

# SIEMENS

## Insights Hub

## Insights Hub OEE

### System Manual

05/2024

Introduction	1
Prerequisites	2
User rights in Insights Hub OEE	3
User Interface of Insights Hub OEE	4
OEE Basics	5
Configuration	6
Data Visualization	7
Manual Inputs	8
System Behavior	9
Changelog	10

## 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.

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### 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.

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### 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.

# Table of contents

<b>1. Introduction.....</b>	<b>5</b>
1.1. Introduction.....	5
<b>2. Prerequisites.....</b>	<b>6</b>
2.1. Prerequisites.....	6
<b>3. User rights in Insights Hub OEE.....</b>	<b>8</b>
3.1. User rights.....	8
<b>4. User Interface of Insights Hub OEE.....</b>	<b>10</b>
4.1. User Interface.....	10
<b>5. OEE Basics.....</b>	<b>13</b>
5.1. Introduction to OEE Basics.....	13
5.2. Time Model.....	13
5.3. Reason Tree.....	13
5.4. Status Mapping.....	13
5.5. Products & Design Speed.....	18
5.6. OEE Standard Formulas.....	19
<b>6. Configuration.....</b>	<b>20</b>
6.1. Introduction to Configuration.....	20
6.2. Configuring KPIs.....	21
6.3. Configuring Time Model.....	25
6.4. Configuring Reason Tree.....	27
6.5. Configuring Status Mapping.....	30
6.6. Excel Import Reason Tree & Status Mapping.....	32
6.7. Configuring Products.....	41
6.8. Configuring Measures.....	47
6.9. Reject Reasons.....	51
6.10. Configuring Quality Codes.....	54

6.11. Introduction to Configuring Calendars.....	57
6.12. Managing Calendars.....	57
6.13. Managing Calendar Entries.....	59
6.14. Introduction to Configuring Machines & Lines.....	66
6.15. Configuring Lines.....	67
6.16. Configuring Machines.....	80
<b>7. Data Visualization.....</b>	<b>82</b>
7.1. Data Visualization.....	82
7.2. Analysis Overview.....	87
7.3. Availability.....	89
7.4. Performance.....	90
7.5. Quality.....	92
7.6. Loss Overview.....	94
7.7. Downtime analysis.....	96
7.8. Downtime management.....	97
<b>8. Manual Inputs.....</b>	<b>103</b>
8.1. Manual Inputs.....	103
<b>9. System Behavior.....</b>	<b>110</b>
9.1. System Behavior.....	110
<b>10. Changelog.....</b>	<b>114</b>
10.1. Insights Hub OEE Release Changelog.....	114

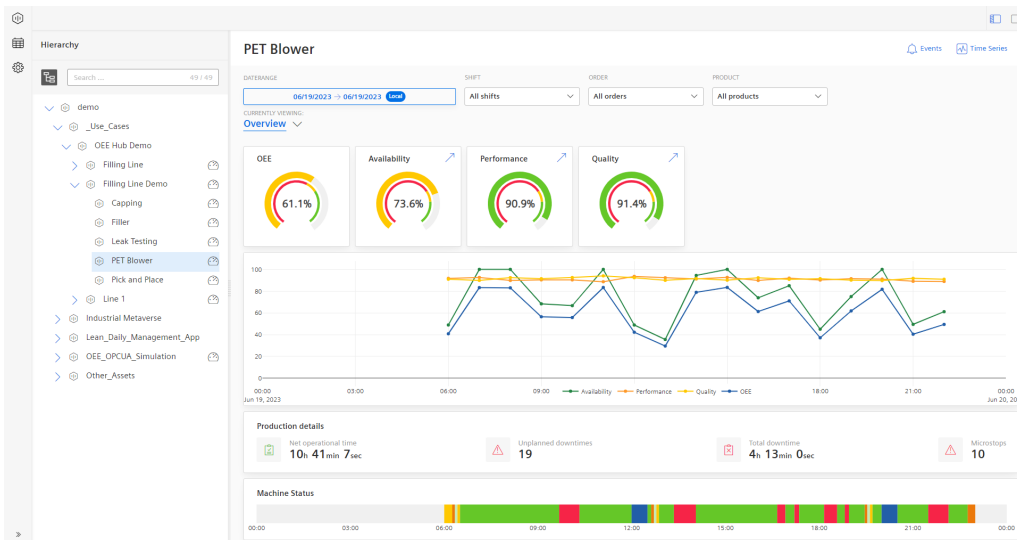


# Introduction

## 1.1 Introduction

Insights Hub OEE is an easy-to-use solution to calculate Overall Equipment Effectiveness (OEE) and further KPIs for lines and machines to better understand the underlying production process and thereby improve continuously. Additionally, it helps the user to track the success of measures taken.

[Insights Hub OEE Introduction](#)



Insights Hub OEE offers the following core capabilities:

- Calculate OEE, Mean-Time-To-Repair (MTTR), Mean-Time-Between-Failure (MTBF), and further relevant KPIs for machines and lines
- Filter capabilities for time range, products, and orders
- Support of single and/or multi-product production systems
- Reason Tree Modeling and the ability to change recorded Downtime Reasons afterward
- Customization of OEE formulas for OEE calculation
- Set up production times, breaks, maintenance, etc. in calendars

# Prerequisites

# 2

## 2.1 Prerequisites

To enable OEE calculations for machines and lines, it is required to collect OEE typical data from the devices. Insights Hub OEE does not require special devices to collect the data from the machines and lines. The only mandatory condition is that the data is stored in the timeseries database and structured properly.

Typically, when setting up a machine, you divide the data structure of an asset into multiple aspects. However, it is recommended to create a single aspect in a machine or line asset, that stores all Insights Hub OEE relevant information since it makes the configuration of machines and lines in Insights Hub OEE easier.

[Insights Hub OEE First Steps](#) 

In general, Insights Hub OEE is relying on the data points as described in the following table:

Variable	Common Datatype	Mandatory for OEE calculation	Comment
Status	BOOLEAN, INT, LONG, STRING	Yes	Status is necessary to enable Availability calculations
Product Code	INT, LONG, STRING	Yes	Product code is necessary to enable Performance calculations
Order ID	INT, LONG, STRING	No	Enables the Order ID filter capabilities
Good Parts	INT, LONG, DOUBLE	Yes	- Two out of three must always be available. The third variable can be calculated through the other two. - Two out of three are necessary to enable Quality calculations - Can be either difference counter or incremental counter
Bad Parts	INT, LONG, DOUBLE	Yes	- Two out of three must always be available. The third variable can be calculated through the other two. - Two out of three are necessary to enable Quality calculations - Can be either difference counter or incremental counter

2.1 Prerequisites

Variable	Common Datatype	Mandatory for OEE calculation	Comment
Total Parts	INT, LONG, DOUBLE	Yes	<ul style="list-style-type: none"><li>- Two out of three must always be available. The third variable can be calculated through the other two.</li><li>- Two out of three are necessary to enable Quality calculations</li><li>- Can be either difference counter or incremental counter</li></ul>

# User rights in Insights Hub OEE

# 3

## 3.1 User rights

Insights Hub OEE adopts user rights from Settings. The user rights depend on the following user roles:

- `mdsp:core:oeehub.admin`
- `mdsp:core:oeehub.user`
- `mdsp:core:oeehub.operator`

The following table gives an overview of the permissions for the Admin, User, and Operator roles:

Permission	Role: <code>mdsp:core:oeehub.admin</code>	Role: <code>mdsp:core:oeehub.user</code>	Role: <code>mdsp:core:oeehub.operator</code>
Configure KPIs	✓	-	-
Configure Time Model	✓	-	-
Configure Reason Tree	✓	-	-
Configure Status Mapping	✓	-	-
Configure Products	✓	-	-
Configure Calendar	✓	-	-
Configure Machines & Lines	✓	-	-
View Overview Page	✓	✓	✓
View Availability Page	✓	✓	✓
View Downtime Analysis Page	✓	✓	✓

## 3.1 User rights

Permission	Role: mdsp:core:oeehub.admin	Role: mdsp:core:oeehub.user	Role: Mdsp:core:oeehub.operator
View Downtime Management Page	✓	✓	✓
View Quality Page	✓	✓	✓
View Performance Page	✓	✓	✓
View Loss Overview Page	✓	✓	✓
View Downtime Reasons Page	✓	✓	✓
Overwrite Downtime Reasons	-	-	✓
Assign measure to downtime	-	-	✓
Create and assign work order to downtime	-	-	✓
Add comment to downtime	-	-	✓
Add/Edit Calendar Entries	✓	-	✓
View and Edit entries in the Manual Inputs	-	-	✓

For more information on roles, see [Settings](#) documentation.

# User Interface of Insights Hub OEE


# 4

## 4.1 User Interface

Insights Hub OEE application can be accessed from the Launchpad by clicking the following icon:



### “Data Visualization” User Interface


The Visualization area "OEE Assets" screen is displayed by default when the Insights Hub OEE application is launched. If you are in the “Configuration” area, you can switch back to the visualization area by clicking the hexagon icon  available in the Navigation tab. This window provides a view of the KPIs and statuses of any selected asset.

## 4.1 User Interface

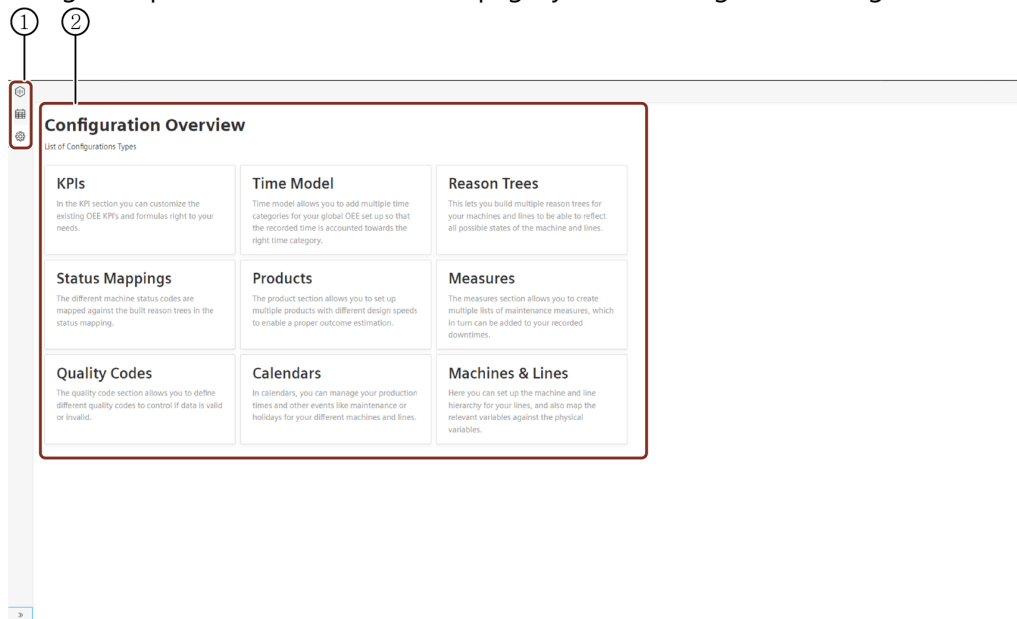


- ① Navigation tab
  - ② Change View, search operations
  - ③ Asset Hierarchy
  - ④ Analysis type selection
  - ⑤ Data filter operations
  - ⑥ Visualization pane
  - ⑦ Hide/Expose Asset Hierarchy
- For more information, see Chapter [Data Visualization](#).

## “Configuration” User Interface

By clicking the gear icon  in the Navigation tab, the Insights Hub OEE Configuration options can be accessed.

Using the options available under this page, you can configure the Insights Hub OEE application.



- ① Navigation tab
- ② Available configuration types

For more information, see Chapter [Configuration](#).



## 5.1 Introduction to OEE Basics

In this section we will introduce you the following fundamental concepts of OEE application:

- Time Model
- Reason Tree
- Status Mapping
- Products and Design Speed
- OEE Standard Formulas

[Insights Hub OEE Basics](#) 

## 5.2 Time Model

Time Model is one of the fundamental concepts of the Insights Hub OEE application. It is a representation of the production time and various downtimes of a plant. It describes how the total time of a plant is being divided into different time categories, which represent how the time is being used in the plant. By default, the Insights Hub OEE application has configured three major time categories for the calculation of overall equipment effectiveness. Using these time categories, users can set up the other time categories.

The main time categories of the Insights Hub OEE application are:

- **Production Time:** The Production time category accounts for all the run time of the machine or line.
- **Availability Loss:** The availability loss category gathers all the various machine or line stop states and downtimes that the user wants to classify as availability loss. This typically includes all types of downtime, change-over, cleaning phases, supply chain-related issues, or internal faults. It is up to the user to define what counts as an availability loss and what does not.
- **Planned Stop:** This category contains all stops that are intended by the user of the application. That could be, for example, planned maintenance, a shift break, a holiday, or simply a weekend, where the machines and lines are not producing. These times are not considered for the calculation of OEE but are important for the calculation of the Total Effective Equipment Performance (TEEP). Furthermore, no OEE is calculated during planned stops.

The following table shows which major time category impacts which KPI:

KPI	Production Time	Availability Loss	Planned Stop
OEE	X	X	
TEEP			X
Availability	X	X	
Performance	X		
Quality	X		
MTTR	X	X	
MTBF	X	X	

The formulas for the KPIs calculation are described in Section [OEE Standard Formulas](#).

The example given below explains the time model:

**Time Model**  
Overview of your defined Time Model Categories

**Production Time**

Name	Description
Run	Please do not delete

**Planned Stop**

Name	Description
Maintenance	Please do not delete
Holidays	Please do not delete
Shift Break	Total shift break time
Refreshers	Refreshments break

**Availability Loss**

Name	Description
Run Down	Please do not delete
Unplanned Downtime	Please do not delete
Start Up	Please do not delete
Cleaning	Please do not delete

In this example, we have defined nine different time categories, which are inherited from the three major time categories:

- **Production time:** Under Production time, we have only defined a one-time category called Run, this represents when the machine or line is operating.
- **Planned Stop:** In this time category, we have defined multiple categories that stand for different stops in a factory, which are Holiday, Shift Break, Maintenance, and No Production. Whenever the machine status or configured calendar for a machine or line is in one of these time categories, then these times are counted towards the Planned stop and are not considered in the overall OEE calculation.
- **Availability Loss:** Under Availability Loss, we have defined multiple time categories which also represent different typical categories of availability losses. In our case, we have defined Unplanned Downtime, Cleaning, Run Down, and Start-Up. Whenever we are in a machine or

line state, that is represented by one of the above-mentioned time categories, then this time is counted towards Availability Loss.

The definition of the time model is a crucial step to evaluate and understand the collected machine status. For more information to set up the time model, refer Section [Configuring Time Model](#).

The states defined under Production Time and Planned Stop can also be utilized in the Calendar configuration to describe the state that the machine is in in a defined event. For more information, refer Section [Configuring Calendar](#).

The following Section [Reason Tree](#) shows how the underlying time model is being utilized to build custom reason trees.

## 5.3 Reason Tree

A reason tree is a structured way to show the various states that a machine or line can be in. OEE is a continuous improvement tool and one crucial step towards improvement is the analysis of downtime reasons of machines and lines. The companies using OEE can try to solve and monitor the performance of their actions once the main levers in the downtime reasons, for example, supply always coming too late at the stations, are discovered. A detailed reason tree is required to enable this type of examination.

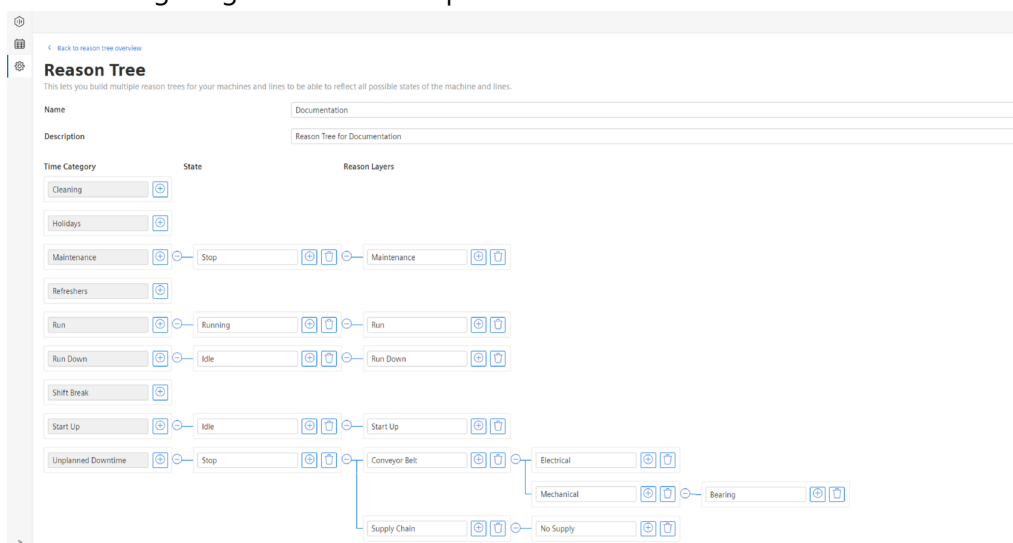
Reason trees are built for same machine types or lines of machines. As a result, Insights Hub OEE allows you to add multiple reason trees for different machines or lines. Only in rare cases one reason tree can cover all machine or line states in a factory. The user can decide how to structure reason trees. Typically, a reason tree contains more reasons than the number of states for each machine, which it can log through different status codes. The reason for this is, that the user can later modify the existing collected reasons and change them if the collected state does not reflect the real machine behavior. For instance, the machine reports an emergency stop of the machine but in reality, it was not caused by the machine itself, but the operator had pushed the emergency button. Then in the post-production analysis, someone can assign the right reason to the registered event and improve the analysis. This only works if the causes are also developed that are not reported by the machine through status codes.

Typically, a reason tree is built out of the following categories:

- Time Category (#time-model))
- State (describes the machine state)
- Reason Layer 1
- Reason Layer 2
- Reason Layer 3
- Reason Layer 4

The reason tree time categories are fixed and cannot be further modified by a user. The second item state describes what type of state the machine, on a higher level. This could be, for example, run, idle, stop, emergency, end of shift, etc. The further details which describe the machine state are then built through the tree structure and the different reason layers.

The following image shows an example of the reason tree:



In the example above, multiple reasons are shown. Here, we focus on a couple of reasons out of the unplanned downtime time category. As explained before, the reason tree consists of time category, state, and then the multiple reason layers. In the above example, there are a couple of reasons shown that share the same state – in this case, it is “stop”, so the machine is in a stop mode and not operating. After the stop state, the reason tree author defined multiple reason layers to describe different reasons for stop states. One of the stop states is related to the supply chain reason, whereas another stop state is related to the conveyor belt reason.

As shown in the example, the following reason layers describe further the stop state. In case of the supply chain reason, the next level of detail is “no supply”, so that the machine is not having further supply; therefore, unable to operate. In the conveyor belt reason, the next layer splits up into multiple reasons. The problem could be either a mechanical or an electrical issue. In the example, there is also another reason layer attached to the mechanical reason. In the third reason layer, a bearing reason is described. The two examples described above should show how the user can build complex and detailed reason trees that can reflect all the different kinds of machine states. For in-depth analysis on downtime reasons later, it is useful to reflect as many states as possible in the reason tree.

For more information to set up the Reason Tree, refer Section [Configuring Reason Tree](#).

## 5.4 Status Mapping

Once the reason trees for different machines or lines are created, the last important step in understanding the machine status is to link the different reasons in the reason tree with status codes that have been collected from the machine. Typically, a machine does not collect machine states like “Bearing Issue” and write that into a buffer, from which it can be fetched and

evaluated. Machines typically store state data as numbers or other formats. From that point on, the information in this case, the status code, must be translated so that engineers or other users of the information can utilize it. For this reason, status mappings for the reason trees are created. As the name indicates, the status codes are mapped against reasons. As described in the Section [Reason Tree](#), a reason tree can have more reasons than the status codes. Therefore, it is not necessary to map a status code against every reason that exists in the tree. Usually, users add status codes to the leaves of the tree structure because the last reason layer then also covers the other reason layers before.

Given below is an example of the status mapping:

In this example, you can see an adapted view of the previously described reason tree. Here, the time categories, states, and reasons cannot be changed by the user anymore. Instead, the user is now prompted to fill in the different status codes for the reason tree. In the example above, the reason tree is not filled on every reason layer. Mainly the leaves of the reason tree have been filled by the user. The code 401 indicates the following information about the machine:

- Time Category: Unplanned Downtime
- State: Stop
- Reason: Conveyor Belt / Electrical

In case of code 200, this is slightly different:

- Time Category: Unplanned Downtime
- State: Stop

It only reflects the stop state of the machine. Since the machine cannot technically describe the actual cause of the stoppage, the user can later change the reason code to something more meaningful.

The status mapping gathers all the pre-work that was completed in the time model and reason tree configurations because in this step, the machine status codes are mapped with the different machine states defined in the reason tree.

For more information to set up the Status Mapping, refer Section [Configuring Status Mapping](#).

## 5.5 Products & Design Speed

Products and the associated design speed are the crucial elements to evaluate the machine or line performance KPI. The product or product code is required to understand the design speed that the machine or line should be operating at the time. The design speed provides information on the count that should be produced by the equipment in a specific time interval (second, minute or hour). Therefore, each product code that an equipment produces must have an associated design speed.

The image below is an example definition of a product and the relevant information:

The screenshot shows a web interface for configuring a product. At the top, there is a navigation bar with a back arrow and the text 'Back to product overview'. Below this, the section is titled 'Product' with a sub-header 'The product section allows you to set up multiple products with different design speeds to enable a proper outcome estimation. The design speed describes the number of parts per interval.' The form contains several input fields: 'Name' with the value 'Orange Lemonade 1L', 'Description' with the value 'Orange Lemonade 1L', 'Design Speed' with the value '6000.00', 'Unit' with the value 'Pcs', 'Time Interval' with a dropdown menu showing 'HOUR', and 'Product Code' with the value 'OL10'. There are also icons for adding and deleting products on the left side of the form.

The example above shows the information that an Insights Hub OEE user has to enter while configuring a new product.

In this case, the following product is configured:

- Product Name: *Orange Lemonade 1L*
- Description: *Orange Lemonade 1L*
- Design Speed: *6000*
- Unit: *Pieces (Pcs)*
- Time Interval: *Hour*
- Product Code: *OL10*

Therefore, whenever Insights Hub OEE receives the product code "OL10", it knows that Orange Lemonade in 1L should currently be manufactured at a speed of 6000 Pcs (or bottles) every hour.

Design speeds are typically determined by estimates and experience rather than by formal calculations. As a result, they can be changed over time, for example, if a machine has been upgraded by the factory operations team so that it can run faster. One reason to adjust the design speed of a product is when the Performance KPI is constantly above 100%. This is always a sign, that the initial design speed was set too low and needs to be further adjusted so that it does not manipulate the OEE calculation.

## 5.6 OEE Standard Formulas

### OEE formula

$$OEE = Availability * Performance * Quality$$

### Availability related formula

$$Availability = \frac{Operating Time}{Planned Production Time}$$

$$Planned Production Time = Total Time - Planned Shutdown$$

$$Operating Time = Planned Production Time - \sum Downtimes$$

The sum of downtimes is determined through different machine states and the underlying time model.

### Performance related formulas

$$Performance = \frac{Total Parts}{Theoretical Output}$$

$$Theoretical Output = Operating Time * Design Speed$$

Theoretical Output depends on the currently produced products in the selected time range. If different products are produced in the selected time range, then the Theoretical Output is the sum of the different time ranges for which the product has been produced multiplied by the product individual design speed.

The number of total parts must be collected.

### Quality related formulas

$$Quality = \frac{Good Parts}{Total Parts} = \frac{Total Parts - Rejected Parts}{Total Parts} = \frac{Good Parts}{Good Parts + Rejected Parts}$$

As shown in the formula above, two out of the three parameters (Total Parts, Good Parts, Rejected Parts) must always be collected. The third variable can always be calculated based on the other two variables.

## Miscellaneous formulas

### Mean Time To Repair

$$MTTR = \frac{\sum Maintenance Time}{Number of Maintenance}$$

### Mean Time Between Failure

$$MTBF = \frac{\sum (Start of Downtime - Start of Uptime)}{Number of Failures}$$


### TEEP

$$TEEP = OEE * Utilization = OEE * \left( \frac{Planned Production Time}{Total Time} \right)$$

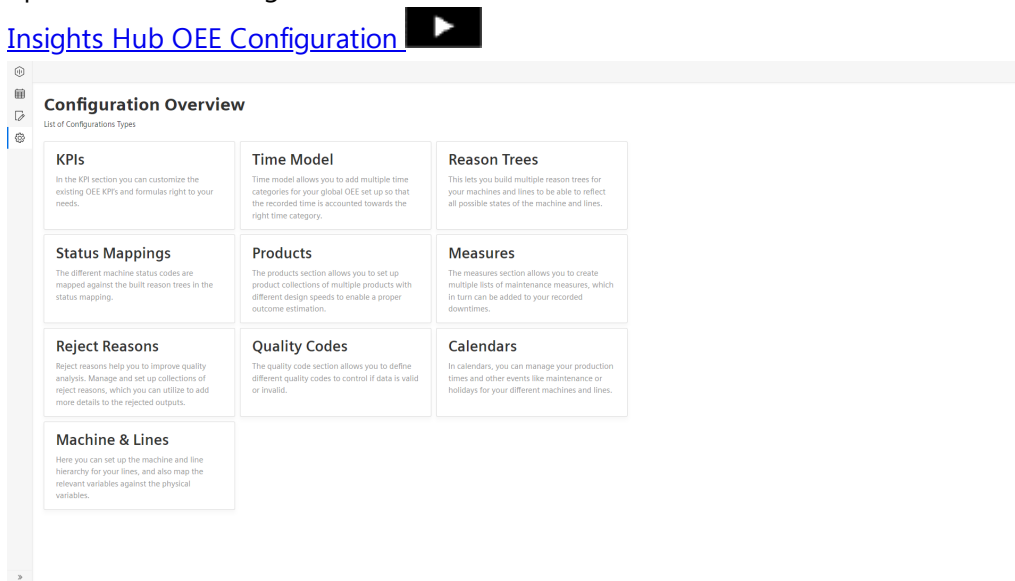
# Configuration

# 6

## 6.1 Introduction to Configuration

To open the configuration of Insights Hub OEE, click the gear icon  in the navigation tab. It opens the main configuration screen as shown below:

[Insights Hub OEE Configuration](#)

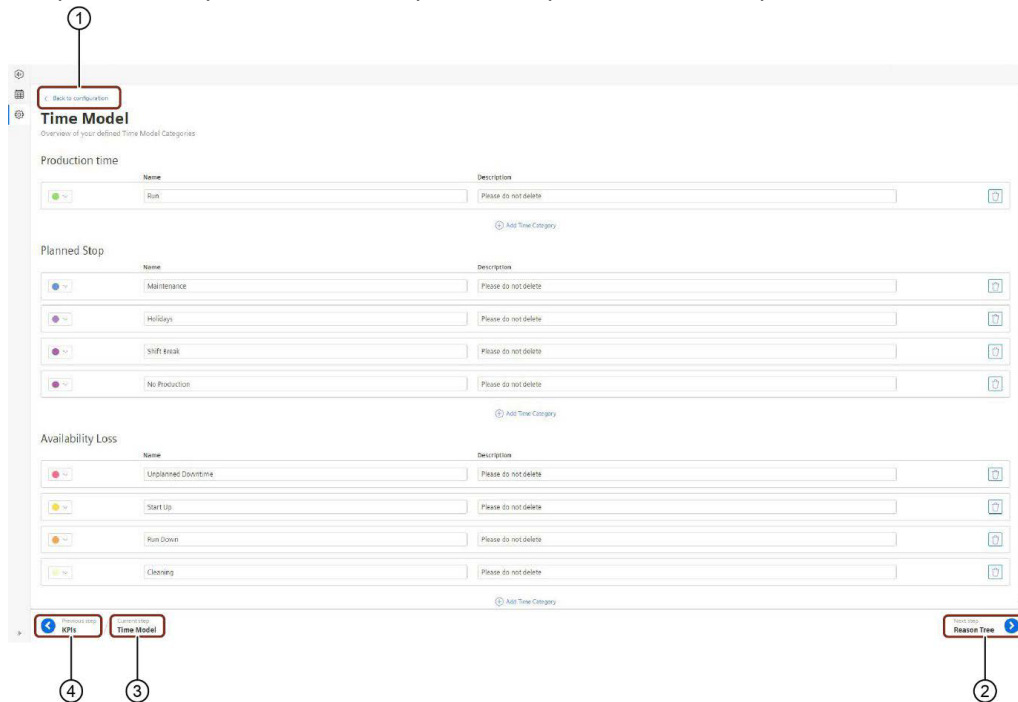


The main configuration screen has eight panes, which allows you to configure the displayed items:

- KPIs
- Time Model
- Reason Trees
- Status Mappings
- Products
- Measures
- Reject Reasons
- Quality Codes
- Calendars
- Machines & Lines



To assist the user with the configuration, a navigation bar is provided at the bottom, which guides the user from one step to another in the configuration. The navigation bar always shows the previous step, the current step, and the potential next step.



- ① Navigates to the “Configuration” tab
- ② Navigates to the next potential step
- ③ Displays the current step
- ④ Navigates to the previous step

## 6.2 Configuring KPIs

In general, OEE calculation can be customized and therefore require the possibility to modify existing OEE KPIs and formulas.

Before starting “KPIs” configuration, it is recommended to read about preconfigured [OEE Standard Formulas](#) in the Chapter OEE Basics to understand all the formulas and an explanation of all expressions.

The table below defines KPIs, Auxiliaries, and Operands:

Name	Definition
Operand	Data that is either fetched from the IoT model or calendar entries
Auxiliary	Mathematical function to calculate intermediate values
KPI	Well-known functions

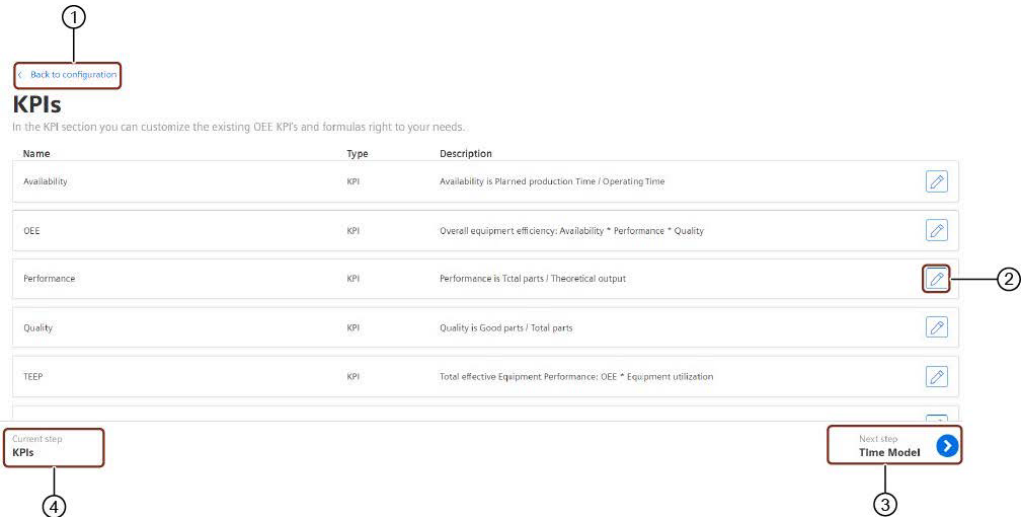
All defined KPIs, Auxiliaries, and Operands that can be modified are listed in the table below. Here, the defaults are provided in case any of the formulas are wrongly configured:

Name	Type	Editable	Formula
OEE	KPI	Yes	$OEE = Availability * Performance * Quality$
Availability	KPI	Yes	$Availability = \frac{Net\ Production\ Time}{Operational\ Time}$
Performance	KPI	Yes	$Performance = \frac{Total\ Parts}{Theoretical\ Output}$
Quality	KPI	Yes	$Quality = \frac{Good\ Parts}{Total\ Parts}$
TEEP	KPI	Yes	$TEEP = OEE * Equipment\ Utilization$
Availability Loss	Operand	Yes	Availability Loss (Operand)
Performance Loss	Auxiliary	Yes	$Performance\ Loss = \left(1 - \frac{Total\ Parts}{Theoretical\ Output}\right) * Net\ Production\ Time$
Quality Loss	Auxiliary	Yes	$Quality\ Loss = \left(1 - \frac{Good\ Parts}{Total\ Parts}\right) * Net\ Operational\ Time$
Good Parts	Operand/Auxiliary	Yes	$Good\ Parts = Total\ Parts - Rejected\ Parts$
Rejected Parts	Operand/Auxiliary	Yes	$Rejected\ Parts = Total\ Parts - Good\ Parts$
Total Parts	Operand/Auxiliary	Yes	$Total\ Parts = Good\ Parts + Rejected\ Parts$
Total Time	Auxiliary	No	No Formula
Planned Stops	Operand	Yes	Planned stops from shift plan (operand)
Operational Time	Auxiliary	Yes	$Operational\ Time = Total\ Time - Planned\ Stops$
Net Production Time	Auxiliary	Yes	$Net\ Production\ Time = Operational\ Time - Availability\ Loss$
Net Operational Time	Auxiliary	Yes	$Net\ Operational\ Time = Net\ Production\ Time - Performance\ Loss$

Name	Type	Editable	Formula
Used Operational Time	Auxiliary	Yes	<i>Used Operational Time = Net Operational Time – Quality Loss</i>
Theoretical Output	Operand	Yes	Theoretical Output (Operand)
Equipment Utilization	Auxiliary	Yes	<i>Equipment Utilization = <math>\frac{\text{Operational Time}}{\text{Total Time}}</math></i>

User interface


In “KPIs” overview, you can perform the following actions:



- ① Navigates to the “Configuration” tab
- ② Edits the existing “KPI”
- ③ Navigates to the next step
- ④ Displays the current step

Procedure

To modify the existing formulas, proceed as follows:


1. From the navigation tab, click “Configuration” and select "KPIs".
2. In “KPIs”, click  next to the desired KPI to modify the existing “KPIs” with a formula editor.
3. In formula editor, change the formulas with the following options:

Option	Description
(	Open a bracket

Option	Description
)	Close a bracket
+	Add another constant or operand
-	Subtract another constant or operand
*	Multiply another constant or operand
/	Divide another constant or operand
Constant	Any decimal number, positive or negative
Operand	Any entry from the provided dropdown list

## Example 1: Modifying the existing operands or constants formulas


To modify existing operands or constants in formulas, proceed as follows:

1. In the formula field, select the operand and click .
2. Insert another constant or select a different operand, KPI, or auxiliary from the dropdown list.
3. Modify the formula and it will be auto-saved.

## Example 2: Adding the operations and constants or operands

To add further operations and constants or operands, proceed as follows:


1. In the formula field, select one of the mathematical expressions “(, ), +, -, \*, /”.
2. Click the “Constant” or “Operand” buttons.

Newly added operands or constants can be edited instantly. To change them later, select the operand or constant and then click .

## Example 3: Delete constants or operands

To delete any operand, constant, or mathematical expression, proceed as follows:

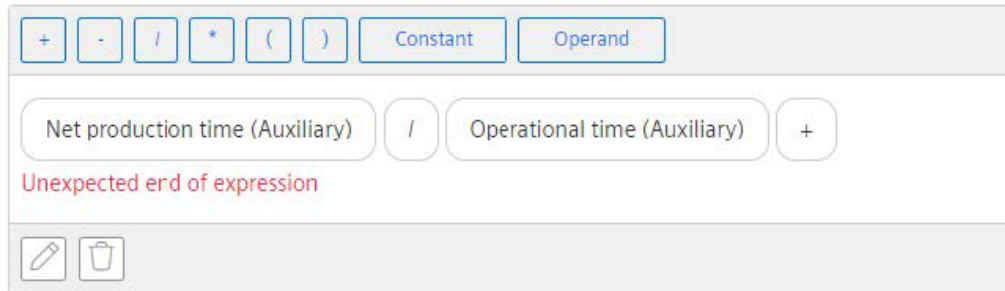
1. Select the item in the formula editor.

Click the trash can icon .

The application automatically validates if the formula is still in the proper format. If not, the

2. following message appears:

#### Formula Editor




- If the formula is not in the proper format, the modifications will not be saved until the user resolves the problem.
- Once a bracket "(" is opened, it is required to close it with the following operation ")"
- Once any of the mathematical operators +, -, \*, or / is added, it is required to add either an operand or constant afterward. Otherwise, the formula will not be saved.
- The changes will directly appear in the application.

## 6.3 Configuring Time Model

One of the fundamental concepts of Overall Equipment Effectiveness (OEE) is the "Time Model". "Time Model" is a representation of the production time and different downtimes of a plant.

### Prerequisite

To configure the time model, it is important to understand the basic concepts from Section [Time Model](#).

### User interface

In "Insights Hub OEE" application, following are the three main time categories:

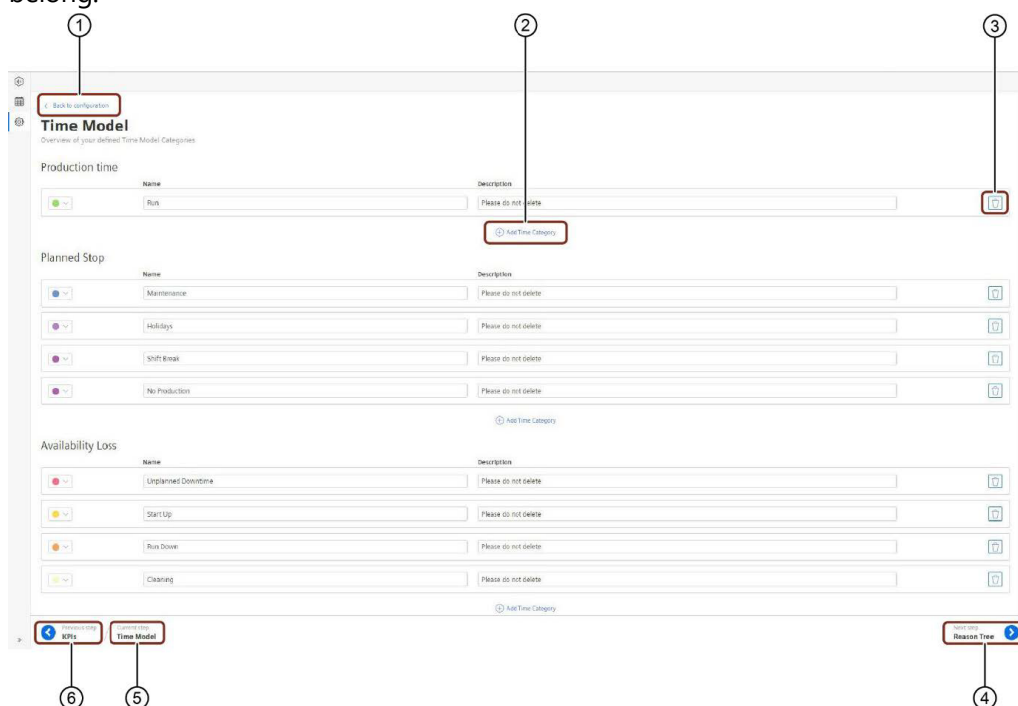
- Production Time
- Availability Loss
- Planned Stop

It is possible to create time categories to split the time of a machine or line into the right categories under each of these main categories.

In the Insights Hub OEE application, it is only possible to create a one-time model. Otherwise, the data cannot be compared between different lines and machines if they are built upon different time models.

It is best to carefully consider which time categories should be included in the time model. Once they are created and reason trees or status mappings are built on the underlying time model, the user should avoid removing time categories. Otherwise, this would lead to data inconsistencies afterward.

While creating the time categories, consider the major time category to which they should belong.



- ① Navigates to the “Configuration” tab
- ② Adds the new “Time Category”
- ③ Deletes the existing “Time Category”
- ④ Navigates to the next step
- ⑤ Displays the current step
- ⑥ Navigates to the previous step

## Procedure

To create a new time category in each major time category, proceed as follows:

1. From the navigation tab, click “Configuration” and select “Time Model”.
2. In “Time Model”, click “Add Time Category”.
3. In each major time category, select a representing color for each time category.



This color will be reflected in the machine status bar.

4. Enter "Name" and "Description" for the time category.



- The changes are auto-saved and will directly appear in the application.
- For more information on how the underlying time model is being utilized to build custom reason trees, see Section [Configuring Reason Tree](#).

## 6.4 Configuring Reason Tree

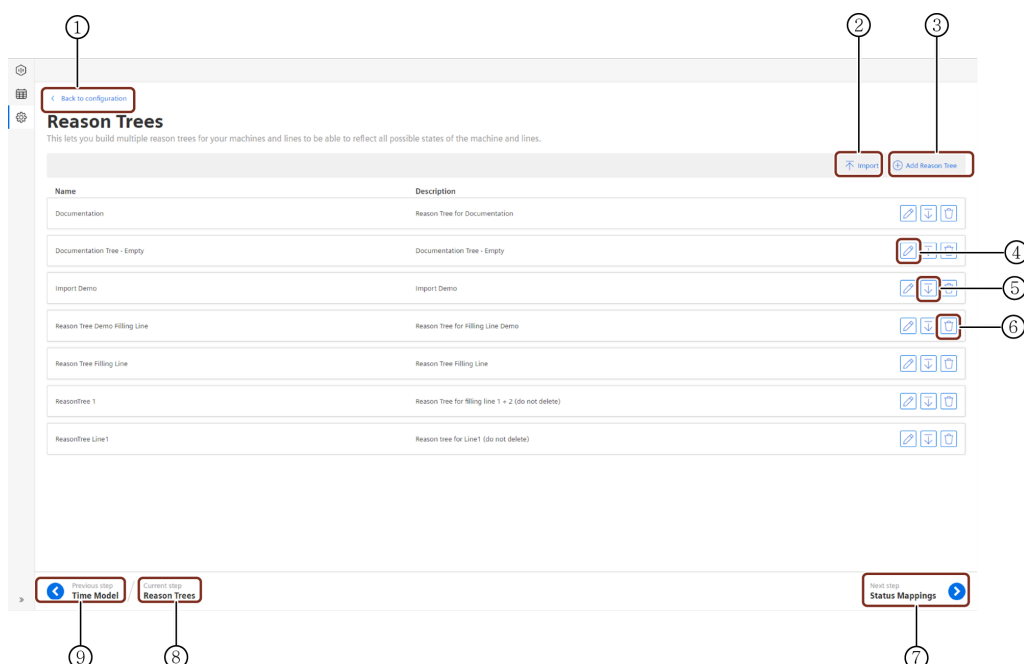
In "Reason Tree" configuration, you can create multiple "Reason Trees" when compared to "Time Model" configuration. You can create "Reason Trees" for either a line or a specific machine type.

### Prerequisite

Before "Reason Tree" configuration, "Time Model" configuration should be completed already. To configure the Reason Tree, it is important to understand the basic concepts from Section [Reason Tree](#).

### User interface

In the "Reason Tree" overview, you can perform the following actions:



- ① Navigates to the "Configuration" tab
- ② Imports the "Reason Tree"
- ③ Adds the new "Reason Tree"
- ④ Edits the existing "Reason Tree"
- ⑤ Exports the "Reason Tree"
- ⑥ Deletes the existing "Reason Tree"
- ⑦ Navigates to the next step
- ⑧ Displays the current step
- ⑨ Navigates to the previous step

## Procedure

To create a "Reason Tree", proceed as follows:

1. From the navigation tab, click "Configuration" and select "Reason Tree".
2. In "Reason Tree", click "Add Reason Tree".



## 3. Enter "Name" and "Description".

**Reason Tree**  
This lets you build multiple reason trees for your machines and lines to be able to reflect all possible states of the machine and lines.

Name: Documentation

Description: Reason Tree for Documentation

Time Category: Cleaning, Holidays, Maintenance, Refreshers, Run, Run Down, Shift Break, Start Up, Unplanned Downtime




Reason Layers: Stop, Maintenance, Running, Run, Idle, Run Down, Start Up, Conveyor Belt, Electrical



- The description field is mandatory. It helps the user to distinguish between different reason trees.
- The changes are auto-saved and will directly appear in the application.

4. Click  to add the "State" or "Reason Layers" to start building the tree structure.



- The moment you enter the "Reason Tree" mandatory name and description, "Time Categories" will be displayed to start building the tree structure.
- Click  to delete the "State" or "Reason Layers".
- The time categories in the first column cannot be further modified, for example, renamed or deleted.
- By clicking  next to the time category once again, you can create another "State" or "Reason Layers" for the time category and this can be repeated multiple times.
- In general, click  to create a child element to the existing element. Thereby, it is possible to create the tree structure.

5. After adding the "Reason Tree" structure, click the "Back to reason tree overview" button and click "Next step" to proceed with "Status Mapping".



By default, existing reasons will be sorted in alphabetic order, new reasons will be set on the top and will not be sorted to not disturb the workflow by possible scroll effects. New reasons will be marked with a new label. Next time you open the reason tree the new reasons will be sorted as well.

## Importing or Exporting a reason tree

How to import or export a reason tree with the help of Excel sheets please see [Excel Import Reason Tree & Status Mapping](#).

## 6.5 Configuring Status Mapping

In the “Status Mapping” configuration, you can create multiple status mappings for a previously configured “Reason Tree”. In this scenario, where one tree is built for the whole line, the underlying machines have different status codes for the same status.

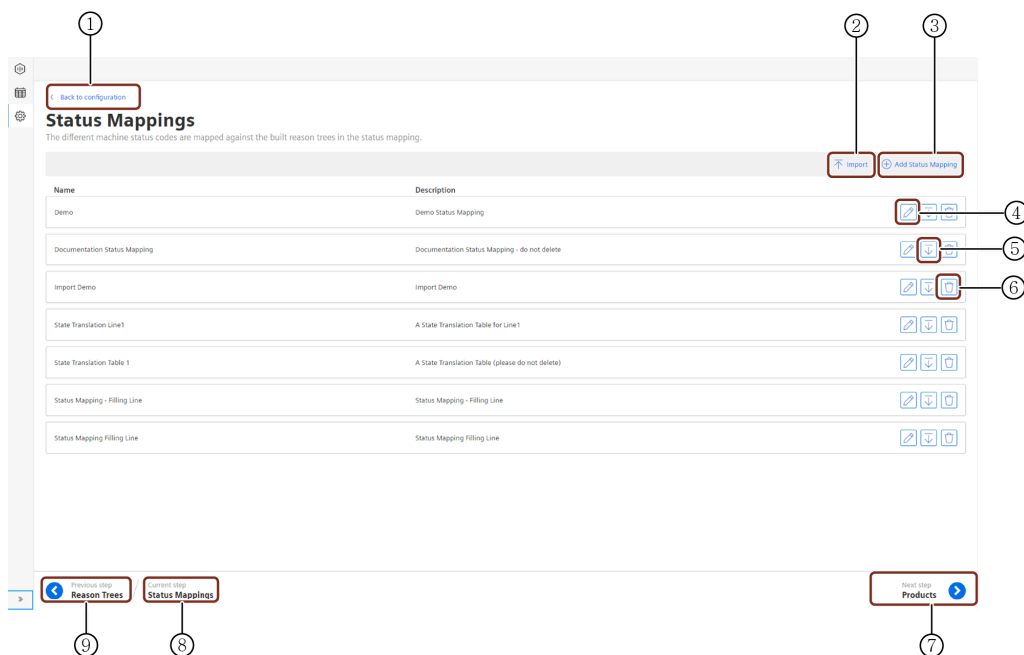
### Prerequisite

Before the “Status Mapping” configuration, the “Reason Tree” and “Time Model” configuration must be completed already.

Before starting the “Status Mappings” configuration, refer to Section [Status Mappings](#) in the OEE Basics chapter.

### User interface

In the “Status Mapping” overview, you can perform the following actions:



- ① Navigates to the "Configuration" tab
- ② Imports the "Status Mapping"
- ③ Adds the new "Status Mapping"
- ④ Edits the existing "Status Mapping"
- ⑤ Exports the "Status Mapping"
- ⑥ Deletes the existing "Status Mapping"
- ⑦ Navigates to the next step
- ⑧ Displays the current step
- ⑨ Navigates to the previous step

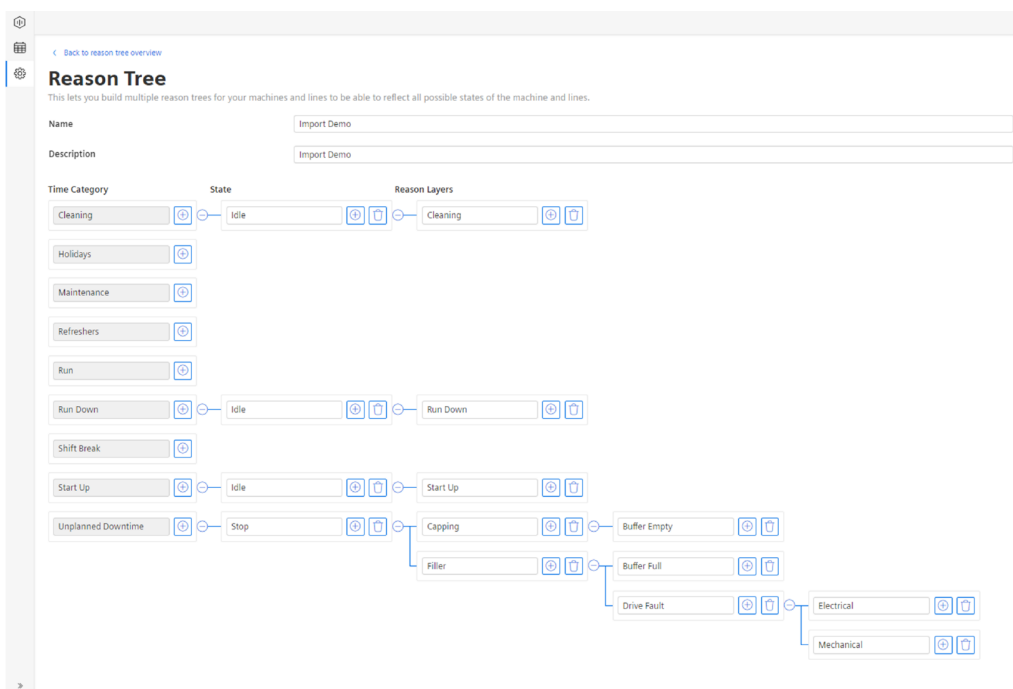
## Procedure

To create a new status mapping, proceed as follows:

1. From the navigation tab, click "Configuration" and select "Status Mapping".
2. In "Status Mapping", click "Add Status Mapping".
3. Select the newly added or existing "Reason Tree".
4. Enter "Name" and "Description".
5. Enter status value code for "Time Category", "State" or "Reason Layers".



Status value codes are defined by the machine or line.



- The existing reasons cannot be changed by the user in this view.
- If you need to change on “Reason Tree” structure, it can be done via the “Reason Tree” configuration of the specific reason tree.

6. After adding “Status Mapping” values, click the “Back to status mapping overview” button and click “Next step” to proceed with “Products”.

For more information on “Status Mapping”, refer to Section [Status Mappings](#) in the OEE Basics chapter. It is not necessary to enter a status code for every reason in the tree structure.

However, it is important to enter the status code for the reasons that are collected by the machine. After entering the status codes, click the “Back to Configuration” button to navigate back to the “Configuration” tab.

## Importing or Exporting a status mapping

How to import or export a status mapping with the help of Excel sheets please see [Excel Import Reason Tree & Status Mapping](#).

## 6.6 Excel Import Reason Tree & Status Mapping

### Excel Template

To import a reason tree and / or a status mapping, Insights Hub OEE requires an Excel template that needs to be filled in properly by the user. The template will be described in the following sections.

## Excel Template Description

Once you opened the Excel Template, you will find an Excel File already pre-filled with some

	A	B	C	D	E	F
1	Reason	Status Code	Time Category	State	Reason Layer 1	Reason Layer 2
2		100	Run			
3		1	Maintenance			
4	Run Down	400	Run Down	Idle		
5	Start Up	200	Start Up	Idle		
6	Cleaning	300	Cleaning	Idle		
7	Stop	500	Unplanned Downtime			
8	Buffer Full	501	Unplanned Downtime	Stop	Filler	
9	Mechanical	502	Unplanned Downtime	Stop	Filler	Drive Fault
10	Electrical	503	Unplanned Downtime	Stop	Filler	Drive Fault
11	Buffer Empty	504	Unplanned Downtime	Stop	Capping	

sample data.

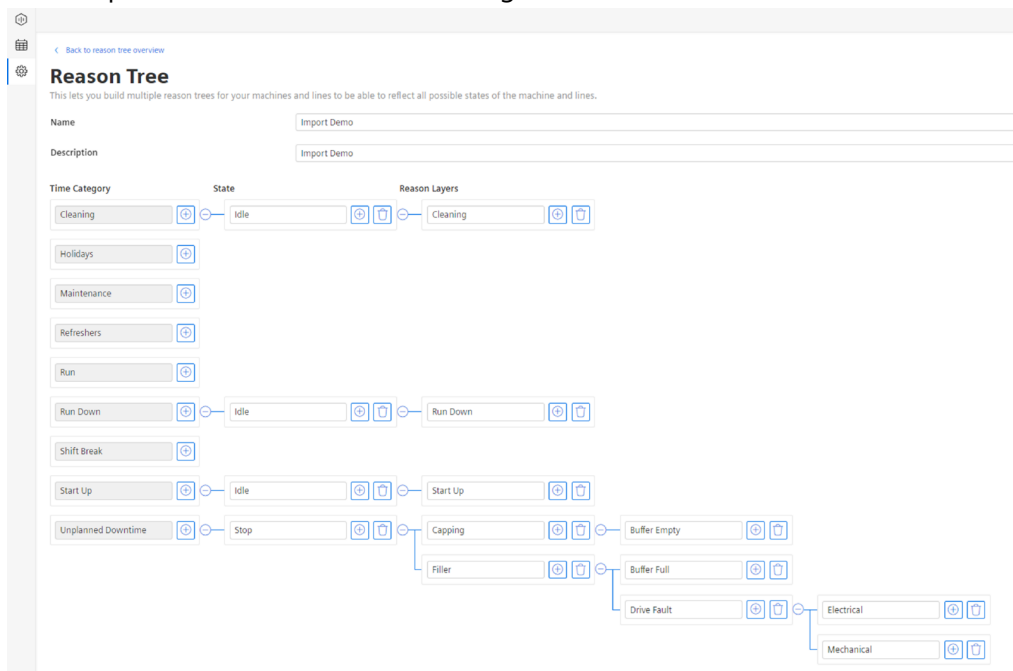
The screenshot above shows how the template is structured. To create a compatible template, you need to follow certain rules:

- First column must always be named **Reason**
- Second column must always be named **Status Code**
- Third column must always be named **Time Category**
- Fourth column must always be named **State**
- Fifth column and onwards must always be named **Reason Layer 1, Reason Layer 2, ..., Reason Layer N**

The first two columns always describe the last element in the tree hierarchy – the so-called leaves. There is one exception to this concept. Assigning a status code to a Time Category requires an empty reason column. Generally, if your reason tree needs to cover up to N Reason Layers then you have to create N-1 Reason Layers in the template and the Nth element in the tree is covered through the Reason column.

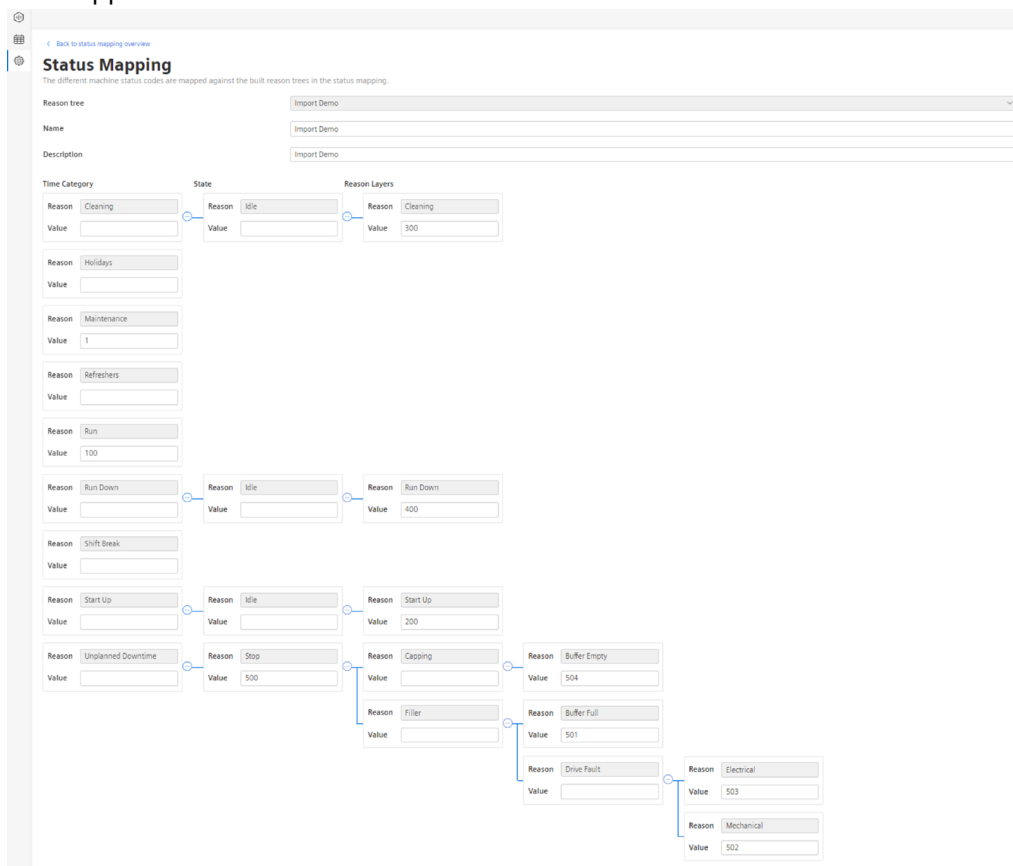
The example template from above covers all possible combinations that can happen in a reason tree and / or status mapping, e.g., status code mapped on a time category or status code mapped on a state or status code mapped to a reason.

The template translates into the following reason tree.



The first thing you notice, that also the time categories (Refreshers, Shift Break, Holidays), that were created in the time model but not included in the Excel template, also show up in the reason tree. This is typical and expected behavior of Insights Hub OEE. You will also notice that all reasons in the first column were turned into leaves after the time categories, e.g. "Buffer Full" in the Reason column turned into the following hierarchy "Unplanned Downtime -> Stop -> Filler -> Buffer Full". The other reasons follow the same principal.

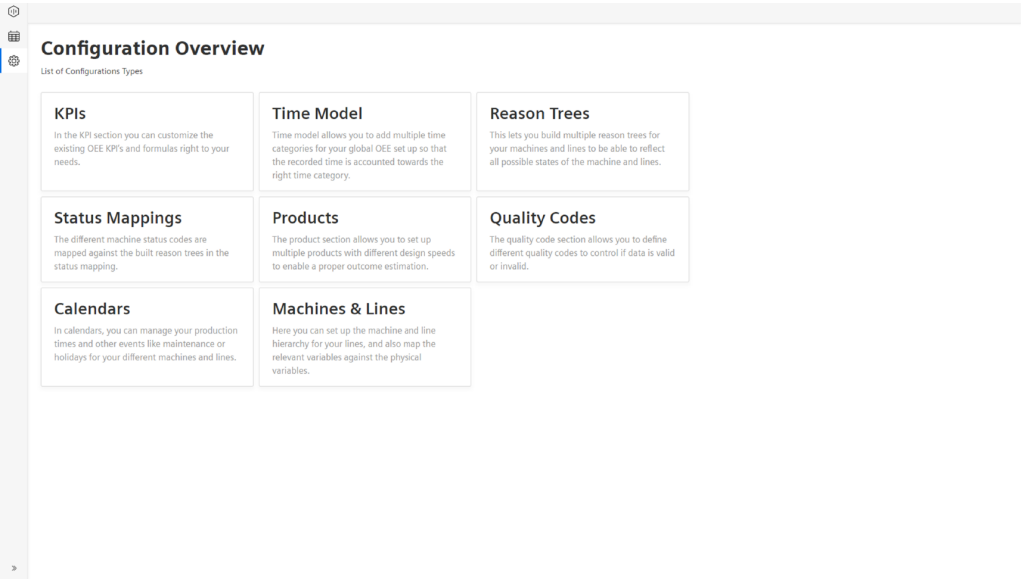
The template also contained status codes. The following screenshot shows how the status codes are mapped in the reason tree.



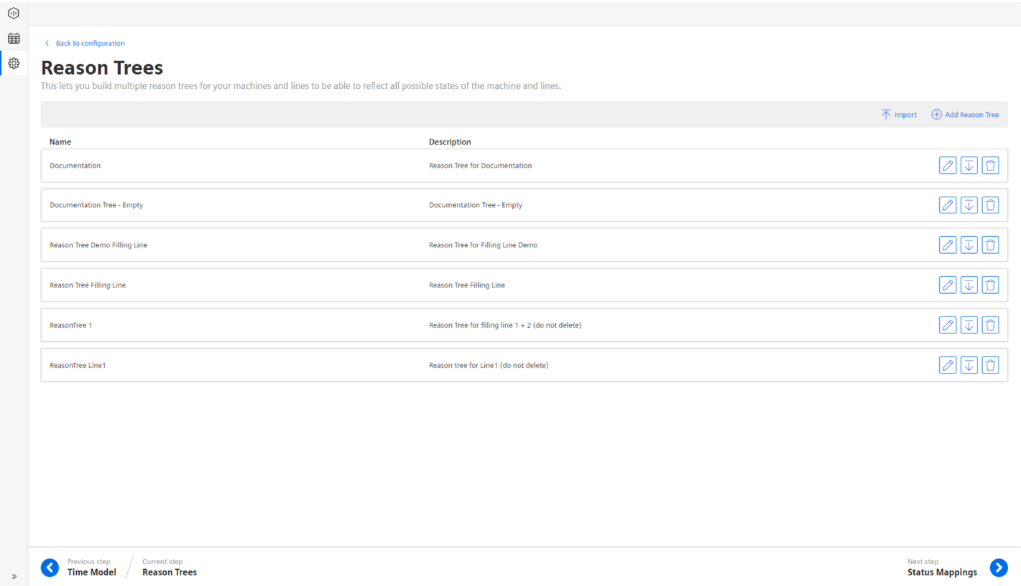
Line 2 and 3 in the Excel template above show how the special case of setting a status code at a time category is handled. Line 7 describes how you can set a status code on state. The other lines in the Excel template show that the combination of the Reason and Status Code column always describe the leaves in the status mapping.

## Import Wizard

In the following sections, you will learn how to import a Reason Tree & Status Mapping and how to import each of them individually. To start the import first navigate to the configuration by clicking the gear icon in the navigation bar on the left side. Following that, you can either select “Reason Trees” or “Status Mappings” to reach the Import Wizard.



On both of the sites, you will find an import button in the upper right corner.



After clicking the button, the import wizard will launch.

The screenshot shows the 'Select Import Type' screen of the 'Import Wizard'. On the left, a vertical sidebar contains four steps: 'Type' (1), 'Configuration' (2), 'File selection' (3), and 'Summary' (4). The 'Type' step is currently active. The main area has the title 'Select Import Type' and the instruction 'Please select applicable option'. There are three radio button options: 'Reason Tree + Status Mapping' (selected), 'Reason Tree', and 'Status Mapping'. Each option has a brief description. At the bottom, there are 'Cancel' and 'Next >' buttons.

## Import Reason Tree & Status Mapping

Select the first option **Reason Tree + Status Mapping** in the wizard and click **Next**, you will be guided to the next screen of the wizard. Here, you must put in a name and description of your choice for the reason tree and status mapping.

The screenshot shows the 'Configuration' screen of the 'Import Wizard'. The sidebar on the left now highlights the 'Configuration' step (2). The main area has the title 'Configuration' and the instruction 'Please provide a name and description for the Reason Tree and Status Mapping'. It contains two sections: 'Reason Tree' and 'Status Mapping'. Each section has input fields for 'Name' and 'Description', both of which contain the text 'Import Demo'. At the bottom, there are 'Cancel', '< Back', and 'Next >' buttons.

To proceed, please click **Next**. After this, click the **Upload** button. This will open another pop-up which allows you to select a file. Please select a file of the type **\*\*\*.xlsx\*\***. Note: downloading the demo template is also possible here.



The screenshot shows the 'File selection' step of the 'Import Wizard'. On the left, a vertical sidebar contains four steps: 'Type' (1), 'Configuration' (2), 'File selection' (3, highlighted), and 'Summary' (4). The main area is titled 'File selection' and includes the instruction 'Please select your import file'. A note states: 'Note: The Excel file requires a specific structure. Please download the sample file [here](#) to get familiar with the structure.' Below this, there is a 'Select file:' section with a text input field containing 'OEEHub\_Import\_Example\_Reason\_Tree.xlsx' and an 'Upload' button. A small text note below the input field says 'Please upload your import file by clicking "Upload"'. At the bottom, there are 'Cancel', '< Back', and 'Next >' buttons.

Once you click **Next**, the file is being uploaded and analyzed by Insights Hub OEE. The last screen will show you the details.

The screenshot shows the 'Summary' step of the 'Import Wizard'. The sidebar on the left highlights 'Summary' (4). The main area is titled 'Summary' and states 'We analyzed your file and found the following'. It lists: '8 reasons will be imported' and '8 status codes will be imported'. Below this is a 'Preview' section showing a hierarchical tree structure of reasons and status codes. The tree includes: 'Run Down' (with 'Idle' and 'Run Down ( 400 )'), 'Maintenance ( 1 )', 'Holidays', 'Shift Break', 'Unplanned Downtime', 'Stop ( 500 )' (with 'Filler', 'Buffer Full ( 501 )', 'Drive Fault', 'Mechanical ( 502 )', 'Electrical ( 503 )', 'Capping', and 'Buffer Empty ( 504 )'). At the bottom, there are 'Cancel', '< Back', and 'Import' buttons.

The last step shows a preview of the analyzed reasons with their status codes. Check the preview to see if everything is set up properly in the Excel file.

If warnings or errors will be detected, for example your template is not providing mandatory header cells, they will be shown here. You have now the chance to fix this in your file and to go back to step 2 and to reselect the file again. In case of errors, you can not start the import. To finalize the import procedure, please click **Import**.

## Import Reason Tree

Select the second option **Reason Tree** in the wizard and click **Next**, you will be guided to the next screen of the wizard. Here, you must put in a name and description of your choice for the reason tree.

**Import Wizard**

**Configuration**

Please provide a name and description for the Reason Tree

**Reason Tree**

Name: Import Demo

Description: Import Demo

Buttons: Cancel, < Back, Next >

To proceed, please click **Next**. After this, please click the **Upload** button. This will open another pop-up which allows you to select a file. Please select a file of the type **\*\*\*.xlsx\*\***.

**Note:** in the dialogue you are also able to download the template, which was described above.

**Note:** In case you only import the reasons of the reason tree, you must have reasons in the first column **Reason**. The minimum level of detail that you have to put in is depicted in line 5 of the screenshot below. Only values in the column **Time Category** will cause a warning during the import and will be ignored.

Once your Excel file fulfills these requirements, you can click **Next** and the file is being uploaded and analyzed by Insights Hub OEE.

**Import Wizard**

**File selection**

Please select your import file

Note: The Excel file requires a specific structure. Please download the sample file [here](#) to get familiar with the structure.

Select file:

OEEHub\_Import\_Example\_Reason\_Tree.xlsx

Buttons: Cancel, < Back, Upload, Next >

The last step shows a preview of the analyzed reasons with their status codes. Check the preview to see if everything is set up properly in the Excel file.

To finalize the import procedure, please click **Import**.

## Import Status Mapping

Select the second option **Status Mapping** in the wizard and click **Next**, you will be guided to the next screen of the wizard. Here, you must select an existing reason tree first and put in a name

and description of your choice for the status mapping.

To proceed, please click **Next**. After this, please click the **Upload** button. This will open another pop-up which allows you to select a file. Please select a file of the type **\*\*\*.xlsx\*\***.

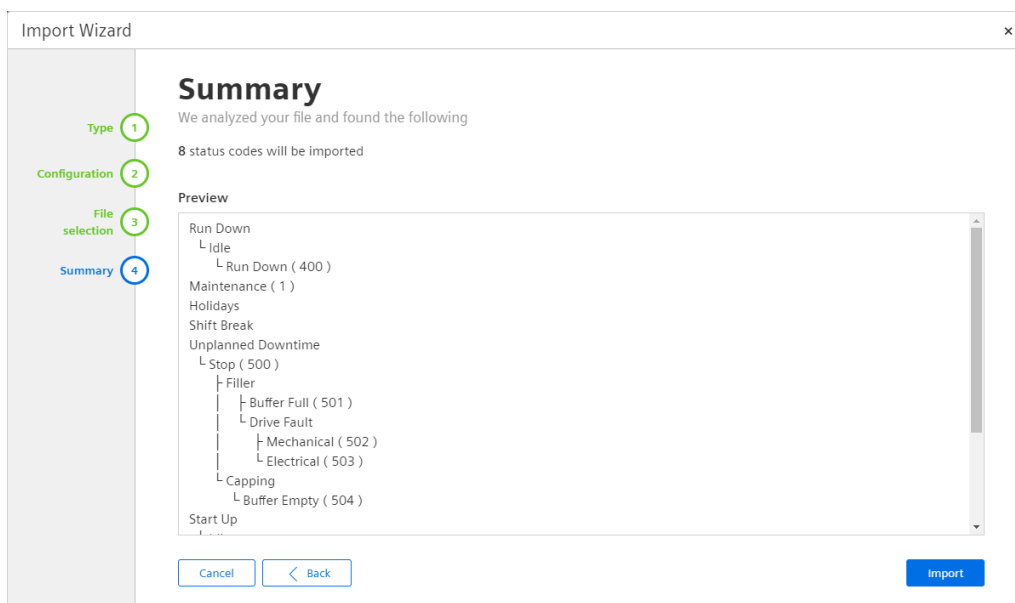
**Note:** In the dialogue you are also able to download the template, which was described above.

**Note:** To speed up the import of a status mapping, it is also possible to export the existing reason tree and fill in the relevant mappings and then upload it to Insights Hub OEE. To learn more about the export of reason trees and status mappings, please read the chapter **Export of Reason Tree and Status Mappings**.

A status mapping file needs to look the same way as it does in the **Reason Tree + Status Mapping** import scenario, so please refer to this section for an example.

Once your Excel file fulfills these requirements, you can click **Next** and the file is being uploaded and analyzed by Insights Hub OEE.

The last screen will show you the details.



The last step shows a preview of the analyzed reasons with their status codes. Check the preview to see if everything is set up properly in the Excel file.

To finalize the import procedure, click **Import**.

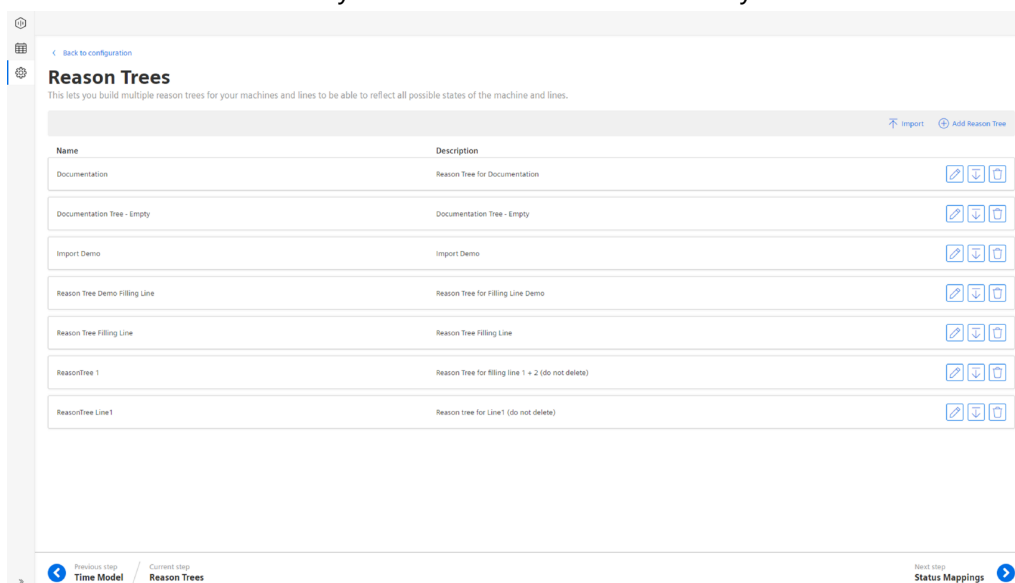
## Export of Reason Tree and Status Mappings

Insights Hub OEE also provides Export capabilities for reason trees and status mappings. This can be used to do snapshots of the existing configuration and help to speed up the configuration.

### Export of a Reason Tree

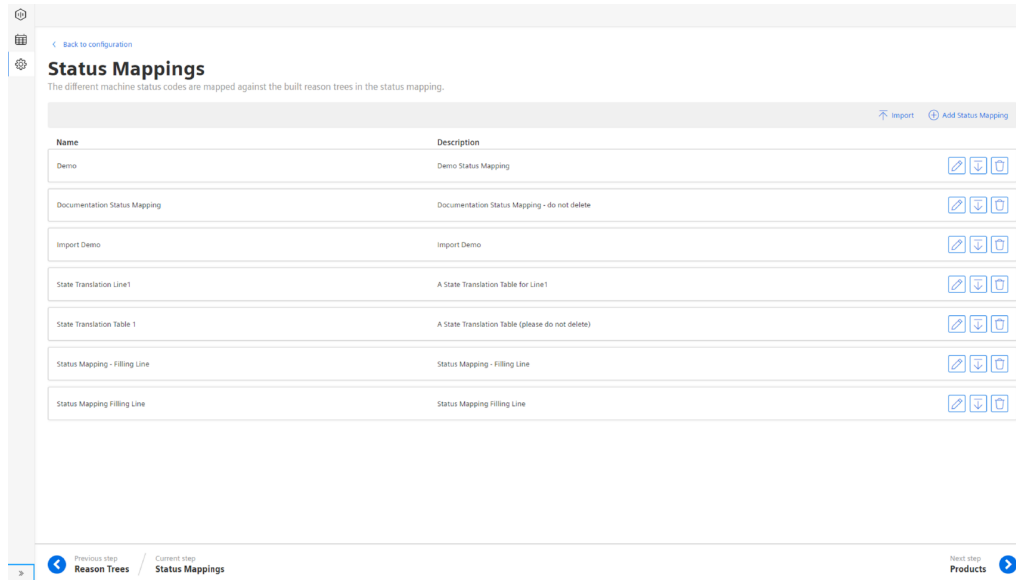
To export a reason tree, please click the gear icon on the left-hand side and go to the configuration. In the next step, please click on **Reason Trees** to open the reason trees configuration page. On each existing reason tree, you can find three different options to manipulate the item – edit, export and delete.

Please click the middle icon, the **download** button, to export the reason tree. It will automatically be saved as an Excel file to your default download folder on your PC.



## Export of a Status Mapping

To export a status mapping, please click the gear icon on the left-hand side and go to the configuration. In the next step, please click on **Status Mappings** to open the status mappings configuration page. On each existing status mapping, you can find three different options to manipulate the item – edit, export and delete. Please click the middle icon, the **download** button, to export the status mapping. It will automatically be saved as an Excel file to your standard download folder on your PC.



## 6.7 Configuring Products

### Prerequisite

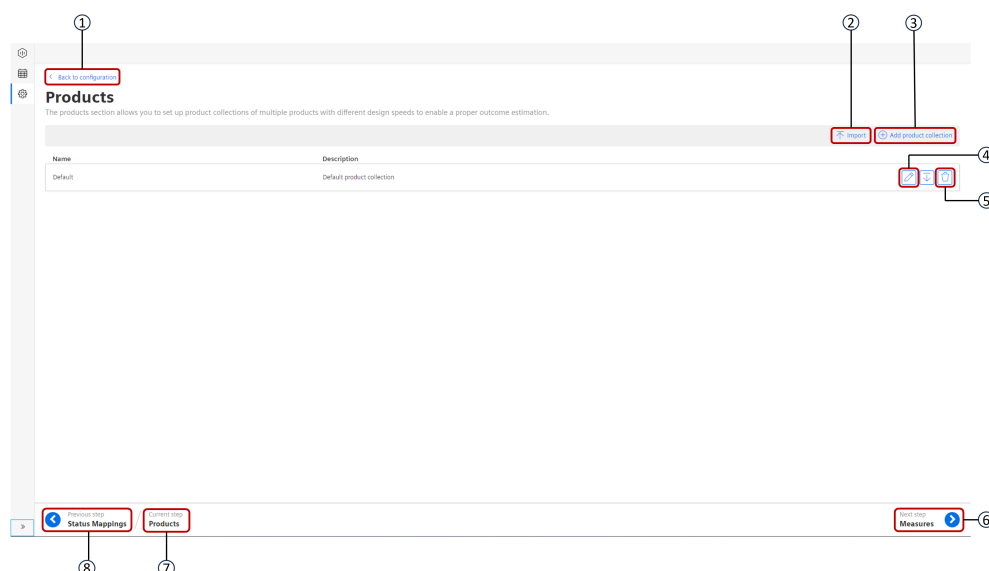
To enable proper Performance KPI calculations, refer to Section [Products & Design Speed](#) in the OEE Basics chapter.

Before configuring "Product Collections" & "Products", it is important to understand the basic concepts from Section [Products & Design Speed](#).

With product collections, you can now create groups of products that you can later assign to a specific machine or line asset. This is helpful if you are running the same products on different lines but with different design speeds, for example, if you are having twice the same equipment, one can produce the same product at a faster rate. In this section, you will learn how to set up collections and subsequent products.

### User interface

In "Products" overview, you can perform the following actions:



- ① Navigates to the "Configuration" tab
- ② Imports a new "Product Collection"
- ③ Adds a new "Product Collection"
- ④ Edits the existing "Product Collection"
- ⑤ Deletes the existing "Product Collection"
- ⑥ Navigates to the next step
- ⑦ Displays the current step
- ⑧ Navigates to the previous step

## Procedure

To create a new product collection, proceed as follows:

1. From the navigation tab, click "Configuration" and select "Products".
2. In "Products", click "Add Product Collection". This will open a new page.

On this page, add "Name" and "Description" for the product collection. Once you entered both, the product collection is auto-saved and you can start to add products.

Click "Add Product" to add a new product. This will open a new page. The page offers two options. Products can be added either with a Design Speed or Cycle Time.

- Enter "Name", "Description", select "Type" and enter "Design Speed" or "Cycle Time", "Unit", "Time interval" and "Product Code".
5. Given below is an example scenario:

- Name: *Orange Lemonade 1L*
- Description: *Orange Lemonade 1L*
- Type: *Speed*
- Design Speed: *6500.00*
- Unit: *Pcs*

- Time interval: *per Hour*
- Product Code: *OL1L*

[Back to product collection](#)

### Product

The product section allows you to set up multiple products with different design speeds to enable a proper outcome estimation. The design speed describes the number of parts per interval.

Name

Orange Lemonade 1L

Description

Orange Lemonade 1L

Type

Speed

Design Speed

6500

Unit

Pcs

Time Unit

per hour

Product Code

OL1L

Input Field	Data type or Units
Name	STRING
Design Speed	INT or DOUBLE
Unit	String (for example, kg, pcs, etc.)
Time Interval	HOUR, MINUTE or SECOND
Product Code	STRING or INT

After adding the product information, click “Back to Product Collection” button to get back to the collection. You will find the newly created product as a list item in the product collection.

[Back to product collection overview](#)

### Product collection

The product collection section allows you to set up multiple products with different design speeds to enable a proper outcome estimation. The design speed describes the number of parts per interval.

Name

Documentation Collection

Description

Documentation Collection

Search...

[Add product](#)

Name	Description	Code	Design Speed	
Orange Lemonade 1L	Orange Lemonade 1L	OL1L	6500 Pcs per hour	<div></div>

6.

The product collection list shows all the individual products created in the collection and showing the following information for each product:

- Name
- Description
- Code
- Design Speed

The product collection also features a search bar, so you can filter the list for the desired product.



Since the product collections are an enhancement compared to the previous products, all existing products are moved in a product collection called "Default".

## Excel Import and Export

For product collections, Insights Hub OEE also features an excel import and export to speed up the configuration of multiple products for different machines and lines. To import a product collection, Insights Hub OEE requires an excel template that needs to be filled in properly by the user. The template will be described in the following sections.

### Excel Template Description

The template creation for a product collection is straightforward. As a first step you need to create the following columns.

- Name
- Description
- Design Speed
- Unit
- Time Interval
- Product Code
- Speed Type

Once you created it properly, it should look like the picture below.

Name	Description	Design Spe Unit	Time Inter	Product Code	Speed Type
OEE Product 1	OEE Product Description 1	1000 Pcs	HOUR	P1	SPEED
OEE Product 2	OEE Product Description 2	2000 Pcs	HOUR	P2	SPEED
OEE Product 3	OEE Product Description 3	2 Pcs	MINUTE	P3	CYCLE_TIME

Now, for every product, that you want to set up, you have to create a single row in the excel template. In the example above, already three products are created with the different design speeds. For the individual columns some constraints apply:

- Name: Must start with a character, followed by characters, digit, hyphen, underscore, dot, comma or white space, max length is 50

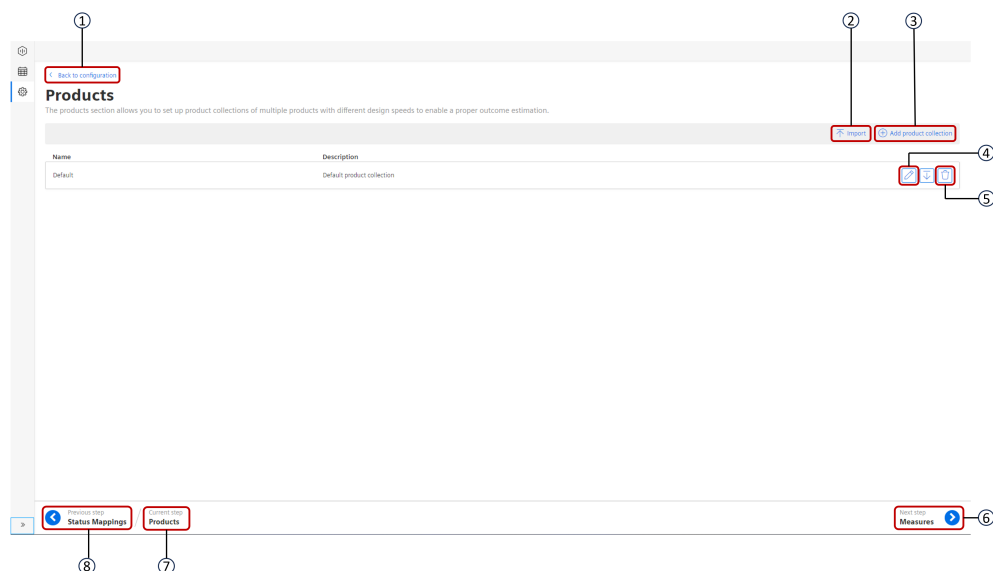


- **Description:** Must start with a character, followed by characters, digits or any of \_ - , . ; : ! " ' \$ % / ( ) @ + \*, max length is 50
- **Design Speed:** Must be a positive number (Double or INT)
- **Unit:** Must start with a character, followed by characters, digit, hyphen, underscore, dot, comma or white space, max length is 10
- **Time Interval:** Must be either HOUR, MINUTE or SECOND
- **Product Code:** Is of the datatype string and must have a length between 1 – 64 characters
- **Speed Type:** Fill in "SPEED" for Design Speed or "CYCLE\_TIME" for Cycle Time

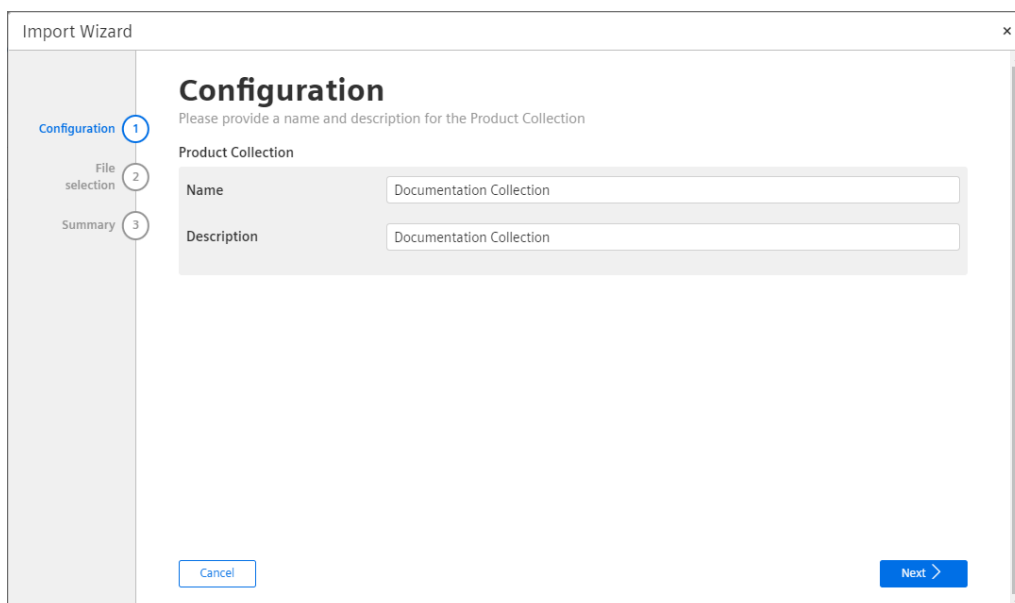
Once you completed your product collection save the file as an .xlsx file to your desired location.

## Import Wizard

In the following section, you will learn how to import a product collection in Insights Hub OEE. To start the import, first navigate to the configuration by clicking the gear icon in the navigation bar on the left side. Following that, you have to select the “Products” to reach the import wizard.

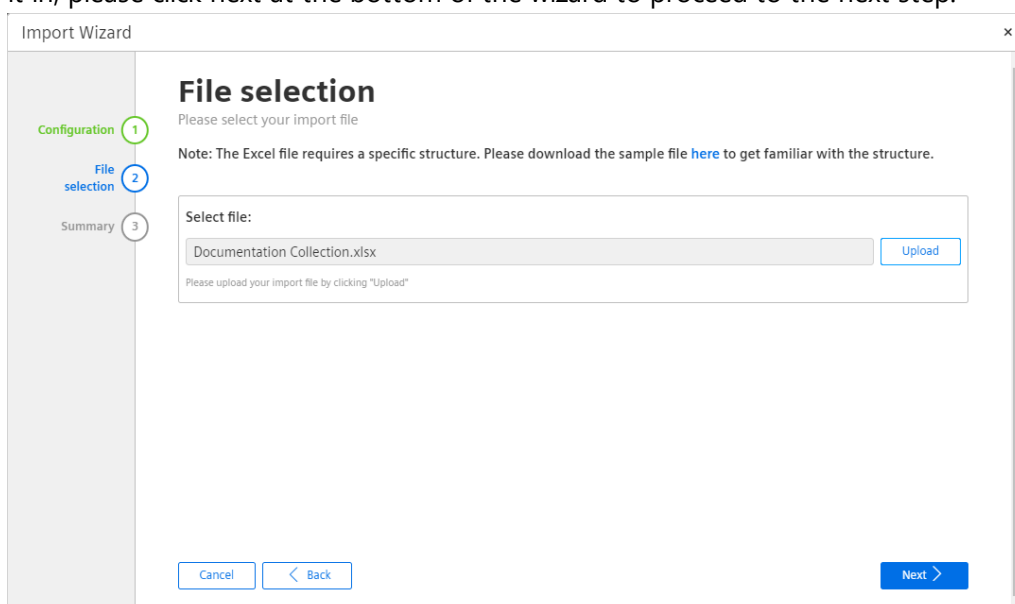


In the upper right corner, you will find an import button. After clicking the button, the import wizard will launch.



The screenshot shows the 'Import Wizard' window with the 'Configuration' step selected. The left sidebar has three steps: 'Configuration' (1), 'File selection' (2), and 'Summary' (3). The main area is titled 'Configuration' and asks the user to provide a name and description for the Product Collection. There are two input fields: 'Name' and 'Description', both containing the text 'Documentation Collection'. At the bottom, there are 'Cancel' and 'Next >' buttons.

The screen above asks you to fill in the product collection name and description. Once you filled it in, please click next at the bottom of the wizard to proceed to the next step.



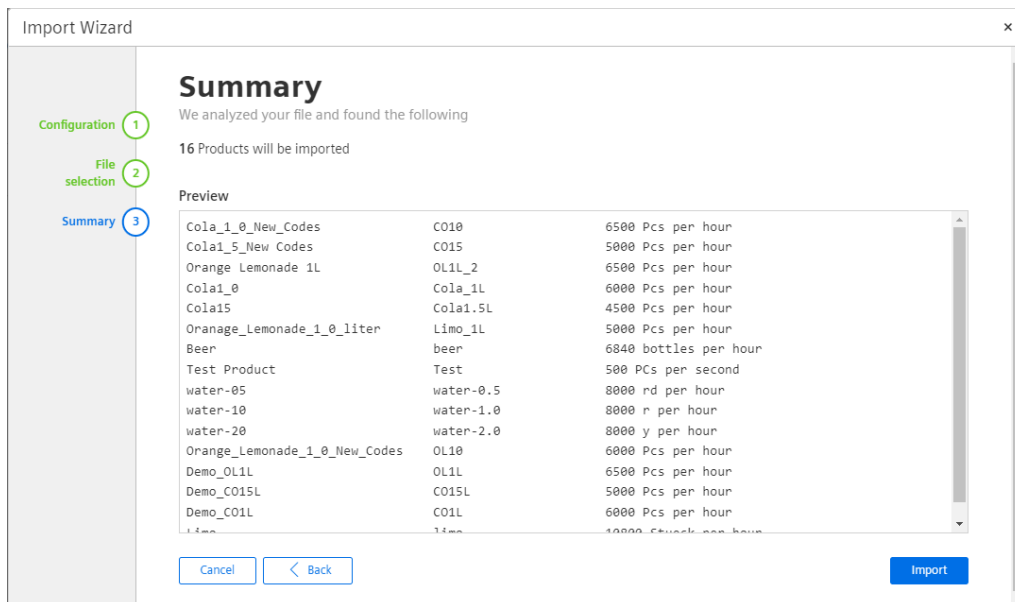
The screenshot shows the 'Import Wizard' window with the 'File selection' step selected. The left sidebar has three steps: 'Configuration' (1), 'File selection' (2), and 'Summary' (3). The main area is titled 'File selection' and asks the user to select their import file. A note states: 'Note: The Excel file requires a specific structure. Please download the sample file [here](#) to get familiar with the structure.' There is a 'Select file:' label and a text input field containing 'Documentation Collection.xlsx'. To the right of the input field is an 'Upload' button. Below the input field, a small text says 'Please upload your import file by clicking "Upload"'. At the bottom, there are 'Cancel', '< Back', and 'Next >' buttons.

In this screen, click the Upload button. This will open another pop-up which allows you to select a file. Please select a file of the type .xlsx.



Downloading a demo template is also possible here.

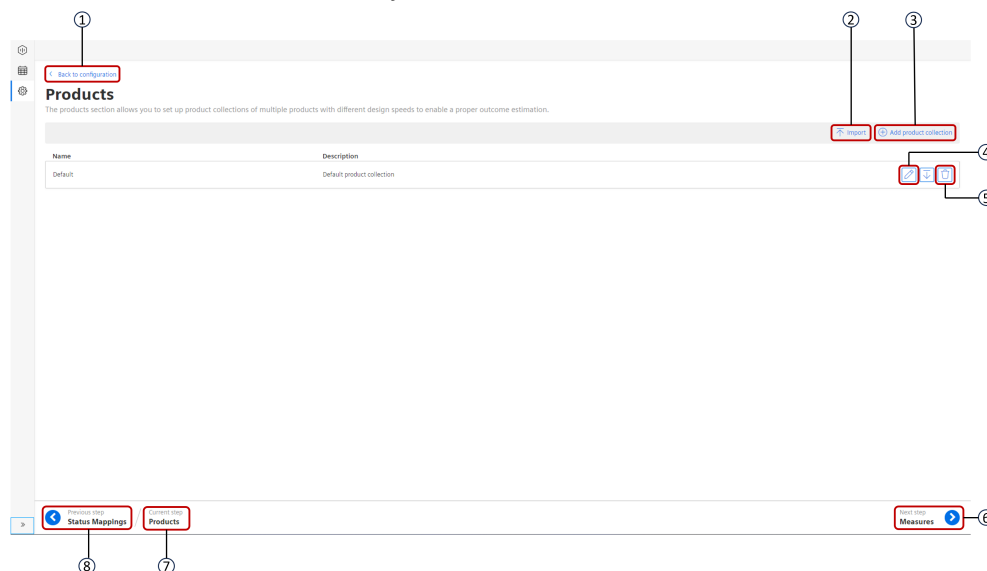
Once you selected the file, click next and the file is being uploaded and analyzed by Insights Hub OEE. The last screen will show you some details of the identified products in a table view.



If warnings or errors are detected, e.g., your template does not provide the mandatory header cells, they will also be shown on the last page of the import wizard. Then you have the chance to fix issues in the file and go back to the second step and to reselect the file again. In case of errors, you can not start the import. To finalize the import, click the Import button.

## Export of a Product Collection

To export a product collection, click product overview page. On each existing product collection, you can find three different icons to manipulate the item - edit, export and delete. Click download button, to export the product collection. It will automatically be saved as an .xlsx file to your default download folder on your PC.



## 6.8 Configuring Measures

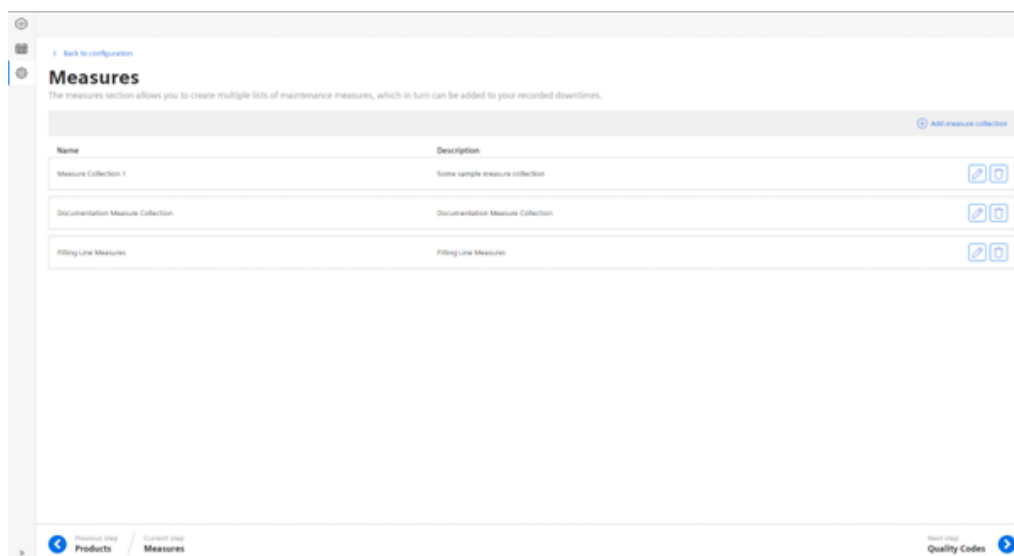
In „Measures“ configuration, you can create multiple measure collections. The “Measures” are created in Insights Hub OEE so that you can keep track of corrective measures your operators

take to resolve certain downtimes of the equipment. To make the input for the machine operators easier, you define measure collections with pre-defined measures. At a later stage (please see Downtime Management Chapter), the operator can assign multiple measures from the preconfigured measure collection to a downtime. The purpose of this capability is to track what measures help to resolve downtimes and given these records identify the measures which work best on certain downtimes to improve the issue recovery process.

## User interface

In the “Measures” overview, you can perform the following actions:

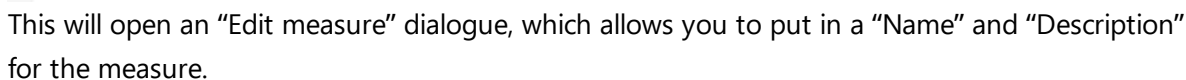
1. Navigates to Configuration Tab.
2. Add a new “Measure Collection”.
3. Edit existing Measure Collection.
4. Delete Measure Collection.
5. Navigates to the next step.
6. Displays the current step.
7. Navigates to the previous step.



## Procedure

To create a measures collection, proceed as follows:

1. From the navigation tab, click on “Configuration” and select “Measures”.
2. In “Measures”, click “Add Measure Collection”.
3. Add “Name” and “Description”.
4. Click “Add measure” in the upper right corner to add the first measure in the collection.



As you can see in the screenshot above, the description input field offers now more capabilities than the usual description fields in the application. The goal is that the user puts in additional information for the created measure such as exact maintenance steps or links to manuals. In general, the editor allows you to structure the input text and can then also be displayed in a better way at a later stage. Once you have put in all the relevant information, please click “Save” and the measure is saved, and the input dialogue closes.

The screenshot shows the 'Measures' configuration page. At the top, there is a 'Back to measure overview' link. Below it, the 'Measures' title is followed by a subtitle: 'The measures section allows you to create multiple lists of maintenance measures, which in turn can be added to your recorded downtimes.' There are two input fields: 'Name' and 'Description', both containing the text 'Documentation Measure Collection'. To the right of the 'Description' field is an 'Add measure' button. Below these fields is the 'Measure Layers' section, which contains a single measure 'My First Measure' with three icons (edit, delete, add) to its right.

Once you created the first measure in the collection, there are now multiple possibilities for you to proceed.

- Click the pen icon to edit the measure.
- Click the trash can icon to delete the measure. This will also delete all child measures.
- Click the plus button to add a child measure to the existing measure.

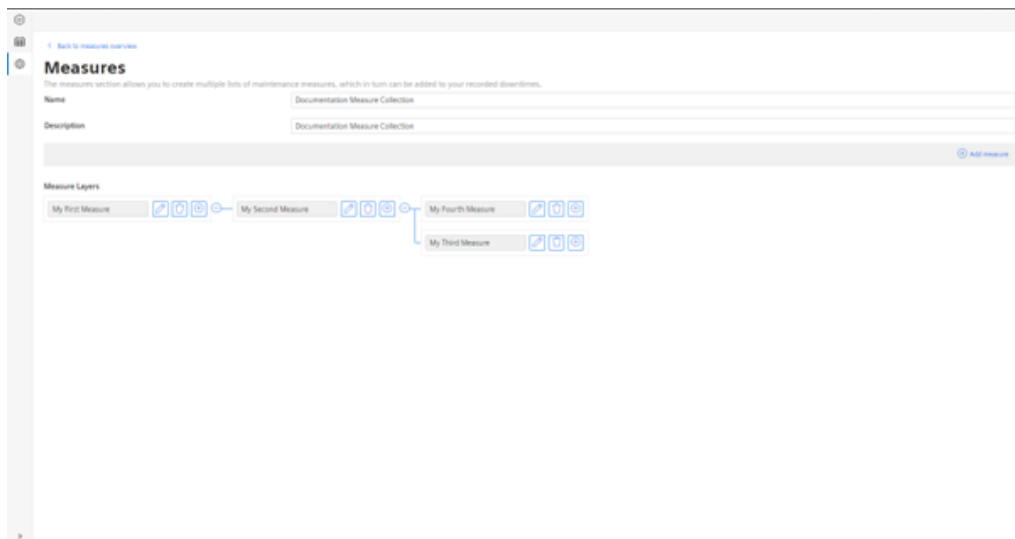
The measure collection can be built in two ways, either as a simple list or as a tree structure like you are already used to from the reason tree capability.

#### Simple List:

To create a simple list, please always keep adding new measures the “Add measure” button. This will always create new measures on the first layer in the collection.

This screenshot shows the 'Measures' configuration page after adding more measures. The 'Name' and 'Description' fields remain the same. The 'Measure Layers' section now contains three measures: 'My First Measure', 'My Second Measure', and 'My Third Measure'. Each measure has the same three icons (edit, delete, add) to its right.

**Tree Structure:** To create a tree structure, you must click on the plus icon on an existing measure as this click will create a new child measure. If you want to create a new measure on the first layer, then you must click the “Add measure” button in the upper right corner.



After you finished adding all measures to the collection, you can click on the “Back to measures overview” button in the upper left corner to get back to the measures overview.

**hide\_license\_text: true**

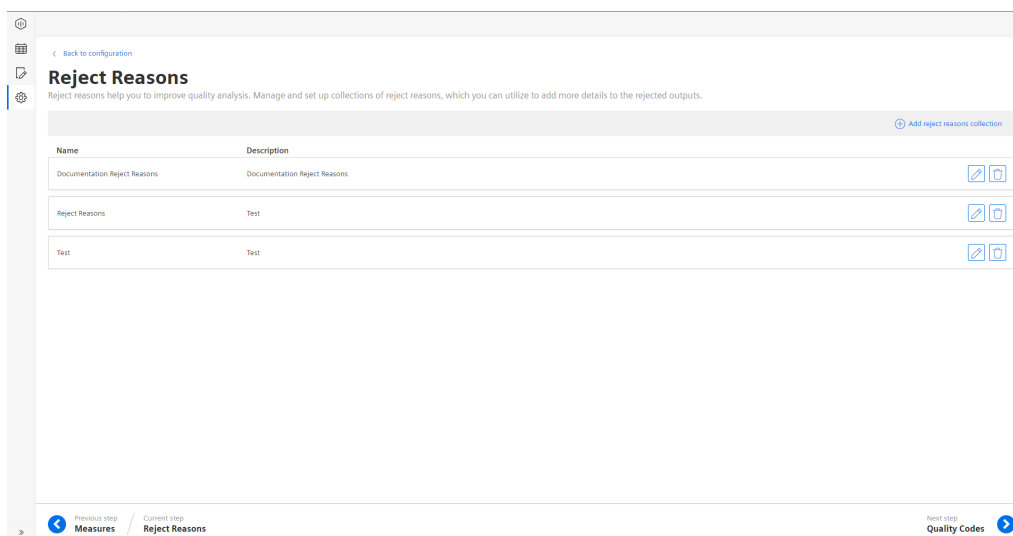
## 6.9 Reject Reasons

To understand your quality issues even further, you can also track the underlying reasons of your rejects via the manual inputs capability. Once track the reject reasons you can for instance see the top 10 reject reasons on the quality page. In this section, you will learn how to configure the reject reason collections which you need to assign in the machine and line configuration.

### User interface

In the “Reject Reasons” overview, you can perform the following actions:

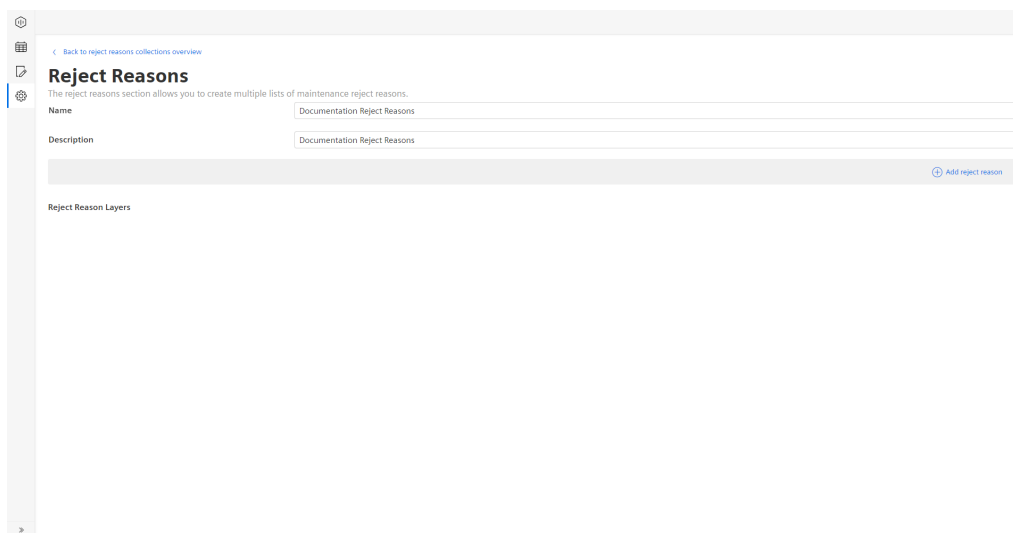
1. Navigates to Configuration Tab.
2. Add a new "Reject Reason Collection".
3. Edit existing Reject Reason Collection.
4. Delete Reject Reason Collection.
5. Navigates to the next step.
6. Displays the current step.
7. Navigates to the previous step.



## Procedure

To create a reject reason collection, proceed as follows:

1. From the navigation tab, click on “Configuration” and select “Reject Reasons”.
2. In “Reject Reasons”, click “Add Reject Reasons Collection”.
3. Add “Name” and “Description”.
4. Click “Add reject reason” in the upper right corner to add the first reject reason in the collection.



This will open an “Edit reject reason” dialogue, which allows you to put in a “Name” and “Description” for the reject reason.



As you can see in the screenshot above, the description input field offers now more capabilities than the usual description fields in the application. The goal is that the user puts in additional information for the created reject reason. In general, the editor allows you to structure the input text and can then also be displayed in a better way at a later stage. Once you have put in all the relevant information, please click “Save” and the reject reason is saved, and the input dialogue closes.

Once you created the first reject reason in the collection, there are now multiple possibilities for you to proceed.

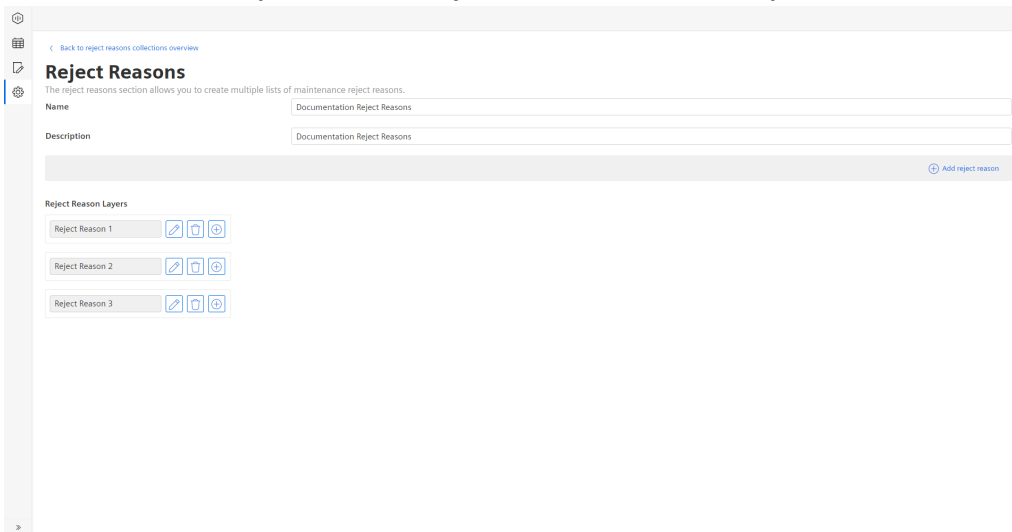
- Click the pen icon to edit the reject reason.
- Click the trash can icon to delete the reject reason. This will also delete all child reject reasons.

- Click the plus button to add a child reject reason to the existing reject reason.

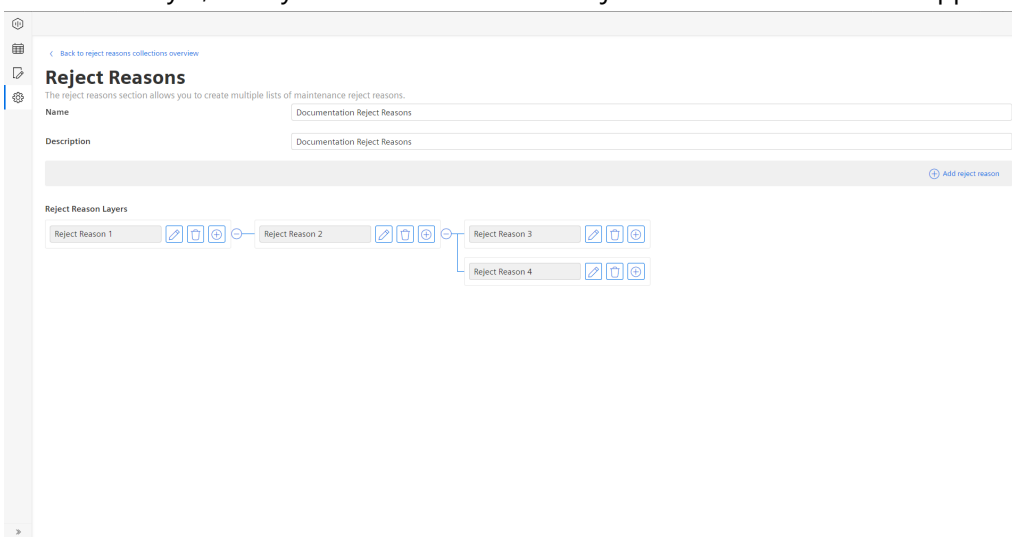
The reject reason collection can be built in two ways, either as a simple list or as a tree structure like you are already used to from the reason tree capability.

### Simple List:

To create a simple list, please always keep adding new reject reasons the “Add reject reason” button. This will always create new reject reasons on the first layer in the collection.



**Tree Structure:** To create a tree structure, you must click on the plus icon on an existing reject reason as this click will create a new child reject reason. If you want to create a new reject reason on the first layer, then you must click the “Add reject reason” button in the upper right corner.



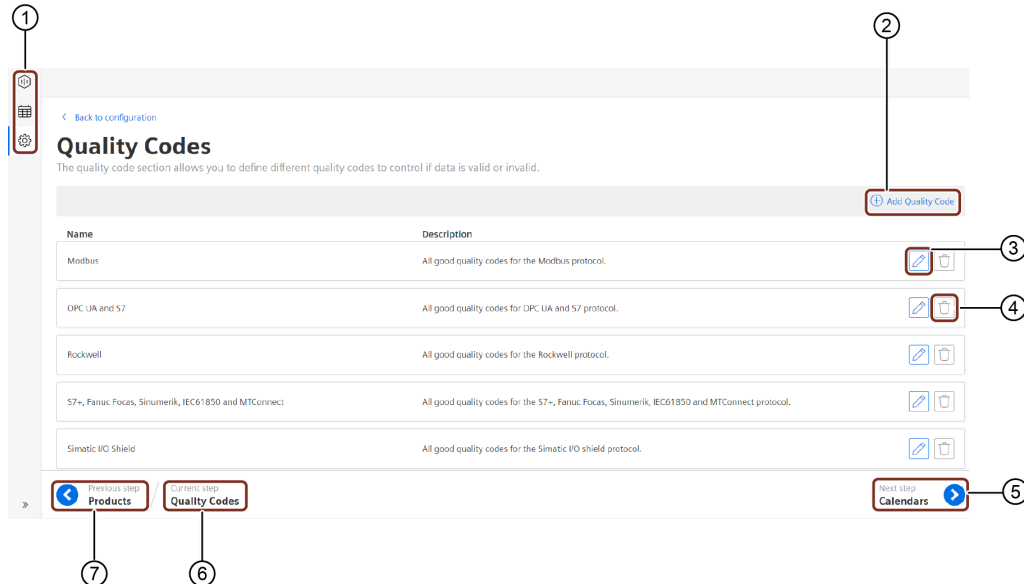
After you finished adding all reject reasons to the collection, you can click on the “Back to reject reasons overview” button in the upper left corner to get back to the reject reasons overview.

## 6.10 Configuring Quality Codes

Industrial communication protocols like OPC UA, S7, or Modbus transfer quality codes with the transmitted value. The purpose of the quality codes is to represent the validity of the send tag or variable. Usually, the quality codes are divided into three different categories – good, bad or

uncertain. In Insights Hub OEE, only the defined quality codes will be evaluated. To avoid issues in the OEE calculation with invalid data, Insights Hub OEE also has the capability to introduce custom quality codes next to a couple of standard quality codes which are already defined in the application as default. In general, if datapoints are being transmitted without a quality code, they will all be considered as valid by the Insights Hub OEE.

In the "Quality Codes" overview, you can perform the following actions:



- ① Navigate to the "Configuration" tab
- ② Adds a new "Quality Code"
- ③ Edits the "Quality Code"
- ④ Deletes the existing "Quality Code"
- ⑤ Navigates to the next step
- ⑥ Displays the current step
- ⑦ Navigates to the previous step

## Default Quality Codes

As described before, Insights Hub OEE comes with few out-of-the-box pre-defined quality codes. The below mentioned six protocols are available in Insights Hub OEE:

- Modbus
- OPC UA and S7
- Rockwell
- S7+, Fanuc Focas, Sinumerik, IEC61850 and MTConnect
- Simatic I/O Shield
- System

These defined quality codes already contain the quality codes of the "good" category of the protocol definition. They cannot be deleted from Insights Hub OEE, but in case if any specific quality codes, which are required for you is missing in the definitions, there is a possibility to

extend the existing quality code definitions in the application. To learn more about how to configure quality codes, please refer to the procedure.

## Procedure

To create a new quality code definition, proceed as follows:

1. From the navigation tab, click "Configuration" and select "Quality Codes".

In the "Quality Codes" page, click "Add Quality Code" in the upper right corner. This will load a new screen.

2. Enter the "Name" for the quality code and an optional "Description".

Start entering the quality codes, which Insights Hub OEE should evaluate as "good" values.

4. All other data associated with other quality codes will be ignored from Insights Hub OEE.
5. Select your preferred "Single value" or "Range" radio button.

If you have selected the "Single Value", enter a value in the value field and an optional description.

In the picture below the value "1" is considered as proper value.

- 6.

If you have selected the "Range", enter a range in both fields and an optional description.

In the picture below, the range of values from "5" to "9" is considered as a proper range.

- 7.

In the above examples, the only datapoints with either the quality code of value "1" or of the range "5" to "9", will be considered by the Insights Hub OEE application when selected in the datapoint configuration at a later stage.

To add more values or ranges to the custom quality code definition, click "Add range or value".


In the Line and Machine configuration, when the data mapping is done select the appropriate quality code definition for the specific datapoint.

## 6.11 Introduction to Configuring Calendars

Insights Hub OEE allows you to set up multiple calendars for different lines. In these calendars, you define at what time the line is in a production time state or a planned stop state. Thereafter, you will configure the different calendar entries in the calendar to which time categories you have defined under the production time and planned stop categories in the time model. The calendar entries are color-coded in the same manner as the time categories. The time categories will be available to choose from when configuring calendar entries.

If you leave gaps in the calendar or have nothing scheduled, these intervals will be automatically counted as planned stops. Configured calendars will be effective only when they are assigned to a line.

Given below are the two options to manage calendars:

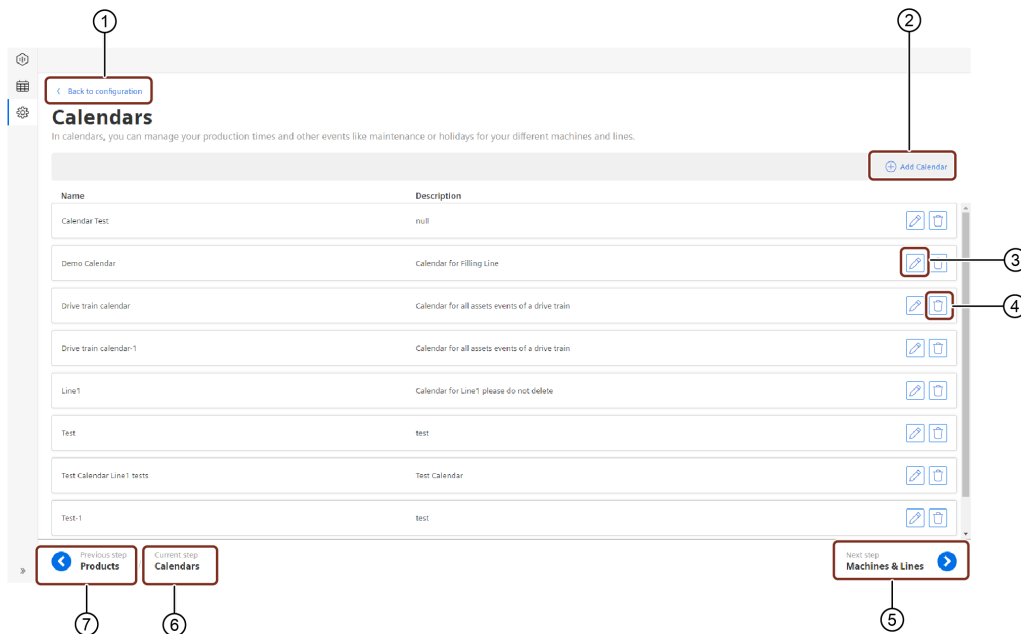
- From the navigation tab, click “Configuration” and select “Calendars”.
- From the navigation tab, click the Calendar Icon  and it will redirect to “Calendars” configuration.

## 6.12 Managing Calendars

In case you choose the first option, click “Calendars” from the “Configuration” page and it will redirect you to the “Calendar” configuration.

### User interface

In “Calendar” overview, you can perform the following actions:



- ① Navigates to the "Configuration" tab
- ② Adds a new "Calendar"
- ③ Edits the existing "Calendar"
- ④ Deletes the existing "Calendar"
- ⑤ Navigates to the next step
- ⑥ Displays the current step
- ⑦ Navigates to the previous step

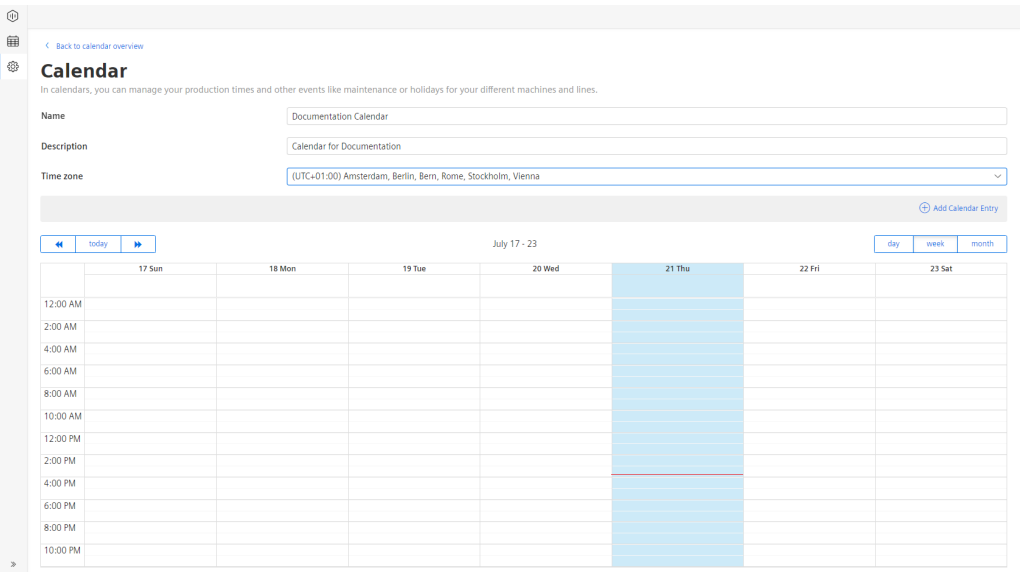
## Procedure

To add a first calendar, proceed as follows:


1. In "Calendars", click on "Add Calendar".
2. Enter "Name" and "Description".
3. Select the time zone whereby the calendar for the line and machines should be relevant.

- Add calendar entries through the "Add Calendar Entries" Button. More details on different calendar entries can be found in Section [Managing Calendar Entries](#).
- 4.

After adding “Calendar” and “Calendar Entries”, click “Back to calendar overview” button and 5. click “Next step” to proceed with “Machines & Lines”.

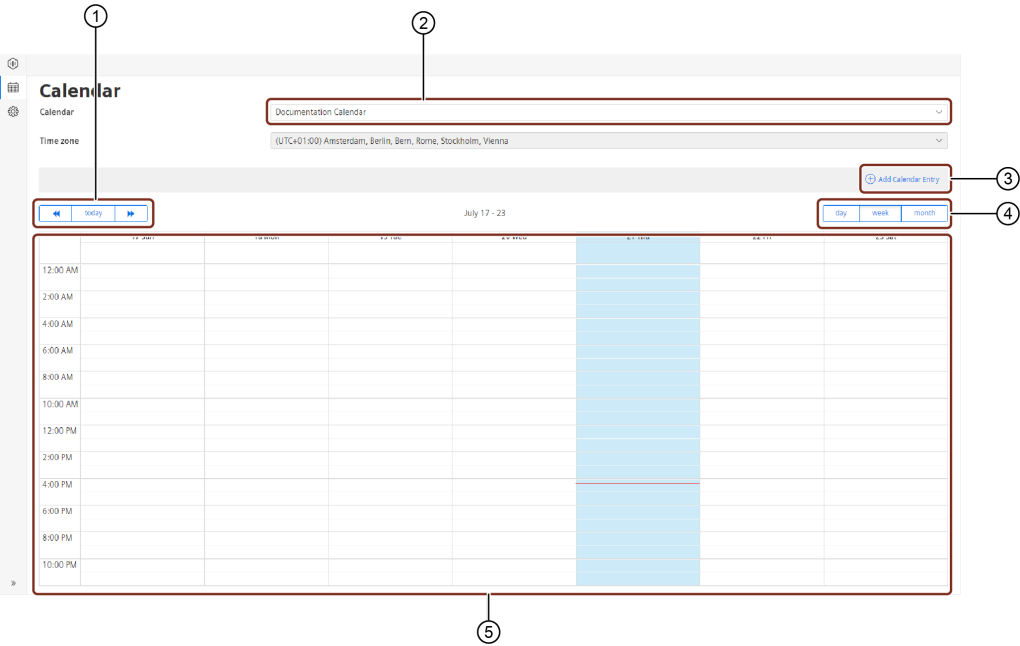


## 6.13 Managing Calendar Entries

To manage calendar entries, Click the Calendar Icon  from the navigation tab. This page provides different navigation and view options which are described in the following section.

### User interface

In “Calendar” overview, you can perform the following actions:



- ① Navigation Options
- ② Shows the selected calendar. The dropdown allows the user to change the selected calendar.

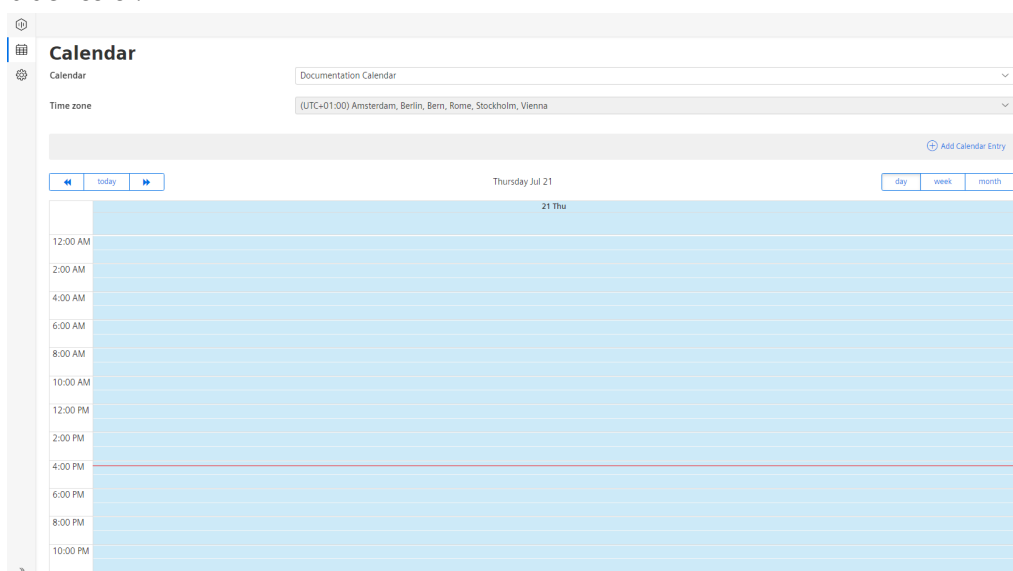
- ③ Adds a new calendar entry
- ④ View Options
- ⑤ Displays the ongoing calendar entry

## View Options

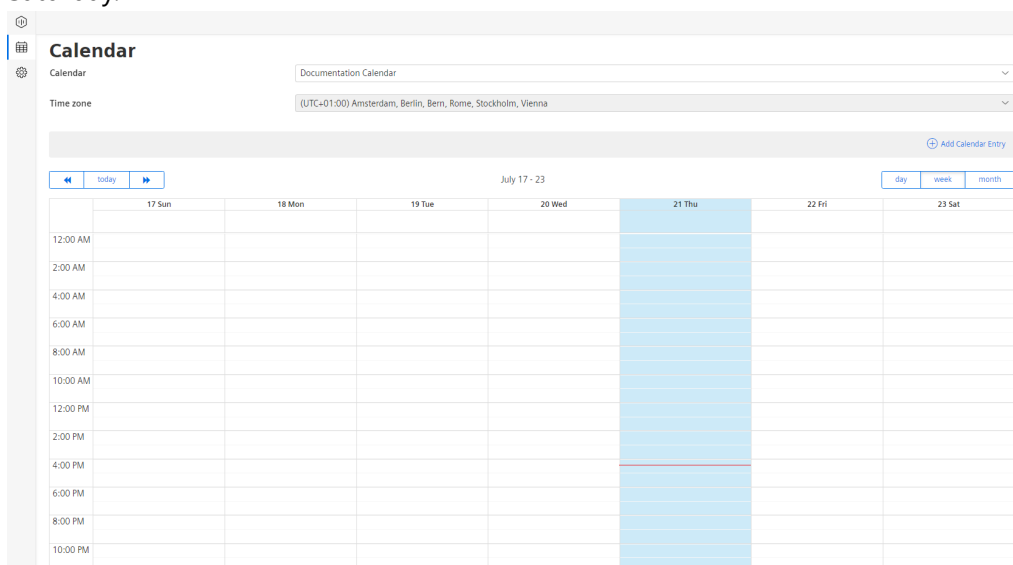
You will find three buttons to change the view mode of the calendar:

- Day
- Week
- Month

To change the view mode of the calendar, click one of the above options. For example, by clicking the option “day”, it will display the Day View. The current date is always highlighted in “light-blue” color.

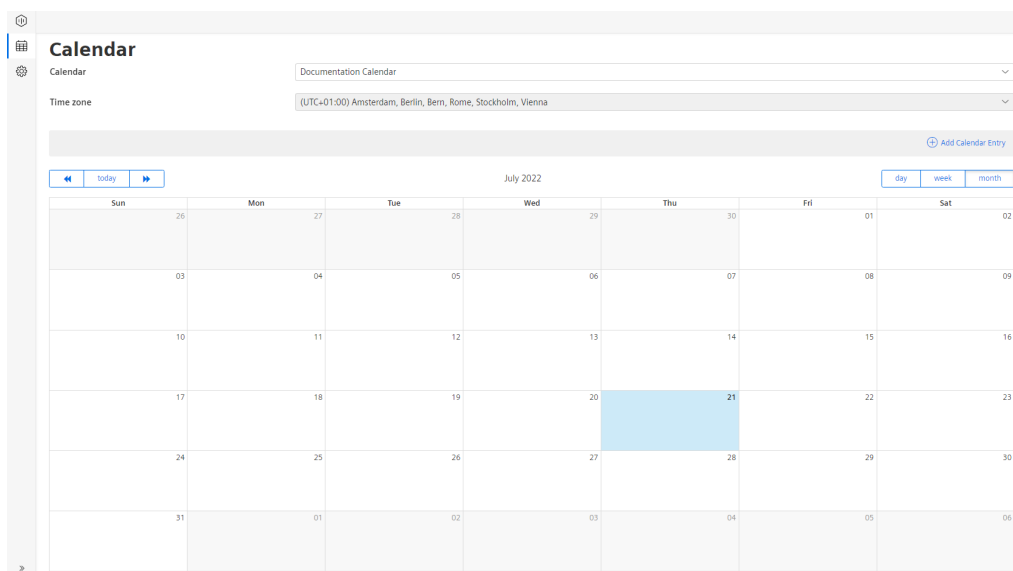


By clicking the option “week”, it will display the weekly View showing the week from Sunday to Saturday.



By clicking the option “month”, it will display the monthly View.





## Navigation Options

You will find three navigation related buttons to change the view by the following options:

- Left Arrow
- Today
- Right Arrow

Depending on the selection of the view mode, these buttons will change the view mode:

Left Arrow button:

- Day View: It will navigate to the previous day
- Week View: It will navigate to the previous week
- Month View: It will navigate to the previous month

Today button:

- Day View: It will display the current day highlighted in light blue
- Week View: It will display the current week, with the current day highlighted in light blue
- Month View: It will display the current month, with the current day highlighted in light blue

Right Arrow button:


- Day View: It will navigate to the next day
- Week View: It will navigate to the next week
- Month View: It will navigate to the next month

## Adding Calendar Entries

To add the calendar entries such as production time or planned stops, click the "Add Calendar Entry" button. This option allows you to add not only one-time calendar entries but also recurring calendar entries.

## One Time Calendar Entries

To add a one-time calendar entry, proceed as follows:

1. Click "Add Calendar Entry" and enter "Title".
2. Click  to select a start date.



- The "Start Time" and "End Time" displays the selected date and "12:00 AM". The time can be changed manually in the input field.
- After selecting the date, you can change the timestamp in the input field.

3. Select "Time Category".



The application displays all configured time categories of the "Production Time" and "Planned Stop" category.

! [config-events-one-time] (./images/config-events-one-time.png)

4. Click "Save" to configure the calendar entry in the calendar.

## Recurring Calendar Entries

The calendar functionality allows you to select the calendar entries in different recurrences. It supports daily, weekly, monthly and yearly calendar entries.

### Daily Calendar Entries

To add a daily calendar entry, the procedure is similar to one-time calendar entry. For adding a daily calendar entry, proceed as follows:

1. Click "Add Calendar Entry".
2. Enter the parameters such as start and end time and select time category for the calendar entry.
3. Toggle the "Recurring", so that you can select a frequency from multiple options.
4. Select "Daily", it loads two more fields.
5. In the "Every" field, you can change the default value, if required.



The default value is “1” in the “Every” field. Which means, it configures the calendar entry daily. For example, if you change the value to “2”, then it configures the calendar entry for every alternate day.

6. Select the recurring “Start” and “End” date and time.

7. Click “Save” to configure the daily calendar entry in the calendar.

## Weekly Calendar Entries

To add a weekly calendar entry, the procedure is similar to one-time calendar entry. For adding a weekly calendar entry, proceed as follows:

1. Click “Add Calendar Entry”.
2. Enter the parameters such as start and end time and select time category for the calendar entry.
3. Toggle the “Recurring”, so that you can select a frequency from multiple options.
4. Select “Weekly”, it loads two more fields.
5. In the “Every” field, you can enter the frequency in which weekly cycle the calendar entry should occur. You can also select the days on which the calendar entry should occur.



The default value is “1” in the “Every” field. Which means, it configures the calendar entry weekly. For example, if you change the value to “2”, then it configures the calendar entry for every alternate week.

6. Select the recurring “Start” and “End” date and time.

7. Click "Save" to configure the weekly calendar entry in the calendar.

## Monthly Calendar Entries

To add a monthly calendar entry, the procedure is similar to one-time calendar entry. For adding a monthly calendar entry, proceed as follows:

1. Click "Add Calendar Entry".
2. Enter the parameters such as start and end time and select time category for the calendar entry.
3. Toggle the "Recurring", so that you can select a frequency from multiple options.
4. Select "Monthly", it loads two more fields.
5. In the "Every" field, you can change the default value. You can also select the specific day(s) or week(s) of the month, if required.



The default value is "1" in the "Every" field. Which means, it configures the calendar entry monthly. For example, if you change the value to "2", then it configures the calendar entry for every alternate month.

- "On Day": It allows you to select a specific day. For example, if you enter "12" in the "Month Day" field, then the calendar entry will be configured on the 12th of every month on your selected cadence and selected "1" in "Month day", then the calendar entry will be configured

on every 12th of the month.

- “On Week”: It allows you to select a specific week and day of the month. For example, if you select “First” and “Wednesday” in “On the” field, then the calendar entry will be configured on the First week of “Wednesday” for every month on your selected cadence.

6. Select the recurring “Start” and “End” date and time.
7. Click “Save” to configure the monthly calendar entry in the calendar.

## Yearly Calendar Entries

To add an yearly calendar entry, the procedure is similar to one-time calendar entry. For adding an yearly calendar entry, proceed as follows:

1. Click “Add Calendar Entry”.

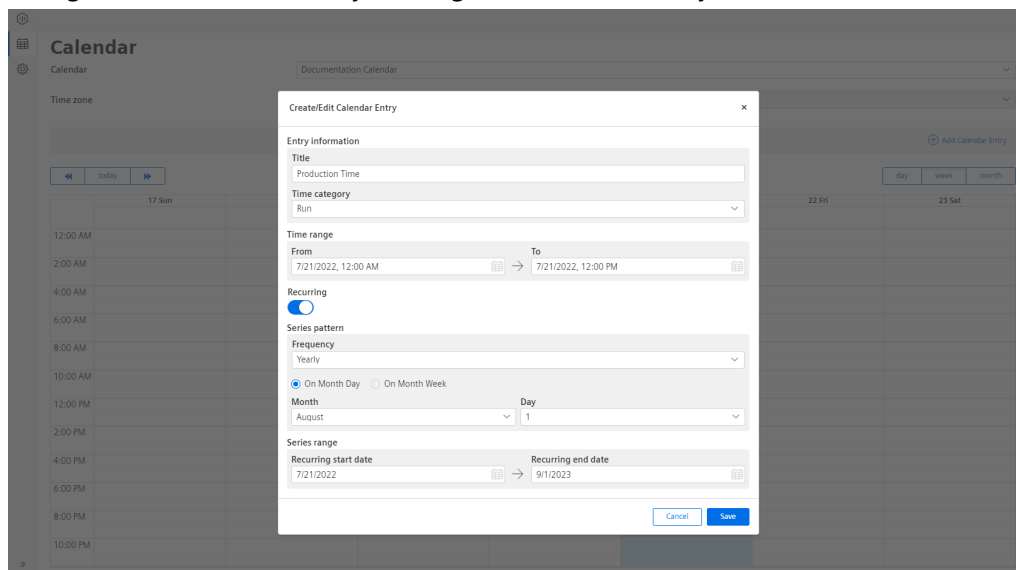
Enter the parameters such as start and end time and select time category for the calendar

2. entry.

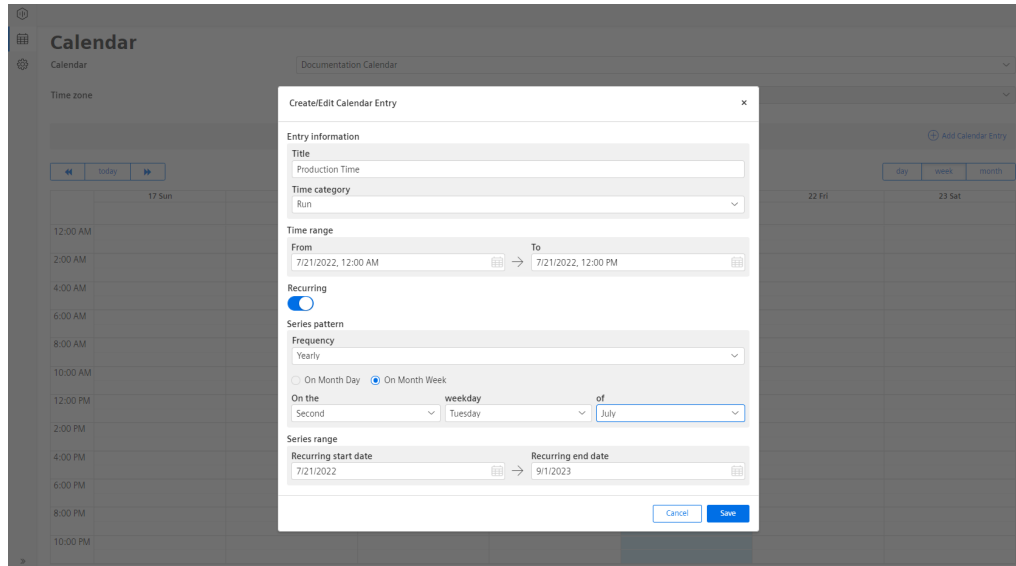
3. Toggle the “Recurring”, so that you can select a frequency from multiple options.

4. Select "Yearly", it loads two more fields.

- "On Month Day": The default value is "Jan" and "1" for "Month" and "Day" fields. For example, if you select the "Month" value to "Aug" and "Day" value to "12", then it configures the calendar entry for August on 12th of the year.



- "On Month Week": The default value is "First", "Mon" and "Jan" for "On the" and "Of" fields. For example, if you select the "Second" and "Wed" values in the "On the" field and "Aug" in the "Of" field, then it configures the calendar entry on "Wednesday" of the August month in the second week of the year.



5. Select the recurring "Start" and "End" date and time.

6. Click "Save" to configure the yearly calendar entry in the calendar.

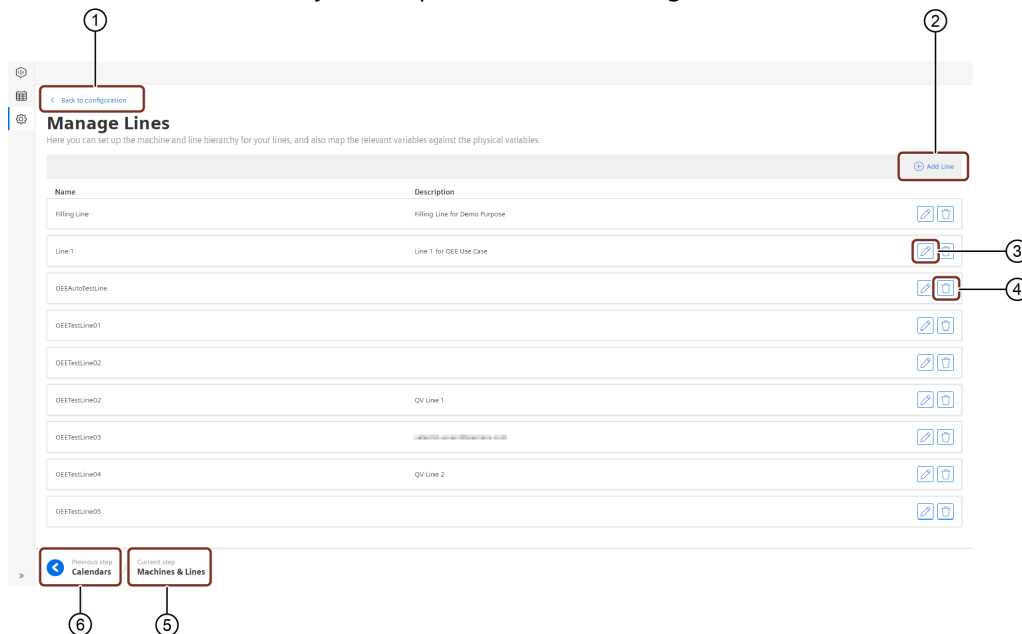
## 6.14 Introduction to Configuring Machines & Lines

Setting up a representing structure is the last crucial step in the configuration of Insights Hub OEE. In this chapter, you will learn how to configure lines and the underlying assets in Insights Hub OEE.

## 6.15 Configuring Lines

### User interface

In “Machines and Lines”, you can perform the following actions:



- ① Navigates to the “Configuration” tab
- ② Adds a new “Line”
- ③ Edits the existing “Line”
- ④ Deletes the existing “Line”
- ⑤ Displays the current step
- ⑥ Navigates to the previous step

### Procedure

To add a new line and the corresponding machines, proceed as follows:

1. From the navigation tab, click “Configuration” and select “Machines & Lines”.
2. In “Manage Lines”, click “Add Line”.

The following window appears:

Manage Line

Select Asset

Name

Description

3. Click “Select Asset”.

The following window appears:

Manage Line

Select an asset

Filling Line 1 / 64

Filling Line  
Filling Line for Demo Purpose

Cancel Select

4. Select the desired “Asset” from the list and click “Select” to auto-fill the asset parameters.

The following window appears:

Manage Line

Name Filling Line

Description Filling Line for Demo Purpose

Calendar Select a Calendar

Measure collection Select a Measure Collection

Machines OEE Setup

List of machines for line

Add Machine

Name	Description
No items found	



5. Using the "Calendar" dropdown option, select the calendar that you have instantiated earlier. Every created calendar will appear here. If the dropdown list is empty, create a calendar before it can be assigned to the line.
6. Using the "Measure collection" dropdown option, select the measure collection that you have instantiated earlier. Every measure collection will appear here. If the dropdown list is empty, create a measure collection before it can be assigned to the line.
7. Using the "Reject reasons collection" dropdown option, select the appropriate reject reason collection that you have created previously. Every reject reason collection will appear here. If the dropdown list is empty, please create a reject reason collection before it can be assigned to the line.
8. Click the "OEE Setup" tab to configure and enable the OEE calculation for the line. The following window appears:

**Manage Line**

Name: Filling Line

Description: Filling Line for Demo Purpose

Calendar: Select a Calendar

Measure collection: Select a Measure Collection

**KPI Targets**

Name	Warning	Error
OEE	0	0
Performance	0	0
Availability	0	0
Quality	0	0

**Operand Mapping**

Name	Type	Mapping
Good parts	<input checked="" type="radio"/> Absolute counter <input type="radio"/> Difference counter <input type="radio"/> Calculated	Asset: Aspect: Variable: Quality Code:

9. In the "KPI Targets" area, you can modify the bandwidth for Error, Warning and Success displayed through the colors Red, Yellow, and Green in the gauges. It helps you to identify if you are currently reaching your targets or not. For this, fill in the table in the following way:

**KPI Targets**

Name	Warning	Error
OEE	70	60
Performance	85	70
Availability	85	70
Quality	85	70

In the example above, two limits for Warning and Error are defined. The bandwidth for Success follows accordingly. In this example it works following in the following way:

- OEE Warning: 70%
- OEE Error: 60%

The two values given in the configuration always describe the upper levels. Therefore, in the OEE gauge it will display the following colors for the following bandwidths:

- Red: 0 - 60
- Yellow: 61 - 70
- Green: 71-100

The gauges for Availability, Performance, and Quality follow the same approach.

10. Perform variable mapping. It has two steps, [Operand Mapping](#) and [Source Mapping](#). Each step is described in detail later in this chapter.

If OEE needs to be calculated on a line level, five out of the following six variables must be specified for the line. The information can either be collected manually by the operator or fed into the system via IoT data. Nevertheless, the following table shows which variables are needed to calculate OEE.

Variable	Mandatory
Status	Mandatory
Order	Optional
Product	Mandatory
Good Parts	Mandatory or auxiliary expression
Rejected Parts	Mandatory or auxiliary expression
Total Parts	Mandatory or auxiliary expression

The following logic applies to the three Quality KPI relevant variables - good parts, rejected parts, and total parts. You need to map two out of three variables, two data points from the asset model and the third one can be calculated through the auxiliary expression which you need to select in that step.

Refer to Section [Configuring KPIs](#) to learn about the auxiliary expressions for the Good Parts, Rejected Parts, and Total Parts.

For all variables, that you can connect automatically, OEE also offers a manual option to feed in the data. Based on your configuration, you will be able to add certain data-points in the manual inputs page.

All variables now have a mode (manual or connected in the most cases) and a mapping option available. For operands, you can also determine different types depending on the configuration.

## Operand Mapping

In the Operand Mapping, you map the counter variables for the quality KPI calculation - Good Parts, Rejected Parts, and Total Parts.

Operand Mapping

Name	Mode	Type	Mapping
Good parts	<input type="radio"/> Connected <input checked="" type="radio"/> Manual <input type="radio"/> Calculated		
Rejected parts	<input type="radio"/> Connected <input checked="" type="radio"/> Manual <input type="radio"/> Calculated <input type="radio"/> Manual and Connected <input type="radio"/> None		
Total parts	<input type="radio"/> Connected <input type="radio"/> Manual <input checked="" type="radio"/> Calculated		

For each of them, you need to select a mode first. The following options are available for the different counters:

- **Good Parts:**

- Connected: A variable is available and can be mapped for the Good Parts counter
- Manual: The Good Parts will be provided manually via the manual inputs
- Calculated: The Good Parts are calculated based on the Total and Rejected Parts

- **Rejected Parts:**

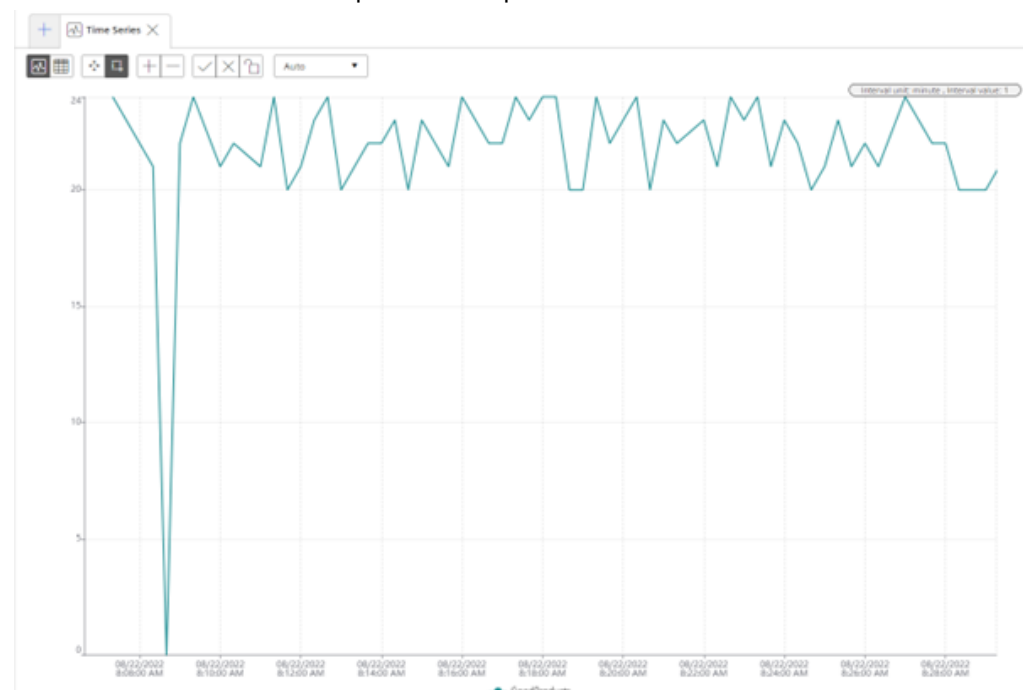
- Connected: A variable is available and can be mapped for the Rejected Parts counter
- Manual: The Rejected Parts will be provided manually via the manual inputs
- Calculated: The Rejected Parts are calculated based on the Good and Total Parts
- Manual and Connected: In this mode, you connect a variable for the rejected parts but they can be increased afterwards again in case you need to adjust. For instance, your machine counter provides that you produced 480 rejected parts for a given time-frame, but number should be increased to 500 due to additional quality control afterwards, then you can do this change in the manual inputs section. Nevertheless, you need to be aware that the 20 additional rejected parts are subtracted from the good parts, if they are in the connected mode. A reduction of rejected parts is not supported, e.g. from 480 rejected parts to 460.
- None: Helps you to simply set the quality to 100%

- **Total Parts:**

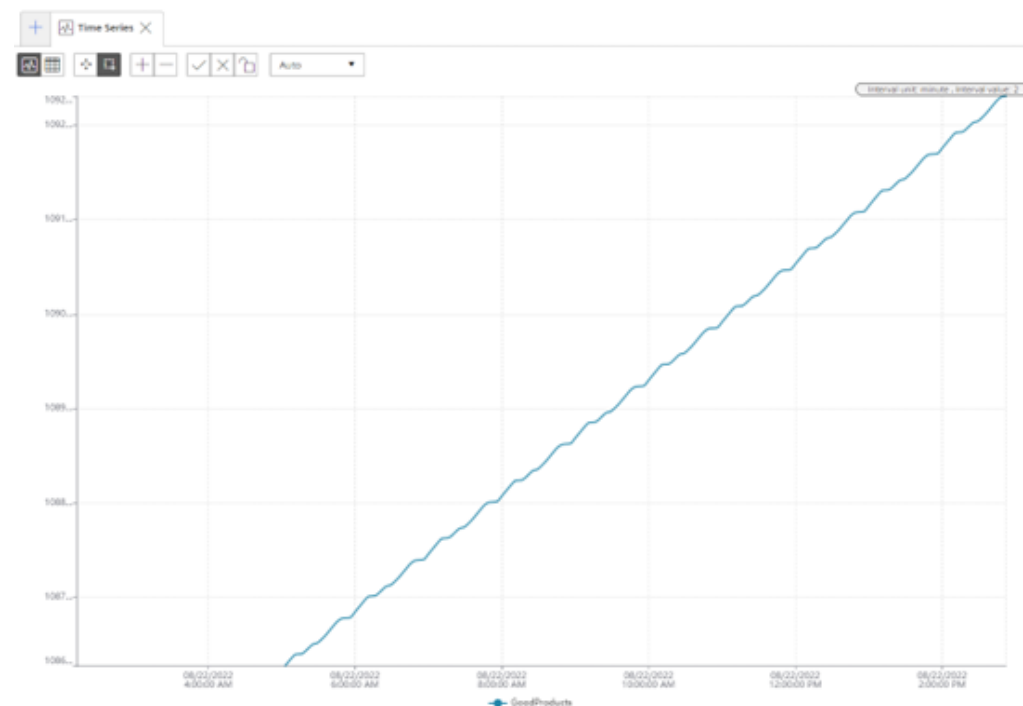
- Connected: A variable is available and can be mapped for the Total Parts counter
- Manual: The Total Parts will be provided manually via the manual inputs
- Calculated: The Total Parts are calculated based on the Good and Rejected Parts

If you select either the "Connected" or "Manual and Connected" mode, you also need to select a type. Following two different types for the connected variables are available:

**Difference Counter:** The machine sends a counter value of the pieces, that were produced since the last time a counter value was sent to. In the picture below you can see that the value for the counter ranges between 20 and 24, this means that each time a counter value was sent to, 20 to 24 pieces were produced".



**Absolute Counter:** An absolute counter continuously counts up and is reset to 0 from time to time, for example, after a shift. In the picture below, you can see a typical absolute counter.



Insights Hub OEE also automatically detects counter resets coming from the machine. Once the following value is 60% smaller than the previous value, then OEE will interpret

- this as a counter reset.

Timestamp	Absolute counter value	Delta value
12:00	1000	-
12:01	12	12
12:02	14	2

This behavior described in the table above would be interpreted as a counter reset by OEE, as you can also see in the delta values.


Timestamp	Absolute counter value	Delta value
12:00	1000	-
12:01	997	0
12:02	1001	1

This behavior described in the table above would not be interpreted as a counter reset by OEE. Here, the second value would be ignored by OEE.

First, there will be a connected parts counter scenario described.

In the following scenario, good parts and rejected parts are measured through variables as difference counters, while the total parts are calculated through the auxiliary expression. To map these variables, proceed as follows:

1. Select the Mode "Connected" and Type "Difference counter" using the radio button for the Good Parts.

2. Click the Pen icon  on the right side to open the Asset / Aspect selector.

The following window appears:

Select a variable of aspect

### 1. Available assets

Please select an asset

Search ... 553 / 553

- ✓ OEE Hub Demo
  - > **Filling Line**
  - Filling Line 02
  - > Filling Line Demo
  - > Line 1

### 2. Available aspects and variables

Please select a variable

Search ... 1 / 1

MachineValues		
GoodProducts	LONG	+
OrderID	INT	+
Product	STRING	+
RejectedProducts	LONG	+
Status	INT	+

### 3. Quality Code (optional)

Please select a quality code definition

OPC UA and S7

**Your selection**

Asset: OEE\_Asset\_1

Aspect: MachineValues


Variable: GoodProducts

QualityCode: OPC UA and S7

Cancel

Select

By default, "Filling Line" asset is selected as shown in the above image and the selection is also highlighted. The selected assets affects the variables and aspects listed under "Available aspects and variables".

3. Click the  icon next to the variable of your choice.

"Your selection" section displays the selected asset, aspect, and variable.

In this example, the selected asset is "Filling Line", the aspect is "Machine Values" and the selected variable is "GoodProducts". Additionally, you can also select a default quality code definition or a custom quality code definition, which was created before. By default, the "OPC UA and S7" option will be selected. If the data-point has no quality code attached, this selection does not have an influence on the data-point collection. Only if the selected variable also uses quality codes, these will be evaluated by Insights Hub OEE. To learn more about quality codes, for more information, refer to [Configuring Quality Codes](#).

4. Once the selection is done, click "Select".

5. For Rejected Parts, follow steps 1 to 4 again.

6. For measuring the "Total Parts", proceed as follows. Select the Mode "Calculated" using the radio button. The following screen shows the completed Operand Mapping for a connected asset:

Operand Mapping			
Name	Mode	Type	Mapping
Good parts	<input checked="" type="radio"/> Connected <input type="radio"/> Manual <input type="radio"/> Calculated	<input type="radio"/> Absolute counter <input checked="" type="radio"/> Difference counter	Asset: OEE_Manual_Documentation Aspect: MachineValues Variable: GoodProducts Quality Code: OPC UA and 57
Rejected parts	<input checked="" type="radio"/> Connected <input type="radio"/> Manual <input type="radio"/> Calculated <input type="radio"/> Manual and Connected <input type="radio"/> None	<input checked="" type="radio"/> Absolute counter <input type="radio"/> Difference counter	Asset: OEE_Manual_Documentation Aspect: MachineValues Variable: RejectedProducts Quality Code: OPC UA and 57
Total parts	<input type="radio"/> Connected <input type="radio"/> Manual <input checked="" type="radio"/> Calculated		



Two other scenarios are also possible here:

**Scenario 1:** Rejected Parts and Total Parts measured through variables, therefore the type for Good Parts has to be "Calculated" and the dropdown selection has to be "Good Parts".

**Scenario 2:** Good Parts and Total Parts are measured through variables, therefore the type for Rejected Parts has to be "Calculated" and the dropdown selection has to be "Rejected Parts".

In the following section also a complete manual example will be provided.

1. Select the Mode "Manual" using the radio button for the Good Parts.
2. Select the Mode "Manual" using the radio button for the Rejected Parts
3. Select the Mode "Calculated" using the radio button for the Total Parts.

Here, you do not have to select a type, since in manual mode all counters are treated as difference counters. In the manual input section, you always put in the numbers for the given time-frame.

The following screen shows the completed Operand Mapping for a manual asset:

Operand Mapping			
Name	Mode	Type	Mapping
Good parts	<input type="radio"/> Connected <input checked="" type="radio"/> Manual <input type="radio"/> Calculated		
Rejected parts	<input type="radio"/> Connected <input checked="" type="radio"/> Manual <input type="radio"/> Calculated <input type="radio"/> Manual and Connected <input type="radio"/> None		
Total parts	<input type="radio"/> Connected <input type="radio"/> Manual <input checked="" type="radio"/> Calculated		

Of course, multiple combinations of the different modes and types can exist, which unfortunately, can't all be documented in here.

Next step in the configuration is Source Mapping. Of course, Insights Hub OEE also provides both connected and manual options.

## Source Mapping

The Source Mapping follows a similar approach compared to Operand Mapping. In this section, also two examples, one manual and one connected will be provided.

In the Source Mapping, for order, product and status multiple modes exist again:

- **Order:**

- Connected: A variable is available and can be mapped for the order information
- Manual: The order information will be provided manually in the manual inputs section
- None: No order is needed and there this filter option is disabled

- **Product:**

- Connected: A variable is available and can be mapped for the product information. The system will read the product information from the variable.
- Single: A single product from a product collection is chosen by the user, no further specification of a variable is required.
- Manual: A product collection needs to be selected by the user and the product itself is then selected from the collection in the manual input section.

- **Design Speed:**

- Connected: A variable is available and can be mapped either for the design speed or cycle time. The system will read the design speed information from the variable.
- Via Product: The design speed is read from the associated product code that the system receives. Also, use this option if you want to set the Design Speed as a manual input. Here, you have to specify different products with the associated design speeds and then select the products from the dropdown. This approach reduces errors when typing in design speeds.
- Fixed: The user can enter either a speed or cycle time in the configuration which is fixed for this asset.

- **Status:**

- Connected: A variable is available and can be mapped for the status information. The user also needs to specify a status mapping
- Manual: The status is provided manually via the manual inputs. The user also needs to specify a reason tree.

Please find in the table below some common combinations for Product & Design Speed:

Product	Design Speed	Use Case
Connected	Connected	Equipment provides both product code and design speed and therefore the design speed information from the variable will be used and the product information to contextualize the calculated KPIs.
Connected	Via Product	Equipment only provides product code information. This is used to determine the design speed.




Product	Design Speed	Use Case
Connected	Fixed	Different products are produced at the same speed.
Single	Connected	Only one Product is produced and the design speed can be fetched from the machine.
Single	Via Product	Only one product is produced at that equipment.
Single	Fixed	One Product is produced at a fixed design speed.
Manual	Connected	The design speed is read from the equipment and the product is set manually.
Manual	Via Product	The product information is provided manually by the operator and the design speed is fetched from the configured design speed of the product.
Manual	Fixed	Equipment is producing at a constant design speed and the product is set manually.

Let's first look in to the connected example.

#### Source Mapping

Name	Mode	Mapping
Order	<input type="radio"/> Connected <input checked="" type="radio"/> Manual <input type="radio"/> None	
Product	<input type="radio"/> Connected <input type="radio"/> Single <input checked="" type="radio"/> Manual	Product collection: <span>Default</span>
Status	<input type="radio"/> Connected <input checked="" type="radio"/> Manual	Reason tree: <span>Documentation</span>

Click the Pen icon  on the right side to map the Order information.

The following Asset / Aspect selector window appears:

Select a data source for variable: Order

1. Available assets

Please select an asset

Search ...

109 / 109

⊞ OEE\_Manual\_Documentation

⊞ OEE\_TestLine01

⊞ Machine0101

⊞ Machine0102

⊞ Machine0103

⊞ OEE\_TestLine02

⊞ OEE\_QV\_Asset\_1

⊞ OEE\_QV\_Asset\_2

⊞ OEE\_QV\_Asset\_3

⊞ OEE\_TestLine03

2. Available aspects and variables

Please select a variable for the: Order

Search ...

2 / 2

MachineValues

GoodProducts

OrderID

Pressure

Product

RejectedProducts

Status

TotalProducts

SensorValues

Pressure

3. Quality Code (optional)

Please select a quality code definition

OPC UA and S7

Your selection

Asset

OEE\_Manual\_Documentation

Aspect

MachineValues

Variable

OrderID

QualityCode


OPC UA and S7

Cancel

Select

The image shows the selected asset, which is also highlighted. The selected assets affects the 1. variables and aspects listed under "Available aspects and variables".



Click the  icon next to the variable of your choice.

"Your selection" section displays the selected asset, aspect, and variable.

In this example, the selected asset is "OEE\_Manual\_Documentation", the aspect is "Machine Values" and the selected variable is "OrderID". Additionally, you can also select a default quality code definition or a custom quality code definition, which was created before. By default, the "OPC UA and S7" option will be selected. If the data-point has no quality code attached, this selection does not have an influence on the datapoint collection. Only if the selected variable also uses quality codes, these will be evaluated by Insights Hub OEE. To

2. learn more about quality codes, for more information, refer to [Configuring Quality Codes](#).

3. Once the selection is done, click "Select" and the window will get closed.

For Product, select the suitable Mode. In this case, "Connected" is selected. Then, choose the product collection from the dropdown. Once the suitable product collection is selected, click on the pen icon to choose the required variable like you did for the Order ID via the input screen. If you select the single product option, choose one product from the next dropdown, which means that the machine only produces one product all the time and therefore a variable mapping is not necessary anymore.

If you

choose the multiple products option, then you need to follow the steps again to select the proper variable after you click on the pen icon.

4.

For Design Speed, select "via Product". In this case the Design Speed configuration is already completed.

If you

select "Connected" for the Design Speed, then analyze whether the information you read is either a Speed or a Cycle Time, then select the variable via the pen icon and the subsequent dialogue and then finish the Design Speed setup via the Time Unit selection.

5.

For Status Mapping, select the applicable Status Mapping from the dropdown "Select Status Mapping".

It is recommended to create a Status Mapping in advance. For more information on this

6. topic, refer to [Configuring Status Mapping](#).

Once the applicable status mapping selection for the line asset is completed, select the variable where to find the status information. This follows the same process as the order 7. and product information.

The following screen shows the completed Source Mapping in the "Connected" mode:

Source Mapping

Name	Mode	Type	Mapping
Order	<input checked="" type="radio"/> Connected <input type="radio"/> Manual <input type="radio"/> None		Asset: OEE_Manual_Documentation Aspect: MachineValues Variable: OrderID Quality Code: OPC UA and 57
Product	<input checked="" type="radio"/> Connected <input type="radio"/> Single <input type="radio"/> Manual		Product collection: <span>Default</span> Asset: OEE_Manual_Documentation Aspect: MachineValues Variable: Product Quality Code: OPC UA and 57
Design Speed	<input type="radio"/> Connected <input checked="" type="radio"/> Via product <input type="radio"/> Fixed		
Status	<input checked="" type="radio"/> Connected <input type="radio"/> Manual		Status mapping: <span>Documentation Status Mapping</span> Asset: OEE_Manual_Documentation Aspect: MachineValues Variable: Status Quality Code: OPC UA and 57

The second example shows a set-up for an all "Manual" Mode Source Mapping. The manual set-up is shorter, as it doesn't require data mappings.

1. Select "Manual" as the mode for the Order. This will allow you to put in any kind of information in the Manual Inputs section for the order.
2. Select "Manual" as the mode for the Product. As a second step you still need to select one product collection from the dropdown. Later, in the Manual Inputs section you will assign one of the products from the product collection for the different time-ranges.
3. Select "Manual" as the mode for the Status. In addition, you also need to select a reason tree from the dropdown, because you will be able to define the different machine states in a distribution based on the reason tree.

A complete Manual Mode setup looks like the following.

Source Mapping

Name	Mode	Type	Mapping
Order	<input type="radio"/> Connected <input checked="" type="radio"/> Manual <input type="radio"/> None		
Product	<input type="radio"/> Connected <input type="radio"/> Single <input checked="" type="radio"/> Manual	Product collection	<span>Default</span>
Design Speed	<input type="radio"/> Connected <input checked="" type="radio"/> Via product <input type="radio"/> Fixed		
Status	<input type="radio"/> Connected <input checked="" type="radio"/> Manual	Reason tree	<span>Documentation</span>

Of course, as also described in the Operand Mapping, many different combinations of Manual and Connected Modes exist. The documentation doesn't cover all of them; the focus is more on how to set it up for the different variables and to describe the differences..



When both Operand and Source mappings are finished, the line asset configuration can be deemed complete.

## 6.16 Configuring Machines

A line is defined as a group of machines that work together. Therefore, in the next step, you need to add the machines for the line.

To add the machine to the line, proceed as follows:

1. Follow steps 1 to 5 as described in Section [Configuring Lines](#).

The following window appears:

The screenshot shows the 'Manage Line' configuration window. It has a sidebar with icons for home, back to line overview, and a gear icon. The main content area has a title 'Manage Line' and a subtitle 'Back to line overview'. Below the title, there are three input fields: 'Name' with the value 'Filling Line', 'Description' with the value 'Filling Line for Demo Purpose', and 'Calendar' with a dropdown menu showing 'Documentation Calendar'. Below these fields, there are two tabs: 'Machines' (selected) and 'OEE Setup'. Under the 'Machines' tab, there is a section titled 'List of machines for line' with a table. The table has two columns: 'Name' and 'Description'. The table is currently empty, with the text 'No items found' displayed. There is an 'Add Machine' button in the top right corner of the table area.

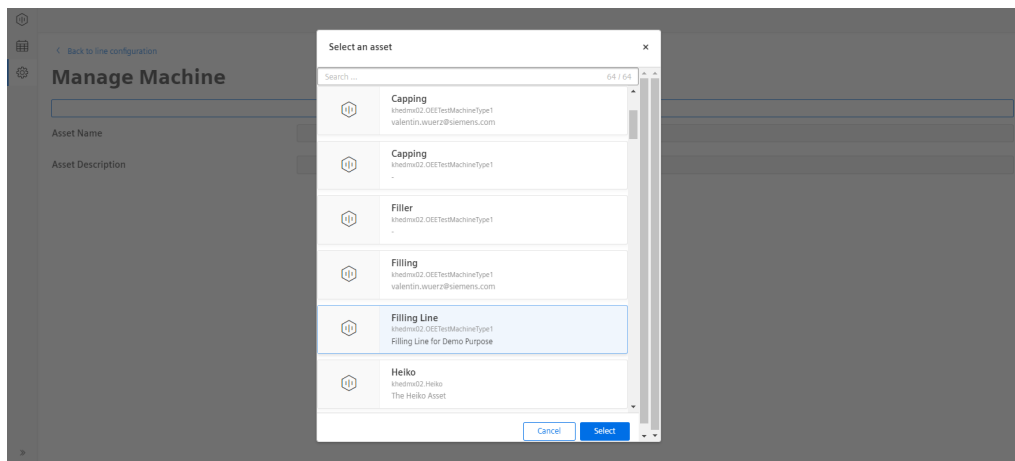
2. Click on the “Add Machine” option available under the Machines tab.

The following window appears:

The screenshot shows the 'Manage Machine' configuration window. It has a sidebar with icons for home, back to line configuration, and a gear icon. The main content area has a title 'Manage Machine' and a subtitle 'Back to line configuration'. Below the title, there is a 'Select Asset' button. Below this button, there are two input fields: 'Asset Name' and 'Asset Description'.

3. Click “Select Asset”.

The following window appears:



4. Select the desired “Asset” from the list and click “Select” to close the window.

The following window with configuration options KPI Target, Operand Mapping, and Source Mapping appears:

5. The configuration of these three elements follows the same approach as described in configuring Lines. Follow steps as described in Section [Configuring Lines](#). For information on variable mapping, refer Sections [Operand Mapping](#) and [Source Mapping](#).

Once the configuration is completed for the gauges and the variable mapping, you can add the next machine. Keep adding additional machines until all machines on the line are configured. Once the line configuration is completed, the line and the underlying machines will be displayed in the tree view on the Analysis screens. For more details on these screens, refer Chapter [Data Visualization](#).


# Data Visualization

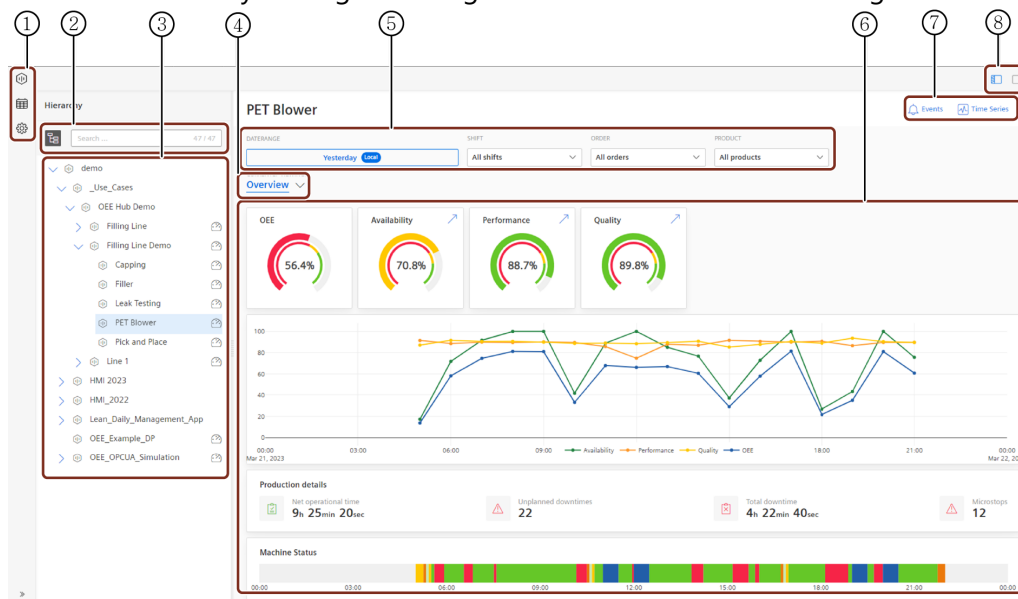
# 7

## 7.1 Data Visualization

### Introduction to Data Visualization


The Data Visualization area displays KPIs and statuses of any selected asset. Here, different aspects of the parameters such as line and machine availability, performance, quality, downtimes, and losses are analyzed and visualized.

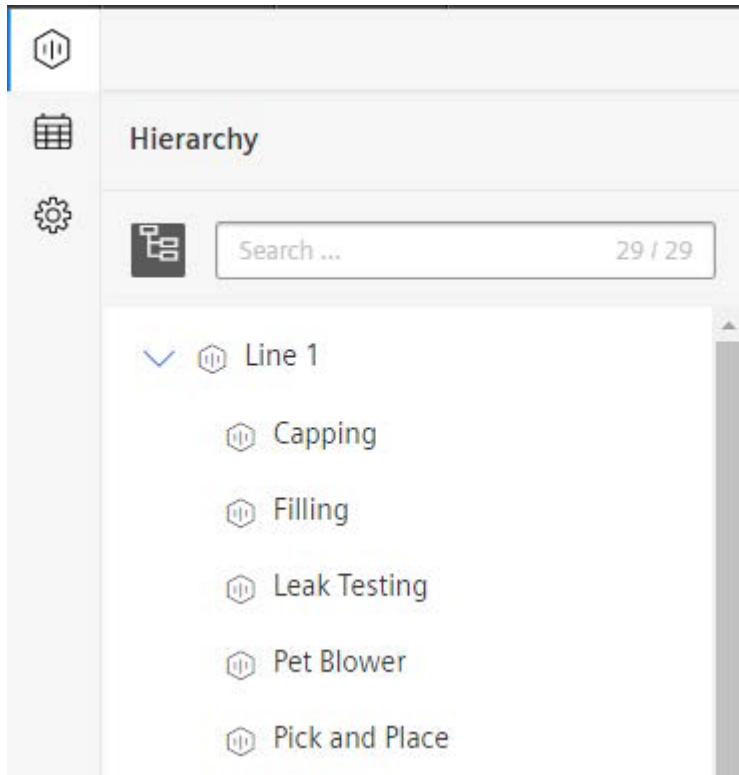
The Visualization area "OEE Assets" screen is displayed by default when the Insights Hub OEE application is launched. If you are in the "Configuration" area, you can switch back to the visualization area by clicking the hexagon icon  available in the Navigation tab.

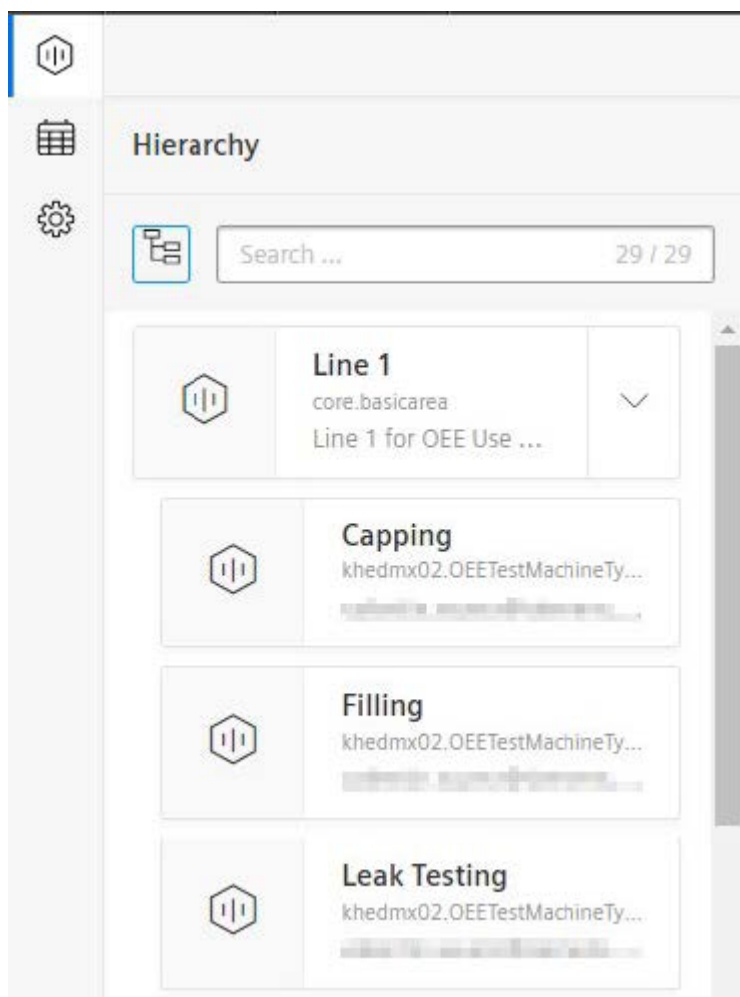


- ① Navigation tab
- ② Change View, search operations
- ③ Asset Hierarchy
- ④ Analysis type selection
- ⑤ Data filter operations
- ⑥ Visualization pane
- ⑦ Links to Insights Hub Monitor
- ⑧ Hide/Expose Asset Hierarchy

### Hierarchy Tab

The hierarchy tab displays all configured assets and devices sorted under different production/assembly lines depending on the configuration. The tree icon  in the asset hierarchy area is used to switch the display between tile view and list view. The tile view makes scrolling easier when the application is running on a tablet.





## Data filtering

The functionality to filter data and the corresponding views on the individual pages according to Date range, order and product is provided.

DATERANGE	SHIFT	ORDER	PRODUCT
05/02/2022 - 2:00:00 AM → 05/03/2022 - 2:00:00 AM <span>Local</span>	All shifts	All orders	All products

Upon clicking the “DATERANGE” field, a window appears with the following options:

- **Absolute:** To select a specific date and/or time range.  
*Please, note that time ranges longer as 90 days are not supported*



Absolute

May 2022

June 2022

Quick Range  
Last 24 hours

Time Zone  
Local

Su	Mo	Tu	We	Th	Fr	Sa	Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7				1	2	3	4
8	9	10	11	12	13	14	5	6	7	8	9	10	11
15	16	17	18	19	20	21	12	13	14	15	16	17	18
22	23	24	25	26	27	28	19	20	21	22	23	24	25
29	30	31					26	27	28	29	30		

ADD TIME

19:11:37 → 19:11:37 ☐ ALL DAY

Cancel OK

- **Quick Range:** To select the desired time frame.

Absolute

Quick Range  
Last 24 hours

Time Zone  
Local

Last 60 minutes

Last 24 hours ✓

Last 7 days

Last 30 days

Last 90 days

Today

Yesterday

Last week

Last month

Last quarter

Cancel OK

- **Time Zone:** To select the desired time zone between Local and UTC.

Additionally, the user can customize the visualization by selecting the desired Shift, Order and Product from the corresponding dropdown list.

SHIFT

ORDER

PRODUCT

All shifts

All orders

All products

All shifts

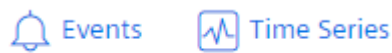
AfternoonShift

MorningShift

In the shift filter, you will only find recurring calendar entries with an associated time category of the type **Production Time**. Hence, shifts in Insights Hub OEE can be defined through recurring production time series. Please check the configuration chapter, to learn more about how to set up recurring calendar entries.

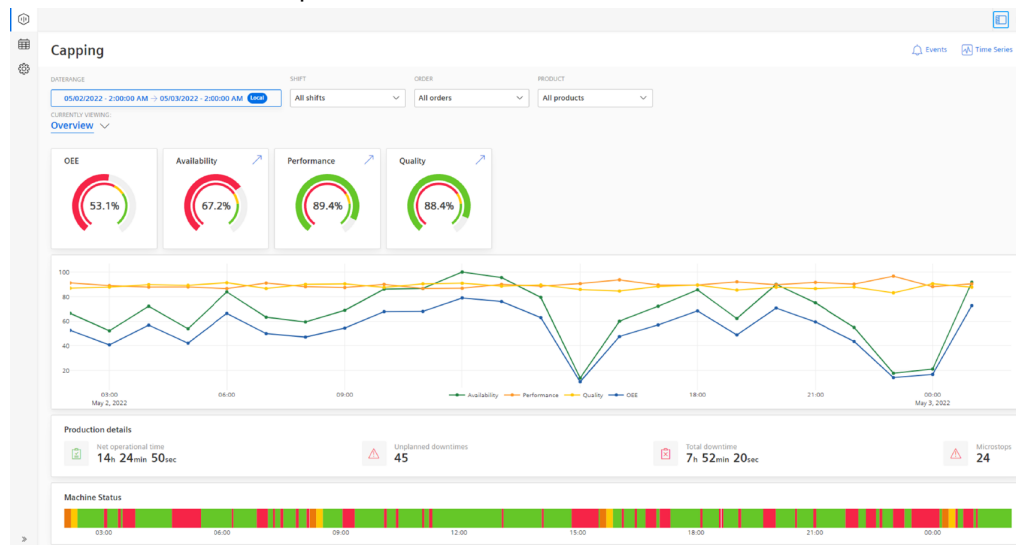
Links to Insights Hub Monitor

Insights Hub OEE features two buttons at the top that act as links to Insights Hub Monitor. You can either jump to the time series data or to the events of the currently mapped asset and view the available data or events for the selected time frame. Once you clicked one of the buttons, OI will open in a second tab – either showing the time series data or events.



## Visualization pane

Based on the selected asset and the filter configuration, different Analysis KPIs are displayed under the Visualization pane.




The following functionalities are available for the user to explore the KPIs further:

Hover the mouse cursor over any chart points to get pop-up information about that

- particular point.



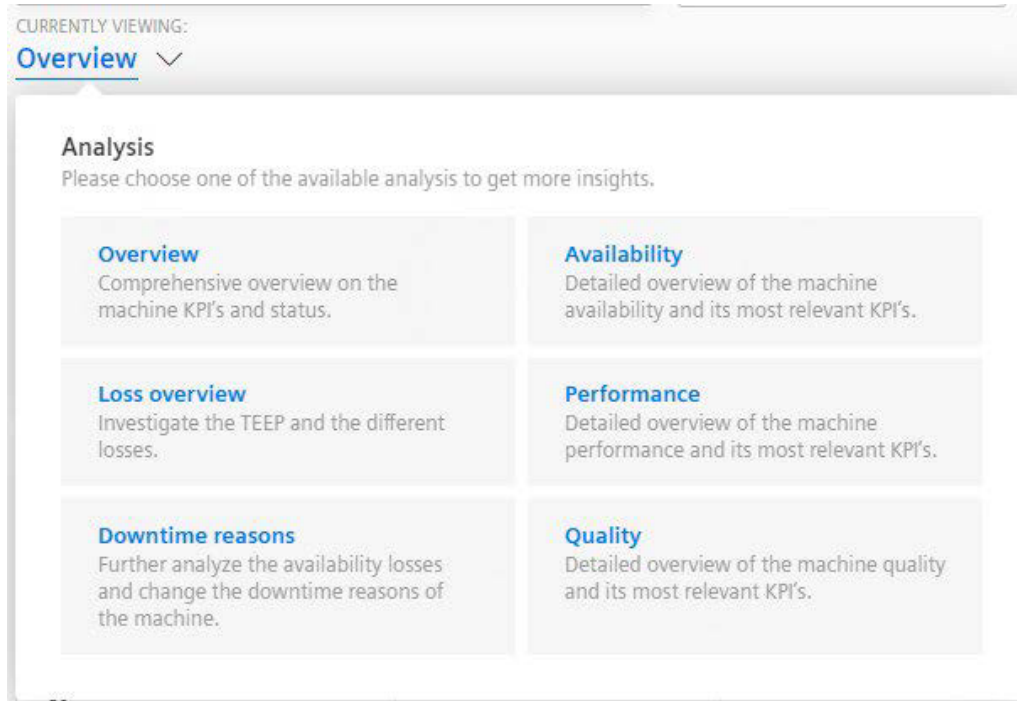
Depending on the filter configuration, for example, if a longer time range is selected, the chart points become narrower. Therefore, a provision to zoom-in is provided to improve visibility. To zoom-in, hover the mouse over any chart until the crop icon  appears and

- select the desired area. To revert (zoom-out), double-click the expanded area.



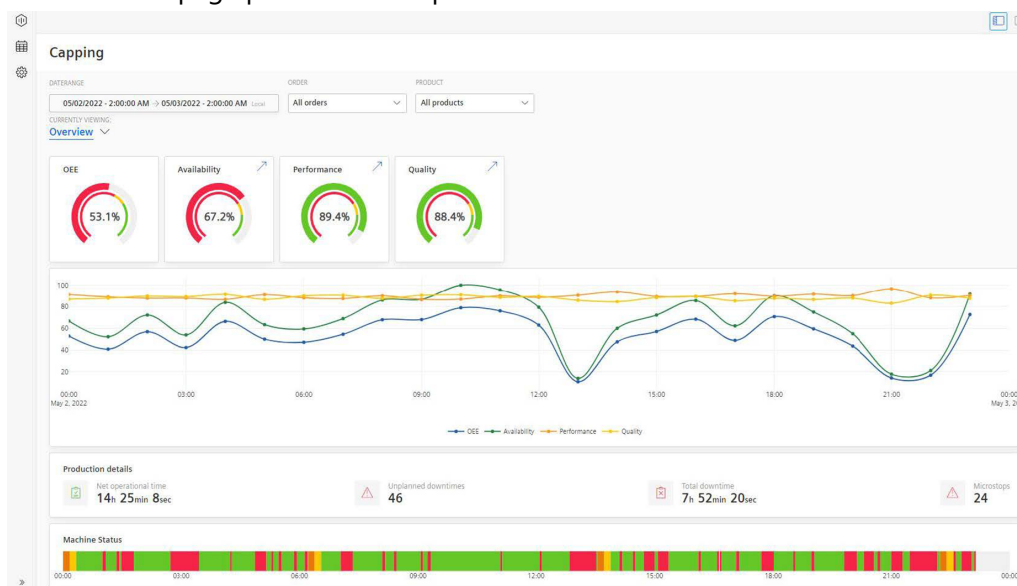
## Analysis categories

The Insights Hub OEE visualizations are grouped into different Analysis categories. The “Overview” page is displayed by default in the visualization pane. To switch between analysis categories, click on the current group and select the desired one. The content in this area will change depending on the filter configuration.



## 7.2 Analysis Overview

The overview page provides a comprehensive overview of the line and machine KPIs and status.




In this section, the following parameters are displayed:

Four semi-donut charts show the parameters such as OEE, Availability, Performance, and Quality. These KPIs are calculated based on the machine inputs. Depending on the configured limits for Error, Warning, and Success they are colored in Red, Yellow, and

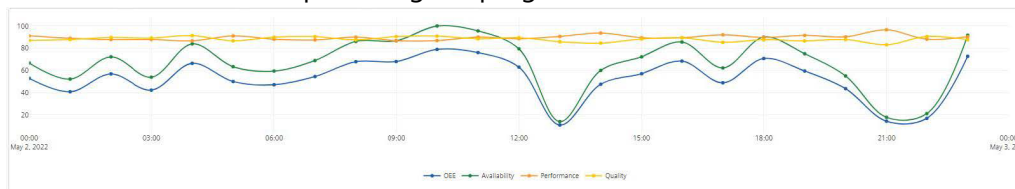
- Green respectively.



The arrows  provided on the top-right corner of the Availability, Performance and Quality cards allow the user to navigate directly to the respective sub-pages.

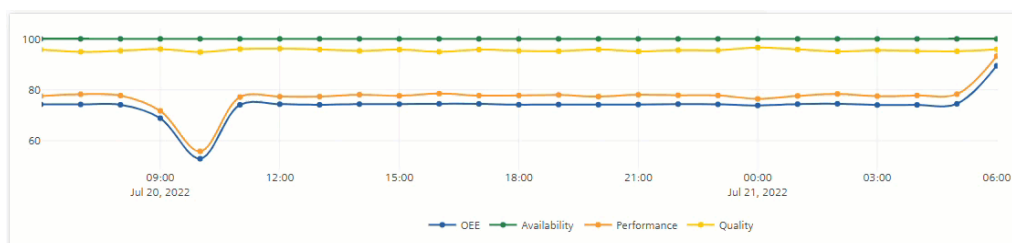
A line-plot chart shows the parameters OEE, Availability, Performance, and Quality

- calculated based on the percentage of progress over time.



Here, the lines are connected by points that represent the percentage of a parameter at a given time.

To improve visibility, it is possible to hide a particular line or multiple lines by clicking the label at the bottom.



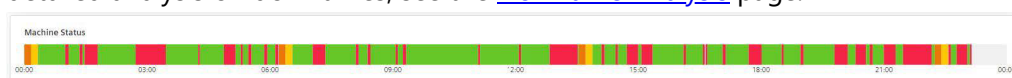
Production details: A table shows the Net operational Time, number of Unplanned downtimes, Total downtime, and number of Microstops based on the filter configuration.

- A microstop is defined as a stop that is shorter than 5 minutes.



Machine Status: A timeline chart that shows the chronological order of the series of events that occurred on a time scale. The color-coding of the chart depends on the machine or line status and always shows the configured time categories. For a more

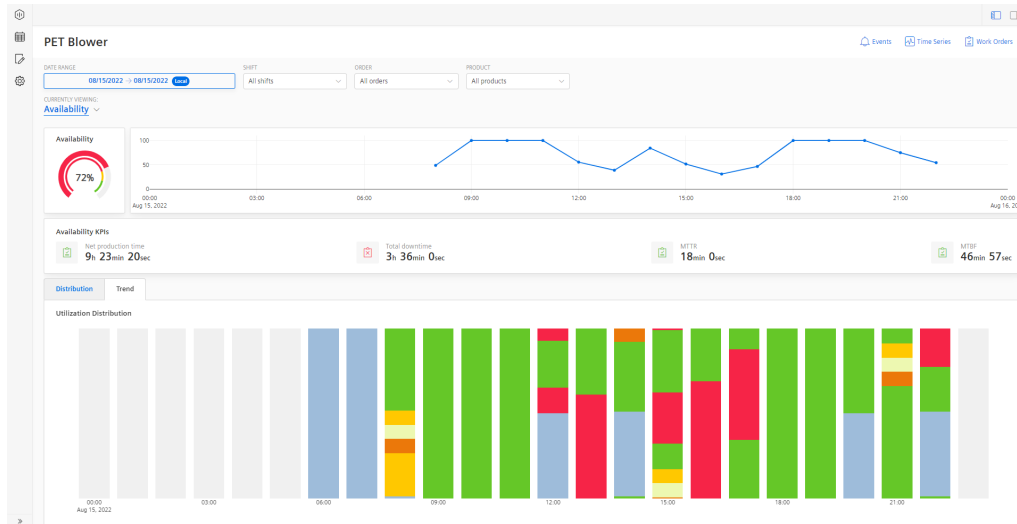
- detailed analysis on downtimes, see the [Downtime Analysis](#) page.



For other functionalities to explore the chart further, see section [Visualization pane](#).

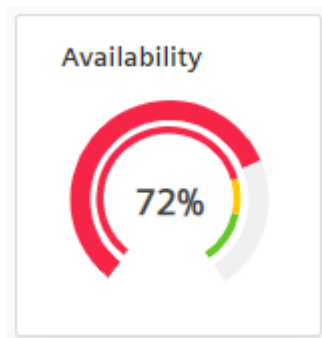
## 7.3 Availability

The Availability page provides a detailed overview of the machine availability and its most relevant KPIs.



### Availability Visualizations

A semi-donut chart shows the Machine availability. These KPIs are calculated based on the machine inputs. Depending on the configured limits for Error, Warning, and Success they are colored in Red, Yellow, and Green respectively.

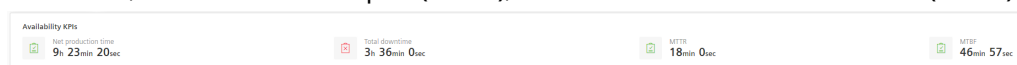


A line-plot chart shows machine Availability that is calculated based on the percentage of progress over time.



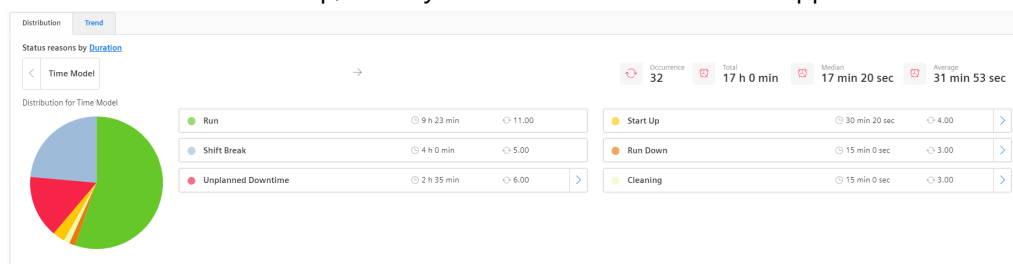
For other functionalities to explore the chart further, see section [Visualization pane](#).

**Availability KPIs:** The Availability KPI table shows KPIs such as Net Production Time, Total downtime, Mean-Time-To-Repair (MTTR), and Mean-Time-Between-Failure (MTBF).

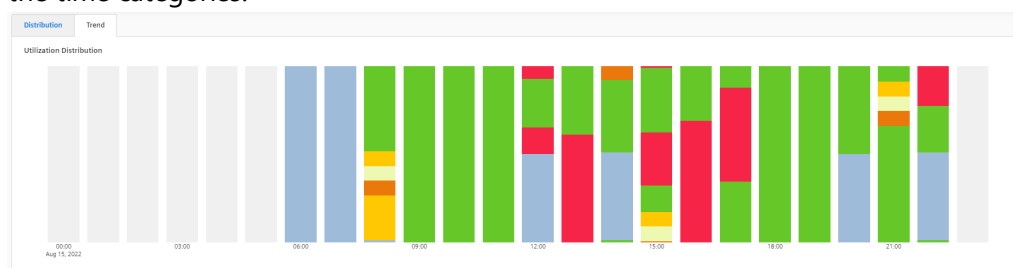


**Distribution & Trend:** At the bottom section of the page, there are two tabs available, one for the status distribution and one for the trend. The distribution shows how the time is distributed across the different time categories that you configured. The view can be also be altered to show the distribution by occurrence. Of course, you can also navigate through the different layers by

clicking on the arrows in the visualization. This allows you either to go one level deeper in the reason tree or one level up, when you click on the arrow in the upper left corner of the chart.



The trend shows the utilization distribution of the selected asset over time. This chart visualizes the same information as the machine status chart on the overview page but allows it more space for details. Similar to the machine status charts, different time categories over time are displayed here. Similar to the machine status chart, the color-coding depends on the configured colors of the time categories.

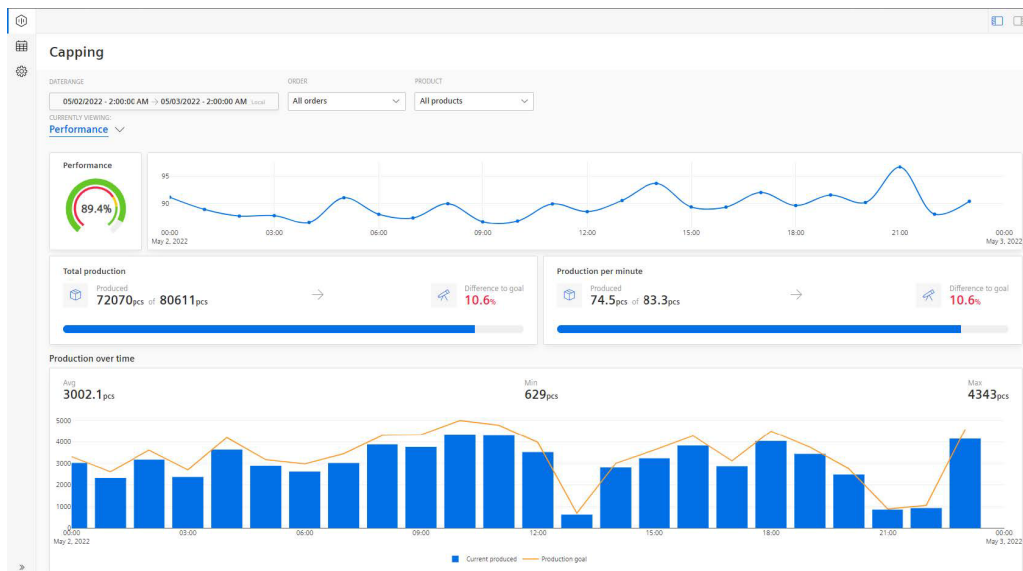


## Behavior of trend and distribution

The distribution and trend also feature some special behavior. The trend is not available when the status is entered manually. Then only a distribution is shown. When the status changes too frequently in a given time range, that it can not be displayed properly in the charts anymore, then the page will first only show the distribution. In case, you also want to see the trend of the machine states then you can still load that manually. The main reason for this is to improve performance especially when longer time ranges are selected by the user.

## 7.4 Performance

The Performance page shows a detailed overview of the machine performance and its most relevant KPIs.



In this section, the following parameters are displayed:

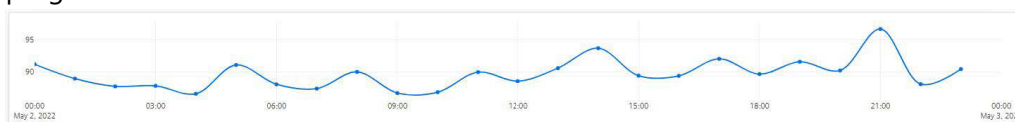
A semi-donut chart that shows the Machine performance. The KPI is calculated based on the machine inputs. Depending on the configured limits for Error, Warning, and Success

- they are colored in Red, Yellow, and Green respectively.



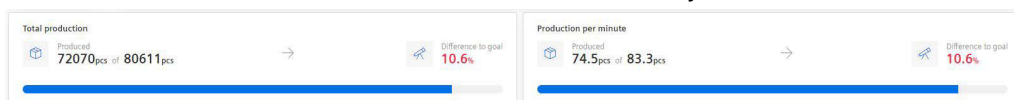
A line-plot chart shows Machine performance calculated based on the percentage of

- progress over time.



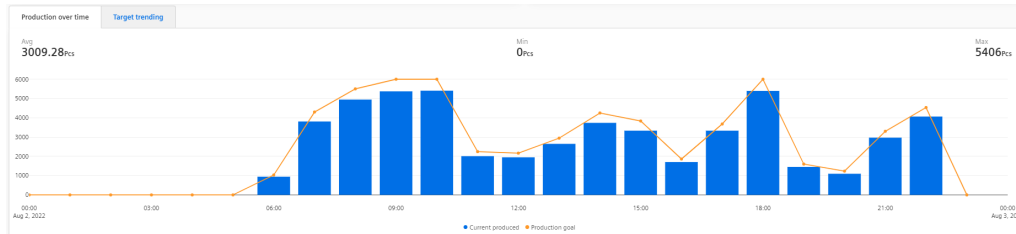
The Total Production and Production per minute KPIs show the quantitative analysis of machine performance and the difference in percentage to achieve the set target (goal). The target in this case is always the theoretically possible output. Here, the measured output and the theoretical output are displayed (Measured Output of Theoretical Output). In one chart the application displays total numbers for the selected time range

- and on the other chart, it is broken down into minute-by-minute intervals.



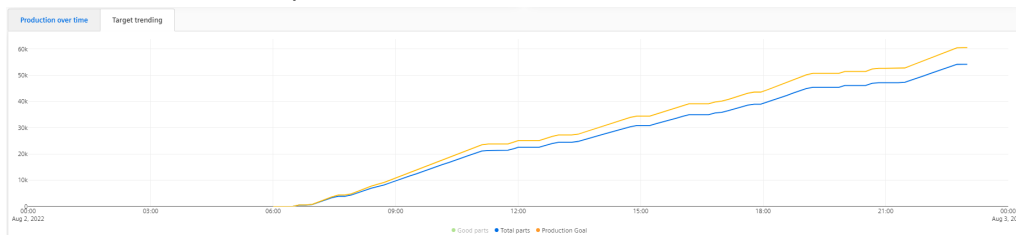
Production over time: This chart shows the produced parts vs. the production goal over time. The production goal is calculated based on the availability of the equipment and the fetched design speed, either coming directly from the equipment or the associated product code. The chart can indicate when the production was slower than it should

- have been or when it was able to catch up.



Target Trending: In this chart, the application shows produced parts vs. the production goal, but this time visualized differently. Here, the chart always starts at 0 and then increases the counters over time. In case, there is a partial flat line in the chart then this indicates a planned or unplanned downtime and the equipment was not able to produce further at this time. The chart also allows you to toggle on or off the different lines. Besides the total parts and the production goal, the chart also includes the good parts

- line which is turned off per default.

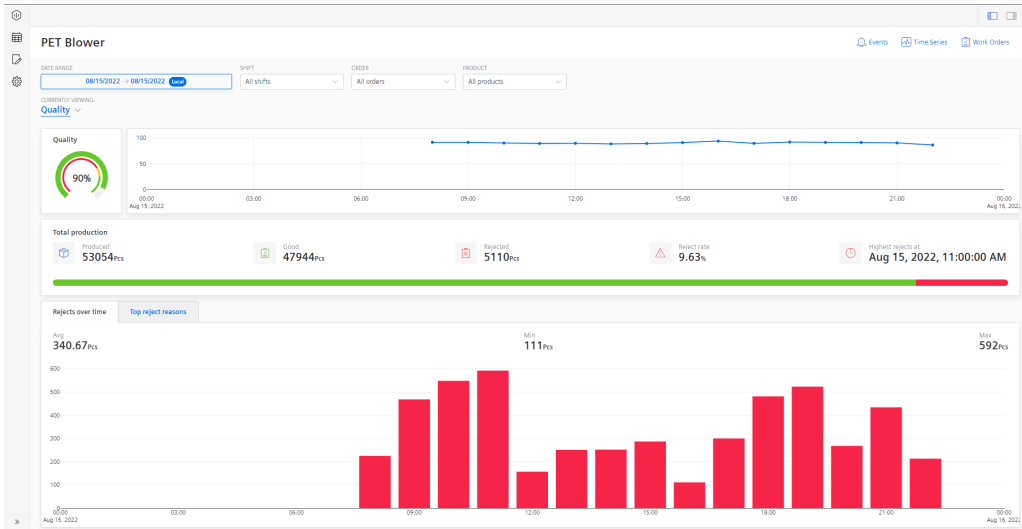


For other functionalities to explore the chart further, refer to [Visualization pane](#).

## 7.5 Quality

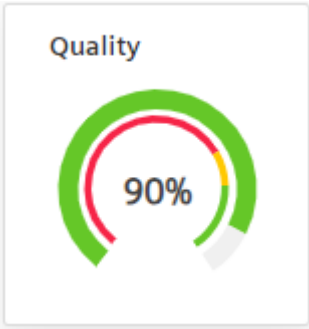
The Quality page shows a detailed overview of the machine quality, its most relevant KPIs and the reject reasons if they are further specified.



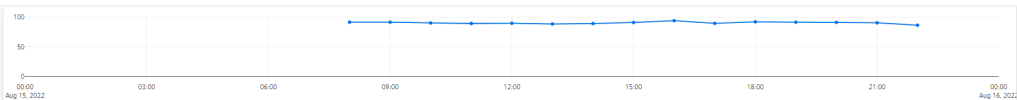


## Quality Visualizations

A semi-donut chart shows the Machine quality. The KPI is calculated based on the machine inputs. Depending on the configured limits for Error, Warning, and Success they are colored in Red, Yellow, and Green respectively.

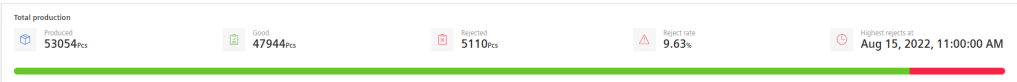


A line-plot chart shows machine quality calculated based on the percentage of progress over time.

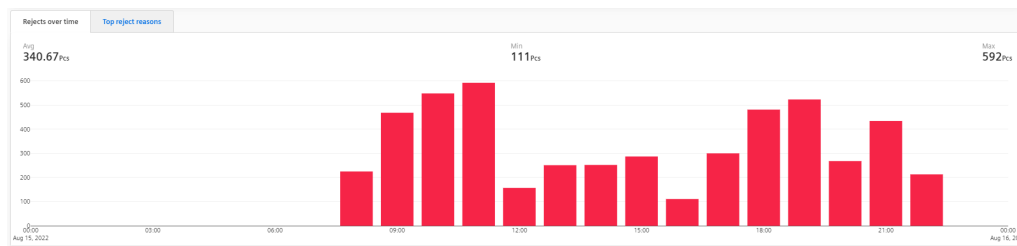


For other functionalities to explore the chart further, see section [Visualization pane](#).

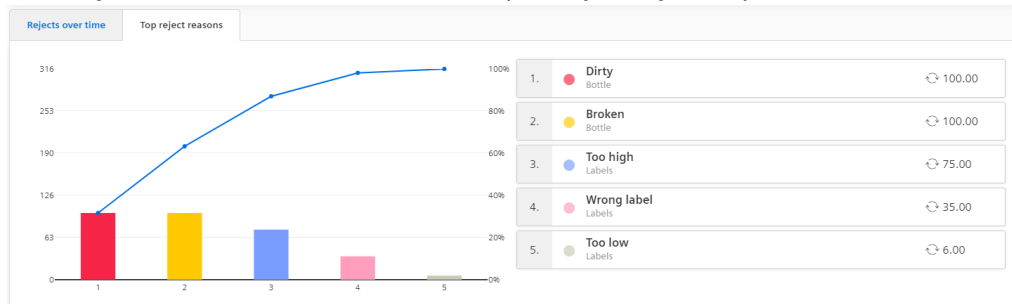
The Total production table shows the total quantity of products produced, the number of good and rejected parts, the percentage of rejections, when the highest amount of rejects occurred in the specified time frame.



The bottom of the page covers the topic on rejects and reject reasons. Therefore, two views are implemented in this section. If you have not assigned a reject reason collection click on the "Top Reject Reason" tab, you will see an error message asking you to assign a collection.



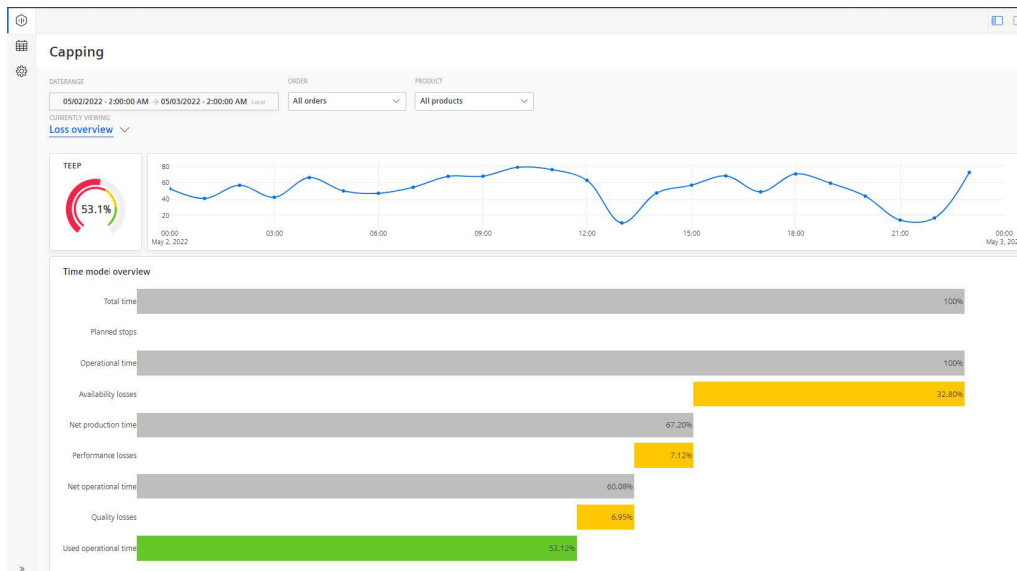
The "Rejects over time" chart shows the quantity of rejected products over time.



The "Top Reject Reasons" chart displays the top reject reasons of the asset, if further specified by the user via the manual inputs. Of course, filters can also be applied to both views.

## 7.6 Loss Overview

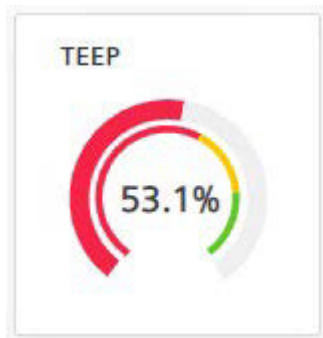
The Loss Overview page shows the Total Effective Equipment Performance (TEEP) and loss distribution for the selected line or asset.



In this section, the following parameters are displayed:

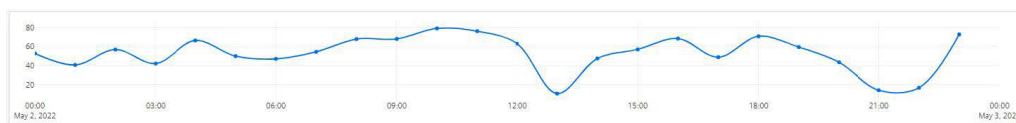
A semi-donut chart that shows the Machine TEEP. The KPI is calculated based on the machine inputs. Depending on the configured limits for Error, Warning, and Success they

- are colored in Red, Yellow, and Green respectively.



A line-plot chart shows machine TEEP calculated based on the percentage of progress

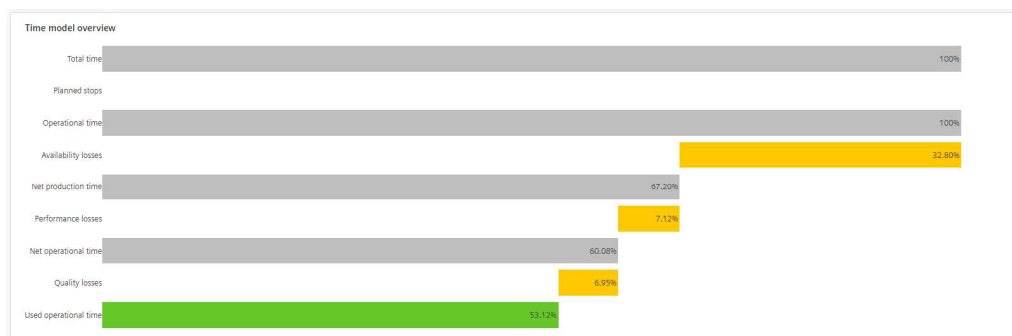
- over time.



For other functionalities to explore the chart further, see section [Visualization pane](#).

The Time model overview chart shows the loss distribution for the following parameters.

- Refer to the [Configuring KPIs](#) Section to see how each KPIs are calculated.
  - Total time
  - Planned stops
  - Operational time
  - Availability losses
  - Net production time
  - Performance losses
  - Net operational time
  - Quality losses
  - Used operational time

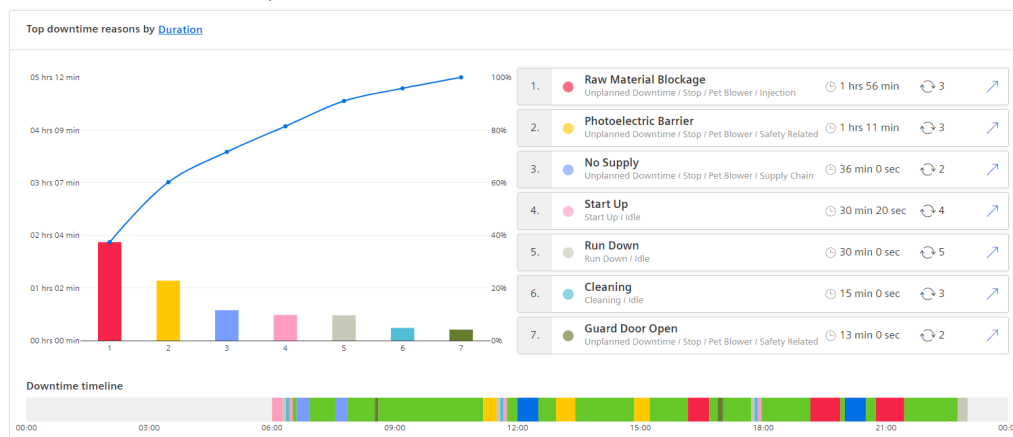


## 7.7 Downtime analysis

The Downtime Analysis page is split into two main capabilities. In the top there are the Top 10 downtime reasons displayed in a list view and combined with a typical pareto chart. On the bottom the application has a drilldown capability included, which allows you to analyze your downtimes navigating through the different levels of your reason tree starting at the time categories and ending at the last leaf of the tree. Both panels can either be viewed by duration or occurrence.

### Top Ten Downtime Reasons

In the top section of the page the application shows the top 10 downtime reasons for the applied filter combination. On the left-hand side of the top section, you can see a typical representation of the downtime reasons in a pareto chart. Starting from the left in the chart you can see the most critical downtime reason and then going more to the right on the x-axis you can see them in a decreasing order. The left y-axis of the chart shows the time in hours. On the right y-axis you can see the percentage going from zero to 100%. Next to the chart, the application displays the list of top 10 downtime reasons that occurred for the selected filter combination. The columns of the chart can be identified either by the color code or by the number below it. Below the chart and table you can also see the typical machine status chart, this time colored with the colors of the top 10 downtime reasons. You can quickly spot by the colors when the downtimes occurred in the selected time period. A hover over the different elements of the chart, shows the downtime reason and the start and end time.



### Reason Tree Drilldown

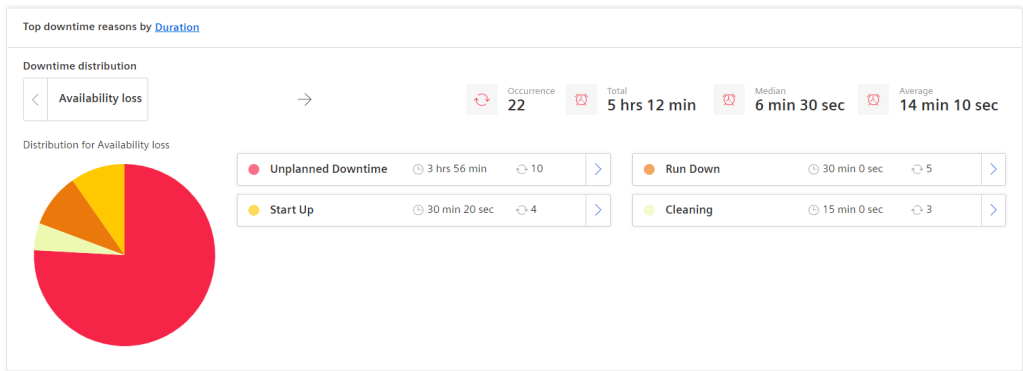
In the bottom section of the page, the application shows a drilldown for the underlying reason tree. This capability allows you to move through the different levels of the reason tree and shows the statistics of the selected level. The drilldown starts on the time categories of the type "Availability Loss" from which you then can move through the state and the different reason layers. To navigate through the different layers there are two options:

Navigate one level up: In the top left corner of the section, you can find the current selected level. If there is a left arrow next to reason, that means that you can navigate one level up. If there is no arrow, this means you reached the top level the Availability Loss categories

1. again.

Navigate one level down: In the center of the section, you can find the underlying reasons of the selected reason. If there are further sub-levels of the displayed reasons, then a right arrow on the right of the item will show up. By clicking on the arrow, you can navigate one level deeper. If there is no arrow displayed, this means you reached the lowest level of this reason already. In general, the drilldown shows the following information. In top row of the section, you can see the selected reason on the left and information related to that reason, how many downtimes occurred in the selected reason layer, how long was the total downtime, the average downtime and median downtime. In the mid-section of the drilldown, you can see the distribution of the underlying reasons of the selected reason. On the left side, the reason distribution is displayed in a pie chart and on the right side you can see an overview of the different reasons and how much time they contributed to the overall

2. downtime of the selected reason.



## 7.8 Downtime management

The Downtime Management page shows a detailed overview of the machine downtimes and downtime related information such as added measures, workorders and comments.



Reason	Occurred	Duration	Measures	Work orders	Comments
Raw Material Blockage Unplanned Downtime / Stop / Pet Blower / Injection	May 9, 2023 at 7:09 PM GMT+2	44 min 0 sec	1 Measure(s)	1 Work order(s)	1 Comment(s)
Raw Material Blockage Unplanned Downtime / Stop / Pet Blower / Injection	May 9, 2023 at 8:45 PM GMT+2	41 min 40 sec	--	--	--
Raw Material Blockage Unplanned Downtime / Stop / Pet Blower / Injection	May 9, 2023 at 4:10 PM GMT+2	31 min 0 sec	--	--	--
Photoelectric Barrier Unplanned Downtime / Stop / Pet Blower / Safety Related	May 9, 2023 at 12:56 PM GMT+2	28 min 0 sec	--	--	--
Photoelectric Barrier Unplanned Downtime / Stop / Pet Blower / Safety Related	May 9, 2023 at 2:51 PM GMT+2	23 min 0 sec	--	--	--
Photoelectric Barrier Unplanned Downtime / Stop / Pet Blower / Safety Related	May 9, 2023 at 11:09 AM GMT+2	20 min 0 sec	--	--	--
No Supply Unplanned Downtime / Stop / Pet Blower / Supply Chain	May 9, 2023 at 6:36 AM GMT+2	19 min 0 sec	--	--	--
No Supply Unplanned Downtime / Stop / Pet Blower / Supply Chain	May 9, 2023 at 7:33 AM GMT+2	17 min 0 sec	--	--	--

The page shows a table of all the downtimes that occurred for the selected filter combination. The table itself can be sorted by clicking the up or down arrow next to every column name. In addition, you can also search for information, e.g., a specific reason by typing in the search bar. The table shows the following information per entry:

- Downtime Reason.
- Start Time.
- Downtime duration.
- Number of measures linked to the downtime.
- Number of work orders linked to the downtime.
- Number of comments linked to the downtime.

To learn more, to edit the reason and to add measures, work orders and comments to a downtime please click on one of the entries in the table. This will open the following screen for you.

In the top of the screen you can see again the details of the downtime, being the current assigned reason, and when the downtime started and ended. On the left and on the right of the

header section you can find two arrows  , which allow you to navigate to the previous or following item of the downtime list. In case you filtered or sorted the list in a certain way, then the previous or next item of the filtered list will be displayed. To get back to the table

view, please click on the close button  in the upper right corner.

The screenshot shows the 'PET Blower' downtime management interface. The 'Reason' section is highlighted with a blue circle and contains a dropdown menu with the selected reason: 'Unplanned Downtime / Stop / Pet Blower / Injection / Raw Material Blockage'. The 'Measure(s)' section is highlighted with a blue circle and contains a text input field with the value 'Unblock PET Blower'. The 'Work order(s)' section is highlighted with a blue circle and contains a text input field with the value 'PET Blower - Maintenance until 5/12/2023'. The 'Comment(s)' section is highlighted with a blue circle and contains a text input field with the value 'Followed the proposed steps but the issue keeps coming back, Maintenance Team should have a look.' Below the comment field, there is a timestamp 'May 11, 2023 at 10:50 AM GMT+2' and buttons for 'edit' and 'delete'.

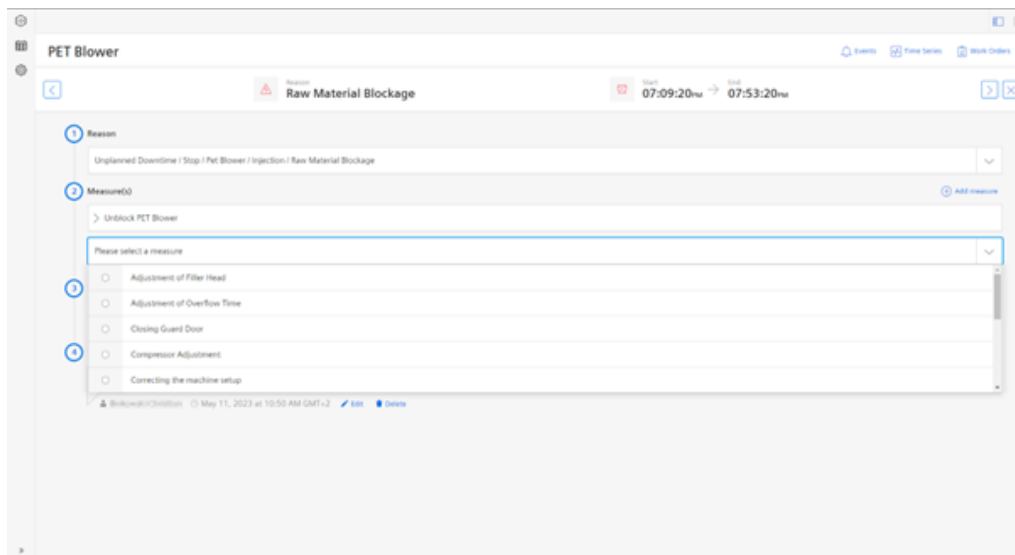
## Overwrite an existing downtime reason


To overwrite the existing downtime reason, click on the down arrow in the reason section of the page. Then a list will populate as in the screenshot below. You can either select one reason from the populated list or start to type the reason in the search bar and let the auto-completion based of the underlying reason tree guide. Once the desired reason pops up, you can simply click on it and select it.

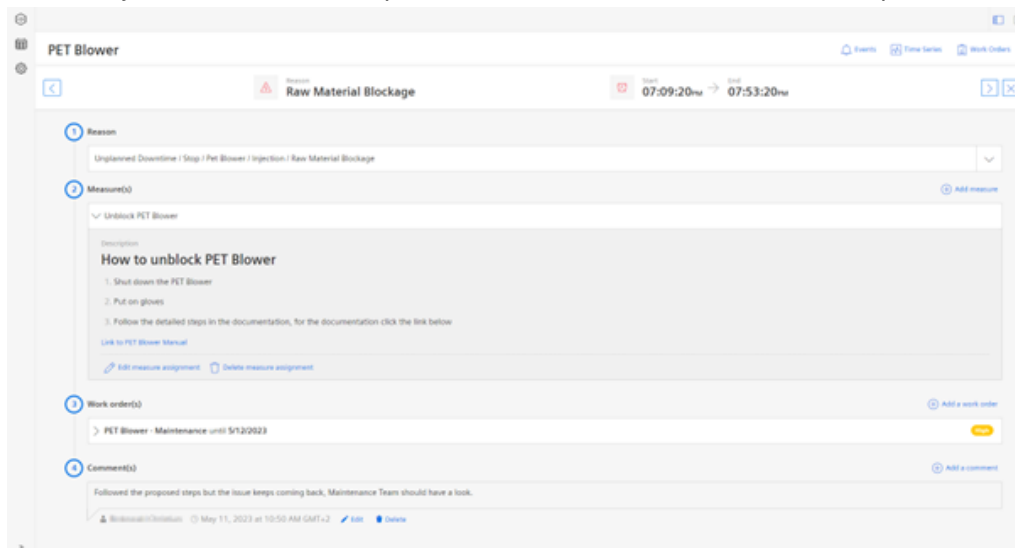
The screenshot shows the 'PET Blower' downtime management interface. The 'Reason' section is highlighted with a blue circle and contains a dropdown menu with the selected reason: 'Unplanned Downtime / Stop / Pet Blower / Injection / Raw Material Blockage'. Below the dropdown, a list of reasons is displayed, including 'Run Down / Idle / Run Down', 'Unplanned Downtime / Stop / Pet Blower / Output / Buffer Full', 'Unplanned Downtime / Stop / Pet Blower / Injection / Raw Material Blockage', 'Unplanned Downtime / Stop / Capping / Supply Chain / No Supply', and 'Run Down / Idle'. The 'Comment(s)' section is highlighted with a blue circle and contains a text input field with the value 'Followed the proposed steps but the issue keeps coming back, Maintenance Team should have a look.' Below the comment field, there is a timestamp 'May 11, 2023 at 10:50 AM GMT+2' and buttons for 'edit' and 'delete'.

## Assign a measure

When you fixed a downtime and you would like to document how you managed to overcome the downtime, you can add multiple measures to the recorded downtime. To add one measure, please click on the "Add a measure" button. Once you clicked it, a dropdown like the downtime reason dropdown will appear, from which you can select the suitable measure that you performed.



Once you selected a measure it will automatically be added to the downtime. By clicking on the expand arrow  on the measure you can see the attached description of the downtime. In addition, you can also either replace the measure or delete it via the respective button.



## Create a work order

In this step you can create multiple work orders related to a specific downtime. This makes sense when a certain issue at the machine keeps coming back after it was solved by the machine operator. Via a work order you can track further actions on this issue and involve other parties such as the maintenance team. To create a work order, please click "Add a work order". Now, an input dialogue populates on the screen.



The screenshot shows a software interface for 'PET Blower' with a modal window titled 'Add a work order'. The modal has the following fields: 'Title' (text input), 'Description' (text area), 'Status' (dropdown menu with 'Open' selected), 'Priority' (dropdown menu with 'Select priority'), 'Type' (dropdown menu with 'Select type'), 'Due date' (text input with 'mm/yyyy' placeholder), 'Assignee' (dropdown menu), and 'Associated asset' (text input with 'PET Blower' selected). At the bottom right of the modal are 'Cancel' and 'Add' buttons. The background interface shows a list of steps: 1. Reason, 2. Measure(s), 3. Work order(s), and 4. Comment(s). The 'Work order(s)' step is highlighted, showing a sub-step 'PET Blower - Maintenance until 5/12/2023'.

Please fill in the following information:

- Title
- Description
- Type (Planned or Incident)
- Assigned To (Select a user from the list)
- Priority (High, Medium or Low)
- Due Date
- Status (Open, On Hold, In Progress, Done)

Once everything is filled in and you click “Add”, the work order will be created

## Add a comment

In special cases it is also necessary to add additional information to a recorded downtime. Here, the comment feature becomes relevant. To add a comment, please click on “Add a comment” and this will open an in-line editor. The editor allows you to structure the text properly and, e.g., to add links. Once you click outside of the editor, the comment will automatically be saved.

The screenshot displays the 'PET Blower' downtime management interface. At the top, there's a header with the title 'PET Blower' and navigation links for 'Events', 'Time Series', and 'Work Orders'. Below the header, a specific event is highlighted: 'Raw Material Blockage'. This event has a start time of 07:09:20 PM and an end time of 07:53:20 PM. The interface is divided into four numbered sections: 1. Reason, 2. Measure(s), 3. Work order(s), and 4. Comment(s). The 'Reason' section contains a dropdown menu with the selected text 'Unplanned Downtime / Stop / Pet Blower / Injection / Raw Material Blockage'. The 'Measure(s)', 'Work order(s)', and 'Comment(s)' sections each have a '+ Add' button. The 'Comment(s)' section is expanded, showing a rich text editor with the text 'Some maintenance needs to be done'. The editor includes a toolbar with icons for bold (B), italic (I), underline (U), strikethrough (ABC), bulleted list, numbered list, link, and unlink. At the bottom of the comment box, there's a timestamp: 'May 30, 2023 at 1:23 PM GMT+2'.

Besides that, you can also edit (via the “pen” icon) and delete (via the “trash can” icon) the comment.

**hide\_license\_text: true**

## 8.1 Manual Inputs

With Manual Inputs, Insights Hub OEE allows users to add OEE relevant data manually to the system. This includes the following data:

- Order Information
- Product Information
- Total Parts Counter
- Good Parts Counter
- Rejected Parts Counter
- Reject Reasons
- Machine State Distribution

To view and edit Manual Inputs, you need to assign yourself the "Operator" role in the Insights Hub settings. In addition, you also need to set required variables as "Manual" instead of "Connected" to be able to put it in data manually.

Once you met the prerequisites you can navigate to the Manual Inputs via the navigation bar on

the left. Please click the manual inputs icon



## Manual Inputs User Interface

### General Behavior

In general, all generated / pre-populated production periods on the manual inputs screen depend on your asset configuration. For example, if you connected all variables except the order information, then you will see multiple production periods populated on the screen which will show you the different products that were produced with the associated counters. The different production periods will indicate then what information is still missing through the yellow

"Missing" label .

Incomplete production periods will also be marked with a yellow flag on the left side.



## Distribution of production counters within one calculated bin

A bin is defined as a time interval of minimum one hour, for which the KPIs are calculated for. Up to 100 bins will be calculated by the application. So, depending on your selected time range the bins will either be 1h or longer. So, when a manually provided production period needs to be divided in more than one bin the following rules will be applied to the two cases:

Manually provided machine state: in this case the counters will be equally distributed across all bins and only planned stops from the calendar will be considered.

$$\text{bin counters} = \frac{\text{total counters} * \text{bin operational time}}{\text{total operational time}}$$

•

Connected machine state: In this case, the planned stops and the availability losses will be considered.

$$\text{bin counters} = \frac{\text{total counters} * \text{bin net production time}}{\text{total net production time}}$$

•



















The total values are always the total values for the time range of the manually provided production period.

## Partly used manual production periods

It can happen that the time range a user selected is not covering the whole manually provided production period. Mainly, it happens for the very first and last manually provided production period within the time range. In this case, the system can not use all manually provided values to calculate the KPIs. The system follows the same logic as for the bin calculation, please refer to section above.

## How to edit Manual Inputs

As mentioned before, the application enables you to input missing information manually through an input screen. The different inputs will be described in the following subsections. You can start to input data through clicking on the pen icon on a production period.

DATE RANGE						
11/29/2023 → 11/29/2023 Local						
Time	Order	Product	Produced	Good	Rejected	Reject Reasons
Begin of period						
Nov 29, 2023, 12:00:00 AM Nov 29, 2023, 05:49:37 AM → 5 h 49 min	Missing	Limo	Missing	Missing	Missing	 
Nov 29, 2023, 05:49:37 AM Nov 29, 2023, 06:00:37 AM → 10 min 59 sec	Missing	Beer	Missing	Missing	Missing	 
Nov 29, 2023, 06:00:37 AM Nov 29, 2023, 06:40:37 AM → 39 min 59 sec	Missing	Limo	Missing	Missing	Missing	 
Nov 29, 2023, 06:40:37 AM Nov 29, 2023, 07:00:37 AM → 20 min 0 sec	Missing	Beer	Missing	Missing	Missing	 
Nov 29, 2023, 07:00:37 AM Nov 29, 2023, 07:40:37 AM → 39 min 59 sec	Missing	Limo	Missing	Missing	Missing	 
Nov 29, 2023, 07:40:37 AM Nov 29, 2023, 08:00:37 AM → 20 min 0 sec	Missing	Beer	Missing	Missing	Missing	 
Nov 29, 2023, 08:00:37 AM Nov 29, 2023, 08:40:37 AM → 39 min 59 sec	Missing	Limo	Missing	Missing	Missing	 
Nov 29, 2023, 08:40:37 AM Nov 29, 2023, 09:00:37 AM → 20 min 0 sec	Missing	Beer	Missing	Missing	Missing	 
Nov 29, 2023, 09:00:37 AM Nov 29, 2023, 09:40:37 AM → 40 min 0 sec	Missing	Limo	Missing	Missing	Missing	 

Following that, you will be presented with the input screen.

Add production period

1 Production Period

11/29/2023 - 6:00:37 AM → 11/29/2023 - 6:40:37 AM Local

2 Enter production information

Order

Product

Limo

3 Enter production values

Total

Good

Rejected

4 Add reject reasons

+ Add a reject reason

Cancel

Add

On top, the dialogue always shows the selected production period and the respective time range. Here, the application allows you also to shorten the time range. This behavior might be needed if you need to split a pre-defined time period to add an additional order or product. This will be explained by an example in one of the following sub-sections.

Depending on your configuration, fields will be disabled because the system already receives this information from a configured variable. In the screenshot above, the product can be fetched from the timeseries data whereas the order information, the total counter and good counter need to be ingested manually for the production period. In this example, the rejected parts are configured as calculated and hence the field is disabled. In addition, the user can also specify reject reasons.

Production Information - Order and Product Information

If you specified the order or product or both as a manual input, you can adjust the values in the respective field.

Enter production information

Order	Product
<input type="text"/>	<input type="text" value="v"/>

The order information needs to be typed in the corresponding field. Based on the configured product collection, you will be able to select the appropriate product from the dropdown.

Enter production information

Order	Product
<input type="text" value="ABC"/>	<input type="text" value="v"/>

Again, based on your configuration the respective fields will either be enabled or disabled for manual inputs.

Production Values - Good Parts, Rejected Parts, Total Parts

One of the most common topics is that a customer would like to add the counter values of a machine, because they could not be tracked directly at the asset. Depending on your configuration, the following fields will be enabled or disabled.

Enter production values

Total	Good	Rejected
<input type="text"/>	<input type="text"/>	<input type="text"/>

In the example above, total and good parts were configured as manual for the machine and the rejected parts are calculated by the application.

Reject Reasons

If you have configured a reject reason collection and also assigned it to a machine or line, then you will be able also to keep track of the reject reasons of the machine. Once you start tracking this information, the Quality page will also show that information, e.g., displaying the top ten reject reasons in a pareto distribution. So, the overall goal is to help you understand your quality issues better and to improve the overall quality.

Based on your manual or automatic inputs, the application will give an indication how many rejects are still unspecified.

Add reject reasons

10 bad items without reject reasons

+ Add a reject reason

In the example from above, 10 rejects were not specified yet. If you click on the "Add a reject reason" button, then you can select a reason from a dropdown and also specify the number of rejects.

Add reject reasons

Bottle / Broken	→	5.00	
-----------------	---	------	--

5 bad items without reject reasons

+ Add a reject reason

You have to repeat this process, until all rejects are specified.

Add reject reasons

Bottle / Broken	→	5.00	
Labels / Wrong label	→	5.00	

Once you are done with that, you can click the "Update" or "Add" button to finish the operation.

Machine State Distribution

Because some machines can't be connected to Insights Hub, there is also a possibility to manually input a status distribution. This needs to be done for every product change, since otherwise it is impossible to calculate the theoretical output per product properly.

Add machine state distribution

+ Add a state

To add a status distribution click on "Add a state". If the calendar has planned stops in the selected time range, then they will automatically be shown in the list as well, however they can't be modified here.

Add machine state distribution

State	Duration	Occurrences
Calendar planned stops	7.69 % 00 hrs 30 min 00 sec	1

Total duration must be 100%, so please increase by 92.31% (6 hrs 0 min 0 sec) to proceed.

+ Add a state

In the first step, you select a state from the reason tree from the dropdown. Once you have set it, you can either give a percentage of time or a proper duration. The time picker features two modes. First, it allows you to enter the time in numbers, like hours, minutes and seconds. Secondly, you can also use a more visual time picker, if you are working with a touch screen. Therefore, you have to click on the clock icon in the duration picker and the following screen will appear.

3 Enter production values

Total

Good

4 Add reject reasons

+ Add a reject reason

5 Add machine state distribution

State	Duration	Occurrences
Calendar planned stops	7.69 % 00 hrs 30 min 00 sec	1
Run	80.00 % 05 hrs 12 min 00 sec	3
Unplanned Downtime / Stop / Conveyor Belt / M...	12.31 % 00 hrs 48 min 01 sec	4

Please select a time span

3	10	
4	11	
5 hours	12 minutes	0 seconds
6	13	1
7	14	2

Cancel

Use time span

You can either scroll through the different times with the mouse wheel or by using your finger on a touchscreen device.

As a second step, you also have to input how often this type of state occurred. Later, the occurrence information will also be used in the downtime reason analysis and the status distribution on the Availability page.

Add machine state distribution

State	Duration	Occurrences
Calendar planned stops	7.69 % 00 hrs 30 min 00 sec	1
Run	80.00 % 05 hrs 12 min 00 sec	3
Unplanned Downtime / Stop / Conveyor Belt / M...	12.31 % 00 hrs 48 min 01 sec	4

Once you filled in all the states and reached a total of 100% in the distribution you can save the information for the production period.

## Split Periods to add products or orders

Whenever you receive the product or order information automatically from the system, it could be required that you need to split an existing time period to account for more products or orders. For example, you are receiving the order information "ABC" for a specific production period, e.g., from 9 pm to 12 am. During that time frame, you produced the two products beer and lemonade.

Date range	Order	Product
09:00 pm - 10:30 pm	ABC	Beer
10:30 pm - 12:00 am	ABC	Lemonade

To achieve a split of a production period, you need to perform the following steps. First, open the production period that you would like to split into multiple periods.

The screenshot shows a 'Add production period' dialog box with a close button (X) in the top right corner. It contains four numbered steps:

- 1 Production Period**: A date range selector showing '11/29/2023 - 8:59:37 PM → 11/30/2023 - 12:00:00 AM' with a 'Local' button.
- 2 Enter production information**: Two input fields, 'Order' (containing '3754') and 'Product' (a dropdown menu).
- 3 Enter production values**: Three input fields labeled 'Total' (14799.00), 'Good' (13996.00), and 'Rejected' (803.00).
- 4 Add reject reasons**: A yellow warning box stating '803 bad items without reject reasons' and a blue link '+ Add a reject reason'.

At the bottom right, there are 'Cancel' and 'Add' buttons.

Second, adjust the time frame to the first production period. In the example above, the time range will be adjusted from 9 pm to 10:30 pm.



Add production period

1

Production Period

11/29/2023 - 8:59:37 PM → 11/29/2023 - 10:30:00 PM Local

2

Enter production information

Order

3754

Product

3

Enter production values

Total

10217.00

Good

9658.00

Rejected

559.00

4

Add reject reasons

559 bad items without reject reasons

+ Add a reject reason

Cancel

Update

Once you adjusted the time range, the collected counters will also be adapted. You can now set the proper product for that period and update the time period.

In addition, the application will automatically indicate that there is still a gap in the data and that a production period needs to be created for the remaining time.

Nov 29, 2023, 08:59:37 PM	→	1 h 30 min	3754	Missing	10217.00	9658.00	559.00	Missing		
Nov 29, 2023, 10:30:00 PM										
<div>Production period missing between Nov 29, 2023, 10:30:00 PM and Nov 30, 2023, 12:00:00 AM</div> <div>Add production period</div>										

Once you click on "Add production period", you can enter the related information and save it. In case you need to split the production period into more intervals, you can perform the steps on the remaining time again.

# System Behavior

# 9

## 9.1 System Behavior

In this section, the system behavior around various topics, for example, data ingest, is described a little more in detail. This should help you to understand the application a little bit better.

### System Limits

In this section, the current system limits of Insights Hub OEE are described.

Type	Limit	Description
Time Range	90 days	Max. time range for KPI calculation is 90 days
Calendars	100	Create up to 100 calendars per tenant
Calendar Events	5000	Create up to 5000 calendar events per tenant
Measure Collection	100	Create up to 100 measure collections per tenant
Measures	1000	Create up to 1000 measures per measure collection
Product collections	100	Create up to 100 product collections per tenant
Products	10000	Create up to 10000 products per product collection
Quality Codes	1000	Create up to 1000 quality code definitions per tenant
Reason Trees	100	Create up to 100 reason trees per tenant
Reasons	2500	Create up to 2500 reasons per reason tree
Status Mappings	200	Create up to 200 status mappings per tenant
Time Categories	300	Create up to 300 time categories per tenant

### Visualization

**Overview Page empty while other pages show data**

Sometimes, it might appear that the OEE application isn't working properly when the Overview page is empty while other pages, e.g. quality or availability, show data. This behavior is related to the following principle:

The overview page only shows data when all KPIs related to the OEE calculation, meaning Availability, Performance and Quality, can be calculated. If one of the KPIs cannot be calculated, then the overview page will be shown as empty, whereas the sub-pages for the other KPIs would still be available. The following example will illustrate this:

You are receiving status information and counters from the machine, but unfortunately, something with the product code ingestion is not working as expected. The system will now behave as follows: The availability page, the downtime analysis page, and the downtime management page will be shown as the status can be evaluated. The quality page can also be shown, since the quality can be calculated based on the counters. The performance page cannot be displayed because the theoretical output and therefore performance cannot be calculated. Following that, the overview page and the loss overview page can also not be displayed since OEE and TEEP can't be calculated.

So, whenever you see that some pages are being shown but not all of them, you should investigate in the data related to the main KPI sub-pages, availability, performance and quality.

## Machine status not automatically loaded for longer time ranges

Whenever you calculate OEE and the other KPIs for longer time ranges, it means that a lot of data needs to be processed and also visualized. In many times, when there are too many state changes in the time range, the chart is not able to display this properly anymore. To improve the application performance, Insights Hub OEE now decides based on the number of status changes in the selected time range, if the machine status will be displayed on the overview or availability page. If the application detects more than 1000 status changes in the period, the machine status charts will remain empty and display a message. This ultimately reduces the application loading times since less data needs to be transferred in the beginning. In any case, the application will show a status distribution on the availability page and the machine status can still be fetched through a button click if really needed.

## Data Ingest

### Data Ingest and post-processed data

Insights Hub OEE fetches the data from the time series storage and stores it in its own database to be able to contextualize the data properly and to perform fast OEE calculations. To fetch the data, Insights Hub OEE uses the subscription services of Insights Hub, which notifies the application when new data was ingested in the asset and then the application starts to read only the new values of the asset and stores it in the OEE database. This is only performed one time. So, whenever you overwrite data in the past, which has already been read by the application, it will not be considered by OEE anymore, as for this timestamp the application already fetched data. If you are post-processing data and want to use it in OEE, it is recommended to set up the post-processed variable in a separate aspect, since it is then separately fetched from the other

variables that can be stored in a single aspect. In general, the idea of an aspect is, that the data from the different variables arrives at the same time and can therefore also be read in one go. If the data is coming from different sources that are not in sync, it is recommended to have separate aspects for the different variables.

## Variable Switch in the machine or line configuration

When you set up an asset in Insights Hub OEE, you need to map the operands in the application, e.g., status, counters, and alike to asset variables from the assets you configured in Asset Manager. Once you succeeded this and everything is set up properly, Insights Hub OEE will start to pull the data from the time series database to its own database. This is done for performance reasons when you want to calculate OEE and the other relevant KPIs.

At some point in time, you might consider switching a mapped variable. Before you do this, you should know what the consequences are and what a suitable strategy might be. If you start to touch the configuration and change a variable, this can lead to issues moving forward. Once you performed the switch of the variable, Insights Hub OEE will start to pull the time series values from the new variable and store it in the database. This can lead to inconsistencies when you want to calculate and view KPIs that includes data from both worlds – from the old variable and the new one. For instance, you pulled data from one status variable with a specific mapping and then choose another status variable to pull the data from. Both variables have different status mappings. Since only one status mapping can be active at a time, the old status codes might not be mapped in the new status mapping and therefore queries might return errors when you start to request data from an overlapping period.

To avoid these kinds of inconsistencies, it is recommended to remove the asset from the Insights Hub OEE configuration entirely and set it up again with the new variable. When an asset is set up in Insights Hub OEE, the application will pull data from the last two weeks if there is data available. With this, you will avoid that OEE will try to calculate KPIs based on a data mix of the old and new variable.

## Configuration

### Mode changes on different variables

The manual input related capabilities add another level of complexity to the application. The configuration now supports multiple combinations of manual and automatic value capture. This also comes with a couple of restrictions:

- **Reject Reasons:** Once one manual entry was created for this asset the reject reason collection can't be changed anymore. If there hasn't been a collection assigned yet, it is still possible to add one when manual entries were already created.
- **Product Collection:** Product collections can be changed when needed
- **Machine/Line Status:** Once one manual input was received for this asset, the status mode can't be changed anymore - neither from manual to connected, nor from connected to manual.

In general, changes can be made from connected mode to manual mode but not the other way around, since data can't be fetched from the past.

## Localization

Different countries have different ways to format a decimal value or a date. Insights Hub OEE supports the localization of dates and decimal values for a couple of predefined languages. Insights Hub OEE automatically discovers the language settings of the browser and, if the setting is supported, chooses this language to visualize dates and decimal values in the proper local format. If the language is not supported, Insights Hub switches to the default language code **en\_US** to display the date and decimal value. OEE supports the following language codes:

Language	Region	Country code
Chinese (Simplified)	China	ch_CN
English	United States	en_US

## 10.1 Insights Hub OEE Release Changelog

In this section, you can find release related changelogs for the Insights Hub OEE application.

### EU1 Releases

#### May 2024

With this release, we provide the following updates:

- Read either a design speed or cycle time directly from a variable
- Product design speed information can be fetched either from a product code and associated product information or directly from a variable
- Set up new products in product collections either with design speed or cycle time
- Performance page now features a new visualization around production target including the calculated production goal, the total output and the good parts
- Introduction of the What's new window which will moving forward give an overview on newly released capabilities

#### February 2024

With this release, we provide the following updates:

- In case some variables can't be connected, hence we now provide manual input capabilities for
  - Machine State Distribution
  - Production Counters (Good, Rejects, Total)
  - Order Information
  - Product
  - Reject Reasons
- Machine State distribution on the availability page
- Reject Reason Pareto chart on the quality page
- Enhanced notification for missing manual inputs and non-configured status or product codes

## September 2023

With this release, we provide the following updates:

- Product Collections
- Show configured product unit on performance and quality page
- Excel import of product collections
- Search on product collections
- Extended product collection overview

## July 2023

With this release, we provide the following updates:

- Chinese language support
- Improved counter reset detection
- Performance improvements
- Bugfixes

## June 2023

With this release, we provide the following updates:

- Split downtime reason page into downtime management and downtime analysis
- Add capability to add comments to a downtime
- Add capability to create a work order from within Insights Hub OEE and assign to a downtime
- Add capability to create a list of downtime measures and the capability to assign one or multiple measures to a downtime
- Show downtime distribution per reason level
- Visualize top ten downtimes by a pareto chart
- Bugfixes

## April 2023

With this release, we provide the following updates:

- Rebranding of the application from MindSphere OEE Hub to Insights Hub OEE

## March 2023

With this release, we provide the following updates:

- Ensure to load data for the last two weeks after all mandatory variables in the configuration of an asset are mapped

- Data compression fixes
- Performance improvements
- Bugfixes

## February 2022

With this release, we provide the following updates:

- Asset view shows images of asset types if available
- Data compression
- Performance improvements
- Bugfixes

## December 2022

With this release, we provide the following updates:

- Shift filter
- Provide notifications if unknown product or status codes are found
- Bugfixes
- Performance Optimization

## October 2022

With this release, we provide the following updates:

- Show local time in tooltips
- Support of shared assets
- Extend configuration to add quality code configuration to handle raw data with quality codes
- Bugfixes

## September 2022

With this release, we provide the following updates:

- Support Chinese characters in input fields
- Consider local / UTC setting from the time picker
- Bugfixes
- Improved scalability

## August 2022

With this release, we provide the following updates:



- Consider daylight saving for calendar events
- Optimized startup when opening application in browser
- Bugfixes
- Provide button to reset KPI to factory default
- Start asset view in collapsed mode (only path to selected asset is expanded)

## July 2022

With this release, we are introducing the new MindSphere solution OEE Hub. OEE Hub is equipped with the following capabilities:

- Calculation of Overall Equipment Effectiveness (OEE), Mean Time To Repair (MTTR), Mean Time Between Failure (MTBF) and further KPIs on line and machine level
- Filter the calculated values for different time ranges, products or orders
- Configure multiple products with different design speeds to support multi-product production systems
- Reason Tree Modeling to better understand occurring downtimes in the factory and the possibility to overwrite collected downtime reasons to improve analysis
- Customization of OEE formulas for OEE calculation
- Possibility to set up production times, breaks, maintenance etc. in calendars
- Visualization screens for general OEE overview, availability, performance, quality, different losses and downtime reasons

## LPC Releases

### July 2023

With this release, we provide the following updates:

- Chinese language support
- Improved counter reset detection
- Split downtime reason page into downtime management and downtime analysis
- Add capability to add comments to a downtime
- Add capability to create a work order from within Insights Hub OEE and assign to a downtime
- Add capability to create a list of downtime measures and the capability to assign one or multiple measures to a downtime
- Show downtime distribution per reason level

- Visualize top ten downtimes by a pareto chart
- Rebranding of the application from MindSphere OEE Hub to Insights Hub OEE
- Performance Improvements
- Bugfixes

## March 2023

With this release, we provide the following updates:

- Ensure to load data for the last two weeks after all mandatory variables in the configuration of an asset are mapped
- Asset view shows images of asset types if available
- Data compression
- Shift filter
- Provide notifications if unknown product or status codes are found
- Show local time in tooltips
- Support of shared assets
- Extend configuration to add quality code configuration to handle raw data with quality codes
- Support Chinese characters in input fields
- Consider local / UTC setting from the time picker
- Consider daylight saving for calendar events
- Optimized startup when opening application in browser
- Provide button to reset KPI to factory default
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- Performance Improvements

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