SIEMENS

SIDRIVE IQ Fleet

Operating Manual

SIDRIVE IQ Fleet V2.13
SIMOTICS CONNECT 400 V1.0.3.2
SIDRIVE IQ Config (Android) V2.7.0
SIDRIVE IQ Config (iOS) V2.7.0

12/2023
A5E50161948B AR

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 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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Introduction

1

1.1 About SIMOTICS

Description

SIMOTICS is the Siemens family of electric motors addressing the complete motor spectrum in Digital Industry.

1.2 About SIMOTICS (detailed)

With a SIMOTICS electric motor, you can always depend on quality, innovation and the highest efficiency. With SIMOTICS electric motors we cover the complete motor spectrum:

Synchronous as well as induction motors, from standard electric motors through servomotors for motion control applications up to high voltage and DC motors.

Siemens motors can look back on more than 150 years of experience.

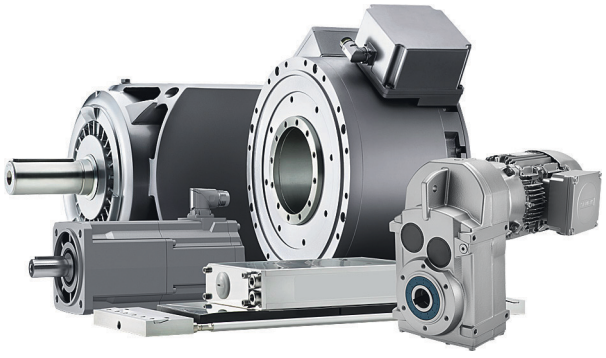
Whether high efficiency for an optimum energy balance, explosion protected for the highest safety standards, sector or customer specific: Every motor is equipped as standard with the widest range of features for the highest cost effectiveness.

In a nutshell:

- Extremely compact
- Energy efficient and environmentally friendly
- Can be flexibly deployed and a wide range of selection options
- Highest degree of cost effectiveness

In the meantime, our electric motors are an integral part of the digital enterprise.

Motors for motion control



Whether synchronous or induction, whether with or without gearbox: Siemens is the right partner when it involves the optimum motor for your motion control application.

Our portfolio is the widest worldwide – and also includes built-in motors and motor spindles. Every motion control motor in our portfolio is perfectly harmonized for operation with our SINAMICS converter family.

1.3 About this manual

1.3.1 Content

These instructions describe the Insights Hub SIDRIVE IQ Fleet application in conjunction with the SIMOTICS CONNECT 400 connectivity module, and explain how you handle the product.

Keep these instructions in a safe place for subsequent use. Read these instructions before you use the Insights Hub SIDRIVE IQ Fleet application, and follow the instructions and notes carefully.

1.3.2 Target group

This document addresses planners, configuring engineers, technologists, installation technicians, programmers, commissioning engineers along with service and maintenance personnel

1.3.3 What's new?

Description

1.3.4 Standard scope

Description

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

Further functions may be executable in the system, which are not explained in this documentation. However, there is no entitlement to these functions in the case of a new delivery or service.

This documentation does not contain all detailed information on all types of the product. Furthermore, this documentation cannot take into consideration every conceivable type of installation, operation and service/maintenance.

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

1.3.5 Websites of third-party companies

Description

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

1.3.6 Definitions

1.3.6.1 Definition "Tenant"

A tenant is the digital representation of a real organization in Insights Hub. A tenant encompasses users, data, assets and other properties.

A tenant groups users and offers them access to Insights Hub and applications such as SIDRIVE IQ Fleet. By default, users only see the data of the assigned tenant and not the other tenant's data.

1.3.6.2 Definition "Subtenant"

You can create and manage additional subtenants within a tenant. The subtenants can represent additional organizations or departments within a tenant.

You can assign multiple users to a subtenant. Users of a subtenant only see the associated assets and data of the subtenant in the respective Insights Hub application.

1.3.6.3 Definition "Package (Offering)"

A package is a set of Insights Hub applications and resources bundled together to address specific customer requirements. A package can include all of the resources necessary to use an application (e.g. SIDRIVE IQ Fleet Package Starter and Asset Upgrade Package) or only a few resource upgrades for optional functions (e.g. additional events). The packages can be purchased through the DEX Store.

1.3.6.4 Definition "Offboarding"

To terminate the communication between SIMOTICS CONNECT 400 and SIDRIVE IQ Fleet, the device has to be switched off. Switching off SIMOTICS CONNECT 400 is done via SIDRIVE Config App.

SIDRIVE IQ Fleet also provides a shortcut offboarding function to delete the Insights Hub asset and free up the allocation.

1.3.6.5 Definition of "Onboarding"

The process applied from connecting and registering the connectivity module through to the Insights Hub SIDRIVE IQ Fleet application, including all settings, is called onboarding.

1.3.6.6 Definition of an "Asset"

An asset is a digital representation of a machine or an automation system with one or multiple automation units connected to Insights Hub. In a SIDRIVE IQ Fleet application, an asset represents a motor.

Insights Hub data collection and data provisioning is based on (virtual) assets. This can be for example a motor, a pump, a fan, a compressor, a drive, an entire tool machine, a production line, a robot, a crane, a car, a windmill and so on. The data of an asset is collected and sent to Insights Hub to make this data available for further processing and analysis.

1.3.6.7 Definition "Asset type"

An Asset type is a pre-configured template for an asset. Assets assume the properties of the Asset type on which they are based. Within the Asset type you can define which aspects are integrated into the template. The Asset types required by SIDRIVE IQ Fleet application are created automatically.

1.3.6.8 Definition "Aspect"

Aspects represent a data modeling mechanism for assets. Aspects group related data points based on their logical association.

For example: The motor has an aspect e.g. "High frequency", which contains the data points Electrical Stator Frequency, Temperature and Vibration. The asset types required by the SIDRIVE IQ Fleet application are created automatically.

1.4 SIMOTICS documentation

Description

Comprehensive documentation on SIMOTICS, SIMOGEAR and on the SINAMICS converter family are provided in Internet.

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

The documentation is divided into the following categories:

Table 1-1 SIMOTICS / SIMOGEAR / SINAMICS documentation

Information	Documentation class[1)]	Content	Target group
General information	Configuration Manual	Rules, guidelines, and tools for configuring products, systems, and plants. Also contains information on the operating and ambient conditions for hardware and software, the use of functions, as well as on circuit diagrams and terminal diagrams and the installation of software insofar as this is necessary for commissioning.	Planners, configuration engineers
Device information	Installation Instructions	All relevant information on setting up, installing and cabling, as well as the required dimensional drawings and circuit diagrams	Installation personnel, commissioning engineers, service and maintenance personnel
Basic information	Operating instructions	Comprehensive collection of all information necessary for the safe operation of products, plant/system parts and complete plants (IEC 82079)	Machine operators, plant operators
	Compact instructions	Essential contents of the operating instructions in a reduced and condensed form	Machine operators, plant operators
	Product Information	Information that only becomes known shortly before or even after start of delivery and is therefore not included in the associated user documentation	Planners, configuration engineers, technologists, installation personnel, constructors; commissioning engineers, machine operators, programmers, service and maintenance personnel
	Online help	Instructions for configuring, programming, and commissioning	Configuration engineers, programmers, commissioning engineers

1) Not all documentation classes are available for every SIMOTICS / SIMOGEAR / SINAMICS product.

1.5 Service and Support

1.5.1 Siemens Industry Online Support on the Web

Important product information is available through Siemens Industry Online Support using the following options:

- Website: SIOS
- App Industry Online Support (for Apple iOS and Android)

Content of Siemens Online Support

- Product support
- Global forum for information and best practice sharing between users and specialists
- Local contact persons via the contact person database (→ Contact)
- Product information
- FAQs (frequently asked questions)
- Application examples
- Manuals
- Downloads
- Compatibility tool
- Newsletter with product selection
- Catalogs/brochures
- Certificates

For products with QR code, the manual and certificate can be directly called.

See also

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

1.5.2 Siemens Industry Online Support on the road

Description

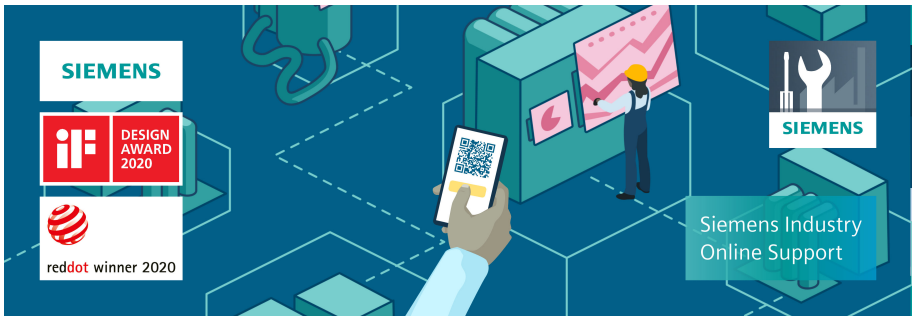


Figure 1-1 "Siemens Industry Online Support" app

The "Industry Online Support" app supports you in the following areas, for example:

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

Furthermore, you have access to the Technical Forum and other articles that our experts have drawn up:

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

There is a data matrix code or QR code on the nameplate of your product. Scan the code using the "Industry Online Support" app to obtain technical information about the device.

The app is available for Apple iOS and Android.

1.5.3 Feedback on the technical documentation

Description

We welcome your questions, suggestions, and corrections for this technical documentation. Please use the "Provide feedback" link at the end of the entries in Siemens Industry Online Support.

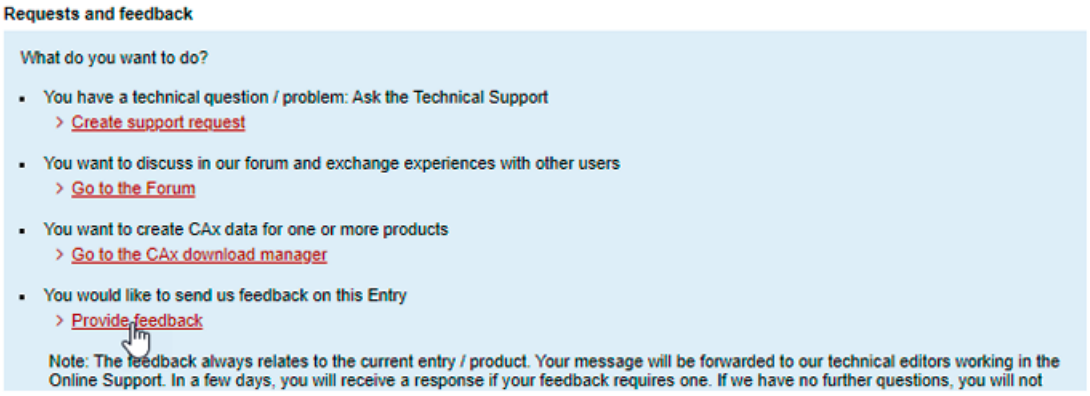


Figure 1-2 Requests and feedback

1.5.4 mySupport documentation

Description

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

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

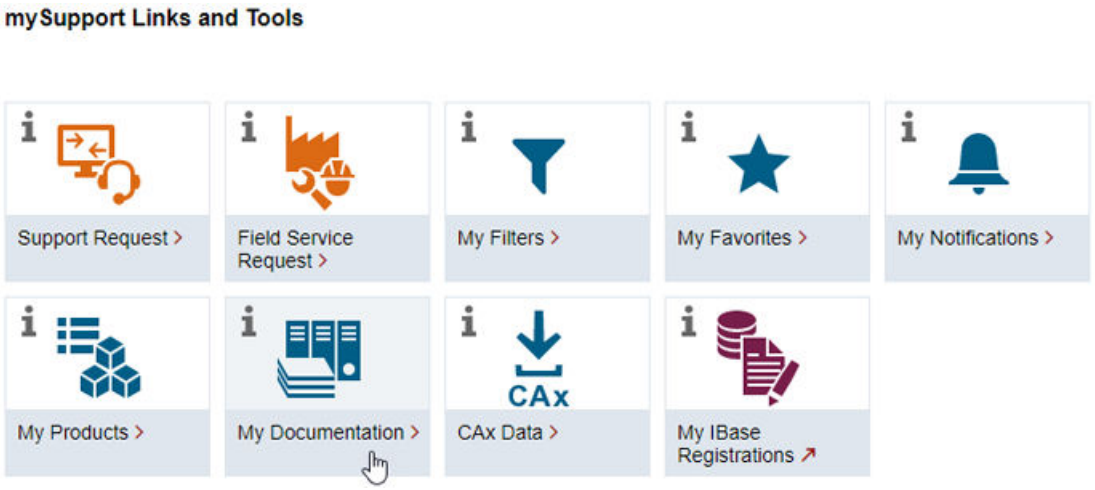


Figure 1-3 mySupport

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

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

1.5.5 Technical support

Description

Your routes to technical support (https://support.industry.siemens.com/cs/ww/en/sc/4868):

- Support Request (https://www.siemens.com/SupportRequest)
- Contact person database (https://www.automation.siemens.com/aspa_app)
- "Industry Online Support" mobile app

The Support Request is the most important input channel for questions relating to products from Siemens Industry. This will assign your request a unique ticket number for tracking purposes. The Support Request offers you:

- Direct access to technical experts
- Recommended solutions for various questions (e.g. FAQs)
- Status tracking of your requests

Technical support also assists you in some cases via remote support (https://support.industry.siemens.com/cs/de/en/view/106665159) to resolve your requests. A Support representative will assist you in diagnosing or resolving the problem through screen transfer.

More information on the Support service packages is available on the Internet via the following address (https://support.industry.siemens.com/cs/ww/en/sc/4869).

1.5.6 Training

Description

SITRAIN – Digital Industry Academy offers a comprehensive range of training courses on Siemens industrial products – directly from the manufacturer, for all industries and use cases, for all knowledge levels from beginner to expert.

More information can be found on the Internet via the following address (https://www.siemens.com/sitrain).

1.5.7 Spare parts services

Description

The online spare part service "Spares on Web" offers certain spare parts for the product:

- Website: SOW address (https://www.sow.siemens.com).

1.6 Important product information

1.6.1 Correct use

Description

The products described in this manual, together with software, accessories, and options, form an electrical power drive system intended to feed low-voltage AC motors. The products are professional equipment for use in industrial applications. The products must be installed and maintained by professionals with sufficient knowledge to implement the safety and EMC measures according to the specifications described in this manual and the recognized state ofthe art.

You may only use the products in compliance with the following requirements:

- All regulations and directives that are applicable at the site of the end use, especially with regard to electrical safety, functional safety and electromagnetic compatibility.
- All instructions, notes, technical data and safety information contained in this manual and other supporting documentation.

Before using the products, you must perform a risk assessment of the entire application and implement appropriate system design measures to ensure safety of persons, property and electromagnetic compatibility.

Open type products (IP00/IP20) are intended for incorporation within cubicles or enclosures which will provide necessary protection.

Any use other than the use explicitly permitted is prohibited and can result in unanticipated hazards.

1.6.2 OpenSSL

Description

This product can contain the following software:

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

You can find more information on the internet:

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

1.6.3 Compliance with the General Data Protection Regulation

Description

Siemens complies with the principles of the **General Data Protection Regulation (EU),** in particular the principle of data minimization ("privacy by design"). For this SINAMICS product, this means:

- **User management and access control (UMAC)**
  The product processes or stores the following personal data:
  - Login data for user management and access control:
    User name, group, password, role, rights.

  The data for user management and access control is stored in the converter and optionally on a memory card.
- **Support data (optional)**
  For optimal support in service cases, the end user or machine manufacturer (OEM) can optionally store contact data (header, email address, telephone number, homepage) in the converter.
  If this data is created, the author must give thought to data protection consent for this optional data. Siemens takes no responsibility for this data.
  This support contact data can be read and is freely accessible in, for example, the user interface as well as in the diagnostics report. This data is not encrypted.

This data is used for user management and access control (UMAC) and for the support function. The storage of this data is appropriate and limited to what is necessary, as it is essential to identify the authorized operators and service contact.

The personal data is also available as part of the backup system to ensure fast recovery of use cases.

The above-mentioned personal data cannot be stored anonymously or pseudonymized, as it serves the purpose of identifying the operating personnel. The anonymization or pseudonymization, e.g. of the login data, must be performed using suitable login names and contact data by the plant/machine operator.

Our product does not provide any functions for automatically deleting personal data. Individual UMAC data can be deleted manually by authorized personnel as soon as this is deemed recommended/required.

1.6.4 Compliance with the General Data Protection Regulation

Description

Siemens complies with the principles of the **General Data Protection Regulation (EU),** in particular the principle of data minimization ("privacy by design").

For SINAMICS DCB Studio, this means:

- **User administration**
  The product processes or stores the following personal data:
  – Login data for user administration: user name.

  The data for user administration is stored in the generated library. The data is not encrypted.

This data is required for user administration. The storage of this data is appropriate and limited to what is necessary, as it is essential to identify the creator of the library. This is particularly important during servicing.

The above-mentioned personal data cannot be stored anonymously or pseudonymized, as it serves to identify the creator of the library. The creator of the library must anonymize or pseudonymize the login data by selecting suitable user names.

Our product does not provide any functions for automatically deleting personal data.

Safety instructions 2

2.1 Security notes

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 attacks, it is necessary to implement and continuously maintain, a holistic, state-of-the-art industrial security 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 that such a connection is necessary, and only when appropriate security measures, such as firewalls and network segmentation, are in place.

For more information on industrial security measures, visit Link (https://www.siemens.com/industrialsecurity):

At Siemens, our products and solutions undergo continuous development to make them even more secure. Siemens strongly recommends that you install available product updates and always use the latest product versions. Use of older product versions, or version that are no longer supported, may increase exposure to cyber threats.

To stay informed about product updates, subscribe to the Siemens Industrial Security RSS Feed at Link (https://new.siemens.com/global/en/products/ services/cert.html#Subscriptions).

You can find more information on the internet:

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

⚠ WARNING

Unsafe operating states resulting from software manipulation

Malware, such as viruses, Trojans, malware, or worms, can cause unsafe operating states in your system, which can lead to death, and serious personal injury and damage to property.

- Always keep software up to date.
- Incorporate automation and drive components into a holistic, state-of-the-art industrial security concept for your plant or machine.
- Make sure that you include all installed products in this holistic industrial security concept.
- Protect files stored on exchangeable data storage media from malicious software with appropriate measures, such as virus scanners.
- After commissioning has been completed, check all security-related settings.

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 customer-specific solutions. They are only intended to provide support for typical applications.

As user, you are responsible for ensuring that the products described are operated correctly.

These application examples do not relieve you of your responsibility for safe handling when using, installing, operating and maintaining the equipment.

Description

3

Drive systems play a key role in countless manufacturing processes. Malfunctions or failures of motors, drives, etc. therefore result in costly downtimes. With the cloud-based SIDRIVE IQ Fleet solution, you can digitally monitor, analyze and optimize drive systems. The operating and status data of your drive train components thus become transparent. You can also determine the need for maintenance and the potential for optimization.

The Insights Hub applications SIDRIVE IQ Fleet for low-voltage motors and drives enable you to continuously visualize, analyze, and monitor your drive data.

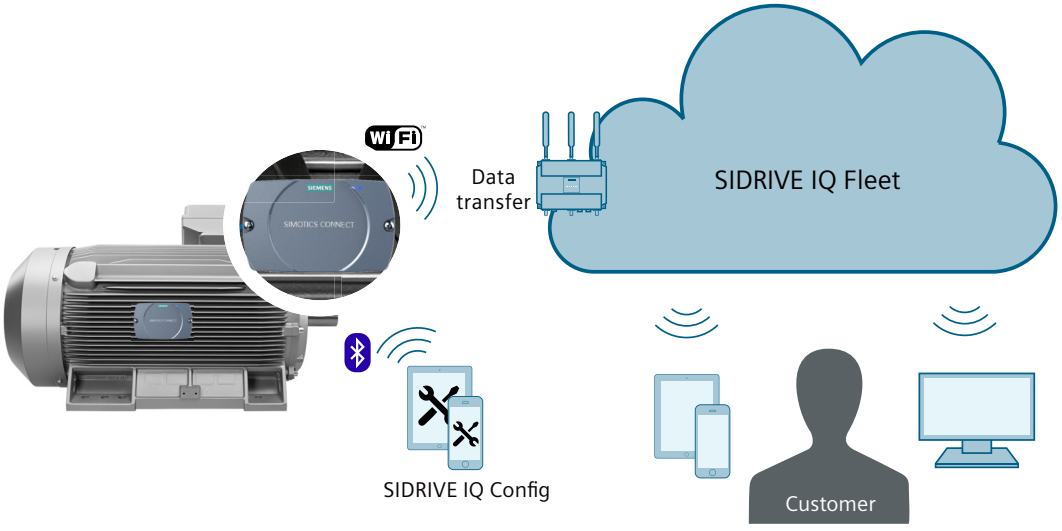
SIDRIVE IQ Fleet

SIMOTICS CONNECT 400 connects drive train components with the cloud-based analytics of the SIDRIVE IQ Fleet Insights Hub application. This enables you to improve the productivity, reliability, and service options of the drive train component. The following figure gives you a system overview of the Insights Hub SIDRIVE IQ Fleet application with the SIMOTICS CONNECT 400 connectivity module:

You can transmit, save and analyze operating data to SIDRIVE IQ Fleet via the SIMOTICS CONNECT 400 connectivity module. SIDRIVE IQ Fleet shows the user the operating data of the drive train component and the results of the operation and status analysis and provides, for example, recommendations for preventive maintenance activities.

Fleet application area - Motor Monitoring

In the Fleet application area, you can monitor low-voltage motors that are connected to SIDRIVE IQ Fleet via the SIMOTICS CONNECT 400 connectivity module.



The data that you read out via the Fleet application area permits you to view several assets in an overview. Among other things, you can monitor and read out the following information in the Fleet application area:

- Status information
- Asset information
- Various signals, for example:
  - Speed
  - Electrical power
- Information related to preventive maintenance
- Alarms and warnings

The Fleet application area offers you various functions for identifying and evaluating an asset:

- Localization of the asset using a map
- Asset filter function
- Visualization of signals over a period of time
- Logbook function (to document maintenance measures)
- Profile of the motor profile
- Central access to product-specific support pages (SIOS, Spares on Web, etc.)
- Setting the email notification and display of the SIMOTICS CONNECT device data
- Thresholds for the output of warnings and errors
- Exporting of asset data
- Supporting maintenance planning with operating hour-based time schedules

Fleet application area - Generic vibration monitoring

In addition to low-voltage motors, you can mount SIMOTICS CONNECT 400 on other components of the drive train. These include the following components:

- Gearbox
- Coupling
- Pillow block bearing
- Pump
- Fan
- Compressor
- Other rotating and non-rotating equipment

For these components, in SIDRIVE IQ Fleet you can configure the assets for "Generic vibration monitoring". The monitoring is based on temperature and vibration signals.

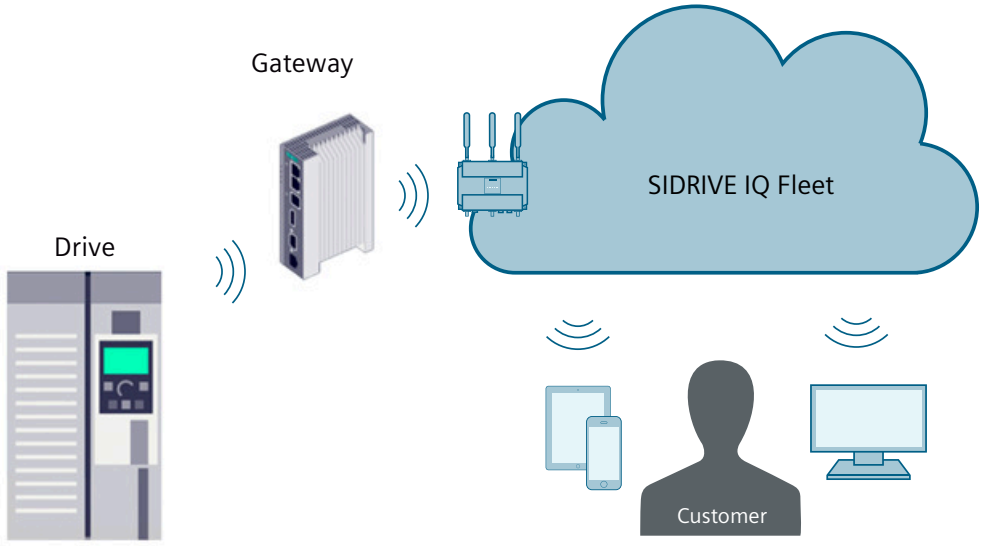
Note

The function is limited to temperature and vibration monitoring. Currently, only restricted analysis functions are available for "Generic vibration monitoring".

The Fleet application area is adapted to the functional scope of "Generic vibration monitoring".

Fleet application area - drive monitoring

In the Fleet application area, you can monitor drives that are connected to SIDRIVE IQ Fleet via the Insights Hub connectivity solution.



The data that you read out via the Fleet application area permits you to view several assets in an overview. Among other things, you can monitor and read out the following information in the Fleet application area:

- Status information
- Asset information
- Various signals, for example:
  - Active power
  - Speed
- Information related to preventive maintenance
- Alarms and warnings

The Fleet application area offers you various functions for identifying and evaluating an asset:

- Asset filter function
- Visualization of signals over a period of time
- Logbook function
- Profile of the drive data
- Central access to product-specific support pages (SIOS, Spares on Web, etc.)
- Email notification settings
- Thresholds for the output of warnings and errors
- Exporting of asset data

More information

More information on the SIMOTICS CONNECT 400 connectivity module can be found in the SIMOTICS CONNECT 400 operating instructions (https://support.industry.siemens.com/cs/ww/en/view/109766915).

Preparation

4

4.1 System requirements

Display resolution

SIDRIVE IQ Fleet is optimized for displays with a minimum size of 10 inches and a minimum resolution of 1920 x 1200 pixels.

Web browser for SIDRIVE IQ Fleet

To use SIDRIVE IQ Fleet, install the latest version of your web browser. We recommend Google Chrome, Firefox and others.

An overview of the browsers supported is provided here (https://design.mindsphere.io/patterns/browser-support.html).

Insights Hub user account

A valid Insights Hub user account is required to register the connectivity module in SIDRIVE IQ Fleet (see Chapter Activating the Insights Hub user account).

Configuring the SIMOTICS CONNECT 400 connectivity module

Carefully ensure that the connectivity module has been completely configured in accordance with the SIMOTICS CONNECT 400 Operating Instructions (https://support.industry.siemens.com/cs/products?dtp=Manual&mfn=ps&pnid=25522&lc=en-WW), and that onboarding to Insights Hub has been completed.

Onboarding and configuration of the Insights Hub connectivity for drives

Before you can use the functionalities of SIDRIVE IQ Fleet for drive monitoring, you must perform onboarding to Insights Hub, fully configure Insights Hub connectivity, and perform the configuration in SIDRIVE IQ Fleet. The description for this can be found in the "Onboarding drives (Page 36)" section.

Note

SIDRIVE IQ Fleet Package Drive Extension

Make sure that you have the required number of licenses. One license allows you to monitor one drive with SIDRIVE IQ Fleet.

4.2 Activating the Insights Hub user account

After you have purchased SIDRIVE IQ Fleet , a user account is automatically set up through Insights Hub for the email address that you specified. If you need additional accesses, please purchase a user upgrade package. Roles are assigned in Insights Hub under "Settings".

See (https://documentation.mindsphere.io/resources/html/settings/en-US/index.html)

If the user account has been assigned to a Tenant, then the user receives an email to activate the user account.

Assigning a password for the Insights Hub user account

The password for your user account must comprise at least 8 characters and satisfy the following criteria:

- At least one upper case letter
- At least one lower case letter
- At least one number
- At least one special character

Requirement

- You have received the email to activate your Insights Hub user account.
- You are assigned the iqfleet (mdsp:ipops) application roles "user" and "admin" by the tenant admin. Roles are assigned via the settings in the Insights Hub application. See (https://documentation.mindsphere.io/resources/html/settings/en-US/index.html)

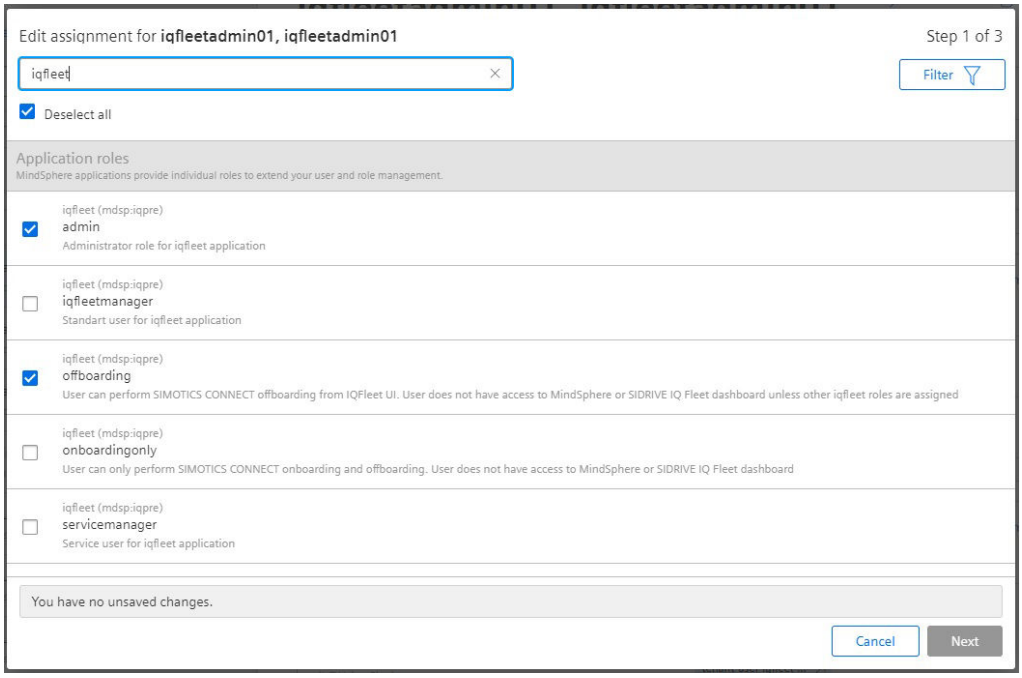
Application roles

Every Insights Hub application can have specific roles that grant access to the application. Using these roles, users can be authorized for specific application functions.

The roles are available for the SIDRIVE IQ Fleet application when the basic package is purchased.

SIDRIVE IQ Fleet roles

SIDRIVE IQ Fleet roles are subsequently explained:



- **admin**
  Administrator for SIDRIVE IQ Fleet. The role authorizes access to all functions, with the exception of "Offboarding".
- **iqfleetmanager**
  Standard SIDRIVE IQ Fleet users. The role authorizes access to the basic functions and advanced functions relevant for operation.
- **servicemanager**
  SIDRIVE IQ Fleet service users. The role authorizes access to the basic functions and specific advanced functions for service.
- **onboardingonly**
  The user is only authorized for SIMOTICS CONNECT onboarding.
- **offboarding**
  The user is only authorized for SIMOTICS CONNECT offboarding of SIDRIVE IQ Fleet and the SIDRIVE IQ Config application.

Note

The tenant administrator can assign several roles to a user.

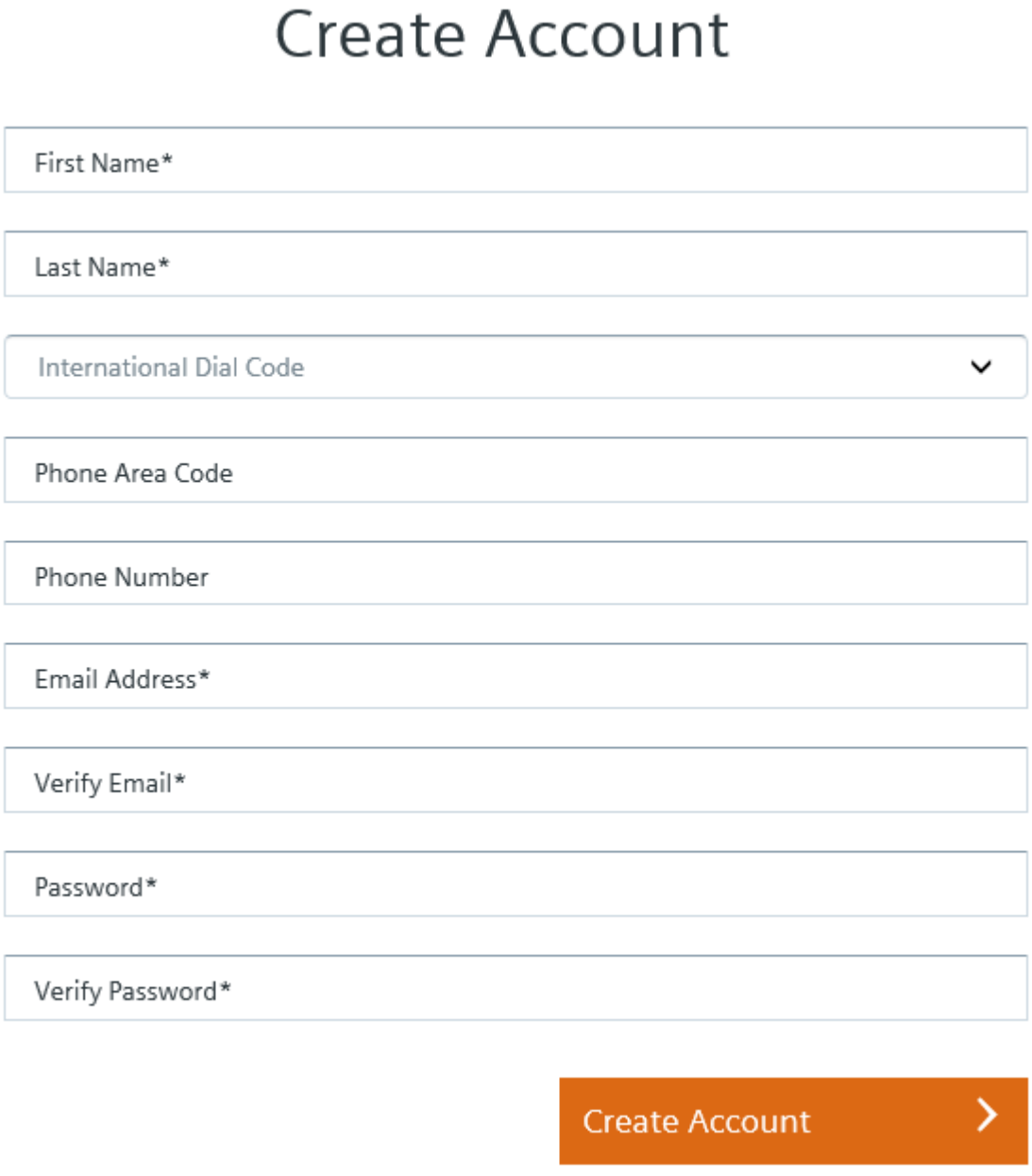
Function/area	admin	iqfleetmanager	servicemanager	onboardingonly	offboarding
General					
Onboarding (via SIDRIVE IQ Config application)	✓	-	✓	✓	-
Uploading images during onboarding (via SIDRIVE IQ Config application)	✓	-	✓	✓	-
Module replacement	✓	-	✓	✓	-
Motor replacement	✓	-	✓	✓	-
Offboarding (via SIDRIVE IQ Config application and SIDRIVE IQ Fleet)	-	-	-	-	✓
Insert drive	✓	-	-	-	-
Set drive	✓	-	-	-	-
Delete drive	✓	-	-	-	-
Main navigation SIDRIVE IQ Fleet					
Notifications of the SIDRIVE IQ Fleet application	✓	✓	✓	-	-
Messages, alarms and warnings	✓	✓	✓	-	-
User status	✓	✓	✓	-	-
Info menu	✓	✓	✓	-	-
API key generation	✓	-	-	-	-
Ordering history of SIDRIVE IQ Fleet packages and the number of assets (package usage transparency)	✓	✓	-	-	-
SIDRIVE IQ Fleet operating area					
Asset overview - map	✓	✓	✓	-	-
Asset overview - list	✓	✓	✓	-	-
Asset overview - KPI	✓	✓	✓	-	-
Create asset group	✓	✓	-	-	-
Assign assets to an asset group	✓	✓	-	-	-
Rename asset group	✓	✓	-	-	-
Delete asset group	✓	✓	-	-	-
Monitoring assets					
"Overview" tab KPIs	✓	✓	✓	-	-
"Overview" tab Explore	✓	✓	✓	-	-
"Overview" tab - Vibration Analysis Display fingerprint time interval	✓	✓	✓	-	-

Function/area	admin	iqfleetmanager	servicemanager	onboardingonly	offboarding
"Overview" tab - Vibration Analysis Change fingerprint time interval	✓	✓	-	-	-
"Logbook" tab Filtering notifications	✓	✓	✓	-	-
"Overview" tab - Pump Analysis Update pump specification	✓	-	✓	-	-
"Overview" tab - Pump Analysis Display pump specification	✓	✓	✓	-	-
"Overview" tab - Pump Analysis Display pumps analysis result	✓	✓	✓	-	-
"Logbook" tab Creating notifications	✓	✓	✓	-	-
"Logbook" tab Service action	✓	✓	✓	-	-
"Logbook" tab Confirm "Info" notifications	✓	✓	✓	-	-
"Logbook" tab Creating and editing comments	✓	✓	✓	-	-
"Profile" tab	✓	✓	✓	-	-
"Profile" tab History of motor versioning (nameplate data)	✓	✓	✓	-	-
"Profile" tab Upload image	✓	-	✓	-	-
"Profile" tab Display uploaded images	✓	✓	✓	-	-
"Profile" tab Rotate uploaded images	✓	-	✓	-	-
"Profile" tab Delete uploaded images	✓	-	✓	-	-
"Profile" tab Download uploaded images	✓	✓	✓	-	-
"Profile" tab Create/remove profile image	✓	-	✓	-	-
"Support" tab	✓	✓	✓	-	-
"Settings" tab Log on for email notifications	✓	✓	✓	-	-
"Settings" tab Device data	✓	✓	✓	-	-

Function/area	admin	iqfleetmanager	servicemanager	onboardingonly	offboarding
"Settings" tab Activate/deactivate automatic firmware update	✓	-	-	-	-
"Settings" tab Display of the actual activation status for automatic firmware update	✓	✓	✓	-	-
"Settings" tab Offboarding	-	-	-	-	✓
"Settings" tab Replacement history	✓	✓	✓	-	-
"Thresholds" tab Overview	✓	✓	✓	-	-
"Thresholds" tab Threshold change history	✓	✓	✓	-	-
"Thresholds" tab Configure threshold values	✓	-	✓	-	-
"Export" tab Initiate export and download	✓	-	-	-	-
"Maintenance" tab Configuring the maintenance counter	✓	-	✓	-	-
Dashboard application Creating the Dashboard	✓	✓	✓	-	-
Dashboard application Creating/updating/deleting Dashboard templates	✓	-	-	-	-
Dashboard application Loading existing Dashboard templates	✓	✓	✓	-	-
Displaying energy parameters	✓	✓	✓	-	-
Editing energy parameters for the asset/subtenant/tenant	✓	-	-	-	-

Procedure

1. To activate your Insights Hub user account, click the button "Click here to activate your account" in the email.
   The link takes you to the activation page.
2. Create your account. To do this, enter your data into the form. All entries marked with a * are mandatory.



3. Click the "Create Account" button. You receive a message that your user account has been created successfully. You receive another email with the request to activate your user account.

4. Click the "Next" button.
   Your profile is displayed.
5. Check your personal data.
6. Click the "Edit" button to modify your personal data or to add data.
7. Click "Save". You have successfully activated your user account.

4.3 Multi-factor authentication

You can further increase security by activating multi-factor authentication (MFA). Activating MFA is therefore recommended for your tenant. MFA adds another layer of authentication to standard authentication by adding a user name and password.

Multi-factor authentication is not a standard Insights Hub setting. Contact Insights Hub (https://documentation.mindsphere.io/resources/html/settings/en-US/114970819851.html) to have it activated.

4.4 Onboarding Drives

Before you can use the functionalities of SIDRIVE IQ Fleet for drive monitoring, you must perform onboarding to Insights Hub, fully configure Insights Hub connectivity, and perform the configuration in SIDRIVE IQ Fleet. Proceed as described in this section.

Note

SIDRIVE IQ Fleet Package Drive Extension

Make sure that you have the required number of licenses. One license allows you to monitor one drive with SIDRIVE IQ Fleet.

More information

More information about onboarding and configuring drives in Insights Hub can be found here: (https://documentation.mindsphere.io/MindSphere/concepts/concept-connectivity.html)

4.4.1 Selecting the asset type "Sinamics" in Insights Hub

Use the "Sinamics" asset type to create drive assets in Insights Hub. The "Sinamics" asset type is a preconfigured template for drives which enables them to be monitored within SIDRIVE IQ Fleet. The asset type determines which aspects and variables are integrated into the template. You must link aspects to the asset type to enable the connection to a data point. To activate data mapping, you must first select the asset type "Sinamics".

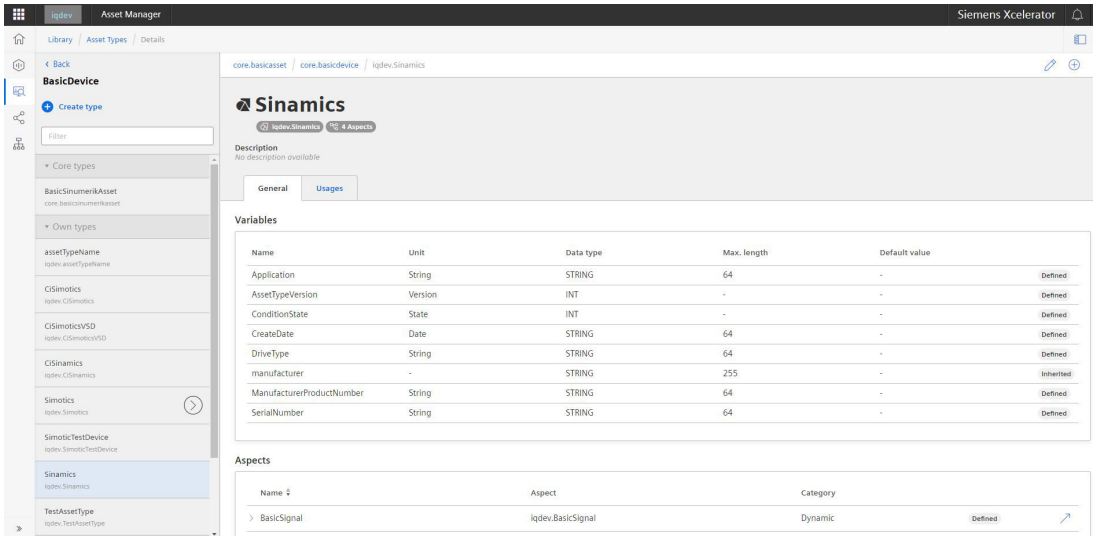
Note

1. The "Sinamics" asset type is created by SIDRIVE IQ Fleet within 30 minutes of the SIDRIVE IQ Fleet application being made available to the tenant. No manual creation or updating is required.
2. Avoid deleting and changing aspects in the asset type "Sinamics" for the tenant, otherwise the functionalities of SIDRIVE IQ Fleet with regard to drive monitoring will be locked.

Procedure

Proceed as follows to select an asset of the type "Sinamics":

1. In the Asset Manager, click on the "Types" tab.
2. Click on "BasicDevice".
3. Select the "Sinamics" drive type under "Own types".



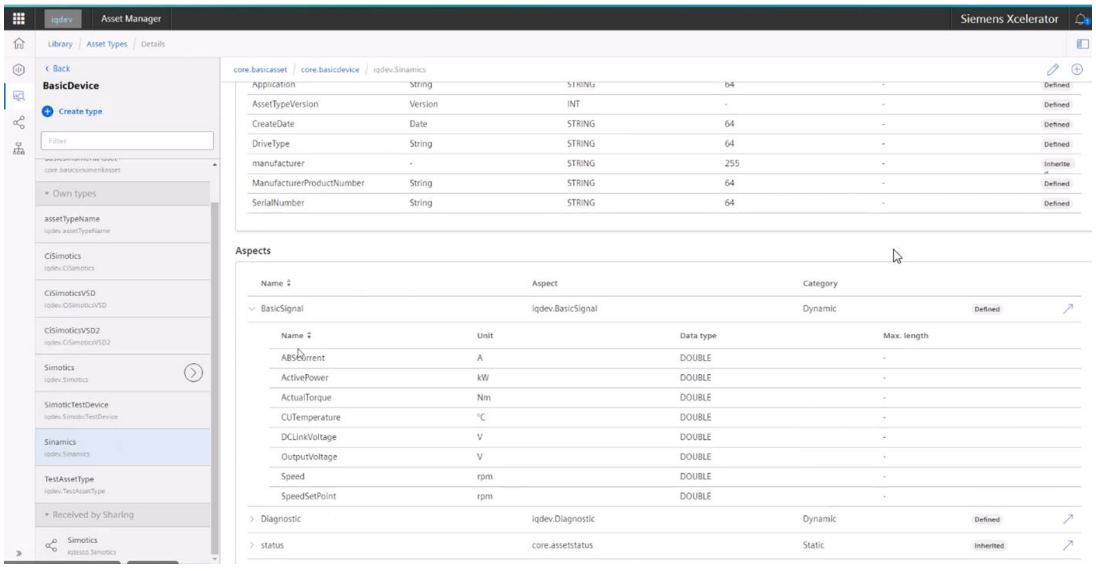
Result

The asset type "Sinamics" has been selected in the Asset Manager and can be configured in the next step.

4.4.2 Configuring aspects and variables in the Asset Manager

To use the data of your drive or gateway, you must configure the aspects and variables in Asset Manager.

Aspects are combined, preconfigured data and form the context for evaluating industrial processes. An aspect can comprise several variables. Within the industrial process, the assets transfer the aspects as time series data. In the Asset Manager, you can visualize Sinamics aspects and aspect variables.



To set up the drive connectivity with Insights Hub, various supported connectivity solutions are available to you. In this document you will find the Insights Hub documentation references for setting up with MindConnect Software Agent.

If you are using another connectivity solution such as MindConnect 2040 or MindConnect Nano, please refer to the relevant Insights Hub documentation.

Procedure

Proceed as described below to configure the drive in Insights Hub:

1. First, integrate the gateway for the MindConnect Software Agent. You can find the description here: (https://documentation.mindsphere.io/MindSphere/apps/mindconnect-software-agent/overview-onboarding-mindconnect-software-agent.html)
2. Add the drive as data source to the gateway. You can find the description here: (https://documentation.mindsphere.io/MindSphere/apps/mindconnect-software-agent/adding-a-data-source-for-mcsa.html#adding-a-data-source-for-mindconnect-software-agent)
3. The aspect variables of the asset type "Sinamics" to be monitored must be added as data points. You can find the description here: (https://documentation.mindsphere.io/MindSphere/apps/mindconnect-software-agent/adding-data-points-for-mcsa.html)
   In this way, the gateway can acquire values for the configured drive data points and upload them to the Insights Hub connectivity object.
4. Create a data object to be able to save uploaded drive data. Drive data points must be assigned to the aspect variables in the data object in the connectivity object.
   The "Sinamics" asset type is automatically created by SIDRIVE IQ Fleet within 30 minutes of the SIDRIVE IQ Fleet application being made available to the tenant. No manual creation or updating is required.
   Create an asset with the asset type "Sinamics" and follow the description for the data mapping procedure defined for MindConnect Software Agent.
   You can find the description here: (https://documentation.mindsphere.io/MindSphere/apps/mindconnect-software-agent/mapping-an-aspect-to-a-data-source-for-mcsa.html)

Result

Once data mapping is complete, you can add the created Sinamics asset to SIDRIVE IQ Fleet to start monitoring.

4.4.3 Adding, editing and removing converters in SIDRIVE IQ Fleet

4.4.3.1 Overview

In SIDRIVE IQ Fleet, you can add drives for which onboarding and configuration in Insights Hub has been completed. These drives can then be displayed in the SIDRIVE IQ Fleet asset list and their status monitored by setting threshold values.

Note

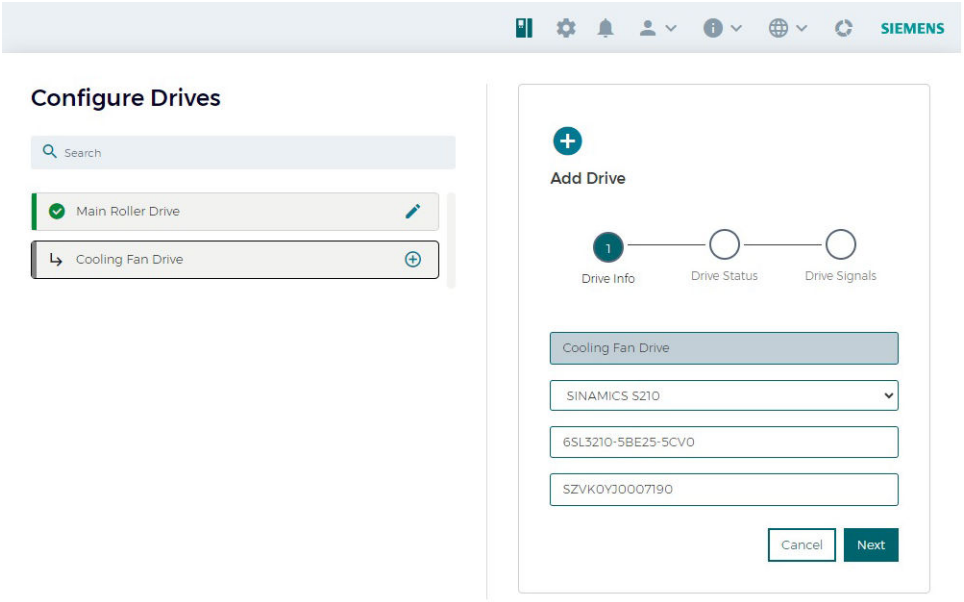
SIDRIVE IQ Fleet Package Drive Extension

Make sure that you have the required number of licenses. One license allows you to monitor one drive with SIDRIVE IQ Fleet.

Note

SIDRIVE IQ Fleet roles

To add, edit, or remove drives from SIDRIVE IQ Fleet, you need the role iqfleet.admin or iqfleet.fleetmanager.



Assets of the assetType [tenant_name]. Sinamics drives that are integrated in Insights Hub are displayed in the "Configure Drive" list.

Drives that are not yet included in SIDRIVE IQ Fleet are visualized with the icon. These still need to be added and configured.

Drives that have already been added are visualized with the icon. You can edit them further.

4.4.3.2 Adding drives in SIDRIVE IQ Fleet

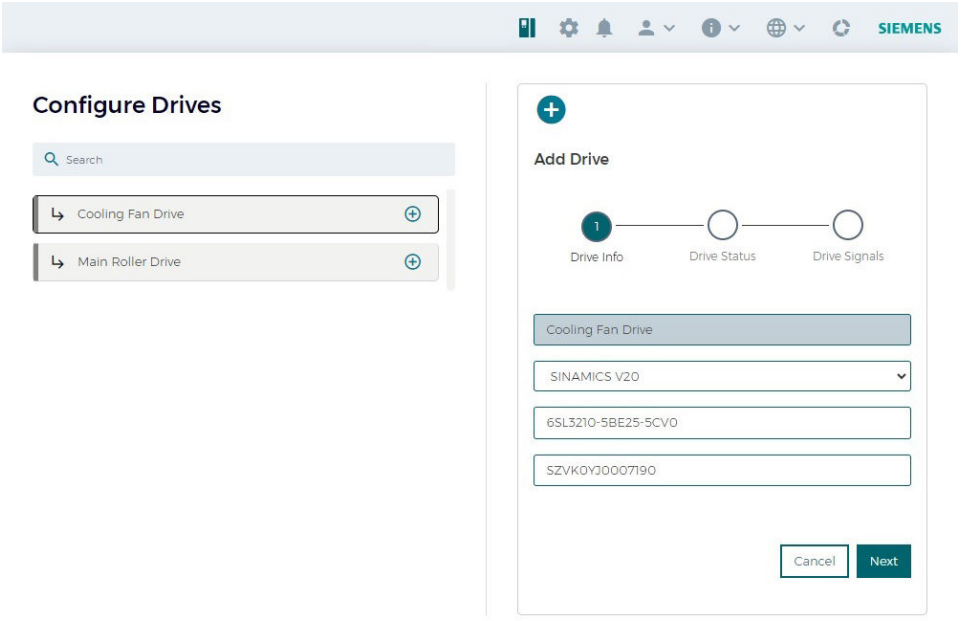
Proceed as described below to create a drive in SIDRIVE IQ Fleet.

Requirement

- Onboarding and configuration in Insights Hub with the Asset Manager is complete.
- Corresponding Sinamics assets have been created.
- You have the necessary number of licenses of the SIDRIVE IQ Fleet Package Drive Extension.

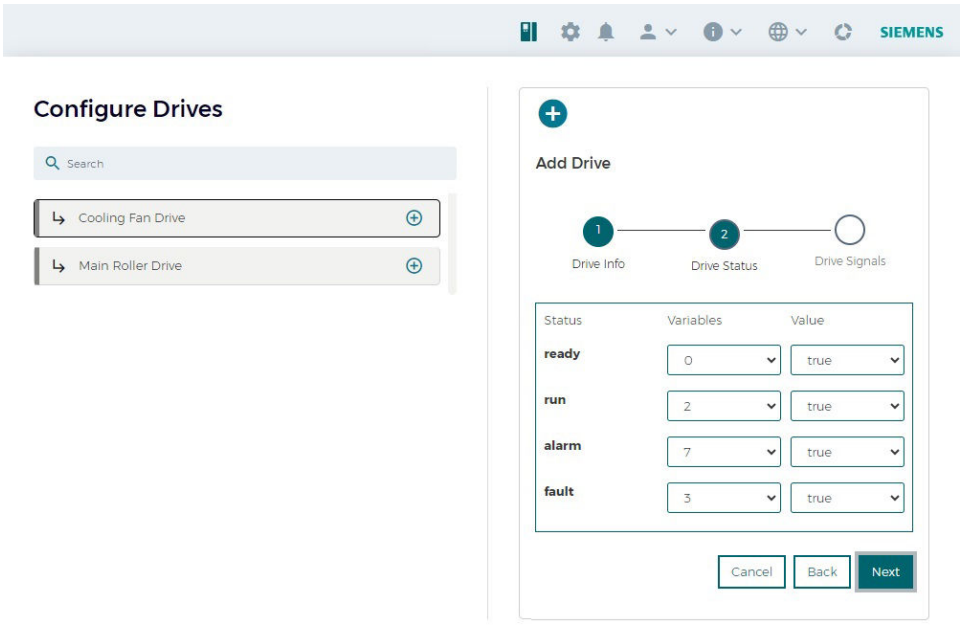
Procedure

1. Open the drive configuration in SIDRIVE IQ Fleet via the icon in the main navigation.
2. Select an appropriate drive from the "Configure Drives" list.

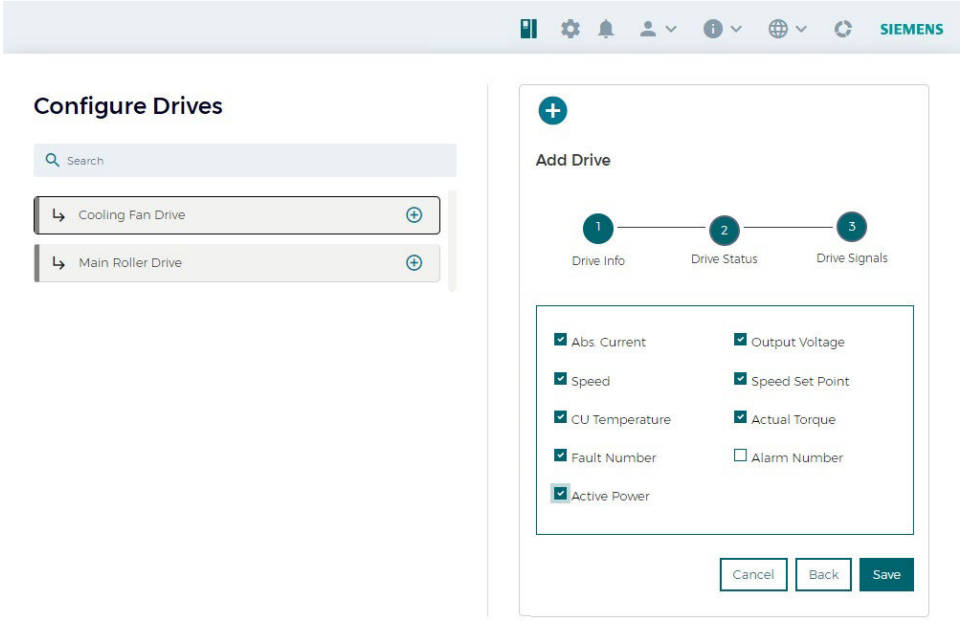


3. Select the drive type and enter the product part number and serial number.

4. Select the status bits. The status bits are pre-filled.



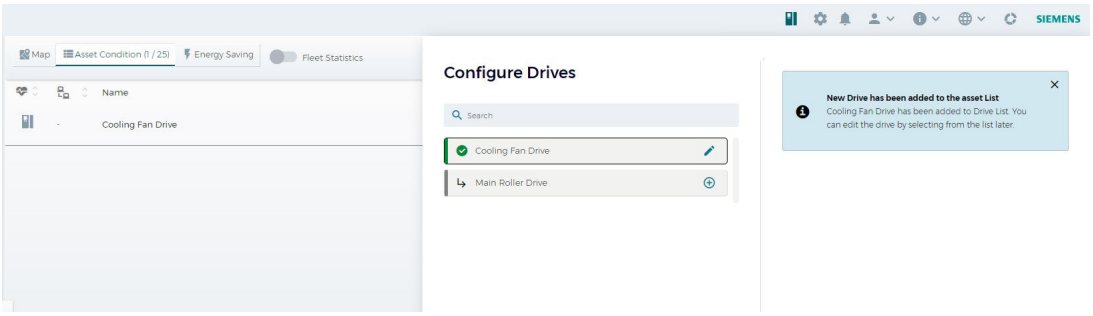
5. Select the signals that are transmitted from the drive.



6. Click the "Save" button to apply the configuration.

Result

The drive is created in SIDRIVE IQ Fleet and is displayed in the asset list with the icon.



4.4.3.3 Edit the drive configuration in SIDRIVE IQ Fleet

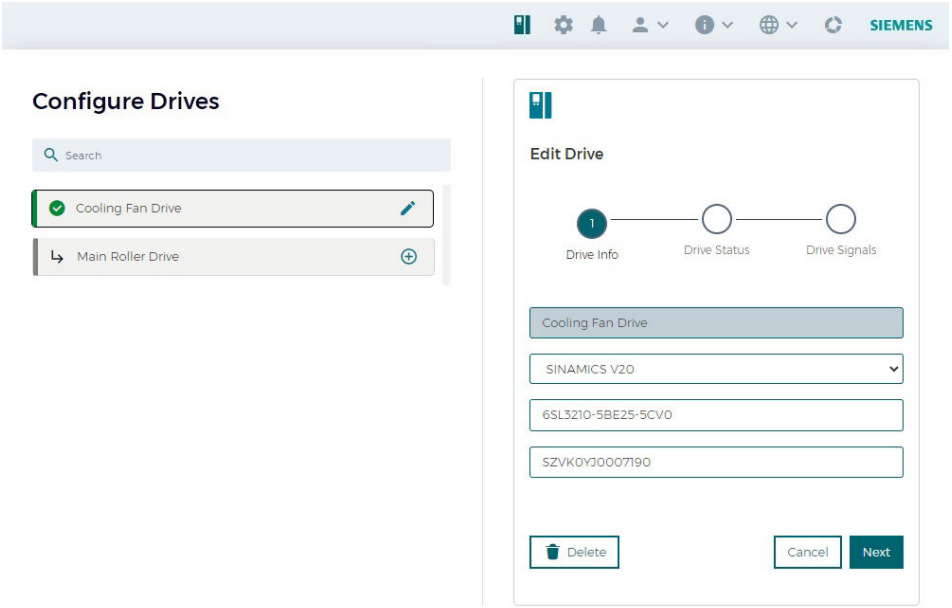
Proceed as described below to edit a drive in SIDRIVE IQ Fleet.

Requirement

A drive has been created in SIDRIVE IQ Fleet.

Procedure

1. Open the drive configuration in SIDRIVE IQ Fleet via the icon in the main navigation.
2. Select the appropriate drive from the "Configure Drives" list.
3. Click on the icon to go to the "Edit Drive" view.



4. Make the desired changes in the areas Drive Info, Drive Status, and Drive Signals.
5. Apply the changes with "Save".

Result

The changes to the drive configuration have been saved.

4.4.3.4 Deleting drives in SIDRIVE IQ Fleet

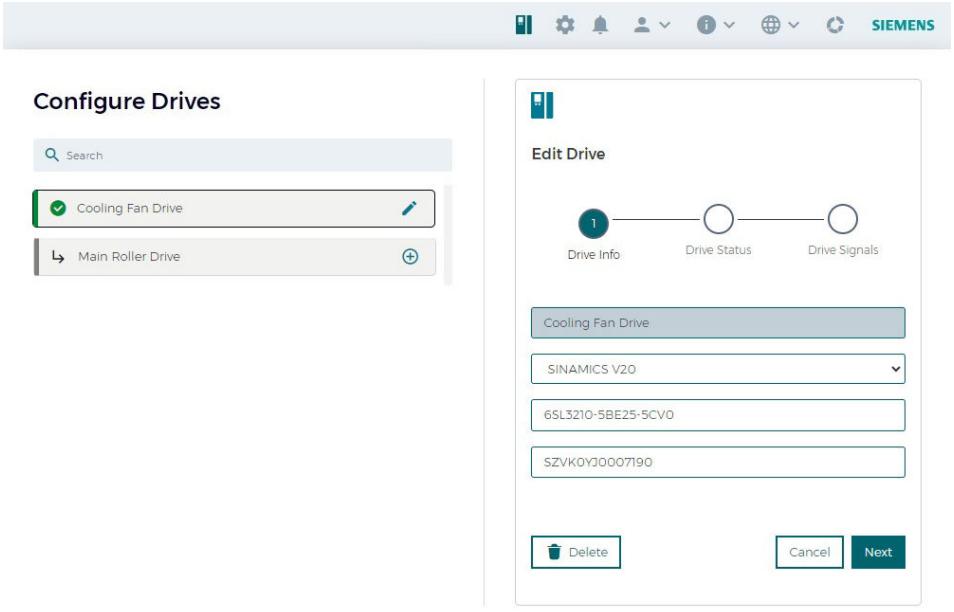
To remove a drive from SIDRIVE IQ Fleet, follow the steps below.

Requirement

A drive has been created in SIDRIVE IQ Fleet.

Procedure

1. Open the drive configuration in SIDRIVE IQ Fleet via the icon in the main navigation.
2. Select the appropriate drive from the "Configure Drives" list.
3. Click on the icon to go to the "Edit Drive" view.



4. Click the "Delete" button.

Result

The drive has been removed from SIDRIVE IQ Fleet.

Working with SIDRIVE IQ Fleet

5

Procedure

1. Open the Insights Hub Launchpad.
2. Click on the "SIDRIVE IQ Fleet" icon to start the application.

5.1 User interface

5.1.1 Main navigation SIDRIVE IQ Fleet

In the main navigation of the Insights Hub SIDRIVE IQ Fleet application, you will find buttons for various functions.

① "SIDRIVE IQ Fleet launch page" button
② "Back to last view" button
③ Configuration of drive assets
④ Settings
⑤ The button is displayed if an announcement is available
⑥ The button is displayed if a notification has been received from the SIDRIVE IQ Fleet application
⑦ User status is displayed
⑧ Public API key, imprint, information, help
⑨ Change display language
⑩ Display of the ordering history of SIDRIVE IQ Fleet packages and the number of assets

5.1.2 Application area of the application

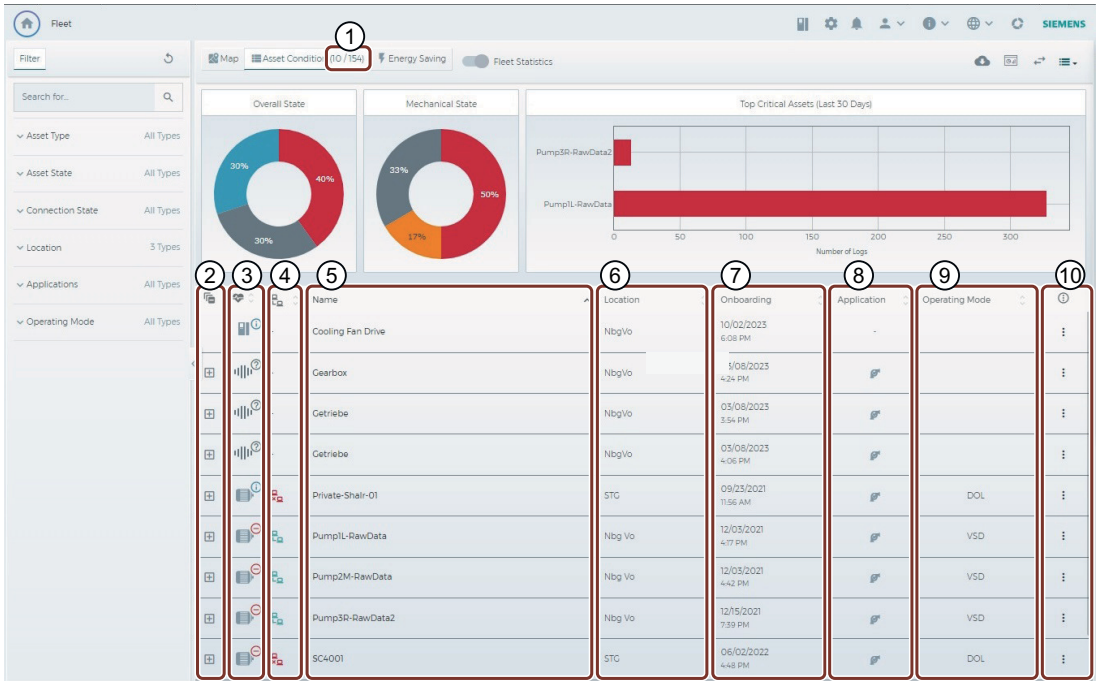
You can select between the following asset views in the SIDRIVE IQ application:

- Map (Page 54) (world map): In the view, the state of the filtered assets is displayed on the world map.
- Asset State (Page 47): The most important information about the filtered asset is displayed in this view. The view is displayed after the application starts (start screen).
- Energy saving (Page 54): The energy-saving information about the filtered asset is displayed in this view.
- Fleet statistics (Page 57): You can activate or deactivate the Fleet statistics area. If the fleet statistics are activated, the key performance indicators of the fleet are graphically displayed in the "Map" view as well as in the "Asset State" view. In the "Energy Saving" view, the energy statistics and the energy savings potential of the fleet are displayed if fleet statistics is activated.

All assets that match the filter criteria are displayed. If you did not set a filter (Page 59), all assets that have been onboarded under your user account will be displayed.

5.1.2.1 Asset Overview - Asset State

The following diagram shows as example the asset overview in the "Asset State" view:



① Number of assets which satisfy the filter criteria / total number of assets in the Tenant/Subtenant

② Icon for displaying the information area (see "Information area" section)

③ Information about the state of the asset and the asset type.

The displayed icons are different for assets for "Motor monitoring", drive monitoring, and for "Generic vibration monitoring".

④ Information about the connection state of the asset

⑤ Asset name

⑥ Location of the asset

⑦ Time of the onboarding

⑧ Application

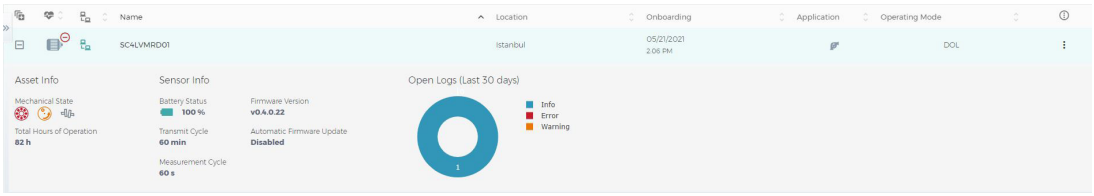
⑨ Operating Mode

⑩ Icon to transfer the asset to the comparison list

Under "View settings", you can adapt the selection of the displayed columns of the list view.

Information area

You can use the + icon to show the information area for each asset.

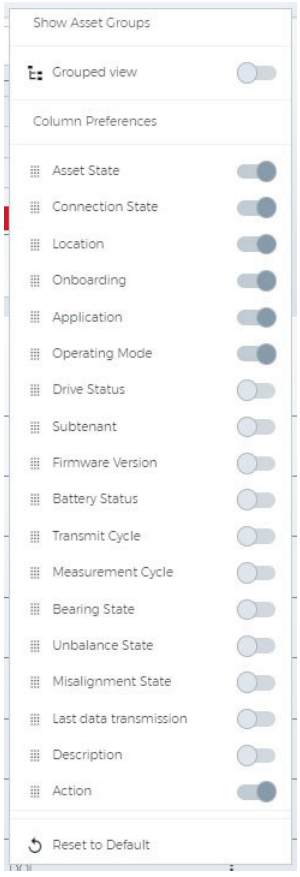


The information area contains the following information:

- Asset info:
  Display of the mechanical state and the total number of operating hours
- Sensor info:
  Display of battery status, firmware version, transmit cycle, automatic firmware update selection and measuring cycle
- Logs (open logs of the last 30 days)

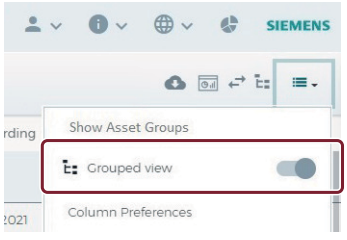
Column Preferences

Open the "Column Preferences" menu using button . Here, you can activate or deactivate the grouping of assets, change the order of the displayed columns and show or hide columns. These settings are stored in the web browser memory of your local computer. If you delete the web browser memory, the columns are shown in the Default view.



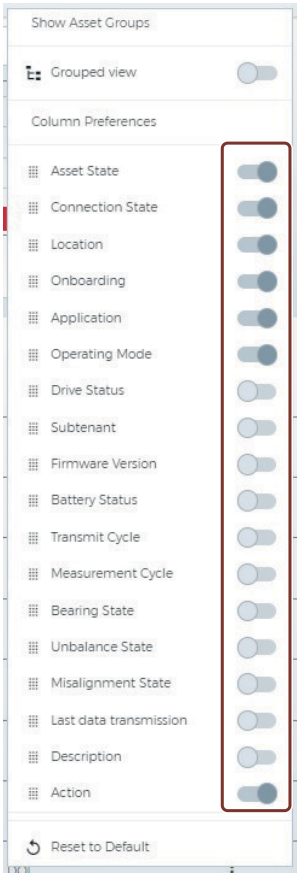
Activating/deactivating grouping of assets

You can toggle between the grouped view and the default view using button "Grouped view". Function "Group Management" is only available if you have activated the group view.



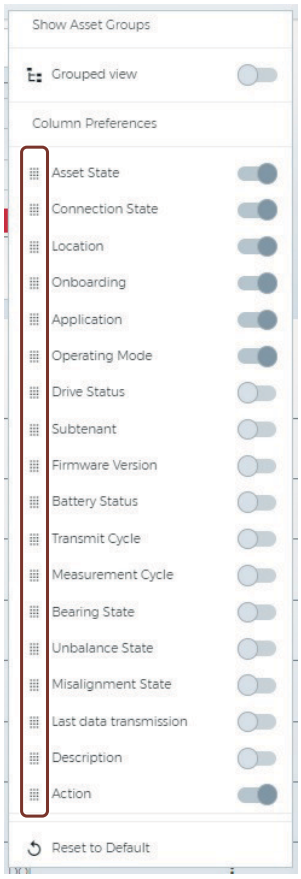
Show/hide columns

You can show and hide columns using the Switch buttons.



Adapt order.

You can change the order of the displayed columns by dragging and dropping them.



Default view

The default view is restored using "Reset to Default". If you have selected the group view, then this is also reset to the default view.

The following columns are displayed in the default view:

- Asset State
- Connection State
- Name
- Location
- Onboarding
- Application
- Operating Mode

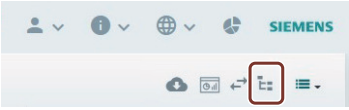
The following columns are hidden in the default view:

- Converter status
- Subtenant
- Firmware Version

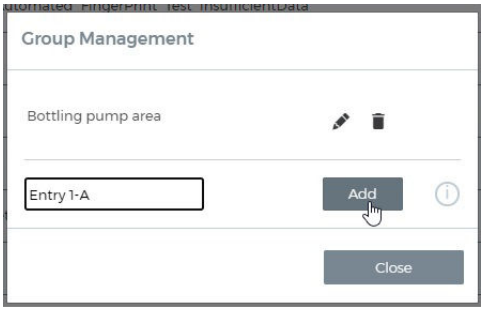
- Battery Status
- Transmit Cycle
- Measurement Cycle
- Bearing Status
- Unbalance State
- Misalignment State
- Last data transmission
- Description
- Action

Group management

Assets can be organized and displayed in groups. The precondition is that the group view has been activated as described in Section "View settings" > "Activate/deactivate grouping of assets". When the group view is activated, icon is displayed.

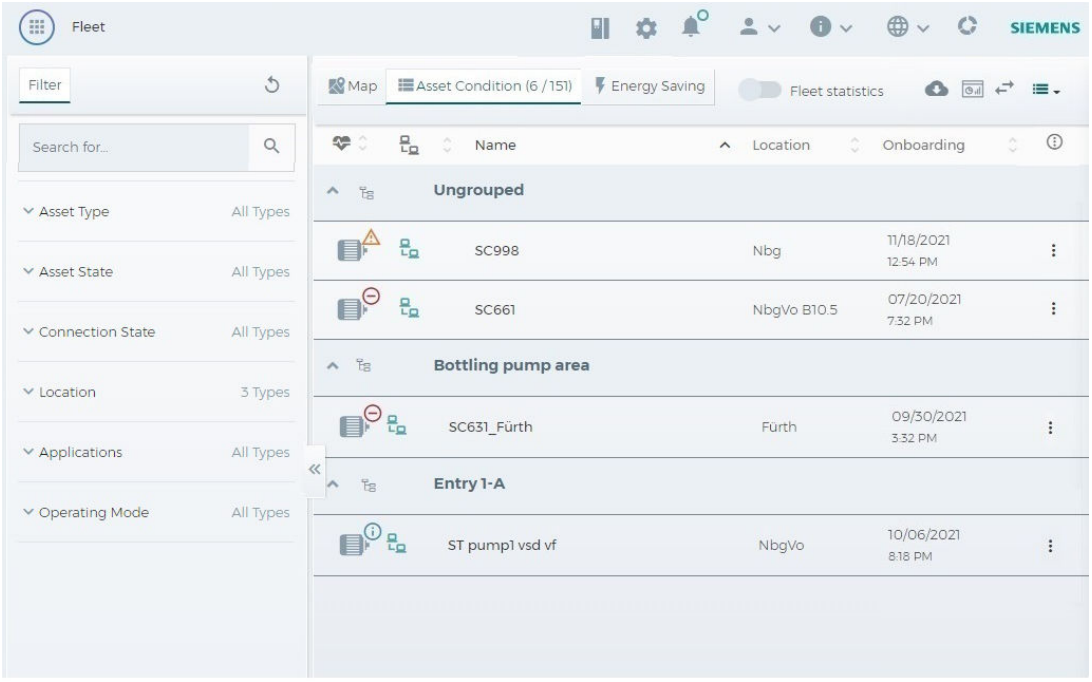


In the "Group Management" dialog, you can add, remove and rename asset groups. To do this, you must have either the "admin" and/or the "iqfleetmanager" role.



Note the following:

- Up to 10 asset groups can be created for each tenant.
- In the default setting, assets are "ungrouped".
- Received assets are automatically grouped under the Share tenant's name and cannot be moved to other groups.
- Assets, which belong to a subtenant, are automatically grouped under the subtenant name for the "Global user". Subtenant assets can only be moved to groups by the subtenant users. However, this move is not visible for "Global users".
- Assets can only be moved to asset groups if asset grouping is activated and the user has either the "admin" and/or "iqfleetmanager" role. You can move the asset of the appropriate line into an existing group using button "Move asset" .



Explanation of the group icons:

	Group created by a user
	Automatically created subtenant group
	Automatically created group of assets of a specific tenant for sharing

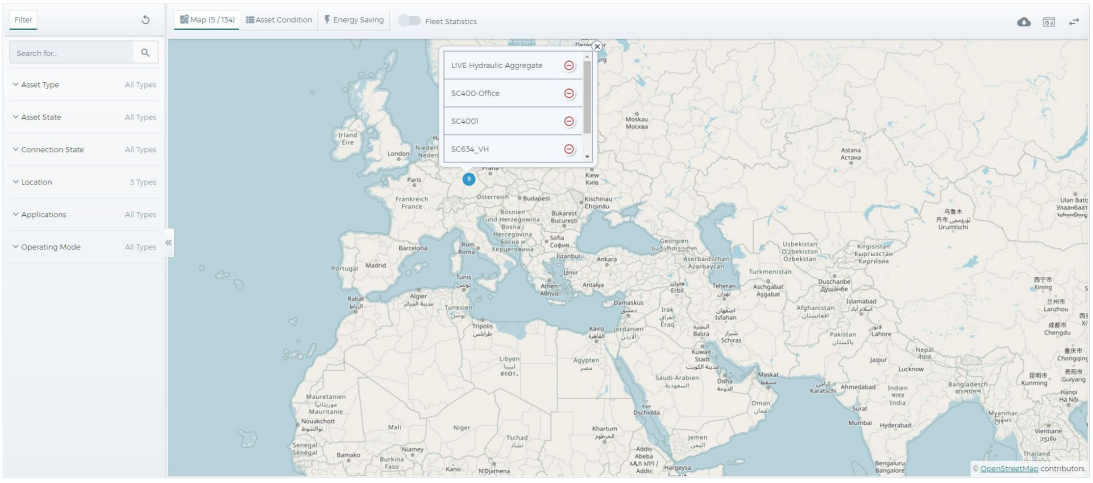
Exporting the asset list

You can export the complete list of assets of your tenant and/or subtenant with the available asset properties and download using button . The data are provided in a "csv" file (comma separated values). You can import these into a spreadsheet program or database.

The assets and their properties are exported; however, the time series data are not exported. For the export of the time series data, see Section Tab "Export" (Page 103).

5.1.2.2 Asset overview - map

The following figure shows an example of the asset overview in the map view. If you did not set any filter, the status of all available assets that were onboarded under your user account will be displayed when viewing.

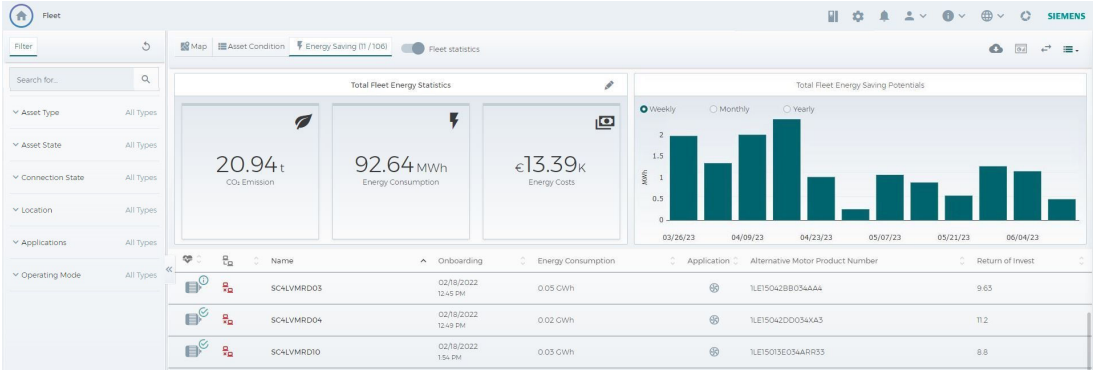


Note

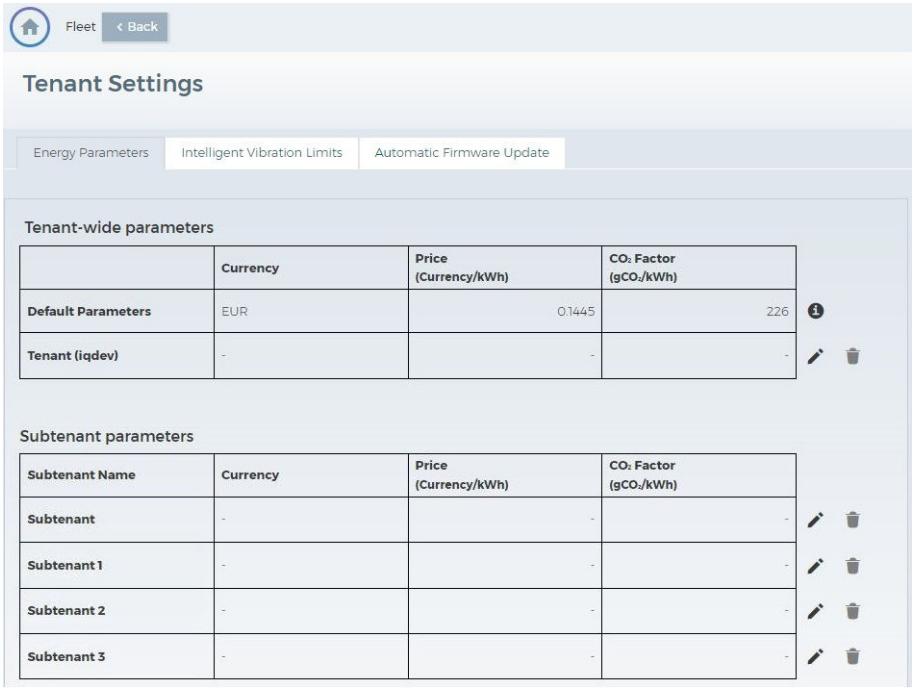
The "geolocation related functions" are not supported in individual regions as a result of local regulations. Please refer to the Release Notes (https://support.industry.siemens.com/cs/document/109811904) for more information.

5.1.2.3 Asset overview - Energy Saving

An overview of the sum of the key performance indicators for the filtered asset is displayed in tab "Energy Saving" in area "Statistics". This area is displayed in the default view. You can hide and display the statistics using the "Fleet statistics" toggle button.

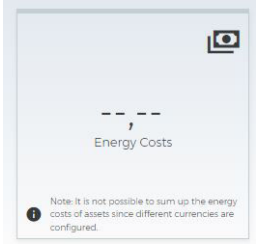


- **Fleet energy statistics:**
  Displays the sum of CO_2 emissions, energy usage and the energy costs for filtered assets. Using button , you can edit cross-tenant parameters and subtenant parameters. You can edit or delete parameters Currency, Price (Currency) and CO_2Factor (gCO_2/kWh) (see Section "Settings (Page 59)".



Note

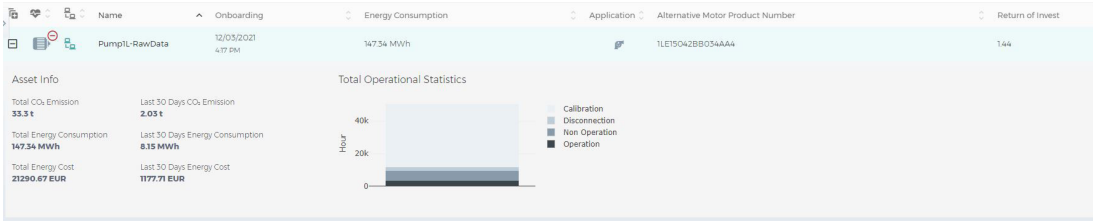
It is not possible to sum the energy costs of the asset if the energy costs of the asset are configured with different currencies. In this case, the display remains empty, and the appropriate information is displayed (see the following diagram).



- **Energy saving potential of the fleet:**
  Displays the total energy saving potential of the fleet for the filtered assets. As default, the calculation is set to "Weekly". You can change the setting to "Monthly" or "Yearly".

Information area

You can use the + icon to show the information area for each asset.

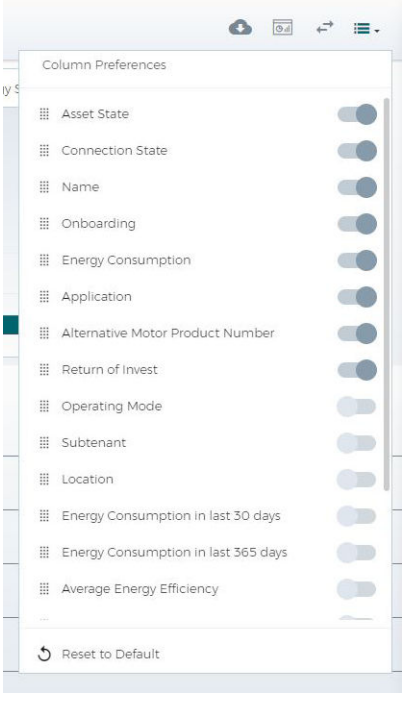


The information area contains the following information:

- Asset info:
  Display of the total CO_2 emission, the total energy consumption and the total energy costs as well as the corresponding values of the last 30 days.
- Total Operational Statistics:
  The total operational statistics are displayed as a diagram.

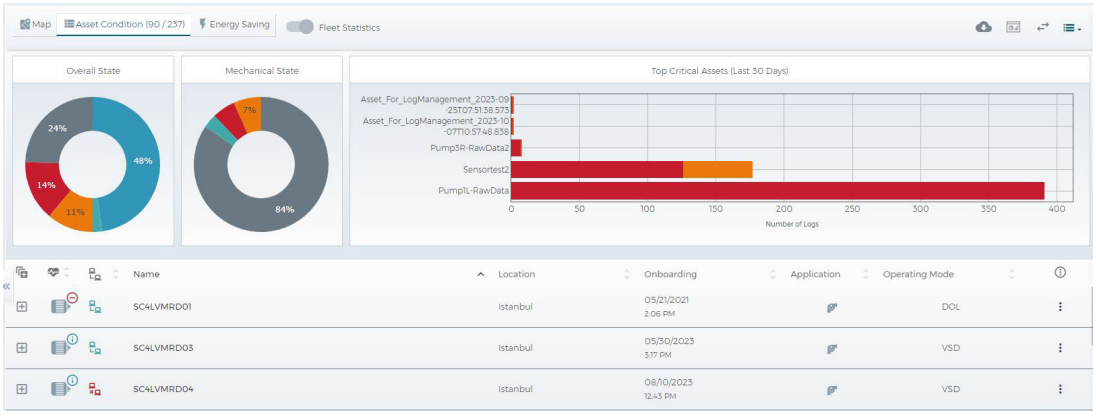
Column Preferences

Open the "Column Preferences" menu using button . There, you can change the order of the displayed columns, and show or hide columns. These settings are stored in the web browser memory of your local computer. If you delete the web browser memory, the columns are shown in the Default view.



5.1.2.4 Fleet statistics

An overview of the important key performance indicators for the filtered assets is displayed in tab "Asset State" in area "Statistics". This area is displayed in the default view. You can hide and display the statistics using the "Fleet statistics" toggle button.



The following information is displayed in the "Statistics" area:

- **Overall state:** For the filtered assets, the percentage distribution with reference to the particular asset state is shown in the pie chart. A tooltip displays the number of assets for each state.

State	Meaning
OK (green)	Percentage of assets that have the "OK" state.
Information (blue)	Percentage of assets that have the "Information" state.
Warning (orange)	Percentage of assets that have the "Warning" state.
Error (red)	Percentage of assets that have the "Error" state.
n. a. (gray)	Percentage of assets that have the "n. a" state (still not known).

- **Mechanical State:** Shows the distribution of the filtered assets with reference to their mechanical state.
  - The mechanical state of an asset is classified as "Error" if at least one of the mechanical analyses (bearing, unbalance and/or misalignment) indicated a "High failure probability".
  - The mechanical state of an asset is classified as "Warning" if none of the mechanical analyses (bearing, unbalance and/or misalignment) indicated a "High failure probability", but at least one of these indicated a "Low/medium failure probability".
  - The mechanical state of an asset is classified as "OK" if none of the mechanical analyses (bearing, unbalance and/or misalignment) indicated a "High failure probability" or "Low/medium failure probability" and all mechanical states are OK.
  - The mechanical state of an asset is classified as "Calibration" if the mechanical state analysis was not able to be performed due to inadequate data or the calibration process.

  The pie chart shows the percentage of each state. A tooltip displays the number of assets for each state.

State	Meaning
OK (green)	Percentage of the assets whose mechanical state is classified as "OK".
Warning (orange)	Percentage of the assets whose mechanical state is classified as "Warning".
Error (red)	Percentage of the assets whose mechanical state is classified as "Error".
Calibration (gray)	Percentage of assets that have the "Calibration" state.

  You will find more information in section "Overview" tab - Mechanical analysis (Page 81).

- **Top critical assets:** Overview of the currently most critical assets (maximum of 5 assets) of the filtered assets. The evaluation of the bar chart refers to the number of warnings and error logs ("Error" and "Warning" asset state) of an asset within the last 30 days.
  The number of warnings is displayed using an orange bar and the number of errors using a red bar.

5.1.2.5 Asset filter

The Insights Hub SIDRIVE IQ Fleet application lists all assets that have been onboarded under your user account. Various filters are available (Page 61) to narrow your search for the required asset:

- Asset State
- Connection State
- Location
- Applications
- Operating Mode

5.1.2.6 Settings

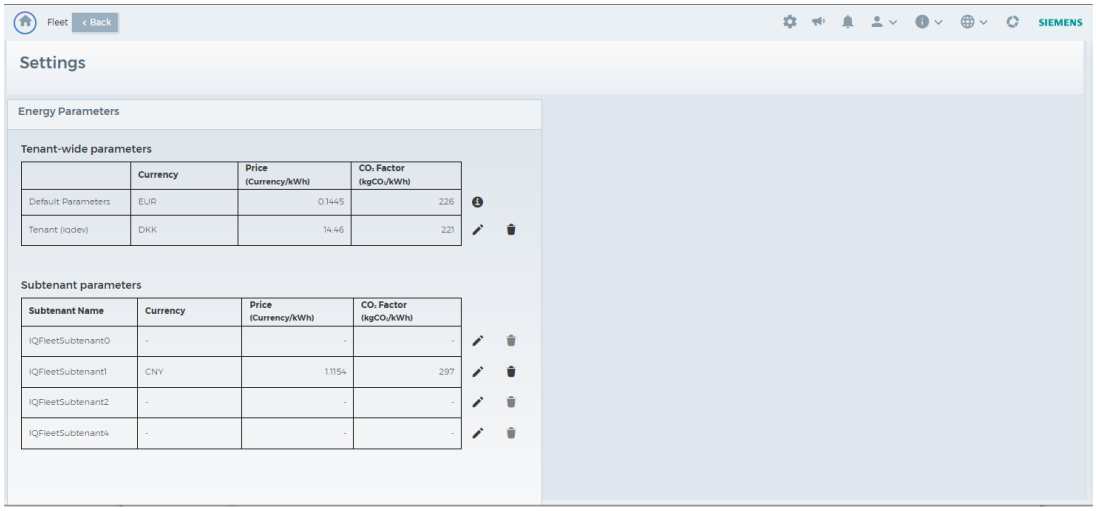
You can display the settings for "Energy parameters" on the "Settings" page.

The energy parameters are used to calculate energy KPIs (CO_2 emissions and energy price) (see tab "Overview"). "Default" parameters are applied as long as no tenant, subtenant or asset-specific parameters are set.

- Default parameters:
  The "Default" parameters originate from energy institutes active worldwide. They are used when calculating the energy parameters as long as no tenant, subtenant or asset-specific parameters are defined. You cannot change these parameters. They are updated if new information about standard energy prices and CO_2 factors are published.
- Tenant parameters:
  Set the tenant parameters under the following conditions:
  - The triplet comprising price per unit, currency and CO_2 factor deviate from the default parameters for most assets in your tenant.
  - The same energy price and CO_2 factor apply for most assets of the corresponding tenant.
- Subtenant parameters:
  Are only displayed for subtenant users. Set the subtenant parameters under the following conditions:
  - The triplet comprising price per unit, currency and CO_2 factor deviate from the default parameters for most assets in your tenant.
  - The triplet comprising price per unit, currency and CO_2 factor deviate from the tenant parameters for most assets in the corresponding subtenant (if at all possible, use the tenant parameter).
  - The same energy price and CO_2 factor apply for most assets of the corresponding subtenant.

Note

You need the iqfleet.admin role to edit the parameters.



For each asset, the parameters to be used for the energy KPI calculations are selected corresponding to the available specific parameters. The specific settings are made corresponding to the following parameter hierarchy:

1. Asset-specific parameters: The asset-specific parameters are set if the individual asset has a different energy unit price and/or different CO_2 factor than the other assets of the tenant.
2. Subtenant parameters (only if the asset is located in the corresponding subtenant)
3. Tenant parameters
4. Default parameters

5.2 Selecting assets

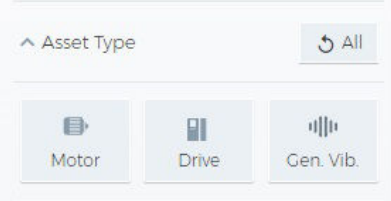
5.2.1 Filter settings

All assets that have been onboarded under your user account are displayed in the asset overview in the list view. Various filters are available so that you can limit your search to just the asset you require.

The last filter criteria used are stored in the web browser memory of your local computer. These stored filter criteria are only changed if you set new filter criteria, reset the filter criteria or delete the web browser memory.

"Asset Type" filter

The "Asset Type" filter allows you to filter assets by motor, drive, and general vibration monitoring.

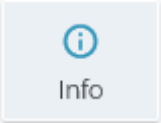


"Asset State" filter

The "Asset State" filter provides you with information about the state of an asset.

The following table provides you with an overview of the properties that you can filter for in the "Asset State" area:

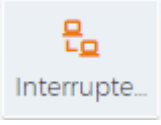
"Asset State" filter	Meaning
OK	The asset state is OK. The asset does not issue any error or warning.
Warning	The asset is in the alarm state. Additional details on the alarm state are available in the logbook (Page 88).
Error	The asset has output an error message. Additional details on the error message are available in the logbook (Page 88).

"Asset State" filter	Meaning
	Information is available about the asset that can be viewed in the logbook (Page 88).
	Currently, there is no information about the asset state.

"Connection State" filter

The "Connection State" filter provides information about the connection state of an asset.

The following table provides you with an overview of the properties that you can filter for in the "Connection State" area:

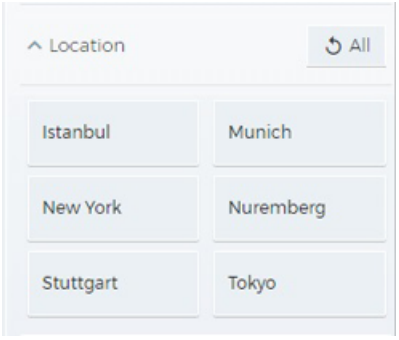
"Connection State" filter	Meaning
	The asset transmitted data within the expected data transmission interval.
	The transmission of data is temporarily interrupted No data was transmitted after the expected first repeat interval.
	• Initial state: The asset has not transmitted any data since it was commissioned. • No data was transmitted also after the expected second repeat interval.

"Location" filter

The "Location" filter offers you the option of filtering the asset based on the registered location. The number is limited to 10 locations.

The location was defined during the onboarding process of the connectivity module, and can no longer be changed in SIDRIVE IQ Fleet.

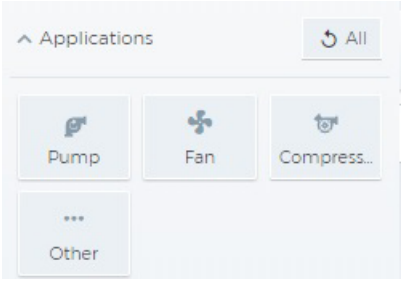
The following figure shows you a list of location examples that you can use as basis to filter your asset.



"Applications" filter

The "Applications" filter provides you with an overview of all the assets and their higher-level product families that were onboarded under your user account. You can filter your assets according to previously set application assignments. This data was defined during the onboarding process of the connectivity module, and can no longer be changed in SIDRIVE IQ Fleet.

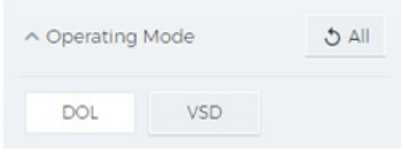
The following figure shows you a list of examples of application assignments that you can use as basis to filter your asset.



"Operating Mode"

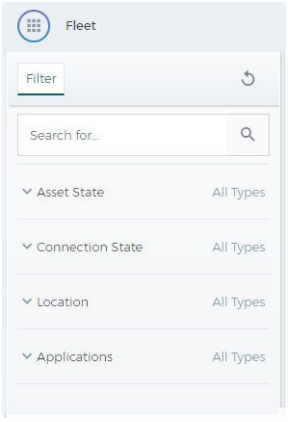
Filter "Operating Mode" allows you to filter motor assets according to line operation (DOL) or converter operation (VSD). You select the operating mode during the onboarding process of the connectivity module. You can only change the operating mode via "Motor change" using application "SIDRIVE IQ Config".

The filter options for the various operating modes are shown in the following diagram:



5.2.2 Filtering assets

All assets that have been onboarded under your user account are displayed in the list view. Various filters are available so that you can limit your search to just the asset you require. The following figure lists the available asset filter:



Procedure - search

This involves searching the content of the "Asset Name" "Location" and "Description" fields.

1. Use Search, for example to search for a specific asset.
2. Enter the asset name in the search field.
3. Click on the magnifying glass icon. The list view is refreshed.

Procedure - filter

1. To make a general search, select a filter.
2. Click on at least one property within the filter.
   If you click on all attributes, this has the same effect on the asset filtering as if you had selected no attribute.
3. If required, select an additional filter.
   You can use the filters either individually or cumulatively. As soon as a filter has been set, the list of assets in the asset overview is updated.
4. Click on at least one property within the filter.

Reset the filters

You can cancel the filter selection in 2 ways:

Icon	Meaning
All Types	Click on this button to cancel the selection in the respective filter range
	Click on this button to cancel all filters

5.2.3 Selecting an asset in the asset overview

All assets that have been onboarded under your user account are displayed in the list view. As soon as you set a filter in the asset filtering, the list of assets in the asset overview is updated.

Procedure

1. Open the list view, for example.
2. Select an asset by clicking on the corresponding row.
   The view changes to the asset view.

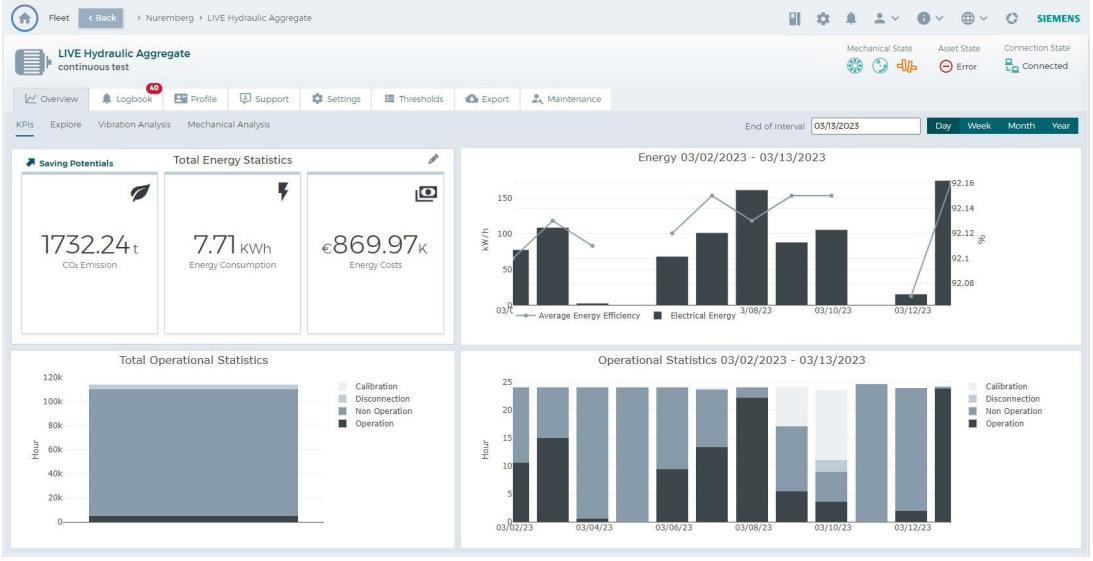
5.3 Monitoring motor assets

5.3.1 Asset view

The following tabs to monitor assets can be selected in the Asset view:

- Overview
  In the Overview tab you will find the following display areas:
  - KPIs (Page 67)
  - Explore (Page 69)
  - Vibration Analysis (Page 76)
  - Mechanical Analysis (Page 81)
- Logbook (Page 88)
- Profile (Page 95)
- Support (Page 98)
- Settings (Page 98)
- Thresholds (Page 101)
- Export (Page 103)
- Maintenance (Page 107)

The following figure provides you with an overview of the asset view:



5.3.2 "Overview" tab - KPIs

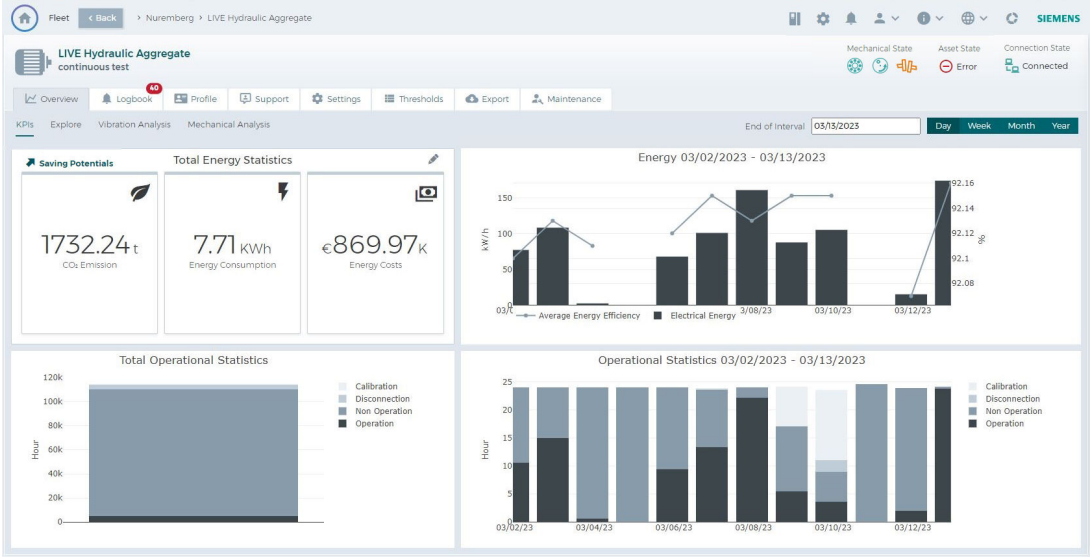
You can see all of the important data associated with the selected asset in the "KPIs" view:

- Overall energy statistics
  Section "Overall energy statistics" shows the overall CO_2 emissions of the motor, the overall energy consumption and the overall energy costs since commissioning. Initially, the values are calculated based on the default parameters CO_2 factor and the energy price.
  You can open the "Saving potentials " dialog using button "Saving potentials". Also see Section "Saving potentials" in this chapter.
  You can display and/or edit specific parameters for this asset using button . The cross-tenant/subtenant parameterization is realized via menu "Settings" (Page 59).

  Note

  You need the iqfleet.admin role to edit the parameters.

- Time-related energy consumption
  12 bars are displayed up to the selected end date. Depending on the option selected, a bar represents either one day, one week or one month.
- Total Operational Statistics
  The Total Operational Statistics displays the total operating time (since onboarding), distributed according to "Operation", "Non Operation", "Calibration" and "Disconnection". "Disconnection" is the time where SIMOTICS CONNECT 400 was disconnected, and no information was available about the operating status of the motor.
- Time-related operational statistics
  12 bars are displayed up to the selected end date. Depending on the option selected, a bar represents either one day, one week or one month.
  For each bar, the operating time (since onboarding) is displayed according to "Operation", "Non Operation", "Calibration" and "Disconnection". "Disconnection" is the time where SIMOTICS CONNECT 400 was disconnected, and no information was available about the operating status of the motor.



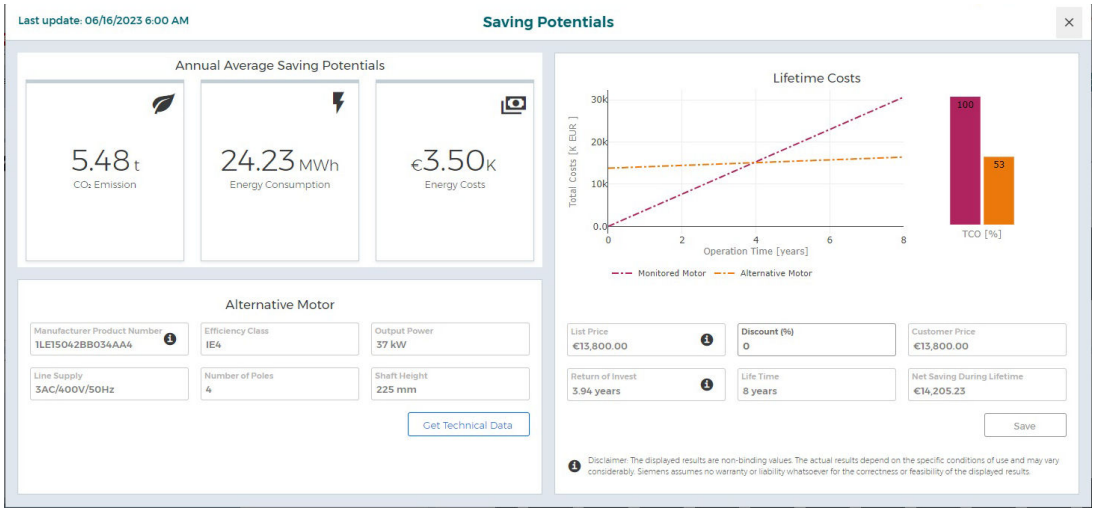
Note

At the present time, for converter-driven motors (VSD), where onboarding was performed with an SIDRIVE IQ Fleet Version < V2.4, calculation of the energy consumption is not supported. Energy consumption values are available for motors where the onboarding was performed with SIDRIVE IQ Fleet version >= V2.4.

Saving potentials

SIDRIVE IQ Fleet analyzes the operational energy consumption of your motor and compares the energy KPIs with an alternative motor with a higher efficiency.

In tab "Overview" - KPIs, by clicking on button "Saving potentials", you can display the comparison for your corresponding motor.



The saving potentials with reference to energy consumption, CO2 emission and energy price are specified as annual average. The alternative motor and the saving potentials are recalculated every week.

The return on investment is based on the price of the alternative motor and the annual energy cost savings. You can adapt the discount (%) or the customer price so that the return on investment can be more precisely determined.

Note

Return on investment and saving potentials

A minimum amount of data is required to calculate the return on investment and saving potentials. The calculations become more meaningful as the amount of data increases. The calculations are updated every Sunday.

Note

- The system automatically supplies the list prices for Europe. The prices can differ for other regions.
- The return on investment is based on the average annual saving potentials. The amount of data increases the accuracy.
- The comparison dialog is not displayed if the system cannot identify a more efficient motor.

5.3.3 "Overview" tab - Explore

You have the option of graphically displaying various signals in the "Explore" view. You can select up to 3 different signals using the "Signal Selection" menu.

The following figure shows 3 selected signals and their representation as example:

You can change the color coding, line width of the graphs and the display type (Page 71)allocated by the system.

Use the arrow keys to the right of the coordinate system to show or hide the signal selection.

See also

Log view (Page 81)

5.3.3.1 Available signals

In the "Measured values" view you can read out the following signals via the "Signal selection" menu:

- Motor State
  After onboarding, the connectivity module automatically starts a calibration procedure at the motor. It requires 10 measuring cycles with the motor in the RUN state and 10 in the OFF state. Precise data is only available for signal "Motor State" after the calibration procedure has been completed:
  - Value "0": Motor off (OFF)
  - Value "1": Sensor not calibrated
  - Value "3": Motor on (RUN)

  For the display in the diagram, we recommend that the "step-after" line style is used.
- Electrical stator frequency (Hz)
- Slip frequency (Hz)
- Torque (Nm or lbf-ft)
- Electrical power drawn (kW)
- Energy efficiency (%)
  Energy efficiency of the motor under the current operating conditions
- Temperature (°C or °F)
  Motor surface temperature
- Axial vibration (x) (mm/s or in/s)
  Vibration velocity [mm/s] in the X direction
- Tangential vibration (y) (mm/s or in/s)
  Vibration velocity [mm/s] in the Y direction
- Radial vibration (z) (mm/s or in/s)
  Vibration velocity [mm/s] in the Z direction
- Number of starts
- Speed (rpm)
  Rotation speed of the motor during the set period

Note

IEC/NEMA

For torque, temperature and vibration signals, you can change the unit from IEC (metric) to NEMA. The default setting is IEC.

Note

The following restrictions apply to converter-driven motors (VSD):

- At the present time, for converter-driven motors (VSD), where onboarding was performed with an SIDRIVE IQ Fleet Version < V2.4, calculation of the torque and electric power consumption is not supported.
- The slip frequency displayed may differ from the actual slip frequency due to the system.

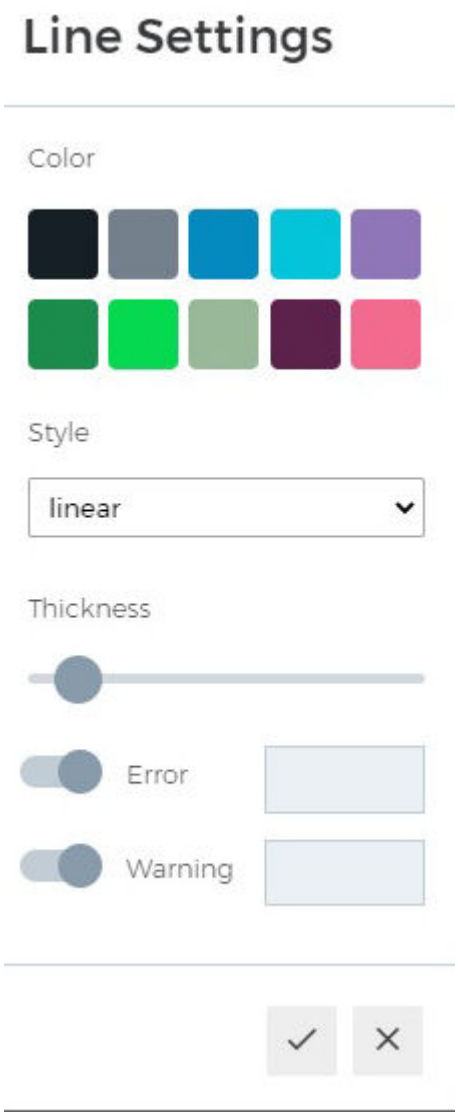
5.3.3.2 Editing a graph

You can change the color coding, line width of the graphs and the display mode.

The settings for the relevant signal are stored in the web browser memory of your local computer. The stored settings are retained for future logins.

Procedure

1. Select a signal.
2. Click the "Pencil" button.
   The edit dialog is opened.



3. Select a color.
4. Select a display mode.
5. Select a line width.
6. Activate/deactivate the display of lines for faults and warnings (if limiting values are configured for the measured values of the asset).

5.3.3.3 Select the display period

You can select how the required measured values are displayed using the following settings:

- Timezone user (user, asset, coordinated universal time)
- Predefined time periods (last year, last month, last week, last 24 h, today)
- Freely selectable time period (Others): For a freely selectable time period, select a start and end time

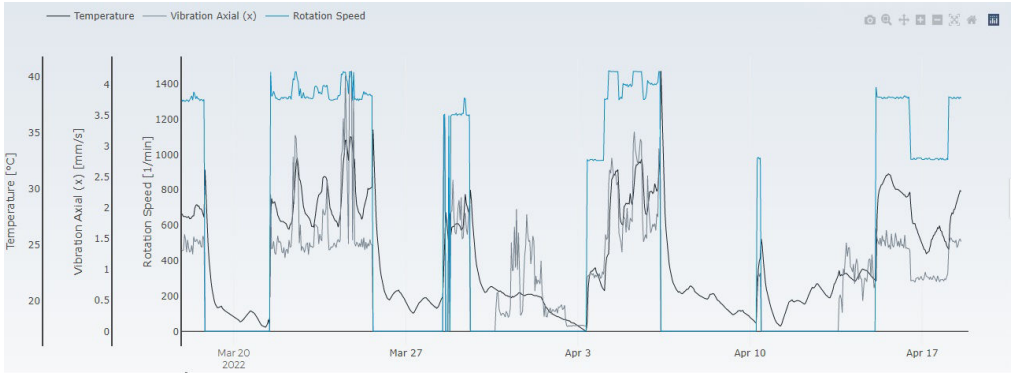
The last time period selected is stored in the web browser memory of your local computer. The stored time period is retained for future logins.

5.3.3.4 Refining the display period

The display area of the selected measure values is split up into 2 different segments:

- Graph with time axis and value axis/axes
- Separate window for the zoom function

The following figure shows the display area of the signals with graph and separate window for the zoom function:



Using the "Zoom" function in separate window

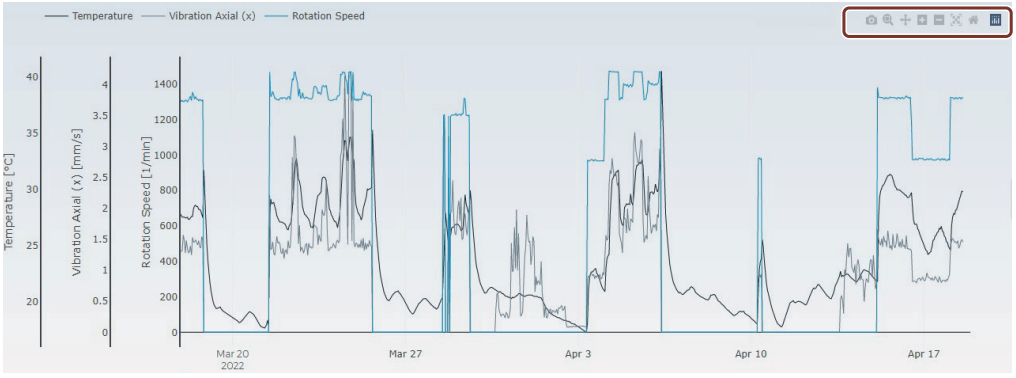
As default setting, the separate window and the graph show the time period that you have defined. You can use the "Zoom" function in separate window to display the graphs in more detail.

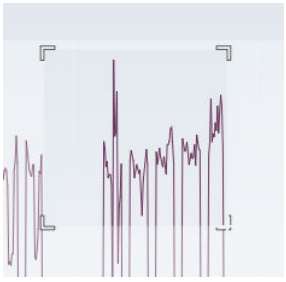
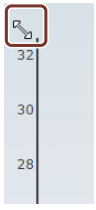
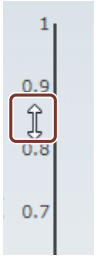
1. Select a specific display time period.
2. In the separate window, limit the time period by shifting the start and end of the separate time range using the mouse.

   The display time period in the graph only shows the selected zoom range. You see the zoomed-in time period that you are presently viewing in the separate window.
3. To view the complete display range again, define a new time period (Page 73).

5.3.3.5 Chart-menu bar

You can adapt the Chart display using the display options. The functions are described below:



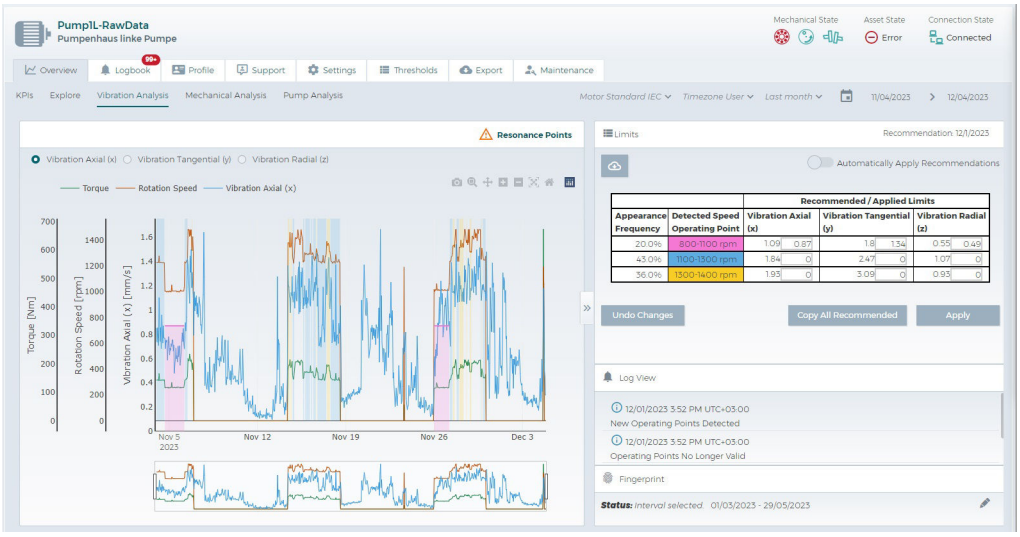
	Download plot Saves the recording as a jpg file in the "Downloads" folder on your local PC.
	Zoom In this mode, you can mark a range in the chart using the mouse. This range is enlarged. This mode is pre-selected when opening the chart view.  You can increase or reduce the chart size by moving the mouse pointer up or down along the Y axis.  You can restore the original display by double-clicking on the diagram or by clicking on button "Reset axes".
	Pan In this mode, you can shift the chart along the X or Y axis. You can also shift the individual signals along the Y axis by moving the mouse pointer to the left hand side of the signal, and then pulling in the required direction. 
	Zoom in Zoom - enlarge
	Zoom out Zoom - reduce
	Autoscale Automatic scaling of the data in the record.
	Reset axes Reset of the axes (undoes zoom and pan actions) You can restore the original display by double-clicking on the diagram.
	http://plotly.com (https://plotly.com/)

5.3.4 Tab "Overview" - vibration analysis

Note

The "Vibration Analysis" view is visible for VSD and DOL motors.

The SIDRIVE IQ Fleet Analytics System analyzes the operating data of VSD and DOL motors and recommends vibration limit values. The system identifies up to three of the most frequent motor operating points. It is expected that DOL motors have just one operating point. Vibration limits are suggested for each operating point. As soon as these limit values are applied, the vibration data points are compared with the applied limit value for the corresponding operating point.



Note

- Note "No operating point found" is listed in the table if the SIDRIVE IQ Fleet Analytics system was not able to identify any operating point. The reason for this could be an insufficient data volume. The results are displayed as soon as sufficient data is available to identify the operating points.
- The SIDRIVE IQ Fleet Analytics System regularly evaluates and updates the operating points and the recommended limit values.
  The recommended limit values are applied automatically if you activated "Automatically Apply Recommendations". This is activated by default and the recommended vibration limits are applied and the vibrations for various operating points are automatically monitored.
  If you deactivate "Automatically Apply Recommendations", you must adhere to the recommended vibration limits and apply them manually. In this case, you will receive corresponding info notifications in the logbook about changed operating points and/or changed limit value recommendations:
  - New Operating Point Detected
  - Operating Point No Longer Valid
  - Recommended Vibration Limit Changed
  - Operating Point Changed

Chart

Three signals are preselected in the chart:

- Torque
- Speed
- One of three vibration signals:

When required, you can change the display by selecting the appropriate signal.

The background color of the diagram sections is identical to the colors of the most frequent operating points in the table for this time period.

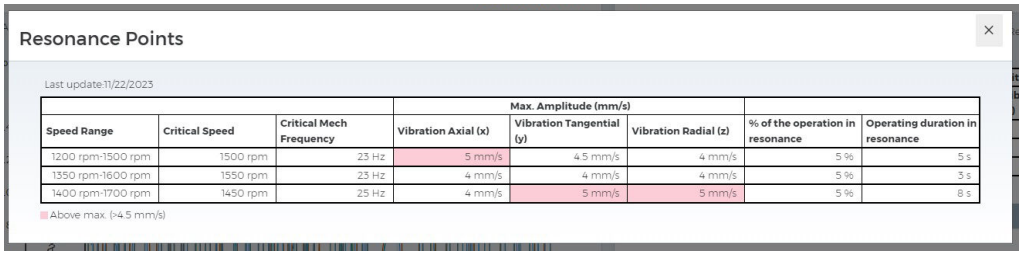
The height of the colored background corresponds to the applied limit of the selected vibration signal.

Resonance points

The assets are analyzed for possible operation in mechanical resonance in relation to the vibration values.

Resonance Points	No resonance range was detected during the 6-month operating time of the motor. In the meantime, further data is being collected and trained. It is recommended to check this again at a later date.
Resonance Points	One or more resonance areas have been detected. Click on the button to display detailed information on the resonance points. In this view, the speed ranges that cause mechanical resonances on the motor are displayed. Avoid operation under these resonance conditions as far as possible in order to extend the service life of the motor.

The following window is displayed via the "Resonance Points" button.



- Speed range: The speed range that caused the resonance
- Critical speed: Speed determined at the resonance peak
- Critical mechanical frequency: Mechanical frequency at the resonance peak
- Maximum vibration amplitude: The maximum vibration measurement in the corresponding resonance range.
- Share (%) of the operation in resonance: The percentage of motor operation in this resonance range in relation to the operating time of the motor (last 6 months).
- Duration of operation in resonance: Duration in minutes in which the motor was in operation in this resonance range (last 6 months).

Note

Generally, up to three different resonances can be displayed. If resonances are detected in various vibration axes and the critical mechanical frequencies are very close to each other, resonance points from different axes are combined to form one resonance. If more than three resonance points were detected, only the three resonance points with the highest vibration amplitude are selected and displayed.

Note

The speed range is an estimate based on the vibration response. If not enough data is collected for all speeds around the critical mechanical frequency, the speed range estimate may be inaccurate. The calculated speed range is merely an interval in which the vibration values are higher than the standard and higher than in normal operation and should therefore be taken out of operation if possible.

Limits

The operating point algorithm provides a recommendation for the vibration signal limit values for the corresponding operating points.

The recommended limit values only become active if you accept these.

- Identified speed operating point:
  The speed range of the corresponding operating point. Operating points are identified based on this range. The background color of this cell is used in the diagrams to display the associated time periods during which the motor was operated.
- Frequency of occurrence:
  The percentage that the operating point occurs over the complete time period of the analysis.
- Suggested / applied limit values:
  The operating point algorithm displays a recommended limit value for each axis of vibration. You can apply the suggested limit values or enter your own limit values. If you do not enter a value, then the limit value monitoring for these operating points is not active.

Log view

In the log view, all logs for vibration analysis are listed.

Fingerprint

Here you can define fingerprint time intervals (Page 80).

5.3.4.1 Entering limit values

You can define limit values if no limit values have been entered. Alternatively, you can accept the limit values suggested by the SIDRIVE IQ Fleet Analytics System (Page 79).

Procedure

1. Enter the limit values in the entry fields.
2. Click on "Apply".

Result

The system uses the entered values to monitor vibration levels at the operating points.

5.3.4.2 Applying suggested limit values

Proceed as described below to apply the suggested limit values.

Procedure

1. Click on "Copy all suggested". All suggested values are copied to the entry fields.
2. Click on "Apply".

Result

The system uses the recommended values to monitor vibration levels at the operating points.

Note

In the case that limit values are violated, the system generates a "Warning" notification "Vibration Anomaly Detected", see tab "Logbook" (Page 88).

5.3.4.3 Changing limit values

You can change limit values at any time if you identify that the monitoring limit is too close or too far away. Proceed as described below:

Procedure

1. Enter the appropriate limit values in the entry fields.
2. Click on "Apply".

Result

The system uses the changed values to monitor vibration levels at the operating points.

Note

In the case that limit values are violated, the system generates a "Warning" notification "Vibration Anomaly Detected", see tab "Logbook" (Page 88).

5.3.4.4 Deleting limit values

You can delete the corresponding limit values if you wish to stop vibration monitoring at the operating points. To do this, proceed as described below.

Procedure

1. Delete the corresponding entry field values.
2. Click on "Apply".

Result

The system stops vibration monitoring for the deleted cells.

5.3.4.5 Fingerprint-time interval

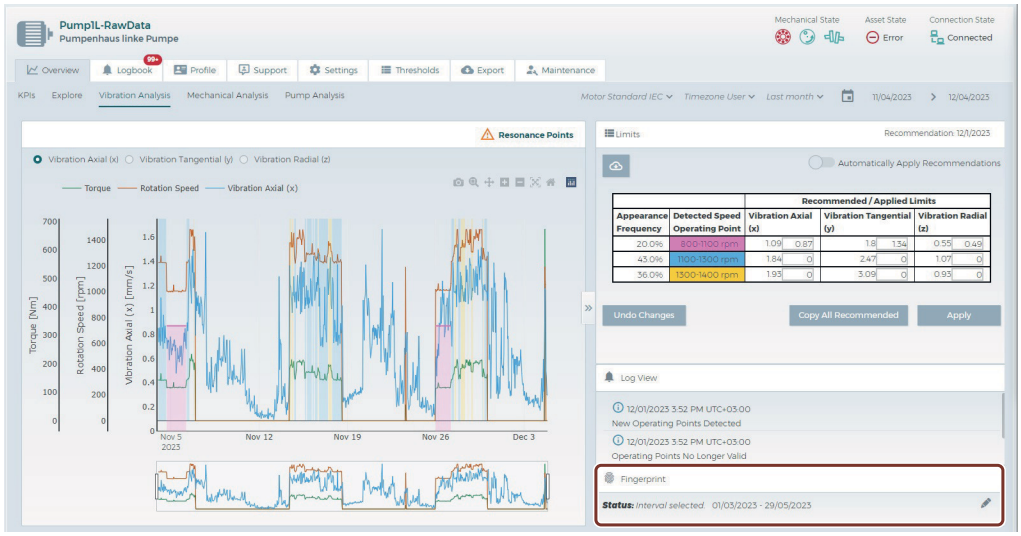
You can define a fingerprint-time interval for your plant/system data to specify the time period for normal operation of the motor. The data within the fingerprint time interval are used for the extended condition analysis and anomaly detection of the motor. The fingerprint time interval can also be used for the "generic vibration monitoring".

The following preconditions must be fulfilled:

- The fingerprint-time intervals must be longer than two weeks and shorter than three months.
- In the selected interval, the number of data points of vibration axial(x) must be more than 20,000.
- In the selected interval, the number of data points of the slip frequency must be more than 6,000 (does not apply to "generic vibration monitoring").

Procedure

1. Click on icon to select the time interval of normal motor operation.
2. Confirm the selection with "Save".



5.3.4.6 Log view

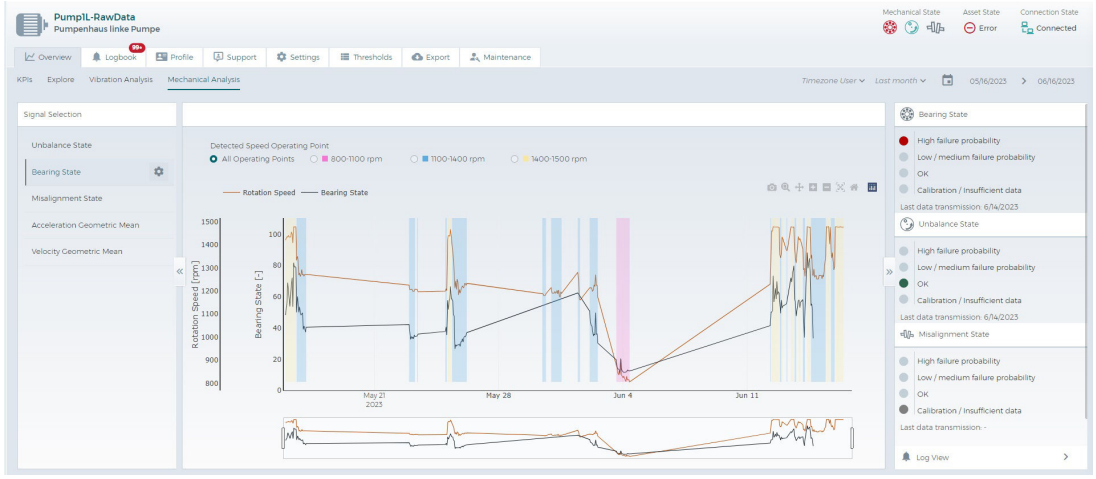
In addition to graphically displaying the measured values, in column "Logbook" messages, alarms and warnings are displayed in a chronological sequence.

With the arrow keys << or >> to the right of the coordinate system you can show or hide the right display area.

5.3.5 Tab "Overview" - Mechanical analysis

The system analyzes and monitors the mechanical status of your motor. You receive an appropriate warning via SIDRIVE IQ Fleet if the probability of damage increases.

The details are displayed in view "Mechanical Analysis":



If the motor is a VSD motor and the most frequent operating points could be detected, the background color of the chart sections is identical to the color of the most frequent operating point for this time period. The operating points and their colors are shown in the legend.

Available signals

- **Bearing status**
  The index value represents the bearing status. This is calculated a maximum of once per day. The characteristic over a time period of several weeks indicates how the bearing status is developing.
  The absolute quantity of the index value can vary between various motor types and their specific applications. However, a continuous increase of the characteristic value over a period of time extending from one or several months indicates that the bearing status is deteriorating.
  Apply the appropriate measures, in combination with the traffic light and generated logs.
  The index value can depend highly on the operating point (motor speed).
  In the chart view, the index value is preselected as main result of the bearing status analysis.
- **Unbalance status**
  Signal "Unbalance Status" displays a time series. The absolute signal amplitude depends on your specific application. As a consequence, the amplitude alone is not an indicator. Unbalance can develop over time, can occur as a result of incorrect maintenance or changes to the motor or the application.
- **Misalignment State**
  Signal "Misalignment State" displays a time series. The absolute signal amplitude depends on your specific application. As a consequence, the amplitude alone is not an indicator. Misalignment can develop over time, can occur as a result of incorrect maintenance or changes to the motor or the application.
- **Speed (rpm)**
  Rotational speed of the motor during the set period.
  This signal is preselected in the chart view to assign identified operating points.
- **Acceleration, geometric mean value (mm/s2)**
  Geometric mean value of the measured vibration acceleration over the set time period. Based on this signal, general vibration trends can be identified and compared with the bearing status characteristic value.
  The signal can depend highly on the operating point (motor speed).
- **Velocity geometric mean (mm/s)**
  Geometric mean of the calculated vibration velocity over the set time period.
  Based on this signal, general vibration trends can be identified and compared with the bearing status characteristic value.
  The signal can depend highly on the operating point (motor speed).

Status traffic light

Traffic light colors	State	Description
Red	Critically high probability of a fault	Condition is critical. Large increase in the condition value has been detected. Probability of a sudden failure is high. Check the motor on site.
Orange	Low to medium probability of a fault	A deterioration of the condition has been detected, and the probability of failure has increased. The probability of sudden failure is low. Continue to monitor the asset.
Green	OK, no fault detected	A condition model has been trained and the asset is being monitored. No fault was found, and the bearing is in good condition.
Gray	Calibration / insufficient data	The condition model is being recalibrated or there is insufficient data.

More information

- **Last data transmission**
  The date when the last mechanical state analysis was able to be performed.
- **Possible reasons for a mechanical analysis that is not available/not up-to-date**
  You receive a note if the mechanical status analysis is not up-to-date.
  Preconditions for performing the mechanical analysis:
  - SIMOTICS CONNECT 400 firmware version 1.0.3.1 or higher
  - Set the measuring cycle ≥ 5 minutes
  - The motor must be switched on and operated for a minimum of 15 minutes to successfully calculate the bearing status.

  If the mechanical state could not be calculated, although the preconditions have been complied with, export the SIMOTICS CONNECT 400 logs and contact Customer Support.

Note

The mechanical state is calculated if the motor is in the "On" operating state for at least 15 minutes, the configured measuring cycle is ≥ 5 minutes and a SIMOTICS CONNECT 400 Firmware version ≥ 1.0.3.1 is being used.

Log view

All logs that refer to the bearing status and monitoring analysis are displayed here.

5.3.6 "Overview" tab - Pump Analysis

SIDRIVE IQ Fleet offers an analysis of the pump efficiency for motors with the "Pump" application. In the "Pump Analysis" view, you can monitor the energy efficiency of the pump under different operating conditions and compare it with the efficiency of the motor.

Before starting the pump analysis, you must configure the pump specification (of the pump curves).

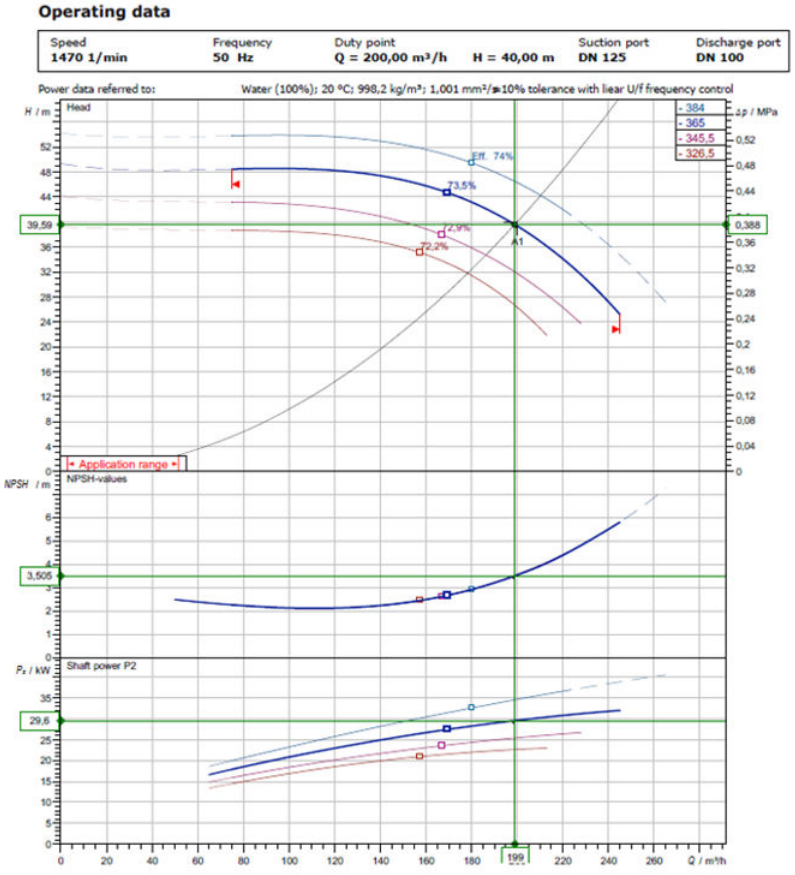
The required pump specification consists of the following values:

- Rated speed of the pump: the speed of the pump to which the specification applies
- The following values are required for 5 points on the pump performance curve:
  - Flow rate (m^3/h): Flow rate of the medium through the pump in cubic meters per hour (if specified in gallons per minute (GPM), it must be converted to cubic meters per hour)
  - Total head (m): Head in meters of the liquid produced by the pump (if specified in feet, it must be converted to meters)
  - Power (kW): Shaft power P2 (in kW) or total braking power (PU, must be calculated from PU in kW)

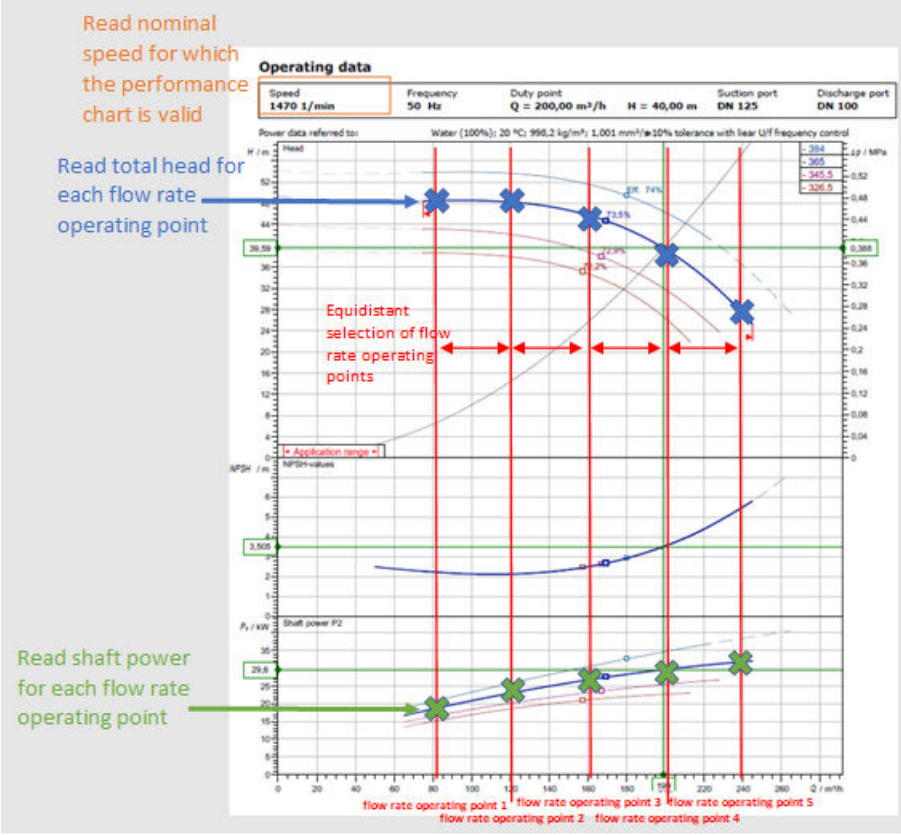
The pump performance is represented using a plotted curve that relates the flow rate to the total head generated. The pump curve is created by the manufacturer under carefully controlled test conditions.

The pump performance curve is almost always presented as head (in m) vs. flow volume (in m^3/h) (or feet vs. GPM), as this provides a general description of pump operation that is completely independent of water temperature or density. Some pump curves show pressure (in Pa) vs. flow rate (in m^3/h) (or PSI vs. GPM or PSI vs. lbs./h). These curves are not general but specific and must be defined in relation to water temperature and density. Pressure curves (in Pa or PSI) are sometimes used to describe boiler feed pumps, but should not be used for pumps for heating and air conditioning systems. The curve between head and flow rate is generally suitable for centrifugal pumps due to its physical properties.

In most cases, these pump specification values can be found on the manufacturer's website. The following figure shows an example of a chart data sheet:

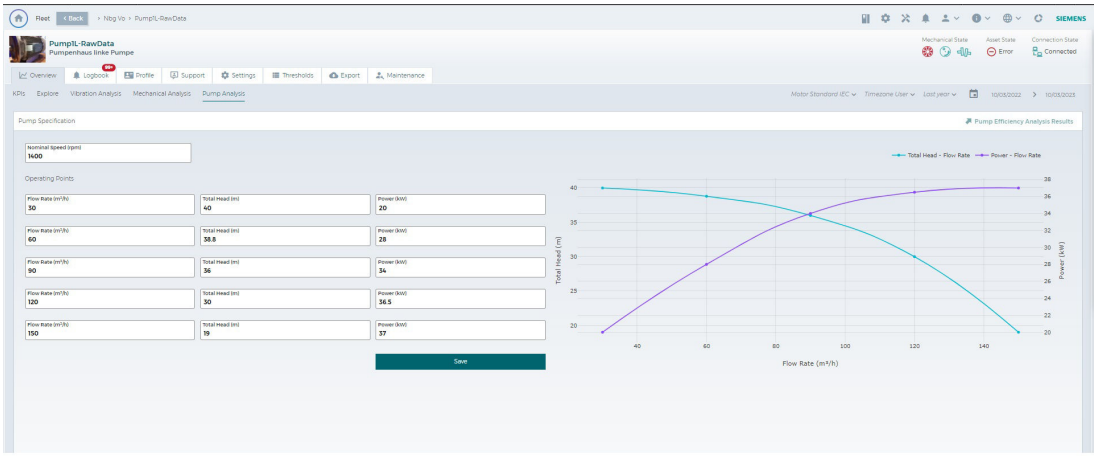


In order to later train a representative model over the relevant flow rate range, the 5 operating points for the flow rate should be selected at equal intervals over the entire flow rate range shown, as in the following example:



Read the values for all 16 input fields as accurately as possible from the table. You will only receive a precise efficiency analysis of the pump if the values entered are correct.

The pump curve is updated while you enter the input values. Be sure to compare the curve with the curve provided by the pump manufacturer.



The information can be updated after saving.

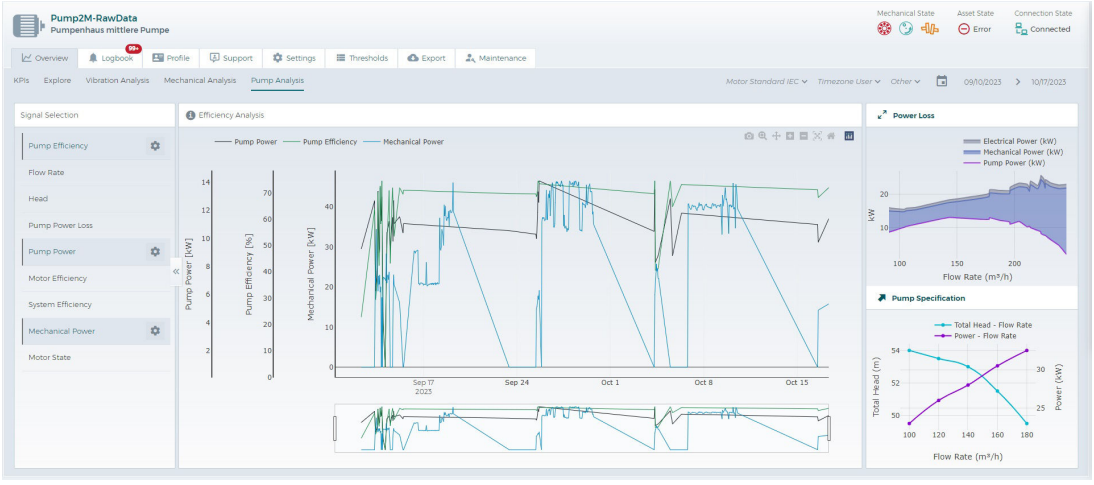
Note

The updated values are applied to the future analysis results only and do not affect the historical analysis of pump efficiency.

After saving the specifications, the "Analysis Result" page is automatically displayed.

Note

The first analysis results are available within 8 hours of the next SIMOTICS CONNECT 400 data transmission for each Electrical Power data point where the motor is in the "ON" state.



Available signals

The analyses contain the following signals over time:

- Pump efficiency (%): Hydraulic power X 100 / shaft power
- System efficiency (%): Overall efficiency of motor and pump (pump efficiency x motor efficiency = hydraulic power x 100 / electrical power)
- Motor efficiency (%): mechanical performance X 100 / electrical power
- Flow volume (m^3/h): As in the specification, but now calculated for all time stamps based on the pump model
- Head (m): As in the specification, but now calculated for all time stamps based on the pump model
- Mechanical performance (kW): Mechanical performance of the motor, equal to the shaft power
- Power loss of the pump (kW): Shaft power – hydraulic power

Note

To create and update the pump specification, you need the SIDRIVE IQ Fleet roles iqfleet.admin or iqfleet.fleetmanager.

Power loss

The power loss diagram is maximized when you click on the Power Loss button in the preview area.

In this diagram you can see the difference between the electrical power consumption, the mechanical power and the pump performance under different flow conditions. You can also change the x-axis to see the performance differences under speed or torque.

Note

You can switch between the "Efficiency analysis" and "Power loss" view at any time. The last view selected applies to the subsequent visualization on the "Pump analysis" tab. The preference is saved in your browser's local memory.

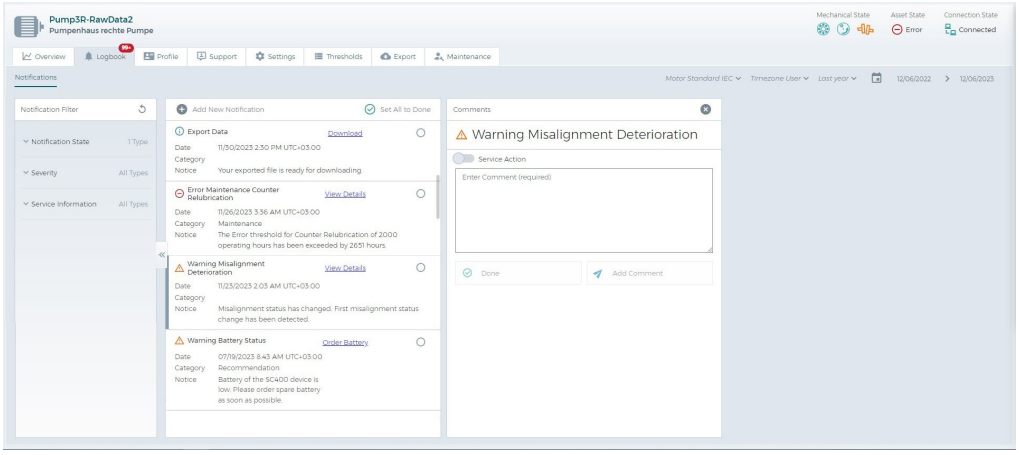
5.3.7 "Logbook" tab

In the "Logbook" tab, you will find an overview of the "Error", "Warning" and "Info" type notifications. There are system-generated notifications as well as notifications you create yourself (Page 92). You can add comments (Page 93) to all notifications.

The entries are sorted chronologically within the selected time range. The list shows the last 20 entries.

Quick links are displayed for some of the notifications generated by the system. The quick links will take you to the relevant page where you can view further details or take direct action.

The following figure provides you with an overview of the "Logbook" tab in the Asset view:



System-generated notifications

The following notifications are generated by the system:

- Thresholds exceeded
  If the warning or error thresholds (Page 101) you have defined for a signal are exceeded, corresponding "Warning" or "Error" notifications are generated.
  Example:
  For the "Temperature" signal of Asset_X, 30 °C is defined as the warning threshold and 35 °C as the error threshold.
  - Values above the warning threshold (30 °C > t ≥ 35 °C) trigger a "Warning" notification.
  - Values above the error threshold (t > 35 °C) will trigger an "Error" notification.

  Note

  For vibration signals (e.g. "Axial vibration (x)"), the system only generates an "Warning" and/or an "Error" notification if two or more consecutive values lie above the threshold.

- Battery replacement recommended
  The battery status of the SIMOTICS CONNECT 400 connectivity module is monitored.
  - If a "Warning" notification is issued, you should order replacement batteries.
  - If an "Error" notification is issued, you should replace the batteries.
- Export file completed
  If you started exporting an asset's data (Page 103) in the "Export" tab, an info notification will be created after the export request has been successfully processed.
  When you receive this notification, you can download the exported files in the "Export" tab.
- Vibration model trained
  The system has completed the vibration model training for vibration monitoring. After receiving the "Info" notification, the system can detect vibration model deviations.
- Operating points
  For VSD motors, the system identifies the most frequent operating points and the associated vibration limits that the system suggests. Anomalies are detected.

- Vibration anomalies are detected
  During vibration monitoring, the data analysis system detected one or several anomalies.
- Maintenance counter exceeded
  With SIDRIVE IQ Fleet you can configure counters to monitor maintenance activities for motors, for example, relubrication, external fan maintenance, bearing replacement and/or your customer-specific maintenance activities (see Activating/deactivating the maintenance counter (Page 108)).
  The following applies to every activated counter:
  - When the number of operating hours that you defined as alarm level is reached, then an "Alarm" notification is output for the corresponding maintenance counter. This "Alarm" notification indicates that you should plan the pending maintenance activity.
  - When the number of operating hours that you defined as fault level is reached, then an "Fault" notification is output for the corresponding maintenance counter. This "Fault" notification indicates that the corresponding maintenance activity was not performed on time.
- Analysis model trained / monitoring active
  The system was able to capture sufficient data and the analysis model is being trained. After receiving this "Information" notification, the system monitors the condition and informs you of any deterioration.
- Resetting the mechanical status
  As a result of a change made by the user, the analysis model must be reset (e.g. after maintenance has been performed). In this case, the model must be recalibrated. Monitoring only becomes active once the training has been completed.
- Deterioration of the mechanical condition
  The system identifies a change of status, which implies mechanical damage with a low fault probability (alarm) or with a high fault probability.
- Resonance detection
  The system has detected a mechanic resonance.

5.3.7.1 Filter notifications

You can filter notifications according to categories "Notification status", "Asset State" and "Service information".

Procedure

You can filter the notifications as described below:

1. Limit the display period for all entries, e.g. "Last month".

2. Filter the entries by notification status.

Icon	Description
Open	Status of the notification "Open": Displays all entries that have not yet been acknowledged.
Done	Status of the notification "Done": Displays all entries that have been acknowledged.

3. Filter the entries by Asset State.

Icon	Description
Error	Asset status "Error": Displays all entries that indicate an error.
Warning	Asset state "Warning": Displays all entries that indicate a warning.
Info	Asset state "Info": Displays all entries where a remedy was saved.

4. Filter according to service information.

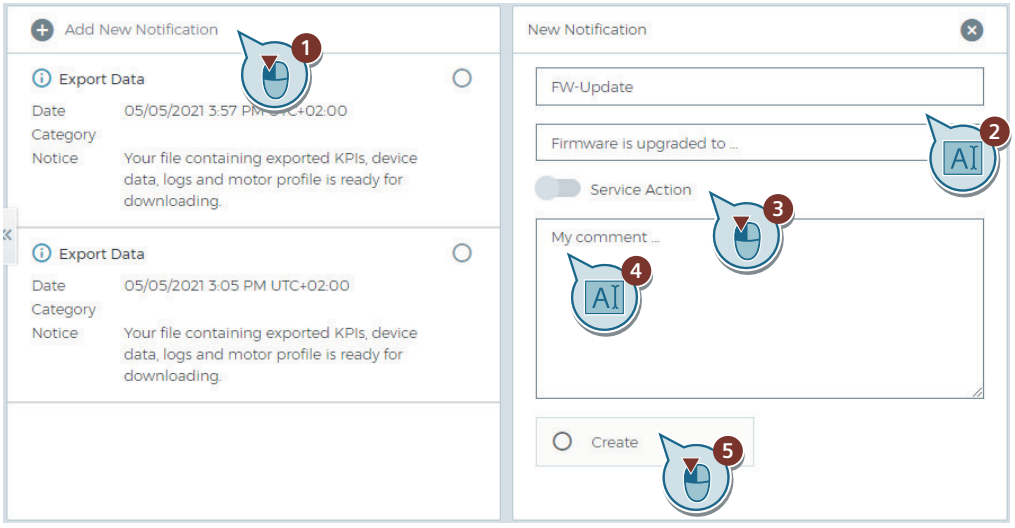
Icon	Description
Service	"Service": Displays all entries whose comment is marked as a "Service Action" (see Creating notifications (Page 92))

5. Reset the filter criteria.

Icon	Description
All	Reset set filters of the corresponding category.
	Reset all filters.

5.3.7.2 Creating notifications

You can create "Info" notifications to document maintenance activities, e.g. motor service or firmware update of the SIMOTICS CONNECT 400 connectivity module.



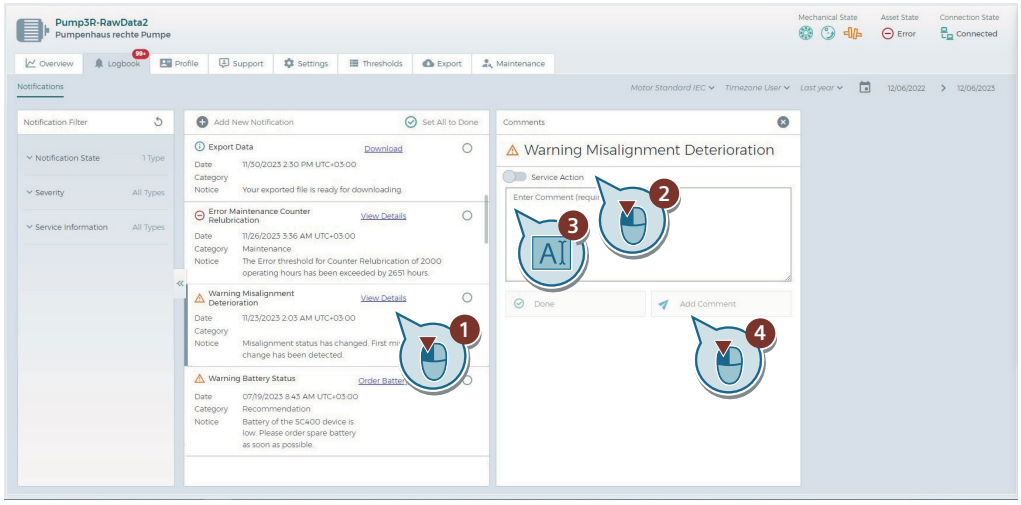
Procedure

Proceed as follows to create a new notification:

1. Click on the "Add new notification" button. The "New notification" dialog is displayed.
2. Enter a title and remark (mandatory fields).
3. Optionally activate "Service Action" if the notification is a service action of a motor.
4. Optionally enter a comment.
5. Click the "Create" button. The "Info" notification is displayed in the overview.

5.3.7.3 Creating and editing comments

You can add comments to all notifications, e.g. to comment on activities performed or specific problems, and also to inform other users. Comments are stored with the user's email address and the date of the comment entry.



Procedure

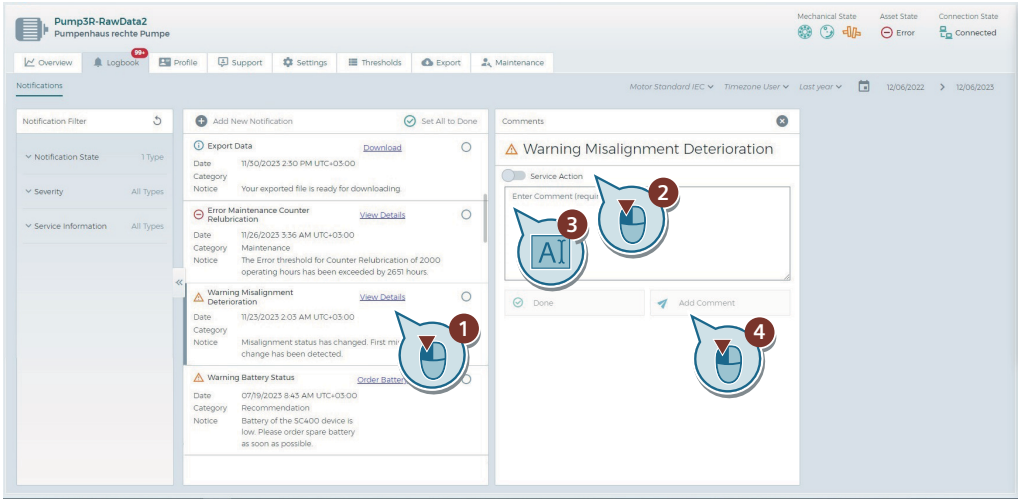
Proceed as follows to create or edit a comment:

1. In the overview, click on the notification for which you want to create a comment. The "Comment" dialog is displayed on the right side. If there are several comments, they are arranged chronologically.
2. Optionally activate "Service Action" if the comment is a service action of a motor, e.g. if you have replaced the bearings of the motor or performed a main inspection of the motor.
3. Enter the comment text (mandatory field), e.g. with general information or remedies.
4. If you only want to add the comment to the selected notification, click the "Add Comment" button.

You can change the status of a notification by clicking on the "Done" or "Reopen" button.

5.3.7.4 Acknowledging notifications

You can mark notifications as "Done". This acknowledges a notification.



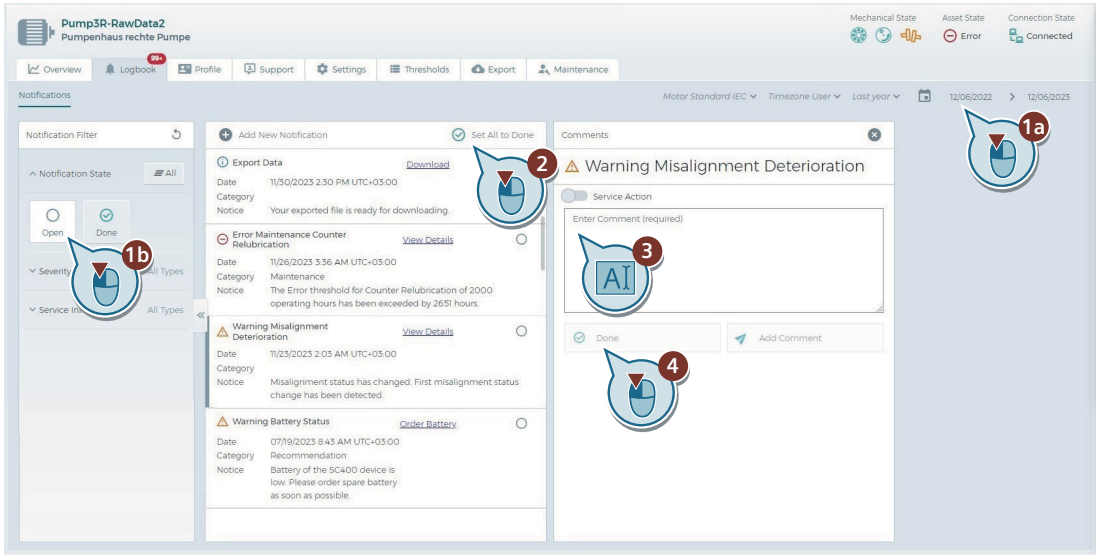
Procedure

Proceed as follows to acknowledge a notification:

1. Click on the notification to be acknowledged in the overview. The "Comment" dialog is displayed on the right side.
2. Optionally activate "Service Action" if the comment is a service action of a motor, e.g. if you have replaced the bearings of the motor or performed a main inspection of the motor.
3. Enter the comment text (mandatory field), e.g. with general information or remedies.
4. Click the "Done" button to acknowledge the notification.

5.3.7.5 Acknowledging all notifications

You can mark all open notifications, which correspond to the filter criteria, as "Done". This means that these are then acknowledged.



Procedure

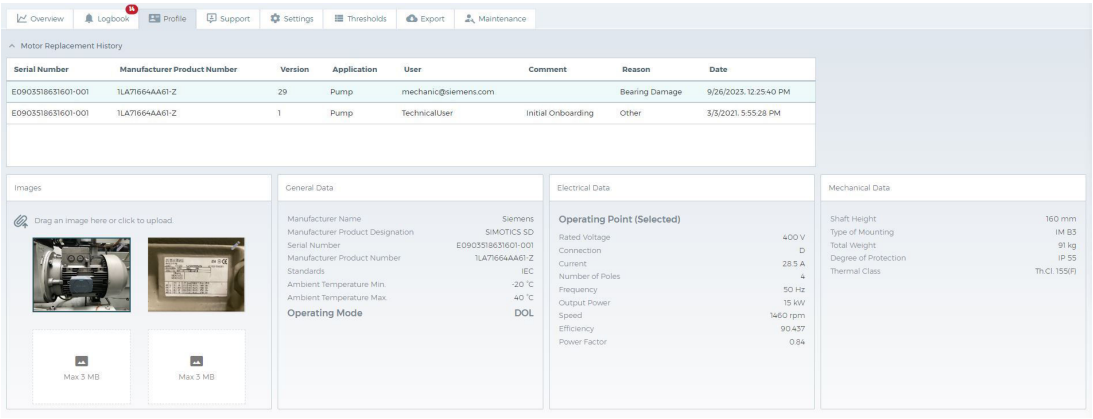
Proceed as described below:

1. Adapt the time interval (1a) and the filter criteria (1b) so that the notifications to be acknowledged are listed.
2. Click on "Set all as done".
3. Enter a comment.
4. Click on "Done" to acknowledge all listed notifications that are open.

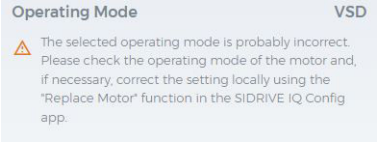
5.3.8 "Profile" tab

The rating plate data of the specific asset are displayed under the "Profile" tab. You can extend the "Motor versioning history". The data are displayed for the selected motor version in the "Profile" tab.

The following diagram provides you with an overview of the "Profile" tab in the Asset view with extended motor versioning history:



When onboarding the motor, the operating mode set in SIDRIVE IQ Config (VSD or DOL) can be seen in column "General Data". The operating mode is detected based on the motor stator frequency. The following message is displayed if the set operating mode differs from the detected operating mode.



SIDRIVE IQ Fleet checks the operating mode on a monthly basis, and automatically updates it if a motor is changed.

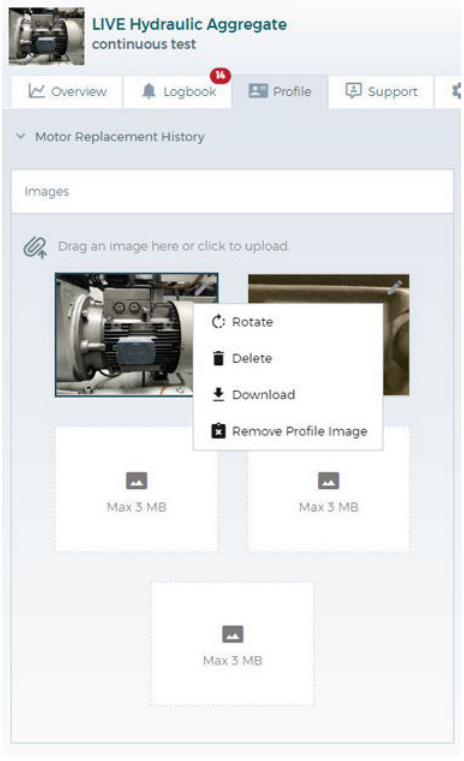
Managing images in the "Profile" tab

In the "Profile" tab, you can upload images for the asset. The image appears in the asset header of the asset view and in the "Profile" tab of the "Images" area. If you do not upload an image, the motor icon is displayed in the asset header by default.

You can drag and drop the image into the image area or upload it by clicking the corresponding text in the image area. You can add up to 5 images, each image is limited to 3 MB. The system supports the formats "*.png", "*.jpg" and "*.jpeg" for images. You can upload only one image at a time. With the pencil icon on each image you can rotate, delete, and download the uploaded image. You can also set an image as a profile image or remove it. A profile image is displayed as the first image in the image area.

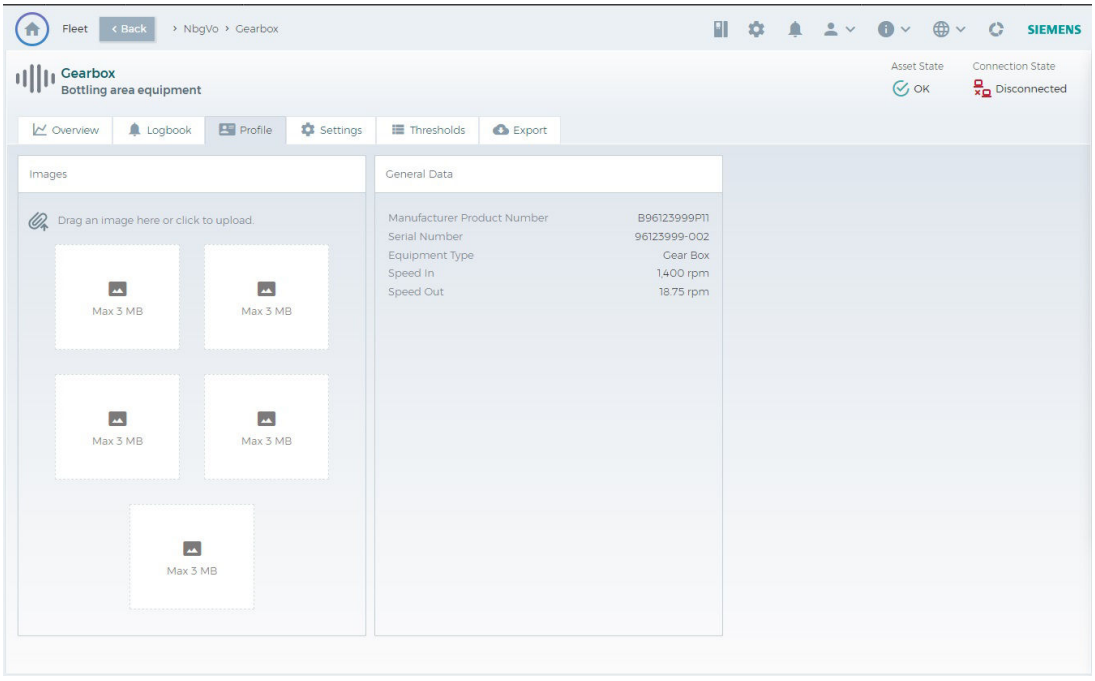
The images are rotated clockwise by 90 degrees for each rotation. When you click on an uploaded image, the image is displayed in full resolution.

To use the functionality, note the necessary SIDRIVE IQ Fleet roles in the Activating the Insights Hub user account (Page 28) section.



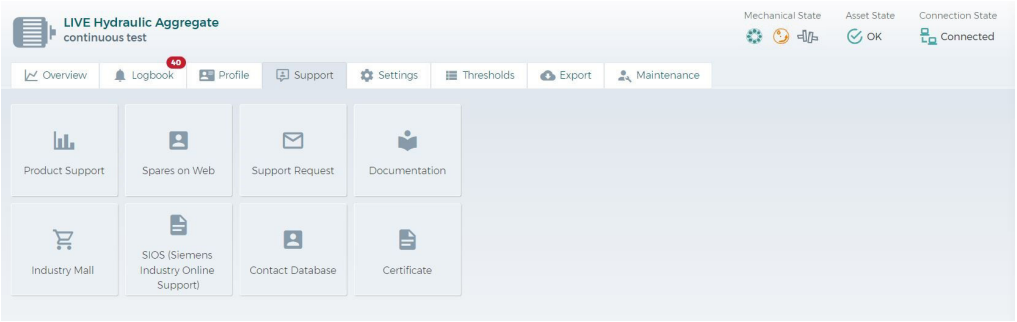
Generic vibration monitoring

The following information is displayed in tab "Profile" if you have configured "Generic vibration monitoring" for an asset.



5.3.9 "Support" tab

Product documentation and different ways to establish contact are listed under the "Support" tab. The following figure provides you with an overview of the "Support" tab in the Asset view:



The following support options are available to you in the "Support" area:

- Product Support
- Spares on Web
  The serial number and the manufacturer's Article number are automatically transferred to Spares on Web to determine the spare parts.
  The display appears as soon as the motor is available in Spares on Web.
- Support Request
  The Siemens Internet page "Support Request" opens. Based on the product name or the order numbers and additional keywords to define your question, you reach the appropriate FAQs and forum topics or the login for the Siemens "Support Request" Internet page.
- Documentation
  You can search for Siemens motor manuals and download these.
- Industry Mall
  On the Siemens Internet page "Industry Mall" you can order Siemens components and software based on their product names or their order numbers.
- SIOS (Siemens Industry Online Support)
  On the Siemens Internet page "SIOS" you can download Siemens documents and software updates.
- Contact Database
  The Siemens Internet page "Your Personal Contact" opens. Authorize the Internet page to acquire your location or enter your location manually. A world map shows your local Siemens contact.
- Certificates
  You can search for certificates for Siemens motors and download these.

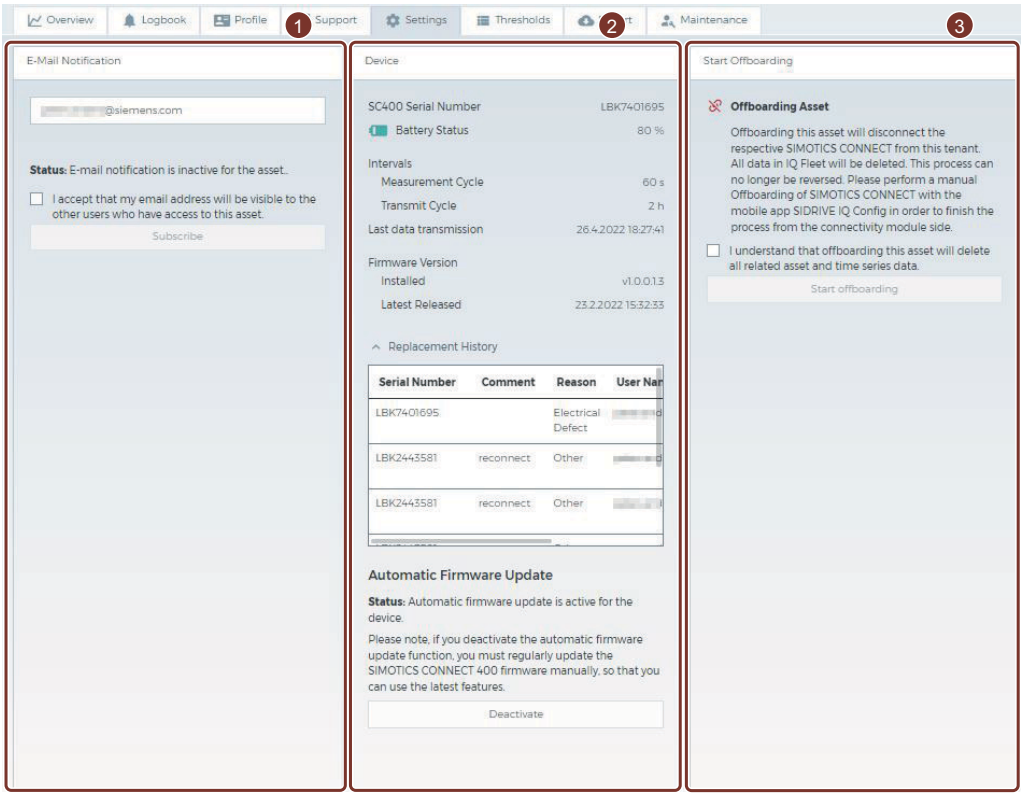
5.3.10 "Settings" tab

In the "Settings" tab, you can log on for email notifications ①. You will receive email notification if the limit values that have been configured for the selected asset are exceeded, or if faults and/or warnings for the asset are active.

In addition, the SIMOTICS CONNECT device data is displayed in the "Settings" tab ②:

- SC400 serial number: Shows the serial number of the SIMOTICS CONNECT 400 device.
- Battery Status: Calculated battery capacity as a percentage.
- Interval
  - Measurement Cycle: indicates the interval at which the measurements are taken.
  - Transmit Cycle: indicates how often the data exchange between SIMOTICS CONNECT 400 and SIDRIVE IQ Fleet takes place.
- Last data transmission: Indicates the date and time when the data was transferred from SIMOTICS CONNECT 400.
- Firmware version
  - Installed: Displays the firmware version installed on the connectivity module.
  - Released version: If you do not have the latest firmware version installed on the connectivity module, the latest version with release date is displayed here.
  - Update status: If you do not have the latest firmware version installed on the connectivity module, the status of automatic firmware update with date and time is displayed here.
- Replacement history
  - Serial number: Serial number of the SIMOTICS CONNECT 400 device.
  - Comment: User comment
  - Reason: Reason for replacing the module
  - User name: Email address of the user who carried out the replacement
  - Date: Date of module replacement
- Automatic firmware update:
  - Status: Displays the current activation status for the automatic firmware update.
  - To activate the automatic firmware update, you required the "iqfleet.admin" role. Activation takes place for the selected asset. For activation, you must read and accept the software update terms and conditions. You can deactivate the automatic firmware update at any time.

You can delete the asset and its complete history using button "Start offboarding" ③.
You cannot undo this action. By offboarding an asset from SIDRIVE IQ Fleet, the allocation becomes free if you wish to analyze another motor, for example. To complete offboarding on the SIMOTICS CONNECT 400 connectivity module side, you should perform the offboarding using the mobile "SIDRIVE IQ Config" application.



Procedure for the activation of email notifications

1. Open the asset overview.
2. Click on the required asset in the asset overview.
3. Open the "Settings" tab.
4. Select the "Subscribe" button to activate the email notification.
   After activation, you will receive notifications about the asset in the following cases:
   - Relubrication is recommended for the motor
   - Configured thresholds (see "Thresholds (Page 101)" tab) were exceeded
   - Battery replacement for the SIMOTICS Connect 400 connectivity module is recommended
   - The connection state of the asset has changed
   - Export file completed

Note

The number of email notifications you can receive per month is limited by your account's notification quota. Note the notification quota when activating email notification.

Note

Security measures

The Insights Hub Notification Service, which is used to transmit messages via the Internet, is used for sending email messages. The transmission of data via the Internet (untrusted channel) generally entails a residual risk regarding the confidentiality of data. Insights Hub provides notification emails sent to the user with a digital signature. Verify the digital signature of email messages you receive from Insights Hub.

Offboarding procedure

1. Open the asset overview.
2. Click on the required asset in the asset overview.
3. Open the "Settings" tab.
4. Carefully check that you really wish to delete the asset and the associated asset and time series data. If yes, then activate checkbox "Agreed".
5. Click on button "Start offboarding". The asset is deleted. The asset overview is then displayed.

Note

Authorization

You require the "iqfleet.offboarding" role for Offboarding via SIDRIVE IQ Fleet and via the application SIDRIVE IQ Config. If you do not have this role, then Offboarding is canceled with fault message "Insufficient rights". Contact your Tenant administrator if you absolutely require the offboarding role. If you are the Tenant administrator, ensure that you carefully allocate this role. An "inadvertent" offboarding means that the asset and the associated asset and time series data is deleted and cannot be subsequently recovered.

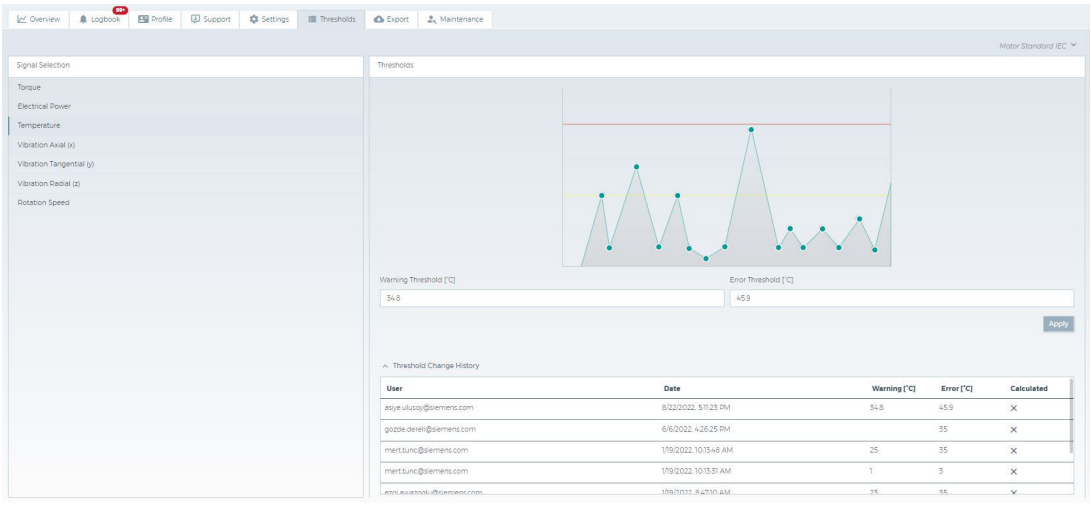
5.3.11 "Thresholds" tab

In the "Thresholds" tab, you can configure a threshold for the output of warning and a threshold for the output of a fault for the respective signals.

Procedure

1. Open the asset overview.
2. Select the required asset in the asset overview.
3. Open the "Thresholds" tab

4. Select a signal in the "Signal Selection" column.



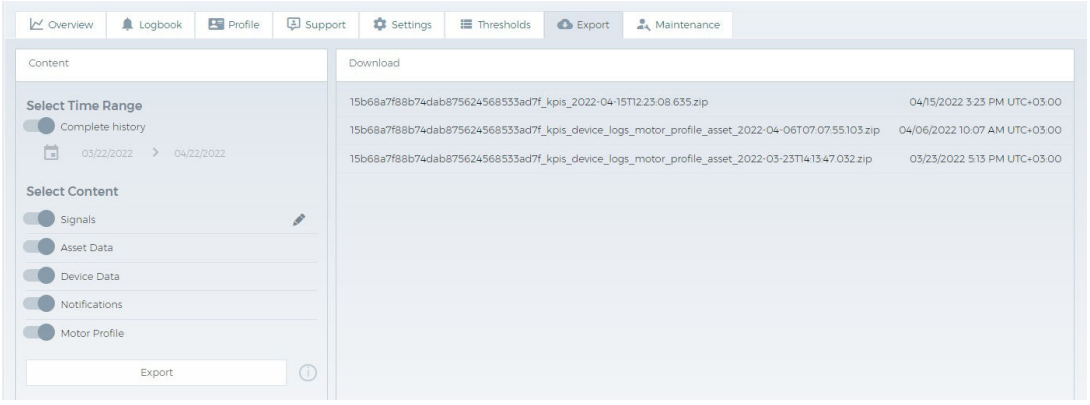
5. In the "Thresholds" column, enter a threshold for the output of a warning (Warning Threshold) and a threshold for the output of a fault (Error Threshold).
6. Confirm your configuration by clicking the "Save" button.
   If a configured asset reaches the defined thresholds, you will either be notified in the form of a warning or a fault message in the logbook of the Asset view. The warning or fault message remains active until you acknowledge the message, even if the measured value has already fallen below the threshold again.
   Furthermore, you can also configure email notifications (Page 98). You will receive an email notification if the thresholds that have been configured for the selected asset are exceeded, or if faults and/or warnings for the asset are active.

Threshold change history

The actual thresholds are displayed in area "Threshold change history". The user that changed the threshold, the date of the change and new fault and warning thresholds are listed. The number of entries in the history that can be saved for each asset signal is limited to 5. If this number is exceeded, the oldest history item is replaced by the new history item.

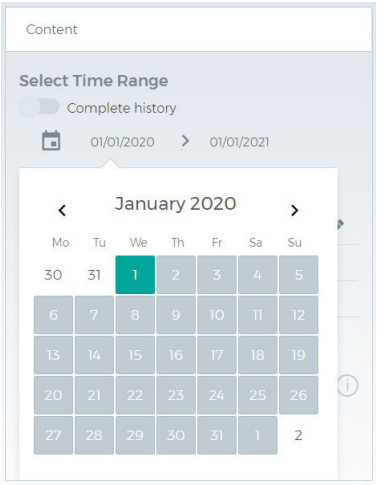
5.3.12 "Export" tab

The "Export" tab allows you to export all of an asset's data to a compressed file and download it to your local computer.

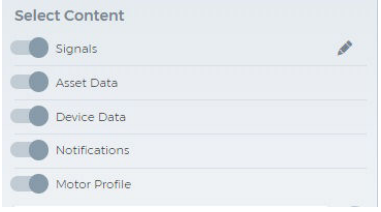


Procedure

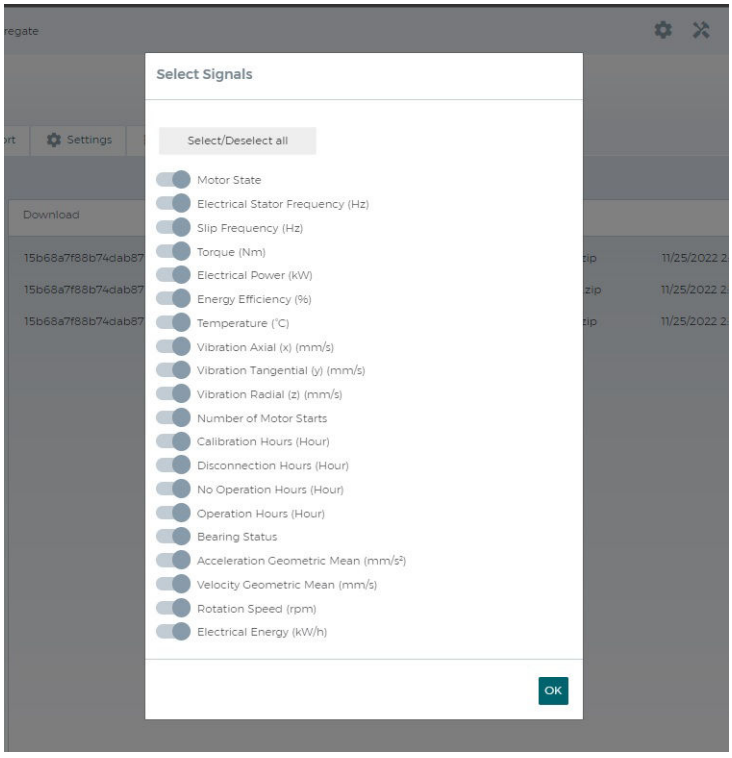
1. Select the time range. Within the defined time range, you can export, among other things, signals (Time Series Data) and logbook notifications.
   The default option is "Complete history". If you disable this, you can select the start and end dates in the calendar. The generation time for the export file depends on the selected time range.



2. Select the contents to be included in the export file.



– **Signals**
By default, the Time Series Data of all signals are included.
If you want to change the selection of signals, click the button .
Activate or deactivate the corresponding signals. Click "OK" to confirm the selection.



Note

IEC/NEMA

For torque, temperature and vibration signals, you can change the unit from IEC (metric) to NEMA. The default setting is IEC.

If you selected the "Signals" option, Time Series Data for each selected signal within the selected time range are exported to a CSV file.

– **"Asset" data**
This option is used to export the asset properties (asset name, description, location, geo-coordinate, onboarding date, application, asset status, connection status and operating mode). The data is exported to a JSON file.

– **Device Data**
This option is used to export the SIMOTICS CONNECT 400 device information (measuring cycle, transmission cycle, firmware version and battery status). If you select the "Device Data" option, the data is exported to a JSON file.

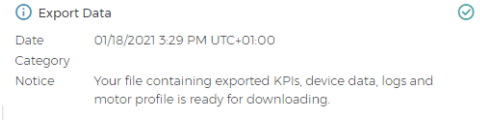
– **Notifications**
This option is used to export the logbook contents. If you select the "Notifications" option, all notifications (info, fault and warning) within the selected time range will be exported to a CSV file.

– **Motor Profile**
  If you select the "Motor Profile" option, the profile data of the motor, including general, electrical and mechanical data, will be exported to a JSON file.

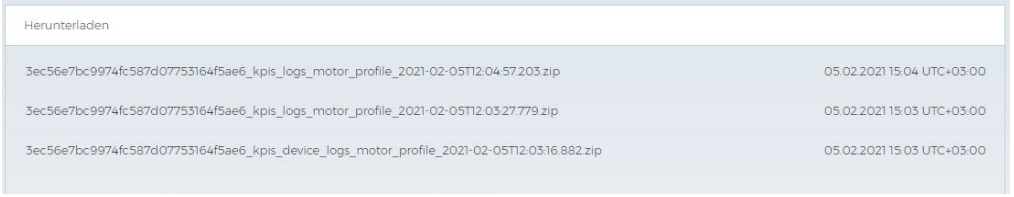
3. Click the "Export" button to start the export.
   For the selected content, the files to be exported are generated and compressed into a single ZIP file for convenient download.

Note

The export request is processed in the background. It may take a few minutes for the file to be ready for download. As soon as the file is available, an info message is displayed in the "Logbook" tab.



4. The exported files are displayed in the "Download" section. Click on the appropriate line to download the file to your local computer.



Note

A maximum of three compressed files per asset can be made available for download at the same time. When this limit is reached, the oldest file is deleted during a new export.

The files are available for download in SIDRIVE IQ Fleet for seven days.

Note

Security measures

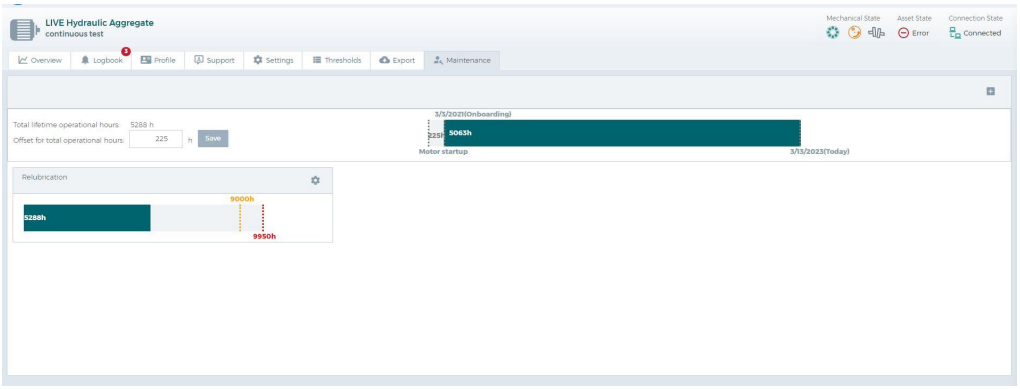
- Ensure that the transport of exported data is secured by technical measures such as encrypted/signed e-mails, encrypted/signed USB flash drives, etc., especially in public areas such as the Internet.
- Store exported data files in the OEM/end customer area in such a way that they are protected from unauthorized access (e.g. on SharePoints, databases, etc. through user management with access data).

5.3.13 "Maintenance" tab

You can configure maintenance counters for tracking certain maintenance activities under tab "Maintenance". Corresponding to the configured intervals for the particular counter, you are notified as soon as the calculated operating hours come close to the scheduled maintenance interval or this was already exceeded.

Note

To configure maintenance counters, you require role "iqfleet.admin" or "iqfleet.servicemanager".



5.3.13.1 Total operating hours

To calculate the total motor operating hours, the hours in which the motor was identified to be in the ON state (since onboarding) are added in SIDRIVE IQ Fleet. This value is also displayed in tab "Overview" - KPIs (Page 67).
You can use of "Offset for total operational hours" as follows:

Using "Offset", you can specify the hours that the motor was already in operation before onboarding the asset in the SIDRIVE IQ Fleet application.

In addition – or as an alternative – using "Offset" you can specify the operating hours during which SIMOTICS CONNECT 400 was disconnected.

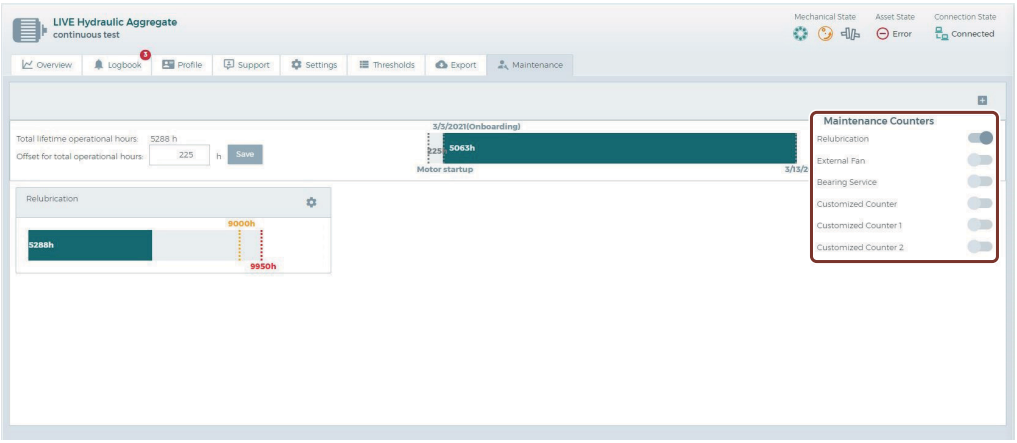
You can edit "Offset for total operational hours" at any time.

Procedure

1. After onboarding, in field "Offset for total operational hours", enter the estimated motor operating hours for the time before the asset was onboarded in the SIDRIVE IQ Fleet application.
   When using a new motor it is expected that initially this value is zero.
   If the SIMOTICS CONNECT 400 connectivity module was disconnected, but the motor was operational for a longer period of time, then you can increase the "Offset" by entering the estimated additional operating time. The monitoring functions take into account the value that is entered.

5.3.13.2 Activating/deactivating the maintenance counter

Using icon in the top right-hand corner, you display the list of maintenance counters. Here you can activate or deactivate maintenance counters.

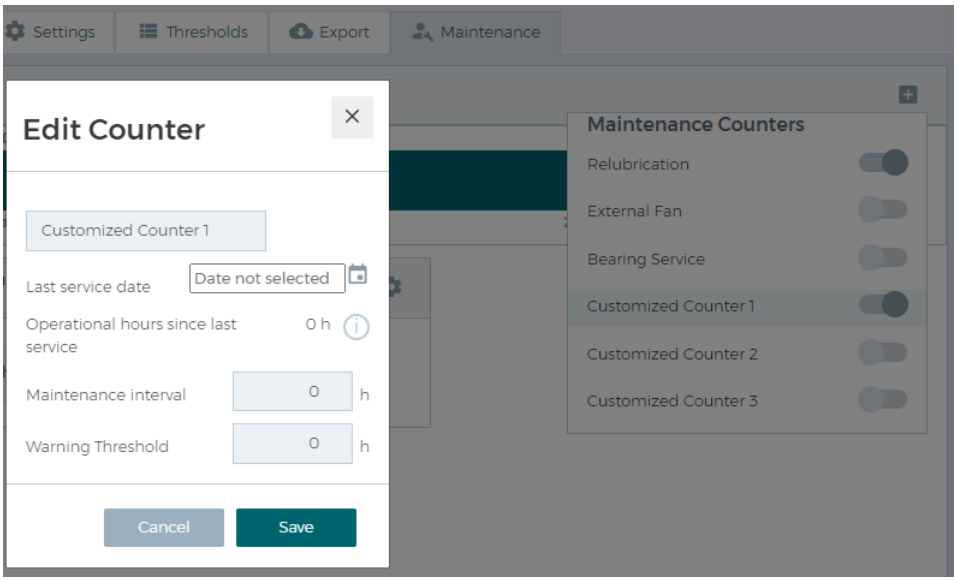


There are 6 counters that you can use to track maintenance activities:

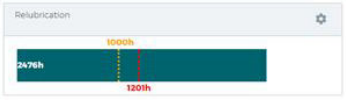
- Relubrication:
  The relubrication counter is automatically activated if relubrication interval information is saved in the digital twin of the asset. You can adapt the interval when required.
  You cannot rename this maintenance counter.
- External Fan:
  This counter is not activated in the default setting. You can activate the maintenance counter by entering the recommended maintenance interval for the external fan of your motor.
  You cannot rename this maintenance counter.
- Bearing Service:
  This counter is not activated in the default setting. You can activate the maintenance counter by entering the recommended maintenance interval for the bearings of your motor.
  You cannot rename this maintenance counter.
- Custom counters 1 ... 3:
  You can define the three user-defined maintenance counters to address the specific requirements of your application.
  You can rename these maintenance counters.

Procedure

1. Activate the required maintenance counter.
2. When activating for the first time, you are requested to enter the "Maintenance interval" and the "Warning threshold" (also see Section Editing counters (Page 109)) .



3. Optionally, you can change the name of the maintenance counter (only for the user-defined maintenance counter) and enter the "Last service date".
   After activation, your maintenance counter is graphically shown under the "Maintenance" tab.

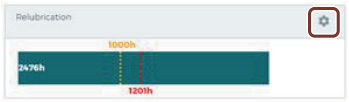


5.3.13.3 Editing the maintenance counter

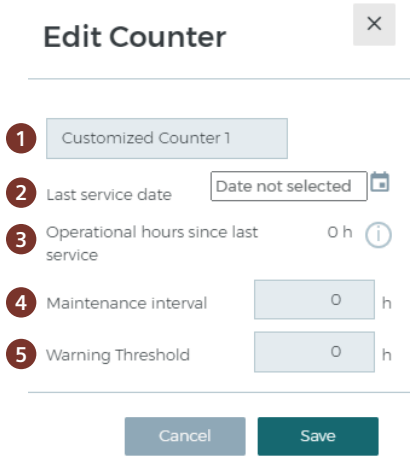
You can edit active maintenance counters (counter name, last service date, maintenance interval and warning threshold), e.g. if the corresponding maintenance activity has been completed. In this case, you should update the "Last service date" with the maintenance date.

Procedure

1. Click on icon to edit an active maintenance counter.



2. Enter the required data in the following dialog.



① Enter/change the name of the customized counter. You can only change the names of the customized counters; the names of the other maintenance counters are fixed and cannot be changed.

② Enter the last service date if the appropriate maintenance work was completed.

③ The "Operational hours since last service" are calculated.

For the calculation, the operational hours from the "Last service date" up to the actual date are added. If the last service date is empty, i.e. the corresponding maintenance work has still not been performed, then the "Total operational hours" for the counter is used.

④ Enter a maintenance interval greater than 0 (e.g. check the external fan after 2000 hours). This value defines the maintenance counter target. A "fault" notification is output if the operational hours since the last service have exceeded the maintenance interval. This error message informs you about a maintenance activity that is overdue.

You receive an email notification if you have activated email notifications (see Section "Logbook" tab (Page 88)).

⑤ You can enter a warning threshold so that you are notified of any pending maintenance. A "warning" notification is generated if the warning threshold is exceeded.

You receive an email notification if you have activated email notifications (see Section "Logbook" tab).

Note

- Notifications are only generated when a maintenance counter is active.
- You only receive emails if you have subscribed to the email notifications for the specific asset (see Section "Logbook" tab), and if you have a sufficient quota for email notifications.

3. Press "Save" to apply the entries/changes.

5.3.14 Overview of analytics functions

Bearing analysis

The bearing status display is a traffic light, which is updated with each new value of the bearing status signal. A model is trained based on the bearing status signal and for each of the most frequent operating points. The traffic light remains "gray" until the new model has been adequately trained. As soon as sufficient data have been captured and the model has been trained, you receive an appropriate notification and the traffic light switches to "green". Based on the trained model, the values of the received bearing status signal are evaluated for each operating point. If the values manifest a low up to average trend, which indicate slight bearing damage or the start of bearing damage, then the traffic light switches to "yellow". If the trend increases above a certain level over a certain time period, which indicates more significant bearing damage, then the traffic light switches to "red". You also receive a note that the risk of bearing damage has increased significantly. As a result, you should quickly check the motor status on site before significant damage occurs. After maintenance has been completed, you must reset the maintenance counter for bearing service under the Maintenance (Page 107) tab so that a new model for the new bearing is trained, and the traffic light is switched back to gray. The traffic light switches back to "green" after training has been completed.

The "Bearing status" signal indicates a time series. The absolute signal amplitude depends on your specific application and the rotation speed of the motor. As a consequence, the amplitude alone is not an indicator. Signal "Bearing status" allows bearing damage to be identified by comparing the values over several months. An increasing general trend can indicate bearing damage. Under normal operating conditions, bearing damage occurs over a time period of several months; after a certain level of damage, the status deteriorates increasingly faster.

To be able to more easily evaluate and interpret the traffic light, in addition to the "Bearing status" signal, you can also display the geometric mean value of the acceleration or the geometric mean value of the speed. At the same time, the operating points that were active during the measurements, are highlighted in color.

To high extent, all vibration-related signals are dependents on the operating point. However, an increasing long-term trend within an operating point over several weeks in the bearing status signal and in one of the two signals for the geometric mean in the bearing analysis tab is a clear indication of increasing bearing damage.

Note

In the present form, the bearing status display does not make a distinction between DE and NDE bearings. As a consequence, one of the two or both bearings can be damaged.

To switch from gray to green (active monitoring), a model must be trained for at least one operating point. This requires a certain number of values of the bearing status signal within this operating point.

Note

Preconditions for calculating the bearing status signal:

- Firmware ≥ 1.0.3.1 is installed
- The measuring cycle must be set to ≥ 5 minutes
- The operating status must be "On" for at least 15 minutes in order to successfully calculate the bearing status.
- At least 5 bearing status values are required for each operating point to successfully train the model and activate the bearing status display. This can take up to 30 days after onboarding. The traffic light displays a "gray" status during this calibration phase time.

Contact customer service if the bearing status was not able to be calculated although the specified preconditions are satisfied.

Calculating the bearing status is independent of the other analytical functions and is not influenced by this. The bearing status calculation is available both for motors directly connected to the line supply (DOL) as well as motors connected to a converter (VSD).

Unbalance analysis

The unbalance status display is a traffic light, which is updated with each new value of the unbalance status signal. The model is trained based on the unbalance status signal. The traffic light remains "gray" until the new model was adequately trained.

You receive an appropriate notification and the traffic light switches to "green" as soon as a sufficient amount of data has been captured and the model trained. The values of the received unbalance status signal are evaluated based on the trained model.

The traffic light switches to "yellow" if the values exceed a certain limit value defined by the model indicating that the level of unbalance has increased. You receive an appropriate notification.

The traffic light switches to "red" if the unbalance level increases and it exceeds a certain alarm threshold defined by the model, which indicates a severe unbalance status. You receive an appropriate notification.

The traffic light switches back to "yellow" if the unbalance level decreases over time down to a threshold value defined by the model. The traffic light switches back to "green" if it decreases to another threshold value defined by the model, as an unbalance status is not necessarily permanent as is the case for bearing damage.

If the traffic light displays "red" for unbalance, you should check the motor locally before the unbalance causes serious damage.

Signal "Unbalance Status" displays a time series. The absolute signal amplitude depends on your specific application. As a consequence, the amplitude alone is not an indicator.

Unbalance can develop over time, can occur as a result of incorrect maintenance or changes to the motor or the application.

Note

Preconditions for calculating the unbalance status signal:

- Firmware ≥ 1.0.3.1 is installed
- The measuring cycle must be set to ≥ 5 minutes
- The operating status must be "On" for at least 15 minutes in order to successfully calculate the unbalance status.

The calculation of the unbalance status is independent of the other analytic functions and is not influenced by these. The unbalance status calculation is available for motors that are directly connected to the line supply (DOL) and for motors that are connected to a converter (VSD).

Misalignment analysis

The status display for misalignment is a traffic light, which is updated with each new value of the status signal for misalignment. The model is trained based on the status signal for the misalignment.

- The traffic light remains "gray" until the new model was adequately trained.
- The traffic light switches to "green" as soon as a sufficient amount of data has been captured and the model trained. You receive an appropriate notification. The values of the received status signal for misalignment are evaluated based on the trained model.
- The traffic light switches to "yellow" if the values exceed a certain limit value defined by the model. This indicates that the level of misalignment has increased. You receive an appropriate notification.
- The traffic light switches to "red" if the level of misalignment increases, and an alarm threshold defined by the model is exceeded. This indicates a critical misalignment state. You receive an appropriate notification.
- The traffic light switches back to "yellow" if the misalignment level decreases over time down to a threshold value defined by the model.
- The traffic light switches back to "green" if the misalignment level decreases to another threshold value defined by the model, as a misalignment is not necessarily permanent. This is the case for bearing damage, for example.
- If the traffic light displays "red" for misalignment, you should check the motor locally before the misalignment causes serious damage.

Signal "Misalignment State" displays a time series. The absolute signal amplitude depends on your specific application. As a consequence, the amplitude alone is not an indicator.

Misalignment can develop over time, can occur as a result of incorrect maintenance or changes to the motor or the application.

Note

Preconditions for calculating the misalignment state signal:

- Firmware ≥ 1.0.3.1 is installed
- The measuring cycle must be set to ≥ 5 minutes
- The operating status must be "On" for at least 15 minutes in order to successfully calculate the status signal for misalignment.

The calculation of the misalignment state is independent of the other analytic functions and is not influenced by these. The calculation of the status signal for misalignment is available for motors that are directly connected to the line supply (DOL) and for motors that are connected to a converter (VSD).

Threshold values (global)

Using this function, you can define the global limit values for various signals, e.g. temperature, vibration or speed. You can use this function to monitor the vibration of motors, which are either directly connected to the line supply (DOL operation) or are always operated at a constant speed at a certain operating point. See Section tab "Thresholds" (Page 101).

If you require that vibration values are more specifically monitored, then you should preferably use operating point-specific limit values.
Function "Thresholds" is independent of other analysis functions and is also possible for converter-operated motors. However, in this specific case, you should preferably use operating point-specific limit values.

Note

The precondition for calling threshold value recommendations is the availability of data over a minimum time period of one month.

Function "Threshold values" is independent of the other analytical functions, and is also possible for converter-operated motors. However, in this specific case, we recommend using operating point-specific limit values.

Operating point-specific limit values

This function allows vibration values to be precisely monitored based on a trained model. This is independent of whether the motor is connected to a converter (VSD operation) and operates at different speeds or is operated as a DOL motor. In this case, use the recommended limit values under tab "Overview" > "Operating points" (see Section "Tab "Overview" - Operating points" (Page 76).

The operating point-specific monitoring is independent of the other analytical functions. This means that a global threshold value can be actively monitored at the same time.

Note

The precondition for determining the operating points and calculating the recommended limit values is a minimum time period of three weeks with no less than 20,000 "vibration" data points, as well as at least one operating point at a constant rotation speed above 10 rpm and not less than 100 "Vibration" data points.

Fingerprint-based anomaly detection

If you know the time that the last maintenance was performed (e.g. bearing change, relubrication or motor replacement), then you can define a "fingerprint" immediately after this maintenance event.

Based on this fingerprint, you can identify any deterioration of the vibration values from when maintenance work was carried out. If any deterioration is identified based on the fingerprint, then you receive a notification with the appropriate warning note.

Note

The precondition for fingerprint-based anomaly detection is a fingerprint time interval of at least 3 weeks with no less than 20,000 "vibration" data points, as well as at least one operating point at a constant rotational speed above 10 rpm and not less than 100 "vibration" data points.

If the criteria for the fingerprint are not satisfied, then you receive a notification and you have the option of adapting this.

If the number of identified anomalies continues to increase during the operating time, then you should update your fingerprint to a later point in time.

Fingerprint monitoring is available for motors connected directly to the line supply (DOL) and for motors connected to a converter (VSD) as well as assets with "General vibration monitoring".

Resonance detection

The resonance detection function automatically checks the last six months for signs of mechanical resonance. A notification is displayed if a critical resonance is detected. A resonance is considered critical if the vibration levels measured during its occurrence exceed the threshold value specified in the ISO 10816 standard.

The resonance areas that generate the highest vibrations are determined and the most critical internal resonance value is displayed in the "Resonance points" pop-up (see "Overview" tab - Vibration analysis (Page 76)). The table shows the maximum vibration values in these ranges for 3 axes. It also shows how long the motor runs in the specified resonance ranges. There are at least 20 data points in all detected ranges.

The notification contains the following information:

- Speed determination at the resonance peak
- Vibration axis for which the resonance was determined

- Speed range around the resonance peak. Avoid this speed range if possible, as it has a negative effect on the service life of the motor.
- Duration in minutes in which the motor has operated in this resonance range in the last six months.
- Percentage of the motor in the resonance range in relation to the motor running time

Resonances can behave asymmetrically. It may be necessary to take this information into account when evaluating resonance intervals and critical peak centers.

In some cases, the recommended resonance intervals may overlap due to asymmetry.

If the motor operates in a narrow speed range or has high data areas, the accuracy of the recommended resonance ranges may decrease.

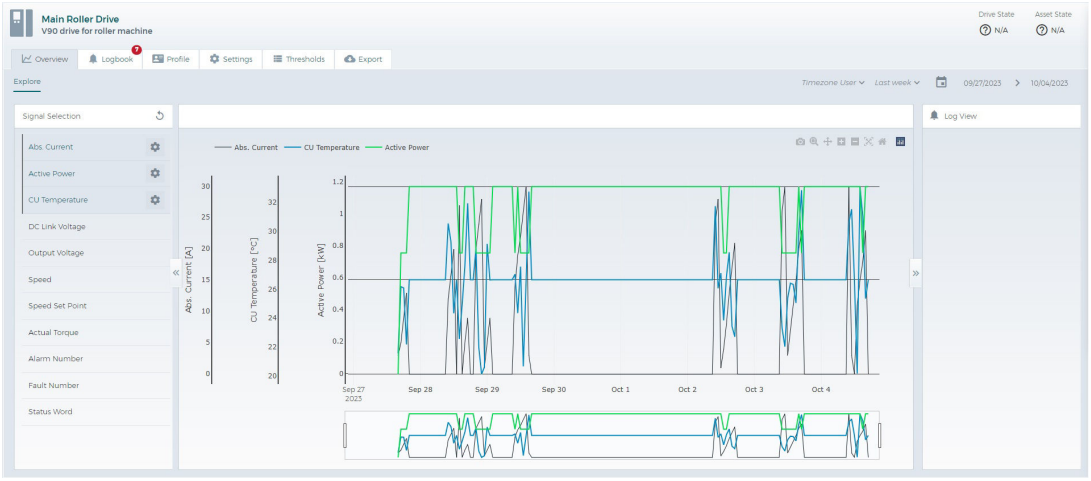
5.4 Monitoring drives assets

5.4.1 Asset view

The following tabs to monitor assets can be selected in the asset view for drives:

- Overview (Page 117)
- Logbook (Page 119)
- Profile (Page 119)
- Settings (Page 120)
- Thresholds (Page 121)
- Export (Page 122)

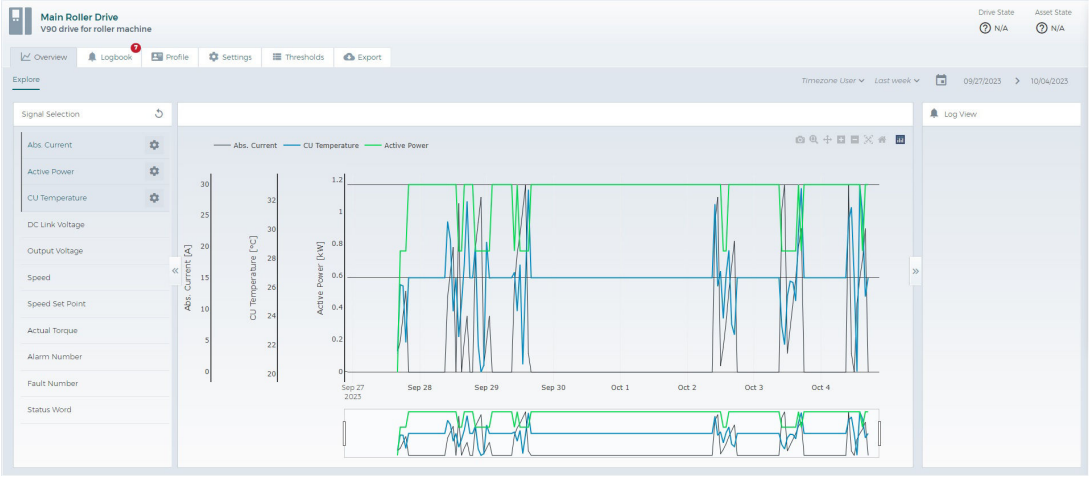
The following figure provides you with an overview of the asset view:



5.4.2 "Overview" tab - Explore

You have the option of graphically displaying various signals in the "Explore" view. You can select up to 3 different signals using the "Signal Selection" menu.

The following figure shows 3 selected signals and their representation as example:



You can change the color coding, line width of the graphs and the display type (Page 71) allocated by the system, as well as select (Page 73) and refine the display period (Page 73).

Use the arrow keys to the right or left of the coordinate system to show or hide the signal selection and the log view (Page 81).

5.4.2.1 Available signals

In the "Measured values" view you can read out the following signals via the "Signal selection" menu:

- Abs. Current (A):
  Represents the smoothed absolute actual current value for the drive (e.g. parameter r0027 or r0068 [1])
- Active Power (kW):
  Represents the absolute active power value for the drive (e.g. parameter r0032 or r0082 [1])
- Actual Torque (Nm):
  Represents the actual torque value for the drive (e.g. parameter r0031 or r0080 [1])
- CU Temperature (°C):
  Represents the measured controlgear temperature for the drive (e.g. parameter r3960 [1])
- DC Link Voltage (V):
  Represents the actual value of the DC link voltage for the drive (e.g. parameter r0026 or r0070 [1])
- Output Voltage (V):
  Represents the output voltage of the power supply unit (e.g. parameter r0025 or r0072 [1])
- Speed (rpm):
  Represents the actual value of the motor speed (e.g. parameter r0021, r0022 or r0063 [1])
- Speed Set Point (rpm):
  Represents the current speed setpoint at the input of the speed controller (e.g. parameter r0020 or r0060 [1])

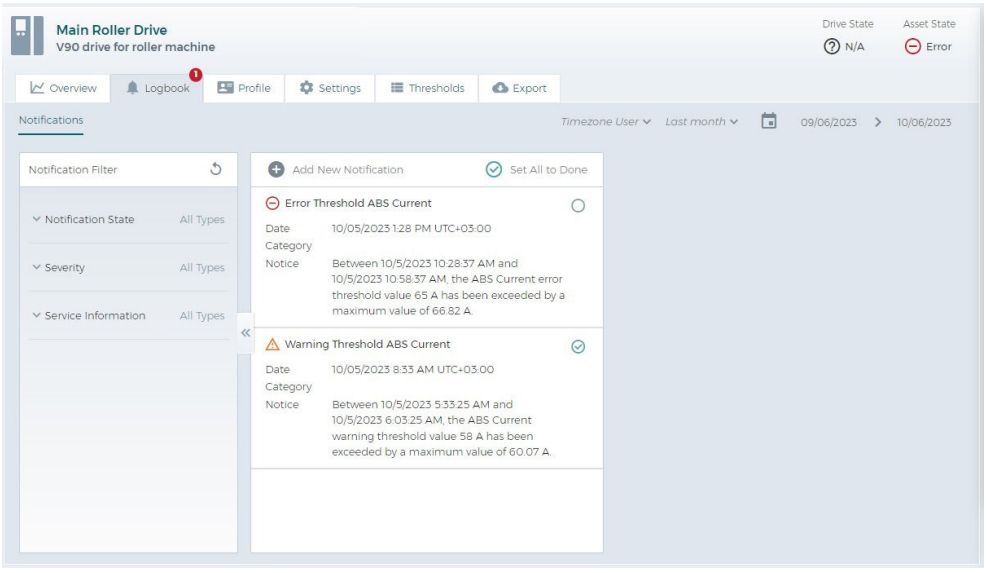
1) The parameters are exemplary for the SINAMICS G120 series

5.4.3 "Logbook" tab

In the "Logbook" tab, you will find an overview of the "Error", "Warning" and "Info" type notifications. There are system-generated notifications as well as notifications you create yourself. You can add comments to all notifications.

The entries are sorted chronologically within the selected time range. The list shows the last 20 entries.

The following figure provides you with an overview of the "Logbook" tab in the Asset view:



More information

A detailed description of the functionalities can be found in the section "Monitoring motor assets":

System-generated notifications (Page 88)

Filtering notifications (Page 90)

Creating notifications (Page 92)

Creating and editing comments (Page 93)

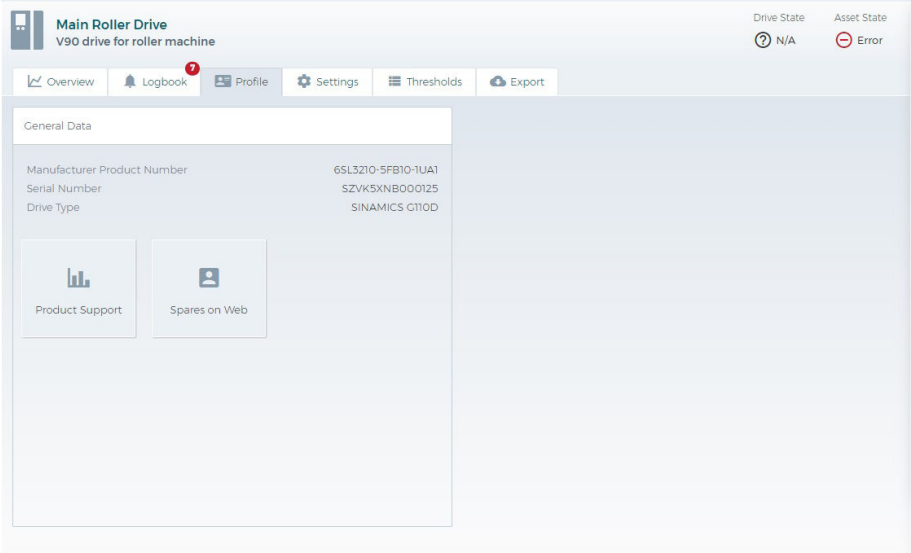
Acknowledging notifications (Page 94)

Acknowledging all notifications (Page 95)

5.4.4 "Profile" tab

The "Profile" tab displays the drive information you have created. You can use this information to easily access product support and spare parts on Spares on Web.

The following figure provides you with an overview of the "Profile" tab:



5.4.5 "Settings" tab

In the "Settings" tab, you can log on for email notifications. You will receive email notification if the limit values that have been configured for the selected asset are exceeded, or if faults and/or warnings for the asset are active.

Procedure

1. Open the asset overview.
2. Click on the required asset in the asset overview.
3. Open the "Settings" tab.
4. Select the "Subscribe" button to activate the email notification.
   After activation, you will receive notifications about the asset in the following cases:
   - Configured thresholds (Page 121) were exceeded
   - The connection state of the asset has changed
   - Export file completed

Note

The number of email notifications you can receive per month is limited by your account's notification quota. Note the notification quota when activating email notification.

Note

Security measures

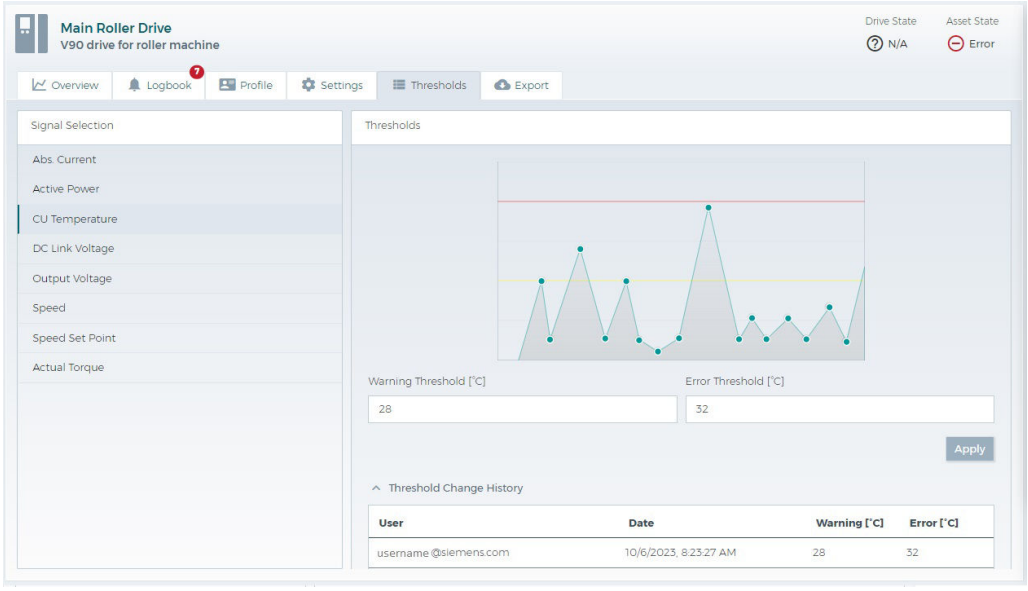
The Insights Hub Notification Service, which is used to transmit messages via the Internet, is used for sending email messages. The transmission of data via the Internet (untrusted channel) generally entails a residual risk regarding the confidentiality of data. Insights Hub provides notification emails sent to the user with a digital signature. Verify the digital signature of email messages you receive from Insights Hub.

5.4.6 "Thresholds" tab

In the "Thresholds" tab, you can configure a threshold for the output of warning and a threshold for the output of a fault for the respective signals.

Procedure

1. Open the asset overview.
2. Select the required asset in the asset overview.
3. Open the "Thresholds" tab
4. Select a signal in the "Signal Selection" column.



5. In the "Thresholds" column, enter a threshold for the output of a warning (Warning Threshold) and a threshold for the output of a fault (Error Threshold).
6. Confirm your configuration by clicking the "Save" button.
   If a configured asset reaches the defined thresholds, you will either be notified in the form of a warning or a fault message in the logbook of the Asset view. The warning or fault message remains active until you acknowledge the message, even if the measured value has already fallen below the threshold again.
   Furthermore, you can also configure email notifications (Page 120). You will receive an email notification if the thresholds that have been configured for the selected asset are exceeded, or if faults and/or warnings for the asset are active.

Threshold change history

The actual thresholds are displayed in area "Threshold change history". The user that changed the threshold, the date of the change and new fault and warning thresholds are listed. The number of entries in the history that can be saved for each asset signal is limited to 5. If this number is exceeded, the oldest history item is replaced by the new history item.

5.4.7 "Export" tab

The "Export" tab allows you to export signals of an asset and notifications to a compressed file and download it to your local computer.

Procedure

1. Select the time range. Within the defined time range, you can export logbook notifications, for example.
   The default option is "Complete history". If you disable this, you can select the start and end dates in the calendar. The generation time for the export file depends on the selected time range.
2. Select "Signals" or "Notifications".

3. Click the "Export" button to start the export.
   For the selected content, the files to be exported are generated and compressed into a single ZIP file for convenient download.

   Note

   The export request is processed in the background. It may take a few minutes for the file to be ready for download. As soon as the file is available, an info message is displayed in the "Logbook" tab.

4. The exported files are displayed in the "Download" section. Click on the appropriate line to download the file to your local computer.

   Note

   A maximum of three compressed files per asset can be made available for download at the same time. When this limit is reached, the oldest file is deleted during a new export.

   The files are available for download in SIDRIVE IQ Fleet for seven days.

   Note

   Security measures

   - Ensure that the transport of exported data is secured by technical measures such as encrypted/signed e-mails, encrypted/signed USB flash drives, etc., especially in public areas such as the Internet.
   - Store exported data files in the OEM/end customer area in such a way that they are protected from unauthorized access (e.g. on SharePoints, databases, etc. through user management with access data).

5.5 Deleting assets

Use the offboarding procedure to delete an asset, as described in Section "Settings" tab (Page 98).

Note

Do not delete a SIDRIVE IQ Fleet asset in the Insights Hub Asset Manager, as not all of the components of the asset are removed by the deletion. This can mean that the asset instance used is not released, which means that it may not be possible to onboard it.

Contact our technical support if you have already inadvertently deleted a SIDRIVE IQ Fleet asset in the Insights Hub Asset Manager. Technical support can help you remove the remaining components so that the quota is released.

5.6 Dashboard application

5.6.1 Overview

The following provides an overview of the operating areas of the Dashboard application. The Dashboard application is integrated in SIDRIVE IQ Fleet, and is called in the Asset overview using the  button.

You can represent asset variables either graphically or as table in the Dashboard application. Various chart types can be selected for graphic representation:

- Line charts
- Bar charts
- Indicator charts
- Gantt charts

You can organize the tables and/or charts in Dashboards. You can define the layout of the Dashboards using Grid Options, and for the charts, you can create Dashboard templates.

Further, in the Dashboards you can also create Cards to save a URL.

In SIDRIVE IQ Fleet you can include assets in the comparison list, and transferred these to the Dashboard application. Using the assets of the comparison list, you can create charts in the Dashboard application.

5.6.2 User interface

1. Home button: Return it to the SIDRIVE IQ Fleet application
2. Dashboard menu (see below for a description)
3. Dashboards: You can create several Dashboards. You can configure the layout of the Dashboards (see 4)
4. "Manage Dashboard Templates":
   You can create and edit your specific Dashboard templates.

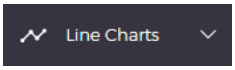
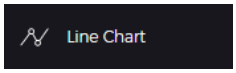
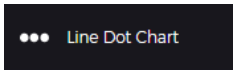
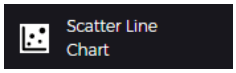
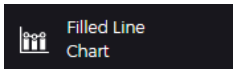
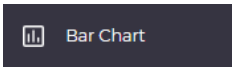
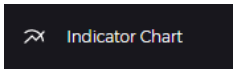
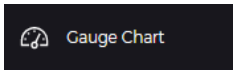
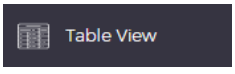
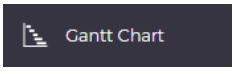
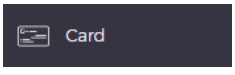
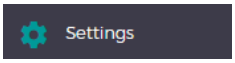
   "Pin to taskbar":
   You can attach the Dashboard menu bar

   "Date selection":
   Here, you can select the date ranges.
5. In the Dashboards you can create charts, tables and cards.
6. Dashboard edit mode:
   In the edit mode, you can edit charts and change the dashboard name.

   Saving the Dashboard:
   Saving changes that have been made.

Dashboard main/submenu

The Dashboard application navigation is structured as follows.

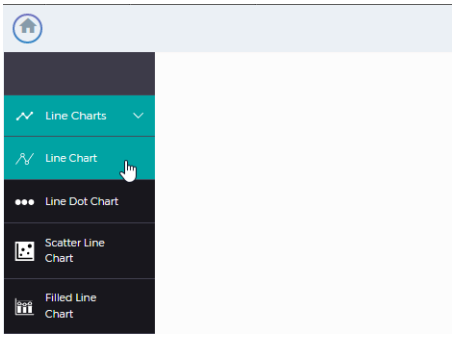
Main/submenu	Description
	Main menu "Line Charts": When clicked on, the submenu is opened with the available chart types.
	You create a line chart using menu item "Line Chart".
	You create a line dot chart using menu item "Line Dot Chart".
	You create a scatter line chart using menu item "Scatter Line Chart".
	You create a filled line chart using menu item "Filled Line Chart".
	Main menu "Bar Chart" You create a bar chart using menu item "Bar Chart".
	Main menu "Indicator Charts" When clicked on, the submenu is opened with the available chart types.
	You create an indicator chart using menu item "Indicator Chart".
	You create a gauge chart using menu item "Gauge Chart".
	Main menu "Table View" You create a table view using menu item "Table View".
	Main menu "Gantt Chart" You create a Gantt chart using menu item "Gantt Chart".
	Main menu "Card" You create a card using menu item "Card". You can save a URL here.
	Main menu "Settings" Using "Settings", you can define the display mode (light/dark), the Grid Options and the names for the Tabs.

5.6.3 Creating charts

The procedure to create a chart using "Line Chart" as example is described in the following.

Procedure

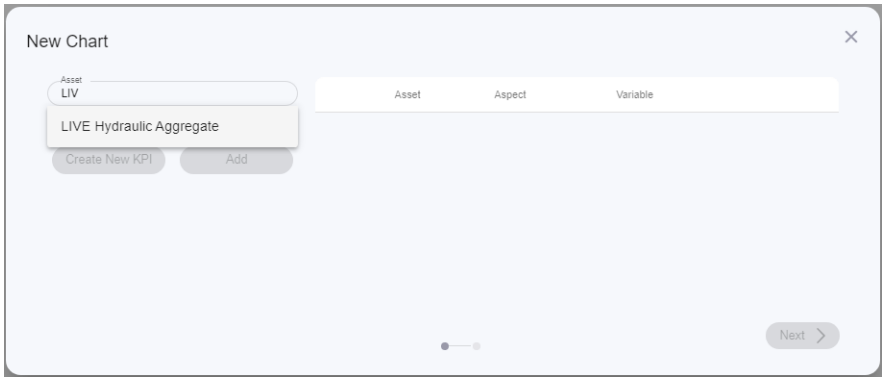
1. Click on main menu "Line Chart". The submenu is displayed.
2. Click on submenu "Line Chart". The following dialog is displayed.



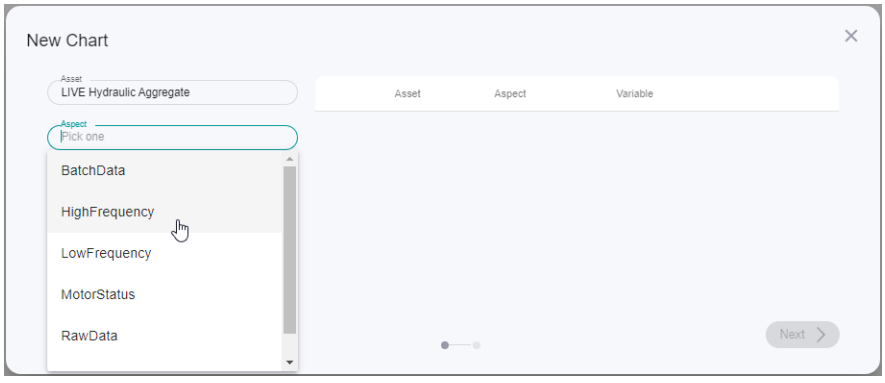
3. Enter the asset name. The corresponding asset is displayed when entering the name.

Note

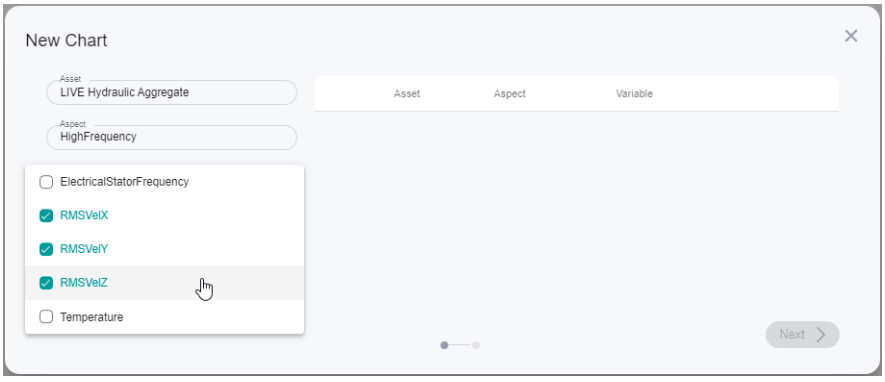
If you created a comparison list (Page 131) in SIDRIVE IQ Fleet and have transferred this to the dashboard application, then these assets are listed here.



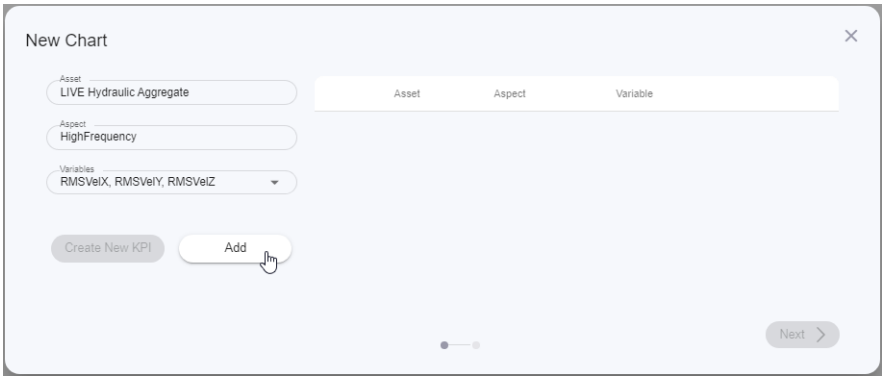
4. From the list, select an Aspect.



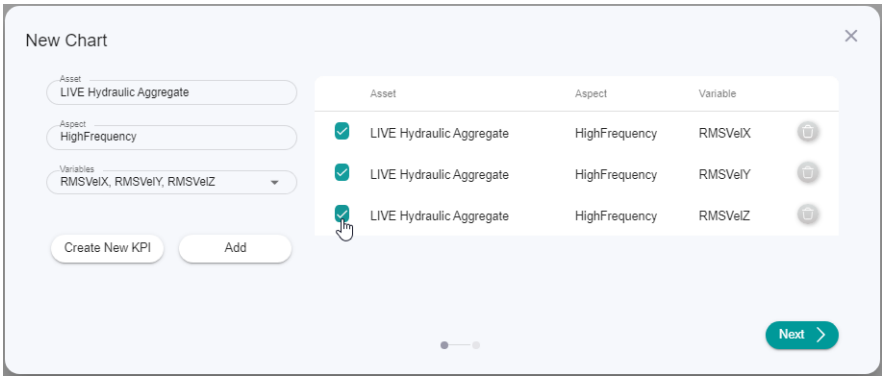
5. Select the required variables from the list.



6. Add the variables using "Add".



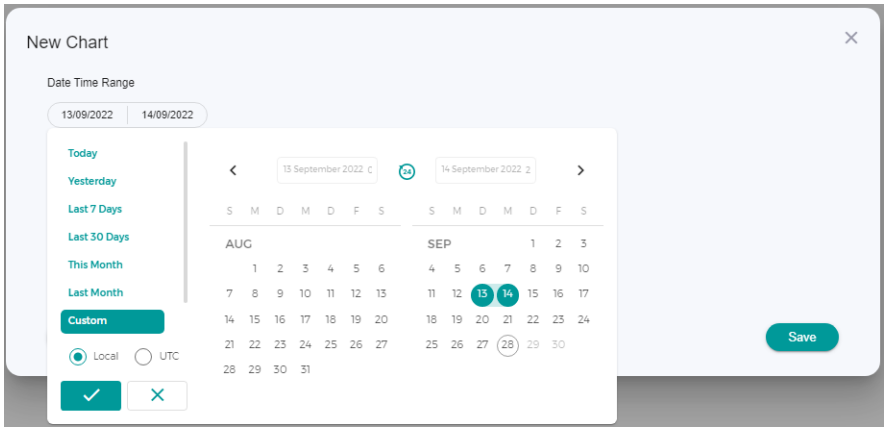
7. Activate the checkboxes of the variables that you wish to display in the chart.



8. Apply the data with "Next >"

9. In the following dialog, you can optionally add Labels for the chart axes. A Label comprises the input of a value and the associated name.

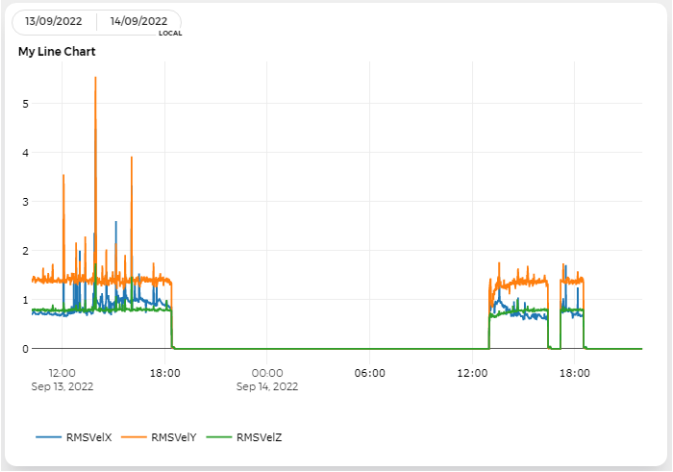
10. Apply your entry or skip this step with "Next >".
11. Select the time interval for the display, and apply your entry by pressing "✓".



12. Save your entry using "Save".

Result

The "Line Chart" is displayed in the dashboard.

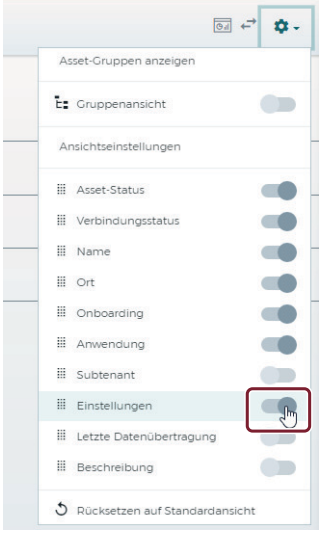


5.6.4 Comparing asset variables

In SIDRIVE IQ Fleet, you can add assets to a comparison list. In the Dashboard application, you can compare the assets of the comparison list in the charts.

Precondition

In order that you can transfer assets into the comparison list, you must activate "Settings" in the view settings. You open the view settings using .



In the list view, the display is expanded to include column .

Procedure

1. Open the asset overview in the list view.

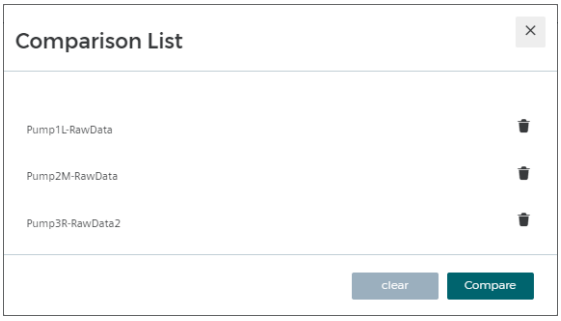
2. Click on ⋮. The "Compare" button is displayed.

3. Click on the button to add an asset to the comparison list.

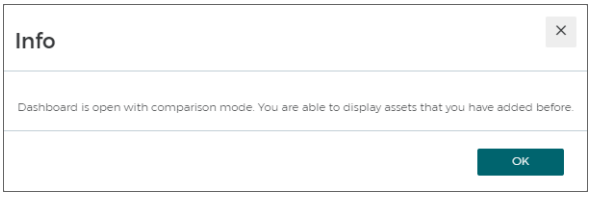
4. Close the comparison list to add additional assets.

5. Repeat steps 2 and 3 until you have added all assets to be compared to the comparison list. The number of assets in the comparison list is displayed as follows.

You can open the comparison list using the button.

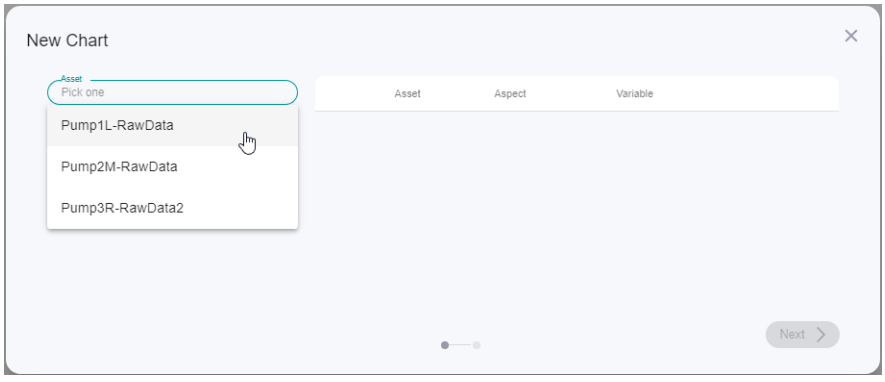


6. Transfer the comparison list to Dashboard using the "Compare" button. The following information is displayed.



Result

In the Dashboard application, you can now create charts (Page 127). The assets of the comparison list are displayed in the asset selection list.



Extended cross-tenancy functionality

6

Within Insights Hub, you can use the cross-tenancy functionality to exchange data between your and another Insights Hub tenant. This functionality helps Insights Hub customers create a data exchange collaboration as the basis for data-driven business models, such as the maintenance of a motor by the owners of the receiver tenant. For more information on cross-tenancy functionality and how to share/receive an asset, click here (https://documentation.mindsphere.io/resources/html/asset-manager/en-US/125945951755.html).

When an asset is shared, the Insights Hub cross-tenancy function creates a copy of the static asset data. Therefore, the receiving tenant must have a quota of one free asset instance for each asset received. If you plan to accept receipt of an asset, you can purchase the "SIDRIVE IQ Fleet Package 1 Shared Asset" to increase your quota of asset instances by 1.

SIDRIVE IQ Fleet gives you the ability to fully share assets with extended cross-tenancy functionality. The following describes the scope of functions for the receiver tenant.

Functional scope

- Users of the receiver tenant can display current asset data (e.g. asset status, connection status, SIMOTICS CONNECT device data, etc.) within the SIDRIVE IQ Fleet application.

  Note

  If users of the receiver tenant use the Insights Hub Asset Manager application or read the assets through APIs, asset data that is copied when the asset share is accepted is displayed and may not be up to date.

  On the other hand, Time Series (e.g. vibration, speed, torque) will be fully available via other Insights Hub applications or API functionality.

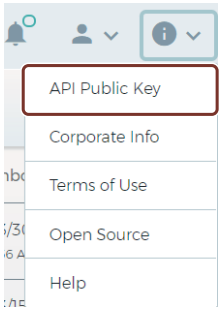
- Users of the receiver tenant can display current messages and limit values within the SIDRIVE IQ Fleet application.
- Users of the receiver tenant can change the limit values of the received assets within the SIDRIVE IQ Fleet application. The users of the share (releasing) tenant can view the changed limit values and the notifications are created according to the changed limit values.
- Users of the receiver tenant can create new messages and confirm/close existing messages within the SIDRIVE IQ Fleet application. Users of the share tenant can view the new notifications created by users of the receiver tenant.
- Users of the receiver tenant can subscribe to email notifications about the received asset and receive email notifications about error and warning messages, battery status, and connection status. The email notifications sent to the users of the receiver tenant consume the receiver tenant's quota for notifications.

Application Programming Interface (API) 7

SIDRIVE IQ Fleet allows you to programmatically read the data of your connected motor fleet via "Insights Hub Services and Industrial IoT APIs". The Insights Hub developer documentation can be found at the following link (https://developer.mindsphere.io/apis/index.html).

Requirements

1. You require the SIDRIVE IQ API key for your tenant. You can find this via the icon in the main navigation.



Here, you can view your API key and the expiration date of your API key. The system sends you an email if the expiration date is to expire within 0 to 7 days or has already expired. You can generate your new API key if it is to expire within 0 to 7 days. If the expiration date is longer than 7 days, then button "Generate" is deactivated.
If an API key is not displayed in the dialog after you click on "Generate", then you are notified that you should contact user support.

Note

Security measures

SIDRIVE IQ API key must be kept secret.

- Ensure that the transport of the key is secured by technical measures such as encrypted/ signed emails, encrypted/signed USB flash drives, etc., especially in public areas such as the Internet.
- Store the key in the OEM/end customer area in such a way that it is protected from unauthorized access (e.g. on SharePoints, databases, etc. through user management with access data).

2. With the SIDRIVE IQ API key, request your bearer token (access token) using the following HTTP request:
Example API:
GET /public/iqtoken/token?key={your SIDRIVE IQ API key} HTTP/1.1
Host:
Region - Europe 1 (Insights Hub on AWS): iqtoken-visualflowcreatorhttp.eu1.mindsphere.io
Region - China 1 (Insights Hub on AliCloud): iqtoken-visualflowcreatorhttp.cn1.mindsphere-in.cn
Response:
{

```
            "access_token": {Bearer Token},
            "token_type":  "bearer",
            "expires_in":  1799,
            "scope":  "mdsp:core:Admin3rdPartyTechUser",
            "jti":  "9d53d67bb046437d90c309c3a228d942",
            "timestamp":  1613126706928
}
```


3. Use the {bearer token} to call the Industrial IoT APIs and access your client tenant's data.

More information

More information on calling up the Industrial IoT Endpoints is provided in the Insights Hub documentation (https://developer.mindsphere.io/howto/howto-selfhosted-api-access.html#calling-mindsphere-endpoints).

7.1 Reading assets and asset properties for the EU1 region (Insights Hub running on AWS)

The following provides an overview of the data that you can access as a user of your client tenant.

SIDRIVE IQ Fleet assets

SIDRIVE IQ Fleet assets are of the type "Simotics" (core.basicdevice -> tenant_name."Simotics").

Asset variables

- AgentSerialNumer: serial number of the SIMOTICS CONNECT 400 device
- Application: motor application
  Possible values are: Pump, fan, compressor, other
- AssetTypeVersion: asset type version number
- BatteryRuntimeLeft: estimate of the remaining battery time in months
- BatteryStatus: battery status as a percentage (%)
- BearingCondition: Motor bearing condition
  Possible values are: {0 = calibration/missing data, 1 = OK , 2 = low/medium probability of failure, 3 = high probability of failure}
- ConditionState: asset status that is derived from the open reports in the logbook.
  Possible values are: {0 = OK, 1 = info, 2 = warning, 3 = error, 4 = unknown}
- ConnectedAt: date and time of the last data that SIMOTICS CONNECT 400 transferred to SI IQ Fleet
- ConnectionState: SIMOTICS CONNECT 400 connection status.
  Possible values: {0 = connected, 1 = temporarily interrupted, 2 = disconnected}
- CreateDate: date and time that the asset was created
- DigitalTwinVersion: (internal) motor digital twin version, which is used during the onboarding
- ElectricalDataIndex: selected motor operating point index
- FirmwareVersion: installed firmware version of SIMOTICS CONNECT 400
- GenericVibrationMonitoring: true, if SIMOTICS CONNECT 400 was onboarded as sensor for generic vibration monitoring.
- ManufacturerProductNumber: manufacturer's product article number (MLFB) of the motor
- OperatingMode: Motor operating mode
  Possible values are: {1 = DOL, 2 = VSD}
- PoleNumber: number of motor poles
- RelubricationInterval: motor relubrication interval in hours
- ScanCycle: SIMOTICS CONNECT 400 sensor measurement interval in the "duration" format defined in standard ISO 8601
- SerialNumber: motor serial number

- TransmitCycle: SIMOTICS CONNECT 400 data transfer interval in the "duration" format defined in standard ISO 8601
- VoltageDropResets: number of SIMOTICS CONNECT 400 brownout resets

You can call up the list of assets integrated in the application and the variables of each asset using the "Asset Management Service" of Insights Hub.

The documentation and the API specification can be found at the following link (https://developer.mindsphere.io/apis/advanced-assetmanagement/api-assetmanagement-overview.html):

Example:

GET

https://gateway.eu1.mindsphere.io/api/assetmanagement/v3/assets

Header:

- Content-Type: application/json
- Authorization: Bearer <Bearer Token>

Signals

All Time Series data of the IQFleet signals are available in the aspects of the "Simotics" asset type:

core.basicasset / core.basicdevice / iqdev.Simotics

Aspects

Name	Aspect
AlternativeMotor	iqdev.AlternativeMotor
BatchData	iqdev.BatchData

Name	Unit	Data type
AccelerationGeometricMean	mm/sÂ²	DOUBLE
BearingState	-	DOUBLE
MisalignmentState	-	DOUBLE
UnbalanceState	-	DOUBLE
VelocityGeometricMean	mm/s	DOUBLE

HighFrequency	iqdev.HighFrequency

Name	Unit	Data type
ElectricalStatorFrequency	Hz	DOUBLE
RMSVelX	mm/s	DOUBLE
RMSVelY	mm/s	DOUBLE
RMSVelZ	mm/s	DOUBLE
Temperature	°C	DOUBLE

LowFrequency	iqdev.LowFrequency

Name	Unit	Data type
Coefficient	-	DOUBLE
ElectricalEnergy	MWh	DOUBLE
ElectricPower	kW	DOUBLE
EnergyEfficiency	%	DOUBLE
RotationSpeed	rpm	DOUBLE
SlipFrequency	Hz	DOUBLE
Torque	Nm	DOUBLE

MechanicalAnalysis	iqdev.MechanicalAnalysis

...

MotorStatus	iqdev.MotorStatus	
Name	**Unit**	**Data type**
CalibrationHours	Hour	DOUBLE
DisconnectionHours	Hour	DOUBLE
MotorState	State	INT
NoOperationHours	Hour	DOUBLE
NumberOfStarts	Number	INT
OperationHours	Hour	DOUBLE
PumpEfficiencyAnalysis	iqdev.PumpEfficiencyAnalysis	
Name	**Unit**	**Data type**
FlowRate	m^3/h	DOUBLE
Head	m	DOUBLE
PumpEfficiency	%	DOUBLE
PumpEnergyLoss	kWh	DOUBLE
PumpPowerLoss	kW	DOUBLE
status	core.assetstatus	

In order to read out the SIDRIVE IQ Fleet signals, all data points within a time period are provided by the "IOT Time Series Service" of Insights Hub. The description and the API specification can be found at the following link (https://developer.mindsphere.io/apis/iot-iottimeseries/api-iottimeseries-overview.html):

As an alternative to individual data points, you can also use the "Aggregates Service" of Insights Hub. The description is provided at the following link: (https://developer.mindsphere.io/apis/iot-iottsaggregates/api-iottsaggregates-overview-v4.html)

Example - IOT Time Series Service:

GET

https://gateway.eu1.mindsphere.io/api/iottimeseries/v3/timeseries/789ffa1f911f4cc08e5a8021208d9476/LowFrequency?to=2020-07-11T07:00:00.00Z&sort=desc

Header:

- Content-Type: application/json
- Authorization: Bearer <Bearer Token>

Example - Aggregates Service:

GET

https://gateway.eu1.mindsphere.io/api/iottsaggregates/v3/aggregates/daa80a036ad74578b49c72e76ded3a24/LowFrequency?

from=2020-05-01T00:00:00.000Z&to=2020-06-23T08:00:00.00Z&intervalUnit=hour&intervalValue=8&select=ElectricalEnergy

Header:

- Content-Type: application/json
- Authorization: Bearer <Bearer Token>

Notifications

Event type: IQFleetEvent

Event Type Id: 015578eb-c77a-4f85-8ac7-8fbbd6e1d181

You can access all protocols that were created for the assets of the tenant via the "Event Management Service" of Insights Hub. The documentation and the API specification can be found at the following link: (https://developer.mindsphere.io/apis/advanced-eventmanagement/api-eventmanagement-overview.html)

Example:

GET

https://gateway.eu1.mindsphere.io/api/eventmanagement/v3/events?filter={%22and%22:{%22timestamp%22:{%22after%22:%222019-04-26T21:00:00.000Z%22},%22typeId%22:%22015578eb-c77a-4f85-8ac7-8fbbd6e1d181%22}}

Header:

- Content-Type: application/json
- Authorization: Bearer <Bearer Token>

Example response model:

```
{
       "id": "7d7f518f-5962-40e6-bbdd-6d82a48f977d",
       "typeId": "015578eb-c77a-4f85-8ac7-8fbbd6e1d181",
       "correlationId": "63884d7db29503c577262efa351192b3",
       "timestamp": "2022-12-01T00:45:45Z",
       "entityId": "b3cf3b0191d64fb5a5c1ebed191d2506",
       "etag": 0,
       "_links": {
             "self": {
                "href": https://gateway.eu1.mindsphere.io/api/
eventmanagement/v3/events/7d7f518f-5962-40e6-bbdd-6d82a48f977d
```

```
            }
        },
        "logType": "multiplethresholdviolation",
        "severity": 20,
        "kpiValue": "14.0674",
        "acknowledged": false,
        "kpiName": "RMSVelY",
        "description": "Error Threshold Connect Vibration Tangential
(y)",
        "thresholdValue": "10",
        "date2": "2022-12-01T06:44:39.000Z",
        "date1": "2022-12-01T00:45:45.000Z",
        "title": "Error Threshold Connect Vibration Tangential (y)",
        "serviceTag": false,
        "comment": "",
        "detail": "Between 12/1/2022 12:45:45 AM and 12/1/2022
6:44:39 AM, the Connect Vibration Tangential (y) error threshold
value 10 mm/s has been exceeded by 46 data point(s) with the
maximum value of 14.067 mm/s.",
        "category": "",
        "parameter1": "46"
}
```


Comments

Event Type: IQFleetCommentEvent

EventTypeId: 953b4143-fc09-4ebe-a05d-eeb0a5c6af34

Header:

- Content-Type: application/json
- Authorization: Bearer <Bearer Token>

Example response model:


```
{
        "id": "3cc0f416-7f7a-41a8-b005-390c6d9def0d",
        "typeId": "953b4143-fc09-4ebe-a05d-eeb0a5c6af34",
        "correlationId": "638864a59080059201c35254c34fdc21",
```

```
        "timestamp": "2022-12-01T08:24:05.114Z",
        "entityId": "b3cf3b0191d64fb5a5c1ebed191d2506",
        "etag": 0,
        "_links": {
              "self": {
                     "href": "https://gateway.eu1.mindsphere.io/api/
eventmanagement/v3/events/3cc0f416-7f7a-41a8-b005-390c6d9def0d"
              }
        },
        "severity": 0,
        "parentLogId": "7d7f518f-5962-40e6-bbdd-6d82a48f977d",
        "acknowledged": false,
        "serviceTag": false,
        "userEmail": "user@email.com",
        "commentText": "This is a comment"
}
```

7.2 Reading assets and asset properties for the CN1 region (Insights Hub running on AliCloud)

The following provides an overview of the data that you can access as a user of your client tenant.

SIDRIVE IQ Fleet assets

SIDRIVE IQ Fleet assets are of the type "Simotics" (core.basicdevice -> tenant_name."Simotics").

Asset variables

- AgentSerialNumer: serial number of the SIMOTICS CONNECT 400 device
- Application: motor application
  Possible values are: Pump, fan, compressor, other
- AssetTypeVersion: asset type version number
- BatteryRuntimeLeft: estimate of the remaining battery time in months
- BatteryStatus: battery status as a percentage (%)
- BearingCondition: Motor bearing condition
  Possible values are: {0 = calibration/missing data, 1 = OK , 2 = low/medium probability of failure, 3 = high probability of failure}
- ConditionState: asset status that is derived from the open reports in the logbook.
  Possible values are: {0 = OK, 1 = info, 2 = warning, 3 = error, 4 = unknown}
- ConnectedAt: date and time of the last data that SIMOTICS CONNECT 400 transferred to SI IQ Fleet
- ConnectionState: SIMOTICS CONNECT 400 connection status.
  Possible values: {0 = connected, 1 = temporarily interrupted, 2 = disconnected}
- CreateDate: date and time that the asset was created
- DigitalTwinVersion: (internal) motor digital twin version, which is used during the onboarding
- ElectricalDataIndex: selected motor operating point index
- FirmwareVersion: installed firmware version of SIMOTICS CONNECT 400
- ManufacturerProductNumber: manufacturer's product article number (MLFB) of the motor
- OperatingMode: Motor operating mode
  Possible values are: {1 = DOL, 2 = VSD}
- PoleNumber: number of motor poles
- RelubricationInterval: motor relubrication interval in hours
- ScanCycle: SIMOTICS CONNECT 400 sensor measurement interval in the "duration" format defined in standard ISO 8601
- SerialNumber: motor serial number

- TransmitCycle: SIMOTICS CONNECT 400 data transfer interval in the "duration" format defined in standard ISO 8601
- VoltageDropResets: number of SIMOTICS CONNECT 400 brownout resets

You can call up the list of assets integrated in the application and the variables of each asset using the "Asset Management Service" of Insights Hub.

The documentation and the API specification can be found at the following link (https://developer.mindsphere.io/apis/advanced-assetmanagement/api-assetmanagement-overview.html):

Example:

GET

https://gateway.cn1.mindsphere-in.cn/api/assetmanagement/v3/assets

Header:

- Content-Type: application/json
- Authorization: Bearer <Bearer Token>

Signals

All Time Series data of the IQFleet signals are available in the aspects of the "Simotics" asset type:

core.basicasset / core.basicdevice / iqdev.Simotics

Aspects

Name	Aspect
AlternativeMotor	iqdev.AlternativeMotor
BatchData	iqdev.BatchData

Name	Unit	Data type
AccelerationGeometricMean	mm/sÂ²	DOUBLE
BearingState	-	DOUBLE
MisalignmentState	-	DOUBLE
UnbalanceState	-	DOUBLE
VelocityGeometricMean	mm/s	DOUBLE

HighFrequency	iqdev.HighFrequency

Name	Unit	Data type
ElectricalStatorFrequency	Hz	DOUBLE
RMSVelX	mm/s	DOUBLE
RMSVelY	mm/s	DOUBLE
RMSVelZ	mm/s	DOUBLE
Temperature	°C	DOUBLE

LowFrequency	iqdev.LowFrequency

Name	Unit	Data type
Coefficient	-	DOUBLE
ElectricalEnergy	MWh	DOUBLE
ElectricPower	kW	DOUBLE
EnergyEfficiency	%	DOUBLE
RotationSpeed	rpm	DOUBLE
SlipFrequency	Hz	DOUBLE
Torque	Nm	DOUBLE

MechanicalAnalysis	iqdev.MechanicalAnalysis

...

MotorStatus		iqdev.MotorStatus
Name	**Unit**	**Data type**
CalibrationHours	Hour	DOUBLE
DisconnectionHours	Hour	DOUBLE
MotorState	State	INT
NoOperationHours	Hour	DOUBLE
NumberOfStarts	Number	INT
OperationHours	Hour	DOUBLE

PumpEfficiencyAnalysis		iqdev.PumpEfficiencyAnalysis
Name	**Unit**	**Data type**
FlowRate	m^3/h	DOUBLE
Head	m	DOUBLE
PumpEfficiency	%	DOUBLE
PumpEnergyLoss	kWh	DOUBLE
PumpPowerLoss	kW	DOUBLE

status	core.assetstatus

In order to read out the SIDRIVE IQ Fleet signals, all data points within a time period are provided by the "IOT Time Series Service" of Insights Hub. The description and the API specification can be found at the following link (https://developer.mindsphere.io/apis/iot-iottimeseries/api-iottimeseries-overview.html):

As an alternative to individual data points, you can also use the "Aggregates Service" of Insights Hub. The description is provided at the following link: (https://developer.mindsphere.io/apis/iot-iottsaggregates/api-iottsaggregates-overview-v4.html)

Example - IOT Time Series Service:

GET

https://gateway.eu1.mindsphere.io/api/iottimeseries/v3/timeseries/789ffa1f911f4cc08e5a8021208d9476/LowFrequency?to=2020-07-11T07:00:00.00Z&sort=desc

Header:

- Content-Type: application/json
- Authorization: Bearer <Bearer Token>

Example - Aggregates Service:

GET

https://gateway.eu1.mindsphere.io/api/iottsaggregates/v3/aggregates/daa80a036ad74578b49c72e76ded3a24/LowFrequency?

from=2020-05-01T00:00:00.000Z&to=2020-06-23T08:00:00.00Z&intervalUnit=hour&intervalValue=8&select=ElectricalEnergy

Header:

- Content-Type: application/json
- Authorization: Bearer <Bearer Token>

Notifications

Event type: IQFleetEvent

Event Type Id: Event Type Id: 3c68be7c-75fd-4cee-8d6d-5d58c3152c5c (for Alibaba)

You can access all protocols that were created for the assets of the tenant via the "Event Management Service" of Insights Hub. The documentation and the API specification can be found at the following link: (https://developer.mindsphere.io/apis/advanced-eventmanagement/api-eventmanagement-overview.html)

Example:

GET

https://gateway.cn1.mindsphere-in.cn/api/eventmanagement/v3/events?filter={%22and%22:{%22timestamp%22:{%22after%22:%222019-04-26T21:00:00.000Z%22},%22typeId%22:%223c68be7c-75fd-4cee-8d6d-5d58c3152c5c%22}}

Header:

- Content-Type: application/json
- Authorization: Bearer <Bearer Token>

Example response model:

```
{
        "id": "7d7f518f-5962-40e6-bbdd-6d82a48f977d",
        "typeId": "015578eb-c77a-4f85-8ac7-8fbbd6e1d181",
        "correlationId": "63884d7db29503c577262efa351192b3",
        "timestamp": "2022-12-01T00:45:45Z",
        "entityId": "b3cf3b0191d64fb5a5c1ebed191d2506",
        "etag": 0,
        "_links": {
              "self": {
                 "href": https://gateway.eu1.mindsphere.io/api/
eventmanagement/v3/events/7d7f518f-5962-40e6-bbdd-6d82a48f977d
```

```
            }
        },
        "logType": "multiplethresholdviolation",
        "severity": 20,
        "kpiValue": "14.0674",
        "acknowledged": false,
        "kpiName": "RMSVelY",
        "description": "Error Threshold Connect Vibration Tangential
(y)",
        "thresholdValue": "10",
        "date2": "2022-12-01T06:44:39.000Z",
        "date1": "2022-12-01T00:45:45.000Z",
        "title": "Error Threshold Connect Vibration Tangential (y)",
        "serviceTag": false,
        "comment": "",
        "detail": "Between 12/1/2022 12:45:45 AM and 12/1/2022
6:44:39 AM, the Connect Vibration Tangential (y) error threshold
value 10 mm/s has been exceeded by 46 data point(s) with the
maximum value of 14.067 mm/s.",
        "category": "",
        "parameter1": "46"
}
```


Comments

Event Type: IQFleetCommentEvent

EventTypeId: 50276fd0-10b3-4cda-a473-3cf7cc45e86b (for Alibaba)

Header:

- Content-Type: application/json
- Authorization: Bearer <Bearer Token>

Example response model:


```
{
        "id": "3cc0f416-7f7a-41a8-b005-390c6d9def0d",
        "typeId": "953b4143-fc09-4ebe-a05d-eeb0a5c6af34",
        "correlationId": "638864a59080059201c35254c34fdc21",
```

```
        "timestamp": "2022-12-01T08:24:05.114Z",
        "entityId": "b3cf3b0191d64fb5a5c1ebed191d2506",
        "etag": 0,
        "_links": {
              "self": {
                     "href": "https://gateway.eu1.mindsphere.io/api/
eventmanagement/v3/events/3cc0f416-7f7a-41a8-b005-390c6d9def0d"
              }
        },
        "severity": 0,
        "parentLogId": "7d7f518f-5962-40e6-bbdd-6d82a48f977d",
        "acknowledged": false,
        "serviceTag": false,
        "userEmail": "user@email.com",
        "commentText": "This is a comment"
}
```

More information

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8.1 Product information

SIMOTICS CONNECT 400 and SIDRIVE IQ Fleet

Additional information about digitalization of low-voltage motors with SIMOTICS CONNECT 400, SIDRIVE IQ Fleet, and Insights Hub is available on our website (https://siemens.com/digital-motor).

You can also find information on the following topics on our website:

- How you get started (https://new.siemens.com/global/en/products/drives/digitalization-in-drive-technology/data-analytics/digitalize-low-voltage-motors.html#Howyougetstarted) step-by-step descriptions of how you can monitor your low-voltage motor
- Quick Support (https://new.siemens.com/global/en/products/drives/digitalization-in-drive-technology/data-analytics/digitalize-low-voltage-motors.html#Quicksupport)
  Links to all information about SIMOTICS CONNECT 400, SIDRIVE IQ Fleet, Insights Hub, and SIDRIVE IQ Config

Insights Hub

- Industrial IOT Store for purchasing SIDRIVE IQ Fleet Starter Package and Upgrade Package (https://www.dex.siemens.com/industrial-iot/applications/sidrive-iq-fleet-package-starter)
- Insights Hub documentation for "Settings" application to manage users and subtenants (https://documentation.mindsphere.io/resources/html/settings/en-US/index.html)
- Insights Hub documentation for "Usage Transparency" application to track the usage of the resources (https://documentation.mindsphere.io/resources/html/usage-transparency-service/en-US/index.html)
- Insights Hub documentation for "Sharing assets with Cross-Tenancy" (https://documentation.mindsphere.io/resources/html/asset-manager/en-US/125945951755.html)

8.2 Product support

Technical questions or additional information

If you have any technical questions or require additional information, please contact Technical Support (https://support.industry.siemens.com/cs/ww/en/sc/4868).

Have the following connectivity module data ready:

- SIMOTICS CONNECT 400 firmware version
- SIDRIVE IQ Config app version
- Tenant name
- Asset name (onboarded)
- Serial number and manufacturer's article number (MLFB) of the motor (onboarded)
- Detailed error description with logged messages if possible
- Date of manufacture of the battery cells that is stamped on the lower edge of the battery cell

Contact person

Please contact your local partner if you wish to request service. This office will contact the responsible service center on your behalf. You can find your local partner in the relevant contact database (www.siemens.com/yourcontact).

Siemens product support

You can find additional information about the product at:

Product support (http://www.siemens.com/automation/service&support)

The following is provided at this address:

- Current product information (product data sheets) FAQs (frequently asked questions), downloads.
- The Newsletter contains the latest information about the products that you are using.
- The Knowledge Manager (intelligent search) helps you find the documents that you are looking for.
- Users and specialists from around the world share their experience and knowledge in the Forum.
- Information about our local service, repairs, spare parts and much more is provided under "Services".

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