

## Machine Monitor for Industrial Edge

Application Manual

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Valid for:

Machine Monitor V2.6.0

## 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.

 <b>DANGER</b>
indicates that death or severe personal injury <b>will</b> result if proper precautions are not taken.
 <b>WARNING</b>
indicates that death or severe personal injury <b>may</b> result if proper precautions are not taken.
 <b>CAUTION</b>
indicates that minor personal injury can result if proper precautions are not taken.
<b>NOTICE</b>
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:

 <b>WARNING</b>
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 Aktiengesellschaft. 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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# Legal information

## 1.1 Cybersecurity information

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

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

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

For more information on protective industrial cybersecurity measures for implementation, please visit (<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 are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply the latest updates may increase customers' exposure to cyber threats.

To stay informed about product updates at all times, subscribe to the Siemens Industrial Cybersecurity RSS Feed under (<https://www.siemens.com/industrialsecurity>).

## 1.2 Note regarding the general data protection regulation

Siemens observes the principles of data protection, in particular the principle of data minimization (privacy by design). For the Machine Monitor product, this means that the product processes / stores the following personal data: User name (first name and last name), email address, user role.

No data of privacy or intimacy is processed or stored.

The above data is required for the login, the billing function and for the internal user administration. The user name and email address are stored when creating or editing monitoring rules and Monitoring Rule collections, as well as when registering maintenance work in the maintenance logbook.

The storage of data is appropriate and limited to what is necessary, as it is essential to identify the authorized operators. The data needs to be maintained manually by you and can also be deleted if necessary. If you need support, please contact customer support.

The above data will not be stored anonymously or pseudonymized, because the purpose (identification of the operating personnel) cannot be achieved otherwise. The above data is protected against loss of integrity and confidentiality by state-of-the-art security measures.



# What's new in Machine Monitor

All important new features in Machine Monitor are summarized here. You can find more details on individual topics in the documentation.

## 2.1 What's new in Machine Monitor V2.6.0

### What's new in Machine Monitor V2.6.0

#### **Saving and activating rules**

You can activate newly created rules directly when saving them.

#### **Adding new rules**

You can create new rules that are assigned directly to the selected Asset and save these new rules as monitoring rules.

#### **Overview of instructions and documents**

You have access to the list of instructions and documents that you can edit within the application. An overview within the application is available. It is not necessary to download instructions and documents.

#### **Editing monitoring rules**

A predefined monitoring rule that you have modified can be saved as a new rule.

#### **New features in the dashboard tab "Current status"**

- Activated rules and non-activated rules are displayed on separate tabs.
- In this view you can assign monitoring rules and monitoring rule collections directly.
- New view for the Asset settings is available.
- You can activate all created and fully configured monitoring rules at once.

#### **Continuous improvement of the user interface**

- New sidebars in the views for monitoring rule collections and for the instructions and documents.
- The "Current status", "Maintenance logbook", and "Event log" views have been standardized.
- The detail views of monitoring rules have been redesigned.
- The settings for reference parameter ranges have been optimized.
- The option of writing the status to Asset variables has been removed.

## What's new in Machine Monitor V2.5.0?

### New term for functions

The following functions and elements have received new names:

- Tag ⇒ Label
- Maintenance rule ⇒ Monitoring rule
- Maintenance trigger ⇒ Parameter

### New term for functions

The new terms are clear and help to avoid misunderstandings.

### Configurable root asset

The root asset is displayed in the tree view of the Assets as a configurable Asset. This allows you to assign monitoring rules to the root asset.

### App available in 6 languages

In addition to English and German, the user interface and the documentation can also be displayed in Chinese, French, Italian and Spanish.

### Optimized display of tables

- Filters for the table with monitoring rule configurations
- Standardization of table views and optimized functionalities

### Optimized layout of the condition monitoring (2D characteristic curve)

The detail view shows detailed information.

### Runtime parameters for monitoring rule of the "Intervals" type

You can assign a new parameter of the "Runtime" type for operating hours to a monitoring rule of the "Intervals" type.

### Runtime variable

You can assign a runtime variable to the new runtime parameter.

## What's new in Machine Monitor V2.4.0?

### Backing up and restoring settings

Settings can be saved in archive files in the settings under "Backup and restore". These archive files can be saved to a data storage medium and used later to restore settings.

### Better display in the "Configuration" module

The tabular displays in the "Configuration" module have been improved. This applies to the display of the monitoring rules, Monitoring Rule collections, instructions and documents.



## What's new in Machine Monitor V2.3.0?

### **Boolean parameter support for interval-based monitoring rules**

Interval-based monitoring rules can be created with Boolean parameters. This function allows you to create monitoring rules that are based on aggregated counter values. The function is available for interval-based monitoring rules on the "Edit Monitoring Rule" page.

### **"Usage information" page updated**

For users with a subscription as of V2.3.0, the "Usage information" page has been updated. The page now displays the number of Assets that are being monitored. You get an overview of the number of Assets included in your subscription.

### **User-defined logo in the user interface**

The default Siemens logo in the user interface can be replaced with a custom logo in the settings under "User-defined logo". This makes it possible to use your own company logo in the user interface.



# Introduction

## 3.1 Security Information for Industrial Edge Apps

Security information (assumptions/constraints) for Industrial Edge Apps is as follows:

- Only authorized internal operators will have access to Industrial Edge Device within a secure network using VPN connection.
- Perimeter firewall configuration responsibility lies with the end customer.
- The security guidelines for usage of USB Flash Drives in the shop floor area are applied accordingly.
- Creating users with appropriate access rights upon commissioning is the responsibility of the operator.
- The customer is responsible for configuring the application on the basis of the system requirements and technical capabilities of the documented App according to the Installation / User Manual such that the automation system performance is not impacted.
- The system is installed in an environment ensuring that physical access is limited to authorized maintenance personnel only. Managing unauthorized attachment of removable devices is the responsibility of the operator.
- The platform including hardware, firmware and operating system is securely configured and maintained by the operator.
- The operator is capable of protecting the environment from malware infection.
- Centralized IT security components (Active Directory, Centralized IT Logging Server) are provided and well secured by the operator and are trustworthy.
- The operator personnel accessing the system is well trained in the usage of the system and general information security aspects like password handling, removable media, etc.
- The operator is responsible for the CIA (Confidentiality, Integrity and Availability) of data stored outside the Industrial Edge Device.
- The operator is responsible for configuring the CPUs with appropriate read/write access levels (legitimization), and for configuring the Industrial Edge Apps using appropriate passwords for data collection from CPUs.
- The customer takes care about the time synchronization of Industrial Edge Management and Industrial Edge Device.

### 3.2 Overview of Industrial Edge

Siemens Industrial Edge is the next generation of digital automation. With Industrial Edge, you use intelligence and scalability of the cloud directly in your manufacturing - in a simple, high-performance manner and without your data leaving the manufacturing process. Industrial Edge combines local and high-performance data processing directly in automation with the advantages of the cloud: app-based data analysis, data processing and Infrastructure-as-a-Service concepts with central update functionality. In this way, you can quickly integrate apps into manufacturing and manage them with a high degree of automation.

Industrial Edge gives you the opportunity to continuously make changes to your automation components and plants, analyze large volumes of automation data to implement innovative functions, such as preventive maintenance, and to obtain maximum flexibility and thus productivity over the entire machine lifecycle.

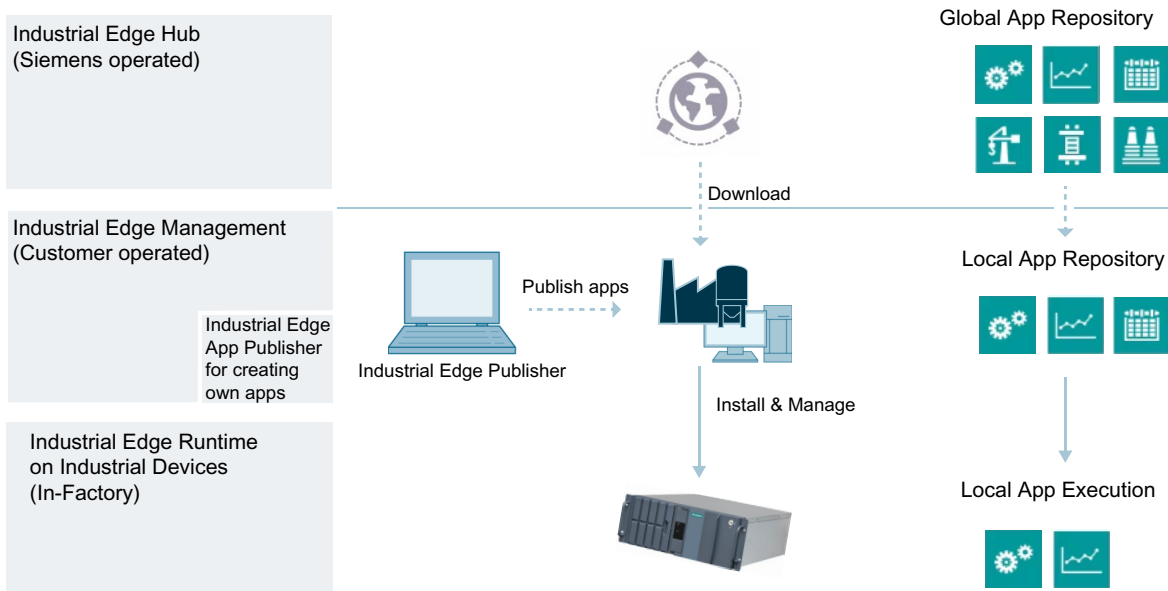
With the Industrial Edge Hub, an App Store is available to you where you can find all Siemens apps and 3rd-party apps. From here, you can manage all licenses for your apps and devices centrally and install updates for security issues, device firmware, apps and Industrial Edge Management.

You can monitor and manage distributed Edge devices centrally in the Industrial Edge Management. In this way, new apps and software functions, for example, can be installed on all connected Edge devices company-wide. Central software management thus minimizes the workload for performing maintenance and updates on individual devices.

On the individual Industrial Edge devices, you can start and run apps and keep statistics on an Edge device, for example.

With the Industrial Edge Publisher, you can develop your own Edge apps and make them available to other users in Industrial Edge Management.

Another component of the Industrial Edge ecosystem is Industrial Edge Runtime, which is installed on Edge Devices (IED) and on which the system, including all applications, ultimately runs.



Industrial Edge Hub	Industrial Edge Management	Industrial Edge Runtime on Industrial Devices
<p>Platform for purchasing apps and software, and for monitoring management systems</p> <ul style="list-style-type: none"> <li>• Central management location for apps, contributing to corporate standardization</li> <li>• Management of all licenses in use, enabling easy cost estimates</li> <li>• Overview of all management system instances that are in use worldwide</li> </ul>	<p>Centralized control level for managing devices, apps, and shop floor users</p> <ul style="list-style-type: none"> <li>• Assignment of apps to the matching Edge devices (worldwide)</li> <li>• Specification of user rights (e.g. app installations)</li> <li>• Just a few clicks for app setup and security update cycles</li> <li>• Supervision of all operations using the centralized Admin view</li> <li>• Excellent usability for IT and OT users, helping to promote user adaptation and self-service</li> </ul>	<p>Software level for app container</p> <ul style="list-style-type: none"> <li>• Installation of scalable apps on many different Edge devices</li> <li>• Supports use in industrial environments by <ul style="list-style-type: none"> <li>– ensuring security and reliability</li> <li>– providing comprehensive user management to meet the requirements of machine manufacturers and plant operators alike</li> <li>– adhering to Company Policy Compliance, e.g. user management integration or IT/firewall specifications</li> </ul> </li> <li>• integrating device connectivity to cloud and automation systems.</li> </ul>

### 3.3 Function overview

#### Introduction

The Machine Monitor app provides transparency on the maintenance status of your connected machines. The tracking of maintenance intervals based on actual machine usage enables an optimized prediction of due dates and planning of service assignments.

- Access to maintenance data of your whole plant structure worldwide
- Setting up and managing monitoring rule templates as well as assigning the monitoring rules for each Asset
- Overview of the maintenance status of all Assets in a cascaded overview
- Checking the progress of each maintenance interval in the detail view
- Optimizing the maintenance schedule through the integrated trend prediction and due date calculation
- Notification about due maintenance work via email or the Notifier app
- Recording performed maintenance work in the maintenance logbook
- Tracking the maintenance history of each machine in its maintenance logbook

## Browser recommendation

You require an HTML5-capable Internet browser to run the app. The Google Chrome, Mozilla Firefox and Microsoft Edge browsers are supported (current and most recent version). Google Chrome is recommended. You should preferably use 1920x1080 resolution.

Internet Explorer is no longer supported.

In general, the app can run on any mobile device with an HTML5-enabled browser. Tablets are recommended.

## 3.4 Validity of the documentation

### Description

The "Machine Monitor for Industrial Edge" documentation is valid for installing the app on an Edge device.

## 3.5 Overview of additional documentation

### Overview

The following table lists additional documents that supplement this description, some of which are available on the Internet.

Documentation	Most important contents
Industrial Edge Management – Getting Started ( <a href="https://support.industry.siemens.com/cs/ww/en/view/109814452">https://support.industry.siemens.com/cs/ww/en/view/109814452</a> )	Getting started with working with Industrial Edge: <ul style="list-style-type: none"> <li>• Purchasing and licensing</li> <li>• Installation</li> <li>• User administration</li> </ul>
Industrial Edge Marketplace ( <a href="https://www.dex.siemens.com/?selected=edge">https://www.dex.siemens.com/?selected=edge</a> )	Platform to purchase app licenses
Industrial Edge Hub ( <a href="https://iehub.eu1.edge.siemens.cloud">https://iehub.eu1.edge.siemens.cloud</a> )	The page describes the functions of the Siemens Industrial Edge platform and the functionalities of the Edge management system. All the documentations on the IE platform are available under "Documents".
System overview ( <a href="https://new.siemens.com/global/en/products/automation/topic-areas/industrial-edge/production-machines.html">https://new.siemens.com/global/en/products/automation/topic-areas/industrial-edge/production-machines.html</a> )	The page provides an overview of all Edge solutions.
Industrial Edge Devices ( <a href="https://www.siemens.com/de/de/produkte/automatisierung/themenfelder/industrial-edge/industrial-edge-devices.html">https://www.siemens.com/de/de/produkte/automatisierung/themenfelder/industrial-edge/industrial-edge-devices.html</a> )	The page presents the wide range of Industrial Edge Devices with their features. Learn which device is best suited for use on the basis of your requirements.

Documentation	Most important contents
Industrial Edge in 10 minutes ( <a href="https://cache.industry.siemens.com/dl/dl-media/991/109772991/att_1010695/v1/109772991_V16_Highlights_V2_web/start.htm#!en/12329">https://cache.industry.siemens.com/dl/dl-media/991/109772991/att_1010695/v1/109772991_V16_Highlights_V2_web/start.htm#!en/12329</a> )	Web Based Training: Integrate IT in the production with Siemens Industrial Edge
Unified Comfort Panel ( <a href="https://support.industry.siemens.com/cs/ww/en/view/109795870">https://support.industry.siemens.com/cs/ww/en/view/109795870</a> )	Unified Comfort Panel manual and a description of user administration on a UCP.
IIH Essentials ( <a href="https://support.industry.siemens.com/cs/ww/en/view/109781417">https://support.industry.siemens.com/cs/ww/en/view/109781417</a> )	IIH Essentials manual
IIH Configurator for Industrial Edge ( <a href="https://support.industry.siemens.com/cs/ww/en/view/109820608">https://support.industry.siemens.com/cs/ww/en/view/109820608</a> )	IIH Configurator manual



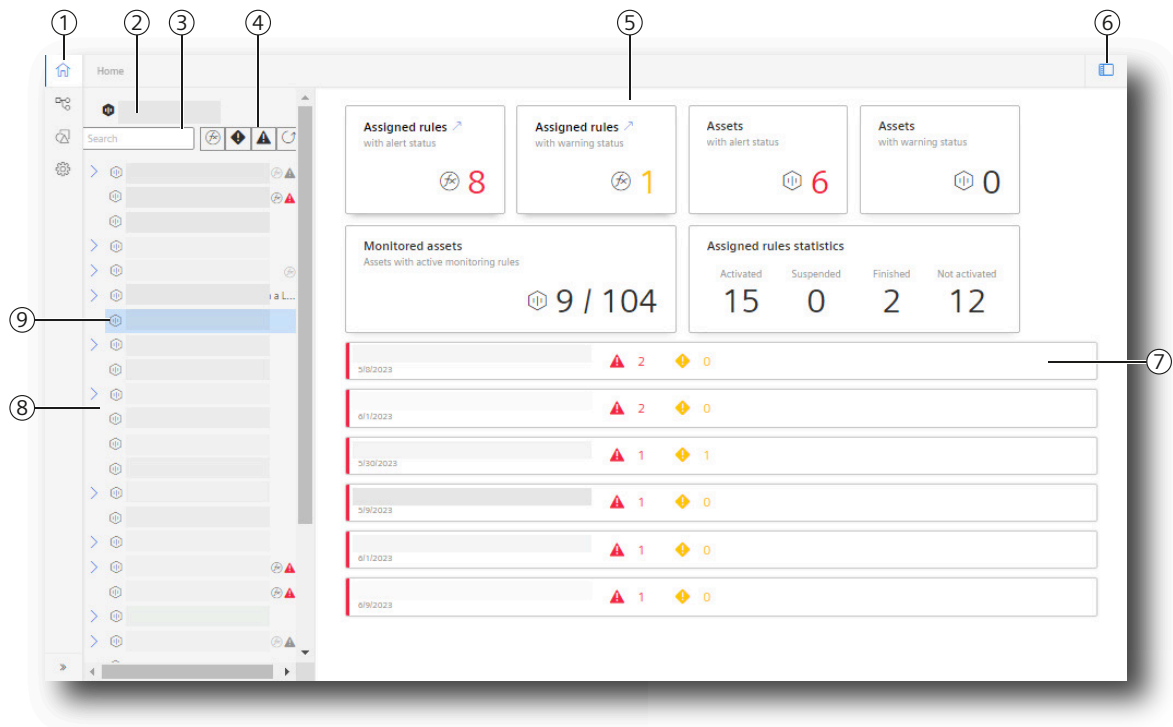


# 4

## Structure of the app





### Home page

After starting the app, the home page is displayed.



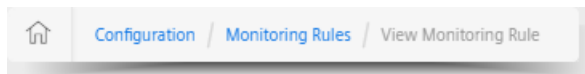
- ① Navigation bar
- ② Root asset
- ③ Search and find Assets
- ④ Filter tree view
- ⑤ View for the selected Asset / dashboard
- ⑥ Display and hide tree view
- ⑦ Connected machines with status display
- ⑧ Tree view of the Asset
- ⑨ Selected asset

### Navigate in the app

	Home	Start page with overview for a selected Asset
	Overview	<ul style="list-style-type: none"> <li>Configure a maintenance monitoring configuration for any Asset. The Asset list is imported from the Asset Manager.</li> <li>Monitor the status and progress of the maintenance intervals of your Assets with an active configuration on automatically generated dashboards. You can register and review performed maintenance jobs in the maintenance logbook for each Asset.</li> </ul>
	Configuration	<ul style="list-style-type: none"> <li>Manage the monitoring rules.</li> <li>Group the monitoring rules in the Monitoring Rule collections.</li> <li>Create and manage the instructions and documents for the monitoring rules.</li> </ul>
	Settings	<ul style="list-style-type: none"> <li>Manage the "User information", e.g. the locale and the user roles.</li> <li>Show the "Usage information", e.g. the number of Assets for maintenance monitoring.</li> </ul>

### Breadcrumb navigation

- The path which leads to the view is displayed for each view.












To go to the desired higher-level view, click on the corresponding entry.

- In addition, a link is displayed which returns you to the higher-level overview.

[< Back](#)

### Icons in the views

	Asset
	Monitoring Rule
	Warning, warning status
	Warning: Maintenance due
	Alarm, alarm status
	Alarm: Maintenance overdue
	Rule type "Interval-based"
	Rule type "Parameter limits"

	Rule type "2D characteristic curve"
	Filter



## User profile

### 5.1 User information

 Settings > User information

Here, you can see your user information and set both the user interface language and the locale of the app. The selection of the locale has an effect on all numbers, such as decimal separators, for example, and dates in the overview dashboards and detail views in the app, as well as the maintenance logbook, and can be selected regardless of the user interface language.

The default Siemens logo in the user interface can be replaced with a custom logo under "User-defined logo". This makes it possible to use your own company logo in the user interface. If you delete a custom logo, the Siemens logo is restored.

#### Embedding a user-defined logo

1. Select "Settings" in the navigation bar.
2. Click "User information".
3. In the "User-defined logo" section, click in the "Upload file" field and select an image file in your file directory.  
Alternatively, drag and drop an image file into the "Upload file" window.

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#### Note


##### Supported file formats

User-defined logos can be used in JPG, JPEG, and PNG image formats up to a file size of 1 MB.

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4. Click the "Upload and set" button.

### 5.2 Email server settings

 Settings > Email server settings

In Machine Monitor for Industrial Edge, you have two channels to send notifications, e.g. in case of due maintenance: Notifier for Industrial Edge and Email (see section Setting up notifications for the Asset (Page 56)).

To send notifications by email, configure an SMTP server.

Setting	Meaning
SMTP host	The hostname or IP address of the outgoing mail server
Port	The SMTP port of your outgoing mail server
Proxy	Address of SMTP proxy server to pass through. The proxy server establishes the TCP/IP connection to the target SMTP server. A proxy server may be required if your IED is operated in a protected network without direct access to the Internet.

Setting	Meaning
<b>Secure</b>	If TRUE, the connection will use TLS when connecting to the server. If FALSE (default), then TLS is used if the server supports the STARTTLS extension.
<b>Username password</b>	The authentication credentials for your SMTP server.
<b>ignoreTLS</b>	If 'ignoreTLS' is TRUE and 'secure' is FALSE, the service will try to use STARTTLS even if the server does not support it. If the connection cannot be encrypted, the message is not sent.
<b>requireTLS</b>	If set to FALSE, this configuration opens a connection to a TLS server with self-signed or invalid TLS certificate.
<b>RejectUnauthorized</b>	If set to FALSE, this configuration opens a connection to a TLS server with self-signed or invalid TLS certificate.
<b>Sender name</b>	The displayed name of the sender in the inbox.
<b>Sender email</b>	The displayed e-mail address of the sender.

### "Test email" function

You can test email delivery by specifying a recipient address and clicking "Send test email". If a green status message with the SMTP server response code "250" is displayed, your message was successfully delivered to the recipient server.

Click "Save" to apply your settings.

## 5.3 Connection configuration

In the "Connection configuration" menu, you can set and check the connection with the "Data Explorer" app and other external applications. The "Data Explorer" app records data with "recording jobs" from various data sources and saves them as "recordings". The "recordings" can then be visualized collectively in charts.

### Establishing a connection to the Data Explorer

1. To establish a connection to the Data Explorer, enter the following information in the "Connection options" input mask:
  - Databus address
  - Login data (user name and password)
2. Click "Save".
3. Then check the connection.

### Additional information

You can find additional information on the Data Explorer and recording jobs in the online help of the Data Explorer.

## 5.4 Usage information

 Settings > Usage information

Display the number of Assets that are configured for maintenance monitoring. Three Assets for maintenance monitoring are included in the basic package.

## 5.5 Backup and restore

Settings can be saved to archive files under "Backup and Restore". These archive files can be saved to a data storage medium and used later to restore settings.

### See also

[Backing up and restoring settings \(Page 75\)](#)





## Filter, search and labels

### 6.1 Filter and search



Filters help you to find specific entries. The following table shows you in which menus you can filter according to which criteria:

	Asset over-view	Maintenance log-book	Event log	Dialog "Assign Monitoring Rules"	Export configuration
Asset	X	X	X		
Period		X	X		
Entry type		X			
Component identifier	X	X	X		
Monitoring Rule	X	X	X		
Entered by		X			
Rule type	X			X	X
Warning and alarm status	X				
Free text search	X	X		X	X
Parameter			X		
Type of event			X		
Status			X		

Alternatively, you can use the free text search. All selected filter criteria and labels are combined with AND logic to further narrow down your search results.

You can search for labels in the following menus:

- Monitoring rules
- Monitoring Rule collections
- Assign monitoring rule
- Instructions and documents
- Export configurations

### 6.2 Using labels

To assign and differentiate entries, assign labels.

You can assign a maximum of 10 labels to an entry. Labels must consist of at least 2 characters and can be up to 50 characters long.

## 6.2 Using labels

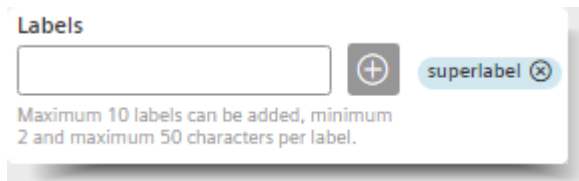
You assign labels for

- Monitoring rules
- Monitoring Rule collections
- Instructions and documents


### Assigning labels

You can assign a label either when creating or editing an entry. Use the "Labels" field for this purpose.

1. Enter a label name in the "Labels" field or select a label from a list of labels already created.
2. To confirm the selection, click the "+" symbol.

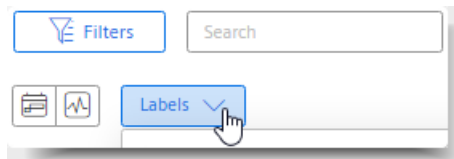


### Removing labels

1. To remove a label, open the configuration by clicking .
2. Remove the label by clicking the "x" icon next to the label name.
3. Save your changes.

### Filtering labels according to lists

1. Click "Labels".



2. Select one or more labels in the drop-down menu.  
If the selection list is too long, you can filter the list by entering the label name.
3. Confirm your selection.

# Creating monitoring rules templates

## 7.1 Introduction to monitoring rules

Monitoring rules are the template for maintenance monitoring of your Assets. You create and edit the monitoring rules step-by-step with the configuration wizard. You link associated instructions and documents.

The configuration of a monitoring rule is independent of the assignment to an Asset or the connection to any Asset variable. You assign monitoring rules to an Asset.

More information: [Assigning new monitoring rules \(Page 41\)](#).

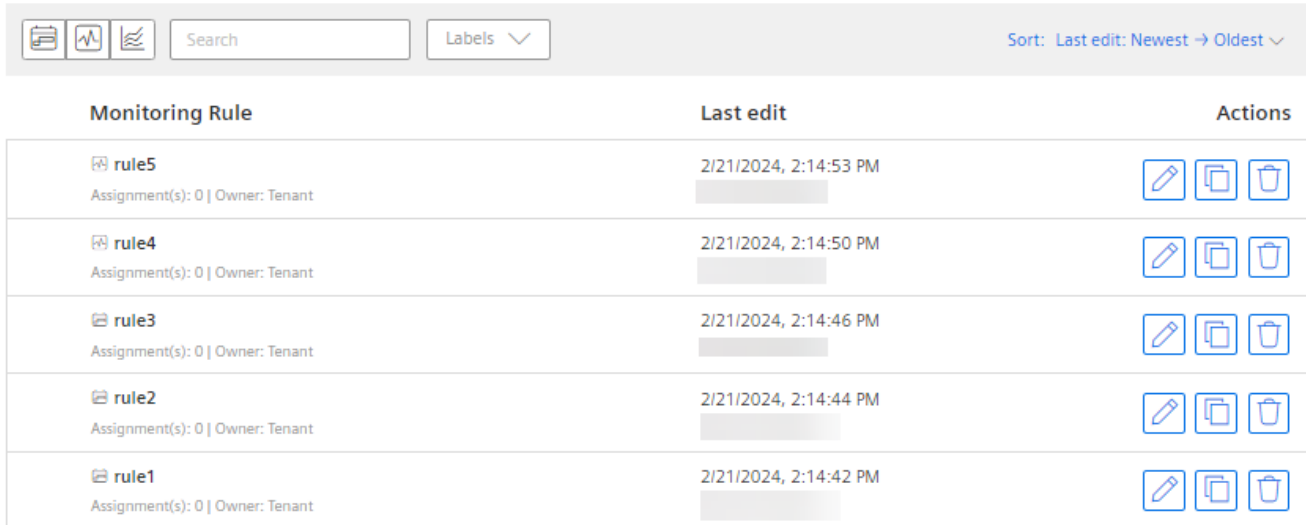
After activating an assigned monitoring rule, you only have limited options to edit the original monitoring rule.





















### Starting the configuration wizard

1.  Select the "Configuration" view and navigate to "Monitoring Rules".

## Monitoring Rules

Monitoring Rules can be assigned to Assets. To do that, select an Asset in the Overview module and go to Asset Configuration > Monitoring Rule assignment.



Monitoring Rule	Last edit	Actions
 <b>rule5</b> Assignment(s): 0   Owner: Tenant	2/21/2024, 2:14:53 PM	  
 <b>rule4</b> Assignment(s): 0   Owner: Tenant	2/21/2024, 2:14:50 PM	  
 <b>rule3</b> Assignment(s): 0   Owner: Tenant	2/21/2024, 2:14:46 PM	  
 <b>rule2</b> Assignment(s): 0   Owner: Tenant	2/21/2024, 2:14:44 PM	  
 <b>rule1</b> Assignment(s): 0   Owner: Tenant	2/21/2024, 2:14:42 PM	  

The view shows information on the created monitoring rules:




- Monitoring rule name
- Last change and who made this change
- Number of assignments  
When you click on the number of assignments, the overview of all Assets to which this monitoring rule was assigned is shown.
- Status of the monitoring rule
- Action: You can edit, duplicate or delete monitoring rules here.

2. To start the configuration wizard for a new rule, click "New Monitoring Rule".

The configuration wizard allows the selection of an interval-based monitoring rule, a rule of the type "Parameter limits" or a rule of the type "2D characteristic curve".

### Actions

The following actions are available for each monitoring rule:

-  Edit - Starts the configuration wizard for the selected monitoring rule.
-  Duplicate - Creates a copy of the selected monitoring rule.
-  Delete - Deletes the selected monitoring rule after confirmation.


## 7.2 Creating rules for interval-based maintenance intervals

Monitoring rules of the "interval based" type are useful for monitoring the maintenance due date depending on the machine utilization.

The monitoring rule is defined by an interval, or an interval series. Intervals can have three types of parameters:

- **Time**  
Regular calendar dates, for example maintenance every 2 months
- **Usage**  
Values which represent the continuous use of the machine  
Examples:
  - "Operating time" (e.g. every 300 h)
  - "Mileage of the axis" (e.g. after 500 km)
  - "Number of cycles" (e.g. after 10000 cycles)
- **Runtime**  
Maintenance after a specified operating time  
Example:
  - Parameter: Operating hours
  - Unit: h

### Procedure

1.  Select the "Configuration > Monitoring Rules" view.
2. Click "New Monitoring Rule" and follow the steps in the configuration wizard.
3. Assign a unique name that represents the monitoring use case.
4. Optionally select one or more labels.
5. Select the users for whom the monitoring rule is to be visible.  
You can find more information on this in the section "User profile (Page 21)".
6. Select the "Intervals" monitoring rule type.
7. Proceed with "Continue".

8. Define one or more parameters for the monitoring rule.

Type*	Parameter*	Unit*	Actions
Usage			Delete
Time	Calendar date	Date	Delete

+ Add new parameter

- A parameter can, for example, be counter data for your machine ("Usage" type) or a time criterion ("Time" or "Runtime" type).
- Specify a representative name for each parameter (e.g. "Runtime" or "Mileage x-axis").
- Specify a corresponding unit (e.g. "h" or "km").

9. Proceed with "Continue".

10. Define the intervals in chronological order and specify instructions and limits for each interval.

- Select the repetition pattern of the interval series. You can click the thumbnail image to visualize the repeat pattern in a larger size.
- Optional: Activate reference parameters for configuration of the limits. Define due and overdue values depending on the value of the reference parameter.

Enable reference parameter for limit configuration

Reference parameter\*

counter

Designation of reference input, e.g. "Machine speed"

▼ Interval #1 ↑ ↓ 🗑️

**Limits**

Specify the due and overdue limits for this interval. You can specify different limits that become valid depending on the reference parameter value.

---

▼ Maintenance trigger "production"

Due limit *📌	Overdue limit *⚠️	Reference parameter ranges
<input type="text" value="200"/> pieces	<input type="text" value="230"/> pieces	<span>⊕ Add</span> <span>🗑️ Delete</span>

---

▼ Maintenance trigger "hours"

Due limit *📌	Overdue limit *⚠️
<input type="text" value="2"/> <input type="text" value="days"/>	<input type="text" value="1"/> days after due date

---

**Instructions**

Link instructions to this interval from your instruction list in the order of their execution, or create a new instruction.

No instruction linked.

---

**Interval repetitions**

Number of repetitions for this interval.

▶ Interval #2 ↑ ↓ 🗑️

▶ Interval #3 ↑ ↓ 🗑️

Example: Define "Machine speed" as reference parameter. Now you can define shorter maintenance intervals, for example, if your machine is operated at higher speeds.

### 7.3 Creating rules for condition monitoring of the type "Parameter limits"


- Specify the due and overdue limits for each previously defined parameter. If you have selected the "Reference parameter" option, you can now add reference parameter value ranges for each parameter as required and specify different limits for each value range.
  - Optional: Link relevant instructions for the due maintenance.  
To select an instruction already created, click "Link instruction".  
Click "Create new instruction" to create a new instruction.  
Unlinked instructions are accessible from the "Instructions and documents" page, see the section "Instructions and documents (Page 35)".
  - Set the number of interval repetitions. This option is disabled if you have selected the repetition pattern "Repeat last interval infinitely".
  - Add another interval, if required. You can specify the limits and instructions for each interval separately. If you have more than one interval defined, you can reorder intervals, or delete intervals.
11. Proceed with "Continue".
  12. In step 4, link the relevant documents and instructions with the monitoring rule.  
Select a previously uploaded document or upload a new document.
  13. Close your monitoring rule configuration.

## 7.3 Creating rules for condition monitoring of the type "Parameter limits"

Monitoring rules of the "Parameter limits" type are useful for monitoring the due maintenance status depending on the current state of the machine.

Parameters can be, for example, process values based on sensor data and can be monitored for high limits and low limits.

### Procedure

1.  Select the "Configuration > Monitoring Rules" view.
2. Click "New Monitoring Rule" and follow the steps in the configuration wizard.
3. Assign a unique name that represents the monitoring use case and select monitoring rule type "Condition-based".
4. Proceed with "Continue".



5. Define one or several parameters for your rule.
  - A parameter can be any process value of the number type (select type "Number"), or a TRUE/FALSE value (select type "Boolean").
  - Enter representative names for each parameter (e.g. "Temperature" or "Overpressure valve") and provide the corresponding unit (only for type "Number", e.g. "°C").

✕ Cancel
① General configuration >
② Parameter(s) >
③ Limits & instructions >
④ Documents
Continue >

## 2. Parameter(s)

Define at least one input parameter. All input parameters are OR-linked.

Data type*	Parameter*	Unit*	Actions
Number	Temperature	°C	Delete
Boolean	lid closed		Delete

Add

6. Proceed with "Continue".
7. Define the limits for each parameter.
  - For number type parameters, you can specify high limits only, low limits only, or both. Specify the range limits for the visualization widget (low limit range, high limit range).
  - For Boolean type parameters, assign a severity level (info/warning/alert) to either TRUE or FALSE state.
8. Proceed with "Continue".
9. Optional: Link relevant instructions for the due maintenance for each severity level. You can select from previously created instructions (click on "Link instruction"), or you can create a new instruction (click on "Create new instruction"). Unlinked instructions remain accessible from the "Instructions and documents" page, see section "Instructions and documents (Page 35)".
10. Link any relevant documents to your monitoring rule by selecting a previously uploaded document or uploading a new document.
11. Close your configuration of your monitoring rule with "Finish".

## 7.4 Creating rules for condition monitoring with 2D characteristic curve

Monitoring rules of the type "2D characteristic curve" are useful for monitoring the due maintenance status depending on the current state of the machine.

7.4 Creating rules for condition monitoring with 2D characteristic curve


The 2D characteristic curve is defined by two parameters. These parameters are related physical values (parameters) that are characteristic for a component, a module, a device or a discrete process.

The monitoring rule defines the relative limits to a reference data record and represents up to 7 value series for actual characteristic curves. You can select whether the monitoring rule should monitor deviations from a reference curve ("Limit curve") or from reference points ("Point-by-point").

Furthermore, you can create multiple limit profiles. This allows you to monitor different limit types, warning values and alarm values for multiple machines or operations.

For active monitoring, you need a connection to the "Data Explorer" application. See also section "Connection configuration (Page 22)".

**Procedure**

1.  Select the "Configuration > Monitoring Rules" view.
2. Click "New Monitoring Rule" and follow the steps in the configuration wizard.
3. Assign a unique name that represents the monitoring use case and select monitoring rule type "2D characteristic curve".
4. Proceed with "Continue".
5. Define the parameters for the X and Y axis and specify the respective unit. Enter representative names for the two parameters (e.g. "Speed" and "Torque") and specify the corresponding unit.
6. Proceed with "Continue".
7. Select the monitoring method, "Limit curve" or "Point-to-point", and create a profile.
8. A profile consists of:
  - Name
  - Limit curves (only with "Limit curve" monitoring method)
  - Warning and alarm limits for X and Y to calculate the limit curves

---

**Note**

In the "Limit curve" monitoring method, the warning limits and alarm limits are calculated relative to the reference characteristic.

---

- Optional: Set a minimum and/or maximum monitoring range.

You can create new profiles and edit, duplicate or delete the existing ones. The Machine Monitor automatically detects which profile matches the currently operated machine and displays the data of the corresponding profile in the detail view.

9. In step 4, link the relevant documents and instructions with the monitoring rule. Select a previously uploaded document or upload a new document.
10. Proceed with "Continue".

11. Link the instructions with the monitoring rule by selecting the previously uploaded instruction or upload new instructions.
12. Close your monitoring rule configuration.

### See also

Instructions and documents (Page 35)

## 7.5 Instructions and documents


Under "Instructions and documents" you link the information and step-by-step instructions to maintenance work with the monitoring rules.

You can view, edit, duplicate, or delete previously created instructions.

You create instructions directly in the app.

Documents have already been created as a file and you upload this file.

### Creating and editing instructions

1.  Select the "Configuration > Instructions and documents" view.
2. Select the "Instructions" tab.
3. Click "New instruction".  
- or -  
Click in the wizard for monitoring rules in step 3, "Create new instruction".

---

#### Note

An instruction that is created using the monitoring rule wizard also appears on the list and can be edited later.

Instructions that are linked to at least one monitoring rule cannot be deleted.

---

#### Note

##### Editing instructions that are already linked

If an instruction is already in use, i.e. linked to a monitoring rule, edit it with caution. Your changes are immediately displayed at each point of use on each Asset where the monitoring rule has been activated.

---

4. Under "Instruction" enter the instruction as free text.

Create new instruction

**Name\***  
Lubrication  
Minimum 2 and maximum 50 characters.

**Labels**  
[ ] [ + ] Tool required [ x ]  
Maximum 10 labels can be added, minimum 2 and maximum 50 characters per label.

**Duration (minutes)**  
2  
Duration of maintenance task. Indicates an estimated net working time for the execution of the maintenance work.

**Instructions**

**Text**

1. Loosen screw 14.  
2. Open lid.  
3. Apply lubricants.

53/1000

**Illustrated Instructions**

[ Upload PDF document ]  
Maximum file size is 5MB.

[ Cancel ] [ Save ]

5. For illustration, upload a PDF to the instruction, for example, a drawing.

## Uploading and updating documents

You have two options to upload new documents:

1. Click "Upload new document" in the "Instructions and documents" view.  
- or -  
Click "Upload new document" in the wizard for monitoring rules in step 4, "Documents".

Any document that is uploaded from within the monitoring rule wizard will also appear on the list and can be updated or deleted later. Documents that are linked to at least one monitoring rule cannot be deleted.

---

**Note****Error when uploading duplicate files**


When you upload a new document and select the same file from your computer that you have uploaded previously, the file upload may fail. In this case, try again or use the previously uploaded document to link to monitoring rules.

---

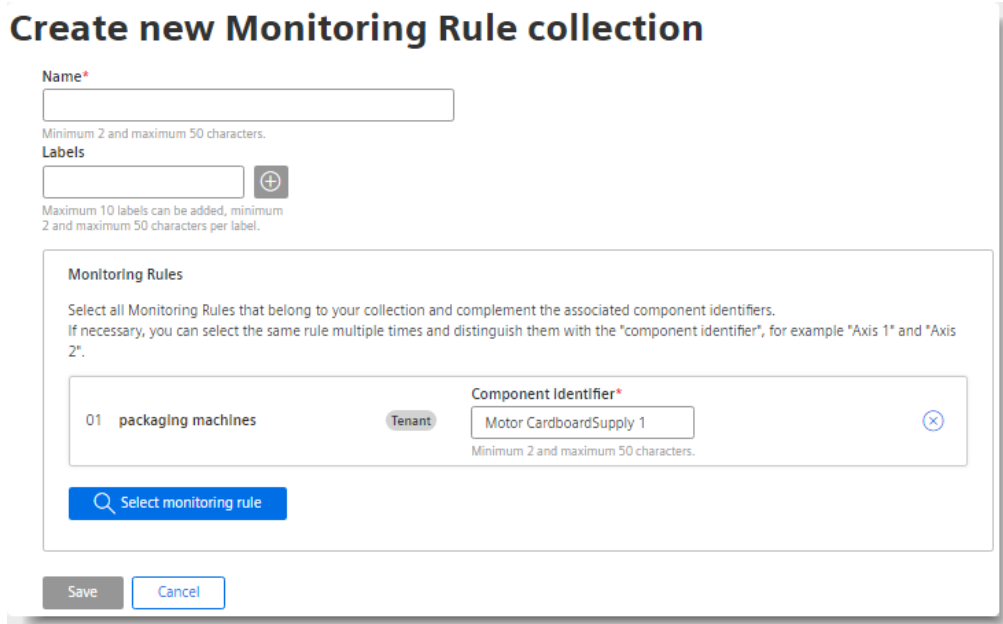
## 7.6 Creating Monitoring Rule collections

Monitoring Rule collections serve the purpose of organizing monitoring rules for various machine types. You can create, modify, duplicate, or delete Monitoring Rule collections.

### Procedure

1.  Select the "Configuration > Monitoring Rules collection" view.
2. Click "New Monitoring Rule collection".
3. Provide a meaningful name, e.g. the label of your machine series.
4. To add monitoring rules to your collection, click "Select maintenance rule".  
You can add the same rule multiple times. This is useful, if you have multiple components in your machine, which require the same maintenance interval.

5. Specify component identifiers for each added monitoring rule.



These entries are applied when you assign the whole collection to an Asset, see section "Rule selection and basic configuration (Page 41)".

6. Close the configuration by clicking "Save".


## 7.7 Exporting or importing configurations

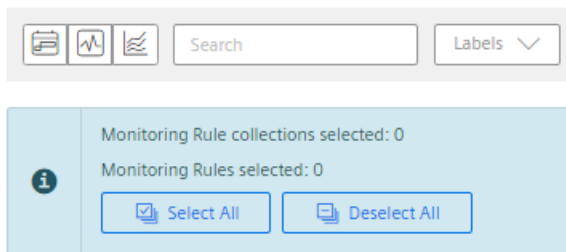
You can export monitoring rule templates completely or partially and save them on a separate data storage medium.

You can use previously saved export files to import monitoring rule templates again.

Use case: You can create backups of your configurations or to make monitoring rule templates available for further Machine Monitor installations.

### Export configuration

1.  Select the "Configuration > Export configuration" view.
2. Use the filter and search functions.



3. Select the desired Monitoring Rule collections or individual monitoring rules.
4. Click "Export" to create the export file.

The generated export file contains all instructions and documents which are linked to the monitoring rules.

Instructions and documents cannot be exported separately.

The export file is available for local saving under the "Downloads" tab. As soon as you have downloaded the export file, it is deleted from the "Downloads" tab.


### Export configuration

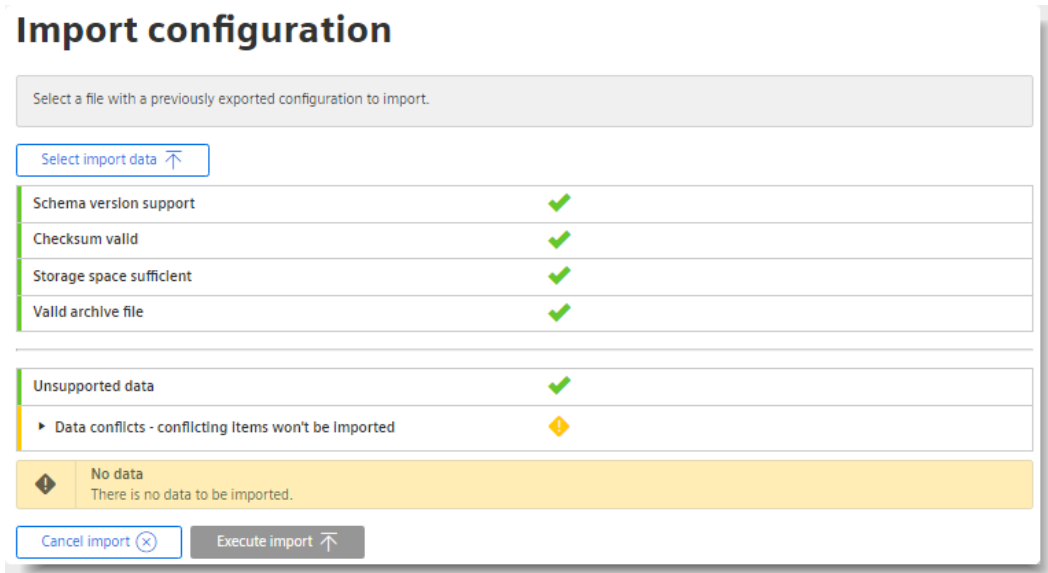
Export Downloads

Download your export file with the selected Monitoring Rules and Monitoring Rule collections.

Status	Created at	Created by	Owner	Actions
<span>✓</span> Ready	7/11/2023, 8:20:50 AM		Tenant	<a href="#">Download</a> 

### Import configuration

1.  Select the "Configuration > Import configuration" view.
2. Select an exported configuration  
Once you have selected a file, the app performs a check to examine the validity and compatibility of the import file.  
You will be shown the contained data that can be imported.  
In case of data conflicts, the configuration items in question are not imported. A data conflict occurs if a configuration item with the same name already exists in your Machine Monitor installation (monitoring rule, or Monitoring Rule collection, or instruction or document with the same name).



3. Complete the process by clicking on "Execute import".



# Configuring Assets for maintenance monitoring

## 8.1 Creating a new rule

To configure the maintenance monitoring for an Asset, you have the following options:

- You can assign a predefined monitoring rule to the selected Asset (see section "Rule selection and basic configuration (Page 41)").
- You can copy the rule assignment from another Asset (see section "Rule selection and basic configuration (Page 41)").
- You can create a new rule and assign it directly to the selected Asset.

### Procedure

1. In the "Overview" view, navigate to the selected Asset.
2. Click "Add rule".
3. Select "Create new".
4. Select the rule type and follow the configuration wizard for creation of the rules (see section "Creating maintenance rule templates (Page 27)").
5. You can save the completed configuration for activation later (see section Activating assigned monitoring rules (Page 56)) or activate the monitoring rule directly by clicking "..." and selecting "Save and activate".

### Result

You have created a new rule for the selected Asset.

## 8.2 Assigning new monitoring rules

### 8.2.1 Rule selection and basic configuration

You can select predefined monitoring rules and assign them to an Asset.

1. Select the Asset to which you want to assign a monitoring rule.
2. Click "Add rule" and select "Assign predefined monitoring rules".
3. Select the monitoring rules for assignment. You can select either from the flat list, or from your Monitoring Rule collections. To find your desired rules, you can use the search and filter inputs.
4. You can select multiple monitoring rules.

## 8.2 Assigning new monitoring rules

5. If you select from a Monitoring Rule collection, you can also deselect individual rules from within the collection.
6. Finish your selection and click on "Assign".

### Copy Rule assignments from another Asset

You can copy the monitoring rule assignments of a configurable Asset. The "Copy from another asset" button is available if you have not yet assigned any monitoring rules.

1. Select the Asset to which you want to copy a monitoring rule assignment.
2. Click "Add rule" and select "Copy from another asset".
3. Select the source Asset to copy from to set up the current Asset.
4. You can specify the default start date and time for maintenance intervals in the dialog.
5. You can specify whether to include rules that are not activated on the source Asset.
6. Finish your selection and click on "Copy".

### Completing the configuration

For each assigned monitoring rule, a collapsible configuration container is created in which you can complete the configuration and activate the monitoring.

1. Label the affected machine component. If you have selected the monitoring rule from a collection, the component identifier is adopted accordingly.  
The component identifiers are useful if the same monitoring rule is assigned several times for one Asset.  
Example: A "lubrication interval" for "ball screw A" and for "ball screw B".
2. For "interval-based" monitoring rules:
  - Specify the date and time for the "Interval start".  
Define from which point in time (up to 30 days retrospectively) the maintenance interval should be calculated. This setting is preset by the "Default interval start" value.
  - Set the limits for "Due limit" and "Overdue limit".  
Create new or link existing instructions to the interval.
3. For "parameter limit" monitoring rules:
  - Select the "Calculation period".  
Define the calculation time range for the aggregation of the process data.

---

#### Note

Accepted units for the calculation period:

- Minute(s): Integer value between 1-43200
  - Hour(s): Integer value between 1-720
  - Day(s): Integer value between 1-30
- 

- Edit the parameter limits.
4. Connect all parameters to the corresponding Asset variables (see section Connecting parameters with Asset variables (Page 43)).

5. Select aggregation function for reading out the values of the linked parameters (see section Aggregation functions (Page 47)).
6. If required, adapt the trend model and calculation period for projection of the maintenance due date (only for "interval-based" monitoring rules, see section Trend model and calculation period (Page 52)).
7. If required, connect the reference parameter to the corresponding Asset variable (see section Connect reference parameter to Asset variable (Page 53)).
8. For 2D characteristic curve monitoring rules: Select an actual characteristic data record and a reference characteristic data record for each profile created (see Selecting characteristic data records (Page 54)).
9. Optional: Have the status information of the monitoring rule written to Asset variables (see section AUTOHOTSPOT).
10. You can save the completed configuration as a new monitoring rule or save the changes in the existing monitoring rule.
11. When you save the completed configuration, you can activate the monitoring rule later (see section Activating assigned monitoring rules (Page 56)) or activate it directly by clicking "..." and selecting "Save and activate".

## 8.2.2 Connecting parameters with Asset variables

Each parameter based on a process value must be linked to an Asset variable.

---

### Note

This description only applies to monitoring rules of the types "Intervals" and "Parameter limits".

---

### Procedure

1. Select an Asset in the tree view of the Asset.
2. Click "Add rule" and select "Assign predefined monitoring rules".
3. Select a rule of type "Intervals" or "Parameter limits".

4. Select the "Configuration" tab.


## Edit rule assignment

**Configuration** | Notifications


---

**Component Identifier\***  
  
Label for the related component of the Asset.  
Component identifier is required →


**Monitoring Rule**  
**Runtime - operating hours x2**  
Repetition pattern of the interval series  
**Repeat entire Interval series Infinitely**

**Interval start\***  
   
Start date and time for maintenance interval

**Intervals**  

Interval #1	
-------------	---

**Parameters**  
Connect each parameter (Type 'Usage') to a variable of your Asset and select the applicable aggregation function.

▼ **Operating hours 1 [Hours] - Runtime** 


**Connected variable\***

---

Projection of the maintenance due date based on previous machine use.

**Trend model\***  **Calculation period\***

Extrapolation model for due date calculation Select the calculation period of the training data for the trend model

► **Operating hours 2 [Hours] - Runtime** 

**Expose status information**  
 Write to Asset variables

5. Connect each parameter with an Asset variable.  
For the runtime parameter, you can create a new runtime variable or connect the parameter to an existing runtime variable (see section Creating a runtime variable (Page 45)).

---


**Note****"Time" parameter**

The parameter of the "Time" type is not connected to any variable.

---

**Note****Available variables for the selection**

The only variables visible and available for selection are those that are compatible with the parameter and can be connected.

You can also check the available variables of the selected Asset. To navigate to the "Variable" page, click  in the dashboard of the Asset and then select "Variable".

---

6. Select the appropriate aggregation function for the variable (see section Aggregation functions (Page 47)).
7. You can navigate to a different Asset if the desired variable is not located on the current Asset.
8. Save the changes.

### 8.2.3 Creating and editing a runtime variable

Each runtime parameter used in a monitoring rule of the "Intervals" type must be linked to an Asset variable.

#### Procedure

1. Navigate to the dashboard of the Asset that has a rule of the "Intervals" type assigned to it.
2. Click a rule of type "Intervals" in which a runtime parameter has been linked.
3. In the "Configuration" tab, click "Select" under "Connected variable".

8.2 Assigning new monitoring rules

4. Select the variable you want to use.

**Note**

**Runtime variable**

The following data types are supported for runtime variables:

- Int32
- Bool

Create new Runtime variable

**Name\***

Minimum 2 and maximum 50 characters.

**Connected variable\***

**VAR** bool\_false  
Kinvara | evosimaspect1




**Aggregation\***

**Start value\***

**Aggregation start\***

5. You can navigate to a different Asset if the desired variable is not located on the current Asset.
6. Specify a name for the variable.
7. Select the appropriate aggregation function for the variable (see section Aggregation functions).
8. Save the changes.

## Editing a runtime variable

1. Navigate to the dashboard of the Asset that has a runtime variable assigned to it.
2. Click "Variables".  
The following actions are available for each runtime variable:
  -  Edit - Launches the configuration wizard for the selected variable.
  -  Duplicate - Creates a copy of the selected variable.
  -  Delete - Deletes the selected variable after confirmation.

## 8.2.4 Aggregation functions

### Note

This description only applies to monitoring rules of the types "Intervals" and "Parameter limits".

You can use an aggregation function for a connected variable.

▼ a [b] - Usage based ModeCurrent Aggregation: Counter

**Connected variable\***

VAR
ModeCurrent
alphabetical ascending order | Productivity\_Data1
×

**Aggregation\***

Counter
▼

**Start value\***

1

---

Projection of the maintenance due date based on previous machine use.

**Trend model\***

Linear extrapolation
▼

Extrapolation model for due date calculation

**Calculation period\***

1

Day

▼

Select the calculation period of the training data for the trend model

- Output the last read value with "Last".
- Use the other functions to obtain summary information from the read values, for example, the sum of all read values.

The following aggregation functions are available for linked Asset variables:

Function	Meaning
None	No aggregation (same as "last").
Counters	<p>The sum of the positive value changes between two points in time is output in each case.</p> <p><b>Additional parameter "Counter start value":</b></p> <ul style="list-style-type: none"> <li>• You can specify a counter start value at interval start.</li> <li>• Default value is "0".</li> <li>• Only numeric input is allowed: Greater than or equal to "0"</li> </ul>

Function	Meaning
Sum	Adds all read values within the calculation period.
Last	Outputs the last read value.
Timer	<p>The Timer calculates the time interval in which the variable was not 0.</p> <p><b>Additional parameter "Timer unit":</b></p> <ul style="list-style-type: none"> <li>• You can select the appropriate time unit that matches the interval limit configuration of your parameter.</li> <li>• Possible options:                             <ul style="list-style-type: none"> <li>– Seconds</li> <li>– Minutes</li> <li>– Hours</li> <li>– Days (24 hours)</li> </ul> </li> </ul>
Minimum (Not available for "interval-based" rules)	Outputs the smallest read value within the calculation period.
Maximum (Not available for "interval-based" rules)	Outputs the largest read value within the calculation period.
Average value (Not available for "interval-based" rules)	Calculates the time-weighted average value of the read values within the calculation period.

### 8.2.5 Monitoring the operating status with a runtime variable

Monitor the operating status of an Asset with a runtime variable.

#### Procedure

1. Create a runtime variable.  
See section "Creating and editing a runtime variable (Page 45)".
2. Select "Timer" as the aggregation.

#### Result

- If the last value of the Runtime variable changes to not equal to 0 (zero), the operating hours counter continues running and the count value is updated continuously.  
The "Running" operating status is shown in the detail view (Page 61).
- If the last value of the Runtime variable changes to equal to 0 (zero), the operating hours counter stops.  
The "Stopped" operating status is shown in the detail view (Page 61).
- The tooltip for ⓘ shows information about the data.

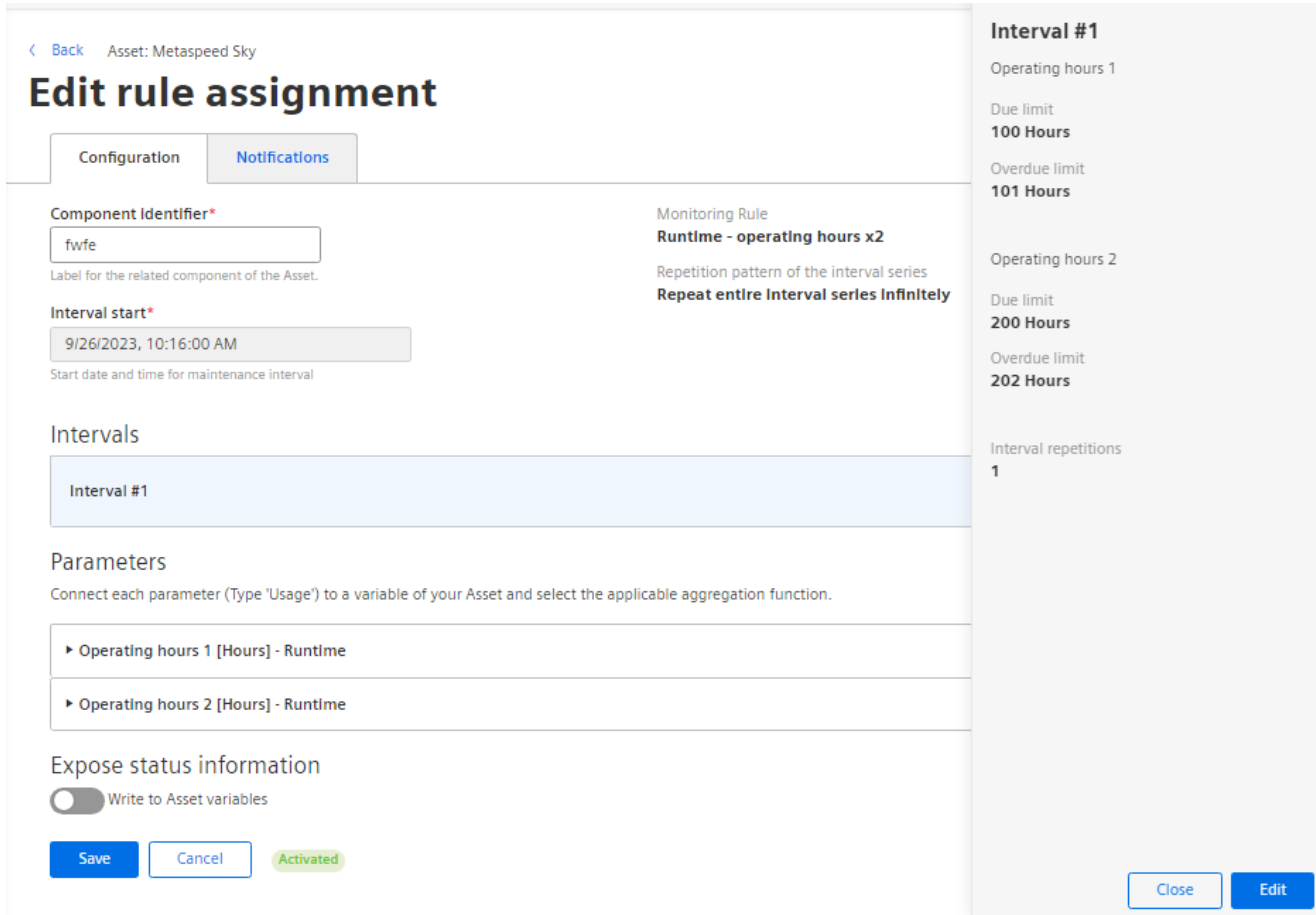



## **8.2.6 Editing limits**

You can edit limits for the monitoring rule of the types "Intervals" and "Parameter limits".

### Editing limits for intervals

1. If you click on the desired interval in the configuration container, the Interval panel is displayed.



2. You can check the interval limits in this panel. If changes are necessary, click "Edit". The "Edit limits and instructions" view is displayed. Alternatively, click  to go directly to the "Edit limits and instructions" view from the configuration container.

## Edit limits and instructions

Interval #1

### Parameters

**Operating hours 1**

Due limit \*◆  Hours      Overdue limit \*▲  Hours

---

**Operating hours 2**

Due limit \*◆  Hours      Overdue limit \*▲  Hours

### Instructions

Link instructions to this interval from your instruction list in the order of their execution, or create a new instruction.

Instruction	Duration	Actions
Modified added Instru <span style="background-color: #e0e0e0; border: 1px solid #ccc; padding: 2px;">Lolabel</span>	no duration	

3. Edit the "Due limit" and "Overdue limit".
4. Click "Apply".

## Editing parameter limits

1. Navigate to the configuration container of a monitoring rule of the "Parameter limits" type.

### Parameters

Connect each parameter to a variable of your Asset and select the applicable aggregation function.

temp [C] - Parameter limits (Number)  Show limits Edit limits

Connected variable\*       Aggregation\*

2. To check limits, click "Show limits".
3. To edit limits, click "Edit limits".

4. Edit the limits.

## Edit limits

temp [C] - Parameter limits (Number)

Lower alert limit	Lower warning limit	Lower limit Information	Upper limit Information	Upper warning limit	Upper alert limit
<input type="text" value="10"/>	<input type="text" value="26"/>	<input type="text" value="30"/>	<input type="text" value="40"/>	<input type="text" value="50"/>	<input type="text" value="60"/>
Alert	Warning	OK		Warning	Alert

Min ← → Max

Lower limit range\*  Upper limit range\*

**i** Lower limit range / Upper limit range  
"Lower limit range" and "upper limit range" mark the value range for the visualization only. These values do not represent alarm thresholds.

5. Click "Apply".

### Resetting changes

You can quickly reset any changes you have introduced for limits in an assigned monitoring rule by clicking "Revert modifications".

## Edit rule assignment

Configuration **Notifications**

**i** Modified monitoring rule  
This rule has changes compared to the originally selected monitoring rule. You can dismiss all modifications by using the revert button.

### 8.2.7 Trend model and calculation period

#### Note

This description only applies to monitoring rules of the "Intervals" type.

Machine Monitor can extrapolate the upcoming maintenance due date based on the previous machine usage. You can set the parameters for projection for each parameter separately.

Available extrapolation methods:

- Linear extrapolation
- Polynomial extrapolation  
(Search for a polynomial that passes exactly through given points)

You can specify a reference time period for the extrapolation training data.

---

**Note****Availability of training data**

If there is no data available for the entire training period, the extrapolation calculation will not be performed.

---

### 8.2.8 Connect reference parameter to Asset variable

An additional reference parameter can be defined for monitoring rules of the "Intervals" type. With the reference parameter as a reference value, dynamic interval limits can be specified to adapt the maintenance intervals better to the actual machine utilization.

Example: A shorter maintenance interval can be defined if the machine is operated at a higher speed.


If a reference parameter has been defined for the assigned monitoring rule, it must be linked to the appropriate Asset variables.

1. Click "Select parameter" in the "Connection to the reference parameter" section of the configuration container.  
The parameter selection dialog opens.
2. Select the desired parameter and confirm the selection.  
You can also navigate to a different Asset if the desired parameter is not located on the current Asset.
3. Save the changes.

---

**Note****Available parameters for selection**

You can only select parameters that are compatible with the reference parameter and can be connected.

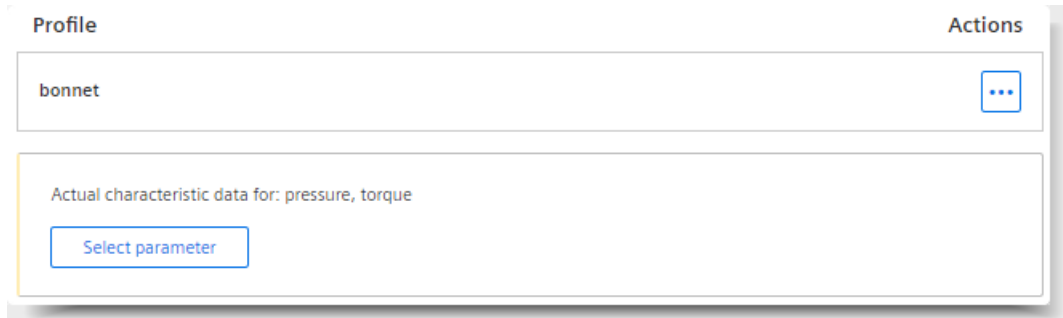
You can also review the available parameters of your selected Asset. To navigate to the "Parameters" page, click  in the dashboard of the Asset and then select "Parameters".

---

### 8.2.9 Selecting characteristic data records

The 2D characteristic curve monitoring rule defines the relative limits to a reference curve data record. For active monitoring, you can establish a connection to the 'Data Explorer' application and select the actual and reference curve data records on the 'Rule assignment' page of your Asset.

1. Click "Select parameter" in the "Actual characteristic data for:" section of the configuration container.




The parameter selection dialog opens.

2. Select the desired parameter and confirm the selection.
3. Click "Select parameter" in the "Reference characteristic curve" section of the configuration container.  
The parameter selection dialog opens.
4. Select the desired parameter and confirm the selection.
5. Save the changes.

## 8.2.10 Editing profiles for 2D characteristics

The 2D characteristic curve monitoring rule defines the relative limits to a reference curve data record. For active monitoring, you can establish a connection to the 'Data Explorer' application and select the actual and reference curve data records on the 'Rule assignment' page of your Asset.

1. Click  in the "Profile" section of the configuration container. The view for editing the profile is displayed.

**Name\***

**Limit curves**

Lower and Upper limits

Upper limits only

Lower limits only

**Limits for Test1 (h) - Number (X axis)**

**Warning limit**  **Alert limit**

**Limits for Test2 (m) - Number (Y axis)**

**Warning limit**  **Alert limit**

**Monitoring range (X axis)**

**Lower limit**  **Upper limit**

2. Set the limits.

---

### Note

#### Setting limits

- Limits for the X axis are optional.
  - Floating point numbers are supported.
- 

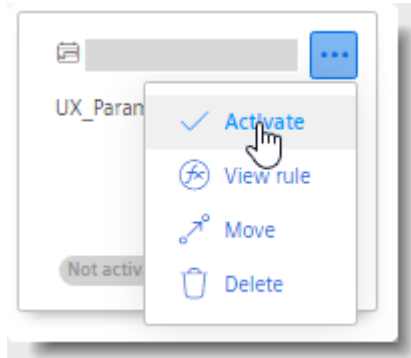
3. Click "Select parameter" in the "Parameters" section of the configuration container. The parameter selection dialog opens.
4. Select the desired parameter and confirm the selection.
5. Save the changes.

## 8.3 Activating assigned monitoring rules

Once you have completed the configuration of the assigned monitoring rules, you can activate them for live monitoring.

### Activating selected monitoring rules

1. Click the "..." button of an assigned monitoring rule.
2. Select the "Activate" option.



3. To confirm the dialog, click "Activate".

### Activating all monitoring rules

1. In the "Current status" view, click "...".
2. Select "Activate all".
3. To confirm the dialog, click "Activate".

## 8.4 Setting up notifications for the Asset

### Setting up notifications

You can enable notifications for the Asset to be automatically informed about due maintenance intervals. You can find the notification settings under "Asset settings".

Available notification channels:

- **Notifier for Industrial Edge:**  
No further configuration required. You can proceed to manage your notification settings in the Notifier app. Click here for more information on the use of SIMATIC Notifier. (<https://support.industry.siemens.com/cs/ww/en/view/109821155>)
- **Email:**  
You must first configure the e-mail server settings (see section Email server settings (Page 21)).  
You can add up to 20 email recipients.



### Notification settings

Select the communication channel for sending notifications.

Notifier app

Go to Notifier app 

Email

Email recipients

0 recipient(s) selected. [You can setup the connection to an email server in the 'Settings' module.](#)

#### Sending advance notifications ("soon due")

days before due date

The calculation is based on the set trend model for projection.

---

### Note

#### NOTIFIER for Industrial Edge

The Notifier must also be installed and run on the same Industrial Edge Device (IED) so that you can enable notifications for this channel.

---

### Editing notification messages

You can edit the generated default notification messages for each assigned monitoring rule. The notification settings are located in the rule assignment menu of a monitoring rule. Select "Notifications" here.

By default, notifications are enabled for all severity levels:

- Information (soon due)
- Warning (due)
- Alert (overdue)

You can selectively disable notifications for individual severity levels.

The dynamic part of the notification text is generated by default from the linked instructions for the monitoring rule.

You can edit this text and reset it to the default text at any time.

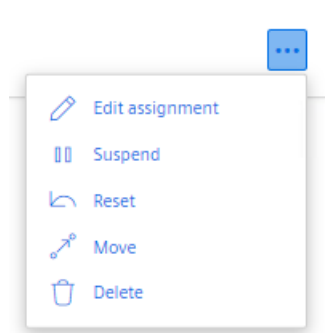
## 8.5 Resetting maintenance intervals

You can reset "interval-based" monitoring rules that are assigned for an Asset. This functionality is useful, for example, if a machine was run in test mode and is to be reset to factory settings for delivery. This use case also occurs when machine components are replaced, and the associated monitoring rules must be reset to the initial state.

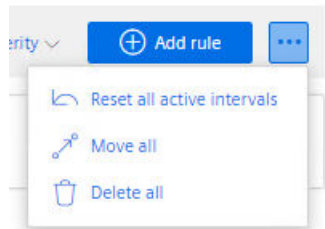
## 8.6 Deleting rule assignments

You can reset either individual intervals or all intervals in the Asset configuration.

- You reset individual intervals at the monitoring rule.



- You reset the rules of all assigned intervals via the "..." menu of the Asset configuration.




You will be shown a confirmation dialog where you must specify a new interval start date.

If there are parameters with counter aggregation configured in the intervals which are to be reset, you will additionally be offered the option to reset the "counter start values" to 0 as well.

## 8.6 Deleting rule assignments

You can delete individual assigned monitoring rules or delete all assigned monitoring rules.

To this purpose use the  button at the monitoring rule or in the Asset configuration.

A corresponding entry is made in the maintenance logbook and the usage information is updated accordingly.

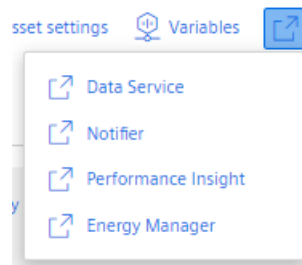
# Monitoring dashboards

## 9.1 Introduction to the dashboard

You can monitor the progress and maintenance status of your Assets on automatically generated dashboards.

### Navigate to other apps

You can switch to the view for your selected Asset in another app with one click. Open the menu at the top right and select the app to which you want to switch.

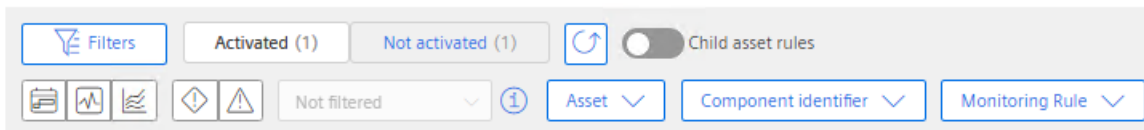


There is also a direction switch for viewing the parameters.

### Filtering and finding

You can filter the entries by various criteria to find specific entries:

- Rule type
- Warning and alert status, also in a specific period
- Asset
- Component name
- Monitoring Rule

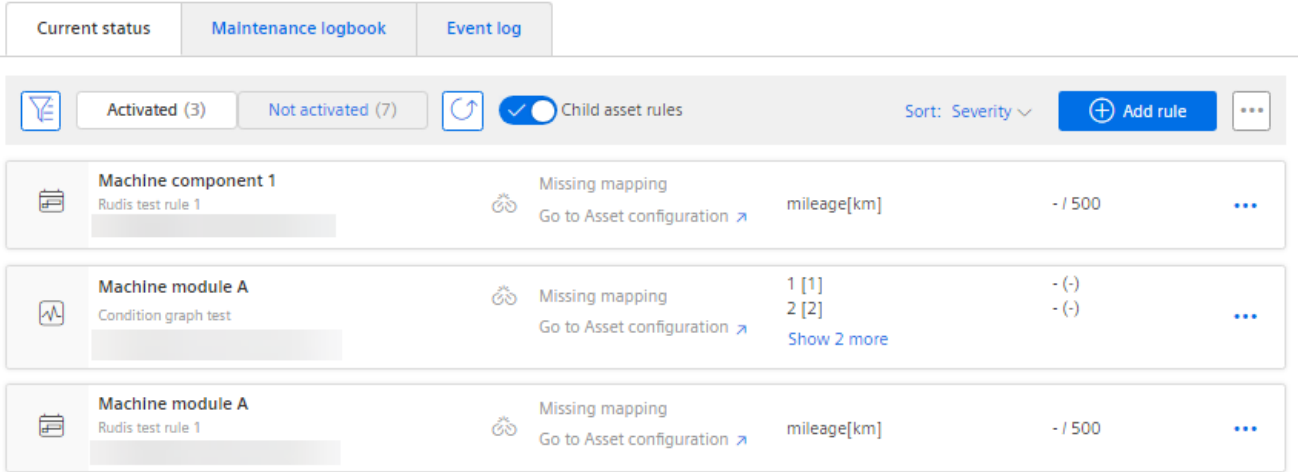


Alternatively, use the free text search.

To further narrow down your search results, the selected filter criteria are combined with an AND logic.

## 9.2 Overview for single Assets

The "Current status" dashboard tab visualizes the current status of all assigned monitoring rules of the selected Asset in distinct, separate status cards.



If there are no monitoring rules assigned to the Asset, both the "Current status" dashboard tab and the "Maintenance logbook" dashboard tab display an empty screen including a note on how to proceed with the setup.

## 9.3 Overview for hierarchical Assets

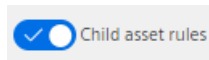
### Enable visibility of entries for child Assets

You can also display the current status cards of the assigned monitoring rules on the dashboard of a parent Asset.

This way you can get a better overview of the maintenance status, for example, for a whole production line with multiple machines (Sub-Assets).

Also, the maintenance logbook of a parent Asset will display the logbook entries of all Sub-Assets (see section Maintenance logbook for hierarchical Asset (Page 69)).

Visibility of entries for child assets is disabled by default. To enable this setting, select the parent Asset of your choice and activate the "Child asset content" option.



### Display of status cards

You can sort the display of status cards across all Sub-Assets by severity or alphabetically. You can group the status cards by Asset.

## 9.4 Viewing detailed rules

The detail view visualizes the current status of the monitoring rule in full detail and displays the instructions associated with the monitoring rule, as well as the linked documents.

When you click the selected monitoring rule, two tabs are displayed in the detail view:

- "Monitoring" shows the current status and widgets for visualization of the individual parameters.
- "Maintenance" shows the instructions and documents.  
Here you enter a maintenance action in the maintenance logbook.

### See also

[View event log \(Page 71\)](#)

### 9.4.1 Monitoring

#### Detail view for "Interval-based" monitoring rules

You can see in detail which parameter triggered the maintenance due date. You can see which interval or interval repetition is currently active.

If a reference parameter has been defined for the monitoring rule, the associated current process value is displayed here.

[Back](#) Asset: Levi

[Edit assignment](#) [Delete](#)

# interval\_infinitely

Intervals

Monitoring

Maintenance



Warning  
3 min due



Monitoring Rule  
interval\_rep\_infinitely

Current interval  
#1: 1/3

Auto refresh



Calendar date

Due since: 3 min



3/22/2024



3/23/2024

p1

Remaining till due: 1 u1  
Actual value: 0 u1

Total: 0 u1

0



2

Operating hours

Running

Remaining till due: 0.9494 Hours  
Actual value: 0.0506 Hours

Total: 550.4339 Hours

0



2

## Detail view for "Parameter limits" monitoring rules

You can track the current observed value for each parameter and see which parameter is responsible for the due maintenance.

# Machine module A

Parameter limits

Monitoring

Maintenance



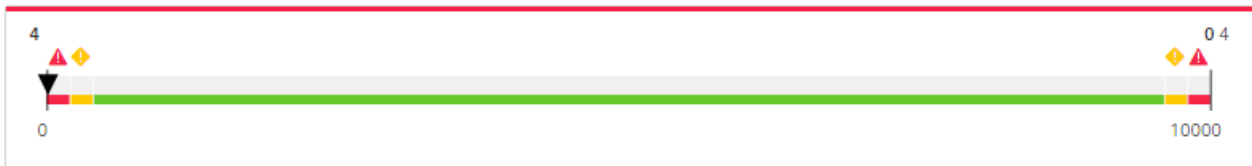
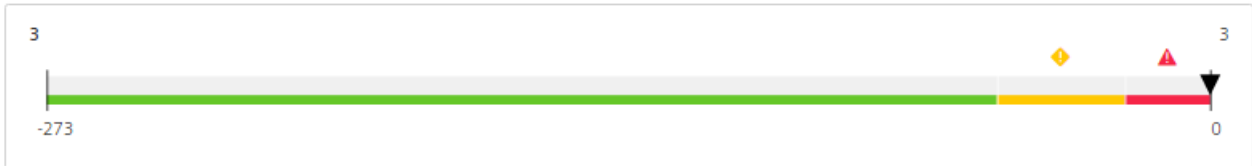
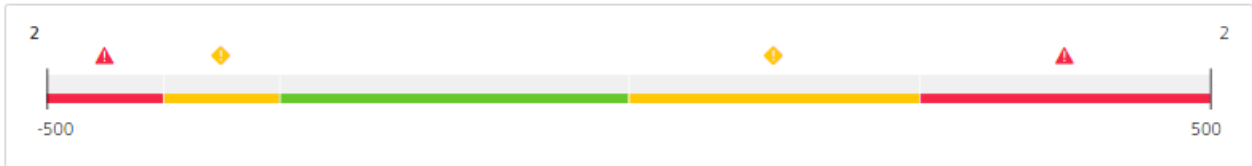
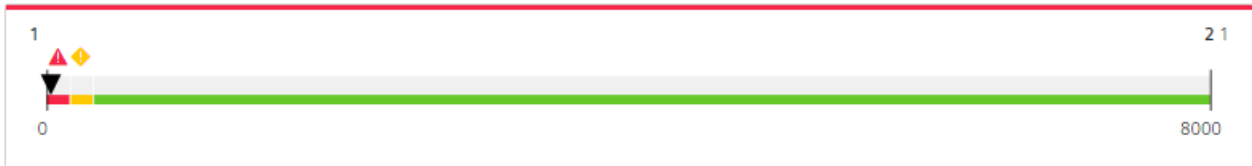
Alert  
1 Min, 3/4/2024



Monitoring Rule  
Condition graph test

Last processed time  
3/4/2024, 9:02:08 AM

Auto refresh

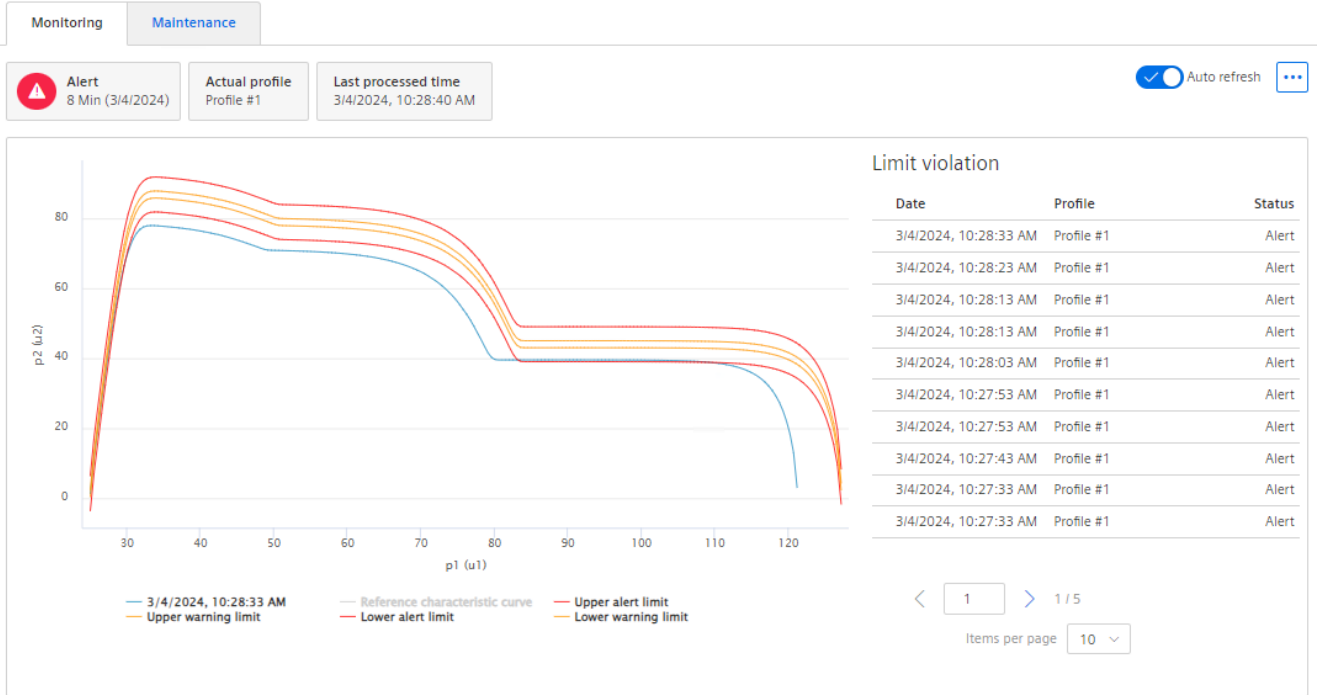


### Detail view for "2D characteristic curve" monitoring rules

You can track the current state of the characteristics and see which characteristics are responsible for one or more limit violations.

#### 2D\_limit\_curve

characteristic curve



To view the exact details of a limit violation, click on the corresponding entry from the "Limit violations" section. The details are displayed in the interactive graphic. To show the current state again, click on "Back to current state".



Alternatively, you can view the entries in the "Event log" (Page 71).



## 9.4.2 Maintenance

### Maintenance view of the selected rule



All referenced instructions and documents are shown in the "Maintenance" view of the selected rule. You can register maintenance in the maintenance logbook or start or stop maintenance.

< Back Asset: Levi  Edit assignment  Delete


# interval\_infinately


Intervals

**Monitoring** Maintenance





Instructions   Register maintenance job

Stop maintenance

 demo\_instruction (30 minutes)


 demo\_title (10 minutes)

image

 2024_02_28_14_10_47_Window.png 	 2024_02_28_14_23_34_Lorem Ipsum All the facts Ipsum_generator.png 
--	---

Click the cards to open the preview

Comments

 lorem\_txt (5 minutes)



## Registering maintenance in the logbook

### 10.1 Introduction to the maintenance logbook

The maintenance logbook dashboard tab displays previous actions in a tabular view. You can register conducted maintenance jobs in the maintenance logbook for each Asset, and you can track the history of machine maintenance of each Asset.

#### Entries in the maintenance logbook

The following types of entries are available:

Type	Meaning
Rule activated	Automatically entered when the monitoring rule is activated.
Rule deleted from Asset	Automatically entered when the monitoring rule is deleted.
Maintenance job	Entered by the user. Contains the details of a registered maintenance task that is related to a monitoring rule.
Intervals reset	Automatically entered when the monitoring rule is reset.
Unplanned maintenance	Entered by the user. Contains the description of maintenance tasks that are <b>not</b> linked to a monitoring rule.

### 10.2 Creating entries for performed maintenance jobs

You can register a maintenance activity that is related to any of the configured monitoring rules.

#### Procedure

1. Open the detail view of a monitoring rule and go to the "Maintenance" tab.
2. Click "Register maintenance job".
3. Specify the date and time when the maintenance job was carried out.
4. Check the checklist with the completed instructions and set the corresponding check marks.
5. Check the current values of the parameters.
  - If a process value is available within the last 7 days, then the respective field in the "Actual values" will be filled with the last available value at the date and time when the maintenance job was performed.
  - If no measured process value is available for the last 7 days: The process value must be entered manually.
6. Optional: Upload additional documents, if available (pictures, checklist, etc.).
7. Optional: Write a comment about the conducted work.
8. Save the entry.

### Effects on monitoring rules of the "interval-based" type

Registering a maintenance job will trigger the following effects for the current status:

- Overall status of maintenance interval changes to "Not due".
- Progress bars for each maintenance trigger are reset.
- Depending on repetition pattern of the interval series:
  - Interval repetition counter is increased (+1).
  - The next interval is started.

## 10.3 Registering unplanned maintenance

You can register a maintenance activity that is not related to any of the configured monitoring rules.

### Procedure

1. Navigate to the "Maintenance logbook" tab of the concerned Asset and click on "+ Unplanned maintenance".

## ST Hoka

Asset settings Variables

Current status Maintenance logbook Event log

Filters Search Sort: Creation date: Newest → Oldest + Unplanned maintenance Export

Entry type	Component	Created
✓ Rule activated	<b>parameter2</b> Asset: ST Hoka Rule type: Parameter limits	3/4/2024, 10:39:21 AM By Admin Edge
✓ Rule activated	<b>parameter</b> Asset: ST Hoka Rule type: Parameter limits	3/4/2024, 10:38:41 AM By Admin Edge
✓ Rule activated	<b>2D_with_template</b> Asset: ST Hoka Monitoring Rule: rule 2d characteristic <a href="#">↗</a>	3/4/2024, 10:37:37 AM By Admin Edge
✓ Rule activated	<b>2D_point_by_point</b> Asset: ST Hoka Rule Type: 2D characteristic curve	3/4/2024, 10:37:00 AM By Admin Edge
✓ Rule activated	<b>2D_limit_curve</b> Asset: ST Hoka Rule Type: 2D characteristic curve	3/4/2024, 10:36:06 AM By Admin Edge

< 1 > 1 / 1 Items per page 10

2. Specify the date and time when the maintenance job was carried out.
3. Optional: Upload additional documents, if available (pictures, checklist, etc.).

4. Optional: Write a comment about the conducted work.
5. Save the entry.

## 10.4 Maintenance logbook for single Asset

You can track the service history of your selected Asset in the maintenance logbook. All entries in the logbook are recorded in chronological order and displayed in a table.

You can open logbook entries to view them. You can also edit or delete logbook entries of the type "Maintenance job " and "Unplanned maintenance". Deleting logbook entries of the type "Maintenance order" and "Unplanned maintenance" is possible up to 7 days after the entry.

### Filtering and finding

You can filter the entries by various criteria to find specific entries:

- Asset
- Period
- Entry type
- Component name
- Monitoring Rule
- Entered by

Alternatively, you can use the free text search function. All selected filter criteria are combined with AND logic to further narrow down your search results.

### Export

All entries of the maintenance logbook can be exported, so the data can be used for further processing with third party software.

Click on the "Export" button in the "Maintenance logbook" dashboard of your Asset. If filter options have been set, then also the export data is filtered according to the applied filters.

The data is exported to a CSV file.

## 10.5 Maintenance logbook for hierarchical Asset

If you have enabled the "Child asset content" option in the maintenance log settings (see section Overview for hierarchical Assets (Page 60)), the maintenance logbook of the selected Asset will also show the entries of all sub-assets.

The maintenance logbook will then have an additional column to specify the Asset. Also, there is an additional filter option to filter for Assets.



## View event log

### 11.1 Introduction to the event log

The event log is available to track entries. The event log menu is located in the Asset overview.

You will receive the following information in the event log:

- Status change of a monitoring rule: OK, information, alarm and warning
- Status change of a parameter: OK, information, alarm and warning
- Limit violations: Alarm and warning
- Notifier notifications: Created and closed notifications
- E-mail notifications: Sent e-mails

A maximum of 5000 entries per monitoring rule are saved in the event log. Older entries are deleted when 5000 entries are reached. In addition, entries older than one year are deleted.

11.1 Introduction to the event log











### Exporting an event log

To save an event log permanently, you can export it.

1. Click the "Event log" tab in the Asset overview.

Current status	Maintenance logbook	Event log
----------------	---------------------	-----------

	<input type="text" value="Search"/>	<input checked="" type="checkbox"/> Child asset rules	
Event	Component	Date	
 Parameter status change	<b>runtime KRISZTA</b> Asset: pmaacctd > ST Saucony Monitoring Rule: Runtime - operating hours x2 Parameter: Operating hours 2	3/4/2024, 9:34:00 AM	
 Parameter status change	<b>runtime KRISZTA</b> Asset: pmaacctd > ST Saucony Monitoring Rule: Runtime - operating hours x2 Parameter: Operating hours 2	3/4/2024, 9:30:00 AM	
 Rule status change	<b>Machine module A</b> Asset: pmaacctd > APC-Prague > VikingMasek_MachineHall > VikingMasek_MachineHall_2A Monitoring Rule: Condition graph test	3/4/2024, 9:02:08 AM	
 Parameter status change	<b>Machine module A</b> Asset: pmaacctd > APC-Prague > VikingMasek_MachineHall > VikingMasek_MachineHall_2A Monitoring Rule: Condition graph test Parameter: 4	3/4/2024, 9:02:08 AM	
 Parameter status change	<b>Machine module A</b> Asset: pmaacctd > APC-Prague > VikingMasek_MachineHall > VikingMasek_MachineHall_2A Monitoring Rule: Condition graph test Parameter: 1	3/4/2024, 9:02:01 AM	
 Rule status change	<b>Gel Intervals</b> Asset: pmaacctd > ST Asics > Gel Monitoring Rule: Rule with all kinds of documents	3/4/2024, 7:06:13 AM	
 Parameter status change	<b>Gel Intervals</b> Asset: pmaacctd > ST Asics > Gel Monitoring Rule: Rule with all kinds of documents Parameter: Operating hours	3/4/2024, 7:06:00 AM	
 Rule status change	<b>Gel Intervals</b> Asset: pmaacctd > ST Asics > Gel Monitoring Rule: Rule with all kinds of documents	3/4/2024, 7:02:18 AM	

2. Use the filters and/or search to find an event log.

**Note**

If you do not apply a filter and/or search, all currently available event logs will be downloaded.

3. Click "Export".
4. Click "CSV" or "JSON" in the menu.  
The event log is downloaded and saved in the selected file format.



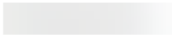
## 11.2 Detail view

The detail view of the event log always contains general information and, if available, parameter information.

Parameter information is only available for parameter status changes, which only occur with interval-based or parameter limit monitoring rules.

# Event details

### General information

Entry type	Parameter status change
Entry date	2/18/2024, 11:30:08 AM
Asset	
Component identifier	fwfe
Monitoring Rule	Runtime - operating hours x2

### Parameter information

Severity	Alert
Previous severity	OK
Parameter type	Runtime
Parameter name	Operating hours 2
Actual value	634.2352 Hours
Total value	6414.0237 Hours
Due limit	200 Hours
Overdue limit	202 Hours

### General information

Here you can find information about:

- Entry type
- Entry date
- Asset
- Component name
- Monitoring Rule

## **Parameter information**

Here you can find information about:


- Severity
- Previous severity
- Parameter type
- Parameter name
- Actual value
- Total value
- "Due from" limit
- "Due since" limit

## Backing up and restoring settings

### 12.1 Saving settings

Settings can be saved to archive files in TGZ format. These archive files can be saved to a data storage medium and used later to restore settings.

#### Procedure

1.  Select the "Settings" view.
2. Click the "Backup and restore" tile.
3. Click the "Start backup" button.  
A dialog box opens.

---

#### Note

It is not possible to make changes in the app during the backup process.


---

4. Click the "Start backup" button in the following dialog.
5. Select a target directory for the backup file and confirm the selection.
6. The backup file (\*.tgz) is saved in the selected target directory.

### 12.2 Restoring settings

Settings that have been saved to an archive file and are in TGZ format can be restored.

#### Procedure

1.  Select the "Settings" view.
2. Click the "Backup and restore" tile.
3. Click the "Restore backup" button.  
The "Restore backup" window opens.
4. Click in the "Upload file" field and select a backup file (\*.tgz).  
Alternatively, drag and drop a backup file (\*.tgz) into the "Upload file" window.
5. Click the "Restore" button.

