

SKF Enlight Centre



User Manual

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1 General product information

General information such as product user manuals and catalogs are published on the [Condition Monitoring Products](#) site on SKF.com. General product information can also be downloaded from the self-service web portal at <https://skfusa-portal.kb.net/>.

2 Product support contact information

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Table of contents

1	Introduction	7
1.1	Overview	7
1.2	Scope	8
1.3	Typographical convention.....	8
1.4	Supported web browsers	8
1.5	Navigation	8
2	User access control	9
3	Machine health status.....	10
3.1	Health status categories	11
4	Functionality description	13
4.1	Log in	13
4.2	User settings	14
4.3	User Admin	14
4.4	Hierarchy.....	15
4.5	Routes.....	24
4.6	Analyze	30
4.7	Reports.....	37
4.8	Insights.....	45
5	Glossary.....	47
6	References.....	49
7	End-User License Agreement	50

1 Introduction

This chapter is a short introduction to SKF Enlight Centre.

1.1 Overview

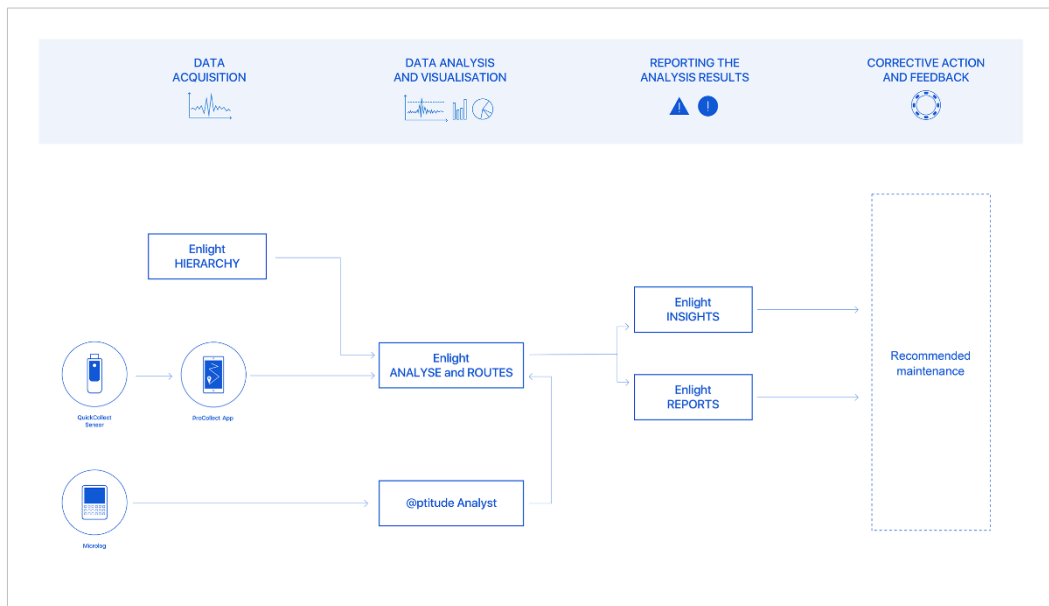


Figure 1 – Enlight Centre workflow

The SKF Enlight Centre is a web-based software that is designed to facilitate collection and analysis of machine data. Enlight Centre then uses this data to provide insight and actions that help SKF improve the customer’s efficiency and reliability.

Data can be collected using various data acquisition devices. To collect machine data, routes are created in Enlight Centre. The routes are downloaded to the data acquisition device and walked by an inspector. Machine data is collected with the data acquisition device, see Section **6 References** for further information.

When machine data has been collected, the data is uploaded from the data acquisition device to Enlight Centre and the route is marked as completed.

1.2 Scope

The purpose of this user manual is to provide instructions for Enlight Centre. The intended audience is all users of Enlight Centre. The manual includes descriptions of different roles and the functionality available for the different roles. The manual does not contain information about any hardware or how to install or modify other software. See Section **6 References** for further information.

1.3 Typographical convention

Names of buttons and on-screen objects are presented in bold text, e.g. click **Log in**.

In this manual, the word “select” means to choose and confirm selection of an item or alternative.

Messages displayed on the screen are written in italics enclosed in single quotes, e.g. ‘*A route already exists*’.

Note: *Is used to indicate notes to the reader (information of special importance).*

Step-by-step procedures are sequenced using sequence numbering: 1., 2., 3., ...

Procedures not dependent of sequence order use bullets: •. Bullets can also mark a list of functions or buttons.

1.4 Supported web browsers

Enlight Centre supports Chrome, Firefox, Safari and Edge. It does not support Internet Explorer. Contact SKF for more information about browser versions, see **Product support contact information**.

1.5 Navigation

Main navigation in Enlight Centre is based on drill-down functionality through the available company hierarchies. The individual segments in the navigation bar are called cards. Click on the desired card to select a specified view or return to the top view by clicking the **All customers** card, see **Figure 2**.

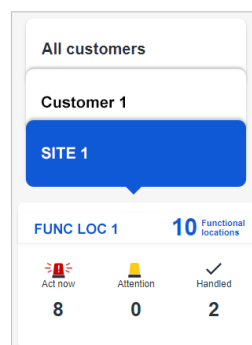


Figure 2 – Example of navigation cards in the Analyze function

2 User access control

User access control is used to manage user access to functionalities and specific company hierarchies. It is also used to set permissions which enables the users to perform certain operation within Enlight Centre.

All roles have access to own personal user settings in the **User settings** panel.

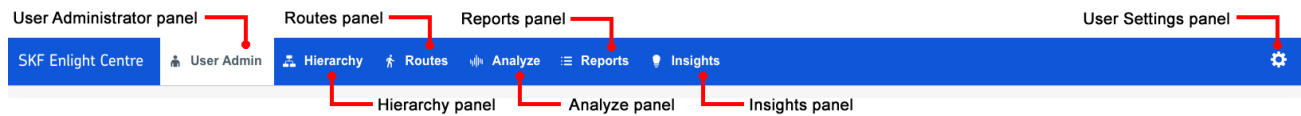


Figure 3 – Enlight Centre main menu with panels for different functions

3 Machine health status

This chapter describes **Machine health status** and how this is determined.

Machine status is determined by several factors, see **Figure 4**.

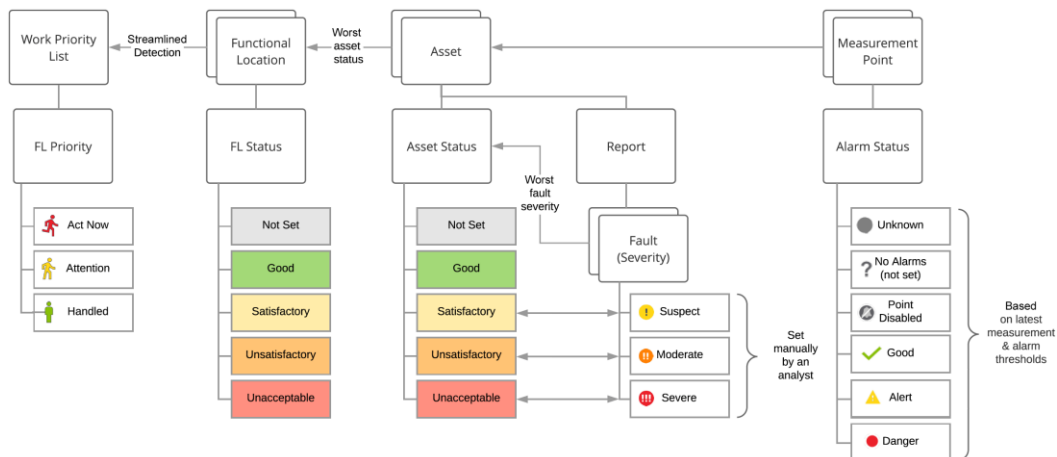


Figure 4 – Determining machine health status

How to set alarm levels

An enabled measurement point with data can have the following alarm status:

- **Danger:** Measurement value above the danger level.
- **Alert:** Measurement value above the warning level and below the danger level.
- **Good:** Measurement value below the warning and danger levels.
- **Not set:** Alarm levels are undefined, and status cannot be set.

See also Section **4.4.7 Set alarm thresholds**.

Faults and Severity

When reporting faults, select between the different severity levels:

- Severe
- Moderate
- Suspect

Fault severity is mapped to health status, according to:

- **Unacceptable:** Severe
- **Unsatisfactory:** Moderate
- **Satisfactory:** Suspect & Minor
- **Good:** No open fault

3.1 Health status categories

The health status categories are described in detail in **Table 1**.

Table 1 – Description of health status categories

Status	Health status category description
Unacceptable (SEVERE)	<p>The Asset Health Status is Unacceptable when the identified fault severity is Severe.</p> <p>Assets in this category have a high risk of immediate functional failure or sustaining secondary damage; this health status involves taking urgent corrective actions to repair or improve the reliability of the asset and reduce risks.</p> <p>Short-term urgency, the problem requires correction in the short term, in general within a few days or weeks.</p> <p>Work Notification must be issued to communicate faults and remedial actions recommended to improve the asset health.</p>
UNSATISFACTORY (MODERATE)	<p>The Asset Health Status is Unsatisfactory when the identified fault severity is marked as Moderate. The Asset Classes in this category have a high risk of functional failure; this health status involves taking corrective actions to repair or improve the reliability of the asset and reduce risks.</p> <p>Mid-term urgency, it is generally estimated that the asset can perform its designated function up to the next vibration analysis survey or for the next few months, although this cannot be guaranteed.</p> <p>Work Notification must be issued to communicate faults and remedial actions recommended to improve the asset health.</p>
SUSPECT (SATISFACTORY)	<p>Assets in this category imply that there might be a Suspect fault which is not clearly identified, and additional measurements are required to clearly define the problem and its severity level.</p> <p>The asset health status is considered Satisfactory but might require that follow up actions are taken by SKF or the customer to support the decision to request corrective actions or update the asset health status to Good. Minor repair actions such as “lubrication”, “inspections” or others may be requested for assets in this health status category.</p>

Status	Health status category description
<p style="text-align: center;">GOOD (NORMAL)</p>	<p>The health status of the asset is considered Good to perform the required function up to the next vibration analysis survey.</p> <p>There are no significant changes over time. Repair actions are not required.</p>
<p style="text-align: center;">NOT MONITORED</p>	<p>The Not Monitored category is applicable to assets which the health status could not be assessed due to safety constraints (e.g. data not collected due to inaccessibility) or CM software or hardware fault.</p> <p>Repair actions such as “Replace coupling guard”, “Replace sensor cable” or others may be requested to assets under this health status category.</p>
<p style="text-align: center;">OUT OF SERVICE</p>	<p>The Out of Service category is applicable to assets whose health status could not be assessed due to it not being operational, not being under the required operating regime or being under maintenance.</p>

Note: The categories **Not Monitored** and **Out of Service** do not replace previous Asset Health Status classification if the severity of the fault is either **Satisfactory**, **Unsatisfactory** or **Unacceptable**.

4 Functionality description

This chapter describes the functions in Enlight Centre.

4.1 Log in

Enlight Centre is a web-based software where the client runs in a web browser. See also Section 1.4 **Supported web browsers**. The user account is set up by a local sales representative.

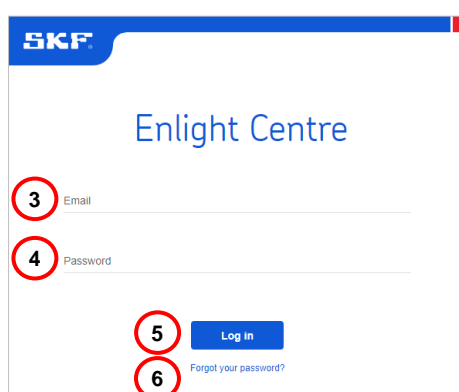


Figure 5 – Log In

- 1 Start an internet browser.
- 2 Open the URL: <http://enlight.skf.com/>
- 3 Enter the registered **Email** address.
- 4 Enter **Password**.
- 5 Press **Log In**.
- 6 Select **Forgot your password?** to reset the password.

4.2 User settings

In the **User settings** panel the user can change the password and log out. User access can also be viewed, see **Figure 6**. Select the **User settings** panel in the main menu.

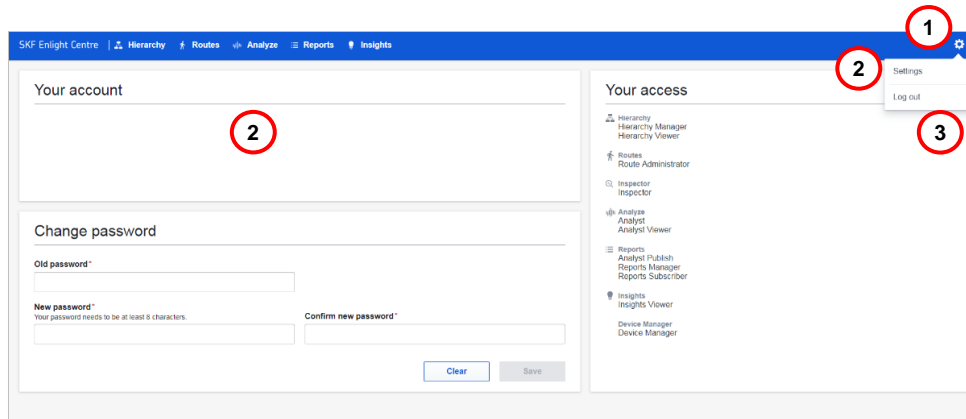


Figure 6 – User Settings

- 1 Select the **User settings** button in the main menu.
- 2 Select **Settings** to change password and view user access.
- 3 Press **Log Out** to log out from Enlight Centre.

4.3 User Admin

The **User Admin** panel is only accessible to the User Administrators. In this panel, new users are created and the existing users of Enlight Centre are administered.

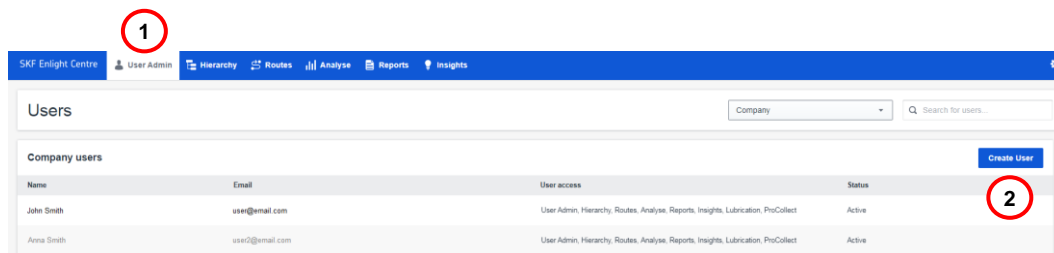


Figure 7 - User Administration panel

- 1 Select the **User Admin** panel in the main menu.
- 2 Press **Create User** to add a new user. Optionally, select an existing user to **Edit** the user details.

Hierarchy

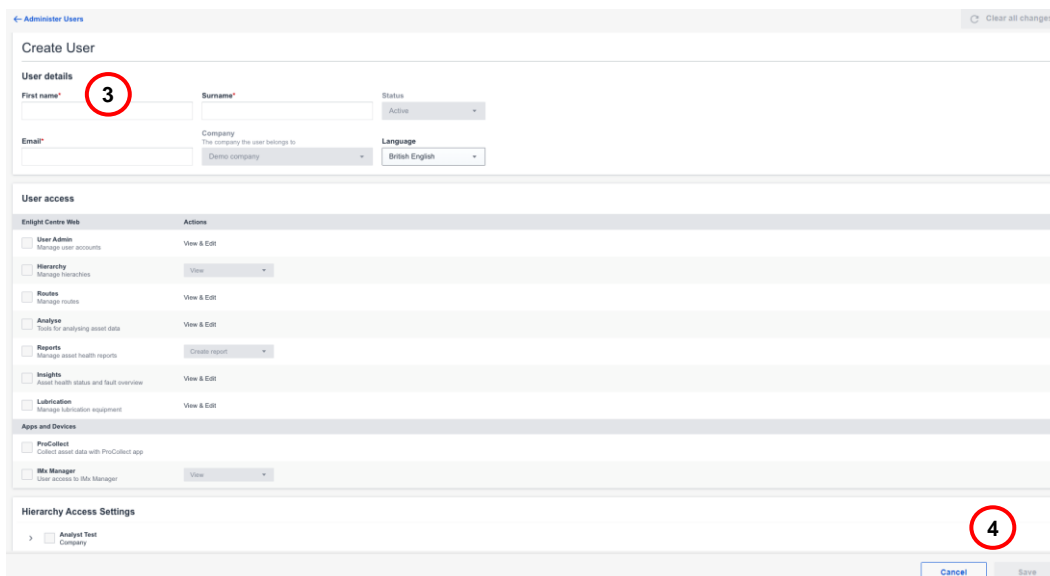


Figure 8 – User Details panel

- 3 The User details panel manages the following: **Name, Status, Company** the user belongs to, **Language setting, User Roles** and **Hierarchy Access Settings**.
- 4 Press **Save** to apply the user details.

4.4 Hierarchy

Hierarchies are used to set up companies in a structured way so that condition monitoring can be performed.

The **Hierarchy** panel displays an overview of a company’s Sites with Functional Locations, Assets, Measurement Points and Inspection Points available for the user. The view is divided into levels. This is an example:

- Root Level (Company)
- Level 1 (Site)
- Level 2 (Plant, Ship, System or Functional Location)
- Level 3 (System or Functional Location)
- Level 4 (System, Functional Location or Asset)
- Level 5 (Asset, Measurement Point or Inspection Point)
- Level 6 (Measurement Point or Inspection Point)

The available Sites with Functional Locations visible in the overview depends on which customer hierarchies the user is assigned access to, by an administrator.

Important: To use Route functionality, **Hierarchies** need to have either **Plant** or **Ship** nodes.

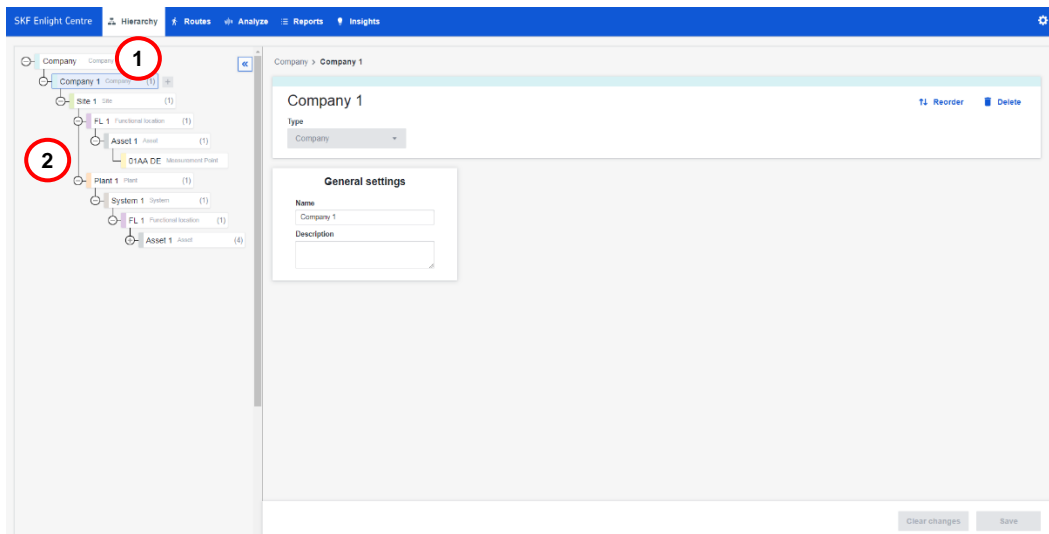


Figure 9 – Hierarchy Cards and Hierarchy Tree

- 1 Select the **Hierarchy** panel in the main menu.
- 2 Navigate through the hierarchy tree to reach the desired view.

4.4.1 Add a node

Sites, Functional Locations, Assets, Measurement Points and Inspection Points can be added by a Hierarchy Manager to create a customer hierarchy.

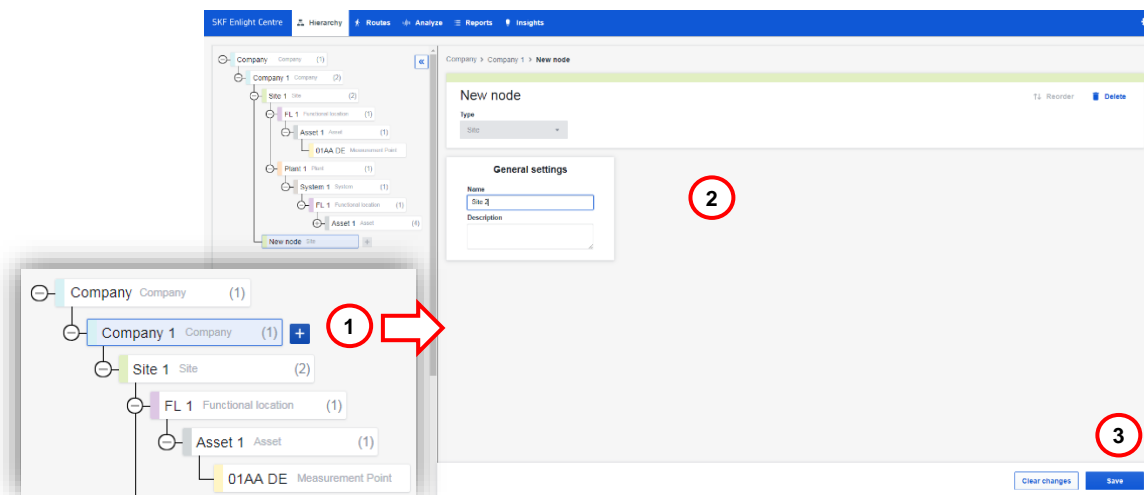


Figure 10 – Add a node

- 1 To add a node at a level, select the desired level in the hierarchy and press the **Add node (+)** button.
- 2 Enter the required information.
- 3 Press **Save**.

Hierarchy

4.4.2 Duplicate Functional Locations and Assets

Entire **Functional Locations** and **Assets** can be duplicated in the **Hierarchy** section. The duplicated node is duplicated with all connected nodes, located in the same place of the hierarchy.

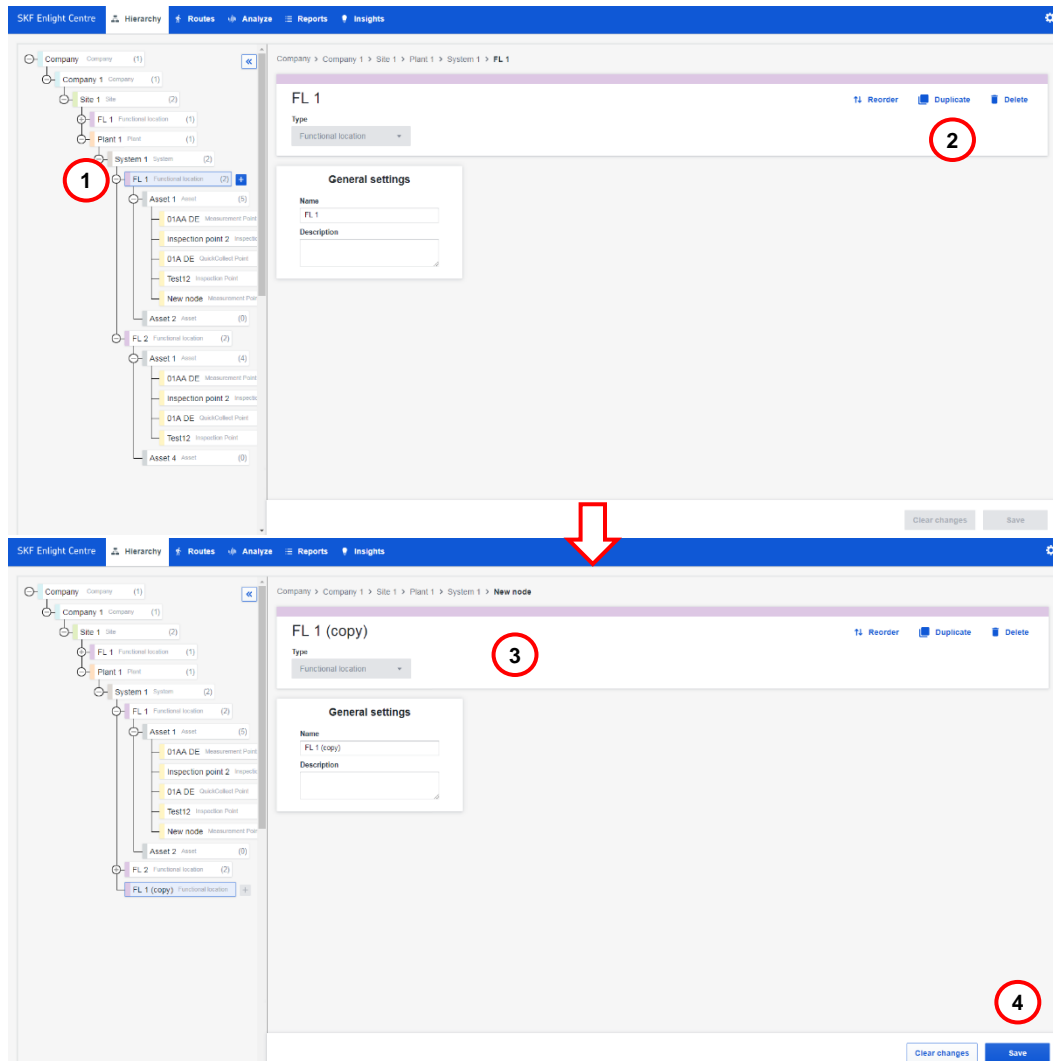


Figure 11 – Duplicate Functional Locations or Assets

- 1 Navigate to **Functional Location** or **Asset** that needs to be duplicated.
- 2 Select the **Duplicate** option.
- 3 A copy of the selected node is displayed.
- 4 Press **Save**.
- 5 The copied node and the connected nodes can now be modified.

Note: The copied node must also be saved before any modifications can be performed on the source node.

4.4.3 Remove branches

Complete branches can be removed from the **Hierarchy** panel. This deletes the entire branch, including all connected nodes originating from the selected node.

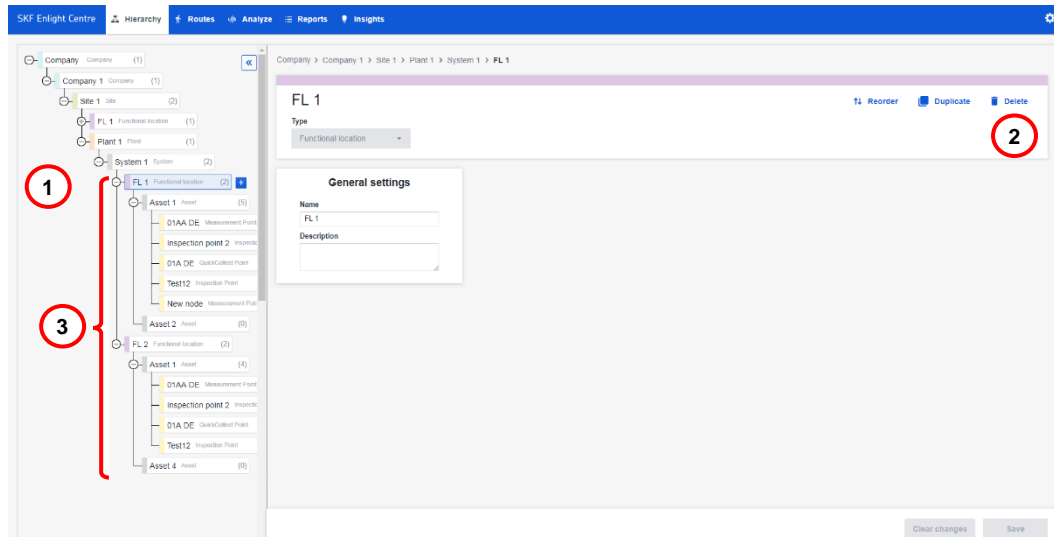


Figure 12 – Remove branches from Hierarchy panel

- 1 Navigate to the branch and node that needs to be removed.
- 2 Select the **Delete** option.
- 3 The **Delete** option removes the selected node and all the connected nodes.

4.4.4 Assign type, sequence and image to Assets

An **Asset** selected in the **Hierarchy** panel can be assigned an **Asset Type** according to the SKF taxonomy and, if applicable, an **Asset Sequence**,

In addition, it is possible to upload an image for each **Asset**. The image is shown in the **ProCollect App**, if the **Asset** is in a **Route**.

Hierarchy

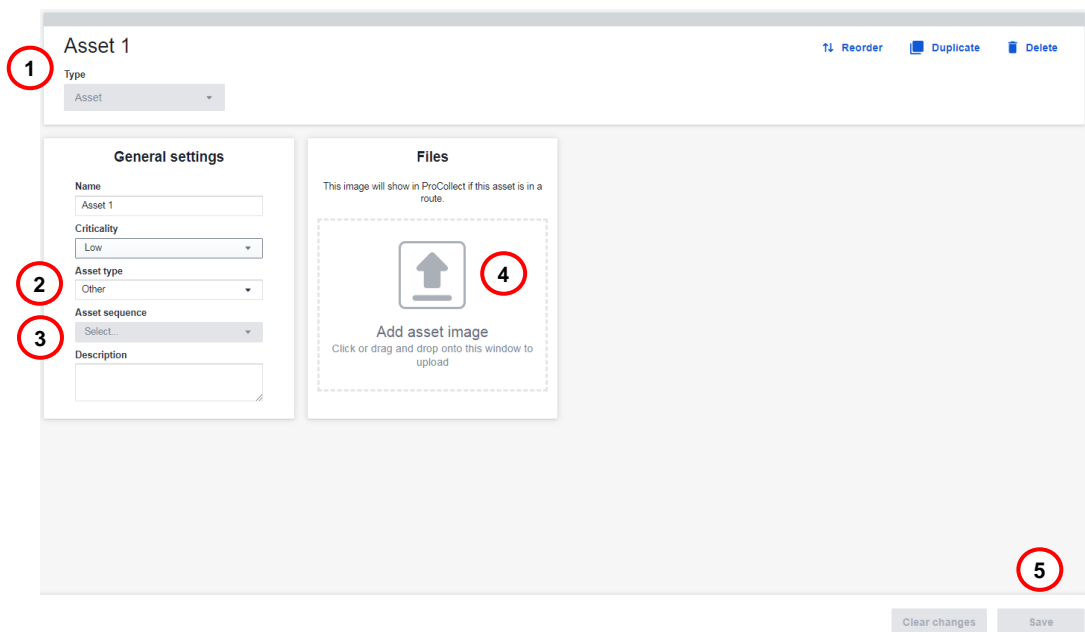


Figure 13 – Assign type, sequence and upload image for an Asset

- 1 Select the desired **Asset** to update.
- 2 Select the **Asset Type** either by searching or viewing the drop-down list.
- 3 If applicable, select the **Asset Sequence**.
- 4 Upload an image to the **Asset**, either by clicking “**Add Asset Image**” to browse, or by dragging and then dropping the desired image.
- 5 Press **Save**.

4.4.5 Inspection points with graphical gauges

In hierarchies, three different types of **Inspection points** can be created:

- Numerical
- Single-Choice questions
- Multi-Choice questions

It is possible to configure the visualization type for **inspection points** with circular or level gauges for the **ProCollect App**. The graphical gauges are used when collecting machine data for the **inspection point** and will indicate any configured **alarm thresholds**.

Figure 14 – Numerical inspection point with graphical gauges

- 1 Add a node to an **Asset** and select **Inspection point** in the drop-down list.
- 2 Add a name of the **Inspection point**.
- 3 Select **Type of Inspection Value** in the drop-down list.
- 4 Select a **Visualization type** in the drop-down list.
- 5 For numeric inspection values, add desired **Min. value**, **Max. value** and **Unit of measurement**. For Single choice question and Multiple-choice question, add one or multiple desired **Answers**.
- 6 Press **Save**.

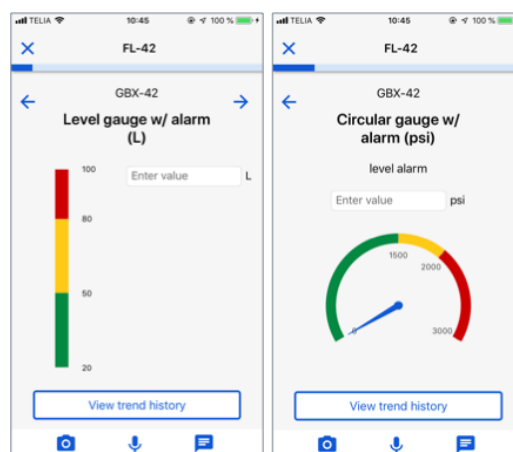


Figure 15 – Level and Circular gauges in the ProCollect App

Hierarchy

4.4.6 Configuration for QuickCollect sensor and extension sensor

In hierarchies, **Measurement points** and **QuickCollect points** can be configured specifically with the use of a **QuickCollect sensor**.

Additionally, when using the **QuickCollect sensor model CMDT 391/392** on applicable points, the use of an **extension sensor** can be configured. **Temperature alarms** are disabled if the **external sensor** is configured for the **Measurement point**.

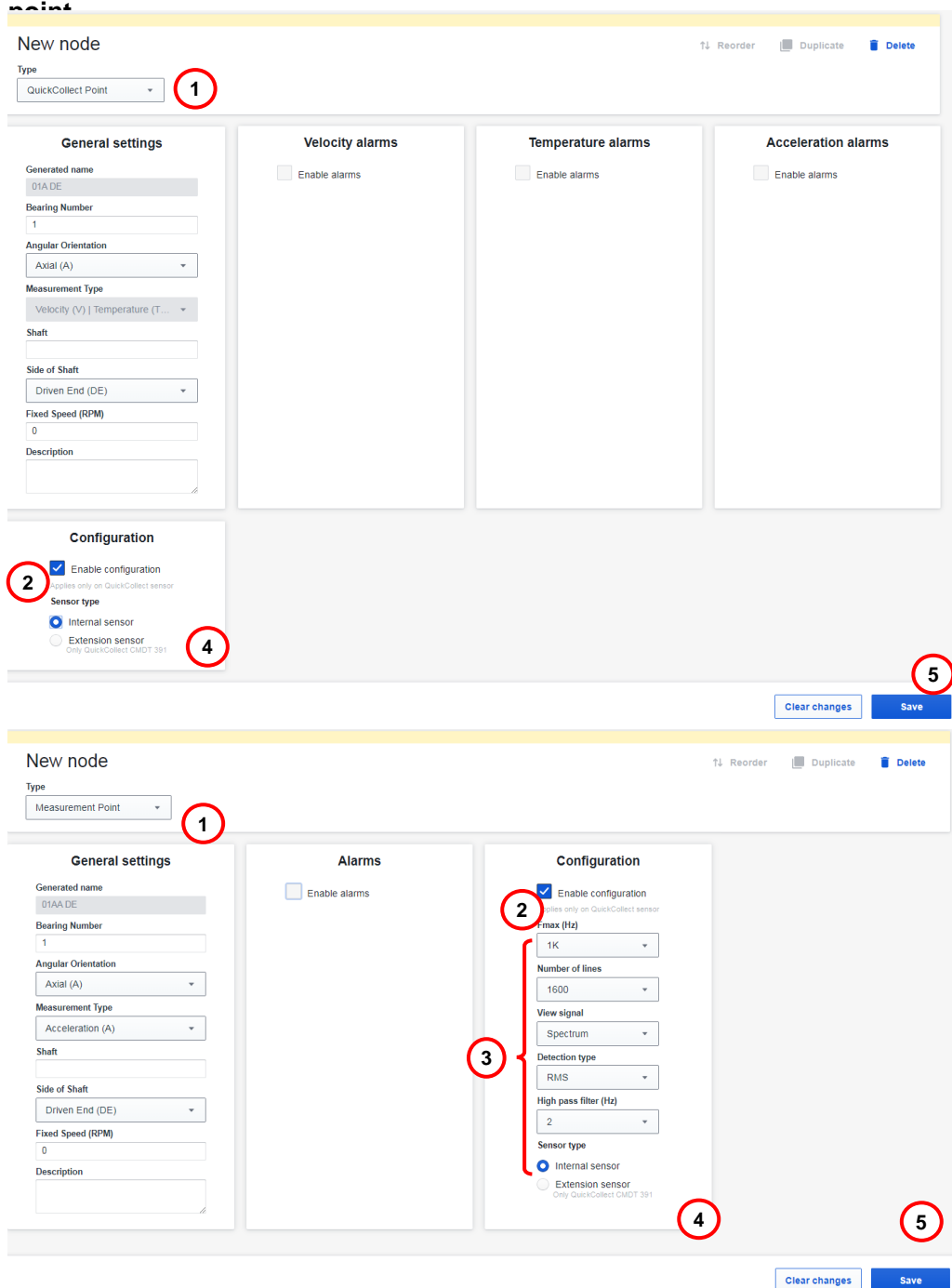


Figure 16 – Measurement point configuration without extension sensor

- 1 Add a node to an **Asset** and select **QuickCollect point** or **Measurement point** in the drop-down list.
- 2 Select **Enable configuration**. (This only applies on QuickCollect sensor)
- 3 For **Measurement points**, select the desired configuration in the drop-down lists.
- 4 Select **Sensor type**: either **Internal sensor** or **Extension sensor**.
Note: Extension sensor is only applicable when using QuickCollect sensor model CMDT 391/392.
- 5 Press **Save**.

Measurement points with enabled configuration for **QuickCollect sensor** have additional settings that can be configured. These settings include: **Fmax (Hz)**, **Number of lines**, **View signal**, **Detection signal** and **High pass filter**.

Configuration

Enable configuration
Applies only on QuickCollect sensor

Fmax (Hz)

Number of lines

View signal

Detection type

High pass filter (Hz)

Sensor type

Internal sensor

Extension sensor
Only QuickCollect CMDT 391

Figure 17 – Measurement point with enabled configuration for QuickCollect Sensor

4.4.7 Set alarm thresholds

In hierarchies, the **alarm thresholds** for a **Measurement point**, **Inspection point** or **QuickCollect point** are set, see **Figure 18**.

Hierarchy

Machine data collected and transferred to Enlight Centre is displayed on the screen with easy-to-identify colour-coded bars that indicate alarm status: green for acceptable, yellow for alert and red for danger.

The alarm levels can also be synchronised with the SKF ProCollect app. See the ProCollect User Manual, Section **6 References**, for further information.

Note: The alarm thresholds can only be set after the **Measurement point**, **Inspection point** or **QuickCollect point** is saved.

The screenshot shows five panels for configuring alarm levels. Each panel has a '1' circled next to the 'Enable alarms' checkbox. The panels are:

- Alarms:** Enable alarms (checked), Out of window (selected), In window (unselected). Thresholds: Danger high (90), Alert high (85), Good (green), Alert low (15), Danger low (10).
- Alarms:** Enable alarms (checked), Out of window (unselected), In window (selected). Thresholds: Good high (90), Alert high (80), Danger (red), Alert low (30), Good low (20).
- Velocity alarms:** Enable alarms (checked), Out of window (unselected), In window (selected). Thresholds: Danger high (9), Alert high (8), Good (green), Alert low (2), Danger low (1).
- Temperature alarms:** Enable alarms (checked), Out of window (selected), In window (unselected). Thresholds: Danger high (10), Alert high (8), Good (green), Alert low (3), Danger low (1).
- Acceleration alarms:** Enable alarms (checked), Out of window (selected), In window (unselected). Thresholds: Danger high (10), Alert high (8), Good (green), Alert low (3), Danger low (1).

Figure 18 – Set alarm levels for Measurement point, Numeric Inspection point and QuickCollect point

- 1 Select **Enable alarm** and enter values for the alarm thresholds.
- 2 **Out of window** means that if a value is outside a certain range, it will trigger an alarm. An example of this is temperature. If something is too cold or too hot, it is 'bad'. In this case it is **Danger high** if it is too hot and **Danger low** if it is too low.
- 3 **In window** is the opposite alarm logic. The value is considered good if it is above a certain number or below a certain number. An out of window alarm is more commonly used, but in either case the colour bar to the right, will usefully feedback a confirmation of where the alarm zones are being set.

Alarms can be configured for **Inspection points** with either single choice or multiple-choice question. An alarm and operator instructions can be specified for each added answer.

The screenshot shows the 'Inspection point' configuration page. At the top, there's a title 'Inspection point' and three action buttons: 'Reorder', 'Duplicate', and 'Delete'. Below the title is a 'Type' dropdown menu currently set to 'Inspection Point'. The main area is titled 'General settings' and contains the following fields:

- Header/Question:** A text input field containing 'Inspection point'.
- Type of Inspection Value:** A dropdown menu set to 'Single choice question'.
- Add an answer:** A blue link.
- Answer 1:** A text input field containing 'Test answer 1'.
- Alarm:** A dropdown menu set to 'Good'.
- Operator Instruction:** A text input field.
- Answer 2:** A text input field containing 'Test answer 2'.
- Alarm:** A dropdown menu set to 'Alert'.
- Operator Instruction:** A text input field.
- Remove answer 2:** A blue link.
- Description:** A text area.

At the bottom right, there are two buttons: 'Clear changes' and 'Save'.

Figure 19 – Set alarm levels for multiple choice question Inspection point and QuickCollect Point

4.5 Routes

Routes are used to manage what data to collect and when data is to be collected from machines using portable devices. A route is a selection of Functional Locations with measurement or inspection points.

The Routes panel displays a list of created routes, see **Figure 20** and **Figure 21**.

When clicking on a route, a more detailed view of the route is displayed, including the Functional Locations, Assets and Points.

Routes can be created to have a mix of Points and complete Assets.

Basic routes can be set as **Make Rewalkable**, which allows the user to create copies of the exact same route through the **ProCollect App**.

Recurring routes are collected in a scheduled interval, which can be specified when creating or editing a route. The recurring routes can be set to inactive or active, which enables the collection to be turned off/on. It is possible to set the schedule interval for each Functional Location and in addition, Assets and Points can have their own schedule.

Observation routes are time-limited routes, intended for repeated data collection on machines that need closer monitoring during a time-period up to 6 months. The content of an observation route is always the same, regardless of the individual functional location schedules.

Routes

Important: Before a route can be created, either a **Plant** or **Ship** must be attached to the **Company** or **Site**. Only eligible plants or ships are shown in the list of available routes.

Note: Only one route can be active at a time per ship. Once the active route is returned to Enlight Centre, a new route can be sent to the ship. Plants support multiple active routes at the same time.

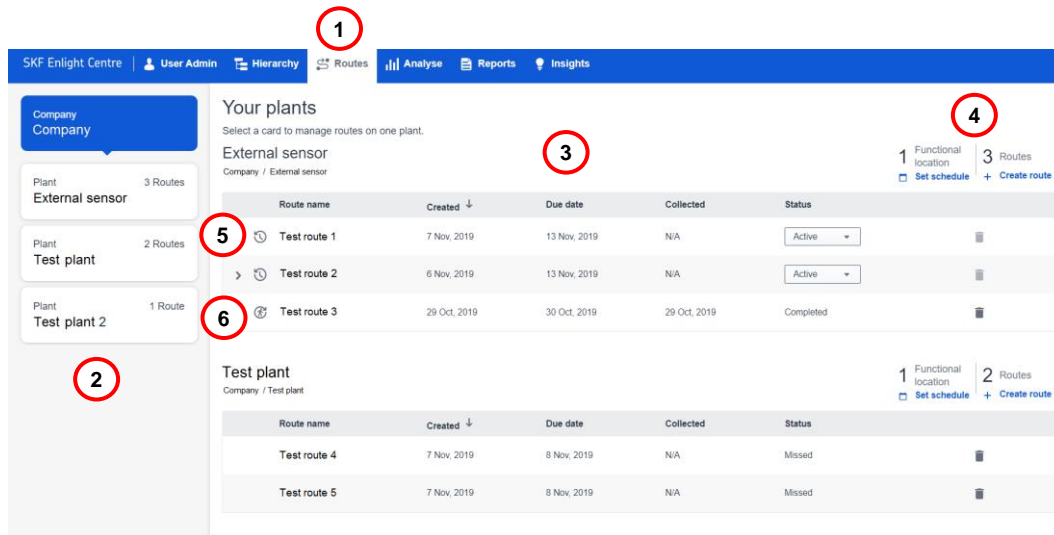


Figure 20 – Routes landing page

- 1 Select the **Routes** panel in the main menu. The **Routes** landing page shows a summary of all routes.
- 2 Navigation panel for **Routes**, used to select a specific **Plant** or **Ship**.
- 3 Overview of the available **Routes**, sorted by **Plant** or **Ship**.
- 4 Summary of number of **Functional Locations** and created **Routes**.
- 5 This symbol indicates instances of recurring routes.
- 6 This symbol indicates instances of rewalkable routes.

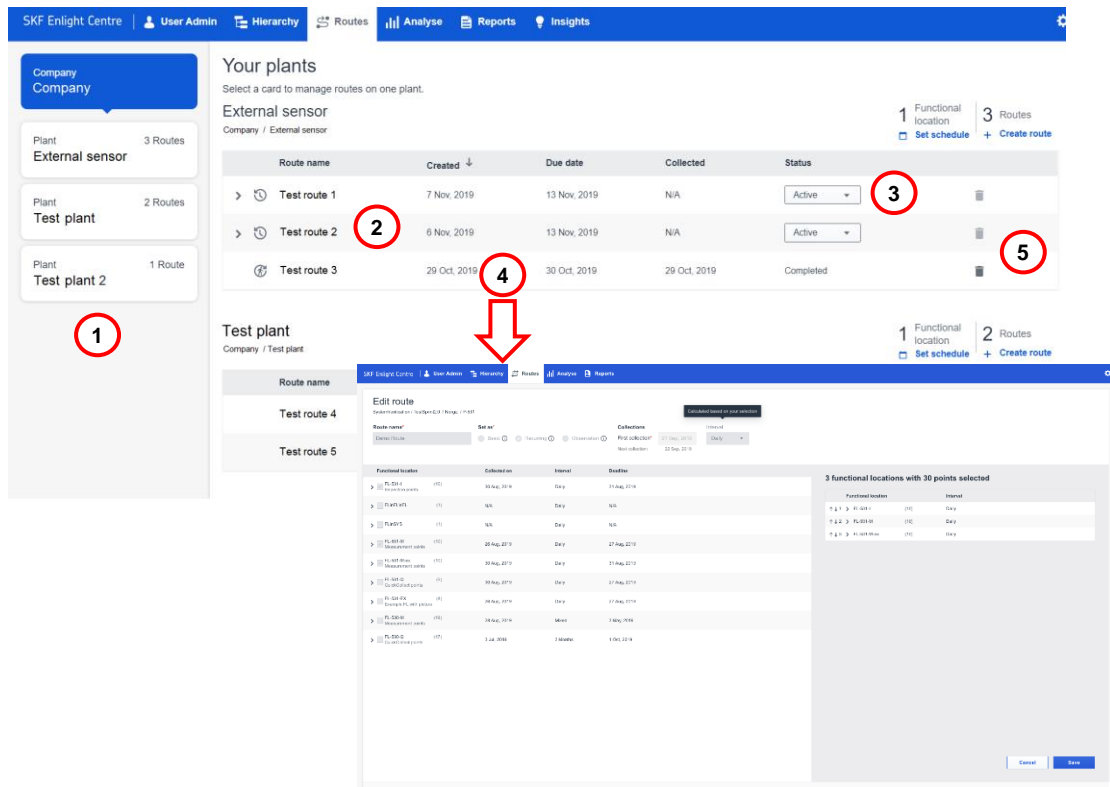


Figure 21 – Routes view of a specified Plant or Ship

- 1 Select the desired **Plant** or **Ship** from the navigation panel.
- 2 List of created routes for the specified **Plant** or **Ship**.
- 3 The status of recurring routes can be set to either **Active** or **Inactive**, using the drop down list.
- 4 Click on an existing route in the route list to display a detailed view of the route, from which the route can be edited.
- 5 Press the **Delete** button to delete a route without ongoing collection.

4.5.1 Creating a route

Routes can be created either directly from the Routes landing page, or from the Routes view, see **Figure 22**. The create route form lists all available functional locations on the selected level, and all sub-levels, in the hierarchy that the user has access to.

Routes

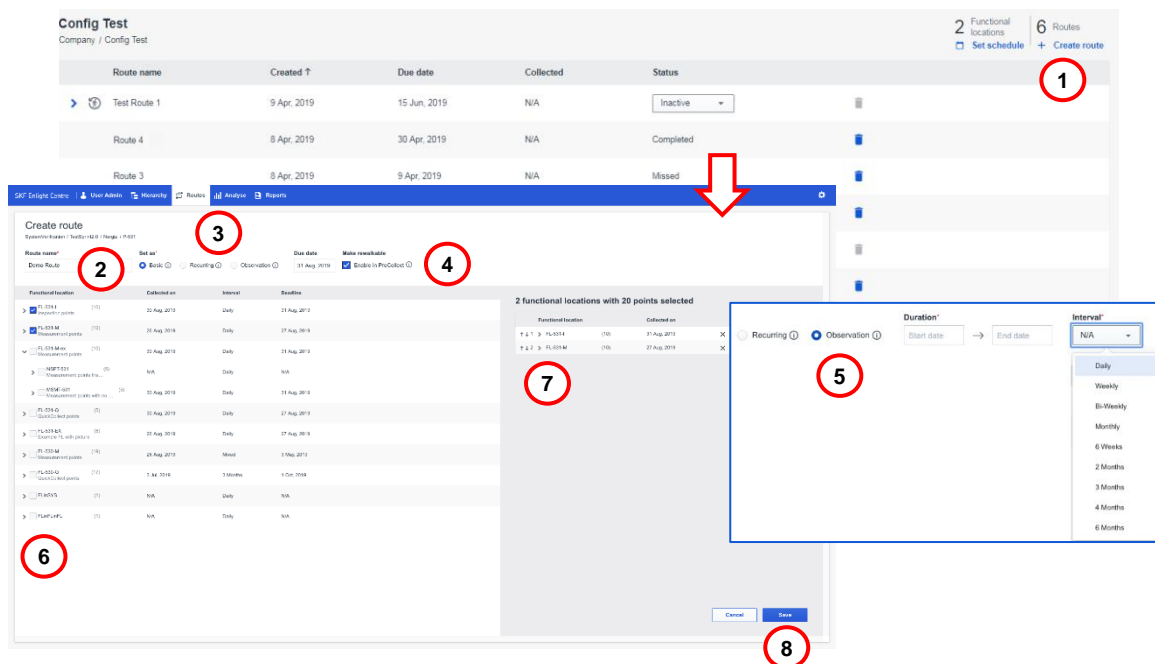


Figure 22 – Create route

- 1 Select the **+ Create Route** option.
- 2 Enter the **Route name**.
- 3 **Set as** either **Basic**, **Recurring** or **Observation**.
- 4 For **Basic** routes, set **Due date** for the route. Optionally for **Basic** routes, set **Make rewalkable**. For **Recurring** routes, set date for **First collection**.
- 5 For **Recurring** routes, select the desired **Interval** for how often the route should be collected. For **Observation** routes, set the desired **duration** for how long the route should be observed, and then select the **Interval**.
***Note:** The **Interval** is automatically set based on the individual scheduled intervals of the Functional Locations. If no scheduled intervals are set for the Functional Locations, the **Interval** can be set manually.*
- 6 Select specified **Functional Locations**, **Assets** and **Points** by ticking the boxes.
- 7 List of the selected Functional Locations, Assets and Points. Press the up and down arrows to re-order the list.
- 8 Press **Save** to save the route or **Cancel** to cancel the operation.

4.5.1.1 Set Schedule for recurring routes

The option **Set Schedule** enables the user to set how often data should be collected from a specified Functional Location, see **Figure 23**.

The following options for the scheduled intervals are available:

- Mixed
- Daily
- Weekly
- Bi-weekly
- Monthly
- 6 weeks
- 2 months
- 3 months
- 4 months
- 6 months

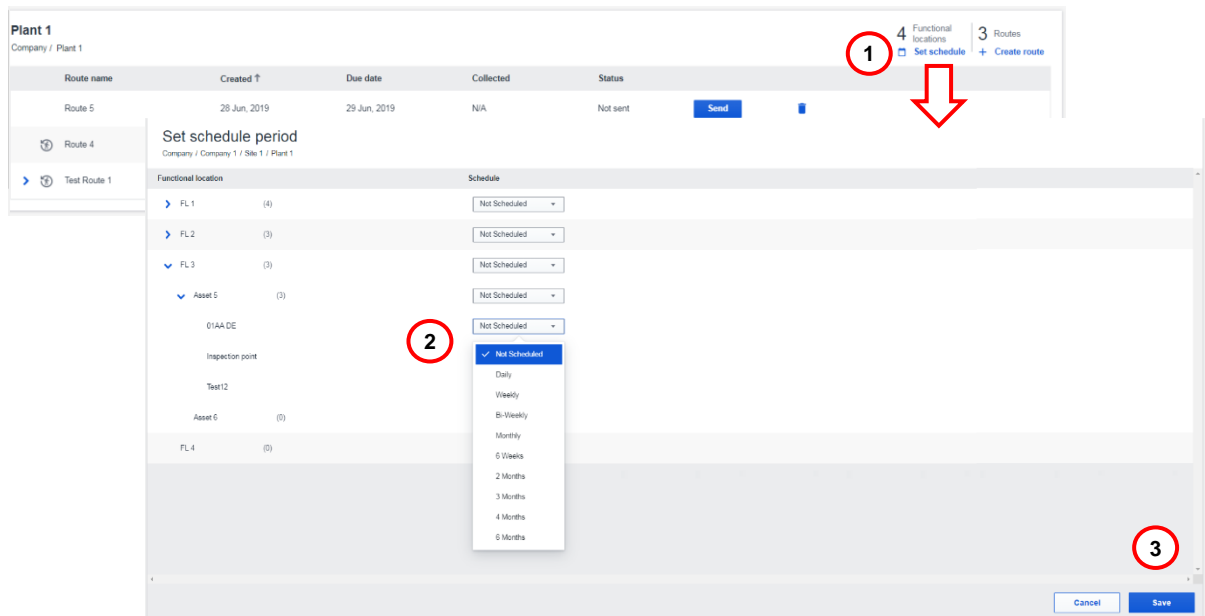


Figure 23 – Set schedule period

- 1 Press **Set Schedule**, to set the time period for when data should be collected on a specified Functional Location, Asset or Point.
- 2 Select **Interval** from the drop down list for each desired asset.
- 3 Press **Save** to save or **Cancel** to cancel the operation.

Routes

4.5.2 Send routes

Routes that does not have a set schedule can be sent manually, by pressing the **Send** button.

Route name	Created ↑	Due date	Collected	Status
Route 2	28 Jun, 2019	30 Jun, 2019	N/A	Sent ent Send
Route 4	8 Apr, 2019	30 Apr, 2019	N/A	Completed
Route 5	28 Jun, 2019	29 Jun, 2019	N/A	Sent
Route	8 Apr, 2019	9 Apr, 2019	N/A	Missed
> ⌚ Route 2	8 Apr, 2019	15 Jun, 2019	N/A	Inactive
Route 1	8 Apr, 2019	8 Apr, 2019	N/A	Completed

Figure 24 – Send routes

4.5.3 Route status

The **Status** column shows the status of a route, see **Figure 25**.

Route name	Created ↑	Due date	Collected	Status
> ⌚ Test Route 1	9 Apr, 2019	15 Jun, 2019	N/A	Inactive
Route 4	8 Apr, 2019	30 Apr, 2019	N/A	Completed
Route 3	8 Apr, 2019	9 Apr, 2019	N/A	Missed
⌚ Route	29 Jun, 2019	1 Jul, 2019	N/A	Active
> ⌚ Route 2	8 Apr, 2019	15 Jun, 2019	N/A	This is an ongoing node. Try again when it's completed.
Route 1	8 Apr, 2019	8 Apr, 2019	N/A	Completed

Figure 25 – Route status

The following route statuses are possible:

- **Not sent** – The route has been created in Enlight Centre but not sent to the data acquisition device.
- **Sent** – The route has been sent but not received by the data acquisition device.
- **Received** – The route has been received by the data acquisition device.
- **In progress** – The collecting of data has started but is not finished.
- **Missed** – The collecting of data was not finished on time and the route is overdue.
- **Completed** – The route is completed and the collected data uploaded to Enlight Centre.

Note: Full support for Route status indication is only available when using the Quick Collect Sensor. For MicroLog, the **In Progress** indication is not supported.

4.6 Analyze

The tree navigation of the **Analyze** panel displays an overview of the nodes available for the user. The list of all Assets of the selected node are shown in the Asset list. The available nodes visible in the overview depend on which customers hierarchies the user is assigned access to, by an administrator.

The colours indicated in the tree navigation represents the different levels of the hierarchy, starting with the Customer level. The Asset list can be sorted on the different columns. It is also possible to search for specific Assets, using the search field.

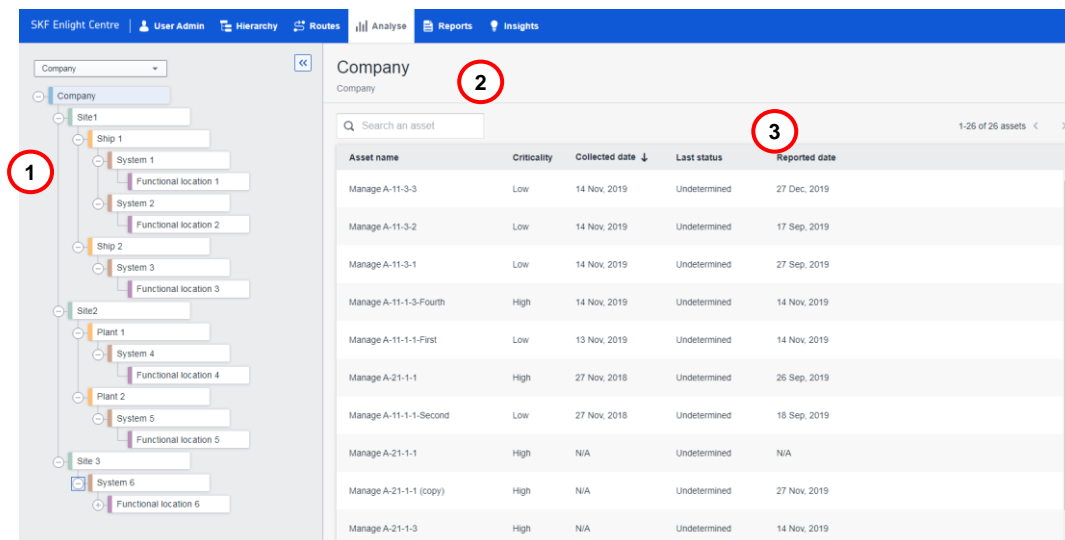


Figure 26 – Analyze landing page

- 1 Navigate through the assigned customer hierarchies, using the tree navigation panel.
- 2 Search for specific **Assets** using the search field.
- 3 Sort on **Asset name**, **Criticality**, **Collected date**, **Status**, or **Reported date** by clicking the labels. The sorting is either ascending or descending which is indicated by the arrows.

If **Anomaly Detection** is enabled for a company, the Anomaly score column is visible in the Analyze panel and anomaly scores are displayed on Asset level.

Asset name	Criticality	Anomaly score ↓	Collected date	Last status	Reported date
30Hz	Medium	55	29 Oct, 2019	Good	20 Dec, 2019

The Anomaly score conveys the condition of a machine, sorted on a scoring between 0 through 99.

- **0** indicates that the machine is most likely in a healthy state.
- **99** indicates that the machine is most likely in an anomalous state.

Analyze

4.6.1 Analyze assets

Trend, **Spectrum** and **Timewave** plots help determine if machinery condition changes are occurring and if so, to help with analysing the cause of machinery condition changes.

Select an Asset in the list to display a detailed view of the available Assets. Select an Asset in the Asset menu to display it in the Asset workspace. In the Asset workspace, detailed trends and graphs are displayed, see **Figure 27**.

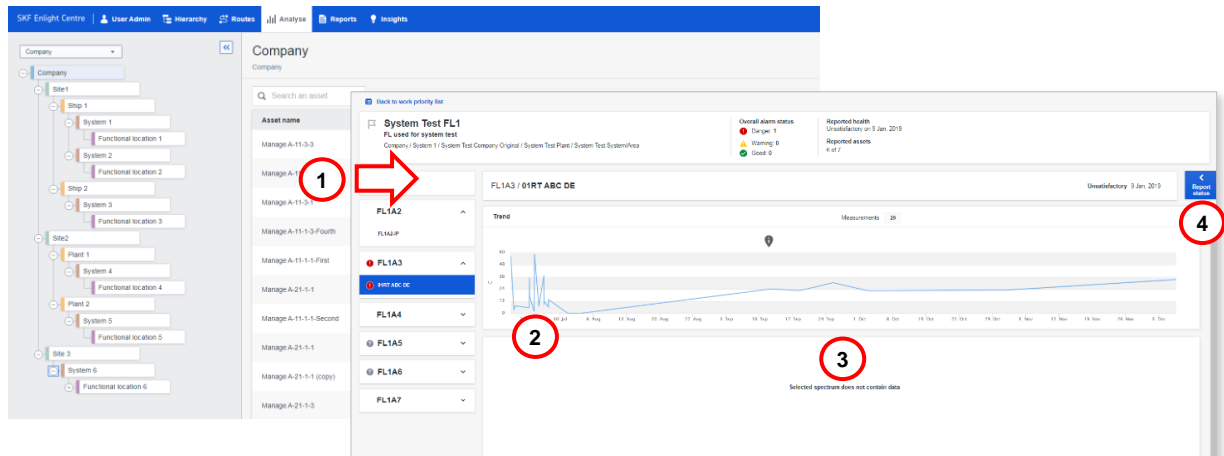


Figure 27 – Asset workspace

- 1 Select an **Asset** in the list to display a Trend plot in the detailed view page.
- 2 Click on a **Collection point** on the trend to display a **Spectrum plot** and **Timewave plot**, if available. The Timewave plot is automatically displayed below the Spectrum plot.

4.6.2 Trend plot

Trend plots allow the user to easily compare a measurement point's most recent reading to its previous readings and its alarm set up, allowing the user to see how the point is 'trending' over time. Trend plot is an easy and accurate method of detecting gradual changes in process conditions and changes that might otherwise be overlooked. The horizontal **X Axis** represents **Time** (Date/Time) and the vertical **Y Axis** represents **Magnitude**.



Figure 28 – Trend plot

- Click on the exclamation marks to see available process data.

4.6.3 Spectrum plot

Spectrum plot is a tool for performing analysis by breaking down the vibration measurements into component frequencies.

The horizontal **X Axis** represents **Vibration frequency** (Hz, CPM or Orders of running speed) and the vertical **Y Axis** represents **Vibration amplitude**.

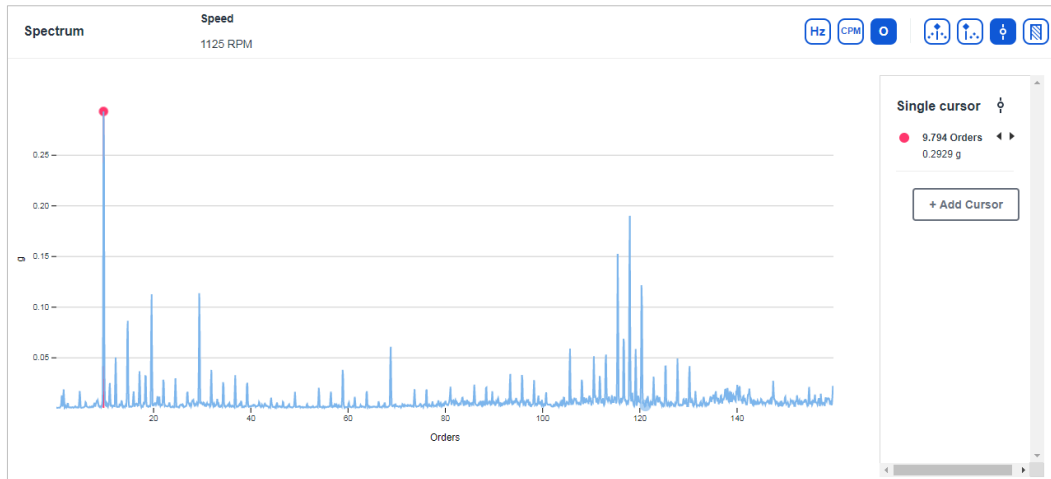


Figure 29 – Spectrum plot

- Use the **mouse scroll wheel** to scroll up and down in the plot.
- Zoom in the Spectrum plot with **shift + mouse scroll wheel**.
- Pan in the Spectrum plot with **shift + mouse drag left or right**.

4.6.4 Timewave plot

The **Timewave plot** displays amplitude versus time and is a sample of the raw vibration signal. Time waveform analysis can provide clues to machine condition that are not always evident in the frequency spectrum and, when available, should be used as part of the analysis program.

Analyze

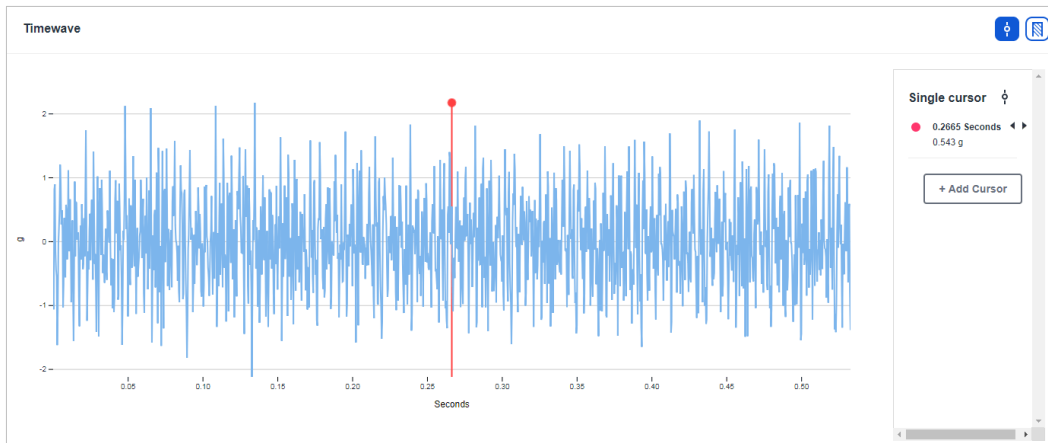


Figure 30 – Spectrum plot

- Use the **mouse scroll wheel** to scroll up and down in the plot.
- Zoom in the Timewave plot with **shift + mouse scroll wheel**.
- Pan in the Timewave plot with **shift + mouse drag left or right**.

4.6.5 Plot cursors

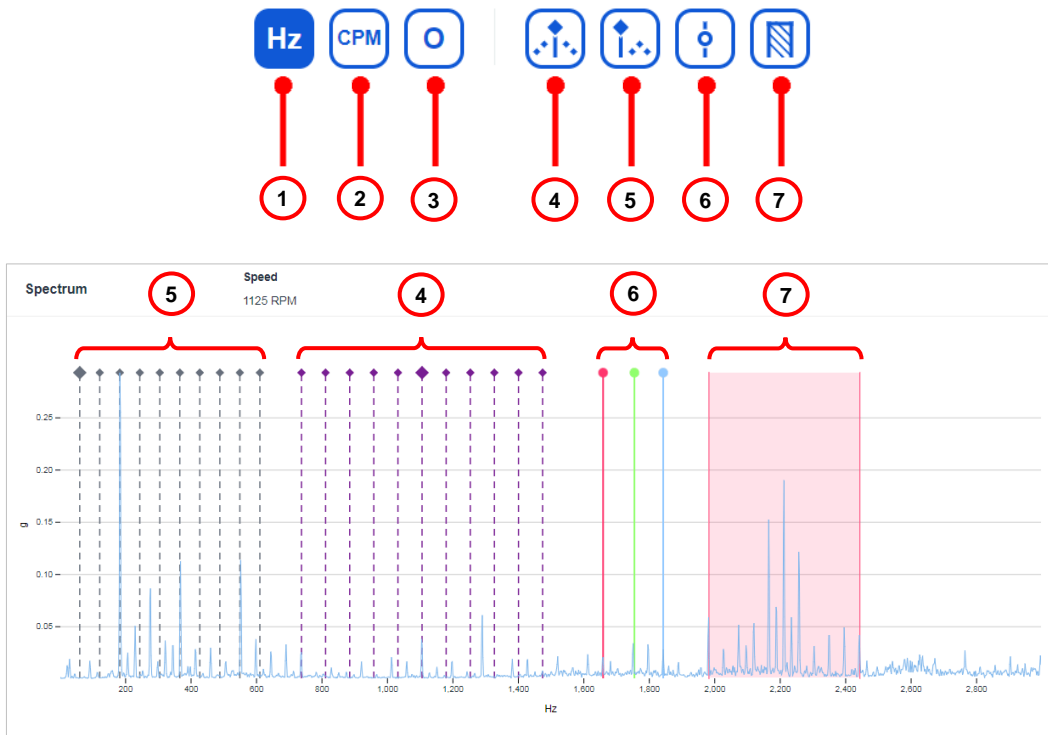


Figure 31 – Plot cursors

- 1 **Hz** – Displays the X-axis as cycles per second.
- 2 **CPM** – Displays the X-axis as cycles per minute.
- 3 **O** – Displays the X-axis as orders of running speed.
- 4 **Sideband cursor**
- 5 **Harmonic cursor**
- 6 **Single cursor**
- 7 **Band cursor**

4.6.5.1 Sideband cursor

The **Sideband cursor** displays additional cursors at frequencies to either side of the base cursor. For example, if the base cursor is placed at 5 orders and the sideband interval equals 1 order, then the 1st pair of sideband cursors will be located at ± 1 order on either side of the base cursor (i.e. at 4 and 6 orders). Additional sideband cursors (5 by default) will each be located an additional ± 1 order away.

Default settings

- Number of sidebands = 5. Change the number of sidebands by using the left and right arrows next to '**Sidebands**' in the information box to the right of the spectrum plot.
- The base cursor is placed at 50% of the frequency range.
- Sidebands are placed at $\pm 1x$, $\pm 2x$... $\pm 5x$ the base frequency.

Move base cursor

- Move the base cursor by selecting it with the mouse and dragging it along the frequency axis to the desired location.

Note: When moving the base cursor, the sidebands will also move to maintain $\pm 1x$, $\pm 2x$, ... $\pm 5x$ the interval from the base frequency.

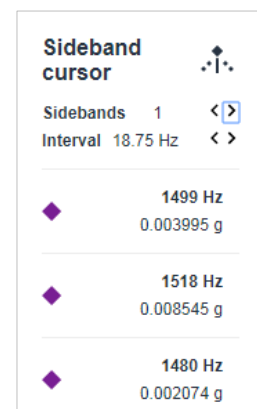
Move sidebands

- Move a sideband cursor by selecting it with the mouse and dragging it along the frequency axis.

Note: When moving a sideband cursor, the base frequency is not changed, and the sidebands are moved to maintain the same distance between them.

Information box

- The information box to the right of the spectrum plot displays the frequency and the amplitude for the base cursor and each sideband cursor.
- The number of sidebands and the interval between them can be controlled using the left and right arrows.



Analyze

4.6.5.2 Harmonic Cursor

The **Harmonic cursor** displays cursors at integer multiples of the base cursor. If the base cursor is located at 1x rpm, harmonics will appear at 2x, 3x, 4x, etc.

Default settings

- Number of harmonics displayed = 10. Alter the number of harmonics by using the left and right arrows next to **'Harmonies'** in the information box to the right of the spectrum plot.
- The base cursor is placed at 1x rpm when information of the speed of the machine is available.
- The base cursor is placed at 50% of the frequency range if the speed of the machine is not known.
- Harmonic markers are placed at 2x, 3x ...10x the base frequency.

Move base cursor

- Move the base cursor by selecting it with the mouse and dragging it along the frequency axis to the desired location.
- Move the base cursor by using the left & right arrows in the information box to the right of the spectrum plot.

Note: *When moving the base cursor, the harmonics will be moved to maintain 2x, 3x, 4x the base frequency.*

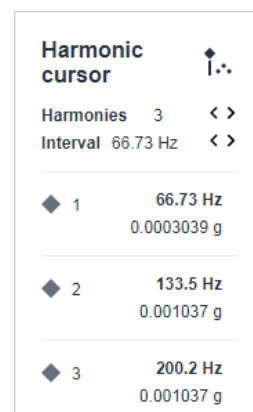
Move harmonic cursor

- Move a harmonic cursor by selecting it with the mouse and dragging it along the frequency axis.

Note: *When moving a harmonic cursor, it will move a fraction of the last harmonic. (i.e. moving the harmonic at 10x the base frequency 1 bin to the left, the harmonic at 9x the base frequency will move 9/10th of a bin and snap to the closest bin, the harmonic at 8x the base frequency will move 8/10th of a bin and snap to the closest bin, etc.)*

Information box

- The information box to the right of the spectrum plot displays the frequency and the amplitude for each harmonic.
- You can control the number of harmonics (**Harmonies**) and the **Interval** between them using the left and right arrows.



4.6.5.3 Single Cursor

The single cursor is a base cursor that can be moved to any frequency and identifies the amplitude at that frequency.

Default settings

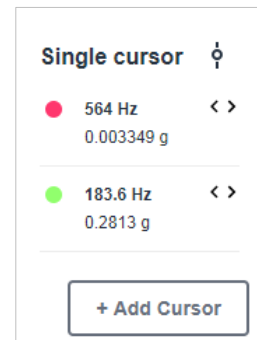
- The single cursor is placed at 1x rpm in the spectrum, when information of the speed of the machine is available.

Move

- Move the single cursor by selecting it with the mouse and dragging it along the frequency axis to the desired location or use the arrow buttons in the information box to the right of the plot.

Multiple cursors

- Add multiple instances of the single cursor by pressing **Add cursor** in the information box to the right of the plot.



Information box

- The information box displays information about each cursor's x and y values.

4.6.5.4 Band Cursor

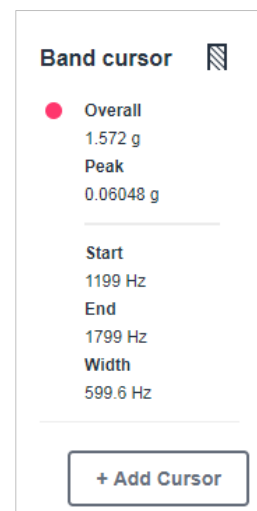
The band cursor is made up of three parts: the fundamental left line, fundamental right line, and the bandwidth. Band cursors sum the total energy contained within the frequency band and display the total energy value with the frequency range in the band.

Default settings

- The band cursor is placed with the highest peak in the spectrum in the middle of the band.
- The width of the cursor is set to 25% of the frequency range.

Move

- Move the band cursor by selecting it with the mouse and dragging it along the frequency axis to the desired location (i.e. the width is kept the same, the left and right lines are moved by equal amounts).
- Move the left/right lines of the band cursor by placing the mouse on the left/right line and drag the line to the desired location.



Information box

Additional information is displayed to the right of the spectrum plot:

- **Overall:** Total energy within the frequency band.
- **Peak:** The amplitude of the highest peak within the frequency band.

Reports

- **Start:** Frequency of the left line.
- **End:** Frequency of the right line.
- **Width:** Frequency range = End-Start.

4.6.6 Report status link

The **Report status** button opens the **Report view** for the specified asset.



Figure 32 – Report status button

4.7 Reports

The **Reports** panel enables the user to view registered faults for specific assets.

4.7.1 Reports panel

In the **Reports panel**, all available assets are shown as either a list or grouped by functional location, see **Figure 33**. Filters can be applied to display the desired types of asset statuses, assets, and faults, see **Figure 35**. The **Asset health** workspace displays details of the registered status and faults for the selected asset.

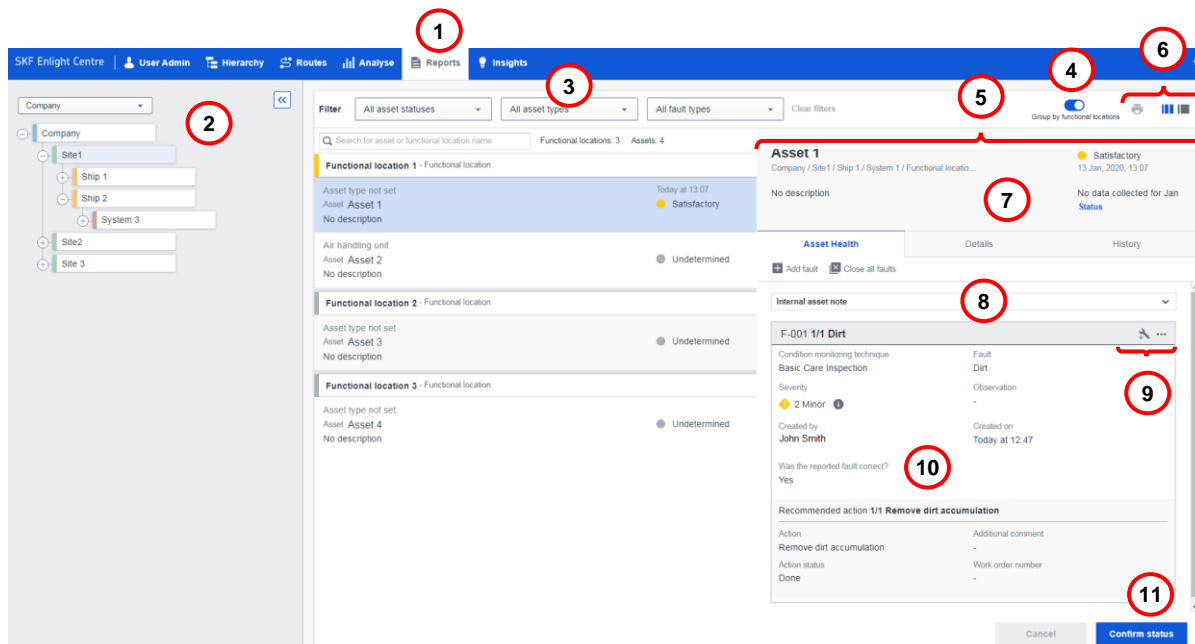



Figure 33 – Reports panel

- 1 Select the **Reports** panel in the main menu.
- 2 Select the desired **Company** from the navigation tree panel.

- 3 **Filter** the view based on **Asset status**, **Asset types** and **Fault types**.
Use the **Search field** to search for Asset or Functional location name.
Press **Clear filters**, to remove all applied filters.
- 4 Use the **Group by functional locations** toggle button to either show the asset grouped by functional locations, or only as a list of assets.
- 5 Toggle between **Asset health**, **Details** and **History**:
 - **Asset health**: Displays registered faults. From this view it is possible to register new faults, or edit and close reported faults.
 - **Details**: Displays information about the **Asset** and the **Functional location**. For example, Machine criticality and Asset image.
 - **History**: Displays all previously closed faults for the specified **Asset**.
- 6 Use the buttons to toggle between the two available views:
 - Detailed view, showing the **Asset health** workspace.
 - List view, showing a list of all **Assets** in the selected hierarchy.

The print button can be used to print the **Asset** list. The print button is only available in **List view**.
- 7 The current status of the **Asset** is indicated here.
- 8 Press **Internal asset note**, to add a note about the asset which is not visible for the customer.
- 9 Press the **Add recommended action** or the  button to make changes to the status report of the fault.
- 10 Information about the **Asset** and any added **Recommended actions**.
- 11 The **Confirm status** button is used to confirm the current status of the specified fault.

Reports

4.7.2 Manage faults and health status

The health of and faults on machines are registered in the **Asset health** workspace. The **Asset health** workspace allows the user to update health status, register new faults, close faults, and to view open and historical faults. The asset health status flow is described in **Figure 34**.



Figure 34 – Asset status flow

4.7.3 Status reports display options

In addition to searching on Asset or Functional location name, the asset list can be filtered by **Asset Status**, **Data Collection** and **Fault Type**, see **Figure 35**.

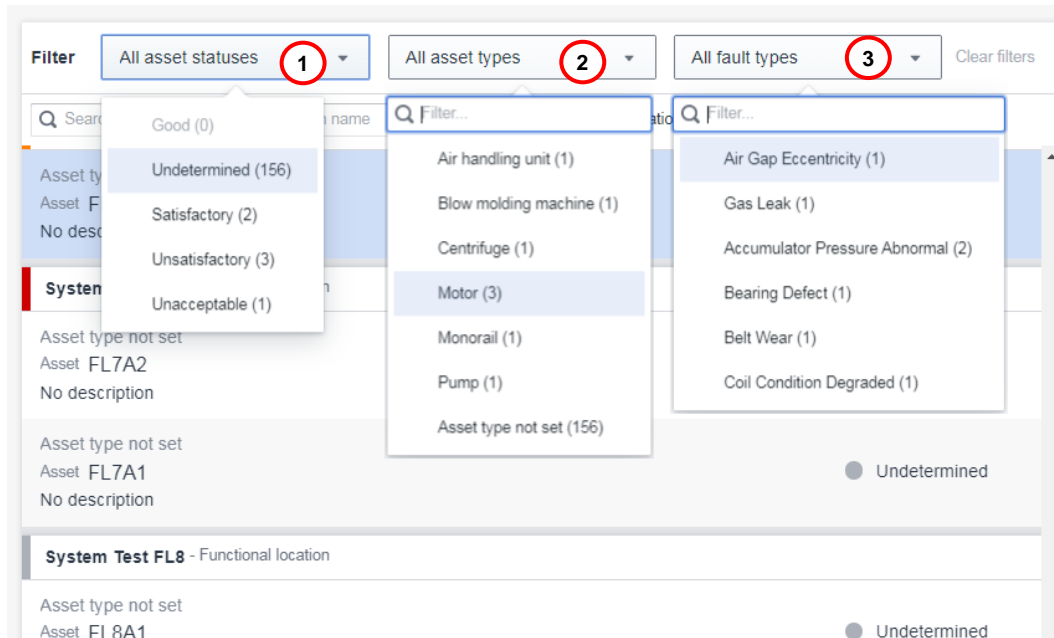


Figure 35 – Filtering status reports

- 1 The filtering option **Asset Statuses** displays assets based on asset statuses:
 - Unacceptable
 - Unsatisfactory
 - Satisfactory
 - Good
 - Undetermined
- 2 The filtering option **Asset types** displays assets based on asset type.
For example:
 - Air handling unit
 - Centrifuge
 - Motor
 - Pump
 - Asset type not set
- 3 The filtering option **Fault types** displays assets based on the fault types.
For example:
 - Air Gape Eccentricity
 - Accumulator Pressure Abnormal
 - Belt wear

Reports

4.7.4 View or update the Status report

The **Asset status** can be viewed or updated in the **Asset health** workspace.

In this workspace, it is possible to review the registered faults and close them individually, or close all faults using the **Close all faults** option. Closed faults remain displayed to show a fault history for the selected **Asset**.

If available, the following detailed information about the Asset is displayed in the **Details** tab:

- Machine criticality and latest collection date
- Asset type and attached Asset image
- Functional location description and status

Press the **Save** button to update the Status report and display the latest status. Current status of the **Asset** is displayed, including the collection status.

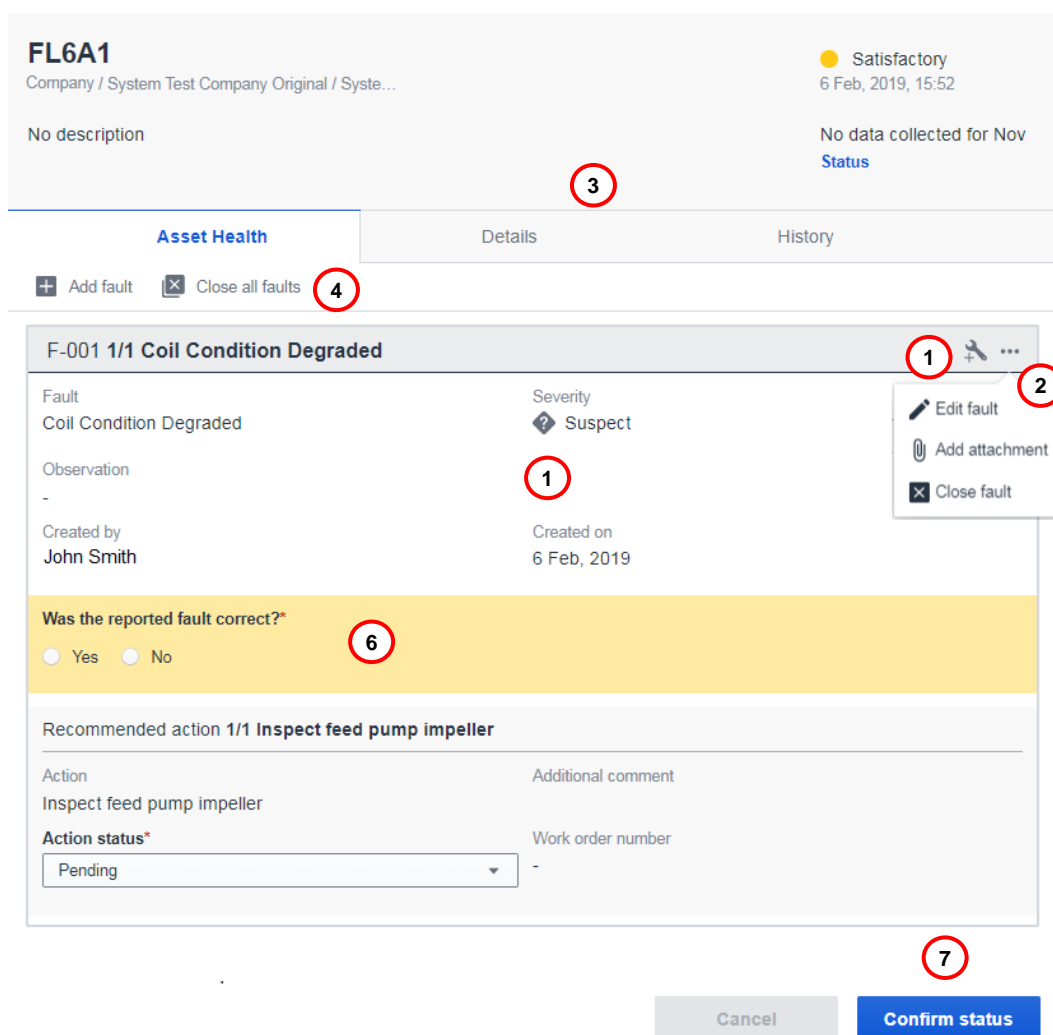



Figure 36 – View or update status report

- 1 Press the **Add rec. action** button to add a new **Recommended action**.
- 2 Press on the  button to access more options.
 - Press **Edit fault** to edit the **Fault type**, **Severity level** and previously specified **Recommended actions** of a fault.
 - Press **Add attachment** to add an image to the status report.
 - Press **Close fault** to close the specified fault.
- 1 Toggle between the **Active faults**, **Details** and **Fault history** tabs.
- 2 Press the **Close all faults** button to close all faults for the report.
- 3 Select if the reported fault is correct or not, by selecting **Yes** or **No**.
- 4 Press the **Confirm status** button after performing the desired updates, this updates the status of the fault.

When selecting **Close fault** or **Close all faults**, the close fault dialogue is shown.

The status for each **Recommended action** must be set to either **Done** or **Rejected** in the drop-down list. Additionally, a comment about the reason for closing the fault must be added before the fault can be closed, using the **Close fault** button.

The information about the closed fault is then visible in **Asset health** workspace.

Reports

4.7.5 Register a new fault

Selecting the **+ Add fault** option for an **Asset** adds a new fault entry in the **Asset Health** workspace.

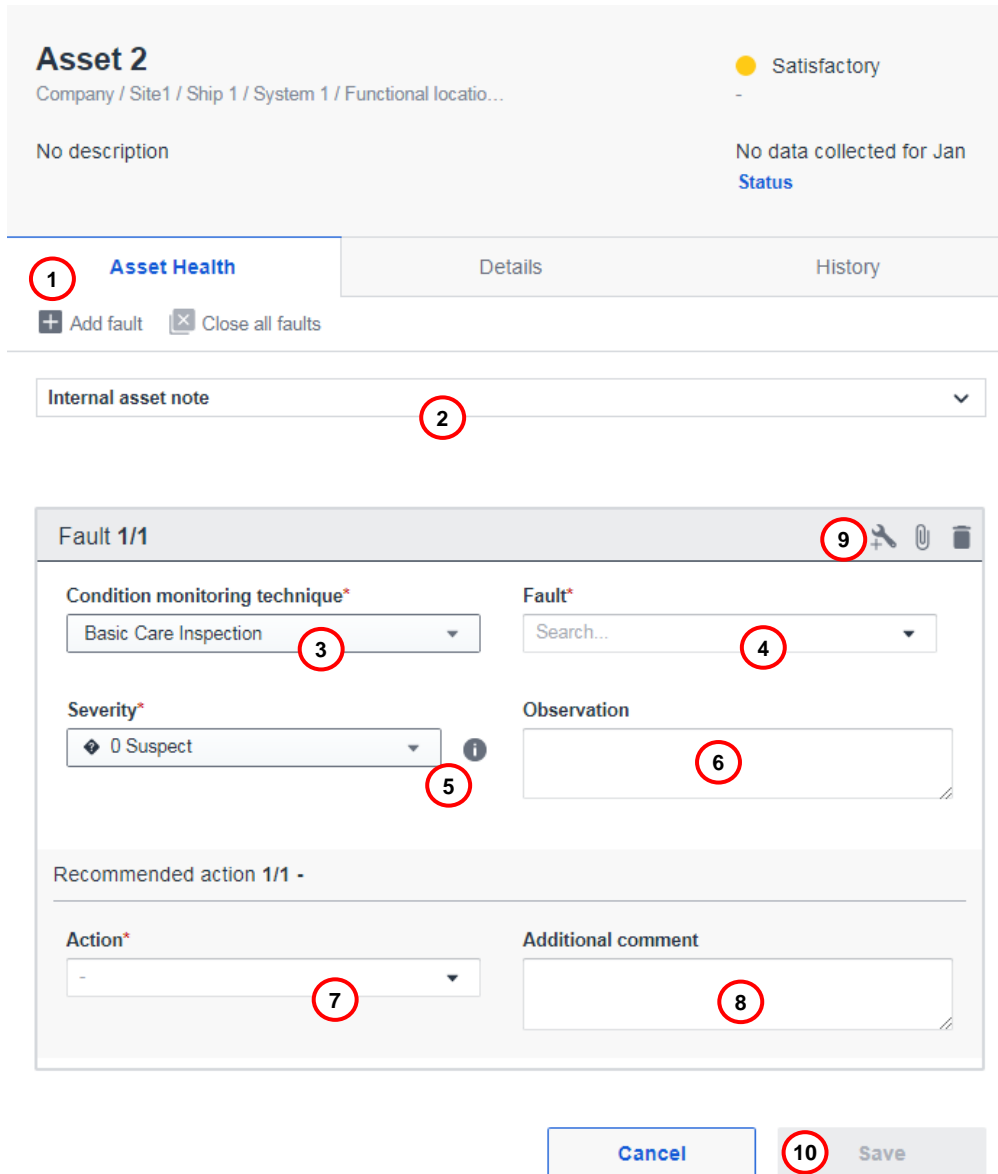



Figure 37 – Register a new fault

- 1 Press the **+Add fault** button, for each new fault to register.
- 2 Optionally, add an **Internal asset note**, which is not visible to the customer.
- 3 Select the **Condition monitoring technique** used, by selecting an item in the pre-defined list.
- 4 Define a **Fault** type for the report, by selecting an item in the pre-defined list.

- 5 Select a suitable **Severity** for the reported fault from the pre-defined list. Click on the  to view the **Fault severity description**.
- 6 Optionally, add a comment about the basis on which the fault has been added in the **Observation** field.
- 7 Select a recommended action from the pre-defined list, the top most recommended actions are suggestions based on the type of fault selected.
- 8 Optionally, add a comment for the recommended action in the **Additional comment** field.
- 9 Optionally, press **Add rec action** button if additional actions are required.
- 10 Press the **Save** button to save the report and update the status of the Asset.
Note: It is only possible to save the report when all required information is entered.

*Note: It is important to add relevant information when reporting and closing faults. The information will be visible in the **Asset health** workspace and facilitates asset status monitoring and fault handling.*

Insights

4.8 Insights

The **Insight** panel provides the user with tools for viewing data collection status and surveillance of critical assets.

4.8.1 Collection status

Collection status displays the status of the overall data collection for the specified company.

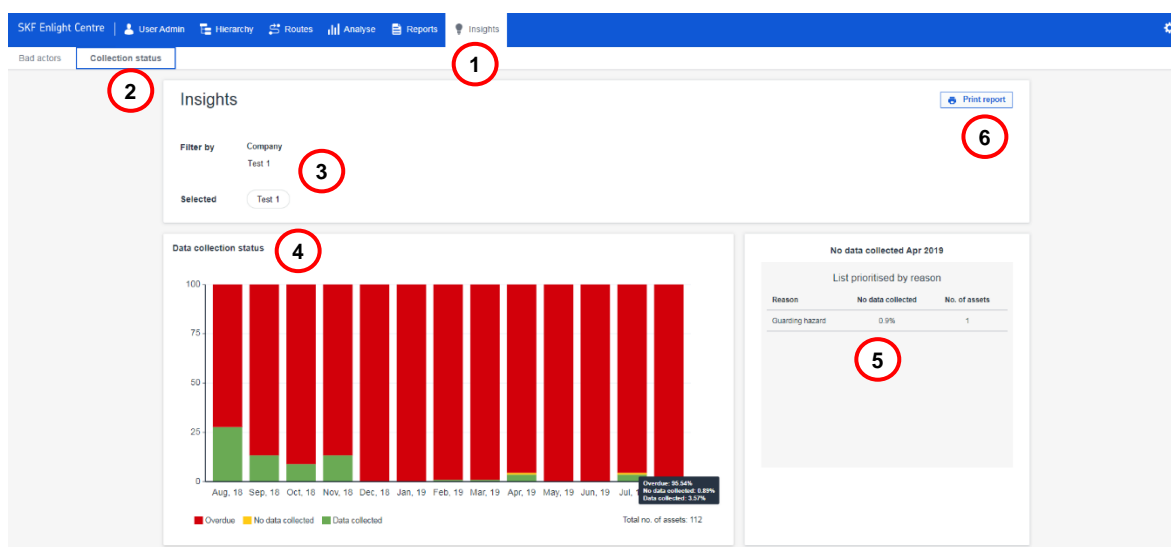


Figure 38 - Collection status

- 1 Select the **Insights** panel in the main menu.
- 2 Select **Collection status** in the Insights menu.
- 3 Filter by **Company** to display the desired view.
- 4 The **Data collection status** graph displays the status as either **Data collected**, **No data collected**, or **Overdue**. For details about the data in the graph, place the cursor on the desired column.
- 5 Clicking on a column including entries with the status **No data collected**, displays the following in the **No data collected list**:
 - Reason for no data collection
 - Percentage of no data collected
 - Number of affected assets
- 6 The view can be printed by pressing the **Print report** button.

4.8.2 Bad actors

Bad actors display the most common type of faults, most repaired assets, functional location with most faults.

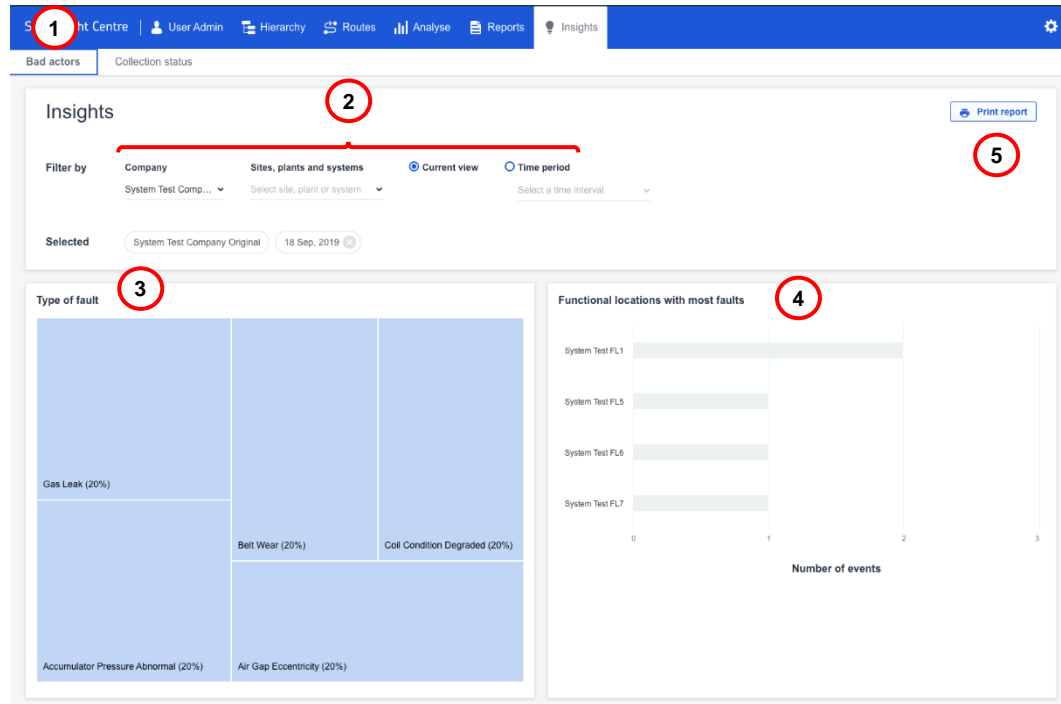


Figure 39 - Bad actors

- 1 Select **Bad actors** in the Insights menu.
- 2 Filter by **Company** and **Sites, plants and systems**, **Current view**, and **Time period** to show desired view.
- 3 **Type of fault** displays the types of fault that are most common.
- 4 **Functional locations with most faults** display a graph of Functional location with most registered faults
- 5 The view can be printed by pressing the **Print report** button.

5 Glossary

@Analyst

A software solution with diagnostic and analytical capabilities for managing asset condition data from portable and on-line devices.

@Observer

Condition monitoring software optimised to collect and analyze continuous measurement data from critical rotating machinery.

Asset

An Asset is a specific piece of equipment with a unique identification number.

Condition

See Health Status.

Criticality

The Asset criticality indicates how critical the asset is within the production process. Criticality is a process to evaluate each functional location's importance to the business with focus on factors such as safety, regulatory impact, revenue loss, and reduced capacity. E.g. "A", "B", "C", "High", "Medium", "Low".

Critical implies that failure has the potential to stop the production process, endanger machinery, personnel, or environment, or have substantial financial consequence.

Enlight Centre

Enlight Centre is a web-based software that is implemented to facilitate collection and analysis of machine data.

Faults

Imperfection in the state or condition of a maintainable item/component/part that is likely to result in a functional failure if not corrected.

Functional Location

A Functional Location groups assets of a company according to functional, process-related or location criteria. Typically, a Functional Location represents the place at which a task is performed, and where various Assets are installed. Examples: Water injection skid, Compressor house, Motor room.

Functional Location ID

The Functional Location ID identifies both the equipment function and the physical location.

ProCollect App

ProCollect is an application designed to run on a mobile device, such as a mobile phone or tablet. ProCollect is used by an inspector for collection of machine data.

Health Status

The Asset Health Status summarises the results of the machinery health state and diagnostics. It also indicates the severity of the fault and urgency of repair actions.

MTBR

Mean Time Between Repair.

Priority Rank

Priority Rank is an integrated approach to the risk-informed decision-making process. It gives Asset Managers a risk-centric view of the asset probability to perform a required function and the risks involved if it doesn't. Used to prioritise CM Specialist workload to establish a most-to-least-critical importance ranking.

Recommended Action

The Recommended Actions are the tasks suggested to resolve the listed incipient faults or functional failures and restore the asset's health status to Normal. The Recommended Actions are based on, for example, the criticality of the assets, operation and maintenance costs, availability of spare parts and the severity of the fault.

Severity

The Severity of a Report indicates the level of criticality from the identified incipient fault.

Work Notification

Work Notification is used to request work to fix incipient faults/functional failures.

Work Order

Work Order is a financial and work management transaction used to plan and charge labour, materials, and services required to execute requested work.

6 References

1. SKF @ptitude Analyst for SKF Microlog Analyzer User Manual, Part No. 32268000 EN, Revision A
2. SKF @ptitude Analyst Thin Client Transfer User Manual, Part No. 32143800 EN, Revision E
3. SKF ProCollect User Manual, Part No. 15V-090-00089-100 EN, Revision D

7 End-User License Agreement

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to be a reason beyond a party's reasonable control. The Parties will promptly inform and consult with each other as to any of the above causes that, in their judgment, may or could be the cause of a delay in the performance of this Agreement.

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All notices under this Agreement are to be delivered by depositing the notice in the mail, using registered mail, return receipt requested, to the party's last known principal business address or to any other address as the party may designate by providing notice. The notice shall be deemed delivered four (4) days after the notice's deposit in the mail, if such notice has been sent by registered mail.

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(e) Read and Understood. Each party acknowledges that it has read and understands this Agreement and agrees to be bound by its terms.

(f) Limitations Period. No action arising under, or related to, this Agreement, may be brought by either party against the other more than one (1) year after the cause of action accrues, unless the cause of action involves death or personal injury.

(g) Attorneys' Fees. In the event any litigation is brought by either party in connection with this Agreement, the prevailing party in such litigation will be entitled to recover from the other party all the costs, reasonable attorneys' fees, and other expenses incurred by such prevailing party in the litigation.

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