FORCAM™ FORCE

Version 5.10

Component Booking

Manual

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1 Concept

There are materials that consist of multiple input components. In this case, the amount of input components is integrated or consumed, respectively, that is at least needed according to the component list of the operation. If components are faulty or are damaged during the assembly, more components are consumed.
Example:
Figure 1 shows the schematic illustration of a cylinder engine. In this case, the motor is the material manufactured by operation X. An amount Y of this material is produced. A scrap reason with a corresponding quality detail is specified for each faulty material.

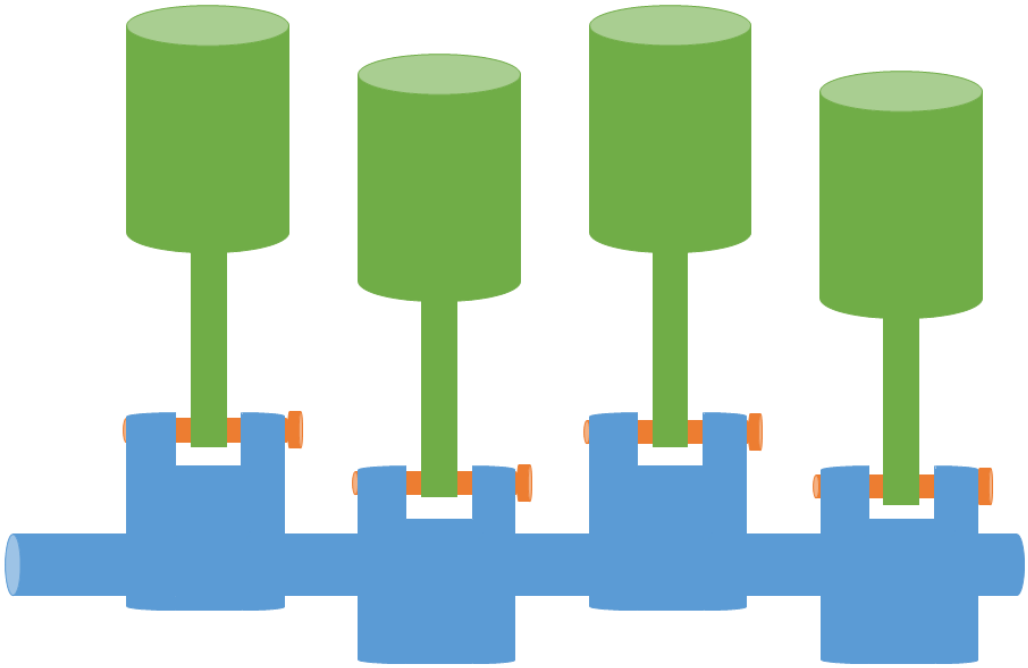


Figure 1: Schematic illustration of a cylinder engine

Figure 2 shows the individual parts of the engine. Here an engine consists of 4 cylinders, 4 screws and a crankshaft. These are the components of the material. The material needs at least this number of components in order to be completed. Therefore 3 engines require at least 12 cylinders, 12 screws and 3 crankshafts.

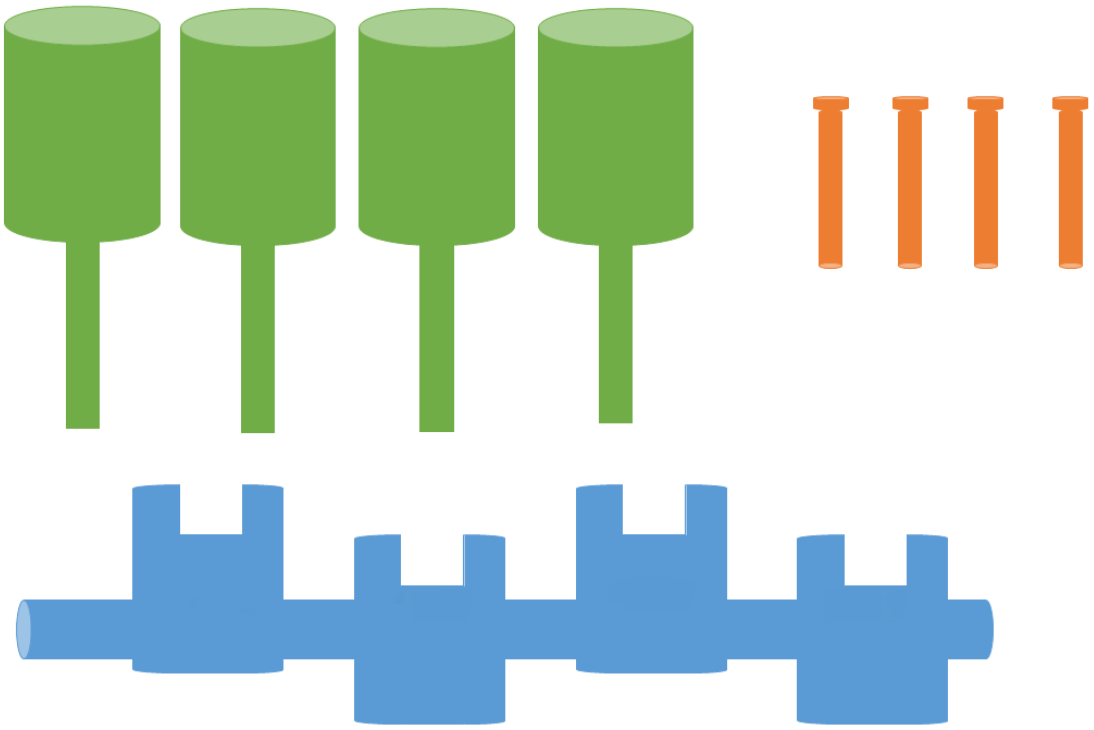


Figure 2: Schematic illustration of individual components of a cylinder engine

FORCAM FORCE™ knows- if applicable - the required amount of components of a material or operation, respectively, based on the order feed by ERP. FORCAM FORCE™ provides the option to acquire these amounts and also to indicate how many components were actually consumed. In addition, and analogous to the produced materials, a distinction can be made between yield and scrap quantity in regards to quality.

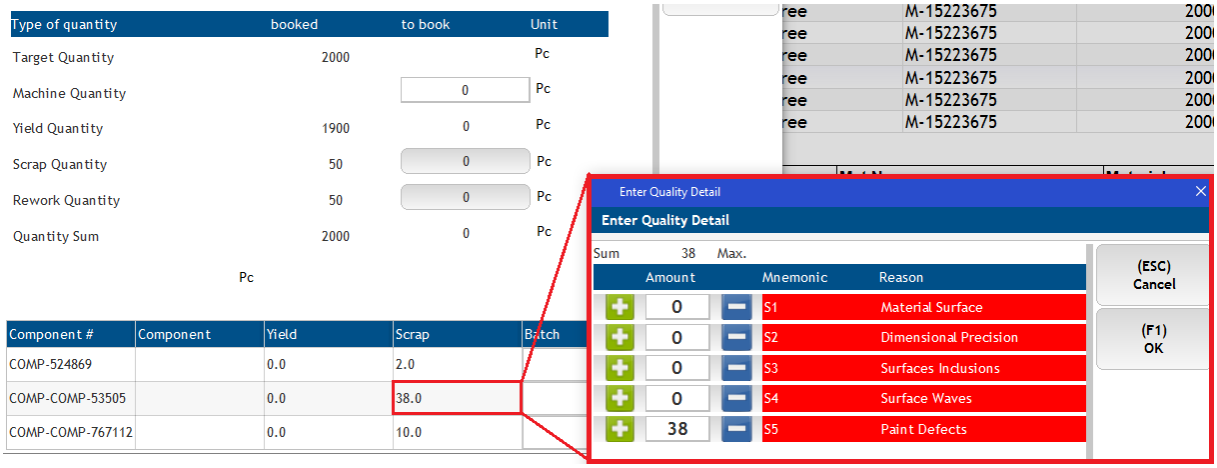


Figure 3: Quality details for the rejection of components

This manual explains the necessary configuration of an activity step in the workbench and describes the execution of the component booking in the shop floor terminal. The configuration of a quantity message is required.

ⓘ If you are booking quantities to the ERP in a retrograde way, the quantities of the components are also booked. You cannot separate the component booking from this.

2 Display components

Path: Configuration > Shop floor terminal

You can display components and production resources in a dialog in the shop floor terminal. The dialog is only for displaying. You cannot edit them.

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

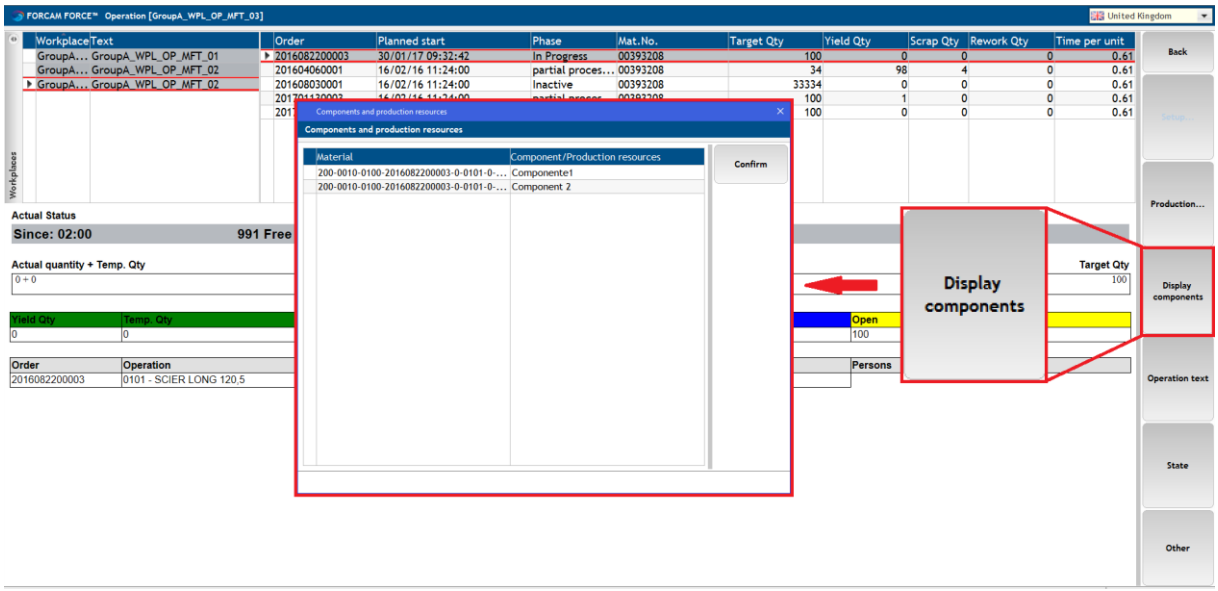


Figure 4: Display of components and production resources using a configured button

The button created in the button bar requires the domain **Selected operation of the basepage (AVO)** and the parameter **AVO (AVO)** as input parameters. All additional settings are on default or optional.

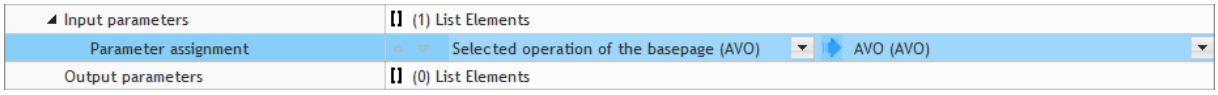


Figure 5: Configuration of a button for displaying components and production resources

The activity step that must be configured for this button is **Dialog for the display of components and production tools to the operation**. You must select the domain **AVO (AVO)** and the parameter **Operation (AVO)** as input parameters. The required sub domain is **Operation component domain**.

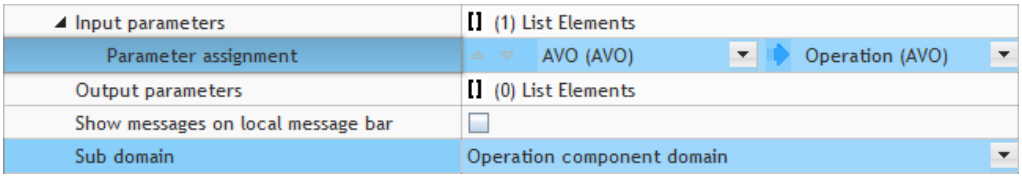


Figure 6: Configuration of the activity step for displaying components and production resources

The columns of the dialog are freely configurable. The dialog in Figure 4 is configured to show material and the related component:

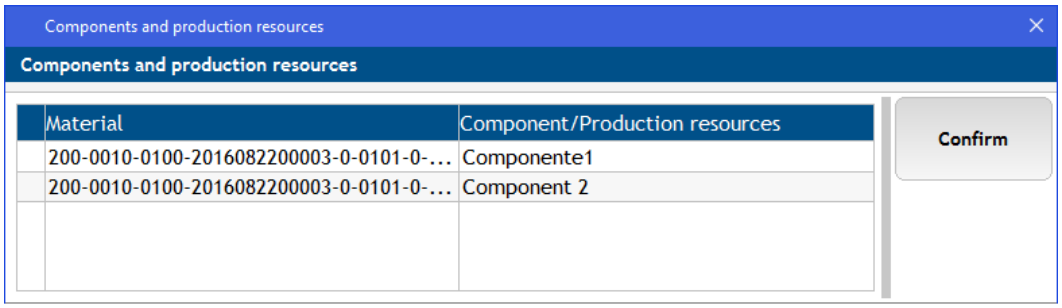


Figure 7: Dialog for displaying material and related production resource

The following configuration is used for this dialog:

Column configurations	(2) List Elements
Grid column configuration	Material
Column name	Material
Column width	50%
Column visibility	☑
Column attribute	Workplace (Ext key)
Reference to color column	
Grid column configuration	Component/Production resources
Column name	Component/Production resources
Column width	50%
Column visibility	☑
Column attribute	Text
Reference to color column	

Figure 8: Configuration of the dialog for displaying material and related production resource

3 Configuration of the Component Booking

Path: Configuration > Shop floor terminal

The component booking is not a separate activity step in the shop floor terminal. The configuration of the component booking takes place in the activity step **Dialog for booking of operation quantities** and is a supplementary adjustment.
Many of the configuration parameter are predefined or optional.

◢ Component quantity booking	
Enable component quantity booking	☑
Height of component table area	100
Show scrap qty column	☑
Batch number column editable by keyboard	☑
Bounce time of the barcode input [ms]	0
Input pattern of valid barcode scans	
◢ Configuration booking components	
◢ Control configuration	Value Object
Max reason to show	6
Show annotation column	☑
◢ Selection for additional quantity reasons	
◢ Configuration	Simple selection list
Dialog width	600
Dialog height	400
▸ Table configuration	
◢ Renderer configuration	
Foreground color	#000000
Background color	#ffffff
Time format	HH:mm:ss
Date format	dd/MM/yy
Format definition for timestamp	
Format definition for numbers	0.00
Remove leading characters of the order number	0
Format definition for quantities	Value
▸ Format definition for the duration	
Don't show zeros	☐
First sort by frequency (hit list) or exclusively alph...	☑
Number of entries, the order frequency	10
Past period [in days] in which the frequency is tak...	7

Figure 9: Configuration screen of the component booking

The configuration of the component booking applies to the component table as well as the dialog to display quality details.

3.1 Component Table

The component table (see lower table in Figure 10) lists all components of the selected material or operation (BOM) respectively. It contains the component number, a description of the respective component (if available), quantity and the batch number (if available). The component list is supplied by the ERP system and is allocated to an operation.

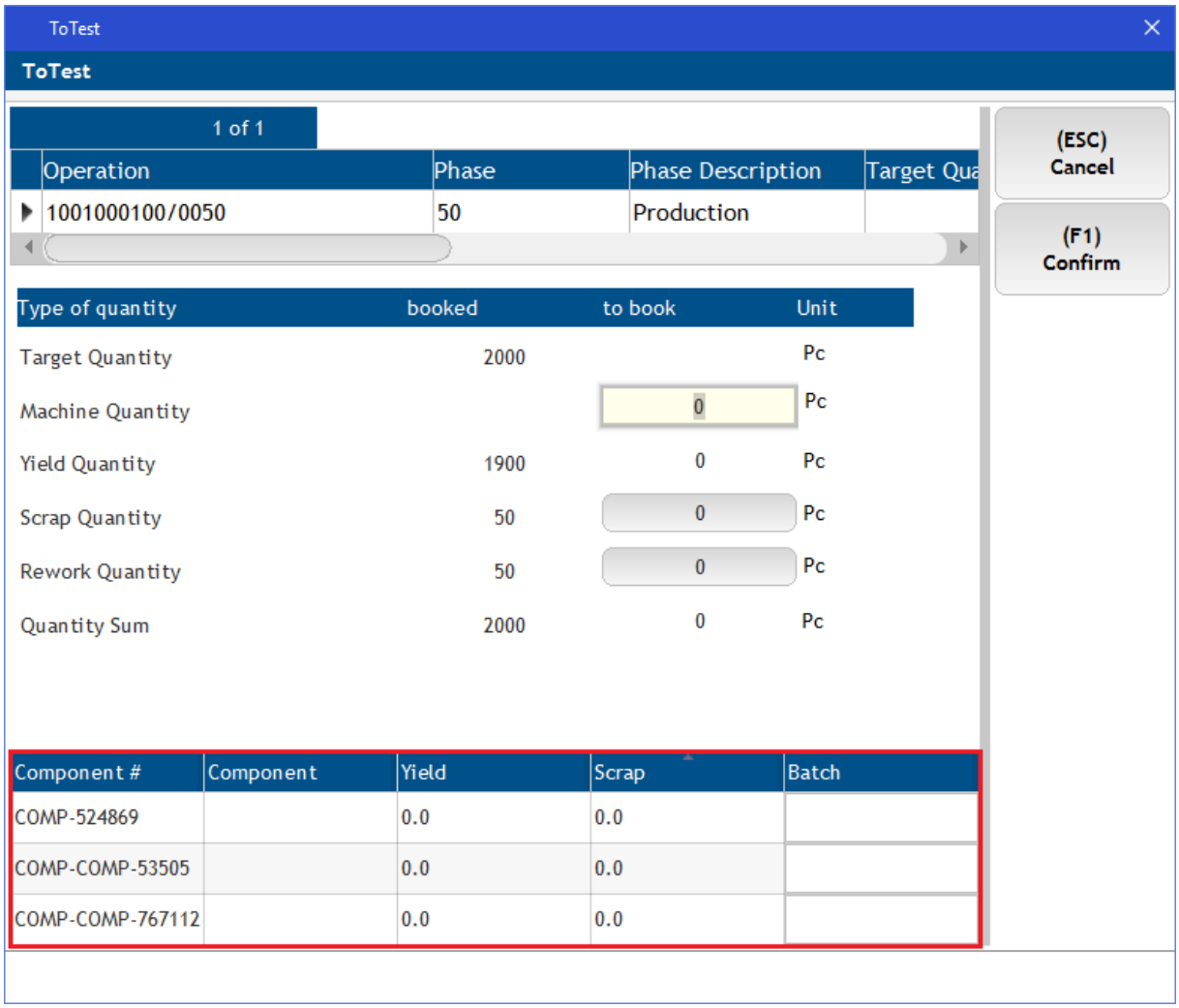


Figure 10: Dialog of a quantity message with a component table

To configure the component table:

✓ The activity step **Quantity message** is selected.

1. Open the drop-down menu at **Component quantity booking**.
2. Set a check mark at **Enable component quantity booking**.

➔ A table with information on components pops up in the lower part of the dialog for quantity booking in the SFT (see Figure 10).

3. Enter the **Height of component table area** in pixel.
4. Set a check mark at **Show scrap quantity column** (optional).
   If no check mark is set, the scrap quantity in the component table is hidden.
5. Set a check mark at **Batch number column editable by keyboard** (optional).
   If a check mark is set, the batch number can be freely entered. Otherwise it has to be scanned.
6. Enter the **Bounce time of the barcode input** in msec (optional).
   The bounce time is the minimum time for a reset between two consecutive barcode scans.
7. Define **Input patterns of valid barcode scans** (optional).
   Regular expression for the definition of valid scans. Example: ([0-9]) for signs between 0 and 9.
8. Save by clicking .

3.2 Dialog for the Specification of Quality Details

The dialog for the specification of quality details (see Figure 11) lists details per the configured detail hierarchy.
An annotation column enables the manufacturing personnel to enter a comment on the respective detail.

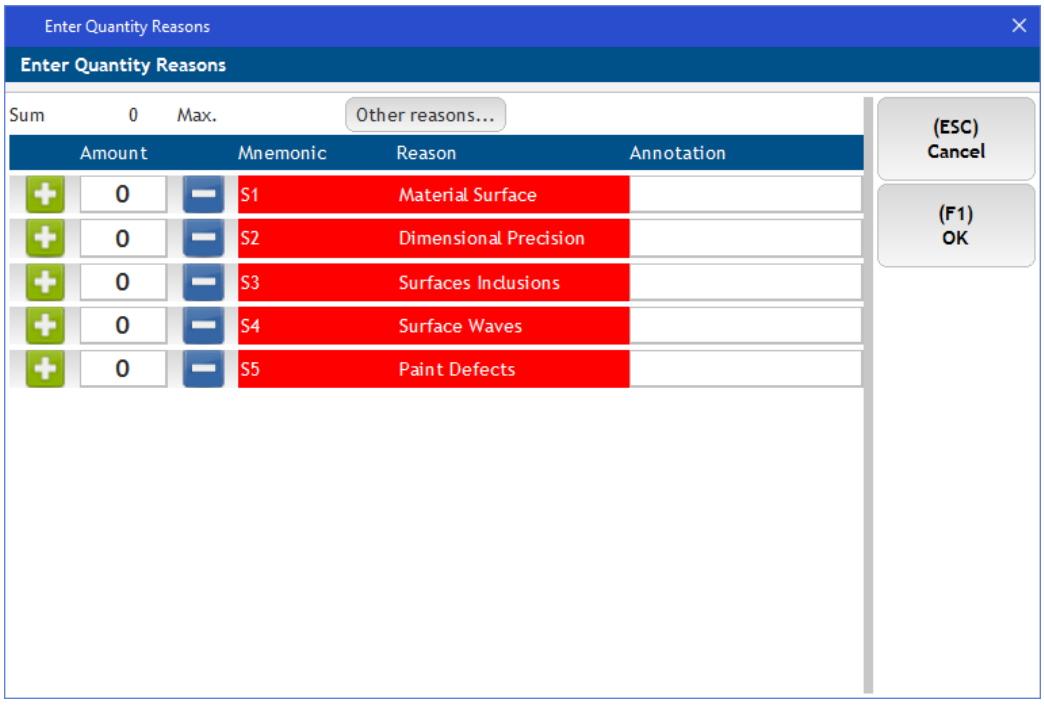


Figure 11: Dialog for the specification of quality details of components

To configure the dialog for the specification of quality details:

1. Open drop-down menus at **Configuration component booking** and then at **Control configuration**.
2. Specify the number of quantity reasons displayed by default.
   Defines the number of columns in the dialog for the specification of quality details of components under **Max reason to show**. Each column depicts one quality detail (see Figure 11).
3. Display **annotation column** (optional).
   If a check mark is set, an additional column for annotations or comments, respectively, appears in the dialog for the specification of quality details (see Figure 11).
4. Open drop-down menu at **Selection for additional quantity reasons** and then at **Configuration**.
5. Enter **dialog width/height** in pixel.
   Specifies the size of the dialog for the specification of quality details on components (see Figure 11).
6. Open drop-down menu at **Table configuration**.
7. Format table as desired.
   The configuration applies to the table in the dialog for the specification of quality details (see Figure 11).
8. Open the drop-down menu at **Renderer configuration**.
9. Select **time/date format**.
   Applies to the time of the component booking.
10. Enter **format definitions for time stamp/numbers**.
11. **Remove leading characters of the order number** (optional).
    Defines, which characters of the order number shall be removed.
12. Select **format definition for quantities and duration**.
13. **Do not display the value zero** (optional).
    If a check mark is set, zero is hidden in the dialog for the specification of quality details, as long as the number equals 0 (see Figure 11).
14. Specify the **sorting** of the quality details.
15. Enter **number of entries** that shall be sorted by frequency.
    Determines the number of quality details in the dialog (see Figure 11).
16. Enter **the time period in the past** in days.
    Number of days in which the occurrence of quality details shall be evaluated based on their frequency.
17. Open drop-down menu at **Batch number barcode format configuration**.
18. Determine **First valid position** of the barcode (optional).
19. Limit the **Number of characters to be read** (optional).
20. Define the **Formatting** of the barcode format.
    String based on the format **string.format** (e.g. %s, %08d, %10s).
21. Save by clicking .

3.3 Logic Component

In order to configure Component Booking, you need to add a Logic Component to the runtime. The Logic Component necessary is **OPERATION COMPONENT QUANTITY REPORTING**. This Logic Component sends operation component related quantity information to the ERP. For each component, a separate message is sent.

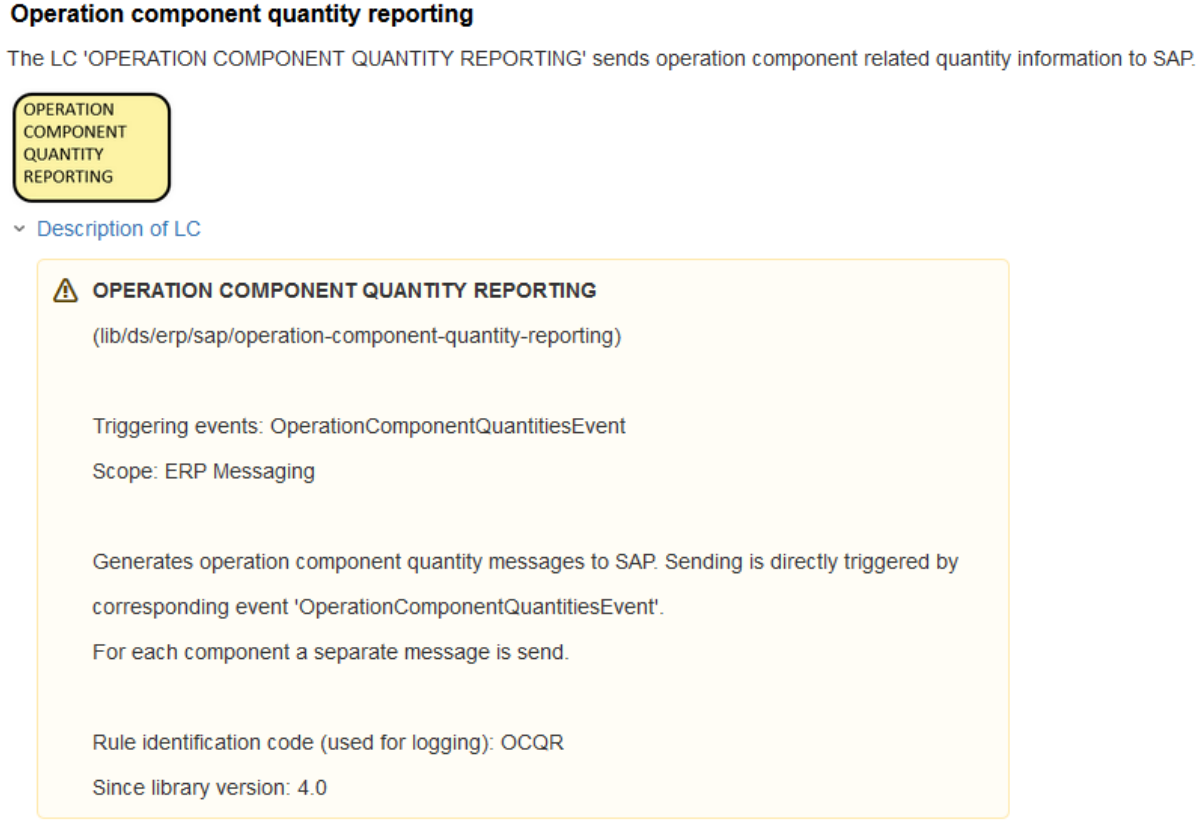


Figure 12: Logic Component for the configuration of Component Booking

4 Booking of Components in the SFT

After finishing the configuration from section 3, the quantity of components of a material can be booked in the shop floor terminal. A configured button for the quantity message is required.

ⓘ The button label is freely configurable and can differ from the labelling mentioned here.

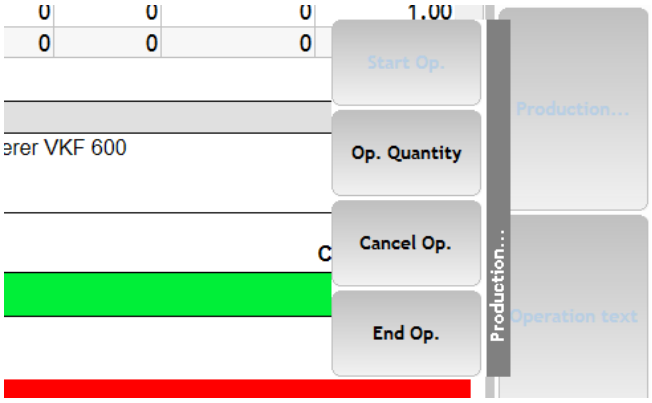


Figure 13: Configured quantity button in the shop floor terminal

To execute a component booking:

✓ The dialog for the **quantity message** is selected (see Figure 10).

1. Click in the cell under **Scrap** in the line of the desired component.
2. Specify how many scrap pieces of the component were produced in the according line in the subsequent dialog (see Figure 11).
3. Confirm by clicking **OK**.
4. Enter a batch number (optional).
   Or
   Scan a batch number.
5. Book quantities by clicking **Confirm**.

ⓘ The yield quantity cannot be edited, because the material to be produced (as explained in section 1) always requires the minimum yield quantity.

5 Component Booking in Multiple Batches

Components can originate from multiple batches. Batch and component numbers are always unique.
Example:
In Figure 14 the cylinder is the component. There are 3 batches that each contain a cylinder with the component number B1244:

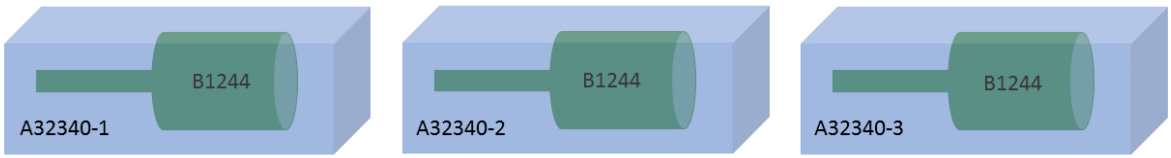


Figure 14: Schematic representation of a component in multiple batches

It is possible in FORCAM FORCE™ to differentiate a component based on the batch numbers. As a result, it is recorded, from which batch a component originates.

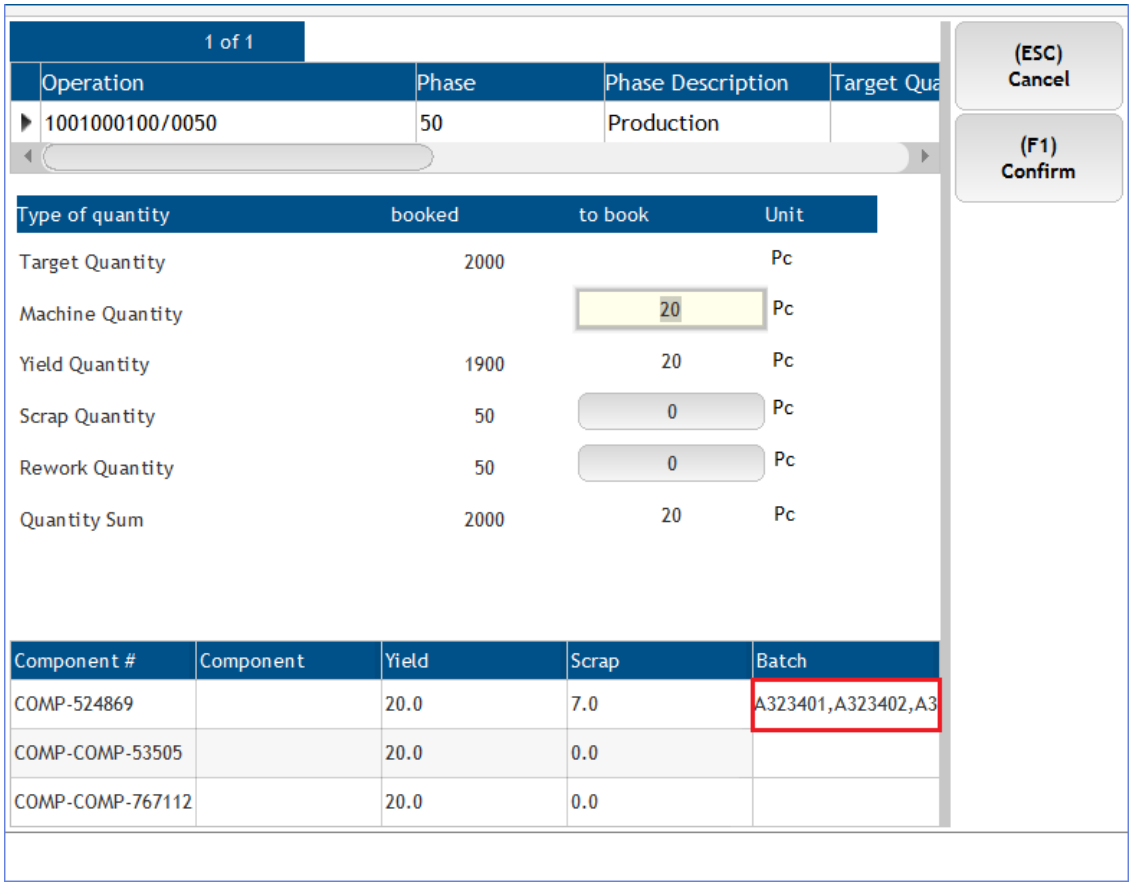


Figure 15: Booking dialog with multiple batch numbers for one component

5.1 Add Multiple Batch Numbers to One Component

To add multiple batch numbers to one component:

✓ The dialog for **quantity message** is selected (see Figure 15).

1. Click in the cell under **Batch** in the line of the desired component.
2. Enter a batch number and confirm.
   Or
   Scan a batch number.

➔ The batch number is submitted for the component.

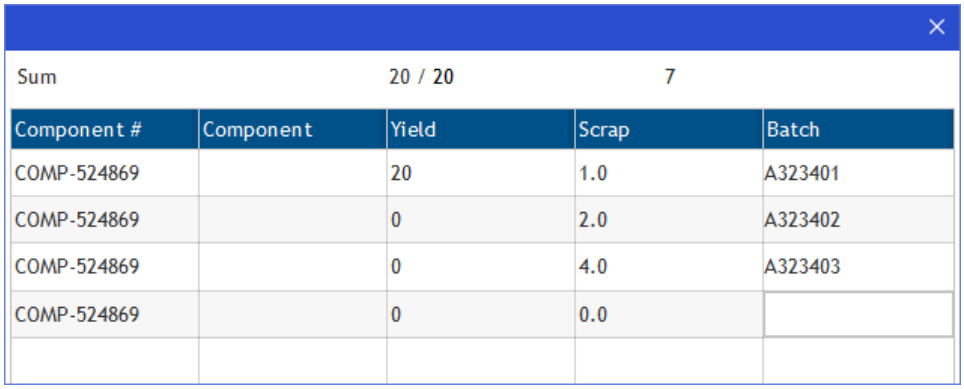
3. Click the just entered/scanned batch number.

➔ A subsequent dialog with additional input fields for the batch number opens (see Figure 16).

4. Enter/scan another batch number in the empty cell.
5. Confirm and close dialog.

➔ The second batch number is submitted. It appears in the dialog for the quantity message next to the previous one (see Figure 15).

6. Repeat the steps 3-5 as often as needed.
7. Book quantities by clicking **Confirm**.



Sum 20 / 20 7

Component #	Component	Yield	Scrap	Batch
COMP-524869		20	1.0	A323401
COMP-524869		0	2.0	A323402
COMP-524869		0	4.0	A323403
COMP-524869		0	0.0	

Figure 16: Dialog for the entry of further batch numbers

5.2 Booking of a Component as Scrap in Multiple Batches

To indicate a component as scrap in multiple batches:

- ✓ The dialog for **quantity message** is selected (see Figure 15).
- ✓ Multiple batch numbers are entered for one component (see section 5.1).

1. Click in the cell under **Scrap** in the line of the desired component.

➔ A subsequent dialog with a list of all entered batch numbers opens.

2. Click in the cell under **Scrap** in the line of the desired batch number.
3. Specify how many scrap pieces of the component were produced in this batch in the according line in the subsequent dialog (see Figure 11).
4. Close by clicking **OK**.
5. Book quantities by clicking **Confirm**.

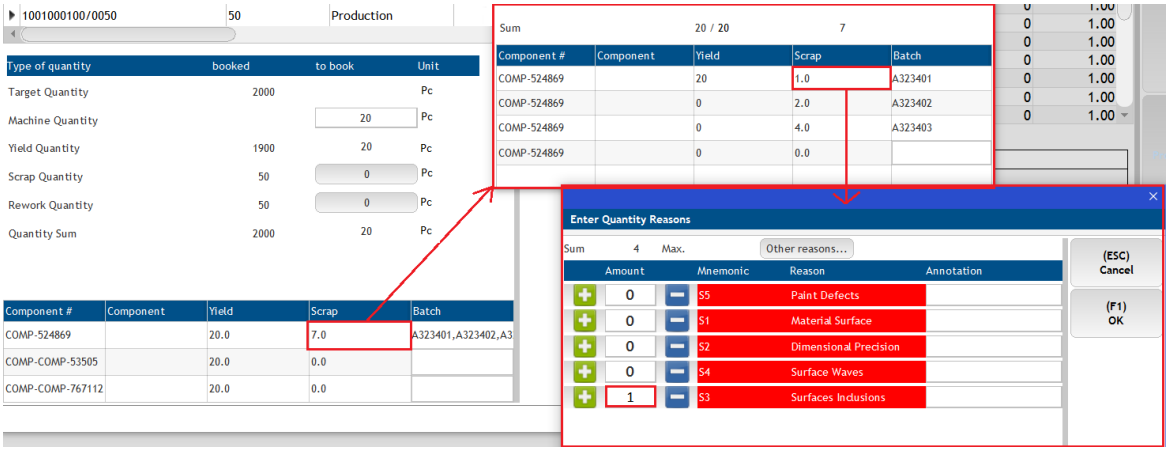


Figure 17: Dialog sequence when booking scrap of a component from multiple charges

6 Annex

6.1 Terms and Abbreviations

Table 1: Abbreviations used

Abbreviation	Description
BOM	Bill of Material (component list)
ERP	Enterprise Resource Planning (resource planning of a company)
msec	Millisecond
Op	Operation
Pc	Pieces
SFT	Shop Floor Terminal

Table 2: Terms used

Abbreviation	Description
Activity step	Specific function (command), that can serve as the basis of a button in the shop floor terminal
Button	Button
Batch	Series of goods with the same characteristics, that are produced, packaged and market with a number during one work section and from the same raw materials
Display area	Central display area of the screen
Dialog	Screen mask: element of the graphic user interface
Navigator	Central control area at the left-hand edge of the screen, displayed in a tree structure. To configure the navigator, see manual Master Data and System Administration.
Shop Floor Terminal	Central source of information and acquisition unit of operating states for the production personnel. Executable on browser-enabled devices
Workbench	Multilingual, web based application for the configuration of master data and other terminal-specific adjustments. The workbench is used to configure FORCAM FORCE™.

6.2 Icons

Table 3: Icons used

Icon	Function	Icon	Function
	Move function one level up		Move function one level down
	Navigate one level up		Navigate one level down
	Navigate to the left		Navigate to the right
	Move everything to the left		Move to the left
	Move everything to the right		Move to the right
	Open selection window		Edit entry
	Add		Remove
	Create new file		Open help menu
	Set search area		Release set search area
	Navigate junction higher		Navigate junction lower
	Restore original navigator symbols		Update/ reload
	Export		Import
	Show XML code		Open drop-down menu
	Select line		Name/ description (literal)

	Copy link of the selected terminal		Minimize/ Maximize
	Change size		Export in PDF format
	Export in CSV format		Change configuration
	Search		Reset search filter
	Apply changes		Reject changes
	Activity step dialog		Activity step command
	Close content		

6.3 Convention and Navigation

Table 4: Document Conventions

Convention	Description
Boldface	The label of buttons and title of tables and fields are printed in boldface.
Icons	If a function is displayed as an icon, the icon is referred to as an object.
Path	Each specified path relates to the navigator in the workbench.
Action step	Action steps are marked as numbers at the beginning of the sentence. The order of numbers corresponds to the order of the actions. Alternative action steps are separated by Or.
Action prerequisite	Action prerequisites are marked by ✓.
Action result	Action results are marked by ➔.
Notice	Notices are marked by ⓘ.
Sub-steps of an action	Sup-steps of an action are indented and have uniform symbols per action level. The order of the levels is: 1. a. i.

Table 5: Navigation in the workbench

Navigation	Description
Close con	Each content called-up in the navigator can be closed via at the right-hand edge of the screen.
Breadcrumb bar	If sub-pages or continuative displays respectively, a breadcrumb bar appears at the upper edge of the screen. A click on the first element closes all sub-pages.
Direct editing	Most of the cells in displayed tables can be edited either directly or via the context menu (right click or drop-down menu).
Blocked columns	Columns with a gray background (display fields) cannot be edited.
Update	Since the workbench is web based, updating via the browser (refresh) leads to a log out in the workbench.
Error message	Error messages appear at the lower left-hand edge of the screen.

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