SIEMENS

SINUMERIK

MindSphere application Analyze MyPerformance /OEE monitor

Function Manual

Valid for control systems:
SINUMERIK 840D sl / 840DE sl
SINUMERIK 828D

Software
Analyze MyPerformance /OEE Monitor Version 1.1

04/2019
A5E45609856B AA

Legal information

Warning notice system

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

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

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

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

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

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

Qualified Personnel

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

Proper use of Siemens products

Note the following:

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

Trademarks

All names identified by ® are registered trademarks of Siemens AG. The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

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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Preface

SINUMERIK documentation

The SINUMERIK documentation is organized into the following categories:

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

Additional information

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

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

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

mySupport/Documentation

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

Training

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

FAQs

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

SINUMERIK

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

Target group

This publication is intended for:

- Project engineers
- Technologists (from machine manufacturers)
- Commissioning engineers (systems/machines)
- Programmers
- Users

Benefits

The function manual describes the functions so that the target group knows them and can select them. It provides the target group with the information required to implement the functions.

Standard scope

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

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

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

Note regarding the General Data Protection Regulation

Siemens respects the principles of data privacy, in particular the data minimization rules (privacy by design). This means the following for this product:

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

Technical Support

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

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Fundamental safety instructions 1

1.1 General safety instructions

⚠ WARNING

Danger to life if the safety instructions and residual risks are not observed

If the safety instructions and residual risks in the associated hardware documentation are not observed, accidents involving severe injuries or death can occur.

- Observe the safety instructions given in the hardware documentation.
- Consider the residual risks for the risk evaluation.

⚠ WARNING

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.

1.2 Warranty and liability for application examples

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

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

1.3 Industrial security

Note

Industrial security

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

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement – and continuously maintain – a holistic, state-of-the-art industrial security concept. Products and solutions from Siemens 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. using firewalls and/or network segmentation) are in place.

For additional information on industrial security measures that can be implemented, please visit:

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

Siemens' products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they become available, and that only 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 Security RSS Feed at:

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

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 holistic, state-of-the-art industrial security concept for the installation or machine.
- Make sure that you include all installed products into the holistic industrial security concept.
- Protect files stored on exchangeable storage media from malicious software by with suitable protection measures, e.g. virus scanners.
- On completion of commissioning, check all security-related settings.
- Protect the drive against unauthorized changes by activating the "Know-how protection" converter function.

Introduction 2

2.1 Overview

This document describes the following:

How you connect MindSphere to the SINUMERIK control system (machine tool).
Additional information is provided in Chapter: Setting up the SINUMERIK control system for Analyze MyPerformance /OEE Monitor (Page 15).

The functionality of the "Analyze MyPerformance /OEE Monitor" MindSphere application.
Additional information is provided in Chapter: Working with Analyze MyPerformance /OEE Monitor (Page 71).

MindSphere

MindSphere is a cloud-based, open IoT operating system from Siemens, which connects your SINUMERIK control system and physical infrastructure with the digital world. This allows you a complete overview of your data at all times.

Several MindSphere-based applications, known as the MindSphere applications, are available.

MindSphere application	Description
Asset Manager	Connect your tool machine (asset) with the MindSphere in the "Asset Manager" and configure the data acquisition. Additional information is provided in Chapter: Asset Manager (Page 48) A detailed description is provided in the System Manual: MindSphere, Section: Asset Manager.
Analyze MyPerformance /OEE Monitor	Use "Analyze MyPerformance /OEE Monitor" to visualize, monitor and analyze the performance of all of your machine tools connected to MindSphere. More information is provided in Chapter: Working with Analyze MyPerformance /OEE Monitor (Page 71).

References

A description of the other MindSphere applications can be found in the following reference:

- MindSphere - Getting Started
- MindSphere System Manual
- Fleet Manager System Manual

In addition to the manuals, you can also find data sheets and FAQs at the following link:
MindSphere (https://support.industry.siemens.com/cs/de/en/view/109742256)

Additional information regarding MindSphere applications is available at the following link:
MindSphere documentation (https://documentation.mindsphere.io/index.html#/kiosk/en)

2.2 System requirements

Hardware and operating software

SINUMERIK 840D sl

SINUMERIK Integrate Client Software Version	Operating software SINUMERIK Operate Version	Hardware version	Operating system
02.00.00.11 02.00.00.12	4.5 SP4, HF 1, 2, 3, 4, 4.5 SP5, HF 1, 3, 5 4.5 SP6, HF 3, 5, 7, 8, 10, 11, 13 14, 15	NCU 730.3 PN	Linux
		PCU 50.5	Windows 7
	4.5 SP6 HF 1, 12	NCU 730.3 PN	Linux
	4.5 SP6 HF 2	PCU 50.5	Windows 7
03.00.00.11 03.00.00.12	4.7 SP2 HF 1, 3, 4	NCU 730.3 PN	Linux
	4.7 SP3, HF 1, 2, 3, 4 4.7 SP4, HF 1, 4, 6 4.7 SP5, HF 1 4.7 SP6, HF 1, 3, 4, 5 4.8 SP1, HF 1, 2, 3 4.8 SP2, HF 1, 3 4.8 SP3, HF 1	PCU 50.5	Windows 7
	4.7 SP4 HF 3, 5	NCU 730.3 PN	Linux

SINUMERIK 828D

SINUMERIK Integrate Client Software Version	Operating software SINUMERIK Operate Version	Hardware version	Operating system
02.00.00.11 02.00.00.12	4.5 SP4 4.5 SP5, HF 1, 2 4.5 SP6, HF 1, 2, 3, 4	PPU 281.3 PPU 241.3	Linux
03.00.00.11 03.00.00.12	4.7 SP2, HF1 4.7 SP3, HF1 4.7 SP4, HF1, 2 4.7 SP5 4.7 SP6, HF1		

Operating PC

Processor	1 GHz processor
RAM (GB)	4
Free hard disk capacity (GB)	1
Operating systems	Windows 7 SP1 (x64) Professional/Enterprise/Ultimate Windows 10 (x64) Pro/Enterprise
Screen resolution	At least 1980 x 1080 pixels

Web browser

You can use the following web browsers:

- Chrome
  Version from 68.0.3440.84 (32 bit) up to the current version
- Firefox
  Version 59.9.0 (32 bit) up to the current version
- Safari for tablets
  iOS and Android systems are supported for the current version and 10 inch tablet size

Safety instructions

Note

Connecting SINUMERIK control systems to MindSphere

Connecting SINUMERIK control systems to MindSphere via TLS 1.2/https complies with the highest security standards.

SINUMERIK versions that do not meet these standards are not part of the product. For these versions, additional security measures must be taken.

You are solely responsible for preventing unauthorized access to your plants, systems, SINUMERIK control systems and the network. Systems, SINUMERIK control systems and components should only be connected to the company's network or the Internet if and to the extent necessary and with appropriate security measures (e.g. use of firewalls and network segmentation) in place.

The actions required in this regard are described in the following Configuration Manual: Industrial Security (https://support.industry.siemens.com/cs/ww/en/view/108862708).

You can read about further actions in the application examples: Manage MyMachines – Installation in existing control environments.

Note

Parallel operation with SINUMERIK Integrate applications is not possible

NOTICE
Data misuse due to an unprotected Internet connection An unrestricted Internet connection can lead to data misuse. Before establishing a network connection, ensure your PC is exclusively connected to the Internet via a secure connection. Pay attention to the security-relevant notes. Further information about communications security can be found in the Configuration Manual: Industrial Security (https://support.industry.siemens.com/cs/ww/en/view/108862708).

Note

SINUMERIK control system security

The necessary security measures (e.g. virus scanner, firewalls, OS patching, etc.) must be implemented on the SINUMERIK control system.

Further information about communications security can be found in the Configuration Manual: Industrial Security (https://support.industry.siemens.com/cs/ww/en/view/108862708).

Note

Operating PC security

The necessary security measures (e.g. virus scanner, firewalls, OS patching, etc.) must be implemented on the PCs which are used to visualize and configure Manage MyMachines at the OEM or end customer.

You will find further information on PCs in the industrial environment in the Configuration Manual: Industrial Security (https://support.industry.siemens.com/cs/ww/en/view/108862708).

Delivery form

The updates and further information on the applications and products are stored on PridaNet and can be downloaded directly from there.

- OR -

You can contact your machine manufacturer.

- OR -

You can contact the Siemens Service & Support.

Additional references

Further information on the "SINUMERIK Operate" operating software can be found in the following reference:

- SINUMERIK Operate Commissioning Manual (IM9)
- SINUMERIK 828D Commissioning Manual, Commissioning CNC

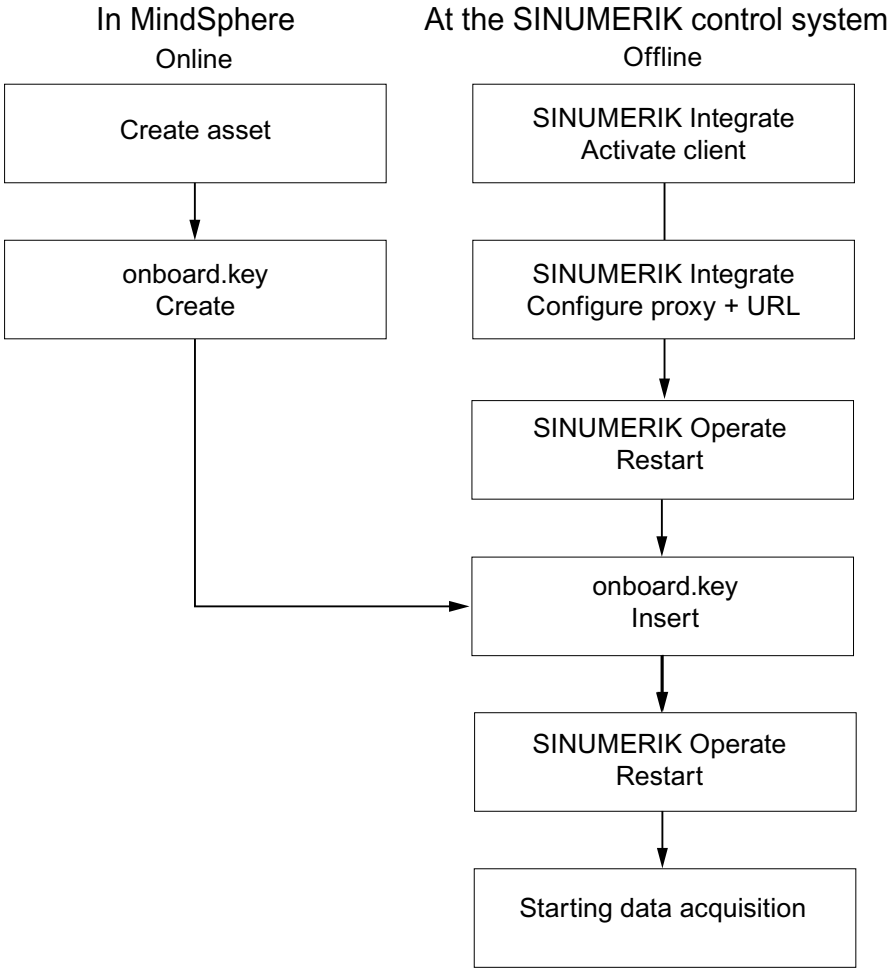
Setting up the SINUMERIK control system for Analyze MyPerformance /OEE Monitor

3

3.1 Sequence

Overview

To use Analyze MyPerformance, you must perform various steps in MindSphere as well as at the SINUMERIK control system itself.



Sequence

Proceed as follows:

In MindSphere:

1. Create the required assets.
   Additional information is provided in Chapter: Asset Manager (Page 48)
   Detailed information is provided in the System Manual: MindSphere, Section: Asset Manager
2. Create the "onboard.key".
   Additional information is provided in Chapter: Connecting the SINUMERIK control system with MindSphere (Page 54)

At the SINUMERIK control system:

1. Check the installed versions.
   Additional information is provided in Chapter: Displaying version data (Page 17)
   – If an appropriate SINUMERIK Integrate version is not installed, then perform a client update.
     Additional information is provided in Chapter: Client update under Windows (Page 21)
2. Activate the SINUMERIK Integrate client.
   Additional information is provided in Chapter: Activating the SINUMERIK Integrate client (Page 29)
3. Enable the use of SINUMERIK Integrate.
   Additional information is provided in Chapter: Activating use of SINUMERIK Integrate (Page 30)
4. Configure the URL and proxy
   – At the SINUMERIK 840D sl control system:
     Additional information is provided in Chapter: Configuring the URL and proxy (Page 31)

   - OR -

   – At the SINUMERIK 828D control system:
     Additional information is provided in Chapter: Configuring the URL and proxy (Page 37)
5. Restart SINUMERIK Operate.
6. Insert "onboard.key".
   – At the SINUMERIK 840D sl control system
     Additional information is provided in Chapter: Install the registration key on a SINUMERIK control system (Page 33)

   - OR -

   – At the SINUMERIK 828D
     Additional information is provided in Chapter: Install the registration key on a SINUMERIK control system (Page 39)
7. Restart SINUMERIK Operate.

Note

File "onboard.key"

The file "onboard.key" contains safety-related information for the one-time connection setup of a SINUMERIK controller with MindSphere and must therefore be stored safely - both on the terminal, on which the file is stored temporarily, and on the target controller. Only when the connection between the SINUMERIK control system and MindSphere has been completely set up is this connection setup key no longer relevant.

This file is then automatically deleted on the SINUMERIK control system.

Secure the terminals used for this accordingly, for example, using virus protection programs, firewalls, OS updates, etc.

3.2 Checking and updating the versions

3.2.1 Displaying version data

In the "Version data" window you can check whether you are using a suitable version.

Only use the versions specified in this document.
Additional information is provided in Chapter: System requirements (Page 12).

The following components with the associated version data are specified:

- SINUMERIK Operate Version
- SINUMERIK Integrate
- System software
- PLC basic program
- PLC user program
- System expansions
- OEM applications
- Hardware

Information is provided in the "Nominal version" column as to whether the versions of the components differ from the version supplied on the CompactFlash card.

Icon	Description
	The version displayed in the "Actual version" column matches the version of the CF card.
	The version displayed in the "Actual version" column does not match the version of the CF card.

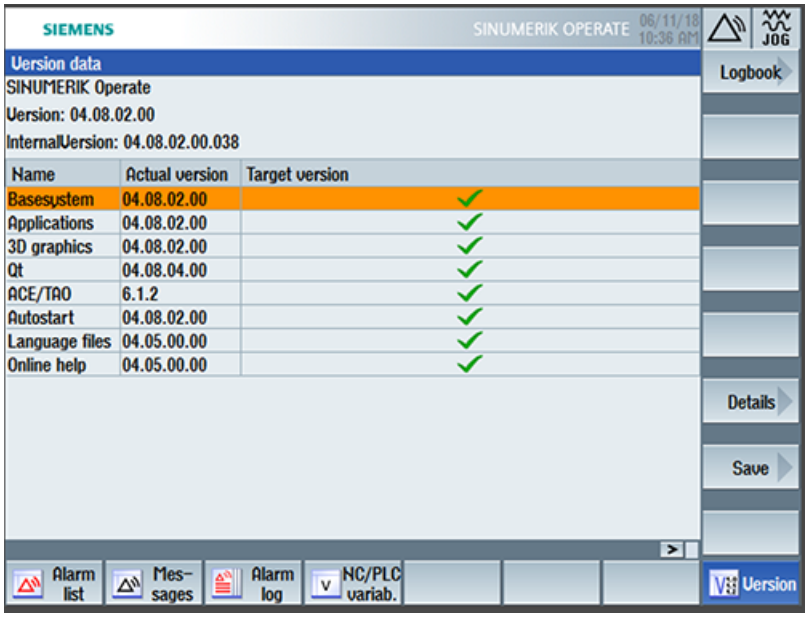
Procedure

1. Start the SINUMERIK Operate operating software on the SINUMERIK control system.
2. Press the <MENU SELECT> key.
3. Select the "Diagnostics" operating area.

4. Press the "Version" softkey.
   The "Version data" window opens.
   The data of the available components is displayed.

5. Select the component for which you would like more information.

6. Press the "Details >" softkey in order to obtain more detailed information on the components displayed.



Start a client update if you have the required SINUMERIK Integrate version on your SINUMERIK control system.

Information is provided in the following chapter as to how you perform a client update:

- Client update under Windows (Page 21)
  - OR -
- Client update under Linux (Page 25)

3.2.2 Installing a SINUMERIK 828D update

If you are not using a suitable software version on the SINUMERIK 828D control, you must install the required software update/backup.

Procedure

1. Switch the control on.
   The following is displayed during startup:

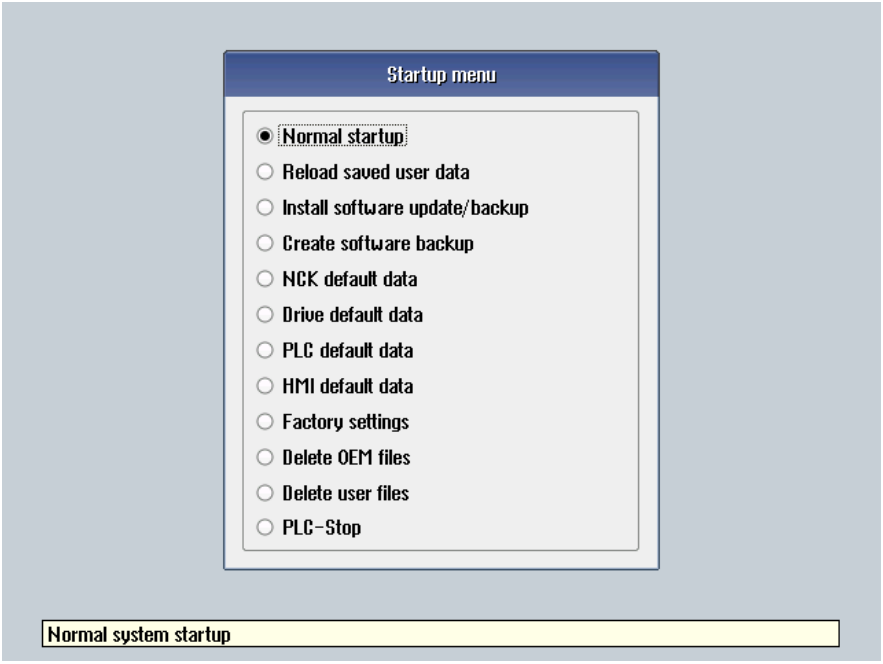
2. Press the <SELECT> key within three seconds.
   To call the "Startup menu", press the following keys in succession:
   Menu back key, **HSK2** (horizontal softkey 2), **VSK2** (vertical softkey 2)

Note

PPU with touch operation

To call the "Startup menu" during startup, there is an additional shortcut key for all PPUs: **"8" → "2" → "8"**

3. The "Startup menu" is displayed, "Normal startup" is the default setting.



4. Select the "Install software update/backup" option to install an update on the system CompactFlash card from the user CompactFlash card or USB flash drive.
5. The following message is displayed:
   "Do you want to install the software update? Either CF card or USB stick must be plugged in".
6. Insert the USB flash drive into the USB interface on the front of the operator panel and click "Yes".
7. Make sure that only individual ".tgz" files are located on the USB flash drive. Press the <INPUT> key to install the required files.
8. The installation preparation and then the installation procedure are shown on the screen.
9. At the end, the following message is displayed: "Restoring complete. Switch off and remove data medium!"
   Switch the control off and remove the storage medium.

References

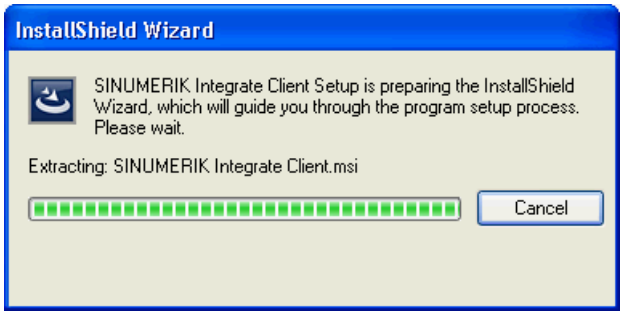
Further information on the commissioning of the SINUMERIK 828D can be found in the following Commissioning Manual:

SINUMERIK 828D, Commissioning CNC

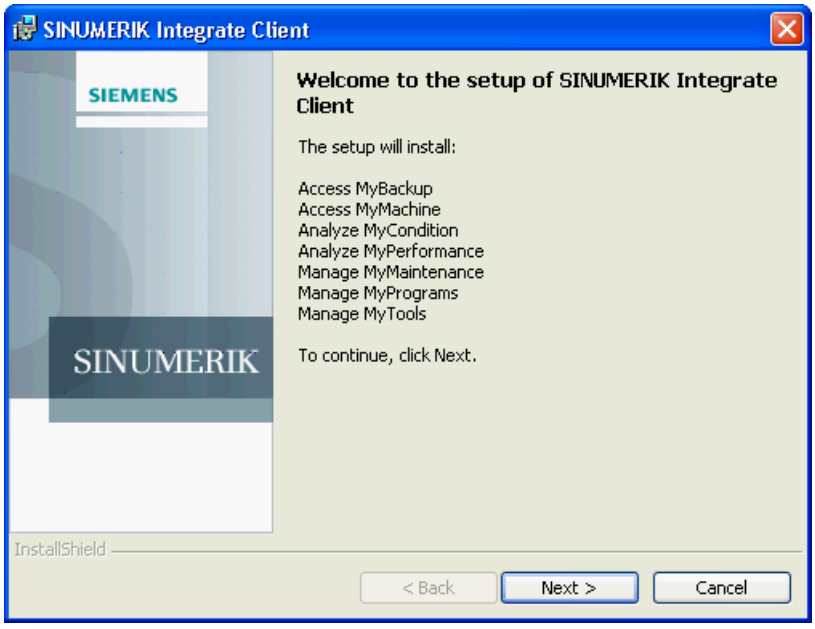
3.2.3 Client update under Windows

Procedure

1. Start the SINUMERIK control system in the Windows service mode.
2. Open the installation directory.
3. Start setup file "setup.exe" with a double-click.
   SINUMERIK Integrate Client - InstallShield Wizard opens.

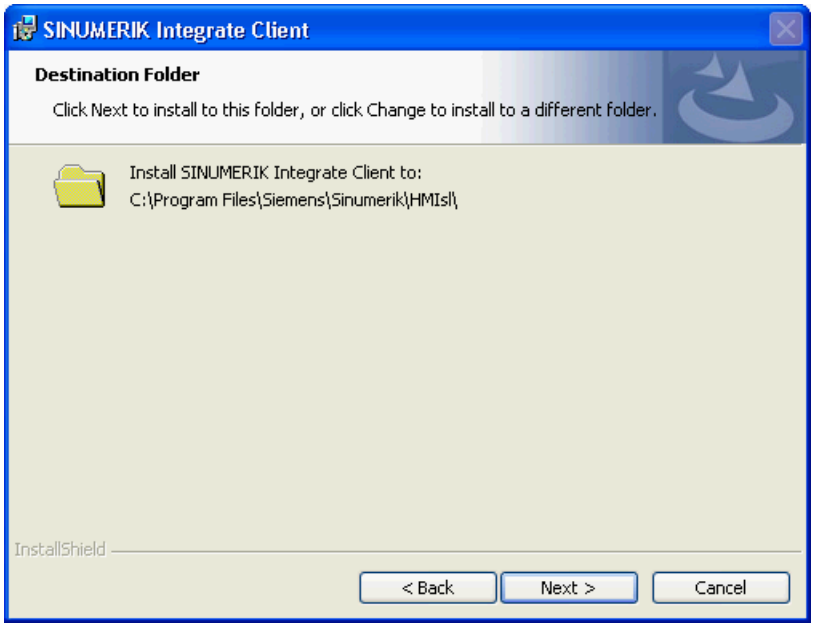


4. The welcome screen opens and shows the applications to which the update applies.
   Click "Next >" to start the installation preparation.

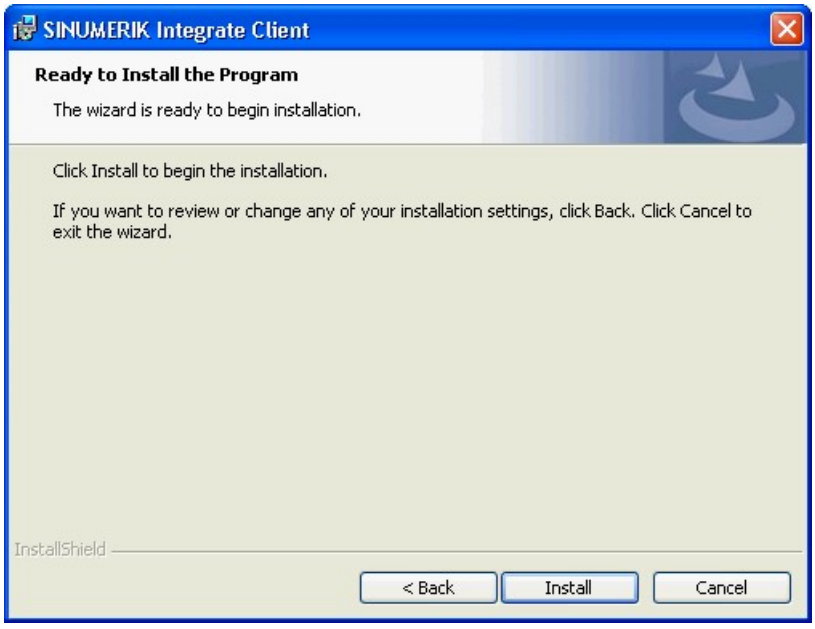


5. The "License Agreement" window opens.
   Read the license agreement.
   - If you want to print the terms, click "Print."
   - Then activate the "I accept the terms in the license agreement" checkbox and click "Next >".
     - OR -
     Click "< Back" to return to the previous window.

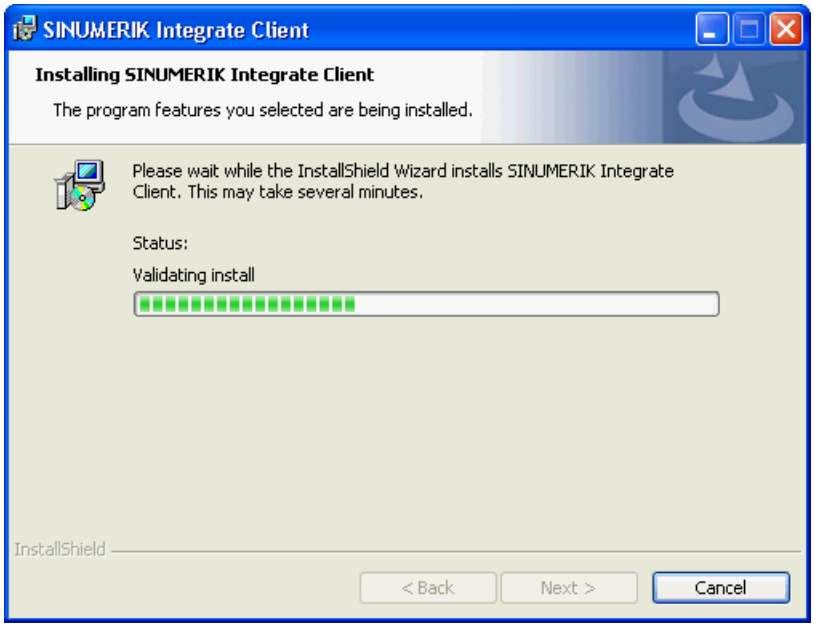
6. The next window displays the installation directory for the application.
   Click "Next >" to accept the directory suggested by the setup.



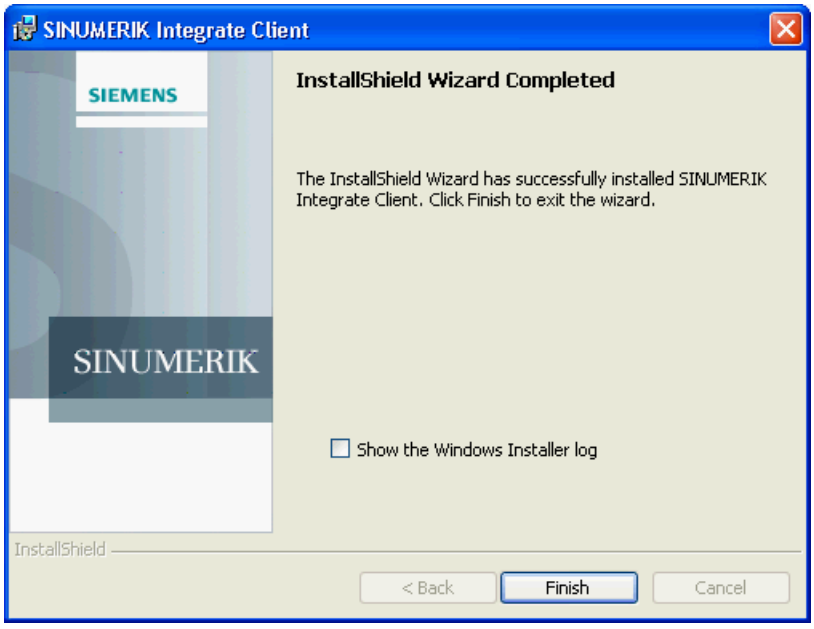
7. The Wizard is ready to start the installation.
   Click "Install" to start the installation.



8. The installation is started, and the progress is displayed with a progress bar.



9. Click "Finish" to complete the installation.



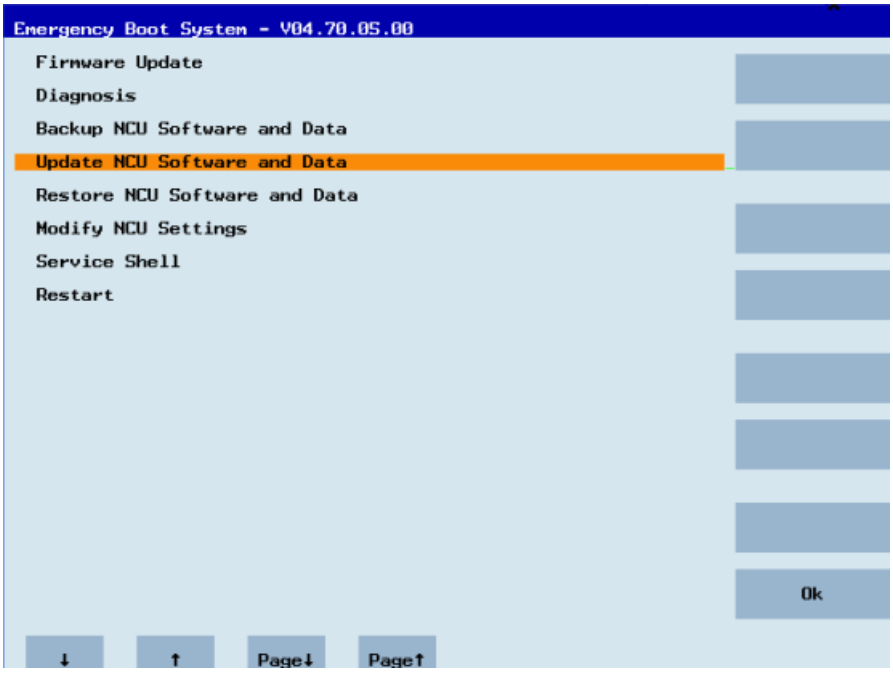
3.2.4 Client update under Linux

Prerequisite

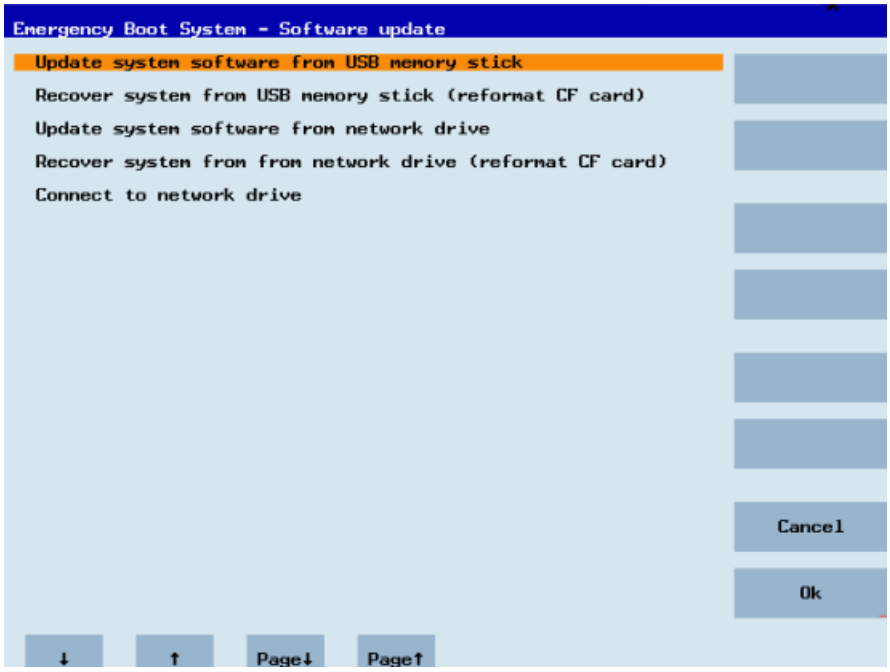
- Emergency Boot System V04.70.05.00
- SINUMERIK Operate 4.5 SP4
  - OR -
- SINUMERIK Operate 4.7 SP2

Procedure

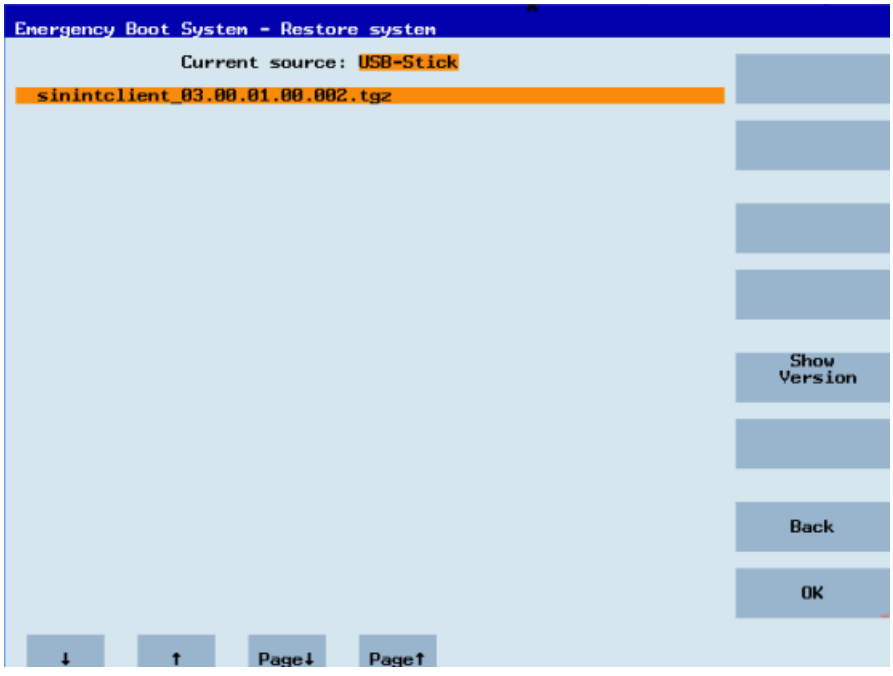
1. Copy the "sinintclient.tgz" file to the USB flash drive.
2. Insert the USB flash drive into the NCU.
3. Start the NCU.
4. In the menu, select "Update NCU Software and Data" with the cursor keys and press the "OK" softkey.



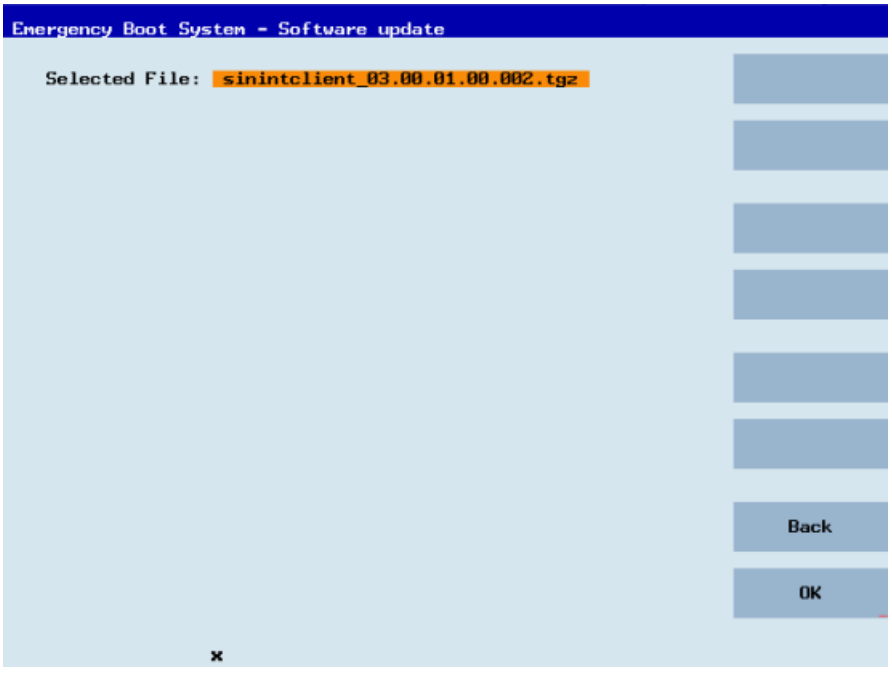
5. In the menu, select "Update system software from USB memory stick" with the cursor keys and press the "OK" softkey.



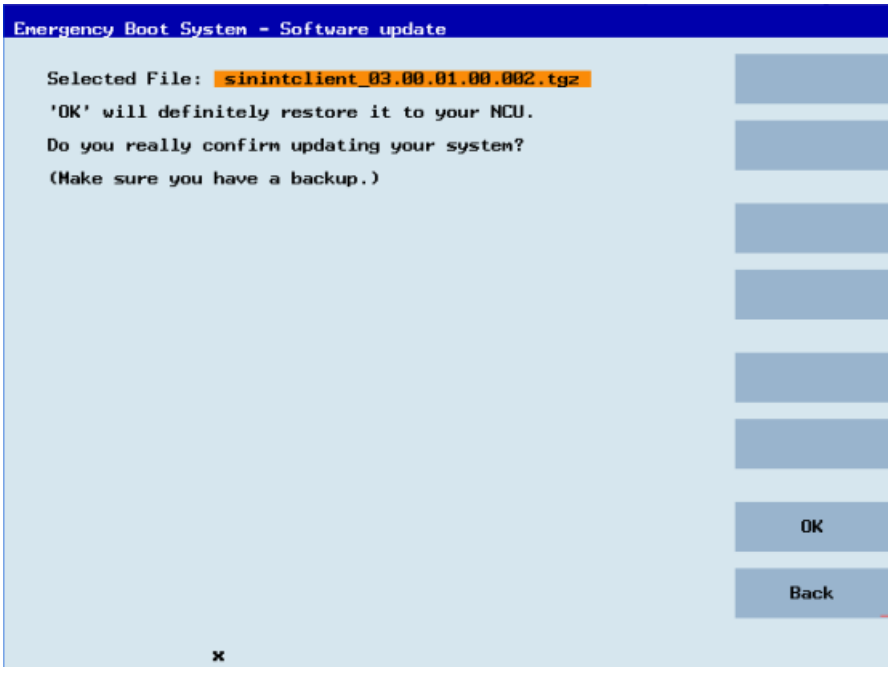
6. You receive a list with all tgz files.
   Select the current file.
   Press the "OK" softkey to confirm your selection.
   - OR -
   Press the shortcut key <Shift> + <F8> on the operator panel.



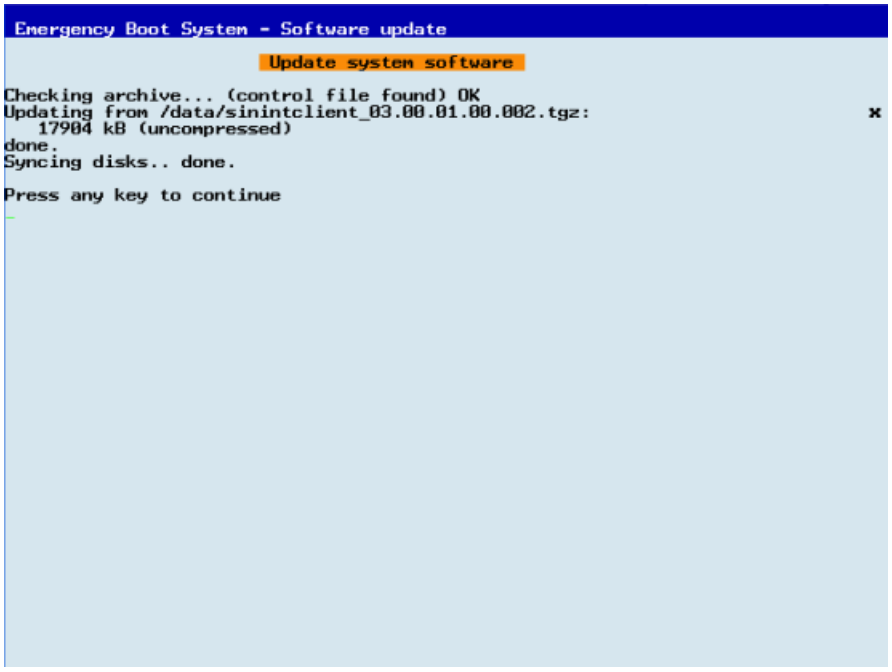
7. The selected file is displayed.
   Press the "OK" softkey to confirm your selection.
   - OR -
   Press the shortcut key <Shift> + <F8> on the operator panel.



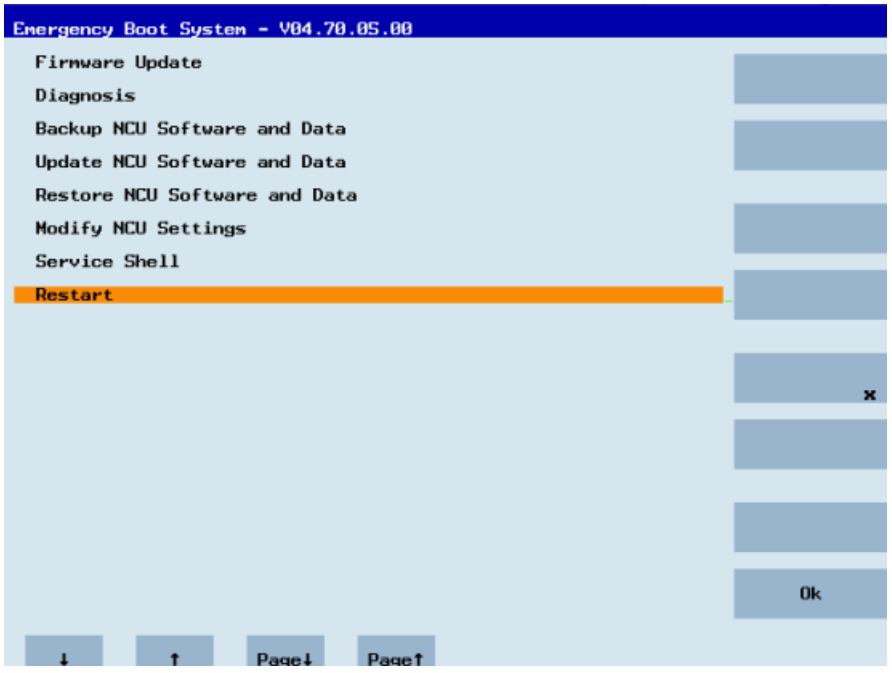
8. A confirmation prompt appears.
   Press the "OK" softkey to confirm the confirmation prompt.
   - OR -
   Press the shortcut key <Shift> + <F7> on the operator panel.



9. The installation is started.



10. When the installation has been completed, the following message appears.
Remove the USB flash drive.
Select "Restart" from the menu and press the "OK" softkey.

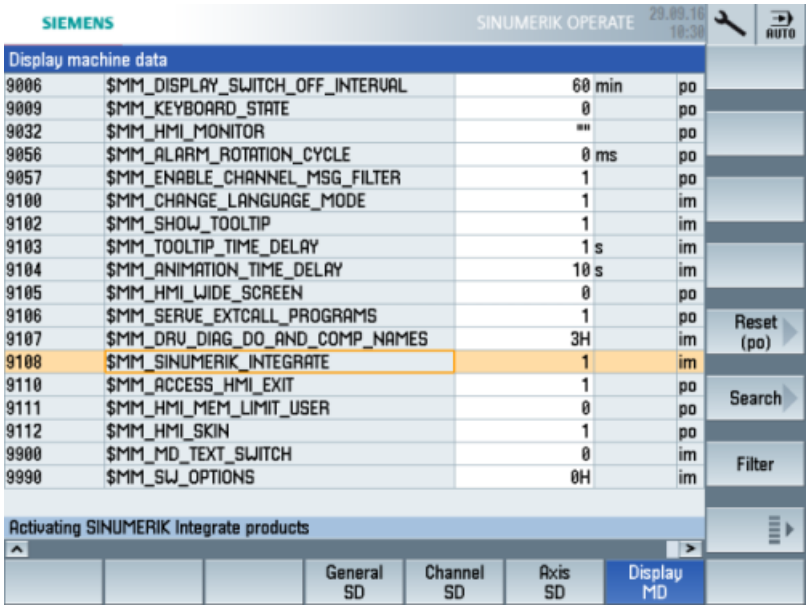


3.3 SINUMERIK Integrate

3.3.1 Activating the SINUMERIK Integrate client

Procedure

1. Start the SINUMERIK Operate operating software on the control.
2. Press the "Setup" and "Mach. data" softkeys.
3. Press the "Password" softkey.
4. The "Set password" window opens.
5. Enter the password for "Manufacture" and press the "OK" softkey.
6. Press the menu forward key and the "Display MD" softkey.
   - Set the machine data
     MD9108 $MM_SINUMERIK_INTEGRATE to "1".

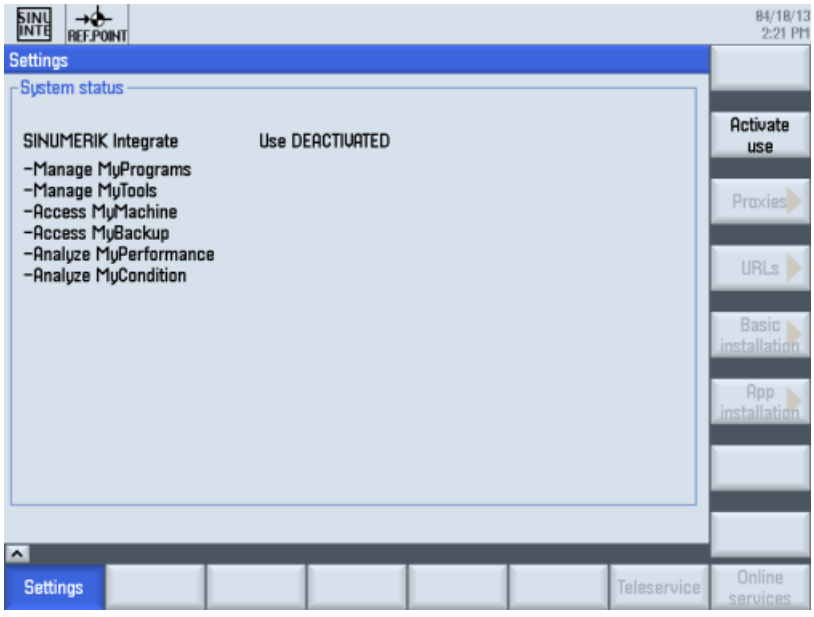


7. Press the <MENU SELECT> key followed by the menu forward key.
8. The "SINUMERIK Integrate" softkey is displayed on the extended horizontal softkey bar.

3.3.2 Activating use of SINUMERIK Integrate

Procedure

1. Press the "SINUMERIK Integrate" softkey.
   The "SINUMERIK Integrate" welcome window opens.
2. Press the "Settings" softkey.
   The "Settings" window opens displaying the system status "Use DEACTIVATED".
   – Press the "Activate use" softkey.



3. The confirmation prompt "Do you want to activate the use of SINUMERIK Integrate applications?" is displayed.
   – Press the "OK" softkey to confirm the prompt.
   The use of SINUMERIK Integrate applications is enabled.

3.4 SINUMERIK 840D sl

3.4.1 Configuring the URL and proxy

Note

Transferring SINUMERIK data on the MindSphere platform

The following steps allow you to transfer the SINUMERIK data to the MindSphere platform.

By performing the steps described below, in particular through input and confirmation of the Web service URL, processes are performed automatically in which software scripts are loaded to the SINUMERIK control.

Requirement

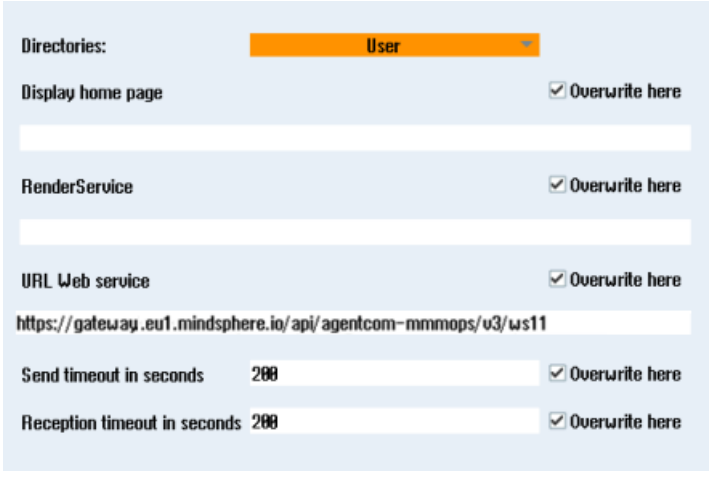
The use of SINUMERIK Integrate has been activated.

Check whether the Internet connection is available and activated:

- TCU:
  Press the "Online Services" softkey. The "Login" window is opened.
  If this is not the case, check the connected Internet connection.
- PCU:
  Start the control in service mode, and call up an Internet page using the Web browser, for example, "www.siemens.com".

Procedure

1. The "Settings" window is open.
   Press the "URLs >" softkey.
2. Press the "Edit" softkey and select the following settings:
   - Directories: Select the "User" entry in the "Directories" drop-down list.
   - Display home page: Select the "Overwrite here" check box.
   - RenderService: Select the "Overwrite here" check box.
   - URL Web service: Select the "Overwrite here" check box.
   - Enter the following WebService URL.
     If, for example, you are connected to the LIVE system:
     https://gateway.eu1.mindsphere.io/api/agentcom-mmmops/v3/ws11
   - Enter the required value in the "Transmit timeout in seconds" input field (default value is 200), and select the "Overwrite here" check box.
   - Enter the required value in the "Receive timeout in seconds" input field (default value is 200), and select the "Overwrite here" check box.

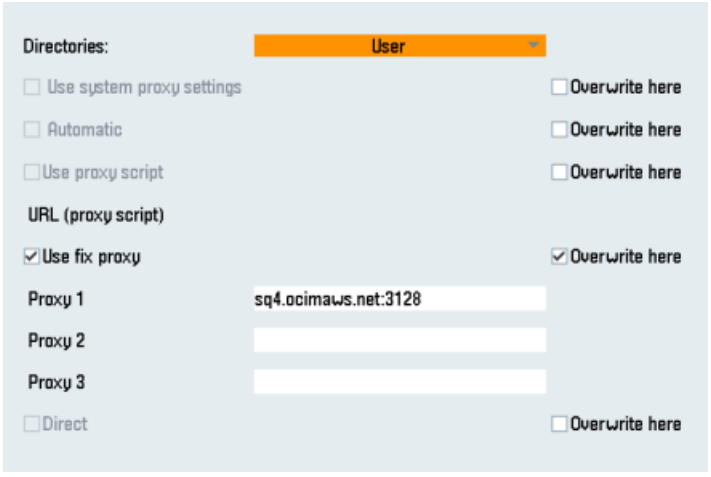


3. Press the "OK" softkey.
   A syntax check is performed and the access data is saved.
   Usually, the settings are now complete. If further adaptations need be made within your company network, read the following paragraph:

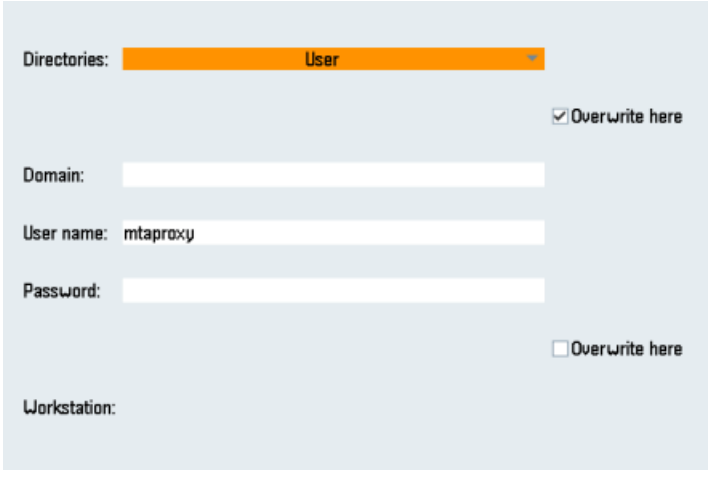
Proxy adaptations (optional)

1. Clarify with your network administrator whether the Proxy settings have to be adjusted for the connection to Cloud mode.
   If this is necessary, proceed as follows:
2. Press the "Proxys >" softkey.
   The stored settings are displayed.

3. Press the "Edit" softkey and select the following settings:
   - Select the "Use fix proxy" check box.
   - Enter your proxies in the "Proxy 1" to "Proxy 3" input fields.
   - Select the "Overwrite here" check box even if you only enter one proxy in order to accept the new entry.



4. Press the "OK" softkey to save the settings.
5. If an authentication is required for the proxy, press the "Authorization" softkey.
   - Select the "Overwrite here" check box to accept the new entry.
   - Enter the user data in the "Domain", "User name" and "Password" input fields.



6. Press the "OK" softkey to save the settings.
7. Restart the control so that the access data can take effect.

3.4.2 Install the registration key on a SINUMERIK control system

The activation of SINUMERIK Integrate, the setting up of the URL/proxy and the restart creates the "boot_job" folder in the /var/tmp/ directory.

If the folder was not set up, then create the folder manually.

There are 2 ways to copy the "onboard.key" to the SINUMERIK control system:

- Via the SINUMERIK Operate user interface
- With the aid of WinSCP

Requirement

- The "onboard.key" has been generated.
- The "boot_job" folder is created on the SINUMERIK control system, e.g. at C:\
- The time on the control system has been synchronized with the current time.
- The Internet connection has been checked and is established.

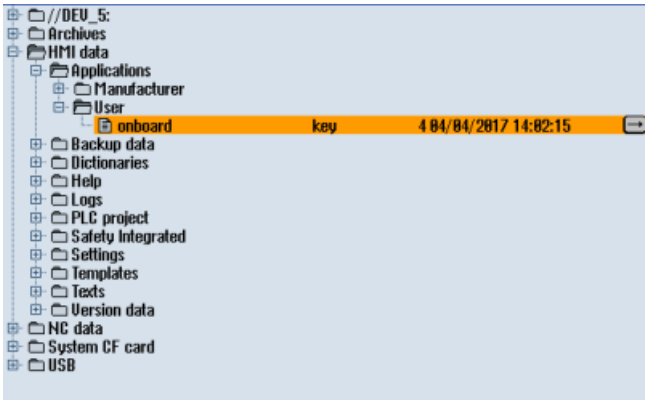
Procedure with SINUMERIK Operate (PCU 50)

1. At the SINUMERIK control system, start the SINUMERIK Operate operating software in the service mode.
2. Insert the USB flash drive with the "onboard.key" file into the PCU.
   The USB flash drive is shown in the directory tree.
3. Copy the file "onboard.key" into the following directory: C:\temp\boot_job.
4. Check the PCU configuration.

Procedure with SINUMERIK Operate (NCU)

1. At the SINUMERIK control system, start the SINUMERIK Operate operating software.
2. Press the "Setup" softkey.
3. Press the "System data" softkey.
   The directory tree is displayed.
4. Insert the USB flash drive with the "onboard.key" file into the NCU.
   The USB flash drive is displayed in the directory tree.
   If the USB flash drive is not detected by SINUMERIK Operate, you must change to a different USB port or configure a logical drive.
   Additional information is provided in Chapter: Create drive (Page 36)
5. Select the "onboard.key" and press the "Copy" softkey.

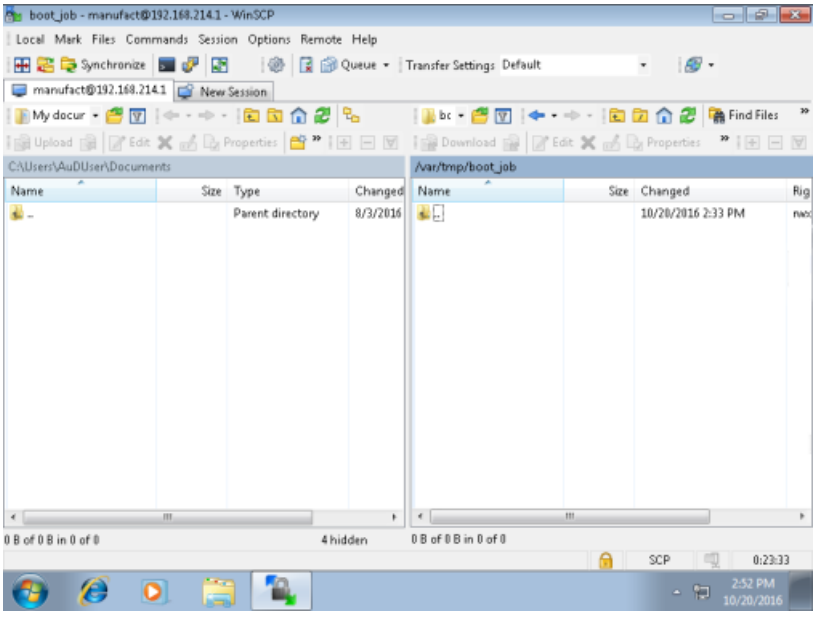
6. Navigate in the following directory: HMI data\Applications\User and press the "Paste" softkey.



7. Then restart.

Procedure with, e.g. WinSCP (NCU)

1. Copy the generated "onboard.key" file using a suitable tool, e.g. using WinSCP via the network to the control system.
2. Start the SINUMERIK control system and open the directory, e.g./var/tmp/boot_job.



3. Insert the "onboard.key" file into the "boot_job" folder.
   Alternatively, you can also insert the "onboard.key" file into the following directory: /user/sinumerik/hmi/appl.
   If there is already a "cert.key" file in the /var/tmp/boot_job folder, the control was already connected to MindSphere. If you want to establish a new connection, then delete the existing file and insert the new "onboard.key" file.

4. Then start the SINUMERIK Operate operating software.
   When the connection to the server is successful, the "cert.key" file is created.
5. The onboarding process is completed. The "onboard.key" is no longer displayed in the directory.

3.4.3 Create drive

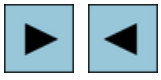
Parameters

Entry		Meaning
Connection	Front	USB interface that is located at the front of the operator panel.
	X203/X204	USB interface X203/X204 that is located at the rear of the operator panel.
	X212/X213	TCU20.2/20.3
Symbolic		Symbolic name of the drive

Procedure

1. Select the "Start-up" operating area.

2. Press the "HMI" and "Log. drive" softkeys.
   The "Set up drives" window opens.



3. Select the softkey that you want to configure.

4. To configure softkeys 9 to 16 or softkeys 17 to 24, click the ">> Level" softkey.

5. To allow input fields to be edited, press the "Change" softkey.
6. Select the data for the appropriate drive or enter the required data.

7. Press the "Details" softkey if you want to enter additional parameters.
   Press the "Details" softkey to return to the "Set up drives" window.

8. Press the "OK" softkey.
   The entries are checked.
   A window with a prompt opens if the data is incomplete or incorrect. Acknowledge the prompt with the "OK" softkey.
   The drive, e.g. "usb-NEU" is shown in the directory tree.

3.5 SINUMERIK 828D

3.5.1 Configuring the URL and proxy

Note

Transferring SINUMERIK data on the MindSphere platform

The following steps allow you to transfer the SINUMERIK data to the MindSphere platform.

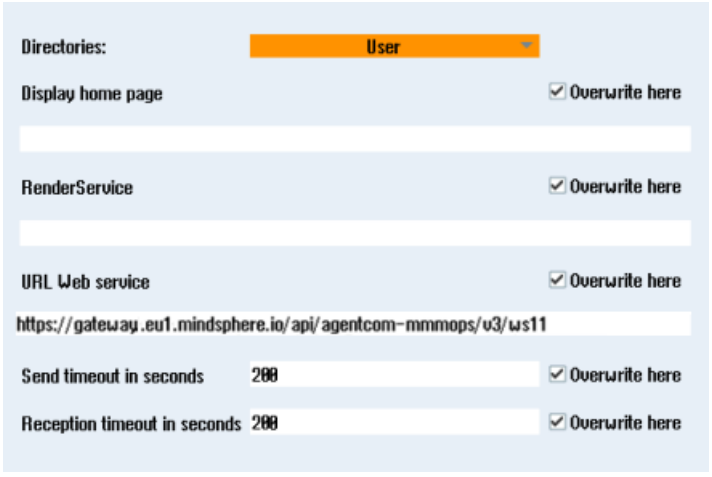
By performing the steps described below, in particular through input and confirmation of the Web service URL, processes are performed automatically in which software scripts are loaded to the SINUMERIK control.

Requirement

The use of SINUMERIK Integrate has been activated.

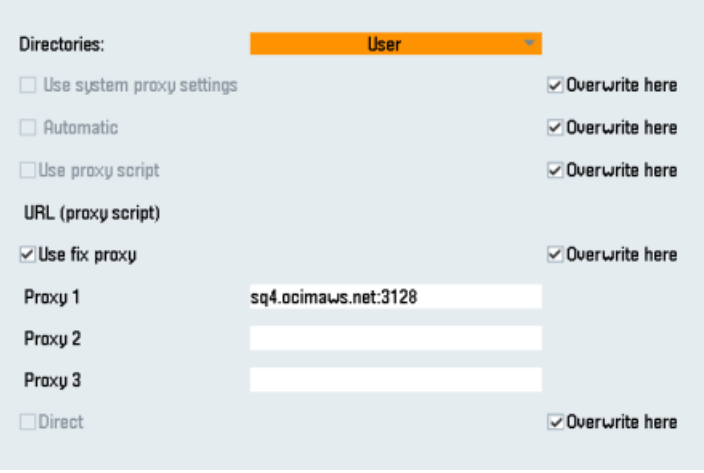
Procedure

1. The "Settings" window is open.
   Press the "URLs >" softkey.
2. Press the "Edit" softkey and select the following settings:
   - Directories: Select the "User" entry in the "Directories" drop-down list.
   - Display home page: Select the "Overwrite here" check box.
   - RenderService: Select the "Overwrite here" check box.
   - URL Web service: Select the "Overwrite here" check box.
   - Enter the following WebService URL.
     If, for example, you are connected to the LIVE system:
     https://gateway.eu1.mindsphere.io/api/agentcom-mmmops/v3/ws11
     Enter the required value in the "Transmit timeout in seconds" input field (the default value is 200), and select the "Overwrite here" check box.
   - Enter the required value in the "Receive timeout in seconds" input field (the default value is 200), and select the "Overwrite here" check box.

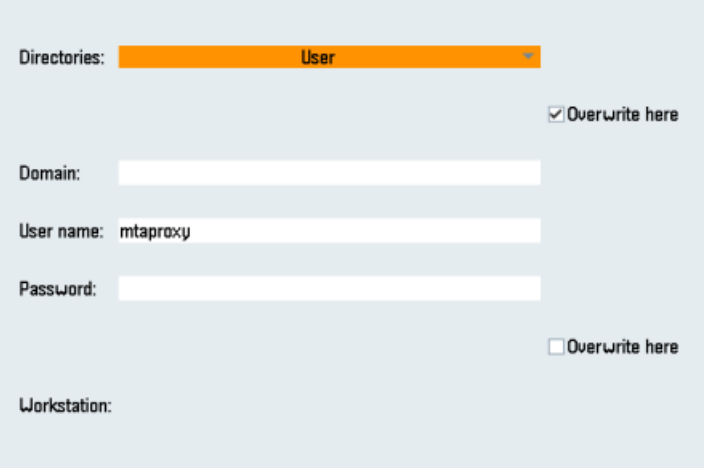


3. Press the "OK" softkey.
   A syntax check is performed and the access data is saved.
4. In order to establish a connection from the customer network, you must adapt the proxy settings.
   Press the "Proxys >" softkey.
   The stored settings are displayed.

5. Press the "Edit" softkey and select the following settings:
   - Select the "Use fix proxy" check box.
   - Enter your proxies in the "Proxy 1" to "Proxy 3" input fields.
   - Select the "Overwrite here" check box even if you only enter one proxy in order to accept the new entry.



6. Press the "OK" softkey to save the settings.
7. If an authentication is required for the proxy, press the "Authorization" softkey.
   - Select the "Overwrite here" check box to accept the new entry.
   - Enter the user data in the "Domain", "User name" and "Password" input fields.



8. Press the "OK" softkey to save the settings.
9. Restart the control so that the access data can take effect.

3.5.2 Install the registration key on a SINUMERIK control system

The activation of SINUMERIK Integrate, the setting up of the URL/proxy and the restart creates the "boot_job" folder in the /var/tmp/ directory.

If the folder was not set up, then create the folder manually.

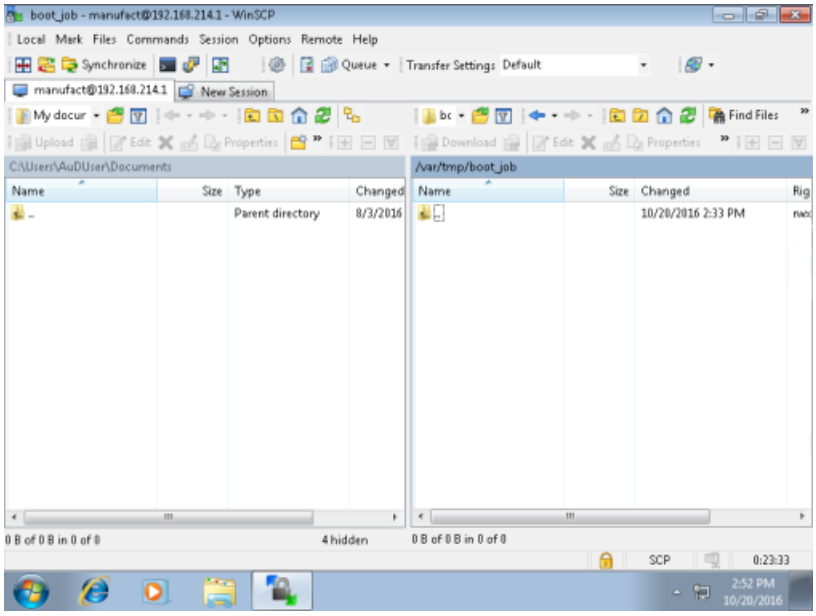
Copy the "onboard.key" to the SINUMERIK control system, e.g. using WinSCP.

Requirement

- The "onboard key" has been generated.
- The "boot_job" folder is created on the SINUMERIK control system, e.g. at C:\
- The time on the control system has been synchronized with the current time.
- The Internet connection has been checked and is established.

Procedure

1. Copy the generated "onboard.key" file using WinSCP for example via the network to the SINUMERIK control system.
2. Start the SINUMERIK control system and open the directory, e.g. /var/tmp/boot_job.
   If the "boot_job" folder does not exist, then create the folder manually.



3. Open the "boot_job" folder.
   If there is already a "cert.key" file in the /var/tmp/boot_job folder, the control was already connected to MindSphere. If you want to establish a new connection, then delete the existing file and insert the new "onboard.key" file.
4. Then start the SINUMERIK Operate operating software.
   When the connection to the server has been successfully established, then the "cert.key" file is created.
5. The onboarding is completed and the "onboard.key" is no longer displayed in the directory.

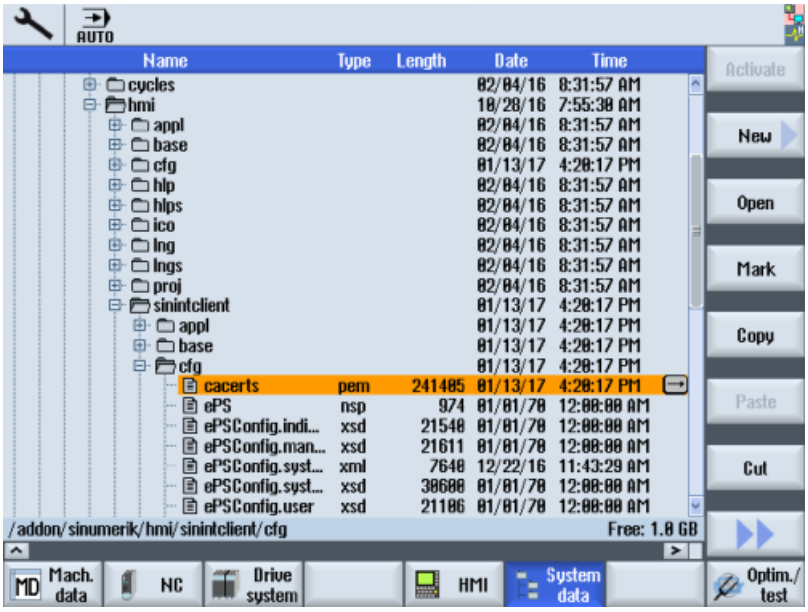
3.6 Adapting SINUMERIK Operate

3.6.1 Exchanging a certificate (optional)

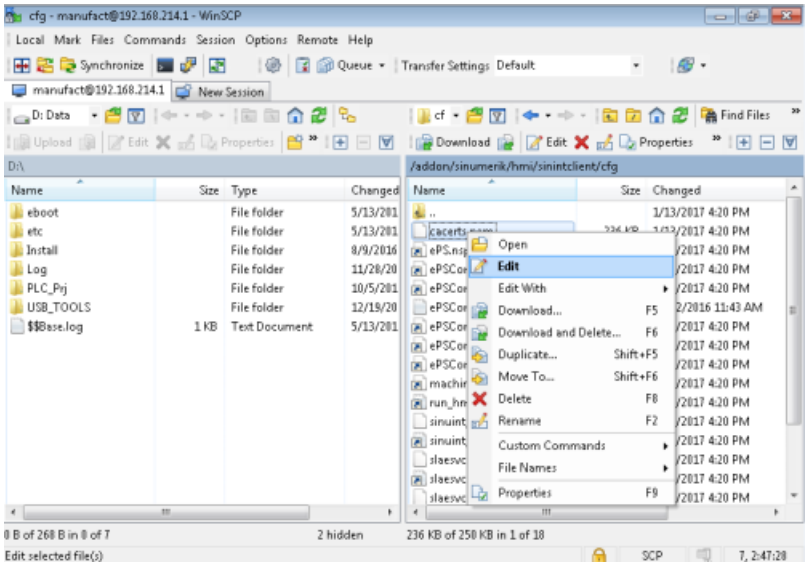
In order to achieve comprehensive security, it is necessary to update the certificate "cacert.pem". The following manual steps are required for this purpose.

SINUMERIK Operate with SINUMERIK Integrate client under Linux

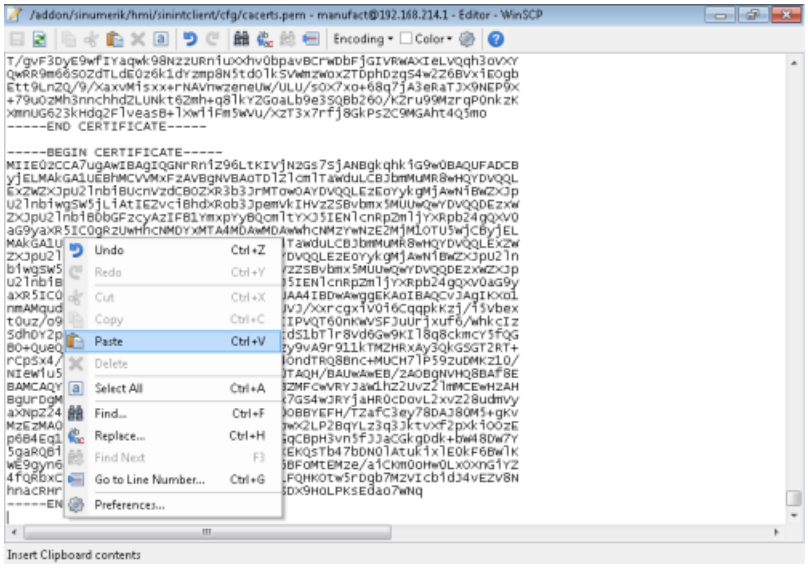
1. Open the directory: card/addon/sinumerik/hmi/sinintclient/cfg
2. Select "cacerts.pem".



3. Use WinSCP, for example, to open "cacerts.pem" in the editor.



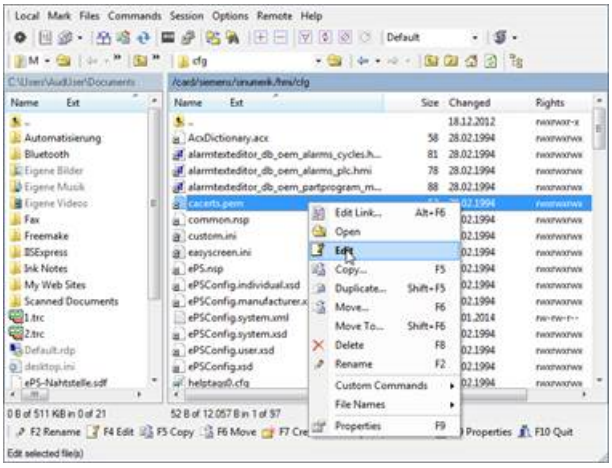
4. Insert the content of "Customer Root CA" at the end of "cacerts.pem".



5. Close the file to save the certificate.
6. Perform a restart.

SINUMERIK Operate under Windows

1. Open the "Customer Root CA" file in the editor and copy the entire content to the clipboard.
2. Use WinSCP, for example, to open "cacerts.pem" in the editor.
   C:\ProgramData\Siemens\MotionControl\addon\sinumerik\hmi\sinintclient\cfg\cacerts.pem



3. Insert the content of "Customer Root CA" at the end of "cacerts.pem".

4. Close the file to save the certificate.
5. Store the adapted file in the same directory again:
   C:\ProgramData\Siemens\MotionControl\addon\sinumerik\hmi\sinintclient\cfg
6. Perform a restart.

3.6.2 Activating logs for troubleshooting

At the SINUMERIK control system, activate the logs in the "ePSConfig.user.xml" file for troubleshooting.

Procedure

1. Press the "System data" softkey.
2. Navigate in the following directory: System CF card/user/sinumerik/hmi/cfg.
3. Open file "ePSConfig.user.xml".
4. Make the following setting:
```
<logging>
<separateScriptLog active="1">1</separateScriptLog>
<scriptLogPath active="1">/var/tmp/scriptLog</scriptLogPath>
<scriptLogSeverity active="1">8</scriptLogSeverity>
<uiScriptLogSeverity active="0">2</uiScriptLogSeverity>
<maxScriptLogSize active="1">10000</maxScriptLogSize>
<maxLogLifeTimeDays active="0">30</maxLogLifeTimeDays>
</logging>
```
5. Restart the SINUMERIK control system and have the log files sent to you.

3.7 Integrating MindSphere

3.7.1 Logging in to MindSphere

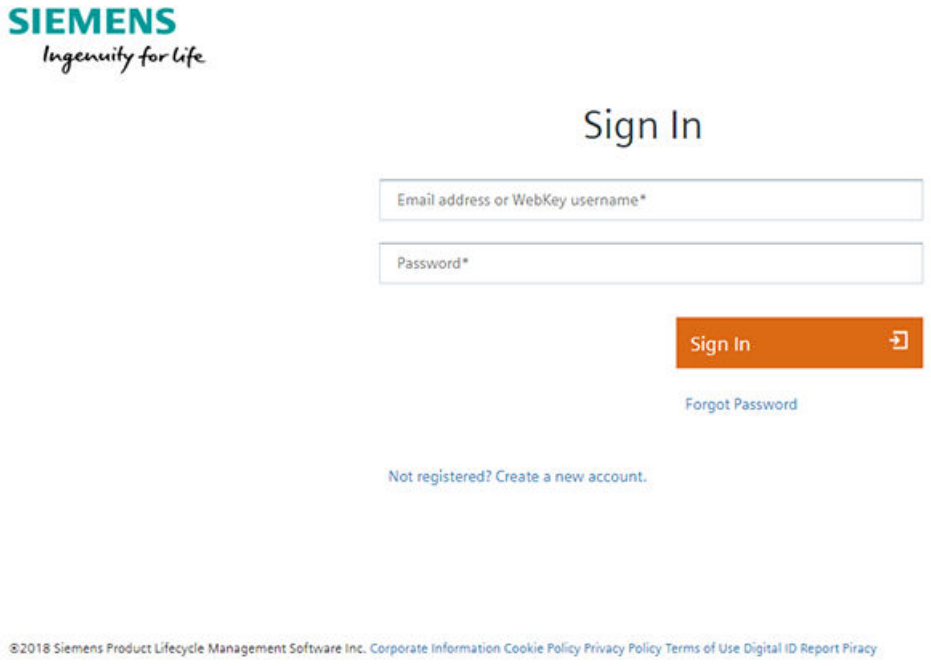
Requirement

You require a MindAccess user account in MindSphere.

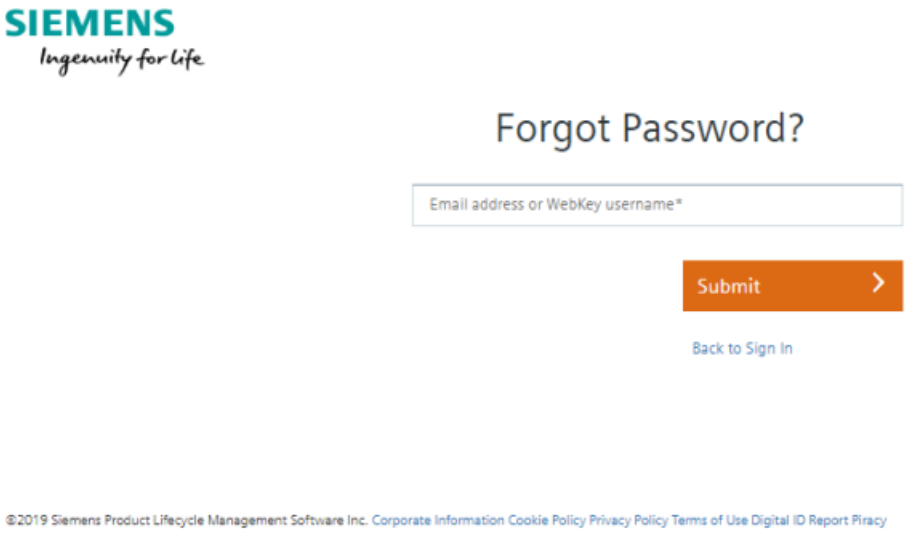
Information on how to create an account is provided in the following documentation:
MindSphere - Getting Started Adjustments, Chapter: Create an OEM user and a customer user

Procedure

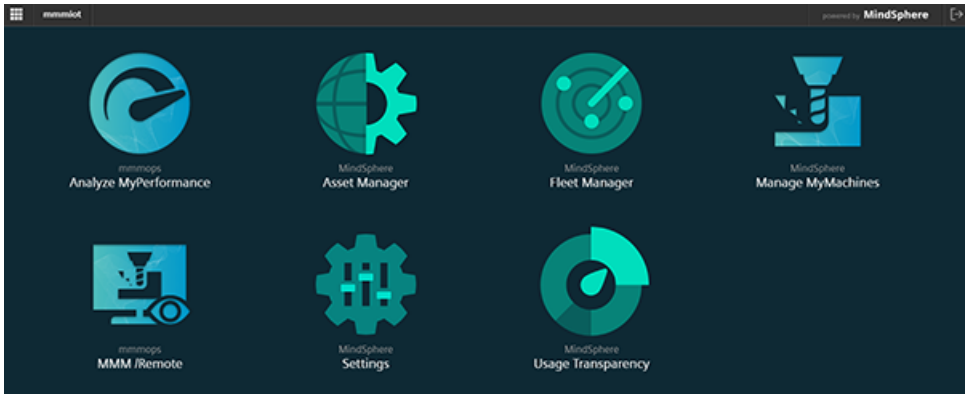
1. Click the link provided by email from Siemens AG.
   The website is displayed: https://<customer-tenant-name>.eu1.mindsphere.io
2. The "Sign In" window opens.
   – Enter your e-mail address and your password.
   – Click the "Sign In" button.



- OR -
If you have forgotten your password, click "Forgot Password?".
The "Forgot Password?" window opens.
Enter your e-mail address and click the "Submit" button.
Your password is reset and you are informed of this via e-mail.



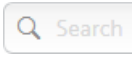
3. The launch pad opens. You can access the individual applications via this user interface.



3.7.2 Description of the icons/buttons

The following symbols and buttons are available.

Icon	Description
	Exit MindSphere
	Switches to the MindSphere launch pad
	Opens a menu with the following search and sorting options: • Country • Type • Status • Sorting • Show

Icon	Description
	Input field for free text search
	Displays assets in an overview
	Displays assets in a map view
	Displays assets in a hierarchic view
	Displays assets in an area view
	Displays a possible extension
	Displays or hides the filters and sorting and their number
	Opens a menu with the following user information: • E-mail address of the user • User state • Language selection • Button for logging out
	Opens the email program set as default, and sends the valid selection by mail, e.g. link to the actual MindSphere view
	Opens a dialog box to select the following views: • Split view • Asset view • Extension view
	Deletes the search text and all filter and sorting rules
	Shows support information: • Online Support Website • Online Request Website • Call Center • MindSphere Services

3.7.3 Managing users

For "Analyze MyPerformance /OEE Monitor", you create users with differing rights.

The following users are available:

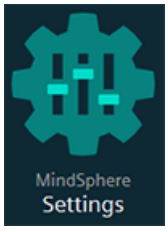
- Standard user: amp.user
- Administrator: amp.admin

Users, roles and rights are edited in the "MindSphere Settings" MindSphere application.

Additional information is provided at: MindSphere documentation (https://documentation.mindsphere.io/index.html#/kiosk/en))

Procedure

1. The launch pad is open.
2. Click the "MindSphere Settings" MindSphere application.



3. Create or edit the users.
4. Assign the corresponding roles.

3.7.4 Asset Manager

3.7.4.1 Overview

Functions

"Asset Manager" is a MindSphere application belonging to the Industrial IoT platform of Siemens. In the "Asset Manager", using assets, you model the structure of an industrial process within MindSphere.

In the "Asset Manager", connect your machine tool, the asset, with the MindSphere application and configure the data acquisition.

The specific functions and configuration options for the "SINUMERIK" area are discussed in the following.

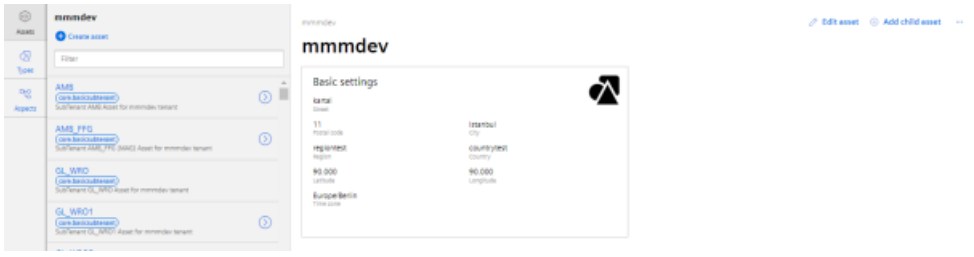
Using an asset type, you can define which aspects should be integrated into the template. Using asset types, you have the option of creating a template, e.g. for several devices, and linking this with your aspects. When creating a new asset, you can access the template or the type.

Aspects are combined, preconfigured data and form the context for evaluating industrial processes. An aspect can comprise several variables. Within an industrial process, assets transfer the aspects into the MindSphere application as time series data.

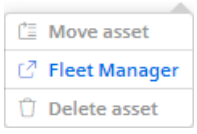
Opening the Asset Manager

1. Click on the "MindSphere Asset Manager" icon.

2. The "Asset Manager" window opens and you have the following options:
   - Edit assets
   - Add subordinate assets
   - Creating assets
     Further information can be found in the following section: Creating an Asset (Page 52).
   - Creating and editing asset types
     Further information can be found in the following section: Creating an asset type (Page 50)
   - Creating and editing aspects



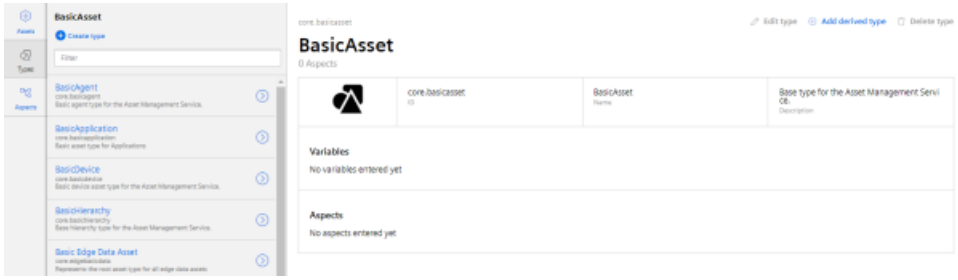
3. When you click on the three dots in the top right window pane, the following options are offered:
   - Shifting an asset
   - Fleet Manager
   - Deleting an asset



3.7.4.2 Creating an asset type

Procedure

1. In the left window pane, click the "Types" button.
   The "BasicAsset" window opens.



2. In the center window pane, select "BasicDevice" and click the small blue arrow (navigate to the child element).
   The "BasicDevice" window opens.

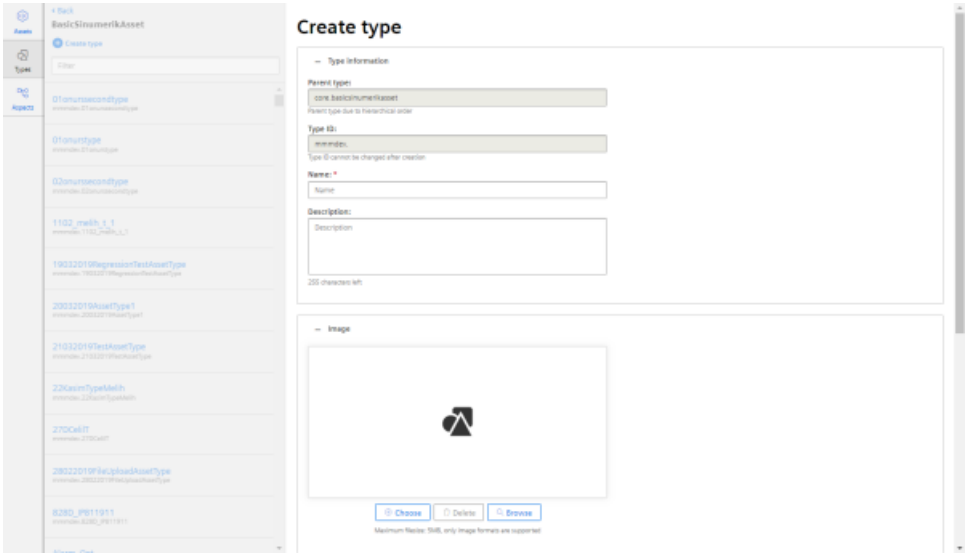
3. In the center window pane, select "BasicSinumerikAsset" and click the small blue arrow (navigate to the child element).
   The "BasicSinumerikAsset" window opens.
4. In the center window pane, click "+ Add type" to create a new asset type.
   The "Create type" window opens.
   - Enter a name for the new asset type.
     Entering the name is mandatory and activates the "Save" button.
   - Enter a description of the new asset type.
   - Select an image with the maximum permitted size of 5 MB.

     Note

     Images in the working area

     Ensure that the name of the image in your working area is unique.

   - Add your chosen variables.
   - Add your chosen aspects.
   - Click "Save" to create the new type.



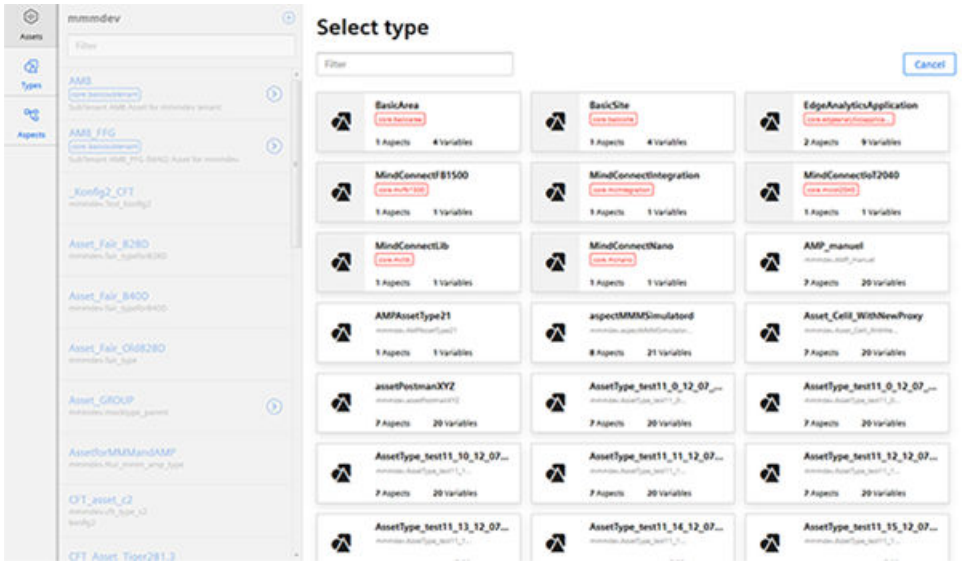
View asset type

1. Open the "Types" window.
2. In the center window pane, select "BasicDevice" > "BasicSinumerikAsset".
3. In the text box "Filter", enter the name.
   The corresponding data is displayed in the right-hand window area

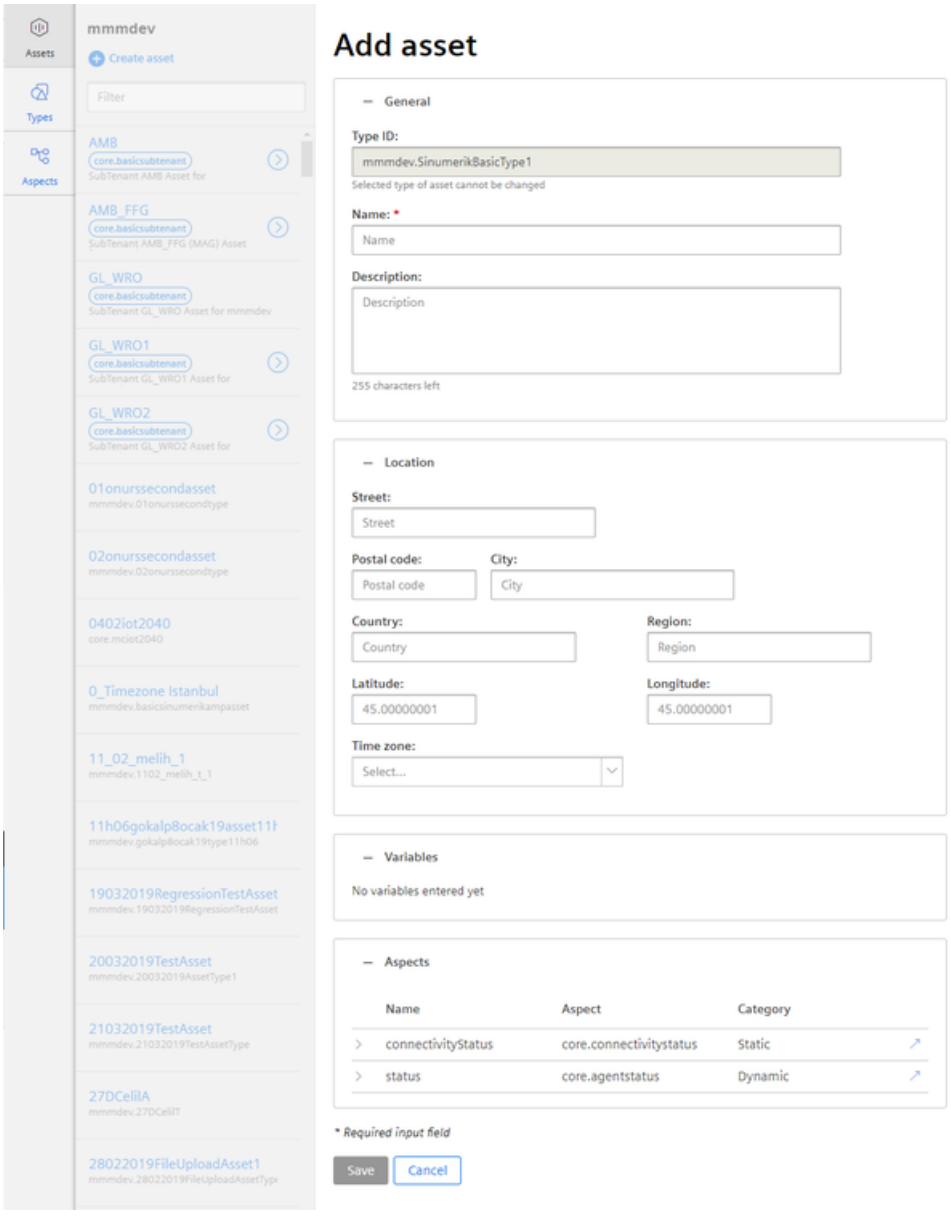
3.7.4.3 Creating an Asset

Procedure

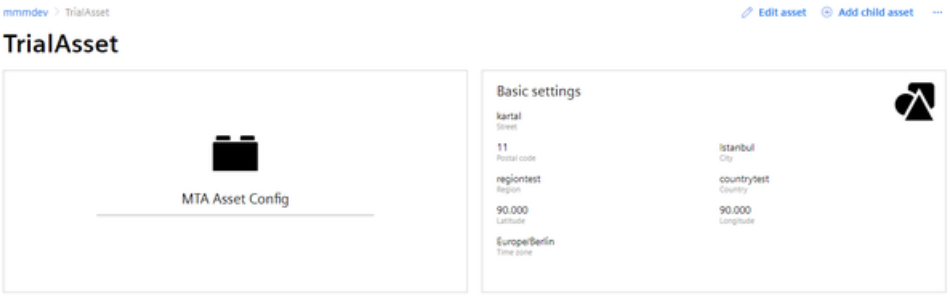
1. Click "Assets" into the left-hand section of the window.
2. In the center window section, click "+ Add asset".
   In the right-hand section of the window, "Select type" is displayed.
3. Enter the name of the required asset type or select the previously generated type from the list.



4. The "New asset" window opens.
   - Populate the fields in the "General" and "Location" areas.
     The "Save" button is activated.
   - Select the corresponding time zone.
     If a time zone is not selected, "Berlin" is given as the default setting.
     The settings of the time zone are used for performance monitoring.
   - Click "Save" to save the new asset.



5. The new asset is displayed.



3.7.5 Connecting the SINUMERIK control system with MindSphere

Using the MindSphere application "Asset Manager", connect the SINUMERIK control systems with MindSphere.

References

Additional information on this is provided in the MindSphere System Manual:

- Chapter: Roles within MindSphere
- Chapter: Configuring assets

Requirement

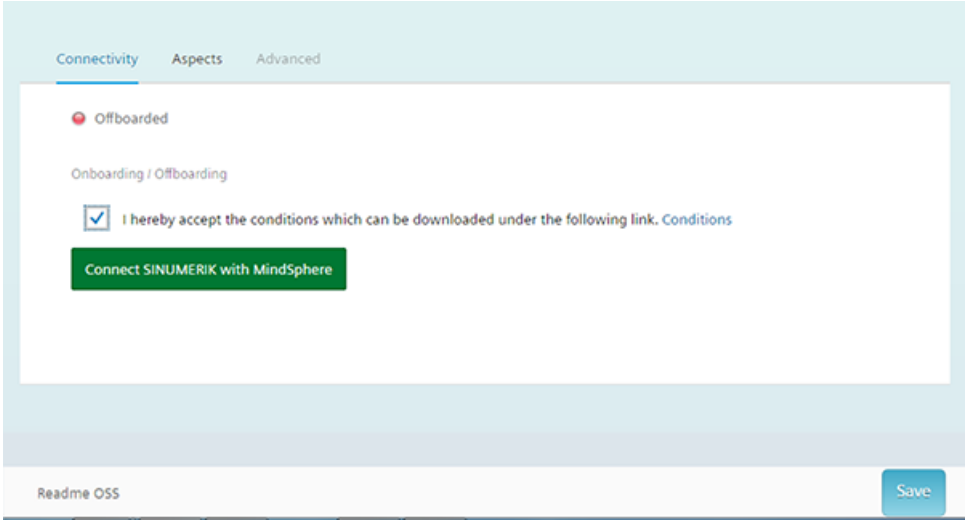
- You require the "MindAccess User" role in MindSphere to do this.
- The configuration must have been saved.

Procedure

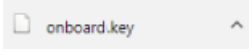
1. Click the "Asset Manager" MindSphere application, and select an asset in the left window pane.
2. Click the "MTA Asset Config" icon in the right-hand side of the window.

3. The "Onboarding / Offboarding" window opens, and you can see the connection status in the "Connectivity" tab, e.g. "Offboarded".

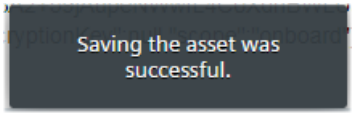
4. Select the "I hereby accept the conditions, which can be downloaded under the following link. Conditions" check box.
   - Click the "Conditions" link.
     The "MindSphere Terms & Conditions" window opens.
   - Click on your region.
   - From the list, select the appropriate Terms & Conditions.
   - Read the Terms & Conditions.
     - OR -
     Download the Terms & Conditions.
     - OR -
     Print the Terms & Conditions.
   - Close the window.
     The "Connectivity" window is displayed again.
5. Click the "Connect SINUMERIK with MindSphere" button to connect the asset with MindSphere.



6. The "onboard.key" is generated and shown below the status bar.
   Please note that you neither change the name nor content of the file.



7. Click the "Save" button to accept the entries and save a consistent version of the configuration.
   Wait for confirmation that the asset was successfully saved.



8. Then copy the "onboard.key" to the control system.

3.7.6 Activating the data acquisition

The "Asset Manager" MindSphere application allows you to configure the assets, and you activate data acquisition for the following data points with a slider in the "Aspects" tab:

- Addressing
- Data formats
- Sampling rate
- Physical unit

The data points can be connected either as preconfigured data sets, or configured separately in the form of variable sets with the SINUMERIK variable configurator.

The following preconfigured variable sets exist for assets with the SINUMERIK control system:

- SINUMERIK basic configuration
- Machine availability
- Advanced recording

Note

Activating pre-configured variable sets

If you activate the checkbox for license conditions under "Analyze MyPerformance", and set the "Analyze MyPerformance" slider to "ON", you can also activate variable transmission.

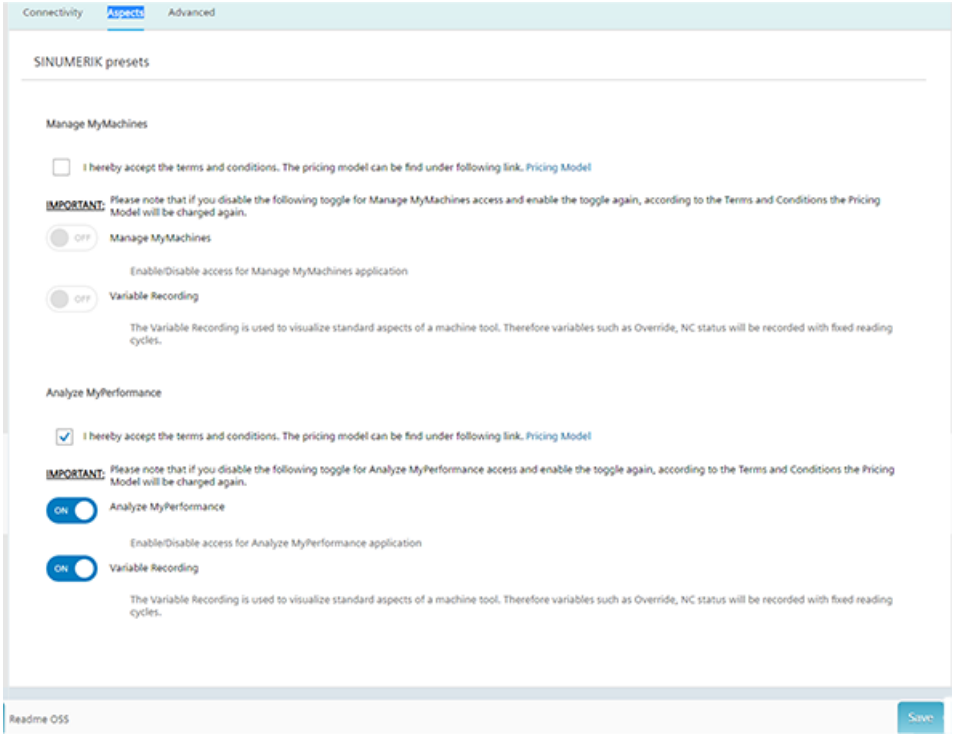
Note

First NC channel

The preconfigured "SINUMERIK basic configuration" and "Machine availability" data refer only to data from the first NC channel.

Procedure

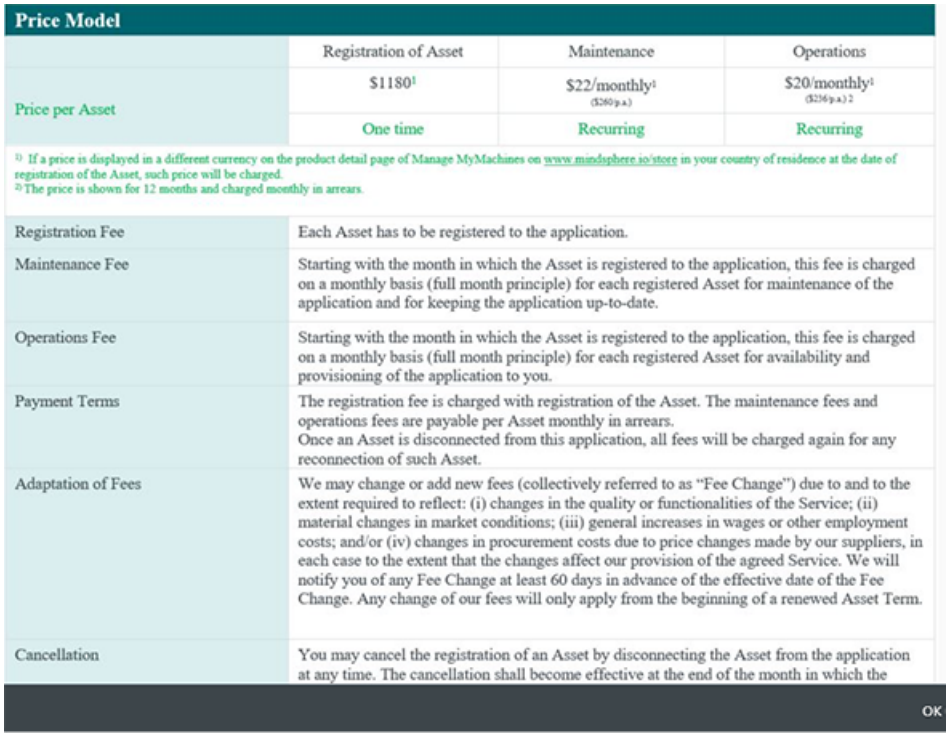
1. Click the "Asset Manager" application and select the required asset in the left-hand side of the window.
2. Click the "MTA Asset Config" icon.
   The "Onboarding / Offboarding" window opens.
3. Click the "Aspects" tab.
   The "SINUMERIK presets" window opens.
   - Activate the checkbox for general license conditions under "Analyze MyPerformance".
   - Set the slider for "Analyze MyPerformance" to "ON" to activate use of "Analyze MyPerformance" for this asset and to enable use of the other slider.
   - Set the slider for "Variable transmission" to "ON" to obtain the data in "Analyze MyPerformance" in the "Aspects" tab and in the MMM dashboard.
   - Click "Save" to save the settings.



Price model

Fees are incurred each time you set the "Analyze MyPerformance" slider to "ON".

- To view the fees, click the "Price Model" link under "Analyze MyPerformance". The information about the price model is displayed.



Price Model

	Registration of Asset	Maintenance	Operations
Price per Asset	$1180[1]	$22/monthly[1] ($260 p.a.)	$20/monthly[1] ($236 p.a.)[2]
	One time	Recurring	Recurring

[1] If a price is displayed in a different currency on the product detail page of Manage MyMachines on www.mindsphere.io/store in your country of residence at the date of registration of the Asset, such price will be charged.
[2] The price is shown for 12 months and charged monthly in arrears.

Registration Fee	Each Asset has to be registered to the application.
Maintenance Fee	Starting with the month in which the Asset is registered to the application, this fee is charged on a monthly basis (full month principle) for each registered Asset for maintenance of the application and for keeping the application up-to-date.
Operations Fee	Starting with the month in which the Asset is registered to the application, this fee is charged on a monthly basis (full month principle) for each registered Asset for availability and provisioning of the application to you.
Payment Terms	The registration fee is charged with registration of the Asset. The maintenance fees and operations fees are payable per Asset monthly in arrears. Once an Asset is disconnected from this application, all fees will be charged again for any reconnection of such Asset.
Adaptation of Fees	We may change or add new fees (collectively referred to as "Fee Change") due to and to the extent required to reflect: (i) changes in the quality or functionalities of the Service; (ii) material changes in market conditions; (iii) general increases in wages or other employment costs; and/or (iv) changes in procurement costs due to price changes made by our suppliers, in each case to the extent that the changes affect our provision of the agreed Service. We will notify you of any Fee Change at least 60 days in advance of the effective date of the Fee Change. Any change of our fees will only apply from the beginning of a renewed Asset Term.
Cancellation	You may cancel the registration of an Asset by disconnecting the Asset from the application at any time. The cancellation shall become effective at the end of the month in which the

OK

3.7.7 Configuring a variable

The following variables may be configured individually:

- Categories (These variables are subject to the appropriate costs.)
  - Time-based / cyclic trigger
  - Trigger based on variable values
  - Alarm-based trigger

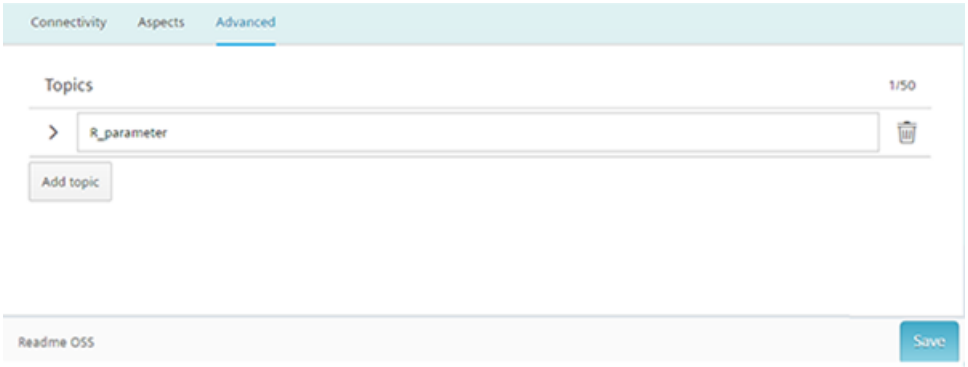
Requirement

Software option

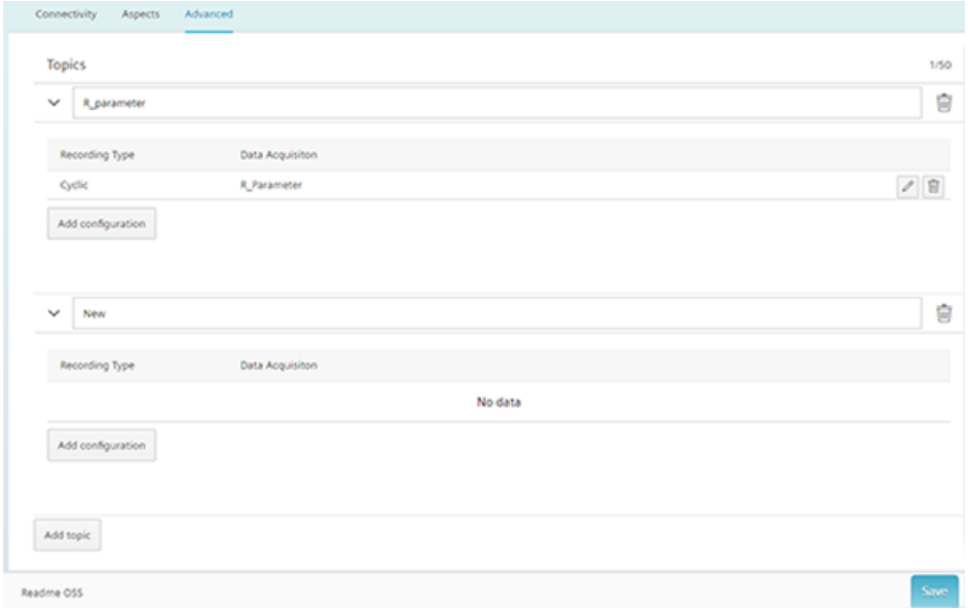
In order to use the variable data, you need the "Path length evaluation" software option (6FC5800-0AM53-0YB0).

Procedure

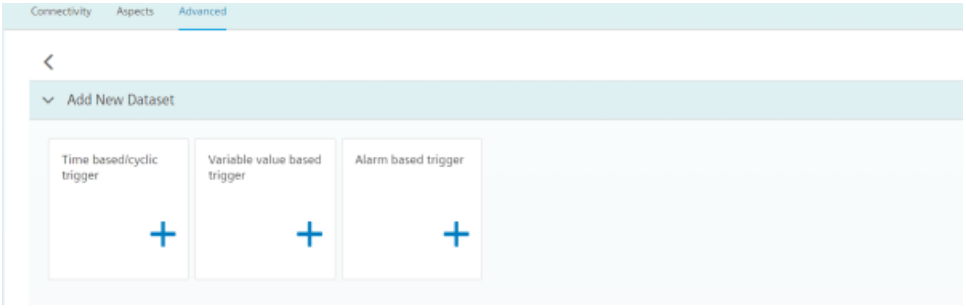
1. In the launchpad, click "Asset Manager" and select the required asset in the left-hand side of the window.
2. Click the "MTA Asset Config" icon.
3. Open the "Advanced" tab.
   The "Topics" window opens.
   - Click "Add topic".
     You obtain a new input field.
   - Enter a name for the topic in the input field.



4. Click on the arrow to the left of the input field to perform additional settings.
   Recording type and data acquisition of the cyclic trigger and alarm trigger are available.



5. Click on the "Edit" icon to create individual cycles or for systematic selection of alarms.
6. Click on the "Add configuration" button to add a new data set.
   The following selection is available:
   - Time-based / cyclic trigger
   - Trigger based on variable values
   - Alarm-based trigger



Time-based / cyclic trigger

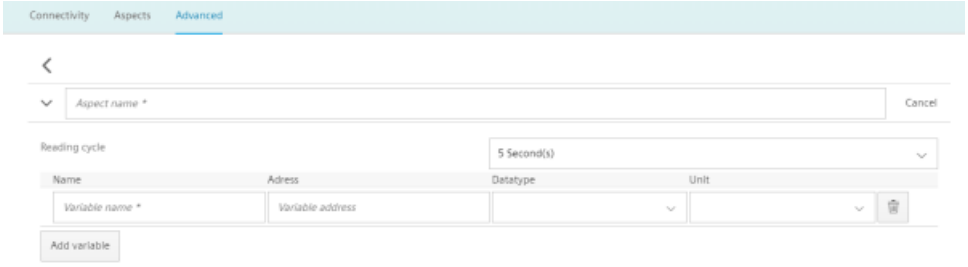
Parameters	Description	
Aspect name	Enter a name to designate a common group of variables. The name must be unique and not exceed 255 characters. The following characters are not permitted: Return, °, $, §, €, \, >, <, ß ä ö ü Ä Ö Ü	
Name	In the variable set, enter a name of the variable to be sensed. Example: Jerk_MA_MX The variable name must have at least three characters. The first character must not be a number or an underscore. Do not use square brackets in the notation of a variable! Do not use any umlauts (special German characters), e.g. "ä", "ö", "ü"!	
Address	Enter the address or the path of a variable. Examples:	
	Axis data:	/Nck/MachineAxis/AATRAVELCOUNT[1] /Nck/MachineAxis/AATRAVELDIST[2]
	Channel data:	/Channel/ChannelDiagnose/CuttingTime[u1] /Channel/ChannelDiagnose/OperatingTime[u1]
	Machine operating mode:	/Bag/State/opMode[u1]
Data type	From the drop-down list select the data type of the variable: • DOUBLE • BOOLEAN • STRING **Note:** If values exceed the floating-point number accuracy, they are displayed with faulty decimal places.	

Parameters	Description
Unit	From the drop-down list, select the physical unit of the variable. Example: m/s^3
A reading cycle	The sampling rate of the data acquisition is specified with this value. From the drop-down list select the time period. Example: 5 seconds

Procedure

1. Click on the "Time-based / cyclic trigger" function.

2. Enter a name in the "Aspect name" input field and click the ">" arrow to the left of the input field.
   Further input fields and drop-down lists open.



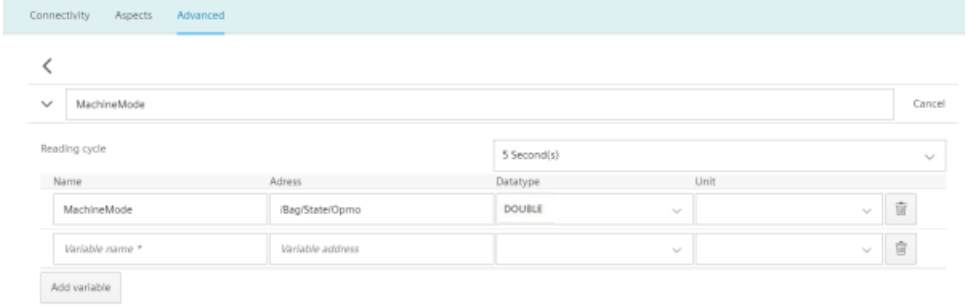
3. Enter the variables in the input fields as in the following example.
   - Click the "Add variable" button to add a new variable.
     If necessary, repeat this step.

     Note
     Limiting the number of variables

     A read cycle time selection of 5 seconds allows the creation of a maximum of 5 variables.

     Otherwise, up to 50 variables can be created.

   - Click the "Delete" icon to delete individual variables.
   - Click on the "Cancel" button to reset the entries.



4. Click the "Save" button to accept the entries.

   Note
   Changing saved variable sets

   After saving, you can only change the following properties of the variable set:
   - Address of a variable
   - Query cycle of the variable set

   If you want to change further properties, you must delete the variable set and create a new one. The previously acquired data is lost!

5. Click the "Exit" button to close the property window without saving the entries.
   You return to the overview of the assets.

Trigger based on variable values

Any variables for which a communication mechanism exists can be linked logically with the variable trigger.

For this you have the following options:

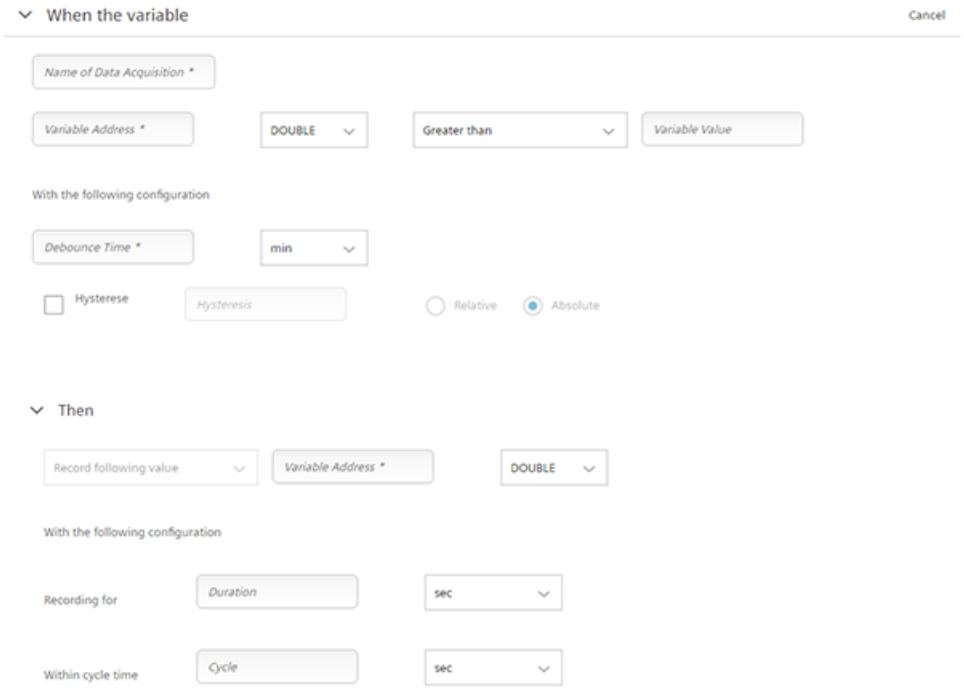
Parameters	Description
When the variable	
Data acquisition name	Enter a previously created variable.
Variable address	Shows the address of the variable.
Data type	From the drop-down list select the data type of the variable. • DOUBLE • BOOLEAN • STRING
	From the drop-down list, select the comparison operation that is restricted to the format of the variables: • Greater than • Less than • Corresponds to • Not equal
Variable value	Enter a value.
With the following configuration	
Debounce time	Enter the debounce time
min	Select the duration of the debounce time from the drop-down list. Minimum: 30 s Maximum: 24 h

Parameters	Description	
Hysteresis	Activate the checkbox if you want to include hysteresis.	
	Activate the "Relative" option button if the relative value in relation to the comparison value is to be recorded. Activate the "Absolute" checkbox if the absolute values in relation to the comparison value is to be recorded. Retriggering to the comparison value only occurs if the actual value differed from the comparison value by more than the stated hysteresis. Enter a comparison value. This is restricted depending on the selection of the address format.	
Then		
Record the subsequent value	Select the value from the drop-down list.	
Variable address	Shows the address of the variable.	
Data type	From the drop-down list select the data type of the variable: • DOUBLE • BOOLEAN • STRING	
With the following configuration		
Recording for	Duration Enter the duration Minimum: 30 s Maximum: 24 h	Time unit Select the time unit from the drop-down list.
Within the cycle time	Cycle Enter a cycle Minimum: 30 s Maximum: 24 h	Time unit Select the time unit from the drop-down list.

Procedure

1. Click on the "Trigger based on variable values" function to define dependencies.

2. Select a variable and open further input fields and drop-down lists with the arrow.
3. Enter the dependencies.
   Click the "Save" button to save the variable trigger.



Alarm-based trigger

The alarm-based trigger reacts to all alarms programmed in the control.

These alarms also contain the user range of alarm numbers that are assigned the machine functions for the machine diagnostics. If machine diagnostics are not performed on the basis of alarm numbers, these error messages cannot be integrated. The alarm numbers that are triggered can be entered individually, in groups, or in series. It is also possible to remove individual alarms or groups from a selection. You can link conditions that themselves do not activate a trigger.

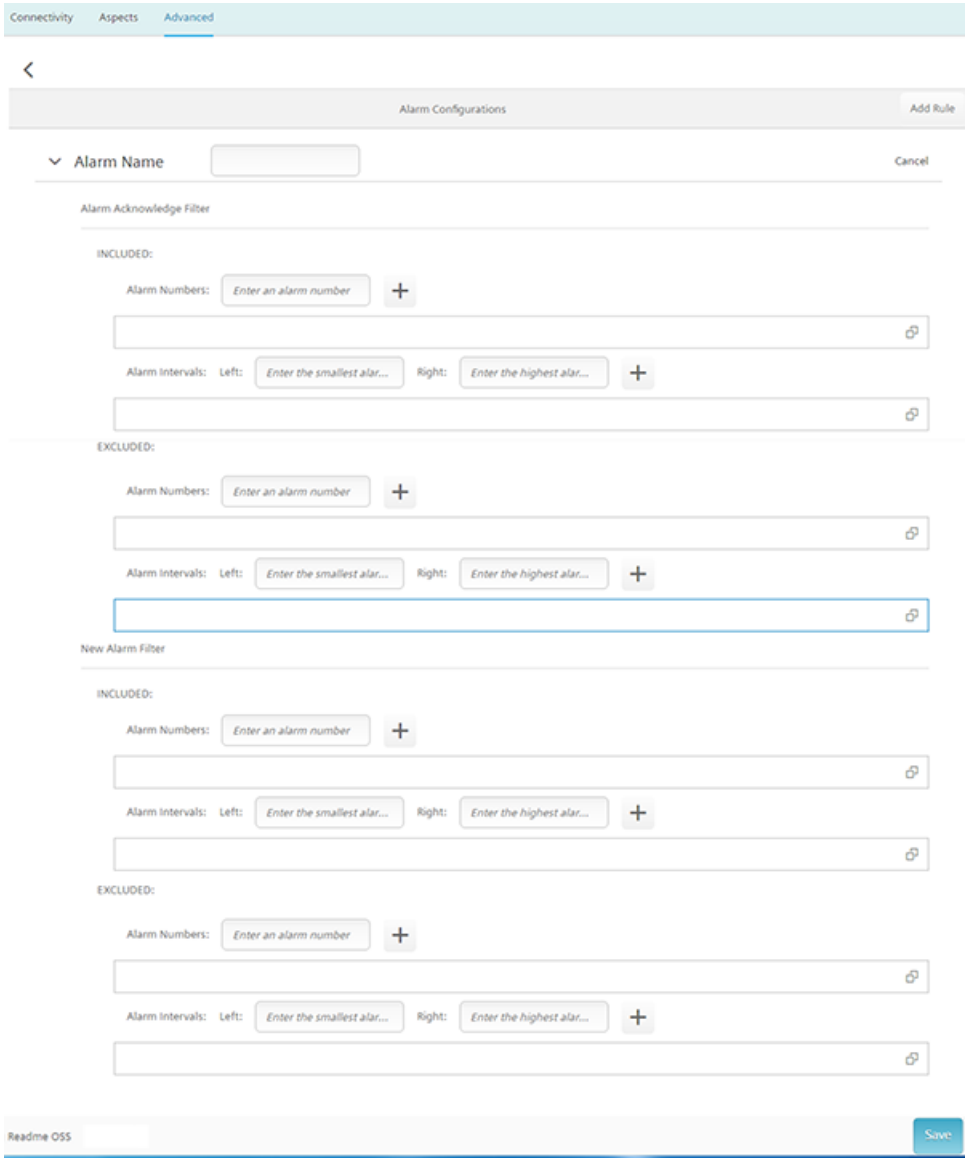
Parameters	Description
Alarm name	Enter a descriptive name for the alarm.
Alarm acknowledgement filter	
INCLUDED	

Parameters	Description
Alarm codes:	Enter the alarm numbers or the alarm IDs that activate the trigger. The alarms are entered in the following notation: • Separate the individual alarms through a comma, e.g. 3200, 32100, ... • Enter the alarm number ranges with a "-" character, e.g. 4000-5000 The alarm list must not exceed 200 characters.
Alarm intervals: Left / Right:	Enter the alarm limits: • Left: Enter the lowest alarm ID, e.g. 0 • Right: Enter the highest alarm ID, e.g. 99999 All alarms between 0 and 99999 are included.
EXCLUDED	
Alarm codes:	Enter the alarm numbers that do not activate the trigger. The alarms are entered in the following notation: • Separate the individual alarms through a comma, e.g. 3200, 32100, ... • Enter the alarm number ranges with a "-" character, e.g. 4000-5000 The list of alarm numbers must not exceed 200 characters.
Alarm intervals: Left / Right:	Enter the alarm limits: • Left: Enter the lowest alarm ID, e.g. 0 • Right: Enter the highest alarm ID, e.g. 99999 All alarms between 0 and 99999 are included.
New alarm filter	
INCLUDED	All fields, the same as under "Alarm Acknowledge Filter" - "INCLUDED"
EXCLUDED	All fields, the same as under "Alarm Acknowledge Filter" - "EXCLUDED"

Procedure

1. Click the "Alarm based trigger" function to define alarm properties, e.g. when an alarm should be displayed.

2. Enter a name for the alarm and specify the properties.
   Click the "Save" button to save the alarm based trigger.



References

Further variables can be found in the following List Manual: SINUMERIK 840D sl, NC Variables and Interface Signals

3.7.8 Activating workpiece counters

The SINUMERIK control system can be configured to automatically accept the number of workpieces produced in Analyze MyPerformance /OEE Monitor. 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.

The system variable $AC_TOTAL_PARTS in the SINUMERIK control system is used to count the number of workpieces produced.

System variable	Meaning
$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

The counter is not reset either by a RESET or 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 is 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 Monitor.

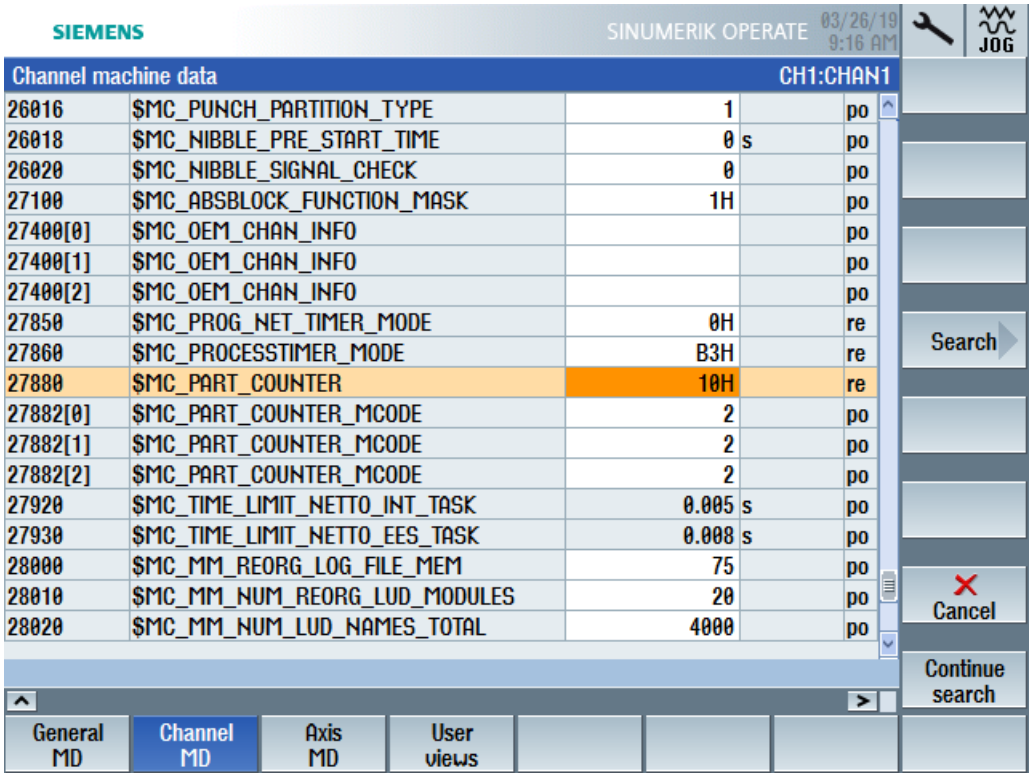
MD27880 $MC_PART_COUNTER	Activation of the workpiece counters
Bit 4 = 1	The counter $AC_TOTAL_PARTS is active
Bit 5 = 0	M02/M30 increments the $AC_TOTAL_PARTS counter by 1
Bit 5 = 1	The M command defined in MD27882[0] increments the $AC_TOTAL_PARTS counter by 1
Bit 6 = 0	$AC_TOTAL_PARTS is also active 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.

3.8 Disconnecting the SINUMERIK control system from MindSphere

3.8.1 Overview

Introduction

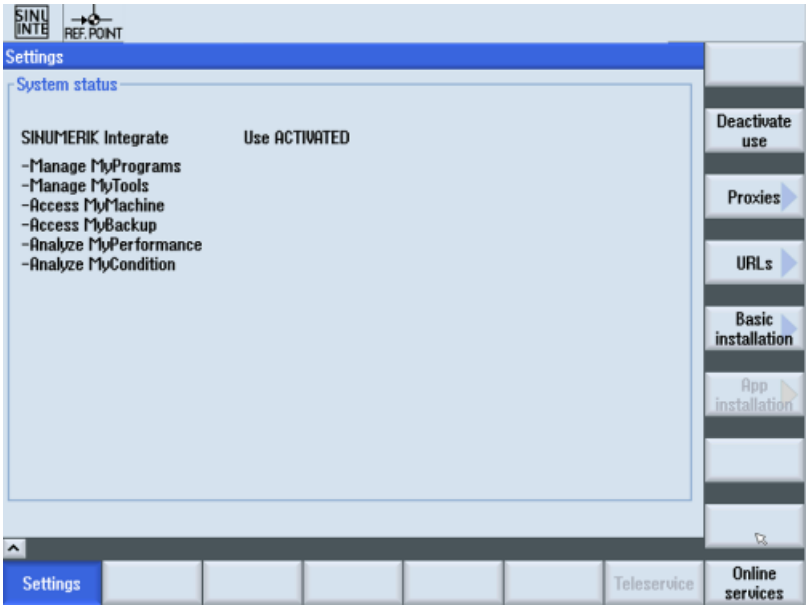
Proceed as follows if you no longer wish to use the "Analyze MyPerformance" MindSphere application on your SINUMERIK control system.

1. Lock SINUMERIK Integrate: Deactivating use of SINUMERIK Integrate (Page 69)
2. In the "Asset Manager", disconnect the machine tool system from MindSphere: Disconnecting the SINUMERIK control system from MindSphere (Page 69)

3.8.2 Deactivating use of SINUMERIK Integrate

Procedure

1. Press the "SINUMERIK Integrate" softkey.
   The "SINUMERIK Integrate" welcome window opens.
2. Press the "Settings" softkey.
   The "Settings" window opens displaying the system status "Use ACTIVATED".
   – Press the "Deactivate use" softkey.



3. You obtain the confirmation prompt "Do you really want to deactivate the use of the SINUMERIK Integrate applications?".
   – Press the "OK" softkey to confirm the prompt.
   The use of SINUMERIK Integrate applications is deactivated.

3.8.3 Disconnecting the SINUMERIK control system from MindSphere

Using the MindSphere application "Asset Manager", disconnect the SINUMERIK control from MindSphere.

References

Additional information on this is provided in the MindSphere System Manual:

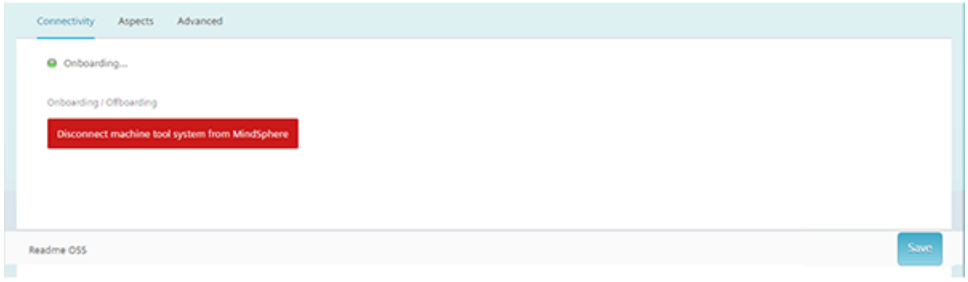
- Chapter: Roles within MindSphere
- Chapter: Configuring assets

Requirement

You require the "MindAccess User" role in MindSphere to do this.

Procedure

1. Click the "Asset Manager" MindSphere application, and select an asset in the left window pane.
2. Click the "MTA Asset Config" icon in the right-hand side of the window.
3. Under the "Connectivity" tab, you can see the connection status, e.g. "Onboarding...".
   - Click the "Disconnect machine tool from MindSphere" button to disconnect the asset from MindSphere.
   - Click "Save" to save the setting.



Note

After MindSphere and the machine tool have been disconnected, we recommend deleting the following files from your SINUMERIK control system:

- All files in the "boot_job" folder
- All files in the "cache" folder
- All files in the "service_job" folder

Working with Analyze MyPerformance /OEE Monitor

4

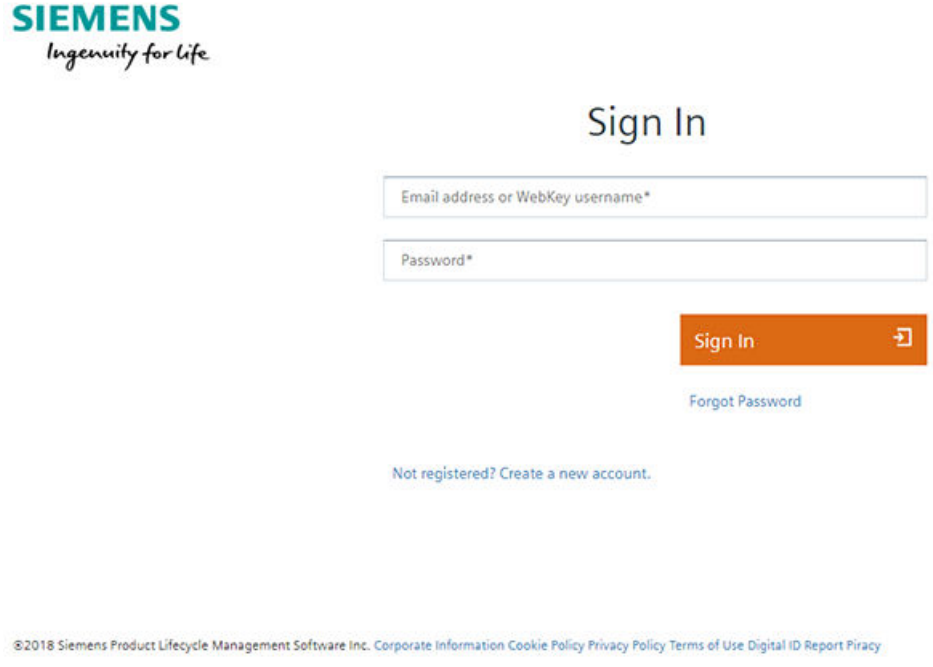
4.1 Log in at / log out from Analyze MyPerformance /OEE Monitor

Requirement

The access authorization for Analyze MyPerformance /OEE Monitor is set up.

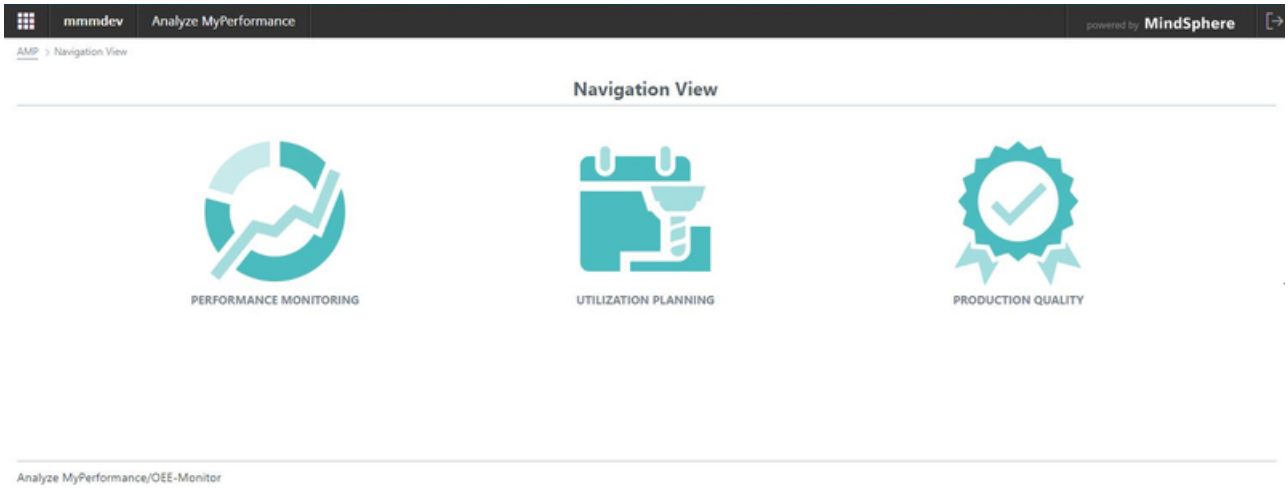
Procedure

1. Click the link provided by email from Siemens AG.
   The website is displayed: https://<your-account-name>.eu1.mindsphere.io
2. The "Sign In" window opens.
   - Enter your e-mail address and your password.
   - Click the "Sign In" button.



3. The launchpad opens and you have access to the individual applications.
   Click on the "Analyze MyPerformance" application.

4. The "Overview" window opens and lists the following functions:
   - Performance monitoring (Page 72)
   - Utilization planning (Page 77)
   - Production quality (Page 84)



5. For further information, click "Analyze MyPerformance /OEE Monitor" in the header line:
   - Version information
   - User documentation
   - Readme OSS: You open the "Siemens Third-Party Software disclosure document" document.
     The OSS licenses as well as the license conditions are also provided on this page.
   - Support information: You open online support

4.2 Performance monitoring

4.2.1 Overview

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

All of the integrated machines are displayed as selections.

The following criteria are available:

- OEE (Overall Equipment Efficiency)
- Availability
- Performance
- Quality

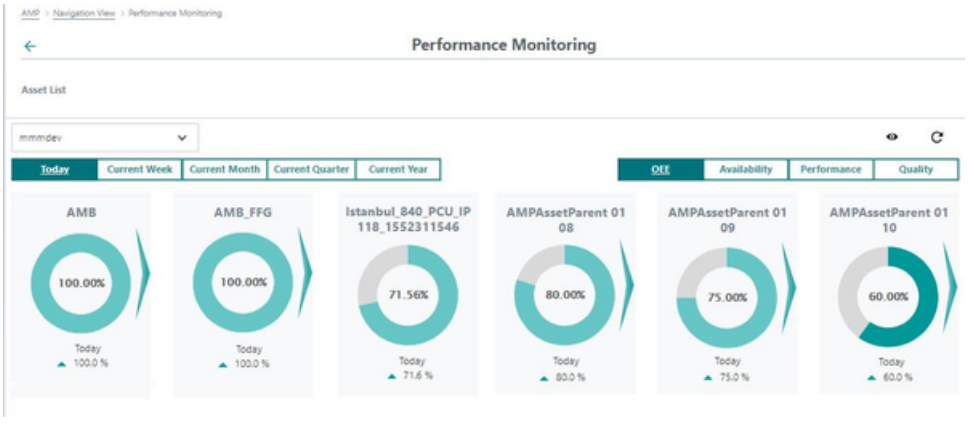
The following monitoring intervals are available:

- Today
- Current week
- Current month
- Current quarter
- Current year

Procedure

1. Click the "PERFORMANCE MONITORING" button in the "Overview" window.

2. The "Performance Monitoring" window opens.



4.2.2 Buttons and elements

Parameters/elements in the "Performance Monitoring" window

The following parameters and elements are available for editing:

Parameter/element	Function
Drop-down lists	
Asset List	Clicking on the small arrow opens the drop-down list for selecting the machine.
Buttons	
	Clicking on the "Screenshot" button generates a screenshot of the current window.

Parameter/element	Function
	You update the opened window by clicking on the "Refresh" button.
Buttons for narrowing down the monitoring	
	Clicking on the "Machine" button opens the "Hierarchy Details" window for the corresponding machine.
	Clicking on the "OEE" button opens the "Hierarchy Details" window.
	Clicking on the "Availability" button opens the availability curve in the "Hierarchy Details" window.
	Clicking on the "Performance" button opens the performance curve in the "Hierarchy Details" window.
	Clicking on the "Quality" button opens the quality curve in the "Hierarchy Details" window.
Time buttons	
	Clicking on the "Today" button opens the current today curve in the "Hierarchy Details" window.
	Clicking on the "Current Week" button opens the current week curve in the "Hierarchy Details" window.
	Clicking on the "Current Month" button opens the current month curve in the "Hierarchy Details" window.
	Clicking on the "Current Quarter" button opens the current quarter curve in the "Hierarchy Details" window.
	Clicking on the "Current Year" button opens the current year curve in the "Hierarchy Details" window.

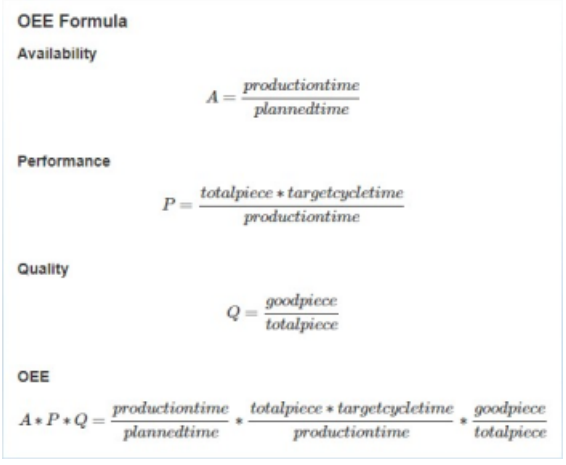
4.2.3 Monitoring performance

KPI development

The output indicator "Key Performance Indicator (KPI)" is calculated at the following times:

Today:	At 10' and 40' past each hour
Weekly:	Daily at 04:00 a.m. and 04:00 p.m. UTC
Monthly:	Daily at 05:00 a.m. UTC
Annually:	Daily at 07:00 a.m. UTC

The OEE formula has the following composition:



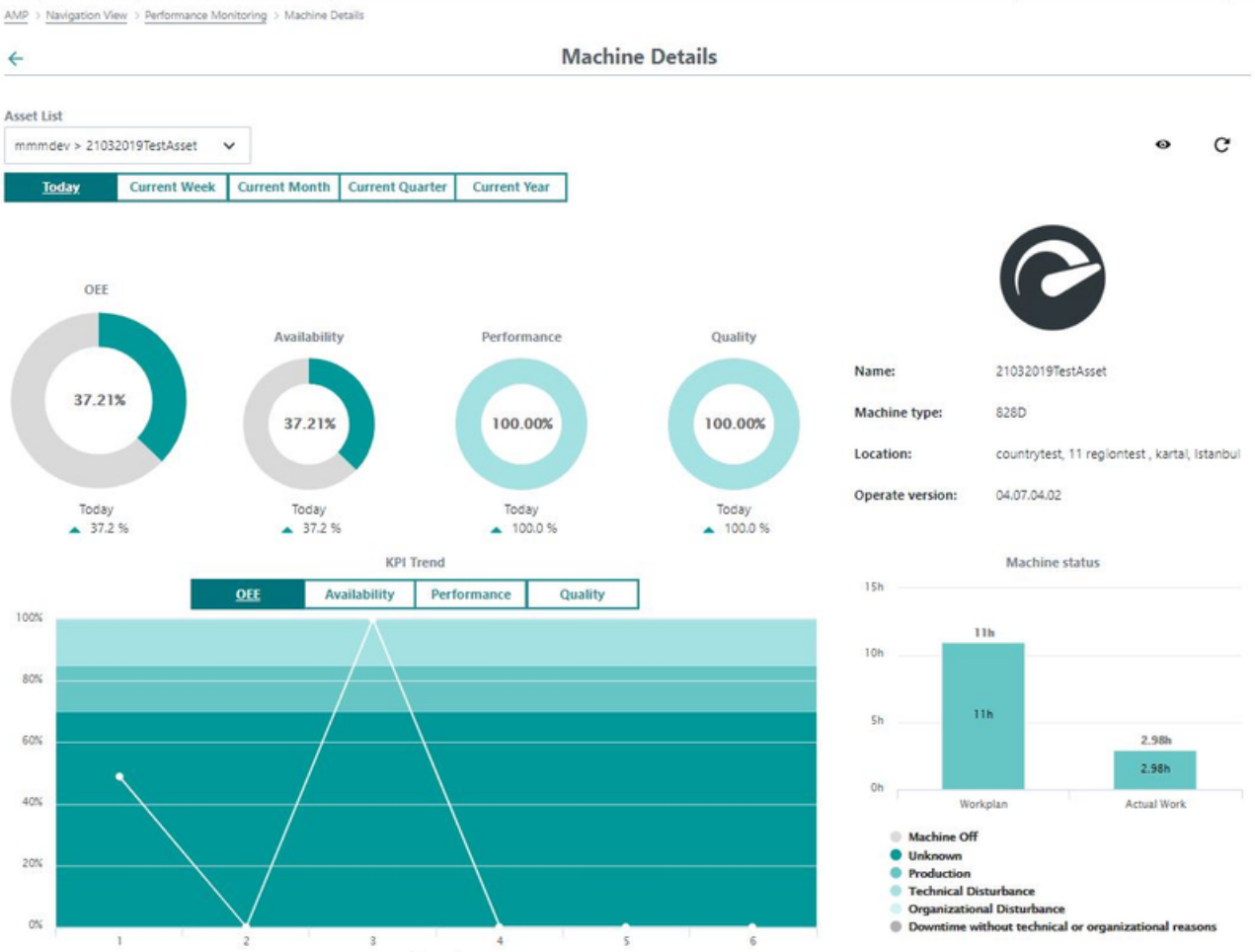
Procedure

1. The "Performance Monitoring" window is open.
2. Clicking on the small arrow opens the drop-down "Asset List".
   The list of available machines is displayed.
3. Select the required SINUMERIK control system (machine) using the cursor.
   The machine is displayed in the input field and as machine button together with the following data.
   - Name
   - Machine type
   - Location
   - SINUMERIK version
   - Machine status: The following data are displayed:
     Machine offline
     Unknown
     Production
     Organizational disturbance
     Disturbance without technical or organizational reasons

4. Press the appropriate machine button.

5. The "Hierarchy Details" window is opened.
   Press the required time button. The performance for the selected time interval is displayed.
   - You can see the performance as a percentage in the circles.
   - The performance is graphically prepared in the diagram.
   - The performance is likewise graphically prepared in the bar chart.

   Select the required monitoring parameter in order to display the KPI development:
   - OEE
   - Availability
   - Performance
   - Quality



4.3 Utilization planning

4.3.1 Overview

You define the utilization plans for the individual SINUMERIK control systems in the "Utilization Planning" window.

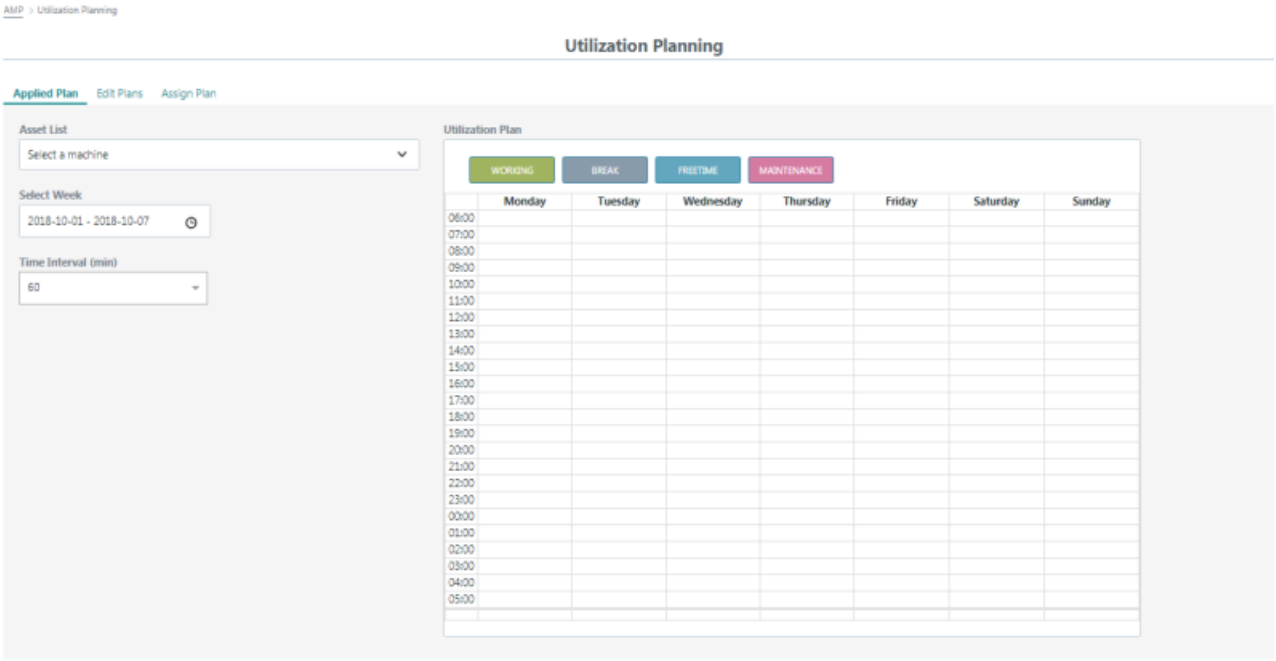
3 tabs are available for editing:

- Applied Plan: (Page 79)
  In this tab, select a utilization plan.
- Edit Plans (Page 80)
  In this tab, you create utilization plans.
- Assign Plan (Page 83)
  In this tab, you assign the various utilization plans to the SINUMERIK control systems.

Procedure

1. Click the "UTILIZATION PLANNING" button in the "Overview" window.

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

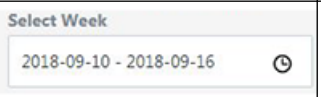
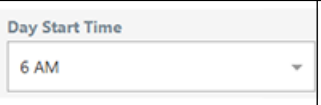


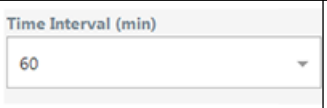
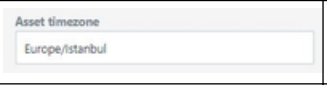
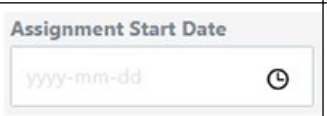
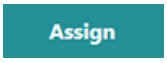
4.3.2 Buttons and elements

The following buttons and elements are available in the tabs of the "Utilization Planning" window for editing.

Parameters/elements in the "Utilization Planning" window

The following parameters and elements are available for editing:

Parameter/element	Function
Utilization plan buttons	
	Identifies the corresponding times as working times.
	Identifies the corresponding times as break times.
	Identifies the corresponding times as free time.
	Identifies the corresponding times as waiting times.
"Applied Plan" tab	
	Clicking on the small arrow opens the drop-down list for selecting a machine.
	Clicking on the clock icon opens the calendar for defining the time period.
	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.
"Edit Plans" tab	
	Clicking on the small arrow opens the drop-down list for selecting the shift calendar that has been created.
	Clicking on the small arrow opens the drop-down list for selecting the available start times.
	Enter the designation for a new utilization plan.

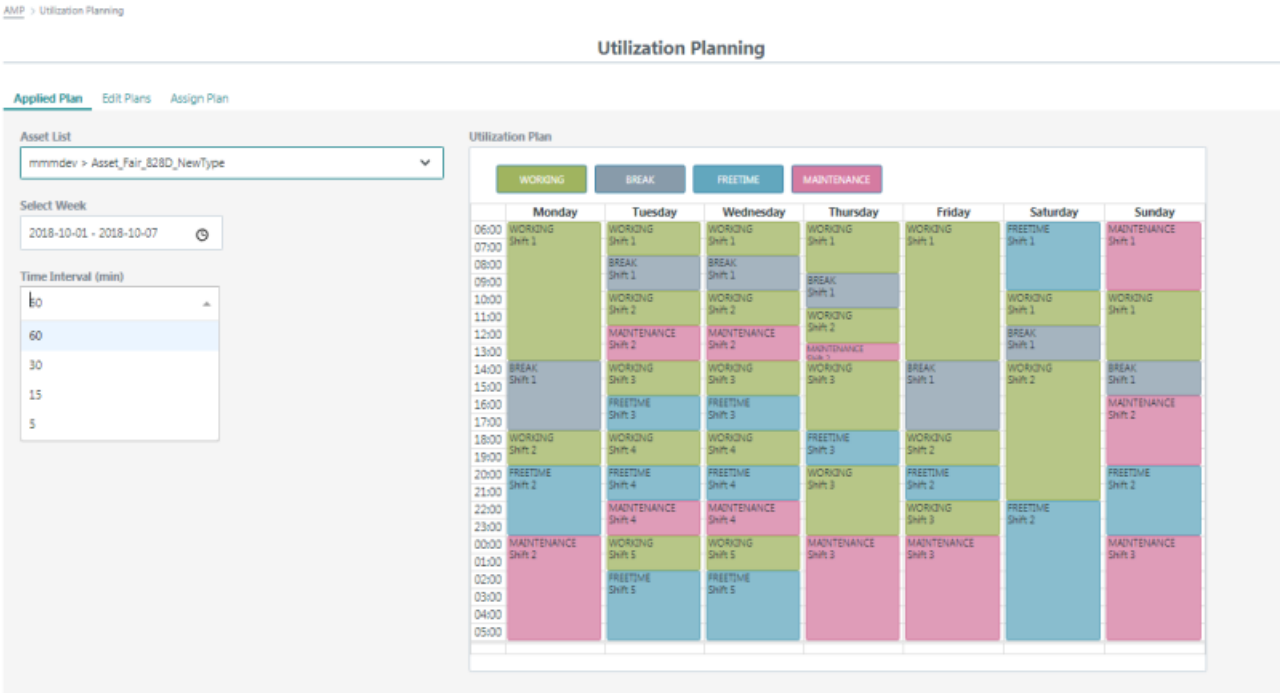
Parameter/element	Function
	Clicking on the small arrow opens the drop-down list to select the available time interval in minutes. • 60 • 30 • 15 • 5 The utilization plan is displayed with the selected time intervals.
	Click the "Delete" button to delete the settings.
	Click the "Save" button to save the settings.
"Assignment" tab	
	Clicking on the small arrow opens the drop-down list for selecting the available shift calendar templates.
	Displays the assigned time zone.
	Clicking on the clock icon opens the calendar for defining the start date.
	Click the "Assign" button to assign the utilization plan that was created to the appropriate machine.

4.3.3 The "Applied Plan" tab

Procedure

1. In the "Utilization Planning" window, open the "Applied Plan" tab.
2. Open the drop-down "Asset List".
   The list of available machines is displayed.
   Select the required SINUMERIK control system (machine) using the cursor.

3. Click on the clock icon in the "Select Week" selection box.
   The "Select Week" calendar is opened.
   Click to select the required week.
4. In the drop-down list "Time Interval (min)", select the required interval.
   The machine utilization plan is displayed for the selected time period.



4.3.4 The "Edit Plans" tab

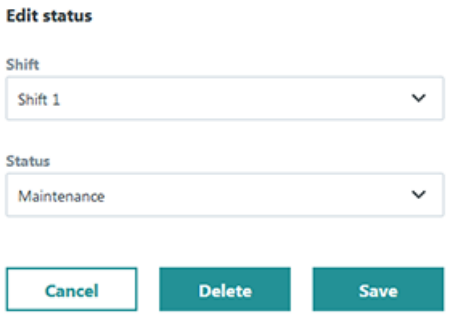
In the "Edit Plans" tab, you have the following options:

- Creating utilization plans
- Deleting utilization plans

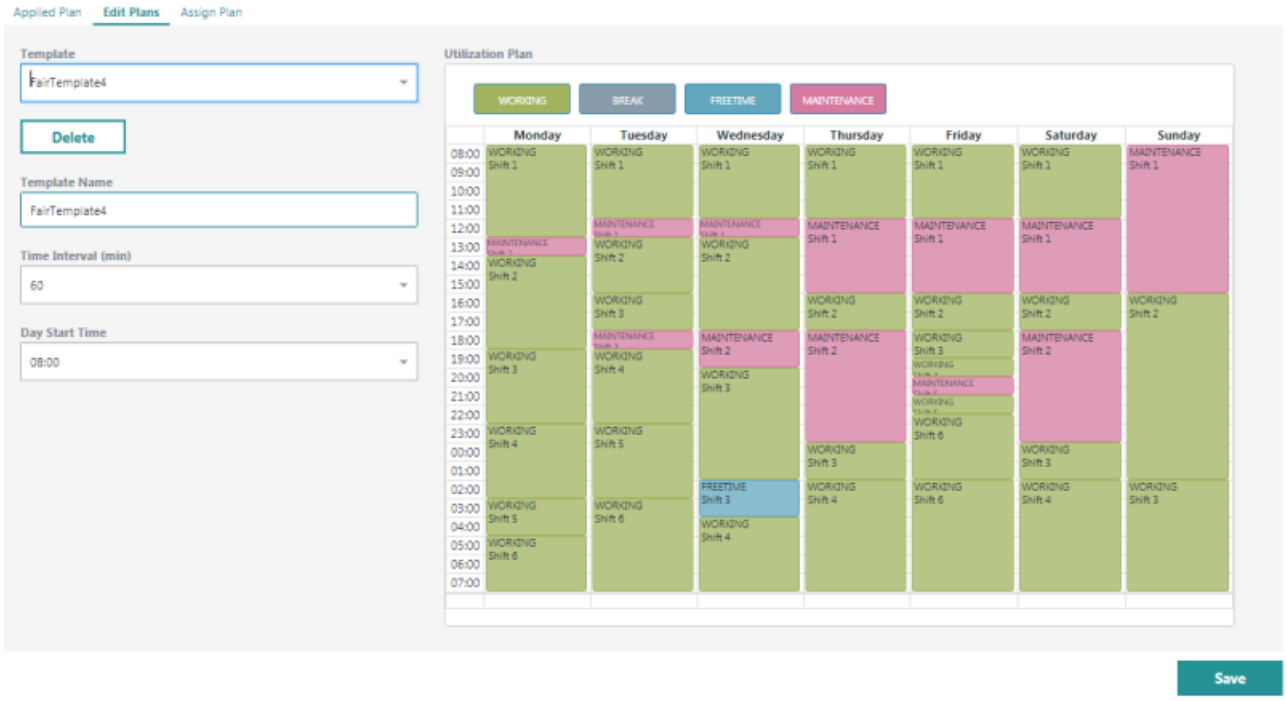
Creating a utilization plan

1. In the "Utilization Planning" window, open the "Edit Plans" tab.
2. Open the drop-down list "Template".
   You can select the following:
   - Click "New Template" if you want to create a new utilization plan.
   - Click a previously created template that you wish 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.

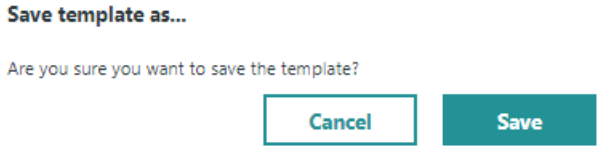
5. Open the drop-down list "Day start time".
   Select the desired start time for the day with a mouse click.
6. Enter the desired times in the machine utilization plan as follows:
   – Click one of the buttons above the weekly plan (e.g. BREAK), and drag the button to the required position in the machine utilization plan.
   – Then position the cursor at the upper or 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.
7. Double-click the positioned button in the machine utilization plan.
   The "Edit status" window opens.
8. Select the desired shift number from the "Shift" drop-down list.
   Note the following:
   – Each day, the shift numbering starts with "1".
   – Several entries can be assigned to the same shift.
   – The shift number may only be incremented by "1" for each entry.
9. If necessary, select a new status from the "Status" drop-down list.
10. 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.



11. Click "Save" to save the machine utilization plan.



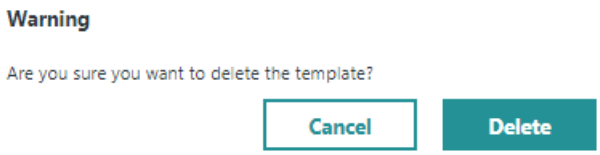
12. The "Save template as..." window opens.
    To save the new template, click on the "Save" button.
    - OR -
    To cancel the operation, click on the "Cancel" button.



Deleting a utilization plan

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 wish 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".



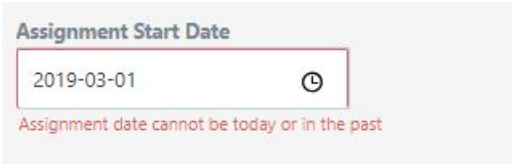
4.3.5 The "Assign Plan" tab

Proceed as follows to assign a utilization plan.

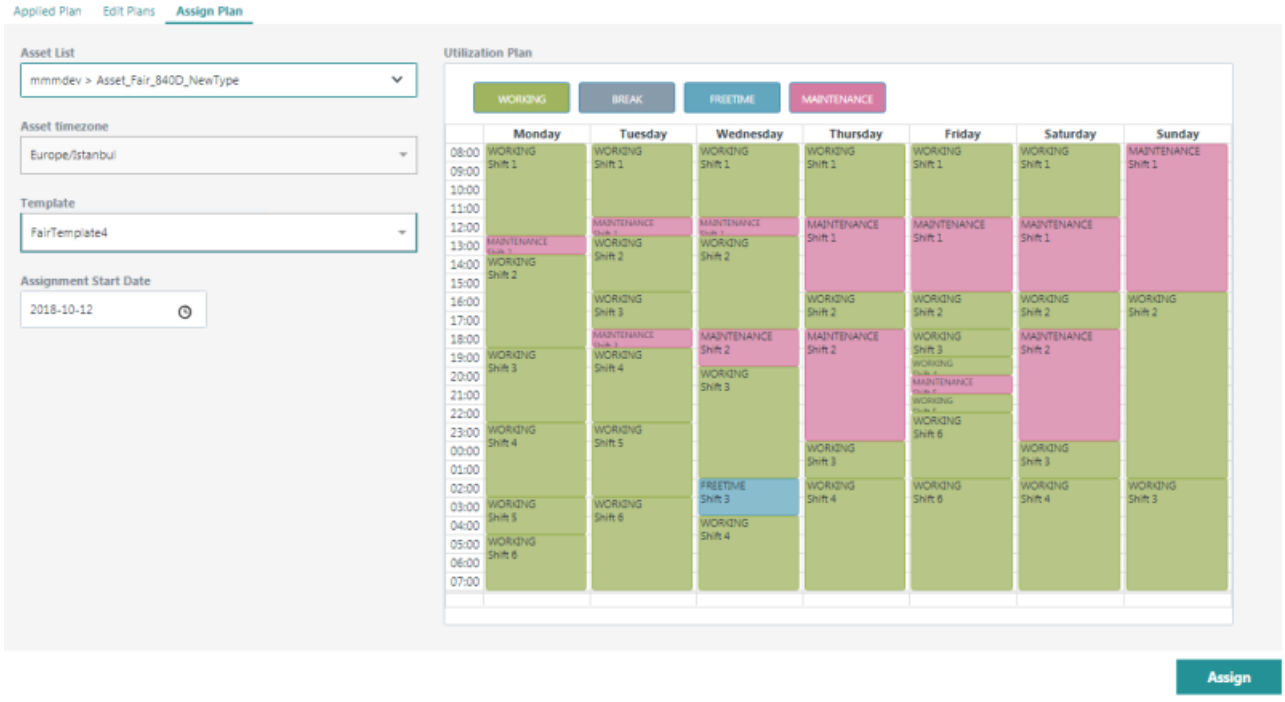
Procedure

1. In the "Utilization Planning" window, open the "Assign Plan " tab.
2. Open the drop-down "Asset List".
   The list of available machines is displayed.
   Use the cursor to select the required SINUMERIK 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.
   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 successfully completed".



4.4 Production quality

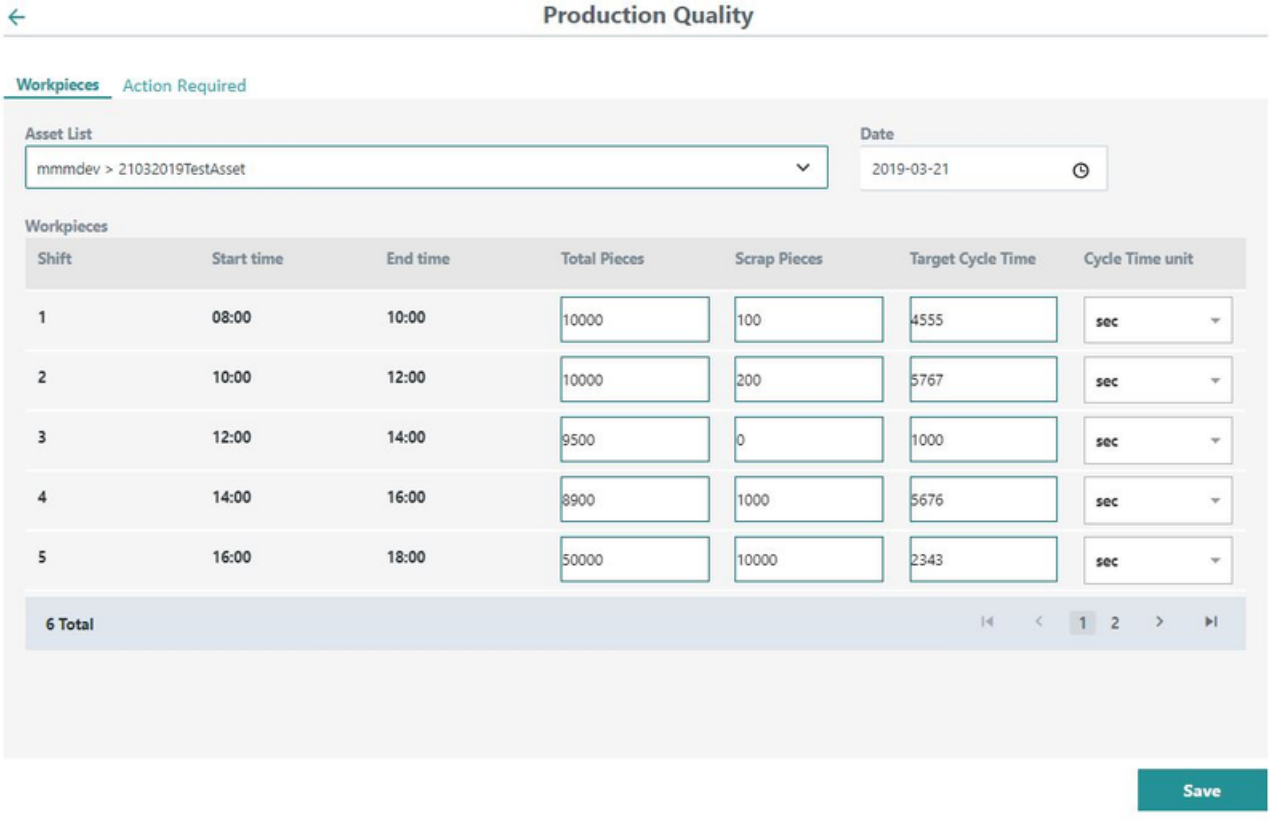
4.4.1 Overview

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

Procedure

1. Click on the "PRODUCTION QUALITY" icon in the "Overview" window.

2. The "Production Quality" window opens.



4.4.2 Buttons and elements

Parameters/elements in the "Production Quality" window

The following parameters and elements are available for editing:

Parameter/element	Function
	Clicking on the arrow opens the drop-down list "Asset List" for selecting the SINUMERIK control (machine).
	Clicking on the clock icon opens the calendar to select the date.
	Click the "Save" button to save the current events.
Columns in the "Workpieces" table	
Shift	Displays the appropriate shift
Start time	Displays the start time of the shift
End time	Displays the end of shift time
Total pieces	Displays the number of error-free parts produced
Scrap pieces	Displays the number of parts produced with error
Target cycle time	Displays the time to produce a part
Cycle Time unit	Drop-down list to select the following time unit. • sec = seconds • min = minutes • h = hours

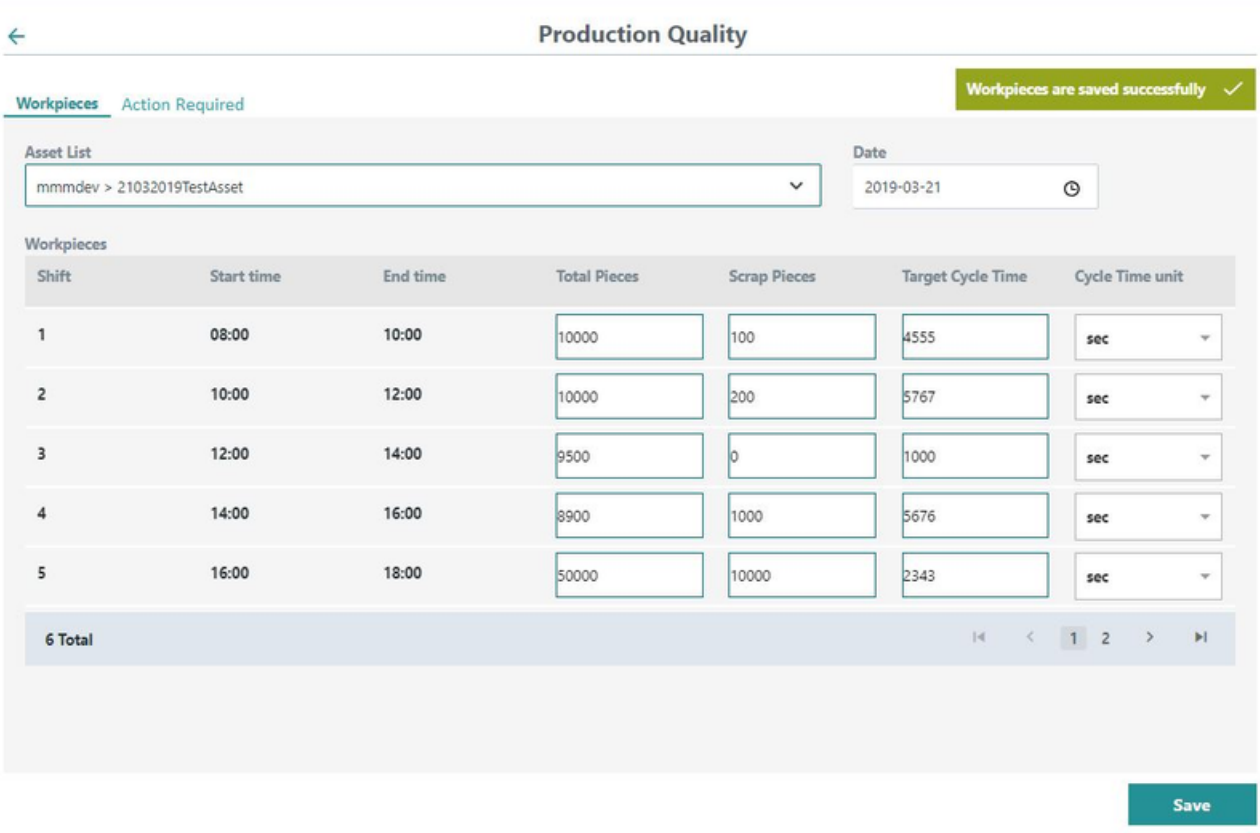
4.4.3 Checking production quality

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

Procedure

1. In the "Production Quality" window, open the "Workpieces" tab.
2. Clicking on the small arrow opens the drop-down "Asset List".
   The list of available machines is displayed.
   Select the required SINUMERIK 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.
4. Click "Save" to save the data.
   "Workpieces were successfully saved" is displayed the right-hand upper part of the window to show that the operation was successfully completed.

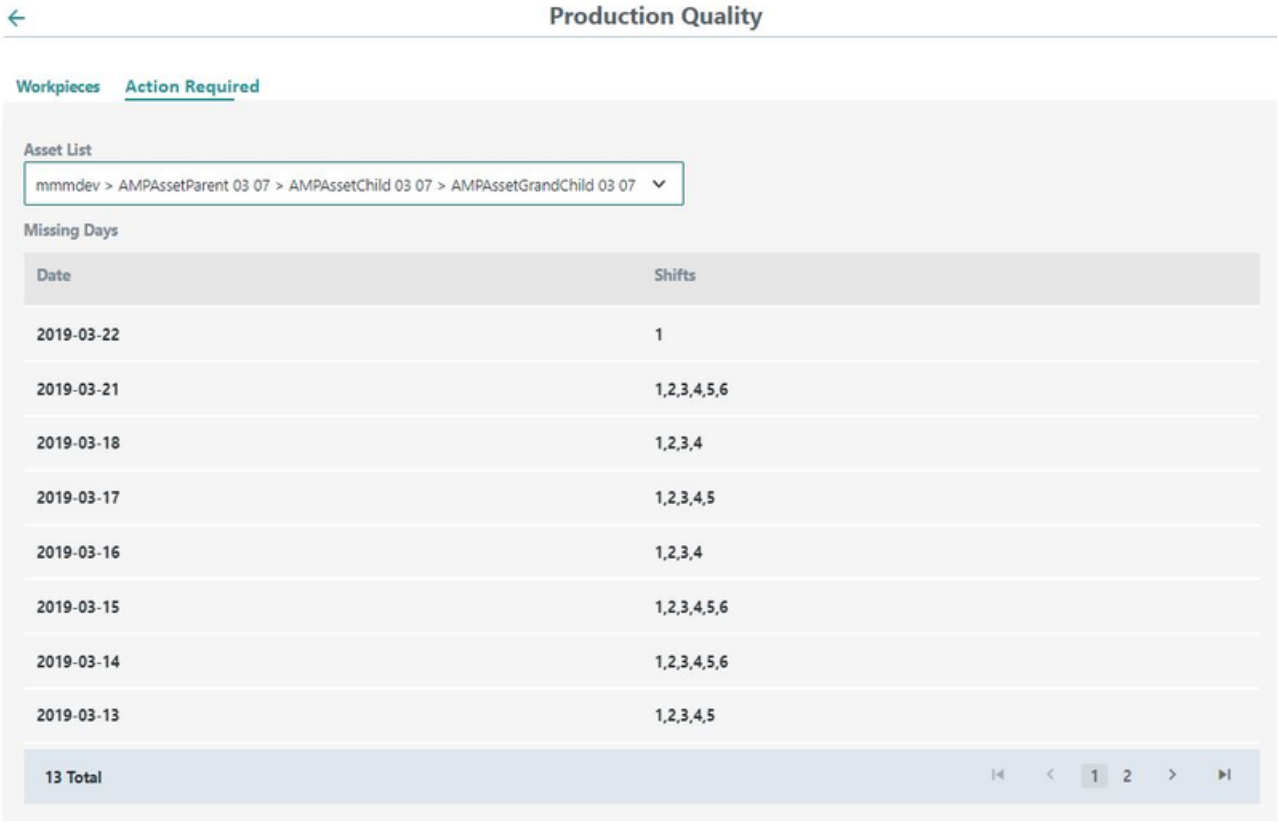


4.4.4 The "Action required" tab

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

Procedure

1. Open the "Action required" tab in the "Production Quality" window.
2. Clicking on the small arrow opens the drop-down "Asset List".
   The list of available machines is displayed.
   Select the required SINUMERIK control system (machine) using the mouse.
3. The corresponding dates are displayed in the "Missing Days" table.



Appendix

A

A.1 List of abbreviations

Admin	Administrator (user role)
AMC	Analyze MyCondition
AMP	Analyze MyPerformance /OEE Monitor
CNC	Computerized Numerical Control
COM	Communication
DIR	Directory
FAQ	Frequently Asked Questions
h	Hour
HTTP	Hypertext Transfer Protocol
HTTPS	HyperText Transfer Protocol Secure
IB	Commissioning engineer (user role)
ID	Identification number
IE	Internet Explorer
IFC	Interface Client
IoT	Internet of Things
IPC	Industrial PC
KPI	Key Performance Indicator
MB	Megabyte
MLFB	Machine-Readable Product Code
MMM	Manage MyMachines
MSTT	Machine control panel
NC	Numerical Control
NCU	Numerical Control Unit, NC hardware unit
OEE	Overall Equipment Efficiency
OEM	Original Equipment Manufacturer
OP	Operation Panel
OSS	Open Source Software
PC	Personal Computer
PCU	PC Unit, computing unit
PLC	Programmable Logic Control: PLC
SI	SINUMERIK Integrate
SK	Softkey
SW	Software
URL	Uniform Resource Locator
UTC	Universal Time Coordinated, coordinated global time

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U

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