

5. To open the"Transformation details <tool> window>, click "Transform. details".
   - OR -
   Click "Cancel" to cancel the operation.



6.4.12.4 Loading tools into magazines with transformation information

You can load a tool into a magazine with transformation information.

Prerequisite

You have installed MMR /Tools on the machine.

Parameters

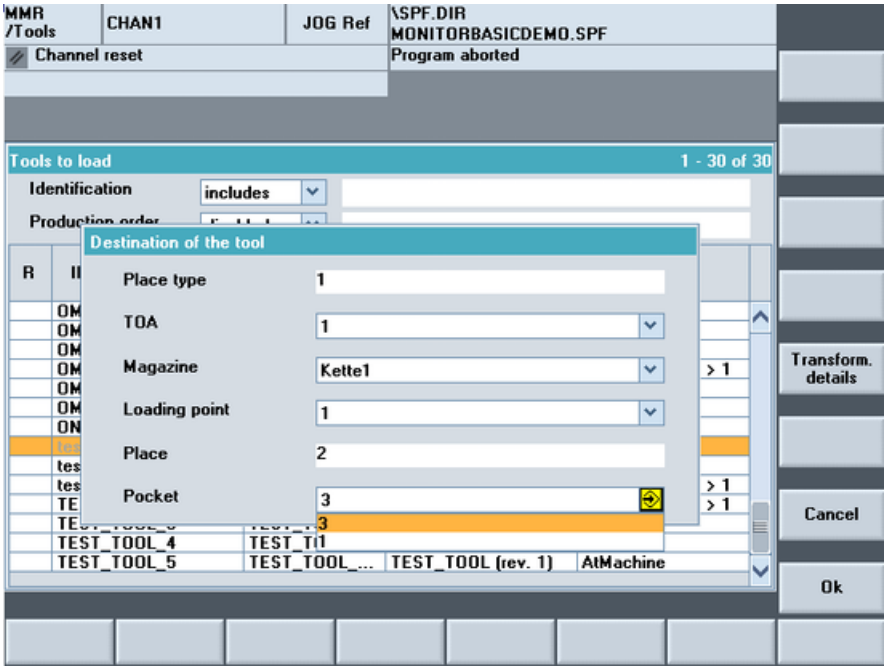
The following parameters are available:

Parameter	Description
Transformation details	
Attribute name	Shows the attribute name.
Old value	Shows the old value.
Adapter value	Shows the adapter value.
Magazine value	Shows the magazine value.
New value	Shows the new value.

Procedure

1. Press the "External view" softkey.
   The "Tools to load" window opens and displays the external tools in an overview.

2. Press the "Load" softkey.
   The "Destination of the tool" dialog box opens.
   Click the "Transform. details" softkey to check the transformation details.



Transform. details

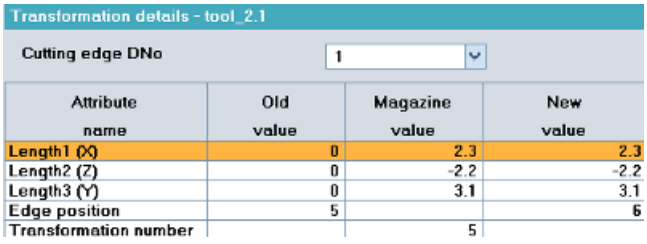
3. You can check the transformation details before completing the loading process of a tool into a magazine.
   The "Transform. details" softkey is only active when transformation information is available at the destination location.

   The columns are displayed according to the transformation information. In case both adapter and magazine transformations are available, the columns are displayed in the order of the transformation. Thus you can review and confirm the transformation details before completing the loading process.

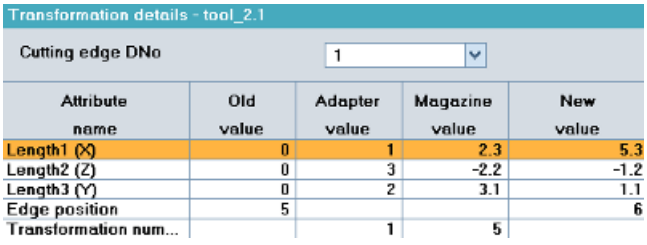
   To open the transformation window, click the "Transform. details" softkey.

   - OR -

   Click "Cancel" to cancel the operation.
4. The "Transformation details -<tool>" window opens.



If adapter data is available, an additional "adapter" column is displayed.



Click "OK" to load the tool to the adapter or magazine.

- OR -

Click "Cancel" to cancel the operation.

NOTICE
Using both adapter and magazine transformation information If you want to use both adapter and magazine transformations, you must generate an adapter instance via Mcenter. You cannot depend on the standard adapter handling of SINUMERIK system variables.

6.4.12.5 Unloading adapters

You can unload adapters from the machine.

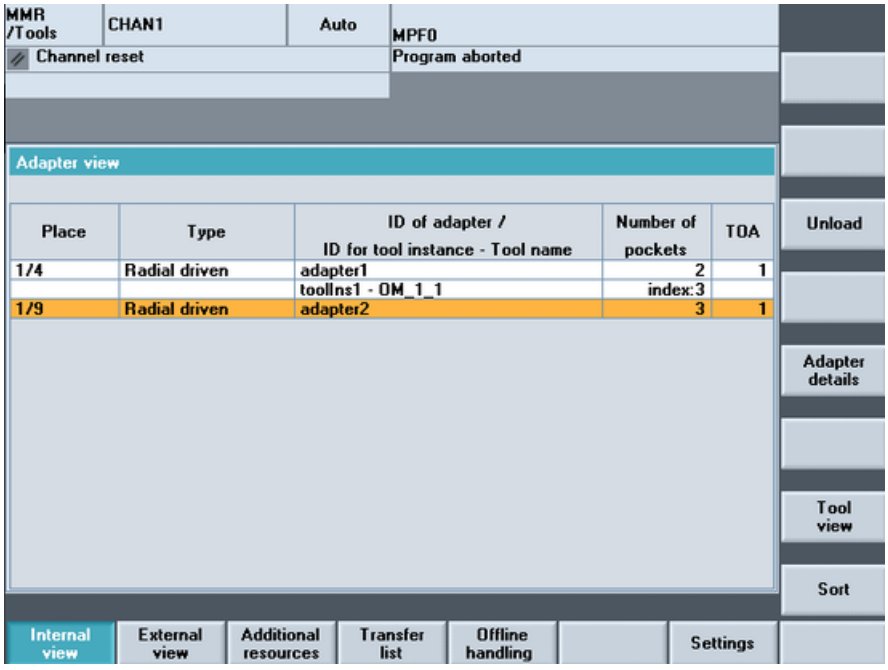
Prerequisite

To unload an adapter, you first unload the tool from the adapter if it carries tools.

Procedure

Adapter view

1. Press "Adapter view".
   The "Adapter view" window opens.

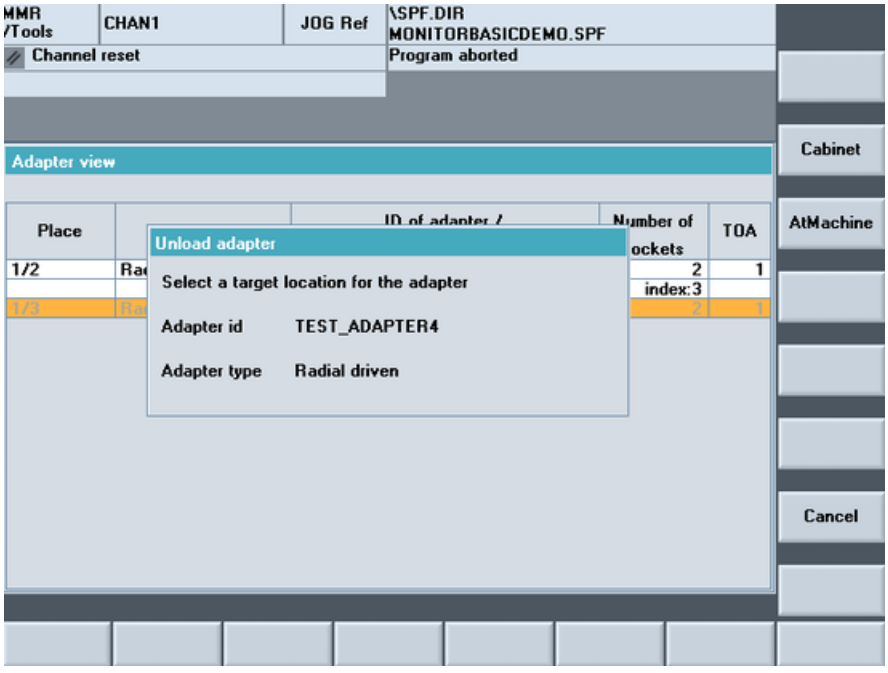


Unload

2. Press "Unload".
   Any tools in the adapter are on display.
   You can unload the adapter

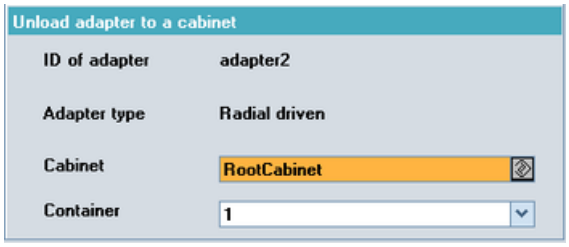
   – Into a Cabinet

   – AtMachine



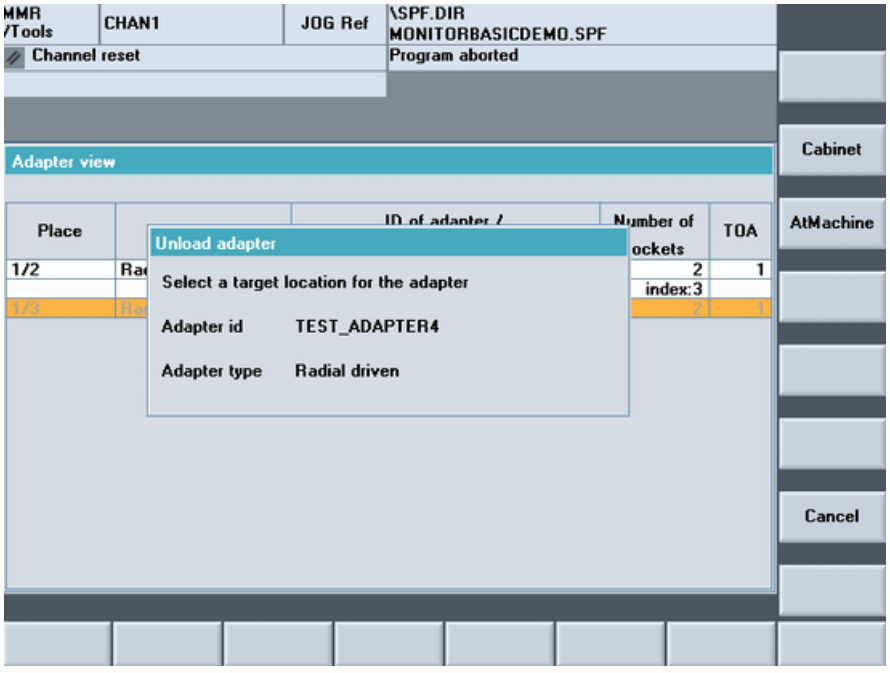
Cabinet

3. To unload the adapter into a cabinet, press "Cabinet".
   The "Unload adapter to cabinet" dialog box opens.
4. Select the Cabinet and Container where the adapter is unloaded.
5. Click "OK" to start the operation
   - OR -
   Click "Cancel" to cancel the operation.



AtMachine

6. To unload the adapter AtMachine, press "AtMachine".
   If you unload the adapter AtMachine, you cannot load it to other machines.
   The adapter does not appear in the hierarchy path.
7. Click "OK" to start the operation
   - OR -
   Click "Cancel" to cancel the operation.



8. Press "Tool view" to switch back to the "Internal view".

Tool view

6.4.12.6 Loading clampings

You can load clampings into the machine.

Parameters

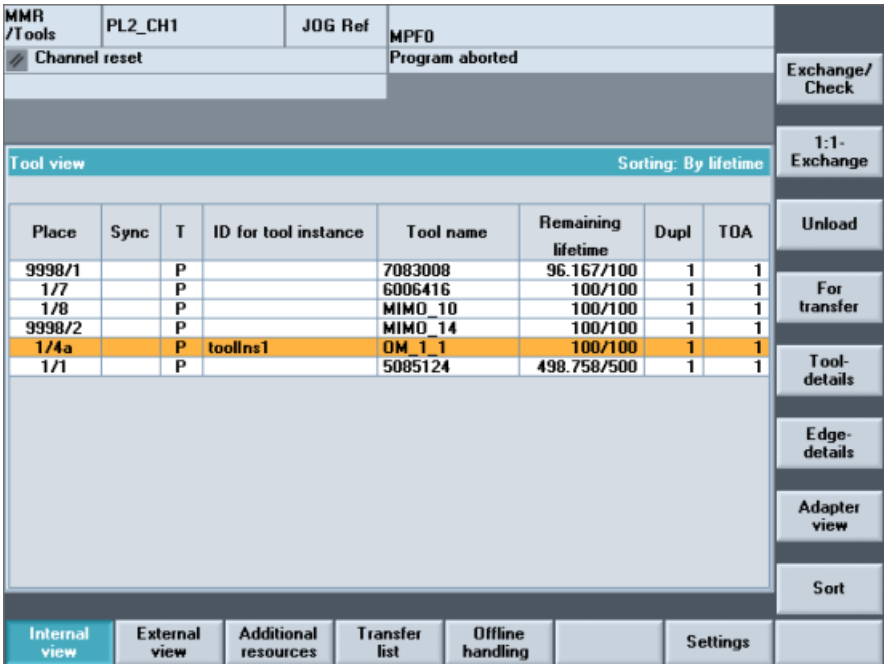
The following parameters are displayed:

Parameter	Description
"Clamping view" window	
Type	Shows the type.
ID of additional resource	Shows the additional resource ID:
Production order	Shows the production order.
Description	Shows the description.
"Available clamping devices" dialog box	
Identification	Displays the "Identification" filter.
Production order	Displays the "Production order" filter
ID of additional resource	Shows the ID of the additional resource.
Production order	Shows the production order.
Description	Shows the description.
Location	Shows the location.

Procedure

Internal view

1. Press the "Internal view" softkey.
   The "Tool view" window opens.

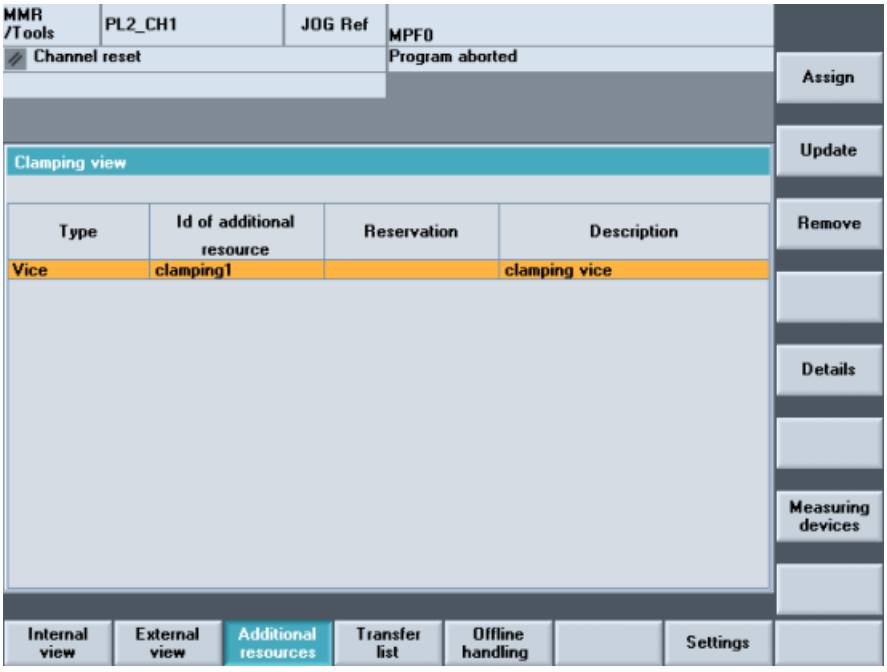


Place	Sync	T	ID for tool instance	Tool name	Remaining lifetime	Dupl	TOA
9998/1		P		7083008	96.167/100	1	1
1/7		P		6006416	100/100	1	1
1/8		P		MIMO_10	100/100	1	1
9998/2		P		MIMO_14	100/100	1	1
1/4a		P	toolIns1	OM_1_1	100/100	1	1
1/1		P		5085124	498.758/500	1	1

Additional resources

2. Press the "Additional resources" softkey.
The "Clamping view" window opens displaying the clampings loaded to the machine.

You cannot select these clampings on other machines. They are assigned to this particular machine and loaded to the container "InMachine".



Assign

3. Press the vertical "Assign" softkey to load a clamping to the machine.

A popup window opens with the list of all the available clampings in the hierarchy path for the machine.

You can filter for

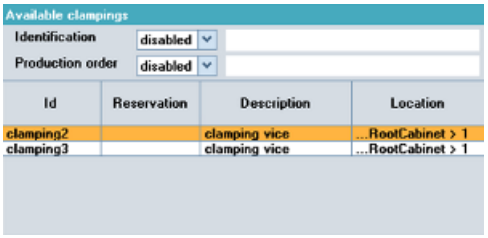
- ID
- Production order

Select a clamping and press "OK" to load it to "InMachine".

- OR -

Press "Cancel" to cancel the operation.

The loaded clamping is displayed in the "Additional resources" view.



Details

4. Press the "details" softkey to display the details of a loaded clamping.

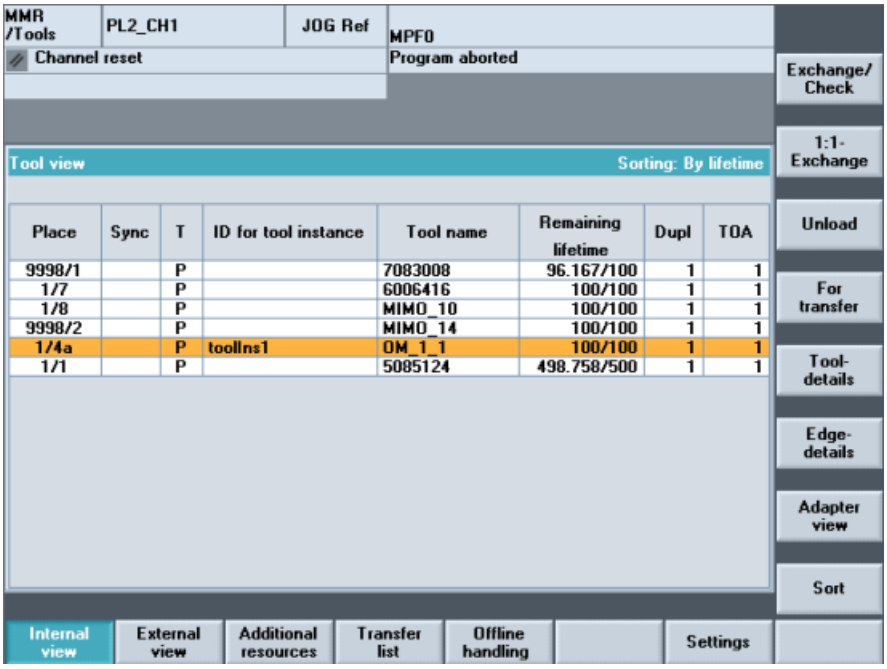
6.4.12.7 Unloading clampings

You can unload clampings.

Procedure

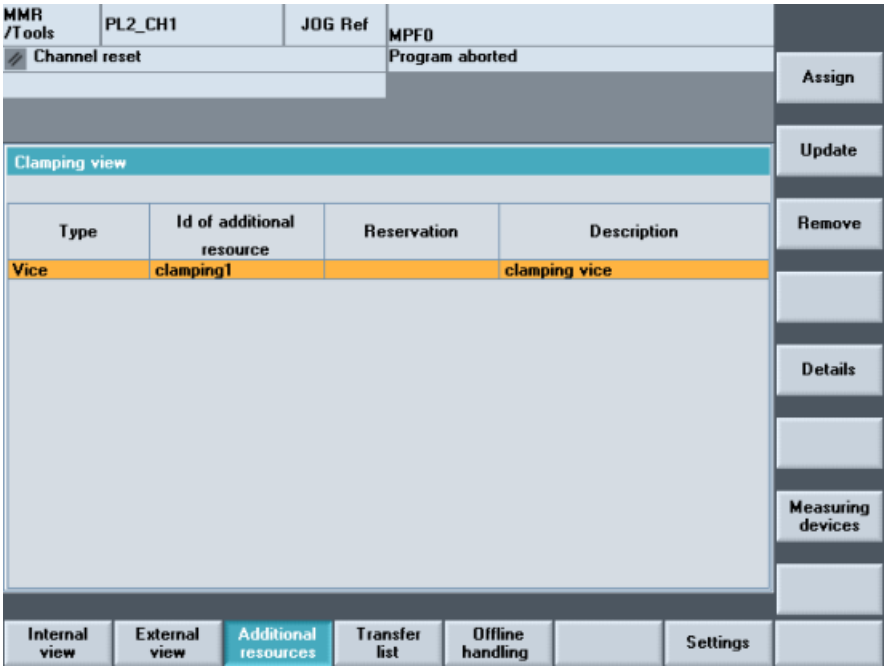
Internal view

1. Press the "Internal view" softkey.
   The "Tool view" window opens.



Additional resources

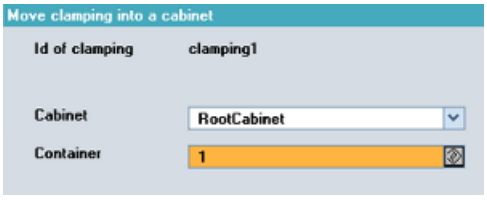
2. Press the "Additional resources" softkey.
The "Clamping view" window opens displaying the clampings loaded to the machine.



You cannot select these clampings on other machines. They are assigned to this particular machine and loaded to the container "InMachine".

Remove

3. Press the vertical "Remove" softkey to unload the clamping from the machine.
The "Move clamping device into cabinet" dialog box opens.
Select the Cabinet and Container where the clamping is unloaded.
All available Cabinets are listed in the drop-down list.
Click "OK" to start the operation
- OR -
Click "Cancel" to cancel the operation.



6.4.12.8 Loading Measuring devices

You can load Measuring devices.

Once you have loaded a Measuring device, it is displayed as "reserved".

Parameters

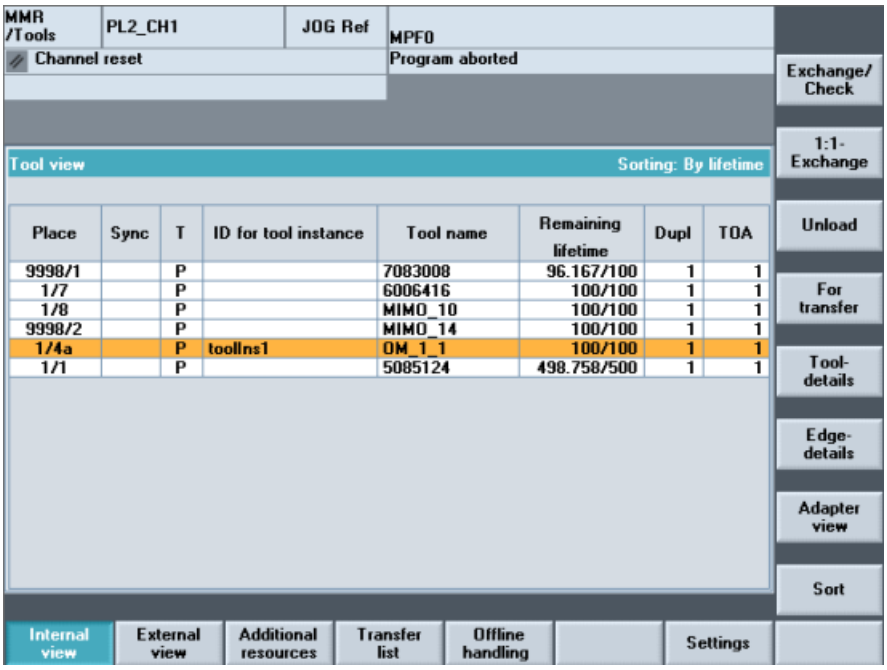
The following parameters are displayed:

Parameter	Description
"Measuring devices view" window	
Id of additional resource	Shows the additional resource Id.
Production order	Shows the production order.
Description	Shows the description.
"Available measuring devices" dialog box	
Identification	Displays the "Identification" filter.
Production order	Displays the "Production order" filter
Id	Shows the Id of the additional resource.
Reservation	Shows the reservation.
Description	Shows the description.
Location	Shows the location.

Procedure

Internal view

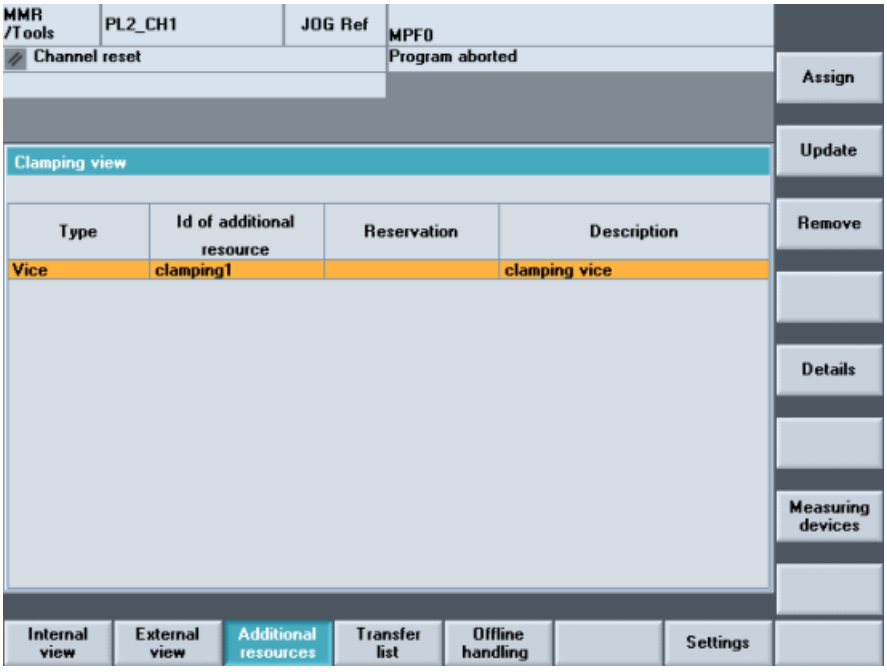
1. Press the "Internal view" softkey.



The "Tool view" window opens.

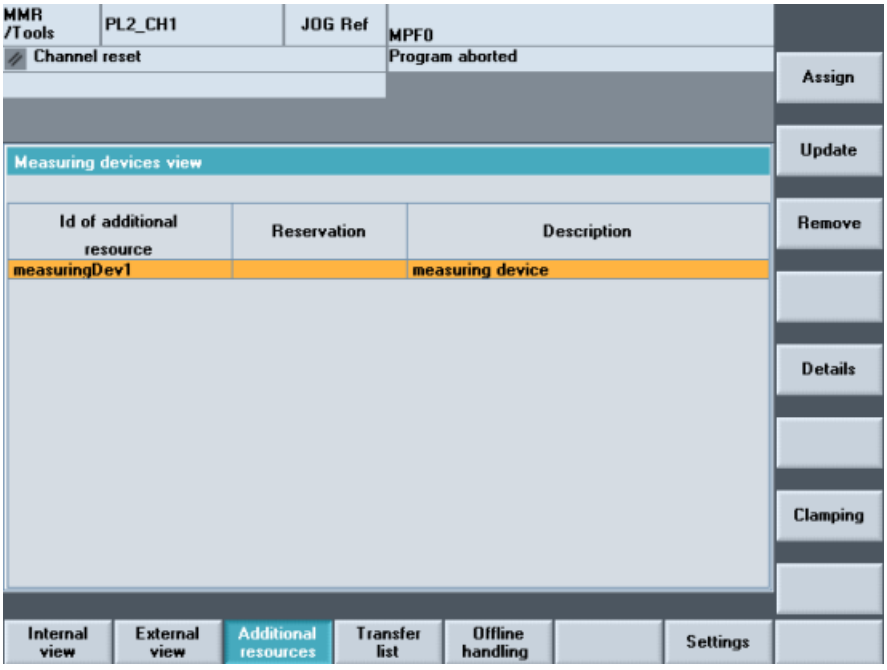
Additional resources

2. Press the "Additional resources" softkey.
"The Clamping view" window opens.



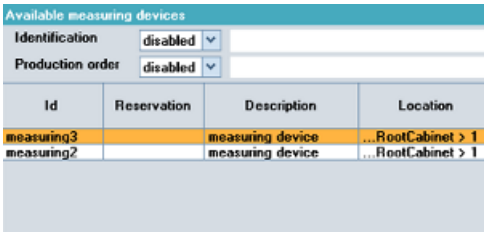
Measuring devices

3. Press the vertical "Measuring devices" softkey.
   With this softkey, you can toggle between the "Measuring devices" and the "Clampings".
   The "Measuring devices view" window opens displaying the measuring devices loaded to the machine.



Assign

4. Press the "Assign" softkey to load a new Measuring device.
   A popup window opens with the list of all the available Measuring devices.
   Select the Measuring device you wish to load onto the machine and press "OK".
   - OR -
   Press "Cancel" to cancel the operation.



Details

5. Press the "details" softkey to display the details of a loaded Measuring device.

   After having loaded the Measuring device, you can switch to "Clampings" by toggling the softkey "Clampings".
   - OR -
   You can go back to the "Internal view".

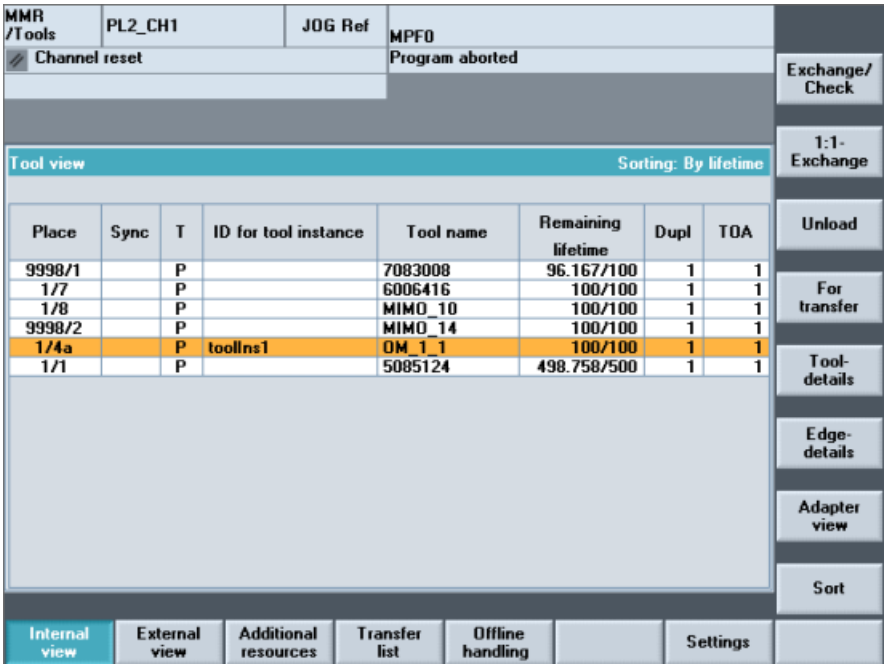
6.4.12.9 Unloading Measuring devices

You can unload Measuring devices.

Procedure

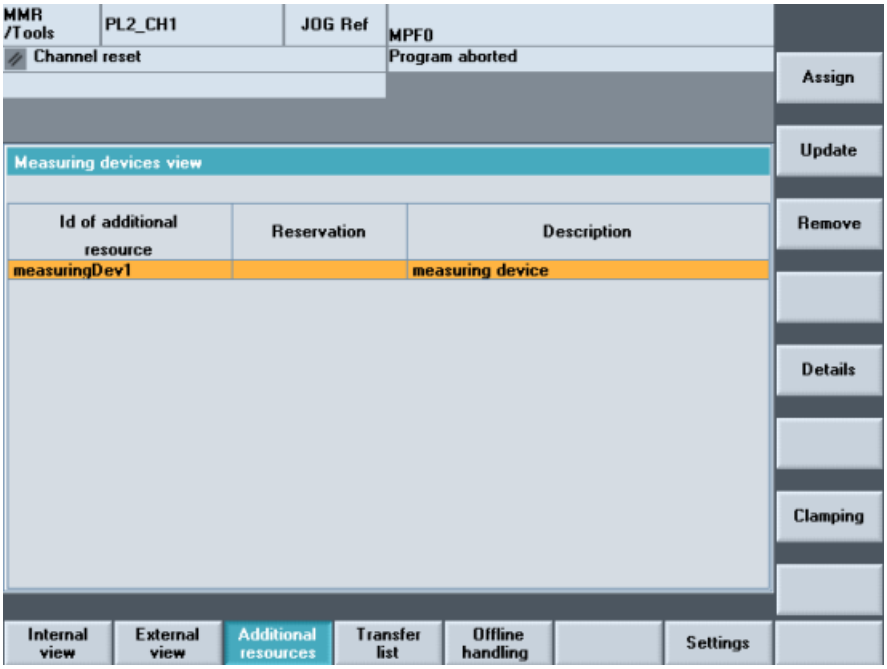
Internal view

1. Press the "Internal view" softkey.
   The "Tool view" window opens.



Additional resources

2. Press the "Additional resources" softkey.
   The "Measuring devices view" window opens displaying the loaded Measuring devices.
   You can toggle between "Clampings" and "Measuring devices".



3. Press the vertical "Remove" softkey to unload the Measuring device.
   The "Move Measuring device into cabinet" dialog box opens.
   Select the Cabinet and Container where the Measuring device is unloaded.
   All available Cabinets are listed in the drop-down list.
   Click "OK" to start the operation
   - OR -
   Click "Cancel" to cancel the operation.

4. Press the "Details" softkey to display the details of a loaded Measuring device.

6.4.13 Scanning external tools

You can scan the IDs of external tools in the following ways:

- Using the PLC code scanner (recommended)
- Using the USB code scanner

6.4.13.1 Using PLC code scanner

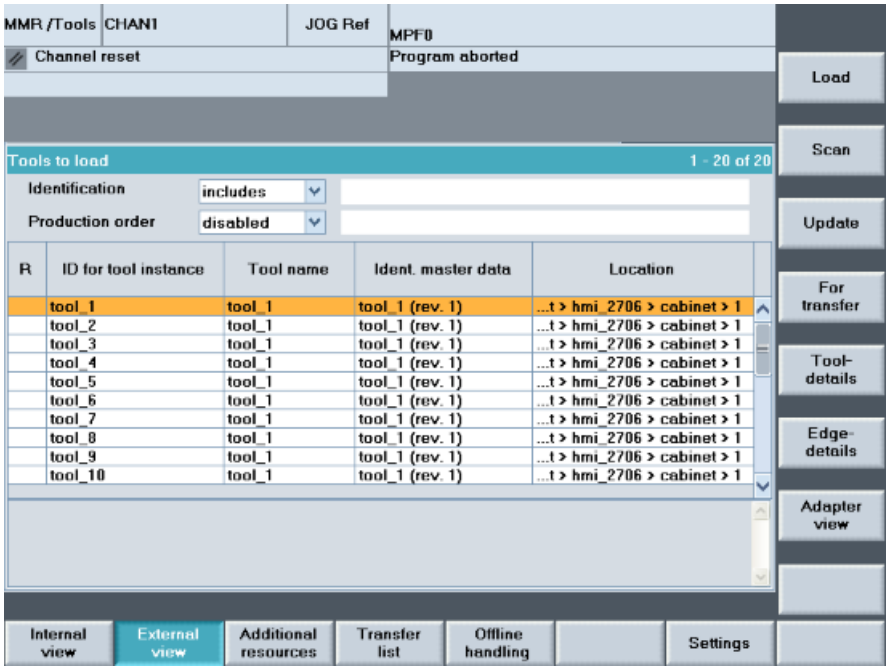
Prerequisites

- The functionality of the PLC code scanner is only available if you have enabled the scanner configuration in the "mmrConfig.json" file.
  Additional information to enable the scanner configuration is provided in the Installation Manual "Mcenter, Manage MyResources, Optimize MyProgramming /NX-Cam Editor, Analyze MyPerformance /OEE, Access MyData /Collector".
- The togglemode of the PLC code scanner can be enabled by setting "togglemode" true in the scanner configuration in the "mmrConfig.json" file.
- You have a hand scanner, for example Balluff-RFID-Chip, that is connected to the PLC.

Procedure

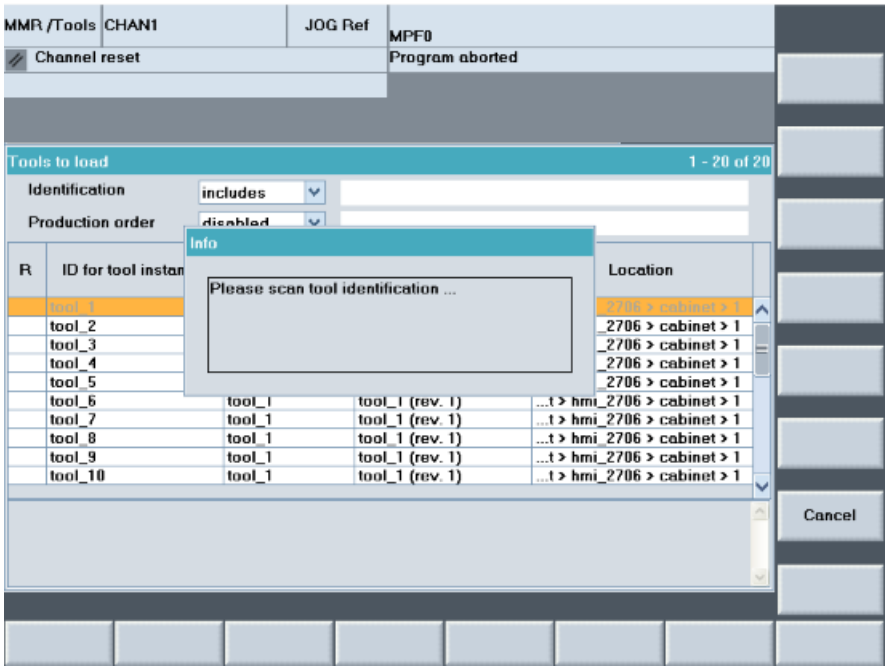
External view

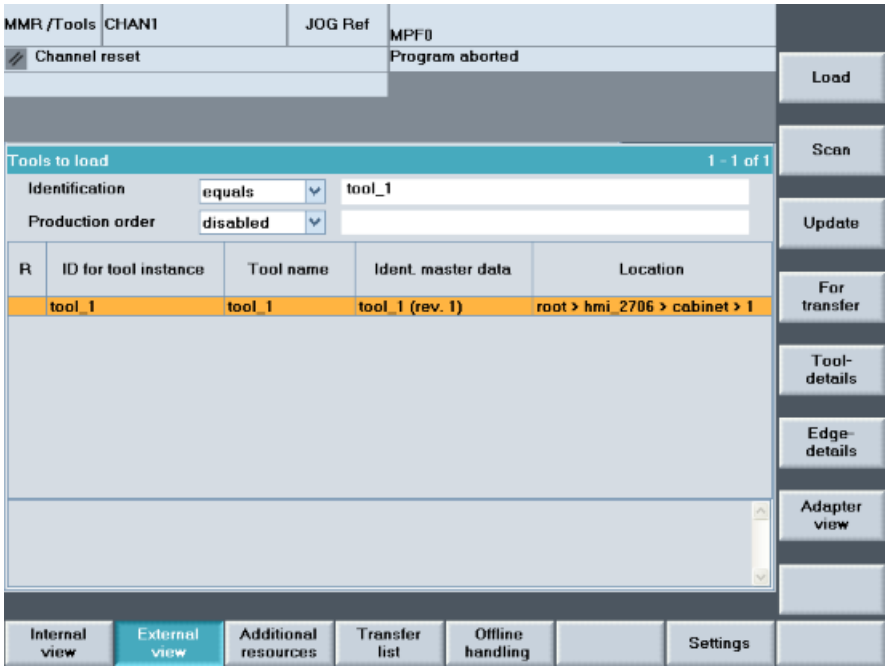
1. Press the "External view" softkey.
   The "Tools to load" window opens.
   If only the "Identification" field has to be considered during the update, the "Production order" field has to be empty.



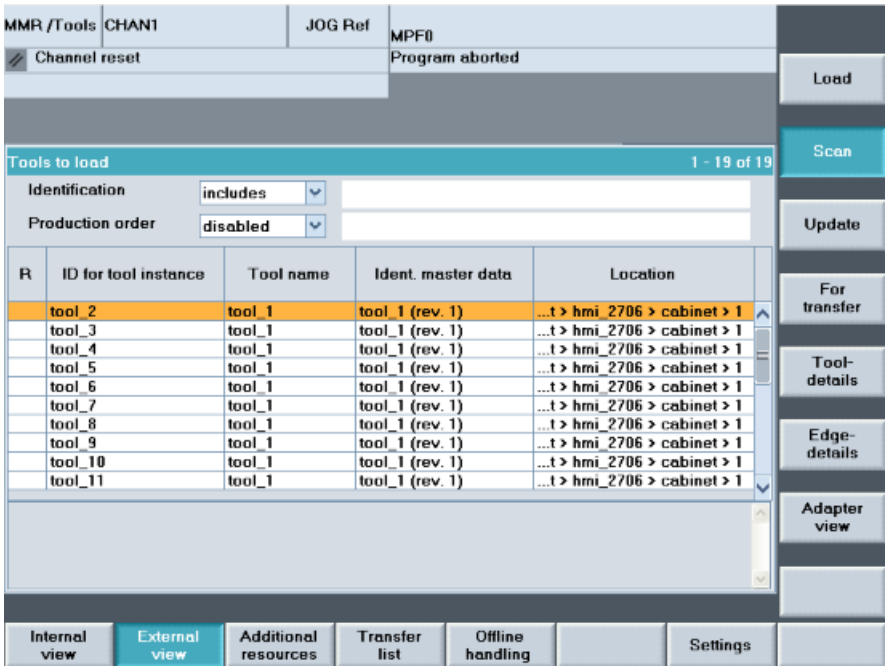
Scan

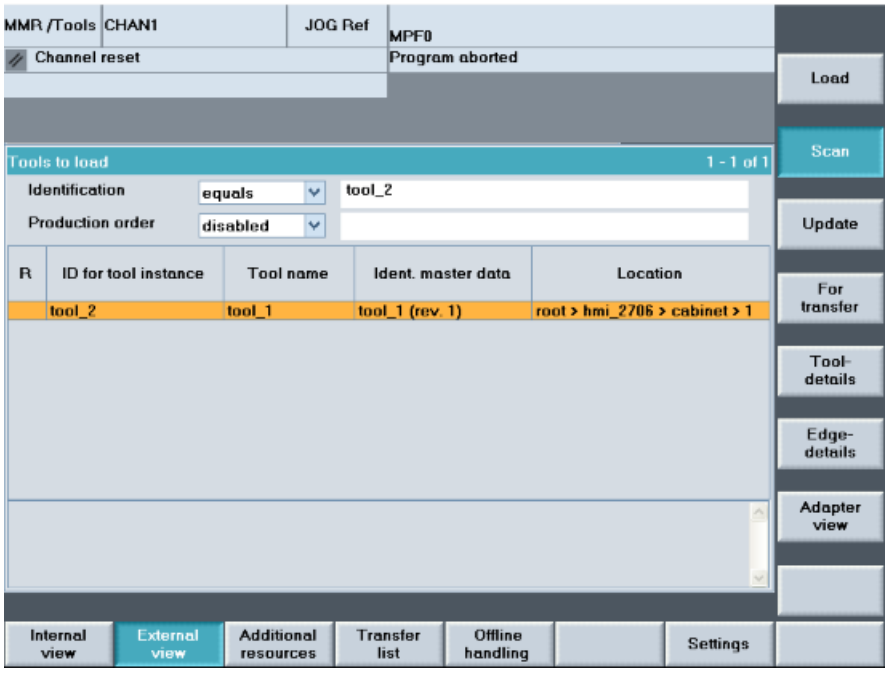
2. Press the "Scan" softkey.
   - If toggle mode of the PLC code scanner is disabled:
     – A dialog with the message "Please scan tool identification ..." opens to inform that the code scanning is initiated.
     – Wait for the scanner to scan the data.
     - OR -
     Press the "Cancel" softkey to stop scanning.
     – The dialog disappears when the scan is complete or canceled.





- If toggle mode of the PLC code scanner is enabled:
  - The "Scan" softkey remains highlighted. You can use the PLC code scanner several times.
  - To stop scanning, press the "Scan" softkey again.





The tool list in the "Tools to load" window is updated with the external tools from the server having the scanned ID instance data.

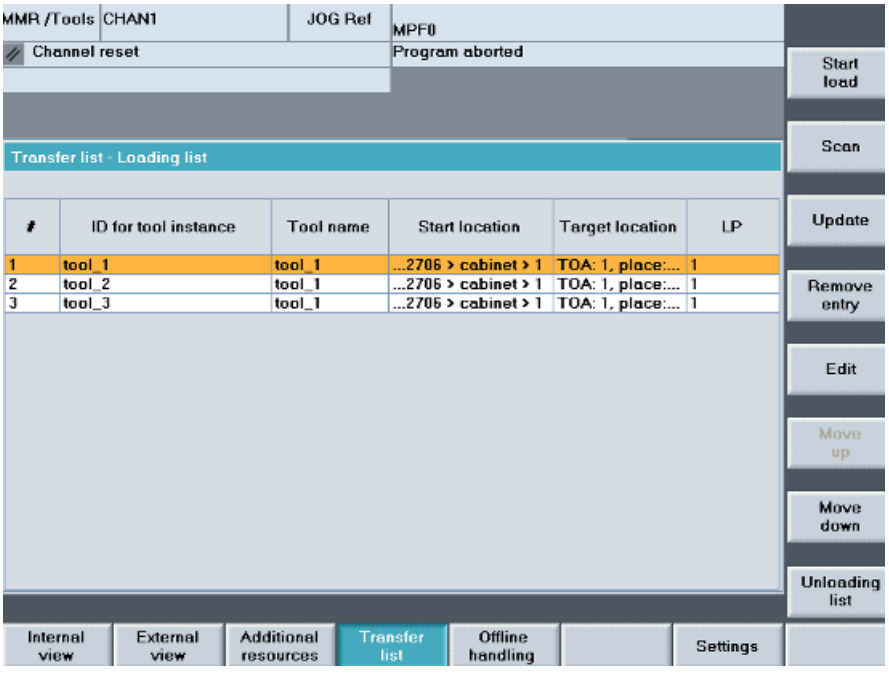
Scanning in transfer list

You can also use the PLC code scanner to load tools in the "Transfer list - loading list":

If scanning is enabled in the "mmrConfig.json" file, scanning in transfer list is working like "toggle" is always enabled regardless of the "mmrConfig.json" file.

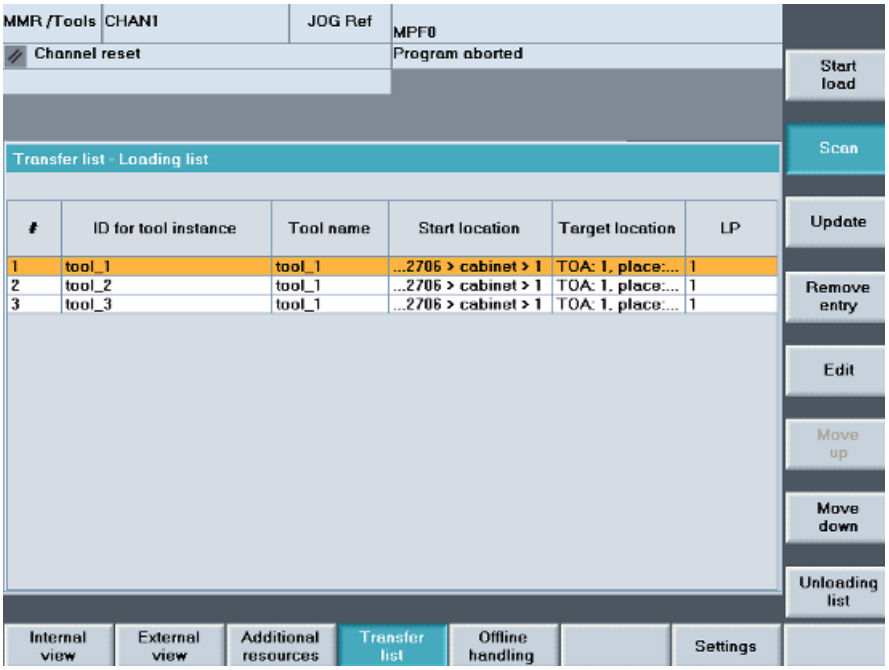
Transfer list

1. Press the "Transfer list" softkey.
   The "Transfer list - loading list" window opens.



Scan

2. Press the "Scan" softkey.
   The softkey remains highlighted.



3. You can use the PLC code scanner several times. All scanned tools will be added to the loading list if the tools are defined on the server.
4. Press the "Scan" softkey again to stop scanning.

Scanning in sister tools list

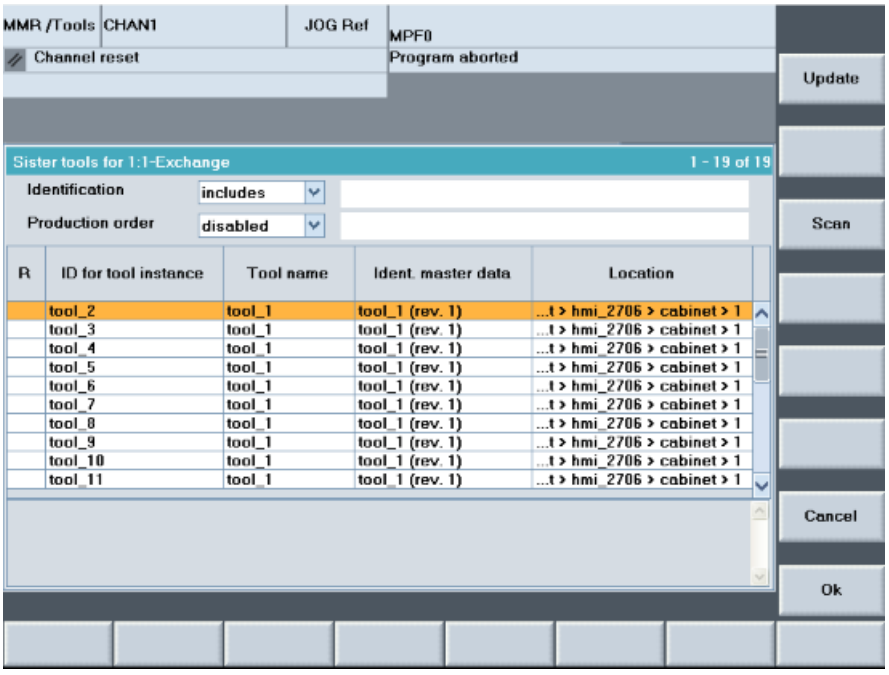
You can also use the PLC code scanner to filter tools in the sister tools list:

1. Press the "Internal view" softkey.
   The "Tool view" window opens and shows the overview of the tools.
2. Select a tool.

1:1-Exchange

3 Press the "1:1 Exchange" softkey.

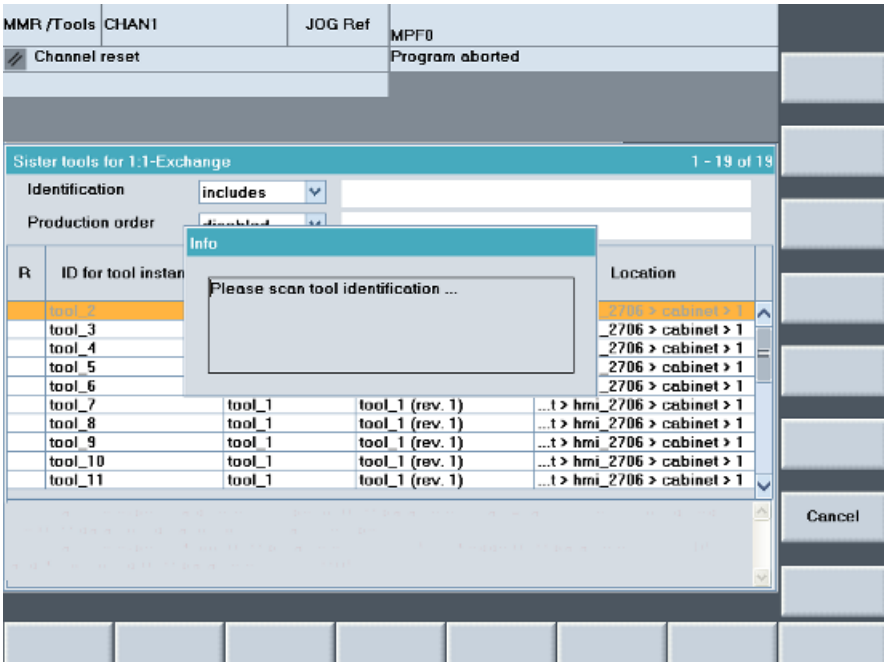
· The "Sister tools for 1:1-Exchange" window opens and shows the loadable sister tools of the chosen tool.

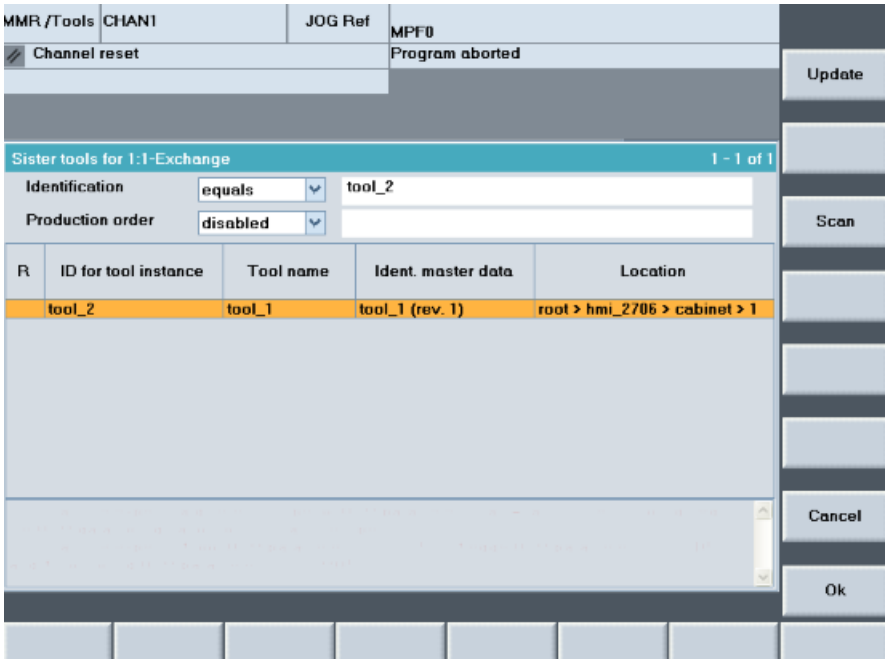


Scan

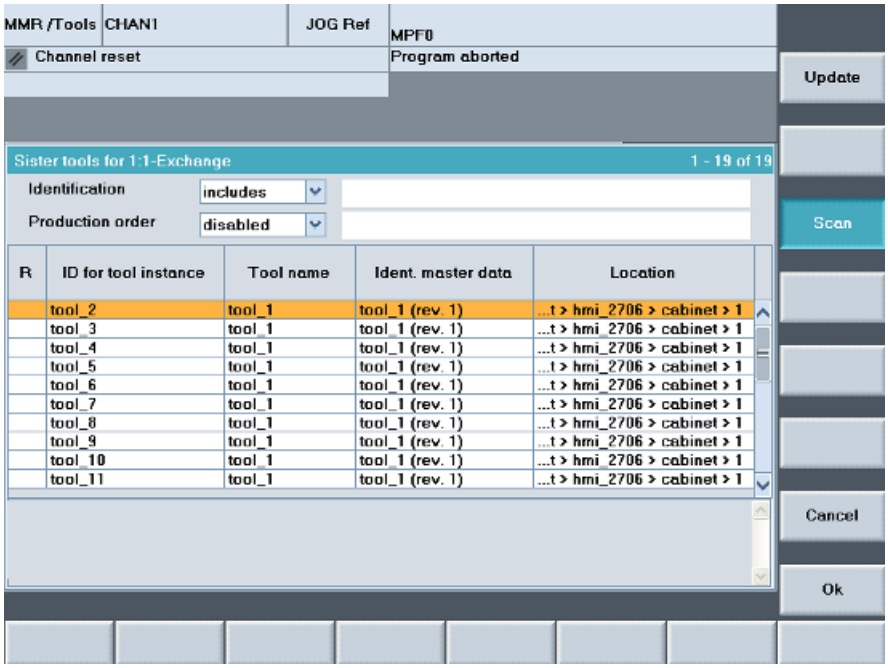
2 Press the "Scan" softkey.

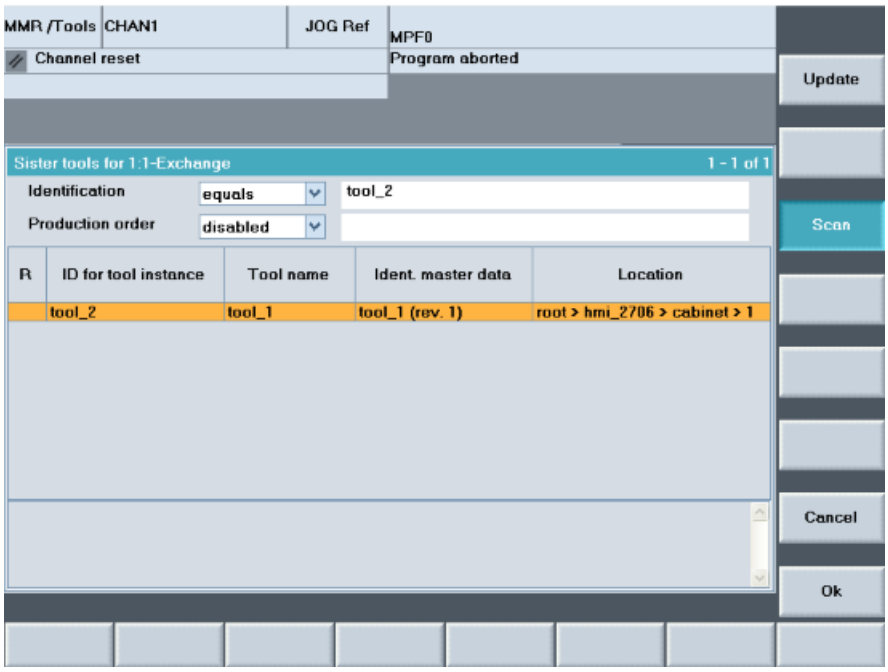
- If togglemode of the PLC code scanner is disabled:
  - A dialog with the message "Please scan tool identification ..." opens to inform that the code scanning is initiated.
  - Wait for the scanner to scan the data.
    - OR -
    Press the "Cancel" softkey to stop scanning.
  - The dialog disappears when the scan is complete or canceled.





- If togglemode of the PLC code scanner is enabled:
  - The "Scan" softkey remains highlighted. You can use the PLC code scanner several times.
  - To stop scanning, press the "Scan" softkey again.





The tool list in the "Sister tools for 1:1-Exchange" window is updated with the sister tools from the server having the scanned ID instance data.

6.4.13.2 Using USB code scanner

You can also use USB code scanners with MMR /Tools.

A USB code scanner acts as a secondary keyboard. The scanned values appear in MMR /Tools as if being typed in with a regular keyboard.

Prerequisites

- A USB code scanner is connected to SINUMERIK via USB.
- If only the "Identification" field has to be considered during the update, the "Production order" field has to be empty.

Procedure

External view

1. Press the "External view" softkey.
   The "Tools to load" window opens.
2. To scan an ID of a tool instance set the focus of the USB code scanner on the Identification" field.
   - The scanned value appears in the field.
   - The tool list is updated with the external tool from the server having the scanned ID instance data.

6.4.14 Loading or unloading multiple tools

6.4.14.1 Displaying transfer lists

In Manage MyResources /Tools, it is possible to load or unload multiple tools in a sequence so that you do not need to trigger multiple processes one by one via HMI-Advanced. Therefore the following transfer lists are used:

- Loading list
- Unloading list

Parameter

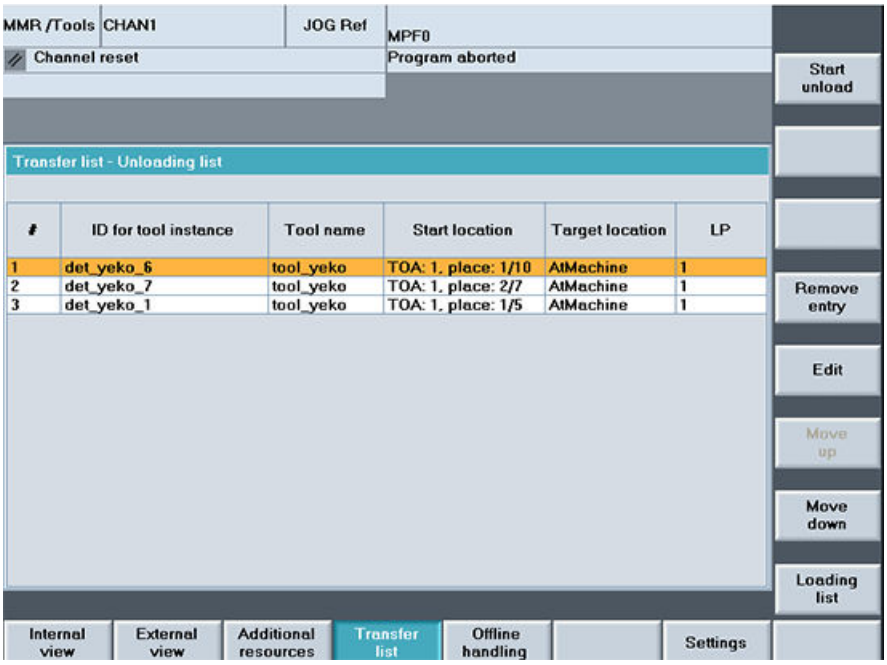
The following parameters are displayed in the "Transfer list" window:

Parameter	Description
Rank (#)	Displays the order in which the tools are loaded or unloaded.
ID for tool instance	Shows the external identifier of the tool. For brownfield tools, the tool name is shown.
Tool name	Shows the tool name.
Start location	For Loading list: Shows the location where the tool is currently located. For Unloading list: Shows the TOA, magazine, and place where the tool is currently located. For machines with turning technology and without a configured magazine: Shows the TOA and T-number.
Target location	For Loading list: Shows the TOA, magazine, and place where the tool should be moved. For machines with turning technology and without a configured magazine: Shows the TOA and T-number. For Unloading list: Shows the location to which the tool should be moved.
Loading point (LP)	Shows the loading point which should be used. This parameter is only available for machines with a configured magazine.

Procedure

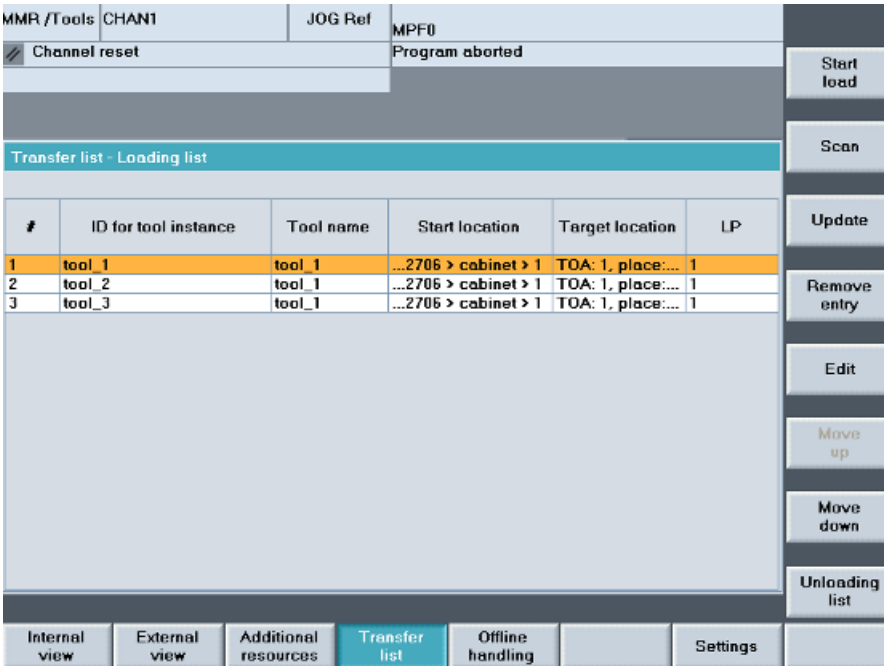
Transfer list

1. Press the "Transfer list" softkey.
   The "Transfer list - Unloading list" window opens by default.



Loading list

2. To change over to loading list, press the "Loading list" softkey.
   The "Transfer list - Loading list" window opens.



Unloading list

3. To display unloading list again, press the "Unloading list" softkey.

6.4.14.2 Changing transfer lists

In Manage MyResources /Tools, transfer lists are used to load or unload multiple tools. You can add or remove tools from the lists and change the transfer order.

Procedure: Add tools to a transfer list

1. To add tools to the unloading list, press the "Internal view" softkey.
   The "Tool view" window opens.
   - OR -

   To add tools to the loading list, press the "External view" softkey.
   The "Tools to load" window opens.

2. Select a tool in the list and press the "For transfer" softkey.
   The tool is added to the end of the transfer list. The "For transfer" softkey remains highlighted.

3. To remove this tool from transfer list, press the "For transfer" softkey again.

Note

Default settings

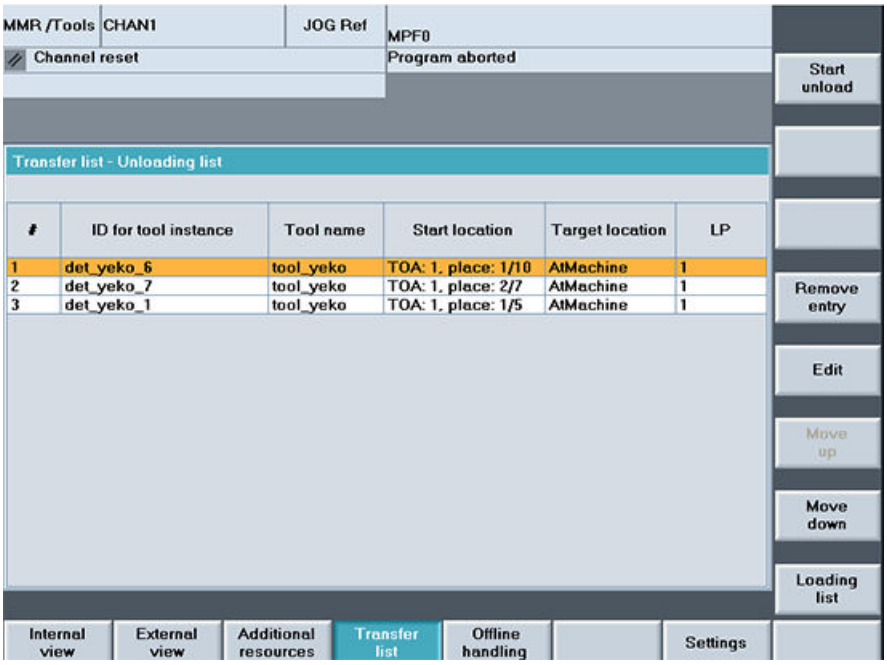
When you add a tool to an unloading list, the default settings are the following:

The target location is "AtMachine".
The loading point is the first one available.

Procedure: Changing a transfer list

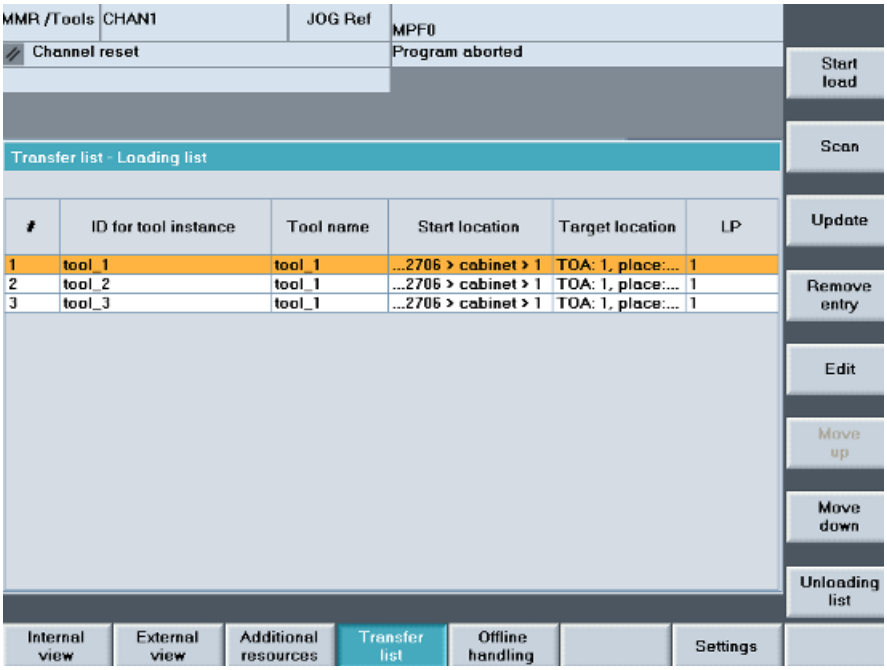
Transfer list

1. Press the horizontal softkey "Transfer list".
   The "Transfer list - Unloading list" window opens by default.



Loading list

2. To change over to loading list, press the "Loading list" softkey.
   The "Transfer list - Loading list" window opens.



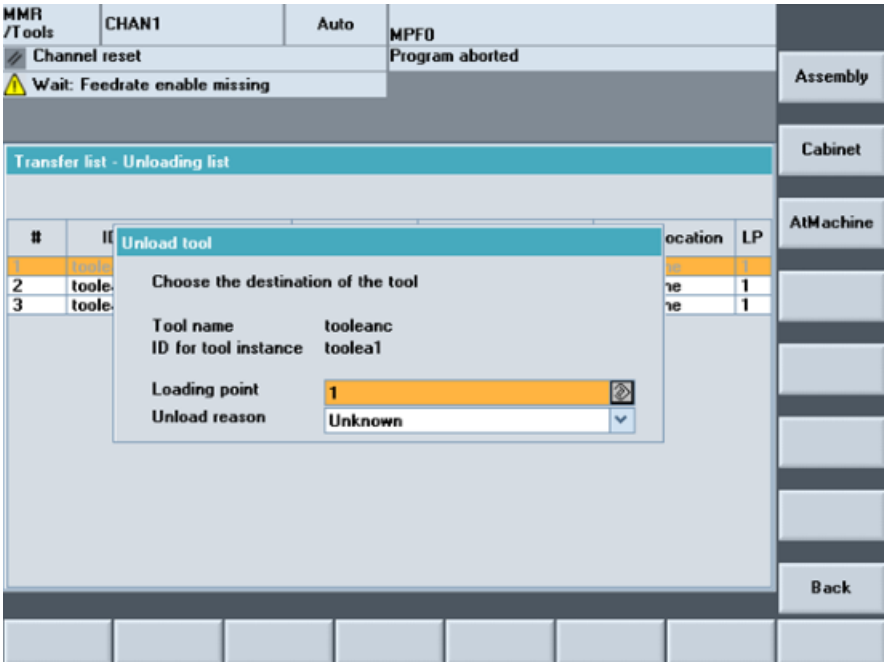
Move up

Move down

Remove entry

Edit

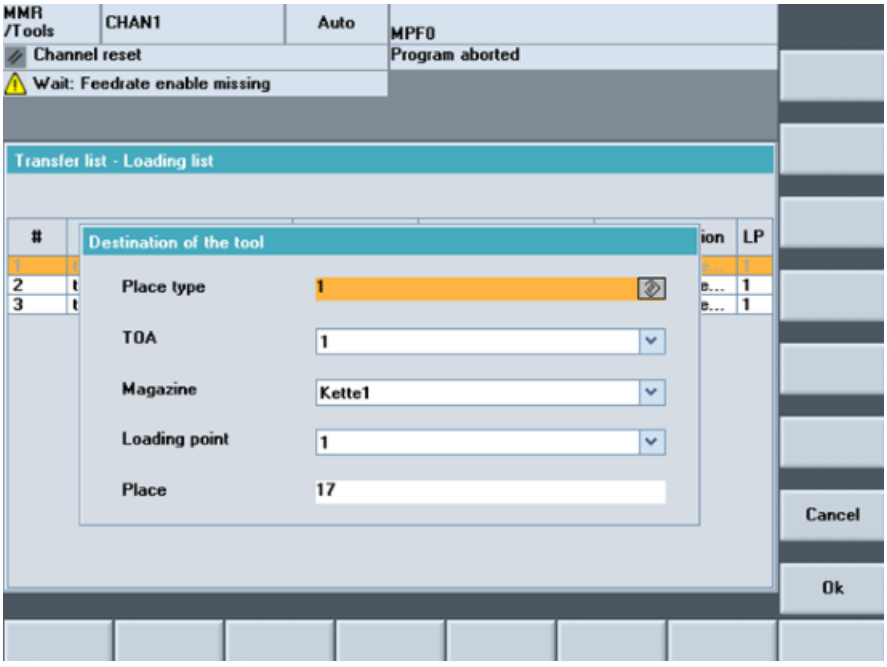
2. To change the order in which the tools will be loaded or unloaded:
   - Select a tool in the list.
   - Press the "Move up" or "Move down" softkey.
3. To remove a tool from transfer list, select the tool and press the "Remove entry" softkey.
4. To change the loading point or the target location that should be used for unloading:
   - Select a tool in the unloading list.
   - Press the "Edit" softkey.
   - Select the desired loading point in the drop-down list.
   - Select the target location.
     For more information, see Unloading internal tools (Page 558)
   - Press "OK" to save the changes.



- OR -

Edit

4. To change the target location which should be used for loading:
   - Select a tool in the loading list.
   - Press the "Edit" softkey.
   - Enter the desired place type (Default: 1).
   - Select the desired TOA and magazine in the drop-down lists.
   - Select the desired loading point in the drop-down list.
   - Enter the desired place, or leave this field empty to use automatic place search.
   - Press “OK” to save the changes.



Note

For machines with turning technology and without a configured magazine, select the desired TOA and T-number.

6.4.14.3 Unloading multiple tools

You can unload all tools that are stored in the "Transfer list - unloading list".

Prerequisite

This functionality is only enabled if the user has at least protection level 4.

Parameter

The following parameters are displayed in the "Transfer Progress" window:

Parameter	Description
Rank (#)	Displays the order in which the tools will be unloaded.
ID for tool instance	Shows the external identifier of the tool (For brownfield tools, the tool name will be shown).
State	Shows the current state during transfer. Possible values are: • Unloading: The tool is currently being unloaded. • Waiting: The tool is waiting to be unloaded. • Success: The tool has been successfully unloaded. • Failed: An error occurred while unloading this tool. • Canceled: The transfer has been aborted due to an occurred error. This tool won't be unloaded anymore.

Procedure

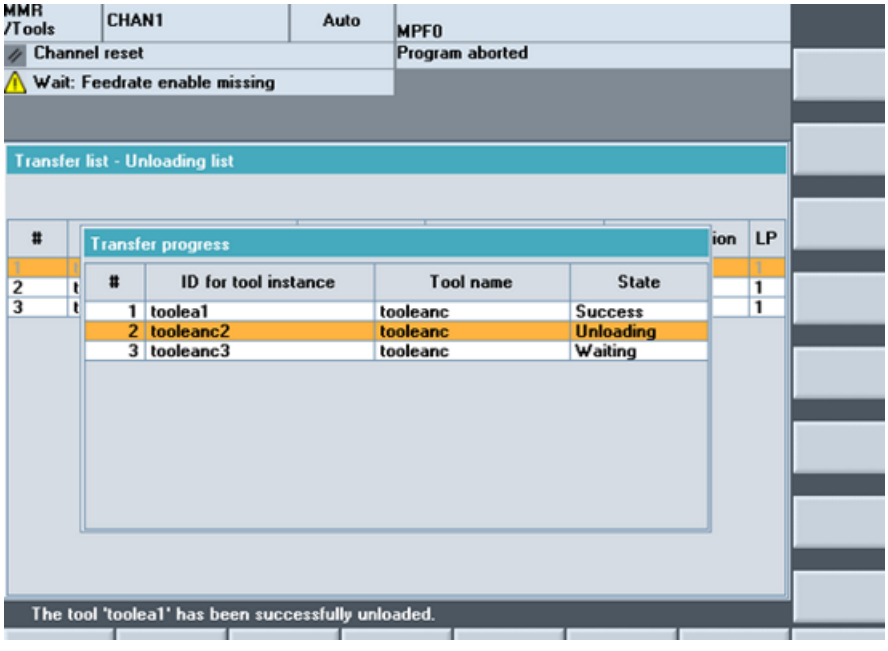
1. Press the horizontal softkey "Transfer list".

2. If the "Transfer list - Loading list" window opens, press the "Unloading list" softkey.

   The "Transfer list - Unloading list" window opens.

3. Press the "Start unload" softkey.

   The "Transfer progress" window opens and shows the current state of the unload process.



4. If the whole transfer process was successful, the "Tool view" window opens.

Error-Case

After start of the unloading process, the places of the tools are checked. If a place is locked, an error message will be shown before the first tool is unloaded and the transfer will not be started.

If an error occurs while the transfer is ongoing, there will also be an error message shown. The transfer will stop at this point. Tools that were not unloaded until then, won't be unloaded anymore and stay in the transfer list. Tools that are already unloaded are removed from the transfer list.

6.4.14.4 Loading multiple tools

You can load all tools that are stored in the "Transfer list - loading list".

Prerequisite

This functionality is only enabled if the user has at least protection level 4.

Parameter

The following parameters are displayed in the "Transfer progress" window:

Parameter	Description
Rank (#)	Displays the order in which the tools will be loaded.
ID for tool instance	Shows the external identifier of the tool (For brownfield tools, the tool name will be shown).
State	Shows the current state during transfer. Possible values are: • Loading: The tool is currently being loaded. • Waiting: The tool is waiting to be loaded. • Success: The tool has been successfully loaded. • Failed: An error occurred while loading this tool. • Canceled: The transfer has been aborted due to an occurred error. This tool won't be loaded anymore.

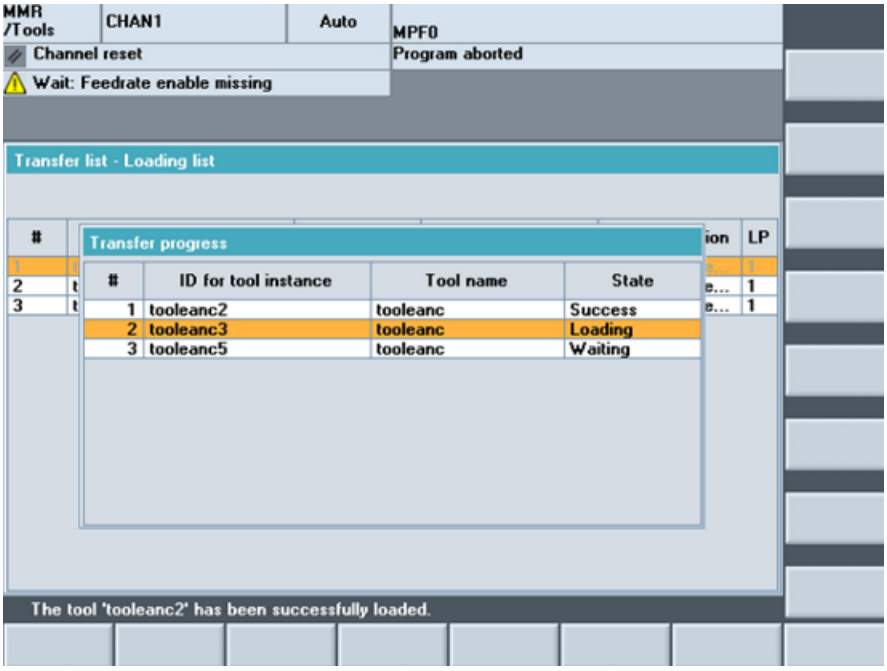
Procedure

1. Press the horizontal softkey "Transfer list".

2. If the "Transfer list - Unloading list" window opens, press the "Loading list" softkey.
   The "Transfer list - Loading list" window opens.

Start load

3. Press the "Start load" softkey.
   The "Transfer progress" window opens and shows the current state of the load process.



4. If the whole transfer process was successful, the "Tool view" window opens.

Error-Case

If an error occurs while the transfer is ongoing, an error message will be shown. The transfer will stop at this point. Tools that were not loaded until then, won't be loaded anymore and stay in the transfer list. Tools that are already loaded are removed from the transfer list.

6.4.15 Tools on an offline machine

6.4.15.1 Creating tools on an offline machine

When the machine has no connection to the server, i. e. the machine is "offline", you have the possibility to continue to work.

You can create tools and sister tools on an offline machine with the three D-number types relative, absolute and flat. You can load them to a machine.

The interruption of the connection is displayed in the application "Tool Stock" and "monitoring tools" on the server.

- Tools which are in the cabinet cannot be loaded. You must create a new tool.
- You can directly load tools with the location "AtMachine".

After a successful synchronization with the server, no further corrections are necessary.

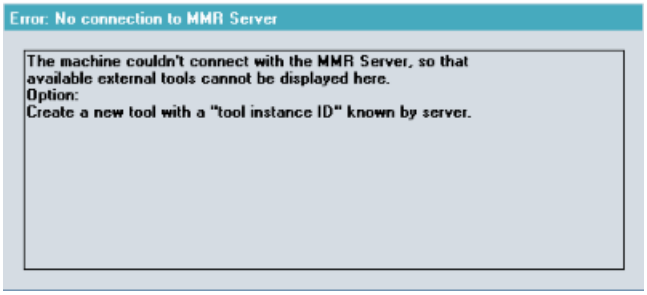
Parameter

The following parameters are available:

Parameter	Description
"Tools in cache" window	
ID for tool instance	Shows the instance data ID.
Tool name	Shows the tool name.
Ident. master data	Shows the master data ID.
Location	Shows the locations.
"Create tool" window	
ID for tool instance	Enter a unique identifier for tool instance data.
Tool name	Enter the tool name.
Number of cutting edges	Select the number of cutting edges from the drop-down list.
"Destination of the tool" window	
TOA	Select the TOA unit from the drop-down list.
Magazine	Select the required magazine from the drop-down list.
Place	Enter the location number of the tool. If the input field remains empty, SINUMERIK Operate assigns a location.
Place type	Enter the location type.
Loading point	Select a load point from the drop-down list
Tool view column "Sync"	
P	The synchronization has not taken place.
E	Data of the tool on the machine do not correspond with data on server.

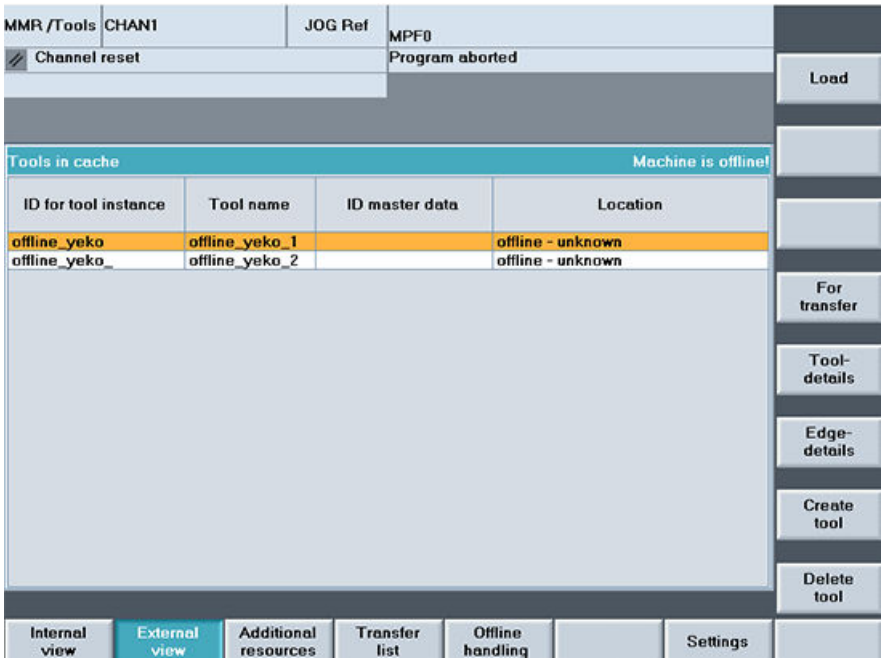
Procedure on the machine

1. Press the "External view" softkey.
   The "External View: Tools to load" window opens.
   If the connection to the server is interrupted, the message “Machine is off-line!” is displayed in the top-right window area.
   The following popup message appears:



2. Press the "Ok" softkey to acknowledge the message.

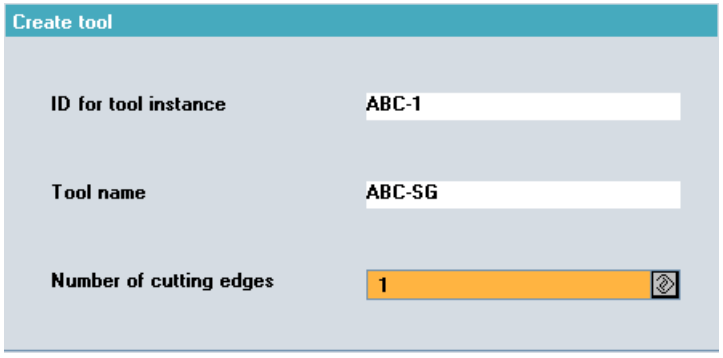
3. The "Tools in cache" window opens.



4. Press the "Create tool" softkey.

   The "Create tool" window opens.

   - Enter the respective values in the input fields.
   - Write down the tool data to create this tool on the server. This is necessary to synchronize the data when the connection to the server is restored.
   - Press the "Ok" softkey.



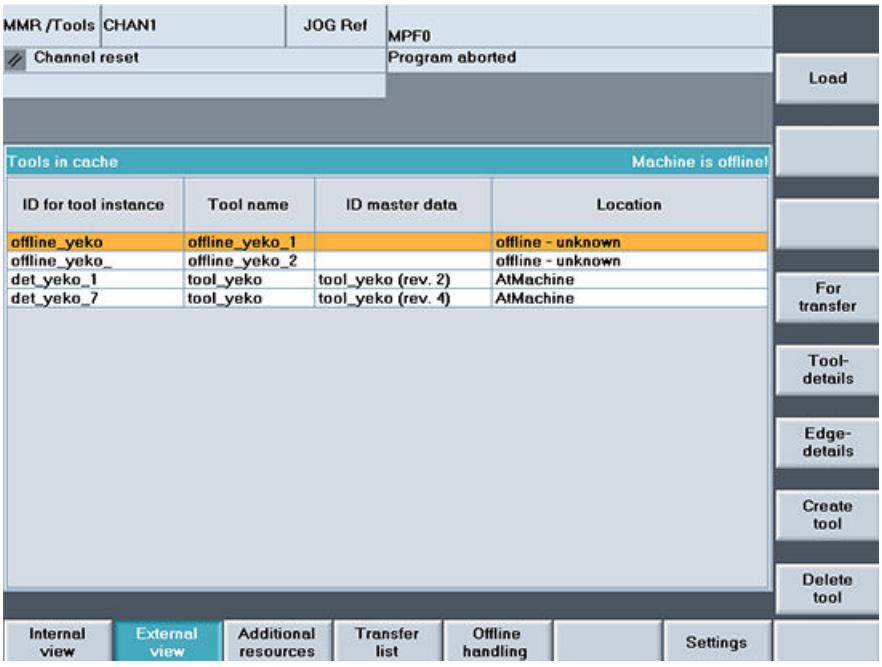
5. The "Create tool: Finalization" window opens.

   Enter a type for each edge of the tool. Allowed tool types are not be checked when an offline tool is created. Entering a tool type "0" is not allowed.

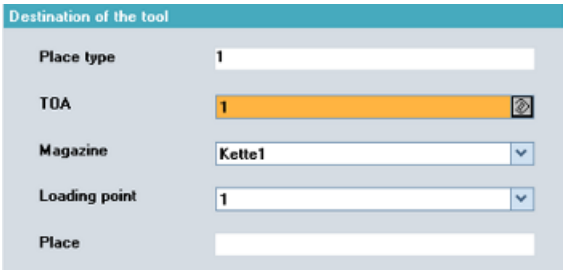
   You can also enter lifetime values for the offline tool.

   Press the "Ok" softkey.

6. The new tool is displayed in the overview.
   The information "offline-unknown" appears in the column "Location".



7. Press the "Load" softkey.
   The "Destination of the tool" window opens.
   - Specify the target of the external tool instance on the machine.
   - Press the "Ok" softkey to load the tool into the selected magazine.



8. The tool is displayed in the "Tool view" window in the "Internal view" area.

   As long as there is no connection to the server, the tool remains in the pending status.

   The letter "P" is displayed in the "Sync" column.

   After the connection to the server has been re-established, the tool is synchronized.

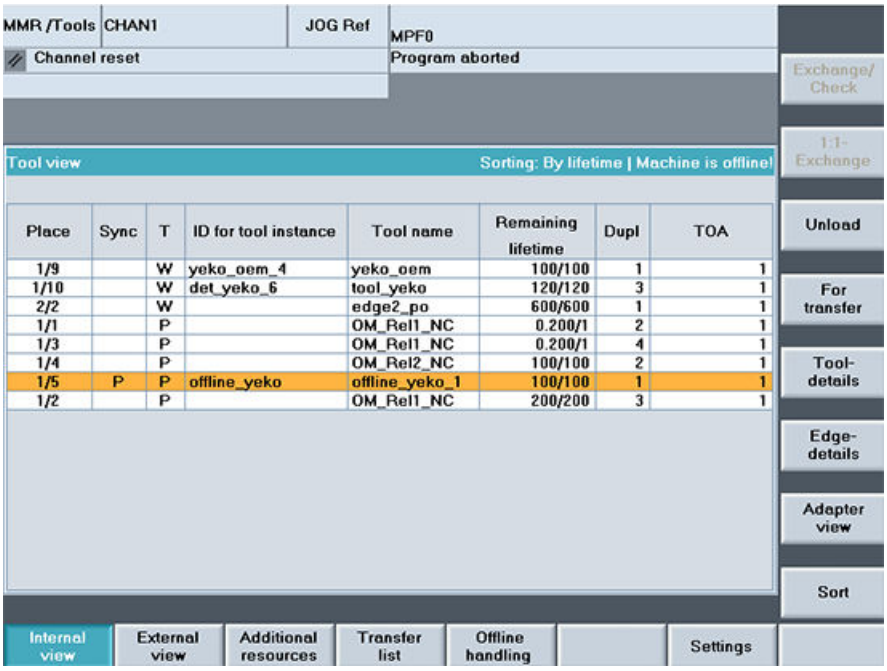
   If the tool could be synchronized successfully, the pending status disappears.

   If the tool could not be synchronized successfully, an "E" is displayed in the "Sync" column.

   In this case, the data on the machine does not match the data on the server.

   You can delete the tool and create a new tool, or you can correct the tool.

   Delete the tool and create a new tool.
   You can also correct the tool.
   For more information, see Correcting tool properties (Page 642).



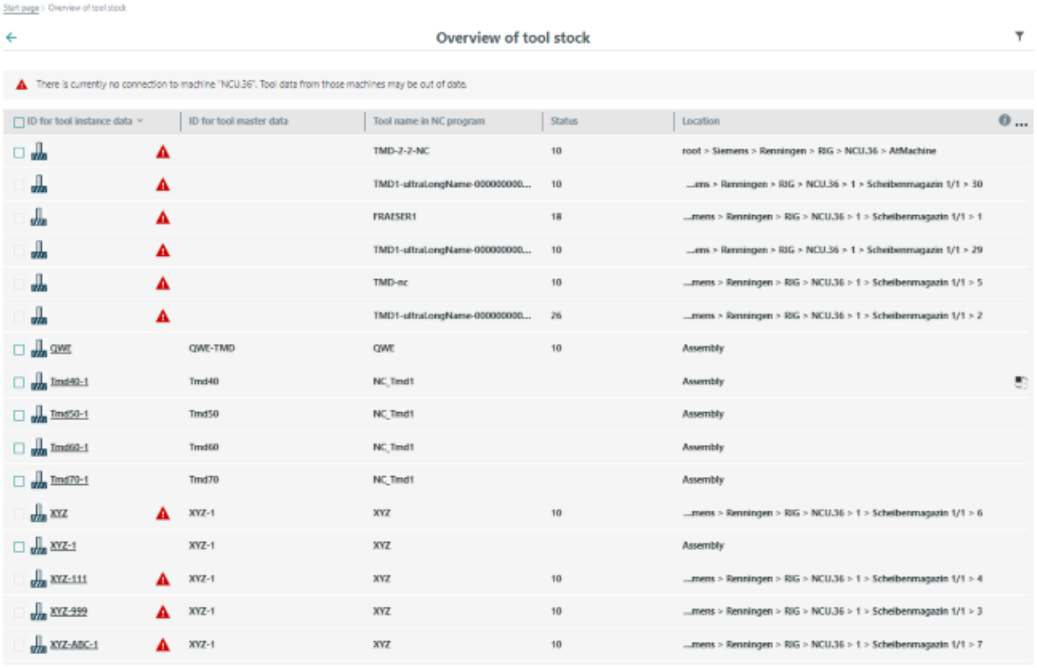
Place	Sync	T	ID for tool instance	Tool name	Remaining lifetime	Dupl	TOA
1/9		W	yeko_oem_4	yeko_oem	100/100	1	1
1/10		W	det_yeko_6	tool_yeko	120/120	3	1
2/2		W		edge2_po	600/600	1	1
1/1		P		OM_Rel1_NC	0.200/1	2	1
1/3		P		OM_Rel1_NC	0.200/1	4	1
1/4		P		OM_Rel2_NC	100/100	2	1
1/5	P	P	offline_yeko	offline_yeko_1	100/100	1	1
1/2		P		OM_Rel1_NC	200/200	3	1

9. Synchronization is done automatically when the machine is reconnected to the server. The letter "P" is no longer displayed in the "Sync" column.

Procedure on the Server

1. On the start page of the Mcenter, click "Tool master data".
   - Create a new tool with the same data as on the machine
     For more information, see Creating or editing tool master data (Page 212).
2. On the start page of the Mcenter, click "Provide Tools".
   - Click "New tool". The "Tool master data" window opens.
   - Click the "Create new tool instance" icon on the right.
   - The "New tool instance" window opens.
   - Enter the same data as on the machine for "ID for tool master data*", "Tool name in NC program*" and "Number of cutting edges".
   - Click "Save".
   - The tool is displayed in the overview.
   - Select the checkbox next to the new tool on the left. Click "Take over processing".
   - Click "Personal tasks".
   - Move the new tool via Drag&Drop to the "To be provided" column.
     Measure the tool and choose the tool location.
     For more information, see Overview for providing tools (Page 250).

3. In the "Overview of tool stock" and "Monitoring tools" windows, red warning symbols appear to indicate that the data has not yet been synchronized.



4. Synchronization is done automatically when the machine is reconnected to the server. The red warning symbols are no longer displayed.

6.4.15.2 Correcting tool properties

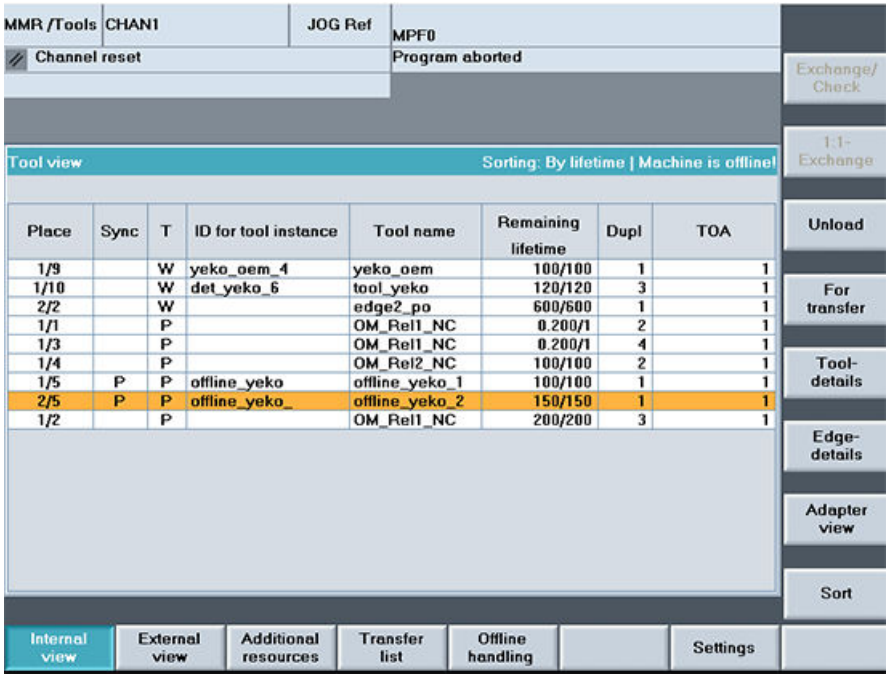
If a tool was created while the machine was in the "Offline" state and was not synchronized with the server, you can correct the properties of the tool when the machine is in the online state again.

Prerequisite

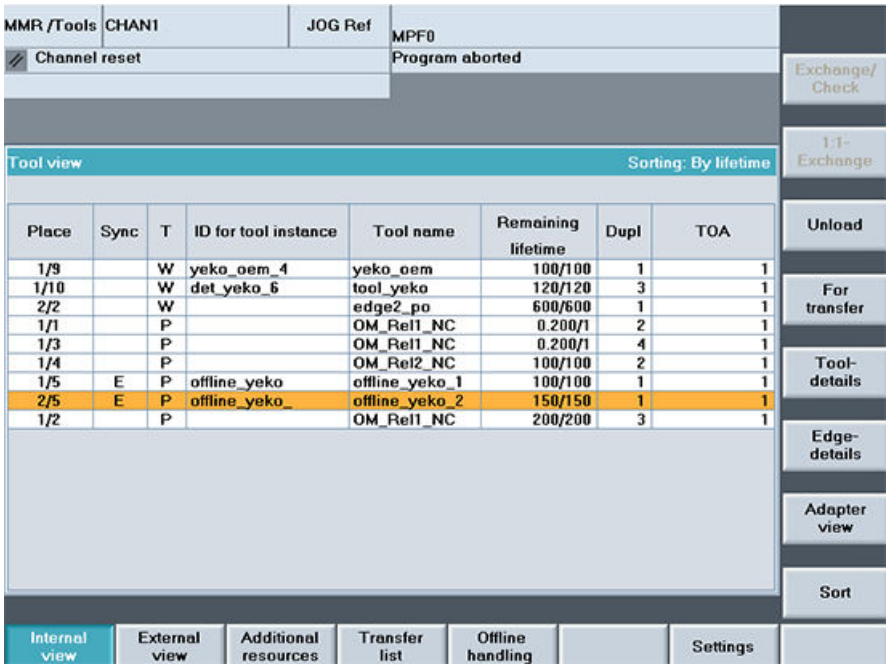
The offline handling view contains two views, "Offline Tools" and "Sync-Errors" that can be reached and changed via the toggle button.

"Offline tools" view: Procedure

1. Press the "Internal view" softkey.
   The "Tool view" window opens.
   If the connection to the server is interrupted, the message “Machine is off-line!” is displayed in the top-right window area.

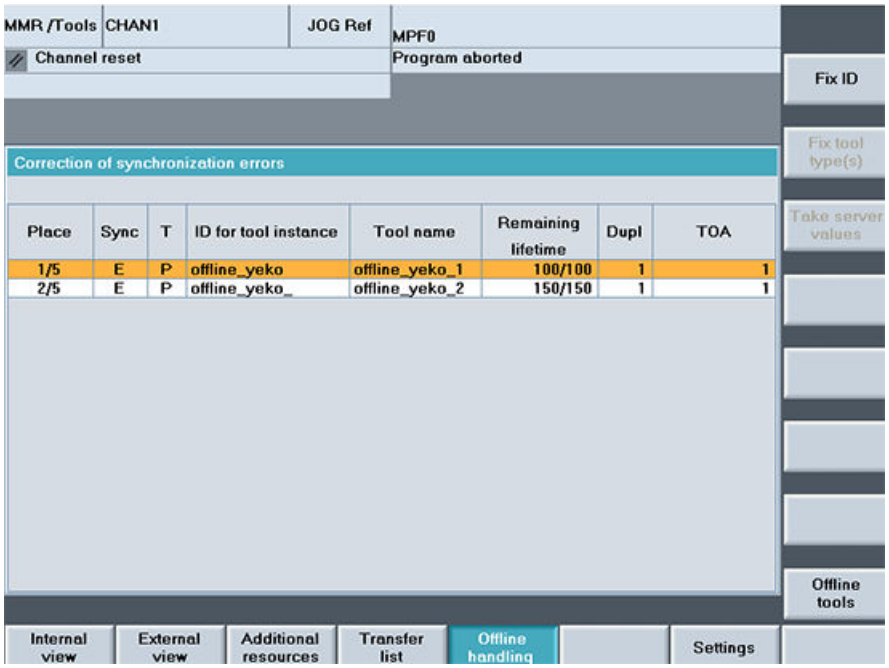


In the "Sync" column, you see the letter "E" that indicates the tool with the incorrect data.



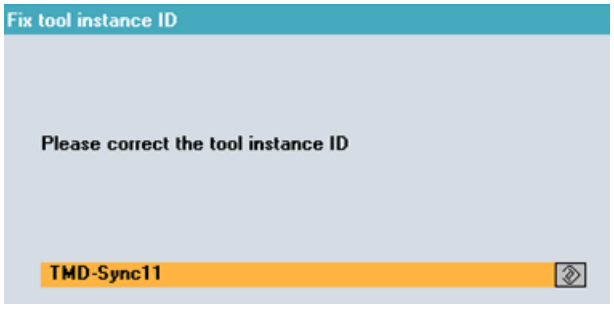
Offline handling

2. Press the "Offline handling" softkey.
The "Correction of synchronization errors" window opens.
All the tools with incorrect data are displayed in the list.



Fix ID

3. Choose a tool and press the "Fix ID" softkey.
The "Fix tool instance ID" window opens. Correct the ID of the instance data.
Press the "Ok" softkey.



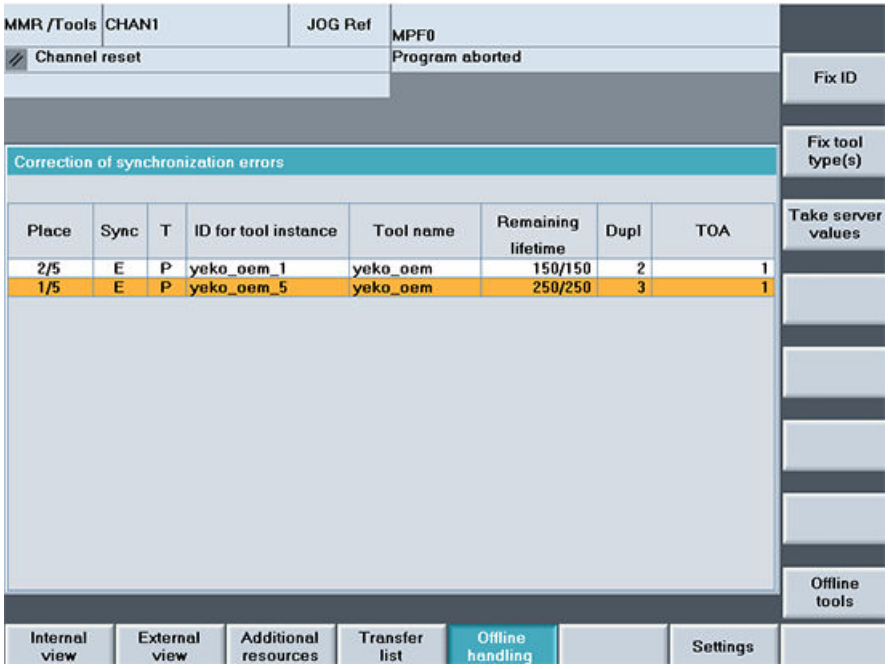
4. The "Confirm" window opens and you receive a message about your input.
Press the "Ok" softkey.

Edge conflicts

In case of an edge conflict, there are two options:

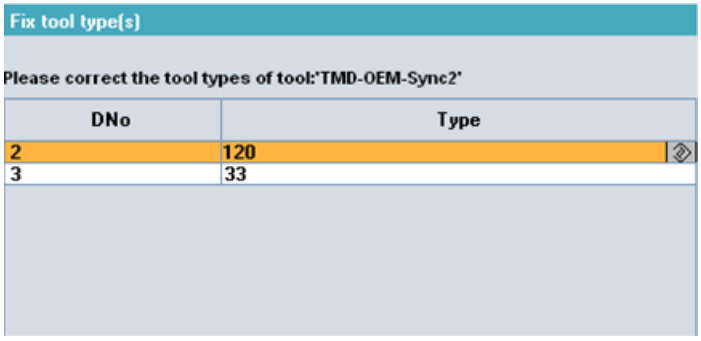
Option 1:

1. The "Fix tool type(s)" softkey is activated when the edge-conflict involves an equal number of edges on the client and the server.
   - Flat and relative D-numbers:
     You can correct the tool type on each edge.
   - Absolute D-numbers:
     You can correct the tool type on each edge as well as the D-number (DNo).

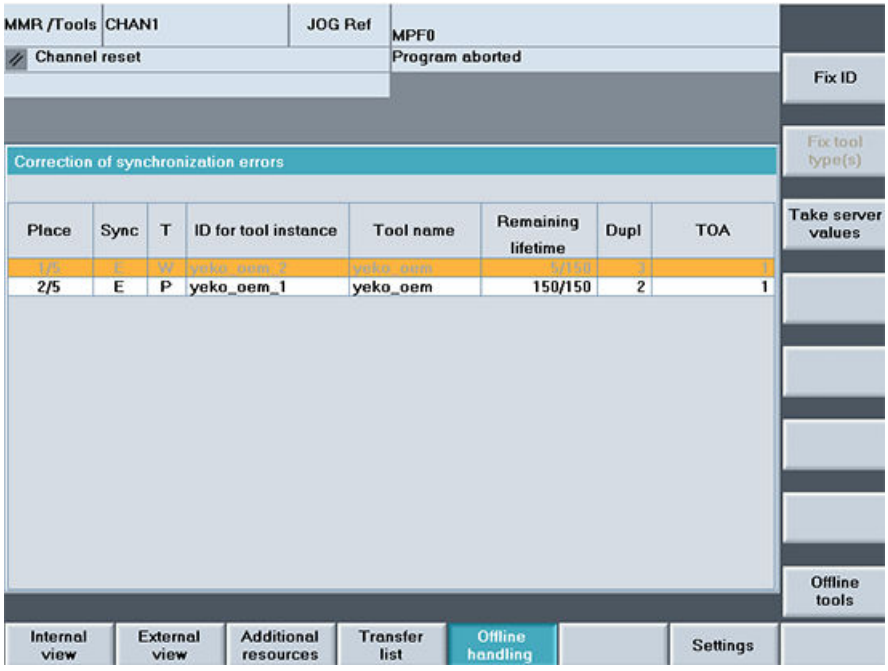


Fix tool type(s)

2. Press the "Fix tool type(s)" softkey.
   The "Fix tool type(s)" window opens.
   Enter new data e. g.the "DNo" and press the "Ok" softkey.



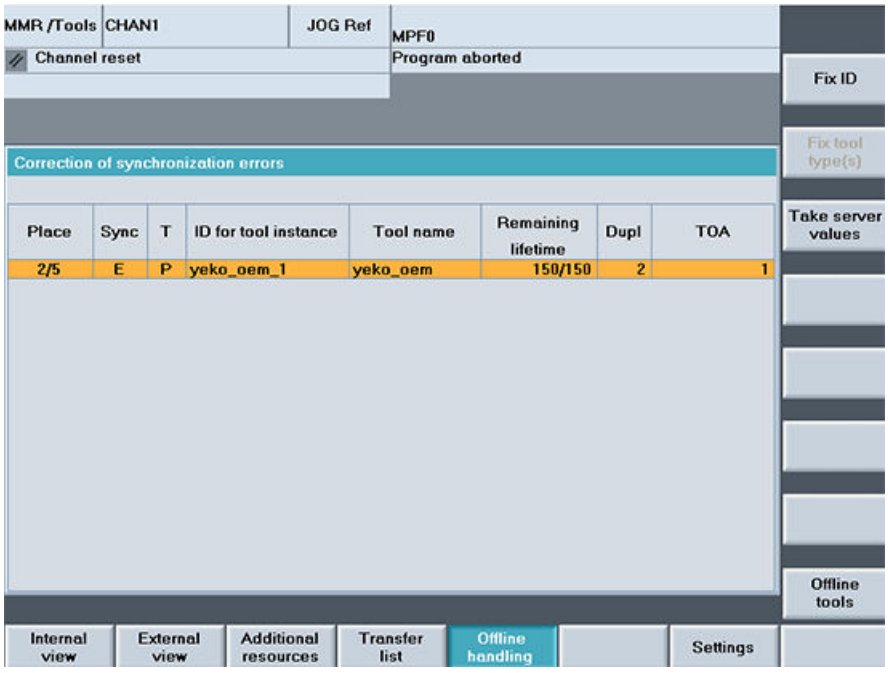
3. The corrected data of the tool are displayed in the list and can be processed.



- OR -

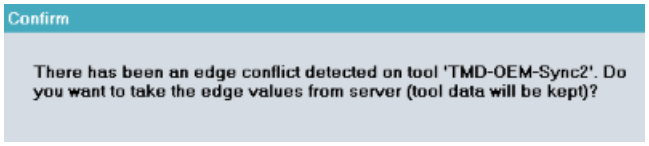
Option 2:

1. The "Take server values" softkey is activated when the edge-conflict involves an equal or a different number of edges on the client and the server.
This option is always available except if the ID does not match.You can take all the values from the tool on the server including the DNo.

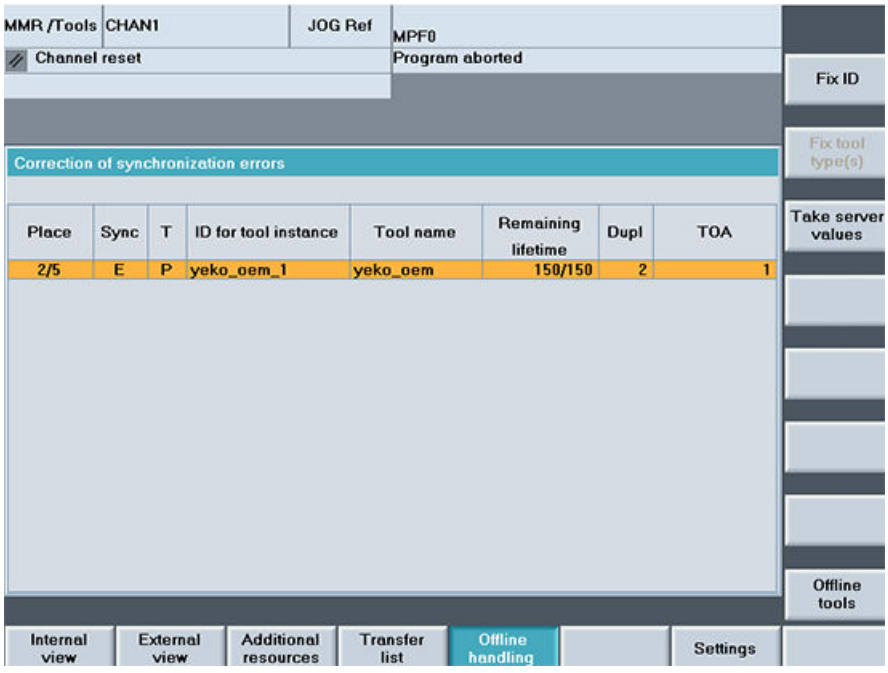


Take server values

2. Press the "Take server values" softkey.
   The "Confirm" popup message appears.
   Press the "Ok" softkey to overwrite the property values with the server values.



3. The "Tools to load" window opens.
   The corrected data of the tool are displayed in the list and can be processed.



For more information, see Checking and exchanging internal tools (Page 542).

6.4.15.3 Exchanging tools on an offline machine

You can load and unload sister tools on machine which is offline.

Procedure

Internal view

1. Press the "Internal view" softkey.
   The "Tool view" window opens and shows the overview of the tools.
2. Select a tool.

1:1-Exchange

3. Press the "1:1-Exchange" softkey.

   The "Sister tools for 1:1-Exchange" window opens.
   Enter the following data:

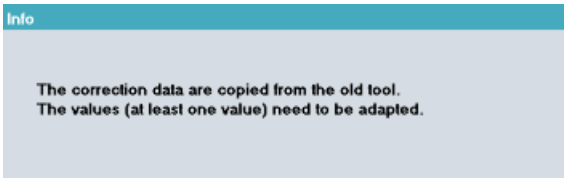
   - ID for tool instance
     This data item is important for the synchronization.
   - Duplo No.
     This information is optional.
   - Loading point (LP)

   Press the "Ok" softkey to unload the tool and to create a sister tool.

   - OR -

   Click "Cancel" to cancel the operation.

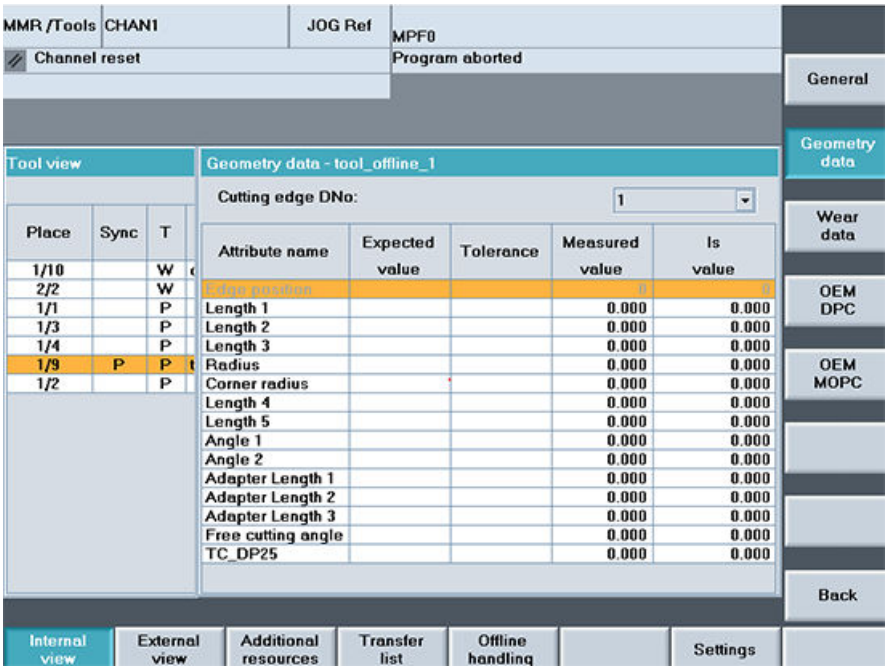
   The OEM and correction data from the original tool is copied and applied to the sister tool. The "Geometry data" window opens displaying the following popup message:



   Press the "Ok" softkey.

4. The "Geometry data - <ID Instance data>" window remains open.
   The "Back" softkey is inactive until you click on at least one of the fields in the "Is value" column. You must adapt at least one property.

   The letter "P" is displayed in the "Sync" column. The synchronization with the server cannot start as long as the machine is offline.



Note

Unloading brownfield tools

You can unload brownfield tools to "AtMachine" when the machine is offline. The tool is not displayed in the "External tools" view and can only be disassembled from "Tool stock" when the machine is synchronized with the server.

For more information, see Unloading internal tools (Page 558).

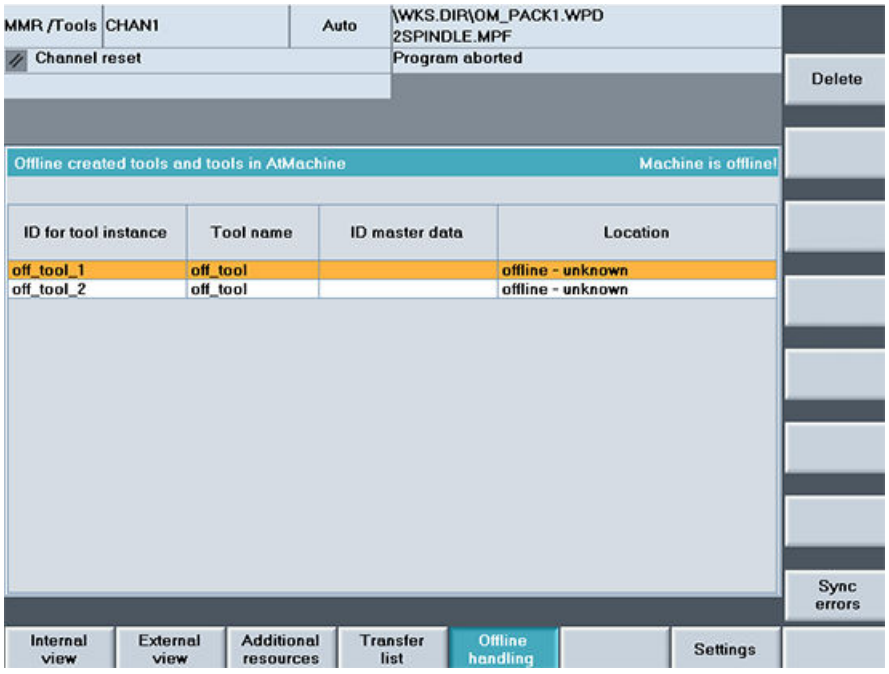
6.4.15.4 Deleting offline created tools

You can display and delete the offline created tools not only on an offline, but also on an online machine.

Procedure

Offline handling

1. Press the "Offline handling" softkey.
   Select the "Offline Tools" softkey.
   The "Offline created tools and tools in AtMachine" window opens.
   Select the tool you wish to delete.

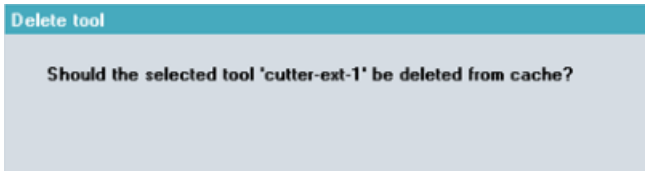


Delete

2. Press the "Delete" softkey.

   The "Delete tool" window opens.
   Press the "Ok" softkey to confirm the deletion of the selected tool.
   - OR -

   Press the "Cancel" softkey to cancel the operation.



6.4.16 Error messages

Error messages are displayed for the following actions:

- Unloading an original tool
- Reloading an original tool
- Loading a sister tool
- Loading an external tool

Error messages and error source

The following errors can occur, if you unload an original tool:

Error message	Error source
Action cannot be done. Place is locked.	The location where the tool is located is locked.

The following errors can occur, if you reload an original tool:

Error message	Error source
Action can not be done. Place is locked.	The location where the tool is located is locked.

The following errors can occur, if you load a sister tool:

Error message	Error source
Sister tool could not be loaded. A duplicate already exist.	A duplicate of the tool is already exist in the TOA with the same tool name and duplo number.

The following errors can occur, if you load an external tool:

Error message	Error source
Loading of the tool failed. A duplicate already exists.	If a magazine is configured, a duplicate of the tool with the same tool name and duplo number already exists in the TOA . Otherwise, a tool with the same T-Number already exists in the TOA.
Loading of the tool failed. The specified place is locked.	The storage for the tool is locked.
Loading of the tool failed. The specified place is not empty.	The storage for the tool is occupied or does not exist.
Search empty place failed. No free places available in the chosen magazine.	There is no free place for the tool in the magazine.
Loading of the tool failed. The specified place is invalid.	The storage for the tool does not exist.

The following error message appears when the machine is in the "offline" state. This messages is shown for MMR /Tools External Tools.

Error message	Error source
No connection to MMR Server.	The server is down, there is no physical connection to the server, or there is a network issues.

Using Manage MyResources /Tools with the Machine Agent

7

7.1 Starting Manage MyResources /Tools

Overview

You can use Manage MyResources /Tools with the Machine Agent application on an IPC or PCU.

Prerequisites

The selected controller type must be Fanuc during machine creation.

The control system has powered up.

You have assigned Manage MyResources /Tools to the control system. The installation has been successful.

Your PC is connected to the control system.

Note

Installation

Do not install the application to the control system, but to a PC connected to the control system powered by the Machine Agent.

For more information, see

- Manage Machines Overview of machines (Page 72)
- Manage application on machines Overview of assignments (Page 90)

Procedure

1. Open a supported web browser on the connected PC, for example Google Chrome.
2. Go to the following page: Localhost_MMRT (http://localhost:8002/mmrt).
   Only the lowercase application name, mmrt, is supported in the address of the new UI page.
   The Machine Agent is running on the same PC.

On FANUC

The FOCAS V2 library and tool management on the Fanuc control system are enabled.

Synchronizing the Tools

After the startup of the application, (or whenever both the server and the controller comes online) the system will do a synchronization. During this the tools on the controller and their data will be uploaded to the server.
Until this process is complete, the application will show a loading bar, indicating that the synchronization is in progress and no changes can be made.

Displaying the connection status to the server and the controller

The connection status indicators are displayed on the top right section of the page.

Green background indicates that the devices is online and the connection is established. Any changes made will be synchronized.

Red background indicates that the device is offline or there is something wrong with the network.

Any changes made will be synchronized, once the server and the controller both come back online.

Gray background means that the connection status is unknown. This can happen when the Machine Agent is not running.

Any changes made will be synchronized, once the server and the controller both come back online.

7.2 Switching the language or theme

Overview

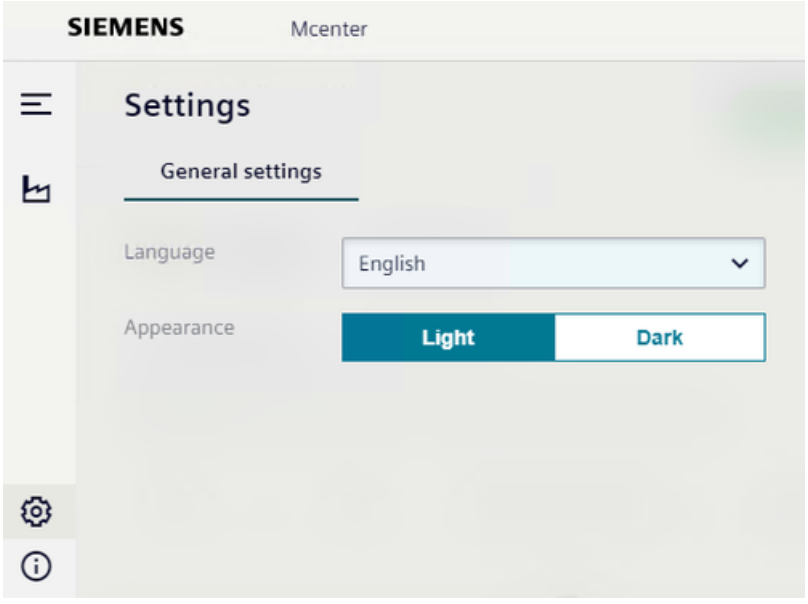
You can select the language.

The default language is English.

The items on the list are written in the respective languages.

Procedure

1. Click on the "Settings" icon in the navigation bar of the Mcenter window.
   The settings page opens, here the language and the theme of the page can be set.



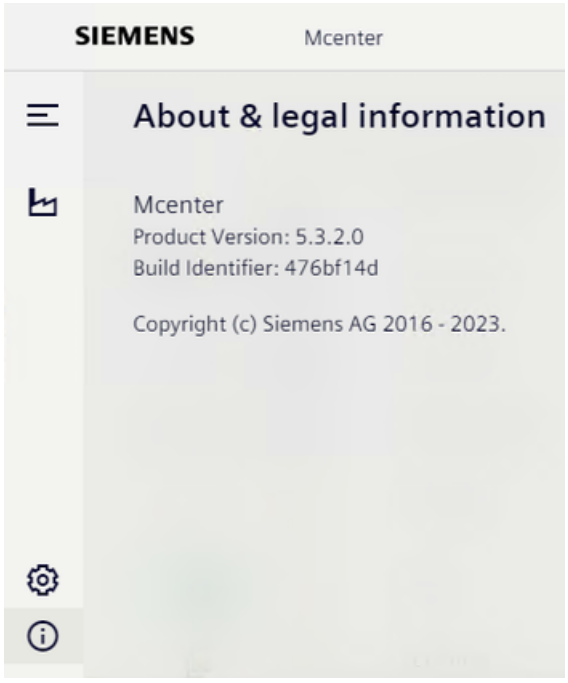
7.3 Displaying information about the product and the version

Overview

You can display the product information and the build identifier of the software.

Procedure

1. Click on the "i" icon in the bottom-left corner of the window.
   A product information popup opens.



7.4 Working with internal tools

7.4.1 Displaying internal tools

Overview

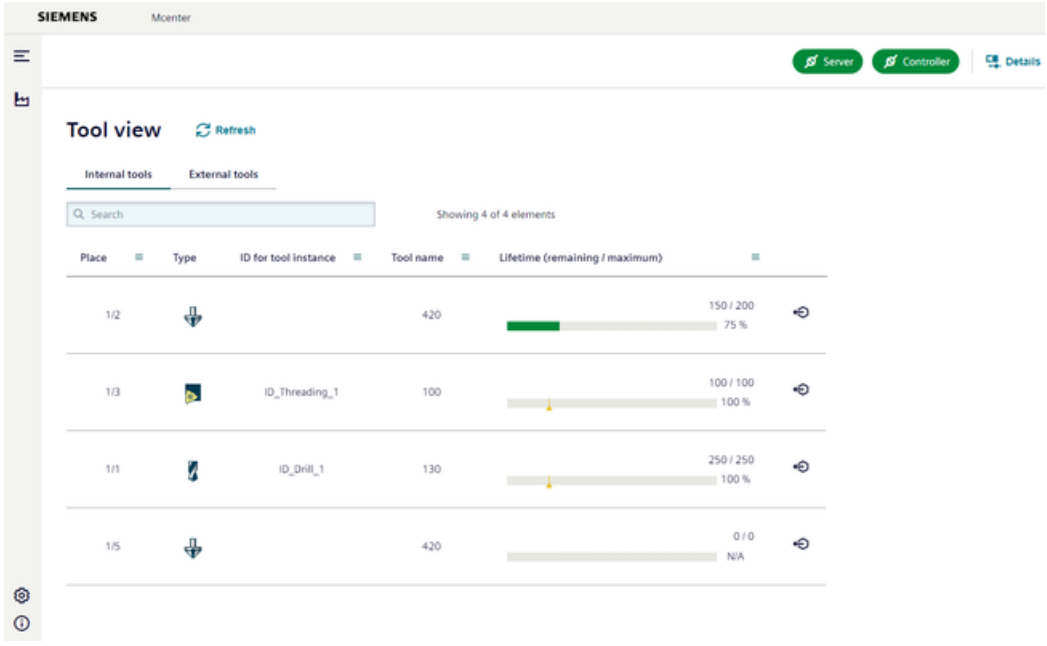
You can view the internal tools information such as place, lifetime on the internal tools page. The "Refresh" button will start the synchronization process.

Parameter

Parameter	Description
Place	Shows the location of the tool (magazine / pot)
Type	Shows the type of the tool
ID for tool instance	Shows the external ID of the tool instance
Tool name	Shows the name of the tool
Lifetime (remaining / maximum)	Shows the life details of the tool

Procedure

1. Click on the "hamburger" icon in the top-left corner of the windows, just under the Siemens logo.
   The navigation menu pops up.
2. Press the "Tools" button.
3. Under the "Tool view" label click on "Internal tools".
   The tools are displayed in the table, below.



7.4.2 Filtering and sorting internal tools

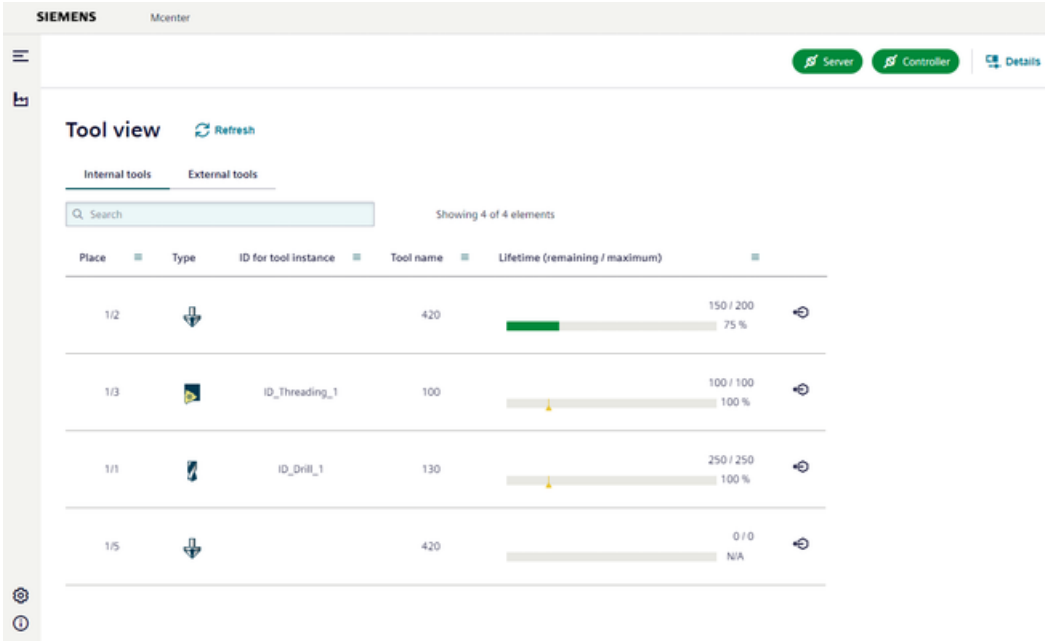
Overview

You can filter tools that are displayed in the "Internal tools" tab for specific tool.

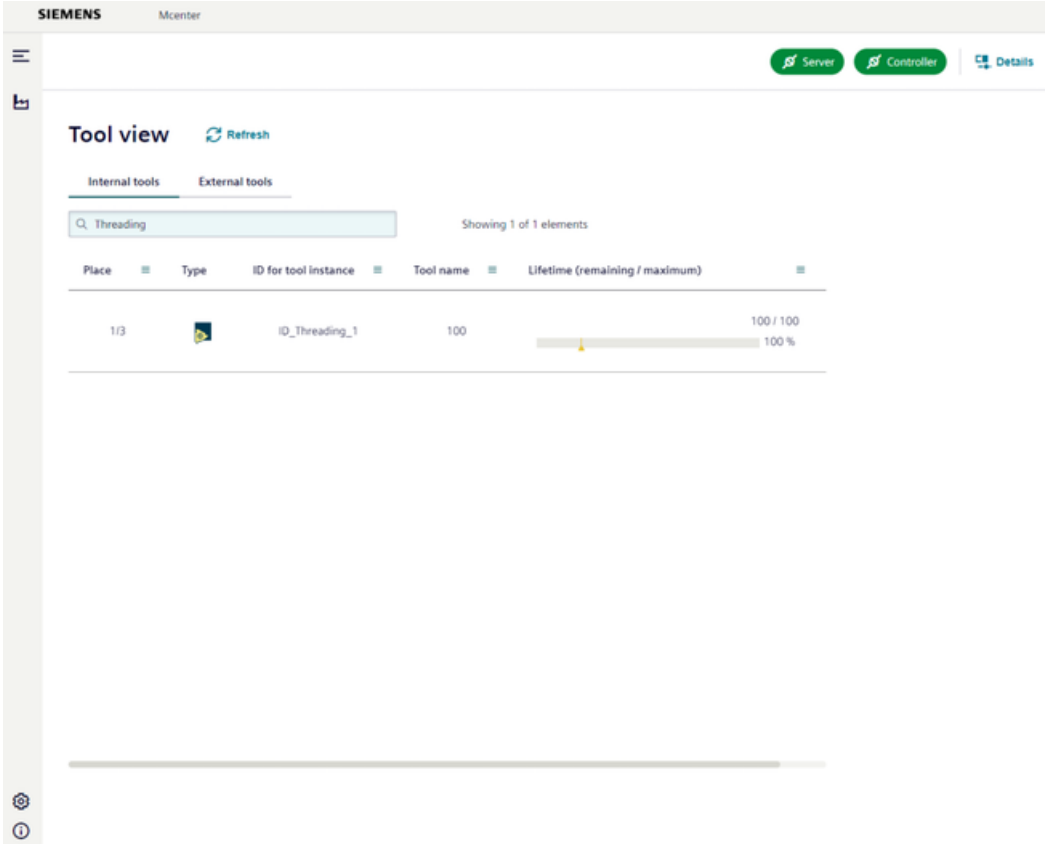
Procedure

1. Click on the "hamburger" icon in the top-left corner of the windows, just under the Siemens logo.
   The navigation menu pops up.
2. Press "Tools".

3. Click "Internal tools" under "Tool view".
   The tools are displayed in the table, below.



4. Type the input in the search bar and press "Refresh".

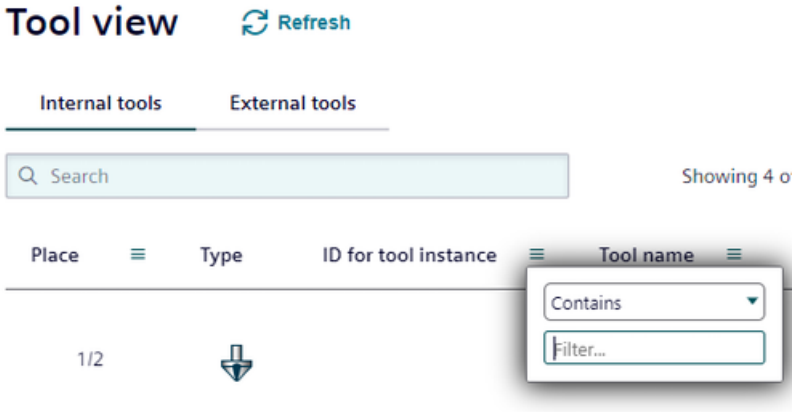


The searched input is applied to the following parameters:

– ID for tool instance
– Tool name

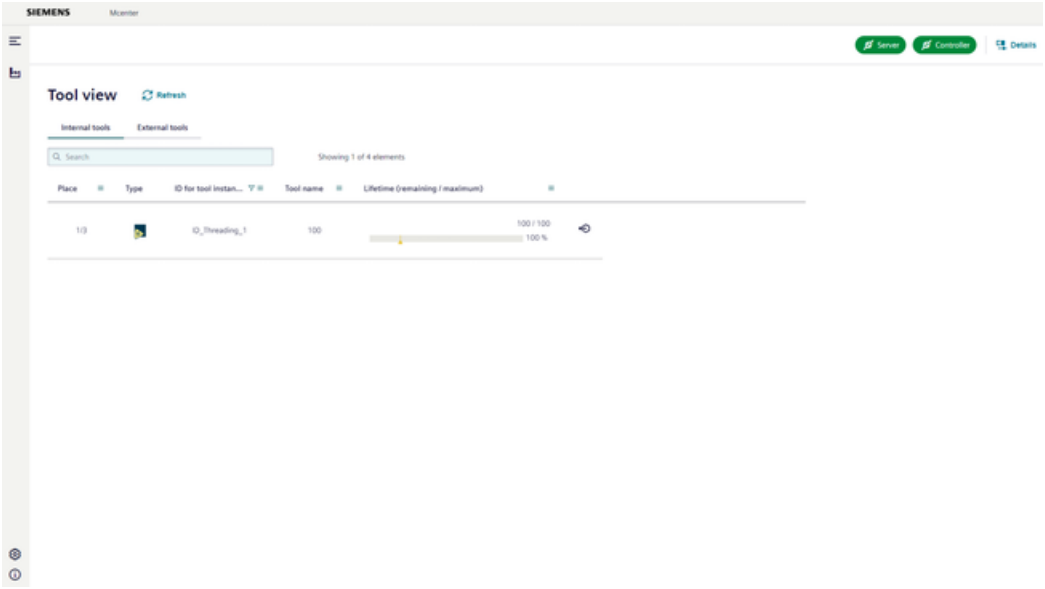
You can also filter the tools by using the tools data table column filter.

1. Click on the "hamburger" icon of the column you want to filter.



2. Select the filter type:
   - Contains
   - Not contains
   - Equals
   - Not equal
   - Starts with
   - Ends with
   - Blank
   - Not blank
3. Type the input inside the "filter" bar.
   You can add one more filter with the parameters above
   - AND - both filter criteria matches
   - OR - one of the filter criteria matches

   Only the filtered tools will be displayed



Note

The available and shown number of elements are displayed next to the search bar. To remove the filter, delete the input field of the filtered column.

You can sort the columns by pressing its column header by default, ascending or descending.

The sortable columns are:

- Place
- ID for tool instance
- Tool name
- Lifetime

7.4.3 Displaying internal tool details

Overview

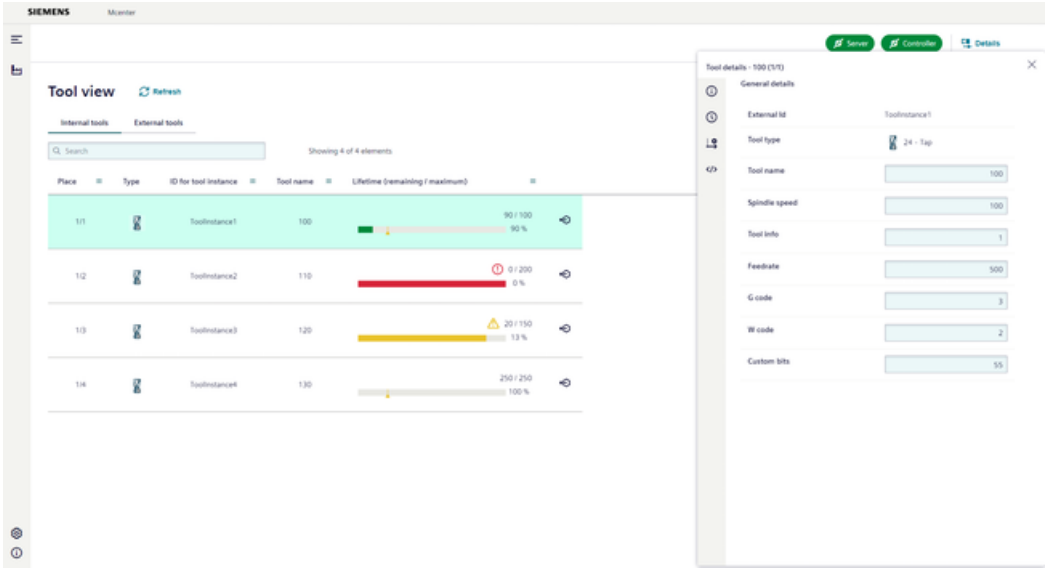
You can display further tool data details. Some of the details can be changed directly on the details window and the change will be synchronized with the controller and server.

Parameter

Parameter	Description
General details	
External Id	Shows the external ID of the tool
Tool name	Shows the name of the tool
Spindle speed	Shows the spindle speed of the tool
Tool type	Shows the Type of the tool
Tool info	Shows additional tool information

Procedure

1. Click on the "hamburger" icon in the top-left corner of the windows, just under the Siemens logo.
   The navigation menu pops up.
2. Press the "Tools" button.
3. Under the "Tool view" label click on "Internal tools".
4. Select a specific tool
5. Press the "Details" button on the top right corner.
6. A window opens on the right side of the details.



On FANUC

Parameter	Description
General details	
Feedrate	Shows feedrate of the tool

Parameter	Description
G code	Tool geometric compensation number
W code	Tool wear compensation number
Custom bits	Custom bits for the tool
Tool lifetime	
Tool max life	Displays the maximum life of the tool.
Tool life consumption	Displays the life consumption of the tool.
Tool life warning limit	Displays the life warning limit. In case the tools life goes below this, the health bar will be marked as yellow.
Geometry data	
Geometry X	Shows the X value of the geometry offset data.
Geometry Y	Shows the Y value of the geometry offset data.
Geometry Z	Shows the Z value of the geometry offset data.
Geometry R	Shows the R value of the geometry offset data.
Wear X	Shows the X value of the wear offset data.
Wear Y	Shows the Y value of the wear offset data.
Wear Z	Shows the Z value of the wear offset data.
Wear R	Shows the R value of the wear offset data.
Custom properties	
Custom 1...40	Shows the value of the configured OEM Data

7.4.4 Unloading internal tools

Overview

A tool can be unloaded directly to a specific destination.

Parameter

The following parameters are displayed in the "Unload tool" window:

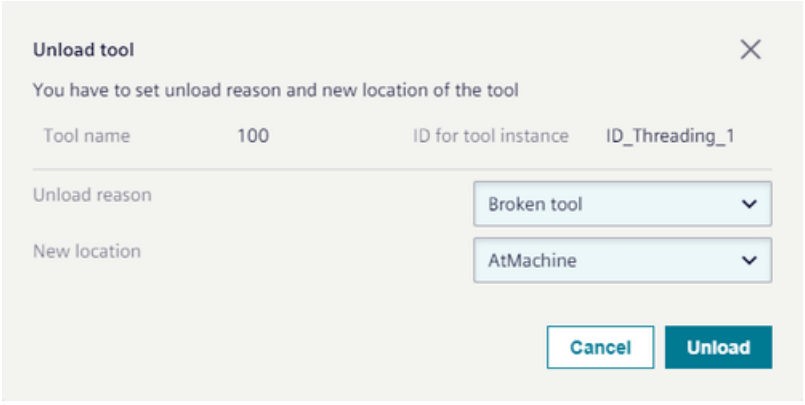
Parameter	Description
Unload tool	
Choose the destination of the tool:	
Tool name	Shows the tool name
ID for tool instance	Shows the identifier for tool instance data
Unload location	Select an unload location from the drop-down list

Parameter	Description	
Unload reason	Select one of the following Unload reasons: • Unknown • Broken tool • Worn out tool • Loud noise of the tool • Empty place needed • Tool is needed • Tool is needed on another machine • Bad workpiece quality • <User-defined Unload reason>	
Unload tool to Assembly		
Choose action flag	Choose one of the following action flags to specify the reason for unloading the tool:	
	Decide further processing	A tool can be unloaded on the machine without an action suggested. After unloading, the tool is listed on the server. The presetter must decide on further action of the tool.
	Overhaul	After unloading the tool to overhaul, the tool is placed in "Kanban" in the column "To be overhauled" on the server. The replacement of the tool edge is enabled.
	Remeasure	The tool is placed in "Kanban" in the column "To be measured" on the server. The tool looses previous correction data.
	Recheck	The presetter provides the tool again after a check. The tool is placed in "Kanban" in the column "To be provided" that keeps the original correction data.
	Disassemble	The tool is removed from the client. Reloading is not possible.
Comment on unloading reason	For the comment, a maximum of 128 characters are available.	
Unload tool to cabinet		
Cabinet	Select the required cabinet from the drop-down list.	
Contaier	Select the required container from the drop-down list.	

Procedure

1. Select the "Internal tools" tab under "Tool view".
2. Select a tool from the list and click on the unload icon on the right side of the table.

3. Select an unload reason from the dropdown menu.

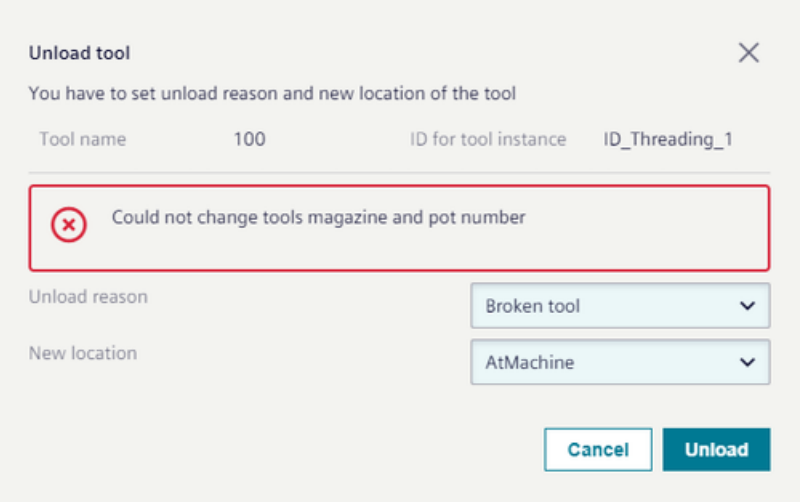
   

   If you have deleted the Unload reasons, they are not displayed in the dialog box. The Unload reasons are deleted via the API.
   For more information, see Configuring Unload reasons and their action flags Configuring Unload reasons and their action flags (Page 955).

4. Select a new location for the tool
   - Assembly (only available for greenfield tools)
     If you unload to Assembly and have deleted the Unload reasons, the default action flag is "Disassemble".
     The “Define target location and propose actions” window opens.
     Select an action flag in the drop-down list
     Write a comment in the text field below (optional)
   - AtMachine
     If you unload brownfield tools in offline mode, this can only happen when the machine is online. Therefore, the following message is displayed in offline mode:
     "Move of the tool will be completed when the machine goes online."
   - Cabinet (only available for greenfield tools)
     The "Unload tool to cabinet" window opens.
     Select the desired cabinet from the drop-down list.
     Select the tool size from the "Container" drop-down list.
5. Click on the "Unload" button
   The unloaded tool is supplied to the desired unloading point.
6. Open the door.
7. Remove the tool.
8. Close the door again.

Error messages

If an error occurs after unloading an internal tool and you press the "Cancel" button. The error is displayed in the red section of the window.



Error message	Error source
Could not change tools magazine and pot number	The tool's magazine and pot number could not be set on the controller
Could not delete geometry data on controller	The tool's geometry data could not be deleted on the controller
Could not delete offset data on controller	The tool's offset data could not be deleted on the controller
Could not delete tool on controller	The tool could not be deleted on the controller
Could not upload the data to the server	The server responded with an error when trying to upload the changes
Something went wrong during getting unload locations	The server was unable to retrieve the unload locations
Something went wrong during getting unload reasons	The server was unable to retrieve the unload reasons

7.5 Working with external tools

7.5.1 Displaying external tools

Overview

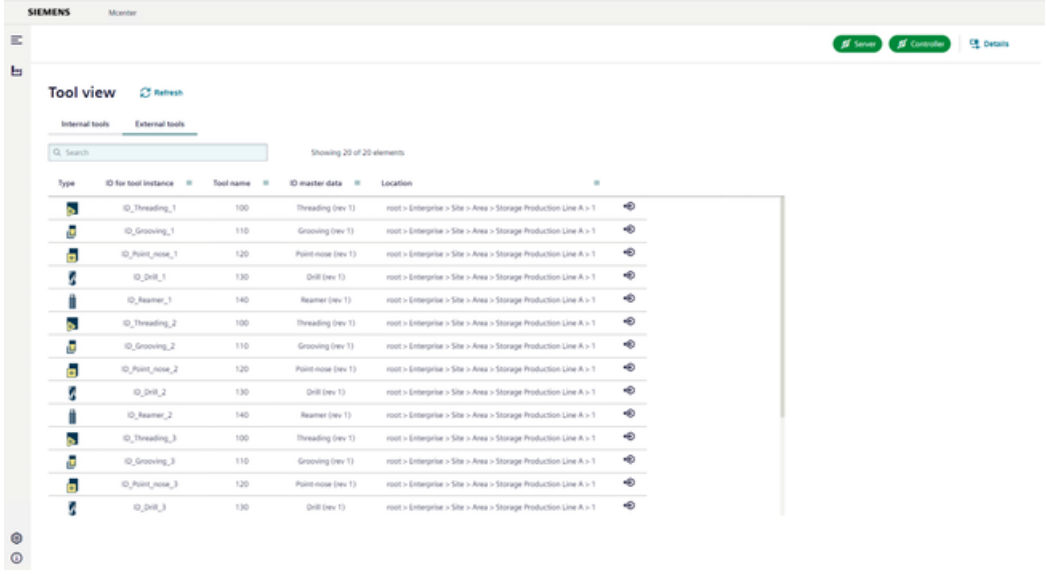
You can view the external tools information such as location, master data ID on the external tools page.

Parameter

Type	Shows the type of the tool
ID for tool instance	Shows the external ID of the tool instance
Tool name	Shows the name of the tool
ID master data	Shows the tool master data's ID
Location	Shows the current location of the tool

Procedure

1. Click on the "hamburger" icon in the top-left corner of the windows, just under the Siemens logo.
   The navigation menu pops up.
2. Press the "Tools" button.
3. Under the "Tool view" label click on "External tools".
   The tools are displayed in the table, below.



7.5.2 Filtering and sorting external tools

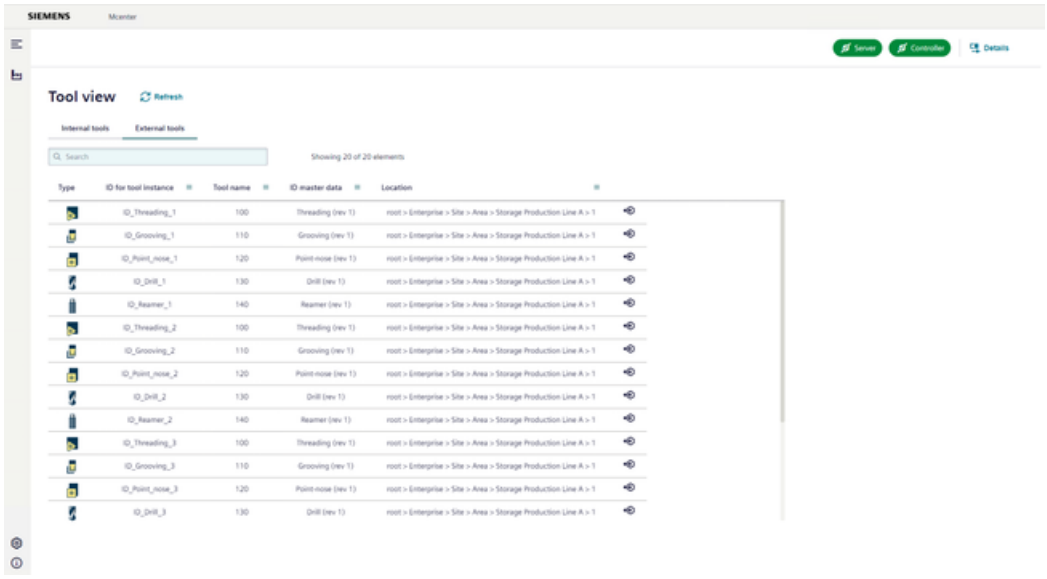
Overview

You can filter tools that are displayed in the "External tools" tab for specific tool.

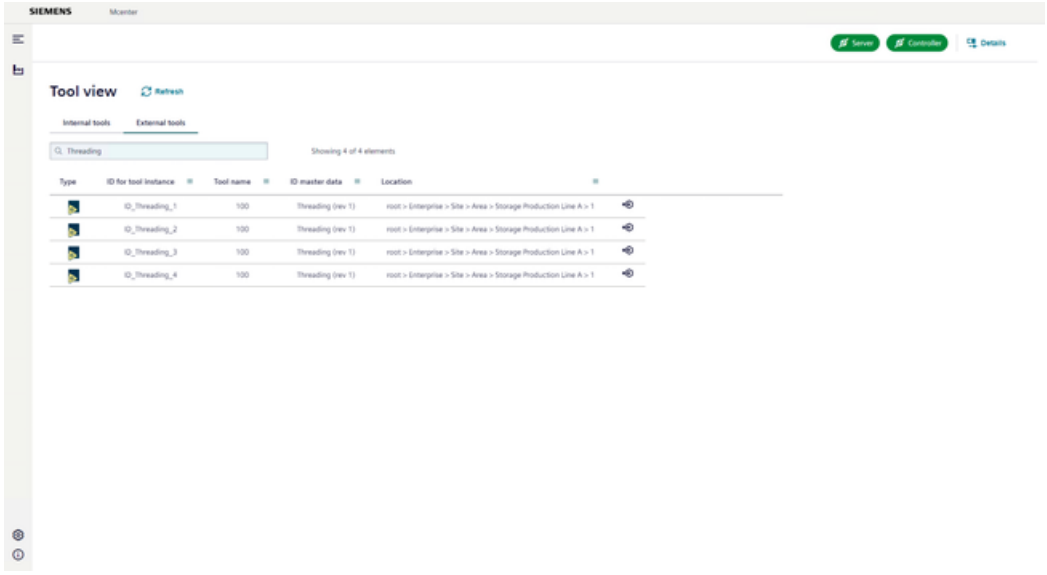
Procedure

1. Click on the "hamburger" icon in the top-left corner of the windows, just under the Siemens logo.
   The navigation menu pops up.
2. Press the "Tools" button.

3. Under the "Tool view" label click on "External tools".
   The tools are displayed in the table, below.



4. Type the input in the search bar and press the "Refresh" button.

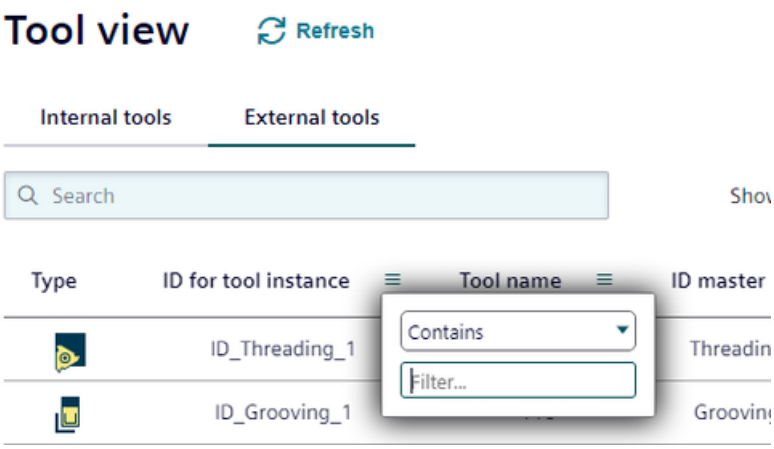


   The searched input is applied to the following parameters:

   – ID for tool instance
   – Tool name

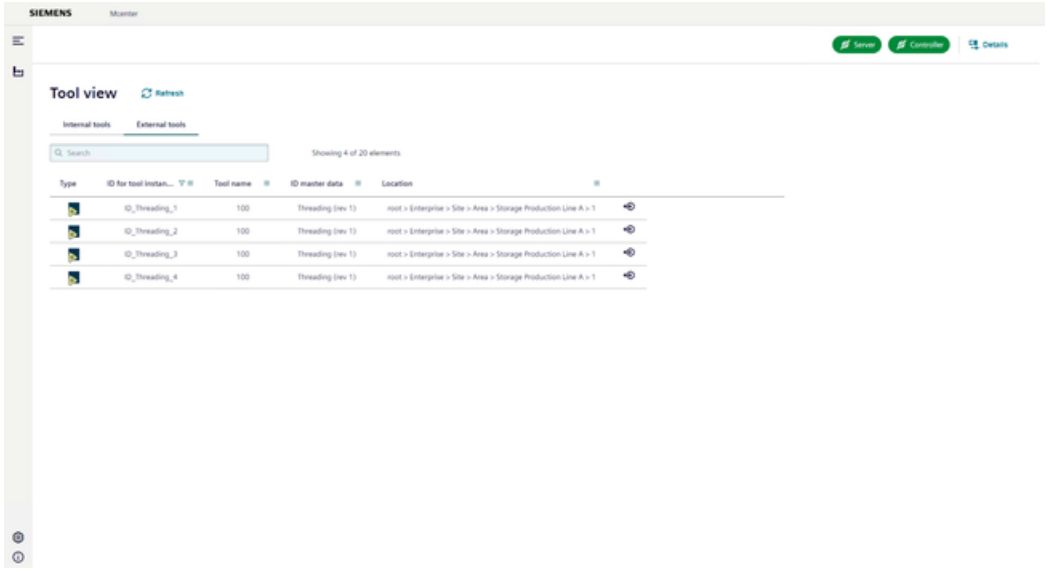
You can also filter the tools by using the tools data table column filter.

1. Click on the "hamburger" icon of the column you want to filter.



2. Select the filter type you want to use:
   - Contains
   - Not contains
   - Equals
   - Not equal
   - Starts with
   - Ends with
   - Blank
   - Not blank
3. Type the input inside the "filter" bar.

4. You can add one more filter with the parameters above
   – AND - both filter criteria matches
   – OR - one of the filter criteria matches
5. Only the filtered tools will be displayed



Note

The available and shown number of elements are displayed next to the search bar. To remove the filter, delete the input field of the filtered column.

You can sort the columns by pressing its column header by default, ascending or descending.

The sortable columns are:

- ID for tool instance
- Tool name
- ID master data
- Location

7.5.3 Displaying external tool details

Overview

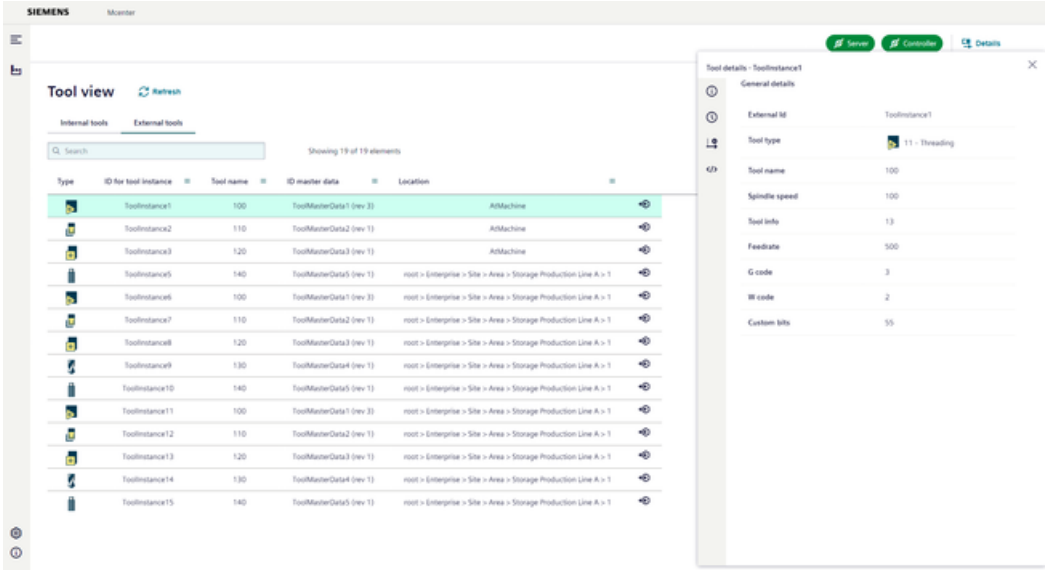
You can display further tool data details.

Parameter

Parameter	Description
General details	
External Id	Shows the external ID of the tool
Tool name	Shows the name of the tool
Spindle speed	Shows the spindle speed of the tool
Tool type	Shows the type of the tool
Tool info	Shows additional tool information

Procedure

1. Select the "External tools" tab under "Tool view".
2. Select a tool from the list.
3. Click on the "Details" button in the top right corner of the window.
   The tool details dialog appears.



4. You can navigate between the different sections of the detail windows with the icons on the left side.

On Fanuc

Parameter	Description
General details	
Feedrate	Shows feedrate of the tool
G code	Tool geometric compensation number
W code	Tool wear compensation number
Custom bits	Custom bits for the tool

Parameter	Description
Tool lifetime	
Tool max life	Displays the maximum life of the tool
Tool life consumption	Displays the life consumption of the tool
Tool life warning limit	Displays the life warning limit. In case the tools life goes below this, the health bar will be marked as yellow.
Geometry data	
Geometry X	Shows the X value of the geometry offset data
Geometry Y	Shows the Y value of the geometry offset data
Geometry Z	Shows the Z value of the geometry offset data
Geometry R	Shows the R value of the geometry offset data
Wear X	Shows the X value of the wear offset data
Wear Y	Shows the Y value of the wear offset data
Wear Z	Shows the Z value of the wear offset data
Wear R	Shows the R value of the wear offset data
Custom properties	
Custom 1...40	Shows the value of the configured OEM data

Note

Only those geometry data values are displayed which are present on Fanuc controller.

For example if Fanuc controller configuration does not contain "Geometry R" and "Wear R" values, then the remaining geometry values are displayed which are present in the table above.

7.5.4 Loading external tools

Overview

The tool data can be loaded from the central database. The assignment is made via the selected components in the tool overview.

External tools are not stored on the machine, but, for example, in a cabinet which can be seen from the machine. For information about loading tools into adapters see Loading tools into adapters Loading tools into adapters (Page 502).

Prerequisite

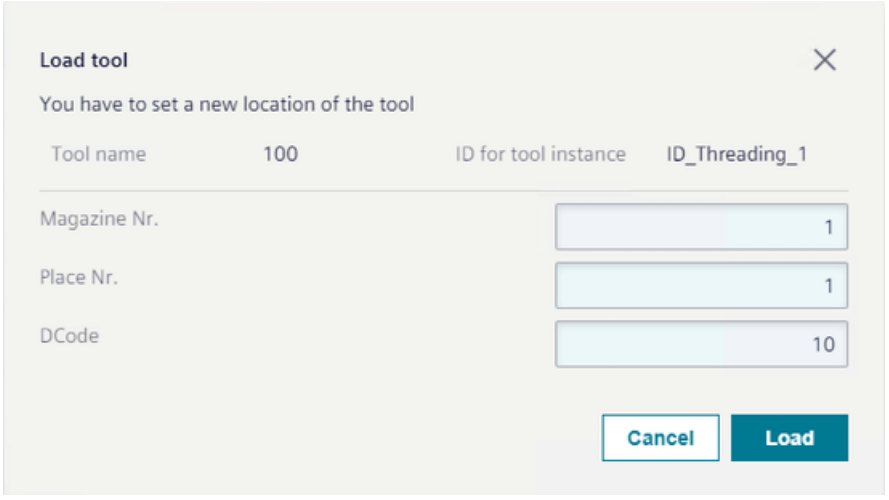
Before a tool is loaded, the tool must be measured and the correction data must be imported.

Parameter

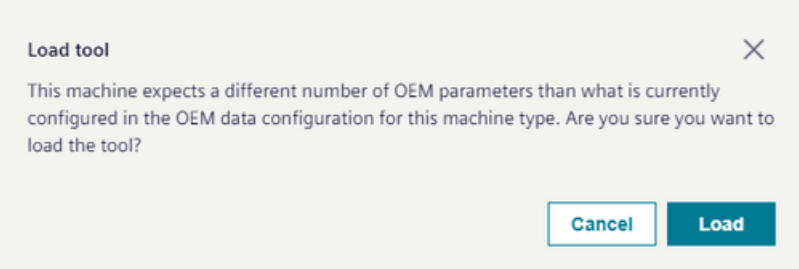
Parameter	Description
Load tool	
Tool name	Shows the tool name.
ID for tool instance	Shows the identifier for tool instance data.
Magazine Nr.	ID of the magazine
Place Nr.	ID of the place in magazine
On Fanuc	
DCode	ID of the tool geometry data

Procedure

1. Select the "External tools" tab under "Tool view".
2. Select a tool from the list and click on the load icon on the right side of the table.
   The "Load tool" windows pops up.
3. Fill the Magazine Nr, Place Nr. and DCode fields



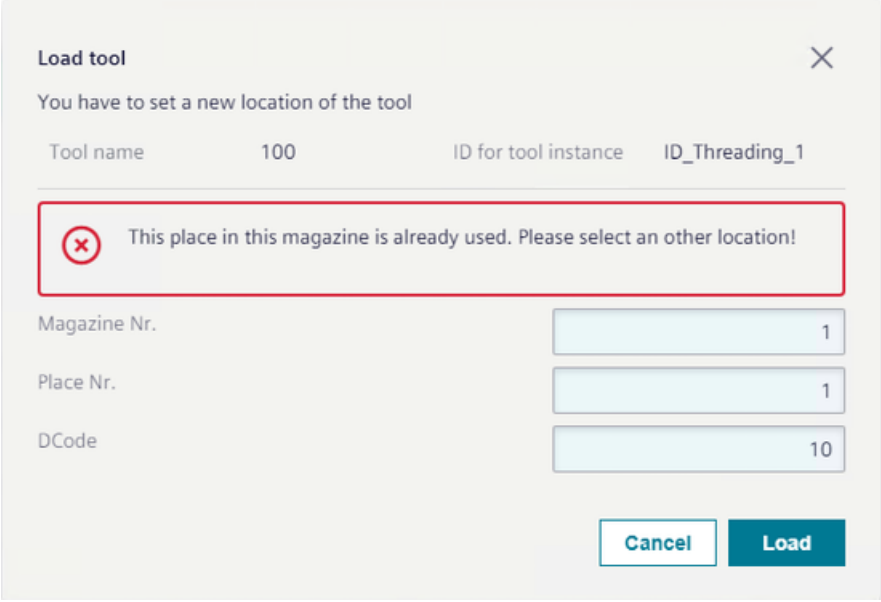
4. Press "Load" to load the tool into the selected magazine.
5. In case the configured OEM data parameter count is more than the machine's maximum parameter count, then a warning message will be prompted.



In this case if you continue, then the tool will be loaded and the parameter's will be cropped at the machine's maximum limitation.

Error messages

If an error occurs after loading an external tool and you press "Cancel". The error is displayed in the red section of the window.

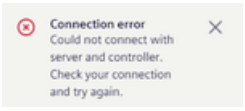


Error message	Error source
Could not create tool on the controller!	The tool creation failed on the controller
Could not get tool info for creation!	Required data could not be retrieved for tool creation
Could not load the selected tool	General error message for load error
Could not load tool on the server!	The tool load process failed on the server side
This place does not exist. Please select an other location!	The selected magazine number and pot does not exist on the machine
This place in this magazine is already used. Please select an other location!	The selected magazine number and pot is already occupied

7.6 Error messages

Overview

Error messages appear as popup notifications.



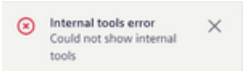
Hover over the error message to stop from disappearing.

You can close the notification by pressing the "X" button on the top right corner.

Internal tools

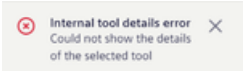
If the internal tools could not be shown, the following message appears:

"Could not show internal tools"



If the selected tool's details could not be shown, the following message appears:

"Could not show the details of the selected tool"



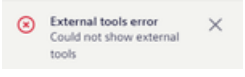
If the tool changes could not be saved, the following message appears:

"Could not save the modifications"

External tools

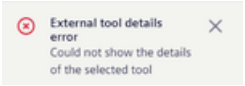
If the external tools could not be shown, the following message appears:

"Could not show external tools"



If the selected tool's details could not be shown, the following message appears:

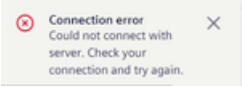
"Could not show the details of the selected tool"



Connection

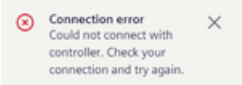
If the connection with the server is offline, and the action needs it to be online, the following message appears:

"Could not connect with server. Check your connection and try again."



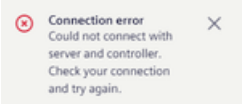
If the connection with the controller is offline, and the action needs it to be online, the following message appears:

"Could not connect with controller. Check your connection and try again."



If the connection with the server and the controller is offline, and the action needs them to be online, the following message appears:

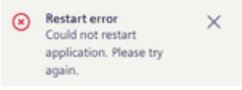
"Could not connect with server and controller. Check your connection and try again."



General

If the application could not be restarted, the following message appears:

"Could not restart application. Please try again."



Using Manage MyResources /Programs on the server

8

8.1 Manage NC packages

8.1.1 MMR /Programs configuration

You can modify the server configuration of MMR /Programs within Consul. Use following path: Key/Values > Processes > SinInt.MMRP.Service

JSON configuration

```
{
    "SinInt.MMRP.Service": {
        "Paths": {
            "RootPath": "C:\\MMRP\\NcPackages"
        },
        "NcPackages": {
            "LimitationPerMachine": 0
        },
        "Revisions": {
            "ManualHandling": false,
            "MandatoryComment": false,
            "NcPrograms": {
                "IgnoreCaseSensitivity": false,
                "IgnoreWhitespaceDifferences": false
            }
        }
    }
}
```

- SinInt.MMRP.Service:Paths:RootPath
  - The value "RootPath" defines the default download path for managed machines. This can be a local folder where the server is installed, or a network drive.
  - The default value is "C:\\MMRP\\NcPackages"
  - For more information see Programs on managed machines (Page 748).
- SinInt.MMRP.Service:NcPackages:LimitationPerMachine
  - LimitationPerMachine is the maximum number of downloadable NC packages for each machine.
  - The value 0 means that unlimited NC package download is allowed.
  - The default value is 0.

- SinInt.MMRP.Service:Revisions:ManualHandling
  - The value defines if a revision is released automatically when the NC package revision is created. Otherwise you must review it and release it manually.
  - If the value is false, "Auto revision handling" is active.
  - If the value is true, "Manual revision handling" is active.
  - The default value is false.
  - For more information see Status transitions (Page 722).
- SinInt.MMRP.Service:Revisions:MandatoryComment
  - The value MandatoryComment determines if you must add a comment before uploading NC program modifications from the machine.
  - The default value is false.
  - If the value is true, then you must clarify every uploaded change from machine in a comment.
- SinInt.MMRP.Service:Revisions:NcPrograms:IgnoreCaseSensitivity
  - If this value is false, a new revision is created on NC program upload if the only differences between the uploaded NC program and the server version are upper/lower case differences.
  - If this value is true, a new revision is created if the only differences between NC programs are upper/lower case letters.
  - The default value is false.
- SinInt.MMRP.Service:Revisions:NcPrograms:IgnoreWhitespaceDifferences
  - If this value is false, a new revision is created on NC program upload if the only differences between the uploaded NC program and the server version are whitespace differences.
  - If the value is true, no new revision is created if there are only whitespace differences between NC programs.
  - The default value is false.

8.1.2 NC program package overview

In the "NC program package overview" window, you see NC programs with the corresponding states and revision numbers.

Note

MMR /Programs configuration

MMR /Programs can be configured whether it handles NC package revisions in manual or automatic mode. Based on this configuration value, NC package states and revision handling is different during NC package lifecycle.

For more information about NC package lifecycle and the difference between "Auto revision handling" and "Manual revision handling" see Status transitions (Page 722).

You have the following options:

- Displaying detailed information about existing NC packages
- Creating new NC packages
- Deleting NC packages
- Copying NC packages
- Show NC package revisions with state "Review in progress"

Note

Deleting NC packages and downloaded NC programs

When you delete NC packages, downloaded NC programs are not removed from the machine. The NC package is deleted from the server and the machine does not show it as downloaded, but the downloaded files are not removed. Delete the downloaded files manually.

Parameters

The following information is displayed:

Parameter	Description
∨	This symbol appears when you click a column heading. Click the symbol to sort the elements alphabetically/numerically, either in ascending or descending order. You can also adapt the column widths. These changes are kept even if you close the application or leave the window.
NC program package ID	Shows the unique name of the NC program package.

Parameter	Description
Trial-run required	Shows the trial-run required property of the NC package. Once set, the NC package state automatically changes to "Trial-run in progress" when a machine initiates the NC package download (in "Published" state). If not, it changes from "Published" to "Trial-run completed" or "Released". If the trial-run is "required", it is mandatory to specify a trial-run machine. This can be done with the "Trial-run machine" parameter.
Manual verification after trial-run	Shows the manual verification after trial-run property of the NC package. After the NC package has been tested, the NC package state is displayed as "Trial-run completed". If not, the state changes to "Released".
Description	Shows the description of the NC package.
NC package state	Shows the state of the NC package: • In preparation • Published • Review in progress. Only for manual revision handling. • Review completed. Only for manual revision handling. • Trial-run in progress • Trial-run completed • Released • Productive • Locked • Rejected • Revoked
Current revision (only for auto revision handling)	Shows the latest revision of the NC package. This is the revision that is downloaded to the machine.
Released revision number (only for manual revision handling)	Shows the released revision of the NC package.
Review needed (only for manual revision handling)	Shows if there is any revision for the NC package which is in the state "Review in progress".
⚠ Yes	The revision is in the state "Review in progress". Click on it to open a window that shows the list.
Latest revision number (only for manual revision handling)	Shows the latest revision number of the NC package.
Trial-run machine	Shows the control system on which the programs should be loaded first. The initial run must be performed on this machine. NC packages can be downloaded only to this machine in the trial-run phase.
Assigned machines	Lists the names of the machines assigned to this package in alphabetical order, separated by commas.
Workpiece ID	Shows the identification of CAM Source.
External revision	Shows the external revision identifier. This is used when the NC packages are imported from another software, which have their own versioning system.

Parameter	Description
	Defines the number of listed NC packages.
	Opens a window in which you select additional columns to be displayed in the overview. These columns can optionally be configured to show further information: • NC program package ID > shown by default • Package state • Current revision • Released revision number - only for manual revision handling • Review needed - only for manual revision handling • Current revision number - only for manual revision handling • Workpiece ID • External revision • Trial-run required • Manual verification after trial-run • Description • Trial-run machine • Assigned machines The maximum of additional columns is limited to 8 here.
	Opens the "My Filters" window and filters data according to the following criteria: • NC program package ID • Package state • Current version • Released revision number - only for manual revision handling • Review needed - only for manual revision handling • Current revision number - only for manual revision handling • Workpiece ID • External revision • Trial-run required • Manual verification after trial-run • Description • Trial-run machine • Assigned machines For more information, see List filtering (Page 46). Click on the filter icon again to close the filter window.
	Copies an NC package. When you hover the cursor over the "Copy" symbol, the following tooltip appears: "Copy NC package".
	Deletes all NC package revisions and the corresponding NC programs and attachments.

Note

Sorting NC packages with quick filter

NC packages can be sorted with the quick filter functionality. If the packages are sorted by NC package state, they are not sorted in alphabetical order. They are sorted in the order of the machine state. Fur further information about the order see "NC package state".

Note

Filter input values

The input values for quick filters and custom filters can be negative numbers. However, do not use negative values for filtering as there is no NC package with a negative revision number.

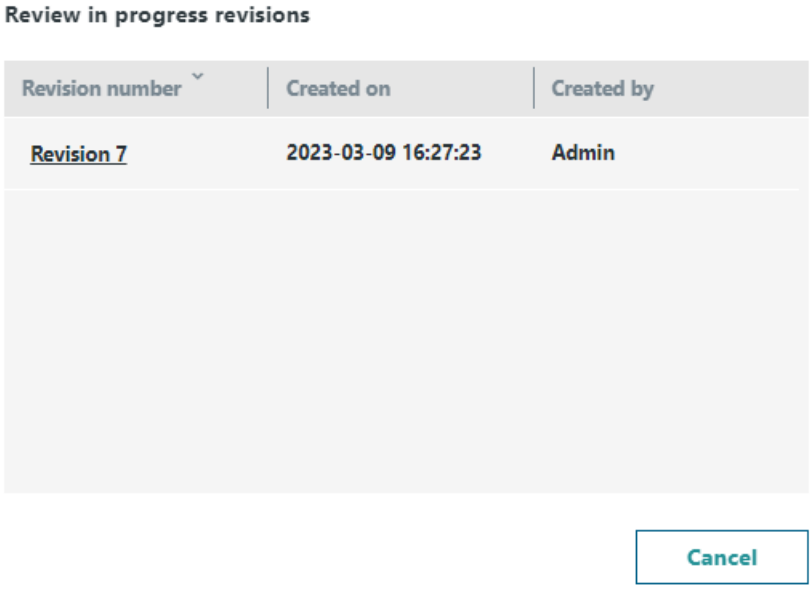
Procedure

1. On the Mcenter start page, click "Manage NC Packages".

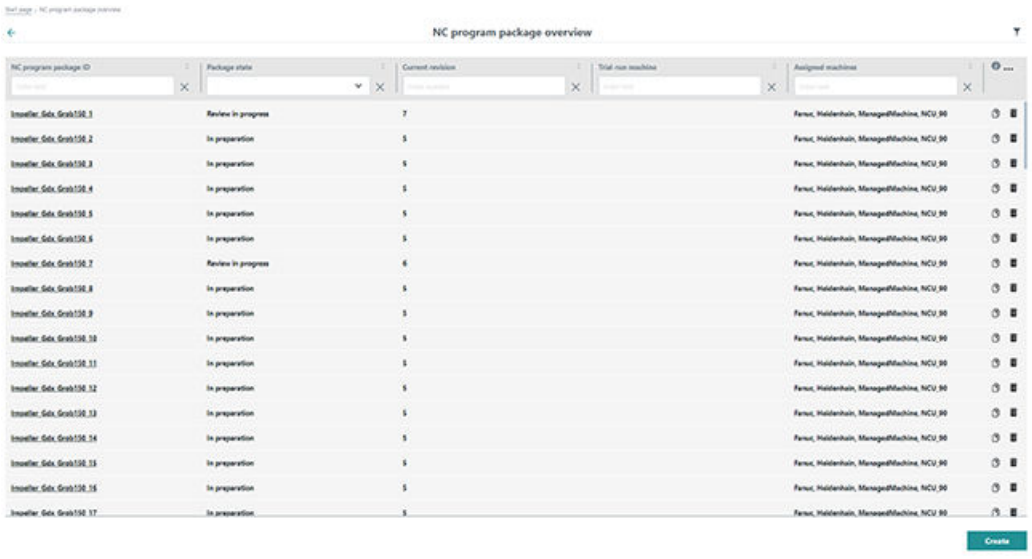
   - OR -
   Open the following URL: Manage NC Packages (https://{ServerIP}/mmrp/programs)

2. The "NC program package overview" window opens.
   In this overview, you can see NC packages that have already been created.
3. Click an underlined NC package name to display the CNC machines, NC program files, revision history, attachments or comments of the package.
   For more information, see Modifying an NC package (Page 690).
4. To create a new NC package, click the "Create".
   For more information, see Creating an NC program package (Page 686).
5. To delete the NC package and all its revisions, NC programs and attachments, click the "Delete" symbol in the package row.

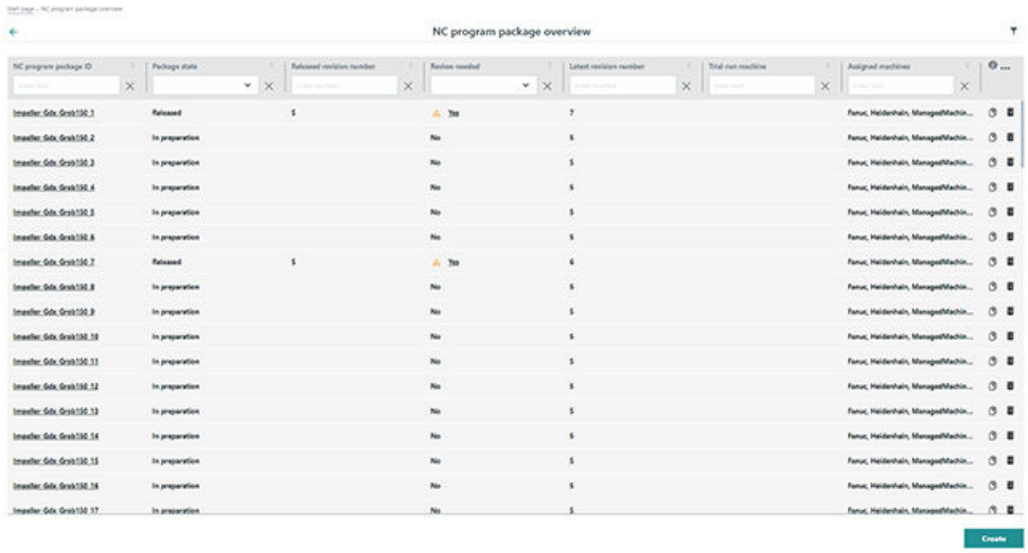
6. To copy the NC package, click the copy icon in the package row.
7. To view revisions which need to be reviewed, click on "Yes" in the column "Review needed". This is only available for the manual revision handling.
   Click on the underlined name of the revision which should be reviewed. The page with the details of the revision opens.



NC program package overview if automatic revision handling is active:



NC program package overview if manual revision handling is active:



Note

Editing the NC package

Editing the NC package can create a new revision based on the modifications of the last revision of the package.

8.1.3 Creating an NC program package

You can create new NC program packages.

Parameters

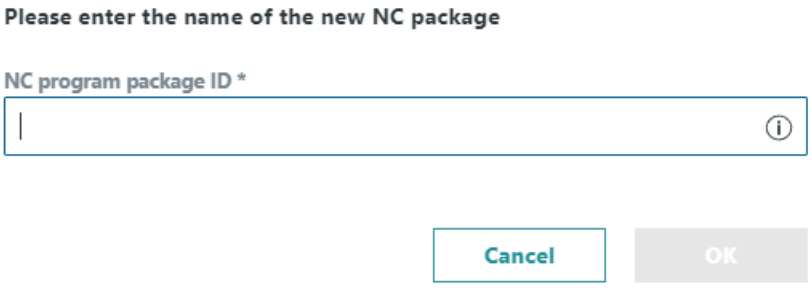
The following parameters are available:

Parameter	Description
NC program package ID	Enter a unique name for the NC package (max. 30 characters). The following characters are permitted for NC package names: [a...z], [A...Z], [0...9], [_], [-]
Workpiece ID	Enter a name for the workpiece (max. 50 characters)
Current revision	Shows the current revision. For the first revision, the value is automatically set to '1'. Specified when created: 1 First revision automatically created on NC package creation Read only field
External revision	Shows the external revision. You can add an external revision via the openness API.
Trial-run	Shows if a trial-run is required. The value can be "Required" or "Not required". This is a read-only field.

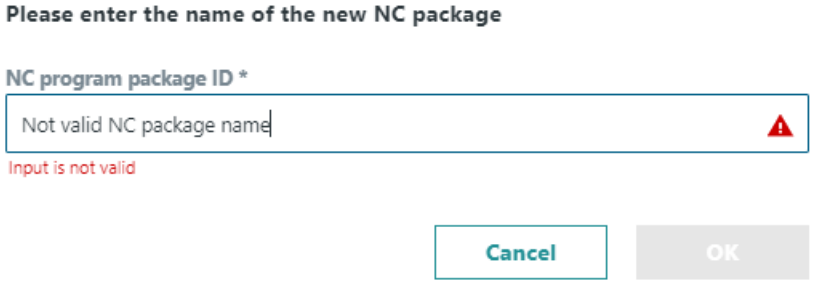
Parameter	Description
Manual verification after trial-run	Shows if a manual verification after the trial-run is necessary. The value can be "Yes" or "No". This is a read-only field.
Trial-run machine	Shows the trial-run machine name with the hierarchy path. This parameter is only required if the "trial-run" parameter is set to "Required". This is a read-only field.
Description	Enter a description (max. 280 characters).

Procedure

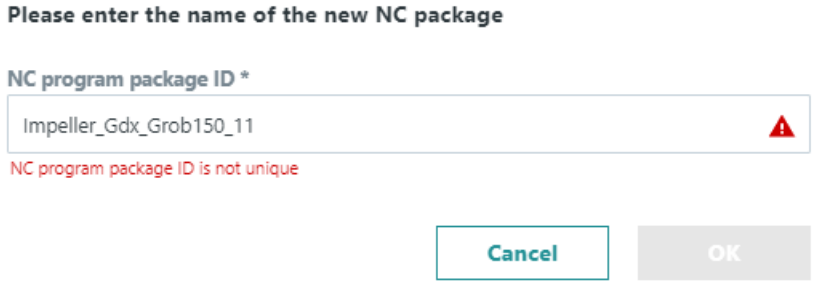
1. Click "Create" in the "NC program package overview" window.
2. Enter the NC program package ID in the popup window.



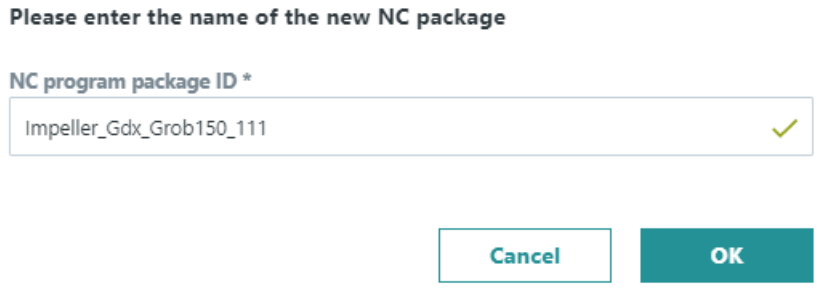
If the NC program package ID is empty or contains invalid characters, following message is shown: "Input is not valid".



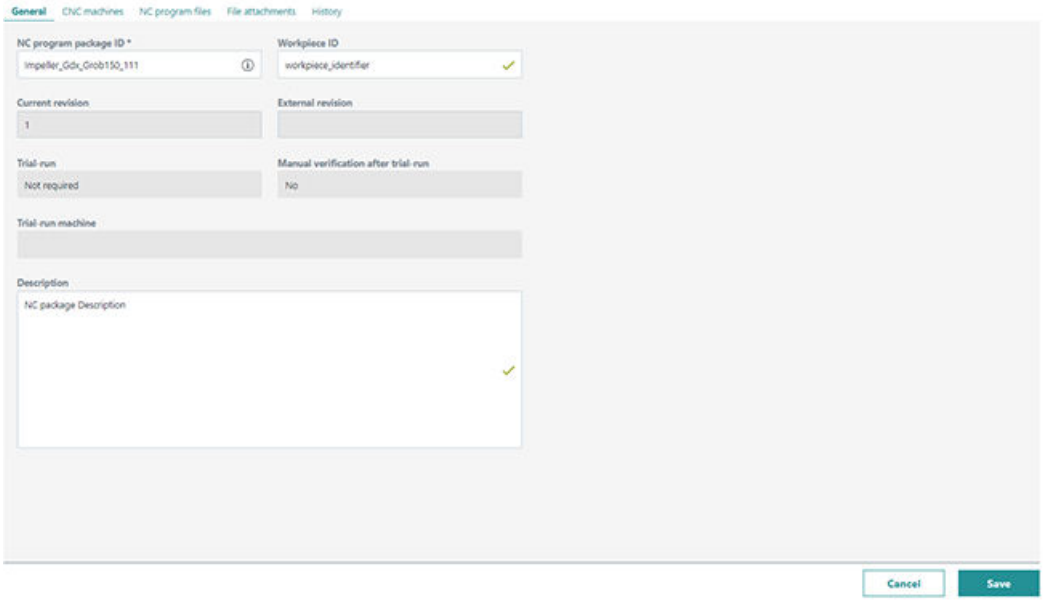
If the NC program package ID is already used in previous revisions of NC packages, following message is shown: "NC program package ID is not unique".



Click on "OK" if the NC program package ID is correct.



3. Enter the necessary data on the "General" tab.



4. Import the required programs via the "NC Program files" tab.
   For more information, see Modifying the NC program list (Page 697).
5. On the "CNC machines" tab
   - assign the CNC machines
   - set trial-run machine
   - set manual verification after trial-run

   For more information, see Modifying an assigned machine list (Page 735).
6. Add file attachments.
   For more information, see Adding file attachments (Page 739).
7. If required, enter comments in the "History" tab.
   For more information, see Adding comments (Page 721).
8. Click "Save" to create the NC package.
   The changes are persisted. Click "Edit" to assign a trial-run machine from the previously added CNC machines.
   - OR -
   Click "Cancel" to reject the data that was entered.

For more information, see Programs on managed machines (Page 748).

8.1.4 Modifying an NC package

You can modify an existing NC package.

The general details, the list of assigned machines, the program list and the attachment list can be changed.

For more information, see Status transitions (Page 722). You find information about the NC package lifecycle, the status of the NC packages and the difference between "Auto revision handling" and "Manual revision handling".

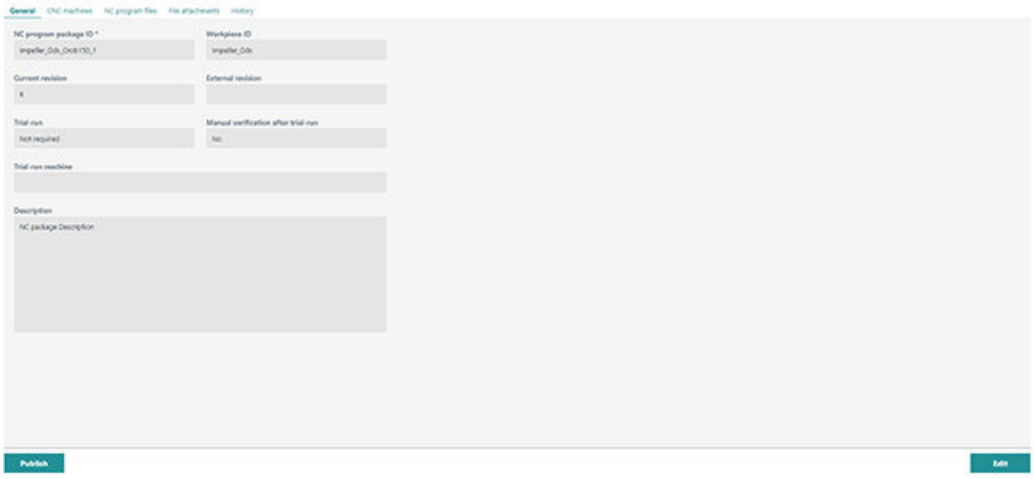
Prerequisites

- An adequate user role is assigned to you.
  For more information, see Users and functions MMR (Page 59)
- The NC package is in one of the following states:
  - In preparation
  - Trial-run completed
  - Locked
  - Rejected
  - Revoked

Procedure

1. In the "NC program package overview" window, click the underlined NC package name.
   The detail view of the NC package opens. The current NC package state is displayed at the top of the window.
2. Click "Edit".
3. If desired, change the general details.
   For more information, see Creating an NC program package (Page 686).
4. If required, change the "Assigned machines" list, "Trial-run machine" and "Manual verification after trial-run" in the "CNC machines" tab.
   For more information, see Modifying an assigned machine list (Page 735)
5. If desired, add file attachments.
   For more information, see Adding file attachments (Page 739).
6. If desired, open the "NC Program files" tab to import program files.
   For more information, see Modifying the NC program list (Page 697).
7. To display the revision history or reinstate a former version, open the "History" tab.
   For more information, see Managing revisions (Page 717).

8. If required, enter comments in the "History" tab.
   For more information, see Adding comments (Page 721).
9. Click "Save" to save the changes made to the NC package.
   The changes are saved.
   - OR -
   Click "Cancel" to reject the data you entered.



Note

Renaming NC package

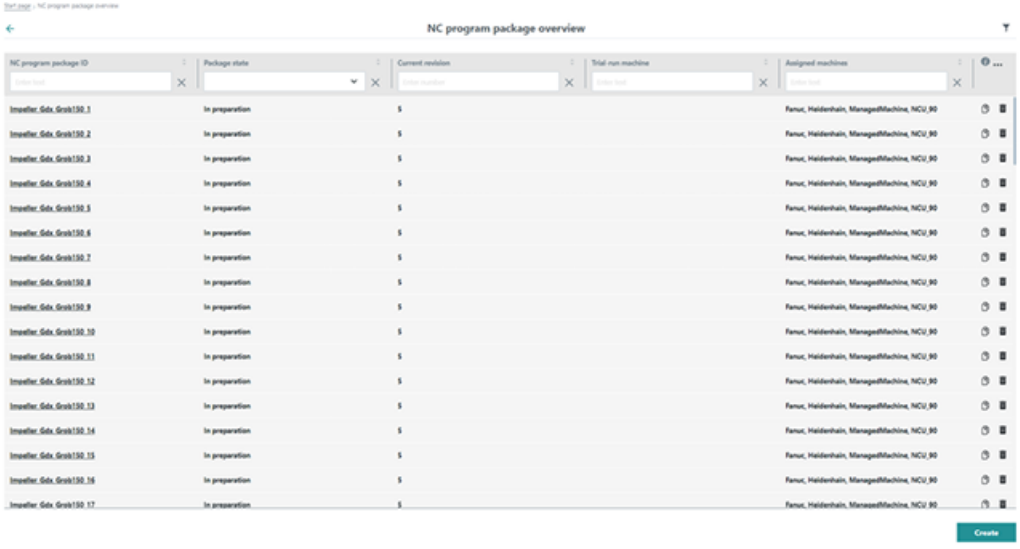
If an NC package on the machine has been renamed, you must download it to the machine again.

8.1.5 Copying an NC package

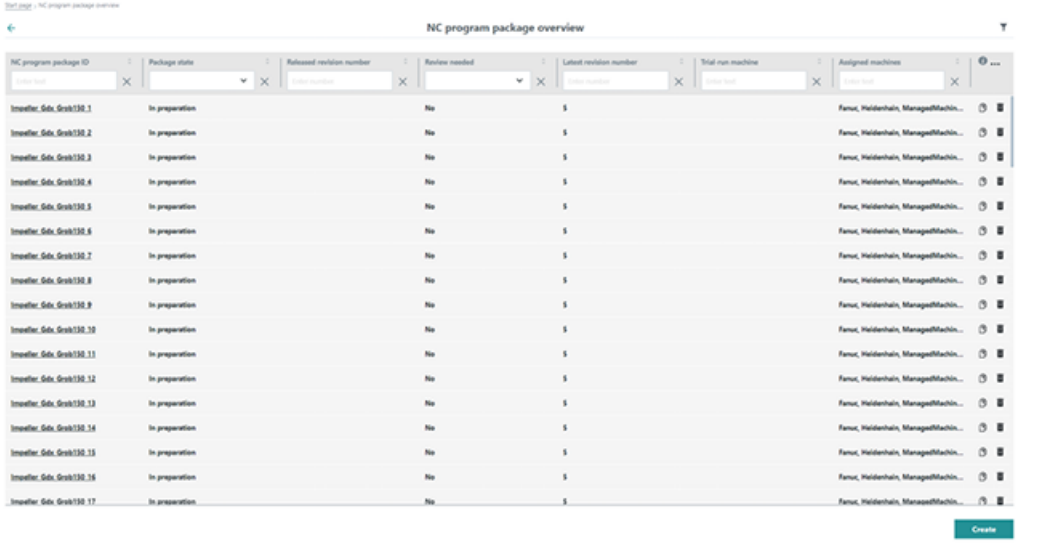
You have the possibility to copy an existing NC package with all NC programs and attachments. You can also copy the machine assignments and the trial-run machine, which is optional.

Procedure

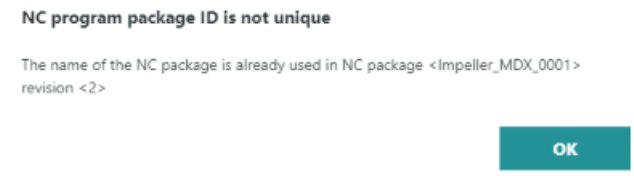
1. Select an NC package in the "NC program package overview" window and click the "Copy" symbol on the right-hand side.
   The copied version is always created from the last revision.
   The view depends on the active revision handling.
   "Auto revision handling" is active:



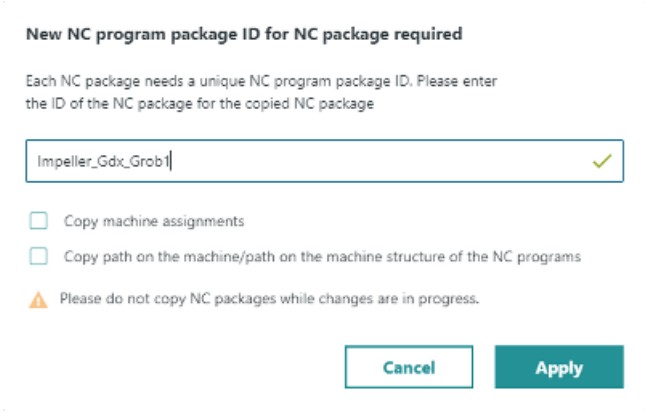
   "Manual revision handling" is active:



   A dialog box opens requiring you to enter an NC program package ID for the new NC package.
   Each NC program package needs a unique NC program package ID.
   The following warning message is displayed: "Please do not copy NC packages while changes are in progress".
   If the NC program package ID is already used in previous revisions of NC packages, the following warning dialog appears:



Enter the new ID into the input field.
Click "Apply" to copy the NC package.
- OR -
Click "Cancel" to cancel the operation.



Note

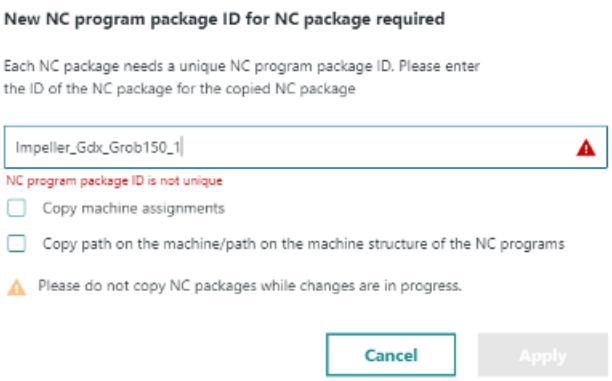
Copied features

If you do not activate the checkboxes "Copy machine assignments" and "Copy path on the machine of the NC programs", the copy function applies only to the NC program files, the file attachments, the workpiece ID, the external revision and the description.

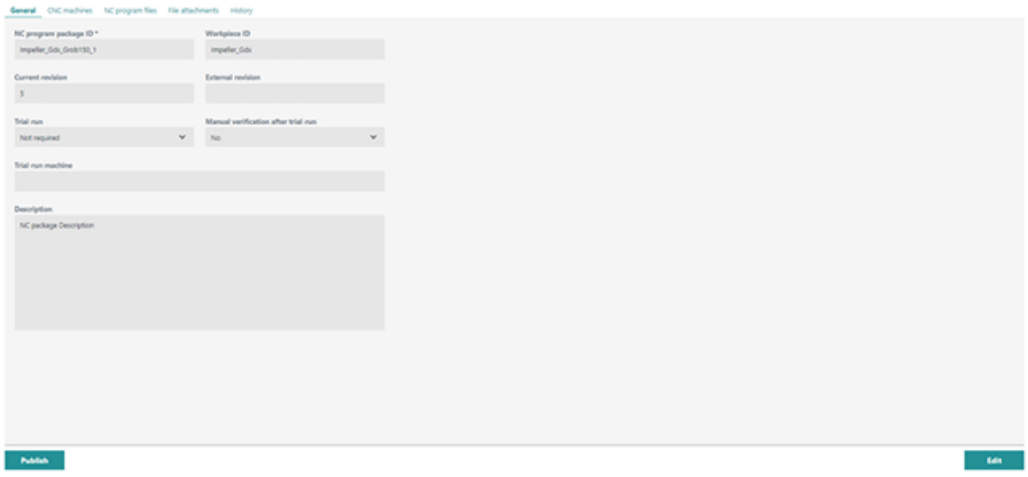
The revision number of the newly created NC package is always "1".

"Trial-run required", "Manual verification after trial-run" and "Trial-run machine" and "Machine assignments" are copied if you check the "Copy machine assignments" checkbox. You cannot copy the comments.

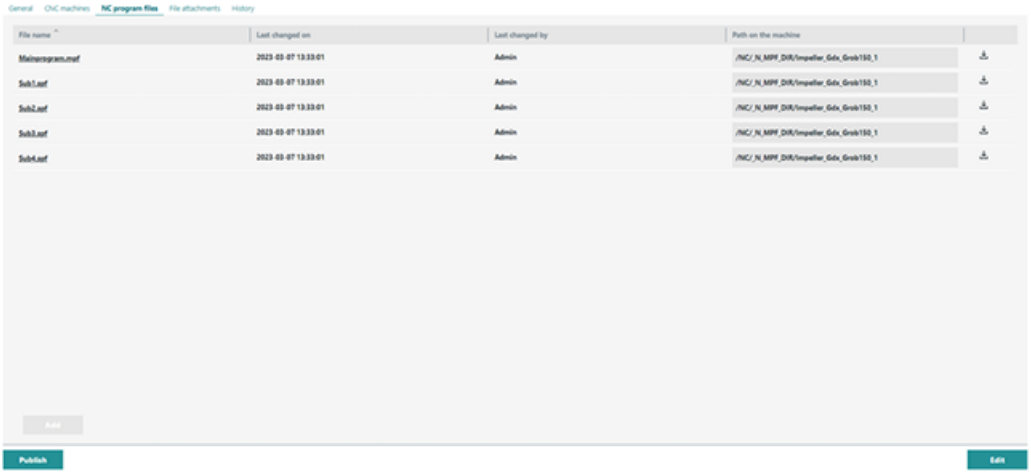
If the name you enter is not unique, the following error message appears: "NC Program package ID is not unique".



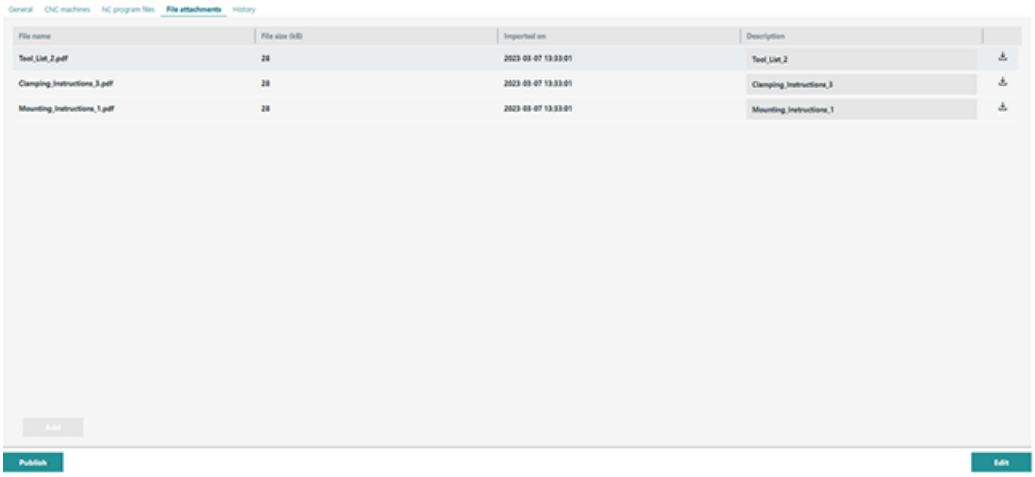
2. The new <package name> page opens.
   The new ID appears in the "NC Program package ID" field.



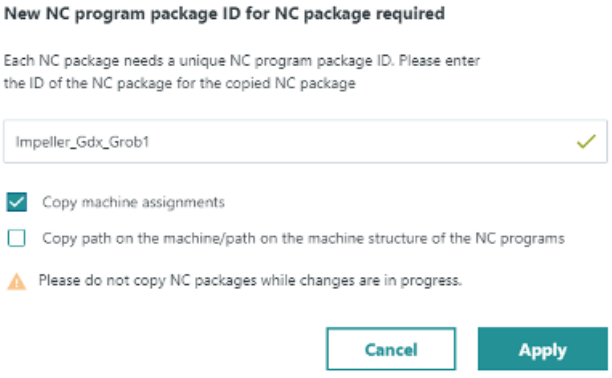
   To display the list of the copied NC program files, open the "NC program files" tab.
   You can see the copied NC package name in the "Path on the machine" column.



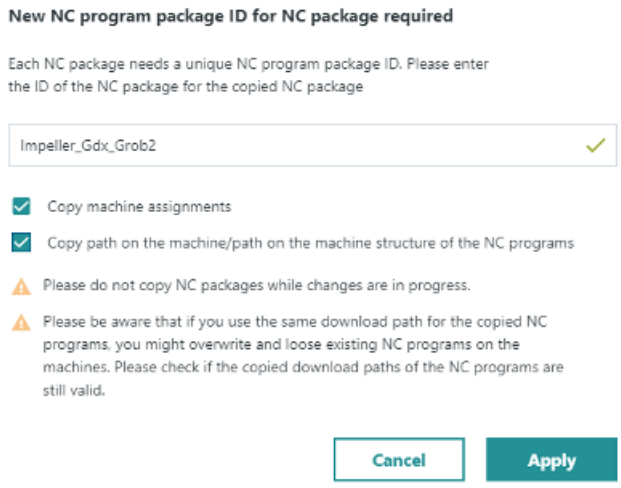
   To display the copied file attachments, open the "File attachments" tab.



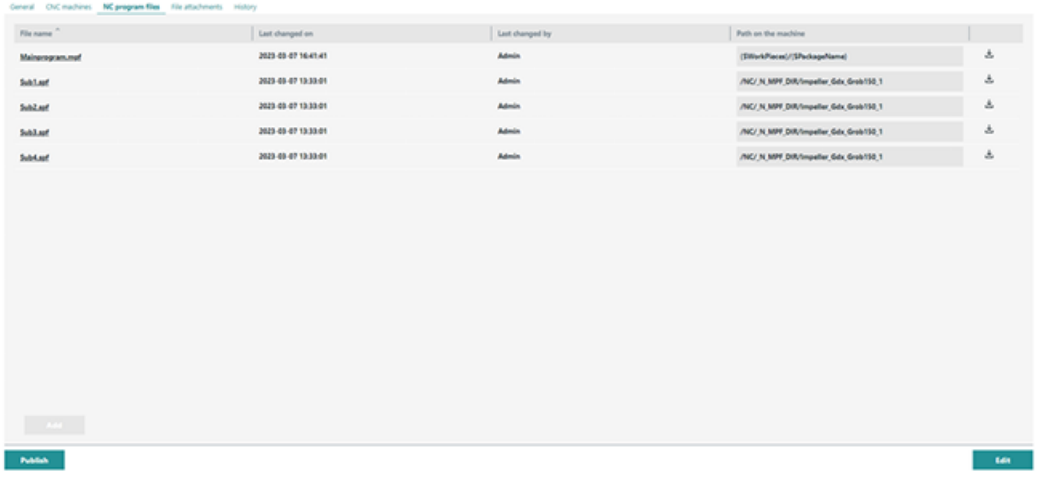
3. To copy the machine assignments, check the "Copy machine assignments" checkbox.
   Click "Apply".
   - OR -
   Click "Cancel" to cancel the operation.



4. To copy the machine path of the NC program, check the checkbox "Copy path on the machine of the NC programs/path on the machine structure of the NC programs".
   The following warning message is displayed: "Please be aware that if you use the same download path for the copied NC programs, you might overwrite and loose existing NC programs on the machines. Please check if the copied download paths of the NC program files are still valid".
   Click "Apply".
   - OR -
   Click "Cancel" to cancel the operation.



   If you do not use variables, the path on the machine is the same as in the original package:



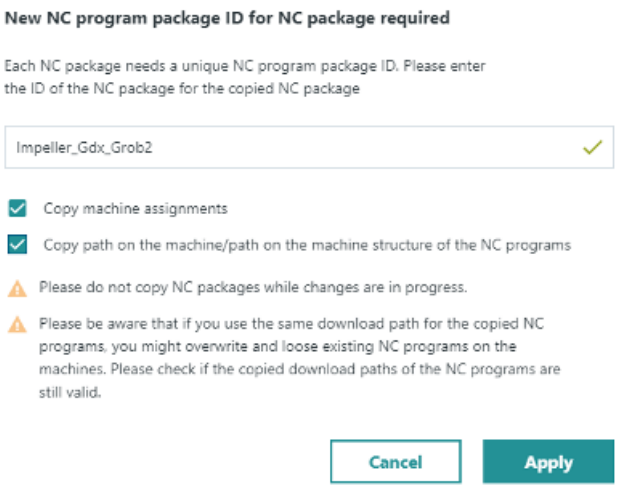
   If you use variables, it is not the exact path but the structure which is copied. Therefore the NC package name {$PackageName} and the revision number {$Revision} can change.

Note

Editing the original NC package

If you wish to edit the original NC package, you cannot change the name to the copied name.

5. You can also check both checkboxes:



8.1.6 Editing the NC program list

8.1.6.1 Modifying the NC program list

You can add NC programs to an NC package or remove NC programs from an NC package.

Prerequisites

- You have been assigned an adequate user role.
  For more information, see Users and functions MMR (Page 59)
- The NC package is in one of the following states:
  - In preparation
  - Trial-run completed
  - Locked
  - Rejected
  - Revoked

- The size of the NC program is smaller than 500 MB.
- The specifications for the "Path on the machine" field are as follows:
  The path on the variable input field does not validate if the path is valid on the target machines. This happens once the machine operator starts to download or transfer the NC package to the machine.
  You can download the programs to any valid path.
  On SINUMERIK machines, the programs are downloaded to EES folder if the EES solftware is activated or not. Withour EES license the programs are not available.
  Valid paths can be different on Microsoft Windows and Linux operating systems, especially if you want to save NC programs in the EES folder.
  - Example on Microsoft Windows: root folder of HMI + \user\sinumerik\data\prog (C:\root\user\sinumerik\data\prog\Impeller_A_01)
  - Example on Linux: /card/user/sinumerik/data/prog/ (card/user/sinumerik/data/prog/Impeller_A_01)

  the NC program assignment is not necessary to download an NC package to a machine. NC packages without an NC program can be downloaded. You can use this function for collecting NC programs for one NC package on the machine.

Parameters

The following data associated with an NC file is displayed:

Parameter	Description
File name	Shows the file name of the NC program. The following characters are permitted for file names: [a...z], [A...Z], [0...9], [_], [-], [.], [ ]
Last changed on	Shows the date and time when the NC program was last modified. The date has the format "yyyy-MM-dd hh:mm:ss".
Last changed by	Shows • the name of the MMR /Programs user who last changed the NC program. - OR - • the designation of the machine used to make the last change of the NC program. The machine designation has the format 'Operator on machine <Machine name>'.
Path on the machine	Shows the path and path variables to the NC program on the machine. The following characters are permitted for the path on the machine: [a...z], [A...Z], [0...9], [ ], [.], [,], [_], [-], [/], [\] The following characters can only stand for path variables: [$], [{], [}]
	Deletes an NC program from the revision.
	Provides a download for an NC program from the NC package.

Note

Path on the machine

Do not use lowercase characters of the machine path in predefined folder names. These programs are not downloaded.

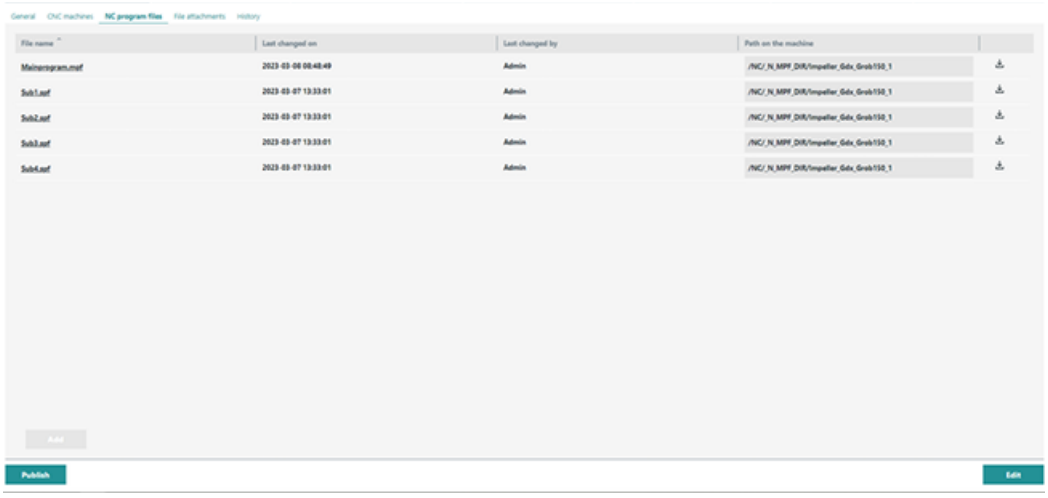
For example:

/nc/_n_wks_dir is not a valid folder, use /NC/_N_WKS_DIR

//CNC_MEM/User/Path1 is not a valid folder, use //CNC_MEM/USER/PATH1

Procedure

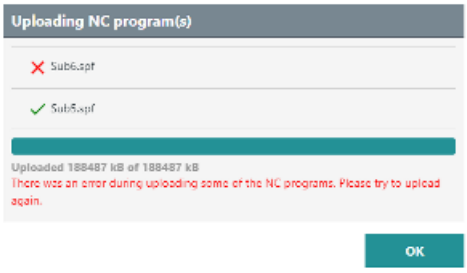
1. In the "NC program package overview" window, click the underlined NC package name.
   The detail view of the NC package opens.
2. Click "Edit".
3. Open the "NC Program files" tab.
   The list of NC programs opens. It is displayed as a data table.
   In order to set your preferred column width, press the left mouse button and drag the column edges to the left or to the right. The respective parameters are automatically saved when you release the mouse button. The next time you log in with your user Id, the columns are displayed with the width you opted for.
4. Click "Add".



5. Navigate to the storage location of the NC program and click "Open".
   If required, change the predefined path on the machine to which the NC program is downloaded.
   Click "Save".

6. During the upload, the progress is displayed on a progress bar.
   After the successful upload, the progress bar disappears.

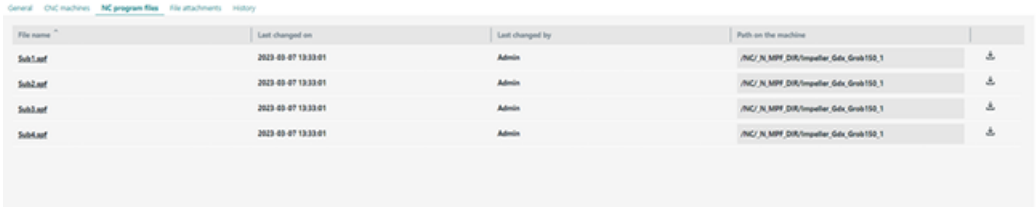
In case of an error, a status message appears. The NC program files which fail to upload are marked with a red cross. A check is displayed in front of the successfully uploaded NC program files.
Click "OK" to close the dialog box.



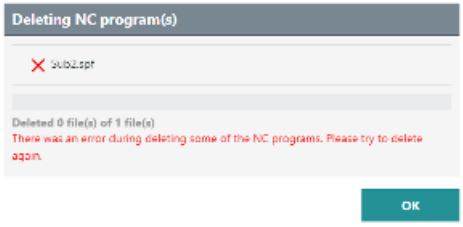
7. To remove an NC program from the NC package, click the "Delete" symbol.
   A confirmation dialog opens. Click "Delete" to remove the NC program or click "Cancel" to abort the process.

   Click "Save".
   During deletion, a progress bar is displayed. After the program file has been deleted, following massage appears

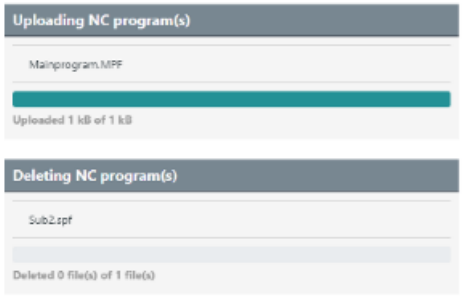
   The program is removed from the list.



   If the program file cannot be deleted, the following error message is displayed. The program file which cannot be deleted is marked with a red cross.
   Click "OK" to close the dialog box.



   If you start upload and delete operations, a dual status message with progress bars is displayed:



8. If you click the "Download" icon, the program is downloaded to the standard download directory of the internet browser.
9. Click "Save" to save the changes that were made to the NC package.
   The changes are saved.
   - OR -
   Click "Cancel" to reject the data you have entered.

Note

Deleting and adding an NC program with same name

You cannot delete and then add an NC program with the same name. If you have deleted an NC program, you must save the package first and edit it again to add an NC program with the name of the deleted one.

8.1.6.2 Using path with the machine variable

The default path on the machine is filled with variables. You can use the custom path on the machine and use variables combined with custom string.

Path variables are substituted by the system when the NC package is transferred or downloaded to the machine. The machine-related path variables are evaluated and substituted by the target machine since these are machine-specific.
You do not need to know the full string as you are entering keywords.

The path variables can also be combined with explicitly defined paths.

Note

Default and customized path

The default is always: {$WorkPieces}/{$PackageName}.

Example for a customized path: {$ExternalStorage}/{$PackageName}/MyPackage

Parameters

Parameter	Description
Variable specifications	The following characters are permitted for the path on the machine: [a...z], [A...Z], [0...9], [.], [:], [,], [-]; [_], [(]; [)], [/], [\]. The following characters can only stand for path variables: [$];[{];[}] You can enter a maximum of 255 characters.
Package-related path variables	
{$PackageName}	Stands for the NC program package ID.
{$WorkPieceID}	Stands for the workpiece ID.
{$Revision}	Stands for the current revision.
{$ExternalRevision}	Stands for the external revision.
Machine-related path variables	

Parameter	Description
{$MainPrograms}	Stands for the directory of the main programs on the machine. Only works for SINUMERIK controllers.
{$SubPrograms}	Stands for the directory of the sub programs on the machine. Only works for SINUMERIK controllers.
{$Workpieces}	Stands for the directory of the workpieces on the machine.
{$ExternalStorage}	Stands for the directory of the "NC Extend" on the machine. This SINUMERIK storage is only available in HMI Operate and if the required license is activated. Only works for SINUMERIK controllers.
ⓘ	Shows further information about using path variables.
⚠	Appears when you use a character which is not conform with the specifications.

Note

Uploading NC programs with a path containing the machine variables

If the path on the machine contains {$Revision}, the NC package is uploaded and a new revision is created, then the path on the machine value changes. The NC package is downloaded again to the machine in order to synchronize with the server. Make sure that there is enough space on the machine after the upload. Otherwise the system gets an inconsistent state.

The machine related path on the machine variables are preset in the MMR /Programs database configuration table. Change the variables via openness API. Fill the empty fields "-" before you use them in the path on the machine.

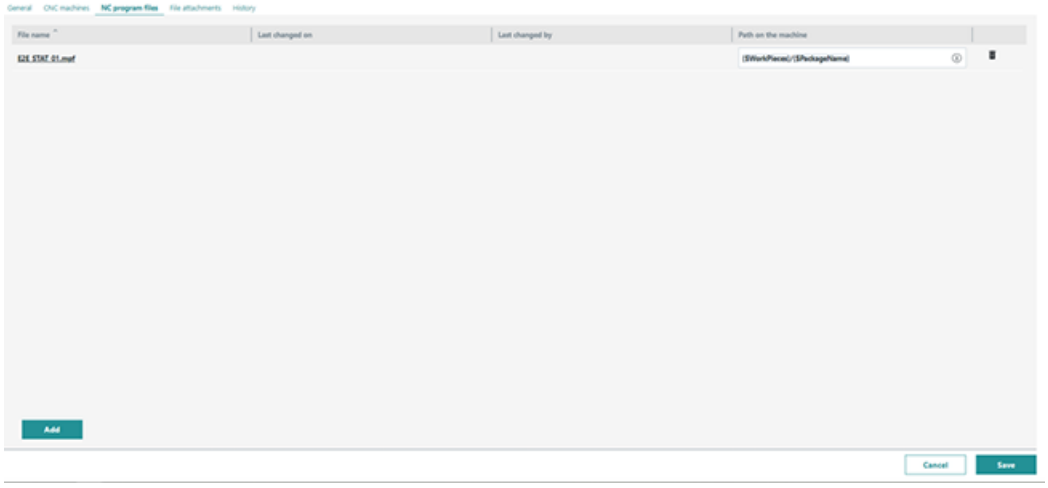
Controller type	Name	Value
Siemens	{$Workpieces}	/NC/_N_WKS_DIR
	{$MainPrograms}	/NC/_N_MPF_DIR
	{$SubPrograms}	/NC/_N_SPF_DIR
Fanuc	{$Workpieces}	//CNC_MEM/USER/PATH1
	{$MainPrograms}	-
	{$SubPrograms}	-
	Separator character	/
Heidenhain	{$Workpieces}	TNC:
	{$MainPrograms}	-
	{$SubPrograms}	-
	Separator character	/
Mitsubishi	{$Workpieces}	M01:\PRG\USER
	{$MainPrograms}	-
	{$SubPrograms}	-
	Separator character	\

Prerequisite

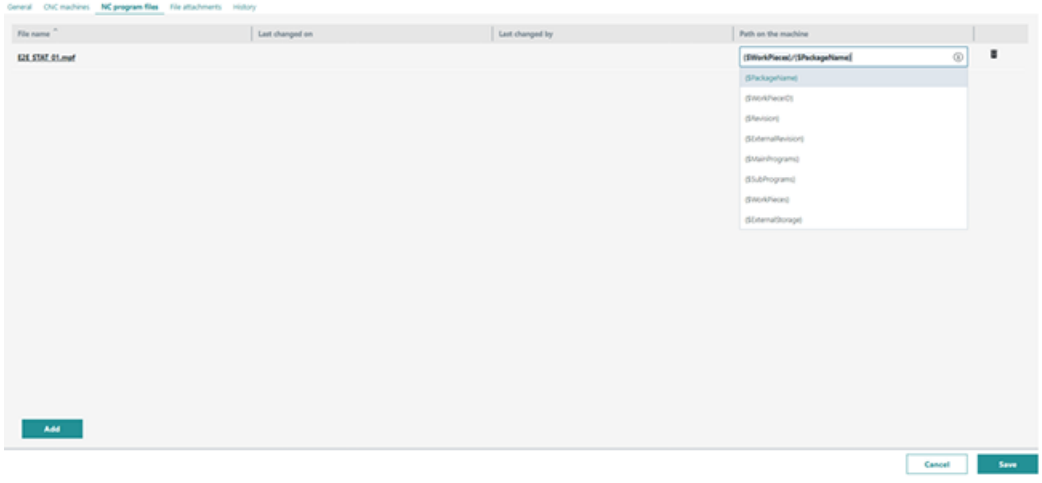
You have created an NC package and entered the NC Program package ID.

Procedure

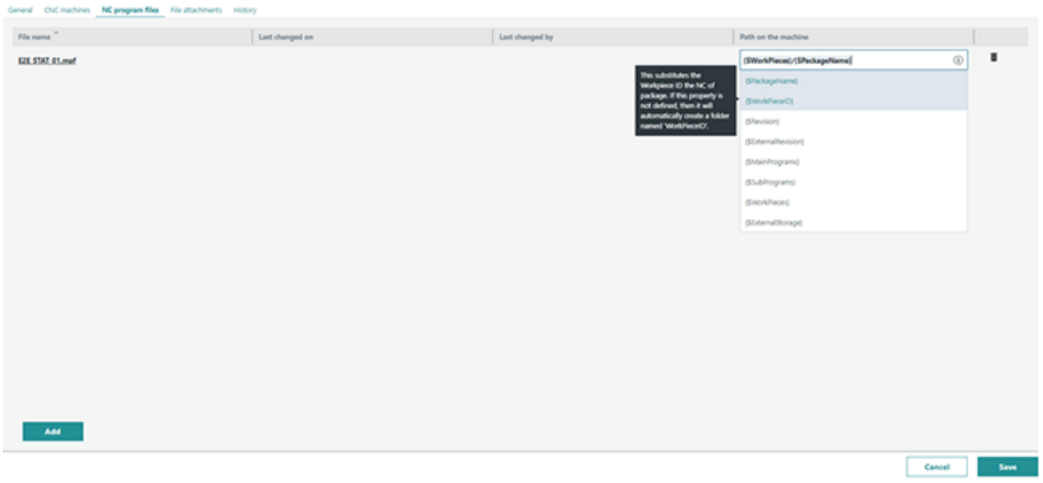
1. Open the "NC program files" tab. The <package name> window opens:



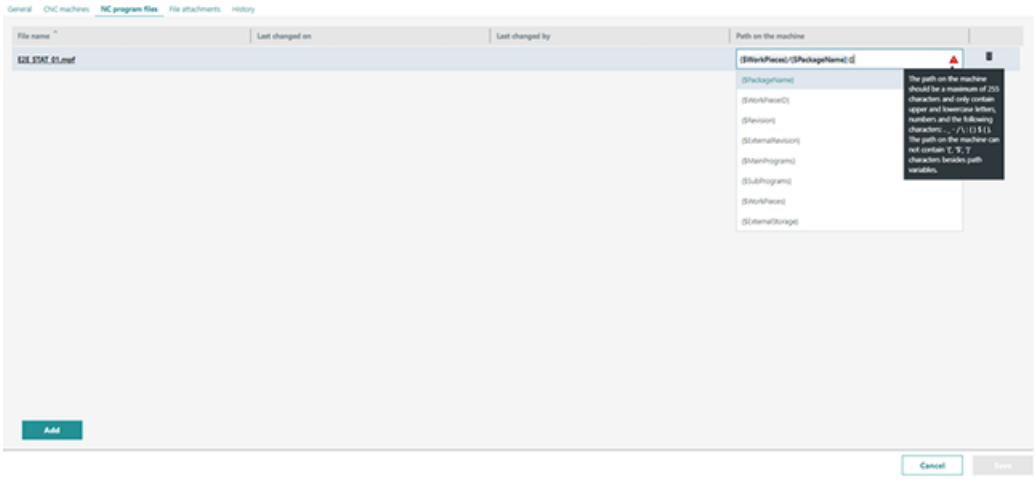
2. Click the "Path on the machine" field and open the drop down list with the predefined machine path variables.



3. Enter substitute characters and select the variable you need via keyboard selection or mouse click.
   When you hover the cursor over the selected variable in the input field or drop-down list, a tooltip shows what the variable stands for.



   You get an error message if you enter characters which are not conform with the above mentioned specifications:



   If you want to change characters which have not yet been allocated to a variable, use the backspace key.
   If you want to change the characters you have already entered and allocated, you have to delete the whole string and start from the beginning.
   You can delete a variable with a single backspace keystroke.

4. Click the "CNC machines" tab.
5. Click "Add" to add a machine.
6. Select a machine and click "Apply".
7. Click "Publish".
   For more information about the machine path variables after the download onto the machine, see Working with machine path variables (Page 790).

Note

Variables on the machine after download

After downloading the packages onto the machine, the path name changes as the variables are replaced.

8.1.6.3 Displaying the NC program content

You can display the NC program content.

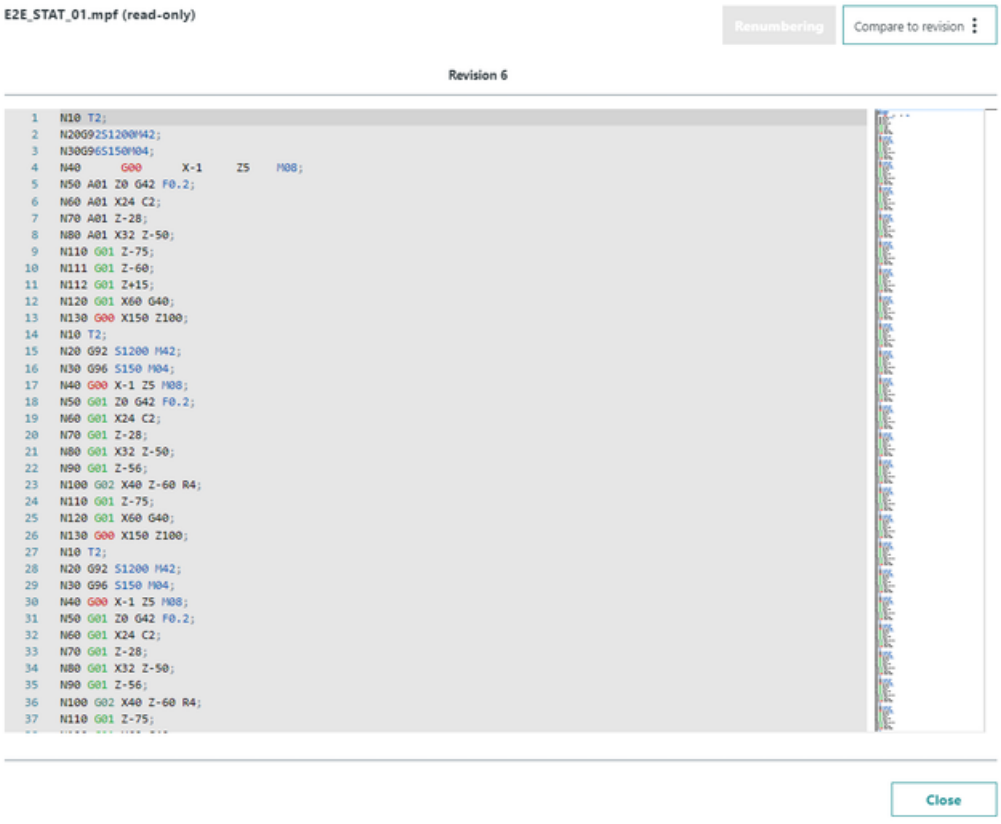
Prerequisite

You have an NC package which contains NC programs.

Procedure

1. In the "NC program package overview" window, click the underlined NC package name.
   The detail view of the NC package opens.
2. Open the "NC program files" tab.
   The list of NC programs opens.

3. Click on the NC program name.
   A popup with the NC program content opens in a read-only editor.
   Use the scroll bar if you need to move the NC program content down to display the full information.



4. Click on the "Close" button to close the popup.

8.1.6.4 Editing the NC program content

You can edit the content of the NC programs.

Prerequisites

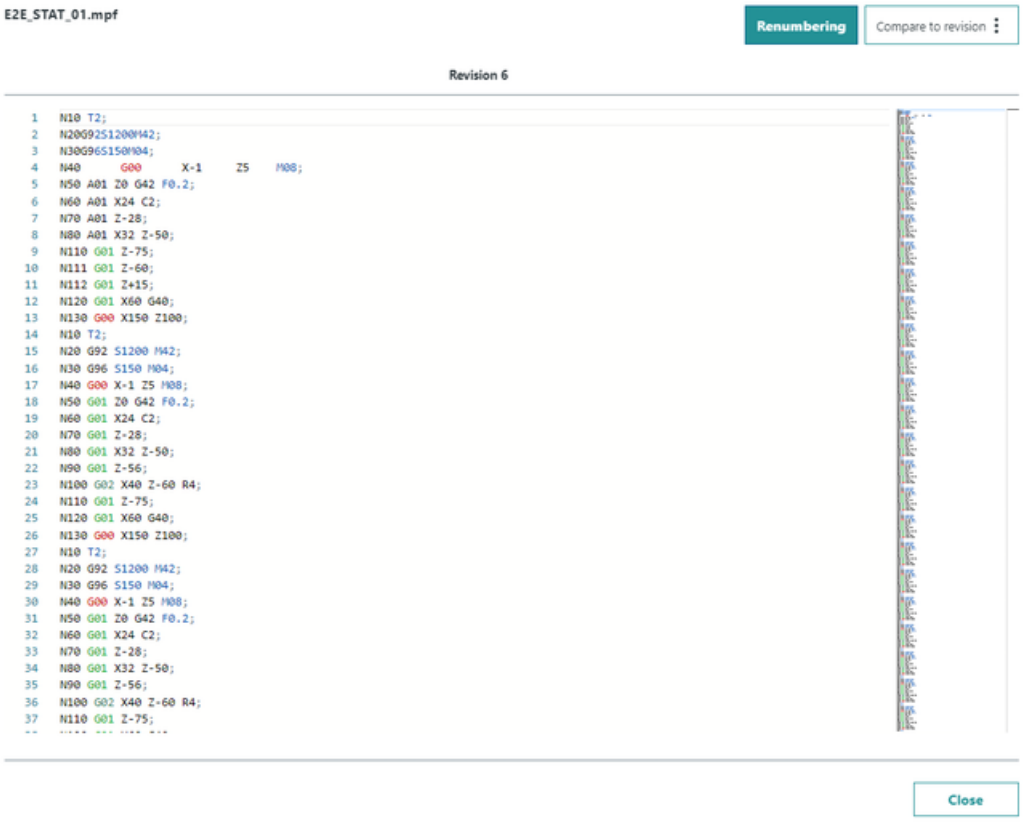
- You have an NC package which contains NC programs.
- The NC package is in "Edit" mode.

Parameter

Symbol	Description
↺	Reverts changes of an edited NC program.

Procedure

1. In the "NC program package overview" window, click the underlined NC package name.
   The detail view of the NC package opens.
2. Click on "Edit".
3. Open the "NC program files" tab.
   The list of NC programs opens.
4. Click on the NC program name.
   A popup with the NC program content opens in an editor. The editor highlights the G code specific code parts of the NC program.



5. Edit the content of the NC program.

6. To renumber the NC program content, click on "Renumbering".

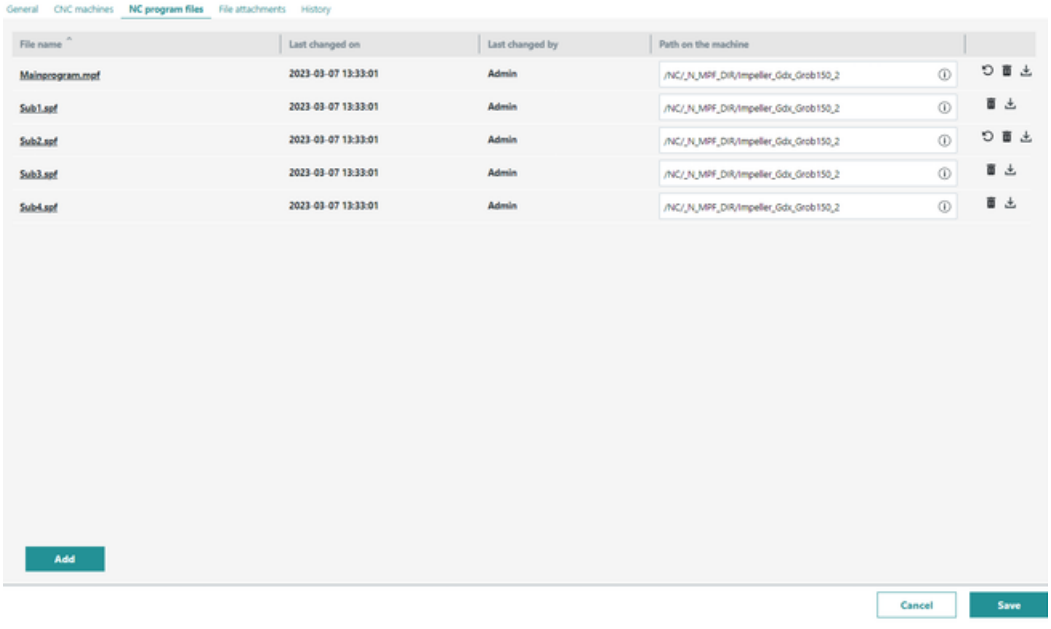
   To define which machine uses the NC program, select the "Controller type".
   The first block number defines the starting number of renumbering.
   Set the increment between lines.

7. Click on the "Close" button to close the popup.
8. A "Revert" icon appears in the row of the edited NC program.
   – Click on the "Revert" icon to revert the changes.
     - OR -
   – Click on the "Save" button to save the changes.

Note

Editing multiple NC programs

You can modify multiple NC programs before saving the changes by clicking the "Save" button.



Renumbering

An example for renumbering is:

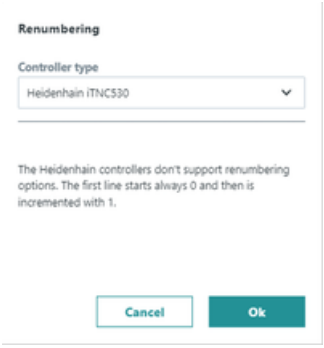
- For Siemens.
- The first block number is 30.
- The increment is 30.

Revision 6

```
N30 T2;
N60 G92S1200M42;
N90 G96S150M04;
N120      G00      X-1     Z5    M08;
N150 A01 Z0 G42 F0.2;
N180 A01 X24 C2;
N210 A01 Z-28;
N240 A01 X32 Z-50;
N270 G01 Z-75;
N300 G01 Z-60;
N330 G01 Z+15;
N360 G01 X60 G40;
N390 G00 X150 Z100;
N420 T2;
N450 G92 S1200 M42;
N480 G96 S150 M04;
N510 G00 X-1 Z5 M08;
N540 G01 Z0 G42 F0.2;
N570 G01 X24 C2;
N600 G01 Z-28;
N630 G01 X32 Z-50;
N660 G01 Z-56;
N690 G02 X40 Z-60 R4;
N720 G01 Z-75;
N750 G01 X60 G40;
N780 G00 X150 Z100;
N810 T2;
N840 G92 S1200 M42;
N870 G96 S150 M04;
N900 G00 X-1 Z5 M08;
N930 G01 Z0 G42 F0.2;
N960 G01 X24 C2;
N990 G01 Z-28;
N1020 G01 X32 Z-50;
N1050 G01 Z-56;
N1080 G02 X40 Z-60 R4;
N1110 G01 Z-75;
```

The first line starts with N30. The second line starts with N60.

Some controller types do not support the first block number and the increment, for example Heidenhain. The values cannot be set.



In this case the renumbering starts from 1 and is incremented by 1 for every line.

Revision 6

```
0 T2;
1 G92S1200M42;
2 G96S150M04;
3     G00     X-1     Z5    M08;
4 A01 Z0 G42 F0.2;
5 A01 X24 C2;
6 A01 Z-28;
7 A01 X32 Z-50;
8 G01 Z-75;
9 G01 Z-60;
10 G01 Z+15;
11 G01 X60 G40;
12 G00 X150 Z100;
13 T2;
14 G92 S1200 M42;
15 G96 S150 M04;
16 G00 X-1 Z5 M08;
17 G01 Z0 G42 F0.2;
18 G01 X24 C2;
19 G01 Z-28;
20 G01 X32 Z-50;
21 G01 Z-56;
22 G02 X40 Z-60 R4;
23 G01 Z-75;
24 G01 X60 G40;
25 G00 X150 Z100;
26 T2;
27 G92 S1200 M42;
28 G96 S150 M04;
29 G00 X-1 Z5 M08;
30 G01 Z0 G42 F0.2;
31 G01 X24 C2;
32 G01 Z-28;
33 G01 X32 Z-50;
34 G01 Z-56;
35 G02 X40 Z-60 R4;
36 G01 Z-75;
```

If the file for a controller type has special requirements, the special lines are not modified.

For example: For Fanuc controllers, "%" marks and file names are not part of the renumbering.

8.1.6.5 Comparing NC programs

You can compare the content of NC programs between different revisions.

Prerequisites

- You have an NC package which contains NC programs.
- The NC package has more than one revision.
- There is an NC program in the NC package which exists in more than one revision.

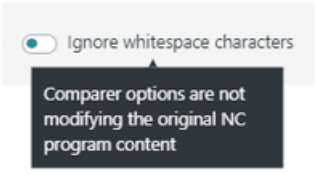
Parameters

Parameter	Description
^	Click on the "Up arrowhead" symbol to navigate to the differences lists above.
v	Click on the "Down arrowhead" symbol to navigate to the differences lists underneath.
Ignore whitespace characters	Click on this toggle button to show NC program differences without whitespaces
Ignore case sensitivity	Click on this toggle button to ignore case sensitivity when comparing NC packages
X	Click on this button to close the comparison and return to the NC program viewer

Note

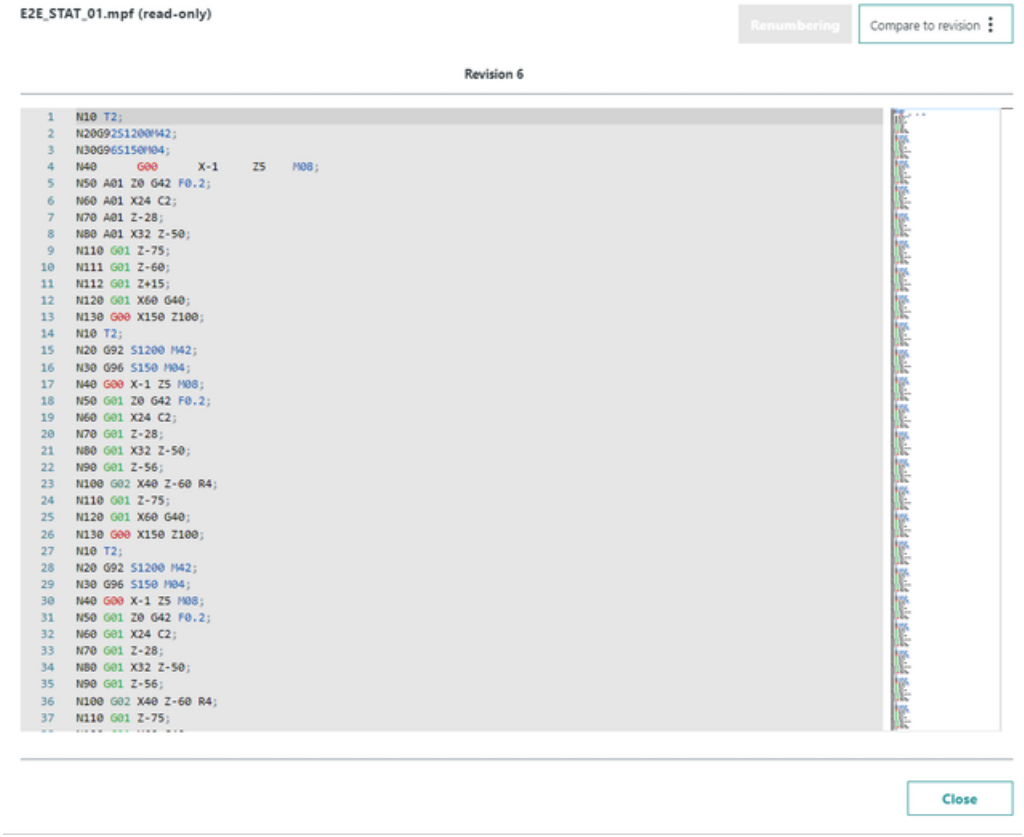
NC program comparer options

The NC program comparer options do not change the content of the NC program. They modify the display of the NC program.



Procedure

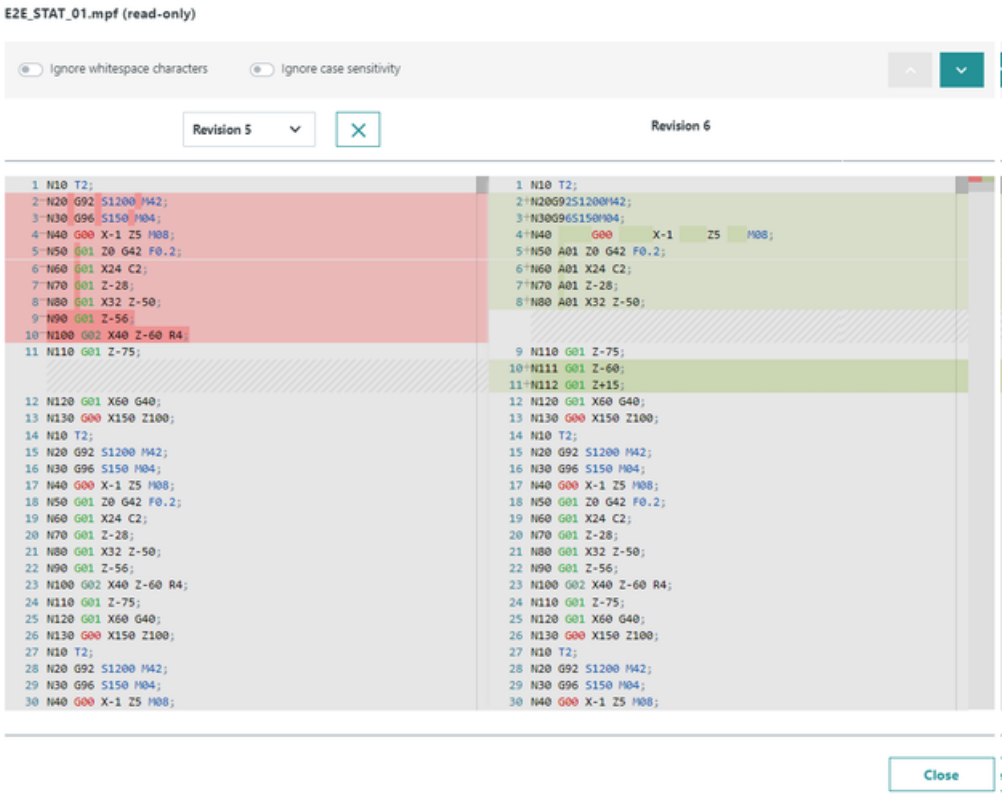
1. In the "NC program package overview" window, click the underlined NC package name.
   The detail view of the NC package opens.
2. Open the "NC program files" tab.
   The list of NC programs opens.
3. Click on the NC program name.
   A popup with the NC program content opens in a read-only editor.



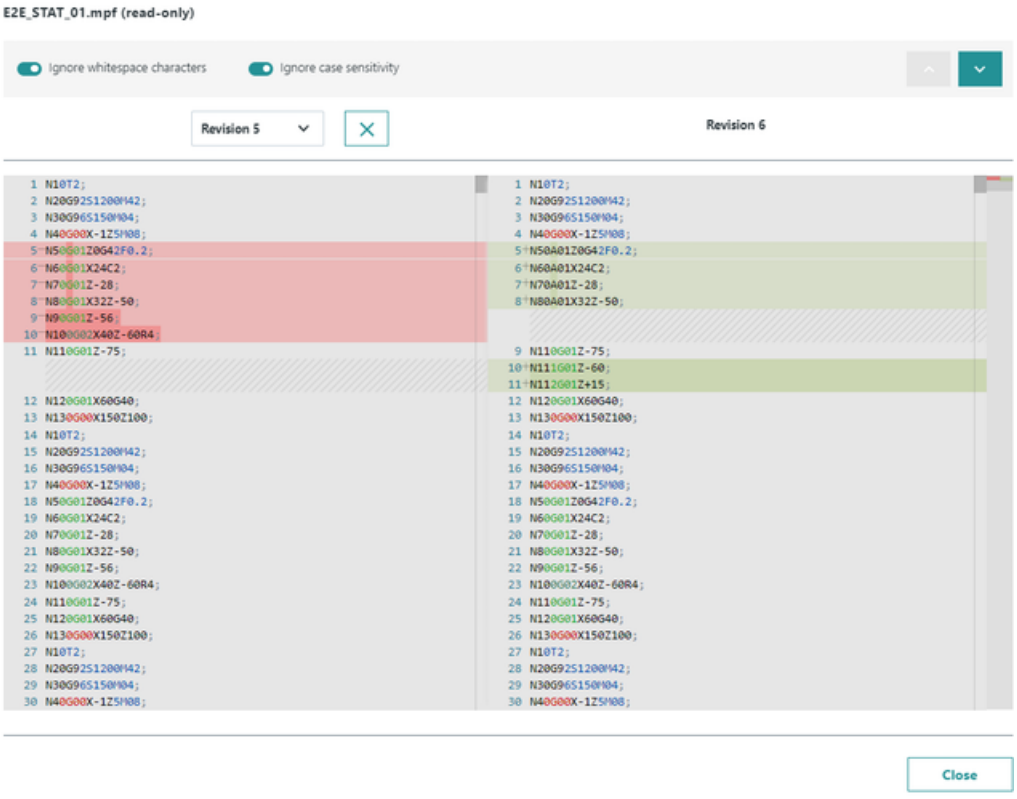
4. Click on the "Compare to revision" button in the top right corner of the popup.
   All revisions of the chosen NC program are displayed.

5. Select the revisions to be compared.
   – Added parts of the NC program are displayed in green colors.
   – Removed parts of the NC program are displayed in red colors.

   Click in the editor field.



   – Click on the "Up" and "Down" arrowheads to navigate between the differences.
   – Click on the toggle buttons to change the compare mode.



6. Click on the "Close" button to close the popup.

Note

Performance issuses

The compare mechanism runs in the memory of the browser. With the increasement of the NC program size the comparer becomes slower.

8.1.7 Revision and comments history

8.1.7.1 History

MMR /Programs provides a solution to manage the NC package history which contains revisions and comments.

Prerequisite

There is an existing NC package.

Parameters

Parameter	Description	
Revision	Shows the revision number. If "Manual revision handling" is active, click the revision to opens the general NC package information.	
Time of creation	Creation time of the revision in the format mm.dd.yyyy.time	
Created by	Creator of the revision	
Traces from revision	Shows the number of parent revisions or 'initial' in case of the first revision.	
Revision states	States of the revision in chronological order, with different colors:	
	In preparation	gray
	Published	blue
	Review in progress (if "Manual revision handling" is active	purple
	Review completed (if "Manual revision handling" is active)	purple
	Trial-run in progress	blue
	Trial-run completed	blue
	Released	blue
	Productive	green
	Locked	orange
	Revoked	orange
	Rejected	orange
Time of creation	Shows the creation date of the revision in the format: "mm.dd.yyyy.time"	
	Floating button. Refreshes the revision history data.	
	Adds a comment.	
	Opens the selected revision and displays the general NC package information if "Auto revision handling" is active.	

8.1.7.2 Managing revisions

To manage revisions, you have the following options:

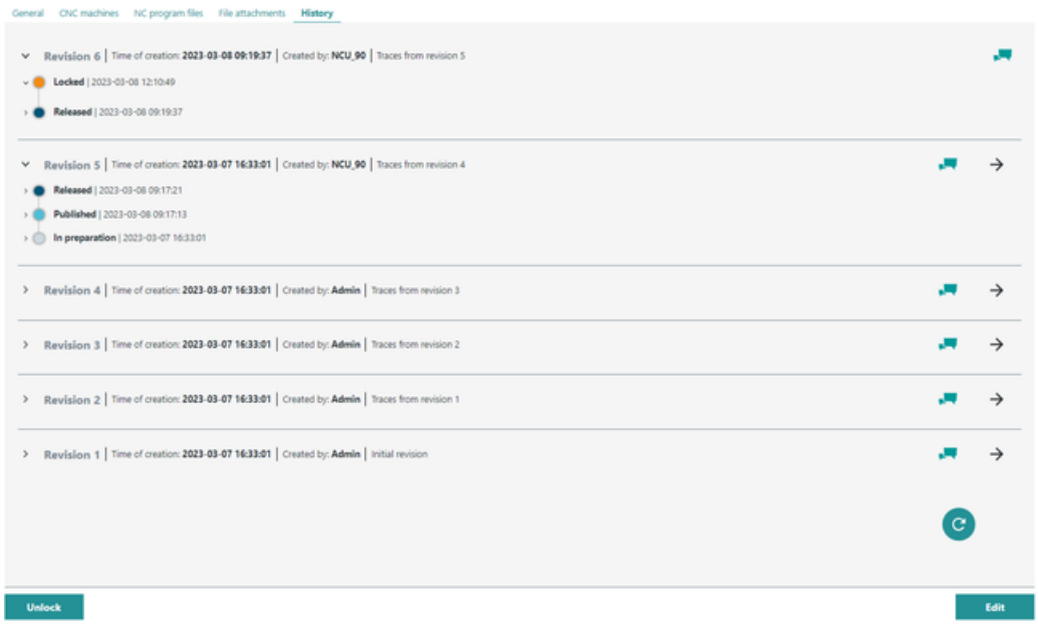
- Checking the revision history and statuses of an NC package.
- Editing the current revision of an NC package, which results in a new revision.
- Editing NC programs, which means deleting and adding content, resulting in a new revision.
- Reinstating a revision, which means going back to an older revision and resulting in a new revision if "Auto revision handling" is active.

Prerequisite

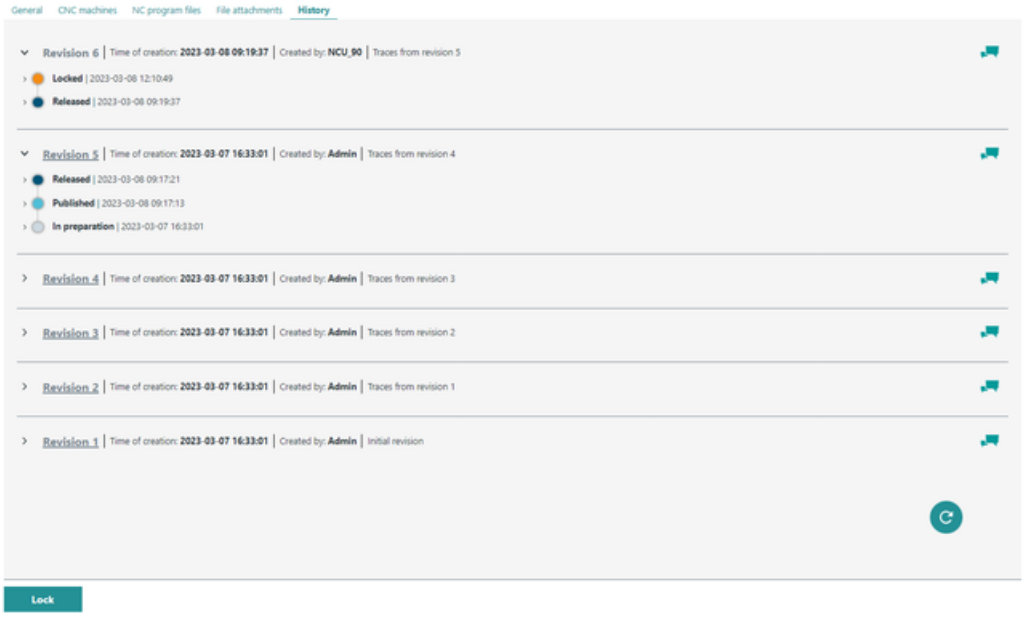
You have the adequate user rights.

Procedure

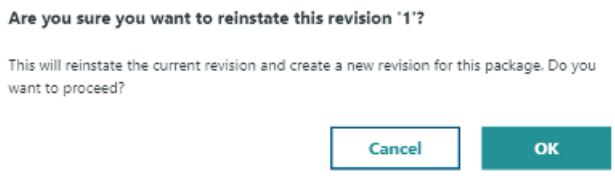
1. In the "NC program package overview" window, click the underlined NC package name.
   The detail view of the NC package opens.
2. Open the "History" tab.
   All revisions of the NC program package are listed numerically in descending order.
   The latest revision is displayed at the top of the list. The details of the revisions are collapsible by clicking the arrow icon left-hand side of it.
   The view depends on the revision handling.
   "Auto revision handling" is active:



"Manual revision handling" is active:



3. Click the "Refresh" floating button to list the latest NC package history data.
4. Click the "Right arrow" symbol of the desired revision if auto revision handling is active to display the general package information for this revision.
   If required, download the NC programs from this revision of the NC package to verify the content of the files. The details view "General package information" opens.
5. Click "Reinstate revision" to reinstate and edit the selected revision if auto revision handling is active.
   A dialog box with the following confirmation request opens: "Are you sure you want to reinstate this revision '<revision number>'?



6. Click "OK" to proceed.
   The NC package is reinstated, which means that a new revision is created from the selected NC package. You can edit this new revision.
   - OR -
   Click "Cancel" to return to the selected revision.
7. Click the "Revision X" if auto revision handling is active to display the general package information for this revision.

8.1.7.3 Managing comments

You have the following options to manage comments:

- Displaying the comments of an NC package.
  For more information, see Displaying comments (Page 719)
- Adding new comments to an NC package.
  For more information, see Adding comments (Page 721)

Prerequisites

- There is an existing NC package.
- You have the adequate user rights.

8.1.7.4 Displaying comments

You can display the comments in chronological order.
The following information is displayed about comments:

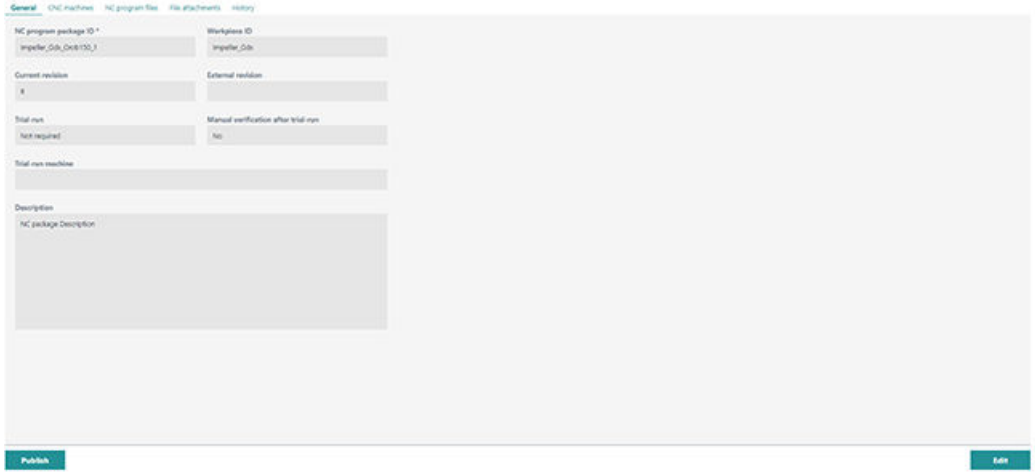
- Comment creator
- Comment time
- Comment text

Prerequisite

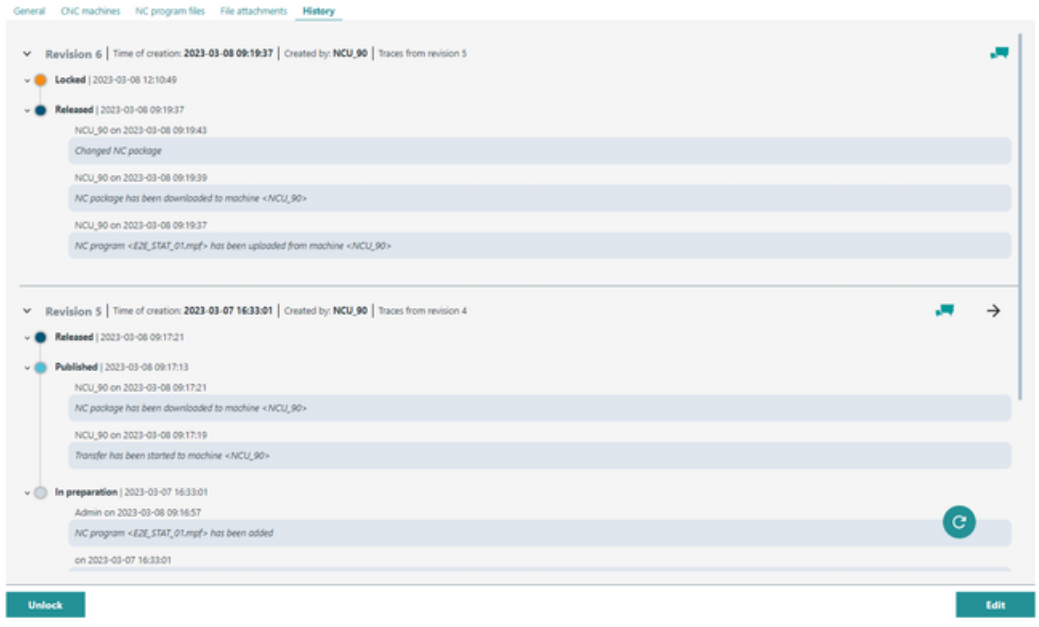
You have adequate user rights.

Procedure

1. In the "NC program package overview" window, click on the underlined NC package name.
   The detail view of the NC package opens.



2. Open the "History" tab.
   The NC package comments are listed in chronological order, according to the revisions and the respective states.
   The latest revision is at the top of the list.
   In order to display only relevant comments, you can open and close the states by clicking on the arrow on the left-hand side.

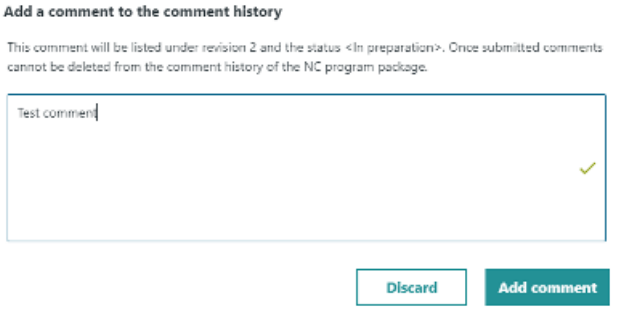


8.1.7.5 Adding comments

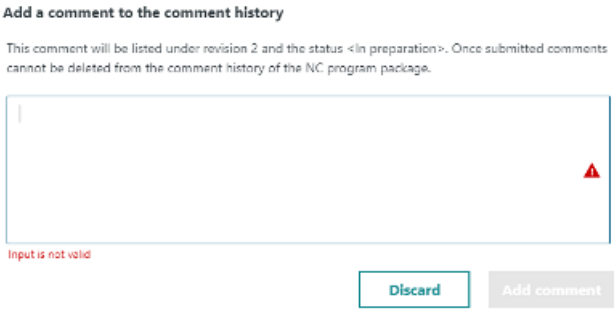
You have the option of adding comments to an NC program package.

Procedure

1. In the "NC program package overview" window, click the underlined NC package name.
   The detail view of the NC package opens.
2. Click on the "History" tab.
3. Click on the comment icon to add a comment for any reason.
   A popup appears into which you can enter your new comment. You can enter a maximum of 280 characters into the entry field.
   - Click on "Add comment" to add the comment.
   - Click on the "Discard" button to cancel the operation.



4. If the comment is not valid, the following error message is displayed underneath the entry field: "Input is not valid".



8.1.7.6 Auto comments

The system stores auto comments. This information is automatically generated by the software.

Prerequisite

There is an existing NC package.

Auto comment triggers

The following actions and events trigger an auto comment:

Action or event	Auto comment information
Download of an NC package to the machine. The comment is only created if the download has been successful.	Machine name
Upload of an NC package from the machine. The comment is only created if the upload has been successful	Machine name
Addition of an NC file to the NC package	Name of the added NC program
Deletion of an NC file from the NC package	Name of the deleted NC program
Addition of a machine assignment	Name of the added machine
Removal of a machine assignment	Name of the removed machine
Transfer of an NC package to the machine	Machine name
Aborted NC package transfer	Machine name

Note

Language change

When you change the language, the text of the auto comment is displayed in the language you have selected.

The machine names are string names. If the machines are renamed, auto comments are not effected. They keep the names of the machines before renaming them.

8.1.8 Status transitions

The NC package state changes by user interaction. The user can publish, unpublish, verify, revoke, lock or unlock an NC package based on its life cycle phase. Therefore action buttons are placed on the left bottom of the NC package detail view.

The NC package lifecycle is based on the configuration value "Manual revision handling", which is by default false after MMR /Programs installation. In this case "Auto revision handling" is active. If this configuration value is set to true, then "Manual revision handling" is active.

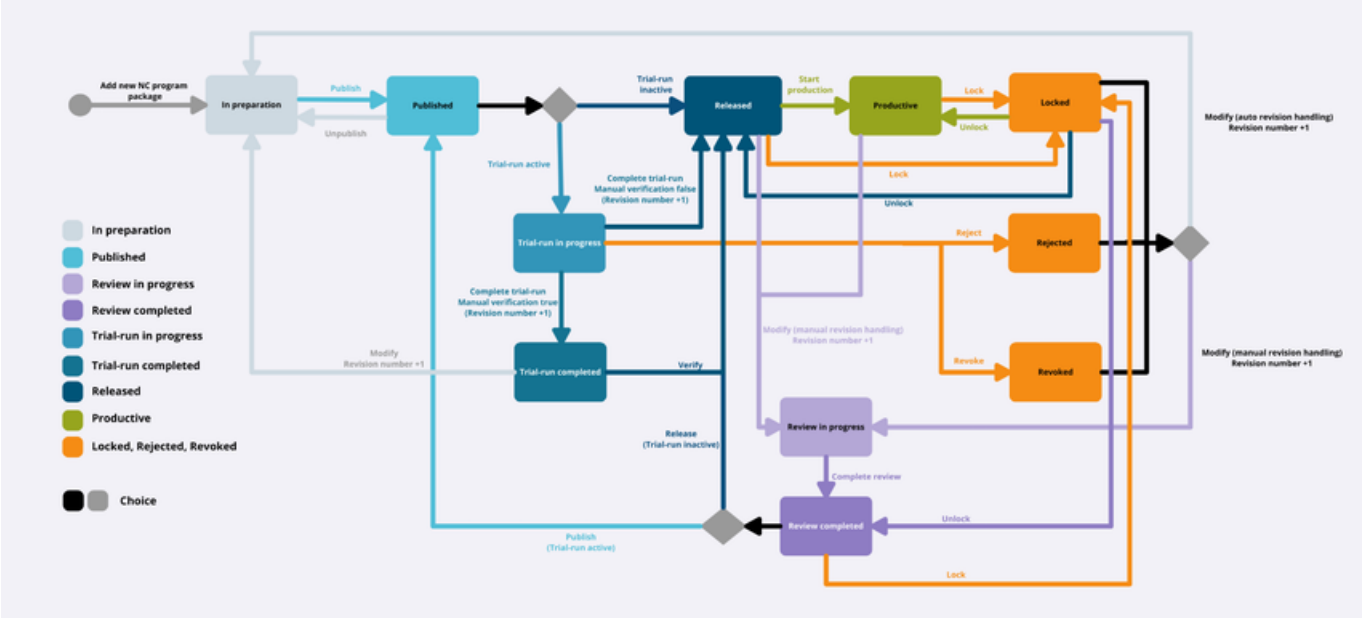
- If "Auto revision handling" is active, the NC package can be in 9 states. If "Manual revision handling" is active, the NC package can be in 11 states ("Review in progress" and "Review completed" states are only available if "Manual revision handling" is active).
- When "Auto revision handling" is active, then always the latest revision of the NC package is available for assigned machines after it has been released. Otherwise when "Manual revision handling' is active, there is a dedicated released revision which is available for machines. Every change must be reviewed before it can be marked as released revision. After a new revision is marked as released, the previous released revision will be locked.

The current NC package state is indicated on the top of the page in an arrow-bar. The current state is highlighted with color, while the rest of the bar is disabled. The NC package status bar is different in this two cases.

Auto revision handling:

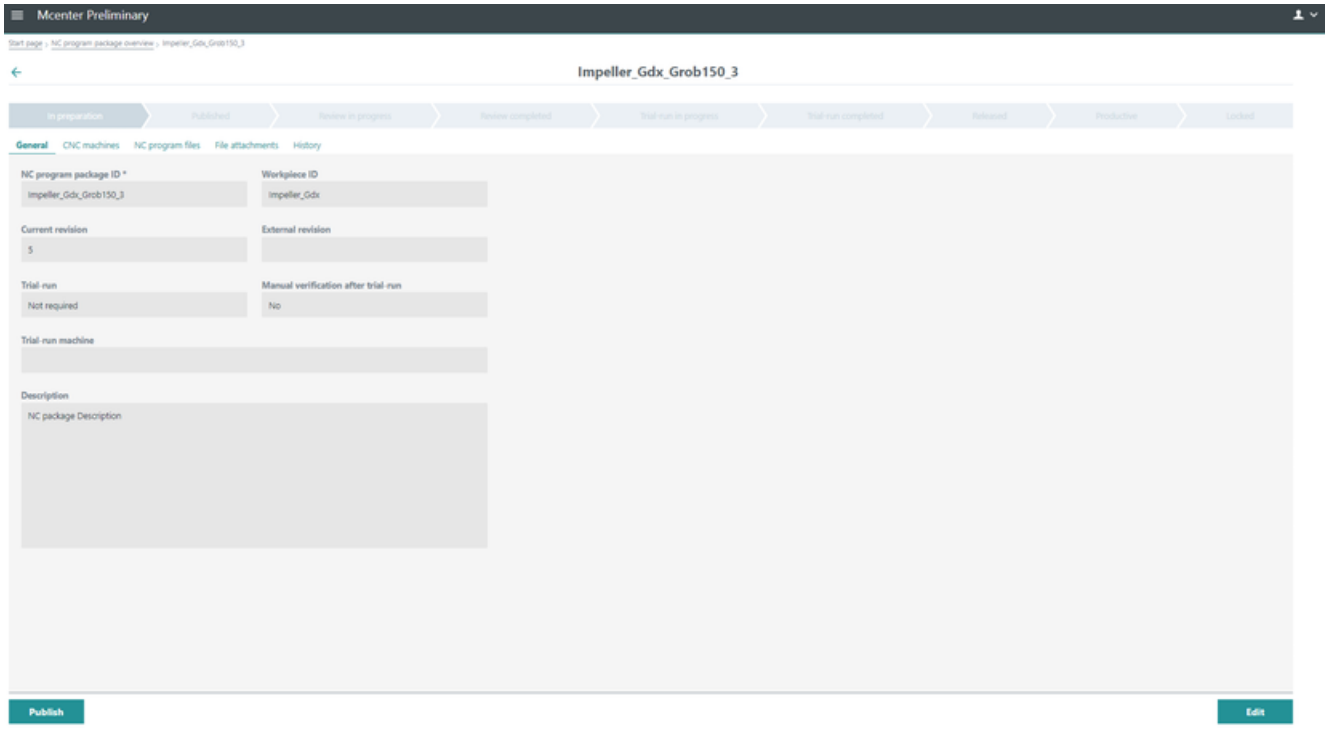
Manual revision handling:

The following flow chart represents the NC package state transitions:



In preparation

When an NC package is created, the default status is "In preparation". This status indicates that the NC package is not yet ready to be downloaded to the trial-run machine.
In this status, you can fully modify the general details of the NC package or the NC program list, assigned machines and attachments. Therefore, click the "Edit" button.

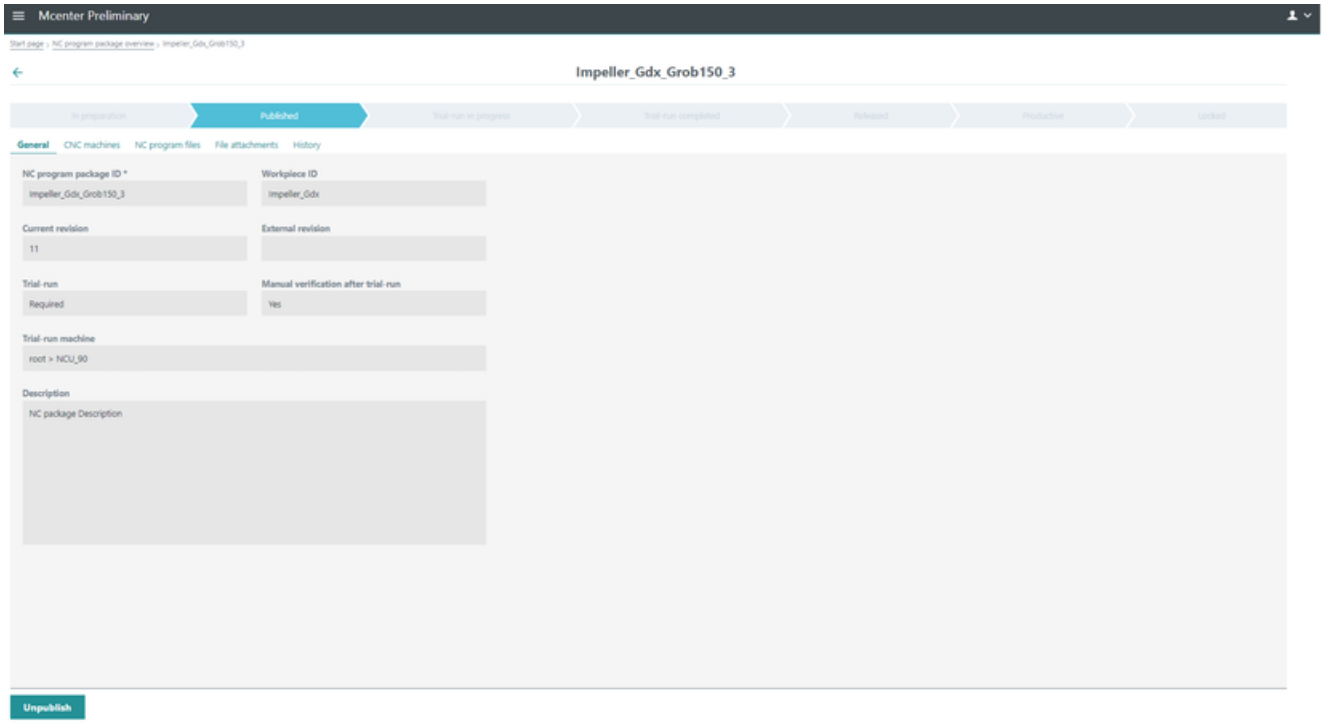


Published

When the NC package is ready for testing on the trial-run machine, you can publish it. In the state "Published", the NC package is ready to be downloaded to the trial-run machine where the actual trial-run can happen. Otherwise, you can unpublish the NC package. In this case, the status changes back to "In preparation".

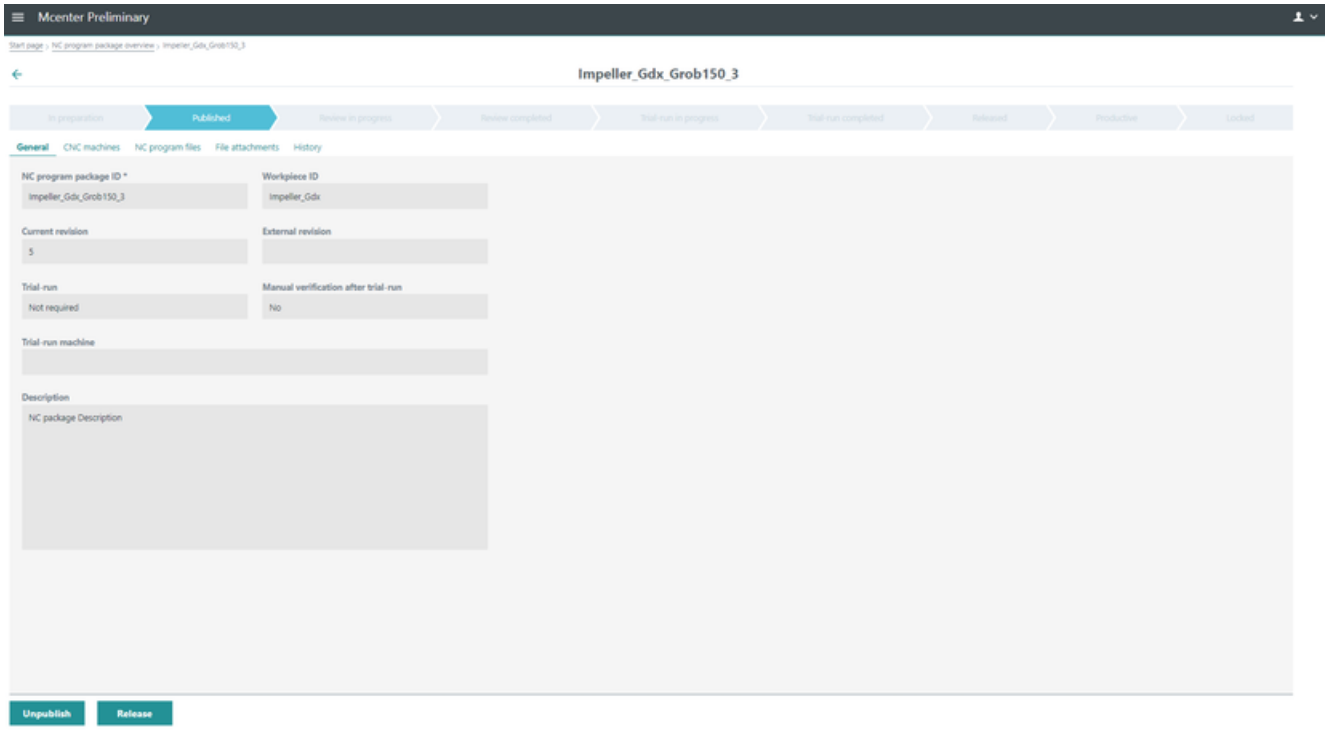
"Auto revision handling" active:

If the trial-run is not required, all of the assigned machines are able to download the NC package. If required, only the trial-run machine is able to download the NC package.



"Manual revision handling" active:

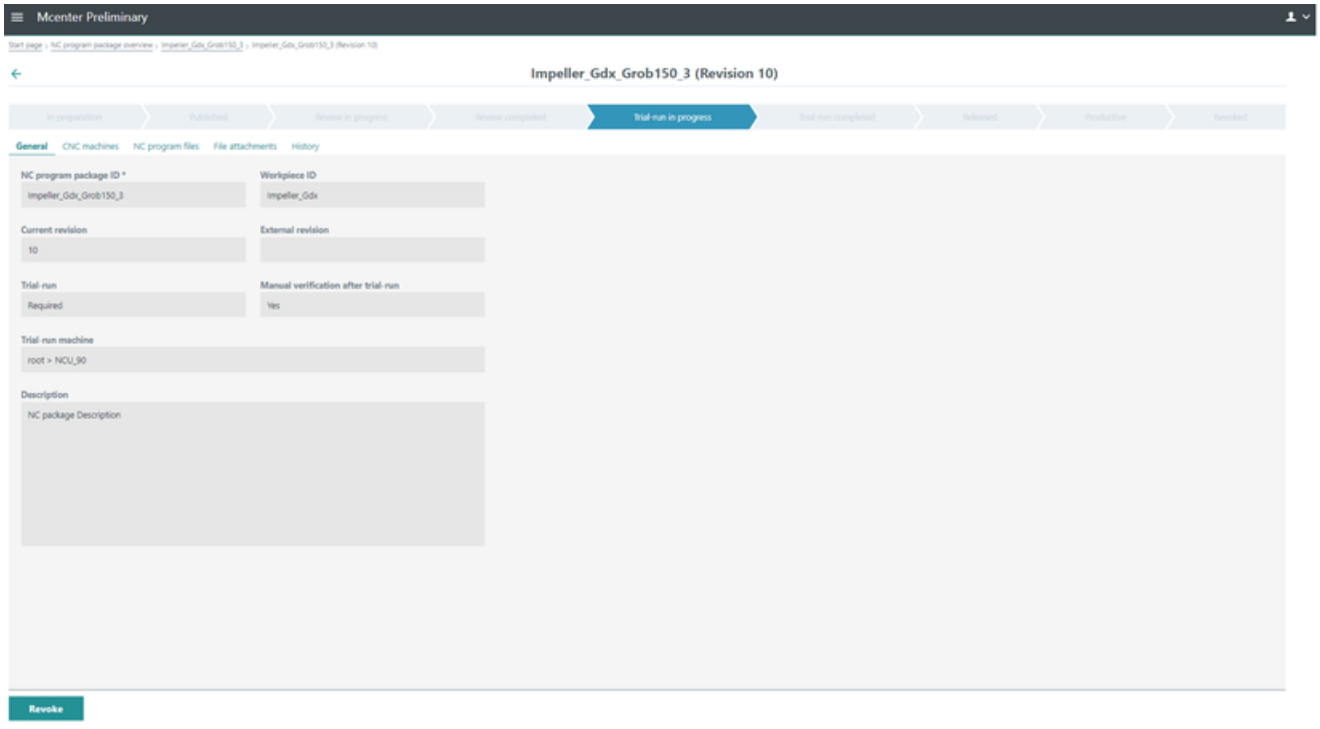
If the trial-run is not required, assigned machines are not able to download the NC package. It should be released manually.



Trial-run in progress

"Auto revision handling" is active:

If the trial-run machine downloads a published NC package, the NC package state changes automatically to "Trial-run in progress" or "Released", based on the "Trial-run required" NC package property. If testing is needed, the NC package state is "Trial-run in progress". In this state, you can revoke the NC package. In the state "Revoked", you can lock the NC package and then restart the NC package life cycle.

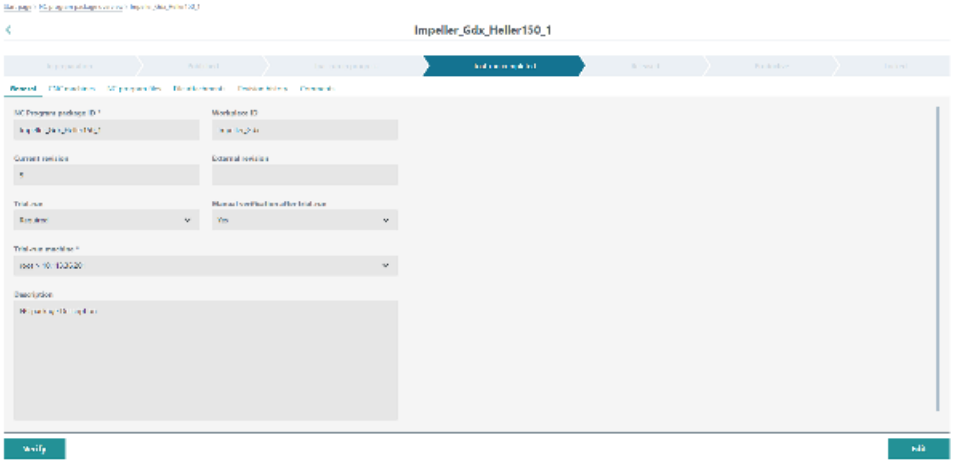


"Manual revision handling" active:

If the trial-run machine downloads a published NC package, the NC package state automatically changes to "Trial-run in progress" if the trial-run is required. In this state, you can revoke the NC package. In the "Revoked" state, you can lock the NC package and then restart the NC package life cycle.

Trial-run completed

The NC package state changes to "Trial-run completed" or "Released" when the machine operator finishes the test on the machine and presses the softkey "Complete trial-run". In this state, the NC package is only visible on the trial-run machine.
In this state, you must verify, that the test was successful and the NC package is ready to use, if manual verification after trial-run was selected. After that, change the status to "Released" by clicking the "Verify" button.
To modify the NC package, click the "Edit" button. In this case, a new revision of the NC package with the status "In preparation" is created.



Released

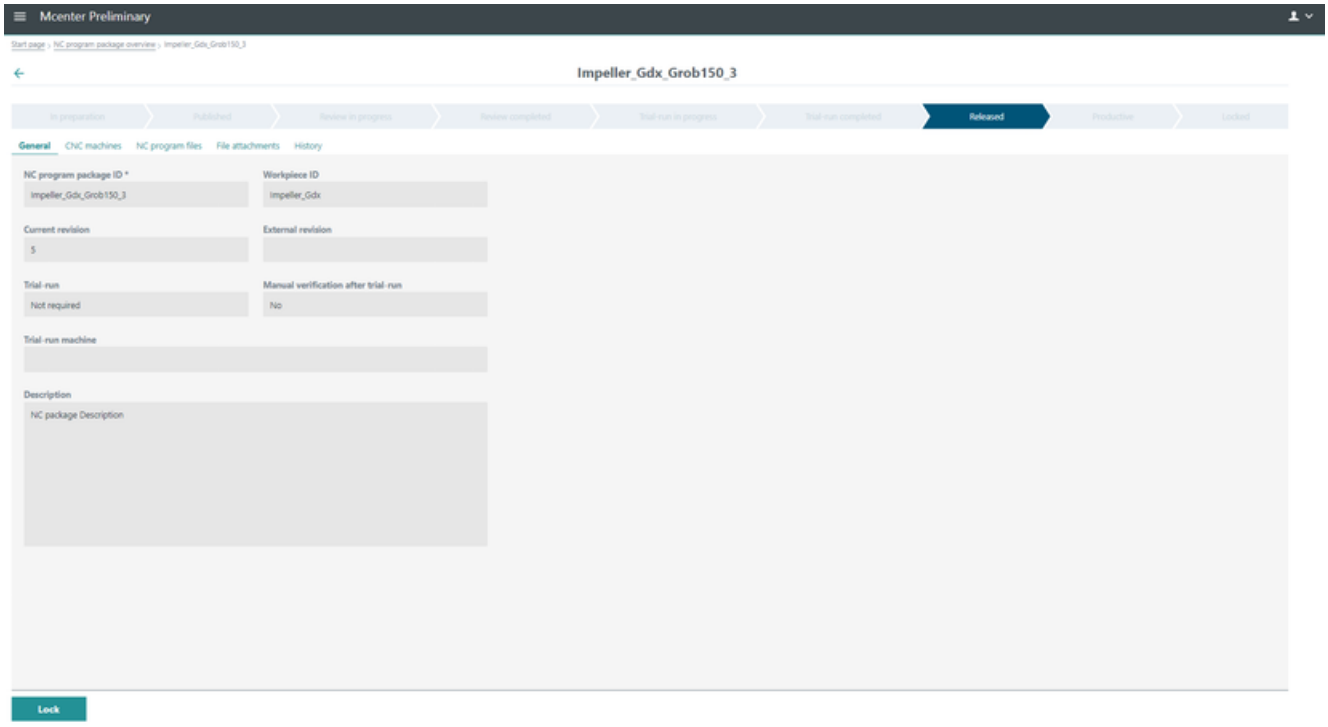
This state indicates that the NC package is ready for use. In this state, the NC package is visible and can be downloaded on the trial-run machine and all other assigned machines.

"Auto revision handling" active:

If the NC package has been downloaded to the machine and all required tests and verifications are done, the NC package state automatically changes to "Released".
In this state, you can lock the NC package.

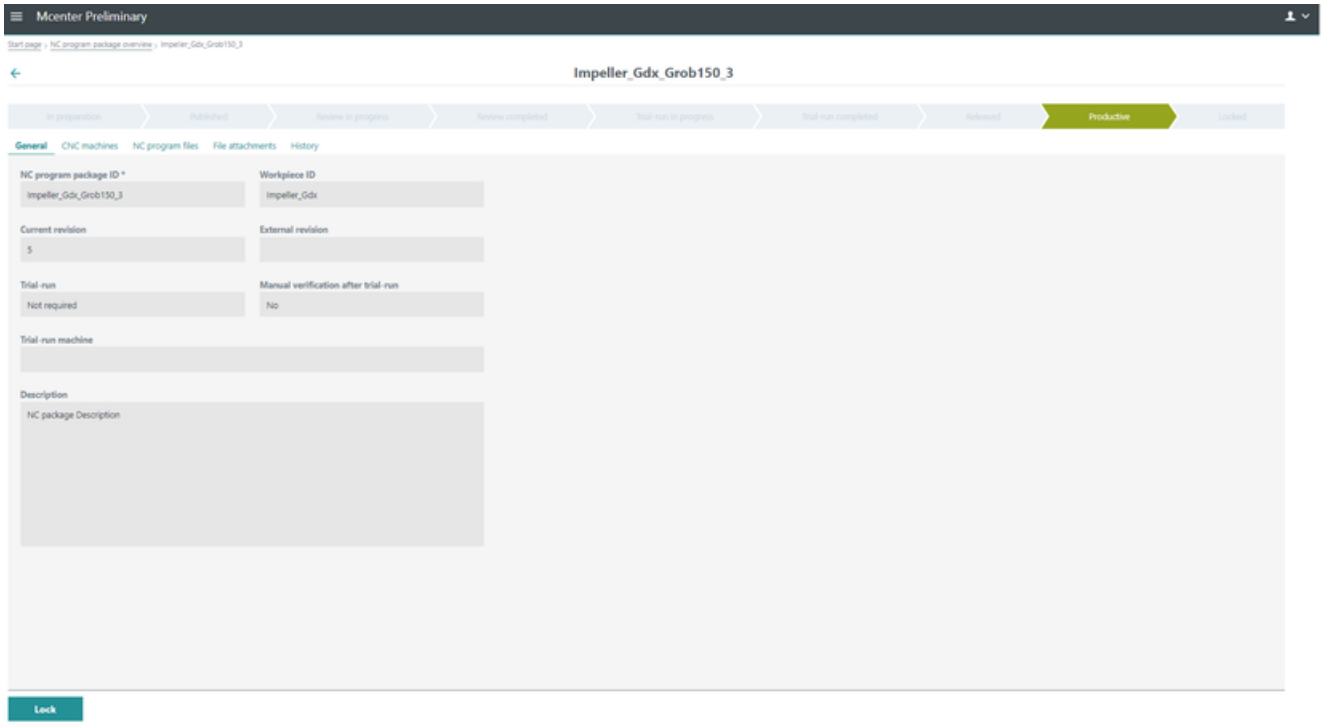
"Manual revision handling" active:

If the NC package has been downloaded to the machine and all required tests and verifications are done, the NC package state automatically changes to "Released". If there is no trial-run machine assigned to the NC package, the NC package should be released manually after "Published" state. In this case this revision will be the "Released revision". It is available for assigned machines. A previously released revision will be locked.


Mcenter Preliminary
Impeller_Gdx_Grob150_3
Released
General
CNC machines
NC program files
File attachments
History
NC program package ID *
impeller_Gdx_Grob150_3
Workpiece ID
impeller_Gdx
Current revision
5
External revision
Trial-run
Not required
Manual verification after trial-run
No
Trial-run machine
Description
NC package Description
Lock

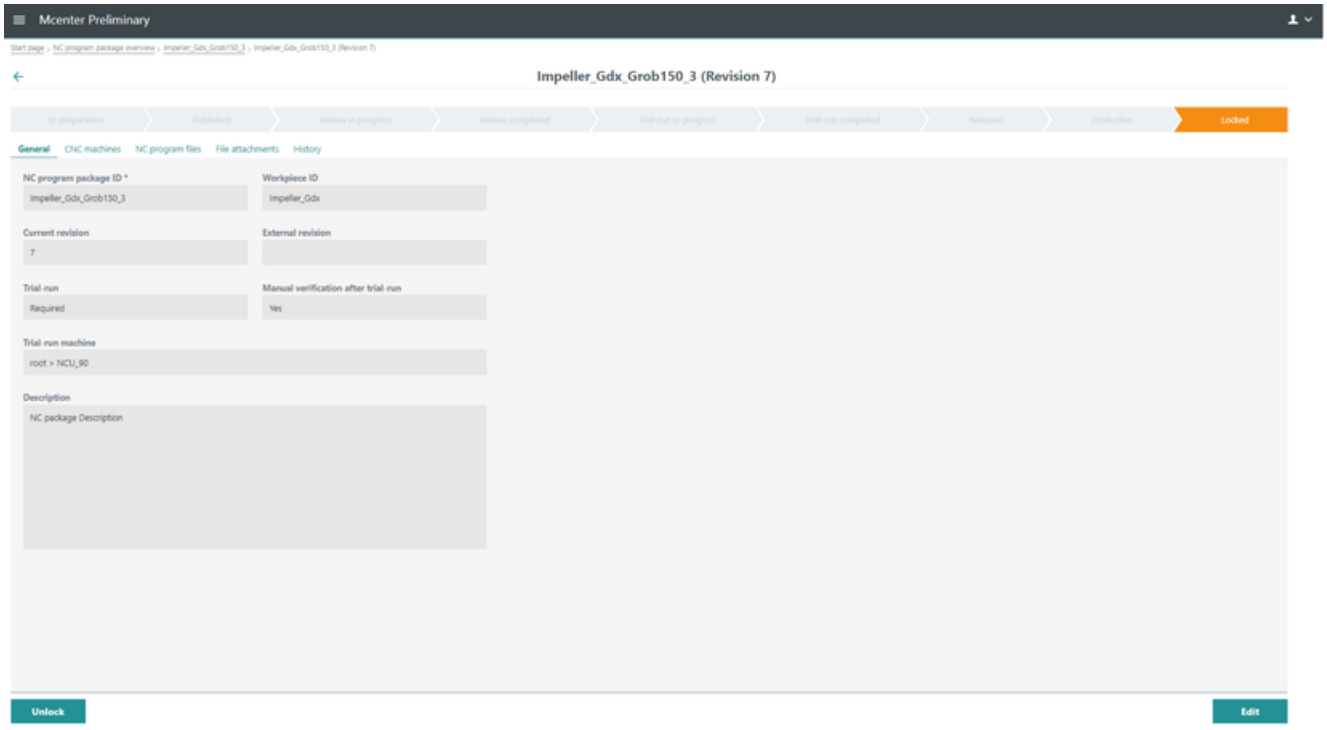
Productive

If the machine starts to use the NC package in production, the state of the NC package changes to "Productive". In this state, you have the option to lock the NC package. Either if "Auto revision handling" or "Manual revision handling" are active the NC package can be locked which not indicates a new revision. If an NC package is locked, it will be unavailable for assigned machines.



Locked

In the state "Locked", the NC package cannot be used for production and cannot be downloaded to the machines anymore.
In this state, you have the option to unlock the NC package. If the NC package has already been productive, its status switches to "Productive" again, otherwise it is "Released".
To modify the NC package, click the "Edit" button. In this case, a new revision of the NC package is created.



"Auto revision handling" active:

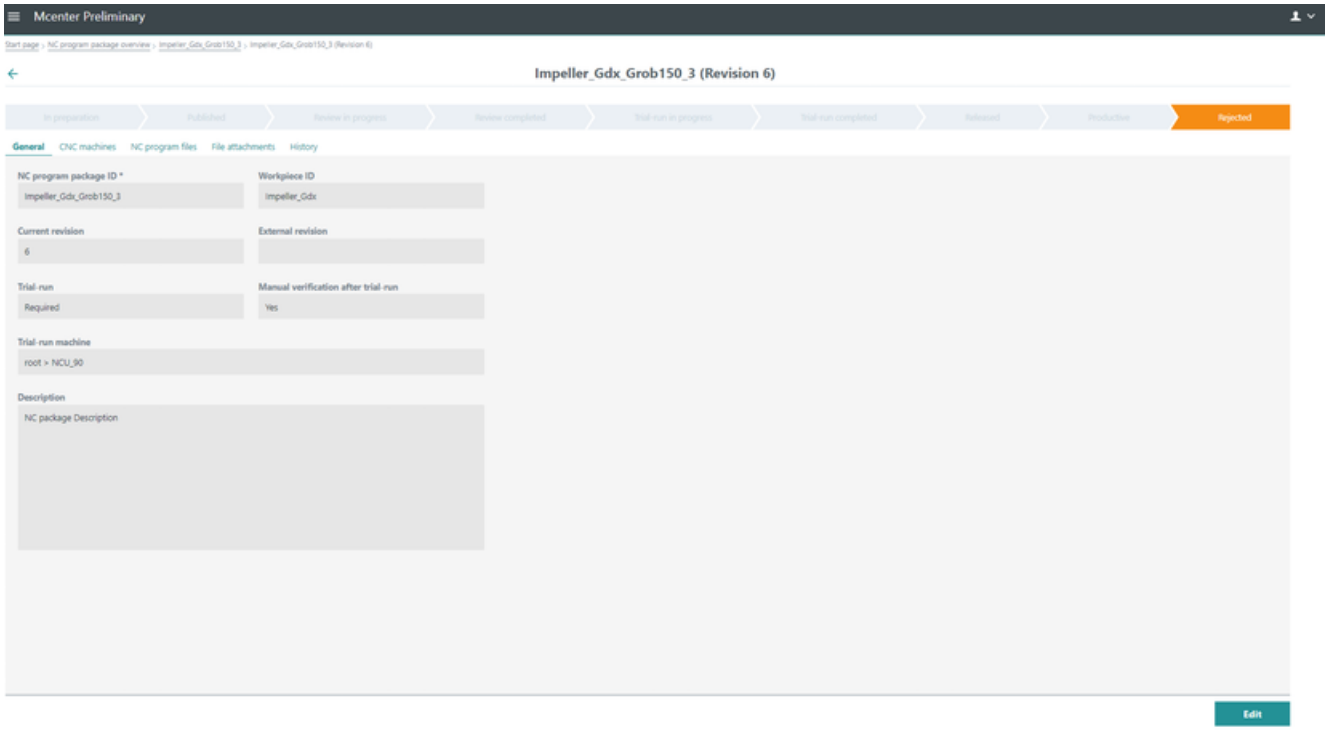
The status of the new revision will be "In preparation"

"Manual revision handling" active:

After unlocking the revision the new status can be "Review completed" if it was locked from that state. The status of the new revision will be "Review in progress", if the NC package is edited in the state "Locked".

Rejected

In the state "Rejected", the NC package cannot be used for production. The rejection is initialized from the machine client side.
To modify the NC package, click the "Edit" button. In this case, a new revision of the NC package is created.



"Auto revision handling" is active:

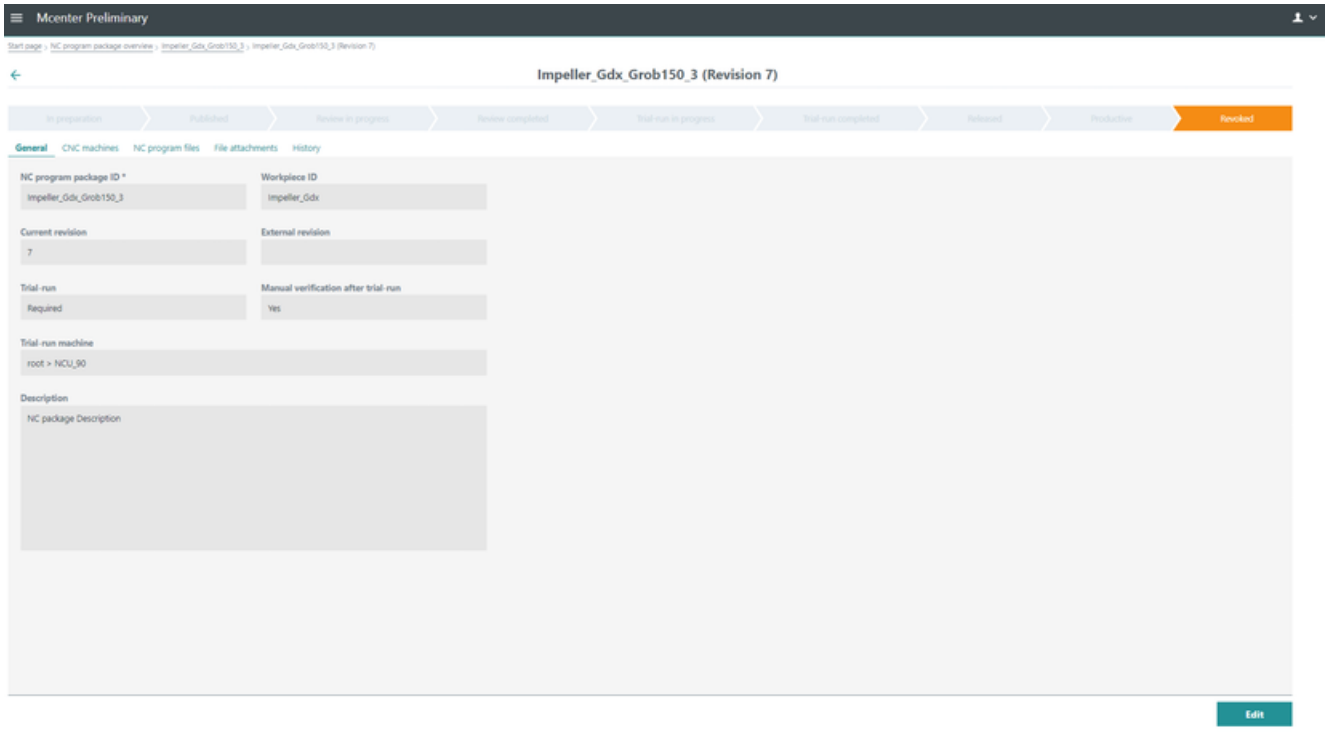
The status of the new revision will be "In preparation"

"Manual revision handling" is active:

The status of the new revision will be "Review in progress"

Revoked

In the state "Revoked", the NC package cannot be used for production.
To modify the NC package, click the "Edit" button. In this case, a new revision of the NC package is created.



"Auto revision handling" is active:

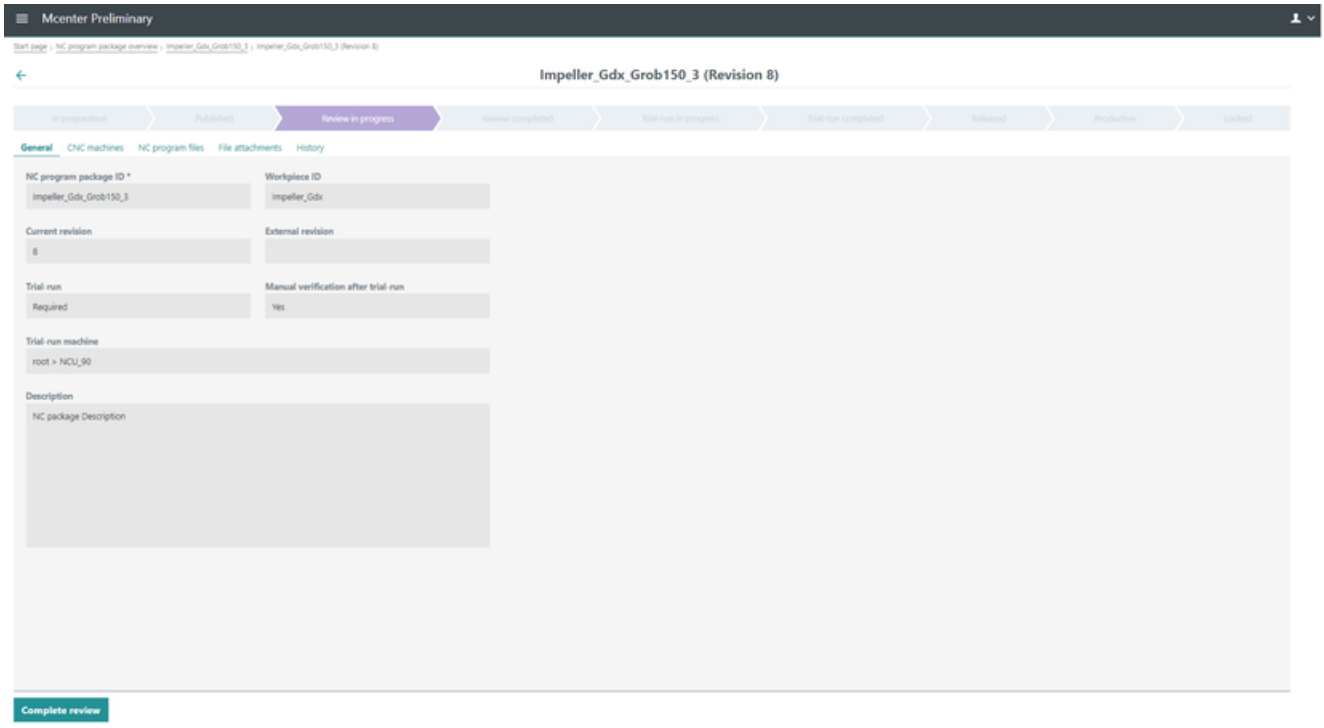
The status of the new revision will be "In preparation"

"Manual revision handling" is active:

The status of the new revision will be "Review in progress"

Review in progress

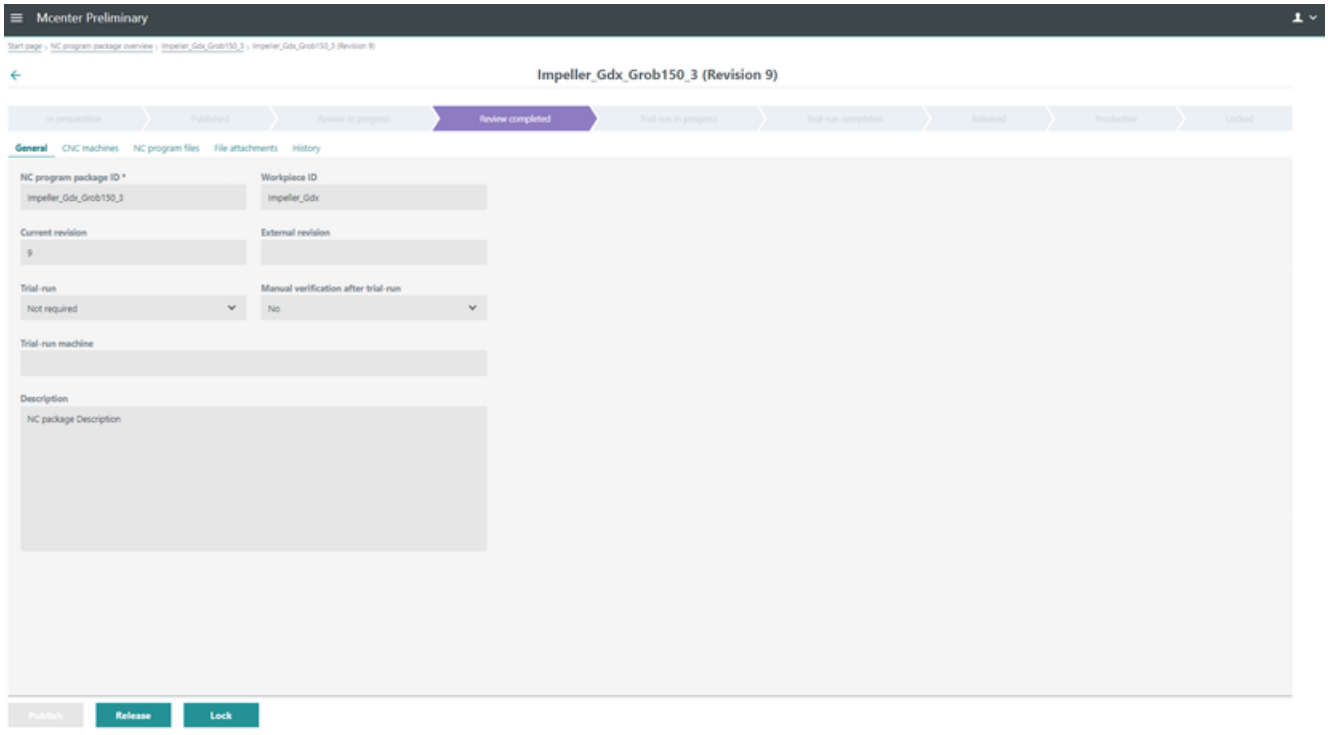
The state "Review in progress" exists only when "Manual revision handling" is active. If the NC package changes (server and machine changes as well), a new revision will be created and the state of that new revision will be "Review in progress". In this state, the NC package is not editable and the review can be completed.



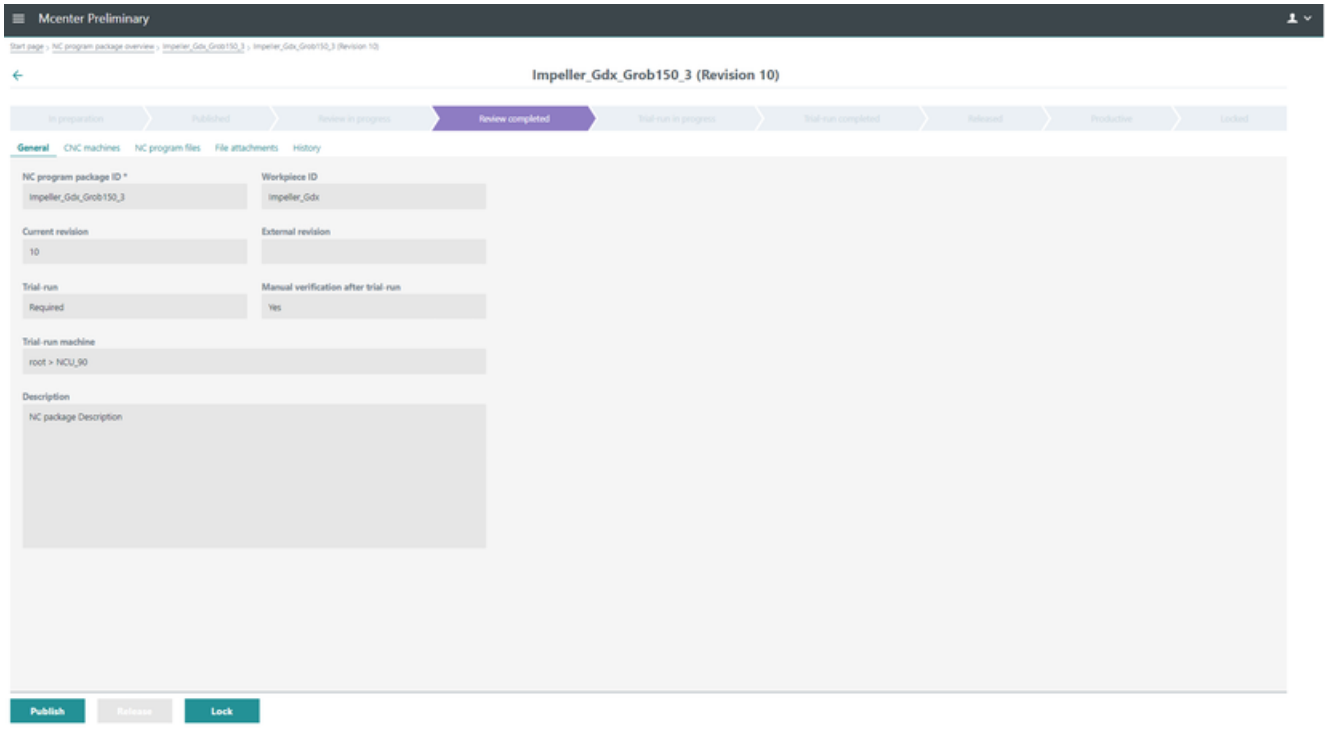
Review completed

The state "Review in progress" exists only when "Manual revision handling" is active. If the review is completed, the user has multiple choices. Based on the evaluation of the modifications the review can be negative and positive. If it is negative, the NC package can be locked. Then this revision of the NC package will not be available for assigned machines, only the released one before. If the review is positive, NC package can be published, if trial-run is required or it can be manually released.

Without trial-run:



With trial-run:



If the NC package is manually released, then this revision will be the released one and the previously released will be locked.

8.1.9 Modifying an assigned machine list

You have the option to assign an NC package to multiple machines or to remove an assignment.

Prerequisites

- You have been assigned an adequate user role.
  For more information, see Users and functions MMR (Page 59)
- The NC package is in one of the following states:
  - In preparation
  - Trial-run completed
  - Locked
  - Rejected
  - Revoked
- The NC package can only be downloaded on machines which are in the assignment list.
- Trial-run machine can be selected from assigned machines.
- To remove an assignment, the machine cannot be a trial-run machine.

Parameters

The following data associated with an assigned machine is displayed:

Parameter	Description
Machine name	Shows the name of the machine.
Machine type	Shows the type of the machine.
Trial-run machine	Shows whether the machine is prepared for a trial-run or the production operation. Possible values: • Yes: Test operation • No: Production operation In an NC package, only one assigned machine can be used for tests but a machine can be used for tests in several NC packages.
Last downloaded revision	Shows the last downloaded revision.
Hierarchy path	Shows the path to the machine within the plant hierarchy.
Root path	Shows the location on the server and is displayed only for Programs on managed machines. This path can be configured in "SinInt.MMRP.Service" > "Paths". Using Consul - IIS reset is required after the changes.
Transfer state	Shows the transfer state.
🗑	Deletes the assignment to the machine. You cannot delete a trial-run machine. In this case, the button is inactive.

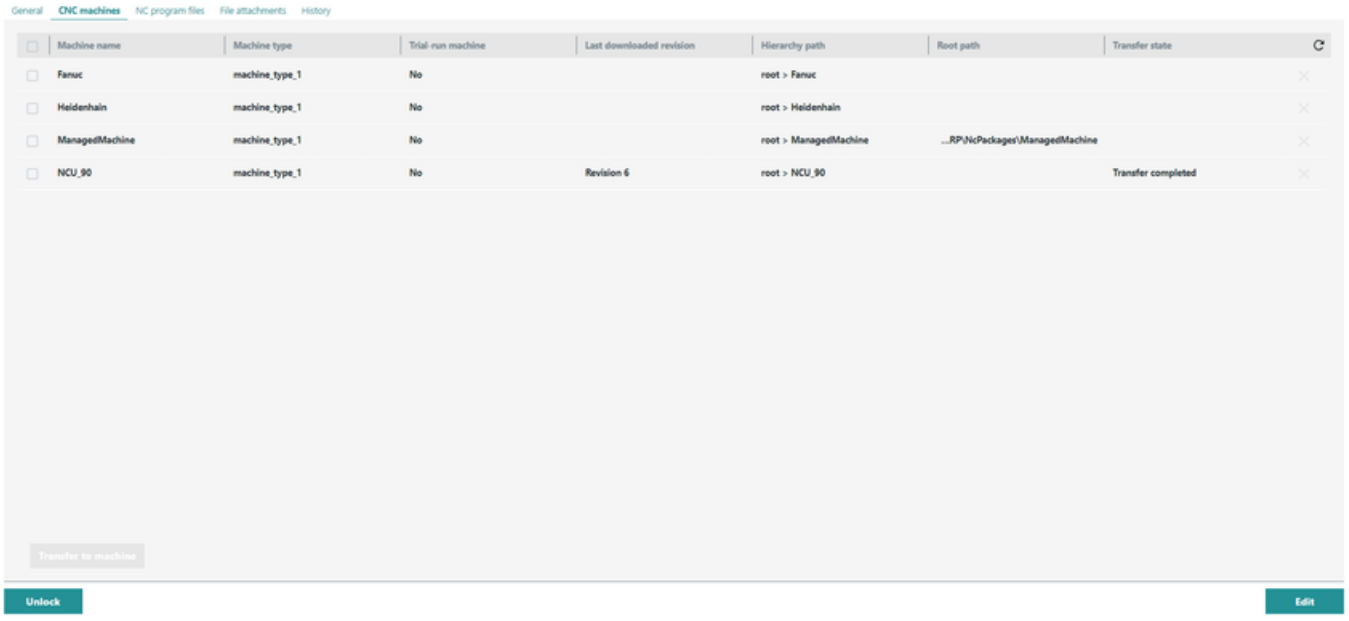
Note

Omitted root path

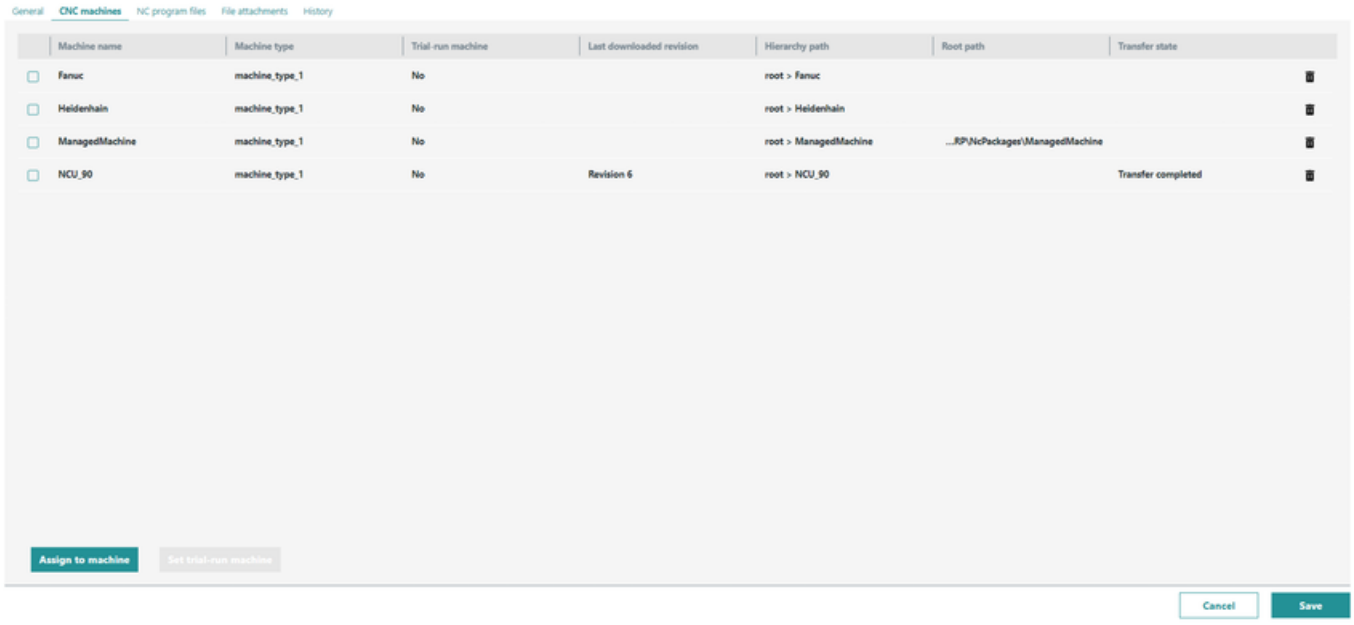
The root path is omitted from the transfer path if you use the drive letter in the path on the machine of the NC programs.
For example, if the root path is "C:\MMRP" and the path on the machine is "D:\MMRP\NcPrograms", then the transfer path is "D:\MMRP\NcPrograms".

Procedure

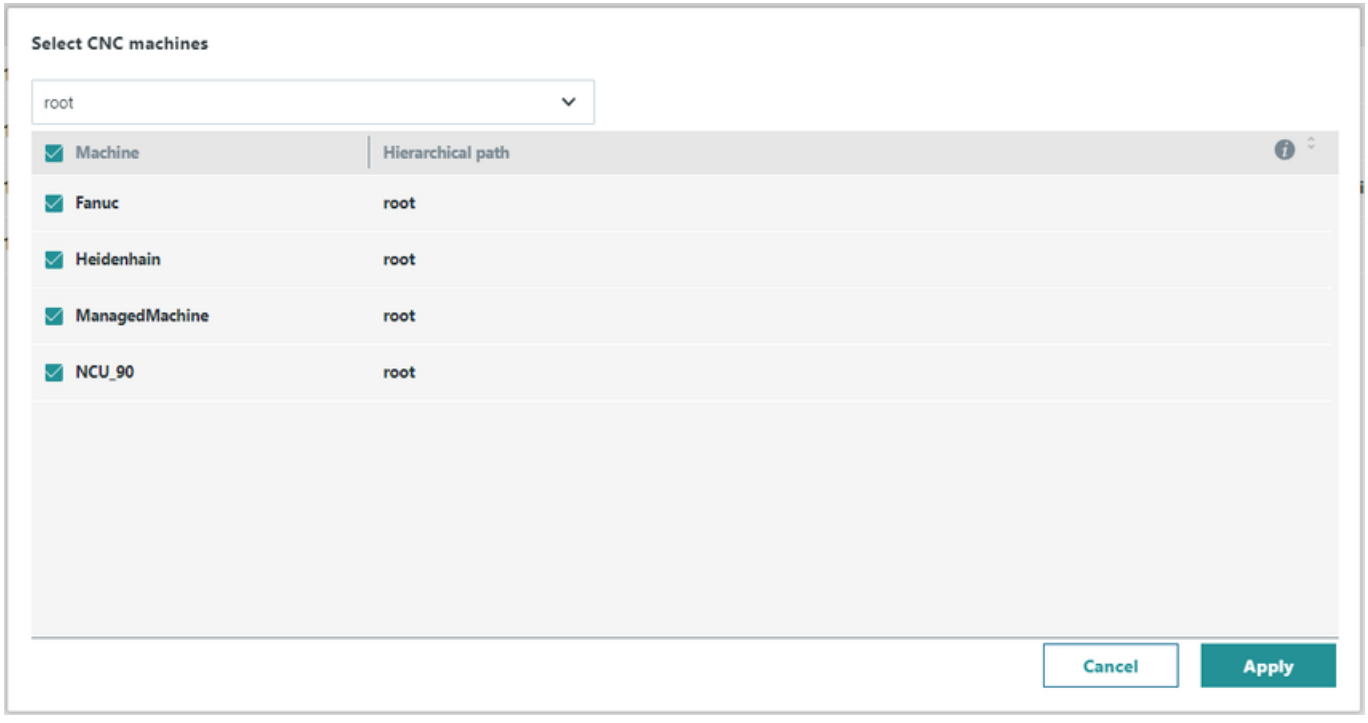
1. In the window "NC program package overview", click the underlined NC package name.
   The detail view of the NC package opens.
2. Open the "CNC machines" tab. This tab shows a table view.
   If there is no assigned machine, the table is empty.



3. Click "Edit".

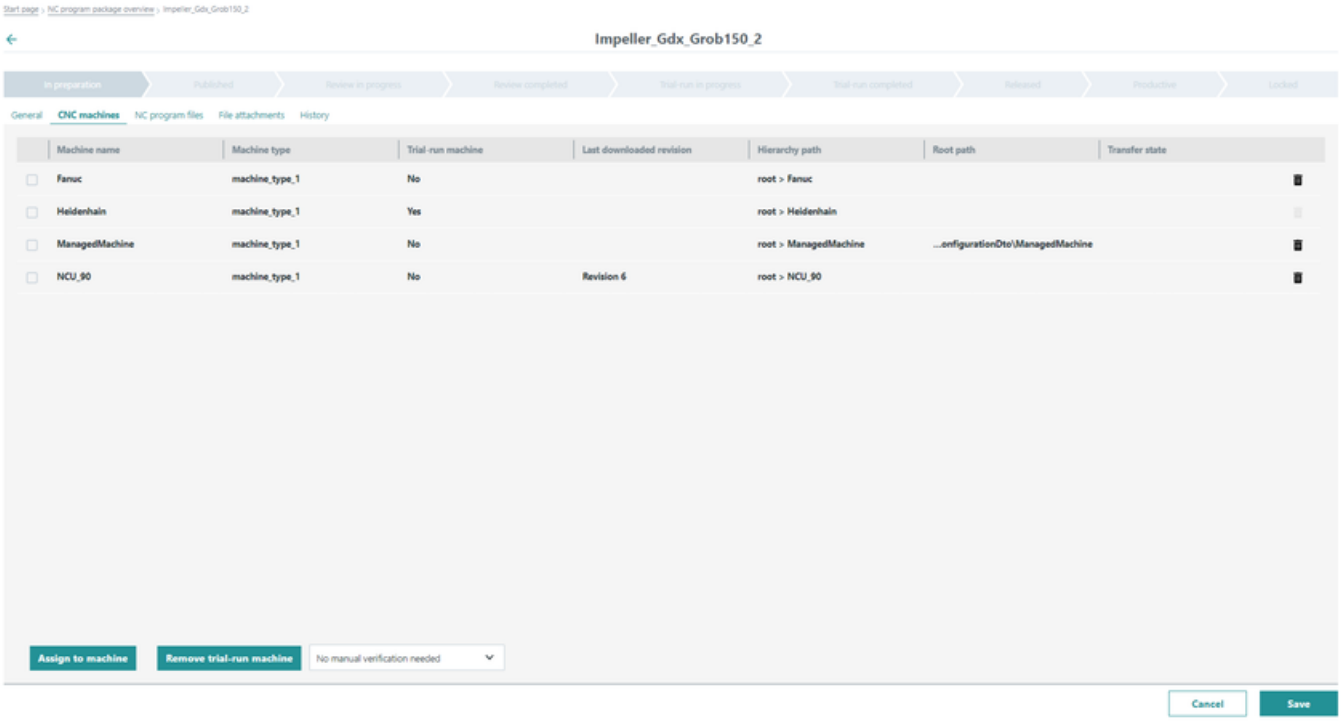


4. Click "Assign to machine".
   A dialog box displaying the machines opens. The trial-run machine is not listed.



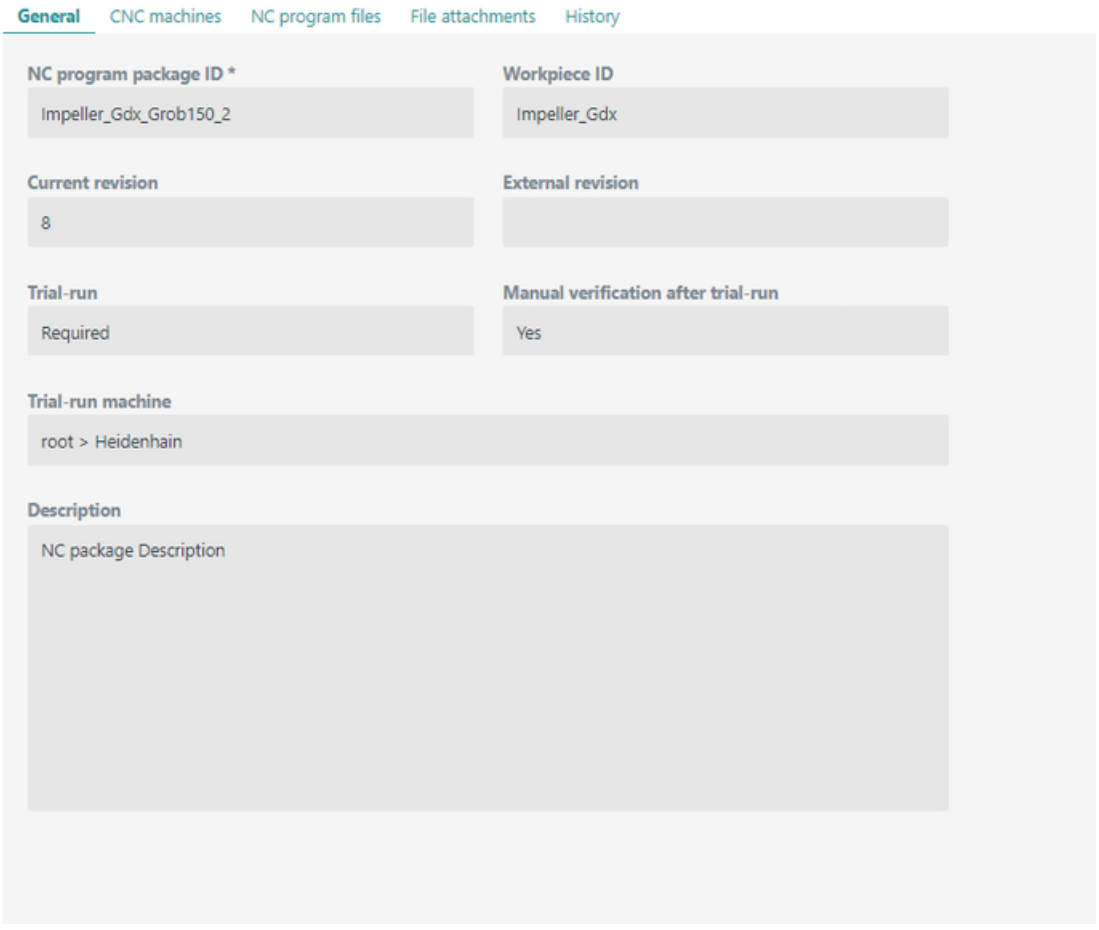
5. Via the drop-down list, specify the path to the machines and select the machines that should be assigned.

6. Click "Apply" to save the selection.
   The table is refreshed and shows the selection.
   - OR -
   Click "Cancel" to undo the selection.
7. If required, you can remove an assignment via the "Delete" symbol.
8. If trial-run is required, select trial-run machine with the checkboxes. Only one trial run machine can be assigned. After selecting a machine, the button "Set trial-run machine" is activated. Click on this button to select the checked machine as trial-run.



After selecting trial run machine, the delete symbol becomes read-only, trial-run machine can not be unassigned from the list. In the trial-run machine column the trial-run machine is marked with "Yes" value.
The manual verification after trial-run can be selected with a dropdown list.
With the button "Remove trial-run machine" the trial-run machine can be removed.

9. Click "Save" to save the changes that were made to the NC package.
10. Navigate to "General" tab. The modifications are shown in read-only fields, if a trial-run machine is selected.



8.1.10 Adding file attachments

You can upload, download and delete file attachments on the server:

You do not need to click "Save" to confirm these operations as they are carried out instantaneously.

Parameters

Parameter	Description
v	This symbol appears when you click on the column heading. Click on the symbol to sort the elements alphabetically/numerically, either in ascending or descending order.
File name	Shows the file name.
File size	Shows the file size in kB.

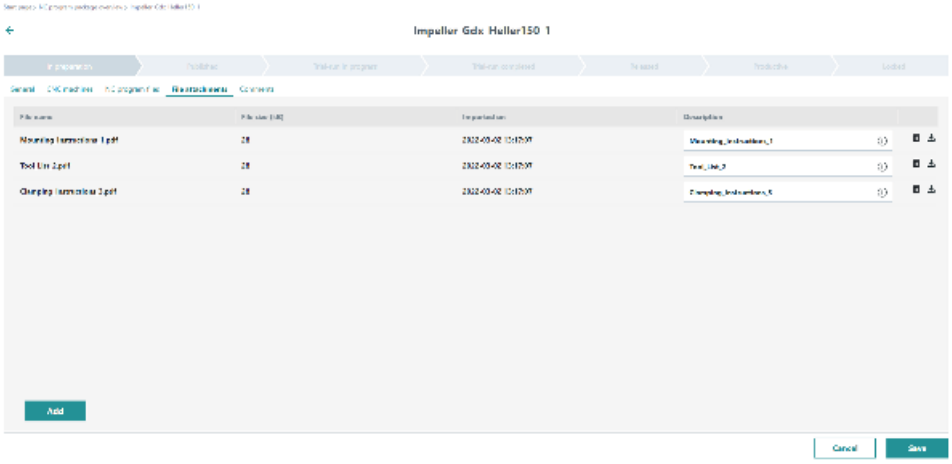
Parameter	Description
Imported on	Shows the import date.
Description	Shows the description you have entered. The description length is limited to 50 characters. At least one non-blank-space character is required.
	Deletes the file after a confirmation prompt.
	Starts the download of the file attachment.

Prerequisites

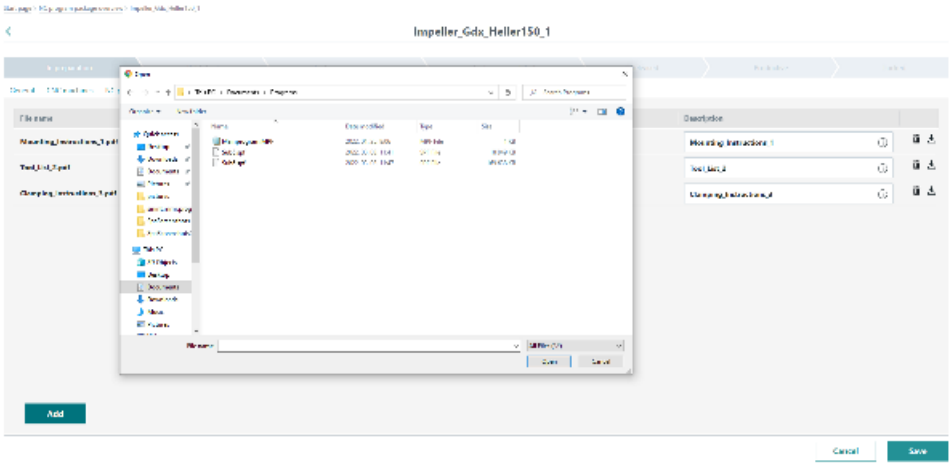
The size limitation is 500 MB.

Procedure

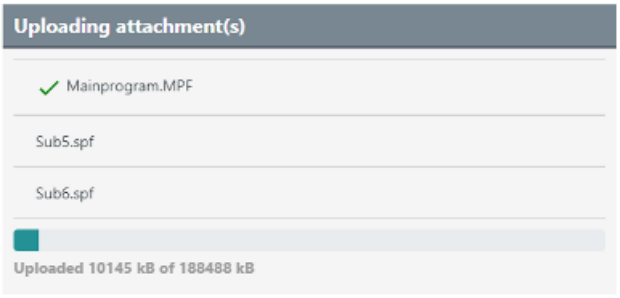
1. Select an NC package.
   Open the "File attachments" tab in the <NC package name> window and click "Add".



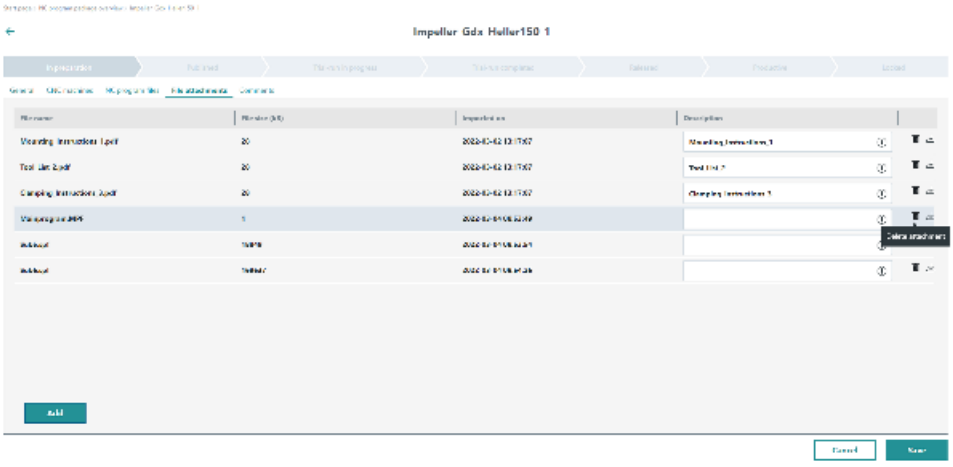
2. The list of files opens. Select the files you need and click "Open".



During the upload, a status message with a progress bar is displayed.

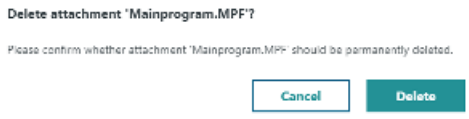


3. In order to delete a file attachment, select a file and click "Delete".
   You can only delete the file attachments one by one.

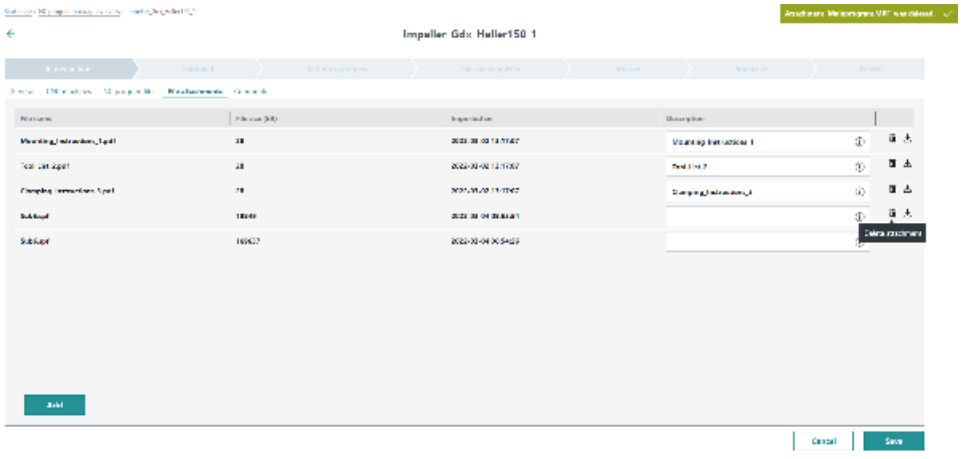


A confirmation dialog opens.

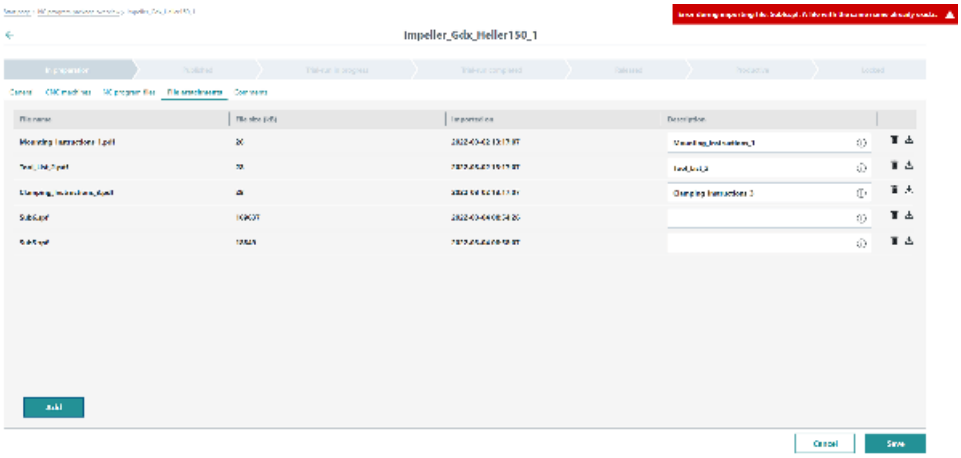
– Click "Delete" to delete the file attachment.
  - OR -
  Click "Cancel" to cancel the operation.



A confirmation message is displayed in the top right corner.



4. If you click the download icon, the attachment or file is downloaded to the standard download directory of the internet browser.
5. The files have to be unique within the NC package.
   If a file is not unique, the following error message is displayed in the top right window area:
   "Error during importing file: <file name> with the same name already exists."



8.1.11 Transferring uploaded NC packages to machines

8.1.11.1 Transferring NC packages

You can transfer existing NC packages to machines.

You have the following options:

- Selecting the machines to which you wish to transfer the NC package
- Monitoring the transfer state
- Executing appropriate actions depending on the transfer state

Prerequisites

- You have the adequate user rights.
- There is an existing NC package.
- The state of the NC package must be one of the following:
  - Published
  - Trial-run in progress
  - Trial-run completed
  - Released
  - Productive
- At least one machine is assigned to the NC package.

- The machine client must have minimum version 1.2.1.0.
- The preconfigured NC package download limit is not reached for machines with 1.3.0.0 minimum version.
- The machine cannot be a Managed machine.
- The machine has at least the same amount of free storage space equal to the total size of the NC package.
  If this is not the case, the transfer fails and the machine gets in an unstable state.

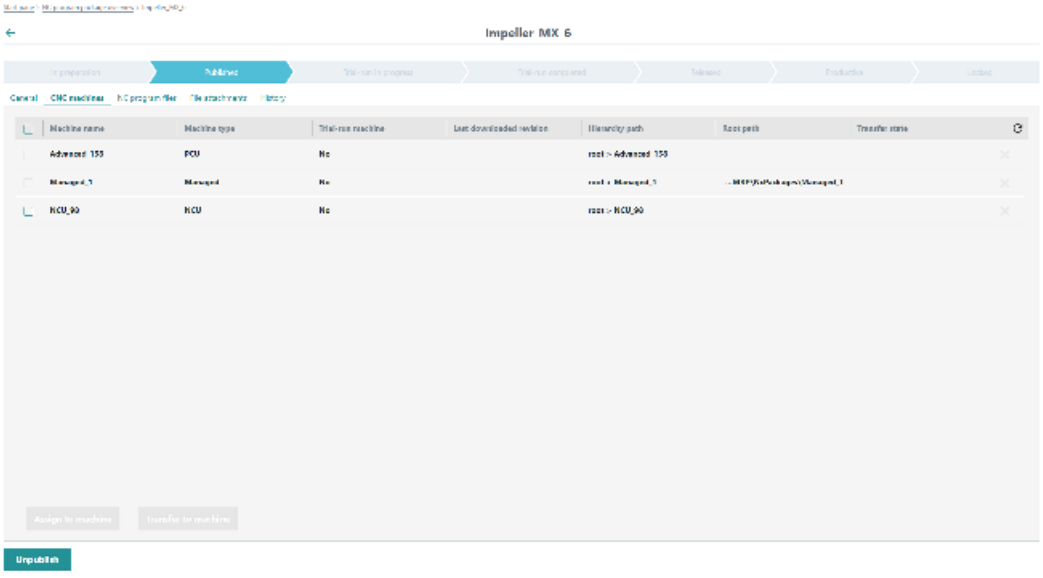
Parameters

The following information is displayed:

Parameter	Description
CNC machines	
Machine name	Shows the name of the machine.
Machine type	Shows the type of the machine.
Trial-run machine	Shows whether a machine has been selected as a trial-run machine or not.
Last downloaded revision	Shows the last downloaded revision.
Hierarchy path	Shows the hierarchy path.
Root path	Shows the root path.
Transfer state	Shows the states of the transfer.
	Refreshes the current state of the transfers.
	Stops the transfer.

Procedure

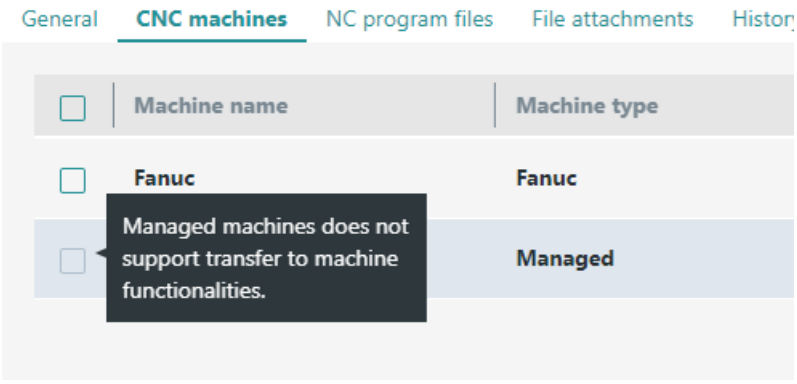
1. In the "NC program package overview" window, click the underlined NC package name. The detail view of the NC package opens.
   Open the "CNC machines" tab.
   All assigned machines are displayed in the table.
   Select the machine you wish to transfer the NC packages to by activating the checkbox in front of it.
   You can select or deselect all the machines by checking the checkbox in the header.



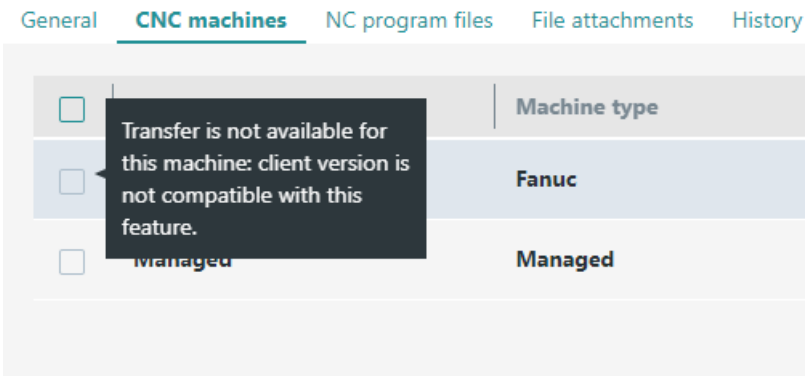
NOTICE
Machines to be selected You can only select the machines which fulfill the requirements.

There is a clickable checkbox in front of these machines. If the machine does not fulfill the requirements then a popup window on the checkbox shows the reason why the transfer functionality is unavailable.

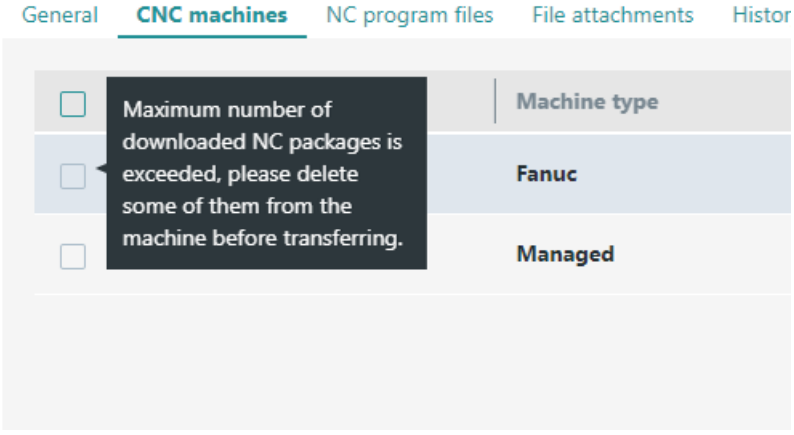
– Managed machine



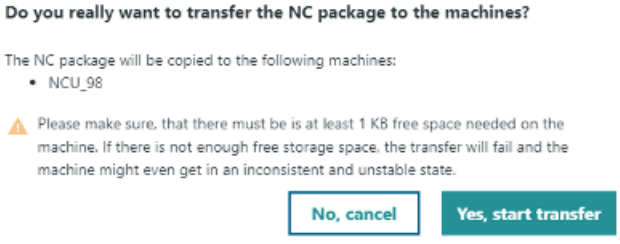
– Old machine client version



– NC package download limit reached for the selected machine



2. Click on the activated "Transfer to machine" button in the bottom left-hand corner.
   A confirmation dialog opens.
   Click "Yes, start transfer" to start the transfer.
   - OR -
   Click "No, cancel" to cancel the operation.



3. You can stop the transfer by clicking on the "X" symbol

8.1.11.2 Transfer states

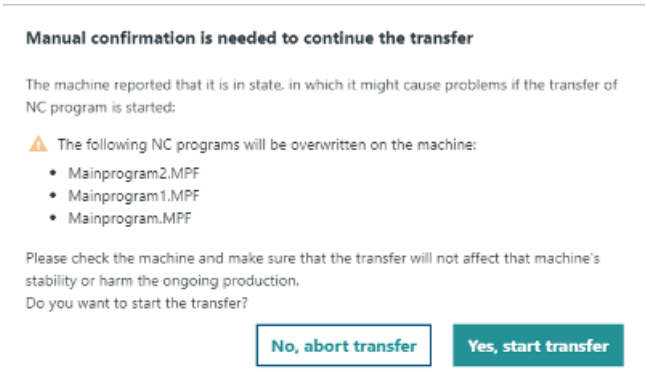
You can see the transfer states in the "Transfer states" column.

Transfer states

The following states can be displayed:

- The column is empty
  There is no ongoing transfer to the machine. Transfers to the machine are possible.
- "Checking machine"
  The transfer has started. The server is checking whether the selected machine is available for transferring.
- "Manual confirmation needed"
  The machine check is finished and indicates that the machine has a problem.
  The following problems can occur:
  - The NC programs have already been downloaded to the machine and are overwritten.
  - The machine channels are in use.

  To view these details, click on the "Manual confirmation needed" state.
  The dialog box "Manual confirmation is needed to continue the transfer" opens.
  - Click "Yes, start transfer" to start the transfer.
  - Click "No, abort transfer" to cancel the operation.



- "Transfer in progress"
  The transfer is in process. The NC programs are being transferred to the selected machine.
- "Transfer completed"
  The transfer to the selected machine has been completed without any error.
  An auto comment stating that the transfer succeeded is created on the "History" tab.
  For more information, see Auto comments (Page 721)
- "Transfer failed"
  A problem occurred during the transfer to the machine.
  You can restart the transfer.
- "Transfer aborted"
  The transfer has been aborted after you stopped it by
  - pressing the "X" icon
  - by clicking "No, abort transfer" in the "Manual confirmations needed" menu

  An auto comment stating that the transfer has been aborted is created on the "History" tab.
  For more information, see Auto comments (Page 721)

8.2 Programs on managed machines

8.2.1 Programs on managed machines overview

With the "Programs on managed machines" function, it is possible to manage NC packages from machines other than SINUMERIK machines or machines which are only accessible via network file share.

In the window "Available NC program packages" you see the selected machine: <ManagedMachine> (Root path for the machine: C:\MMRP\NcPackages\<ManagedMachine>)

For more information about configurations (Root path, "Manual revision handling", "Auto revision handling"), see Manage NC packages (Page 679).

Prerequisites

You have created a machine with connectivity type "Managed Client".

For more information, see Creating a machine (Page 79).

Parameter

The following information is displayed about the NC programs:

Parameter	Description
Available packages tab	
NC program package ID	Shows the name of the NC program package.
Workpiece ID	Shows the identification of CAM Source.
Revision status	Shows the status of the NC package: • In preparation • Published • Review in progress ("Manual revision handling" active) • Review completed ("Manual revision handling" active) • Trial-run in progress • Trial-run completed • Released • Productive • Locked • Rejected • Revoked
Trial-run required	Shows status of trial-run required property of the NC package: • Yes • No
Revision number	Shows the number of the revision.
Time of creation	Shows the creation date of NC package.
Package size (KB)	Shows the size in kilobytes.

Parameter	Description
Actions	Available actions: If the trial-run is not set to "required", the package state "Published" has the following actions: • Transfer to machine If the trial-run is set to "required", the package state "Published" has the following actions: • Transfer and start trial-run Package state "Trial-run in progress" has the following actions: • Transfer to machine Package state "Trial-run completed" has the following actions: • Transfer to machine Package state "Released" has the following actions: • Transfer to machine Package state "Productive" has the following actions: • Transfer to machine If "Manual revision handling" is active, then the states "Review in progress" and "Review completed" are available, but in these states there are no actions available.
Downloaded packages tab	
NC program package ID	Shows the name of the NC program package.
Workpiece ID	Shows the identification of CAM Source.
Revision status	Shows the status of the NC package: • In preparation • Published • Review in progress ("Manual revision handling" active) • Review completed ("Manual revision handling" active) • Trial-run in progress • Trial-run completed • Released • Productive • Locked • Rejected • Revoked
Last transfer time	Shows the time of the last transfer.

Parameter	Description
Last transferred revision	Shows the number of the last transferred revision.
Actions	Available actions: Package state "Trial-run in progress" has the following actions: • Transfer back and complete trial-run • Transfer back from machine • Delete last downloaded programs • Reject package Package state "Trial-run completed" has the following actions: • Transfer back from machine • Delete last downloaded programs Package state "Released" has the following actions: • Transfer back from machine • Start of production • Lock package • Delete last downloaded programs Package state "Productive" has the following actions: • Transfer back from machine • Lock package • Delete last downloaded programs Package state "Locked" has the following action: • Delete last downloaded programs Package state "Rejected" has the following action: • Delete last downloaded programs Package state "Revoked" has the following action: • Delete last downloaded programs Package state "In preparation" have the following action: • Delete last downloaded programs Package state "Review in progress" has the following actions, if "Manual revision handling" is active: • Delete last downloaded programs

Note

Sorting NC packages with quick filter

You can sort NC packages with the quick filter functionality. If the packages are sorted by the NC package state, then they are not sorted in alphabeticl order but in the order of the machine state. For further information about the oder, see "Revision status" row in the parameter table.

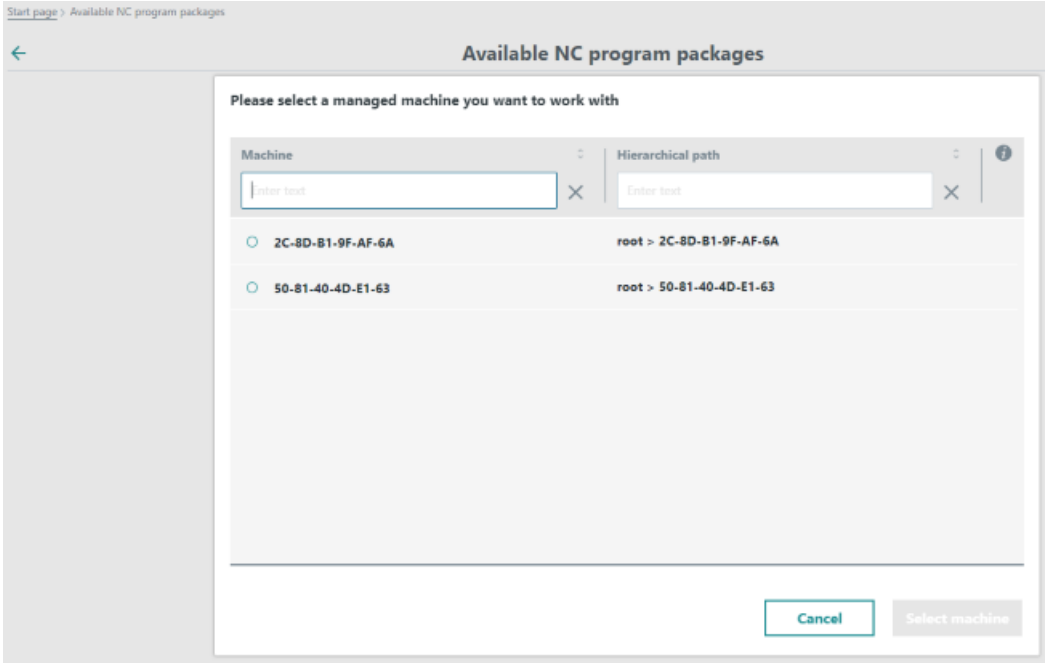
Procedure

1. On the Mcenter start page, click "Programs on managed machines".

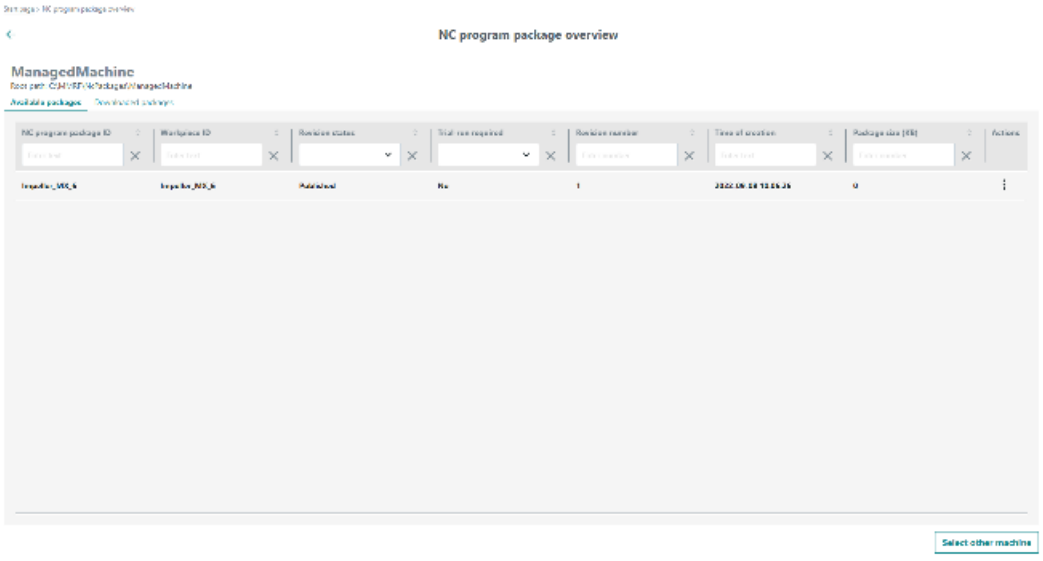
   - OR -
   Open the following URL: Programs on managed machines (https://{ServerIP}:{PortNumber}/mmrp/machinewebui)

2. The "Available NC program packages" > "Please select a managed machine you want to work with" window opens and displays an overview of all created managed machines.
   - Activate the checkboxes to select the machine.
   - Click "Select machine".

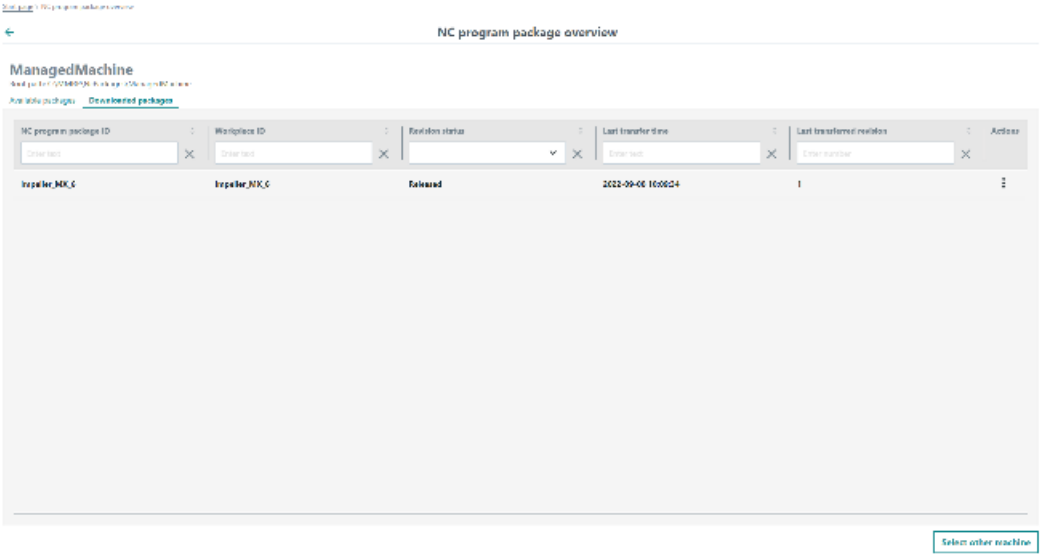
   The selected machine is saved as the preferred machine. When you reopen the page, the last selected machine is automatically displayed.



3. The "Available NC program packages" window shows all NC program packages of the machine.
   - To select another machine, click "Select other machine".
   - Various actions are available to you under "Actions".
     For more information, see Working with NC program packages (Page 752).



4. To display the downloaded NC packages, click the "Downloaded packages" tab.



8.2.2 Working with NC program packages

When you perform the available actions, you receive corresponding information and warnings.

For more information how to edit, change or delete NC programs, see Manage NC packages (Page 679).

Procedure

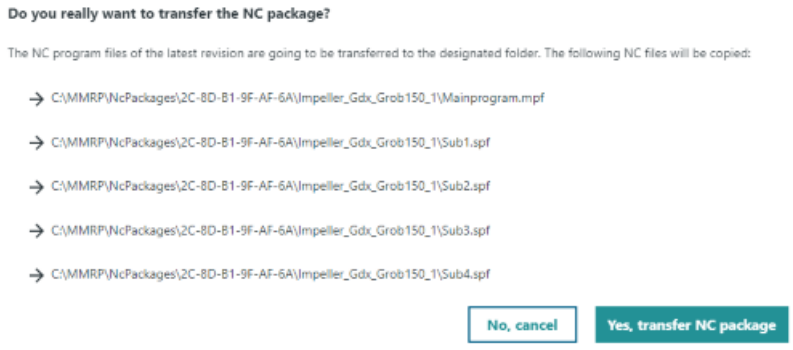
The "Available NC program packages" window shows all NC program packages of the machine.

1. Select NC program package in the overview and click the three dots in the last column "Action".
   You have the following options:
   - Behavior of the "Transfer to machine" action
   - Behavior of the "Transfer and start trial-run" action
   - Behavior of the "Start of production" action
   - Behavior of the "Delete last download programs" action
   - Behavior of the "Transfer back from machine" action
   - Behavior of the "Transfer back and complete trial-run" action
   - Behavior of the "Reject package" action
   - Behavior of the "Lock package" action

Behavior of the "Transfer to machine" action

- You receive the message "Do you really want to transfer the NC package?".
- You see a list of the affected files.

1. Click "Yes, transfer NC package".

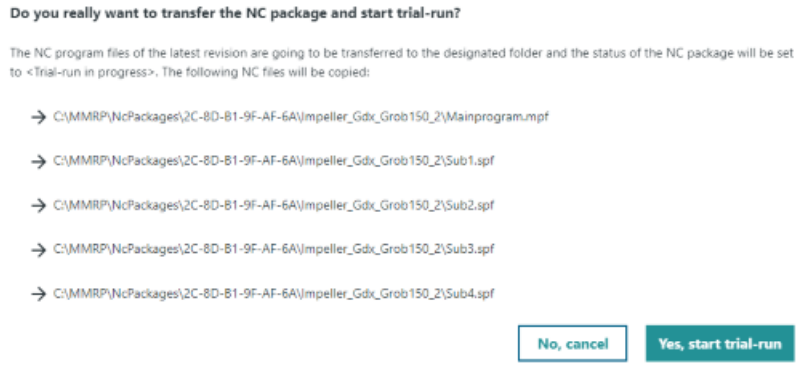


The message "The NC package was successfully transferred to the target location" is displayed. The NC programs are transferred to their destination directory on the server. The transferred files are displayed in the confirmation dialog.
The status of the NC package is "Released", if "Auto revision handling" is active and the state of the NC package is "Published".

Behavior of the "Transfer and start trial-run" action

You receive the message "Do you really want to transfer the NC package and start trial-run?".

1. Click "Yes, start trial-run".



   The message "The NC package was successfully transferred to the target location" is displayed.
   The status of the NC package is "Trial-run in progress".

Behavior of the "Start of production" action:

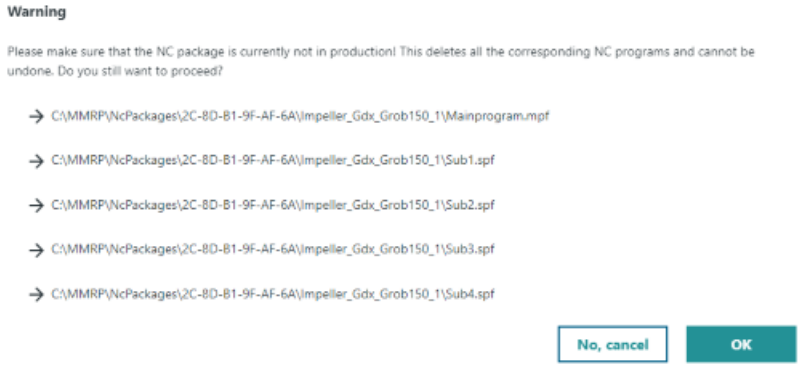
You receive the message "The status of the package has been successfully changed to <Productive>".

The status of the NC package is "Productive".

Behavior of the "Delete last download programs" action

You receive the following warning: "Please make sure that the NC package is currently not in production! This deletes all the corresponding NC programs and cannot be undone. Do you still want to proceed?"

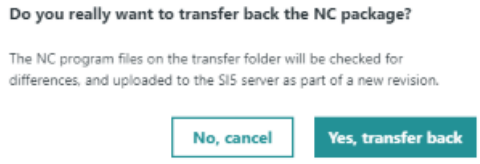
You see a list of the affected files.



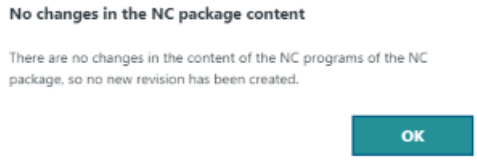
The message "The last downloaded NC programs have been successfully deleted" is displayed. The deleted files are displayed in the confirmation dialog.

Behavior of the "Transfer back from machine" action

1. Click "Transfer back from machine", if you changed the content of the NC programs and want to transfer them back to the server.
   You receive the message "Do you really want to transfer back the NC package?".
2. Click "Yes, transfer back".



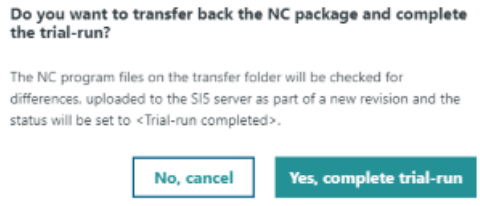
3. - OR -
   If the content of the NC package has not been changed and no new revision is created:
   You receive the message "No changes in the NC package content".
   Click "OK".



Behavior of the "Transfer back and complete trial-run" action.

You receive the message "Do you want to transfer back the NC package and complete the trial-run?".

1. Click "Yes, complete trial-run".



Behavior of the "Reject package" action

You receive the message "The status of the package has been successfully changed to <Rejected>".

The status of the NC package changes to "Rejected".

The status of the NC package is changed:

- To "Released", if manual verification after trial-run is not required on the NC package.
- To "Trial-run completed", if manual verification after trial-run is required on the NC package.

Behavior of the "Lock package" action

You receive the message "The status of the package has been successfully changed to <Locked>".

The status of the NC package changes to "Locked".

If the NC package was not downloaded to the selected machine, then the NC package is removed from the list of available NC packages.

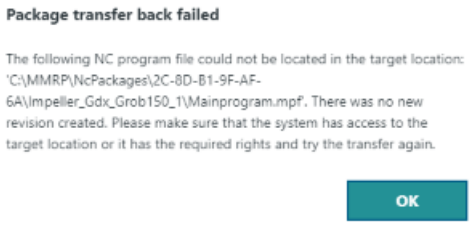
Note

Changes in the status of the revision

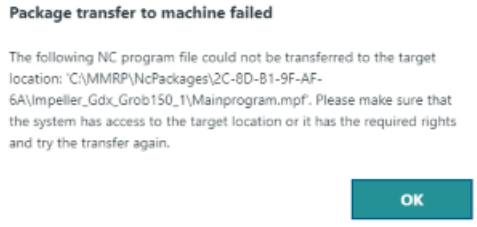
If you make a change to the content of the NC programs, a new revision is stored on the server.

Error messages

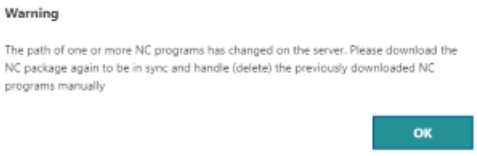
- If there was any problem during transferring back one of the NC programs to the server, for example changing the name of the files or deleting them, you receive the error message "Package transfer back failed".



- If there was any problem during transferring one of the NC programs to its destination folder, you receive the error message "Package transfer to machine failed".



- If, during the transfer back the NC programs to the server, the path of at least one NC program changes from the path of the currently downloaded path, the path variable is included in the path. It changes the value when creating a new revision and you receive the following warning:



- If the machine has reached the maximum amount of NC packages, the transfer will fail and the following warning is displayed:

The newly uploaded revision is not marked as committed.
Commit the new revision to synchronize the latest revision on the server.

Using Manage MyResources /Programs at a SINUMERIK control system

9

9.1 With SINUMERIK Operate

9.1.1 Starting Manage MyResources /Programs

You can only use Manage MyResources /Programs together with the SINUMERIK Operate operating software.

Prerequisites

The SINUMERIK control system has powered up.

Manage MyResources /Programs has been assigned to the SINUMERIK control and installed successfully.

Procedure

1. Press key <MENU SELECT> or F10.
2. Press softkey "MMR /Programs".
   The Manage MyResources /Programs client application opens and provides you with the following two views:
   - Displaying the available NC packages (Page 759)
   - Displaying the downloaded NC packages (Page 766)

9.1.2 Displaying the available NC packages

On the SINUMERIK control system, in Manage MyResources /Programs, you can see all of the NC packages assigned by the server.

An NC package can include one or several NC programs with any file extension.

File storage

Manage MyResources /Programs supports a solution for storing larger NC programs on the controller with the software option "Execution from External Storage (EES)".

Software option

To use this function, you need the software option:

"Execution from External Storage" (6FC5800-0AP75-0YB0)

You can download the programs to any valid path, whether the EES software is activated or not. Without the EES license, the programs downloaded to the EES folder are not available, only those downloaded to the NC memory. With the EES license, you have more storage space.

For more information, see Displaying NC programs in the EES folder (Page 793).

Parameters

Parameter	Description	
Filter	Enter a name to filter the NC package names.	
	Operations	
	• includes	Default operation. Filters any available NC package by name that contains the given filter text.
	• equals	Filters any available NC package by name that equals to the given filter text.
	• starts with	Filters any available NC package by name that starts with the given filter text.
	• ends with	Filters any available NC package by name that ends with the given filter text.
Package name	Shows the NC package name.	
Package state	Shows the following states	
	• Productive	This state indicates that at least one part was produced successfully according to the Machine Operator. This state is manually defined via the CNC user interface.
	• Published	NC program packages in this state are visible and available for download from the CNC user interface of the assigned machine but not any others. This state is manually defined via the Server application or via openness API.
	• Trial-run in progress	The NC package is marked with "Trial-run is required". The corresponding NC programs have already been downloaded to the SINUMERIK control system. This state is automatically set.
	• Trial-run completed	The NC package is marked with "Trial-run is required". The corresponding NC programs have already been uploaded to the server. This status is automatically set.
	• Released	The NC package has deactivated the marking "Trial-run is required". The NC programs have already been downloaded to the SINUMERIK control system. In this case the state is automatically set. - OR - You accept the changes that were made while running in the NC program. This status is manually defined via the Server application or via openness API.

Parameter	Description
Revision No.	Shows the latest available revision number on the server. The number is incremented for each NC package change.
Size [byte]	Shows the NC package size in bytes.

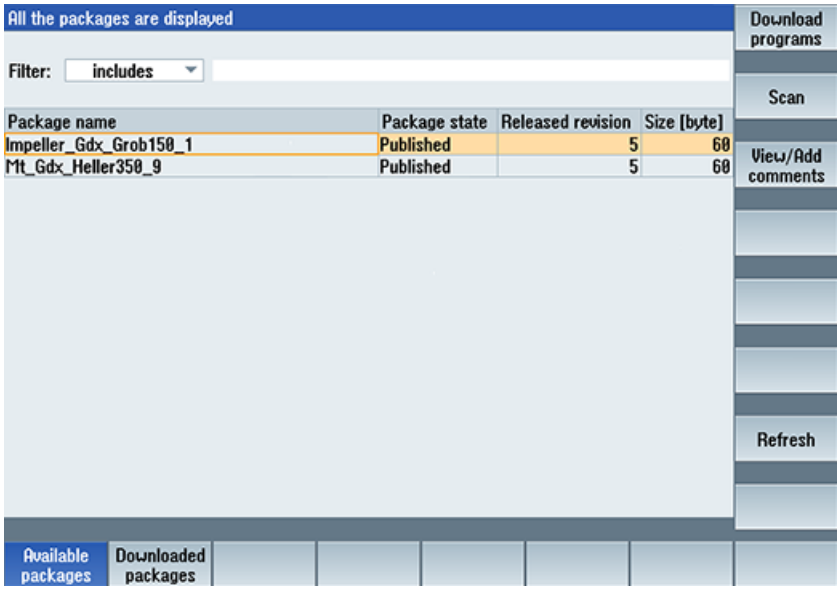
Procedure

Refresh

1. The "All the packages are displayed" window of the available NC packages opens.

   If you wish to display a specific NC package, select an operation from the drop-down list and enter a name or subname in the input field "Filter:". The filter applies after one second elapses. If you press the "Refresh" softkey, the list is refreshed with the given parameters.

   Select the required NC package.

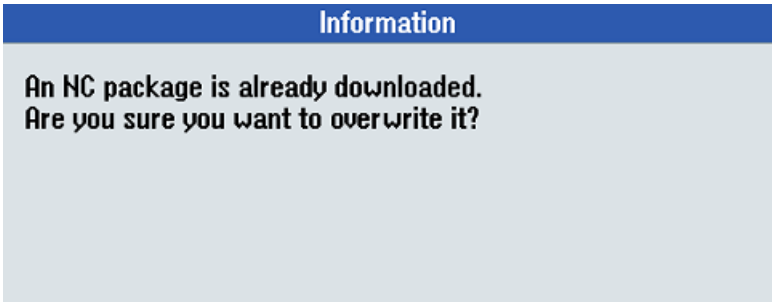


Download programs

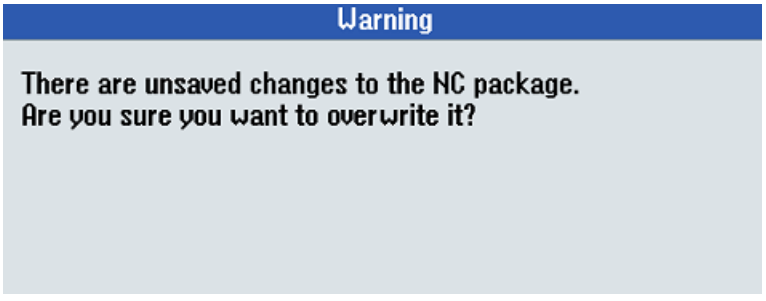
2. Press softkey "Download programs" to download the required programs.

   Depending on the synchronization status of the NC package following happens:

   - If the selected NC package has not been downloaded before:
     - The NC package is downloaded, and the "Downloaded packages" view opens. The newly downloaded package is preselected.
   - If the selected NC package has already been downloaded and the NC package has been modified on the controller:
     - The warning "There are unsaved changes to the NC package. Are you sure you want to overwrite it?" appears.
     - To overwrite the NC package, press "OK".
       - OR -
       To return to the "Available packages" view, press "Cancel".

   - If there is no information about the NC package:
     - The warning "An NC package is already downloaded. Are you sure you want to overwrite it?" appears.
     - To download the NC package, press "OK".
       - OR -
       To return to the "Available packages" view, press "Cancel".

   The NC programs are in the workpiece directory in a folder with the NC package name.

   For more information, see Further error and system messages (Page 787)

View/Add comments

You have the option of entering a comment.

For more information, see Viewing and adding comments (Page 786)

9.1.3 Scanning NC package names

Using the code scanner

The machine operator can scan package names in 2 ways:

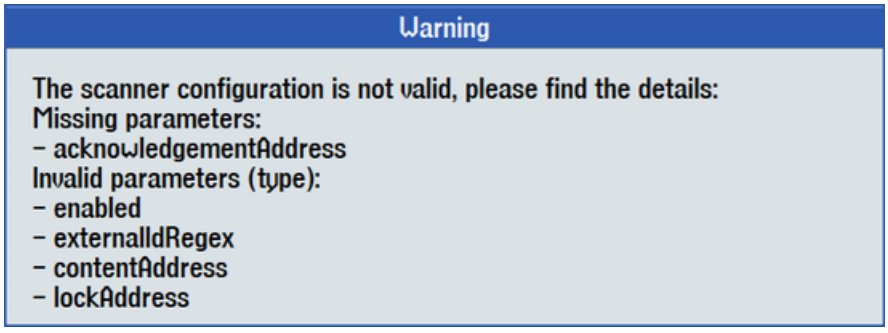
- By using the PLC code scanner (recommended)
- By using the USB code scanner

Prerequisite

- The functionality of the PLC code scanner is only available if the scanner configuration is enabled in the ”mmrConfig.json” file.
  Additional information to enable the scanner configuration is provided in the Installation Manual "Mcenter, Manage MyResources, Optimize MyProgramming/NX-Cam Editor, Analyze MyPerformance/OEE, Access MyData /Collector".
- You have a hand scanner, for example, Balluff-RF*D-Chip, that is connected to the PLC.

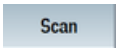
In case the "mmrConfig.json" file is incorrect or is invalid, on the starting page of the application will be a detailed report. Therefore the scanner cannot be used.

An error message will look like the following:

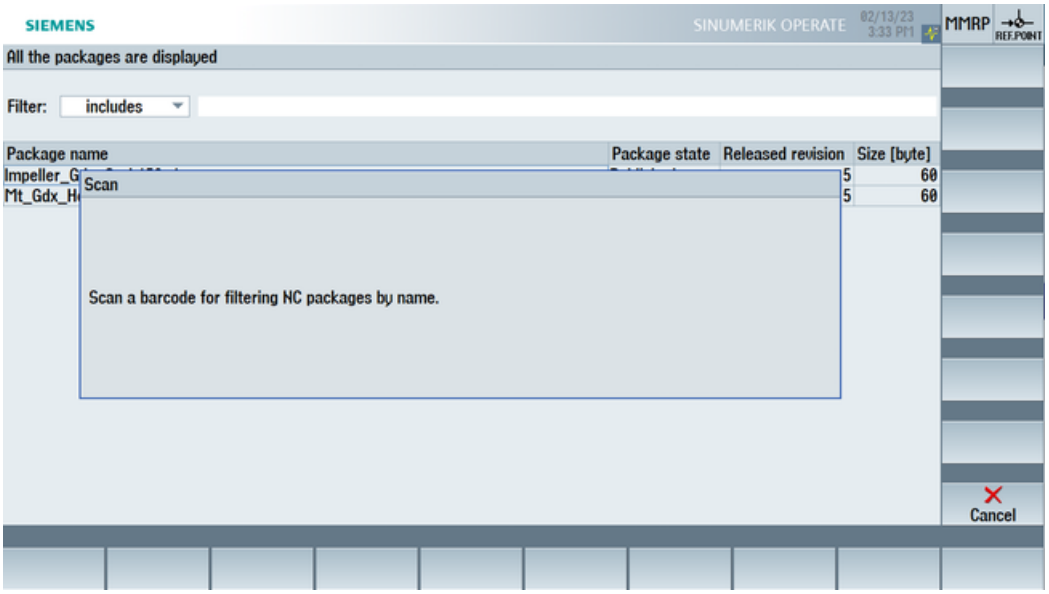


Procedure

1. Press the "Scan" softkey on the "Available packages" tab.

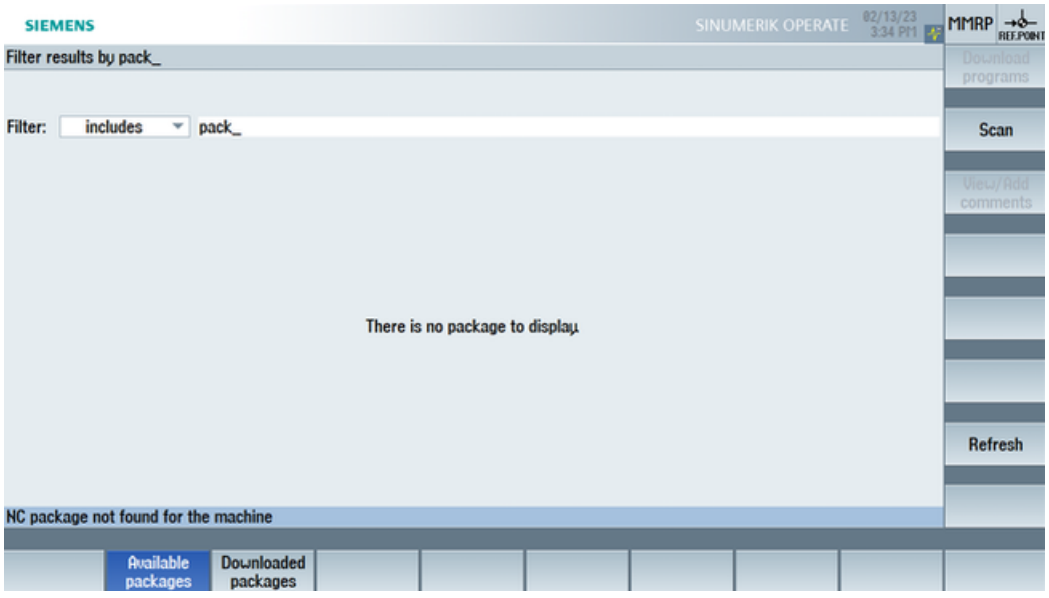
   

2. The Scan dialog appears with the following text: "Scan a barcode for filtering NC packages by name".

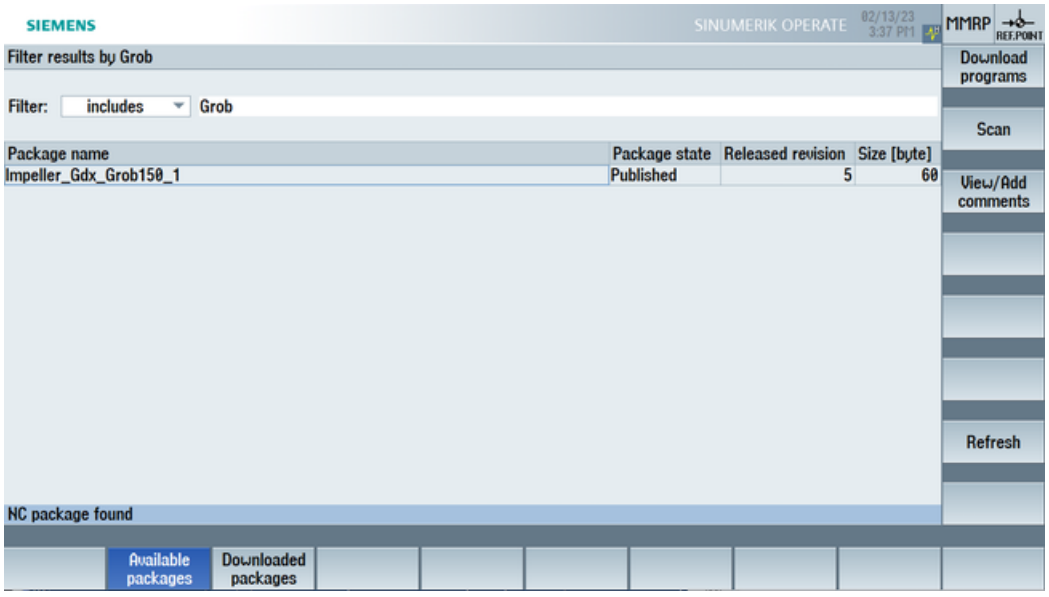
   

3. Proceed scanning with the barcode reader
   - OR -
   Press cancel.

In case the machine operator proceeds with scanning, but no NC package can be found with the scanned NC package name, the following screen is shown:



In case an available NC package is found for the machine, the NC package list is filtered with the given name:



9.1.4 Downloaded NC packages

9.1.4.1 Displaying the downloaded NC packages

On the SINUMERIK control system, in Manage MyResources /Programs, you can see all of the NC packages already downloaded from the server.

Parameters

Parameter	Description	
Filter	Enter a name to filter the NC package names.	
	Operations	
	• includes	Default operation. Filters any available NC package by name that contains the given filter text.
	• equals	Filters any available NC package by name that equals to the given filter text.
	• starts with	Filters any available NC package by name that starts with the given filter text.
	• ends with	Filters any available NC package by name that ends with the given filter text.
Package name	Shows the NC package name.	

Parameter	Description	
Package state	Shows the following statuses	
	• Productive	This state indicates that at least one part was produced successfully according to the Machine Operator. This state is manually defined via the CNC user interface.
	• Published	NC program packages with this state are visible and available for download from the CNC user interface of the assigned machine but not any others. This state is manually defined via the Server application or via openness API.
	• Trial-run in progress	The NC package is marked with "Trial-run is required". The corresponding NC programs have already been downloaded to the SINUMERIK control system. This state is automatically set.
	• Trial-run completed	The NC package is marked with "Trial-run is required". The corresponding NC programs have already been uploaded to the server. This state is automatically set.
	• Released	The NC package has deactivated the marking "Trial-run is required". The NC programs have already been downloaded to the SINUMERIK control system. In this case the state is automatically set. - OR - You accept the changes that were made while running in the NC program. This state is manually defined via the Server application or via openness API.
Revision No.	Shows the downloaded revision number. The number is incremented for each NC package change.	
Downloaded time	Shows the date and time of the NC program download.	
Sync	Shows the following synchronisation statuses	
		There are no NC file changes.
		NC file changes have not been uploaded to the server.
		There is no information about NC file changes.
		When the field is empty then the "Sync" status is not present.

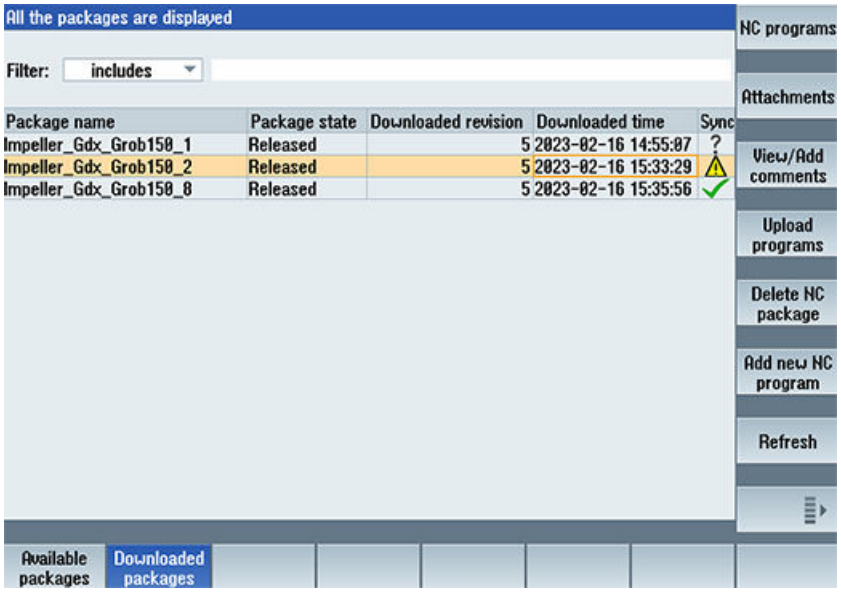
Procedure

Downloaded packages

1. Press the "Downloaded packages" softkey.

2. If you wish to display a specific NC package, select an operation from the drop-down list. Enter a name or subname in the input field "Filter". The filter applies after one second elapses. If you press the "Refresh" softkey, the list is refreshed with the given parameters.

   Select the required NC package.



NC programs

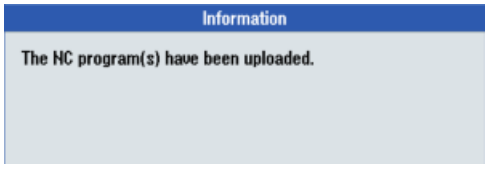
3. Press "NC programs" softkey to edit and execute the required programs.

   For more information, see Editing and executing NC programs (Page 778).

Upload programs

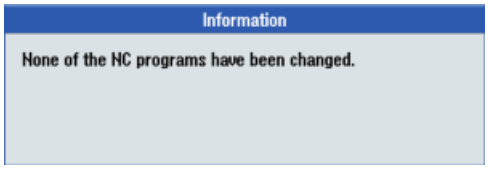
4. To upload programs, press the "Upload programs" softkey.

   The NC package is uploaded. A message is displayed that it has been successfully uploaded:



   - OR -

   A message is displayed that none of the NC programs have been changed.



5. Press "OK" softkey.
6. You have the option of entering a comment.

   For more information, see Viewing and adding comments (Page 786)

Delete NC package

7. If you wish to delete an NC package which has been downloaded to the machine, press the "Delete NC package" softkey.

   For more information, see Deleting a downloaded NC package (Page 774)

Add new NC program

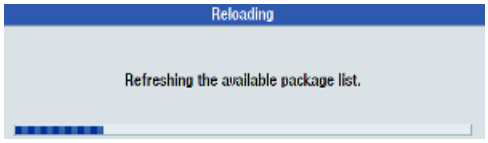
8. To add new programs to the selected NC package from the machine, press the "Add new NC program" softkey.

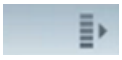
   For more information, see Adding new NC files (Page 777)

Refresh

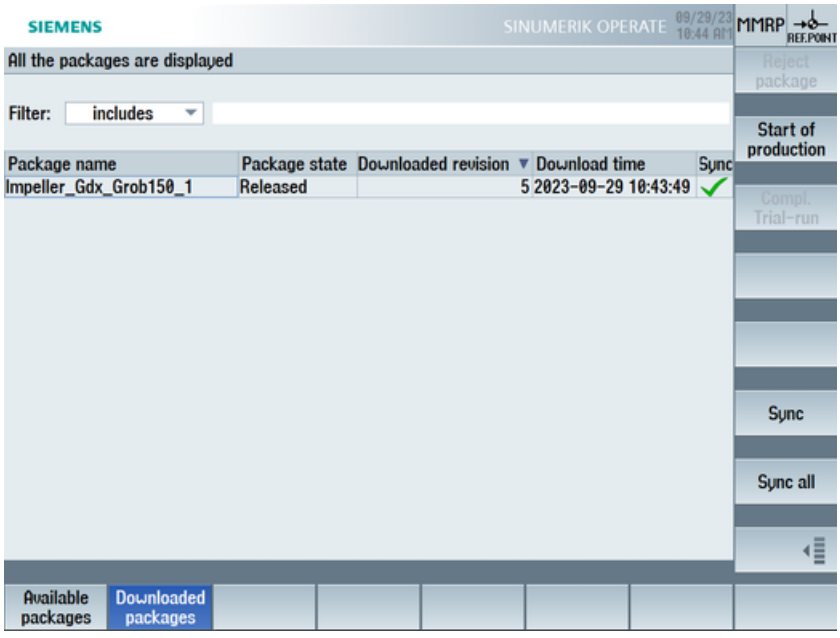
9. If you wish to reload the available package list, press the "Refresh" softkey.

   The following message is displayed:





10. To access the view with the "Reject package", "Start of production" and "Compl. Trial-run" softkeys, press the extension softkey. The following view is displayed:



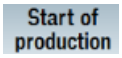
The "Start of production" softkey is only available if the state of the selected package is "Released".

The softkeys "Reject package" and "Compl. Trial-run" are only available if the state of the selected package is "Trial-run in progress".

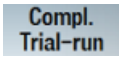
Reject package

11. If an NC package is in the "Trial-run in progress" state, you are able to reject the process:
    Press the "Reject package" softkey.

    The confirmation is displayed in the status bar of SINUMERIK Operate.



12. To change the NC package state to "Productive", press "Start of Production" softkey.
    The confirmation is displayed in the status bar of SINUMERIK Operate.



13. To change the NC package state to "Trial-run completed" or "Released", press "Compl. Trial-run" softkey.
    For more information, see NC packages with status "Trial-run in progress" (Page 770)

9.1.4.2 NC packages with status "Trial-run in progress"

On the SINUMERIK control, you can change the NC package state "Trial-run in progress" to a different state, e. g. "Trial-run completed" or "Released".

Prerequisite

The settings are already configured on the server.

For more information, see Copying an NC package (Page 691)

Parameters

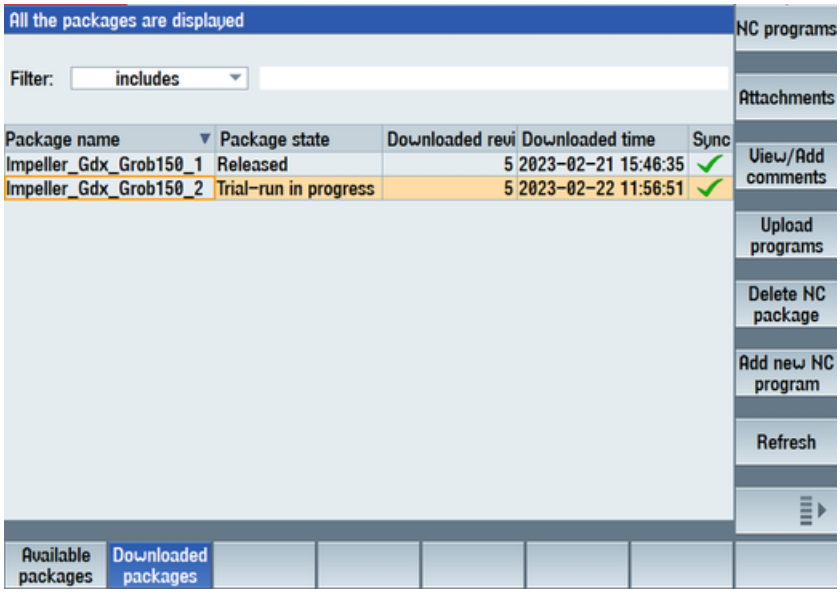
Parameter	Description	
Filter	Enter a name to filter the NC package names.	
	Operations	
	• includes	Default operation. Filters any available NC package by name that contains the given filter text.
	• equals	Filters any available NC package by name that equals to the given filter text.
	• starts with	Filters any available NC package by name that starts with the given filter text
	• ends with	Filters any available NC package by name that ends with the given filter text
Package name	Shows the NC package name.	

Parameter	Description	
Package state	Shows the following states:	
	• Trial-run in progress	The NC package is marked with "Trial-run is required". The corresponding NC programs have already been downloaded to the SINUMERIK control system. This state is automatically set.
	• Trial-run completed	The NC package is marked with "Trial-run is required". The corresponding NC programs have already been uploaded to the server. This state is automatically set.
	• Released	The NC package has deactivated the marking "Trial-run is required". The NC programs have already been downloaded to the SINUMERIK control system. In this case the state is automatically set. - OR - You accept the changes that were made while running in the NC program. This state is manually defined via the Server application or via openness API.
Revision No.	Shows the revision number. The number is incremented for each NC package change.	
Downloaded Time	Shows the downloaded date and time of the NC package.	

Procedure

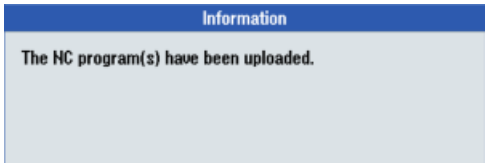
NC programs

1. Press "NC programs" softkey to edit the required programs. Press the "Close" softkey to close the program.
   In the overview, the modified NC package is displayed with the state "Trial-run in progress".
2. Select the required NC package in the "Downloaded packages" list.



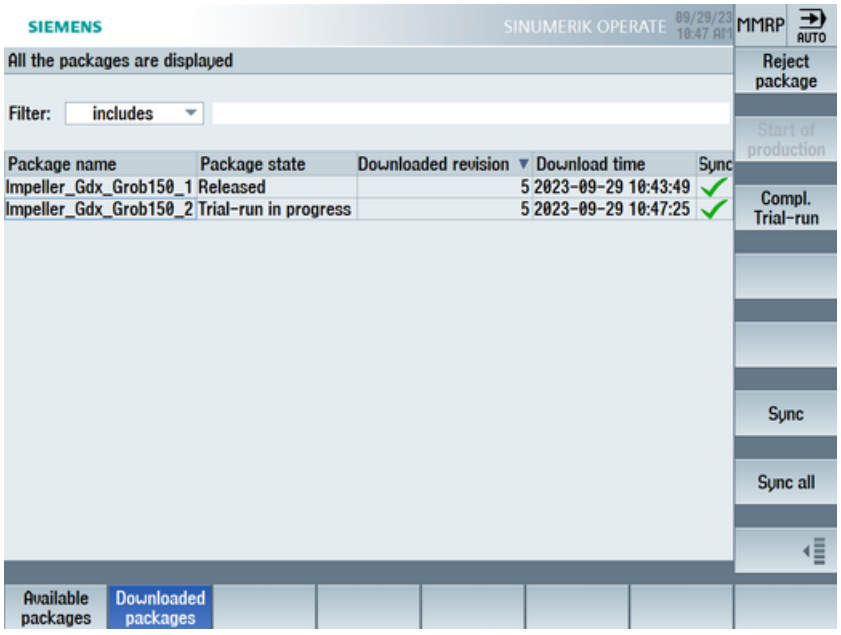
Upload programs

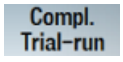
3. To upload programs, press the "Upload programs" softkey.
   The NC package is uploaded, and a message is displayed when it has been successfully uploaded.



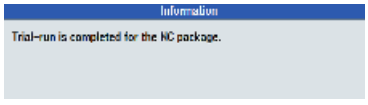
4. Press "OK" softkey.
   - A new revision number is created for the modified package.
   - The package state still displays "Trial-run in progress".

5. Press the extension softkey.
   The following view is displayed:

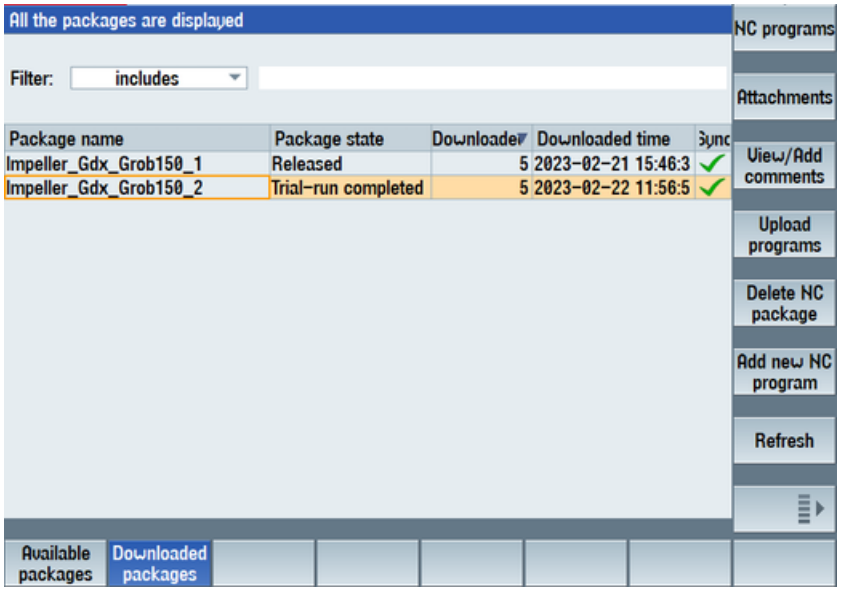




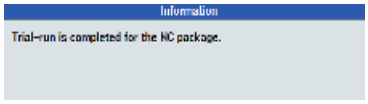
6. Press the "Compl. Trial-run" softkey.
   The following information is displayed:



7. Press the back softkey to return to the overview window.
   Depending on the setting you have made on the server, the state changes to "Trial-run completed" or "Released".
   For more information, see Copying an NC package (Page 691)



If you select a package with a state other than "Trial-run in progress" and press the "Compl. Trial-run" softkey, you receive the following information:

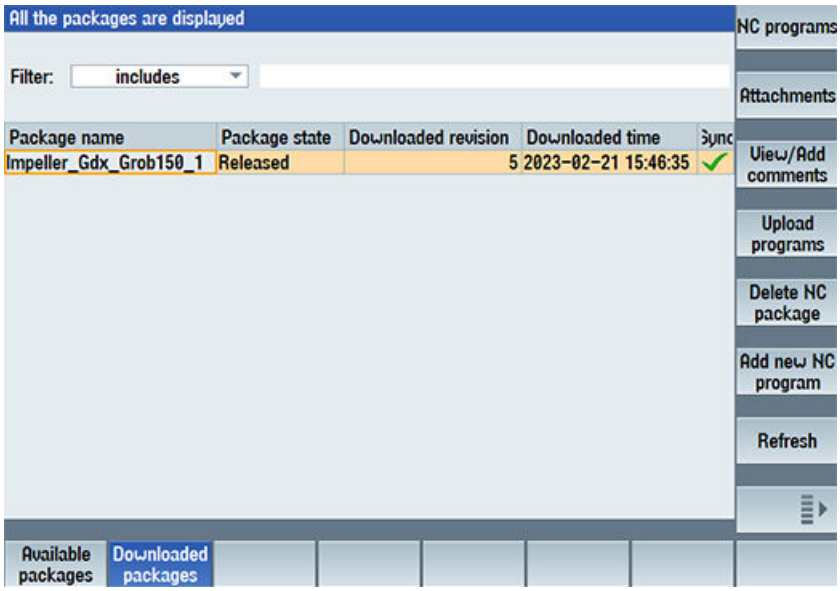


9.1.4.3 Deleting a downloaded NC package

You can delete an NC package which has been downloaded onto the machine. This function does not delete the package on the server.

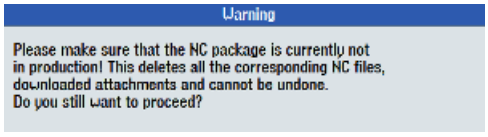
Procedure

1. Select the required NC package in the "Downloaded packages" list.

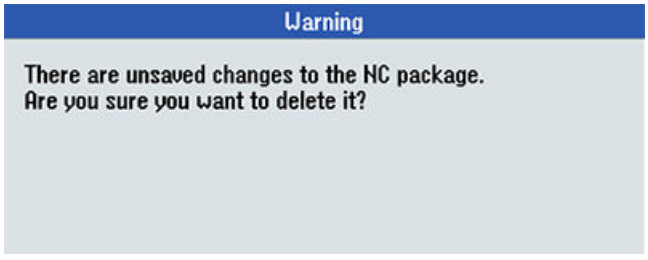


2. Press the "Delete NC package" softkey.

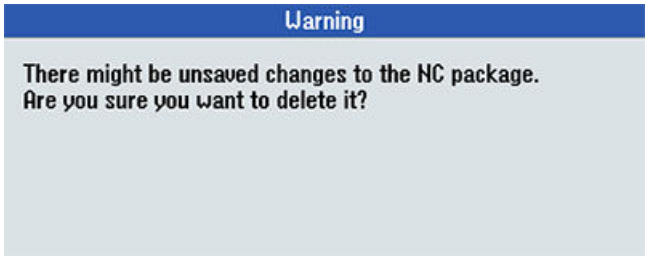
3. The following warning dialog appears to ensure the selected NC package is not in production:



If the Sync status of the NC package is "!", NC file changes have not been uploaded to the server. The following dialog appears:



If the Sync status of the NC package is "?", there is no information about NC file changes. The following dialog appears:



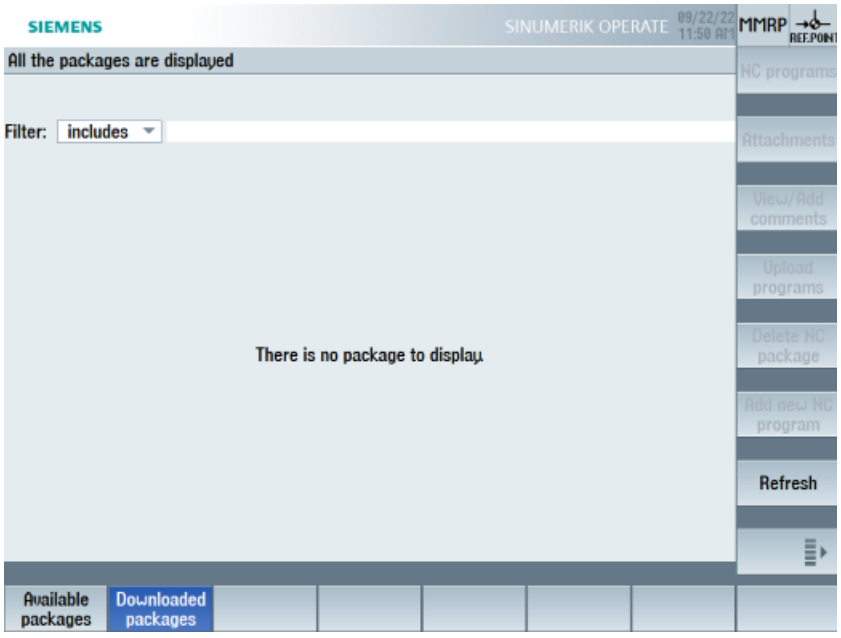
4. For each dialog:

   Press the "OK" softkey to continue.

   - OR -

   Press the "Cancel" softkey to cancel the operation.

   If you press "OK", the package is deleted. The message "There is no package to display" appears, if there are no downloaded packages to the given machine.



For more information about deleting NC packages on the server, see Modifying an NC package (Page 690).

For more information about warning and error messages, see Further error and system messages (Page 787).

Note

Deleted NC packages

Once you have deleted an NC package on the machine, you can download it again from the server.

9.1.4.4 Adding new NC files

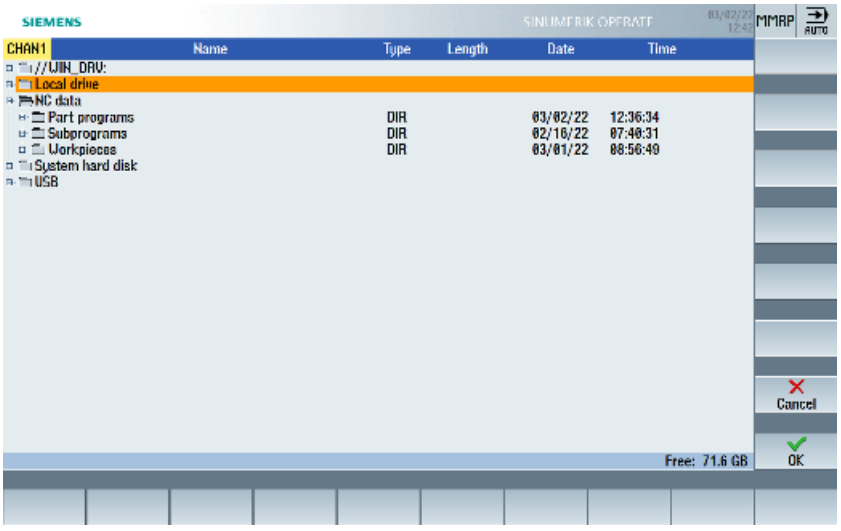
You can add new NC files to an NC package.

Procedure

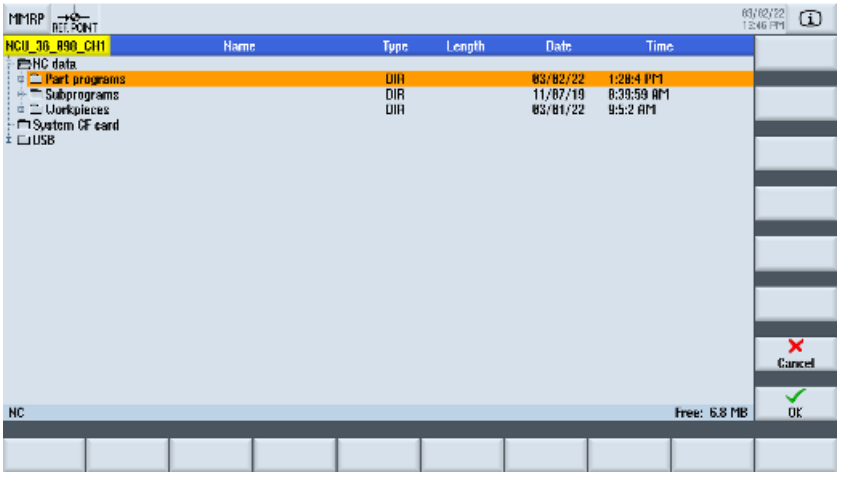
1. Select an NC package in the "Downloaded packages" window.
   For more information, see Displaying the downloaded NC packages (Page 766)

Add new NC program

2. To add new files to the selected NC package, press the "Add new NC program" softkey. The following window opens:
   In case of a PCU/IPC:



   In case of an NCU:



   Select the desired files and press "OK" to upload them onto the server.
   If the upload is successful, the downloaded NC package is displayed.

   - OR -

   Press "Cancel" to cancel the upload and to return to the "Downloaded packages" window.

Note

New revision

Adding a new NC file to the NC package will result in a new revision.

9.1.4.5 Editing and executing NC programs

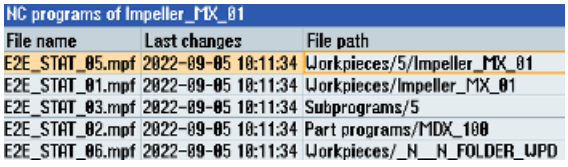
In Manage MyResources /Programs, you can check and edit the content of an NC program with the NC Editor before executing it. You can thus prevent running incorrect NC programs.

Procedure

1. Select an NC package in the overview "Downloaded packages".
2. Press the softkey "NC programs".

   NC programs

   The window "NC programs of <NC package name>" opens.
   The window contains the downloaded program list with the following details:
   - NC program name
   - The time of change of the NC program
   - The downloaded path of the NC program
     The main folder of the download path is localized.



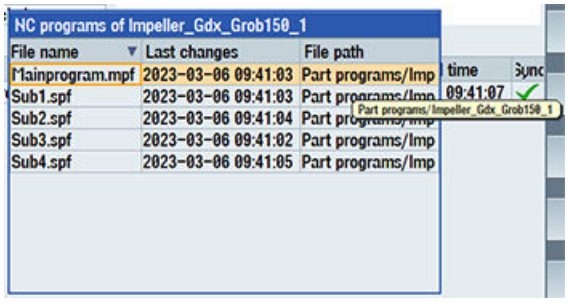
   Select the desired program.

   Press “OK”.
   The NC program is opened in the HMI standard program editor.

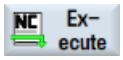
   - OR -

   Press “Cancel” if you do not want to edit the listed files.

   If the text for the file path does not fit in the column width and you move the mouse pointer over it, a tooltip displays the full path.

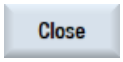


4. Check and edit the content of the NC program, if necessary.



5. To execute the NC program straight from the editor, press the softkey "Execute" on the horizontal menu bar.

6. Press the extension and softkey "Close" softkeys to return to "Manage MyResources/Programs".



Note

No return to the MMR /Programs application

If you open an NC program directly from MMR /Programs in the HMI editor, navigate to the HMI area "Program" or "Program manager" and close the opened NC program file, you cannot return to the MMR /Programs application.

When you open the MMR /Programs application, it navigates to the file browser in the "Program manager". There is no possibility to return to the MMR /Programs application, which becomes inaccessible.

Note

Executing NC programs

When you open an NC program directly from MMR /Programs, it is not possible to execute it. Pressing the "Execute" button in the standard editor navigates to the HMI page, but the selected NC program is not loaded in the NC channel.

9.1.4.6 Working with file attachments

On the SINUMERIK control system, you can use the attachments you imported onto the server. The attachments are not downloaded automatically.

For more information, see Adding file attachments (Page 739)

Prerequisites

The supported file extensions are the following:

- PDF
- SVG
- JPG, JPEG, PNG, BMP, DIB, GIF, TIF, TIFF
- TXT, XML, JSON, LOG, HTM, HTML
  Text files have a limitation of 3 MB.

Parameters

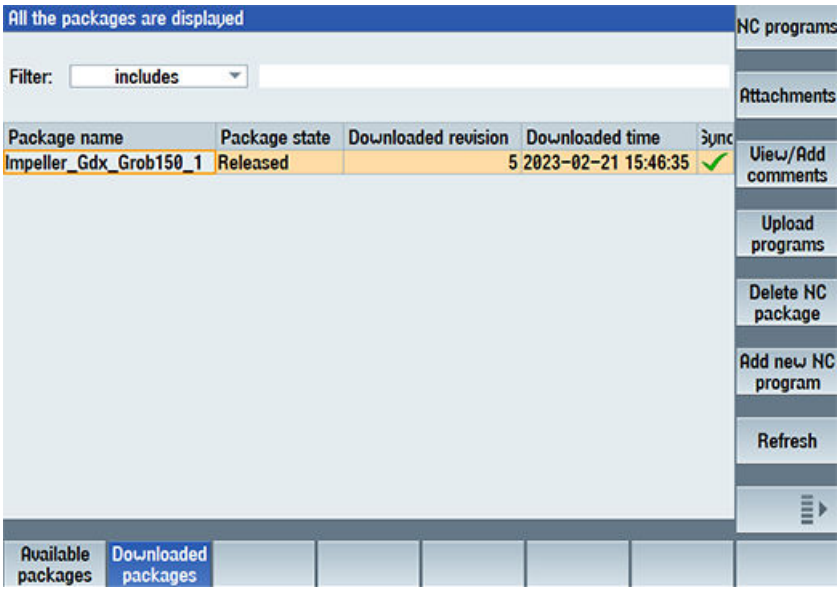
Parameter	Description
Attachments of <package name>	
File name	Shows the name of the file.

Parameter	Description
File ext.	Shows the filename extension.
Size [KB]	Shows the file size in KB.
Imported on	Shows the import date.

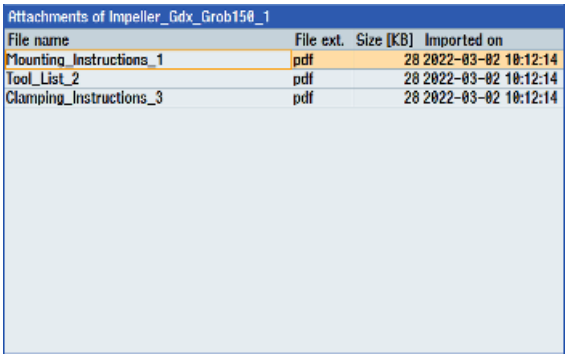
Procedure

Attachments

1. Press the "Attachments" softkey to open the list of attachments in the window "Downloaded packages".

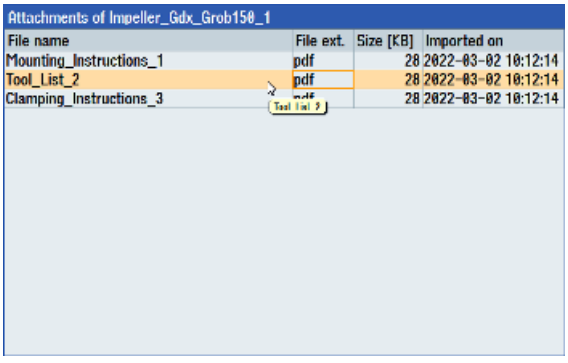


The window "Attachments of <package name>" opens.



When you move the mouse pointer over the file information, the description you entered on the server is displayed as a tooltip.

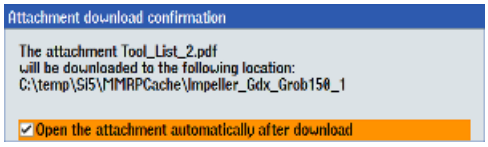
For more information, see Adding file attachments (Page 739).



Download attachment

2. Press the softkey "Download attachment" to download the attachment.

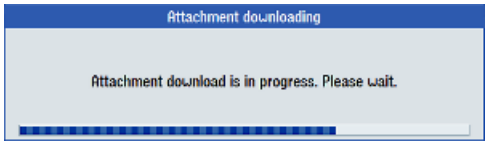
   An "Attachment download confirmation" is displayed: "The attachment <file name> will be downloaded to the following location: /var/temp/Si5/MMRPCache/<package name>" on Linux controller and. On Windows controller, the path is C:\temp\Si5\MMRPCache\.



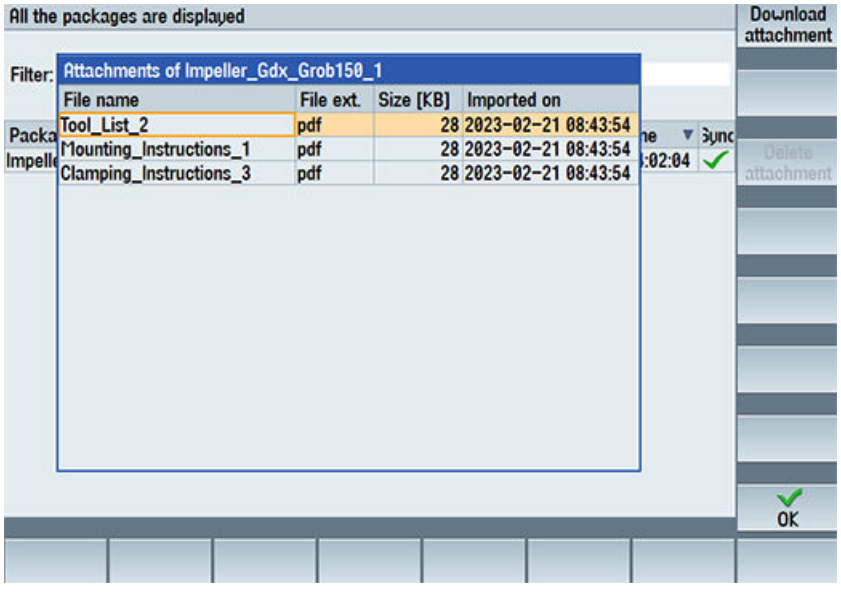
   - Check the checkbox "Open the attachment automatically after download" if you want to open the attachment automatically after download
   - Uncheck the checkbox if you want to download the attachment without opening it

   Press "OK" to start the download.

   The download progress is displayed on a progress bar.

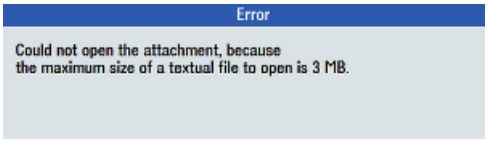


   The list of downloaded file attachments is displayed.

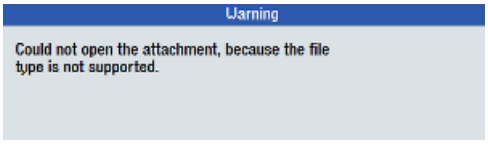


Open attachment

3. The softkey "Open attachment" is available on the vertical scrollbar after the download.
   Press the softkey "Open attachment" and double-click the file you wish to open.
   If an image is bigger than the screen, you can use the vertical and horizontal scrollbars or scroll with the arrow keys on your keyboard.
   If you try to open a text file which exceeds 3 MB, the following error message appears:

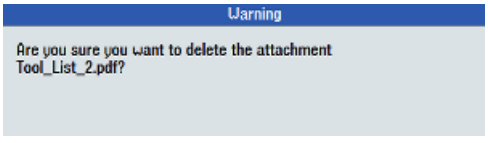


   If you try to open an attachment which is not supported, the following warning dialog appears:



Delete attachment

4. The softkey "Delete attachment" is available on the vertical scrollbar after the download.
   You can delete downloaded attachments.
   Select an attachment in thewindow "Attachments of <package name>" and press the softkey "Delete attachment".
   The following warning dialog appears: "Are you sure you want to delete the attachment <file name>?"



   Press"OK" to delete the selected file attachment.
   - OR -
   Press "Cancel" to cancel the operation.

Note

Vector graphic files

The svg-files expand to take the whole view.
If a vector graphic is larger than the display, it is downsized to fit into the view.

9.1.4.7 Synchronization of downloaded NC package list

Prerequisites

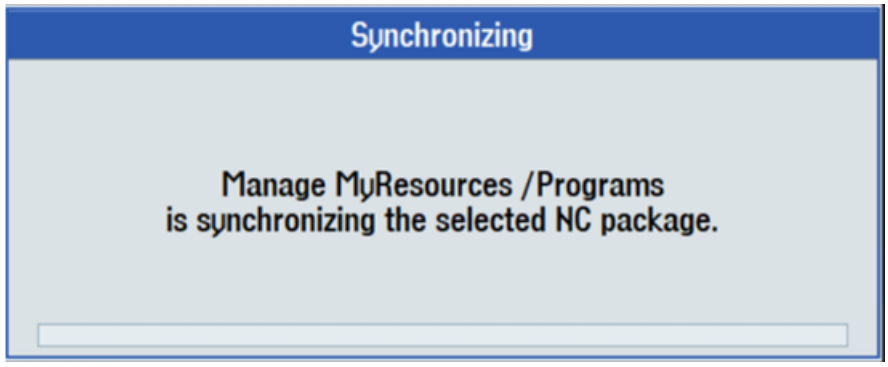
There are downloaded NC packages on the machine

Procedure

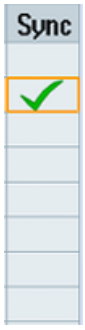
The "Sync" column on the "Downloaded packages" tab is empty by default. It means that the status of the NC package is unknown.

- Select an NC package and press "Sync" button to synchronize one NC package

- A popup will show the synchronization progress

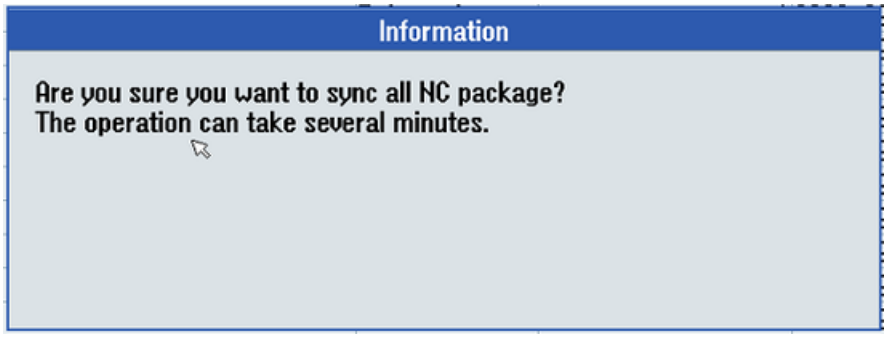


- When synchronization is ready the status of the NC package will be shown in "Sync" column. Other NC package statuses will be empty.

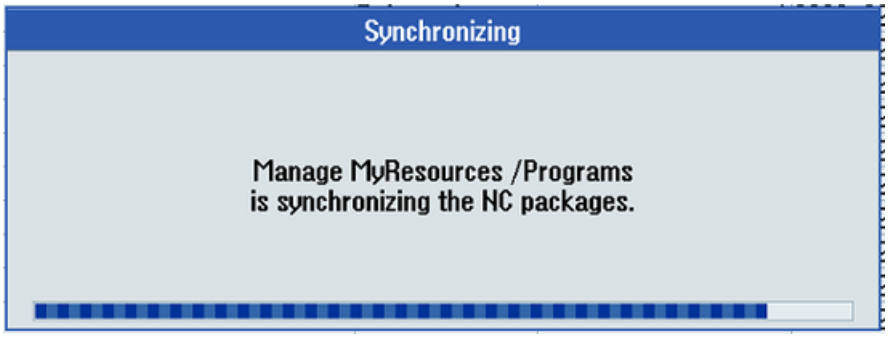


- Press "Sync all" button to synchronize all the NC packages.

- This is a long running operation, that's why a popup will ask confirmation from the user.



- If "OK" button is clicked, the synchronization starts and a popup will show the progress.



- When "Sync all" is ready, every field will be filled with NC package sync data

Note

NC package sync statuses disappear upon every user interaction which reloads the "Downloaded packages" tab, e.g.: If user refreshes the tab, uses filter, uploads NC package etc... In these cases "Sync" or "Sync all" buttons should be used to display the current statuses.

If all of the NC package statuses are filled and the "Sync" button is pressed for one NC package, then the other NC package statuses will be empty, because we do not have information of other NC package state if only one is synced.

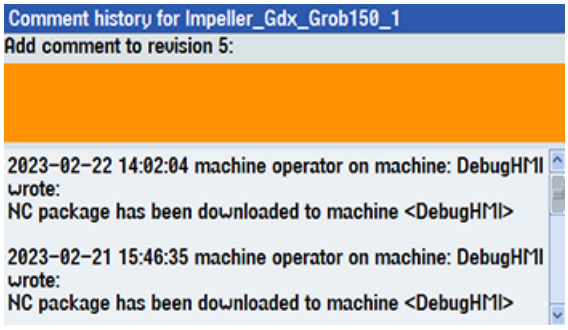
"Sync all" NC package is a long running process and it depends on NC package count. Please be aware it can take several minutes, use "Sync" button if only one NC package status is relevant.

9.1.5 Viewing and adding comments

Procedure

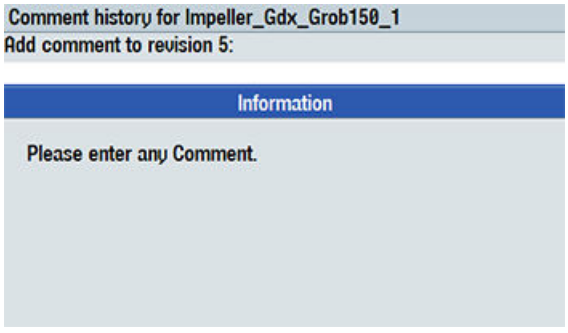
View/Add comments

1. Press the softkey "View/Add comments".
   The window "Comment history" opens.
   If comments have already been entered, they are on display along with the date, time and user information.
   The revision to which the comment is added is also displayed as "Add comment to revision <revision number> " at the top of the window.



Add Comment

2. Press the softkey "Add Comment".
   In the input field "Add a comment:", enter the required text and press the softkey "Add Comment".



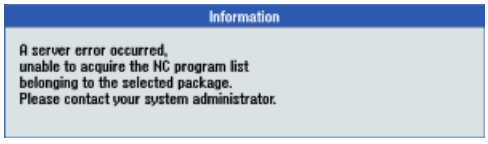
Close

3. Press the softkey "Close".
   The window "Comment history" closes.

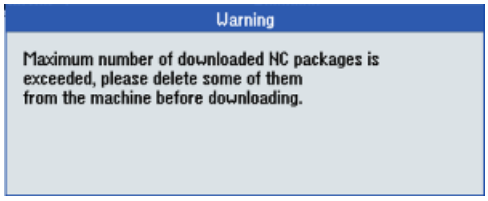
9.1.6 Further error and system messages

Status indication

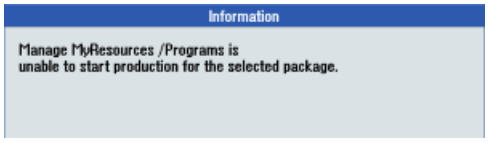
In case the machine operator tries to download NC packages with the status "In preparation" or "Locked", the following dialog appears:
"A server error occurred, unable to acquire the NC program list belonging to the selected package. Please contact your system administrator."



In case the machine operator tries to download NC packages and the machine has already reached the package limit, the following warning message is displayed:
"Maximum number of downloaded NC packages is exceeded, please delete some of them from the machine before downloading."

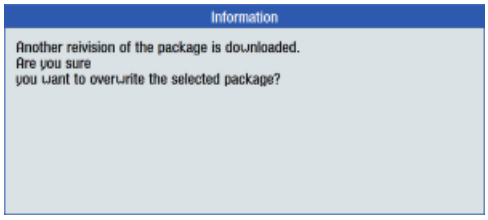


The machine operator receives the following message if the production fails to start:
"Manage MyResources /Programs is unable to start production for the selected package."



Confirmation message

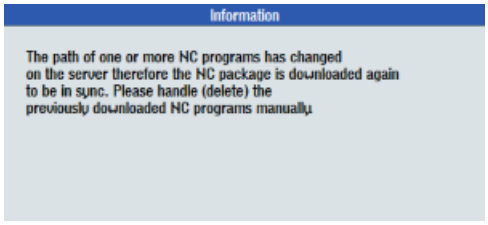
In case another revision of the NC package is already downloaded to the controller, the following dialog appears:
"Another revision of the package is downloaded. Are you sure you want to overwrite the selected package?"



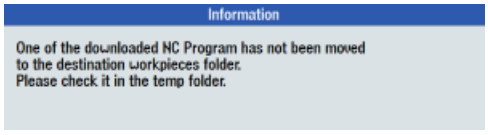
When the NC programs are uploaded to the server, there is a possibility of path change on the machine. For example, if the path on the machine contains {$Revision} path variable

and a new revision is created on the server. In this case you receive the following warning message:

"The path of one or more NC programs has changed on the server therefore the NC package is downloaded again to be in sync. Please handle (delete) the previously downloaded NC programs manually".



In case the full file path (NC package and NC program name (with the extension) preceded by the working directory path) is longer than what the operating software can allocate, SINUMERIK Operate is unable to create the full file path and the following dialog appears:
"One of the downloaded NC Program has not been moved to the destination workpiece folder. Please check it in the temp folder."

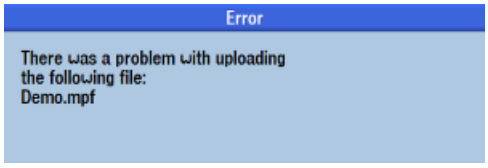


If the file upload fails because the package state is not "Released", "Trial-run in progress", "Trial-run completed" or "Productive", the following dialog appears:
"Manage MyResources /Programs is unable to upload the selected programs."

Error messages

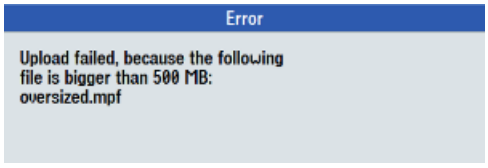
If the upload of a new NC file fails because you selected a directory instead of a file, the following dialog appears:
"Directory upload is not supported."

The upload of a file can fail, for instance if it is already part of the NC package. In this case, the following dialog appears:

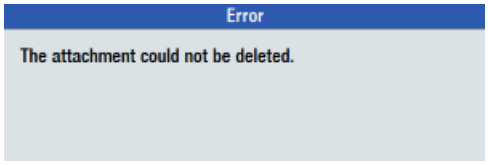


If the size of a file exceeds the limit of 500 MB, the following dialog appears:

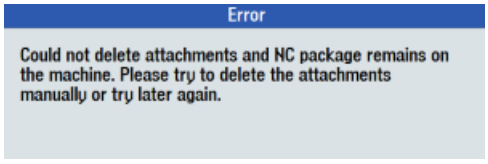
"Upload failed, because the following file is bigger than 500 MB: <ncProgram>"



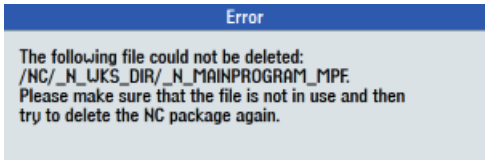
In case the attachment cannot be deleted, the following error message is displayed:



In case the NC package cannot be deleted, the following error message is displayed:



In case one of the attachment cannot be deleted, the following error message is displayed:



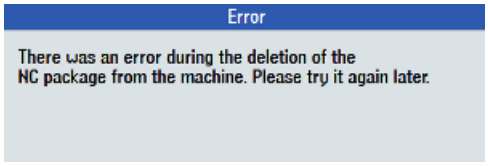
Note

Path longer than 50 characters

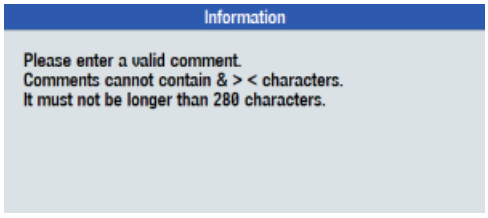
If the path on the machine value is longer than 50 characters, then the path of the file is not fully displayed in the error message window

It can occur when the path on the machine contains path variables which combined length is longer than 50 characters.

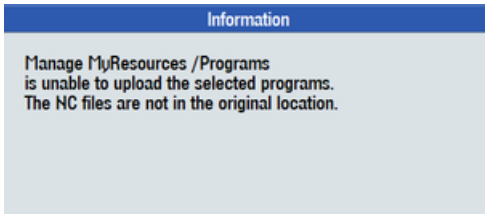
In case there is some other unspecific error during deleting the NC package, the following error message is displayed:



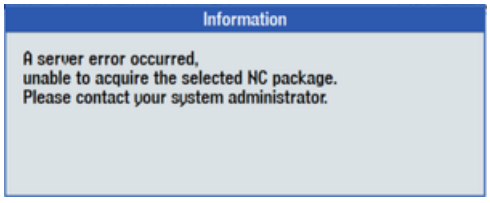
In case the machine operator gives a mandatory comment that is longer than 280 characters, the following error message is displayed:



If the file upload fails because one of the NC programs cannot be found on the machine, the following dialog appears:



If NC package synchronization fails the following error message is displayed:



9.1.7 Working with machine path variables

The machine path variables for NC packages are replaced once the NC package is downloaded onto the machine.

Prerequisite

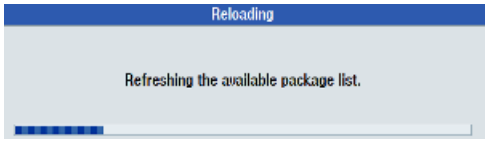
You have defined machine path variables for the NC package on the server. You have added the NC package to a machine.

For more information, see Using path with the machine variable (Page 702).

Procedure

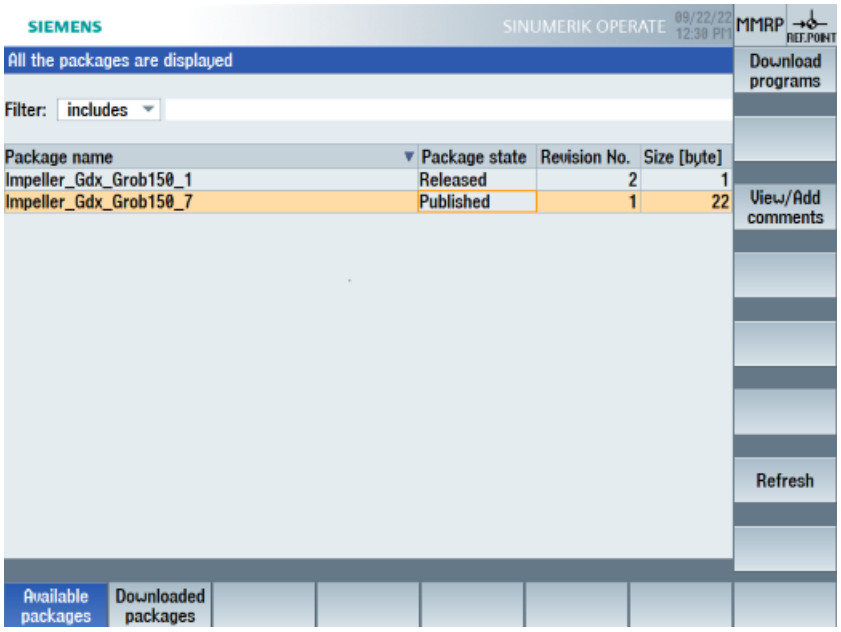
Refresh

1. Press the "Refresh" softkey to display the new NC package.
   The available package list is reloaded.

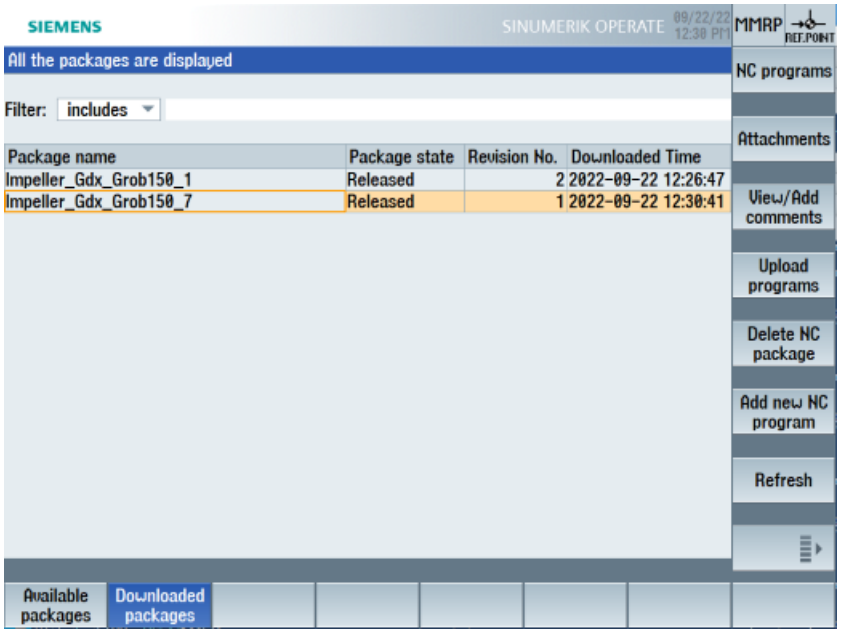


Download programs

2. Press the "Download programs" softkey to download the NC programs.

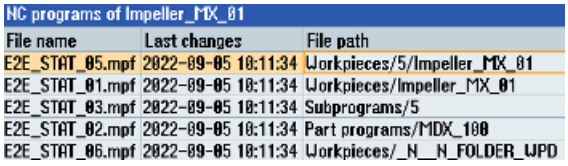


All the packages are displayed:



NC programs

3. Press the "NC programs" softkey to display the path with the replaced variables on the machine.



Note

Empty path variables

Empty path variables are replaced with constant text.

The package-related placeholder texts are PackageName, WorkPieceID, ExternalRevision, Revision.

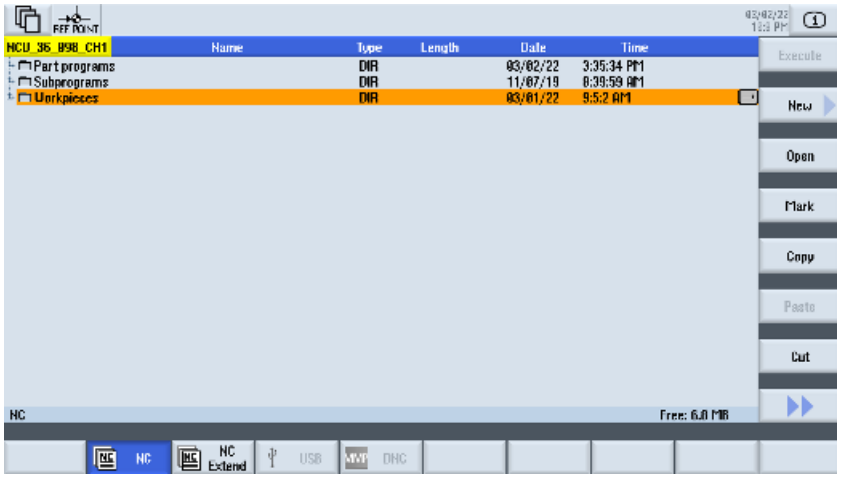
The machine-related placeholder texts are MainPrograms, SubPrograms, WorkPieces, ExternalStorage

9.1.8 Displaying NC programs in the EES folder

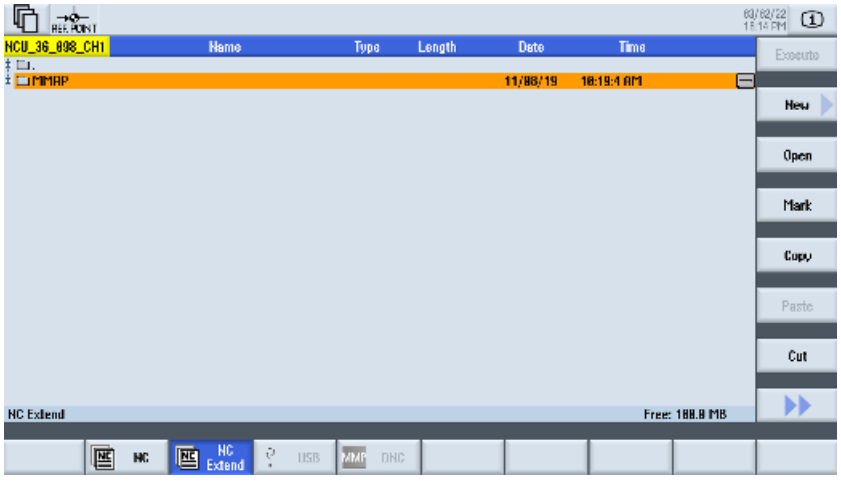
If you have a license for the "Execution from External Storage" software, you can execute the program from any other storage place.

Procedure

1. Create a package and add programs to it. The default pass leads to the NC memory.
   If you have the EES license, the "NC Extend" softkey appears.
   For more information, see Creating an NC program package (Page 686)



2. Press the "NC Extend" softkey to display the programs which have been downloaded into the EES folder.



Downloading NC programs to a machine without EES assignation

There is no difference whether you have a license or not. You can download the package to any path. If you have no EES license, the program is downloaded, but you do not see the program.

9.2 With HMI-Advanced

9.2.1 Starting Manage MyResources /Programs

You can only use Manage MyResources /Programs together with the HMI-Advanced operating software.

Prerequisites

The SINUMERIK control system has powered up.

Manage MyResources /Programs has been assigned to the SINUMERIK control and successfully installed .

Procedure

1. Press the key <MENU SELECT> or F10.
2. Press the softkey "MMR /Programs".
   The Manage MyResources /Programs client application opens and provides you with the following two views:
   - Displaying the available NC packages (Page 795)
   - Displaying the downloaded NC packages (Page 801)

9.2.2 Displaying the available NC packages

On the SINUMERIK control system, in Manage MyResources /Programs, you can see all the NC packages assigned by the server.

An NC package can include one or several NC programs with the ".mpf" or ".spf" extension.

Parameter

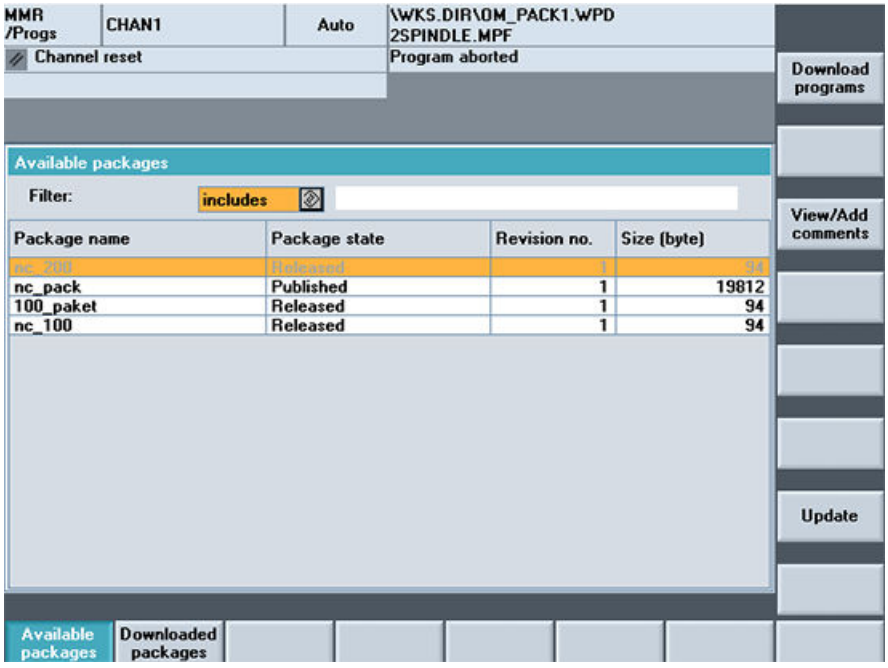
Parameter	Description
Filter	Enter the kind of filter: • includes • equals • starts with • ends with Enter a name or part of the name to filter the NC package names.
Package name	Shows the NC package name.

Parameter	Description	
Package state	Shows the following states	
	• Productive	This state indicates that at least one part was produced successfully according to the Machine Operator. This state is manually defined via the CNC user interface.
	• Published	NC program packages in this state are visible and available for download from the CNC user interface of the assigned machine but not any others. This state is manually defined via the Server application or via openness API.
	• Trial-run in progress	The NC package is marked with "Trial-run is required". The corresponding NC programs have already been downloaded to the SINUMERIK control system. This state is automatically set.
	• Trial-run completed	The NC package is marked with "Trial-run is required" with a manual verification after the trial-run. The corresponding NC programs have already been uploaded to the server via the "Compl. trial-run" softkey. This status is automatically set.
	• Released	The package has deactivated the marking "Trial-run is required". The NC programs have already been downloaded to the SINUMERIK control system. In this case, the state is automatically set after the package upload onto the server via the "Compl. trial-run" softkey. - OR - You accept the changes that were made while running in the NC program. This status is manually defined via the Server application or via openness API.
Revision no.	Shows the revision number. The number is incremented for each NC package change.	
Size [byte]	Shows the NC package size in bytes.	

Procedure

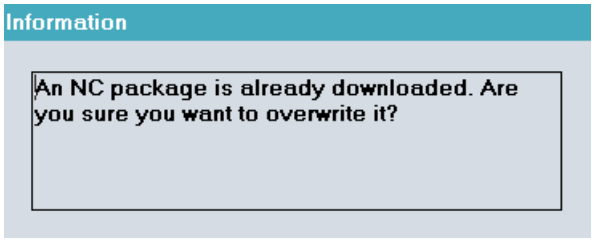
Update

1. The "Available packages" window with the available NC packages opens.
   If you wish to display a specific NC package, enter a name or subname in the input field "Filter:" and press the "Update" softkey.
   Select the required NC package.

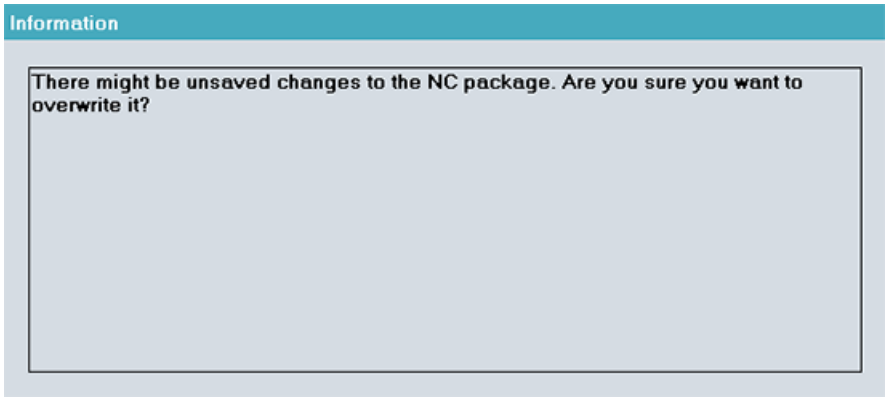


Download programs

2. Press the softkey "Download programs" to download the required programs.
   Depending on the synchronization status of the NC package following happens:
   - If the selected NC package has not been downloaded before:
     - The NC package is downloaded.
     - The "Downloaded packages" view opens.
     - The downloaded package is preselected.
   - If the selected NC package has already been downloaded and it is modified on the controller:
     - The dialog appers: "an NC package is already downloaded. Are you sure you want to overwrite it?"
     - To overwrite the downloaded package press "Ok"
       - OR -
       To return to the "Available packages" view press "Cancel".



   - If there is no information about the NC package:
     - The following warning appears: "There might be unsaved changes to the NC package. Are you sure you want to overwrite it?"
     - To download the NC package press "Ok"
       - OR -
       To return to the "Available packages" view press "Cancel".



View/Add comments

3. You have the option of entering a comment.
   For more information, see Viewing and adding comments (Page 820)

9.2.3 Scanning NC package names

Using the code scanner

The machine operator can scan NC package names in 2 ways:

- By using the PLC code scanner (recommended)
- By using the USB code scanner

Prerequisite

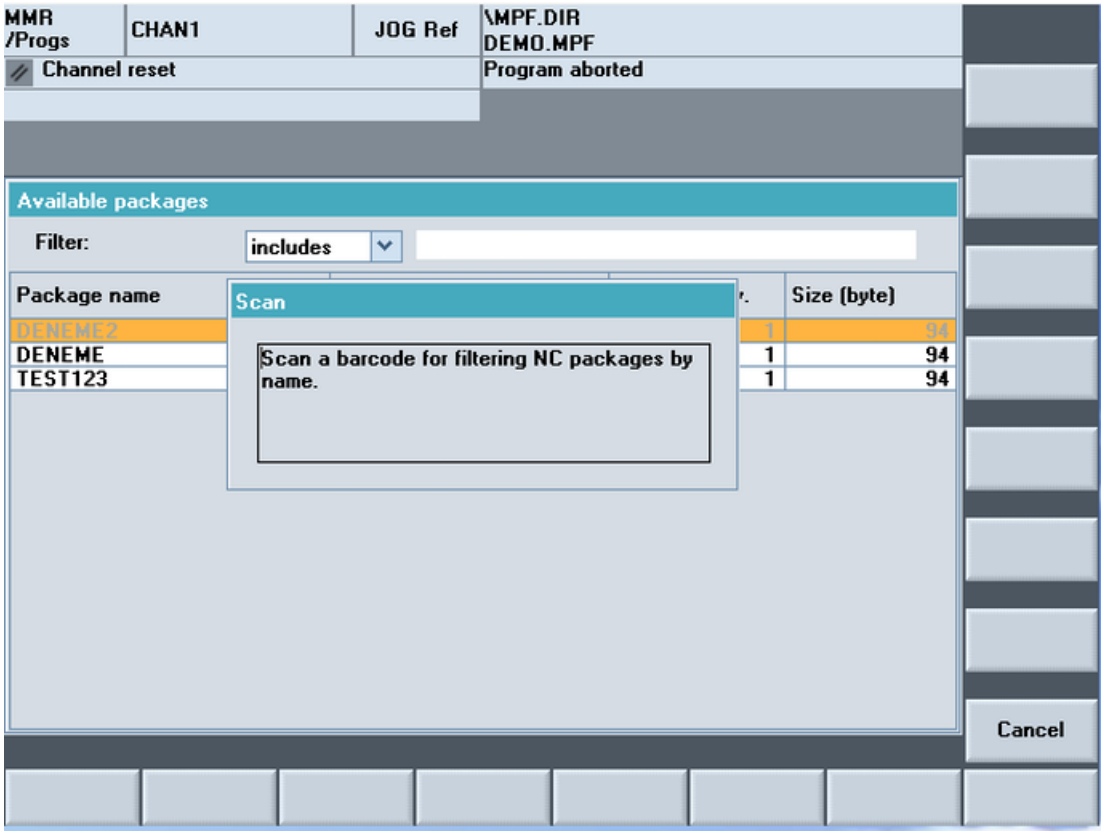
- The functionality of the PLC code scanner is only available if the scanner configuration is enabled in the "mmrConfig.json" file.
  Additional information to enable the scanner configuration is provided in the Installation Manual "Mcenter, Manage MyResources, Optimize MyProgramming /NX-Cam Editor, Analyze MyPerformance /OEE, Access MyData /Collector".
- You have a hand scanner, for example, Balluff-RF*D-Chip, that is connected to the PLC

Procedure

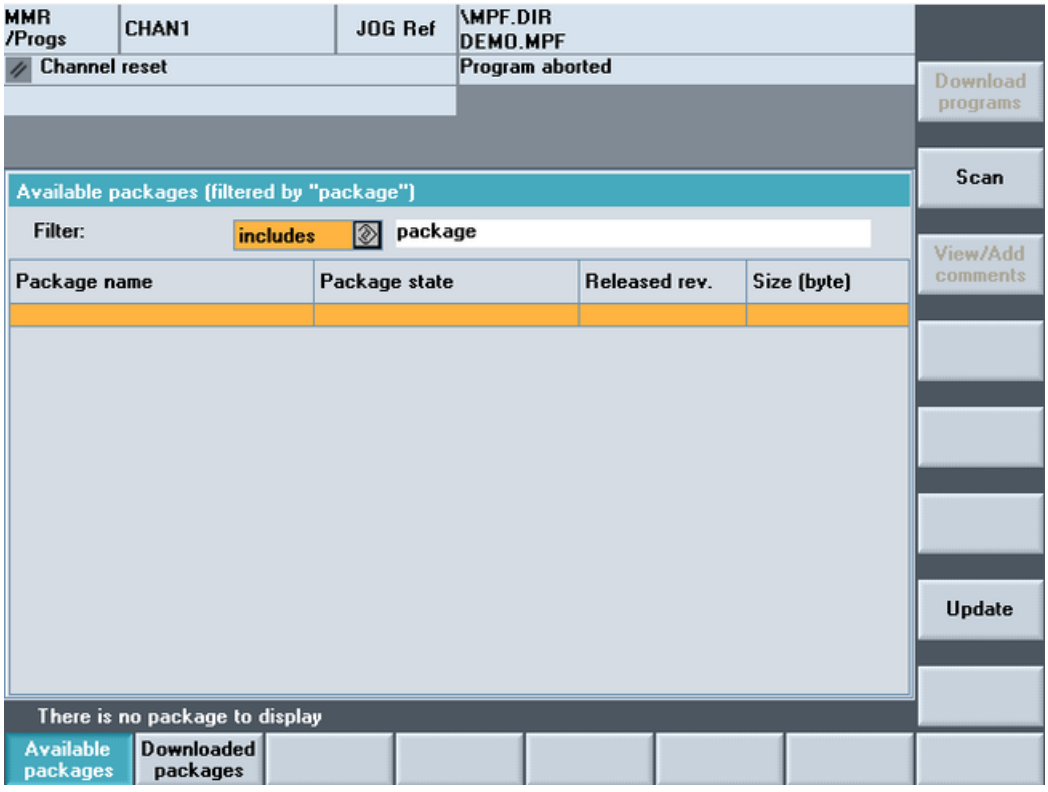
1. Press the softkey "Scan" on the available packages tab

Scan

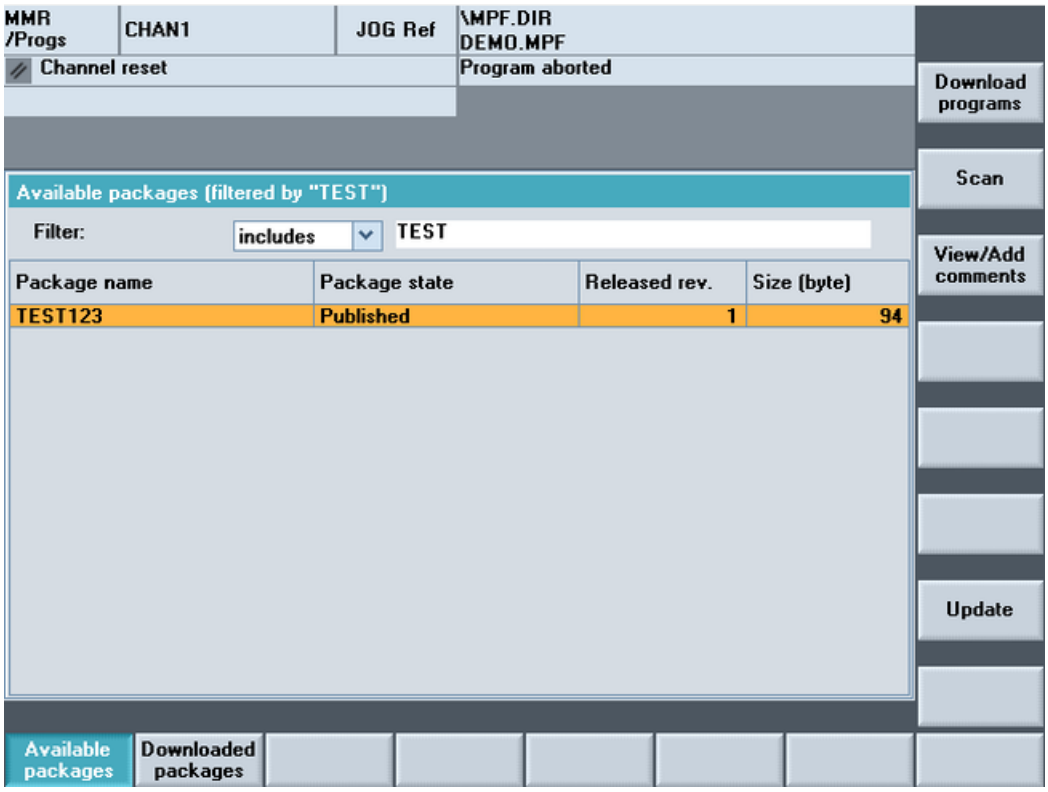
2. The Scan dialog appears with the following text: "Scan a barcode for filtering NC packages by name."



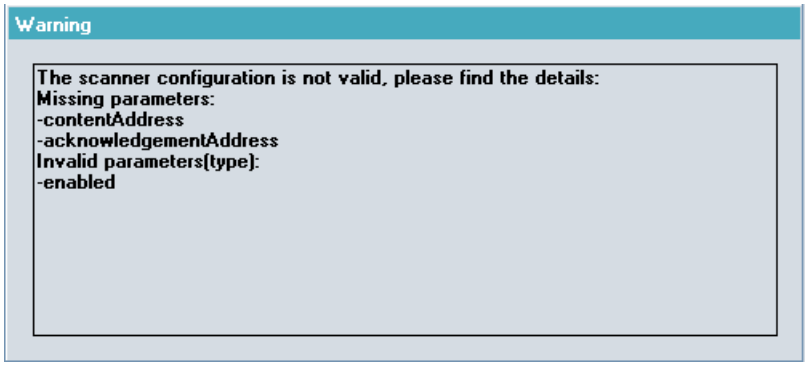
3. Proceed scanning with the barcode reader
   - OR -
   Press cancel
4. The following screen is shown in case the machine operator proceeds with scanning,but no NC package can be found, that has the name of the scanned NC package name:



In case an available NC package is found for the machine, the NC package list is filtered with the given name:



Error Message



9.2.4 Downloaded NC packages

9.2.4.1 Displaying the downloaded NC packages

On the SINUMERIK control system, in Manage MyResources /Programs, you can see all the NC packages already downloaded from the server.

Parameter

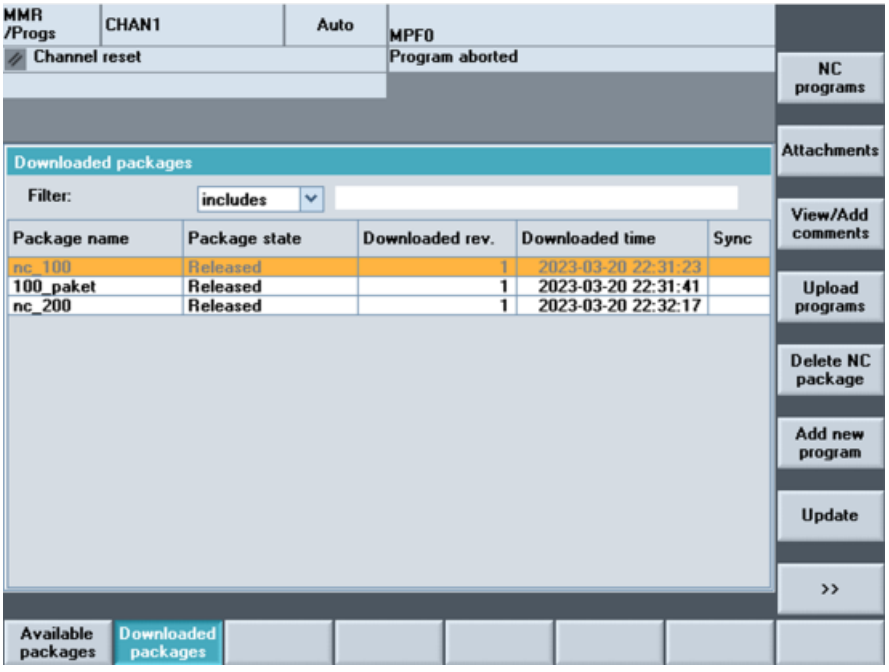
Parameter	Description	
Filter	Enter the kind of filter: • includes • equals • starts with • ends with Enter a name or a part of the name to filter the NC package names.	
Package name	Shows the NC package name.	
Package state	Shows the following statuses	
	• Productive	This state indicates that at least one part was produced successfully according to the Machine Operator. This state is manually defined via the CNC user interface.
	• Published	NC program packages with this state are visible and available for download from the CNC user interface of the assigned machine but not any others. This state is manually defined via the Server application or via openness API.
	• Trial-run in progress	The NC package is marked with "Trial-run is required". The corresponding NC programs have already been downloaded to the SINUMERIK control system. This state is automatically set.
	• Trial-run completed	The NC package is marked with "Trial-run in required" with a manual verification after the trial-run. The corresponding NC programs have already been uploaded to the server via the "Compl. trial-run" softkey. This status is automatically set.
	• Review in progress	When the NC package is changed, the newly created revision is marked as "Review in progress" and has to be reviewed to be used in production. This state is manually defined via the Server application or via openness API.
	• Review completed	The review of the NC package is completed. In this state, the package can be released. This state is manually defined via the Server application or via openness API.
	• Released	The NC package has deactivated the marking "Trial-run is required". The NC programs have already been downloaded to the SINUMERIK control system. In this case, the state is automatically set after the package upload onto the server via the "Compl. Trial-run" softkey. - OR - You accept the changes that were made while running in the NC program. This state is manually defined via the Server application or via openness API.

Parameter	Description	
Downloaded rev.	Shows the revision number of the downloaded package. The number is incremented for each NC package change.	
Downloaded time	Shows the date and time when the NC programs were downloaded.	
Sync	Shows the following synchronisation statuses	
	• (no mark)	There is no information regarding the synchronisation status
	• Yes	NC file changes of the package are up-to-date
	• !	NC file changes have not been uploaded to the server
	• ?	There is no information about NC file changes

Procedure

Downloaded packages

1. Press the "Downloaded packages" softkey.
   The "Downloaded packages" window opens.
   If you wish to display a specific NC package, enter a name or subname into the input field "Filter:" and press the "Update" softkey.
2. Select the required NC package.



NC programs

3. To edit the selected NC package, press the "NC programs" softkey.
   You can edit the respective NC programs.
   For more information, see Editing NC programs (Page 812)

Attachments

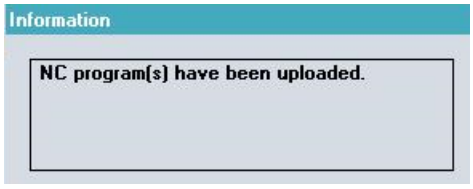
4. To display attachments, press the "Attachments" softkey.
   For more information, see Working with file attachments (Page 813)

View/Add comments

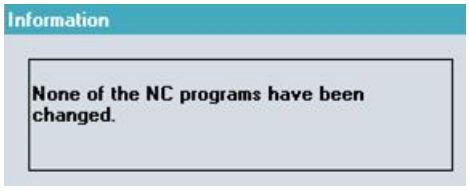
5. To enter or view comments, press the "View/Add comments" softkey.
   For more information, see Viewing and adding comments (Page 820).

Upload programs

6. To upload programs, press the "Upload programs" softkey.
   The NC package is uploaded, and a message is displayed that it has been successfully uploaded:



   - OR -
   A message is displayed that none of the NC programs have been changed.



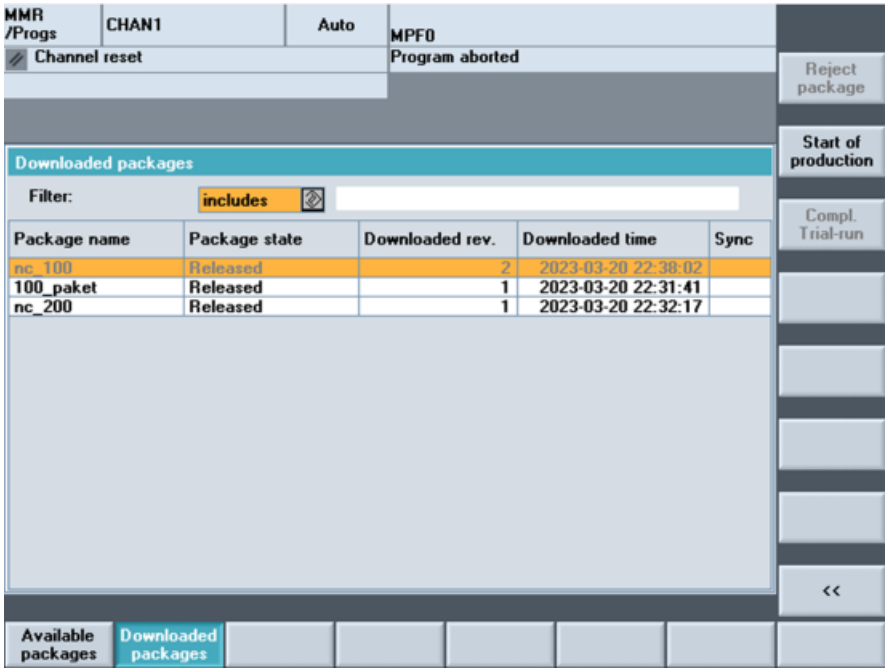
Delete NC package

7. To delete an NC package which has been downloaded onto the machine, press the "Delete NC package" softkey.
   For more information, see Deleting a downloaded NC package (Page 809).

8. To add new programs to the selected NC package from the machine, press the "Add new program" softkey.
   For more information, see Adding new NC programs (Page 811).

Add new program

9. To access the view with the "Reject Package", "Start of Production" and "Compl. Trial-run" softkeys, press the ">>" softkey. The following view is displayed:



10. To go back to the previous softkey menu bar, press the "<<" softkey.

11. If an NC package is in the "Trial-run in progress" state, you can reject the process:
    Press the "Reject package" softkey.
    The confirmation is displayed in the status bar of HMI-Advanced.
12. To change the NC package state to "Productive", press the "Start of production" softkey.
    The confirmation is displayed in the status bar of HMI-Advanced.
13. To change the NC package state to "Trial-run completed" or "Released" , press "Compl. Trial-run" softkey.
    For more information, see NC packages with status "Trial-run in progress" (Page 805)
14. To synchronize the highlighted package,press the "Sync" softkey.
15. To synchronize all downloaded NC packages, press the "Sync all" softkey.

Note

NC package sync statuses

NC package sync statuses disappear with every user interaction which reloads the "Downloaded packages" tab. Such interactions can for example be refreshing the tab, using filters or uploading NC packages. In these cases, use the "Sync" or "Sync all" softkeys to display the current statuses.

Note

In case the user specifies a path for a program in a form that requires a sub folder under the NC package workpiece folder directory of the SINUMERIK controller, the program will not be manageable via the standard Program application of the HMI Advanced.

9.2.4.2 NC packages with status "Trial-run in progress"

On the SINUMERIK control, you can change the NC package state with the state "Trial-run in progress" to a different state, e. g. "Trial-run completed" or "Released".

Prerequisite

The settings are already configured on the server.

For more information, see Creating an NC program package (Page 686)

Parameters

Parameter	Description
Filter	Enter a name to filter the NC package names.
Package name	Shows the NC package name.

Parameter	Description	
Package state	Shows the following states:	
	• Trial-run in progress	The NC package is marked with "Trial-run is required". The corresponding NC programs have already been downloaded to the SINUMERIK control system. This state is automatically set.
	• Trial-run completed	The NC package is marked with "Trial-run is required". The corresponding NC programs have already been uploaded to the server. This state is automatically set.
	• Released	The NC package has deactivated the marking "Trial-run is required". The NC programs have already been downloaded to the SINUMERIK control system. In this case the state is automatically set. - OR - You accept the changes that were made while running in the NC program. This state is manually defined via the Server application or via openness API.
Downloaded rev.	Shows the revision number. The number is incremented for each NC package change.	
Downloaded time	Shows the date and time of the NC program download.	

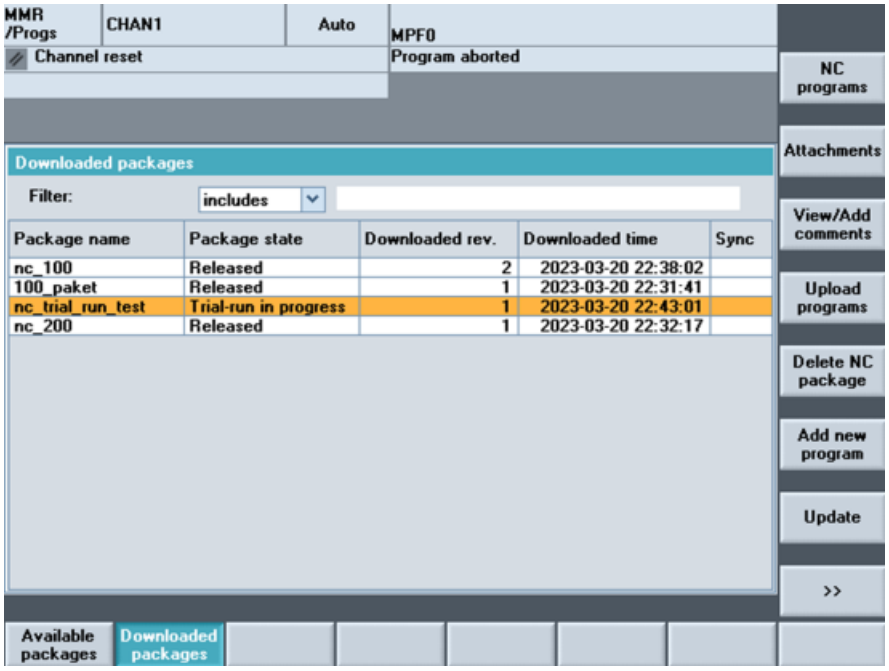
Procedure

NC programs

1. Press "NC programs" softkey to edit the required programs. Press "Close editor" softkey to close the program.

   For more information, see Editing NC programs (Page 812)

   In the overview, the modified NC package is displayed with the state "Trial-run in progress".
2. Select the required NC package in the "Downloaded Packages" list.

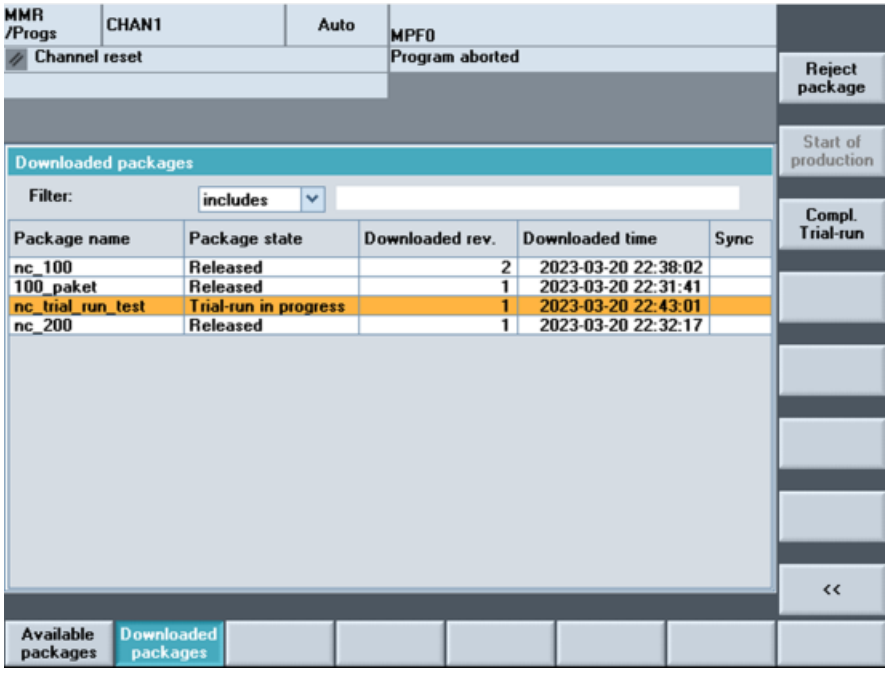


Upload programs

3. To upload edited programs, press the "Upload programs" softkey.

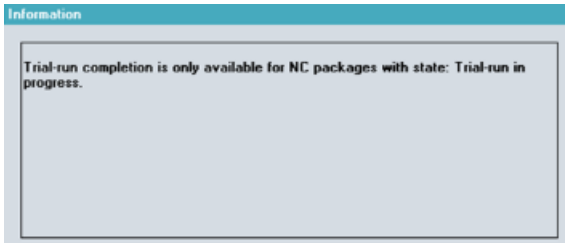
   The NC package is uploaded, and a message is displayed when it has been successfully uploaded.
4. Press "OK" softkey.
   - A new revision number is created for the modified package.
   - The package state still displays "Trial-run in progress".

5. Press the ">>" extension softkey.
   The following view is displayed:



6. Press the "Compl. Trial-run" softkey.
   The following information is displayed: "Trial-run is completed for the NC package".
   If the edited files were not uploaded via "Upload programs" earlier, see step 3, they are uploaded to the server at this stage before completing trial-run.
   Press the "OK" softkey.

7. Press the "<<" softkey to return to the overview window.
   Depending on the setting you have made on the server, the state changes to "Trial-run completed" or "Released" .
   For more information, see Creating an NC program package (Page 686)
   If you select a package with a state other than "Trial-run in progress" and press the "comply.Trial-run" softkey, you will receive the following information:

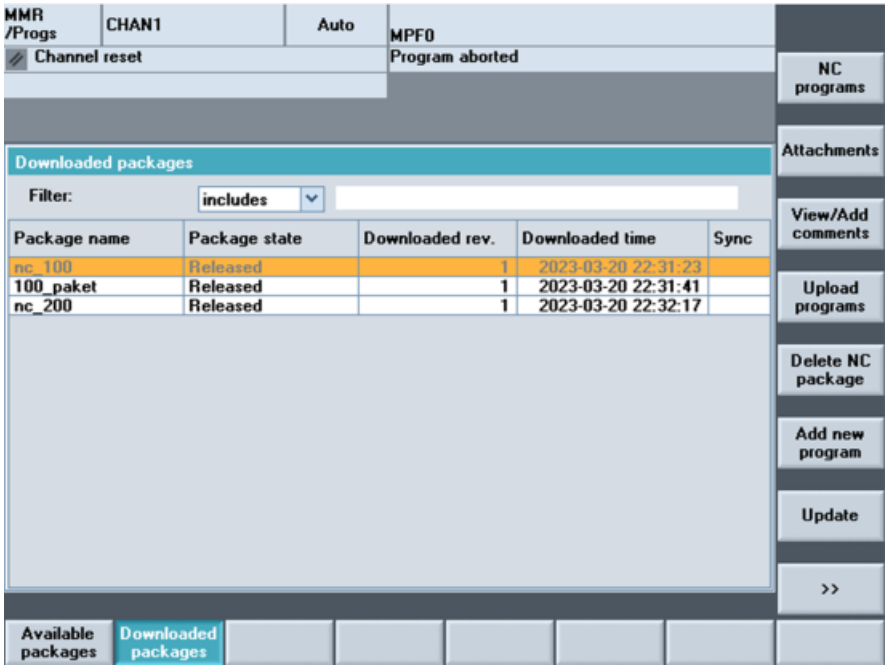


9.2.4.3 Deleting a downloaded NC package

You can delete an NC package which has been downloaded onto the machine. This function does not delete the package on the server.

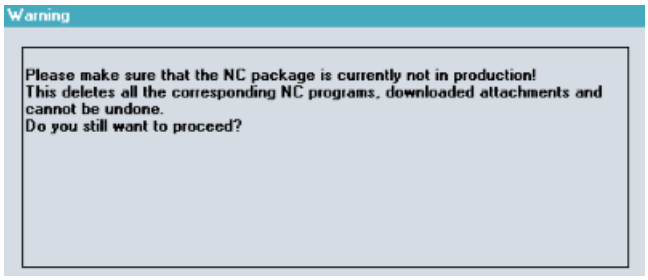
Procedure

1. Select the required NC package in the "Downloaded packages" list.

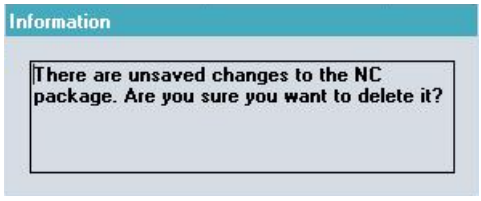


Delete NC package

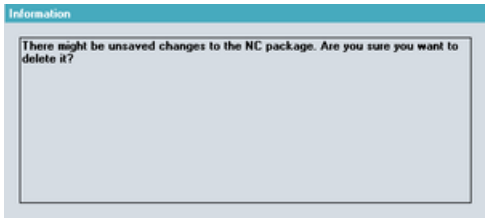
2. Press the "Delete NC package" softkey.
   The following warning message appears:



   If the Sync status of the NC package is "!", NC file changes have not been uploaded to the server. The following dialog initially appears:



   If the Sync status of the NC package is "?", there is no information about NC file changes. The following dialog initially appears:



   Press the "Ok" softkey to continue.

   - OR -

   Press the "Cancel" softkey to cancel the operation.

Note

Deleted NC packages

Once you have deleted an NC package on the machine, you can download it again from the server.

9.2.4.4 Adding new NC programs

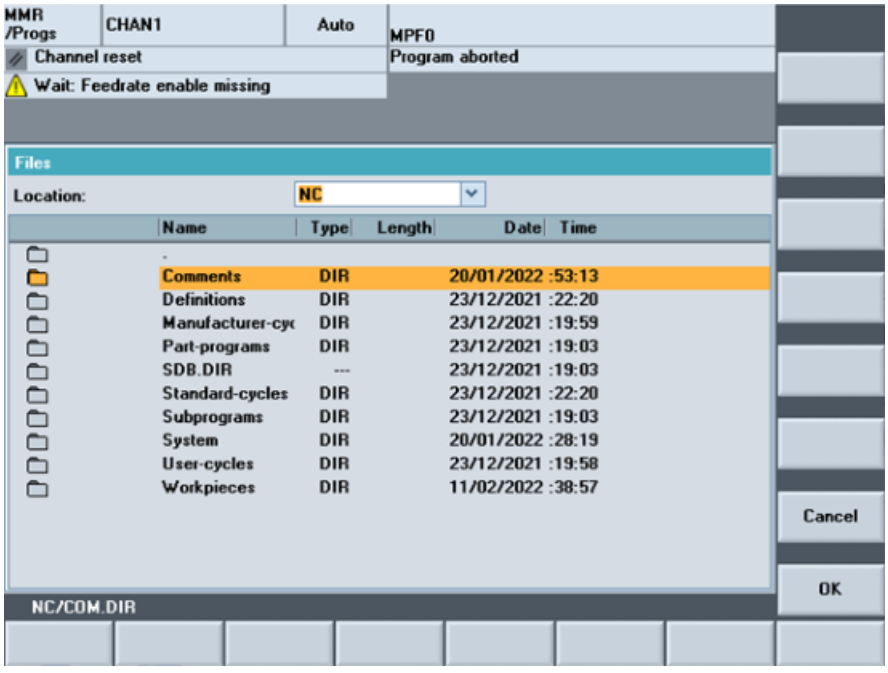
You can add new NC programs to an NC package.

Procedure

1. Select an NC package in the "Downloaded packages" window.
   For more information, see Displaying the downloaded NC packages (Page 801).

Add new program

2. To add new programs to the selected NC package, press the "Add new program" softkey.
   The "Files" window opens.
   Select a directory or drive in the "Location" drop-down list. The NC directory is preselected, but you can choose any other location in the list.
   Select the desired programs and press "OK" softkey to upload them onto the server.
   If the upload is successful, the "Downloaded packages" window is displayed.
   - OR -
   Press "Cancel" softkey to cancel the upload and to return to the "Downloaded packages" window.



Note

New revision

Adding a new file to the NC package will result in a new revision.

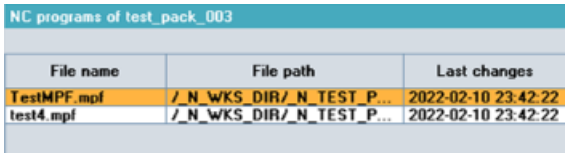
9.2.4.5 Editing NC programs

In Manage MyResources /Programs, you can check and edit the content of an NC program. You can thus prevent running incorrect NC programs.

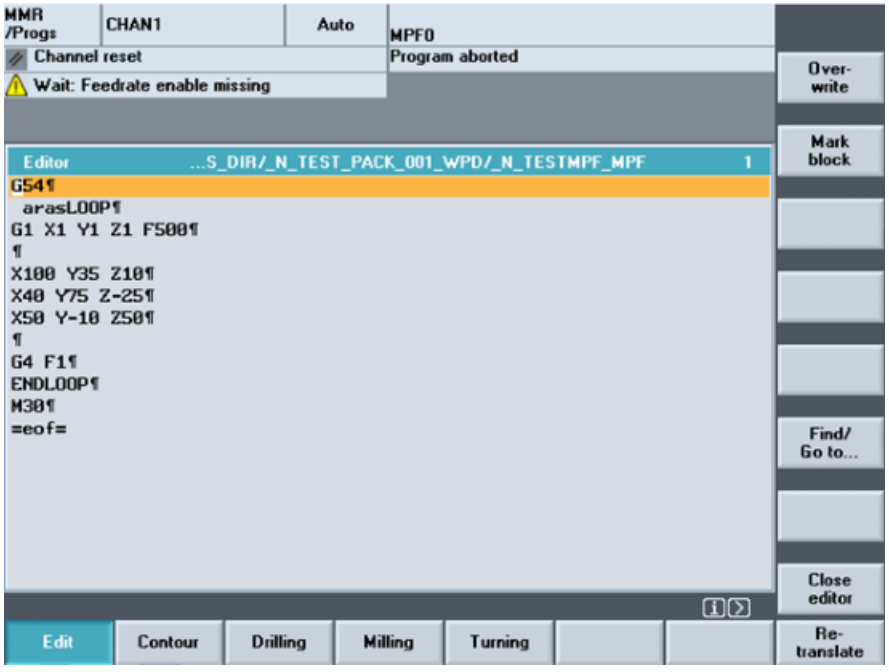
Procedure

1. Select a package in the "Downloaded packages" overview.

2. Press the "NC programs" softkey.
3. The "Programs of <package name>" window opens.
   - Select the desired program.
   - Press “OK”.
     The program opens in the HMI-Advanced standard program editor.
     Press “Cancel” if you do not want to edit the listed programs.



4. Check and, if necessary, edit the content of the program.



5. Press the "Close editor" softkey to close the editor.

9.2.4.6 Working with file attachments

On the SINUMERIK control system, you can download the attachments you imported onto the server. The programs are not downloaded automatically.

For more information, see Adding file attachments (Page 739).

Prerequisites

The supported file extensions are the following:

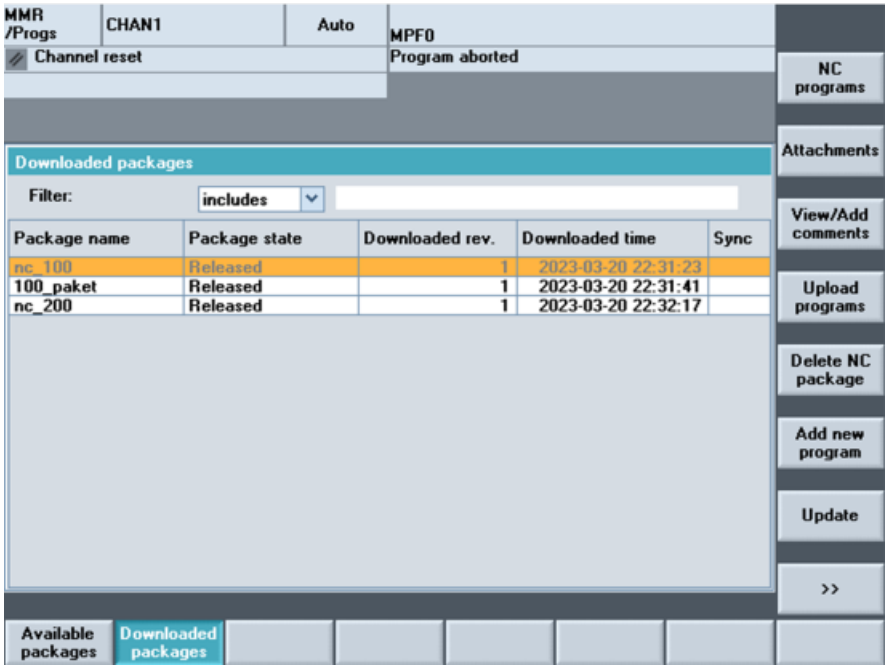
- PDF
- JPG, JPEG, BMP, GIF
- TXT, XML, JSON, LOG, HTM, HTML
  Text files have a limitation of 3 MB.

Parameters

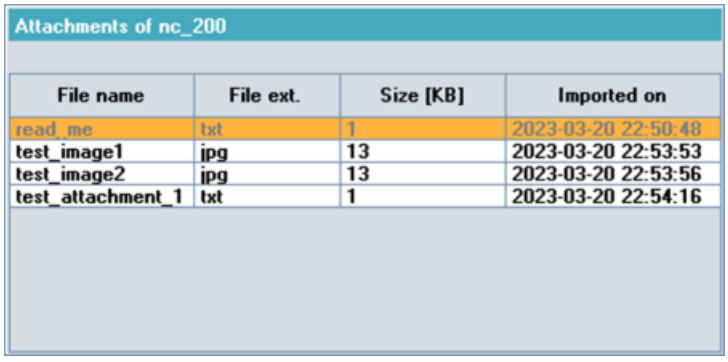
Parameter	Description
Attachments of <package name>	
File name	Shows the name of the file.
File ext.	Shows the filename extension.
Size [KB]	Shows the file size in KB.
Imported on	Shows the import date.

Procedure

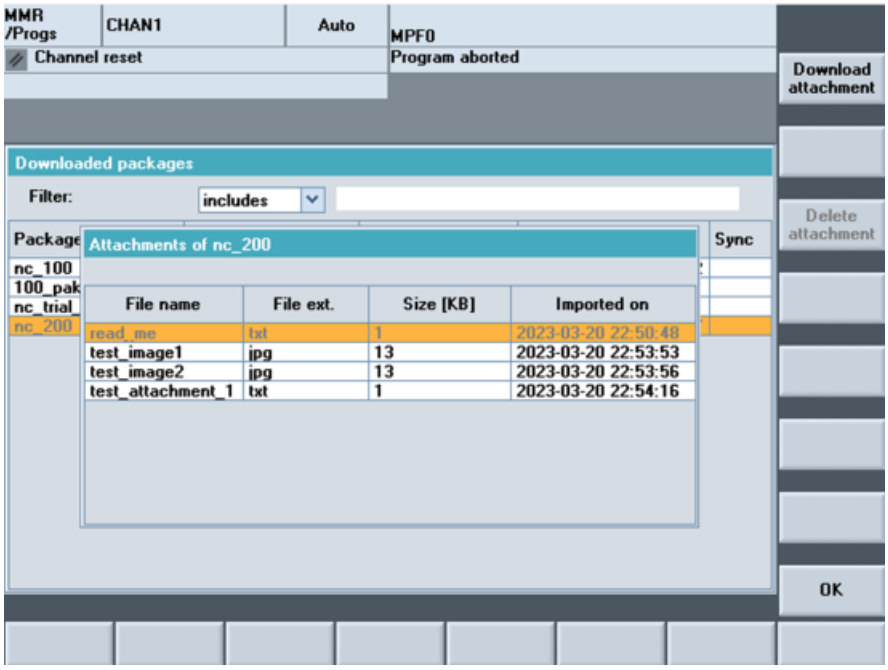
1. Press the "Attachments" softkey to open the list of attachments in the "Downloaded packages window".



The "Attachments of <package name> window opens.



The "Download attachment" softkey is available on the vertical bar.

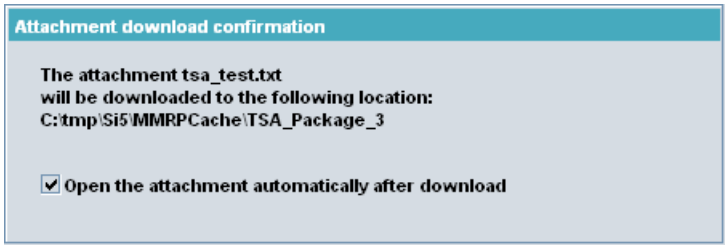

MMR /Progs
CHAN1
Auto
MPF0
Channel reset
Program aborted
Download attachment
Downloaded packages
Filter:
includes
Delete attachment
Package
Sync
Attachments of nc_200
nc_100
100_pak
nc_trial_
nc_200
File name
File ext.
Size [KB]
Imported on
read_me
txt
1
2023-03-20 22:50:48
test_image1
jpg
13
2023-03-20 22:53:53
test_image2
jpg
13
2023-03-20 22:53:56
test_attachment_1
txt
1
2023-03-20 22:54:16
OK

Download attachment

2. Select an attachment and press the "Download attachment" softkey to start the download.

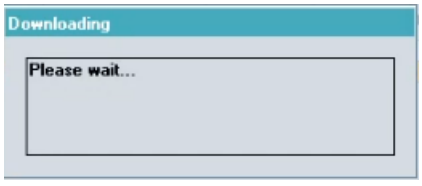
   An "Attachment download confirmation" with the following wording is displayed: "The attachment <name> will be downloaded to the following location:
   /<Primary hard drive>/tmp/Si5/MMRPCache/<package name>".

   - Check the checkbox "Open the attachment automatically after download" to open the attachment automatically.
   - Uncheck the checkbox to download the attachment without opening it.

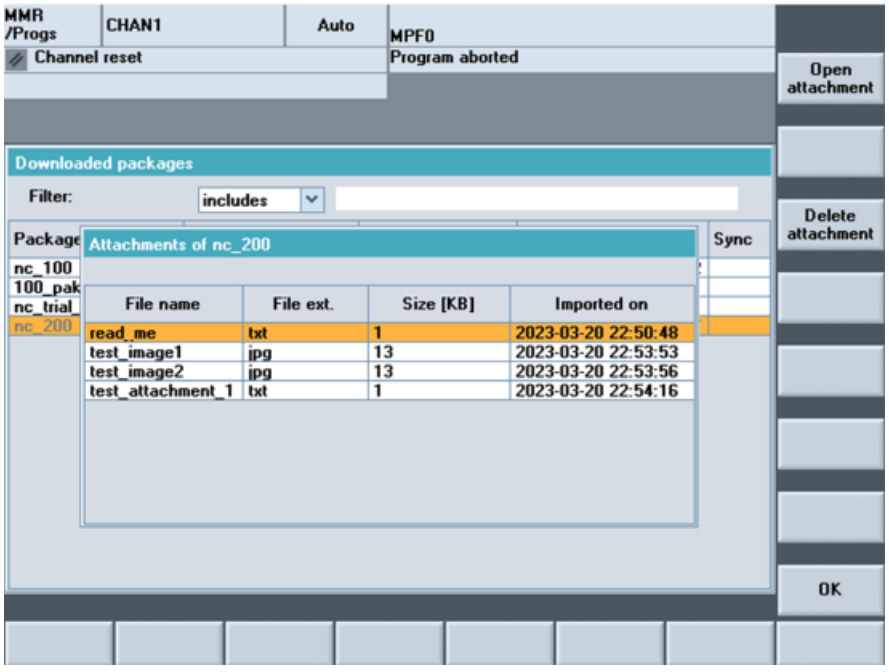


   Press the "OK" softkey to start the download.

   The download progress is displayed.



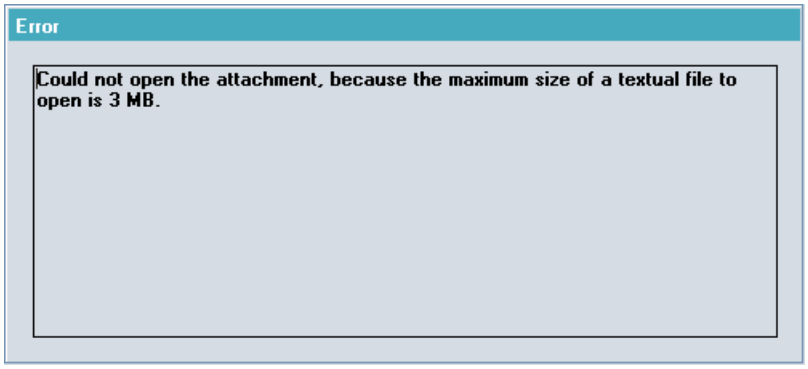
   The list of downloaded file attachments is displayed.



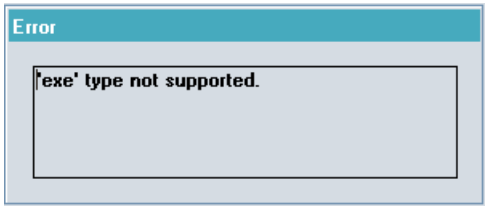
3. The "Open attachment" softkey is available on the vertical bar after the download.

   Press the "Open attachment" softkey and double-click the file that you want to open. If an image is bigger than the screen, use the vertical and horizontal scrollbars or the arrow keys on your keyboard.

   If you try to open a text file with more than 3 MB, the following error message appears: "Could not open the attachment, because the maximum size of a textual file to open is 3 MB."

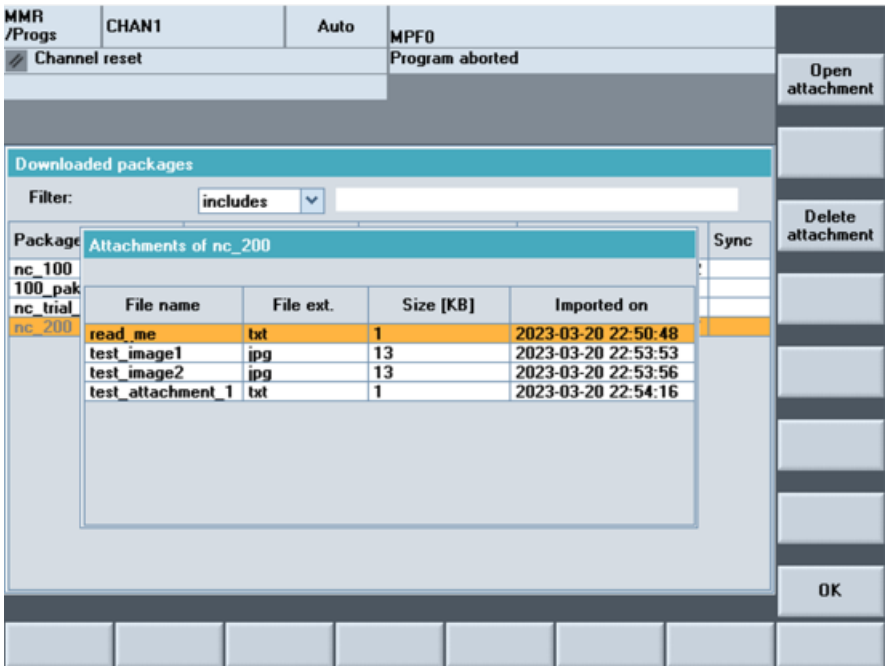


   If you try to open an attachment that is not supported, the following warning appears: "<type> type is not supported."

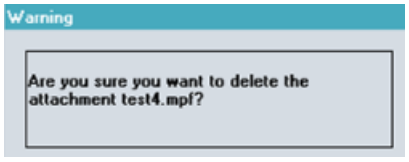


Delete attachment

4. The "Delete" softkey is enabled on the vertical bar after the download.
You can delete downloaded attachments.
Select an attachment in the "Attachments of <package name>" window and press the "Delete attachment" softkey.



The following warning dialog appears: "Are you sure you want to delete the attachment <attachment name>?"



Press the "OK" softkey to delete the selected attachment.

- OR -

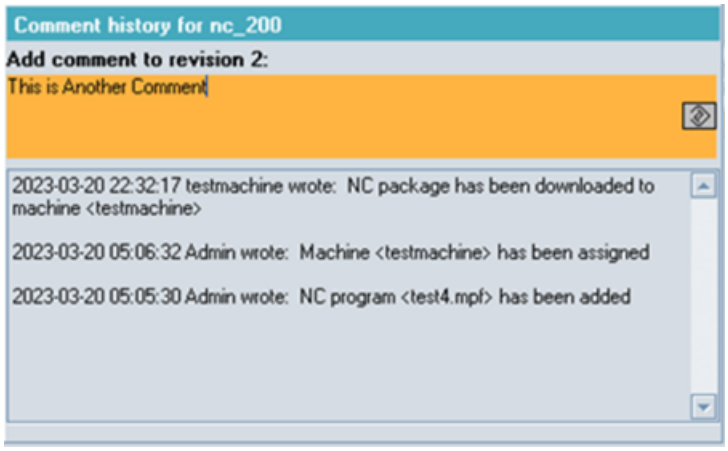
Press the "Cancel" softkey to cancel the operation.

9.2.5 Viewing and adding comments

Procedure

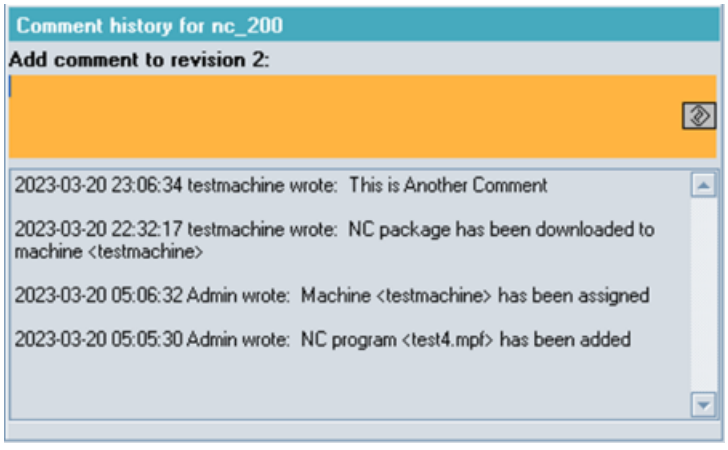
View/Add comments

1. Press the "View/Add comments" softkey.
   The "Comment history for <package name>" window opens.
   If comments have already been entered, they are displayed with the respective date, time and user information.



Add comment

2. Press the "Add comment" softkey.
   Enter the required text into the input field "Add comment:" and press the "Add comment" softkey.



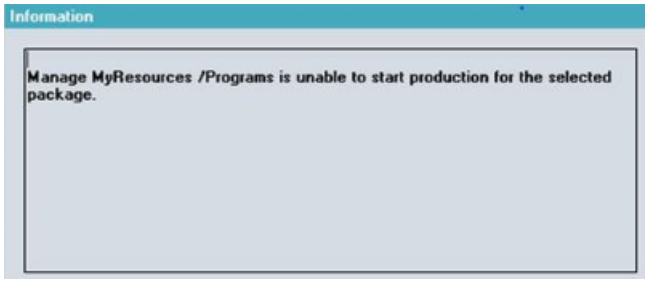
Close

3. Press the "Close" softkey.
   The "Comment history" window closes.

9.2.6 Further error and system messages

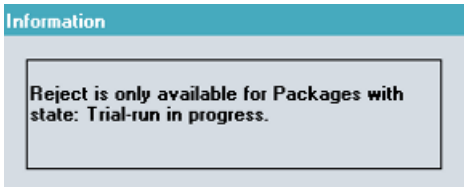
Status indication

If the production fails to start, the following message is displayed:
"Manage MyResources /Programs is unable to start production for the selected package."



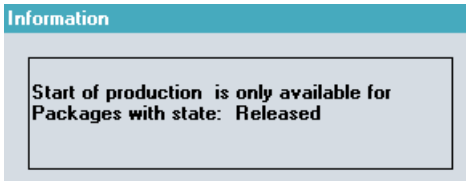
Reject

You receive the information that the rejection of an NC package is only possible in the "Trial-run in progress" state:
"Reject is only available for Packages with state: Trial-run in progress."



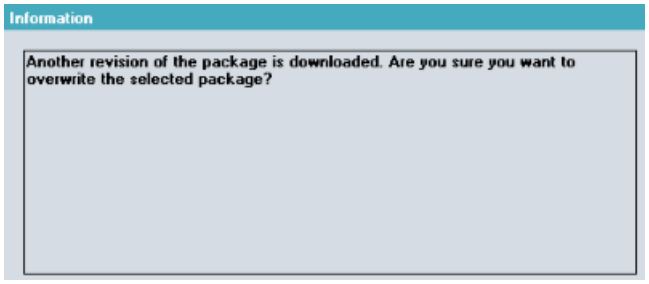
Start of production

You receive the information that the production start is only possible in the "Released" state:
"Start of production is only available for Packages with state: Released."



Confirmation message

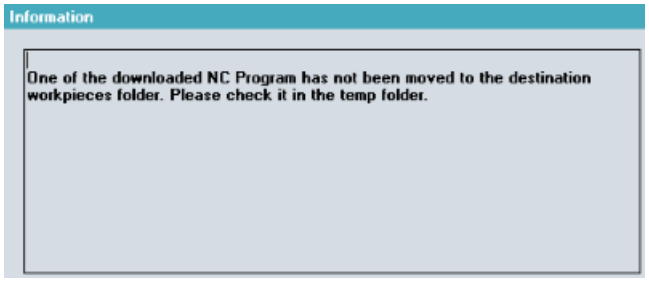
In case another revision of the NC package is already downloaded to the controller, the following dialog appears:
"Another revision of the package is downloaded. Are you sure you want to overwrite the selected package?"



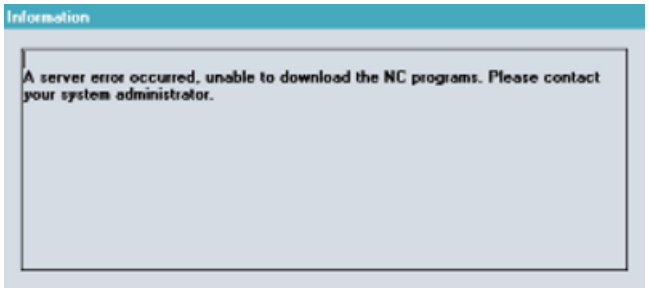
Error messages

In case the full program path (NC package and NC program name, with the extension, preceded by the working directory path) is longer than what the operating software can allocate, HMI-Advanced is unable to create the full program path and the following error message appears:

"One of the downloaded NC Programs has not been moved to the destination workpieces folder. Please check it in the temp folder."

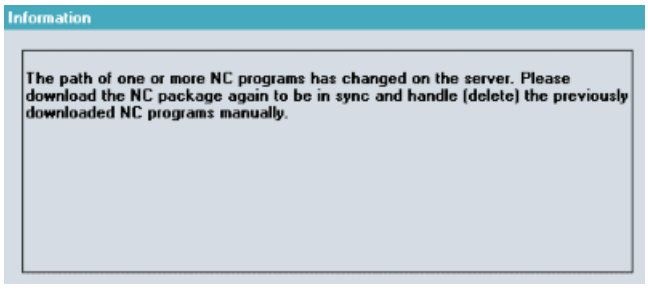


When the download of the selected NC package from the server fails, the following error message appears:
"A server error occurred, unable to download the NC programs. Please contact your system administrator."



When the target path for one of the NC programs is dependent on the version of the NC package, the following error message appears upon its upload to server after modification:

"The path of one or more NC programs has changed on the server. Please download the NC package again to be in sync and handle (delete) the previously downloaded NC programs manually."



9.2.7 Working with machine path variables

The machine path variables for NC packages are replaced once the NC package is downloaded onto the machine.

Prerequisite

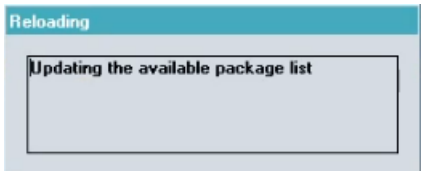
You have defined machine path variables for the NC package on the server. You have added the NC package to a machine.

For more information, see Using path with the machine variable (Page 702).

Procedure

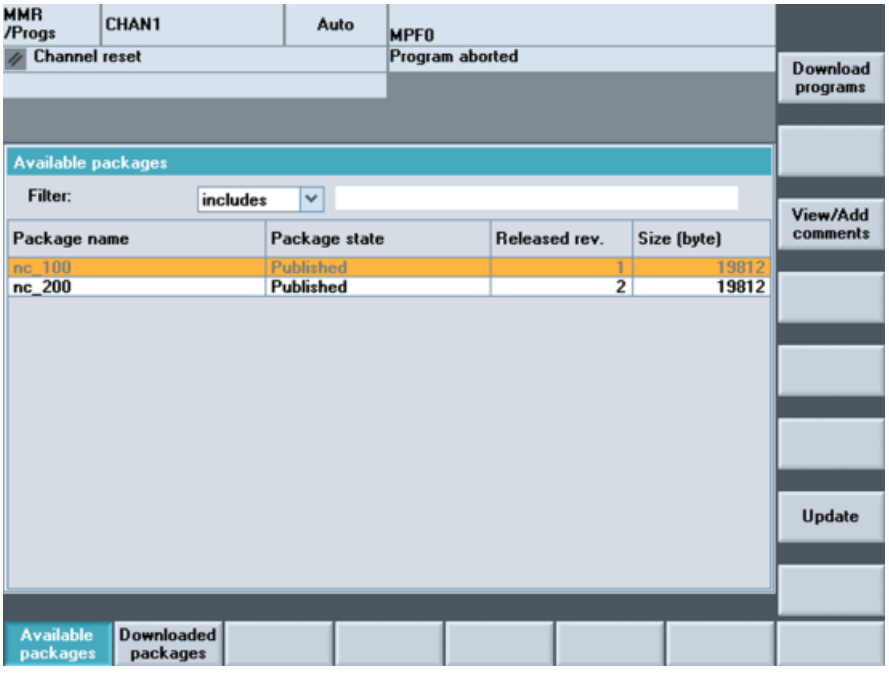
Update

1. Press the "Update" softkey to display the new NC package.
   The available package list is reloaded.

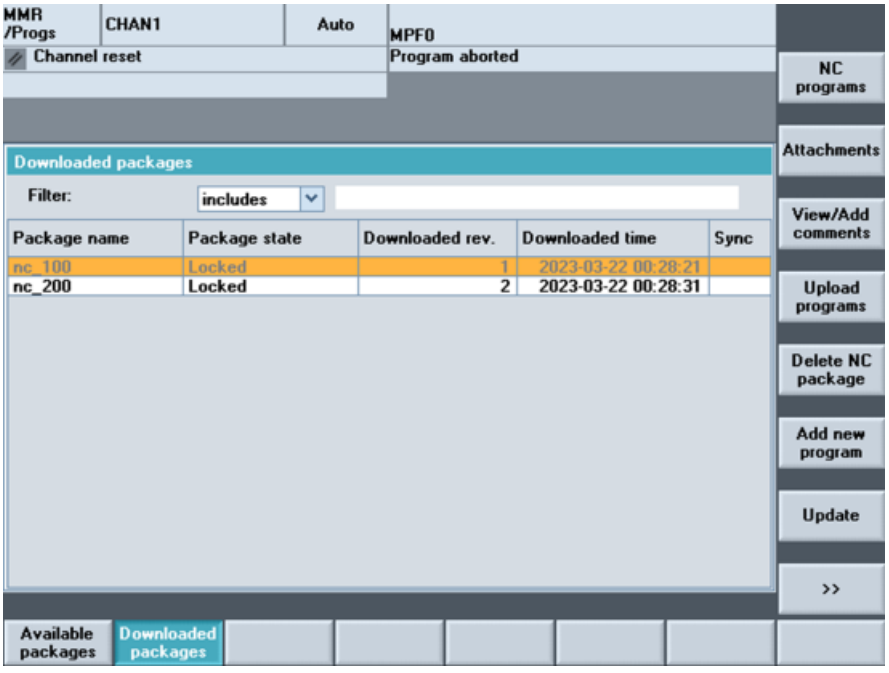


Download programs

2. To download the NC programs press the "Download programs" softkey.

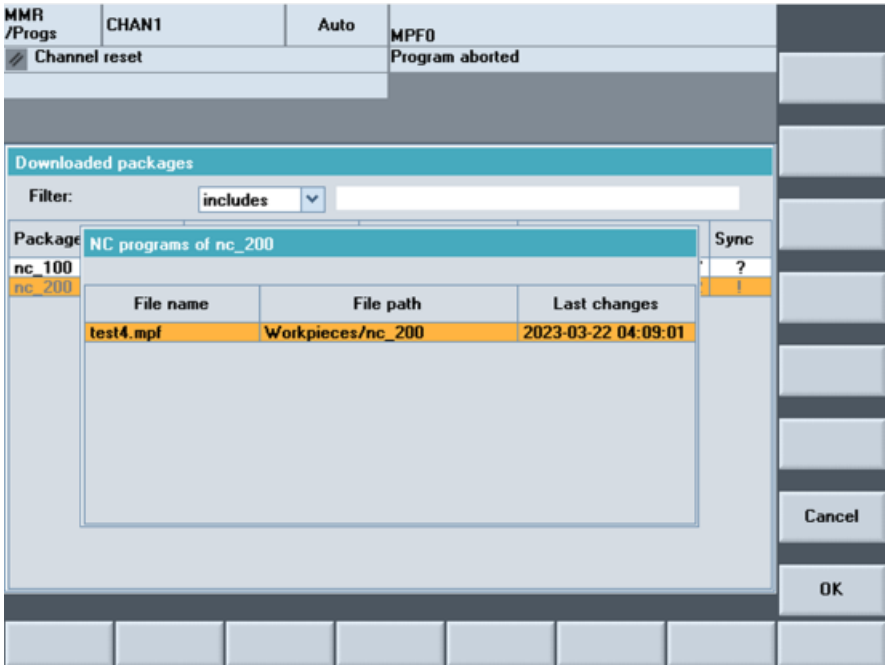


All packages are displayed:



NC programs

3. Press the "NC programs" softkey to display the path with the replaced variables on the machine.



Note

Empty path variables

Empty path variables are replaced with constant text.

The package-related placeholder texts are PackageName, WorkPieceID, ExternalRevision, Revision.

The machine-related placeholder texts are MainPrograms, SubPrograms, WorkPieces, ExternalStorage.

Using Manage MyResources /Programs with the Machine Agent

10

10.1 Starting Manage MyResources /Programs

10.1.1 Starting Manage MyResources /Programs

You can use Manage MyResources /Programs with the controller-independent Machine Agent application on an IPC or PCU.

Prerequisites

- The selected controller type must be Fanuc, Heidenhain or Mitsubishi during machine creation.
- The control system has powered up.
- You have assigned Manage MyResources /Programs to the control system.
  The installation has been successful.
- Your PC is connected to the control system.

NOTICE
Installation Do not install the application to the control system, but to a PC connected to the control system powered by the Machine Agent.

For more information, see

- Manage machines (Page 72)
- Manage applications on machines (Page 90)

Procedure

1. Open a supported web browser on the connected PC, for example Google Chrome.
2. Go to the following page: Localhost_MMRP (http://localhost:8002/mmrp).
   Only the lowercase application name, mmrp, is supported in the address of the new UI page.
   The Machine Agent is running on the same PC.

10.1.2 On Fanuc

Prerequisites

The FOCAS library on the Fanuc control system is enabled.

10.1.3 On Heidenhain

Prerequisites

No special requirement needed

10.1.4 On Mitsubishi

Prerequisites

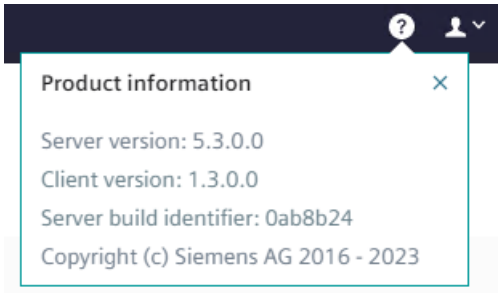
For the prerequisites, please contact the Mcenter support or the customer support.

10.2 Displaying information about the product and the version

You can display the product information and the build identifier of the software.

Procedure

Click on the "?" icon in the top-right corner of the window.
A product information popup opens.

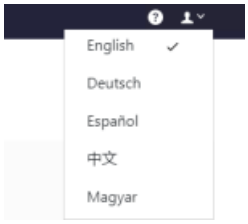


10.3 Switching the language

You can select the language.
The default language is English.
The items on the list are written in the respective languages.

Procedure

1. In the header of the Mcenter window, click the "User" icon in the top-right corner of the window.
   The drop-down menu opens.



10.4 Working with NC files

10.4.1 On FANUC

NC files on FANUC

To download NC files to the Fanuc control system from the server side, you must use the following file format:

- The content before the first new row character will be ignored and not transferred to the Fanuc control system.
- The second row of the NC file must contain the name of the file
  - The file name must start with "O".
  - The file name must end with 4 or 8 digits (e.g. O1234)
  - The last row of the file must be the "%" character.
- When uploading the NC file to the server, a "%" character will be added to the first row of the content.

Examples

Simple NC file (with "%" character in the first row)

NC file	NC file (after uploading to the server side)
%	%
O1234	O1234
M30	M30
%	%

Simple NC file (without "%" character in the first row)

NC file	NC file (after uploading to the server side)
custom_first_row	%
O1234	O1234
M30	M30
%	%

Note

NC file without "%" character in the first row

The "custom_first_row" characters will be changed to "%" character and a new revision will be created on the server side.

10.4.2 On Heidenhain

NC files on Heidenhain

To download NC files to the Heidenhain control system from the server side, you must use the following format:

- The program should start with "BEGIN PGM programName MM" or "BEGIN PGM programName INCH"
- The program should end with "END PGM programName MM" or "BEGIN PGM programName INCH"
- The Heidenhain controller might supplement the NC program with these values
- If the NC file name and NC program name is different, the Heidenhain controller changes it to the name of the NC file
- The tabulation of the NC program might be changed to reflect the controller tabulation
- After saving the program, the controller auto renumbers the lines starting from 0
- The recommended file extension is "H"

Example

Simple NC file named "FILE.H"

NC file	NC file (after uploading to the server side)
0 BEGIN PGM TESTFILE	0 BEGIN PGM FILE MM
1 BLK FORM 0.1 Z X+0 Y+0 Z-15	1 BLK FORM 0.1 Z X+0 Y+0 Z-15
2 BLK FORM 0.2 X+93 Y+64 Z+4	2 BLK FORM 0.2 X+93 Y+64 Z+4
3 END PGM TESTFILE	3 END PGM FILE MM

Note

If the NC file is changed because of these reasons, when uploading the program, a new revision will be created on the server.

10.4.3 On Mitsubishi

NC files on Mitsubishi

To download NC files to the Mitsubishi control system from the server side, you must use the following format:

- The last row of the file must be the "%" character.

10.5 Available NC packages

10.5.1 Displaying the available NC packages

On the control system, you can see all the NC packages assigned by the server in "Manage MyResources /Programs".

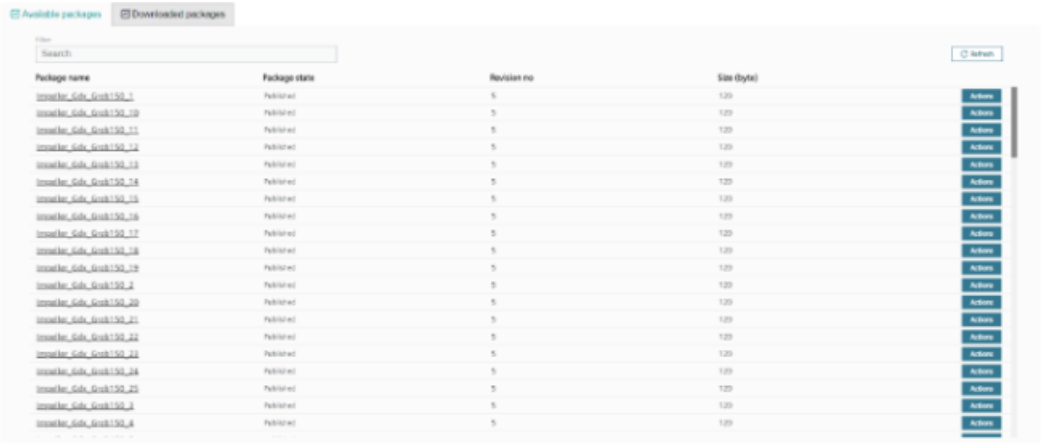
An NC package can include one or several NC programs.

Parameters

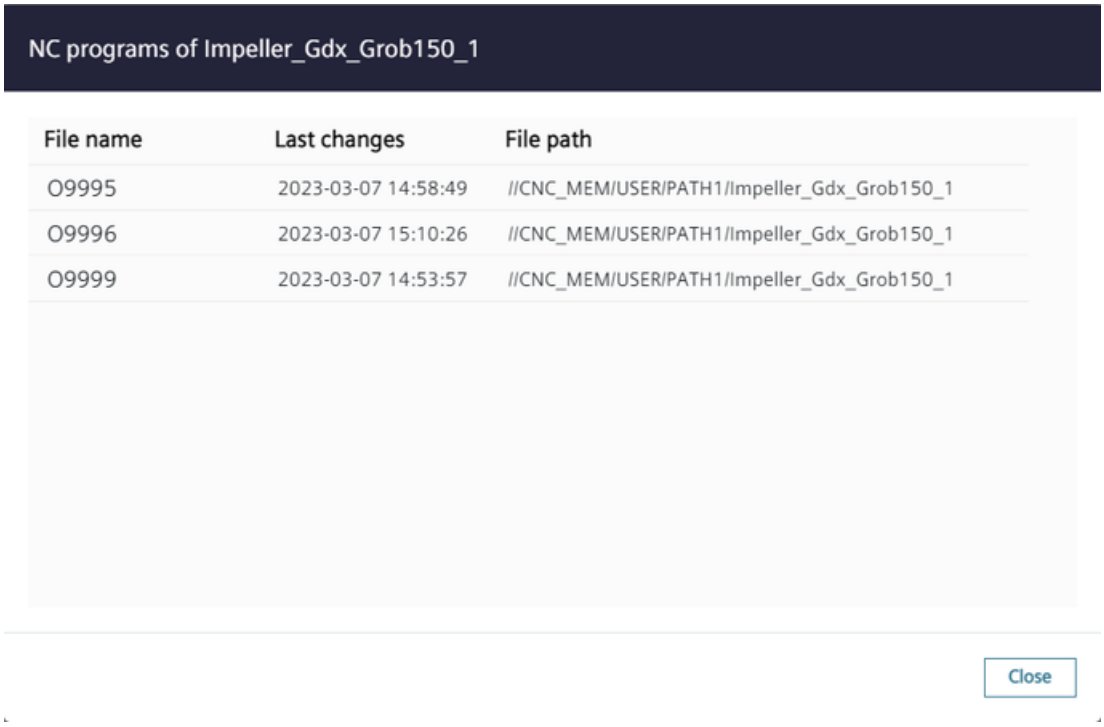
Parameter	Description	
Filter	Enter a name to filter the NC package names.	
Package name	Shows the NC package name.	
Package state	Shows the following states:	
	• Productive	This state indicates that at least one part was produced successfully according to the Machine Operator. This state is manually defined via the CNC user interface.
	• Published	NC program packages in this state are visible and available for download from the CNC user interface of the assigned machine but not any others. This state is manually defined via the Server application or via openness API.
	• Trial-run in progress	The NC package is marked with "Trial-run is required". The corresponding NC programs have already been downloaded to the control system. This state is automatically set.
	• Trial-run completed	The NC package is marked with "Trial-run is required". The corresponding NC programs have already been uploaded to the server. This status is automatically set.
	• Released	The NC package has deactivated the marking "Trial-run is required". The NC programs have already been downloaded to the control system. In this case the state is automatically set. - OR - You accept the changes that were made while running in the NC program. This status is manually defined via the Server application or via openness API.
Revision No.	Shows the latest revision number. The number is incremented for each NC package change.	
Size (byte)	Shows the NC package size in bytes.	
Actions	The following actions are available: • Download programs - downloading NC program(s) from the server	

Procedure

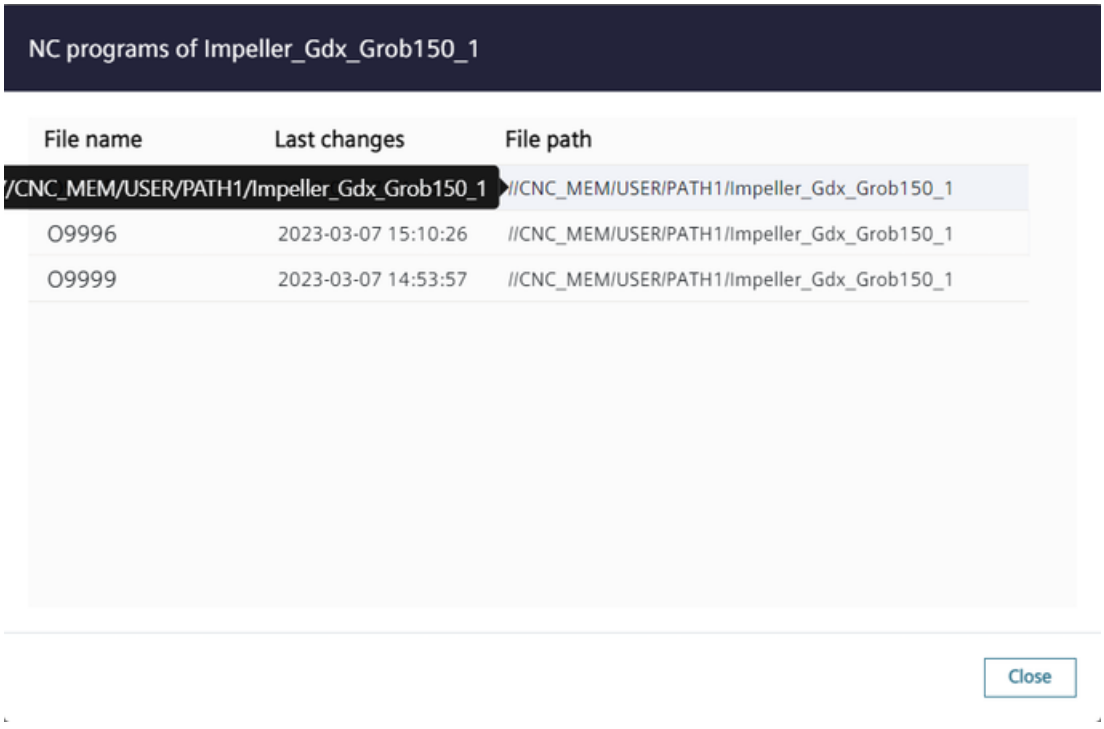
1. The available NC packages page opens. It displays all the available NC packages assigned by the server.
   If you wish to display a specific NC package, enter a name or sub name in the input field "Filter" and click on the "Refresh" button.



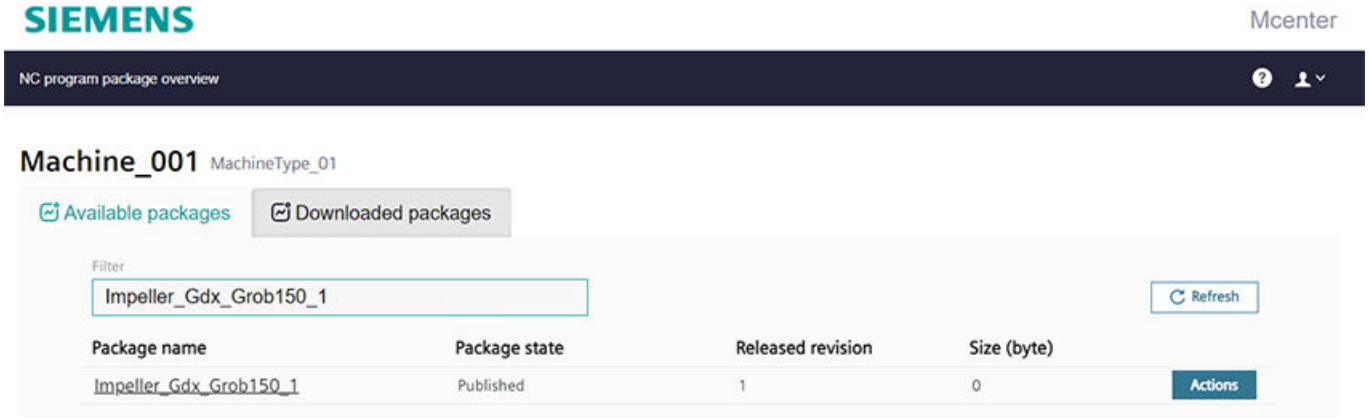
2. Select the required NC package. To open the list of the NC programs of the selected NC package, click on the underlined name of the NC package.
   A new window opens which contains all metadata of the NC programs of the selected NC package:



   The columns of this window are not resizable. The full file path is displayed in a tooltip when you move the mouse pointer over it:



3. If you wish to display a specific NC package, enter a whole name (or the part of the name) into the input field "Filter".
   Select the required NC package.



4. Click on the button "Actions" on the right side of the selected NC package and click on "Download Programs" to download the required NC programs.

Note

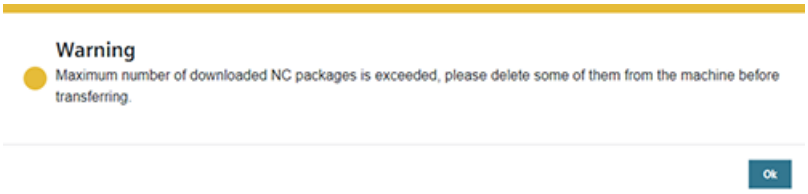
Download NC programs

You can only download NC programs if the path on the machine contains at most 4 subfolders below the PATH1 folder.

For example:
//CNC_MEM/USER/PATH1/SubFolder1/Subfolder2/SubFolder3/SubFolder4

5. A message is displayed when the NC package is successfully downloaded to the specified location:

6. If the number of downloaded packages has reached the limit, following warning massage appears: "Maximum number of downloaded NC packages is exceeded, please delete some of them from the machine before transferring." You must delete packages from the machine. The package limit can be set in the server configuration. For more information, see MMR / Programs configuration (Page 679).



7. The NC programs are in the workpiece directory in a folder with the NC package name. For more information, see Error and system messages (Page 877).
8. The popup message from the bottom-right side disappears automatically after some seconds.

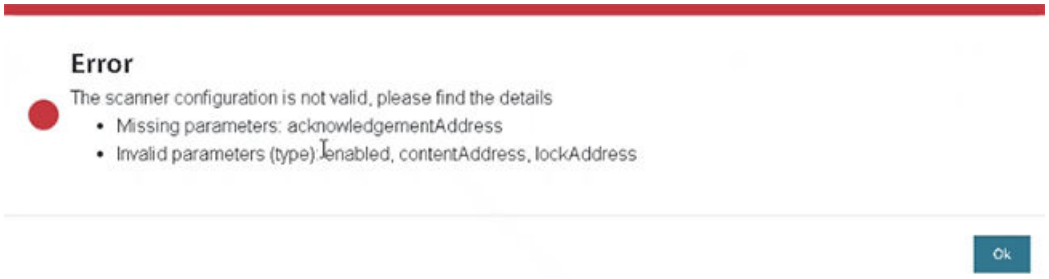
10.5.2 Scanning NC package names using the PLC code scanner

You can scan NC package names with a PLC code scanner or an USB code scanner. The recommended option is using the PLC code scanner.

Prerequisite

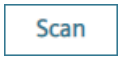
- The scanner configuration is enabled in the configuration file "mmrConfig.json"
- The configuration file "mmrConfig.json" is located at "C:/temp" of the client machine Additional information about enabling the scanner configuration is provided in the Installation Manual "Mcenter, Manage MyReources, Optimize MyProgramming /NX-Cam Editor, Analyze MyPerformance /OEE, Access MyData /Collector".
- The hand scanner, for example Balluff-RF*D-Chip, is connected to the PLC

If the configuration file is invalid or has errors, an error message appears when the application is started. The scanner cannot be used.

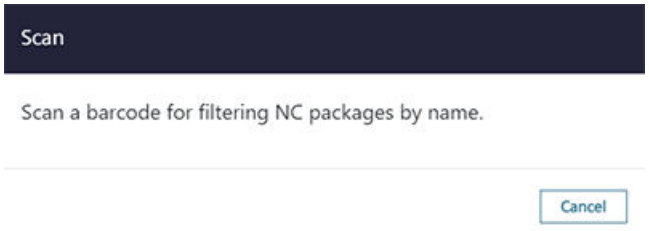


Procedure

1. Select "Scan" on the available packages tab.

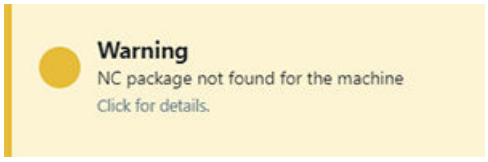
   

2. The scan dialog appears: "Scan a barcode for filtering NC packages by name".
3. Scan the barcode with the barcode reader
   - OR -
   Select "Cancel".

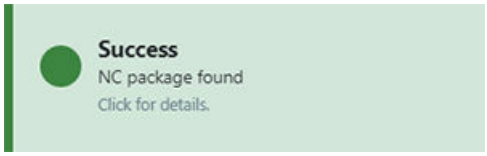
   

The NC package list is filtered with the scanned NC package name.

If no NC package is found with the name, the following popup message is shown:



If the NC package is found, the following popup message is shown:


Success
NC package found
Click for details.

10.6 Downloaded NC packages

10.6.1 Displaying the downloaded NC packages

On the control system, you can display all the NC packages that already downloaded from the server in "Manage MyResources /Programs".

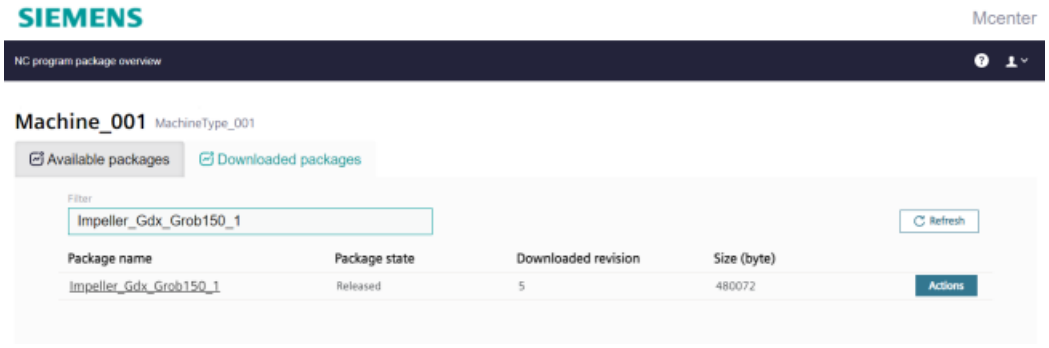
Parameters

Parameter	Description	
Filter	Enter a name to filter the NC package names.	
Package name	Shows the NC package name.	
Package state	Shows the following states:	
	Productive	This state indicates that at least one part was produced successfully according to the Machine Operator. This state is manually defined via the CNC user interface.
	Published	NC program packages in this state are visible and available for download from the CNC user interface of the assigned machine but not any others. This state is manually defined via the Server application or via openness API.
	Trial-run in progress	The NC package is marked with "Trial-run is required". The corresponding NC programs have already been downloaded to the control system. This state is automatically set.
	Trial-run complete	The NC package is marked with "Trial-run is required". The corresponding NC programs have already been uploaded to the server. This status is automatically set.
	Review in progress	In manual handling mode, when the NC package is changed, the newly created revision is marked as "Review in progress" and has to be reviewed to use in production.
	Review completed	In manual handling mode, when the review of the NC package is completed. In this state, the package can be released.
	Released	The NC package has deactivated the marking "Trial-run is required". The NC programs have already been downloaded to the control system. In this case the state is automatically set. - OR - You accept the changes that were made while running in the NC program. This status is manually defined via the server application or via openness API.
	Locked	In the "Locked" state, the NC package cannot be used for production.
Revision No.	Shows the download revision number. The number is incremented for each NC package change.	

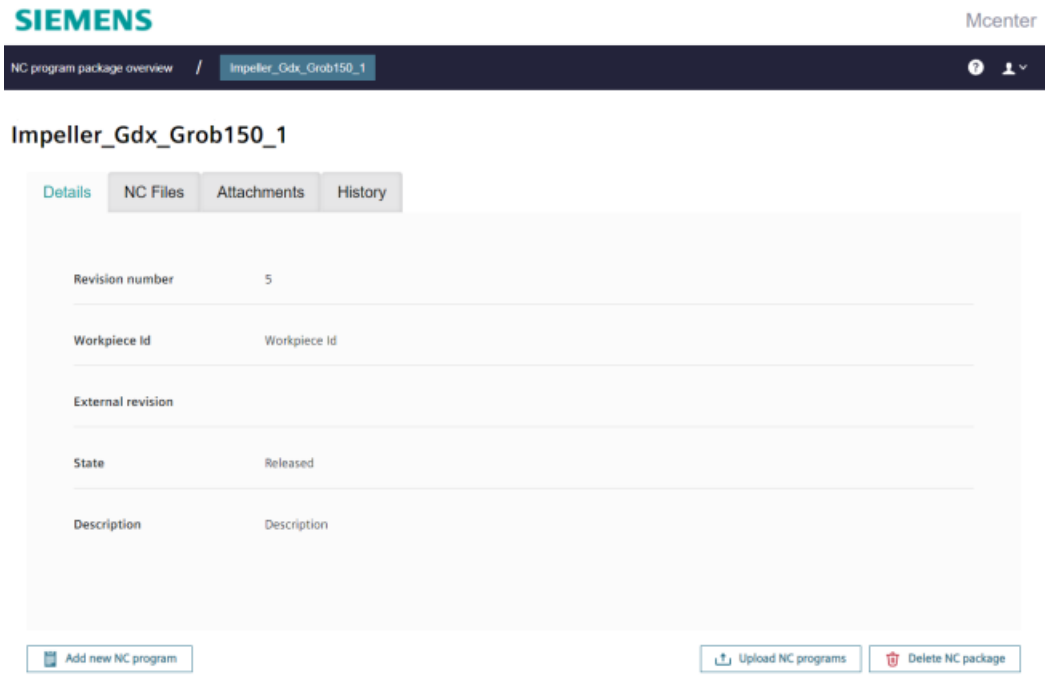
Parameter	Description
Size (byte)	Shows the NC package size in bytes.
Actions	The following actions are available: • Upload programs - uploading NC program(s) to the server • Delete - deleting NC packages only from the machine • Attachments - opens the attachments of the NC package • State changes: – Lock - changing NC package state to "Locked" – Productive - changing NC package state to "Productive" – Complete trial-run - changing NC package state to "Trial-run completed" – Reject - changing NC package state to "Rejected"

Procedure

1. Open the "Downloaded packages" tab.



2. Select the required NC package. To open the details of the selected NC package, click on the underlined name of the NC package.
   A new page will be opened with the details of the NC package.



3. If you wish to display a specific NC package, enter the whole name or the part of the name into the input field "Filter".
   Click on the "Refresh" button.
   Select the required NC package.

10.6.2 Changing the NC package status "Trial-run in progress"

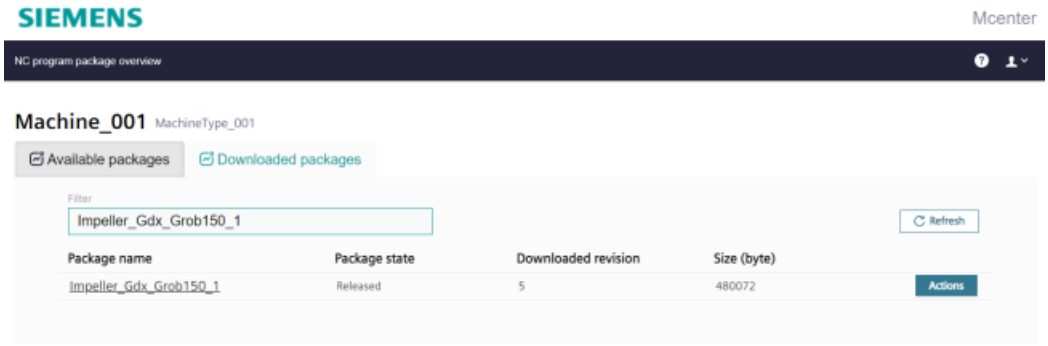
On the FANUC control, you can change the NC package state "Trial-run in progress" to a different state, e. g. "Trial-run completed" or "Released".

Prerequisite

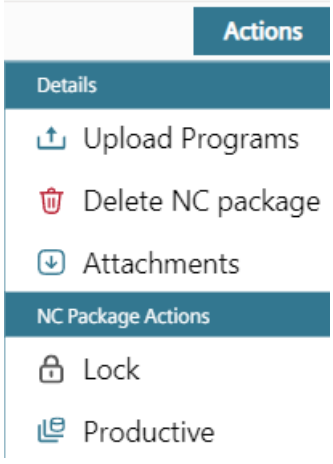
The settings are already configured on the server.

Procedure

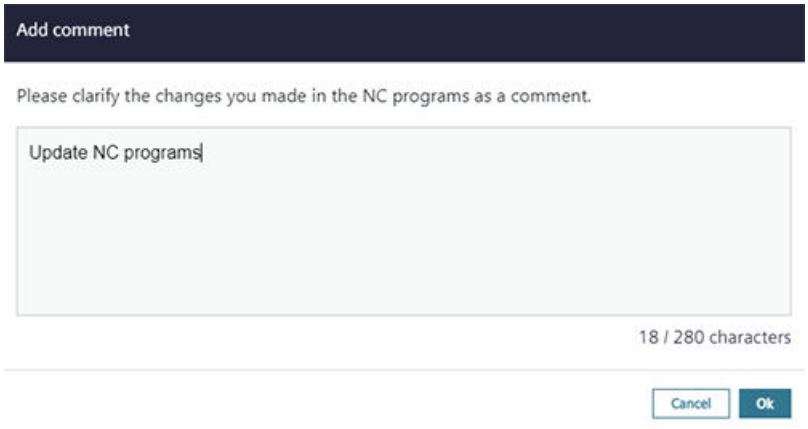
1. Select the required NC package in the “Downloaded packages” list.



2. Cick on the "Actions" button on the right side of the selected NC package and click on "Upload Programs" to upload the required NC programs

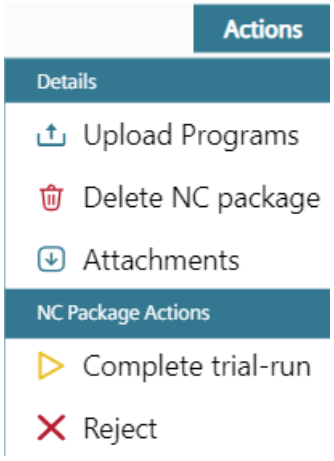


If a mandatory comment is required, a popup window opens. You must give a comment for uploading the NC program changes. Press "Ok" to continue, or press "Cancel" to stop the upload.



3. The following popup message is displayed on the bottom-right side and disappears automatically after some seconds:

4. A new revision number is created for the modified NC package
5. The NC package state still displays "Trial-run in progress".
6. Click on the "Actions" button on the right side of the selected NC package and click on "Complete trial-run" to change the state of the NC package to "Trial-run completed" or to "Released".



7. Depending on the setting you have made on the server, the state changes to "Trial-run completed" or "Released".

10.6.3 Deleting a downloaded NC package

You can delete an NC package which has been downloaded onto the machine. This function does not delete the package on the server.

For more information about deleting NC packages on the server, see Modifying an NC package (Page 690).

For more information about warning and error messages, see Error and system messages (Page 877).

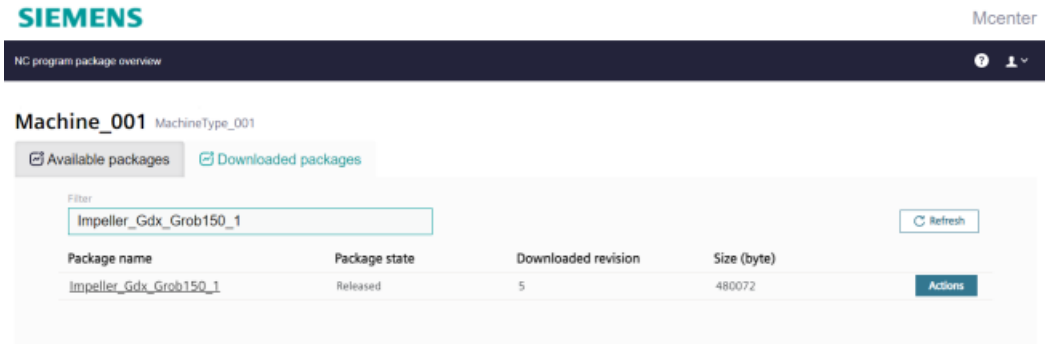
Note

Deleted NC packages

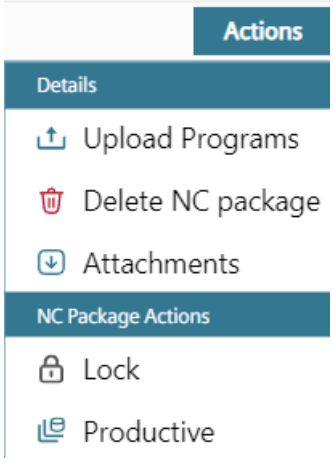
Once you have deleted an NC package on the machine, you can download it again from the server.

Procedure

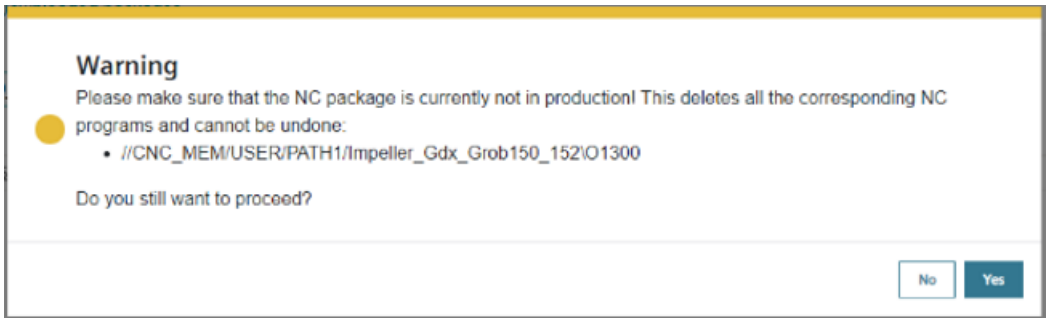
1. Select the required NC package in the “Downloaded packages” list.



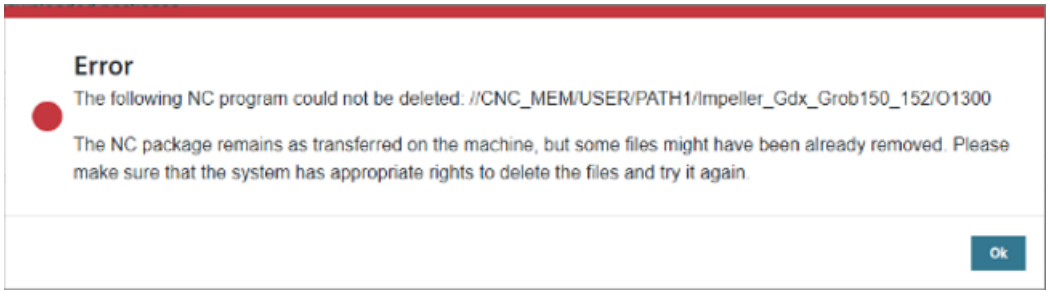
2. Click on the button button "Actions" on the right side of the selected NC package and click on "Delete NC package".



3. The following warning popup window appears to ensure the selected NC package is not in production.
   Click on "Yes" to continue.
   - OR -
   Click on "No" to cancel the operation.



4. The NC package is deleted.
   If the deletion of the NC package fails, you receive the following error message:

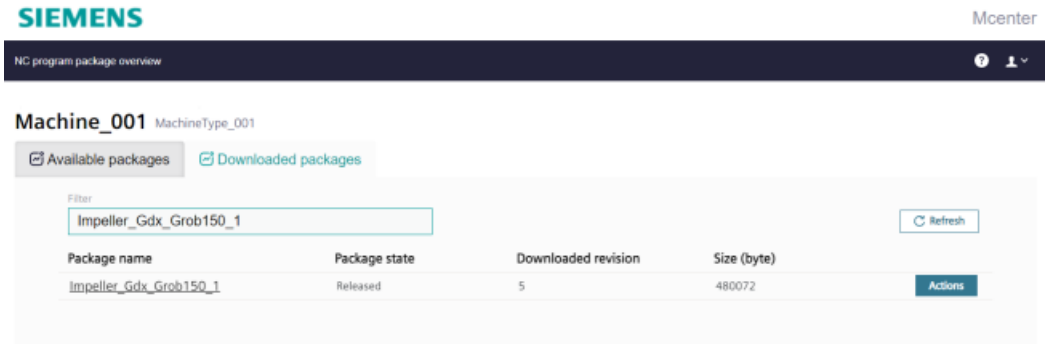


10.6.4 Displaying attachments

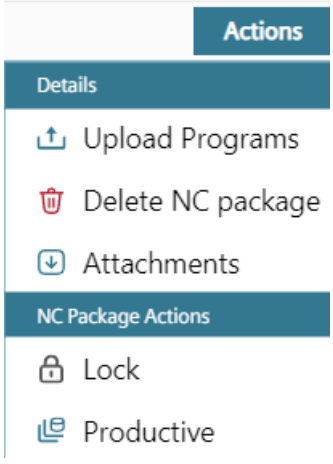
You can open NC package attachments on the machine.

Procedure

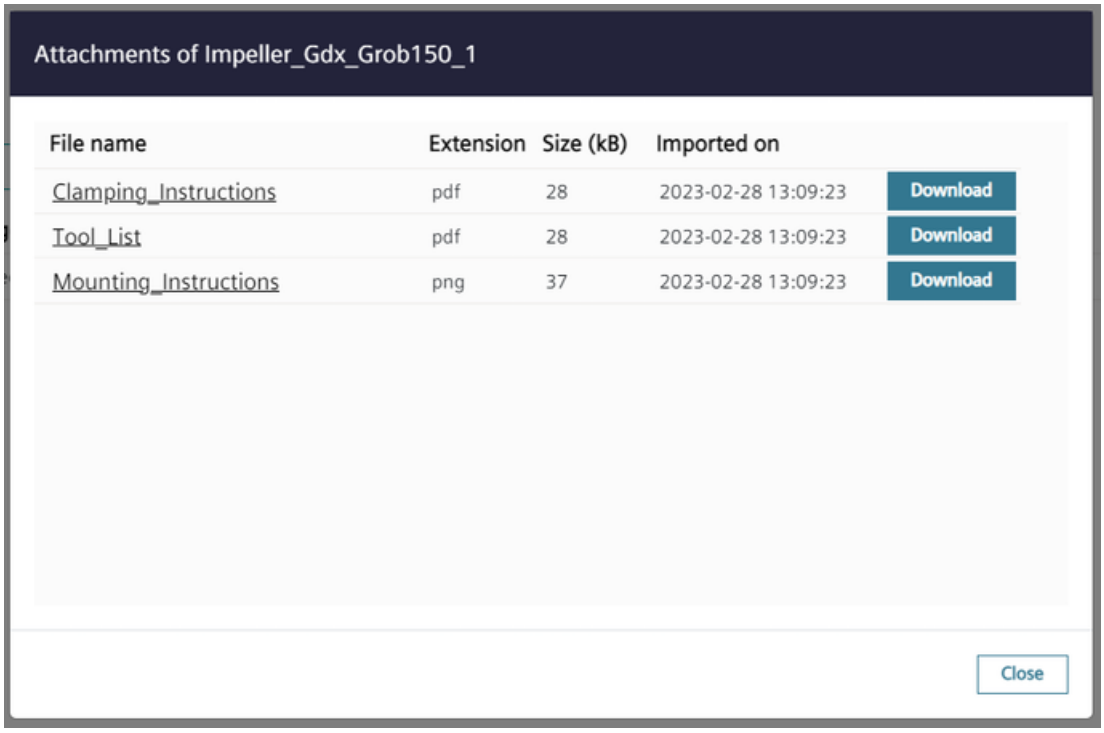
1. Select the required NC package in the "Downloaded packages" list.



2. Click on the "Actions" button on the right side of the selected NC package and click on "Attachments".

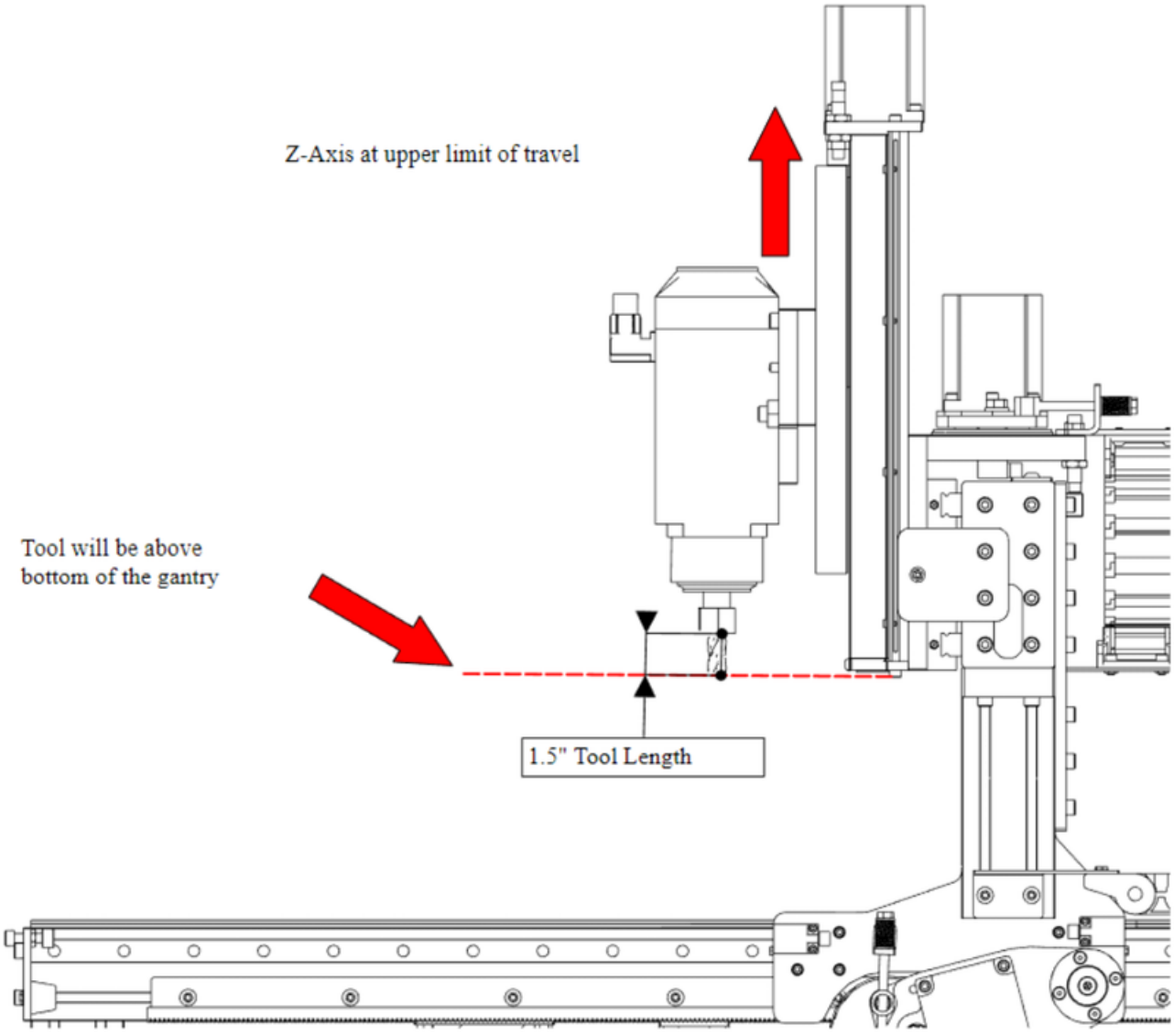


3. A popup window appears, which shows all uploaded attachments to the NC package. This window contains all metadata of the attachments of the selected NC package:



The columns of this window are not resizable.

4. If you want to open the selected attachment, click on its underlined name. The attachment is opened in a new tab if it can be opened. Otherwise it is downloaded to the local machine.



The following files are supported for opening in new tab:

- PDF
- SVG
- JPG, JPEG, PNG, BMP, GIF
- TXT, XML, JSON, LOG, HTM, HTML

5. If you want to download the attachment directly, press on the "Download" button.

10.6.5 Editing NC files

To edit NC files, use the default editor of the FANUC control system.

10.7 NC package details

10.7.1 NC package details

Parameter

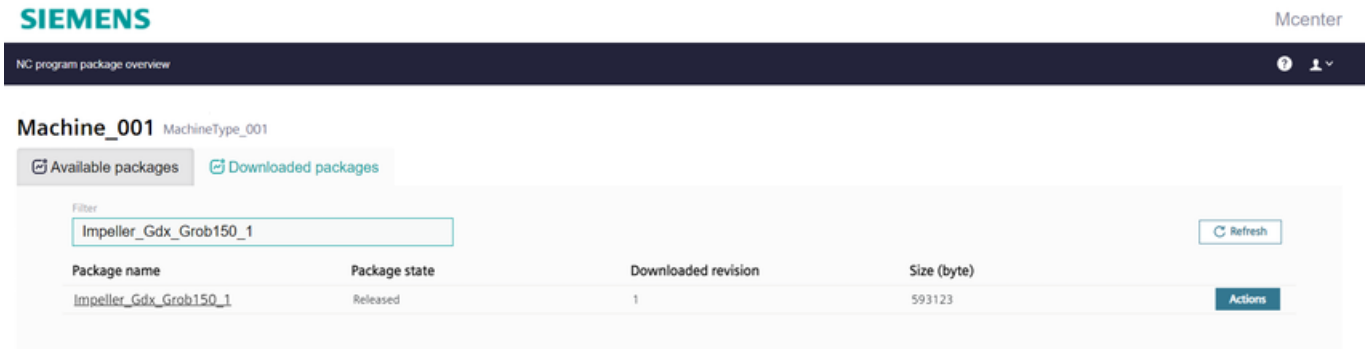
On the NC package details page, you can see the parameters of the opened NC package.

Parameter	Description	
Revision number	Shows the download revision number. The number is incremented for each NC package change.	
Workpiece Id	Workpiece identifier	
External revision	External revision	
State	Shows the following states:	
	Productive	This state indicates that at least one part was produced successfully according to the Machine Operator. This state is manually defined via the CNC user interface.
	Published	NC program packages in this state are visible and available for download from the CNC user interface of the assigned machine but not any others. This state is manually defined via the Server application or via openness API.
	Trial-run in progress	The NC package is marked with "Trial-run is required". The corresponding NC programs have already been downloaded to the control system. This state is automatically set.
	Trial-run completed	The NC package is marked with "Trial-run is required". The corresponding NC programs have already been uploaded to the server. This status is automatically set.

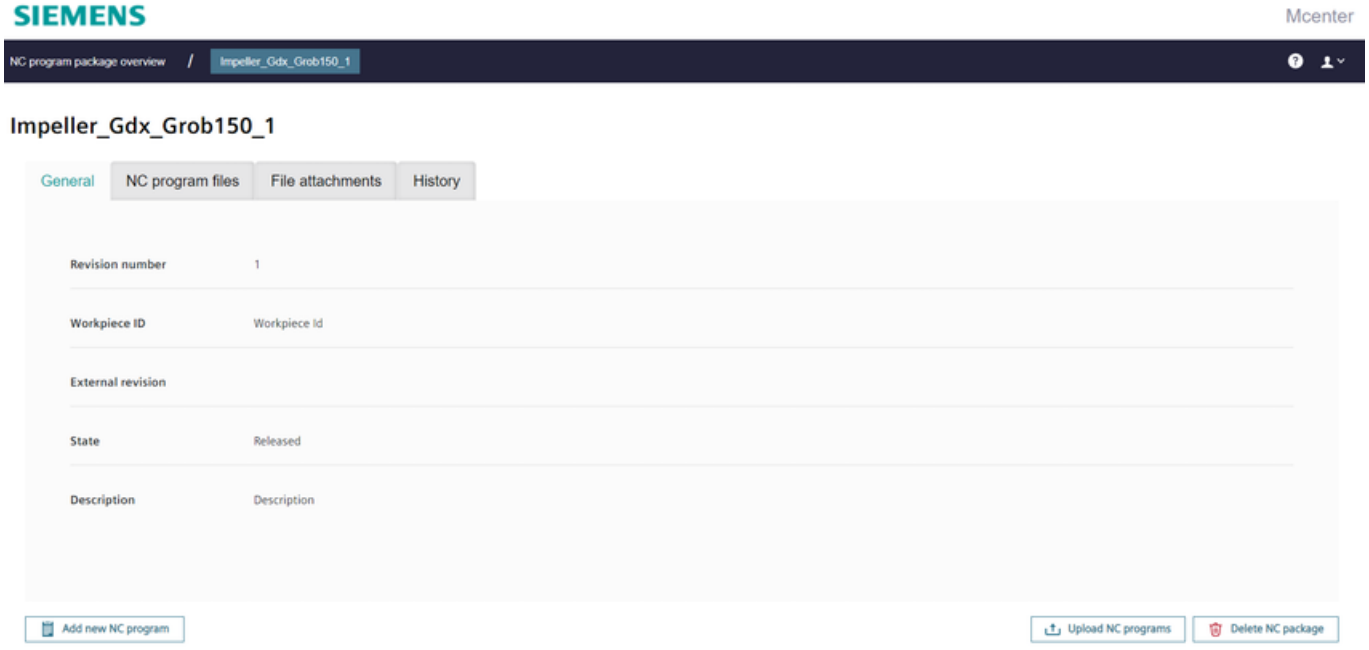
Parameter	Description	
	Review in progress	In manual handling mode, when the NC package is changed, the newly created revision is marked as "Review in progress" and has to be reviewed to use in production.
	Review completed	In manual handling mode, when the review of the NC package is completed. In this state, the package can be released.
	Released	The NC package has deactivated the marking "Trial-run is required". The NC programs have already been downloaded to the control system. In this case the state is automatically set. - OR - You accept the changes that were made while running in the NC program. This status is manually defined via the Server application or via openness API.
	Locked	In the "Locked" state, the NC package cannot be used for production.
Description	Description of the NC package	

Procedure

1. Open the "Downloaded packages" tab.



2. Select the required NC package. To open, click on the underlined name of the NC package. A new page will open with the details of the NC package.



10.7.2 NC program files

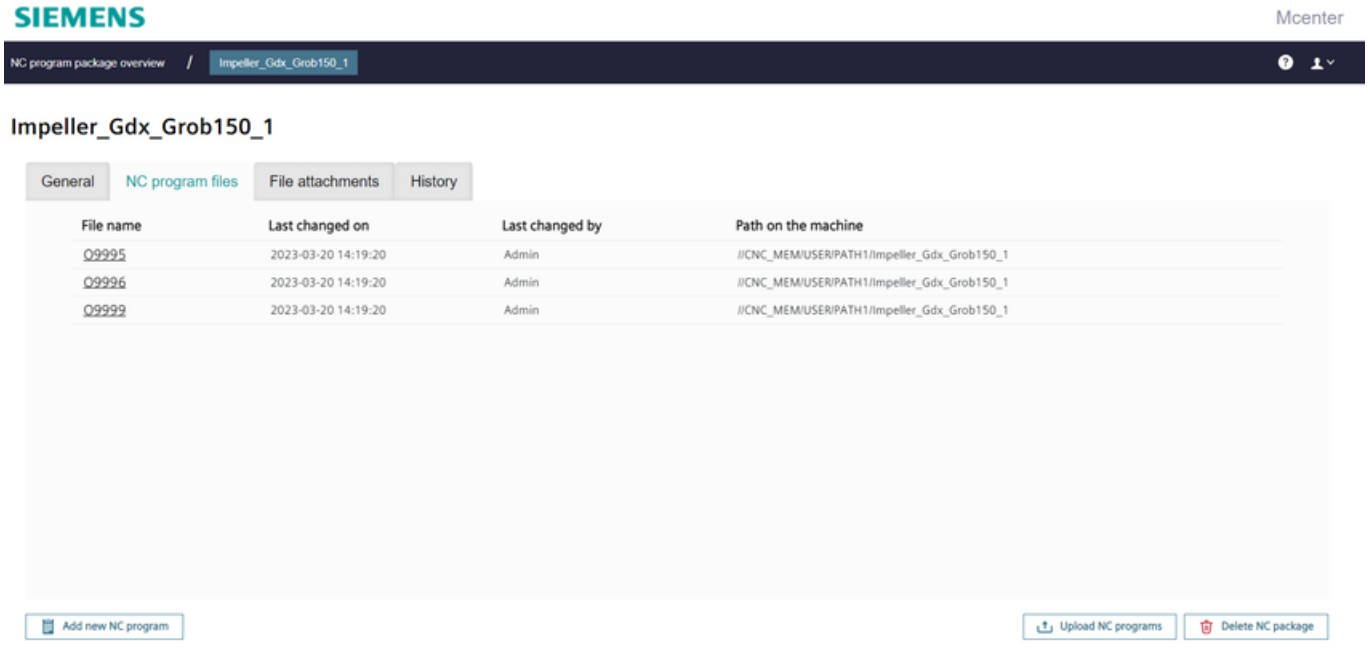
Parameters

On the NC files tab of the details page, you can see all of the assigned NC programs to the NC package.

Parameter	Description
File name	The name of the NC program
Last changed on	The last modification date of the NC program
Last changed by	The last user who changed the NC program
Path on the machine	Displays the full path of the NC program in the machine

Procedure

1. Click on the "NC Files" tab.
2. The assign NC programs are shown in a table.

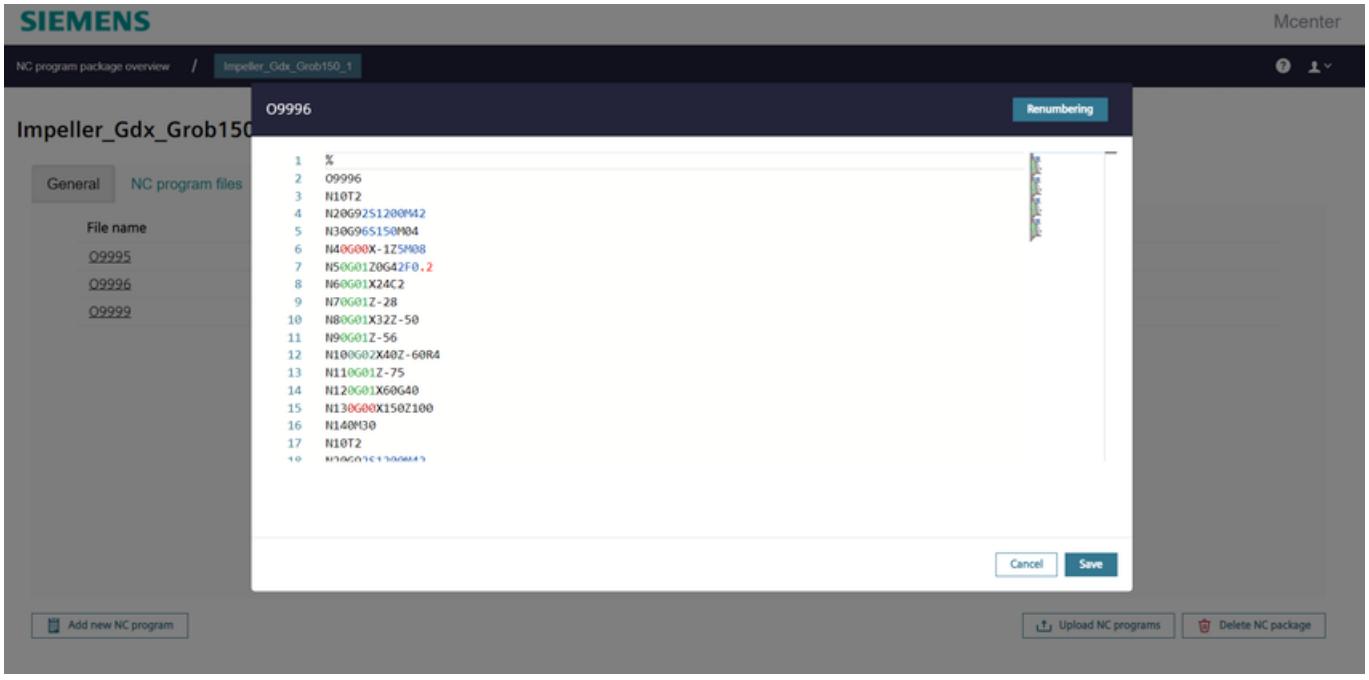


10.7.3 Editing NC files

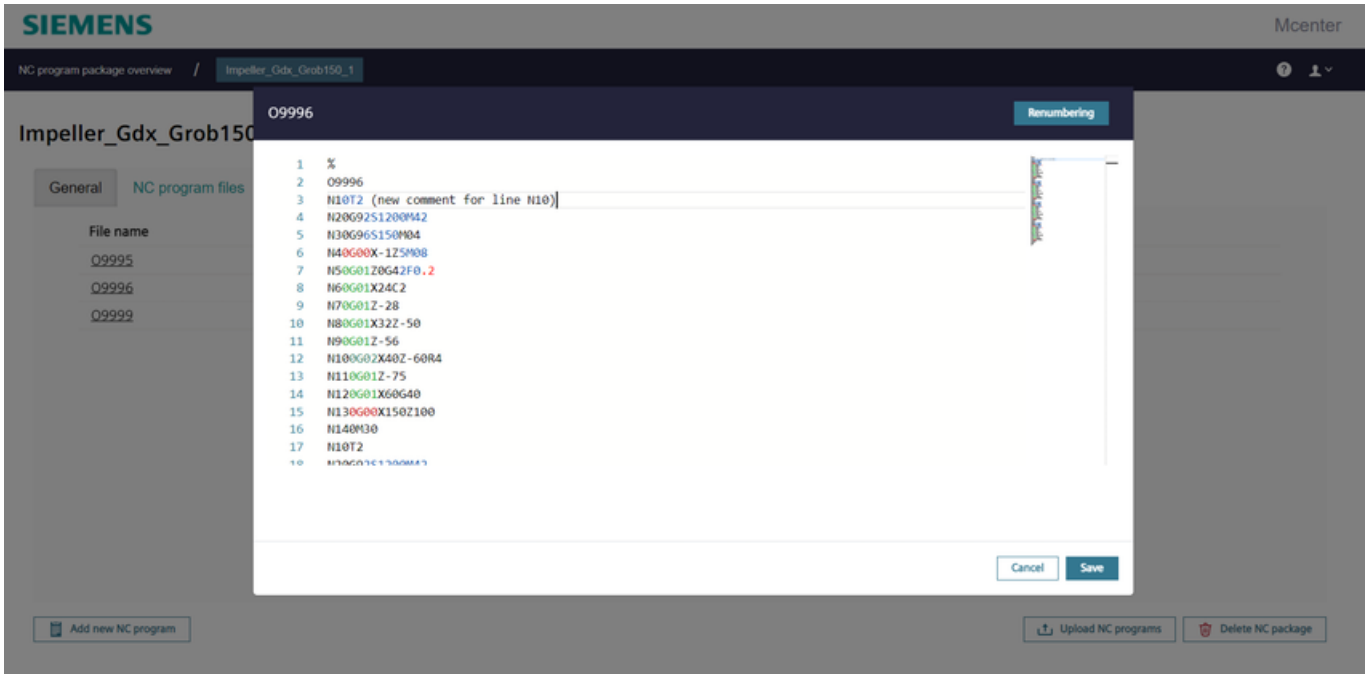
Procedure

On the NC files tab, you can open the already downloaded NC programs.

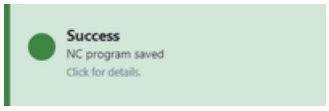
1. Click on the underlined name of the NC program
2. The content of the NC program opens in a popup window



3. In this window, you can change the content of the NC program



4. To save the changes, press the "Save" button. If the save was successful, a notification window is shown.



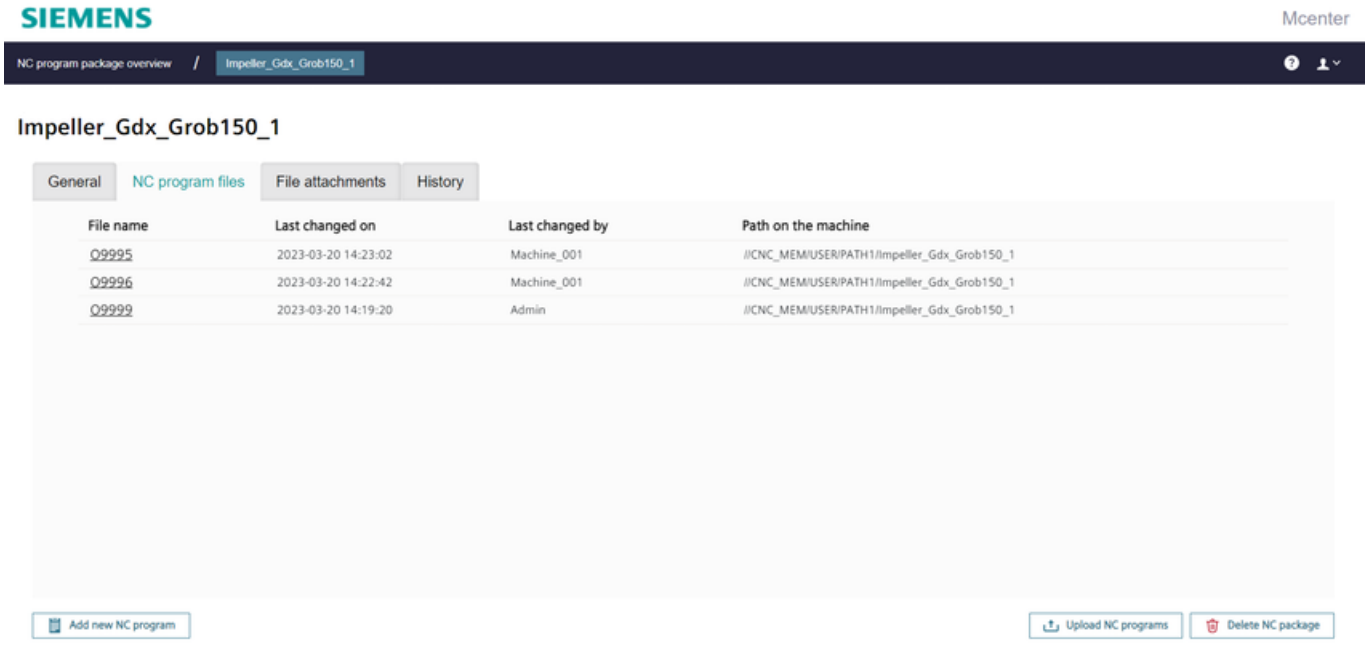
5. To discard the changes, press the "Cancel" button.

10.7.4 Comparing NC file changes

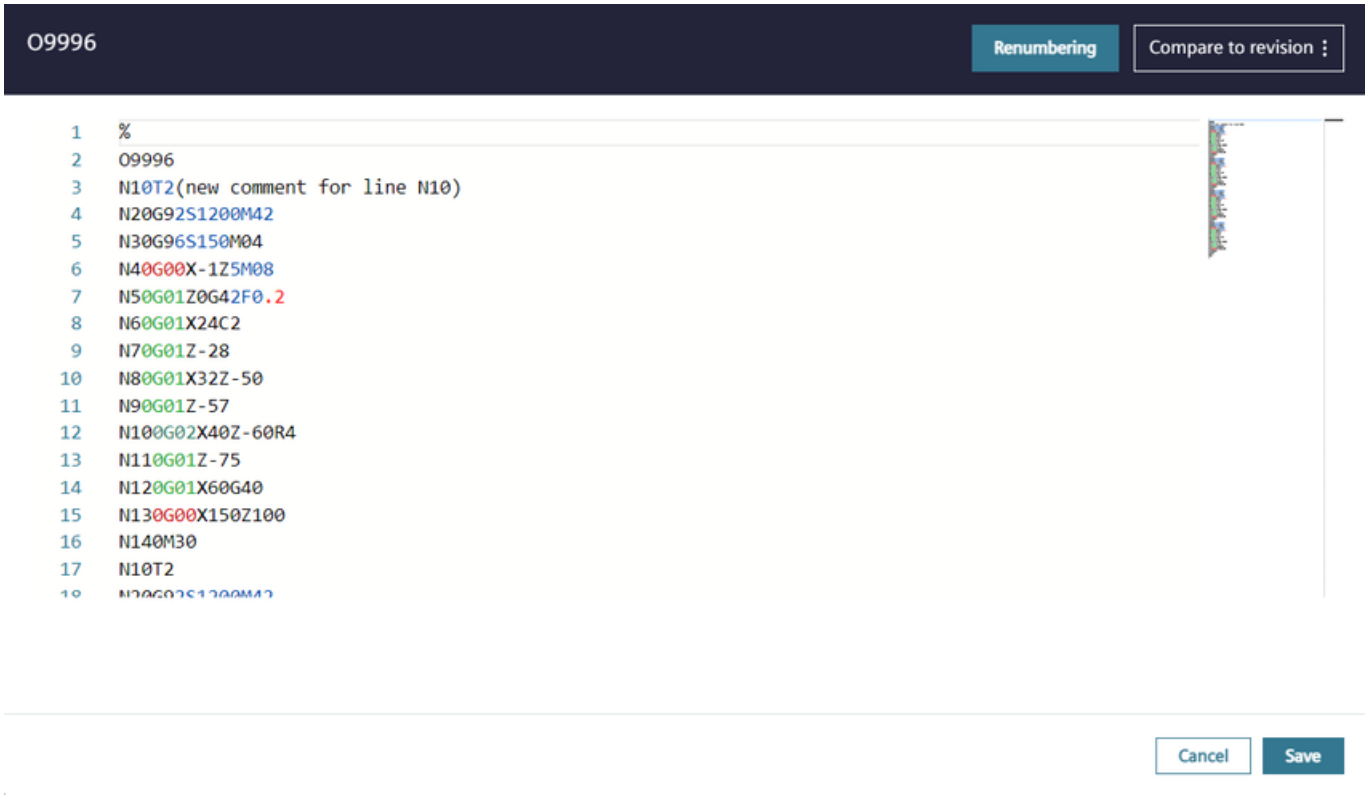
Procedure

On the editor window of the NC program, you can display the differences between revisions.

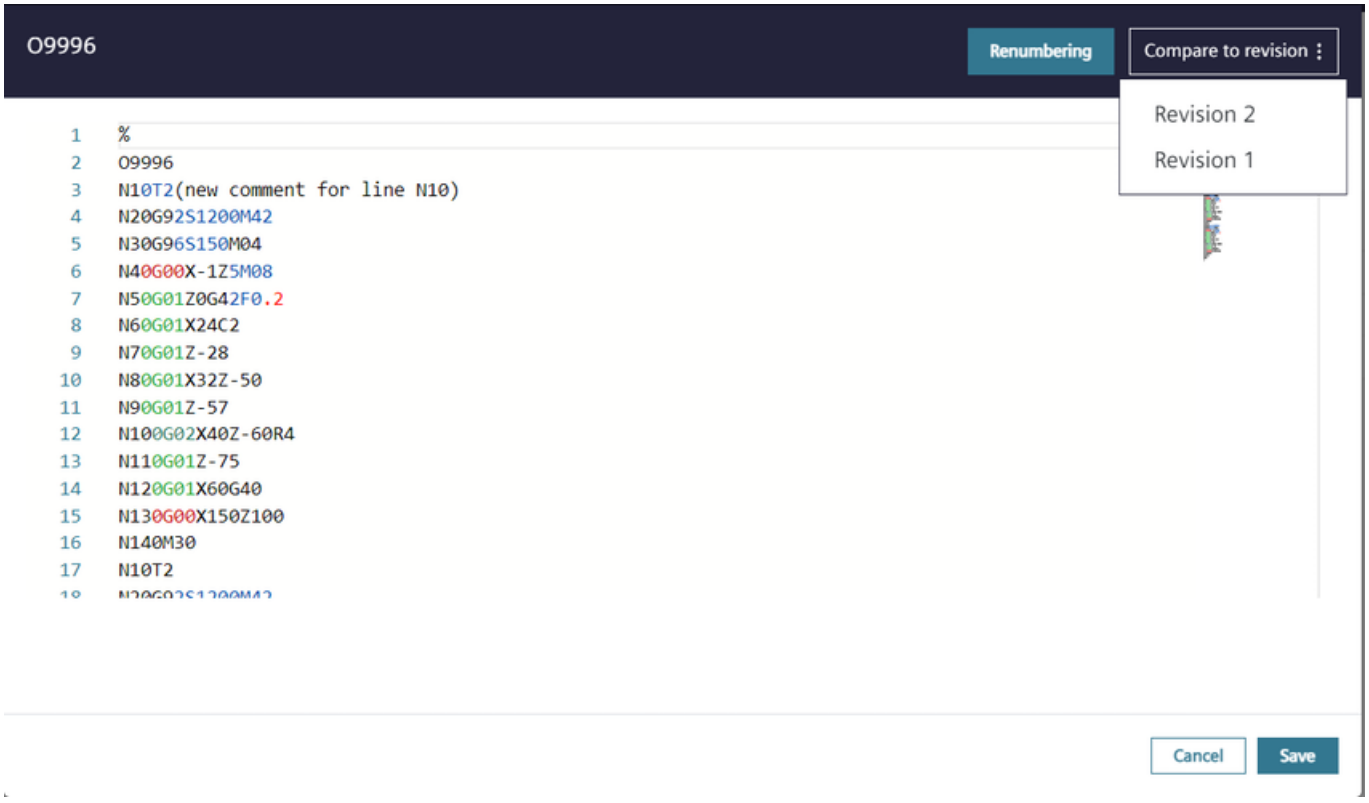
1. Click on the underlined name of the NC program



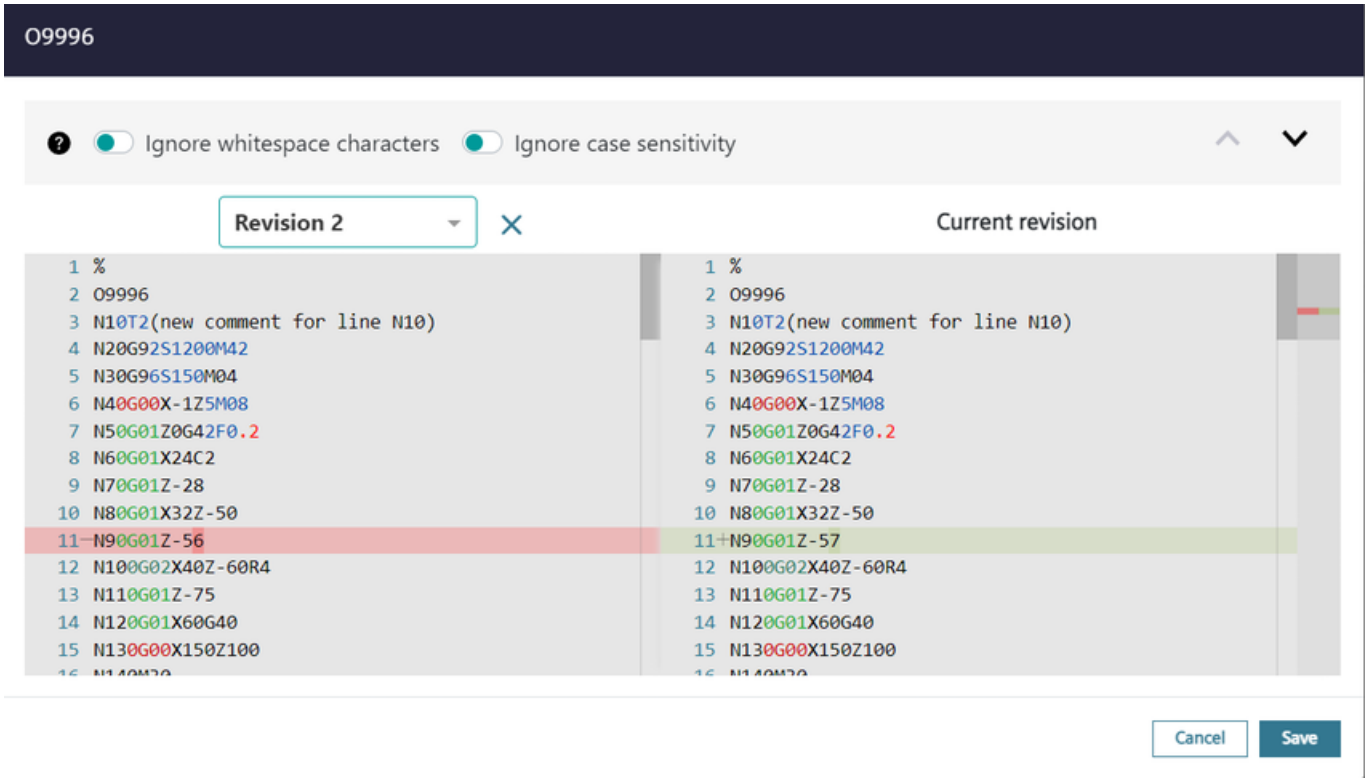
2. The content of the NC program opens in a popup window


O9996
Renumbering
Compare to revision
%
O9996
N10T2(new comment for line N10)
N20G92S1200M42
N30G96S150M04
N40G00X-1Z5M08
N50G01Z0G42F0.2
N60G01X24C2
N70G01Z-28
N80G01X32Z-50
N90G01Z-57
N100G02X40Z-60R4
N110G01Z-75
N120G01X60G40
N130G00X150Z100
N140M30
N10T2
Cancel
Save

3. Click on the "Compare to revision" dropdown to select a revision



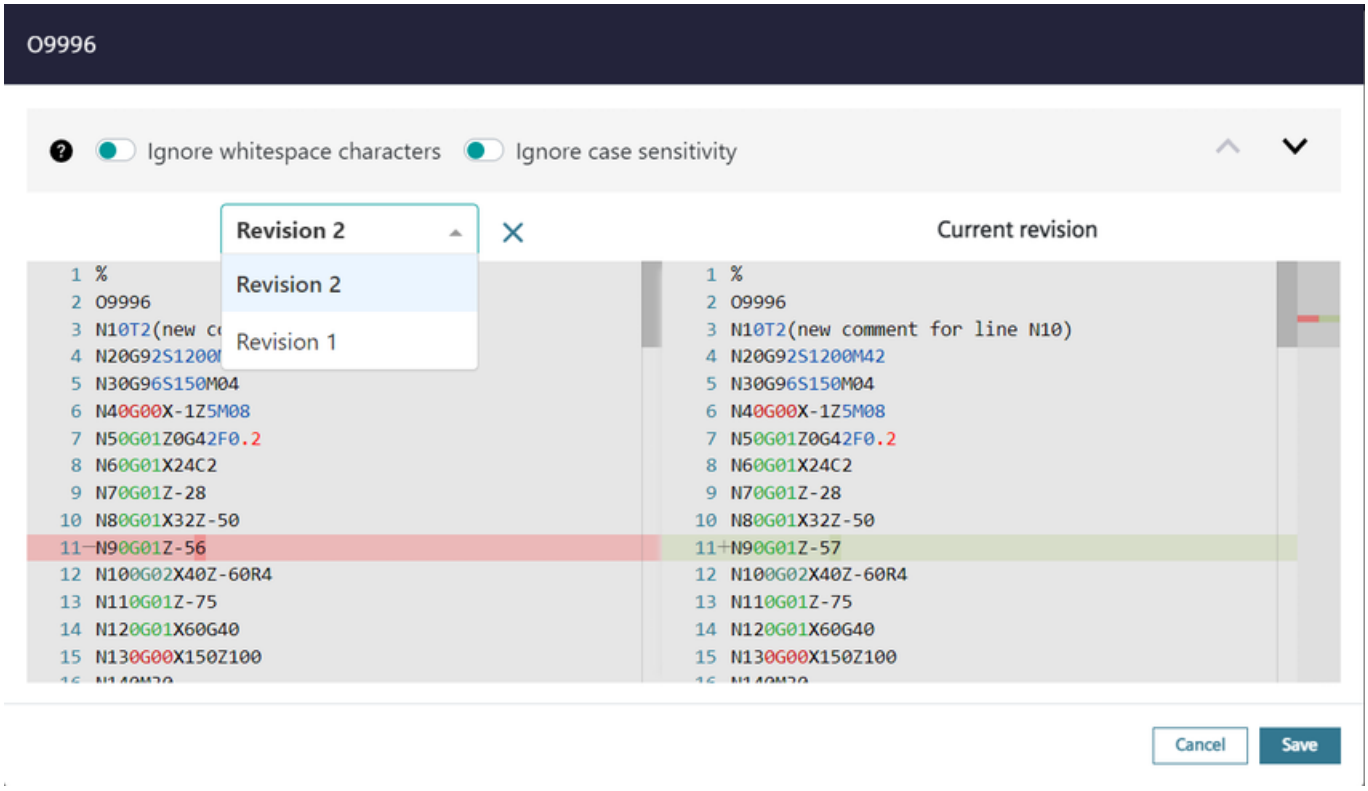
4. By clicking on the selected revision, the comparer component is shown.



Comparing revisions

In this window, you can see the differences between revisions. On the left side is displayed the selected revision.

You can re-select a different revision by clicking on the revision dropdown.



You can close the comparing function by clicking on the "X" icon.

On the right side, the current content of the NC program is displayed.

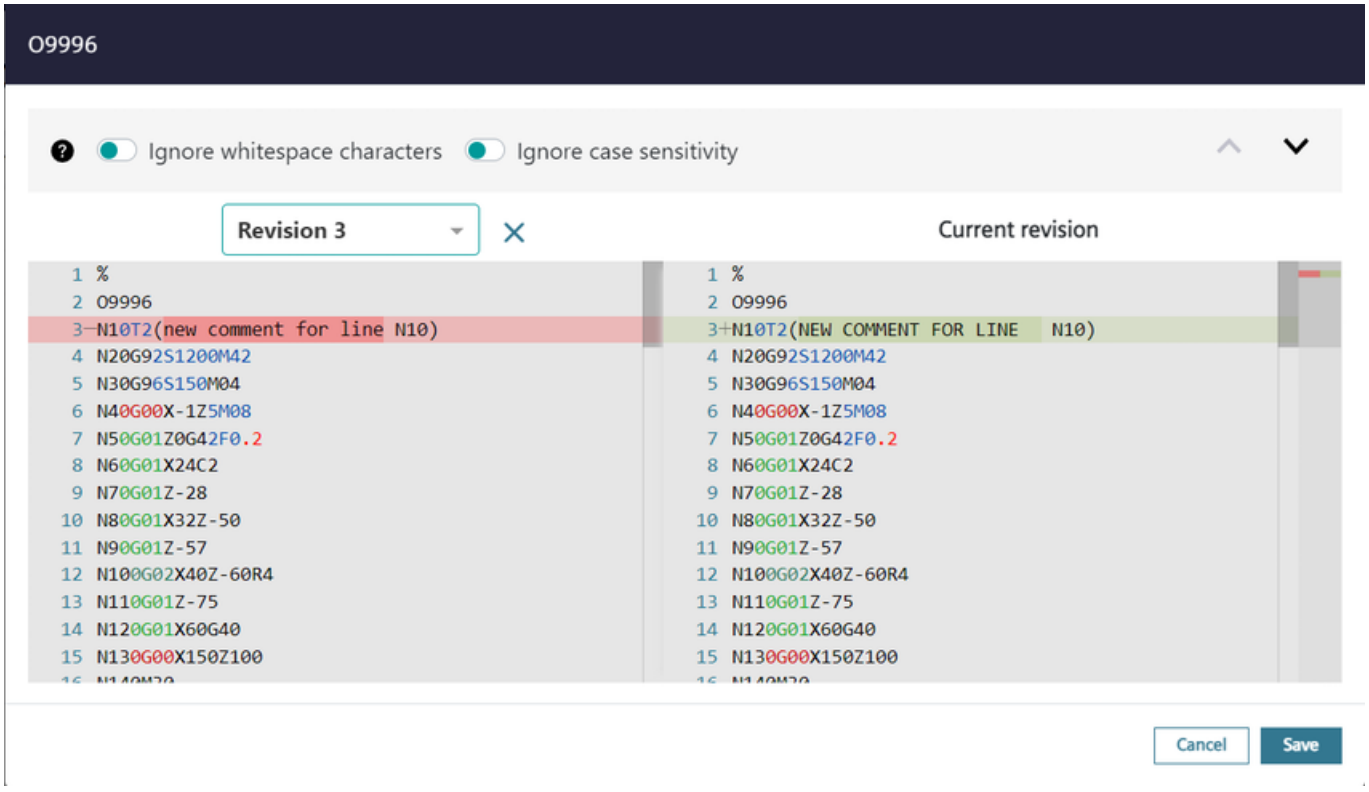
By clicking on the up arrow on the top right corner, you can navigate to the previous difference, and by clicking on the down arrow, you can navigate to the next difference.

Ignore differences

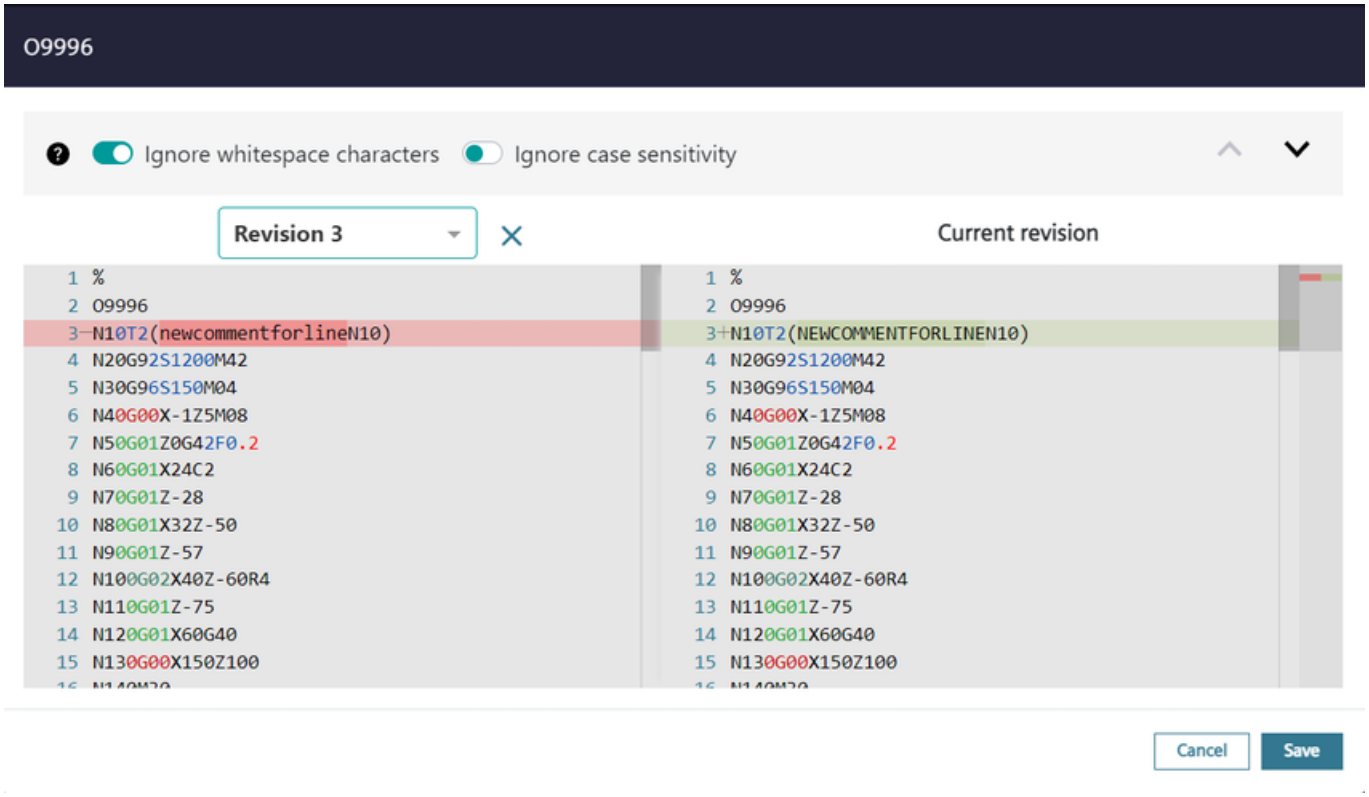
You can change the comparer options to ignore whitespace characters and case sensitivity.

Note

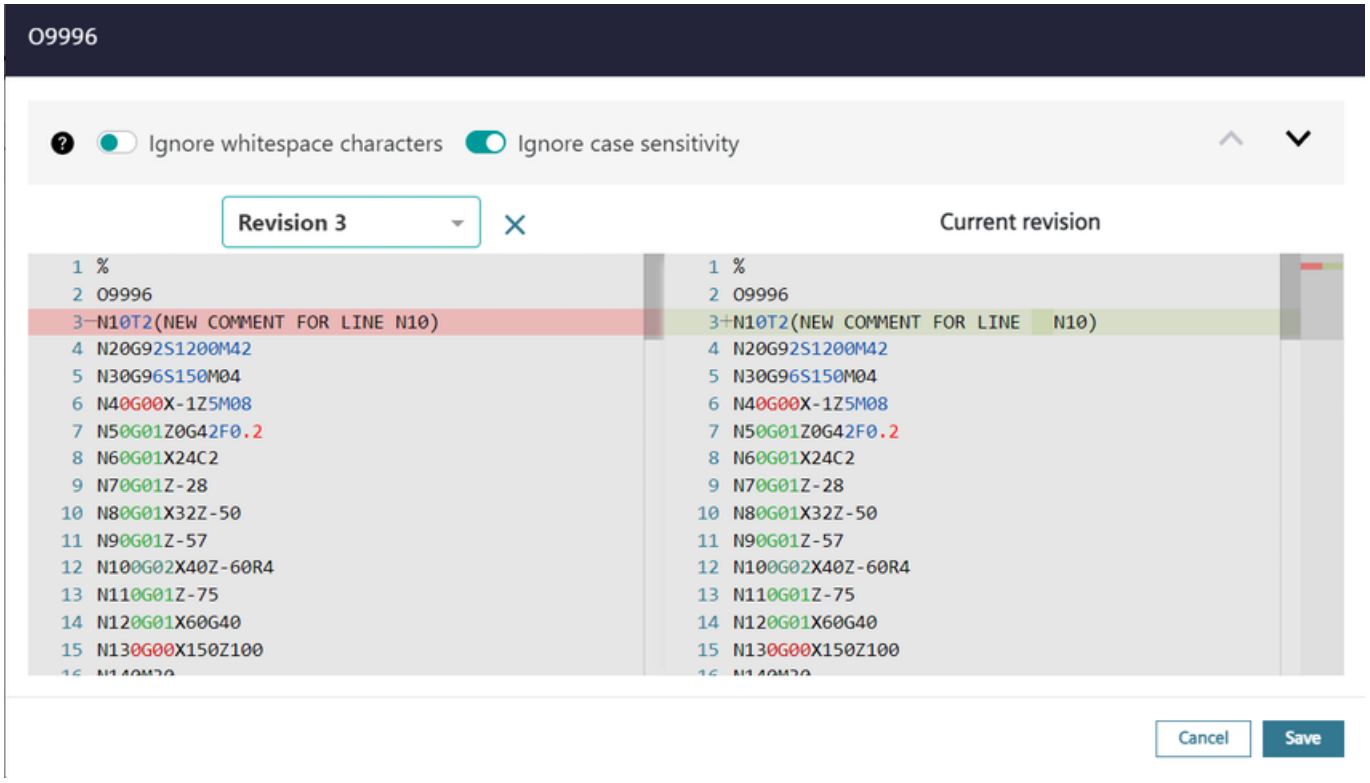
Ignoring whitespace characters and case sensitivity does not change the original NC program.



By checking the "Ignore whitespace characters", the comparer ignores whitespace differences.



By checking the "Ignore case sensitivity", the comparer ignores case differences.



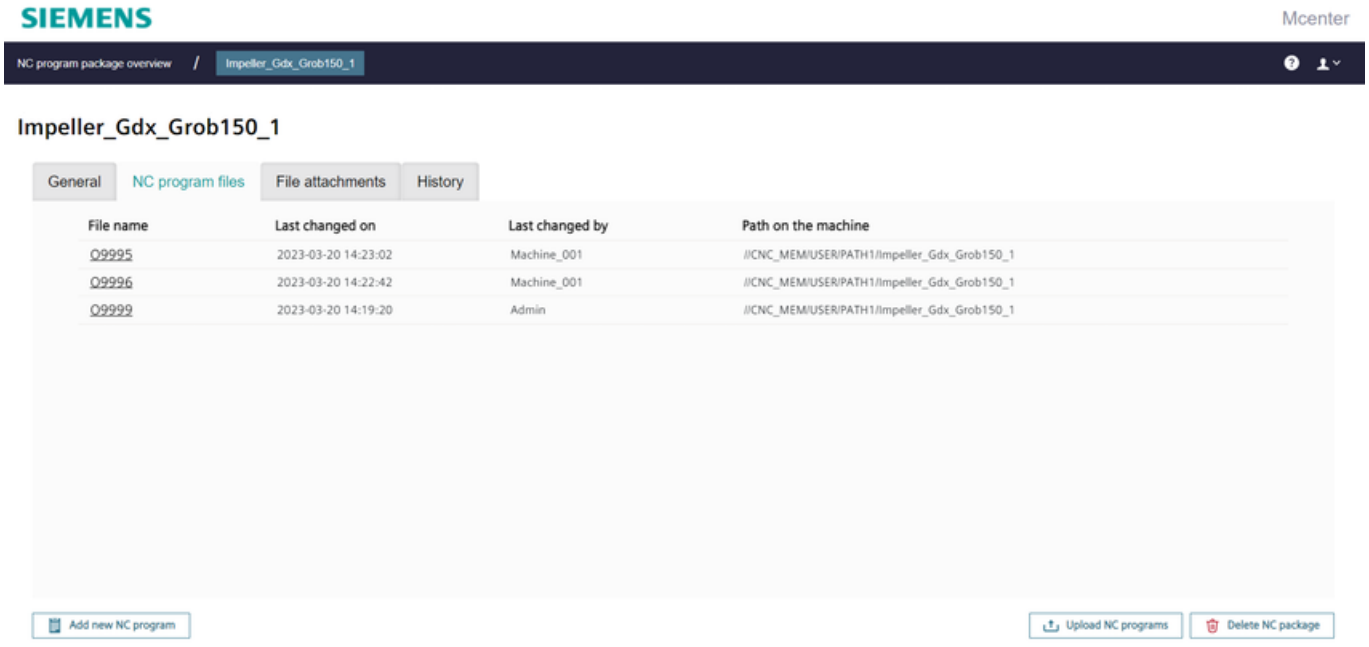
It is possible to combine the two of them.

10.7.5 Renumber NC files

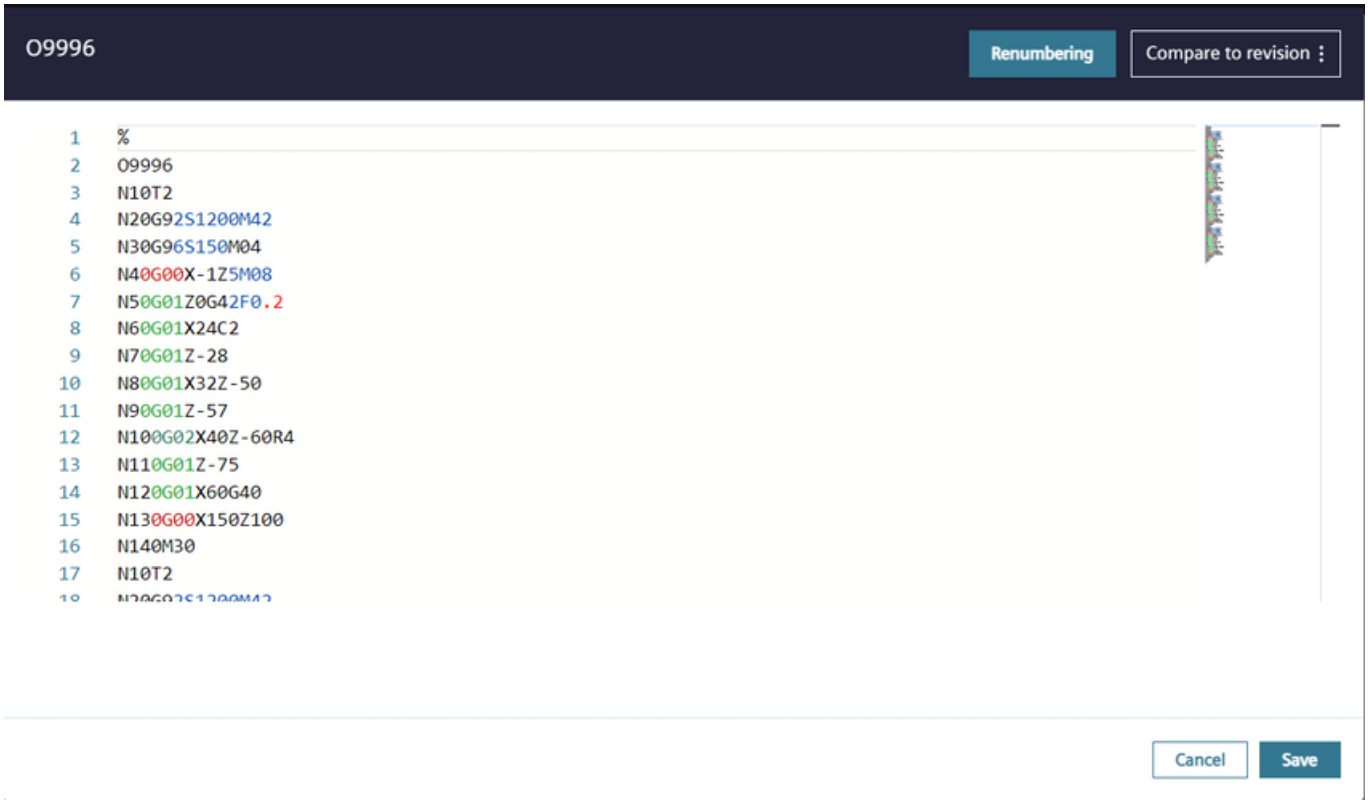
Procedure

On the editor window of the NC program, you can renumber the selected NC program content.

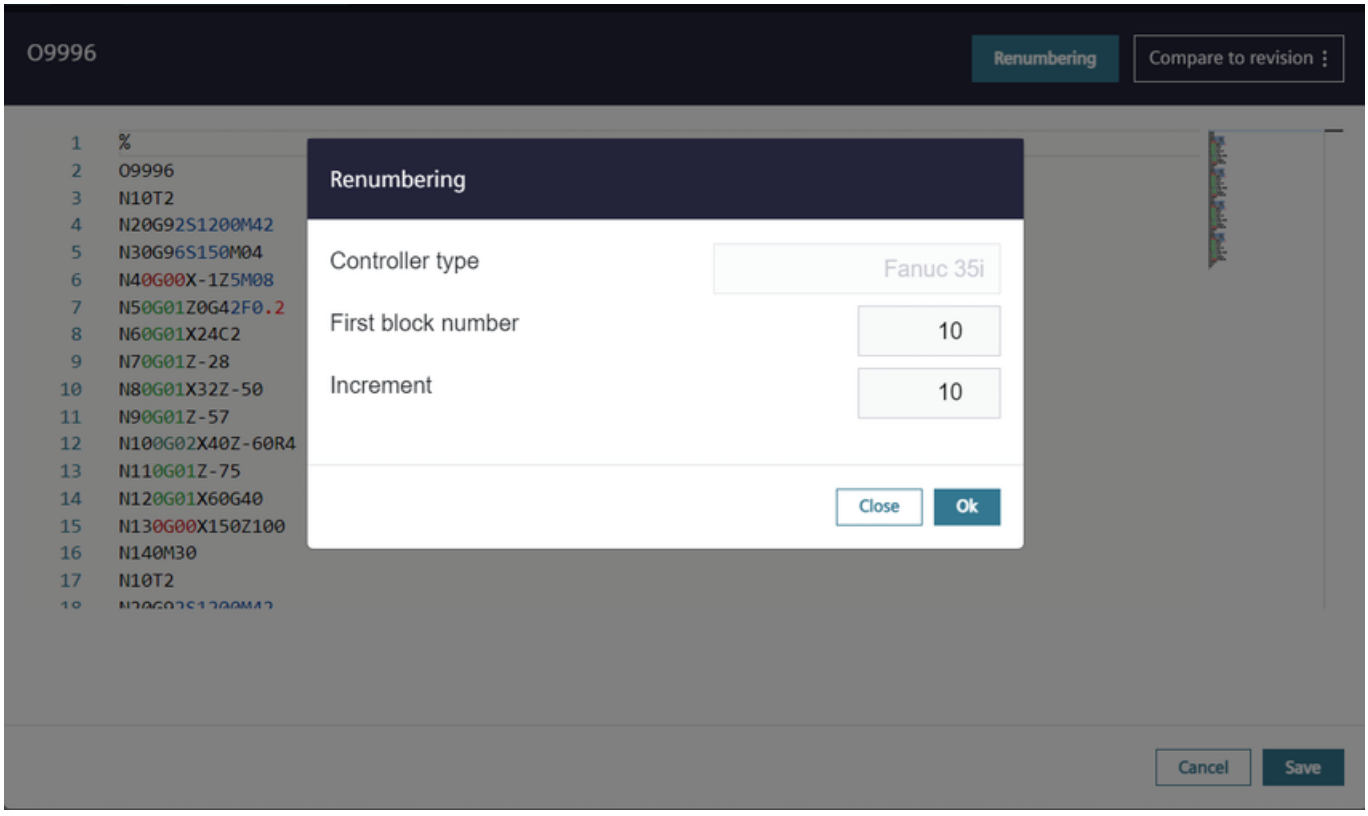
1. Click on the underlined name of the NC program.



2. The content of the NC program opens in a popup window.



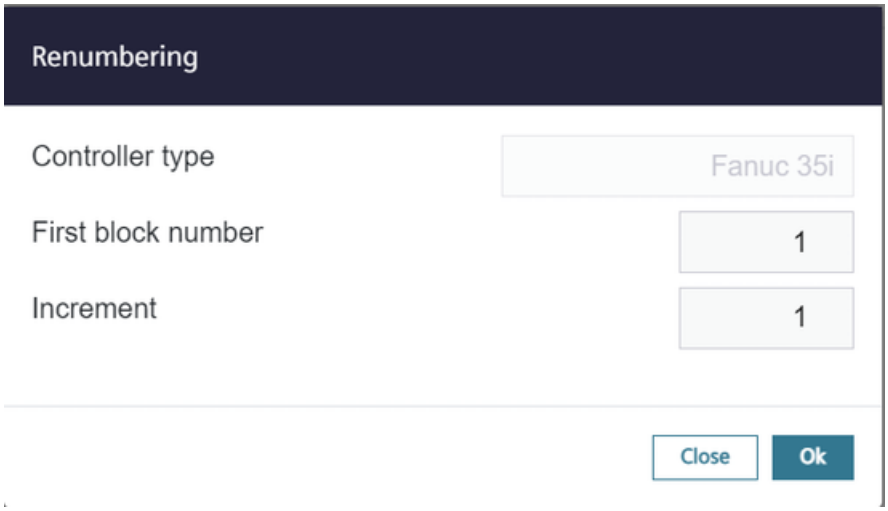
3. Press the "Renumbering" button to open renumbering input window.



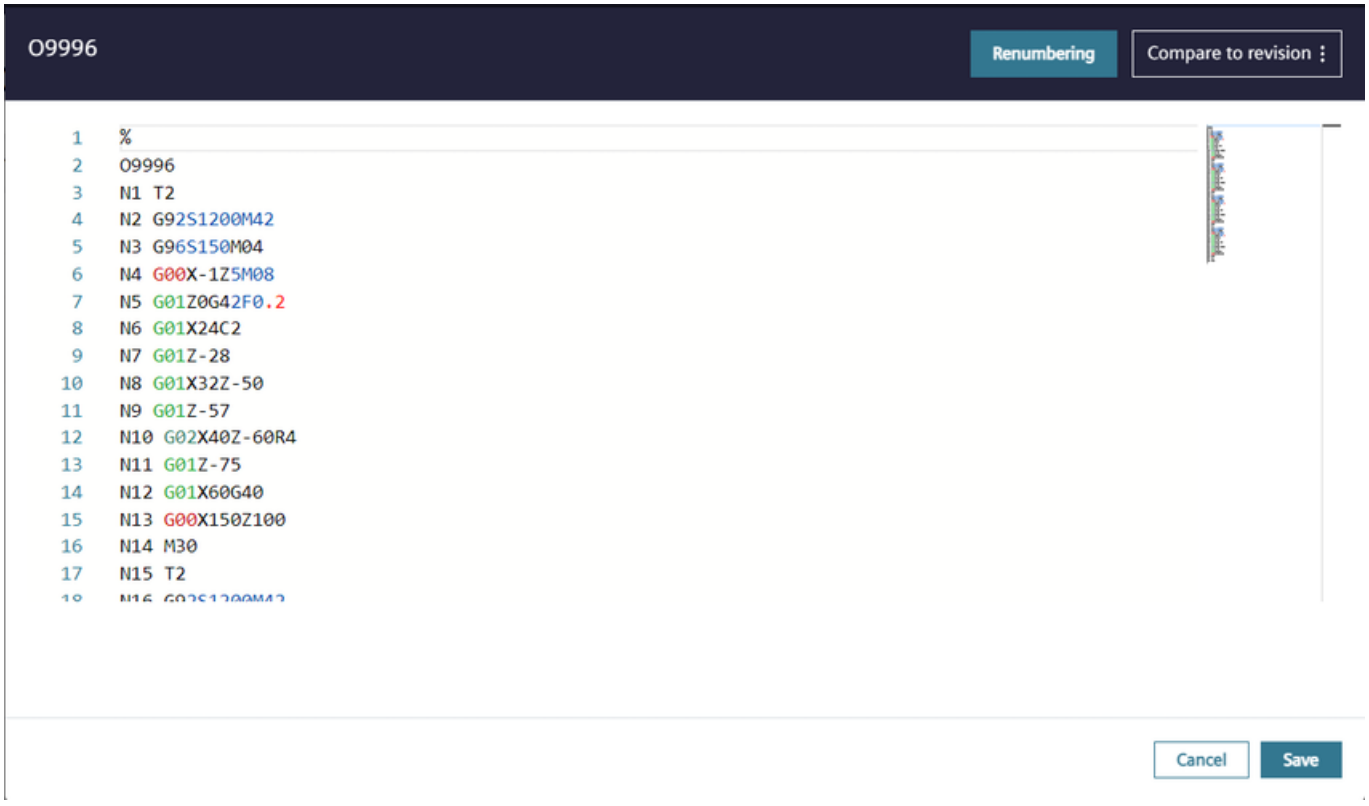
Renumbering

In the renumbering window, you can adjust the parameters to your liking, meaning you can set the first blocks number and the value of incrementation.

To start the renumbering, press the "Ok" button, to cancel, press the "Close" button.

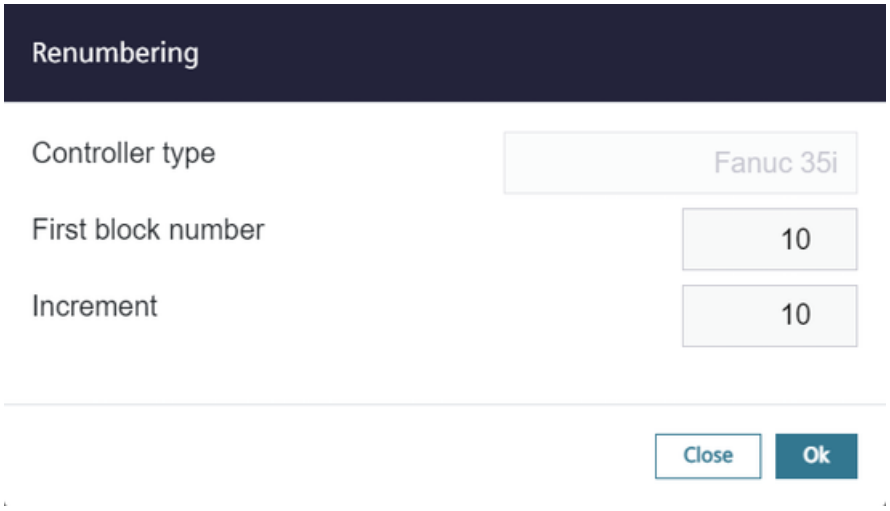


After pressing the "Ok" button, the window closes and the NC program content viewer renumbers the content by the given parameters.

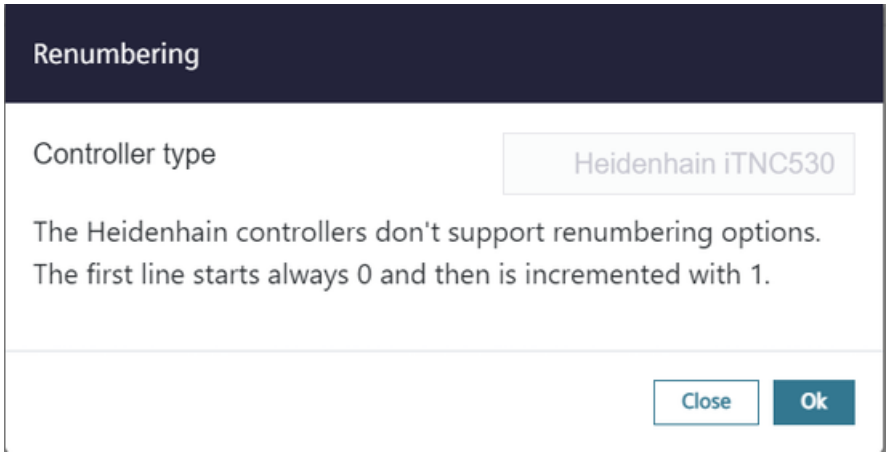


The renumbering can be different by the controller type of the machine, meaning every controller type has it's own renumbering feature.

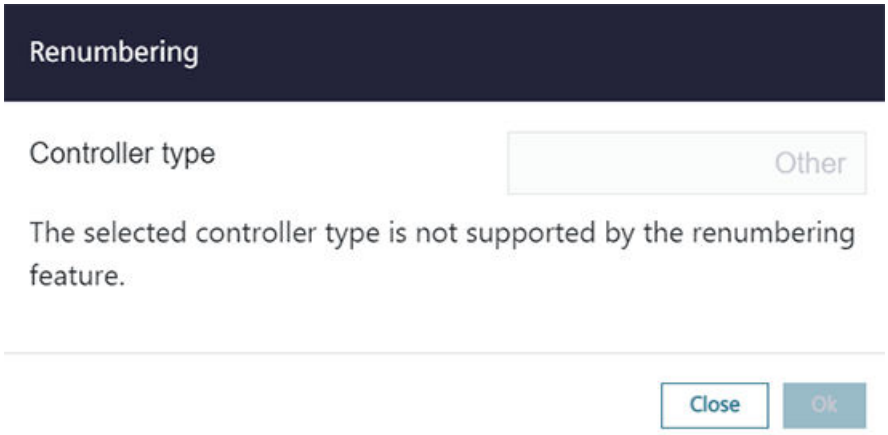
- Supports first block number and increment setting:
  - Fanuc
  - Siemens SINUMERIK



- Supports renumbering without setting parameters (renumbering is predefined):
  - Heidenhain



- Renumbering is not supported:
  - every other controller



10.7.6 Attachments

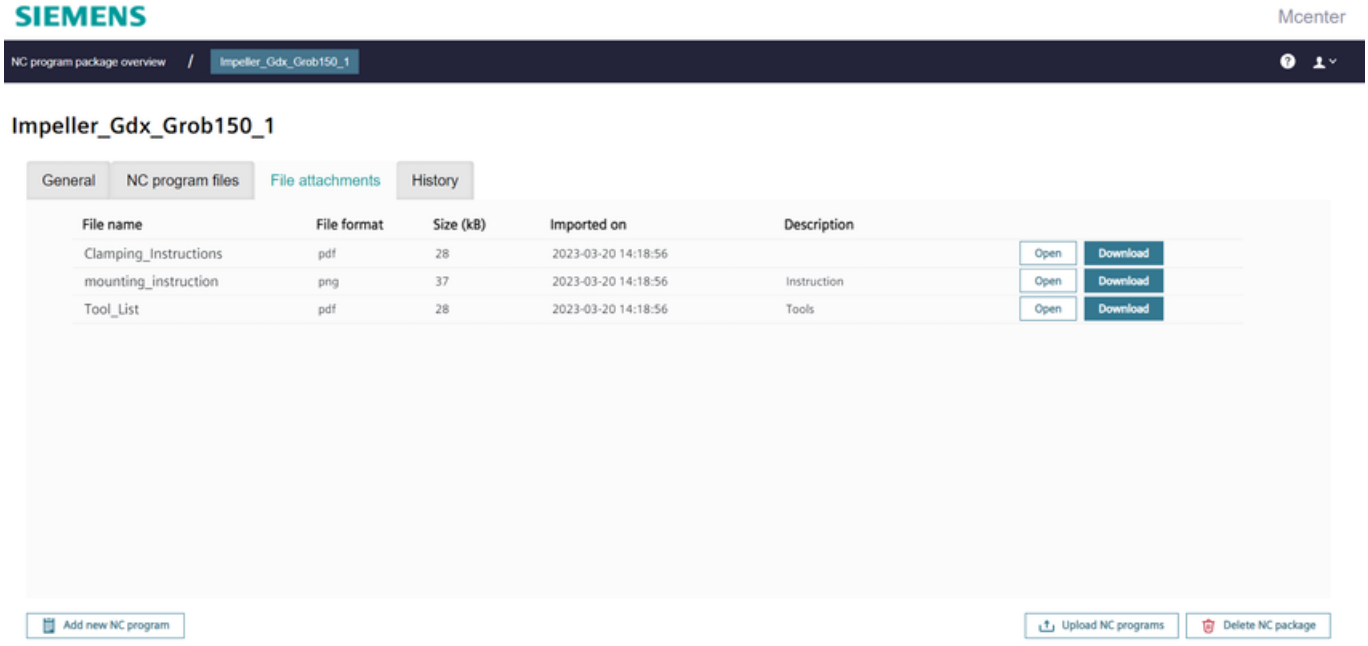
Parameters

On the Attachments tab of the details page, you can see the uploaded attachments for the selected NC package.

Parameter	Description
File name	The name of the attachment
File format	The format of the attachment
Size (kB)	Size in kilobyte
Imported on	Attachment upload date
Description	The description of the attachment

Procedure

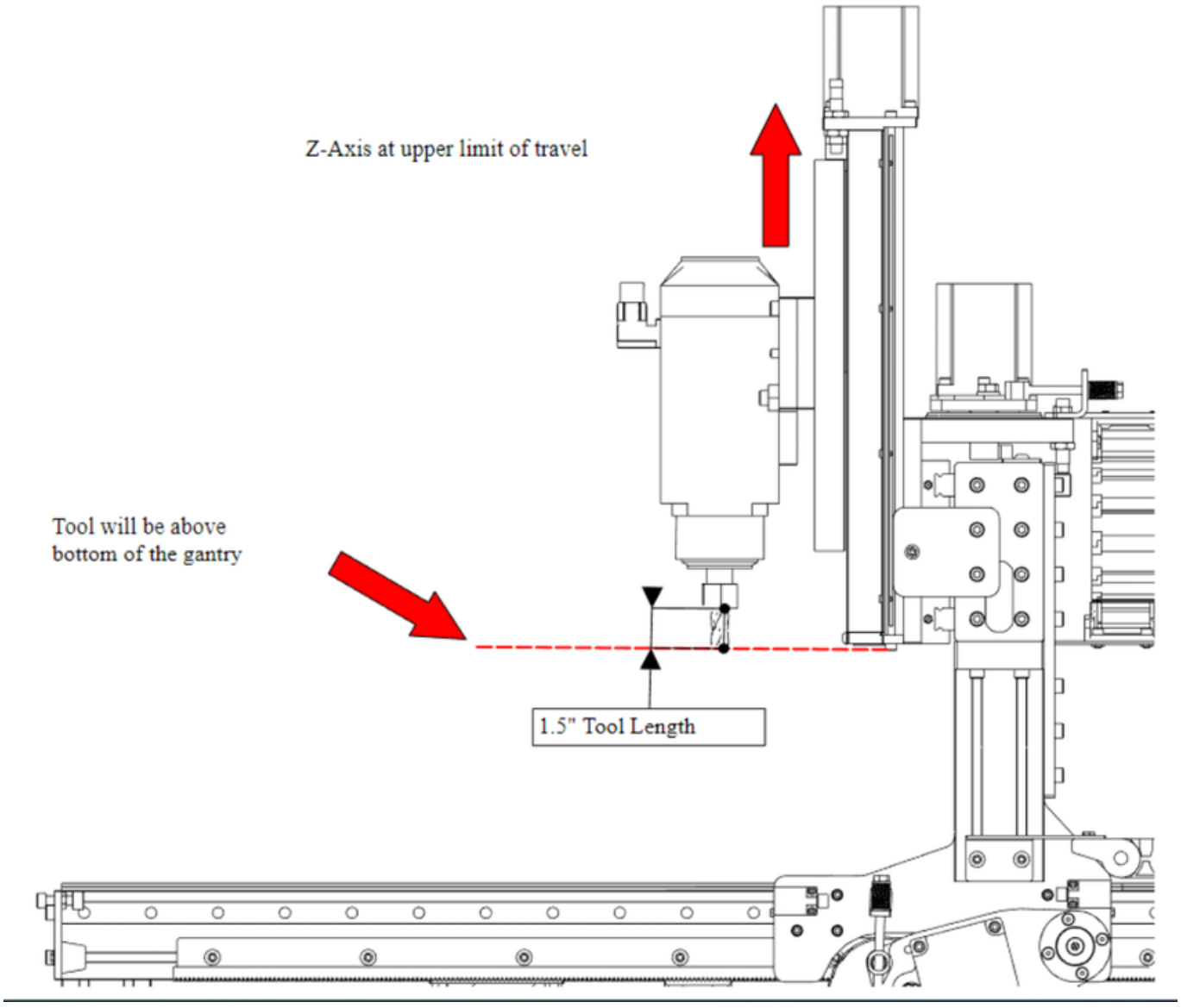
1. Click on the "File attachments" tab.
2. The uploaded attachments are shown in a table.



Handling attachments

If the browser supports the a file, it can be opened. You can do it by clicking on the selected attachment "Open" button.

If it can be opened, the file is opened in a new tab, if not, the application auto downloads the selected file.



The following files are supported for opening in new tab:

- PDF
- SVG
- JPG, JPEG, PNG, BMP, GIF
- TXT, XML, JSON, LOG, HTM, HTML

You can download the attachment without opening if you click on the "Download" button.

By doing this, the browser auto downloads the file to the browser's download folder or the download location selector opens, where you can select the download location of the specific attachment.

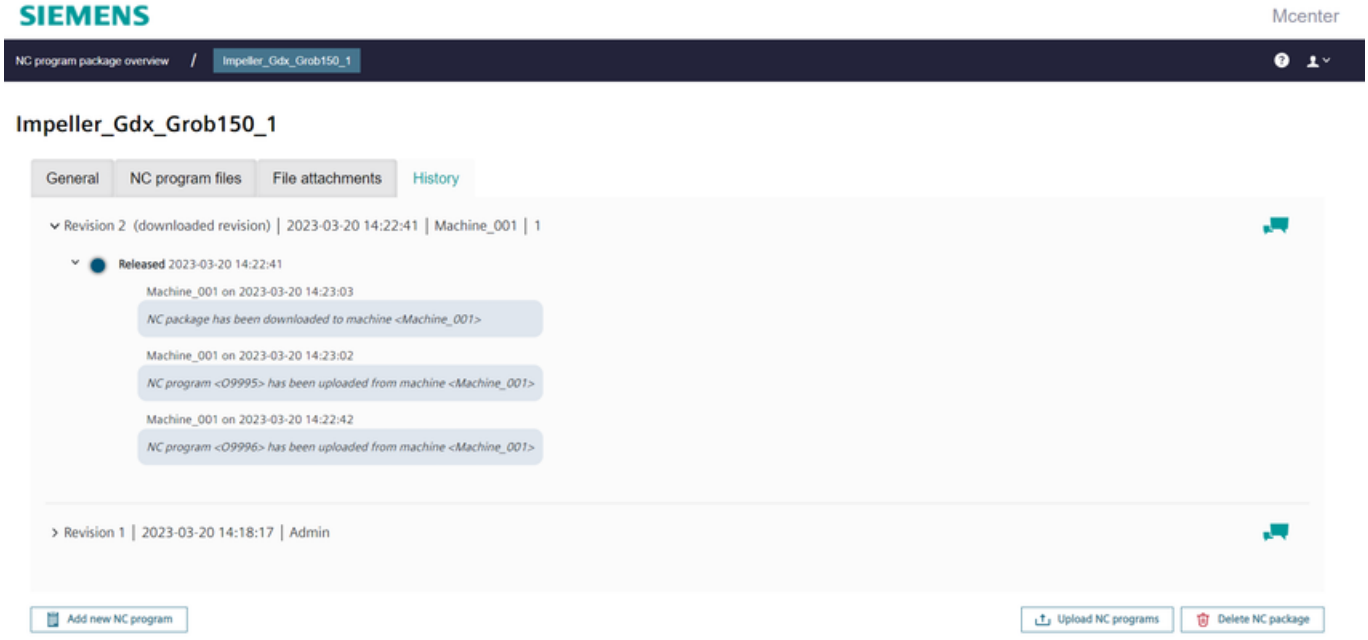
10.7.7 History

Procedure

On the History tab of the details page, you can see the chronological order of the revisions, including their comments.

In this tab you can also add new comments to the selected revisions.

1. Click on the "History" tab.
2. The revisions of the NC package are displayed in a chronological order.
   The currently downloaded revision is opened, and the other revisions are collapsed.



Handling revisions

For each revision the following parameters are displayed side-by-side:

Parameter	Description
Revision number	The number of the revision Note: The downloaded revision is pre opened and marked as "downloaded revision"
Creation date	The creation date of the revision
Creation by	Creator of the revision
Traces from revision	Parent revision

Hovering the cursor to these parameters displays the description in a tooltip.

Below each revision, the different states of the revision are shown in a descending order with their creation date.

In order to display only relevant comments, you can open and close the states by clicking on the arrow on the left-hand side.

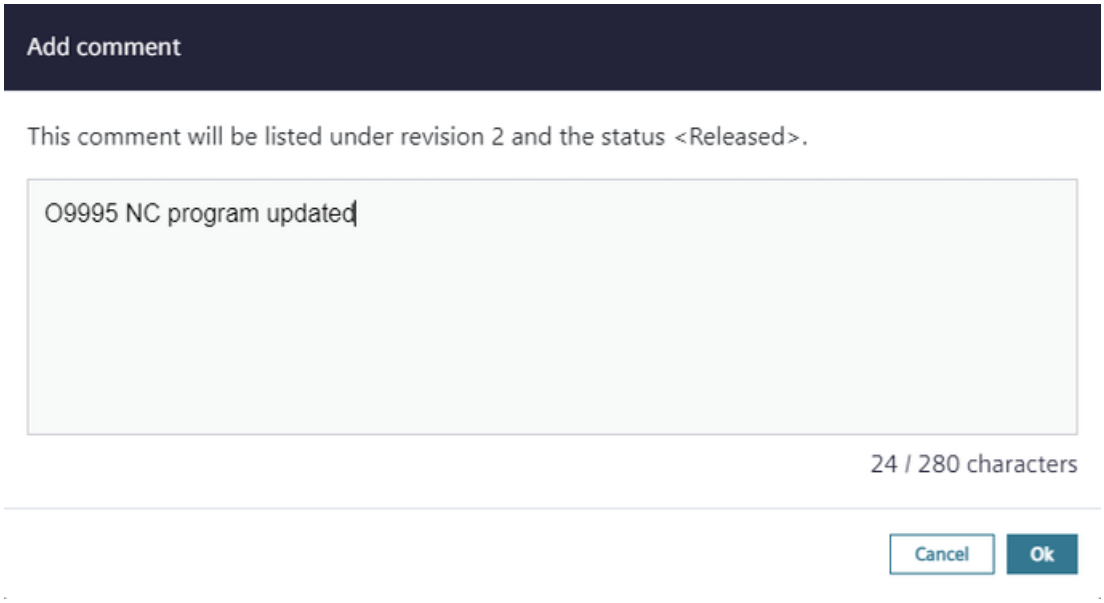
Adding comments

You have the option of adding comments to an NC program package.

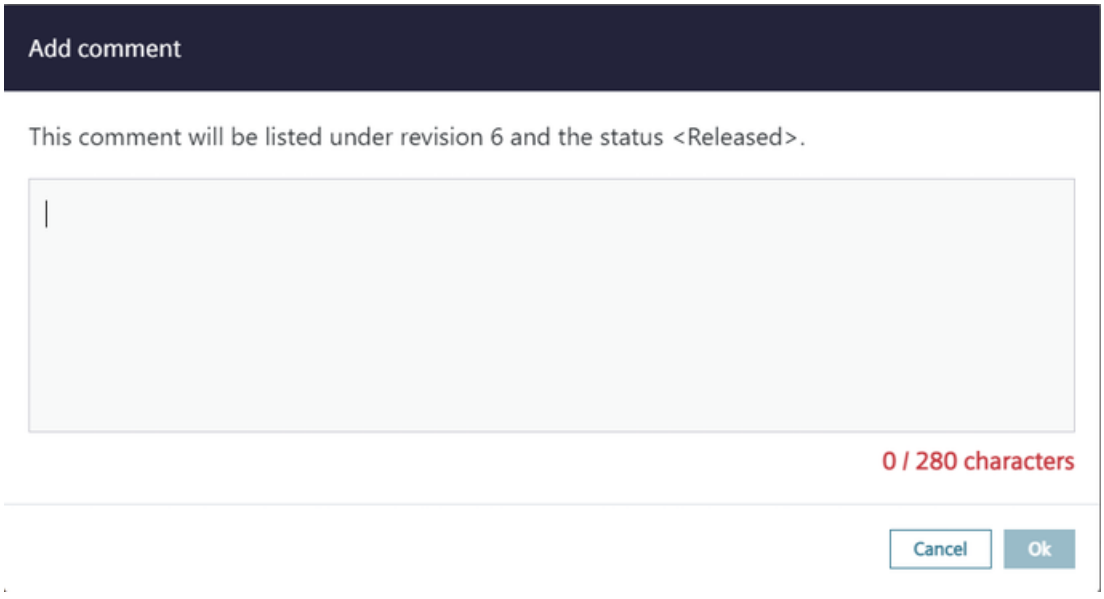
Procedure

1. Select the revision which you want to add a new comment
2. Click on the comment icon

3. A popup appears into which you can enter your new comment. You can enter a maximum of 280 characters into the entry field.
   Click on "Ok" to add the comment.
   Click on "Cancel" to cancel the operation.



4. If the comment is not valid, it is not possible to add the comment

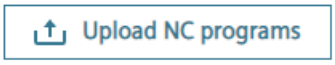


10.7.8 Upload NC programs

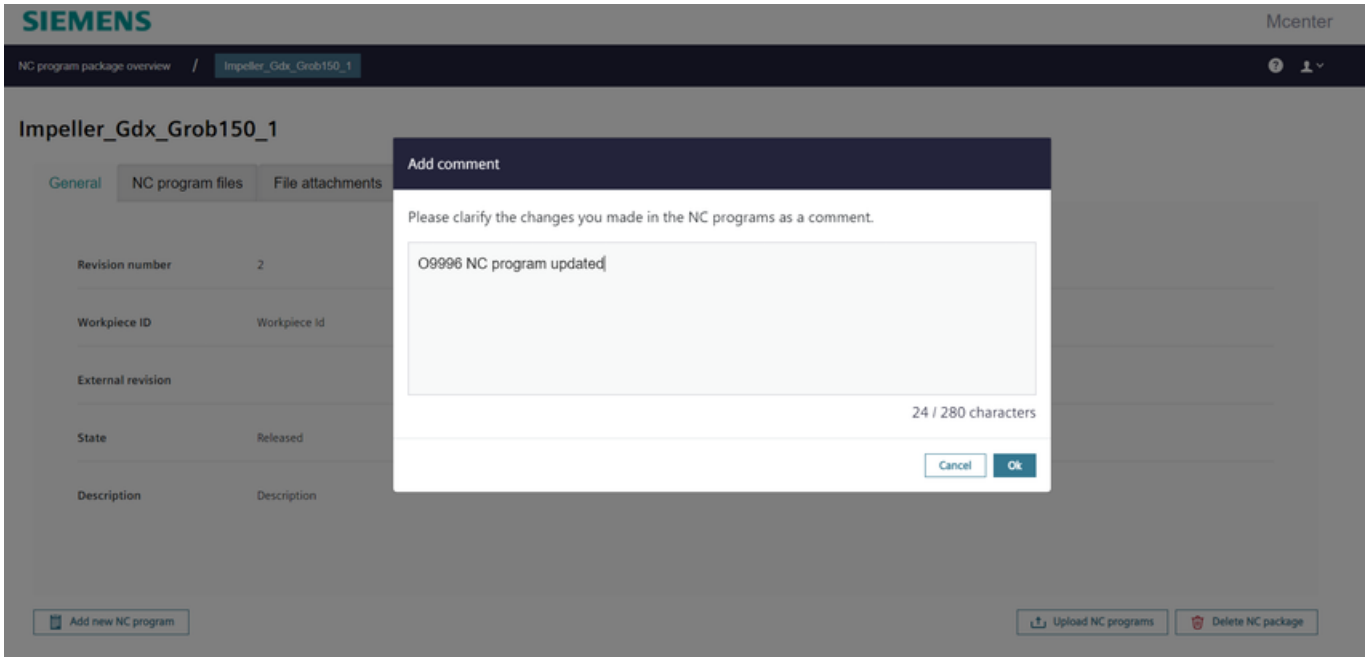
Procedure

In the details page of an NC package, you can upload all modified NC program.

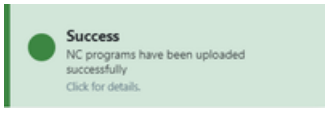
1. Navigate to the selected NC package
2. Press the "Upload NC programs" button.



If a mandatory comment is required, a popup window opens, where you must give a reason as a comment for uploading the NC program changes. Press "Ok" to continue, or press "Cancel" to stop the upload.



3. A toast message shows if the upload was successful, and a new revision is created in the correct state.

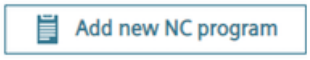


10.7.9 Add new NC program

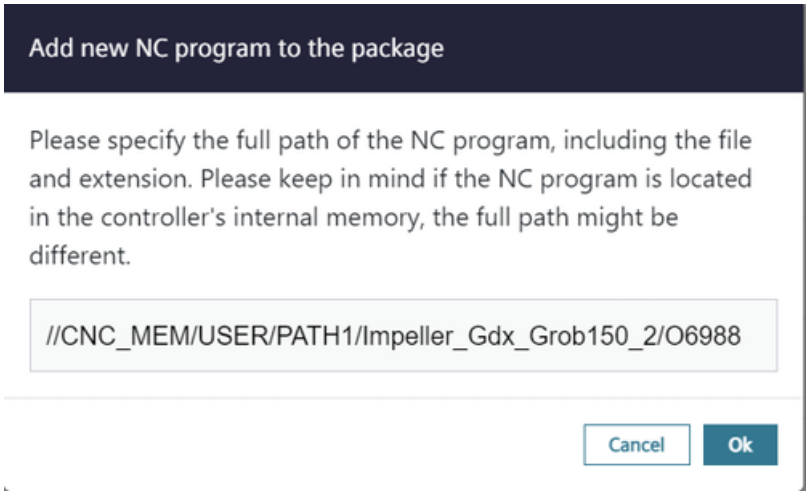
Procedure

In the details page of an NC package, you can upload a new NC program.

1. Navigate to the selected NC package
2. Press the "Add new NC program" button



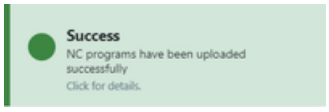
3. A popup window opens, stating that the full path with the name of the NC program should be stated



Note

The path of the NC program can be different in each controller

4. A toast message shows if adding the file was successful, and a new revision is created in the correct state.



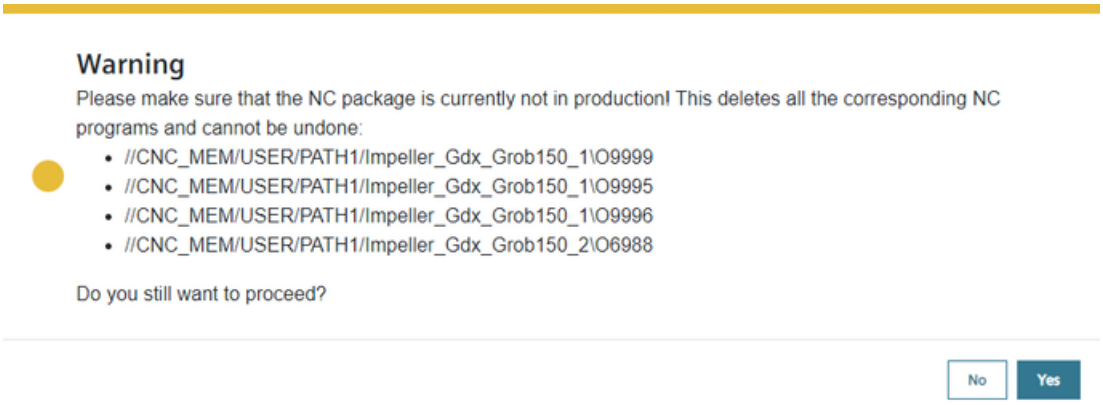
10.7.10 Delete NC package

Procedure

In the details page of an NC package, you can delete the opened NC package.

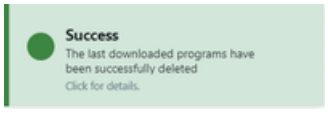
1. Navigate to the selected NC package
2. Press the "Delete NC package" button

3. A popup window opens, stating that all downloaded NC programs will be deleted.



   Press "Yes" to confirm the deletion or press "No" to cancel.

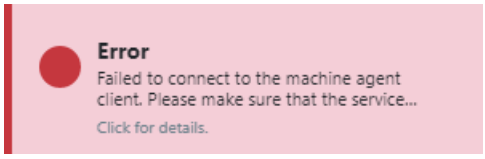
4. A toast message shows if the deletion of the NC package was successful.



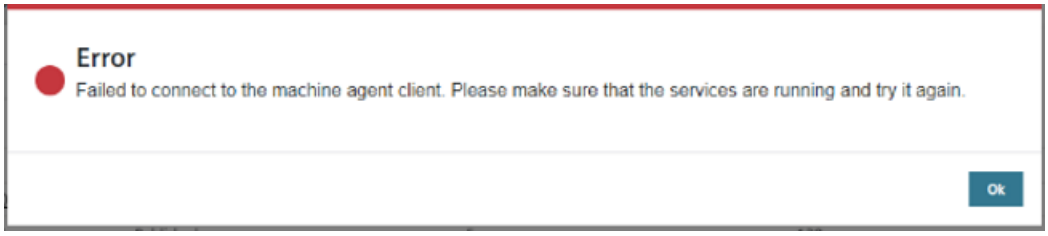
5. The application navigates back to the downloaded packages tab of the main page.

10.8 Error and system messages

Error messages appear as popup notifications.

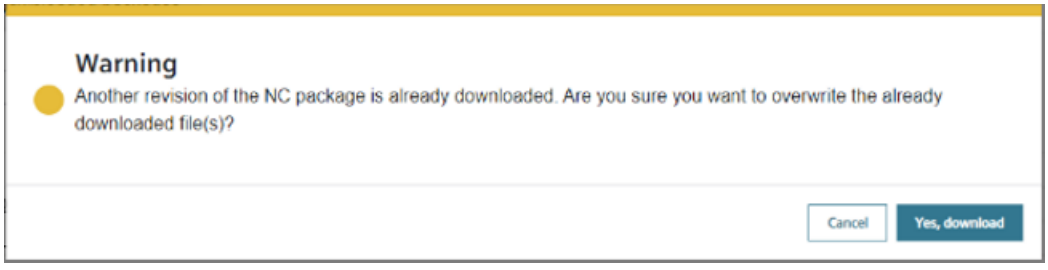


Click on "Click for details." A popup window shows the full message.

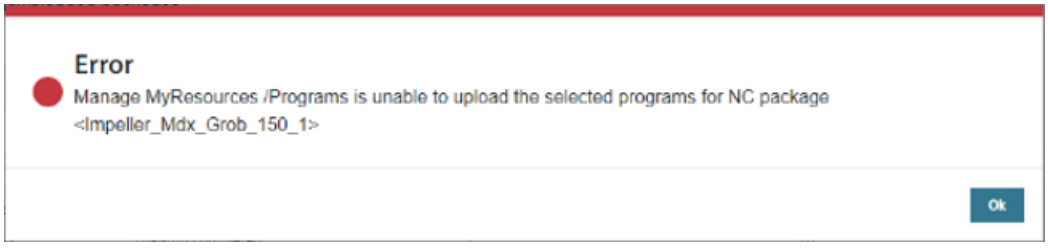


Confirmation message

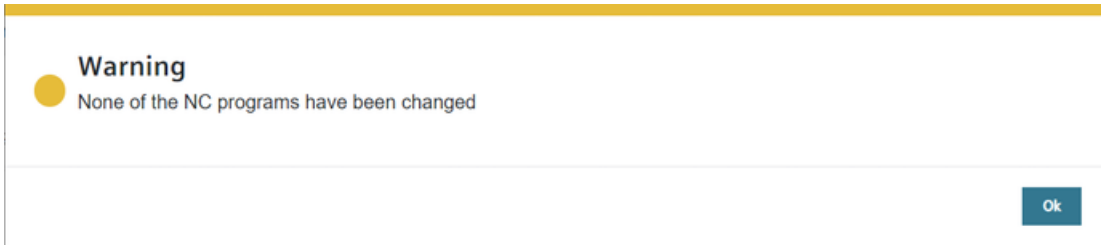
If another revision of the NC package is already downloaded to the controller, the following dialog appears: "Another revision of the NC package is already downloaded. Are you sure you want to overwrite the already downloaded file(s)?"



If the file upload fails, because the package state is not "Released", "Trial-run in progress", "Trial-run completed" or "Productive", the following message appears: "Manage MyResources / Programs is unable to upload the selected programs for NC package <name>"



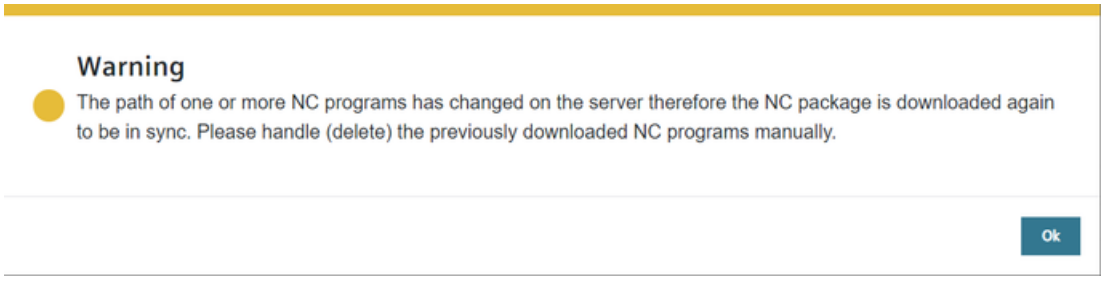
If the content of the NC programs has not changed, the NC programs cannot be uploaded. The following message appears: "None of the NC programs have been changed."



Note

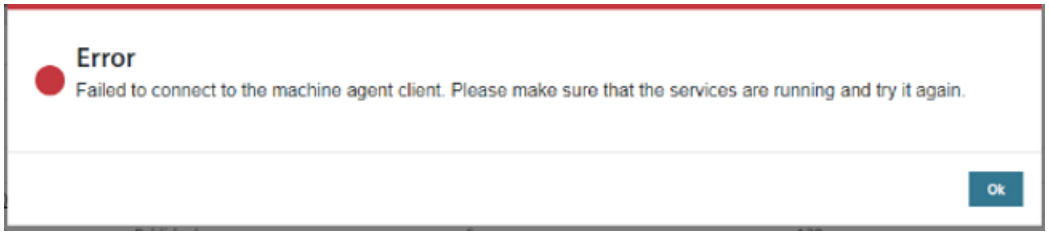
On the server, the NC program content check can be configured to check whitespace differences and case sensitivity.

If the path of an NC program has the variable "Revision" in its path, and a new revision is created after uploading, the following message appears: "The path of one or more NC programs has changed on the server therefore the NC package is downloaded again to be in sync. Please handle (delete) the previously downloaded NC programs manually."

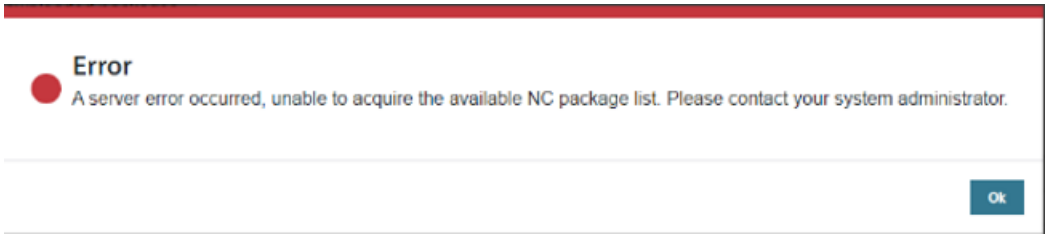


General error messages

- Connection to the Machine Agent client lost
  If the connection is lost between the MMR /Programs UI application and the Machine Agent Core, the following error message appears: "Failed to connect to the Machine Agent client. Please make sure that the services are running and try it again."

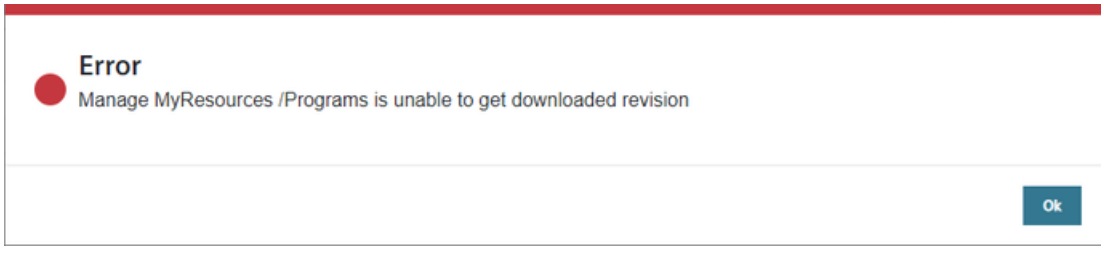


- Unable to acquire the available NC package list
  If an error occurs when acquiring the available NC package list, the following error message appears: "A server error occurred, unable to acquire the available NC package list. Please contact your system administrator."

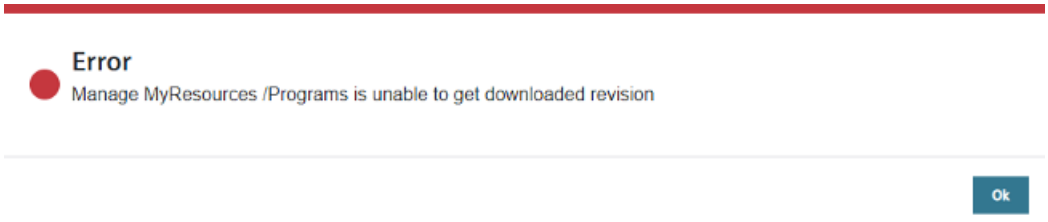


- Unable to acquire information for the machine
  If an error occurs when acquiring machine information, the following error message appears: "A server error occurred, unable to acquire the machine data. Please contact your system administrator."

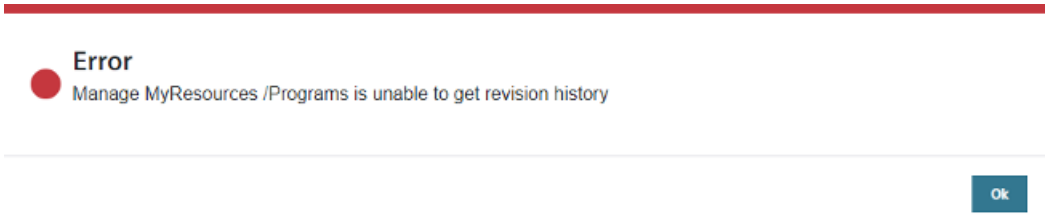
- Unable to get downloaded revision
  If an error occurs when acquiring NC package revision information, the following error message appears: "Manage MyResources /Programs is unable to get downloaded revision"



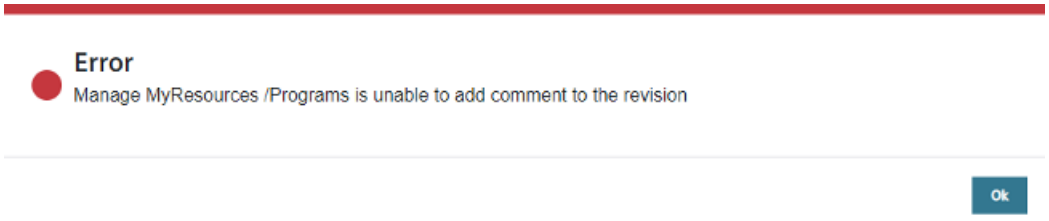
- Unable to get downloaded revision
  If an error occurs when acquiring NC package revision information, the following error message appears: "Manage MyResources /Programs is unable to get downloaded revision".



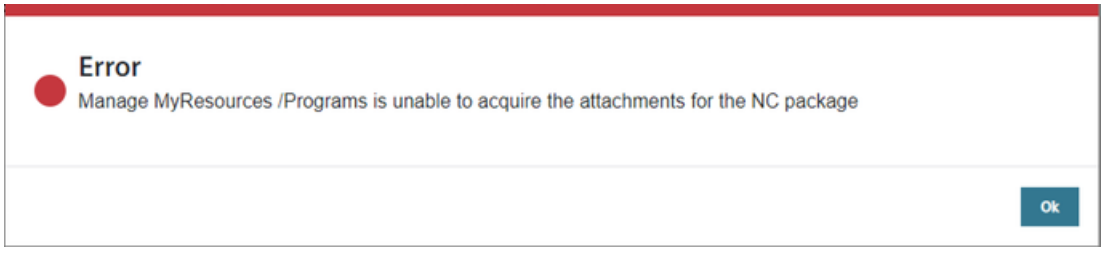
- Unable to get revision history
  If an error occurs when acquiring NC package revision history, the following error message appears: "Manage MyResources /Programs is unable to get revision history".



- Unable to add comment to the revision
  If an error occurs when adding a new comment to a revision, the following error message appears: "Manage MyResources /Programs is unable to add comment to the revision".



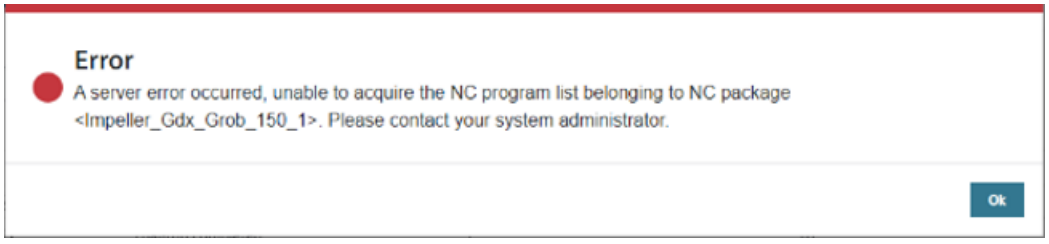
- Unable to get attachments
  "Manage MyResources /Programs is unable to acquire the attachments for the NC package"



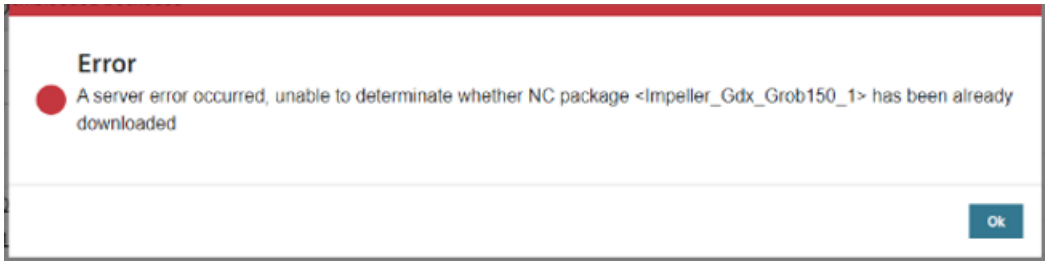
- Unable to download attachment
  If an error occurs when downloading an attachment, the following error message appears: "Manage MyResources /Programs is unable to download the attachment"

Downloading NC packages

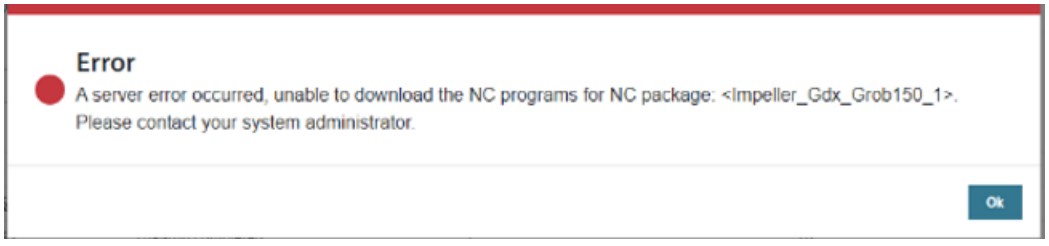
- Unable to acquire the NC program list for the selected NC package
  If an error occurs during acquiring the NC program list for the selected NC package, the following error message appears: "A server error occurred, unable to acquire the NC program list belonging to NC package <name>. Please contact your system administrator."



- Unable to determine whether the NC package has been already downloaded
  If it is not possible to determine whether the NC package has been already downloaded to this machine, an error occurs. The following error message is shown: "A server error occurred, unable to determinate whether NC package <name> has been already downloaded"



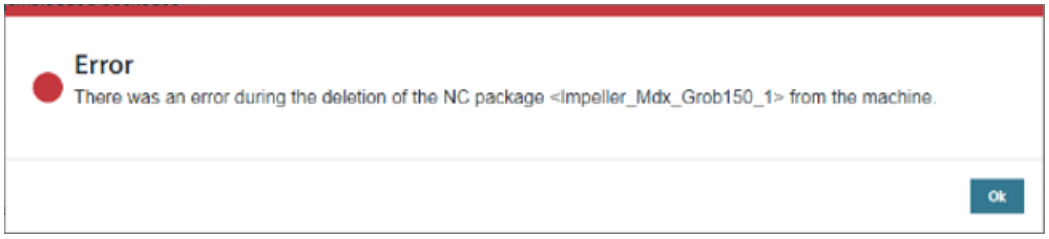
- Unable to download the NC programs for an NC package
  If an error occurs when downloading the NC package, the following error message is shown: "A server error occurred, unable to download the NC programs for NC package: <name>. Please contact your system administrator."



- Unable to download specific NC programs.
  If there is a problem (for example wrong file format) downloading specific NC programs, the following error message is shown: "Unable to download the following NC programs for NC package <name>"

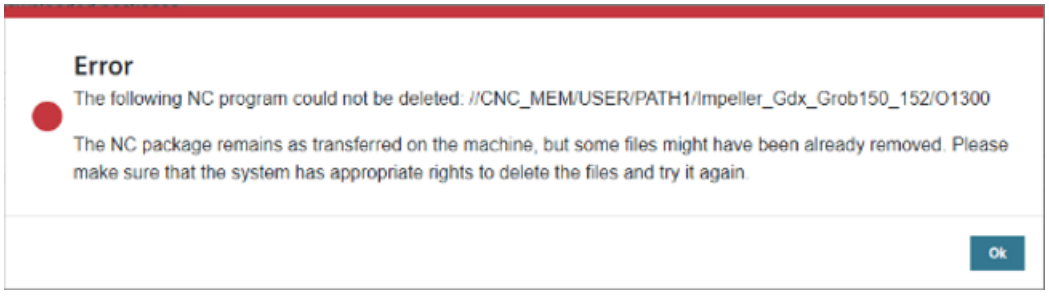
Deleting NC packages

- Error during deleting an NC package
  If an error occurs deleting an NC package from the machine the following error message is shown: "There was an error during the deletion of the NC package <name> from the machine."



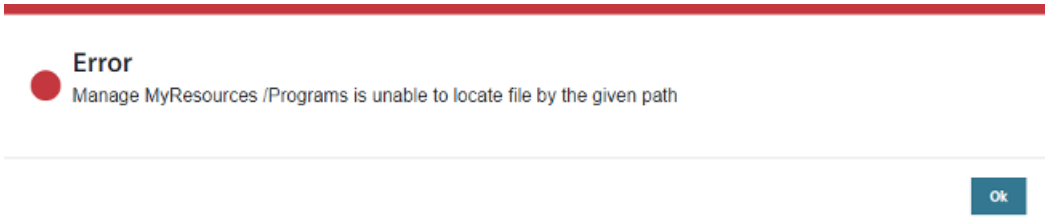
- An NC program could not be deleted
  If an NC program can not be deleted from an NC package the following error message is shown: "The following NC program could not be deleted: <ncProgram>"

- Some of the NC programs have been deleted
  If some of the NC programs have been deleted, but other NC programs could not be deleted, the following error message is shown: "The NC package remains as transferred on the machine, but some files might have been already removed. Please make sure that the system has appropriate rights to delete the files and try it again."

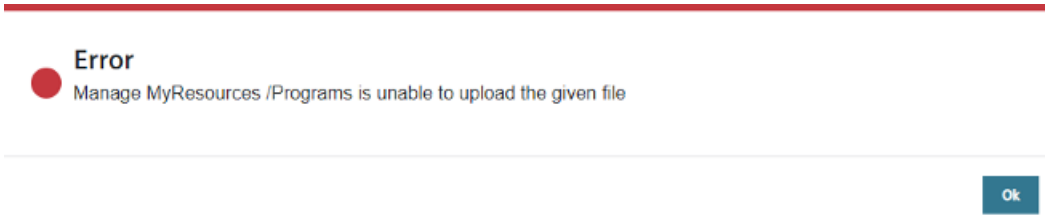


Uploading NC programs

- Could not find file by the given path
  If the file does not exist in the given path, the following error message is shown: "Manage MyResources /Programs is unable to locate file by the given path".

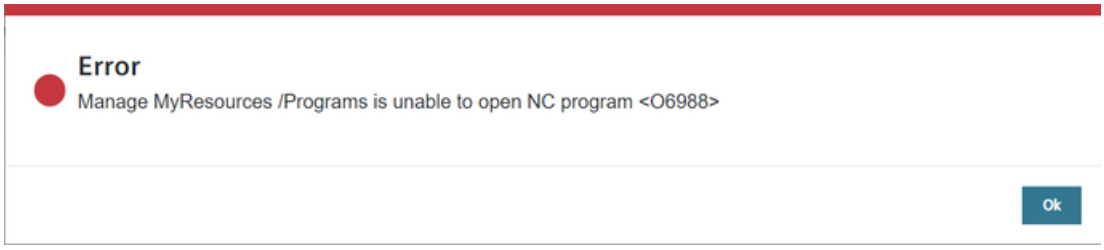


- Could not upload the given file
  If an error occurs when uploading an NC program, the following error message is shown: "Manage MyResources /Programs is unable to upload the given file".

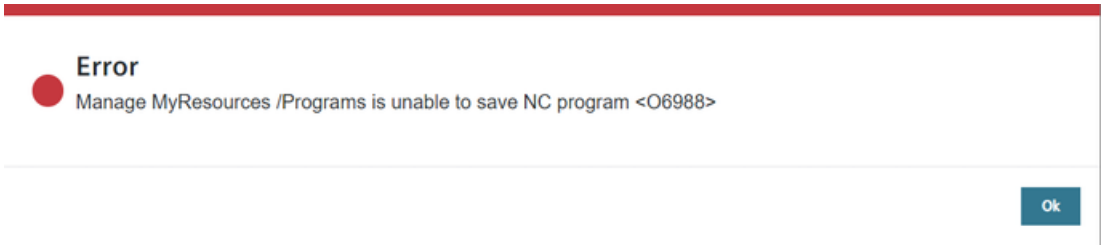


Handling NC programs

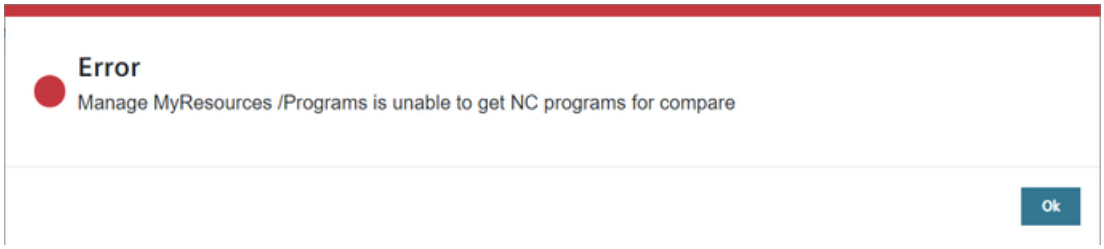
- Unable to open NC program
  If an error occurs during opening the selected NC program, the following error message appears: "Manage MyResources /Programs is unable to open NC program <{{name}}>"



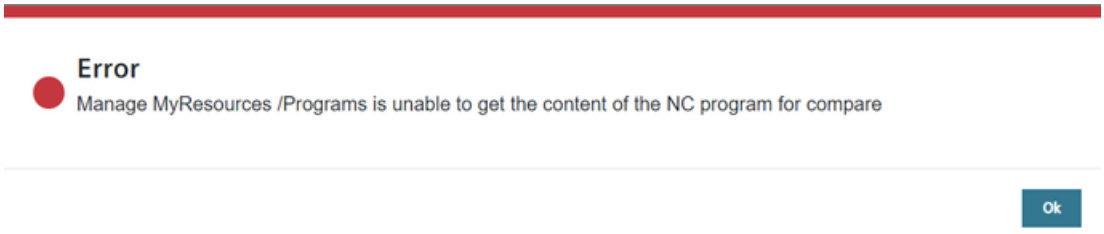
- Unable to save NC program
  If an error occurs during saving the content of the opened NC, the following error message appears: "Manage MyResources /Programs is unable to save NC program <{{name}}>"



- Unable to acquire the list of revisions for an NC program
  If an error occurs during acquiring the list of revisions for comparing, the following error message appears: "Manage MyResources /Programs is unable to get NC programs for compare"

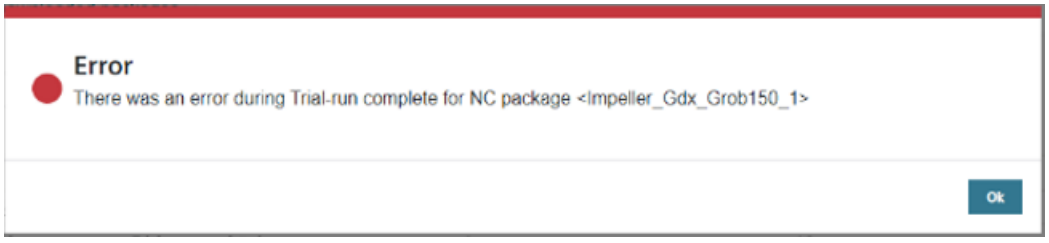


- Unable to acquire the selected NC program content for comparing
  If an error occurs during acquiring the content of an NC program of the selected revision for comparing, the following error message appears: "Manage MyResources /Programs is unable to get the content of the NC program for compare"

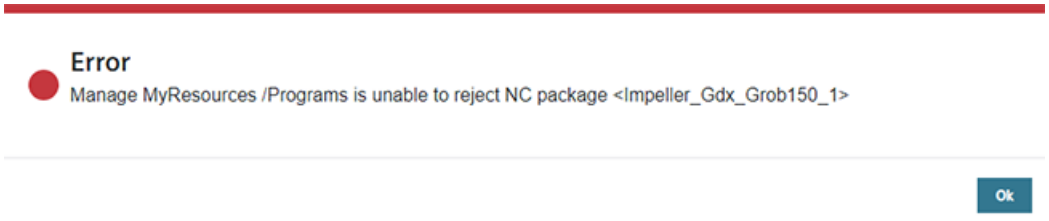


State changes

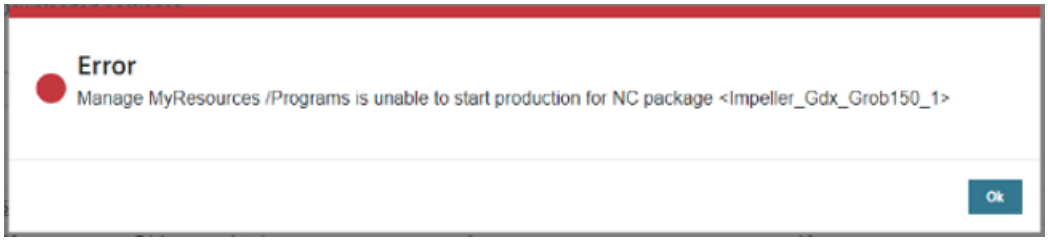
- Error during state change to Trial-run complete
  If there is a problem changing the state to "Trial-run complete" (for example: state change is not available from the current state), the following error message is shown: "There was an error during Trial-run complete for NC package <name>"



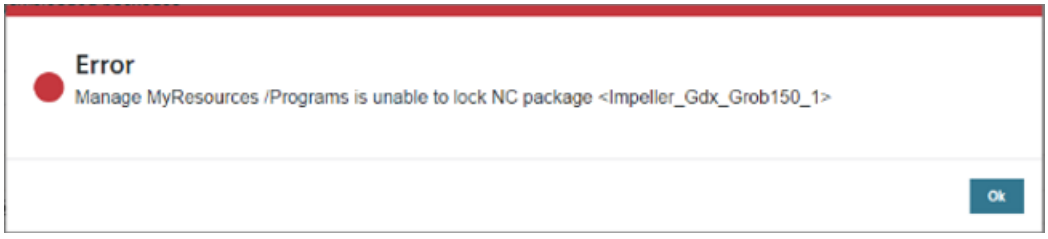
- Error during rejecting an NC package
  If a problem occurs rejecting an NC package (for example: unable to reject in the current state) the following error message is shown: "Manage MyResources /Programs is unable to reject NC package <name>"



- Error during starting production of an NC package
  If a problem occurs starting the production of an NC package (for example: unable to produce in the current state) the following error message is shown: "Manage MyResources /Programs is unable to start production for NC package <name>"



- Error during locking an NC package
  If a problem occurs locking an NC package (for example: unable to lock in the current state) the following error message is shown: "Manage MyResources /Programs is unable to lock NC package <name>"



Product information

- Error during acquiring product information
  If a problem occurs while acquiring product information, the following error is shown: "A server error occurred, unable to acquire the version information of the software. Please contact your system administrator."

10.9 Working with machine path variables

The machine path variables for NC packages are replaced, once the NC package is downloaded onto the machine.

Note

Empty path variables

Empty path variables are replaced with constant text.

The package-related placeholder texts are:

- PackageName
- WorkPieceID
- ExternalRevision
- Revision

The machine-related placeholder texts can be configured via Openness API. Default values are controller dependent.

- MainPrograms - pre-configured on the server with controller dependent values
- SubPrograms - default value is empty
- WorkPieces - default value is empty

The machine-related placeholder texts that cannot be configured

- ExternalStorage

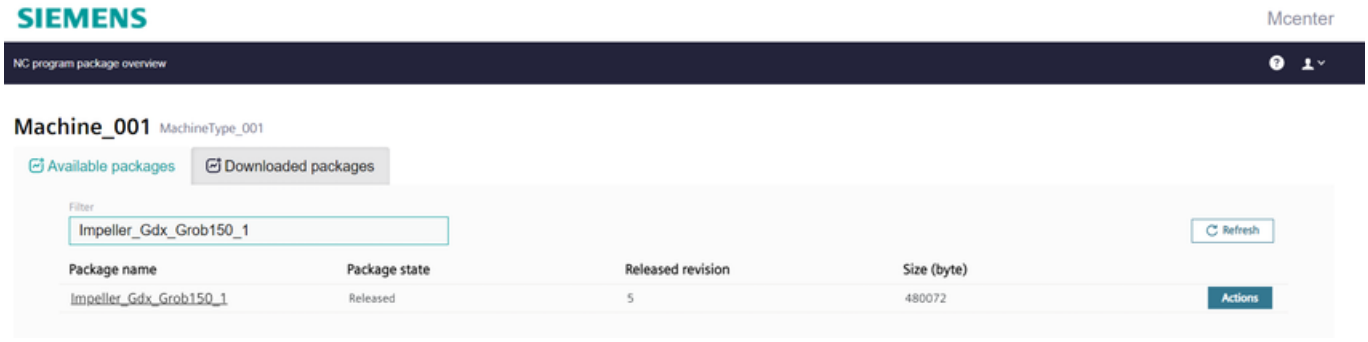
Prerequisite

You have defined machine path variables for the NC package on the server and added the NC package to a machine.

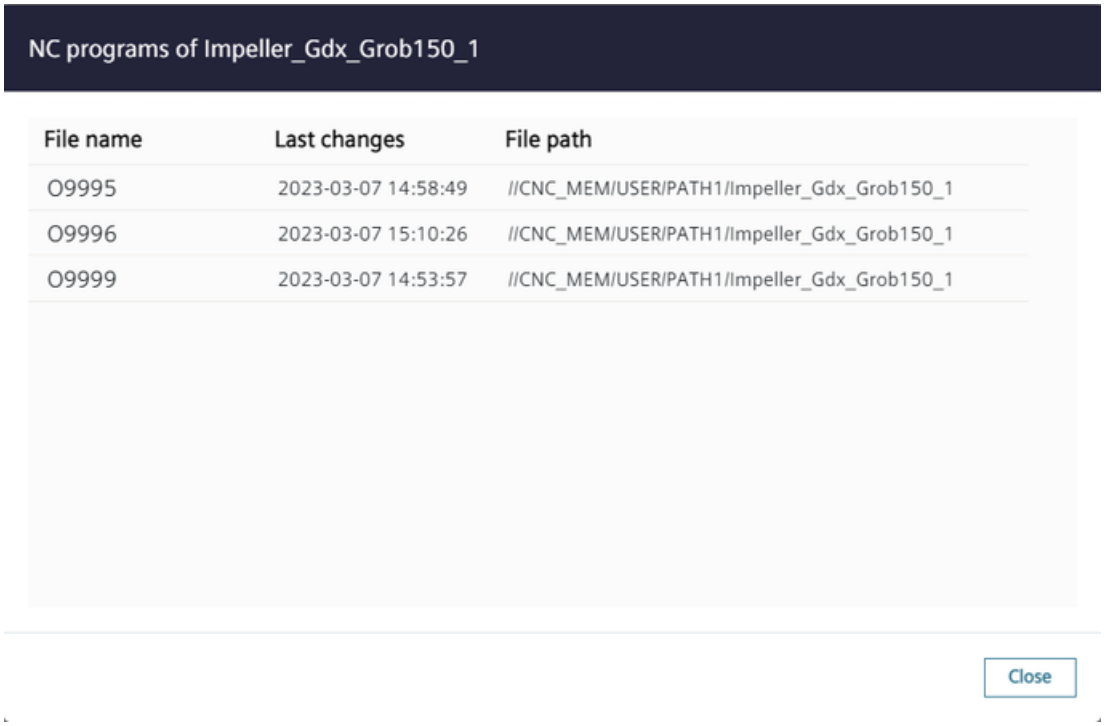
For more information, see Using path with the machine variable (Page 702).

Procedure

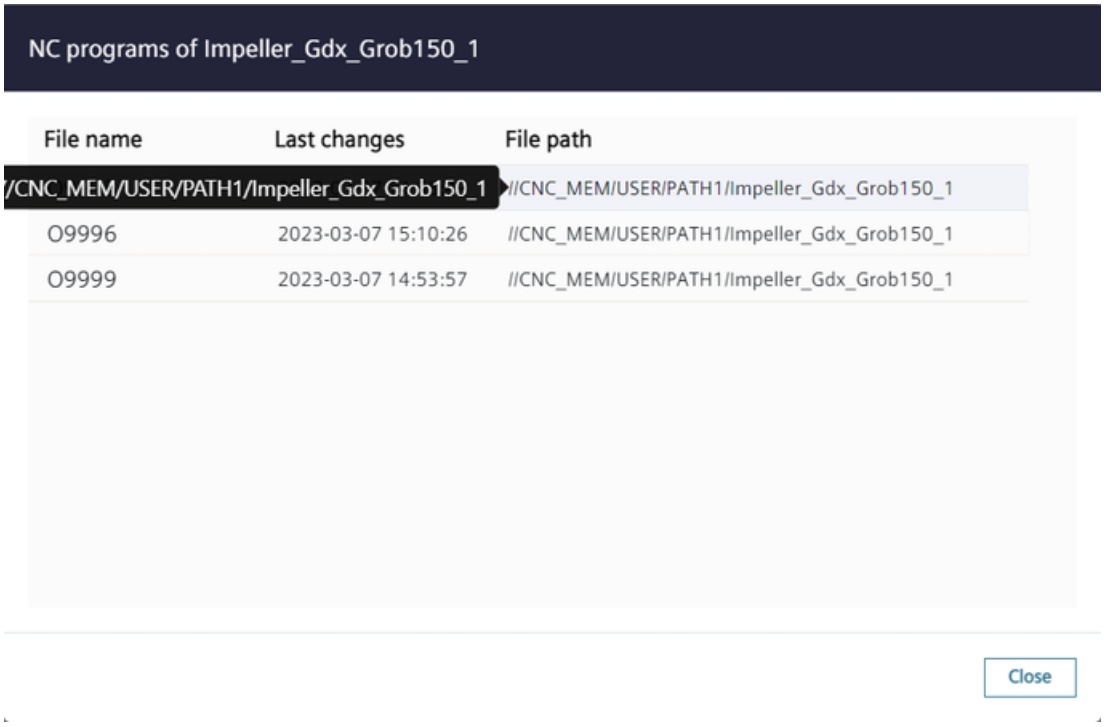
1. Open the "Available packages" tab.



2. To open the list of the NC programs of the selected NC package, click on the underlined name of the NC package.
   A new window opens which contains all metadata of the NC programs of the selected NC package:



   The columns of this window are not resizable. The full file path is shown in a tooltip if you hover it:


NC programs of Impeller_Gdx_Grob150_1
File name
Last changes
File path
/CNC_MEM/USER/PATH1/Impeller_Gdx_Grob150_1
//CNC_MEM/USER/PATH1/Impeller_Gdx_Grob150_1
O9996
2023-03-07 15:10:26
//CNC_MEM/USER/PATH1/Impeller_Gdx_Grob150_1
O9999
2023-03-07 14:53:57
//CNC_MEM/USER/PATH1/Impeller_Gdx_Grob150_1
Close

10.10 Path variables on controllers

Parameters

Different controller types support different machine-related variables on each controller.

All of these variables have a default value pre-defined, and can be configured by the Openness API:

- MainPrograms
- SubPrograms
- WorkPieces

For more information, see

- MMR /Programs configuration (Page 679)
- Managing configurations (Page 1042)

The default values can bee seen in the following table:

Controller	MainPrograms	SubPrograms	WorkPieces
Mitsubishi	The default value is empty	The default value is empty	M01:\PRG\USER
Heidenhain	The default value is empty	The default value is empty	TNC:
Fanuc	The default value is empty	The default value is empty	//CNC_MEM/USER/PATH1

Manage MyResources API 11

11.1 Token for the openness interface (extension interface)

Software products from third-party suppliers can access data or functions from the Mcenter via its open interfaces. An access token obtained from the Identity Service is used for identification.

Prerequisite

- You require administrator rights to generate the token.
- You need a token as generated by user login or generated by an authentication of the third-party component.
  The "OpennessToken.json" file contains the following parameters:
  - `client_id`
  - `client secret`
  - `identityServiceUrl`

For more information, see Manage openness clients (Page 103).

Request the access token with the Identity Service URL as basis address

The content type of the request is: "`application/x-www-form-urlencoded`".

Use the following key value pairs in the HTTP request form.

`client_id`	`sinint-api-client`
`grant_type`	`ClientAuthGrantType`
`ClientAuthPayload`	`{"ClientId" : "<clientid>", "Secret" : "<secret>"}`

Example of an HTTP request code

Replace "`<clientid>`" and "`<secret>`" by the data that you obtain in the "OpennessToken.json" file that is downloaded.

```
POST /connect/token HTTP/1.1
Host: <Identity Service URL, which comes from the downloaded JSON
file>
"Content-Type: application/x-www-form-urlencoded; boundary=boundary"
--boundary
Content-Disposition: x-www-form-urlencoded; name="client_id"
client_Id:sinint-api-client
--boundary Content-Disposition: x-www-form-urlencoded;
name="grant_type"
grant_type:ClientAuthGrantType
--boundary
Content-Disposition: x-www-form-urlencoded; name="ClientAuthPayload"
```

```
{"ClientId": "<clientid>", "Secret": "<secret>"}
--boundary--
```

Possible answers

- OK (200)
  - No problems occurred while processing the request.
  - Example:
    ```
    HTTP/1.1 200 OK
    Content-Type: application/json; charset=UTF-8
    {
       "access_token": "<access_token>",
       "expires_in": "<expiration_time_in_seconds>,
       "token_type": "Bearer"
    }
    ```
- Bad Request (400)
  - At least one of the form data items is missing or is incorrect.
  - Example:
    ```
    HTTP/1.1 400 Bad Request
    Content-Type: application/json; charset=UTF-8
    {
      "error": "<error description>"
    }
    ```

Note

Messages

- Each request provided with the access token as owner token for a platform service is satisfied.
- If an access token is not listed or the listed access token is invalid, you receive "`HTTP code 401 (Unauthorized)`" as a response. In this case, you must request a new access token from the Identity Service.
  To avoid this error message, proceed as described in Using the token in the Swagger UI (Page 893).

Further information

An application example is given in the application directory provided:

\SI5\Documentation\Examples\SinInt.Identity.OpennessClient.Example

For more information, see Application example: Token for the openness interface (extension interface) (Page 894).

11.1.1 Using the token in the Swagger UI

To ensure that requirements sent from the Swagger UI to the openness interface are not rejected as "Unauthorized", a token must be used in the Swagger UI.

Prerequisite

The token must have been created.

For more information, see:

- Manage openness clients (Page 103)
- Generate token with Windows PowerShell script (Page 896)

Procedure

1. Click "Authorize" in the top-right of Swagger UI.
2. The input form opens.
   Enter the following: `Bearer<space>`
3. Copy the token, which you created using the application example or using the PowerShell, into the clipboard.
4. Open the clipboard.
5. Copy the token and paste the contents after the space.
6. Click "Authorize".
7. Click "Close" to complete the operation.
   As long as the token remains valid, the Swagger UI can make requests to the system.

Note

Do not refresh the page

After authorization, do not refresh the page (F5) as this will automatically log the user out and they must log in again using the token.

Note

Token for Swagger UI invalid

The token is invalid or is no longer accessible for the following reasons :

After the expiry of a certain time, e.g. 1 hour.
- OR -
If you close the web browser.

11.1.2 Application example: Token for the openness interface (extension interface)

With the "SinInt.Identity.OpennessClient.Example" file example provided, you have the option of addressing the interface to the Identity Service.

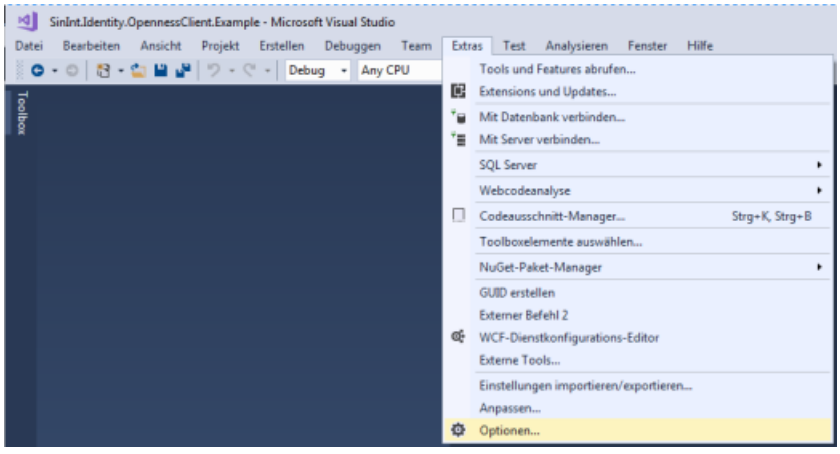
You can find the file in the following directory:
\SI5\Documentation\Examples\SinInt.Identity.OpennessClient.Example

Prerequisite

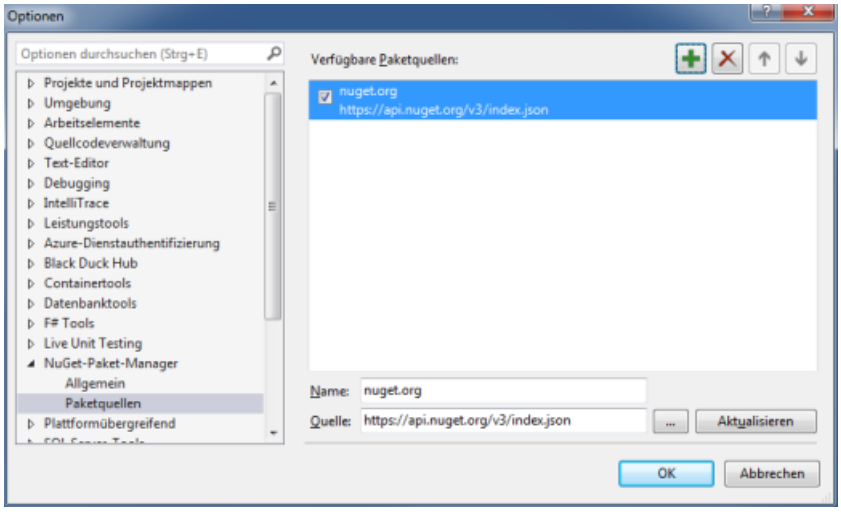
You must be familiar with using Visual Studio.

Procedure

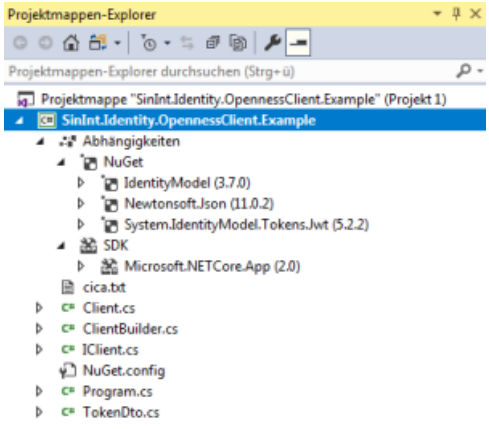
1. Install the current file ".Net core SDK".
   Microsoft (https://dotnet.microsoft.com/download)
2. Open file "SinInt.Identity.OpennessClient.Example" in the Visual Studio.
3. Open the "Tools" tab and select "Options".



4. In the left-hand window pane, select "NuGet Package Manager" > "Package sources".
   - Adapt the address in input field "Source": https://api.nuget.org/v3/index.json.
   - Click the "Update" button
   - Click on "OK".

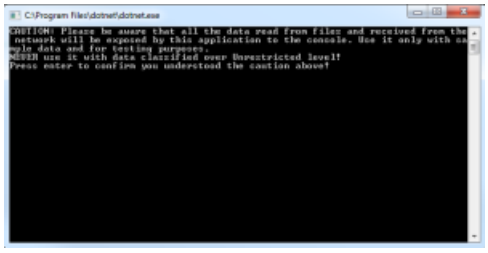


5. The "Project folder Explorer" window opens.



6. Create the file "OpennessToken.json" as described in Manage openness clients (Page 103).
7. Copy the file to the following directory:
   \..\BespielApplication\bin\Debug\netcoreapp2.0\OpennessToken.json
8. Start the application via Visual Studio.

9. Confirm the first message using the <Enter> key.



10. You receive a token with which you can program in MMR-API and use the Swagger UI.

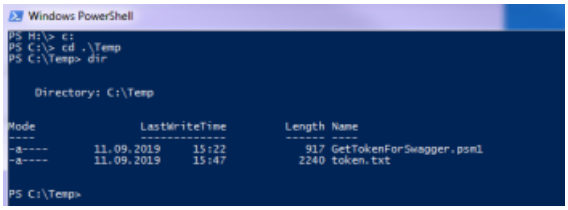
11.1.3 Generate token with Windows PowerShell script

When you use for example Windows PowerShell-Script "GetTokenForSwagger.ps1", you have the option of generating a token with which you can program in Manage MyResources API as well as create functions in Manage MyResources via Swagger UI.

Procedure

1. Open the following directory:
   <Installationsverzeichnis>\Siemens\SINUMERIK_Integrate_5\MMR\SinInt.MMRAPI.Service\
2. Copy the script file "GetTokenForSwagger.ps1".
3. Insert the script into a directory, for example C:\Temp.
4. Download the file "OpennessToken.json" from the server.
   For more information, see Manage openness clients (Page 103).
5. Insert the "OpennessToken.json" into the same directory as "GetTokenForSwagger.ps1".
6. Start Windows PowerShell.

7. Navigate to the directory where the script file has been saved, for example `C:\Temp>`



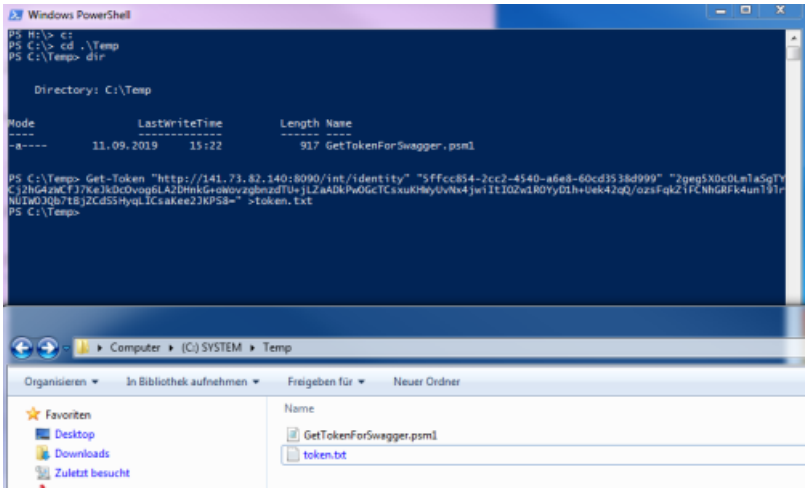
8. Enter the following call:
   `C:\temp> GetTokenForSwagger.ps1 > token.txt`
   Execute the command. All information that you need to get the token is contained in "OpennessToken.json".

Note

Configured token lifetime

The token expires within Consul after the configured time. To create an new token with the same "OpennessToken.json" file, execute the Windows PowerShell command again.

9. After having successfully executed the command, you receive the token in the same directory in which the file "GetTokenForSwagger.ps1" is located.



10. Open the file "token.txt" and use the token.

11.2 Manage MyResources /Tools API

11.2.1 Generating and modifying tool component stacks

Prerequisite

Authenticate using the token, so that you can use the various functions in Swagger UI.

For more information, see:

- Manage openness clients (Page 103)
- Using the token in the Swagger UI (Page 893)
- Logging in and logging out from Mcenter (Page 36)

Generating and modifying tool components stacks

GET /toolcomponentinventory/v1/toolcabinets

- Retrieves all cabinets with their containers.
- Tool component stack boxes may be placed in these containers.
- Containers in state 'Locked' are excluded from the result.

POST /toolcomponentinventory/v1/componentstacks

- Creates a stack in the specified cabinet container.
- The component is identified by its unique name.

GET/ toolcomponentinventory/v1/componentstacks

- Reads all available tool component stacks.
- The result may be filtered by the component Id and the modification time.

POST /toolcomponentinventory/v1/componentstacks/{id}/increment

- Increases or decreases the amount of the given tool component stack.

PATCH /toolcomponentinventory/v1/componentstacks/{id}

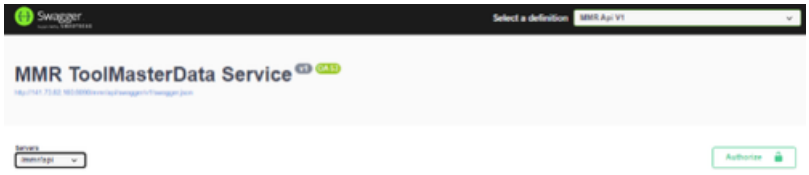
- Applies the given json patch (http://jsonpatch.com/) operations to the component stack.
- Only the warning limit and the box Id may be changed here.

DELETE /toolcomponentinventory/v1/componentstacks/{id}

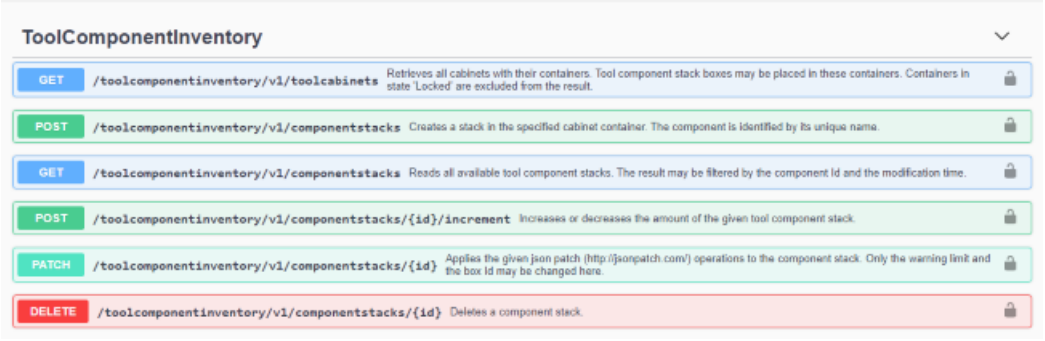
- Deletes a component stack.

Procedure

1. Call the following address: Swagger (http://<IP adress of the MMR server>:8090/mmr/api/swagger/index.html).
   The "Swagger" > "MMR ToolMasterData Service" window opens.



2. Scroll to area "ToolComponentInventory".



3. Open the desired field "GET", "POST", "PATCH", "DELETE" and click on "Try it out".
   There are 7 default operation types to specify properties in a json patch document:
   - Add
   - Remove
   - Replace
   - Move
   - Copy
   - Test
   - Invalid
4. Enter the appropriate values for parameters.
5. Click "Execute" to start the request.

Note

Supported operations

Only the operations "Add", "Remove" and "Replace" are supported.

Note

Relative and absolute path

There are two paths:

- Absolute path: /Siemens/Site/Area/ComponentCabinet/5/BigBox/warningLimit
- Relative path: /warningLimit

Use the relative path and not the absolute one. All endpoints can work with the relative path because in the use case, it is always clear which attribute you have to set.

Example "POST /toolcomponentinventory/v1/componentstacks"

Open the field "POST /toolcomponentinventory/v1/componentstacks". This creates a stack in the specified cabinet container. The component is identified by its unique name.

Parameters	Description
`amountNew`	Number of new components.
`amountUsed`	Number of used components.
`warningLimit`	User warning when the amount falls below this value.
`customerMaterialId`	Already existing components of the master data set.
`toolCabinetContainerNumber`	Specifies the box in the cabinet. It must be an existing box.
`boxId`	Box name in the cabinet. The box is created in the container.
`toolCabinetId`	UID of the toolcabinet, which was read in the GET before.

```
{
  "amountNew": 123,
  "amountUsed": 12,
  "warningLimit": 20,
  "customerMaterialId": "Comp1",
  "toolCabinetContainerNumber": 1,
  "boxId": "CAB",
  "toolCabinetId": "5b6c1c1e-67b9-4807-b5ed-3f3a1c7a5a5c"
}
```

Note

Omissible attributes

You can omit the attributes "`amountNew`", "`amountUsed`" and "`warningLimit`". In this case, the default value is set to 0. You can combine these attributes with the needed information later. All the other attributes are obligatory.

Exceptions structure

- Not Found (404)
  - Not existing "ID of tool component / customerMaterial Id."
- Bad Request (400)
  - "The request body is invalid: tool component name is null or empty."
  - "The request body is null or empty."
- Internal server error (500)
  - "Trying to create different components within the same box."

Example "POST /toolcomponentinventory/v1/componentstacks/{id}/increment"

Open the field "POST /toolcomponentinventory/v1/componentstacks/{id}/increment".

The UID can be found in the GET above.

```
{
 "incrementNew": 100,
 "incrementUsed": -10
}
```

Note

Modification of attributes

You can modify each attribute individually.

Exceptions structure

- Bad Request (400)
  - GUID is not found
- Internal Server Error (500)
  - The request is not json-compliant

Example "PATCH /toolcomponentinventory/v1/componentstacks/{id}"

Open the field "PATCH /toolcomponentinventory/v1/componentstacks/{id}".

- Change the warning limit

```
[
 {
  "path":"warningLimit",
  "op":"Replace",
  "value":"1010"
 }
]
```

- Change of the box name

```
[
 {
  "path":"boxId",
  "op":"Replace",
  "value":"CAB1"
 }
]
```

Note

Warning limit and box ID

You can only change the warning limit and the box Id. Use the relative path as it is the only one working.

Note

Change in the components cabinet

This operation changes the box name which is used for the component stack. Use the relative path as it is the only one working.

Exceptions structure

- Bad Request (400)
  - If you use an existing box name, the error message 400 occurs. The path for the storage location must be unique (Siemens/site/cabinet/1/BoxA). There can only be one box with this particular name and path.
  - Wrong GUID for the component stack, which was not found.
- Internal server error (500)
  - Empty request body or not json-compliant.

11.2.2 Generating and modifying tool instances

Before you provide a new tool in Manage MyResources /Tools, prepare the measurement data (correction data). Only after that you can move the tool in the "Provide tools" window from the left "Measure" column to the right "Provide" column. These endpoints use a new data model.

For more information, see Finish provision (Page 258).

You can prepare the measurement data via the open interface, e.g. using the Swagger UI.

Prerequisite

- The tool has been measured by a setting device.
- Authenticate using the token, so that you can use the various functions in Swagger UI. For more information, see:
  - Manage openness clients (Page 103)
  - Using the token in the Swagger UI (Page 893)

Generating and modifying tool instances

GET /toolassembly/v2/toolinstances

- Retrieves the tool instances which are in the process of presetting.
- The result set can be filtered by specifying an external Id of a tool instance in order to receive a collection with a single tool instance.
- The result will be a collection, instead of 'NotFound'. The external Id is a filter by a unique, but optional value and does not access the tool instance by its Id 'domain concept of identity'.
- The response does not contain tool instances that do not show in the interactive kanban board.
- This affects the tools which are awaiting disassembly or have the flag 'Specify further processing'.
- Tool states included in the result set are: “Assemble”, “Overhaul”, “Measure”, “Provide”. The ownership of the tool is ignored by the openness api.

PUT /toolassembly/v2/toolinstances/{id}/presettingstate

- Modifies the given state values at the specified tool instance.
- All other tool instance data remains unchanged.
- Currently, it is allowed to change the state from "Unassembled" to "Unmeasured".
- The components needed to assemble the tool from the available component stacks are checked out.

PUT /toolassembly/v2/toolinstances/{id}/presettingaction

- Modifies the given action values at the specified tool instance.
- Possible states:
  - To be decided (Undefined): It sets action to "Undefined" and keeps every data.
  - To measure (Measure): It sets action to "Measure" and the user can decide to remove the correction data or not.
  - To provide (Provide): It moves the tool to "Provide" - if the tool has measurement data. In the case of components, API does not change any stack value.

GET /toolassembly/v2/toolinstances/disassembling

- Retrieves tool instances which are in process of disassembling.
- The result set can be filtered to a single instance by specifying an external Id of a tool instance.
- The result will be a collection, instead of 'NotFound'. The external Id is a filter by a unique, but optional value and does not access the tool instance by its Id 'domain concept of identity'.

POST /toolassembly/v2/toolinstances/{id}/disassemble

- Disassembles a tool which is identified by its unique Id.
- If the tool has a bill of material, the following action is carried out:
  - If a component is 'wearable', it is scrapped.
  - If a component is not 'wearable', it is stored in the component stack as used.

PUT /toolassembly/v2/toolinstances/todisassemble

- Sets a tool to disassemble if the tool is in the cabinet.
- The API moves the tool automatically into the Assembly container.

PUT /toolassembly/v2/toolinstances/{id}/todisassemble

- Sets a tool to disassemble if the tool is in the cabinet.
- The API moves the tool automatically into the Assembly container.

POST /toolassembly/v2/toolinstances/{id}/addcorrection

- Attaches the specified correction data to the specified tool instance edges.
- It is not necessary to include correction data for all defined edges but the operation fails, if correction data for unexisting edges is sent.

PUT /toolassembly/v2/toolinstances/{id}

- Modifies the given property values for the specified tool instance.
- All other instance data remains unchanged.

PATCH /toolassembly/v2/toolinstances/{id}

- Applies the given json patch (http://jsonpatch.com/) operations to the tool instance.

PATCH /toolassembly/v2/toolinstances/{id}/cuttingedges/{dNo}

- Applies the given json patch (http://jsonpatch.com/) operations to the tool instance.

PUT /toolassembly/v2/toolinstances/{id}/obtain

- Obtains a component for a tool with the required action "Obtain" or "Overhaul".

PUT /toolassembly/v2/toolinstances/obtain

- Obtains a component for a tool with the required action "Obtain" or "Overhaul".

PUT /toolassembly/v2/toolinstances/overhaul

- Moves a tool from the cabinet to the assembly and sets its presetting action to “Overhaul”.

PUT /toolassembly/v2/toolinstances/{id}/overhaul

- Moves a tool from the cabinet to the assembly and sets its presetting action to “Overhaul”.

GET /toolassembly/v2/toolcabinets

- Retrieves all MMR tools which are valid destinations for assembling tools.
- The cabinets contain all logical containers which are currently able to receive tools.
- Locked containers are excluded.
- If a cabinet does not contain any container which might receive a tool, it is excluded as well.

PUT /toolassembly/v2/toolinstances/{toolInstanceId}/location

- Moves a measured tool instance to a tool cabinet place.
- This finalizes the presetting workflow of the tool.
- An unmeasured tool cannot be moved out of the assembly container.
- The tool is no longer accessible from the MMRApis tool assembly workflow endpoints.

GET /toolassembly/v2/toolclasses/{toolClassId}

- Reads the tool master data item by its Id.
- Use this method to access extended information about a tool in the process of assembly or measuring.

GET /toolassembly/v2/toolclasses

- Reads the tool master data item by its unique name.
- Use this method to access extended information about a tool in the process of assembly or measuring.

GET /toolassembly/v2/toolclasses/{id}/attachments

- Reads the meta data of all tool master data attachments.
  This contains the file name, size and date and the time of the upload.

GET /toolassembly/v2/toolclasses/attachments/{id}/content

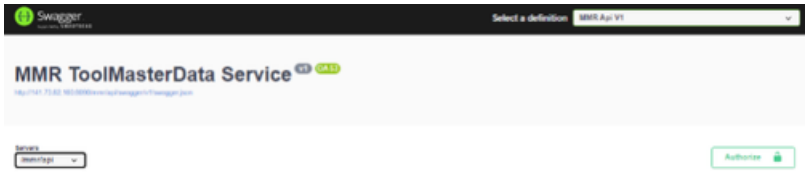
- Downloads the content of a tool master data attachment.

POST /toolassembly/v2/toolclasses/{toolClassId}/createinstance

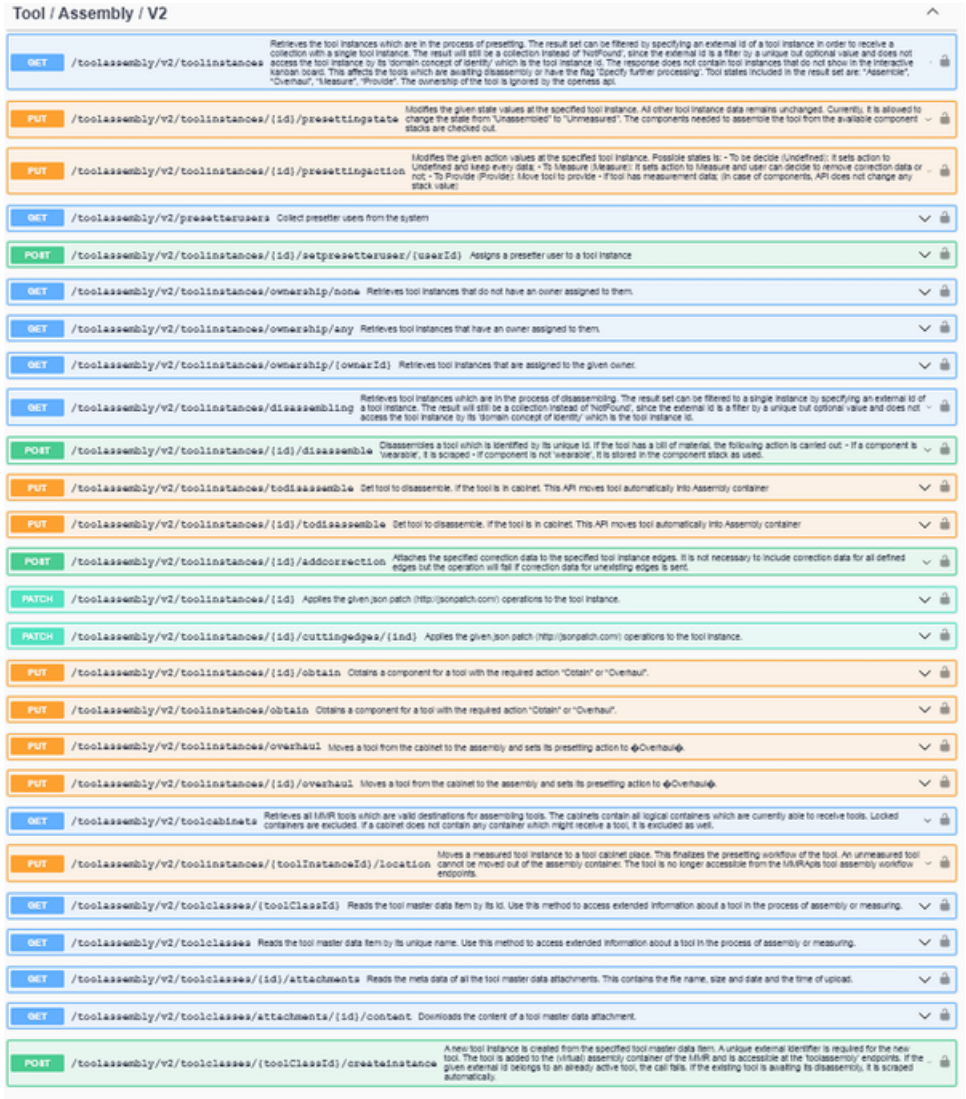
- A new tool instance is created from the specified tool master data item.
- A unique external identifier is required for the new tool.
- The tool is added to the (virtual) assembly container of MMR and is accessible at the 'toolassembly' endpoints. If the given external Id belongs to an already active tool, the call fails.
- If the existing tool is awaiting its disassembly, it is scrapped automatically.

Procedure

1. Call the following address: Swagger (http://<IP adress of the MMR server>:8090/mmr/api/swagger/index.html).
   The "Swagger" > "MMR ToolMasterData Service" window opens.



2. Scroll to the area "ToolInstanceAssembly".



3. Open the desired field "GET", "POST", "PUT", "PATCH", and click on "Try it out".
4. Enter the appropriate values for parameters.
5. Click "Execute" to start the request.

Example "GET /toolassembly/v1/toolinstances"

Open the field "GET /toolassembly/v1/toolinstances".
Thus, you get all the tools with a tool state which are in the presetting, when no external Id is defined.
If there is an external Id, only this tool data is returned.

This endpoint also delivers the action flag:

```
"presettingState": "Unassembled",
"presettingAction": "Obtain",
```

Example "POST /toolassembly/v1/toolinstances/{id}/addcorrection"

Open the field "POST /toolassembly//v1/toolinstances/{id}/addcorrection".
You get the ID from the "GET" request before. The tool has to be in a "To be measured / Unmeasured" state.

```
{
"cuttingEdgeCorrections": [
{
"dNo": 1,
"geoLength1": 1,
"geoLength2": 2,
"geoLength3": 3,
"geoLength4": 4,
"geoLength5": 5,
"geoRadius": 6,
"geoCornerRadius": 7,
"geoAngle1": 8,
"geoAngle2": 9,
"wearLength1": 10,
"wearLength2": 11,
"wearLength3": 12,
"wearLength5": 13,
"wearCornerRadius": 14,
"wearStickOut": 15,
"wearAngle1": 16,
"wearAngle2": 17,
"adapterLength1": 18,
"adapterLength2": 19,
"freeCutAngle": 20,
"adapterLength3": 21,
"wearRadius": 22,
"reserved25": 23
}
]
```

```
}
```

Note

Tool state change

After executing this command, the tool automatically changes its state to "To be provided/ measured".

Exceptions structure:

- Not Found (404)
  - Wrong GUIID
- Bad Request (400)
  - Request body is empty or not JSON conform

Example "PUT /toolassembly/v1/toolinstances/{id}"

Open the field "PUT /toolassembly/v1/toolinstances/{id}".
For tools in assembly some data can be modified.
Change the desired duplo No. This duplo No is used when the tool is loaded.

Example:

```
{
  "duploNo": 123,
  "toolState”: 10,
  "magazineType”: 1,
  "externalId”: “QWERT”
}
```

```
or
{
  "duploNo": 123
}
```

```
{
  "toolState”: 10
}
```

```
{
  "magazineType”: 1
}
```

```
{
  "externalId”: “QWERT”
}
```

Note

Set all attributes

All attributes need to be set, otherwise the original values are overwritten. If you want to keep the original value, you have to set these as well within the PUT request.

Possible modifications:

- "duploNo": 0
- "magazineType": 0
- "toolState": 0
- "externalId": "string"

Exceptions structure:

- Not Found (404)
  - Wrong GUIID used which is not in the assembly container.
- Bad Request (400)
  - Request body is empty or not JSON conform.

Example "PATCH /toolassembly/v1/toolinstances/{id}"

Open the field "PATCH /toolassembly/v1/toolinstances/{id}".

Change the DuploNo. The tool must be in assembly:

```
[
 {
  "op":"Replace",
  "path":"/DuploNo",
  "value":"177",
 }
]
```

Change of the ToolIdent:

```
[
 {
  "op":"Replace",
  "path":"/ToolIdent",
  "value":"AXZ",
 }
]
```

Change of the MagazineType:

```
[
 {
  "op":"Replace",
  "path":"/MagazineType",
  "value":"2",
```

```
 }
]
```

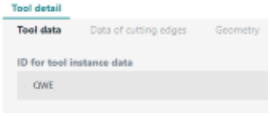
Change of the ExternalID:

```
[
 {
  "op":"Replace",
  "path":"/ExternalId",
  "value":"QWE",
 }
]
```

Change Customer Attribute:

```
[
 {
  "op": "Replace",
  "value": "ATT321",
  "path": "/customProperties/attribute1"
 }
]
```

You see the result on the server:



Note

Changeable properties

You can change the following properties.

- ToolIdent
- DuploNo
- MagazineType
- ToolState
- ExternalID

Exceptions structure:

- Bad Request (400)
  - Request body is empty or not JSON conform.
- Internal server error (500)
  - Wrong GUIID used
  - Wrong path

Example "PATCH /toolassembly/v1/toolinstances/{id}/cuttingedges/{dNo}"

Open the field "PATCH /toolassembly/v1/toolinstances/{id}/cuttingedges/{dNo}".
Json patch document specifying operations for properties:

- targetToolLifeTime: int(>=0)
- targetToolLifeTimeWarningLimit: int(>=0)
- residualToolLife: int(>=0)
- targetToolLifePieces: int(>=0)
- targetToolLifePiecesWarningLimit: int(>=0)
- residualWorkpieces: int(>=0)

```
[
 {
 "path": "/targetToolLifePieces"
 "op": "Replace",
 "value": "999"
 },
 {
 "path": "/residualWorkpieces",
 "op": "Replace",
 "value": "9"
 },
 {
 "path": "/targetToolLifePiecesWarningLimit",
 "op": "Replace",
 "value": "99"
 }
]
```

Note

Operation in the assembly container

You can carry out this operation for the tool in the assembly container. For tools loaded onto the machine or into the cabinet , you can follow this procedure with the patch:
/toolstate/v1/toolinstances/{id}/{dNo}/toollife
For more information, see Changing tool life (Page 939).

Exceptions structure:

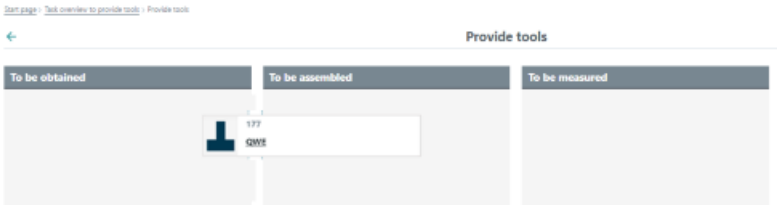
- Not Found (404)
  - Wrong GUIID which is not in the assembly container
- Bad Request (400)
  - Request body is empty or not Json conform
  - Wrong path

Example "PUT /toolassembly/v1/toolinstances/{id}/presettingstate"

Open the field "PUT /toolassembly/v1/toolinstances/{id}/presettingstate".
This shows you how to change the state from "Unassembled" to "Unmeasured".

```
{
 "presettingState": "Unmeasured"
}
```

You see the result on the server: The tool is moved automatically from "To be obtained" to "To be measured".



Note

Tool states

The first state of the created tool is "Unassembled". When the user takes over the tool for processing, it remains "Unassembled". You can move the tool with Drag&Drop to the column "To be assembled" or via API to the state "Unassembled". The tool can now be moved manually to the column "To be measured", or via API to the state "Unmeasured".

You can now measure the tool and set the correction data via API, by POST /toolassembly/v1/toolinstances/{id}/addcorrection (see above).

The tool cannot get the state "Measured" via API here, the correction data first needs to be set! The different states are: "Unassembled", "Unmeasured", "Measured". They are set automatically when the correction data is added to the tool instance.

Exceptions structure:

- Not Found (404)
  - Wrong GUIID which is not in the assembly container
- • Bad Request (400)
  - Request body is empty or not JSON conform
  - The state can only be set from "Unassembled" to "Unmeasured", and later to "Measured", but not backwards.

Example "PUT /toolassembly/v1/toolinstances/{toolInstanceId}/location"

Open the field "PUT /toolassembly/v1/toolinstances/{toolInstanceId}/location".

```
{
 "toolCabinetId": "5b6c1c1e-67b9-4807-b5ed-3f3a1c7a5a5c",
 "containerNumber": 1
}
```

Note

Container Id and container number

For the container Id and container number, see "GET" above.

Exceptions structure:

- Not Found (404)
  - Wrong GUIID which is not in the assembly container
- Bad Request (400)
  - Request body is empty or not JSON conform
  - Wrong container GUID, container not found
  - Container place not found: wrong container number

Example "PUT /toolassembly/v1/toolinstances/overhaul"

Open the field "PUT /toolassembly/v1/toolinstances/overhaul".

```
{
 "presettingActionDescription": "MOVE"
}
```

You see the result on the server:

Note

Tool

This operation moves the tool from the cabinet to the To be overhauled section

Exceptions structure:

- Not Found (404)
  - Wrong external ID
  - The tool is not in the cabinet

Example "GET /toolassembly/v1/toolinstances/disassembling"

Open the field "GET /toolassembly/v1/toolinstances/disassembling"
This operation returns the tools with an action flag to "Disassemble".

Example "POST /toolassembly/v1/toolinstances/{id}/disassemble”

Open the field "POST /toolassembly/v1/toolinstances/{id}/disassemble”.

Note

Disassembling of a tool identified by its unique Id

For a tool with a bill of material, make the following choice.

- If a component is "wearable", it is scrapped.
- If a component is not "wearable", it is stored as used in the component stack.

Exceptions structure:

- Not Found (404)
  - The tool with the given UUID is not found
- Bad Request (400)
  - The selected tool for disassembling does not have the action "Disassemble"

Example "POST /toolassembly/v1/toolclasses/{toolClassId}/createinstance"

Open the field "POST /toolassembly/v1/toolclasses/{toolClassId}/createinstance".

```
{
 "externalId": "ONEINST"
}
```

You see the result on the server:

Exceptions structure:

- Bad Request (400)
  This error message appears after the following actions:
  - A tool with the same ExternalID already exists
  - The toolClassId is wrong

11.2.3 Adding files to the tool master data

Prerequisite

Authenticate using the token, so that you can use the various functions in Swagger UI.

For more information, see:

- Manage openness clients (Page 103)
- Using the token in the Swagger UI (Page 893)

Adding files to tool master data

POST /tmdimport/v1/toolclasses/{id}/attachments

- Creates a tool master data item attachment from a file upload.
- An attachment has the max size of 50 MB and up to 10 attachments per master data item are allowed.

GET /tmdimport/v1/toolclasses/{id}/attachments

- Reads the meta data of all tool master data attachments.
- This contains the file name, size and date and the time of upload.

GET /tmdimport/v1/toolclasses/attachments/{id}/content

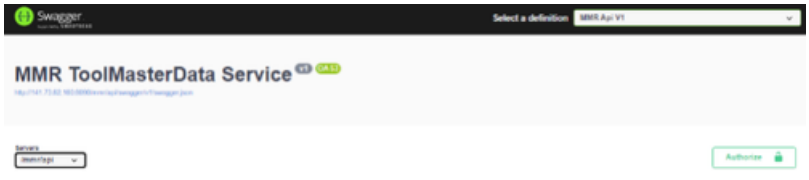
- Downloads the content of a tool master data attachment.

DELETE /tmdImport/v1/toolclasses/attachments/{id}

- Removes a tool master data attachment from MMR.

Procedure

1. Call the following address: Swagger (http://<IP adress of the MMR server>:8090/mmr/api/swagger/index.html)
   The "Swagger" > "MMR ToolMasterData Service" window opens.



2. Scroll to area "ToolMasterDataAttachmentImport".

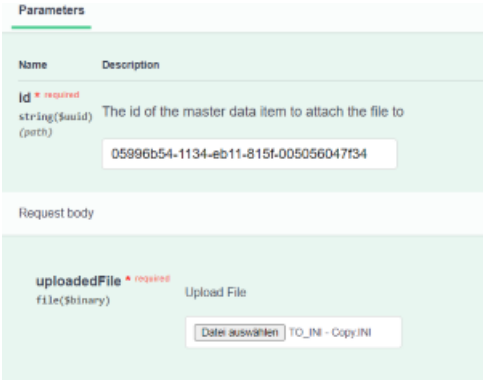
3. Open the desired field "POST", "GET", "DELETE" and click on "Try it out".

4. Enter the desired Id.
5. Click "Execute" to start the request.

For more information about the server, see Adding files (Page 209).

Example "POST /tmdimport/v1/toolclasses/{id}/attachments"

This creates a tool master data item attachment from a file upload.



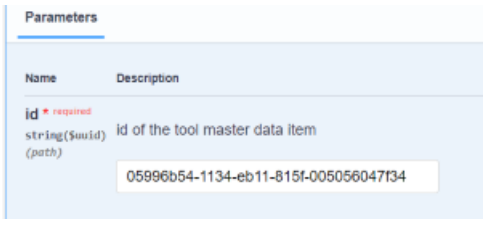
You see the result on the server: The files are visible and can be selected in Manage MyResources /Tools.

Exceptions structure:

- Internal server error (500)
  - Wrong UUID for ToolComponentMasterdata

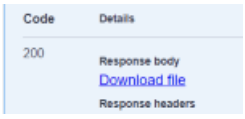
Example "GET /tmdimport/v1/toolclasses/{id}/attachments"

Insert the Id of the tool master data item.



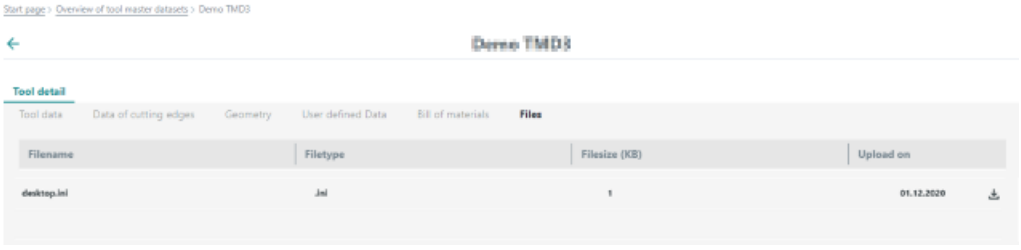
Example "GET /tmdimport/v1/toolclasses/attachments/{id}/content"

This downloads the content of a tool master data attachment.



Example "DELETE /tmdImport/v1/toolclasses/attachments/{id}"

You see the result on the server: One file has been removed.



11.2.4 Adding files to the tool master data components

Prerequisite

Authenticate using the token, so that you can use the various functions in Swagger UI.

For more information, see:

- Manage openness clients (Page 103)
- Using the token in the Swagger UI (Page 893)

Adding files to tool components

POST /tmdimport/v1/toolcomponents/{id}/attachments

- Creates a tool component data item attachment from a file upload.
- An attachment has the max size of 50 MB and up to 10 attachments per master data item are allowed.

GET /tmdimport/v1/toolcomponents/{id}/attachments

- Reads the meta data of all tool component data attachments. This contains the file name, size and date and the time of upload.

GET /tmdimport/v1/toolcomponents/attachments/{id}/content

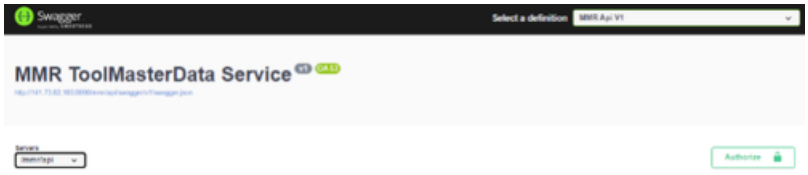
- Downloads the content of a tool component data attachment.

DELETE /tmdImport/v1/toolcomponents/attachments/{id}

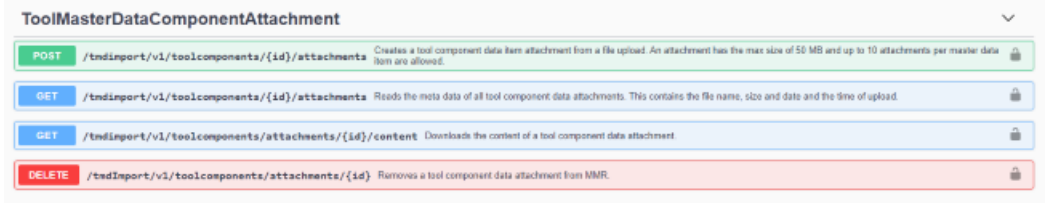
- Removes a tool component data attachment from MMR.

Procedure

1. Call the following address: Swagger (http://<IP adress of the MMR server>:8090/mmr/api/swagger/index.html)
   The "Swagger" > "MMR ToolMasterData Service" window opens.



2. Scroll to area "ToolMasterDataComponentAttachment"".

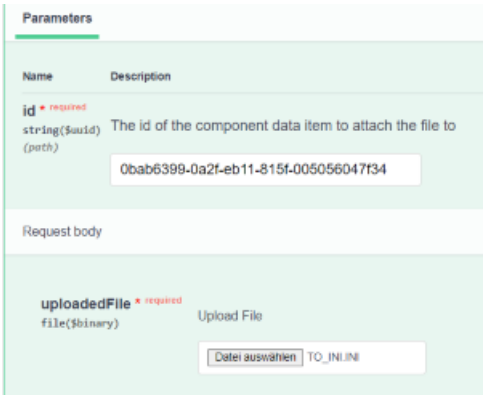


3. Open the desired field "POST", "GET", "DELETE" and click on "Try it out".
4. Enter the desired id.
5. Click "Execute" to start the request.

For more information about the server, see Adding files (Page 141).

Example "POST /tmdimport/v1/toolcomponents/{id}/attachments"

This request creates a tool master data item attachment from a file upload.



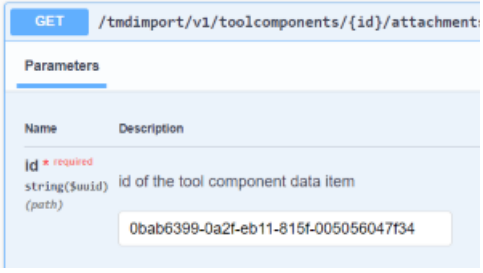
The files are visible and can be selected in Manage MyResources /Tools.

You see the result on the server:

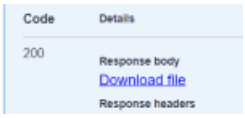
Exceptions structure:

- Internal server error (500)
  - Wrong UUID for Toolmasterdata

Example "GET /tmdimport/v1/toolcomponents/{id}/attachments"



Example "GET /tmdimport/v1/toolcomponents/attachments/{id}/content"



Example "DELETE /tmdImport/v1/toolcomponents/attachments/{id}"

11.2.5 Import tool component master data

Prerequisite

- Authenticate using the token, so that you can use the various functions in Swagger UI. For more information, see:
  - Manage openness clients (Page 103)
  - Token for the openness interface (extension interface) (Page 891)

Import tool component master data

GET /tmdimport/v1/toolcomponents/norms

- Retrieves the DIN norms for the component classification known to MMR
- For each norm, PictureID items serve as a sub-classification.
- On each level, a placeholder for “Unknown/Undefined” is available.

POST /tmdimport/v1/toolcomponents

- Creates a new tool component.
- Each component must have a unique name and must be classified with a tool component norm and Image Id.

GET /tmdimport/v1/toolcomponents

- Retrieves a tool component by its unique name.

GET /tmdimport/v1/toolcomponents/{id}

- Retrieves a tool component by its unique name.

PATCH /tmdimport/v1/toolcomponents/{id}

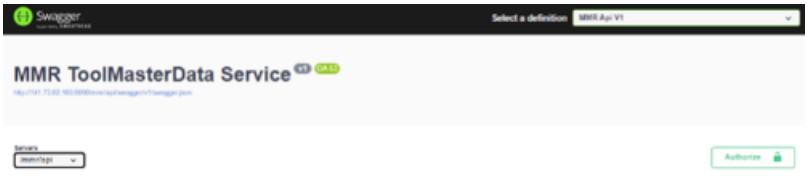
- Updates a tool component by applying the given json patch document (http://jsonpatch.com/) to the component.

DELETE /tmdimport/v1/toolcomponents/{id}

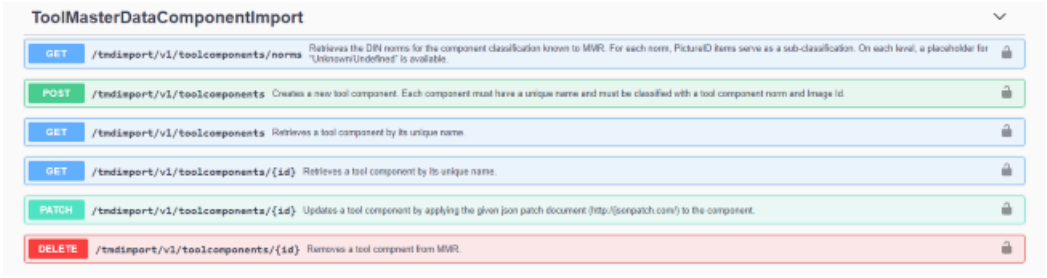
- Removes a tool component from MMR.

Procedure

1. Call the following address: Swagger (http://<IP adress of the MMR server>:8090/mmr/api/swagger/index.html).
   The "Swagger" > "MMR ToolMasterData Service" window opens.



2. Scroll to area "ToolMasterDataComponentImport".



3. Open the desired field "GET", "POST", "PATCH", "DELETE", and click on "Try it out".
4. Enter the appropriate values for parameters.
5. Click "Execute" to start the request.

Example "POST /tmdimport/v1/toolcomponents"

Open the field "POST /tmdimport/v1/toolcomponents"

```
{
"customerMaterialId": "CustomID",
 "nsm": "DIN4000-076",
 "bld": "01",
 "isWearPart": true,
 "note": "noteit",
 "supplier": "suplierOne",
```

```
 "primaryId": "primId",
 "resharpeningSupplier": "reshSup",
 "customProperties": {
 }
}
```

You see the result on the server:

Note

Creation of a new tool component

Each component must have a unique name and must be classified with a tool component norm and an Image Id.

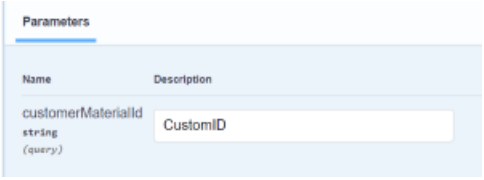
Exceptions structure:

- Bad Request (400)
  This error message appears after the following actions:
  - The request body is null or empty.
  - A property is missing within the json request.
  - Duplicated value due to an existing component with the a customerMaterialId.

Example "GET /tmdimport/v1/toolcomponents"

Open the field "GET /tmdimport/v1/toolcomponents"

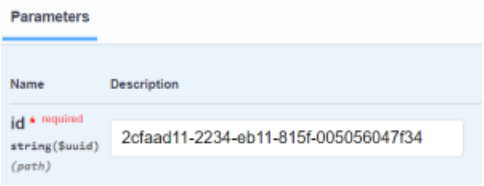
This operation retrieves a tool component by its unique name.



Example "GET /tmdimport/v1/toolcomponents/{id}"

Open the field "GET /tmdimport/v1/toolcomponents/{id}"

This operation retrieves a tool component by its unique name.



Example "PATCH /tmdimport/v1/toolcomponents/{id}"

Open the field "PATCH /tmdimport/v1/toolcomponents/{id}"

This example applies to wear parts.

```
[
 {
 "op":"Replace",
 "path":"isWearPart",
 "value":false,
 }
]
```

```
[
 {
 "op":"Replace",
 "path":"nsm",
 "value":"DIN4000-077",
 }
]
```

Note

Wear part

"Wear part" shows you whether the component is a wear part or not. Certain parts, for instance cutting edges, are subject to wear. This is not the case for components like holders.

Properties you can change:

- `"customerMaterialId": "CustomID",`
- `"nsm": "DIN4000-076",`
- `"bld": "01",`
- `"isWearPart": true,`
- `"note": "noteit",`
- `"supplier": "suplierOne",`
- `"primaryId": "primId",`
- `"resharpeningSupplier`

Exceptions structure:

- Not Found (404)
  - UUID is wrong
- Bad Request (400)
  This error message appears after the following actions:
  - The request body is null or empty.

Example "DELETE /tmdimport/v1/toolcomponents/{id}"

Open the field "DELETE /tmdimport/v1/toolcomponents/{id}"

11.2.6 Import tool master data

Prerequisite

- Authenticate using the token, so that you can use the various functions in Swagger UI.
  For more information, see:
  - Manage openness clients (Page 103)
  - Using the token in the Swagger UI (Page 893)

Import tool master data

POST /tmdimport/v2/toolclasses

- Creates a new ToolClass (tool master data item).
- Creates an external revision name.

GET /tmdimport/v1/toolclasses

- Reads a tool class from the master data service by its unique external name.

PUT /tmdimport/v2/toolclasses/{id}

- Updates a ToolClass (tool master data item).
- If tools are already associated with the master data item, the update will affect only a small subset of properties of the master data item.
- In this case, you can neither change the geometry of the edges nor add or remove edges.

- Only master data items without connected tools are fully editable.
- The "PUT" operation does not allow to set values of custom attributes beyond 'attribute10'. These are available for writing in the "Patch" endpoint. This endpoint is provided for downwards compatibility only and will not be extended with the new functionalities. Use the PATCH endpoint instead.

PATCH /tmdimport/v2/toolclasses/{id}

- Applies the given json patch (http://jsonpatch.com/) operations to the master data item including its bill of material.
  - The patch allows access to custom properties beyond 'attribute10' <list type="bullet"><item>
  - For patching edges, use the dno of the edge as path segment</item><item>.
  - For patching bill of materials, use the Id of the component as path segment </item></list>.

DELETE /tmdimport/v2/toolclasses/{id}

- Deletes a ToolClass (tool master data item).
- It is forbidden if any tool instance belongs to this tool class.

PUT /tmdimport/v2/toolclasses/propagate

- Propagates the changes of the most recent tool class revision to tools.

DELETE /tmdimport/v2/toolclasses/lastrevision

- Deletes the last revision of a tool class.
- Deletion is only possible, if the revision does not have tool instances. OEM data is assigned to it.

GET /tmdimport/v1/toolclasses/{internalUUid}

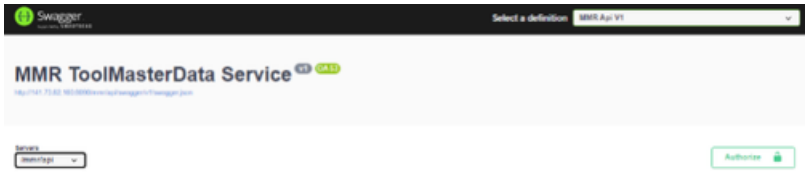
- Reads a tool class from the master data service by its unique internal UUID.

Note

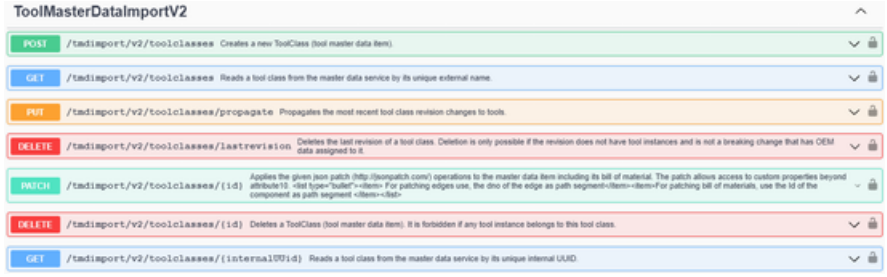
DnoType field is no longer supported, but it is still sent in the v1 GET endpoints for consistency with a default value of 0.

Procedure

1. Call the following address: Swagger (http://<IP adress of the MMR server>:8090/mmr/api/swagger/index.html).
   The "Swagger" > "MMR ToolMasterData Service" window opens.



2. Scroll to the area "ToolMasterDataImport".

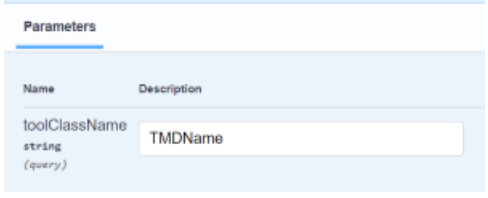


3. Open the desired field "POST", "GET", PUT", "PATCH", "DELETE" and click on "Try it out".
4. Enter the appropriate values for parameters.
5. Click "Execute" to start the request.

Example "GET /tmdimport/v1/toolclasses"

1. You can disassemble a tool and create a new one with the same external Id. The tool must have the "AtMachine" status and the "Disassemble" action flag.

2. Open "GET /tmdimport/v1/toolclasses" to retrieve the tool class information from the tool master data. You need the UUID as well as the external Id. The tool gets the "In assembly" status and can be measured.

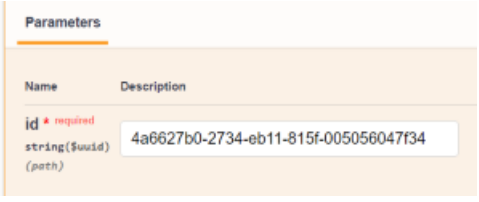


3. Open "Post /toolassembly/v1/toolclasses/{toolClassId}/createinstance" and enter the Id. Use the same external Id to create and measure the new tool. The old tool is automatically disassembled.

Example "PUT /tmdimport/v1/toolclasses/{id}"

These are the required minimal properties for the Tmd update:

```
{
 "name": "TMDName-New",
 "toolIdent": "tool-Ident1-New ",
 "toolSizeLeft": 2,
 "toolSizeRight": 0,
 "toolSizeAbove": 2,
 "toolSizeUnder": 0,
 "cuttingEdges": [
 {
 "dNo": 1,
 "toolType": 100,
 }
 ]
}
```



Exceptions structure:

- Not Found (404)
  - UUID not found
- Bad Request (400)
  The error messages appears after the following action:
  - The request body is null or empty.
- Internal server error (500)
  - The TMDName and toolIdent are not from the same data set.

Example 2:

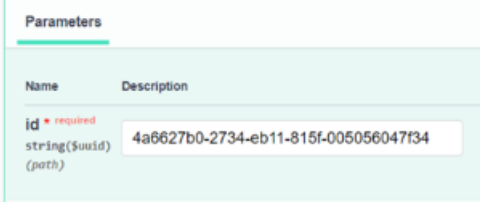
```
{
 "cuttingEdges": [
  {
   "cuttingEdgeGeometry": {
    "adapterLength1": 999
   },
   "cuttingEdgeTolerance": {
    "adapterLength1": 1
   },
   "dNo": 1,
   "toolType": 200,
   "targetToolLifeTimeWarningLimit": 12,
   "targetToolLifeTime": 200
  }
],
```

```
"customProperties": {
 "attribute1": "ASD-999",
 "attribute2": "ASD-999",
 "attribute3": null,
 "attribute4": null,
 "attribute5": null,
 "attribute6": null,
 "attribute7": null,
 "attribute8": null,
 "attribute9": null,
 "attribute10": null
},
"toolComponents": [
 {
  "amount": 1,
  "toolComponentId": "26d370b2-3c84-ec11-81cd-0050561a0005",
  "customerMaterialId": "CutIt"
 }
],
"name": "TMD-Rev",
"description": "Beschreibung-A",
"vendor": "Lieferant-A",
"orderNumber": "Bestellnummer-123",
"toolIdent": "Drill-rev",
"maxRotSpeed": 123,
"maxAcceleration": 321,
"toolSizeLeft": 1,
"toolSizeRight": 1,
"toolSizeAbove": 1,
"toolSizeUnder": 1,
"isDisabled": false,
"dNoType": "Relative"
}
```


Example "PATCH /tmdimport/v1/toolclasses/{id}"

Example:


```
[
 {
 "op":"replace",
 "value":"ti-value1",
 "path": "/customProperties/attribute1"
 }
]
```

Exceptions structure:

- Not Found (404)
  - UUID not found
- Bad Request (400)
  This error message is displayed after the following actions:
  - The attribute property does not exist.
  - The request body is null or empty.

Example "PUT /tmdimport/v1/toolclasses/propagate"

Example:

```
{
 "toolClassName": "TMD-Rev",
 "propagationDestinations": "ToolCabinet, Assembly"
}
```

Exceptions structure:

- Not Found (404)
  - An error in execution occurred.
- Bad Request (400)
  This error message is displayed after the following actions:
  - Propagation destination (Cabinet or Assembly) not found
  - Tool class not found

Example "POST /tmdimport/v2/toolclasses/active"

It reads all active tool classes filtered by the given Dto. If you do not send any filter Dto, all tool classes currently active are returned.

These are the optional properties that can be given as the filter Dto:

```
{
  "name": "TMD1",
  "revision": 3,
  "externalRevisionName": "TMD1_External_Revision_3",
  "toolNameInNcProgram": "TMD1_NC_TI",
  "customProperties": {
    "attribute1": "value1",
    "attribute2": "value2"
  }
}
```

All given properties are checked with equals and the "AND" logical gate.

Exceptions structure:
• Bad Request (400)
The error message appears after the filtering or retrieval of tool classes.

See also

Displaying an external revision (Page 228)

11.2.7 Activating/deactivating revisions for tool master data

Prerequisite

- Authenticate using the token, so that you can use the various functions in Swagger UI. For more information, see:
  - Manage openness clients (Page 103)
  - Using the token in the Swagger UI (Page 893)

Activating/deactivating revisions for tool master data

GET /v1/revisionconfiguration

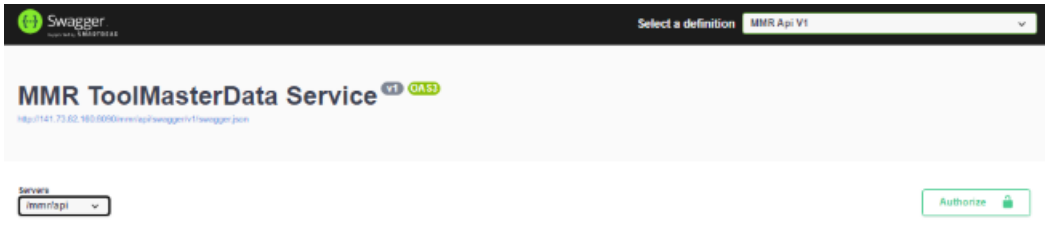
- Shows all tool master data properties for which revisions can be deactivated.

PUT /v1/revisionconfiguration

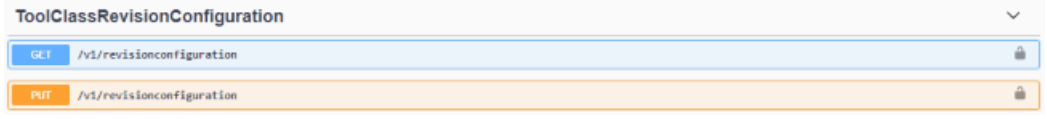
- Deactivates or activates the revision of the selected tool master data property.

Procedure

1. Call the following address: Swagger (http://<IP adress of the MMR server>:8090/mmr/api/swagger/index.html).
   The "Swagger" > "MMR ToolMasterData Service" window opens.



2. Scroll to area "ToolClassRevisionConfiguration".



3. Open the desired field "GET", PUT" and click on "Try it out".
4. Enter the appropriate values for parameters.
5. Click "Execute" to start the request.

Example GET /v1/revisionconfiguration

For properties defined as "true", no new revision will be created when those properties are changed.


```
{
 "description": false,
 "vendor": false,
 "orderNumber": false,
 "maxRotSpeed": false,
 "maxAcceleration": false,
 "cuttingEdges": {
 "toolMaterialType": false,
 "targetToolLifeTimeWarningLimit": false,
 "targetToolLifeTime": false,
 "targetToolLifePiecesWarningLimit": false,
 "targetToolLifePieces": false,
 "cuttingEdgeGeometry": false,
 "cuttingEdgeTolerance": false
},
 "toolSizeLeft": false,
 "toolSizeRight": false,
 "toolSizeAbove": false,
 "toolSizeUnder": false,
 "customProperties": false,
 "toolComponents": false
}
```


Example PUT /v1/revisionconfiguration

In the following example, the properties "description", "targetToolLifePiecesWarningLimit" and "customProperties" were defined as true. Changing those properties will have no effect on revision and propagation.


```
{
 "description": true,
 "vendor": false,
 "orderNumber": false,
 "maxRotSpeed": false,
 "maxAcceleration": false,
 "cuttingEdges": {
 "toolMaterialType": false,
 "targetToolLifeTimeWarningLimit": false,
 "targetToolLifeTime": false,
 "targetToolLifePiecesWarningLimit": true,
 "targetToolLifePieces": false,
 "cuttingEdgeGeometry": false,
 "cuttingEdgeTolerance": false
},
 "toolSizeLeft": false,
 "toolSizeRight": false,
 "toolSizeAbove": false,
 "toolSizeUnder": false,
```

```
 "customProperties": true,
 "toolComponents": false
}
```

11.2.8 Import tool plan V1

Prerequisite

- Authenticate using the token, so that you can use the various functions in Swagger UI. For more information, see:
  - Manage openness clients (Page 103)
  - Using the token in the Swagger UI (Page 893)

Import tool plan V1

POST /toolplan/v1

- A new tool plan is created with specific plan items. A unique name is required for the new plan.

GET /toolplan/v1

- Retrieves all MMR tool plans.

GET /toolplan/v1/{id}

- Retrieves a specific MMR tool plan based on its Id.

PATCH /toolplan/v1/{id}

- Patches a specific MMR tool plan based on its Id.

DELETE /toolplan/v1/{id}

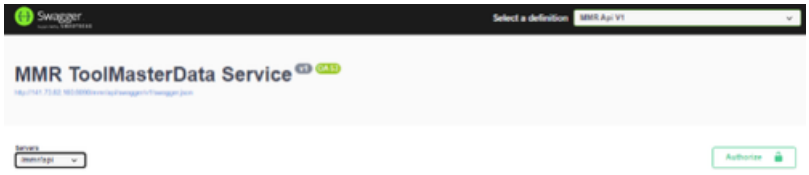
- Deletes a specific MMR tool plan based on its Id.

GET /toolplan/v1/byname

- Retrieves a specific MMR tool plan based on its name.

Procedure

1. Call the following address: Swagger (http://<IP adress of the MMR server>:8090/mmr/api/swagger/index.html).
   The "Swagger" > "MMR ToolMasterData Service" window opens.



2. Scroll to area "ToolPlanV1".

3. Open the desired fields "POST", "GET", "PATCH", "DELETE"", and click on "Try it out".
4. Enter the appropriate values for the tool plans.
5. Click "Execute" to start the request.

The tool plan or tool state is visible and can be selected in Manage MyResources /Tools.

For more information, see Overview of tool plans (Page 277).

Example "POST /toolplan/v1"

Open the field "POST /toolplan/v1"

```
{
  "name": "ToolPlan",
  "workpieceName": "workpieceName",
  "description": "MYPlan",
  "items": [
  {
   "toolClassName": "TMDName",
   "dNo": 1,
   "workingTimeProPiece": 1,
   "overwrites": {
    "toolIdent": "TMDName-Ident",
    "targetToolLifePieces": 111,
    "targetToolLifePiecesWarningLimit": 11
   }
  }
 ]
}
```

Exceptions structure:

- Bad Request (400)
  The error message appears after the following actions:
  - The request body is null or empty.
  - Operation duplicate: A unique tool plan already exists.

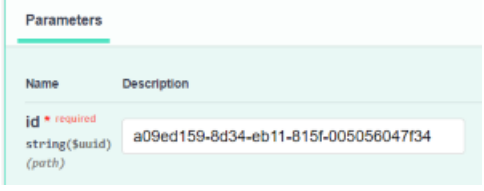
Example "PATCH /toolplan/v1/{id}"

Open the field "PATCH /toolplan/v1/{id}"

```
[
{
  "op":"Replace",
  "path":"description",
  "value":"MYPlan-ASD",
  }
]
```

- OR -

```
[
 {
  "op":"Replace",
  "path":"name",
  "value":"NameIT",
  }
 ]
```



Note

Possibilities to overwrite

"name": "ToolPlan",
"workpieceName": "workpieceName",
"description": "MYPlan"

Exceptions structure:

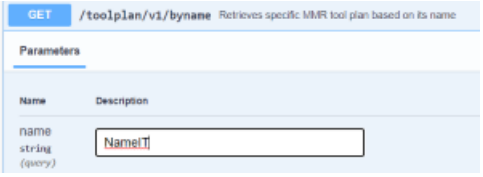
- Not Found (404)
  - UIID of tool plan is not found
- Bad Request (400)
  The error message appears after the following actions:
  - The request body is null or empty.
  - Operation duplicate: A unique tool plan already exists.

Example "DELETE /toolplan/v1/{id}"

Open the field "DELETE /toolplan/v1/{id}"

Example "GET /toolplan/v1/byname"

Open the field "GET /toolplan/v1/byname"



11.2.9 Import tool plan V2

Prerequisite

- Authenticate using the token, so that you can use the various functions in the Swagger UI.
  For more information, see:
  - Manage openness clients (Page 103)
  - Using the token in the Swagger UI (Page 893)

Note

Difference to the previous toolplan

In the V2, it is now possible to overwrite the whole toolplan collection. In the V1, you could just overwrite some of the properties.

Import tool plan V2

POST /toolplan/v2

- A new tool plan is created with specific plan items. A unique name is required for the new plan.

GET /toolplan/v2

- Retrieves all MMR tool plans.

GET /toolplan/v2/{id}

- Retrieves a specific MMR tool plan based on its Id.

PATCH /toolplan/v2/{id}

- Patches a specific MMR tool plan based on its Id.

DELETE /toolplan/v2/{id}

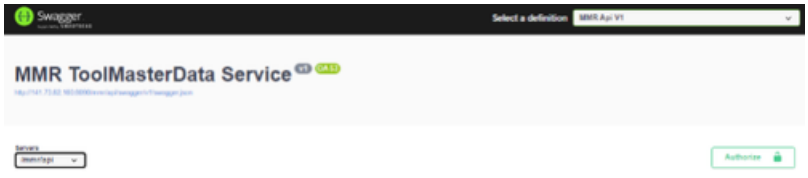
- Deletes a specific MMR tool plan based on its Id.

GET /toolplan/v2/byname

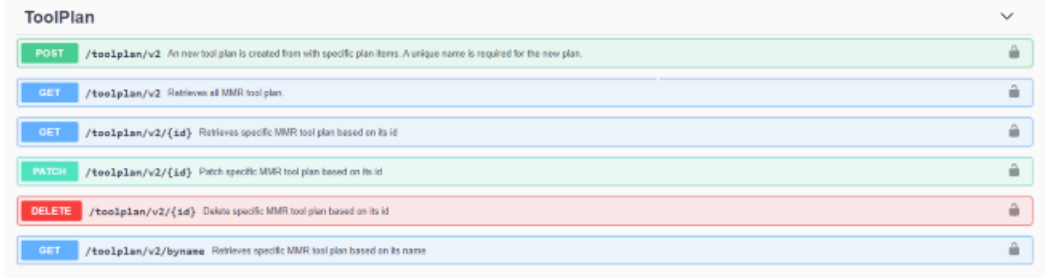
- Retrieves a specific MMR tool plan based on its name.

Procedure

1. Call the following address: Swagger (http://<IP adress of the MMR server>:8090/mmr/api/swagger/index.html).
   The "Swagger" > "MMR ToolMasterData Service" window opens.



2. Scroll to area "ToolPlan".



3. Open the desired fields "POST", "GET", "PATCH", "DELETE"", and click on "Try it out".
4. Enter the appropriate values for the tool plans.
5. Click "Execute" to start the request.

The tool plan or tool state is visible and can be selected in Manage MyResources /Tools.

For more information, see Overview of tool plans (Page 277).

Example "POST /toolplan/v2"

Open the field "POST /toolplan/v2"

```
{
"name": "ASD1",
"workpieceName": "string",
"description": "string",
"items": [
"items": [
  {
    "toolClassName": "string",
    "dNo": 0,
    "workingTimeProPiece": 0
  }
],
"overwrites":[
  {
    "toolClassName": "ASD",
    "cuttingEdgeOverwrites": [
      {
        "dNo": 0,
        "targetToolLifeTime": 0,
        "targetToolLifeTime": 0,
        "targetToolLifeTimeWarningLimit": 0,
        "targetToolLifePieces": 0,
        "targetToolLifePiecesWarningLimit": 0,
      }
    ],
    "toolValueOverwrites": [
      {
        "path": "/toolIdent",
        "value": "QWERT1"
      }
    ]
    }
  ]
}
```

Exceptions structure:

- Bad Request (400)
  The error message appears after the following actions:
  - The request body is null or empty.
  - Operation duplicate: A unique tool plan already exists.

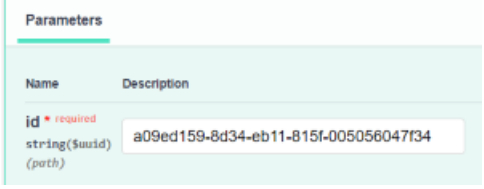
Example "PATCH /toolplan/v2/{id}"

Open the field "PATCH /toolplan/v2/{id}"

```
[
{
  "op":"Replace",
  "path":"description",
  "value":"MYPlan-ASD",
  }
]
```

- OR -

```
[
 {
  "op":"Replace",
  "path":"name",
  "value":"NameIT",
  }
 ]
```



Note

Possibilities to overwrite

"name": "ToolPlan",
"workpieceName": "workpieceName",
"description": "MYPlan"

Exceptions structure:

- Not Found (404)
  - UIID of tool plan is not found
- Bad Request (400)
  The error message appears after the following actions:
  - The request body is null or empty.
  - Operation duplicate: A unique tool plan already exists.

11.2.10 Changing tool life

You can change data from tools (brownfield tools/ greenfield tools) that are on the machine.

These endpoints use new data model.

Prerequisite

- Authenticate using the token, so that you can use the various functions in Swagger UI.
  For more information, see:
  - Manage openness clients (Page 103)
  - Using the token in the Swagger UI (Page 893)
- The tool whose values you want to change must be in a cabinet or magazine on the machine.
- The machine must be connected and onboarded.

Import tool state

GET /toolstate/v2/toolplans/tools

- Retrieves tools with basic tool data which belongs to a specific tool plan.

GET /toolstate/v2/productionorders/tools

- Retrieves tools with basic tool data which belongs to a specific production order.

GET /tollstate/v2/tools

- Retrieves tool with basic tool data which has a given External Id.

GET /toolstate/v2/tools/atmachines

- Retrieves tools with basic tool data which are at the machine or unloading.

POST /toolstate/v2/tolls/atcabinets

- Retrieves tools with basic tool data and cabinet location which are at the given cabinets.

PUT /toolstate/v2/tools/{toolInstanceId}/movetocabinet

- Moves a single tool into a designated cabinet.

DELETE /toolstate/v2/tools/{toolInstanceId}/reservation

- Deletes the reservation of a tool.

PUT /toolstate/v2/tools/{toolInstanceId}/reservation

- Changes the reservation of a tool.

PATCH /toolstate/v2/toolinstances/{id}/{dNo}/toollife

- Changes a tool's edge life time.
- This includes target life, warning limits and the remaining life of an edge.
- It is possible to change the values for both types of measurement (cutting time and workpieces).
- A tool to be changed must be in a cabinet or a magazine on a machine.
- Other locations are not allowed here.
- If the machine is offline or not onboarded, the change is aborted immediately.

POST /toolstate/v2/tools/query

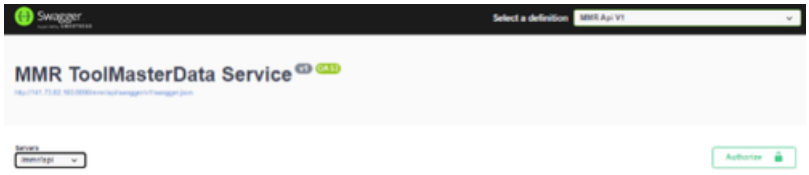
- Retrieves tool based on query conditions.
  There must be a condition. The connector between condition is by defaul 'AND'.
  In case the same condition is added multiple times, it used as 'CONTAINS / IN / OR'.
  CustomAttribute and CuttingEdge selected in Path: 'CuttingEdges/DNO/ToolType' but it is not a must.
- Is used as 'CONTAINS / IN / OR' and will be added multiple times. 'CustomAttribute' and 'CuttingEdge' are selected in the path 'CuttingEdges/DNO/ToolType'. This is not a must.

PUT /toolstate/v2/tools/{toolid}/istrialtool

- The tool state will be updated with the option 'Trial Tool'.

Procedure

1. Call the following address: Swagger (http://<IP adress of the MMR server>:8090/mmr/api/swagger/index.html).
   The "Swagger" > "MMR ToolMasterData Service" window opens.

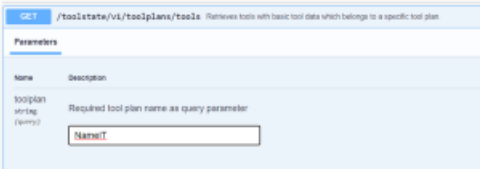


2. Scroll to the area "ToolState".

3. Open the desired fields "GET", "POST", "PUT", "DELETE", "PATCH", and click on "Try it out".
4. Enter the appropriate values for tool plans.
5. Click "Execute" to start the request.

Example "Open the field "GET /toolstate/v1/toolplans/tools"

Open the field "GET /toolstate/v1/toolplans/tools".



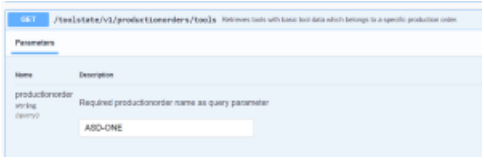
Exceptions structure:

- Not found (404)
  - The toolplan has no production order.
- Bad Request (400)
  The error message appears after the following actions:
  - The name of the toolplan is wrong.
  - The tool plan does not exist.

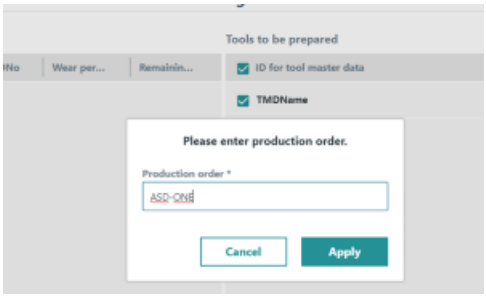
Example "GET /toolstate/v1/productionorders/tools"

Open the field "GET /toolstate/v1/productionorders/tools".


```
{
  "toolInstances": [
  {
   "id": "85b1b618-a3c7-4d5e-8a44-b6a00f07ace6",
   "toolIdent": "TMDName-Ident",
   "externalId": "TMDName-1",
   "presettingState": "Unassembled",
   "customProperties": {
    "attribute1": "ti-value1",
    "attribute2": null,
    "attribute3": null,
    "attribute4": null,
    "attribute5": null,
    "attribute6": null,
    "attribute7": null,
    "attribute8": null,
    "attribute9": null,
    "attribute10": null
  },
  "toolClassId": "4a6627b0-2734-eb11-815f-005056047f34",
  "locationType": "Assembly",
  "productionOrderName": "ASD-ONE",
  "productionOrderId": "ce5e7e87-3fcb-427b-17e0-08d896b4c688"
 }
]
}
```

You see the result on the server:



Exceptions structure:

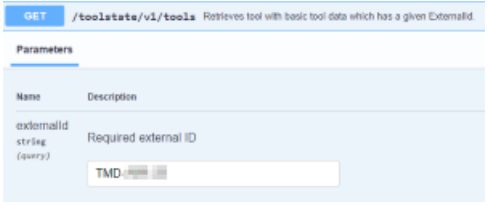
- Not Found (404)
  - The production order for the toolplan was not found.
- Bad Request (400)
  The error message appears after the following actions:
  - The name of the toolplan is wrong.
  - The toolplan does not exist.

Example "GET /toolstate/v1/tools"

You can set a new endpoint or an adapted endpoint to delete a reservation for a TI within assembly, cabinet or on a machine.

You can set an endpoint to change a reservation: For the reservation, the related machine and order can be changed / newly assigned for a TI within assembly, cabinet or on a machine.

1. Open the field "GET /toolstate/v1/tools".
2. Get externalId to find the reservation:



Response:


```
{
  "cuttingEdges": [
    {
      "dNo": 1,
      "toolType": 100,
      "residualToolLife": 123,
      "targetToolLifeTime": 123,
      "targetToolLifeTimeWarningLimit": 12
    },
 ],
  "id": "82ad3442-8750-4a0c-04f5-08d9795", > the ID you are looking for
  "toolIdent": "TMD1",
  "externalId": "TMD1-1",
  "presettingState": "Measured",  "customProperties": {},
  "toolClassId": "c1b8e61a-3817-ec11-8c9b-005056189619",
   "locationType": "ToolCabinet"
}
```

Example "GET /toolstate/v1/tools/atmachines"

You can transfer a tool instance from AtMachine to a cabinet:

1. Open the field "GET /toolstate/v1/tools/atmachines" to retrieve the UUID of a tool AtMachine.
2. Open "GET /toolassembly/v1/toolcabinets" to get the container ID.
3. Open "PUT /toolstate/v1/tools/{toolInstanceId}/movetocabinet" to move the tool to the selected cabinet.

Example "POST /toolstate/v1/tools/atcabinets"

1. Open the field "GET /toolassembly/v1/toolcabinets" to get the container ID.
2. Open the field "POST /toolstate/v1/tools/atcabinets" and enter the IDs.

```
{
   "collection": [
     "9b342261-3aa2-4b67-b7b4-01ba02dc1d55", "58be88c7-662c-4bc7-
bc98-df1fb8191a64"
   ]
}
```

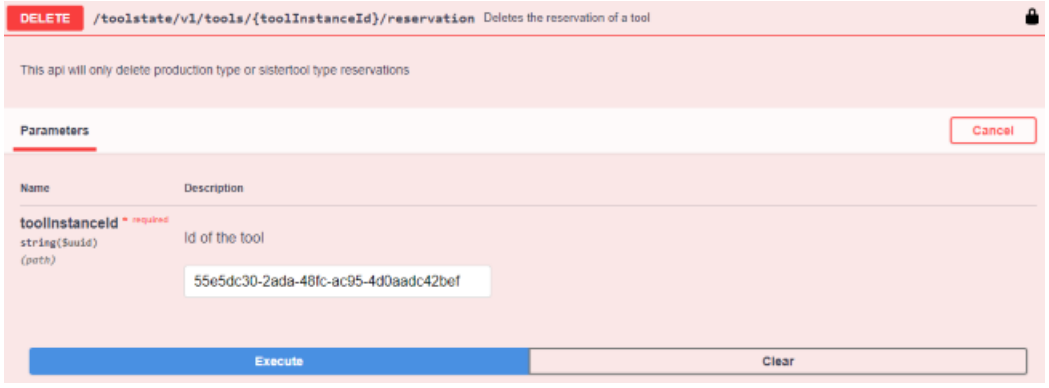
Exceptions structure:

- Not Found (404)
  - The tool cabinets were not found.
- Bad Request (400)
  - Request body is empty.

Example "DELETE /toolstate/v1/tools/{toolInstanceId}/reservation"

You can delete the reservation of a tool if the tool is reserved as a default tool or a sister tool for a machine or if it is reserved by a production order:

Open the field "DELETE /toolstate/v1/tools/{toolInstanceId}/reservation".



The tool is shown on every machine with external tools.

Exceptions structure:

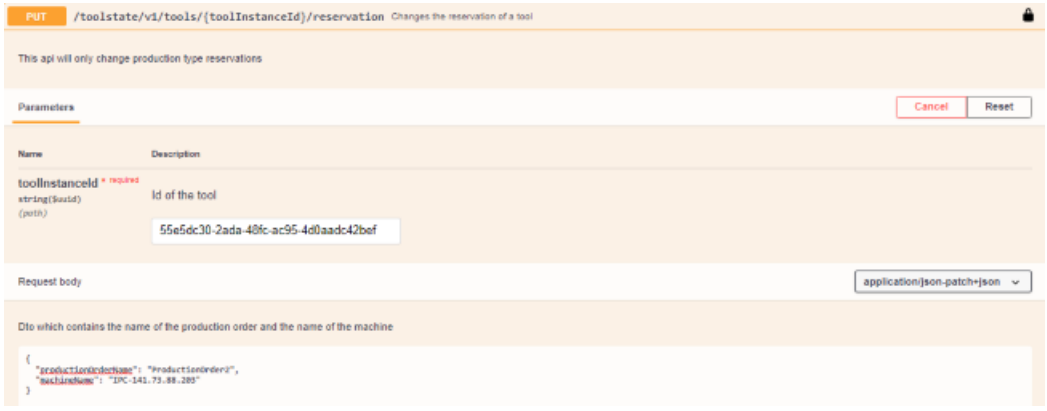
- Not Found (404)
  - The tool instance was not found.
- Bad Request (400)
  - The tool has no reservations.

Beispiel "PUT /toolstate/v1/tools/{toolInstanceId}/reservation"

A production order can be assigned to a tool and the tool reservation can be changed to another machine:

Enter the GUID of the tool.

```
{
  "productionOrderName": "ProductionOrder2",
  "machineName": "IPC-141.73.88.203"
}
```



Exceptions structure:

- Not Found (404)
  - The tool instance was not found.
  - The production order was not found.
  - The machine was not found.
- Bad Request (400)
  - Request body is empty.

Example "PATCH /toolstate/v1/toolinstances/{id}/{dNo}/toollife"

Open the field "PATCH /toolstate/v1/toolinstances/{id}/{dNo}/toollife".

```
[
  {
   "path": "targetToolLifeTime",
   "op": "Replace",
   "value": "999"
  },
  {
   "path": "residualToolLife",
   "op": "Replace",
   "value": "9"
  },
  {
   "path": "targetToolLifeTimeWarningLimit",
   "op": "Replace",
   "value": "99"
 }
]
```

You can see the new values immediately on the machine and the server UI.

11.2.11 Modifying user-defined attributes

The number of user-defined attributes can be set for tool master data and for tool components. The default number is 10.

You can specify the number and definition of the attributes individually via the Swagger UI, and import them into Manage MyResources /Tools.

Prerequisite

The token was generated and used in the Swagger UI.

For more information, see:

- Manage openness clients (Page 103)
- Token for the openness interface (extension interface) (Page 891)

User-defined attributes for tool master data

POST /v1/toolclasses/customproperties

- Defines the number of custom properties available for tool classes.
- There is only one restriction concerning the numbers, which may never be under 10.
- Default localizations for custom properties are created, removed or decreased.

GET /v1/toolclasses/customproperties

- Retrieves the collection of all defined custom properties available to tool classes..

PUT /v1/toolclasses/customproperties/{key}

- Replaces the custom property's single definition for tool classes with the given definition.

Tool component user-defined attributes

POST /v1/toolcomponents/customproperties

- Defines the number of custom properties available for tool classes.
- There is only one restriction concerning the numbers, which may never be under 10.
- Default localizations for custom properties are created, removed or decreased.

GET /v1/toolcomponents/customproperties

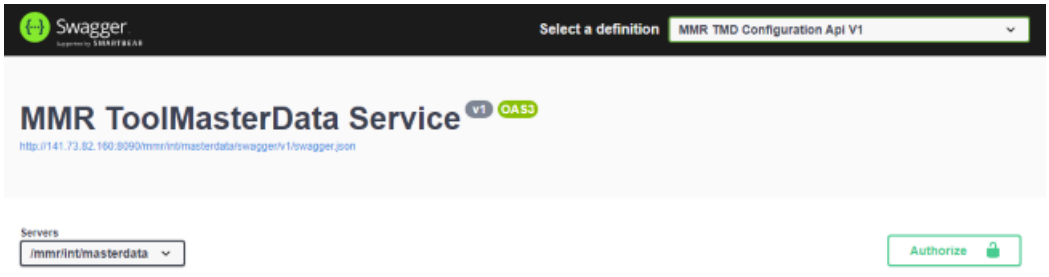
- Retrieves the collection of all the defined custom properties available for tool components.

PUT /v1/toolcomponents/customproperties/{key}

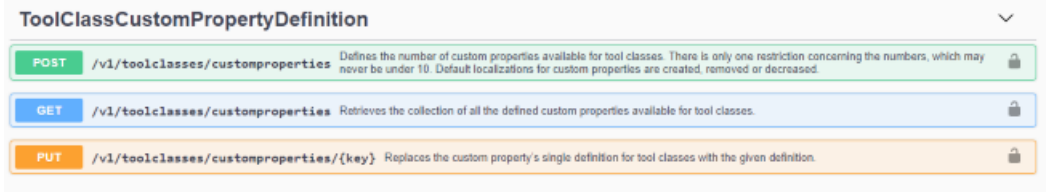
- Replaces the custom property's single definition for tool classes with the given definition.

Procedure

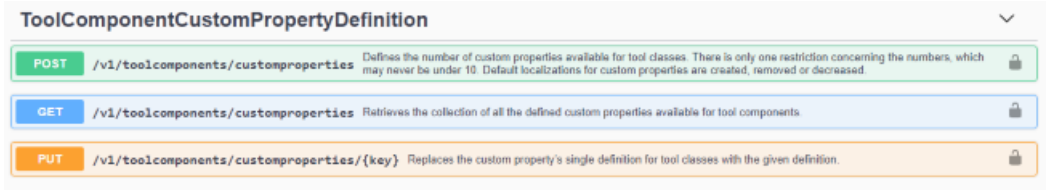
1. Call the following address: swagger (https://<IP address of the MMR server>/mmr/int/masterdata/swagger/index.html).
   The "Swagger" > "MMR ToolMasterData Service" window opens.



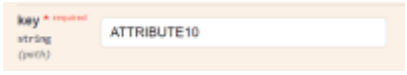
2. Scroll to "ToolClassCustomPropertyDefinition" area,



   or scroll to "ToolComponentCustomPropertyDefinition" area.



3. Open the "POST" field to specify the number of attributes.
   – Click "Try it out".
   – Adapt number of properties in request body.
   – Click "Execute".
4. Open the "GET" field to retrieve defined properties.
   – Click "Try it out".
   – Click "Execute".
     The structure of the attributes is displayed.
5. Open the "PUT" field.
   – Click "Try it out".
   – Enter the key you found in the "GET" request.



   – Adapt the request body.
   – Click "Execute".
6. You see the result in the "User-defined data" tab in detail view of tool master data or tool component.
   The user-defined data is visible and can be selected in Manage MyResources /Tools.
   For more information, see:
   – Tool master data: Creating or editing user-defined data (Page 206).
   – Tool component: Creating or editing user-defined data (Page 139)

11.2.12 Creating attribute names

The names of user-defined attributes can be set in Manage MyResources /Tools for tool master data and for tool components. The default names are "Attribute 1", "Attribute 2" etc.

You can specify the names of the attributes individually via Swagger UI, and import them into Manage MyResources /Tools.

Prerequisite

Token was generated and used in Swagger UI.

For more information, see:

- Manage openness clients (Page 103)
- Token for the openness interface (extension interface) (Page 891)

Localization data

GET /v1/toolclasses/localizations

- This API returns all the stored localizations which are related to the tool master data (e.g. project specific attributes).

POST /v1/toolclasses/localizations

- This "Post" method stores new localizations in the database.
- The DTO must contain an equal number of attributes for every supported language.
- The attributes must be named "ATTRIBUTE#" (e.g. ATTRIBUTE10) and the numbers must be consecutive in ascending order.

Tool component localization data

Set all components custom attributes configuration to a customer defined value this has to be done for all languages. The structure can be copied from a **Get** localization.

GET /v1/toolcomponents/localizations

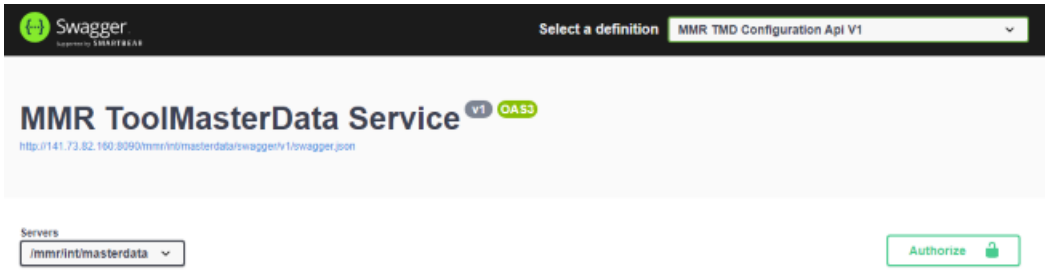
- This API returns all the stored localizations which are related to the tool component data (e.g. project specific attributes).

POST /v1/toolcomponents/localizations

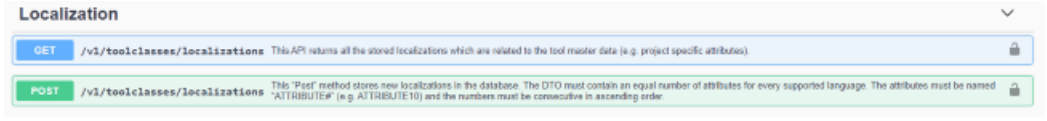
- This "Post" method stores new localizations in the database.
- The DTO must contain an equal number of attributes for every supported language.
- The attributes must be named "ATTRIBUTE#" (e.g. ATTRIBUTE10) and the numbers must be consecutive in ascending order.

Procedure

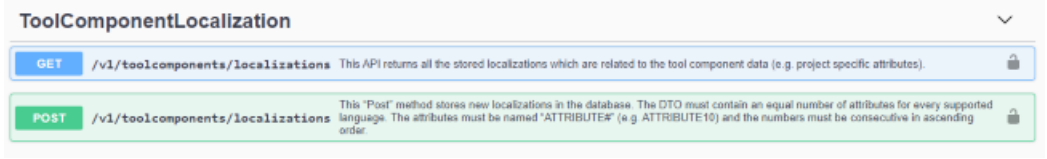
1. Call the following address: swagger (https://<IP address of the MMR server>/mmr/int/masterdata/swagger/index.html).
   The "Swagger" > "MMR ToolMasterData Service" window opens.



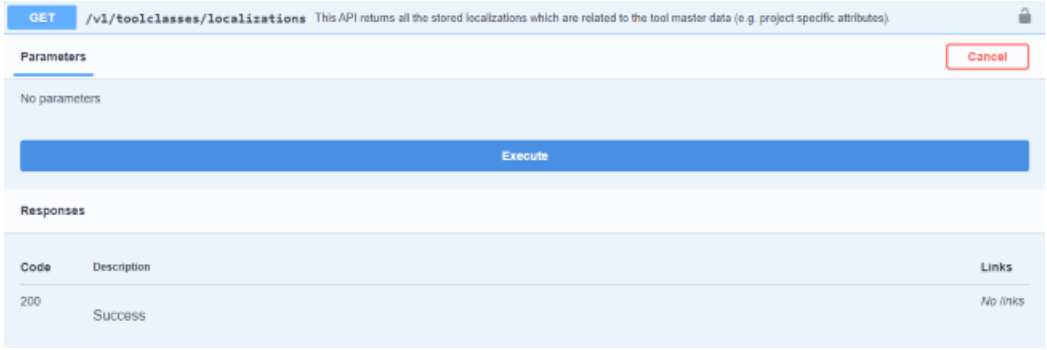
2. Scroll to "Localization" area,



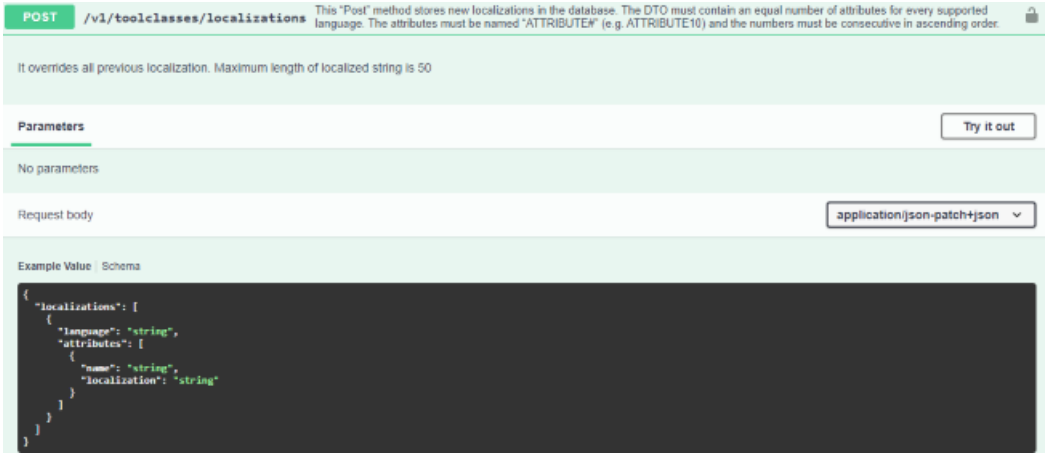
   or scroll to "ToolComponentLocalization" area.



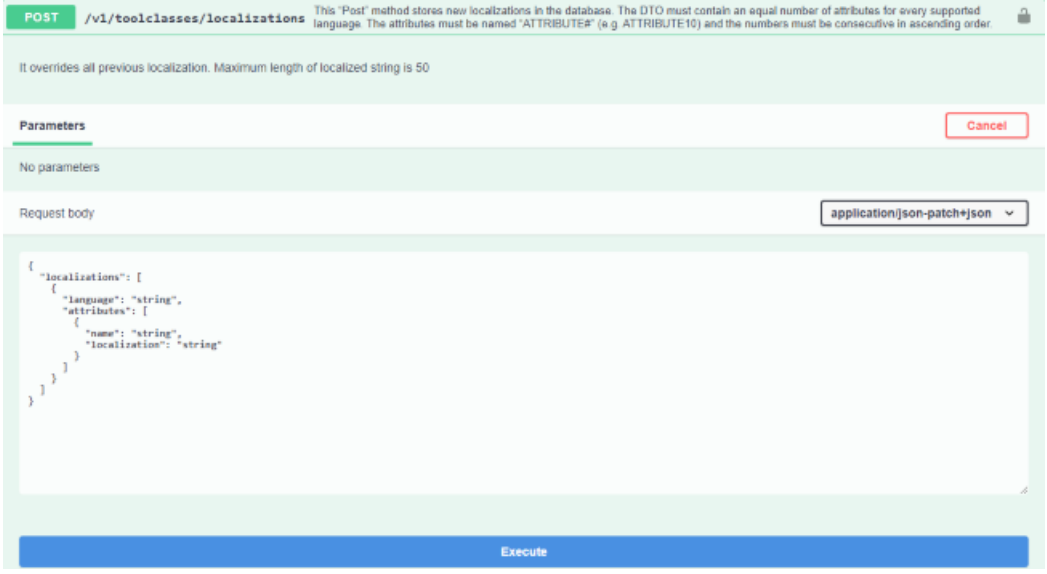
3. Open the "GET" field.
   Click "Execute".
   The structure of the attributes is displayed.
   Copy the structure.



4. Open the "POST" field.
   – Click "Try it out" to start the new structure.



5. You can edit the new structure in the "Edit Value" field.
   – Insert the structure from "GET" request.
   – Adapt the localization to all languages.
   – Click "Execute" to start the import.



6. You see the result in the "User-defined data" tab in detail view of tool master data or tool component.
   The user-defined data is visible and can be selected in Manage MyResources Tools.

Exceptions structure:

- Not Found (404)
  - The Machine is not found with the given name: {machineName}
- Bad Request (400)
  The error message appears after the following actions:
  - The request body is null or empty.
  - The request body has a formal problem: the attribute count is not continuous or one attribute is missing.

For more information, see:

- Tool master data: Creating or editing user-defined data (Page 206).
- Tool component: Creating or editing user-defined data (Page 139).

11.2.13 Configuring tool class or tool components

The number of user-defined attributes can be retrieved for tool master data and for tool components.

Prerequisite

Token was generated and used in Swagger UI.

For more information, see:

- Manage openness clients (Page 103)
- Token for the openness interface (extension interface) (Page 891)

Tool class configuration

GET /v1/configuration

- Retrieves the number of supported user-defined attributes which are available for tool master data.

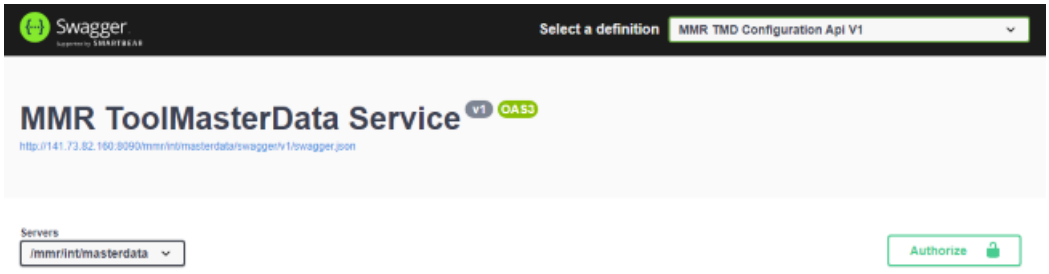
Tool component configuration

GET /v1/toolcomponents/configuration

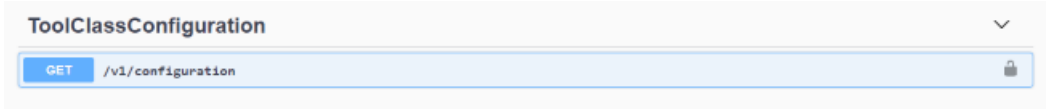
- Retrieves the number of supported user-defined attributes which are available for tool component master data.

Procedure

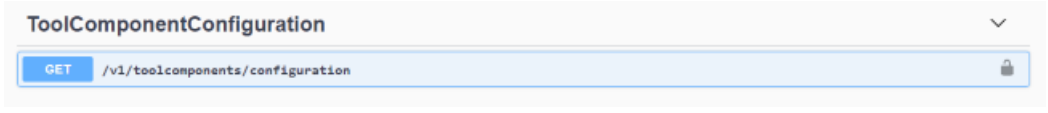
1. Call the following address: swagger (https://<IP address of the MMR server>/mmr/int/masterdata/swagger/index.html).
   The "Swagger" > "MMR ToolMasterData Service" window opens.



2. Scroll to "ToolClassConfiguration" area,



   or scroll to "ToolComponentConfiguration" area.



3. Open the "GET" field.
   Click "Try it out" and "Execute".
   The current structure is displayed.
   Example:

```
{
 "supportedCustomAttributes": 10
}
```

11.2.14 Configuring tool life observation method

As to the global observation method for tool life, you can switch between lifetime and workpieces.

After the installation, the observation method is set to "Time" by default .

The set value has an impact on the master data and the monitoring of green field tools on the machine. Manage MyResources reads the value and adapts the views to the defined value. Tools with a monitoring type differing from this global value are shown with "-".

Prerequisite

A token has been generated and used in the Swagger UI.

For more information, see:

- Manage openness clients (Page 103)
- Token for the openness interface (extension interface) (Page 891)

Configuring the tool monitoring mode

GET /v1/toollifeconfiguration

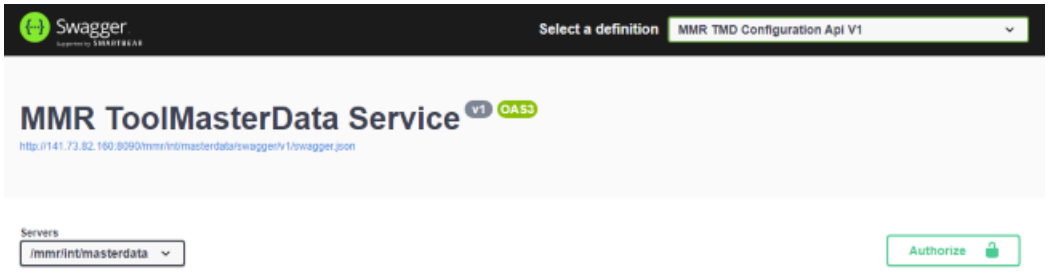
- This API returns the observation method for tool life:
  - Time: Lifetime
  - Pieces: Workpieces

PUT /v1/toollifeconfiguration

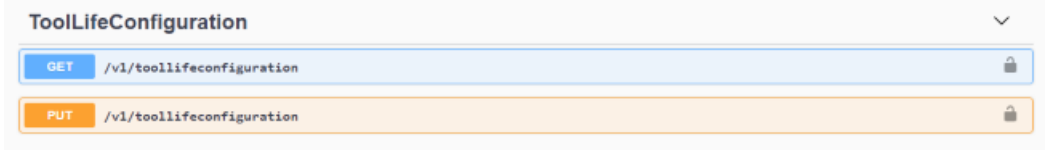
- This "Put" method configures a new observation method.

Procedure

1. Call the following address: swagger (https://<IP address of the MMR server>/mmr/int/masterdata/swagger/index.html).
   The "Swagger" > "MMR ToolMasterData Service" window opens.



2. Scroll to "ToolLifeConfiguration" area.



3. Open the "GET" field.
   – Click "Try it out" and "Execute".
     The current observation method is displayed.
4. Open the "PUT" field.
   – Click "Try it out" to start the new structure.
   – Edit observation method:

```
{
 "observationMethod": "Time"
}
```

Or

```
{
 "observationMethod": "Pieces"
}
```

   – Click "Execute".

11.2.15 Configuring Unload reasons and their action flags

You can select predefined Unload reasons or configure the ones you need.
For more information, see Tools overview (Page 159).

Prerequisite

- Authenticate using the token, so that you can configure the Unload reasons in the Swagger UI.
  For more information, see:
  – Manage openness clients (Page 103)
  – Using the token in the Swagger UI (Page 893)
- The machine must be connected and onboarded.

Unload Reason

GET /v1/toolinstances/unloadreasons

- This API returns all the stored unload reason configurations.

POST /v1/toolinstances/unloadreasons

- This “Post” method stores new unload reason configurations in the database. The unload reason ID must be specified: “UNLOADREASON#” (e.g. UNLOADREASON10).

UnloadReasonLocalization

GET /v1/toolinstances/localizations

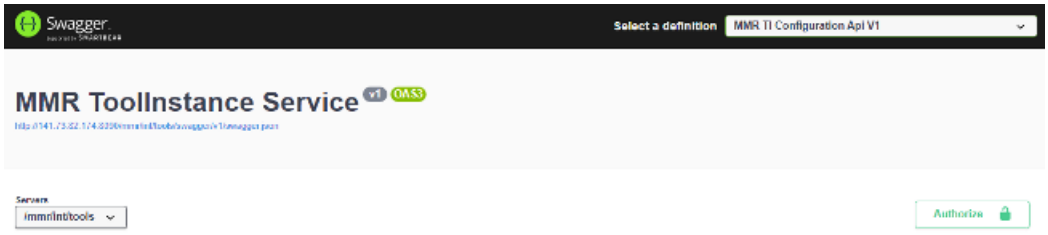
- This API returns all the stored localizations which are related to the tool instances (e.g. project specific attributes).

POST /v1/toolinstances/localizations

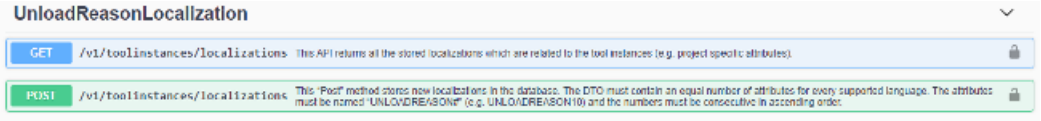
- This “Post” method stores new localizations in the database. The DTO must contain an equal number of attributes for every supported language. The attributes must be named “UNLOADREASON#” (e.g. UNLOADREASON10) and the numbers must be consecutive in ascending order.

Configuring Unload reasons: Procedure

1. Call the following address: Swagger (http://<IP address of the MMR Server>:8090/mmr/int/tools/swagger/index.html)
   The "Swagger" > "MMR ToolInstance Service" window opens.



2. Scroll to the area "UnloadReasonLocalization".



3. Open the desired fields "GET" or "POST and click on "Try it out".
4. Enter or modify the values in one of the four predefined languages German, English, Chinese or Spanish.
   If you do not enter an Unload reason in your language, the value of the default language English is automatically selected.
5. Click "Execute" to start the request.

Note

Unload reason configuration

You can configure whether an Unload reason must be given. You have two options:

- The selection of an Unload reason is optional and no reason is preselected on the machine. The "OK" softkey on the machine is activated even if you do not select any reason.
- The selection of an Unload reason is mandatory.
  The "OK" softkey on the machine is not activated as long as you have not selected any reason.

Example "POST /v1/toolinstances/localizations"

Open the field "POST /v1/toolinstances/localizations" to configure new Unload reasons. Enter the new reasons in an ascending order.

```
{
 "localizations": [
   {
    "language": "en",
    "attributes": [
      {
       "name": "UNLOADREASON1",
       "localization": "Unknown"
      },
      {
       "name": "UNLOADREASON2",
       "localization": "Broken tool"
      },
      {
       "name": "UNLOADREASON3",
       "localization": "Worn out tool"
      },
      {
       "name": "UNLOADREASON4",
       "localization": "Loud noise of the tool"
      },
      {
       "name": "UNLOADREASON5",
       "localization": "Empty place is needed"
      },
      {
       "name": "UNLOADREASON6",
       "localization": "Tool is needed on another machine"
      },
      {
       "name": "UNLOADREASON7",
       "localization": "Bad workpiece quality"
      },
                          {
       "name": "UNLOADREASON8",
       "localization": "en Unload Reason 8"
      }
     ]
    },
{
    "language": "es",
    "attributes": [
      {
       "name": "UNLOADREASON1",
       "localization": "Unknown"
      },
      {
       "name": "UNLOADREASON2",
       "localization": "Broken tool"
```

```
        },
        {
         "name": "UNLOADREASON3",
         "localization": "Worn out tool"
        },
        {
         "name": "UNLOADREASON4",
         "localization": "Loud noise of the tool"
        },
        {
         "name": "UNLOADREASON5",
         "localization": "Empty place is needed"
        },
        {
         "name": "UNLOADREASON6",
         "localization": "Tool is needed on another machine"
        },
        {
         "name": "UNLOADREASON7",
         "localization": "Bad workpiece quality"
        },
                            {
         "name": "UNLOADREASON8",
         "localization": "es Unload Reason 8"
        }
       ]
      },
{
    "language": "zh",
    "attributes": [
      {
       "name": "UNLOADREASON1",
       "localization": "Unknown"
      },
      {
       "name": "UNLOADREASON2",
       "localization": "Broken tool"
      },
      {
       "name": "UNLOADREASON3",
       "localization": "Worn out tool"
      },
      {
       "name": "UNLOADREASON4",
       "localization": "Loud noise of the tool"
      },
      {
       "name": "UNLOADREASON5",
       "localization": "Empty place is needed"
      },
      {
       "name": "UNLOADREASON6",
```

```
          "localization": "Tool is needed on another machine"
        },
        {
         "name": "UNLOADREASON7",
         "localization": "Bad workpiece quality"
        },
                              {
         "name": "UNLOADREASON8",
         "localization": "zh Unload Reason 8"
        }
       ]
      },
{
      "language": "de",
      "attributes": [
        {
         "name": "UNLOADREASON1",
         "localization": "Unknown"
        },
        {
         "name": "UNLOADREASON2",
         "localization": "Broken tool"
        },
        {
         "name": "UNLOADREASON3",
         "localization": "Worn out tool"
        },
        {
         "name": "UNLOADREASON4",
         "localization": "Loud noise of the tool"
        },
        {
         "name": "UNLOADREASON5",
         "localization": "Empty place is needed"
        },
        {
         "name": "UNLOADREASON6",
         "localization": "Tool is needed on another machine"
        },
        {
         "name": "UNLOADREASON7",
         "localization": "Bad workpiece quality"
        },
                              {
         "name": "UNLOADREASON8",
         "localization": "de Unload Reason 8"
        }
       ]
      }
{
      "language": "hu",
      "attributes": [
```

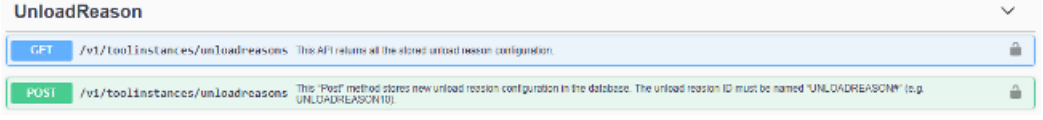
```
{
 "name": "UNLOADREASON1",
 "localization": "Unknown"
},
{
 "name": "UNLOADREASON2",
 "localization": "Broken tool"
},
{
 "name": "UNLOADREASON3",
 "localization": "Worn out tool"
},
{
 "name": "UNLOADREASON4",
 "localization": "Loud noise of the tool"
},
{
 "name": "UNLOADREASON5",
 "localization": "Empty place needed"
},
{
 "name": "UNLOADREASON6",
 "localization": "Tool is needed on another machine"
},
{
 "name": "UNLOADREASON7",
 "localization": "Bad workpiece quality"
}
]
```


Exceptions structure.

- Bad Request (400)
  The error message appears if the values for the different languages are not consistent.

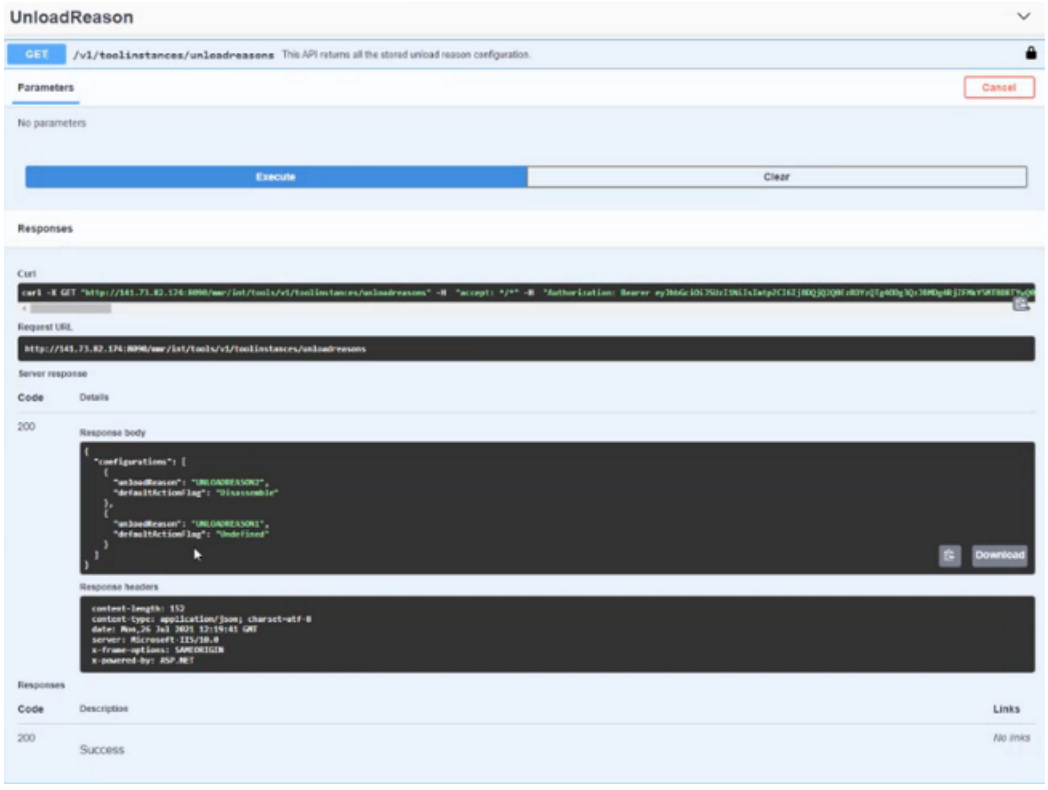
Configuring action flags for Unload reasons: Procedure

1. Scroll to the area "UnloadReason".



2. Open the desired fields "GET" and "POST" and click on "Try it out".
3. Enter the appropriate values.
4. Click "Execute" to start the request.
   The action flags are connected to the Unload reasons.

Example "GET /v1/toolinstances/unloadreasons"



Default action flags

You can define a standard action flag for each Unload reason. The flag is displayed as preselected on the machine.
The following standard reasons with a nullable action flag are provided:

Unload reason	Action flag type	Action
Unknown	standard action flag	decide further processing
Broken tool	standard action flag	disassemble
Worn out tool	no standard action flag	
Loud noise of the tool	no standard action flag	
Empty place needed	no standard action flag	
Tool is needed on another machine	no standard action flag	
Bad workpiece quality	no standard action flag	

Example "POST /v1/toolinstances/unloadreasons"

Open the field "POST /v1/toolinstances/unloadreasons" to connect the Unload reason "Worn out tool" to the action flag "Disassemble". The action flag is automatically preselected.

```
{
 "configurations": [
  {
   "unloadReason": "UNLOADREASON2",
   "defaultActionFlag": "Disassemble"
  },
  {
   "unloadReason": "UNLOADREASON1",
   "defaultActionFlag": "Undefined"
  },
{
   "unloadReason": "UNLOADREASON3",
   "defaultActionFlag": "Disassemble"
}
 ]
}
```

Note

Changing action flags

You can change the action flag on the machine.

For more information, see Unloading internal tools (Page 464)

Deleting Unload reasons

If you delete the Unload reasons, they are no longer on display when you unload tools or when you do the 1:1 Exchange.

For more information, see Unloading internal tools (Page 464)

Example "POST /v1 /toolinstances /localizations"

Open the field "POST /v1/toolinstances /localizations" to delete the Unload reasons.

```
{
 "localizations": [
   {
    "language": "en",
    "attributes": [
    ]
   }
  ]
}
```

11.2.16 Creating default Unload reasons

You can use a default Unload reason when doing an 1:1 Exchange or Check/Change and replacing the tool.

UnloadReasonLocalization

GET/v1/toolinstances/localizations

- This API returns all the stored localizations which are related to the tool instances (e.g. project specific attributes).
- You can copy the output to a notepad and improve it, or you can use the example which contains two languages, German and English. English is always the default value and is used for all other languages if it is not defined.

POST/v1/toolinstances/localizations

- This "Post" method stores new localizations in the database. The DTO must contain an equal number of attributes for every supported language. The attributes must be named "UNLOADREASON#" (e.g. UNLOADREASON10) and the numbers must be consecutive in ascending order. It overrides all previous localizations. The maximum length of a localized string is 50 characters.

```
{
  "localizations": [
   {
    "language": "en",
    "attributes": [
     {
      "name": "UNLOADREASON1",
      "localization": "Unknown"
     },
     {
      "name": "UNLOADREASON2",
      "localization": "Broken tool"
     },
     {
      "name": "UNLOADREASON3",
      "localization": "Worn out tool"
     },
     {
      "name": "UNLOADREASON4",
      "localization": "Loud noise of the tool"
     },
     {
      "name": "UNLOADREASON5",
      "localization": "Empty place needed"
     },
     {
      "name": "UNLOADREASON6",
      "localization": "Lifetime reached"
     },
     {
      "name": "UNLOADREASON7",
      "localization": "Bad workpiece quality"
     }
    ]
   },
   {
```

```
    "language": "de",
    "attributes": [
     {
      "name": "UNLOADREASON1",
      "localization": "Unknown"
     },
     {
      "name": "UNLOADREASON3",
      "localization": "Worn out tool"
     },
     {
      "name": "UNLOADREASON4",
      "localization": "Loud noise of the tool"
     },
     {
      "name": "UNLOADREASON5",
      "localization": "Empty place needed"
     },
     {
      "name": "UNLOADREASON6",
      "localization": "Lifetime reached"
     },
     {
      "name": "UNLOADREASON7",
      "localization": "Bad workpiece quality"
     },
     {
      "name": "UNLOADREASON2",
      "localization": "Broken tool"
     }
    ]
   }
 ]
}
```

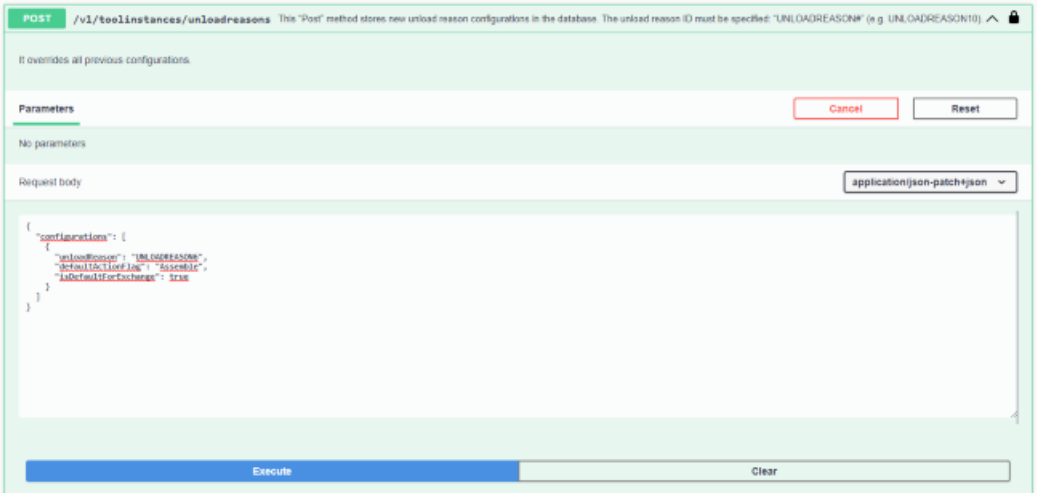
You can use the "UNLOADREASON6" - Lifetime reached as a default value for tools unloaded to Assembly. Go to:

POST/v1/toolinstances/unloadreasons

- This "Post" method stores new unload reason configurations in the database. The unload reason ID must be specified: "UNLOADREASON#" (e.g. UNLOADREASON10). It overrides all previous configurations.

```
{
 "configurations": [
  {
   "unloadReason": "UNLOADREASON6",
   "defaultActionFlag": "Assemble",
   "isDefaultForExchange": true
  }
 ]
}
```

"Unloadreason6" is a now a default value when you do an 1:1 exchange or Check and Change with exchanging the tool.



11.2.17 Creating and changing OEM Data

You can set the values of user-defined OEM data sets in Manage MyResources /Tools.

You can specify the values of the attributes individually via the Swagger UI, and import them into Manage MyResources /Tools.

Prerequisite

Authenticate using the token, so that you can use the various functions in the Swagger UI.*{"Swagger UI";"OEM Data"}*

For more information, see:

- Manage openness clients (Page 103)
- Using the token in the Swagger UI (Page 893)

Localization data

GET /oemdata

- Gets all OEM MetaData

POST /oemdata

- Creates OEM data entities for the given tool master data and machine types

GET /oemdata/{id}

- Gets OEM Data from Uniqueid

PUT /oemdata/ {id}

- Updates the OEMDatas values

DELETE /oemdata/ {id}

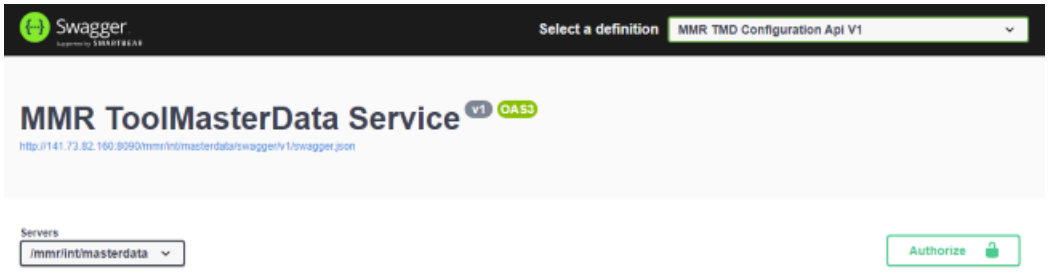
- Deletes the OEMData by its id

GET /oemdata/machinetypes

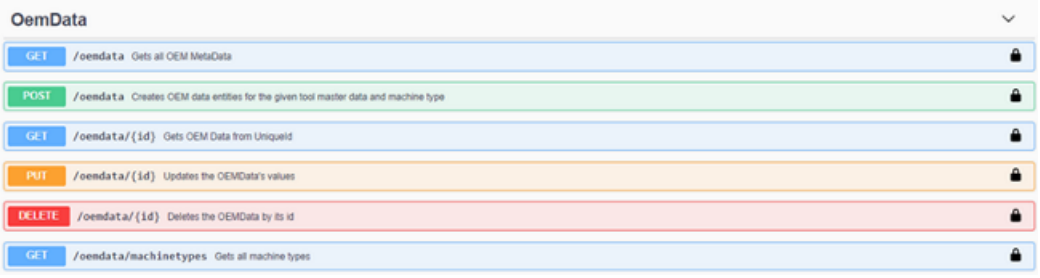
- Gets all machine types

Procedure

1. Call the following address: Swagger (http://<IP address of the MMR Server>:8090/mmr/int/tools/swagger/index.html).
   The "Swagger" > "MMR ToolMasterData Service" window opens.



2. Scroll to "OEMData" area



3. Open the "GET", "POST", "PUT", "DELETE" field, and click on "Try it out".
4. Enter the appropriate values for parameters. Only "." is accepted as as decimal separator.
5. Click "Execute" to start the request.
6. You see the result in the "Overview of OEM tool data sets" window, open the detail view "<ID for OEM datset>".

For more information, see OEM data sets (Page 298).

Exceptions structure:

- 200 OK
- 400 Error: Bad Request
- 404 Error: Not Found

Example: Create OEM data entries

POST /oemdata

Requires a `ToolName` (tool name in NC program alias toolident) and a `MachineTypeName`.

The endpoint works like the create by template on UI, it tries to create and OEM Data for all revisions (that are breaking) and have the given ToolName.

If there is already an OEM Data for a revision then it skips that but does all the none existent ones. It only gives back the OEM Data that was created.

The OEMData values TC_TPC1 ..... TC_MOPC (some number) are all created correctly and have the default value of 0.

Success example:

200 OK

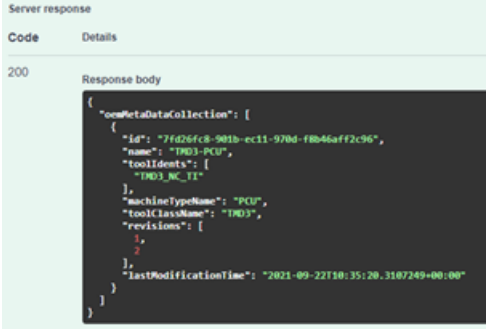
TMD3 has 2 revisions:

- revision1 breaking
- revision 2 not breaking
- ToolIdent is `TMD3_NC_TI`

```
{
 "toolName": "TMD3_NC_TI",
 "machineTypeName": "PCU"
}
```

After execution:

Only one OEM Data will be created since only revision1 is breaking



TMD1 has 3 revisions:

- All breaking
- toolident is `TMD1_NC_TI`
- TMD1 revision 1 has an OEM data

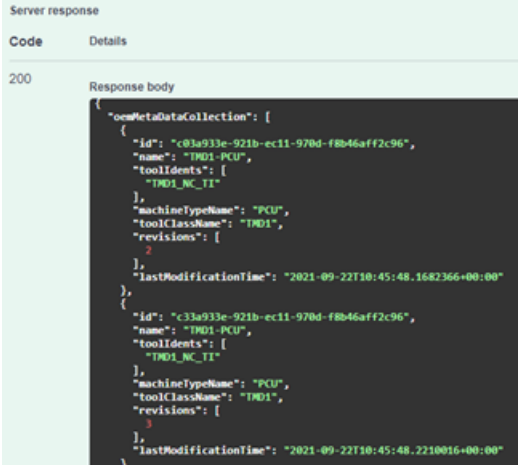
Dto for creation:

```
{
 "toolName": "TMD1_NC_TI",
 "machineTypeName": "PCU"
}
```

After execution:

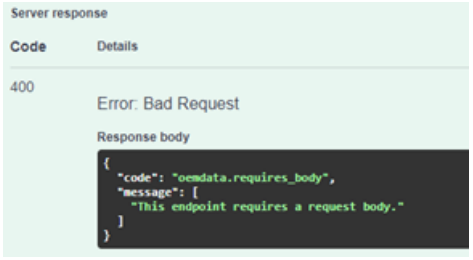
Only 2 OEM Data will be created:

One for revision 2 and one for revision 3

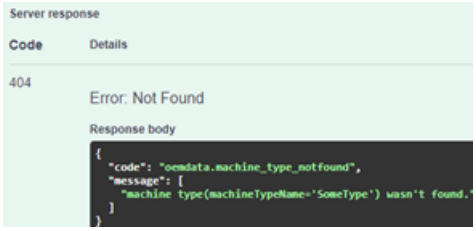


Error examples:

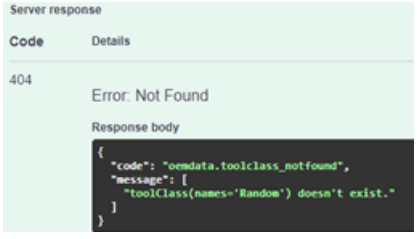
- 400 Error: Bad Request
  If `ToolName` or `MachineTypeName` is 0 or the body is empty.



- 404 Error: Not Found
  If `Machine Type` is not found by `MachineTypeName`.



  If `toolclass` is not found by `ToolName`.



Example: Gets OEM data from Unique Id

GET/oemdata/{id}


```
{
 "data": [
 {
 "name": "TC_TPC1",
 "edgeId": "",
 "value": "0"
 },
 {
 "name": "TC_TPC2",
 "edgeId": "",
 "value": "0"
 },
 {
 "name": "TC_TPC3",
 "edgeId": "",
 "value": "0"
```

```
},
{
"name": "TC_TPC4",
"edgeId": "",
"value": "0"
},
{
"name": "TC_TPC5",
"edgeId": "",
"value": "0"
},
{
"name": "TC_DPC1",
 "edgeId": "1",
"value": "0"
},
{
"name": "TC_DPC2",
"edgeId": "1",
"value": "0"
},
{
"name": "TC_DPC3",
"edgeId": "1",
"value": "0"
},
{
"name": "TC_DPC4",
"edgeId": "1",
"value": "111"
},
{
"name": "TC_DPC5",
"edgeId": "1",
"value": "0"
}
{
"name": "TC_MOPC1",
"edgeId": "1",
"value": "0"
},
{
"name": "TC_MOPC2",
"edgeId": "1",
"value": "0"
},
{
"name": "TC_MOPC3",
"edgeId": "1",
"value": "0"
},
{
```

```
 "name": "TC_MOPC4",
 "edgeId": "1",
 "value": "0"
 },
 {
 "name": "TC_MOPC5",
 "edgeId": "1",
 "value": "0"
 }
 ],
 "id": "a5c743da-861f-ec11-8c9b-005056189619",
 "name": "TMD1-IPC",
 "toolIdents": [
 "TMD1"
 ],
 "machineTypeName": "IPC",
 "toolClassName": "TMD1",
 "revisions": [
 1
 ],
 "lastModificationTime": "2021-09-27T13:36:06.0850557+00:00"
}
```

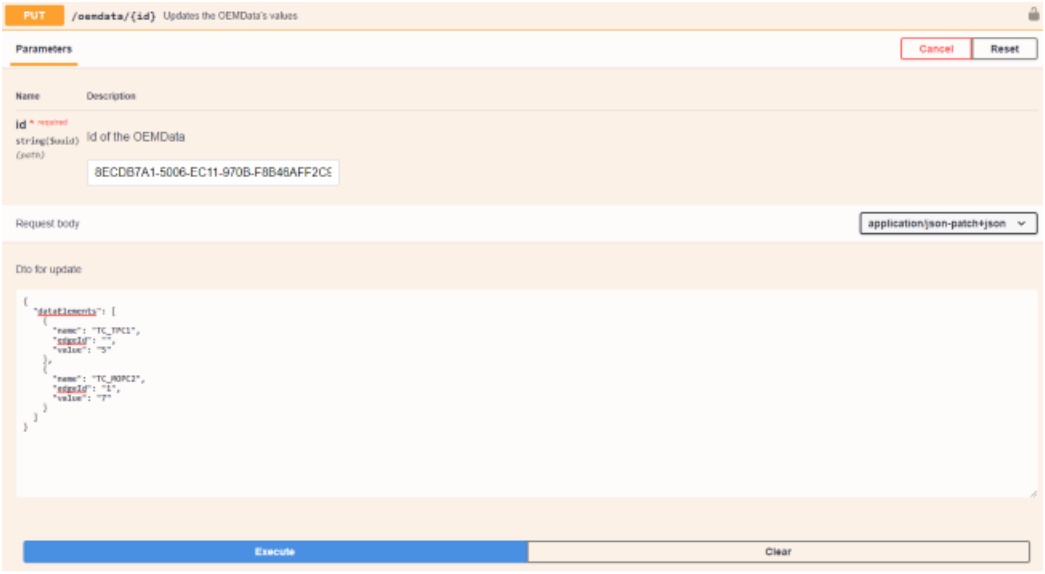

Example: Change OEM data

PUT /oemdata/{id}

The endpoint requires the OEM data Id and a Dto that contains the information to be updated.

Example Id: 8ECDB7A1-5006-EC11-970B-F8B46AFF2C96

```
{
  "dataElements":[
   {
    "name": "TC_TPC1"
    "edgeId":""
    "value":"5"
   },
   {
    "name": "TC_MOPC2",
    "edgeId":"1"
    "value": "7",
   }
 ]
}
```



After execution:

You can receive the following answer to your request.

The code 200 is displayed:

The changed values are displayed in the "Overview of OEM tool data sets" window, in the detail view "<ID for OEM datset>" window.

Error examples

- If you enter a Dto where neither the name nor the edgeId pair exist in the OEMData, you get a Bad Request error.

```
{
 "dataElements": [
  {
   "name": "something",
   "edgeId": "9999",
   "value": "5"
  }
 ]
}
```

After execution
400 "Error: Bad Request"

- If you enter a non-existent Id of the OEMData, an error message is displayed.

404 "Error Not Found"

Example: Delete the OEM Data by its id

DELETE /oemdata/{id}

Deletes the OEMData by its id

404 Error: Not Found

Example: Get all machine types

GET /oemdata/machinetypes

No input required, returns all `machineTypeIds` and `machineTypeNames`

Success example:

200 OK

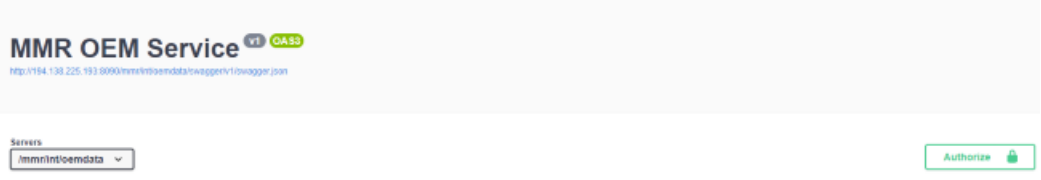
```
{
 "collection": [
 {
 "machineTypeId": "51c0f92d-f617-46fe-bda7-4665cb3fd86d",
 "machineTypeName": "IPC"
 }
 ]
}
```

11.2.18 Configuring and localizing OEM Data

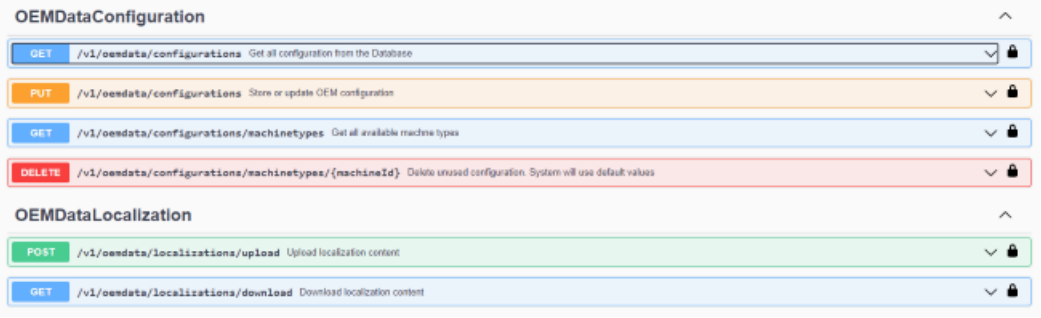
You can specify the names of the attributes individually via the Swagger UI, and import them into Manage MyResources /Tools.

Procedure

1. Call the following address: Swagger (http://<IP address of the MMR Server>:8090/mmr/int/oemdata/swagger/index.html).
   The "Swagger" > "MMR OEM Service" window opens.



2. Scroll to "OEMDataConfiguration" and "OEMDataLocalization" area.



3. Open the "GET", "POST", "PUT", "DELETE" field, and click on "Try it out".
4. Enter the appropriate values for parameters.

5. Click "Execute" to start the request.
6. You see the result in the "Overview of OEM tool data sets" window, open the detail view "<ID for OEM datset>".

For more information, see OEM data sets (Page 298).

Exceptions structure:

- 200 OK
- 400 Error: Bad Request
- 404 Error: Not Found

OEMDataConfiguration

GET/v1/oemdata/configurations

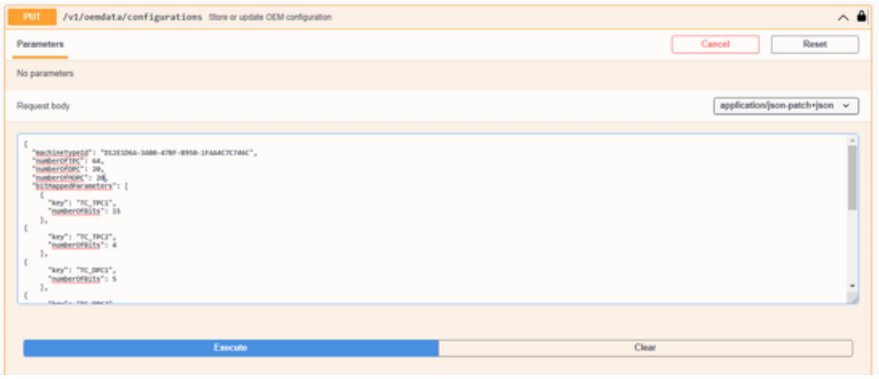
- Get all configuration from the Database of machine types. Contained number of properties, if the date is already in use and the data has changed from default value.

PUT/v1/oemdata/configurations

- Number of properties can be changed.
- Store or update OEM configuration.

```
{
  "machineTypeId": "D12E1D6A-3AB0-47BF-B950-1FAA4C7C746C",
  "numberOfTPC": 64,
  "numberOfDPC": 20,
  "numberOfMOPC": 20
},
  "bitMappedParameters": [
    {
      "key": "TC_TPC1",
      "numberOfBits": 20
    },
{
      "key": "TC_TPC2",
      "numberOfBits": 5
    },
{
      "key": "TC_TPC3",
      "numberOfBits": 14
    },
{
      "key": "TC_DPC1",
      "numberOfBits": 10
    },
{
      "key": "TC_DPC2",
      "numberOfBits": 2
    },
{
      "key": "TC_DPC3",
```

```
      "numberOfBits": 30
    },
{
      "key": "TC_MOPC1",
      "numberOfBits": 7
    },
{
      "key": "TC_MOPC2",
      "numberOfBits": 7
    },
{
      "key": "TC_MOPC3",
      "numberOfBits": 17
    }
```



Note

numberOfBits

For the "numberOfBits" parameter, select a value between 1 and 32.

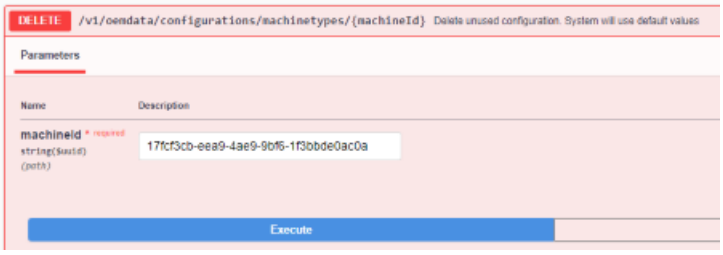
Otherwise, there is an error message in the output and nothing is updated.

GET/v1/oemdata/configurations/machinetypes

Get all available machine types and machine type Ids

DELETE/v1/oemdata/configurations/machinetypes/{machineId}

Delete unused configuration. System will use default values for deleted configuration of OEM, as long as machine type is not deleted the default OEM property will also be shown.

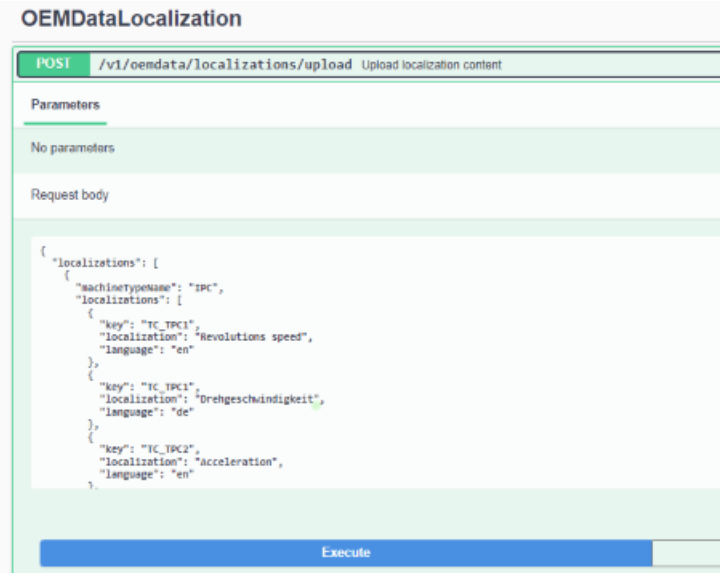


OEMDataLocalization

To add names to the OEM properties, the user can use this endpoint.

POST/v1/oemdata/localizations/upload

Change and upload localization content.



Example: Use the same localization string for all languages, which is shown on HMI and Web UI:

```
{
  "localizations": [
   {
     "machineTypeName": "IPC",
     "localizations": [
              {
       "key": "TC_TPC1",
       "localization": "Revolutions speed"
      },
                        {
        "key": "TC_TPC2",
        "localization": "Acceleration"
      },
                        {
        "key": "TC_TPC3",
        "localization": "Cooling fluid on"
      },
                        {
        "key": "TC_TPC4",
        "localization": "Cooling fluid pressure"
      },
                        {
        "key": "TC_DPC1",
        "localization": "Min cutting edge pos"
```

```
      },
                        {
        "key": "TC_DPC9",
        "localization": "In work"
      },
                        {
        "key": "TC_MOPC10",
        "localization": "Cutting edge"
      },
                        {
        "key": "TC_MOPC1",
        "localization": "Not used"
},
{
          "key": "TC_TPC1_Bit0",
          "localization": "TC TPC1 Bit0 Description"
        },
{
          "key": "TC_TPC1_Bit1",
          "localization": "TC TPC1 Bit1 Description"
        },
{
          "key": "TC_MOPC2_Bit0",
          "localization": "TC MOPC2 Bit0 Description"
        },
{
          "key": "TC_MOPC2_Bit2",
          "localization": "TC MOPC2 Bit2 Description"
        },
{
          "key": "TC_DPC1_Bit0",
          "localization": "TC DPC1 Bit0 Description"
        },
{
          "key": "TC_DPC1_Bit15",
          "localization": "TC DPC1 Bit15 Description"
      }
     ]
   }
 ]
}
```

Example: Use for distinct languages different value string which is shown on HMI and Web UI:

You can use only the properties which you want to distinguish between the different languages. If a language for a property is not defined, the default value is English. The properties do not have to be sorted.

```
{
 "localizations": [
  {
```

```
"machineTypeName": "IPC",
"localizations": [
 {
  "key": "TC_TPC1",
  "localization": "Revolutions speed",
  "language": "en"
 },
 {
  "key": "TC_TPC1",
  "localization": "Drehgeschwindigkeit",
  "language": "de"
 },
 {
  "key": "TC_TPC2",
  "localization": "Acceleration",
  "language": "en"
 },
 {
  "key": "TC_TPC2",
  "localization": "Beschleinigung",
  "language": "de"
 },
 {
  "key": "TC_TPC2",
  "localization": "Acceleration",
  "language": "zh"
 },
 {
  "key": "TC_TPC2",
  "localization": "Acceleration",
  "language": "es"
 },
 {
  "key": "TC_TPC2",
  "localization": "Acceleration",
  "language": "hu"
 },
 {
  "key": "TC_TPC3",
  "localization": "Cooling fluid on",
  "language": "en"
 },
 {
  "key": "TC_TPC3",
  "localization": "Cooling fluid on",
  "language": "de"
 },
 {
  "key": "TC_TPC3",
  "localization": "Cooling fluid on",
  "language": "zh"
 },
```

```
{
 "key": "TC_TPC3",
 "localization": "Cooling fluid on",
 "language": "es"
},
{
 "key": "TC_TPC3",
 "localization": "Cooling fluid on",
 "language": "hu"
},
{
 "key": "TC_TPC4",
 "localization": "Cooling fluid pressure",
 "language": "en"
},
{
 "key": "TC_TPC4",
 "localization": "Cooling fluid pressure",
 "language": "de"
},
{
 "key": "TC_TPC4",
 "localization": "Cooling fluid pressure",
 "language": "zh"
},
{
 "key": "TC_TPC4",
 "localization": "Cooling fluid pressure",
 "language": "es"
},
{
 "key": "TC_TPC4",
 "localization": "Cooling fluid pressure",
 "language": "hu"
},
{
 "key": "TC_DPC1",
 "localization": "Min cutting edge pos"
 "language": "en"
},
{
 "key": "TC_DPC1",
 "localization": "Min cutting edge pos",
 "language": "de"
},
{
 "key": "TC_DPC1",
 "localization": "Min cutting edge pos",
 "language": "zh"
},
{
 "key": "TC_DPC1",
```

```
 "localization": "Min cutting edge pos",
 "language": "es"
},
{
 "key": "TC_DPC1",
 "localization": "Min cutting edge pos",
 "language": "hu"
},
{
 "key": "TC_MOPC10",
 "localization": "Cutting edge",
 "language": "en"
},
{
 "key": "TC_MOPC10",
 "localization": "Cutting edge",
 "language": "de"
},
{
 "key": "TC_MOPC10",
 "localization": "Cutting edge",
 "language": "zh"
},
{
 "key": "TC_MOPC10",
 "localization": "Cutting edge",
 "language": "es"
},
{
 "key": "TC_MOPC10",
 "localization": "Cutting edge",
 "language": "hu"
},
{
 "key": "TC_DPC9",
 "localization": "In work",
 "language": "en"
},
{
 "key": "TC_DPC9",
 "localization": "In work",
 "language": "de"
},
{
 "key": "TC_DPC9",
 "localization": "In work",
 "language": "zh"
},
{
 "key": "TC_DPC9",
 "localization": "In work",
 "language": "es"
```

```
    },
    {
     "key": "TC_DPC9",
     "localization": "In work",
     "language": "hu"
    },
    {
     "key": "TC_MOPC1",
     "localization": "Not used",
     "language": "en"
    },
    {
     "key": "TC_MOPC1",
     "localization": "Not used",
     "language": "de"
    },
    {
     "key": "TC_MOPC1",
     "localization": "Not used",
     "language": "zh"
    },
    {
     "key": "TC_MOPC1",
     "localization": "Not used",
     "language": "es"
    },
    {
     "key": "TC_MOPC1",
     "localization": "Not used",
     "language": "hu"

},
{
     "key": "TC_TPC1_Bit0",
          "localization": "TC TPC1 Bit0 Description",
          "language": "en"
       },
{
     "key": "TC_TPC1_Bit0",
          "localization": "TC TPC1 Bit0 Description",
          "language": "de"
       },
{
      "key": "TC_TPC1_Bit0",
          "localization": "TC TPC1 Bit0 Description",
          "language": "zh"
       },
{
      "key": "TC_TPC1_Bit0",
          "localization": "TC TPC1 Bit0 Description",
```

```
          "language": "es"
        },
{
      "key": "TC_TPC1_Bit0",
          "localization": "TC TPC1 Bit0 Description",
          "language": "hu"
        },
{
      "key": "TC_MOPC2_Bit2",
          "localization": "TC MOPC2 Bit2 Description"
          "language": "en"
        },
{
      "key": "TC_MOPC2_Bit2",
          "localization": "TC MOPC2 Bit2 Description"
          "language": "de"
        },
{
      "key": "TC_MOPC2_Bit2",
          "localization": "TC MOPC2 Bit2 Description"
          "language": "zh"
        },
{
      "key": "TC_MOPC2_Bit2",
          "localization": "TC MOPC2 Bit2 Description"
          "language": "es"
        },
{
       "key": "TC_MOPC2_Bit2",
          "localization": "TC MOPC2 Bit2 Description"
          "language": "hu"
        },
{
       "key": "TC_DPC1_Bit15",
          "localization": "TC DPC1 Bit15 Description"
          "language": "en"
        },
{
        "key": "TC_DPC1_Bit15",
          "localization": "TC DPC1 Bit15 Description"
          "language": "de"
        },
{
          "key": "TC_DPC1_Bit15",
          "localization": "TC DPC1 Bit15 Description"
          "language": "zh"
        },
```

```
{
          "key": "TC_DPC1_Bit15",
           "localization": "TC DPC1 Bit15 Description"
           "language": "es"
         },
{
          "key": "TC_DPC1_Bit15",
           "localization": "TC DPC1 Bit15 Description"
           "language": "hu"
  }
 ]
 }
]
}
```

Note

key

For bitmapping, an OEM value key parameter must comply with the following format:

"key" parameter should consist of "name of the OEM Value" + "Selected bit name"

For example:

```
{
          "key": "TC_TPC1_Bit0",
          "localization": "TC TPC1 Bit0 Description",
          "language": "en"
}
```

As can be seen here, this body will update the localizations for Bit0 of TC_TPC1 for English language. The parameter "localization" will be added to this selected bit as "Description"

GET/v1/oemdata/localizations/download

Download localization content and show all OEM properties in different languages.

11.2.19 Updating scheduling result status

The status of work sequence can be updated to "DONE" in the Tool scheduling overview.

Normally tool scheduling does not have any information about the status of work order process. After the work order is completed, you can manually update the status to "DONE".

Prerequisite

Token was generated and used in Swagger UI.

For more information, see:

- Manage openness clients (Page 103)
- Token for the openness interface (extension interface) (Page 891)

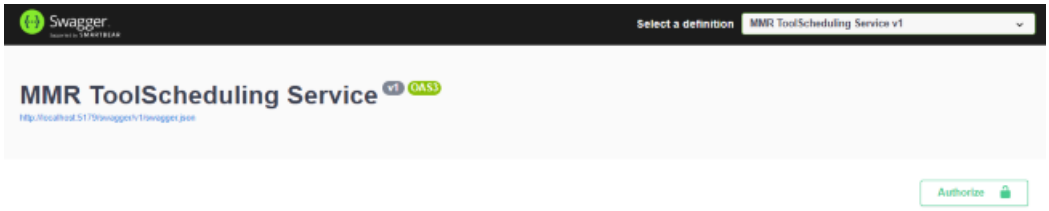
Update work order status

PATCH v1/schedules/scheduleDoneWorkSequenceNumber

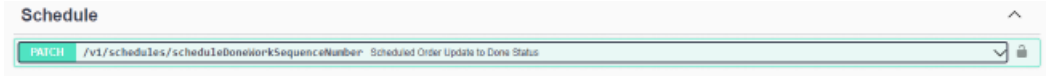
- Order update to Done status
  Scheduling information with Done

Procedure

1. Call the following address: swagger (https://<IP address of the MMR server>/mmr/int/scheduling/swagger/index.html).
   The "Swagger" > "MMR Tool scheduling" window opens.



2. Scroll to "Schedule" area.



3. Open the "PATCH" field to specify the status of work order.
   Click "Try it out".
   Enter the workSequenceNumber.
   Click "Execute".

11.2.20 Updating timeout for tool scheduling process

If there is a problem within the system, it takes too long to process the tool scheduling results.

You can adapt the timeout duration.

Prerequisite

Token was generated and used in Swagger UI.

For more information, see:

- Manage openness clients (Page 103)
- Token for the openness interface (extension interface) (Page 891)

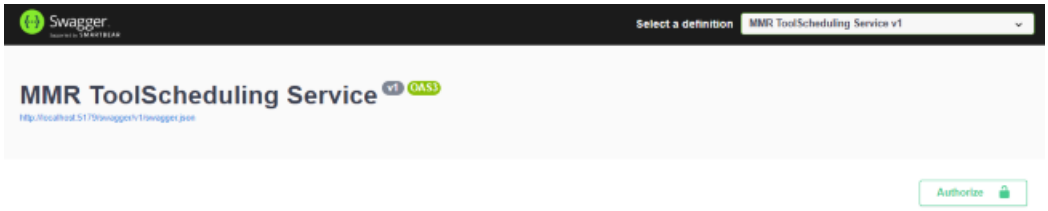
Update timeout for tool scheduling process

PUT v1/configurations/schedulingconfiguration

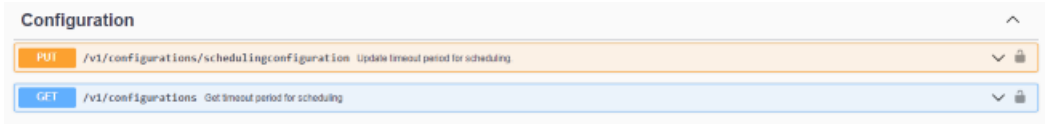
- configures the timeout duration for tool scheduling process
- The timeout is set to 20 minutes by default.

Procedure

1. Call the following address: swagger (https://<IP address of the MMR server>/mmr/int/scheduling/swagger/index.html).
   The "Swagger" > "MMR Tool scheduling" window opens.



2. Scroll to "Configuration" area.



3. Open the "PUT" field to specify the timeout duration in minutes.
   Click "Try it out".
   Set the timeoutPeriod in minutes.
   Click "Execute".
4. Open the "GET" field to retrieve defined timeout.
   Click "Try it out".
   Click "Execute".

11.2.21 Regular scheduling configuration

To use regular scheduling, set the parameters for tool scheduling.

Prerequisite

The token was generated and used in Swagger UI.

For more information see

- Manage openness clients (Page 103)
- Token for the openness interface (extension interface) (Page 891)

Update or create the first regular scheduling configuration

Put v1/configurations/regularscheduling

- Configuration for regular scheduling

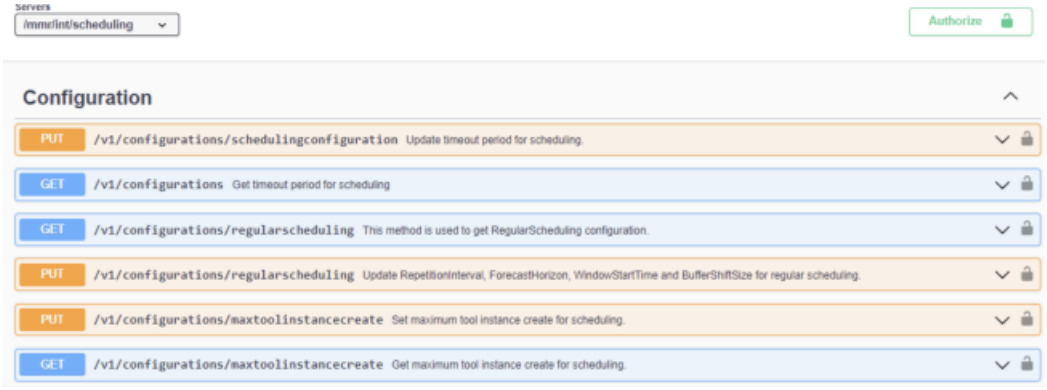
The limits for the parameters are

- Lower limit for repetition interval is 1 hour. The upper limit is 1 week.
- The lower limit for the forecast horizon is the repetition interval. The upper limit is 1 month.

- Regular scheduling stops if the repetition interval is set to null.
- The parameters "windowStartTime" and "bufferShiftSize" cannot be set to null. If you try to set it null, a warning appears. The current configuration is not changed.
- The bufffer shift size configures the time interval ,where rescheduling for the already scheduled work sequences is not allowed.

Procedure

1. Call the following address: https://<IP address of the MMR server>/mmr/int/ scheduling/ swagger/index.html. The "Swagger" > "MMR Tool scheduling" window opens.
2. Scroll to the "Configuration" area.



3. Open the "PUT" field to specify the configuration details. Click "Try it out".
4. Enter
   - repetitionInterval (hour)
   - windowStartTime (datetime)
   - forecastHorizon (hour)
   - bufferShiftSize (hour)
5. Click "Execute".

Examples

Configuration where regular scheduling works properly:

- "repetitionInterval": 8
- "windowStartTime": 2023-01-02 08:00:00
- "forecastHorizon": 24
- "bufferShiftSize": 1

Configuration where regular scheduling stops:

- "repetitionInterval": null
- "windowStartTime": 2023-01-02 08:00:00

- "forecastHorizon": 24
- "bufferShiftSize": 1

11.2.22 Maximum tool instance configuration

In each work sequence, a tool instance is created digitally, if no tool is in the system. The tool instance appears in the system with obtain status. The maximum tool instance configuration limits the number of created digital tool instances per work sequence.

Prerequisite

The token was generated and used in Swagger UI.

For more information see

- Manage openness clients (Page 103)
- Token for the openness interface (extension interface) (Page 891)

Update or create a maximum tool instance configuration

Put v1/configurations/maxtoolinstancecreate

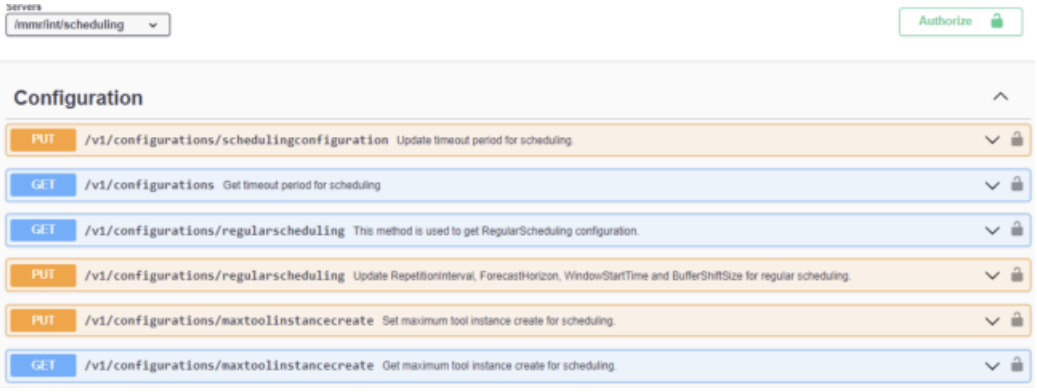
- Configure the maximum tool instance

Get v1/configurations/maxtoolinstancecreate

- Get the configuration for maximum tool instance

Procedure

1. Call the following address: https://<IP address of the MMR server>/mmr/int/ scheduling/ swagger/index.html. The "Swagger" > "MMR Tool scheduling" window opens.
2. Scroll to the "Configuration" area.



3. Open the "PUT" field to specify the configuration details. Click "Try it out".

4. Enter the toolInstanceCountLimit (maximum tool instance)
5. Click "Execute".

An example where regular scheduling works properly is "toolInstanceCountLimit": 1000.

11.2.23 Magazine configuration

To configure machines without the Web UI

Prerequisite

The token was generated and used in Swagger UI.

For more information see:

- Manage openness clients (Page 103)
- Token for the openness interface (extension interface) (Page 891)

Read, update or delete magazine configurations

Get magazines/v1

- Get all the magazines on a specific magazine

Get magazines/v1/transformationinfo

- Gets the transformation information of a specific magazine

Post magazines/v1/transformationinfo

- Creates or updates the transformation information of a specific magazine

Delete magazines/v1/transformationinfo

- Deletes the transformation information of a specific magazine

Get magazines/v1/magazineplacesize

- Gets the place size information of a specific magazine

Post magazines/v1/magazineplacesize

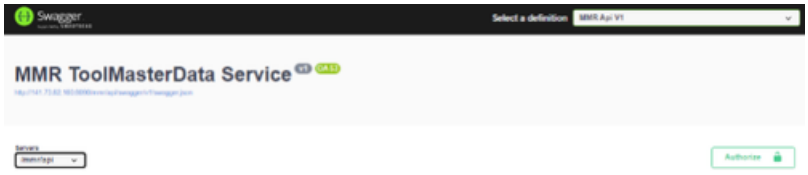
- Sets the place size information of a specific magazine

Delete magazines/v1/magazineplacesize

- Removes the place size information of a specific magazine

Procedure

1. Call the following address: https://<IP address of the MMR server>/mmr/api/swagger/index.html.
   The "Swagger" > "MMR ToolMasterData Service" window opens.



2. Scroll to the "Magazine" area.

3. Open the field interesting for your case.
4. Click "Try it out".
5. Enter the necessary data.
6. Click "execute".

11.2.24 Tool plan, work order id and sequence number assignment

Prerequisite

Authenticate using the token, so that you can use the various functions in Swagger UI.

For more information, see:

- Manage openness clients Manage openness clients (Page 103)
- Using the token in the Swagger UI Using the token in the Swagger UI (Page 893)

Assign tool plan to work order id and sequence number

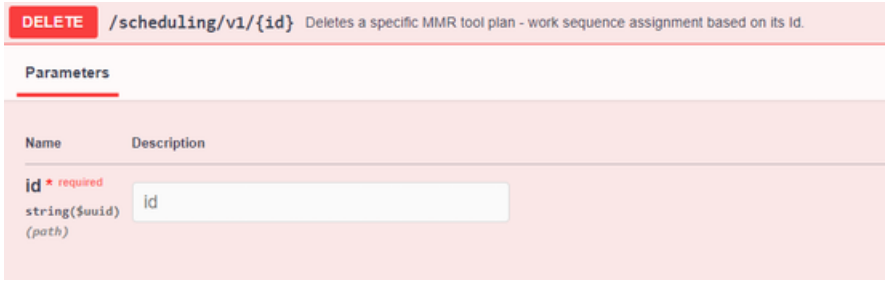
POST /scheduling/v1/

- A new plan assignment is created with specific work order id and sequence number.

GET /scheduling/v1/

- Retrieves all assignments

DELETE /scheduling/v1/{id}



- Deletes a specific MMR tool plan - work sequence assignment based on its Id.

Procedure

1. Call the following address: Swagger (http://<IP adress of the MMR server>:8090/mmr/api/swagger/index.html).
   The "Swagger" > "MMR ToolMasterData Service" window opens.
2. Scroll to area "Scheduling".
3. Open the desired field "GET", PUT", "DELETE" and click on "Try it out".
4. Enter the appropriate values for parameters.
5. Click "Execute" to start the request.

Example "POST /scheduling/v1/"

Open the field "POST /toolplan/v1

```
{
"workOrderId": "WorkOrderId",
"sequenceNumber": "SequenceNumber",
"toolPlanName": "ToolPlan"
}
```

Example "GET /scheduling/v1/"

{
"assigments": [
{
"workOrderId": "WorkOrderId",
"sequenceNumber": "SequenceNumber",
"toolPlanName": "ToolPlan",
"id": "3fa85f64-5717-4562-b3fc-2c963f66afa6"
}
]
}

Delete "/scheduling/v1/{id}"

Open the field "DELETE /toolplan/v1/{id}"

The id of the assignment to be deleted is entered and delete operation is performed.

See also

Tool master data (Page 195)

11.2.25 Purchasing order requests

To create, patch and delete purchase order requests without the WebUI

Prerequisite

Perform the authentication procedure with the token, so that you can use the various functions in the Swagger UI.

For more information, see:

- Secret and tokens (Page Manage openness clients (Page 103))
- Using the token in the Swagger UI (Page Using the token in the Swagger UI (Page 893))

Generating, updating and deleting purchase order requests

GET requestorders/components/v1

- Retrieves all purchase orders with their items.

GET requestorders/components/v1?purchaseOrderState={state}

- Filters all purchase orders and their purchase order state.

GET requestorders/components/v1/{porId}

- Retrieves a purchase order via its PorId.

POST requestorders/components/v1/

- A new purchase order is created with its terms.

PUT requestorders/components/v1/{porId}

- Updates a purchase order and its items based on its PorId.

PUT requestorders/components/v1/{porId}/{componentId}/{deliveryNumber}

- Updates a delivery if exists , otherwise creates a new one

DELETE requestorders/components/v1/{porId}/{deliveryNumber}

- Deletes a specific MMR purchase oder delivery, based on purchase orders ID and delivery number.

11.3 Manage MyResources /Programs API

Manage MyResources /Programs provides an open programming interface. Using HTTP requests, you can manage NC packages as well as the associated revisions, NC programs, attachments, comments and Manage myResources /Programs server configurations.

Prerequisite

You must authenticate yourself using a token to use the open programming interface.

For more information about generating and using a token, see:

- Manage openness clients (Page 103)
- Token for the openness interface (extension interface) (Page 891)
- Using the token in the Swagger UI (Page 893)

For more information about revision handling and a better understanding of the configuration value SinInt.MMRP.Service:Revisions:ManualHandling see:

- MMR /Programs configuration (Page 679)
- Status transitions (Page 722)

Note

Breaking change

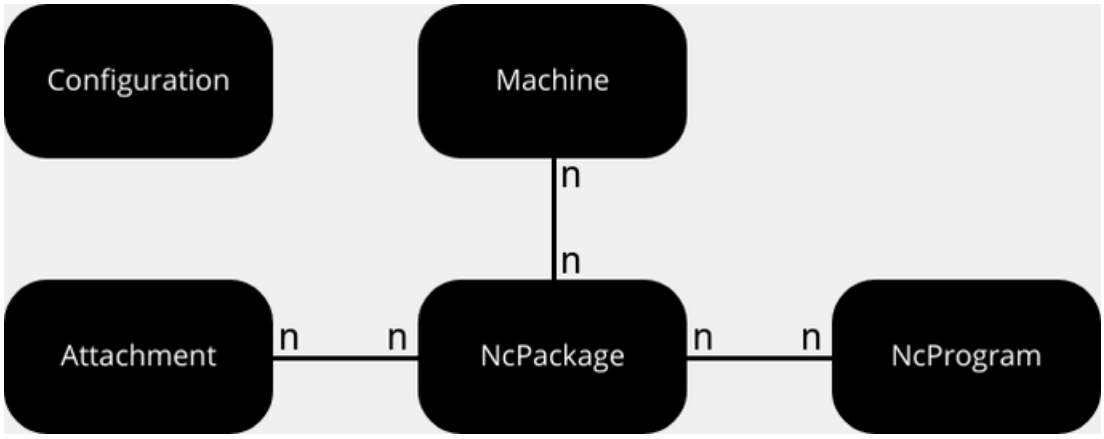
There is no breaking change in MMR /Programs Openness API. If manual revision handling is active, the Openness API works differently than with auto revision handling active. For more information see the endpoint descriptions.

If you do not use a token or if the token is invalid or expired, you can receive the following responses:

- 401 status code: unauthorized - invalid or expired token
- 403 status code: forbidden - You do not have the permission for the requested endpoint.

Entities

The following diagram shows all entities of Manage MyResources /Programs API and their interdependencies. All elements of the entities and their associated data type are also listed.



Interface functions

For a detailed description of the interface functions with their associated parameters, see:

- Managing NC packages (Page 996)
- Managing revisions (Page 1006)
- Managing NC programs (Page 1021)
- Managing comments for NC packages (Page 1031)
- Managing attachments (Page 1035)
- Managing configurations (Page 1042)

Error message structure

The error messages and status codes are defined one by one for every endpoint.

Openness API can return multiple error messages if the request body is not valid and if more validation errors occur. For example: If the description of the NC package is updated, it can not be longer then 280 characters and can not contain only whitespace. If the description is updated with 281 whitespace characters, two validation error messages are returned.

Further information

You can find application and code examples in the Examples folder.

11.3.1 Managing NC packages

Prerequisite

Authenticate using the token, so that you can use the various functions in Swagger UI.

For more information, see:

- Manage openness clients (Page 103)
- Using the token in the Swagger UI (Page 893)

Generating and modifying NC packages

GET /v5/ncpackages

- Gets the available NC packages

POST /v5/ncpackages

- Creates an NC package

GET /v5/ncpackages/{packageId}

- If "Auto revision handling" is active: Gets an NC package by Id at its latest version/revision
- if "Manual revision handling" is active: Returns the released version/revision

DELETE /v5/ncpackages/{packageId}

- Deletes an NC package with all its revisions, programs, attachments and comments

GET /v5/ncpackages/fromtimestamp/{timeStamp}

- Gets the modified NC package IDs from the given timestamp

POST /v5/ncpackages/{packageId}/copy

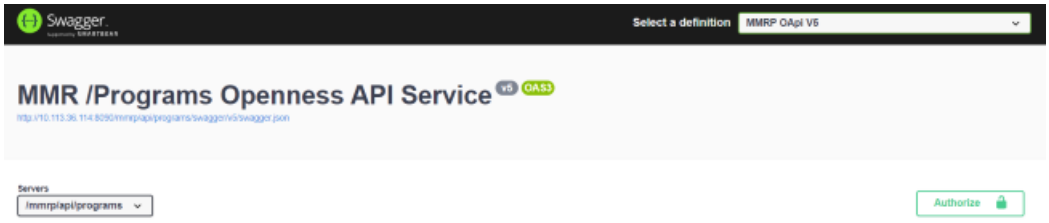
- Copies an NC package by Id

PATCH /v5/ncpackages/{packageId}

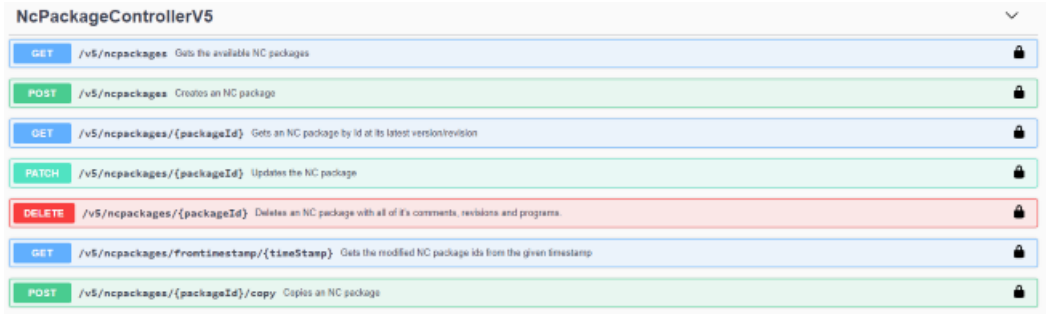
- Applies the given json patch (http://jsonpatch.com/) operations to the NC package.
  - If "Auto revision handling" is active: The modifications effect the latest version/revision of the NC package
  - If "Manual revision handling" is active: The modifications effect the released revision of the NC package

Procedure

1. Call the following address: Swagger (http://{ServerIP}:{ServerPort}/mmrp/api/programs/swagger/index.html).
   The "Swagger" > "SinInt.MMRPAPI.Service" window opens.



2. Scroll to area "NcPackageControllerV5".



3. Open the desired field "GET", "POST", "PATCH", "DELETE" and click on "Try it out".
4. Enter the appropriate values for parameters.
   For restrictions, see the corresponding endpoint details.
5. Click "Execute" to start the request.

Example: Creating an NC package

Use the following HTTP request form:

```
POST {ServerIP}:{ServerPort}/mmrp/api/programs/v5/ncpackages
```

Request body:

```
{
  // obligatory members
  // Size Limit: 30 characters
  "Name": {String name of the package},
  // optional members
  "WorkpieceId": {Identification of CAM Source},
  // Size Limit: 280 characters,
  "Description": {String description of the package},
  "CreatedBy": {Optional string of the author},
  "TrialRun": {Optional Boolean, default false},
  "ManualVerificationAfterTrialRun": {Optional Boolean, default false}
}
```

You can receive the following responses to your request:

- Created (201)
  The body contains the created NC package:

```
{
  "id": "438fe317-dfa8-eb11-837d-005056aa8f53",
  "name": "newPackageName",
  "workpieceId": "newWorkpieceId",
  "lastRevisionState": 0,
  "createdBy": "me",
  "revisionNumber": 1,
  "timeOfModification": "2021-04-29T13:36:10.4178829",
  "timeOfCreation": "2021-04-29T13:36:10.4178829",
  "description": null,
  "trialRun": true,
  "manualVerificationAfterTrialRun": false
  "wasProductive": false
}
```

Exceptions structure:

- Bad Request (400)
  The following error occurred: A validation error occurred during creating NC package:
  - The name of the NC package should not exceed 30 characters
  - The name of the NC package should not be empty
  - The name of the package should contain only alphanumeric and '_', '-', '.' characters
  - The description of the NC package should not exceed 280 characters
  - The description should contain other than whitespaces
  - A non-empty request body is required

  The following error occurred:
  - An error occurred during creating NC package: {error message}
- Conflict (409)
  - NC package with the same name already exists
- Unsupported Media Type (415)
  - Only media type application/json is supported
- Internal Server Error (500)
  - An error occurred during creating NC package

Note

Initial creation

In case of initial creation of an NC package, a revision (1) will be created automatically based on the NC package.

Example: Updating an NC package

Use the following HTTP request form:

```
PATCH {ServerIP}:{ServerPort}/mmrp/api/programs/v5/ncpackages/
{packageId}
```

Request Body:

Change NC package's name:

```
[
  {
    "path":"name",
    "op":"Replace",
    "value":"UpdatedName"
  }
]
```

Change NC package's description:

```
[
  {
    "path":"description",
    "op":"Replace",
    "value":"UpdatedDescription"
  }
]
```

Change NC package's WorkPieceId:

```
[
  {
    "path":"workpieceid",
    "op":"Replace",
    "value":"UpdatedWorkpieceId"
  }
]
```

Change NC package's Trial-run parameter:

```
[
  {
    "path":"trialrun",
    "op":"Replace",
    "value":"false"
  }
]
```

Change NC package's ManualVerificationAfterTrialRun parameter:

```
[
  {
    "path":"manualverificationaftertrialrun",
    "op":"Replace",
    "value":"false"
  }
]
```

You can add more operation to one request to modify more then one parameter:

```
[
  {
    "path":"name",
    "op":"Replace",
    "value":"UpdatedName"
  },
  {
    "path":"description",
    "op":"Replace",
    "value":"UpdatedDescription"
  },
  {
    "path":"workpieceid",
    "op":"Replace",
    "value":"UpdatedWorkpieceId"
  },
  {
    "path":"trialrun",
    "op":"Replace",
    "value":"false"
  },
  {
    "path":"manualverificationaftertrialrun",
    "op":"Replace",
    "value":"false"
  }
]
```

You can change the following values:

- Name
- WorkpieceId
- Description
- TrialRun
- ManualVerificationAfterTrialRUn

You can receive the following responses to your request:

- OK (200)
  The body contains the updated NC package:

```
{
  "id": "438fe317-dfa8-eb11-837d-005056aa8f53",
  "name": "newPackageName",
  "workpieceId": "workpieceId",
  "lastRevisionState": 0,
  "createdBy": "me",
  "revisionNumber": 1,
  "timeOfModification": "2021-04-29T13:36:10.4178829",
  "timeOfCreation": "2021-04-29T13:36:10.4178829",
  "description": null,
  "trialRun": true,
  "manualVerificationAfterTrialRun": false,
  "wasProductive": true
}
```

Exceptions structure:

- Bad Request (400)
  The following error occurred: A validation error occurred during updating NC package:
  - The name of the NC package should not exceed 30 characters
  - The name of the NC package should not be empty
  - The name of the package should contain only alphanumeric and '_', '-', '.' characters
  - A non-empty request body is required
  - The description of the NC package should not exceed 280 characters
  - The description should contain other than whitespaces
  - Trial-run should not be empty
  - Manual verification after trial-run should not be empty
  - NC Package cannot be modified in state: {state}

  The following error occurred:
  - An error occurred during updating the NC package: {error message}

  Note

  State: published

  NC package update is not possible in state: Published

- Not Found (404)
  - NC package is not found with the given Id: {packageId}
- Conflict (409)
  - NC package with the same name already exists

- Unsupported Media Type (415)
  - Only media type application/json is supported
- Internal Server Error (500)
  - An error occurred during updating NC package

Example: Copying an NC package

Use the following HTTP request form:

```
POST {ServerIP}:{ServerPort}/mmrp/api/programs/v5/ncpackages/
{packageId}/copy
```

Be aware that you should copy NC packages when no changes are in progress.

Request body:

```
{
  "name": "string",
  "copyAssignedMachines": true,
  "copyPathForPrograms": true
}
```

You can receive the following responses to your request:

- OK (200)
  The body contains the copied NC package as a json object.
  ```
  {
    "id": "224141a6-b5a2-eb11-837d-005056aa8f53",
    "name": "package2",
    "workpieceId": "",
    "lastRevisionState": 1,
    "createdBy": "Admin",
    "revisionNumber": 1,
    "timeOfModification": "2021-04-21T21:18:44.2413539",
    "timeOfCreation": "2021-04-21T17:24:23.5388442",
    "description": "",
    "trialRun": false,
    "manualVerificationAfterTrialRun": false,
    "wasProductive": true
  }
  ```
- Bad Request (400)
  The following error occurred: A validation error occurred during creating NC package:
  - The name of the NC package should not exceed 30 characters
  - The name of the package should contain only alphanumeric and '_', '-' characters
  - A non-empty request body is required

  The following error occurred:
  - An error occurred during updating NC package: {error message}
- Not Found (404)
  - NC package is not found with the given Id

- Conflict (409)
  - NC package with the same name already exists
- Unsupported Media Type (415)
  - Only media type application/json is supported.
- Internal Server Error (500)
  - An error occurred during copying NC package

Example: Requesting all NC packages

Use the following HTTP request form:

```
GET {ServerIP}:{ServerPort}/mmrp/api/programs/v5/ncpackages
```

You can receive the following responses to your request:

- OK (200)
  The body contains the collection of the NC packages as a json object.

```
{
"collection": [
  {
   "id": "a93cdc7a-a7a2-eb11-837d-005056aa8f53",
   "name": "package1",
   "workpieceId": "",
   "lastRevisionState": 1,
   "createdBy": "Admin",
   "revisionNumber": 1,
   "timeOfModification": "2021-04-21T15:44:33.0259445",
   "timeOfCreation": "2021-04-21T15:42:57.6778543",
   "description": "",
   "trialRun": false,
   "manualVerificationAfterTrialRun": false,
   "wasProductive": false
  },
  {
   "id": "224141a6-b5a2-eb11-837d-005056aa8f53",
   "name": "package2",
   "workpieceId": "",
   "lastRevisionState": 5,
   "createdBy": "Admin",
   "revisionNumber": 1,
   "timeOfModification": "2021-04-21T21:18:44.2413539",
   "timeOfCreation": "2021-04-21T17:24:23.5388442",
   "description": "",
   "trialRun": false,
   "manualVerificationAfterTrialRun": false,
   "wasProductive": true
  }
 ]
}
```

- Bad Request (400)
  The following error occurred:
  - An error occurred during getting NC packages
- Internal Server Error (500)
  - An error occurred during getting NC packages

Example: Requesting the NC package based on the Id

Use the following HTTP request form:

```
GET {ServerIP}:{ServerPort}/mmrp/api/programs/v5/ncpackages/
{packageId}
```

You can receive the following responses to your request:

- OK (200)
  The body contains the requested NC package as a json object.

```
{
  "id": "224141a6-b5a2-eb11-837d-005056aa8f53",
  "name": "package2",
  "workpieceId": "",
  "lastRevisionState": 5,
  "createdBy": "Admin",
  "revisionNumber": 1,
  "timeOfModification": "2021-04-21T21:18:44.2413539",
  "timeOfCreation": "2021-04-21T17:24:23.5388442",
  "description": "",
  "trialRun": false,
  "manualVerificationAfterTrialRun": false,
  "wasProductive": true
}
```

- Not Found (404)
  - NC package is not found with the given id: {packageId}
- Internal Server Error (500)
  - An error occurred during getting NC package

Example: Requesting the Ids of modified NC packages from a given timestamp

Use the following HTTP request form:

```
GET {ServerIP}:{ServerPort}/mmrp/api/programs/v5/ncpackages/
fromtimestamp/{timeStamp}
```

You can receive the following responses to your request:

- OK (200)
  The body contains the NC package Ids from the given timestamp as a json object.

```
{
  "collection":
    [
      "bdf9a20b-378d-eb11-8379-005056aa8f53",
      "518e341e-388d-eb11-8379-005056aa8f53",
      "cfd5a44b-588d-eb11-8379-005056aa8f53",
      "981368d6-588d-eb11-8379-005056aa8f53"
    ]
}
```

- Not Found (404)
  - NC packages are not found from the given timestamp
- Internal Server Error (500)
  - An error occurred during getting NC package Ids

Example: Deleting a NC package

Use the following HTTP request form:

```
DELETE {ServerIP}:{ServerPort}/mmrp/api/programs/v5/ncpackages/
{PackageId}
```

You can receive the following responses to your request:

- No Content (204)
- Not Found (404)
  - NC package is not found with the given Id: {packageId}
- Internal Server Error (500)
  - An error occurred during deleting NC package

11.3.2 Managing revisions

Prerequisite

Authenticate using the token to use the various functions in the Swagger UI.

For more information, see:

- Manage openness clients (Page 103)
- Generate token with Windows PowerShell script (Page 896)

Generating and modifying revisions

GET /v5/ncpackages/{packageId}/revisions

- Retrieves all revisions of a NC package

GET /v5/revisions/{revisionId}

- Retrieves a revision by Id

GET /v5/revisions/ncPackageId/{packageId}

- Retrieves the latest revision by given packageId

GET /v5/revisions/{revisionId}/assignedmachines

- Retrieves all assigned machine by revision

GET /v5/revisions/{revisionId}/master

- Retrieves master (trial-run) machine by revision

POST /v5/revisions/{revisionId}/reinstate

- Reinstates a revision to the given revision

POST /v5/revisions/machines/names

- Retrieves by machine names and Ids

POST /v5/revisions/machines/name

- Retrieves by machine name and Id

Note

Current timestamp

The `TimeOfModification` parameter of the NC package is updated with the current timestamp.

POST /v5/revisions/{revisionId}/assignmachine

- Assign machine to the given revision
- Cannot assign machine in published state

Note

Current timestamp

The `TimeOfModification` parameter of the NC package is updated with the current timestamp.

POST /v5/machines/names

- Get machine Ids based on the names of them.
- If a machine does not exist with the given name, the Id of it will be null in the returned list.

PATCH /v5/revisions/{revisionId}

- Applies the given json patch (http://jsonpatch.com/) operations to the Revision.

Note

Current timestamp

The `TimeOfModification` parameter of the NC package is updated with the current timestamp.

DELETE /v5/revisions/{revisionId}/unassignmachine/{machineId}

- Unassign machine from the given revision
- Cannot unassign machine in published state

Note

Current timestamp

The `TimeOfModification` parameter of the NC package is updated with the current timestamp.

PATCH /v5/revisions/{revisionId}/markasmaster

- Mark machine as master (trial-run)
- Cannot mark as master in published state

Note

Current timestamp

The `TimeOfModification` parameter of the NC packages is updated with the current timestamp.

PATCH /v5/revisions/{revisionId}/unmarkasmaster

- Unmark machine as master (trial-run)
- Cannot unmark as master in published state

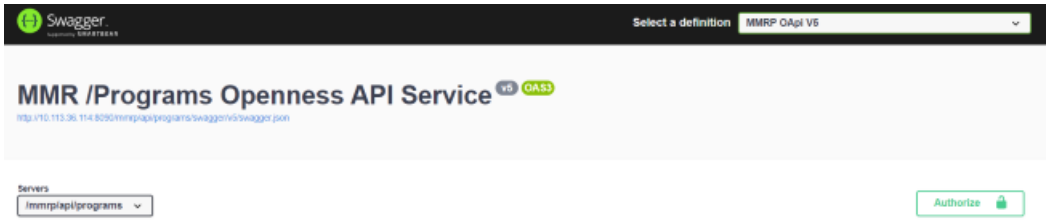
Note

Current timestamp

The `TimeOfModification` parameter of the NC packages is updated with the current timestamp.

Procedure

1. Call the following address: Swagger (http://{ServerIP}:{ServerPort}/mmrp/api/programs/swagger/index.html).
   The "Swagger" > "SinInt.MMRPAPI.Service" window opens.



2. Scroll to the area "RevisionControllerV5".

3. Open the desired field "GET", "POST", "PATCH", "DELETE" and click on "Try it out".
4. Enter the appropriate values for parameters.
   – For restrictions, see the corresponding endpoint details.
5. Click "Execute" to start the request.

Example: Reinstate a revision

Use the following HTTP request form:

```
POST {ServerIP}:{ServerPort}/mmrp/api/programs/v5/revisions/
{revisionId}/reinstate
```

You can receive the following responses to your request:

- Created (201)
  The body contains the reinstated revision:

```
{
  "Id": "ce547e61-19cb-e911-afab-a08cfde43258",
  "Status": 0,
  "CreatedBy": "Admin",
  "TimeOfCreateion": "2020-02-22",
  "RevisionNumber": 2,
  "ExternalRevision": "ExtB",
  "ParentId": "ce547e61-0000-e911-afab-a08cfde43258",
  "WasProductive": "false",
  "NcPackageId": "ce547e61-0000-e911-afab-a08cfde43258"
}
```

- Not Found (404)
  - Revision is not found with Id: {revisionId}
- Internal Server Error (500)
  - An error occurred during reinstating revision

Example: Requesting all revisions of NC package

Use the following HTTP request form:

```
GET {ServerIP}:{ServerPort}/mmrp/api/programs/v5/ncpackages/
{packageId}/revisions
```

You can receive the following responses to your request:

- OK (200)
  The body contains the requested collection of revisions.

```
{
"collection": [
{
  "id": "ce547e61-19cb-e911-afab-a08cfde43258",
  "status": 0,
  "createdBy": "Admin",
  "timeOfCreation": "2021-03-22",
  "revisionNumber": 1,
  "externalRevision": "ExtB",
  "parentId": "ce547e61-0000-e911-afab-a08cfde43258",
  "wasProductive": "false",
  "ncPackageId": "ce547e61-0000-e911-afab-a08cfde43258"
},
{
  "id": "dd547e61-19cb-e911-afab-a08cfde43258",
  "status": 1,
  "createdBy": "Admin",
  "timeOfCreation": "2021-02-22",
  "revisionNumber": 2,
  "externalRevision": "ExtB",
  "parentId": "ce547e61-0000-e911-afab-a08cfde43258",
  "wasProductive": "false",
  "ncPackageId": "ce547e61-0000-e911-afab-a08cfde43258"
}
]
```

- Not Found (404)
  - NC package is not found with the given Id: {packageId}
- Internal Server Error (500)
  - An error occurred during getting revisions

Example: Requesting revisions by revision id

Use the following HTTP request form:

```
GET {ServerIP}:{ServerPort}/mmrp/api/programs/v5/revisions/
{revisionId}
```

You can receive the following responses to your request:

- OK (200)
  The body contains the requested revision:
  ```
  {
    "id": "ce547e61-19cb-e911-afab-a08cfde43258",
    "status": 0,
    "createdBy": "Admin",
    "timeOfCreateion": "2020-02-22",
    "revisionNumber": 1,
    "externalRevision": "",
    "parentId": "ce547e61-0000-e911-afab-a08cfde43258",
    "wasProductive": "false",
    "ncPackageId": "ce547e61-0000-e911-afab-a08cfde43258"
  }
  ```
- Not Found (404)
  - Revision is not found with the given Id: {revisionId}
- Internal Server Error (500)
  - An error occurred during getting revision

Example: The latest revision by the given NC package Id

Use the following HTTP request form:

```
GET {ServerIP}:{ServerPort}/mmrp/api/programs/v5/revisions/
ncPackageId/{packageId}
```

You can receive the following responses to your request:

- OK (200)
  The body contains the necessary revision as json object:
  ```
  {
    "id": "ce547e61-19cb-e911-afab-a08cfde43258",
    "status": 0,
    "createdBy": "Admin",
    "timeOfCreateion": "2020-02-22",
    "revisionNumber": 1,
    "externalRevision": "",
    "parentId": "ce547e61-0000-e911-afab-a08cfde43258",
    "wasProductive": "false",
    "ncPackageId": "ce547e61-0000-e911-afab-a08cfde43258"
  }
  ```
- Not Found (404)
  - NC package is not found with the given Id: {packageId}
- Internal Server Error (500)
  - An error occurred during getting revision

Example: Updating revision

Use the following HTTP request form:

```
PATCH {ServerIP}:{ServerPort}/mmrp/api/programs/v5/revisions/
{revisionId}
```

The Request Body as json object:

Change revision's Status:

```
[
  {
    "path":"status",
    "op":"Replace",
    "value": 1
  }
]
```

Change revision's WasProductive parameter:

```
[
  {
    "path":"wasProductive",
    "op":"Replace",
    "value": false
  }
]
```

Change revision's ExternalRevision parameter:

```
[
  {
    "path":"externalRevision",
    "op":"Replace",
    "value": UpdatedExternalRevision
  }
]
```

You can add more operation to one request to modify more than one parameter:

```
[
  {
    "path":"status",
    "op":"Replace",
    "value": 1
  },
  {
    "path":"wasProductive",
    "op":"Replace",
    "value": false
  },
  {
    "path":"externalRevision",
    "op":"Replace",
    "value": UpdatedExternalRevision
  }
]
```

You can change the following values:

- Status
- WasProductive
- ExternalRevision

You can receive the following responses to your request:

- OK (200)
  The body contains the necessary revision as json object:
  ```
  {
    "id": "ce547e61-19cb-e911-afab-a08cfde43258",
    "status": 1,
    "createdBy": "Admin",
    "timeOfCreation": "2020-02-22T11:33:22.194",
    "revisionNumber": 1,
    "externalRevision": "ExtB",
    "parentId": "ce547e61-0000-e911-afab-a08cfde43258",
    "wasProductive": "false",
    "ncPackageId": "ce547e61-0000-e911-afab-a08cfde43258"
  }
  ```
- Bad Request (400)
  The following error occurred: A validation error occurred during updating revision's status:
  - A non-empty request body is required
  - Status should not be empty
  - Status is not valid
  - State change is not allowed from {fromState} to {toState}
  - External revision identifier should not exceed 50 characters
  - External revision should only contain alphanumeric and underscore characters
  - WasProductive should not be empty

  The following error occurred:
  - An error occurred during updating revision: {error message}
- Not Found (404)
  - Revision is not found with the given Id: {revisionId}
- Unsupported Media Type (415)
  - Only media type application/json is supported.
- Internal Server Error (500)
  - An error occurred during updating revision

Example: Get all assigned machines by revision

Use the following HTTP request form:

```
GET {ServerIP}:{ServerPort}/mmrp/api/programs/v5/revisions/
{revisionId}/assignedmachines
```

You can receive the following responses to your request:

- OK (200)
  The body contains the Ids of the assigned machines:
  ```
  {
     "Collection":
     [
       "f5b90155-aeba-489a-aff5-994b1b1d91f6",
       "6c354f15-6655-45be-bd9f-d7bc0d5f0863"
     ]
  }
  ```
- Not Found (404)
  - Revision is not found with the given Id: {revisionId}
- Internal Server Error (500)
  - An error occurred during getting assigned machines

Example: Get master (trial-run) machine by revision

Use the following HTTP request form:

```
GET{ServerIP}:{ServerPort}/mmrp/api/programs/v5/revisions/
{revisionId}/master
```

You can receive the following responses to your request:

- OK (200)
  The body contains the Id of the master machine:
  ```
  {
      "MachineId": "f5b90155-aeba-489a-aff5-994b1b1d91f6"
  }
  ```
- Not Found (404)
  - Revision is not found with the given Id: {revisionId}
- No Content (204)
  - No master machine for the given revision Id
- Internal Server Error (500)
  - An error occurred during getting master machine for revision

Example: Assign machine to the given revision

Use the following HTTP request form:

```
POST {ServerIP}:{ServerPort}/mmrp/api/programs/v5/revisions/
{revisionId}/assignmachine
```

The Request body as json object:

```
{
    "MachineId": "f5b90155-aeba-489a-aff5-994b1b1d91f6"
}
```

You can receive the following responses to your request:

- Created (201)
  The body contains the Id of the master machine:
  ```
  {
      "MachineId": "f5b90155-aeba-489a-aff5-994b1b1d91f6"
  }
  ```
- Bad Request (400)
  The following error occurred: A validation error occurred during assigning machine to revision:
  - A non-empty request body is required
  - Machine identifier should not be empty

  An error occurred during assigning machine to revision: Revision cannot be modified in state: {state}
  The following error occurred:
  - An error occurred during assigning machine to revision: {error message}
- Not Found (404)
  - Revision is not found with the given Id: {revisionId}
  - Machine is not found with the given Id: {machineId}
- Conflict (409)
  - Machine assignment with machine Id: {machineId}
- Unsupported Media Type (415)
  - Only media type application/json is supported.
- Internal Server Error (500)
  - An error occurred during assigning machine to revision

Example: Unassign machine from the given revision

Use the following HTTP request form:

```
DELETE {ServerIP}:{ServerPort}/mmrp/api/programs/v5/revisions/
{revisionId}/unassignmachine/{machineId}
```

You can receive the following responses to your request:

- No Content (204)
- Bad Request (400)
  - {item} cannot be modified in state: {state}
- Not Found (404)
  - Revision is not found with the given Id: {revisionId}
  - There is no Assigned machine with Id: {machineId} to the revision
- Internal Server Error (500)
  - An error occurred during unassigning machine from revision

Example: Get machine Ids based on the names of them

Use the following HTTP request form:

```
POST {ServerIP}:{ServerPort}/mmrp/api/programs/v5/machines/names
```

The Request body as json object:

```
{
    "Collection":
    [
      "Machine1",
      "Machine2"
    ]
}
```

You can receive the following responses to your request:

- Ok (200)
  The body contains the name and the Id of the machines:
  ```
  {
      "Collection": [
       {
         "name": "Machine1",
         "id": "fc16b4fa-4f19-4fd7-820a-4d9adf7bf5a0"
       },
       {
         "name": "Machine2",
         "id": null
       }
    ]
  }
  ```
- Bad Request (400)
  A validation error occurred during getting the Ids of the machines based on the names of them:
  - A non-empty request body is required
- Unsupported Media Type (415)
  - Only media type application/json is supported.
- Internal Server Error (500)
  - An error occurred during getting the Ids of the machines based on the names of them.

Example: Get machine Id based on the name of it

Use the following HTTP request form:

```
POST {ServerIP}:{ServerPort}/mmrp/api/programs/v5/machines/name
```

The Request body as json object:

```
{
    "Name": "MachineName"
}
```

You can receive the following responses to your request:

- - OK (200)
  ```
  {
    "Name": "MachineName",
    "Id": "ce547e61-19cb-e911-afab-a08cfde43258"
  }
  ```
- Bad request (400) - Body is null or empty
  The following error occurred: A validation error occurred while getting the Ids of the machines based on the names of it:
  The name of the machine should not be empty.
- Not Found (404) - Machine name is not found.
  - Machine is not found with the given name: `{machineName}`
- Internal server error (500)
  An error occurred while getting the machine Id based on machine name: `{exception message}`

Example: Mark machine as master (trial-run)

Use the following HTTP request form:

```
PATCH {ServerIP}:{ServerPort}/mmrp/api/programs/v5/revisions/
{revisionId}/markasmaster
```

The Request body as json object:

```
{
    "MachineId": "f5b90155-aeba-489a-aff5-994b1b1d91f6"
}
```

You can receive the following responses to your request:

- OK (200)
  The body contains the Id of the machine which will be mark as master machine
  ```
  {
      "MachineId": "f5b90155-aeba-489a-aff5-994b1b1d91f6"
  }
  ```
- Bad Request (400)
  The following error occurred: A validation error occurred during marking a machine as master:
  - A non-empty request body is required
  - Machine identifier should not be empty

  An error occurred during marking a machine as master: Revision cannot be modified in state {state}
  The following error occurred:
  - An error occurred during marking a machine as master: {error message}
- Not Found (404)
  - Revision is not found with the given Id: {revisionId}
  - Machine is not found with the given Id: {machineId}

- Unsupported Media Type (415)
  - Only media type application/json is supported.
- Internal Server Error (500)
  - An error occurred during marking a machine as master

Example: Unmark machine as master (trial-run)

Use the following HTTP request form:

```
PATCH {ServerIP}:{ServerPort}/mmrp/api/programs/v5/revisions/
{revisionId}/unmarkasmaster
```

The Request body as json object:

```
{
    "MachineId": "f5b90155-aeba-489a-aff5-994b1b1d91f6"
}
```

You can receive the following responses to your request:

- OK (200)
  The body contains the Id of the machine which will be unmark as master machine
  ```
  {
      "MachineId": "f5b90155-aeba-489a-aff5-994b1b1d91f6"
  }
  ```
- Bad Request (400)
  The following error occurred: A validation error occurred during unmarking a machine as master:
  - A non-empty request body is required
  - Machine identifier should not be empty

  An error occurred during unmarking a machine as master: Revision cannot be modified in state {state}
  The following error occurred:
  - An error occurred during unmarking a machine as master: {error message}
- Not Found (404)
  - Revision is not found with the given Id: {revisionId}
  - Machine is not found with the given Id: {machineId}
- Unsupported Media Type (415)
  - Only media type application/json is supported.
- Internal Server Error (500)
  - An error occurred during unmarking a machine as master

Status

Valid state changes for revision status update

Current status	Future status
InPreparation	InPreparation
InPreparation	Published
Locked	InPreparation
Locked	Locked
Locked	Productive
Locked	Released
Rejected	Rejected
Rejected	InPreparation
Revoked	Revoked
Revoked	InPreparation
TrialRunInProgress	Revoked
TrialRunInProgress	Rejected
TrialRunInProgress	Released
TrialRunInProgress	TrialRunInProgress
TrialRunInProgress	TrialRunCompleted
TrialRunCompleted	InPreparation
TrialRunCompleted	Released
TrialRunCompleted	TrialRunCompleted
Published	Published
Published	InPreparation
Published	TrialRunInProgress
Published	Released
Released	Locked
Released	Released
Released	Productive
Productive	Productive
Productive	Locked
Review in progress	Review completed
Review in progress	Review in progress
Review completed	Released
Review completed	Published
Review completed	Locked
Review completed	Review completed

NC package status

Value	NcPackageStatusType
0	InPreparation
1	Published

Value	NcPackageStatusType
2	TrialRunInProgress
3	TrialRunCompleted
4	Released
5	Productive
6	Locked
7	Rejected
8	Revoked
9	Review in progress
10	Review completed

11.3.3 Managing NC programs

Prerequisite

Authenticate using the token, so that you can use the various functions in Swagger UI.

For more information, see:

- Manage openness clients (Page 103)
- Generate token with Windows PowerShell script (Page 896)

Generating and modifying NC programs

POST /v5/revisions/{revisionId}/ncprograms/info

- Creates NC program info (NC program metadata)
- Revision must exist
- Cannot create NC program in published state

POST /v5/ncprograms/{programId}/content

- Creates an NC programs content
- NC Program info must created before creating content

PATCH /v5/ncprograms/{programId}/content

- Updates an NC programs content
- New NC program content must differ
- NC program must exist in parent revision
- Cannot update NC program in published state

Note

Current timestamp

The `TimeOfModification` parameter of the NC packages is updated with the current timestamp.

GET /v5/revisions/{revisionId}/ncprograms

- Retrieves all NC programs by revision Id

GET /v5/ncprograms/{programId}/info

- Retrieves an NC Programs Info

GET /v5/ncprograms/{programId}/content

- Retrieves an NC Programs content

GET /v5/revisions/{revisionId}/ncprograms/names

- Retrieves NC program names with timestamp

GET /v5/revisions/{revisionId}/name/{name}/info

- Retrieves an NC programs metadata by revision id and name

PATCH v5/ncprograms/{programId}

- Applies the given json patch (http://jsonpatch.com/) operations to the revision.
- NC program must exist

Note

Current timestamp

The `TimeOfModification` parameter of the NC packages is updated with the current timestamp.

DELETE /v5/ncprograms/{programId}

- Deletes an NC program
- NC program must exist in parent revision
- Cannot delete NC program in published state

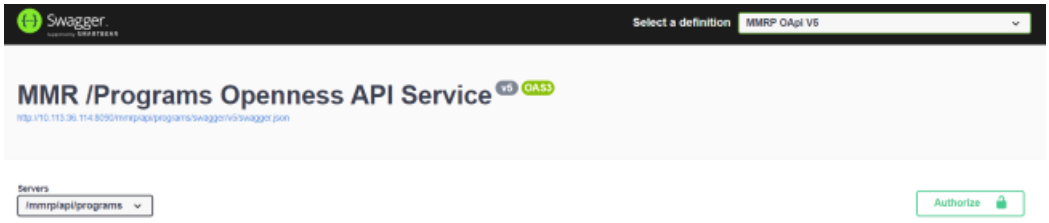
Note

Current timestamp

The `TimeOfModification` parameter of the NC packages is updated with the current timestamp.

Procedure

1. Call the following address: Swagger (http://{ServerIP}:{ServerPort}/mmrp/api/programs/swagger/index.html).
   The "Swagger" > "SinInt.MMRPAPI.Service" window opens.



2. Scroll to area "NcProgramControllerV5".

3. Open the desired field "GET", "POST", "PATCH", "DELETE" and click on "Try it out".
4. Enter the appropriate values for parameters.
   – For restrictions, see the corresponding endpoint details.
5. Click "Execute" to start the request.

Example: Create NC program metadata

Use the following HTTP request form:

```
POST {ServerIP}:{ServerPort}/mmrp/api/programs/v5/revisions/
{revisionId}/ncprograms/info
```

Request body as a json object:

```
{
  // obligatory members
  // Size Limit: 50 characters
  "Name": {string filename},
  // Size Limit: 255 characters, must not be null
  "PathOnTheMachine": {string path}
  // optional members
  "CreatedBy": {string original author},
}
```

You can receive the following responses to your request:

- Created (201)
  Body contains created NC program metadata as json object

```
{
  "Id": "4f57547e-ef92-4abf-8db0-cd867f9ff288",
  "Name": "Testprogram.MPF",
  "CreatedBy": "Admin",
  "PathOnTheMachine": "/path/testpath"
  "TimeOfCreation": "2020-12-20T12:54:41.930",
  "Length": 0
  "ContentSha256": null
}
```

- Bad Request (400)
  The following error occurred:
  A validation error occurred during creating NC program info:
  - The name of the NC program should only contain alphanumeric, whitespace and '-', '_', '.' characters
  - The name of the NC program should not exceed 50 characters
  - The name of the NC program should not be empty
  - A non-empty request body is required

  The following error occurred:
  - NC program cannot be added to revision. Revision cannot be modified in state: {state}
  - An error occurred during creating NC program info: {error message}
- Not Found (404)
  - Revision is not found with the given Id: {revisionId}
- Conflict (409)
  - NC program with the same name already exists in this revision
- Unsupported Media Type (415)
  - Only media type application/json is supported.
- Internal Server Error (500)
  - An (db update) error occurred during creating NC program info
  - An error occurred during creating NC program info

Example: Create NC program content

Use the following HTTP request form:

```
POST {ServerIP}:{ServerPort}/mmrp/api/programs/v5/ncprograms/
{ncProgramId}/content
```

This HTTP request creates only the content for an NC program. Pre-existence of metadata of the NC program is mandatory.

Request body contains the NC program file

You can receive the following responses to your request:

- Created (201)
  The body contains the metadata of the updated NC program without content as json object.

```
{
  "Id": "4f57547e-ef92-4abf-8db0-cd867f9ff288",
  "Name": "Testprogram.MPF",
  "PathOnTheMachine": "/path/testpath",
  "CreatedBy": "Admin",
  "TimeOfCreation": "2020-12-20T13:07:04.818",
  "Length": 1345,
  "ContentSha256":
60def975a82bc7044fd7b0881d10c5f5406c6e1fe2e0024ca90fa982d711ef34
}
```

- Bad Request (400)
  - The following error occurred:
    A validation error occurred during creating NC program content: {the reason of the error}
  - Content type must be: multipart/form-data
- Not Found (404)
  - NC program is not found with the given Id: {programId}
- Conflict (409)
  - NC program content already exists
- Request Entity Too Large (413)
  - Content is too big
- Unsupported Media Type (415)
  - Only media type application/json is supported
- Internal Server Error (500)
  - An error occurred during creating NC program content

Example: Update NC program content

Use the following HTTP request form:

```
PATCH {ServerIP}:{ServerPort}/mmrp/api/programs/v5/ncprograms/
{ncProgramId}/content
```

This HTTP request creates only the content for an NC program. Pre-existence of metadata of the NC program is mandatory.

Request body contains the NC program file.

You can receive the following responses to your request:

- OK (200)
  The body contains the metadata of the updated NC program as a json object.
  ```
  {
    "id": "4f57547e-ef92-4abf-8db0-cd867f9ff288",
    "Name": "Testprogram.MPF",
    "PathOnTheMachine": "/path/testpath",
    "CreatedBy": "Admin",
    "TimeOfCreation": "2020-12-20T13:07:04.818",
    "Length": 1345
    "ContentSha256":
  a52d159f262b2c6ddb724a61840befc36eb30c88877a4030b65cbe86298449c9
  }
  ```
- Bad Request (400)
  The following error occurred:
  - A validation error occurred during creating NC program content: {the reason of the error}
  - Content type must be: multipart/form-data
  - {item} cannot found in none of the previous revisions
  - {item} cannot deleted if it is not persisted in any of the previous revisions
  - Create a new revision before modifying the {item}
  - Cannot update {item}. Content did not change
- Not Found (404)
  - NC program is not found with the given Id: {programId}
- Conflict (409)
  - NC program content already exists
- Request Entity Too Large (413)
  - Content is too big
- Unsupported Media Type (415)
  - Only media type application/json is supported.
- Internal Server Error (500)
  - An error occurred during updating NC program content

Example: Requesting all NC programs by revision Id

Use the following HTTP request form:

```
GET {ServerIP}:{ServerPort}/mmrp/api/programs/v5/revisions/
{revisionId}/ncprograms
```

You can receive the following responses to your request:

- OK (200)
  The body contains the collection of NC programs.


```
{
"collection":
  [
    {
      "Id": "4f57547e-ef92-4abf-8db0-cd867f9ff288",
      "Name": "Testprogram.MPF",
      "PathOnTheMachine": "/NC/_N_WKS_DIR/_N_NCPACKAGE_WPD",
      "CreatedBy": "Admin",
      "TimeOfCreation": "2020-12-20T13:07:04.818",
      "Length": 1345,
      "ContentSha256":
a52d159f262b2c6ddb724a61840befc36eb30c88877a4030b65cbe86298449c9
    },
    {
      "Id": "07743a7b-698c-48c5-8f6f-e588de0da90a",
      "Name": "Testprogram323.SPF",
      "PathOnTheMachine": "/path/somepath",
      "CreatedBy": "Admin",
      "TimeOfCreation": "2021-11-20T13:07:04.818",
      "Length": 1243,
      "ContentSha256":
60def975a82bc7044fd7b0881d10c5f5406c6e1fe2e0024ca90fa982d711ef34"
    },
    {
      "Id": "423921dc-6c86-40a9-ae9a-49c9c46a183a",
      "Name": "Multibody.MPF",
      "PathOnTheMachine": "/path/somepath",
      "CreatedBy": "Hans",
      "TimeOfCreation": "2025-12-21T13:07:04.818",
      "Length": 34565,
      "ContentSha256":
a52d159f262b2c6ddb724a61840befc36eb30c88877a4030b65cbe86298449c9
    }
  ]
}
```


- Not Found (404)
  - Revision is not found with the given Id: {revisionId}
- Internal Server Error (500)
  - An error occurred during getting NC programs

Example: Requesting the metadata of an NC program based on the Id

Use the following HTTP request form:

```
GET {ServerIP}:{ServerPort}/mmrp/api/programs/v5/ncprograms/
{ncprogramId}/info
```

You can receive the following responses to your request:

- OK (200)
  The body contains the metadata of the requested NC program as a json object.

```
{
  "Id": "4f57547e-ef92-4abf-8db0-cd867f9ff288",
  "Name": "Testprogram.MPF",
  "TimeOfCreation": "2020-12-20T13:07:04.818",
  "Length": 1345,
  "CreatedBy": "Admin",
  "ContentSha256":
a52d159f262b2c6ddb724a61840befc36eb30c88877a4030b65cbe86298449c9
  "pathOnTheMachine": "/path/testpath"
}
```

- Not Found (404)
  - NC program is not found with the given Id: {ncprogramId}
- Internal Server Error (500)
  - An error occurred during getting NC program info

Example: Requesting the content of an NC program based on the Id

Use the following HTTP request form:

```
GET {ServerIP}:{ServerPort}/mmrp/api/programs/v5/ncprograms/
{ncprogramId}/content
```

You can receive the following responses to your request:

- OK (200)
  - The response body contains the NC program file as filestream.
- Not Found (404)
  - NC program is not found with the given Id: {programId}
- Internal Server Error (500)
  - An error occurred during getting NC program content

Example: Requesting NC program names with timestamp by revision Id

Use the following HTTP request form:

```
GET {ServerIP}:{ServerPort}/mmrp/api/programs/v5/revisions/
{revisionId}/ncprograms/names
```

You can receive the following responses to your request:

- OK (200)
  The body contains the metadata of the requested NC program as a json object.
```
{
  "collection": [
   {
     "names": "testNCprogram.MPF",
     "timeStamp": "2021-04-20T10:39:27.990Z"
   }
  ]
}
```
- Not Found (404)
  - Revision is not found with the given Id: {revisionId}
- Internal Server Error (500)
  - An error occurred during getting NC program names with timestamp

Example: Requesting NC program info by revision Id and NC program name

Use the following HTTP request form:

```
GET {ServerIP}:{ServerPort}/mmrp/api/programs/v5/revisions/
{revisionId}/name/{name}/info
```

You can receive the following responses to your request:

- OK (200)
  The body contains the metadata of the requested NC program as a json object.
```
{
  "Id": "4f57547e-ef92-4abf-8db0-cd867f9ff288",
  "Name": "Testprogram.MPF",
  "PathOnTheMachine": "/path/testpath",
  "CreatedBy": "Admin",
  "TimeOfCreation": "2020-12-20T13:07:04.818",
  "Length": 1345,
  "ContentSha256":
a52d159f262b2c6ddb724a61840befc36eb30c88877a4030b65cbe86298449c9
}
```
- Not Found (404)
  - NC program is not found with the given Id: Revision Id: {revisionId} and name: NC program name: {name}
- Internal Server Error (500)
  - An error occurred during getting NC program info

Example: Deleting an NC program from the latest revision by NC program Id

Use the following HTTP request form:

```
DELETE {ServerIP}:{ServerPort}/mmrp/api/programs/v5/ncprograms/
{ncprogramId}
```

You can receive the following responses to your request:

- OK (204)
- Bad request (400)
  - NC program cannot modified in revision in state: {state}
  - {item} cannot found in none of the previous revisions.
    {item} cannot deleted if it is not persisted in any of the previous revisions.
    Create a new revision before modifying the {item}.
- Not Found (404)
  - NC program is not found with the given Id: {programId}
- Internal Server Error (500)
  - An error occurred during deleting NC program

Example: Updating an NC program by NC program Id

Use the following HTTP request form:

```
PATCH {ServerIP}:{ServerPort}/mmrp/api/programs/v5/ncprograms/
{programId}
```

Change revision's PathOnTheMachine parameter:

```
[
  {
     // Size Limit: 255 characters, must not be null
     "path":"pathonthemachine",
     "op":"Replace",
     "value": "updated_path_on_the_machine'
  }
]
```

You can change the following values:

- PathOnTheMachine

You can receive the following responses to your request:

- OK (200)
  The body contains the metadata of the path modified NC program as a json object.
  ```
  {
    "Id": "4f57547e-ef92-4abf-8db0-cd867f9ff288",
    "Name": "Testprogram.MPF",
    // Size Limit: 255 characters, must not be null
    "PathOnTheMachine": "/path/testpath",
    "CreatedBy": "Admin",
    "TimeOfCreation": "2020-12-20T13:07:04.818",
    "Length": 1345,
    "ContentSha256":
  a52d159f262b2c6ddb724a61840befc36eb30c88877a4030b65cbe86298449c9
  }
  ```
- Bad request (400)
  The following error occurred:
  A validation error occurred during updating the NC program's path:
  - The path of the NC program should not exceed 255 characters
  - The path of the NC program should not be empty
  - The path of the NC program should contain only alphanumeric and '_', '\', '/', '-', ':', '.', '(', ')', '{', '$', '}' characters
  - The path on the machine should not contain '{', '$', '}' characters besides path variables
  - A non-empty request body is required.

  The following error occurred:
  - An error occurred during updating NC program: {error message}
- Not Found (404)
  - NC program is not found with the given Id: {programId}
- Unsupported Media Type (415)
  - Only media type application/json is supported.
- Internal Server Error (500)
  - An error occurred during updating the NC program

11.3.4 Managing comments for NC packages

Prerequisite

Authenticate using the token, so that you can use the various functions in Swagger UI.

For more information, see:

- Manage openness clients (Page 103)
- Generate token with Windows PowerShell script (Page 896)

Generating and modifying comments for NC packages

GET /v5/ncpackages/{packageId}/comments

- Retrieves an NC Programs Info
- NC package id must exist

POST /v5/ncpackages/{packageId}/comments

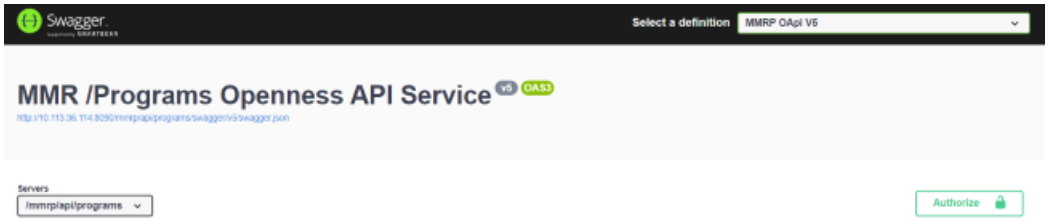
- Creates a comment
- NC package id must exist

GET /v5/comments/{commentId}

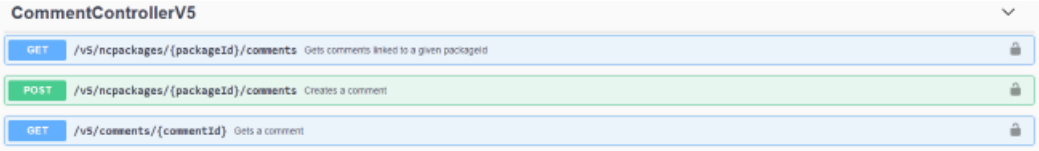
- Retrieves a comment

Procedure

1. Call the following address: Swagger (http://{ServerIP}:{ServerPort}/mmrp/api/programs/swagger/index.html).
   The "Swagger" > "SinInt.MMRPAPI.Service" window opens.



2. Scroll to area "CommentControllerV5".



3. Open the desired field "GET", "POST" and click on "Try it out".
4. Enter the appropriate values for parameters.
   – For restrictions, see the corresponding endpoint details.
5. Click "Execute" to start the request.

Example: Create Comment for NC package

Use the following HTTP request form:

```
POST {ServerIP}:{ServerPort}/mmrp/api/programs/v5/ncpackages/
{packageId}/comments
```

Request body:

```
{
  // obligatory members
  // Size Limit: 280 characters
```

```
  "Text": {string text of the comment},
  // optional members
  "CreatedBy": {string, author},
}
```

You can receive the following responses to your request:

- Created (201)
  The body contains the created comment as a json object.
  ```
  {
    "Id": "ce547e61-19cb-e911-afab-a08cfde43258",
    "Text": "Initial Package status text",
    "CreatedBy": "CreatorAdmin",
    "TimeOfCreation": "2020-01-10T14:39:24.008"
    "ncPackageId": "44f0bbfb-e084-ec11-83a8-005056aa973a"
  }
  ```
- Bad Request (400)
  - The following error occurred: A validation error occurred during creating comment:
  - The text of the comment should not exceed 280 characters
  - The comment should not be empty
  - A non-empty request body is required

  The following error occurred:
  - An error occurred during creating comment: {error message}
- Not Found (404)
  - NC package is not found with the given id: {packageId}
- Unsupported Media Type (415)
  - Only media type application/json is supported.
- Internal Server Error (500)
  - An error occurred during creating comment

Example: Retrieve all comments for NC package

Use the following HTTP request form:

```
GET {ServerIP}:{ServerPort}/mmrp/api/programs/v5/ncpackages/
{packageId}/comments
```

You can receive the following responses to your request:

- OK (200)
  The body contains the requested collection of comments as a json object.

```
{
"collection":
  [
    {
      "Id": "ce547e61-19cb-e911-afab-a08cfde43258",
      "Text": "Initial Package status text",
      "CreatedBy": "CreatorAdmin",
      "TimeOfCreation": "2020-01-10T14:39:24.008621"
      "ncPackageId" : "3fa85f64-5717-4562-b3fc-2c963f66afa6"
    },
    {
      "Id": "b4bd067b-a9b3-4a7d-a60a-f1c76ed7ea4a",
      "Text": "Fix errors",
      "CreatedBy": "CreatorAdmin",
      "TimeOfCreation": "2020-01-11T14:39:24.008621"
      "ncPackageId" : "3fa85f64-5717-4562-b3fc-2c963f66afa8"
    }
  ]
}
```

- Not Found (404)
  - NC package is not found with the given Id: {packageId}
- Internal Server Error (500)
  - An error occurred during getting comments

Example: Retrieve a comment by its Id

Use the following HTTP request form:

```
GET {ServerIP}:{ServerPort}/mmrp/api/programs/v5/comments/
{commentId}
```

You can receive the following responses to your request:

- OK (200)
  The body contains the requested collection of comments as a json object.

```
{
  "Id": "ce547e61-19cb-e911-afab-a08cfde43258",
  "Text": "Initial Package status text",
  "CreatedBy": "CreatorAdmin",
  "TimeOfCreation": "2020-01-10T14:39:24.008621"
  "ncPackageId" : "3fa85f64-5717-4562-b3fc-2c963f66afa6"
}
```

- Not Found (404)
  - Comment is not found with the given Id: {commentId}
- Internal Server Error (500)
  - An error occurred during getting comment

11.3.5 Managing attachments

Prerequisite

Authenticate using the token, so that you can use the various functions in Swagger UI.

For more information, see:

- Manage openness clients (Page 103)
- Generate token with Windows PowerShell script (Page 896)

Requesting, generating and modifying attachments

GET /v1/revisions/{revisionId}/attachments

- Retrieves the attachments for the given revision
- The given revision must exist

GET /v1/attachments/{attachmentId}/info

- Retrieves an attachment information based on the attachment Id
- The given attachment must exist

GET /v1/attachments/{attachmentId}/content

- Retrieves an attachment content based on the attachment Id
- The given attachment must exist

POST /v1/revisions/{revisionId}/attachments/info

- Creates a new attachment without content to the given revision
- The given revision must exist

Note

Current timestamp

The `TimeOfModification` parameter of the NC package is updated with the current timestamp.

POST /v1/attachments/{attachmentId}/content

- Creates the content of the attachment
- The given attachment must exist

Note

Current timestamp

The `TimeOfModification` parameter of the NC package is updated with the current timestamp.

PATCH /v1/attachments/{attachmentId}

- Applies the given json patch (http://jsonpatch.com/) operations to the attachment.
- The given attachment must exist

Note

Current timestamp

The `TimeOfModification` parameter of the NC package is updated with the current timestamp.

DELETE /v1/attachments/{attachmentId}

- Deletes an existing attachment by Id
- The given attachment must exist

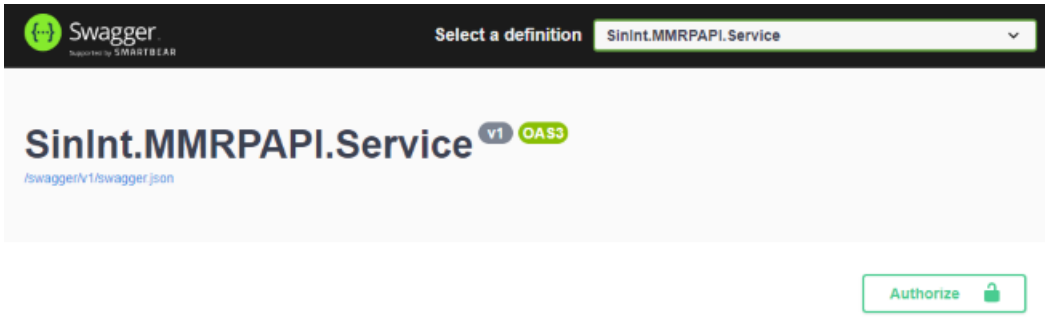
Note

Current timestamp

The `TimeOfModification` parameter of the NC package is updated with the current timestamp.

Procedure

1. Call the following address: Swagger (http://{ServerIP}:{ServerPort}/mmrp/api/programs/swagger/index.html).
   The "Swagger" > "SinInt.MMRPAPI.Service" window opens.



2. Scroll to area "AttachmentControllerV1".

3. Open the desired field "GET", "POST", "PATCH", "DELETE" and click on "Try it out".

4. Enter the appropriate values for parameters.
   – For restrictions, see the corresponding endpoint details.
5. Click "Execute" to start the request.

Example: Create attachment metadata

Use the following HTTP request form:

```
POST: {ServerIP}:{ServerPort}/mmrp/api/programs/v1/revisions/
{revisionId}/attachments/info
```

Request body as json object:

```
{
     // Obligatory member
     // Size limit: 50 characters
     "Name": {string filename},
     // Size limit: 50 characters
     "Description": {string description of the attachment},
     // Optional member
     "CreatedBy": {string of the author}
}
```

You can receive the following responses to your request:

- Created (201)

The body contains the following created attachment:

```
{
     "id": "f3ea5f0b-7814-ec11-b6b3-14cb19c99036",
     "name": "some_attachment.txt",
     "description": "some_description",
     "createdBy": "some_created_by",
     "timeOfCreation": "2021-09-13T11:50:36.9390922",
     "contentSha256": null,
     "length": 0
}
```

Exceptions structure:

- Bad Request (400)
  The following errors could be occurred during creating attachment (info):
  - The request body is invalid: A non-empty request body is required.
  - Missing or invalid data
  - The name of the attachment should not be empty
  - The name of the attachment should not exceed 50 characters
  - The name of the attachment cannot contain '<', '>', ':', '\"', '/', '\\', '|', '?', '*', '&' characters
  - The description of the attachment should not exceed 50 characters
  - The description should contain other than whitespaces
- Not Found (404)
  - Revision is not found with the given Id: {revisionId}
- Conflict (409)
  - Attachment with the same name already exists in the NC package
- Unsupported Media Type (415)
  - Only media type application/json is supported
- Internal server error (500)
  - An error occurred during creating attachment info

Example: Create attachment content

Use the following HTTP request form:

```
POST: {ServerIP}:{ServerPort}/mmrp/api/programs/v1/attachments/
{attachmentId}/content
```

This HTTP request creates only the content for an attachment. Pre-existence of metadata of the attachment is mandatory.

Request body contains the attachment file.

You can receive the following responses to your request:

- Created (201)

The body contains the metadata of the created attachment without content (but with contentSha256 and length) as json object:

```
{
     "id": "f3ea5f0b-7814-ec11-b6b3-14cb19c99036",
     "name": "some_attachment.txt",
     "description": "some_description",
     "createdBy": "some_created_by",
     "timeOfCreation": "2021-09-13T11:50:36.9390922",
     "contentSha256":
"f6ede265dab9d69f951c5f2b61a509b4c38d3de25a0043781a6110f86bd5d23a",
     "length": 131018
```

```
}
```

Exceptions structure:

- Bad Request (400)
  The following errors could be occurred during creating attachment (content):
  - Content type must be: multipart/form-data
  - The request body is invalid: File content is over 31 457 280
- Not Found (404)
  - Attachment is not found with the given Id: {attachmentId}
- Conflict (409)
  - Attachment content already exist
- Request Entity Too Large (413)
  - Content is too big
- Unsupported Media Type (415)
  - Only media type application/json is supported
- Internal server error (500)
  - An error occurred during creating attachment content

Example: Update attachment

Use the following HTTP request form:

```
PATCH: {ServerIP}:{ServerPort}/mmrp/api/programs/v1/attachments/
{attachmentId}
```

Request body as json object:

Change attachment's description:

```
[
   {
      "path":"description",
      "op":"Replace",
      "value": "updated_description"
   }
]
```

You can change the following values:

- Description

You can receive the following responses to your request:

- Ok (200)

The body contains the following updated attachment:

```
{
     "id": "f3ea5f0b-7814-ec11-b6b3-14cb19c99036",
     "name": "some_attachment.txt",
     "description": "some_updated_description",
```

```
     "createdBy": "some_created_by",
     "timeOfCreation": "2021-09-13T11:50:36.9390922",
     "contentSha256":
"f6ede265dab9d69f951c5f2b61a509b4c38d3de25a0043781a6110f86bd5d23a",
     "length": 131018
}
```

Exceptions structure:

- Bad Request (400)
  The following errors could be occurred during updating attachment:
  - The request body is invalid: A non-empty request body is required.
  - The description of the attachment should not exceed 50 characters
- Not Found (404)
  - Attachment is not found with the given Id: {attachmentId}
- Unsupported Media Type (415)
  - Only media type application/json is supported
- Internal server error (500)
  - An error occurred during updating attachment

Example: Requesting all attachments based on the given revision Id

Use the following HTTP request form:

```
GET: {ServerIP}:{ServerPort}/mmrp/api/programs/v1/revisions/
{revisionId}/attachments
```

You can receive the following responses to your request:

- Ok (200)

The body contains the following:

```
{
    "collection": [
        {
            "id": "f3ea5f0b-7814-ec11-b6b3-14cb19c99036",
            "name": "some_attachment.txt",
            "description": "some_description",
            "createdBy": "some_created_by",
            "timeOfCreation": "2021-09-13T11:50:36.9390922",
            "contentSha256":
"f6ede265dab9d69f951c5f2b61a509b4c38d3de25a0043781a6110f86bd5d23a",
            "length": 131018
        }
    ]
}
```

Exceptions structure:

- Not Found (404)
  - Revision is not found with the given Id: {revisionId}
- Internal server error (500)
  - An error occurred during getting attachments

Example: Requesting the metadata of an attachment based on the Id

Use the following HTTP request form:

```
GET: {ServerIP}:{ServerPort}/mmrp/api/programs/v1/attachments/
{attachmentId}/info
```

You can receive the following responses to your request:

- Ok (200)

The body contains the following:

```
{
     "id": "f3ea5f0b-7814-ec11-b6b3-14cb19c99036",
     "name": "some_attachment.txt",
     "description": "some_description",
     "createdBy": "some_created_by",
     "timeOfCreation": "2021-09-13T11:50:36.9390922",
     "contentSha256":
"f6ede265dab9d69f951c5f2b61a509b4c38d3de25a0043781a6110f86bd5d23a",
     "length": 131018
}
```

Exceptions structure:

- Not Found (404)
  - Attachment is not found with the given Id: {attachmentId}
- Internal server error (500)
  - An error occurred during getting attachment info

Example: Requesting the content of an attachment based on the Id

Use the following HTTP request form:

```
GET: {ServerIP}:{ServerPort}/mmrp/api/programs/v1/attachments/
{attachmentId}/content
```

You can receive the following responses to your request:

- OK (200)

The body contains the necessary attachment

Exceptions structure:

- Not Found (404)
  - Attachment is not found with the given Id: {attachmentId}
- Internal server error (500)
  - An error occurred during getting attachment content

Example: Deleting an attachment based on the Id

Use the following HTTP request form:

```
GET: {ServerIP}:{ServerPort}/mmrp/api/programs/v1/attachments/
{attachmentId}
```

You can receive the following responses to your request:

- No Content (204)

Exceptions structure:

- Not Found (404)
  - Attachment is not found with the given Id: {attachmentId}
- Internal server error (500)
  - An error occurred during deleting attachment

11.3.6 Managing configurations

Prerequisite

Authenticate using the token, so that you can use the various functions in Swagger UI.

For more information, see:

- Manage openness clients (Page 103)
- Generate token with Windows PowerShell script (Page 896)

Requesting, generating and modifying configurations

GET /v1/configuration/client

- Retrieves the client configurations for Manage MyResources /Programs

GET /v1/configuration/client/{configurationId}

- Retrieves a client configuration by configuration identifier

PATCH /v1/configuration/{client}/{configurationId}

- Applies the given json patch (http://jsonpatch.com/) operations to the configuration.

GET /v1/configuration/client/controllertype/{controllerType}

- Retrieves client configurations by machine controller type

Procedure

1. Call the following address: Swagger (http://{ServerIP}:{ServerPort}/mmrp/api/programs/swagger/index.html).
   The "Swagger" > "SinInt.MMRPAPI.Service" window opens.
2. Scroll to area "ConfigurationControllerV1".

3. Open the desired field "GET" or "PATCH". Click on "Try it out".
4. Enter the appropriate values for parameters.
   For restrictions, see the corresponding endpoint details.
5. Click "Execute" to start the request.

Example: Requesting configurations by controller type

Use the following HTTP request form:

```
GET: {ServerIP}:{ServerPort}/mmrp/api/programs/v1/configuration/
client
```

You can receive the following responses to your request:

- Ok (200)

The body contains the following:

```
{
  "collection": [
    {
      "id": "3fa85f64-5717-4562-b3fc-2c963f66afa6",
      "name": "Workpieces",
      "value": "/NC/_N_WKS_DIR",
      "controllerType": "siemens"
    }
  ]
}
```

Exceptions structure:

- Internal server error (500)
  - An error occurred during getting client configurations

Example: Requesting configuration based on the Id

Use the following HTTP request form:

```
GET: {ServerIP}:{ServerPort}/mmrp/api/programs/v1/configuration/
client/{configurationId}
```

You can receive the following responses to your request:

- Ok (200)

The body contains the following:

```
{
  "id": "3fa85f64-5717-4562-b3fc-2c963f66afa6",
  "name": "Workpieces",
  "value": "/NC/_N_WKS_DIR",
  "controllerType": "siemens"
}
```

Exceptions structure:

- Not found (404)
  - Configuration is not found with the given Id: {configurationId}
- Internal server error (500)
  - An error occurred during getting configuration

Example: Updating configuration based on the Id

Use the following HTTP request form:

```
PATCH: {ServerIP}:{ServerPort}/mmrp/api/programs/v1/configuration/
client/{configurationId}
```

Request body as json object, change configurations value:

```
[
 {
 "path":"value",
 "op":"Replace",
 "value": "/NC/_N_MPF_DIR"
 }
]
```

You can change the following values:

- Value

You can receive the following responses to your request:

- Ok (200)

The body contains the following:

```
{
  "id": "3fa85f64-5717-4562-b3fc-2c963f66afa6",
  "name": "Mainprograms",
  "value": "/NC/_N_MPF_DIR",
```

```
  "controllerType": "siemens"
}
```

Exceptions structure:

- Bad request (400)
  - The following error occurred: {error reason}
- Not found (404)
  - Configuration is not found with the given Id: {configurationId}
- Internal server error (500)
  - An error occurred during updating client configuration

Example: Requesting configurations by controller type

Use the following HTTP request form:

```
GET: {ServerIP}:{ServerPort}/mmrp/api/programs/v1/configuration/
client/controllertype/{controllertype}
```

The available controller types as string are:

- siemens
- fanuc
- heidenhain
- mitsubishi

You can receive the following responses to your request:

- Ok (200)

The body contains the following:

```
{
  "collection": [
    {
      "id": "3fa85f64-5717-4562-b3fc-2c963f66afa6",
      "name": "Workpieces",
      "value": "/NC/_N_WKS_DIR",
      "controllerType": "siemens"
    }
  ]
}
```

Exceptions structure:

- Internal server error (500)
  - An error occurred during getting client configurations by controller type

Mendix integration 12

12.1 Overview

In this chapter you can read how to use the openness interfaces of Mcenter from your Mendix low-code environment. The documentation of the existing openness interfaces is available in the Operating Manual of each application that supports such API. This documentation is focused on how to reach those APIs from a Mendix application.

To be able to use the open APIs, you need to authenticate with our identity solution, acquire a token and send it with all your requests to the openness interface endpoints.

In the following sections you can find a detailed description on how this authentication works, followed by the documentation of the Mcenter authenticator module for Mendix that can be used to automate most of the steps of the authentication process.

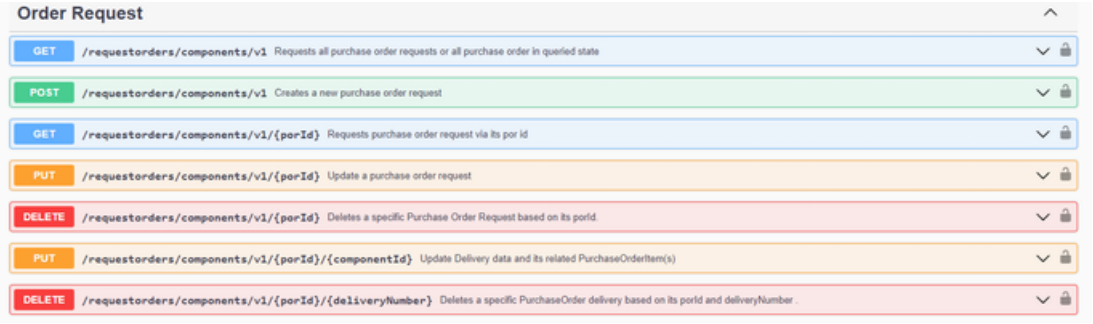
12.2 Authentication

The Mcenter server uses OAuth2 for authentication. Getting data from the server requires an access token. Access tokens can be acquired via openness clients.

Keep in mind that the openness clients have limited rights and only the supported endpoints can be called with them.

Procedure

1. Enter the following example address: Swagger (https://<IP address of the MMR server>/mmr/api/swagger/index.html). The "Swagger"> "MMR API Service" window opens.
2. Scroll to "Order Request" area



3. Open the desired fields "POST", "GET", "PUT", "DELETE"" and click on "Try it out"
4. Enter the appropriate values for the purchase orders
5. Click "Execute"

Example "POST requestorders/components/v1"

```
"purchaseOrderId": 0,
"porId": "string",
"purchaseOrderItemsDto": [
 {
  "componentDto": {
   "componentId": "string",
   "din": "string",
   "supplier": {
    "id": "string",
    "name": "string"
   },
   "maxPurchaseOrderQuantity": 0,
   "limitPurchaseOrderToRoles": [
    "string"
```

```
      ]
    },
    "deliveryDto": [
     {
       "deliveryNumber": 0,
       "deliveredAmount": 0,
       "deliveredGoodQuantity": 0,
       "deliveryDate": "2023-08-10T23:22:17.846Z",
       "stackId": "3fa85f64-5717-4562-b3fc-2c963f66afa6"
     }
    ],
    "quantity": 0,
    "slidingAveragePrice": 0,
    "minimumDeliveryQuantity": 0,
    "orderedQuantity": 0,
    "deliveredQuantity": 0,
    "deliveredGoodQuantity": 0,
    "latestDeliveryDate": "2023-08-10T23:22:17.846Z",
    "purchaseOrderItemDeliveryStateDto": "Initial",
    "note": "string"
  }
 ],
 "plantDto": {
  "id": "string",
  "name": "string"
 },
 "deliveryAddressDto": {
  "cityName": "string",
  "country": "string",
  "faxNumber": "string",
  "fullName": "string",
  "name": "string",
  "name2": "string",
  "phoneNumber": "string",
  "postalCode": "string",
```

```
    "region": "string",
    "streetName": "string"
  },
  "accountAssignmentDto": {
    "businessArea": "string",
    "costCenter": "string",
    "costObject": "string",
    "controllingArea": "string",
    "goodsRecipientName": "string"
  },
  "earliestDeliveryDate": "2023-08-10T23:22:17.846Z",
  "latestDeliveryDate": "2023-08-10T23:22:17.846Z",
  "wishedDeliveryDate": "2023-08-10T23:22:17.846Z",
  "plannedDeliveryDate": "2023-08-10T23:22:17.846Z",
  "committedDeliveryDate": "2023-08-10T23:22:17.846Z",
  "createdByUserDto": {
    "id": "string",
    "name": "string",
    "role": "string"
  },
  "creationDate": "2023-08-10T23:22:17.846Z",
  "purchaseOrderState": "Initial",
  "purchaseOrderDeliveryStateDto": "Initial",
  "note": "string"
}
```


Exceptions structure:

- Bad Request (400)

The error message appears after the following actions:

- The request body is null or empty
- Minimum order amount not proper:
  The ordered quantity for any purchase order item should be factor of minimum order amount of related tool component.

12.2.1 Creating an openness client

Procedure

1. To create an openness client, start the "Manage openness clients" application.
2. Click on "Create".
3. Name your client.
4. Click on "Confirm & Download".
5. The downloaded file contains the credentials of the openness client.

12.2.2 Acquiring an access token

You can acquire tokens by sending a REST request to the server's token endpoint with the credentials of the openness client.

Request method: POST

Request URL: <URLoftheserver>/int/identity/connect/token

Header:

Content-Type: application/x-www-form-urlencoded

Body:

client_id: sinint-api-client

grant_type: ClientAuthGrantType

ClientAuthPayload: {"clientId":"<Client ID from file>","secret":"<secret from file>"}

The response is a JSON file containing the access token:

```
{
"access_token": "<accesstoken>",
"expires_in": 3600,
"token_type": "Bearer",
"scope": "sinint-api"
}
```

The access token is valid for an hour. The token should be used while it is valid. Only request a new token when the old one has expired.

12.2.3 Using the access token

When you request data from the Mcenter server, the access token must be included in the request. To use the access token, set the Authorization header of the request to "bearer" and insert the access token:

Authorization: bearer <insert access token here>

12.3 Using the openness client in Mendix

12.3.1 Storing the openness client

The credentials of the openness client need to be stored in the Mendix application. You can store the contents of the "OpennessToken.json" file or just the necessary properties (clientId and secret).

The URL of the server's token endpoint also needs to be stored. The token endpoint is:

<server URL> /int/identity/connect/token

You can also get the URL of the Identity service from the downloaded file. It is the identityServiceUrl field.

12.3.2 Getting access token from server

An access token can be acquired by sending a REST request to the server's token endpoint. Create a microflow in your Mendix application that sends the request to the server with the credentials of the openness client.

Create a REST request with the following configuration:

- Set Location to the address from configuration (should be <server address>/int/identity/connect/token)
- Set HTTP method to POST
- Add HTTP header Content-Type: 'application/x-www-form-urlencoded'
- At Request choose Custom request template
- Set Template to client_id=sinint-api-client&grant_type=ClientAuthGrantType&ClientAuthPayload={1}
- Parameter is the client credentials in JSON format
- At Response set Response handling to Apply import mapping and select the matching mapping

12.3.3 Storing access token

Store the received access token to be used for authentication. Create an entity with the following structure to store the access token:

- access_token: string
- expires_in: integer
- token_type: string
- scope: string

Store the datetime when the token was received. With the store datetime and the "expires_in" property, it can be determined if the token is still valid. The "expires_in" property is in seconds. Its default value is 3600 (one hour).

Create a JSON mapping to easily convert the received JSON into an entity.

12.3.4 Getting data from Mcenter server

To get data from the server, a REST request must be sent to the appropriate endpoint. An access token must be included in the request.

To achieve this in the Mendix application, create a microflow in your application. First, check stored access token. If no access token is stored or the stored token is expired, request a new access token.

Create a REST request. In the Call REST microflow activity at HTTP Headers, add a custom HTTP header:

- Key: Authorization
- Value: 'Bearer ' + <access token>

Set the URL to the server endpoint you want to get the data from. The returned data is in JSON format. Create an entity and JSON mapping to store the received data.

12.4 Using the provided Mendix authentication module

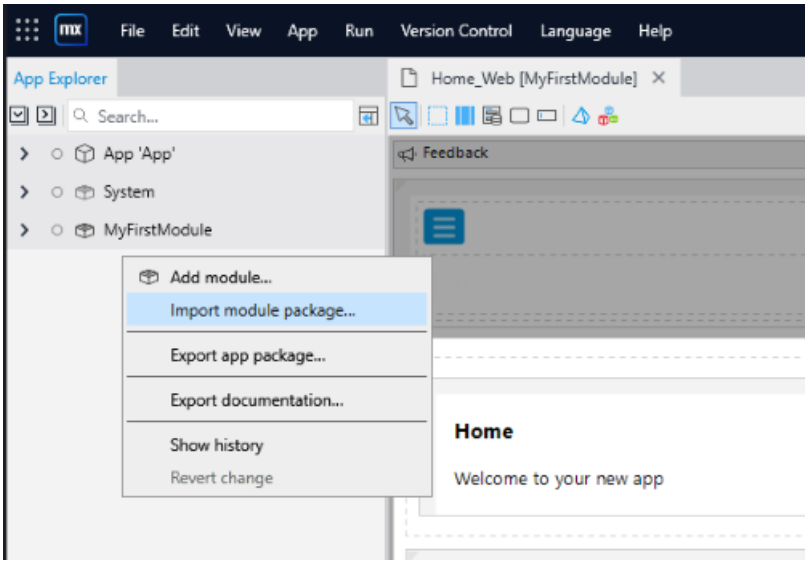
Prerequisite

You are familiar with Mendix development, have Mendix studio installed and already started to develop an application which needs to show data coming from Mcenter.

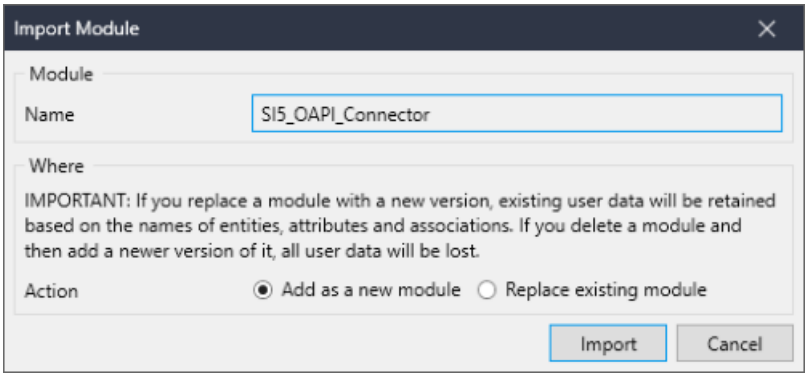
12.4.1 Installing the module

Procedure

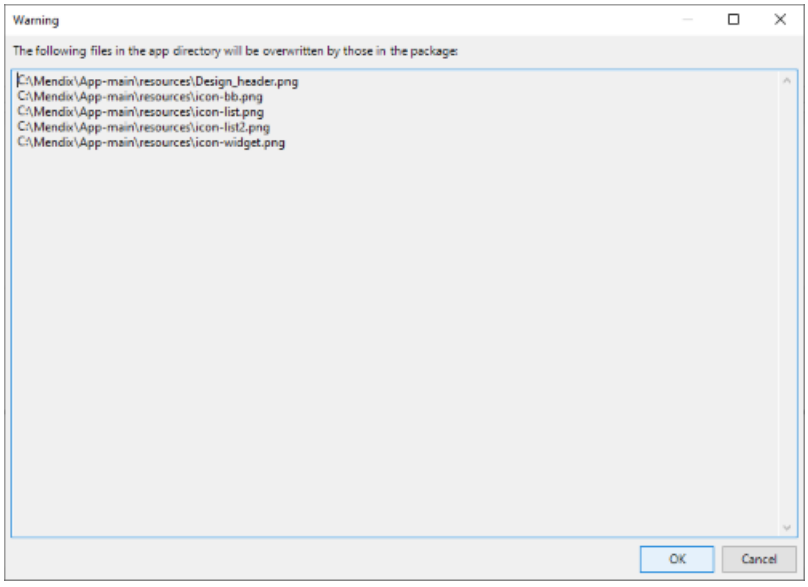
1. To import the authentication module into your Mendix application, right click on the empty space in the App Explorer view and select "Import module package".
   Select your package file (SI5_OAPI_Connector.mpk) and click "Open".



2. The "Import Module" window opens.
   Select the "Add as a new module" action and click on the "Import" button.



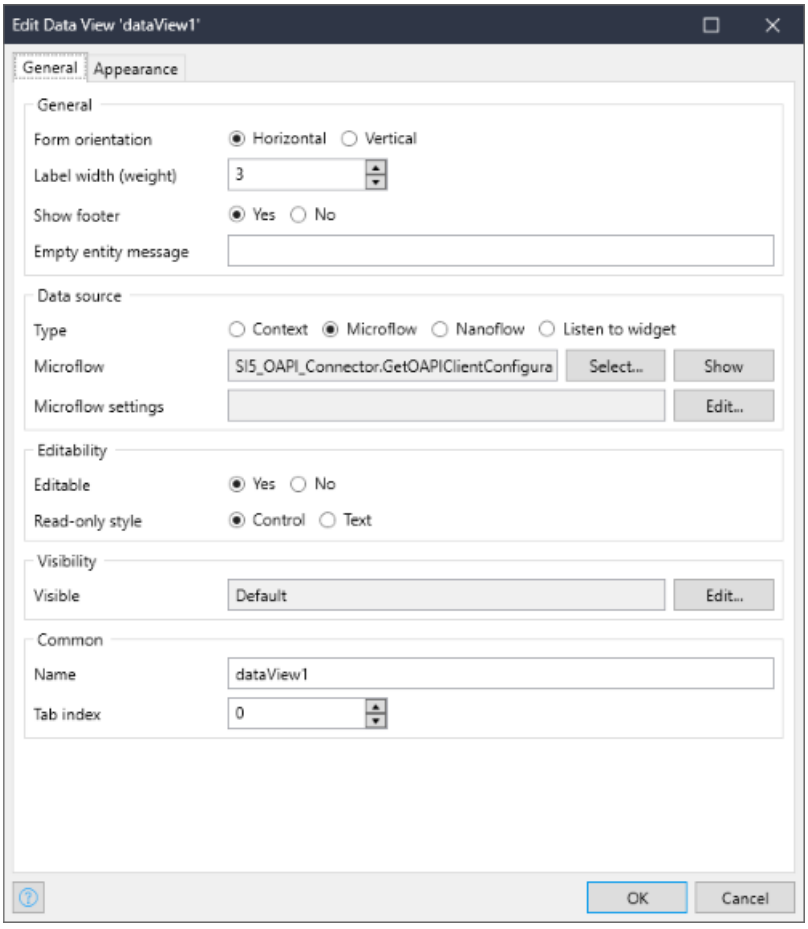
3. Click on the "OK" button to acknowledge the following warning:


Warning
The following files in the app directory will be overwritten by those in the package:
C:\Mendix\App-main\resources\Design_header.png
C:\Mendix\App-main\resources\icon-bb.png
C:\Mendix\App-main\resources\icon-list.png
C:\Mendix\App-main\resources\icon-list2.png
C:\Mendix\App-main\resources\icon-widget.png
OK
Cancel

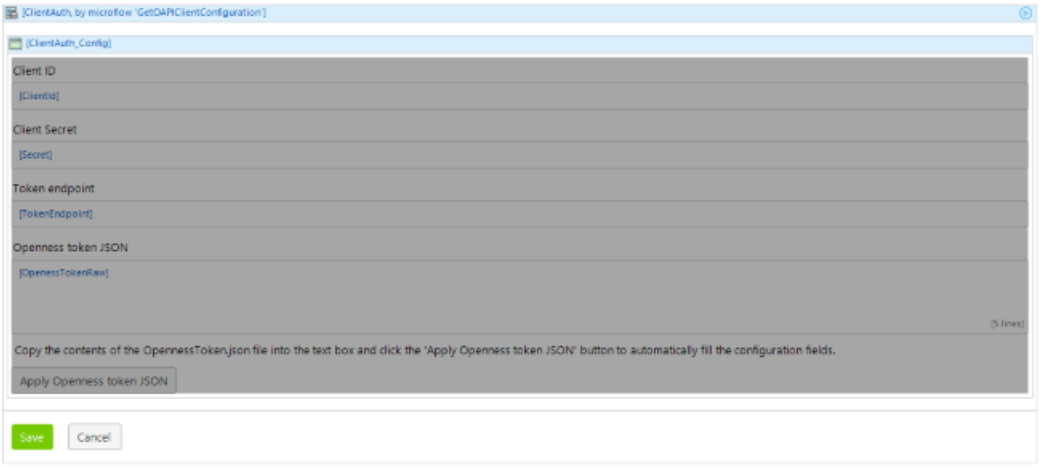
12.4.2 Setting up authentication

Procedure

1. Configure the connection to Mcenter. To start, create a dataview at the appropriate place.
2. Configure the microflow data source to use the following microflow:
"SI5_OAPI_Connector.GetOAPIClientConfiguration"



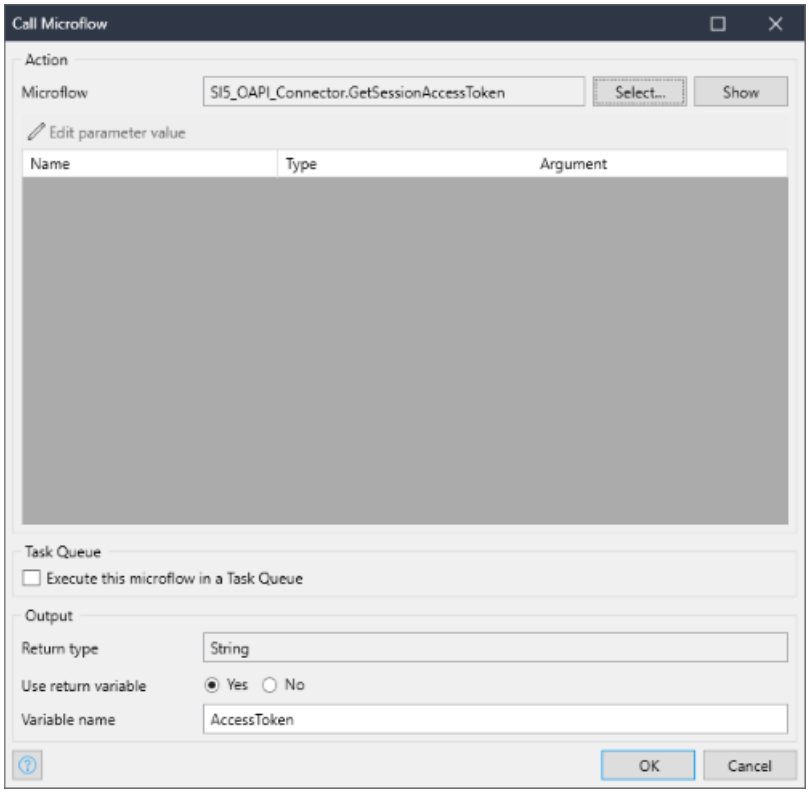
3. Add the "ClientAuth_Config" snippet from the "_USE ME" folder in the connector module, a "Save" and a "Cancel" button to the data view. The end result should look like the following:


[ClientAuth, by microflow 'GetOAPIClientConfiguration']
[ClientAuth_Config]
Client ID
[ClientId]
Client Secret
[Secret]
Token endpoint
[TokenEndpoint]
Openness token JSON
[OpennessTokenRaw]
[5 lines]
Copy the contents of the OpennessToken.json file into the text box and click the 'Apply Openness token JSON' button to automatically fill the configuration fields.
Apply Openness token JSON
Save
Cancel

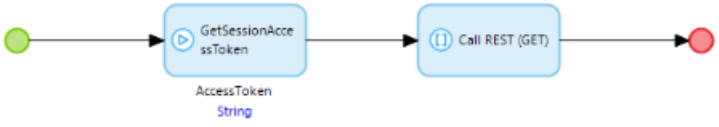
12.4.3 Accessing Mcenter open API

Procedure

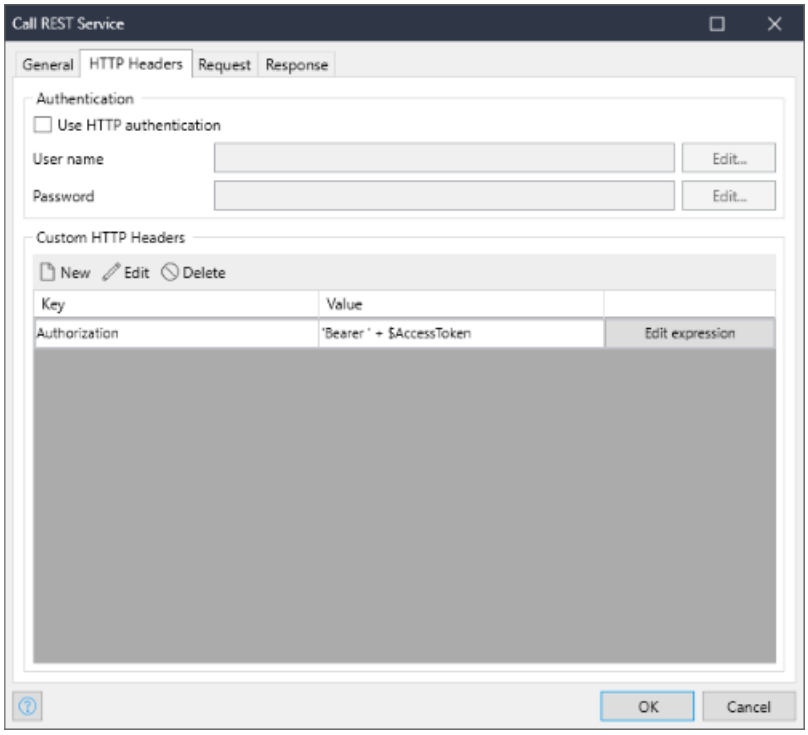
1. To insert the proper authorization header into your REST call, in your microflow, add a "Microflow call" activity before "Call REST".
   Configure it to run the "SI5_OAPI_Connector.GetSessionAccessToken" microflow. The returned string should be stored in a variable. In this example, the variable name "AccessToken" is used.



2. The resulting flow should look like the following:



3. Add the "Authorization" header into the request and set its value to 'Bearer ' + $AccessToken`.
   Replace "$AccessToken" with the name of your variable.


Call REST Service
General
HTTP Headers
Request
Response
Authentication
Use HTTP authentication
User name
Edit...
Password
Edit...
Custom HTTP Headers
New
Edit
Delete
Key
Value
Authorization
'Bearer ' + $AccessToken
Edit expression
OK
Cancel

Appendix

A

A.1 Example for tool plan

Tool plans are saved as *.json files. These files are structured as followed.

Example

```
{
  "name": "Plan8245",
  "description": "My plan to create things",
  "workpieceName": "Rotor453_8/5",
  "items" : [
    {
      "dNo": 1,
      "toolClassName" : "Never Ending Cutter",
      "workingTimeProPiece" : "0.4"
    },
    {
      "dNo": 1,
      "toolClassName" : "Ultimate Driller",
      "workingTimeProPiece" : "0.5",
      "overwrites": {
        "toolIdent": "ToolRotor43",
        "targetToolLifeTime": "1299",
        "targetToolLifeTimeWarningLimit": "155",
        "targetToolLifePieces": "199",
        "targetToolLifePiecesWarningLimit": "15"
    }
  },
  {
    "dNo": "1",
    "toolClassName" : "TMD1",
    "workingTimeProPiece" : "0.6"
   }
 ]
}
```

A.2 Example for OEM tool data set

OEM tool data sets are saved as *.ini files. These files are structured as followed.

Example

```
$TC_TP1[329]=1
$TC_TP2[329]="NCTool"
$TC_TP3[329]=1
$TC_TP4[329]=1
$TC_TP5[329]=1
$TC_TP6[329]=1
$TC_TP7[329]=1
$TC_TP8[329]=130
$TC_TP9[329]=1
$TC_TP10[329]=1
$TC_TP11[329]=0
$TC_TPC1[329]=1
$TC_TPC2[329]=2
$TC_TPC3[329]=3
$TC_TPC4[329]=4
$TC_TPC5[329]=0
$TC_TPC6[329]=6
$TC_TPC7[329]=0
$TC_TPC8[329]=0
$TC_TPC9[329]=0
$TC_TPC10[329]=0
$TC_DP1[329,1]=140
$TC_DP2[329,1]=0
$TC_DP3[329,1]=122
$TC_DP4[329,1]=0
$TC_DP5[329,1]=0
$TC_DP6[329,1]=12.5
$TC_DP7[329,1]=0
$TC_DP8[329,1]=0
$TC_DP9[329,1]=0
$TC_DP10[329,1]=0
```

```
$TC_DP11[329,1]=0
$TC_DP12[329,1]=0
$TC_DP13[329,1]=0
$TC_DP14[329,1]=0
$TC_DP15[329,1]=0
$TC_DP16[329,1]=0
$TC_DP17[329,1]=0
$TC_DP18[329,1]=0
$TC_DP19[329,1]=0
$TC_DP20[329,1]=0
$TC_DP21[329,1]=0
$TC_DP22[329,1]=0
$TC_DP23[329,1]=0
$TC_DP24[329,1]=0
$TC_DP25[329,1]=0
$TC_DPC1[329,1]=200
$TC_DPC2[329,1]=15
$TC_DPC3[329,1]=150
$TC_DPC4[329,1]=120
$TC_DPC5[329,1]=0
$TC_DPC6[329,1]=0
$TC_DPC7[329,1]=0
$TC_DPC8[329,1]=0
$TC_DPC9[329,1]=0
$TC_DPC10[329,1]=0
$TC_DPC1[329,2]=302
$TC_DPC2[329,2]=102
$TC_DPC3[329,2]=352
$TC_DPC4[329,2]=122
$TC_DPC5[329,2]=0
$TC_DPC6[329,2]=0
$TC_DPC7[329,2]=0
$TC_DPC8[329,2]=0
$TC_DPC9[329,2]=0
$TC_DPC10[329,2]=0
```

```
$TC_MOP1[329,1]=10
$TC_MOP2[329,1]=55
$TC_MOP3[329,1]=0
$TC_MOP4[329,1]=0
$TC_MOP5[329,1]=0
$TC_MOP6[329,1]=0
$TC_MOP11[329,1]=160
$TC_MOP13[329,1]=0
$TC_MOP15[329,1]=0
$TC_MOPC1[329,1]=1
$TC_MOPC2[329,1]=2
$TC_MOPC3[329,1]=3
$TC_MOPC4[329,1]=4
$TC_MOPC5[329,1]=5
$TC_MOPC6[329,1]=6
$TC_MOPC7[329,1]=7
$TC_MOPC8[329,1]=8
$TC_MOPC9[329,1]=9
$TC_MOPC10[329,1]=10
$TC_MOPC1[329,2]=11
$TC_MOPC2[329,2]=12
$TC_MOPC3[329,2]=13
$TC_MOPC4[329,2]=14
$TC_MOPC5[329,2]=15
$TC_MOPC6[329,2]=16
$TC_MOPC7[329,2]=17
$TC_MOPC8[329,2]=18
$TC_MOPC9[329,2]=19
$TC_MOPC10[329,2]=20
```

A.3 List of abbreviations

Admin	Administrator (user role)
API	Application Programming Interface: Programming interface or extension interface for connection and interaction between software systems
CNC	Computerized Numerical Control
COM	Communication
DIR	Directory, directory
FAQ	Frequently Asked Questions
h	Hour
HTTP	Hyper Text Transfer Protocol, hypertext transfer protocol
HTTPS	Hyper Text Transfer Protocol Secure, secure hypertext transfer protocol
IB	Commissioning engineer (user role)
ID	Identification number
IE	Internet Explorer
IFC	Interface Client
IIS	Internet Information Services
IoT	Internet of Things
MB	Megabyte
MLFB	Machine-Readable Product Code
MMR /Tools	Manage MyResources /Tools management
MMR /Programs	Manage MyResources /Programs management
MSTT	Machine control panel
NC	Numerical Control: Numerical control
NCU	Numerical Control Unit: NC hardware unit
OEE	Overall Equipment Effectiveness
OEM	Original Equipment Manufacturer
OP	Operation Panel: Operating equipment
OMP /NX-Cam Editor	Optimize MyProgramming /NX-Cam Editor
PC	Personal Computer
PCU	PC Unit: Computer unit
PLC	Programmable Logic Control
SI	SINUMERIK Integrate
SK	Softkey
SSL	Secure Sockets Layer, cryptographic protocol to encrypt data transferred between server and client
SW	Software
TLS	Transport Layer Security, cryptographic protocol to encrypt data transferred between server and client
TMD	Tool Master Data
TMD-ID	Unique identification of Tool Master Data
TOA	Tool Offset Active, identifier (file type) for tool offset
URL	Uniform Resource Locator
UTC	Universal Time Coordinated

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