SIEMENS

MindSphere

MindApp
Manage MyMachines

Function Manual

Valid for control:
SINUMERIK 840D sl
Manage MyMachines Version 1.0

08/2017
A5E39084455B-AD

Legal information

Warning notice system

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

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

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

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

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

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

Qualified Personnel

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

Proper use of Siemens products

Note the following:

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

Trademarks

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.

Siemens AG
Division Digital Factory
Postfach 48 48
90026 NÜRNBERG
GERMANY

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Preface

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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.

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.

Fundamental safety instructions 2

2.1 General safety instructions

⚠ WARNING

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

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

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

⚠ WARNING

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

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

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

2.2 Warranty and liability for application examples

The application examples are not binding and do not claim to be complete regarding configuration, equipment or any eventuality which may arise. The application examples do not represent specific customer solutions, but are only intended to provide support for typical tasks. You are responsible for the proper operation of the described products. These application examples do not relieve you of your responsibility for safe handling when using, installing, operating and maintaining the equipment.

2.3 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. Siemens products and solutions only represent one component of such a concept.

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

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

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

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

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

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

⚠ WARNING

Unsafe operating states resulting from software manipulation

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

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

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3.1 Overview

This document describes the following:

How you connect MindSphere to the machine, see Section: Setting up the machine (Page 17)

For the functionality of the "Manage MyMachines" MindApp, see Section: Manage MyMachines (Page 43)

MindSphere

MindSphere is an Industrial IoT ecosystem from Siemens and contains several applications, the so-called MindApps, in a Launchpad.

Table 3-1 Applications in MindSphere

MindApp	Description
IoT Data Modeler	In the "IoT Data Modeler", you create and configure the machine tools through so-called assets. The description for this can be found in the following System Manual: MindSphere, Section: IoT Data Modeler
Fleet Manager	The "Fleet Manager" visualizes, monitors and analyzes your assets. The description for this can be found in the following System Manual: MindSphere, Section: Fleet Manager
Manage MyMachines	"Manage MyMachines" provides an overview of the machine tools configured in your MindSphere. For further information, see Section: Manage MyMachines (Page 43).

Manage MyMachines

The "Manage MyMachines" MindApp visualizes numerous operating and plant-specific data of machine tools or individual machine components for production, service and maintenance. This increases the transparency of the machine tools connected in MindSphere.

The following functions are possible:

- Worldwide distributed machines can be managed and displayed.
- Visualize relevant information in an overview page.
- Intuitive creation of rules and queries.
- Simple installation through integrated SINUMERIK Integrate client.
- Combines critical machine data for a meaningful analysis.
- Create your own digital service portfolio based on the MindApp.

The data that you provide is exclusively variables from the NC, the PLC or from the drives. This data enables conclusions to be drawn with regard to:

- Availability
- Operating times
- Operating state, state duration
- Maintenance, wait times
- Technical state

The corresponding data is either preconfigured or can be defined centrally by the user and configured with appropriate warning limits. It is also possible to identify trends with the aid of measuring series.

The data processing and visualization is performed on the MindSphere platform.

References

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

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

In addition to the manuals, you can also find data sheets and FAQs at the following link: MindSphere (https://support.industry.siemens.com/cs/document/109742256/mindsphere-%E2%80%93-overview-about-the-most-important-documents-and-links?dti=0&lc=en-DE // XmlEditor.InternalXmlClipboard:de9c127e-7905-dff4-8714-6253d0902bc0)

3.2 System requirements

In order to use "Manage MyMachines", please observe the following system requirements.

Hardware and operating software

- SINUMERIK 840D sl with SINUMERIK Operate (NCU with Linux and PCU 50 with Win7)
- PC with web browser or tablet with a minimum resolution of 1980 x 1080 pixel and Internet access to the World Wide Web

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 MMM at the OEM or end customer.

Web browser

You can use the following web browsers:

- Chrome
- Firefox and Firefox ESR

Always use the latest version.

Software

The connection is via the integrated SINUMERIK Integrate client.

SINUMERIK Operate	SINUMERIK Integrate client
4.5 SP4 HF1 to HF6	02.00.09
4.5 SP5 HF1 to HF6	
4.5 SP6 HF1 to HF3, HF5, HF6	
4.7 SP2 HF1 to HF4	03.00.09
4.7 SP3 HF1 to HF3	
4.7 SP4	

Note

Parallel operation with SINUMERIK Integrate applications

Parallel operation with SINUMERIK Integrate applications is not possible.

Delivery form

The SINUMERIK Integrate client as well as the latest 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.

References

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

SINUMERIK Operate Commissioning Manual (IM9)

For further information on "SINUMERIK Integrate", please refer to:

SINUMERIK Integrate MMP, MMT, AMC, AMP, AMD Commissioning Manual

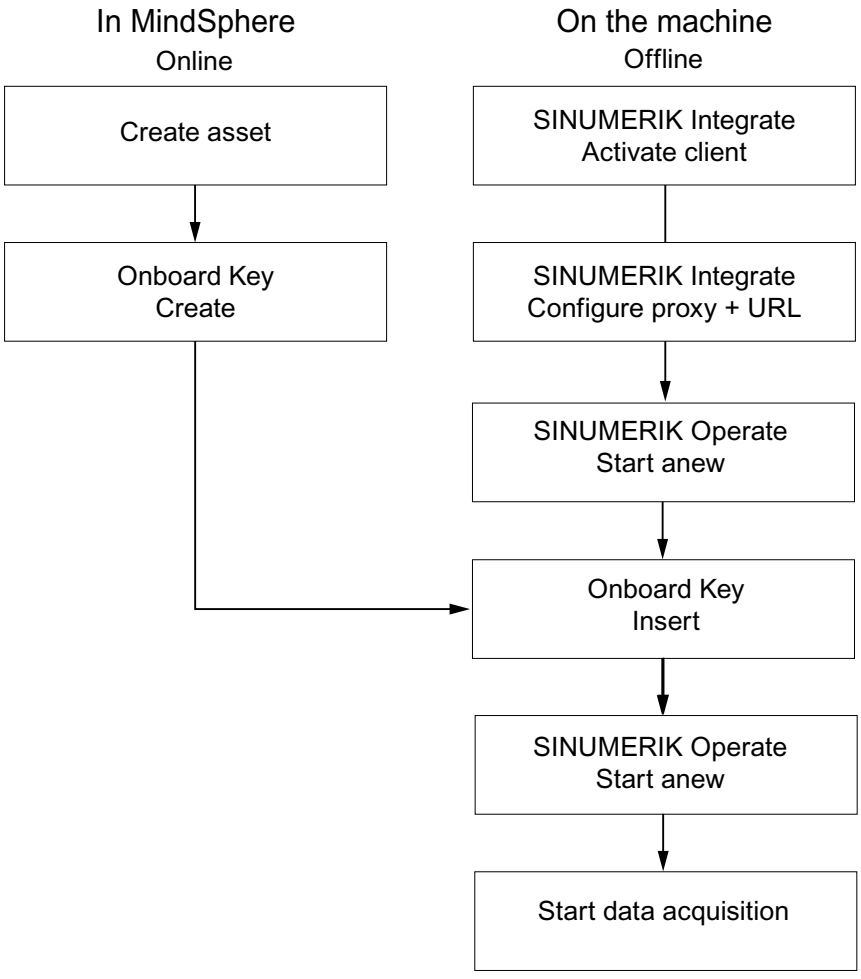
Connecting MindSphere to the machine

4

4.1 Sequence

Overview

In order to use the "Manage MyMachines" MindApp, you must perform the following steps in MindSphere as well as on the machine.



Sequence

Proceed as follows to activate the data acquisition:

1. In MindSphere:
   - Create the required assets, see the description in the System Manual: MindSphere, Section: IoT Data Modeler
   - Generate the onboard key, see Section: Connecting/disconnecting the machine with MindSphere (Page 33)
2. On the machine:
   - Check the installed version of SINUMERIK Integrate, see Section: Displaying version data (Page 17)
   - Activate the SINUMERIK Integrate client, see Section: Activating the SINUMERIK Integrate client (Page 18)
   - Enable the use of SINUMERIK Integrate, see Section: Activating/deactivating SINUMERIK Integrate use (Page 19)
   - Configure the SINUMERIK Integrate URL and proxy, see Section: Configuring the SINUMERIK Integrate URL and proxy (Page 21)
   - Insert the onboard key and restart SINUMERIK Operate, see Section: Inserting the onboard key (Page 24)

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 controller and MindSphere has been completely set up is this connection setup key no longer relevant.

This file is then automatically deleted on the controller.

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

4.2 Setting up the machine

4.2.1 Displaying version data

You can check whether you have a suitable version in the "Version data" window.

Only use the versions specified in this document, see Section: System requirements (Page 13)

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.

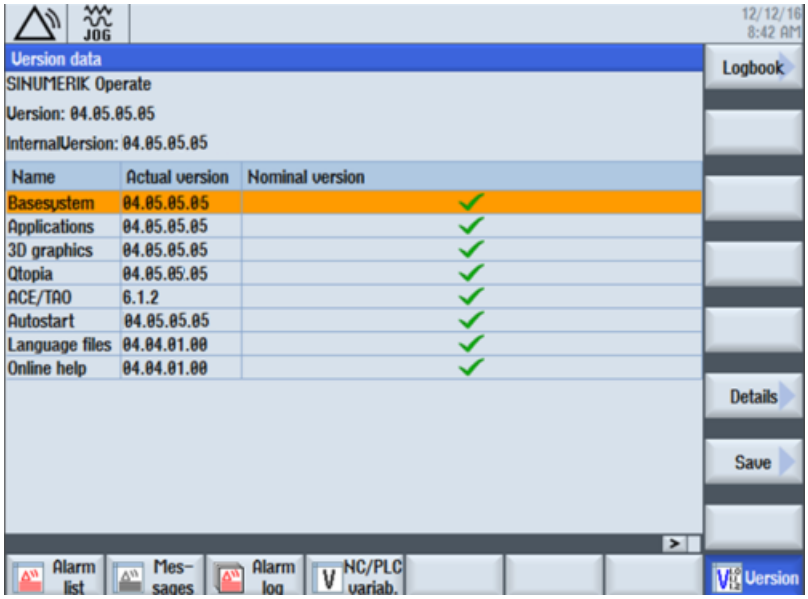
Procedure

1. Start the SINUMERIK Operate operating software on the machine.
2. Select the "Diagnostics" operating area.

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

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

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



References

If you have not installed the correct version of SINUMERIK Integrate, you can find the procedure for the client update in the following documentation:

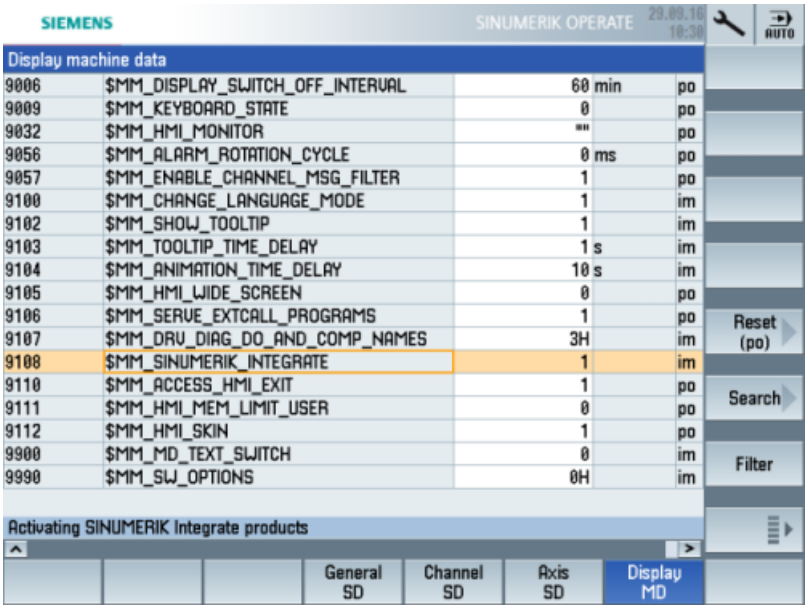
SINUMERIK Integrate MMP, MMT, AMC, AMP, AMD Installation Manual.

4.2.2 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 menu forward key and the "Display MD" softkey.
4. Set the machine data
   MD9108 $MM_SINUMERIK_INTEGRATE to "1".
   The "SINUMERIK Integrate" softkey is displayed on the extended horizontal softkey bar.



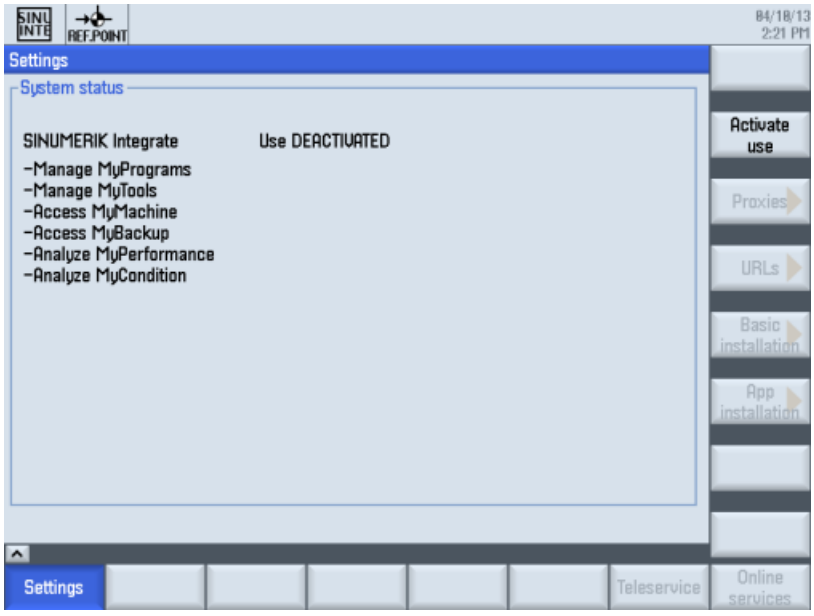
4.2.3 Activating/deactivating SINUMERIK Integrate use

Procedure for activating SINUMERIK Integrate

Proceed as follows to activate the client:

1. Press the "SINUMERIK Integrate" softkey.
   The "Welcome" window opens.
2. Press the "Settings" softkey.
   The "Settings" window opens displaying the system status "Use DEACTIVATED".

3. Press the "Activate use" softkey.
   You obtain the safety prompt "Do you really want to activate the use of SINUMERIK Integrate applications?"

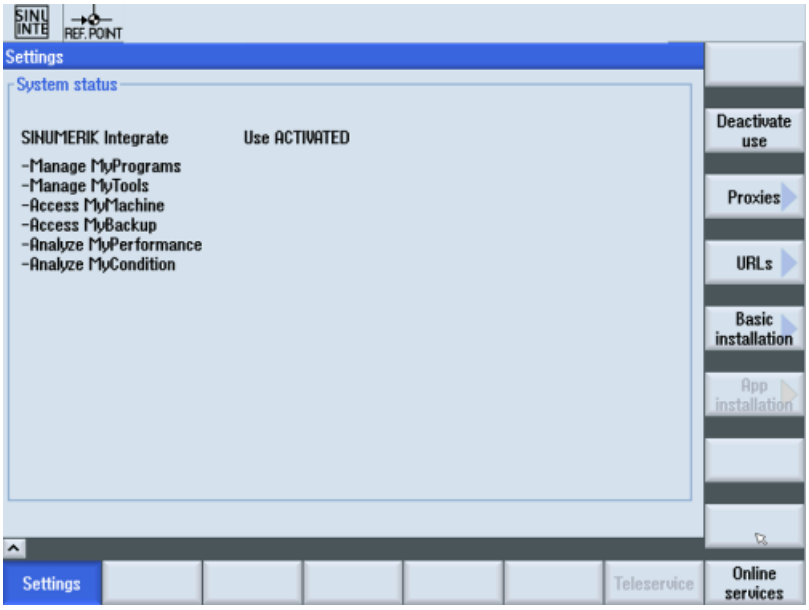


4. Press the "OK" softkey to confirm the prompt.
   The use of SINUMERIK Integrate applications is activated.

Procedure for deactivating SINUMERIK Integrate

Proceed as follows to deactivate the client:

1. Press the "Settings" softkey.
   The "Settings" window opens displaying the system status "Use ACTIVATED".
2. Press the "Activate use" softkey.
   You obtain the safety prompt "Do you really want to deactivate the use of SINUMERIK Integrate applications?"



3. Press the "OK" softkey to confirm the prompt.
   The use of SINUMERIK Integrate applications is deactivated.

4.2.4 Configuring the SINUMERIK Integrate URL and proxy

Note

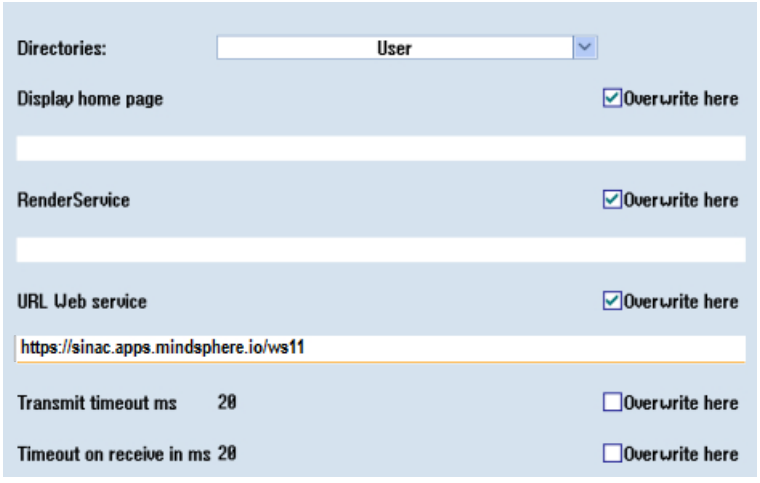
Transferring SINUMERIK data on the MindSphere platform

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.

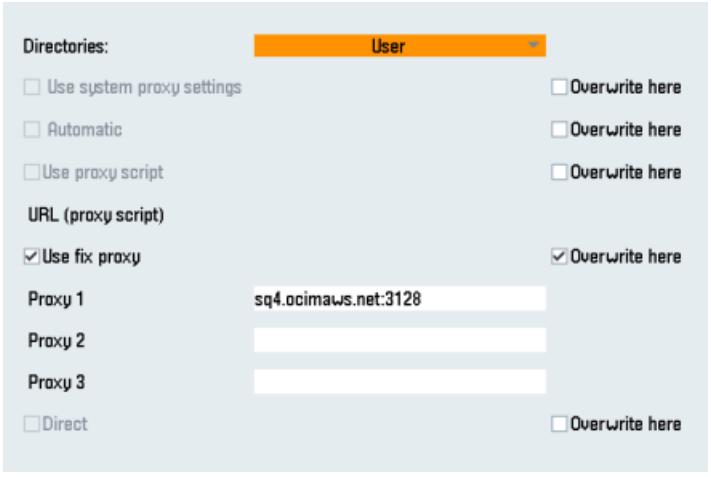
Procedure

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: Activate the "Overwrite here" checkbox.
   - RenderService: Activate the "Overwrite here" checkbox.
   - URL Web service: Activate the "Overwrite here" checkbox.
   - Enter the following Web service URL.
     If you are connected to the live system:
     https://sinac.apps.mindsphere.io/ws11
     If you are connected to the DEV system:
     https://SinumerikAgentCom-dev.apps.mindsphere.io/ws11

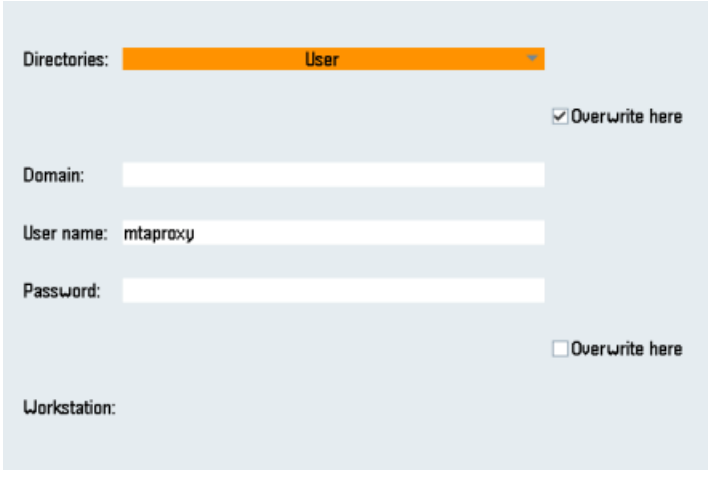


3. Press the "OK" softkey.
   A syntax check is performed and the access data is saved.
4. In order to establish a connection from the customer network, you must adapt the proxy settings.
   Press the "Proxies>" softkey.
   The stored settings are displayed.

5. Press the "Edit" softkey and select the following settings:
   - Activate the "Use fix proxy" checkbox.
   - Enter your proxies in the "Proxy 1" to "Proxy 3" input fields.
   - Activate the "Overwrite here" checkbox 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.
   - Activate the "Overwrite here" checkbox 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.

References

Further information can be found in the following documentation:

SINUMERIK Integrate MMP, MMT, AMC, AMP, AMD Installation Manual.

4.2.5 Inserting the onboard key

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.

There are two ways to copy the "onboard.key" to the machine:

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

Requirement

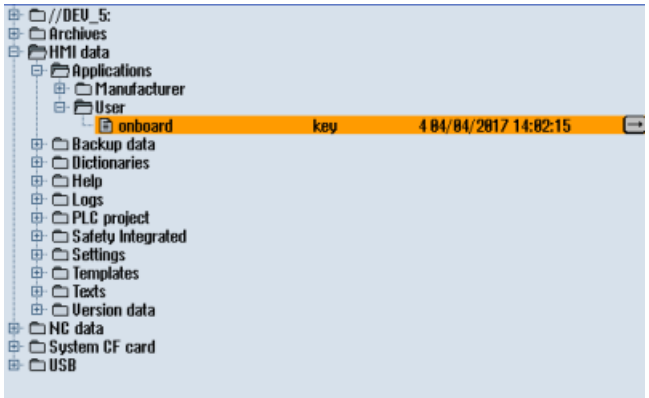
The onboard key has been generated, see Section: Connecting/disconnecting the machine with MindSphere (Page 33).

Procedure with SINUMERIK Operate (PCU 50)

1. Start the SINUMERIK Operate operating software on the control in 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.

Procedure with SINUMERIK Operate (NCU and PCU 50)

1. Start the SINUMERIK Operate operating software on the control.
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 shown in the directory tree.
   If the USB flash drive of SINUMERIK Operate is not detected, you must change the USB socket or configure a logical drive, see the following Section "Setting up a drive".
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.



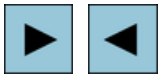
Entry		Meaning
Connection	Front	USB interface that is located at the front of the operator panel.
	X203/X204	USB interface X203/X204 that is located at the rear of the operator panel.
	X212/X213	TCU20.2/20.3
Symbolic		Symbolic name of the drive

Setting up a drive

Procedure

1. Select the "Commissioning" 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.

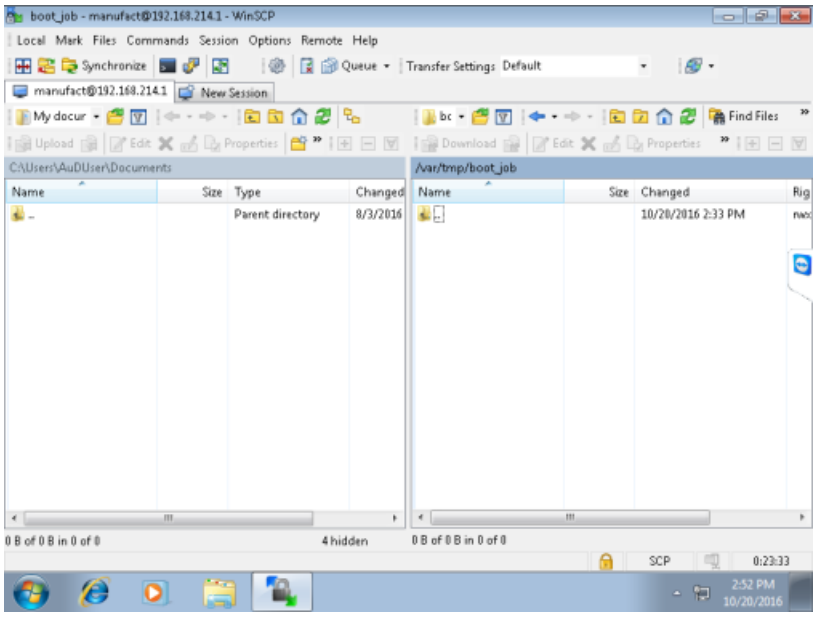
7. Press the "Details" softkey if you want to enter additional parameters.
   Press the "Details" softkey to return to the "Set up drives" window.

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.

Procedure with WinSCP (NCU)

1. Copy the generated "onboard.key" file with a suitable tool via the network to the control, e.g. with WinSCP.
2. Start the control 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 the following directory: /user/sinumerik/hmi/appl.
   If there is already a "cert.key" file in the folder, the control was already connected to MindSphere. If you want to establish a new connection, then delete the already 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 is completed and the "onboard.key" is no longer displayed in the directory.

Starting MindSphere

5

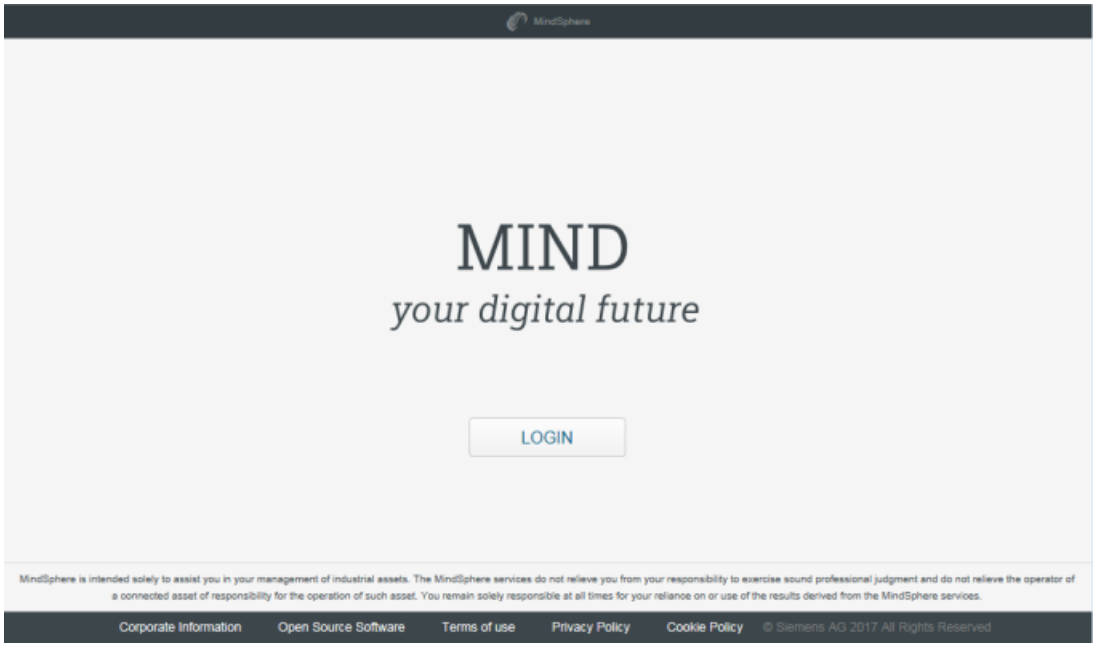
5.1 Logging in to MindSphere

Requirement

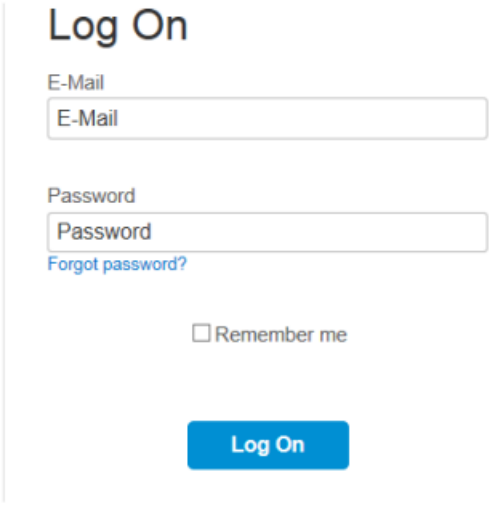
- You require a MindAccess user account in MindSphere.
  Information on how to create an account is provided in the following documentation: MindSphere - Getting Started Adjustments, Section: Create an OEM user and a customer user
- The terminals used for this are secured accordingly, for example, through virus protection programs, firewalls, OS updates, etc.

Procedure

1. Click the link provided per mail by the Siemens AG.
   The "MIND your digital future" window opens.
2. Click the "LOGIN" button.



3. The "Login" window opens.
   - Enter your e-mail address and your password.
   - Click the "Log in" button.
   - Activate the "Remember me" checkbox to remain logged in even when the window is closed.



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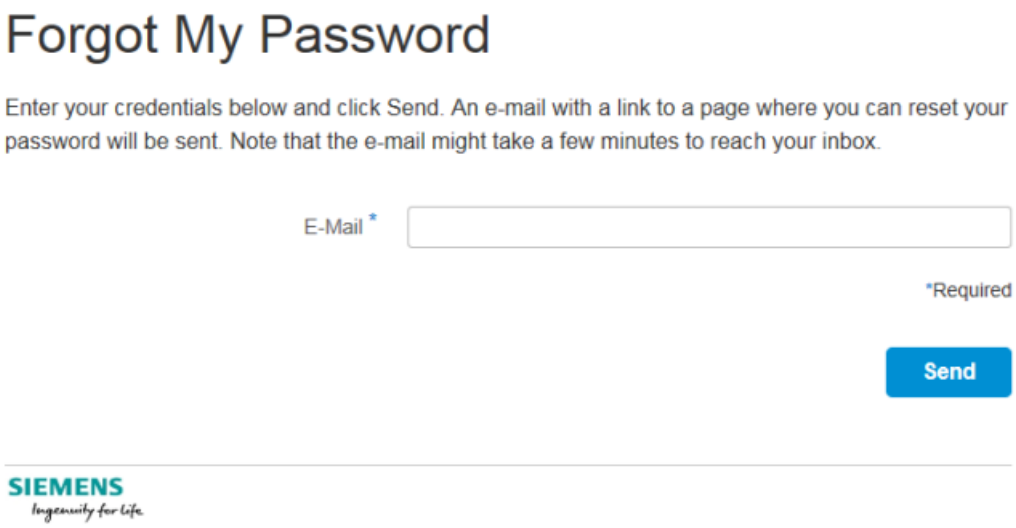
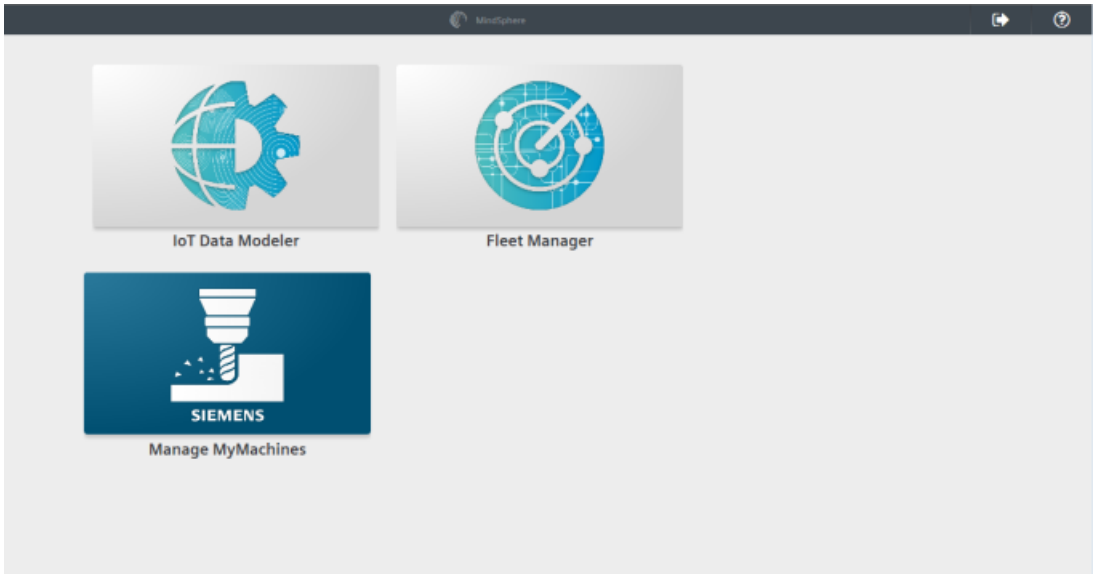
- OR -
If you have forgotten your password, click "Forgot password?".
The "Forgot my password" window opens.
Enter your e-mail address and click the "Send" button.
Your password is reset and you are informed of this via e-mail.

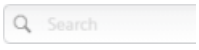
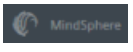


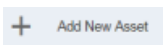
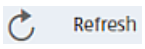
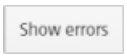
4. The Start menu opens and shows the Launchpad. You can access the individual applications, the MindApps, via this user interface.

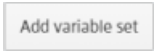
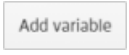


5.2 Description of the icons/buttons

Table 5-1 Display of the icons and buttons

Icon	Description
	Log off from MindSphere
	Back to the MindSphere Launchpad
	Filter and search option
	Free text search
	• Deletes the search text • Resets all filter and sorting rules
	Displays the hierarchy
	Displays set filters and specifies the number of filters
	Displays the asset list
	Displays the machines on the world map
	Zoom in
	Zoom out
	Resets the zoom range
	Displays the possible extension
	Switches to the edit mode
	Switches the view to full-screen mode
	Opens the preset e-mail program and sends the current selection via e-mail, e.g. a link to the current MindSphere view.
	Variable is not displayed in the "Aspects" or is displayed in the view
	Switches to theMindSphere overview
	Edit
	Copy
	Delete
	Save
	Save as ...
	Back to the prevous window

Icon	Description
	Opens a window and provides information on the error
	Shows the set filter and the number of filters
	Side bar is displayed
	Side bar is hidden
	Opens further details
	Closes further details
	Goes to the current time range. The values are refreshed every minute and the time ranges are refreshed according to the set interval.
	Takes over the set time from the chat
	Opens the calendar to select an exact date
	Creates a manual request
	Creates/edits rules
	Deletes a selected machine from the overview
	Selects a marked machine from the overview
	Line chart
	Pie chart
	Bar chart
	Block diagram
	Slider "ON"
	Slider "OFF"
	Back to the previous property window
	Continue to the next property window
	Creates a new asset
	Refreshes the view
	Opens the "Configuration error" window and provides information on the error
	Deletes time series data

Icon	Description
	Saves
	Back / Exit
	Connects the asset to MindSphere
	Disconnects the asset from MindSphere
	Adds a new variable set
	Adds a new variable
	Information Number of open requests with the priority "Information"
	Warning An open request wit the priority "Important"
	Warning An open request wit the priority "Urgent"
	Sets the request state "In Progress"
	Sets the request state "Closed"
	Request state Open
	Request state Closed
	Request state In Progress

5.3 Connecting/disconnecting the machine with MindSphere

You can connect or disconnect the SINUMERIK machiner with MindSphere with the "IoT Data Modeler" MindApp.

References

Further information on this can be found in the System Manual: MindSphere, Section: Configuring assets.

Requirement

The configuration must have been saved.

Parameters

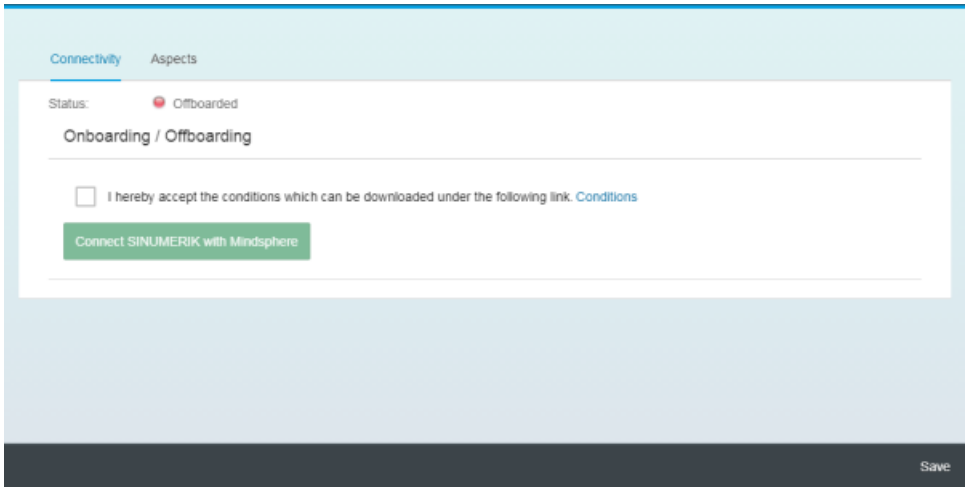
Table 5-2 Agent, connectivity

Parameters	Description
Connect machine tool with MindSphere	Connect asset with MindSphere
Disconnect machine tool from MindSphere	Disconnect asset from MindSphere

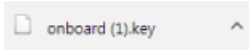
Procedure: Connecting the machine with MindSphere

1. Click the "IoT Data Modeler" MindApp and select the desired asset in the left-hand side of the window.
2. Open the "Agent" function in the right-hand side of the window.
   You can select various options during the initial configuration.
3. Select the desired agent in the overview, e.g. SINUMERIK, and click the "Edit" icon.
4. The "Onboarding / Offboarding" window opens, and you can see the status in the "Connectivity" tab, e.g. "Disconnected".
5. Activate the "I accept the license conditions that can be called via the following link. License conditions" checkbox.
   - Click the "License conditions" link.
     The "MindSphere documents" window opens.
   - Select the required language and click "Documents".
     A further window opens and you can open the "MindSphere general conditions for customers in Germany" via a link.
   - Read the license conditions.
     - OR -
     Download the conditions.
     - OR -
     Print the conditions.
   - Close the window and the "Connectivity" window is displayed again.

6. Click the "Connect SINUMERIK with MindSphere" button to connect the asset with MindSphere.



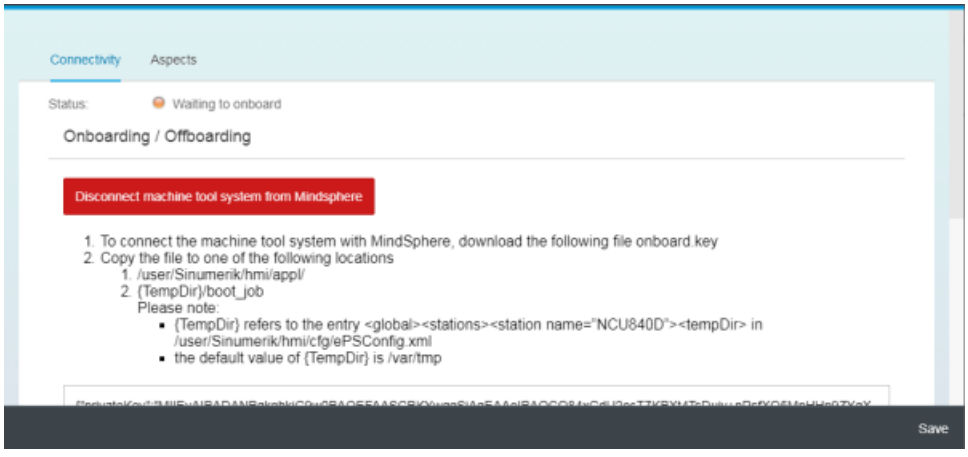
7. The onboard key is generated and shown below the status bar.



8. Click the "Save" button to accept the entries and save a consistent version of the configuration.
9. Then copy the onboard key to the control, see Section: Inserting the onboard key (Page 24)

Procedure: Disconnecting the machine from MindSphere

1. Click the "Disconnect machine tool from MindSphere" button to disconnect the asset from MindSphere.
2. Click "Save" to save the setting.



5.4 Activating the data acquisition

You can connect the assets with the "IoT Data Modeler" MindApp.

In the "Aspects" tab, activate via a slider the SINUMERIK basic configuration and machine availability for the following data points:

- Addressing
- Data formats
- Sampling rate
- Physical unit

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

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

- SINUMERIK basic configuration
- Machine availability

Note

First channel

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

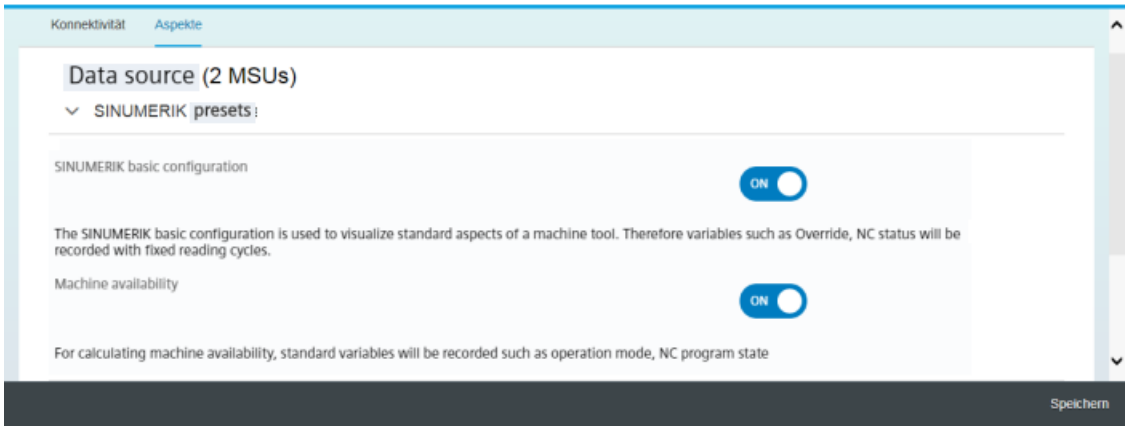
Parameters of preconfigured SINUMERIK data sets

Table 5-3 Aspects

Display	Description
Data source ([Number of] MSUs)	Monthly costs ensue through the creation of further variables, which are indicated by the MindSphere Units ([Number of] MSUs).
Preconfigured SINUMERIK data sets	
SINUMERIK basic configuration	The SINUMERIK basic configuration is used to visualize standard aspects of the machine tool. For this purpose, variables of the first machining channel are acquired with fixed recording rhythms. You can switch the data acquisition on or off with a slider. In "Manage MyMachines", the data is displayed at "CH1_Basic-Config".
Machine availability	Standard variables of the first machining channel are acquired for calculating the machine availability. You can switch the data acquisition on or off with a slider. In "Manage MyMachines", the data is displayed at "CH1_MachineStatus".

Procedure: Activating the presets

1. Click the "IoT Data Modeler" MindApp and select the desired asset in the left-hand side of the window.
2. Open the "Agent" function in the right-hand side of the window.
3. Select the required machine in the Agent overview and click the "Edit" icon.
   The "Onboarding / Offboarding" window opens.
4. Click the "Aspects" tab.
   The "Data source ([Number of] MSUs)" window opens.
   - Set the slider for "SINUMERIK basic configuration" to "ON" in order to obtain the data for "Manage MyMachines" in the Aspects (Page 57) and MMM Dashboard (Page 49) tabs.
   - Set the slider for "Machine availability" to "ON" in order to obtain the data for "Manage MyMachines" in the Aspects (Page 57) and MMM Dashboard (Page 49) tabs.



5.5 Configuring a variable

Parameters of individually configured variables

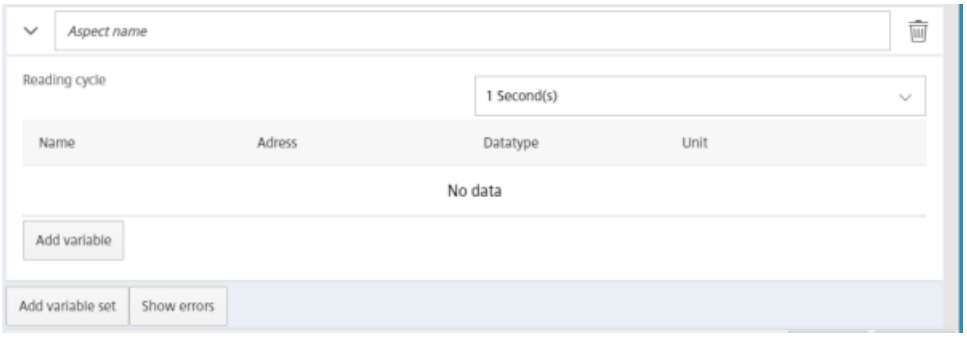
Table 5-4 SINUMERIK variable configurator

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	Enter the name of the variables to be acquired in the variable set 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)!	
Address	Specify the address/path of the 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	Select the data type of the variable Example: • Float • Boolean • String **Note:** If values exceed the floating-point number accuracy, they are displayed with faulty decimal places.	
Unit	Select the physical unit of the variable from the list Example: m/s^3	
Reading cycle	The sampling rate of the data acquisition is specified with this value. The selection is made from the drop-down list. • 1 min • 5 min • 15 min • 30 min • 1 h • 4 h • 12 h • 24 h	

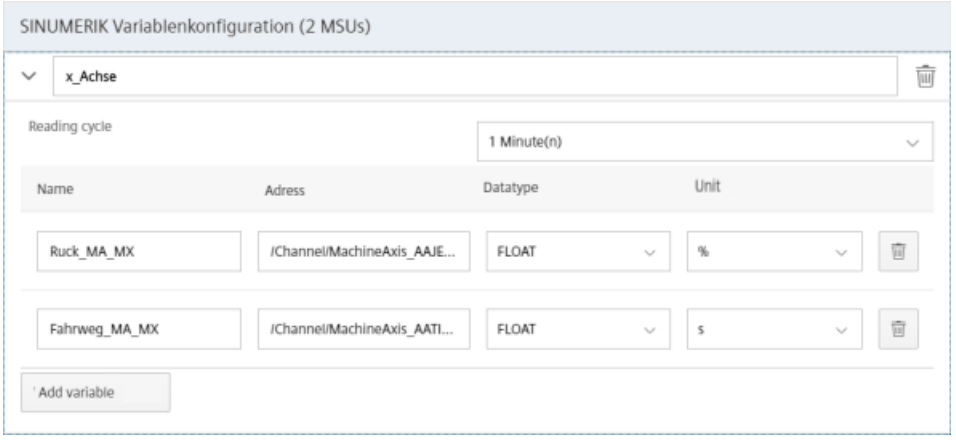
Procedure: Creating a variable set

If you create individual variables, they are subject to a charge and are displayed in MSUs.

1. Click the "Add variable set" button.
   The "SINUMERIK variable configuration (1 MSU)" window opens.
2. Select a name for the variable set.
3. Click the arrow on the left next to the name of the variable set.
   Enter the name in the input field.



4. Enter the variables in the input fields as in the following example.
5. Click the "Add variable" button to add a new variable.
   Repeat this step when required.
   You can create up to 30 variables.



6. Click the "Add variable set" button to add a new variable set when required.
   In this case, repeat the above steps to enter the variables for the new variable set.
7. Click the "Delete" icon to delete individual variables or a variable set.

Note

Save after deleting variable sets

After deleting a variable set, save the asset manually before exiting the dialog in order to save a consistent version of the configuration.

8. Click the "Show errors" button.
   The "Configuration errors" window opens and lists the faulty variables.
   Click the "Close" button to close the window again.

9. Correct the faulty variables.

10. Click the "Save" button to accept the entries.
    - You receive a confirmation prompt "Save and accept configuration and specified MindSphere units for accounting?".
    - Click the "Accept settings" button to save the values and at the same time accept the costs for the additional variables.
      - OR -
      Click the "Cancel" button to not accept the values.

    Note

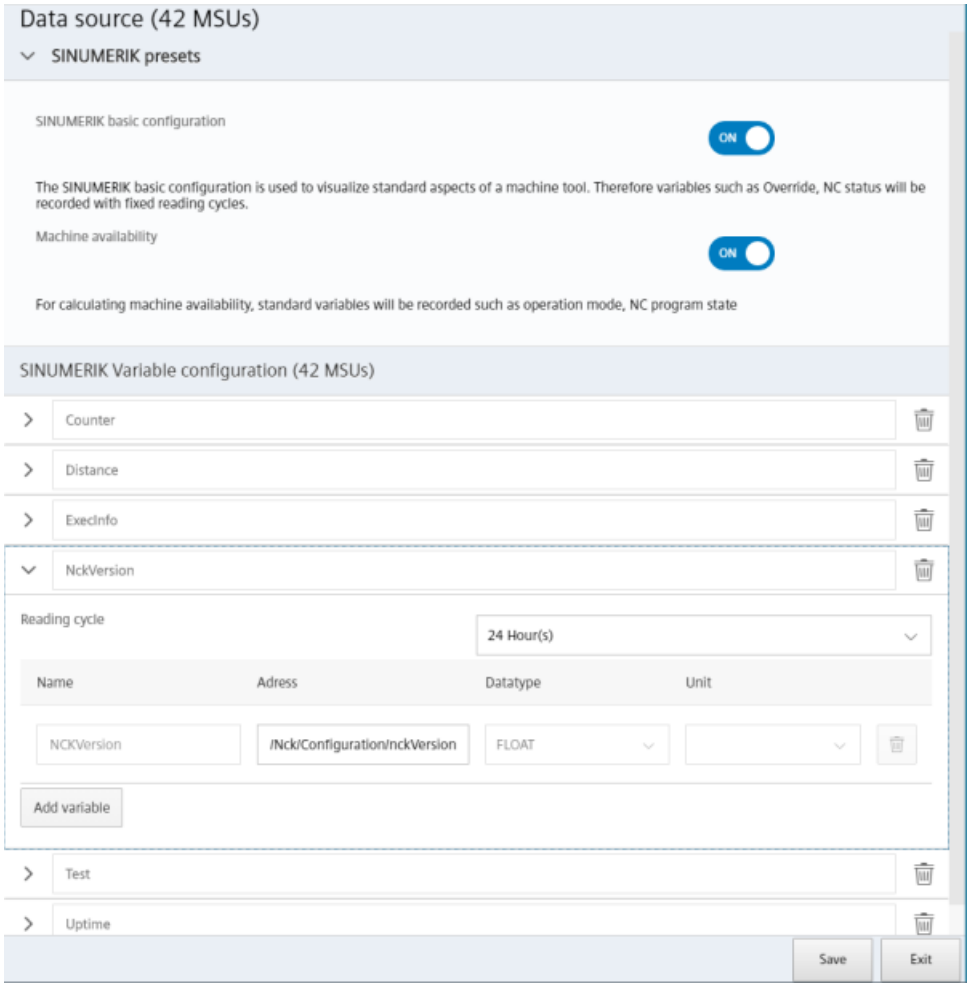
    Changing saved variable sets

    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!

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



References

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

Manage MyMachines 6

6.1 Overview

Introduction

The "Manage MyMachines" MindApp visualizes the data that you have transferred and offers the following:

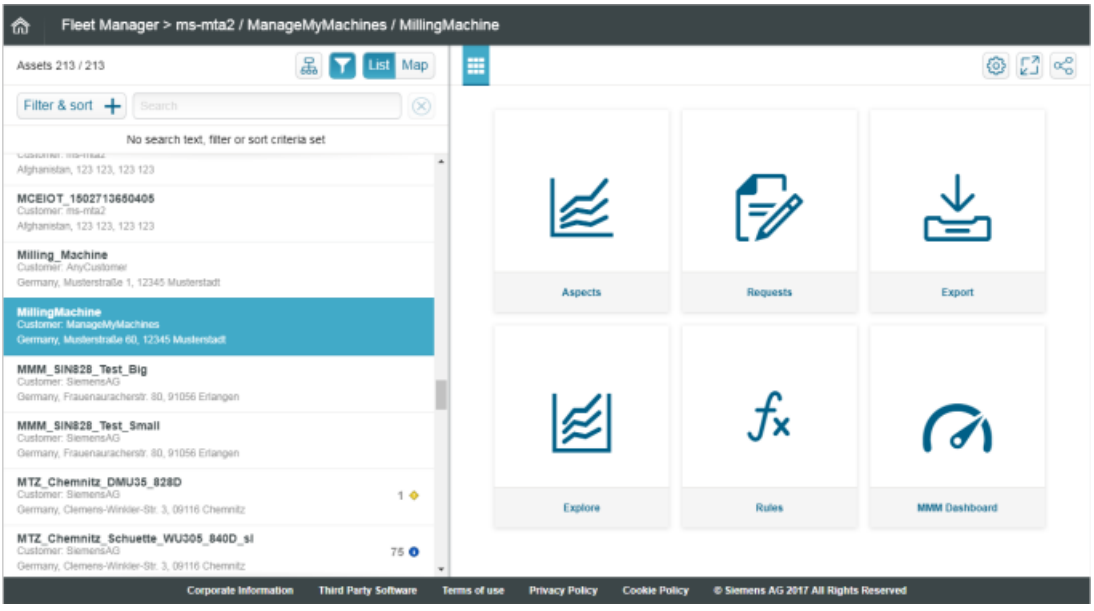
- Overview of the operating data of an asset, see Section: MMM Dashboard (Page 49)
- Display/logging of previously defined machine events, see Section: Requests (Page 53)
- Export of data points of an aspect, see Section: Export (Page 55)
- Creating and changing rules, see Section: MindSphere - Getting Started Adjustments
- Analyses based on defined aspects from the user and critical machine data, see Section: Aspects (Page 57)
- Individual combination of existing variables, see Section: Explore (Page 60)

6.2 Opening Manage MyMachines

Procedure

1. Click the "Manage MyMachines" MindApp.

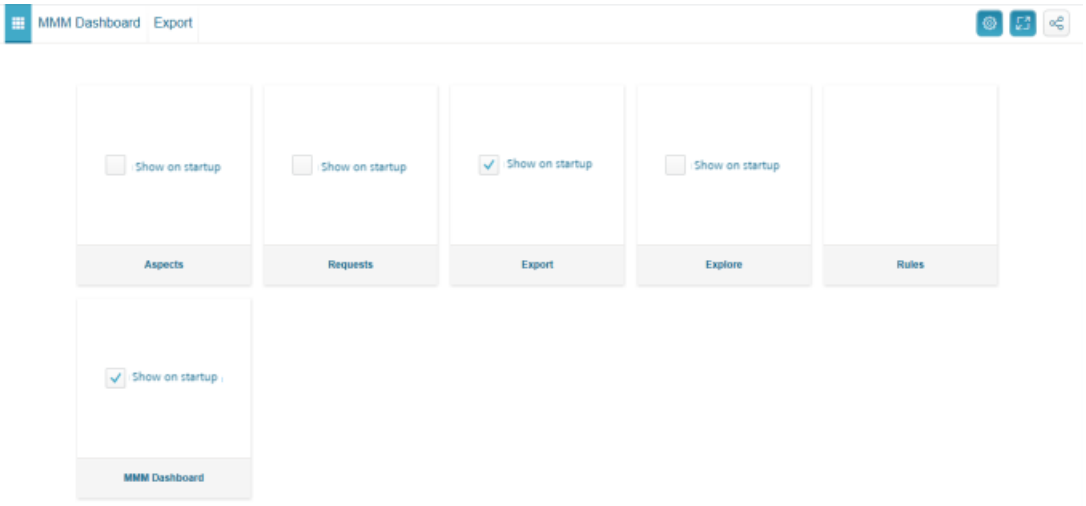
2. The already created assets are displayed in the left-hand side of the window, see following Section: Selecting the machine (Page 46)
   The individual functions are displayed in the right-hand side of the window.
   For quicker access to the individual functions, you can create the functions in the top navigation bar, see the following: Displaying functions at startup



Displaying functions at startup

You can display individual functions in the top bar. In this way, you save opening the overview and can access the desired function area with one click.

1. Click the "Edit mode" icon at the top right.
   The Overview display changes.
2. Activate the "Show on startup" checkbox for the desired function.
   The functions are created in the top line, e.g. MMM Dashboard, Export.



6.3 Selecting the machine

The already created assets are displayed in the left-hand side of the window.

Filter & sort

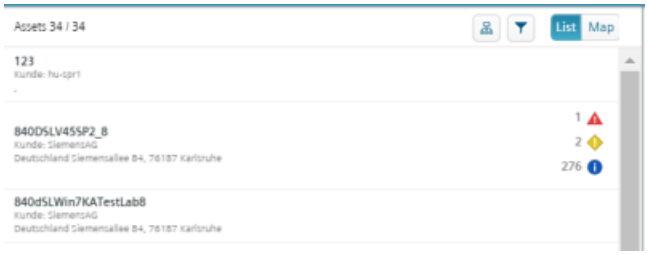
You can influence the view of the machines through the following filter criteria.

The filter selection is made from the drop-down list.

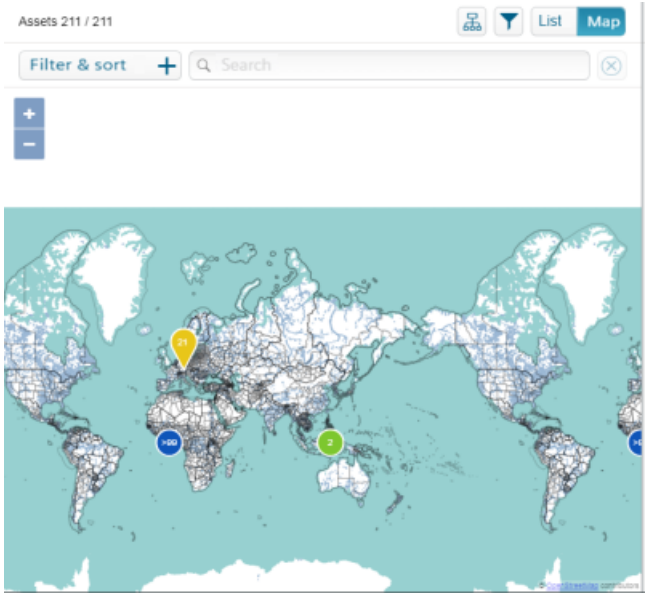
Filter option	Further sorting
Country	• Country name • Country not configured
Priority	• Urgent • Important • Information
Customer	• Customer name • Customer name not configured
Sorting	• None (asset name A-Z) • Asset with the most requests according to priority first • Asset with the most requests in total first

Procedure

1. The overview window is open.
2. The already created assets are displayed in the left-hand side of the window.
   - Click the "List" button to display the list display.



   - Click the "Map" icon to display the map view.
     The position of the machine is shown on the world map. Prerequisite for this is that you have entered the GPS coordinates in the asset configuration.



– If you have stored a plan of the plant for the machine, the view changes automatically from the map to the plant plan as of a specific zoom level.

3. Click the "Filter & sort +" button to limit the display of the machines.
   The "Filter & sort" window opens.
   – Activate the corresponding criteria option button:
   – Click the "Close" button to close the window.
4. Select the required asset.

6.4 MMM Dashboard

The "MMM Dashboard" view provides a summary of the SINUMERIK basic configuration and machine availability for the selected machine.

The dashboard is refreshed after every value change of an "MMM Dashboard" variable.

Requirement

To obtain the view of the machine overview, the slider must be switched on in the asset for the following data acquisition:

- SINUMERIK basic configuration
- Machine availability

The activation of the data acquisition is described in the following Section: Activating the data acquisition (Page 35).

Note

No data display

If no data is displayed, switch the slider off and on again to reload the data.

Parameters

Table 6-1 MMM Dashboard

Parameters	Description
Connection status	Displays the connection status of the machine tool: • Online with date and time • Offline with date and time
Diagram	The time information is taken from the drop-down list: • Last hour • Last four hours • Last eight hours
Feed override	Displays the last value of the feed override in percent
Spindle override	Displays the last value of the spindle override in percent

Parameters	Description		
NC program status	Displays the last value of the NC program status:		You can display the chronological history as a block diagram or pie chart in the right-hand side of the window.
	• Suspended	The NC program has been suspended and will be restarted by the operator.	
	• Stopped	The NC program has been stopped and will be exited by the operator.	
	• Running	The NC program is currently running.	
	• Waiting	The NC program is waiting. For example, the program is waiting for the execution of an NC program in a different channel or the operator is changing a tool.	
	• Cancelled	The NC program has been cancelled by the operator on the machine.	
Operating mode	Displays the last value of the machine tool operating modes: • MDA • JOG • AUTO		You can display the chronological history as a block diagram or pie chart in the right-hand side of the window.
Access protection level	The access to functions and data areas is controlled via the access rights. Access levels 0 to 7 are available, where 0 represents the highest level and 7 the lowest level. Access levels 0 to 3 are locked via a password and access levels 4 to 7 via a keyswitch. • 1 = Password - Machine manufacturer: Development • 2 = Password - Machine manufacturer: Commissioning engineer • 3 = Password - End user Service • 4 = Keyswitch position 3 - Programmer, machine setter • 5 = Keyswitch position 2 - Qualified operator • 6 = Keyswitch position 1 - Trained operator • 7 = Keyswitch position 0 - Trainee operator		
Alarms pending	Displays the number of pending alarms		
Stop condition	Displays the "StopCondition" NC variable which describes the cause of the NC program stop in more detail.		
NC program	Displays the program currently running		
Machine status	Displays the last value of the following machine status: • Unknown status • Production • Technical fault • Organizational fault • Fault-free standstill		You can display the chronological history as a block diagram or pie chart in the right-hand side of the window.
Last value recording	Displays the date and time of the last recording.		

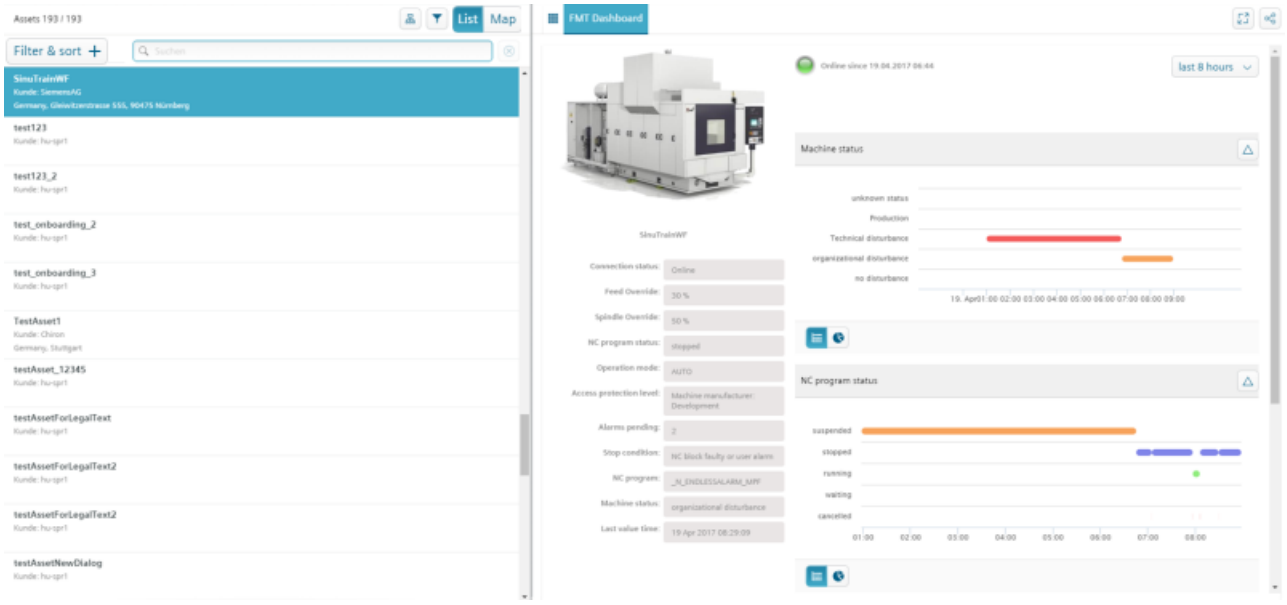
Note

UTC time definition

All variables are displayed with a UTC time stamp.

Procedure

1. The required asset has been selected in the left-hand side of the window.
2. Click the "MMM Dashboard" function.
   The data is displayed.
3. Select the required period from the drop-down list.
   - Last hour
   - Last four hours
   - Last eight hours



Switching between full-screen mode and display

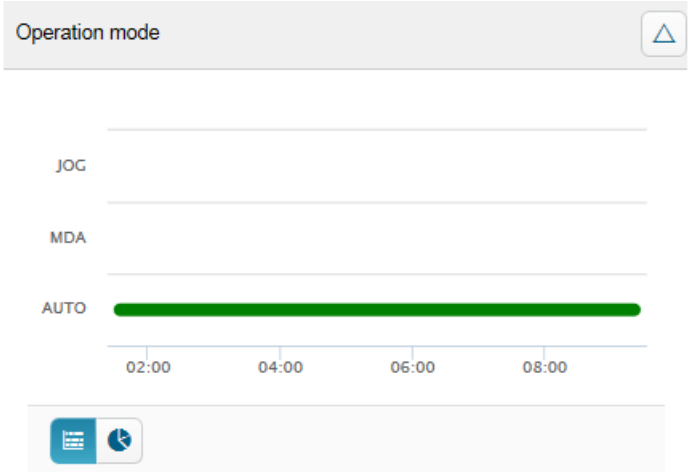
If you click the "Full-screen mode" icon, the left-hand window area is hidden and only the "MMM Dashboard" is shown on the screen.

You can also view the following values more closely:

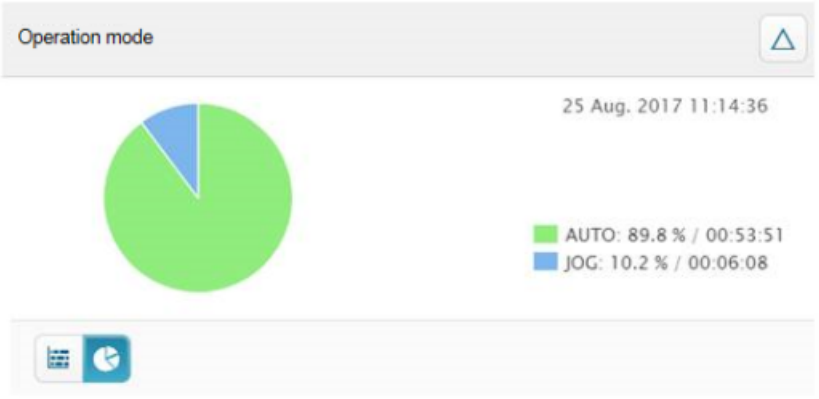
- Machine status
- NC program status
- Operating mode

Procedure

1. Click the ▽ button to open the view, e.g. operating mode.
2. Click the "Block diagram" icon to view the history of the operating modes.



3. Click the "Pie chart" icon to change the display.



6.5 Requests

With requests, you log all machine incidents based on your predefined rules.

You can create purely manual requests as well as requests for the regular acquisition of measured quantities with measuring series.

All requests are displayed in an overview and you can influence the view through different filter criteria.

You can also assign a specific status to the request.

References

How to create a request is described in the following documentation: MindSphere - Getting Started Adjustments, Section: Configure requests

Requirement

Requests are already available.

Filter & sort

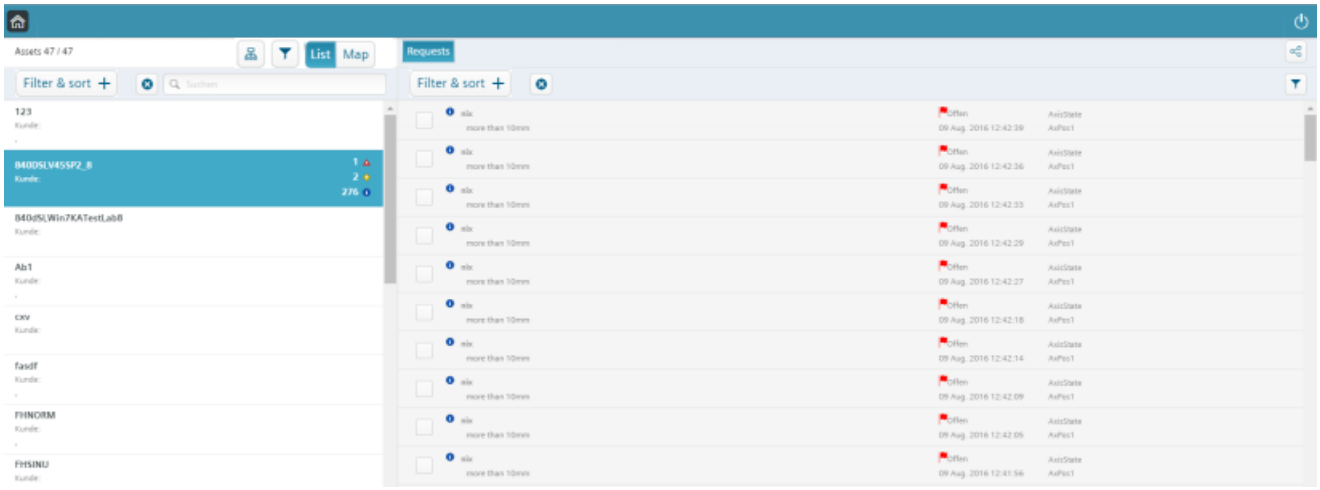
Table 6-2 Request, filter and sorting options

Filter option	Further sorting
Status	The following selection is offered: • Open • In progress • Closed
Priority	The following selection is offered: • Urgent • Important • Information
Sorting	The following selection is offered: • None (latest requests) • Oldest requests

Procedure

1. The required asset has been selected in the left-hand side of the window.
2. Click the "Requests" function.
   The data is displayed.

3. Reduce the display through specific filtering.
   Click the "Filter & sort +" button to limit the display of the requests.
   The "Filter & sort" window opens.
   - Activate the corresponding criteria option button:
   - Click the "Close" button to close the window.
4. Activate the checkbox of a request and mark the request accordingly:
   - Click the "In progress" button if the machining has not been completed.
   - Click the "Closed" button if the machining has been completed.



6.6 Export

You can export data points of an aspect.

You can export data of a specific period and select between two export methods.

Note

Configuring the target directory for the download

The exported data is stored in several files depending on the data volume.

Make sure that a target directory for the download has been configured in your browser.

Parameters

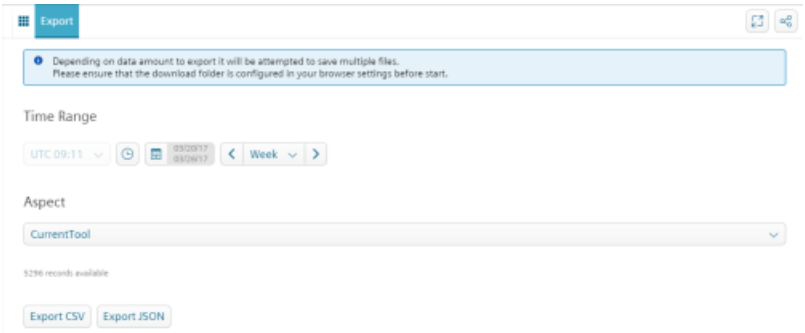
Table 6-3 Export

Parameters	Description
Interval	Select the desired period via the calendar function. - OR - Select the desired period from the drop-down list: • Day • Week • Month • Quarter • Year • 0 <days> All data is exported in UTC.
Export CSV	Data export in CSV format
Export JSON	Data export in JSON format

Procedure

1. The required asset has been selected in the left-hand side of the window.
2. Click the "Export" function.
3. Select the desired period.

4. Select the desired aspect from the drop-down list.
5. Click the button of the desired export.
   The export is started. The exported data is stored in several files depending on the data volume.



6.7 Aspects

User-defined aspects combine your selected data for a meaningful analysis.

All aspects are displayed in an overview and you can influence the view through different filter criteria.

You can create requests manually or controlled by variables for the individual parameters of an asset.

Requirement

To activate the data acquisition, the slider must be switched on in the asset, see Section: Activating the data acquisition (Page 35)

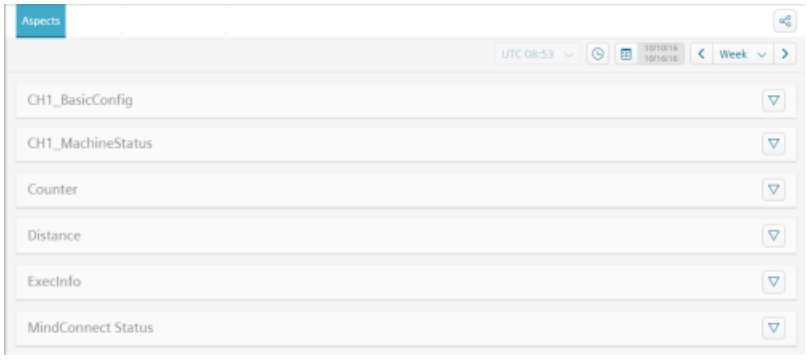
Parameters

Table 6-4 Aspects

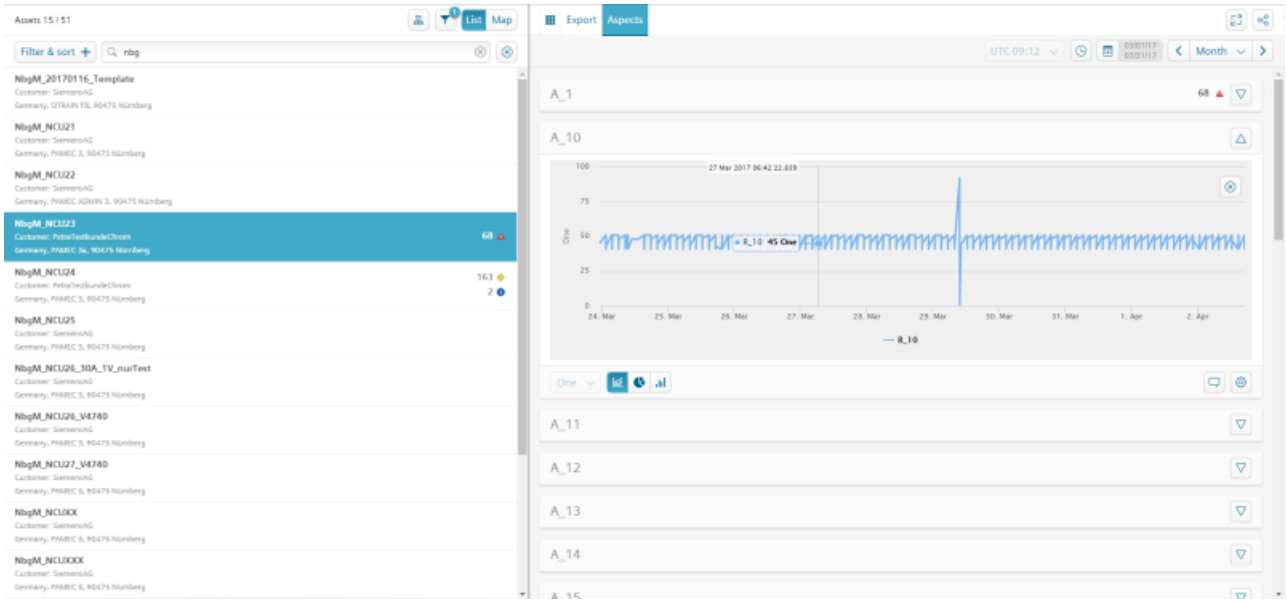
Parameters	Description
CH1_BasicConfig	SINUMERIK basic configuration When "%" is selected, the following data is acquired: • Feed override • Spindle override When "None" is selected, the following data is acquired: • NCProgramStatus • Opmode • ProtectionLevel • NrOfAlarms • StopCond When the pie chart is selected, the following data is acquired: • NC program status
CH1_MachineStatus	Machine status
MindConnect status	Connection status
Additional parameters ...	You can set up additional parameters individually, e.g. x_axis.
Period	Select the desired period via the calendar function. - OR - Select the desired period from the drop-down list: • Day • Week • Month • Quarter • Year • 0 <days> All data points are displayed in UTC.

Procedure

1. The required asset has been selected in the left-hand side of the window.
2. Click the "Aspects" function.
   The data is displayed.
3. Select the desired period.

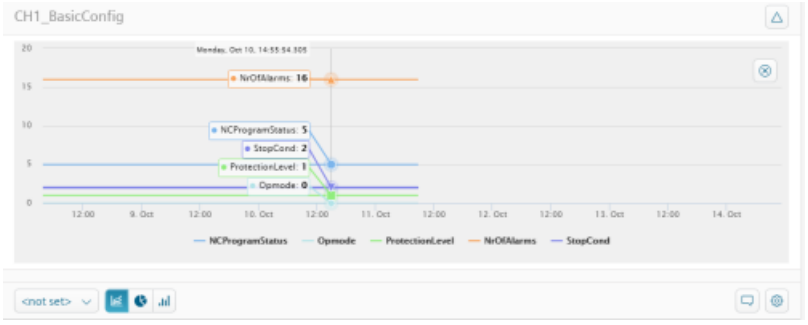


4. Click the ▽ button on the left to display the data recording.
   You have various options to influence the display, see below: Switching the display.

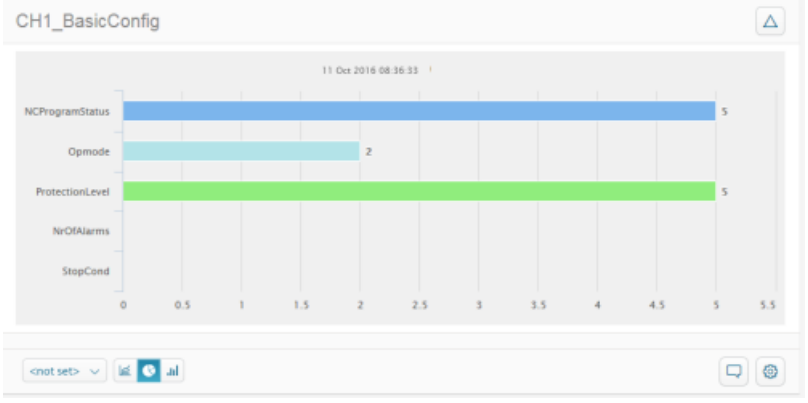


Switching the display

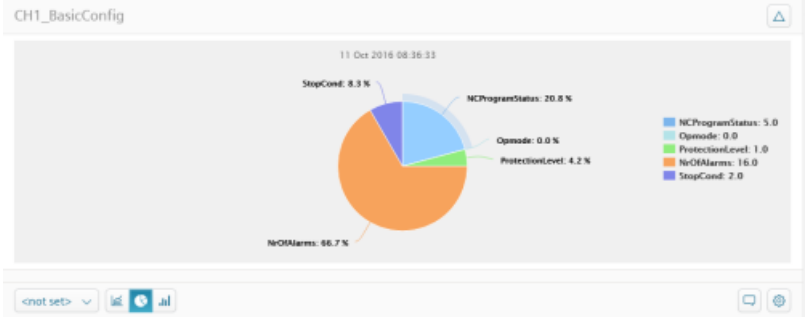
1. Click the button on the right to open the view, e.g. CH1_BasisConfig.
   The data is displayed in a coordinate system, i.e. in a line chart.
   Select the unit from the drop-down list, e.g. "%". The data from Feed override and Spindle override is displayed.



2. Select the unit, e.g. "None", from the drop-down list to display the data that does not have any unit.
   Click the "Bar chart" icon to view the history of the axis in the bar display.



3. Click the "Pie chart" icon to view the history of the NC program in the pie display.



You can create a manual or an automatic request using the icons in the right-hand side of the window.

References

How to create a request is described in the following documentation: MindSphere - Getting Started Adjustments, Section: Configure requests

6.8 Explore

You can combine existing variables individually and display them.

You can influence the view with different filter and search criteria.

Requirement

Variables have already been created.

Parameters

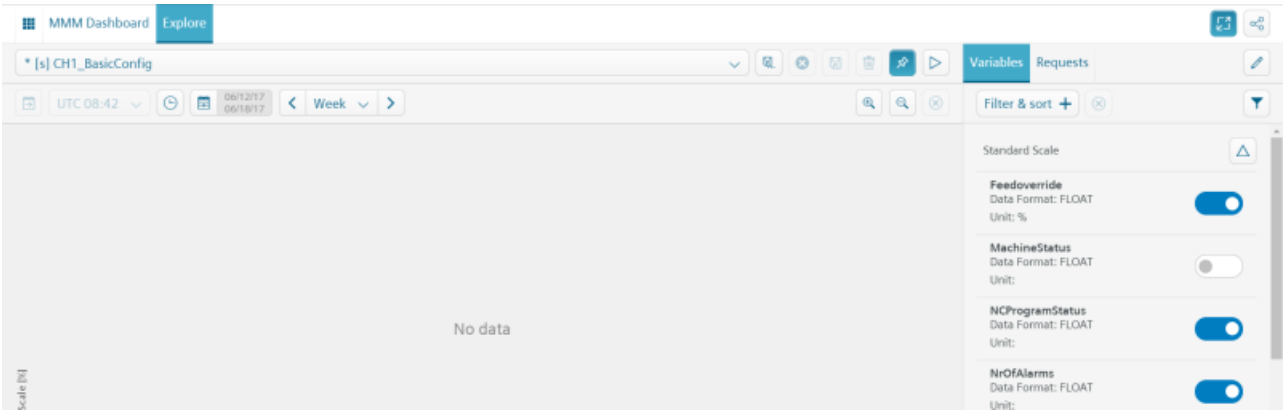
Table 6-5 Explore

Parameters	Description
Variables	All created variables are available for selection.
Period	Select the desired period via the calendar function. - OR - Select the desired period from the drop-down list: • Day • Week • Month • Quarter • Year • 0 <days> All data points are displayed in UTC.
View	Enlarge or reduce the display range of the time series using the zoom icons.
Display	The following displays are possible: • Line chart • Pie chart • Bar chart
	Create manual request Further information can be found in the"MindSphere" System Manual.
	Edit or add rules Further information can be found in the"MindSphere" System Manual.

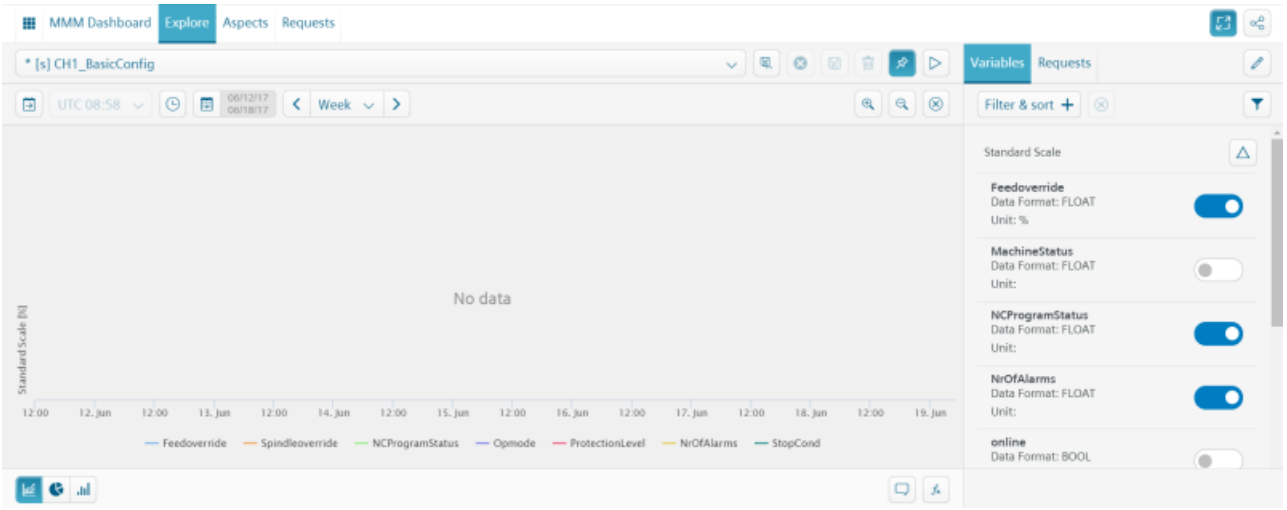
Procedure

1. The required asset has been selected in the left-hand side of the window.
2. Click the "Explore" function.
3. Enter the desired name in the input field or select an already created configuration.

4. Click the "Save as..." icon.



5. Select the "Variables" function in the right-hand window area.
6. Open a further window area on the right-hand side with the "Side bar" icon.
7. Click the ▽ button on the right next to "Standard scale" to display the already created variables.
8. Select the desired variables. The data points are displayed in the right-hand window area.
9. Select the desired view and display.
   You can increase or decrease the display range of the time series with the mouse wheel.



10. Save the new configuration and view the data at Aspects, see Section: Aspects (Page 57)

Appendix

A

A.1 List of abbreviations

Admin	Administrator (user role)
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
MB	Megabyte
MLFB	Machine-Readable Product Code
MMM	Manage MyMachines
MSTT	Machine control panel
MSU	MindSphere Unit
NC	Numerical Control: Numerical control
NCU	Numerical Control Unit: NC hardware unit
OEM	Original Equipment Manufacturer
OP	Operation Panel: Operating equipment
PC	Personal Computer
PCU	PC Unit: Computer unit
PLC	Programmable Logic Control: PLC
SI	SINUMERIK Integrate
SK	Softkey
SW	Software
URL	Uniform Resource Locator
UTC	Universal Time Coordinated

Glossary

Aspects

Aspects or variable sets are a group of the same data points / variables and describe the context of the imported data, e.g. wear.

Asset

For MindSphere, an asset is each connected element that provides data. This can be a machine or an individual component. In conjunction with this documentation, an "asset" is a machine tool with SINUMERIK 840D sl.

Data points or variables

For "Manage MyMachines", data points or variables are all the values that can be acquired from the NC, the PLC and from the drives, e.g. sampling rate, temperature, jerk. They must be defined and configured in the asset configuration as data points. The data is combined into aspects. The acquired values are then displayed as time series in the MindApp under "Aspects". There are also preconfigured data sets, such as the basic configuration and the machine availability. Details can be found in the relevant sections.

IoT Data Modeler

The "IoT Data Modeler" is a MindApp and component in MindSphere. The assets of a machine are created and configured in the "IoT Data Modeler". The MindApp is also used for the management of customers, users and shopfloors.

MindSphere - Industial IoT ecosystem from Siemens

MindSphere – the open cloud platform from Siemens – is the core component of a high-performance IoT operating system. It offers data analysis, comprehensive connectivity, tools for developers, applications and services. MindSphere supports you in the analysis and utilization of your data in order to obtain new insights. In this way, you can optimize your resources for maximum availability.