SIEMENS

Mcenter

Analyze MyPerformance /OEE

Operating Manual

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Appendix A

Valid for control:
SINUMERIK 840D, 840D sl/ 840DE sl,
SINUMERIK 828D, SINUMERIK ONE
Software
Mcenter, version 5.4.0.0
Analyze MyPerformance /OEE, version 1.4.0.0

05/2024
A5E50889350B AH

Legal information

Warning notice system

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

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

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

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

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

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

Qualified Personnel

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

Proper use of Siemens products

Note the following:

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

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Disclaimer of Liability

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

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GERMANY

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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 Analyze MyPerformance /OEE

Overview

Analyze MyPerformance /OEE calculates important KPIs for the entire plant (such as Overall Equipment Effectiveness - OEE) and provides important indicators for measures to increase efficiency.

Through the automatic recording of machine data and conditions as well as through user dialog entered data, Analyze MyPerformance /OEE provides all the information required for production optimization.

Customizable options allow for individual calculation and visualization of KPIs to address customer's needs.

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 5.4.0.0
- Analyze MyPerformance /OEE, version 1.4.0.0

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

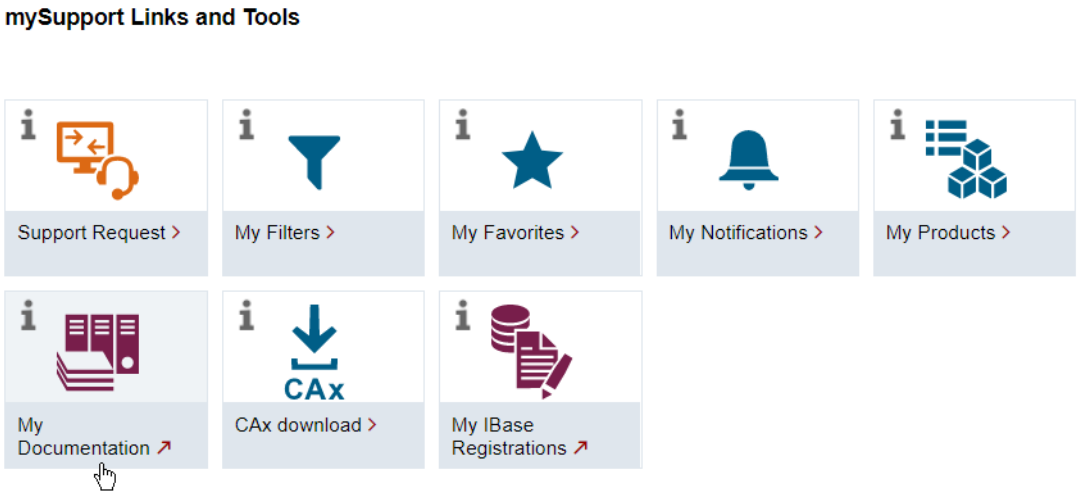
1.6 Feedback on the technical documentation

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 customer-specific solutions, but merely serve to provide assistance with 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/cybersecurity-industry.

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/cert.

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.

Product functions

3

Functions

Use Analyze MyPerformance /OEE to adjust the representation and visualization of all machine tools connected to Mcenter:

- Performance Monitoring
  With "Performance Monitoring", you have the option to check the performance of the machines using the performance monitoring function.
  Further information can be found in the Chapter: Performance Monitoring (Page 129)
- Utilization Planning
  With "Utilization Planning", you have the option of defining the utilization plans for the individual control system.
  Further information can be found in the Chapter: Utilization Planning (Page 223)
- Production Quality
  With "Production Quality", you have the option to check the quality of your production.
  Further information can be found in the Chapter: Production Quality (Page 242)
- Configure AMP /OEE
  With "Configure AMP /OEE", you have the option to configure OEE Machines.
  Further information can be found in the Chapter: Configuring AMP /OEE (Page 271)
- Operator States
  With "Operator States", you have the option to apply operator states created by the system administrator/supervisor to a machine.
  Further information can be found in the Chapter:Operator States (Page 247)

Operating on the server

4

4.1 Introduction

To access Mcenter, call the corresponding URL in a web browser.

Overview

The start page is called after logging on.

Displaying information about the product and the version (Page 30)

You can start the following applications:

- Analyze MyPerformance /OEE
  - Performance Monitoring (Page 129)
  - Utilization Planning (Page 223)
  - Production Quality (Page 242)
  - Configuring AMP /OEE (Page 271)
  - Operator States (Page 247)
- Mcenter
  - Administration Overview (Page 39)
  - Manage machines (Page 63)
  - Manage applications on machines (Page 80)
  - Manage users (Page 42)
  - Manage openness clients (Page 95)
  - Manage adapters (experimental) (Page 104)

Calling applications with HTTP communication

This Operating Manual only describes calling applications with HTTPS communication.

You can also call all applications with HTTP communication. To do this, use "http" instead of "https" and add port ":8080" after the IP address.

4.2 Logging in to Mcenter

4.2.1 Without an external authentication provider

Prerequisite

The user account has been set up.

Procedure

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

3. Click on the "Login" button.



Note

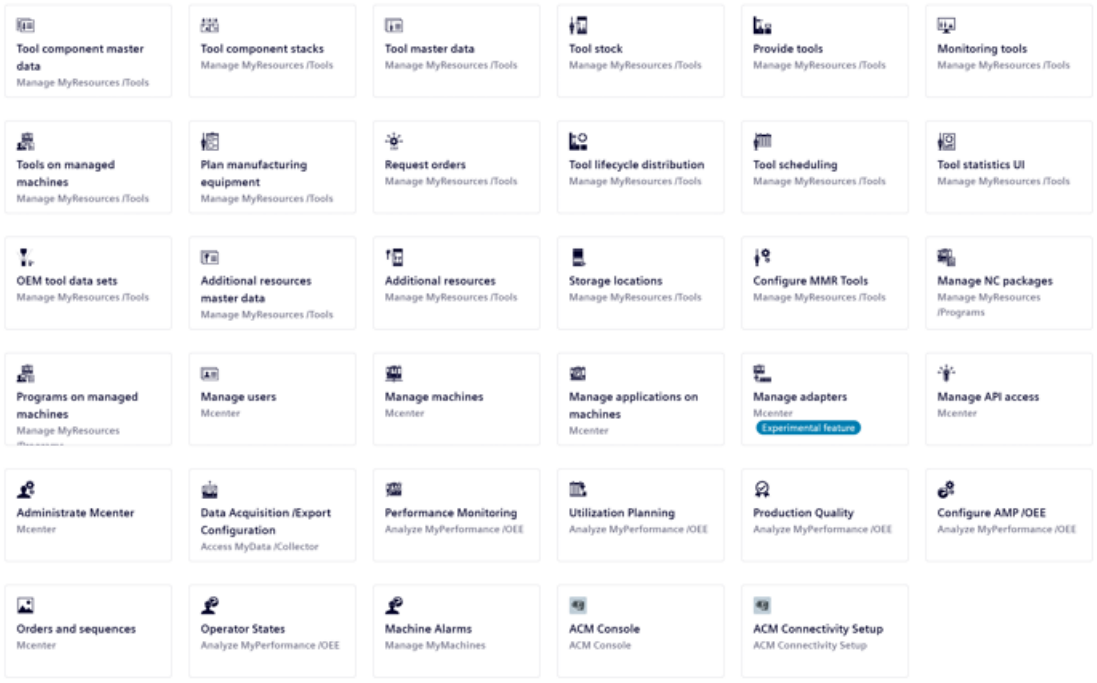
Invalid login attempt

The error message "Invalid login attempt" is displayed when incorrect credentials are entered.

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

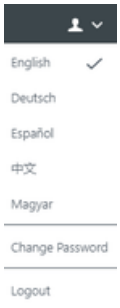
The start page opens.

4. 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. Open the drop-down menu in the upper right section of the window.
2. Click "Logout" to log out of all applications.



4.2.2 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.

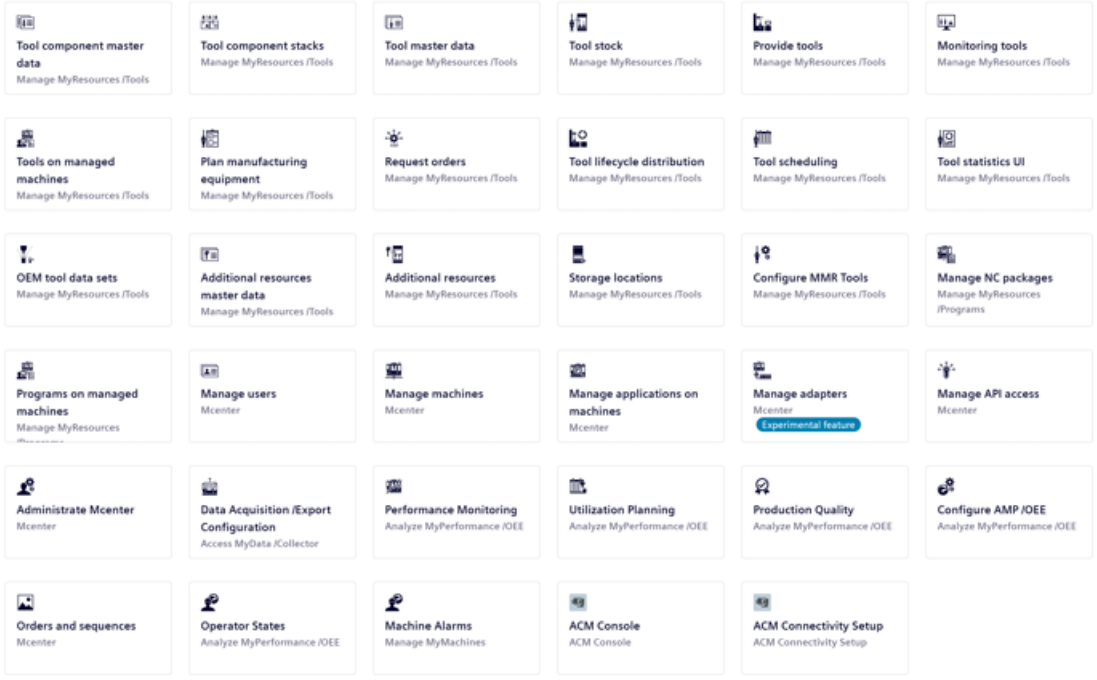
   Note

   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.

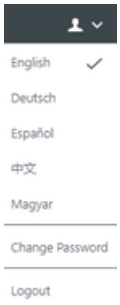
   After the fifth unsuccessful attempt, your user account is locked for 5 minutes.

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. Open the drop-down menu in the upper right section of the window.
2. Click "Logout" to log out of 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 22).

"UseExternalUserManagement": true

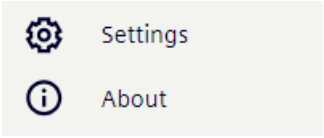
If the value is "true", logging in with an internal user is not allowed.

4.3 Functions on the start page

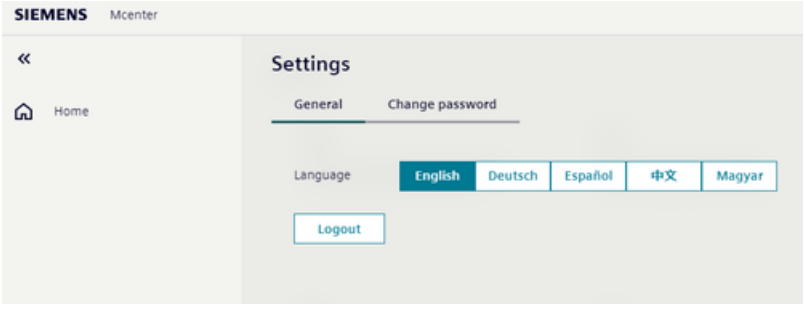
On the Mcenter start page, the following functions are available.

Logging out

1. Click on "Settings" in the bottom-left corner.

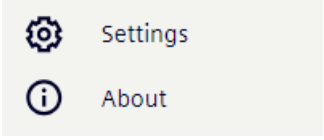


2. Select the "General" tab.
3. Click on "Logout" to log out of all applications.

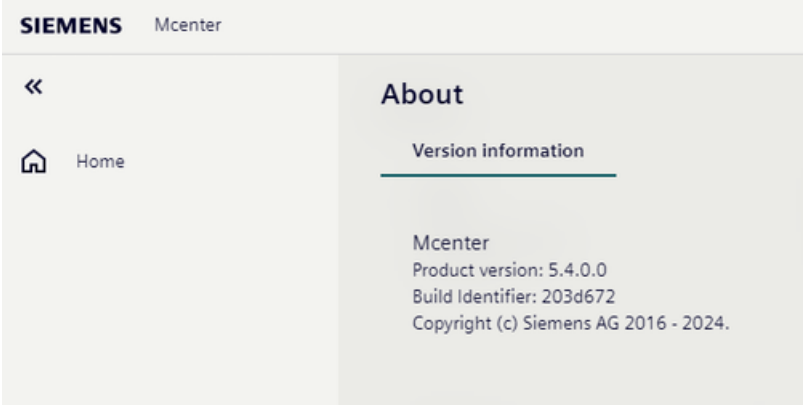


Displaying information about the product and the version

1. Click on "About" in the bottom-left corner.

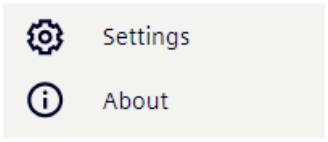


2. The "Version information" tab opens and shows the installed version.

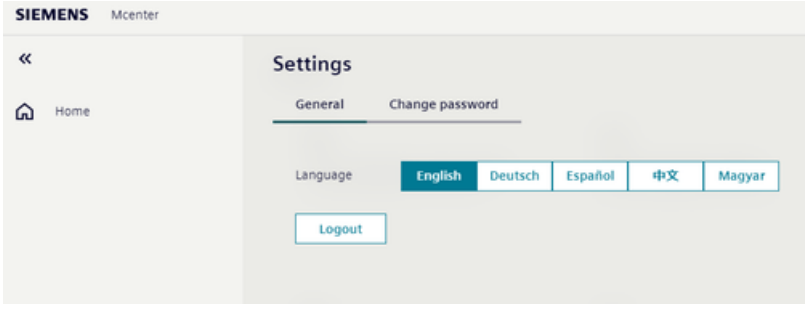


Switch language

1. Click on "Settings" in the bottom-left corner.

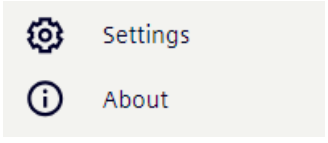


2. Select the "General" tab.
3. Click on a language.
   The user interface is displayed in the desired language.



Password change

1. Click on "Settings" in the bottom-left corner.



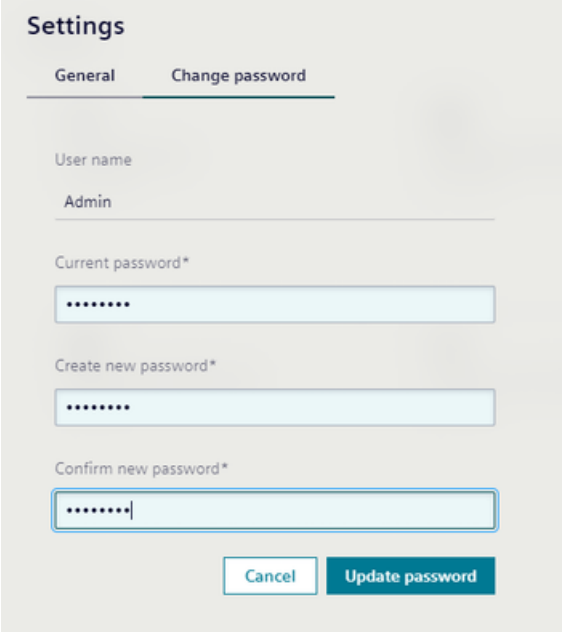
2. Select the "Change password" tab.
3. Enter your current password in the "Current password*" input field.
4. Enter a new password in the "Create new password*" input field.

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

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



4.4 Displaying information about the product and the version

The following Mcenter data is displayed:

- Product version
- Build identifier

Procedure

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



4.5 Switch language

The user interface is available in the following languages:

- English
- German
- Spanish
- Chinese
- Hungarian

If a language in a server application is selected, this language is used for the GUI of any other application, even when logging out.

Procedure

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



Note

Language support for Analyze MyPerformance /OEE

Analyze MyPerformance /OEE only supports English, German, Spanish and Chinese languages for current version.

4.6 Password change

The password can be changed in regular intervals.

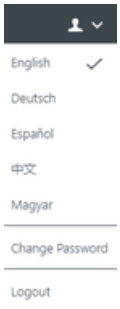
This function is not available for external users.

Prerequisites

This function is only available to internal users.

Procedure

1. Click the user icon in the upper right corner of the header in the Mcenter window. A drop-down menu opens.
2. Click "Change Password".



The "Change Password" window opens.

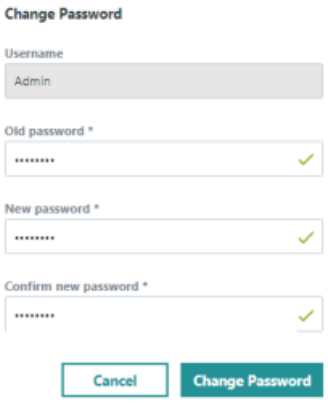
3. Enter your current password in the "Old password *" input field.
4. Enter a new password in the "New password *" input field.

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

5. Repeat the new password in the "Confirm new password *" input field.
6. 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

Password Policy Verification

You can verify if the password policy meets the requirements of your organization. You need administrator rights.

1. Check the password policy settings.
   For more information, see the chapter "Configuring password policies" in the Installation manual.
2. Change the password according to the instructions in this section (see procedure above).
3. After checking the settings, apply the configured password policy to the new password.

4.7 Filtering

4.7.1 List filtering

On many overview pages, the filter functioncan be used to reduce the amount of displayed data.

When a filter is saved, it is stored even if the page is refreshed.

If active filters are set for an application when you log out, the filters remain active when logging in again and open the application. The saved filters are saved after logging out.

Symbols

The filter symbols are:

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:

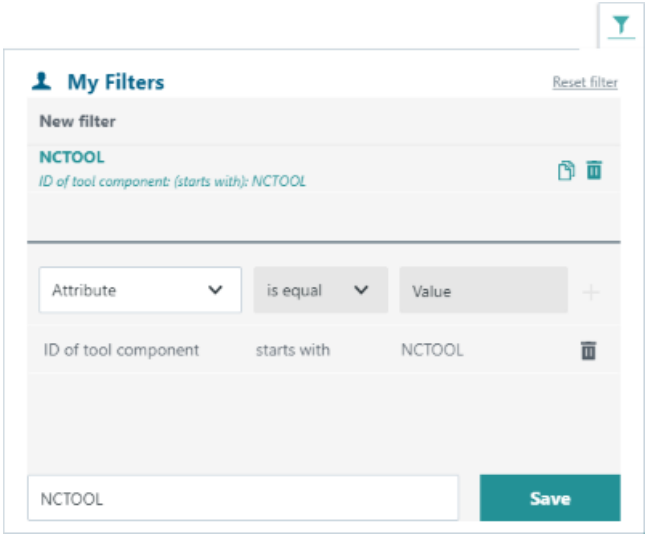
- is equal

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. Define a new filter by selecting 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.

Reuse the filter

1. Enter a filter name.
2. Click on "Save".
   The filter is displayed in the "My Filters" list.
3. Click on "Reset filter" to redisplay all of the data.

Note

Filters

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

4.7.2 Quick filtering

The Quick filter is an additional filter function. The function can be used to reduse the amount of dislayed data. The general and quick filters can be used 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 34).

Symbols

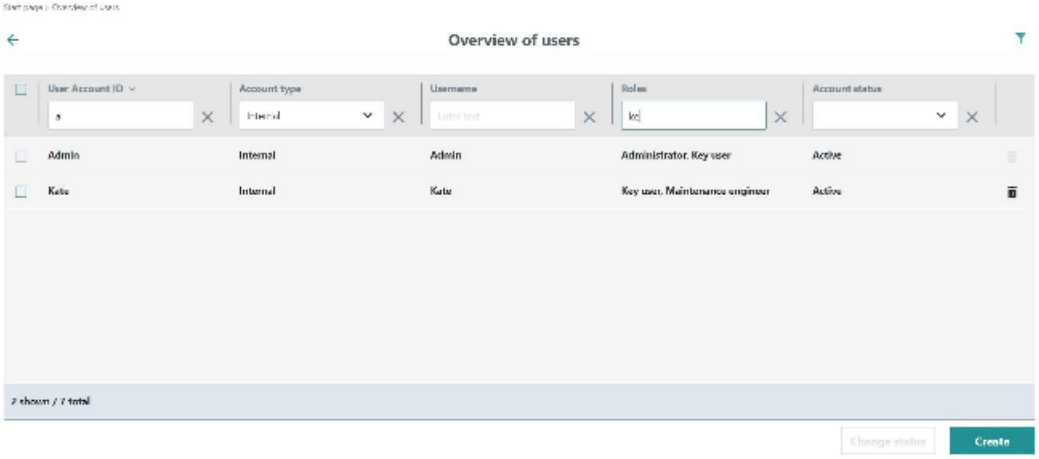
The filter symbols are:

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

The overview page, with a table that supports the quick filtering functionality, is open.

1. Select a column.
2. 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.
3. Click the cross symbol to clear an entry and reset the filtering on the column.



In addition, the other columns can be filtered, 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

Using Mcenter on the server

5

5.1 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 39).

Prerequisite

Administrator rights or the role of Key user is needed to access the "Administration overview" window.

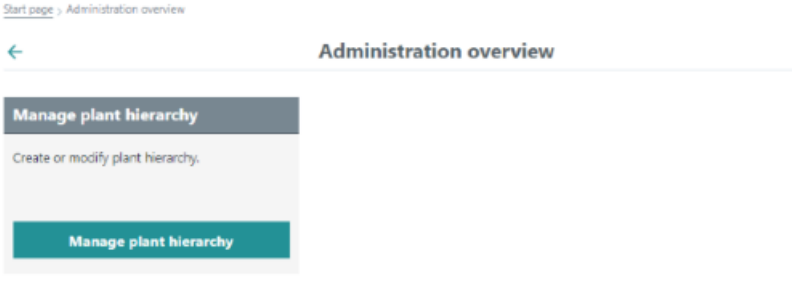
Procedure

1. Click on "Administrate Mcenter" on the Mcenter start page.



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

2. Enter a username and password.
The "Administration overview" window opens.



5.2 Managing plant hierarchy

Prerequisite

Administrator rights or the role of Key user is needed 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:

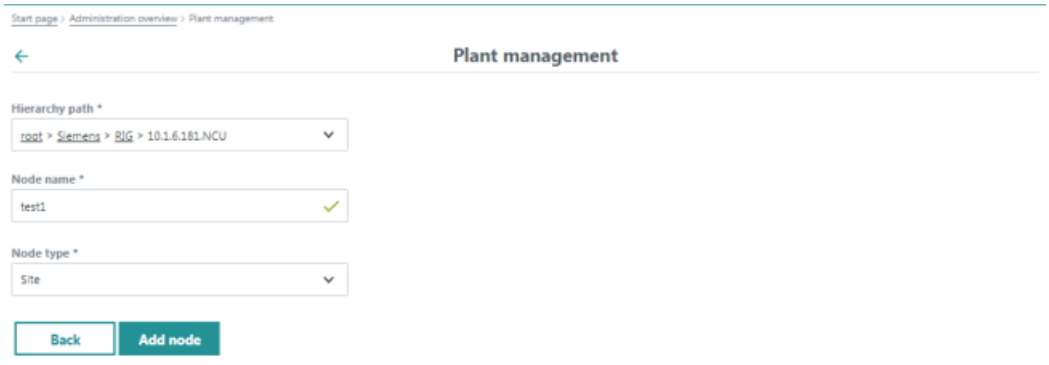
The storage zone is a designated location within the area, which holds the materials that are required for the production, or the already manufactured products.

Storage unit:

The Storage unit is 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".
   The "Plant management" window opens.
3. Fill in the required fields.
4. To create a node, click "Add node".
   A success message is displayed in the upper right corner of the window.



5. To return to the "Administration overview" window, click "Back".

Note

Nodes

You cannot delete or update the nodes you have created.

5.3 Manage users

Note

External user management

The "Manage users" functions are unavailable when using external user management.

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

5.3.1 Overview of the users

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

- Create users
  - internal
  - external
- Update users
  - account status
  - roles
  - plant node assignments
- Delete users

When the session expires, press <F5> to return to the login page.

Prerequisite

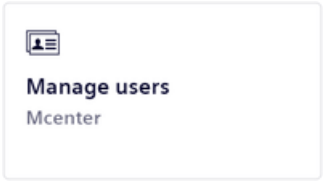
Administrator rights or the role of Key user is needed to manage users.

Parameters

Parameter	Description
∨	This symbol appears by clicking on the column heading. Click on the symbol to sort the elements alphabetically or 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 48) • Updating the account status (Page 50) • Deleting user accounts (Page 54)
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 themself.
Roles	Shows the roles. You cannot sort the elements in this column. For more information, see Admin User (Page 44).
Plant nodes	Shows the assigned plant hierarchy nodes to the user. This column cannot be sorted.
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 34). Click on the filter icon again to close the filter window.

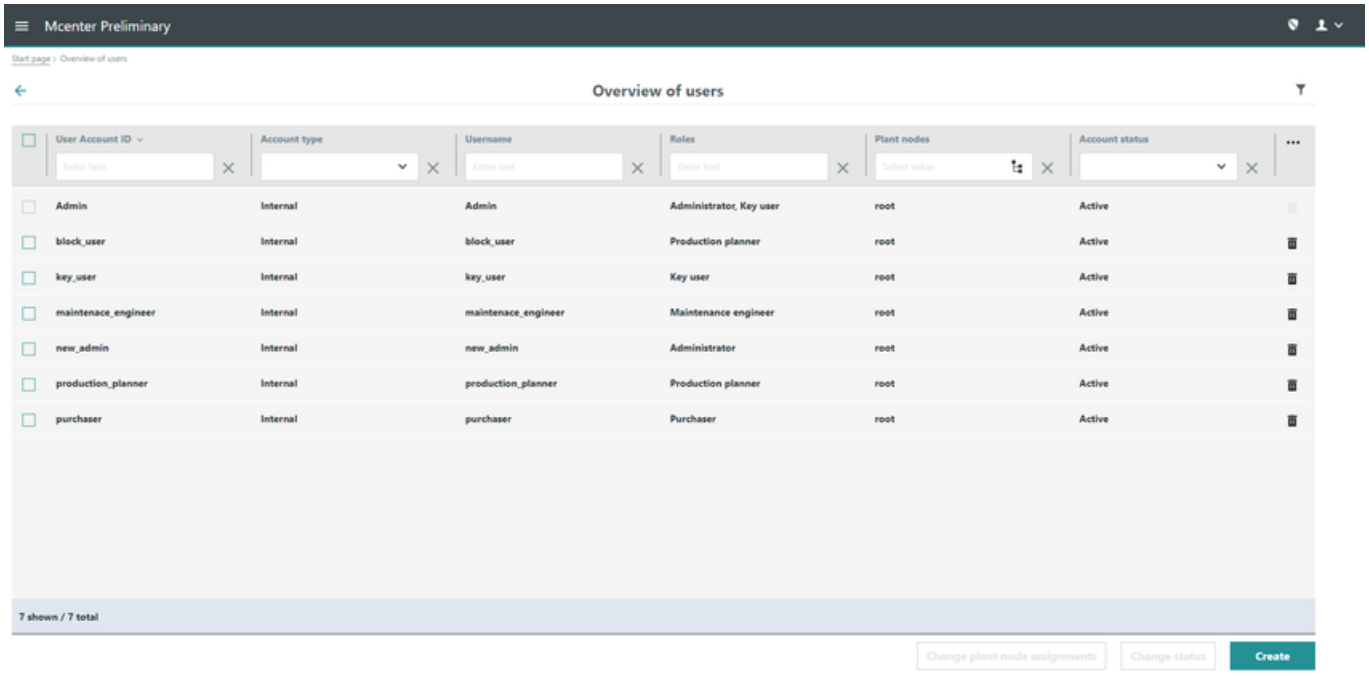
Procedure

1. Click on "Manage users" on the Mcenter start page.



   - OR -
   Open the following URL: Manage users (https://{ServerIP}/user-overview)
   The "Overview of users" window opens and displays an overview of all users with their rules.

2. In order to set a 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 by releasing the mouse button. On the next log in with the user Id, the columns are displayed with the width you opted for.



5.3.2 Admin User

The following users are available in Mcenter:

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

Overview

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					
Update Trial tool life	write	write				write				write	
Provide tools	write	write		write		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**
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	read	write				write					
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
Configure MMR Tools		write	write	write		write	read	read		read	write
Display OEE & KPIs	read & write	read & write	read & write			read & write			read		read
Custom Date Queries	read & write	read & write	read & write			read & write			read		read
Exporting Machine Status	read & write	read & write	read & write			read & write			read		read
Create Dashboard Templates	read & write	read & write	read & write			read & write			read		read
Display to all data shown on the charts	read & write	read & write	read & write			read & write			read		read
Display Applied Plans to the Machines	read & write	read & write	read & write			read & write					
Edit Templates (Create new templates & Delete Existing Template)	read & write	read & write	read & write			read & 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**
View Templates	read & write	read & write	read & write			read & write					
Assign Templates to the Asset	read & write	read & write	read & write			read & write					
Display Produced Workpieces (Total Piece, Scrap Piece, etc.)	read & write	read & write	read & write			read & write					
Edit Produced Workpieces (Total Piece, Scrap Piece, etc.)	read & write	read & write	read & write			read & write					
Display Missing Workpieces	read & write	read & write				read & write					
Display Selected KPI Formulas	read & write	read & write				read & write					
Edit KPI Formulas	read & write	read & write				read & write					
Display Selected Color Options for the KPIs	read & write	read & write				read & write					
Edit Color Options for the KPIs	read & write	read & write				read & write					
Display Selected Production Levels	read & write	read & write				read & write					
Edit Production Levels	read & write	read & write				read & write					
Operator States Configuration	read & write	read & write				read & write					
Using Operator States	read & write	read & write								read & write	
Manual/Operator State History	read & write	read & write				read & 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.

5.3.3 Creating new users

Parameters

The following parameters are available:

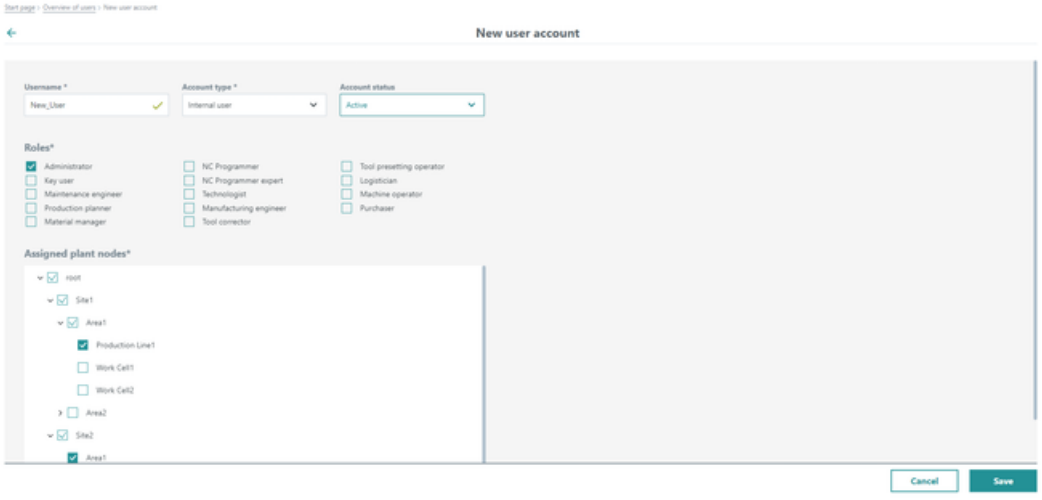
Parameter	Description
Username *	Enter the username. You can enter a maximum of 50 characters. The following characters are permitted for user names: [a...z], [A...Z], [0...9], [-]; [_]
Account type *	You can choose the following type: • Internal user • External user
Account status	You can choose the 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 • Tool corrector For more information, see Admin User (Page 44)

Parameter	Description
Assigned plant nodes *	Assign plant nodes to the new user. It is mandatory to assign at least one node to the user.
Password *	Enter a secure password. Only requested and mandatory if the account type = Internal user. 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 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.

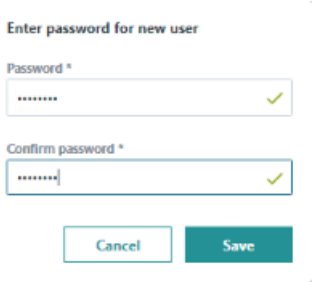


Note

Displaying selected nodes

If the selected node ☑, e.g. "Production Line1", has a parent node , e.g. "Area1", the parent node is also displayed as selected ☑.

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



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

5.3.4 Updating the account status

Existing users can be enabled and disabled. 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

Parameter	Description
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 • Purchaser • Material manager [1)] • Tool corrector For more information, see Admin User (Page 44)
Assigned plant nodes *	Assign plant nodes to user. It is mandatory to assign at least one node to the user.
ⓘ	Shows further information.

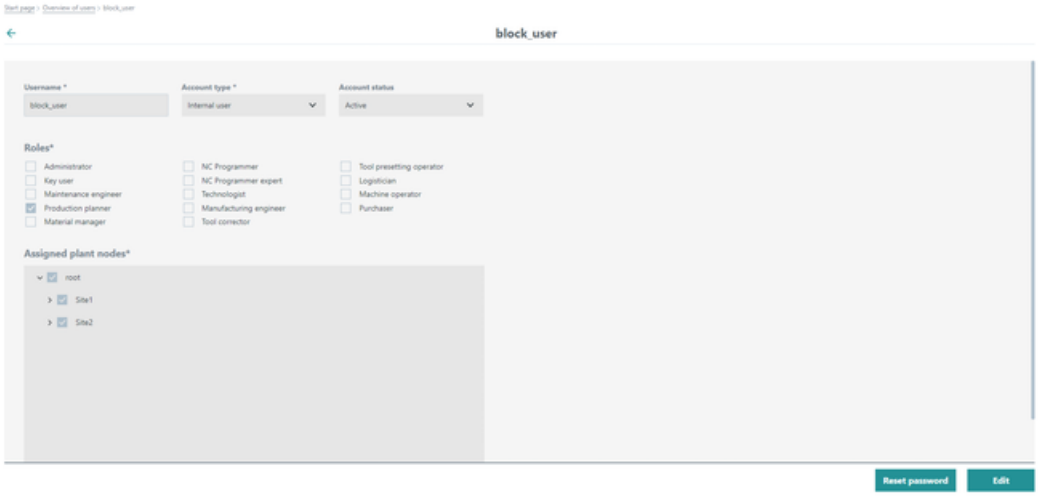
*) The fields marked with an asterisk are mandatory and must be completed. An error message is output if you make an erroneous entry.

1) The role is currently not used in any existing applications and is intended for new future applications.

Procedure

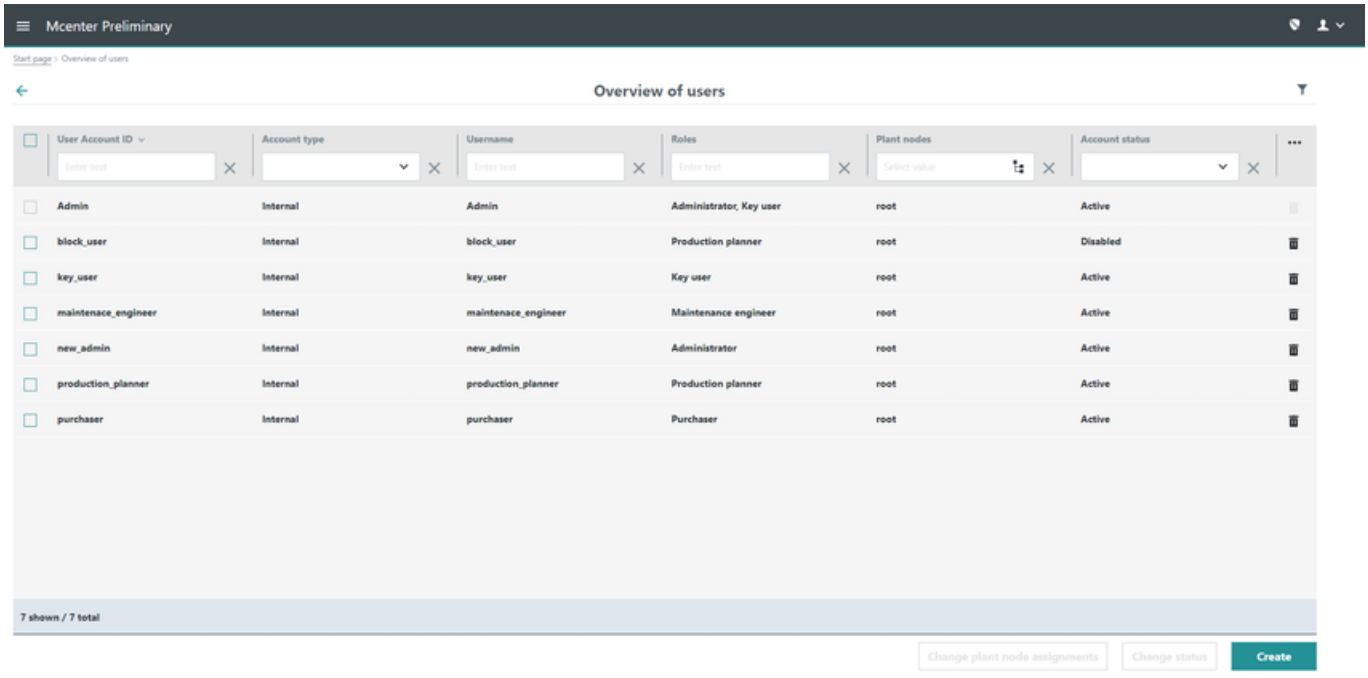
1. Click on the underlined name of the user in the "Overview of users" window.
   The "<username>" window opens.
2. Click "Edit".
3. Enter the required information.

4. Click "Save" to change the user.
   - OR -
   Click "Cancel" to discard the inputs.

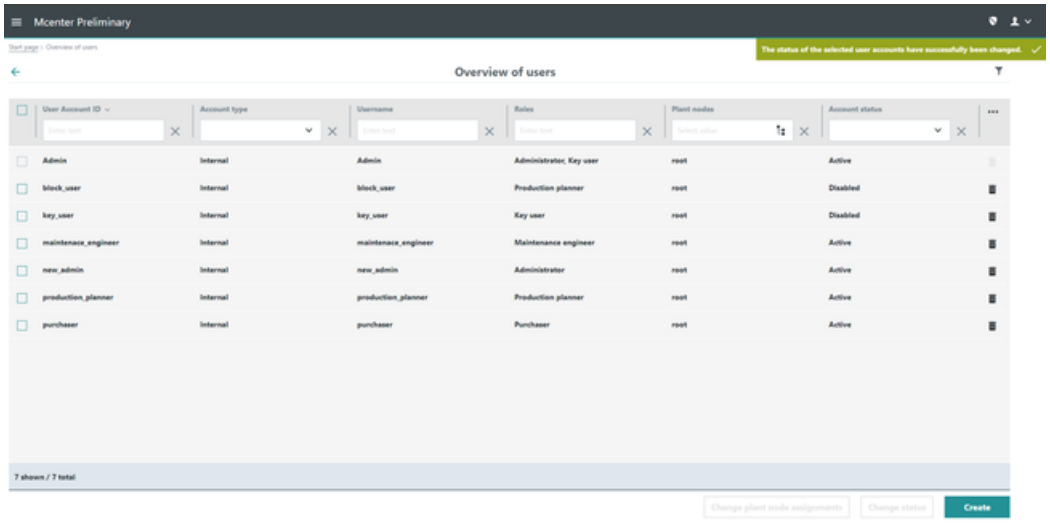


   - OR -
   Open the "Overview of users" window.

5. Activate the checkbox immediately adjacent to the User Account ID field.
   You have two options:
   - Activating individual checkboxes
   - Activating the column header checkbox in order to select all users except the logged-in admin



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



Note

Change status button

"Change status" is only activated if:

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

If you want to change the password, see further information in the chapter Password change (Page 32).

5.3.5 Deleting user accounts

User accounts can be deleted.

Parameters

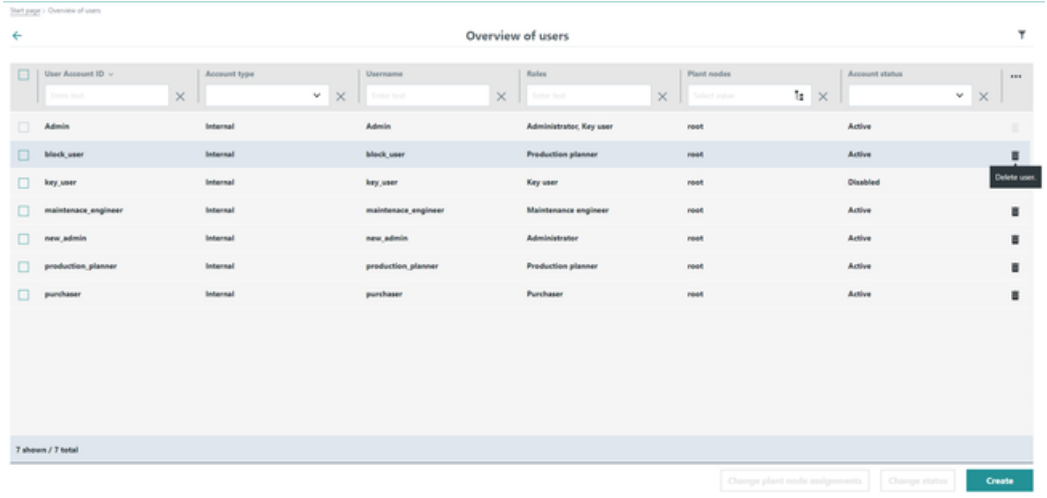
The following parameters are available:

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 themself.
Roles	Shows the roles For more information, see Admin User (Page 44).
Plant nodes*	Shows the assigned plant nodes to the user This column cannot be sorted
Account status	Shows the account status: • Active • Disabled

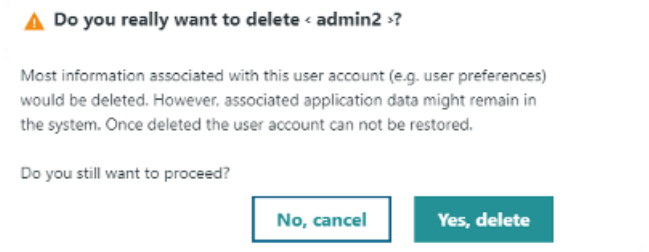
Parameter	Description
	Deletes the user account
	Opens the "My Filters" window and filters the user table according to the following criteria: • User Account ID • Account type • Username • Roles • Account status For more information, see List filtering (Page 34). Click on the filter icon again to close the filter window.

Procedure

1. Open the "Overview of users" window.



2. Click the "Delete" symbol.
   A dialog box appears.
3. 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 user accounts are deleted, 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 countdown 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.

The default time slot can be changed within Consul.

Note

User account data

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

5.3.6 Resetting the password

The password can be reset, if it has been deactivated after long absence. A new password can be entered or the user's old one is used to reactivate.

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, the following rights are needed:

- Administrator rights
  - OR -
- Key user rights

The password can be reset only for internal users. There is no "Reset" on the detail page, when an external user is selected.

Parameters

The following parameters are available:

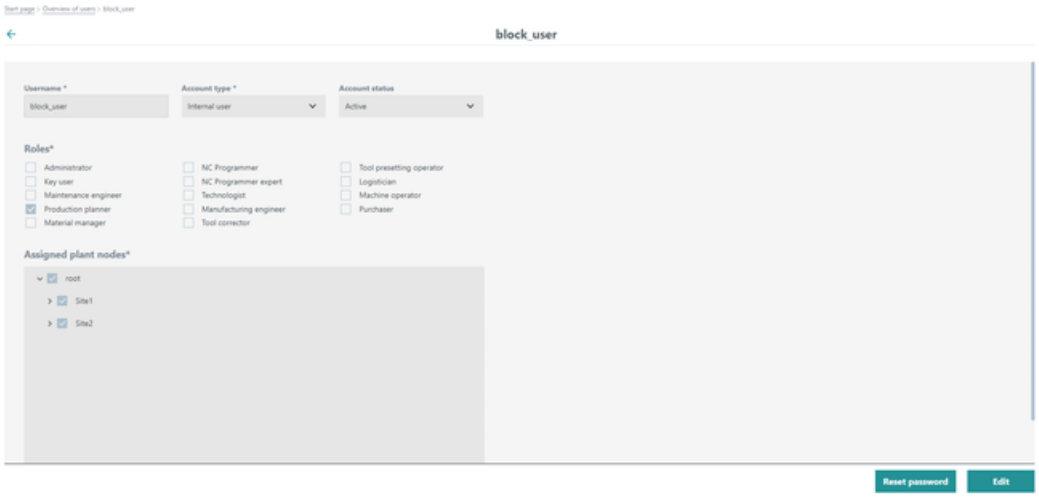
Parameter	Description
Account status	You can choose the following status: • Active • Disabled
Password *	Enter a secure password Password criteria**:** • Use at least 8 characters • Contains at least one uppercase letter • Contains at least one lowercase letter • Contains at least one special character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

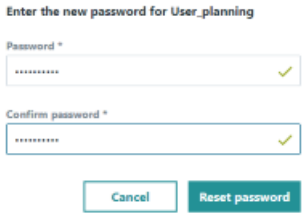
*) The fields marked with an asterisk are mandatory and must be completed. An error message appears if you make an erroneous entry.

Procedure

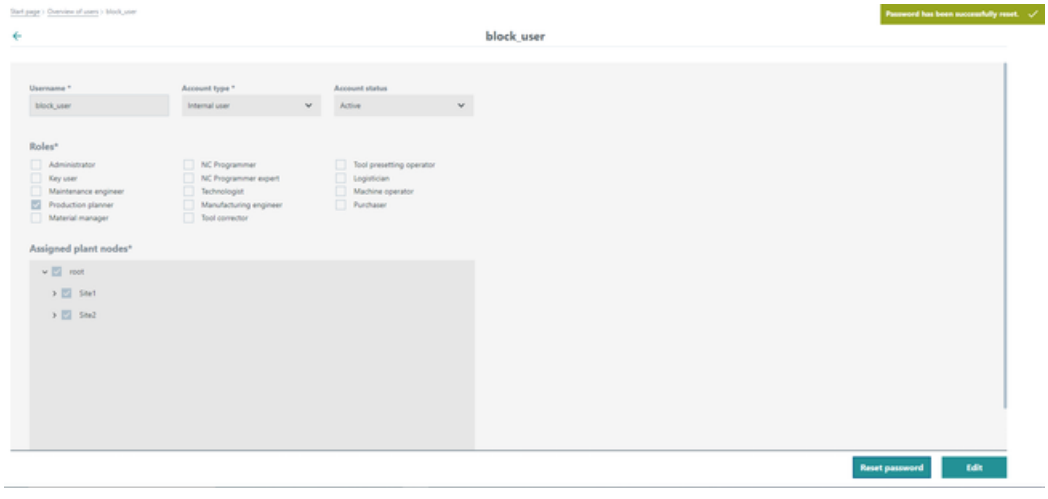
1. Log in as Administrator or Key user.
2. Click "Manage users".
   The "Overview of users" window opens.
3. Select the user that has requested a password reset.
4. Click on the username and open the detail page.
5. Click on "Reset password" in the bottom-right window area.

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





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



5.3.7 Managing hierarchy rights

You have the possibility to map existing Mcenter users to Plant Hierarchy nodes. In this way, you can manage the visibility and/or confidentiality of Mcenter resources related to hierarchy nodes depending on logged in user.

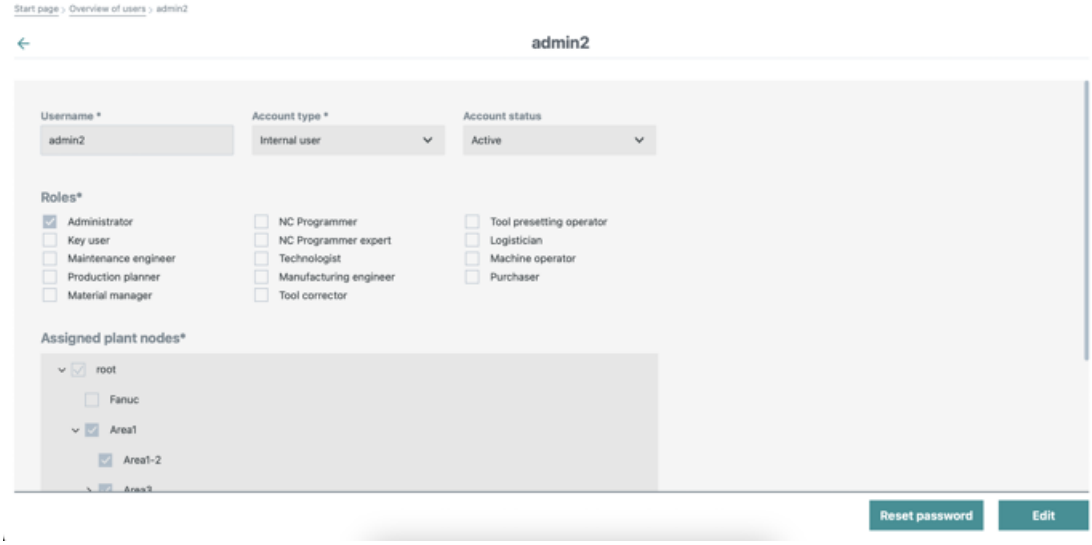
Prerequisites

In order to map an Mcenter user to Plant Hierarchy, the following rights are needed:

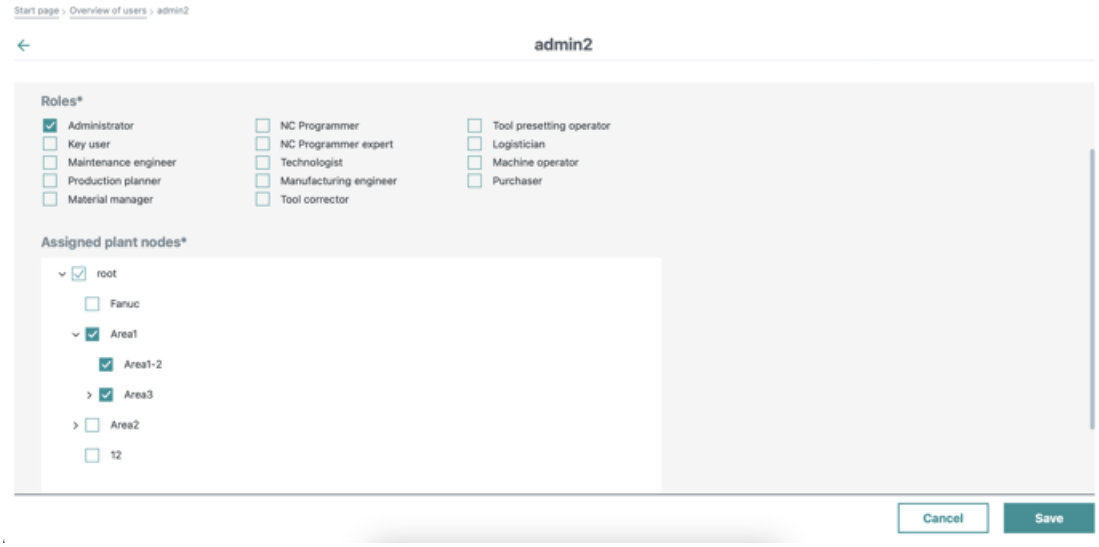
- Administrator rights
  - OR -
- Key user rights

Procedure

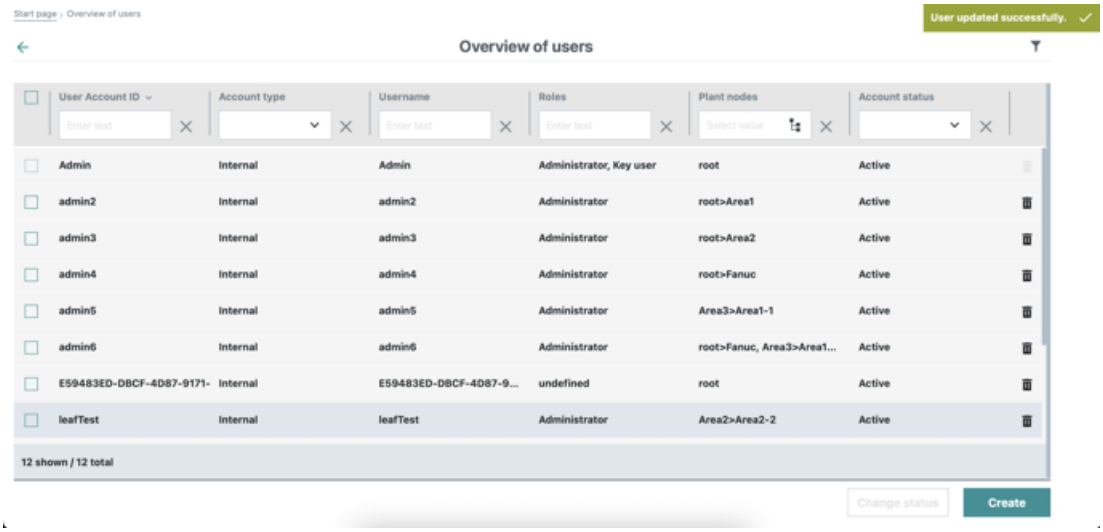
1. Log in as Administrator or Key user.
2. Click "Manage users".
   The "Overview of users" window opens.
3. Select the user that you want to map with hierarchy.
4. Click on the username and open the detail page.
5. Click on "Edit" in the bottom-right window area.



6. Select the desired hierarchy or multiple hierarchies or the desired machines under multiple hierarchies by clicking the related checkbox.



7. Click on "Save".
   -OR-
   Click "Cancel" to discard to cancel the operation.
   A green message appears in the top-right window area indicating that the operation was successful.
8. After mapping the user to Plant Hierarchy nodes, Analyze MyPerformance /OEE application will only display the mapped Plant Hierarchy nodes for the configured user on all windows.



Example

There are three different Plant Hierarchies created on Mcenter (Area1, Area2 and Area3) and there are six different machines onboarded on Mcenter (Machine1, Machine2, Machine3, Machine4, Fanuc and SINUMERIK 840D).

Plant Hierarchies are created as below:

root → Area1 → Area3 → Machine1

root → Area1 → Machine2

root → Area2 → Machine3

root → Area2 → Machine4

root → SINUMERIK 840D

root → Fanuc

Five users are created on Mcenter:

Admin

User1

User2

User3

User4

Users are mapped with the Plant Hierarchies as below:

Admin → root

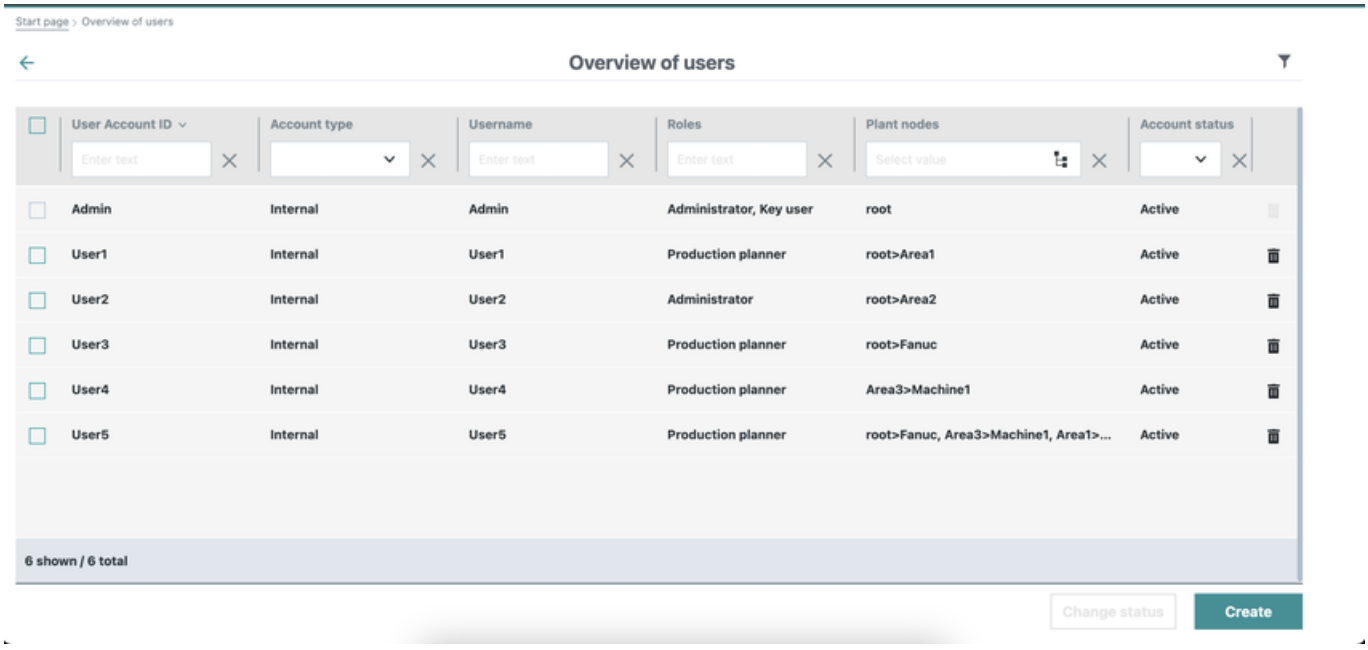
User1 → Area1

User2 → Area2

User3 → root → Fanuc

User4 → Area3 → Machine1

User5 → root → Fanuc, Area3 → Area1, Area1 → Machine2, Area2 → Machine4

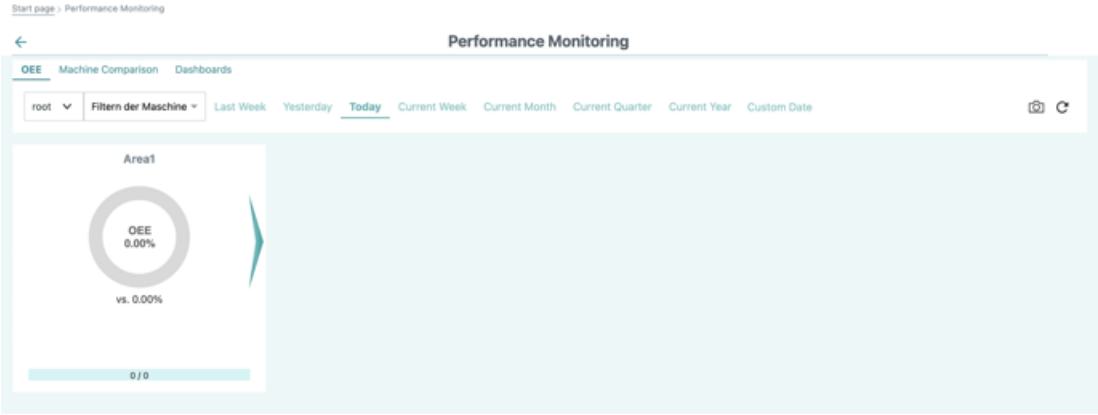


In this example:

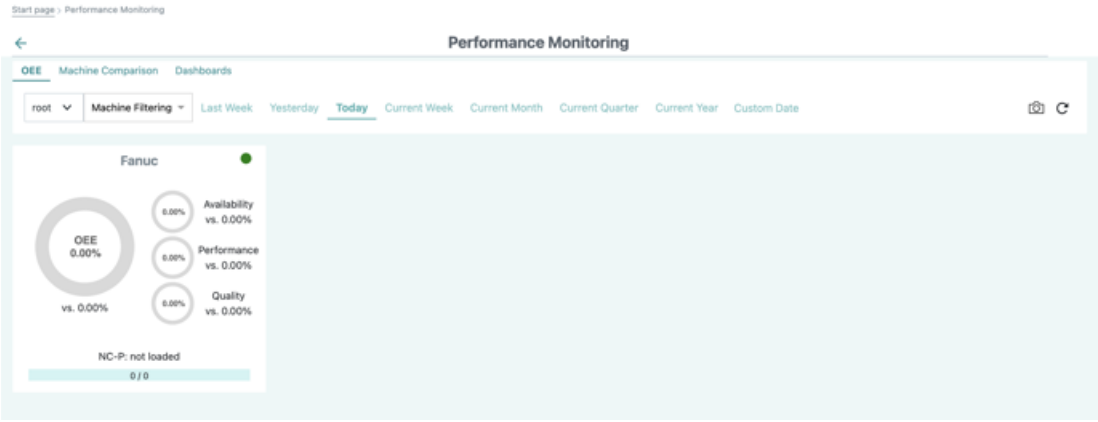
If you login with Admin user and open one of the Analyze MyPerformance /OEE application windows, you will have access to all Analyze MyPerformance /OEE assigned machines.



If you login with User1 user and open one of the Analyze MyPerformance /OEE application windows, you will have access to Analyze MyPerformance /OEE assigned machines under Area1 Plant Hierarchy.



If you login with User3 user and open one of the Analyze MyPerformance /OEE application windows, you will only have access to Fanuc machine if Analyze MyPerformance /OEE application is assigned (For application assignment, see Manage applications on machines (Page 80)).



5.4 Manage machines

5.4.1 Overview of machines

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

Parameter

The following information is displayed for machines:

Parameter	Description
v	Appears by 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

Parameter	Description
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, the onboard connection state can sorted alphabetically, either in an ascending or descending order.
Application state	Shows the state of applications on machine: • Not applicable: The machine is not onboarded or there are no applications installed on it • Changes in progress: The application installation state for the given machine is in an 'in progress-like' (e.g.: Downloading, Installing, WaitingFor..., etc..) onboard state for at least one assigned app OR the machine is in 'Re-onboarding' onboard state • Failed: The machine is NOT IN 'Re-onboarding' onboard state AND at least one application installation went to a failed-like state (e.g.: ErrorBefore, ErrorAfter, etc...) • Maintenance: The machine is NOT IN 'Re-onboarding' onboard state AND at least one application on the machine is in maintenance state • Ready: Every assigned application is in 'Installed' state on the machine AND there are no applications in maintenance state • Not available due to an error: The application service was not available at the time of the query
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, the state can be sorted alphabetically in an ascending or descending order.
Machine type	Shows the type of the machine Machine types can be created, edited and deleted In this column, the machine types can be sorted alphabetically 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, the autoconnect address can be sorted alphabetically in an ascending or descending order. The sort works inside in groups (IP or MAC or "other").

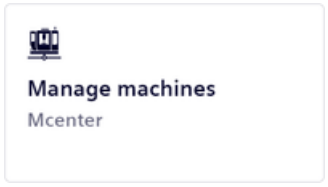
Parameter	Description
Machine agent version	• Not applicable: Machines without Machine Agent connectivity • Not available: Machines with Machine Agent connectivity but version unavailable • <empty>: Machines which have Machine Agent connectivity but the connection is not defined • Version (e.g.: 1.5.5): Shows the Machine Agent version installed on the machine In this column, can be sorted alphabetically in an ascending or descending order. The right ordering: <empty>, "Not applicable", "Not available" and the concrete versions as alphabetically

Parameter	Description
Machine agent state	• Not applicable: Is shown for machines that have a connectivity type other than Machine Agent • Not onboarded: Is shown for 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" The software update state cannot be read.
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
•••	Opens a window in which aditional columns can be selected, to display 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 Columns in the overview can be sorted individualy. The next time you log in with your user Id, the selected columns are displayed.
▼	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 34). Click on the filter icon again to close the filter window.
⋮	Initiates re-onboarding process on the machine OR Deletes the machine after a confirmation prompt

Procedure

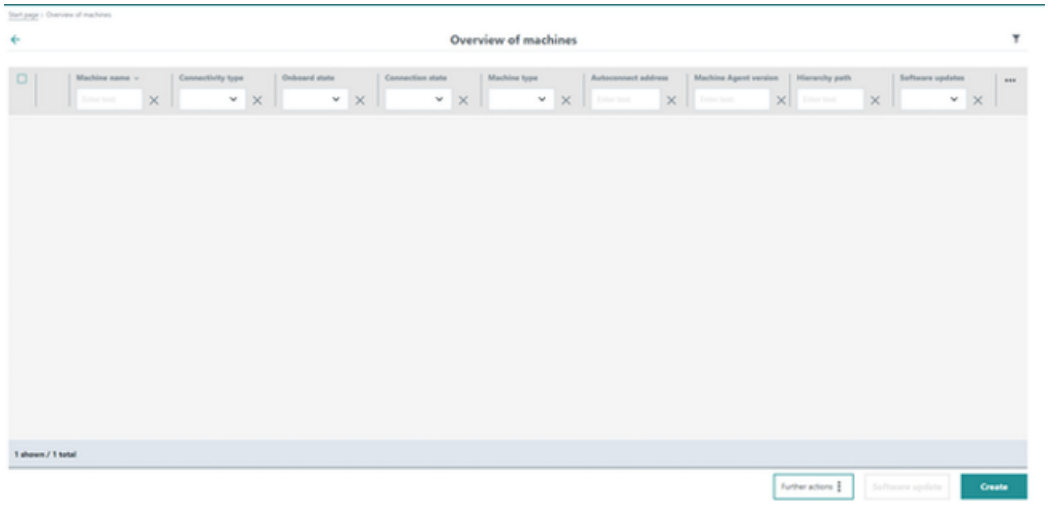
1. Click on "Manage machines" on the Mcenter start page.



   - OR -
   Open the following URL: Overview of machines (https://{ServerIP}/configure-plant)
   The "Overview of machines" window opens and displays an overview of all created machines with their respective properties.

2. To set the 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 by releasing the mouse button. The next time you visit the "Overview of machines" page, the columns are displayed with the width you opted for.

3. Create, edit, or delete a machine:
   - Creating a machine (Page 71)
   - Editing a machine (Page 76)
   - Deleting a machine (Page 79)



4. Right click the underlined name of the machine, 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 the machine is the conected with the server via the Machine Agent, the "Download Machine Agent installer" is needed.

The admin, key user, production planner, NC programmer expert and maintenance engineer can download user rights.

1. Click on the "Further actions" button.
2. Click on "Download Machine Agent installer".
   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 the machine is the conected with the server via the Machine Agent, the "onboarding keys" is needed.

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.

The admin, key user, production planner, NC programmer expert and maintenance engineer can download user rights.

1. In the "Overview of machines", select the machine(s)/the key(s) of which can be downloaded.
   Only machine(s) with "Machine Agent" connectivity type and "Not onboarded" onboard state can be selected.
2. Click on "Further actions".
3. Click on "Download onboarding keys".
4. Depending on the browser settings, there are 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 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".

5.4.2 Creating a new machine type

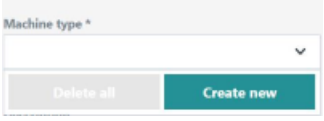
A new machine type can be created an added to the machine type list.

Parameters

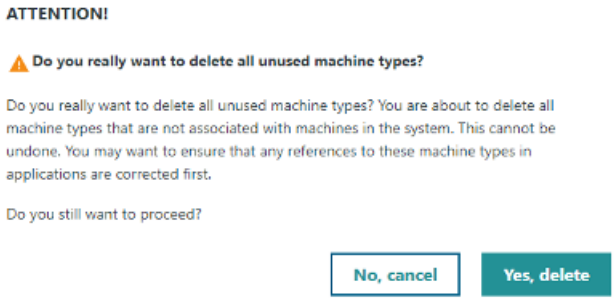
Parameters	Description
Machine type *	
✓	Indicates that the input is correct
✗	Cancels the data that was entered into the field
	Edits the machine type name
	Deletes a machine type

Procedure

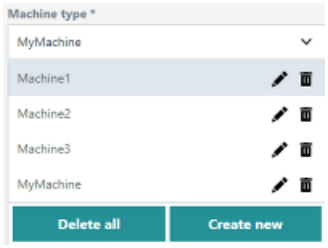
1. Open the "Overview of machines" window.
2. Click on the "Create".
   The dialog window "Please select the connectivity type for your machine" opens.
3. Select the desired connectivity type and click "Select".
   The "Create new machine" window opens.
4. Click the "Machine type" field to display "Create new" and "Delete all".
5. Click on "Create new".
6. Enter the machine type into the "Machine type" field.
7. Click the check symbol to save the new machine type.
   The check symbol turns green when you click it.



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

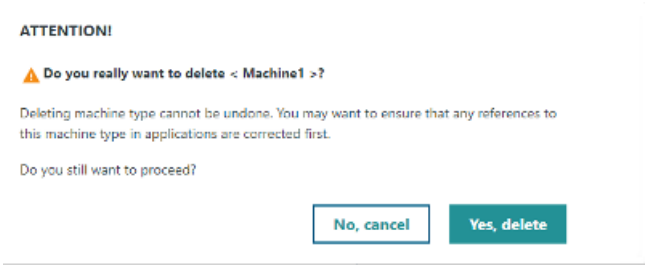


10. To delete an individual machine type, click the "Machine type" field.
    The drop-down list displaying the machine types opens.
11. Select a machine type and click the "Delete" symbol.



    A dialog box appears.

12. Click "Yes, delete" to delete the selected machine type.
    - OR
    Click "No, cancel" to cancel the operation.



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

Note

List filtering

By entering the name into the field "Machie type", for a specific machie can be searched.

5.4.3 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 69).
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.

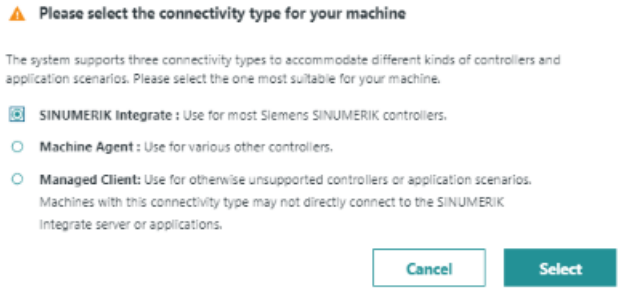
Parameter	Description
Autoconnect address *	For the connectivity type "SINUMERIK Integrate", enter the IP address or MAC address. Enter the unique and valid IP address or MAC address. • IP addresses consist of 4 decimal integers between 0 and 255. Separate each of the numbers with a period, for example 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.

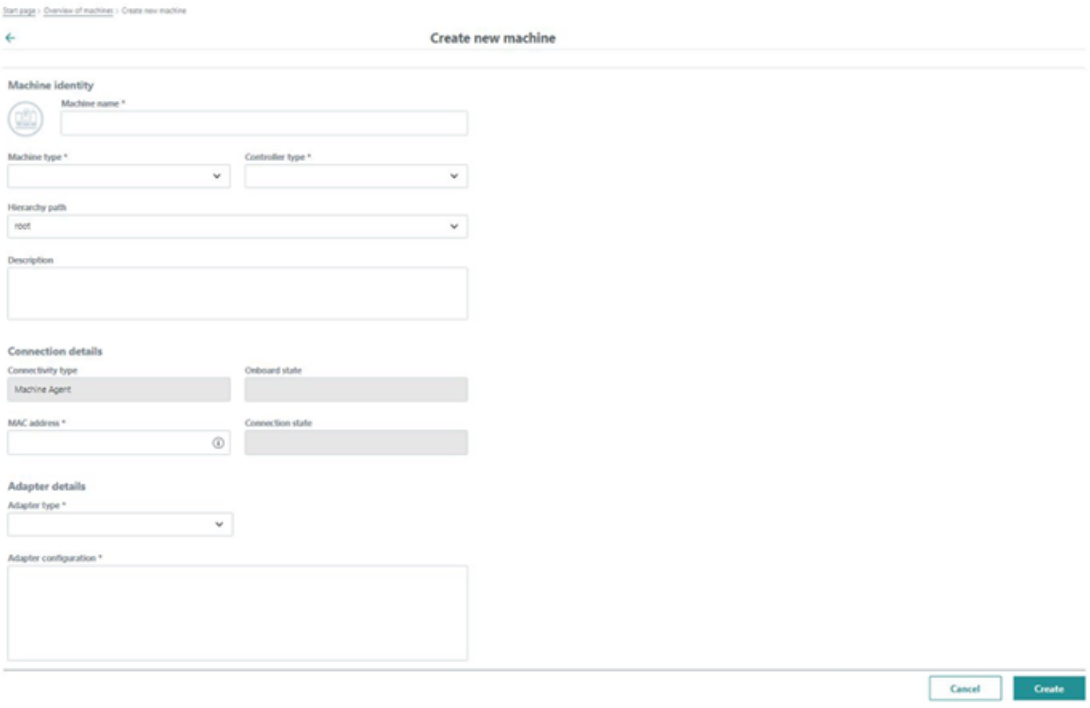
Procedure

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

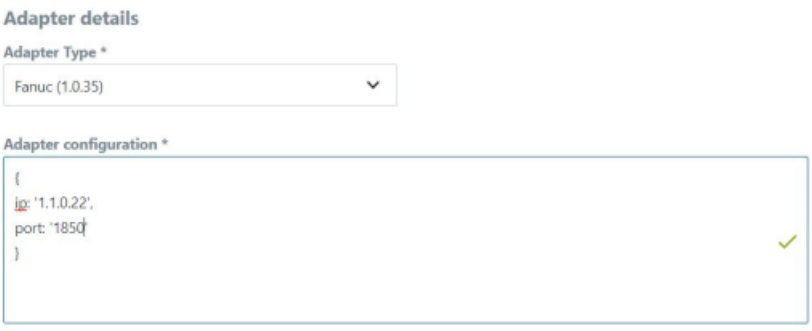
   Activate the option "SINUMERIK Integrate" and click "Select" button.



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 63)
     - 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.

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

5.4.4 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. The controller details can also be displayed.

Prerequisite

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

Parameter

The following parameters are available:

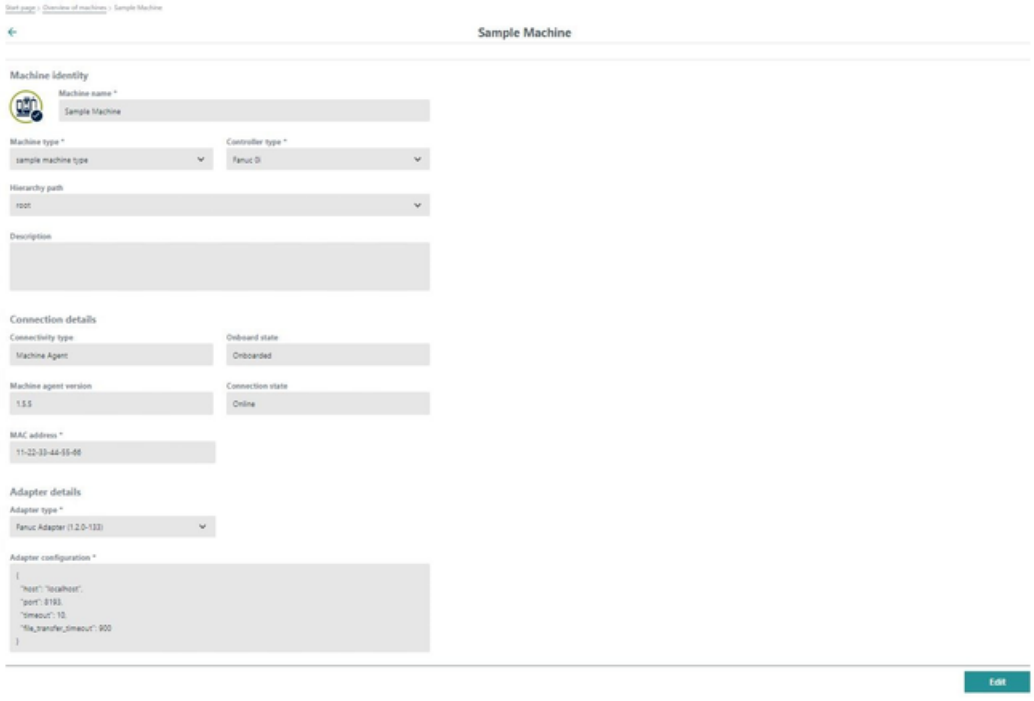
Parameter	Description
Machine identity	
Machine name *	Enter a unique name for the machine Up to 50 characters can be entered
Machine type *	Open the drop-down list and select the type of machine or create a new machine type
Controller type *	It is not editable, but displays the selected controller type 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 a value is entered 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.
   The window "<Machine name>" opens and displays the machine data.
2. Click on "Edit".



   The input fields can be edited.
3. Enter the new data and select the desired changes from the drop-down lists.
   In the "Connection details" section can o changes entered!
4. 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.

5.4.5 Deleting a machine

Superfluous machines from the "Overview of Machines" can be deleted.

Note

Deleting machines without installed applications

Only delete machines without Mcenter applications.

If a machine is deleted, which has an Mcenter application installed, uninstall it later manually.Partial or complete loss of HMI functionality can result.

For more information about uninstalling an application from a machine, see Changing assignments (Page 86).

Note

Deleting machines without tools

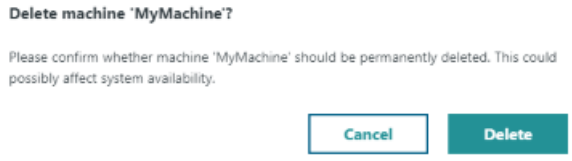
Only delete machines that are not equipped with tools.

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

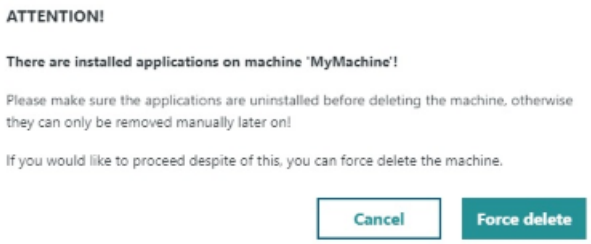
If you have deleted a machine equipped with tools, you must subsequently delete the tools in the Manage MyResources /Tools, Tool stock application. As these tools are still known to Manage MyResources /Tools, they will be shown in the following location: <hierarchy of the deleted machine>-LostMagazine.
Additional information about containers is provided in Operating Manual ManageMyResources.

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.
   If there is no application on the machine, the following dialog box appears.



4. 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.



5. Click "Cancel" to cancel the operation.
   - OR -
   Click "Force delete" to delete the machine.
   A success message is displayed in the upper right corner of the window.

5.5 Manage applications on machines

5.5.1 Overview of assignments

Mcenter applications can be assigned to connected computers. 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 42).
- The connections between the server and the machines must be established to use the application assignment
  For more information, see Manage machines (Page 63).

Before installing any applications using the Mcenter Server, uninstall all applications, which were installed with the SINUMERIK Integrate 4.1 Installer. If this is not done, 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

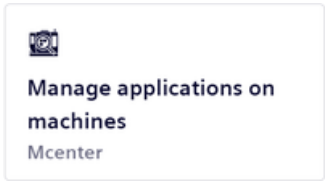
The following information is displayed for machines:

Parameter	Description
∨	By clicking on the column heading the symbol appears 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
New version available	Shows the availability of a new version: • "Yes"- A new version is available on the server The machine can be selected 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.

Parameter	Description
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 – Machine is in re-onboarding state – All applications are in "Installed" state and at least one application is "In maintenance" state • "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 34). Click on the filter icon again to close the filter window.

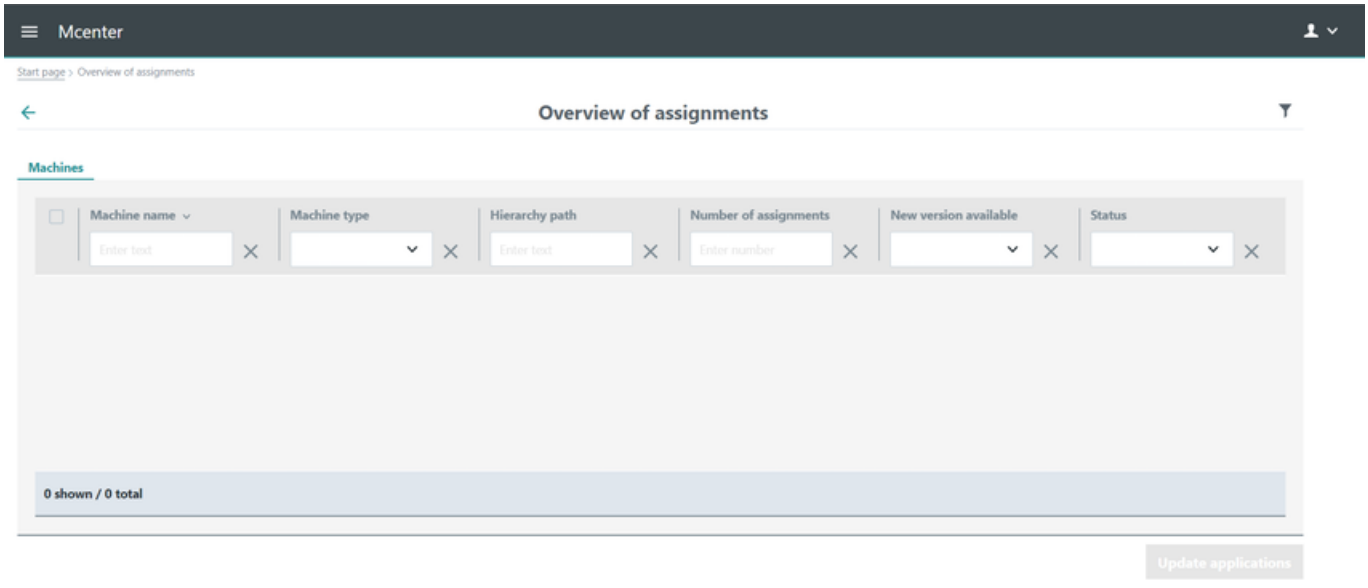
Procedure

1. Click on "Manage applications on machines" on the Mcenter start page.



   - OR -
   Open the following URL: Manage applications on machines (https://{ServerIP}/appassignment-overview)
   The "Overview of assignments" window opens and displays an overview of all machines with their properties.

2. In order to set the 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 by releasing the mouse button. The next time you log in with your user Id, the columns are displayed with the width you opted for.



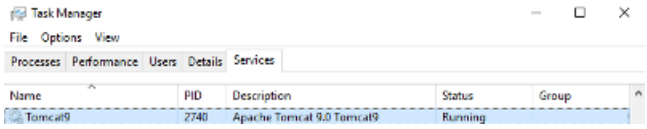
When a machine is selected for the first time, an update is carried out and the following message appears: "Post update information: Any actions regarding the application assignments are not possible due to performed Mcenter update. Please, wait a few minutes until the machine is ready to use and try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

5.5.2 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 42).
- The connection between the server and the machine is configured
  For more information, see Manage machines (Page 63).
- Tomcat9 service must be running before assigning and updating the application to the client
  The service status can checked under "Task Manager - Services".



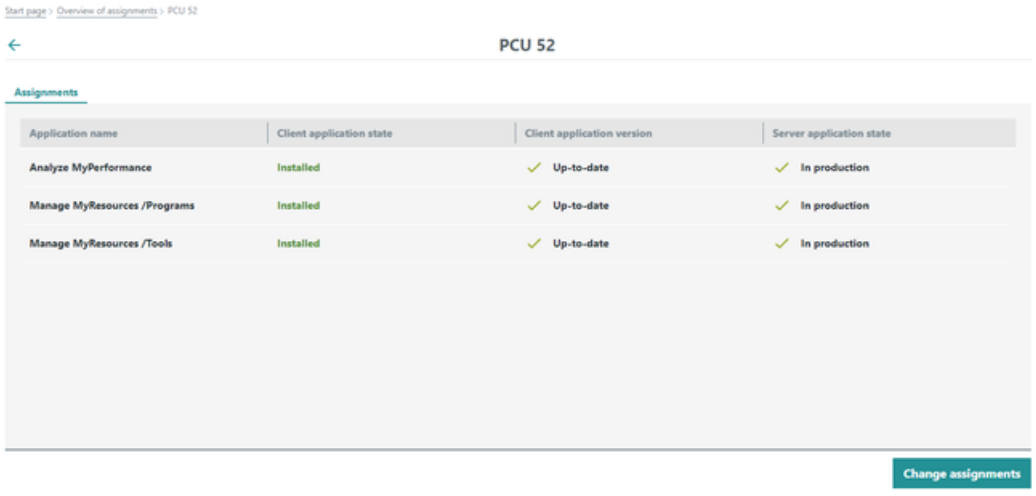
Parameter

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 • Changes in progress **Note:** 'Changes in progress' is shown when the machine is being re-onboarded.
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 90). The tooltip shows the version of the applications that is available on the server and the version of the assigned and installed application.
Server application state	Shows the state of the server side application if is is still working on finalizing the re-onboarding operation or not. Available values: • In production • In maintenance For more information, see Re-onboarding a machine (Page 122)

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 86)
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".

If the application is in state "Uninstall failed", the application has to be removed manually.

The assignments can be changed at any time before the HMI is rebooted. Even if an assignment is already in the "Reboot required..." state.

1. Apply the changes to the assignments.
2. Wait until the assignment reverts to the "Reboot required..." state.
3. Reboot the HMI.

5.5.3 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 42).
- The machine model of the machine is available on the server
  If the 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 63).

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.

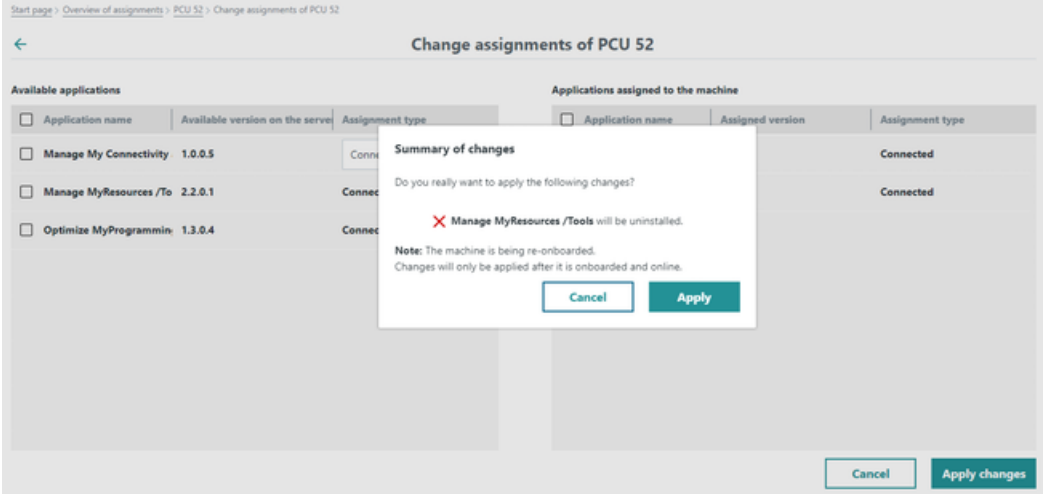
Note

Changing assignments on machines in Re-onboarding state

The following note will be displayed in the "Summary of changes" confirmation dialog:

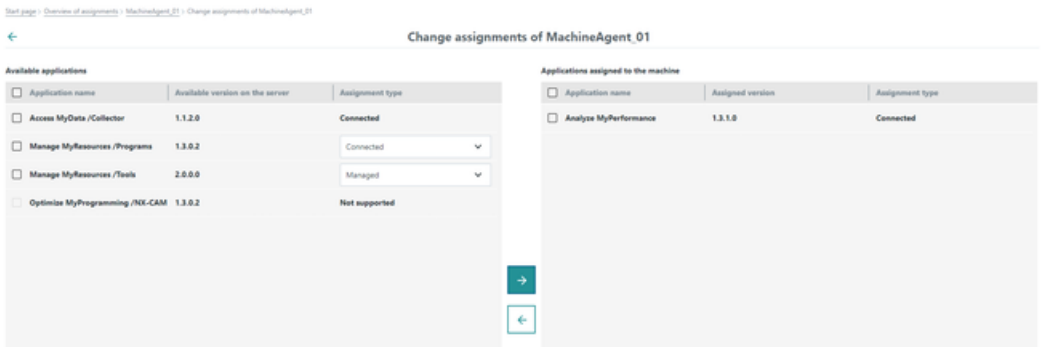
The machines is being re-onboarded.

Changes will only be applied after it is onboarded and online.



Assignment type

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



Available applications panel

If the selected machine has the 'Connectivity type' 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**
  Option is available ,if the given application has a client package for the given machine
- **Managed**
  Option is 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 cannot 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 unassigning 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.

- Changing the assignment type during a temporary operation is not permissible
- To change the assignment type, finalize the assignment change operation by clicking on "Apply changes"

Once the operation is completed, the application can be assigned with a different assignment type.

Note

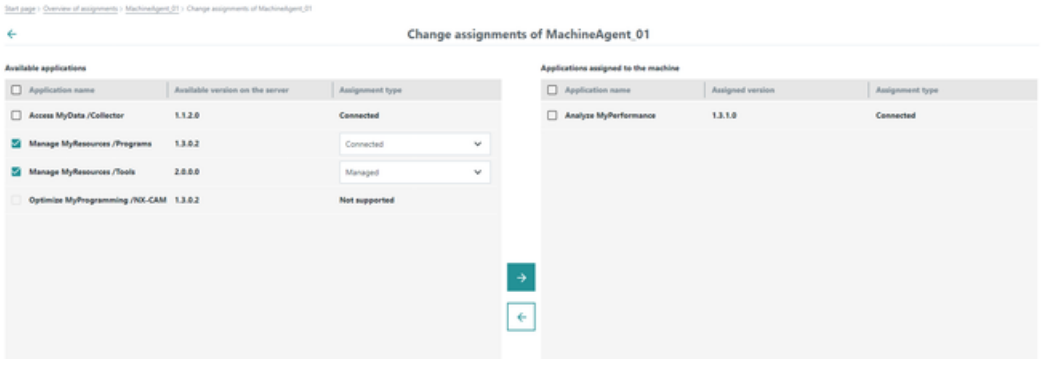
Changing assignment of application that is being uninstalled

Changing the assignment type of an application that is being uninstalled is not permissible.

To understand this consider the use-case:

- The application supports both "Connected" 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."

5.5.4 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 42).
- 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:

- 1.3.1.0
- 1.3.1.1
- 1.3.1.2

Note

It is recommended to update the Machine Agent and the adapters first (via Machine management) and only after that initiate the update of the client applications for the given machine.

For more information please consult the Mcenter readme document (technical restrictions section).

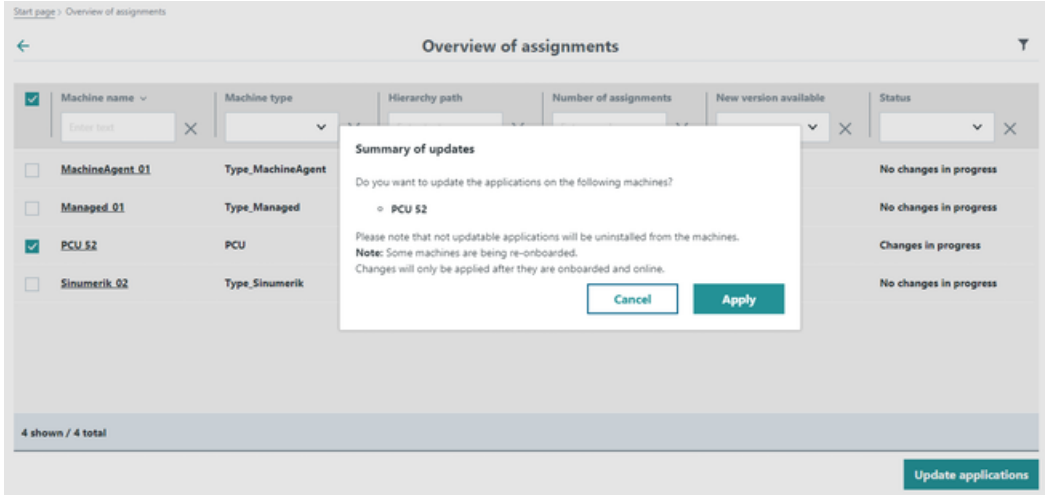
Note

Updating assignments on machines in Re-onboarding state

The following note will be displayed in the "Summary of updates" confirmation dialog:

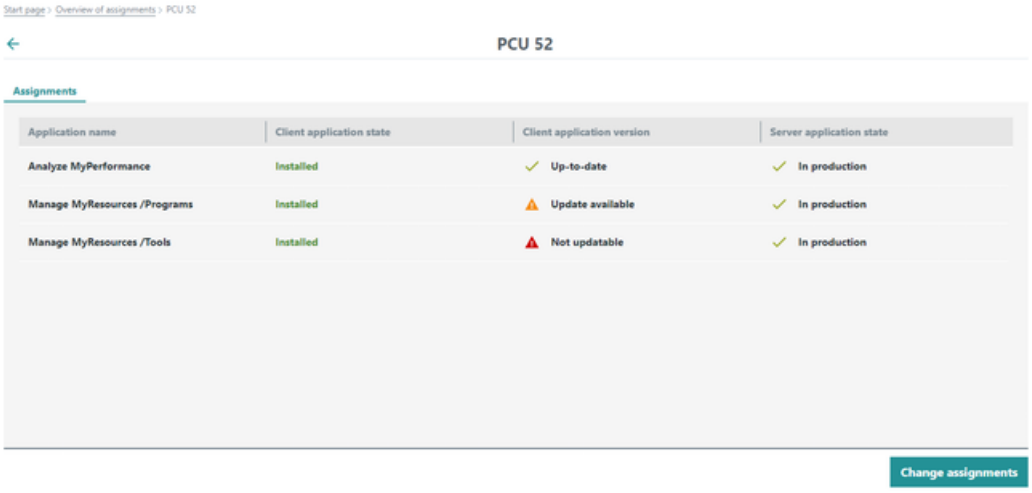
Some machines are being re-onboarded.

Changes will only be applied after they are onboarded and online.



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.

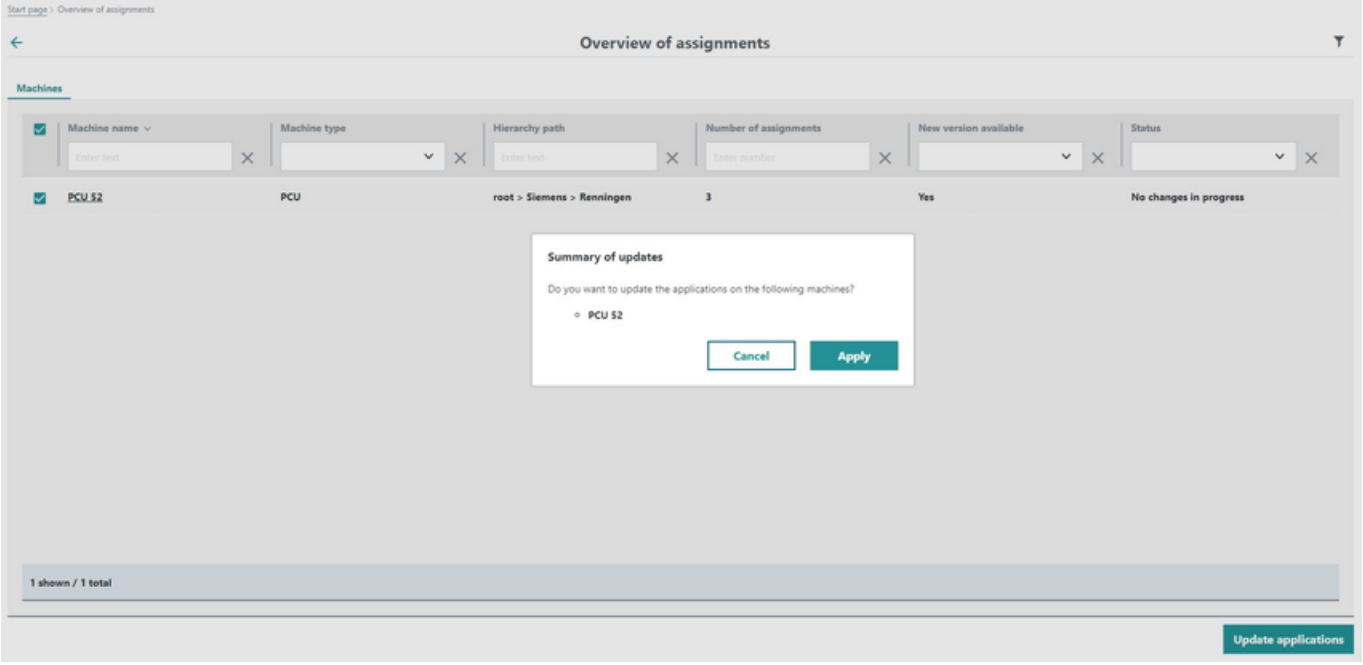


   An application with the status "Update available" can be updated.
   An application with the status "Not updatable" must be uninstalled and a new version of the application must be installed.

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.

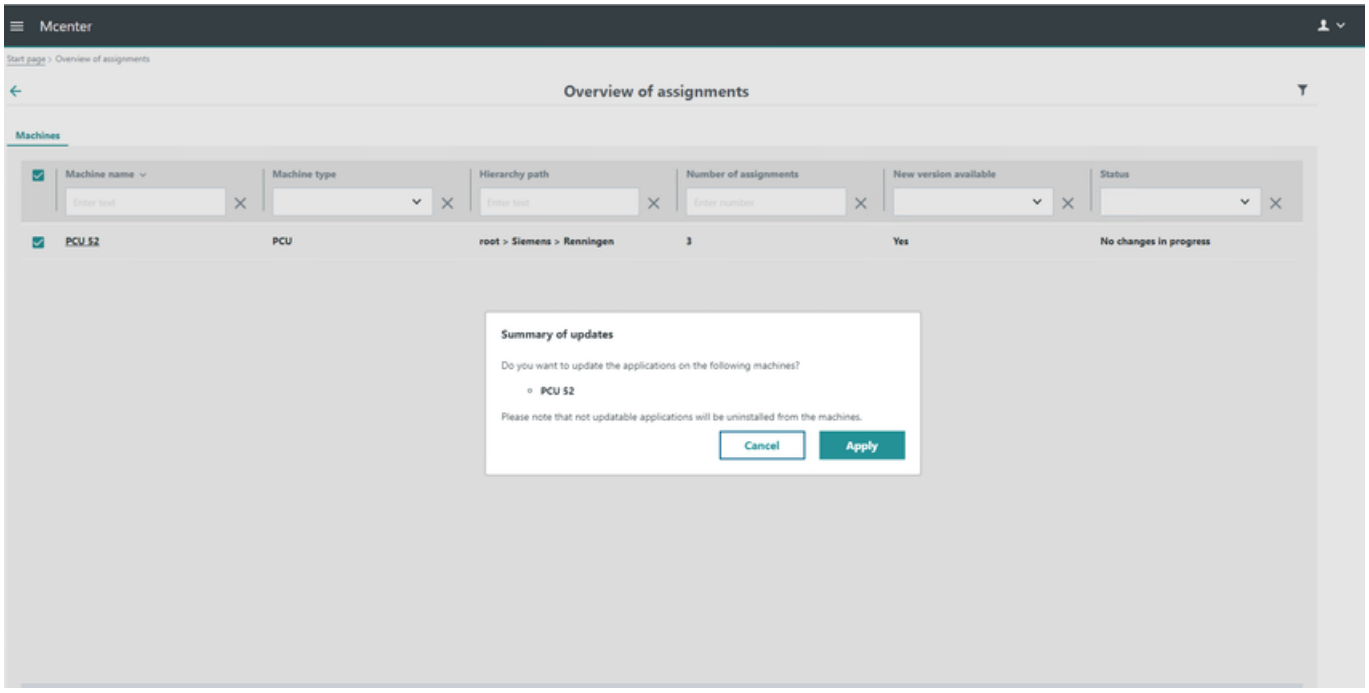
4. Click on the "Apply" button to continue.
   For the affected machines, the value in the "Updates available" column changes to "No" and the value in the "Status" column changes to "Changes in progress".
   - OR-
   Click the "Cancel" button to abort the process.



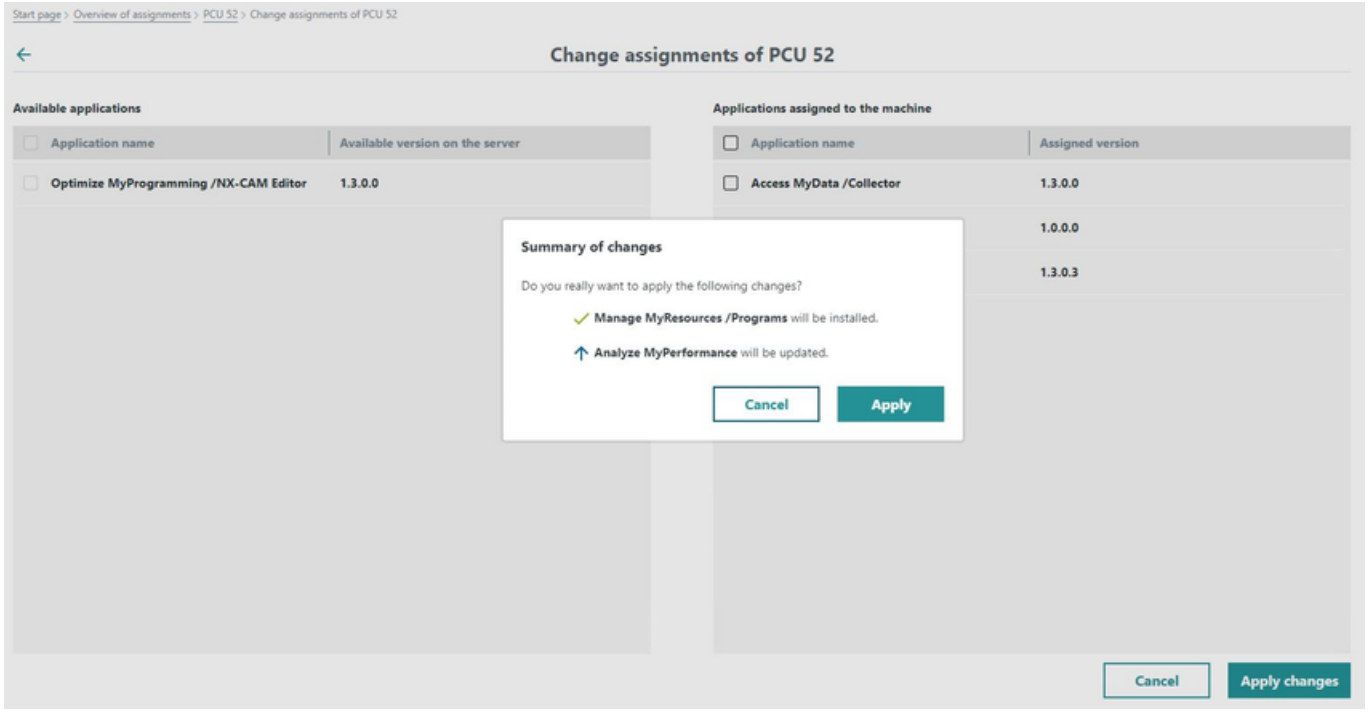
5. Click on the name of a machine.
   During the update process, the "Client application state" is "Download pending" and the "Client application version" is empty.
6. As soon as all applications of the affected machines have the state "Reboot required on machine client after installation", reboot the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

Forced update or uninstall

If applications are displayed with the "Update available" version and you want to install a new application that has not been installed to date, 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 opens. 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".

5.6 Manage openness clients

5.6.1 Prerequisite

Prerequisite

You need administrator rights to manage API access.

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

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

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

5.6.2 Summary

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.

5.6.3 Manage openness clients validity

Validity of API access

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

Note

Expiration of API access

The expiration date of the API access 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.

5.6.4 Overview of Manage API access

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

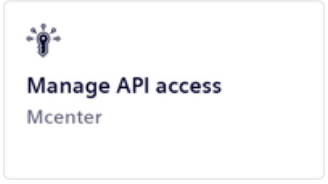
- Listing API access
- Create a new API access
- Edit the name of an API access
- Change the secret of an API access
- Delete one or multiple API access
- Changing the API rights of an API access

Parameters

Parameter	Description
ID	Shows the Client-Id of the API access
Name	Shows the name of the API access
Creation date	Shows the creation date of the API access
Expiration date	Shows the expiration date of the API access
Assigned API rights	Shows the assigned API rights of the API access Previously created API access (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.

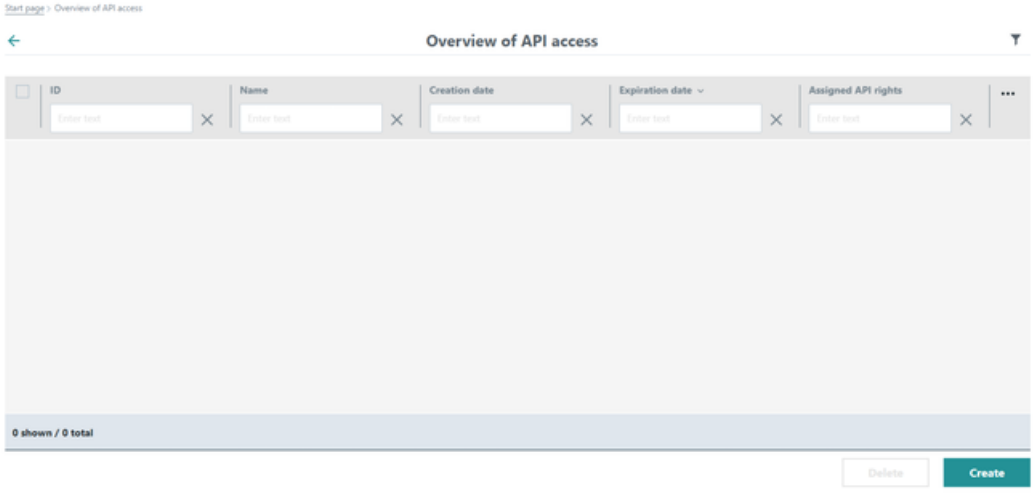
Procedure

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



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

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



5.6.5 Creating a new API access

You can create API access in the "Overview of API access" window.

Note

API access name

The name of the API access does not have to be unique.

Parameter

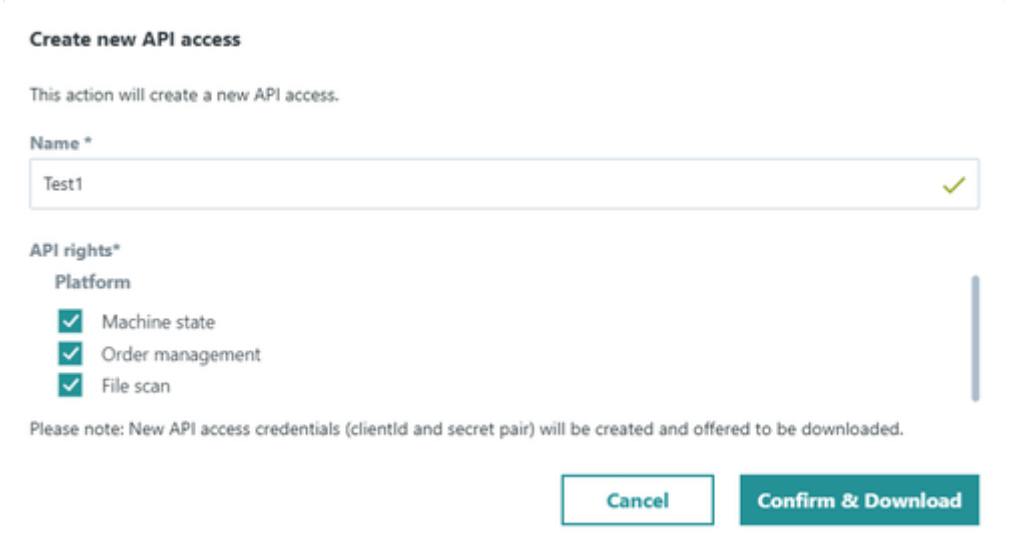
Parameter	Description
Create new API access	
Name*	Enter the name of the API access
API rights*	Choose the API rights of the API access

*) 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 API access" window.
   The "Create new openness client" window opens.
2. Enter the name of the API access.

3. Click on the "Confirm & Download" button to create an API access.
   - OR -
   Click on the "Cancel" button to discard the input data.



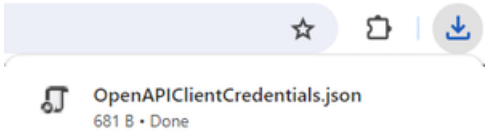
The created API access is displayed in the " Overview of API access" window.
The "OpenAPIClientCredentials.json" file is created. This file contains all information required to receive an access token from the Identity service.
Depending on the browser you use, the file is shown in the status bar.
The created API access is displayed in the " Overview of API access" window.
The "OpenAPIClientCredentials.json" file is created. This file contains all information required to retrieve an access token from the Identity service.
Depending on the browser you use, the file is shown in the status bar.

4. 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

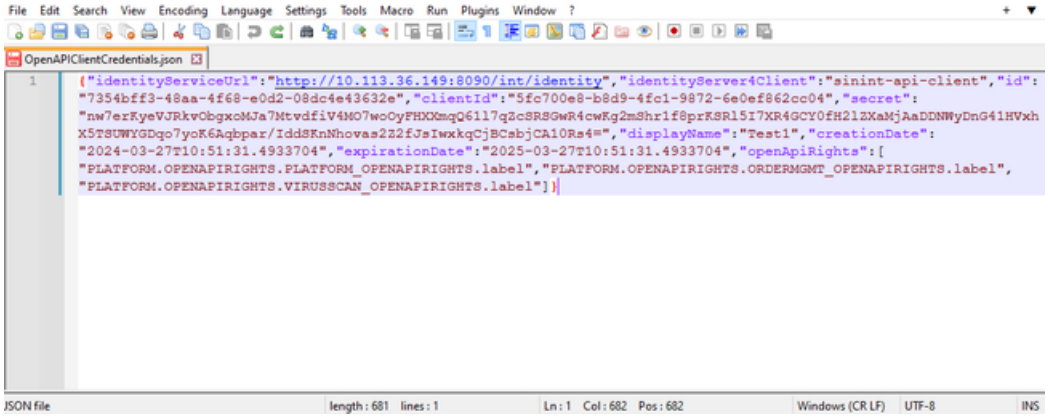
Note

"OpenAPIClientCredentials.json" file

If the "OpenAPIClientCredentials.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 data wich can be used to generate an access token.



5.6.6 Editing an API access

You can rename existing API access.

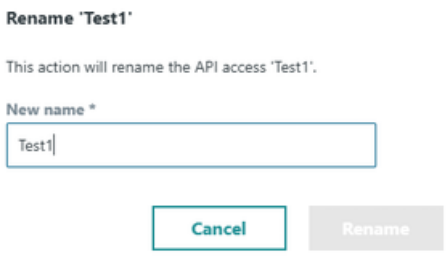
Parameter

Parameter	Description
Rename <API access name>	
New name*	Enter the name of the API access

*) 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 API access" window.
2. Click on "Edit".
   The "Rename <API access name>" window opens.
3. Enter the name of the API access.
   Click on the "Rename" button to rename the selected API access.
   - OR -
   Click on the "Cancel" button to discard the input data.



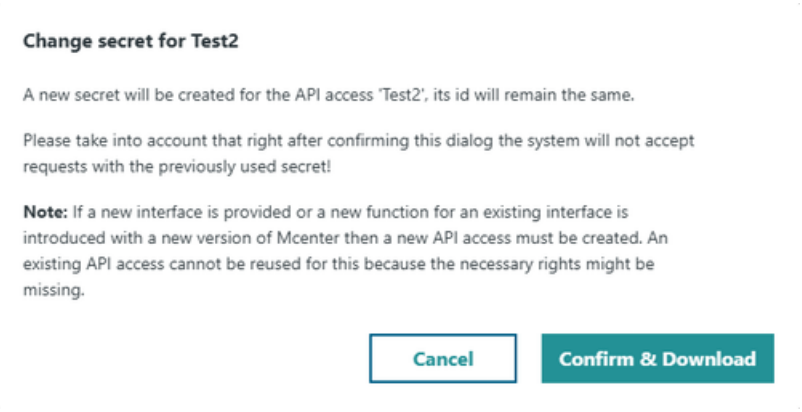
The renamed API access is displayed in the "Overview of API access" window.

5.6.7 Changing the secret of an API access

You can change the secret of a selected API access.

Procedure

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



The "OpenAPIClientCredentials.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 generated secret will be accepted.

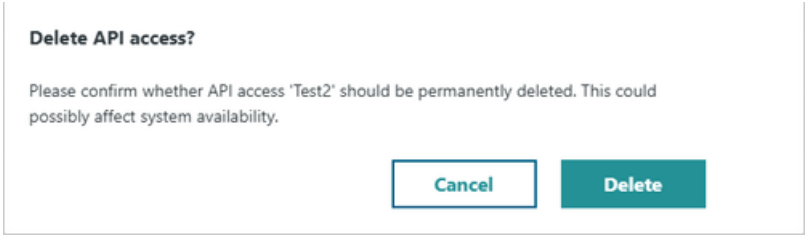
5.6.8 Deleting API access

You can delete unnecessary API access from the "Overview of API access" window.

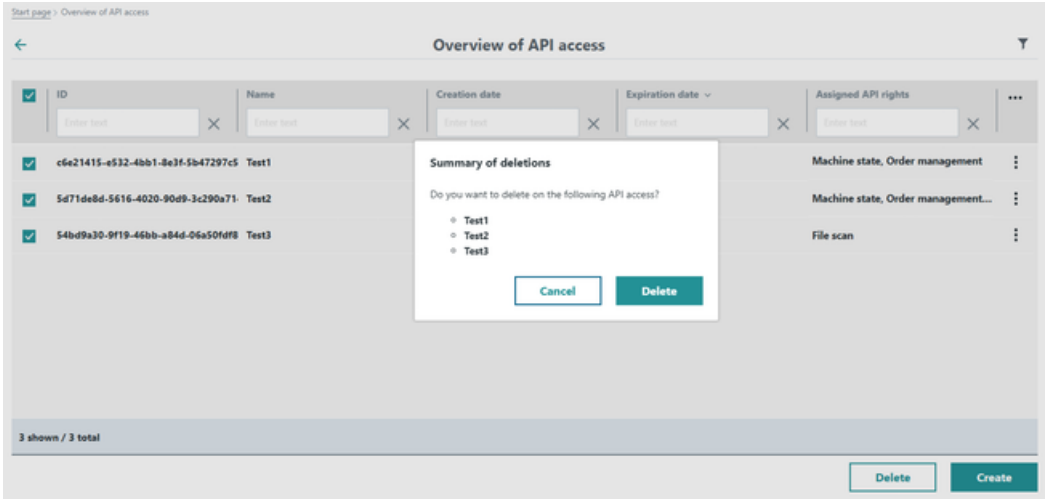
Procedure

1. Click on the "Actions" button in the "Overview of API access" window.
2. Click on "Delete".
   The "Delete API access?" window opens.

3. Click on the "Delete" button to delete the API access.
   - OR -
   Click on the "Cancel" button to cancel the operation.



4. Activate the checkbox of the desired API access in the "Overview of API access" 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 API access.
   - OR -
   Click on the "Cancel" button to cancel the operation.



The selected API access are deleted.

5.7 Manage adapters (experimental)

5.7.1 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)

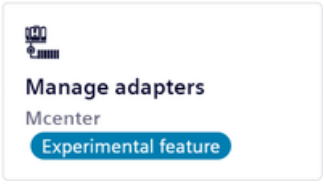
Parameters

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 34). Click on the filter icon again to close the filter window.

Procedure

1. Click on "Manage adapters" on the Mcenter the start page.



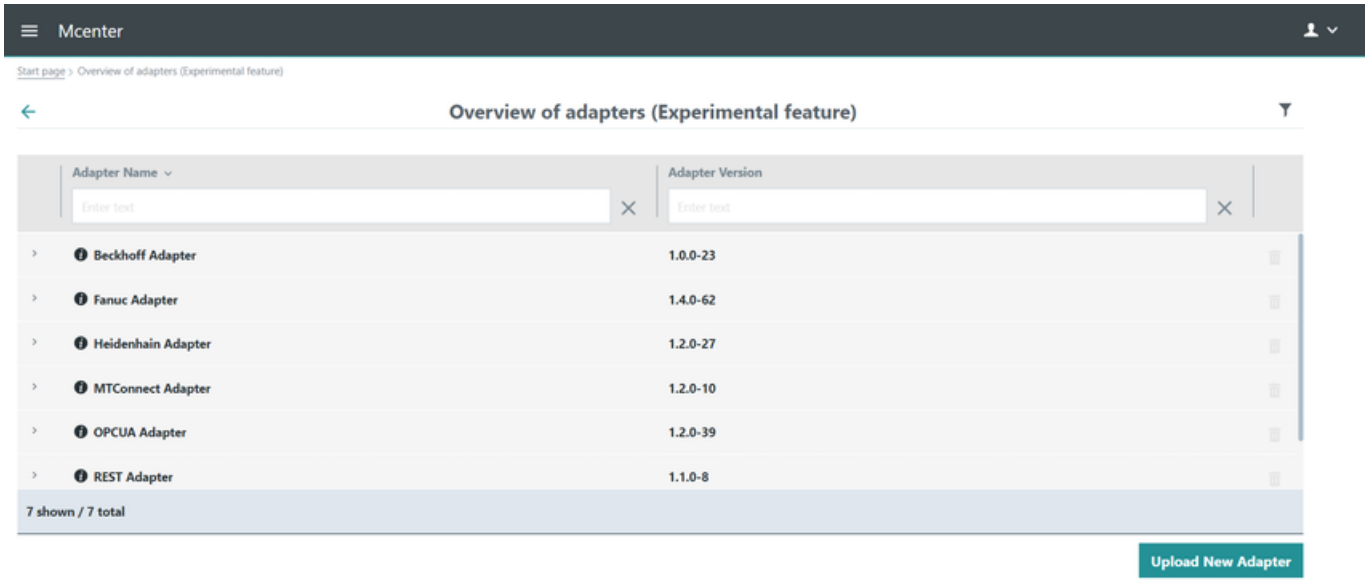
   - OR -
   Open the following URL: Overview of adapters (https://{ServerIP}/adapter-overview).

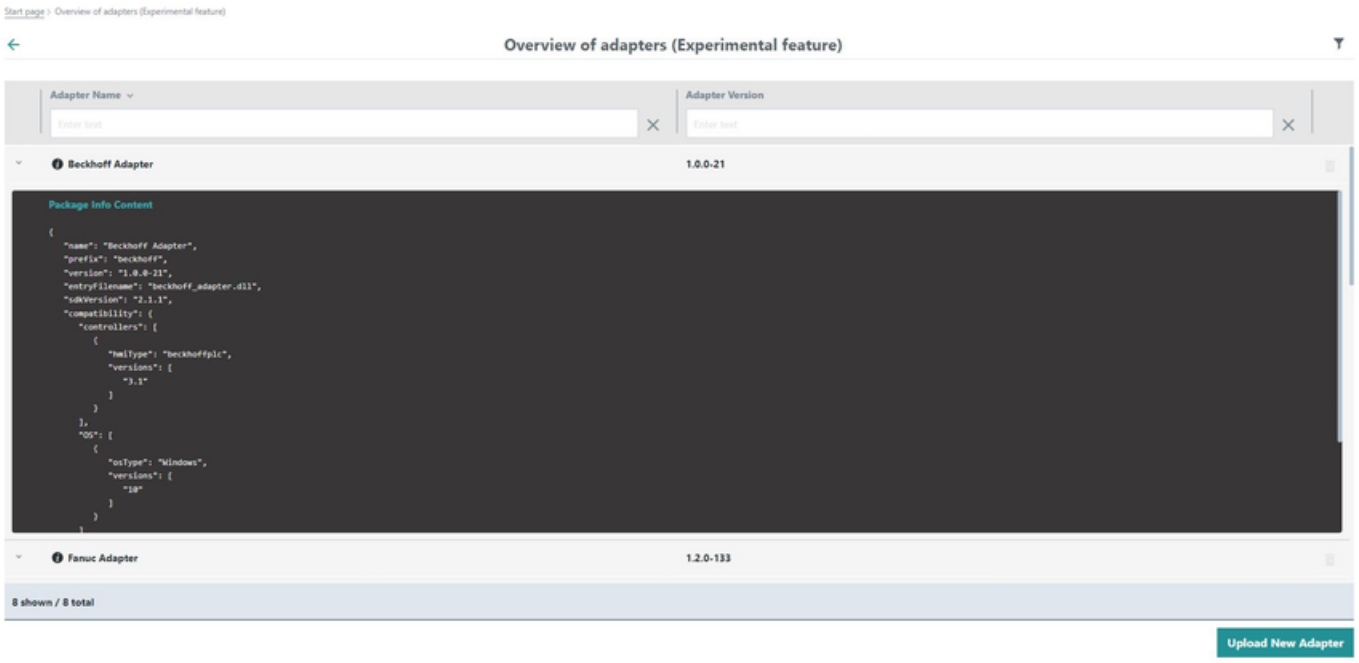
2. The "Overview of adapters" window opens and displays an overview of all uploaded adapters with their properties.
   In order to set your preferred column width, press the left mouse button and drag the column edges to the left or to the right. The respective parameters are automatically saved when 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.



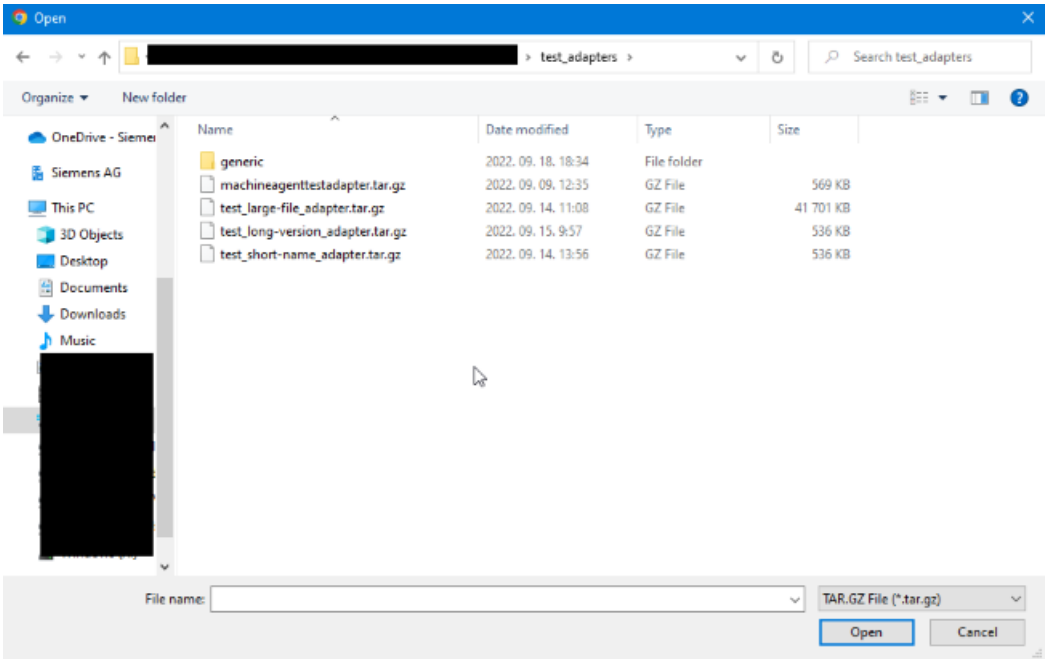


5.7.2 Uploading an adapter

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 incorrect content, its file size is too large, 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.".



5.7.3 Deleting an adapter

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

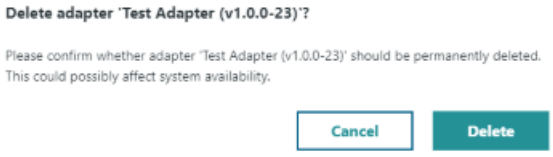
Note

"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.

5.8 Platform Open API

5.8.1 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 95)
- Logging in to Mcenter (Page 22)

5.8.2 Retrieve machine states

GET /machinestate/v1/machines

Note

"/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

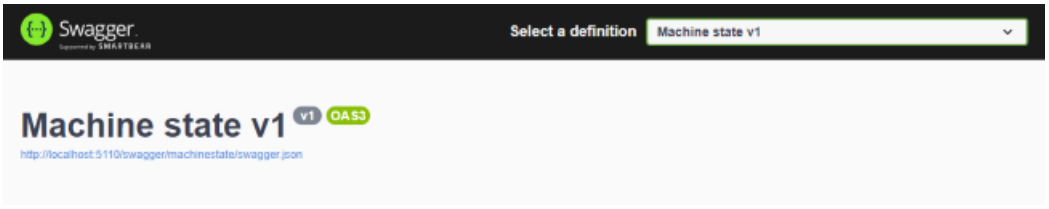
Restrictions

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

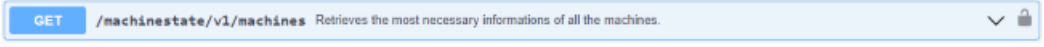
Procedure

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 affect system performance. Monitor the system for a drop in performance. The endpoint should not be called by a client more than once per minute.

5.8.3 Order management

5.8.3.1 Retrieve machines

GET /ordermgmt/v1/machines

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

- Retrieving machines listed in Mcenter
- Creating work sequences
- 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

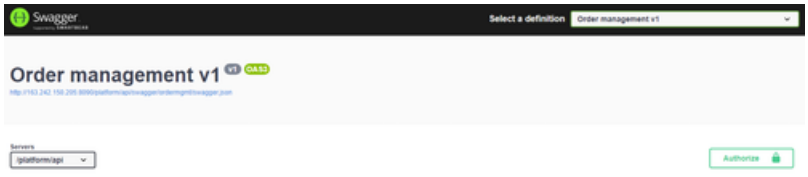
- **https://<IP address of the Mcenter server>/platform/api**/ordermgmt/v1/worksequences

Procedure

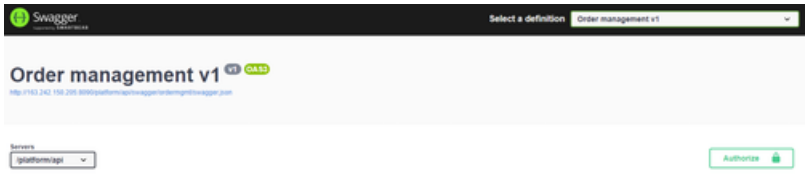
1. Open the Swagger page, the URL depends on the protocol settings:
   – http://<IP address of the Mcenter server>:8090/platform/api/swagger/index.html

   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"
     }
  ]
}
```

5.8.3.2 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 produced for the corresponding workOrderId and sequence-Number
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 **assignedMachineId** properties are required
- **assignedMachineId** should 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 must be input in **yyyy-MM-ddThh:mm:ss.fff[zone - offset]** format, in accordance with ISO8601
  - if there is a value in **plannedStartDateMin**, set the **plannedStartDateMax** value, also ensure the **plannedStartDateMin** value is before the **plannedStartDateMax** value. The same is also the case for **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 may be 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"

}
```

5.8.4 Virus scan (experimental)

In Mcenter, you have the option of introducing additional information into the system via files at various points. 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.

5.8.4.1 Retrieve scanable files

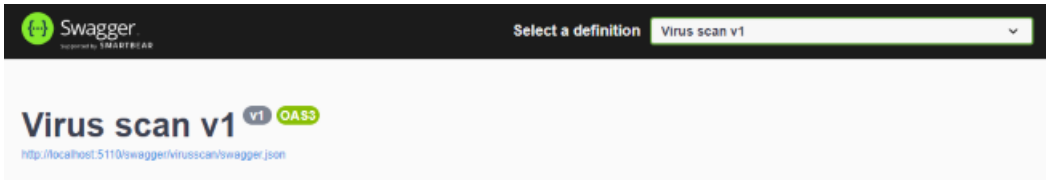
GET /virusscan/v1/files

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.

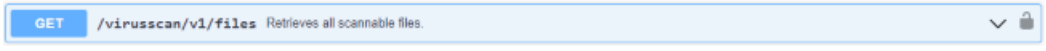
- Retrieves the scanable files
- The full URL is
  - http://<IP address of the Mcenter server>:8090/platform/api/virusscan/v1/files
- or
  - https://<IP address of the Mcenter server>/platform/api/virusscan/v1/files

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.

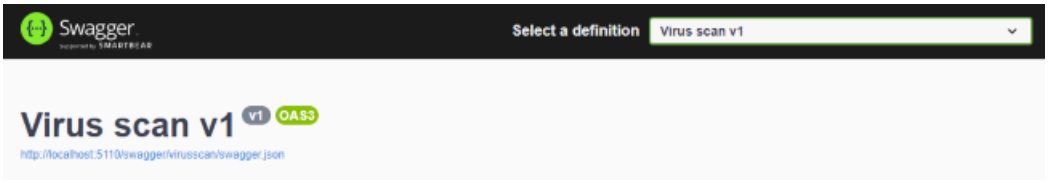
5.8.4.2 Update the state of a file

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

5.8.4.3 Get a one time URL for downloading a file

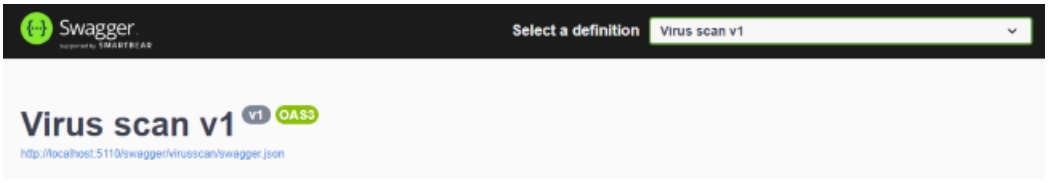
GET /virusscan/v1/files/{rowId}/downloaduri

- 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

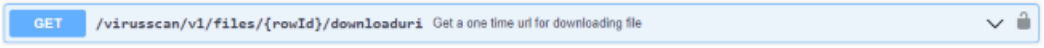
The rowId in the URL is the id of the file. You can get the value from the response of the GET /virusscan/v1/files API.

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

5.9 Re-onboarding a machine

5.9.1 Goal of the feature

Initiate re-onboarding process

If some hardware on the given machine breaks, it needs to be replaced with new hardware. This process also involves a change in the MAC address.

If the MAC address of a given machine changes, for example due to a hardware replacement, then the machine goes offline and can no longer be used. With this feature, we would like to provide the opportunity for these machines to continue operating with less effort as possible.

Prerequesites

The re-onboard function can only be used on onboarded machines with SINUMERIK Integrate connectivity type.

Only users with administrator or key user role can initiate a re-onboard operation.

Machine backup/ghost is necessary, which is created after Mcenter (server, machine) is updated to V5.4.0.0

Note

Archive image

After updating Mcenter server to 5.4.0.0, it is highly recommended to create an archive image from the onboarded and online machines once they have been restarted. You can use that image later on to restore the machine and initiate the re-onboard operation.

Restoring a machine from previously created, older archive images could cause application management-related problems after a successful re-onboard operation.

Note

The re-onboard feature is only supported in cases where the maintenance did not change the machine's fundamental hardware and sofware configuration and the replacement software and hardware are equivalent with the replaced ones.

Note

*Currently there are no Mcenter applications that support this feature. For this reason re-onboarding a machine could cause unexpected behaviors in said applications.

Behind the scenes - During a machine is being re-onboarded

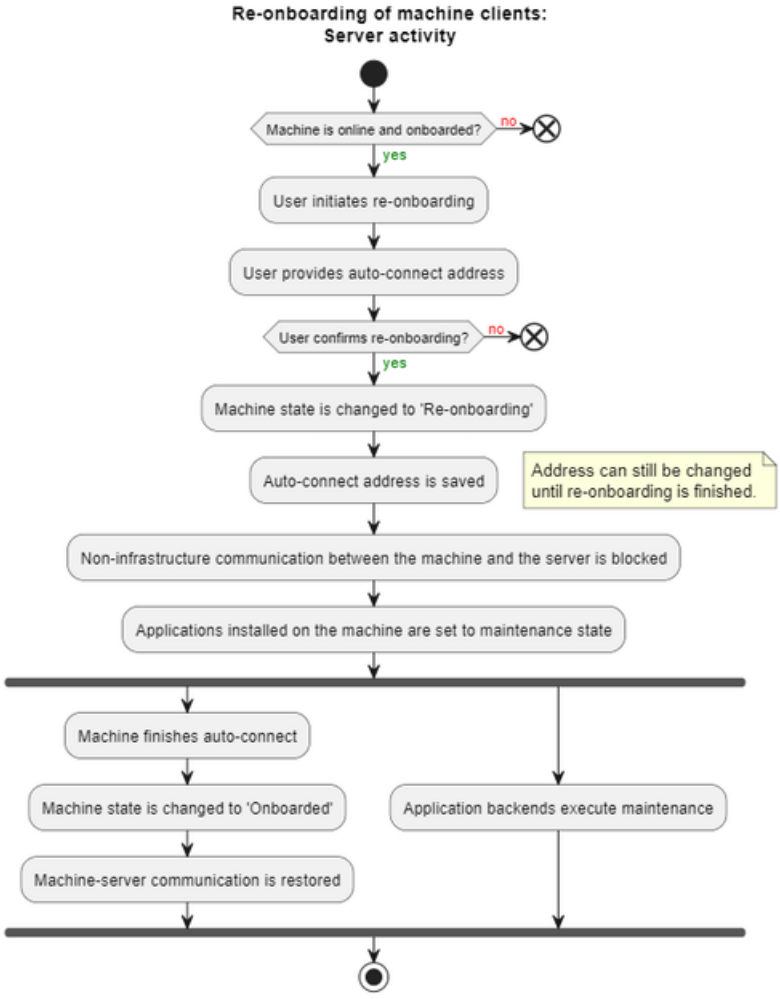
On Mcenter Server

Several different microservices are responsible to execute the operation. If any of the request fails, the system tries to revert the already executed actions to restore its original state.

Note

While the machine is in re-onboarding state, only infrastructural communication is allowed between the client and the machine. It means that requests not related to onboarding operations are rejected. Also in the first 10 minutes of the re-onboarding phase, connection attempts from the machine are also refused by the server. This time window is needed for other operations to run.

During this period the infrastructure logs will contain error entries about connection retries, but it is by design and it is the expected behavior. After 10 minutes the client will be allowed to finalize the auto-connect procedure and eventually finish the re-onboard operation.



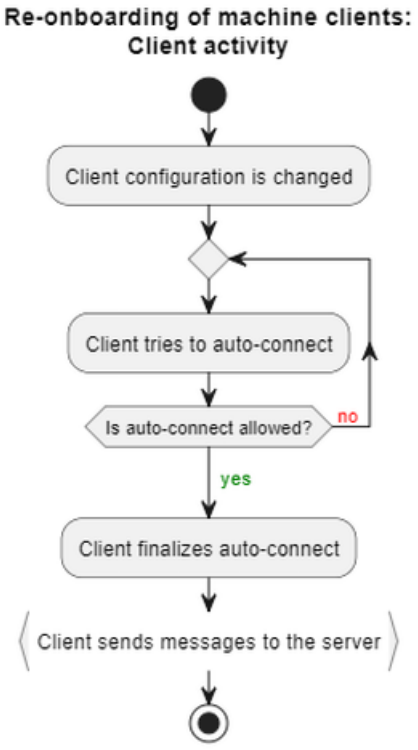
On the client machine

The client can be in several different initial state when a re-onboard operation has been requested for it:

- Completely operational
- Damaged (because of a faulty hardware and/or software)
- Restored from an archive image where the image was created after the client was connected to and onboarded via an operational Mcenter server where the server version was at least 5.4.0.0
- Restored from an archive image where the image was created before the client was connected to and onboarded via an operational Mcenter server where the server version was at least 5.4.0.0
- A new machine with base OS image and HMI installed on

It is recommended to initiate the re-onboard operation only when the given machine was restored from a recent archive image (see point 3 in the list above).

In other cases unexpected errors could occur during the process and manual action could be needed to restore the machines's normal operating state.



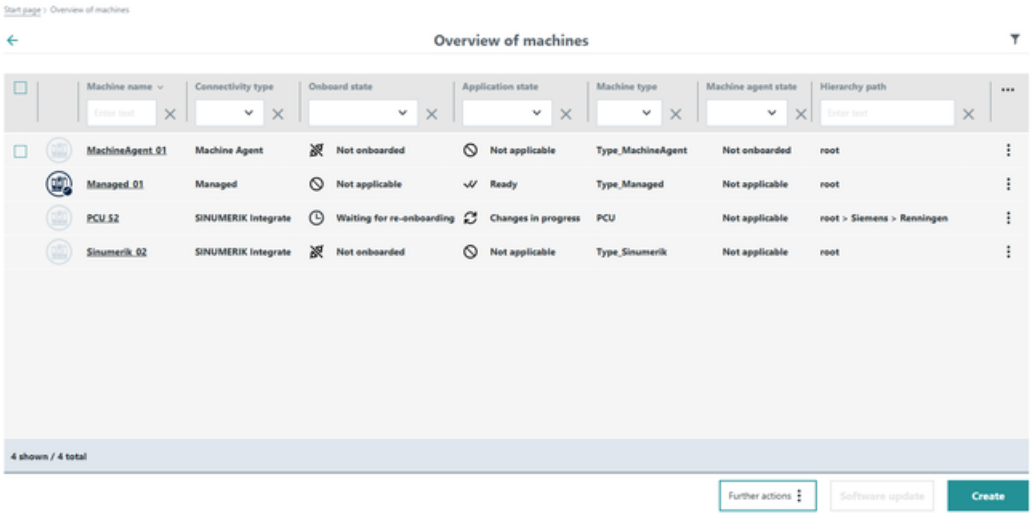
5.9.2 Monitoring the re-onboarding process

The Machine management and the Application management can be used to monitor the whole process.

Machine management

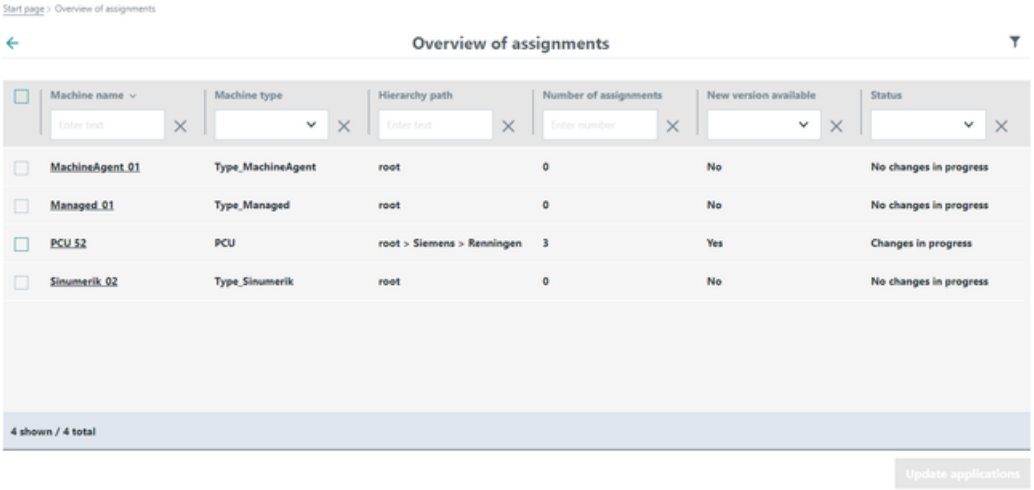
The autoconnect address is editable during the machine is in 'Reonboarding' onboard state.

On the page 'Overview of machines' the onboard state of the machine is 'Waiting for re-onboarding', the application state of the machine is 'Changes in progress'.

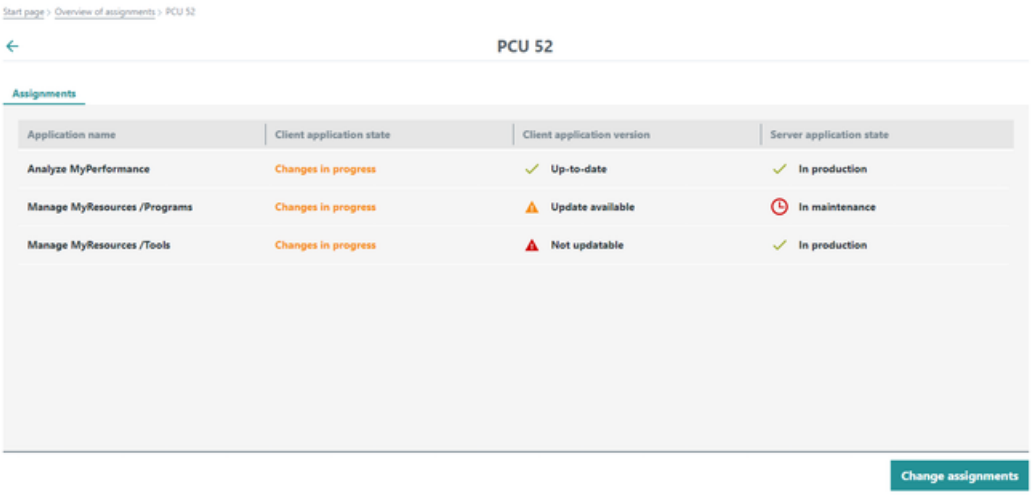


Application management

On the page 'Overview of assignments' the 'Status' column shows 'Changes in progress' for the machine.



On the details page of a given machine (Assignment) the 'Client application state' column shows 'Changes in progress' and the 'Server application state' column shows 'In maintenance' for applications* which supports the server side maintenance phase of the process.



After the machine has been successfully re-onboarded

When the client finishes the re-onboarding process, an HMI needs a restart.

Applications installed on the given client before the re-onboarding might be automatically installed again because the information about their state could have been encrypted and that information might no longer be accessible by the Mcenter scripts because of the hardware (or software) changes.

Initiate and monitoring the re-onboarding

1. Click on the "Manage machines" tile on the dashboard and identify the desired machine in the "Overview of machines" window.
2. In the row of the desired machine open the kebab menu and click on the Re-onboard menu item.
   A confirmation dialog appears. You can change the IP or MAC address of the machine if necessary, then click „Re-onboard" to initiate the re-onboard process on the machine.
   A message about the result of the requested operation will be shown at the upper right corner of the window.

5.9.3 Example use-case

Overview

An onboarded and connected client machine is no longer able to connect to the Mcenter server.the

The fault analysis shows that the of the given machine is broken.

Since the machine is the part of the productive system and produces goods it is important to fix the problem as soon as possible.

A maintenance window has being designated when repair tasks are allowed in the faulty machine's area.

The Mcenter server administrator (or a user with Key user role) initiates the re-onboarding process on the Machine management overview:

- A new autoconnect address (MAC address) has been set for the machine since the new network card has a MAC address that is different from the faulty one's.
- Server-side Mcenter applications* are notified about the operation and can apply their business logic accordingly.

In the maintenance window the machine is powered down, the faulty hardware is replaced and the machine is reconnected to the network and powerwed on again:

- A recently created archive image (A Norton Ghost image for example) is restored in the machine.
- The machine is restarted, booted up and the HMI has also been started.
- If needed, the Mcenter server address is corrected and set in the HMI.

Because the machine is restored from an image, it thinks it is already been onboarded with the given server and tries to execute the tasks which are part of its normal operation:

The server refuses to serve these attempts and instead, it instruments the client to re-initiate an autoconnect operation.

Note

Please note that data created by Mcenter applications and stored on the client machine prior to the re-onboard operation could pontially lost after the operation is completed.

- Since the machine is in the re-onboarding onboard state, the server accepts the onboard operation request, creates new credentials for the client and and finishes the autoconnect process.

The machine's onboard state changes to 'Onboarded' and its online state changes to "Online" on the Machine management overview.

An alarm is shown on the HMI stating that a restart is needed to finalize the application-related operations:

- On the Application management overview page on the server, the applications' client state of the machine also indicates that a manual action is required and the machine is waiting for a restart.

After the machine and the HMI are restarted, the client is ready to be used in production again.

Note

*Currently there are no Mcenter applications that support this feature. For this reason re-onboarding a machine could cause unexpected behaviors in said applications.

Working with Analyze MyPerformance /OEE

6

6.1 Performance Monitoring

6.1.1 Opening the Performance Monitoring

You can check the performance of the machines using the performance monitoring function.

Note

Before starting the Analyze MyPerformance application

Clean the browser cache before using the Analyze MyPerformance application if you have upgraded Mcenter from a previous version. Otherwise there might be missing texts and translations on the Analyze MyPerformance /OEE pages.

Procedure

1. On the start page of the Mcenter, click "Performance Monitoring".



2. The "Performance Monitoring" window opens with 2 tabs:
   - OEE: For more information see Performance Monitoring - OEE (Page 129).
   - Machine comparison: For more information, see Machine comparison (Page 153).
3. To switch to the "Machine Details" view, select a machine on the OEE tab.
   The "Machine Details" view opens with 2 tabs:
   - Summary: For more information, see Machine details (Page 134).
   - Dashboards: For more information, see Dashboards (Page 157).

6.1.2 Performance Monitoring - OEE

The "Key Performance Indicator (KPI)" and the "Overall Equipment Efficiency (OEE)" will be calculated instantly.

If the selected time interval includes the current workday, the OEE, and the KPIs results are calculating when the Performance Monitoring page opens for that machine in real-time with the latest arrived machine data.

The formula that you set under "Configuration" for the Analyze MyPerformance /OEE is used.

For more information on processing the KPI calculation, see Opening the Configuration (Page 287).

Parameters and elements

The following parameters and elements are available for editing:

Parameter/element	Description
Root	Select the root to see all child machines of this root.
Machine Filtering	Opens the drop-down list to select a tag. Only the machines with this tag are displayed. For more information on tagging a machine see Adding tags (Page 152) and Machine tags (Page 300).
Time selection	
Today	Clicking on "Today" allows you to see the values for the current day, taking into account the time of day.
Current Week	Clicking on "Current Week" allows you to see the values for the current week. Starts on Monday and ends on the current workday.
Current Month	Clicking on "Current Month" allows you to see the values for the current month. Starts on the 1st day of the month and ends on the current workday.
Current Quarter	Clicking on "Current Quarter" allows you to see the values for the current quarter. Starts on the 1st day of the current quarter and ends on the current workday.
Current Year	Clicking on "Current Year" allows you to see the values for the current year. Starts on January 1 and ends on the current workday.
Custom Date	Clicking on "Custom Date" opens the calendar to select a date range. After selection, this time interval is displayed in the line. For more information, see Defining the custom date (Page 147).
Last week	Clicking on "Last Week" allows you to see the values of the previous week. Starts from previous week's Monday and ends on previous week's Sunday.
Yesterday	Clicking on "Yesterday" allows you to see the values of the previous day, taking into account the time of day.
Symbols	
	Clicking on the "Screenshot" button generates a screenshot of the current window.
	If you click on the "Refresh" icon, you update the opened window.

Procedure

You see the "OEE/KPI Overview" of all machine.

You can select a root to view all child machines of this parent.

In the overview, the OEE value is displayed in percent in the large circle. Online/Offline signals of the machines are also displayed.

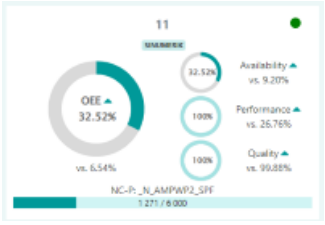
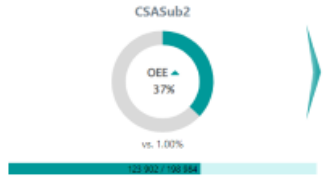
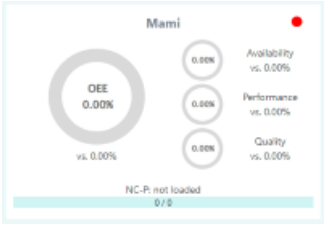
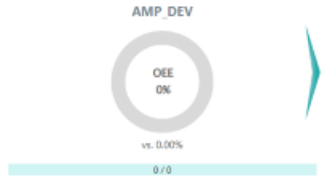
The KPI values for the selected time interval are displayed in the three circles on the right:

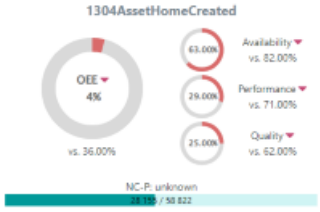
- Availability
- Performance
- Quality

A progress bar below the circles displays a workpiece summary for the ongoing shifts (good workpieces/target number of workpieces).

Click on the required period to display the number of good and target workpieces based on the selected period of time.

Click on one of the "OEE/KPI Overview" tiles to see a detailed view.

	Regular tile: • NC program name (NC-P) is displayed. • For long NC program names, a tooltip with the full NC program name is shown when hovering the cursor over it. • Online/Offline signals: – Green circle icon = Machine is online – Red circle icon = Machine is offline
	Grouping tile: • NC program name is not displayed as the program name is related to an asset.
If there is no planned production, the program is not loaded:	
	• For regular tiles, the text "NC-P: not loaded" is displayed and the number of workpieces is 0/0.
	• For grouping tiles, the number of workpieces is 0/0.

	If the program name could not be read, "NC-P: unknown" message is displayed.
	If the number of "Good" and target workpieces could not be read, "NaN / NaN" message is displayed.

Note

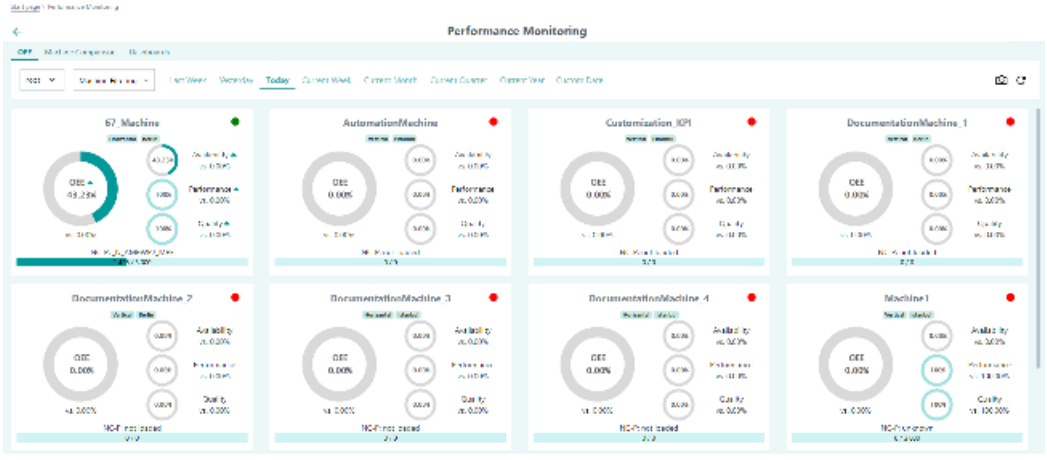
Be advised, that altering the machine hierarchy path of a connected device to relocate it beneath another connected machine will result in the inability of the AMP to accurately calculate OEE, KPI, or other pertinent variables for the parent machine.

To circumvent this potential issue, we strongly recommend refraining from designating a connected machine as a parent node.

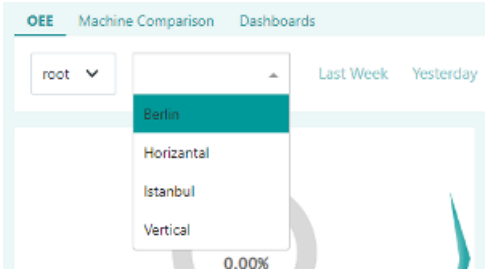
Should you wish to establish a hierarchical structure for your machines, we encourage the utilization of the "Plant Management" feature within Mcenter. For comprehensive instructions, see Managing plant hierarchy (Page 39)

Machine filtering

1. You see all machines.
2. Click "Machine Filtering" .



3. Select the tag that you want. You can select several tags.



The machines are filtered.



6.1.3 Machine details

6.1.3.1 Controlling the performance of the machines

Parameters/symbols

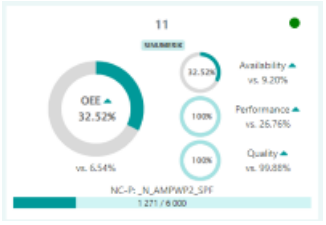
The following parameters and elements are available for editing:

Parameter/element	Description
Machine List	Open the drop-down list to select the machine. After selecting the machine, the machine name is displayed in the header.
Add Tag	Adds a tag to the machine.
Time selection	
Today	Clicking on "Today" allows you to see the values for the current day, taking into account the time of day.
Current Week	Clicking on "Current Week" allows you to see the values for the current week. Starts on Monday and ends on the current workday.
Current Month	Clicking on "Current Month" allows you to see the values for the current month. Starts on the 1st day of the month and ends on the current workday.
Current Quarter	Clicking on "Current Quarter" allows you to see the values for the current quarter. Starts on the 1st day of the current quarter and ends on the current workday.
Current Year	Clicking on "Current Year" allows you to see the values for the current year. Starts on January 1 and ends on the current workday.
Custom Date	Clicking on "Custom Date" opens the calendar to select a date range. After selection, this time interval is displayed in the line. For more information, see Defining the custom date (Page 147).
Last week	Clicking on "Last Week" allows you to see the values of the previous week. Starts from last Monday and ends on the previous Sunday.
Yesterday	Clicking on "Yesterday" allows you to see the values for the previous day, taking into account the time of day.
Symbols	
	The sustainability icon indicates the sustainability level of the machine. • Gray: below the sustainability level • Green: above the sustainability level
	The machine is online. For Machine Agent connected devices, the green icon is always displayed which means the machine is displayed as online even when the machine is offline.
	The machine is offline.
	Clicking on the "Screenshot" button generates a screenshot of the current window.
	If you click on the "Refresh" icon, you update the opened window.
	If you click on the icon, you can change the actual work state of a past time.
	If you click on the icon, you switch back and forth to and from the full view.

Parameter/element	Description
	Clicking on the "Export machine status trend as CSV" button generates a CSV export of the machine status data of the selected machine for the selected time interval. For more information, see Exporting machine status (Page 149).
	Clicking on the "Machine Information" button displays the machine information for the selected machine in a new pop-up window. For more information, see Displaying machine information (Page 151).
	The time that the last data was received is displayed in the footer of the "Machine Details" window. It displays when the data is queried from the database and when the calculations on the UI have been done by the application.
Machine status trend window	
	Machine/Operator state
	Manual state

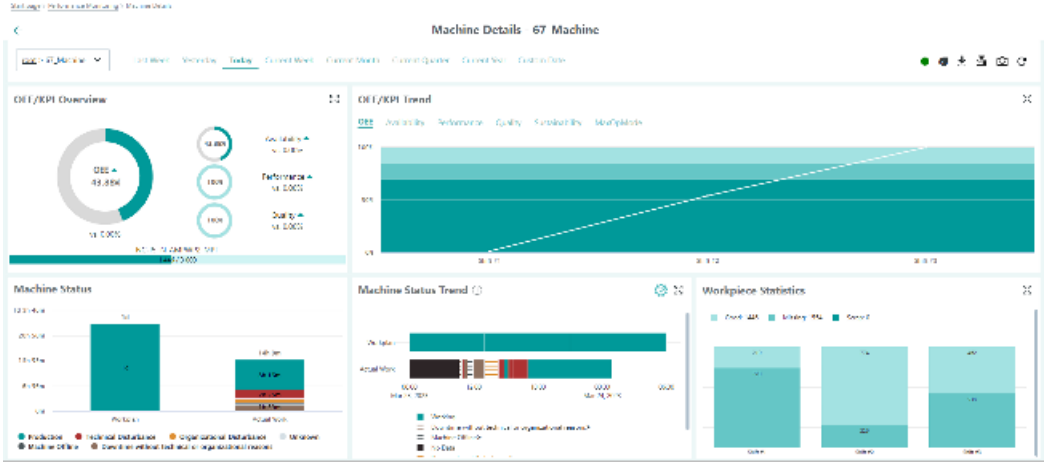
Procedure

1. Select the required machine.
   Click on one of the "OEE/KPI Overview" tiles in the overview of the "Performance Monitoring" window.



   - OR -
   Open the drop-down list in the upper left window area and select the required machine.
   The window with the machine details opens.

2. Click on the required time period.
3. The following window opens.



OEE/KPI Overview

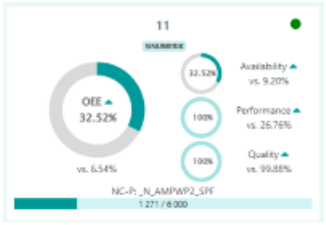
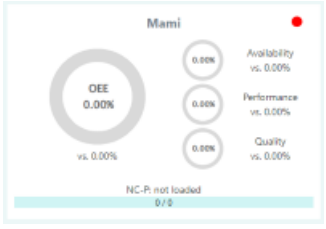
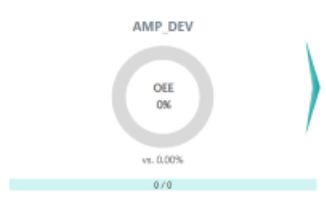
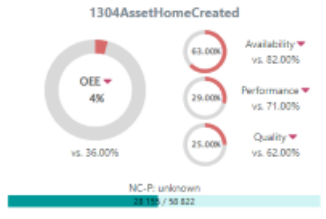
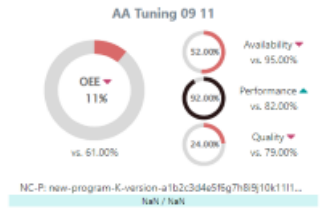
In the "OEE/KPI Overview" window area, the OEE value is displayed in percent in the large circle.

The KPI values for the selected time interval are displayed in the three circles on the right:

- Availability
- Performance
- Quality

A progress bar below the circles displays a workpiece summary for the ongoing shifts (good workpieces/target number of workpieces).

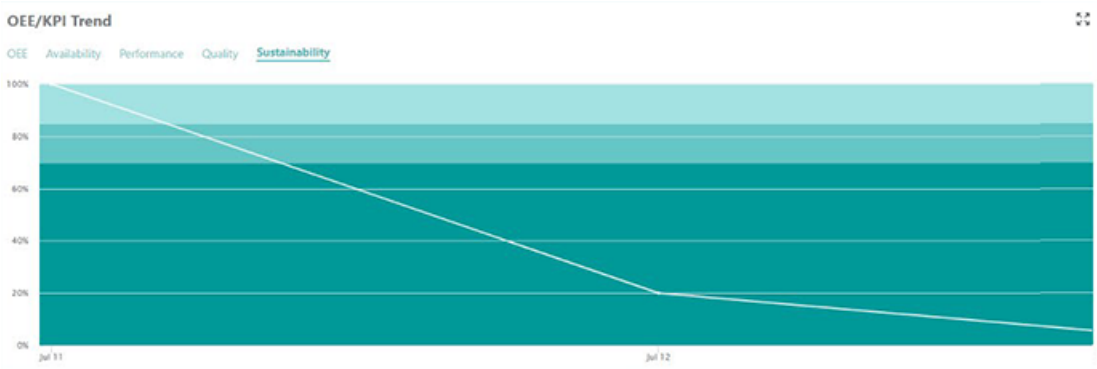
Click on the required period to display the number of good and target workpieces based on the selected period of time.

	Regular tile: • NC program name (NC-P) is displayed. • For long NC program names, a tooltip with the full NC program name is shown when hovering the cursor over it.
	Grouping tile: • NC program name is not displayed as the program name is related to an asset.
If there is no planned production, the program is not loaded:	
	• For regular tiles, the text "NC-P: not loaded" is displayed and the number of workpieces is 0/0.
	• For grouping tiles, the number of workpieces is 0/0.
	If the program name could not be read, "NC-P: unknown" message is displayed.
	If the number of "Good" and target workpieces could not be read, "NaN / NaN" message is displayed.

OEE/KPI Trend

In the "OEE/KPI Trend" window area, the OEE/KPI and Custom KPI values are graphically presented.
Click on the required monitoring parameter in order to display the OEE/KPI trend:

- OEE
- Availability
- Performance
- Quality
- Sustainability



You can edit the designations of the KPI labels "Availability", "Performance" and "Quality".
Further information on this can be found under: Customizing the KPI calculation (Page 272)

Sustainability

Click on the "Sustainability" tab.
The sustainability is displayed for each shift.

The sustainability level is the usage time compared to the uptime of the machine.

The usage time is the time when the machine status is "Production".

The uptime of the machine is the sum of the time when the machine is in one of the following states:

- Downtime without technical or organizational reasons
- Organizational disturbance
- Technical disturbance
- Production

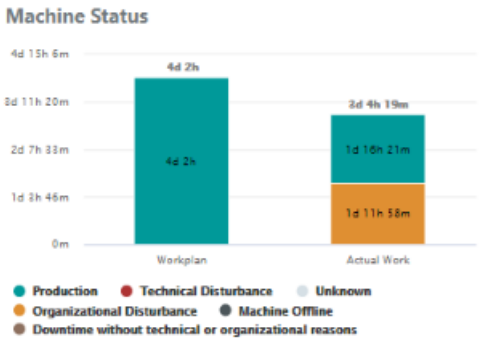
Machine Status

In the "Machine Status" window area, the duration of the planned machine status (work plan) and the duration of the actual machine states (actual work) are shown side by side. You have the option of displaying and hiding individual states.

- Production
- Technical disturbance

- Unknown
- Organizational disturbance
- Machine offline
- Downtime without technical or organizational reasons

You see a comparison of the workplan and the actual work in the "Machine Status" window area. Click on the machine status below the bar chart.
The selected machine status is displayed or hidden in the overview.



Machine Status Trend

In the "Machine Status Trend" window area, "Work Plan" and "Actual Work" are graphically displayed.

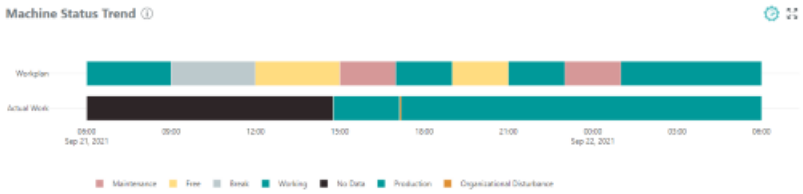
The following states are displayed:

- Maintenance
- Free
- Break
- Working
- Production
- Organizational disturbance
- No data

You can configure the "Actual Work" area via three levels.

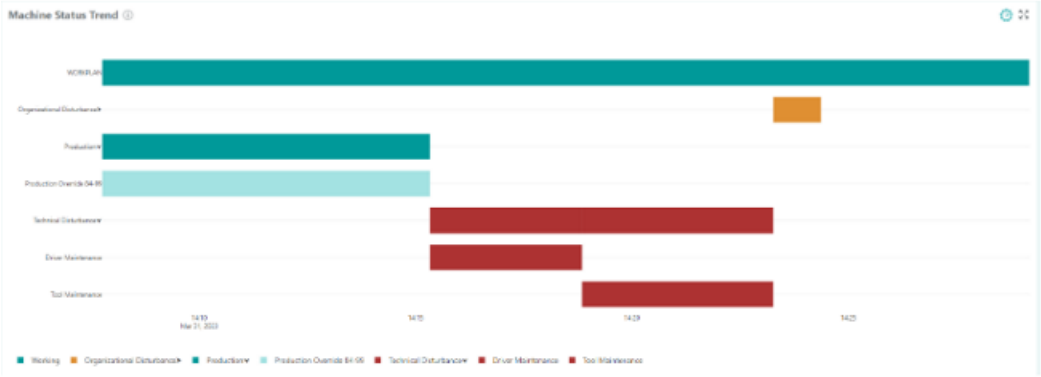
- If no machine status data arrived within 15 minutes from the machine, the "No data" state will be displayed on the Machine Status Trend chart.
- If a new state arrives for that interval via machine as buffered data, the "Machine Status Trend" chart will be updated and will display the recently arrived machine status.
- No data status can be editable via the Manual state function.

Additional information for editing machine status can be found in chapter: Configure manual states (Page 141).
You can find additional information in chapter: Editing the production level (Page 290).



- You can display details of the Operator /Machine states In the "Machine Status Trend" window by clicking the "Expand" icon.

  - In the "Machine Status Trend" window area, details of state can be visualized by clicking expand button



Workpiece Statistics

In the "Workpiece Statistics" window area, workpiece data is displayed according to the selected time.

The selected time is divided into the following grouping period:

- Today: shifts (x-axis label: shift number)
- Yesterday: shifts (x-axis label: shift number)
- Current week: days (x-axis label: specific date)
- Current month: weeks (x-axis label: week number of the year)
- Current quarter: months (x-axis label: month number)
- Current year: quarters (x-axis label: quarter number)
- Last week: days (x-axis label: specific date)

For custom periods the following way of grouping is implemented:

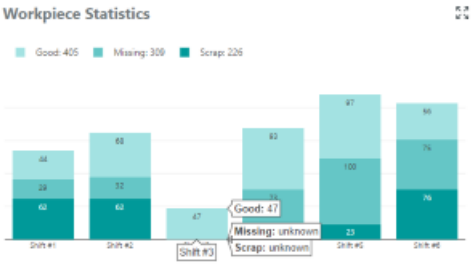
- Case 1: from 0 to 7 days group by DAY
- Case 2: from 7 to 31 days group by WEEK
- Case 3: from 31 to 210 days group by MONTH
- Case 4: from 210 to 365 days group by QUARTER
- Case 5: from 365 to 2555 days group by YEAR

Workpieces are grouped as:

- Good
- Missing
- Scrap

Click on the legend to filter the selected group of workpieces in the bar chart.

Use the tooltip to increase the readability of the bar chart. Data that could not be retrieved is shown as "unknown" value.



Limitations:

- maximum of 7 groups of data on a single bar chart
- maximum of 7 years as custom period

6.1.3.2 Configure manual states

With the function "Manual state" you have the possibility to adjust the actual working time manually.

Actual work states are calculated based on the received machine status information. In some cases, actual state and calculated machine state can be different.

Such as:

- In order to show machine in production, feed override must be higher than 70. But for some machines, that assumption must not be true. The machine could be in preparation state, such as cleaning or testing.

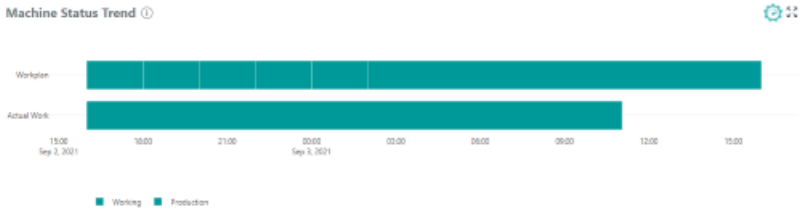
Parameter/symbols

The following parameters and elements are available for editing:

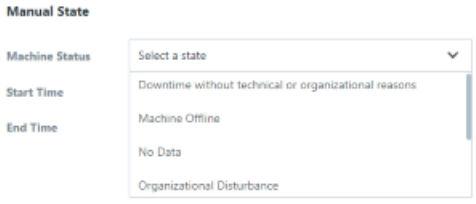
Parameter/element	Description
Manual State	
Machine Status	There are different machine status options that can be changed for selected duration: • Downtime without technical or organizational reasons • Machine Offline • No Data • Organizational Disturbance • Production • Technical Disturbance • Unknown
Operator State	Operator State which is mapped with selected machine status.
Start time	Start time of manually changed machine state.
End time	End time of manually changed machine state.
Symbols	
	If you click on the icon, you can choose the start/end time.
	If you click on the icon, you can change the actual work state of a past time.
	If you click on the icon, you switch back and forth to and from the full view.

Procedure

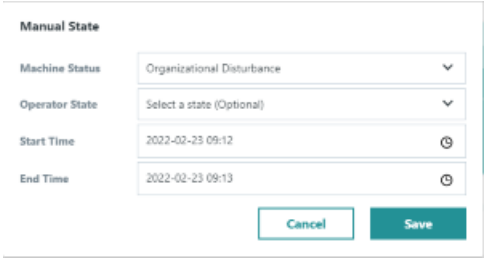
1. Select the required machine from the overview of the "Performance Monitoring" window. In the "Machine Status Trend" window, "Workplan" and "Actual Work" are graphically displayed.
   – Click on the icon in the upper right area to change the actual state.



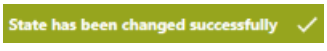
2. The "Manual State" window opens.
   – Open the "Machine Status" drop-down list and select the required machine status.



   – Open the "Operator State" drop-down list and select the desired operator state to map the selected machine status with an operator state.
   The drop-down list is only visible if an operator state has been created and mapped with the selected machine status. For more information, see Operator States (Page 291).
   Click on the clock icon to open the calendar and select the start time and end time.
   Click on the "Save" button.



   – If the machine state entering is successful, notification "State has been changed successfully" is displayed in the upper right window area.



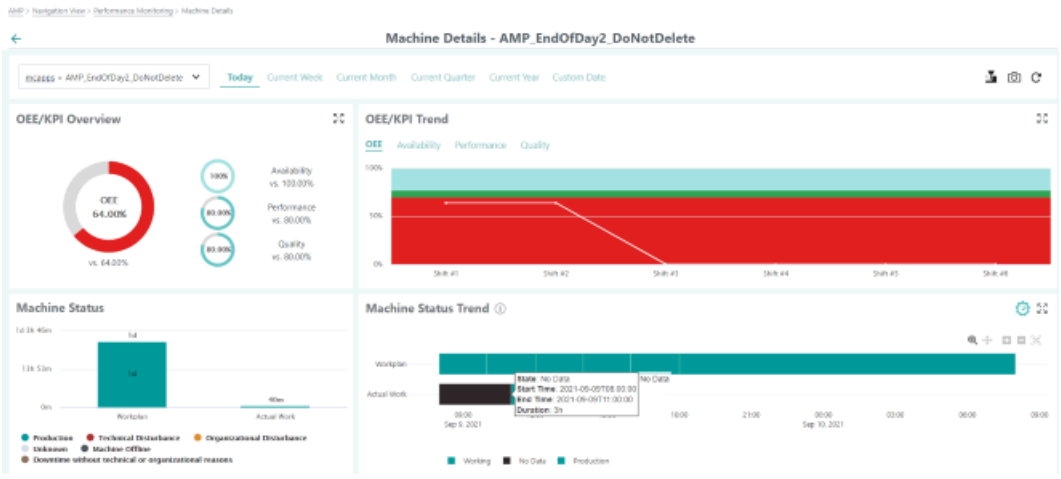
3. When there is "no data" received after the manually changed times, the system shows the remaining time as no data. It is allowed to change no data to a defined state as well.
   For example: Organizational disturbance was entered for the time between 05:00 to 10:00. The remaining time is shown as no data and can be changed to a defined state as well.



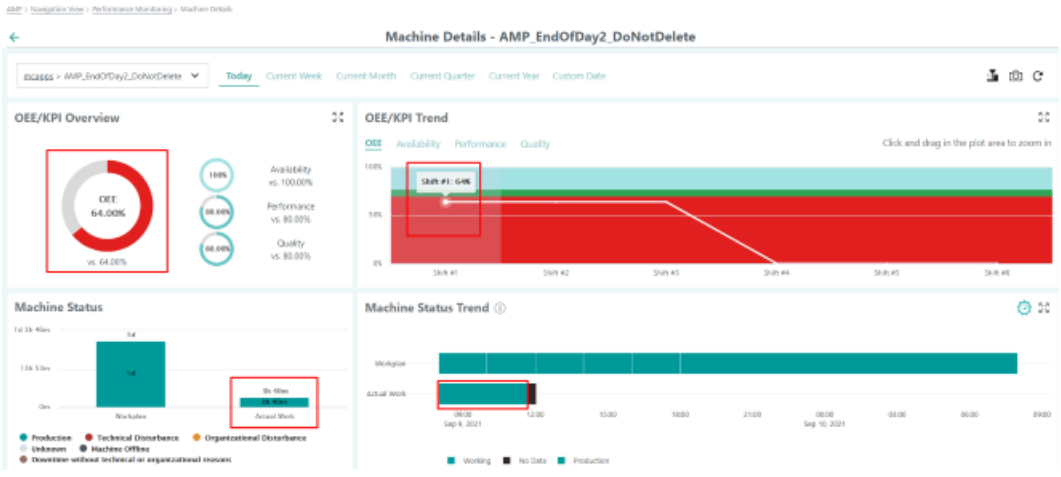
Example

For example, production state entered for 09.09.2021 08:00 - 09.09.2021 11:00 via Manual State feature. 3 hours later production state is entered, OEE/KPIs are recalculated in respect to new states and all charts on the UI are going to be updated as well.

Before entering machine state:



After having manually entered machine state:



6.1.3.3 Change manual states

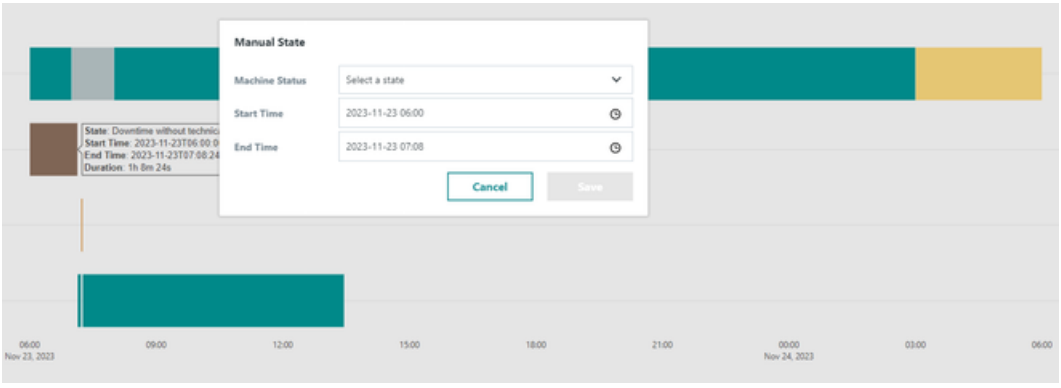
Manual states can be entered by clicking on Machine states on Actual Work line of Machine Status Trend chart.

Procedure

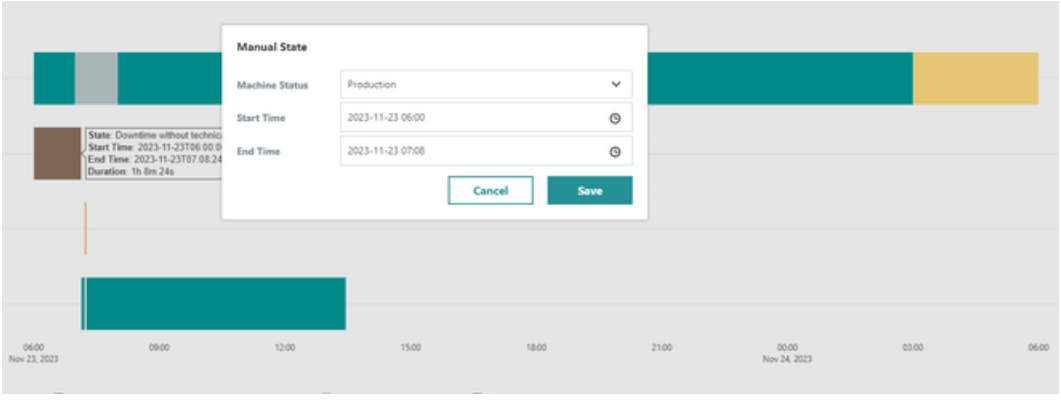
1. Click the machine status that should be changed.



Start and end time are displayed in the pop-up window.



2. Select the machine status to be displayed.



3. Click "Save".



Selected machine status is displayed according to the configured start and end time.

6.1.3.4 Defining the custom date

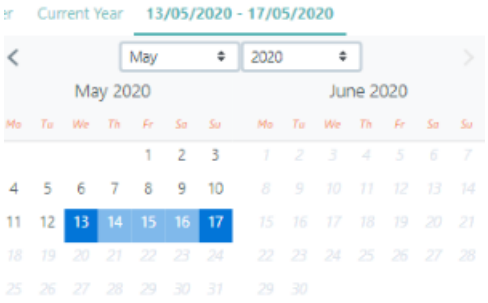
To display the performance results of the resource, in addition to the predefined date, you can also define a user-defined range of dates in the "Performance Monitoring" and "Machine Details" windows.

Button

Button	Function
Custom Date	Clicking on the "Custom Date" button opens the calendar where you can select a date range. After selection, this time interval is displayed on the button.

Procedure

1. Click on "Custom Date".
2. The calendar opens.
   Click on the start date followed by the end date.



3. The component is automatically closed.
   – The selected time interval is displayed on the button instead of text "Custom Date".
   – The results are automatically refreshed on the page.



- OR -
If you only select a day, then the date is displayed on the button and the result is refreshed on the page.



Effects

You can see the results (OEE / KPI) for each displayed machine – corresponding to the date selected – in window "Performance Monitoring".

The average OEE result of all subordinate (lower level) values is displayed for the higher-level machines.

You can view the performance (OEE / KPI) and the machine status data of the machine corresponding to the data that you selected in window "Machine Details" of a machine.

If you select "Today" or a specific single day, then the OEE / KPI results for each shift of the selected day are displayed.

If an individual day is not selected, then the KPI trend diagram displays the aggregated OEE / KPI results for each day in the selected time interval.

Note

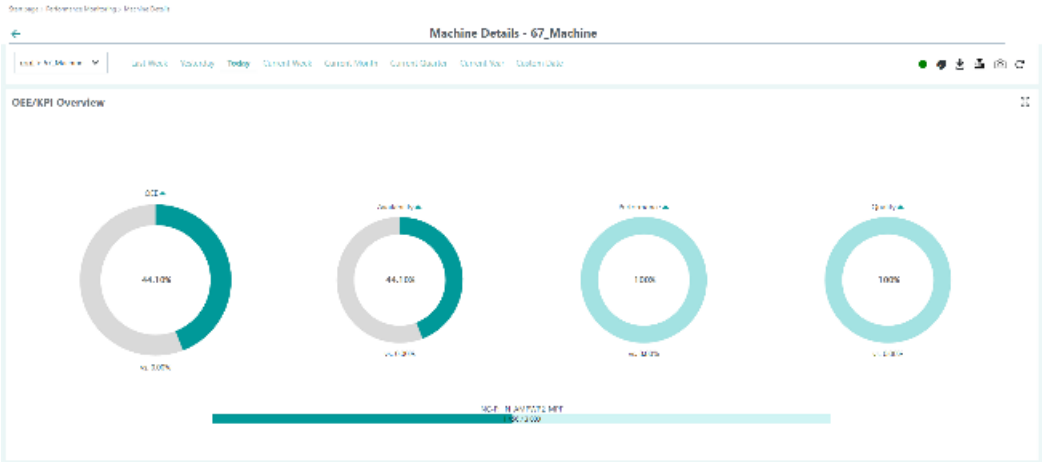
Comparison function is available for OEE / KPI results

The comparison function for the OEE / KPI results is only available for the predefined selected date.

The comparison function is not available if you select a range of custom dates.

Example:

In the following example, you see the comparison function for the currently selected week, which compares the results with the previous week.



6.1.3.5 Exporting machine status

With the function "Export Machine Status", you can get a copy of the raw machine status data for the selected asset in CSV format.

Parameters

The following parameters are available:

Parameter	Description
Machine List	Open the drop-down list to select the machine. After selecting the machine, the machine name is displayed in the header.
Time selection	
Today	Clicking on "Today" allows you to see the values for the current day, taking into account the time of day.
Current Week	Clicking on "Current Week" allows you to see the values for the current week. Starts on Monday and ends on the current workday.

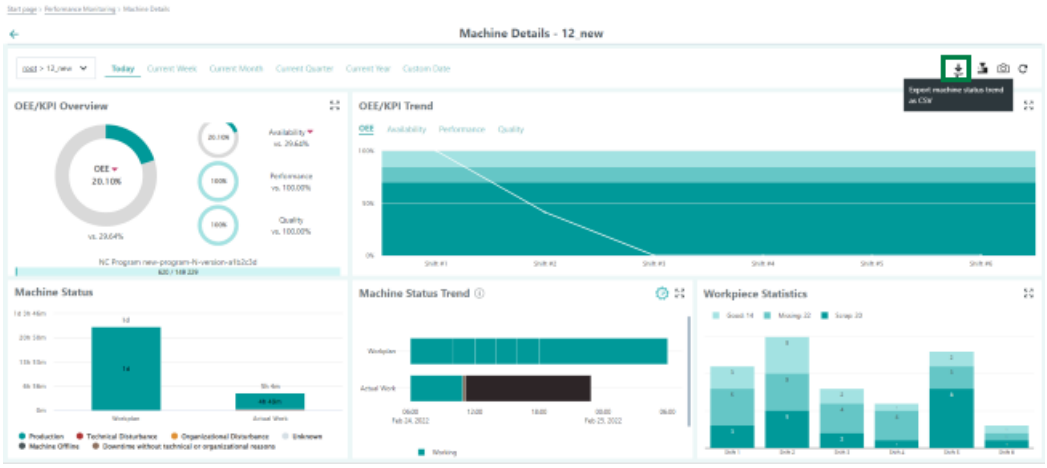
Parameter	Description
Current Month	Clicking on "Current Month" allows you to see the values for the current month. Starts on the 1st day of the month and ends on the current workday.
Current Quarter	Clicking on "Current Quarter" allows you to see the values for the current quarter. Starts on the 1st day of the current quarter and ends on the current workday.
Current Year	Clicking on "Current Year" allows you to see the values for the current year. Starts on January 1 and ends on the current workday.
Custom Date	Clicking on "Custom Date" opens the calendar to select a date range. After selection, this time interval is displayed in the line. For more information, see Defining the custom date (Page 147).
Last week	Clicking on "Last Week" allows you to see the values of the previous week. Starts from last Monday and ends on the previous Sunday.
Yesterday	Clicking on "Yesterday" allows you to see the values of the previous day, taking into account the time of day.
Symbol	
	Clicking on the "Export machine status trend as CSV" button generates a CSV export of the Machine Status data of the selected machine for the selected time interval.

The columns of the exported CSV file contain the following information:

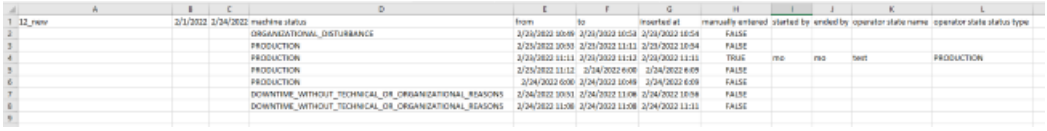
Column	Description
A	Shows the name of the machine.
B	Shows the start period of the exported data.
C	Shows the end period of the exported data.
D	Shows the machine status type.
E	Shows the machine status start time.
F	Shows the machine status end time.
G	Shows the machine status insert time.
H	Shows the machine status type: • "TRUE" if it is a manual operator state • "FALSE" if the state came from the machine
K	Shows the operator state name. This column's value is only available for operator states.
L	Shows the operator state status type. This column's value is only available for operator states.

Procedure

1. Select the required machine from the overview of the "Performance Monitoring" window.
2. Click the "Export machine status trend as CSV" button.



3. The machine status export file will be downloaded to your computer.
   The date range shown in the exported file depends on the time interval selection on the "Machine Details" window.



6.1.3.6 Displaying machine information

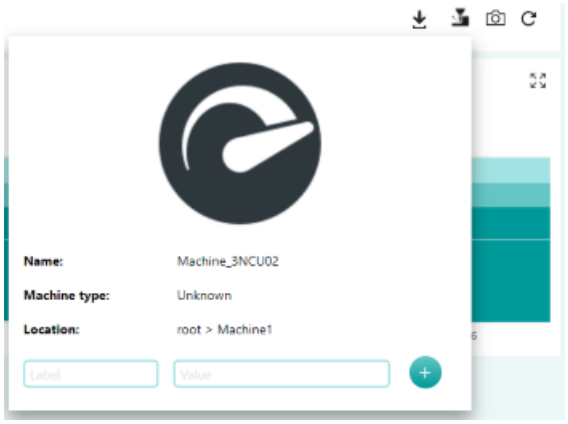
Parameter

The following parameters are available:

Parameter	Description
Machine List	Open the drop-down list to select the machine. After selecting the machine, the machine name is displayed in the header.
	Clicking on the "Machine Information" button displays the machine information for the selected machine in a new pop-up window.
Machine Information:	
Name	Shows the machine name.
Machine type	Shows the machine type.
Location	Shows the hierarchy path of the machine.
Label and Value	You can enter up to three additional labels and specific values for the machine. Label: A maximum of 50 characters can be entered. Value: A maximum of 100 characters can be entered.
	Adds a new label and value field to the machine information.

Procedure

1. Select the required machine from the overview of the "Performance Monitoring" window.
2. Click the "Machine Information" button.
   The machine information window opens.

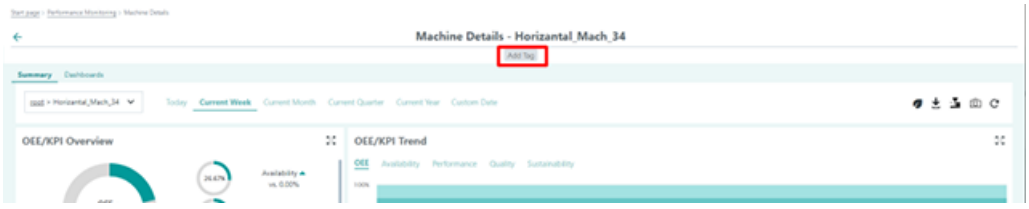


6.1.3.7 Adding tags

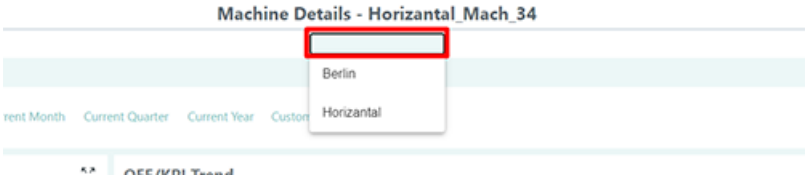
You can add a tag to a machine. This can be done in the "Machine Details" view or in the configuration. For more information on tagging, see Machine tags (Page 300).

Procedure

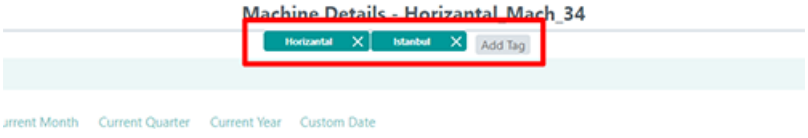
1. Click on the "Add tag" button.



2. Set the tag which is wanted in the text box.



The machine is tagged.



The notification "New relation is saved" is displayed in the upper right window area.



6.1.4 Machine comparison

You can compare machines by selecting predefined intervals or custom dates.

Parameters and elements

Elements	Function
	Refreshes the window.
	Takes a screenshot of the window.
	Previous or next window
	Allows to switch between Machine States or Cycle Time window.
root	Allows the selection of machines by parent machine.

Elements	Function
Machine Filtering	Allows the selection of a machine tag.
Interval	Time interval selection: • Last week • Yesterday • Today • Current week • Current month • Current quarter • Current year • Custom date

Procedure

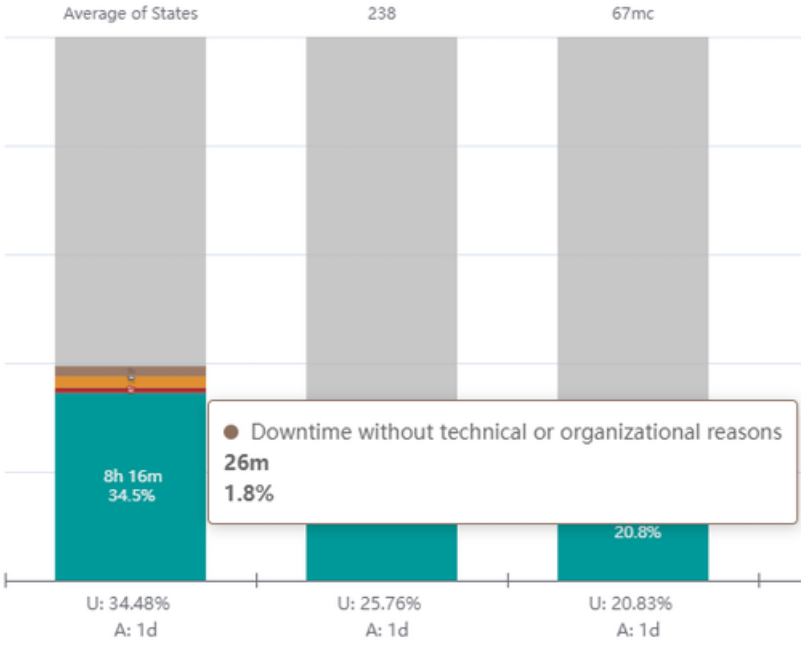
1. Click the "Machine Comparison" tab on the "Performance Monitoring" window.



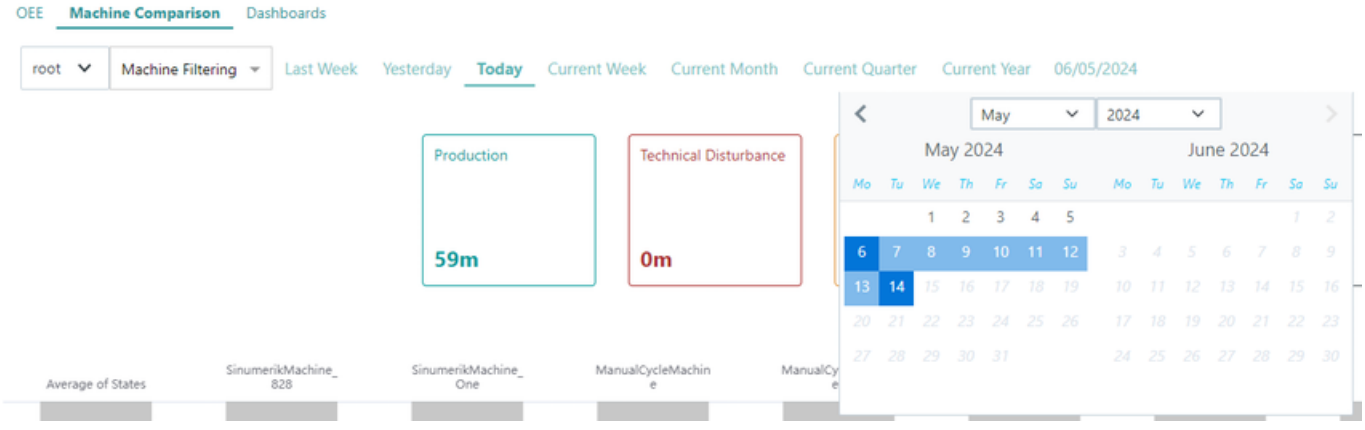
2. The actual machine states are displayed in bar charts for each machine. If the machines have no data, the chart is empty.
   The first bar chart shows the average of machine states. The average result is calculated for all machines. The default interval is "Today".
   The sum of machine states for Production, Technical Disturbance, Organizational Disturbance and Downtime without technical or organizational reasons is displayed above the bar charts.



3. Hover the mouse over the machine state parts to see the duration and percentage values of the machine state.



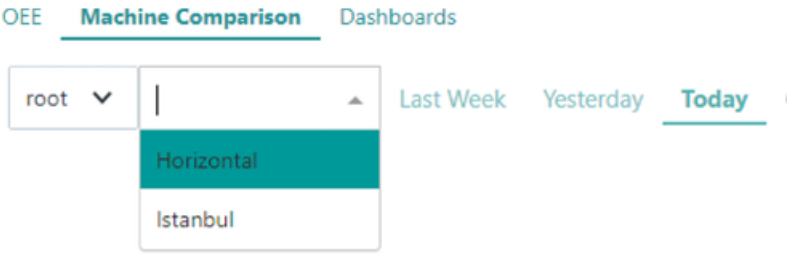
4. To change the interval
   Click on a predefined interval.
   - OR -
   Click on "Custom Date" to open the date picker.



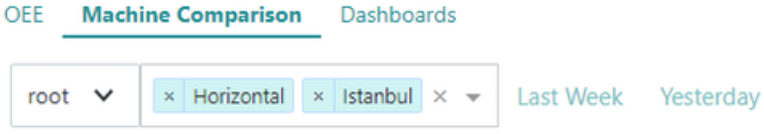
5. Each page shows 10 charts. Use the arrow symbols to navigate to the next page.
6. Click on the machine state legend to remove it from the view.
7. To display child machines, select the parent machine in the machine list.

Machine filtering

1. Click on "Machine Filtering".
   The drop-down list with the machine tags opens.



2. Select the filter.



3. Only the machines with this tag are displayed. For more information, see Adding tags (Page 152).

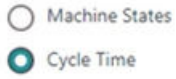
6.1.4.1 Cycle time

You can compare assigned machines with aggregated data. For more information, see Cycle Time Analysis (Page 327).

Elements	Function
▾	Filters related columns.
Machine Details 	Navigate to the machine details page.

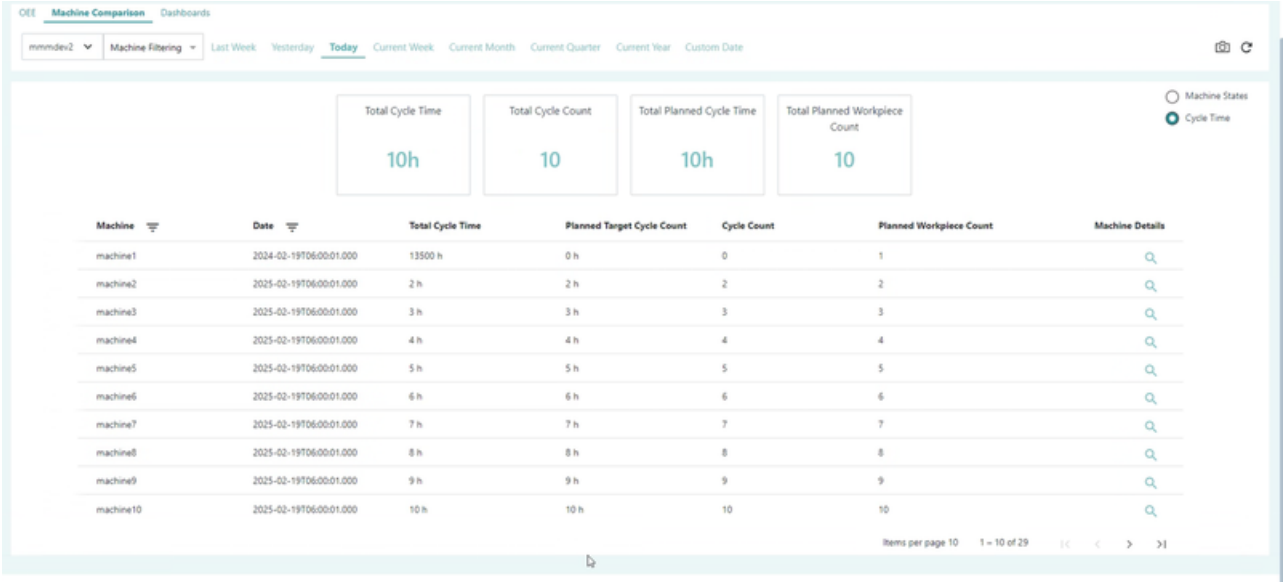
Procedure

1. Click the "Machine Comparison" tab on the "Performance Monitoring" page.
2. Click the "Cycle Time" button on the "Machine Comparison" page.



Based on the assigned machines the following information is displayed:

- Total Cycle Time
- Planned Target Cycle Count
- Cycle Count
- Planned Workpiece Count



6.1.5 Dashboards

6.1.5.1 Dashboard overview

Check the performance of the machines in the customizable dashboards. You can create charts and new OEE/KPI. You can select all integrated machines. You can also use default templates.

Procedure 1

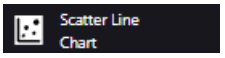
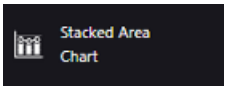
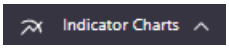
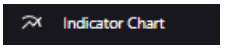
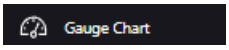
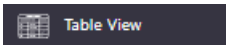
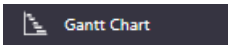
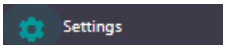
1. Go to the "Performance Monitoring" window.
2. Click the "Dashboards" tab.
3. The "Dashboards" window opens.

Procedure 2

1. Go to the "Machine Details" window.
2. Select a machine.
3. Click the "Reporting Engine" tab.
   The default boards open for the respective machine.

Buttons and elements

Move the mouse over the bar on the left to see the complete buttons.

Element	Function
	Opens the drop-down list for line charts.
	Opens the window to add a line chart.
	Opens the window to add a line dot chart.
	Opens the window to add a scatter line chart.
	Opens the window to add a stacked area chart.
	Opens the window to add a filled line chart.
	Opens the window to add a bar chart.
	Opens the window to add a bar chart.
	Opens the window to add a stacked bar chart.
	Opens the drop-down list for indicator charts.
	Opens the window to add an indicator chart.
	Opens the window to add a gauge chart.
	Opens the window to add a pie chart.
	Opens the window to add a table view.
	Opens the window to add a Gantt chart.
	Opens the window to add a card.
	Opens the window to set the attributes of the dashboard: • Dark Mode • Dashboard Name • Grid Options

Element	Function
	Editable board name label
	Click to add a new dashboard. You can create up to 7 dashboards.
	Saves the dashboard as a template respectively opens the saved templates.
	Exports the charts opened on the board.
	Pins the taskbar.
	Click the "Date picker" symbol to change the date range in the dashboard.
	The pen icon activates the edit menu. You can edit charts and edit tabs. The symbol changes to the "Save" symbol. Click the "Save" symbol to save the dashboard.

Chart elements

The following elements are available in the charts.

Some of them are only available in the edit mode. Click on the pen symbol at the lower right. The edit mode is started.

Click on a chart to edit.

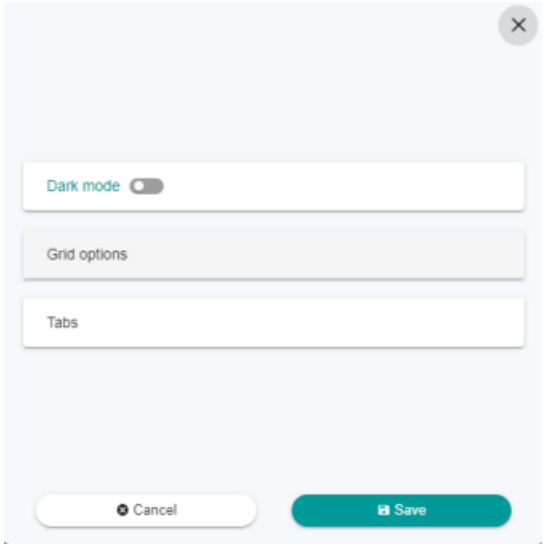
Element	Function
	Displays the time range and the time zone. Opens the calendar function.
	Saves the chart as image.
	Zooms into the display area.
	Zooms out of the display area.
	Resets the axis view.
	Opens the full screen view.
	Exports the chart as csv.
	Filters the chart data.
	Edits the chart.
	Deletes the chart

6.1.5.2 Configuring the Welcome page

As a new user, you can get guidance on the Welcome page by following the "Tips".

Procedure

1. Click the "Settings" symbol at the bottom of the toolbar on the left-hand side of the window.
2. Click the tabs.
3. Open the toggle and click "Save".



4. The customized Welcome page opens.



6.1.5.3 Generating charts

Elements

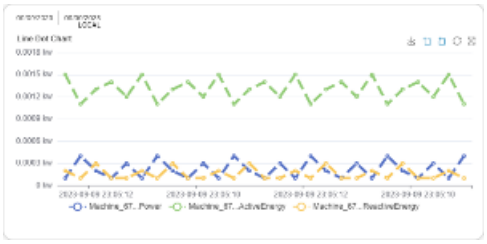
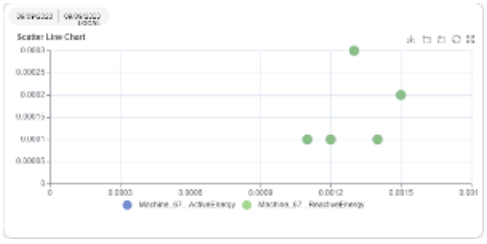
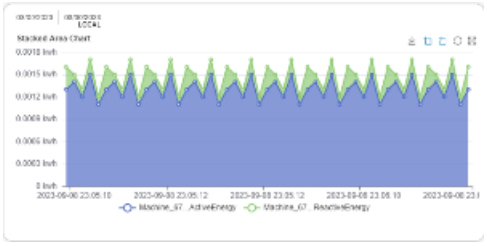
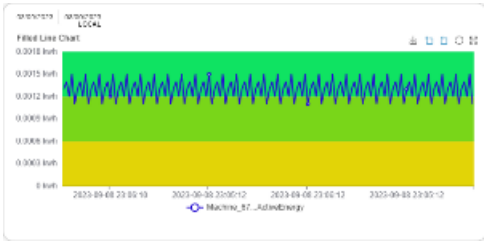
Chart type	Appearance	Description
Line Chart		
Line Dot Chart		
Scatter Line Chart		• 2 variables are mandatory
Stacked Area Chart		–
Filled Line Chart		• max. 1 variable/KPI
Bar Chart		

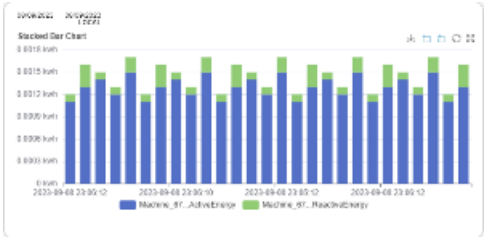
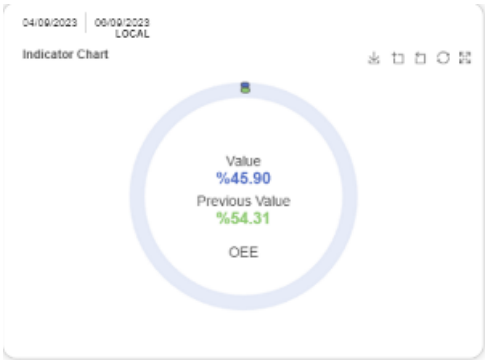
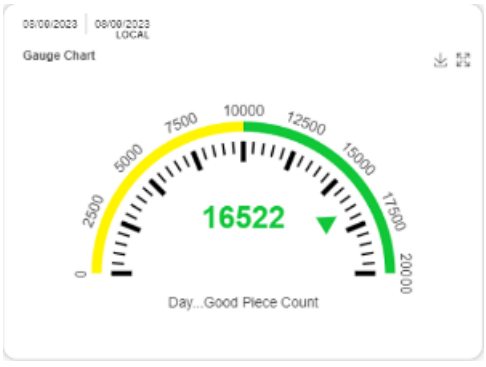
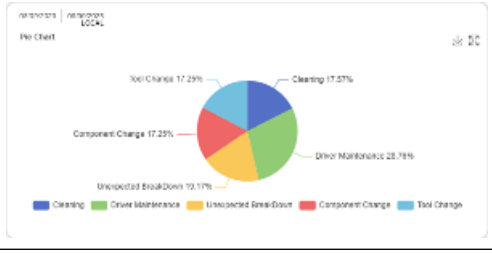
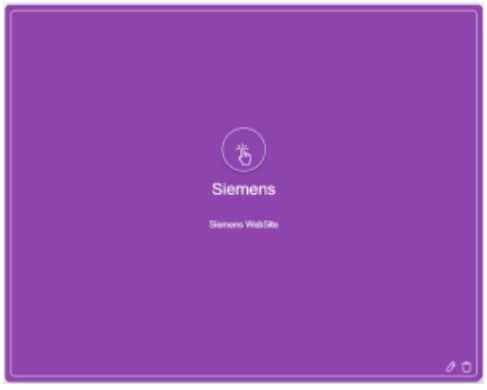
Chart type	Appearance	Description
Stacked Bar Chart		–
Indicator Chart		• max. 1 variable/KPI
Gauge Chart		• max. 1 variable/KPI
Pie Chart		–
Table View		

Chart type	Appearance	Description
Gantt Chart		• max. 1 variable/KPI
Card		–

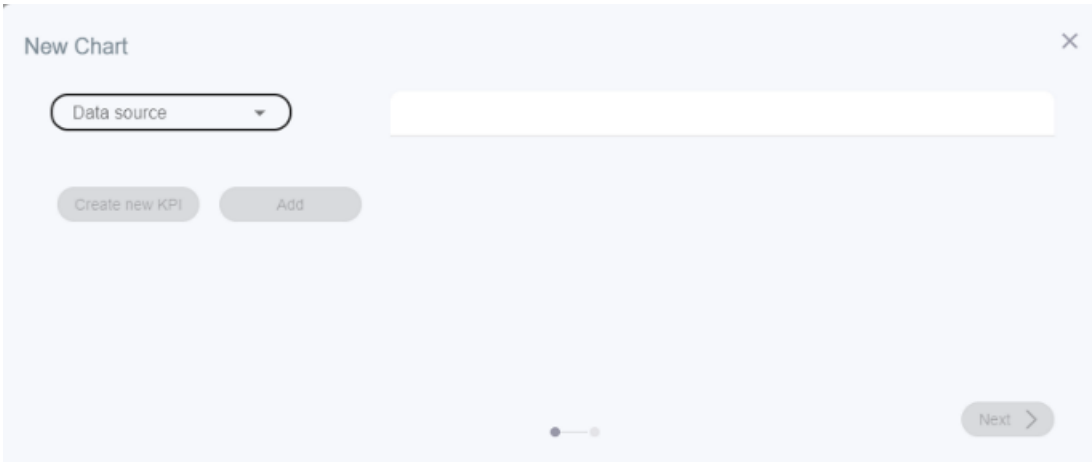
Data sources

OEE/KPIs	• Predefined KPIs • Custom KPIs
KPI Parameters	• Workpiece • Availability • Machine States • Operator States • Manual States • Custom
Operator States	• All • Production • Technical Disturbance • Organizational Disturbance • Downtime Without Technical or Organizational Reasons • Machine Off • Unknown
Machine Data	• Aspects
Summary Data	• Operator States • Manual States • Machine States • Production Analysis

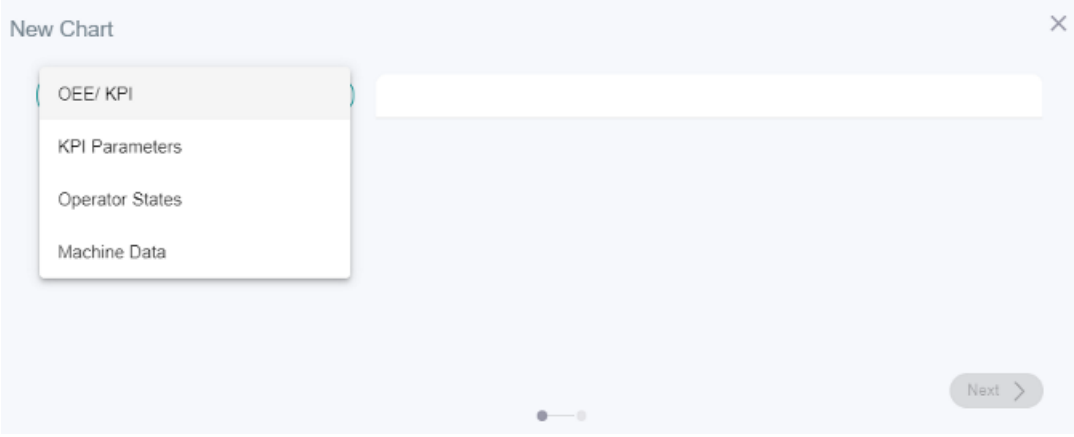
Table View	• Workpiece Results • Availability Results • Workpiece Performance Result
State Information Table View	• Machine States • Operator States • Manual States

Procedure

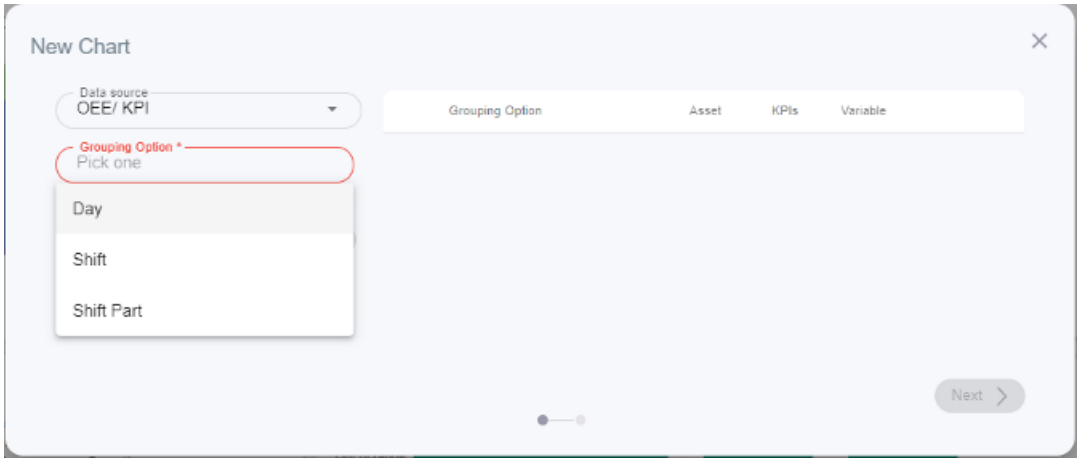
1. Click on the button of the chart you want to create.
   The window "New Chart" opens.



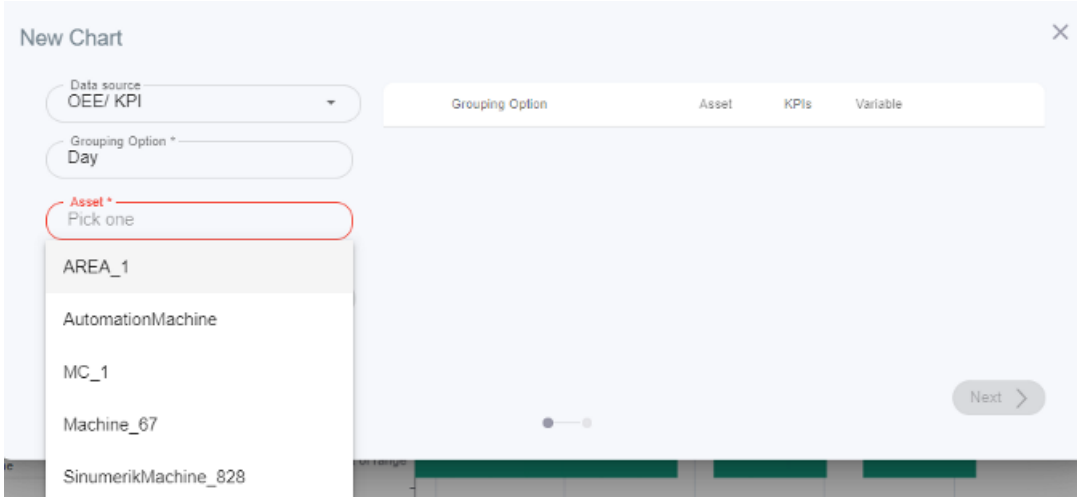
2. Select the data source.



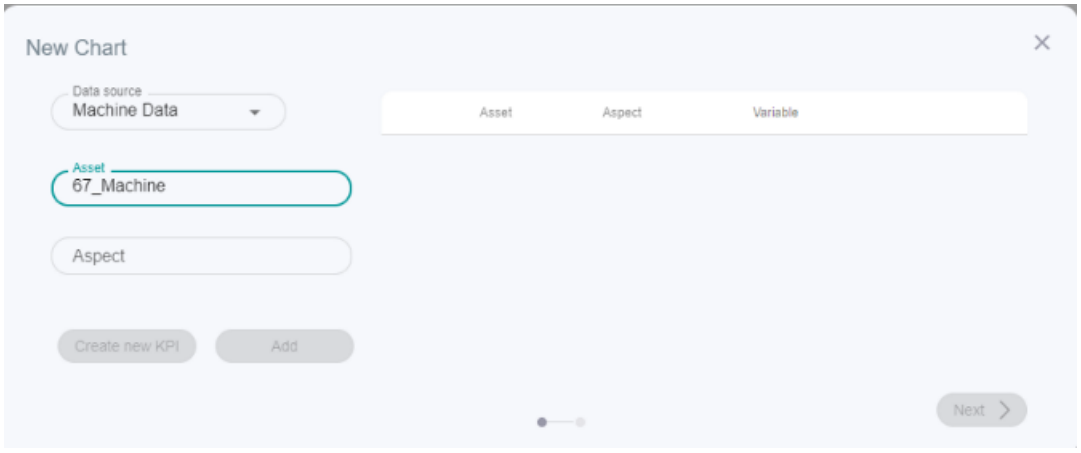
3. Select "Grouping Option".
   This field does not exist for all data sources.



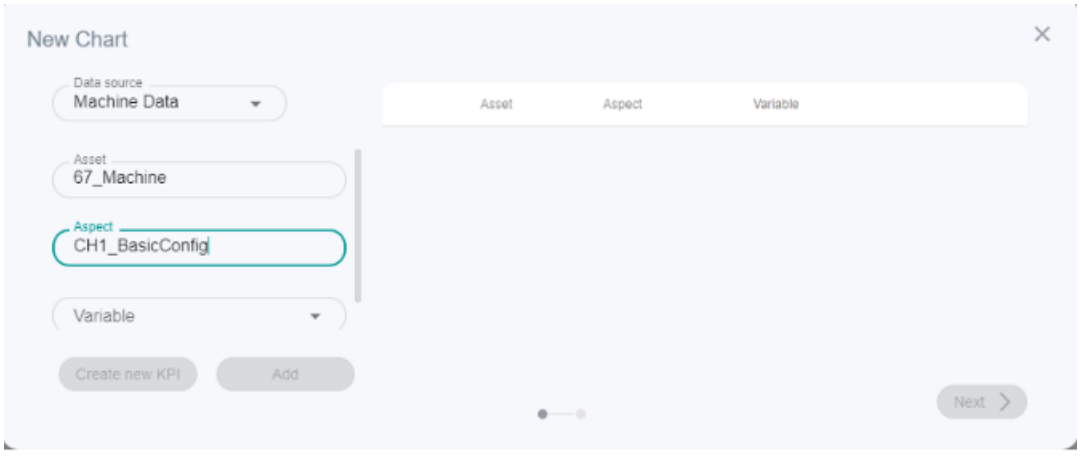
4. Select "Asset", i.e. the machine.



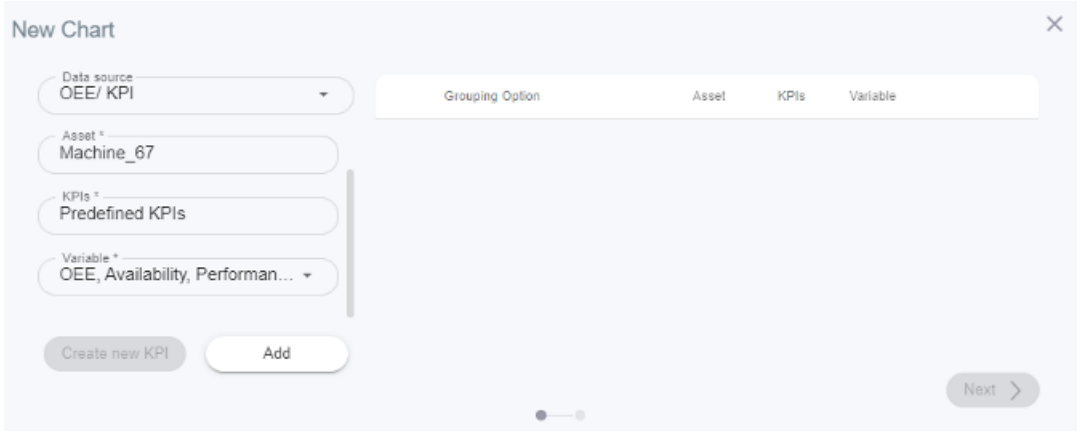
5. Select the KPIs.
   Depending on the selected data source, you can change the selected field name.



6. Select the variables. The number of variables depends on the chart type.

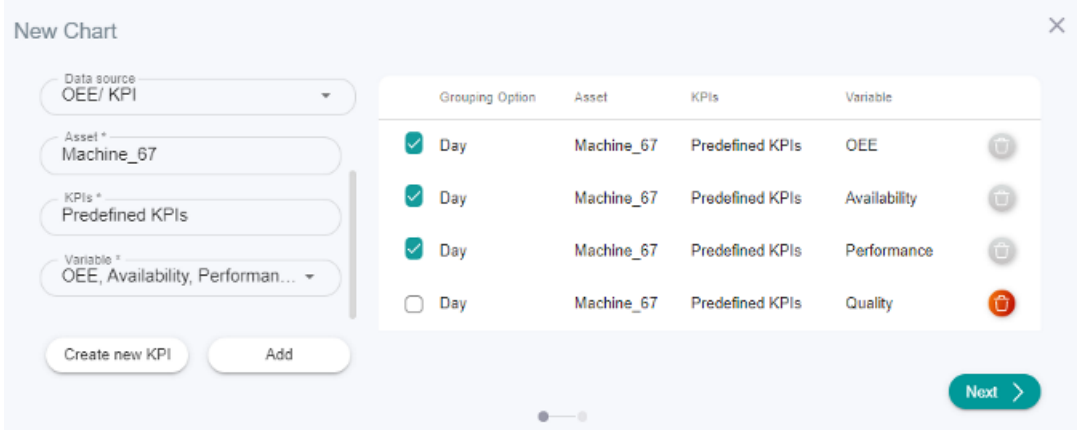


7. Click the "Add" button.



8. Activate the required checkbox for the variables you want to display.
   - The "Next" button is enabled as soon as you have selected the variables.
   - The checkboxes are disabled if the maximum number of variables/KPI is reached.

   Click on "Next".



9. Define labels for the chart values.
   - For the Gantt chart this field is mandatory.
   - For the other charts this field is optional.

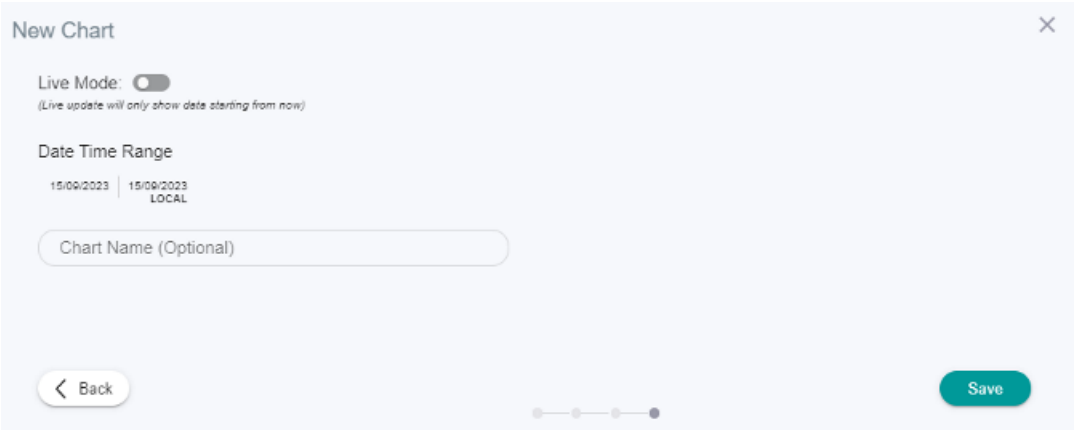
   You can add more labels with the "Plus" button.
   Click on "Next".



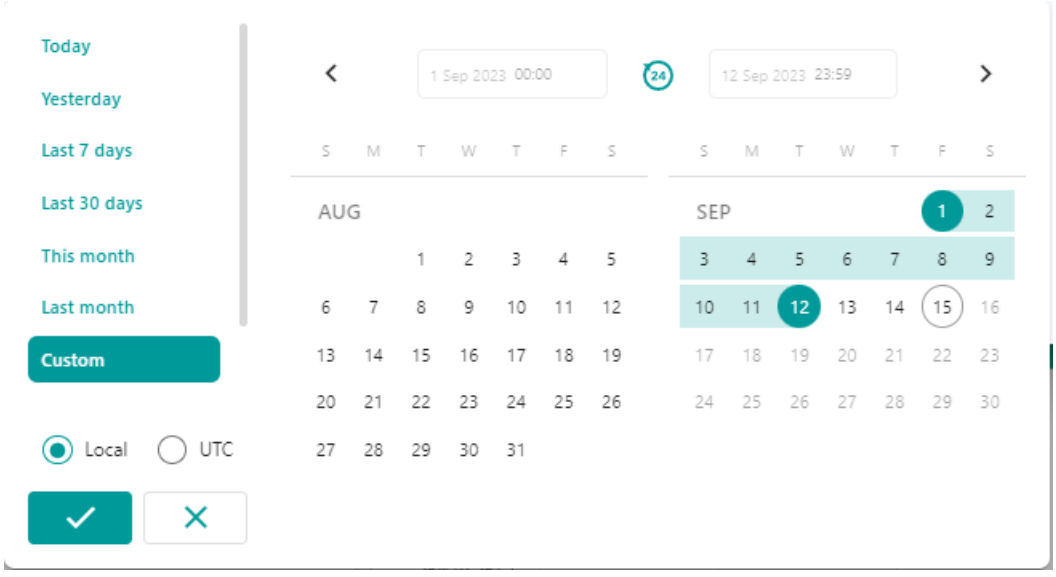
   For specific charts, follow the additional steps described below.
   Select the colors. This field is optional.



10. Click on the "Date Picker".



11. Select relative time stamps.
    - OR-
    Select custom states.
    For custom states:
    - Select the time zone. local or UTC.
    - Select the date of the custom states.
    - Click on "24" to change the hours.
    - Type the hours



12. Click on the "OK" button.

13. Enter the name of the chart. This entry is optional.
    Click on "Save".
    The chart is created.

Additional steps for specific charts

These steps are necessary as step 9.

For filled line chart

1. Select "Time Series Values Color" for every desired range



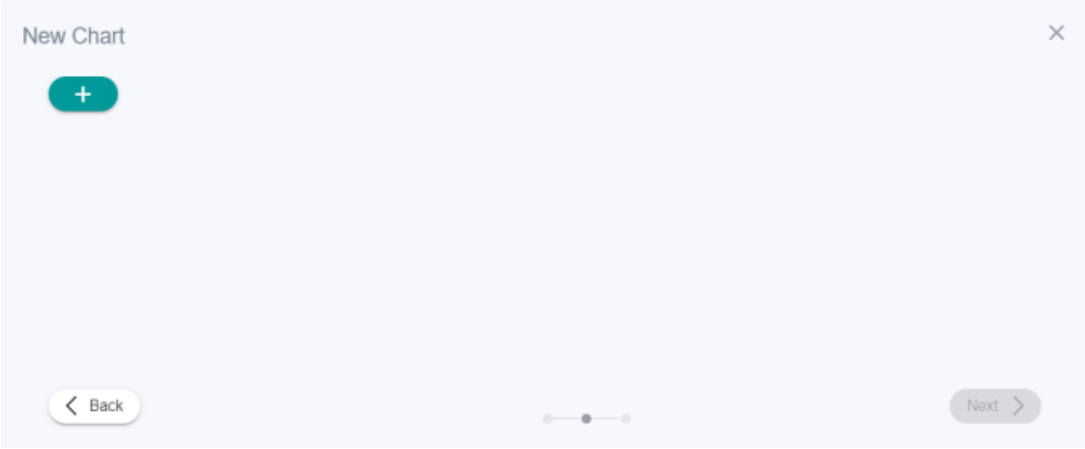
   – Click the "Plus" symbol to add a colored value range.
   – Enter the range.
   – Select the color.

2. Click "Next".
   For filled line chart you can select only one variable.



For Gauge chart

1. Click on the "Plus" symbol to add the value range which is colored.

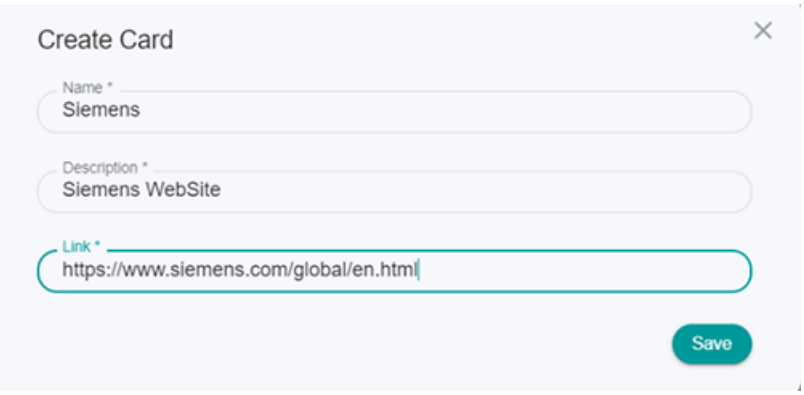


2. Enter the range.
3. Select the color.
4. Click on "Next".
   For Gauge charts you can select only one variable.



Creating Card

1. Click on the "Card" button.
2. Fill in
   - the name of the card
   - The description
   - the URL



3. Click on "Save".
   The card is created.
4. Click on the card to be directed to the link.

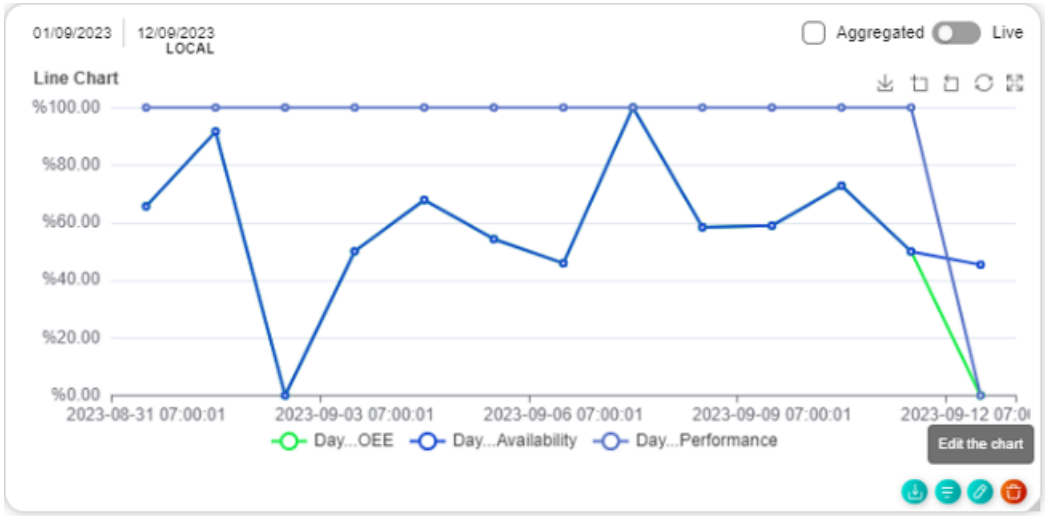
6.1.5.4 Editing charts

Click on the pen in the lower right edge of the "Dashboard" window to switch to the Edit mode.

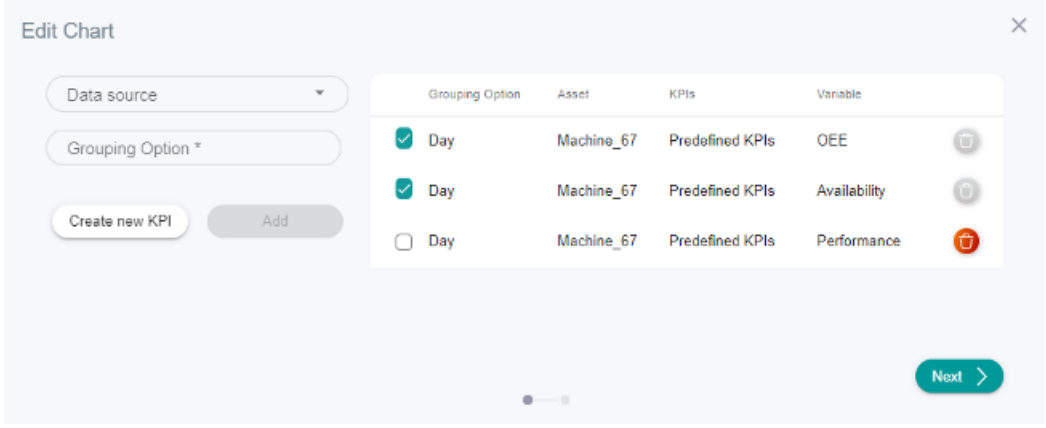
You can edit the individual charts.

Procedure

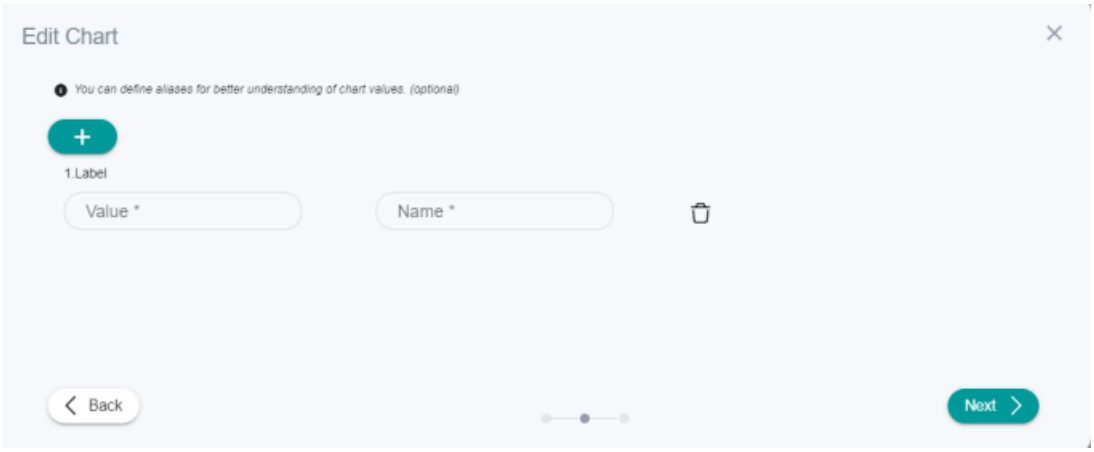
1. Click the edit button in the chart window.
   The "Edit Chart" window opens.



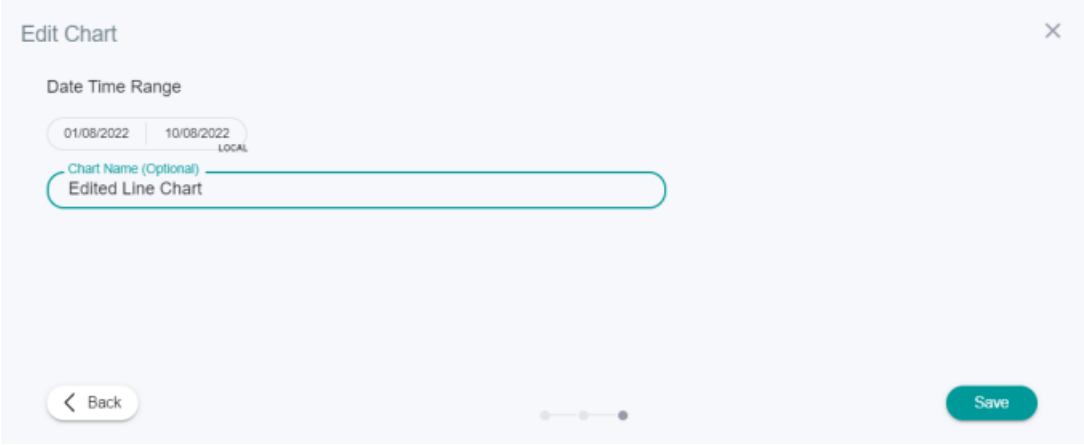
2. Add the new variable or KPI, or delete the variable.
   Click on "Next >".



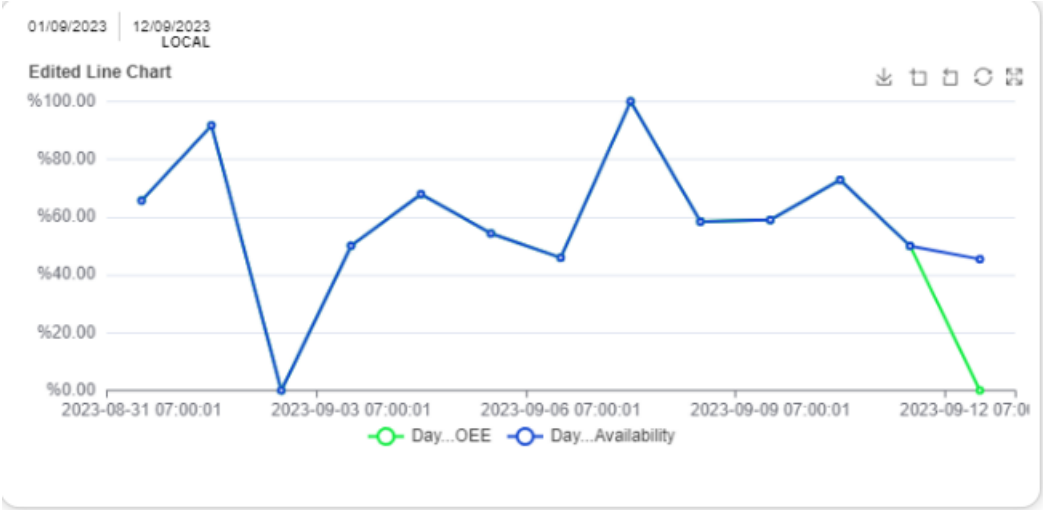
3. Click on the "Add" symbol to add a new label.
   Click on the dashboard symbol next to the name to delete it.
   Click on "Next >".



4. Click on the date to edit the date range.
   Change the chart name.



5. Click on "Save".
   The chart is edited.

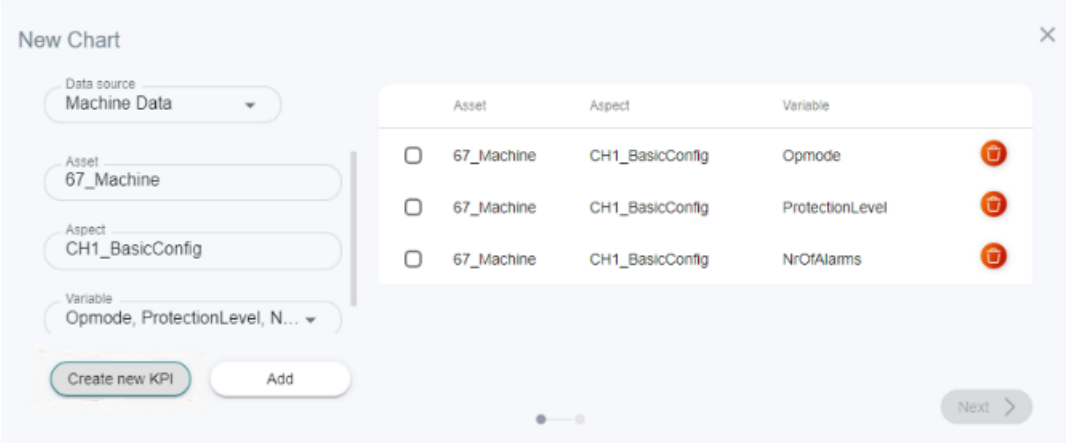


6.1.5.5 Creating KPIs

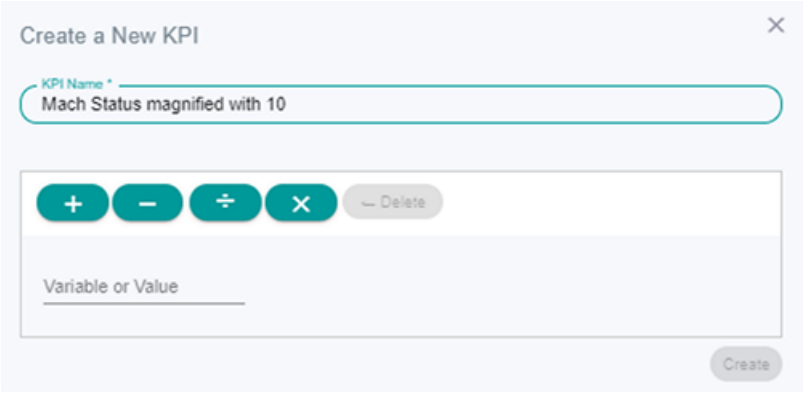
You can create KPIs from a combination of added variables and numerical values.

Procedure

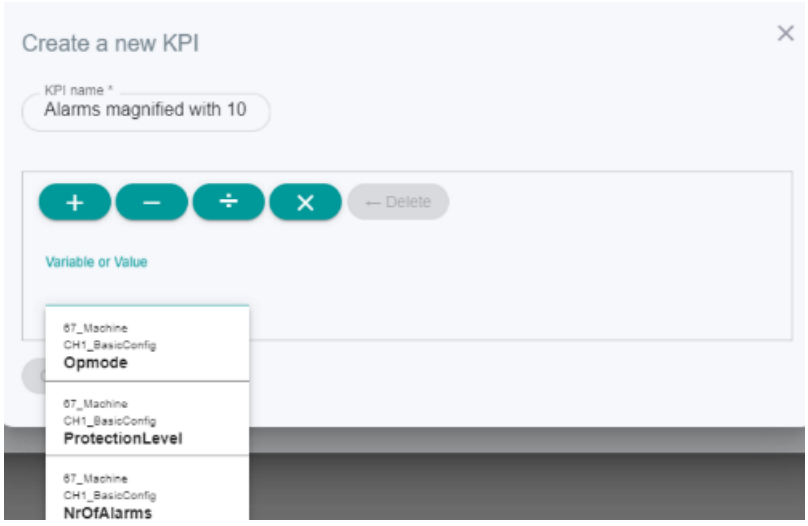
1. Click on the button of the chart you want to create.
   Select parameters as described in Generating charts (Page 161).



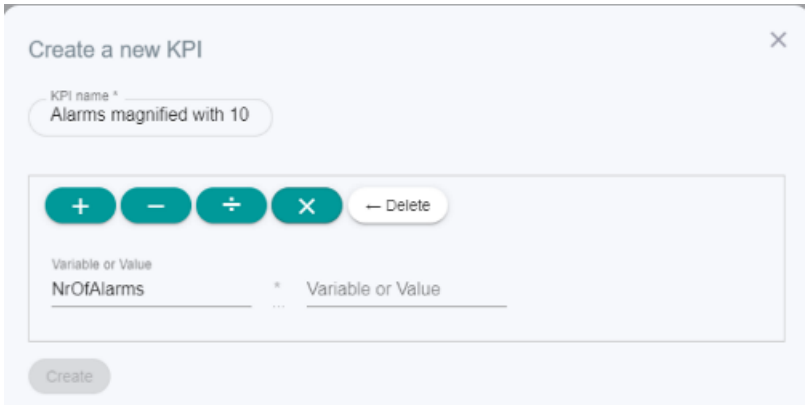
2. Click on "Create New KPI".
3. Type the KPI name.



4. To add a variable, click on "Variable or Value".
   A list with the added variables appears.
   Select the desired variable.

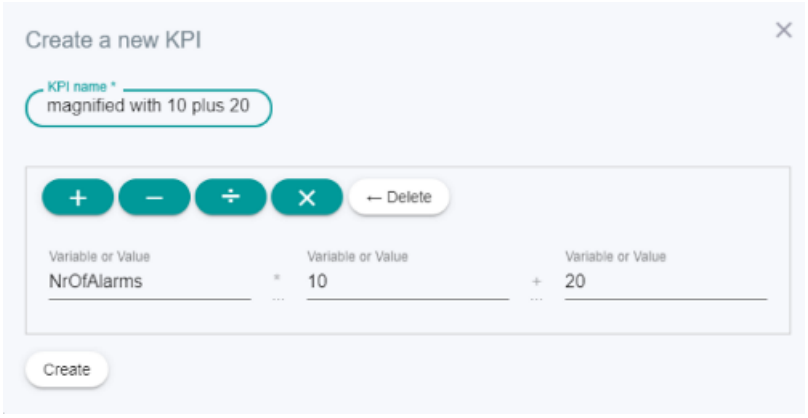


5. Click on the desired operator.

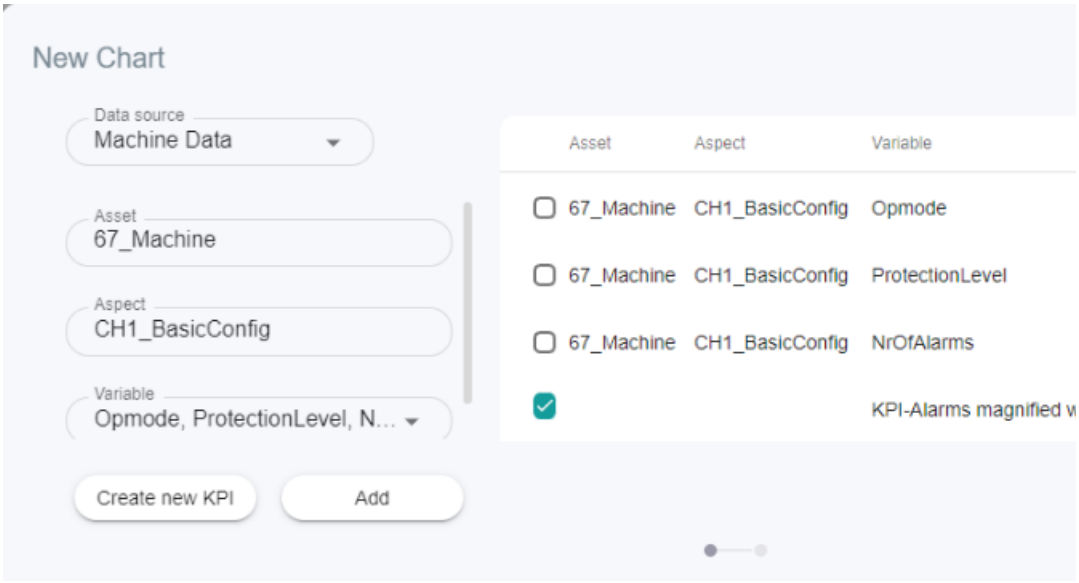


6. Select another variable
   - OR -
   Type a numerical value.
   At least one of the parameters should be a variable.

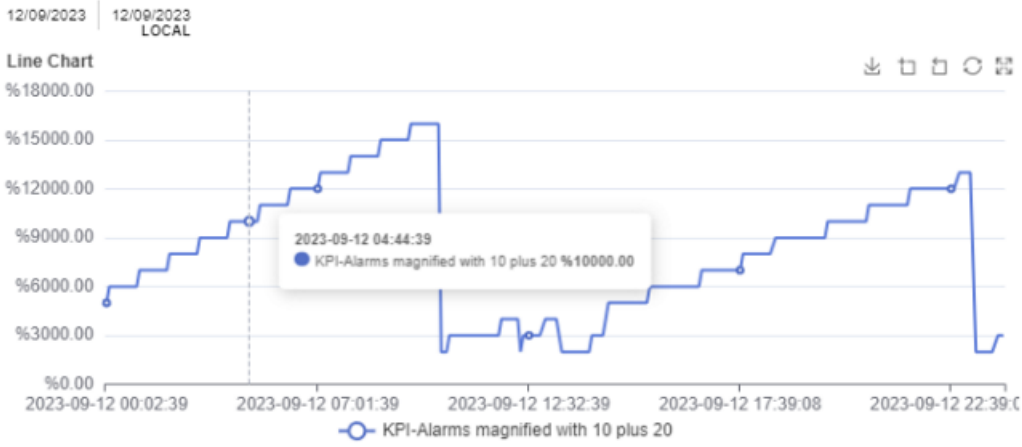
7. You can repeat step 5 and 6.
   Click on "Delete" if you want to remove a variable.
   Click on the "Create" button.



8. To see the KPI in the chart, click the checkbox.
   Click on "Next >".



9. Complete the other parameters as described in Generating charts (Page 161).
   The KPI is shown in the chart.



6.1.5.6 Editing KPIs

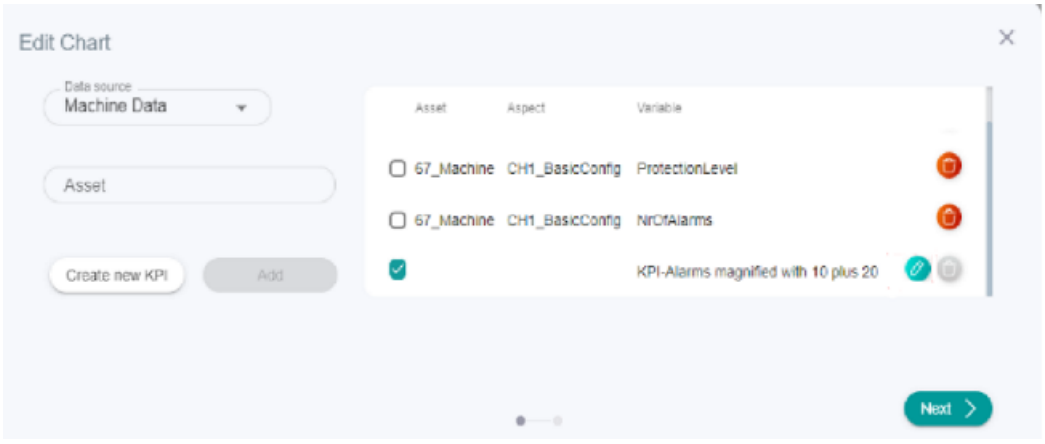
You can change the definition of a KPI.

Switch to the "Edit" mode. Click on the pen in the lower right edge of the "Dashboard" window.

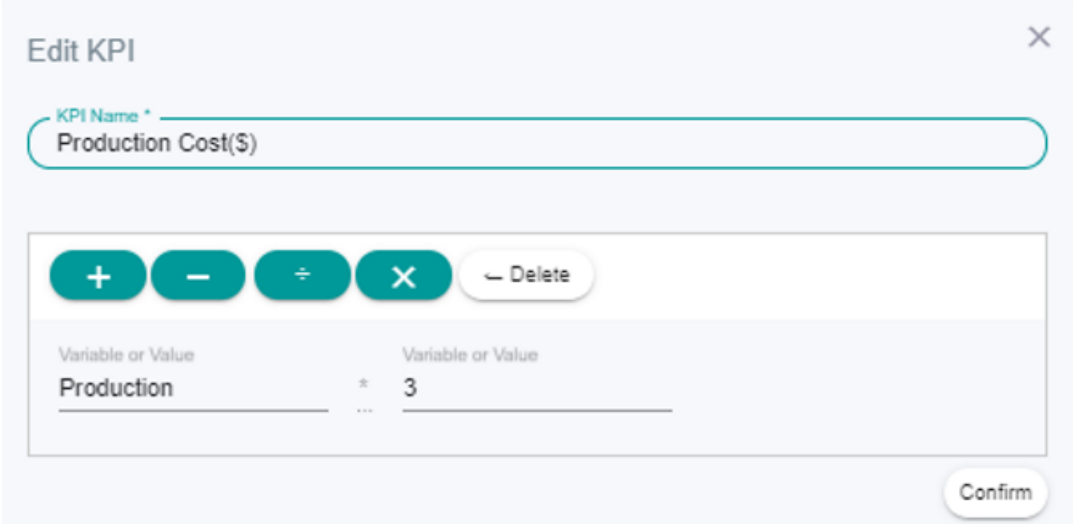
You can edit the individual charts.

Procedure

1. Click on the "Edit" button in the chart window.
   The "Edit Chart" window opens.



2. Click on the "KPI Edit button" next to the KPI that you want to edit.
3. Edit on the desired formulation.
   Click on the "Confirm" button.



4. Complete the other chart parameters. For more information see Generating charts (Page 161).

6.1.5.7 Filtering charts

You can filter the charts to display a defined value range.

Procedure

Adding filter

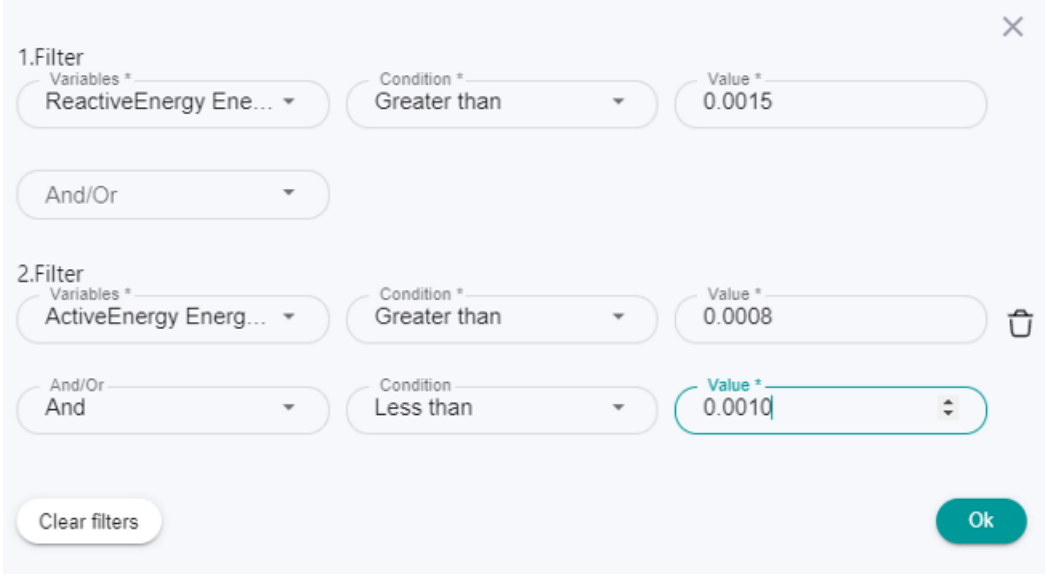
1. To add a filter, click on the "Filter" button in the chart.



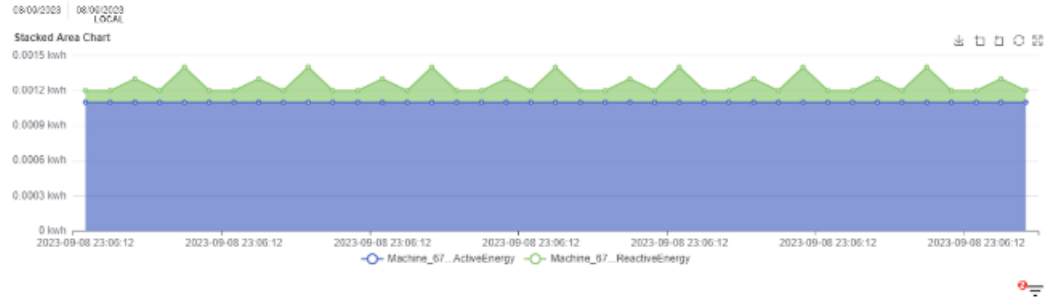
2. Click on the "Plus" button to add a new filter.
   The maximum number of filters is equal to the number of variables and KPIs.

3. Define the filter.
   - Select the variable.
   - Select the condition.
   - Set the value.
   - You can select AND or OR to define a range for this variable.

   Click on "OK".

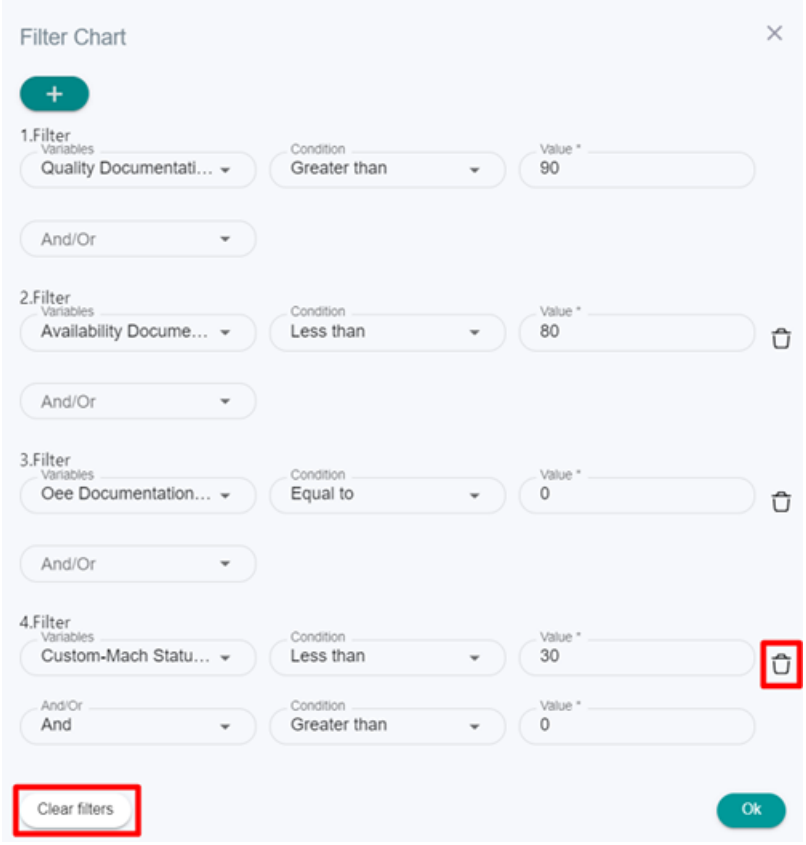


4. The chart is filtered.
   The number of applied filters is shown next to the "Filter" symbol.



Clearing filter

1. Click on the "Filter" button in the chart.
   The "Filter Charts" window opens.
2. To remove one filter, click on the "Remove" button next to the filter.
   To remove all filters, click "Clear filters".



6.1.5.8 Exporting data

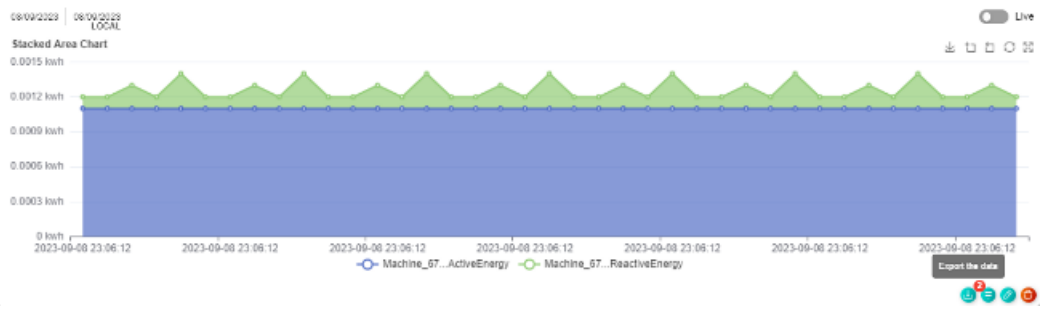
You can export filtered data or data that is not displayed in the chart. The data is exported as "csv" format.

Procedure

Click on the "Export" button.

The data is exported.

The csv file can be imported with any tool that is able to handle the CSV format. The separator of the columns is ",".



6.1.5.9 Creating PDF report

Create a PDF report of the active dashboard. You can choose to exclude the chart from the report.

Procedure

1. Click the Report button.



2. Optional steps:
   - Type a report header.
   - Type a comment.

3. If you want to exclude the chart from the report, click the Hide button.
4. Click the Download button.

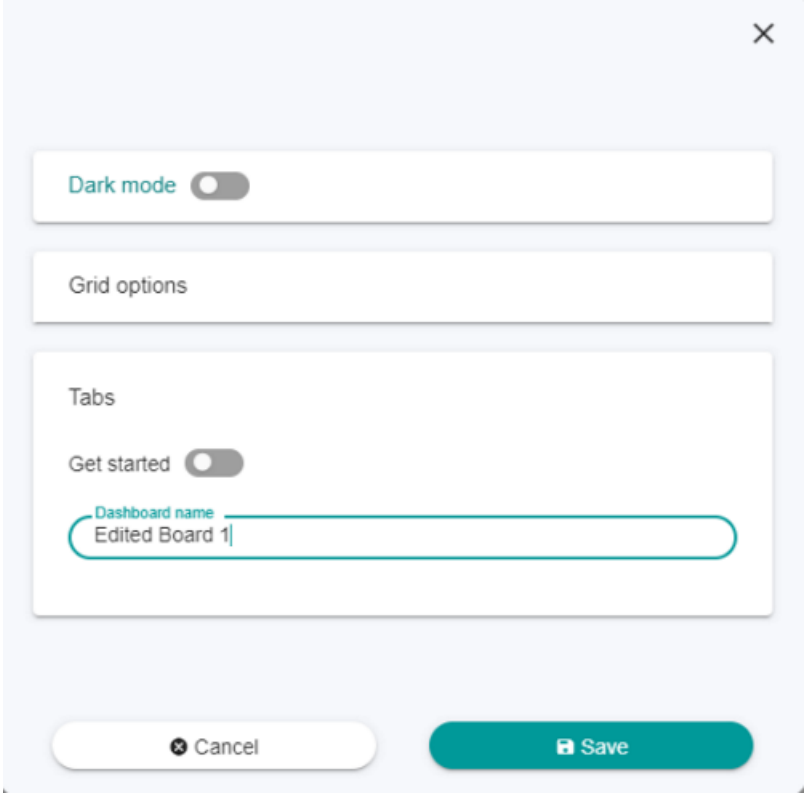


6.1.5.10 Dashboard settings

You can add a new dashboard. The maximum number of dashboards is seven.

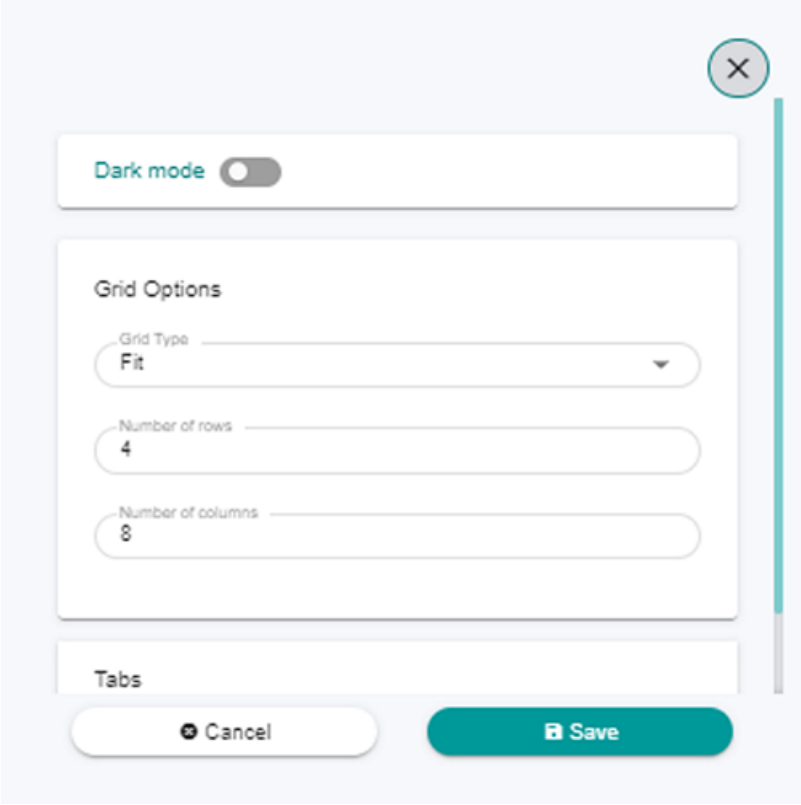
Edit dashboard name

1. Click the "Settings" button in the tool bar on the left.
   The window for the dashboard option appears.
2. Click "Tabs".
3. Set the tab name.
4. Click "Save".



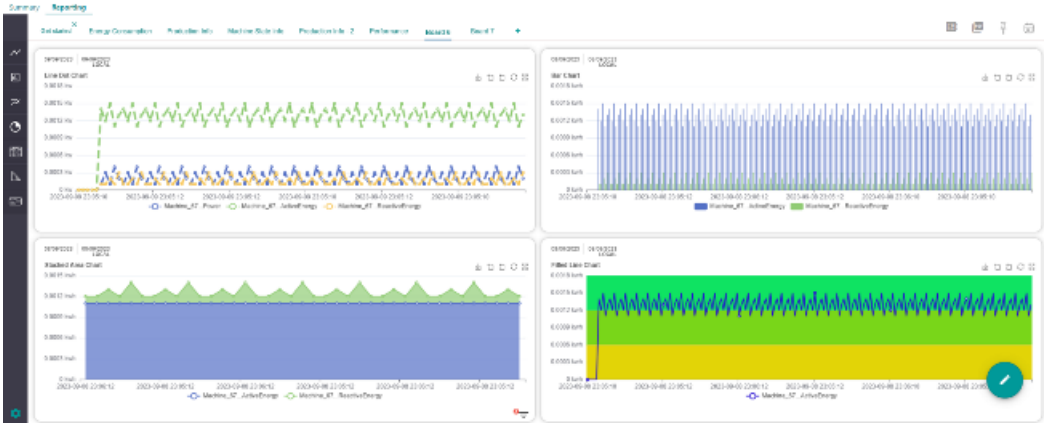
Edit dashboard grid options

1. Click the "Settings" button in the tool bar on the left.
   The window for the dashboard option appears.
2. Click "Grid Options".
3. Set the grid options:
   - grid type
   - number of rows
   - number of columns
4. Click "Save"



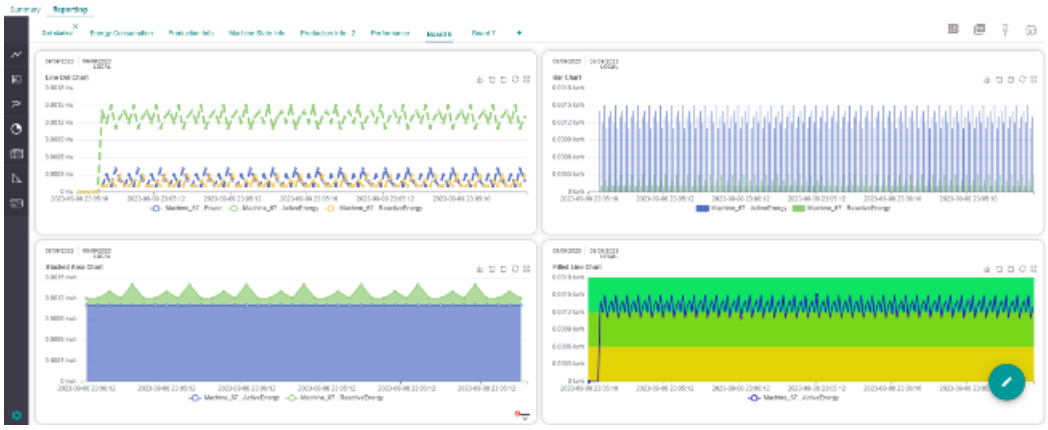
Grid options

This option describes how the charts are displayed after adding a new chart. All charts are arranged in a way to fill the screen.

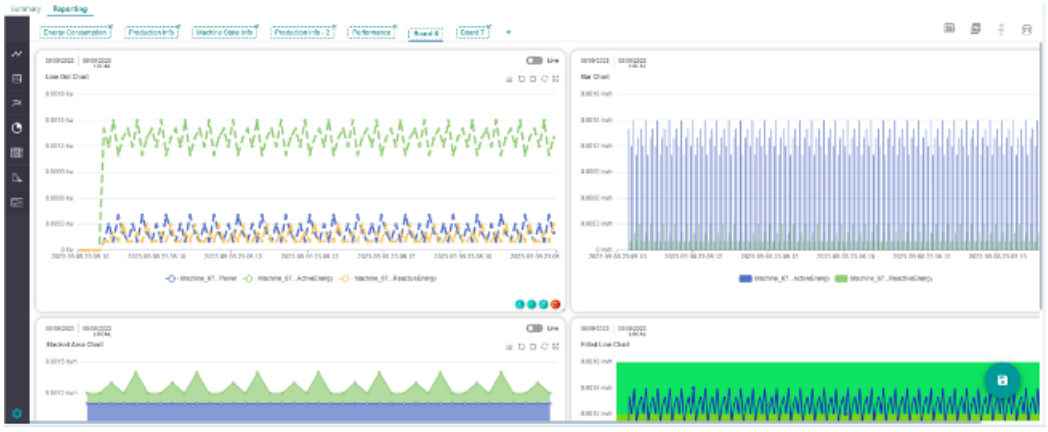


The following grid options are possible:

- Fit
  The newly-added charts fill the window.



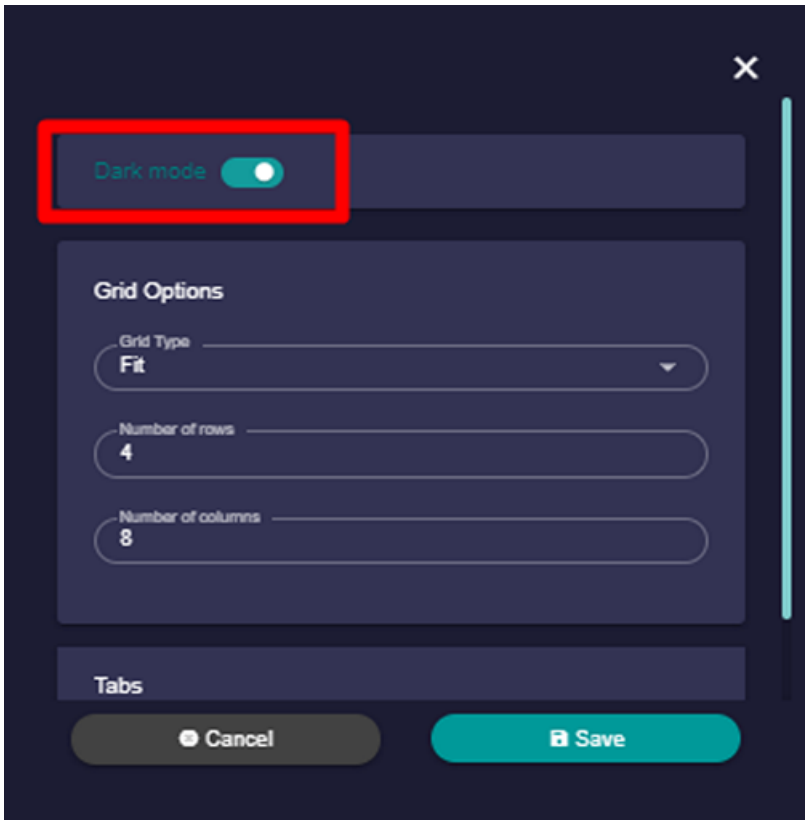
- Scrollable
  The window expands in x and y directions. A vertical and a horizontal scrollbar appear.



- Scroll horizontal
  The window expands in the x-direction. You can scroll the page in a horizontal dimension.
- Scroll vertical
  The window expands in the y-direction. You can scroll the page in a vertical dimension.

Dark mode

1. Click the "Settings" button in the tool bar on the left.
   The window for the dashboard option appears.
2. Switch to "Dark mode".



3. The dashboard is shown in the dark mode.



6.1.5.11 Dashboard templates

You can save prepared dashboards as a template to use the template another time.

Buttons

The following buttons are available for template functions.

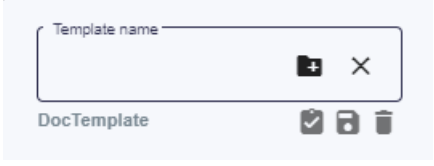
Buttons	Function
	Adds a new template.
	Sets this template as the default template.
	Saves the changes.
	Deletes the template.

Procedure

1. Click the "Template" icon.



2. The template dialog appears.
3. Fill the Template name.



4. Click the "Add" button.
5. The template is added to the list.



6. Click the "Save" button next to the template name.
   The template is saved.

6.2 Reporting Engine

6.2.1 Introduction

Analyze MyPerformance /OEE (AMP /OEE) calculates Key Performance Indicators (KPIs) such as Overall Equipment Effectiveness (OEE), Availability, Performance, Quality and provides important indicators for developing measures to increase efficiency.

Reaching our goal "increasing efficiency" requires tracking many KPI's which can be different from one factory production line to another.

Therefore as Analyze MyPerformance /OEE (AMP /OEE), we provide reporting capabilities which help users to create charts by using specific data source that can be selectable on custom dashboard pages.

From availability to performance, you can create and visualize many different indicators to measure the factory performance effectiveness. While creating reports, it is recommend to follow OEE analyses indicators



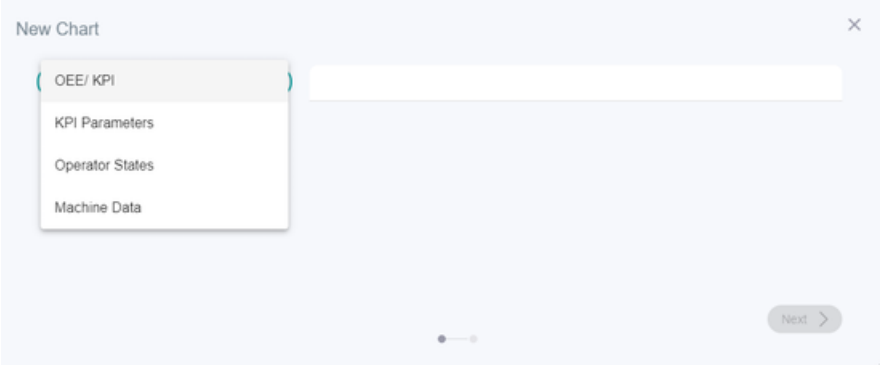
Parameters

Parameters	
All Time	The total time which measures the effectiveness (This information can be provided by KPI Parameters data source under Availability as "Total Duration").
Planned Production Time	Utilization of factory plan is the planned production time.
Schedule Loss	Includes planned non production time for breaks, free time, etc.
Run Time & Availability Loss	Availability takes into account Availability Loss, which includes any events that stop planned production for an appreciable length of time, such as tool broken, order is changed, extra maintenance is defined.
Net Run Time & Performance Loss	OEE performance takes into account Performance Loss, which accounts for anything that causes the manufacturing process to run at less than the maximum possible speed when it is running (including both Slow Cycles and Small Stops).
Fully Productive Time & Quality Loss	Quality takes into account Quality Loss, which accounts for manufactured parts that do not meet quality standards. For more details go to section 6.2.4.

6.2.2 Data sources

Data sources are the main categories that include different metrics for visualization of AMP provided datasets.

If a chart/ table is clicked from dashy side menu bar, corresponding data sources appear on dashboarding popup. For example if Line Chart is clicked from dashy side menu, 4 corresponding data sources are listed (OEE/ KPI, KPI Parameters, Operator States, Machine Data) (Check data source chart relation table).

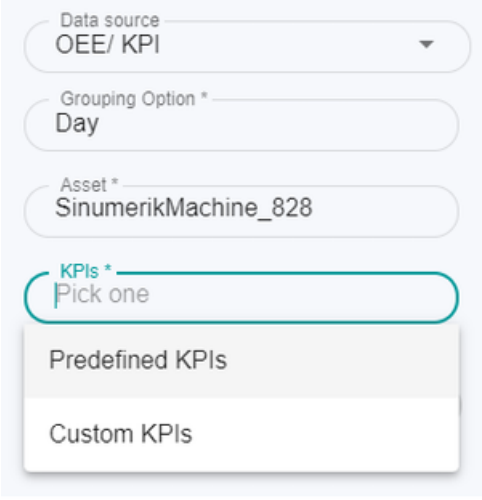


OEE/ KPI Data Source

The OEE/ KPI data source provides the main KPI capabilities of the production line.

It includes 2 categories:

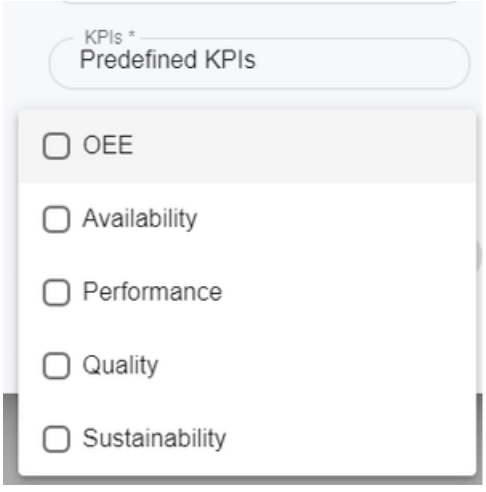
- Predefined KPIs
- Custom KPIs



Predefined KPIs are system default KPIs.

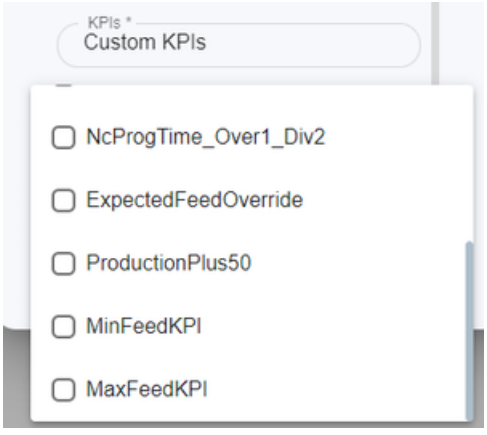
There are 5 predefined KPIs:

- **OEE**
- **Availability**
- **Performance**
- **Quality**
- **Sustainability**



Custom KPIs are defined by users in KPI Calculation tab of AMP configuration page.

If a Custom KPI is defined, it will be listed under Custom KPI category.



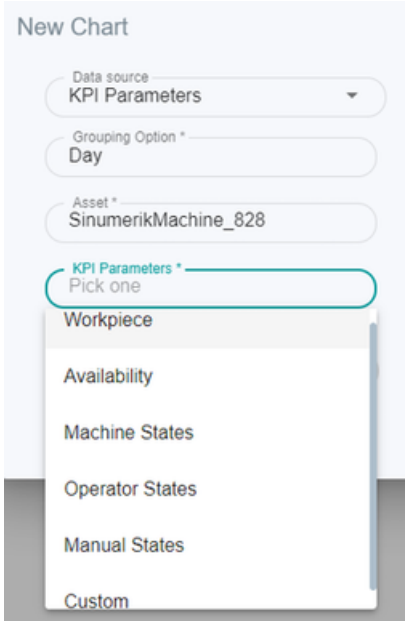
KPI Parameters Data Source

KPI parameters is the most enriched data source as compared to the other data source options.

The user can create and visualize many different indicators to measure the factory performance effectiveness.

KPI Parameters data source includes 6 categories:

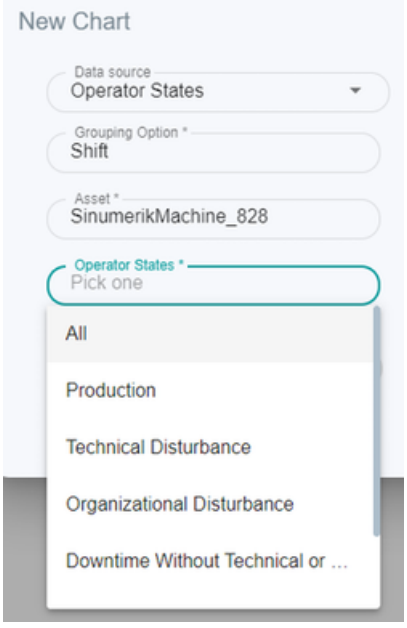
- **Workpiece** - includes 5 variables, check data source variable table for the corresponding variables 6.2.6
- **Availability** - includes 7 variables, check data source variable table for the corresponding variables 6.2.6
- **Machine States -** includes 7 variables, check data source variable table for the corresponding variables 6.2.6
- **Operator States -** includes defined operator states
- **Manual States** - includes entered manual states
- **Custom** - includes defined custom KPI parameters



Operator States Data Source

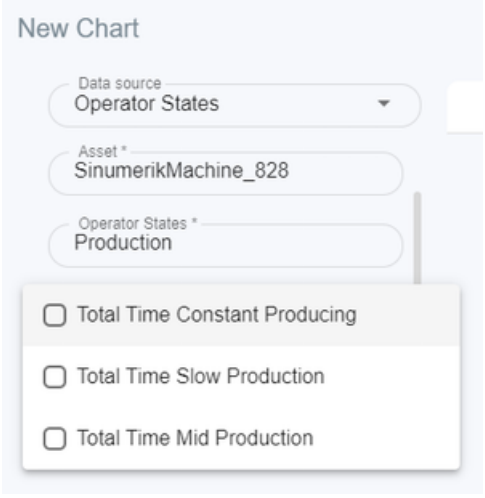
The data source "Operator States" provides user operator states by their grouping option.

Operator states are grouped depending on their machine state mapping.



If the option "All" is selected, all the defined operator states are going to be listed in variable list.

If an option is selected other than the option "All", all of the defined operator states that are mapped to the selected option are listed.



Note

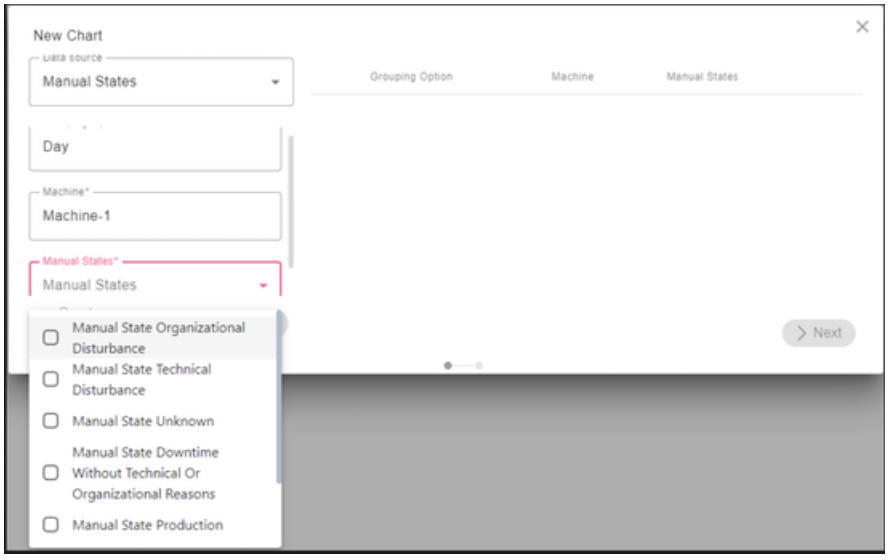
If the Machine State of the operator state is changed

For the new metrics of the operator state, the operator state should be added again to the chart to see the new metrics.

Manual States Data Source

The data source "Manual States" provides user manual states by their grouping option.

Manual states are grouped depending on their machine state mapping.

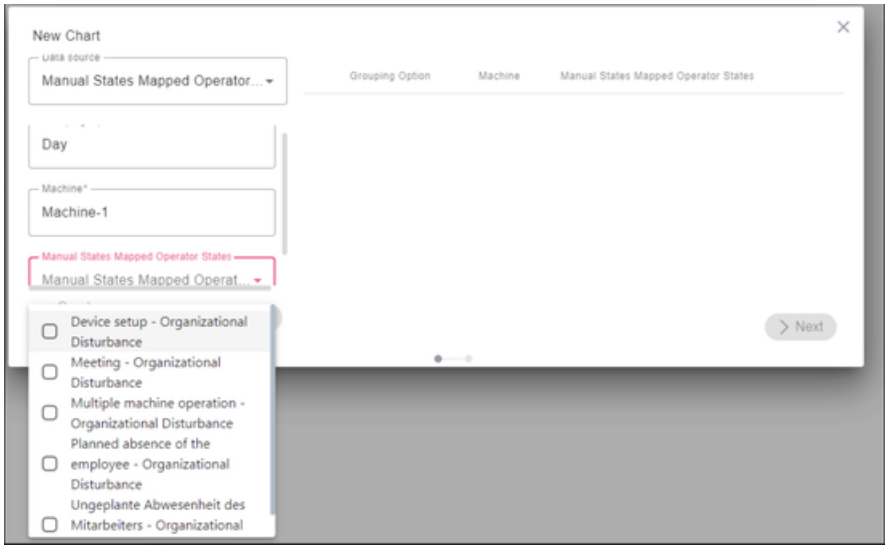


The chart will display the selected manual states mapped with actual machine state.

Manual States Mapped Operator States Data Source

The data source "Manual States Mapped Operator States" provides entered manual states mapped with operator states.

Example: There is a "Device setup" operator state created and mapped with Organizational Disturbance and the user entered an Organizational Disturbance manual state and mapped it with "Device setup". This data source will provide the duration of "Device setup" which is entered as manual state in the given time frame.



Machine Data Data Source

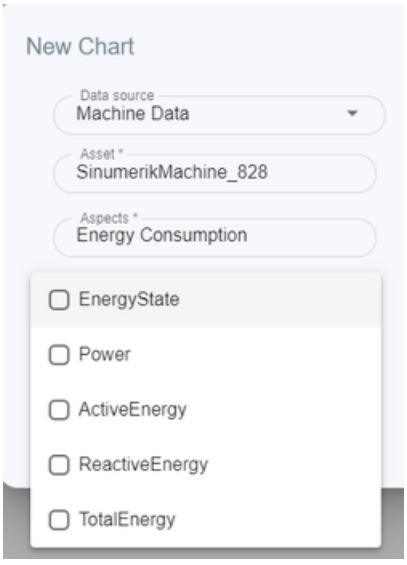
Data acquired from various machine addresses can be used with the data source "Machine Data".

There are 2 data source categories listed under Machine Data:

- Energy Consumption
- CH1_BasicConfig

Selecting Energy Consumption includes energy related data. Check the data source variable table for provided variables.

Selecting CH1_BasicConfig includes basic machine data. Check data source variable table for provided variables.



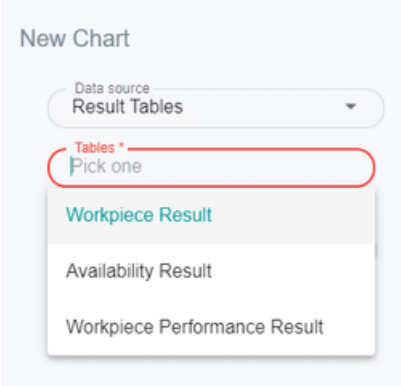
Result Tables Data Source

The Result Tables data source can be used only when Table View type is chosen from dashy side menu.

The Result Tables data is only time based, there is no grouping option.

The Result Tables data source is comprised of 3 tables:

- **Workpiece Results** - includes 3 workpiece related metrics, Check data source variable table 6.2.6
- **Availability Result** - includes 5 availability related metrics, Check data source variable table 6.2.6
- **Workpiece Performance Result** - includes 6 workpiece performance related metrics, Check data source variable table 6.2.6



State Information Tables Data Source

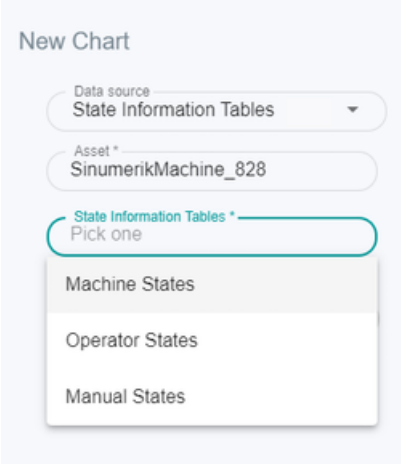
State Information Tables data source can be used only when Table View type is chosen from dashy side menu.

Therefore State Information Tables data is displayed only in tables.

State Information Tables data is only time based, there is no grouping option.

State Information Tables data source includes 3 State Information Tables:

- **Machine States**
- **Operator States**
- **Manual States**

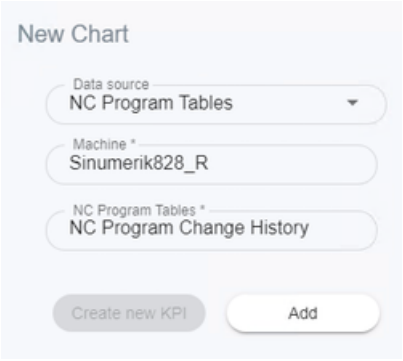


NC Program Tables Data Source

NC Program Table data source can be used when Table View type is chosen from dashy side menu to analyze NC Programs used by the corresponding machine based on a specific time.

The NC Program table contains one variable:

- **NC Program Change History**



Summary Data Data Source

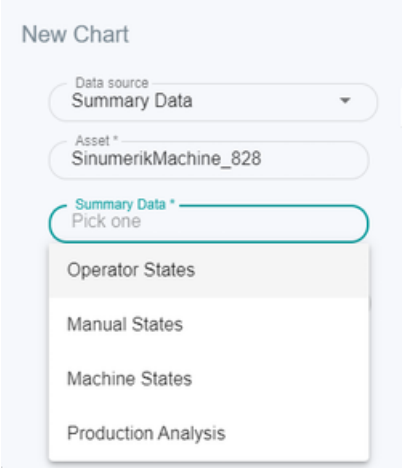
The data source "Summary Data" can be used only when Pie Chart type is chosen from dashy side menu.

Summary data is displayed in pie charts only.

Summary Data is only time based, there is no other option.

Summary Data data source includes 4 categories:

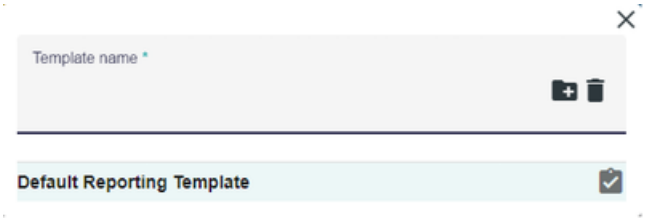
- **Operator States**
- **Manual States**
- **Machine States**
- **Production Analysis**



6.2.3 System Defined Charts

System Defined Charts

AMP provides system defined chart as default. These charts are part of the template.



For more information, see Dashboard templates (Page 188)

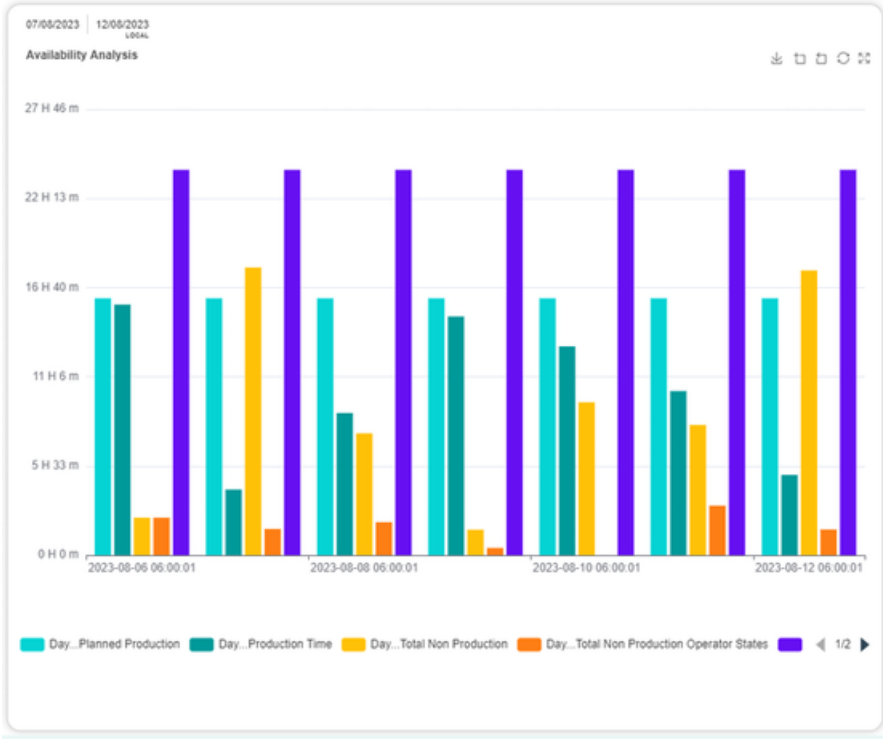
Availability Related Charts

Availability Analysis

In Availability analysis, First 5 variables of KPI Parameters under Availability aspect are used.

Planned Production, Production Time, Total Non Production, Total Non Production Operator States, Total Duration.

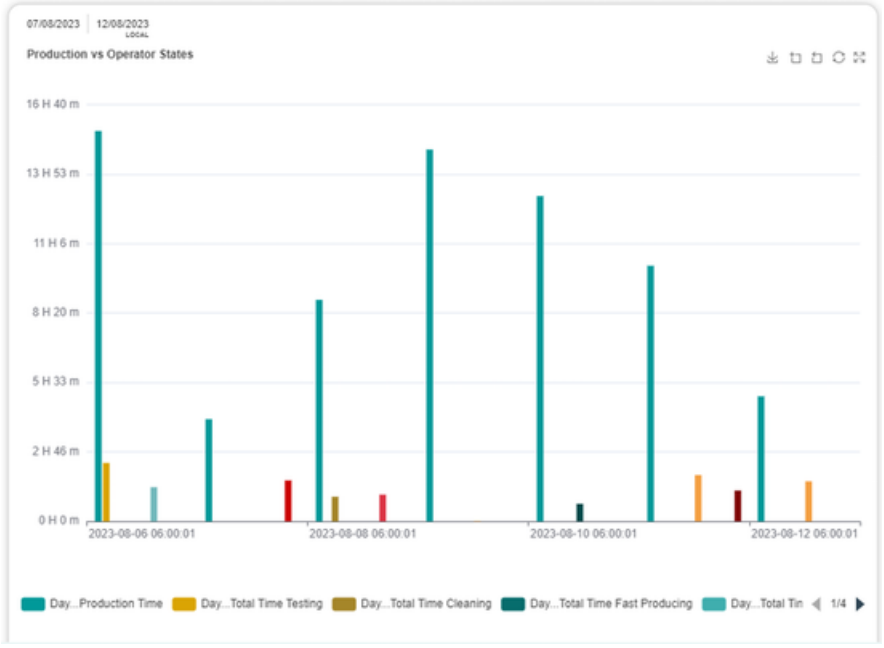
That chart provides a general information about the production line and provides metrics about "RunTime". please go to section 6.2.4.



Production vs Operator States

Production vs Operator States chart enables user to compare Production Time to all operator states.

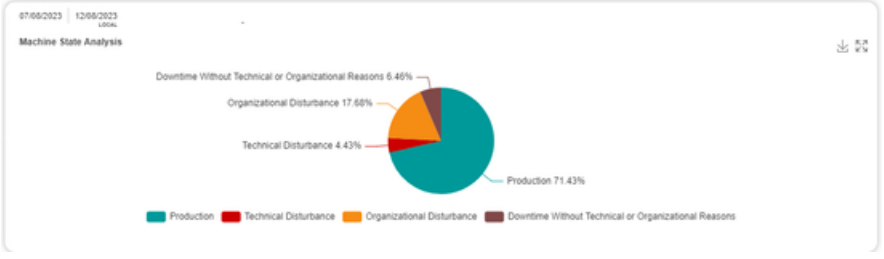
This chart provides day based data.



State Analysis

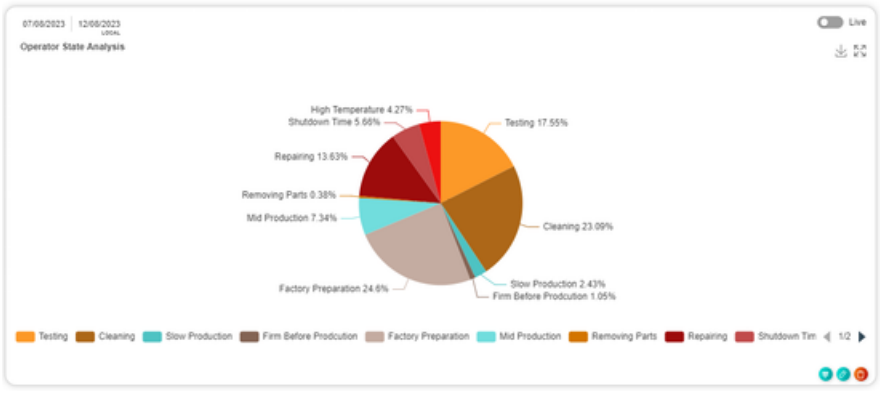
Machine States Analysis

Machine State Analysis is displayed in pie chart. All 6 Machine States provided in the chart as a percentage info.



Operator States Analysis

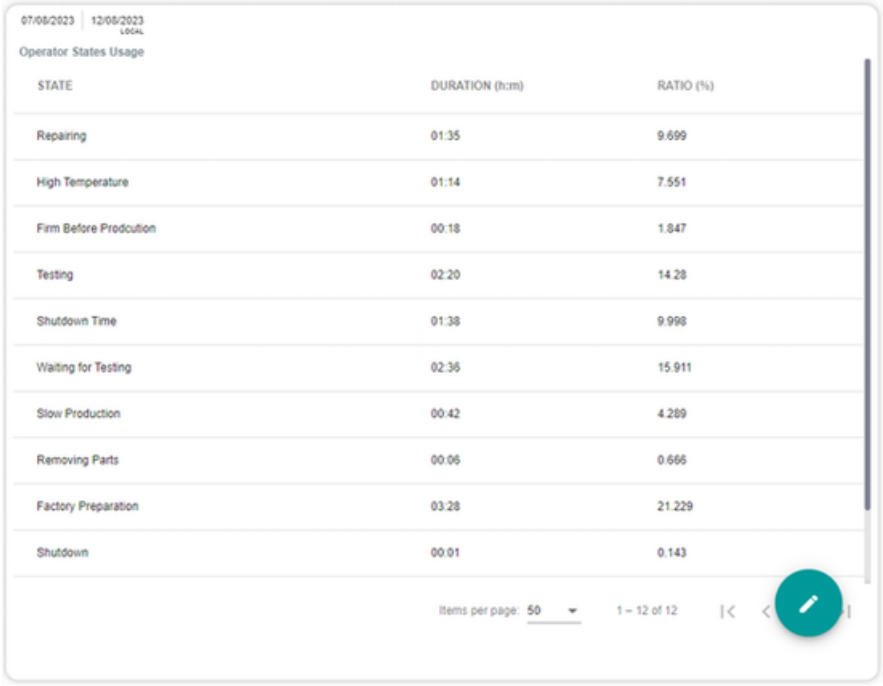
Operator State Analysis is displayed in pie chart. All defined and used operator states are provided in the chart as a percentage info



Operator States Usage

Operator states are visualized as a list. By that way, you can order the operator states by their usage times. Operator state duration info is displayed as hour:minute.

Ratio of each operator state is calculated as ratio of one operator state to all operator states.



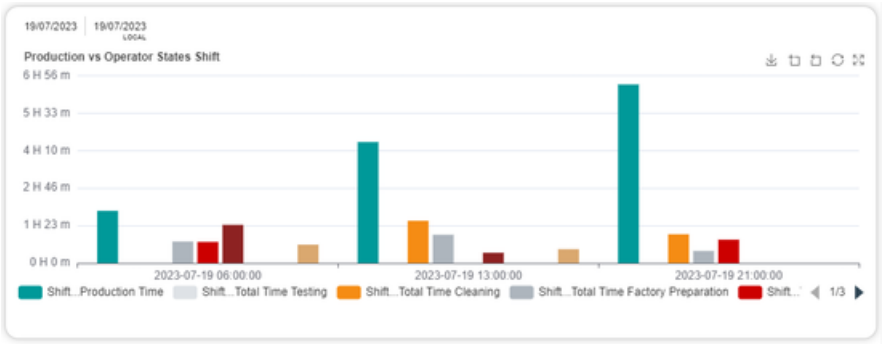
Shift Analysis

Production vs Operator States - Shift Based

Production Time is compared to all the used operator states in the current day.

This chart is shift based. There will be one result point for each variable for each shift of the corresponding machine.

If machine has 3 shifts in a day, 3 points will be displayed for each variable in the chart.



6.2.4 Sample Charts

Users can create charts in addition to the default charts. Some optional charts are recommended which can be useful for report analysis.

Production Analysis

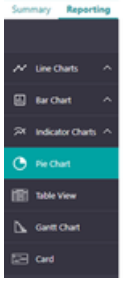
The Production Analysis is displayed as a pie chart. 'Summary' is used as the data source.

All variables under Production Analysis are selected (Machine States, Manual States and Operator States). It gives summary information about the usage of AMP production states.

3 different machine data types are visualized and can be analyzed in pie chart.

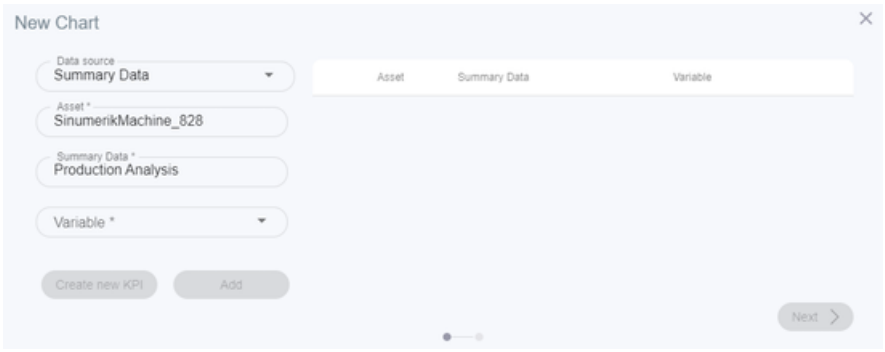
Procedure

1. Select a chart type from dashy side menu (Pie Chart)

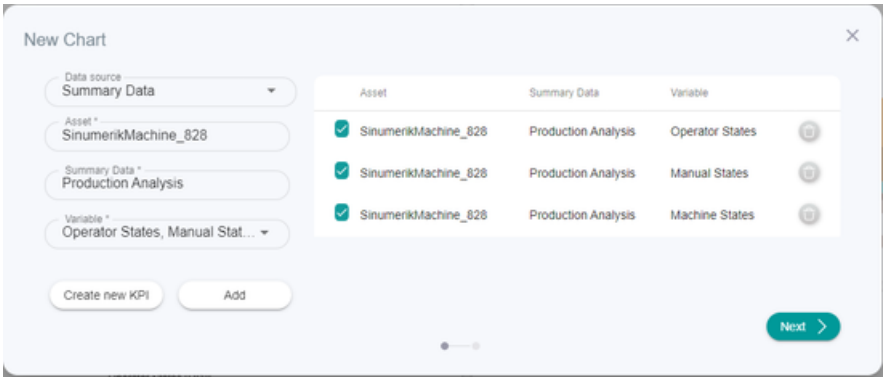


2. Select the corresponding data source (Summary)
3. Select the corresponding machine - the selected machine's data will be displayed

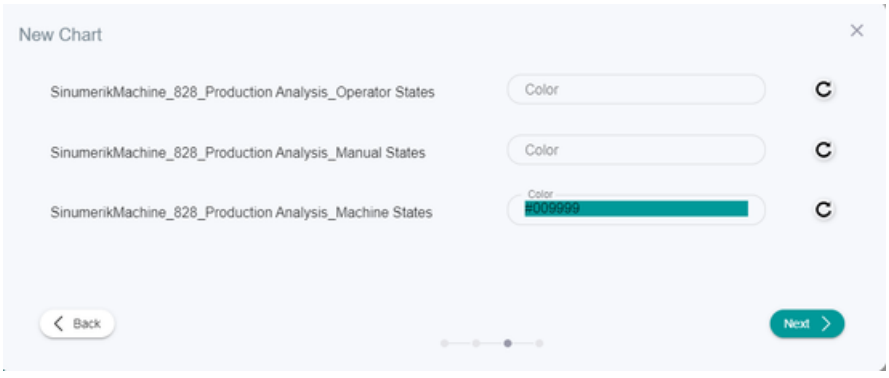
4. Select the category (Production Analysis)



5. Select necessary variables(Machine States, Manual States, Operator States).
6. Click the "Add" button.

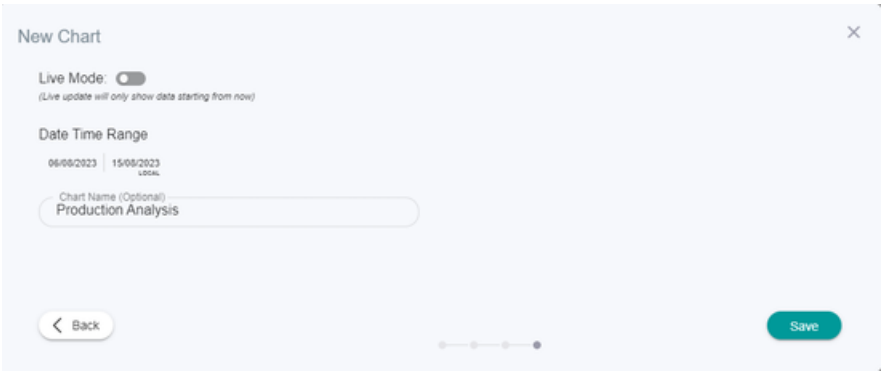


7. Click the "Next" button
8. Click the "Add" button.
9. Click in the color fields of variables to set the color of the variables.
   Color codes can be written directly or color can be picked manually.

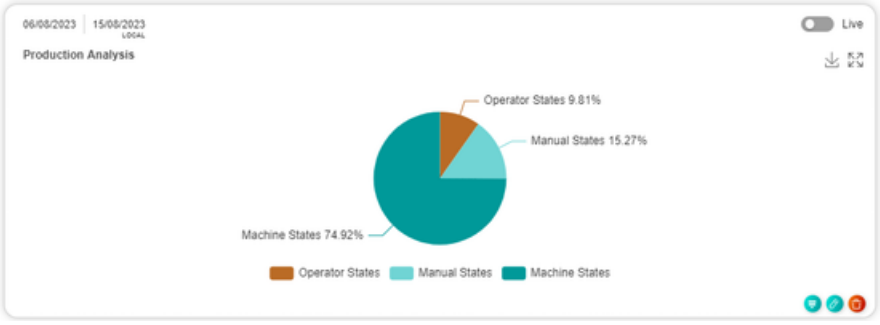


10. Click the "Next" button.
11. Select dates from date picker

12. Enter the chart name "Production Analysis".



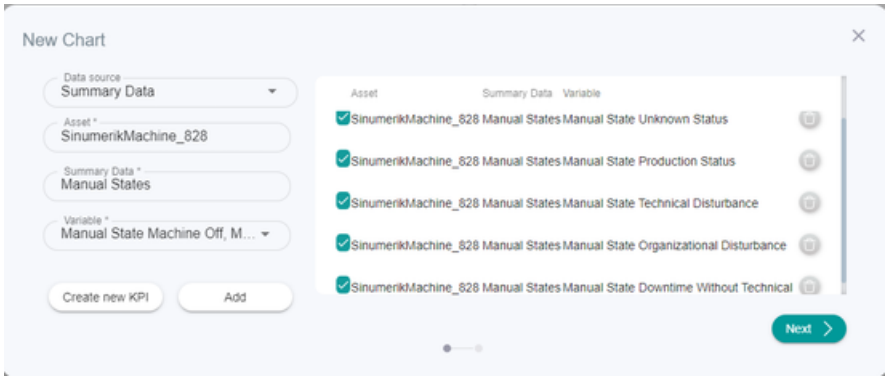
13. Click the "Save" button.
    The "Production Analysis" chart is created and displayed on the page.



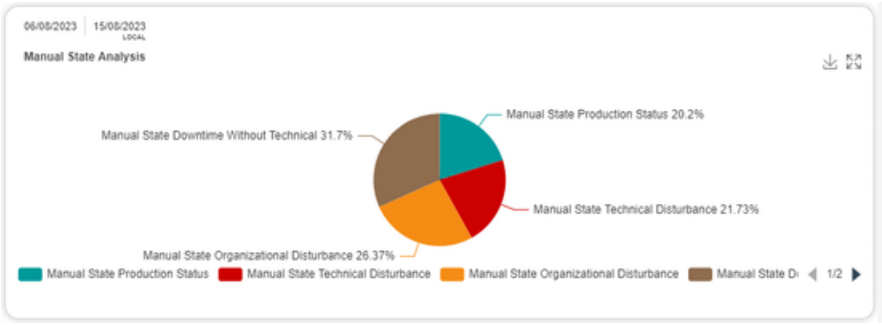
Manual State Analysis

The Manual State Analysis displayed in pie chart. Summary Data is as the used as the data source.

All manual state variables are selected.



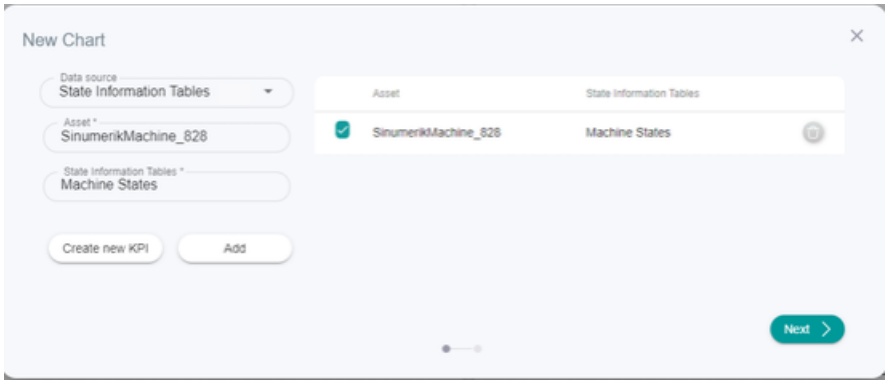
Entered manual states can be analyzed in more detail.

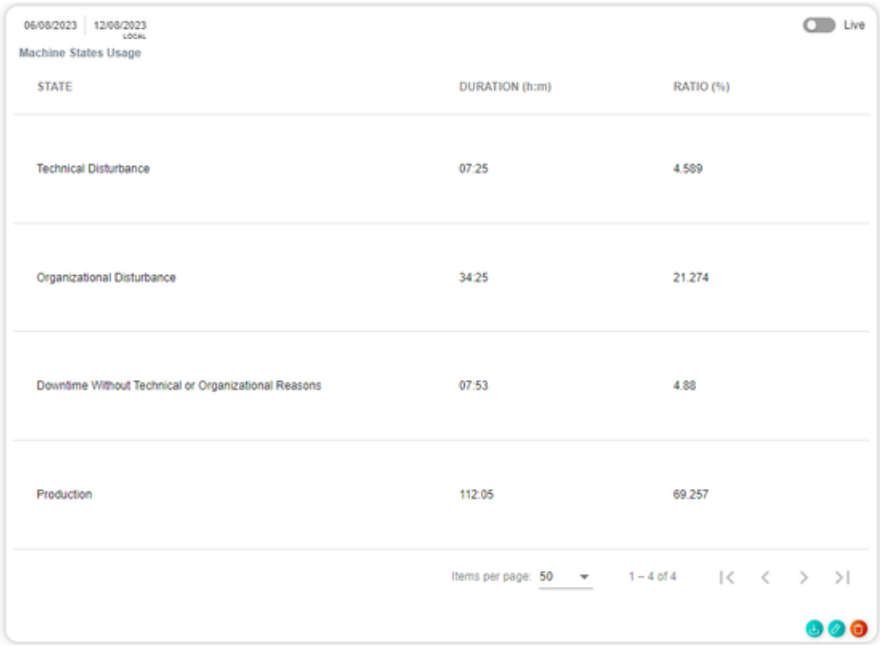


Machine States Usage Table

Machine States Usage can be displayed in table view with duration information (h:m) and ratio (ratio of the machine state to all machine states).

Machines states are sum of all data (Data received by machine, used Manual States and used Operator States)

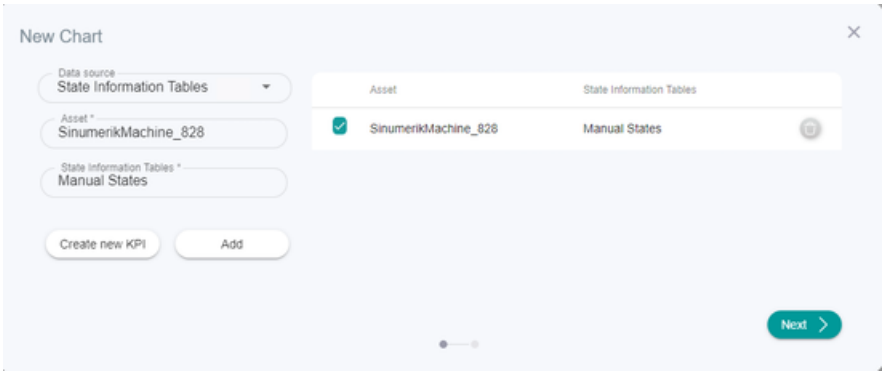


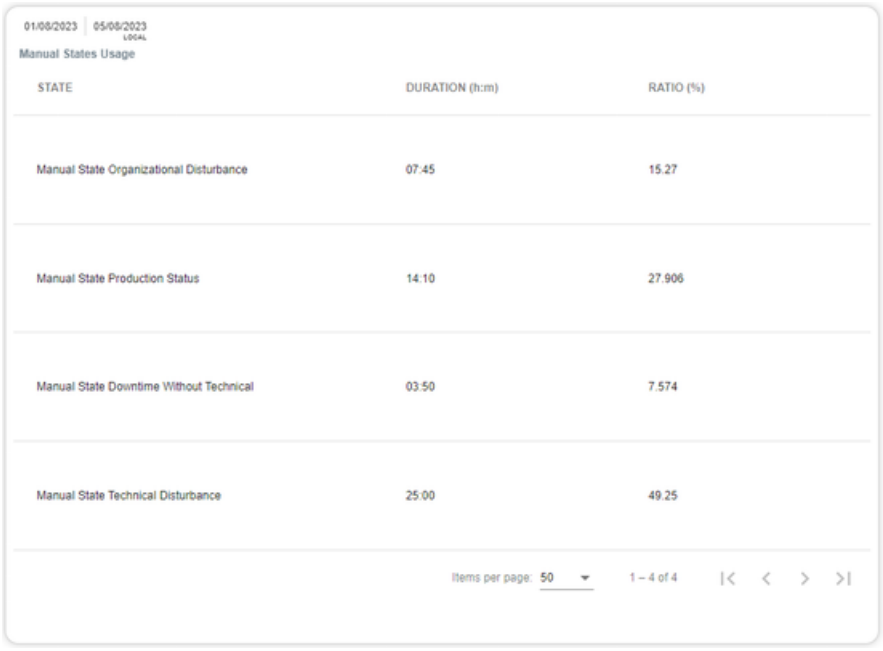


Manual States Usage Table

Manual State Usage can be displayed in table view with duration information (h:m) and ratio (ratio of the manual state to all manual states).

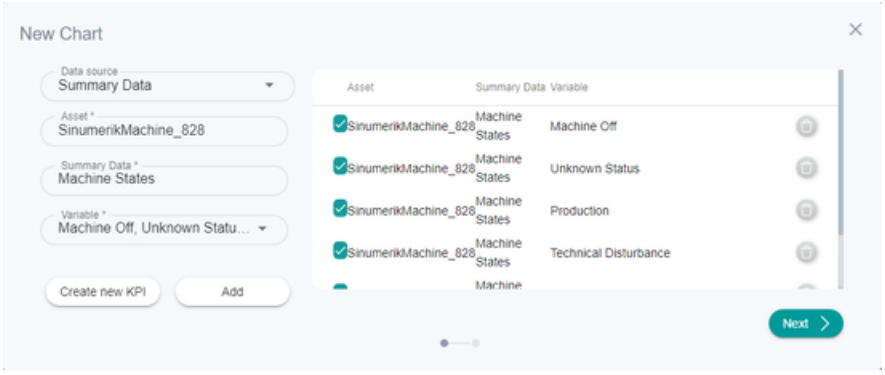
State Information Table View data source is selected.

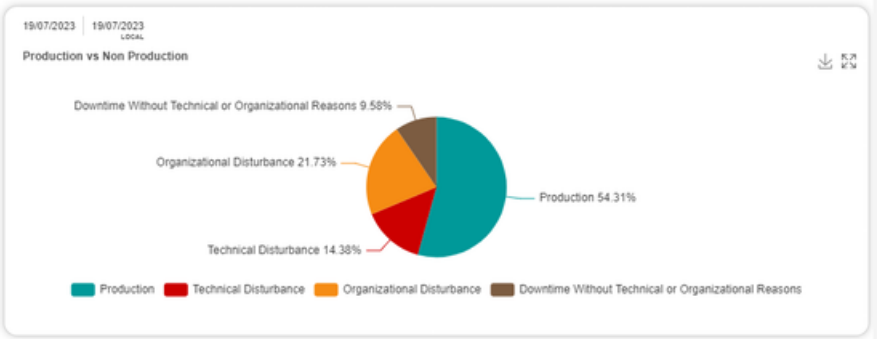




Production vs Non Production

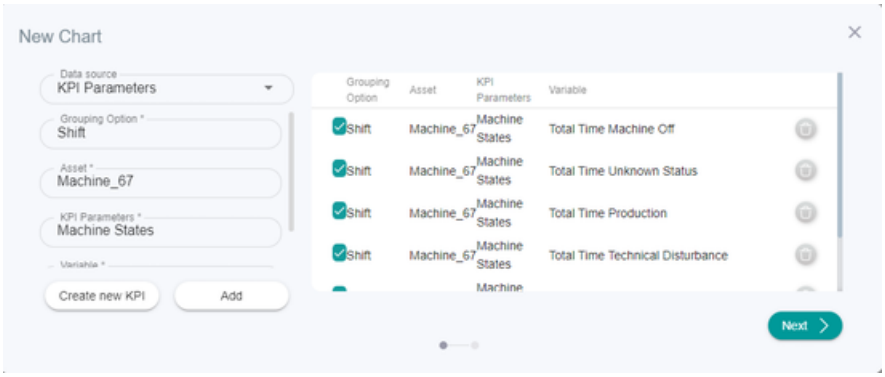
Production vs Non Production can be analyzed via pie chart by using the "Summary Data" source.

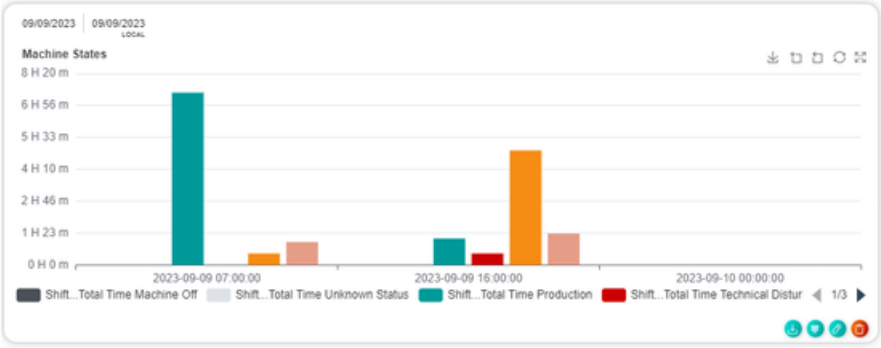




Machine States

Machine states can be displayed in bar chart as shift based by using KPI Parameters data source.

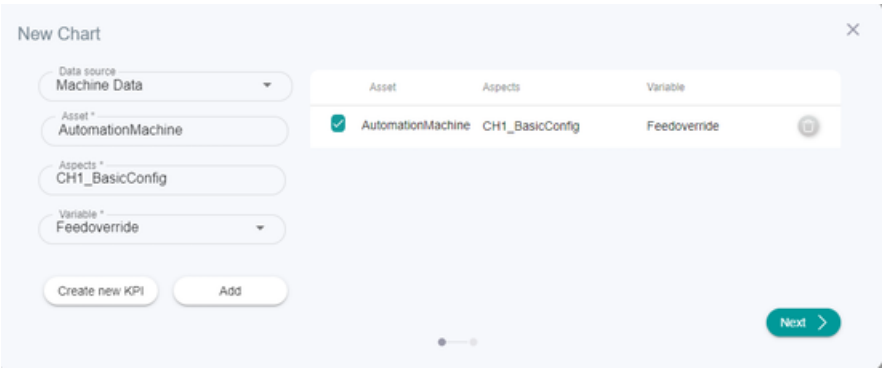




Feedoverride Analysis

Feedoverride analysis can be displayed using line chart. Feedoverride change based on selected time of the machine can be analyzed.

Machine Data data source and CH1_BasicConfig aspects are used for feedoverride analysis.

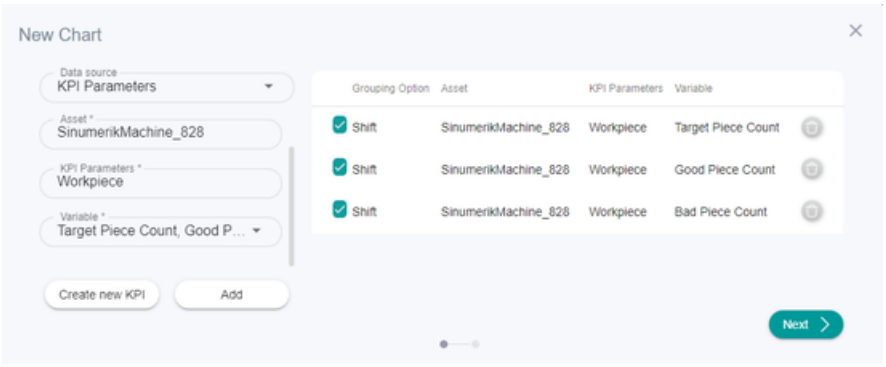


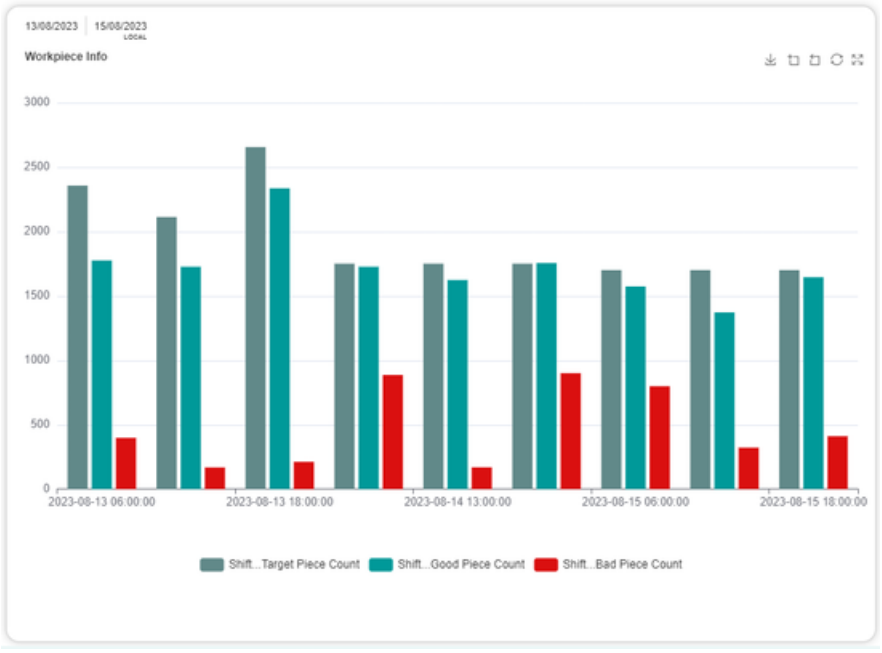


Workpiece Info

Workpiece counts (Target Piece Count, Good Piece Count, Bad Piece Count) are displayed in Workpiece Info Chart. This can be a shift based bar chart.3 bars will be displayed per variable for each day

KPI Parameters data source and Workpiece aspects are used for workpiece info.





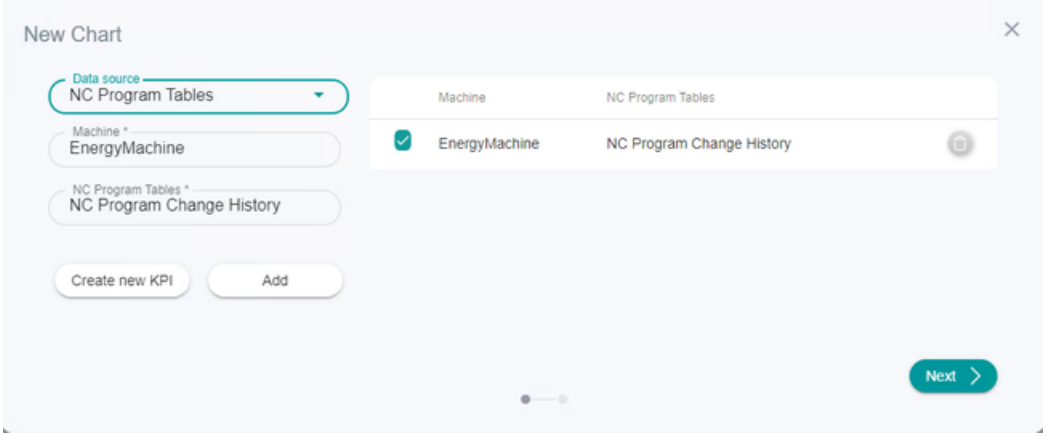
Note

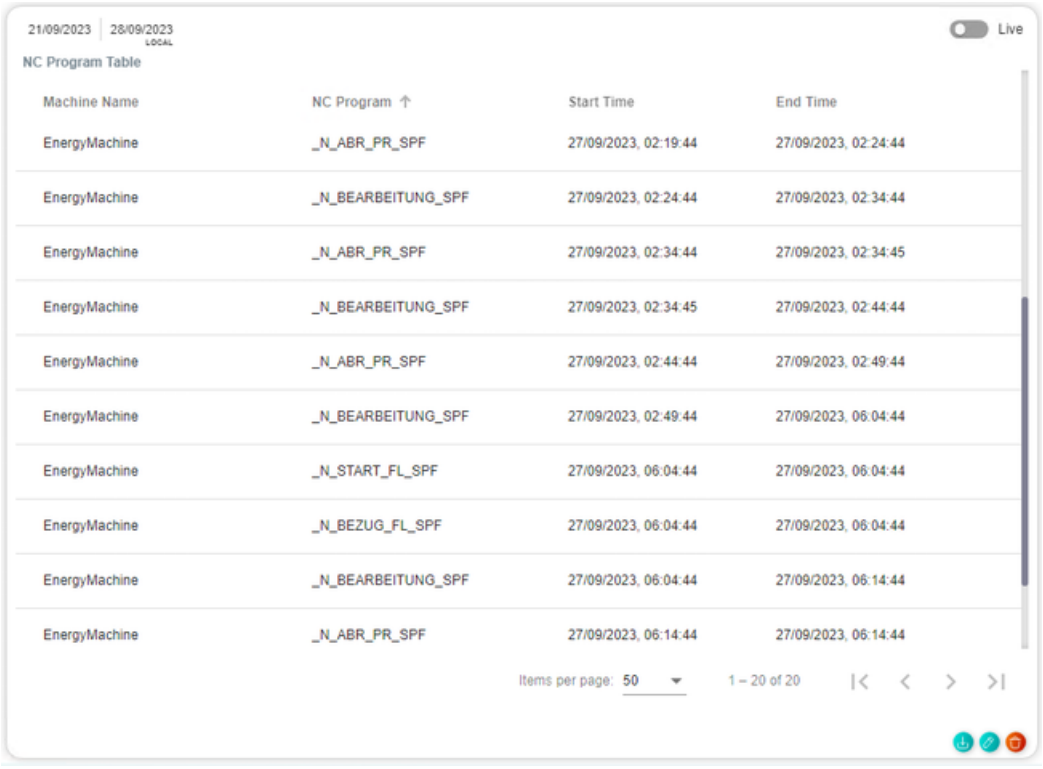
Energy consumption related charts can be created.

For more information, see section Production logic (Page 306)

NC Program Table

NC program changes of the machine can be displayed using NC Program Tables data source.





6.2.5 Factory Performance Analysis Reports

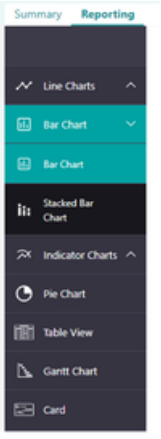
From availability to performance, you can create and visualize many different indicators to measure the factory performance effectiveness. While creating your own reports, we recommend you to follow OEE analyses indicators.

Below you can find the related reports.

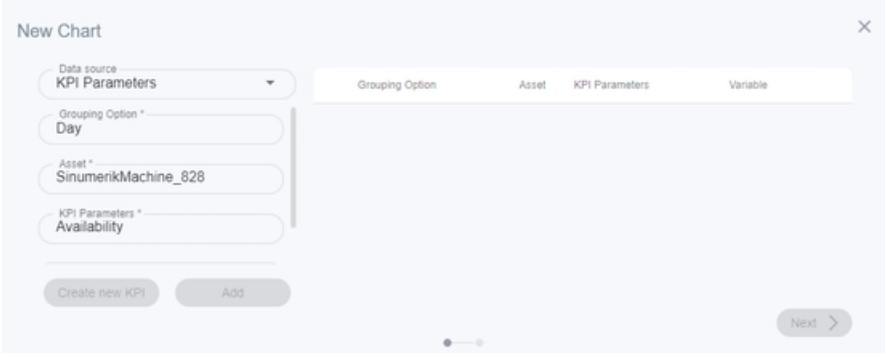
With the indicators explained above a report named "**Availability Analysis**" is the first chart that provides information about planned production time to availability losses.

Procedure

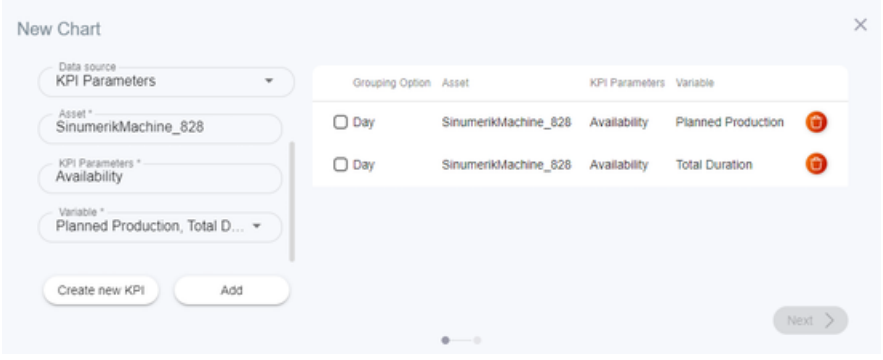
1. Select a chart type from dashy side menu (Bar Chart>Bar Chart).



2. Select corresponding data source (KPI Parameters)
3. Select Grouping Option (Day)
   When Day grouping option is selected, one result point will be displayed for selected variables for each day in the selected date range.
4. Select the corresponding machine
   The selected machine's data will be displayed
5. Select category (Availability)

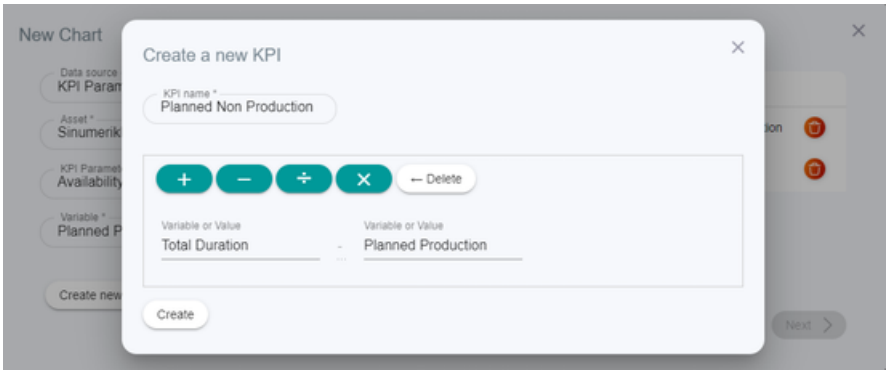


6. Select necessary variables (Planned Production, Total Duration)

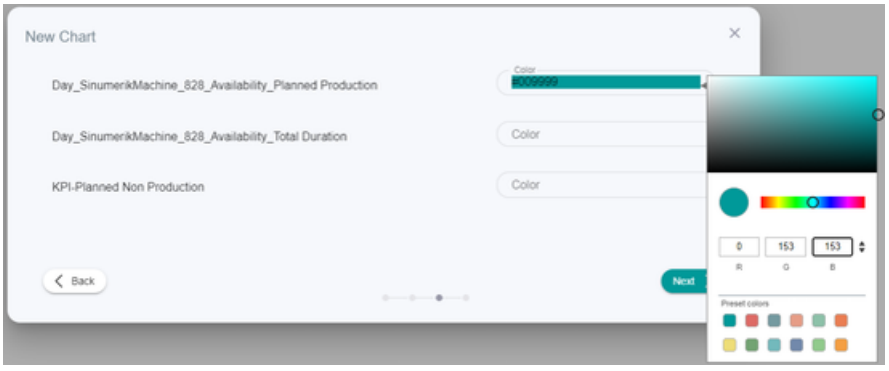


7. Click Create new KPI to create a new KPI named "Planned Non Production"

8. Enter new KPI name
9. Select variables (Total Duration and Planned Production) and expression ("-" to subtract 2 variables to create the new KPI)



10. Click Next
11. Click Next
12. Click on color fields of variables to color variables
    Color codes can be written directly or color can be picked manually.



13. Click Next
14. Select dates from date picker

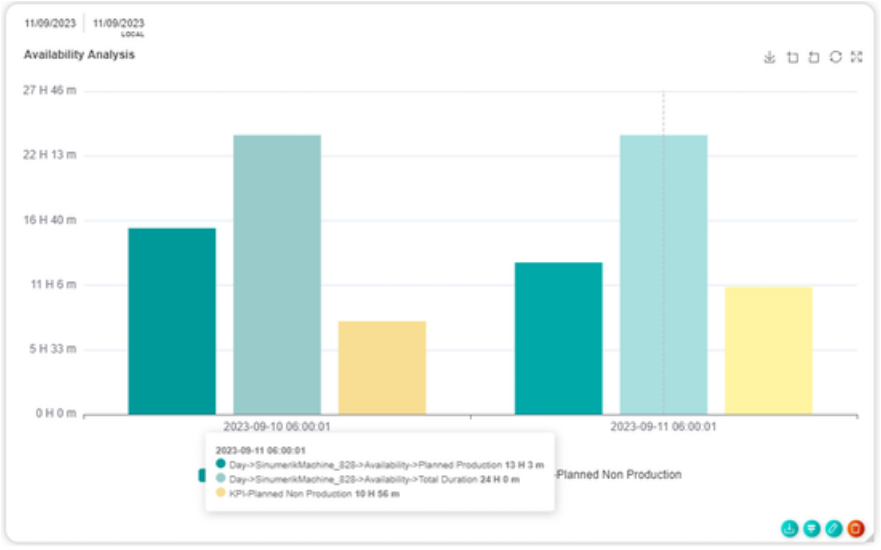
Note

Maximum 90 days can be queried

15. Enter Chart Name ("Planned Production/ Non Production")



16. Click Save
"Availability Analysis" chart is created and displayed on the page



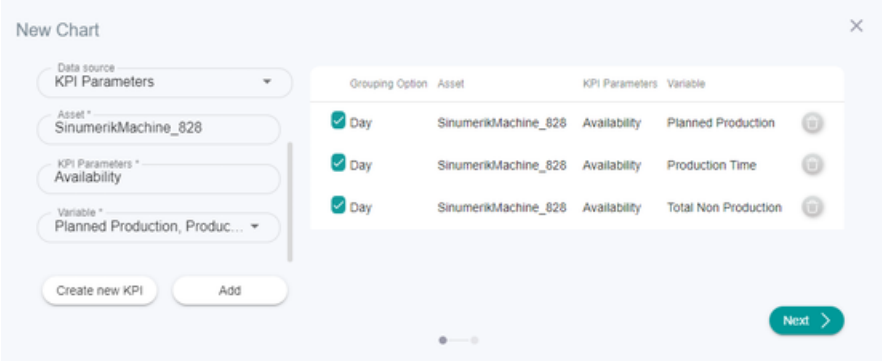
Run Time

The second part of OEE analysis is the actual runtime analysis (This information can be provided by KPI Parameters data source under Availability as "Production Time").

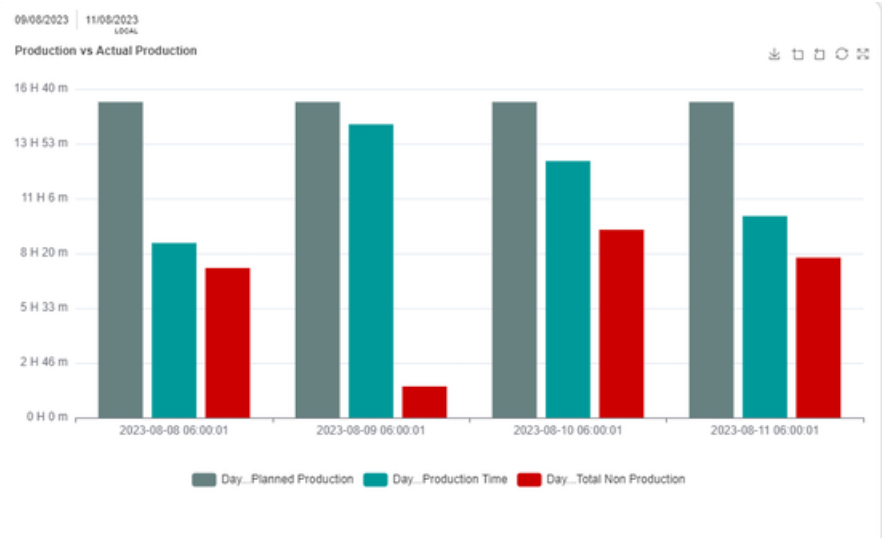
Due to some problems or unexpected conditions, there can be a gap between planned production and actual production. User can analyze this gap by using several options.

Comparing planned production with actual production, This comparison can be created by using 3 KPI Parameters data source variables

(Planned Production, Production Time and Total Non Production)



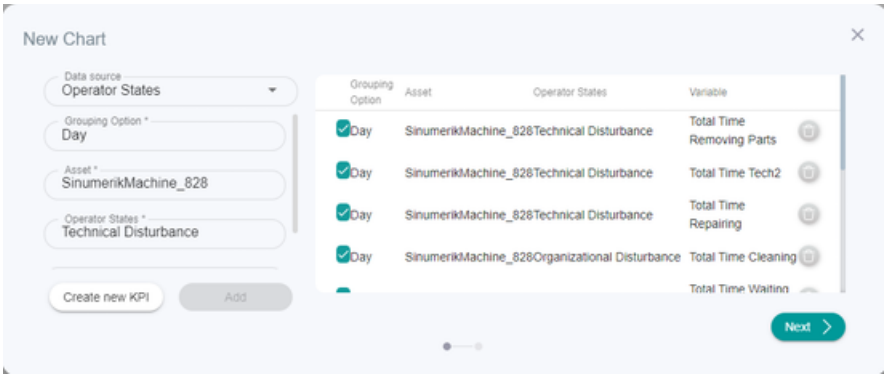
Selecting necessary options below chart named "Production vs Actual Production" is created:

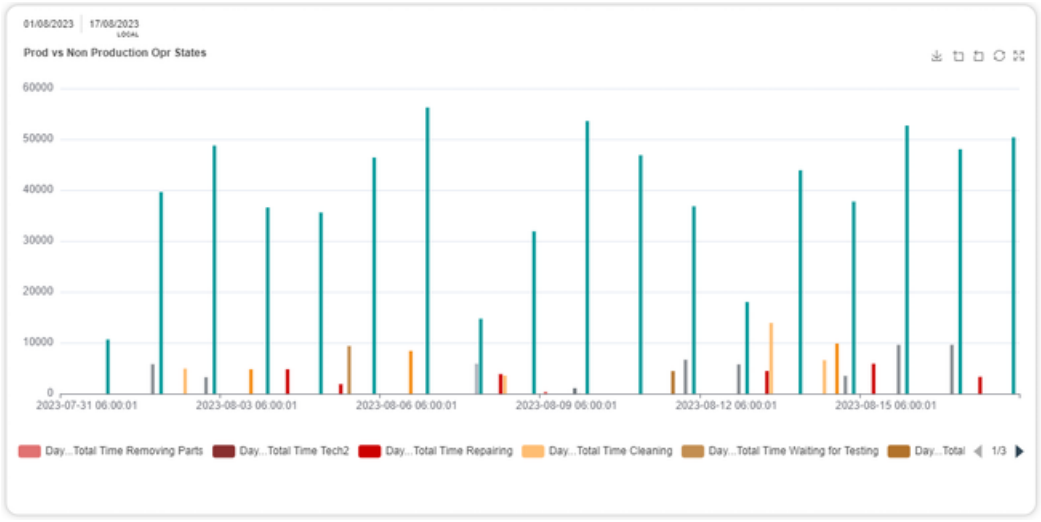


The reason behind the non production time can analyzed with different data sources and variables.

There might be some operator state, which are non production mapped that, behind non production time.

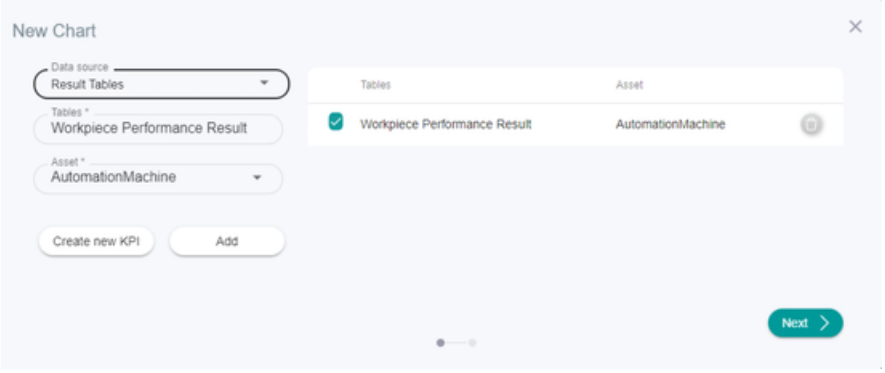
Therefore a chart Production vs Total Non Production Operator States can be created

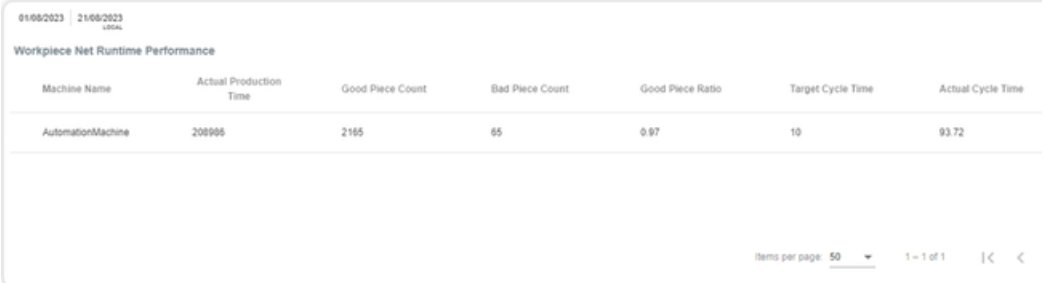




Net Runtime

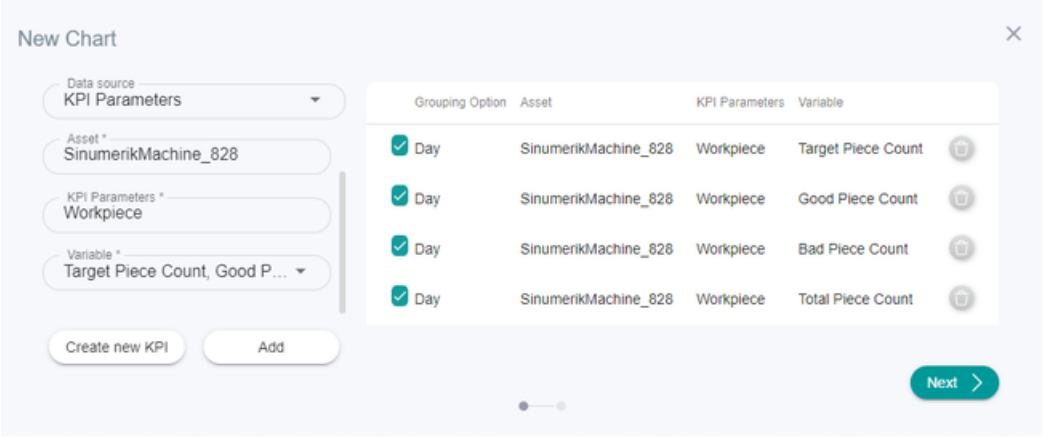
Net runtime can be measured by actual cycle time vs target cycle time info. This information provides a feedback of how fast parts are produced and if users have achieved production targets for the overall time. With Table View data source and Workpiece Performance Result table this Net runtime can be measured.

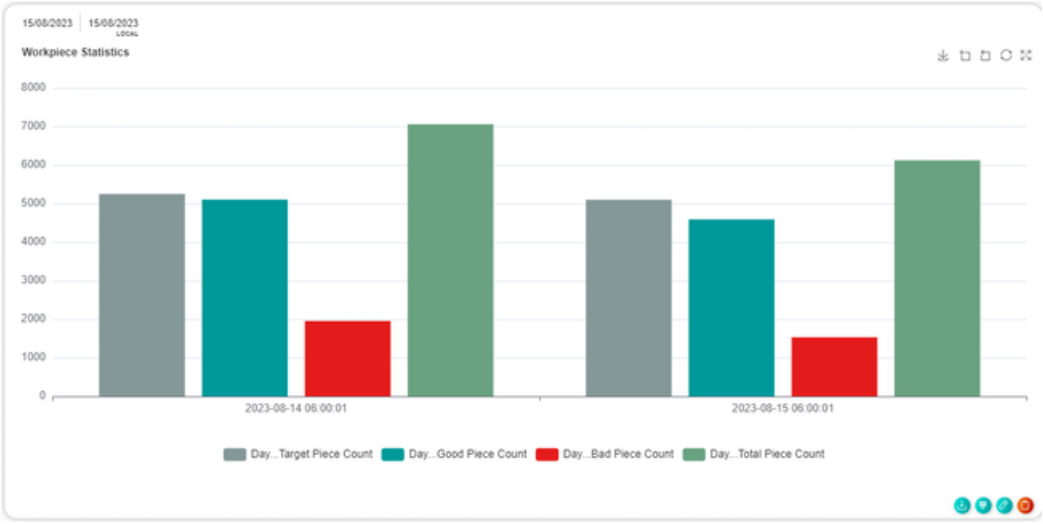




Fully Productive Time

During the productive times, quality of the items are also a criteria for measuring the effectiveness of the production line. Quality losses can be visualized as shown.





6.2.6 Creating PDF report

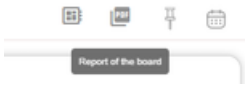
The pdf reports of boards can be exported. PDF report is exported for the board which user is on.

All the charts for corresponding board is included in PDF Report.

Procedure

In the report

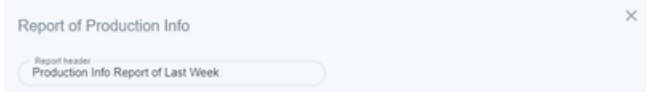
1. Click the pdf button in the upper right corner of the page.



The pdf report popup appears on the screen.



2. Enter a pdf report name



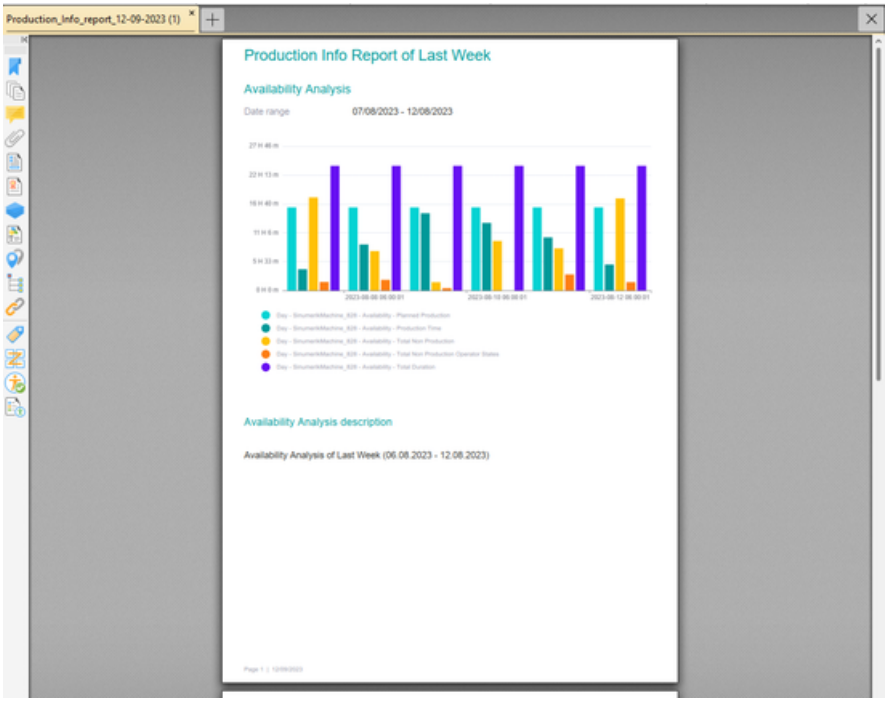
Click the chart "Hide" button if the chart is not required in the pdf export.



3. Charts can be zoomed in or zoomed out if scrolling is used on the charts.



4. Write a description for the charts in description fields of the charts
5. Click the "Download" button at the bottom to download the pdf report. The location of the downloaded file can be changed.
   The pdf report has been downloaded.



6.2.7 Supported Variable List

Supported Variable List

Note

Each data source provides different variables for user to use in charts. So user has to select corresponding data source for desired variable

Data source variable relation table

Variable	Description	Data Soure	Category	Grouping Option
OEE	OEE KPI of the machine	OEE/ KPI	Predefined KPIs	Day, Shift,Shift Part
Availability	Availability KPI of the machine	OEE/ KPI	Predefined KPIs	Day, Shift,Shift Part
Performance	Performance KPI of the machine	OEE/ KPI	Predefined KPIs	Day, Shift,Shift Part

Variable	Description	Data Soure	Category	Grouping Option
Quality	Quality KPI of the machine	OEE/ KPI	Predefined KPIs	Day, Shift,Shift Part
Sustainability	Sustainability KPI of the machine	OEE/ KPI	Predefined KPIs	Day, Shift,Shift Part
Custom KPIs	User defined KPI's of the machine	OEE/ KPI	Custom KPIs	Day, Shift,Shift Part
Target Piece Count	Target piece count	KPI Parameters	Workpiece	Day, Shift,Shift Part
Good Piece Count	Good Piece Count	KPI Parameters	Workpiece	Day, Shift,Shift Part
Target Cycle Time	Target Cycle Time	KPI Parameters	Workpiece	Day, Shift,Shift Part
Bad Piece Count	Bad Piece Count	KPI Parameters	Workpiece	Day, Shift,Shift Part
Total Piece Count	Total Piece Count	KPI Parameters	Workpiece	Day, Shift,Shift Part
Planned Production	Planned production time	KPI Parameters	Availability	Day, Shift,Shift Part
Production Time	Actual production time	KPI Parameters	Availability	Day, Shift,Shift Part
Total Non production	Total non production time within the selected interval	KPI Parameters	Availability	Day, Shift,Shift Part
Total Non Production Operator States	Total duration of the operator states which are non production mapped	KPI Parameters	Availability	Day, Shift,Shift Part
Total Duration	Selected interval time	KPI Parameters	Availability	Day, Shift,Shift Part
Total Unscheduled Non Production	Unplanned breaks during productive shift parts	KPI Parameters	Availability	Day, Shift,Shift Part
Total Unscheduled Production	Unplanned production time during non productive shift parts	KPI Parameters	Availability	Day, Shift,Shift Part
Total Time Machine Off	Total time of the machine in "Machine Off" state	KPI Parameters	Machine States	Day, Shift,Shift Part
Total Time Unknown	Total time of the machine in "Unknown" state	KPI Parameters	Machine States	Day, Shift,Shift Part
Total Time Production	Total time of the machine in "Production" state	KPI Parameters	Machine States	Day, Shift,Shift Part
Total Time Technical Disturbance	Total time of the machine in "Technical Disturbance" state	KPI Parameters	Machine States	Day, Shift,Shift Part
Total Time Organizational Disturbance	Total time of the machine in "Organizational Disturbance" state	KPI Parameters	Machine States	Day, Shift,Shift Part
Total Time Downtime Without Technical Disturbance or Organizational Reasons	Total time of the machine in "Downtime Without Technical Disturbance or Organizational Reasons" state	KPI Parameters	Machine States	Day, Shift,Shift Part

Variable	Description	Data Soure	Category	Grouping Option
Total Time No Data	Total time of the machine in "No Data" state	KPI Parameters	Machine States	Day, Shift,Shift Part
Total Time YYY Operator State	Total time of the defined operator state	KPI Parameters	Operator States	Day, Shift,Shift Part
Total Time YYY Manual State	Total time of the entered manual state	KPI Parameters	Manual States	Day, Shift,Shift Part
Custom KPI Parameters	User defined KPI parameters of the machine	KPI Parameters	Custom	Day, Shift,Shift Part
All defined operator states	All defined operator states	Operator States	All	Day, Shift,Shift Part
Operator states which are mapped to production	Operator states which are mapped to production	Operator States	Production	Day, Shift,Shift Part
Operator states which are mapped to Technical Disturbance	Operator states which are mapped to Technical Disturbance	Operator States	Technical Disturbance	Day, Shift,Shift Part
Operator states which are mapped to Organizational Disturbance	Operator states which are mapped to Organizational Disturbance	Operator States	Organizational Disturbance	Day, Shift,Shift Part
Operator states which are mapped to Downtime Without Technical or Organizational Reasons	Operator states which are mapped toDowntime Without Technical or Organizational Reasons	Operator States	Downtime Without Technical or Organizational Reasons	Day, Shift,Shift Part
Operator states which are mapped to Machine Off	Operator states which are mapped toMachine Off	Operator States	Machine Off	Day, Shift,Shift Part
Operator states which are mapped toUnknown	Operator states which are mapped toUnknown	Operator States	Unknown	Day, Shift,Shift Part
EnergyState	Energy state info	Machine Data	Energy Consumption	Time Based
Power	Power info	Machine Data	Energy Consumption	Time Based
Active Energy	Active Energy info	Machine Data	Energy Consumption	Time Based
ReactiveEnergy	Reactive Energy info	Machine Data	Energy Consumption	Time Based
TotalEnergy	Total Energy info	Machine Data	Energy Consumption	Time Based
Feedoverride	Feedoverride info	Machine Data	CH1_BasicConfig	Time Based
Spindleoverride	Spindleoverride info	Machine Data	CH1_BasicConfig	Time Based
NCProgramStatus	NCProgramStatus info	Machine Data	CH1_BasicConfig	Time Based
StopCond	StopCond info	Machine Data	CH1_BasicConfig	Time Based
Opmode	Opmode info	Machine Data	CH1_BasicConfig	Time Based
ProtectionLevel	ProtectionLevel info	Machine Data	CH1_BasicConfig	Time Based
NrOfAlarms	NrOfAlarms info	Machine Data	CH1_BasicConfig	Time Based
Workpiece Result	Good Piece Count, Bad Piece Count and Good Piece Rate info	Result Tables	-	Time Based

Variable	Description	Data Soure	Category	Grouping Option
Availability Result	Total production time, Total non production time, Total unplanned downtime time and OEE info	Result Tables	-	Time Based
Workpiece Performance Result	Actual production time, Good Piece Count, Bad Piece Count, Good Piece Ratio, Target Cycle Time and Actual Cycle Time info	Result Tables	-	Time Based
Machine States	Machine state usage info in result tables	State Information Tables	-	Time Based
Operator States	Operator state usage info in result tables	State Information Tables	-	Time Based
Manual States	Manual State usage info in result tables	State Information Tables	-	Time Based
Operator States	Operator state usage info in pie chart	Summary Data	-	Time Based
Manual States	Manual state usage info in pie chart	Summary Data	-	Time Based
Machine States	Machine state info in pie chart	Summary Data	-	Time Based
Production Analysis	Production Analysis in pie chart	Summary Data	-	Time Based
NC Program Change History	NC Program changes of the machine	NC Program Tables	-	Time Based

Note

Data sources are accessible in specific charts/tables

Data source	Line Charts	Bar Charts	Indicator Charts	Table View	Gantt Chart	Pie Chart
OEE/ KPI	+	+	+	+	+	
KPI Parameters	+	+	+		+	
Operator States	+	+			+	
Machine Data	+	+		+		
Result Tables				+		
State Information Tables				+		
NC Program Tables				+		
Summary						+

6.3 Utilization Planning

6.3.1 Overview

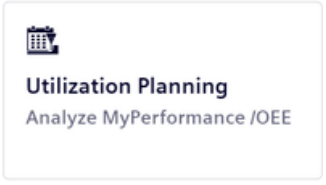
You have the option of defining the utilization plans for the individual control systems in the "Utilization Planning" window.

The following tabs are available in the "Utilization Planning" window:

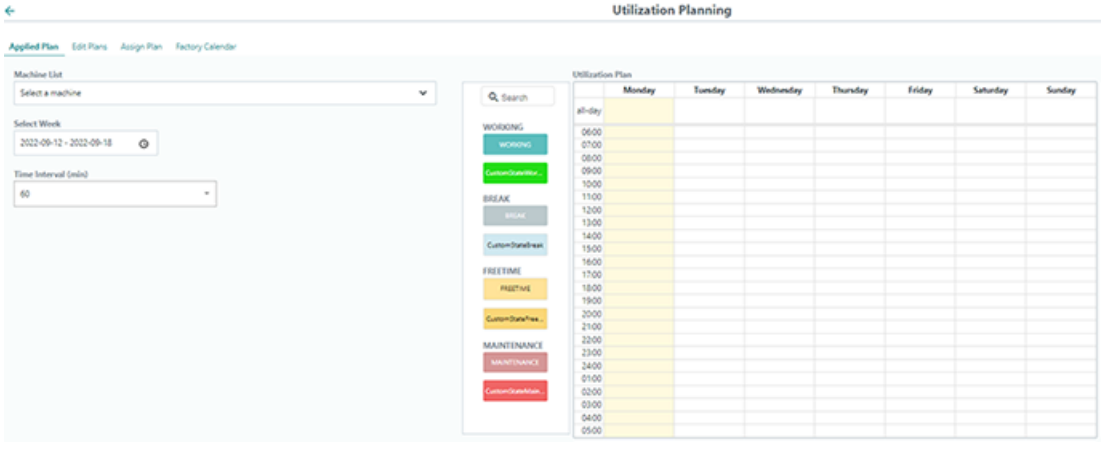
- Applied plan (Page 224).
  Under this tab you can see the assigned utilization plans for the control systems.
- Edit plans (Page 225).
  Under this tab you can create, edit and delete utilization plans.
- Assign plan (Page 234).
  Under this tab you can assign the required assets to the machine utilization plans that have been created.
- Factory calendar (Page 238)
  Under this tab you can apply weekend, public holidays and days when the factory is offline.

Procedure

1. On the start page of Analyze MyPerformance /OEE, click "Utilization Planning".



2. The "Utilization Planning" window is opened with the "Applied Plan" tab.



6.3.2 Applied plan

Parameters and elements

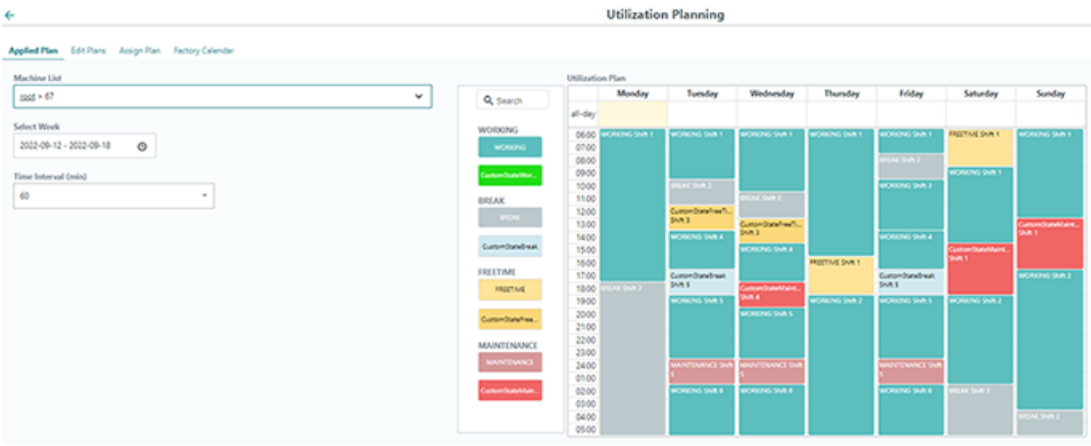
The following parameters and elements are available for editing:

Parameter/element	Description
Utilization plan buttons You can create other utilization states. For more information see Customize utilization states (Page 317).	
WORKING	Identifies the corresponding times as working times.
BREAK	Identifies the corresponding times as break times.
FREETIME	Identifies the corresponding times as free time.
MAINTENANCE	Identifies the corresponding times as maintenance time.
⋮ **Saturday**	Opens the "Workday details" view. For more information see Workday details (Page 236).
Applied Plan	
Machine List	Clicking on the small arrow opens the drop-down list for selecting a machine.
Select Week	Clicking on the clock icon opens the calendar for defining the time period.
Time Interval (min)	Clicking on the small arrow opens the drop-down list to select the available time interval in minutes: • 60 • 30 • 15 • 5 The utilization plan is displayed with the selected time intervals.

The "Utilization Planning" window is opened with the "Applied Plan" tab.

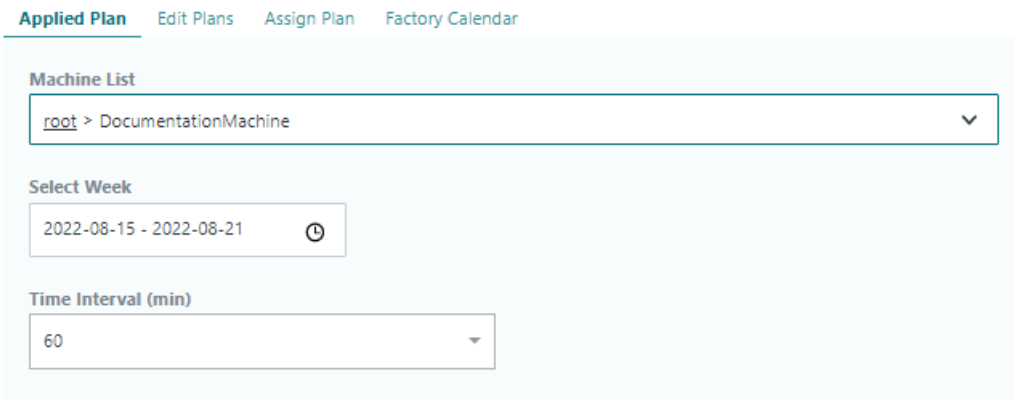
You see the utilization plan and the settings for the applied plan.

Deleted utilization states are also listed in the shift status list if they are used in a templated assigned to the machine.



Procedure

1. Open the drop-down "Machine List".
   The list of available machines is displayed.
   Select the required control system (machine) using the mouse.
2. Click on the clock icon in the "Select Week" selection box.
   The "Select Week" calendar is opened.
   Click to select the required week.
3. In the drop-down list "Time Interval (min)", select the required interval.
   The machine utilization plan is displayed for the selected time period.



6.3.3 Edit plans

6.3.3.1 Creating machine utilization plans

Under this tab you can create, edit and delete machine utilization plans.

Parameters and elements

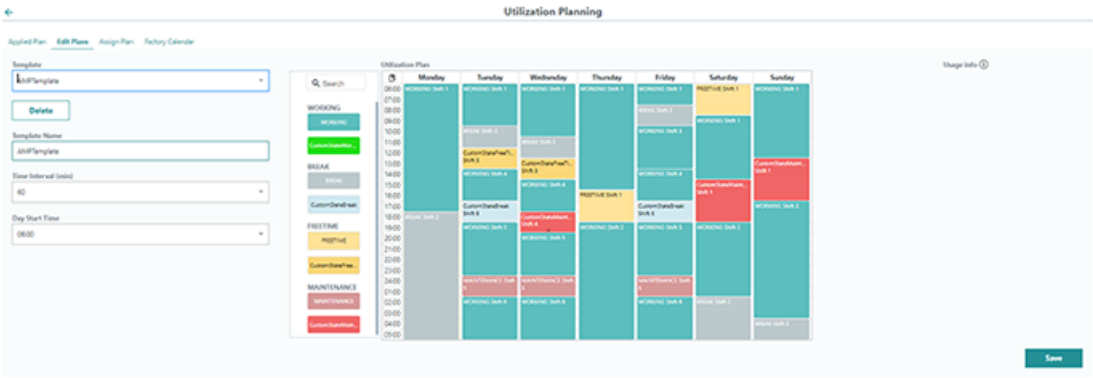
The following parameters and elements are available for editing:

Parameter/element	Description
Utilization plan buttons You can create other utilization states. For more information see Customize utilization states (Page 317).	
WORKING	Identifies the corresponding times as working times.
BREAK	Identifies the corresponding times as break times.
FREETIME	Identifies the corresponding times as free time.
MAINTENANCE	Identifies the corresponding times as maintenance time.
	Click "Copy-Paste" to copy and paste a schedule from a day to another day(s).
⋮ **Saturday**	Opens the "Workday details" view. For more information see Workday details (Page 236).
"Edit Plans" tab	
Template	Clicking on the small arrow opens the drop-down list to select an existing template.
Template Name	Enter the required name for the new template.
Time Interval (min)	Clicking on the small arrow opens the drop-down list to select the available time interval in minutes: • 60 • 30 • 15 • 5 The utilization plan is displayed with the selected time intervals.
Day Start Time	Clicking on the small arrow opens the drop-down list for selecting the available start times of the day.
Usage info ⓘ	Click on "Usage info" to see or hide the usage information.
Delete	Click on "Delete" to delete the selected utilization plan template.
Save	Click on "Save" to save the selected utilization plan template.

Procedure

Open the "Edit Plans" tab.

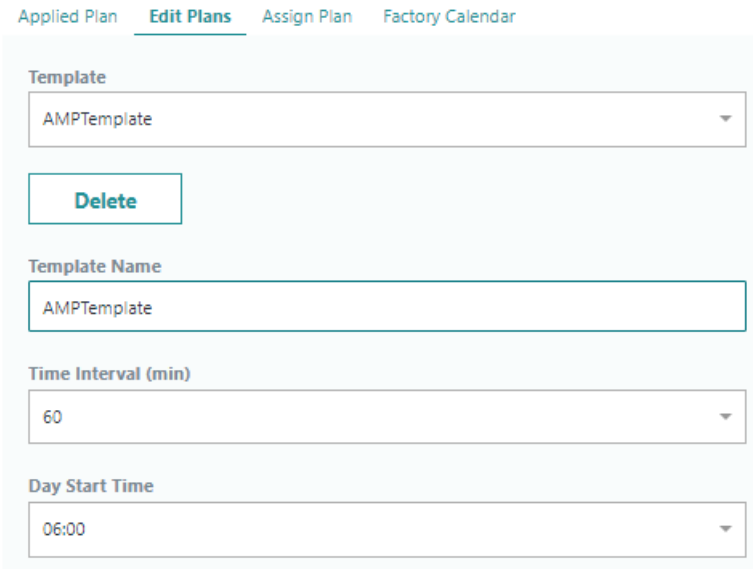
You see the utilization plan and the tab for creating and deleting the plan.



Creating machine utilization plans

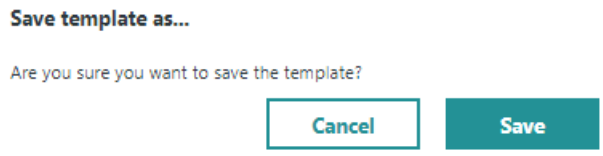
You have the option of creating a utilization plan.

1. Open the "Edit Plans" tab.



2. Open the drop-down list "Template".
   You can select the following:
   - Click on "New Template" if you want to create a new utilization plan.
   - Click on a previously created template that you want to edit and save as the new machine utilization plan.
3. Enter the name of the new machine utilization plan in the "Template name" input field.
4. Open the "Time interval (min.)" drop-down list.
   Choose the required time interval by clicking on it.
5. Open the drop-down list "Day start time".
   Select the desired start time for the day with a mouse click.

6. Enter the desired times in the machine utilization plan as follows:
   – Click one of the buttons above the weekly plan (for example BREAK), and drag the button to the required position in the machine utilization plan.
   – Then position the cursor at the lower edge of the button in such a way that the cursor becomes a double arrow. Drag the button to the required start or end time.
   – You can also edit the times in the "Edit status" window, see Edit status (Page 229).
7. Edit the calendar events:
   – Click on the event in the machine utilization plan.
   – The "Edit status" window opens. For more information, see Edit status (Page 229).
   – Edit the data of the status.
8. Click on "Save" to save the machine utilization plan.
9. The "Save template as..." window opens.
   To save the new template, click on the "Save" button.
   - OR -
   To cancel the operation, click on "Cancel".



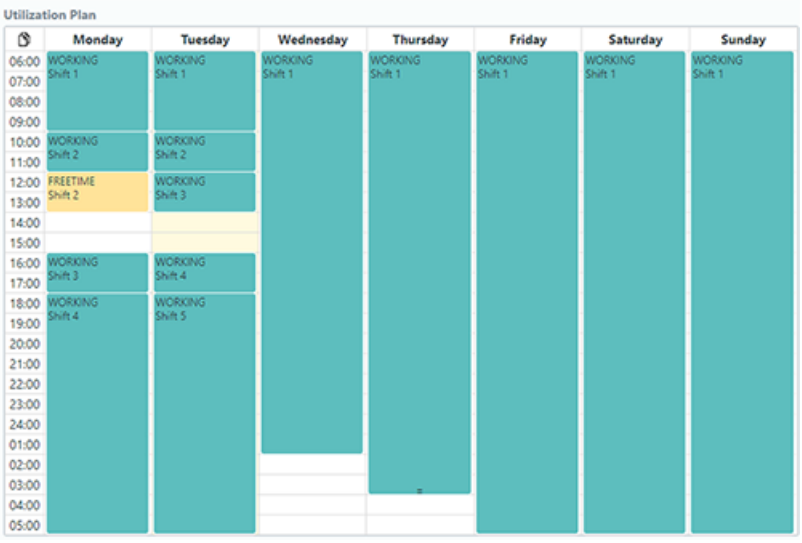
Gaps in the utilization plan

You can create a utilization plan with gaps between two status parts. The gap is included in the previous shift.The gap is considered as free time on the "Machine details" view and the "Performance monitoring" view.

Note

Gaps are included with the correct shift in the OEE and KPI calculation.

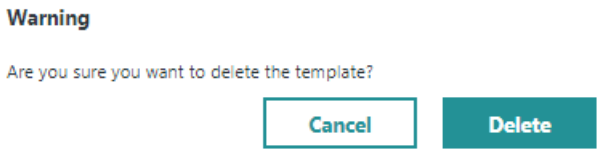
The OEE value is not increased during the gap, because it is supposed to be non-productive time.



Deleting machine utilization plans

You have the option of deleting a utilization plan.

1. Clicking on the small arrow opens the drop-down list "Templates".
   Select the template that you want to delete using the mouse.
2. Click "Delete".
   The "Warning" window opens.
   To delete the template, click "Delete".
   - OR -
   To cancel the operation, click "Cancel".



6.3.3.2 Edit status

Click on an event in the shift calendar to edit the event in the "Edit status" window.

Parameter and elements

Parameter/element	Description
Start time	Time at which the event starts
End time	Time at which the event ends

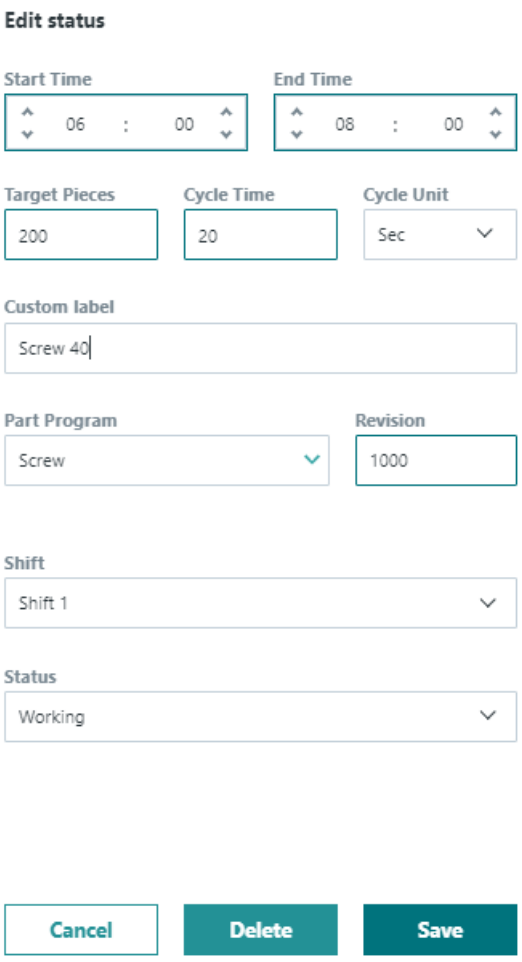
Parameter/element	Description
Target Pieces	• The number of parts • Optional value in the range from 1 to 9999 • Only available for status "Working"
Cycle Time	• Needed time to produce 1 target piece • Mandatory if target pieces are provided • Only available for status "Working" • Cannot be larger than the duration of the shift
Cycle Unit	• Time unit for cycle time • Mandatory if cycle time is provided • Seconds, minutes or hours
Custom label	• Optional • Up to 256 characters • All type of characters
Part Program	Only available for status "Working"
Revision	Only available for status "Working" 4 characters, of ".", ",", "A" to "Z" or "0" to "9"
Shift	• Each day, the shift numbering starts with "1" • The shift number may only be incremented by "1" for each entry. • The maximum number of shifts is 24.
Status	Select: • Working • Break • Freetime • Maintenance
Cancel	Reject the changes.
Delete	Delete this status from the utilization plan.
Save	Save this event. You must save the template on the "Edit Plans" tab to save the event permanently.

Procedure

The "Edit Status" window opens when you click into the utilization calendar.

1. Set the start and the end time of the event. Change it in one of the 3 ways:
   - Resize the event on the "Edit Plans" tab. Click on the edge of an event and drag it.
   - Click the up or down button (arrows) next to the hour or minute values.
   - Click on the hour or minute value. Press and hold the up or down arrow key.

   Events must not overlap.
   The event must start and end in the same calendar column.
2. Select the desired shift number from the "Shift" drop-down list.
   You can assign several calendar entries to the same shift.
3. If necessary, select a new status from the "Status" drop-down list.
4. Set the other information on the event.
   - Cycle unit
   - Cycle time
   - Target pieces
   - Production time ≳ target cycle time × Target pieces
   - Custom label
   - Part program
   - Revision
5. Click "Save" to save the status.
   - OR -
   Click "Delete" to delete this status from the machine utilization plan.
   - OR -
   Click "Cancel" to reject the changes.



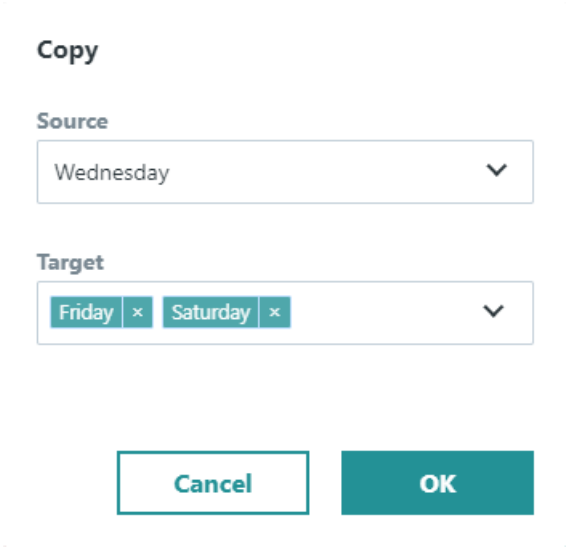
6.3.3.3 Copy daily plan

You can copy a daily plan and paste it to other days.

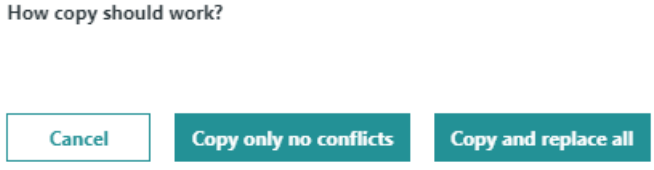
Procedure

1. Click "Copy-Paste" in the utilization calendar.
2. Select the source. This is the daily plan which you want to copy.

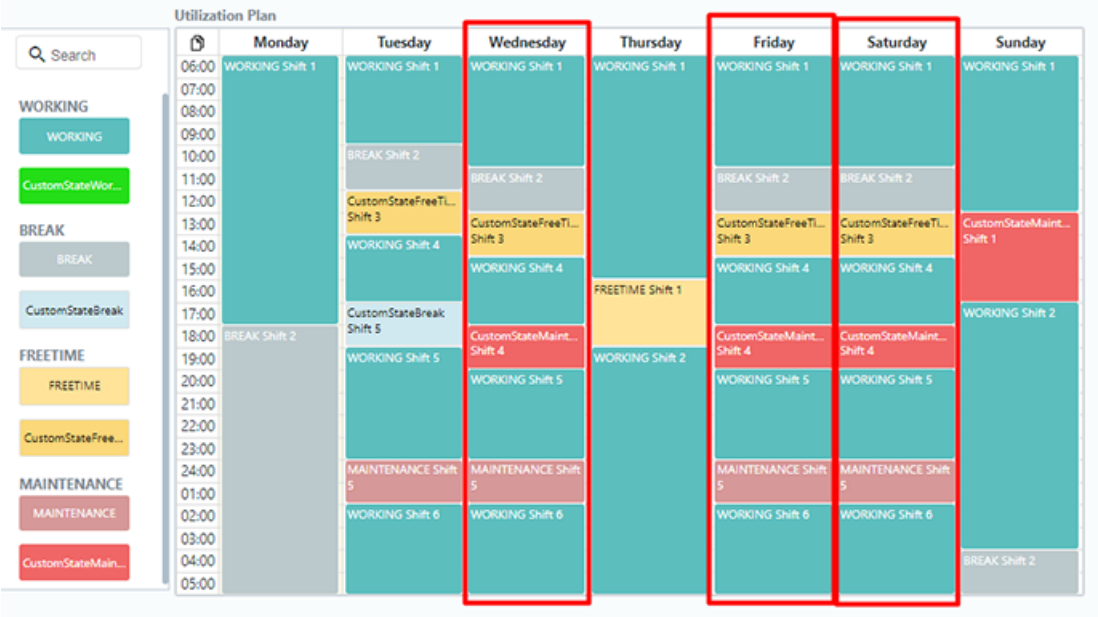
3. Select the target. You can select several targets.



4. Click "OK"
5. Select the copy option
   - Select "Copy only no conflicts" if you want to copy only the shift components if there is no conflict in the target.
   - Select "Copy and replace all" if you want to paste the source to the target without control.



6. Click "OK" to complete the process.



6.3.4 Assign plan

Under this tab you can assign the required machine to the machine utilization plans that have been created.

Parameters and elements

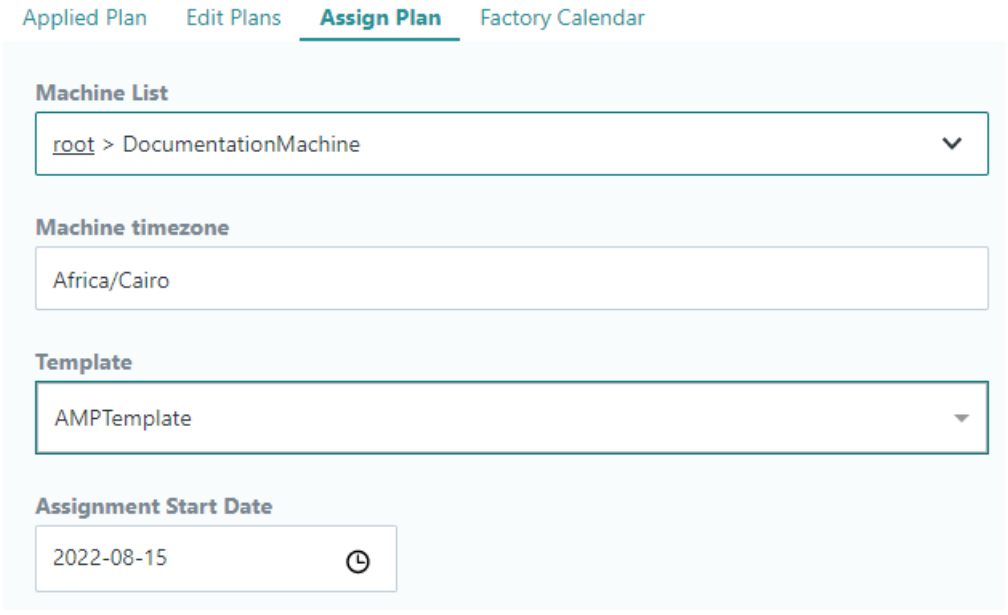
The following parameters and elements are available for editing:

Parameter/element	Description
Utilization plan buttons You can create other utilization states. For more information see Customize utilization states (Page 317).	
WORKING	Identifies the corresponding times as working times.
BREAK	Identifies the corresponding times as break times.
FREETIME	Identifies the corresponding times as free time.
MAINTENANCE	Identifies the corresponding times as maintenance time.
Save	Click on "Save" to save the selected utilization plan template.
⋮ **Saturday**	Opens the "Workday details" view. For more information see Workday details (Page 236).
"Assignment" tab	
Machine List	Clicking on the small arrow opens the drop-down list for selecting a machine.
Machine Timezone	Displays the time zone that is assigned to the machine.

Parameter/element	Description
Template	Clicking on the small arrow opens the list of the available utilization plan templates.
Assignment Start Date	Clicking on the clock icon opens the calendar to assign the start date.
Assign	Click on "Assign" to assign the created utilization plan template to the required machine.

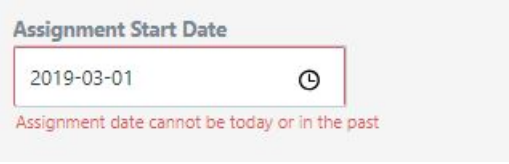
Procedure

1. In the "Utilization Planning" window, open the "Assign Plan" tab.

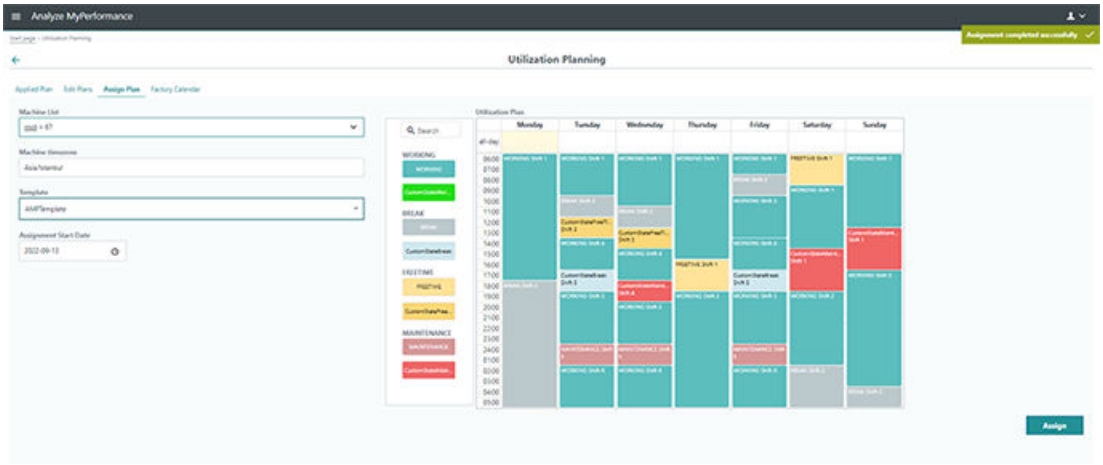


2. Open the drop-down "Machine List".
   The list of available machines is displayed.
   Use the cursor to select the required control system.
3. Open the drop-down list "Template".
   Select the required template.
   The machine utilization plan of the template is displayed.

4. Open the "Assignment Start Date" calendar by clicking on the clock icon.
   Select the required start date. The next day is the earliest start date.
   If you have not selected the correct date or the day, an error message is displayed.



5. Click "Assign".
   You receive the success message "Assignment completed successfully".



Note

Assignment takes place from the next day

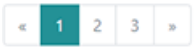
You cannot assign the utilization plan until the next day or one of the next days.

6.3.5 Workday details

You can see detailed information about specific days in the shift calendar.

Parameters and elements

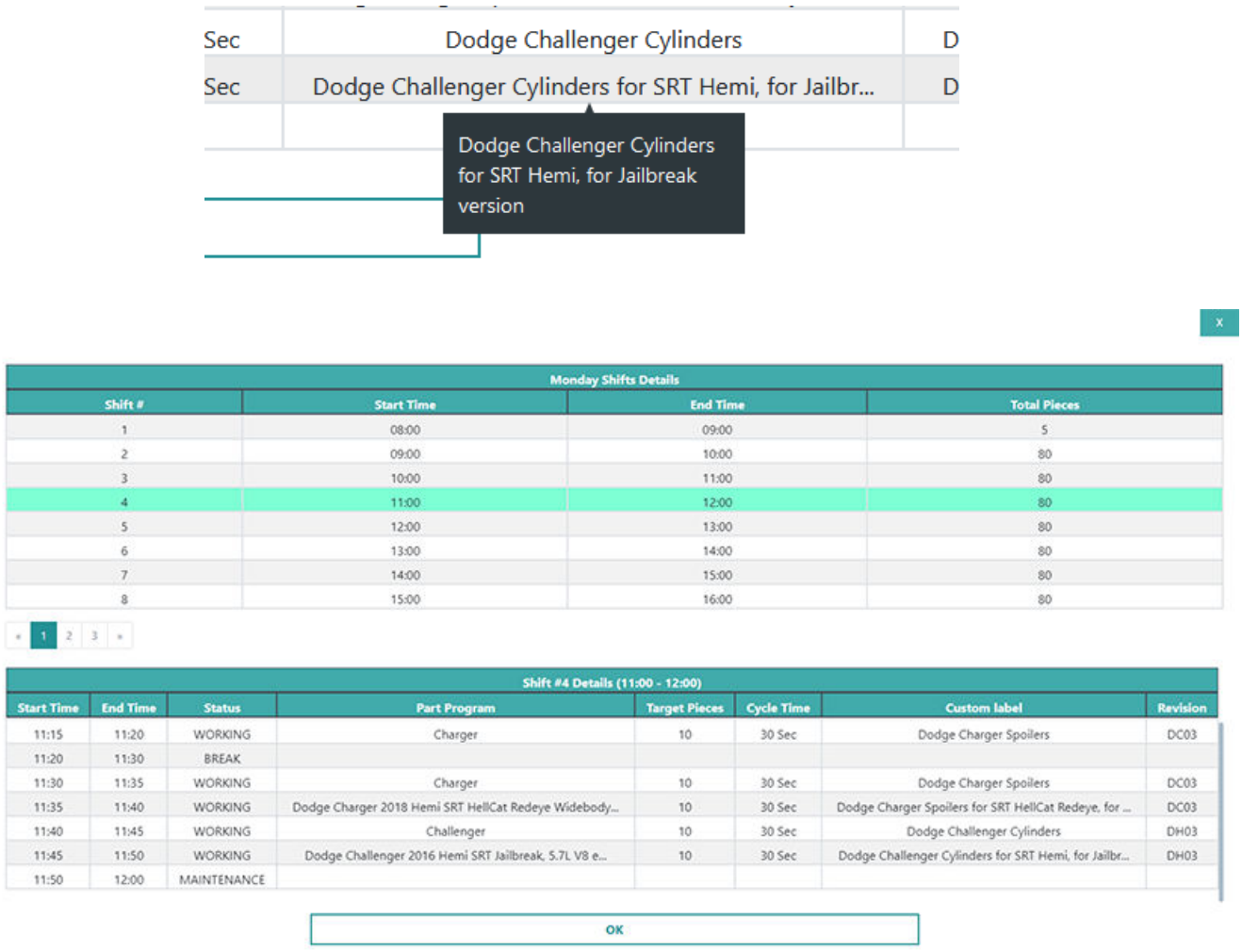
Parameter/element	
OK	Closes the window.
Day shifts details	
Shift #	Shift number
Start Time	Start time of the shift
End Time	End time of the shift
Total Pieces	Number of produced parts

Parameter/element	
	Previous or next page, select page
Shift details	
Start Time	start time of the event
End Time	end time of the event
Status	event status
Part program	part program for this event
Target pieces	number of pieces
Cycle Time	cycle time
Custom label	custom label
Revision	Revision

Procedure

1. Click on the day in the shift calendar or on the three-dot icon next to the day label.
   The window with the day details opens.
2. In the upper table you see the shifts of the selected day. Use the arrows and numbers to scroll through the pages.
   For every shift you see
   - Shift number
   - Start time
   - End time
   - Total pieces
3. Select a shift.
   The second table shows details about the selected shift. You see for all calendar events:
   - Start time
   - End time
   - Status
   - Part program
   - Target pieces
   - Cycle time
   - Custom label
   - Revision

   Use the vertical scrollbar to scroll through the events.
4. The 2 columns "part program" and "custom label" can become very long. You can see the full text when hovering them.



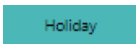
6.3.6 Factory calendar

Under this tab you can enter holidays.

Parameters and elements

The following parameters and elements are available for editing:

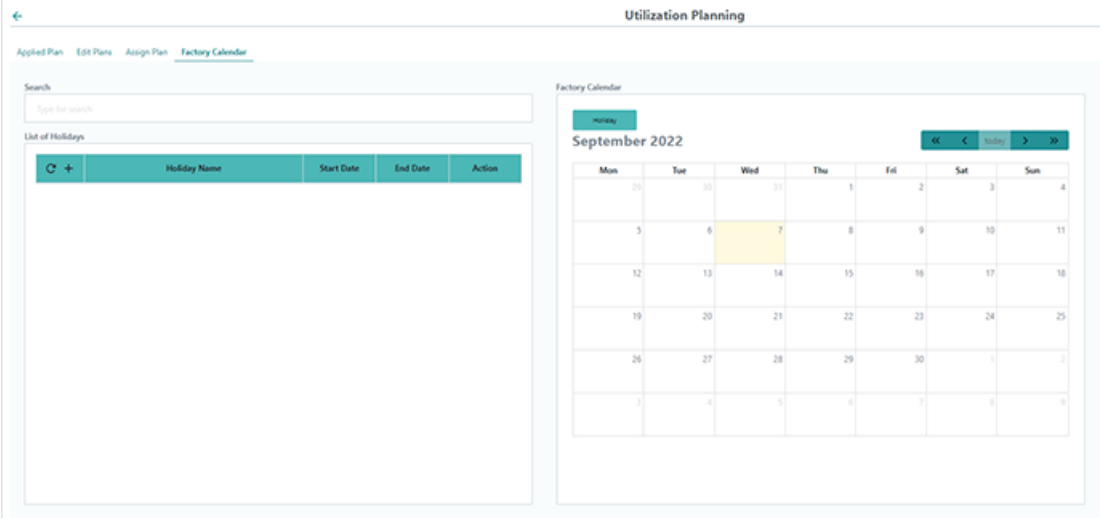
Parameter/element	Description
Search Holiday 2	Enter a name to search for a holiday.
	Refreshes the list.
	Adds a new holiday.

Parameter/element	Description
	Duplicates the holiday.
	Edits the holiday.
	Deletes the holiday.
	Drag and drop this button to add a new holiday in the calendar.
	Click to go back for a year.
	Click to go back for a month.
	Click to go forward for a year.
	Click to go forward for a month.

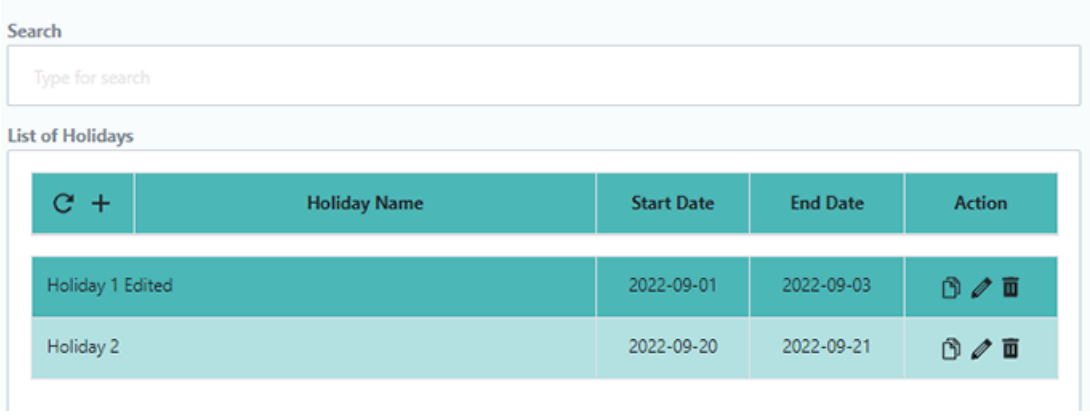
Procedure

Open the "Factory calendar" tab.

You see a list of holidays and the factory calendar with the holidays.

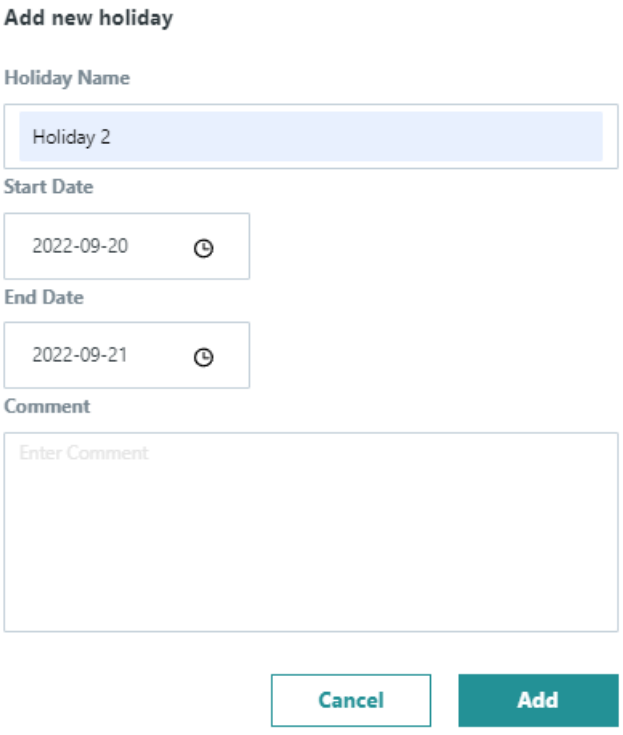


In the "List of holidays" you can add, edit or delete holidays.



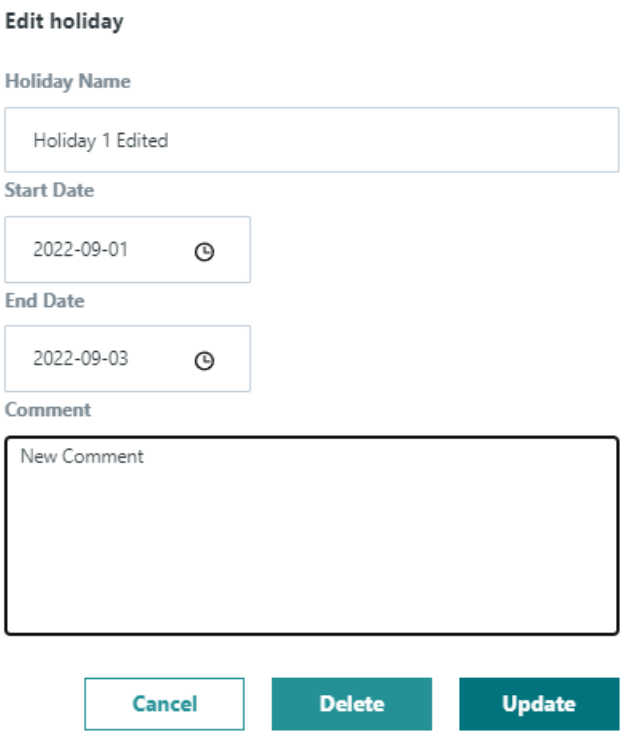
Add a new holiday

1. Click "Plus" in the list of holidays
   - OR -
   Drag and drop the "Holiday" button into the calendar.
2. The "Add new holiday" window opens.
3. Enter the following data in the "Add new holiday" window.
   - holiday name
   - start date
   - end date
   - optional comment
4. To add the comment, click "Add".
   - OR -
   To reject the changes, click "Cancel".
5. Added holidays are shown in the list and in the calendar.



Edit a holiday

1. Click the "Edit" symbol in the list of holidays.
2. The "Edit holiday" window opens.
3. Enter the new data.
4. To commit the changes click "Update".
   - OR -
   To delete the holiday click "Delete".
   - OR -
   To reject the changes click "Cancel".



Delete a holiday

Click the "Delete" symbol in the list of holidays.

- OR -

Click the "Edit" symbol on the list of holidays. Click "Delete" in the "Edit holiday" window.

6.4 Production Quality

6.4.1 Opening the Production Quality

Check the quality of your production in the "Production Quality" window.

The following tabs are available in the "Production Quality" window:

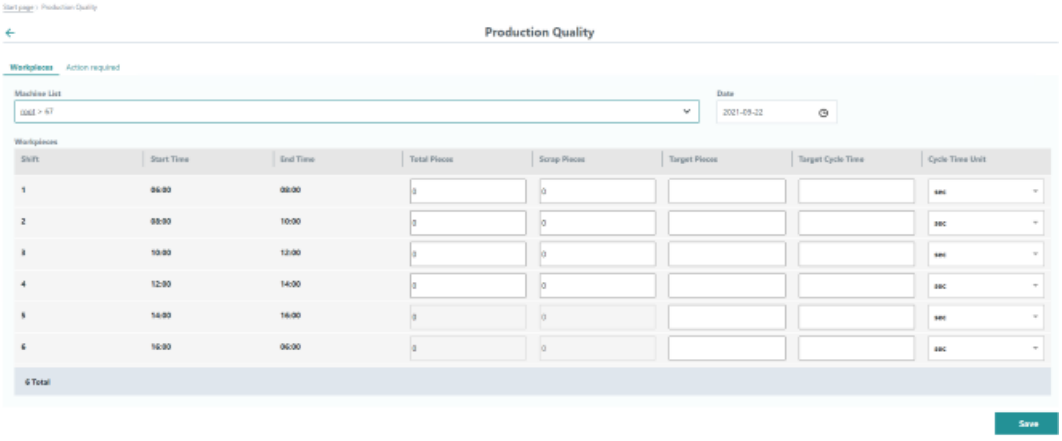
- Workpieces
  For more information, see Checking the workpieces (Page 243).
- Action required
  For more information, see Finding missing workpieces (Page 244).

Procedure

1. On the start page of the Mcenter, click "Production Quality".



2. The "Production Quality" window opens.



6.4.2 Checking the workpieces

To check the production quality of a machine, proceed as follows.

Parameters and elements

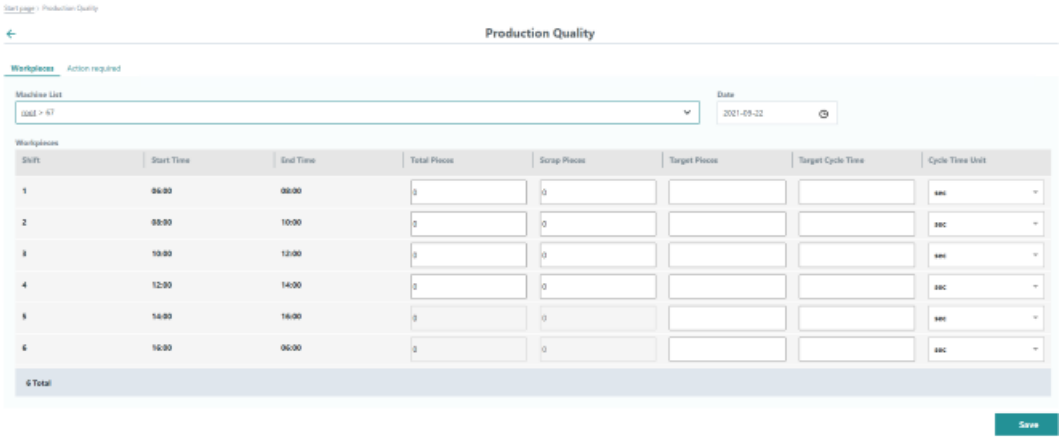
The following parameters and elements are available for editing:

Parameter/element	Description
Machine List	Clicking on the arrow opens the drop-down list "Machine List" for selecting the control system (machine).
Date	Clicking on the clock icon opens the calendar to select the date.
Save	Click the "Save" button to save the current events.
Columns in the "Workpieces" table	
Shift	Displays the number of the work shift.
Start time	Displays the start time of the shift.
End time	Displays the end time of the shift.
Total pieces	Displays the number of produced parts. The number is automatically updated. If a shift is in progress, the field cannot be edited.
Scrap pieces	Displays the number of parts produced with error.
Target pieces	Shows the number of workpiece parts to be produced in one shift.

Parameter/element	Description
Target cycle time	Displays the targeted cycle time for a piece to be produced.
Cycle Time unit	Drop-down list to select the following time unit: • sec = seconds • min = minutes • h = hours

Procedure

1. In the "Production Quality " window, open the "Workpieces" tab.
2. Clicking on the small arrow opens the drop-down "Machine List".
   The list of available machines is displayed.
   Select the required control system (machine) using the mouse.
3. Click on the clock icon to open the "Date" calendar.
   Select the required day.
   You can see the required production data in the "Workpieces" table.



Note

Enter target values

Note that the target values can be entered for all shifts of the previous days and the current day.

4. Click "Save" to save the data.
   "Workpieces are saved successfully" is displayed in the upper right section of the window to show that the operation was successfully completed.



6.4.3 Finding missing workpieces

To find out the missing workpiece of a machine, proceed as follows.

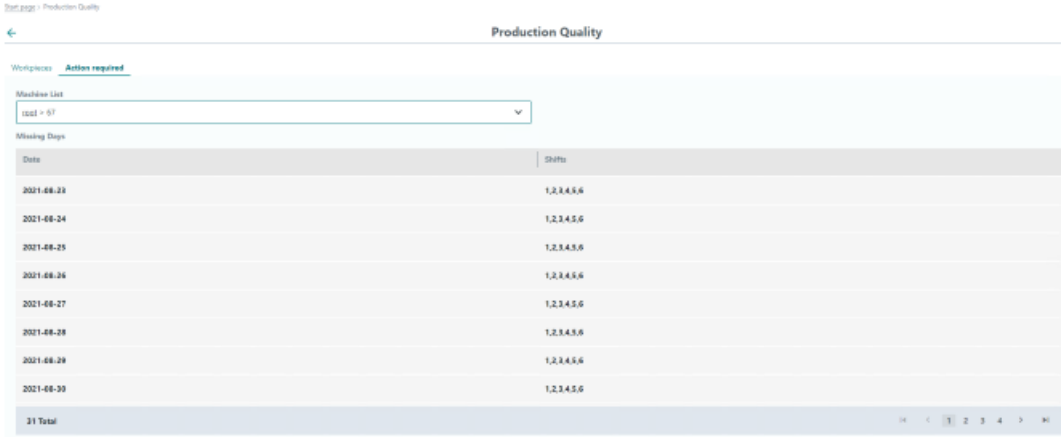
Parameters and elements

The following parameters and elements are available for editing:

Parameter/element	Description
Machine List	Clicking on the arrow opens the drop-down list "Machine List" for selecting the control system (machine).
Columns in the "Missing Days" table	
Date	Displays the date of the work shift.
Shifts	Displays the number of the work shift.

Procedure

1. Open the "Action required" tab in the "Production Quality" window.
2. Clicking on the small arrow opens the drop-down "Machine List".
   The list of available machines is displayed.
   Select the required control system (machine) using the mouse.
3. The "Missing days" table shows the corresponding data.
   You can use this information to enter the missing input data for the corresponding shifts and days in the "Workpieces" tab.
   Up to 8 data items are displayed to you on one page. If there is more data, scroll forward or backward to the next page in the footer.



4. For more information on entering workpieces, see Checking the workpieces (Page 243).

6.4.4 Activating workpiece counters

- The SINUMERIK control system can be configured such that the number of workpieces produced is automatically counted. Analyze MyPerformance /OEE uses these numbers.
- This data is evaluated and further processed in the "Production Quality" window. SINUMERIK produces and counts the workpieces, and this is then accepted as a data input in Analyze MyPerformance /OEE.
- The system variable "$AC_TOTAL_PARTS" in the SINUMERIK control system is used to count the number of workpieces produced.

Parameter

System variable	Description
$AC_TOTAL_PARTS	Total number of workpieces produced (actual workpiece total) as from start time. The value is only automatically reset to "0" when the control system runs up with default values.

Note

Counter is not reset

The counter is neither reset by a RESET nor by an HMI restart of the SINUMERIK control system.

The default procedure is that the value of the "$AC_TOTAL_PARTS" counter is incremented by 1 as soon as the end of the NC program has reached M02 or M30 command. Other M commands can be configured as count pulses with the machine data.

Settings

Set the following bits of the machine data to activate and configure the workpiece counters for Analyze MyPerformance /OEE.

MD27880 $MC_PART_COUNTER	Activation of the workpiece counters
Bit 4 = 1	The counter $AC_TOTAL_PARTS is active.
Bit 5 = 0	M02/M30 increments the $AC_TOTAL_PARTS counter by 1.
Bit 5 = 1	The M command defined in MD27882[0] increments the $AC_TOTAL_PARTS counter by 1.
Bit 6 = 0	$AC_TOTAL_PARTS is also active for program test / block search.
Bit 7 = 1	A return with GOTOS increments the $AC_TOTAL_PARTS counter by 1.

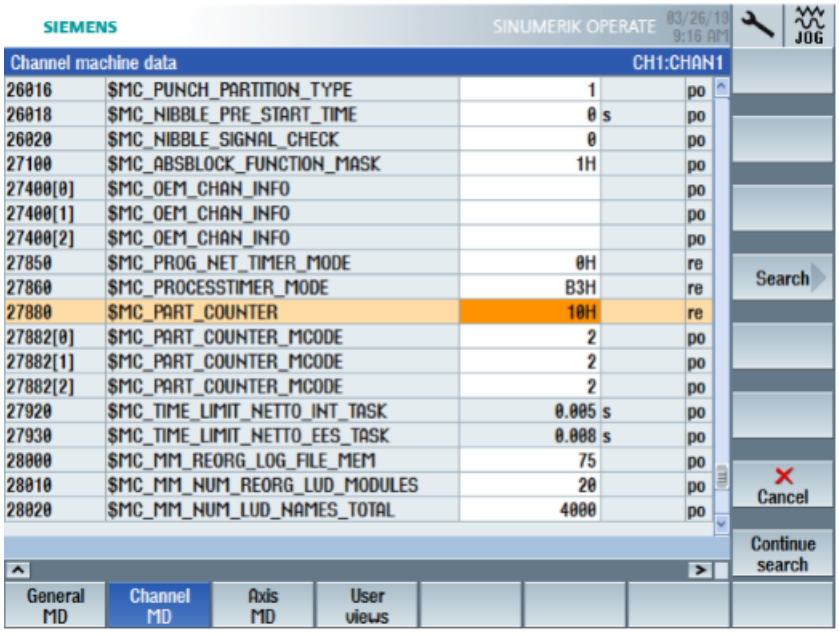
User-defined M commands for the count pulse are stored in MD27882[0].

MD27882[0] $MC_PART_COUNTER_MCODE	Workpiece counting with user-defined M command

Procedure

1. Start the SINUMERIK Operate operating software on the controller.
2. Press the "Setup", "Mach.data" and "Channel MD" softkeys.

3. Set the machine data MD27880 to the desired value.
   – Value for activating the counter: MD27880 $MC_PART_COUNTER ="10H"



4. If necessary, set the machine data MD27882[0] to the desired value.
5. Restart SINUMERIK Operate to activate the changes.

6.5 Operator States

6.5.1 Opening the Operator States

With the function "Operator States", you can start a machine state manually for the next 24 hours. You can also edit produced workpiece information such as "Good piece" and "Scrap piece" values for ongoing shifts.

Analyze MyPerformance /OEE Operator States provides functionality to handle operator actions such as cleaning, testing, preparing the machine, heating, producing. All operator actions can be harmonized with machine status data and visualized within Analyze MyPerformance /OEE charts.

All OEE & KPI calculations will be done according to the started operator state for the selected machine for the next 24 hours unless it is stopped manually.

For more information, see Operator States (Page 291).

Note

Stopped auto workpiece count

If you enter any "Good piece" or "Scrap piece" information for a machine, auto workpiece count will be stopped for this shift. Auto workpiece count will start counting again on the next shift.

Prerequisite

- You need the rights of the administrator or machine operator role to view and edit the "Operator States" window. To create a new user with machine operator role, see Manage users (Page 42).

Parameters

The following parameters and elements are available for editing:

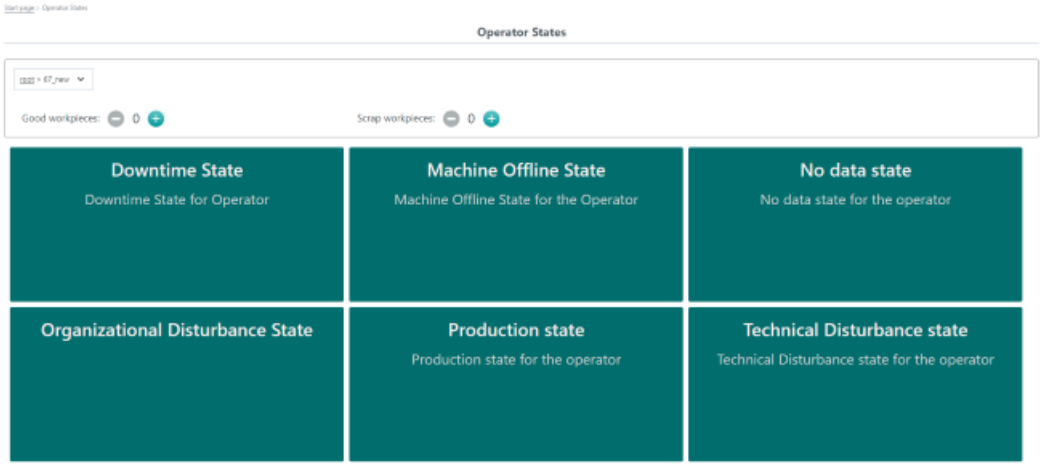
Parameter/element	Description
Machine List	Open the drop-down list for selecting the machine. The last three used machines are shown as buttons next to the machine drop-down list.
Good workpieces	Workpieces that are successfully produced.
Scrap workpieces	Workpieces that are produced with error.
	Reduces the number of workpieces.
	Increases the number of workpieces.
Operator States	The following machine states are available: • Downtime State • Machine Offline State • No data state • Organizational Disturbance State • Production state • Technical Disturbance state • Unknown State

Procedure

1. On the start page of Analyze MyPerformance /OEE, click "Operator States".



2. The "Operator States" window opens.



6.5.2 Starting an operator state

Procedure

1. On the "Operator States" window, select a machine from the drop-down list.

Note

Last used machines

The last three used machines are shown as buttons next to the machine drop-down list and can be selected by clicking on the buttons.

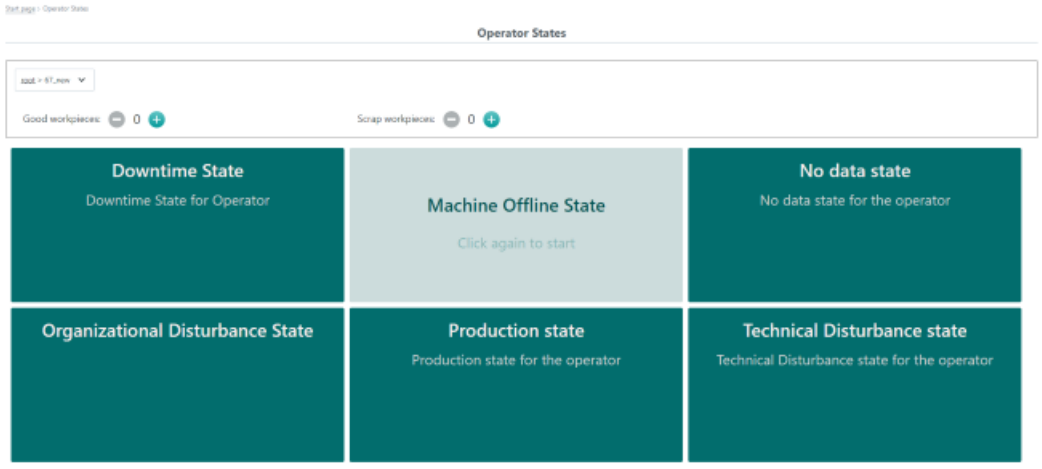
Note

No machine selection

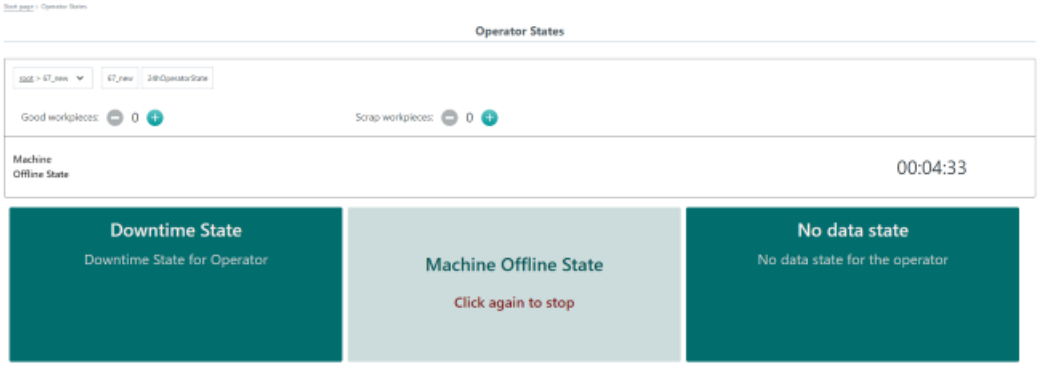
If no machine is selected, workpiece entering and ongoing operator state actions cannot be used.

2. If needed, click the "+" or "-" icons to set a workpiece number for good and scrap workpieces.
3. Click on an operator state tile to select the desired operator state.

4. Click again on selected operator state tile to start the operator state.



5. The started operator state is now active for the selected machine for the next 24 hours. OEE & KPI calculations are done according to the started operator state.
6. The ongoing state name and the timer are shown on the window.
   The timer shows the duration between the start time of the ongoing operator state and the current time.

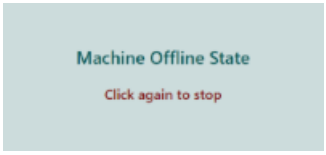


7. After 24 hours, the started operator state is stopped automatically.
   If a machine is connected to Mcenter, Analyze MyPerformance /OEE continues to calculate OEE & KPIs with the data sent by the machine.

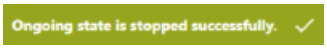
6.5.3 Stopping an operator state

Procedure

1. On the "Operator States" window, select the machine that has the ongoing operator state from the drop-down list.
2. Click on the ongoing operator state tile.



3. The ongoing operator state is stopped and the notification "Ongoing state is stopped successfully" is displayed in the upper right section of the window.

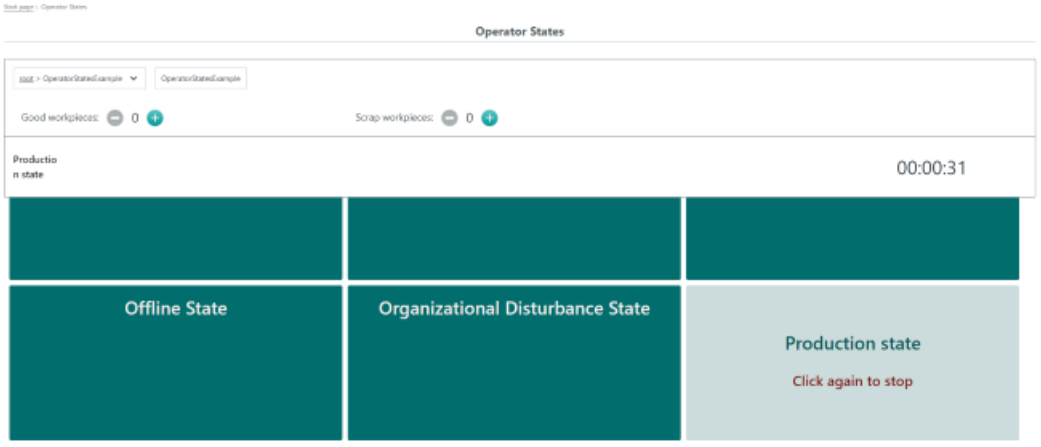


6.5.4 Example of working with Operator States

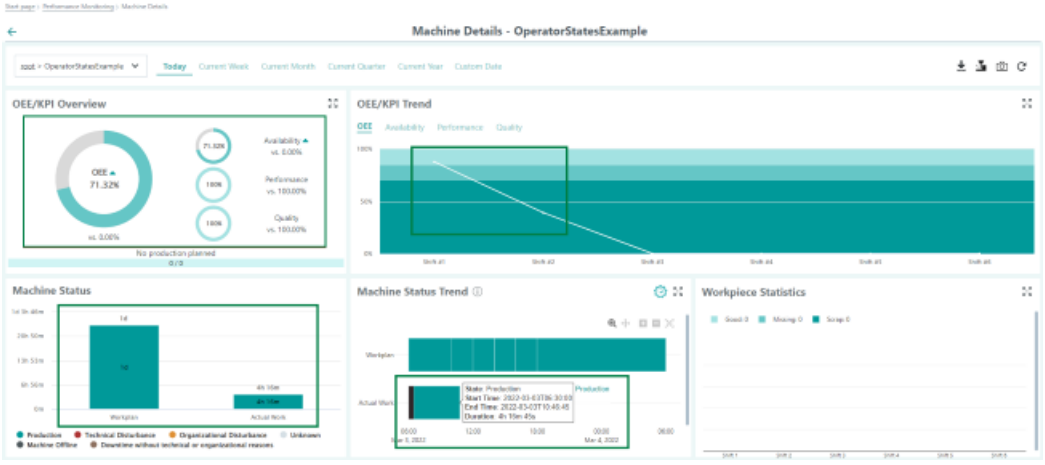
When an operator state is started for a machine, Analyze MyPerformance /OEE will calculate OEE & KPIs according to the selected operator state.

Example:

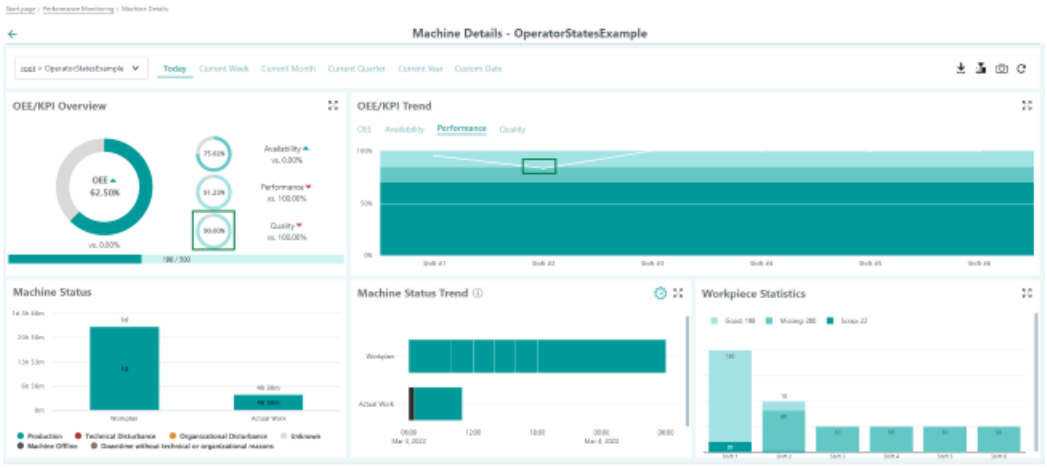
- The operator state named "Production state" is started by the machine operator user.



- When opening the "Performance Monitoring" window and the machine details for "OperatorStateExample", the selected operator state is active on the charts.



- 24 hours after the start time of the operator state, the ongoing state will be stopped automatically and Analyze MyPerformance /OEE will consider actual machine data. All OEE & KPI calculations will be done according to the actual machine data.
- Performance and quality KPIs will be calculated when a machine operator user sets a workpiece information on the "Operator States" window.
  For example, the supervisor entered the target piece value as 100 and target cycle time value as 300 for the second shift of the machine.
  If the machine operator enters 18 good workpieces and two scrap workpieces for the second shift, the quality will be calculated as 90% for the second shift and performance will be calculated as 83.33% at the end of the shift (This example is calculated with default formulas.).



6.6 Operator States in HMI

6.6.1 Overview

With Analyze MyPerformance /OEE 1.3.0.0 or higher versions, the Operator States screen is available on HMI client screens.

After assigning the Analyze MyPerformance /OEE application from "Manage applications on machines" page to the client, the new page is automatically created on the HMI screens.

Note

Machine Agent-connected devices

This function is not available for Machine Agent-connected devices

6.6.2 Opening Operator States in HMI

Procedure

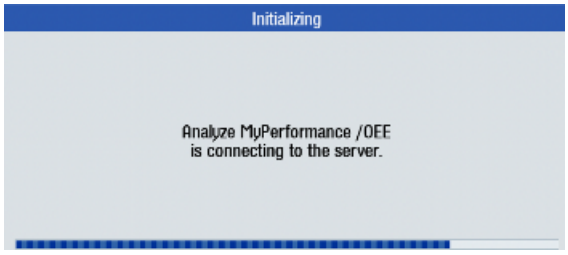
1. On the HMI screen, press the "Menu" softkey
   - OR -
   Press the "M" softkey to open the menu.



1. Press the "Menu" softkey
   - OR -
   Press the "M" softkey to open the menu.
   The menu opens.



2. Press the AMP softkey.
   The "Initializing" window opens, displaying the progress bar.



After the connection between the client and the server is established, the main page opens.

The created "Operator States", the "Machines Connection Status" and the "Active State" are displayed.

If you have not created any "Operator States" on Mcenter, the HMI screen only displays the "Machine Connection Status" and the "Active State" fields.



Note

Operator States

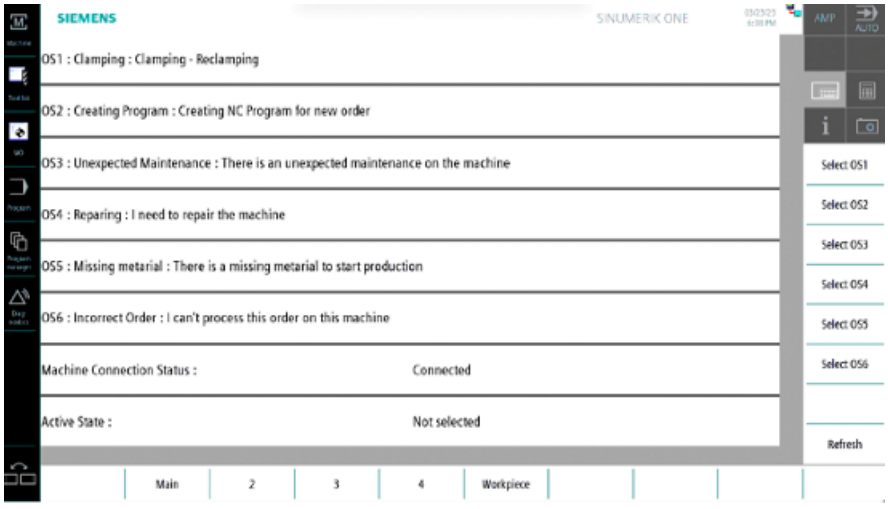
You must create the Operator States on the "Configure AMP /OEE" page in Mcenter.

For further information, see Configuring operator states (Page 291)

6.6.3 Using Operator States in the HMI

Using Operator States in the HMI

The available Operator States as well as the Machine Connection Status and the Active State information are displayed on the main pages.



Functions on the Workpiece page

Function	Description
Good Workpiece Count +	Increases produced good workpiece as 1
Good Workpiece Count -	Decreases produced good workpiece as 1
Scrap Workpiece Count +	Increases produced scrap workpiece as 1
Scrap Workpiece Count -	Decreases scrap workpiece count as 1
Good/Target Parts Count	Displays produced good pieces and target pieces as defined on Analyze MyPerformance /OEE.
Scrap Parts Count	Displays the produced scrap parts count.
Current Order	Displays the NC Program loaded on the machine.

Function	Description
Machine Connection Status	Displays the connection status between the machine and Mcenter.
Active State	Displays the ongoing Operator State.

Note

Acquiring the newest data

Clicking the "Refresh" softkey fetches the newest data from the server. Click this softkey if there are Operator States missing.

Note

Acquiring the changed data

Operator states are listed based on their priority level (high to low).

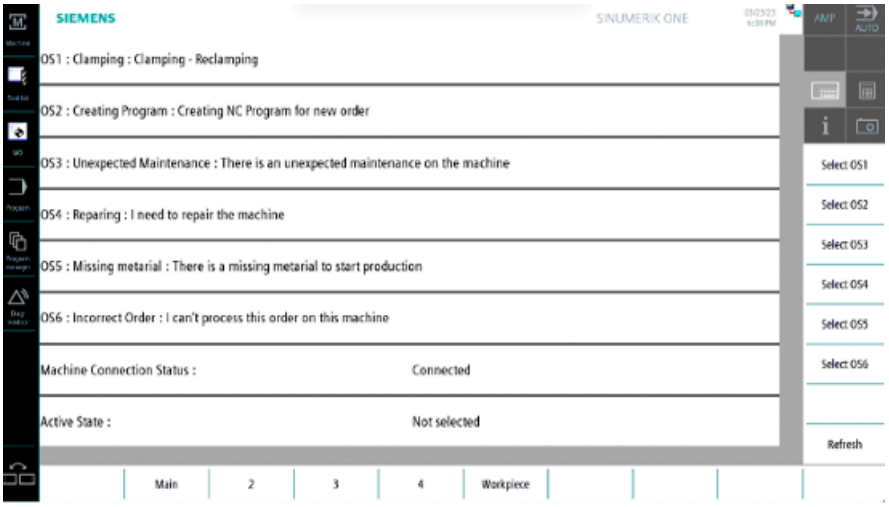
Users can edit the priority of any operator state from the Configure AMP /OEE page in Mcenter. However, to see the reflection of the changes in priority, after editing the priority field, users must click on the "Refresh" button on the HMI screen to fetch the changed data with priorities.

6.6.4 Starting an Operator State in HMI

Procedure

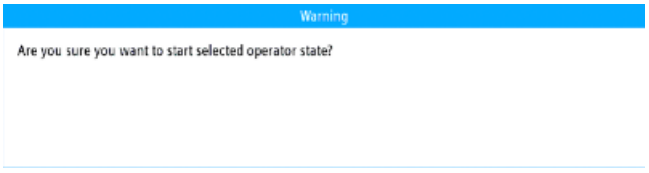
Select OS1

1. Press the corresponding state's softkey to start an Operator State.
   Example:
   If you press the "Select OS1" softkey, you start the Clamping state.

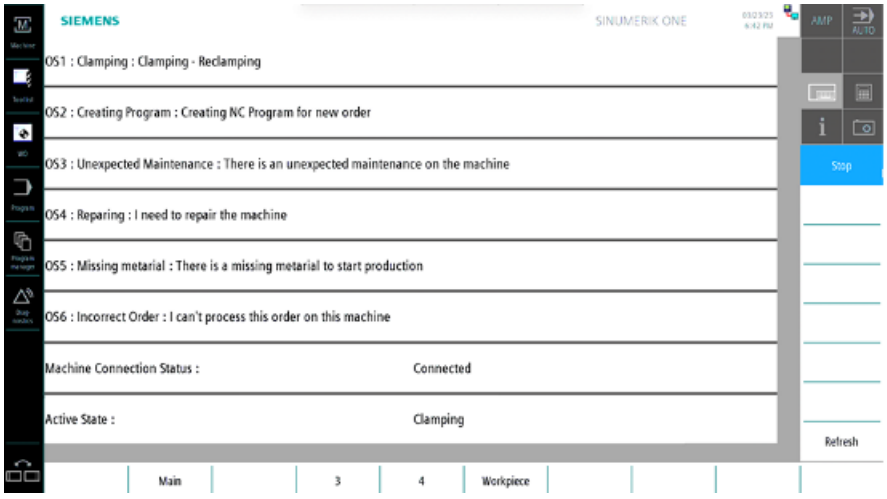


2. The following warning message appears: "Are you sure you want to start selected operator state?"

   Press "OK"- OR -Press "Cancel" to cancel the operation.



The "Operator" state is activated, and the Analyze MyPerformance /OEE application does not take into account the actual machine datails.The "Active State" displays the ongoing Operator State on the sceen.



Note

Stopping an Operator State

The ongoing state is active for the next 24 hours, unless you stop it. You must stop the state when it is done.

For more information, see Stopping an Operator State in HMI (Page 258).

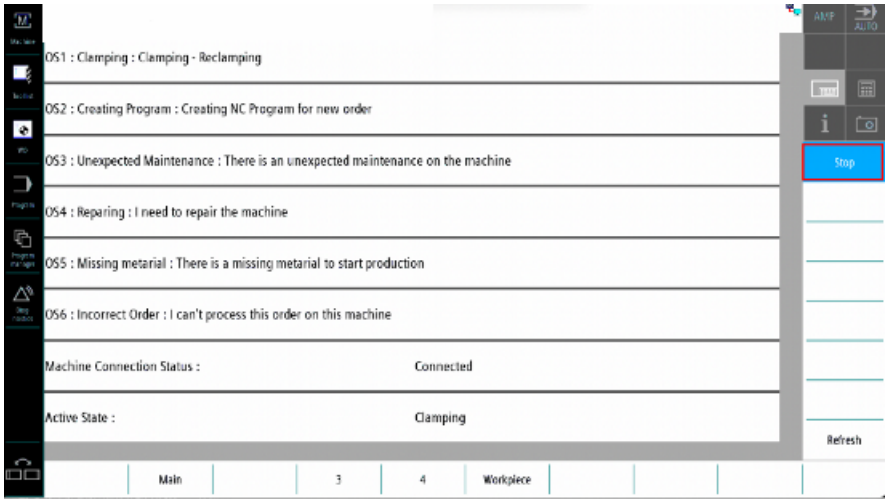
6.6.5 Stopping an Operator State in HMI

You can stop an "Operator State" in the HMI.
During an ongoing "Operator State", the "Stop" softkey is displayed.

Procedure



1. Press the "Stop" softkey to stop the ongoing Operator State.

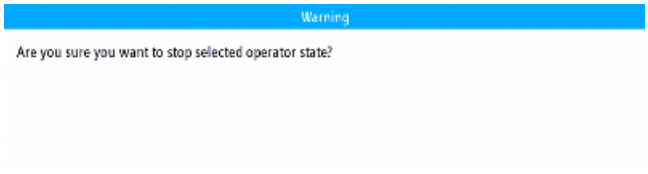


2. The following warning message appears: "Are you sure you want to stop selected operator state?"

   Press "OK" to confirm

   - OR -

   Press "Cancel" to cancel the operation.



   After stopping the ongoing state, Analyze MyPerformance /OEE continues to calculate the necessary data with the actual machine status, generated by the machine.

6.6.6 Using workpiece functions in HMI

Analyze MyPerformance /OEE can automatically calculate and gather the produced workpiece count from the machine.
You can also enter workpiece information manually.

You can

- increase and decrease good and scrap workpiece counts
- display the good workpieces produced
- the target workpiece count you have defined

- display the loaded NC program name
- display the Machine Connection Status and the Active State.

Softkeys

Softkey	Description
+ Good WP	Increases the produced Good Workpiece Count.
- Good WP	Decreases the produced Good Workpiece Count.
+ Scrap WP	Increase the produced Scrap Workpiece Count.
- Scrap WP	Decreases the produced Scrap Workpiece Count.

Note

Automatical override

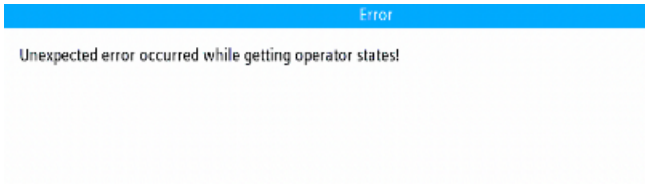
When an information comes from the HMI screen, Analyze MyPerformance /OEE automatically overrides the gathered workpiece count from the machine. It stops auto-counting the workpieces until the next shift.

6.6.7 Error message

Error message

The error message "Unexpected error occurred while getting operator states!" is displayed in the following cases:

- The connection between the machine and the server is not available
  In this case, the AMP screen cannot list the created Operator States: The operator can neither start nor stop the Operator State, nor enter any workpiece information.
  If the connection is lost while an Operator State is running, it continues in the background. If it needs to be stopped, wait until the connection is reestablished.
  To correct these states for the offline period, see Configure manual states (Page 141)
  As soon as the connection is available again, the AMP screen works as usual.
  However, if the problem persists,report it to your supervisor and contact the Hotline.
- No Operator State has been created. AMP cannot get the Operator State list.
  In this case, contact your supervisor to create an Operator State.



6.6.8 Operator States in HMI-Advanced

6.6.8.1 Operator States in HMI-Advanced

Operator States in HMI-Advanced

With Analyze MyPerformance /OEE 1.3.1.0 or higher versions, the Operator States screen is available on HMI Advanced client screens.
After assigning the Analyze MyPerformance /OEE application from "Manage applications on machines" page to the client,

the new page is automatically created on the HMI Advanced screens

Note

HMI-Advanced clients

HMI-Advanced clients are not supported for using workpiece functions such as in HMI client mentioned in section Using workpiece functions in HMI (Page 259)

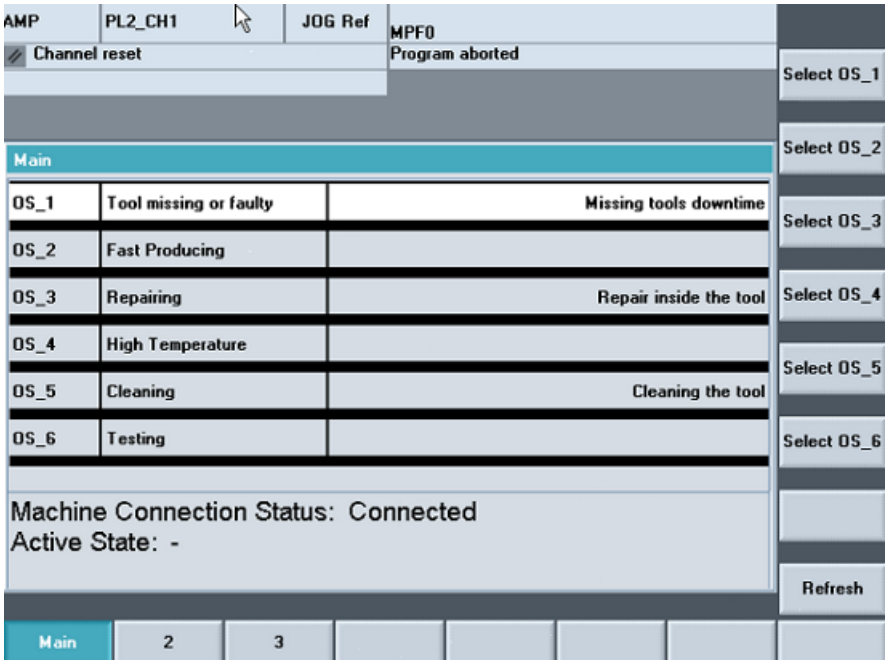
6.6.8.2 Opening Operator States in HMI-Advanced

Procedure

1. On the HMI screen, press the "Menu" softkey.
   - OR -
   Press the "M" softkey to open the menu.

Machine

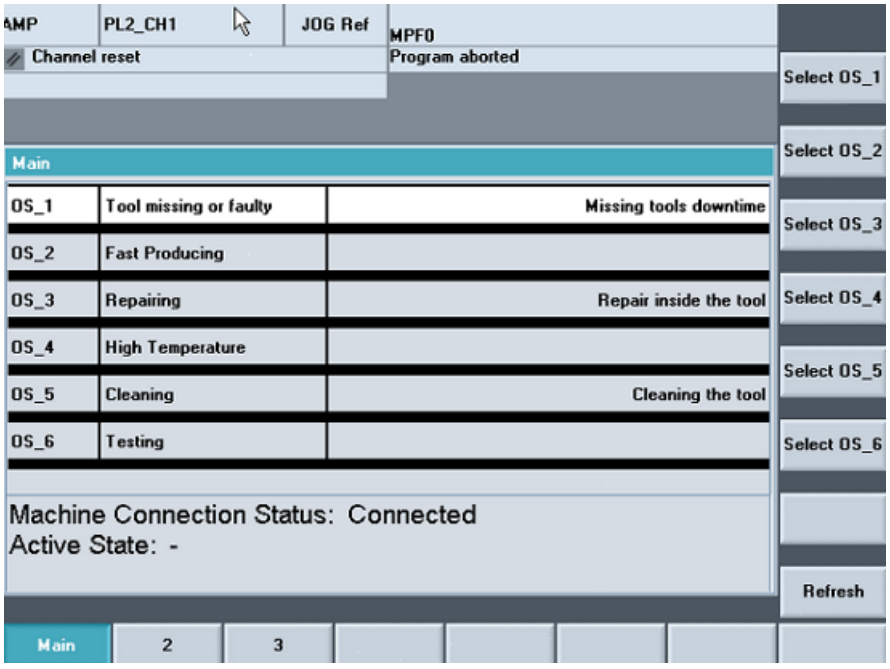
2. Press the "Menu" softkey
   - OR -
   Press the "M" softkey to open the menu.
   The menu opens.
3. Press the"AMP" softkey.
   The "Initializing" window opens, displaying the progress bar.
   After the connection between the client and the server is established, the main page opens.
   The created "Operator States", the "Machines Connection Status" and the "Active State" are displayed.



6.6.8.3 Starting Operator States in HMI-Advanced

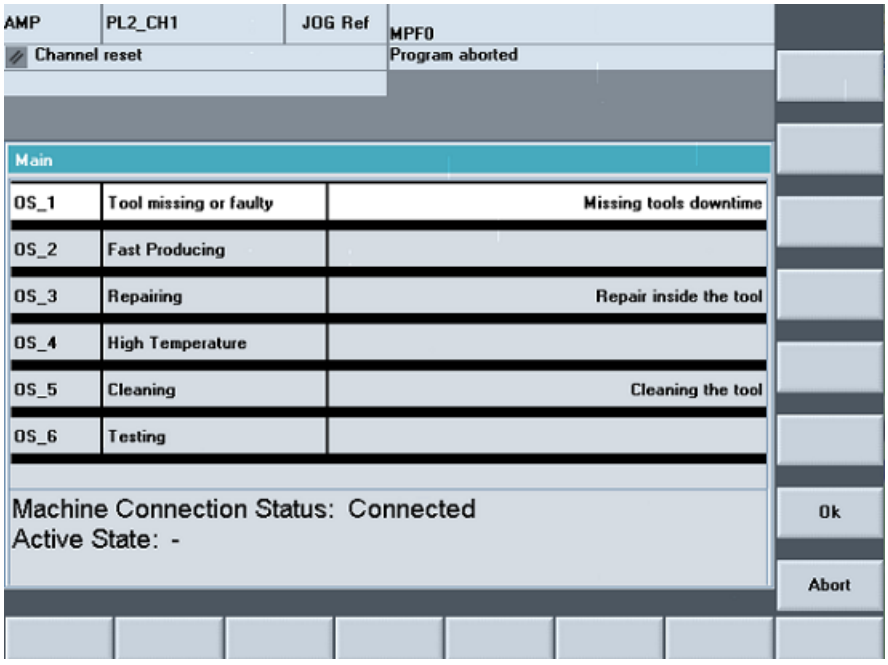
Procedure

1. Press the corresponding state's softkey to start an Operator State.

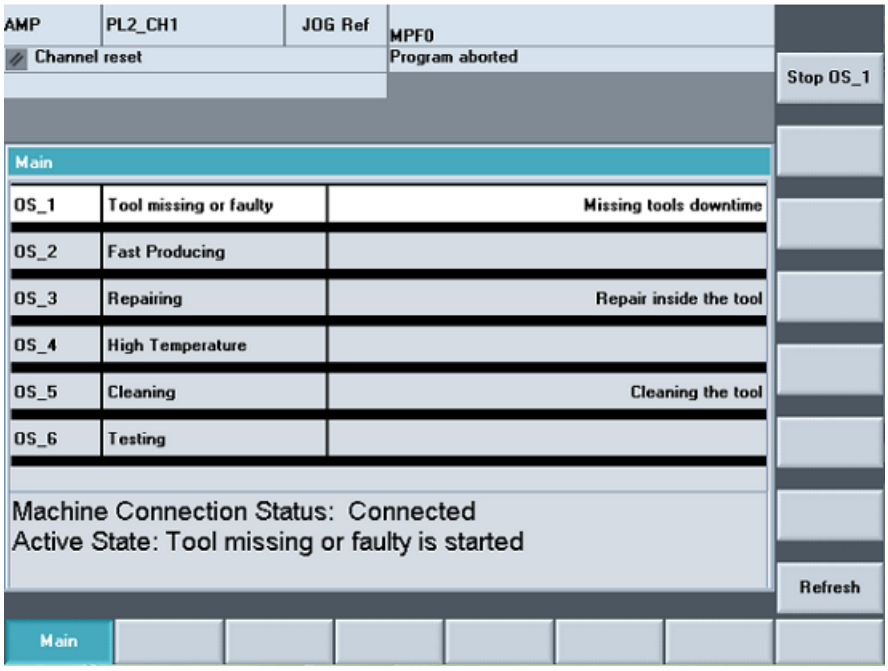


Example:
If you press the "Select OS_1" softkey, you start "Tool missing or faulty".
"OK" and "Abort" options appear on the right side of the HMI.

2. Press "OK"
- OR -
Press "Abort" to cancel the operation.



The "Operator" state is activated, The "Active State" is displayed.
The ongoing Operator State is on the screen.



6.6.8.4 Stopping Operator States in HMI-Advanced

You can stop an "Operator State" in HMI Advanced. During an ongoing "Operator State", the "Stop OS" softkey is displayed.

Procedure

1. Press the "Stop OS" ("Stop OS_1") softkey to stop the ongoing Operator State.
   "Ok" and "Abort" options appear on the right side of the HMI.
2. Press "OK"
   - OR -
   Press "Abort" to cancel the operation.

6.6.9 Operator States in IPC Screens

Operator States in IPC Screens

This guide aims to introduce Operator States in IPC Screens.

The Analyze MyPerformance /OEE application provides the functionality to manage operator states and workpieces over IPC screens for Non-SINUMERIK Controller types. Users are able to start/stop Operator States and increase/decrease workpieces on machines, connected via the Machine Agent on an IPC.

By directly accessing the Analyze MyPerformance /OEE, combined with a touch-enabled interface and an improved user experience, it enables smooth operation and efficiency in manufacturing environment.

Key Features

Operator States:

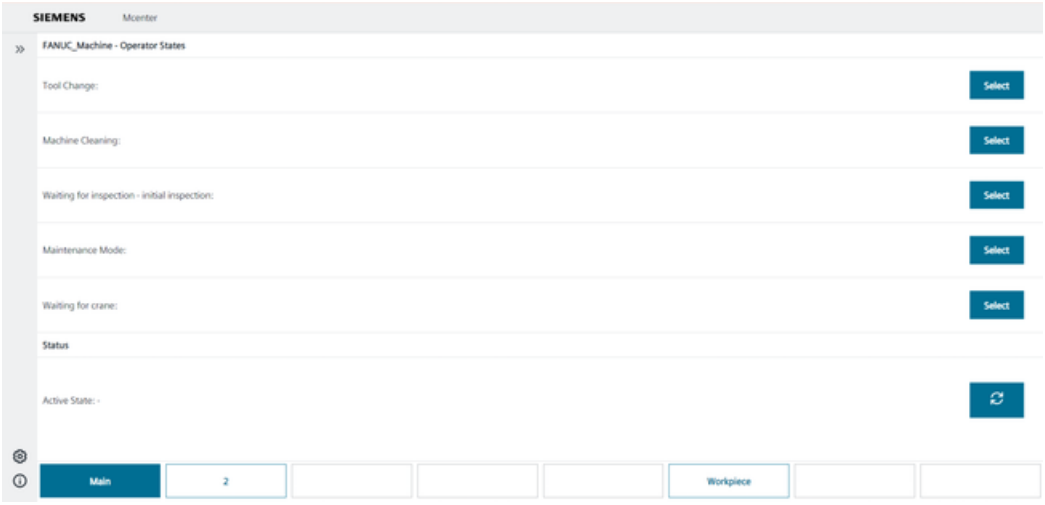
- Monitoring of the active operator state
- Starting and stopping operator states

Workpieces:

- Monitoring of the target piece count and workpiece info (good & scrap pieces)
- Increasing and decreasing good and scrap workpiece count

Endless session:

- The IPC screens provides unlimited session, to access the Analyze MyPerformance/ OEE functions (Operator States)
- Removing the necessity for repeated logins



Procedure

1. Install the Machine Agent Client on IPC.
   Follow the steps under the part of "Installing the Machine Agent Client" in the Installation Manual.
2. Create and integrate the machine.
3. Assign Analyze MyPerformance /OEE to the machine.
4. Open the browser on IPC.
5. Navigate to `localhost:8002/amp` to see the Operator States in the IPC Screens.

Note

Please be aware that the network speed between IPC and Mcenter server may affect the download operation of the AMP client application.

The download step during the application assignment may take up to 10 minutes. If the download is not completed within 10 minutes, the application assignment will stuck on the downloading step.

If you encounter that problem, please contact with Hotline.

Operator States Functionalities

You must create the Operator States on the "Configure Analyze MyPerformance /OEE" page in Mcenter.

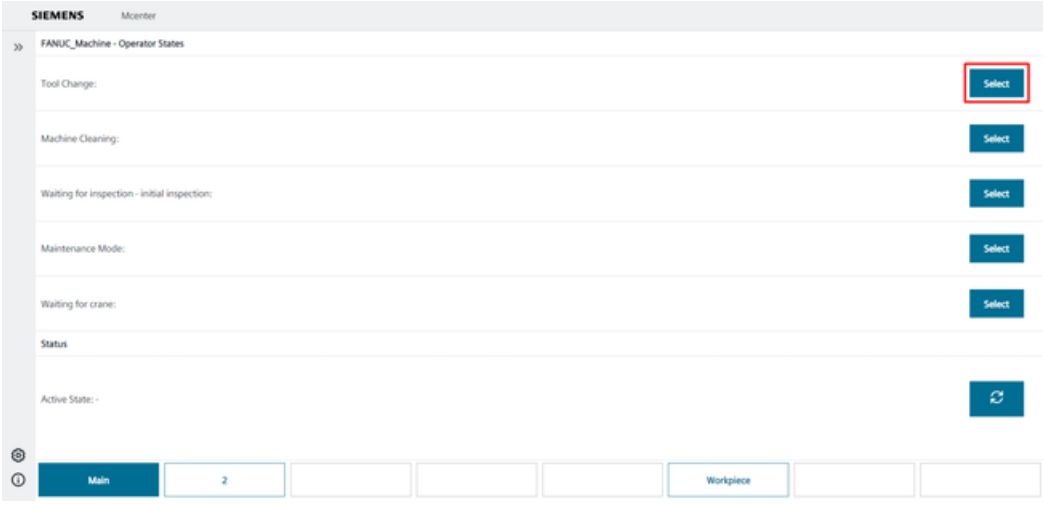
For further information, see Configuring operator states (Page 279 – Operating Manual)

Starting an Operator State in IPC Screen

Click on "Corresponding state" to start an Operator State.

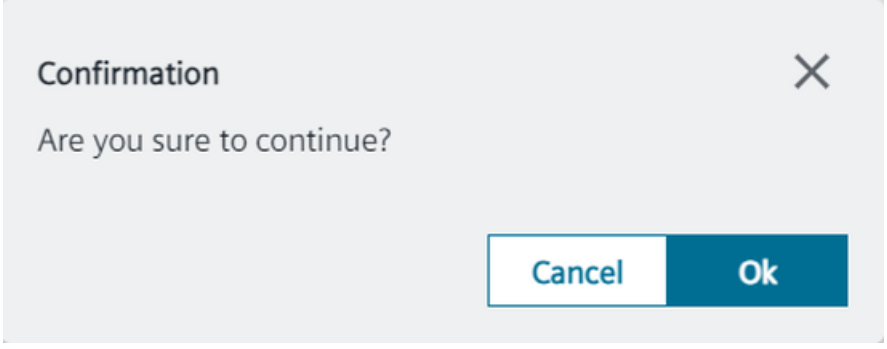
Example

If the user clicks on "Select" for the related Operator State, that operator state will be started.



The following warning message appears: "Are you sure continue?"

Click "OK" or click "Cancel" to cancel the operation.



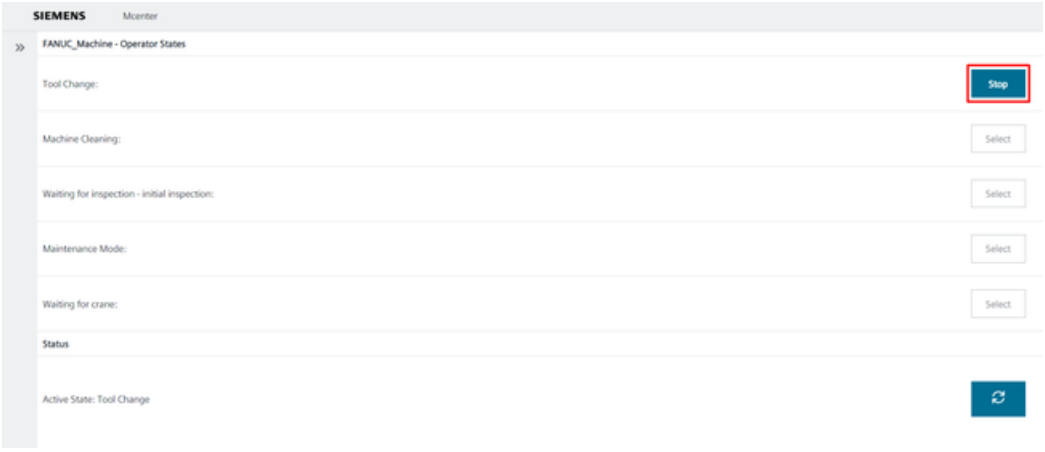
Stopping an Operator State in IPC Screen

During an ongoing "Operator State", the "Stop" button is displayed.

Click on the "Corresponding state" to stop.

Example

If the user clicks on "Stop" for the related Operator State, that operator state will be stopped.



Refresh

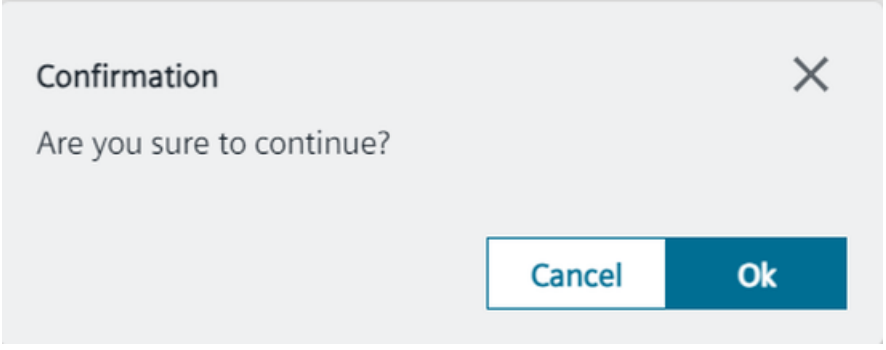
If the user clicks on "Refresh", the Operator States will be refreshed, newly added ones will be added into a list.



Active State

The ongoing Operator State is displayed.





Using Workpiece function in IPC Screens

Analyze MyPerformance /OEE can automatically calculate and gather the produced workpiece count from the machine. Users can adjust the workpieces by using Analyze MyPerformance /OEE in IPC Screen.

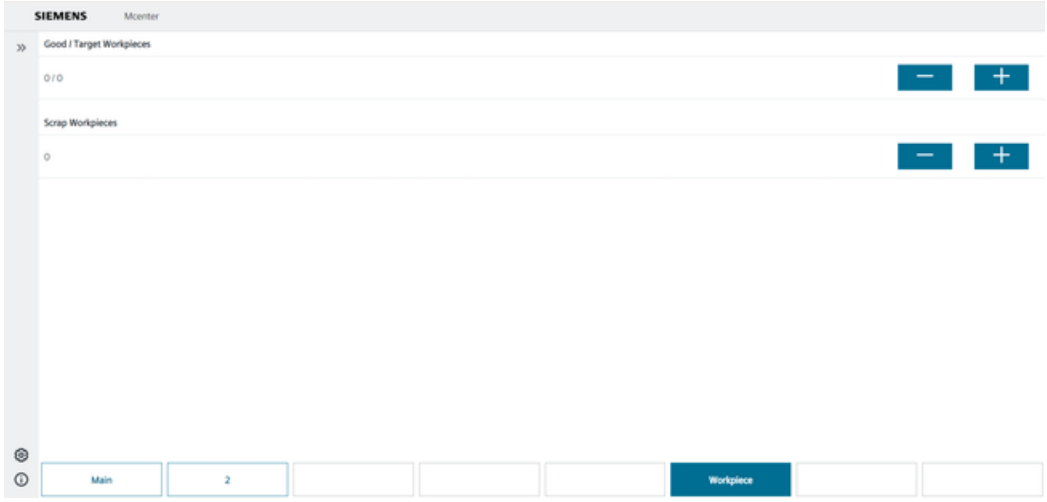
There are two options to increase and decrease a workpiece. Users can increase/decrease good piece and scrap piece count.

Expample

To go to the workpiece page, users have to click on "Workpiece".



The user will be redirected to below pages:



Functions	Description
Good Workpiece Count +	Increases produced good workpiece as 1
Good Workpiece Count -	Decreases produced good workpiece as 1
Scrap Workpiece Count +	Increases produced scrap workpiece as 1
Scrap Workpiece Count -	Decreases scrap workpiece count as 1

Note

Acquiring the newest data

Clicking "Refresh" fetches the newest data from the server.

If there are Operator States missing, you can click on "Refresh".

Note

Listing operator states

The Operator States are listed based on their priority level (High to low).

Note

Acquiring the changed data

After editing the priority field, the user must click on "Refresh" to fetch changed data with priorities.

6.7 Connecting Fanuc machines to Analyze MyPeformance /OEE

Analyze MyPerformance /OEE is supporting Fanuc devices from version 1.2.0.0. You can connect your Fanuc devices to Mcenter. Additional information is available in the following manual:

- Operating Manual Mcenter, Manage MyResources

When your device is connected to Mcenter successfully, you can start to use all Analyze MyPerformance /OEE calculations.

Configuring AMP /OEE

7

7.1 Overview

On this site, you can configure KPI Calculation Formula, Display settings, Production levels, Operator States, Machine tags, Sustainability level, Production logic and Customize Utilization States for Analyze MyPerformance /OEE enabled machines.

The selected configurations of this site are valid for all Analyze MyPerformance /OEE enabled machines on the Mcenter platform.

Prerequisite

- To edit this site, you need the rights of the administrator role.

Overview

The "Configuration" window contains the following tabs:

- KPI Calculation
  Adapting customized formulas for "Availability", "Performance" and "Quality" or the KPI names defined in the "Display" tab:
  For more information, see Customizing KPIs (Page 278).
- Display
  Adapting the display of KPI colors, KPI ranges and KPI names:
  For more information, see Editing the Display (Page 287).
- Production Levels
  Adapting the Feed Override area, displaying various production levels of the Machine Status Trend:
  For more information, see Editing the production level (Page 290).
- Operator States
  The "Operator States" tab contains the following subtabs:
  - "Machine/Operator states" for creating, editing and deleting an operator state and prioritizing a machine/operator state
  - "Configuration History" for displaying the history of an operator state
  - "Manual/Operator State History" for displaying the history of a manual/operator state

  For more information, see Operator States (Page 291).
- Machine tags
  For more information, see Machine tags (Page 300).
- Sustainability
  Adapting the sustainability threshold.
  For more information, see Sustainability level (Page 305).

- Production logic
  For more information, see Production logic (Page 306).
- Customize Utilization States
  Defining Utilization states:
  For more information, see Customize utilization states (Page 317).

Note

Security events

Security events are logged by the application. Major security events are explained in Mcenter 5.4.0.0 - Readme - Analyze MyPerformance /OEE or future versions.

7.2 Customizing the KPI calculation

7.2.1 Overview

Overview

In a production environment, various KPIs are usedto measure the quality, availability or performance of the live system. To support the various KPIs, which can be dynamically calculated at production level, AMP provides the Custom KPI feature. KPI parameters have their own algorithms. You can customize them according to the required KPI. If you need a new KPI, such as "Time ratio of spindle override greater than 100", "Feedoverride greater than 100" or "Reaching the target of produced parts", you can configure the KPIs.

You can create new KPIs with the existing logical AMP System parameters, or newly created KPI parameters. They can consist of any available system machine data. After the Custom KPIs are set, they are calculated and monitored on the Performance Monitoring page, together with the default KPIs.

Only the default KPI "OEE" can be edited, and include custom KPIs or constant values.

You cannot customize other default KPIs.

7.2.2 Customizing KPI parameters

7.2.2.1 Working with KPI parameters

Parameters

Parameter	Description
Machine/Operator state	Shows the Machine/Operator state name
Select a machine	Open the drop-down list to select a machine.
Save	Saves the changes.
Reset	Goes back to the default KPI Parameter status.
Cancel	Cancels the saving or resetting process.
+	Inserts a new KPI parameter row.
	Deletes the KPI parameter row.
Add	Opens the pop-up window to define the KPI parameter algorithm.
Choose function	Shows the KPI parameter functions: • avg: used to take the average of the algorithm result. • when: used to get the sum of the times the algorithm result is true or false. • min: used to get the lowest value of the algorithm result. • max: used to get the highest value of the algorithm result. • sum: used to get the highest values sent by the machine.
	Informs about KPI parameter functions.
Select Aspect	Opens the drop-down list to select aspects in the system.
Select Variable	Opens the dropdown list to select variables of the selected aspect.
Complete	Assigns the selected algorithm to the corresponding KPI parameter.
Mathematical expressions - Operators	
Arithmetic	
+	Plus
-	Minus
/	Divided by

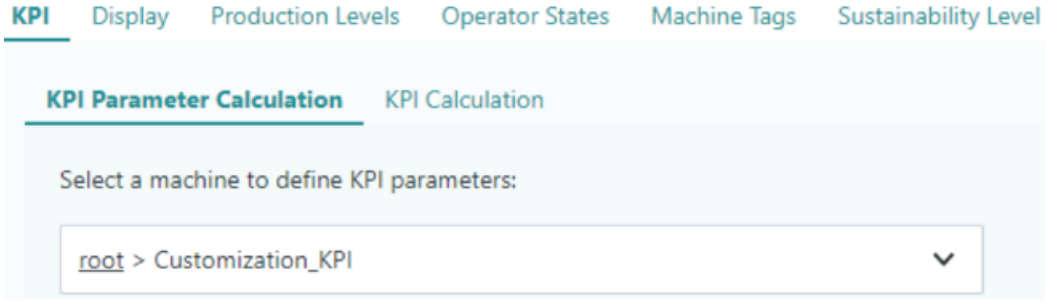
Parameter	Description
*	Multiplied by
Comparison	
==	Equal to
!=	Not equal to
>	Greater than
>=	Greater than or equal to
<	Smaller than
<=	Smaller than or equal to
Logical	
&	And
|	Or
Contains	
>>	Included
!>	Not included
Parenthesis	
(	Opens the round bracket
)	Closes the round bracket
[	Opens the square bracket
]	Closes the square bracket

7.2.2.2 Creating KPI parameters

You can create KPI parameters.

Procedure

1. Click "KPI Parameter Calculation" in the "KPI" tab.
2. Select a machine in the machine drop-down list.



3. Click the "+" button to add a KPI parameter row.

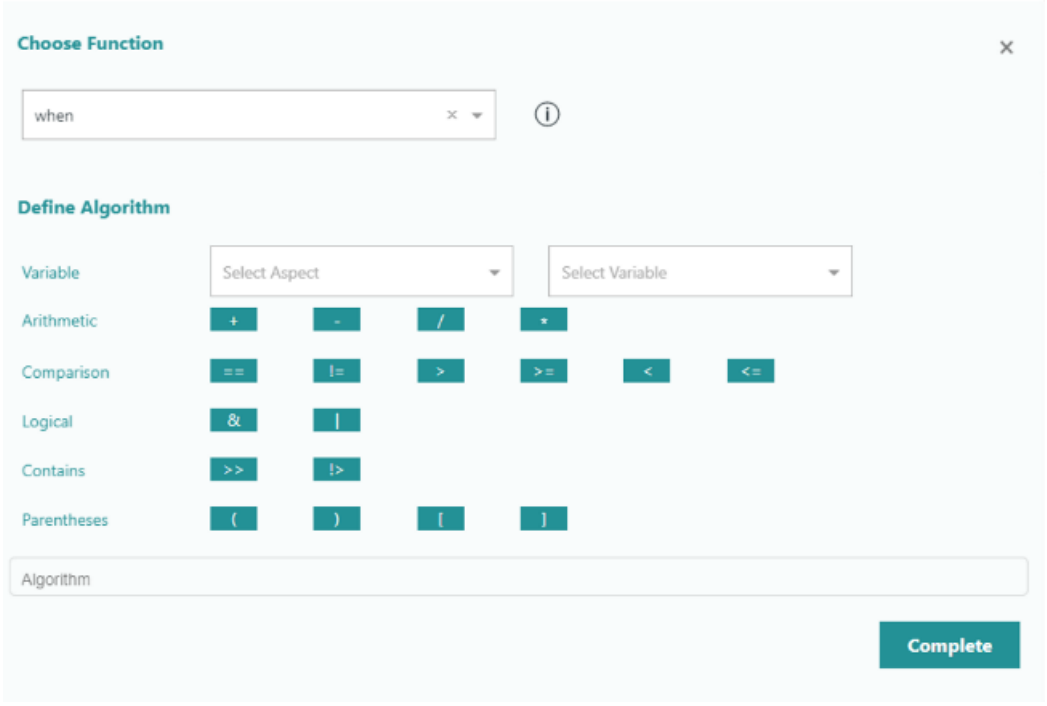


Note

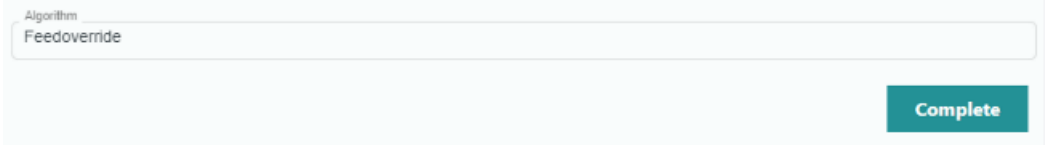
KPI parameters

You can add at most 25 KPI parameters. If the maximum KPI parameter number is reached, the "+" button disappears.

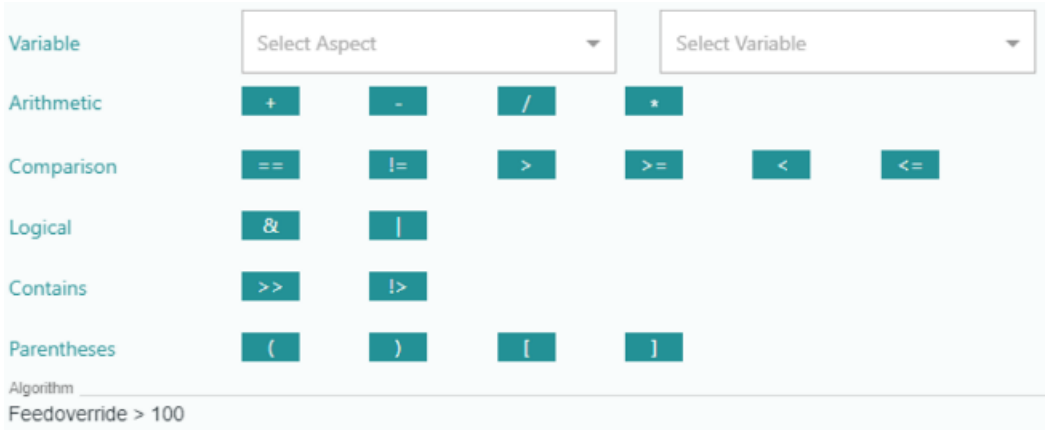
4. Click the "Add" button.
   The "Define algorithm" window opens.
   Select an appropriate KPI parameter function.
   Example: If a machine variable is measured based on time, select the "when" function.
   Select an aspect.and a variable of the selected aspect.
   Click the "Info" button next to the function to display the tooltip with information about the respective function.



The selected variable is written in the algorithm bar.



5. Select a mathematical expression to be written in the KPI parameter algorithm.



Note

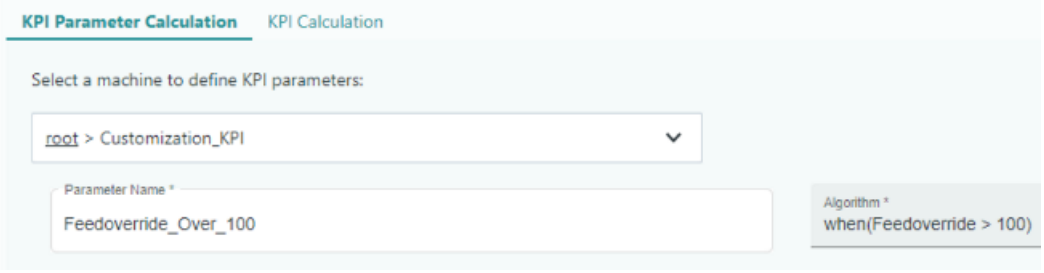
Using a constant value

In addition to machine variables and mathematical expressions, you can use a constant value in the KPI parameter algorithm, for example "100".

Click the "Complete" button.
If the KPI parameter algorithm you have entered is invalid, the warning message "Please provide a valid algorithm!" is displayed.



6. Enter a unique KPI parameter name.



Note

KPI parameter names

Entering a unique KPI parameter name is mandatory.

7. Click on the "Save" button to confirm.
The following confirmation message is displayed: "Parameter algorithms are saved successfully!".



Note

Editing KPI parameters

To edit KPI parameters, use the same procedure as for their creation.

The KPI parameters are now available in the KPI algorithms.

7.2.2.3 Deleting KPI parameters

You can delete KPI parameters.

Procedure

1. To delete a KPI parameter, clicke on the "Delete" icon.
The KPI parameter row disappears from the screen.
2. Click the "Save" button to confirm the Operation.
You can no longer use the corresponding KPI parameter and the deleted KPI parameter in KPI algorithms.

Note

Deleting impossible

You cannot delete KPI parameters if they have been used in KPI algorithms.

7.2.2.4 Resetting KPI parameters

You can reset KPI parameters by clicking on the "Reset" button.

Procedure

Click on the ""Reset" button.to confirm the reset process.
The KPI parameters go back to default.
In the default state, there is no KPI parameter

Note

Resetting impossible

You cannot reset KPI parameters if they have been used in KPI algorithms.

7.2.3 Customizing KPIs

7.2.3.1 Working with KPI parameters

You can customize KPIs.

You can create and delete KPIs.

Only "OEE" from the default KPIs can be edited. The other four default KPIs are constant.

Parameters

Parameter	Description
Machine/Operator state	Shows the Machine/Operator state name
Select a machine	Open the drop-down list to select a machine.
Save	Saves the changes.
Reset	Goes back to the default KPI status.
Cancel	Cancels the saving or resetting process.
+	Inserts a new KPI row.
	Deletes the KPI row.
Add	Opens the pop-up window to define the KPI algorithm.
Select Variable	Enables user to select default and custom KPIs.
Complete	Assigns the selected algorithm to the corresponding KPI.

Parameter	Description
	Informs about default and custom KPI parameters.
Default KPIs	• OEE • Availability • Performance • Quality • Sustainability
Mathematical expressions - Operators	
Arithmetic	
+	Plus
-	Minus
/	Divided by
*	Multiplied by
Parentheses	
(	Opens the round bracket
)	Closes the round bracket
[	Opens the square bracket
]	Closes the square bracket

7.2.3.2 Creating KPIs

You can create KPIs.
KPI algorithms can contain - all together - your custom KPI parameters, default KPI parameters and constant values.

Parameters

Default parameter Information	Description
Planned Working Time	Total duration of the production time configured in the utilization plan.
Productive Time	Total duration of machine production while, at the same time, the planned production time has been configured in the utilization plan.
Target Piece Count	Number of the expected workpieces to be produced in the shift.
Good Piece Count	Number of the good workpieces produced in the shift.
Bad Piece Count	Number of the scrap workpieces produced in the shift
Total Piece Count	Total number of the workpieces produced in the shift.

Default parameter Information	Description
Target Cycle Time	Targeted duration to execute one cycle of the loaded NC-Program.
Machine Off	Total time of the machine in the "Offline" status.
Machine Unknown	Total time of the machine in the "Unknown" status.
Machine Production	Total time of the machine in the "Production" status.
Machine Technical Disturbance	Total time of the machine in the 'technical disturbance' status.
Machine Organizational Disturbance	Total time of the machine in the "Organizational disturbance" status.
Machine Downtime Without Technical or Organizational Reasons	Total time of the machine in the "Downtime without technical or organizational reasons'"status.
Machine No Data	Total time of the machine during which it has not sent any data/has sent unhealthy data

Procedure

1. Click "KPI Calculation" in the "KPI" tab.
2. Select a machine in the drop-down list.
   The five default KPIs are displayed.



3. Click the "+" button to add a KPI row.



Note

Maximum

You can add at most 10 KPIs. If the maximum KPI number is reached, the "+" button disappears.

4. Click on the "Add" button.
   The "Define KPI algorithm" window opens.
5. Select an appropriate KPI parameter according to the KPI you need.
   The KPI parameter list contains the custom KPI parameters you have created and the default KPI parameters.
   Click the "Info" button next to the KPI parameter dropdown list to display the tooltip with the default KPI parameter information.

6. Select a mathematical expression to be written in the KPI algorithm.



Click the "Complete" button.
If the KPI parameter algorithm you have entered is invalid, the warning message "Please provide a valid algorithm!" is displayed:



7. Enter a unique KPI name, for example "Override_ratio".
   The KPI names cannot be the same as the default KPI names.

Note

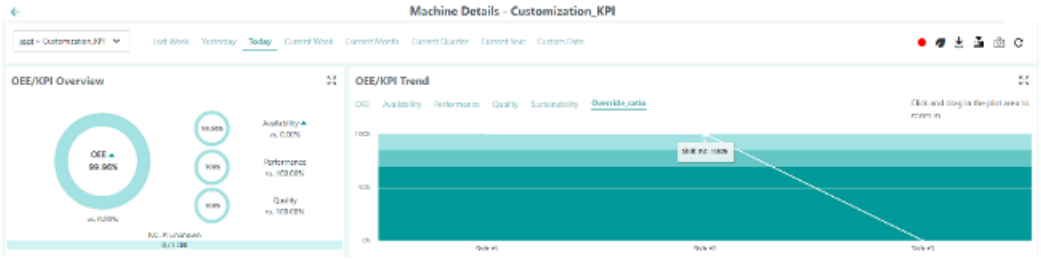
KPI names

Entering a unique KPI name is mandatory.

8. Click on the "Save" button to confirm.
   The following confirmation message is displayed: "Parameter algorithms are saved successfully!".



The KPIs are now available in the OEE algorithms.
Once the data for the created custom KPIs has been acquired by AMP, they are displayed as tabs on the Performance Monitoring "OEE/KPI Trend" chart.
The created custom KPIs are calculated according to the new custom KPI algorithms.



Note

Editing KPIs

To edit KPIs, use the same procedure as for their creation.

7.2.3.3 Deleting KPIs

You can delete created custom KPIs.

There is no delete option for the default KPIs:

- OEE
- Availability
- Performance
- Quality

Procedure

1. To delete a custom KPI, clicke on the "Delete" icon.
   The KPI row disappears from the screen.
2. Click the "Save" button to confirm the Operation.
   The corresponding custom KPI and the deleted custom KPI can no longer be used in the OEE algorithms.
   The deleted KPIs are no longer displayed on the Performance Monitoring page.

Note

Deleting impossible

You cannot delete KPIs if they have been used in OEE algorithms.

7.2.3.4 Resetting KPIs

You can reset KPIs.

Procedure

Click on the ""Reset" button.

Click on the "Reset" button to confirm the reset process.
In the default state, there is no custom KPI.

Note

Resetting impossible

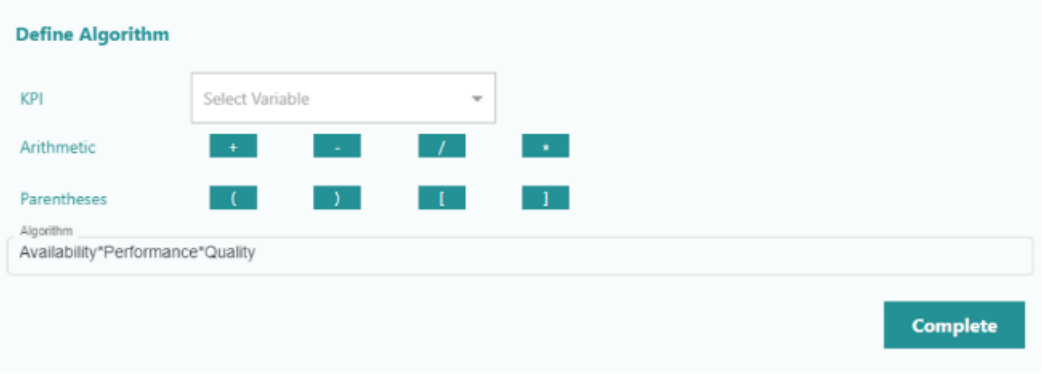
You cannot reset KPIs if they have been used in OEE algorithms.

7.2.3.5 Editing the OEE algorithm

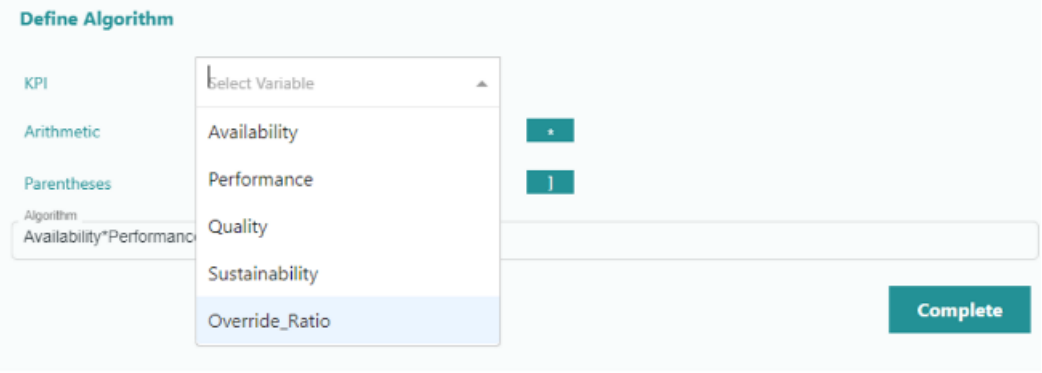
You can edit OEE algorithms.

Procedure

1. Click the OEE "Add" button to open the "Define Algorithm" window.
   The OEE algorithm is equal to the multiplication of three default KPIs:
   - Availability
   - Performance
   - Quality



2. Open the KPI drop-down list and select a KPI according to the OEE you need.
   The KPI list contains the created custom KPIs and default KPIs.
   OEE algorithms can have created custom KPIs, the default KPIs and constant values, all together.



3. Select a mathematical expression to be written in the OEE algorithm.
   All selected mathematical expressions, custom KPIs and default KPIs are written in dthe KPI algorithm.

4. Click the "Complete" button.
   The new algorithm is displayed in the "Algorithm" field.
   If the KPI parameter algorithm you have entered is invalid, the warning message "Please provide a valid algorithm!" is displayed.



5. Click on the "Save" button to confirm.
   The following confirmation message is displayed: "Kpi algorithms are saved successfully!".

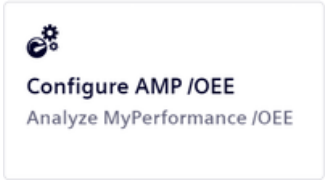


   The edited OEE is calculated according to the new OEE algorithm, and monitored on the "OEE/KPI Trend" chart on the Performance Monitoring page.

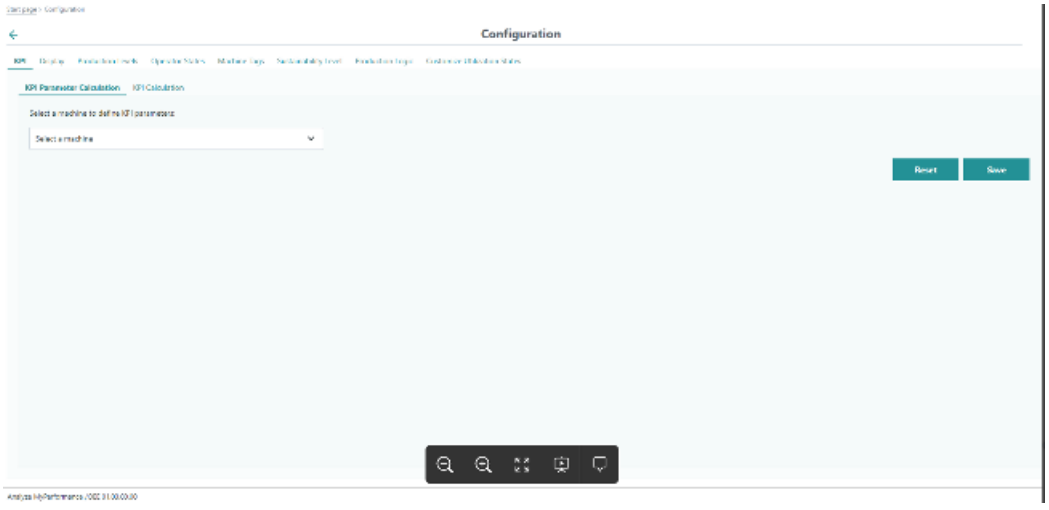
7.3 Opening the Configuration

Procedure

1. On the start page of Analyze MyPerformance /OEE, click "Configure AMP /OEE".



2. The "Configuration" window with the "KPI" tab opens.
   Click on the "KPI" tab to display the two subtabs "KPI Parameter Calculation" and "KPI Calculation".



7.4 Editing the Display

In the "Display" tab, you can change the names and ranges of the KPIs and the color in which they are displayed.

You can select a maximum of 3 different colors to display the KPI values.

The selected color is applied to:

- The circular display
- The graphic representation

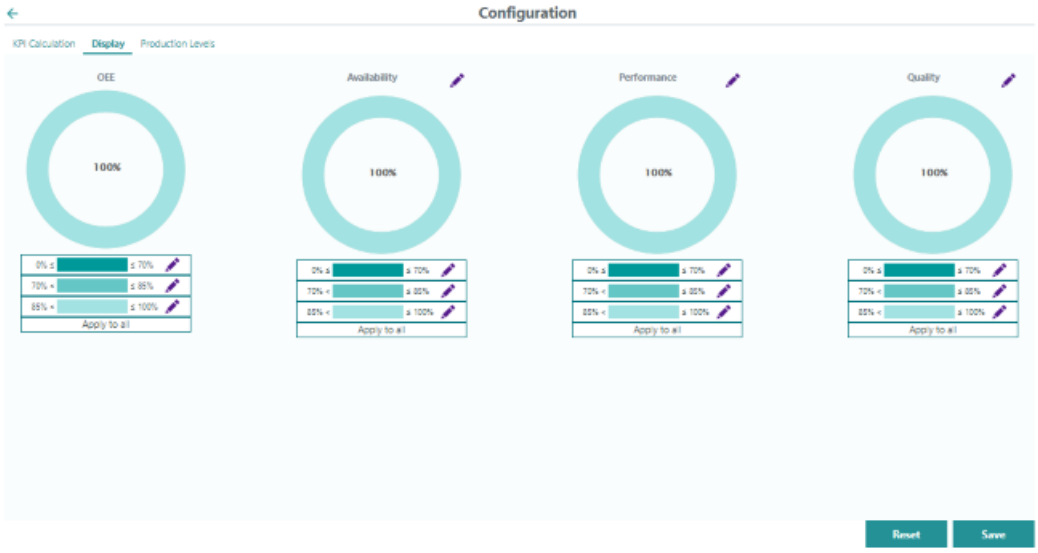
Icons/buttons

The following icons and buttons are available.

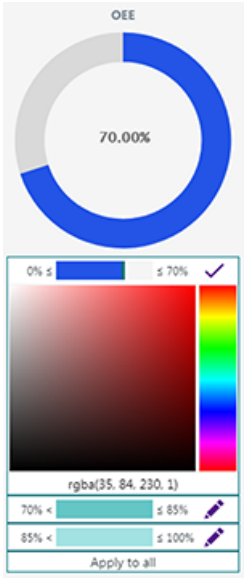
Icon/button	Description
	The "Edit" icon opens the color selection of the display.
Save	The "Save" button saves the processed KPI configuration.
Reset	The "Reset" button resets all KPIs to their default settings.

Procedure

1. Click the "Display" tab.
   In this tab, you can change the names of the KPI, the ranges of the KPI and the color in which they are displayed.

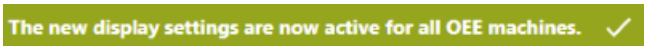


2. Click the "Edit" icon in the line you want to edit.
   - Select the desired color from the color column on the left.
   - Click the desired color intensity in the color selection.
   - Click the check mark above the color selection.



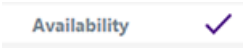
3. Clicking the "Apply to all" button sets the settings for all KPIs.

– Click the "Save" button.
You see the note: "The new display settings are now active for all OEE machines."



Changing KPI names

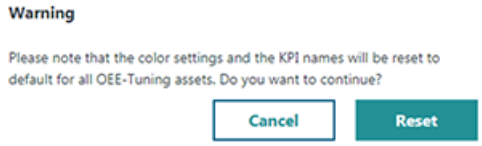
1. Click the "Edit" button alongside the name of the KPI.
The name is opened for editing.



2. Enter a new name.
3. Click the check mark next to the name.
The change is accepted.
4. Click the "Save" button.
You see the note that the change is applied to all OEE machines

Reset settings

1. Click the "Reset" button.
You see the warning notice that the color settings and KPI names are reset for all OEE machines.



2. Click the "Reset" button.
The color settings and KPI names are reset to their default settings.

7.5 Editing the production level

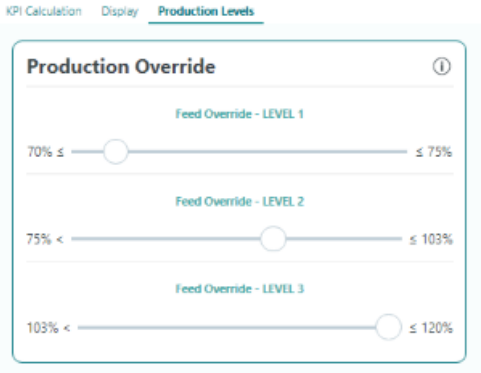
The production status of a machine can be displayed on 1 to a maximum of 3 levels in the "Machine Status Trend" graphic in the Machine Details window.

You can adjust the range of feed override values for each production override level.

Procedure

1. Open the "Production Levels" tab.
2. Click on the slider under "Feed Override - LEVEL 1" and move it to the desired values.
   – Machines are displayed in the organizational fault condition if the feed override value is less than 70%.
   The lower limit value in this configuration is 70%. The maximum value is 120%.
   – If you edit the "Feed Override - LEVEL 2", the value of LEVEL 1 must be below 120%.

3. Click on the slider under "Feed Override - LEVEL 2" and move it to the desired values.
   – If you edit the "Feed Override - LEVEL 3", the value of LEVEL 2 must be below 120%.
4. Click on the slider under "Feed Override - LEVEL 3" and move it to the desired values.
   Example:
   The configuration has 3 levels, but the machine only has a feed override value of 85%, therefore LEVEL 2 is displayed in the window area.
   – To save the settings, click the "Save" button.
   - OR -
   To discard the settings, click the "Reset" button.



5. You can see the set range in the "Machine Status Trend" window section.
   Instead of "Actual Work", "Production Override 75-103" is displayed, for example.

7.6 Operator States

7.6.1 Configuring operator states

With the function "Operator States", you can start an operator state for the next 24 hours and prioritize operator states and machine states.

OEE & KPI calculations will be done according to the started operator state for the selected machine for the next 24 hours unless it is stopped manually or stopped by a prioritized machine status. Actual machine status data received from the machine will be ignored for the operator state enabled period if the operator state is prioritized over the actual machine status.

For more information, see Operator States (Page 247).

Prerequisites

- You need the rights of the administrator role to create an operator state and activate the operator state for the corresponding machine.

Parameters

The following parameters are available:

Parameter	Description
Operator State	Shows the operator state name.
Description	Shows a description of the machine/operator state. You can leave the "Description" field empty while creating a machine/operator state.
State	Shows the state of the machine/operator state.
Priority	Shows the priority of the machine/operator state. • 1: high priority • 100: low priority
	The "Sorting" button sorts a column alphabetically, either in ascending or descending order.
	The "+ Add" button opens the "Define New Operator State" window to create a new operator state.
Action	
	The "Edit" icon opens the "Edit Operator State" window to edit the selected machine/operator state.
	Deletes the selected operator state.

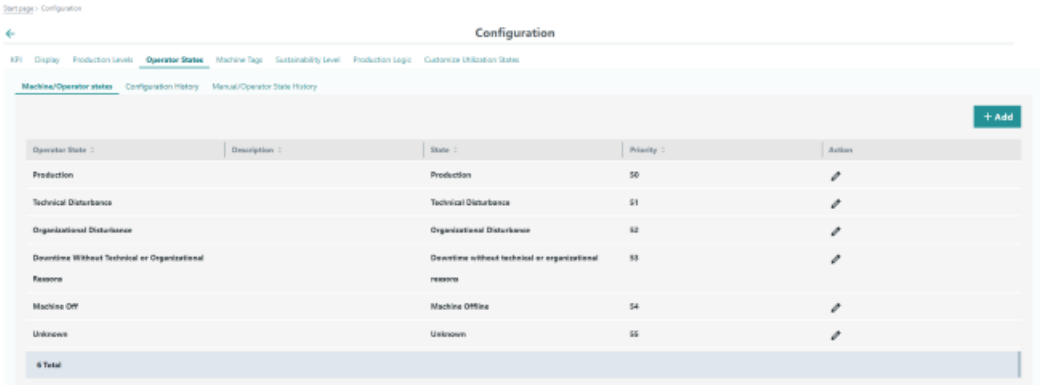
Creating an operator state

Note

Maximum of 20 operator states

A maximum of 20 operator states can be created in Analyze MyPerformance /OEE. You will be notified in the "Operator State" tab when the maximum number is reached ("+ Add" button will be disabled).

1. Open the "Operator States" tab and the "Machine/Operator states" subtab.
   Click the "+ Add" button to create an operator state.

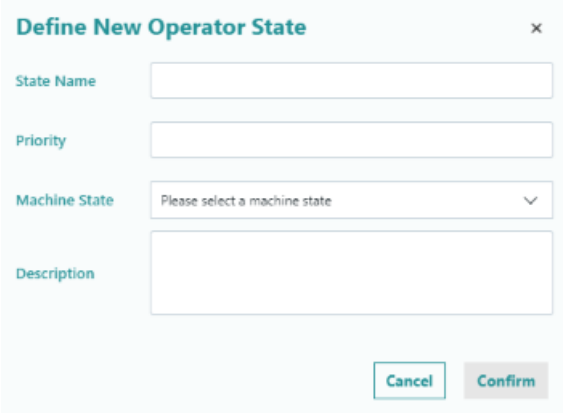


2. The "Define New Operator State" window opens. Enter an operator state name, priority and an optional description. Select a machine state from the drop-down menu.

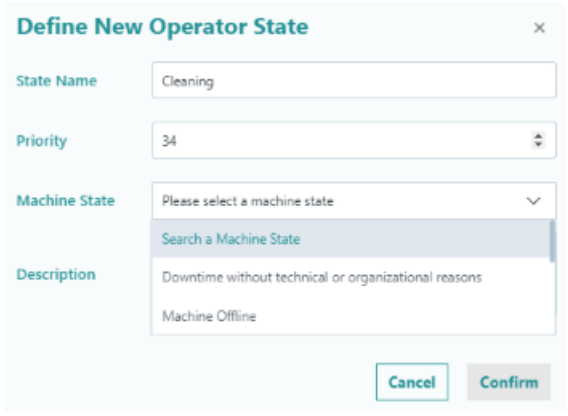
Note

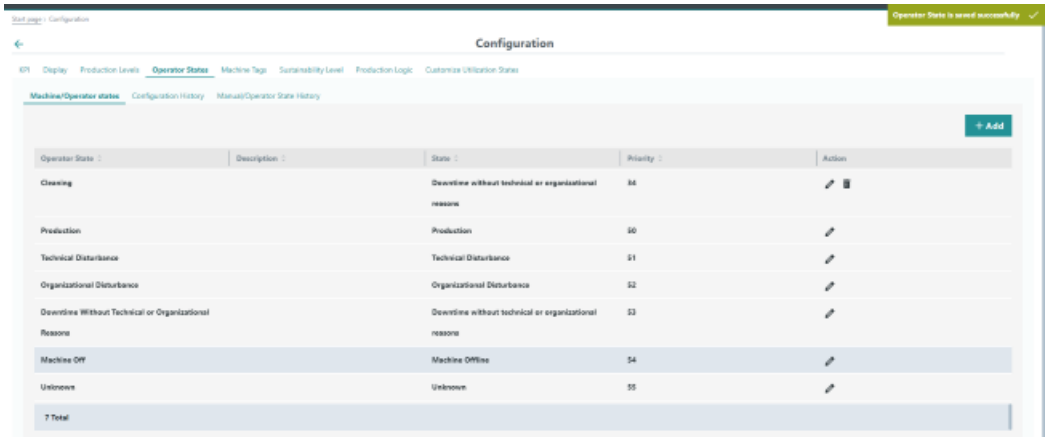
Mapping of machine state and operator state

The selected machine state in the "Define New Operator State" window will be mapped to the created operator state and may affect your OEE & KPI calculations.



3. Click "Confirm".
   The operator state will be created and displayed on the operator states list.
   - OR -
   Click "Cancel" to cancel the creation process.





Editing an operator state

Note

OEE & KPI calculations of used operator states

When the "Machine State" mapping of the operator state is changed, historical OEE & KPI calculations will not be affected if the operator state is used in a machine.

New machine state mapping will be active when the state is used in a machine after editing.

Note

Ongoing operator states

Ongoing machine/operator states cannot be edited.

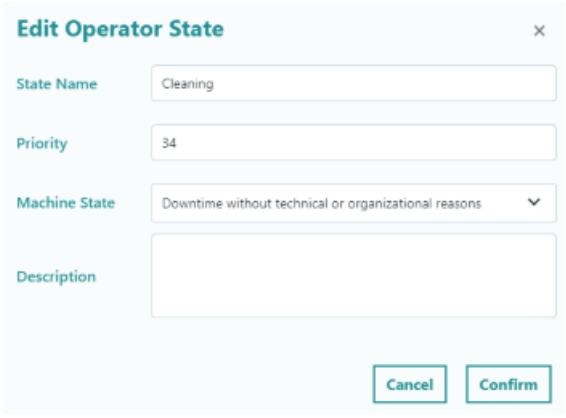
Note

Priority of machine states

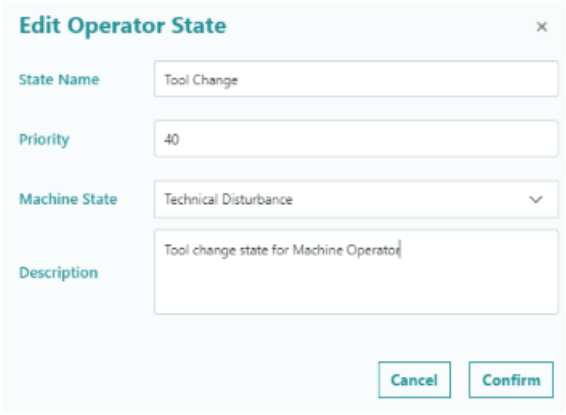
The priority of machine states is unique. Different machine states cannot have the same priority.

The priority of machine states will be active after changing the machine state.

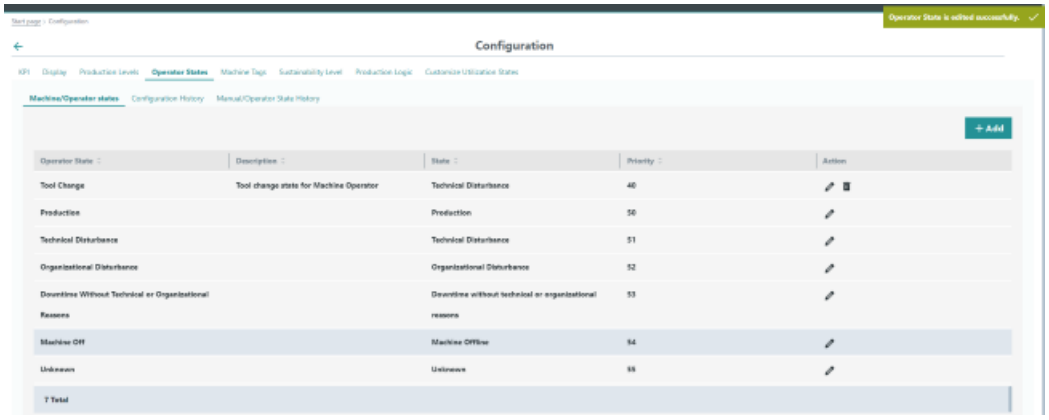
1. In the "Machine/Operator states" subtab, click the "Edit" icon in the "Action" column.
   The "Edit Operator State" window opens.



2. Change one of the fields:
   - State Name
   - Priority
   - Machine State
   - Description



3. Click "Confirm".
   The changes will be saved and displayed on the operator states list.
   - OR -
   Click "Cancel" to cancel the editing process.



Deleting an operator state

Note

OEE & KPI calculations of deleted operator states

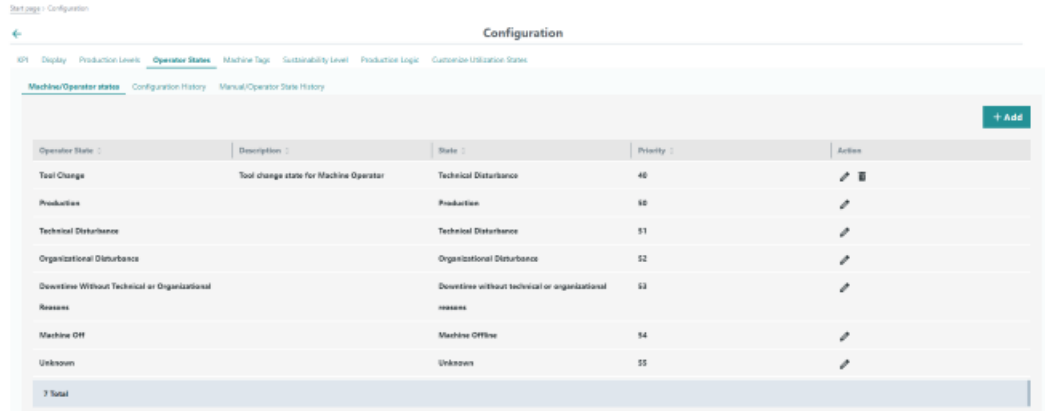
When a created operator state is deleted, historical OEE & KPI calculations will not be affected if the operator state is used in a machine.

Note

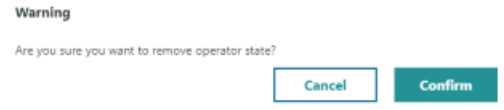
Ongoing operator states

Ongoing operator states cannot be deleted.

1. In the "Machine/Operator states" subtab, click the trash can icon in the "Action" column.



2. A "Warning" window opens.
   Click "Confirm" to delete the operator state.
   - OR -
   Click "Cancel" to cancel the deleting process.



Sorting operator states

1. In the "Operator states" subtab, click the "Sorting" button in the desired column.
2. The column will be sorted alphabetically (A to Z). When clicking the "Sorting" button again, the column will be sorted in reverse (Z to A).

7.6.2 Displaying the configuration history

With the function "Configuration History", you can display the history of the created, edited and deleted operator states.

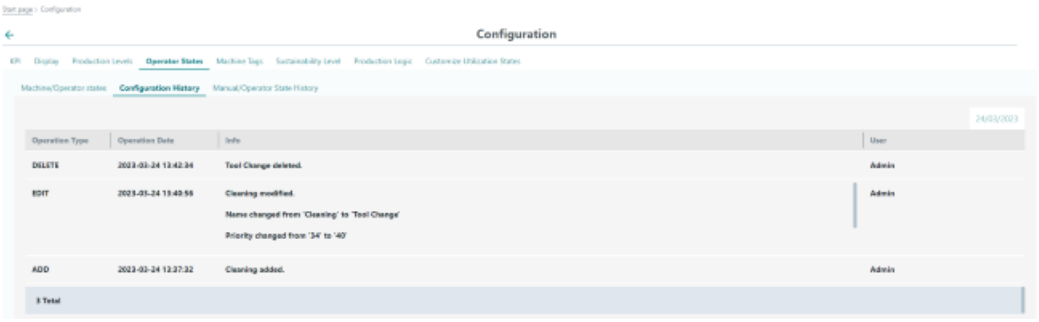
Parameters

The following parameters are available:

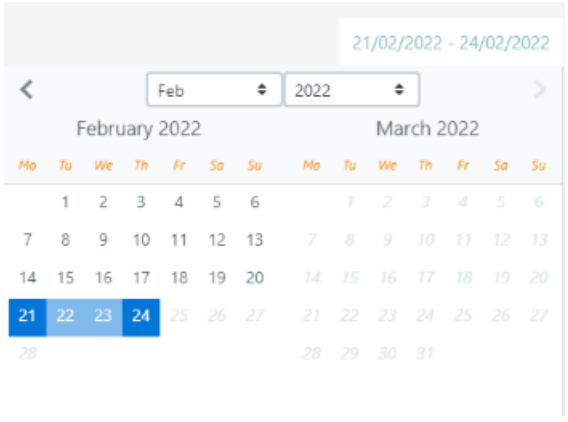
Parameter	Description
Operation Type	Shows the action done in the "Operation states" subtab: • ADD • EDIT • DELETE
Operation Date	Shows the action date in local time zone.
Info	Shows specific information depending on the operation type: • ADD: operator state name • EDIT: old and new operator state name, priority, description and status type • DELETE: deleted operator state name
User	Displays the user name of the user who performed the action.
Select Date	Opens a calendar to select a date. A maximum period of two month in the last two years from the current date can be selected.

Procedure

1. Open the "Operator States" tab and the "Configuration History" subtab.



2. Click the "Select Date" button to filter the history by date.
   Select a single date or a time period in the calendar.



3. The configuration history will be displayed according to the set date filter.

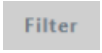
7.6.3 Displaying the manual/operator state history

With the function "Manual/Operator state history", you can review the history of the entered manual states including operator states.

Parameters

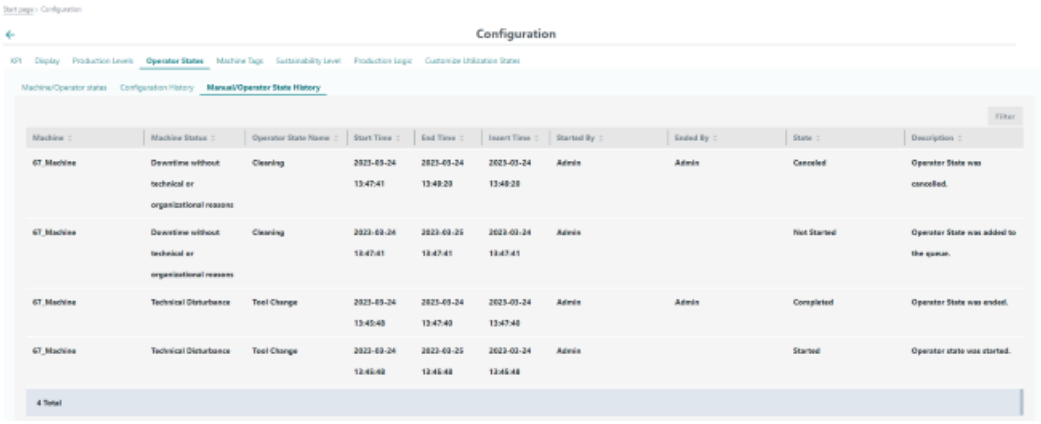
The following parameters are available:

Parameter	Description
Machine	Shows the entered machine name for the manual and operator state. If the previously used machine is deleted, "--- Machine was removed ---" message will be shown.
Machine Status	Shows the type of the entered manual and operator state.
Operator State Name	Shows the name of the entered operator state. If the entered manual state is not mapped with an operator state, "—" will be displayed for this field.
Start Time	Shows the start time of the entered manual and operator state in the local time zone in YYYY-MM-DD HH:MM:SS format.

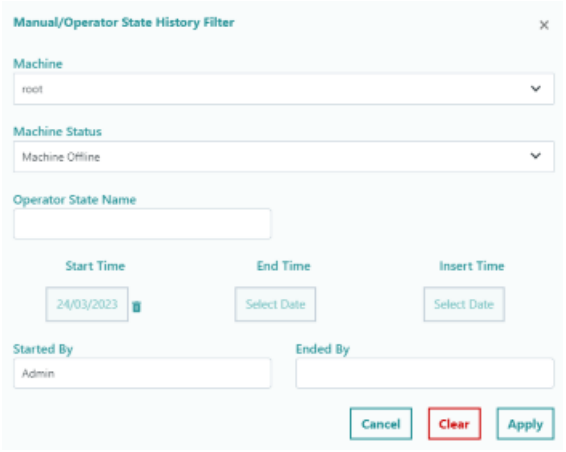
Parameter	Description
End Time	Shows the end time of the entered manual and operator state in the local time zone in YYYY-MM-DD HH:MM:SS format.
Insert Time	Shows the operation date and time of the manual and operator state.
Started By	Shows the name of the user who started the manual and operator state.
Ended By	Shows the name of the user who ended the manual and operator state. "Ended By" data will not be available if the entered state is a manual state.
State	Shows the state of the operator state: • Not Started • Started • Completed • Canceled
Description	Shows the explanation of the operation for the operator state.
	The "Sorting" button sorts a column alphabetically/numerically, either in ascending or descending order.
	Opens the "Manual/Operator State History Filter" window to filter the history by the following parameters: • Machine • Machine Status • Operator State Name • Start Time • End Time • Insert Time • Started By • Ended By
	Clears the "Start Time", "End Time" or "Insert Time" field in the "Manual/Operator State History Filter" window.

Procedure

1. Open the "Operator States" tab and the "Manual/Operator State History" subtab.



2. Click the "Filter" button.
   The "Manual/Operator State History Filter" window opens.
   - Select the desired filters.
   - Click "Clear" to clear all the filters.
   - Click the trash can icon to clear the "Start Time", "End Time" or "Insert Time" field.
   - Click "Apply" to filter the manual/operator state history by the selected parameters.
     - OR -
     Click "Cancel" to cancel the filter process.



3. The manual/operator state history will be displayed according to the set filters.

7.7 Machine tags

You can tag machines with multiple tags. You can filter the machines using this tags.

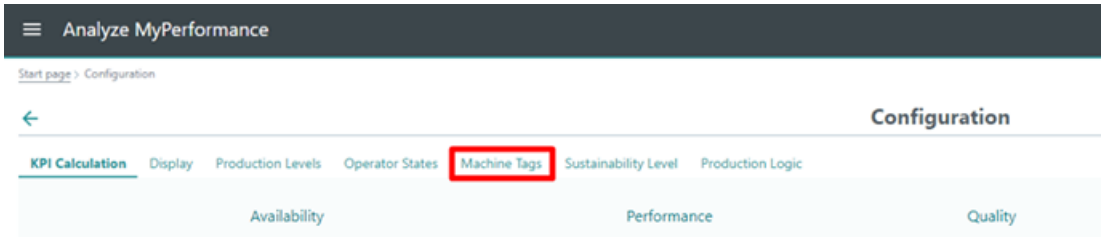
You can also add a single tag to a machine on the "Machine Detail" view. For more information , see Adding tags (Page 152).

Parameters and elements

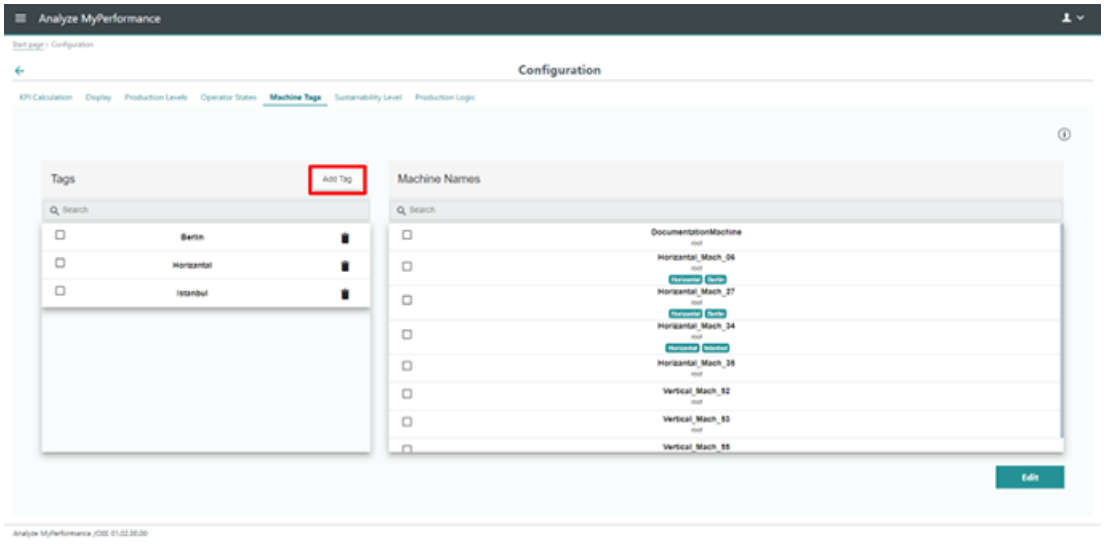
Element	Description
ⓘ	Page info
Add Tag	Adds new tags.
Edit	Allows to assign and unassign tags.
Save	Saves the tag.

Create a tag

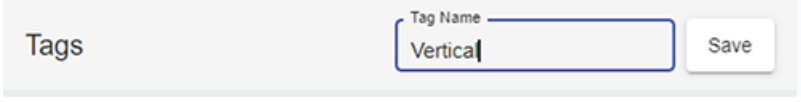
1. Click on the "Machine Tags" tab in the configuration view.



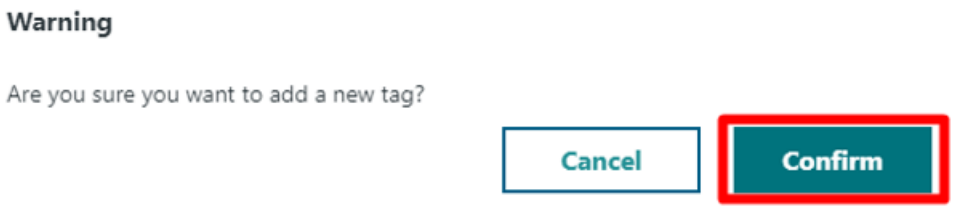
2. You see the tags and the machines with their tags.
3. Click on the "Add tag" button



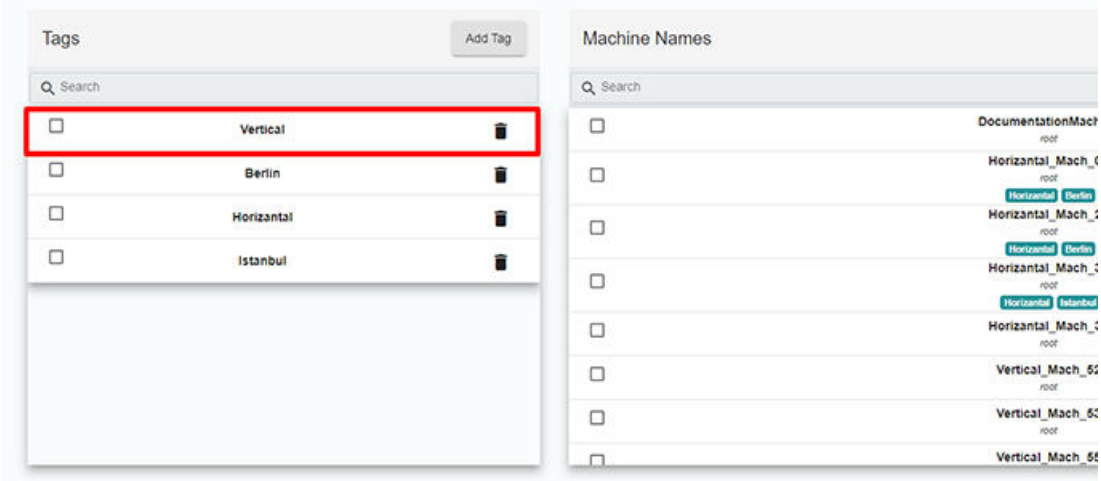
4. Set the name of the tag in the text box.



5. Click on "Save".
6. Click on "Confirm".

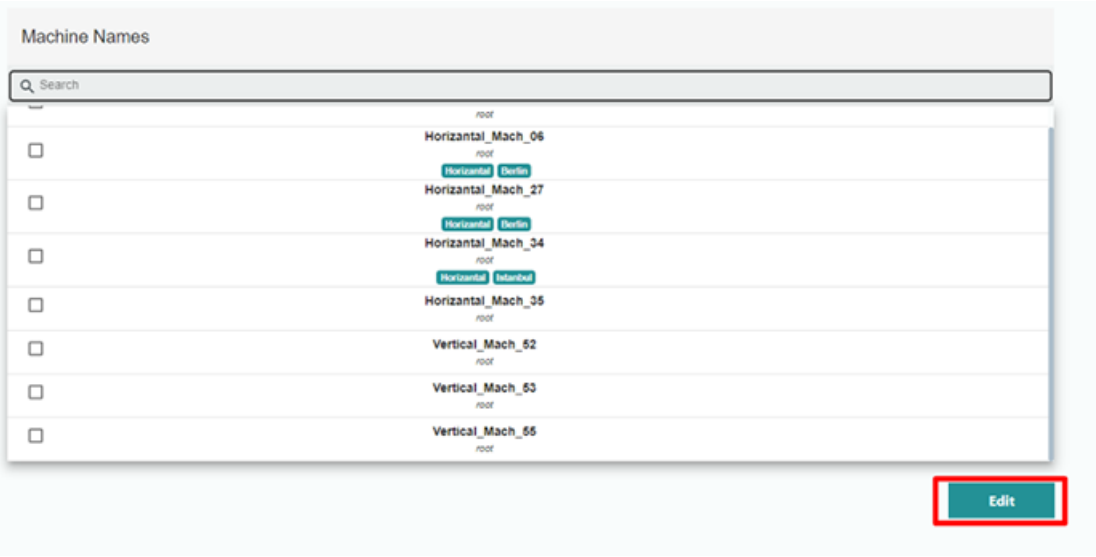


The tag is added to the list.
You can add maximal 10 tags.

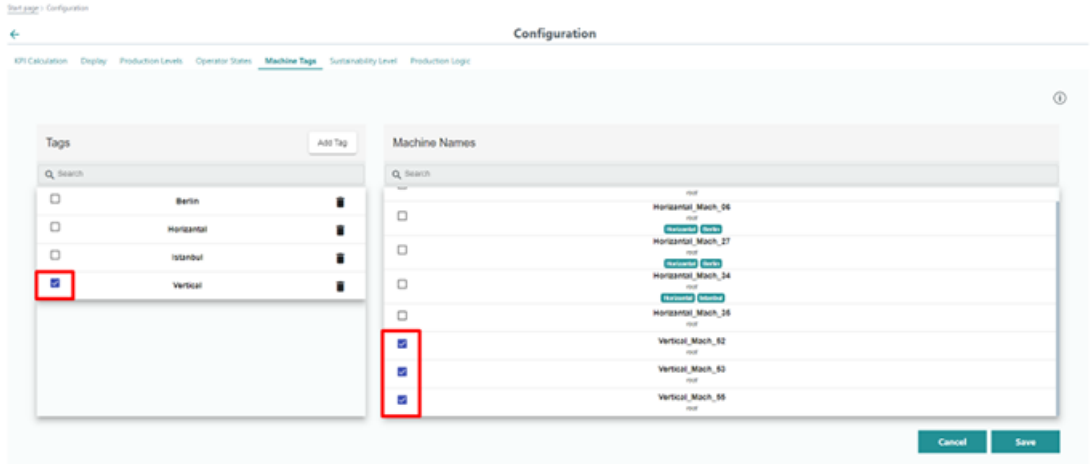


Assign the tag to machines

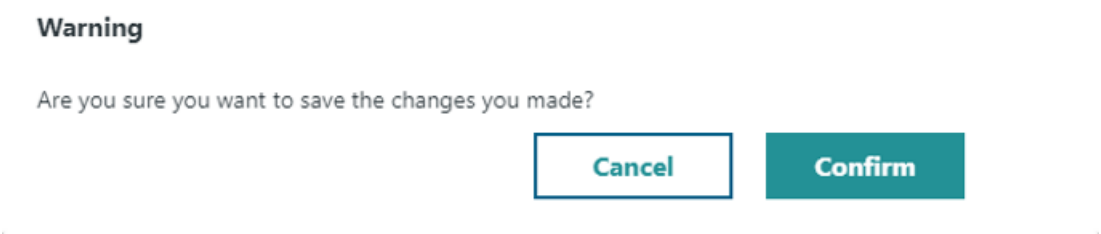
1. Click on "Edit"



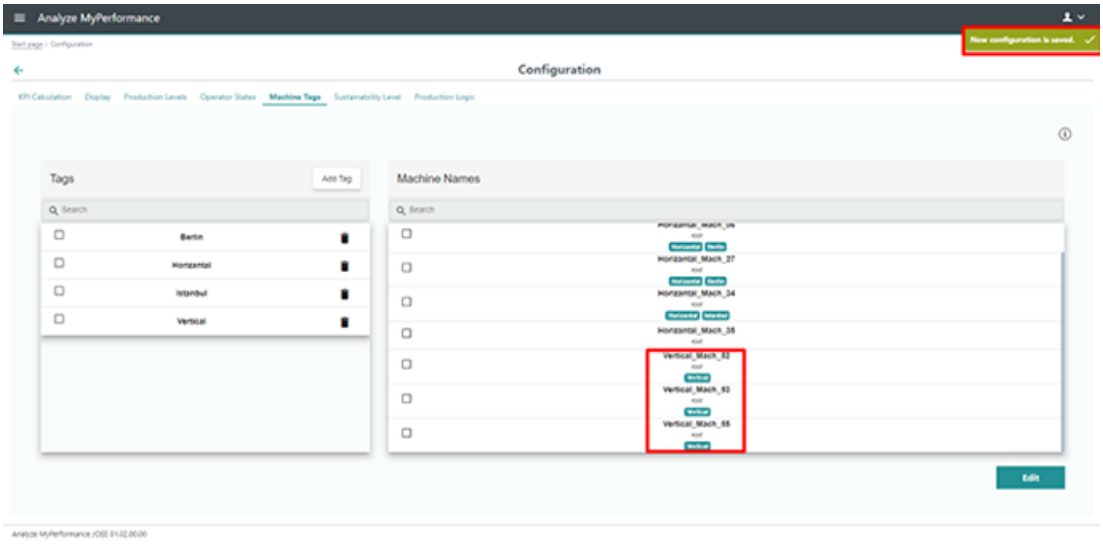
2. Select the checkboxes of the machines that should be tagged.



3. Click on "Save"
4. Click on "Confirm".

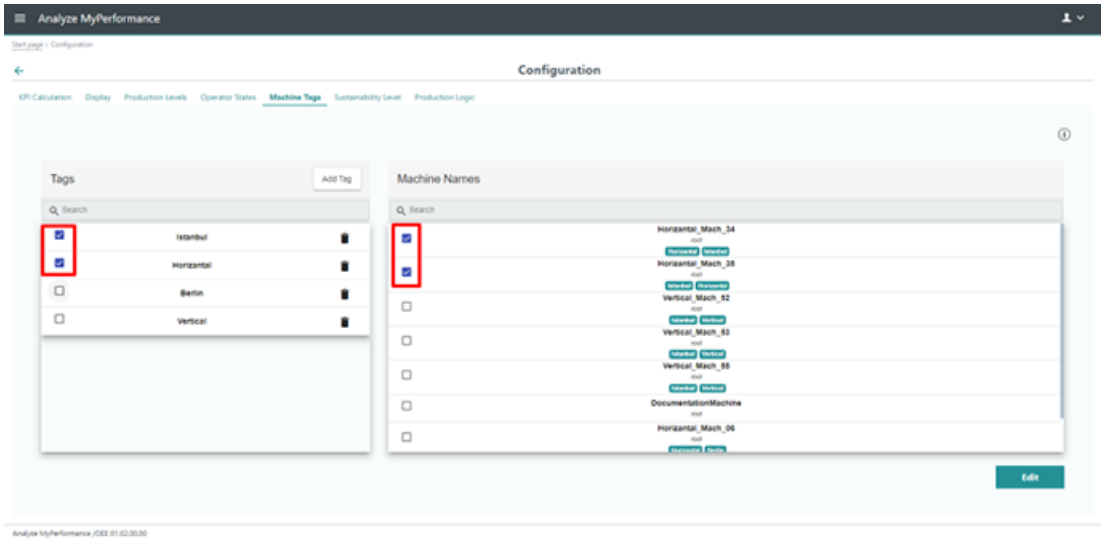


The selected machines are tagged.
You can tag multiple machines with multiple tags.



Filtering

1. Select the checkboxes of the tag that you want
2. The machines in the "Performance Monitoring" view are filtered.



7.8 Sustainability level

The sustainability indicator informs about the negative impact on the environment, the energy consumption or the natural resources. It refers to the current production cycle. If the sustainability is above the percentage threshold, it changes color.

Elements

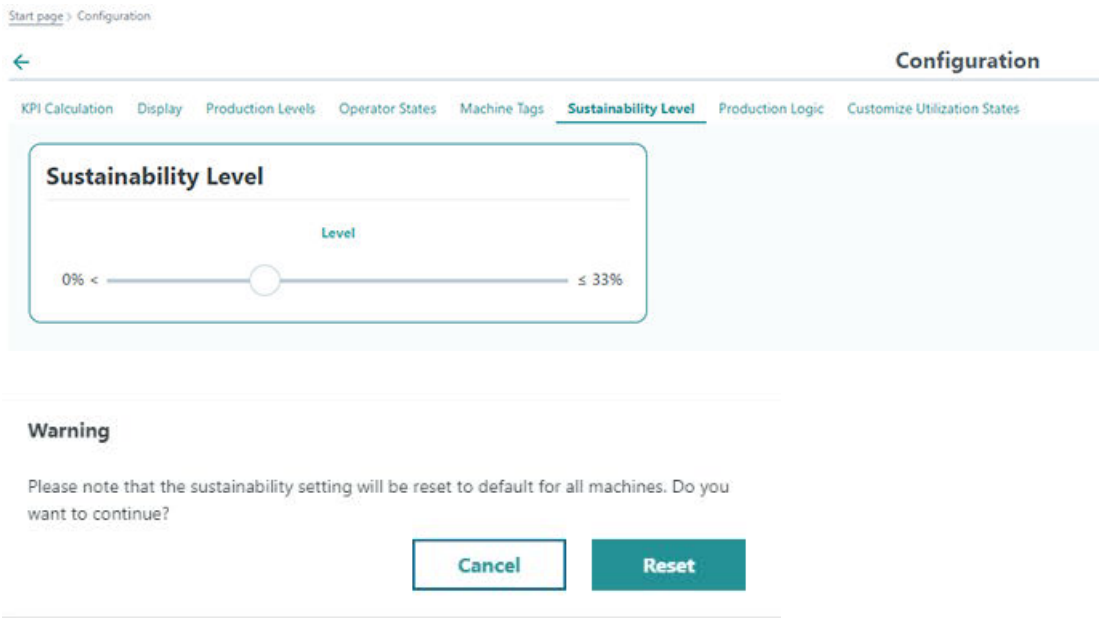
Element	Description
Sustainability level	Sustainability level, range from 0% to 100%.
Save	Saves the settings.
Reset	Discard the settings.

Procedure

To set the sustainability level, click "Configuration" on the start page of Analyze MyPerformance / OEE.

1. Click on the "Sustainability level" tab.
2. Click on the slider and move it to the desired value.
   The default level is 75%.

3. To save the settings, click on "Save"
   - OR -
4. To cancel the changes, click on "Reset".



7.9 Production logic

7.9.1 Addresses

You can create new variables. You can customize the KPIs with new or existent variables.

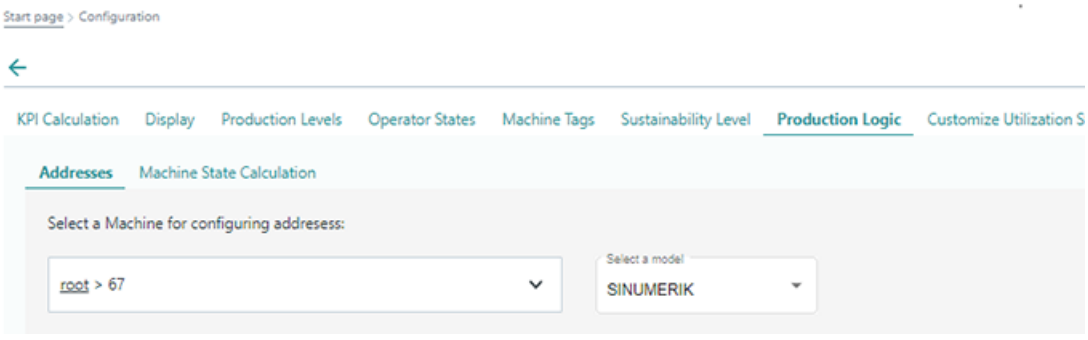
Parameters and elements

Parameter/element	Description
Variable or Value	Name of the new variable
Variable Address	Address
Aspect	Aspect
🗑	Deletes the variable.
+	Adds a new variable.
Reset to defaults	Resets to default addresses.
Reset	Resets the changes.
Save	Saves the variables.

Procedure

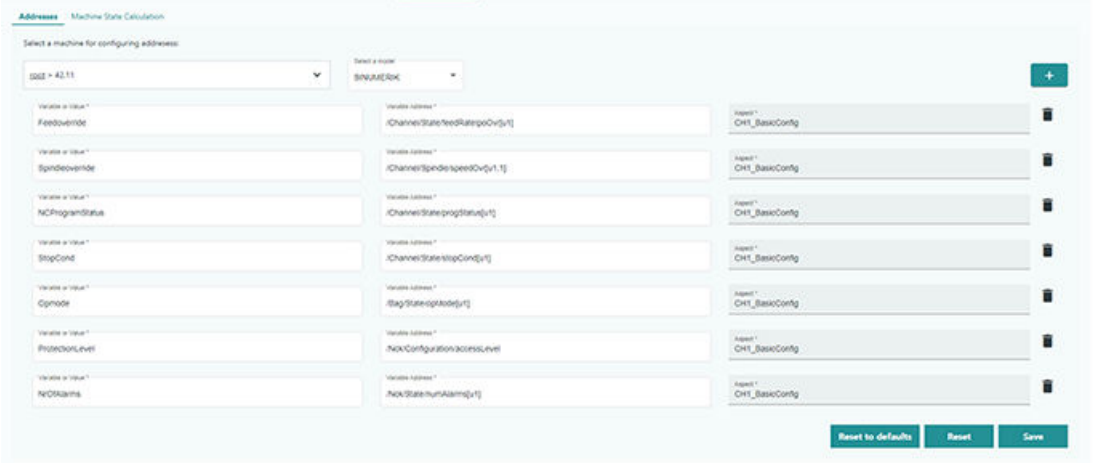
Create a new variable

1. Click on the "Production Logic" tab in the "Configuration" view.



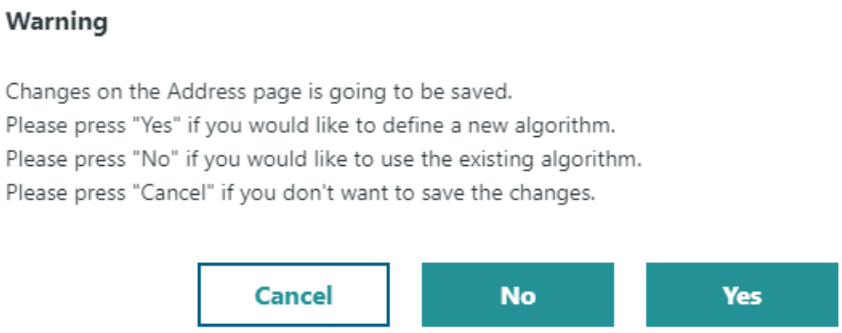
2. Select a machine.
3. Select a model. You have following options:
   - SINUMERIK
   - FANUC
   - HEIDENHAIN
   - Other

   You see a list of all variables for this machine.



4. Click on the "Plus" button to add a new variable.
5. Fill the spaces with the desired values.
   - Variable or value
   - Variable address
   - Aspect

6. Click on "Save" to add the new variable.
   - OR -
   Click on "Reset" to undo all changes.
   - OR -
   Click on "Reset to defaults" to use the default addresses.
7. Click on "Yes" to define a new algorithm.
   - OR -
   Click on "No" to use the existing algorithm.
   - OR -
   Click on "Cancel" if you do not want to save the variables.



The new variable is added.
The default addresses of the controllers are listed in the appendix. For more information, see Controller addresses (Page 390).

Note

Machine reboot

Machine reboot is required after every configuration change.

Limitations

- Maximum 25 variables
- Maximum 100 characters for variable name
- Maximum 250 characters for variable address
- Maximum 50 characters for aspect name
- Newly added aspects can be visualized on the dashboards. For more information, see Generating charts (Page 161).
- Only integer or double values are supported. Make sure that the defined address's value is in integer or double format. If the received data from the defined address is null or in a string type, the data will be ignored.
- Auto workpiece count feature is not supported for the Machine Agent connected devices except for Fanuc.
- NC Program Name is not displayed for the Machine Agent connected devices except for Fanuc.

- You cannot edit th default addresses for Fanuc and SINUMERIK type devices. To remove these address from variable list, remove their usage in the algorithm page first.
- If a variable is used in the algorithm, remove it from the algorithm definition in order to remove it from address list
- The default variables are set for the SINUMERIK and Fanuc controllers. For the other type controllers, you must define the addresses manually.

Note

Defining a new algorithm

If you changed the existing variables, added or removed a variable from the list, you must define a new algorithm. Otherwise the machine status data is calculated "Unknown" and OEE/ KPIs are calculated 0% when you restart your device after saving the new variable configuration.

If you would like to use the existing algorithm when you changed the variables, press "Save" and them "No" in the confirmation window.

To read data by using different adapters, add the prefix of the used adapter to the front of the address as below.

- For Fanuc adapter:
  - "ext::fanuc::"
  - Example: "ext::fanuc::/pmc/pmcrng/G/byte[1,12]"
- For Mitsubishi adapter:
  - "ext::mitsubishi::"
  - Example: "ext::mitsubishi::/nc/axis/powerConsumption[1]"
- For Heidenhain adapter:
  - "ext::heidenhain::"
  - Example: "ext::heidenhain::\PLC\memory\B\4123"
- For OpcUA adapter:
  - "ext::opcua::2/"
  - 2 in the prefix may be different according to the your configuration
  - Example: "ext::opcua::2//Bag/State/opModeBag/State/opMode[u1]"
- For MTConnect adapter:
  - "ext::MTConnect::"
  - Example: "ext::MTConnect::/variable/auto_time"

Note

Reset to default

Pressing the "Reset to Defaults" button retrieves default variables and addresses for SINUMERIK and Fanuc type devices. For the oher devices, all addresses are removed.

7.9.2 Example addresses for third-party controllers

Example addresses for third-party controllers

The example addresses apply to the following third-party controllers:

- HEIDENHAIN
- MTConnect
- Mitsubishi
- FANUC
- OPCUA (SINUMERIK Operate)
- HAAS

Check the system requirements to see if the specific type of controller is supported.

Note

Disclaimer

This information is based on our best knowledge of controllers and their openness interfaces. Adress strings can vary according to the controller types, OEMs, customers and the aspects you want to include into the KPI calculation.

Note

Adapternames with lowercase

Add in front of each address on the AMP UI:

adaptername_with_lowercase

HEIDENHAIN

Variable name	Address
Feedoverride	\DNC\feed\override value is integer, should be divided by 100 for actual result
NCProgramStatus	\DNC\program\status value is string, all possible values: "DNC_PRG_STS_IDLE" , "DNC_PRG_STS_RUNNING" , "DNC_PRG_STS_STOPPED" , "DNC_PRG_STS_INTERRUPTED" , "DNC_PRG_STS_FINISHED" , "DNC_PRG_STS_ERROR" , "DNC_PRG_STS_NOT_SELECTED"
Opmode	\DNC\execution\mode value is string, all possible values: "DNC_EXEC_MANUAL" , "DNC_EXEC_MDI" , "DNC_EXEC_RPF" , "DNC_EXEC_SINGLESTEP" , "DNC_EXEC_AUTOMATIC" , "DNC_EXEC_OTHER" , "DNC_EXEC_SIMULO_TURBO_DEPRECATED" , "DNC_EXEC_HANDWHEEL"
StopCond	\DNC\program\status

MTConnect

Variable name	Address
Feedoverride	/variable/pfo
Spindleoverride	/variable/cso
NCProgramStatus	/variable/exec value is string, all possible values: READY, ACTIVE, INTERRUPTED, STOPPED
Opmode	/variable/mode value is string, all possible values: AUTOMATIC, MANUAL, MANUAL_DATA_INPUT
Program name	/variable/pgm value is string, returns name of the program as string

Mitsubishi

Variable name	Address
Feedoverride	/nc/command/feed/FA integer and a string
Spindleoverride	/nc/axis/spindleMonitor/2[<spindlenumber>] /nc/axis/spindleMonitor/2[1] double
NCProgramStatus	/nc/status/run/run /nc/status/run/start /nc/status/run/pause return 1 or 0, values also include start stop conditions
Program name	/nc/program/programNumber/main /nc/program/programNumber/sub string

	In automatic operation "RUN" (OP)	In automatic operation "START" (STL)	In automatic operation "PAUSE" (SPL)
In "reset"	0	0	0
Automatic operation stop condition	1	0	0
Automatic operation pause condition	1	0	1
Automatic operation start condition	1	1	0

FANUC

Variable name	Address
Feedoverride	/pmc/address/data/G/byte/address[12]
Spindleoverride	Spindleoverride
NCProgramStatus	/cnc/info/status#automatic_operation
Opmode	/cnc/info/status#automatic_manual_mode_selection
Program name	/cnc/program/path

OPCUA (SINUMERIK Operate)

Variable name	Address
Feedoverride	ns=2;s=/Channel/State/feedRateIpoOvr[1]
Spindleoverride	ns=2;s=/Channel/Spindle/speedOvr[u1,1]
NCProgramStatus	ns=2;s=/Channel/State/progStatus[u1]
Opmode	ns=2;s=/Bag/State/opMode[u1]
Program name	ns=2;s=/Channel/ProgramPointer/progName[u1,1]

HAAS

Variable name	Address
Feedoverride	?Q600 3004 Override FEED HOLD control
Spindle RPM	?Q600 3027 Spindle RPM (read only)
Spindle RPM	?Q500 Three-in-one (PROGRAM, Oxxxxx, STATUS, PARTS, xxxxx) PROGRAM, MDI, IDLE, PARTS, 380
Opmode	?Q104 Mode (LIST PROG, MDI, etc.) MODE, ZERO
Program name	?Q500 Three-in-one (PROGRAM, Oxxxxx, STATUS, PARTS, xxxxx) PROGRAM, MDI, IDLE, PARTS, 380

7.9.3 Machine state calculation

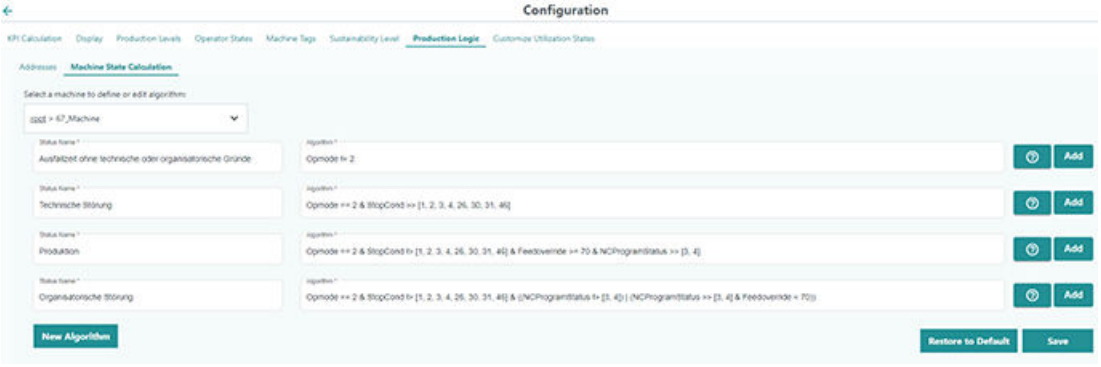
Parameters and elements

Following elements are available:

Elements	Description
Status Name	Name of the machine status
Algorithm	Algorithm to describe this status
New Algorithm	Adds a new algorithms
ⓘ	Information
Add	Opens the window to add a new variable or expression.
Restore to Default	Resets the changes.
Save	Saves the changes.

Procedure

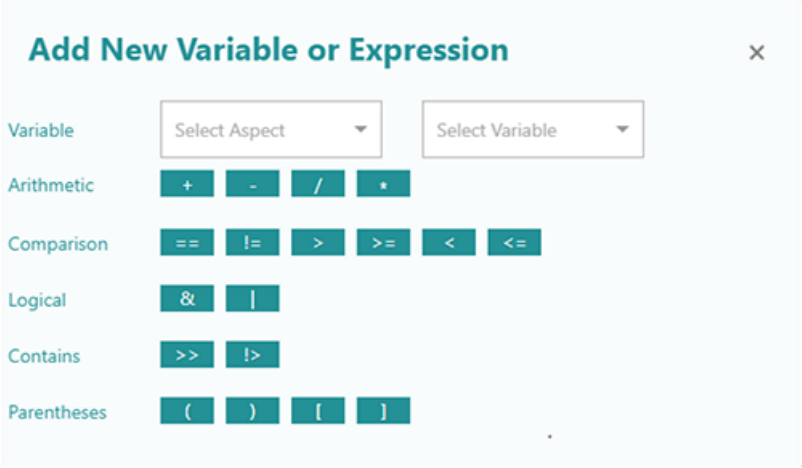
1. Click on the "Machine State Calculation" tab.
2. Select a machine.
   The existent algorithms are shown.



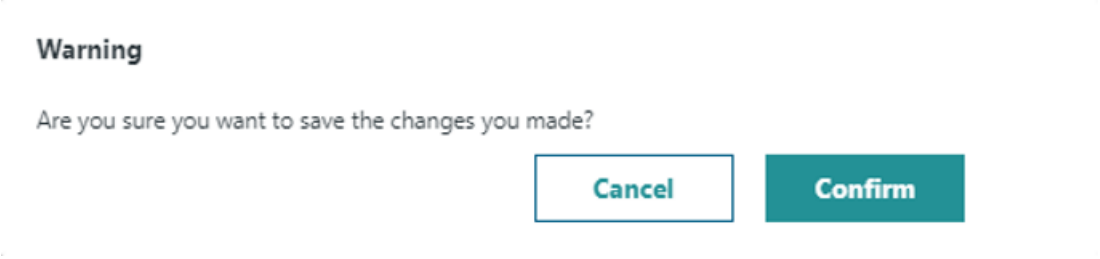
3. To edit an algorithm, click the algorithm.



   – Type the new algorithm.
   – Click on "Add" to add a new variable or expression.
     Select the variable or expression in the window that appears.



4. To create a new algorithms click the "New Algorithm" button. For every algorithm
   – Type the algorithm.
   – Click the "Add" button to add anew variable or expression.
     Select the variable or expression in the window that appears.
5. Click on "Save".
6. - OR -
7. Click on "Restore to default" to reset to the default.
8. Click on "Confirm".



The machine states are calculated based on the new algorithm.

Note

New variable

If you have saved a new variable, you must define a new algorithm by clicking on the "New Algorithm" button. Otherwise your machine status data is calculated as "unknown".

The "Save" button in the right-below corner is only updating the existing algorithm for the existing variables.

Note

Restore to default

Clicking on the "Reset to Default" button resets the algorithms according to the machine model.

- If the connected device is SINUMERIK, algorithms are reset to SINUMERIK's default.
- If the connected device is Fanuc, algorithms are reset to Fanuc's default.
- If the connected device is other than SINUMERIK or Fanuc, all the algorithms are removed. You must create a new algorithm in order to calculate the machine status in AMP for resetting other device's algorithm.

Restrictions

- If two or more of the algorithms are "valid" with the received values, the application calculates the incorrect machine status.
- If all of the algorithms are "invalid" with the received values, the application calculates the machine status as "Unknown". Your OEE/KPI is calculated as 0% for this machine.
- The entered algorithm must include a comparison like "equal, greater than, less than". Otherwise you cannot save the algorithm.

7.10 Data Acquisition Configuration

Overview

AMP starts fetching data from machines after the AMP assignment is done. In case if you want to disable the data acquisition, AMP provides Data Acquisition configuration page.

By that configuration feature, user can enable or disable data acquisition for selected machines.

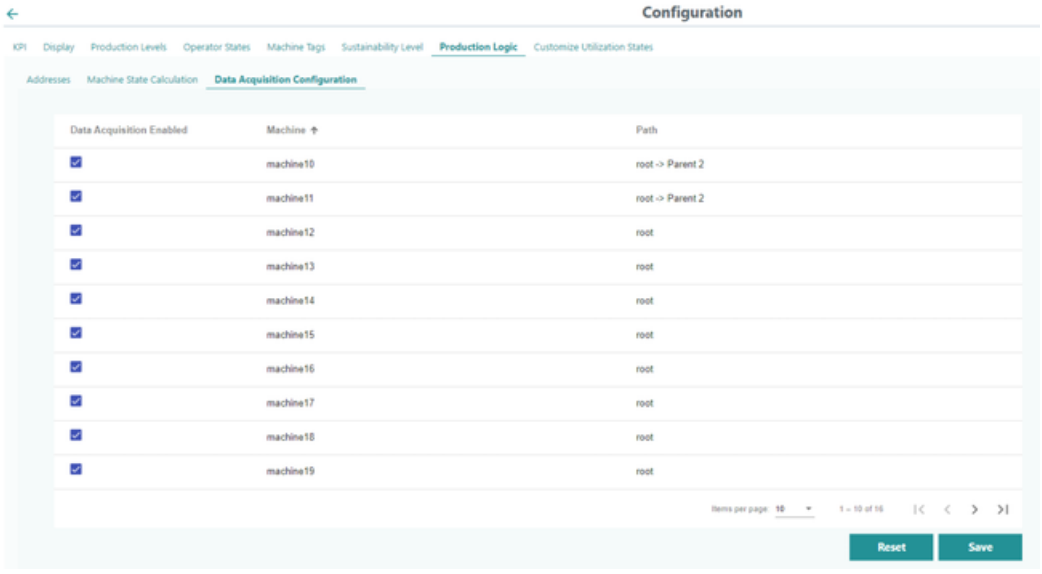
Data acquisition from all onboarded machines in AMP is enabled as the default setting. Disabled machines can be enabled again if the user decides that data for corresponding

machine(s) are required.

The Enable/Disable process is carried out on the Production Logic > Data Acquisition Configuration tab of AMP Configuration page.

Procedure

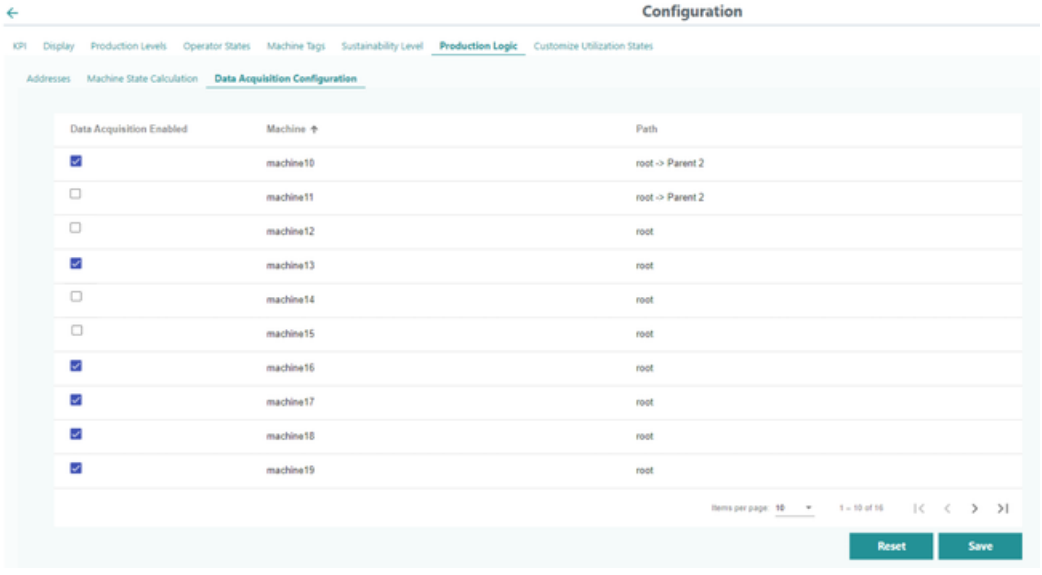
1. Click "Data Acquisition Configuration".



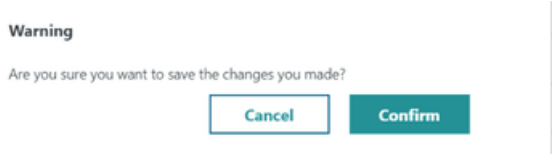
2. Unselect check boxes of machines which are not required for data acquisition

Note

Keep check boxes selected if they are required for data acquisition.

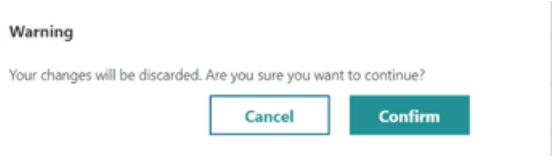


3. Click "Save".
4. Click "Confirm".
   After clicking the Confirm button, the configuration is saved and data acquisition is set accordingly.



Click "Reset", if you want to return to the previous data acqusition configuration.

1. Click "Reset".
2. Click "Confirm".



7.11 Customize utilization states

You can define custom utilization states for the utilization plan. These states are mapped to the default shift states.

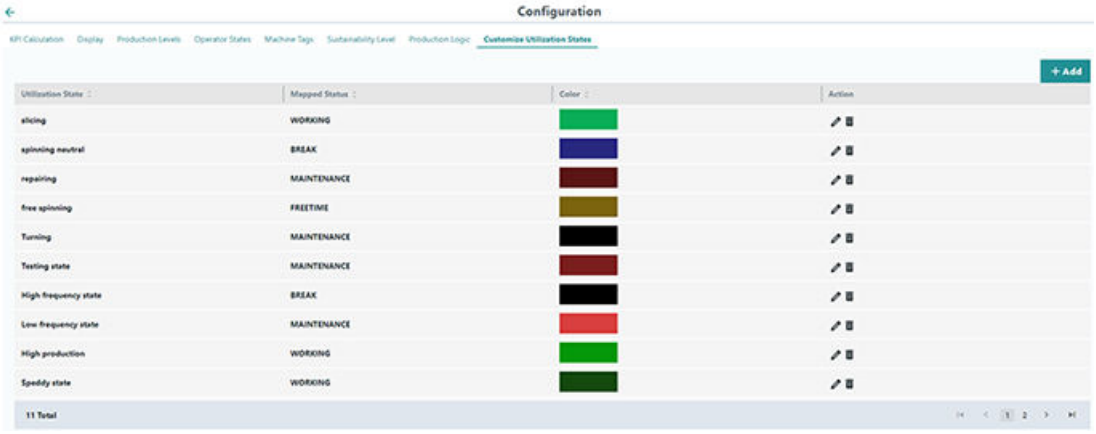
Parameters and elements

The following parameters and elements are available:

Parameter/element	Description
Utilization State	Name of the utilization
Mapped Status	Select a status: • Working • Break • Maintenance • Freetime
Color	Color of the utilization state.
	The "Sorting" button sorts a column alphabetically, either in ascending or descending order.
Action	
	The "Edit" symbol opens the utilization state.
	Deletes the selected utilization state.
+ Add	Add a new utilization state.

Procedure

1. Click the "Customize Utilization Status" tab.
2. You see a list of all utilization states that you have already created. Up to 10 utilization states are displayed on a page.



Note

Utilization states

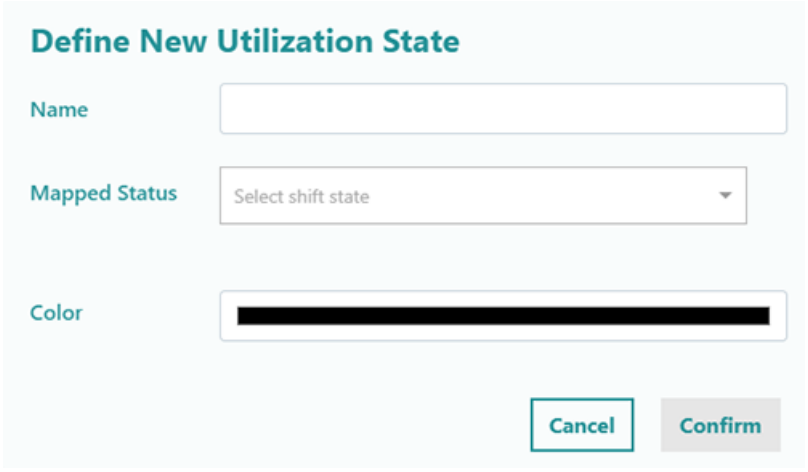
The maximum number of utilization states is 50.

The names of the utilization states can be in any language such as Chinese, Arabic or Korean.

Add a utilization state

1. Click the "Add" button.
2. The "Define New Utilization State" window appears.
3. Enter the name of the utilization state.
4. Select one the shift status to map the utilization state.

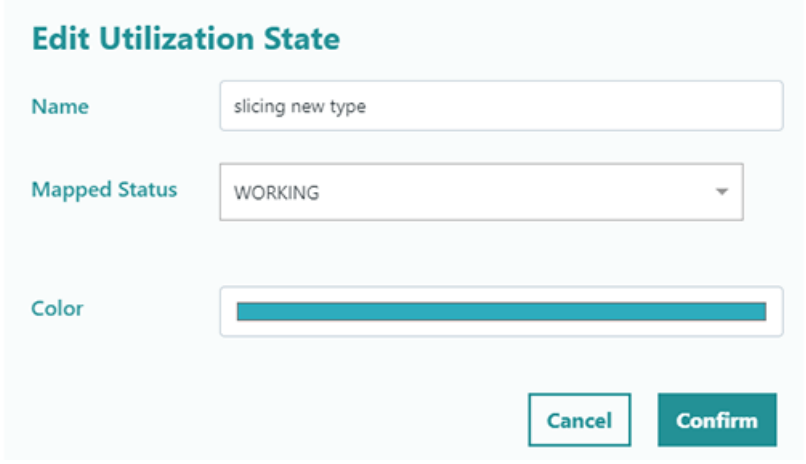
5. Click the colored bar to select a new color.
6. Click "Confirm" to save the utilization state
   - OR -
   Click "Cancel" to return to the list without saving.



Edit a utilization state

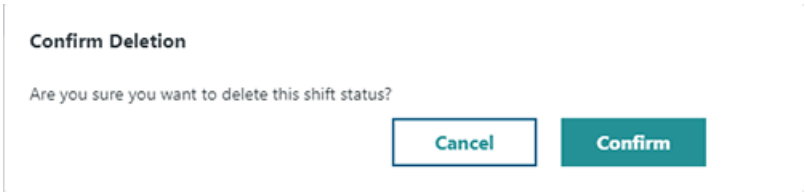
You can edit the name or the color of a utilization state. The mapped state cannot be edited.

1. Click the "Edit" icon.
2. The "Edit Utilization State" window appears.
3. Enter the new name of the utilization state.
4. Select the new color.
5. Click "Confirm" to save the changes of the utilization state
   - OR -
   Click "Cancel" to return to the list without saving.



Delete a utilization state

1. Click the "Delete" icon.
2. Click "Confirm" to delete the state
   - OR -
   Click "Cancel"



7.12 Energy Consumption

Overview

Energy efficiency and energy saving are playing an increasingly important role in the machine tool environment. AMP supports SINUMERIK Ctrl-Energy where you can visualize the Energy consumption of your machines. The functions Ctrl-E Analysis to acquire and evaluate the energy consumption of the machine and Ctrl-E Profiles, to control energy-saving states of the machine are available in SINUMERIK Operate. You can find the details about configuring the Ctrl-Energy at the link below:

https://support.industry.siemens.com/cs/document/109481517/sinumerik-840d-sl-828d-ctrl-energy?dti=0&lc=de-WW (https://support.industry.siemens.com/cs/document/109481517/sinumerik-840d-sl-828d-ctrl-energy?dti=0&lc=de-WW)

With the flexibility of dynamic dashboarding and reporting functionalities at AMP, Energy data also is shown as a new dashboard.

Configuration

To use the functionality and activate the variables, the configuration file "slctrl_energy.ini" should be created in the directory "<Installationpath>/oem/sinumerik/hmi/cfg" with the following content:

```
[Misc]
EnableOAInterface=true
```

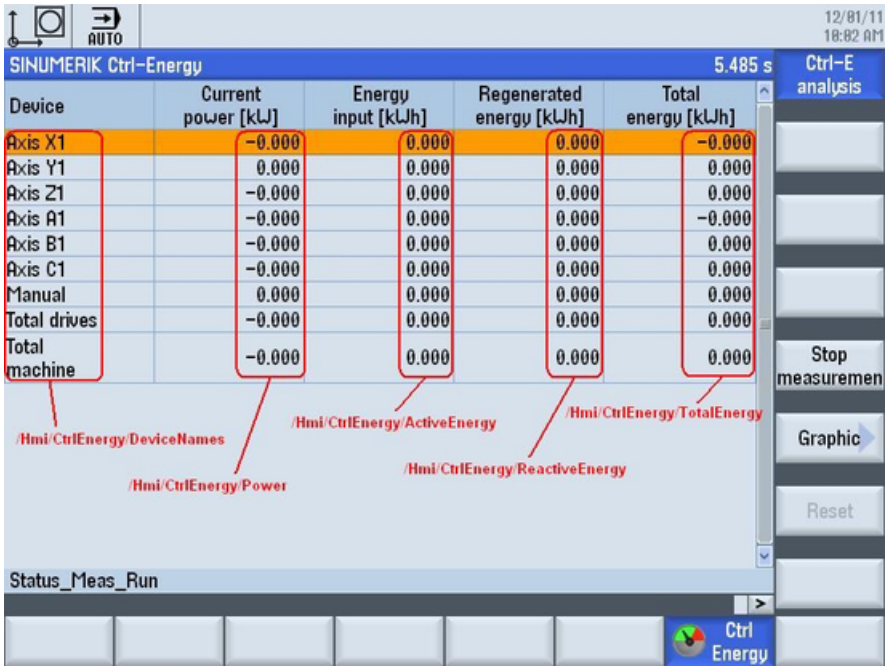
Variable paths CTRL-Energy

The following variable paths are available for accessing energy management (CTRL-Energy):

Variable	Description
/Hmi/CtrlEnergy/State	Format:v QVariant / UInt Available: Always Meaning: • 1 Measurement active • 0 Measurement inactive
/Hmi/CtrlEnergy/Power	Format: QVariant / QVariantList Available: Always Meaning**:** Parallel to /Hmi/CtrlEnergy/DeviceNames, contains the current power of each configured device
/Hmi/CtrlEnergy/ActiveEnergy	Format: QVariant / QVariantList Available: For active measurement Meaning: Parallel to /Hmi/CtrlEnergy/DeviceNames, contains the current energy used of each configured device.
/Hmi/CtrlEnergy/ReactiveEnergy	Format: QVariant / QVariantList Available: For active measurement Meaning: Parallel to /Hmi/CtrlEnergy/DeviceNames, contains the regenerative energy of each configured device
/Hmi/CtrlEnergy/TotalEnergy	Format: QVariant / QVariantList Available: For active measurement Meaning: Parallel to /Hmi/CtrlEnergy/DeviceNames, contains the total energy (infeed + regenerative energy) of each configured device or (active energy - reactive energy)

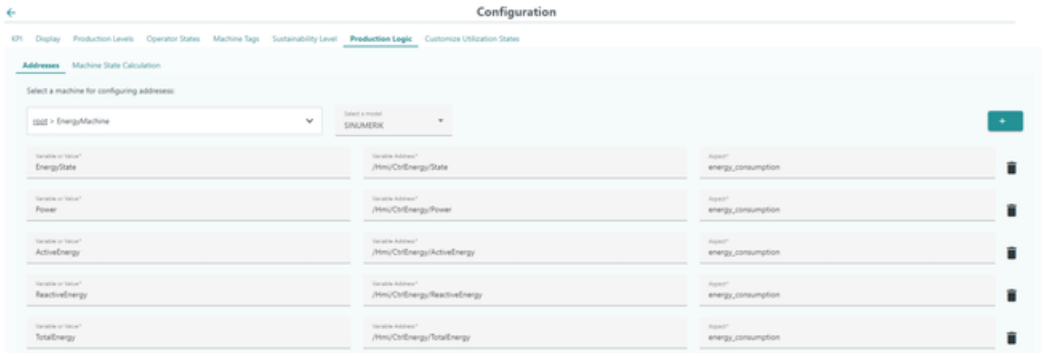
Visualizing of CTRL Energy at HMI:

The key combination Ctrl+E on the operator panel allows direct access to the energy management of the machine tool



Configuration in AMP Screens:

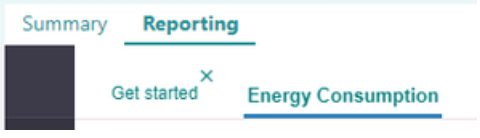
To visualize the energy data in AMP, related variables are required to be configured as below. Please control the related variables are correctly shown in Production Logic tab → Addresses subtab:



Configuration of the Reporting Page

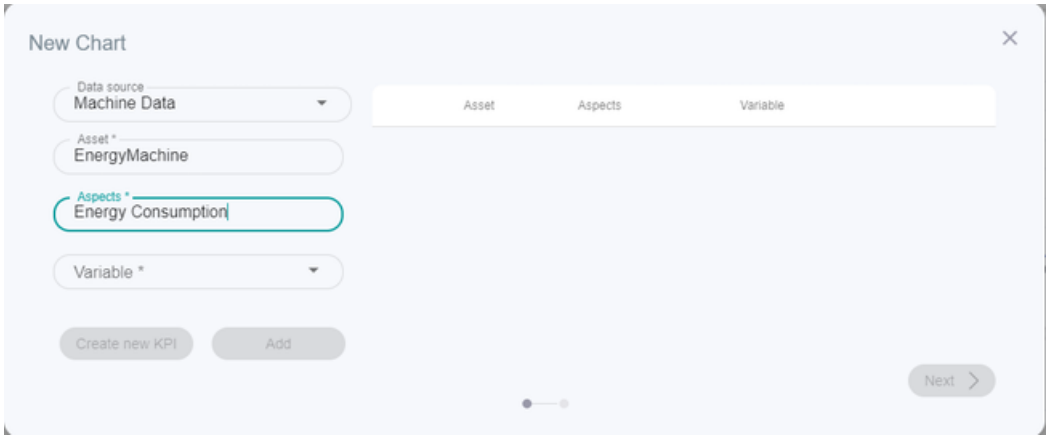
After variables are configured and machine sends related data to AMP, in Machine Details page within the reporting tab, it is possible to visualize the energy consumption data within the corresponding charts:

1. Create a board in Reporting page for Energy Consumption.

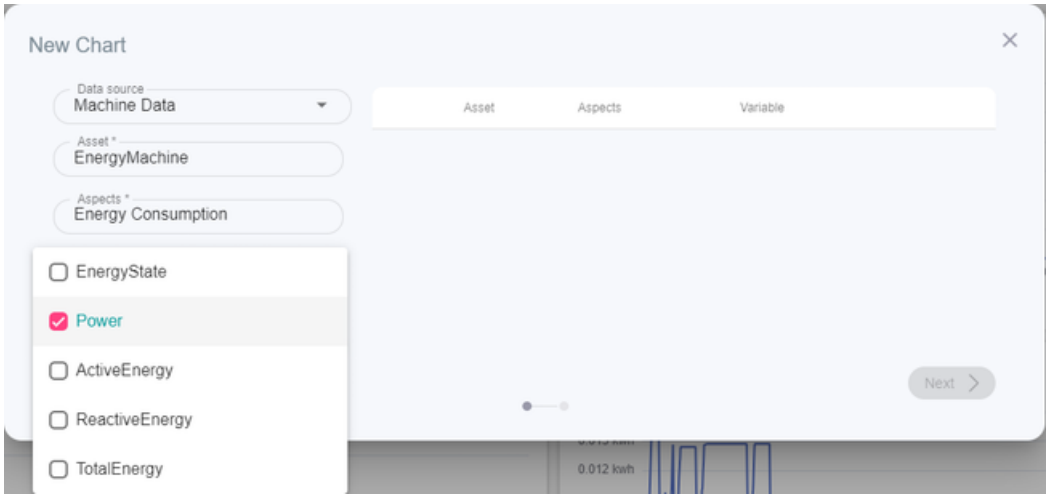


2. Create new line chart for energy consumption.

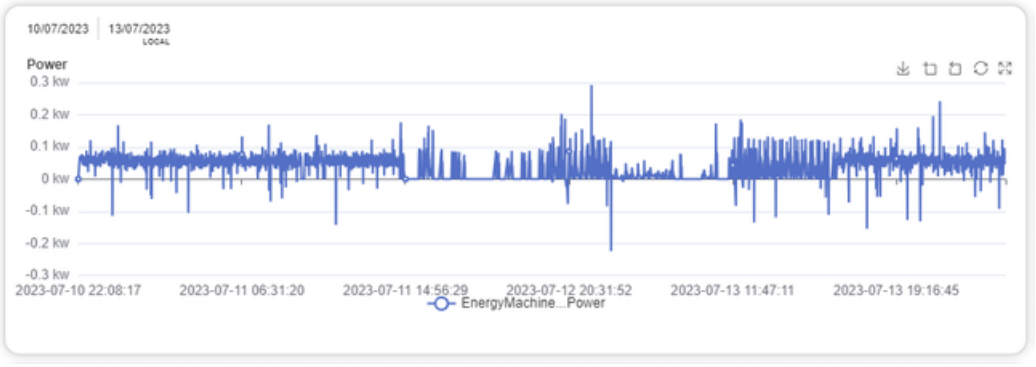
3. select the chart type (Line chart) and select Machine Data data source as below.



4. Select Power variable for visualization of the current power data.



5. Save the configuration and when data is fetched, it will be visualized as below.



6. Repeat the same steps for Active Energy, Reactive Energy and Total Energy. At the end, board consists of 4 different line charts as below.



7.13 Copy Configuration

Overview

The function allows you to copy the configuration of a source machine to multiple target machines.

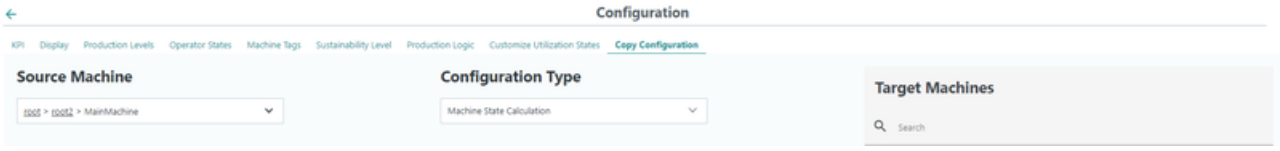
Parameters and elements

Element	Function
Select a machine	Select a source machine.
Select a configuration	Select a configuration.
Search	Search a machine.

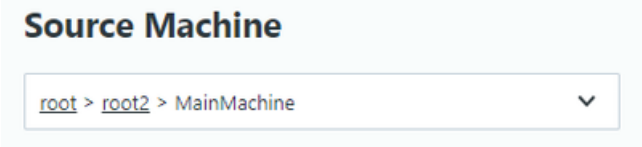
Element	Function
Next	Go to further steps after selecting target machines.
Save	Save after selecting target machines and configurations.
Cancel	Cancel selected configurations on selected machines.
Configurations are copied to the target machines successfully!	Confirmation message

Procedure

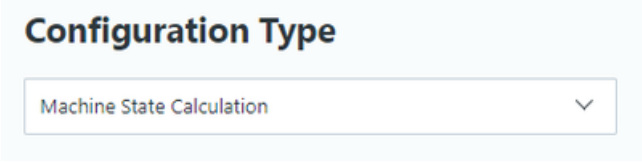
1. Click the "Copy Configuration" tab on the "Configuration" page.



2. Select source machine.



3. Select the configuration type that you want to copy to other machines.
   The following configuration types are available:
   - Address
   - Machine State Calculation
   - KPI Parameter Calculation
   - KPI Calculation



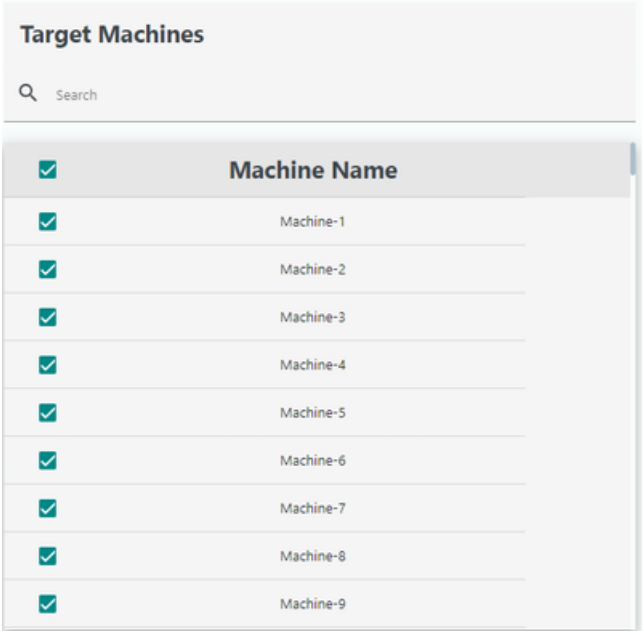
4. Select the target machines to which the configuration type shall to be copied.

Note

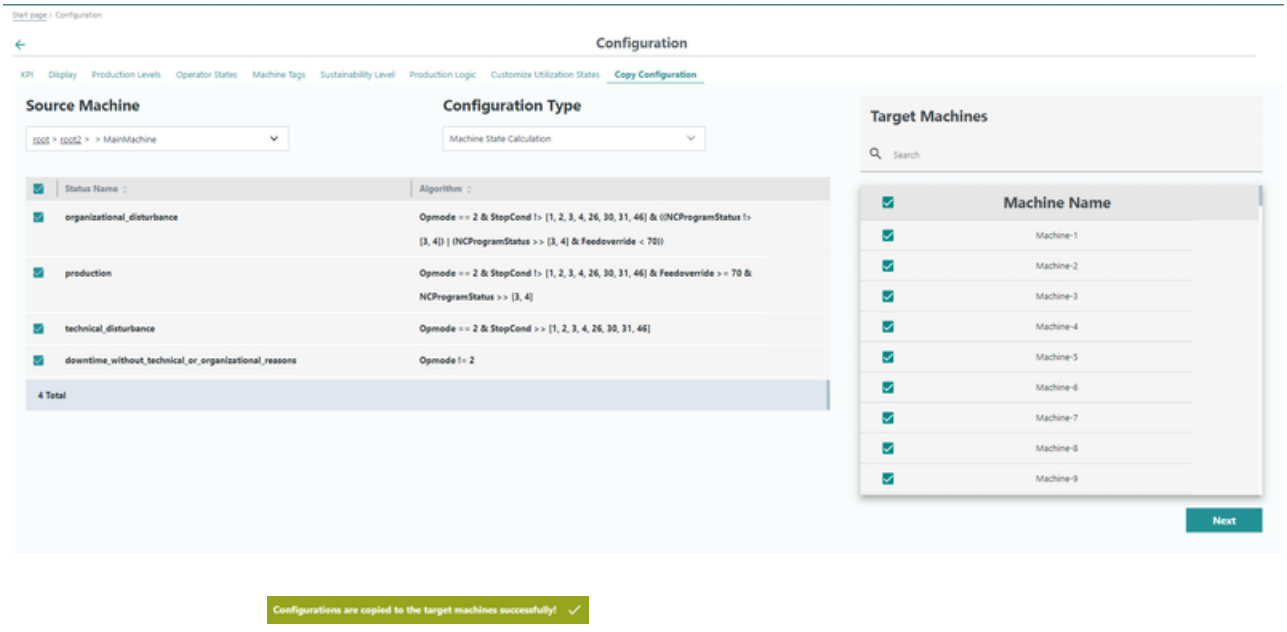
Machine with same variable names

If a target machine has the same variable names as the source machine, a message is displayed. You can choose one of the following options:

- "Exclude"
  Excludes the target machine from having the selected configuration type of the source machine applied to it.
- "Overwrite"
  Overwrites the configuration of the target machine with the selected configuration type of the source machine.
- "Cancel"
  Choose this option to keep the last status of configurations for target and source machines.



5. Save and apply changes to selected target machines.



7.14 Cycle Time Analysis

Overview

The function helps you to analyze the lead time and minimize the cost of particular parts or end products. The following functions provide better understanding of the cycle time criterias involved:

- Compare actual NC program cycle times with planned cycle times.
- Shift based cycle time analysis helps you to analyze the cycle time of the current shift. Average, minimum and maximum cycle time information is displayed. Based on these informations you can compare the results with other shift results.
- Compare total cycle time with total production time. Provided information helps to compare the preparation of exact production time with real production time.
- Compare total cycle time of multiple machines. Provided information helps to determine machine-related delays and root cause analysis.

Prerequisite

In order to measure the start and end time of an NC Program, you need to define a custom parameter within NC Program.

Define custom parameter

To define a custom parameter, "R Parameter" can be used in SINUMERIK controllers.

Check the available "R Parameters" by clicking the following softkeys in the indicated order: "Parameters" > "User variable" > "R Variables".

Note

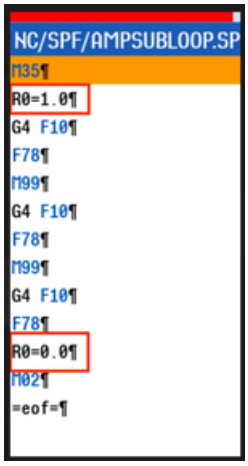
Reading GUD or LUD variables

GUD or LUD variables cannot be read in Mcenter.

Use case

If you want to use parameter R0, set the value of R0 at the beginning and at the end of NC Programs.

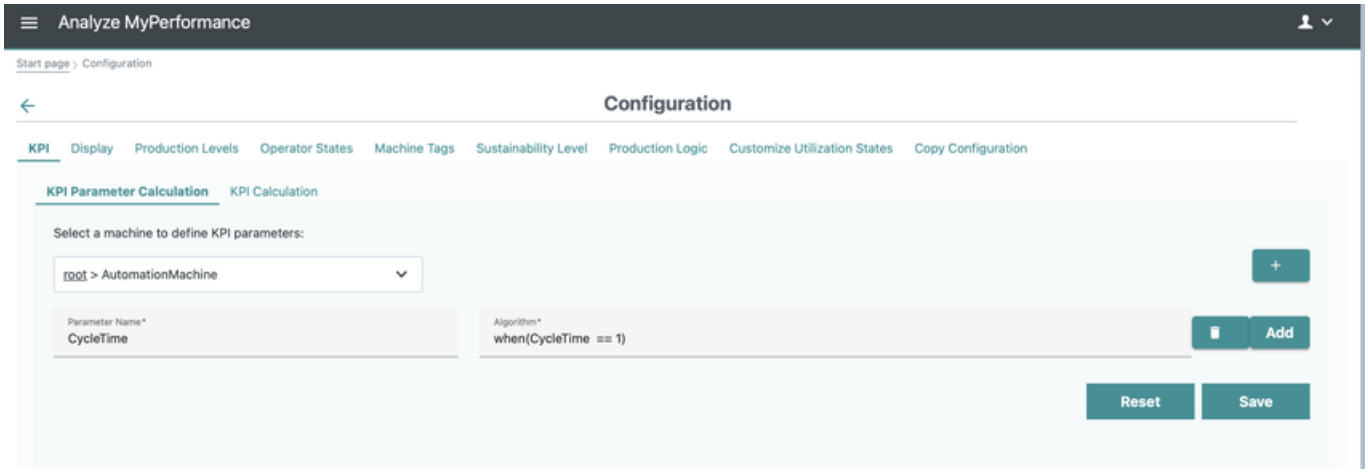
- If NC Program starts with R0=1 and ends with R0=0, cycle time algorithm should be set, when CycleTime==1.



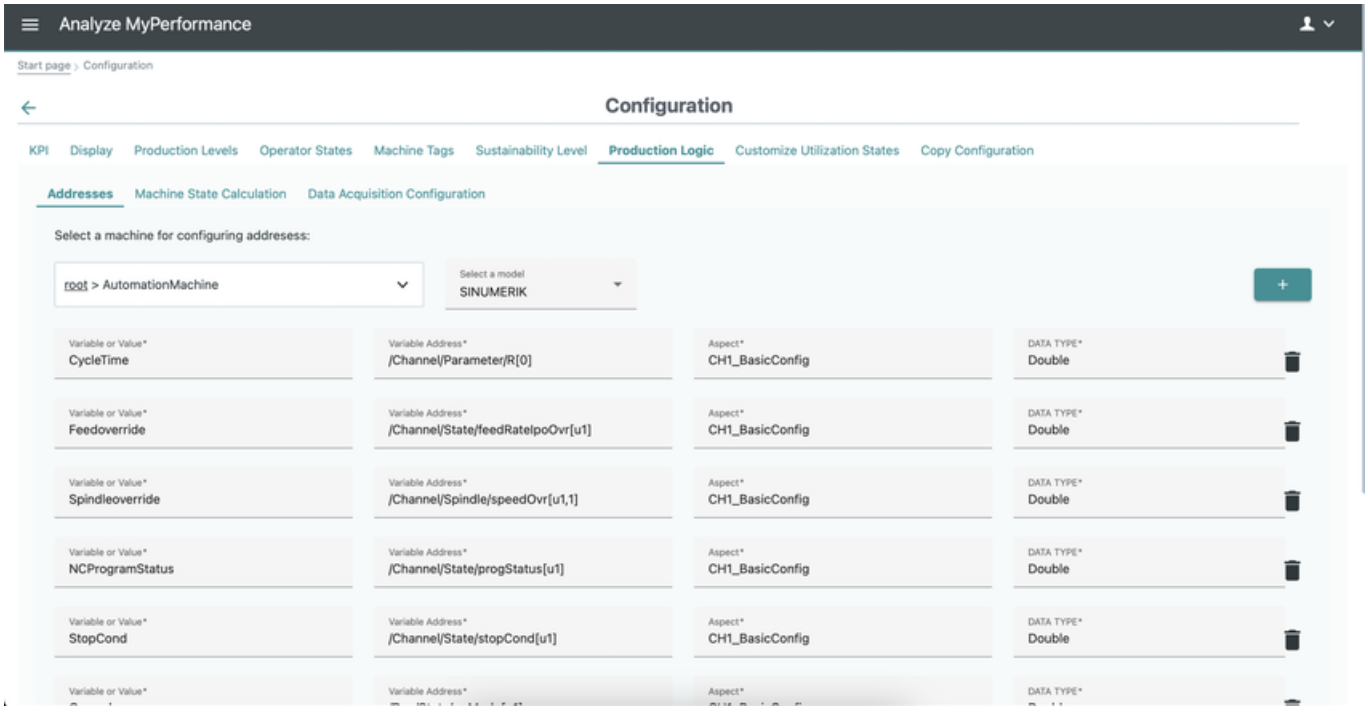
- If NC Program starts with R0=0 and ends with R0=1, cycle time algorithm should be set, when CycleTime==0.
- Sample NC Program starts with R0=1.

Configuration

To use cycle time analysis functions it is required to use variables in NC Programs. Related variables should be set to a value at the start of the analysis. At the end of the analysis the variables should be set back to default values. Thus, the system will read the address value and calculate the cycle time duration as a KPI parameter.



After cycle time is configured as a variable, the KPI parameter needs to be set as shown in the picture below. The name "CycleTime" is mandatory.

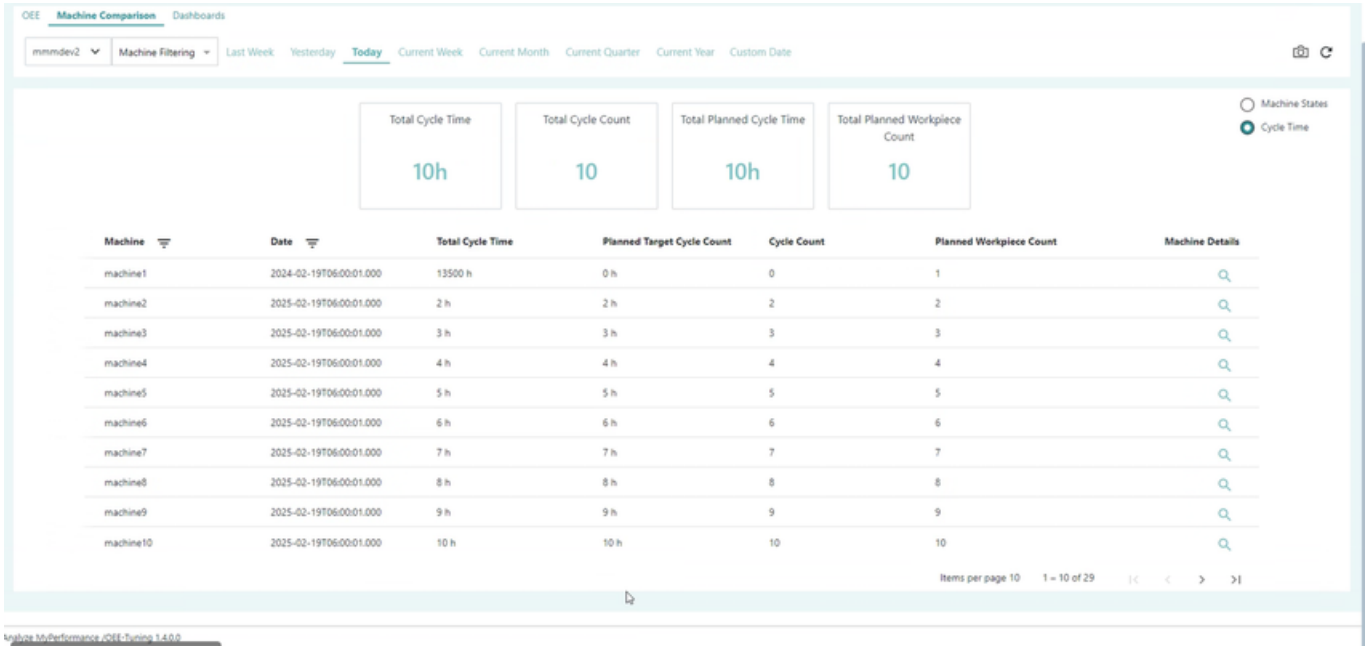


Comparing cycle times of individual machines

To view the comparison of the cycle times of individual machines navigate to the "Cycle Time" page via "Performance Monitoring > Machine Comparison > Cycle Time".

Visualization is based on the selected hierarchy level:

- Total Cycle Time
  Aggregates the selected machines total cycle time information.
- Total Cycle Count
  Aggregates the selected machines number of execution times.
- Total Planned Cycle Time
  Aggregates the selected machines total cycle time information. Value = target cycle time · target workpiece.
- Total Planned Workpiece Count



"Date"	If selected date range is 1 day, shift base information is displayed. If selected date range is > 1 day, values are grouped per day.
"Total Cycle Time"	Total cycle time of a machine
"Cycle Time Count"	Number of execution time of the NC Program
"Total Planned Cycle Time"	Sum of planned Target Cycle Time
"Planned Workpiece Count"	Planned Target Workpiece Count
"Machine Details"	Link to machine details page for the selected asset.

Comparing actual cycle time with target cycle time

You can visualize a comparison between actual cycle time and target cycle time.

1. Open "Performance Monitoring".
2. Select a machine by clicking the corresponding tile.
3. Go to the Reporting tab on the "Machine Details" page.
4. Select "Line Chart".

5. Select "Part Cycle Times" from "Data source" dropdown.
6. Select "Shift part" as grouping option.
7. Select machine.
8. Select "Utilization for Cycle Time".
9. Select "Target Cycle Time".
10. Press "Add".
11. Select "KPI Parameters as Data source".
12. Select "Shift part" as groping option.
13. Select "Custom for KPI Parameters".
14. Select "Cycle Time".
15. Press "Add".

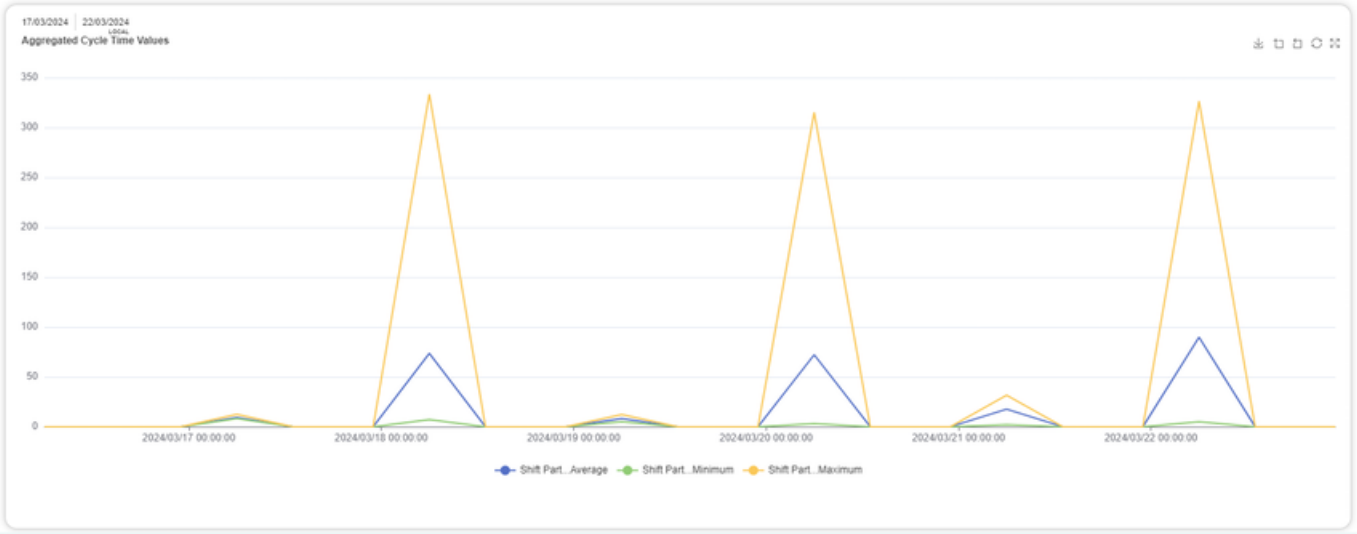


Visualization of aggregated cycle time values

You can visualize minimum, maximum or average cycle time information per shift part, shift or day level.

1. Open "Performance Monitoring".
2. Select a machine by clicking the corresponding tile.
3. Go to the Reporting tab on the "Machine Details" page.
4. Select "Line Chart".
5. Select "Part Cycle Times" from "Data source" dropdown.
6. Select "Shift part" as grouping option.

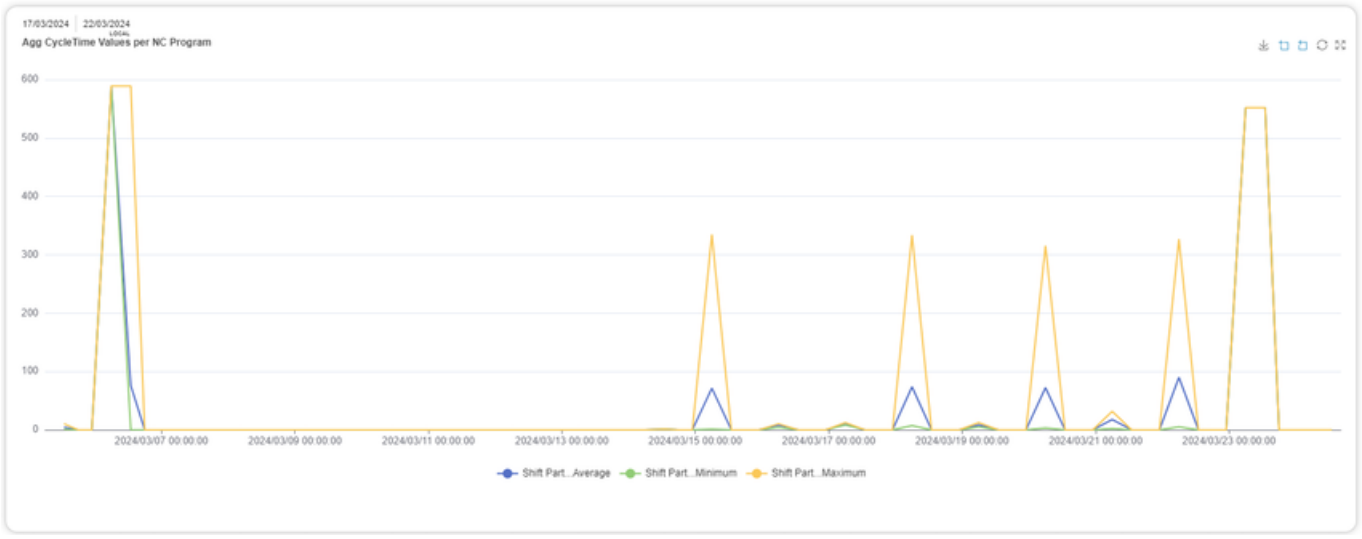
7. Select machine.
8. Select "Aggregations for Cycle Time".
9. Select "Minimum, Maximum, Average" values.
10. Press "Add".



Visualization of aggregated cycle time values per NC Program

You can visualize minimum, maximum or average cycle time information of NC Programs per shift part, shift or day level.

1. Open "Performance Monitoring".
2. Select a machine by clicking the corresponding tile.
3. Go to the Reporting tab on the "Machine Details" page.
4. Select "Line Chart".
5. Select "NC Cycle Times" from "Data source" dropdown.
6. Select "Shift part as grouping option".
7. Select machine.
8. Select an NC program.
9. Select "Minimum, Maximum, Average, Cycle Time Count, Total Cycle Time" values.
10. Press "Add".



NC Program based cycle time analysis in list view

You can visualize NC program cycle time information in a list view.

1. Open "Performance Monitoring".
2. Select a machine by clicking the corresponding tile.
3. Go to the Reporting tab on the "Machine Details" page.
4. Select "Table View".
5. Select "Result Tables" from "Data source" dropdown.
6. Select "Cycle Time Results" as table option.
7. Select machine.
8. Press "Add".

29/03/2024 | 29/03/2024
LOCAL
Table View

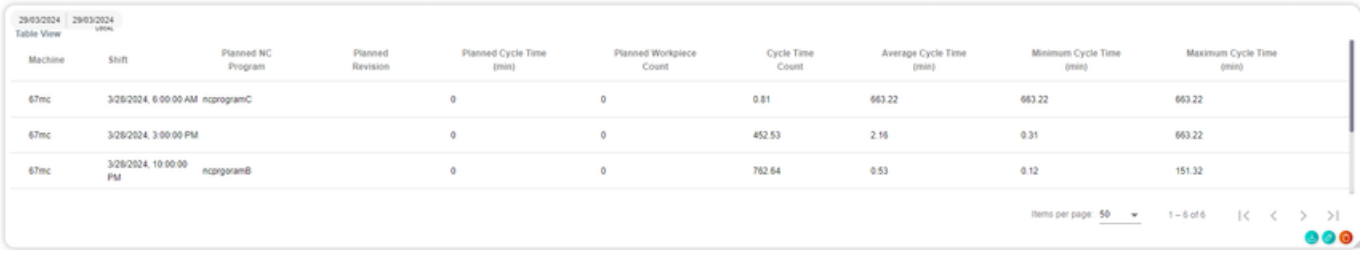
Machine	Planned NC Program	Planned Revision	Actual NC Program	Cycle Time Start	Cycle Time End	Average Cycle Time (min)	Minimum Cycle Time (min)	Maximum Cycle Time (min)
67mc	ncprgoramB		_N_SECONDCYCLEWP2_MPF	3/28/2024, 8:58:28 PM	3/29/2024, 8:47:34 AM	0.47	0.12	151.32
67mc	ncprgoramB		_N_AMPWP2_MPF	3/29/2024, 8:47:34 AM	3/29/2024, 8:57:52 AM	0.38	0.33	1.31
67mc	ncprgoramB		_N_SECONDCYCLEWP2_MPF	3/29/2024, 8:57:52 AM	3/29/2024, 9:04:30 AM	0.33	0.33	0.33
67mc	ncprgoramB		_N_AMPWP2_MPF	3/29/2024, 9:04:30 AM	3/29/2024, 9:07:17 AM	67.48	0.33	336.05
67mc	ncprgoramB		_N_SECONDCYCLEWP2_MPF	3/29/2024, 9:07:17 AM	-	0	0	0

Items per page: 50 1 – 5 of 5

Shift based cycle time analysis in list view

You can visualize shift based cycle time information in a list view.

1. Open "Performance Monitoring".
2. Select a machine by clicking the corresponding tile.
3. Go to the Reporting tab on the "Machine Details" page.
4. Select "Table View".
5. Select "Result Tables" from "Data source" dropdown.
6. Select "Cycle Time Shift Results" as table option.
7. Select machine.
8. Press "Add".



Useful KPIs

AMP supports the definition of custom KPIs. The following KPIs help you with the measurement of the system performance:

- Cycle Time Loss
  You can create a KPI that checks the production efficiency. It detects the losses during the production by calculating the total cycle time duration compared to the production time.
  Formula: Production Time - (Total Piece Count · Target Cycle Time)
- Cycle Time Performance
  You can create a KPI that compares the planned cycle time with the cycle time.
  Formula: CycleTime / Target Cycle Time

Analyze MyPerformance API

8

8.1 Token for 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 95)

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.

8.2 Providing and obtaining data via the ERP/MES systems

8.2.1 Assigning a shift plan

To ensure that information provided or obtained from the ERP/MES System are not rejected as "Unauthorized", a generated token via Identity Service must be used for the authorization.

For more information, see Token for openness interface (extension interface) (Page 335).

Prerequisite

The token must have been created.

For more information, see: Manage openness clients (Page 95)

Assigning a shift plan to a machine

POST /production-planning/v1/shiftplans

- Assigns a utilization plan to the specified machine starting from the desired date.

Procedure

1. Open the following URL (http://<IP Address of the SI5 Server>:8080/amp/shiftcalendar/api/production-planning/shiftplans).
2. Select the API method POST.
3. Insert the bearer token to the authorization field.
4. Insert the JSON file of the desired shift plan to the body field as raw data.
5. Send the request.

JSON body structure

Parameter	Description
machineName	Machine name of the preferred machine to use in the Mcenter system
planName	Name of the shift plan that is going to be assigned to the machine
startDate	Start date of the assigned shift plan (Format must be in "YYYY-MM-DD" format)
days	Contains the daily plan of the shift statuses in a JSON format.

Structure of "days" in JSON format

Parameter	Description
day	Name of the day
shifts	Contains the shift information for the day in a JSON format.

Structure of "shifts" in JSON format

Parameter	Description
order	Order of the shift
startTime	Start time of the shift
endTime	End time of the shift
shiftStatuses	Contains the status information of the shift in a JSON format.

Structure of "shiftStatuses" in JSON format

Parameter	Description
startTime	Start time of the status
endTime	End time of the status
name	Name of the status
productionInfo	Contains the targets and production information of the status in a JSON format.

Structure of "productionInfo" in JSON format

Parameter	Description
targetCycleTime	Target cycle time of the status
targetCycleTimeUnit	Unit of the entered target cycle time (Sec. Min. Hour)
targetPieceCount	Target piece number of the status
workpieceName	Name of the workpiece that is going to be used in the status
ncProgramName	Name of the NC Program that is going to be used in the status

Example JSON

Example for the Monday's first shift:

```
{
  "machineName": "Test_1",
  "planName":"ApiTemplateTest",
  "startDate": "2022-07-25",
  "days":[
    {
       "day": "MONDAY",
       "shifts": [
         {
             "order": 1,
             "startTime": "09:00",
             "endTime": "14:00",
             "shiftStatuses": [
                {
                   "startTime": "09:00",
                   "endTime": "13:00",
                   "name": "WORKING",
                   "productionInfo": {
                      "targetCycleTime": 5,
                      "targetCycleTimeUnit": "Min",
                      "targetPieceCount": 50,
                      "workpieceName": "workpieceName",
                      "ncProgramName": "ncProgramName"
                }
              },
              {
                "startTime": "13:00",
```

```
                "endTime": "14:00",
                "name": "BREAK"
              }
            ]
          }
        ]
      }
  ]
}
```

Note

Omissible attributes

You can omit the attributes "targetCycleTime", "targetCycleTimeUnit", "targetPieceCount", "workpieceName" and "ncProgramName". In this case, the default value is set to null. You can combine these attributes with the needed information later. All the other attributes are obligatory.

Exception structures

- **Not Found (404)**
  - **"Wrong URL"**
    Response:
    ```
    {
       "timestamp": "2022-08-25T10:07:04.215+0000",
       "status": 404,
       "error": "Not Found",
       "message": "No message available",
       "path": "/amp/api/production-planning/v1/shiftplans"
    }
    ```
- **Bad Request (400)**
  - **"The request body is null"**
    Response:
    ```
    {
       "code": "AMP005",
       "message": "Malformed JSON request"
    }
    ```
  - **"Not existing machine"**
    Response:
    ```
    {
       "code": "AMP003",
       "message": "Validation error. Check 'errors' field for detail
    s.",
       "detailMessage": "",
       "errors": [
         {
            "field": "machineName",
            "message": "Can not find asset information"
         }
       ]
    }
    ```
  - **"Missing machineName field"**
    Response:
    ```
    {
       "code": "AMP008",
       "message": "Validation exception!!!",
      "detailMessage": "The argument 'machineName' must not be null!"
    }
    ```

- **"Missing startDate field"**
  Response:
  ```
  {
     "code": "AMP003",
     "message": "Validation error. Check 'errors' field for detail
  s.",
     "detailMessage": "",
     "errors": [
       {
          "field": "startDate",
          "message": "Shift plan start date cannot be null"
       }
     ]
  }
  ```
- **"Invalid startDate format"**
  Response:
  ```
  {
     "code": "AMP005",
     "message": "Malformed JSON request"
  }
  ```
- **"Date of past/today"**
  Response:
  ```
  {
     "code": "AMP003",
     "message": "Validation error. Check 'errors' field for detail
  s.",
     "detailMessage": "",
     "errors": [
       {
          "field": "startDate",
          "message": "Shift plan assignment date cannot be in past
   or today"
       }
     ]
  }
  ```
- **"Missing days field"**
  Response:
  ```
  {
     "code": "AMP003",
     "message": "Validation error. Check 'errors' field for
  details.",
     "detailMessage": "",
     "errors": [
       {
          "field": "days",
          "message": "Days cannot be empty or null"
       }
     ]
  }
  ```

- **"Missing day field"**
  Response:

```
{
   "code": "AMP006",
   "message": "constraints not valid",
   "detailMessage": "",
   "errors": [
     {
        "field": "days",
        "message": "1004#Each day of the week must exist and the
re must be no duplicates"
     }
   ]
}
```

- **"Invalid Day Name"**

  Note

  Monday is set as "MONDAYY" to take response.

  Response:

```
{
   "code": "AMP005",
   "message": "Malformed JSON request",
   "detailMessage": "Can not parse value MONDAYY"
}
```

- **"Missing order field"**
  Response:

```
{
   "code": "AMP006",
   "message": "constraints not valid",
   "detailMessage": "",
   "errors": [
     {
        "field": "order",
        "message": "Shift order cannot be null"
     }
   ]
}
```

– **"Invalid shift order"**

Note

Order was set as "0" to take response.

Response:

```
{
   "code": "AMP006",
   "message": "constraints not valid",
   "detailMessage": "",
   "errors": [
     {
        "field": "days[0].shifts",
        "message": "1005#Start and end time of the shifts must
not overlap. Shift order must be between 1 and 24 and unique in
a shift."
     }
   ]
}
```

– **"Gap between shifts as an orders"**

Note

Orders were set respectively 1,3 to take response.

Response:

```
{
   "code": "AMP006",
   "message": "constraints not valid",
   "detailMessage": "",
   "errors": [
     {
        "field": "days[0].shifts",
        "message": "1005#Start and end time of the shifts must
not overlap. Shift order must be between 1 and 24 and unique in
a shift."
     }
   ]
}
```

– **"Missing startTime field"**

Response:

```
{
   "code": "AMP006",
   "message": "constraints not valid",
   "detailMessage": "",
   "errors": [
     {
        "field": "startTime",
        "message": "Shift start time can not be null"
     }
   ]
}
```

- **"Missing endTime field"**
  Response:
  ```
  {
     "code": "AMP006",
     "message": "constraints not valid",
     "detailMessage": "",
     "errors": [
       {
          "field": "endTime",
          "message": "Shift end time can not be null"
       }
     ]
  }
  ```
- **"Missing/Not Exist name field"**
  Response:
  ```
  {
     "code": "AMP012",
     "message": "Invalid shift status name !"
  }
  ```
- **"Invalid type name"**

  Note

  Type Name was set as "NotExistState" to take response.

  Response:
  ```
  {
     "code": "AMP005",
     "message": "Malformed JSON request",
     "detailMessage": "Can not parse value NotExistState"
  }
  ```
- **"Overlaping Shifts"**
  Response:
  ```
  {
     "code": "AMP006",
     "message": "constraints not valid",
     "detailMessage": "",
     "errors": [
       {
          "field": "days[0].shifts",
          "message": "1005#Start and end time of the shifts must
  not overlap. Shift order must be between 1 and 24 and unique in
  a shift."
       }
     ]
  }
  ```

- **"Invalid targetCycleTime"**
  Response:
  ```
  {
     "code": "AMP006",
     "message": "constraints not valid",
     "detailMessage": "",
     "errors": [
       {
          "field": "targetCycleTime",
          "message": "must be greater than or equal to 0"
       }
     ]
  }
  ```
- **"Invalid targetCycleTimeUnit"**

  Note

  targetCycleTimeUnit was set as "Seca" to take response.

  Response:
  ```
  {
     "code": "AMP005",
     "message": "Malformed JSON request",
     "detailMessage": "Can not parse value Seca"
  }
  ```
- **"Invalid targetPieceCount"**
  Response:
  ```
  {
     "code": "AMP006",
     "message": "constraints not valid",
     "detailMessage": "",
     "errors": [
       {
          "field": "targetPieceCount",
          "message": "Target pieces valid range is from 1 to 9999"
       }
     ]
  }
  ```
- **"Exceeding the multiplication of target pieces and target cycle time values to the planned production time"**
  Response:
  ```
  {
     "code": "AMP011",
     "message": "The multiplication of target pieces and target cy
  cle time values should not exceed the planned production time !"
  }
  ```

  - **"Wrong targetCycleTimeUnit"**
    Response:
    ```
    {
        "code": "AMP005",
        "message": "Malformed JSON request",
        "detailMessage": "Can not parse value : Secc."
    }
    ```

- **Internal Server Error (500)**
  - **"Invalid Token"**
    Response:
    ```
    {
       "timestamp": "2022-08-25T10:58:50.534+0000",
       "status": 500,
       "error": "Internal Server Error",
       "message": "Invalid access token!",
       "path": "/amp/api/production-planning/v1/shiftplans"
    }
    ```

8.2.2 Providing shift results

To ensure that information provided or obtained from the ERP/MES System are not rejected as "Unauthorized", a generated token via Identity Service must be used for the authorization.

For more information, see Token for openness interface (extension interface) (Page 335).

Prerequisite

The token must have been created.

For more information, see: Manage openness clients (Page 95)

Providing shift results to a machine

POST /production-quality/workpiece/v1/shift-result

- Provides the shift results to specified machine for the existing shift number and date

Procedure

1. Open the following URL (http://<IP Address of the SI5 Server>:8080/amp/mcenter-adapter/api/production-quality/workpiece/v1/shift-result).
2. Select the API method POST.
3. Insert the bearer token to the authorization field.
4. Insert the JSON file of the desired shift result to the body field as raw data.
5. Send the request.

JSON body structure

Parameter	Description
date	Date of the provided shift result (Format must be in "YYYY-MM-DD" format)
machineName	Machine name of the preferred machine to use in the Mcenter system
shiftNumber	Shift number of the provided shift result
goodPieceCount	Good piece count of the provided shift result
scrapPieceCount	Scrap piece count of the provided shift result

Example JSON for shift result

```
{
   "date":"2022-08-18",
   "machineName": "Test_1",
   "shiftNumber": 1,
   "goodPieceCount": 100,
   "scrapPieceCount": 10
}
```

Limitations

- In the provided data, there should be a shift plan.
- Machine Name should exist.
- Shift Number should exist in the related data.
- Good/Scrap piece count should be between [0 - 2147483647].

Exception structures

- **Not Found (404)**
  - **"Wrong URL"**
    Response:
    ```
    {
       "timestamp": "2022-08-25T14:55:54.566+0000",
       "status": 404,
       "error": "Not Found",
       "message": "No message available",
       "path": "/amp/api/production-quality/v1/shift-results"
    }
    ```
  - **"Not exist shift number in the related date"**
    Response:
    ```
    {
       "code": "AMP010",
       "message": "There is no shift with order 5"
    }
    ```
  - **"Not exist shift plan the related date"**
    Response:
    ```
    {
       "code": "AMP010",
       "message": "Shift plan not found for specified date !!!"
    }
    ```
- **Unsupported Media Type (415)**
  - **"The request body is null"**
    Response:
    "The type of the input parameters are not valid. Content type "not supported".

- **Bad Request (400)**
  - **"Missing Date field"**
    Response:
    ```
    {
       "code": "AMP003",
       "message": "Validation error. Check 'errors' field for detail
    s.",
       "detailMessage": "",
       "errors": [
         {
            "field": "date",
            "message": "Date cannot be null !"
         }
       ]
    }
    ```
  - **"Invalid Date format"**
    Response:
    ```
    {
       "code": "AMP005",
       "message": "Malformed JSON request"
    }
    ```
  - **"Invalid Date (If shift plan not exist in that date)"**
    Response:
    ```
    {
       "code": "AMP010",
       "message": "Shift plan not found for specified date !!!"
    }
    ```
  - **"Invalid Date (If date is in the future)"**
    Response:
    ```
    {
       "code": "AMP003",
       "message": "Validation error. Check 'errors' field for detail
    s.",
       "detailMessage": "",
       "errors": [
         {
            "field": "date",
            "message": "Date should be in past or present !"
         }
       ]
    }
    ```

- **"Not existing machine"**
  Response:
  ```
  {
     "code": "AMP003",
     "message": "Validation error. Check 'errors' field for detail
  s.",
     "detailMessage": "",
     "errors": [
       {
          "field": "machineName",
          "message": "Can not find asset information"
       }
     ]
  }
  ```
- **"Missing machineName field"**
  Response:
  ```
  {
     "code": "AMP008",
     "message": "Validation exception!!!",
    "detailMessage": "The argument 'machineName' must not be null!"
  }
  ```
- **"Missing shiftNumber field"**
  Response:
  ```
  {
     "code": "AMP003",
     "message": "Validation error. Check 'errors' field for detail
  s.",
     "detailMessage": "",
     "errors": [
       {
          "field": "shiftNumber",
          "message": "Shift order cannot be less than 1 !"
       }
     ]
  }
  ```
- **"ShiftNumber Less than 1"**
  Response:
  ```
  {
     "code": "AMP003",
     "message": "Validation error. Check 'errors' field for detail
  s.",
     "detailMessage": "",
     "errors": [
       {
          "field": "shiftNumber",
          "message": "Shift order cannot be less than 1 !"
       }
     ]
  }
  ```

- **"ShiftNumber more than 24"**
  Response:
  ```
  {
     "code": "AMP003",
     "message": "Validation error. Check 'errors' field for detail
  s.",
     "detailMessage": "",
     "errors": [
       {
          "field": "shiftNumber",
          "message": "Shift order cannot be greater than 24 !"
       }
     ]
  }
  ```
- **"Not exist "WORKING" type in the shift"**
  Response:
  ```
  {
     "code": "AMP010",
     "message": "There is no WORKING shift status for specified da
  te!!!"
  }
  ```
- **"Not exist field is added"**
  Response:
  ```
  {
     "code": "AMP005",
     "message": "Malformed JSON request"
  }
  ```

- **Internal Server Error (500)**
  - **"Invalid Token"**
    Response:
    ```
    {
       "timestamp": "2022-08-25T10:58:50.534+0000",
       "status": 500,
       "error": "Internal Server Error",
       "message": "Invalid access token!",
       "path": "/amp/api/production-quality/v1/shift-result"
    }
    ```

8.2.3 Getting shift based OEE

To ensure that information provided or obtained from the ERP/MES System are not rejected as "Unauthorized", a generated token via Identity Service must be used for the authorization.

For more information, see Token for openness interface (extension interface) (Page 335).

Prerequisite

The token must have been created.

For more information, see: Manage openness clients (Page 95)

Getting shift based OEE of machine

GET /production-quality/custom-kpi/v1/kpis

- Gets the shift based OEE of specified machine for the desired day

Procedure

1. Open the following URL (http://<IP Address of the SI5 Server>:8080/amp/mcenter-adapter/api/production-quality/custom-kpi/v1/kpis/{machineName}?from={Instant}&to={Instant}).
2. Select the API method GET.
3. Insert the bearer token to the authorization field.
4. Send the request.

Response structure

Parameter	Description
message	Shows the response message
machineName	Machine name of the preferred machine to use in the Mcenter system
shifts	Contains the shift information for the day in a JSON format

Structure of "shifts" in JSON format

Parameter	Description
date	Desired Date
shiftNumber	Order of the shift
kpis	Contains the KPI information for the day in a JSON format.
shiftResult	Contains the shift result information of the shift in a JSON format.

Structure of "KPIs" in JSON format

Parameter	Description
oee	Shows the overall equipment efficiency.
availability	Shows the availability.
quality	Shows the quality.
performance	Shows the performance.

Structure of "shiftResult" in JSON format

Parameter	Description
goodPieceCount	Shows the good piece count.
badPieceCount	Shows the scrap piece count.
targetPieceCount	Shows the target piece count.

Example response for the results of first shift


```
{
   "message": "Successfully got shift based kpi list",
   "machineName": "PetClient_TC_1",
   "shifts": [
     {
        "date": "2023-04-11",
        "shiftNumber": 1,
        "kpis": [
            {
                "name": "availability",
                "value": 0.61194
            },
            {
                "name": "performance",
                "value": 1.00000
            },
            {
                "name": "quality",
                "value": 1.00000
            },
            {
                "name": "sustainability",
                "value": 0.60912
            },
            {
                "name": "oee",
                "value": 0.61194
            }
        ],
        "shiftResult": {
            "goodPieceCount": 0,
            "badPieceCount": 0,
            "targetPieceCount": 0
        }
    },
```

Exception structures

- **Not Found (404)**
  - **"Wrong URL"**
    Response:
    ```
    {
       "timestamp": "2022-08-26T11:39:50.010+0000",
       "status": 404,
       "error": "Not Found",
       "message": "No message available",
       "path": "/amp/api/production-quality/v1/kpiss/Test_01"
    }
    ```
  - **"Not Exist KPI Result for the desired date"**
    Response:
    ```
    {
       "code": "AMP010",
       "message": "KPI not found for given range !"
    }
    ```
  - **"Not exist machineName"**
    Response:
    ```
    {
       "code": "AMP011",
       "message": "Can not find machine information for machineName
    : NotExistMachine"
    }
    ```
- **Bad Request (400)**
  - **"Missing "from" parameter"**
    Response:
    ```
    {
       "code": "AMP001",
       "message": "from parameter is missing"
    }
    ```
  - **"Missing "to" parameter"**
    Response:
    ```
    {
       "code": "AMP001",
       "message": "to parameter is missing"
    }
    ```
  - **"Wrong Date format"**
    Response:
    ```
    {
       "code": "AMP006",
       "message": "2022-09-03T23:00:00Zaa value for to should be of
    type class java.time.Instant"
    }
    ```
- **Internal Server Error (500)**

– **"Invalid Token"**
Response:

```
{
   "timestamp": "2022-09-19T23:05:37.768+0000",
   "status": 500,
   "error": "Internal Server Error",
   "message": "Invalid access token!",
   "path": "/amp/api/production-quality/v1/kpis/Test_1"
}
```

8.2.4 Getting average OEE/KPI

To ensure that information provided or obtained from the ERP/MES System are not rejected as "Unauthorized", a generated token via Identity Service must be used for the authorization.

For more information, see Token for openness interface (extension interface) (Page 335).

Prerequisite

The token must have been created.

For more information, see: Manage openness clients (Page 95)

Getting average OEE/KPI of machine

GET /production-quality/custom-kpi/v1/kpis/average

- Gets the average OEE of specified machine for the desired date range

Procedure

1. Open the following URL (http://<IP Address of the SI5 Server>:8080/amp/mcenter-adapter/api/production-quality/custom-kpi/v1/kpis/average/<MachineName>?from=<startDate>&to=<endDate>).
2. Select the API method GET.
3. Insert the bearer token to the authorization field.
4. Send the request.

Response structure

Parameter	Description
message	Shows the response message.
machineName	Machine name of the preferred machine to use in the Mcenter system
from	Beginning of the desired date range
to	End of the desired date range
kpi	Contains the KPI information of the shift in a JSON format.

Structure of "kpi" in JSON format

Parameter	Description
oee	Shows the overall equipment efficiency.
availability	Shows the availability.
quality	Shows the quality.
performance	Shows the performance.

Example response


```
{
   "message": "Successfully got average kpi list",
   "machineName": "PetClient_TC_1",
   "from": "2023-04-11",
   "to": "2023-04-12",
   "kpiList": [
       {
           "name": "availability",
           "value": 0.21063
       },
       {
           "name": "oee",
           "value": 0.21063
       },
       {
           "name": "performance",
           "value": 1.00000
       },
       {
           "name": "quality",
           "value": 1.00000
       },
       {
           "name": "sustainability",
           "value": 0.60912
       }
   ]
}
```

Exception structures

- **Not Found (404)**
  - **"Wrong URL"**
    Response:
    ```
    {
       "timestamp": "2022-08-26T12:49:44.893+0000",
       "status": 404,
       "error": "Not Found",
       "message": "No message available",
       "path": "/amp/api/production-quality/v1/average-oees/Test_01"
    }
    ```
  - **"Not exist machineName"**
    Response:
    ```
    {
       "code": "AMP011",
       "message": "Can not find machine information for machineName
    : NotExistMachine"
    }
    ```
- **Bad Request (400)**
  - **"Missing "from" parameter"**
    Response:
    ```
    {
       "code": "AMP001",
       "message": "from parameter is missing"
    }
    ```
  - **"Missing "to" parameter"**
    Response:
    ```
    {
       "code": "AMP001",
       "message": "to parameter is missing"
    }
    ```
  - **"Wrong Date format"**
    Response:
    ```
    {
       "code": "AMP006",
       "message": "2022-09-10aa value for to should be of type class
     java.time.LocalDate"
    }
    ```
- **Internal Server Error (500)**
  - **"Invalid Token"**
    Response:
    ```
    {
       "timestamp": "2022-09-19T23:04:58.428+0000",
       "status": 500,
       "error": "Internal Server Error",
       "message": "Invalid access token!",
       "path": "/amp/api/production-quality/v1/kpis/average/Test_1"
    }
    ```

8.2.5 Getting granular OEE/KPI

To ensure that information provided or obtained from the ERP/MES System are not rejected as "Unauthorized", a generated token via Identity Service must be used for the authorization.

For more information, see Token for openness interface (extension interface) (Page 335).

Prerequisite

The token must have been created.

For more information, see: Manage openness clients (Page 95)

Getting granular OEE/KPI of machine

GET /production-quality/custom-kpi/v1/kpis/granular

- Gets the granular OEE of specified machine for the desired date range with desired granular

Procedure

1. Open the following URL (http://<IP Address of the SI5 Server>:8080/amp/mcenter-adapter/api/production-quality/custom-kpi/v1/kpis/granular/<MachineName>?from=<StartDate>&to=<EndDate>&intervalUnit=<Granular>).
2. Select the API method GET.
3. Insert the bearer token to the authorization field.
4. Send the request.

Response structure

Parameter	Description
message	Shows the response message.
payload	Contains the KPI information of the shift in a JSON format.

Structure of "payload" in JSON format

Parameter	Description
start	Shows the overall equipment efficiency.
end	Shows the availability.
kpi	Contains the KPI information for the day in a JSON format.

Structure of "kpi" in JSON format

Parameter	Description
oee	Shows the overall equipment efficiency.
availability	Shows the availability.

Parameter	Description
quality	Shows the quality.
performance	Shows the performance.

Example response


```
{
   "message": "Successfully got granular kpi list",
   "payload": [
       {
           "start": "2023-04-11",
           "end": "2023-04-12",
           "kpiList": [
               {
                   "name": "oee",
                   "value": 38.7100
               },
               {
                   "name": "availability",
                   "value": 38.7100
               },
               {
                   "name": "performance",
                   "value": 100.0000
               },
               {
                   "name": "quality",
                   "value": 100.0000
               },
               {
                   "name": "sustainability",
                   "value": 119.2600
               }
           ]
       }
   ]
}
```

Exception structures

- **Not Found (404)**
  - **"Wrong URL"**
    Response:
    ```
    {
       "timestamp": "2022-08-26T13:42:40.253+0000",
       "status": 404,
       "error": "Not Found",
       "message": "No message available",
      "path": "/amp/api/production-quality/v1/granular-oees/Test_01"
    }
    ```
  - **"Not exist machineName"**
    Response:
    ```
    {
       "code": "AMP011",
       "message": "Can not find machine information for machineName
    : NotExistMachine"
    }
    ```
- **Bad Request (400)**
  - **"Missing "from" parameter"**
    Response:
    ```
    {
       "code": "AMP001",
       "message": "from parameter is missing"
    }
    ```
  - **"Missing "to" parameter"**
    Response:
    ```
    {
       "code": "AMP001",
       "message": "to parameter is missing"
    }
    ```
  - **"Missing "intervalUnit" parameter"**
    Response:
    ```
    {
       "code": "AMP001",
       "message": "intervalUnit parameter is missing"
    }
    ```
  - **"Wrong Date format"**
    Response:
    ```
    {
       "code": "AMP006",
       "message": "2022-09-10aa value for to should be of type class
     java.time.LocalDate"
    }
    ```

- **"Exceeding Max Date Range"**
  Response:
  ```
  {
     "code": "AMP007",
     "message": "Bad request exception!!!",
     "detailMessage": "Query dates are not valid. Date range shoul
  d be max 730 days."
  }
  ```
- **"Wrong interval Unit"**
  Response:
  ```
  {
     "code": "AMP012",
     "message": "Wrong intervalUnit format. Should be one of [day,
  week,month,quarter,year]"
  }
  ```

- **Internal Server Error (500)**
  - **"Invalid Token"**
    Response:
    ```
    {
       "timestamp": "2022-09-19T23:04:10.882+0000",
       "status": 500,
       "error": "Internal Server Error",
       "message": "Invalid access token!",
       "path": "/amp/api/production-quality/v1/kpis/granular/Test_1"
    }
    ```

8.2.6 Adding custom state

To ensure that information provided or obtained from the ERP/MES System are not rejected as "Unauthorized", a generated token via Identity Service must be used for the authorization.

For more information, see Token for openness interface (extension interface) (Page 335).

Prerequisite

The token must have been created.

For more information, see: Manage openness clients (Page 95)

Adding custom state

POST /production-planning/v1/shiftstatus

- Send the custom state.

Procedure

1. Open the following URL (http://<IP Address of the SI5 Server>:8080/amp/api/production-planning/v1/shiftstatus).
2. Select the API method POST.
3. Insert the bearer token to the authorization field.
4. Insert the JSON file of the desired custom state to the body field as raw data.
5. Send the request.

JSON body structure

Parameter	Description
name	Name of custom state (Max. 200 characters)
color	Color of the custom state (Format must be in "#XXXXXX" format) (X can be [0,9] and [a,f])
mappedStatus	Name of predefined states (WORKING, BREAK, FREETIME, MAINTENANCE)

Limitations

- State name must be unique.
- State name contains maximum 200 characters.
- Existent mapped status should be used (WORKING, BREAK, FREETIME, MAINTENANCE).

Example JSON

```
{
   "name":"New Custom State",
   "color":"#a34b53",
   "mappedStatus":"WORKING"
}
```

Exception structures

- **Not Found (404)**
  - **"Wrong URL"**
    Response:

```
{
   "timestamp": "2022-09-19T22:09:57.229+0000",
   "status": 404,
   "error": "Not Found",
   "message": "No message available",
   "path": "/amp/api/production-planning/v1/
shiftstatusNotExistPath"
}
```

- **Bad Request (400)**
  - **"Missing "name" field"**
    Response:

```
{
   "code": "AMP003",
   "message": "Validation error. Check 'errors' field for detail
s.",
   "detailMessage": "",
   "errors": [
     {
        "field": "name",
        "message": "Status name cannot be empty or null."
     }
   ]
}
```

  - **"Missing "color" field"**
    Response:

```
{
   "code": "AMP003",
   "message": "Validation error. Check 'errors' field for detail
s.",
   "detailMessage": "",
   "errors": [
     {
        "field": "color",
        "message": "Color cannot be empty or null."
     }
   ]
}
```

- **"Missing "mappedStatus" field" (will be updated)**
  Response:
```
{
   "code": "AMP003",
   "message": "Validation error. Check 'errors' field for detail
s.",
   "detailMessage": "",
   "errors": [
     {
        "field": "name",
        "message": "Status name cannot be empty or null."
     }
   ]
}
```
- **Custom State has more than 200 characters**
  Response:
```
{
   "code": "AMP003",
   "message": "Validation error. Check 'errors' field for detail
s.",
   "detailMessage": "",
   "errors": [
     {
        "field": "name",
        "message": "Status name length should be max 200 charact
ers."
     }
   ]
}
```
- **Try to Add Same Custom State Name**
  Response:
```
{
   "code": "AMP012",
   "message": "2400#The shift status with given name already
exists."
}
```
- **Try to Add Not Exist Mapped Status**
  Response:
```
{
   "code": "AMP005",
   "message": "Malformed JSON request",
   "detailMessage": "Can not parse value : NotExistMappedStatus.
Type should be one of [ WORKING MAINTENANCE FREETIME BREAK ]"
}
```
- **Sending the Wrong Json Structure**
  Response:
```
{
   "code": "AMP005",
   "message": "Malformed JSON request"
}
```

- **Sending the Fifty First**
  Response:

  ```
  {
     "code": "AMP012",
     "message": "2500#Cannot exceed max number of allowed shift st
  atuses"
  }
  ```


- **Internal Server Error (500)**
  - **"Invalid Token"**
    Response:

    ```
    {
       "timestamp": "2022-09-19T23:03:19.178+0000",
       "status": 500,
       "error": "Internal Server Error",
       "message": "Invalid access token!",
       "path": "/amp/api/production-planning/v1/shiftstatus"
    }
    ```


8.2.7 Getting all custom states

To ensure that information provided or obtained from the ERP/MES System are not rejected as "Unauthorized", a generated token via Identity Service must be used for the authorization.

For more information, see Token for openness interface (extension interface) (Page 335).

Prerequisite

The token must have been created.

For more information, see: Manage openness clients (Page 95)

Getting all custom states

GET /production-planning/v1/shiftstatus

- Gets the all active custom states.

Procedure

1. Open the following URL (http://<IP Address of the SI5 Server>:8080/amp/api/production-planning/v1/shiftstatus).
2. Select the API method GET.
3. Insert the bearer token to the authorization field.
4. Send the request.

Response structure

Parameter	Description
payload	Contains all active custom states in a JSON format.

Structure of "payload" in JSON format

Parameter	Description
name	Name of the custom state
color	Color of the custom state
mappedStatus	Name of predefined states (WORKING, BREAK, FREETIME, MAINTENANCE)

Example responses

```
{
   "payload": [
     {
       "name": "WORKING",
       "color": "#5dbebe",
       "mappedStatus": "WORKING"
     },
     {
       "name": "BREAK",
       "color": "#bcc9cc",
       "mappedStatus": "BREAK"
     } ,
     {
       "name": "New Custom State_1",
       "color": "#345327",
       "mappedStatus": "WORKING"
     }...
```

Exception structures

- **Not Found (404)**
  - **"Wrong URL"**
    Response:
    ```
    {
       "timestamp": "2022-09-19T22:54:12.048+0000",
       "status": 404,
       "error": "Not Found",
       "message": "No message available",
       "path": "/amp/api/production-planning/v1/
    shiftstatusNotExistPath"
    }
    ```
- **Internal Server Error (500)**
  - **"Invalid Token"**
    Response:
    ```
    {
       "timestamp": "2022-09-19T23:03:19.178+0000",
       "status": 500,
       "error": "Internal Server Error",
       "message": "Invalid access token!",
       "path": "/amp/api/production-planning/v1/shiftstatus"
    }
    ```

8.2.8 Orders

Overview

To ensure that information provided or obtained from the ERP/MES System are not rejected as "Unauthorized", a generated token via Identity Service must be used for the authorization.

For more information, see Token for openness interface Machine tags (Page 300).

Prerequisite

The token must have been created.

For more information, see: Manage openness clients (Page 95)

Sending Orders

POST /production-planning/mcenter-adapter/v1/fetch-order provides the orders to the specified machine for existing shift plans.

Procedure

1. Open the following URL: http://<IP Address of the SI5 Server>:8080/amp/api/production-planning/mcenter-adapter/v1/fetch-order (http://<IP Address of the SI5 Server>:8080/amp/api/production-planning/mcenter-adapter/v1/fetch-order)
2. Select the API method POST.
3. Insert the bearer token to the authorization field.
4. Insert the JSON file of the desired shift result to the body field as raw data.
5. Send the request.

JSON body structure

Parameter	Description
sequenceNumber	Order no
description	Order description
plannedStartDateMin	Planned order start date minimum
plannedStartDateMax	Planned order start date maximum
plannedEndDateMin	Planned order end date minimum
plannedEndDateMax	Planned order end date maximum
timePerUnit	Preparation time for per Unit
timeForPreparation	Preparation time for All Units
actualStartDate	Actual start date
actualEndDate	Actual end date
state	"Created", "Started", "PartialAcknowledged", "Acknowledged","Canceled", "OnHold", "Deleted"
confirmationNumber	Confirmation number
priority	Priority number
workOrderID	Workorder id
lotSize	Order size as a piece count
material	Order material
assignedMachineID	Machine id

Example JSON for shift result


```
{
    "sequenceNumber": "12345",
    "description": "Sample work sequence",
    "plannedStartDateMin": "2023-09-16T04:00:00.000Z",
    "plannedStartDateMax": "2023-09-16T10:00:00.000Z",
    "plannedEndDateMin": "2023-09-16T10:15:30.123Z",
    "plannedEndDateMax": "2023-09-17T04:00:00.000Z",
    "timePerUnit": 6,
    "timeForPreparation": 770,
    "actualStartDate": "2023-09-16T10:15:30.123Z",
    "actualEndDate": "2023-09-16T15:15:30.123Z",
    "state": "Created",
    "confirmationNumber": "Confinmartion number 123",
    "priority": 1,
    "workOrderID": "order id",
    "lotSize": 100,
    "material": "Titanium",
    "assignedMachineID": "b12b3541-ba41-ee11-8de7-005056a1a69c"
}
```


Limitations

- "**plannedEndDateMax**" minus **"plannedStartDateMin"** must be maximum **24 hours**
- **plannedStartDateMin :** it must be in the future
- **plannedStartDateMax :** it must be in the future and forward from "plannedStartDateMin"
- **plannedEndDateMin :** it must be in the future and backward from "plannedEndDateMax"
- **plannedEndDateMax :** it must be in the future
- **"timePerUnit" X "lotSize"** must be lower than **"Sum of Shift durations"**

Exception structures

Not found

- Wrong URL

Response:


```
<title>HTTP Status 404 – Not Found</title>
```


- **Not exist machine**

Response:


```
{
    "code": "AMP011",
    "message": "Work day plan or machine not found!"
}
```


- Not exist shift plan

Response:


```
{
    "code": "AMP011",
```

```
    "message": "Work day plan or machine not found!"
}
```

Bad Request (400)

- Inappropriate JSon

Response:

```
{
    "code": "AMP005",
    "message": "Malformed JSON request",
    "detailMessage": ""
}
```

- If "timePerUnit" X "lotSize" bigger than "Sum of Shift durations

Response:

```
{
    "code": "AMP012",
   "message": "Planned production time "Sum of Shift durations"is lower then
required time "timePerUnit" X "lotSize""
}
```

- If "plannedEndDateMax" minus "plannedStartDateMin" more than 24 hours

Response:

```
{
    "code": "AMP012",
    "message": "Order dates are not proper !"
}
```

- If dates are in the past

Response:

```
{
    "code": "AMP012",
    "message": "Order dates are not proper !"
}
```

- Unexceptional state

Response:

```
{
    "code": "AMP005",
    "message": "Malformed JSON request",
    "detailMessage": "Can not parse value : Createds."
}
```

Unathorized (401)

- Invalid Token

Response:

```
{
    "code": "AMP111",
    "message": "Invalid access token!"
}
```

- Without Token

Response:

```
{
    "code": "AMP111",
    "message": "No valid token found within the request"
}
```

8.3 Obtaining machine data via API

This API allows users to retrieve machine data from Analyze MyPerformance.

Prerequisite

The token must have been created.

For more information, see: Manage openness clients (Page 95)

Getting machine data

GET /amp/api/machine-data

- This API provides machine data by considering machineID and desired date

Procedure

1. Open the following URL (https://<IP Address of the SI5 Server>:8443/amp/api/machine-data/{machineId}?startTime={startTime}&endTime={endTime}).
2. Select the API method GET (URL).
3. Insert the bearer token to the authorization field.
4. Make sure the related Machine ID is correct on URL.
5. Send the request.

Note

Default port

Be aware that the default port of Analyze MyPerformance application is 8443 if Mcenter is installed with https. If you are using http, the default port of Analyze MyPerformance is 8080.

Request Parameter

Parameter	Description
startTime	Start Time of the requested time range (Format must be in "YYYY-MM-DDTHH:mm:ss.SSSSSSZ" format)
endTime	End Time of the requested time range (Format must be in "YYYY-MM-DDTHH:mm:ss.SSSSSSZ" format)

Example request

Sample Machine ID : 5d07afc2-ce15-4d9c-9ca1-52ff6e6f29fd

https://<IP Address of the SI5 Server>:8443/amp/api/machine-data/5d07afc2-ce15-4d9c-9ca1-52ff6e6f29fd?startTime=2024-04-12T05:36:18.60Z&endTime=2024-04-18T13:05:26.60Z

Sample response:


```
{
    "data": [
        {
            "st": "2024-04-18T07:31:13.494Z",
            "ct": "2024-04-18T07:31:13.494Z",
            "v": "[{\"n\":\"Feedoverride\",\"v\":\"90.00001\"},
{\"n\":\"Spindleoverride\",\"v\":\"100.000000\"},
{\"n\":\"NCProgramStatus\",\"v\":\"3\"},
{\"n\":\"StopCond\",\"v\":\"11\"},
{\"n\":\"NCProgram\",\"v\":\"_N_AMPWP2_SPF\"},
{\"n\":\"Opmode\",\"v\":\"2\"},
{\"n\":\"ProtectionLevel\",\"v\":\"1\"},
{\"n\":\"NrOfAlarms\",\"v\":\"4\"},
{\"n\":\"CycleTime\",\"v\":\"0\"}]"
        }
    ],
    "mid": "5d07afc2-ce15-4d9c-9ca1-52ff6e6f29fd",
    "lt": "2024-04-18T07:31:13.494Z"
}
```


Note

If the request is empty and the response code is 200, there are a few steps to see data. You need to implement the following steps to see data on the machine:

1. **Work Plan Assignment:** Ensure that a work plan has been assigned to the machine.
2. **Data Acquisition Enabled:** Data acquisition must be enabled for the related machine.

Exception Structures

- **Wrong URL (Response code : 404)**
  - Response:
    ```
    {
        HTTP Status 404 – Not Found
    }
    ```
- **Missing Machine ID (Response code : 500)**
  - Response :
    ```
    "No static resource api/machine-data."
    ```

- **Invalid Machine ID (Response code : 200)**
  - Response :

```
{
    "message": "There is no data for machineId:2222-
ce15-4d9c-9ca1-52ff6e6f29fd startTime:2024-04-12T05:36:18.596Z
endTime:2024-04-18T13:05:26.815Z"
}
```

- **Missing Start Time (Response code 400)**
  - Response :

```
{
    "message": "Missing parameter"
}
```

- **Missing End Time (Response code 400)**
  - Response :

```
{
    "message": "Missing parameter"
}
```

Mendix integration

9

9.1 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.

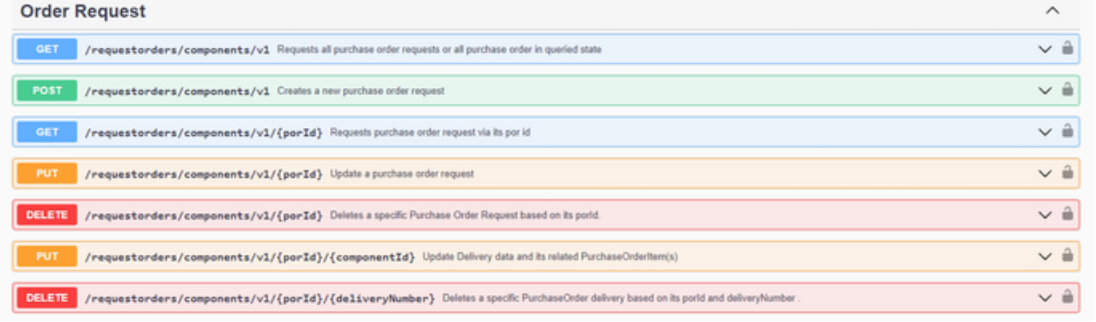
9.2 Authentication

The Mcenter server uses OAuth2 for authentication. Getting data from the server requires an access token. Access tokens can be acquired via API access.

Keep in mind that the API access 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.

9.2.1 Creating an API access

Procedure

1. To create an API access, start the "Manage API access" application.
2. Click on "Create".
3. Name your client.
4. Click on "Confirm & Download".
5. The downloaded file contains the credentials of the API access.

9.2.2 Acquiring an access token

You can acquire tokens by sending a REST request to the server's token endpoint with the credentials of the API access.

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.

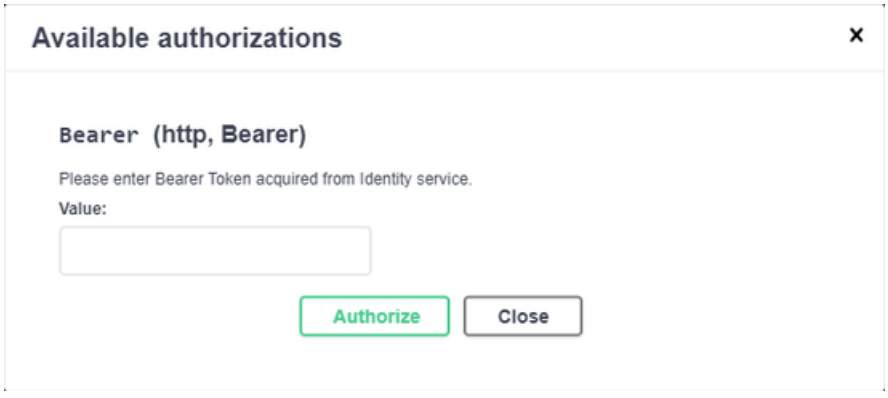
9.2.3 Using the access token

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>

To use the access token via Swagger page, only copy the access token:

Authorization: <insert access token here>



9.3 Using the openness client in Mendix

9.3.1 Storing the API access

The credentials of the API access need to be stored in the Mendix application. You can store the contents of the "OpenAPIClientCredentials.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.

9.3.2 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 API access.

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

9.3.3 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.

9.3.4 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.

9.4 Using the provided Mendix authentication module

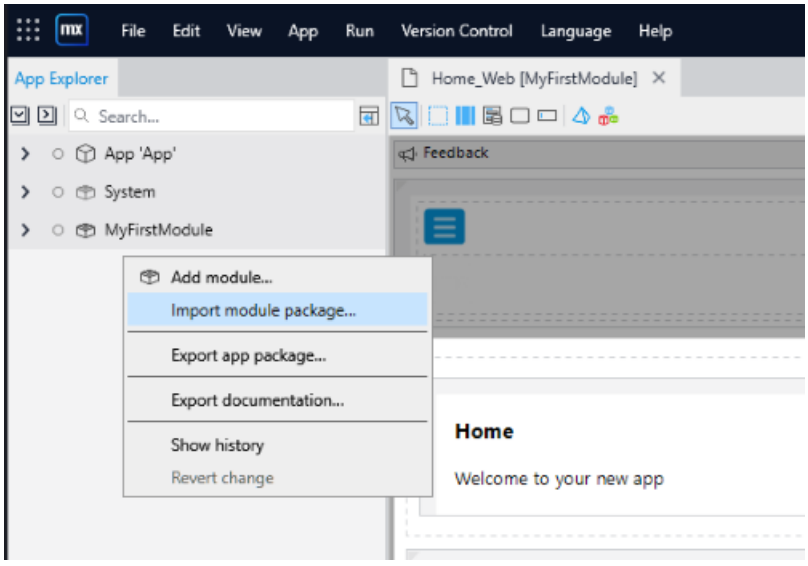
Prerequisite

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.

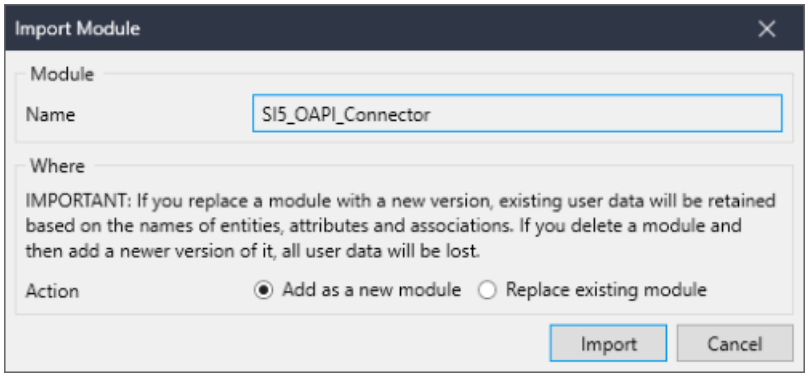
9.4.1 Installing the module

Procedure

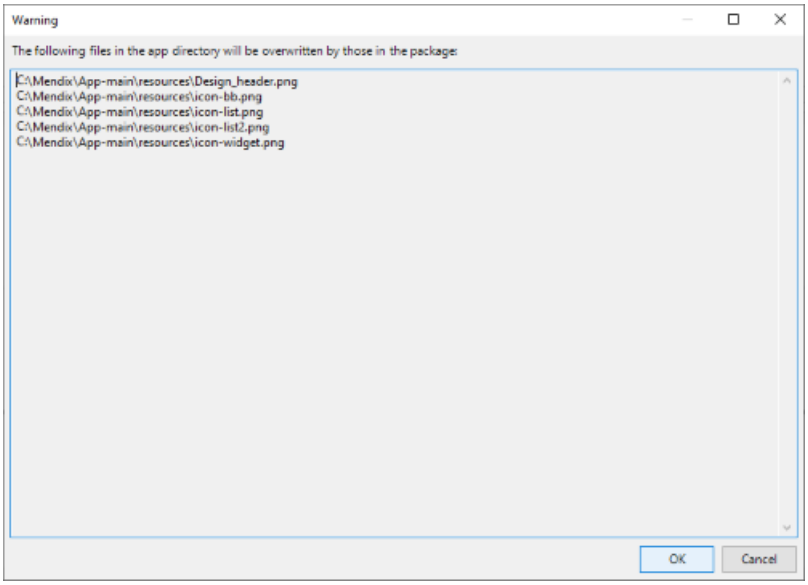
1. To import the authentication module into your Mendix application, right click on the empty space in the App Explorer view and select "Import module package".
   Select your package file (SI5_OAPI_Connector.mpk) and click "Open".



2. The "Import Module" window opens.
   Select the "Add as a new module" action and click on the "Import" button.



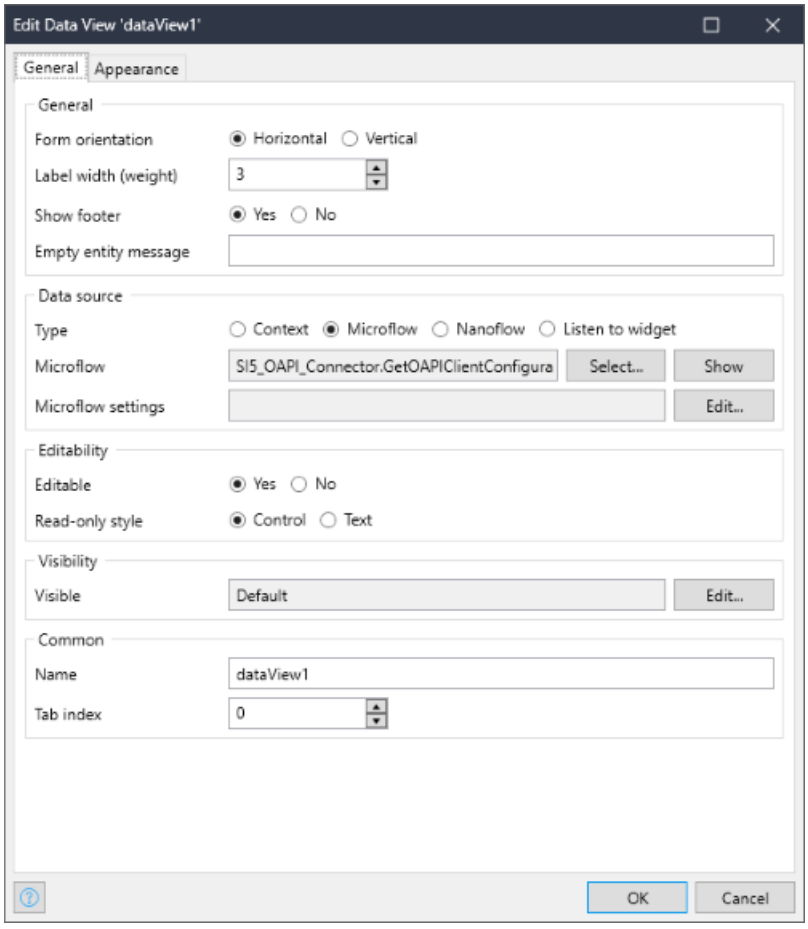
3. Click on the "OK" button to acknowledge the following warning:


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

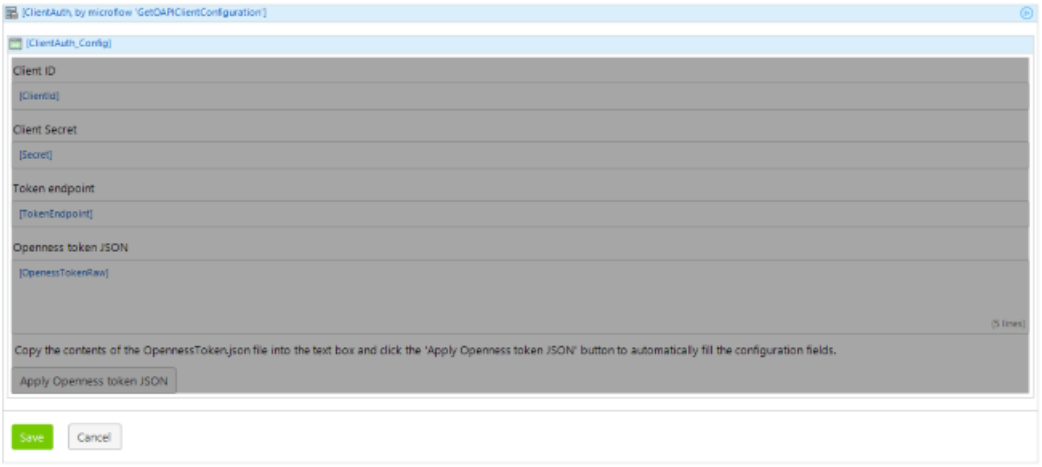
9.4.2 Setting up authentication

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"



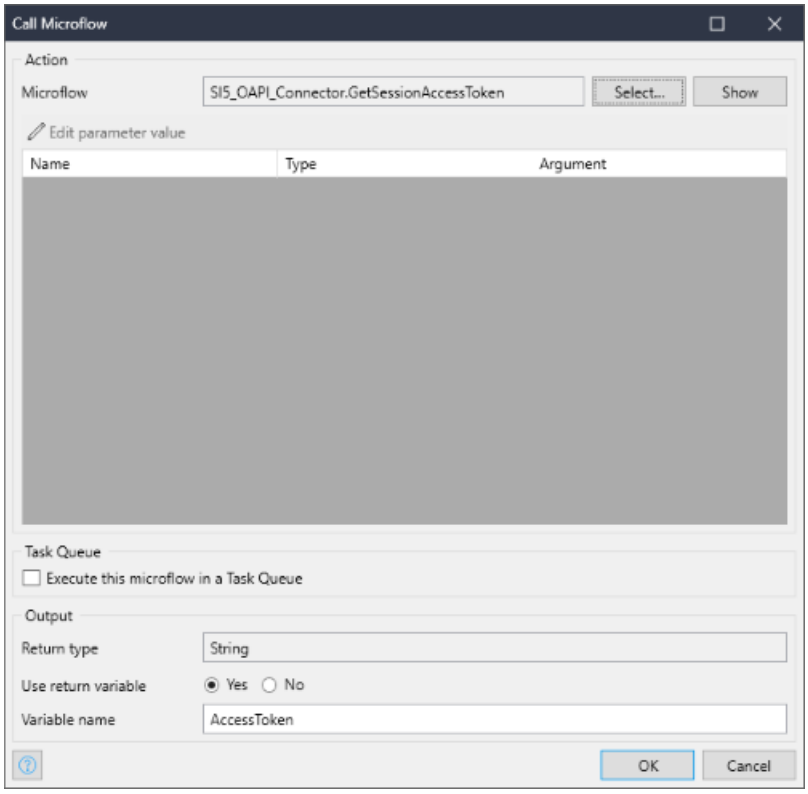
3. Add the "ClientAuth_Config" snippet from the "_USE ME" folder in the connector module, a "Save" and a "Cancel" button to the data view. The end result should look like the following:


[ClientAuth, by microflow 'GetOAPIClientConfiguration']
[ClientAuth_Config]
Client ID
[ClientId]
Client Secret
[Secret]
Token endpoint
[TokenEndpoint]
Openness token JSON
[OpenessTokenRaw]
(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

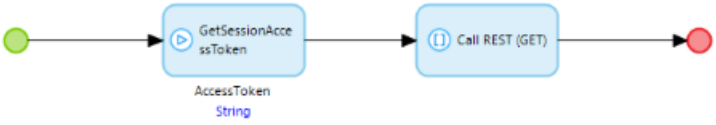
9.4.3 Accessing Mcenter open API

Procedure

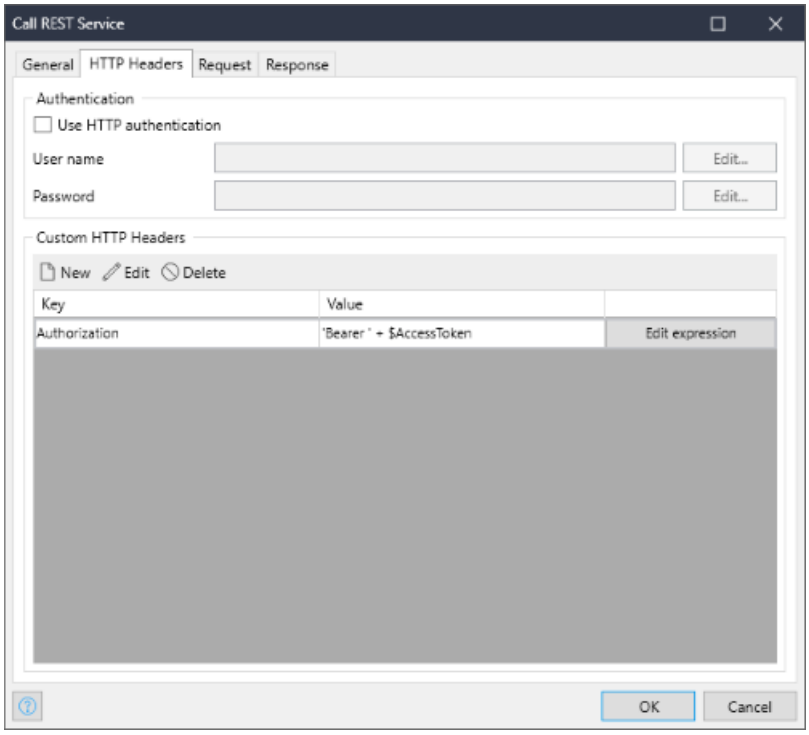
1. To insert the proper authorization header into your REST call, in your microflow, add a "Microflow call" activity before "Call REST".
   Configure it to run the "SI5_OAPI_Connector.GetSessionAccessToken" microflow. The returned string should be stored in a variable. In this example, the variable name "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 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

A.2 Controller addresses

Controller	Variable name	Address	Aspect name
SINUMERIK	Feedoverride	/Channel/State/feedRateIpoOvr[u1]	CH1_BasicConfig
	Spindleoverride	/Channel/Spindle/speedOvr[u1,1]	CH1_BasicConfig
	NCProgramStatus	/Channel/State/progStatus[u1]	CH1_BasicConfig
	StopCond	/Channel/State/stopCond[u1]	CH1_BasicConfig
	Opmode	/Bag/State/opMode[u1] CH1_BasicConfig	CH1_BasicConfig
	ProtectionLevel	/Nck/Configuration/accessLevel	CH1_BasicConfig
	NrOfAlarms	/Nck/State/numAlarms[u1]	CH1_BasicConfig
FANUC	Feedoverride	ext::fanuc::/pmc/address/data/G/byte/ address[12]	CH1_BasicConfig
	NCProgramStatus	ext::fanuc::/ cnc/info/status#automatic_operation	CH1_BasicConfig
	StopCond	ext::fanuc:: /cnc/info/status#automatic_operation	CH1_BasicConfig
	Opmode	ext::fanuc:: /cnc/info/status#automatic_manual_mode_selection	CH1_BasicConfig
	NCProgram	ext::fanuc:: /cnc/program/path	CH1_BasicConfig
HEIDENHAIN	Feedoverride	ext::heidenhain::\DNC\feed\override	CH1_BasicConfig
	NCProgramStatus	ext::heidenhain::\DNC\program\status	CH1_BasicConfig
	NCProgramStatus	ext::heidenhain::\DNC\execution\mode	CH1_BasicConfig
	StopCond	ext::heidenhain::\DNC\program\status	CH1_BasicConfig

A.3 Definitions of SINUMERIK Variables

This section provides definitions for:

- NC Program Status
- Opmode
- StopCond
- ProtectionLevel encountered during operation

These are represented by numbers in the machine: 0,1,2 and etc.

Example

If machine data includes "NCProgramStatus": "3" means, that NC Program is running. The table below shows mapping with data and status.

Value	NC program status
1	Suspended
2	Stopped
3	Running
4	Waiting
5	Cancelled

Value	Operation mode
0	JOG
1	MDA
2	Automatic Mode

Value	Stop condition
1	NC not ready
2	Operation Mode not ready
3	Emergency Stop active
4	Alarm with NC stop active
26	Wait for position control
30	Wait for save operation
31	No channel ready
46	Rapid retraction activated
...	Additional Codes see SINUMERIK documentation

Value	Protection Level
0	Access Level - SIEMENS
1	Password Level - Development
2	Password Level - Commissioning Engineers
3	Password Level - Service
4	Keylock 3 Level - Programmer
5	Keylock 2 Level - Qualified Operator
6	Keylock 1 Level - Trained Operator
7	Keylock 0 Level - Operator

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