FORCAM™ FORCE

Version 5.9

Master Data and System Configuration

Manual

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Content

1 Concept

This User Manual provides instructions for configuring FORCAM FORCE™ using the Workbench.

The Workbench is a multilingual web-based application designed for configuring the master data and other terminal-specific settings. The Workbench is used for configuring FORCAM FORCE™.
Functions of the Workbench:

- Create master data
- Maintenance of the complete system
- Interface for module configuration:
  - System administration
  - Data Collection Unit (DCU)
  - User administration
  - Production resources & tools administration

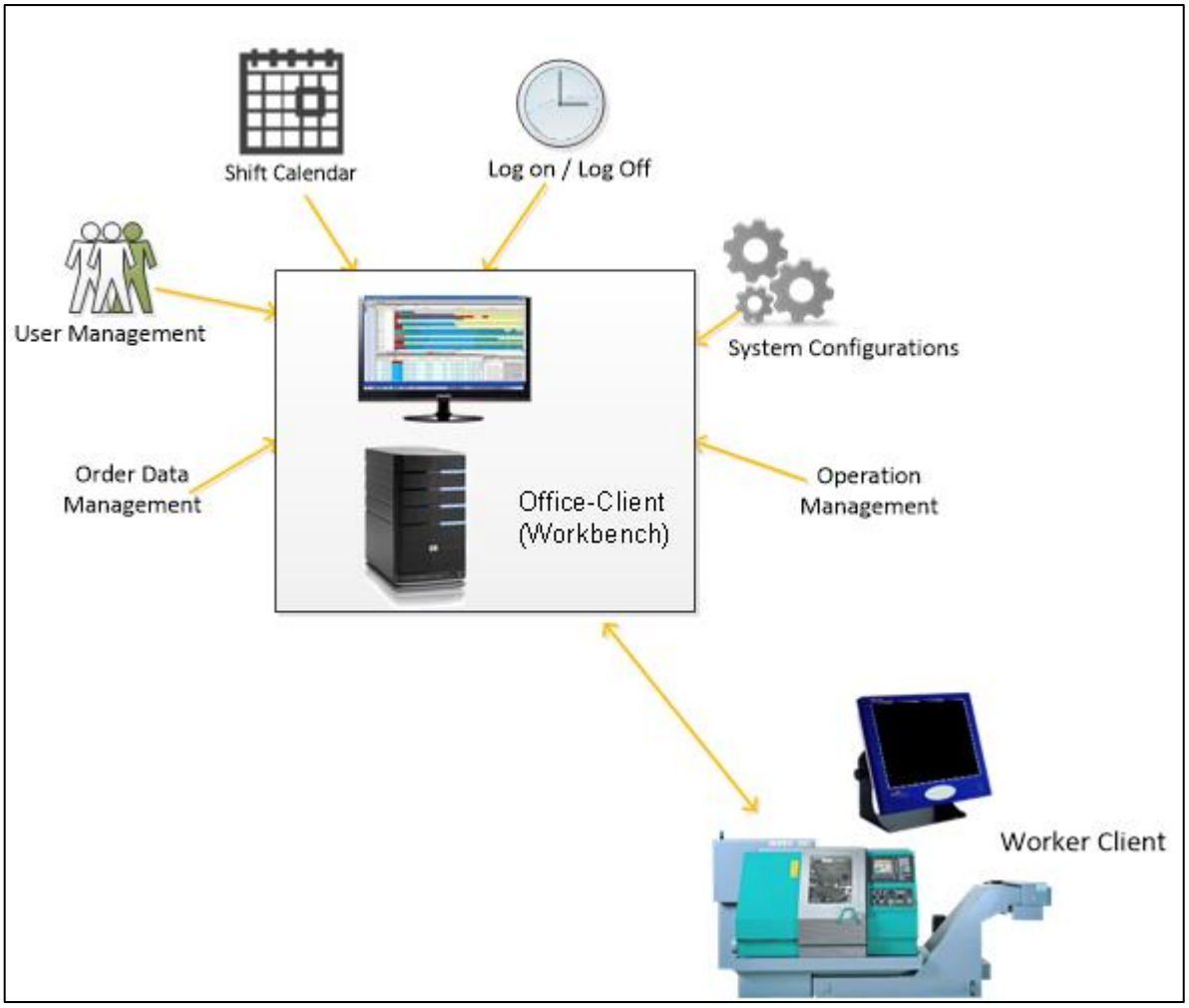

Fig. 1: Workbench overview

You can use the Workbench to perform the following functions:

- Change the appearance of the user interface of the SFT:
  - Templates and profiles of terminals
  - Definition of workplaces and their assignment to a terminal
  - Buttons (height, width) and actions assigned
- Personnel data management:
  - Employee database management
  - Assignment to workplaces
- Preparation and management of shift calendars:
  - Definition and assignment of working shifts
  - Definition of breaks and workweeks
- Production Data Management
  - Creating and searching for packages and elements
  - Definition and maintenance of NC Types
  - Logs and configuration
- Detailed Order Scheduling
  - Detailed production planning and control
  - Determination of the machine occupancy of workplaces
  - Capacity planning and distribution
- System configurations:
  - Logon page
  - ERP hierarchies
  - Status definitions
  - Database connections
  - System language

1.1 Requirements

As of release version 5.8.1, the Workbench no longer requires a JAVA Runtime Environment to run. The browsers Google Chrome and Microsoft Edge are recommended. Internet Explorer (from version 10) is still supported.

1.2 Logging on to the Web Interface

To go to the Workbench logon page, enter the name of the page into the address bar of your browser. Enter your username and password and click on **Logon**.

ⓘ The language can be selected in the drop-down menu at the top right of the screen after logging in.

Example for the structure of an address:

http://w2k12-ff5-tekr:15080/ffworkbench/
Host-Address Port Application

Fig. 2: Logon dialog of the Workbench

2 Basic Functions

2.1 Tile View

As of Release 5.8.1, the Workbench appears in a tile interface. Each tile is linked to a function or configuration page.
The tile interface can be customized. It is possible to determine the number and arrangement of the tiles as well as the appearance and color of the tile content.
If not all tiles can be displayed on one tile page for space reasons, they are moved to the next page.
Figure 3 shows the structure of the tile surface.

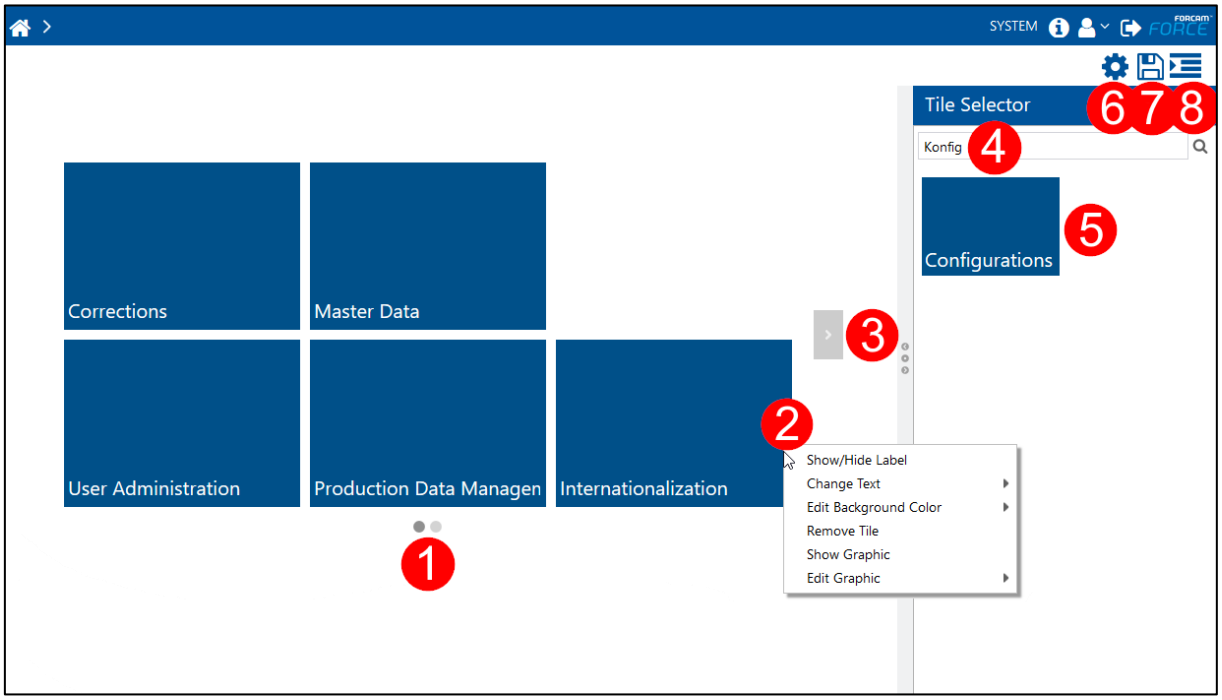

Fig 3: Tile interface of the Workbench

(1) Number of tile pages.
Each dot represents a tile page. The dark dot indicates the page on which the user is located.
(2) Context menu for editing tiles.
Appears by right-clicking after activating the edit mode (see (6)).
(3) Switches to the next tile page.
(4) Search field for tiles.
Searches for the labels of existing tiles that have not been placed on the tile page.
(5) Existing tile that is not placed on the tile page.
Drag and drop into the tile side to place it (see section 2.1.3).
(6) Activates the edit mode.
Locks the tile (no action after left click). Activates dragging and dropping the tiles on the page. Displays the tile selection on first execution.
(7) Saves the tile view after editing.
(8) Shows/hides the tile selection.

2.1.1 Determine Number and Font of Tiles

Path: Configurations > System > FORCAM FORCE™ > Configurations > Modules > Workbench > Tile Navigation

In the Workbench system settings, you can determine the number of columns and rows on a tile page. The maximum number of adjacent tiles depends on the screen resolution. The smaller the resolution, the more tiles fit on a page. If not all tiles can be displayed on one tile page due to space restrictions, they are moved to the next page. The number of tiles and pages is not limited. However, too many tiles can affect system performance.

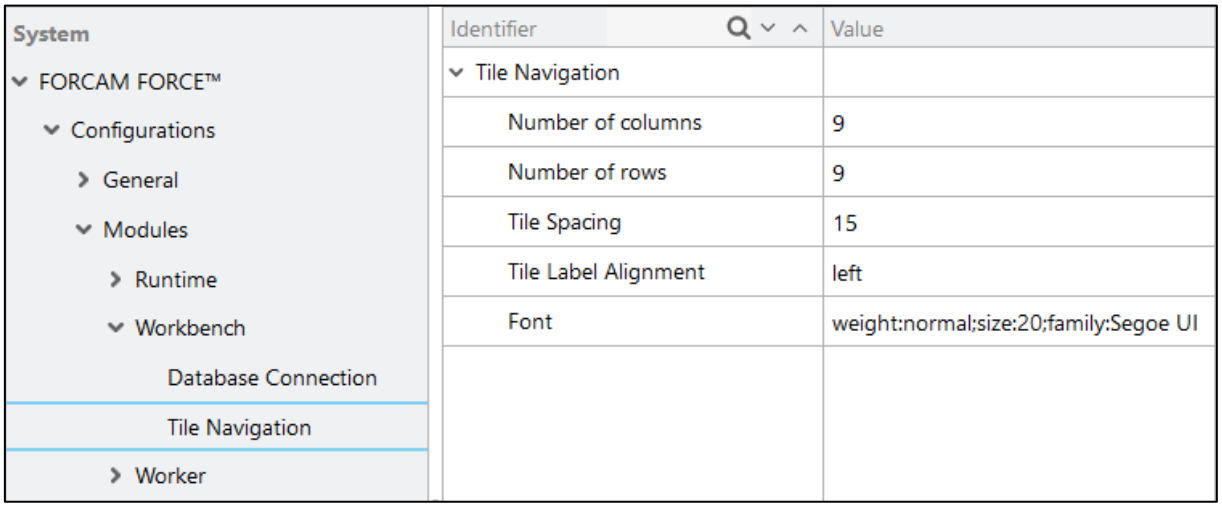

Fig. 4: Tile navigation configuration

The following configurations are possible:

Table 1: Parameters for tile navigation

Parameter	Description
Number of columns	Determines the number of columns on the tile page
Number of rows	Determines the number of rows on the tile page
Tile spacing	Defines the distance between the tiles in pixels
Tile Label Alignment	Determines the alignment of the text within a tile. Possible values: – left – right – center
Font	Determines weight or posture, size and family. The information is summarized in one line and separated by a semicolon. They can be edited freely but must retain the schema. Example for a tile label in Bold, size 12 und the font Times New Roman: weight:bold;size:12;family:Times New Roman ⓘ For italics, **weight** must be replaced by **posture**: posture:italic;size:12;...

2.1.2 Create Tiles

Each main page of the Workbench is available as a tile in the tile selection (e.g. **Configurations**, **Master Data**, etc.). The tile is linked to the main page. This is called after clicking on the tile.
Each main page has default configured subpages with functions (function pages). The main page **User Administration** has, for example, the function pages **User Editor** and **Permission & Roles Editor**. The function pages of a main page can be changed. Function pages can, for example, be added from a list of available functions or removed from a main page.
In addition to the function tile, there is a URL tile. Any URL can be stored in this tile. After clicking on the tile, it calls the corresponding page within the Workbench window. This also works as forwarding to modules of FORCAM FORCE™ like Reporting or Shop Floor Terminal.
The URL tile (green by default) does not have to be created manually. It is permanently available in the tile selection and can be placed as often as required.

ⓘ Depending on the installation or update to release version 5.8.1, it is possible that no tiles are initially created.

A new tile is created by adding a new main page. The main page is then extended with functions (an empty tile leads to an empty page). The **User Administration** page has, for example, the **User Editor** and **Permission & Roles Editor** sub-pages. The main page is then available as a tile. After a click, it displays the function pages that have been added to it. In this way, any number of tiles can be created.

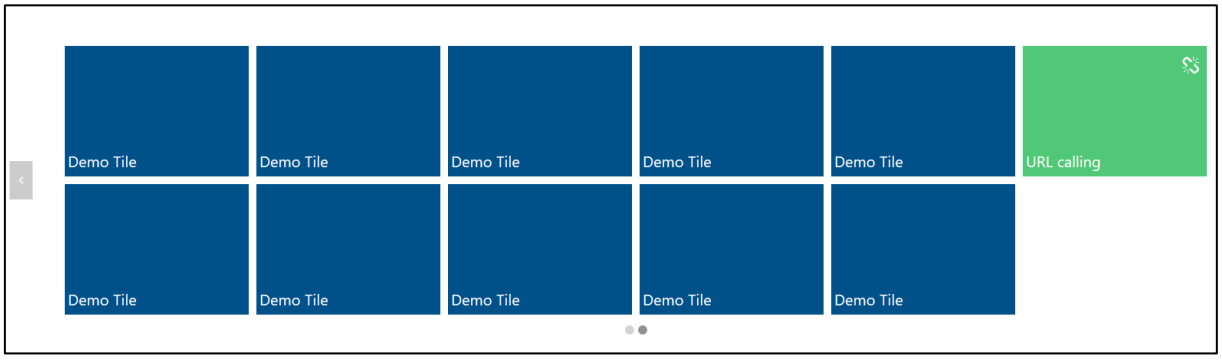

Fig. 5: Example of several tiles next to each other

The option to add a tile is integrated in the navigator. The Navigator is located on the left side of each Workbench page (see section 2.2). The Navigator appears after clicking on a tile.

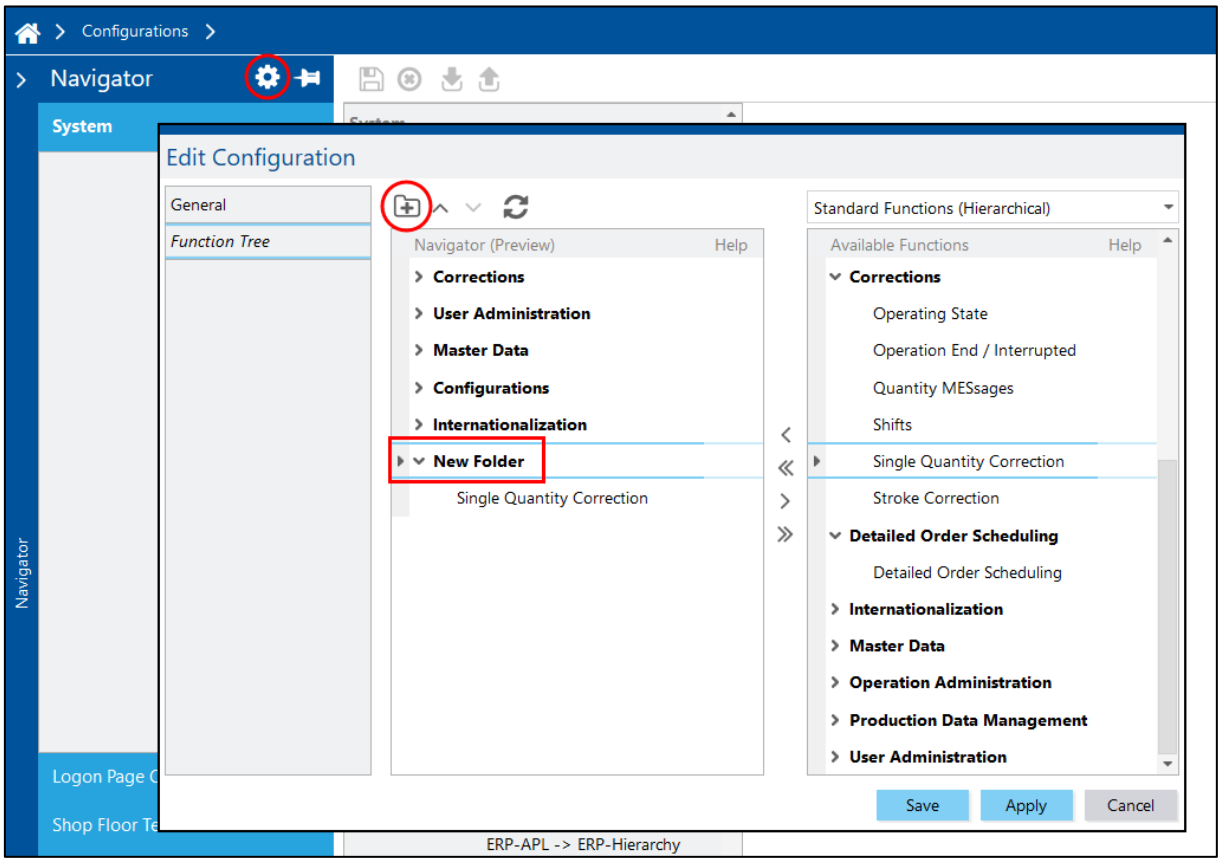

Fig. 6: Creating a new tile

To add a new tile:

1. Click on the **Edit** icon in the navigator.
2. Click on the **Create new folder** icon in the following dialog.
3. Right-click on the newly created folder and click on **Change name** in the context menu. Both the Navigator entry and the tile are initially named **New folder**. The name change here refers only to the Navigator entry. The tile must be renamed on the tile page.
4. Enter the desired name and click in an area outside the language box.
5. Add functions to the newly created folder (see section 2.2).
6. Save.

To edit a tile in the Navigator configuration:

1. Right-click on the desired node.
2. Click on the desired option in the context menu.
3. Save.

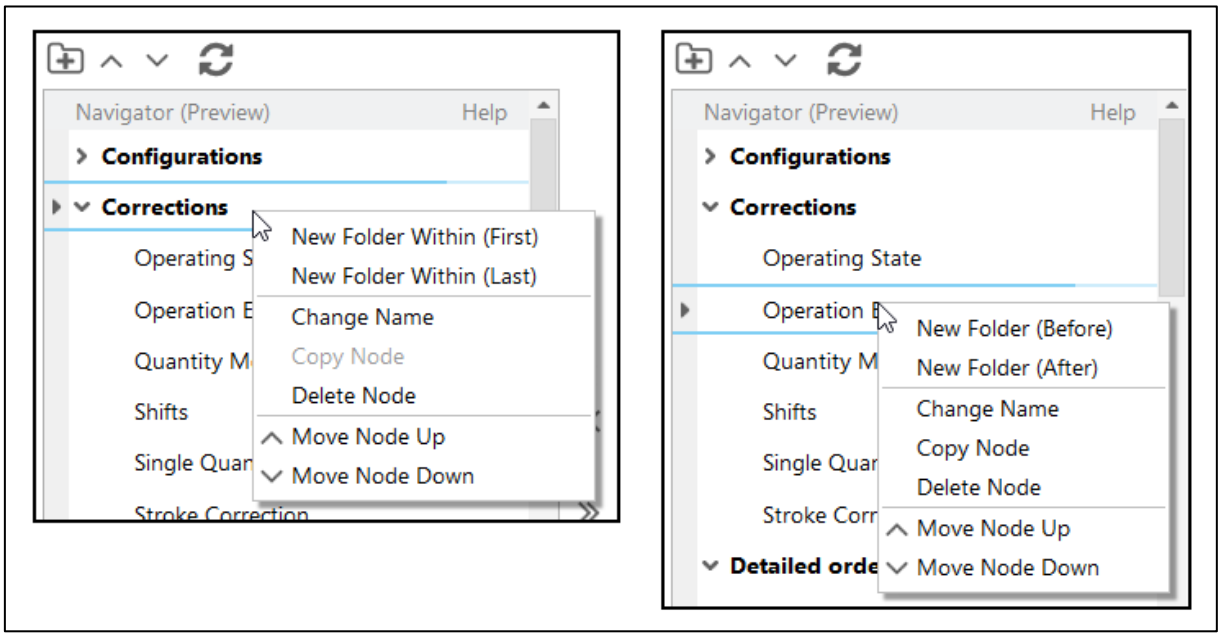

Fig. 7: Editing a tile in the Navigator configuration

The following options are available:

Table 2: Options for editing a tile in the Navigator configuration

Function	Description
New Folder Within (First/Before)	Creates a new folder at the first position of the main node (first) or in front of the selected subnode (before).
New Folder Within (Last/After)	Creates a new folder at the last position of the main node (last) or after the selected subnode (after).
Change Name	Changes the name of the Navigator entry. The change is only applied here and does not apply to the tile.
Copy Node	Copies the selected node and inserts it below it. Only possible for subnodes.
Delete Node	Deletes the selected node.
Move Node Up	Moves the selected node one position up.
Move Node Down	Moves the selected node one position down.

2.1.3 Place and Remove a Tile

A function tile can only be placed once on a tile page and is then not available again in the selection. The URL tile is permanently available in the selection and can be placed any number of times.
If a tile is dragged to a free space in the tile page, the target place is marked with a red frame. If a tile is dragged onto an existing tile, the target tile is marked with a red frame. After placing, the existing tile will be replaced by the selected one.

To place a tile:

1. Click the **Edit Tiles** icon in the upper right corner.

➔ The editing of the tiles is activated. The **Show/Hide Tile Selector** icon is active. The linking of the tiles is deactivated.

2. Drag and drop the desired tile in the tile selection to the tile page and release it at the desired destination.
3. Save.
   Or
   Click the **Edit Tiles** icon to cancel.

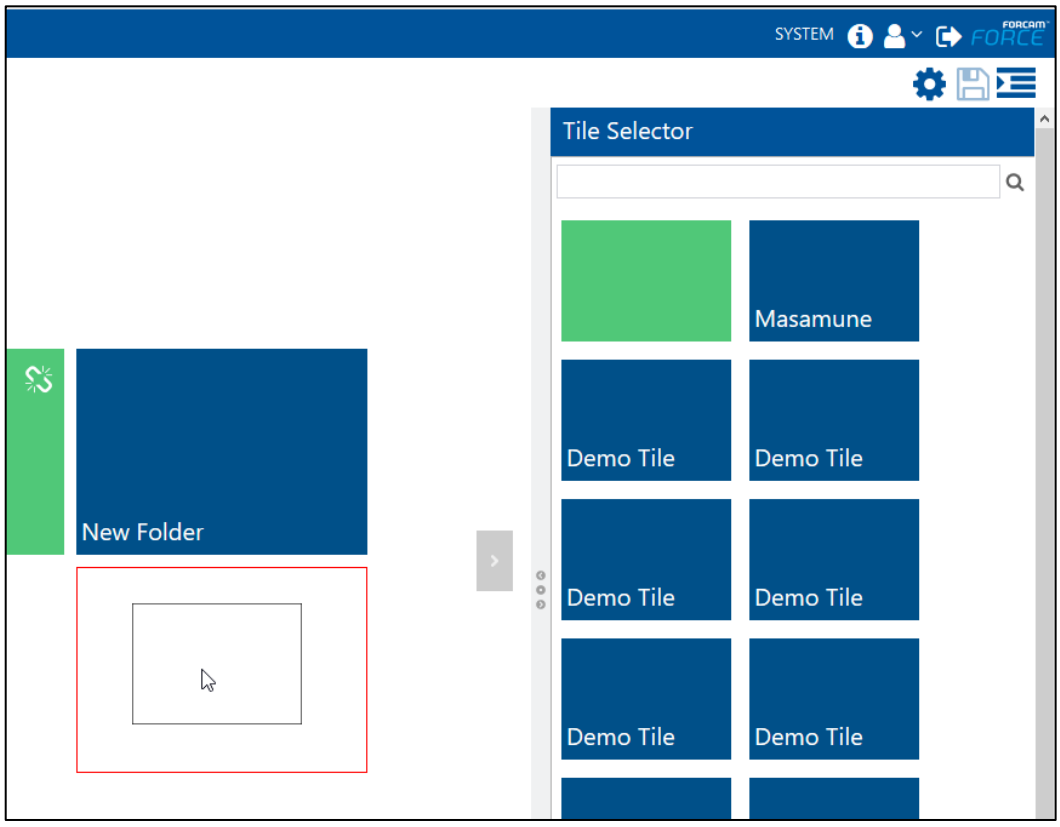

Fig. 8: Placing a tile

To remove a tile:

1. Click on the **Edit Tiles** icon in the upper right corner.

➔ The editing of the tiles is activated. The **Show/Hide Tile Selector** icon is active. The linking of the tiles is deactivated.

2. Drag and drop the desired tile from the tile page into the tile selection.
3. Save.
   Or
   Click the **Edit Tiles** icon to cancel.

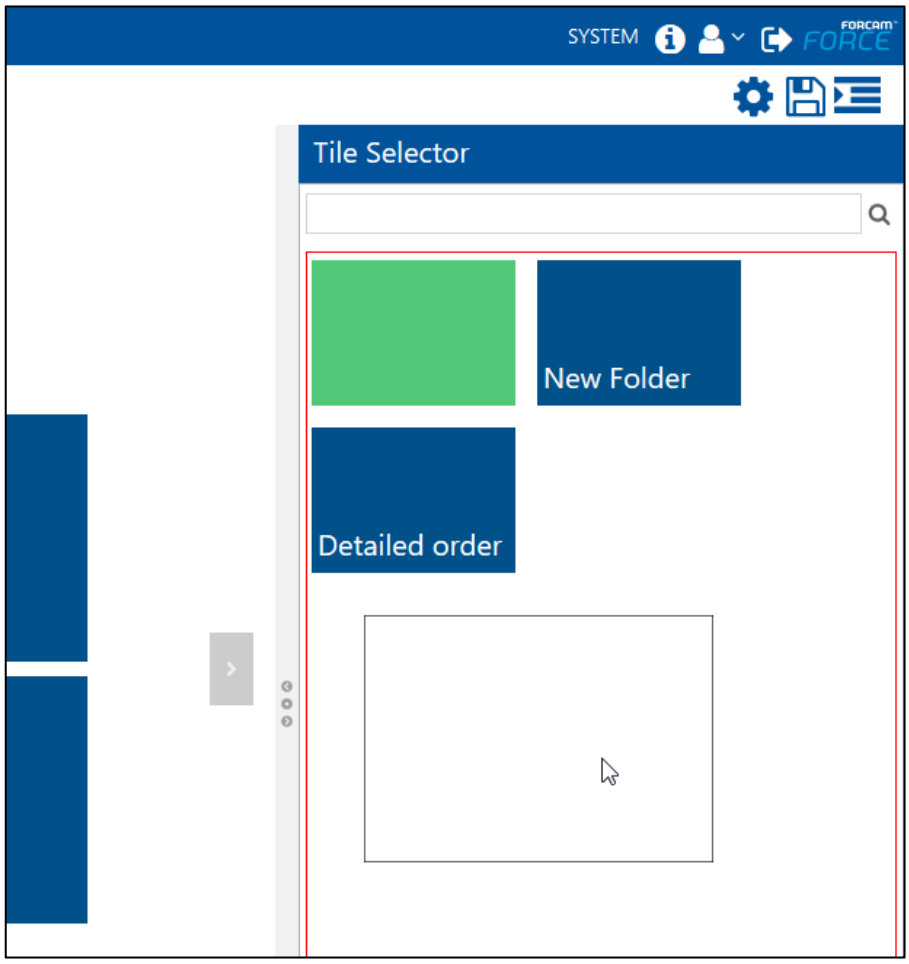

Fig. 9: Removing a tile

2.1.4 Personalize a Tile

Each tile can be designed individually. It is possible to customize the labeling and background color. In addition, tiles can be assigned user-specific icons.

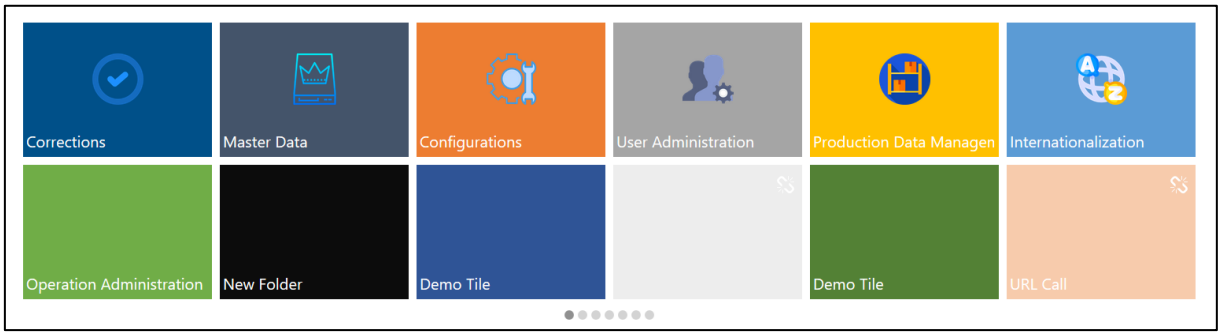

Fig. 10: Tiles with icons in different colors

To personalize a tile:

1. Click on the **Edit Tiles** icon in the upper right corner.

➔ The editing of the tiles is activated. The **Show/Hide Tile Selector** icon is active. The linking of the tiles is deactivated.

2. Right-click on a tile in the tile page or tile selection and perform the desired personalization.
3. Save.

Table 3: Options for personalizing a tile

Function	Description
Show/Hide Label	Shows or hides the label of a tile
Change Text	Changes the label text
Edit Background Color	Changes the background color of the tile. The font color always remains white.
Remove Tile	Removes the tile from the side. The tile becomes available again in the tile selection.
Hide Graphic	Shows or hides the graphic of the tile
Edit Graphic	Allows you to upload your own icon that is displayed on the tile background. The following restrictions apply to the icon: – Supported formats: jpg, png, gif, svg – Maximum file size: 5 MB – No restriction of dimensions. Icons take up as much space as possible in tiles. To avoid scaling, an icon can be displayed smaller.
Edit URL (only for URL tile)	Enter a URL to which the tile should redirect. The URL opens within a Workbench window.

2.2 Navigator

The Navigator is a tree structure facilitating the use of the Workbench and providing a structure for the modules. You can configure the visual appearance of the Navigator. The individual modules can be exchanged.

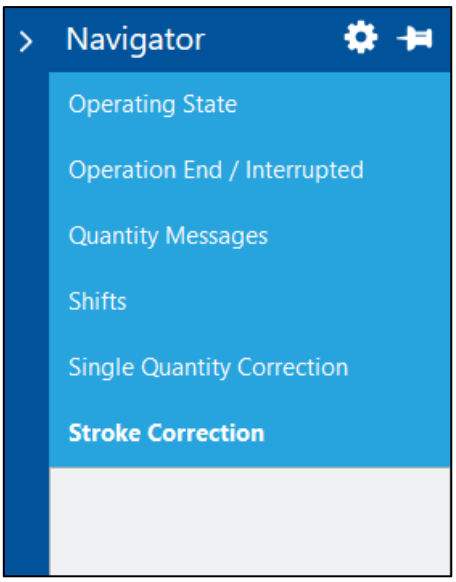

Fig. 11: Navigator - sample view

To configure the Navigator in general:

1. Click on the **Edit icon** in the Navigator.
2. Click **General** in the left-hand area.
3. Define initial pinning.
   If you set a check mark at **Initially pinned**, the Navigator is pinned on the Workbench screen.
4. Define the initial width.
   The value specified here defines the width of the Navigator.
5. Click **Save**.

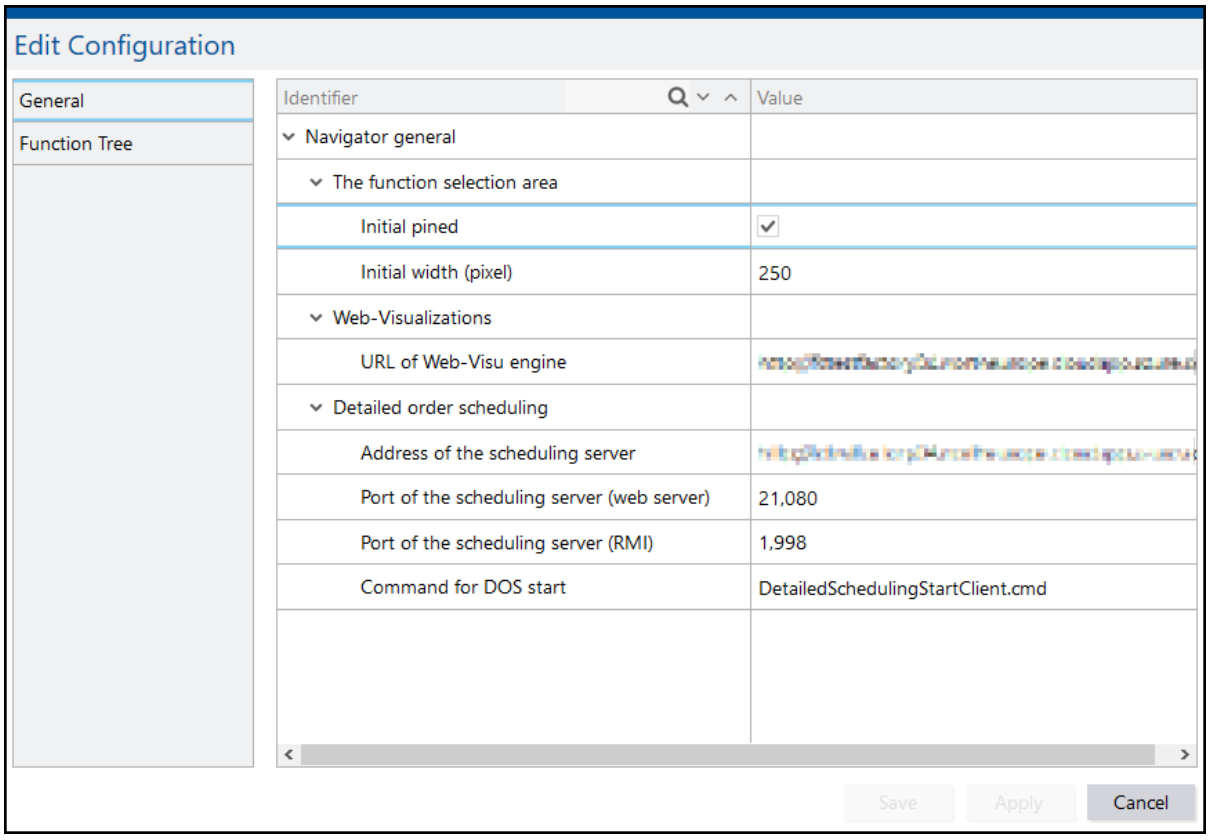

Fig. 12: Navigator - general configuration

Users with appropriate permissions can change the functions in the Navigator.
To change the functions in the Navigator:

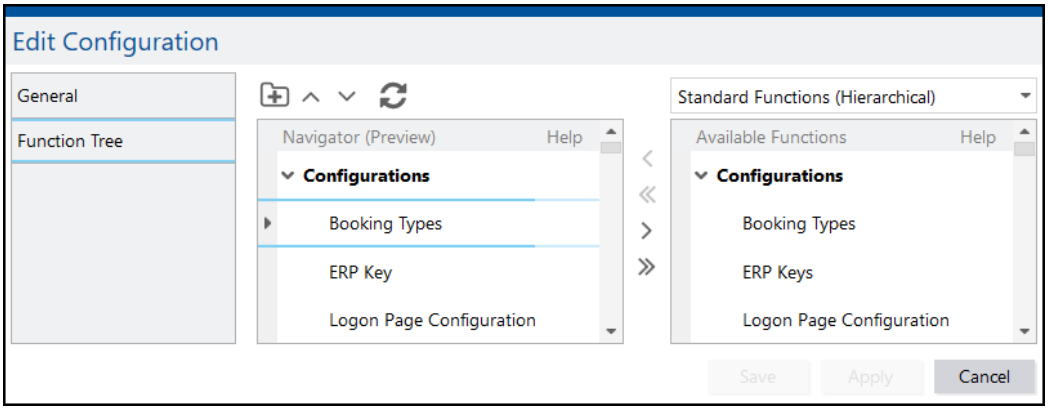

Fig. 13: Navigator function configuration

✓ You have the permission for making changes.

1. Click the **Edit** icon in the Navigator.
2. Click **Function Tree** in the left-hand area.
3. In the **Navigator (Preview)** column, select a function or the parent folder and click the M**ove right** icon.

➔ The function is removed from the **Navigator (Preview)** column and appears in the **Available Functions** column.

4. In the **Available Functions** column, select a function or the parent folder.
5. Select a folder from the **Navigator (Preview)** column and click the **Move left** icon.

➔ The function is removed from the **Available Functions** column and appears in the **Navigator (Preview)** column under the specified folder.

6. Click **Save**.

ⓘ You can move all functions of each column at the same time by clicking the **Move everything right/left** icon.

2.3 Change Color

You can assign a color to some cells (e.g. Status Details with related colors, see section 6.2).

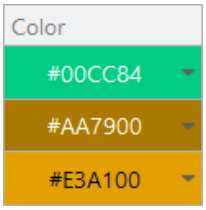

Fig. 14: Cell with a possible color assignment

To assign a color to a cell:

1. Open the dropdown menu on the right of the cell.
2. Select a color and confirm.
   The following color channels are available:
   - Swatches (simple color patterns)
   - HSV (Hue Saturation Value)
   - RGB
   - CMYK

2.4 Change Column Width

You can change the width of each column.

To change the column width:

1. Move the cursor to the right in the header bar until ⇹ appears.
2. Keep the left mouse button pressed and drag the column to the desired width.

2.5 Add or Remove Parameters in a Table

In addition to the default functions in a table there may be other functions available that you can add to the table. You may also remove existing functions.

ⓘ The **Edit** icon appears above each table which offers this option.

To add a parameter to a table:

1. Click the **Edit** icon above the table.
2. Select a parameter in the **Available** column and click the **Move left** icon.
   Or
   Select a parameter in the **Selected** column and click the **Move right** icon.
3. Save.

ⓘ You can move all parameters of each column at the same time by clicking the **Move everything right/left** icon.

2.6 Edit Name/Description (Literal)

Columns provided with the globe icon on the left can have names/descriptions.

To enter or edit a description (a literal):

1. Click on the appropriate cell.
2. Enter or edit the entry.
3. Click somewhere outside of the column.

ⓘ You can also enter literals additionally in other languages.

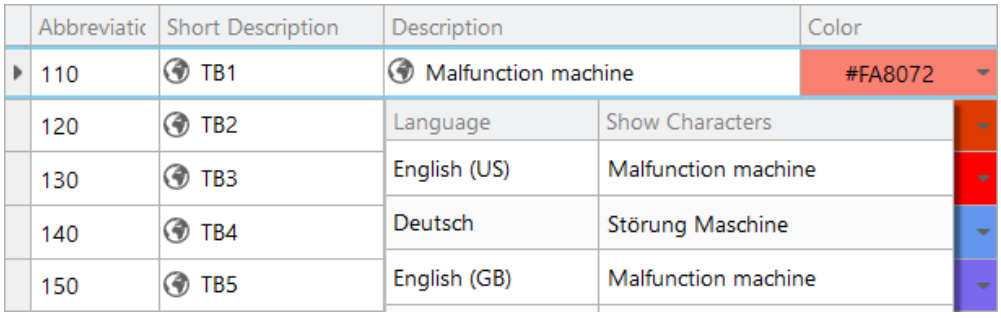

Fig. 15: Literals in several languages

To enter or edit literals in other languages:

1. Double-click on the appropriate cell.
2. Enter or edit the entry in the appropriate language.
3. Click somewhere outside of the column.

ⓘ The first literal entered is automatically adopted for all other languages by default.

2.7 Changing the Workbench Language

You can display the Workbench in multiple languages. FORCAM FORCE™ supports the following languages:

- German
- English (GB)
- English (US)
- Spanish
- French
- Chinese

To display the Workbench in another language:

1. Open the dropdown menu behind the country name in the upper right area.
2. Select the appropriate country name.
   The country name indicates the respective language.

➔ The Workbench is displayed in the selected language immediately.

2.8 Configuring Languages

Path: Internationalization > Languages

You can add or remove languages in the Workbench. The languages available are displayed in the language selection (see section 2.7). You can remove languages installed from the selection. This does not delete them. German and English (GB) cannot be removed.
When a language not yet installed is added, displaying this language can cause errors. It is possible to install additional languages at the request of the customer.

ⓘ All languages available in the selection are listed in the **Visible Languages** area.
Changing the language settings takes effect only after the next login.

To add a language:

1. Select appropriate language in the **Available Languages** area and click the **Move left** icon.
2. Save.

To remove a language:

1. Select appropriate language in the **Visible Languages** area and click the **Move right** icon.
2. Save.

2.9 Recommended Process to Configure FORCAM FORCE™

You can configure FORCAM FORCE™ in several ways. One of the available configuration options is described below.

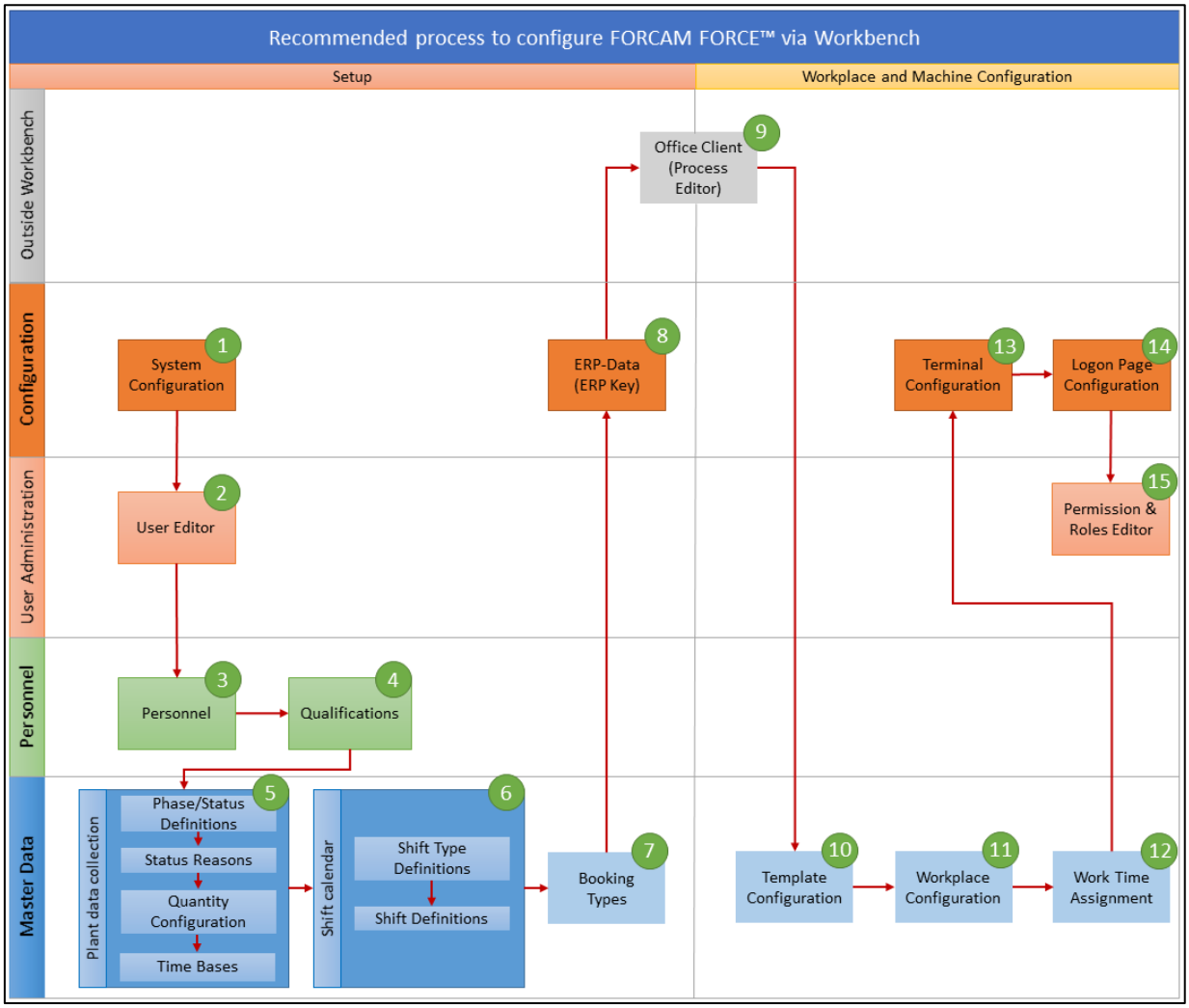

Fig. 16: Recommended process to configure FORCAM FORCE™

Steps suggested in figure 8:

1. **Configurations > System:** Configuring the system variables.
2. **User Administration > Permission & Roles Editor:** Assigning permissions and defining roles.
3. **Personnel Data > Personnel:** Adding employees to the system.
4. **Personnel Data > Qualifications:** Defining qualification-related roles.
5. Configure the **Master Data** in the following order:
   - Plant Data Collection > Status details
   - Plant Data Collection > Quantity Configuration
   - Machine Data Collection templates
   - Message templates (quality reasons and malfunctions)
   - Workplace > Workplace Configuration > Status detail column
   - Plant Data Collection > Time Bases
6. **Master Data > Shift Calendar:** Configuring the shift calendar.
   - Shift Type Definitions
   - Shift **Definitions**
7. **Configurations > Booking Types:** Defining booking types.
8. **Configurations > ERP Key:** Defining ERP data.
9. **Process Editor**: Defining the domain logic (Office Client).
10. **Master Data > Workplace Configuration > Template Configuration:** Configuring templates.
11. **Master Data > Workplace Configuration > Workplace Configuration**: Defining workplaces.
12. **Master Data > Shift Calendar > Work Time Assignment:** Assigning work times.
13. **Configurations > Shop Floor Terminal:** Configuring a terminal.
14. **Configurations > Logon Page Configuration:** Defining the logon page.
15. **User Administration > Permission & Roles Editor:** Creating users and assigning roles.

3 System Configuration

Path: Configurations > System

The system configuration is shown as a tree. You can edit the node currently at the lowest position. General and module-specific settings can be made in the system configuration. You can make these general settings:

- Caches:
  Defining the size of caches
- Object update:
  Event buffer times for the display of objects
- Logging:
  If you set a check mark here, the log file will be cleared after the specified time.
  The execution cycle determines the number of logging actions per day.
  The first execution delay is the time (in minutes) to wait after booting before the logging process starts.
- Time synchronization:
  Activate remote time service to synchronize all times
- Import/Export:
  Activate/deactivate XML export for state detail reasons
- Production tool resources:
  Identification of tools and other production resources by their type identifier and group.
  These data are supplied from the ERP.

The modular settings are based on the Runtime, Workbench, Worker and Tracing modules. The following settings are available in the Runtime module:

- ERP:
  - ERP Download:
    Templates for XSL transformation
  - ERP Upload:
    Configuring the connection for the upload to ERP
  - Filter:
    You can only re-open a closed operation after the specified time (in days). Since re-opening involves some side effects, it is recommended to keep the number of days low.
- Data Lifecycle Management:
  For details and configuration, see the **Data Lifecycle Management** manual.
- Material-TEB:
  If you set a check mark here, wildcards can be processed.
  A wildcard (placeholder symbol: * for "all" or "any") is replaced by all elements it includes.
- ERP control key:
  If you set a check mark, a change command is issued when an SAP key is received.
- Nonworking shift generation:
  If you set a check mark, non-working shifts are automatically generated based on the number of days entered.
- Shift generation:
  Defines the number of days a shift generates within the pattern

- Database connection:
  Number of connections
- Deployment:
  Path of the configured business logic. The episode determines the time when a specific logic is activated. If you set a check mark for **Incompatible**, an incompatible conflict can be avoided.
  You can only assign a new booking logic to a workplace after activating it here. You can only activate one booking logic. After activating a new booking logic, the runtime has to be re-started completely.
- Rule engine:
  If you set a check mark, only the duration entered is recomputed when booting.
- TimeOuts:
  Definition of timeouts

The following settings are available in the Workbench module:

- Database connection:
  Definition of timeout and size of preinstalled resources

The following settings are available in the Worker module:

- Database connection:
  Definition of timeouts and size of preinstalled resources
  Timeout setting for connection failure error messages
- External command dispatcher:
  Settings for external commands such as activation/deactivation and polling interval
- Sending commands:
  Definition of timeouts for command sending
- Terminal template merge:
  Migration of SFT settings of different revision levels. If you set a check mark, a migration is required.
- ERP:
  - ERP object query:
    Data of the object query interface

4 User Administration

The User Administration provides options for creating and updating user accounts and access permissions for the Shop Floor Terminal.

4.1 Permissions and Roles

Path: User Administration > Permission & Roles Editor

Users can be assigned to various groups with different permissions. These groups are referred to as roles (e.g. manager, foreman, maintenance, etc.). Each role can be assigned the permissions and/or functions it needs to fulfil specific tasks.

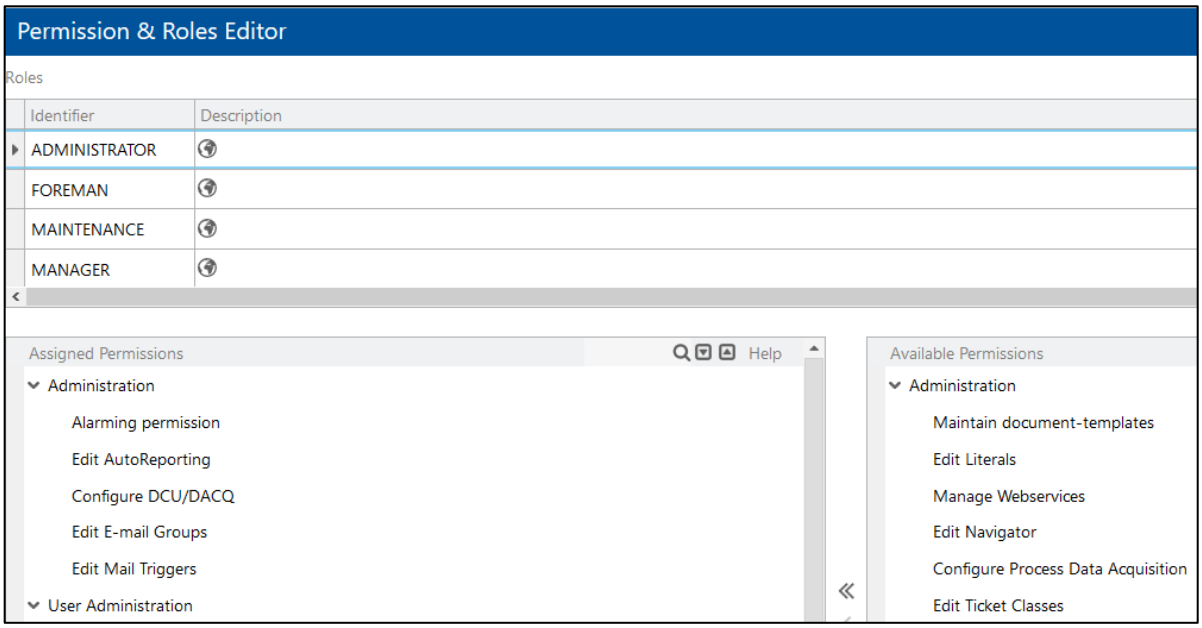

Fig. 17: Permission & Roles Editor

The use of permission and role management is necessary to handle the visibility and maintenance of data and user interfaces within FORCAM FORCE™. This will not change after the introduction of Multi-Site Administration.

A local administrator requires the assignment of the organizational entity to which they are localized (required branches of the ORG hierarchy of the localization). The assignment basically determines which hierarchy and branches of a hierarchy the user is allowed to see and pass on (assign) to users in roles.

ⓘ For detailed information on Multi-Site, see the Multi-Site Administration manual.

To create a new role:

1. Right-click in the upper table and click **Create New Role** in the context menu.
2. Enter the identifier and a description.
3. Save.

To assign or remove permissions to/from a role:

1. Select a role in the upper table.
2. Select a permission or a function in the **Available Permissions** column and click the **Move left** icon.
   Or
   Select a permission or a function in the **Assigned Permissions** column and click the **Move right** icon.
3. Save.

4.2 User Editor

Path: User Administration > User Editor

You can create a dedicated user account for each Workbench user. Each user account can be assigned one or more roles. Assigning a role is not mandatory.

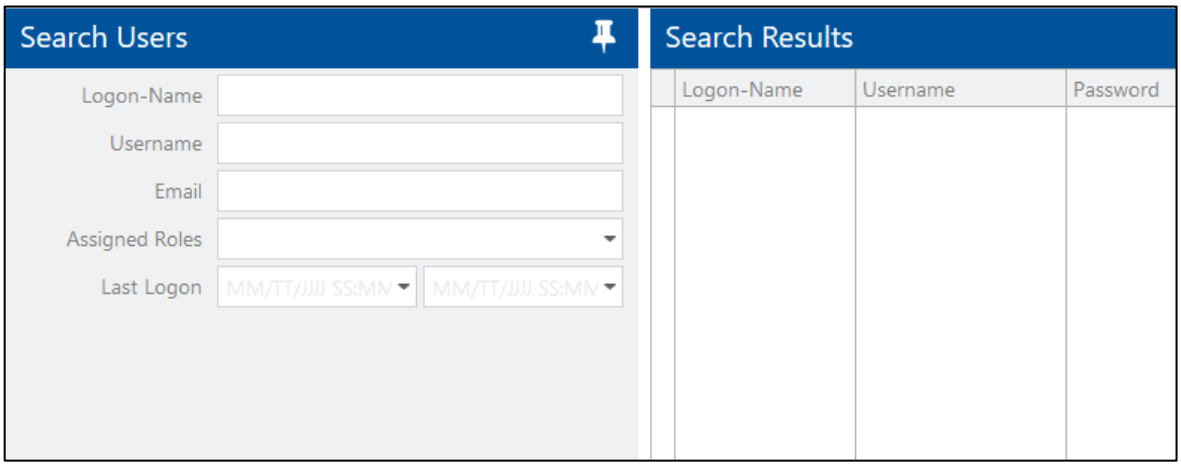

Fig. 18: User Editor

To create a new user account:

1. Click on a free area in the Search Results field and click on **Create New User** in the context menu.
2. Enter desired data and save.

ⓘ Minimum requirements for a new user account are these entries: **Logon Name**, **Username** and **Password**. A superuser has access to all functions of the system.

To edit a user account:

1. Click the **Search** icon without entering any parameters.

➔ All user accounts available appear in the search results.

2. Select the appropriate line and enter your changes directly.

ⓘ A user account can be assigned several roles.

To assign a role to a user account:

1. Click the **Search** icon without entering any parameters.
2. In the Search Results field, right-click on the appropriate user account and then click on **Edit Role Assignments** in the context menu.
3. In the Role Editor (see Fig. 19), right-click in the **Roles** field and then click on **Assign Role(s)** in the context menu.
4. Select role(s) in the **Available** column, click the **Move left** icon and confirm.
5. In the Role Editor (see Fig. 19), right-click on a free area in the **Organizational Units** field and then click on **Add Organizational Unit** in the context menu.
6. Select the workplace and confirm.
7. Save.

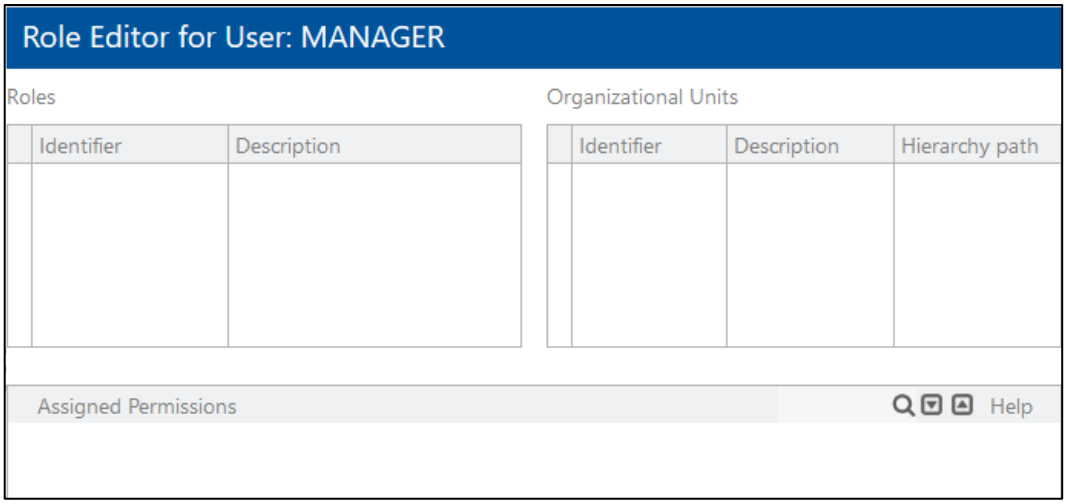

Fig. 19: Role Editor

4.2.1 Localizing Users

If Multi-Site Administration is used actively, all users must be localized. Only localized users and super users can exist.

ⓘ For detailed information on Multi-Site, see the Multi-Site Administration manual.

The **Localization** column was added in software version 5.7. Here a user is assigned instances of the defined localization level (see section 11.2.3.1) for Multi-Site. The localization level instances from the ORG hierarchy have assigned configured attributes (see section 2.3.2).
A super user can create local administrators by localizing users. A super user has no restrictions on the viewing of data and has access to all localizations.
Localized users can only see their localizations assigned to themselves. They receive display, editing and creation permissions based on the existing permissions & role management.
Example:
In Fig. 43, there is the localization **GER** (Germany). Workplaces **760-1** and **760-2** have been assigned to subnode **MUC** (Munich).
In Fig. 20, users Wolf and Trapp have been assigned the localization **GER**. These two users can only view and edit data localized to the Munich site.

ⓘ Local administrators must have at least one localization; however, they can also have several localizations.

Search Results

Logon-Name	Username	Password	Email	Localization	Super-User
ADMINISTRATOR	Administrator	••••••	Administrator@example.com	LON	☐
FOREMAN	Foreman	••••••	FOREMAN@example.com	LON	☐
JGANDHI	Jiten Gandhi	•			☑
JGTEST01	JGTets01	•		RAV	☐
MAINTENANCE	Maintenance	••••••	MAINTENANCE@example.com	RAV	☐
MANAGER	Manager	••••••	MANAGER@example.com	RAV	☐
SYSTEM	System	••••••	System@example.com	RAV	☐

Fig. 20: Localizing users

Local administrators with the relevant permissions can localize other users if they are part of their own localization. A user can also have a foreign localization (foreign key).
When editing localizations of other users, local administrators can only pass on or remove their own localization. If they create other users themselves, these users have the same localization(s) as they do.
Example (see Fig. 21):
A super user localizes user X to plant A. X is local administrator for plant A.
X localizes user Y. Y is therefore also local administrator for plant A.
Y creates user Z. Z is not an administrator but automatically belongs to plant A.

ⓘ A user is only allowed to administer the master data of their own localization.

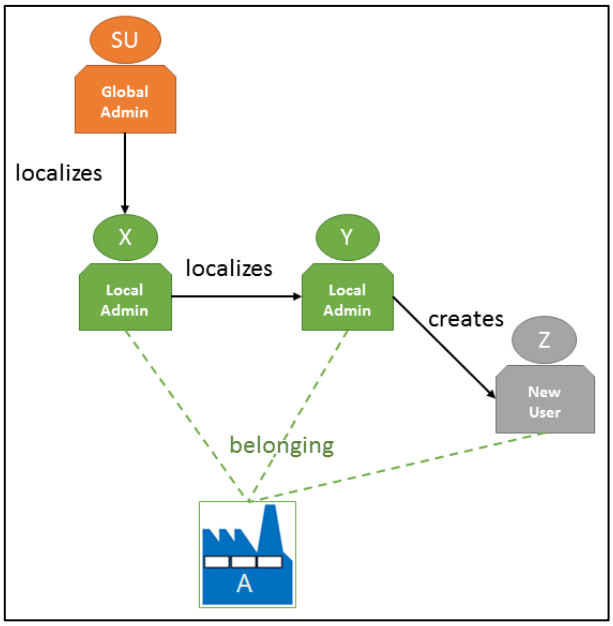

Fig. 21: Localizing users (example)

To localize a user:

✓ The ORG hierarchy is configured.

✓ A hierarchy tree is created.

1. Open the drop-down menu for the desired user in the **Localization** column.
2. In the subsequent dialog (see Fig. 22), select the desired localization in the **Available Localizations** section and click on the **Move left** icon.
   Or
   Select all localizations and click on the **Move everything left** icon.
3. Confirm and save.

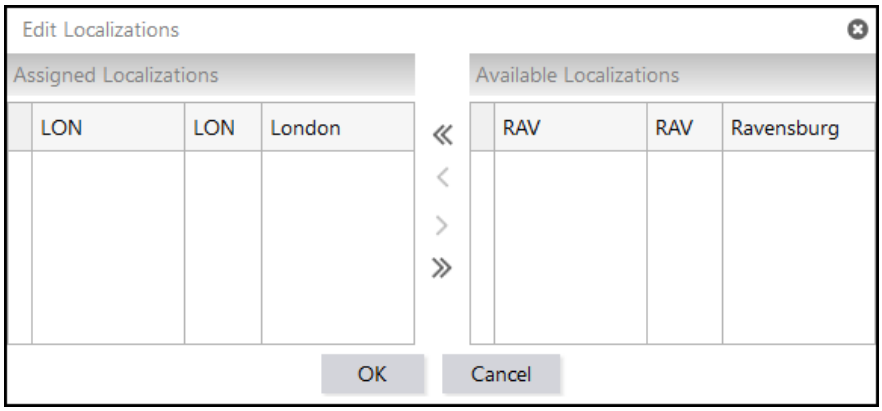

Fig. 22: Adding user localization

ⓘ Super users have no localization. Consequently, they are global administrators and have unrestricted permissions.

5 Personnel Data

In the Personnel Data section, you can create employee profiles. Here you can view the workplaces assigned in the Workplace Configuration. However, modifying the workplaces is not possible here. Qualification roles are defined to summarize and classify the competencies of employees.

5.1 Personnel

Path: Master Data > Personnel Data > Personnel

Every employee is assigned a unique employee number and ID card number. The ERP key links the employee to the ERP system. Workplaces are assigned in the Workplace Configuration and can only be viewed here.

✓ The ERP key and workplace are configured.

To create a new employee:

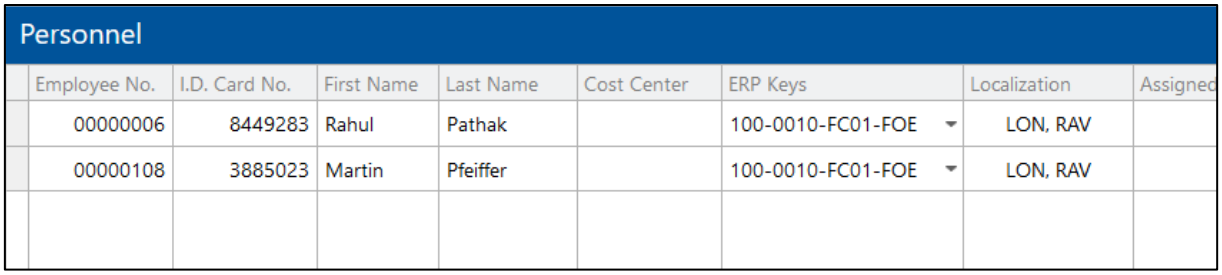

Fig. 23: Creating an employee

1. Go to the **Personnel** screen and click the **Add** icon.
➔ An employee previously selected is copied and the associated settings are adopted.
2. Enter the employee number.
3. Enter the ID card number (optional).
4. Enter first name and last name (optional).
5. Enter the cost center (optional).
6. Go to the **ERP Keys** column and select an ERP key from the dropdown menu.
7. Define the storage location.
If you set a check mark in **Only MES**, the employee is created in the MES system only.
8. Save.

Through assignment of the system attribute **Person ERP Key** (see section 11.2.3.1) within the ORG hierarchy, the personnel are localized automatically in the case of automatic supply of selected master data from an ERP. The newly added **Localization** column shows active localizations next to the particular person.

ⓘ For detailed information on Multi-Site, see the Multi-Site Administration manual.

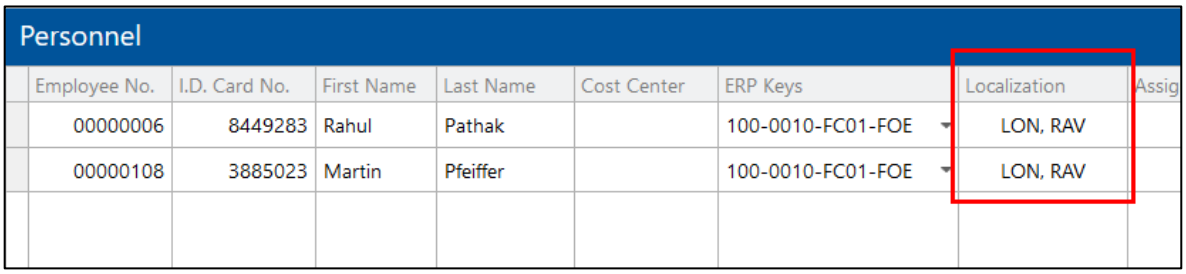

Fig. 24: Localizing personnel

If a person is created manually, this person is not localized automatically. Localization takes place by manual assignment of a personnel ERP key. The quantity of localizations in which this personnel ERP key is assigned as an attribute is determined via a lookup in the ORG hierarchy.

Personnel areas can no longer be selected from the total quantity of master data, only from the personnel areas assigned via attributes in the ORG hierarchy. Only the super user sees all existing personnel areas in the master data tables. If the super user assigns a personnel area that is not assigned to the ORG hierarchy, this personnel data set is not localized.

5.2 Qualifications

Path: Master Data > Personnel Data > Personnel

Qualification roles enable an additional subdivision of user rights. They are used e.g. in SFT for dialogs, which allow a two-tiered release. There, a function can only be executed e.g. by the user in the role as a foreman, even if he has general read and write permission. The roles foreman and worker are predefined.
Any number of qualification roles can be created additionally.

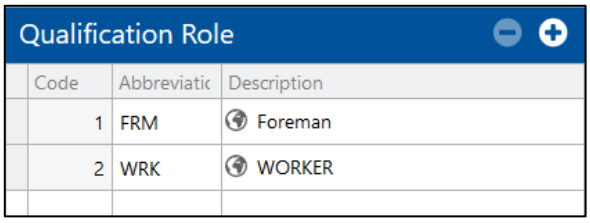

Fig. 25: Creating qualification roles

To create a new qualification role:

1. Go to the **Qualification Role** field and click the **Add** icon.
➔ A role previously selected is copied and the associated settings are adopted.
2. Enter an abbreviation and a description.
3. Save.

6 Plant Data Collection

In the Plant Data Collection section, you can view statuses and define Status Details. Moreover, you can configure quality types and create time bases.

6.1 Phases/Status Definitions

Path: Master Data > Plant Data Collection > Phases/Status Definitions

Phases/Status Definitions is a summary of various phases/statuses describing the condition of several areas or processes. The phases/statuses are predefined and cannot be removed here. You can edit Abbreviation, Short Description, Description and Color. They are assigned to the respective code.

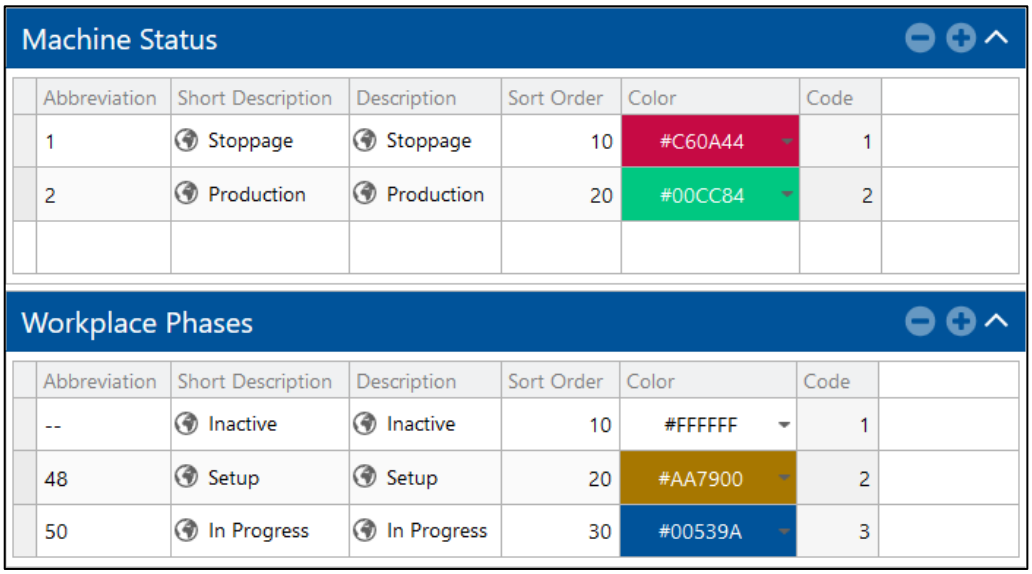

Fig. 26: Phases/Status Definitions sample view

The phases/statuses are assigned colors that are used in reports and in the visualization. You can freely assign or change these colors.

To assign a color to a phase or status:

1. Select the appropriate line.
2. Open the dropdown menu in the **Color** column and select a color.
3. Confirm and save.

6.2 Status Details

Path: Master Data > Plant Data Collection > Status Details

A status defines the current condition of a machine, workplace or process. A Status Detail defines the status more specifically and indicates, for example, that a status is inactive because of a lack of material.
Status details may have several levels. The number of levels determines the depth of differentiation of a status or Status Detail. Multiple levels of Status Details are only necessary if this differentiation is needed.
An existing Status Detail can be assigned to a certain level.

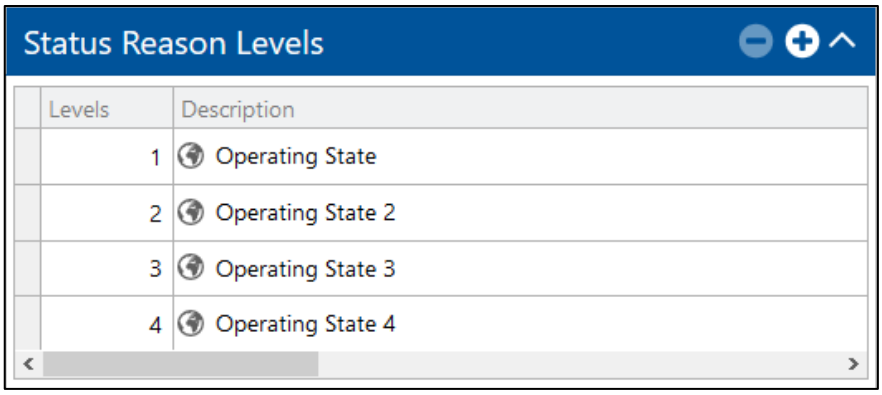

Fig. 27: Status detail levels

To create a Status Detail level:

1. Go to the **Status detail Levels** field and click the **Add** icon.
2. Enter a description.
3. Save.

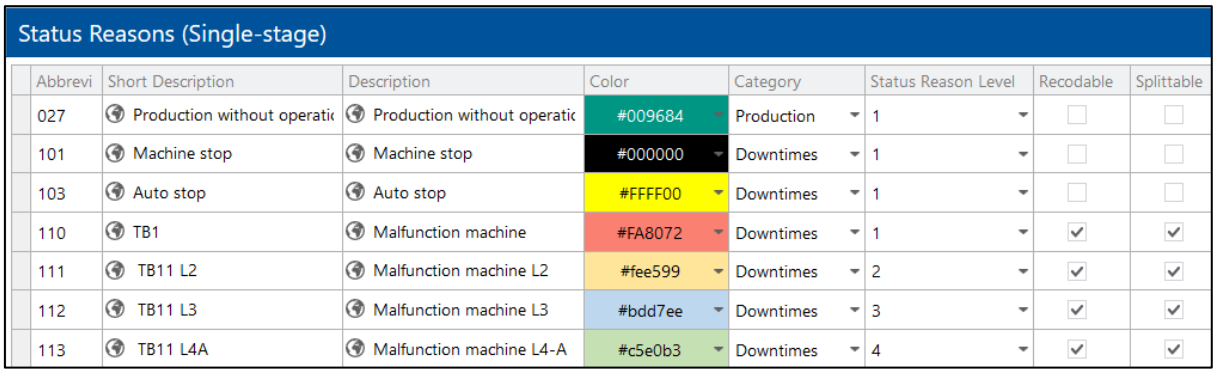

Fig. 28: Status details

To create a Status Detail:

1. Go to the **Status details** field and click the **Add** icon.

➔ A Status Detail previously selected is copied and the associated settings are adopted. Otherwise a blank Status Detail appears at the bottom of the list.

2. Enter a short description and a description.
   The description is the name of the Status Details.
3. Select a color.
4. Select a Status Detail level.
   The Status Detail will appear on the Shop Floor Terminal only at the selected level.
5. Set the option to enable/disable recoding.
   If you set a check mark in **Recodable**, it is possible to change the Status Detail in the SFT to a different Status Detail.
6. Set the splitting option.
   If you set a check mark in **Splittable**, you can split the duration of Status Details in the SFT. You can then assign different Status Details to the different split periods.
7. Set the annotation option.
   If you set a check mark in **Annotatable**, it is possible to add a comment to the Status Detail in the SFT.
8. Enter the sort sequence.
   Determines the order in which Status Details appear in the SFT.
9. Save.

ⓘ When adding a malfunction tree, the buttons in the SFT do not allow for multiple level reasons. If using a Status Detail tree, a specific scripting is required in the DACQ to be able to auto assign machine reasons.

6.3 Quality Types

Path: Master Data > Plant Data Collection > Quality Types

In the **Quality Types** section, you can create quality details for predefined quality types. A quality type defines the condition of a unit produced (yield, scrap, rework). A quality detail specifies the type in more detail and indicates, for example, why a certain quantity was rated as a scrap quantity.
The predefined quality types cannot be deleted but only edited.

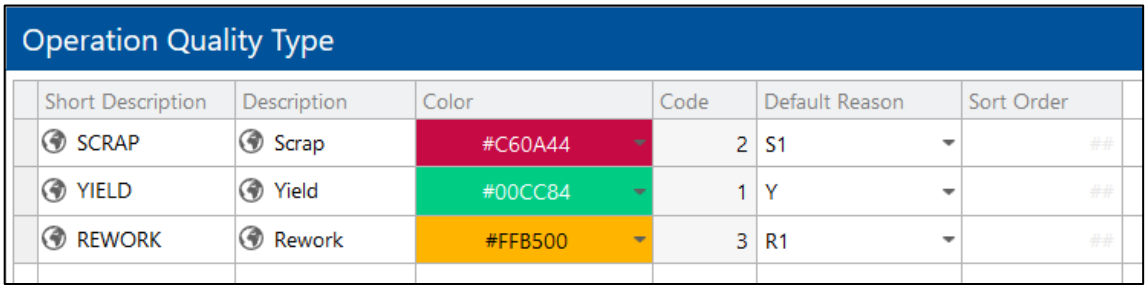

Fig. 29: Quality types

To edit a quality type:

1. Select the appropriate quality type in the **Quality types** field (see Fig. 30).
2. Edit the short description and description.
3. Select a color.
4. Select the default reason.

➔ The quality detail selected is set by default for the quality type.

5. Save.

To create a quality detail:

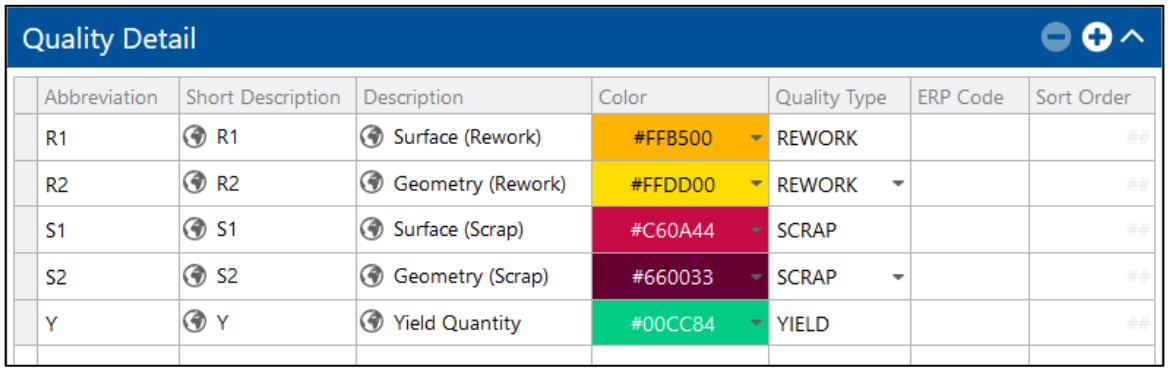

Fig. 30: Quality details

1. Go to the **Quality details** field and click the **Add** icon.

➔ A quality detail previously selected is copied and the associated settings are adopted.

2. Enter an abbreviation, a short description and a description.
3. Select a color.
4. Select a quality type.
   You can select the quality type only for new quality details created.
5. Enter the SAP code, if appropriate.
6. Save.

6.4 Time Bases

Path: Master Data > Plant Data Collection > Time Bases

Time bases permit grouping of statuses and Status Details for any purpose per your requirements. Here you define the underlying statuses for calculating the OEE.

ⓘ Time bases and operating state classes cannot use the same abbreviation, since the data base entry of these abbreviations is identical.

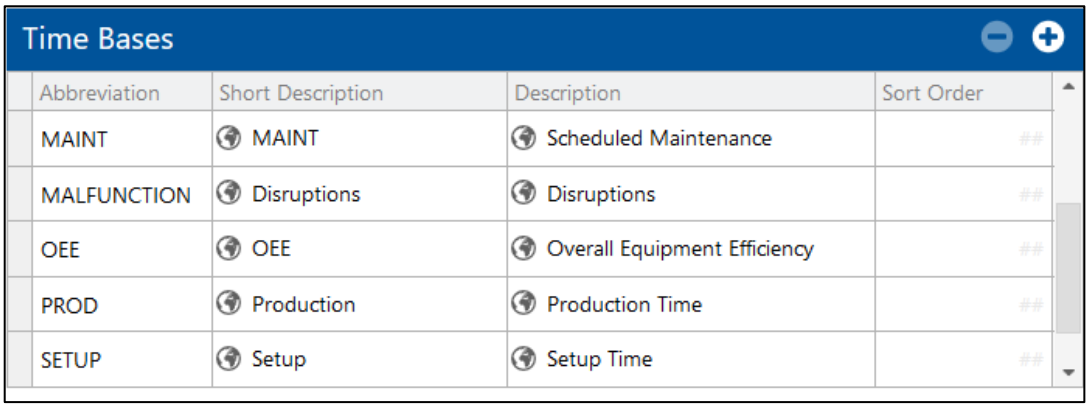

Fig. 31: Time Bases

To create a new time basis:

1. Click the **Add** icon in the upper field.
➔ A time basis previously selected is copied and the associated settings are adopted.
2. Enter an abbreviation, a short description and a description.
3. Click the **Add** icon in the lower area.
4. Go to the **Phase** column and select an operation phase from the dropdown menu.
5. Go to the **Status** column and select an operation status from the dropdown menu.
6. Go to the **Status details** column, click the **Open in pop-up** icon and select Status Details.
7. Save.

6.5 Operating State Classes

Path: Master Data > Plant Data Collection > Operating state classes

Operating state classes group operating states thematically by superordinate classes. They can be used in filters of reports to display data of entire operating state classes. Selecting single (ungrouped) operating states is also possible.
Each operating state class must contain at least one operating state. An operating state can only be assigned to one class.

ⓘ Time bases and operating state classes cannot use the same abbreviation, since the data base entry of these abbreviations is identical.

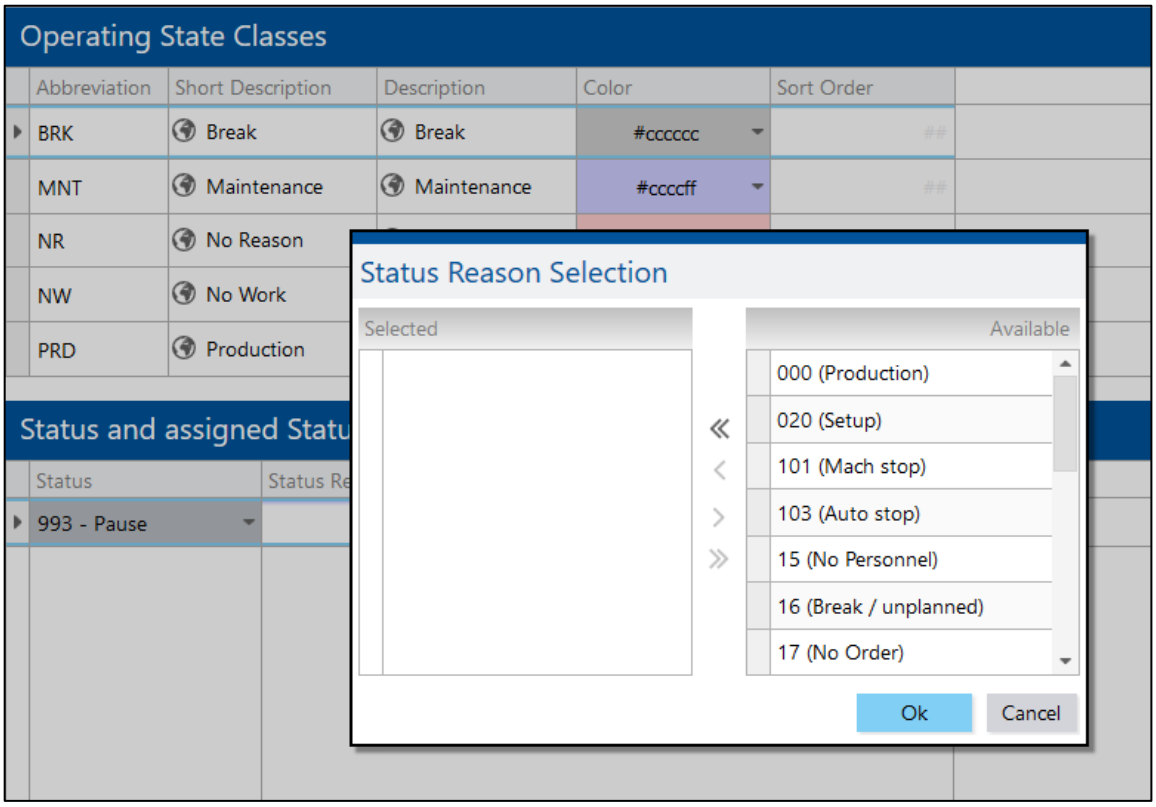

Fig. 32: Defining operating state classes

The following classes are including in the standard application:

Table 4: Operating state classes included in the standard application

Abbreviation	Operating state class	Subordinate operating state (example)
ORG	Organizational issue	No personnel/material, etc.
TEC	Technical issue	Disruption hydraulics/pneumatics, etc.
BRK	Break	Unplanned, flexible
FC	Free capacity	Inside shift
MNT	Scheduled maintenance	Planned repair/maintenance, etc.
STP	Setup	Setup, retrofit
PRD	Production	Production

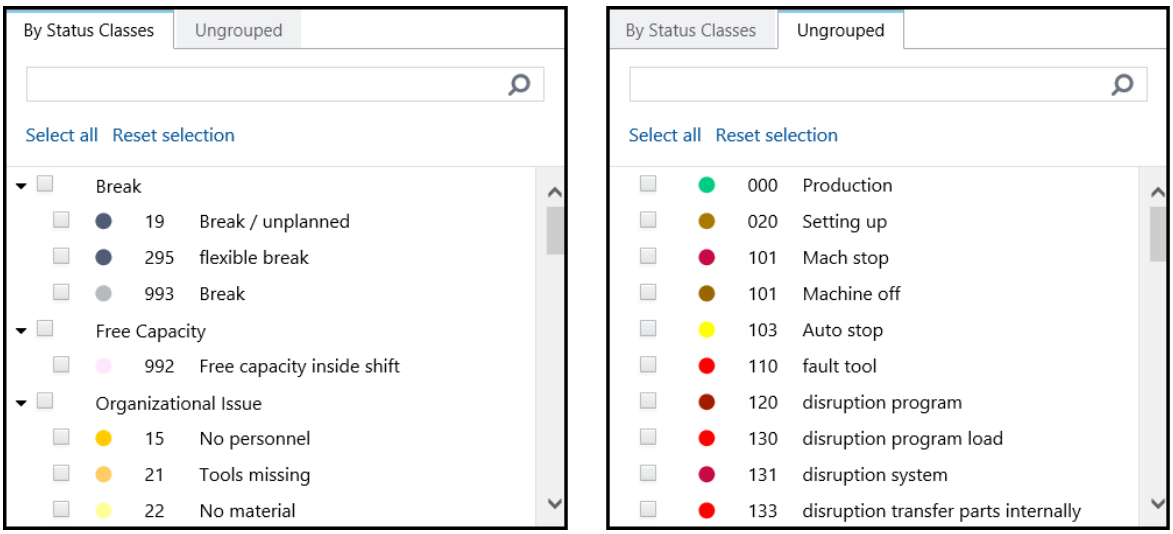

Fig. 33: Filter for operating state classes and ungrouped operating states in reports

Each operating state class is based on one of 4 states (production, setup, break or downtime). Operating states for the class maintenance are, for example, downtimes requiring a maintenance. Organizational issues are downtimes caused by missing material or personnel.

To create an operating state class:

1. Click the **Add** icon in the upper field
➔ An operating state class previously selected is copied and the associated settings are adopted.
2. Enter an abbreviation, a short description and a description.
3. Go to the **Color** column and select a color from the dropdown menu.
4. Click the **Add** icon in the lower area.
5. Go to the **Status** column and select a status from the dropdown menu.
Operating states will be subordinated to this status.
6. Go to the **Status details** column and click the **Open in pop-up** icon to select Status Details.
These Status Details will be subordinated to the selected status.
7. Save.

7 Shift Calendar

The Shift Calendar provides functions to define shifts and assign them to workplaces. You can create and configure shift weeks, for example, to schedule non-working days.
It is also possible to define teams and assign them to a shift week.

ⓘ You can only maintain shifts within the time zone of the application server.

7.1 Shift Type Definitions

Path: Master Data > Shift Calendar > Shift Type Definitions

Shift Type

Short Description	Description	Sort Order	Non-Working Shift	Code
E	Early shift	##	☐	11
FS1	Nonworking shift 1	##	☑	1
FS2	Nonworking shift 2	##	☑	2
FS3	Nonworking shift 3	##	☑	3
FS4	Nonworking shift 4	##	☑	4
FS5	Nonworking shift 5	##	☑	5
FS6	Nonworking shift 6	##	☑	6
FS7	Nonworking shift 7	##	☑	7
FS8	Nonworking shift 8	##	☑	8
FS9	Nonworking shift 9	##	☑	9
FS10	Nonworking shift 10	##	☑	10
MAN1	Manual shift 1	##	☐	14
MAN2	Manual shift 2	##	☐	15
N	Night shift	##	☐	13
N2	Night shift 2	##	☐	16
L	Late shift	##	☐	12

Fig. 34: Shift Type definitions

The Shift Type Definition defines the shifts that exist and how they are identified.
Various shift types are predefined. Each shift is assigned a code and can be referred to in other places within the Workbench.
The predefined shift types cannot be deleted. However, you can edit the short description and the description directly in the respective line. If there is a check mark in the **Non-Working Shift** column, the related shift is out of working time.

7.2 Shift Definitions

Path: Master Data > Shift Calendar > Shift Definitions

Each shift type is assigned a working time in Shift Definitions. You can create shift weeks and schedule shifts for various days.

ⓘ A shift handover is done at shift start in many plants. To prevent that the handover duration does not distort the OEE calculation, it is possible to schedule a break in the shift for the handover. In this case, the break starts/ends simultaneously with the start/end of a shift.

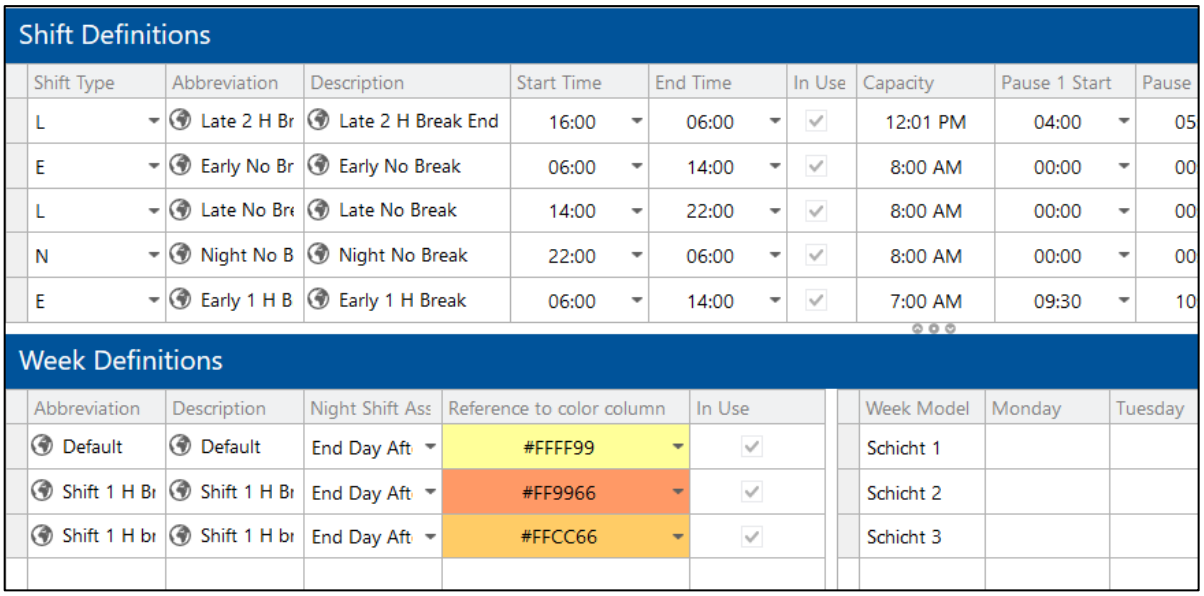

Fig. 35: Shift Definitions

To define a shift:

1. Right-click on a free space in the upper area and click on **Add Shift Definition** in the context menu.
2. Go to the **Shift Type** column and select a shift type from the dropdown menu.
3. Enter an abbreviation and a description.
   Abbreviation is a mandatory field. The description is optional.
4. Enter the start time and end time of the shift.
5. Enter the break times.
   You may want to change the number of breaks; click the **Edit** icon to do this.
6. Save.

ⓘ The **In Use** and **Capacity** columns cannot be edited manually.
If there is a check mark for **In Use**, the shift is currently in use.
The time shown under **Capacity** indicates the real working time of a shift less breaks.

To define a shift week:

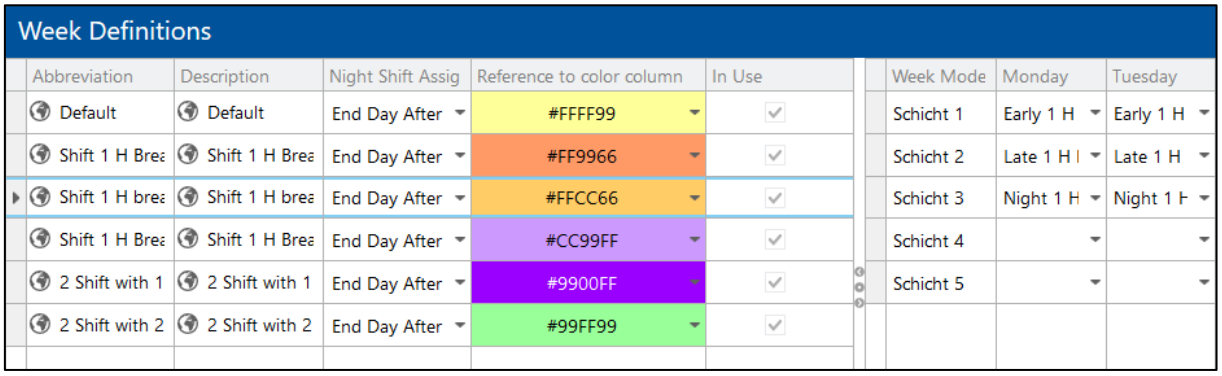

Fig. 36: Week Definitions

1. Right-click on a free space in the lower area (see Fig. 36) and click on **Add Week Definition** in the context menu.
   Or
   Select an existing week.
2. Enter an abbreviation and a description.
   Description is a mandatory field. The abbreviation is optional
3. Set the start and end of the night shift in the dropdown menu of the **Night Shift Assignment** column.
4. Assign a color.
5. Select the appropriate shift from the dropdown menu for the appropriate day in the bottom right area.
6. Save.

ⓘ The **In Use** column cannot be edited manually. If there is a check mark for **In Use**, the shift is currently in use.

7.3 Team Definitions

Path: Master Data > Shift Calendar > Team Definitions

FORCAM FORCE™ allows you to define shift teams. Shift teams are relevant for cases which require fixed working groups working on shifts and eventually changing the task after a certain period. In this way, you can determine the team performance.

ⓘ When a shift assigned to a team is corrected (see section 17.5), the shift assignment of the team is removed.

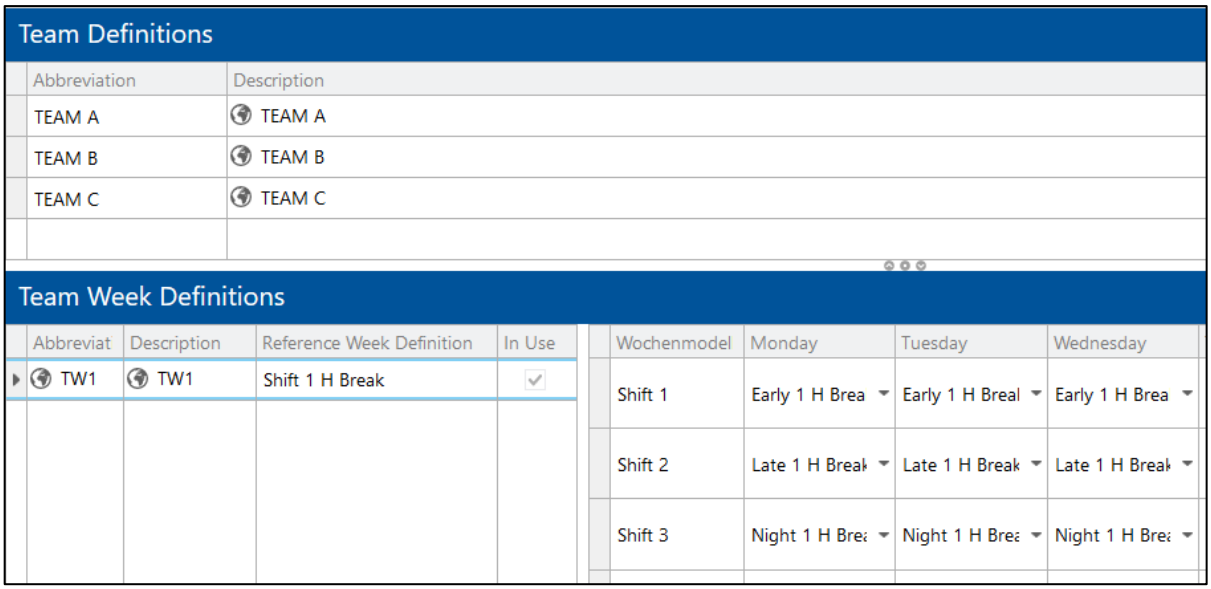

Fig. 37: Shift team and the assigned team week

To define a shift:

1. Right-click in the **Team Definitions** area and click on **Add Team Definition** in the context menu.
2. Enter Abbreviation and Description of the team.
3. Save.

To copy/delete a team definition:

1. Right-click on the appropriate team and click on **Copy/Delete Team Definition** in the context menu.
2. Save.

The definition of a team week accesses previously defined shifts and weeks (see section 7.2). You can only assign teams to a team week.

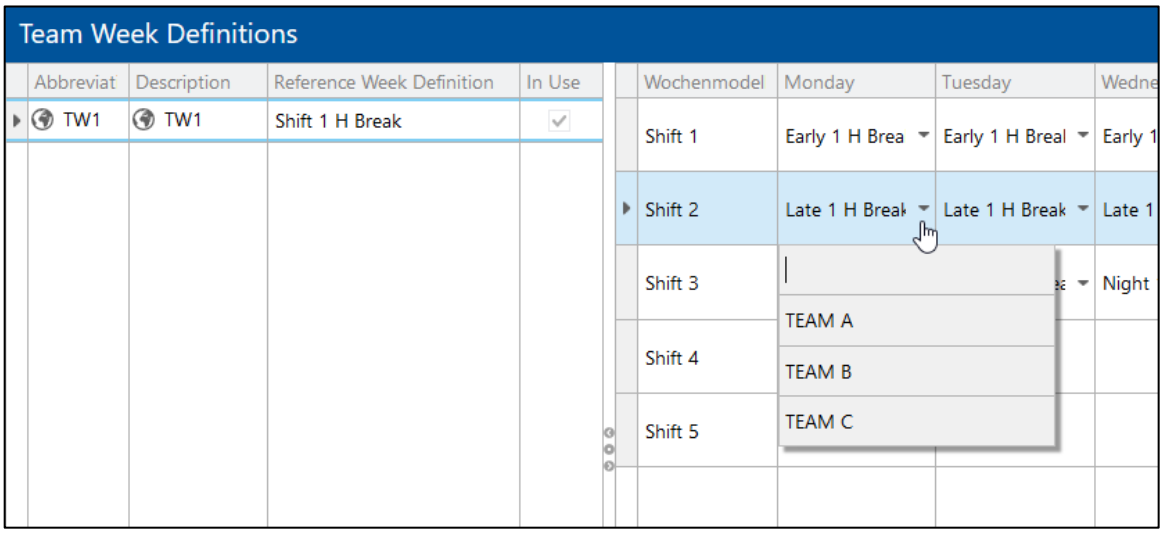

Fig. 38: Assigning a team to a team week

To define a team week:

✓ Shifts, weeks and teams are defined.

1. Right-click in the **Team Week Definitions** area and click on **Add Team Week Definition** in the context menu.
2. Add Abbreviation and Description of the week.
3. Select the appropriate shift week in the dropdown menu in the **Reference Week Definition** column.

➔ The times of the selected shift week are adopted to the team week.

4. Select a team in the dropdown menu in a day column.
   The team will be assigned to the respective shift.
5. Save.

ⓘ You can assign only one team to a shift of a workplace.

To copy/delete a team week definition:

1. Right-click on the appropriate team week and click on **Copy/Delete Team Week Definition** in the context menu.
2. Save.

8 Booking Types

Path: Configurations > Booking Types

Booking types determine how messages are booked to obtain condensed data (statuses, quantities, etc.). Booking types define, for example, the operating state output by a specific signal.
Booking types cannot be edited but only viewed in the Workbench. The configuration of booking types is done in New Office (see "Business Process Modeler" manual).
The following four booking types are predefined:

Booking Type

Code	Abbreviation	Description
1	OEE-Standard	Machine data with status and quantities of stroke factor or direct
2	OEE-AutoStatus	Machine data with hit messages and automatic status derivation (by piecetime)
3	OEE-Operation-Free	Operation free workplace
4	OEE-Manual-Sequence	Machine data with manual determined sequence of processing (pallet machine)

Fig. 39: Booking types

- OEE-Standard:
  Automatic collection and processing of hit, quantity and status messages to determine operating states and the quantity produced. With hit messages, the quantities produced are derived from the product of hits recorded and the hit factor.
  Collection of the operation phase messages (setup, production, break) output on the SFT and the operation quantity messages output from there (yield, rework, scrap quantities).
- OEE-Operation-Free:
  Booking type for a workplace without operation. Automatic collection and processing of machine status messages independent from orders to determine times of use.
- OEE-AutoStatus:
  Booking type used to derive the operating state from the hit message.
  Automatic collection and processing of hit messages and derivation of the quantities produced from the product of hits recorded and the hit factor. Used to determine the machine status based on the hit signals received. When hits are not received, it is assumed that the machine is in the standstill status.
  Collection of the operation phase messages (setup, production, break) output on the SFT and the operation quantity messages output from there (yield, rework, scrap quantities).
- OEE-Manual-Sequence
  Booking type for the parallel production of multiple operations in sequential order. The operating states are parallel and independent of each other. Several sequences (pallets) are defined here that contain a number of process steps. A process step is a list of operations that are processed simultaneously. Use case is usually a pallet system.

9 ERP Keys

Path: Configurations > ERP Keys

An ERP key is an individual code used for assigning orders, machines or employees to a client, company code or plant within the ERP system. The ERP Keys section describes the management of operating resources. Machines and employees can be specified here by assigning an ERP key. ERP keys are read in other places (e.g. in Workplace Configuration).

ⓘ The ERP key must match the client's ERP system in order to bring orders in from ERP or send orders to ERP.

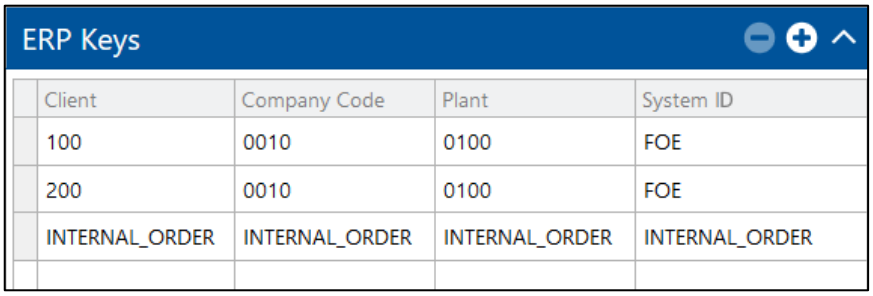

Fig. 40: ERP keys for machines

To assign an ERP key to a machine:

1. Go to the **ERP Keys** field and click the **Add** icon.
➔ A key previously selected is copied and the associated settings are adopted.
2. Enter a client.
   The ERP client is the highest organizational unit in the system.
3. Enter a company code.
   A client can be subdivided according to several company codes.
4. Enter a plant.
5. Enter a system ID (optional).
6. Save.

To assign ERP keys to employees:

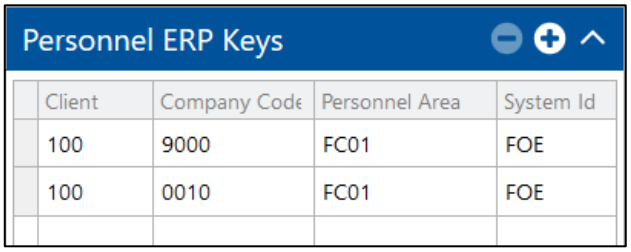

Fig. 41: ERP keys for personnel

1. Go to the **Personnel ERP Keys** field and click the **Add** icon.
➔ A key previously selected is copied and the associated settings are adopted.
2. Enter a client.
   The ERP client is the highest organizational unit in the system.
3. Enter a company code.
   A client can be subdivided according to several company codes.
4. Enter a personnel area.
5. Enter a system ID (optional).
6. Save.

10 Machine Communication

Path: Configuration > Machine communication (DCU)

The machine communication in FORCAM FORCE™ is done via the DCU. To do so, a controller (control unit) is connected to a machine, which reads the machine data.

The DCU contains all relevant information (controller type, IP address, port, signals etc.) of a machine. One DCU can collect data of up to 100 machines. To prevent jeopardizing the stability of all processes it is suggested to connect not more than 50 machines to one DCU.

The DCU communicates with the machine and polls data in short intervals (e.g. every 100msec or once per second) or receives them from an intermediate OPC server or a WAGO box. The DCU collects unprocessed signals and transfers them (via RMI) to the DACQ.
The DACQ normalizes the received data and assigns them to operating states. The DACQ then sends relevant information like machine status or quantities to the server. A script within the DACQ regulates the interpretation of the received data.

It is possible to identify different signals of one machine. At least the following signals must be readable:

- (Full) production
- Fault
  Not necessarily needed, since **No production** can also be interpreted as downtime/fault.
- Operational availability (switched on/off)
  No separate signal. DCU checks this automatically.

The following table lists commands that are executed after the accordingly interpreted signal:

Table 5: Messages and their transmitted commands

Message	Command	Function
Status message	MachineStatusCommand	Status message setup, production or downtime with Status Detail
Qualified quantity message	MachineQuantityCommand	Qualified quantity (yield or scrap quantity), is sent to FFRuntime
Quantity message	MachineCountCommand	Absolute counter value, is sent to FFRuntime
Hit message	MachineStrokeCommand	Machine hit, is sent to FFRuntime. FFRuntime multiplies hit amount with hit factor

To guarantee the stability of all processes, it is suggested to establish a failover DCU. It duplicates an existing DCU and is a fail-safe:
If the (master) DCU fails, the data collection is done via the failover DCU. The DACQ notices the failover and in this case, communicates with the failover-DCU.
As soon as the master DCU is available again, the DACQ switches back to it. A separate configuration for the failover DCU is not necessary.

To configure a DCU:

1. Right-click in the table in an empty area and click on **Add DCU** in the context menu.
2. Enter the name and description of the DCU.
3. Enter the master address and port.
   Address and port of the (main) DCU.
4. Enter the failover address and Port (optional).
   Address and port of the failover DCU.
5. Enter the geographic location (optional).
6. Save.

ⓘ FORCAM FORCE™ offers workplace templates with preconfigured DCU controllers or DACQ scripts (see section 12.1)

11 Workplace

The following configuration items must have been set before you can configure a workplace:

- **System Administration > Business Logic Modeler > Process Editor (Office Client):** Definition of the complete domain logic of data collection
- **Master Data** > **Plant Data Collection** > **Status details**
- **Master Data** > **Plant Data Collection** > **Quantity Configuration**
- **Master Data** > **Personnel Data**
- **Configurations** > **ERP Keys**

11.1 Workplace Configuration

Path: Master Data > Workplace > Workplace Configuration

Workplace Configuration is a central point for configuring machines, booking orders and personnel assignments.

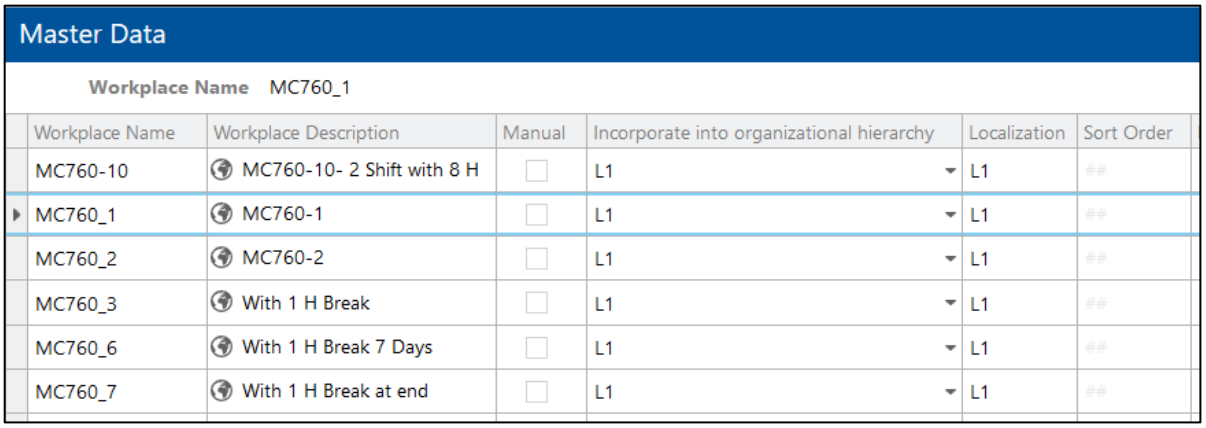

Fig. 42: Workplace configuration sample view

11.1.1 Adding a New Workplace

1. Right-click on a free area and click on **Add Workplace** in the context menu.
2. Enter a name and a description and confirm.
3. Create ERP key.
4. Configure booking logic.
5. Select machine name.
6. Save.

11.1.2 Configuring a Workplace

You can edit an existing workplace directly in the table. The following settings can be made:

- Workplace Name:
  The workplace name must not contain a minus character ("-").
  Changing the workplace name later may cause communication issues with the ERP.
- Workplace Description
- Manual
  If a check mark is set, the workplace is defined as a manual workplace.
- ERP Keys:
  An individual code used for assigning orders, machines or employees to a client, company code or plant within the ERP system.
- Booking Active:
  If there is no check mark, the workplace will not transfer any data.
- SAP Upload Active:
  If there is no check mark, a report (quantity produced, scrap, yield, etc.) is not sent from the SFT to the SAP system.
- User Fields
  A blank field made available to enter additional information of any kind.
- State Detail Assignments:
  Assignment of statuses previously defined (see section 6.2)
- Booking Logic:
  After changing a booking logic, the new logic can behave completely different. All information/variables of the old logic must be deleted, and the workplace must be initiated with the new logic. It is recommended to book all quantities on the workplace and to log out all operations and personnel before a change.
- Machine Name
- Machine Description
- DCU Controller
- DACQ Script
- Quality detail Assignments:
  Assignment of quality details (scrap, yield, etc.) to a machine
- Status detail tree:
  Assignment of state detail reasons (no material, tool failure, etc.) to a machine
- Worker Assignment
- Foreman Assignment

11.1.3 Incorporating a Workplace into the ORG Hierarchy

The uniqueness of a workplace is formed from the double name and ERP key of the production area. This means that a workplace with the same name can exist in different production areas (thus different ERP keys) and also plays a role in the ERP confirmation process.

The ORG hierarchy is the only one in which workplaces cannot be incorporated manually in the lowest node of the hierarchy tree. Workplaces are incorporated into this hierarchy in the workplace configuration. Three new columns for this were introduced in product version 5.7. **ERP Keys** is an existing column; however, it is no longer possible to edit it manually.

ⓘ For detailed information on Multi-Site, see the Multi-Site Administration manual.

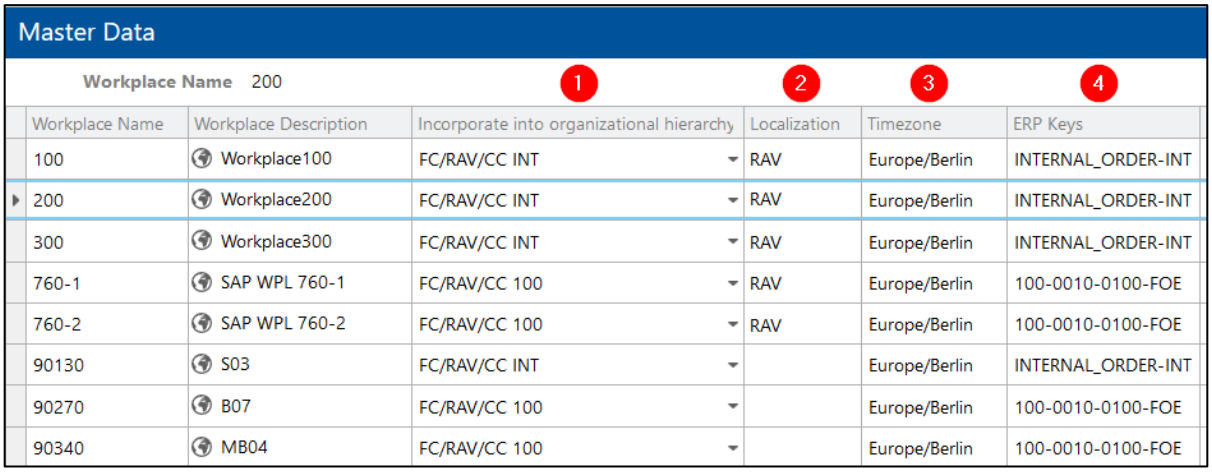

Fig. 43: New columns in the workplace configuration

(1) Selection of ORG hierarchy nodes
Selection automatically incorporates the workplace into this hierarchy, and the workplace appears as the lowest node in the hierarchy tree (see section 11.2.3).

(2) Localization
Non-editable field. Results from the ORG hierarchy path if Multi-Site is active. The workplace is not localized if Multi-Site is inactive.

(3) Time Zone
Non-editable field. Determined in accordance with the selected ORG hierarchy path and populated automatically.

(4) ERP Keys
Existing field which is not editable as of this product version. Determined in accordance with the selected ORG hierarchy path and populated automatically.

To incorporate a workplace into the ORG hierarchy:

- ✓ An ORG hierarchy is configured.
- ✓ A hierarchy tree is created.
- ✓ Multi-Site Administration is activated.

1. Open the drop-down menu in the **Incorporate into organizational hierarchy** column.
2. In the subsequent dialog (see Fig. 44), select the desired hierarchy nodes in the drop-down menus.
   The left column shows the abbreviation for the particular node, the right column shows the description.
3. Confirm and save.

ⓘ The attributes for ERP keys and time zone must be defined. Otherwise a workplace cannot be saved after incorporation into the ORG hierarchy.

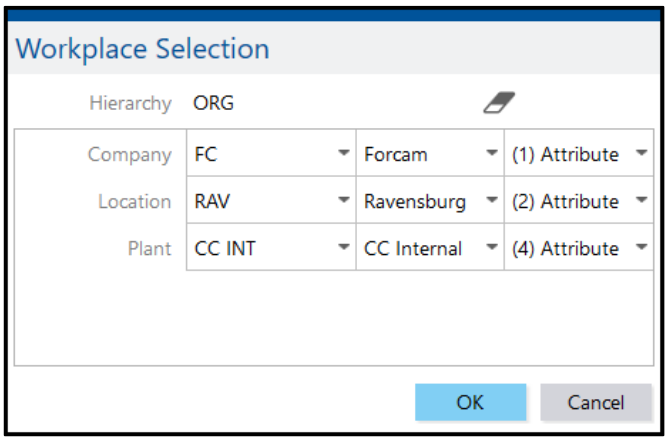

Fig. 44: Dialog for selection of hierarchy nodes

11.1.4 State Detail Assignment (Status details)

A workplace can be assigned one or more Status Details, or malfunctions (e.g. no material, tool failure, etc.) that are used for describing the current status of a machine.
In addition to assigning individual malfunctions, it is also possible to assign a group of malfunctions to a workplace as a template.
It is recommended to create a template for each machine type. This makes it easier to assign templates with the relevant malfunctions to the same or similar machines.

ⓘ State detail reasons (malfunctions) and templates must have been defined before they can be assigned.

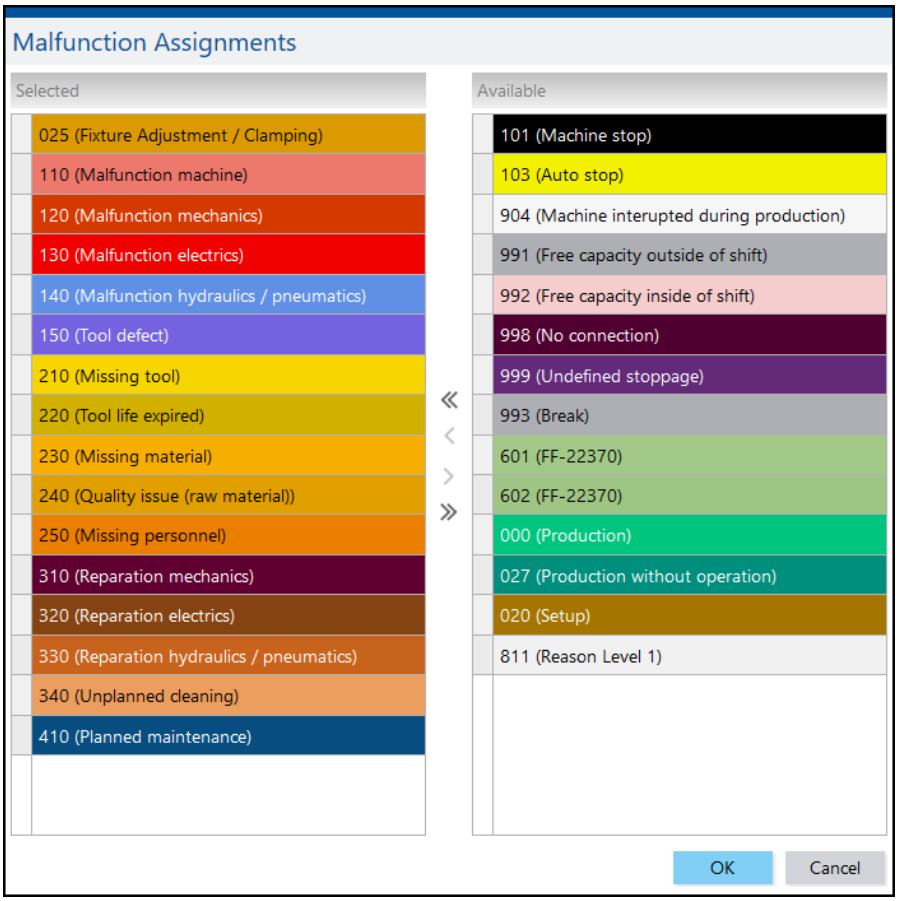

Fig. 45: Malfunction assignments

To assign a Status Detail (malfunction) to a workplace:

1. Open the dropdown menu in the appropriate line of the **State Detail Assignments** dialog.
2. Click on **Open Editor** in the context menu.
3. Select the appropriate status in the **Available** column (see Fig. 45) and click on the **Move left** icon.
4. Confirm and save.

ⓘ You can move all parameters of each column at the same time by clicking on the **Move everything right/left** icon.

To assign a state detail reason (malfunction) template to a workplace:

1. Open the dropdown menu in the appropriate line of the **State Detail Assignments** dialog.
2. Click on **Assign Template** in the context menu.
3. Select the appropriate template and confirm.
4. Save.

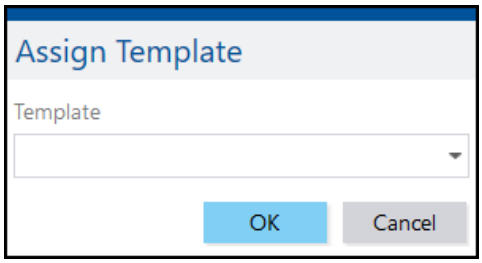

Fig. 46: Template assignment

11.1.5 DCU Controller Configuration

✓ The machine communication (DCU) is configured (see section 10).

The DCU controller is linked to a DCU in the configuration and assigned to a machine. The DCU controller contains information about the specific machine such as IP address, port and various signals. Signals from machines can report numerous conditions (e.g. machine in production, X-axis operated, gate open, etc.).

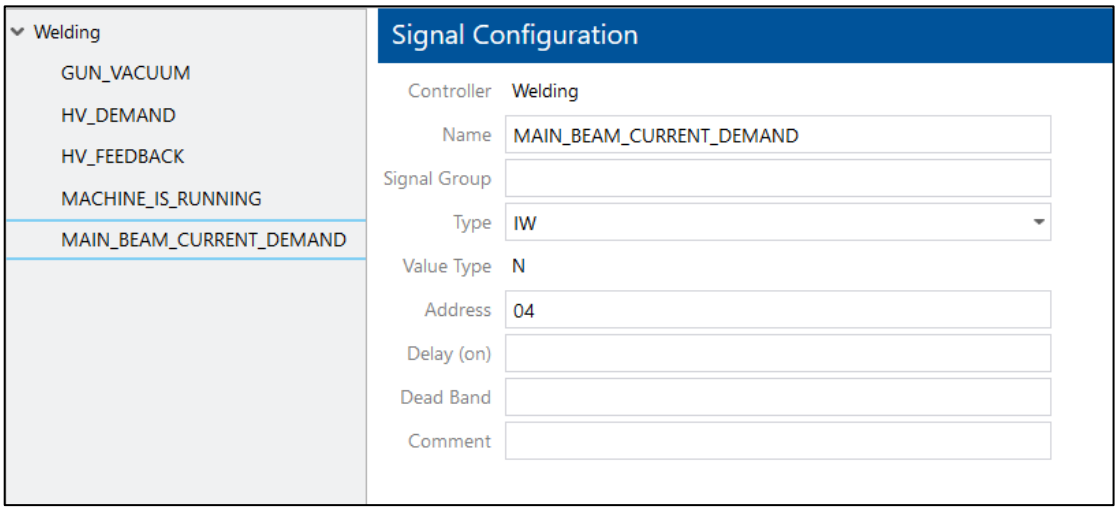

Fig. 47: Controller configuration

To configure a DCU controller:

1. Open the dropdown menu in the appropriate line of the **DCU Controller** dialog.
2. Click on **Open Editor** in the context menu.
3. Right-click on the free space in the left area and click on **Add Controller** in the context menu.
4. Select a DCU in the **Controller Configuration** field from the dropdown menu of the **DCU** cell.
5. Enter a name for the controller in the **Controller** line.
6. Select a controller type from the dropdown menu in the **Type** line.
   Some types are predefined as plug-ins. Some lines may be hidden or shown depending on the type selected.
7. Make other settings as necessary for the selected type.
8. Right-click on the controller created in the left area and click on **Add Signal** in the context menu.
9. Enter a name for the signal in the **Name** line.
10. Enter a signal group in the **Signal Group** line.
11. Select a signal type from the dropdown menu in the **Type** line.
    Some types are predefined as plug-ins. Some lines may be hidden or shown depending on the selected type and a different value type may appear.
12. Select a signal range from the dropdown menu in the **Range** line.
13. Make other settings as necessary for the selected type.
14. Save.

11.1.6 DACQ Script Configuration

The DACQ determines the type and quantity of data received by the DCU. The DACQ has a signal image of the machine. The signals are combined with a script and sent to the runtime module.

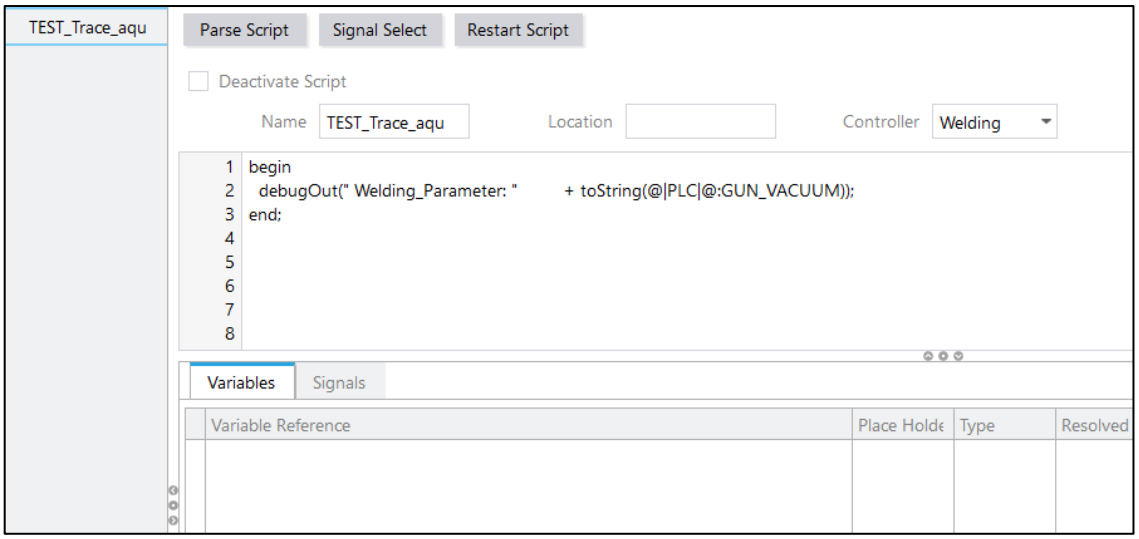

Fig. 48: Script configuration

To configure a DACQ script

✓ A DCU controller is configured.

1. Open the dropdown menu in the appropriate line of the **DACQ Script** column.
2. Click on **Open Editor** in the context menu.
3. Right-click on the free space in the left area and click on **Add Script** in the context menu (see Fig. 48).
4. Insert the script and make the settings as necessary.
5. Save.

11.1.7 Configuring a Booking Logic

Waiting period, shift day offset and quantity backdating time amongst others can be defined on the configuration page of the booking logic.

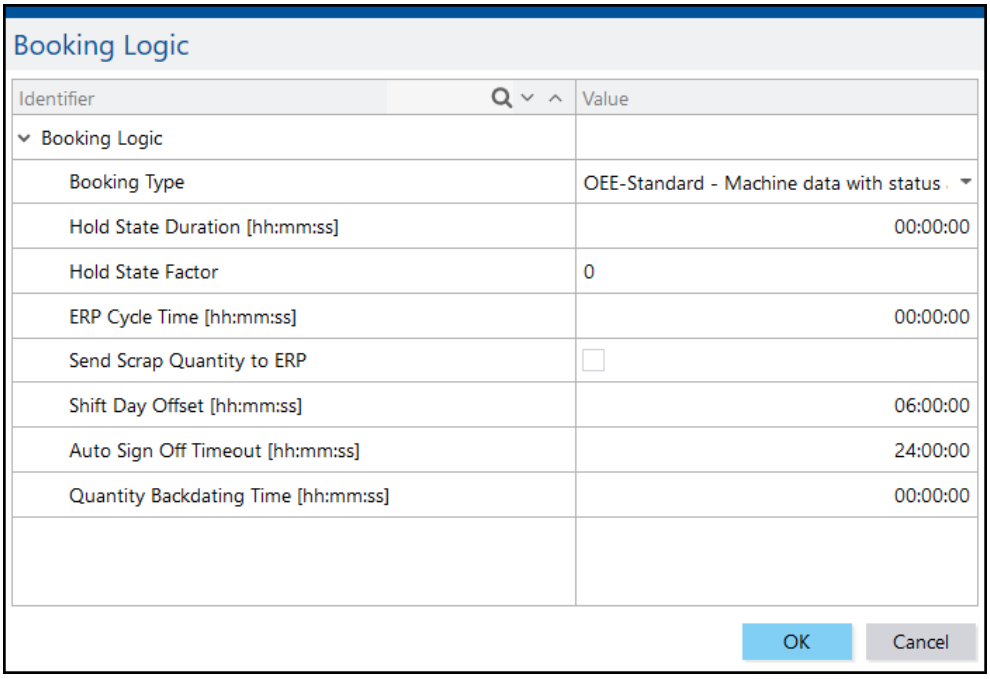

Fig. 49: Configuration of the booking logic

To configure a booking logic:

1. Open the drop-down menu in the desired line in the column **Booking logic**.
2. Click on **Open editor** in the context menu.
3. Select a booking type from the drop-down menu in the following dialog.
4. Enter the waiting period (optional).
   Or
   Enter the waiting period factor (optional).
5. Enter the ERP cycle time.
   Defines the cycle, in which IDocs are sent to the ERP system (0 = directly or ad hoc, respectively).
6. Activate scrap message to ERP (optional).
   There are ERP systems that cannot process scrap. In this case, the scrap message can be deactivated at this point.
7. Enter the shift day offset (optional).
8. Determine timeout for automatic log-off.
   The user is automatically logged-off by the system after the time entered here.
9. Determine quantity backdating time.
10. Confirm and save.

11.1.7.1 Waiting Period

The time per unit of a product or a material is a default value. With machines that provide production signals, the time per unit (production time of a single unit) starts after the production signal and ends with a downtime. The time per unit is here the time between production and downtime. If one production signal is followed by another, the time per unit equals the time between both production signals.

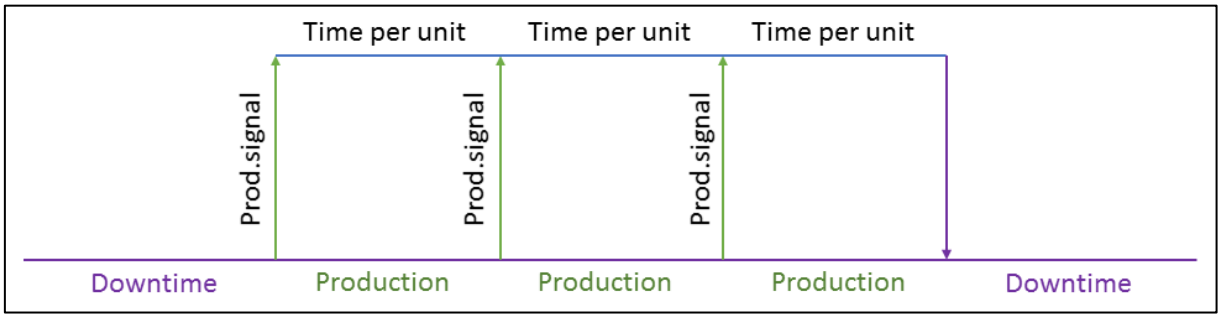

Fig. 50: Multiple consecutive production signals

If one production signal and the default time per unit are not followed by another signal, a downtime is reported. But if another production signal follows after a short downtime, the downtime is not desirable, since a continuous production is interrupted.

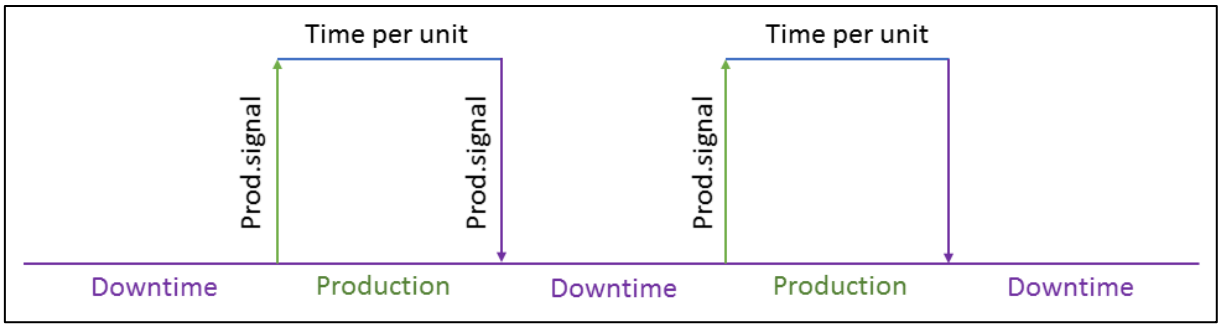

Fig. 51: Production signals with an interruption (downtime)

To prevent these downtimes, a waiting period can be defined. The waiting period is an absolute value and overwrites or replaces, respectively, the time per unit (old time per unit + waiting period = new time per unit). A typical use case are machines with high-frequency strokes. In case of a time per unit of 1 second, a minimal lag of the production signal can lead to many downtimes. A waiting period of e.g. 10 seconds ensures here, that plenty of waiting time is available after one stroke and that downtimes are prevented.

An alternative to the waiting period is the definition of a waiting period factor. The waiting period factor is a value that equates to the percental value of the time per unit. It is multiplied with the time per unit (old time per unit * waiting period factor = new time per unit). The factor 1 is equivalent to 100% of the time per unit.
The factor must not be less than 1.

ⓘ It is only possible to use *either* a waiting period *or* a waiting period factor.

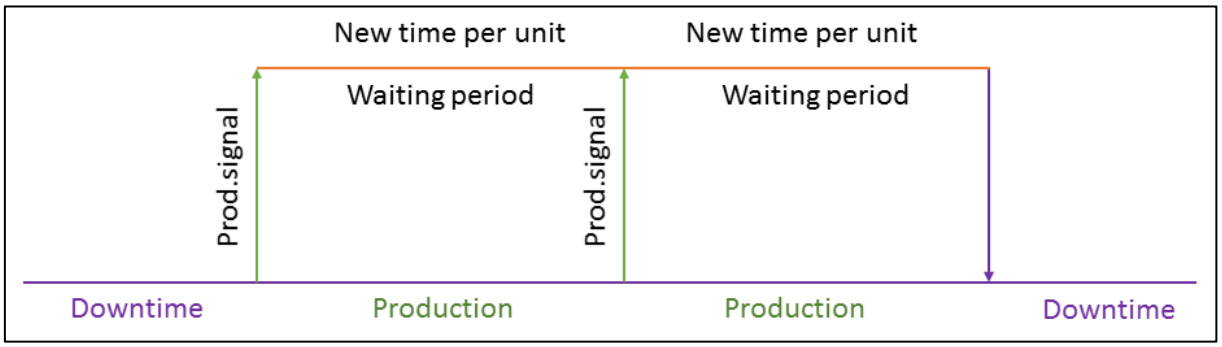

Fig. 52: New time per unit, calculated with the waiting period

11.1.7.2 Shift Day Offset:

A day in the production does not start at 0:00 o'clock (midnight), but with the start of the first shift (e.g. 6:00 o'clock). The shifts within a week are regulated by configured times (see chapter 7). However, most companies do not have a continuous shift model on the weekend. To enable their capturing, non-working shifts are defined during those times.
The shift day offset is used to assign a start time to a shift day by offsetting the start of the day at 0:00 o'clock by a certain value. An offset of 6:00 hours for instance sets the start of a shift day at 6:00 o'clock.
Without the offset, a non-working shift could potentially take longer than 24 hours, which would ultimately falsify the 24-hour analysis of the shifts.

Example with a shift day offset of 6:00 hours:
Friday 22:00 – Saturday 06:00: non-working shift 1
Saturday 06:00 – Sunday 06:00: non-working shift 2
Sunday 06:00 – Sunday 22:00: non-working shift 3

Non-working shift 1 is a night shift from 22:00 o'clock on Friday until 6:00 o'clock on Saturday. With a shift day-offset of 6:00 hours the non-working shifts 2 and 3 each start at 6:00 o'clock. Without this offset the time of the last shift (6:00 o'clock on Saturday) until the first time in the new week (22:00 o'clock on Sunday) would last longer than 24 hours.

ⓘ The shift day-offset can be positive as well as negative.

11.1.7.3 Quantity Backdating Time

Quantities are always booked to the shift in which the booking is sent. If the booking is done at the end of a shift, the booking is sent chronologically after the shift. The quantities are then booked to the subsequent shift.

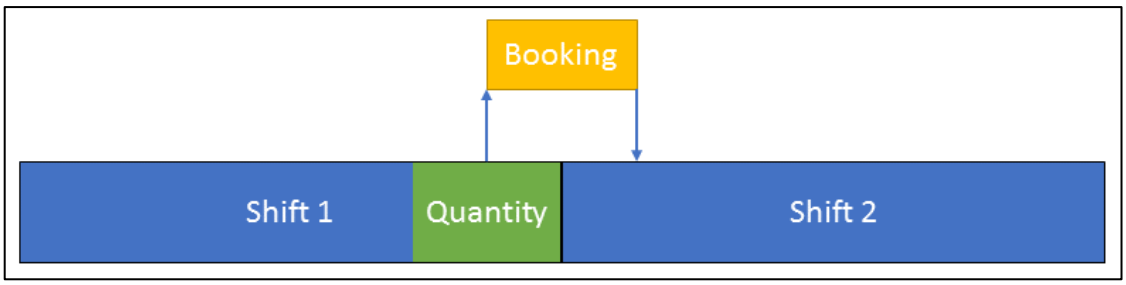

Fig. 53: Quantity booking at the end of a shift, booked to the next shift

To enable the correct booking of the quantity at the end of a shift, a quantity backdating time can be defined. The quantity backdating time is a time window in a new shift, during which booked quantities are still booked to the predecessor shift. Only after the expiration of this term are all bookings valid for the next shift.

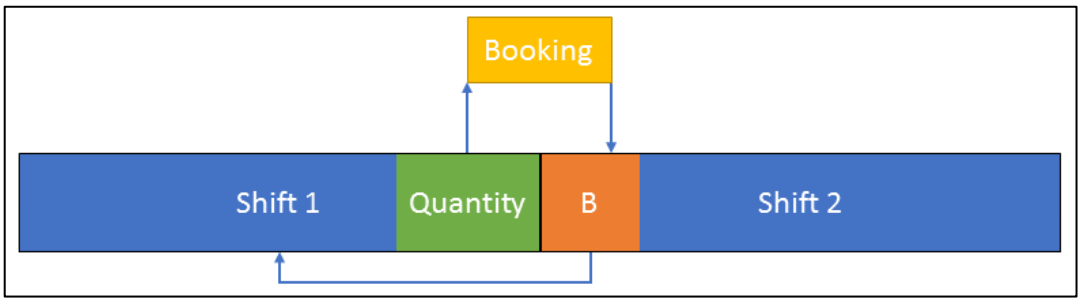

Fig. 54: Quantity booking during the backdating time, booked to the current shift

11.1.8 Quality Detail Assignment

Every quantity produced can be characterized by assigning a quality detail (e.g. yield, scrap, etc.). In addition to assigning individual quality details, it is also possible to assign a group of quality details to a workplace as a template.
It is recommended to create a template for each machine type. This makes it easier to assign templates with the required quality details to the same or similar machines.

ⓘ Quality details and templates must have been defined before they can be assigned.

To assign a quality detail to a workplace:

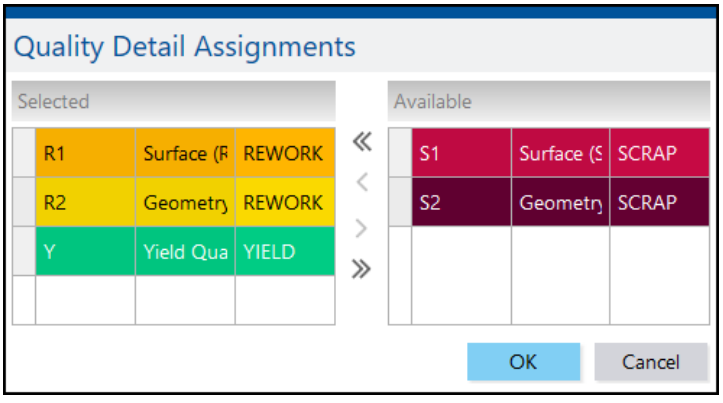

Fig. 55: Assigning quality details

1. Open the dropdown menu in the appropriate line of the **Quality Detail Assignments** column.
2. Click on **Open Editor** in the context menu.
3. Select the appropriate quality details in the **Available** column and click the **Move left** icon.
4. Confirm and save.

ⓘ You can move all quality details at the same time by clicking on the **Move everything right/left** icon.

To assign a quality detail template to a workplace:

1. Open the dropdown menu in the appropriate line of the **Quality Detail Assignment** column.
2. Click on **Assign Template** in the context menu.
3. Select the appropriate template and confirm.
4. Save.

11.1.9 Error Code Mapping

Error Code Mapping provides a possibility to combine several error codes in a meaningful group. For example, alarms such as **Poor material** and **Brittle material** may be combined in a group called **Material defects**.
Each error code group is assigned a state detail which applies to all error codes of that group. Hence, the group is the second level of differentiation while the state detail assigned is the first one. For example, the **Material defects** group could be assigned the **Material failure** malfunction.

ⓘ Since error code mapping defines the levels of malfunctions, you can configure *either* error code mapping *or* a Status Detail tree (see section 11.1.10).

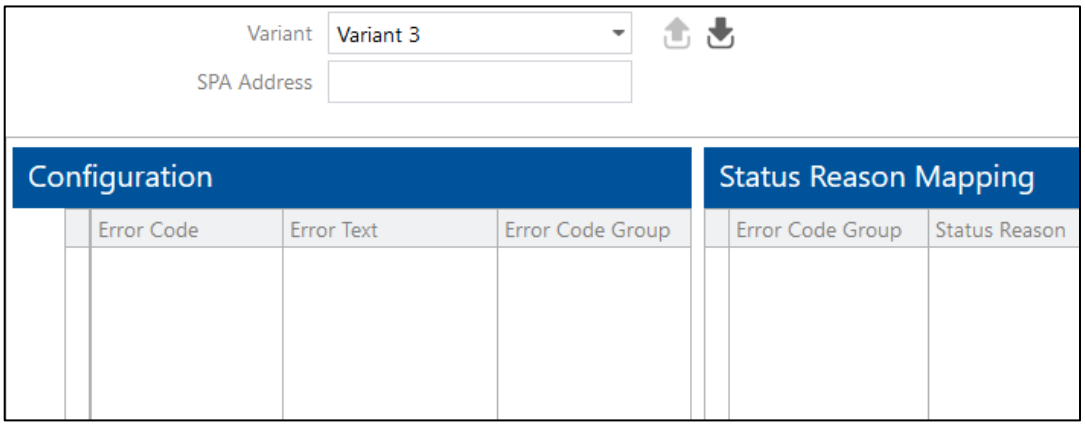

Fig. 56: Error code mapping

There are various variants for error code mapping:

- Variant 1
  You can map the PLC address individually to each error code.
- Variant 3
  You can map one PLC address that is used for all error codes. Variant 3 may be applied but is not functional at present. This variant will be eliminated in future versions.

ⓘ Variant 2 was used for older systems that are now obsolete. Variant 2 was therefore eliminated in the latest version of FORCAM FORCE™.

To assign an error code to an operating status:

1. Open the dropdown menu in the appropriate line of the **Error Code Mapping** tab.
2. Click on **Open Editor** in the context menu.
3. Right-click on a free space in the **Configuration** area and click on **Add Line** in the context menu.
   Error Code is generated automatically. It is used for unique identification.
4. Enter an Error Text.
   A description of the reason of the error (e.g. **Poor material**).
5. Enter an Error Code Group and click on a free area.

➔ The group name appears in the **State Detail Assignment**s area.

6. Enter the ERP address, if appropriate.
7. Repeat steps 3 to 5 (or 6) as often as necessary.
   To assign an error code to an existing group, enter the existing group name again.
8. Select a state detail from the dropdown menu next to the group name in the **State Detail Assignments** area.
9. Save.

ⓘ The position of an error code within the list reflects its significance. You can change the position by clicking the **Move up/down** icon.

11.1.9.1 Exporting and Importing a Mapping

You can export an error code mapping as a XML file. The export process creates a structure required by the system. This structure is also necessary for the import of a XML file. Therefore, it is recommended to import only files which were previously exported in the error code mapping. The export process involves all errors listed in the configuration page.

ⓘ Exporting and importing XML files is intended for transferring data within FORCAM FORCE™, e.g. from one FORCE system to another. Importing XML files alien to the system is not ensured.

Since errors contain relatively few information, creating a complete XML structure is not necessary. You can import personal error lists therefore only as a CSV file. When importing a file, the number of columns in the file must match the number of columns in the configuration page

Fig. 57 displays the necessary structure of a CSV file exemplified by Microsoft Excel.
The needed information about the error is listed starting with the 3rd row. The rows above are irrelevant for the system and can be defined as wanted. However, cell B1 is important. If it contains **Variant** 1 the system expects 4 columns and can predict where to find the needed information.
You must add **$** before a number in the Alarm Group column as a mate reference. The SPS-Address is the bit-addressing of data blocks and is created in the DCU.

	A	B	C	D
1	#0	Variant 1		
2	#Alarm ID	Alarm Text	Alarm Group	SPS-Address
3	1	Insert lid: gripper on rotary table not open!	$1	DB81.DBX241.1
4	2	Insert cartridges: gripper on rotary table not closed!	$2	DB81.DBX240.3
5	3	Insert cartridges: gripper on rotary table not open!	$5	DB81.DBX241.2
6	4	Insert cartridge guides: rotary table gripper not clamped!	$1	DB81.DBX241.3

Fig. 57: Necessary structure of a CSV file exemplified by Microsoft Excel

To export an XML file:

1. Click the **Export** icon in the upper bar.
2. Select a location in the subsequent dialog and confirm.

To import a CSV file:

1. Click the **Import** icon in the upper bar.
2. Click **Upload…** in the subsequent dialog, select a CSV file and confirm.
3. Select **CSV** as file extension.
4. Select **No** at **Force Import?** and confirm.

➔ The rows of the imported file are transferred to the configuration page.

5. Save.

ⓘ If you select **No** at **Force Import?**, empty fields of the target are filled or additional content from the source is copied to the target. If you select **Yes**, the entire content of the target is overwritten by the content of the source.

11.1.10 Defining a Status detail tree

Each state detail can be defined more precisely by other malfunctions. The corresponding nesting depth is defined in the Status detail tree.

✓ Malfunctions are defined.

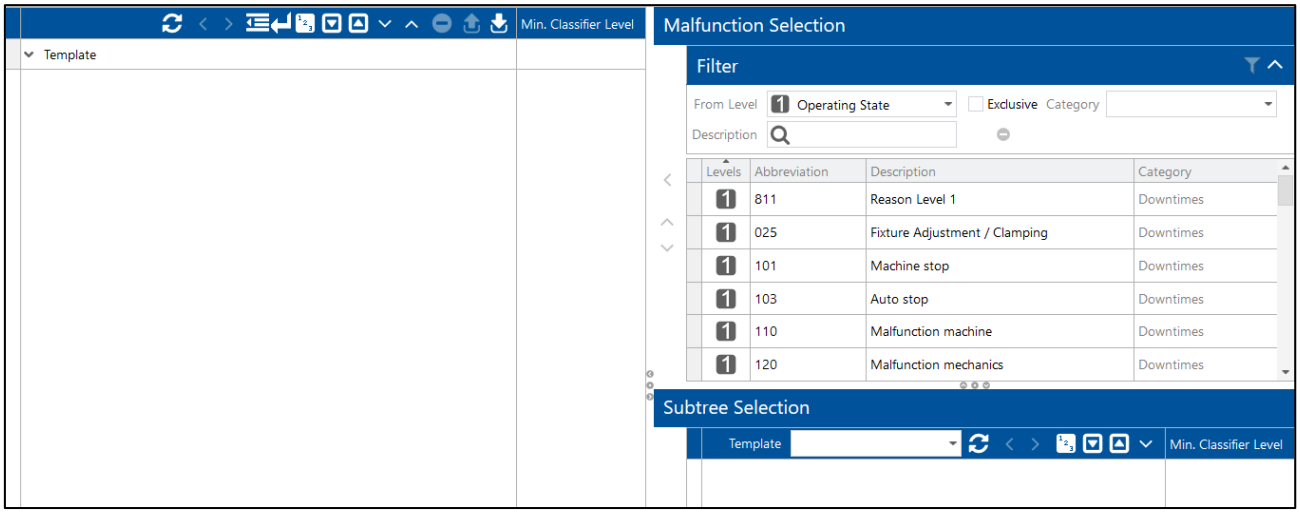

Fig. 58: Status detail tree

ⓘ Since the Status Detail tree defines the levels of malfunctions, you can configure *either* a Status Detail tree *or* error code mapping (see section 11.1.9).

To define a Status Detail tree:

1. Open the dropdown menu in the appropriate line of the **Status detail tree** column.
2. Click on **Open Editor** in the context menu.
3. Click on the main node **Template** in the left-hand area.
   The main node is predefined and mandatory.
4. Select the first level of the tree in the right-hand field **State Detail Selection** from the dropdown menu next to **From Level**.
   To display only malfunctions of the selected level, set a check mark next to **Exclusive**.
   To find a specific malfunction, type it into the search field next to **Description**.
5. Select the state detail from the list and click the **Move left** icon.
   You can move any number of malfunctions.
6. In the left-hand area, select a state detail of the first level from **Template**.
7. Select the next lower level in the **State Detail Selection** area from the dropdown menu next to **From Level**.
8. Select the state detail from the list and click the **Move left** icon.
9. Repeat these steps as often as necessary.
10. Save.

ⓘ A state detail may exist only once at each level.

The following settings are available in the Status Detail tree:

- Move Node:
  Move malfunctions in the left column (nodes) up or down by clicking the **Move up/down** icon in the screen center.
- Arrange Malfunctions:
  Have malfunctions arranged automatically by clicking the **Automatic alignment** icon.
- Insert Existing Tree:
  If a template containing a Status Detail tree already exists, you can insert it in full or in part:

1. Select the appropriate template from the dropdown menu in the **Subtree Selection** field at the bottom right.
2. Select the node(s) to move and insert by clicking the **Move left** icon.

- Define the minimum classifier level:
  Specifies the level to which a state detail must at least be defined.
  Select the minimum level from the dropdown menu next to the state detail on the left.

ⓘ When you set the minimum classifier level, it may take more than 15 minutes until it becomes active in the Shop Floor Terminal.

To assign a Status Detail tree template to a workplace:

1. Open the dropdown menu in the appropriate line of the **Status detail tree** area.
2. Click on **Assign Template** in the context menu.
3. Select the appropriate template and confirm.
4. Save.

11.1.11 Assigning Workers and Foremen

A workplace can be assigned one or more workers or foremen. They must first be created in the User Administration (see section 4).

To assign a worker or foreman to a workplace:

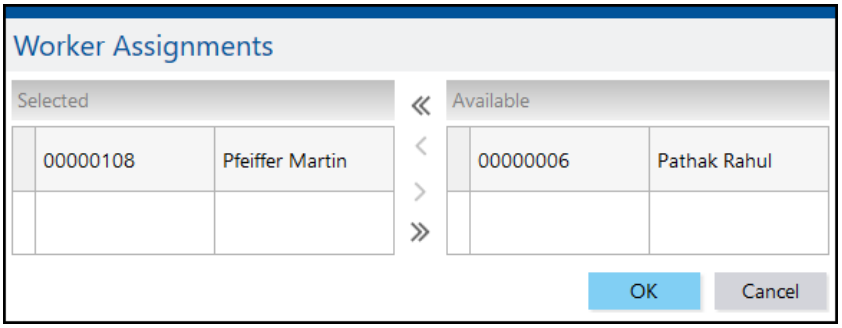

Fig. 59: Worker assignment

1. Open the dropdown menu in the appropriate line of the **Worker Assignments** column.
   Or
   Open the dropdown menu in the **Foremen Assignments** column.
2. Click on **Open Editor** in the context menu.
3. Select the appropriate person and click the **Move left** icon.
4. Confirm.

ⓘ You can move all persons at the same time by clicking on the **Move everything right/left** icon.

11.2 Workplace Hierarchy

Path: Master Data > Workplace > Workplace Hierarchy

The workplace hierarchy determines the hierarchical structure of workplaces. These hierarchies are used for structuring and precisely locating a workplace and facilitate visualization substantially. It is recommended to specify the hierarchy precisely particularly if a higher number of workplaces are involved.

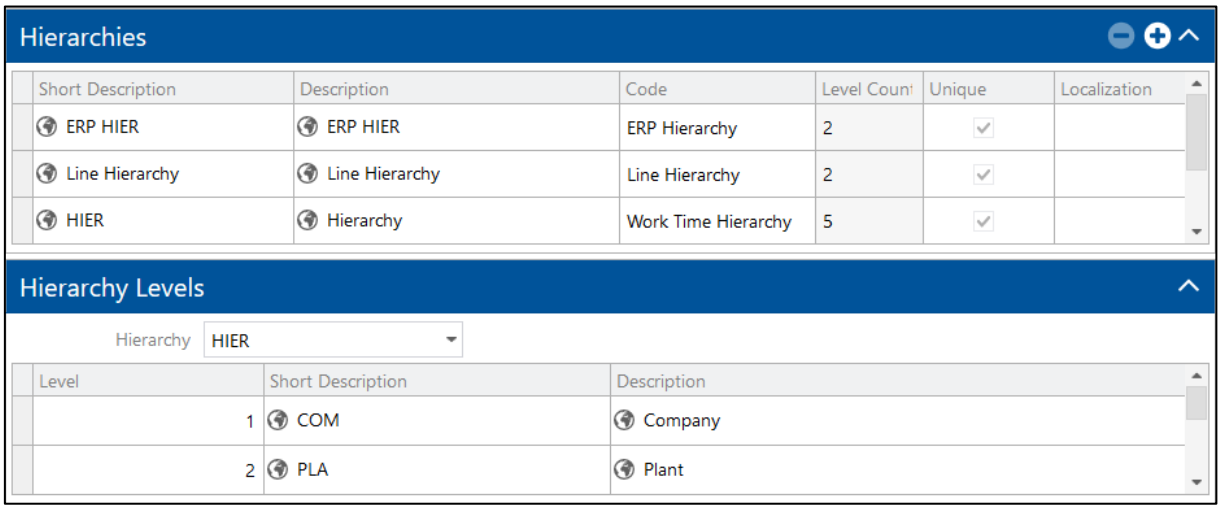

Fig. 60: Workplace hierarchy

The following hierarchies are predefined:

- Work Time Hierarchy:
  Definition of the working time based on weeks
- DNC Hierarchy:
  Defined exclusively for DNC mode. In this mode, technology groups are created and machines with the same control unit are grouped. When a program is transferred to a machine, the system verifies that the NC program pertains to the same technology group.
- Line Hierarchy:
  Defined for production lines (sequences of machines)
- ERP Hierarchy:
  Added in the ERP system

11.2.1 Defining Hierarchies

To create a new hierarchy:

1. Go to the **Hierarchies** field and click on the **Add** icon.
2. Enter a short description and a description.
3. Select the hierarchy type in the **Code** column.
   If none of the predefined types should fit, you can create a user-defined type (Custom).
4. Enter the required number of hierarchy levels.
5. Set the Unique option.
   If you set a check mark in the **Unique** column, the workplace can only exist once in a node.
6. Save.

To define hierarchy levels:

1. Select a hierarchy from the dropdown menu in the **Hierarchy Levels** tab.
2. Enter a short description and a description.
3. Save.

11.2.2 Creating an ORG Hierarchy

The organizational hierarchy is a system hierarchy in which all workplaces must be incorporated. This ORG hierarchy serves as a framework for administering workplaces on an organizational level and maintaining them within the system.

ⓘ For detailed information on Multi-Site, see the Multi-Site Administration manual.

⚠ It is not possible to delete system hierarchies once they have been created.

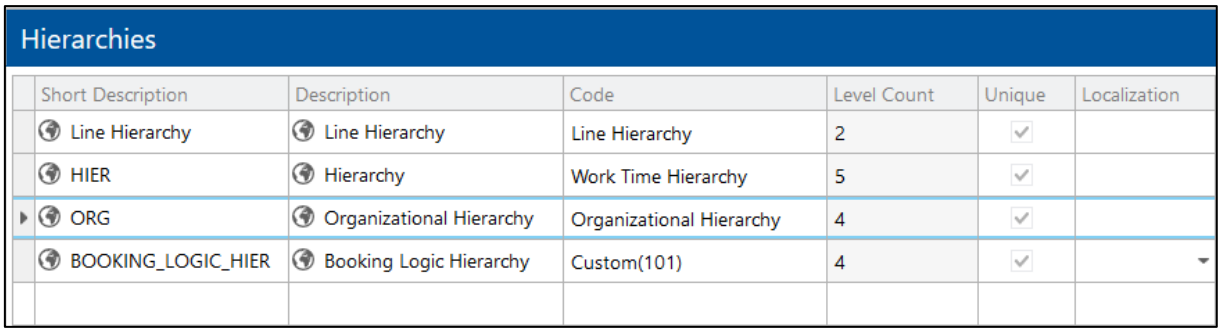

Fig. 61: Creating a new ORG hierarchy

To create a new ORG hierarchy:

1. In the **Hierarchies** section, click the **Add** icon.
2. Enter the desired short description and description of the new hierarchy.
   The hierarchy appears under the entered short description under **Hierarchy Levels**.
3. In the drop-down menu under **Code**, select the **Organizational Hierarchy**.
4. Enter the number of levels.
   The ORG hierarchy requires at least 2 levels. The number of levels is editable providing no element is created in the hierarchy.
5. Save.

➔ The hierarchy appears in the **Hierarchy Tree** section (see section 11.2.3).

ⓘ As soon as workplaces are assigned to a hierarchy, their number of levels and, therefore, their basic definition can no longer be changed.

The localization is not confined to the ORG hierarchy. System hierarchies (workplace, ERP and DNC hierarchy) and custom hierarchies can likewise be localized on every node. The localization concept applies fully here, too.

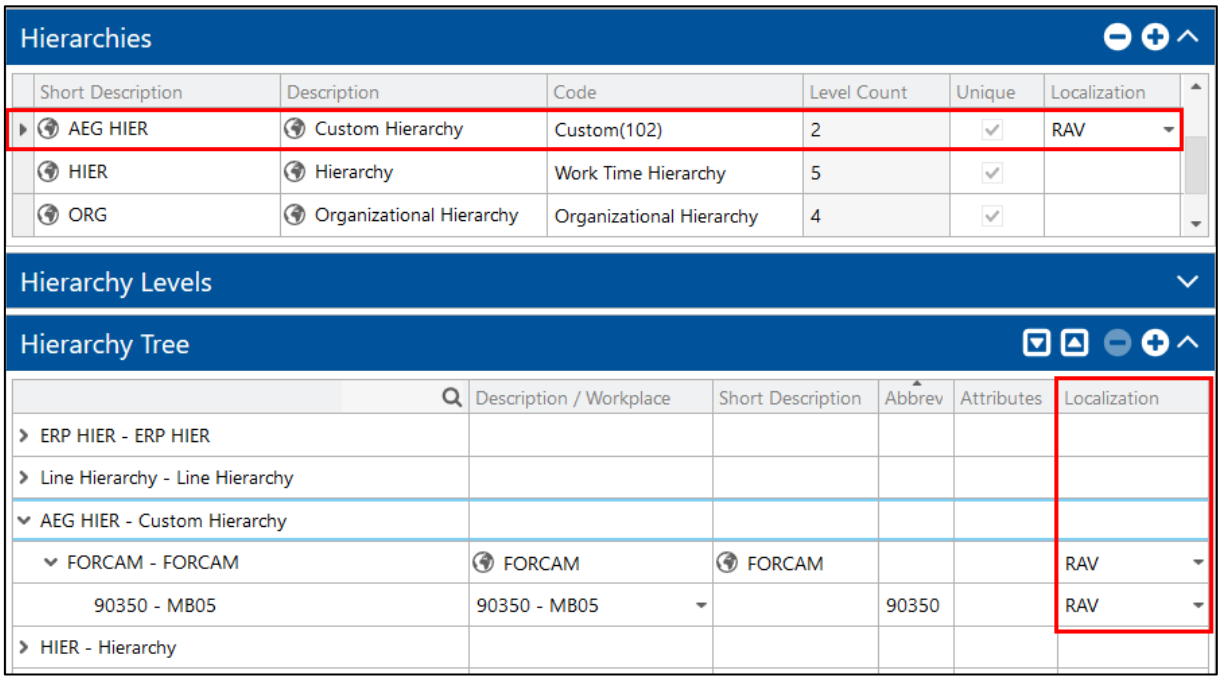

Fig. 62: Localizing a custom hierarchy

Local administrators can only create local hierarchies and nodes. Node elements must therefore be created and localized by the super user so that local administrators can maintain and change these branches. New nodes can only be created under a localized node.
The ERP hierarchy is an exception. Here it is permissible for local administrators to add assignments on the top level. This allows maintenance independently of a super user.

11.2.2.1 Determining a Localization Level

A localization level is only required for the use of Multi-Site Administration. The localization level defines the level from the ORG hierarchy on which the local administration is depicted from an organizational standpoint (generally the plant level). It is only ever possible to label one level of the ORG hierarchy as a localization level.

Workplaces are incorporated on the lowest level of the hierarchy (see section 11.2.3). This level cannot serve as a localization level.

⚠ If a defined and assigned localization level is changed subsequently, the localizations of all linked data are deleted. Automatic retrieval is not possible.

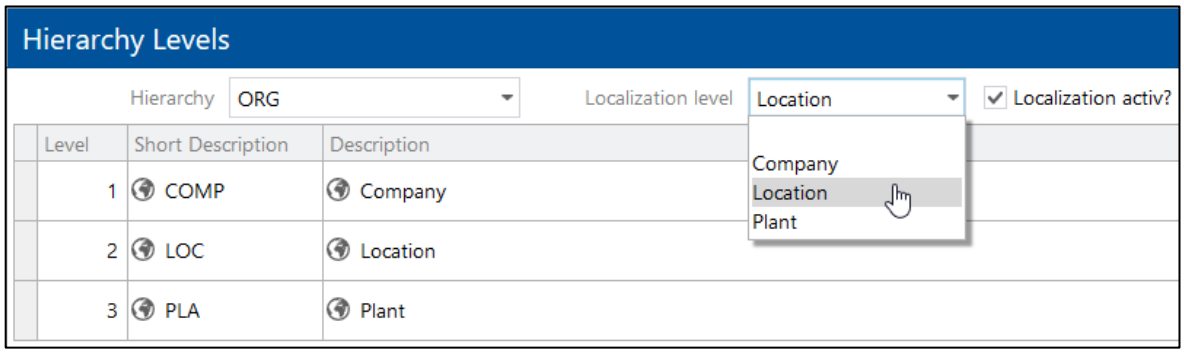

Fig. 63: Selecting a localization level

To select a localization level:

✓ The ORG hierarchy is created and saved.

1. Enter short description and description of the levels in the **Hierarchy Levels** section.
   The short description and description are only visible here and do not appear at any other point.
2. Save.

➔ The levels become available for selection of the localization level.

3. Select desired level in the drop-down menu under **Localization level**.
4. Place a check mark next to **Localization active?**.
5. Save.

ⓘ Multi-Site Administration is not active until a localization level has been selected and a check mark has been placed next to **Localization active?**.
A change to a user's localization or the deactivation of Multi-Site does not take effect until after each user logs into the Workbench again.

11.2.3 Creating a Hierarchy Tree

The hierarchy tree allows the depiction of hierarchical structures. The nodes display the hierarchical structure which was defined in the **Hierarchy Levels** section. The lowest node cannot be set manually in the ORG hierarchy but is created automatically as soon as a workplace has been added in the ORG hierarchy (see section 11.1.3).
It is possible to create a hierarchy tree with fewer than the indicated levels (e.g. 2 instead of 4 nodes). To incorporate a workplace, however, the tree must be constructed up to the lowest level.

To create a hierarchy tree:

✓ A hierarchy is created, and levels are defined.

1. In the **Hierarchy Tree** section, select the desired hierarchy and click on the **Add** icon.
2. Enter description, short description and abbreviation of the created subnode.
3. Select subnode and click the **Add** icon.
4. Repeat steps 2-3 until the lowest node has been reached.
5. In the drop-down menu in the lowest node, select the desired workplace that is to be incorporated into this hierarchy.
   Not available in the ORG hierarchy. Workplaces are added automatically via the workplace configuration in the ORG hierarchy (see section 11.1.3).
6. Save.

11.2.3.1 Attributes

Attributes are features that carry one or a list of configured values (e.g. language, time zone etc.). They can be defined and assigned on any node in the ORG hierarchy.

ⓘ For detailed information on Multi-Site, see the Multi-Site Administration manual.

An attribute on a node can be passed on to lower child nodes (inherited). However, if a different attribute is set on the child node manually, it overwrites the attribute passed on from the higher node (local overwriting of the attribute).
A super user can write-protect attributes. Subnodes which have the attribute passed on also have the write-protection passed on and cannot be edited by users. The passing on of attributes with write protection has a higher weighting than the manual attribution on a (child) node and overwrites this attribution.
The super user can only activate/deactivate the write-protection on the initial node.

ⓘ The attribution was newly introduced in FORCAM FORCE™ version 5.7 and is independent of the Multi-Site Administration. Later functions will be based on this.

Passing on and write-protection of the attributes are determined in the dialog for attribute assignment:

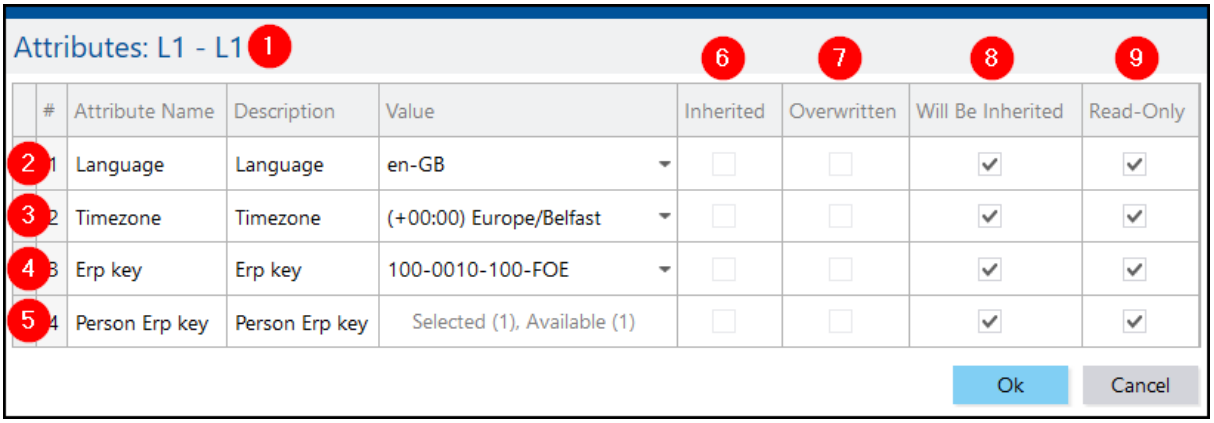

Fig. 64: Dialog for attribute assignment

(1) Dialog title
Consists of description (left) and abbreviation (right)
(2) Attribute for language
(3) Attribute for time zone (mandatory attribute)
(4) Attribute for ERP key (mandatory attribute)
(5) Attribute for personnel ERP key (only a mandatory attribute if personnel data are used)
(6) Attribute passed on from higher node (non-editable field)
(7) Attribute overwritten by manual (local) attribution of the node
(8) Attribute passed on to lower node
(9) Attribute is write-protected (by super user)

ⓘ The attributes for ERP key and time zone must be defined. Otherwise a workplace cannot be saved after incorporation into the ORG hierarchy.
The time zone of a workplace is taken into account in FORCAM FORCE™ shift planning and shift generation. It represents elementary system information.

The following table shows the common scenarios of attribution and passing on:

Table 6: Example scenarios for attributes

Inherited	Overwritten	Will be inherited	Read-only	Meaning
✓				The attribute is passed on to the node from a higher node.
✓	✓			The attribute passed on from a higher node has been changed manually on this node.
		✓	✓	This node's attribute is passed on to all child nodes and cannot be changed.

To assign attributes to a node:

✓ A hierarchy tree is created.

1. Select desired node in the hierarchy tree.
2. Open the drop-down menu in the **Attributes** column.
3. In the subsequent dialog (see Fig. 64), select the desired attribute value in the **Value** column (if not already populated as a result of inheritance).
4. Place a check mark next to the desired function (if not already populated as a result of passing on).
5. Save.

ⓘ System attributes are currently only used for resources, personnel and workplaces. This coverage will be extended to include further resources in future.

12 Template Configuration

Path: Master Data > Workplace > Template-Configuration

Templates make it possible to define several settings for a workplace or machine once and save them for other uses. A template can be imported at several places within the Workbench. If the template contains settings for a specific item, they are adopted and assigned to the item. It is recommended to configure a template for each machine and workplace type.

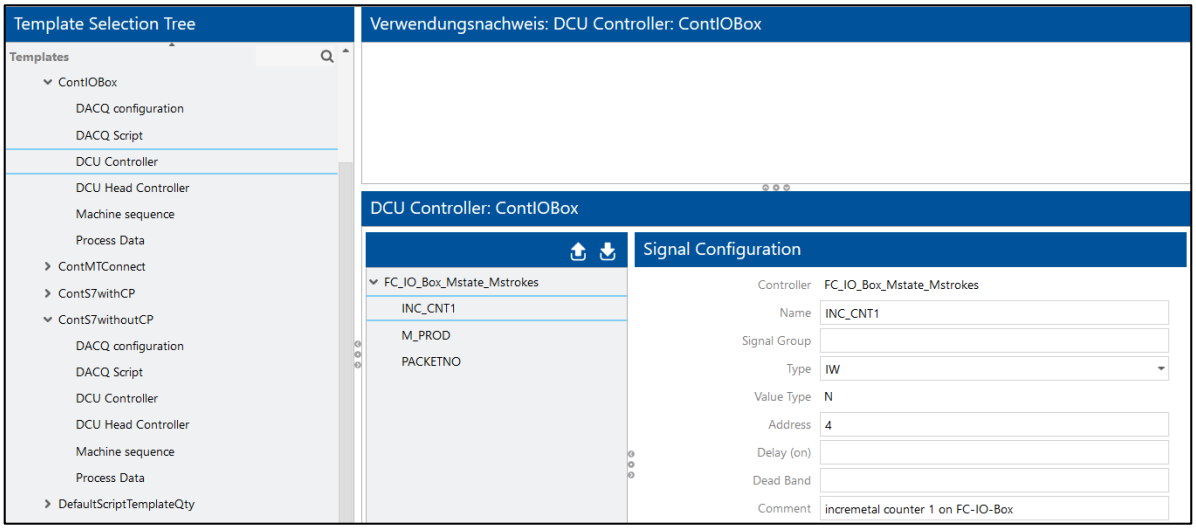

Fig. 65: Template configuration

To create a new template:

1. Right-click on the appropriate node in the **Template Selection Tree** field and then click on **Add New Template** in the context menu.
2. Enter a template abbreviation and description and confirm.
   Both fields are mandatory.

➔ The template appears in the selection tree. One or more subnodes appear under the template.

3. Select a subnode and make the required settings in the editor (bottom right).
   Right-click in the editor to add new content.
4. Save.

To delete a template:

1. Right-click on the appropriate template in the **Template Selection Tree** dialog.
2. Click on **Delete Template** in the context menu.

ⓘ You cannot delete a template that is assigned to a workplace in the Workplace Configuration. A template that is in use is displayed in the **Cross Reference** area (upper right).

12.1 Default Templates

FORCAM FORCE™ offers templates with preconfigured DCU controllers or DACQ scripts. A template used for a workplace will automatically have the according settings preconfigured.

ⓘ A template can either have a DCU controller configuration or a DACQ script configuration.

Table 7: Templates with DCU or DACQ configurations

Selection Tree Entry	Template Name	Template Data	MDC Plug-in	Function
ContIOBox	FC_IO_Box_Mstate_Mstrokes	DCU Controller	FORCAM IO Box	Delivering machine state and machine strokes
ContMTConnect	MTConnect_Mstate_Mstroke	DCU Controller	MT Connect	Delivering machine state and machine strokes
ContS7withCP	S7withCP_Mstate_Mstroke	DCU Controller	Siemens S7 with CP	Delivering machine state and machine strokes
ContS7withoutCP	S7withoutCP_Mstate_Mstroke	DCU Controller	Siemens S7 without CP	Delivering machine state and machine strokes
DefaultScriptTemplateQty	S7_Mstate_Mquantity	DACQ Script		Sending machine state, Status Details and quantities to the runtime
DefaultScriptTemplateState	S7_Mstate	DACQ Script		Sending machine state and Status Details to the runtime
DefaultScriptTemplateStroke	S7_Mstate_Mstroke	DACQ Script		Sending machine state, Status Details and strokes to the runtime
IOBoxScriptTemplateState	FC_IO_Box_Mstate	DACQ Script	FORCAM IO Box	Sending machine state and Status Details to the runtime
IOBoxScriptTemplateStateQty	FC_IO_Box_Mstate_Mquantity	DACQ Script	FORCAM IO Box	Sending machine state, Status Details and quantities to runtime
IOBoxScriptTemplateStroke	FC_IO_Box_Mstate_Mstroke	DACQ Script	FORCAM IO Box	Sending machine state, Status Details and strokes to runtime

13 Work Time Assignment

Path: Master Data > Shift Calendar > Work Time Assignment

The previously defined shift weeks (see section 7) can be assigned to a workplace in Work Time Assignment.

ⓘ You can only maintain shifts within the time zone of the application server. You cannot create or edit a current day shift it will not take effect until.

To assign a shift week to a workplace:

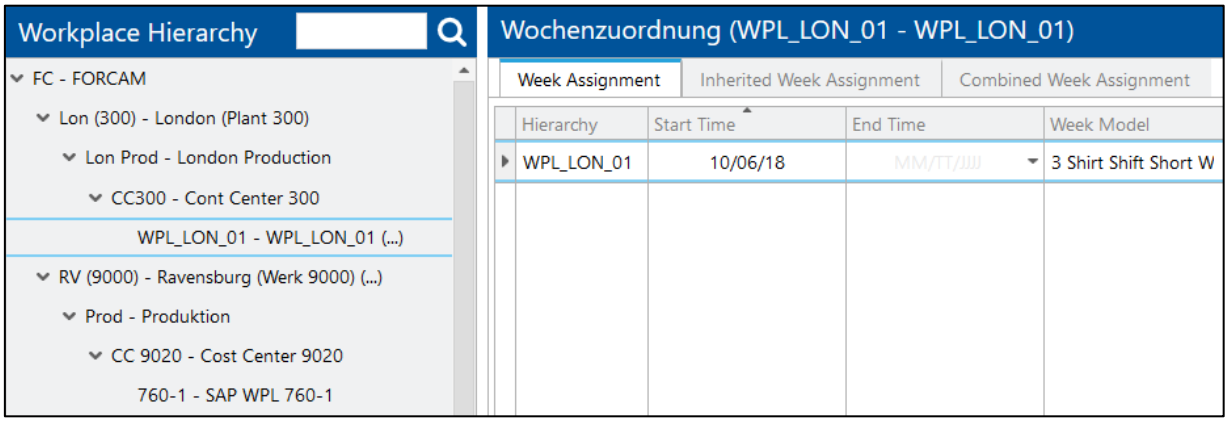

Fig. 66: Work time assignment

1. Select a workplace in the **Workplace Hierarchy** field.
2. Right-click on a free space in the **Week Assignment** field and click on **Add Week Assignment** in the context menu.

➔ The workplace selected in the hierarchy tree appears in the **Week Assignment** field.

3. Select the start time and end time of the shift week.
   The start date cannot be earlier than the current date.
4. Select a shift week from the dropdown menu in the **Week Model** column.

➔ The shift for the selected period appears in the calendar in the color it was previously assigned.

5. Select a shift team from the dropdown menu in the **Team Model** column, if necessary.
6. Save.

	Week 47			
Week Model	3 Shirt Shift Short Week	3 Shirt Shift Short Week	3 Shirt Shift Short Week	3 Shirt Shift Short Week
Date	Nov 19, 2018	Nov 20, 2018	Nov 21, 2018	Nov 22, 2018
Weekday	Monday	Tuesday	Wednesday	Thursday
Working day	☑	☑	☑	☐ Cleaning
Timezone	Europe/London	Europe/London	Europe/London	Europe/London
Shift 1	F 06:00 - 09:00	F 06:00 - 09:00	F 06:00 - 09:00	
Shift 2	S 09:00 - 12:00	S 09:00 - 12:00	S 09:00 - 12:00	
Shift 3	N 12:00 - 15:00	N 12:00 - 15:00	N 12:00 - 15:00	

Fig. 67: Calendar with non-working days

You can add or remove a fixed shift to a day in the shift week. A fixed shift is a manually added shift outside the week definition. The shift added must be defined previously (see section 7.2).
It is not possible to add times manually here. A shift type (see section 7.1) can only appear once per day. You can only add or remove current or future shifts.

To add a fixed shift to a day:

1. Right-click on the appropriate day in the calendar and click on **Add Fixed Shift** in the context menu.
2. Select a Shift Definition Pattern.
   A shift type (E/L/N) created in the Shift Definition.

➔ The data of the selected Shift Definition (shift type, times, breaks) are entered automatically.

3. Select a team you want to add to the shift, if appropriate.
4. Confirm.

➔ The fixed shift is added to the day.

5. Save.

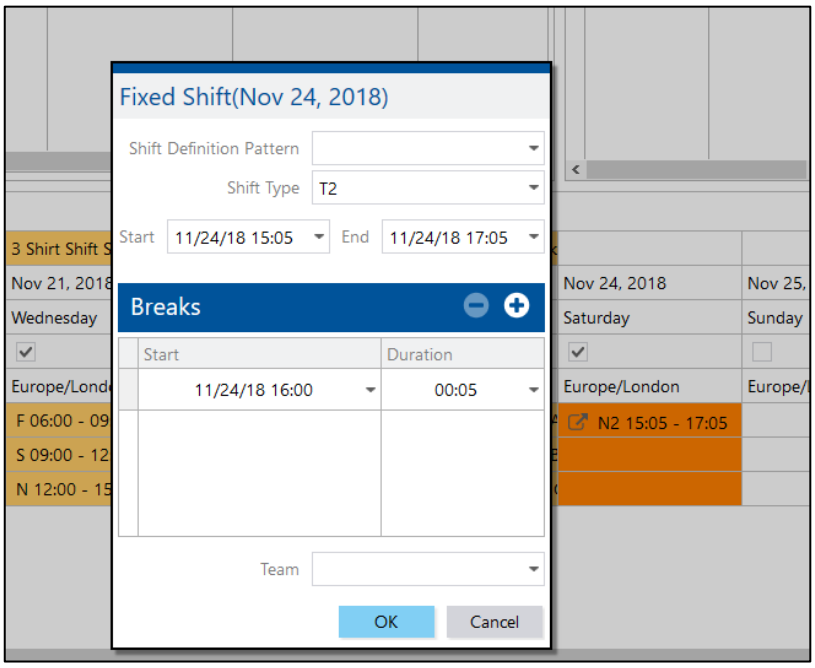

Fig. 68: The new shift is added to the day

To remove a shift:

1. Right-click on the appropriate shift in the calendar and click on **Remove Fixed Shift** in the context menu.

➔ The fixed shift is removed.

Or

Click on **Remove All Local Fixed Shifts**.

➔ All shifts of that day are removed.

2. Save.

Specifying non-working days defines those days when a workplace is inactive. Non-working days are added to a shift week. You cannot add shifts to a non-working day.

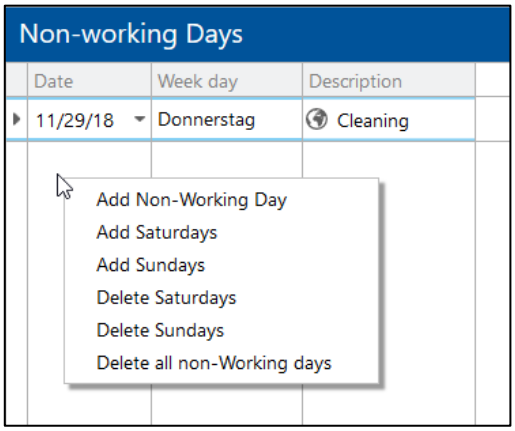

Fig. 69: Adding non-working days

To add non-working days to a shift week:

1. Right-click on a free space in the **Non-Working Days** field.
2. Click on **Add Non-Working Day** and select the appropriate day.
   The day cannot be earlier than the current date.

   Or

   Click on **Add Saturdays** in the context menu.

➔ This will add all future Saturdays of the current year.

Or

Click on **Add Sundays** in the context menu.

➔ This will add all future Sundays of the current year.

3. Save.

To delete a non-working day:

1. Right-click on a day in the **Non-Working Days** field and click on **Delete non-working day** in the context menu.

➔ The selected working day is deleted.

Or

Right-click in the **Non-Working Days** field and then click on **Delete Saturdays/Sundays** in the context menu.

➔ After confirming, all Saturdays or Sundays are deleted, as applicable.

Or

Right-click in the **Non-Working Days** field and then click on **Delete all non-working days** in the context menu.

➔ After confirming, all individual days and both Saturdays and Sundays are deleted.

2. Save.

13.1 Time Zone

In the work time assignment, the corresponding workplace time zone is displayed for each workplace shift day. Each shift relates exclusively to the displayed time zone.

< >	Week 47			
Week Model	3 Shirt Shift Short Week	3 Shirt Shift Short Week	3 Shirt Shift Short Week	3 Shirt Shift Short Week
Date	Nov 19, 2018	Nov 20, 2018	Nov 21, 2018	Nov 22, 2018
Weekday	Monday	Tuesday	Wednesday	Thursday
Working day	☑	☑	☑	☑
Timezone	Europe/London	Europe/London	Europe/London	Europe/London
Shift 1	F 06:00 - 09:00	F 06:00 - 09:00	F 06:00 - 09:00	F 06:00 - 09:00 Team A
Shift 2	S 09:00 - 12:00	S 09:00 - 12:00	S 09:00 - 12:00	S 09:00 - 12:00 Team B
Shift 3	N 12:00 - 15:00	N 12:00 - 15:00	N 12:00 - 15:00	N 12:00 - 15:00 Team C

Fig. 70: Time zone in the work time assignment

In future, each shift will be created and saved by the shift generator in UTC. When the work time assignment is loaded, the system then converts the time into the corresponding workplace time zone. The workplace obtains the time zone data via the corresponding attribute maintained in the ORG hierarchy (see section 11.2.3.1). This attribution is independent of the use of a local administration.

UTC shifts generated in the past are counted back to the workplace time zone and displayed when the shift configuration page is loaded.

The addition of a fixed shift likewise always relates to the particular workplace time zone.

14 Shop Floor Terminal

Path: Configurations > Shop Floor Terminal

The SFT is the central source of information for the production personnel and for reporting operating states. Runtime course and runtime protocol are displayed in real-time. The SFT runs in a browser environment. The layout and the displayed information can be fully configured in each screen.

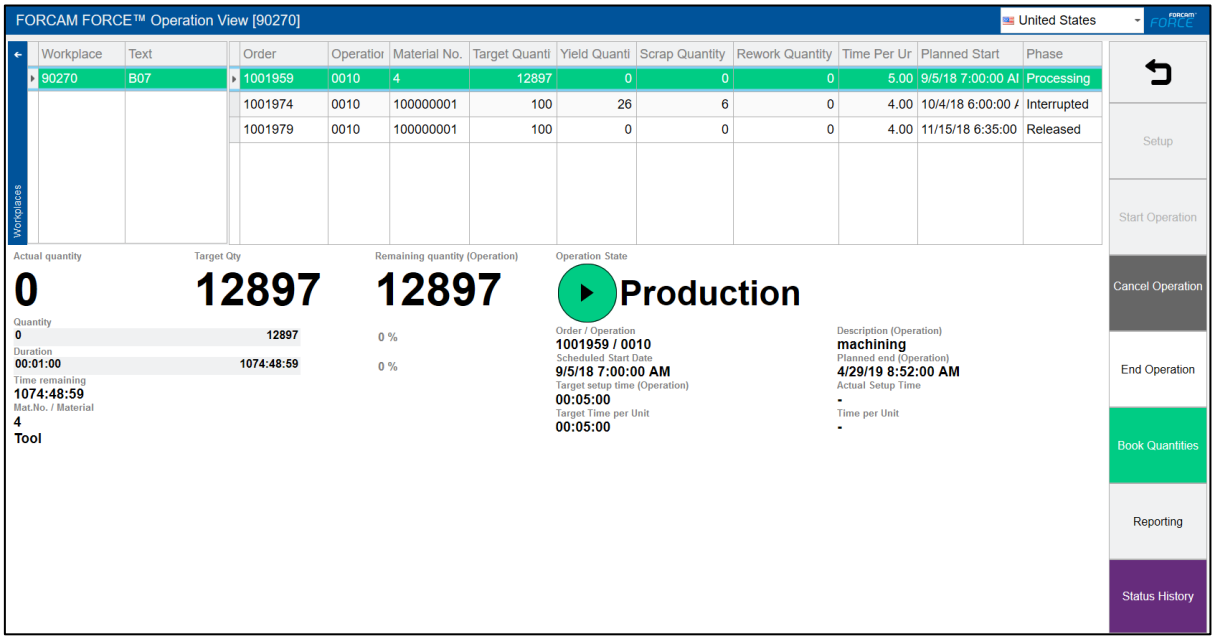

Fig. 71: SFT root base page (example)

All buttons of the Shop Floor Terminal (right-hand edge of the screen in Fig. 71) are freely configurable. Each button equates to one activity step, which can be linked with a certain action. Possible actions are e.g. the change of the status of an operating state, the display of logged-on personnel, the search of workplaces to OPs etc. Overall, 91 activity steps are available by default.

ⓘ For the detailed configuration of activity steps, see the manual Shop Floor Terminal.

14.1 Concept of Parameters

Each activity step requires the configuration of input parameters and if applicable output parameters, to read and export the correct information or to execute a step, respectively.
The configuration of input and output parameters is done via the dialog for the configuration of activity steps.

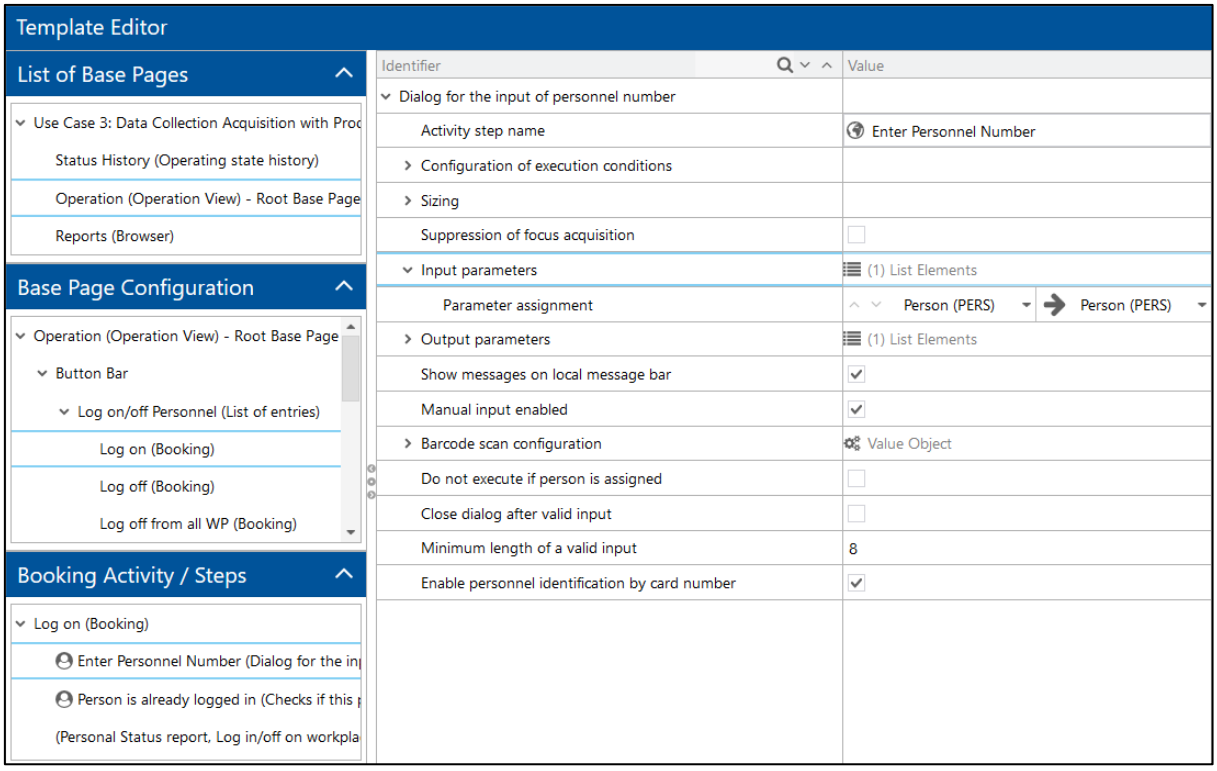

Fig. 72: Dialog for the configuration of activity steps in the Shop Floor Terminal configuration

Parameters are each selected in two side-by-side drop-down menus (see Fig. 73). The left drop-down menu determines the domain of the activity. Here is defined, to which type the activity step relates. The following types are available:

- OP (operation)
- WPL (workplace)
- UNKNOWN (place holder for any type)

The right drop-down menu determines the actual parameter of the activity step. Depending on the selected domain, there are corresponding parameters available.

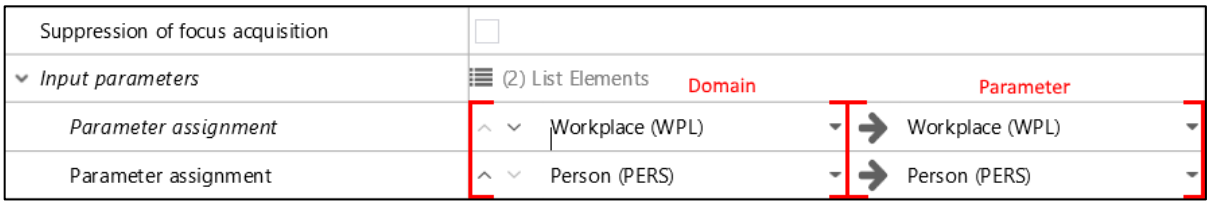

Fig. 73: Selection of domain and parameter of activity steps

Domain and parameter must coincide textually. If, for instance, a workplace shall be determined as parameter, it must be consequently in the domain workplace. If domain and parameter do not coincide textually, the line of the parameter assignment is marked in red (see Fig. 74). Therefor the system check for conformity equals a consistency check.

Parameter assignment		Person (PERS)	→	Workplace (WPL)
Parameter assignment		Person (PERS)	→	Person (PERS)

Fig. 74: Textual inconsistency of domain and parameter

14.1.1 Input Parameter

Input parameters determine the data an activity step includes to process them. The function of input parameters is displayed in the following figure:

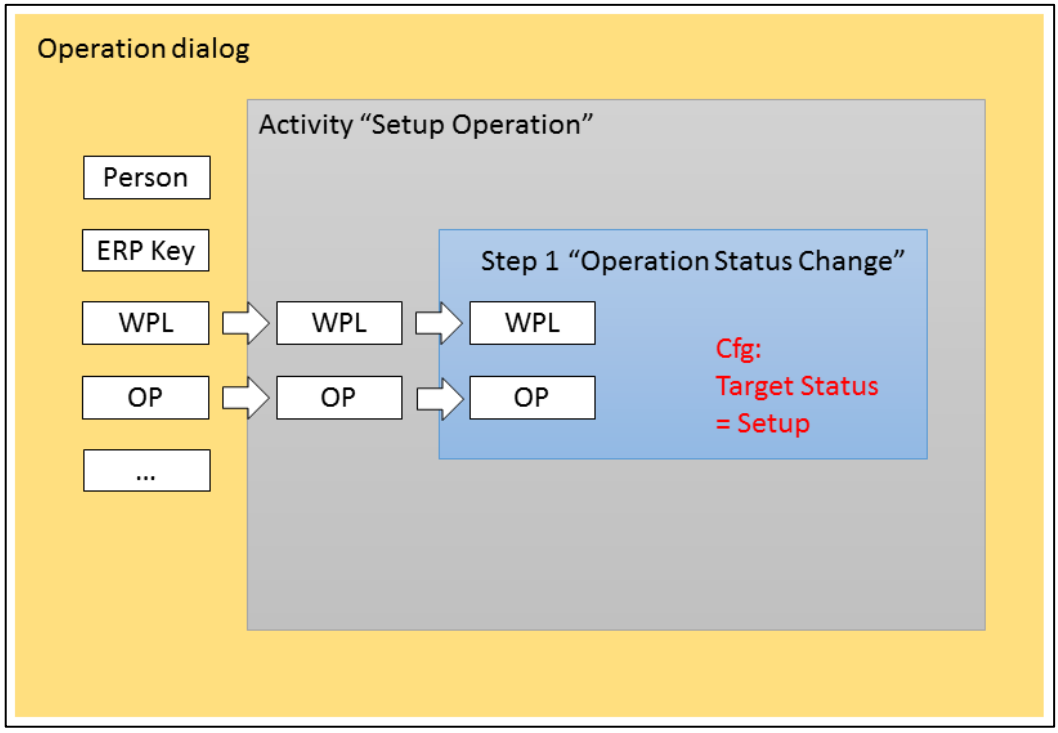

Fig. 75: Function of input parameters

In this example, the button **Setup operation** is pressed in the Shop Floor Terminal. As a result, the system is to change the status of an operation to **Setup**. The button starts the activity **Setup operation**. This activity executes the activity step **Operation phase change** with the target status **Setup**.

To change the operation status, the activity step requires data on the operation itself. Hence, the operation is the required parameter. An operation always refers to a workplace. Therefor the domain of the operation is the workplace. This results in **WPL** and **OP** being the input parameters for the activity step **Operation status change**.

14.1.2 Output Parameters

Output parameters are not the indication of data that an activity step e.g. in the form of a display or a dialog export. They are parameters that are transferred internally to be used in further steps. The function of input parameters is displayed in the following figure:

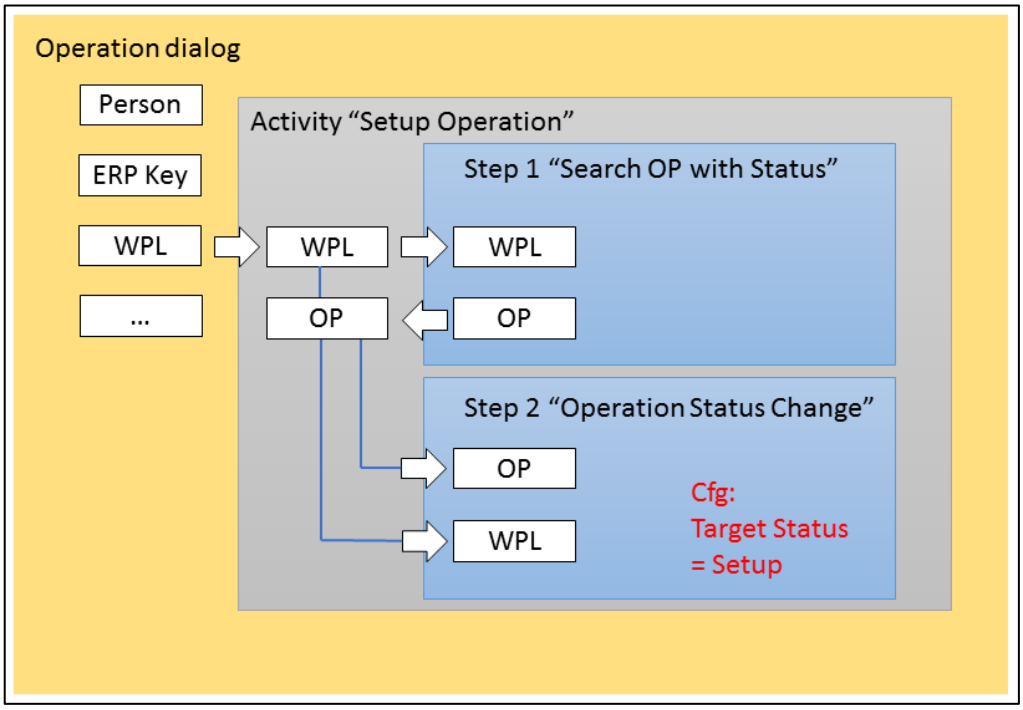

Fig. 76: Function of output parameters

In this example, the button **Setup operation** is pressed in the Shop Floor Terminal. As a result, the system is to change the status of an operation to **Setup**. The button starts the activity **Setup operation**. This activity executes the activity step **Search OP with status**. The activity step exports data of operations with status. The next activity step **Operation status change** receives these data and changes the status of the corresponding operation to **Setup**.

The activity step **Search OP with status** searches for operations at workplaces. Therefore, the activity step requires data of workplaces as input parameter: **WPL**. The operations that the activity step detects are exported as output parameters: **OP**.
The activity step **Operation status change** shall change the status of the operation that was identified by the predecessing activity step. The input parameters needed by this activity step are **OP**, which are provided by the predecessing activity step as output parameters. In addition, **WPL** is used as domain, since an operation always refers to a workplace.

14.2 Configuration of a Terminal

A Shop Floor Terminal consists of a template and a profile.
The user interface of the terminal is configured in the template. This applies e.g. to the buttons or the layout of the displayed tables.
The profile provides configurations relating to the user: logon data, time zone, entry form etc.
Templates and profiles can be combined at will.

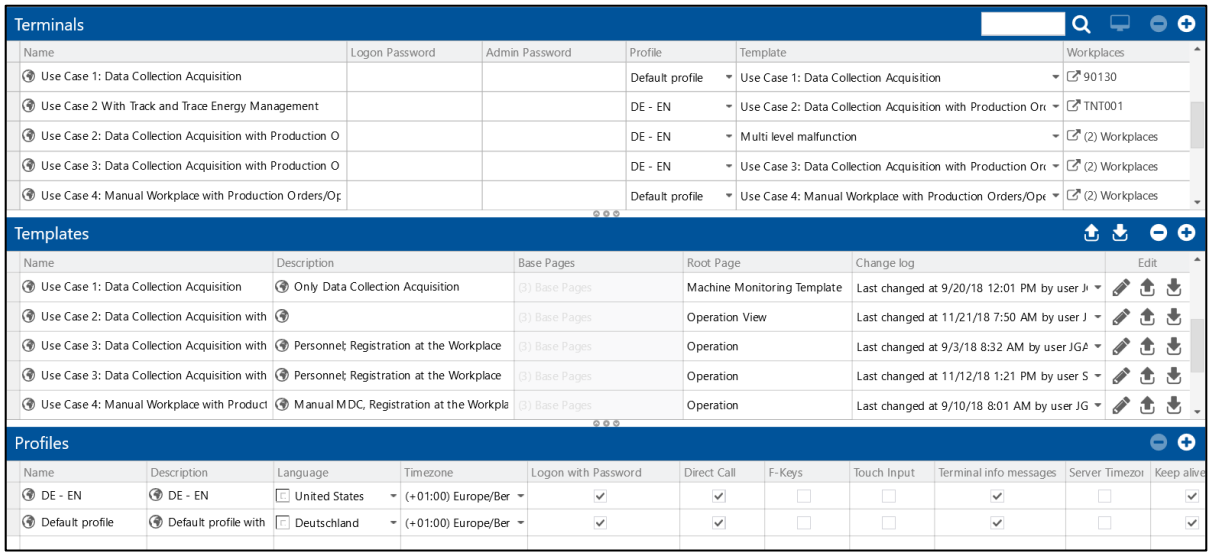

Fig. 77: Configuration page for the Shop Floor Terminal

14.2.1 Creating a Template

To create a new template:

1. Click on the **Add** icon in the **Templates** area.

➔ A template previously selected is copied and the associated settings are adopted.

2. Enter the name and description.
3. Save.
4. Click on the **Edit** icon in the column **Edit**.

➔ The display switches to the template editor (see Fig. 78).

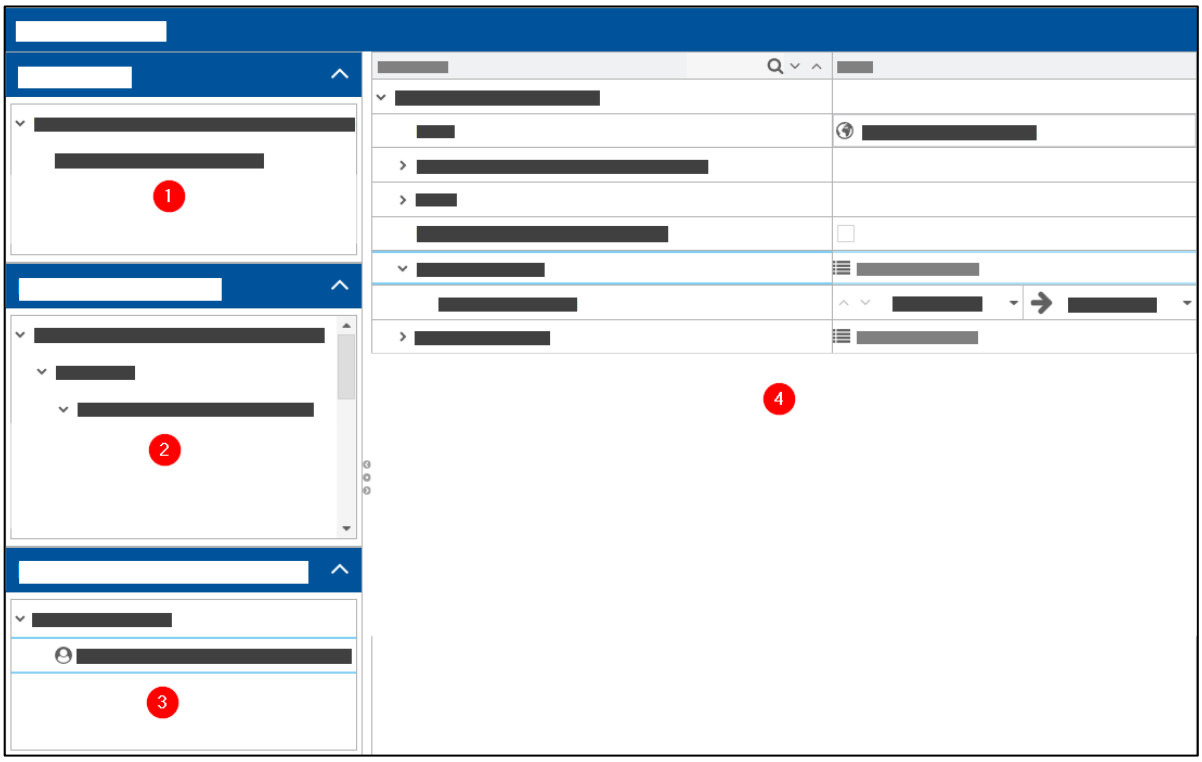

Fig. 78: Template editor

The template editor consists of the following areas:

(1) List of Base Pages:
List of all pages in the template. There are 5 predefined page types overall. Each type has individual settings.

(2) Base Page Configuration:
Configuration of buttons and display area of single masks

(3) Booking Activity / Steps:
Configuration of activity steps of single buttons

(4) Editing area:
Any setting is displayed and executed here.

14.2.1.1 Creating a Page

There are 5 predefined mask types overall. Each mask shows fields that are reasonable for it and therefore are predefined by default:

- Operation View:
  Display of workplaces and operations
- Browser
  Display of any report, visualization or HTML page or switch to another mask
- Machine Monitoring view
  Display of workplaces with the current machine status for the configured timespan (e.g. shift)
- NC View
  Display of NC packets to an OP
- Operating State History
  Display of operation states with the option to transcode them

To create a new mask:

1. Right-click on the template name in the **List of Base Pages** area**,** then click on **Add Base Page** in the context menu.
2. Select the desired page type from the drop-down menu of the subsequent dialog.
3. Enter the name and description and confirm.

➔ The page appears in the list of base pages.

4. Save.

To edit a page:

1. Right-click on a page, then click on **View/Edit** in the context menu.
2. Change the desired settings.
3. Click on **Root Base Page** in the context menu (optional).

➔ The page appears after logging in in the Shop Floor Terminal.

4. Save.

The settings of a page vary with the type. The following settings are available:

Table 8: Setting option of the different page types

Mask type	Setting
Operation View	Height and width of the tables top and left
	Automatic refresh cycle in msec
	Option to enter the barcode with bounce time (minimum time for the reset between two consecutive barcode scans)
	Terminal identification: If the SFT communicates with an external program, terminal identification must be activated. The file with the terminal identification contains a unique terminal ID which identifies it. It is sent during the communication and makes it unique.
Browser	Name and description of the button. The target value is defined in the page configuration.
Machine Monitoring View	Height of table, status diagram and status history
	Automatic refresh cycle in msec
	Time unit and value (e.g. shift)
NC View	Height of the header data area of a packet
	Header element with line/column width (e.g. material description)
Operating State History	Reverse time correction mode: – Fixed number of shifts – Fixed period in msec – Last shift that reaches into the new shift for a desired duration (in msec) – No restriction

	Coding period for pre-shift in msec (duration for which a previous shift reaches into the new one). Only relevant, if the mode **Last shift until x [ms] in a new shift** was selected.
	Standard status detail filter: Preselection of Status Details that shall be displayed: – Display all: Displays qualified and unqualified malfunctions – Display malfunctions: Displays qualified malfunctions only – Display unqualified Displays unqualified malfunctions only
	Maximal coding horizon: Disables an already recoded status time line element for further recoding. The following values are possible: – -1: This parameter is not taken into consideration. – 0: All the previously recoded timeline elements will be disabled for further recoding. – >0 (e.g. 25000): All the timeline elements which were recoded before e.g. 25 seconds will be disabled from further recoding.
	Default period: Preselection of a period: – 1/2/3 shifts – 1/3 days – 1 week – 8 hours
	Period selection: Selection of periods (shift, day, week, hours), that shall be selectable.

Depending on the selected page type, other settings are available in the **Page configuration** area.

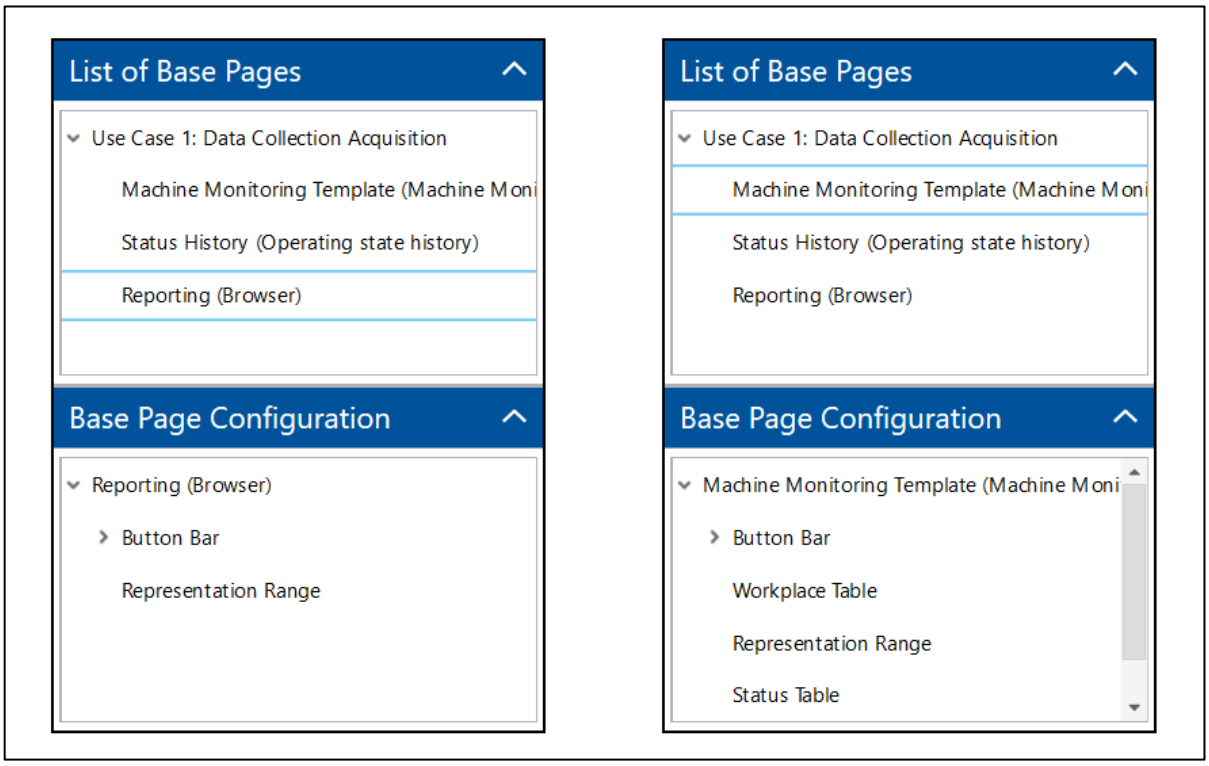

Fig. 79: Different mask configuration for each mask type

To edit a mask configuration:

1. Right-click on the desired setting in the **Base Page Configuration** field, then click on **View/Edit** in the context menu.
2. Change the desired settings.
3. Save.

The following settings are available:

Table 9: Mask configuration of the different mask types

Mask type	Setting
Operation View	Formatting of tables that list workplaces and OPs and definition of individual columns.
	Configuration of the detailed view of OPs. Selected workplace and OP of the base page must be chosen as input parameter.
Browser	Configuration of the display area: Indication of an URL that shall be displayed.
Machine Monitoring View	Formatting of tables that list workplaces and their states and definition of individual columns. Configuration of the display area: Indication of an URL that shall be displayed.
NC View	Formatting of the table that lists NC files and definition of individual columns. Selected workplace, OP and NC packet of the base page must be chosen as input parameter.
State history	Formatting of tables that list operating states and definition of individual columns.

14.2.1.2 Creating a Button

Buttons can be created for each page. The buttons are displayed in the button bar (right sidebar) of the Shop Floor Terminal.
Initially a button does not have a function. Only after a command (activity step) was assigned, a button triggers function.

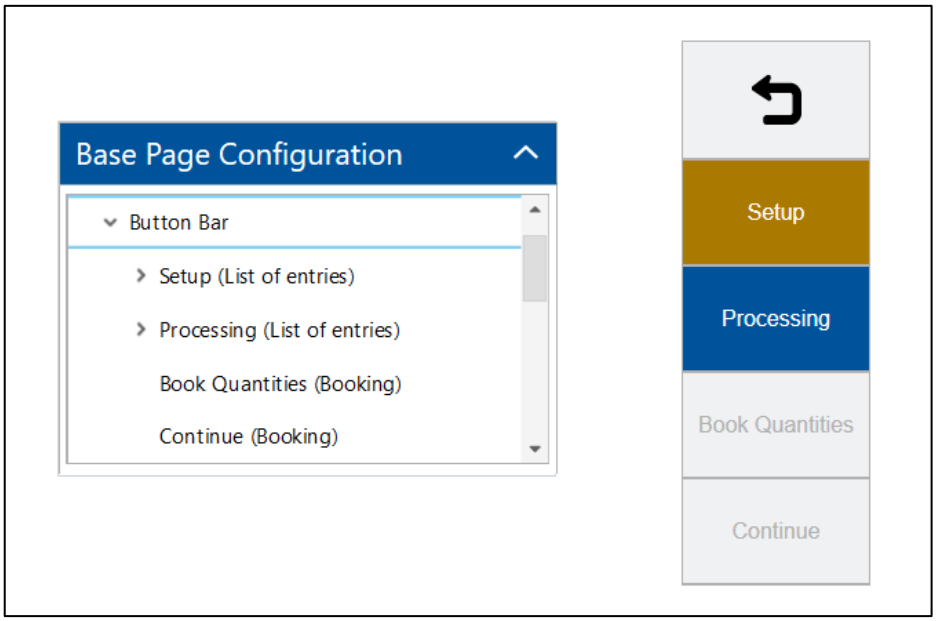

Fig. 80: Configuration of a button bar and display in the SFT

To create a button:

1. Right-click on **Button Bar** in the **Base Page Configuration** area, then click on **Add Activity** in the context menu.
2. Select an activity from the drop-down menu of the subsequent dialog.
   3 activity types are predefined.
3. Enter the name and confirm.

➔ Setting options for the button appear in the editing area.

4. Save.

The following activity types are available:

Table 10: Activity types and their function

Activity type	Explanation
Booking	Basic button that can have a function (booking or message) assigned.
List of entries	Superordinate button that can have multiple subordinate buttons assigned. If the superordinate button is pressed in the SFT, the subordinate ones appear beside it. Only the subordinate buttons can execute functions.
New page	Button that forwards to another existing page. This button does not need an activity step. The page to which the user is forwarded to is selected after setting the button under **Reference to base page**.

To assign a function to a button:

1. Select a button that shall get a function assigned in the **Base Page Configuration** area.
➔ The button is created as file in the **Booking activity / Steps** area.
2. Right-click on the file in the **Booking activity / Steps** area, then click on **Add Activity Step** in the context menu.
3. Select the desired activity step from the drop-down menu of the subsequent dialog.
4. Enter a name of the step and confirm.
The name is only used as internal identifier. The button name remains unchanged.
5. Configure activity step in the editing area as desired.
6. Save.

ⓘ One button can have multiple activity steps assigned. Thereby buttons can be configured that execute multiple functions consecutively to solve a more complex task.

14.2.2 Creating a Profile

All settings are optional, except the profile name. Some settings are predefined.

To create a terminal profile:

1. Click on the **Add** icon in the **Profile** area.
➔ A profile previously selected is copied and the associated settings are adopted.
2. Enter the profile name.
3. Save.

The following settings for profiles are available:

Table 11: Profile settings for the SFT

Setting	Explanation
Language and Time Zone	Language and time zone in which the terminal shall be displayed. The languages German, English (US/GB), Spanish and Chinese are currently supported.
Logon with Password	A password is needed to access the terminal. The password is set in the **Terminals** area (see chapter 14.2.3).
Exit Allowed	The user can close the terminal window.
Exit with password	To close the terminal window, a password is needed. The password is set in the **Terminals** area (see chapter 14.2.3).
Direct call-up	Call-up of the terminal with this profile without authentication.
F-Keys	Each button can get an F-key assigned, except for F1. The F1-key is permanently linked with the back function.
Touch Input	In case of a manual entry in the SFT, a touch input field appears. It is recommended to activate this function when using devices with a touchscreen.
Terminal info messages	Messages can be sent to the terminal.
Server Time Zone	The server time zone is used for the terminal.
Keep alive	Test signal that is sent in configurable time intervals to the terminal to check if it is active.
Keep alive interval [sec]	Time interval in seconds for the keep alive signal
Serial Port	Name of the serial port (COM2 is predefined)
UDP Receiver	Minimal, connectionless network protocol that belongs to the transport layer of the internet protocol family. UDP enables applications the transmission of datagrams in IP-based computer networks.
UDP Port	Port of the UDP receiver (18.999 is predefined)
Printer name	Name of the used printer. A printer can be used e.g. for the activity step **Printing of a document**.
Client directory	Directory of the application

14.2.3 Configuring a terminal

A terminal always consists of a template and a profile. These must be created and saved before they can be used for a terminal.

To configure a terminal:

1. Click on the **Add** icon in the **Terminals** area.
➔ A terminal previously selected is copied and the associated settings are adopted.
2. Enter the terminal name.
The name appears in the logon screen with the terminal selection.
3. Create passwords.
Only necessary, if an option with a mandatory password was activated in the profile (see chapter 14.2.2).
4. Select a profile from the drop-down menu in the column **Profile**.
5. Select a template from the drop-down menu in the column **Template**.
6. Click on the **Open in pop-up** icon in the column **Workplaces** and select one or more workplaces.
The number in parenthesis indicates how many workplaces are assigned to the terminal.
7. Save.

15 Logon Page

Path: Configurations > Logon Page Configuration

You can personalize the logon page of the Workbench using your own logo or news ticker view. The news ticker and logo appear only on the logon screen.
The size of the logo is automatically scaled. The suggested size is 350 (width) x 200 (height) Pixel.
Supported graphic formats are .png, .jpg und .gif.

Fig. 81: Workbench logon page

To personalize the logon page:

1. Enter the desired system identifier.
➔ The system identifier appears in the top bar after logging on.
2. Click **Upload** and select the desired logo.
3. Enter the desired news ticker view.
4. Save.

16 Operation Management

Path: Operation Management > Operation Management

You can use **Operation Management** to view orders. A freely editable search function can be used to list relevant details.

16.1 Finding an Operation

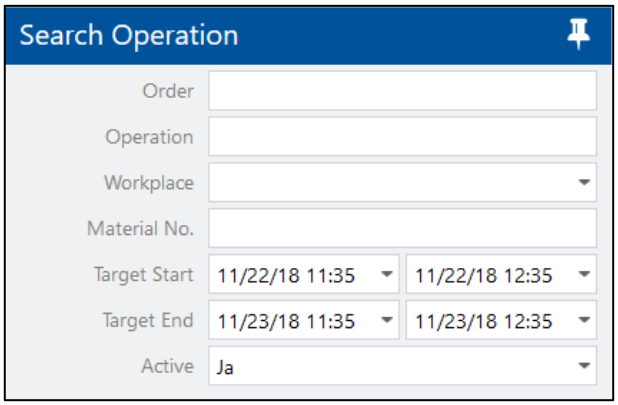

Fig. 82: Operation management

1. Enter the relevant search parameters.
2. Click the **Search** icon.
3. For another search, reset the search filter by clicking the **Reset search** icon.

16.2 Managing the Search Results

When a search is completed successfully, operations are listed in the search results. When you right-click on an operation in the list, the following options are available in the context menu:

- Show Order
- Display Operation
- Create New Operation
- Edit Operation

16.2.1 Show Order

Show Order shows the **Order Details** of the selected order. You can select the **Attributes** and **User Fields** tabs:

- Attributes:
  Data of the order such as ID, status, order number, target quantity, etc.
- User Fields:
  Blank fields made available to enter additional information of any kind

16.2.2 Show Operation

Show Operation shows the **Operation Details** of the selected order. In addition to the **Attributes** and **User Fields** tabs, the **Components** and **Production Tool Resources** tabs are also available for selection.

- Components:
  Data related to input components (parts) that are necessary for the creation or the assembly, respectively, of a material (see Manual Component Message).
- Production Tool Resources:
  Data related to passive operating resources (e.g. tool, clamping device, casting mold etc.) that are necessary for the manufacturing of a material

16.2.3 Edit Operation

Edit Operation shows the existing details of the selected order. You can edit all fields that are not greyed out.

17 Corrections

Path: Corrections

The **Corrections** function enables you to correct operating states, quantity messages and shifts later. You can terminate or abort operations here. In addition, you can make corrections to the hit setting. The correction of operating states also offers you the possibility of correcting a configuration. Corrections are effective immediately after saving and become visible in reports after a renewed log in.

✓ A function (e.g. quantities) is searched and selected.

To find a function:

1. Select a workplace from the dropdown menu next to **Workplace**.
2. Enter additional search criteria as necessary.
3. Click the **Search** icon.

➔ One or more search results will appear, depending on the precision of the search and/or the available data.

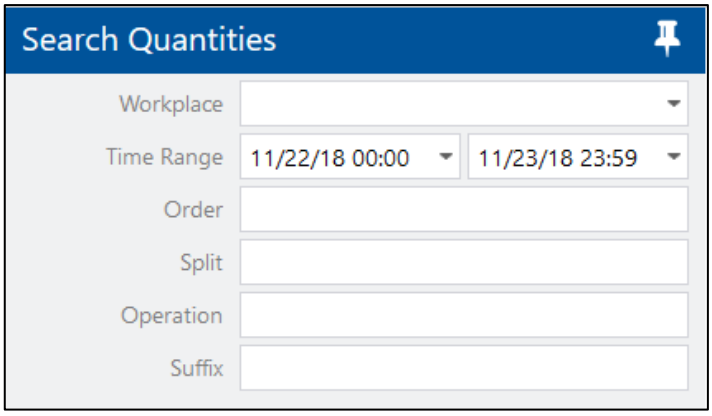

Fig. 83: Finding quantities

The search period is predefined for 14 days. The period can be edited via the **Edit** icon in the configuration:

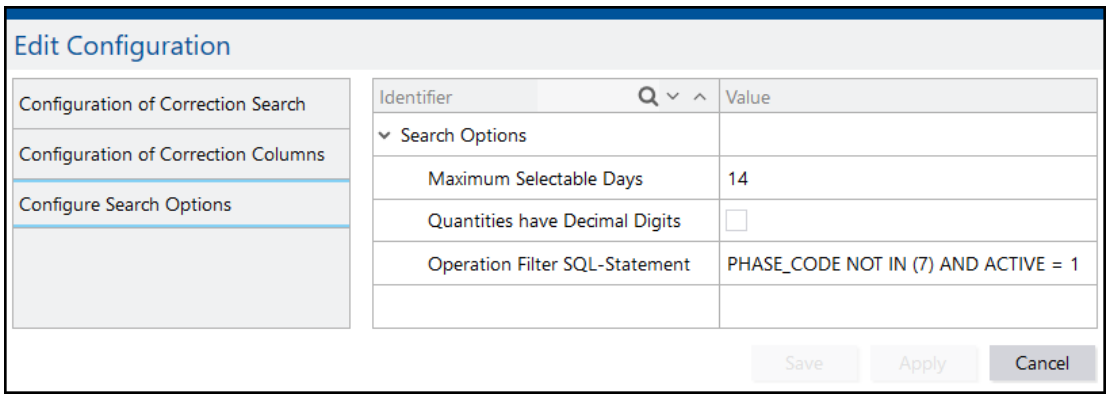

Fig. 84: Configuring the maximum selectable days

17.1 Correction of Operating States

Path: Corrections > Operating State

ⓘ You can only change an operating state if a correct check mark has been set under **Status details** (see section 6.2) for **Recodable** or **Splittable**.

One or more operating states may be changed, depending on the selection made for the Status Detail tree configuration (see section 17.1.1). You can correct an operating state in the following ways:

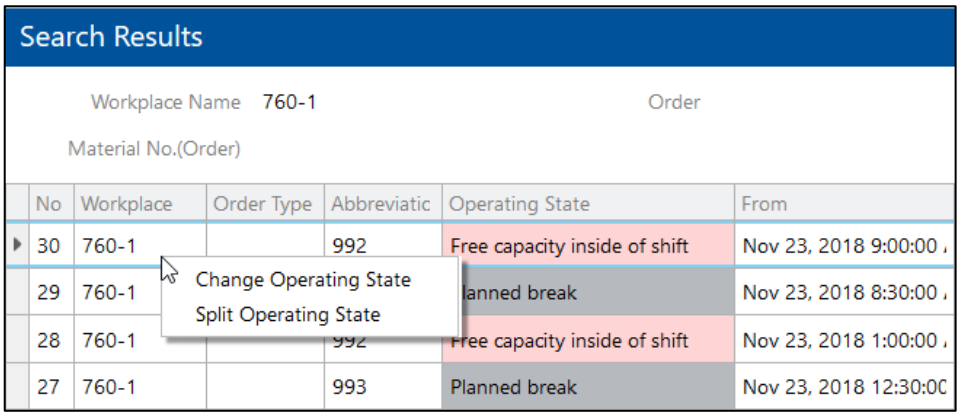

Fig. 85: Changing an operating state

- Change Operating State:
  To change the data of an operating state
- Split Operating State:
  Subdivide a process at any point between its start and end points

To change an operating state:

1. In the Search Results field, right-click on the appropriate line and then click on **Change Operating State** in the context menu (see Fig. 85).

➔ The view changes to the editing page. You cannot edit the **Change Operating State** field manually.

2. Go to the **State Correction** field and select the desired category.
   The drop-down menu lists all categories that can replace the current category.
3. Select the desired operating state that is to replace the current one.
4. Enter comment
   Short text explaining why the operating state was changed.
5. Enter detail
   Larger input field with the option to explain the reason for change in more detail. The detail field can be hidden in the correction configuration of the previous page.
6. Save.

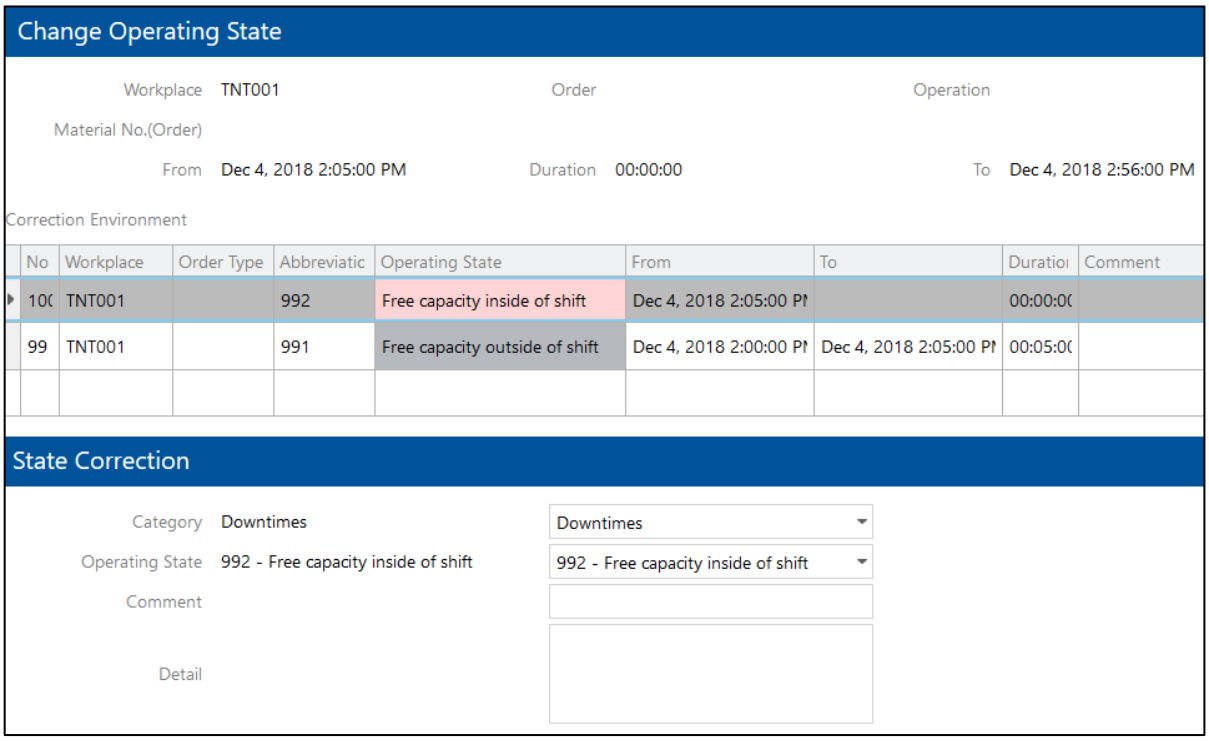

Fig. 86: Metadata of an operating state

To split an operating state:

1. In the Search Results field, right-click on the appropriate line and then click on **Split Operating State** in the context menu (see Fig. 85).
2. Select the time for splitting the process.
3. Fill in the input fields.
4. Save.

17.1.1 Correction Configuration (State Detail Recoding)

When you want to correct operating states, you can select the mode for state detail recoding (see Fig. 87). It is possible to create a Status Detail tree and/or change the type of the tree:

- Single-level Status Detail tree:
  A Status Detail tree with a single level only. If there is no error code mapping, the state detail reason is undefined.
- Multilevel Status Detail tree:
  A Status Detail tree with 1-n levels.
- Multilevel Status Detail tree with tooling identification:
  A Status Detail tree with 1-n levels where the tool information is read in dynamically.
- Recoding with fault reasons
  Detailing is not hierarchical any more. A subordinate level is no longer linked to the parent level. This means that a change to the upper level does not affect the subordinate level and you can change the levels independently of each other.

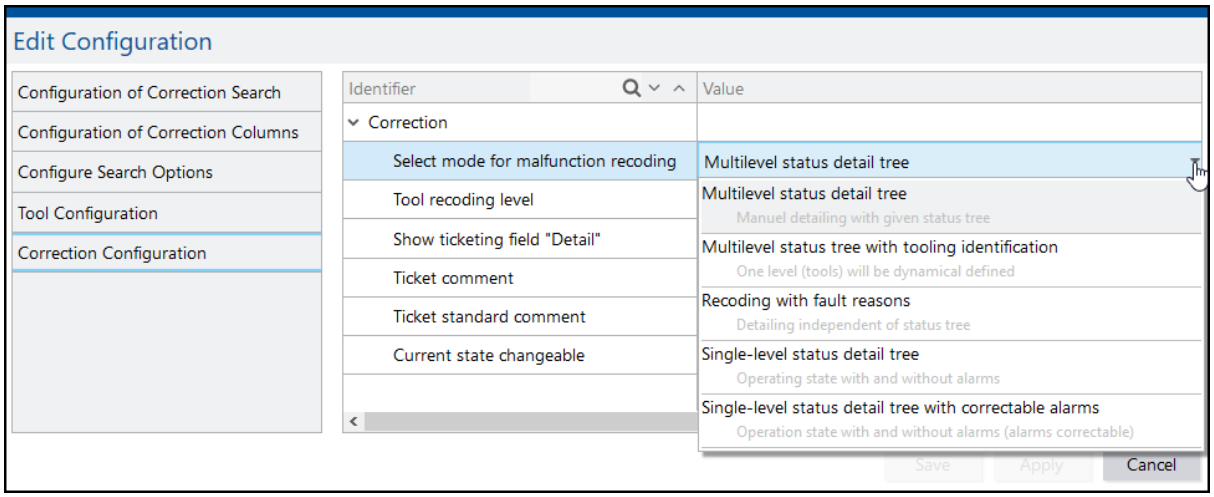

Fig. 87: Editing a configuration

To select the mode for operating state correction:

1. Click the **Edit** icon in the upper bar.
2. Click **Correction Configuration** in the left-hand area.
3. Select the appropriate setting in the central area from the dropdown menu next to **Select mode for state detail recoding**.
4. Save.

17.2 Correction of Quantity Messages

You can correct quantities, which are booked in the form of quantity messages on an operation during the production process, subsequently. You can correct all quantity messages which arrive on an operation as a whole. You can also correct single quantity messages (explicit event) of an operation.

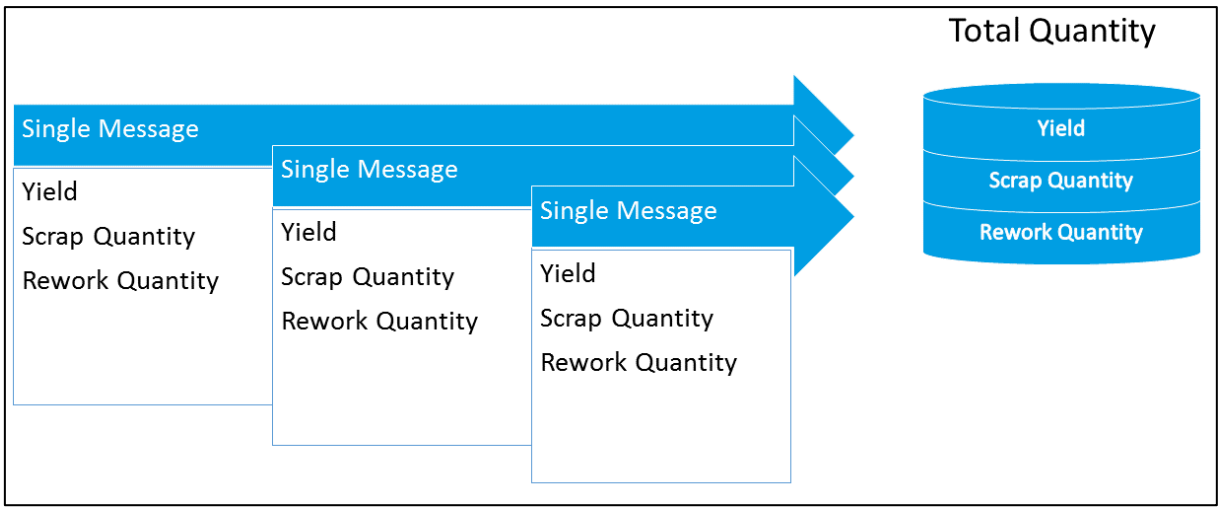

Fig. 88: Relation of single messages to the total quantity

The displayed quantity of an operation always describes the total quantity which arrives during the production time. The total quantity is defined by the quality types and is composed of yield, scrap quantity and rework quantity. The yield, scrap quantity and rework quantity of the total quantity of an operation are each the sum of the quantities from the single messages.
You can change the quantities of the total quantity in the Quantity Correction. You can change the quantities of single messages in the Single Quantity Correction. The total quantity will then be adjusted.

17.2.1 Changing Quantity Messages as a Whole

Path: Corrections > Quantity Messages

You can change all quantity messages of an operation as a whole. The displayed quantities are the sum of all quantities of the selected operation. When a quantity is changed, the total quantity changes by the same amount. The changes are applied on the single events automatically in a background process. The user cannot influence the times and events of the corrections with this correction mechanism.

Search Results

Workplace Name TNT001

Workplace	Current Time	Order	Operation	Material No.	Yield	S
TNT001	Oct 23, 2018 12:13	T1001963	0010	5	1,653	

Fig. 89: Quantity messages of an operation as a whole

To change the yield:

1. Right-click on the appropriate quantity and select **Change Quantity** in the context menu.
2. Select the option field **Changeable Yield** in the **Total/Yield Quantity** area.

➔ The input field next to **Yield** becomes editable.

3. Enter appropriate value in the input field next to **Yield**.

➔ The total quantity changes by the amount by which the yield is changed.

4. Save.

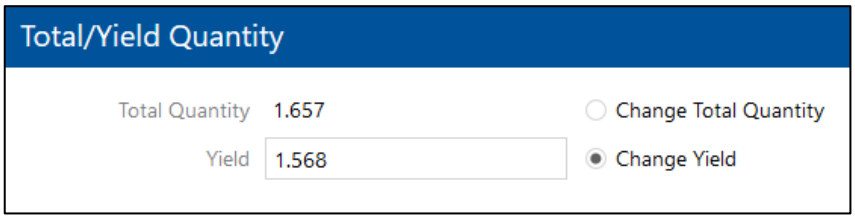

Fig. 90: Change the yield

You can change scrap quantities and rework quantities, too. You can also change the reason for scrap/rework or add another reason. When the scrap reason or rework reason is raised or a reason with an additional quantity is added, the total quantity is raised by that amount.

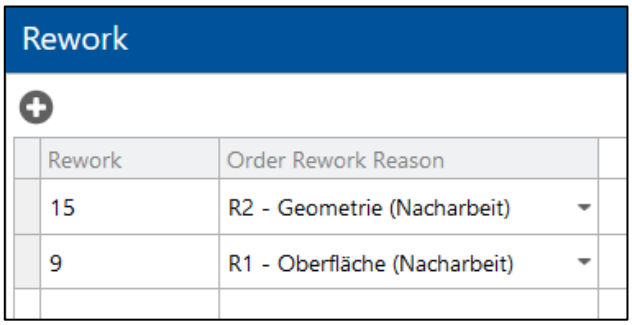

Fig. 91: Change the rework quantity

To change a scrap reason or rework reason:

1. Right-click on the appropriate message and select **Change Quantity** in the context menu.
2. Select appropriate quantity in the **Scrap** or **Rework** area.
3. Edit the quantity directly in the cell.

➔ The total quantity changes by the amount by which this quantity is changed.

4. Select a different reason in the dropdown menu behind the quantity, if necessary.
5. Save.

To add a scrap reason or rework reason:

1. Right-click on the appropriate message and select **Change Quantity** in the context menu.
2. Click the **Add** icon in the **Scrap** or **Rework** area.
3. Enter appropriate quantity.

➔ The total quantity raises by this amount.

4. Select appropriate reason in the dropdown menu.
5. Save.

To delete a scrap quantity or rework quantity:

1. Right-click on the appropriate message and select **Change Quantity** in the context menu.
2. Right-click on the appropriate quantity in the **Scrap** or **Rework** area.
3. Select **Delete Quantity** in the context menu.

➔ The total quantity is reduced by the amount of the deleted quantity.

4. Save.

17.2.2 Changing Single Quantity Messages

Path: Corrections > Single Quantity Correction

You can change all quantity messages of an operation individually. The displayed quantities are single quantity messages of an operation on the selected workplace. Each change effects the selected event only. The total quantity in Fig. 93 relates to the single message.

Search Results

Workplace Name TNT001

Current Time	Order	Operat	Material No.	Yield	Scrap	Rework	Workplace
Oct 23, 2018 12:13:36	T100196313	0010	5	1,565	0	0	TNT001
Oct 24, 2018 1:02:09 F	T100196313	0010	5	0	6	0	TNT001
Oct 24, 2018 1:02:09 F	T100196313	0010	5	0	8	0	TNT001
Oct 24, 2018 1:42:56 F	T100196313	0010	5	0	2	2	TNT001
Oct 25, 2018 8:19:58 /	T100196313	0010	5	0	4	2	TNT001

Fig. 92: Single quantity messages for each operation

To change the total quantity of the single message:

1. Right-click on the appropriate message and select **Change Quantity** in the context menu.
2. Select the option field **Change Total Quantity** in the **Total/Yield Quantity** area.

➔ The input field next to **Total Quantity** becomes editable.

3. Enter appropriate value in the input field next to **Total Quantity**.
4. Save.

Total/Yield Quantity

Total Quantity 1.565 ◉ Change Total Quantity

Yield 1.565 ○ Change Yield

Fig. 93: Change total quantity

To change the yield:

1. Right-click on the appropriate message and select **Change Quantity** in the context menu.
2. Select the option field **Change Yield** in the **Total/Yield Quantity** area.

➔ The input field next to **Yield** becomes editable.

3. Enter appropriate value in the input field next to **Yield**.

➔ The total quantity changes by the amount by which the yield is changed.

4. Save.

You can change scrap quantities and rework quantities, too (see Fig. 91). You can also change the reason for scrap and rework or add another reason. When the scrap reason or rework reason is raised or a reason with an additional quantity is added, the total quantity is raised by that amount.

Changing single quantity messages does not influence the yield. Changing the scrap quantity and rework quantity raises/reduces the total quantity of each message only.

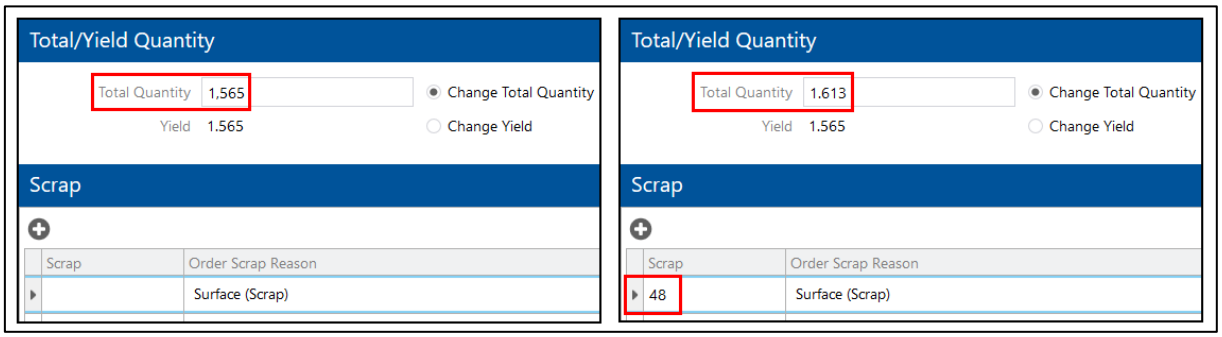

Fig. 94: Raising the scrap quantity raises the total quantity

To change a scrap quantity or rework quantity:

1. Right-click on the appropriate message and select **Change Quantity** in the context menu.
2. Select appropriate quantity in the **Scrap** or **Rework** area.
3. Edit the quantity directly in the cell.

➔ The total quantity changes by the amount by which this quantity is changed.

4. Select a different reason in the dropdown menu behind the quantity, if necessary.
5. Save.

To add a scrap reason or rework reason:

1. Right-click on the appropriate message and select **Change Quantity** in the context menu.
2. Click the **Add** icon in the **Scrap** or **Rework** area.
3. Enter appropriate quantity.

➔ The total quantity raises by this amount.

4. Select appropriate reason in the dropdown menu.
5. Save.

To delete a scrap quantity or rework quantity:

1. Right-click on the appropriate message and select **Change Quantity** in the context menu.
2. Right-click on the appropriate quantity in the **Scrap** or **Rework** area.
3. Select **Delete Quantity** in the context menu.

➔ The total quantity is reduced by the amount of the deleted quantity.

4. Save.

17.3 Terminating an Operation

Path: Corrections > Operation End / Interrupted

You can abort an operation. This involves changing the status from **Finish** to **Aborted to Restart**.

To abort an operation:

1. In the Search Results field, right-click on the appropriate line.
2. Click on **Change Operation** in the context menu.

➔ The status changes from **Finish** to **Aborted to Restart**.

17.4 Hit Correction

Path: Corrections > Hit Correction

Hit Correction specifies the hit message for the complete process. There are two scenarios for hit correction:

- Positive Hits:
  The last hit message increments by the corresponding difference.
- Negative Hits:
  The last hit message is corrected first, then the second one, etc.

You can correct hits in the following way:

- Change Hits:
  Change the hit quantity of a selected workplace.
- Delete Hits:
  Delete the selected hits.

To correct a hit:

1. In the Search Results field, edit the quantity directly in the **Hits** cell.
2. Save.

To delete a hit:

1. In the Search Results field, remove the quantity in the **Hits** cell or set the value to 0.
2. Save.

17.5 Shift Correction

Path: Corrections > Shifts

Once you have created a shift week, you can modify it later. You can insert shifts later within existing shift weeks.

You can correct shifts in the following way:

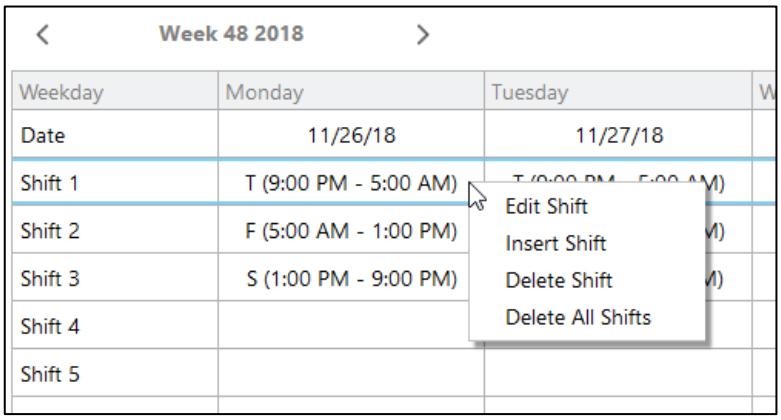

Fig. 95: Shift correction

- Edit Shift:
  To edit the hours of the selected shift.
- Insert Shift:
  To insert a new shift with hours as necessary.
- Delete Shift:
  To delete the selected shift.
- Delete All Shifts:
  Delete all shifts of a specific day.

To edit a shift:

1. In the Search Results field, right-click on the appropriate shift and then click on **Edit Shift**.
2. Make the required changes in the **Edit Shift** field (see Fig. 96) and then save.

ⓘ You can only edit past or future shifts. It is not possible to edit a current shift.

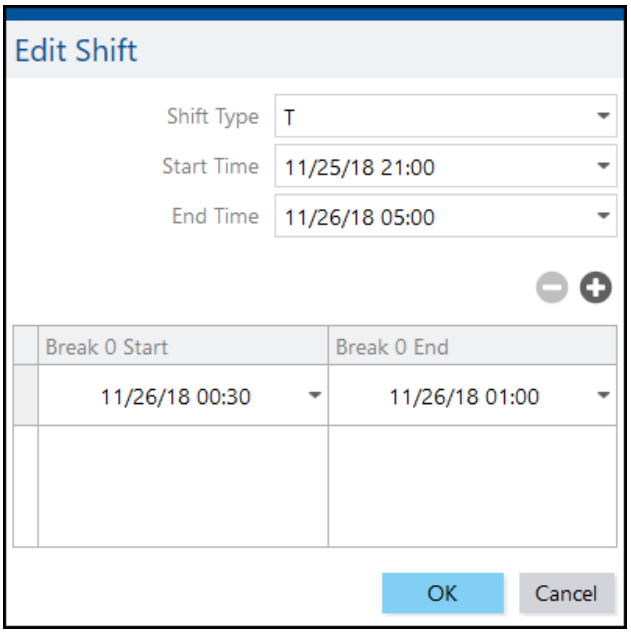

Fig. 96: Editing a shift

To insert a shift:

1. In the Search Results field, right-click on the appropriate field and then click on **Insert Shift** in the context menu (see Fig. 95).
2. Enter the hours as necessary.
3. Save.

ⓘ If the hours of a new shift created are already included in another shift of the same day, the existing shift will be overwritten by the new one.

To delete one or all the shifts of a specific day:

1. In the Search Results field, right-click on the appropriate field.
2. Click on **Delete Shift** in the context menu (see Fig. 95).

➔ The selected shift is deleted.

Or

Click on **Delete All Shifts** in the context menu (see Fig. 95).

➔ All the shifts of the selected day are deleted.

18 Message Types

The following table lists message types that are used in FORCAM FORCE™ (e.g. available in the exclusion list for serialization in the ERP upload).

Table 12: Message types in FORCAM FORCE™

Message type	Function
DRWBK	Transfer to ERP to call label printing
KEYFG	Key figure message
OPRES	Operation rescheduling
SPSBC	Transmission of a barcode to ERP
OPSTR	Starting the operation in MES
OPINT	Interrupting the operation in MES
QTYMG	Quantity booking of operation in MES
DURAT	Time booking of operation in MES
REVMG	Making corrections in MES
OPEND	Ending the operation in MES

19 Annex

19.1 History of Changes

Table 13: List of changes in release version 5.9 compared to 5.8.2

Date	Type	Description	Chapter
2019-02-13	Edited	Status details instead of status reasons	
2019-02-13	Edited	Corrected literals	
2019-05-06	Edited	Changed SAP to ERP	3
2019-02-19	Added	“Manual” column at workplace configuration	11.1.2
2019-02-20	Edited	Adjusted configuration parameters	17.1
2019-05-06	Added	Message types	18

19.2 Abbreviations and Terms

Table 14: Abbreviations used

Abbreviation	Description
AVO	Operation
CP	Communication Processor
DACQ	Data acquisition unit. Processes signals that are collected by the DCU. Data collected this way can be combined via a script in any way and can be used e.g. for the status determination.
DCU	Data Collection Unit
ERP	Enterprise Resource Planning
IDoc	Intermediate Document (SAP document format)
MDC (MDE)	Machine Data Collection
MES	Manufacturing Execution System
min	Minutes
ms	Milliseconds
PLC	Programmable Logic Control
PLC address	A value which defines where information is stored or retrieved in a memory and which periphery equipment should be addressed (inputs, outputs)
RMI	Communication protocol that is used for remote calls between Java objects
SFT	Shop Floor Terminal
SSO	Single sign-on: access to all available services after one-time authentication (rights assumed)
TEB	Tensile energy to break
URL	Uniform Resource Locator
WPL	Workplace
XML	Extensible Markup Language

Table 15: Terms used

Term	Description
Display area	Central viewing area of the display screen
Navigator	Main user control area on the left of the screen in the work-bench arranged in a tree structure.
OPC Server	Software application (driver) that complies with at least one OPC specification, defined by the OPC Foundation. OPC servers communicate natively with one or multiple data sources on one side and with OPC clients on the other side.
Qualification role	Qualification roles enable an additional subdivision of user rights. They are used e.g. in SFT for dialogs, which allow a two-tiered release. There, a function can only be executed e.g. by the user in the role as a foreman, even if he has general read and write permission.
Shop Floor Terminal	Central source of information and operating state acquisition unit for the production personnel. Can be executed on devices with browser capability.
WAGO Box	I/O box by WAGO. Is connected to a machine to read and write data.
Workbench	Multilingual web-based application designed for configuring the master data and other terminal-specific settings. The Workbench is used for configuring FORCAM FORCE™.

19.3 Document Conventions

The following table lists conventions used in this document:

Table 16: Document conventions

Convention	Description
Bold type	Button names and table and field titles are printed in bold type.
Icons	A function shown as an icon involves a reference to the icon as an object.
Path	All paths specified relate to the Navigator (see section 2.1).
Action step	Action steps are initiated by numbers in the beginning of a sentence. The order of the numbers is equal to the order of the steps. Alternative actions are identified by "Or".
Instruction result	Instruction results are initiated by ➔.
Note	Notes are initiated by ⓘ.
Prerequisite	Prerequisites are initiated by ✓.
Caution	Important information which has consequences if not observed is indicated by ⚠.

19.4 Navigation in the Workbench

The following table describes the navigation options available in the Workbench:

Table 17: Workbench navigation

Navigation	Description
Close icon	You can close any content opened in the Navigator by clicking on the right of the screen.
Breadcrumb bar	If subpages or additional screens are available, a breadcrumb bar appears at the top edge of the screen. Clicking on the first element will close all subpages.
Direct editing	You can edit most of the cells displayed in tables either directly or via the context menu (right-click or dropdown menu).
Disabled columns	Columns with a grey background cannot be edited.
Refresh	Since the Workbench is a web-based application, refreshing in the browser will cause the Workbench to log off.
Error message	Error messages appear at the bottom left of the screen.

19.5 Workbench Icons

Table 18: Icons used in the Workbench

Sym-bol	Function	Sym-bol	Function
	Save		Discard change
	Edit		Close content
	Move left		Move everything left
	Move right		Move everything right
	Move up		Move down
	Search		Reset search filter
	Name/description (Literal)		Open in pop-up
	Activity Step with dialog		Activity Step without dialog
	Pin search area		Unpin search area
	Add		Remove
	Edit Tiles		Add new folder
	Show tile selector		Hide tile selector
	Export		Import

	Automatic alignment		Copy Terminal-URL to clipboard

19.6 Table of Figures