Produmex Manufacturing Functional Guide

Quick Start Tutorial

Produmex Manufacturing is a legacy product and Boyum IT Solutions no longer sells new installations for it.

1. Overview

1.1. Produmex Manufacturing

Produmex Manufacturing is an add-on for SAP Business One that extends the Production module of SAP Business One with new factor: manufacturing resources. The incorporation of this new concept required a myriad of modifications to the system forms and databases and new forms, reports and database tables.

A major strategic decision was that wherever SAP Business One has a solution for manufacturing concept, Produmex Manufacturing will re-use or extend that solution. For example, the original forms and database tables for Item Master Data, Bill of Material, Production Orders, MRP Scenarios and Recommendations have been reused and extended. The Material Resource Planning logic had to be completely rewritten, and when the user presses the Run button in the MRP Wizard screen, the Produmex Manufacturing Advanced MRP logic executed, and not the original simple MRP. The architecture of the add-on is backward compatible with the SAP Business One original simple Production Module; this make migration very simple and straightforward.

1.2. Business Benefits

From business perspective the major benefits the user of the add-on may get are as follows:

- The technology of manufacturing process can be defined with the operations and material requirements. The entire production process can be scheduled at the minute level. This way the company will have an exact schedule of the manufacturing resource consumption. Eventually it may come to light that the old processes were not efficient and fewer resources may produce the same results, or the same amount of resources could produce more products.
- Since the manufacturing process is scheduled the material requirements can be ordered just-in-time. That is it is not needed to purchase all materials long before the materials are actually needed. This way warehousing costs can be significantly reduced and the money needed to finance the manufacturing process could be reduced.
- Since the manufacturing resources of limited capacity are taken into consideration when planning or scheduling the process, the result will be much more realistic.
- Since the add-on is fully and completely integrated with SAP Business One, there is no gap between the manufacturing system and the enterprise information (inventory, sales, purchasing, accounting, etc) system.

2. Setup and Installation of the Company

2.1. Installing the Produmex Manufacturing Add-On

Produmex Manufacturing is packaged and distributed as a regular SAP Business One add-on with an .ard and a self-installing .exe file.

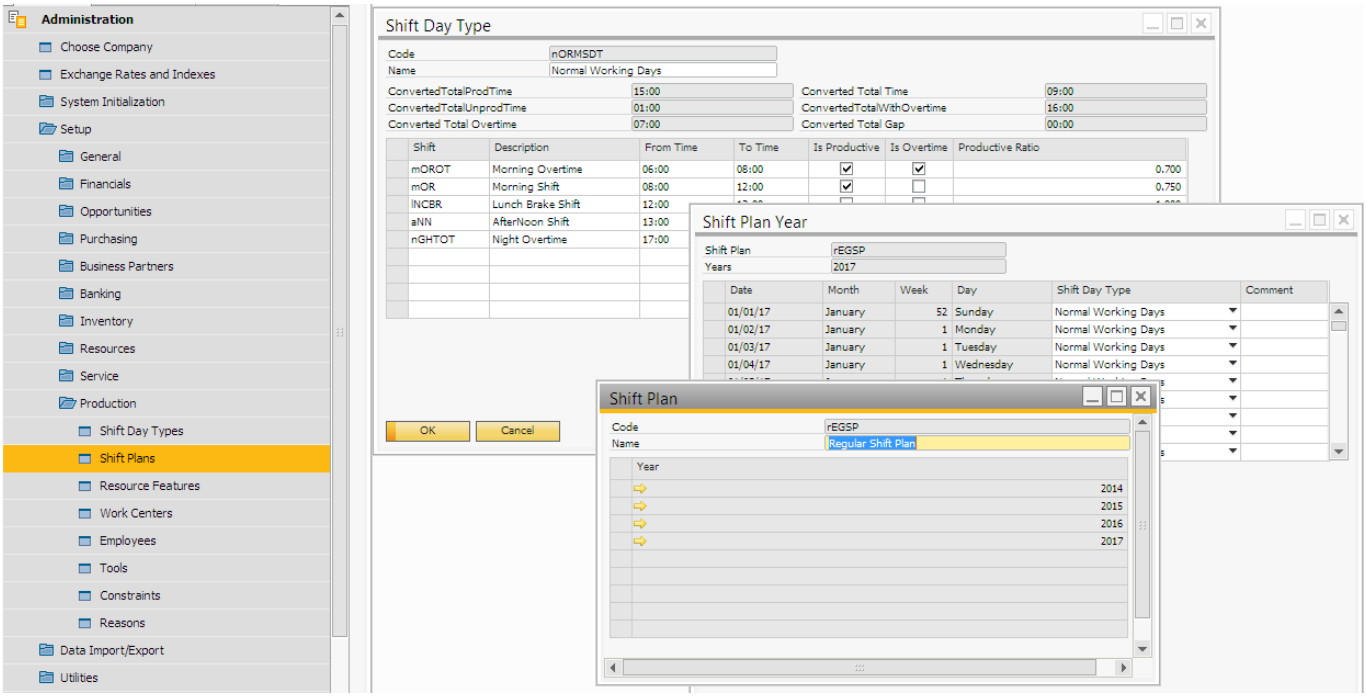
2.2. Setup initial data

Produmex Manufacturing extended the standard SAP production module with manufacturing resources. Work centers are the primary resources. When using the multi-dimensional allocation strategy, supplementary resources such as employees, tools and constraints can be defined as well.

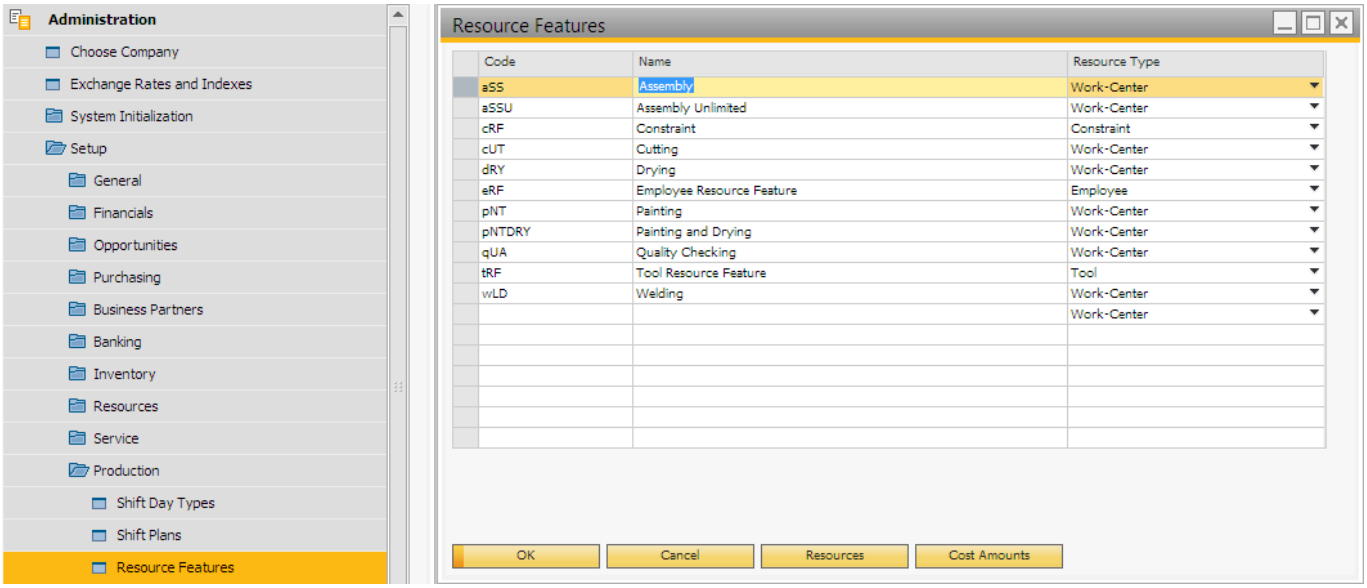
Before setting up the resources, create Shift Day Types and Shift Plans.

The shift day types are used when shift plans are defined for resources. A shift day type can contain multiple shifts. It is possible to add overtime and nonproductive shifts for administrative reasons, but such shifts are never used by the resource scheduling logic. The productive ratio determines how much of a shift is used by the resource allocation logic.

On shift plans a shift day type can be assigned for each calendar day.



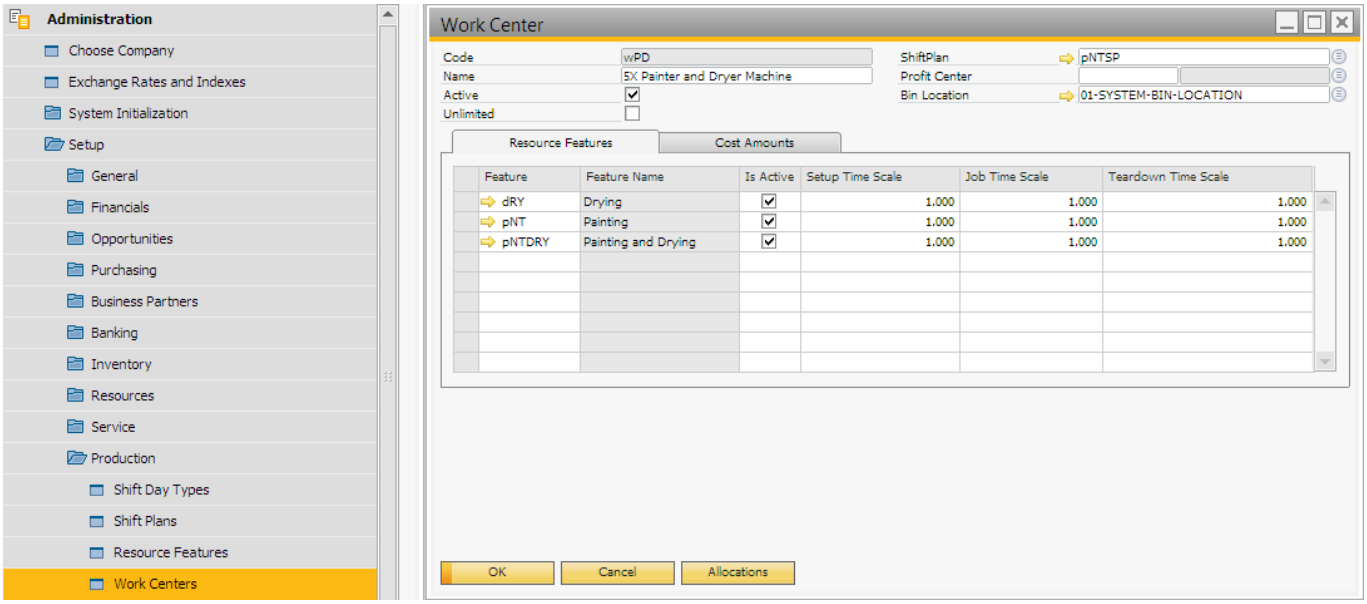
Then define the Resource Features. A feature in the resource context is a kind of capability a specific resource has. A resource may support multiple features. A feature is used by the resource scheduling logic to find the appropriate resource for a manufacturing operation.



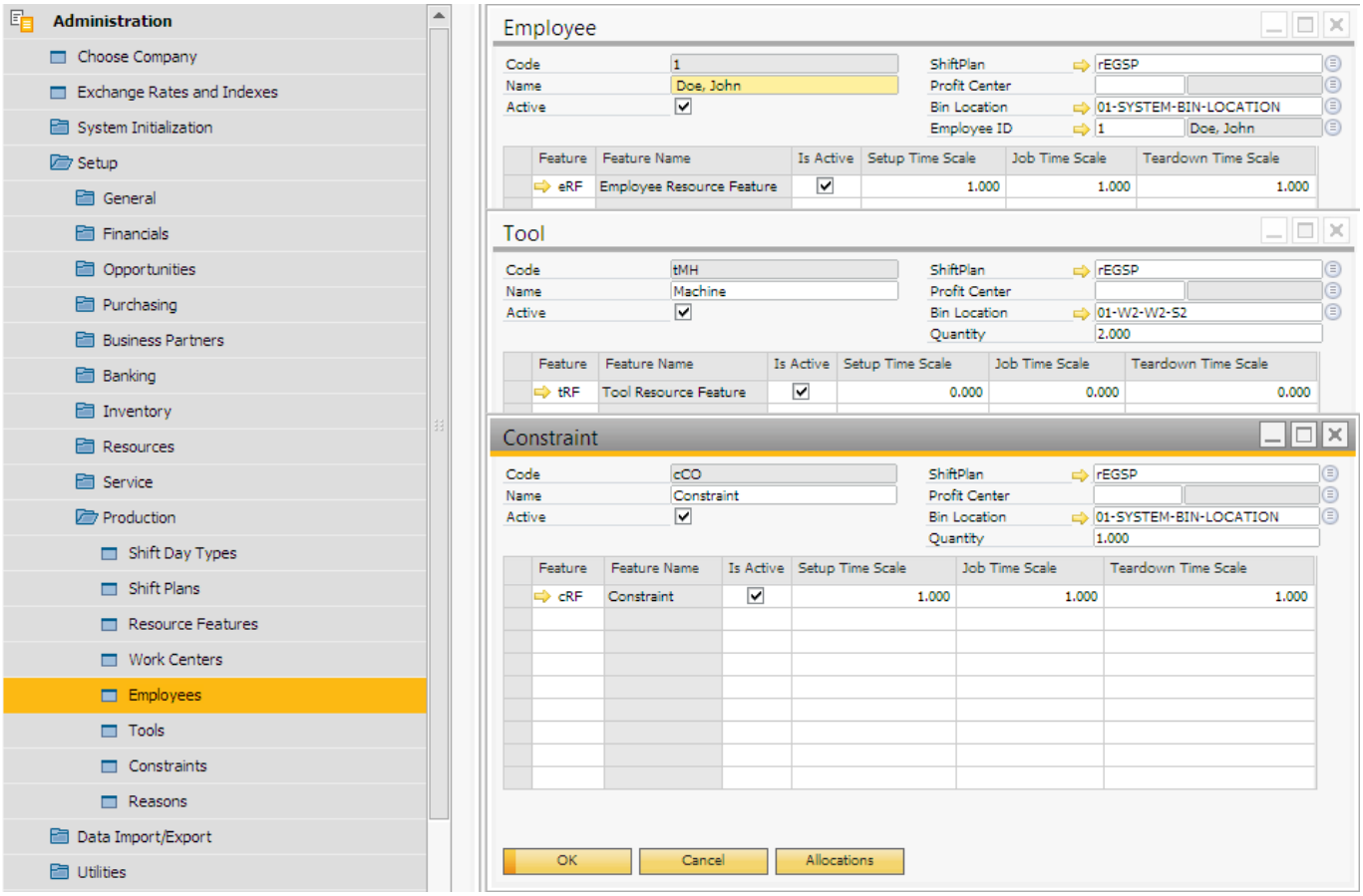
Then define Work Centers. A work center is an individual production area or sub-process of an overall manufacturing process. It is a section of a production facility where all tasks associated with a particular process (such as assembling, painting, welding) are performed. A work center may represent a single machine, a group of machines, a single person, a group of persons.

The job scheduler will only take into account *'Active'* work centers. The assigned shift plan defines the working schedule of the work center.

Work centers must support at least one feature. Features can be switched off individually with the *'Is Active'* checkbox. With the '*Job Time Scale*' setting the efficiency of the work center regarding the feature can be set.



When using the multi-dimensional allocation strategy, you can define Employees, Tools and Constraints too.



Resources can be linked to the BoM/production order with operations. Operations are special items that represent manufacturing processes.

First create a Manufacturing Operation. When a manufacturing operation is created, an *'Operation'* item is automatically added. The parameters of the operation can be set on the Item Master Data and the Manufacturing Operations form. The operation will be more meaningful in the context of a Bill of Material (BoM) or Production Order. All the parameters (except Is Outsourceable) for an operation can be redefined in a BoM or Production Order.

An operation has a number of parameters, the most important of which is the '*Job Time*'. The '*Job Time*' defines the resource capacity the operation requires. The setup, job and teardown times consume resource capacity while the before, safety and after times do not consume capacity but are taken into account when calculating the beginning of the jobs in the sequence of operations. The job time for some operation cannot be defined for a single unit; the '*Time Base*' is the number of the units of the operation the job time refers to.

The second most important parameter of an operation is the Work Center Feature. For each operation a Work Center Feature must be selected. This parameter is used extensively by the job scheduler; when the scheduler tries to find work center capacities for an operation, it will search for work centers that have the selected feature for the operation. It is possible to define a preferred work center. When the *'Is Mandatory Work Center'* checkbox is checked, the job scheduling logic will always allocate the operation on the preferred work center. When using the multi-dimensional allocation, supplementary resources can be defined for the operation on the grid.

If an operation is a parallel operation, it means that it can be performed by multiple work centers at the same time if there are enough resource capacities available. Operation break types define

whether more than one allocation for an operation is allowed or not.

As mentioned earlier operations are items from the perspective of SAP Business One, and some of their parameters can be defined in the item Master Data form. An operation item is never an inventory item. If the operation is outsourceable the item is set as 'Purchased' item.

Operations are used extensively in production Bill-of-Materials. The standard SAP Business One BoMs are extended by Produmex Manufacturing add-on with operation items.

The role of an item can be indicated with row types. A row in a BoM may be of type:

- Material (Purchased and own-manufactured items are differentiated with row icons)
- Operation
- By-Product (A material with negative quantity)
- Unfinished Product (For Outsourcing.)
- Unfinished Material (For Outsourcing.)
- Phantom (Virtual item in SAP Business One.)
- Cost (Any non-inventory item can be defined as ‘Cost’)

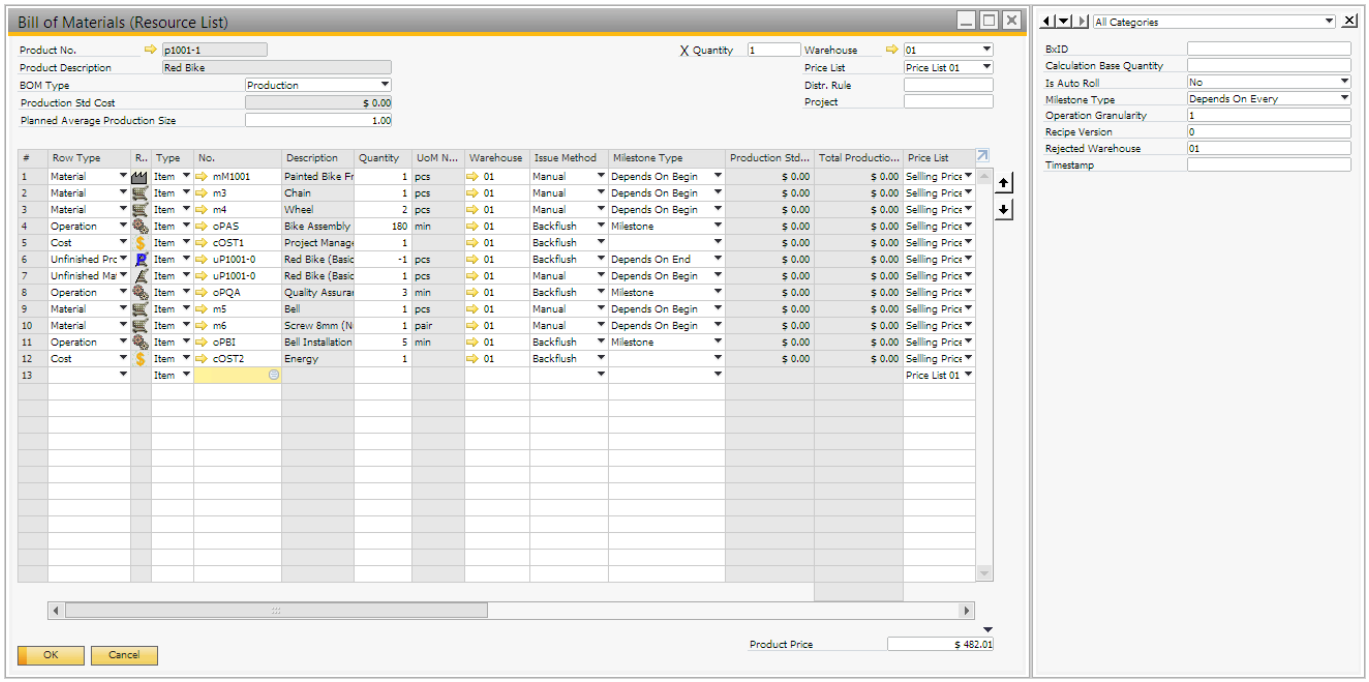
The sequence of materials and operations are important: materials required for an operation should come above (from top down) the operation.

Milestones connect the operations with the belonging materials. The issue method of an operation should always be ‘Backflush’. Items with ‘Manual’ issue type can be set with the following Milestones:

- *Depends on Begin*: The item will be issued when a Start Job is reported for the subsequent operation.
- *Depends on Every*: The item will be issued/received at every PDC booking for the subsequent operation where a quantity is booked.
- *Depends on End*: The item will be issued/received at every complete job booking for the subsequent operation.

> We recommend to only use the ’Depends on End’ milestone type if the base quantity of the material is 1 and only ’Completed’ job bookings are used.

The quantity of an operation is the same as the job time. The initial parameters of an operation are copied from the manufacturing operation, and these parameters may be customized for the BoM. The operation details form can be opened by clicking the row image icon.



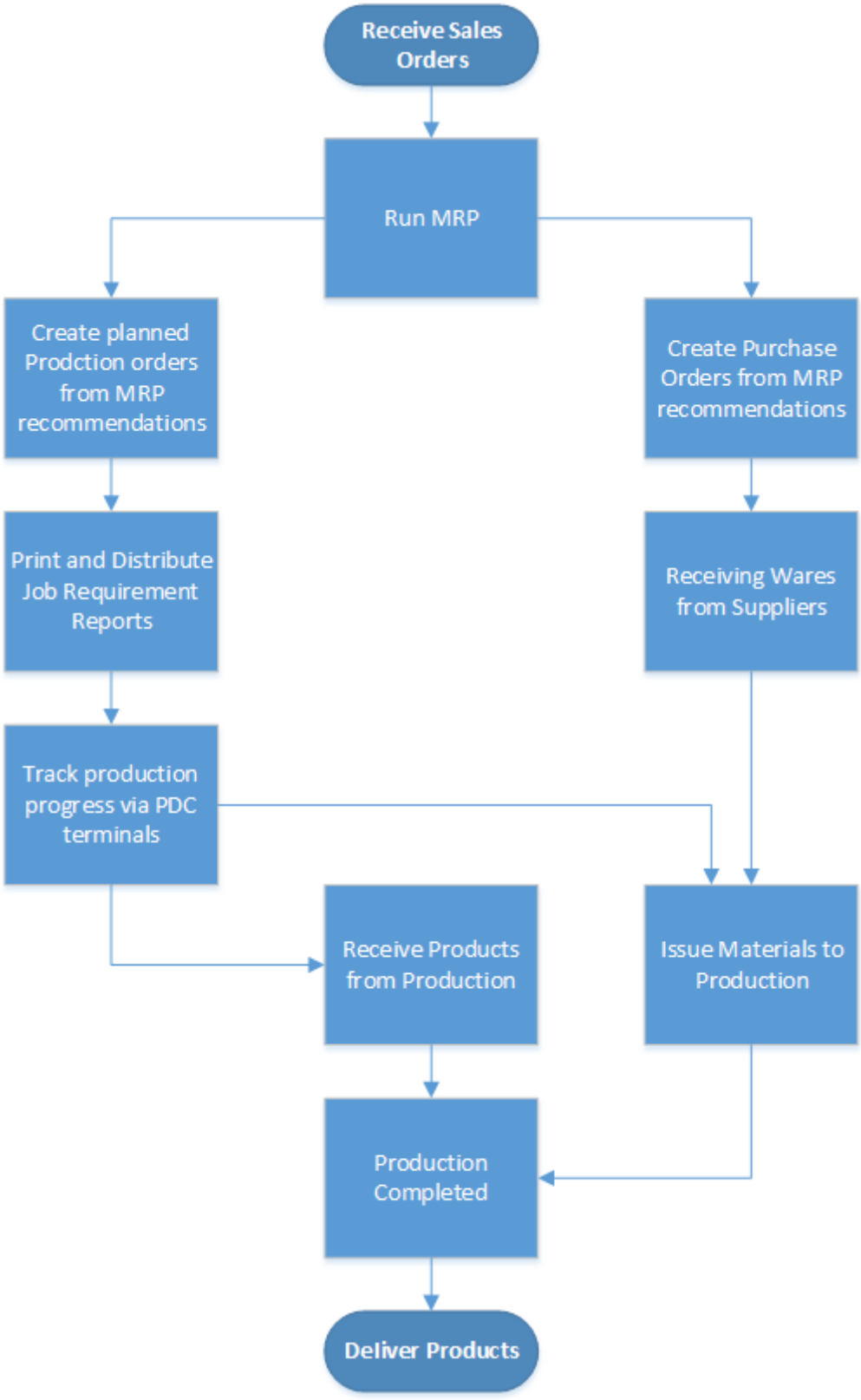
To calculate the estimated price of a product based on the Bill of Materials, configure the Cost Calculation settings.

2.3. Install initial data

In most cases when SAP Business One is installed for a company, the company has already had some computerized information system. Therefore, typically the first job for a SAP Business One installation project is to migrate or import the startup data for the company database of SAP Business One. The tools that may help in this job are Test Script Executor and Test Script Creator. Download the Test Script Executor and the Test Script Creator from: TxTestScriptCreator.zip

For more information about how to use the Test Script executor for installing initial data please see: Test Script Executor

3. Everyday Work – Business Process



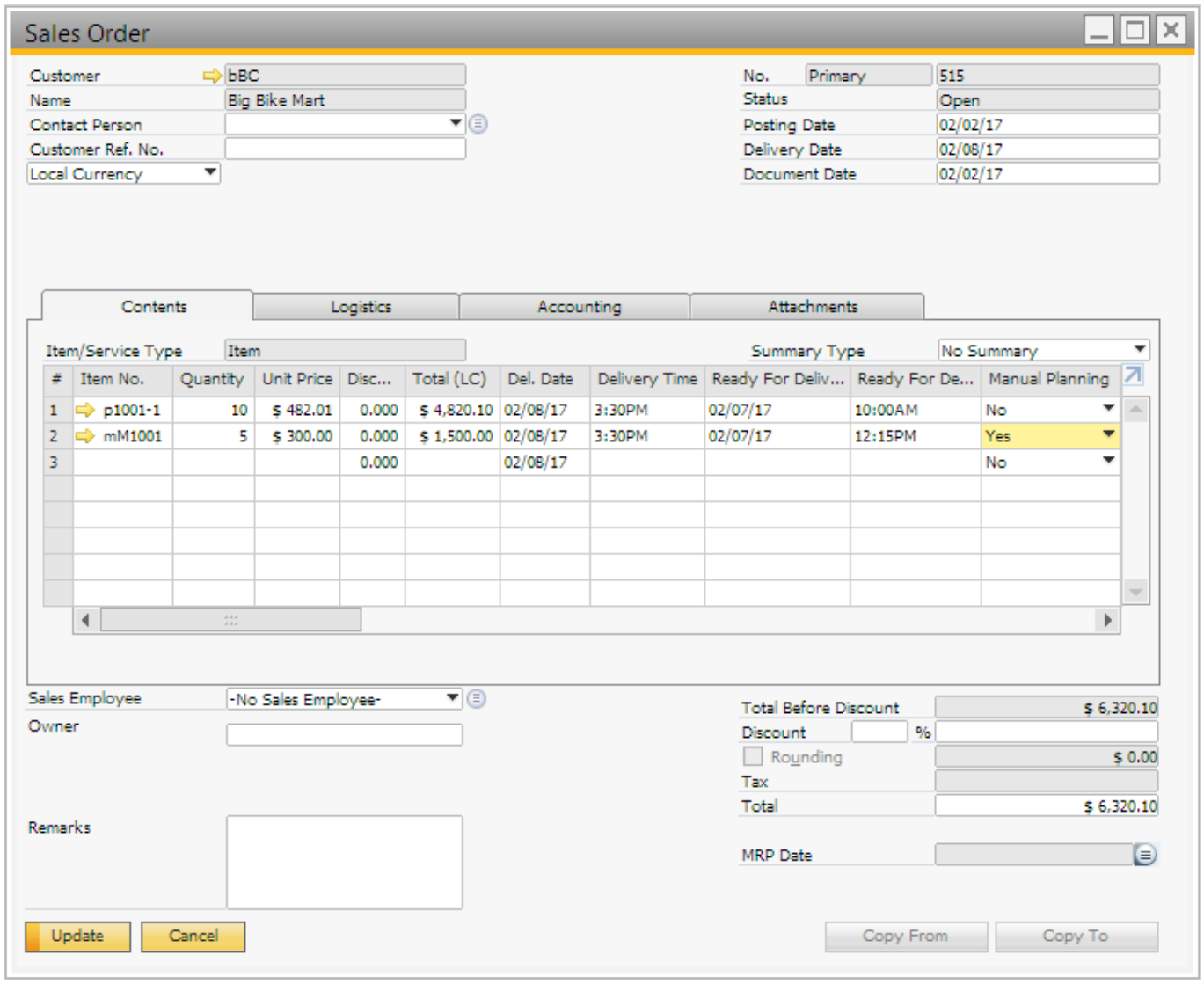
3.1. Receiving Sales Orders and Sales Quotations

3.1.1. Receiving Sales Orders

The requirements for the manufacturing process in most businesses are driven by sales orders. The Sales Order form is extended by Produmex Manufacturing with a new field ‘MRP Date’. The MRP Date calculated by the planning logic of Produmex Manufacturing is the earliest possible date to

accomplish/fulfill the sales order.

Please note: Only the Bill of Materials of the product is considered during the MRP Date calculation. The Bill of Materials of lower level assembly materials are not considered during the calculation.



Produmex Manufacturing supports just-in-time manufacturing; a new 'Delivery Time' column is added to the items matrix, which is the time of date of the 'Delivery Date' (a standard SAP Business One field). Since Production Orders extended by Produmex Manufacturing support 'Due Time', the recommendations created by MRP support 'Due Time' as well.

In a number of cases the 'Delivery Date' and 'Delivery Time' is the time when the customer wants the products on her premises. In such a case if the shipping time is significant, the manufacturing should accomplish the production before shipping. This is where the 'Ready for Delivery' and 'Ready for Delivery Time' fields are important: if they are defined, the MRP logic uses them as the expected due date and time for the Production (or Purchase) Order Recommendations.

In some situations some of the Sales Order lines should be ignored by the MRP. If the '*Manual Planning*' flag is set to 'Yes', the MRP ignores this and the fulfillment of the sales order line should be managed manually. This setting allows the combined running of the MRP and the MTO.

3.1.2. Receiving Sales Quotations

The earliest fulfillment date can also be calculated for Sales Quotations. The form is extended by Produmex Manufacturing with a new *'MRP Date'* field. Click on the button next to the MRP Date field. Starting from the current date, the planning logic of Produmex Mnaufactuirng will calculate the earliest possible date to fulfill the sales quotation.

Please note: Only the Bill of Materials of the product is considered during the MRP Date calculation. The Bill of Materials of lower level assembly materials are not considered during the calculation.

If the '*Advanced MTO Recommendation*' option is enabled on the MTO tab of Produmex Manufacturing settings, a *'Sales Quotation Simulation Parameters'* form will open.

On this form a separate MTO scenario can be created for the sales quotation. It is possible to adjust the scenario name and select additional MRP scenarios to include in the allocation simulation. The type of the scenarios that can be included is defined by the '*Sales Quotation Simulation Type filter*' setting on the MTO tab of Produmex Manufacturing settings.

Click on the *'Calculate'* button to calculate the earliest MRP Begin Date/Time and MRP End Date/Time for the sales quotation lines. The 'MRP Mark' column determines which lines are taken into account in the simulation:

- If the 'MRP Mark' is set to 'No' for each line, every sales quotation line will be taken into account.
- If there is at least one line with enabled 'MRP Mark', only lines where the 'MRP Mark' is set to 'Yes' will be taken into account.

These fields will be populated with the begin/due date/time of the order recommendation of the item created by the MTO.

To also see the simulation results on the Job Scheduling Control Panel, click on the *'Show'* button.

3.2. Detect Requirements

3.2.1. Advanced MRP

Material Resource Planning (MRP) is the tool in SAP Business One to find the purchasing and production requirements driven by sales orders, advance/reserve invoices, forecasts and inventory level requirements.

In SAP Business One MRP can be run with a number of parameters; the parameters and the purchasing and production recommendations are saved in scenarios. Produmex Manufacturing simply extends the scenario concept of SAP Business One.

When the Run button is pressed on the MRP Wizard screen, the advanced MRP logic of Produmex

Manufacturing is executed suppressing the built-in simple MRP logic of SAP Business One. The advanced MRP logic of Produmex Manufacturing uses exactly the same parameters of a scenario as SAP Business One, but the algorithm is much more complex because it takes the available resource capacities into account.

The results of the advanced MRP are displayed in an overview matrix. When the buttons are clicked a form is shown that explains the driving factors behind that recommendation.

If there are requirements that cannot be fulfilled on time, a list of error is displayed after MRP has completed running. In many cases the reason of the error is that the MRP cannot find available capacity for the operation of a production order recommendation. Click on the red x to see the detailed explanation.

The problematic figures are displayed in red on the overview matrix. The pegging information window shows the production or purchase order recommendation.

3.2.2. Manage MRP scheduling on a graphic board

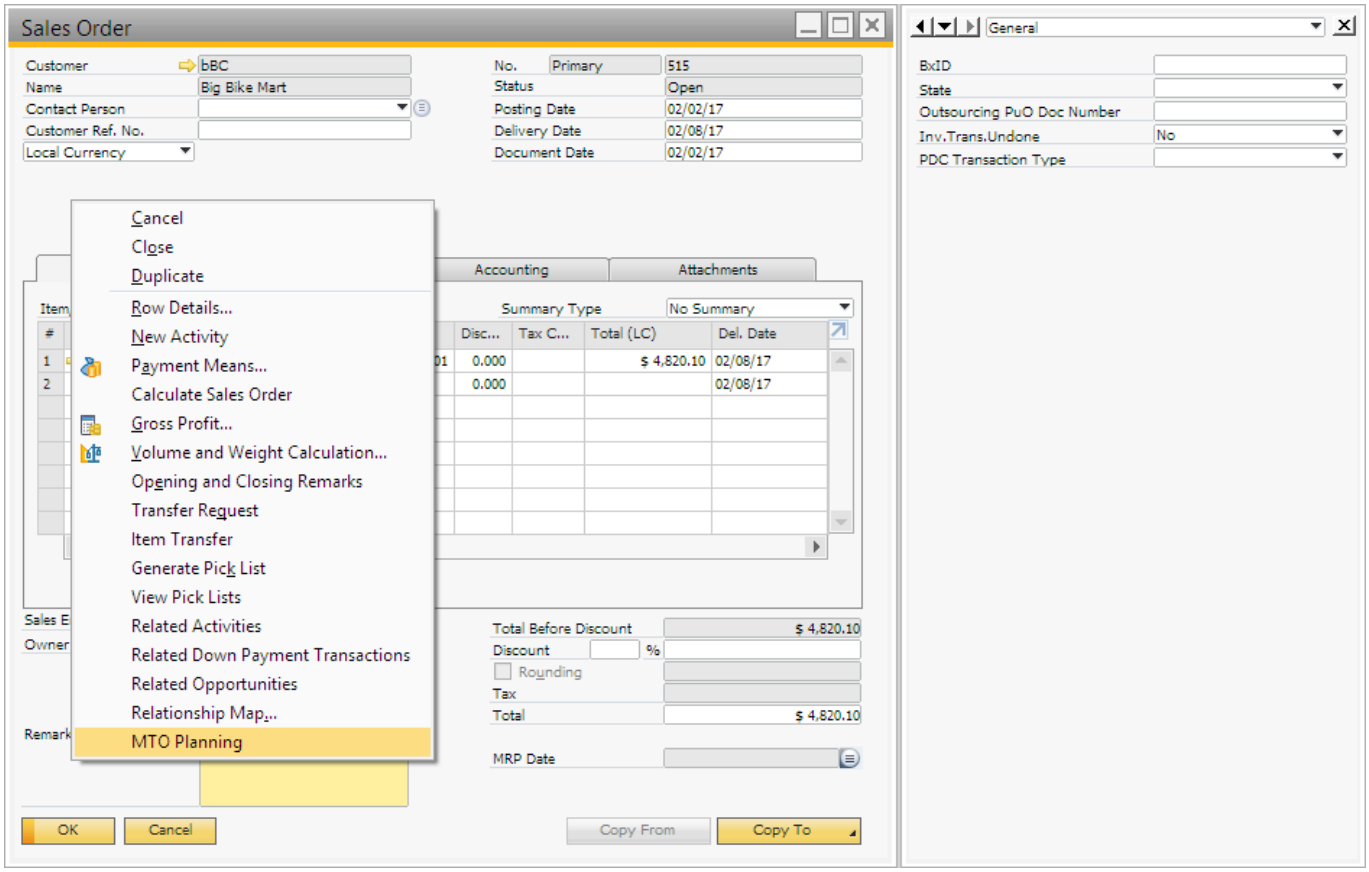
To see the simulated resource allocations for the production orders recommended by the MRP, open the Job Scheduling Control Panel. Click on the 'Query' button. Check 'MRP recommendations' as a Data Source and select the MRP scenario from the dropdown list.

3.2.3. Make To Order

Produmex Manufacturing also supports procurement planning strictly based on production orders and incoming sales orders. With Make To Order planning a separate MRP scenario can be created for the triggering production/sales order. Production and purchase orders created from MTO recommendations will be linked to the top order.

In order to take into account an item during the MTO planning, set the *'MTO Planning'* UDF to 'Yes' on the Item Master Data.

Initiate the MTO from the right click menu of the top order.



On the opening ‘Top Order Picker’ form select the top order line. It is possible to combine more than one orders in one MTO scenario. Click on the ‘Load Top Orders’ button to load every order that can be included in the MTO scenario. Select the orders with the *‘Selected’* checkbox then click on the ‘Add’ button to add the new MTO scenario.

3.2.4. Combine MRP and MTO

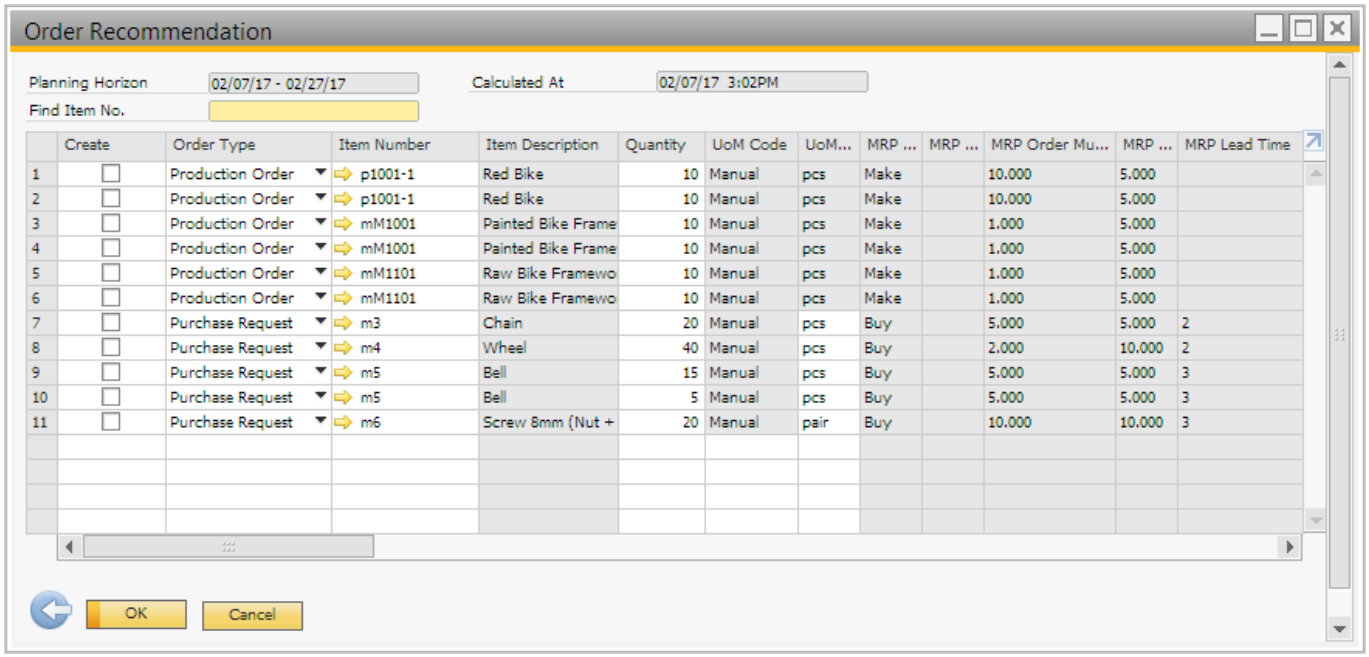
Manufacturing companies that produce complex and customizable products might want to run MRP and MTO simultaneously. Produmex Manufacturing supports the combined use of MRP and MTO.

To plan the procurement of an element with MTO only, enable the *’Skip MTO from Normal MRP’* option on the MTO tab of Produmex Manufacturing settings]]. Every item with the ‘MTO planning’ option set to ‘Yes’ will be excluded from the MRP run.

To exclude certain sales order lines from the MRP run, set the ‘Manual Planning’ field of the line to ‘Yes’ on the sales order.

3.3. Creating Production and Purchase Orders from Recommendations

Order recommendations created by the Produmex Advanced MRP and MTO are saved into the same database as used by the SAP Business One’s original simple MRP logic. This way the standard Order Recommendation form extended by the Produmex Manufacturing add-on is used to review the recommendations for a scenario. From this form the user may create both production orders and purchase orders.



	Create	Order Type	Item Number	Item Description	Quantity	UoM Code	UoM...	MRP ...	MRP ...	MRP Order Mu...	MRP ...	MRP Lead Time
1	☐	Production Order	p1001-1	Red Bike	10	Manual	pcs	Make		10.000	5.000	
2	☐	Production Order	p1001-1	Red Bike	10	Manual	pcs	Make		10.000	5.000	
3	☐	Production Order	mM1001	Painted Bike Frame	10	Manual	pcs	Make		1.000	5.000	
4	☐	Production Order	mM1001	Painted Bike Frame	10	Manual	pcs	Make		1.000	5.000	
5	☐	Production Order	mM1101	Raw Bike Framewo	10	Manual	pcs	Make		1.000	5.000	
6	☐	Production Order	mM1101	Raw Bike Framewo	10	Manual	pcs	Make		1.000	5.000	
7	☐	Purchase Request	m3	Chain	20	Manual	pcs	Buy		5.000	5.000	2
8	☐	Purchase Request	m4	Wheel	40	Manual	pcs	Buy		2.000	10.000	2
9	☐	Purchase Request	m5	Bell	15	Manual	pcs	Buy		5.000	5.000	3
10	☐	Purchase Request	m5	Bell	5	Manual	pcs	Buy		5.000	5.000	3
11	☐	Purchase Request	m6	Screw 8mm (Nut +	20	Manual	pair	Buy		10.000	10.000	3

After the production orders have been created from the recommendations, they are created in ‘Planned’ status initially. The production order can be modified in any manner.

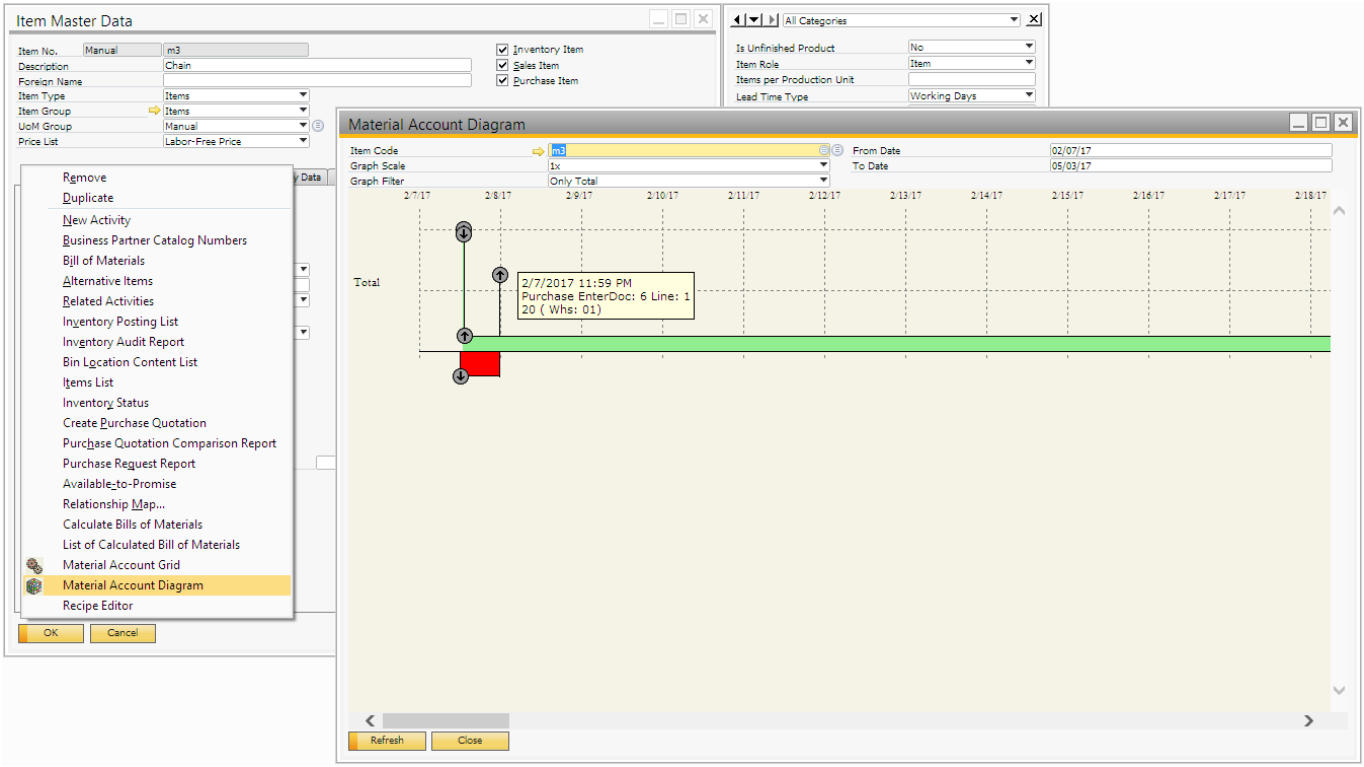
For planned production orders only temporary allocations are made. Permanent allocations will only be created after the production order has been released.

As mentioned earlier, Produmex Manufacturing extended the production order 'Due Date' with a time component. With the '*Due Time*' UDF the production planning is detailed at the time-of-day level.

3.4. Detect missing components

At this point the components needed for the production may be missing. The Missing Parts Report shows the components that are not on stock for the planned or released manufacturing, and this way they need special attention.

To see the material flow of a given item, open the Material Account Grid/Diagram from the right-click menu of the Item Master Data.



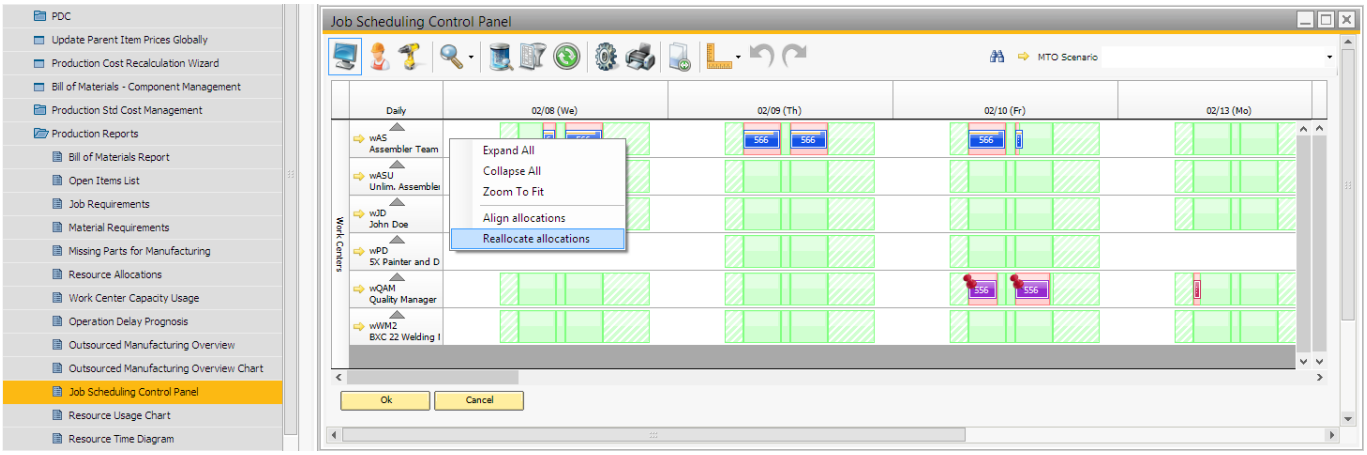
When the mouse cursor is moved over the circled arrow icons, a bubble shows details about that transaction; if the icon is clicked the appropriate production, purchase, etc. order form is opened. The up arrow shows incoming, the down arrow outgoing inventory transactions.

When all the purchased components are on stock the production can be started.

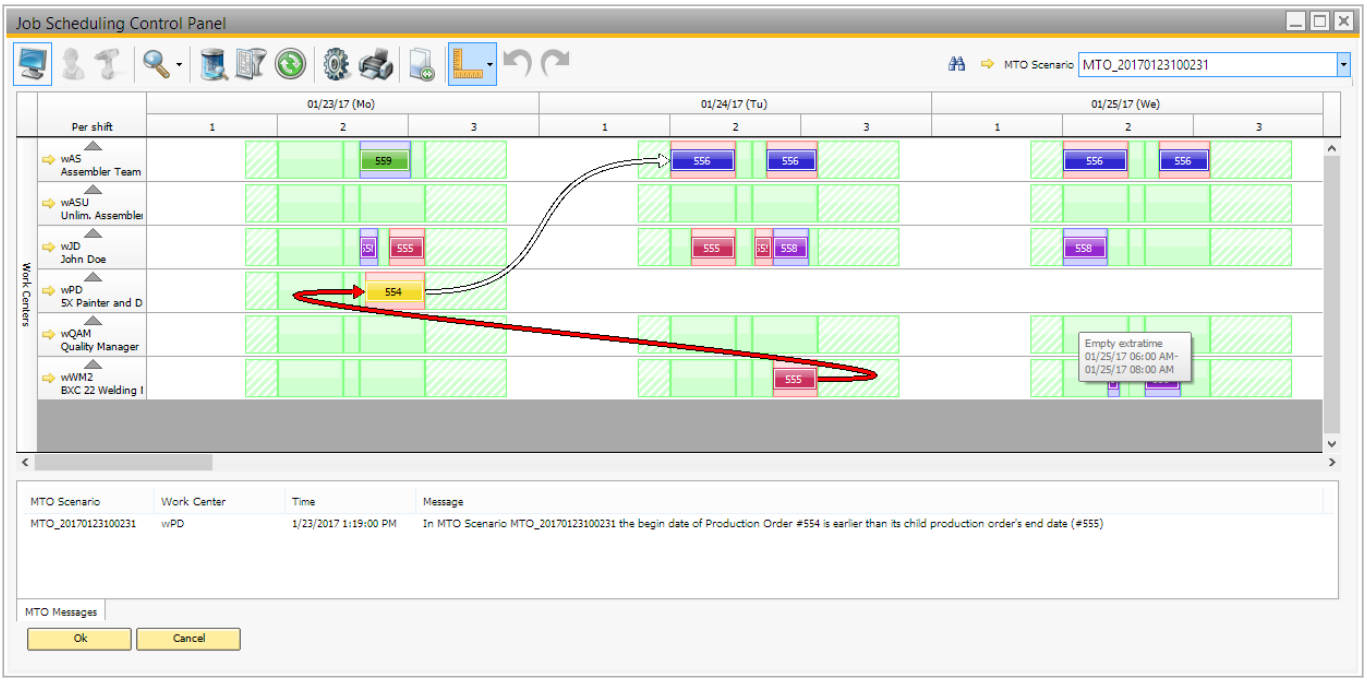
3.5. Manage scheduling

For the operations of production order recommendations and planned production orders, no actual resource capacities have been allocated. In the case of such orders, the resource allocations are only temporarily made as a simulation. Permanent allocations are only created when a production order is released.

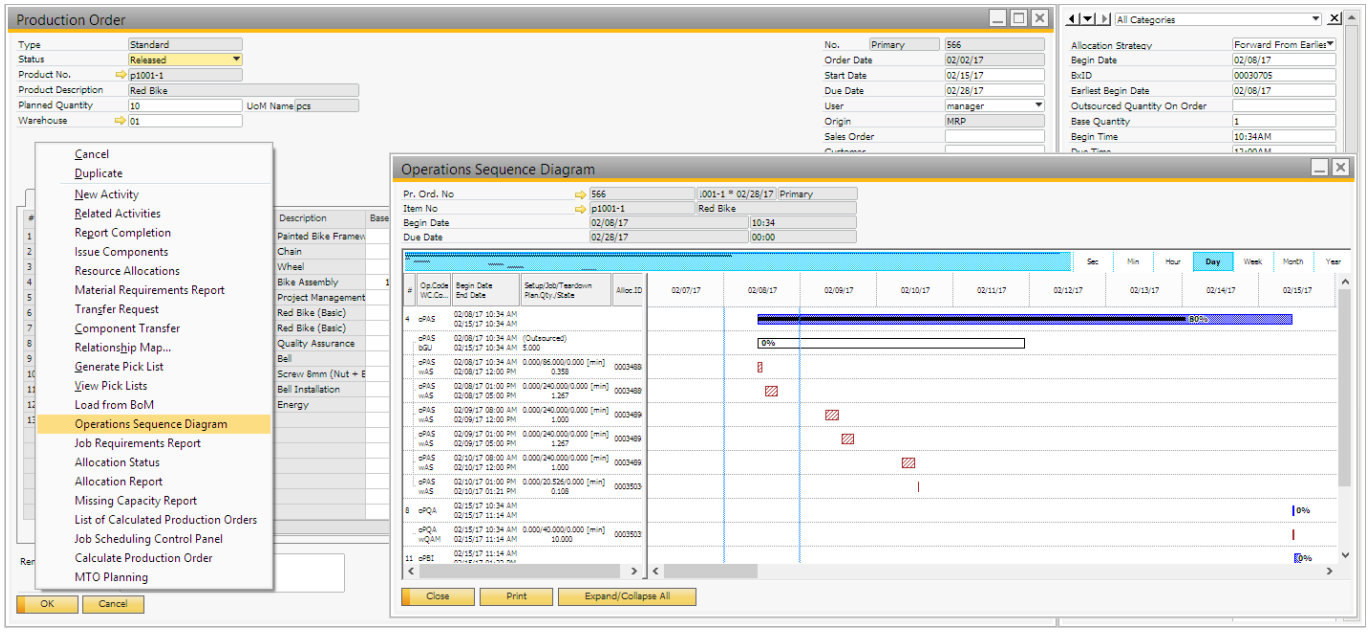
On the Job Scheduling Control Panel not just the allocations for recommendations but the simulated allocations for planned production orders and the temporarily allocations for released orders can be monitored. To reschedule an operation, simply drag it and replace it on a free slot. To reschedule every allocation for a resource, use the semi-automatic rescheduling functions.



The Job Scheduling Control Panel has special functions for MTO scenarios. If a scenario is highlighted, the sequence of the operations is indicated with arrows. When the system detects discrepancy, an MTO message is shown and the discrepancy is marked with a red arrow.



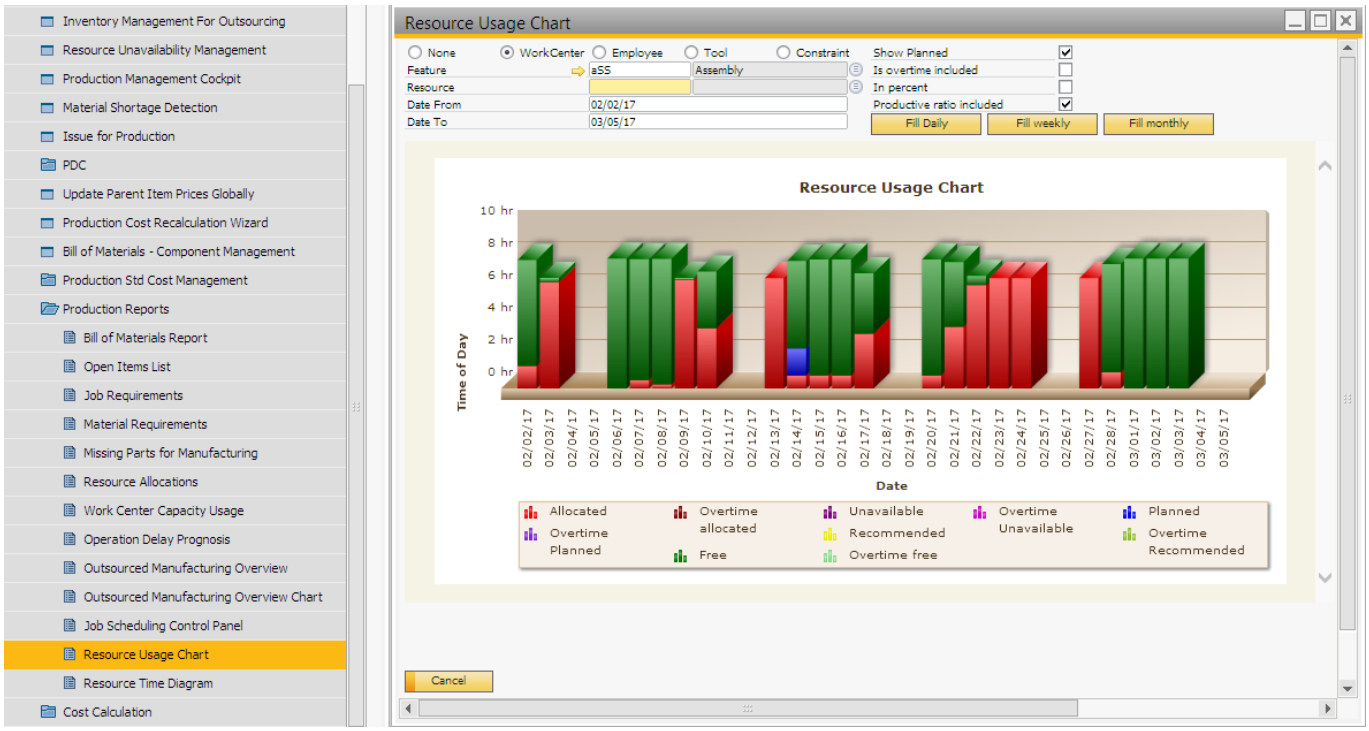
To review the operation sequence of only one production order, open the Operation sequence diagram from the right-click menu of the order. On the diagram resource allocation are displayed in separate lines with the completion percentage.



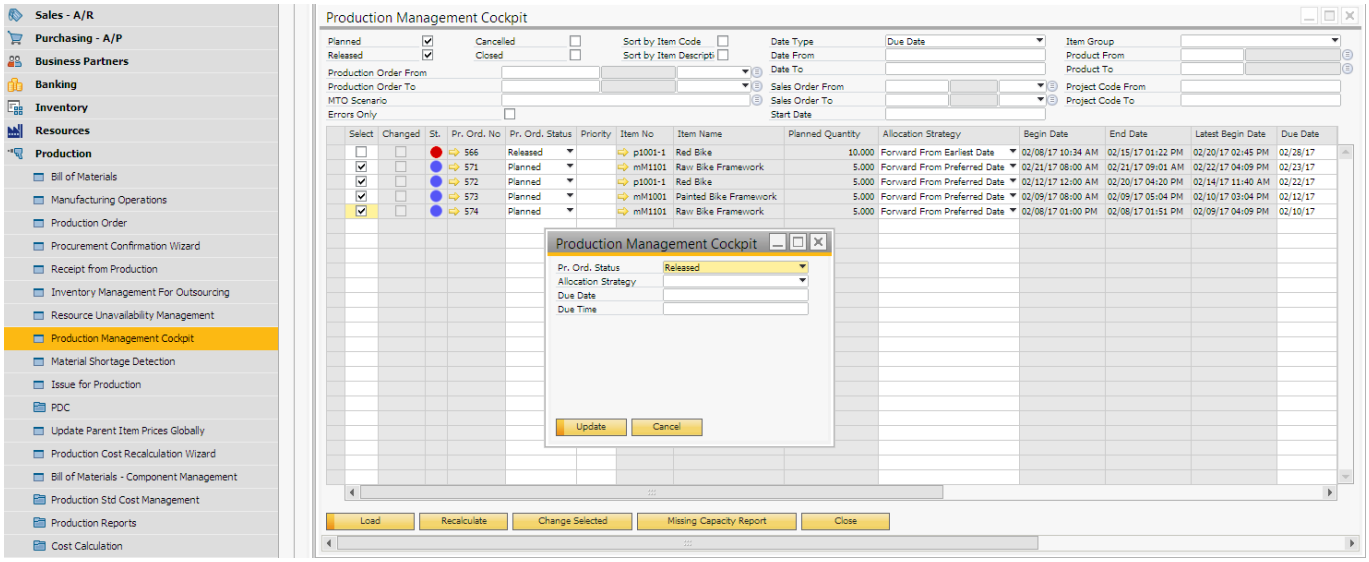
One of the goals of a manufacturing company is to optimize the usage of resources.

The Resource Usage Chart may be used even with planned or recommended production orders. Keep in mind that resource capacities are allocated for the operations in production orders based on the resource feature settings.

When no work center is selected, the combined usage of all work centers of the company is shown. The available capacities of the resources are determined by the associated shift model.

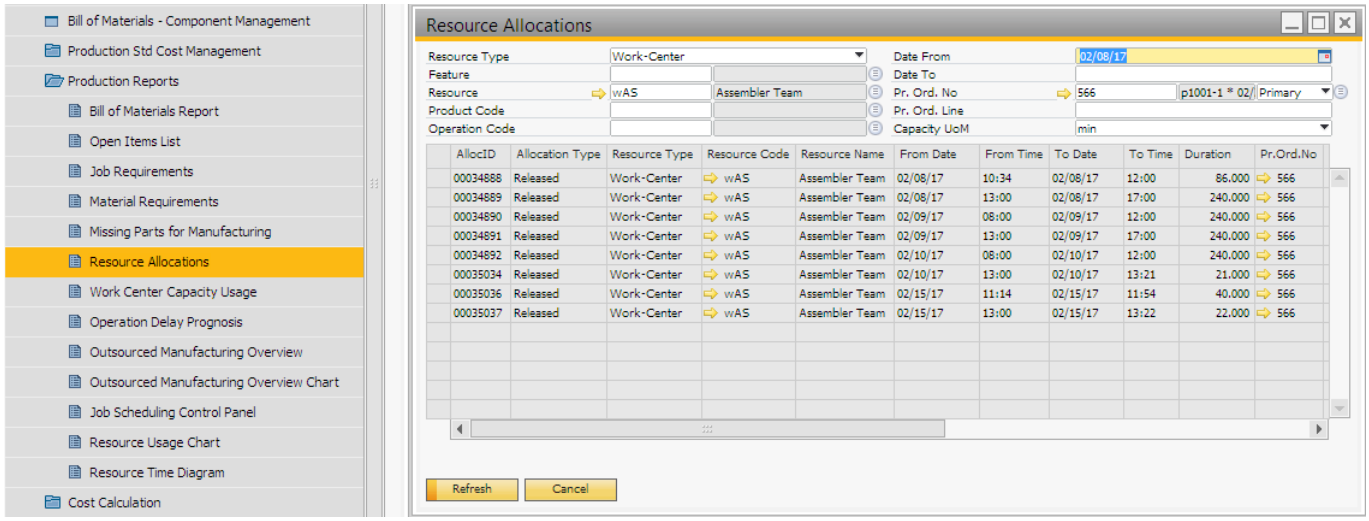


Produmex Manufacturing also offers a Production Management Cockpit. On this cockpit production orders can be released, closed or rescheduled in groups. To release multiple production orders, select the lines of the production orders then click on the ‘Change Selected’ button. Select the new status from the dropdown menu. After pressing ‘Update’ recalculate the production orders.

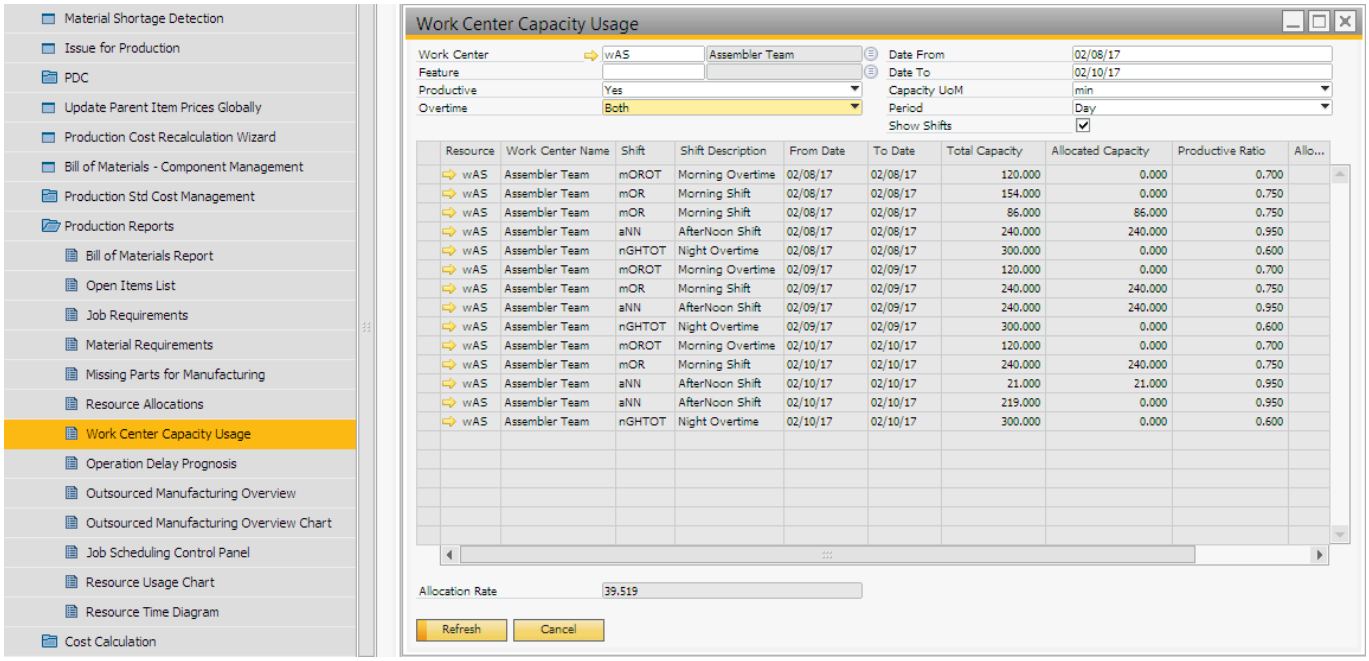


When a production order has been released, the scheduling logic of the Produmex Manufacturing add-on finds resource capacities for the operations and a number of reports are available including the Resource Allocations report.

The allocations for a selected resource, resource feature, product, production order or time period can also be viewed on a grid. Open the Resource Allocations form.



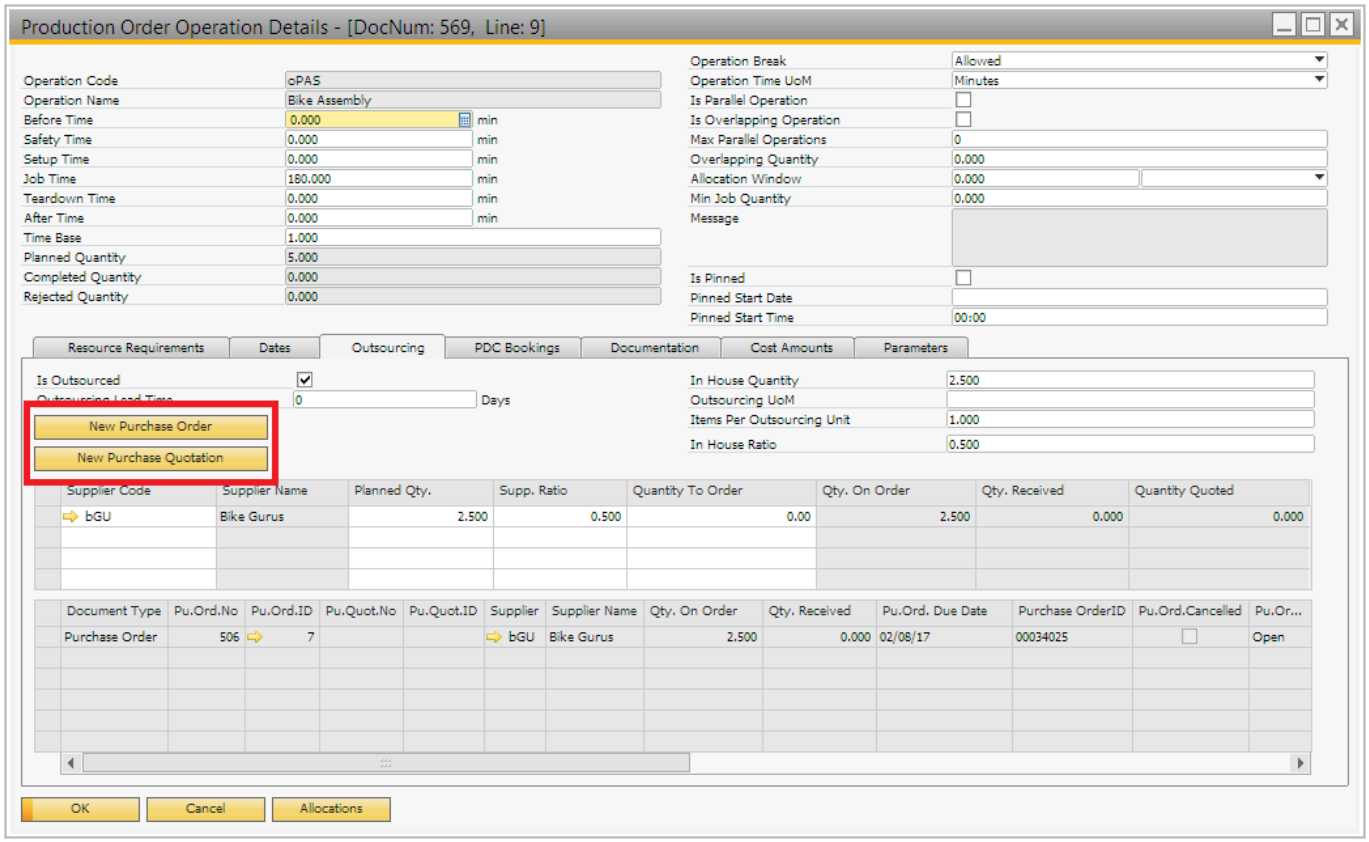
To see the capacity usage of a given work center, open the Work Center Capacity Usage form. On the *'Allocation Rate'* field the work center usage percentage for the given work center with the selected parameters is shown.



3.6. Create outsourcing orders

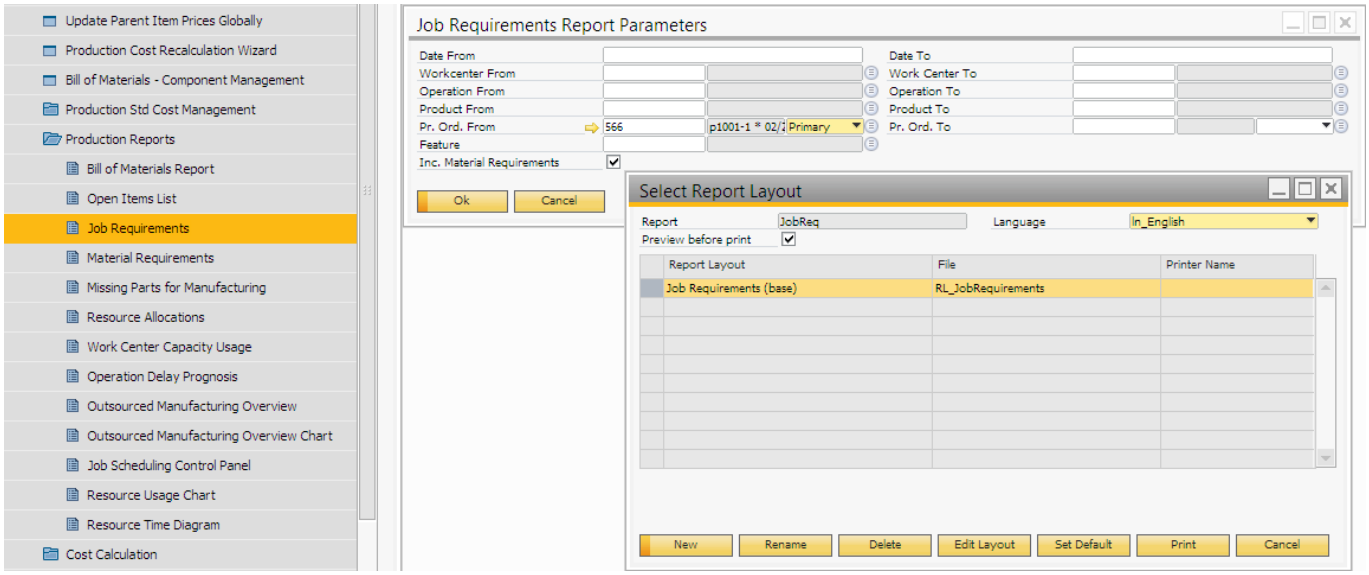
After the production order has been released, purchase quotations and purchase orders can be created for the outsourced operations on the Production Order Operations Details form.

For more information about the Outsourcing please see: Outsourced Manufacturing

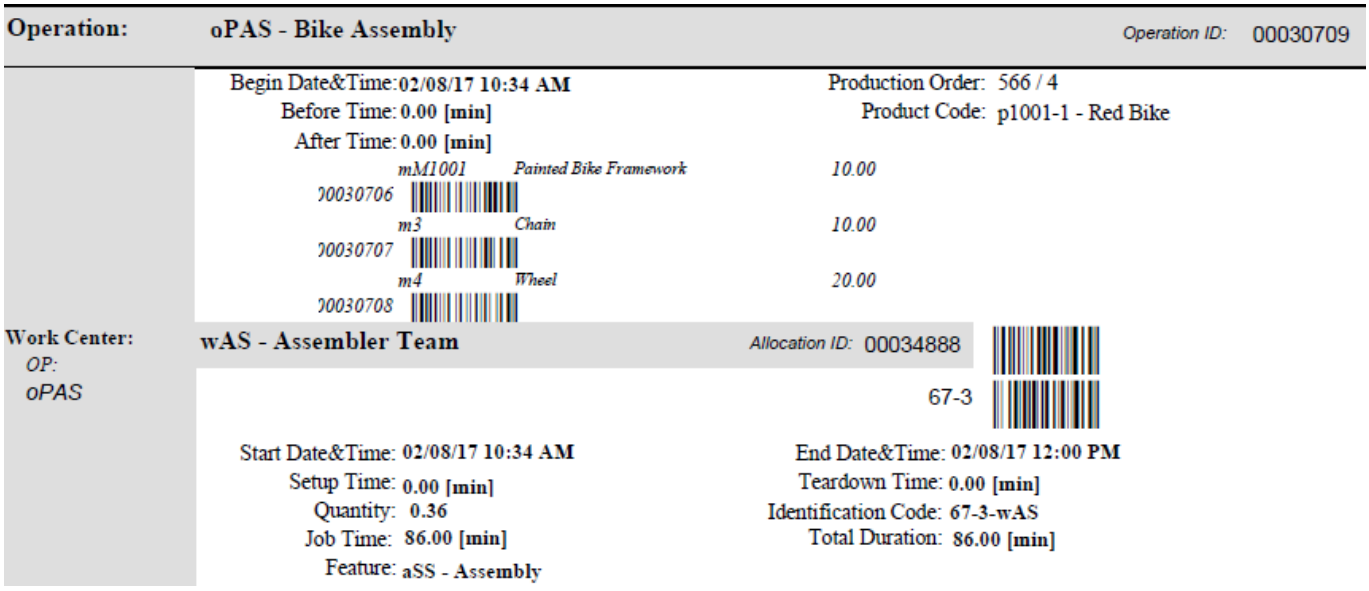


3.7. Print production reports

Before starting the production on the shopfloor, print the Requirements Reports for the operations and materials. The Job/Material Requirements Report is meant to be distributed to the workers who do the jobs. These reports are a kind of daily work orders for the workers. The production data collection is done with the help of these reports.



Define the parameters of the report. To print the material requirements among the job requirements, check the *'Inc. Material Requirements'* checkbox. After pressing the 'Print' button, the printing is directed to the default printer. To print the report in PDF file, check the *'Preview before Print'* checkbox. The report is built with Crystal Reports and can be customized.

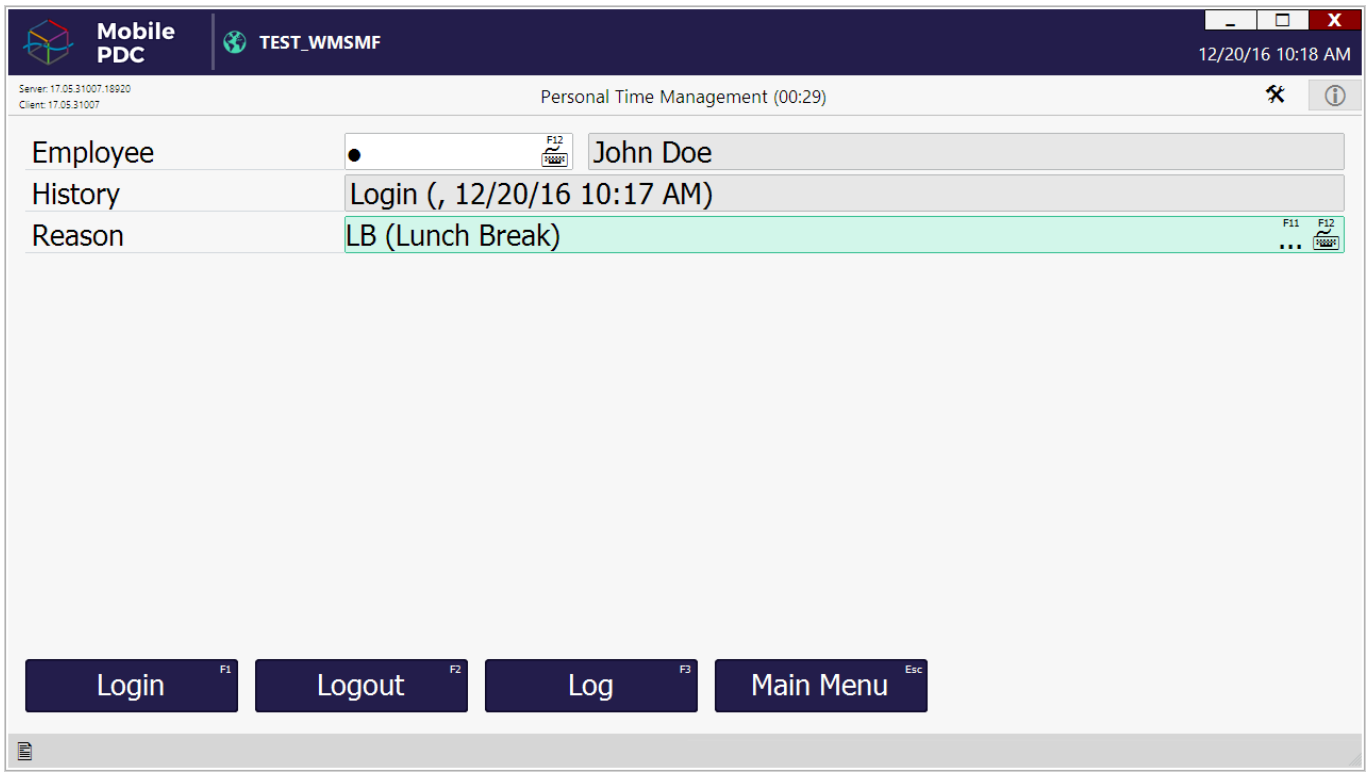


3.8. Production on the shopfloor

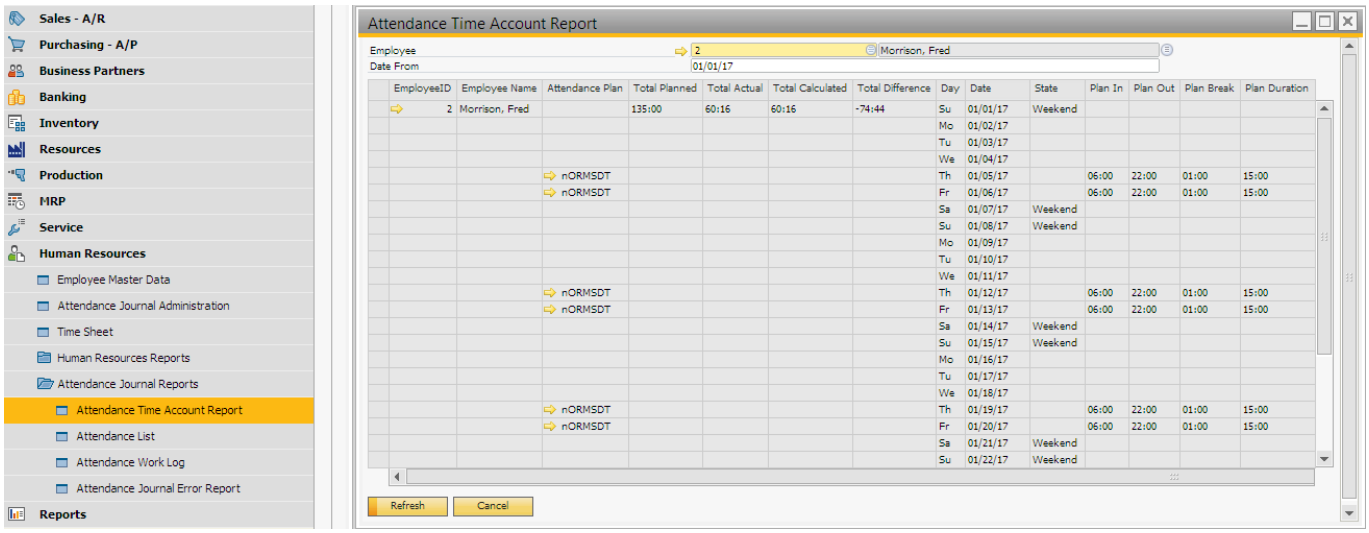
3.8.1. Personal Time Management

Produmex Manufacturing can be extended with an employee attendance data collecting solution. At

the beginning and end of their shift, employees can login/logout on a terminal. This transaction is recorded in SAP Business One in real time which allows to monitor arrivals and leaves directly from the office.



On the office module of PTM monthly and ad-hoc attendance reports can be generated.

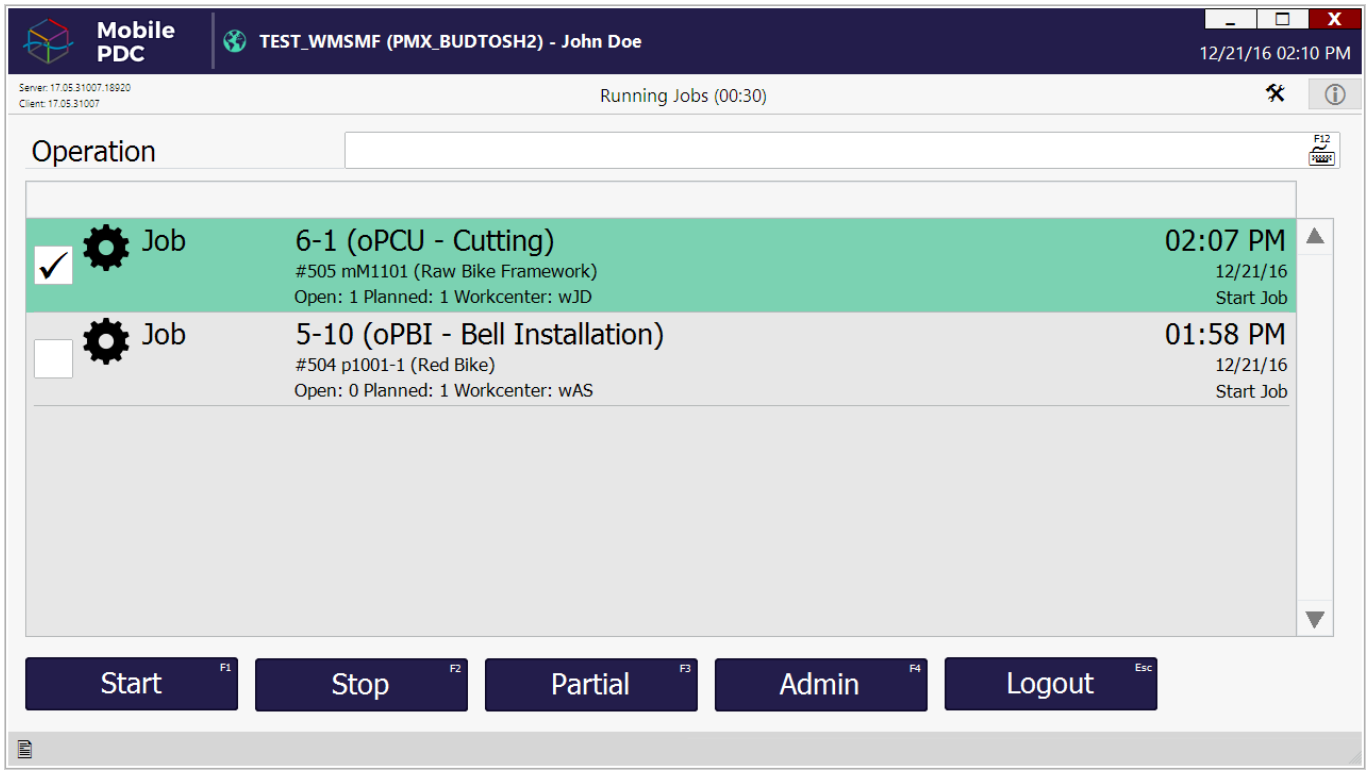


3.8.2. Production Data Collection

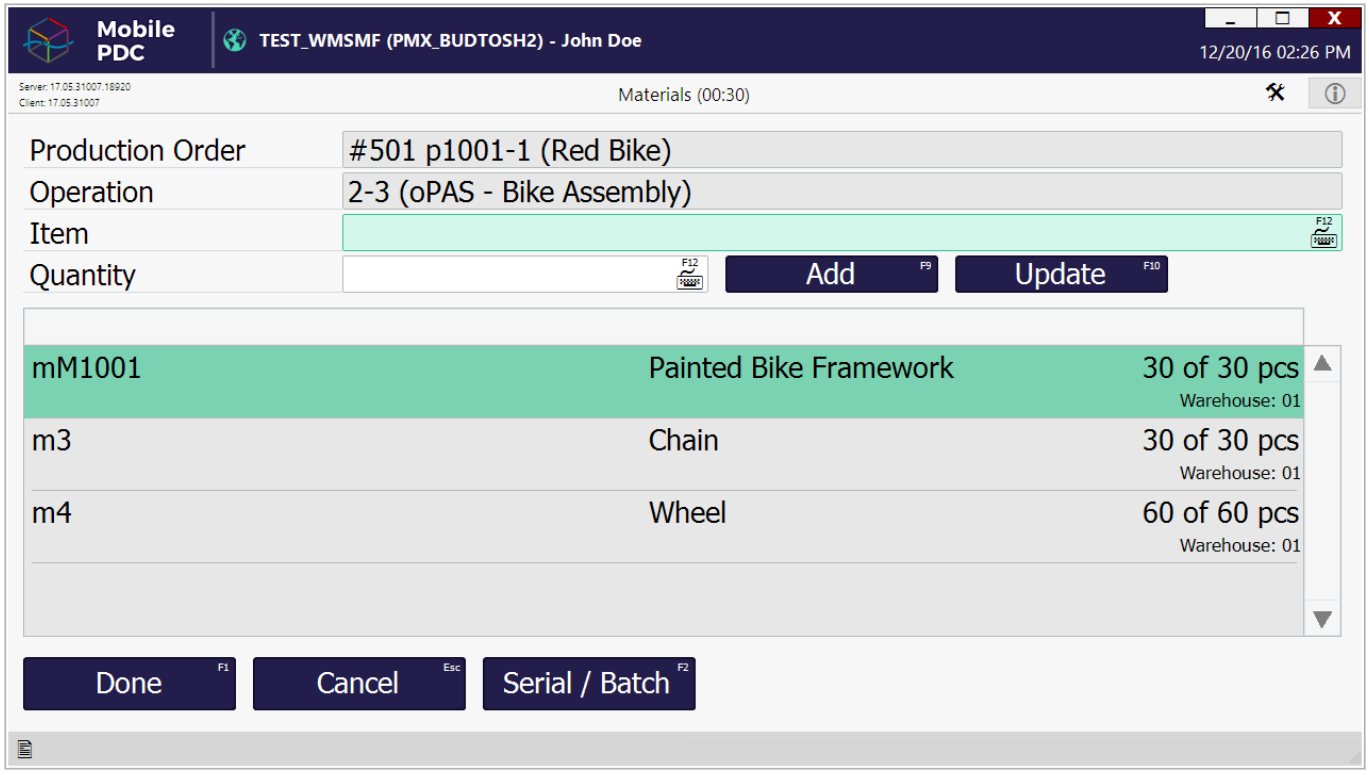
Production Data Collection is when the workers report back to the system how their work is progressing.

With the standard PDC application employees first have to start the setup/job then they can report partial/full completion. The duration of the operation is measured in real time and cannot be modified. With the simple job function employees can report the operation duration, setup and job completion

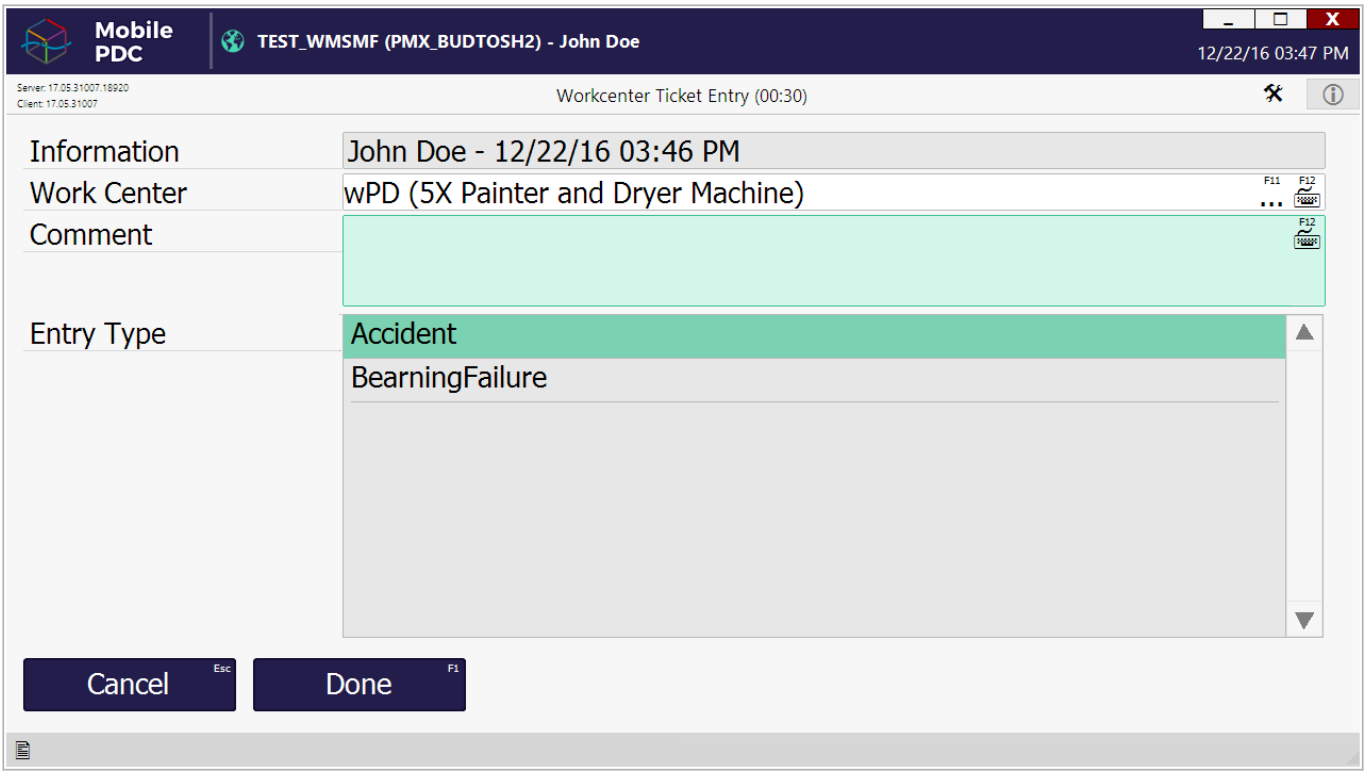
in one step.



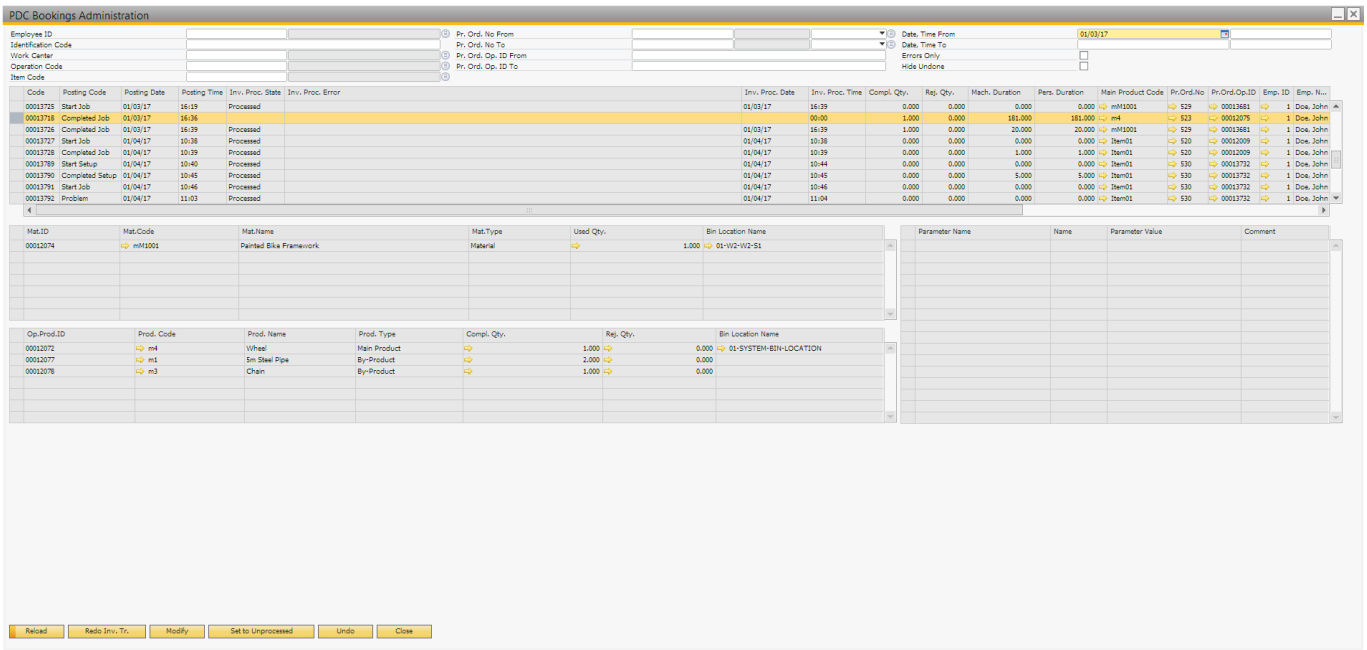
According to the milestone settings of the production order lines and the production order, material consumption and product and by-product completion can be reported during the PDC booking. The appropriate material issue or product receipt inventory transactions will be committed as well.



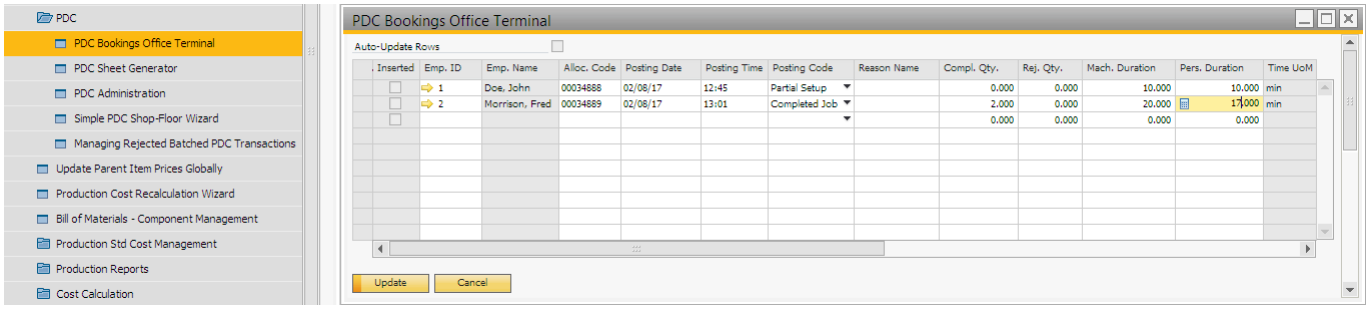
Unplanned work center unavailability or machine failure can be reported with the Workcenter Journal and Workcenter Ticket functions.



On the PDC office terminal, PDC bookings can be monitored, canceled or created.

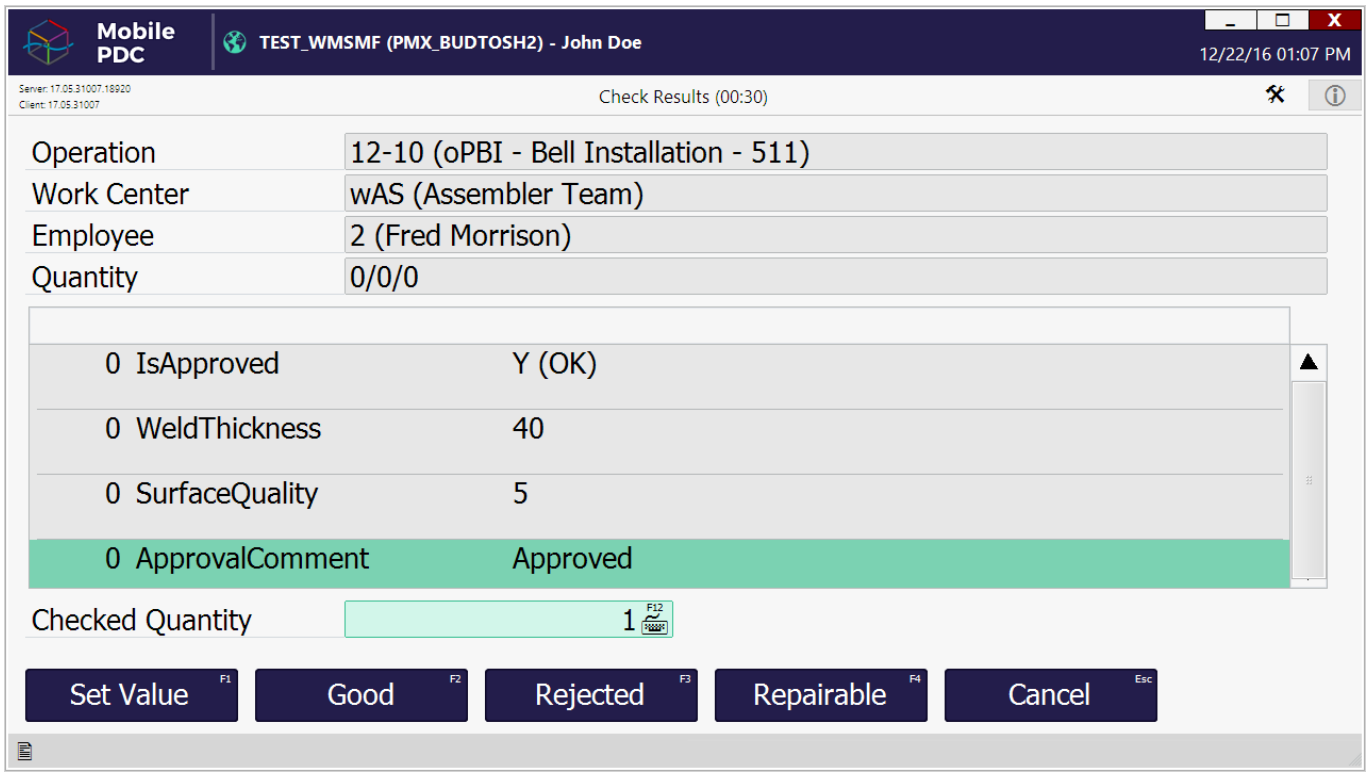


Many manufacturing companies do not need the full-fledged data collection terminal. Instead, they could do very well with the much simpler PDC Bookings Office Terminal. In this scenario, the production data is collected (mostly) on paper, and the data is entered at the end of the day by an office assistant.



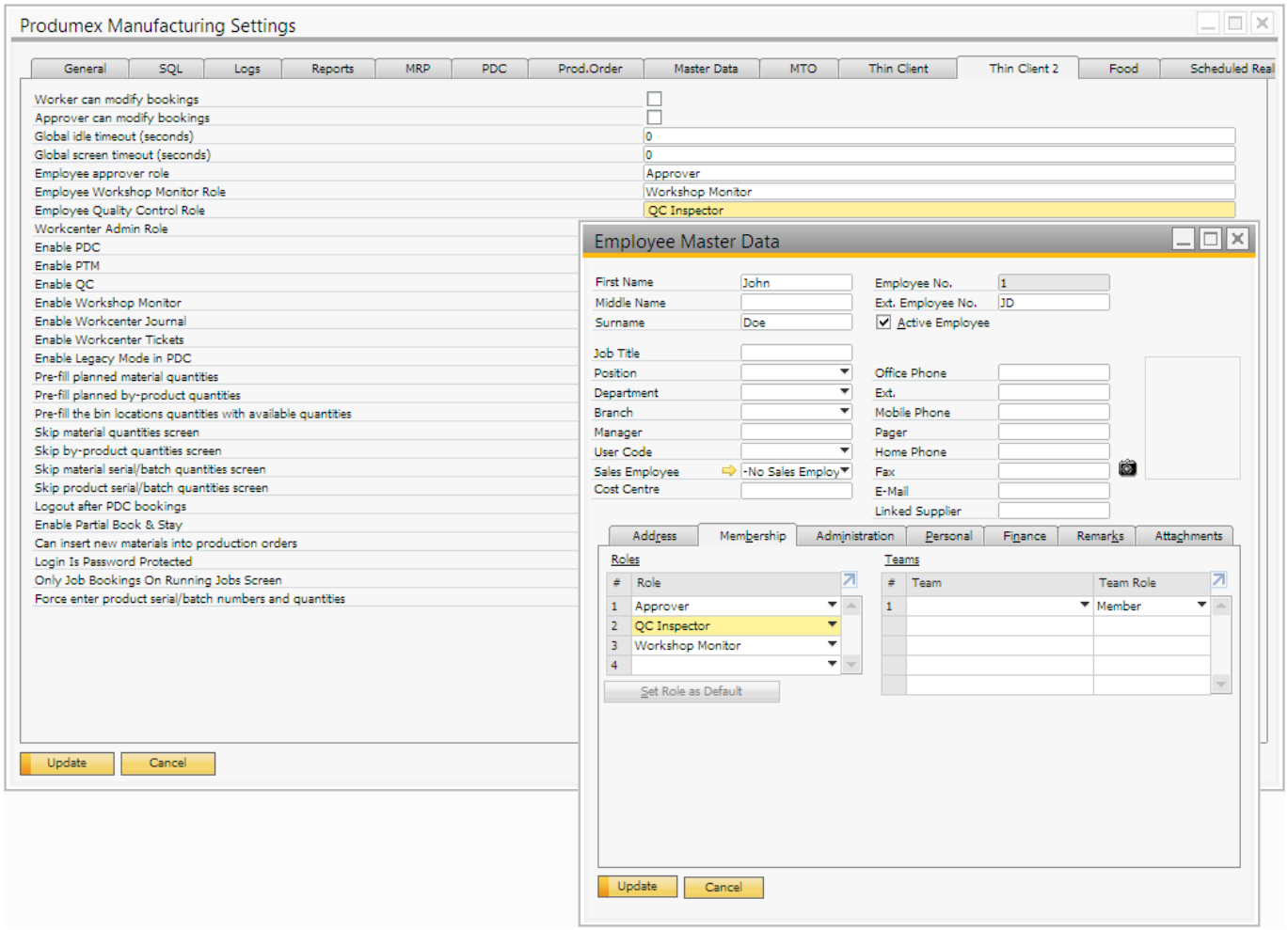
3.8.3. Quality Control

The early detection of defects reduces product risk and helps to identify delay in an early stage. With the Quality Control function the appointed inspector can report quality assurance data for own-manufactured and outsourced products.



To appoint an inspector, add the Employee Quality Control Role defined on Produmex Manufacturing settings as the Role for employee.

To setup quality control parameters, enable the *'Use Operation Parameters'* option on Produmex Manufacturing settings. Define the parameter types on the Operation Parameter Types UDW. Link the quality control parameters to an operation on the Operation Details form.



Operations

Produmex Manufacturing is a legacy product and Boyum IT Solutions no longer sells new installations for it.

Manufacturing operations are special items that represent the operations in production orders. An operation item is never an ‘Inventory’ item, but can be a ‘Purchase’ item if outsourceable.

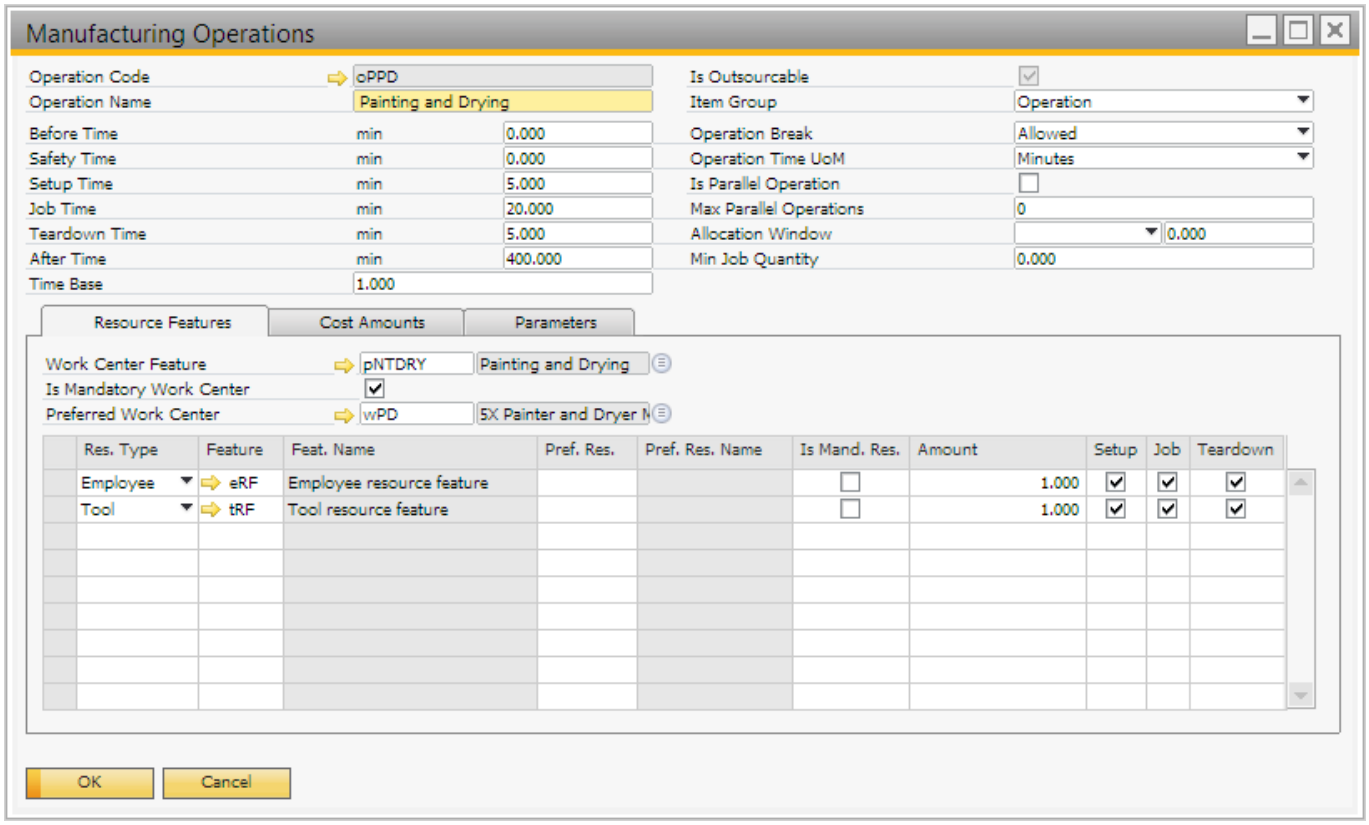
The operation will be more meaningful in the context of a Bill of Material (BoM) or Production Order. All the parameters (except ‘Is Outsourceable’) for an operation can be redefined in a BoM or Production Order.

Manufacturing Operations

On the Manufacturing Operations form the manufacturing details of an operation type item can be defined and new operations type items can be added. New operations should be created from the Manufacturing Operations screen and not directly from the Item Master Data.

Open the form via:

- Production module> Manufacturing operations.
- Right-click menu on the Item Master Data of an operation.



Header

Operation code
The code of the operation item.

Operation name
The name of the operation.

Time Values
The duration each operation step requires, displayed in the selected ‘Operation Time UoM’.
The safety, setup, job and teardown time consume the capacity of the work center. Before and after times do not consume work center capacity but the job scheduling logic will take them into account when calculating the beginning of the jobs in the sequence of operations.

- Before time: The duration of the tasks to be done before allocating the work center for the operation. No work center is allocated for the before time period.
- Safety time: Duration of the time buffer. No PDC bookings can be created for the safety time.
- Setup time: Duration of the tasks to be done before the production starts.
- Job time: The actual production time for the amount of units defined in time base.
- Teardown time: The duration of the tasks after the production finished but before the work center is released.
- After time: The duration of the tasks to be done after releasing the work center. The work center is released and available for other operations.

Time Base
The number of the units of the operation the job time refers to.

Is outsourceable? (Y/N)

Indicates whether the operation is outsourceable or not. This option cannot be changed after the operation was created. If the operation is outsourceable the item is set as Purchased Item.

Item Group
The item group the operation belongs to. Item groups with 'Standard' valuation method can be selected. When changing the 'Item Group' either on the Item Master Data or on the Manufacturing Operations form, the 'Item Group' on the other form will be changed too.

Operation break
During manufacturing, an operation can be stopped and restarted or the work center can be changed. With the Operation Break setting the user can define whether these break types are allowed or not.

- Allowed: Intermissions and work center changes are allowed during the operation.
- Denied: No breaks are allowed during the operation.
- Allowed WC: Other operations may get in between the sequence of the operation, but the work center cannot be changed during the operation.
- Allowed NBP: The work center can be changed, but intermissions are not allowed during the operation, therefore other operations cannot get in between the sequence of the operation.
- Allowed WCNBP: Neither the change of the work center, nor intermissions are allowed. It is recommended to use this option instead of the old 'Denied' option.

> The 'Allowed WC', 'Allowed NBP' and 'Allowed WCNBP' operation break types are not allowed in multi-dimensional allocation environment and do not work with parallel operations.

Operation Time UoM
The unit of measurement of the operation time. Possible values: Days, Hours, Minutes, Seconds, Weeks.

Is Parallel Operation (Y/N)
Indicates whether an operation can be performed on multiple work centers at the same time or not. This way the overall duration of an actual manufacturing operation may be much shorter if enough resource capacities are available.

Max Parallel Operations
The maximum number of work centers where the operation can be performed if it is a parallel operation.

Allocation Window
Defines the horizon of the allocation. 'Weeks', 'Days', 'Hours', 'Minutes' and 'Seconds' can be selected as the time scale.

Min Job Quantity
The minimum quantity that must be produced during an allocation.

Resource Features tab

Work Center Feature

Select a work center feature for the operation. This is a mandatory field. The parameter is used extensively by the job scheduler; when the scheduler tries to find work center capacities for an operation, it will search for work centers that have the selected feature for the operation.

Is Mandatory Work Center (Y/N)
Indicates whether the operation must take place on the preferred work center or not.

Preferred Work Center
A preferred work center can be set. Every work center with the feature linked to the operation can be selected.

The work center set here will be preferred during the allocation process. If the work center is free, the operation will be allocated there. If the work center is busy, the system will calculate the delay the usage of this work center could cause. If this delay exceeds the maximum delay set on the *'MRP Max Delay For Pref. WC (s)'* option on Produmex Manufacturing settings, the operation will be allocated to another work center, otherwise the system will schedule it to the preferred work center.

When using the multi-dimensional allocation strategy, employee, tool and constraint requirements can be added to the operation too. Select a resource type then add the feature and a preferred resource. The 'Feature Name' and 'Resource Name' fields will be automatically filled. Only resources linked to the selected feature and features linked to the selected resource type can be added.

Indicate whether the resource is mandatory or not on the *'Is Mand. Res.'* cell.

On the 'Amount' field in an employee row indicate the employee capacity the operation uses. If the Amount is set to one, it means that the operation requires 100% of the employee capacity. Therefore the amount set for an employee cannot be greater than one.

On the amount field of a tool set the needed quantity of the tool during an operation.

Additional resources might not being used during the entire operation. On the Setup, Job and Teardown fields mark that the resource is required in which step of the operation. The setup, job and teardown time of a supplementary resource will be the same as the work center time of the respective step.

Cost Amounts tab

Cost types with parameters can be set on this tab for cost calculation purposes.

Cost Type
Select a 'Cost Type'. Multiple cost type rows can be defined for an operation. Define cost types on the 'Cost Type' form that can be reached via: Production > Cost Calculation > Cost Type.

- Setup Amount: The Setup Amount for the given operation from the cost amounts.
- Job Amount: The Job Amount for the given operation from the cost amounts.
- Teardown Amount: The Teardown Amount for the given operation from the cost amounts.
- Cycle Amount: The Cycle Amount for the given operation from the cost amounts.
- Quantity Amount: The Quantity Amount for the given operation from the cost amounts.
- Fix Amount: The Fix Amount for the given operation from the cost amounts.

For more information about cost calculation please see: Cost and Price Calculations

Parameters tab

When the *'Use Operation Parameters'* setting is enabled on the PDC tab of the Produmex Manufacturing settings, an additional 'Parameter' tab is displayed on the form.

On this tab parameters for shopfloor Quality Controlling can be set. Parameters types can be set up on the *OperationParameterTypes* UDT.

BoM Order Operation Details

Open the form from the Bill of Materials by clicking on the operation icon on the Row type field.

On this form the operation details can be modified and specialized for the particular BoM. The BoM Order Operation Details inherits data from the operation item's Manufacturing Operations form.

Header

Operation code
The code of the operation item.

Operation name
The name of the operation.

Time Values
The duration each operation step requires, displayed in the selected 'Operation Time UoM'.
The safety, setup, job and teardown time consume the capacity of the work center. Before and after times do not consume work center capacity but the job scheduling logic will take them into account when calculating the beginning of the jobs in the sequence of operations.

- Before time: The duration of the tasks to be done before allocating the work center for the operation. No work center is allocated for the before time period.
- Safety time: Duration of the time buffer. No PDC bookings can be created for the safety time.
- Setup time: Duration of the tasks to be done before the production starts.
- Job time: The actual production time for the amount of units defined in time base.
- Teardown time: The duration of the tasks after the production finished but before the work center is released.
- After time: The duration of the tasks to be done after releasing the work center. The work center is released and available for other operations.

Time Base
The number of the units of the operation the job time refers to.

Is outsourceable? (Y/N)
Indicates whether the operation is outsourceable or not. This option cannot be changed after the operation was created. If the operation is outsourceable the item is set as Purchased Item.

Item Group
The item group the operation belongs to. Item groups with 'Standard' valuation method can be selected. When changing the 'Item Group' either on the Item Master Data or on the Manufacturing Operations form, the 'Item Group' on the other form will be changed too.

Operation break
During manufacturing, an operation can be stopped and restarted or the work center can be changed. With the Operation Break setting the user can define whether these break types are allowed or not.

- Allowed: Intermissions and work center changes are allowed during the operation.
- Denied: No breaks are allowed during the operation.
- Allowed WC: Other operations may get in between the sequence of the operation, but the work center cannot be changed during the operation.
- Allowed NBP: The work center can be changed, but intermissions are not allowed during the operation, therefore other operations cannot get in between the sequence of the operation.
- Allowed WCNBP: Neither the change of the work center, nor intermissions are allowed. It is recommended to use this option instead of the old 'Denied' option.

> The 'Allowed WC', 'Allowed NBP' and 'Allowed WCNBP' operation break types are not allowed in multi-dimensional allocation environment and do not work with parallel operations.

Operation Time UoM
The unit of measurement of the operation time. Possible values: Days, Hours, Minutes, Seconds, Weeks.

Is Parallel Operation (Y/N)
Indicates whether an operation can be performed on multiple work centers at the same time or not. This way the overall duration of an actual manufacturing operation may be much shorter if enough resource capacities are available.

Max Parallel Operations
The maximum number of work centers where the operation can be performed if it is a parallel operation.

Allocation Window
Defines the horizon of the allocation. 'Weeks', 'Days', 'Hours', 'Minutes' and 'Seconds' can be selected as the time scale.

Min Job Quantity
The minimum quantity that must be produced during an allocation.

Main Product Code and Name
The item code and name of the main product.

Is Overlapping Operation

Indicates whether the operation can overlap the previous operation or not. When an operation is an overlapping operation, it can be started right after the previous operation is started, otherwise the earliest start date of an operation is the due date of the previous operation.

Overlapping Quantity
The quantity produced after the following overlapping operation can be started.

Resource Requirements tab

Work Center Feature
Select a work center feature for the operation. This is a mandatory field. The parameter is used extensively by the job scheduler; when the scheduler tries to find work center capacities for an operation, it will search for work centers that have the selected feature for the operation.

Is Mandatory Work Center (Y/N)
Indicates whether the operation must take place on the preferred work center or not.

Preferred Work Center
A preferred work center can be set. Every work center with the feature linked to the operation can be selected.

The work center set here will be preferred during the allocation process. If the work center is free, the operation will be allocated there. If the work center is busy, the system will calculate the delay the usage of this work center could cause. If this delay exceeds the maximum delay set on the *'MRP Max Delay For Pref. WC (s)'* option on Produmex Manufacturing settings, the operation will be allocated to another work center, otherwise the system will schedule it to the preferred work center.

When using the multi-dimensional allocation strategy, employee, tool and constraint requirements can be added to the operation too. Select a resource type then add the feature and a preferred resource. The 'Feature Name' and 'Resource Name' fields will be automatically filled. Only resources linked to the selected feature and features linked to the selected resource type can be added.

Indicate whether the resource is mandatory or not on the *'Is Mand. Res.'* cell.

On the 'Amount' field in an employee row indicate the employee capacity the operation uses. If the Amount is set to one, it means that the operation requires 100% of the employee capacity. Therefore the amount set for an employee cannot be greater than one.

On the amount field of a tool set the needed quantity of the tool during an operation.

Additional resources might not being used during the entire operation. On the Setup, Job and Teardown fields mark that the resource is required in which step of the operation. The setup, job and teardown time of a supplementary resource will be the same as the work center time of the respective step.

Outsourcing tab

Mark the operation as outsourced by ticking the 'Is Outsourced?' box. Add a lead time for the outsourcing on the 'Outsourcing Lead Time' textbox. The time scale of the lead time is in days. If set,

this lead time will be taken into account during the scheduling instead of the lead time on the Item Master Data.

An operation can be fully or partially outsourced. Define the non-outsourceable quantity on the 'In House Quantity' field. The default value is the planned quantity unless the *'Null InHouse Quantity for Outsourcing'* is set to true on the Master Data Tab of Produmex Manufacturing settings. If this setting is enabled, the default InHouse quantity is zero.

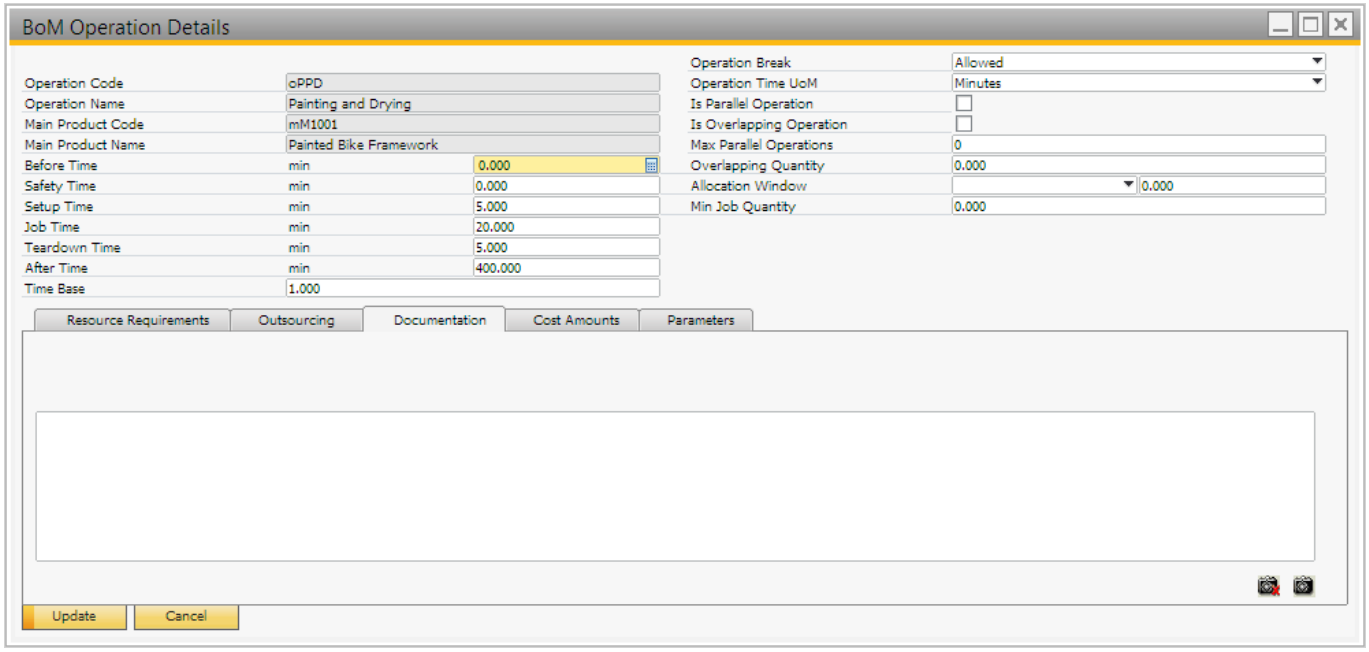
A new UoM for the outsourcing can be defined on the *'Outsourcing UoM'* field. The conversion rate between the inventory UoM and the Outsourcing UoM can be specified on the *'Items Per Outsourcing Unit'* field. The outsourcing UoM can be used when the unit of measurement the sub-contractor uses differs from the UoM the company uses. If an outsourcing UoM is set, it will be the UoM in the purchase order.

Add the potential outsourcing suppliers on the grid:

- *Supplier Code*: Enter the card code of the supplier to the supplier code cell.
- *Supplier Name*: The name of the supplier. The *Supplier Name* will be automatically filled after the *Supplier Code* is entered.
- *Planned Quantity*: The Planned Quantity defines the outsourced quantity. When outsourcing to more than one supplier, the *'Planned Qty'* defines the ratio of the outsourced operation the supplier covers.

Documentation tab

On this tab remarks and images can be added to the operation. Enter the text to the textbox. Click on the camera icon to add an image. Remove the image by clicking on the camera icon with the red x.



Cost Amounts

Cost types with parameters can be set on this tab for cost calculation purposes.

Cost Type
Select a 'Cost Type'. Multiple cost type rows can be defined for an operation. Define cost types on the 'Cost Type' form that can be reached via: Production > Cost Calculation > Cost Type.

- Setup Amount: The Setup Amount for the given operation from the cost amounts.
- Job Amount: The Job Amount for the given operation from the cost amounts.
- Teardown Amount: The Teardown Amount for the given operation from the cost amounts.
- Cycle Amount: The Cycle Amount for the given operation from the cost amounts.
- Quantity Amount: The Quantity Amount for the given operation from the cost amounts.
- Fix Amount: The Fix Amount for the given operation from the cost amounts.

For more information about cost calculation please see: Cost and Price Calculations

Parameters

When the *'Use Operation Parameters'* setting is enabled on the PDC tab of the Produmex Manufacturing settings, an additional 'Parameter' tab is displayed on the form.

On this tab parameters for shopfloor Quality Controlling can be set. Parameters types can be set up on the *OperationParameterTypes* UDT.

Production Order Operation Details

Open the form from the Production order by clicking on the operation icon on the Row type field. On this form the operation details can be modified and specialized further for the particular production order. The form inherits data from the BoM Operation Details.

Header

Operation code
The code of the operation item.

Operation name
The name of the operation.

Time Values
The duration each operation step requires, displayed in the selected 'Operation Time UoM'.
The safety, setup, job and teardown time consume the capacity of the work center. Before and after times do not consume work center capacity but the job scheduling logic will take them into account when calculating the beginning of the jobs in the sequence of operations.

- Before time: The duration of the tasks to be done before allocating the work center for the operation. No work center is allocated for the before time period.

- Safety time: Duration of the time buffer. No PDC bookings can be created for the safety time.
- Setup time: Duration of the tasks to be done before the production starts.
- Job time: The actual production time for the amount of units defined in time base.
- Teardown time: The duration of the tasks after the production finished but before the work center is released.
- After time: The duration of the tasks to be done after releasing the work center. The work center is released and available for other operations.

Time Base
The number of the units of the operation the job time refers to.

Is outsourceable? (Y/N)
Indicates whether the operation is outsourceable or not. This option cannot be changed after the operation was created. If the operation is outsourceable the item is set as Purchased Item.

Item Group
The item group the operation belongs to. Item groups with 'Standard' valuation method can be selected. When changing the 'Item Group' either on the Item Master Data or on the Manufacturing Operations form, the 'Item Group' on the other form will be changed too.

Operation break
During manufacturing, an operation can be stopped and restarted or the work center can be changed. With the Operation Break setting the user can define whether these break types are allowed or not.

- Allowed: Intermissions and work center changes are allowed during the operation.
- Denied: No breaks are allowed during the operation.
- Allowed WC: Other operations may get in between the sequence of the operation, but the work center cannot be changed during the operation.
- Allowed NBP: The work center can be changed, but intermissions are not allowed during the operation, therefore other operations cannot get in between the sequence of the operation.
- Allowed WCNBP: Neither the change of the work center, nor intermissions are allowed. It is recommended to use this option instead of the old 'Denied' option.

> The 'Allowed WC', 'Allowed NBP' and 'Allowed WCNBP' operation break types are not allowed in multi-dimensional allocation environment and do not work with parallel operations.

Operation Time UoM
The unit of measurement of the operation time. Possible values: Days, Hours, Minutes, Seconds, Weeks.

Is Parallel Operation (Y/N)
Indicates whether an operation can be performed on multiple work centers at the same time or not. This way the overall duration of an actual manufacturing operation may be much shorter if enough resource capacities are available.

Max Parallel Operations
The maximum number of work centers where the operation can be performed if it is a parallel

operation.

Allocation Window
Defines the horizon of the allocation. ‘Weeks’, ‘Days’, ‘Hours’, ‘Minutes’ and ‘Seconds’ can be selected as the time scale.

Min Job Quantity
The minimum quantity that must be produced during an allocation.

Is Overlapping Operation
Indicates whether the operation can overlap the previous operation or not. When an operation is an overlapping operation, it can be started right after the previous operation is started, otherwise the earliest start date of an operation is the due date of the previous operation.

Overlapping Quantity
The quantity produced after the following overlapping operation can be started.

Planned Quantity
The planned quantity. *Non-modifiable field.*

Completed Quantity
The completed quantity. *Non-modifiable field.*

Rejected Quantity
The rejected quantity. *Non-modifiable field.*

Message
Operation error messages are displayed on this field. Double-click on the field to see further details.

Is Pinned
Tick the box to pin down the operation to a start date and time. The start date and time can be specified on the ‘Pinned Start Date’ and the ‘Pinned Start Time’ fields. When an operation is pinned, all other operations in the same production order are also shifted (either backward or forward) around the pinned operation.
Please note: The allocation strategy of production orders with pinned operations will be automatically set to ‘Forward from Earliest Date’.

Resource Requirements

Work Center Feature
Select a work center feature for the operation. This is a mandatory field. The parameter is used extensively by the job scheduler; when the scheduler tries to find work center capacities for an operation, it will search for work centers that have the selected feature for the operation.

Is Mandatory Work Center (Y/N)
Indicates whether the operation must take place on the preferred work center or not.

Preferred Work Center
A preferred work center can be set. Every work center with the feature linked to the operation can be

selected.

The work center set here will be preferred during the allocation process. If the work center is free, the operation will be allocated there. If the work center is busy, the system will calculate the delay the usage of this work center could cause. If this delay exceeds the maximum delay set on the *'MRP Max Delay For Pref. WC (s)'* option on Produmex Manufacturing settings, the operation will be allocated to another work center, otherwise the system will schedule it to the preferred work center.

When using the multi-dimensional allocation strategy, employee, tool and constraint requirements can be added to the operation too. Select a resource type then add the feature and a preferred resource. The 'Feature Name' and 'Resource Name' fields will be automatically filled. Only resources linked to the selected feature and features linked to the selected resource type can be added.

Indicate whether the resource is mandatory or not on the *'Is Mand. Res.'* cell.

On the 'Amount' field in an employee row indicate the employee capacity the operation uses. If the Amount is set to one, it means that the operation requires 100% of the employee capacity. Therefore the amount set for an employee cannot be greater than one.

On the amount field of a tool set the needed quantity of the tool during an operation.

Additional resources might not being used during the entire operation. On the Setup, Job and Teardown fields mark that the resource is required in which step of the operation. The setup, job and teardown time of a supplementary resource will be the same as the work center time of the respective step.

Dates

The planning dates of the operation can be overviewed on this tab. These values cannot be modified on the form.

Outsourcing

Mark the operation as outsourced by ticking the 'Is Outsourced?' box. Add a lead time for the outsourcing on the 'Outsourcing Lead Time' textbox. The time scale of the lead time is in days. If set, this lead time will be taken into account during the scheduling instead of the lead time on the Item Master Data.

An operation can be fully or partially outsourced. Define the non-outsourceable quantity on the 'In House Quantity' field. The default value is the planned quantity unless the *'Null InHouse Quantity for Outsourcing'* is set to true on the Master Data Tab of Produmex Manufacturing settings. If this setting is enabled, the default InHouse quantity is zero.

A new UoM for the outsourcing can be defined on the *'Outsourcing UoM'* field. The conversion rate between the inventory UoM and the Outsourcing UoM can be specified on the *'Items Per Outsourcing Unit'* field. The outsourcing UoM can be used when the unit of measurement the sub-contractor uses differs from the UoM the company uses. If an outsourcing UoM is set, it will be the UoM in the

purchase order.

Add the potential outsourcing suppliers on the grid:

- *Supplier Code*: Enter the card code of the supplier to the supplier code cell.
- *Supplier Name*: The name of the supplier. The *Supplier Name* will be automatically filled after the *Supplier Code* is entered.
- *Planned Quantity*: The Planned Quantity defines the outsourced quantity. When outsourcing to more than one supplier, the *'Planned Qty'* defines the ratio of the outsourced operation the supplier covers.

On the *'In House Ratio'* field the ratio of the in house production is displayed. System calculated value, the user cannot modify it.
The supplier grid is extended with information regarding the outsourcing order. Additional columns:

- Supplier Ratio: The ratio of the supplier.
- Quantity in Order: The total ordered quantity.
- Quantity Received: The sum of the received quantity.
- Quantity Quoted: The quoted quantity.

Outsourcing purchase orders and purchase quotations are listed on an additional grid. These values are only form information, the user cannot modify them.

Use the 'New Purchase order' or 'New purchase quotations' buttons to create purchase orders or quotations. For more information about the outsourcing process please see: Outsourcing

PDC Bookings

On this tab the production bookings from the terminal can be overviewed. Select a Time UoM for display.

Planned Job/ Planned Setup/ Planned Teardown
The time planned for each manufacturing step.

Booked Job/ Booked Setup/ Booked Teardown
The total booked time for each manufacturing step.

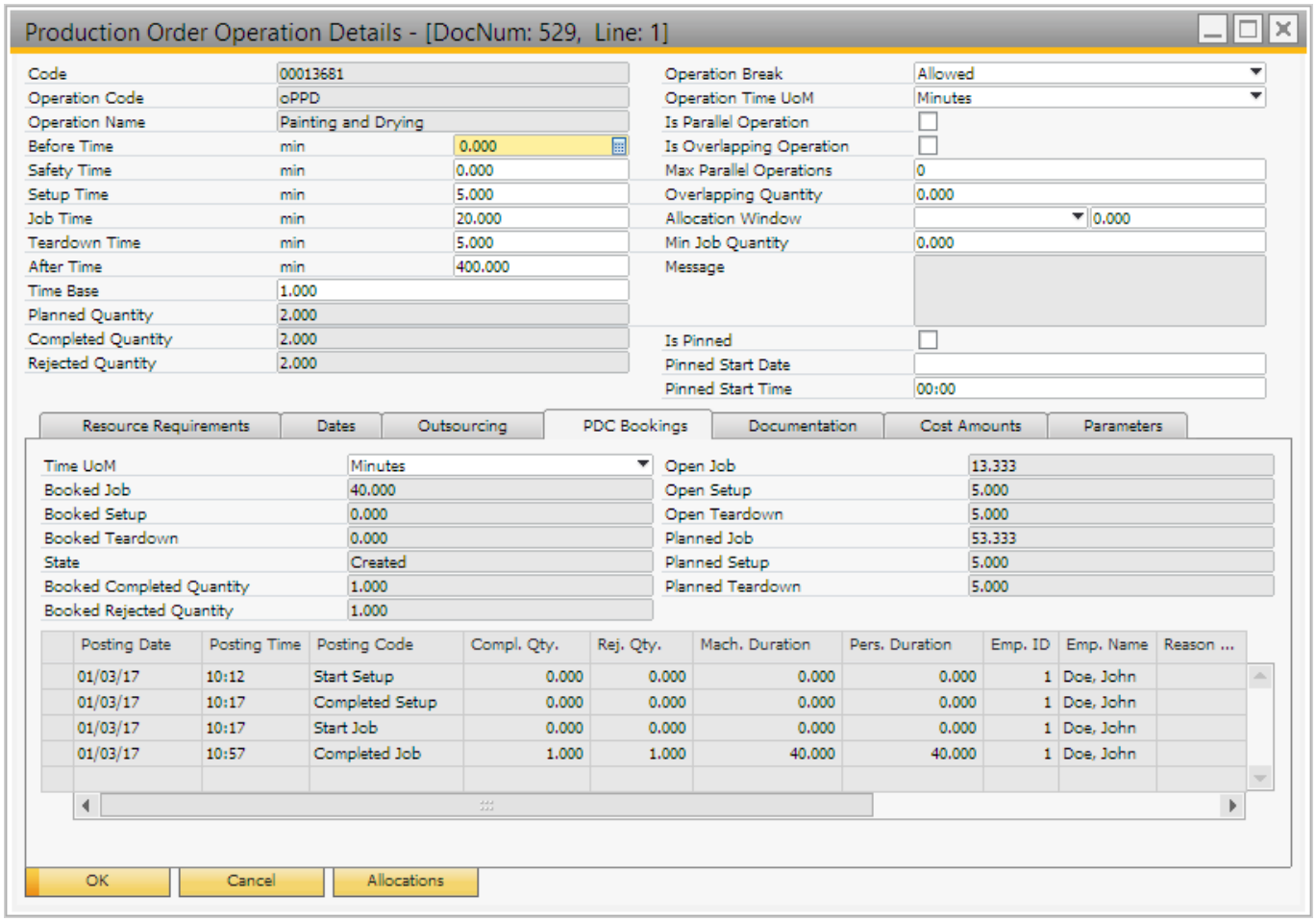
Open Job/ Open Setup/ Open Teardown
The open time for each manufacturing step.

State
The current status of the operation. Possible values: Created/ Started/ Finished.
When a production order is created, the operation status is set to *Created* by default. The operation status is changed to *Started* when a start PDC booking is processed for the operation. The status is changed to *Finished* in the following scenarios:

- When the employee marks the operation as 'Completed' during a Stop job booking on the terminal
- When a Close PDC booking is performed on the Simple PDC Shop-Floor Wizard or on the PDC Bookings Office Terminal

Booked Completed Quantity
The total booked quantity.

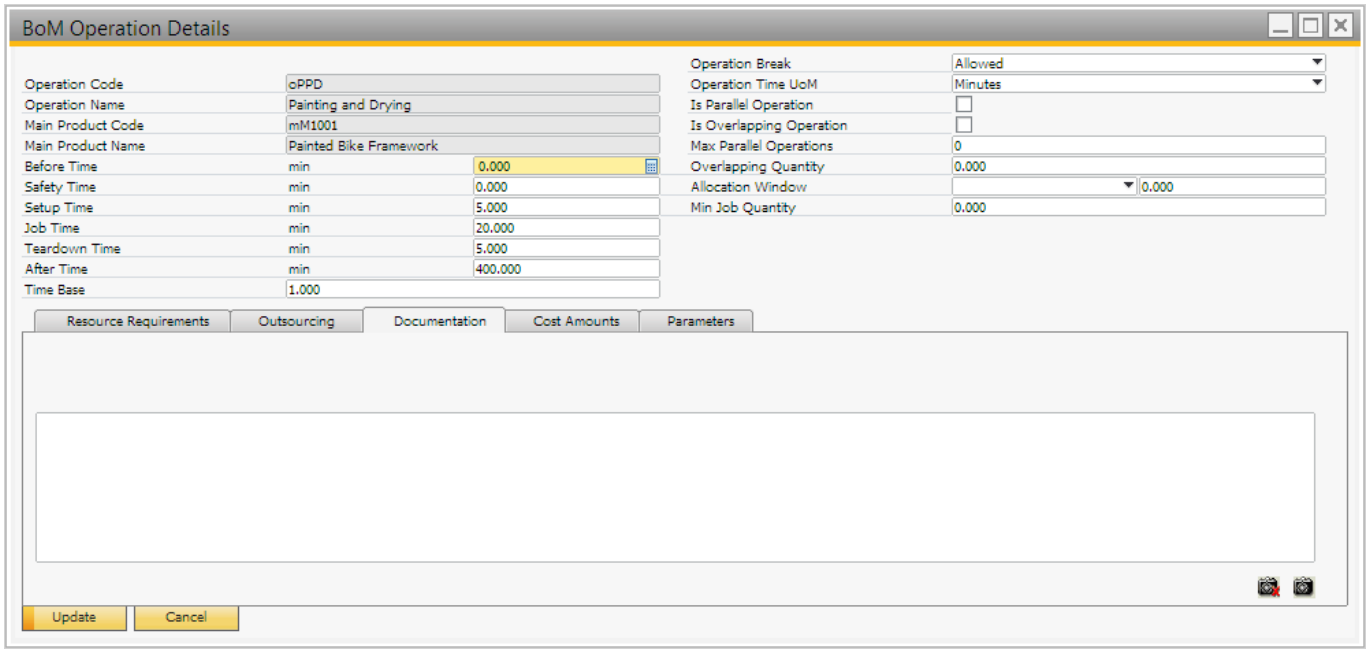
Booked Rejected Quantity
The total rejected quantity.



On the grid booking entries are listed.

Documentation

On this tab remarks and images can be added to the operation. Enter the text to the textbox. Click on the camera icon to add an image. Remove the image by clicking on the camera icon with the red x.



Cost Amounts

Cost types with parameters can be set on this tab for cost calculation purposes.

Cost Type
Select a 'Cost Type'. Multiple cost type rows can be defined for an operation. Define cost types on the 'Cost Type' form that can be reached via: Production > Cost Calculation > Cost Type.

- Setup Amount: The Setup Amount for the given operation from the cost amounts.
- Job Amount: The Job Amount for the given operation from the cost amounts.
- Teardown Amount: The Teardown Amount for the given operation from the cost amounts.
- Cycle Amount: The Cycle Amount for the given operation from the cost amounts.
- Quantity Amount: The Quantity Amount for the given operation from the cost amounts.
- Fix Amount: The Fix Amount for the given operation from the cost amounts.

For more information about cost calculation please see: Cost and Price Calculations

Parameters tab

When the *'Use Operation Parameters'* setting is enabled on the PDC tab of the Produmex Manufacturing settings, an additional 'Parameter' tab is displayed on the form.

On this tab parameters for shopfloor Quality Controlling can be set. Parameters types can be set up on the *OperationParameterTypes* UDT.

Click on the 'Update' button to apply the changes or click on the 'Cancel' button to close the form without any adjustments.

If the production order is 'Released' an additional 'Allocations' button is displayed on the form. Click

on this button to allocate work centers for the operation. The allocated work centers will be shown on the opening ‘Work Center Allocations’ form.

Production Setup

Produmex Manufacturing is a legacy product and Boyum IT Solutions no longer sells new installations for it.

Produmex Manufacturing extends the Production module of SAP Business One with the concept of manufacturing resources such as work centers, employees, tools and constraints. In order to define the available capacities, a shift plan can be set for each resource.

The production setup module can be reached via: Administration > Setup > Production

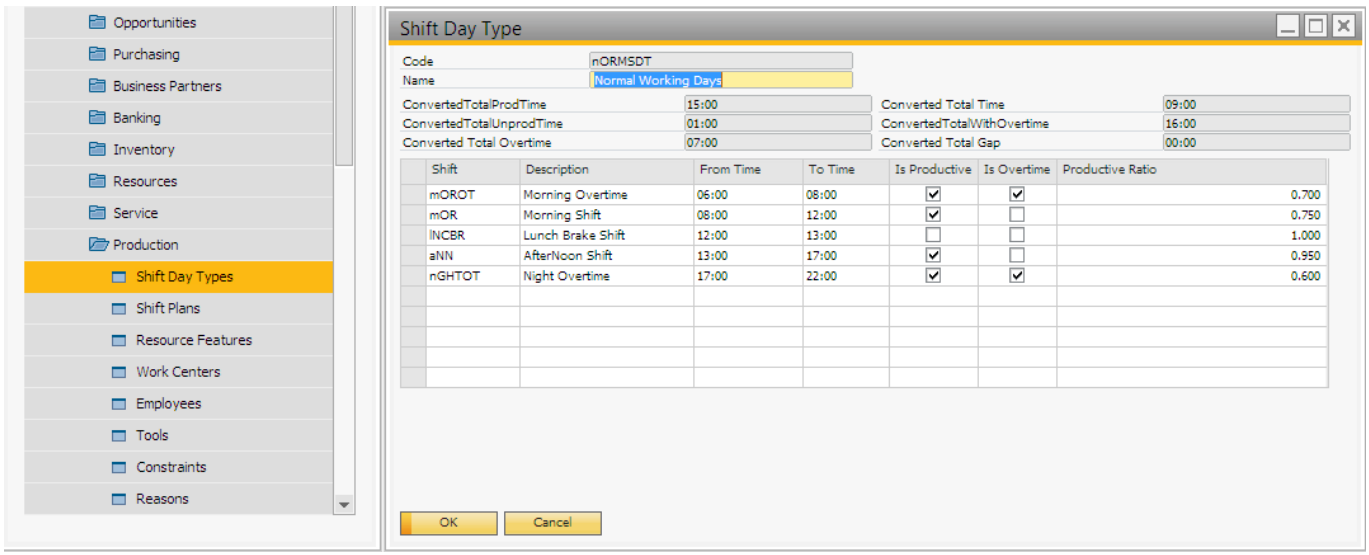
1. Shift Day Type

The shift day types are used when shift plans are defined for resources.

In this example the shift day type is defined with five shifts. Each shift has a code, a name and a duration defined with the ‘From Time’ and ‘To Time’ values.

For documentation purposes overtime and nonproductive shifts can be added as well. These shifts will be never used by the resource scheduling logic.

The productive ratio specifies the available capacity in the shift. For more information about how the productive ratio affects the capacity please see: Change productive ratio for a shift day type



The system automatically calculates various total times to give a better overview of the shift day.

- Converted Total Prod Time: Total time marked as productive.
- Converted Total Unprod Time: Total time marked as unproductive.
- Converted Total Overtime: Total time marked as overtime.
- Converted Total Time: Total length of the shift without the overtime.
- Converted Total With Overtime: Total length of the shift with the overtime.
- Converted Total Gap: Total length of gaps between shifts.

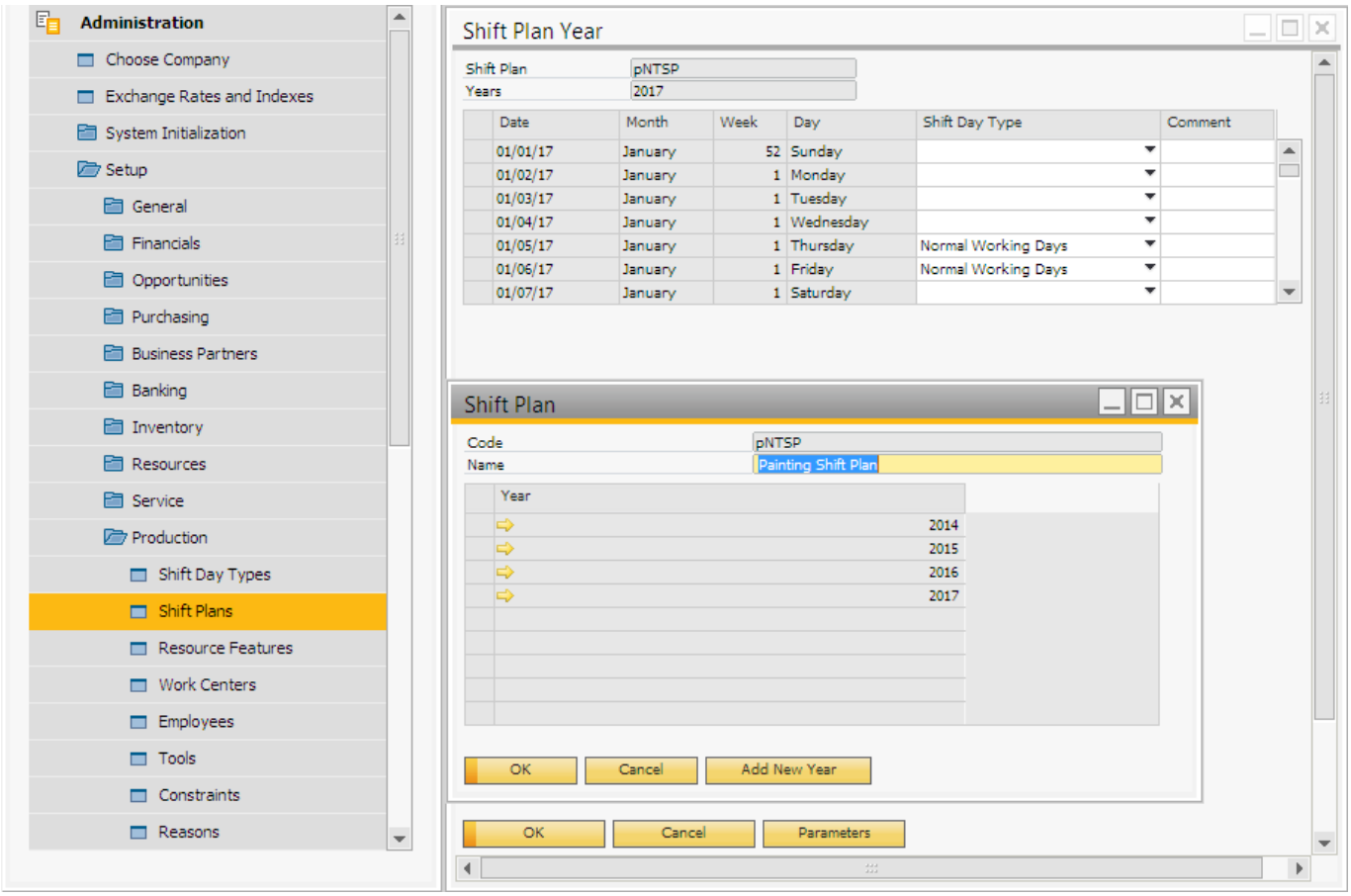
2. Shift Plans

With shift plans yearly work center capacities can be defined. On the ‘Shift Plan’ screen add the code and description of the shift plan. Click on the ‘Add New Year’ button to add a new yearly shift plan.

On the ‘Shift Plan Year’ form a shift day type can be determined for each day in the year. Select the year from the dropdown list. After the year has been selected, the Date, Month, Week and Day fields are automatically filled. Select the shift day type for each day or click on the ‘Parameters’ button to define the shift day types based on weeks or periods.

On the opening ‘Shift Plan Days Parameters’ form assign a shift day type for each day. Tick the ‘Different Odd/Even Weeks checkbox to differentiate odd and even weeks. Tick the ‘Time Period’ checkbox to apply these setting to a selected period only. Define the period on the ‘From Day’ and ‘To Day’ fields.

The shift plan can be modified any time after it has been created.



3. Work Center/Resource Features

A feature is a kind of capability a work center has and it is used by the resource scheduling logic to find the appropriate resource for a manufacturing operation.

1. Define the work center features on this form by adding the feature code and a description to *Code* and *Name* columns of the grid.

2. To see which work centers are assigned for a feature, select the line of the feature and click on the `Resources` button. To define cost amounts for a feature, select the line of the feature then click on the `Cost Amounts` button. Select the cost type then specify the amount of each phrase.

3. It is also possible to define SAP time-based resources for the features in the *SAP Resource* column. For more information on defining SAP time-based resources please consult with section Using Time-Based Resources in Work Centers and PDC.

4. If the multi-dimensional allocation strategy is enabled on the MRP tab of Produmex Manufacturing settings, features for supplementary resources can be defined too. The form title will be changed to 'Resource Features' and an additional *Resource Type* column will be displayed. On this column you can select the resource type of the feature.

4. Resources

With default settings only work center resources can be defined.

When using the multi-dimensional allocation strategy, an operation can be scheduled for supplementary resources, such as employees, tools and constraints, in addition to a work center. Work centers remain the primary manufacturing resources, if a company had only human resources and no machines, the workers should be modeled as work centers. Employees are needed only when the company would like to manage the capacity of human workers and machines separately.

Manufacturing costs can only be assigned for work centers; no costs can be defined for Employees, Tools and Constraints. The supplementary resources are used only for the job scheduling not for cost calculations.

To schedule maintenance and other planned periods of resource unavailability, use the 'Resource Unavailability' form.

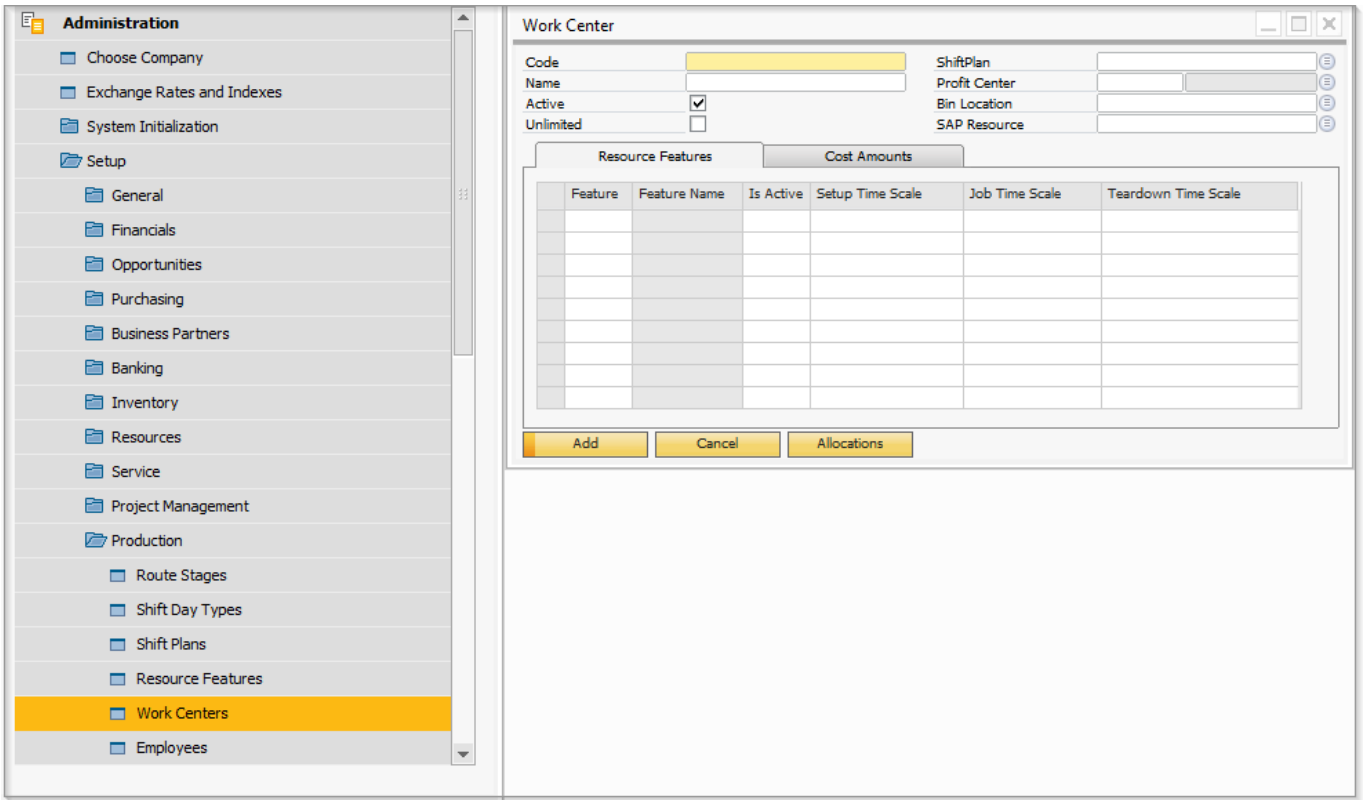
4.1. Work Center

A work center is an individual production area. It is a section of a production facility where all tasks associated with a particular process (such as assembling, painting, welding) are performed. A work center may represent a single machine, a group of machines, a single person, a group of persons.

1. Define the available shifts/capacity slots for the work center by selecting a Shift Plan for it.
2. Defining a profit center for the work center is optional.
3. The selected bin location will be the default bin for material issues and product receipts during PDC bookings.
4. It is also possible to define SAP time-based resources for work centers in the *SAP Resource* column. For more information on defining SAP time-based resources please consult with section Using Time-Based Resources in Work Centers and PDC.

The job scheduler will only take into account work centers marked as 'Active'.

Work centers marked as *'Unlimited'* have boundless capacities. Since there is no capacity constraint, multiple operations can be scheduled to the same time.



Resource Feature

A work center must support at least one feature. Features can be switched off individually by unticking the 'Is Active' box. Only 'Work Center' type features can be added to a work center.

Time Scales for manufacturing steps define the efficiency of the work center when performing the feature. The default value is one. When a work center is twice as fast in performing a feature, it requires half the job time for scheduling.

For more information about how the time scale and the shift productivity affects the capacity please see: Change the time scale for a work center

Cost Amounts

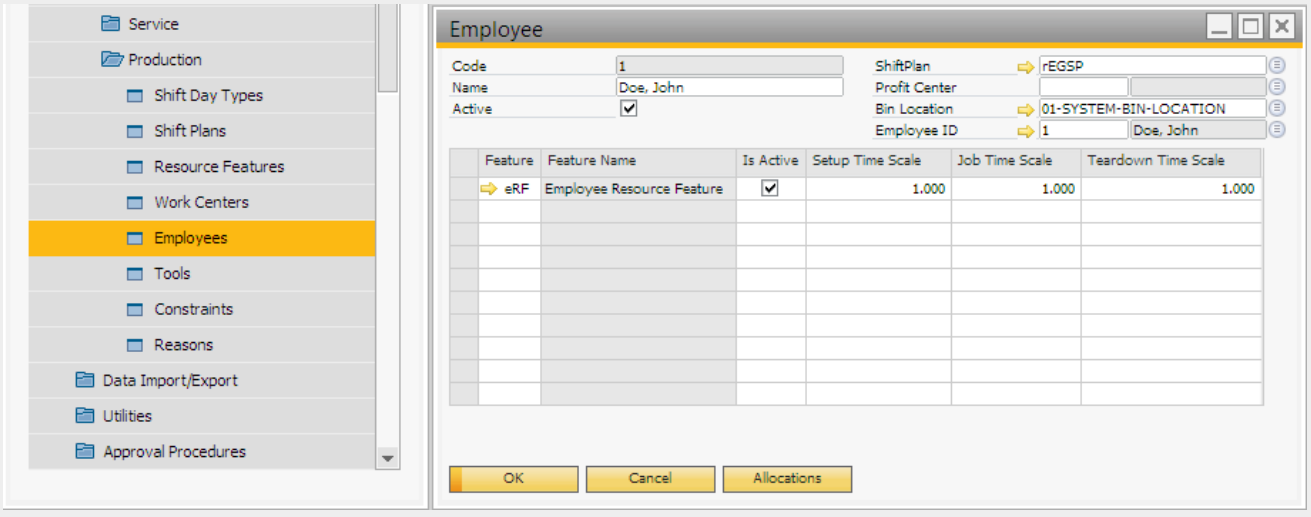
Define the cost types and amounts for cost calculation reasons on this tab.

Click on the *'Allocations'* button to review the open allocations of the work center on the 'Resource Allocations' form.

4.2. Employees

The settings of an employee resource are similar to the *work center settings*, except an employee resource cannot be unlimited and no cost amounts can be defined for it.

Add the feature to the employee on the grid. Only 'Employee' type features can be added.



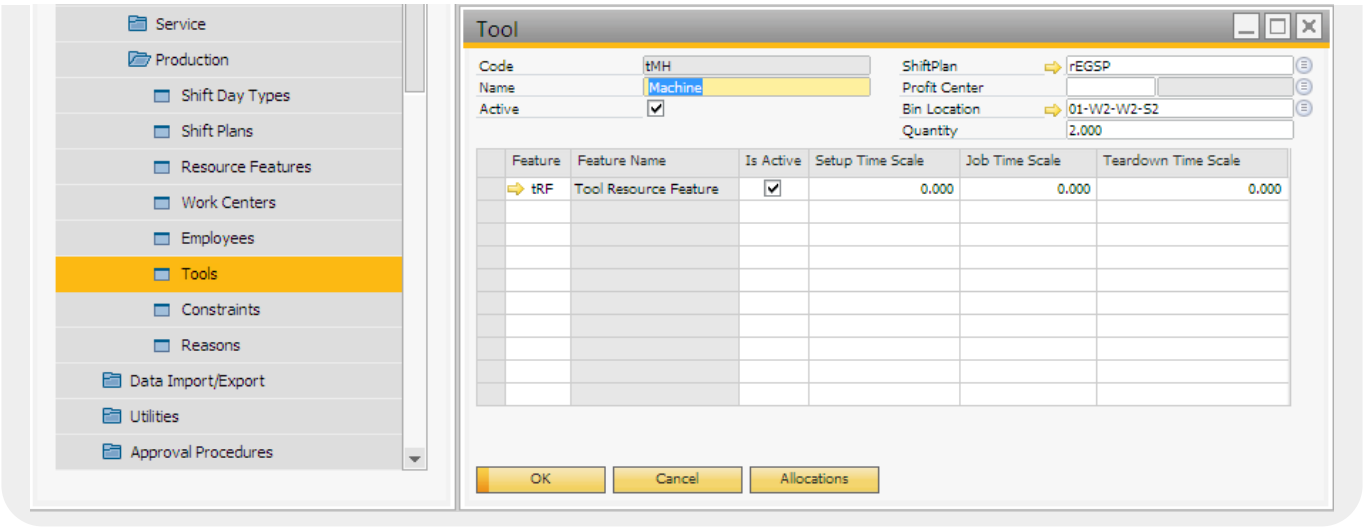
The 'Employee' resource might be linked to an employee who has an Employee Master Data defined in SAP Business One. Add the 'Employee No.' as the 'Employee ID' on this form. The 'Name' will be filled accordingly, but it can be adjusted.

4.3. Tools

The tool resource represent manufacturing tools and machines. The settings of a tool resource are similar to the *work center settings*, except a tool resource cannot be unlimited and cannot have cost amounts.

Add the feature to the tool on the grid. Only 'Tool' type features can be added.

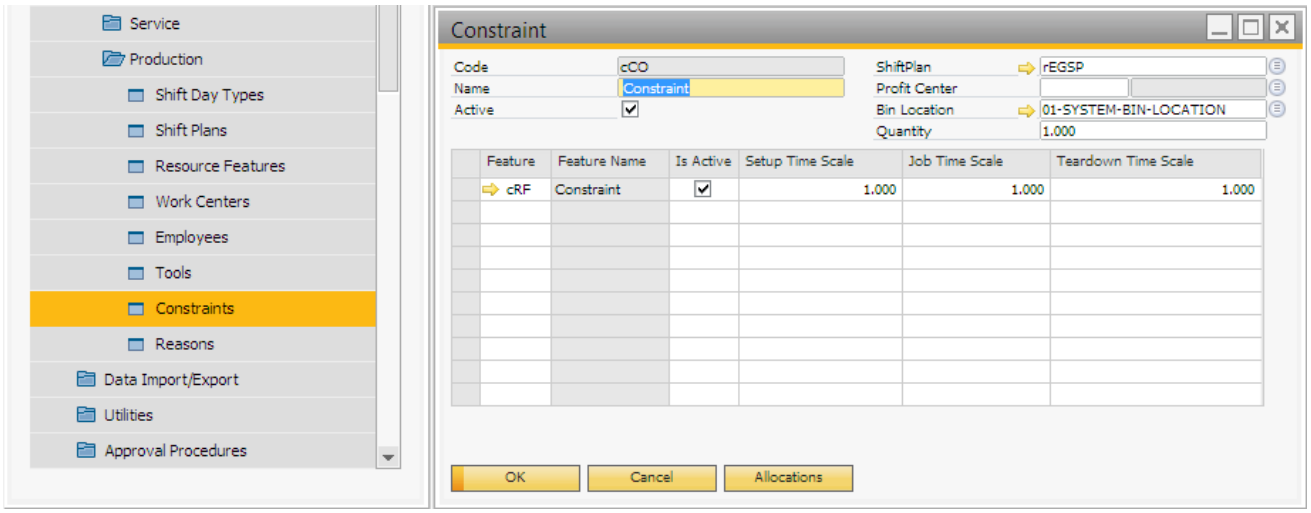
Add the number of the available tools to the 'Quantity' field. When the quantity of a tool resource is two, it means that there are two available tools that can be used simultaneously in two operations.



4.4. Constraints

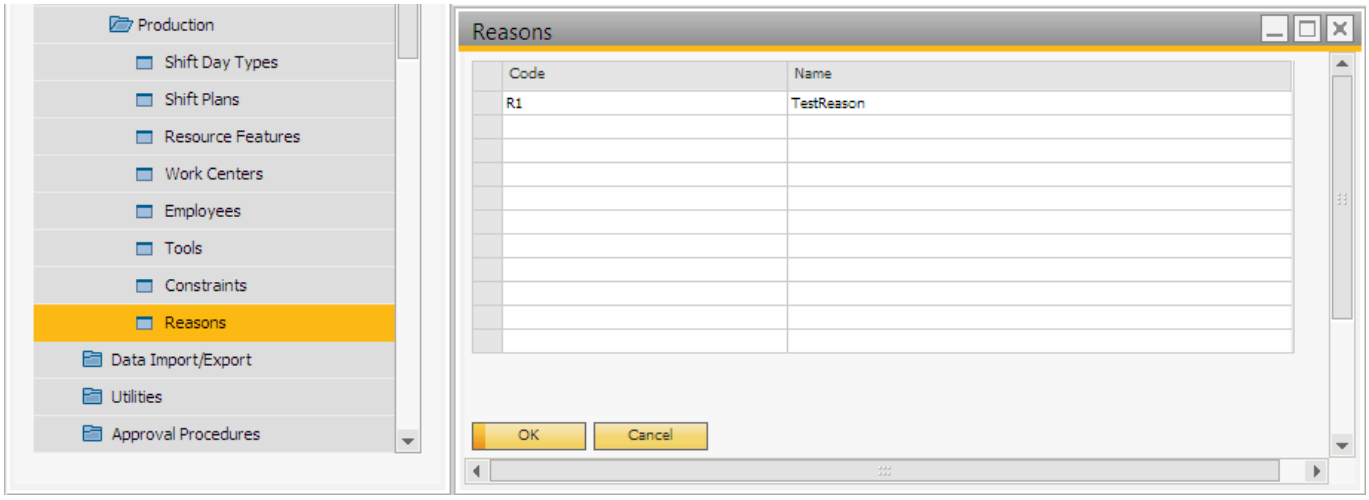
Constraints represent general resources such as electricity that can be a limitation during manufacturing. The settings of a constraint are similar to the work center configurations, but a constraint cannot be unlimited. No cost amounts can be defined for constraints.

By defining the *'Quantity'* of the constraint, you can set up the amount of this resource that can be used simultaneously.



5. Reasons

On this form resource unavailability reasons can be defined. Add the reason code and name on the grid then click on 'Update'.



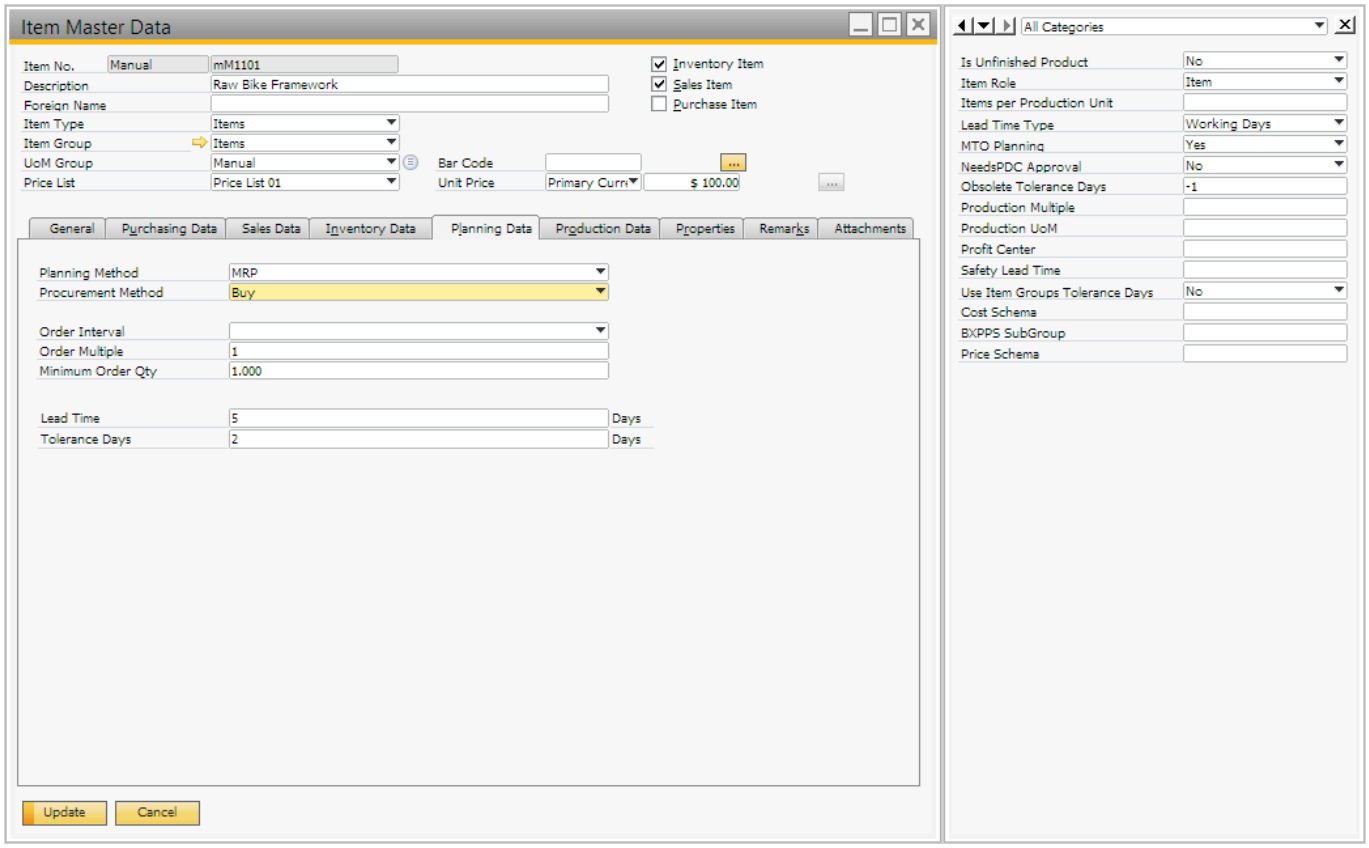
Key Extensions for SAP Business One

Produmex Manufacturing is a legacy product and Boyum IT Solutions no longer sells new installations for it.

1. Item Master Data

1.1. User Defined Fields

Produmex Manufacturing extended the standard SAP Item Master Data with the following user defined fields:



Is Unfinished Product

Defines whether the item is an unfinished product or not. Unfinished products are used only when working with outsourced manufacturing. Set the ‘’Planning method’ on the ‘Planning Data’ tab to ‘None’ to prevent MRP to make recommendations. Make sure that the Valuation Method of the item is ‘Standard’.

Lead time type

Defines whether the lead time is calculated in calendar days or weekdays.

Safety Lead Time

Defines the earliest date when a purchased material is available. When there is a Safety Lead Time added, the Begin Date of a Purchase Recommendation is calculated as {Due Date – (Lead Time + Safety Lead Time)}.

Item role

Indicates whether it is an item or an operation. Items with the role ‘Item’ work as standard SAP items. Items with the role ‘Operation’ represent manufacturing operations on the BoM or production order. Operation items can be specified further on the Operation Details forms. This field cannot be modified manually.

MTO planning

Defines whether the item is taken into account in MTO planning or not.

NeedsPDC approval

Defines whether the PDC bookings related this items has to be approved by an appointed employee or not.

Use Item Groups Tolerance Days

If set to ‘No’, during the MRP the Tolerance Day set on the ‘Planning Data’ tab will be taken into account. If set to ‘Yes’, the MRP will calculate with the Tolerance Day set for the item group the item

belongs.

Cost Schema
Add a cost schema to the item.

Price Schema
Add a price schema to the item.

1.2. Right-click menu

1.2.1. Material Account

The item flow can be viewed in the Material Account Grid or Diagram.

On the grid the current stock level of each warehouse and the planned receipts/issues are listed. By default the displaying period is three months starting from the current day, but the period can be modified by changing the values of the 'From Date' and 'To Date' fields.

On the 'Material Account Diagram' form stock flow is displayed on a graph.

If the 'Graph Filter' value is *'All Warehouses'*, the material flow is displayed separately for each warehouse among the total flow. If the value is *'Only Total'*, then only the consolidated flow is displayed. Select the displaying scale from the 'Graph Scale' dropdown list.

When the mouse cursor is moved over the circled arrow icons, a bubble shows details about that transaction; if the icon is clicked the appropriate production, purchase, etc. order form is opened. The up arrow shows incoming, the down arrow outgoing inventory transactions.

Red areas indicate stock deficit while green areas show stock availability.

1.2.2. Calculate Bills of Materials

Please see: Cost Calculation

1.2.3. List of Calculated Bill of Materials

Please see: Cost Calculation

When duplicating an item that has a Bill of Materials, the system will ask whether to duplicate the BoM too.

2. Business Partner Master Data

2.1. User Defined Fields

Produmex Manufacturing extended the Business Partner Master Data with the following user defined fields used in outsourcing:

Outsourcing Partner
Defines if the business partner is an outsourcing partner or not.

Linked Customer
Link 'customer' outsourcing partners to the 'vendor' outsourcing partner by adding the code of the customer to this field.

4.3. Bill of Materials

The standard SAP Business One BoM is extended with operation items. Through operation items, features and resources can be linked to the production. For fine - tuning the scheduling of the receipts and issues, milestone types can also be set.

4.3.1. Header and Grid

Row type

A row in a BoM may be of type:

- Material (purchased or own-manufactured)
- Operation
- Unfinished Product (unfinished product sent to the outsourcing partner)
- Unfinished Material (unfinished material received from the outsourcing partner)
- Supplier Material
- By-Product (a material with negative quantity)
- Phantom (a virtual item in SAP Business One)
- Cost (any non-inventory item)

The sequence of materials and operations are important: materials required for an operation should come above (from top down) the operation, while produced products should come below. It is possible to define operations that do not require materials or do not create products.

The system differentiates purchased and own-manufactured materials. Materials that have their own BoM are regarded as own-manufactured. These materials are indicated with a factory icon on the 'Row Image' field. When clicking on the yellow arrow, for own-manufactured materials the BoM, while for purchased materials the Item Master Data will open.

The operation quantity indicates the time required for the process. The initial parameters of an operation are copied from the manufacturing operation, and these parameters may be customized for the BoM. The operation details form can be opened by clicking the row image icon. An operation can be defined as outsourced too. Fully outsourced operations are indicated with a different icon on the 'Row Image' field.

Row Image

Indicates the row type.

	raw material/subassembly material/supplier material
	operation/fully outsourced operation
	unfinished product/unfinished material
	by-product
	phantom item
	cost

To see the Operation Details form, click on the Row Image of the operation.

Milestone Type

The two main function of milestones is to connect the operation lines with the belonging materials and to determine for what operations PDC information should be captured.

With the help of the milestones, during a PDC booking for the operation line the belonging materials or the product can also be booked. Milestones can be set for every BOM line where the row type is not 'Cost'. You can set the milestone type at a phantom line, but it makes no sense as the milestone settings from the BoM of the phantom item will be used in the production order.

The 'Milestone type' field can have five values:

- *None*: The milestone is turned off.
- *Milestone*: The line is a milestone. Only operations can be milestones.
- *Depends on Begin*: The line is a dependent line that will be issued when a Start Job is reported for the belonging operation.
- *Depends on Every*: The line is a dependent line that will be issued/received at every PDC booking where a quantity is booked. (Partial job/Complete job)
- *Depends on End*: The line is a dependent line that will be issued/received at every complete job

booking for the belonging operation.

> We recommend to only use the ’Depends on End’ milestone type if the base quantity of the material is 1 and only ’Completed’ job bookings are used.

For the depending line the issue type must be ‘Manual’ while for operations it must be ‘Backflush’. Outsourced operations must be set to milestones and the issue method for an unfinished product must be set as ‘Backflush’. To set a milestone for the product, use the ‘Milestone type’ column on the BoM.

When you save the BoM, there is a validation for the milestones.
A warning will appear if there is no belonging operation for a material line with a ‘Depends on…’ milestone setting.
The saving will be blocked in the following cases:

- There is a material line with the milestone type set to ’Milestone’.
- There is an operation with the Issue Method is ‘Manual’.
- There is a material with the milestone type set to a Depends on… setting but the Issue Method is ’Backflush’.
- There is an outsourced operation that is not set as a ‘Milestone’.
- There is an unfinished product with ‘Manual’ issue method.

BxID

Internal identification value.

Rejected Warehouse

Add the warehouse code where the rejected unfinished products or by-products will be stored to this field to the respective lines. For MultiBranch company databases the add-on validates if the rejected warehouse is in the same branch as the branch defined for the bill of materials row warehouse.

4.3.2. User Defined Fields

Milestone type

To set a milestone for the product, use the ‘Milestone type’ UDF on the BoM. As the product is never an operation, it makes no sense to set the milestone type as ‘Milestone’. When set as ‘Depends on…’ it is always connected to the last operation of the BoM.

Calculation Base Quantity

The Calculation Base Quantity is an estimated quantity of a typical production order created from the BoM. This number is used when the setup and shutdown costs are calculated for a single unit of product. For more information please see: Cost calculation

Rejected Warehouse

Defines the warehouse used for rejected main products. For MultiBranch company databases the addon validates if the rejected warehouse is in the same branch as the branch defined for the bill of materials header warehouse. Keep in mind that SAP B1 does not validate branch consistency for BOMs; it validates for production orders but not for BOMs. This is why the add-on introduced a new Master Data Configuration Setting named “BOM Branch Validation Level”.

Is Auto Roll

If set to ‘Yes’ the due date and time of an MTO child order is automatically aligned with the begin date and time of the parent production order. This setting is only taken into account if the ‘Auto Roll child MTOs’ option is enabled on the MTO tab of BX Core settings.

BxID

Internal identification value.

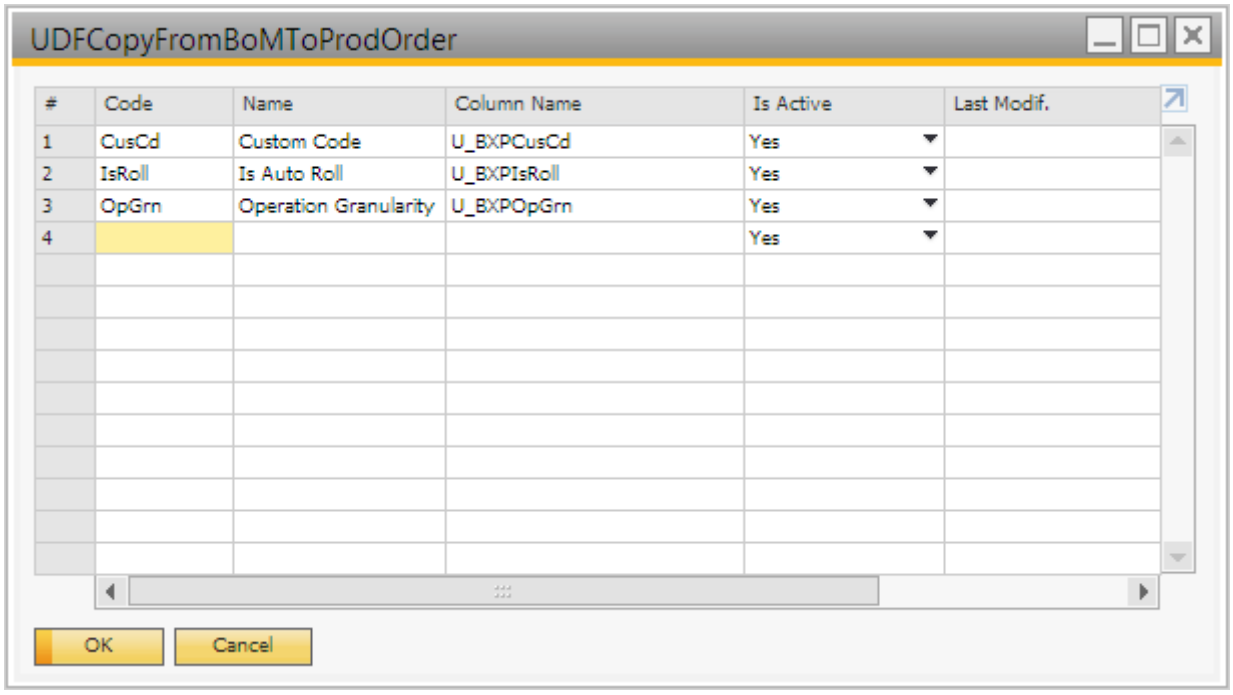
Operation Granularity

The operation granularity value impacts the allocation algorithm. The quantity produced in the operation during the allocation must be a multiple of this value. If the operation granularity value is set to zero, the allocation can be continuous.

Custom Code

On the ‘Custom Code’ field a generic BoM code can be added. This code can contain letters and numbers.

By default the production order created from the BoM only inherits the ‘Milestone type’ and ‘Rejected Warehouse’ UDFs. In order to copy other UDF settings to the production order, set the UDFs on the *UDFCopyFromBoMToProdOrder* table.



4.4. Production order

Production orders also inherit the Produmex Manufacturing extension settings from their base Bill of Materials. For production orders other extensions are available, including *'Milestone Groups'*, *'Due Time'*, and *'Allocation Strategy'*.

4.4.1. Header and Grid

Row type

A row in a BoM may be of type:

- Material (purchased or own-manufactured)
- Operation
- Unfinished Product (unfinished product sent to the outsourcing partner)
- Unfinished Material (unfinished material received from the outsourcing partner)
- Supplier Material
- By-Product (a material with negative quantity)
- Phantom (a virtual item in SAP Business One)
- Cost (any non-inventory item)

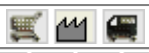
The sequence of materials and operations are important: materials required for an operation should come above (from top down) the operation, while produced products should come below. It is possible to define operations that do not require materials or do not create products.

The system differentiates purchased and own-manufactured materials. Materials that have their own BoM are regarded as own-manufactured. These materials are indicated with a factory icon on the 'Row Image' field. When clicking on the yellow arrow, for own-manufactured materials the BoM, while for purchased materials the Item Master Data will open.

The operation quantity indicates the time required for the process. The initial parameters of an operation are copied from the manufacturing operation, and these parameters may be customized for the BoM. The operation details form can be opened by clicking the row image icon. An operation can be defined as outsourced too. Fully outsourced operations are indicated with a different icon on the 'Row Image' field.

Row Image

Indicates the row type.

	raw material/subassembly material/supplier material
	operation/fully outsourced operation/operation cannot be allocated/finished
	unfinished product/unfinished material
	by-product
	phantom item
	cost

To see the Operation Details form, click on the Row Image of the operation.

Milestone Type

The two main function of milestones is to connect the operation lines with the belonging materials and to determine for what operations PDC information should be captured.

With the help of the milestones, during a PDC booking for the operation line the belonging materials or the product can also be booked. Milestones can be set for every BOM line where the row type is not 'Cost'. You can set the milestone type at a phantom line, but it makes no sense as the milestone settings from the BoM of the phantom item will be used in the production order.

The 'Milestone type' field can have five values:

- *None*: The milestone is turned off.
- *Milestone*: The line is a milestone. Only operations can be milestones.
- *Depends on Begin*: The line is a dependent line that will be issued when a Start Job is reported for the belonging operation.
- *Depends on Every*: The line is a dependent line that will be issued/received at every PDC booking where a quantity is booked. (Partial job/Complete job)
- *Depends on End*: The line is a dependent line that will be issued/received at every complete job booking for the belonging operation.

> We recommend to only use the 'Depends on End' milestone type if the base quantity of the material is 1 and only 'Completed' job bookings are used.

For the depending line the issue type must be ‘Manual’ while for operations it must be ‘Backflush’. Outsourced operations must be set to milestones and the issue method for an unfinished product must be set as ‘Backflush’. To set a milestone for the product, use the ‘Milestone type’ column on the BoM.

When you save the BoM, there is a validation for the milestones.
A warning will appear if there is no belonging operation for a material line with a ‘Depends on…’ milestone setting.
The saving will be blocked in the following cases:

- There is a material line with the milestone type set to ’Milestone’.
- There is an operation with the Issue Method is ‘Manual’.
- There is a material with the milestone type set to a Depends on… setting but the Issue Method is ’Backflush’.
- There is an outsourced operation that is not set as a ‘Milestone’.
- There is an unfinished product with ‘Manual’ issue method.

BxID

Internal identification value.

Rejected Warehouse

Add the warehouse code where the rejected unfinished products or by-products will be stored to this field to the respective lines. For MultiBranch company databases the add-on validates if the rejected warehouse is in the same branch as the branch defined for the bill of materials row warehouse.

Milestone groups

Production orders inherit the milestone type from the base BoM. An additional ‘Milestone Group’ field is added to the production orders which contains the code of the operation the line belongs to. This field is automatically set by the add-on based on the milestone settings and it cannot be changed manually.

Allocation error

Operations with allocations errors are indicated with an icon on the ‘Row Image’ field.

Due Date & Due Time

After the production order is added/updated, an advanced MRP runs in the background and calculates the due dates and times the operation must be finished/ the material must be available.

Manual Planning

Defines whether this line is taken into account by the MRP logic or not.

MRP result

On operation lines indicates whether there is an error with the allocation or not.

MTO scenario

If the production order is a part of an MTO chain and its subassembly line has an MTO production order, the MTO scenario code is displayed on this field on the line of the subassembly.

Operation Reference

In material lines it shows the BX ID of the linked operation. In operation lines it shows the BX ID of the next operation.

Planned Outsourced Quantity

The planned outsourced quantity of an unfinished product.

Completed Outsourced Quantity

The completed quantity of the unfinished product received from the subcontractor.

Rejected Outsourced Quantity

The quantity of an unfinished product that was booked as ‘Rejected’ by the quality inspector.

Completed Quantity

The completed quantity booked with PDC for an operation.

Rejected Quantity

The quantity booked as ‘Rejected’ with PDC for an operation.

4.4.2. User Defined Fields

Milestone type

To set a milestone for the product, use the ‘Milestone type’ UDF on the BoM. As the product is never an operation, it makes no sense to set the milestone type as ‘Milestone’. When set as ‘Depends on…’ it is always connected to the last operation of the BoM.

Calculation Base Quantity

The Calculation Base Quantity is an estimated quantity of a typical production order created from the BoM. This number is used when the setup and shutdown costs are calculated for a single unit of product. For more information please see: Cost calculation

Rejected Warehouse

Defines the warehouse used for rejected main products. For MultiBranch company databases the addon validates if the rejected warehouse is in the same branch as the branch defined for the bill of materials header warehouse. Keep in mind that SAP B1 does not validate branch consistency for BOMs; it validates for production orders but not for BOMs. This is why the add-on introduced a new Master Data Configuration Setting named “BOM Branch Validation Level”.

Is Auto Roll

If set to ‘Yes’ the due date and time of an MTO child order is automatically aligned with the begin date and time of the parent production order. This setting is only taken into account if the ‘Auto Roll child MTOs’ option is enabled on the MTO tab of BX Core settings.

BxID

Internal identification value.

Operation Granularity

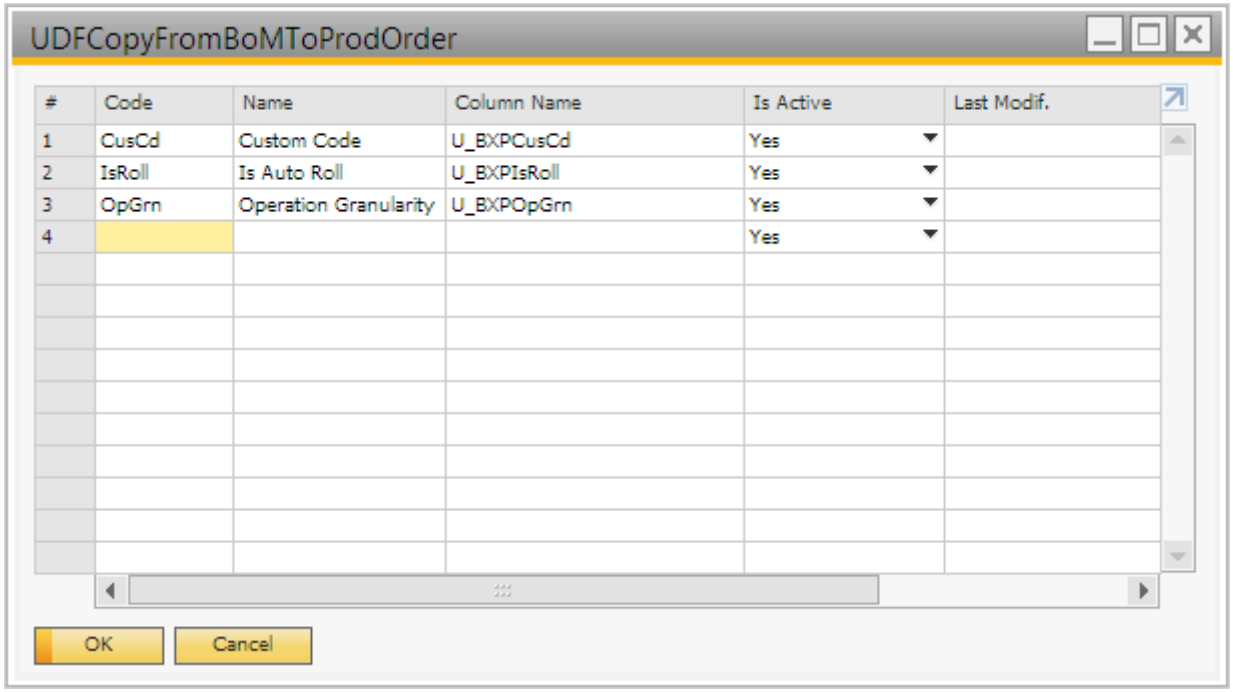
The operation granularity value impacts the allocation algorithm. The quantity produced in the operation during the allocation must be a multiple of this value. If the operation granularity value is

set to zero, the allocation can be continuous.

Custom Code

On the 'Custom Code' field a generic BoM code can be added. This code can contain letters and numbers.

By default the production order created from the BoM only inherits the 'Milestone type' and 'Rejected Warehouse' UDFs. In order to copy other UDF settings to the production order, set the UDFs on the *UDFCopyFromBoMToProdOrder* table.

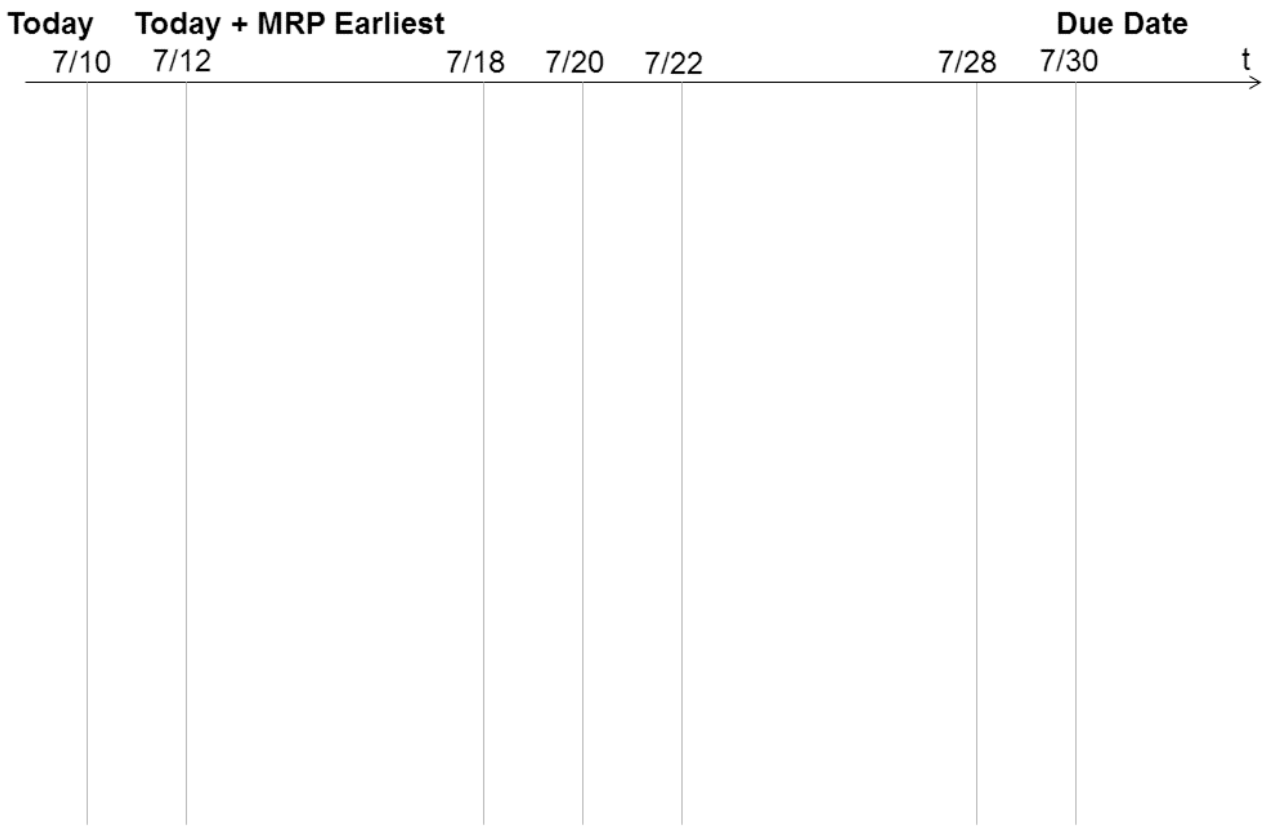


Allocation strategy

On the 'Allocation Strategy UDF' the scheduling logic for allocations can be defined. The default the allocation strategy depends on the *'Default ProdOrd. Allocation Strategy'* set on the Production order tab of Produmex Manufacturing settings.

There are three possible values:

- ***Back From Due Date***: The system starts the allocation from the Due Date of the Production Order and the last operation. Resources are allocated backward.
- ***Forward From Preferred Date***: The preferred date is calculated from the due date, the total duration of the production order and the safe completion factor defined on the MRPProdOrderSafeComplFactor field on the MRP tab of Produmex Manufacturing settings.
- ***Forward From Earliest Date***: The earliest start date is calculated based on the Minimal delay for begin setting, the Document Date of the production order and the material availability determined by the material flow. The add-on starts the allocations from this date and schedules the operations forward starting with the first operation of the production order.



When using forward scheduling, the End Date/Time of the production might be later then the due date. In this case a warning will appear when creating/updating the production order.

Due Time

Produmex Manufacturing extends the production order Due Date with a time component. With the Due Time production planning is detailed at the time of day level.

Force Reallocation

To recalculate the allocations for the production order, set the ‘Force Reallocation’ option to ‘Yes’ and click update. After the reallocation, the value will be set back to ‘No’.

Scheduling dates and times are displayed on UDFs that can be overviewed under the *‘Allocation’* category among the allocation message and state.

Under the *‘Outsourcing’* category outsourcing parameters of the production order can be seen.

Under the *‘Planning’* category key planning dates and times of the production order are displayed.

Under the *‘Technical’* category information about the parent order (if any) and other technical details

can be overviewed.

Under the *'General'* category production comments, missing capacity information and MTO details are indicated.

4.4.3. Right-click menu

Allocation status

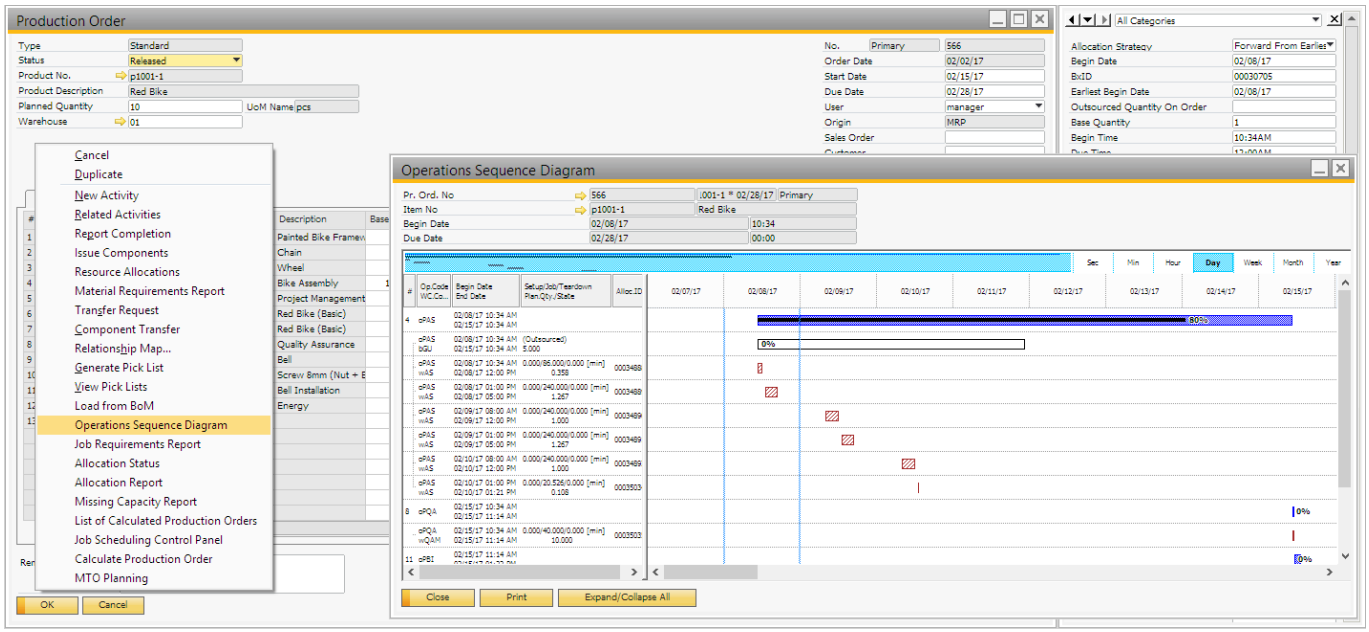
To see the list of allocation errors for the production order after the creation or an update, select the *'Allocation status'* option from the right-click menu. On the opening *'System Message'* form allocation errors will be listed.

Operations Sequence Diagram

To review the schedule/planning/allocations of a single production order, open the 'Operations sequence diagram' form. The form can be reached from the right-click menu of the production order.

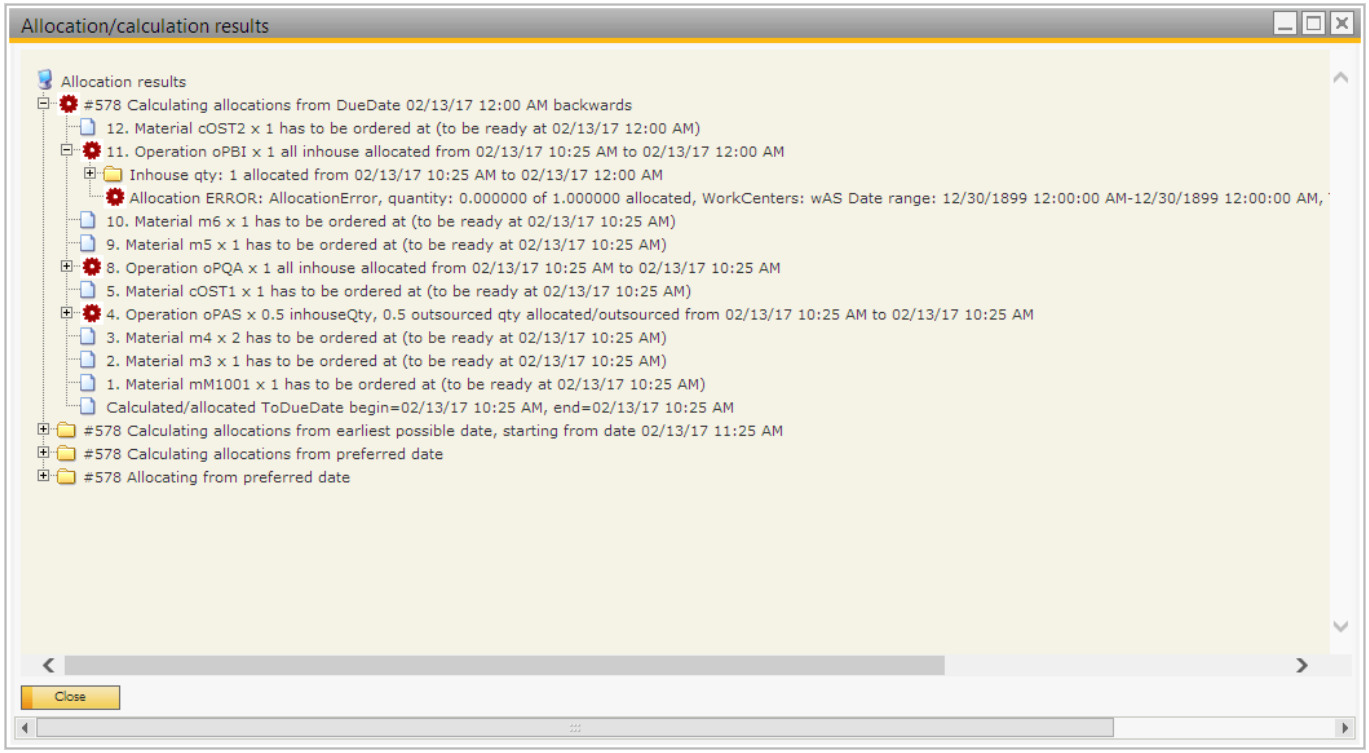
On the form the operations of the production order are displayed in the required order with the work center allocations and the completion percentage.

When a production order is in *'Planned'* status, no actual work center capacities have been allocated for its operations. Still, in this status an operation sequence diagram can be shown by right-clicking the production order form. In the operation sequence diagram for a planned production orders the work center allocations are only temporarily made; a kind of simulation.



Allocation Report

After a production order has been created or updated, the Allocation/calculations results report can be opened from the right click menu to overview the allocations. The red cog indicates an allocation error where the system could not allocate enough capacity for the operation.



Job Requirements Report

For more information please see: Requirements Report

Material Requirements Report

For more information please see: Requirements Report

Missing Capacity Report

On the missing capacity report operations from the production order are listed if the total capacity needed for the operation is not available. Select a line and click on the ‘Job Scheduling Control Panel’ button to see the work center in question on the control panel.

Resource Allocations

For more information please see: Resource Allocations. Please note: As ‘Planned’ production orders do

not have permanent allocations, the allocation report is not available for ‘Planned’ production orders.

Job Scheduling Control Panel

For more information please see: Job Scheduling Control Panel

Calculate Production Orders

For more information please see: Cost calculation

List of Calculated Production Orders

For more information please see: Cost calculation

MTO Planning

For more information please see: MTO Planning

Material Resource Planning

Produmex Manufacturing is a legacy product and Boyum IT Solutions no longer sells new installations for it.

Material Resource Planning (MRP) is the tool in SAP Business One to find the purchasing and production requirements driven by sales orders, advance/reserve invoices and forecasts. In SAP Business One MRP can be run with a number of parameters; the parameters and the purchasing and production recommendations are saved in scenarios. Produmex Manufacturing simply extends the scenario concept of SAP Business One.

1. Define Planning Data

Before starting the MRP, make sure that you set the following configurations:

1.1. Item Master Data

Define the planning parameters on the Item Master Data. The Produmex MRP will take into account the following fields from the Planning Data tab:

- *'Planning Method'*: Only items with 'MRP' set as the planning method will be taken into account in the MRP.
- *'Procurement Method'*: Determines the order type of the procurement recommendation.
  - Buy: Purchase orders will be recommended.
  - Make: Production orders will be recommended.
- *'Order Multiple'* and *'Minimum Order Qty'*: Affects the quantity to order on the order recommendations.
- *'Tolerance Days'*: Defines the number of days to adjust the due date range of order recommendations. If there is a Tolerance Day specified, the due date is calculated as: {Original Due Date- Tolerance Days}
- *'Lead Time'*: The Lead Time defines the following:
  - For operation items it defines the duration of the outsourcing.
  - For items with the procurement method 'Buy' it defines the duration of the purchasing
  - For items with the procurement method 'Make':
    - If there are no operations in their BoM, it defines the duration of the production.
    - If there are operations in their BoM, the duration of the production is calculated as the total length of the operations. If a Lead Time is set, it will be added to the total operations length.

The Lead Time is defined in days. On the 'Lead Time type' UDF set whether the lead time is calculated in calendar days or in work days.

For purchased items a 'Safety Lead Time' can be defined too. In this case the begin date of the purchase recommendation is calculated as: as {Due Date – (Lead Time + Safety Lead Time)}. *Please note: The Safety Lead Time is always calculated in calendar days, regardless of the 'Lead Time type' setting.*

1.2. Produmex Manufacturing settings

Configure the Produmex MRP settings on the MRP tab of Produmex Manufacturing Settings.

1.3. Bill of Materials

Adjust the following parameters on the Bill of Materials:

- Specify the operation details on the BoM Order Operation Details form.
- The *Operation granularity* value is used by the allocation algorithm. The quantity produced in an allocation must be the multiple of this value.

2. Run MRP to detect requirements

Follow the steps of the standard SAP MRP wizard.

The following MRP wizard settings are supported:

- **Scenario Details**
  - *Planning Horizon*
    - View Data in Periods Of Days/Weeks/Months (Please note: grouping are not

supported.)
        - Planning Horizon Length
    - *Display preferences*
        - Display Items with No Requirements
        - Display Selected Items Only
- **Item Selection**
    - All Items/Selected Items
- **Inventory Data Source**
    - *Run By*
        - Company
        - Warehouse (*see note below)
    - *Include Data Source*
        - Include Existing Inventory
        - Include Demand
        - Include Supply
- **Documents Data Source**
    - *Sources of demand and supply*
        - Purchase Orders
        - Sales Orders
        - Production Orders
        - Reserve Invoices
        - Forecast
        - Inventory Level
    - *Recommendations*
        - Purchase Requests/Purchase Orders

> Produmex MRP supports the selection of warehouses for filtering purposes only, but the recommendations are always generated for the entire company. It always combines the recommendations, and always uses the warehouse defined in the BoM instead of the demand document (for example Sales Order).
> Since Produmex MRP supports Filtering by Warehouse; if the user wants a separate MRP for each warehouse or group of warehouses, they can define separate MRP Scenarios for each of them, and run them one-by-one.
> This is especially important to understand when working with multi-branch companies.
> In the forthcoming release run by warehouse will be disabled for Produmex MRP to avoid confusions and false expectations.

For MultiBranch companies it is very important to select warehouses from the same branch. Produmex MRP does not generate separate recommendations for the branches. If the company has multiple branches, it is highly advised to create separate MRP scenarios for each branches for the smoothest user experience.

When Produmex Manufacturing add-on runs, two additional checkbox is displayed on the **Documents Data Source** window:

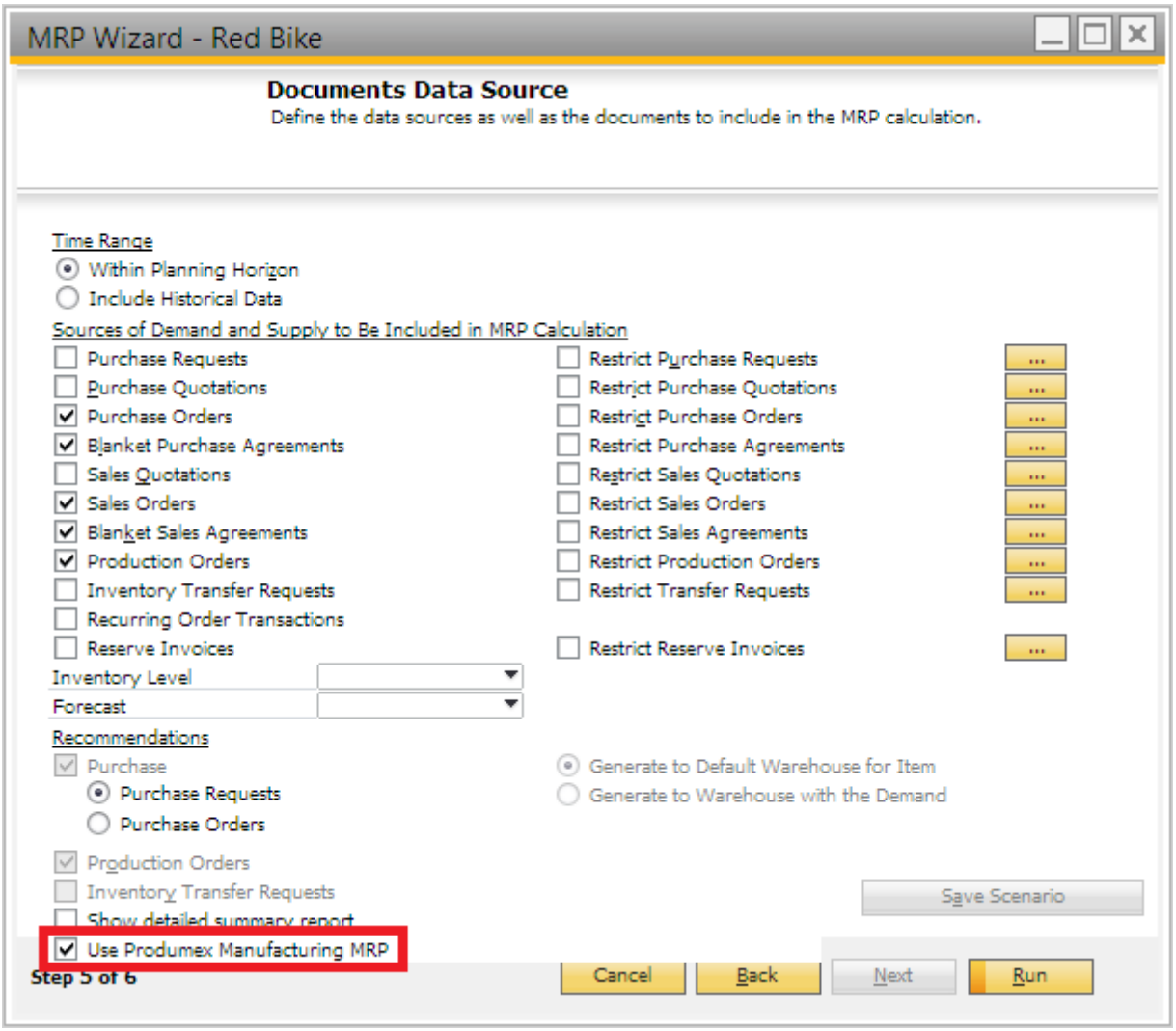
- Use Produmex Manufacturing MRP: If enabled, the advanced Produmex Manufacturing MRP runs instead of the SAP Business One MRP.

- Show detailed summary report: If this setting is enabled, the detailed summary report can be printed after the MRP run. The ‘Select Report Layout’ form opens. Select the report layout and press the Print button to print the document. The default layout is the ‘MRP Summary Detailed (base)’ report.

The MRP Summary report contains the following:

- Report Name
- From Date – To Date
- From Item – To Item
- Collected Input Data
- MRP Recommendations
- Error Log
- MRP Log

In order to run the Produmex MRP, make sure that the ‘Use BX MRP’ box is checked on the ‘Documents Data Source’ screen.



After the ‘Run’ button has been pressed on the MRP Wizard screen, the advanced MRP logic of Manufacturing is executed suppressing the built-in MRP logic of SAP Business One. The algorithm of the advanced MRP is much more complex than the SAP MRP logic because it takes the available resource capacities into account.

After a Produmex MRP run the MRP summary data is saved to an xml file. The file is located in *C:\Program Files (x86)\SAP\SAP Business One\AddOns\BXP\Produmex Manufacturing.*
The file name is MRPData-*ScenarioName*.xml. Please note: The file for a given scenario is updated after each Produmex MRP run for the scenario.

3. MRP logic

I. Gross requirement

First the system queries the item selected on the MRP wizard, then based on the item BoMs identifies the dependent sub-products and raw materials. The gross requirements for these items are detected based on the demand sources selected on the ‘Document Data Source’ screen of the MRP wizard.

II. Net requirement

Then the system calculates the available item quantities based on the supply sources selected on the Document Data Source’ screen of the MRP wizard. The net requirements are determined by subtracting the available quantities from the gross requirements.

III. Free Resource capacities

The system calculates the free capacities based on the existing allocations for released production orders, the simulated allocations for planned production orders, the resource shift schedules and the work plan.

Then the system starts the allocation of the production requirements to the free capacities. The Advanced MRP runs multiple simulations and evaluates each simulation with the weighting factors (MRP Fragmentation Weight, MRP Due Date Weight, and MRP Total Time Weight) set on the MRP tab of Produmex Manufacturing settings. The best outcome possible will be recommended.

IV. Order recommendations

Based on the scheduling of the required productions, production and purchase order recommendations are generated.
The recommended quantities for purchase orders depend on the net required quantity and the predefined planning rules such as ‘Order multiple’, ‘Order Interval’, ‘Minimum Order Quantity’.
The recommended quantities for production orders depend on the net required quantity and the predefined planning rules such as ‘Order multiple’, ‘Minimum Order Quantity’. The 'Order Interval' is a setting not supported for production orders.

4. MRP results

The results of the advanced MRP are displayed in an overview matrix. When there are issues with the items/allocations, an additional error list form will open.
Please note: The MRP Error List does not takes into account the MRP item selection therefore it will open whenever an error is detected in the MRP regardless if it is linked to the selected items or not.

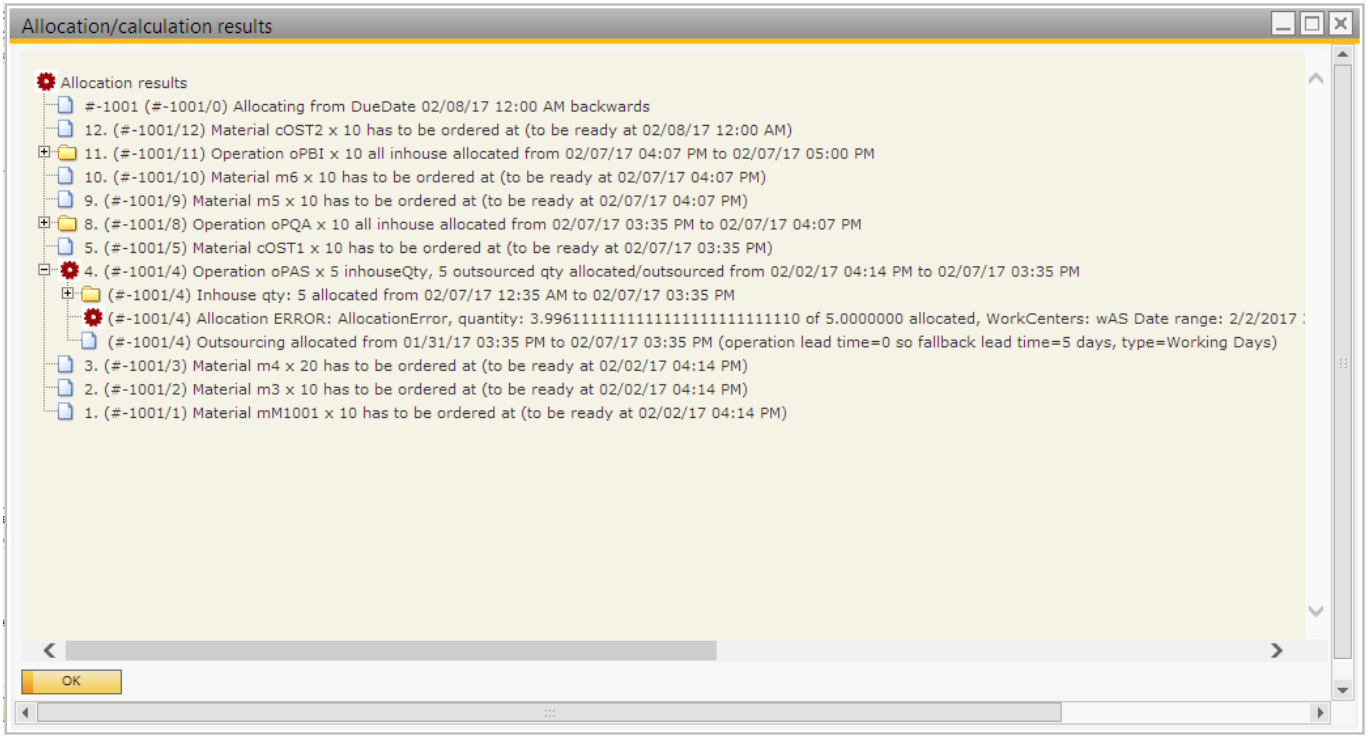
4.1. MRP Error List form

On the 'MRP Error List' grid allocation errors are listed. Click on the red x to see further details regarding the error. On the System Message the detailed description will be shown.

Click on the 'Ok' button to open the 'Allocation/calculation results' form.

4.2. Allocation/calculation results form

On this form the allocation results will be displayed. The red cog indicates an allocation error where the system could not allocate enough capacity for the operation.



Allocation errors have to be solved manually. The possible solutions are:

- Close the document that created the demand.
- Modify the due date of the document that created the demand. *Please note: You also have to modify the due date of every related order.*

4.3. MRP results form

On the ‘MRP results’ form order recommendations are displayed on an overview matrix. Values in red indicate unfulfillable recommendations while orange values indicate recommendations that cannot be completely fulfilled.

When clicking on a button, the Pegging Information form opens. This form explains the driving factors behind the given recommendation.

For Multibranch companies the branch name of the warehouse is shown. Keep in mind that Produmex MRP always combines the requirements from all the warehouses selected in the demand warehouse filter. Likewise, it combines the recommendations for all demands, and the target warehouse always comes from the BOM for production order recommendations or the default warehouse for purchase recommendations. Again, order recommendations are never generated for the actual demanding warehouse, the target warehouse for order recommendations come from BOM and item master data when working with Produmex MRP.

To locate an item on the grid, enter the item code to the ‘Find item’ field. The system will scroll down and highlight the item. Change the display with the ‘Period’ setting. Possible values:

- Day: Recommendations will be grouped daily.
- Week: Recommendations will be grouped weekly.
- Month: recommendations will be grouped monthly.

If the ’Display after MRP’ checkbox is enabled, the MRP order recommendations will be displayed on the grid.

To see the material account, select a line, then select the Material account option from the right-click menu. The ’Material account with recommendations’ window opens. For more information please see: Material account grid

The items are sorted by hierarchy/alphabetical order, regardless of the ‘Sort by’ MRP Wizard setting.

The list starts with the item on the highest level. When there are more than one items on the highest level, the first item is the alphabetically first from such items. If an item has a BoM, then the materials in BoM order will follow that item. Subassemblies are listed after the raw materials, regardless of the BoM order. If there is a material/subassembly that belongs to multiple BoMs, the item is listed only once, at the lowest level. The recommendations for the given item are merged.

Example
Hierarchy:

Sequence: P1 - P2 - M2 - A2 - A1 - M3 - A3 - M4 - M1 - P3 - M5

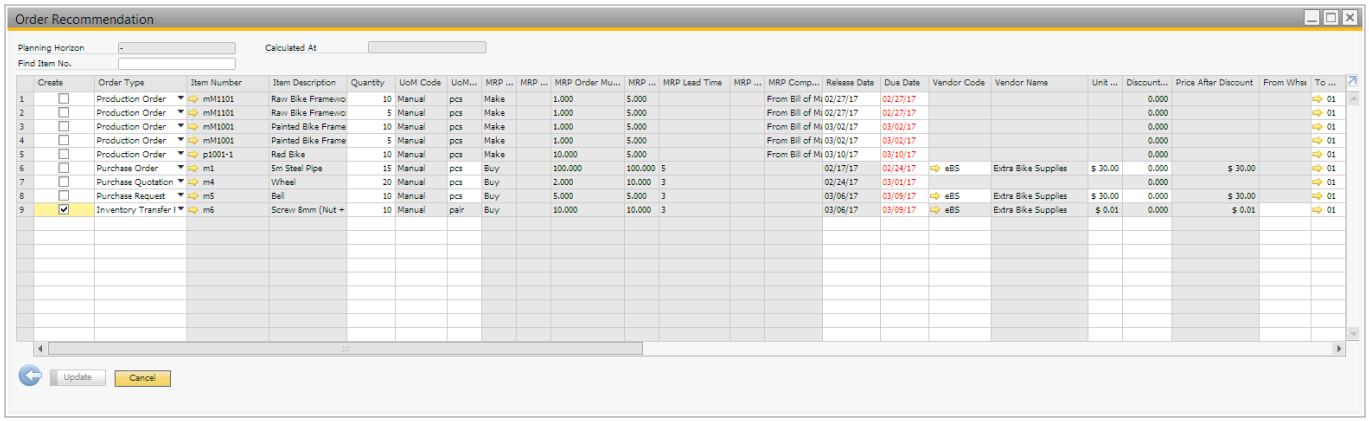
5. Creating Production and Purchase Orders from Recommendations

The Advanced MRP logic of Produmex Manufacturing creates and saves the order recommendation into the same database as used by the SAP Business One's original simple MRP logic. This way the standard 'Order Recommendation' form extended by the Produmex Manufacturing add-on is used to review the recommendations for a scenario.

On this form the recommendations created by the MRP are listed. By default the order type for items with 'Make' planning method is Production order. For items with 'Buy' planning method the default recommendation type is 'Purchase Request'.

It is possible to change the order type to 'Purchase Quotation', 'Purchase Request' or 'Inventory Transfer Request'.

Values in white cells can be adjusted.



The add-on extends the SAP Business One recommendations database table (ORCM) with the following user defined fields:

- Available Quantity: The available quantity.
- Begin Date: The recommended begin date. Adjustable value.
- Begin Time: The recommended begin time. Adjustable value.
- BX Production Comments: Production comments.
- Committed Quantity: The committed quantity.
- Customer Code: The card code of the customer.
- Customer Name: The name of the customer.
- Customer Ref. No: The customer reference number.
- Due Time: The calculated due time.
- In Stock Quantity: The quantity in stock.
- Is Grouped: Indicates whether the order recommendation is grouped nor not.
- IsMTO: Indicates whether the recommendation was created in MTO planning or not.
- Ordered Quantity: The ordered quantity.
- Project: The project code.
- SOL Reference Code: Recommendation reference code.
- Top Order Doc Entry: The doc entry of the top order.
- Top Order Doc Line: The top order line the recommended order is linked to.
- Top Order Doc Number: The top order number.
- Top Order Type: The type of the top order. Possible values: Sales or Production.

To create an order/request from a recommendation, select its line with the ‘Create’ checkbox then click on the ‘Update’ button.

5.1. Outsourcing orders

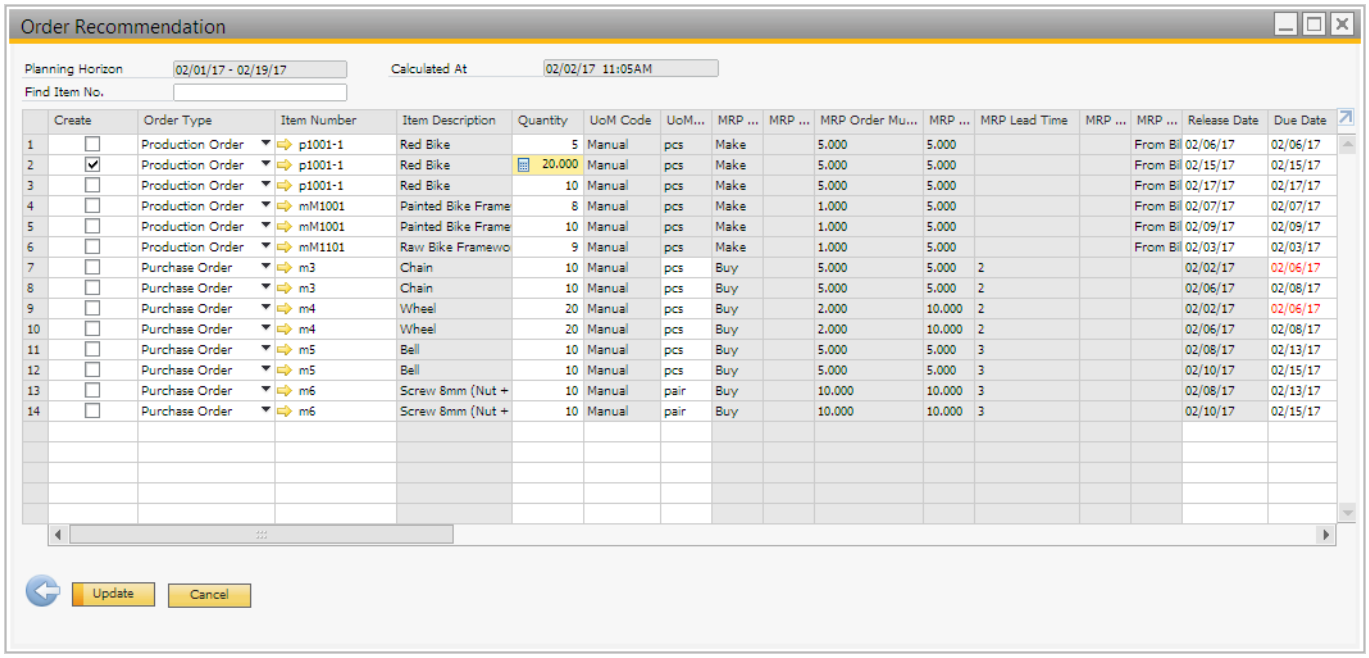
With default settings, outsourcing purchase orders have to be created manually. To automate the order generation, enable the ‘Automatic Generation of Outsourcing Purchase Orders on Production Order Release’ option on the Prod.Order tab.

6. Combining Production and Purchase Orders

When the delivery date of some sales orders are close, it might be more efficient to combine these to

start a single production order scheduled according to the earliest due date.

To combine the productions, first create a production order with the earliest due date and increase its quantity with the total quantity of the other recommendations. Do not create any other orders at this time, just the combined production order.



	Create	Order Type	Item Number	Item Description	Quantity	UoM Code	UoM...	MRP ...	MRP ...	MRP Order Mu...	MRP ...	MRP Lead Time	MRP ...	MRP ...	Release Date	Due Date
1	☐	Production Order	p1001-1	Red Bike	5	Manual	pcs	Make		5.000	5.000			From Bi	02/06/17	02/06/17
2	☑	Production Order	p1001-1	Red Bike	20.000	Manual	pcs	Make		5.000	5.000			From Bi	02/15/17	02/15/17
3	☐	Production Order	p1001-1	Red Bike	10	Manual	pcs	Make		5.000	5.000			From Bi	02/17/17	02/17/17
4	☐	Production Order	mM1001	Painted Bike Frame	8	Manual	pcs	Make		1.000	5.000			From Bi	02/07/17	02/07/17
5	☐	Production Order	mM1001	Painted Bike Frame	10	Manual	pcs	Make		1.000	5.000			From Bi	02/09/17	02/09/17
6	☐	Production Order	mM1101	Raw Bike Framewo	9	Manual	pcs	Make		1.000	5.000			From Bi	02/03/17	02/03/17
7	☐	Purchase Order	m3	Chain	10	Manual	pcs	Buy		5.000	5.000	2			02/02/17	02/06/17
8	☐	Purchase Order	m3	Chain	10	Manual	pcs	Buy		5.000	5.000	2			02/06/17	02/08/17
9	☐	Purchase Order	m4	Wheel	20	Manual	pcs	Buy		2.000	10.000	2			02/02/17	02/06/17
10	☐	Purchase Order	m4	Wheel	20	Manual	pcs	Buy		2.000	10.000	2			02/06/17	02/08/17
11	☐	Purchase Order	m5	Bell	10	Manual	pcs	Buy		5.000	5.000	3			02/08/17	02/13/17
12	☐	Purchase Order	m5	Bell	10	Manual	pcs	Buy		5.000	5.000	3			02/10/17	02/15/17
13	☐	Purchase Order	m6	Screw 8mm (Nut +	10	Manual	pair	Buy		10.000	10.000	3			02/08/17	02/13/17
14	☐	Purchase Order	m6	Screw 8mm (Nut +	10	Manual	pair	Buy		10.000	10.000	3			02/10/17	02/15/17

Now run the MRP again, and this time the required production and purchase order recommendations are automatically combined by the MRP. Now all production and purchase orders may be created from the recommendations.

If you have Bill of Materials with a number of levels with own-manufactured components, then this combination process may have more iterations. Always start combining the production orders of the topmost products. The purchase order recommendation should only be combined when no more combined production order is needed.

7. Job Scheduling Control Panel

To overview the scheduling of the production orders on a graphical panel, open the Job Scheduling Control Panel.

8. Production Management Cockpit

After the production orders have been created, they can be managed easily on the Production Management Cockpit.

9. Detailed Summary Report

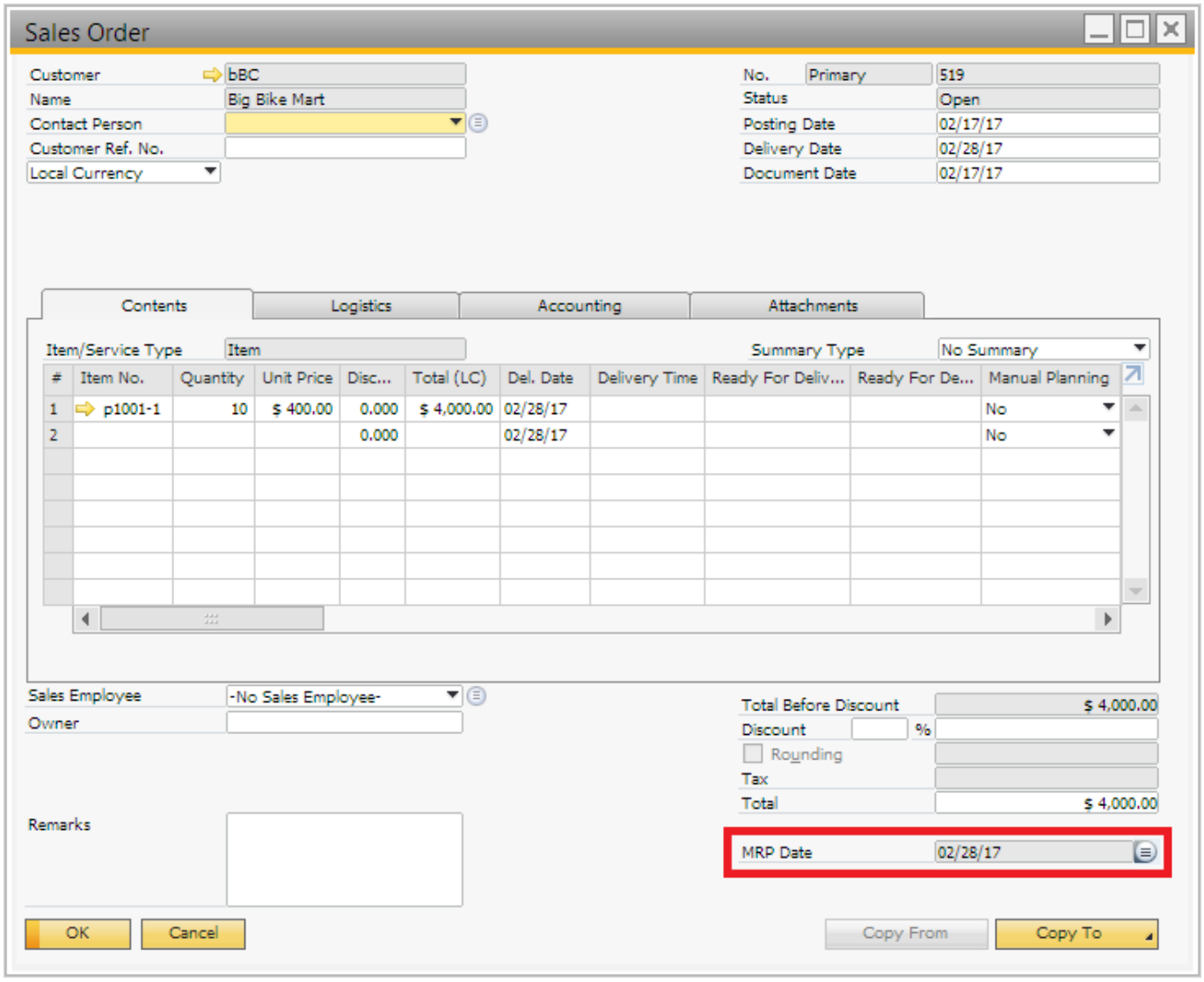
To print a detailed MRP summary report, tick the *'Show detailed summary report'* checkbox on the Document Data Source screen.

After the MRP run has been finished, the 'Select Report Layout' form will open. Select the report layout then click on the 'Print' button. To print the file in .pdf, check the *'Preview before print'* box. On the standard report the following is displayed:

- Collected input data
- List of MRP recommendations
- Error log showing the allocation errors
- MRP log showing the MRP steps

10. Available to Promise

10.1. Sales order



To calculate the earliest possible date to fulfill the sales order, click on the button next to the ‘MRP date’ field.

Starting from the current date, the planning logic of Produmex Manufacturing calculates the earliest date of fulfillment for each sales order line. The 'MRP Date' field will be filled with the latest date from the calculated fulfillment dates.

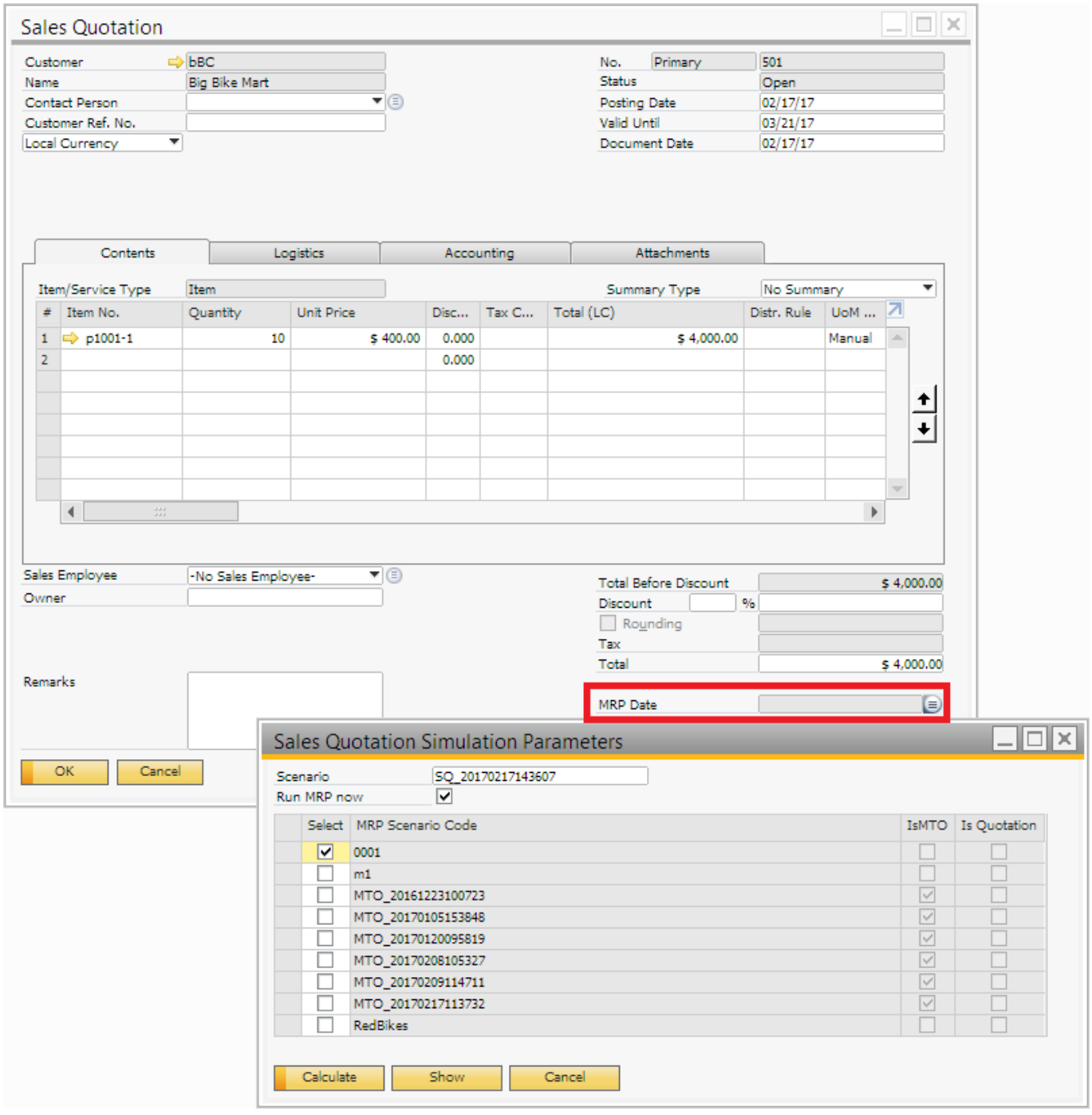
Please note: Only the Bill of Materials of the product is considered during the MRP Date calculation. The Bill of Materials of lower level assembly materials are not considered during the calculation.

10.2. Sales quotation

The earliest fulfillment date can also be calculated for Sales Quotations. The form is extended by Produmex Manufacturing with a new ’MRP Date’ field. Click on the button next to the MRP Date field. Starting from the current date, the planning logic of Produmex Manufacturing will calculate the earliest possible date to fulfill the sales quotation.

Please note: Only the Bill of Materials of the product is considered during the MRP Date calculation. The Bill of Materials of lower level assembly materials are not considered during the calculation.

If the '*Advanced MTO Recommendation*' option is enabled on the MTO tab of Produmex Manufacturing settings, a ’Sales Quotation Simulation Parameters’ form will open. Select the simulation parameters on this form.



The system will create a new MTO scenario based on the sales quotation. Default scenario name is: SQ_ *YearMonthDayHourMinuteSecond* but it can be adjusted on the ‘Scenario’ field.

The 'MRP Mark' column of the purchase order determines which lines are taken into account in the simulation:

If the 'MRP Mark' is set to 'No' for each line, every sales quotation line will be taken into account. If there is at least one line with enabled 'MRP Mark', only lines where the 'MRP Mark' is set to 'Yes' will be taken into account.

Select the scenarios to include into the simulation on the grid. If the *‘IsMTO’* checkbox is ticked, the scenario is an MTO scenario. If the *‘Is Quotation’* checkbox is ticked, the scenario was created based on a sales quotation.

Based on the *'Sales Quotation Simulation Type filter'* option on the MTO tab of Produmex Manufacturing settings different scenarios are listed:

- VVMRPSimulationType_All: Current MRP and MTO scenarios are listed.
- VVMRPSimulationType_MTO: Only the current MTO scenarios are listed.
- VVMRPSimulationType_Quotation : Only the current MTO scenarios created based on a sales quotation are listed.

The system will read the order recommendations for the selected scenarios and will create a simulation with forward allocation strategy as if every production order recommendation were released. If the *'Run MRP now'* checkbox is ticked, the system will run again the selected scenarios.

Calculate

Click on the 'Calculate' button to run the MTO scenario for the sales quotation. The system will calculate the MRP Begin Date/Time and MRP End Date/Time for each line. The code of the scenario will also be added to each line.

The Order Recommendations form will open. It is possible to group recommendations for the same item. Select the *'Group Recommendations for Scenario ...'* option from the right-click menu. For more information about grouping recommendations please see: Make To Order

It is also possible to delete the scenario. Select the *'Delete Scenario ...'* option from the right-click menu.

Show

When the user clicks on the 'Show' button, the MRP calculation runs. The system fills the MRP Begin Date/Time, MRP End Date/Time and the MTP scenario code for each line.

The Order Recommendations form will open. The system creates an allocation simulation containing order recommendation operations from the sales quotation scenario and the selected scenarios and operations from planned production orders. The simulation is displayed on the Job Scheduling Control Panel.

Make-to-Order Manufacturing and Purchasing

Produmex Manufacturing is a legacy product and Boyum IT Solutions no longer sells new installations for it.

With MTO planning business activities such as manufacturing, assembling and purchase, can be planned strictly based on incoming sales orders or in-house production orders. The generated purchase and production orders are traceable as every child order is linked to the triggering top order. Since sales or production orders usually have a number of lines, multiple child orders may belong to a top order. Requirements for the same item from multiple top order lines can be combined

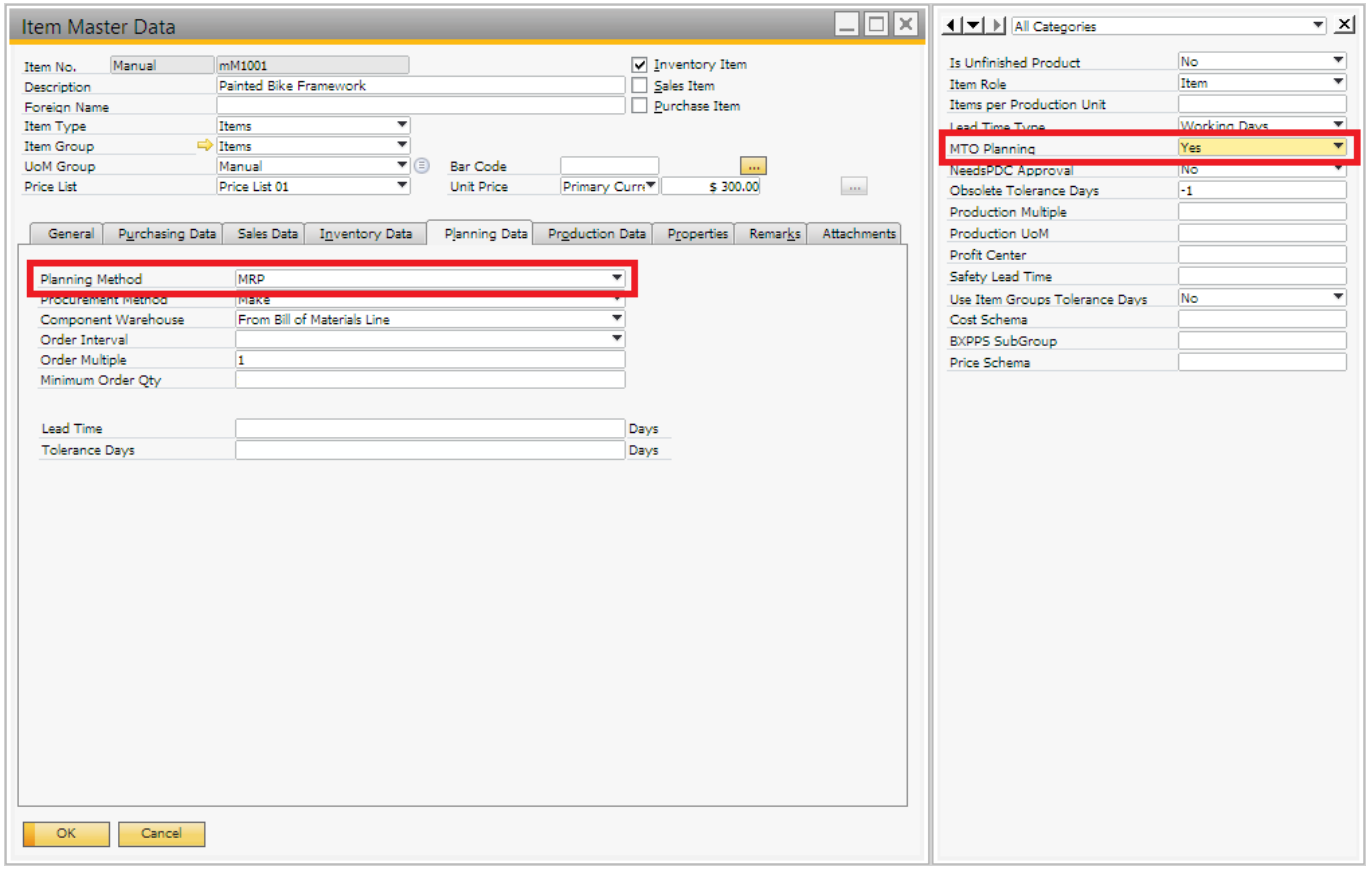
into a single scenario.

The add-on uses the Produmex extended Material Resource Planning. The production and purchase order recommendations are placed in separate MRP scenarios with the MRP parameters. The MRP logic of the MTO add-on stores the recommendations in dedicated scenarios. These scenarios created by the MTO add-on can be regarded as a kind of 'projects', which are independent of the SAP Business One built-in project-machinery.

1. Configurations

Adjust the settings of the MTO process on the MTO tab of the Produmex Manufacturing Settings screen.

To configure items for MTO planning, set the *'MTO Planning'* UDF to 'Yes' on the Item Master Data of the item.
Please note: the *'Planning Method'* of the item should be 'MRP'. Order recommendations will be created based on the *'Procurement Method'* of the item. Production orders will be recommended for items with 'Make' Procurement Method and purchase orders for items with 'Buy' method.



2. Initiate MTO

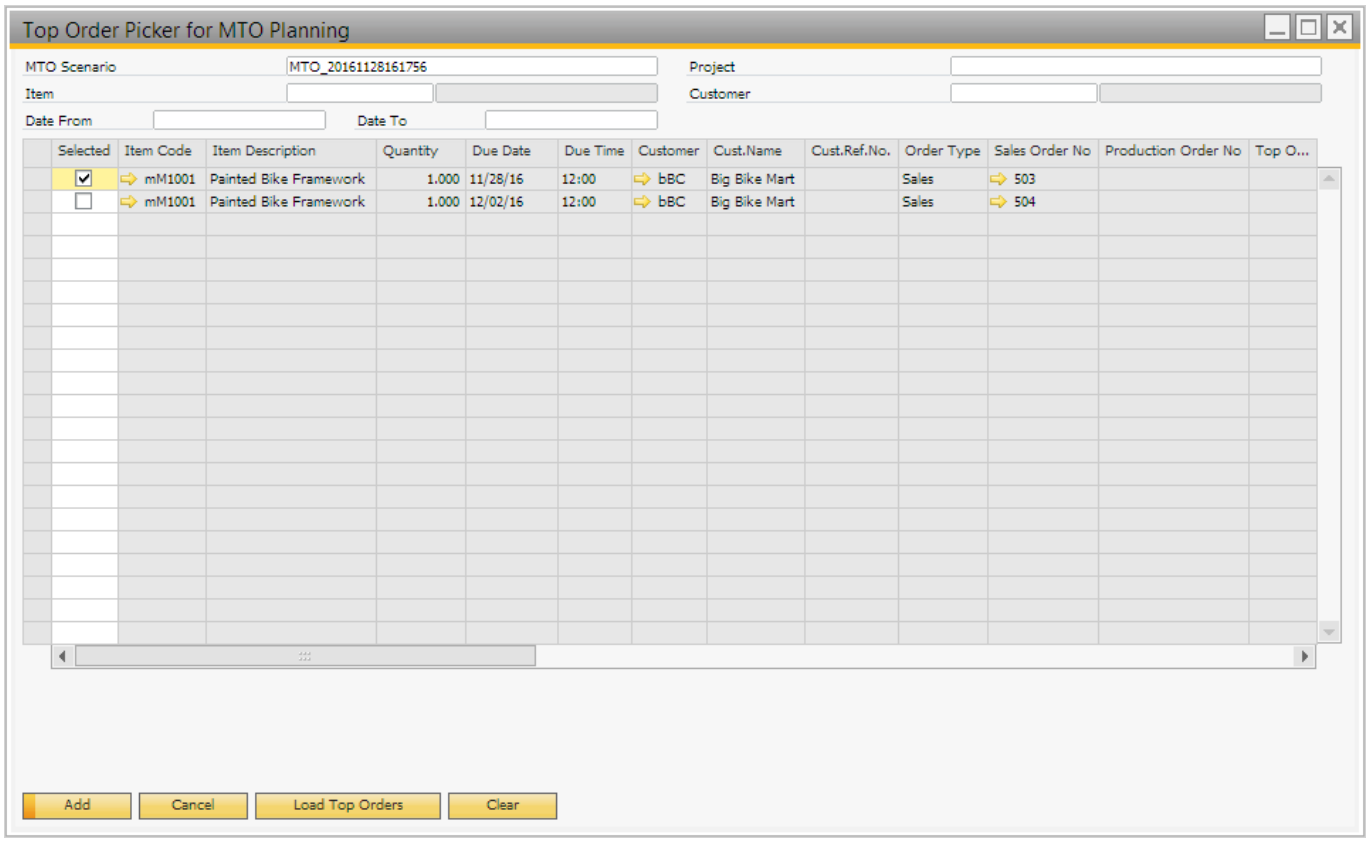
The scheduling of MTO specific procurement can be initiated from the base document. The base document can be an open sales order or a planned/released production order if the *'MTO from production order'* option is enabled on the MTO tab of Produmex Manufacturing Settings. After

selecting an item line, select the *'MTO Planning'* option from the right-click menu.

3. Top Order Picker for MTO Planning

A new form *'Top Order Picker for MTO Planning'* will be opened displaying the item on the selected line. The form also can be opened via the following path: MRP > Make to Order Scenario.

On the *'MTO Scenario field'* a specific MTO scenario name can be defined. The default name is: MTO_timestamp where timestamp is in yyyyMMddHHmmss.
Select line(s) by checking the box in 'Selected' column and click on the 'Add' button to create MTO planning for the selected document line(s). To select every line, click on 'Selected'.



The recommendations are always generated into a new scenario, and the recommendations cannot be added to an existing scenario. The add-on runs its extended MRP logic for the selected line(s), and the recommendations are generated into a new scenario with the name specified. The form *'Order Recommendations'* will be automatically opened for the scenario.

3.1. Combine MTO planning for multiple top orders

Other sales order and production order lines could be loaded into the 'Top Order Picker for MTO Planning' form to combine them.

Click on the 'Load Top Orders' button to load the orders. It is possible to filter the documents with the 'Item', 'Date From-To', 'Project' and 'Customer' fields.

- *Item*: Only load top order lines containing the item.
- *Date From- To*: Only load lines of top orders from the selected period.
- *Project*: Only load lines of top orders of the selected project.
- *Customer*: Only load lines of top orders for the selected customer.

To remove the top orders from the grid, click on the ‘Clear’ button.
To close the screen without any adjustments, click on the ’Cancel’ button.

4. Creating Production and Purchase Orders from Recommendations

The extended MRP logic of the add-on creates the recommendations into a dedicated scenario that contains only the recommendations belonging to the selected document line(s).
Please note: The current stock is not taken into account for the complete requirements; a new recommendation is always created for items with MTO Planning.

On the ‘Order recommendation’ form recommended production and purchase orders with the scheduling are listed.

Values in white cells can be adjusted.

When the ‘Allow MTO Order Type Change’ option is set to true, the ‘Order Type’ column is displayed on the ‘Order Recommendations’ form. In this case the order type can be changed to: Purchase Order/ Production Order/ Purchase Request. Please note: Purchase Quotations and Inventory Transfer Requests are not yet supported in the MTO planning.

The following fields will be filled only if the ‘Show Stock Information’ option is set to true on the MTO tab of Produmex Manufacturing Settings:

- Available Quantity
- Committed Quantity
- In Stock Quantity
- Ordered Quantity

To create the actual production and purchase orders, select the line(s) and click on the ‘Update’ button. The MTO logic uses the *Lead Time* and *Tolerance Days* when scheduling. For each selected document line separate order recommendations will be created. It’s not mandatory to create all orders immediately and in one step. The scenario containing the MTO recommendations can be opened later as well from the standard MRP module.

When all recommendations were processed into an MTO scenario, then the scenario might be deleted with the MRP wizard. To delete the scenario, select ‘Delete Scenario …’ from the right-click menu. It is not possible to delete recommendation lines for an MTO scenario.

To create grouped recommendations, select ‘Group Recommendations for Scenario …’ from the right-click menu.

4.1. Group Recommendations form

On the opening *'Group Recommendations'* form select the lines to group.

The recommendation selected first will be the primary recommendation. The following header fields will be filled based on the primary recommendation:

- *Primary Order Recommendation*: The recommendation number of the primary order.
- *Primary Order Type*: The type of the primary recommendation order.
- *Item*: The item code and description.
- *Vendor*: The card code and description of the vendor.
- *Grouped (Y/N)*: Indicates whether the recommendation is grouped or not.
- *Project*: The project code.
- *Warehouse*: The warehouse code.

After the primary order has been selected, only lines containing the same item can be added to the group. The primary recommendation can only be unselected with the 'Unselect' button.

The 'Total Selected' field shows the number of the selected lines and the 'Total Quantity' field displays the total ordered quantity on the selected lines.

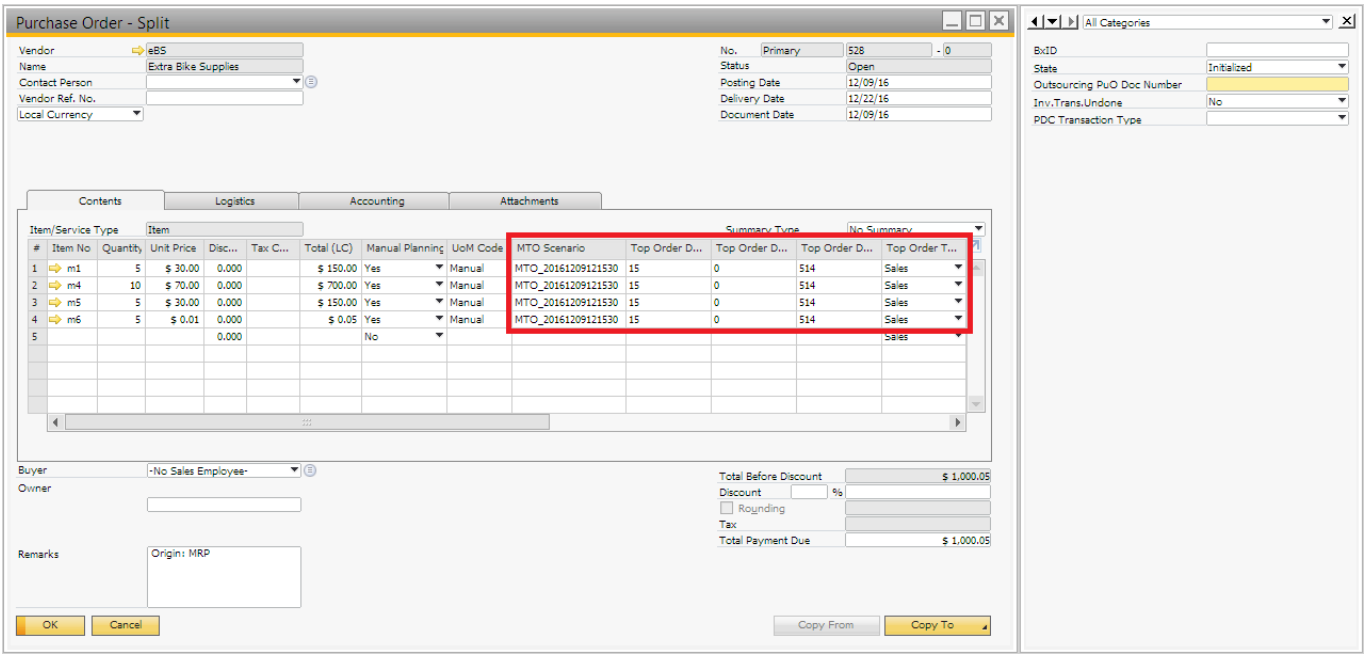
If the 'Show Group Members' option is ticked, grouped items are displayed in separate lines.

The 'Group Days' value defines the period length within order recommendations for the same item will be grouped with the Auto-Group function.

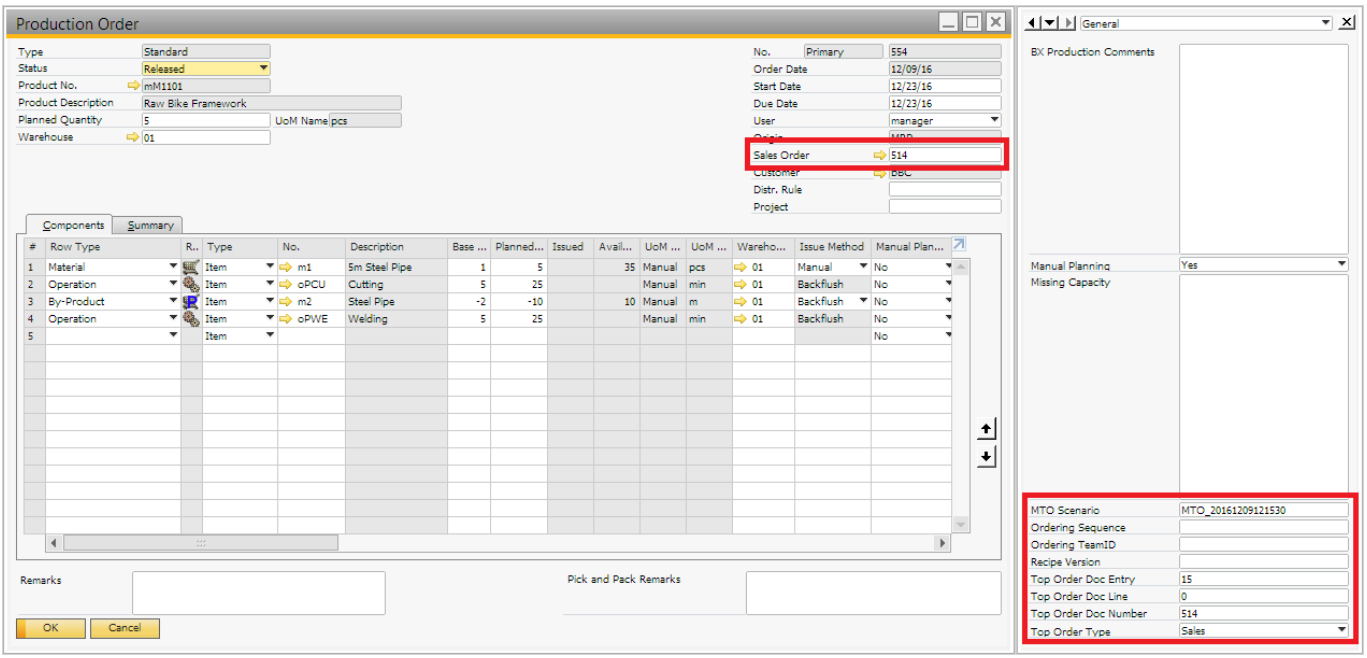
Click on the 'Group' button to group the selected lines. The lines that are grouped in this form will be grouped on the 'Order Recommendation' form too. To split grouped recommendations, select the recommendation and click on the 'Ungroup' button. To make every possible grouping within the period length defined in the 'Group Days' field, click on the 'Auto-Group' button.

5. Production and Purchase Orders Linked to Top Order Line

On purchase orders created from an MTO scenario the Manual Planning cell is set to 'Yes' and the MTO scenario name is added to the respective 'MTO Scenario' cell. The order type, the document number, the doc entry of the top order and the top order line is also added to the purchase order for reference.



When the top order is a sales order, the sales order number and the customer code is added to the production orders created from the MTO planning. The MTO scenario code and the top order details are displayed on the respective UDFs.

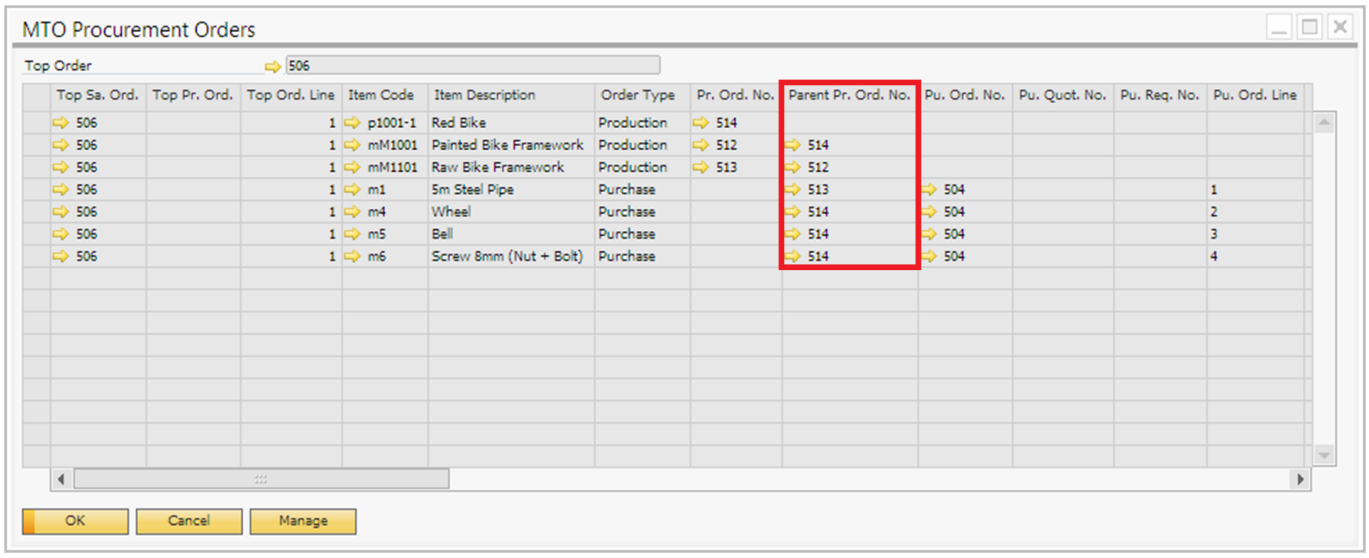


6. Changes on the top order

When reopening the base document, a couple of modifications can be seen. The name of the MTO scenario is written into the appropriate top order line and the Manual Planning cell is set to ‘Yes’. These are necessary because the Produmex Manufacturing regular MRP logic should skip the order lines that are handled by MTO planning.

7. MTO Procurement Orders

To overview the MTO Procurement orders created from a top order line, select the line on the top order then select ‘MTO Procurement Orders’ from the right-click menu. Every production and purchase orders linked to the selected top order line displayed. The order hierarchy, the significant dates and times, the order status and the completed quantity is shown on this form.

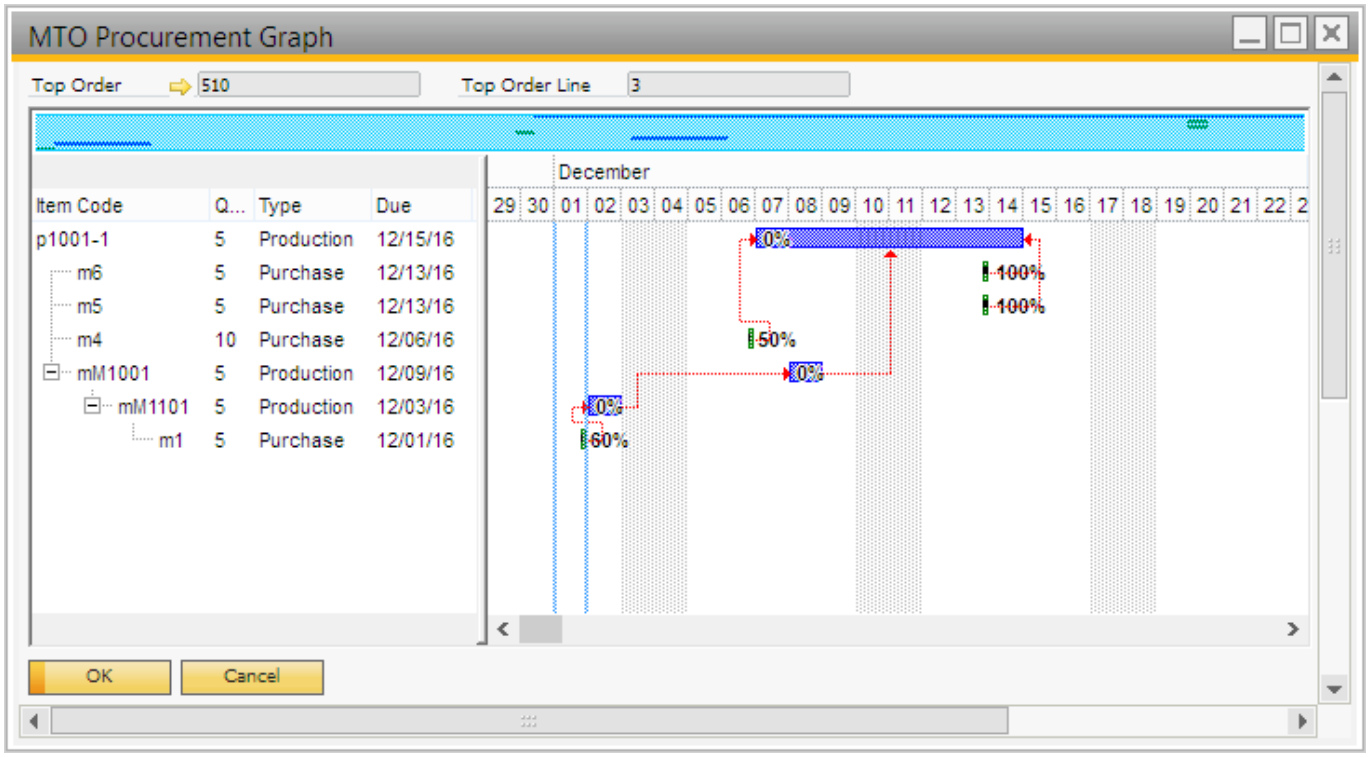


Click on the ‘Manage’ button to manage the production orders linked to the top order on the Production Management Cockpit.

8. MTO Procurement Graph

When we select the option MTO Procurement Graph in the right-click menu of a top order line, a form is opened that shows the timing of the production and purchase orders linked to the line. The diagram shows the hierarchies of the production and purchase orders as well.

On the left section, the order details (the item code of the ordered item, the ordered quantity, the order type and the due date) are shown as well as the order hierarchy. On the right section, bars display the planned duration of the orders. Next to the each bar, a completion percentage is displayed. The manufacturing sequence is indicated with red arrows.

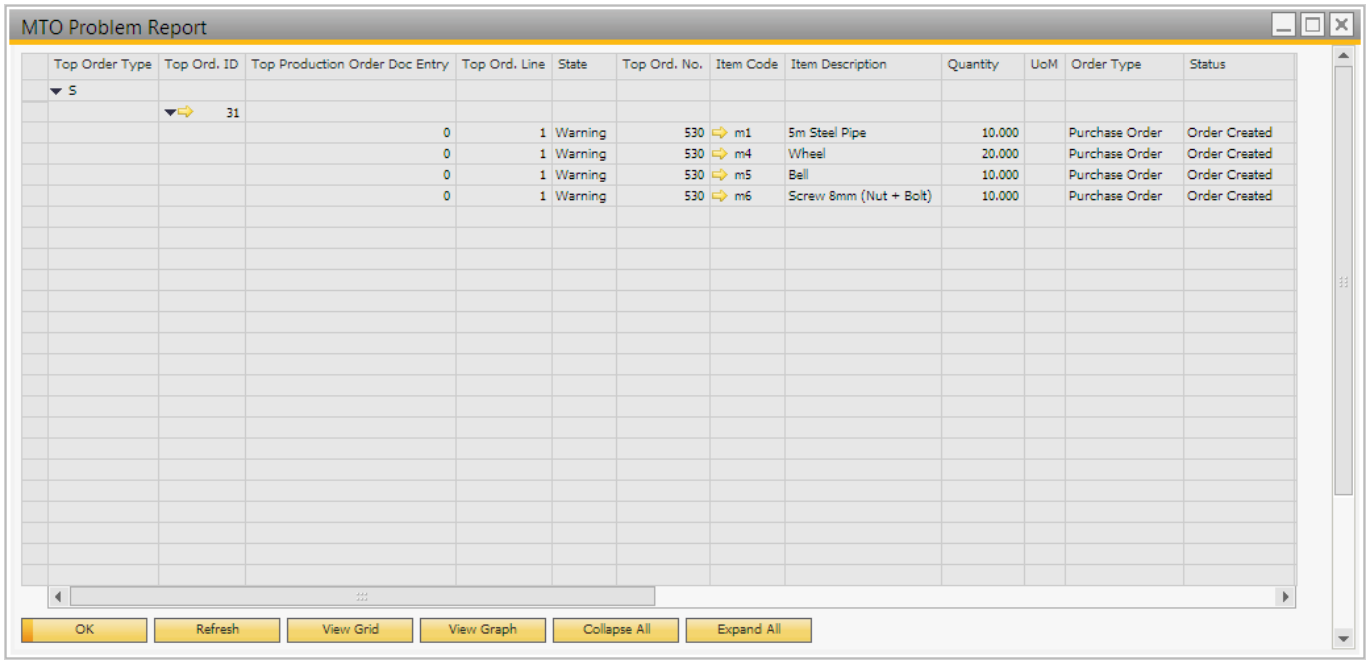


9. MTO Top Order References

To see the details of the referenced top order, select the ‘MTO Top Order References’ option from the right click menu on a created production or purchase order.

10. MTO Problem Report

Open the MTO Problem Report from the right click menu on the top order. Set the too early and too late thresholds for the MTO Report on the MTO Tab of Produmex Manufacturing Settings.



11. Reschedule MTO scenario

11.1. On the Production Management Cockpit

When the ‘Move Earliest’ and/or the ‘Move Latest’ setting is enabled on the MTO Tab of the Produmex Manufacturing Settings, the production orders linked to the MTO chain can be rescheduled based on the earliest or latest start date of the top order on the Production Management Cockpit.

12.2. On the Job Scheduling Control Panel

On the Job Scheduling Control Panel operations can be rescheduled manually. When the ‘Auto Roll child MTOs’ option is enabled on the MTO tab of Produmex Manufacturing settings, the child production orders that have the ‘Is Auto Roll’ UDF set to ‘Yes’ are automatically reallocated if the parent MTO is rescheduled if the *Allocation Strategy* of the production orders is ‘Back from Due Date’. The due date of the child production order will be aligned to the begin date of the parent order.

11.2.1. Discrepancy

To highlight the production orders belonging to the MTO scenario, select the scenario from a list on the header next to the MTO scenario. The list of the procurement orders of the selected MTO can be opened by clicking on the yellow arrow. The 'MTO Procurement Orders' form will open.

The order sequence is displayed with arrows. Red arrows indicate discrepancies. The discrepancy messages are shown on the bottom section on the form. Double click on the message to highlight the arrow showing the discrepancy.

Discrepancies can be corrected manually or by using the ‘Reallocate allocations’ function. For more

information about this function please see: 3.2. Rescheduling.

Rework orders

Produmex Manufacturing is a legacy product and Boyum IT Solutions no longer sells new installations for it.

With rework orders supplementary operations can be added to an MTO chain in order to improve the quality of the child items. It can be created from the parent MTO production order for a child element. The rework order will be linked to the MTO chain of the parent production order.

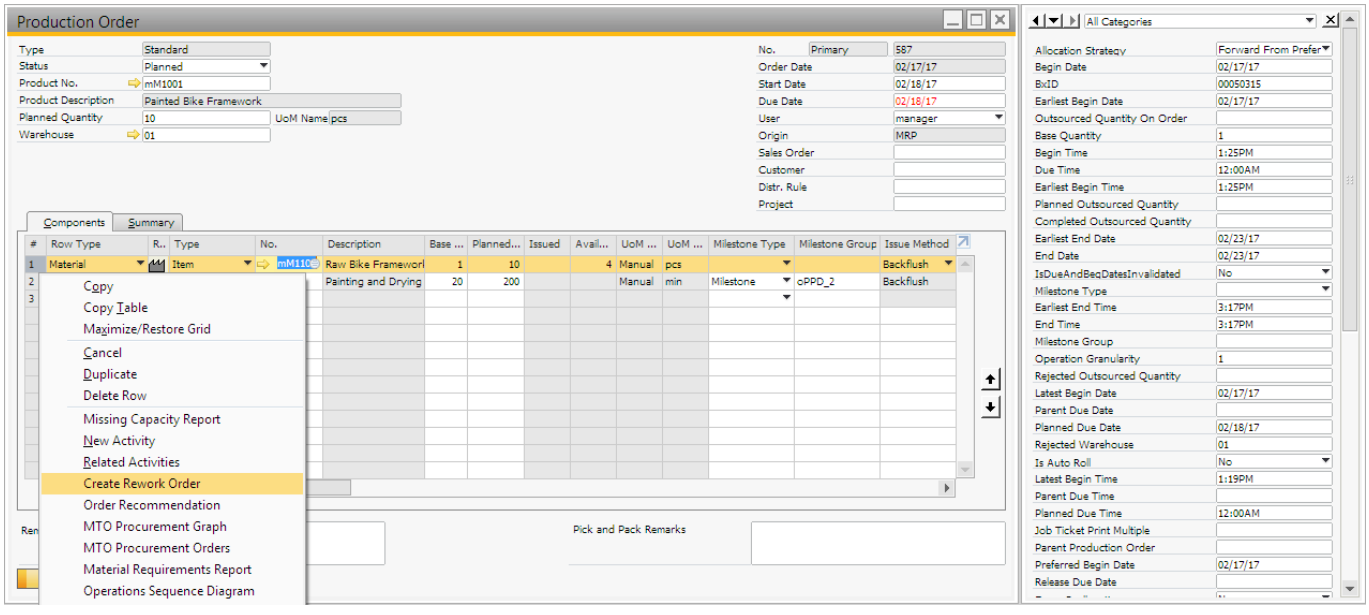
1. Prerequisites

First define an item for rework. Normally this item is only an 'Inventory' item as it is used only internally. Then create the rework BoM for this item that includes all the operations and materials needed for the rework.

Add the code of the rework item to the *'Rework Order special BoM item code'* field on the Production order tab of Produmex Manufacturing settings.

2. Create a rework order

Rework order can be created from the parent MTO production order. Select the line of the assembly material in question the select the *'Create Rework Order'* option from the right-click menu.



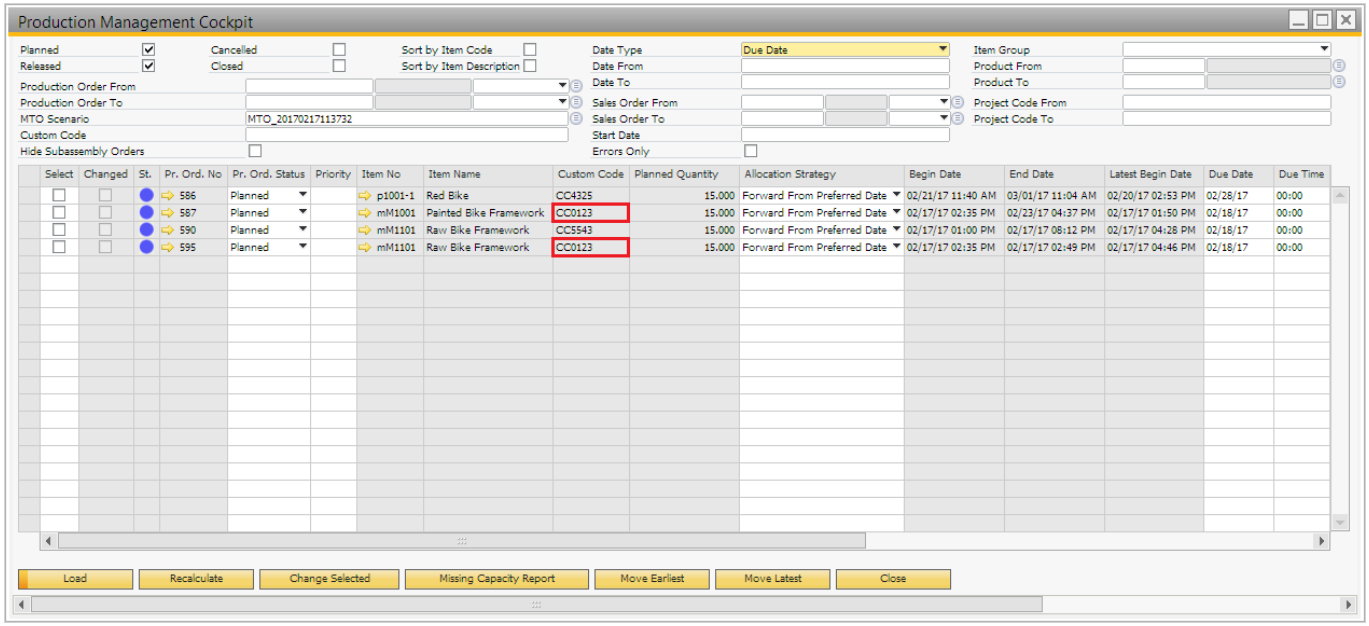
The created rework order will open up.

The order type will be ‘Special’ and the BoM loaded in the order is the BoM of the rework item defined on the Rework Order special BoM item code field.

The product will be the assembly material and the quantity will be the planned quantity of the material on the parent production order. The rework order inherits its due date from the base production order. The planned quantity for the product will be the planned quantity of the assembly material of the parent production order.

Adjust the rework order manually by adding or modifying material & operation lines that will reflect the specific rework order that has to be performed then click on the ‘Update’ button.

The rework order is automatically added to the MTO chain of the top order. If the parent production order has a Custom Code defined on the Custom Code UDF, the rework order will inherit it.



3. Execute the order

Execute the rework order in the shopfloor as described in: PDC bookings.

To ensure accurate inventory records, do not receive the product at the end of the job as it has been already received from the job of the child production order.

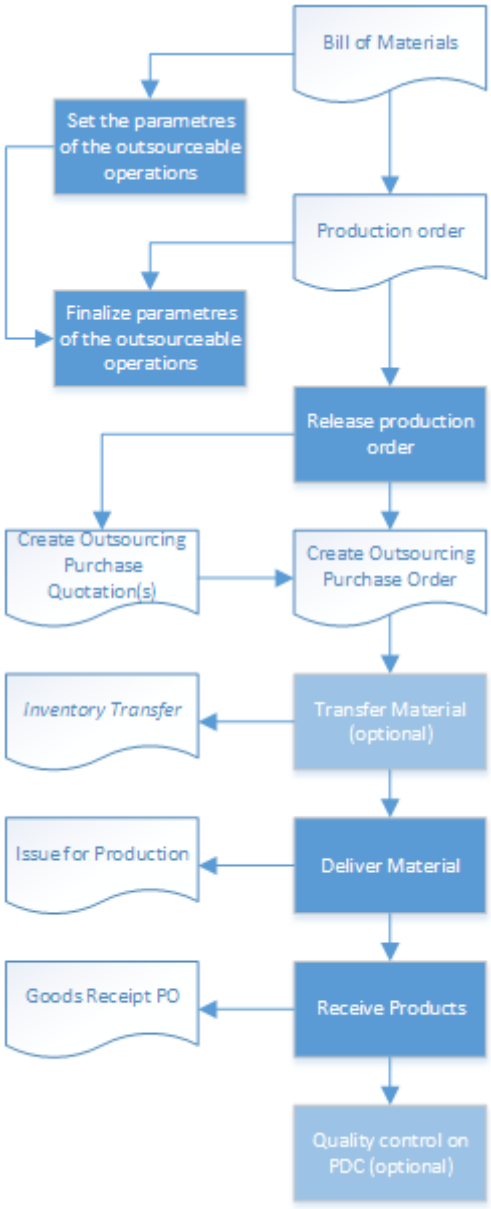
Outsourced Manufacturing

Produmex Manufacturing is a legacy product and Boyum IT Solutions no longer sells new installations for it.

An operation in a Bill of Material or in a Production Order may be defined as outsourced, meaning that this operation is performed by one of our outsourcing suppliers.
Here are the steps in outsourcing:

- Define outsourcing suppliers and supplier warehouses

- Define outsourceable operations (items) with lead times
- Define outsourceable operations with suppliers on the Bill of Materials
- Create production orders and review, fine-tune or redefine outsourced operations
- Release production order
- Create outsourcing purchase quotations and orders
- (Optional) Transfer materials from company warehouses into supplier warehouses
- Deliver materials to supplier
- Receive product from supplier



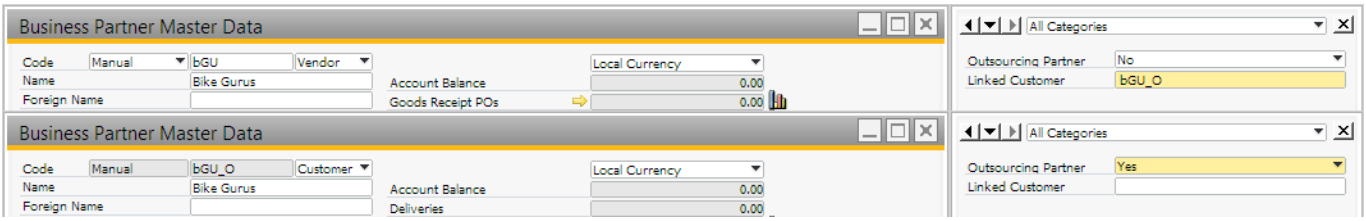
1. Configurations

1.1. Define Outsourcing Partners and Supplier Warehouse

Every ‘Vendor’ type business partner can be selected as an outsourcing partner. When the materials are not delivered directly from the main warehouse to the supplier and inter-warehouse stock transfer

transactions are applied, an outsourcing warehouse and a customer type business partner should be added for the outsourcing supplier in order to create Stock/Inventory Transfer documents.

To create this “supplier- client”, first add the partner as a customer too. On the customer Business Partner Master Data set the customer as an outsourcing partner with the ’Outsourcing Partner’ UDF. Link the business partners on the vendor Business Partner Master Data by adding the card code of the customer to the ‘Linked Customer’ UDF.



This ‘supplier-customer’ is needed only when the materials are transferred from the main warehouse(s) into the outsourcing warehouse, and when the materials are delivered to the supplier either from the supplier warehouse or directly from the main warehouse.

Supplier warehouses are used and needed only when the materials sent to the outsourcing supplier are moved from the main warehouses of the company to these special warehouses.

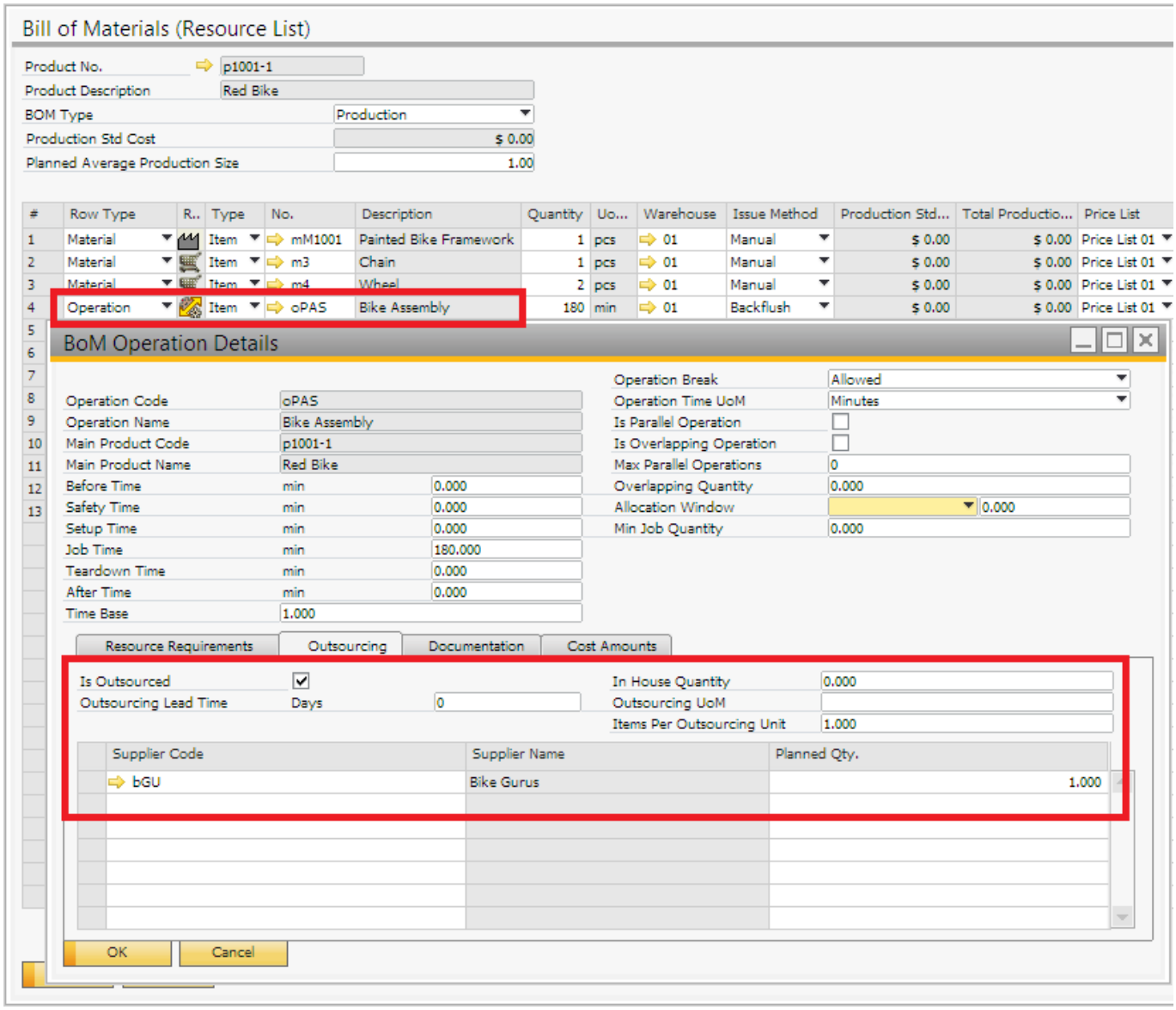
To create a supplier warehouse, add the supplier code to the ‘Outsourcing Partner’ UDF on the warehouse to link the outsourcing partner to the warehouse. The ‘Partner Name’ field will be automatically filled.

1.2. Bill of Materials with Outsourced Operations

1.2.1. Defining Outsourced Operations in BoMs

When creating an operation item it has to be set to be ‘Purchased’ in order to be outsourceable; since when a purchase order is created for outsourcing, it is the operation item that is included in the purchase order document.

Define the operation as outsourced either on BoMs and Production orders Operation Details form. On the Outsourcing tab, tick the ‘Is Outsourced’ box to enable the outsourcing.



An operation can be fully or partially outsourced. In the ‘In House Quantity’ field define the quantity that is not outsourced. When the ‘Null InHouse Quantity for Outsourcing’ option is enabled on the Master Data tab, the default In House quantity on the BoM Operation details form will be zero, meaning that the operation is fully outsourced. When this setting is not enabled, the default quantity is the default value.

If an operation is fully outsourced its icon is changed in the BoM form’s matrix. The possible outsourcing suppliers can be listed in the outsourcing grid. It is possible that an operation is outsourced to multiple suppliers in the ratio defined in the Planned Qty value. The default ‘Outsourcing UoM’ is the Purchasing UoM of the operation but it is possible to adjust it. Add a new UoM and specify how many inventory units make for one outsourced unit on the ‘Items per Outsourcing UoM’ field.

Set an unit price for the outsourced operation. When the purchase order is created, the appropriate price is used.

The Lead Time of an outsourced operation does not dependent on the quantity manufactured, which might be a limitation. The Lead Time concept comes from standard SAP Business One. The Lead Time can be meant in working days or calendar days: this is the value of ‘Lead Time Type’ UDF on the Item

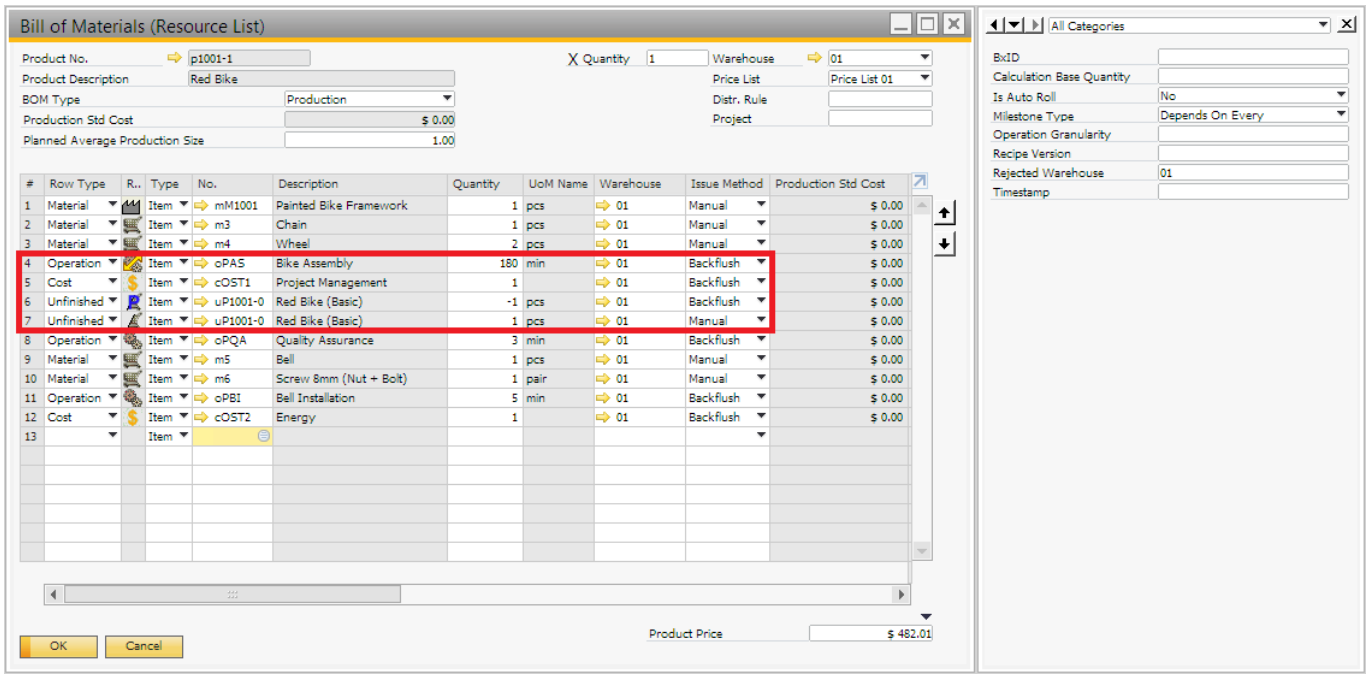
Master Data of the operation.

The lead time can be set:

- On the MRP tab of Produmex Manufacturing settings
  Set the 'Default Outsourcing Lead Time'. This value is used when no Lead Time is defined on the Item Master Data or on the Operation Details.
- On the Planning tab of the Item Master Data
  Set a default lead time for an item on the 'Lead Time' field.
- On the Outsourcing tab of the Operation Details form
  Specify a lead time for the current operation on the 'Outsourcing Lead Time' field.

1.2.2. Defining Materials for Outsourced Operations

Regular materials can be defined for outsourcing operations just like for non-outsourced operations. These materials are delivered to the supplier partner. When the 'ProdOrder Allow Simplified Outsourcing' option on the Prod.Order tab of Produmex Manufacturing settings is disabled, the use of unfinished products and materials is mandatory. In simplified outsourcing unfinished products and materials are optional.
Here is an example how to define unfinished products/materials.



This BoM has three operations: The first one is outsourced and the last two is non-outsourced. When an outsourced operation is followed by other operations and materials, the 'unfinished product' item must be added to the BoM twice. First add it right after the operation with the row type 'Unfinished product'. Then add the unfinished product item before the next operation with the row type 'Unfinished material'.

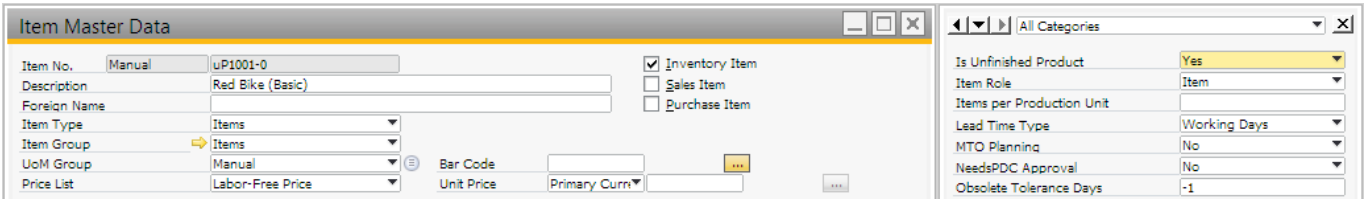
1.2.3.1. Define 'Unfinished product' items

On the Item Master Data of the product, set the 'Is Unfinished Product' UDF to 'Yes'. Normally these

items are only ‘Inventory’ items since these are purely internally used to keep track of the stock of the interim manufacturing items.

On the Planning tab set the Planning method to ‘None’ to prevent the MRP to make recommendations.

On the ‘Inventory Data’ tab make sure that the valuation method is set to ‘Standard’ to avoid inventory transaction errors. Since the Unfinished Product items are used only in manufacturing transactions, they should be defined for the manufacturing warehouse and all relevant supplier warehouses.



1.2.3.1. Add ‘Unfinished product’ items to the BoM

The same intermediate item has to be included in a BoM twice: first with row type ‘Unfinished Product’ followed by a row type of ‘Unfinished Material’.

If the last operation is outsourced, no unfinished product has to be defined for that operation, since the product of that operation is the actual product item of the BoM. Here is then the sequence of rows in a BoM:

- (In-House or Outsourced) Operation
- (Cost)
- Unfinished Product
- Material
- Unfinished Material with the same item code as the preceding Unfinished Product
- (In-House or Outsourced) Operation
- Other materials/ operation

Since the unfinished products are normally available only in the manufacturing and the supplier warehouses, the source warehouse for the unfinished product/material rows in the BoM should be set accordingly. Since the inventory management of unfinished products works best with PDC, the milestone types of the rows should be set accordingly. The milestone type of operations should be set to ‘Milestone’ and all other materials and unfinished products are best to set to ‘Depends on every’, other ‘Depends on …’ values are supported as well, of course. The quantity value of the unfinished product must be a negative value (-1 if the X Quantity in the BoM header is 1, which is automatically set by the PPS module), and therefore the issue method can only be backflush, enforced by SAP Business One.

Make sure that the Milestone Type in the header of the BoM is set to ‘Depends on Every’ in order that whenever a PDC completion booking is reported for the milestoned last operation, the main product is taken onto stock automatically with a Receipt from Production transaction.

Please note: Defining a serial or batch managed item as ‘Unfinished product’ is not supported. Because the quantity value of an unfinished product must be set as negative, the issue type can only

be 'Backflush'. If PDC is not used, the automated inventory management functions for unfinished product rows are not available, and have to be made manually, which should be avoided.

2. Outsourcing process

2.1. Outsourced Operations in Production Orders

When a 'Standard' production order is created from a BoM, the outsourced operations are copied with their parameters as usual. At this point the user may modify a number of parameters, the most typical being to change the actual supplier. When a production order is released, the duration of the outsourced operation is calculated from the Lead Time. Outsourced operations are not assigned to any work centers.

Outsourced operations are only included in the Job Requirements report if the 'Include Outsource Operations In Job Requirements Report' option is enabled on the Prod.Order tab of Produmex Manufacturing settings.

On the production order outsourcing UDFs are added to review the outsourced quantities.

- *Outsourced Quantity On Order*: The sum of the outsourced quantities on the production order.
- *Planned Outsourced Quantity*: The sum of the planned outsourced quantities on the production order.
- *Completed Outsourced Quantity*: The sum of the already completed outsourced quantities on the production order.
- *Rejected Outsourced Quantity*: The sum of the rejected outsourced quantities on the production order.

2.2. Creating Outsourcing (Purchase) Orders

When the 'Automatic Generation of Outsourcing Purchase Orders on Production Order Release' option is enabled on the Prod.Order tab, outsourcing purchase order are automatically created when the production order is released otherwise the user have to create them manually. Purchase quotations can only be generated manually.

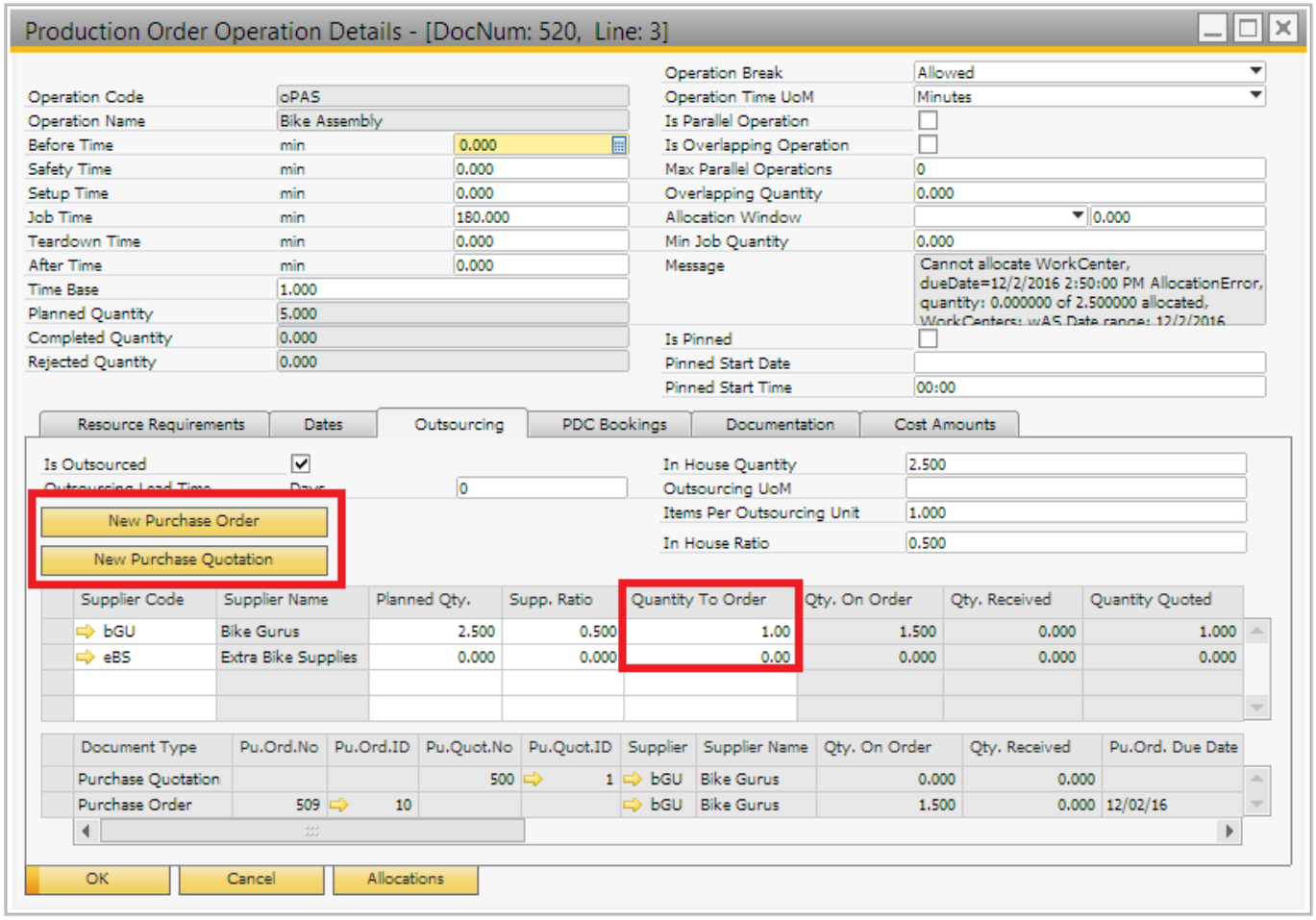
When using this setting with an enabled 'Immediate Release after Add' option, the production order will be released and outsourcing orders will be created automatically after the production order was added or created by MRP.

2.2.1. Creating Outsourcing Orders Manually from Production Order Operation Details Form

Outsourcing (purchase) orders or quotations can be created manually from the operation details form. When the production order is in released mode and unchanged, open the outsourced operation details form and enter the 'Quantity to Order' value on the row of the selected supplier.

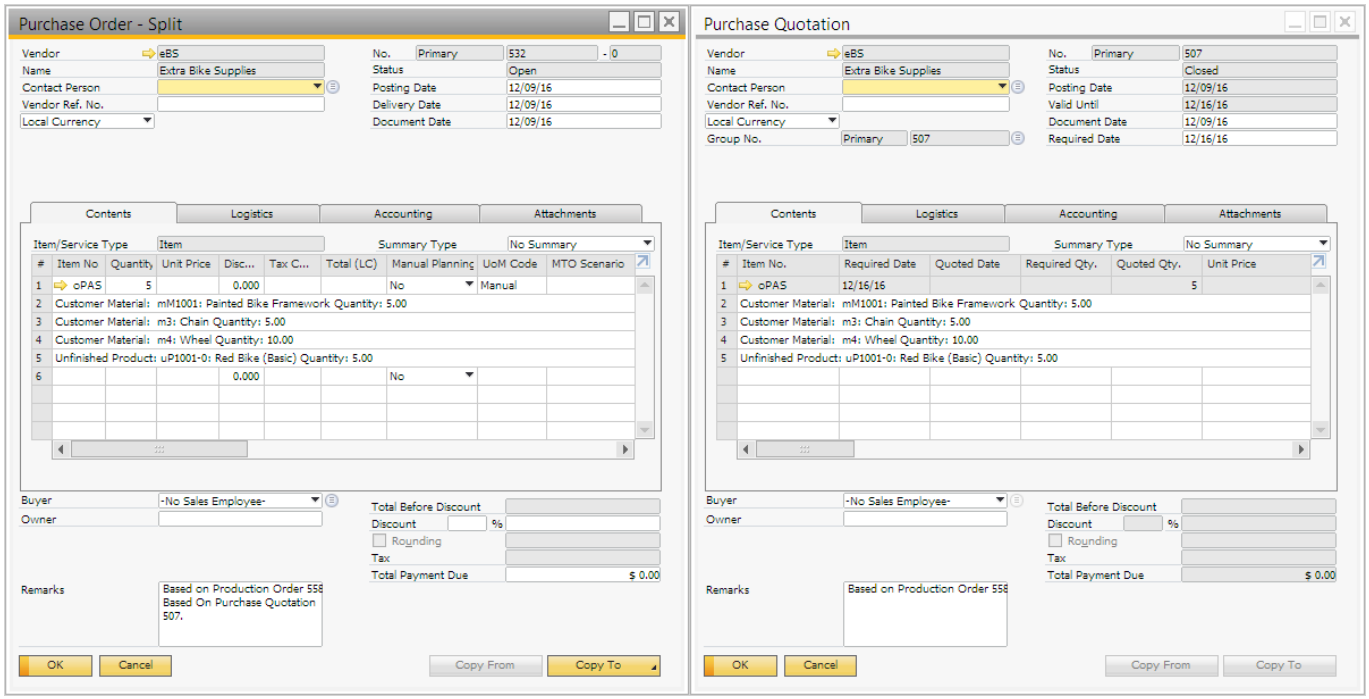
To create a purchase quotation, press the 'New Purchase Quotation' button. When creating a Purchase Order based on a Purchase Quotation, references for the production order will be copied.

To create a purchase order, press the ‘New Purchase Order’ button.



The outsourcing order is a regular purchase order with some special text lines and remarks. The ordered item is the operation item. The components required for the operation are listed as ‘Customer Materials’. These items have to be delivered to the supplier. The ‘Unfinished product’ is the product of the outsourced operation. The unit price comes from the price list of the operation item.

The user can change most of the data of these purchase orders manually, however the operation item and text lines should not be deleted.



2.3. Inventory Management for Outsourced Operations

Open the Inventory Management for Outsourced Operations form from the Production module or from the right-click menu of an outsourcing purchase order document. When opening the form from the module, first select the supplier. When there is a defined warehouse for the selected supplier, the Supplier Warehouse field is automatically populated.

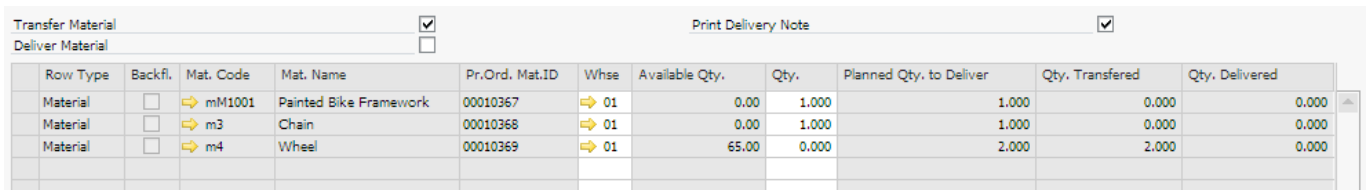
Then select the purchase order. The production order details will be automatically filled.

When opening the form from the purchase order, the purchase order and supplier fields will be automatically filled based on the purchase order.

On the upper grid every material linked to the outsourced operation will be listed. On the lower grid products to receive will be listed.

2.3.1. Transfer materials to the supplier warehouse

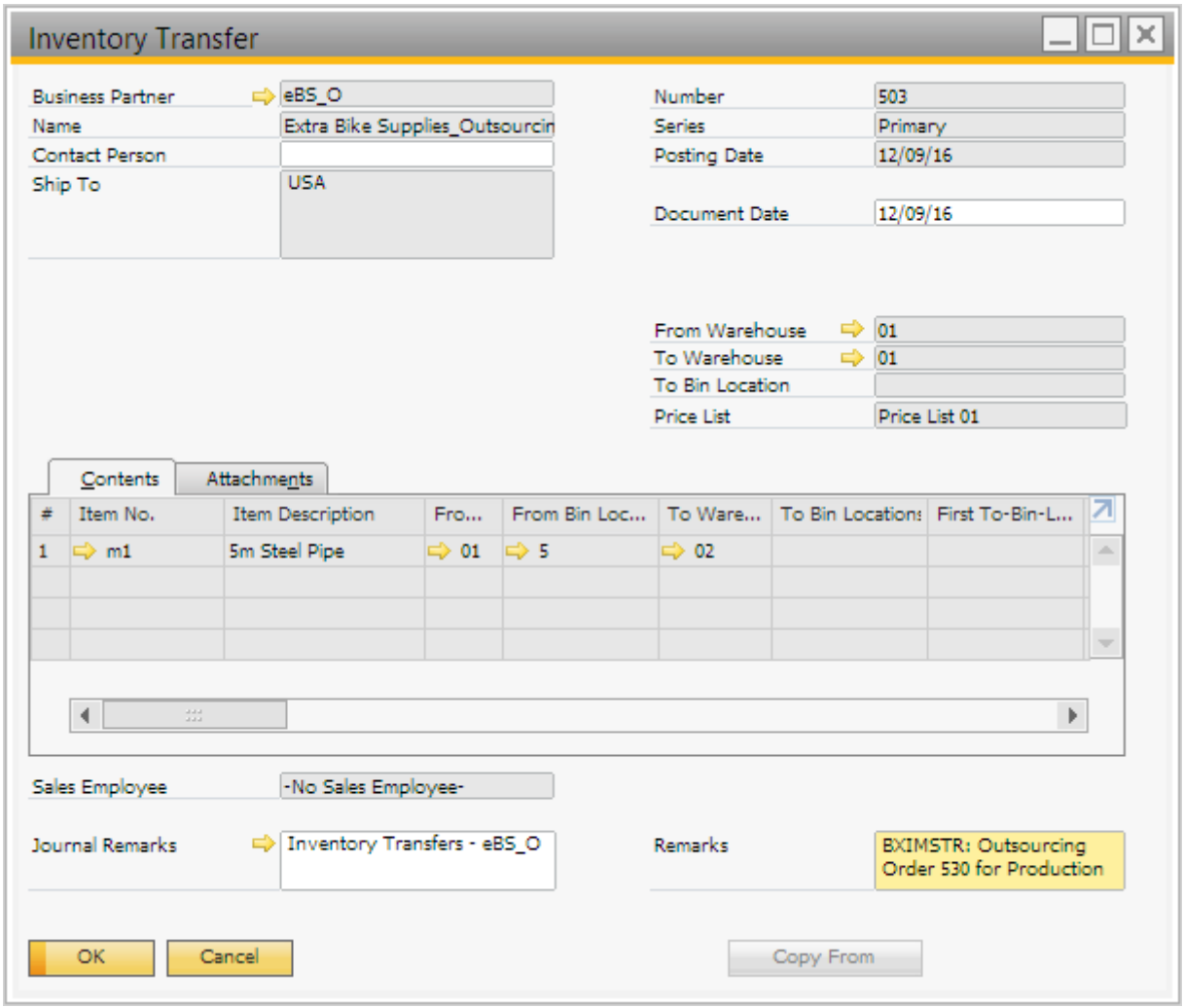
In most outsourcing situation the materials are provided for the outsourcing partner by the company. When precise inventory tracking is required, materials should be transferred for the duration of the outsourced operation to a warehouse dedicated to the supplier.



To transfer the materials to the supplier warehouse, tick the ‘Transfer Materials’ box. Adjust the

source warehouse on the ‘Whse’ cell and the quantity to transfer on the ‘Qty’ cell (if needed) then click on the ‘Update’ button. The transfer is booked in an Inventory Transfer document.

The business partner is the outsourcing customer. The outsourcing order number, the production order number and the outsourcing supplier is added as a ‘Remark’.



To print the Outsourcing Deliver Note, tick the ‘Print Delivery Note’ option too before the update. (The default report is: RL_OutsourcingDeliveryNote)

Outsourcing Delivery Not

Ship To: Extra Bike Supplies

Document Date: 12/09/16
Doc. Number: 503
Doc Type: Inventory Transfer
Sales Employee: -No Sales Employee-
Customer Code: eBS

Line No.	ItemCode	Description	Quantity	UoM
1	m1	5m Steel Pipe	5.00	pcs

Remarks: Inventory Transfers - eBS_O

Please note: When no supplier warehouse is defined, the 'Transfer Material' option is not available. For material transfers it is required that the outsourcing supplier has a linked customer. (See: 1.1. Define Outsourcing Partners and Supplier Warehouse)

When working with MultiBranch company databases, the source and target transactions must be in the same branch. SAP B1 does not allow direct cross-branch inventory transactions. The supplier warehouse has to be in the same branch as the source warehouse from which the materials are delivered to the supplier. The production order warehouse must be in the same branch as the outsourcing warehouse. Cross-Branch outsourcing is not supported to any extent. In practice, branches cannot share the outsourcing suppliers since each supplier can have only one outsourcing warehouse and that warehouse must belong to a single specific branch. Likewise, a production order is allocated to a single branch, therefore it can only be linked to an outsourcing supplier of the same branch.

2.3.1.1. Inventory Transfer for Backflush Materials

Stock/Inventory Transfer is supported for backflush materials as well. It is very important that the source warehouse for backflush materials in the production order is set to the outsourced operation's supplier's warehouse. Otherwise, the materials are retrieved from the wrong warehouses when the automatic backflush is applied.

2.3.1.2. Inventory Transfer for Materials managed by serial/batch numbers

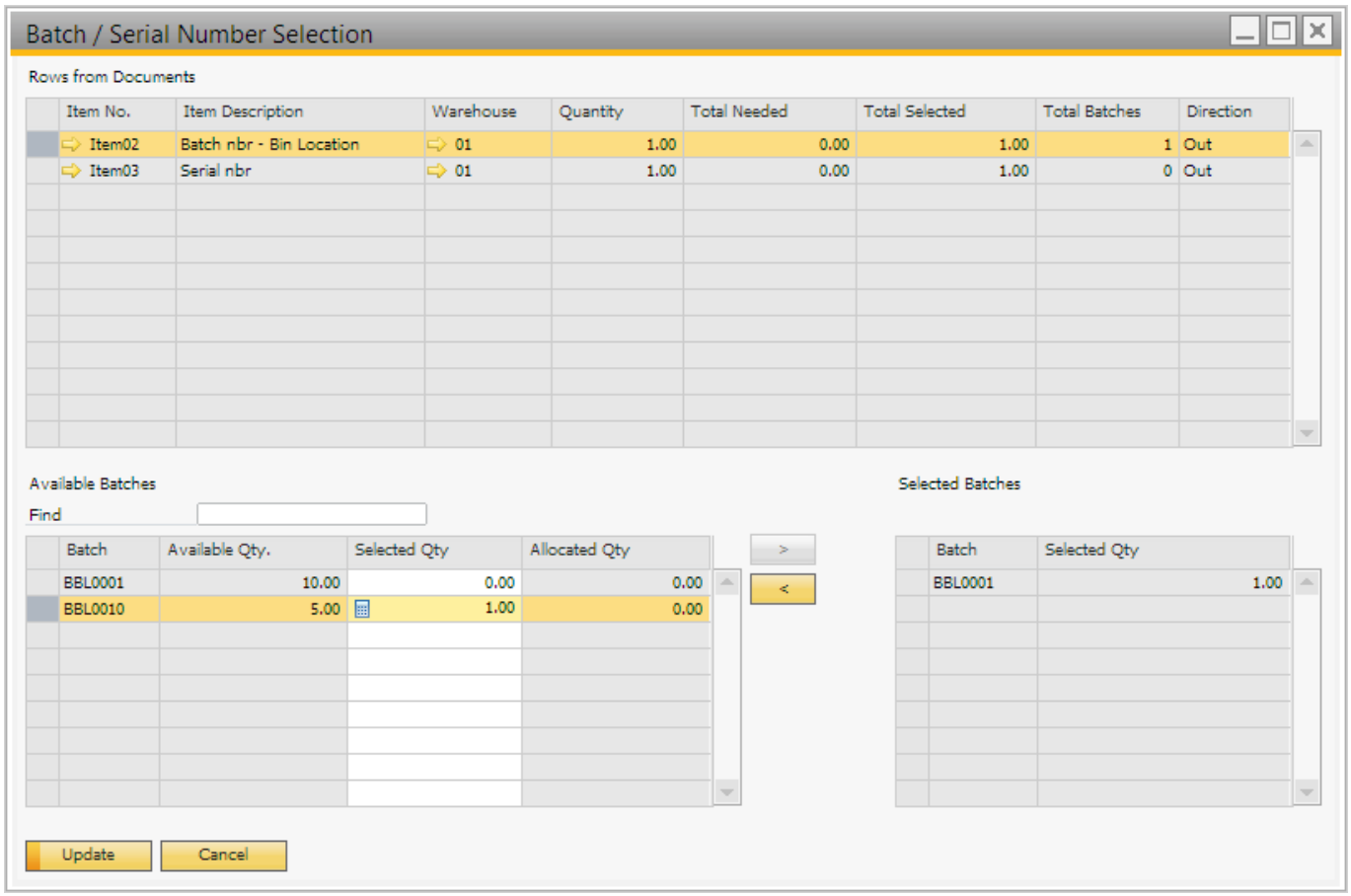
After the 'Update' button has been clicked, 'Batch/Serial Number Selection' form opens. On this form select the batch/serial number(s) of the material(s) to transfer.

On the 'Rows from Documents' grid every serial or batch numbered item to transfer is listed. On the 'Quantity' field the total quantity to transfer is displayed. On the 'Total Needed' field the open quantity and on the 'Total Selected' field the selected quantity is shown. The number of the selected batches is displayed on the 'Total Batches' field.

Batch number
To find a batch, enter the batch number to the 'Find' field then press TAB.

Select a batch in the ‘Available batches’ grid and adjust the ‘Selected Qty’ then click on the right arrow. The selected batch with the added quantity will be displayed on the ‘Selected Batches’ grid. Products from multiple batches can be added.

It is not possible to exceed the needed quantity. To remove a selected batch, select its line then click on the left arrow. Click on the ‘Update’ button to save the selected batches.

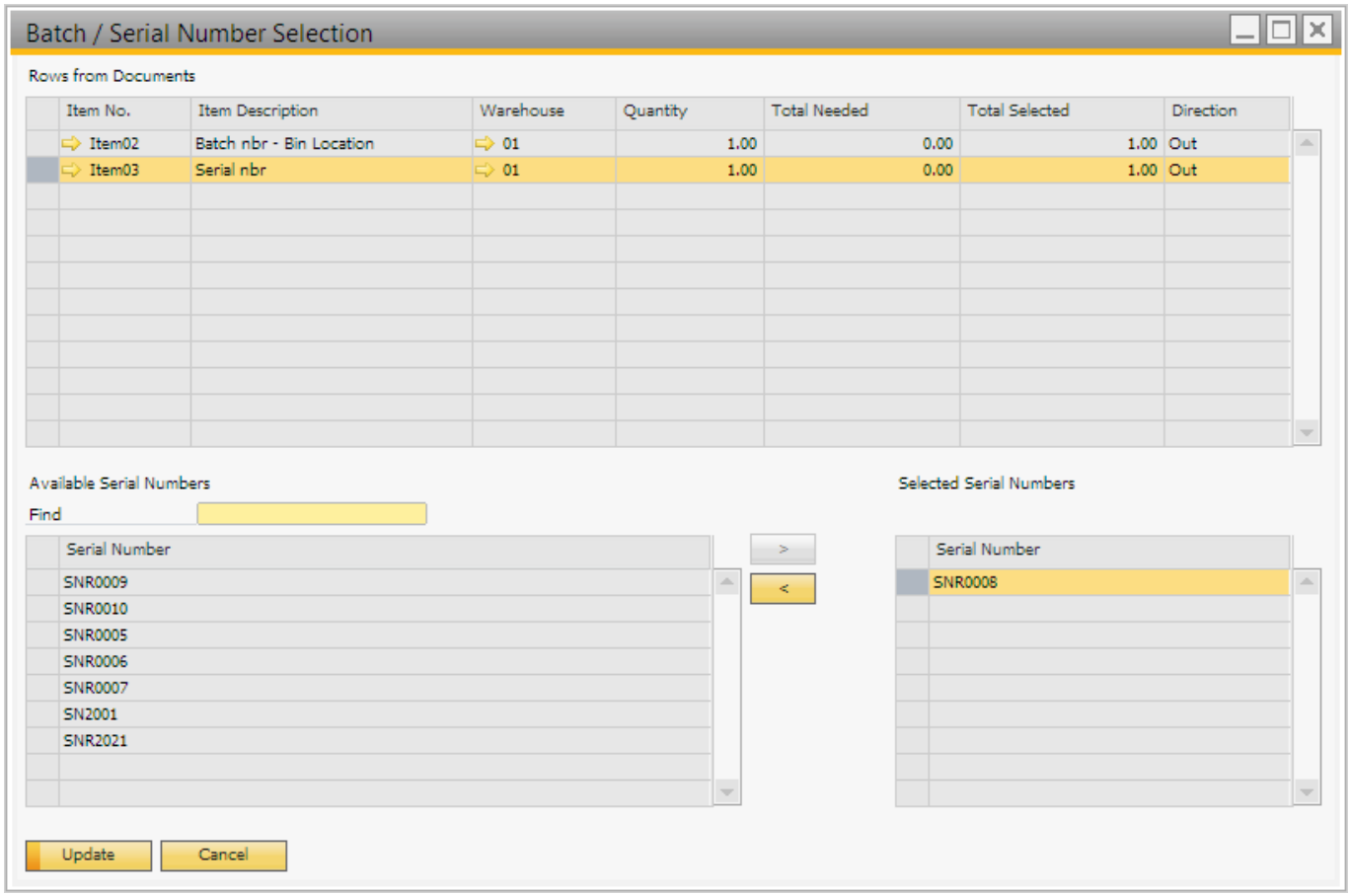


Serial number
To find a serial number, type the serial number to the ‘Find’ field then press TAB.

Select a serial number on the ‘Available Serial Numbers’ grid then click on the right arrow to add it to the ‘Selected Serial Numbers’ grid. To select every serial numbers on the list, click on the ‘Serial Number’ title.

To remove a serial number from the selected serial numbers, select its line then click on the left arrow.

It is not possible to add more serial numbers than the quantity needed.



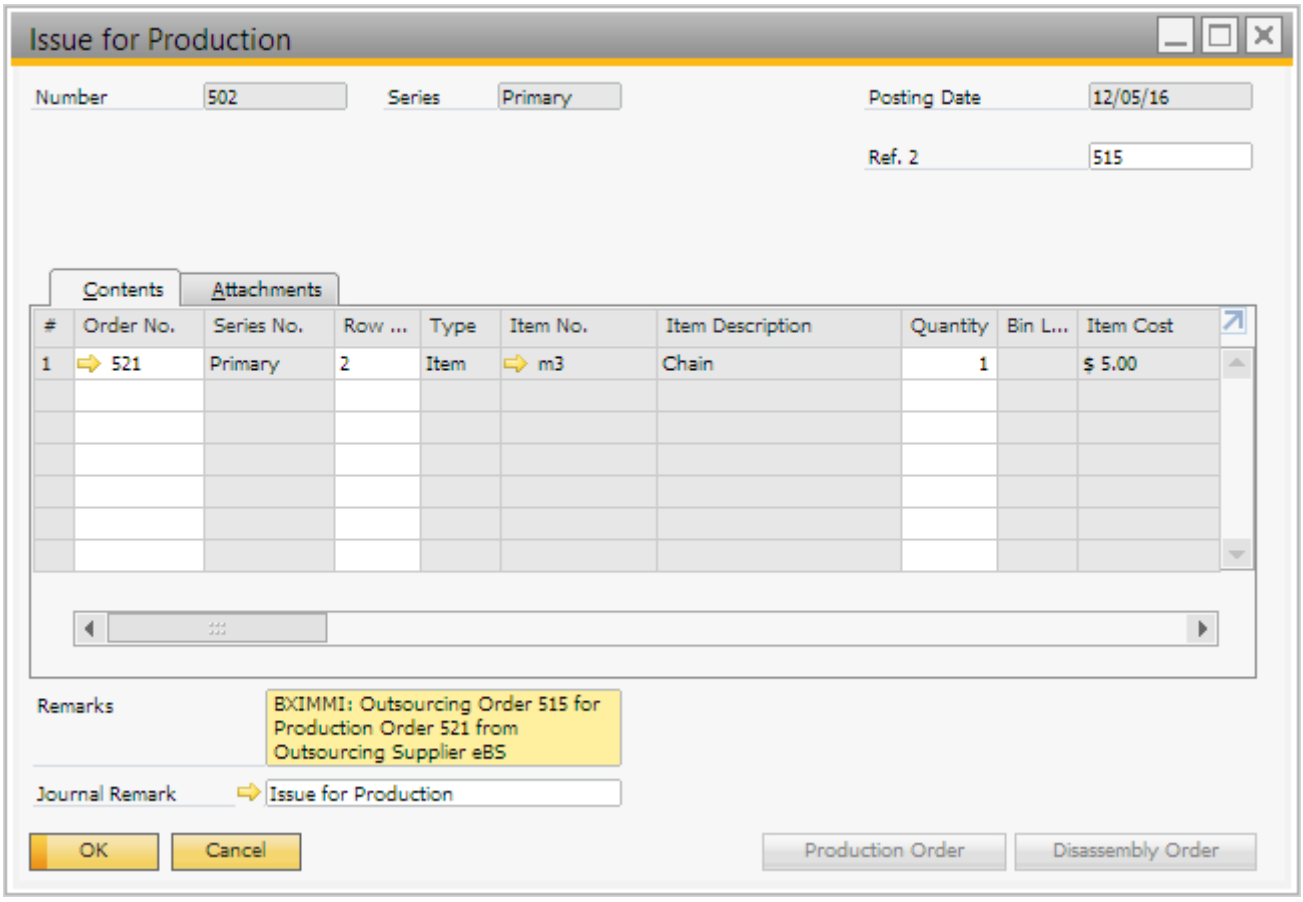
2.3.2. Deliver materials from the company's inventory

After the outsourced operation was completed, the materials in the supplier warehouse should be released/issued as consumed by the manufacturing.

To issue the materials, tick the 'Deliver Materials' box. Adjust the quantity to issue on the Qty cell and the source warehouse if needed then click on the 'Update' button. The components will be issued and an 'Issue from production' order will be generated.

Please note: The material delivery option is not available for backflush components and these materials will be removed from the grid when ticking the 'Deliver Material' option. (Backflush materials will be issued automatically after the main product is taken into stock.)

The outsourcing order number, the production order number and the outsourcing supplier is added as a 'Remark' to the document.



2.3.2.1. Deliver materials managed by serial/batch numbers

After the ‘Update’ button has been clicked, ‘Batch/Serial Number Selection’ form opens. On this form select the batch/serial number(s) of the material(s) to deliver as described in *2.3.1.1. Inventory Transfer for Materials managed by serial/batch numbers.*

2.3.3. Receiving the Products from the Outsourcing Supplier

When the outsourced operation is (partly) completed, the products should be taken into stock.

Add the quantity to receive to the ‘Operation Quantity’ field. The default value is the quantity still to receive. When outsourcing ‘Unfinished Product’ items, the issued quantity of the unfinished material must be exactly the same as the received quantity of the unfinished product.

Tick the ‘Products Received’ box. The destination warehouse can be adjusted on the grid. Click on the ‘Update’ button to receive the products. A ‘Receipt from Production’ document will be generated.

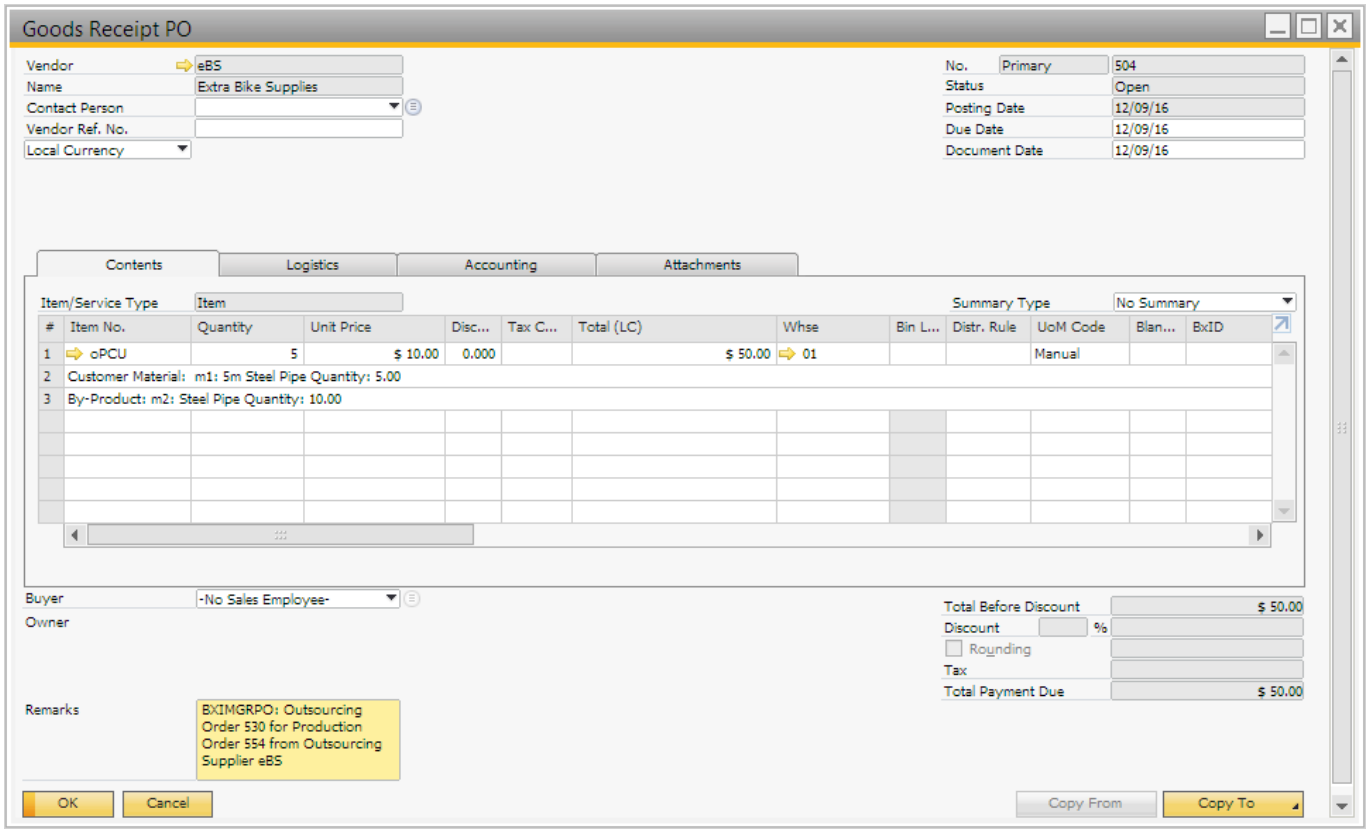
After all products have been received the purchase order is closed automatically.

When the ‘Goods Receipt PO’ box is also ticked, a Goods Receipt PO document linked to the Purchase order is also generated with the appropriate values.

Received and issued material quantities are also maintained on the base Production Order document.

2.3.3.1. Quality controlling on the shopfloor

After the delivery (Goods Receipt) document is created for an outsourced operation, quality assurance can be executed on the shopfloor. Based on the quality qualifications, an outsourced operation might be rejected. For more information about the quality control of the outsourced operations, please see: PDC Quality Controlling.



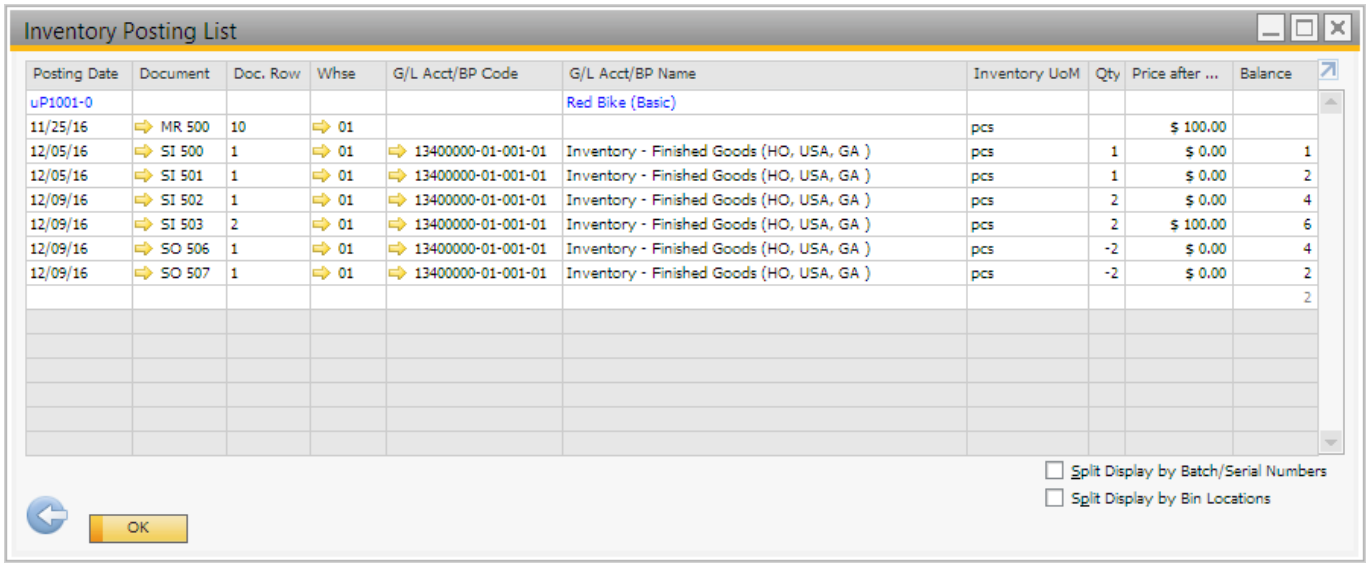
2.4. Completing the production order

When the last operation of the production order is completed, the unfinished materials, which are the same as the outsourcing operation unfinished product, as well as the other materials for the operations are issued for production, and the main product is taken onto stock.

When the main product is taken onto stock from production, the backflush materials are automatically issued for production in the ratio of the completed and, if there were any, rejected product quantity.

Since unfinished products have negative quantities similarly to by-products, they will be automatically taken onto stock. To negate this transaction and to maintain the stocks in balance, the system automatically issues these products and books transaction in a Goods Issue document.

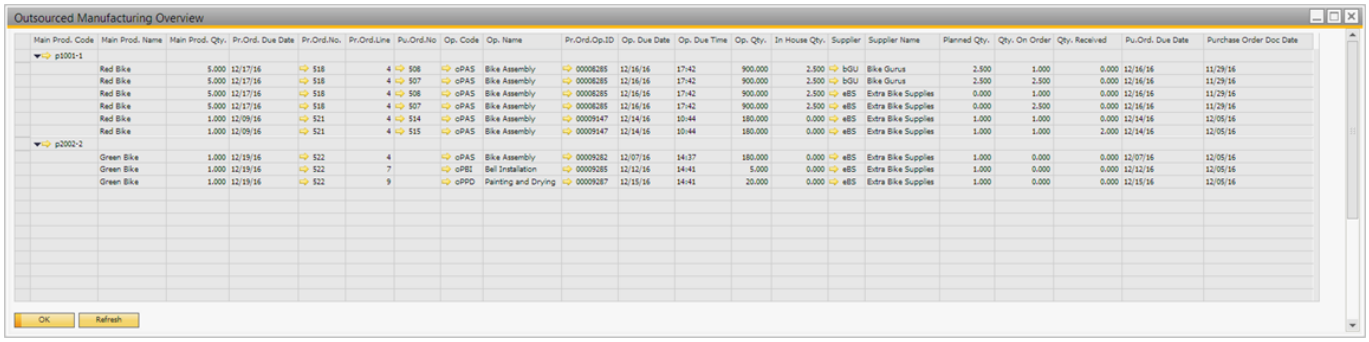
To see the stock flow of the unfinished products, open the Inventory Posting List.



3. Overview the outsourced operations

3.1. Outsourcing Manufacturing Overview

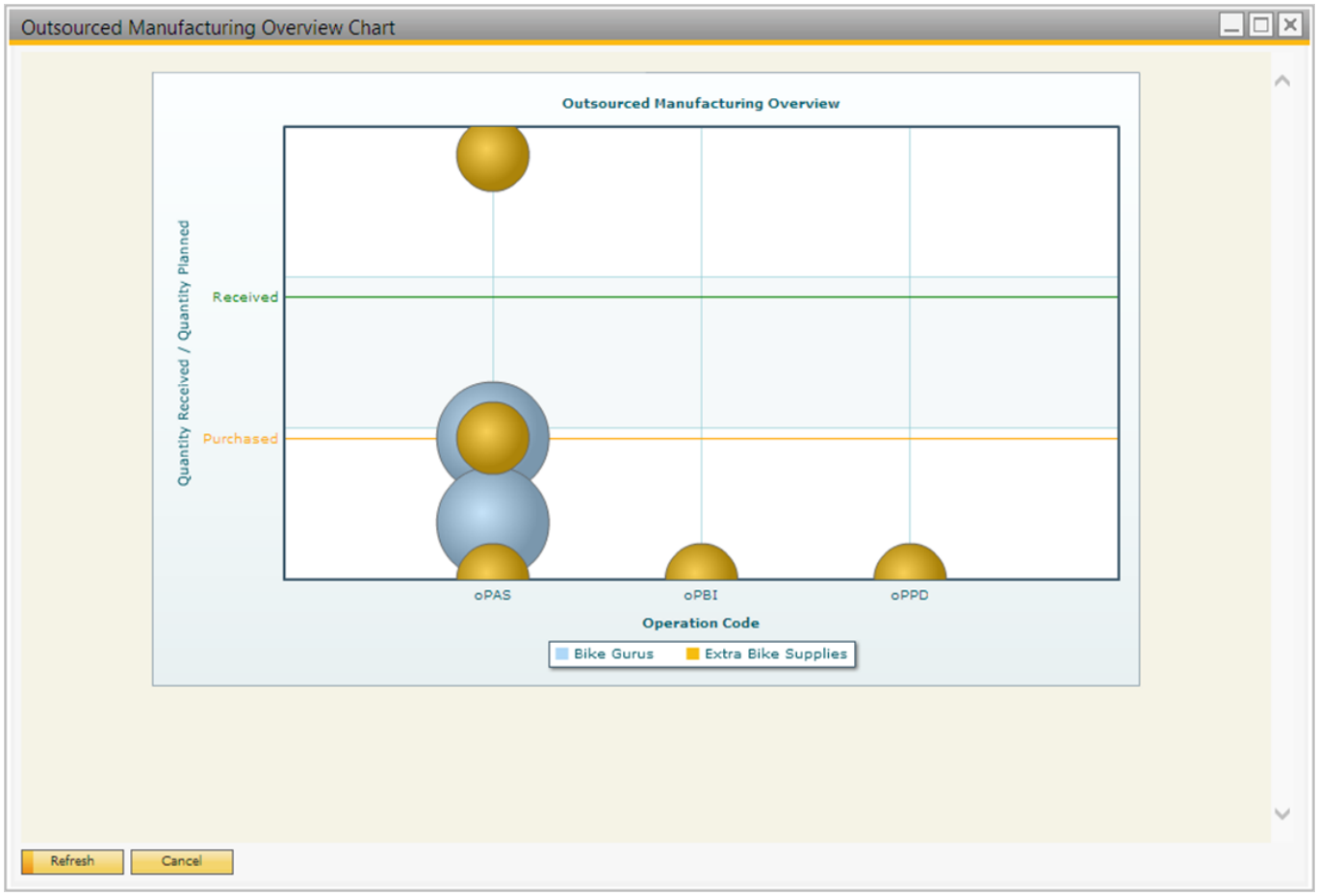
Open the form via the following path: Production > Production Reports > Outsourcing Manufacturing Overview. On this form the user can review the status and the details of outsourced manufacturing operations. Operations are grouped by the main product.



Please note: Purchase quotations for outsourcing are not displayed on this form.

3.2. Outsourcing Manufacturing Overview Chart

Open the chart via the following path: Production > Production Reports > Outsourcing Manufacturing Overview Chart. The bubble chart displays the performance and progression of the outsourced operation types. Operations outsourced to different supplier are distinguished by color.



Production Management Cockpit

Produmex Manufacturing is a legacy product and Boyum IT Solutions no longer sells new installations for it.

Use the Production Management Cockpit to overview and manage the production orders. The listed production orders can be filtered and more than one production orders can be changed in one step. Open the cockpit via:

- Production > Production Management Cockpit
- Job Scheduling Control Panel > Feed to Management Cockpit.

The list of the production orders can be filtered with the following criteria:

- *Status*: When no checkbox is ticked, production orders will not be filtered based on the status. When at least one status checkbox is ticked, only the production orders with the selected status(es) will be loaded to the form.
- *Production Order From – To*: Only the selected production orders will be loaded.
- *MTO Scenario*: Only production orders belonging to the selected MTO scenario will be loaded.
- *Errors only (Y/N)*: Only production orders with 'Error' type 'Allocation State' will be loaded.
- To filter to a period only, select the Date type and then set the period with the *Date From* and *Date To* fields. Possible values for the *Date Type* are: 'All Dates', 'Release Date', 'Due Date', 'Begin Date', and 'Order Date'.
- *Sales Order From- To*: Only production orders linked to the selected sales order(s) will be loaded.

- *Start Date*: Only production orders with the added start date will be loaded.
- *Item Group*: Only production order for products belonging to the selected Item Group will be loaded.
- *Product From – To*: Only production orders for the selected product(s) will be loaded.
- *Project Code From – To*: Only production orders belonging to the selected project(s) will be loaded.
- *Hide Subassembly Orders (Y/N)*: If enabled, MTO child orders will not be displayed on the list.
- *MTO Scenario*: Only production orders belonging to the given MTO scenario will be listed.
- *Custom Code*: Only production orders with the given custom code will be listed.
- *Ignore Start Date*: If this setting is enabled and the user clicks on the 'Move Earliest' button, the production order start date is ignored when the system reschedules the MTO scenario.
- *Ignore Due Date*: If this setting is enabled, and the user clicks on the 'Move Latest' button, the production order due date is ignored when the system reschedules the MTO scenario.

Other user defined fields can be added as filters. Add the UDF name to the *'Cockpit UDFs for filtering'* field on the Prod.Order tab of the Produmex Manufacturing settings.

Loaded production orders are sorted based on the 'Sort by' setting. Possible values:

- *Prod. Order Number*: Ascending based on the production order number.
- *Item No.*: Ascending based on the code of the main product.
- *Item Name*: Ascending based on the name of the main product.
- *1st Operation*: Ascending based on the code of the first operation in the production order.

Press the **'Load'** button to load the production orders with the applied filter(s).
Press the **'Recalculate'** button to recalculate the scheduling.
Press the **'Change Selected'** button to change the details of the selected production order(s). On the opening form the following can be changed:

- *Production order status*
- *Allocation Strategy*: Back From Due Date/ Forward From Earliest Date/ Forward From Preferred Date (the default allocation strategy is the allocation strategy set as the *'Default Pr.Ord. Allocation Strategy'* on the Prod.Order tab of the Produmex Manufacturing settings.)
- *Start Date*: Change the start date of the production order.
- *Due Date*: Change the due date.
- *Due Time*: Change the due time.

Press the **'Update'** button then recalculate the scheduling by pressing the **'Recalculate'** button to apply the changes.
When reallocating more than one production order at the same time, the allocation order is defined by:

1. Priority (descending)
2. Due date (ascending)
3. Document number (ascending)

Press the **'Close'** button to close the form without making any adjustments.

Missing Capacity Report
When the 'Use Missing Capacity Report' option is set to true on the Prod.Order tab of the Produmex Manufacturing settings, an additional 'Missing Capacity Report' button is displayed on the form. Click on the button to open the 'Missing Capacity Report' for the selected production order.

Move Earliest
When the 'Move Earliest' option is enabled on the MTO tab of Produmex Manufacturing settings, an additional 'Move Earliest' button is displayed on the screen. Select a production order from the MTO scenario and click on this button to reschedule the MTO scenario to the earliest possible start date of the top order.

Move Latest
When the 'Move Latest' option is enabled on the MTO tab of Produmex Manufacturing Settings, an additional 'Move Latest' button is displayed on the screen. Select a production order from the MTO scenario and click on this button to reschedule the MTO scenario to the latest possible start date of the top order.

Grid:

- *Select (Y/N):* If ticked, the line is selected.
- *Changed (Y/N):* Indicates whether the production order was changed or not.
- *St.:* The production order status indicated with a color. Possible values:
  -  - Planned
  -  - Released
  -  - Released, but allocation error
  -  - Cancelled
  -  - Closed
- *Pr.Ord.Status:* The status of the production order. Possible values:
  - Cancelled
  - Closed
  - Planned
  - Released
- *Pr.Ord.No:* The production order number.
- *Priority:* The priority of the production order. Used when recalculating more than one production orders at the same time.
- *Item No:* The item code of the main product.
- *Item Name:* The item description of the main product.
- *First Operation*: The code of the first operation in the production order.
- *Custom code field*: The custom code of the production order that was defined on the Custom code UDF on the production order.
- *Planned Quantity:* The planned quantity copied from the production order.
- *Allocation Strategy:* The allocation strategy. Copied from the 'Allocation Strategy' UDF of the Production order.
  - *Back From Due Date*: For just in time manufacturing. The system will allocate work centers based on the Due Date.
  - *Forward From Earliest Date*: The system will allocate work centers based on the earliest possible start date.
  - *Forward From Preferred Date*: The system will allocate work centers based on the preferred start date.
- *Begin Date:* The begin date of the production.
- *End Date:* The end date of the production.

- *Latest Begin Date:* The latest begin time calculated from the due date.
- *Start Date:* The start date of the production order.
- *Due Date:* The due date of the production order.
- *Due Time:* The due time of the production order.
- *Preferred Begin Date:* The begin date calculated based on the capacity of the preferred work center.
- *Preferred Due Date:* The due date calculated based on the 'Preferred Begin Date'.
- *Earliest Begin Date:* The earliest possible start date.
- *Earliest Due Date:* The due date calculated based on the 'Earliest Begin Date'.
- *Recalc. Latest Begin Date:* The recalculated 'Latest Begin Date'. Filled after recalculating the production order.
- *Recalc. Preferred Begin Date:* The recalculated 'Preferred Begin Date'. Filled after recalculating the production order.
- *Recalcu. Preferred Due Date:* The recalculated 'Latest Begin Date'. Filled after recalculating the production order.
- *Recalc. Earliest Begin Date:* The recalculated 'Earliest Begin Date'. Filled after recalculating the production order.
- *Open Quantity:* The quantity still to produce.
- *Completed Quantity:* The produced quantity.
- *Origin Number:* The base document number. When the production order was created from a base document, the base document number and a link is added to this field.
- *Material Requirements Report:* Link to the Material Requirements Report. Material Requirements Reports can only be created for unchanged and released production orders.
- *Project Code:* The code of the linked project.
- *Order Date:* The Order Date of the Production Order.
- *MTO Scenario:* The name of the MTO Scenario.
- *Warehouse:* The SAP Business One warehouse code.

Produmex WMS Integration
If Produmex WMS is also installed on the database, two additional columns are displayed:

- *Pmx Production Line:* The WMS Organizational Structure code of the assigned production line.
- *Pmx Status:* The Produmex production order status. Possible values:
  - Planned
  - Started
  - Closed
  - On hold

The Produmex status is also indicated on the status icon if the SBO status of the production order is 'Released':

-  - Produmex status: 'Planned'
-  - Produmex status: 'Started'
-  - Produmex status: 'On hold'

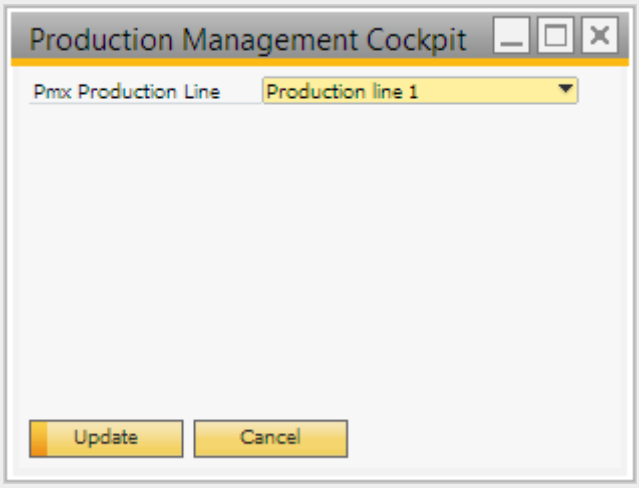
Set Production Line
If Produmex WMS is also installed on the database, an additional 'Set Production Line' button is

displayed on the screen.

To set a Produmex WMS production line for the production order, select the line of the production order. You can only set or change the PMX production line of production orders with 'Planned' SBO status.

It is possible to set the production line for multiple production orders by selecting multiple lines. The selected production orders must be from the same warehouse.

Click on the 'Set Production Line' button. On the opening screen select the production line from the dropdown list. Every production line from the warehouse of the production order is listed. Click on the 'Update' button to save the changes.



Error List
An error list opens up when error(s) occur. On the list the error type, the production order number and the error message is displayed.

Job Scheduling Control Panel

Produmex Manufacturing is a legacy product and Boyum IT Solutions no longer sells new installations for it.

The Job Scheduling Control Panel is an interactive graphical board where resource allocations can be reviewed and the scheduling of the operations can be managed for advanced production planning.

When a production order is recommended or added, the allocation logic schedules allocations for its operations, but these allocations are only temporary. After the order has been released, allocations will be scheduled permanently.

When an operation is scheduled for a production order it requires manufacturing resources: at least one work center. When using the multi-dimensional allocation strategy, supplementary resources

including tools and employees might be added. The work center is the primary factor for the scheduling of an operation.

The Job Scheduling Control Panel is a graphical board that displays the scheduling and resource allocations of production operations and supports manual rescheduling.

The Job Scheduling Control Panel can be reached via two paths:

- Production > Production Reports > Job Scheduling Control Panel
  After opening the panel, click on the 'Refresh' button to display allocations meeting the filter criteria.
- Right-click menu on the Production Order > Job Scheduling Control Panel
  When opening the panel from this path, only allocations for that production order will be displayed on the panel.

1. Configurations

1.1. Configurations on Produmex Manufacturing settings

1.1.1. Allocation dimensions

With default configurations only the work center dimension of the allocation is used in the MRP, therefore the other two dimensions cannot be displayed on the Job Scheduling Control Panel. To enable multidimension allocation, go to the MRP tab of the Produmex Manufacturing Settings and check the *'Use multidimension allocation'* option.

1.1.2. Align allocations

To use the 'Align allocations' function for work centers, adjust the *'JSCP align max days'* and *'JSCP align gap minutes'* options on the Prod. Order tab of Produmex Manufacturing Settings.

1.1.3. Rescheduling

To allow the automatic rescheduling of production orders in the case of shift day capacity shrunk, enable the *'Allow rescheduling Production Orders when shift day capacity is shrunk'* on the MRP tab of Produmex Manufacturing Settings. To enable the automatic align of child MTO orders, enable the *'AutoRoll child MTOs'* option in the MTO tab of Produmex Manufacturing Settings.

1.2. Configurations on the Job Scheduling Control Panel form

1.2.1. Header Buttons

(1) **Work Centers**: Use this button to show or hide work centers on the panel.
(2) **Employees**: Use this button to show or hide employees on the panel.
(3) **Tools**: Use this button to show or hide tools on the panel.
(4) **Period**: Select the time scale on the dropdown list. The possible values are:

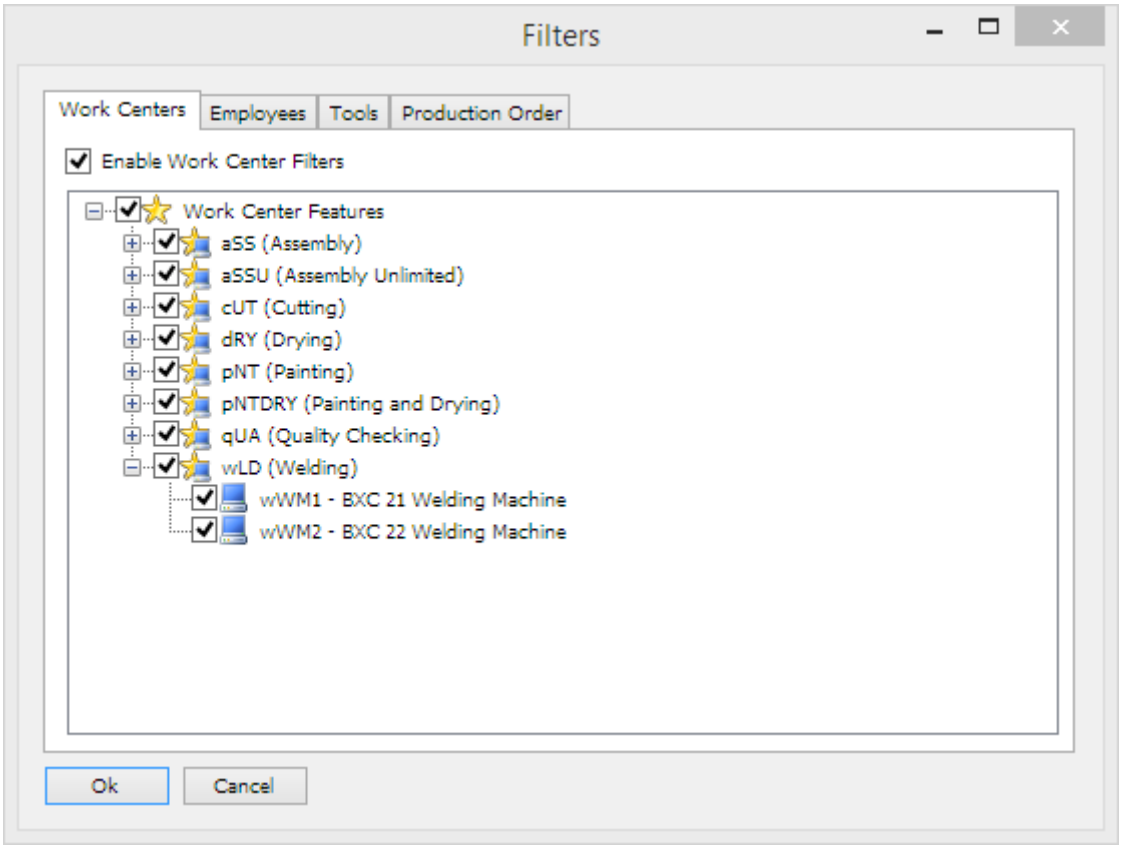
- 'Hourly': Days and hours are displayed on the time bar.
- 'Per shift': Days and shifts are displayed on the time bar.
- 'Daily': Only days are displayed on the time bar.
- On the bottom of the list the zoom percentage can be selected.

(5) **Query**: On the opening form the parameters of the panel can be set.

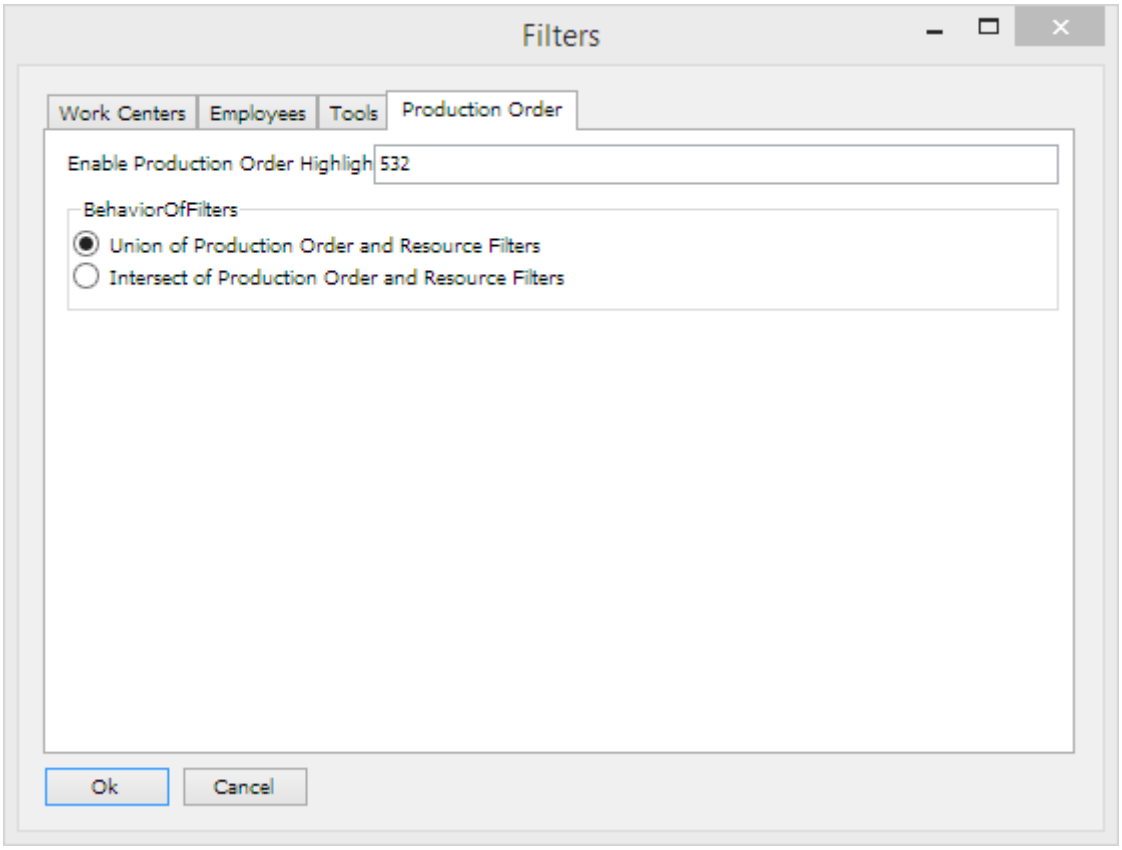
- *Data Source*: Select a data source. Possible values are:
  - Released: Only released production orders are displayed.
  - Released and Planned: Released, planned and recommended production orders are displayed.
  - MRP Recommendations: Select MRP scenario(s) from the list. The system will create and display an allocation simulation the planned production orders and the production order recommendations from the selected scenarios. Tick the 'Run MRP now' box and click on the 'Ok' button to run the MRP scenario(s).
- *Display Defaults*: Define the period to display on the 'Data From' – 'Data To' fields.

(6) **Filters**: Add filters to the panel on the Filters form.

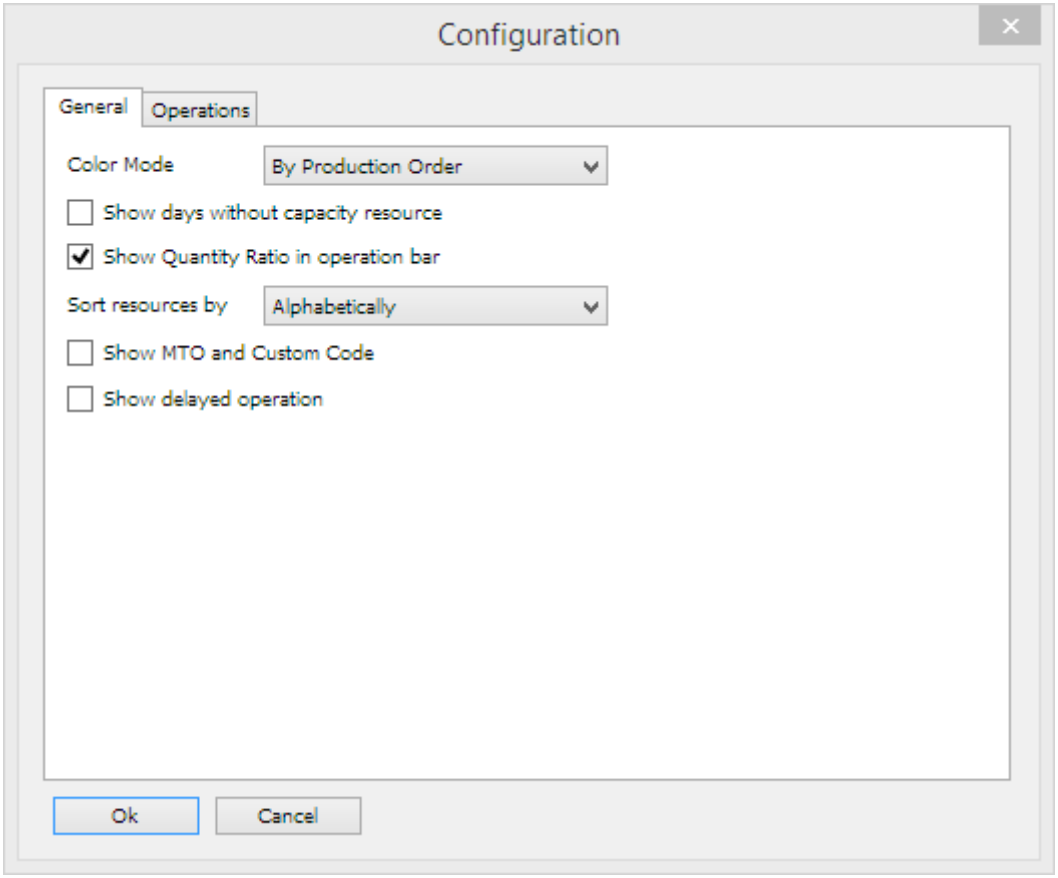
- Enable the filters for resources on the corresponding tab and tick the features or resources to display on the data tree.



- On the 'Production Order' tab, filter the panel based on the production order.
  Add the production order number to the 'Enable Production Order Highlight' textbox. The selected production order will be highlighted on the panel.
  The 'Behavior of filters' setting defines the displayed resources. Possible values:
  - Union of Production Order and Resource Filters: Resources that meet either for resource or for production order filter criteria will be displayed.
  - Intersect of Production order and Resource Filters: Only resources that meet both resource and production order filters will be displayed.



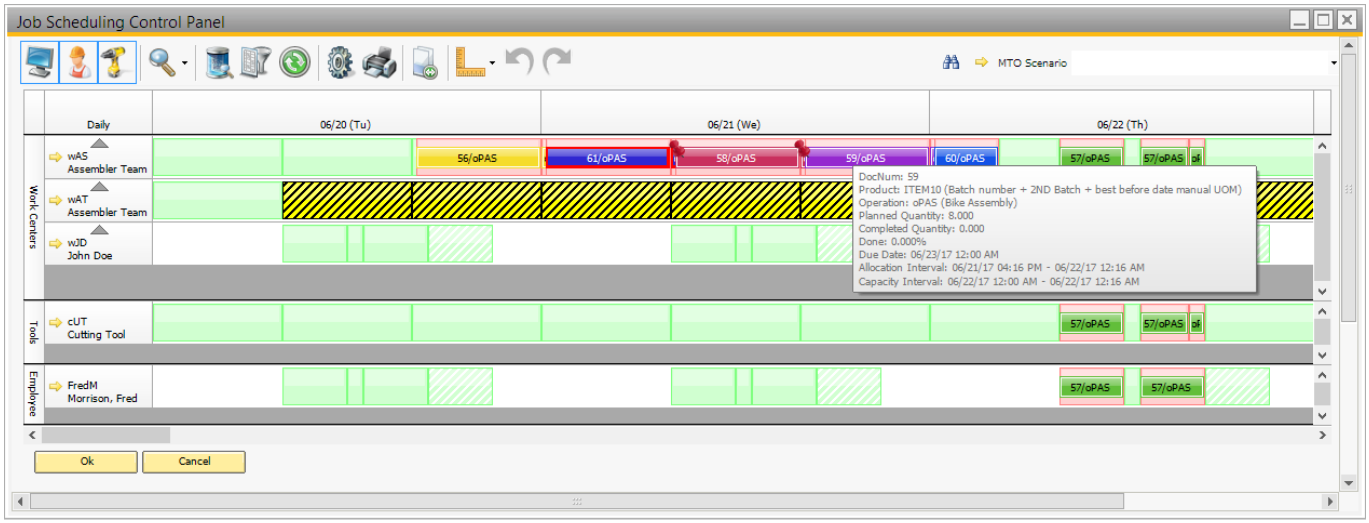
(7) **Refresh**: Click on the button to redraw the panel by reloading data from the database.
(8) **Options**: Click on the button to open the 'Configurations' form.



- On the 'General' tab the general displaying configurations can be set.
  On the control panel operations are alternated with color. With the 'Color Mode' setting the

base of the color grouping can be defined. Possible values: By production order, By product, By project, By MTO Scenario.
    - Show days without capacity resource: If enabled, days without capacity resources will be displayed on the panel as well.
    - Show Quantity Ratio in operation bar: If enabled, quantity ratios are shown in the operation bar.
    - On the 'Sort resources by' dropdown textbox the sorting type of the resources can be selected.
        - First allocation: Resources will be ordered in the allocation time sequence.
        - Alphabetically: Resources will be ordered alphabetically.
    - Show MTO and custom code: If checked, the MTO scenario code and the custom code is displayed on the operation label instead of the document number.
- Show delayed operation checkbox: If enabled, when the begin or the end date/time of an allocation is later than the production order's due date, the allocation will be highlighted with a red frame.

- On the 'Operations' tab the displaying options of the operations can be set.
    - Operation label: Defines the labeling on the operation bar. The operation label also determines the document opening after a double-click on the operation.
        - Document Number: The production order will open.
        - Document Number- Operations Code: The production order and the production order operation details will open.
        - Please note: In the case of recommended orders, instead of the production order and/or the operation details form, the BoM will open when the operation label is 'Document Number' or 'Document Number – Operations Code'.
        - Product Code: The Item Master data of the main product will open.
    - Tool Tip: Select the data to show on the hover box. Only the data checked will be displayed.



(9) **Print**: Set the printing options on the opening form.
(10) **Feed to Management Cockpit**: Click on the button to see the production orders linked to the displayed operations on the Production Management Cockpit.
(11) **Timescale**: Set the timescale for drag and drop. The following periods can be set: day, hour, half an hour, 20 minutes, 15 minutes, 10 minutes, 5 minutes, 1 minute. The Timescale setting defines how the start time of the dropped allocation is rounded.

(12) **Undo/ Redo**: Click on the left arrow to undo a drag&drop action. Click on the right arrow to redo an undone drag&drop action. After updating, the action cannot be undone. Only active if the 'Enable drag & drop in Job Scheduling Control Panel' option is enabled on Produmex Manufacturing Settings.
(13) **MTO Scenario**: Choose MTO Scenario from a list. The selected scenario will be highlighted.

1.2.2. Resources

Work Centers: Click on the gray arrow to expand or collapse the row of the work center.

From the right-click menu on work center row the following displaying options can be selected:

- Select the *'Expand All'* option to expand every work center strip and to see the vertical operation labels. (On the vertical label the operation code and name, main product code and name are displayed.)
- Select the *'Collapse All'* option to collapse every work center row.
- Select the *'Zoom To Fit'* option to resize the work center section to the correct fit.

1.2.3. MTO message

When there is a discrepancy on the MTO chain, an additional section is displayed on the bottom of the form. The scenario code, the work center in concern, the time and the error message is displayed on a table.
When an MTO chain is highlighted, the order sequence is visualized with arrows. When there is a discrepancy, the arrow is red, otherwise it is white. Double-click on the message to highlight the MTO scenario and to see the arrow showing the scheduling issue.

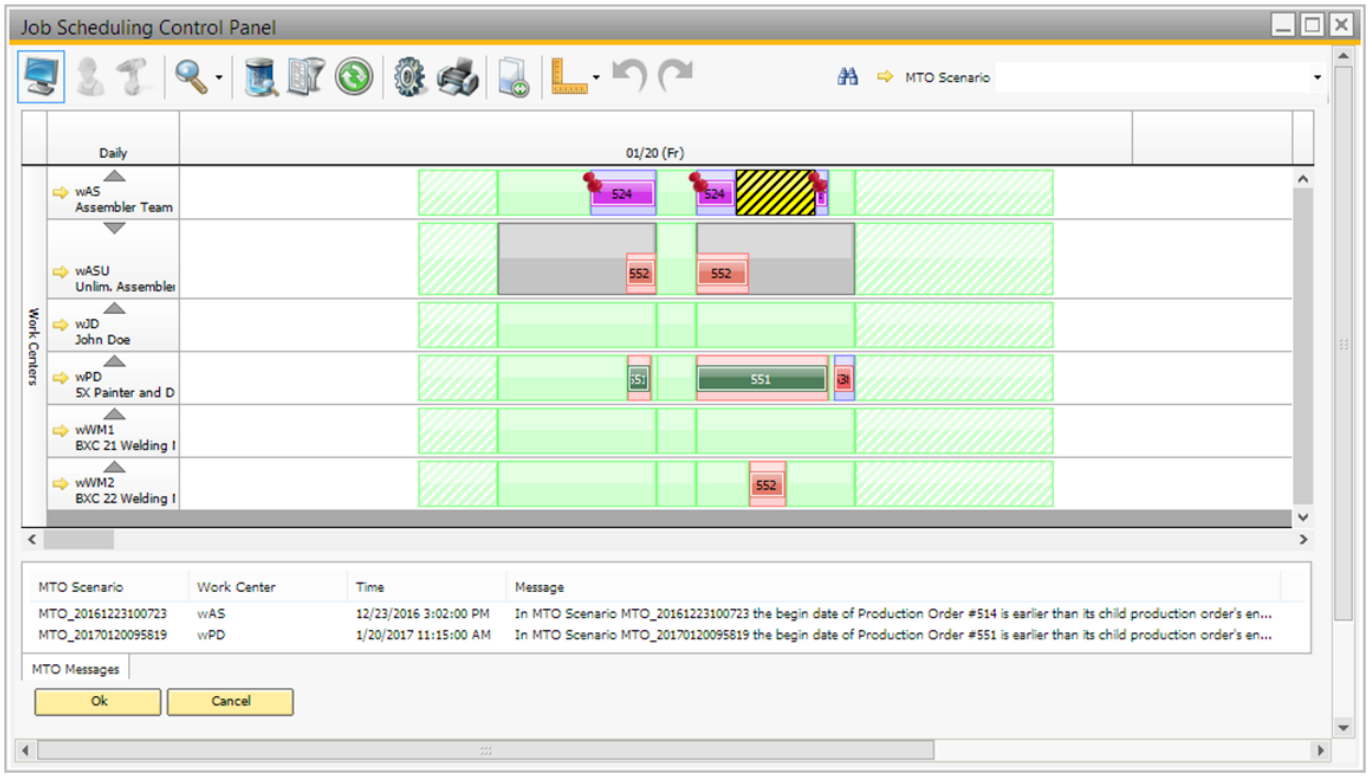
2. Review Allocations

On the Job Scheduling Control Panel the allocations are displayed on resource timelines. Based on the Data Source settings, temporary allocations for planned and recommended production orders might displayed on the board. With default settings only the allocations for released production orders are shown.

When using the multi-dimensional allocation strategy, timelines for supplementary resources might be displayed too.

Green boxes stand for empty slots. The solid color indicates a normal shift and the diagonal pattern displays overtime capacities. Resource unavailability is marked with black diagonal lines over yellow boxes.

Red boxes indicate permanent allocations for released production orders. Allocations for planned orders are violet and the recommended order allocations are displayed with yellow. Grey boxes indicate allocations on unlimited work centers. The operation that was scheduled for the allocation is displayed with a bar on the allocation box. The coloring of the operation bars depends on the 'Color Mode' setting.



From the right-click menu of an operation the following documents can be opened:

- Bill of Materials
- Production order and operation (for order recommendations, the Bill of Materials will open)
- Procurement orders (for MTO orders only)
- Procurement graph (for MTO orders only)

3. Reschedule

On the Job Scheduling Control Panel the user can initiate semiautomatic rescheduling or he can reallocate the operations manually.

3.1. Manual rescheduling

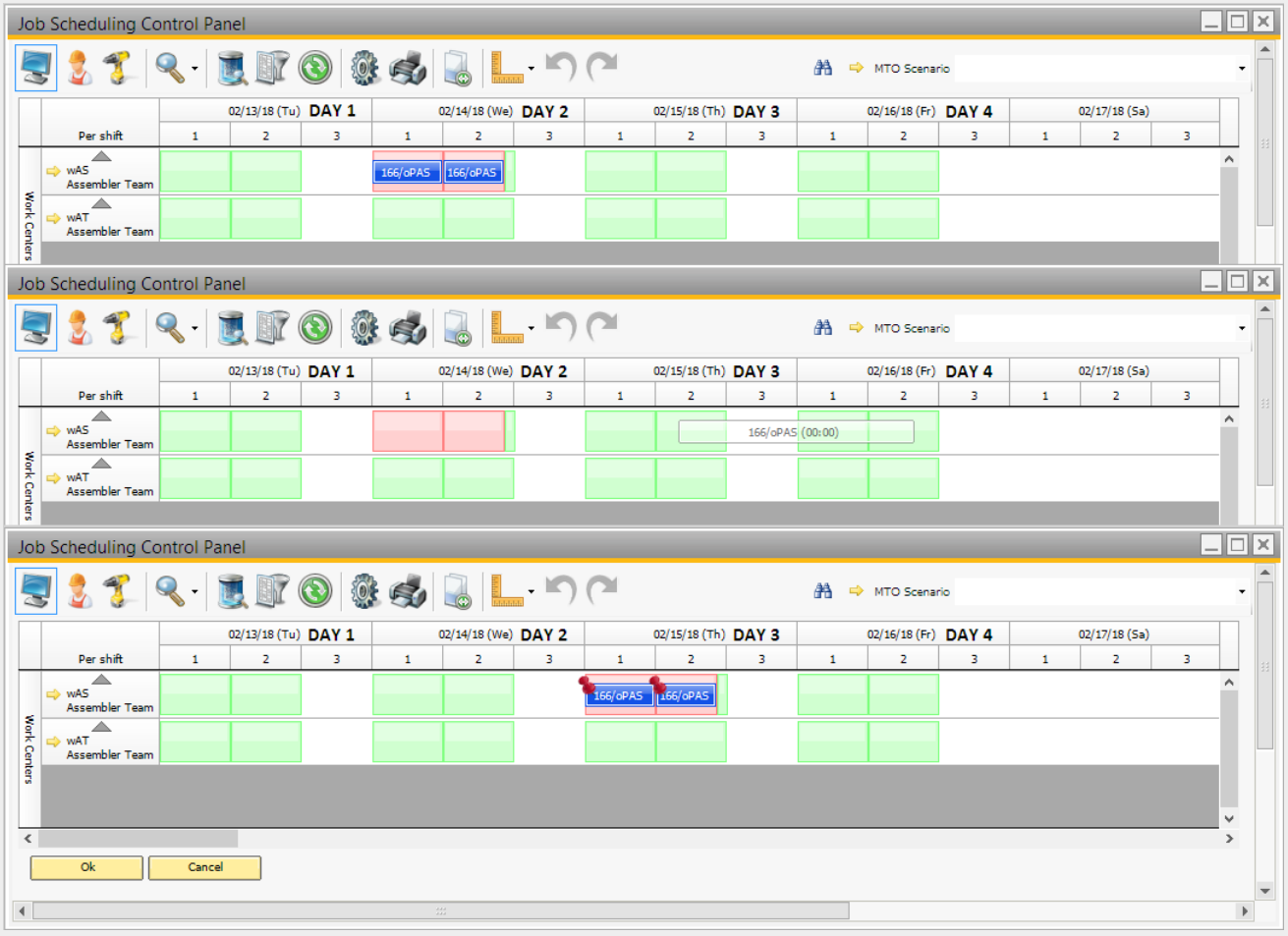
3.1.1. Drag &Drop

If the 'Enable drag & drop in Job Scheduling Control Panel' option is enabled on Produmex Manufacturing settings, operations can be reallocated manually on the Job Scheduling Control Panel.

To reallocate an operation manually, simply drag it and place it on a new date or work center.

The *Timescale* setting defines how the start time of the dropped allocation is rounded. The dropped allocation is aligned to the beginning of the first period it was dropped into.

Example: The timescale is set to 'Day'. If we drop the allocation between day 3 and day 4, the allocation will be pinned to the beginning of the first shift on day 3.

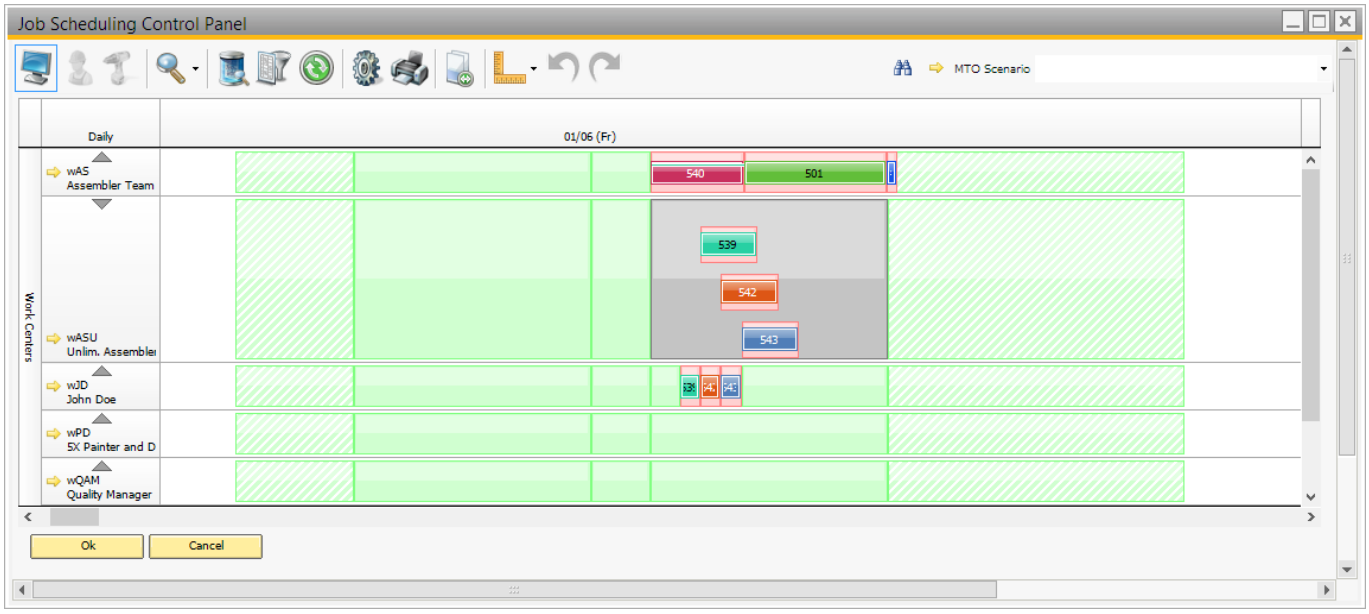


Use the Undo/ Redo arrows to undo or redo the move. To apply the rescheduling, click on the 'Update' button. After an update the action cannot be undone. The system will automatically pin down manually allocated operations for released and planned production orders. Order recommendations will not be pinned down.

If an operation of the production order was rescheduled, the *'Allocation Strategy'* of the operation is automatically changed to the default strategy set as the *'Default ProdOrd. Allocation Strategy'* on the Production order tab of Produmex Manufacturing settings.

Please note: the manual scheduling of parallelizable operations is not supported because such operations cannot be pinned down.

Operations can only be moved to a supplementary work center and to an empty slot. Because unlimited work centers have boundless capacities, in the case of an unlimited work centers multiple allocations can be moved to a slot where are already allocated operations.



The allocation of the first operation of a production order defines its begin date.

The first operation can be shifted to any new point in time that is later than today 00:00. A subsequent operation cannot be moved earlier than the end date of the previous operation, except for overlapping operations. Such operations can be scheduled backward to the begin date of a previous operation.

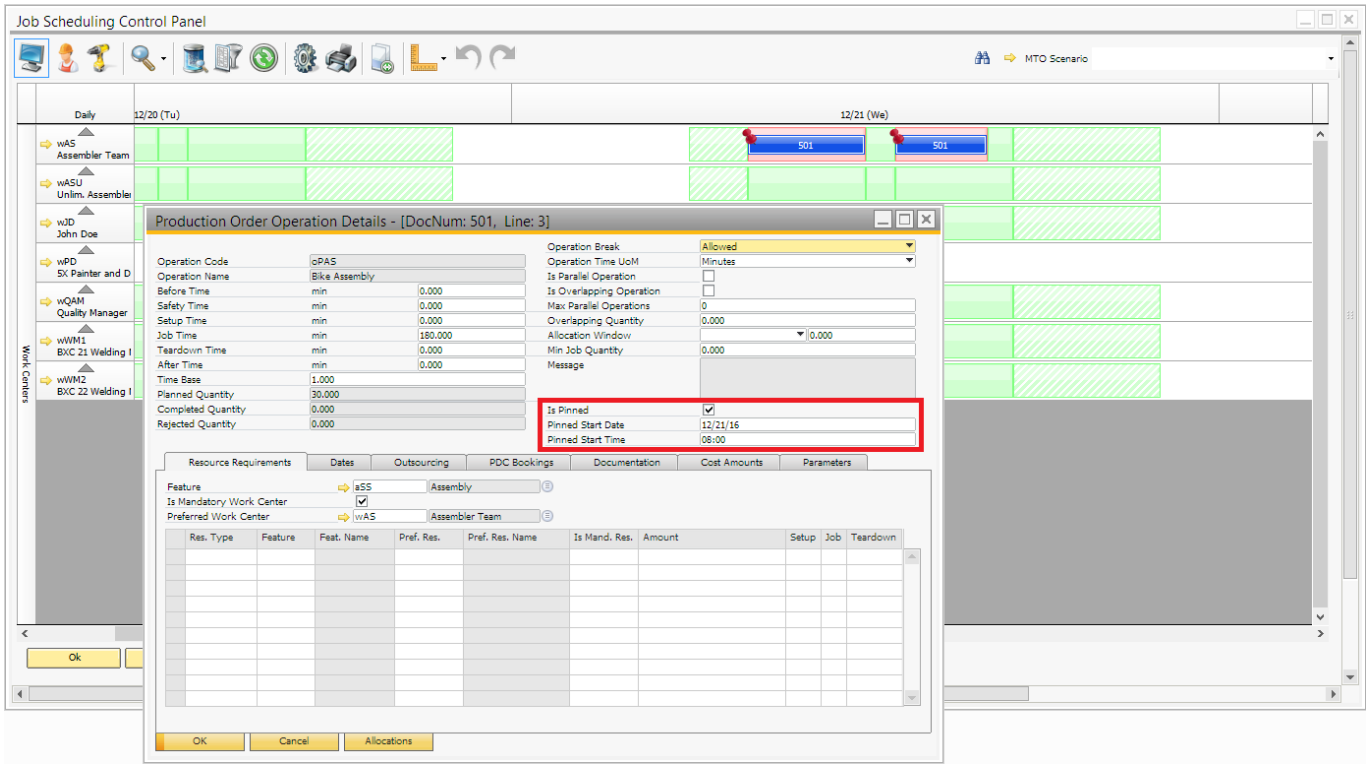
An operation can be shifted later than the subsequent operation but the subsequent operations of the same production order will be automatically shifted later into an available free capacity slot on the timelines of compatible work centers. The overlapping is considered if the subsequent operation can be overlapped.

> When scheduling operations manually, please keep in mind that allocations scheduled to an inadequate slot might be lost.

3.1.2. Pin Down an operation

Another way to schedule an operation manually is to pin it down to a start date and time on a work center.

On the Production Order Operation Details form tick the ‘Is Pinned’ box and select the Pinned Start Date and Time. Click on ‘Update’ then update the production order too. Subsequent operations will be scheduled accordingly.



3.2. Semiautomatic rescheduling

The user can initiate rescheduling from the right click menu of an allocation/work center row.

The system will reschedule operations that are assigned to the selected work center, but the rescheduling might affect allocations on other work centers too. Subsequent operations of the respective production order and other production order operations (eg: MTO, auto-roll) will be rescheduled too.

3.2.1. Eliminate gaps

Use these functions to optimize the scheduling of a critically important work center (key resource). These functions work best for 7×24 manufacturing.

Before initiating the aligning process, set its parameters on the Prod. Order tab of Produmex Manufacturing Settings. The *'JSCP align max days'* parameter defines the total duration of the aligning process and the *'JSCP align gap minutes'* parameter defines the maximum gap length the system eliminates.

The process might reschedule the pinned operations too. After the reallocation the originally pinned operations will be pinned to the new date & time of allocation. The allocation strategy of the production orders will be changed to 'Forward'.

3.2.1.1. Align allocations

Select the ***'Align allocations'*** option from the right click menu of the work center line. The system will optimize the scheduling plan meaning that it aims to eliminate the gaps and to align related operations.

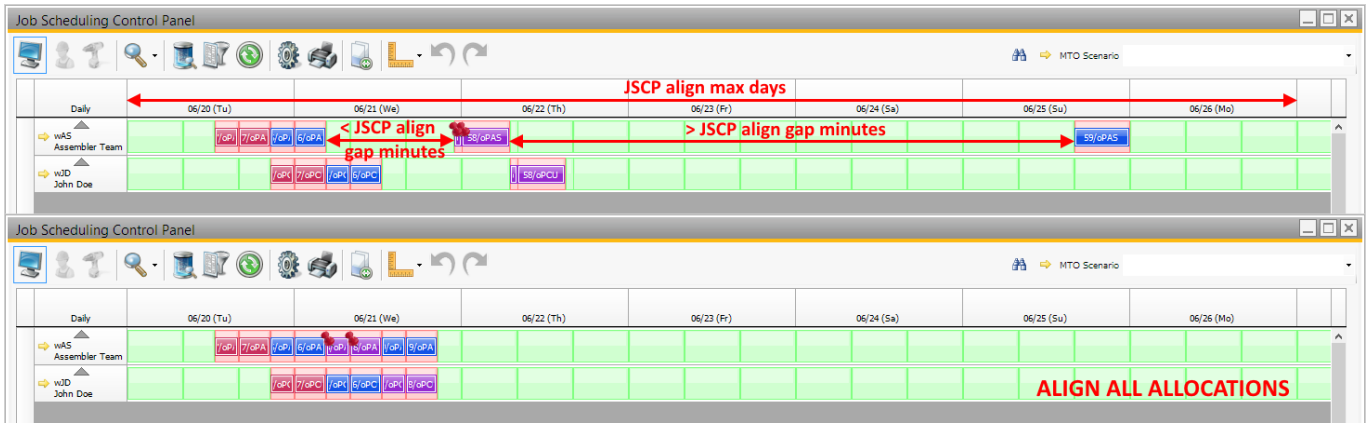
When there is a longer free capacity between two allocations than the defined gap, the aligning process stops, therefore the actual duration of the aligning can be shorter than the '*JSCP align max days*' value.

This way the rescheduling of production orders with further due dates can be prevented.

Please note: Inactive periods are included to the gap between the two allocations.

3.2.1.2. Align all allocations

Select the ***'Align all allocations'*** option from the right click menu of the work center line to align every allocation in the defined period. This function does not consider the *'JSCP align gap minutes'* setting.



3.2.2. Reallocate

Use these functions to reschedule an allocation or every allocation for a work center. Originally pinned operations will be pinned to the new date & time of the allocation. The allocation strategy of the affected production orders will be changed to 'Forward'.

3.2.2.1. Reallocate allocations

With this popup function allocations for a work center can be optimized and erroneous allocations can be corrected.

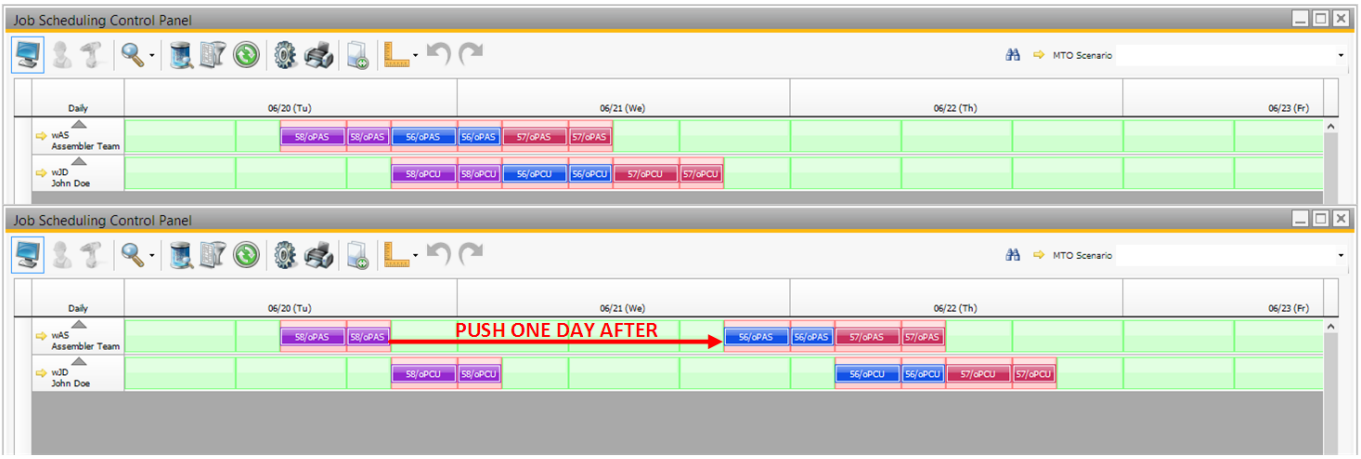
Select the ***'Reallocate Allocations'*** option from the right click menu of a work center. The system will collect every existing allocations for the work center then gather all operations from released production orders assigned to that work center. Then the system will reschedule these operations starting with the existing allocations that were pinned to the lifeline. Every operation that can be disposed will be allocated.

During the reallocation, MTO chains and auto-roll is considered. Works with unlimited work centers too.

3.2.2.2. Push one day before/after

Select the ***'Push one day before'*** option from the right click menu of an allocation to move the allocation to the previous day. The allocations following the selected allocation will be rescheduled too.

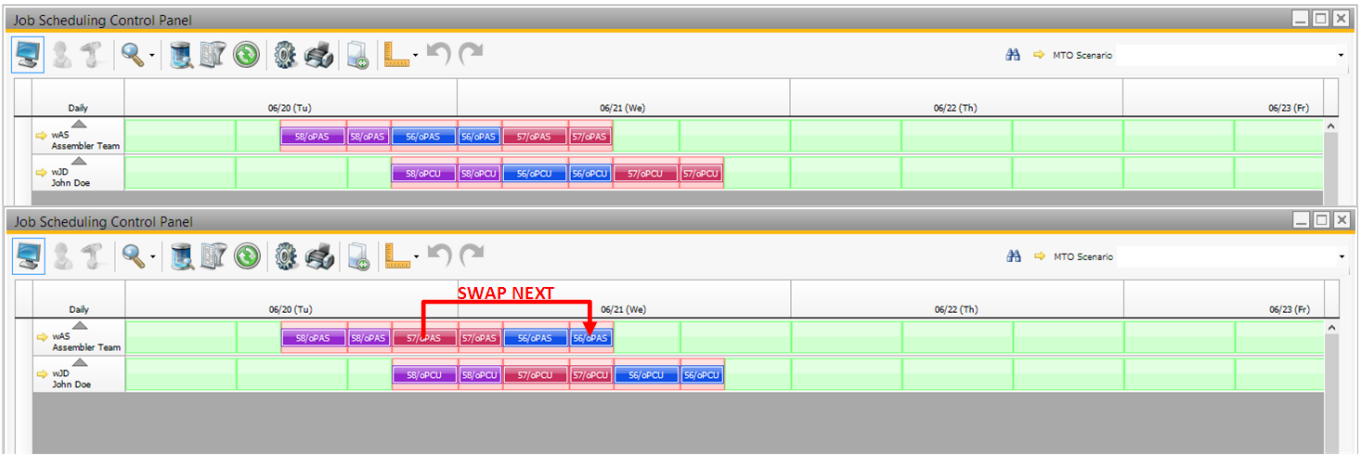
Select the ***'Push one day after'*** option from the right click menu of an allocation to move the allocation to the next day. The allocations following the selected allocation will be rescheduled too.



3.2.2.3. Swap allocation with next/previous allocation

Select the ***'Swap allocation with the next allocation'*** option from the right click menu of an allocation to swap the selected allocation with the next allocation.

Select the ***'Swap allocation with the previous allocation'*** option from the right click menu of an allocation to swap the selected allocation with the previous allocation.



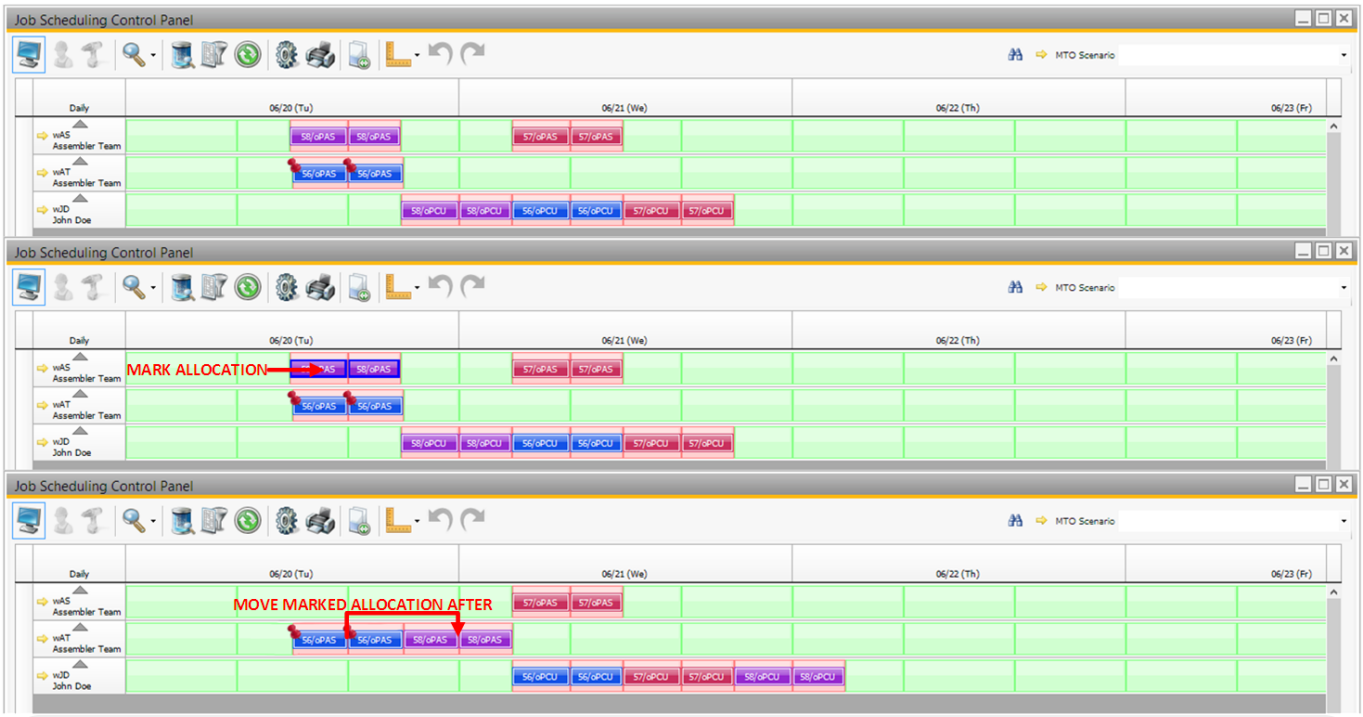
3.2.2.4. Move marked allocation before/after

It is also possible to move a marked allocation before/after another allocation, if the allocation is on a work center that supports the work center feature the marked allocation requires.

First mark an allocation: select the ***'Mark allocation'*** function from the right-click menu of the allocation. The marked allocation will be highlighted with a blue frame.

Then right click on the allocation to move.

- Select the ***'Move marked allocation before'*** function to move the marked allocation before the allocation the rescheduling was initiated from.
- Select the ***'Move marked allocation after'*** function to move the marked allocation after the allocation the rescheduling was initiated from.

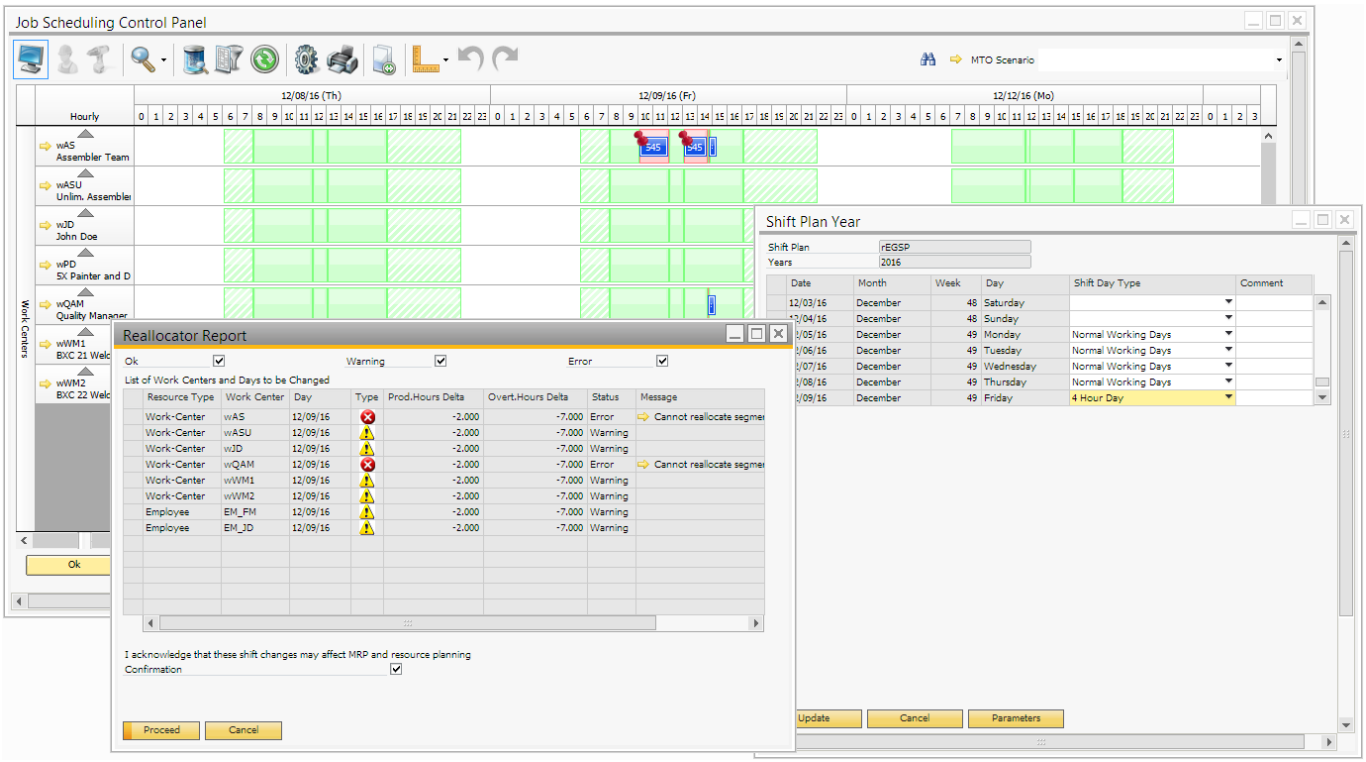


In the example first we marked the *58/oPAS (purple)* allocation. Then we right-clicked on the *56/oPAS (blue)* allocation and selected the ***'Move marked allocation after'*** function. The system moved the *58/oPAS (purple)* allocation after the *56/oPAS (purple)* allocation and also rescheduled the *58/oPCU (purple)* allocation because the *58/oPAS (purple)* and the *58/oPCU (purple)* allocations were created for sequential operations.

3.3. Actions that trigger automatic rescheduling

3.3.1. Shift day capacity decrease

With default settings the capacity of a shift day can only be shrunk when there are no allocations that have to be rescheduled due the capacity decrease.



When the *'Allow rescheduling Production Orders when shift day capacity is shrunk'* option is enabled on the MRP tab of Produmex Manufacturing Settings, the shift day capacity can be decreased regardless of the allocated operations. In the case of a capacity decrease, the system will automatically reschedule all relevant released production orders.

Please note: Automatic rescheduling does not work when using multi-dimensional allocation.

Human Resources Management

Produmex Manufacturing is a legacy product and Boyum IT Solutions no longer sells new installations for it.

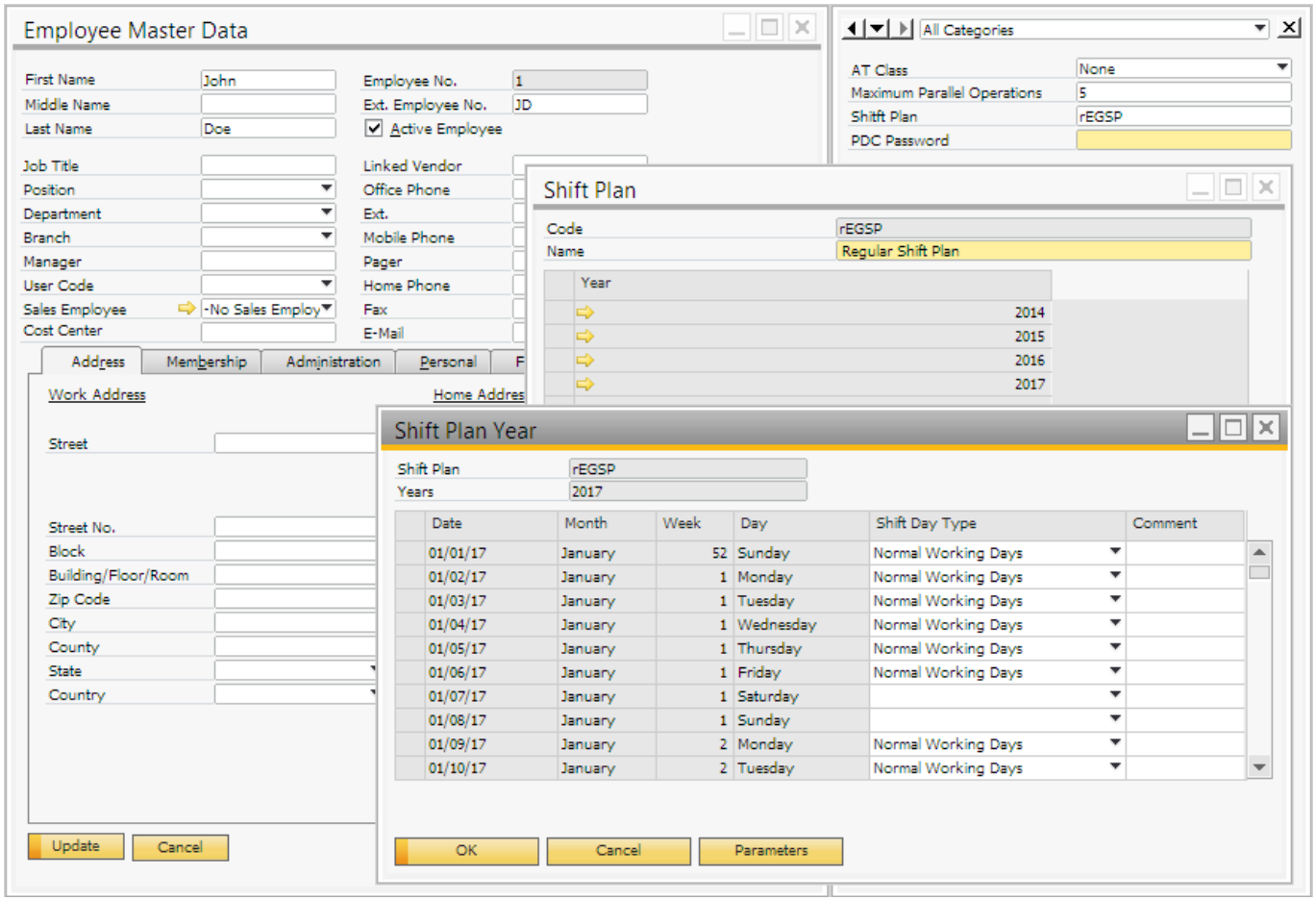
Human Resources Management is part of Produmex Manufacturing add-on. It is closely related to the Produmex PDC Solutions, which consists of several production data collection modules. These modules save all their data in the Attendance Journal. The new features in Produmex Manufacturing for Human Resource Management are made for administrating these entries in the Attendance Journal.

1. Prerequisites

1.1. Employee Master Data Settings

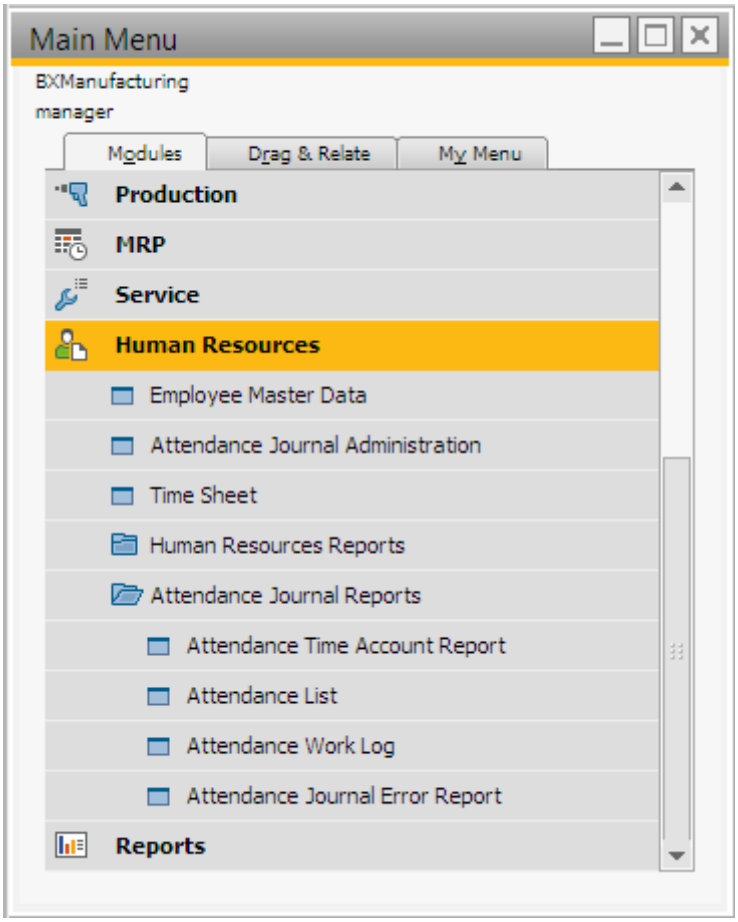
The attendance journal functions are based on shift plan and attendance class settings. You can find these settings in the Employee Master Data.

The add-on can calculate the difference between the planned time and the booked time. The planned time is based on the shift plan that is set in the Employee Master Data *'Shift Plan'* UDF for the employee. For more information about shift plans please see: 2. Setup and Installation of the Company



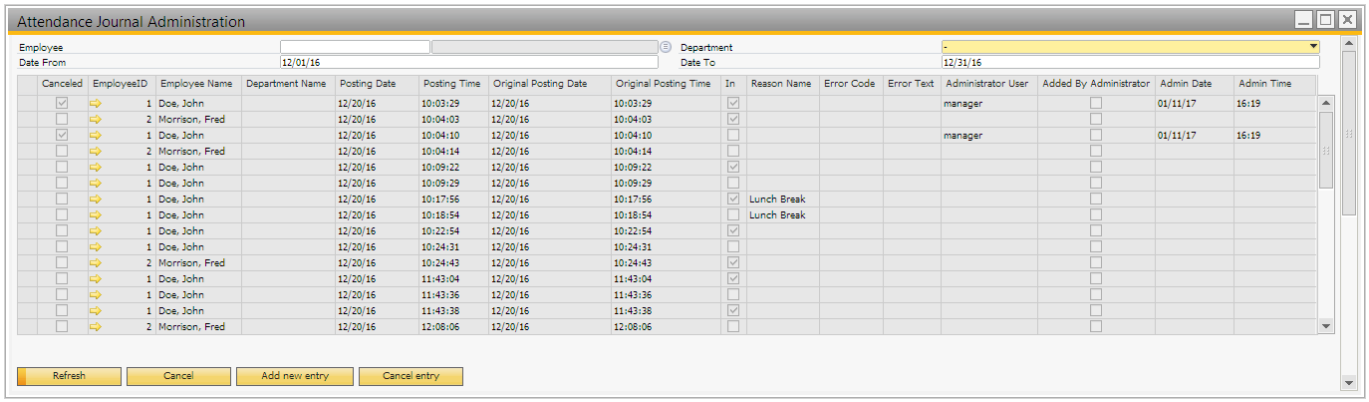
2. Attendance Journal Functions

Attendance Journal Administration functions can be accessed in SAP at the Human Resources folder in the main menu. These functions can be used for managing data that has been collected from the shopfloor.



2.1. Attendance Journal Administration

In the Attendance Journal Administration you can view, create and cancel the personal time management entries booked by employees. It is possible to create new bookings and to cancel wrong ones.



The form can be filtered according to employee, department and date. After filling out the filter fields click on the '*Refresh*' button to load the data.

The *Posting date* and *Posting time* fields show the corrected time, the *Original Posting Date* and *Original Posting Time* fields show the original time when the booking happened. If the booking was a log in, the 'In' check box is turned on. If the employee is not working although he should, the '*Reason name*' field is filled with the reason why he is missing (illness, holiday, etc). However, the *Reason name* column is not filled if the employee did not log in, but according to the shift plan he should have

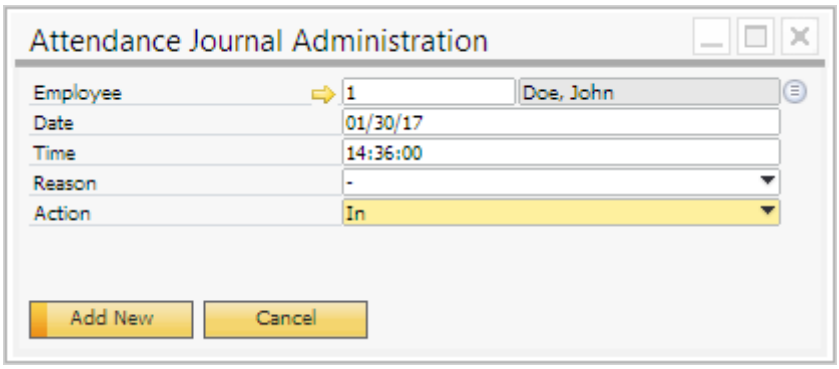
(he is late). Reasons can be defined on the Absence Reasons user table.

The field '*Error Code*' contains the error code if a wrong booking happened. It can be:

- “101 - Double In-action has been booked”. Double in-action means that the employee booked two log ins after each other.
- “102 - Double Out-action has been booked”. Double out-action means two log outs were booked after each other.

If you want to cancel a booking, select the line and click on the '*Cancel Entry*' button. It is also possible to select several lines and cancel all at once. If the administrator cancels a booking, the ‘Canceled’ flag will be checked, but the booking still will be visible. The add-on will also save the administrator user name and the date as well as the time of the modification.

If you want to add a new booking click on the '*Add New Entry*' button. In this case a small form appears with all the necessary data to fill in:



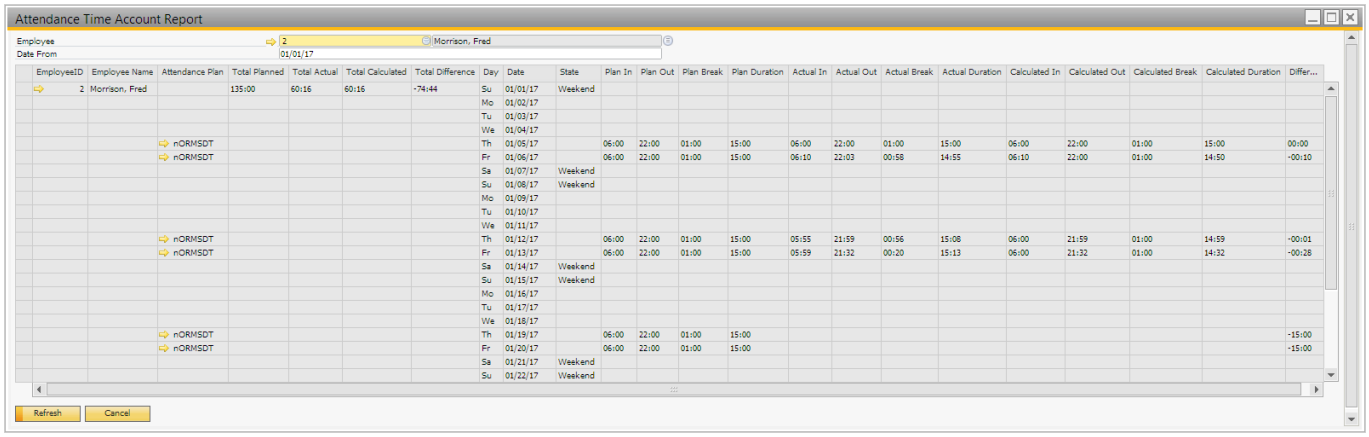
You have to set the employee, the date and time, the reason if any and the action type which can be ‘In’ or ‘Out’. After you have set all necessary fields click on the '*Add new*' button to create the new entry. It will appear right away in the list of entries, and the form will stay opened, so that you can create several bookings after one another.

2.2. Attendance Journal Reports

> Please note that at present no calculation method is added to the reports below. If calculated values are needed, you need to create your own report. In this case the Produmex Support Team can be contacted for help.

2.2.1. Attendance Time Account Report

This report shows all in/out bookings of one employee for a specific month. You can filter it according to the *Employee Number* and *Date From*, however, the entered date will always be corrected to the first day of the entered month, and the report will always show the data until the end of this month.

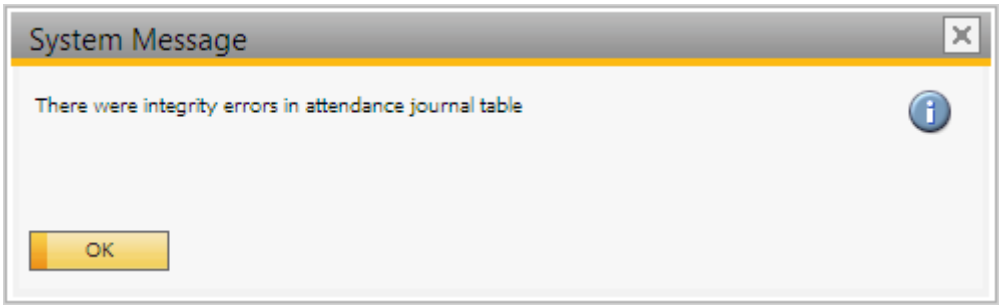


In the first line for the 1st of the month the report shows the employee name, the total planned and the total booked time, and the difference between them (**Total Difference = Total Planned - Total Calculated**). If it is not yet the end of the month, the total difference will show negative numbers.

In the report all columns which name contains “Plan” refer to the time set in the shift plan. Columns with text “Actual” refer to the actually booked times (i.e. the time when the booking really happened).

The Attendance Plan column shows the shift name from Shift Day Type for the specific day. In the Shift Day Type you can check the set shift times for that day. For more information about shift day types please see: 2. Setup and Installation of the Company

If there is a problem with the sequence of the bookings for the given employee and the given date, you will get a message about the inconsistency and the 'Attendance Journal Error Report' form will open.



For more information please see: 2.2.4. Attendance Journal Error Report.

2.2.2. Attendance List

In the 'Attendance List' you can check the status of employees for a given date and time. You can filter the form according to *Department*, *Date* and *Time*. If you click on the '*Now*' button, the actual date/time will be set in the fields.

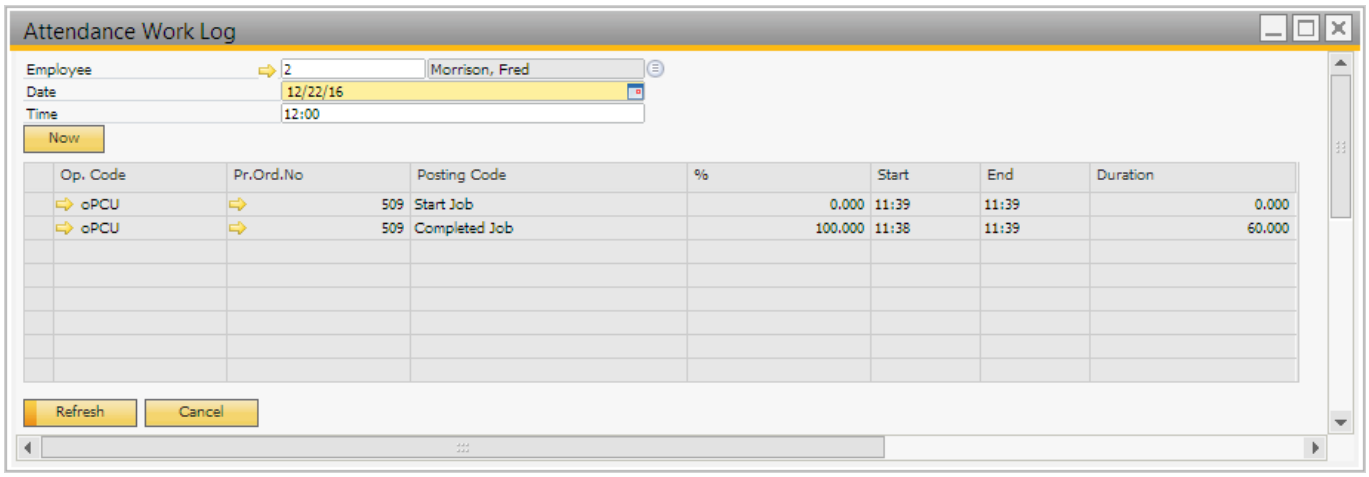
The report shows the plan, the actual and the calculated in and out times the same way as the 'Attendance Time Account' report. The *Operation Code* and *Operation Name* displays the name and code of the operation to which the employee last booked.

The state of the employees are depicted with colorful flags. The meaning of the different colors is the following:

- *Green flag*: The employee is present.
- *Red flag*: The employee is not present, although he should be.
- *Yellow flag*: The employee is not present, but for a reason. If this is the case, the reason column will show the reason (holiday, illness, etc). If the flag is yellow and the reason column is not filled, it means the employee is not here, but his shift has not started yet or already finished.

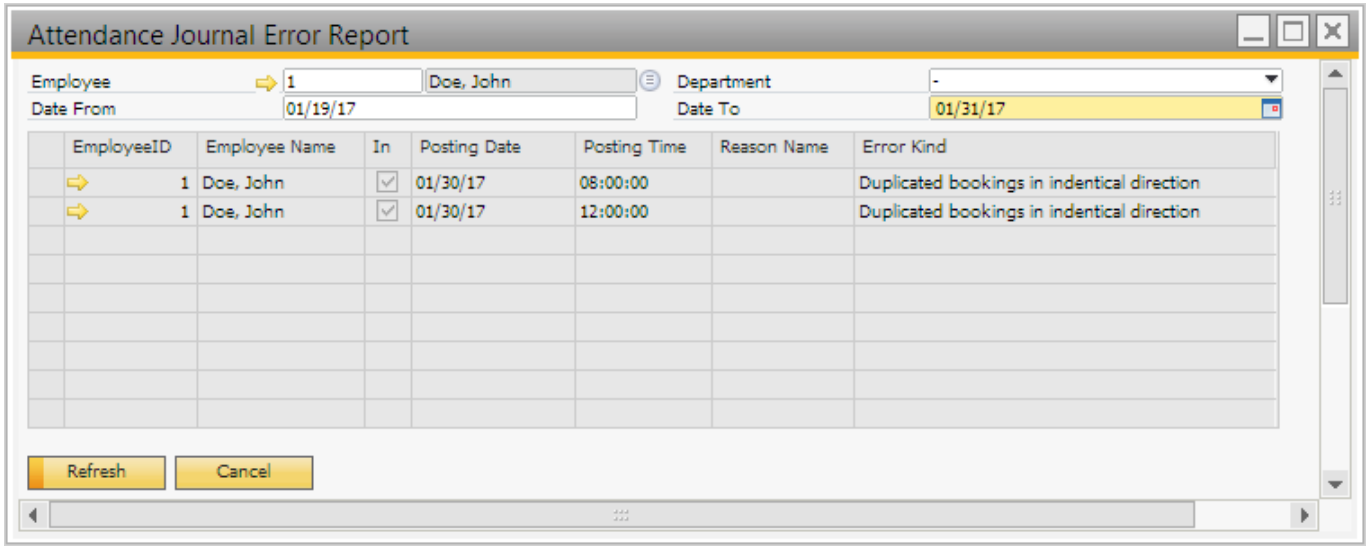
2.2.3. Attendance Work Log

The 'Attendance Work Log' shows all PDC bookings for one specific employee on a given day until the given time. If you click on the '*Now*' button, the *Date* and *Time* will be filled automatically with the actual date and time.



2.2.4. Attendance Journal Error Report

The Attendance Journal Error Report shows all problematic bookings for an employee in the given time period:



The '*Error Kind*' column shows the type of the error:

- “Duplicated bookings in identical direction” means two consecutive in or out bookings have been made. In this case one of the bookings has to be cancelled or a new booking with the other direction must be inserted between the two bookings.
- “Row is corrupted” means somebody changed the lines manually in the database.

This is only a list of incorrect bookings. To correct the problematic bookings you have to use 'Attendance Journal Administration', where you can cancel superfluous bookings, or insert missing ones.

Change capacity

Produmex Manufacturing is a legacy product and Boyum IT Solutions no longer sells new installations for it.

In Produmex Manufacturing there are three methods to modify the capacity that can be allocated:

- **Modify shift capacity**: The available capacity can be changed by adjusting the shift length
- **Modify productive capacity**: The available capacity can be changed by modifying the productivity of the shift
- **Resource unavailability**: The available capacity can be changed by registering resource unavailability

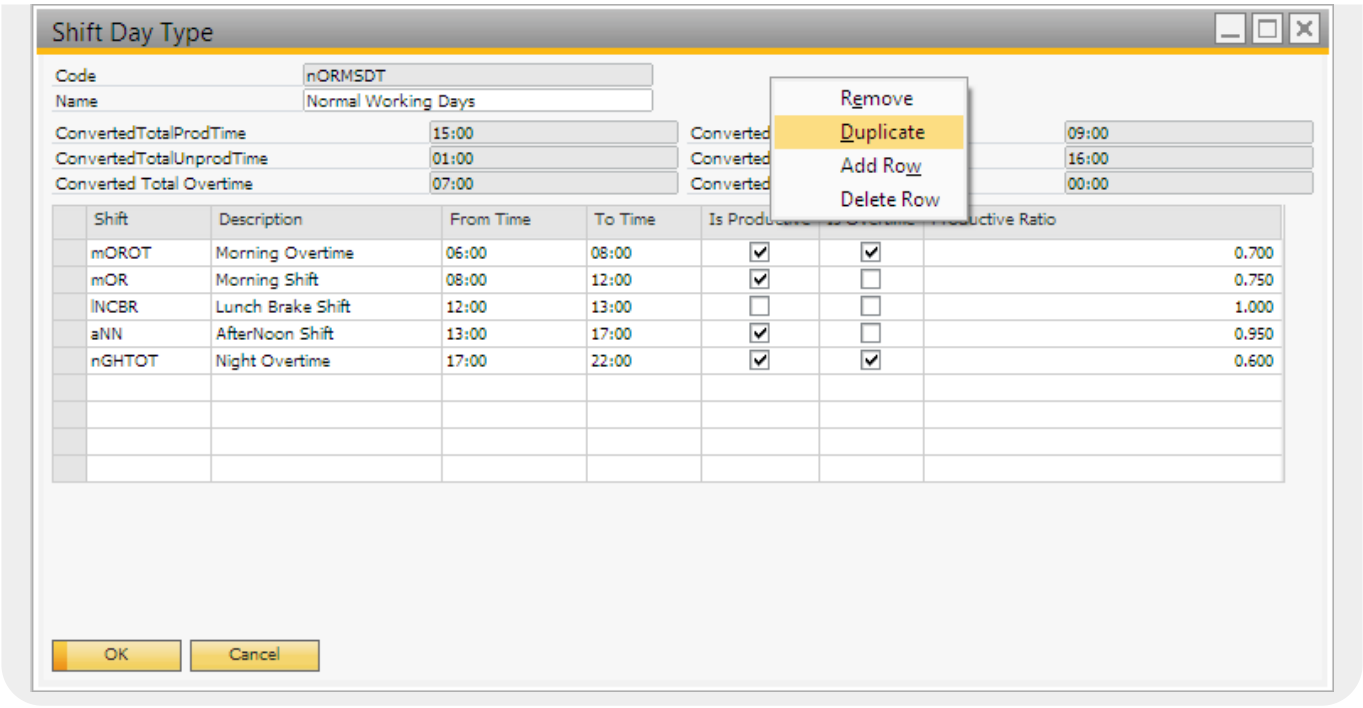
1. Modify shift capacity

Please note: Shift capacity change is not supported when using multidimensional allocation.

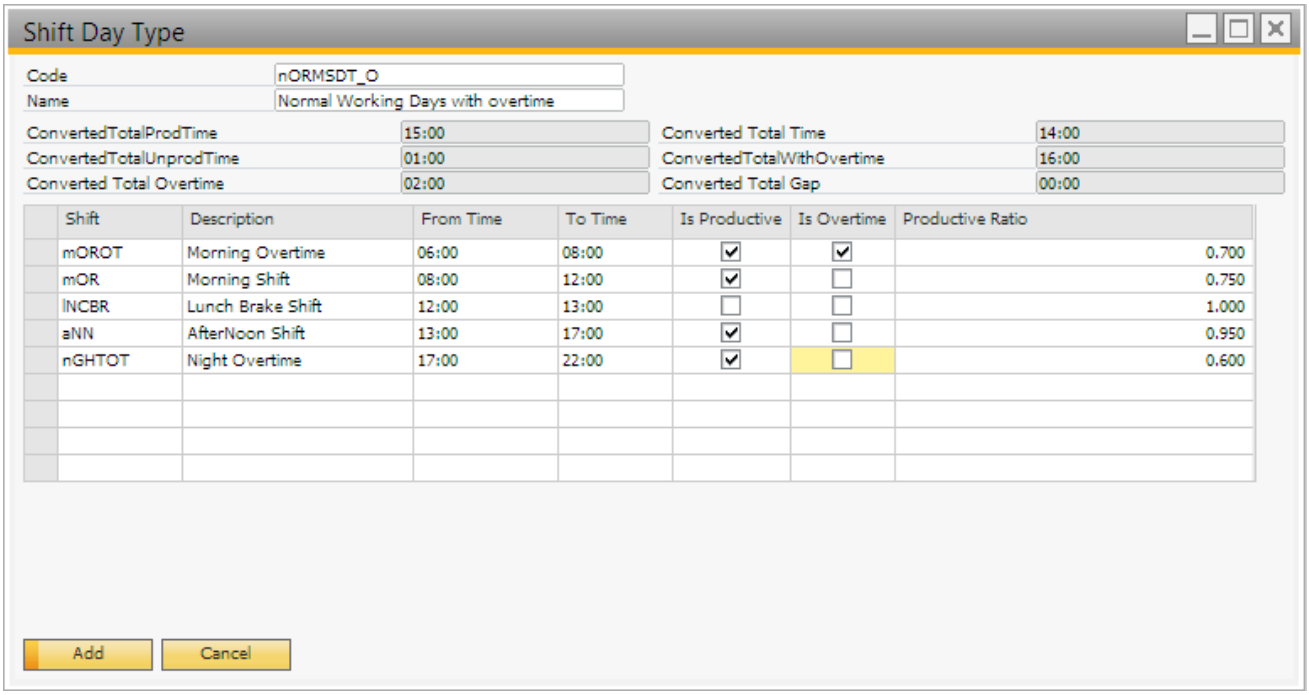
1.1. Apply overtime/Expand shift day

In Produmex Manufacturing shifts marked as ‘Overtime’ are never used by the allocation logic and can be added for administrative reasons only. In order to apply overtimes, create a new Shift Day type.

In the example we have a ‘Normal Working Days’ shift day with two administrative overtime shifts: a ‘Morning Overtime’ shift and a ‘Night Overtime’ shift. In order to create a new shift day type, we duplicated the Shift Day by selecting the *‘Duplicate’* option from the right-click menu of the Shift Day type.



We named this new shift day type as ‘Normal Working Days with overtime’ and also changed the code of the shift day type. Then we simply unticked the ‘Overtime box’ for the night overtime shift and added the new shift day.



Then alter the Shift Year Plan.

- To apply overtime only for one day, open the current Shift Year Plan. Find the given date then change the Shift Day type.
- To apply the new shift day to more than one day, open the current Shift Year Plan and click on

the ‘Parameters’ button. It is possible to change the shift plan for a period only. For more information please see: Shift Year Plan

- To assign overtime for one work center (resource) only, create a new shift plan by adding a new one from scratch or by duplicating an existing shift plan. Assign this new shift plan for the given work center.

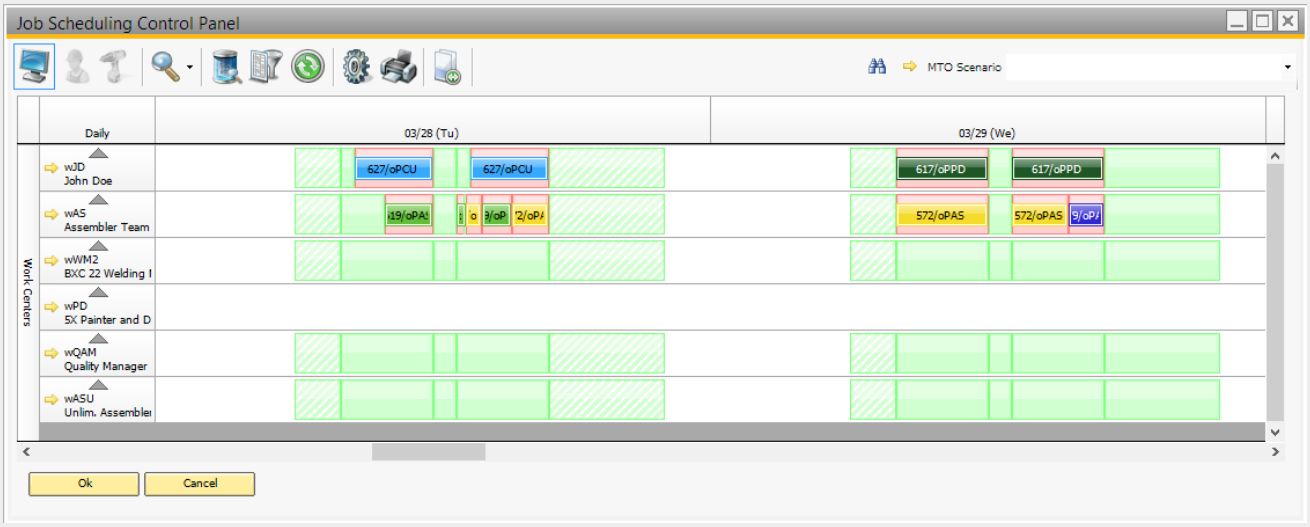
After clicking on the ‘Update’ button on the Shift Plan Year or the Work Center form, the Reallocator Report will open up. On this form every allocation affected by the shift day change is listed. Filter the list based on the status of the allocations with the ‘Ok’, ‘Warning’ and ‘Error’ checkboxes on the header. Only allocations with the checked status will be displayed.

Status:

- ‘*Ok*’: Indicates additional capacity on the work center
- ‘*Warning*’: Indicates change in the capacity of an existing shift
- ‘*Error*’: Indicates an allocation that has to be reallocated

In order to proceed, acknowledge the message by ticking the ‘Confirm’ checkbox under the grid. The ‘Proceed’ button will became active. Click on this button to apply the shift plan change.

To display the difference, we assigned the ‘Normal Working Days’ shift day type to the work day on the left side and the ‘Normal Working Days with overtime’ shift day to the work day on the right side.



The system will not automatically recalculate the scheduling when expanding the capacity. Affected production orders can be rescheduled with the following methods:

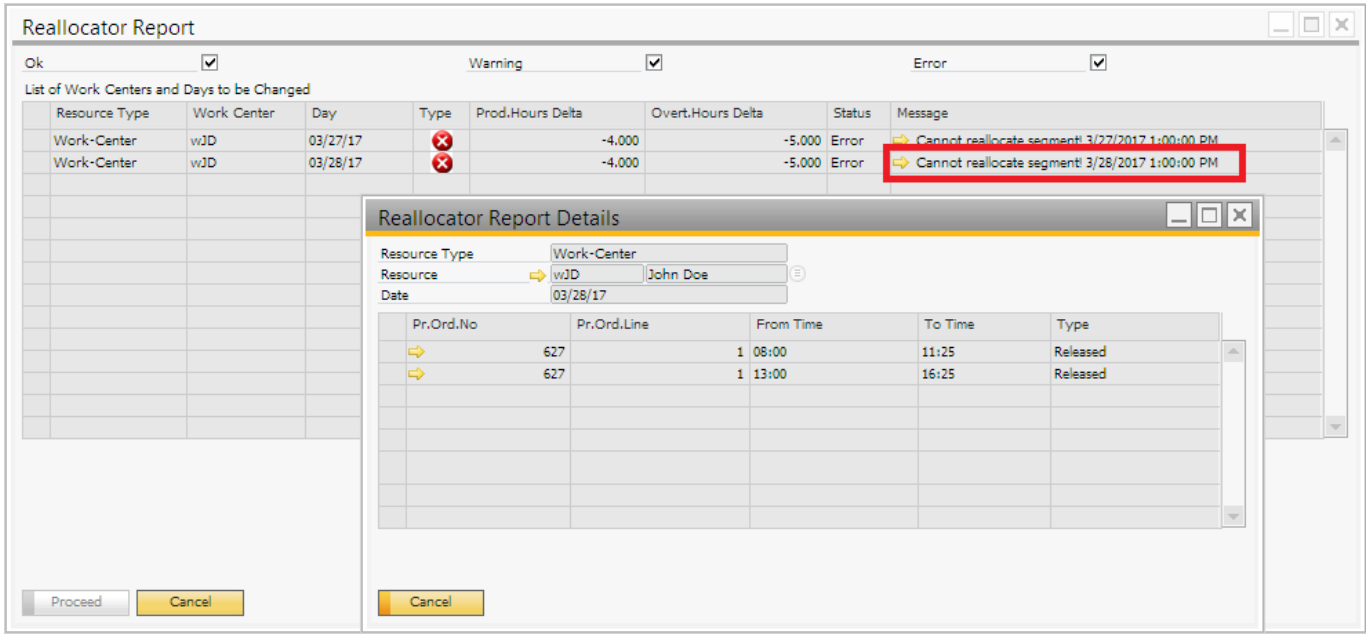
- To reschedule a single production order only, set the ‘Force recalculation’ UDF to ‘Yes’ and click on the ‘Update’ button.
- To reschedule multiple production orders,
  - On the Production Management Cockpit select the production order(s) and click on the

'Recalculate' button.
- On the Job Scheduling Control Panel use semiautomatic rescheduling

1.2. Shrink shift day

With default settings the shift capacity can only be decreased, if there are no allocations with the status 'Error' on the *Reallocator Report*.

If there are allocations with 'Error' status, the acknowledgement message is not displayed and the 'Proceed' button is not active.



To allow rescheduling triggered by capacity decrease, enable the *'Allow rescheduling Production Orders when shift day capacity is shrunk'* option on the MRP tab of Produmex Manufacturing settings.

In the case of a capacity shrinkage, production orders with affected allocations will be rescheduled automatically.

2. Modify the productive capacity

2.1. Change productive ratio for a shift day type

It is also possible to modify the capacity by changing the productive ratio of a shift day type.

- If the productive ratio is 1, it means that the required capacity equals to the total operation time.
- If the productive ratio is lower than 1, it means that the capacity that needs to be allocated is greater than the total length of the operation.
- If the productive ratio is greater than 1, it means that the capacity that needs to be allocated is less than the total length of the operation.

Productive Ratio	Total operation time	Total allocation duration
1	60 minutes	60 minutes
0.5	60 minutes	120 minutes
2	60 minutes	30 minutes

2.2. Change the time scale for a work center

The time scale of a work center defines its efficiency for performing a feature.

- If the time scale is 1, it means that the required capacity equals to the total operation time.
- If the time scale is lower than 1, it means that the work center capacity that needs to be allocated is greater than the total length of the operation.
- If the time scale is greater than 1, it means that the work center capacity that needs to be allocated is less than the total length of the operation.

Job Time Scale	Setup time	Job time	Teardown time	Total allocation duration
1	-	60 minutes	-	60 minutes
0.5	-	60 minutes	-	120 minutes
2	-	60 minutes	-	30 minutes

The productive ratio of a shift day type and the time scale of the work center both affect the capacity allocated for an operation. Please refer to the example how the combination of these two settings affect the allocated capacity.

Example:
Total operation duration: 60 minutes

- Setup time: 0 minutes
- Job time: 60 minutes
- Teardown time: 0 minutes

Shift day type: Normal shift

The table below shows how the Time Scale and the Shift Productivity affect the duration allocated for the operation.

Time Scale	Shift productivity	Total allocation duration
1	1	60 minutes
2	1	30 minutes
1	2	30 minutes
0.5	1	120 minutes
0.5	2	60 minutes
2	2	15 minutes

3. Register maintenance and resource unavailability

Resource unavailability or planned maintenance can be registered on the Work Center Unavailability Management form. No allocations will be scheduled for the work center on periods that are registered as ‘Unavailable’.

It is possible to add work center unavailability for a period that has allocations. In such cases those allocations have to be rescheduled.

To reschedule the production orders containing the affected allocations, click on the ‘Report Conflicts’ button. The Allocation Conflicts’ form will open. On this form every affected allocation is listed. Click on the ‘Reallocate Conflicting Production Orders’ button to reallocate the production orders containing the affected allocations.

Produmex PDC Functional Guide

Produmex Manufacturing is a legacy product and Boyum IT Solutions no longer sells new installations for it.

Produmex PDC is a work reporting extension for Produmex Manufacturing add-on. It is a light weight solution meant for mobile platforms or PCs that don’t need SAP client on the hardware where it is running. Users can report their work real-time during the working day using barcode scanners or RFID tools.

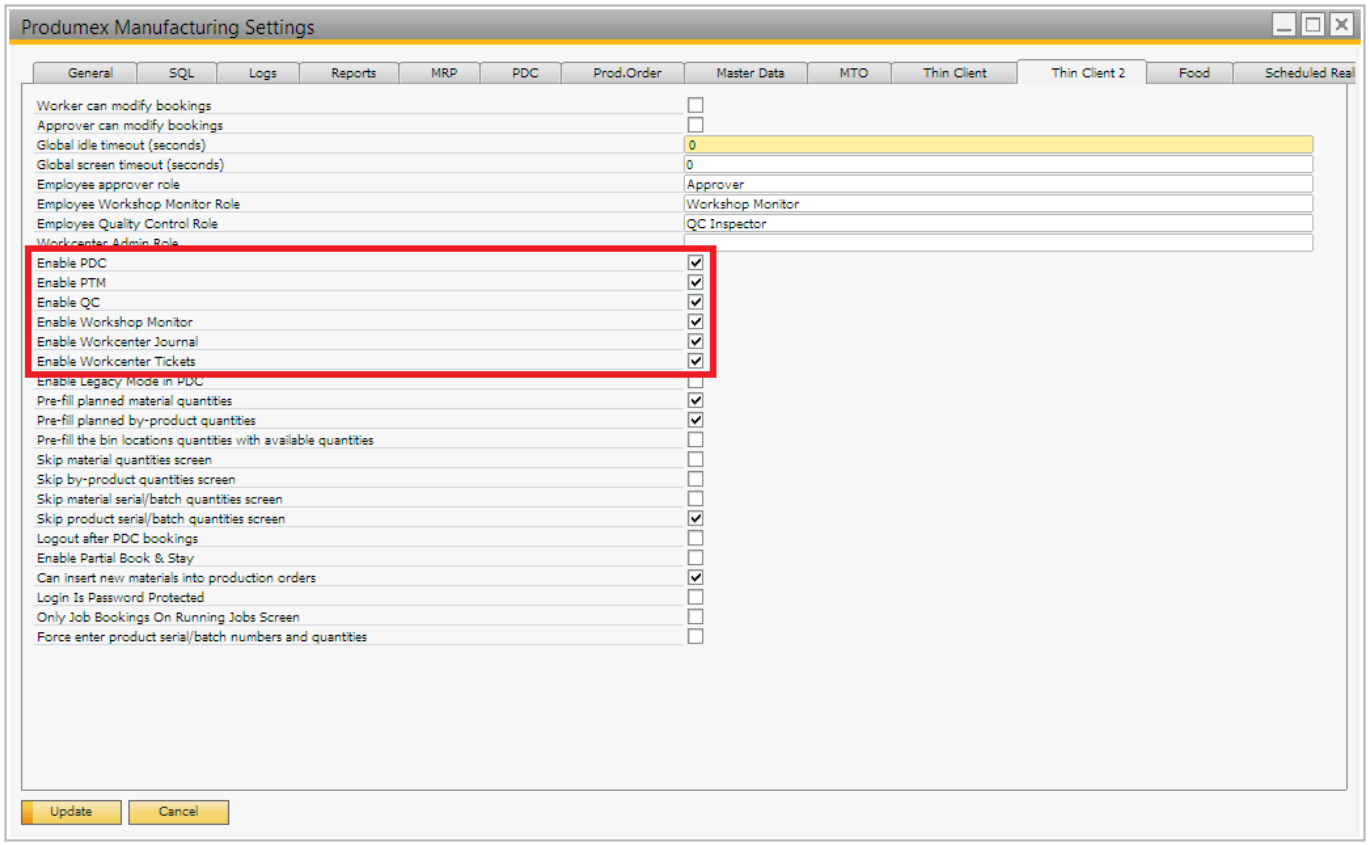
1. Configurations

For more information about the configuration option for PDC please see:

- settings for the office PDC:
    - Produmex Manufacturing Settings > PDC tab
- settings for the mobile device:
    - Produmex Manufacturing Settings > Thin client tab
    - Produmex Manufacturing Settings > Thin client 2 tab
    - Configuration of Produmex PDC

1.1. Enable modules

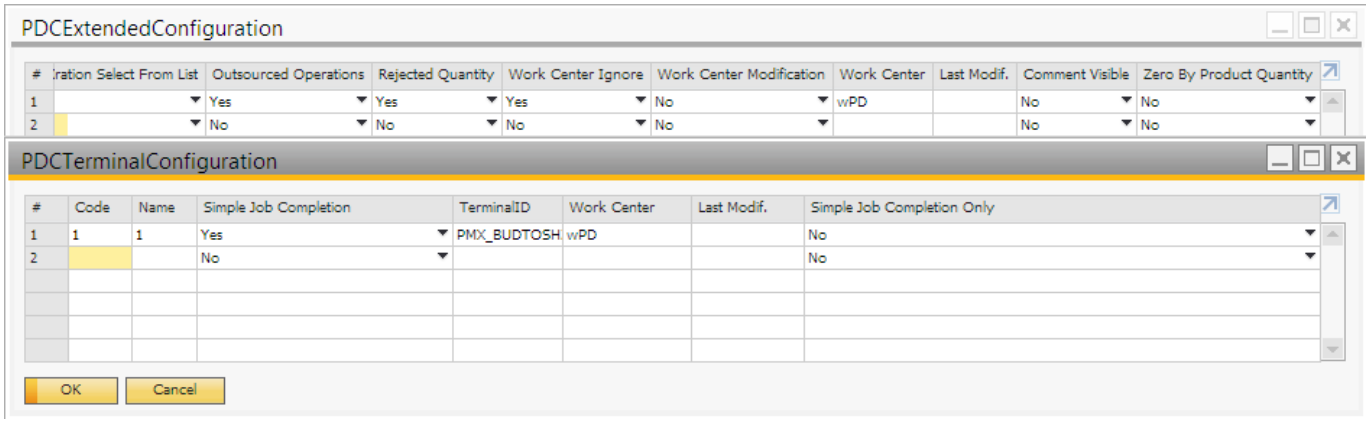
In order to use a module on terminals, enable it on the Thin client 2 tab of Produmex Manufacturing Settings. Every enabled module is displayed on the Main Menu.



The only exception is the ‘Simple Job’ module because it is terminal dependent and assigned for one work center only per terminal. To enable it, open the PDC Terminal Configuration UDT via: Tools > User Defined Windows.

On this form terminal configurations can be specified. Add the terminal ID and define the work center. Only work centers with extended configurations (defined with the *PDC Extended Configuration* UDT) can be added. Set the ‘Simple Job Completion’ option to ‘Yes’.

It is possible to set the terminal only for Simple Job mode by enabling the *‘Simple Job Completion Only’* option too. In this case the system automatically proceeds to the login screen of the module and skips the main menu screen.



1.2. Setup employee roles

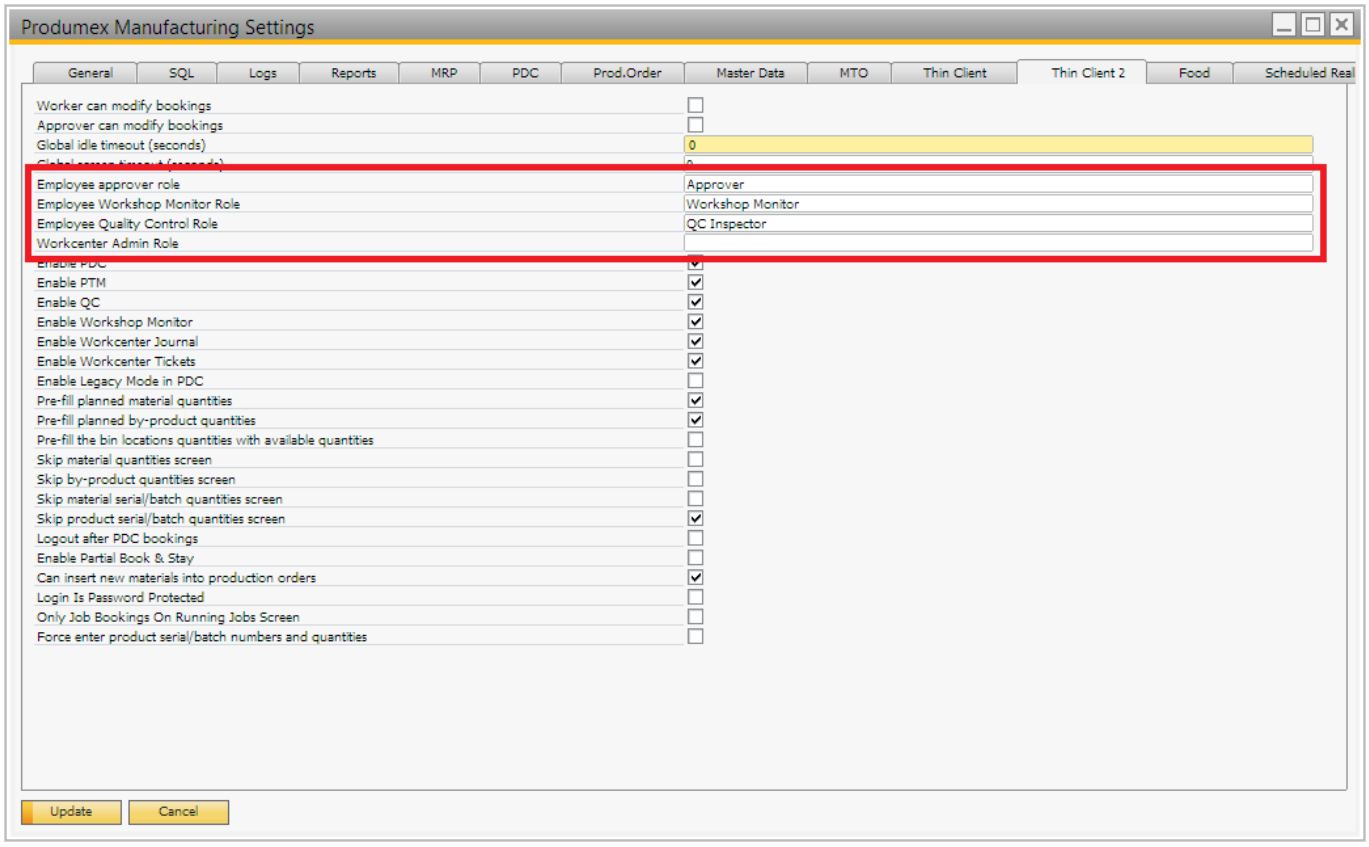
The following employee roles can be defined for PDC:

- *Approver role*: Employees appointed as an approver can approve PDC bookings of sticky/ delicate materials or products.
- *Quality Control Role*: Employees appointed as quality control inspector are authorized to conduct quality inspection.
- *Workshop Monitor Role*: Employees appointed to the workshop monitor role are authorized to use the workshop monitor.
- *Workcenter Admin role*: Employees appointed as work center admins can modify and close work center journals and work center tickets.

First create a role in SAP Business One. Open the Employee Master Data and on the 'Membership' tab select the 'Define new' option on the Role grid.

Add the new role to the employee you would like to appoint. An employee can have more than one roles.

On the Thin Client 2 tab of Produmex Manufacturing Settings add the role name to the corresponding employee role.



1.3. Set a product/ material for PDC approval

Enable the approval for the product or a material in the Item Master Data. Set the *'NeedsPDC Approval'* UDF field to 'Yes'. If it is enabled for a product/material, operations producing/consuming that item must be approved by an employee appointed as 'Approver'. For more information about the approval process please see: 2.2.10. Approval of PDC Bookings

1.4. Date and Time

The Produmex PDC module uses the date and time settings of the company database.

It is possible that the company time differs from the server time. If the ‘Manage Company Time’ checkbox is enabled on the *Display* tab of General settings, the time zone of the company can be set on the *Time Zone* tab of General Settings.

The Produmex PDC module only considers the daylight saving time if the ‘Daylight Saving Time’ checkbox is enabled for the company.

2. Mobile Device

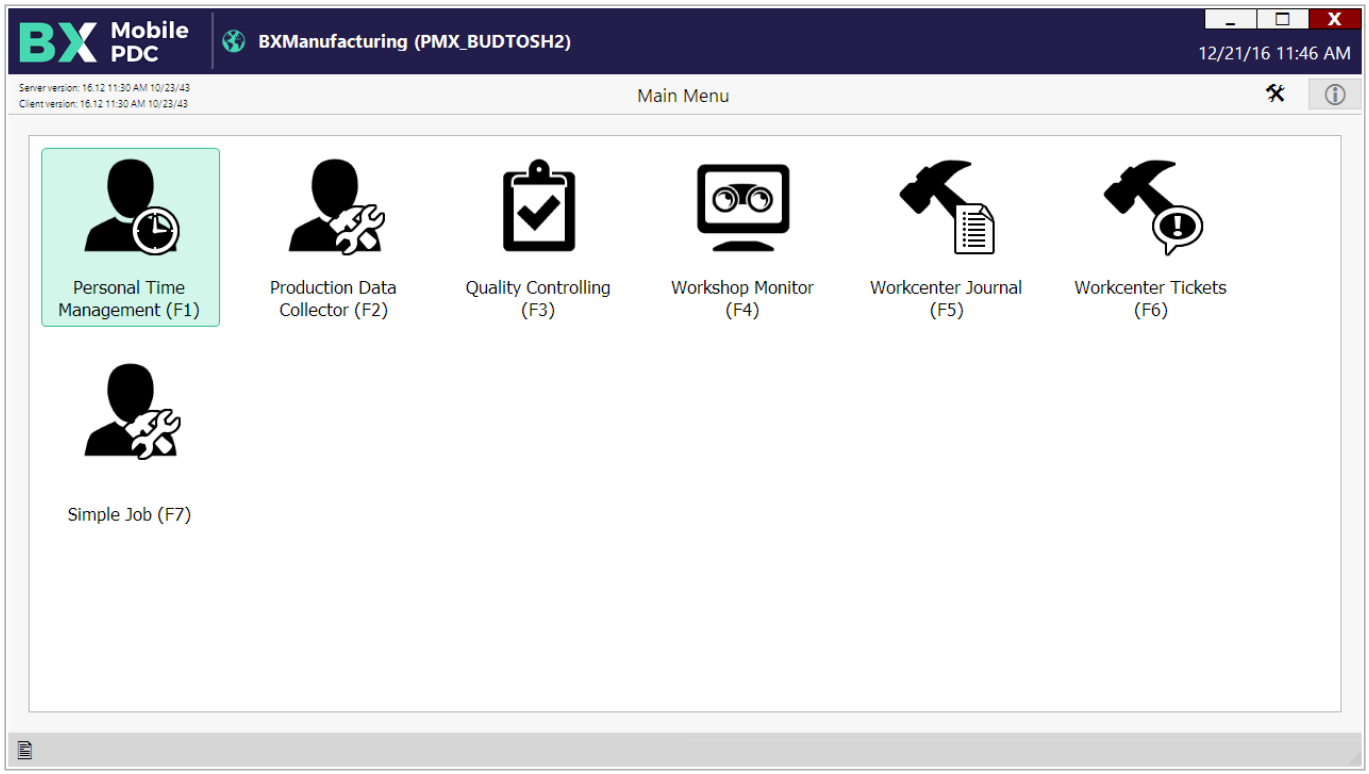
With Produmex PDC you can start the mobile PDC application itself. You have to start it on the client machine.

The user interface was primarily designed for industrial PCs and mobile devices. It means that the windows are not 'normal' windows as in any other applications. You can only move the windows with the blue frame around the window and it will not store the form settings so it always starts maximized.

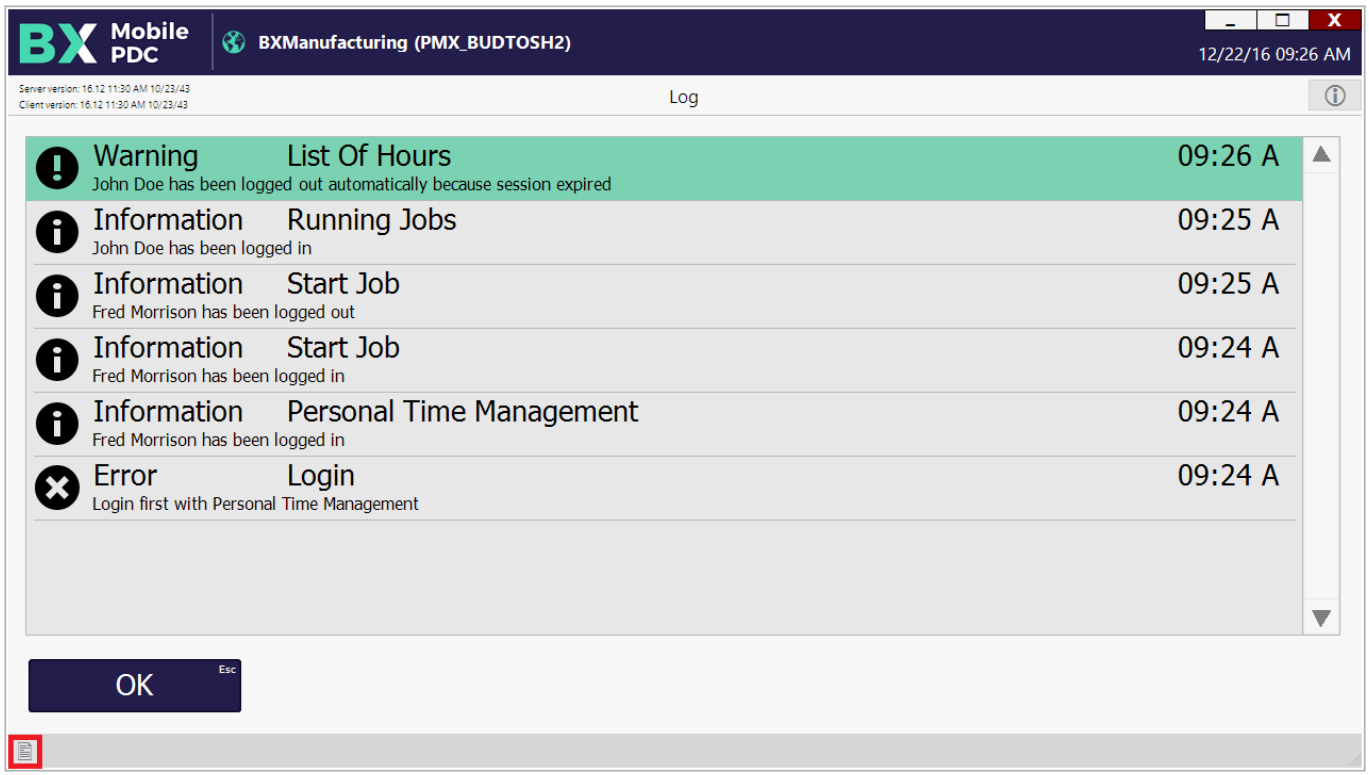
All buttons have a keyboard shortcut, so if you press the keyboard shortcut it is the same as you clicked on the button. In text fields you have a keyboard icon, if you click on that or press F12, the on screen keyboard opens with which you can enter text as well.

If you press tab after adding the code of an employee or operation, the system automatically populates the respective fields. If you have a scanner attached, any data can be added by scanning the barcode.

Main menu
Running the Mobile PDC Client Application the user will find the Main Menu.



On the main menu every enabled module is displayed. If only one module is enabled, the system automatically proceeds with that module and skips the main menu. Click on the icon to see the system messages.



2.1. Personal Time Management

At each new session or work day the user has to log in with Personal Time Management once. This will

track the user as an employee, who is mobile across different workstations.

Personal Time Management is optional for a company. If the setting is not set, the employees can use the rest of the system without logging in to PTM. The user can tap the Personal Time Management button to advance to the Personal Time Management login screen.

2.1.1. Logging in PTM

Here the user can log in to Personal Time Management. To log in simply enter the employee ID, and click on Login button. When the password protection is enabled, the user has to enter the password instead of the employee ID.

The ‘History’ textbox will list the latest account event of the user, in this example the last login event.

In the Reason box the user can choose from a list of reasons pre-defined on the Absence Reasons UDT in SAP B1. Open the form via: Tools > User Defined Windows > Absence Reasons.

When the *‘PTM Reason for Log out mandatory’* option is enabled on the Thin Client tab of Produmex Manufacturing Settings, a reason is must be given when creating a log out booking.

Press ’Login’ to log in or ’Logout’ to log out. To go back to the main menu press the ’Main Menu’ button.

To overview the employee actions, press the ‘Log’ button. The displayed data is supplied by the ***‘bxtc_pdc_ptm_log_query’*** user query. Before using this function, create a custom query. Please see the custom query example here: PTM Log

2.2. Production Data Collector

When Personal Time Management is enabled, you have to log in with PTM before starting the work with the Production Data Collector. Press the PDC icon. Enter the employee ID and click on the ‘Login’ button to log in.

If the employee has any open jobs, the system will proceed to the ‘Running Jobs’ screen otherwise the user will be redirected to the ‘Start Job’ screen.

2.2.1. Running Job screen

The running jobs window shows all operations that were already started by the employee that has logged in. The jobs for which there is already a started booking (setup or job) or a partial booking will

appear.

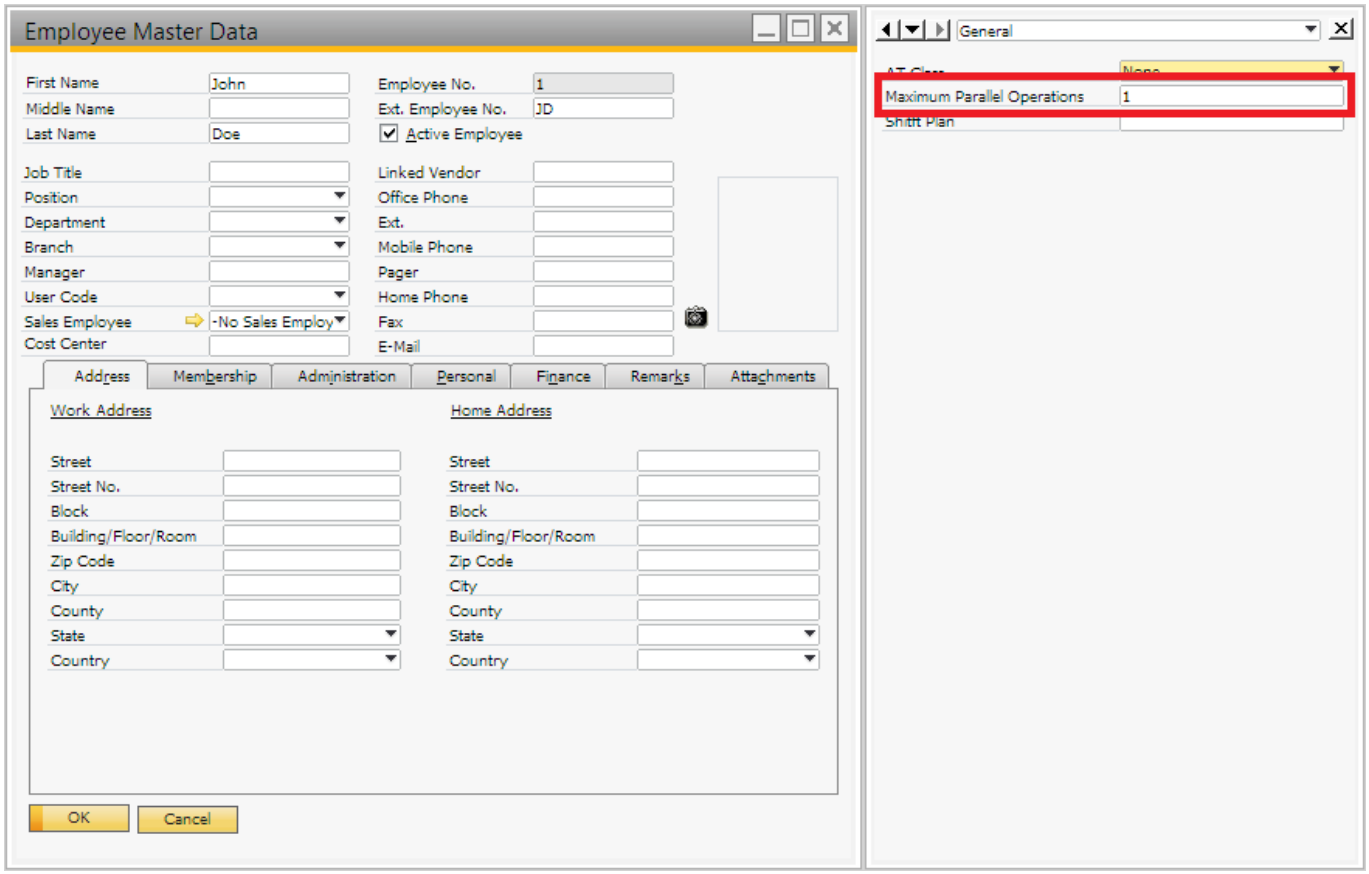
Displayed information:

1. Operation phase
2. Doc Entry – Line Number (Operation code – name)
3. Production order number, Main product code (name)
4. Open quantity, Planned Quantity, Assigned work center
5. Time of the last PDC booking for the operation
6. Date of the last PDC booking for the operation
7. Type of the last PDC booking for the operation

Select an operation from the list. Tick the white box or scan the DocEntry-LineNum identified to the search bar then press TAB.
The DocEnry- LineNum identifier can be found on the Job Requirements report.

To start a new operation that is not listed, scan or enter the *DocEntry-LineNum* identifier from the related production order then press the *'Start'* button. The system will proceed to the 'Start Job' screen. See: 2.2.2. Start Job

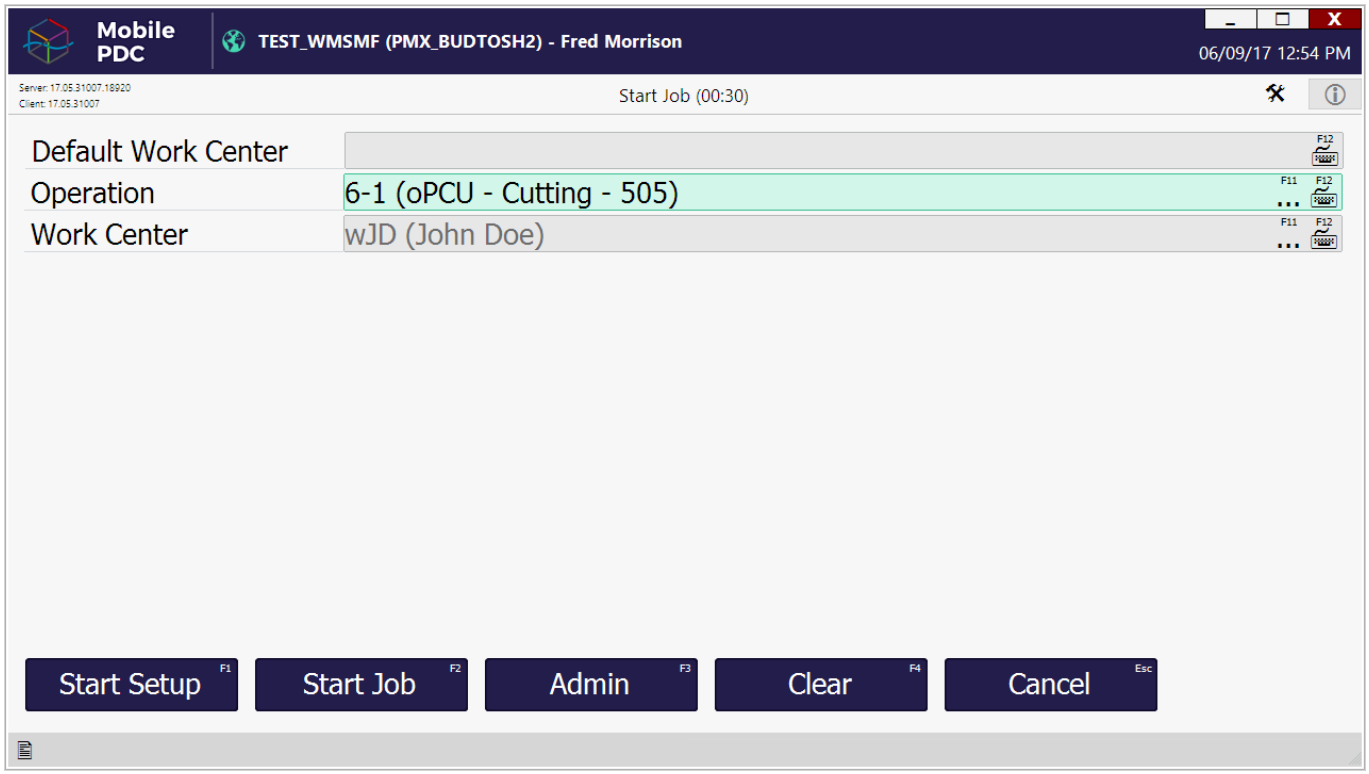
> If the 'Start' button is not active, it means that the employee has reached the maximum number of active operations that can be started at once. The maximum number of parallel operations for an employee can be set on the Maximum Parallel Operations UDF of the Employee Master Data. The employee must close a running operation first before starting another one.



To stop a running operation, press the ‘Stop’ button. See: 2.2.7. Complete Setup or 2.2.8. Complete Job
To make partial booking for a running operation, press the ‘Partial’ button. See: 2.2.3. Partial Completion
To review bookings, press the ‘Admin’ button. See: 2.2.9. Admin
To logout as the current employee, press the ‘Logout’ button.

2.2.2. Start Job

If the employee has no running jobs, he is redirected to the Start Job page.



The default work center is the work center defined for the terminal on the ‘PDC Terminal Configuration’ user table. To disable the default work center, set the ‘Work Center Ignore’ option to ‘Yes’ for the employee on the PDC Extended Configuration user table. When there is a default work center, bookings can be created only for operations with the feature assigned to the default work center.

Scan or enter the *DocEntry-LineNum* identifier of the operation to the ‘Operation’ field.

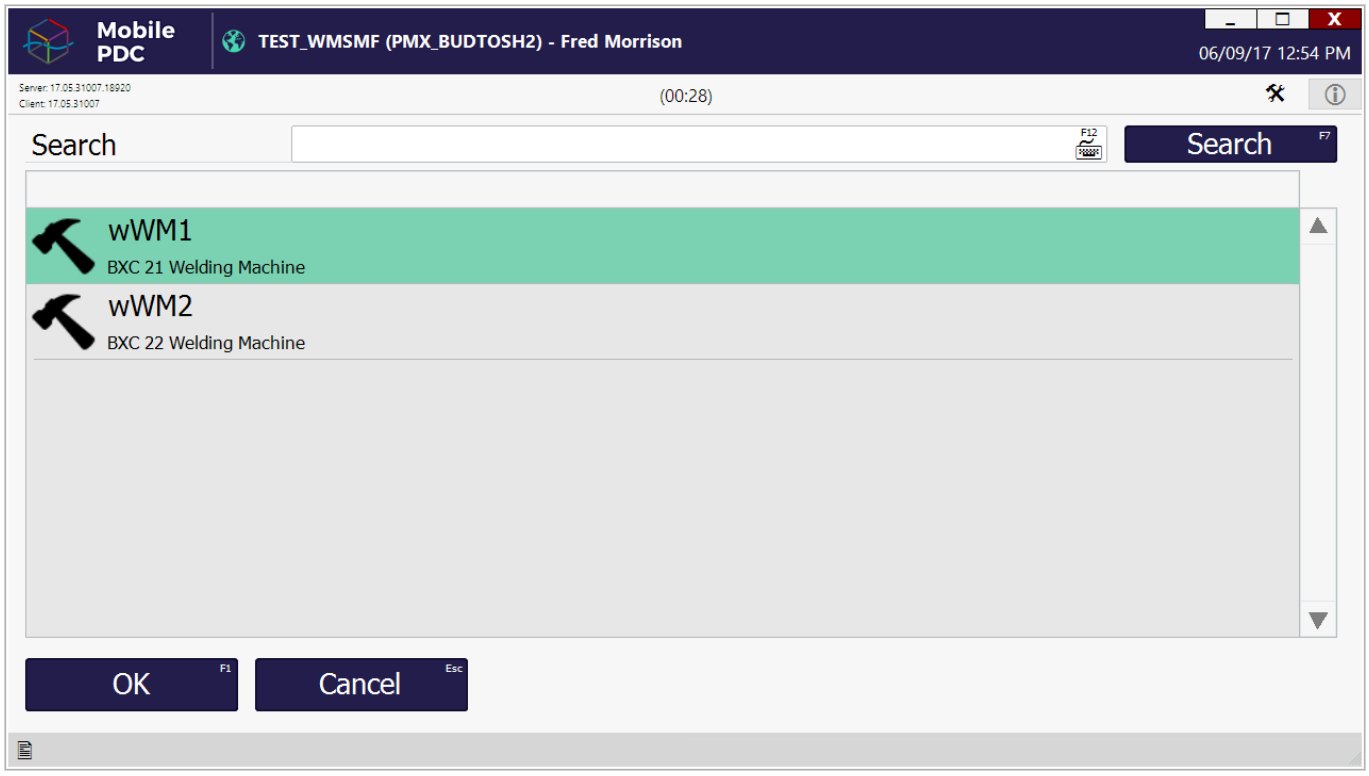
If there is a default work center, the work center field will be populated automatically. The user cannot modify the work center if the default work center is mandatory. The default work center is mandatory in the following cases:

- The employee and/or the work center has no configurations set on the PDC Extended Configuration user table and the ‘PDC Modifiable WC for Start’ option is disabled on the Thin Client tab of Produmex Manufacturing settings.
- The ’Work Center Modification’ option is disabled on the PDC Extended Configuration user table for the employee and/or work center.

Otherwise the work center is not mandatory and the user can select an alternative work center.

If there is no default work center, the user has to enter the work center or select it from a list of available work centers by pressing F11. If there is only one work center for the feature that belongs to the operation, the work center field will be automatically populated with it.

If the operation has a mandatory work center, the operation can only be started on the mandatory work center.

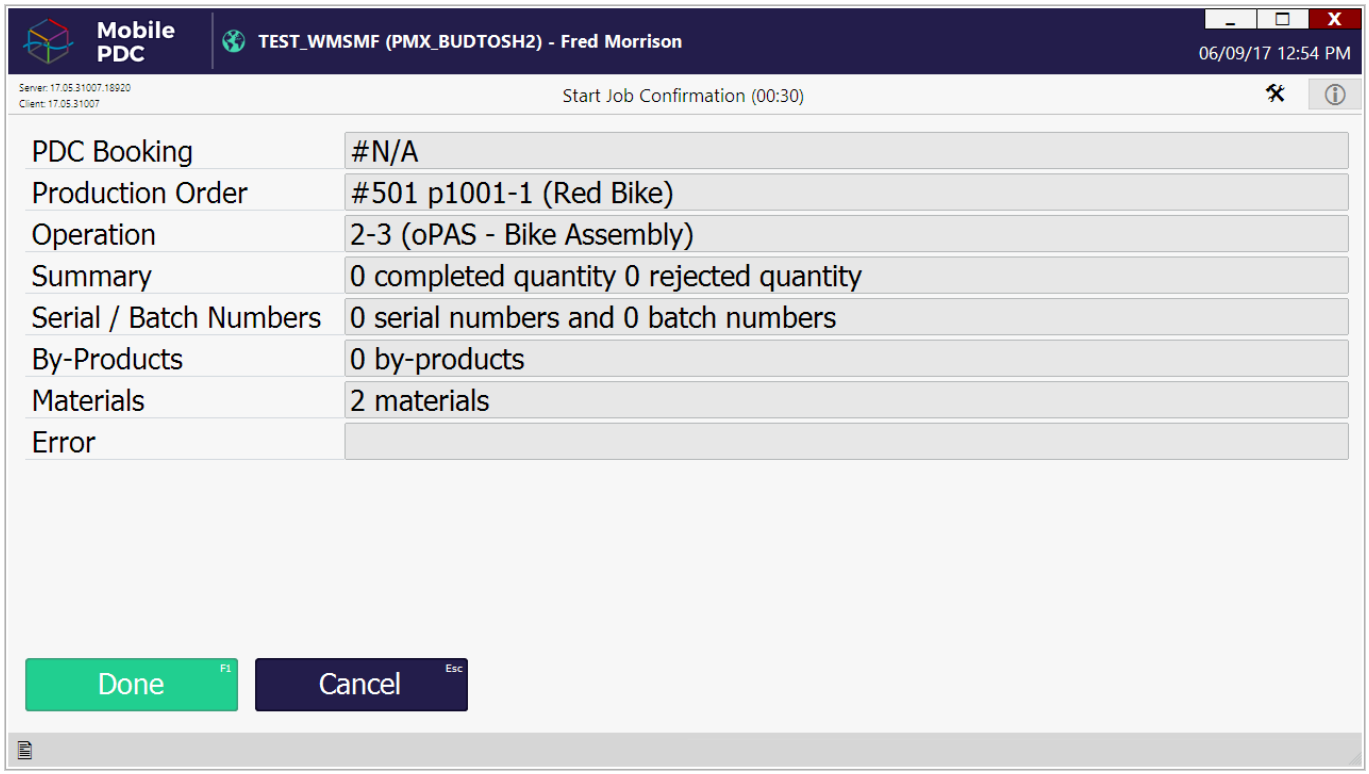


Then he can click on 'Start Setup' or 'Start Job' to start the operation. Based on the settings on the Thin Client tab, setup bookings might be allowed for operations without setup or might be forbidden for every operation. Only operations that meet the following conditions can be started:

- Production order is released
- The operation status is Created or Started

The ‘Clear’ button erases the contents of all fields, so the entered data will be lost. If the user clicks on the ‘Logout’ button, he will be logged out and redirected to the Login screen.

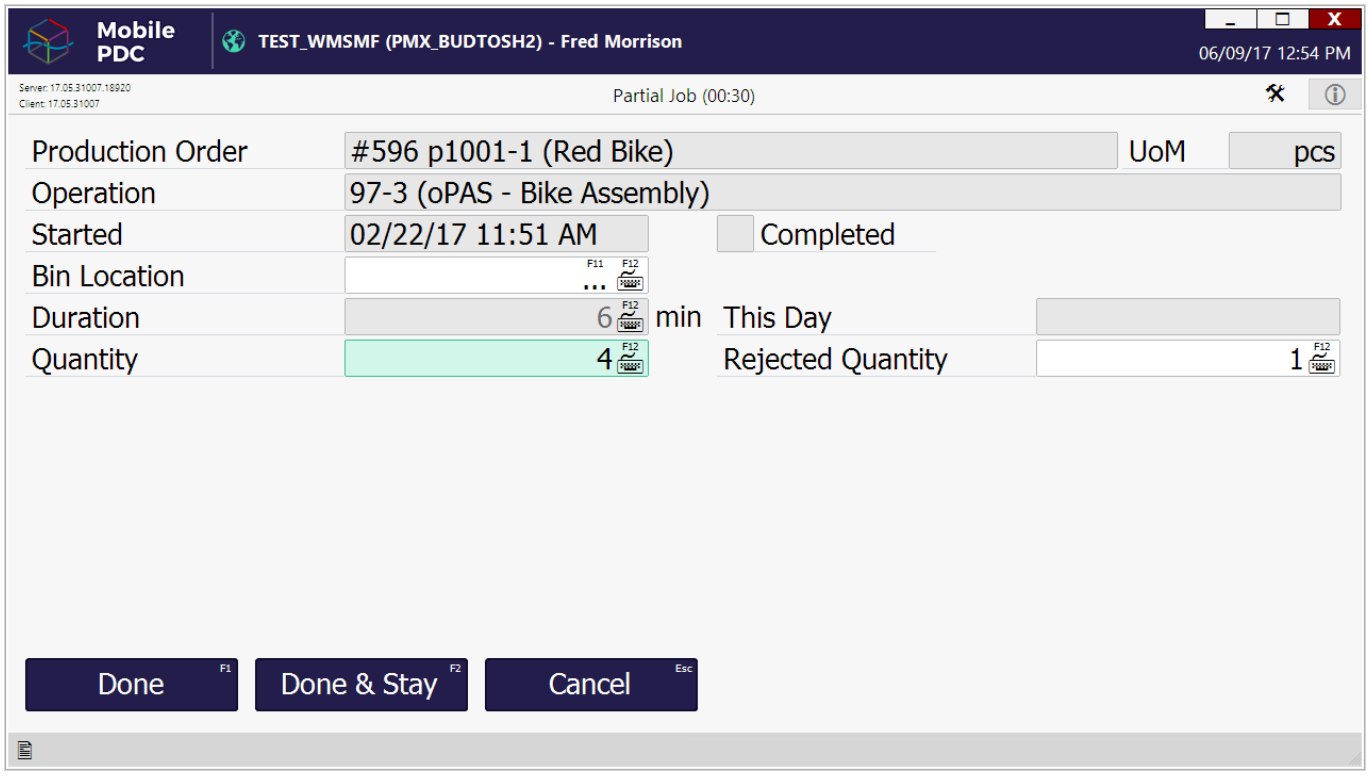
On the next screen the user can overview the details of the operation. Press ‘Done’ to start the setup/job or press ‘Cancel’ to go back to the previous screen.



During the Start Job/Setup phase, materials might be issued depending on their milestone type. For more information about issuing materials please see:2.2.5. Materials.

2.2.3. Partial Completion

To create bookings for a partially completed job/setup, press the *'Partial'* button. After a partial booking the job/setup remains open therefore it will be listed among the running jobs.



Enter the completed and rejected quantity (if any) for the operation.

Define a Bin Location for material issues/product receipts on the 'Bin Location' field. The default Bin Location is the bin location specified on the PDCExtendedConfiguration UDT. If no bin location has been defined on that form, by default the bin location specified for the work center is shown. If there is no bin location specified on either form, the bin location is empty by default.

The bin location selected on this screen can be overridden for materials and products.

Press the 'Done' button to proceed.

If there are by-products for the operation or the operation is the last operation on the production order and the product is linked to it with a milestone, 'Products' screen will open up. Please see: 2.2.4. Product and By-Products

If an operation has materials linked to it with a milestone, the 'Materials' screen will open up. Please see: 2.2.5. Materials

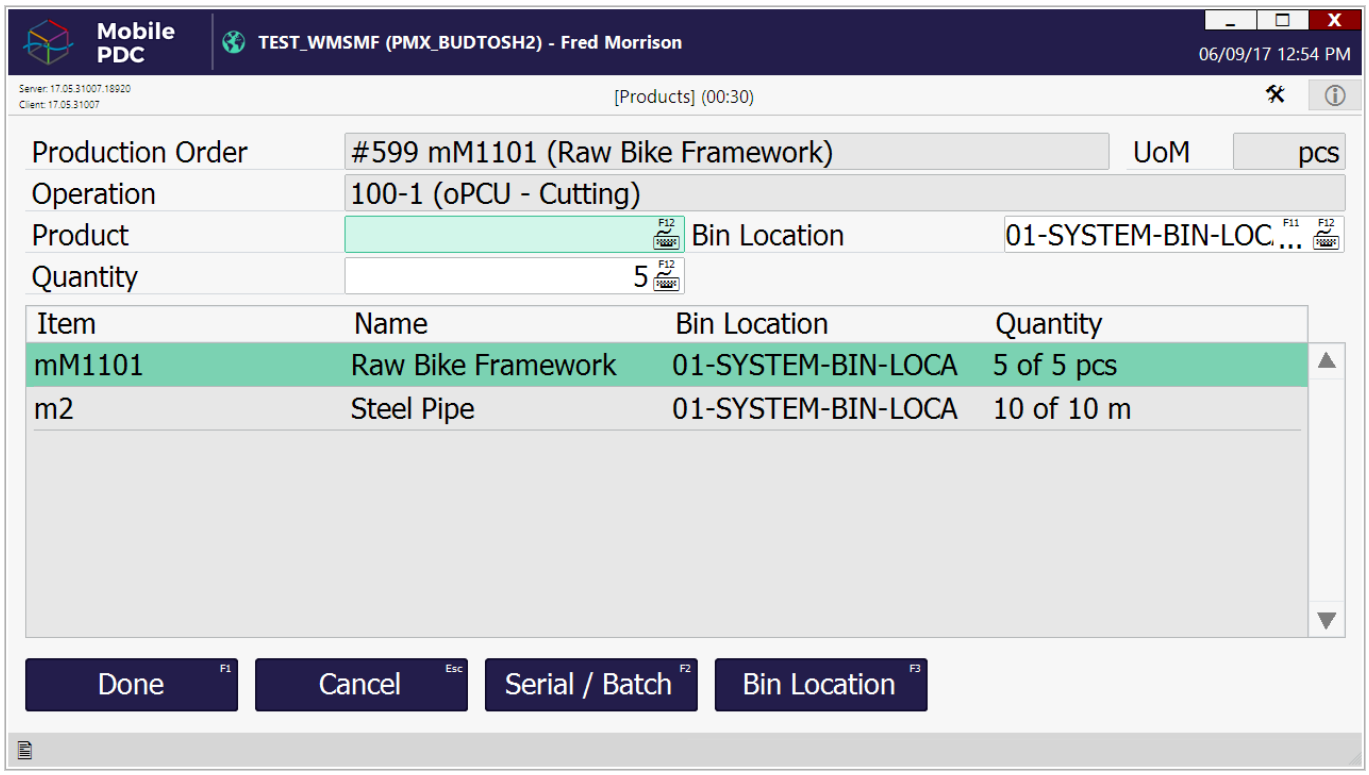
After the booking was created, the system will return to the Running Jobs screen or the Start Job screen if the employee has no running jobs. When the *'Logout after PDC bookings'* option is enabled on the Thin client 2 tab, the employee will be automatically logged out and redirected to the Main Menu.

When the *'Enable Partial Book & Stay'* option is set to true, an additional 'Done & Stay' button is displayed on the Partial Job screen. To stay on the 'Partial Job' screen after the booking was created, perform the partial completion after pressing this button.

2.2.4. Product and By-Products

Receive the products or by-products on the 'Products' screen. On the grid the main product and the

by-products (if any) are listed. The main product is always listed first.



Select the product on the grid then enter the quantity. Add the quantity by pressing the ‘Add’ button or overwrite the quantity by pressing the ‘Update’ button.

The default quantity of the main product is the quantity added on the partial or complete job/setup screen.

The default quantity of a by-product is calculated from the received quantity of the main product and the base quantity of the by-product. It is possible to receive more or less of a by-product than the calculated quantity.

The default bin location is the bin location specified for the operation but it can be adjusted. Scan or enter the destination bin location to the ‘Bin Location’ field or select it from a list after pressing F11. To add a product to different bin locations, select the bin location then press the Bin Location button (F3). The ‘Product Bin Location Picker’ screen will open. (Please see: 2.2.4.3. Product Bin Location Picker). Please note: The bin location for items managed by batches or serial numbers can be added on the Product Batch/Serial Numbers screen therefore the bin location picker function is not available for such items.
When using the Legacy mode, the Bin Location button is not displayed and the Product Bin Location Picker screen cannot be reached.

After the PDC processor processes the booking, the system automatically creates the Receipt from Production document for the main product and receives it to the inventory. By-products will be taken into stock with a Goods Receipt document which will be converted to a Receipt from production document after the main product has been booked.

If the main product is managed by batches or serial numbers, add the serial/batch numbers before receiving the product. Press the ‘Serial/Batch’ button. If the product is managed by batches, the

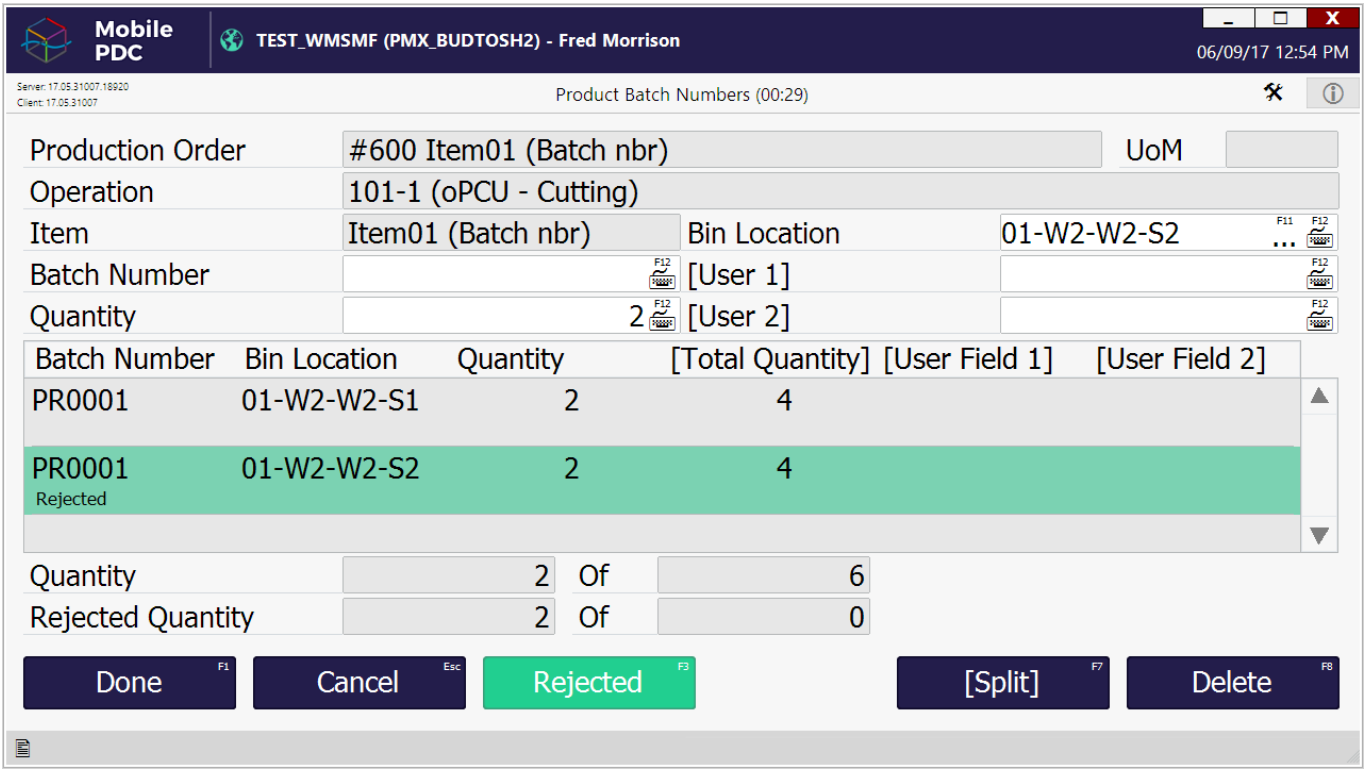
Product Batch Numbers screen will open. (Please see: 2.2.4.1. Product Batch Numbers).

If the product has serial numbers, the Product Serial Numbers screen will open. (Please see: 2.2.4.2. Product Serial Numbers). If the 'Skip product serial/batch quantities screen' option is enabled on the Thin client 2 tab, this button will not be active and the serial/batch numbers will be determined by a custom query. For more information please see: Product serial/batch number

By-products cannot be managed by serials/batches.

2.2.4.1. Product Batch Numbers

If it is a batch numbered product, the *'Product Batch Numbers'* form appears.



Enter the created batch number into the 'Batch Number' field then press TAB to add the batch number to the grid. Multiple batch numbers might be added.

Select the batch on the grid. Enter the quantity of the batch into the 'Quantity' field and scan the bin location or select it on the 'Bin Location' field then press TAB. All bin locations must have the same warehouse. Please note: When using Legacy mode, the Bin Location cannot be specified on this screen.

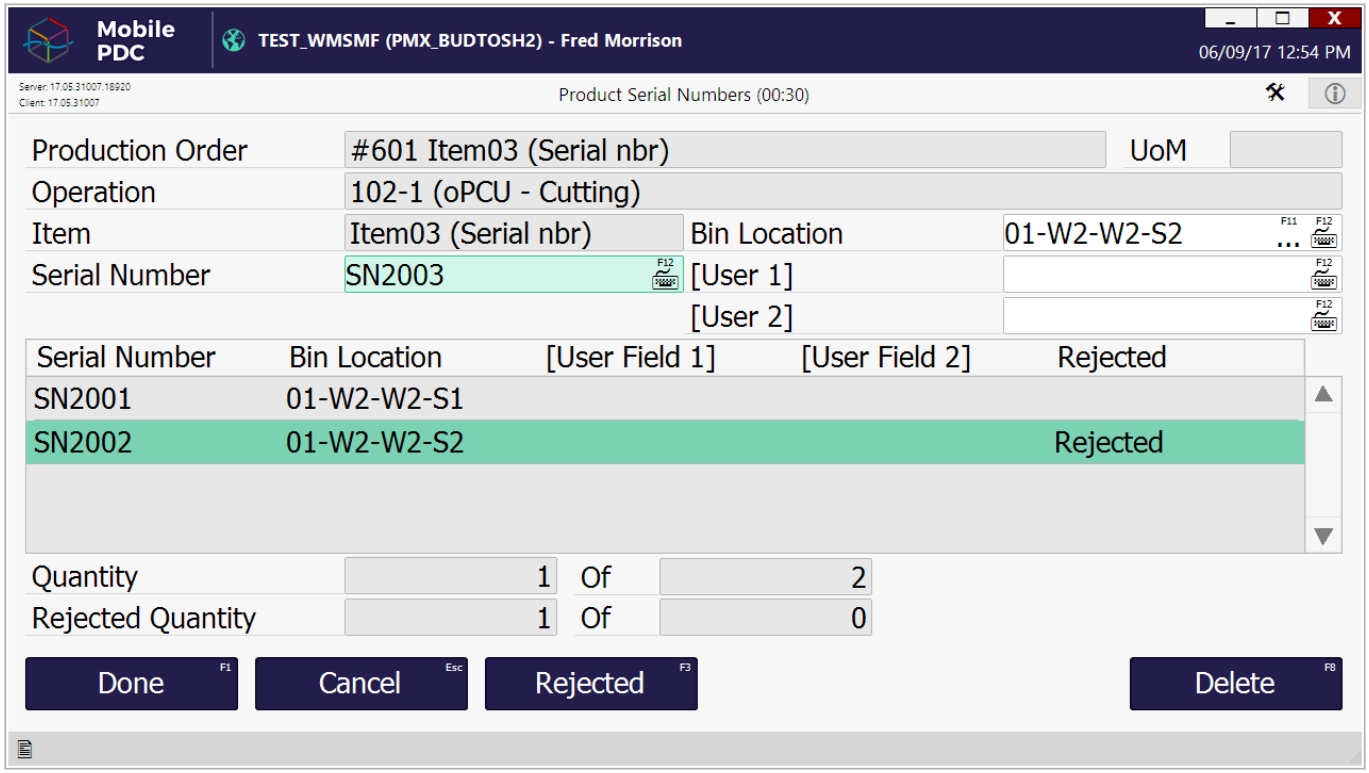
To register the batch for rejected quantities, select the line of the batch number then press the 'Rejected' button. It is possible to set completed and rejected quantities for the same batch number.

To receive the same batch into multiple bin locations, select the batch then press the 'Split' button. The line of the batch will be duplicated but the bin location and the quantity value on the new line will be empty.

To remove a wrongly entered batch number, select it on the grid and click on 'Delete'.

2.2.4.2. Product Serial Numbers

If the product is serial numbered, the ‘Product Serial Numbers’ window will open.



Add the serial numbers into the ‘Serial Number’ field then press TAB to add it to the grid. If the serial number already exist, an error message will be shown.

To define the bin location, select a serial number and add the bin location to the ‘Bin Location’ field then press TAB. all bin locations must have the same warehouse. Please note: When using Legacy mode, the Bin Location cannot be specified on this screen.

To add serial numbers belonging to rejected quantities, first enter the serial number, then select it on the grid and press the ‘Rejected’ button. The serial number will be marked as ‘Rejected’.

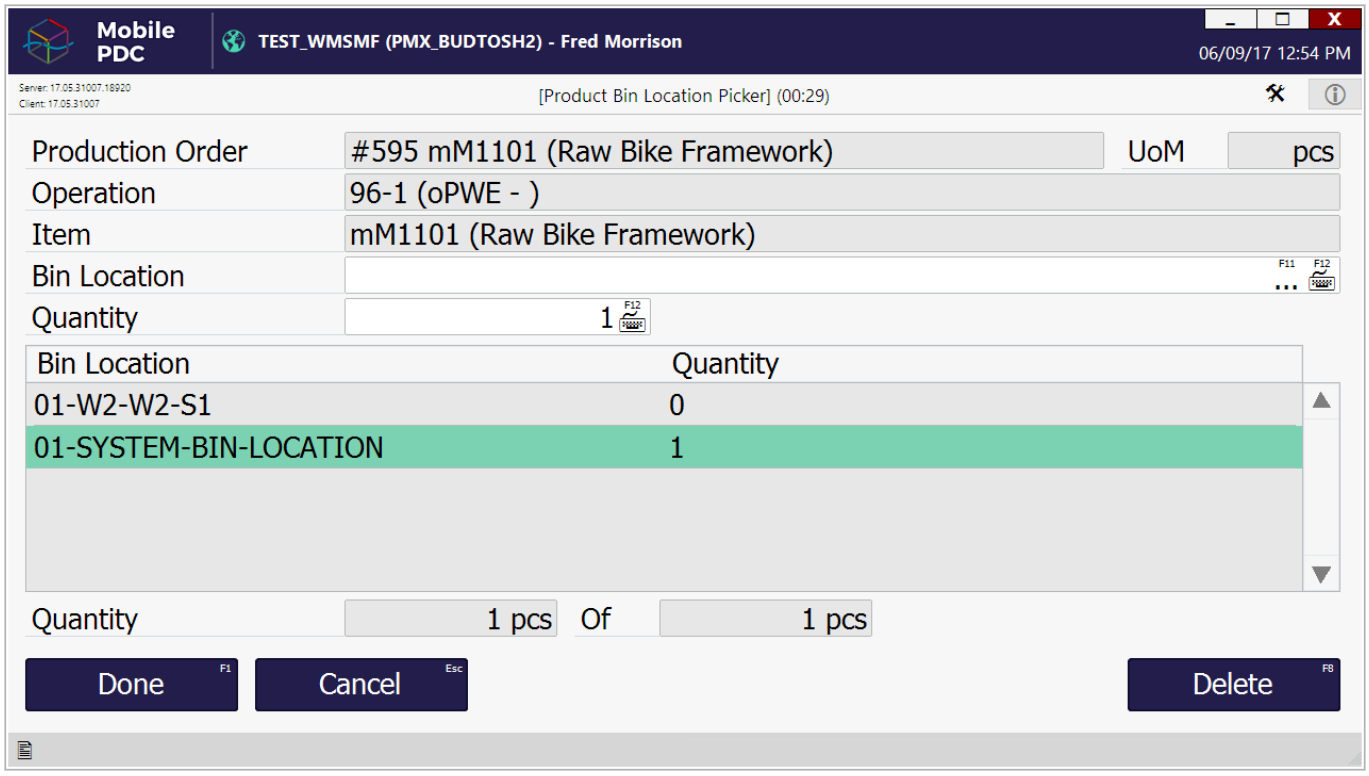
To remove a wrongly entered serial number, select it and press the ‘Delete’ button’.

After every serial number has been entered, press the ‘Done’ button to proceed.

Please note: The added batch/serial quantity must equal to the quantity entered on the partial or complete job/setup form.

2.2.4.3. Product Bin Location Picker

On the ‘Product Bin Location Picker’ screen scan the Bin Location or select it by pressing F11 or pressing the ‘…’ button then press TAB to add it to the grid. Select the Bin Location line then add the quantity to receive to the ‘Quantity’ field.



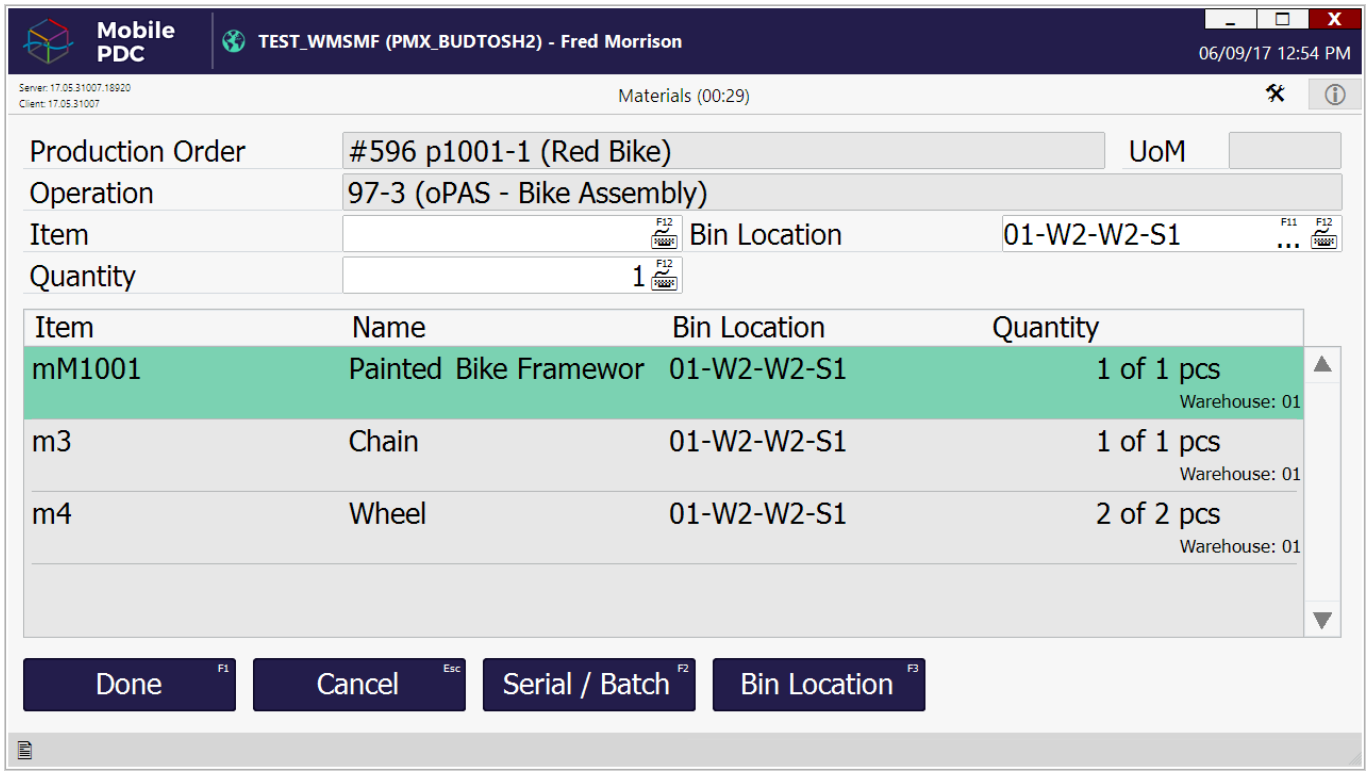
It is of high importance to keep in mind that when working with MultiBranch company databases the user must select a target warehouse from the same branch as defined for the production order, otherwise SAP B1 will reject the inventory transaction. In case of an error the user can fix the issue in the PDC administration screen on the terminal.

2.2.5. Materials

Consumed materials might be reported in different operation phases, depending on their Milestone type.

- Materials with the milestone type ‘Depends On Begin’ have to be issued when starting a job.
- Materials with the milestone type ‘Depends on Every’ can be issued in partial and completed PDC bookings.
- Materials with the milestone type ‘Depends on End’ can only be issued when completing a job.

If the operation has no linked materials, the system will automatically skip this screen.



Scan the item code or enter it to the ‘Item’ field. When the ‘Can insert new materials into production orders‘ option is enabled on the Thin client settings, the user might be able to add items not linked to the operation.

Select the line of the material. If you scan the item code of the material or enter it to the ‘Item’ field, the material line will be automatically selected.

After that the cursor will be automatically positioned into the Quantity field. Here you can enter the used quantity and click on ‘Add’ or ‘Update’. To add the entered quantity to the already booked quantity, press ‘Add’. To overwrite the already booked quantity with the entered quantity, press ‘Update’. When the *‘Can insert new materials into production orders’* option is enabled on the Client 2 tab, new materials can be added during the booking. Scan the item code or enter it to the ‘Item’ field then press TAB. The item will be listed on the grid. Add the consumed quantity and the bin location as described above. After the booking is processed, a new material line is automatically inserted before the operation on the production order.

If the materials are serial or batch managed, you have to select the batches/serials that were used. Select the line of the material then press the ‘Serial/Batch’ button. If the material is managed by batches, the Material Batch Number Picker screen will open. (Please see: 2.2.5.1. Material Batch Number Picker) If the material has serial numbers, the Material Serial Number Picker screen will open. (Please see: 2.2.5.2. Material Serial Number Picker)

Please note: If you don’t enter any quantity on the Materials screen, and click on Serial/Batch button, then the needed quantity will be zero. It means the user can add as many serial/batch numbers as he wants, but he cannot add more than the remaining quantity for the operation.

If the ‘Skip material serial/batch quantities screen’ option is enabled on the Thin client 2 tab, this button will not be active and the serial/batch numbers will be determined by a custom query. For more information about the custom query please see: Material serial/batch number

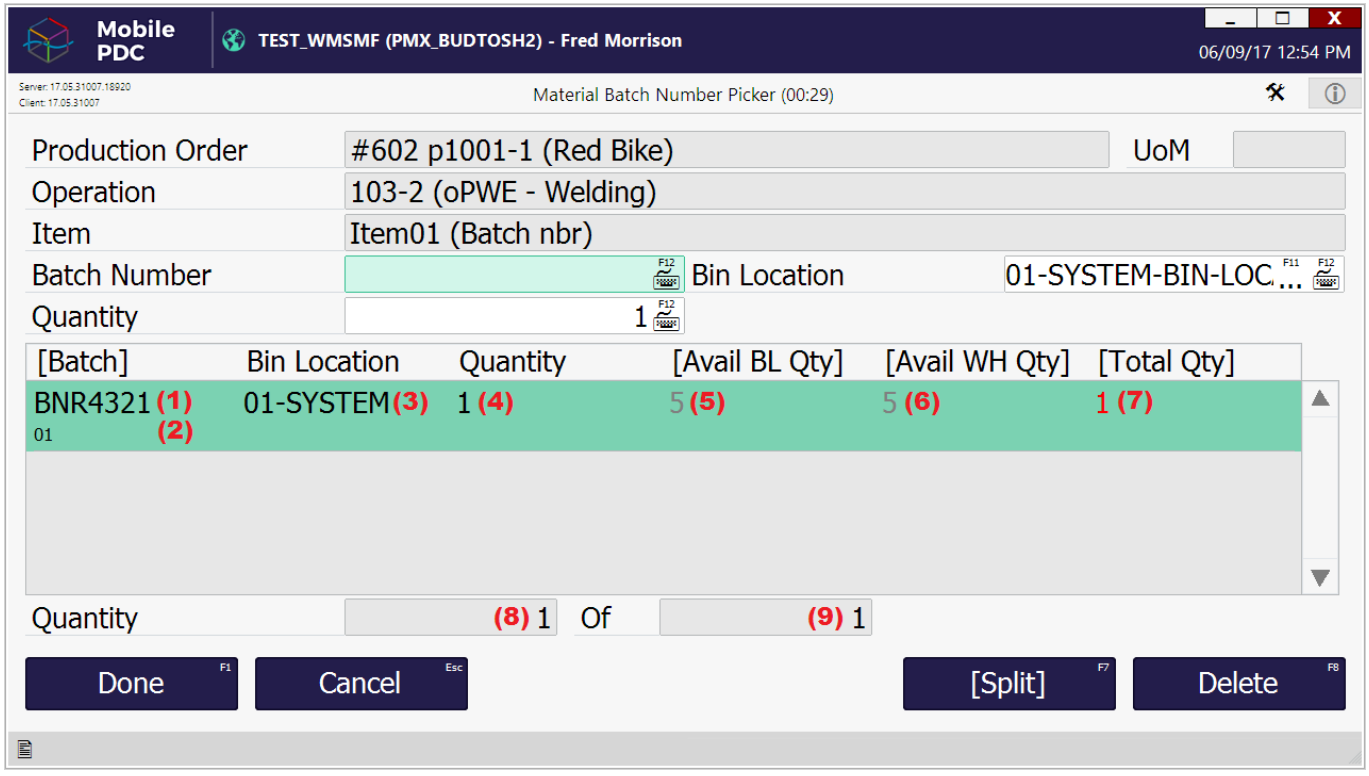
The default bin location is the bin location specified for the operation but it can be adjusted. Scan the source bin location or add its code to the Bin Location field or select it from a list after pressing F11. To add materials from multiple bin locations select the material then press the 'Bin Location' button. The Material Bin Location Picker screen will open. (Please see: 2.2.5.3. Material Bin Location Picker) When using the Legacy mode, the Bin Location button is not displayed and the Material Bin Location Picker screen cannot be reached.

After the transaction is processed by the PDC processor, the booked materials will be issued with an Issue from Production document.

2.2.5.1. Material Batch Number Picker

Add a batch to the grid by scanning the batch number or entering it to the 'Batch Number' field then press TAB. Only existing batches can be added. Select the batch on the grid then add the quantity to the 'Quantity' field and scan the Bin Location or enter its code to the Bin Location field then press TAB. If the bin location is specified, the batch must exist in the bin location with the specified quantity.

All batch numbers must have the same warehouse.

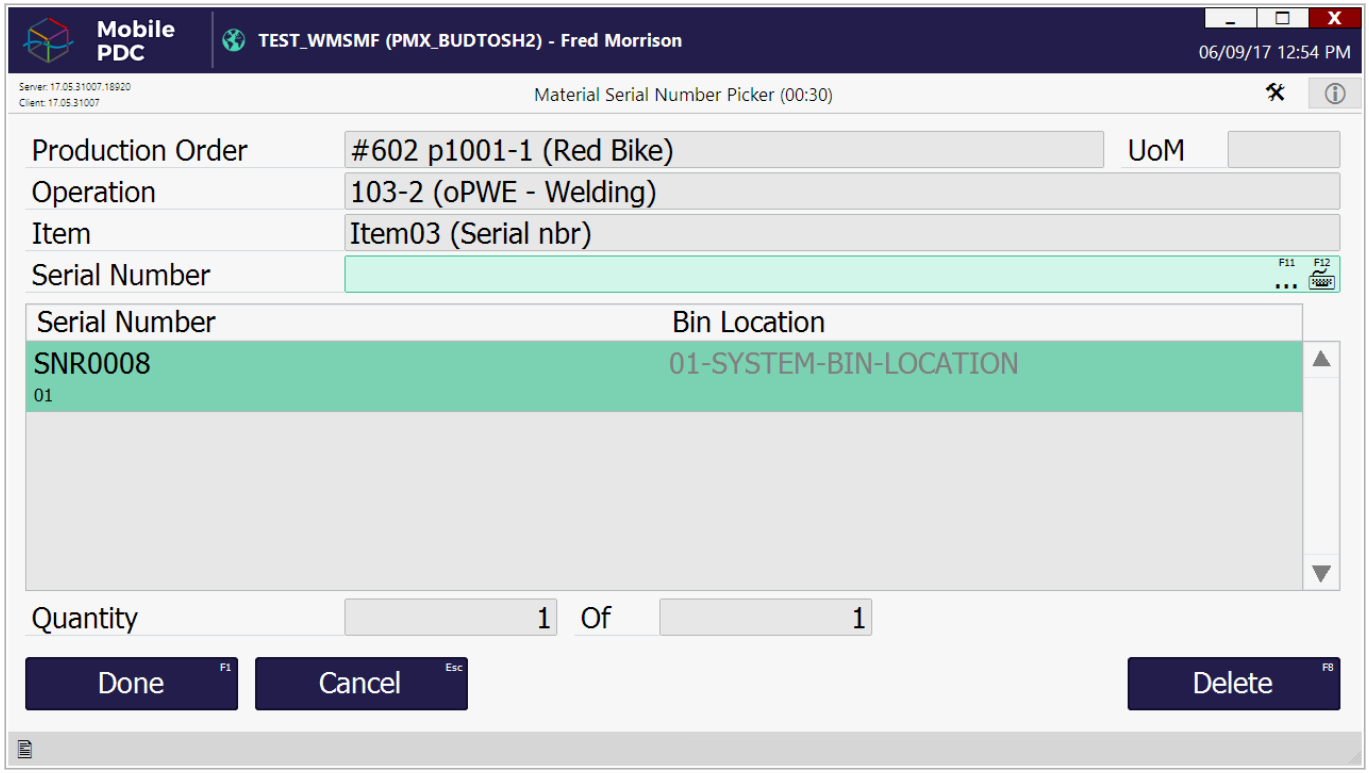


1. Existing batch number
2. Warehouse
3. Bin location
4. Allocated quantity
5. Available quantity in the bin location
6. Available quantity in the warehouse
7. Total allocated quantity
8. Total allocated quantity
9. Needed quantity

To issue the same batch from multiple bin locations, select the batch then press the ‘Split’ button. The line of the batch will be duplicated but the bin location and the quantity value on the new line will be empty.
Please note: When using Legacy mode, the Bin Location cannot be specified on this screen.

To delete a line, select a line then press the ‘Delete’ button.
Press ‘Cancel’ to go back.
Press ‘Done’ to proceed.

2.2.5.2. Material Serial Number Picker



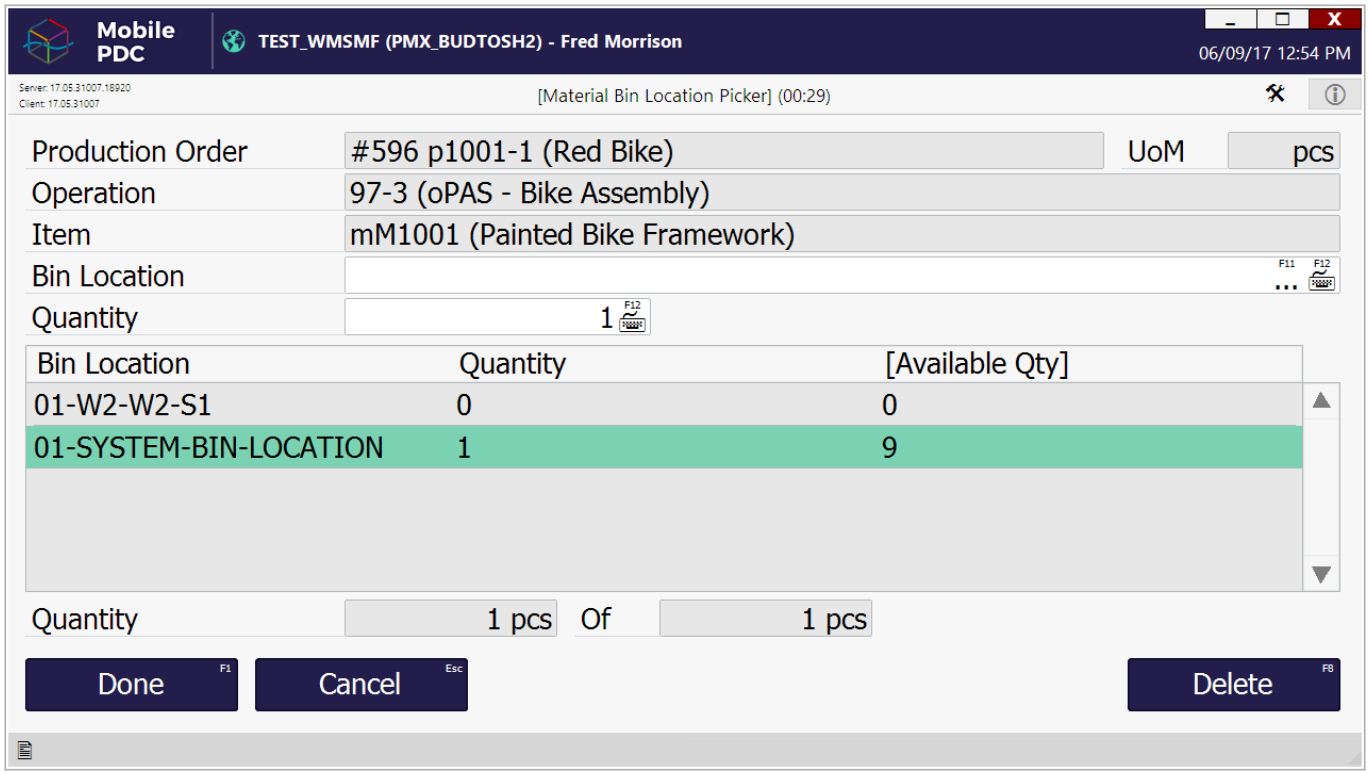
Add the serial number to the serial number field. Already added serial numbers will be listed on the form. Only existing serial numbers can be added. It is not possible to scan serial numbers from different warehouses.

To delete the serial number, select its line and press the ‘Delete’ button.

You have to add all needed serial/batch numbers. Partial definition is not possible. After all serial/batch numbers have been defined, you can click on ‘Done’.

2.2.5.3. Material Bin Location Picker

On the ‘Material Bin Location Picker’ screen scan the Bin Location or select it by pressing F11 or pressing the ‘…’ button then press TAB to add it to the grid. Select the Bin Location line then add the quantity to consume to the ‘Quantity’ field.



It is of paramount importance that when working with MultiBranch company databases the user must select a source warehouse from the same branch as defined for the production order, otherwise SAP B1 will reject the inventory transaction. In case of an error the user can fix the issue in the PDC administration screen on the terminal, nevertheless.

2.2.6. Confirmation

You will get a confirmation dialogue with all the data you entered.

Click on ‘Done’ to finish the process. If the booking does not need approval or quality controlling, it will be processed by the PDC Processor. Click on ‘Cancel’ to go back to the Materials screen where the entered data can be changed.

2.2.7. Complete Setup (Stop Booking)

To finish a setup, press the ‘Stop’ button. The steps of a setup completion are identical to the steps of a partial completion. After the setup is completed, the system will ask whether to start the job part of the operation. Press ‘Yes’ to start the job. A start job booking will be created for the operation. Press ‘No’ to start the job later. Only a ‘Complete setup’ booking will be created and the user must manually start the job for the operation.

When a setup was finished, the phase is closed and it will not be listed on the Running jobs screen.

2.2.8. Complete Job (Stop Booking)

To finish a job, press the ‘Stop’ button.

Enter the completed and rejected quantity (if any) for the operation.

Define a Bin Location for material issues/product receipts on the ‘Bin Location’ field. The default Bin Location is the bin location specified on the PDC Extended Configurations UDT. If no bin location has been defined on that form, the bin location specified for the work center is shown by default. If there is no bin location specified on either form, the bin location is empty by default.

The bin location selected on this screen can be overridden for materials and products.

If the employee has permission to mark operations as completed, the ‘Completed’ checkbox is active. You can set this permission on the PDC Extended Configurations user table. If the employee checks the ’Completed’ checkbox, the operation is marked as ‘Completed’ and the status of the operation is changed to ’Finished’ when the booking is processed. Finished operations cannot be started again.

Press the ‘Done’ button to proceed.

If there are by-products for the operation or the operation is the last operation on the production order and the product is linked to it with a milestone, ‘Products’ screen will open up. Please see: 2.2.4. Product and By-Products

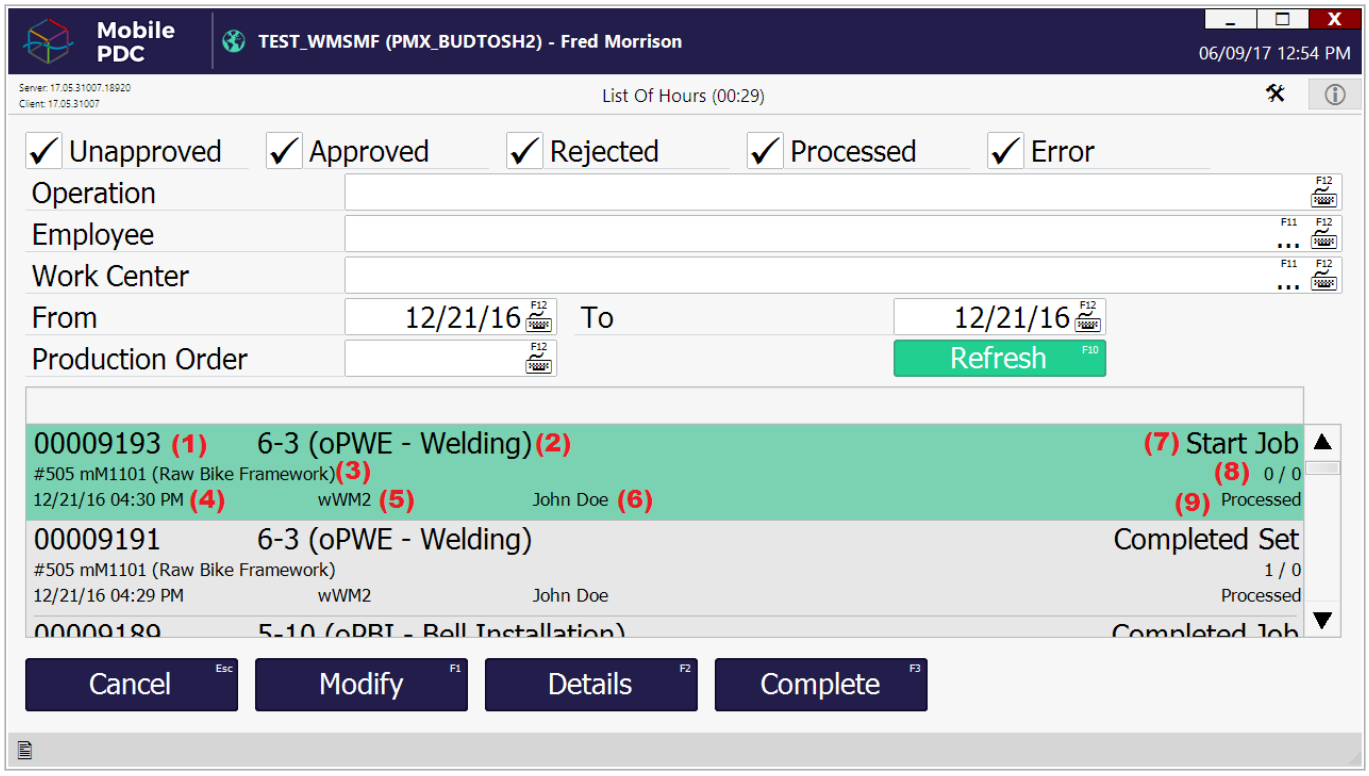
If an operation has materials linked to it with a milestone, the ‘Materials’ screen will open up. Please see: 2.2.5. Materials

After the booking was created, the system will return to the Running Jobs screen or the Start Job screen if the employee has no running jobs. When the ‘Logout after PDC bookings’ option is enabled on the Thin client 2 tab, the employee will be automatically logged out and redirected to the Main Menu.

After a job is completed, it is not shown on the running jobs screen.

2.2.9. Admin

On the Admin screen the employee can overview the bookings he created. Press the ‘Admin’ button to open the ‘Admin’ screen.



1. Allocation Code
2. DocEntry- LineNumber (operation code –name)
3. Production order number. Main product code (name)
4. Booking date and time
5. Work center
6. Employee (who made the booking)
7. State/ Phase
8. Completed/ Rejected quantity
9. Process status

The upper part of the window is a filter. The user can select what type of bookings he wants to see (unapproved, approved, rejected, processed or error) for which operation and work center in which date range. When the user filled the filter fields he has to click on the ‘Refresh’ button to get the list of the operations in the grid below.

Please note: Only employees with approver role can change the Employee code and see the bookings of other employees. Employees without approver role can only see their own bookings.

Details
To overview the details of a booking, select the operation and press the ‘Details’ button. First the summary page will be shown. To see the details of the selected materials or products (if any) click on the ‘Done’ button. To go back to the Admin page, press ‘Cancel’.

When the materials/ products are managed by serials or batches, an additional ‘Serial/Batch’ button is displayed. Press this button to review the added serials/batches. Click on the ‘Done’ button to proceed.

Modify
If the *Worker can modify bookings* setting is enabled, employees can change their bookings. If the *Approver can modify bookings* setting is enabled, employees with approver role can change any bookings.

To modify the booking, press the 'Modify' button. The following can be modified:

- The booked time.
- Completed status. (Please note: Only employees/approvers who have the permission to mark an operation as 'Finished' can modify the completed status. The permission can be set on the PDC Extended Configurations user table.)

It is not advised to use this function for correcting material/product bookings. Use these SAP BO functions instead:

- right-click menu on the Production order: Report completion >Return components
- Goods Issue/ Goods receipt
- Disassembly order

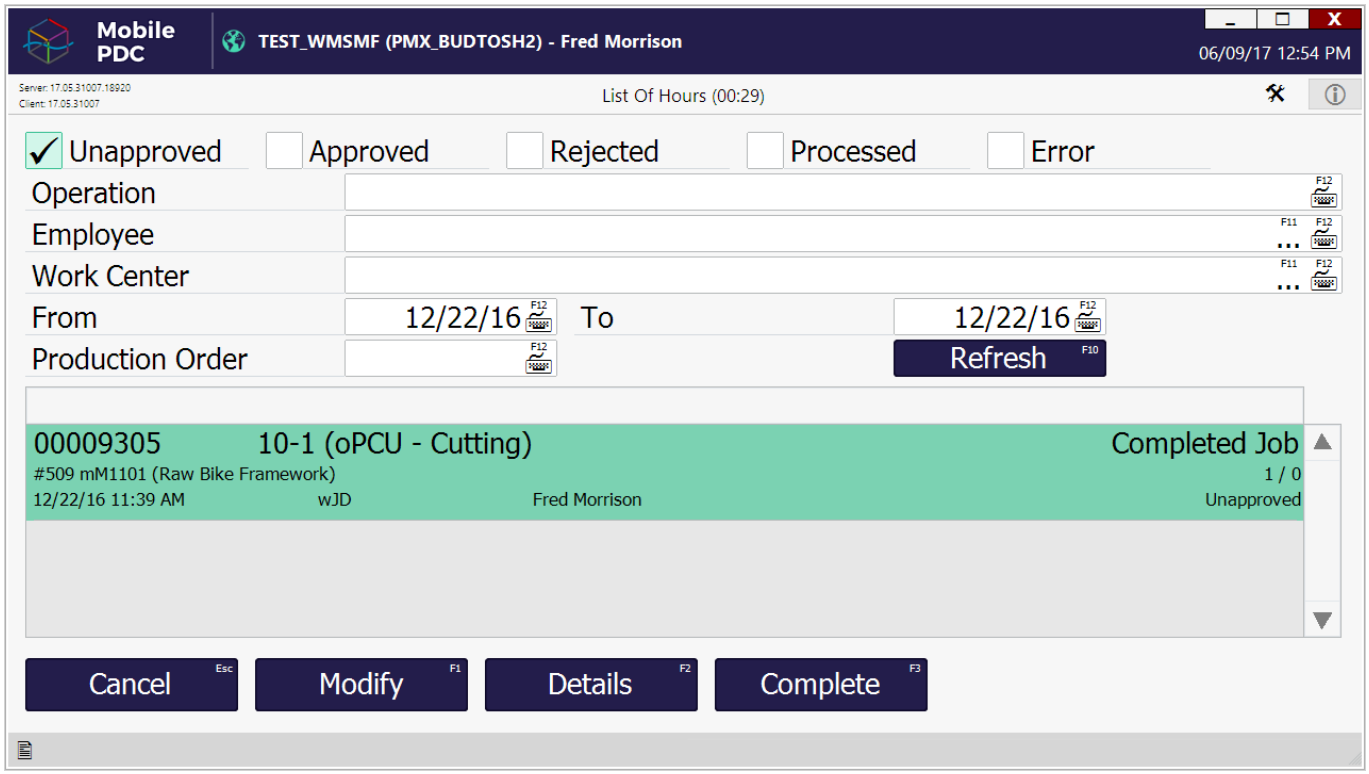
Complete
To finish a job booking, press the 'Complete' button. Only jobs with 'Started' status can be completed.

2.2.10. Approval of PDC Bookings

PDC supports approving of the PDC bookings by the appointed approver person only.

If there is at least one material/product where the *'NeedsPDC Approval'* option is set to 'Yes', approval is needed for the PDC booking. To approve the PDC booking the approver employee has to log in to the mobile PDC, and click on the 'Admin' button on the Start Job page.

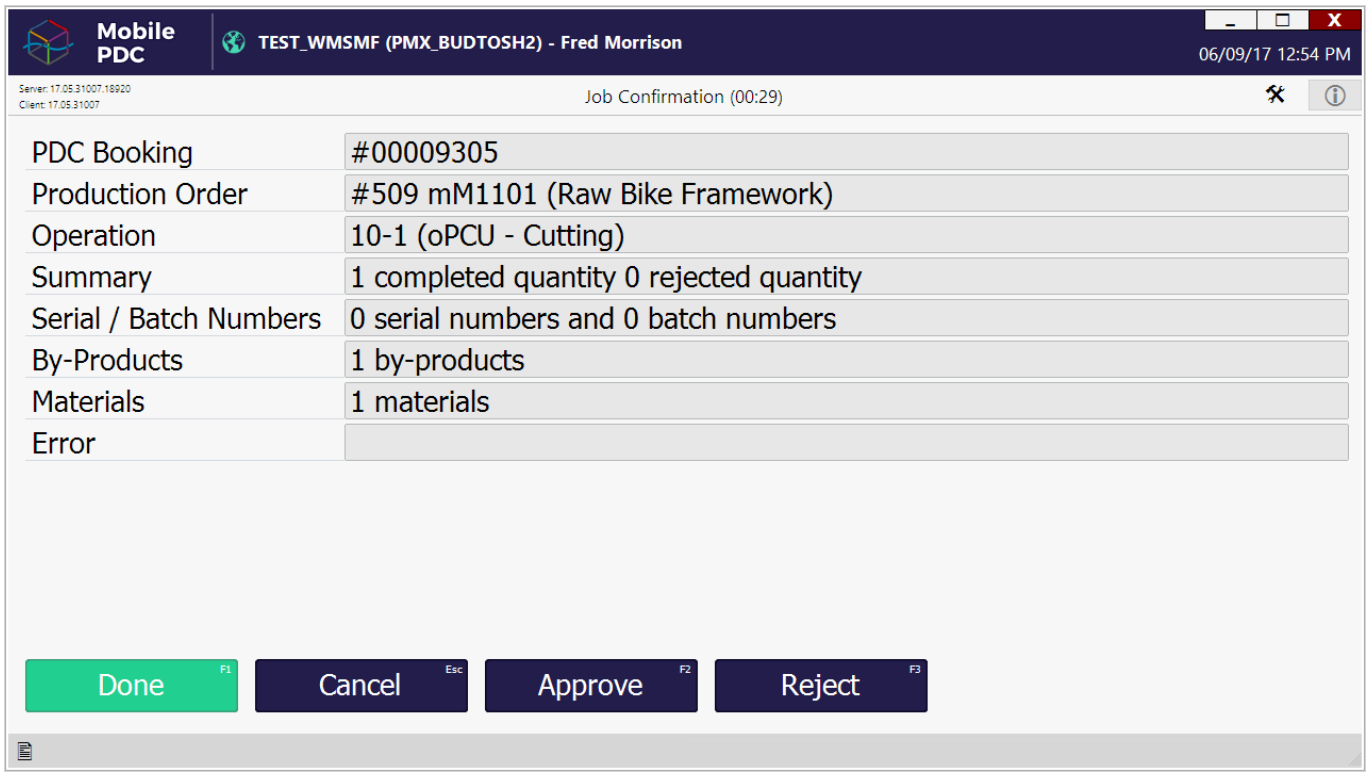
The filter form will open preloaded with all the operations that are unapproved:



The filter fields works as described in the ***2.2.9. Admin section***. Approver employees can see the

bookings of other employees too. Press the ‘Details’ button to review or press the ‘Modify’ button to revise the details of the selected booking.

On the summary page additional ‘Approve’ and ‘Reject’ buttons are displayed if the status of the selected operation is ‘Unapproved’.



If the PDC booking is rejected, the material bookings will not happen and the booking will be marked as ‘Rejected’.

If the PDC booking is approved, it will be processed by PDC Processor.

Employees without approver role cannot perform an operation that has materials or products that needs to be approved. If a non-approver employee starts a job for such operation, it will be disposed automatically to an approver employee. When this setting is enabled, sticky jobs completed by approver employees will be automatically approved.

2.3. Quality Controlling

Quality Controlling is a manufacturing shop-floor quality control/assurance data collection function of Produmex Manufacturing. It supports two major processes:

- QC for production order operations
- QA for outsourcing deliveries

When a worker reports the (partial) completion of an operation with the PDC system (either via the mobile client or shop floor PDC wizard), a QC officer can report QA data for that operation. The QC officer can qualify an operation as rejected (repairable or un-repairable) or approved. The QA data are stored in a database (in the @BXPQAPARAMSJRNL table), and custom reports can be created by the

customers or the partner. Saving QA data to that table is the only result of the quality controlling terminal; any additional steps that should be taken after the quality control process (workflow, repairing job, etc.) should be implemented separately as an addition to the quality controlling terminal.

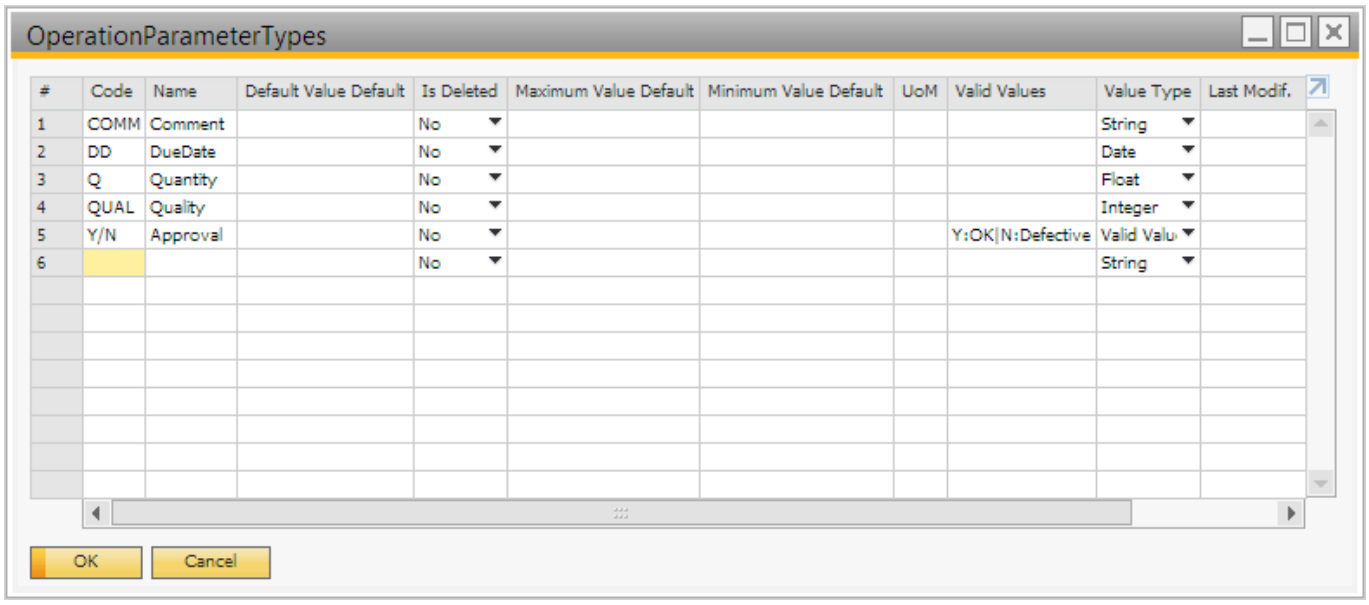
When a delivery (Goods Receipt PO) document is created for an outsourced operation, a QC officer can enter QA data for that delivery. Based on the quality qualifications, the outsourced operation may be rejected.

2.3.1. Set up quality controlling

In order to set up quality control parameters for an operation, enable the *'Production Operation Parameters'* option on the PDC tab of Produmex Manufacturing Settings. Next open the Operation Parameter Types form from: Tools > User-Defined Windows.

Here company specific reporting parameter types (dimensions) can be specified. Each operation can have multiple parameter types associated with it.

Typically in QA these parameters are some metric of the component worked on or the result of some QC tests. In the following example four parameter types were added, that will cover all the relevant features.



Based on the value type

- String: Text can be specified freely. Here it is used for a comment parameter type.
- Float, Integer, Boolean: Numeric fields can be used for measurement.
- Valid Values: This type can be used to create a 'choose from list' parameter. With a taglanguage, the entries in the list can be specified. The syntax is the following: 'Value in database':'Description'|'Value in database':'Description'|... For example in this case Y: OK|N: Defective was specified.
- Date, Time: Date and time is best stored in these types.

Please note: It is not necessary to add timestamp to every operation, as this is automatically collected.

Next open the Production > Manufacturing Operations form. Here, under the Parameters tab, the used parameters can be specified for each kind of operation.

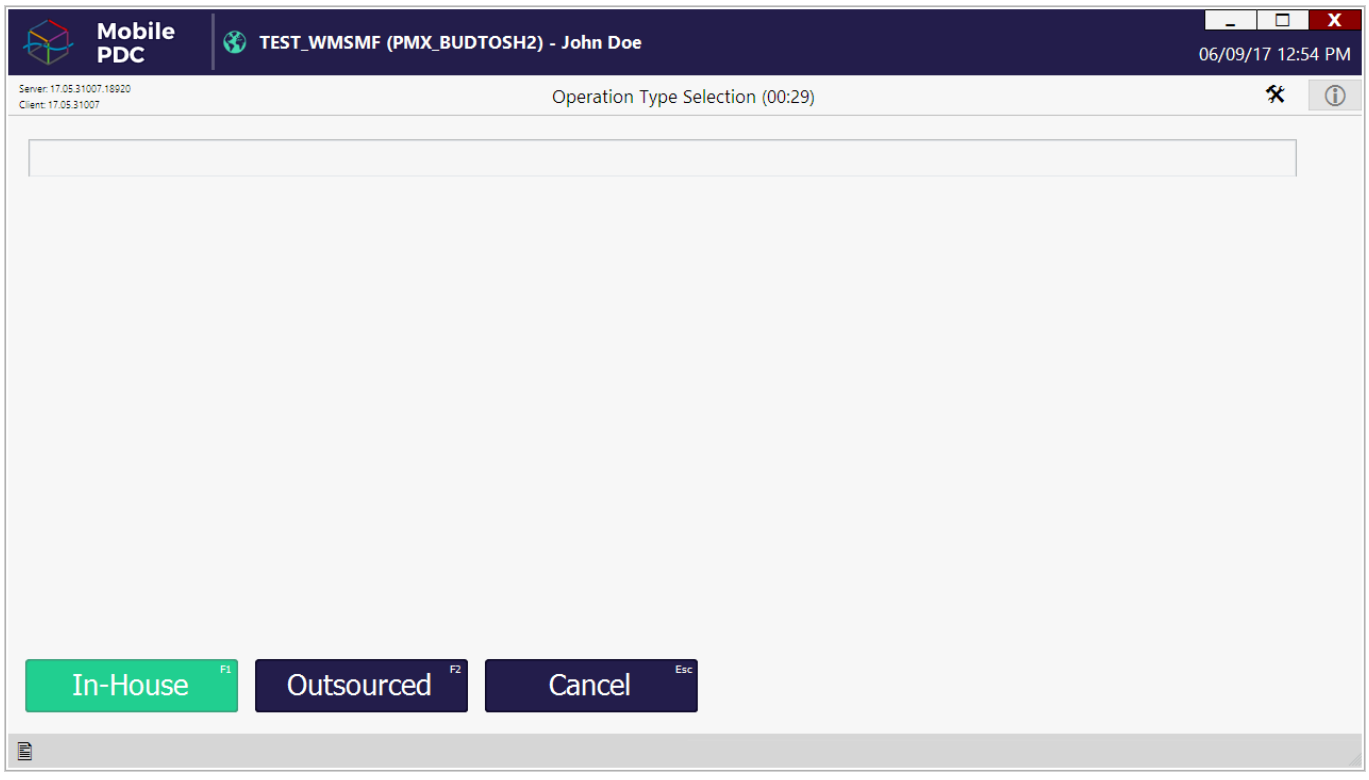
In the Type column, the previously defined parameter types can be chosen.
To use the parameters for the mobile QC terminal the value at the Quality Assurance column has to be set to true. In this example four parameters were specified.

2.3.2. Logging in to QC

Only employees appointed quality inspectors can log into Quality Control.

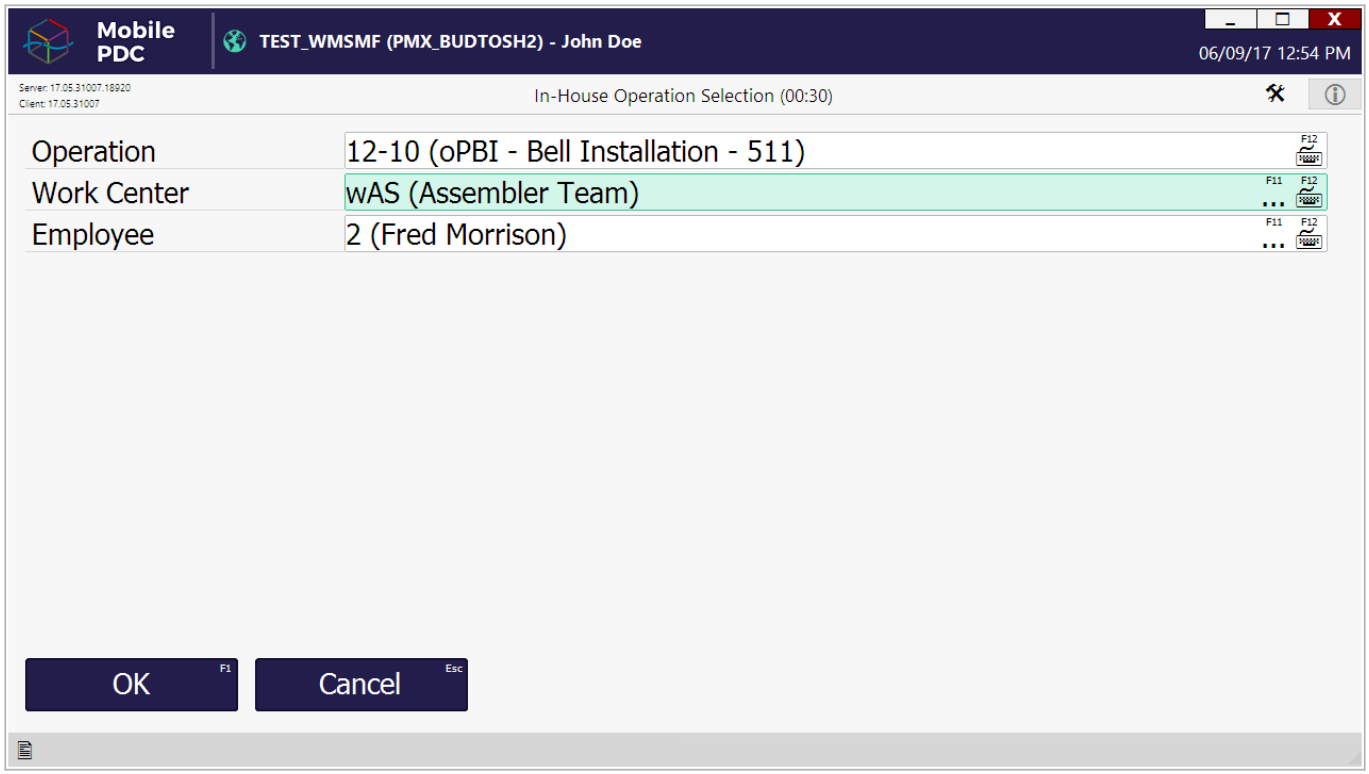
In the next screen the employee can choose between the two mentioned functions: the in-house QC and the outsourced QC.

Select the type of the operation on the next screen. Press the ‘In-house’ button to inspect in-house operations, or press the ‘Outsource’ button to inspect the quality of outsourced products. Press the ‘Cancel’ button to go back to the previous screen.

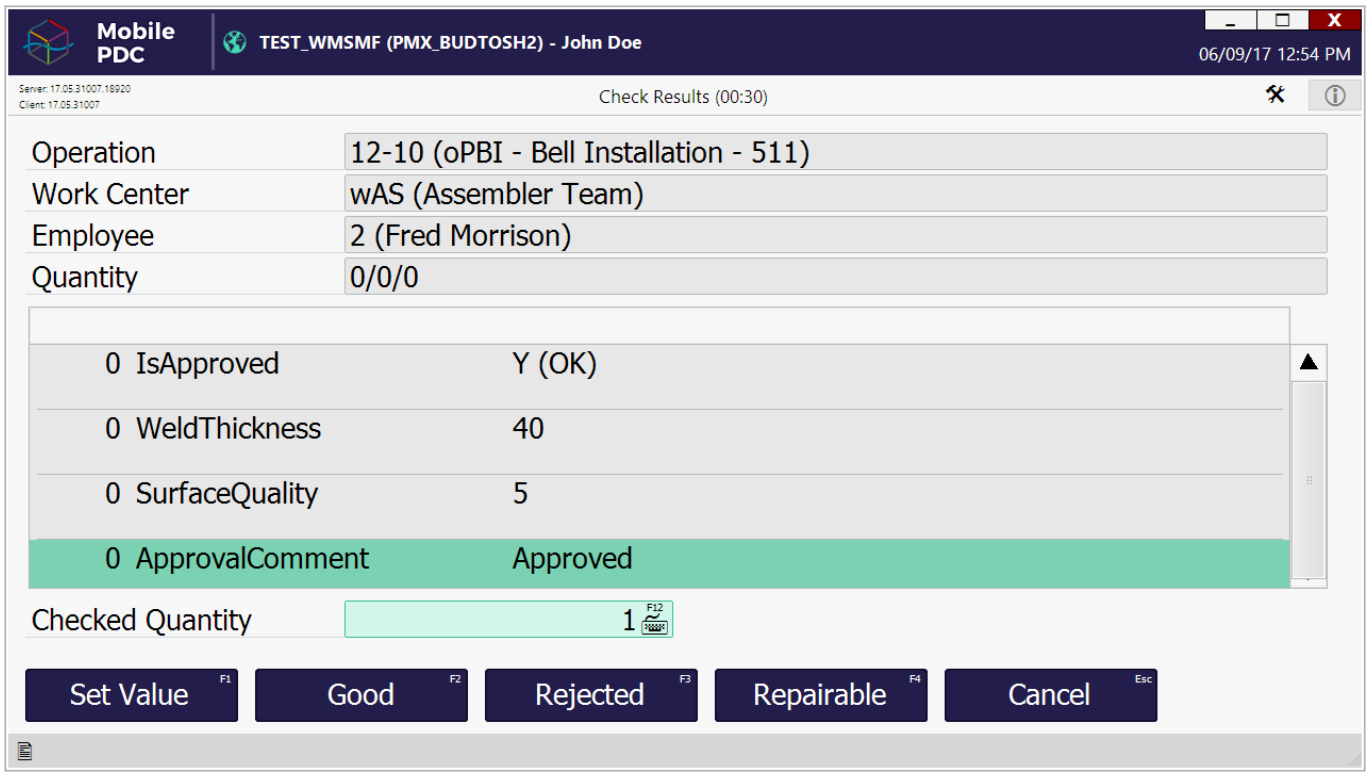


2.3.3. In-House QC

On the ‘In-House Operation Selection’ screen enter an operation ID. Choose a work center and the employee who performed the operation. Only operations with at least one PDC booking can be selected.



The system will proceed to the ‘Check Results’ screen. On this screen the quality of the operation can be reported with the previously defined parameters. Add the number of the tested instances to the ‘Checked Quantity’ field.



To specify parameters, select the parameter from the list and press the ‘Set Value’ button. This will prompt the ‘Set Value’ form.

The method for entering the value varies according to the value type of the parameter:

- String: Enter the text to the textbox.
- Float, Integer, Boolean, Date -Time: Add the value to the textbox.
- Valid Values: Select a value from the list.

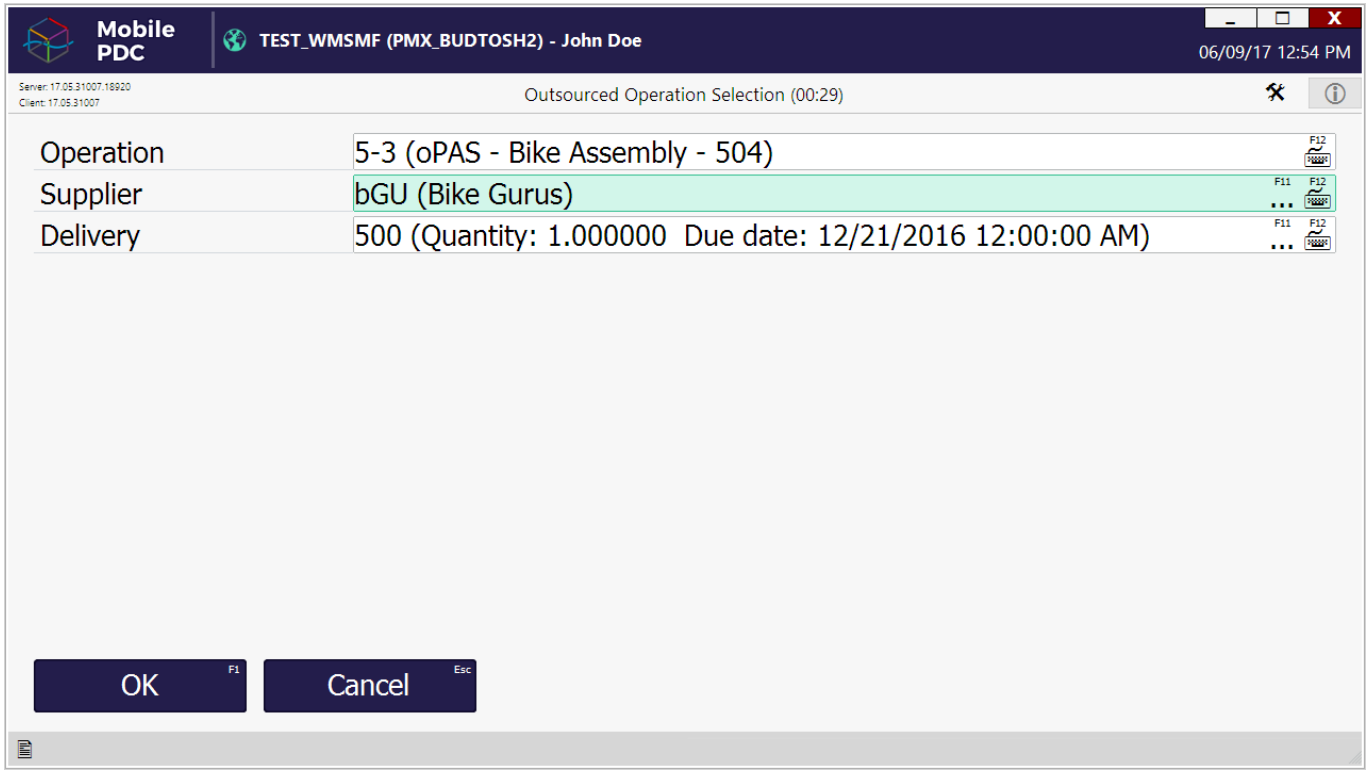
To approve the operation quality, press the ‘Good’ button.
To reject the operation, press the ‘Rejected’ button.
To register the operation as repairable, press the ‘Repairable’ button.

2.3.4. Outsourced QC

For more information about outsourced operations please see: Outsourced Manufacturing.

The Quality Control of an outsourced operation can be handled by selecting ‘Outsourced’ on the Operation Type Selection form. The procedure is the same as an in house operation with the one exception of the selection form.

In the Outsourced Operation Selection window the operation can be specified and then the supplier and the instance of the delivery can be selected.



After this the procedure is the same as introduced in the in-house case.

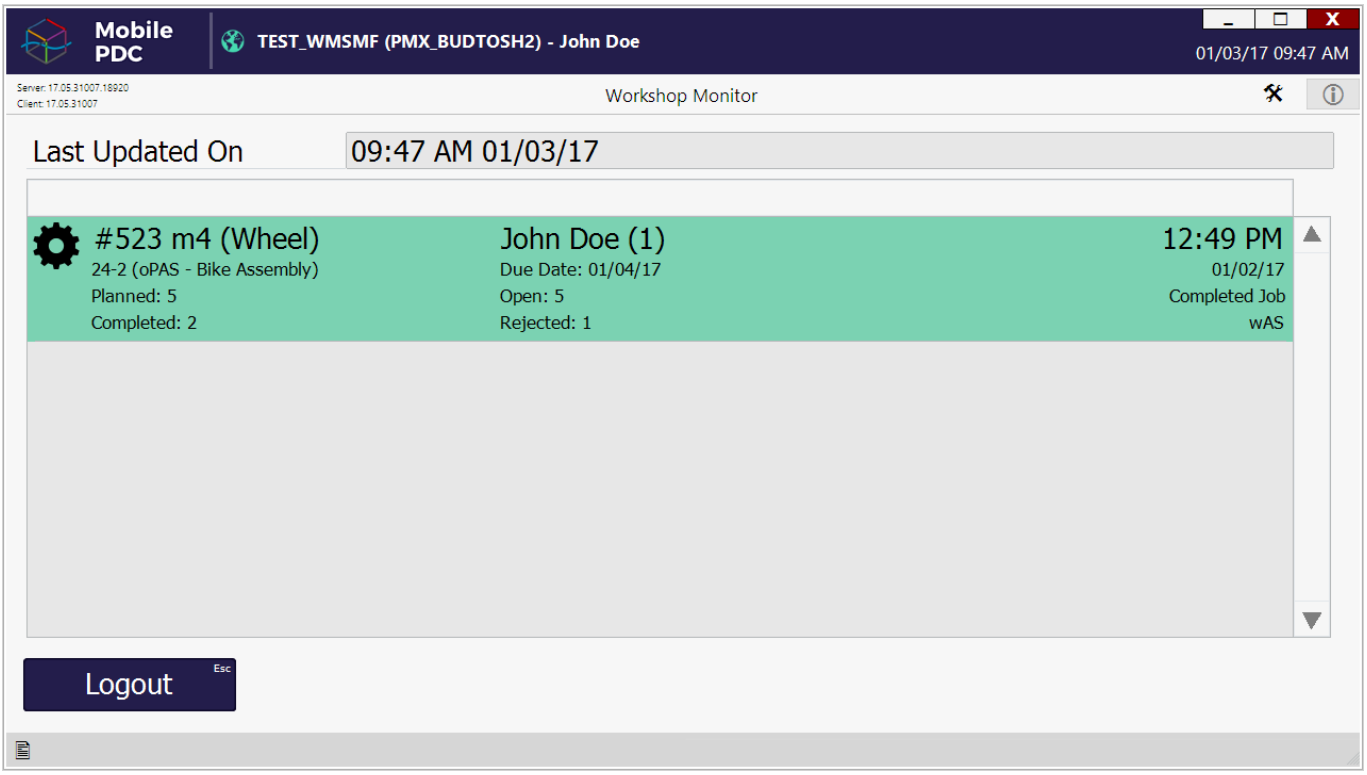
Quality Assurance entries can be seen on: Tools > User Defined Windows > QualityAssuranceJournal

2.4. Workshop Monitor

On the workshop monitor ongoing operations can be overviewed. The workshop monitor will display data supplied by the ***‘bxtc_pdc_workshop_monitor_query’*** user query. Before using the workshop

monitor, create the custom query. See the example query here: Workshop Monitor

Only employees appointed as Workshop Monitor inspector can log in the Workshop Monitor.

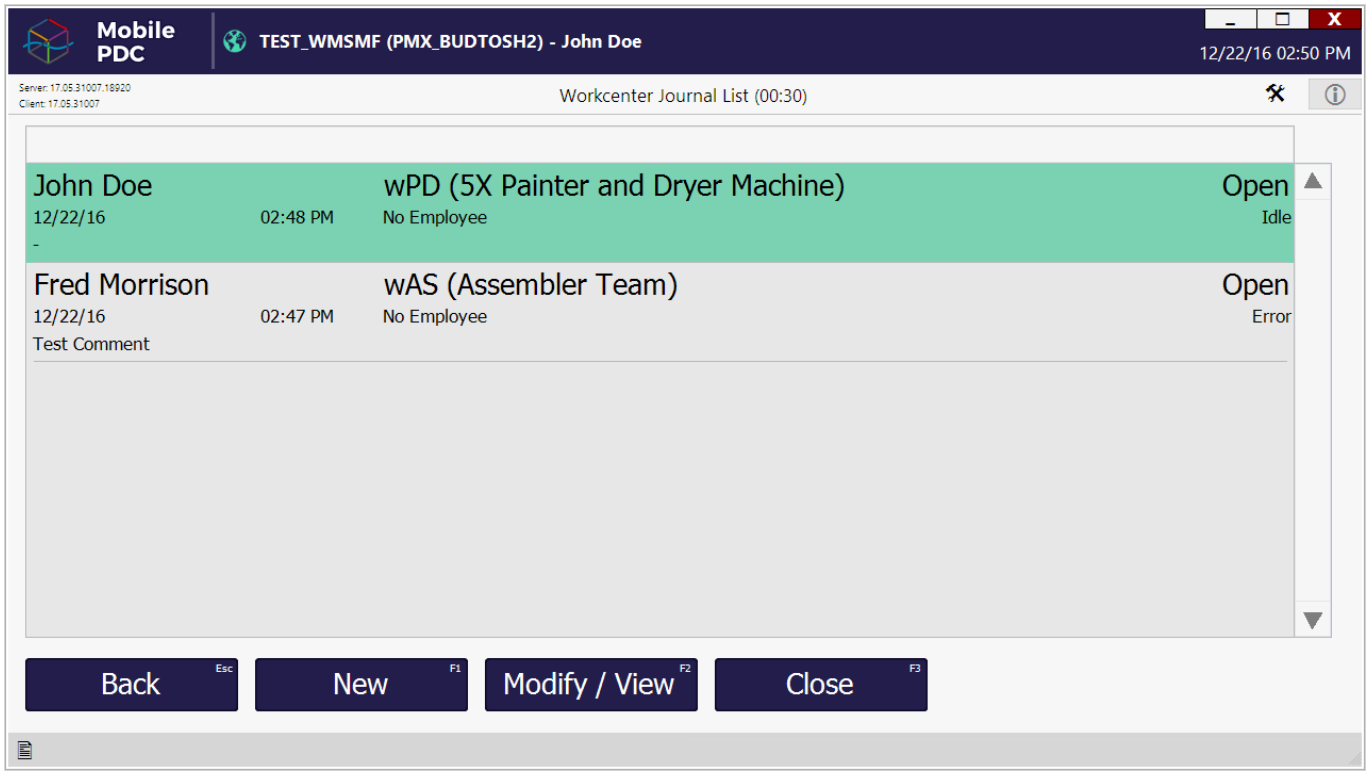


2.5. Work Center Journal

With Work Center Journal tickets work center unavailability reasons can be reported. To create work center journal entries, login the Work Center Journal module. Every employee can create WC journal entries or modify their entries. Only employees appointed as WC admins can close journal entries or modify entries created by other employees.

2.5.1. Work Center Journal List

After the login, the list of open entries are displayed.



Press the ‘Back’ button to go back to the login screen.
Press the ‘Modify/View’ button to review or modify the elected entry. The ‘Work Center Journal Entry’ screen of the selected entry will open up.
If the employee is appointed to the Work Center Admin role, an additional ‘Close’ button is displayed on the screen. Press this button to close the entry.
Press the ‘New’ button to create a new entry. The ‘Workcenter Journal Entry’ screen will be prompted.

2.5.2. Work Center Journal Entry

On the ‘Information’ field the employee name and the date of the creation is displayed. Non modifiable field.

Enter the code of the work center to the work center field or select it from a list after pressing F11.

Select a reason for the work center unavailability. The possible values are: ‘No Employee’, ‘No Material’ or ‘None’. Select an entry type. The possible values are: ‘Idle’, ‘Error’ or ‘None’. It is possible to add remarks to the journal with the ‘Comment’ textbox.

Press the ‘Done’ button to create the entry or press the ‘Cancel’ button to go back to the previous screen.

Work Center Journal entries can be reviewed in the office environment as well. Open the Work Center Journal UDT via: Tools > User Defined Windows. On this form closed journal entries are also displayed.

2.6. Work Center Tickets

With work center tickets machine failures and malfunctions can be reported.

2.6.1. Setup Work Center Ticket types

If you would like to use the Work Center Ticket module, it is recommended to setup ticket types for the work center. Open the Form via: Tools > User Defined Fields > WorkCenterTicketTypes.
Add the ticket code and name then press 'Update'.

2.6.2. Work Center Ticket List

After the login, the list of open tickets are displayed.

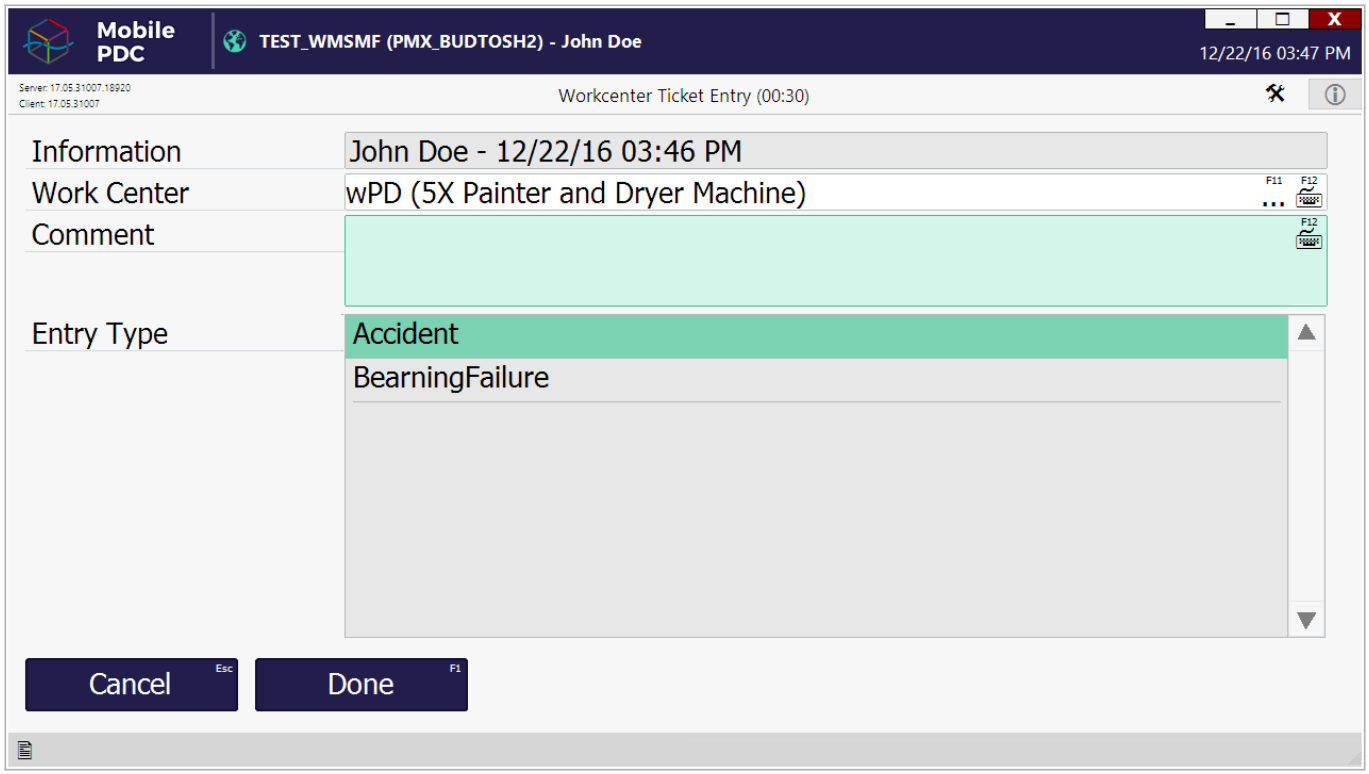
1. Creator name, date and time of the creation
2. Added comment
3. Work center code and description
4. Ticket status
5. Ticket type

Press the 'Back' button to go back to the login screen. Press the 'Modify/View' button to review or modify to selected ticket. The 'Work Center Ticket Entry' screen of the selected entry will open up.

If the employee is appointed to the Work Center Admin role, an additional 'Close' button is displayed on the screen. Press this button to close the ticket.

Press the ‘New’ button to create a new entry. The ‘Workcenter Ticket Entry’ screen will be prompted.

2.6.3. Work Center Ticket Entry



On the ‘Information’ field the employee name and the date of the creation is displayed. Non modifiable field.

Enter the code of the work center to the ‘Work Center’ field or select it from a list after pressing F11. Add a comment to the ‘Comment’ textbox.

Select an entry type. Every ticket type defined on the Work Center Ticket Type UDT can be selected.

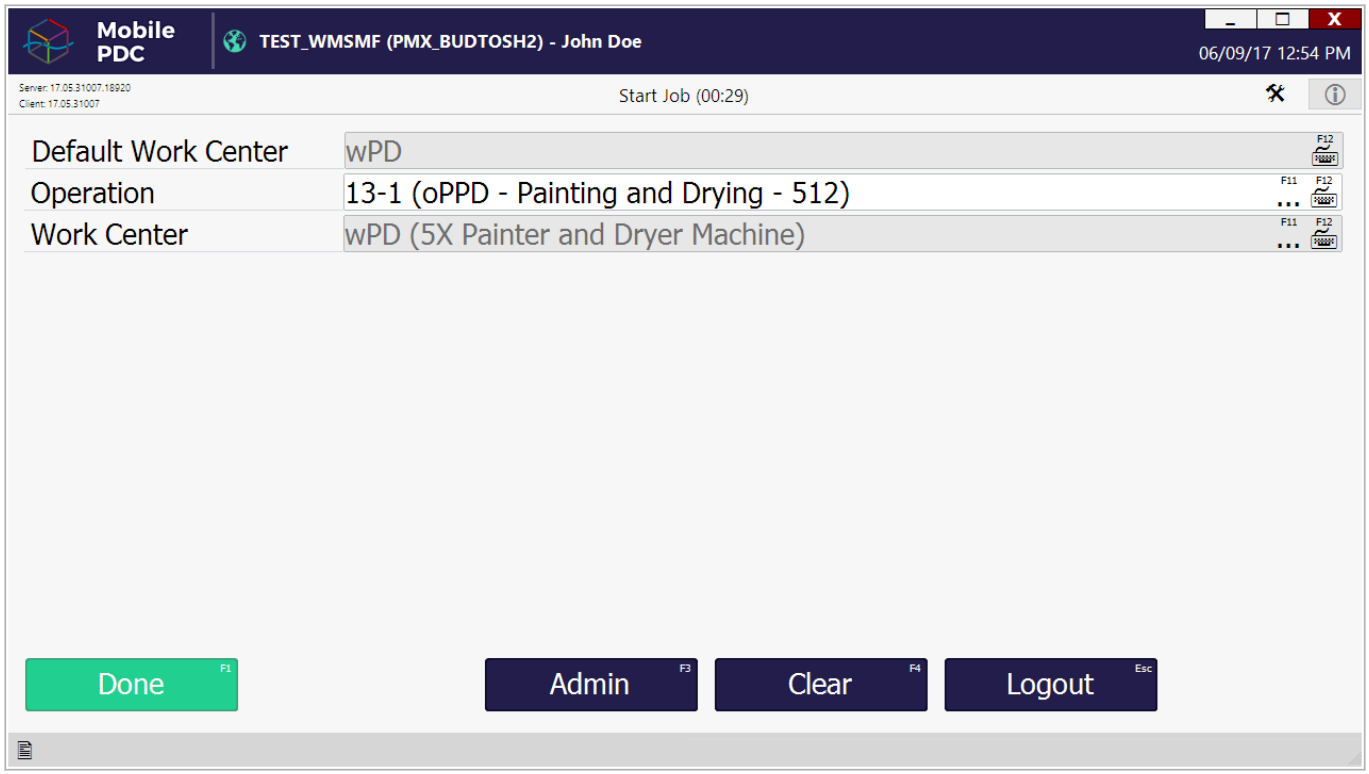
Press the ‘Done’ button to create the entry or press the ‘Cancel’ button to go back to the previous screen.

Work Center Ticket entries can be reviewed in the office environment as well. Open the Work Center Tickets UDT via: Tools > User Defined Windows. On this form closed ticket entries are also displayed.

2.7. Simple Job module

With the Simple Job module, the user can start and complete a job and a setup at one step.

2.7.1. Start Job



The default work center is the work center defined for the terminal on the PDC Terminal Configuration user table. To disable the default work center, set the 'Work Center Ignore' option to 'Yes' for the employee on the PDC Extended Configuration user table]]. When there is a default work center, bookings can be created only for operations with the feature assigned to the default work center.

Add the *DocEntry-LineNumber* identifier to the 'Operation' field.

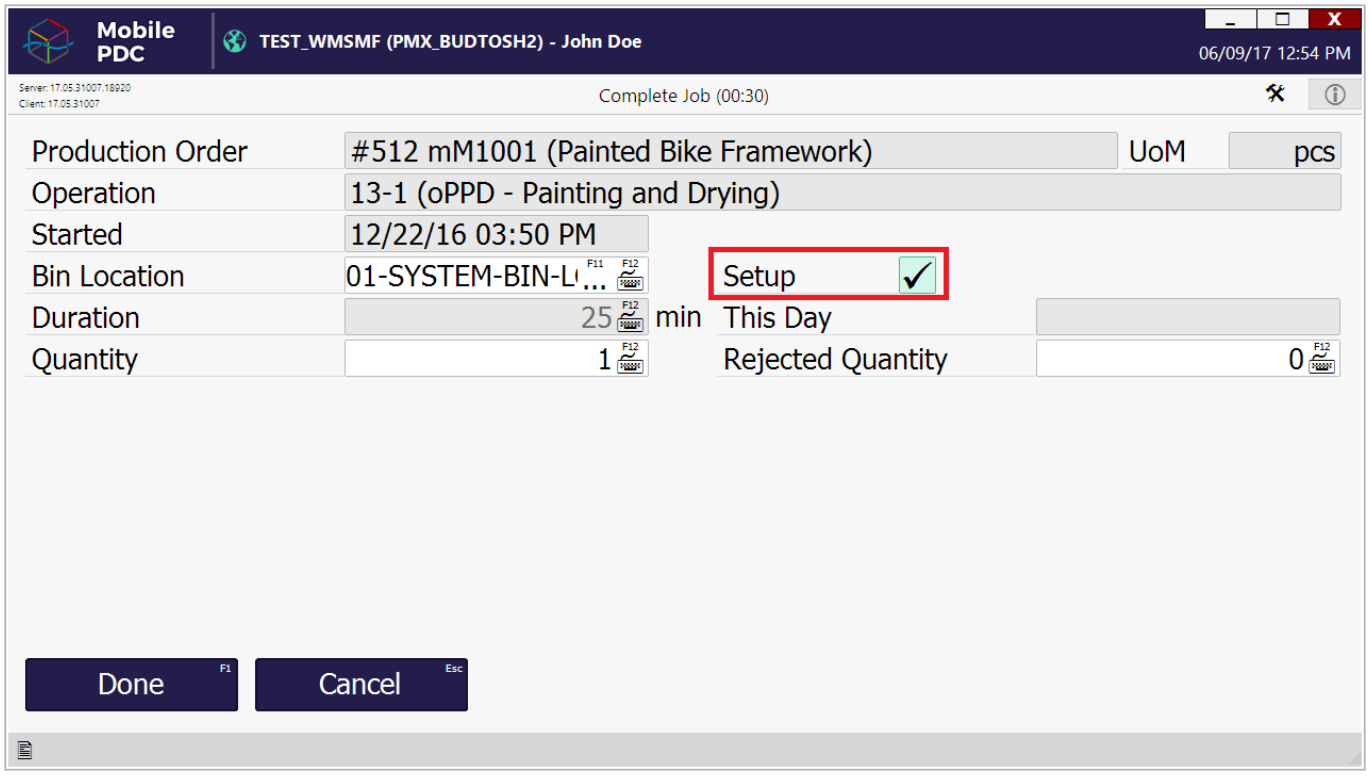
If there is a default work center, the work center field will be populated automatically. The user cannot modify the work center if the default work center is mandatory. The default work center is mandatory in the following cases:

- The employee and/or the work center has no configurations set on the PDC Extended Configuration user table and the 'PDC Modifiable WC for Start' option is disabled on the Thin Client tab of Produmex Manufacturing settings.
- The 'Work Center Modification' option is disabled on the PDC Extended Configuration user table for the employee and/or work center.

Otherwise the work center is not mandatory and the user can select an alternative work center.

To erase the content of the modifiable fields, press the 'Clear' button.
To log out as the current employee, press the 'Logout' button.
To see the Admin screen, press the 'Admin' button. For more information about the Admin function please see: 2.2.9. Admin

Press the 'Done' button to proceed.



2.7.2. Complete Job

Scan the destination Bin Location or enter its code.
The default Bin Location is the Bin Location defined for the employee/work center on the PDC Extended Configuration user table. If there is no default bin location defined for the employee/work center on the PDC Extended Configuration user table, then the default bin location is the bin location defined for the work center.

To create setup bookings too, tick the 'Setup' box. The box is only active if there is setup time defined for the operation. Scan the destination Bin Location or enter its code.

Then enter the completed and rejected quantity. When the user enters the completed/rejected quantity, the duration is automatically calculated.

- If setup time is defined for the operation and the 'Setup' checkbox is checked, the duration is calculated as {(Setup base quantity + Operation base quantity) * (Completed quantity + Rejected quantity)}.
- If there is no setup time defined for the operation and/or the 'Setup' checkbox is not checked, the duration is calculated as {Operation base quantity * (Completed quantity + Rejected quantity)}.

After the Duration field is filled, the system also calculates the Start time as {Current Date/Time – Duration}.

If the *'Manual Job Duration'* option is enabled on the PDC Extended Configuration user table, the user can enter the duration. When the user enters or modifies the duration, the system recalculates the Start time. Please note: The completed quantity will not be recalculated based on the duration.

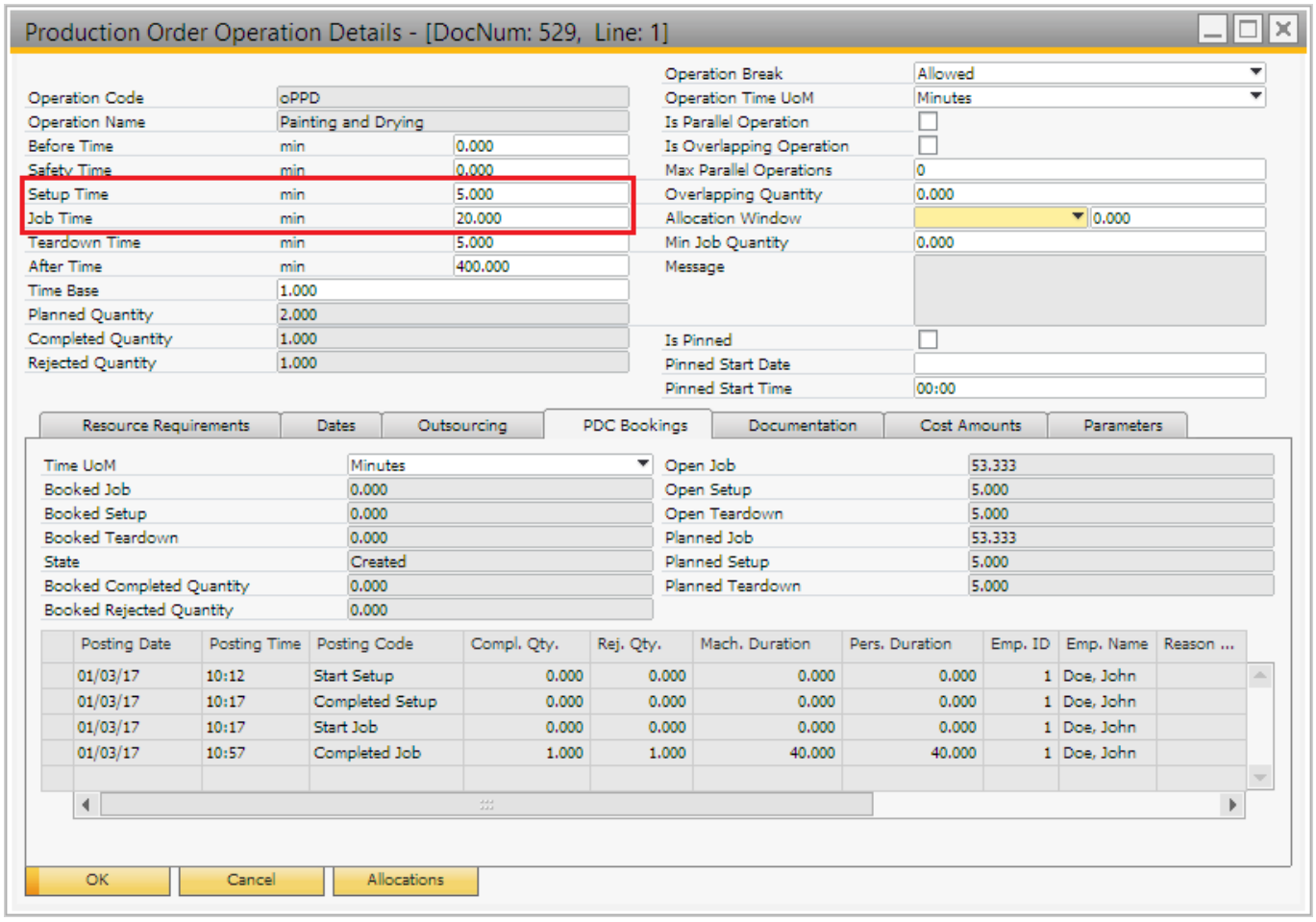
If the *'Comment Visible'* option is enabled on the PDC Extended Configuration user table, an additional Commend field is displayed on the screen.

Press the ‘Done’ button to proceed.

When there are materials linked to the operation with a milestone, receive the materials. Please see: 2.2.7.Materials

When there is a by-product linked to the operation or the operation is the last one on the production order and there is a milestone set for the product, receive the (by-)products too. Please see: 2.2.6.Products

Operation Details
Because the user does not start the job manually, the booked time cannot be measured. The system will automatically create the ‘Start Setup’, ‘Completed Setup’, ‘Start Job’ and ‘Completed Job’ bookings. The Posting Time of the Complete Job booking is the time when the PDC booking was created. The Posting Time of the ‘Start Setup’, ‘Completed Setup’, ‘Start Job’ bookings is calculated backwards.



3. PDC bookings in SAP B1

3.1. Create PDC bookings

3.1.1. Simplified Production Data Collection

Many manufacturing companies do not need the full-fledged data collection terminal. Instead, they could do very well with the much simpler PDC office terminal. In this scenario, the production data is collected (mostly) on paper, and the data is entered at the end of the day by an office assistant.

3.1.1.1. Print the PDC sheet

Open the sheet generator via: Production > PDC > PDC Sheet Generator.

The *'PDC Sheet Generator Parameters'* screen will open up.

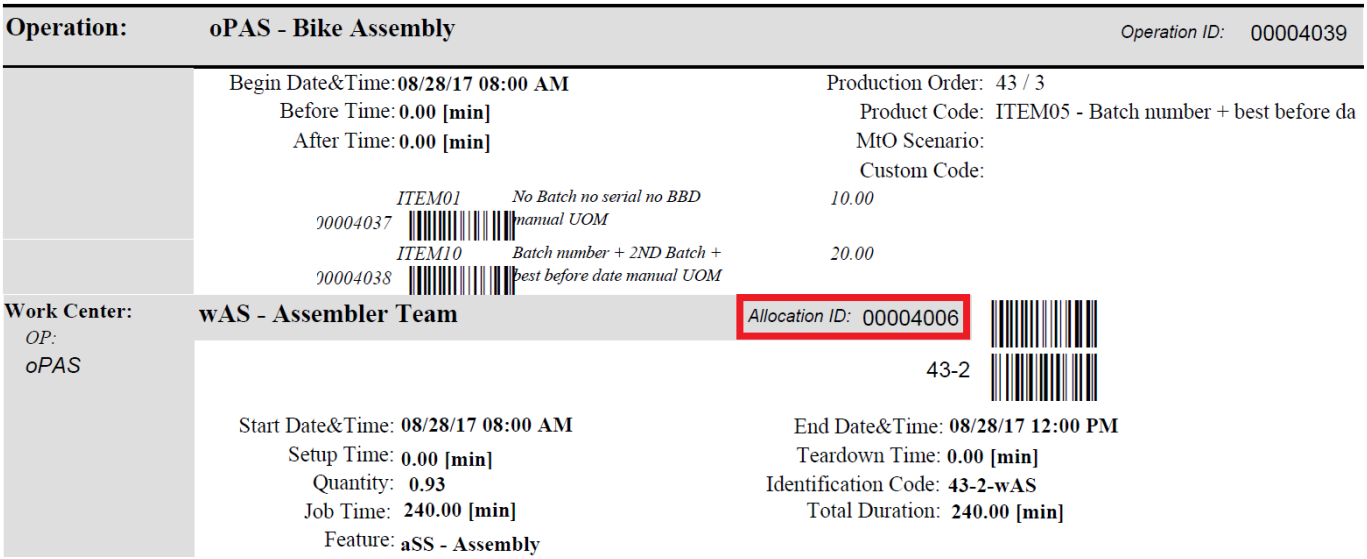
To print a prefilled sheet, tick the 'Prefilled' box then select the data to add to the sheet. The sheet can be prefilled with the following data:

- Employee ID
- Pr. Ord. No
- Operation Code
- Work Center

Enter the number of rows you would like to add for each allocation to the 'Rows per allocation' field.

Click on 'Ok' then set the printing options on the 'Select Report Layout' screen.

The Allocation ID is the identification number of the allocation that can be seen on the Job Requirements Report:



The Posting Code stands for the status of a certain phase in PDC booking. (Eg.: 'Partial setup', 'Completed Job')

3.1.1.2. PDC Bookings office terminal

Enter the data collected on the PDC screen on the PDC Bookings office terminal form. Open the form via: Production > PDC > PDC Bookings office terminal.

With the office terminal it is not mandatory to record all phases (setup, job, shutdown, break, etc.) of the operation; most typically only the job completion is booked.

When the bookings have been inserted and user presses the ‘Update’ button, the appropriate material issue for production or product receipt from production (according to the milestone settings of the operation and material lines) inventory transactions will be committed as well. After a job completion is booked on the office terminal, the status of the operation is set to ‘Finished’.

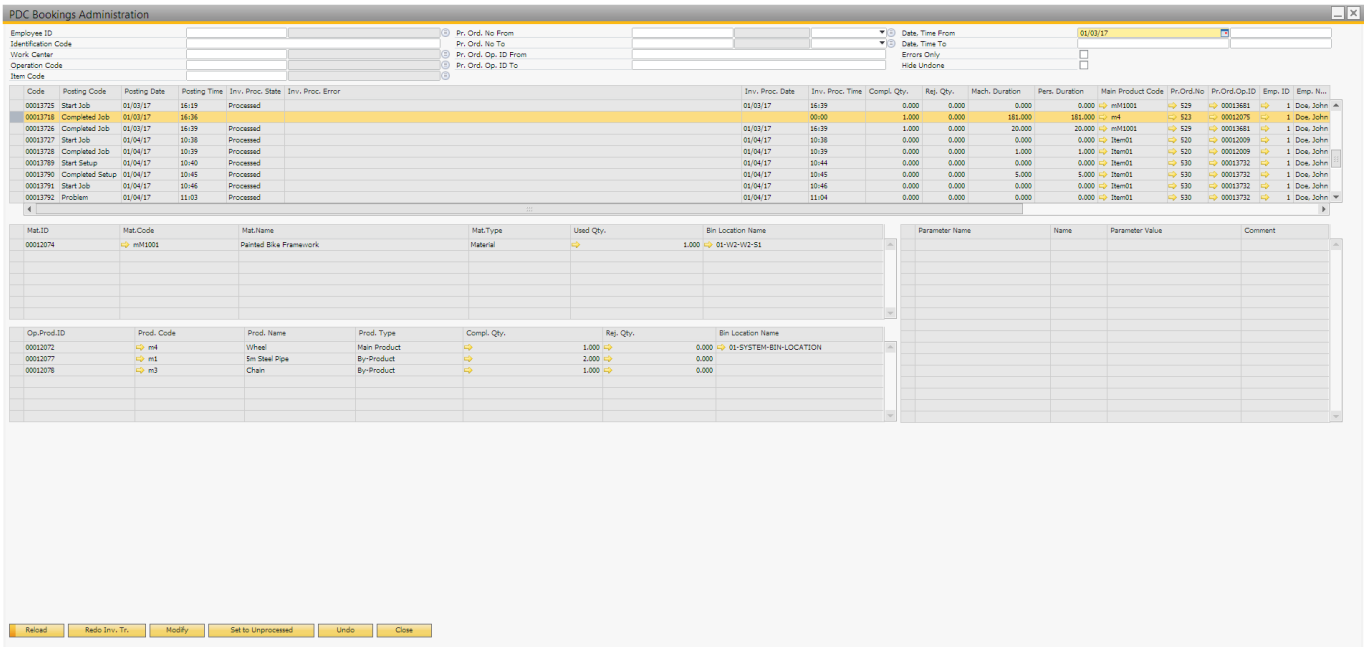
3.1.3. Simple PDC Shop-Floor Wizard

The Simple PDC Shop-Floor Wizard is an obsolete function. It is recommended to use the Mobile PDC instead.

3.2. Manage PDC bookings

3.2.1. PDC Administration

On the PDC Administration form PDC bookings can be reviewed and modified. Open the form via: Production > PDC > PDC Administration.



The upper part of the screen is a filter. Bookings can be filtered with the following:

- Employee
- Work center
- Operation code
- Item code (of the main product)
- Production order number (range)
- Production order operation ID (range)
- Date (range)

Check the ‘Errors only’ box to list only bookings with processing errors. Uncheck the ‘Hide undone bookings’ box to include undone bookings in the list as well.

Click on the ‘Reload’ button to get the list of the bookings with the applied filters. The bookings will be listed on the upper grid.

On the middle of the screen a ‘Material’ grid and a ‘Product’ grid is displayed. When the ’Use Operation Parameters’ option is enabled on the PDC tab of Produmex Manufacturing Settings, an additional ‘Parameter’ grid is shown.

On the ‘Material’ grid the materials issued during the selected booking are listed. On the ‘Product’ grid the products received during the selected booking are listed. On the ‘Parameter’ grid the quality assurance parameters will be displayed.

Click on the ‘Close’ button to close the form.

Modify
To modify a booking, select its row and click on the ‘Modify’ button. The ‘Modify PDC Booking’ form will open up. On this form the following can be modified:

- Posting Date and Time
- Machine and Person Duration
- Completed and Rejected Quantity

If the PDC booking has inventory transactions, the completed and the rejected quantities cannot be modified.

Set to Unprocessed
To reprocess every failed transaction displayed on the screen, click on the ‘Set to Unprocessed’ button. The status of the transaction will be set to ‘Unprocessed’. These transactions will be reprocessed when the PDC Processor runs again.

Redo failed transactions
To individually reprocess bookings with inventory transaction errors, select the row of the booking and press the ‘Redo Inventory Transactions’ button.

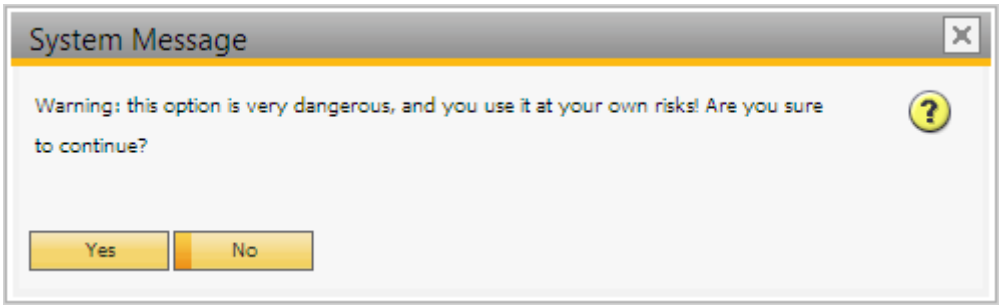
The System Message shows the number of the successful and failed reprocesses.

Undo a booking

When the *'PDC Allow Undo'* option is enabled on the PDC tab of the Produmex Manufacturing Settings, PDC transactions can be undone. An additional 'Undo' button is displayed on the screen.

To undo an erroneous booking, select the row of the transaction and click on this button. Undone bookings are marked with a tick in the box on the 'Is Undone' column. Undoing a *Close* or IsCompleted booking changes the status of the operation back from *Finished* to *Started* or *Created*.

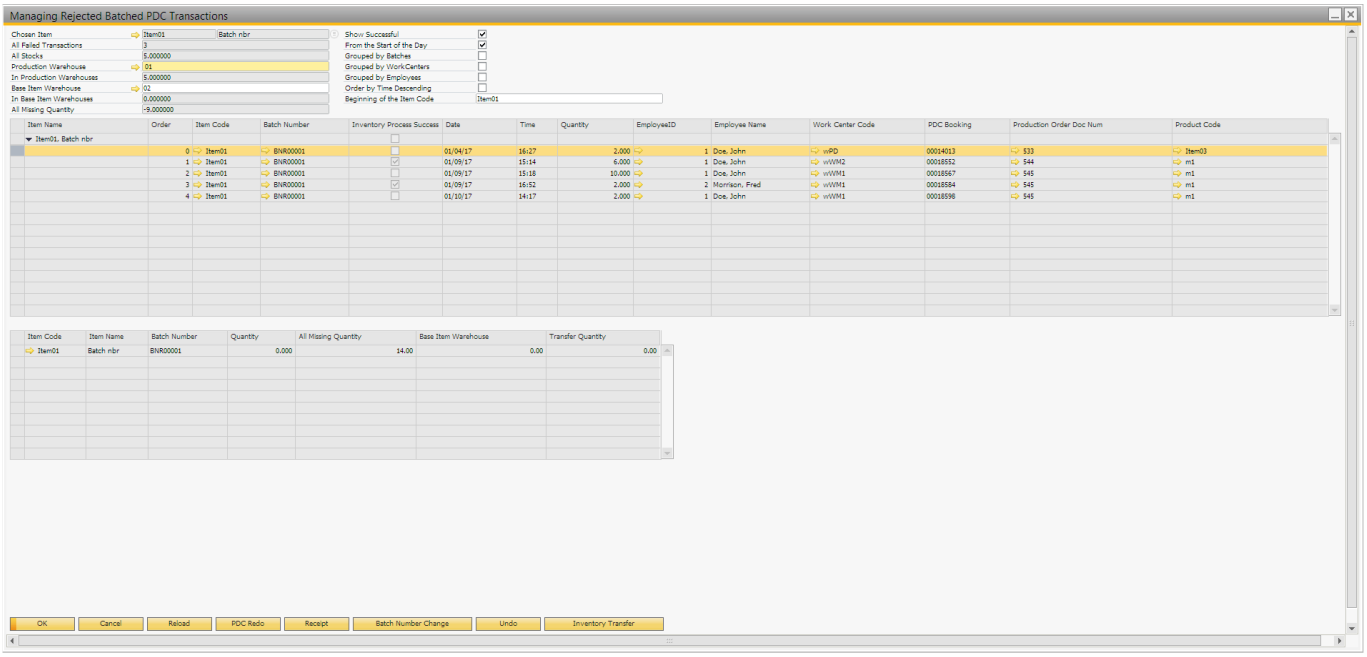
When the *'PDC Undo Only No Transaction'* option is disabled, PDC bookings with inventory transactions can also be undone. Please note that undoing a PDC booking with inventory transaction is strongly discouraged. During the process a system warning will open up. Press the 'Yes' button to proceed with the undoing. The inventory transactions booked for the PDC transaction will be undone too.



PDC bookings containing materials or products managed by serial or batch numbers cannot be undone.

3.2.2. Managing Rejected Batched PDC Transactions

To correct PDC transactions that were unsuccessful due low stock quantity of batch managed materials, enable the *'Managing Rejected Batched PDC Transactions'* option on the PDC tab of Produmex Manufacturing settings. Open the form via: Production > PDC > Managing Rejected Batched PDC Transactions.



On the header transaction details can be overviewed.
The grid can be filtered with the following:

- Show successful: Tick the box to show the successful transactions linked to the rejected batches.
- Beginning of the Item Code: To filter the list based on the item code, start to enter the item code to the textbox.

Displaying options can also be set on the header:

- Grouped by Batches/ Work Centers/ Employees: Enable the grouping options by ticking the box.
- Order by Time Descending: By default the rows are sorted by the batch/ serial numbers. When this option is enabled, the rows are ordered descending by the creation date and time.

Reload

Click on the ‘Reload’ button to get the list of rejected batched transactions with the applied filters.

The transactions are grouped by the item. Click on the black arrow next to the item code to reveal the rows of the failed transactions belonging to the item.

PDC Redo

To reprocess bookings with rejected batches, select the row(s) of the booking(s) and press the ‘PDC Redo’ button.

Batch Number Change

When the transaction is failed because there are insufficient stock from the added batch but there are stock available from other batches, the transaction can be corrected by changing the batch number. Select the transaction row to change then click on the ‘Batch Number Change’ button. The ‘Batch Number Change’ form will be open.

Batches with available quantities are listed on the grid. Add the quantity to change to the ‘Change Quantity’ cell on the row of the new batch. Remarks can be added on the ‘Comment’ textbox.

The transaction will be reprocessed by the PDC processor.

Receipt
When the transaction is failed because there are insufficient stock in the inventory, the transaction can be corrected by receiving the missing quantity. Select the transaction row(s) then click on the 'Receipt' button.

Add the quantity to receive to the 'Receipt Quantity' cell on the opening form then press the 'Ok' button to create a 'Goods Receipt' document and receive the items.

Please note: In order to create the goods receipt document, a *'GoodsReceipt Series Name'* should be set on the PDC tab.

The selected transaction(s) will be reprocessed by the PDC processor.

Inventory Transfer
When the transaction is failed because there are insufficient stock from the batch in the warehouse, the transaction can be corrected by receiving the missing quantity from another warehouse. Select the transaction row(s) then click on the 'Inventory Transfer' button.

The selected transaction(s) will be reprocessed by the PDC processor.

Undo
Rejected batch transactions have no inventory bookings linked therefore can safely undone. To undo rejected batch transactions, press the 'Undo' button then add the quantity to undone to the 'Undone Quantity' field.

Finter

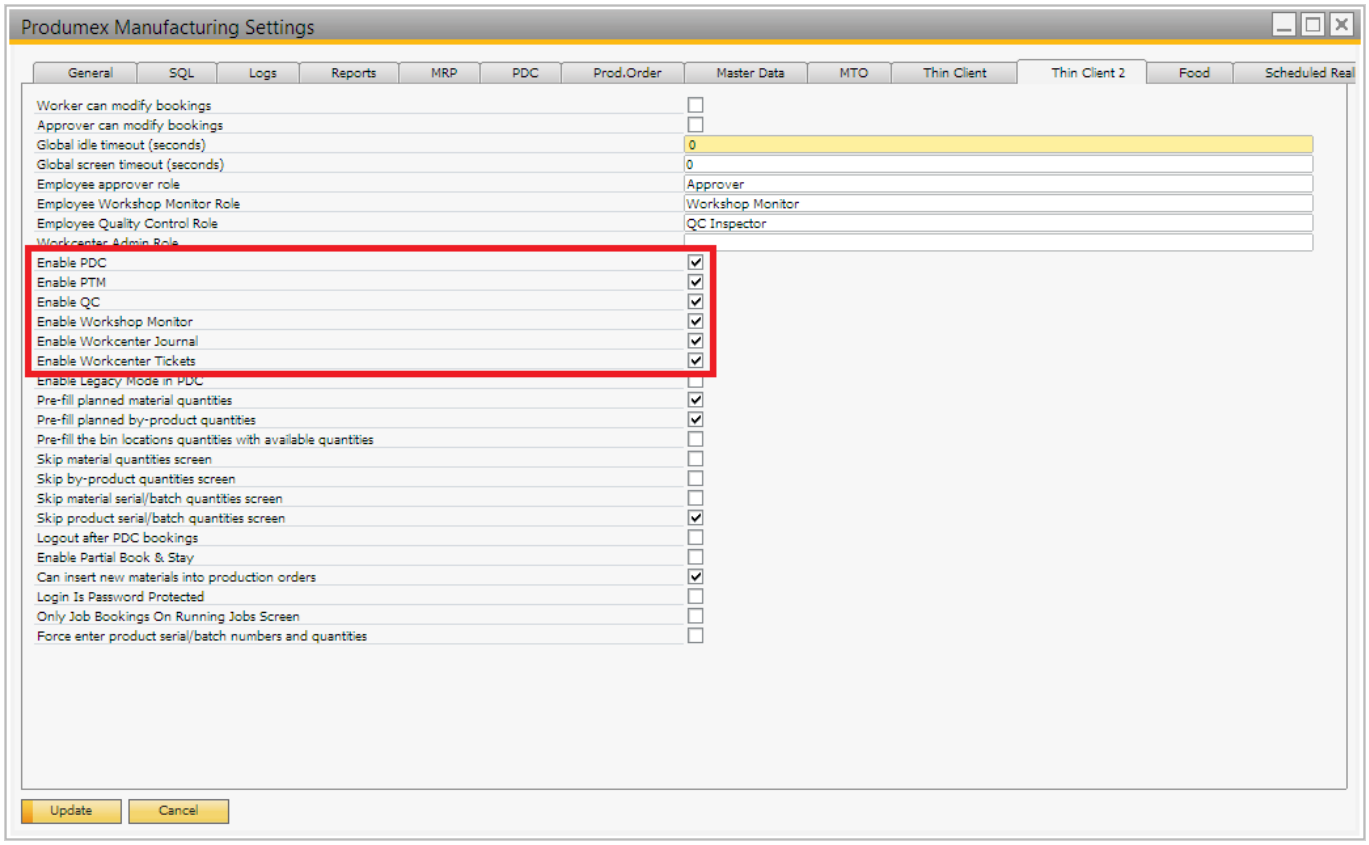
1. Configurations

For more information about the configuration option for PDC please see:

- settings for the office PDC:
  - Produmex Manufacturing Settings > PDC tab
- settings for the mobile device:
  - Produmex Manufacturing Settings > Thin client tab
  - Produmex Manufacturing Settings > Thin client 2 tab
  - Configuration of Produmex PDC

1.1. Enable modules

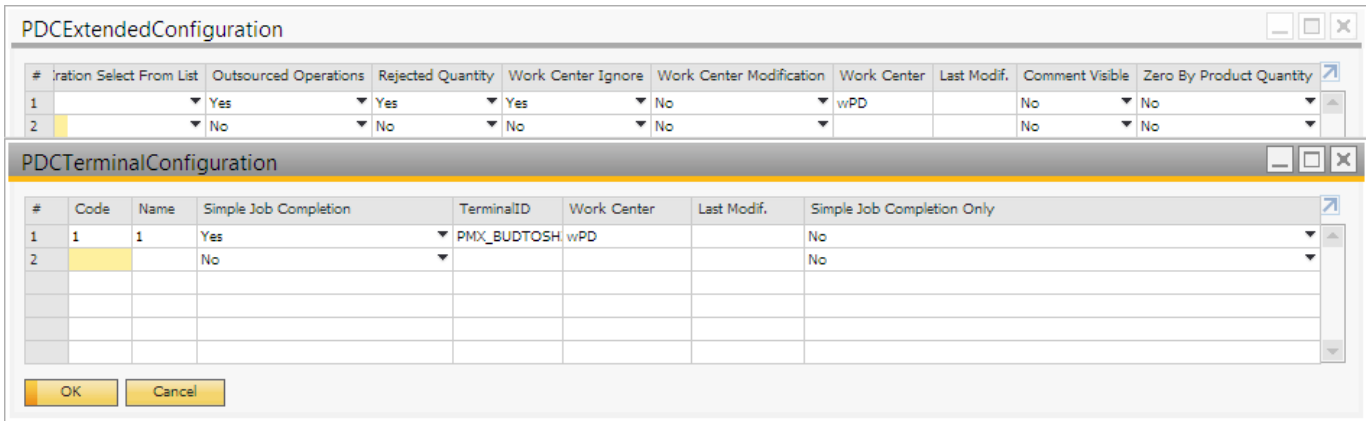
In order to use a module on terminals, enable it on the Thin client 2 tab of Produmex Manufacturing Settings. Every enabled module is displayed on the Main Menu.



The only exception is the ‘Simple Job’ module because it is terminal dependent and assigned for one work center only per terminal. To enable it, open the PDC Terminal Configuration UDT via: Tools > User Defined Windows.

On this form terminal configurations can be specified. Add the terminal ID and define the work center. Only work centers with extended configurations (defined with the *PDC Extended Configuration* UDT) can be added. Set the ‘Simple Job Completion’ option to ‘Yes’.

It is possible to set the terminal only for Simple Job mode by enabling the *‘Simple Job Completion Only’* option too. In this case the system automatically proceeds to the login screen of the module and skips the main menu screen.



1.2. Setup employee roles

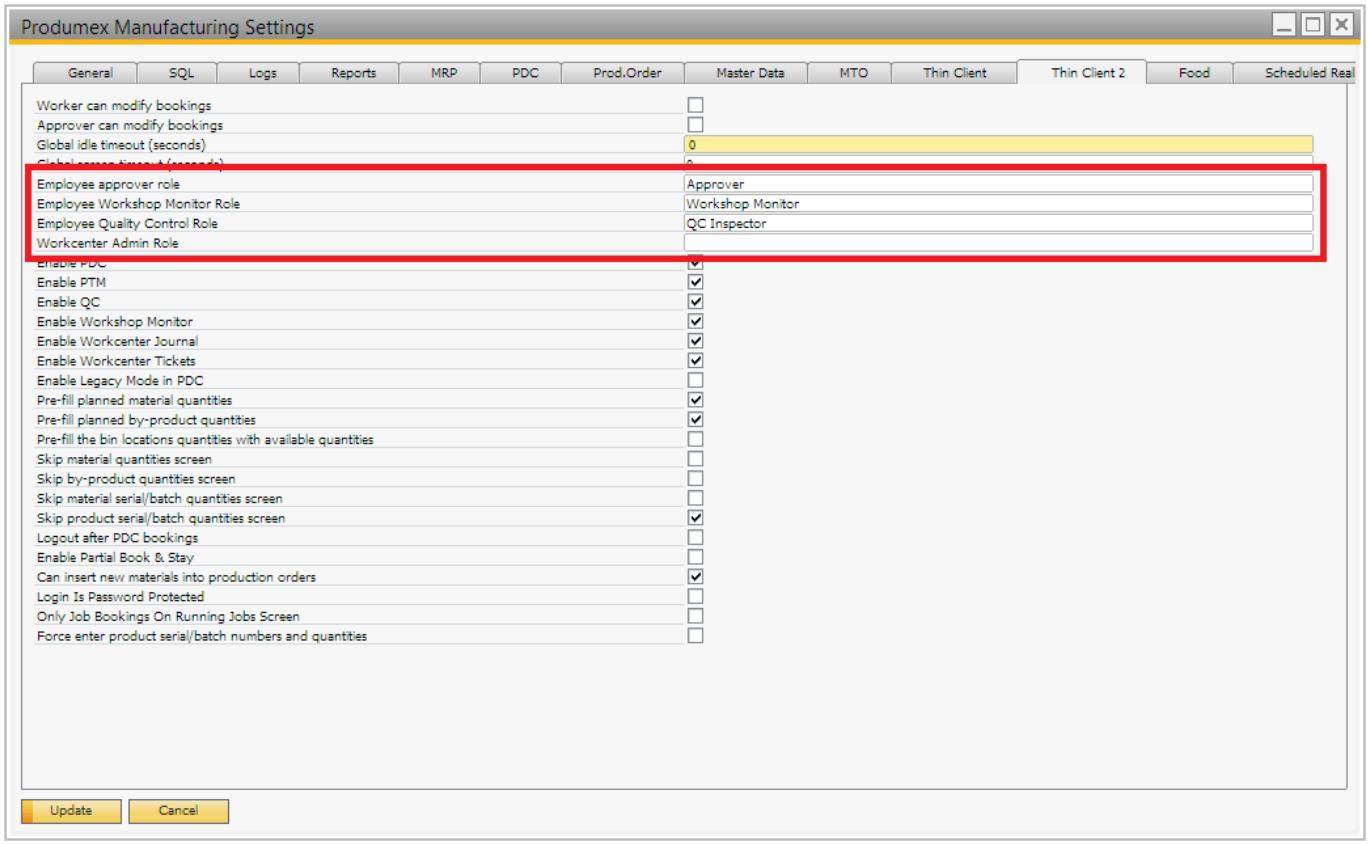
The following employee roles can be defined for PDC:

- *Approver role*: Employees appointed as an approver can approve PDC bookings of sticky/ delicate materials or products.
- *Quality Control Role*: Employees appointed as quality control inspector are authorized to conduct quality inspection.
- *Workshop Monitor Role*: Employees appointed to the workshop monitor role are authorized to use the workshop monitor.
- *Workcenter Admin role*: Employees appointed as work center admins can modify and close work center journals and work center tickets.

First create a role in SAP Business One. Open the Employee Master Data and on the 'Membership' tab select the 'Define new' option on the Role grid.

Add the new role to the employee you would like to appoint. An employee can have more than one roles.

On the Thin Client 2 tab of Produmex Manufacturing Settings add the role name to the corresponding employee role.



1.3. Set a product/ material for PDC approval

Enable the approval for the product or a material in the Item Master Data. Set the *'NeedsPDC Approval'* UDF field to 'Yes'. If it is enabled for a product/material, operations producing/consuming that item must be approved by an employee appointed as 'Approver'. For more information about the approval process please see: 2.2.10. Approval of PDC Bookings

1.4. Date and Time

The Produmex PDC module uses the date and time settings of the company database.

It is possible that the company time differs from the server time. If the 'Manage Company Time' checkbox is enabled on the *Display* tab of General settings, the time zone of the company can be set on the *Time Zone* tab of General Settings.

The Produmex PDC module only considers the daylight saving time if the 'Daylight Saving Time' checkbox is enabled for the company.

2. Mobile Device

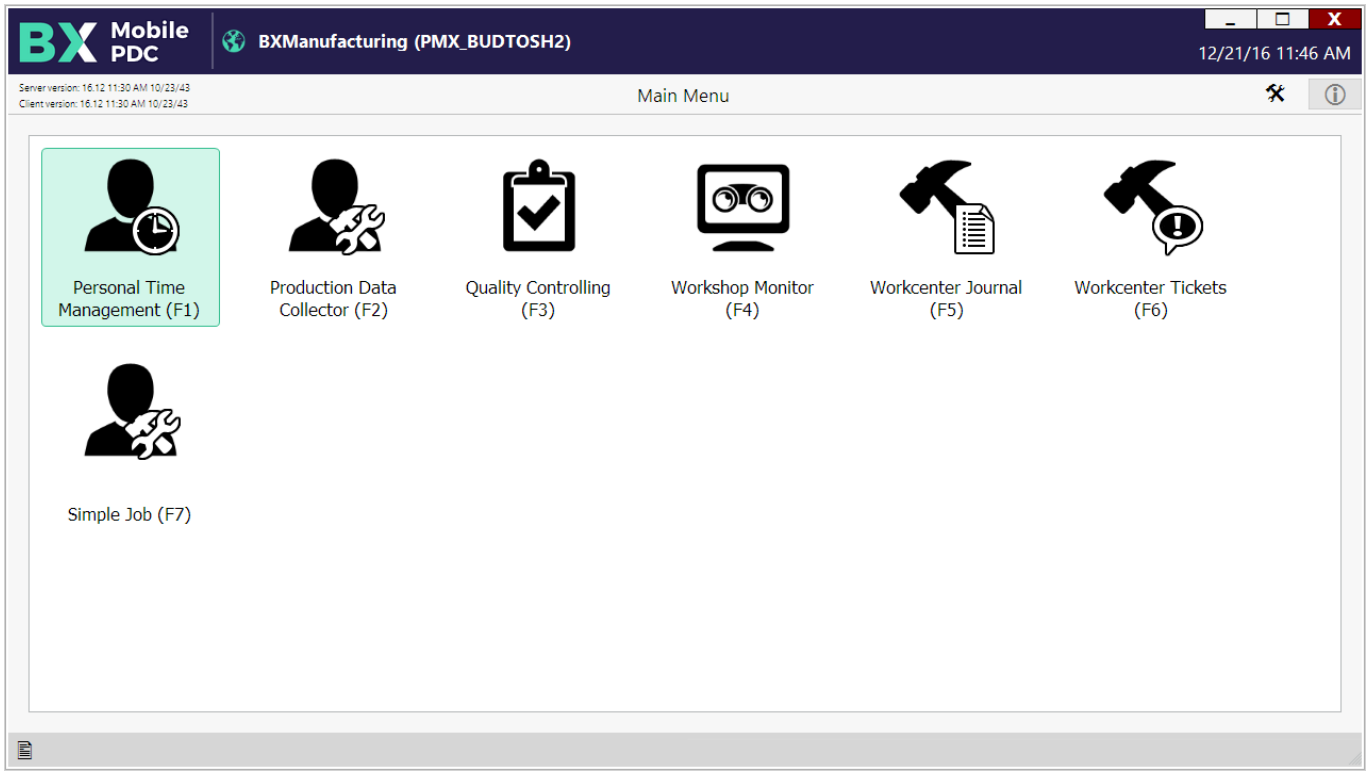
With Produmex PDC you can start the mobile PDC application itself. You have to start it on the client machine.

The user interface was primarily designed for industrial PCs and mobile devices. It means that the windows are not 'normal' windows as in any other applications. You can only move the windows with the blue frame around the window and it will not store the form settings so it always starts maximized.

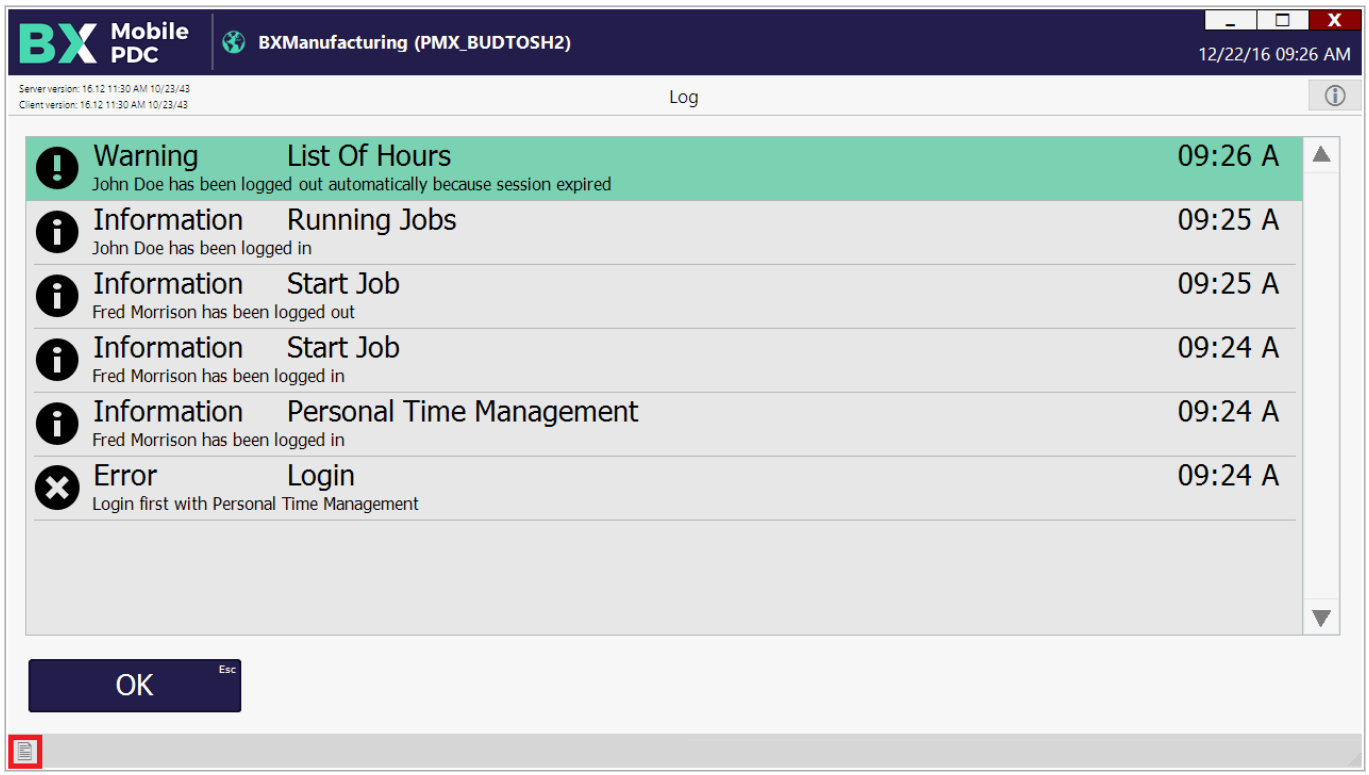
All buttons have a keyboard shortcut, so if you press the keyboard shortcut it is the same as you clicked on the button. In text fields you have a keyboard icon, if you click on that or press F12, the on screen keyboard opens with which you can enter text as well.

If you press tab after adding the code of an employee or operation, the system automatically populates the respective fields. If you have a scanner attached, any data can be added by scanning the barcode.

Main menu
Running the Mobile PDC Client Application the user will find the Main Menu.



On the main menu every enabled module is displayed. If only one module is enabled, the system automatically proceeds with that module and skips the main menu. Click on the icon to see the system messages.



2.1. Personal Time Management

At each new session or work day the user has to log in with Personal Time Management once. This will

track the user as an employee, who is mobile across different workstations.

Personal Time Management is optional for a company. If the setting is not set, the employees can use the rest of the system without logging in to PTM. The user can tap the Personal Time Management button to advance to the Personal Time Management login screen.

2.1.1. Logging in PTM

Here the user can log in to Personal Time Management. To log in simply enter the employee ID, and click on Login button. When the password protection is enabled, the user has to enter the password instead of the employee ID.

The ‘History’ textbox will list the latest account event of the user, in this example the last login event.

In the Reason box the user can choose from a list of reasons pre-defined on the Absence Reasons UDT in SAP B1. Open the form via: Tools > User Defined Windows > Absence Reasons.

When the *‘PTM Reason for Log out mandatory’* option is enabled on the Thin Client tab of Produmex Manufacturing Settings, a reason is must be given when creating a log out booking.

Press ’Login’ to log in or ’Logout’ to log out. To go back to the main menu press the ’Main Menu’ button.

To overview the employee actions, press the ‘Log’ button. The displayed data is supplied by the ***‘bxtc_pdc_ptm_log_query’*** user query. Before using this function, create a custom query. Please see the custom query example here: PTM Log

2.2. Production Data Collector

When Personal Time Management is enabled, you have to log in with PTM before starting the work with the Production Data Collector. Press the PDC icon. Enter the employee ID and click on the ‘Login’ button to log in.

If the employee has any open jobs, the system will proceed to the ‘Running Jobs’ screen otherwise the user will be redirected to the ‘Start Job’ screen.

2.2.1. Running Job screen

The running jobs window shows all operations that were already started by the employee that has logged in. The jobs for which there is already a started booking (setup or job) or a partial booking will

appear.

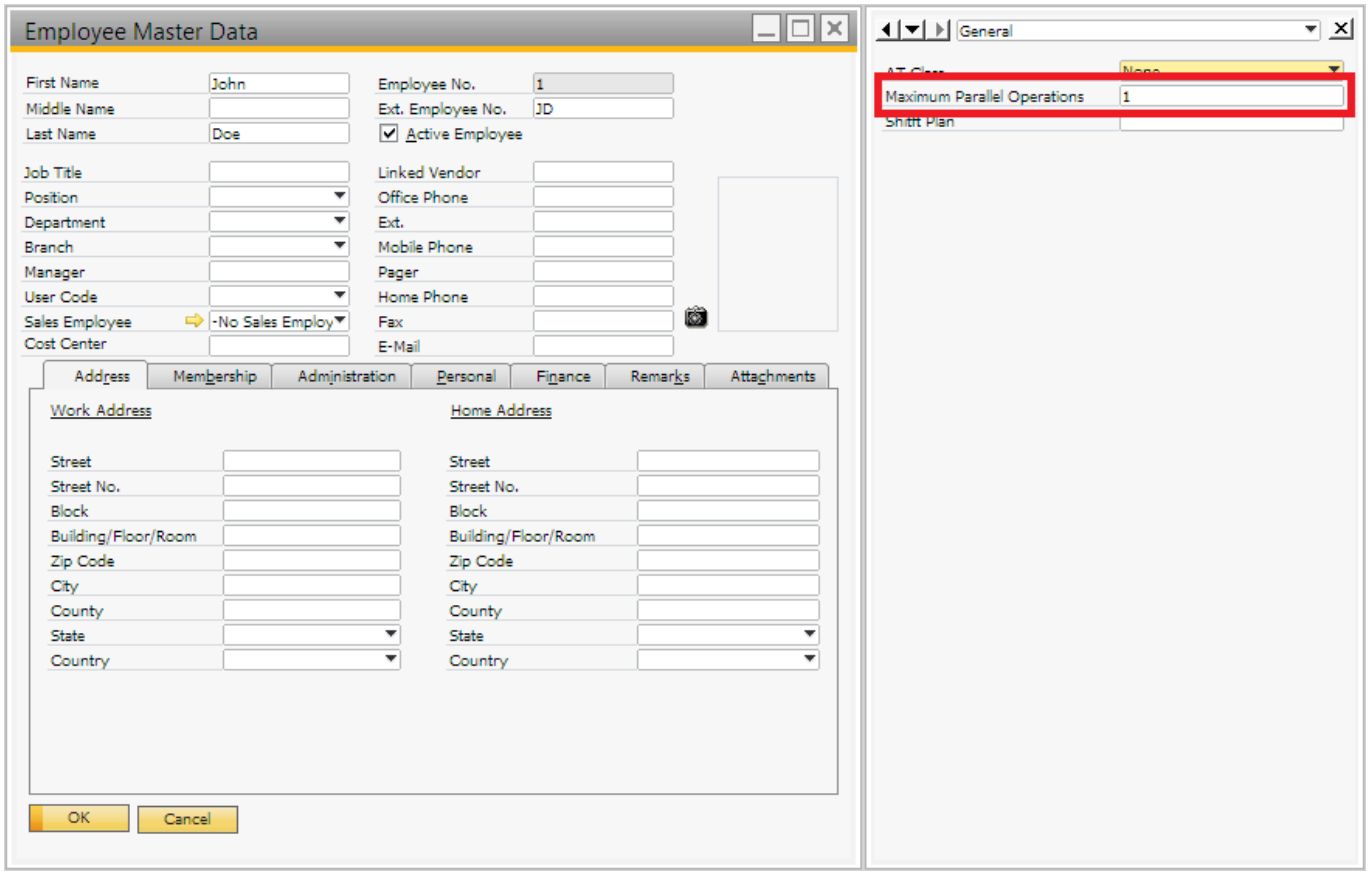
Displayed information:

1. Operation phase
2. Doc Entry – Line Number (Operation code – name)
3. Production order number, Main product code (name)
4. Open quantity, Planned Quantity, Assigned work center
5. Time of the last PDC booking for the operation
6. Date of the last PDC booking for the operation
7. Type of the last PDC booking for the operation

Select an operation from the list. Tick the white box or scan the DocEntry-LineNum identified to the search bar then press TAB.
The DocEnry- LineNum identifier can be found on the Job Requirements report.

To start a new operation that is not listed, scan or enter the *DocEntry-LineNum* identifier from the related production order then press the *'Start'* button. The system will proceed to the 'Start Job' screen. See: 2.2.2. Start Job

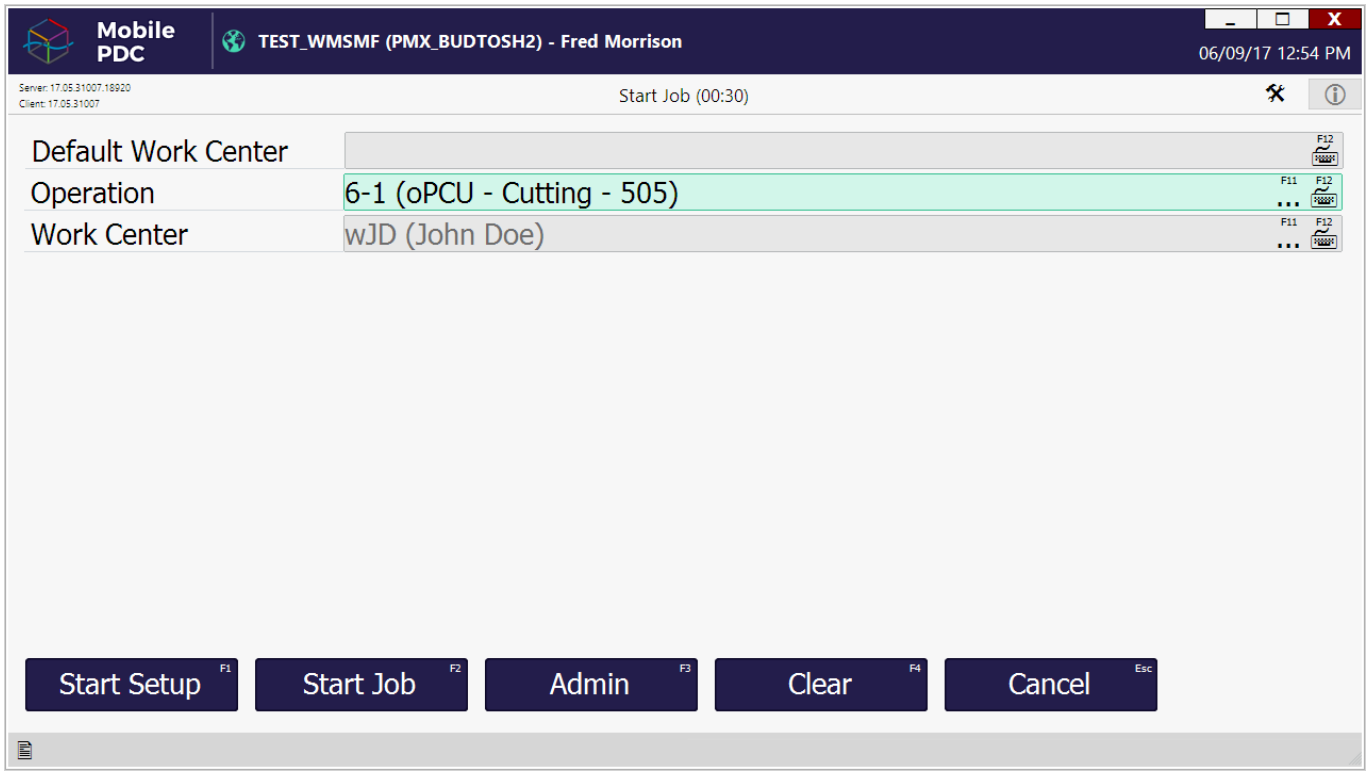
> If the 'Start' button is not active, it means that the employee has reached the maximum number of active operations that can be started at once. The maximum number of parallel operations for an employee can be set on the Maximum Parallel Operations UDF of the Employee Master Data. The employee must close a running operation first before starting another one.



To stop a running operation, press the ‘Stop’ button. See: 2.2.7. Complete Setup or 2.2.8. Complete Job
To make partial booking for a running operation, press the ‘Partial’ button. See: 2.2.3. Partial Completion
To review bookings, press the ‘Admin’ button. See: 2.2.9. Admin
To logout as the current employee, press the ‘Logout’ button.

2.2.2. Start Job

If the employee has no running jobs, he is redirected to the Start Job page.



The default work center is the work center defined for the terminal on the ‘PDC Terminal Configuration’ user table. To disable the default work center, set the ‘Work Center Ignore’ option to ‘Yes’ for the employee on the PDC Extended Configuration user table. When there is a default work center, bookings can be created only for operations with the feature assigned to the default work center.

Scan or enter the *DocEntry-LineNum* identifier of the operation to the ‘Operation’ field.

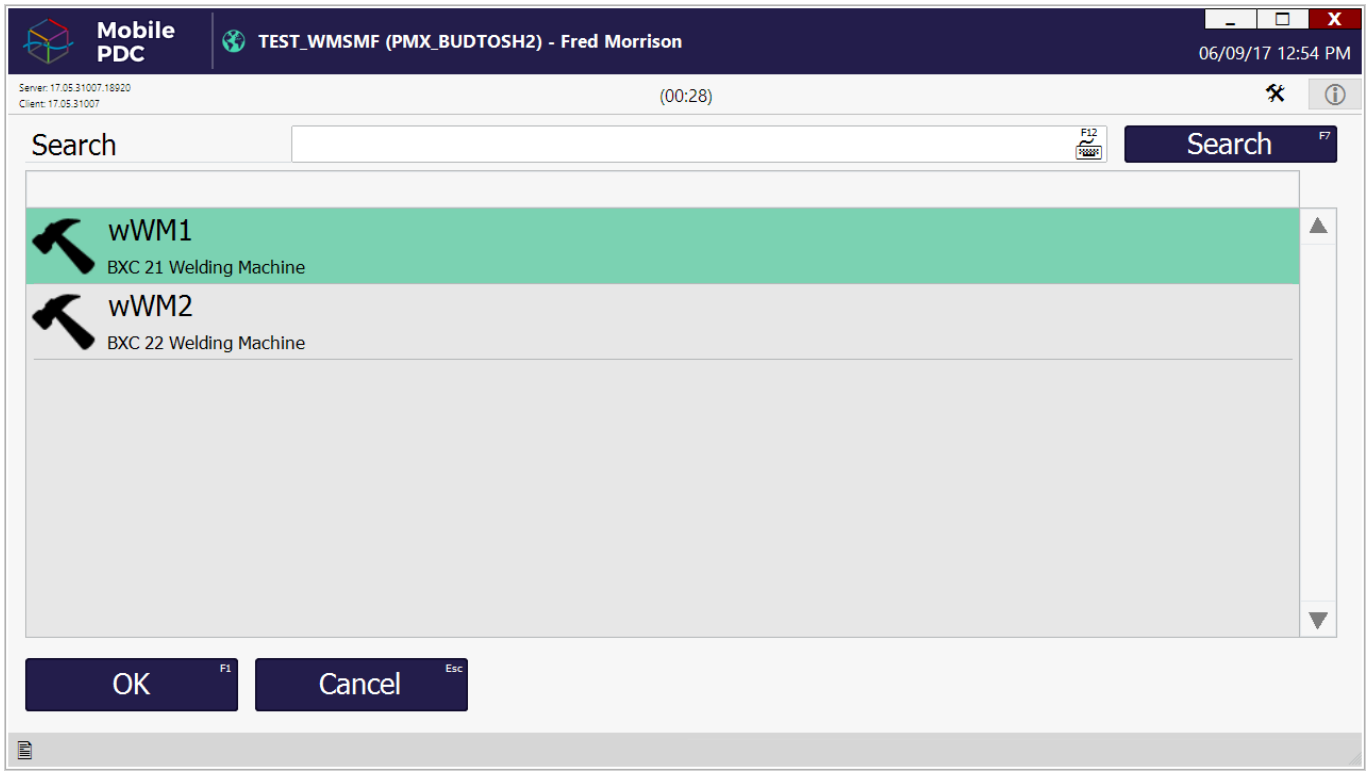
If there is a default work center, the work center field will be populated automatically. The user cannot modify the work center if the default work center is mandatory. The default work center is mandatory in the following cases:

- The employee and/or the work center has no configurations set on the PDC Extended Configuration user table and the ‘PDC Modifiable WC for Start’ option is disabled on the Thin Client tab of Produmex Manufacturing settings.
- The ’Work Center Modification’ option is disabled on the PDC Extended Configuration user table for the employee and/or work center.

Otherwise the work center is not mandatory and the user can select an alternative work center.

If there is no default work center, the user has to enter the work center or select it from a list of available work centers by pressing F11. If there is only one work center for the feature that belongs to the operation, the work center field will be automatically populated with it.

If the operation has a mandatory work center, the operation can only be started on the mandatory work center.

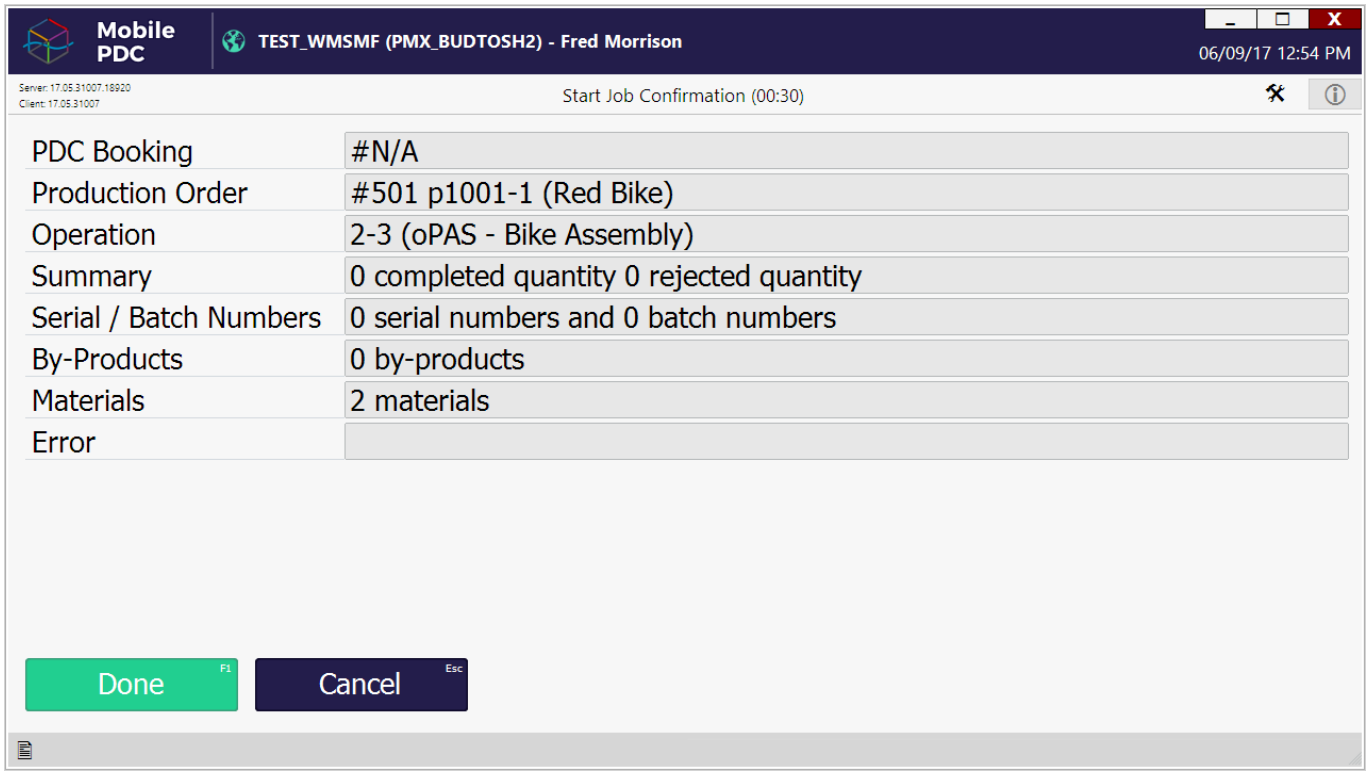


Then he can click on 'Start Setup' or 'Start Job' to start the operation. Based on the settings on the Thin Client tab, setup bookings might be allowed for operations without setup or might be forbidden for every operation. Only operations that meet the following conditions can be started:

- Production order is released
- The operation status is Created or Started

The ‘Clear’ button erases the contents of all fields, so the entered data will be lost. If the user clicks on the ‘Logout’ button, he will be logged out and redirected to the Login screen.

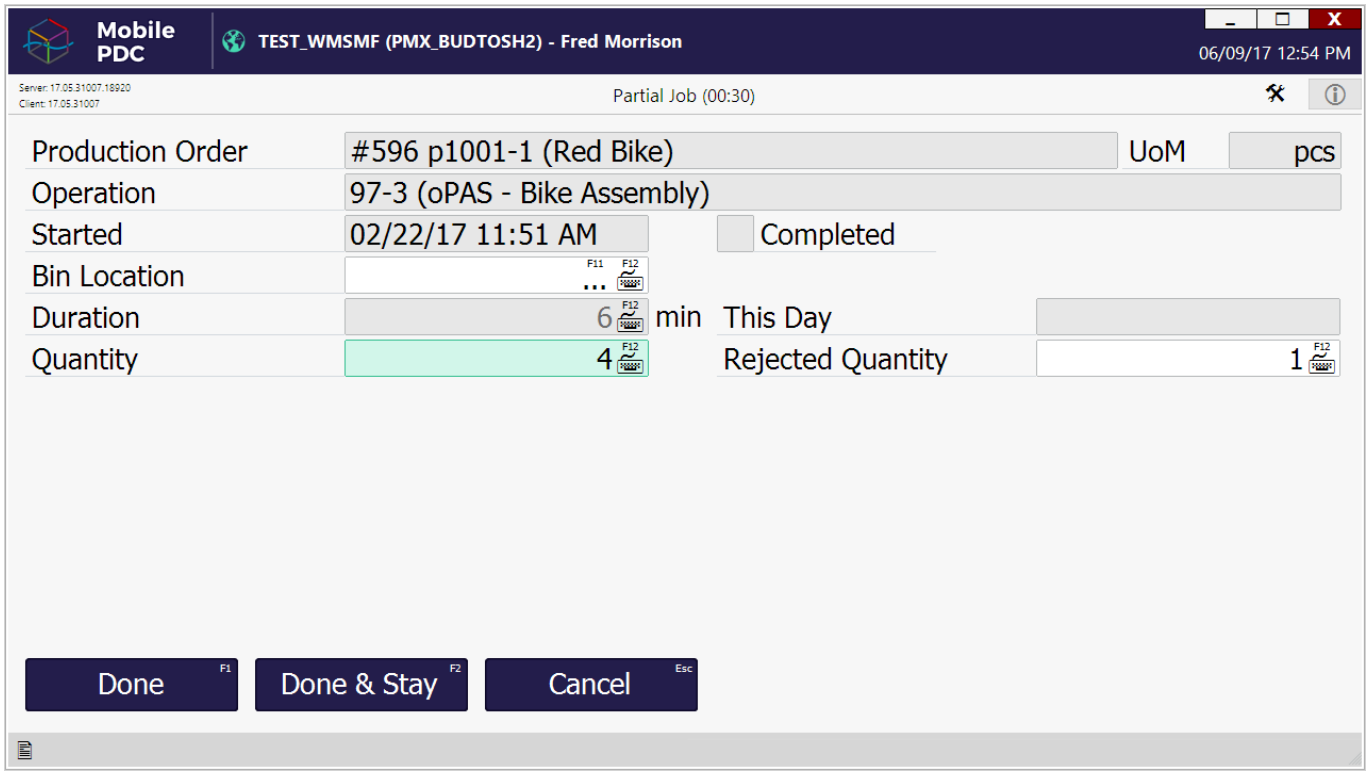
On the next screen the user can overview the details of the operation. Press ‘Done’ to start the setup/job or press ‘Cancel’ to go back to the previous screen.



During the Start Job/Setup phase, materials might be issued depending on their milestone type. For more information about issuing materials please see:2.2.5. Materials.

2.2.3. Partial Completion

To create bookings for a partially completed job/setup, press the *'Partial'* button. After a partial booking the job/setup remains open therefore it will be listed among the running jobs.



Enter the completed and rejected quantity (if any) for the operation.

Define a Bin Location for material issues/product receipts on the 'Bin Location' field. The default Bin Location is the bin location specified on the PDCExtendedConfiguration UDT. If no bin location has been defined on that form, by default the bin location specified for the work center is shown. If there is no bin location specified on either form, the bin location is empty by default.

The bin location selected on this screen can be overridden for materials and products.

Press the 'Done' button to proceed.

If there are by-products for the operation or the operation is the last operation on the production order and the product is linked to it with a milestone, 'Products' screen will open up. Please see: 2.2.4. Product and By-Products

If an operation has materials linked to it with a milestone, the 'Materials' screen will open up. Please see: 2.2.5. Materials

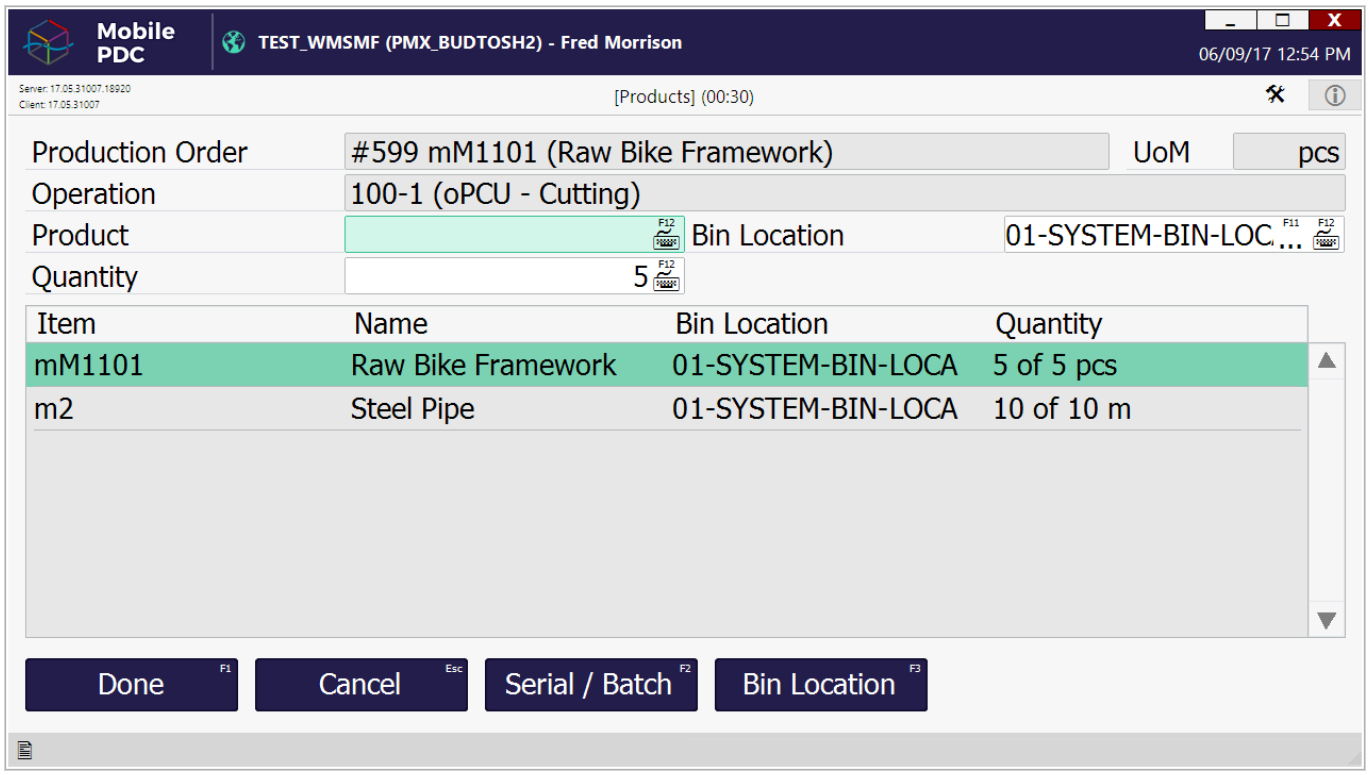
After the booking was created, the system will return to the Running Jobs screen or the Start Job screen if the employee has no running jobs. When the *'Logout after PDC bookings'* option is enabled on the Thin client 2 tab, the employee will be automatically logged out and redirected to the Main Menu.

When the *'Enable Partial Book & Stay'* option is set to true, an additional 'Done & Stay' button is displayed on the Partial Job screen. To stay on the 'Partial Job' screen after the booking was created, perform the partial completion after pressing this button.

2.2.4. Product and By-Products

Receive the products or by-products on the 'Products' screen. On the grid the main product and the

by-products (if any) are listed. The main product is always listed first.



Select the product on the grid then enter the quantity. Add the quantity by pressing the ‘Add’ button or overwrite the quantity by pressing the ‘Update’ button.

The default quantity of the main product is the quantity added on the partial or complete job/setup screen.

The default quantity of a by-product is calculated from the received quantity of the main product and the base quantity of the by-product. It is possible to receive more or less of a by-product than the calculated quantity.

The default bin location is the bin location specified for the operation but it can be adjusted. Scan or enter the destination bin location to the ‘Bin Location’ field or select it from a list after pressing F11. To add a product to different bin locations, select the bin location then press the Bin Location button (F3). The ‘Product Bin Location Picker’ screen will open. (Please see: 2.2.4.3. Product Bin Location Picker). Please note: The bin location for items managed by batches or serial numbers can be added on the Product Batch/Serial Numbers screen therefore the bin location picker function is not available for such items.
When using the Legacy mode, the Bin Location button is not displayed and the Product Bin Location Picker screen cannot be reached.

After the PDC processor processes the booking, the system automatically creates the Receipt from Production document for the main product and receives it to the inventory. By-products will be taken into stock with a Goods Receipt document which will be converted to a Receipt from production document after the main product has been booked.

If the main product is managed by batches or serial numbers, add the serial/batch numbers before receiving the product. Press the ‘Serial/Batch’ button. If the product is managed by batches, the

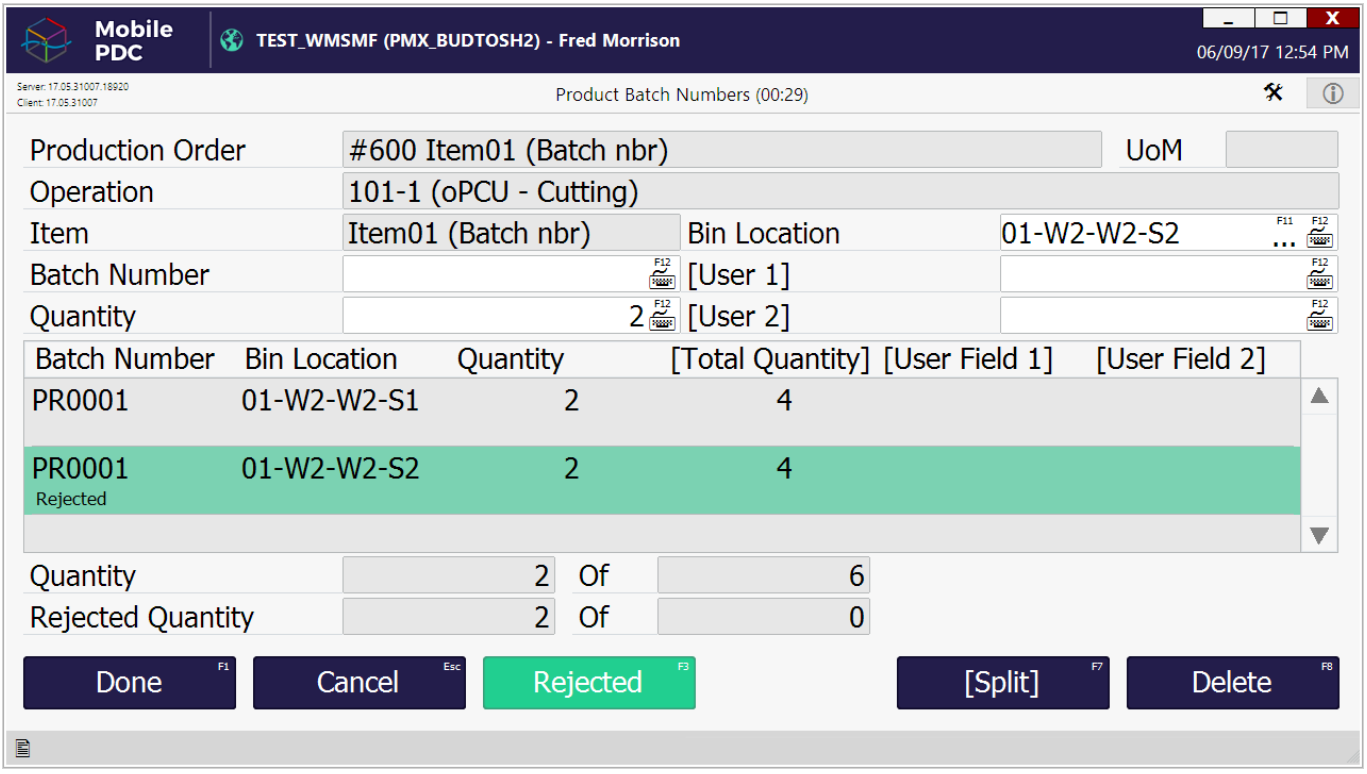
Product Batch Numbers screen will open. (Please see: 2.2.4.1. Product Batch Numbers).

If the product has serial numbers, the Product Serial Numbers screen will open. (Please see: 2.2.4.2. Product Serial Numbers). If the 'Skip product serial/batch quantities screen' option is enabled on the Thin client 2 tab, this button will not be active and the serial/batch numbers will be determined by a custom query. For more information please see: Product serial/batch number

By-products cannot be managed by serials/batches.

2.2.4.1. Product Batch Numbers

If it is a batch numbered product, the *'Product Batch Numbers'* form appears.



Enter the created batch number into the 'Batch Number' field then press TAB to add the batch number to the grid. Multiple batch numbers might be added.

Select the batch on the grid. Enter the quantity of the batch into the 'Quantity' field and scan the bin location or select it on the 'Bin Location' field then press TAB. All bin locations must have the same warehouse. Please note: When using Legacy mode, the Bin Location cannot be specified on this screen.

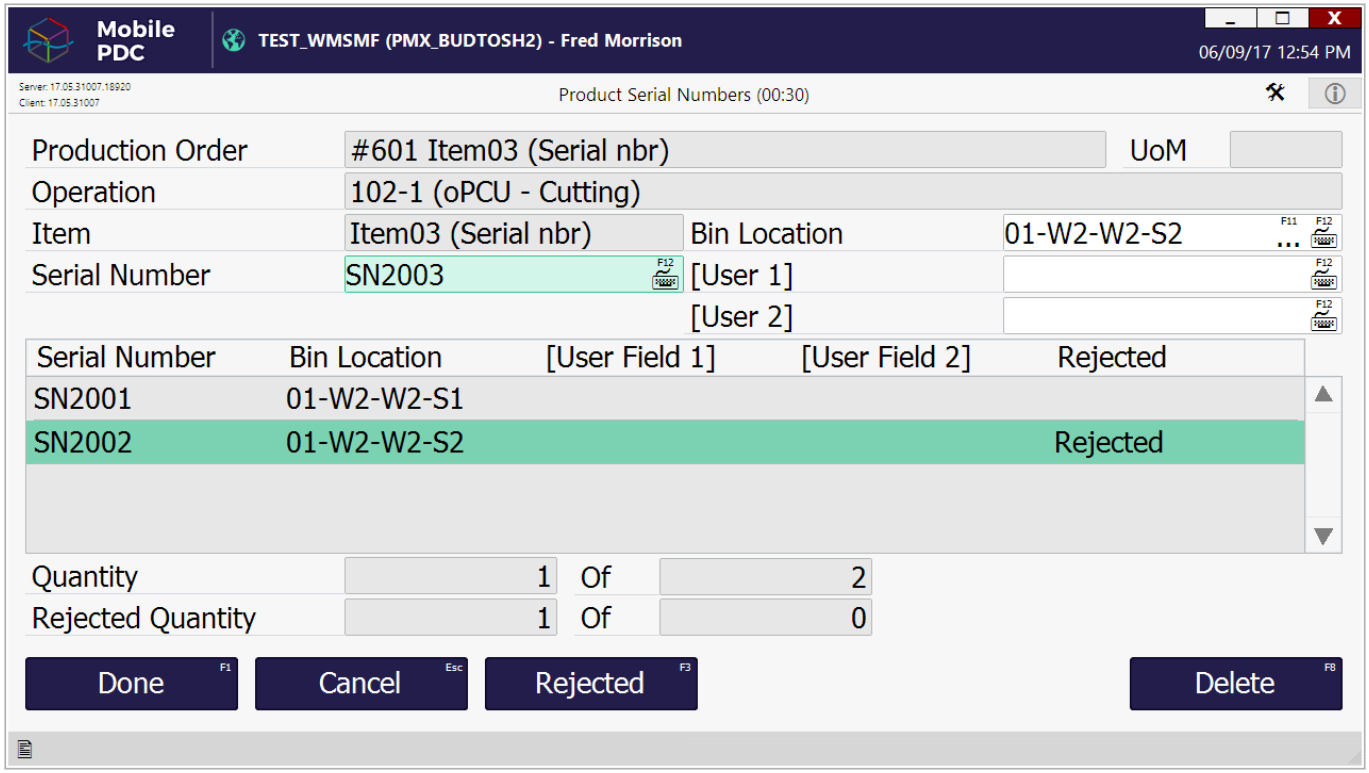
To register the batch for rejected quantities, select the line of the batch number then press the 'Rejected' button. It is possible to set completed and rejected quantities for the same batch number.

To receive the same batch into multiple bin locations, select the batch then press the 'Split' button. The line of the batch will be duplicated but the bin location and the quantity value on the new line will be empty.

To remove a wrongly entered batch number, select it on the grid and click on 'Delete'.

2.2.4.2. Product Serial Numbers

If the product is serial numbered, the ‘Product Serial Numbers’ window will open.



Add the serial numbers into the ‘Serial Number’ field then press TAB to add it to the grid. If the serial number already exist, an error message will be shown.

To define the bin location, select a serial number and add the bin location to the ‘Bin Location’ field then press TAB. all bin locations must have the same warehouse. Please note: When using Legacy mode, the Bin Location cannot be specified on this screen.

To add serial numbers belonging to rejected quantities, first enter the serial number, then select it on the grid and press the ‘Rejected’ button. The serial number will be marked as ‘Rejected’.

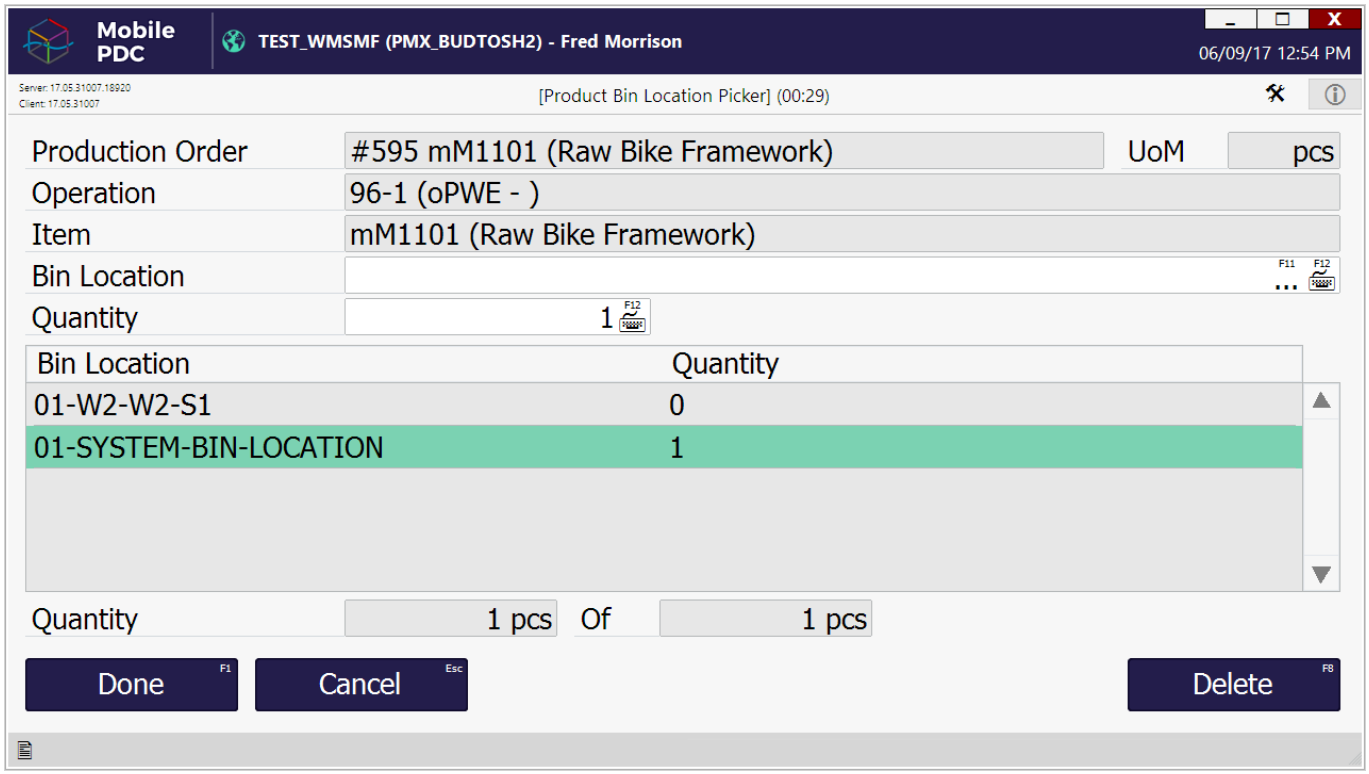
To remove a wrongly entered serial number, select it and press the ‘Delete’ button’.

After every serial number has been entered, press the ‘Done’ button to proceed.

Please note: The added batch/serial quantity must equal to the quantity entered on the partial or complete job/setup form.

2.2.4.3. Product Bin Location Picker

On the ‘Product Bin Location Picker’ screen scan the Bin Location or select it by pressing F11 or pressing the ‘…’ button then press TAB to add it to the grid. Select the Bin Location line then add the quantity to receive to the ‘Quantity’ field.



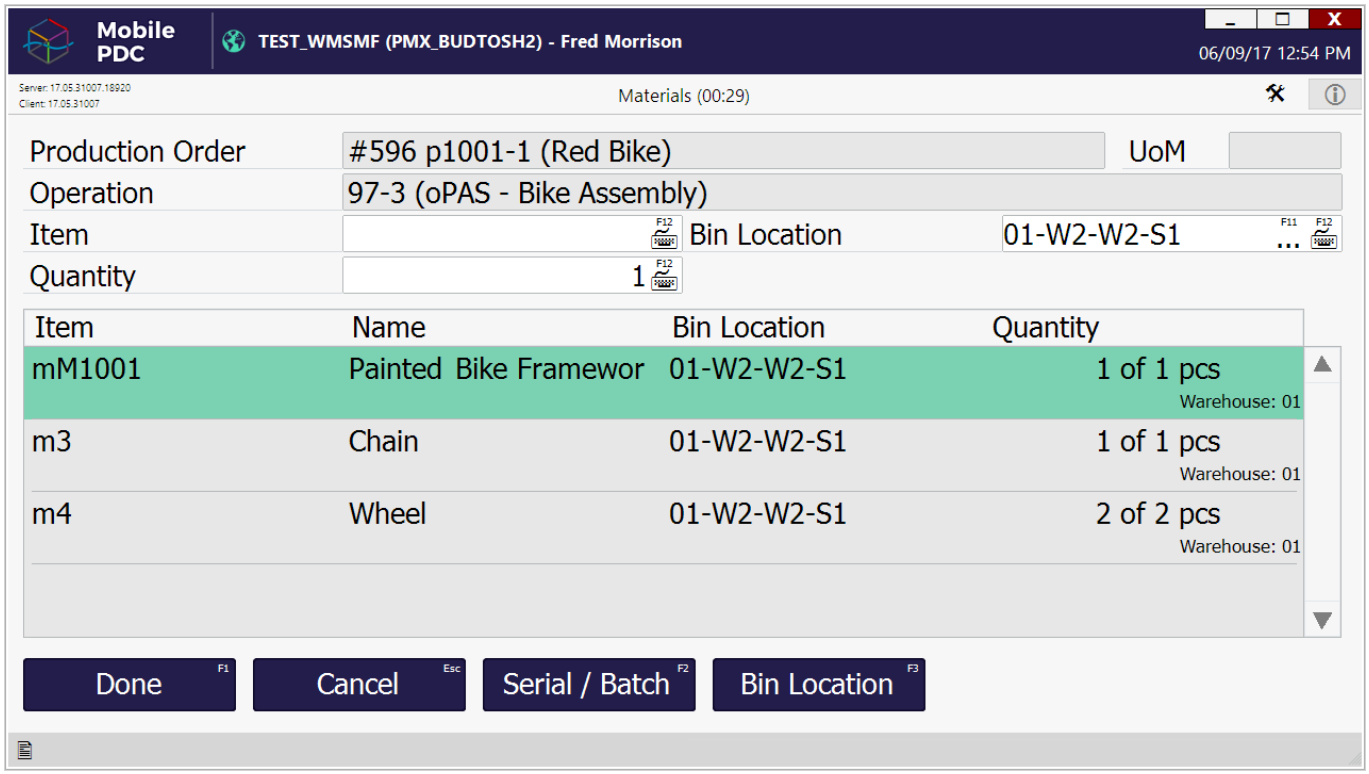
It is of high importance to keep in mind that when working with MultiBranch company databases the user must select a target warehouse from the same branch as defined for the production order, otherwise SAP B1 will reject the inventory transaction. In case of an error the user can fix the issue in the PDC administration screen on the terminal.

2.2.5. Materials

Consumed materials might be reported in different operation phases, depending on their Milestone type.

- Materials with the milestone type ‘Depends On Begin’ have to be issued when starting a job.
- Materials with the milestone type ‘Depends on Every’ can be issued in partial and completed PDC bookings.
- Materials with the milestone type ‘Depends on End’ can only be issued when completing a job.

If the operation has no linked materials, the system will automatically skip this screen.



Scan the item code or enter it to the ‘Item’ field. When the ‘Can insert new materials into production orders‘ option is enabled on the Thin client settings, the user might be able to add items not linked to the operation.

Select the line of the material. If you scan the item code of the material or enter it to the ‘Item’ field, the material line will be automatically selected.

After that the cursor will be automatically positioned into the Quantity field. Here you can enter the used quantity and click on ‘Add’ or ‘Update’. To add the entered quantity to the already booked quantity, press ‘Add’. To overwrite the already booked quantity with the entered quantity, press ‘Update’. When the *‘Can insert new materials into production orders’* option is enabled on the Client 2 tab, new materials can be added during the booking. Scan the item code or enter it to the ‘Item’ field then press TAB. The item will be listed on the grid. Add the consumed quantity and the bin location as described above. After the booking is processed, a new material line is automatically inserted before the operation on the production order.

If the materials are serial or batch managed, you have to select the batches/serials that were used. Select the line of the material then press the ‘Serial/Batch’ button. If the material is managed by batches, the Material Batch Number Picker screen will open. (Please see: 2.2.5.1. Material Batch Number Picker) If the material has serial numbers, the Material Serial Number Picker screen will open. (Please see: 2.2.5.2. Material Serial Number Picker)

Please note: If you don’t enter any quantity on the Materials screen, and click on Serial/Batch button, then the needed quantity will be zero. It means the user can add as many serial/batch numbers as he wants, but he cannot add more than the remaining quantity for the operation.

If the ‘Skip material serial/batch quantities screen’ option is enabled on the Thin client 2 tab, this button will not be active and the serial/batch numbers will be determined by a custom query. For more information about the custom query please see: Material serial/batch number

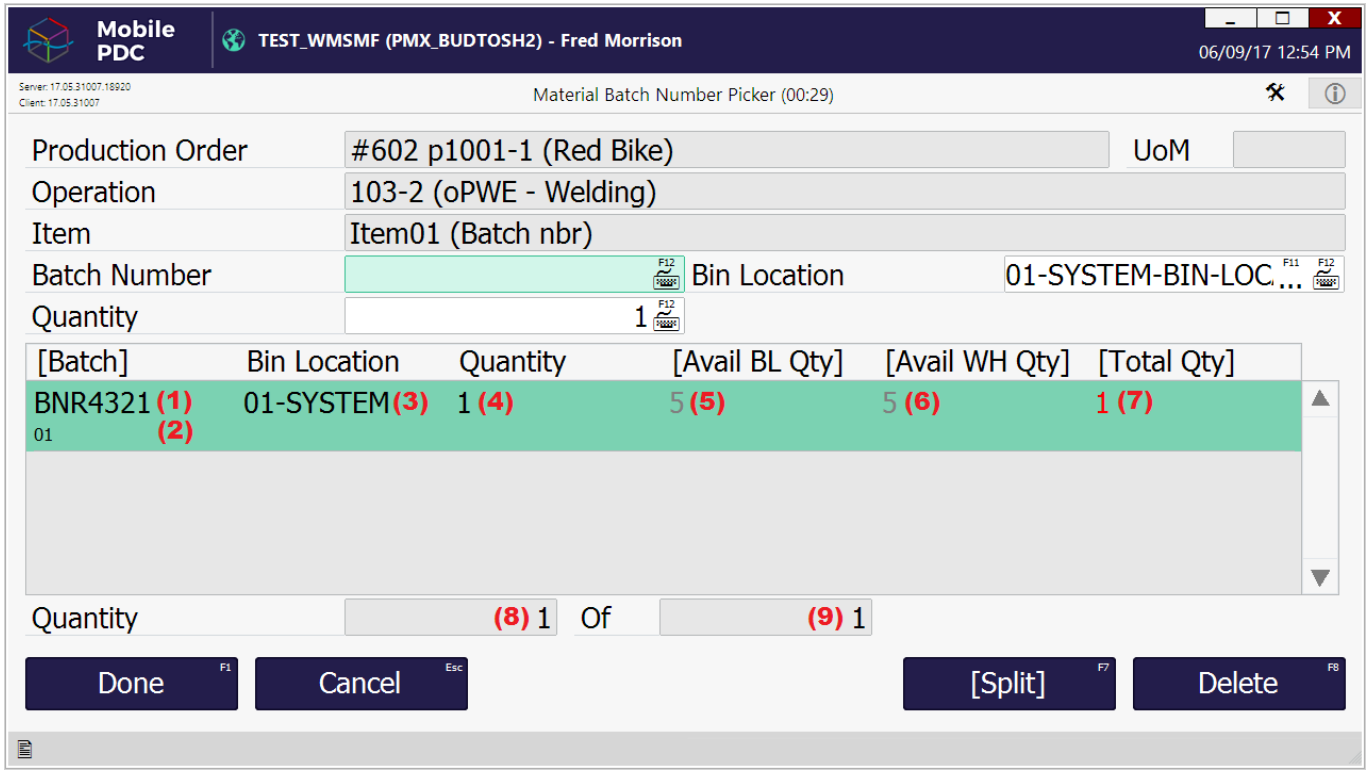
The default bin location is the bin location specified for the operation but it can be adjusted. Scan the source bin location or add its code to the Bin Location field or select it from a list after pressing F11. To add materials from multiple bin locations select the material then press the 'Bin Location' button. The Material Bin Location Picker screen will open. (Please see: 2.2.5.3. Material Bin Location Picker) When using the Legacy mode, the Bin Location button is not displayed and the Material Bin Location Picker screen cannot be reached.

After the transaction is processed by the PDC processor, the booked materials will be issued with an Issue from Production document.

2.2.5.1. Material Batch Number Picker

Add a batch to the grid by scanning the batch number or entering it to the 'Batch Number' field then press TAB. Only existing batches can be added. Select the batch on the grid then add the quantity to the 'Quantity' field and scan the Bin Location or enter its code to the Bin Location field then press TAB. If the bin location is specified, the batch must exist in the bin location with the specified quantity.

All batch numbers must have the same warehouse.

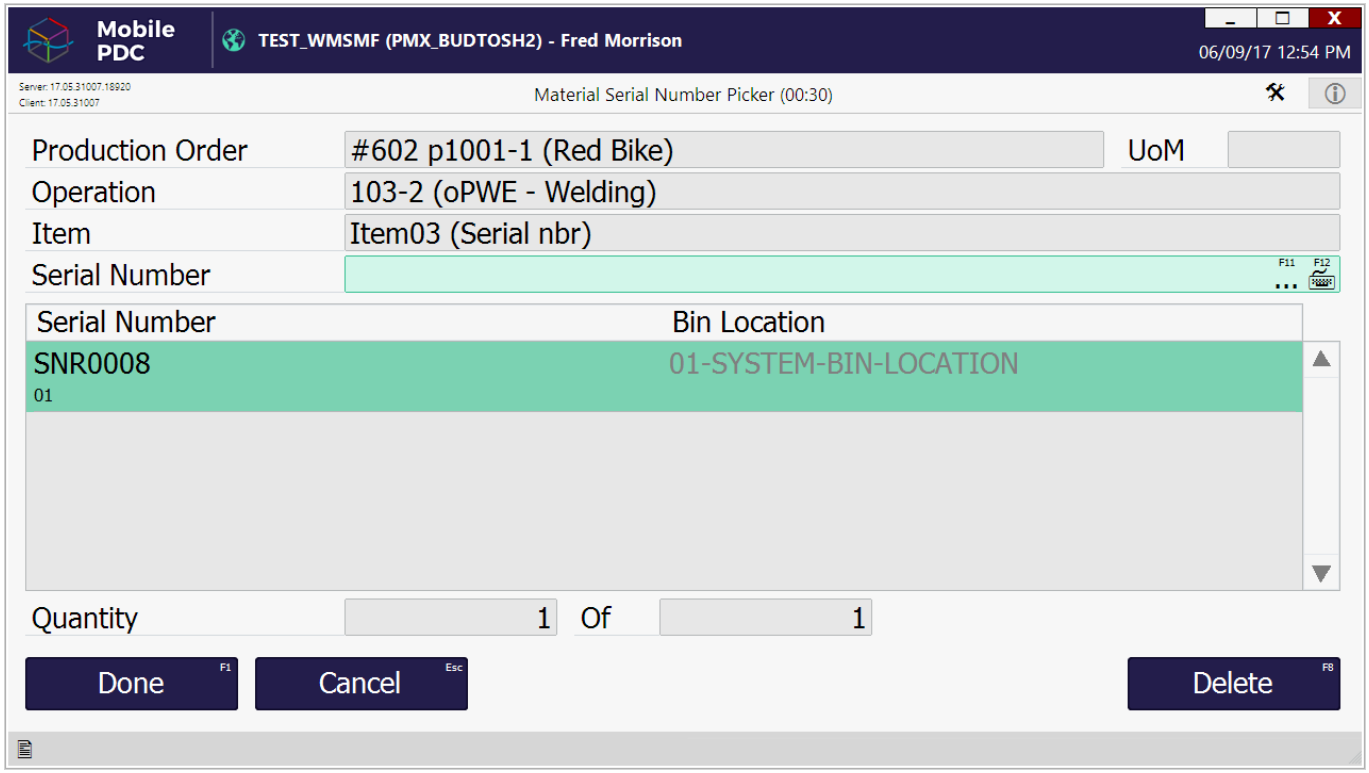


1. Existing batch number
2. Warehouse
3. Bin location
4. Allocated quantity
5. Available quantity in the bin location
6. Available quantity in the warehouse
7. Total allocated quantity
8. Total allocated quantity
9. Needed quantity

To issue the same batch from multiple bin locations, select the batch then press the ‘Split’ button. The line of the batch will be duplicated but the bin location and the quantity value on the new line will be empty.
Please note: When using Legacy mode, the Bin Location cannot be specified on this screen.

To delete a line, select a line then press the ‘Delete’ button.
Press ‘Cancel’ to go back.
Press ‘Done’ to proceed.

2.2.5.2. Material Serial Number Picker



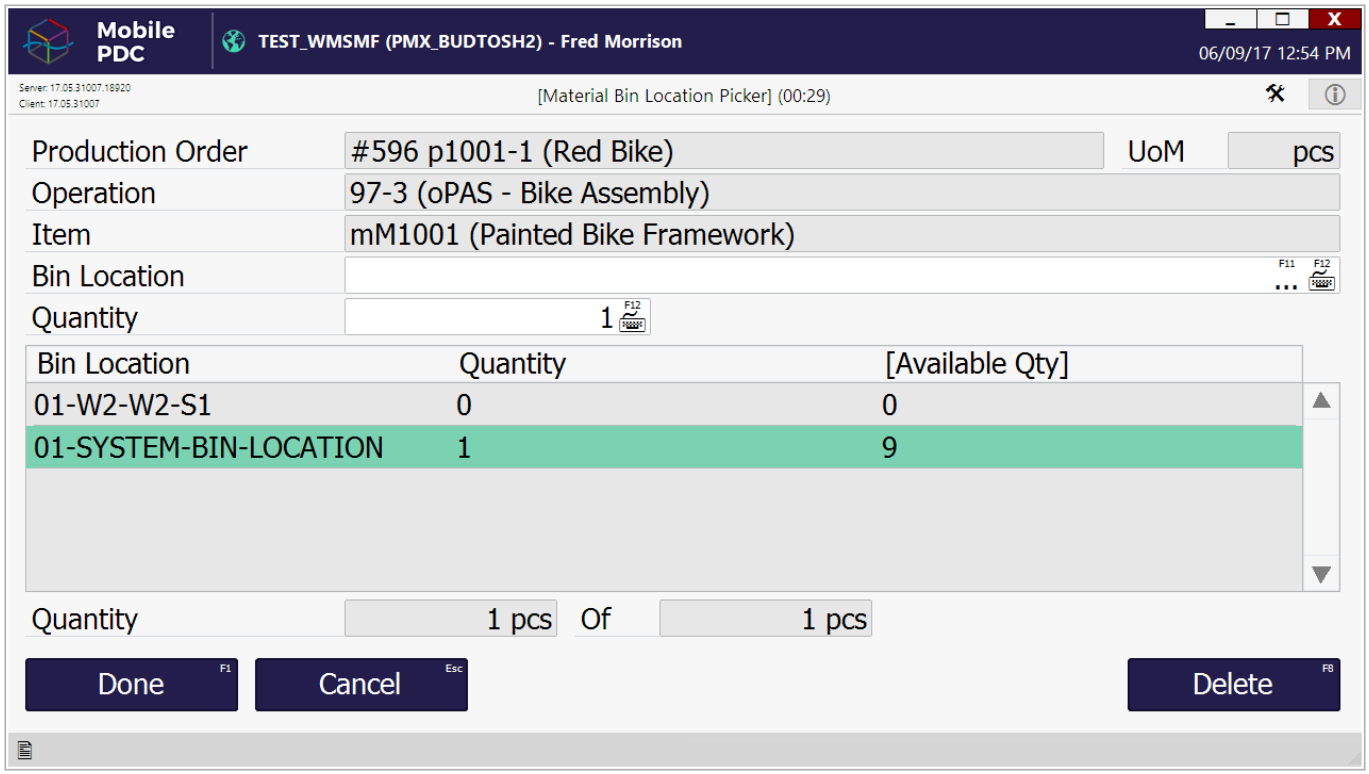
Add the serial number to the serial number field. Already added serial numbers will be listed on the form. Only existing serial numbers can be added. It is not possible to scan serial numbers from different warehouses.

To delete the serial number, select its line and press the ‘Delete’ button.

You have to add all needed serial/batch numbers. Partial definition is not possible. After all serial/batch numbers have been defined, you can click on ‘Done’.

2.2.5.3. Material Bin Location Picker

On the ‘Material Bin Location Picker’ screen scan the Bin Location or select it by pressing F11 or pressing the ‘…’ button then press TAB to add it to the grid. Select the Bin Location line then add the quantity to consume to the ‘Quantity’ field.



It is of paramount importance that when working with MultiBranch company databases the user must select a source warehouse from the same branch as defined for the production order, otherwise SAP B1 will reject the inventory transaction. In case of an error the user can fix the issue in the PDC administration screen on the terminal, nevertheless.

2.2.6. Confirmation

You will get a confirmation dialogue with all the data you entered.

Click on ‘Done’ to finish the process. If the booking does not need approval or quality controlling, it will be processed by the PDC Processor. Click on ‘Cancel’ to go back to the Materials screen where the entered data can be changed.

2.2.7. Complete Setup (Stop Booking)

To finish a setup, press the ‘Stop’ button. The steps of a setup completion are identical to the steps of a partial completion. After the setup is completed, the system will ask whether to start the job part of the operation. Press ‘Yes’ to start the job. A start job booking will be created for the operation. Press ‘No’ to start the job later. Only a ‘Complete setup’ booking will be created and the user must manually start the job for the operation.

When a setup was finished, the phase is closed and it will not be listed on the Running jobs screen.

2.2.8. Complete Job (Stop Booking)

To finish a job, press the ‘Stop’ button.

Enter the completed and rejected quantity (if any) for the operation.

Define a Bin Location for material issues/product receipts on the ‘Bin Location’ field. The default Bin Location is the bin location specified on the PDC Extended Configurations UDT. If no bin location has been defined on that form, the bin location specified for the work center is shown by default. If there is no bin location specified on either form, the bin location is empty by default.

The bin location selected on this screen can be overridden for materials and products.

If the employee has permission to mark operations as completed, the ‘Completed’ checkbox is active. You can set this permission on the PDC Extended Configurations user table. If the employee checks the ’Completed’ checkbox, the operation is marked as ‘Completed’ and the status of the operation is changed to ’Finished’ when the booking is processed. Finished operations cannot be started again.

Press the ‘Done’ button to proceed.

If there are by-products for the operation or the operation is the last operation on the production order and the product is linked to it with a milestone, ‘Products’ screen will open up. Please see: 2.2.4. Product and By-Products

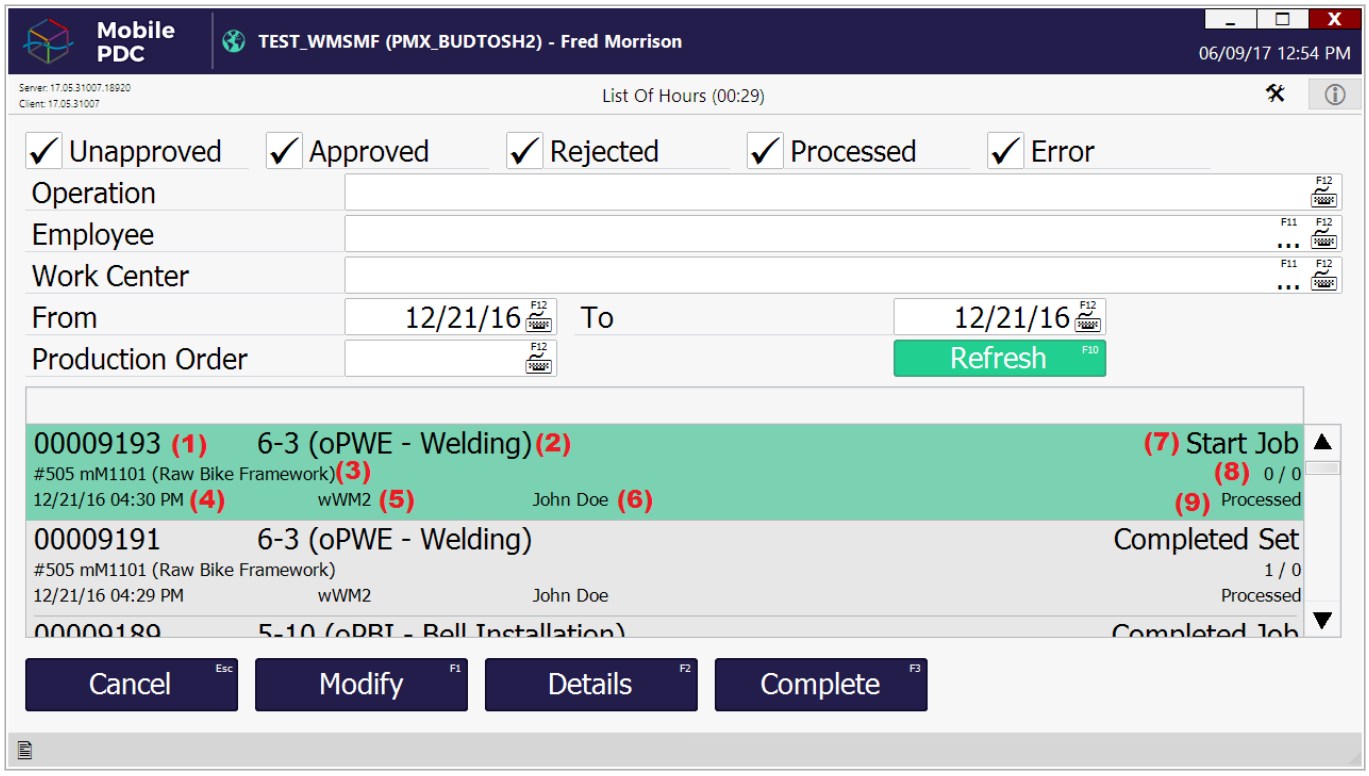
If an operation has materials linked to it with a milestone, the ‘Materials’ screen will open up. Please see: 2.2.5. Materials

After the booking was created, the system will return to the Running Jobs screen or the Start Job screen if the employee has no running jobs. When the ‘Logout after PDC bookings’ option is enabled on the Thin client 2 tab, the employee will be automatically logged out and redirected to the Main Menu.

After a job is completed, it is not shown on the running jobs screen.

2.2.9. Admin

On the Admin screen the employee can overview the bookings he created. Press the ‘Admin’ button to open the ‘Admin’ screen.



1. Allocation Code
2. DocEntry- LineNumber (operation code –name)
3. Production order number. Main product code (name)
4. Booking date and time
5. Work center
6. Employee (who made the booking)
7. State/ Phase
8. Completed/ Rejected quantity
9. Process status

The upper part of the window is a filter. The user can select what type of bookings he wants to see (unapproved, approved, rejected, processed or error) for which operation and work center in which date range. When the user filled the filter fields he has to click on the ‘Refresh’ button to get the list of the operations in the grid below.

Please note: Only employees with approver role can change the Employee code and see the bookings of other employees. Employees without approver role can only see their own bookings.

Details
To overview the details of a booking, select the operation and press the ‘Details’ button. First the summary page will be shown. To see the details of the selected materials or products (if any) click on the ‘Done’ button. To go back to the Admin page, press ‘Cancel’.

When the materials/ products are managed by serials or batches, an additional ‘Serial/Batch’ button is displayed. Press this button to review the added serials/batches. Click on the ‘Done’ button to proceed.

Modify
If the *Worker can modify bookings* setting is enabled, employees can change their bookings. If the *Approver can modify bookings* setting is enabled, employees with approver role can change any bookings.

To modify the booking, press the 'Modify' button. The following can be modified:

- The booked time.
- Completed status. (Please note: Only employees/approvers who have the permission to mark an operation as 'Finished' can modify the completed status. The permission can be set on the PDC Extended Configurations user table.)

It is not advised to use this function for correcting material/product bookings. Use these SAP BO functions instead:

- right-click menu on the Production order: Report completion >Return components
- Goods Issue/ Goods receipt
- Disassembly order

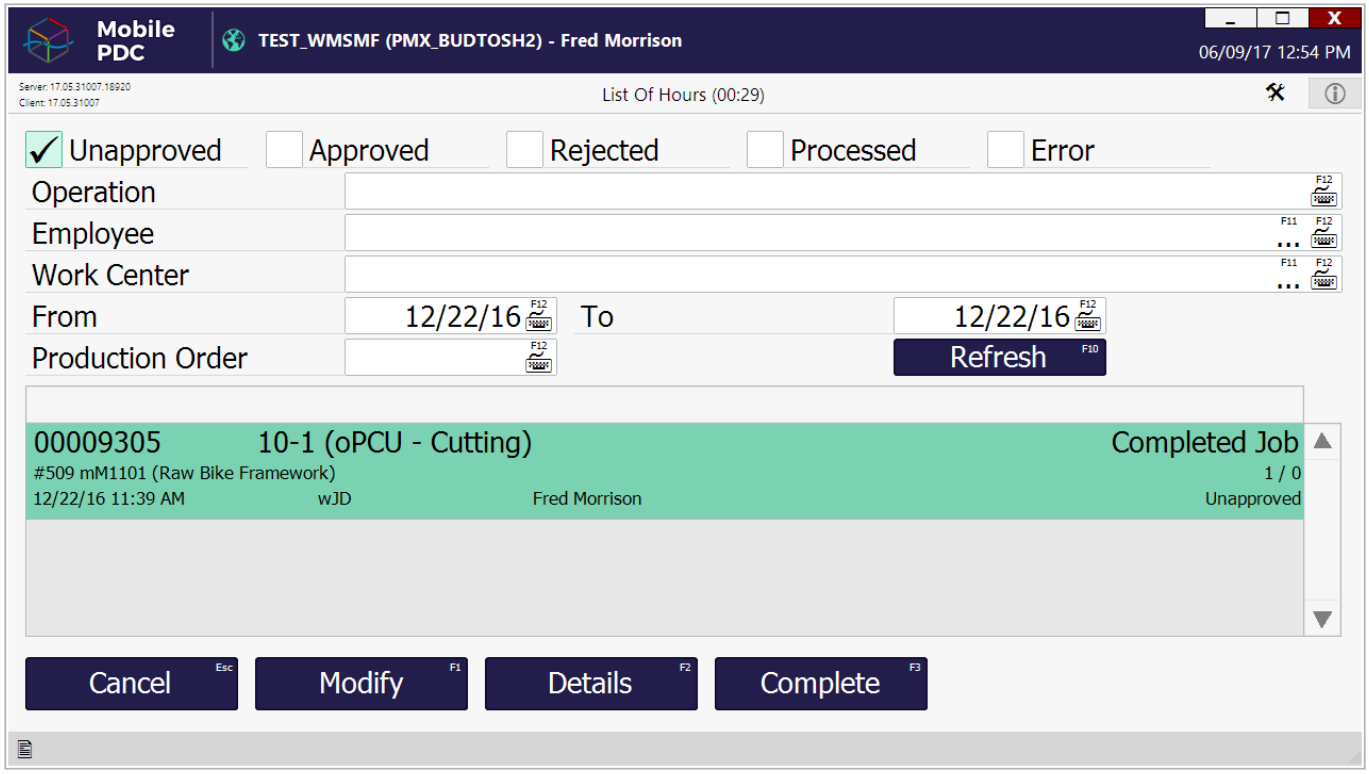
Complete
To finish a job booking, press the 'Complete' button. Only jobs with 'Started' status can be completed.

2.2.10. Approval of PDC Bookings

PDC supports approving of the PDC bookings by the appointed approver person only.

If there is at least one material/product where the *'NeedsPDC Approval'* option is set to 'Yes', approval is needed for the PDC booking. To approve the PDC booking the approver employee has to log in to the mobile PDC, and click on the 'Admin' button on the Start Job page.

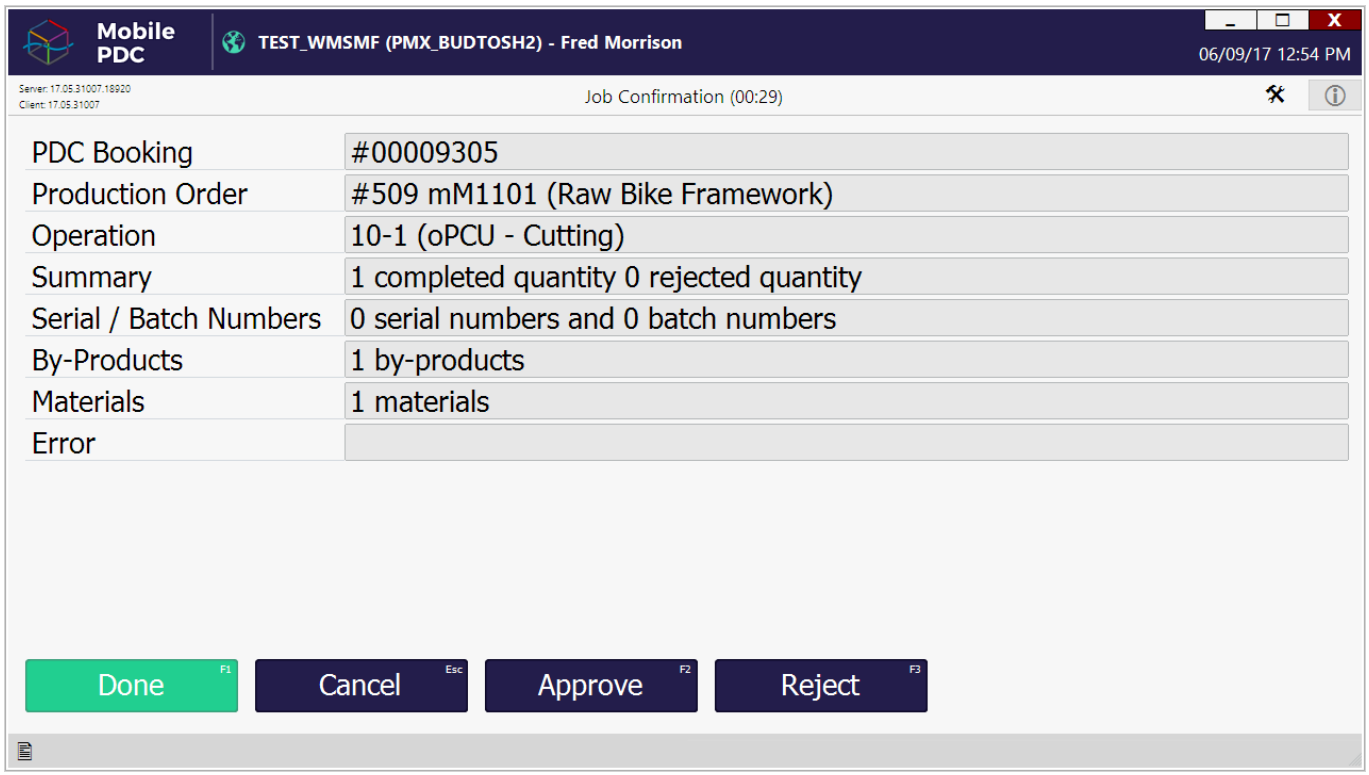
The filter form will open preloaded with all the operations that are unapproved:



The filter fields works as described in the ***2.2.9. Admin section***. Approver employees can see the

bookings of other employees too. Press the ‘Details’ button to review or press the ‘Modify’ button to revise the details of the selected booking.

On the summary page additional ‘Approve’ and ‘Reject’ buttons are displayed if the status of the selected operation is ‘Unapproved’.



If the PDC booking is rejected, the material bookings will not happen and the booking will be marked as ‘Rejected’.

If the PDC booking is approved, it will be processed by PDC Processor.

Employees without approver role cannot perform an operation that has materials or products that needs to be approved. If a non-approver employee starts a job for such operation, it will be disposed automatically to an approver employee. When this setting is enabled, sticky jobs completed by approver employees will be automatically approved.

2.3. Quality Controlling

Quality Controlling is a manufacturing shop-floor quality control/assurance data collection function of Produmex Manufacturing. It supports two major processes:

- QC for production order operations
- QA for outsourcing deliveries

When a worker reports the (partial) completion of an operation with the PDC system (either via the mobile client or shop floor PDC wizard), a QC officer can report QA data for that operation. The QC officer can qualify an operation as rejected (repairable or un-repairable) or approved. The QA data are stored in a database (in the @BXPQAPARAMSJRNL table), and custom reports can be created by the

customers or the partner. Saving QA data to that table is the only result of the quality controlling terminal; any additional steps that should be taken after the quality control process (workflow, repairing job, etc.) should be implemented separately as an addition to the quality controlling terminal.

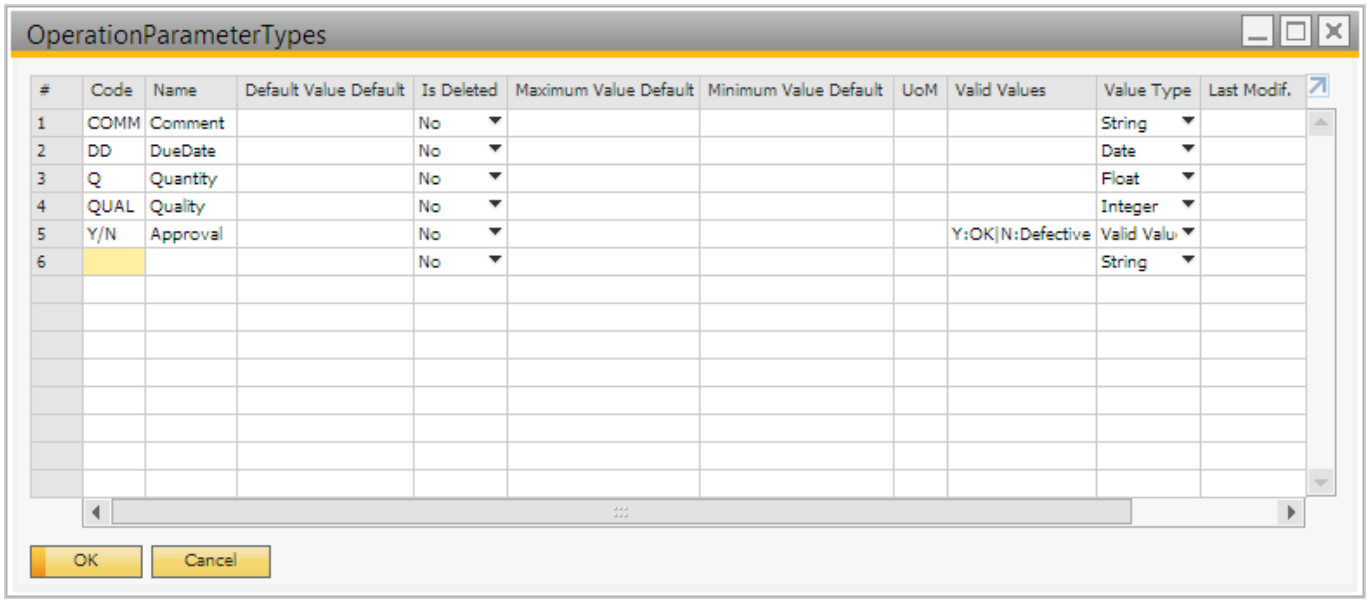
When a delivery (Goods Receipt PO) document is created for an outsourced operation, a QC officer can enter QA data for that delivery. Based on the quality qualifications, the outsourced operation may be rejected.

2.3.1. Set up quality controlling

In order to set up quality control parameters for an operation, enable the *'Production Operation Parameters'* option on the PDC tab of Produmex Manufacturing Settings. Next open the Operation Parameter Types form from: Tools > User-Defined Windows.

Here company specific reporting parameter types (dimensions) can be specified. Each operation can have multiple parameter types associated with it.

Typically in QA these parameters are some metric of the component worked on or the result of some QC tests. In the following example four parameter types were added, that will cover all the relevant features.



Based on the value type

- String: Text can be specified freely. Here it is used for a comment parameter type.
- Float, Integer, Boolean: Numeric fields can be used for measurement.
- Valid Values: This type can be used to create a 'choose from list' parameter. With a taglanguage, the entries in the list can be specified. The syntax is the following: 'Value in database':'Description'|'Value in database':'Description'|... For example in this case Y: OK|N: Defective was specified.
- Date, Time: Date and time is best stored in these types.

Please note: It is not necessary to add timestamp to every operation, as this is automatically collected.

Next open the Production > Manufacturing Operations form. Here, under the Parameters tab, the used parameters can be specified for each kind of operation.

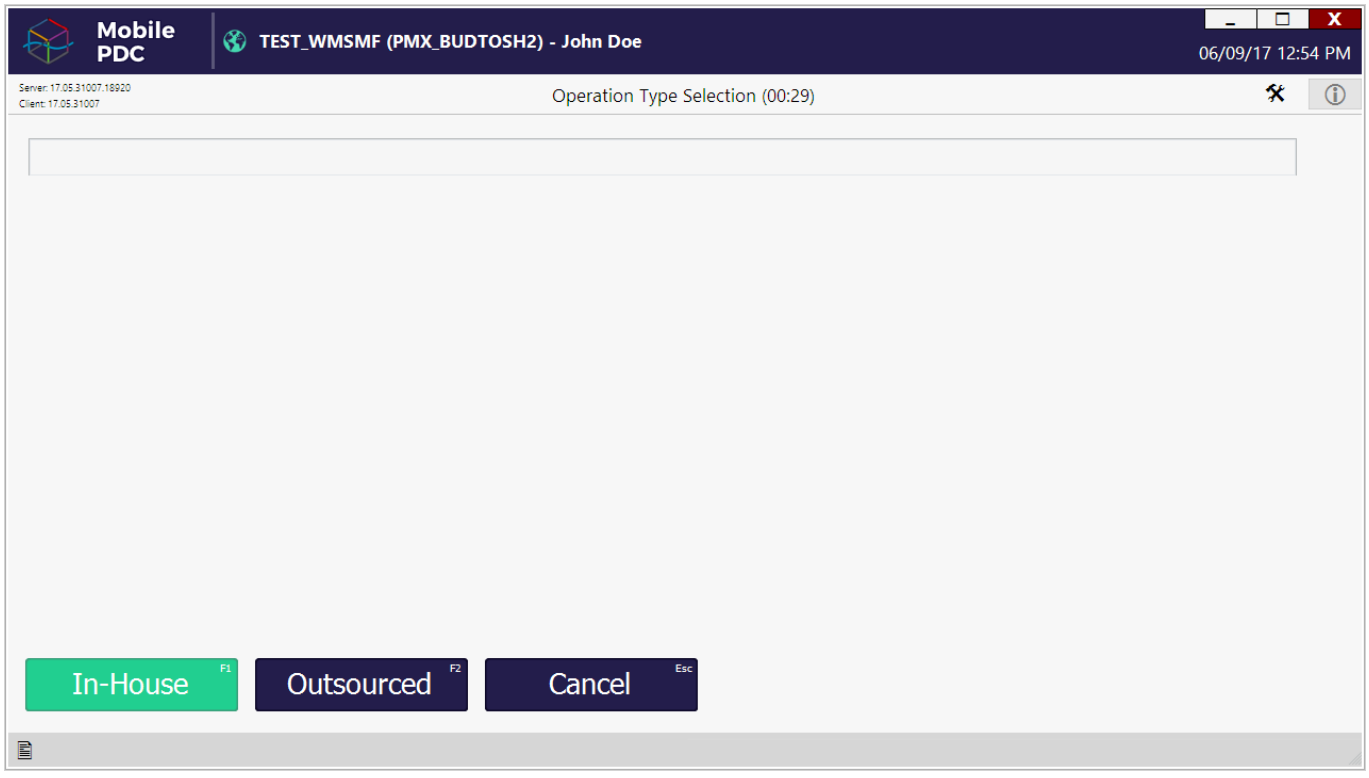
In the Type column, the previously defined parameter types can be chosen.
To use the parameters for the mobile QC terminal the value at the Quality Assurance column has to be set to true. In this example four parameters were specified.

2.3.2. Logging in to QC

Only employees appointed quality inspectors can log into Quality Control.

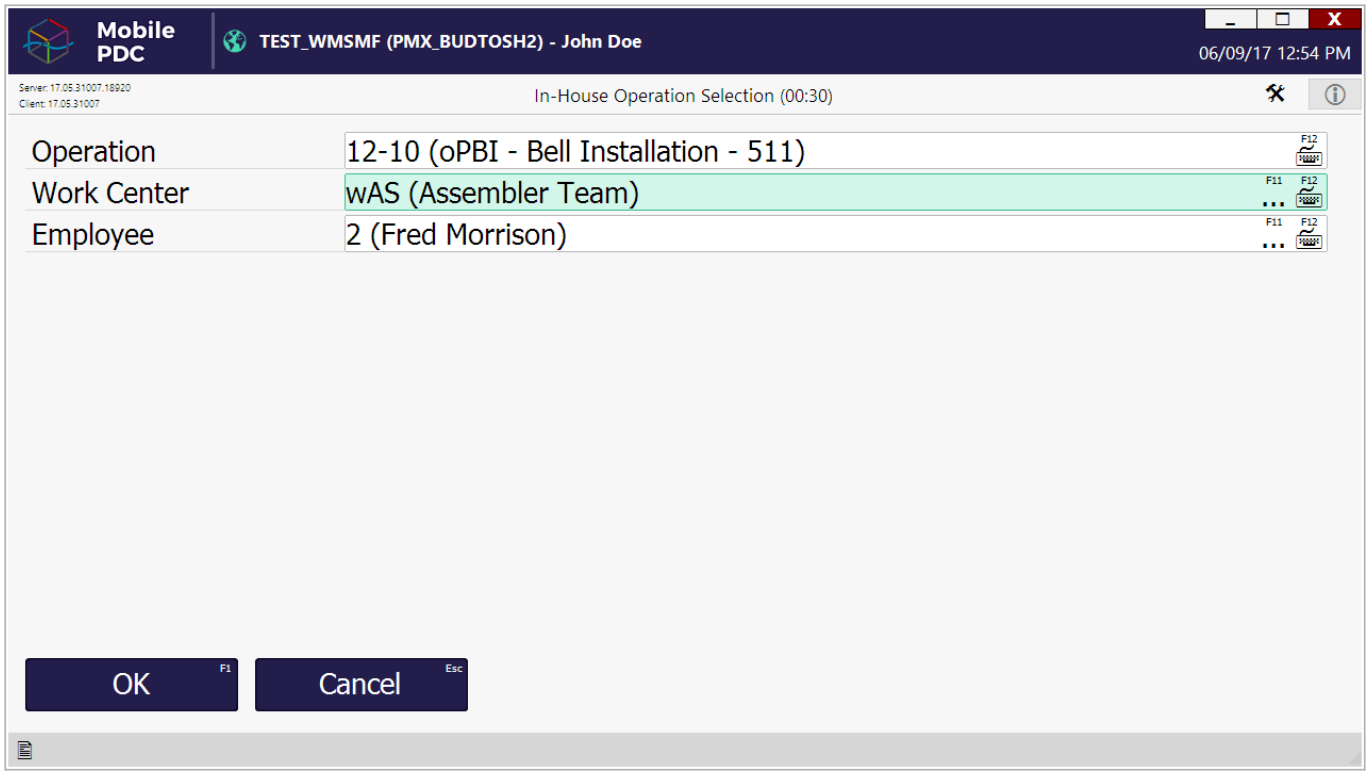
In the next screen the employee can choose between the two mentioned functions: the in-house QC and the outsourced QC.

Select the type of the operation on the next screen. Press the ‘In-house’ button to inspect in-house operations, or press the ‘Outsource’ button to inspect the quality of outsourced products. Press the ‘Cancel’ button to go back to the previous screen.

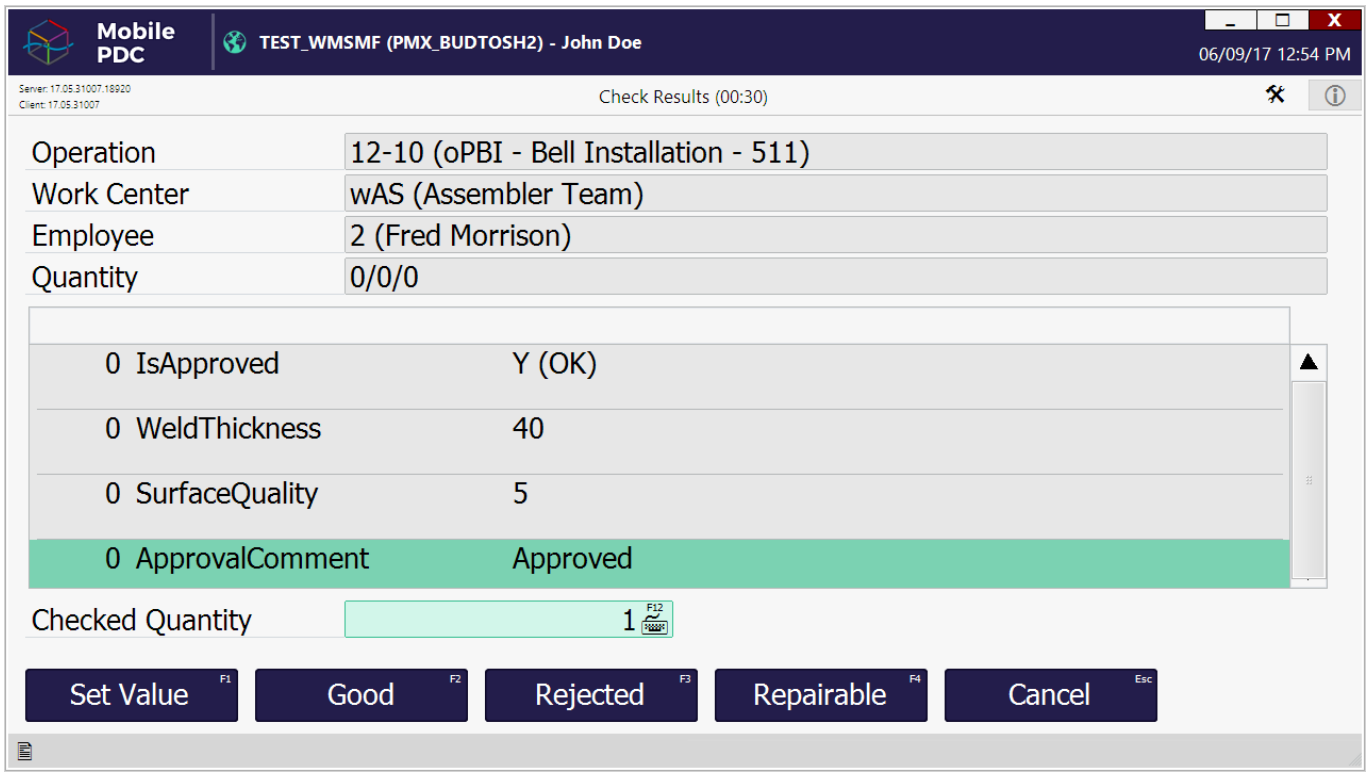


2.3.3. In-House QC

On the ‘In-House Operation Selection’ screen enter an operation ID. Choose a work center and the employee who performed the operation. Only operations with at least one PDC booking can be selected.



The system will proceed to the ‘Check Results’ screen. On this screen the quality of the operation can be reported with the previously defined parameters. Add the number of the tested instances to the ‘Checked Quantity’ field.



To specify parameters, select the parameter from the list and press the ‘Set Value’ button. This will prompt the ‘Set Value’ form.

The method for entering the value varies according to the value type of the parameter:

- String: Enter the text to the textbox.
- Float, Integer, Boolean, Date -Time: Add the value to the textbox.
- Valid Values: Select a value from the list.

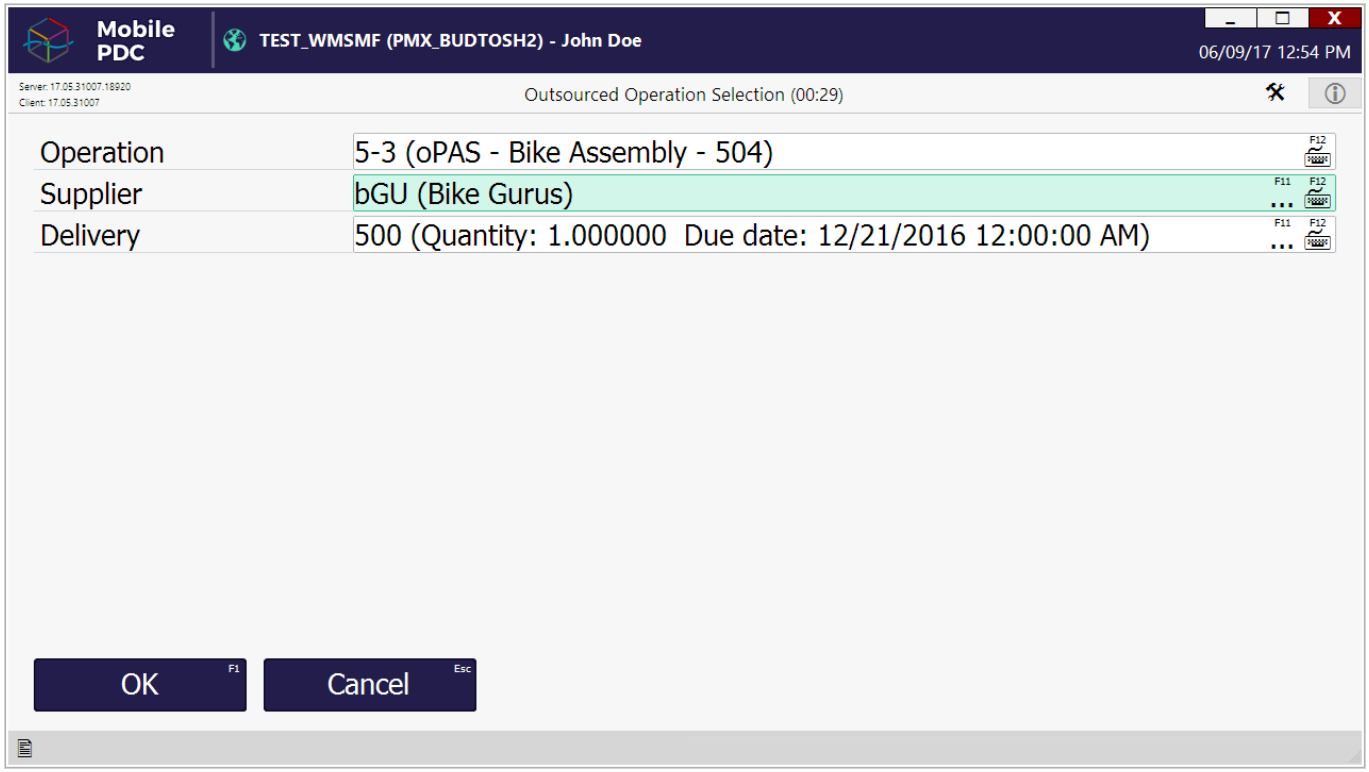
To approve the operation quality, press the ‘Good’ button.
To reject the operation, press the ‘Rejected’ button.
To register the operation as repairable, press the ‘Repairable’ button.

2.3.4. Outsourced QC

For more information about outsourced operations please see: Outsourced Manufacturing.

The Quality Control of an outsourced operation can be handled by selecting ‘Outsourced’ on the Operation Type Selection form. The procedure is the same as an in house operation with the one exception of the selection form.

In the Outsourced Operation Selection window the operation can be specified and then the supplier and the instance of the delivery can be selected.



After this the procedure is the same as introduced in the in-house case.

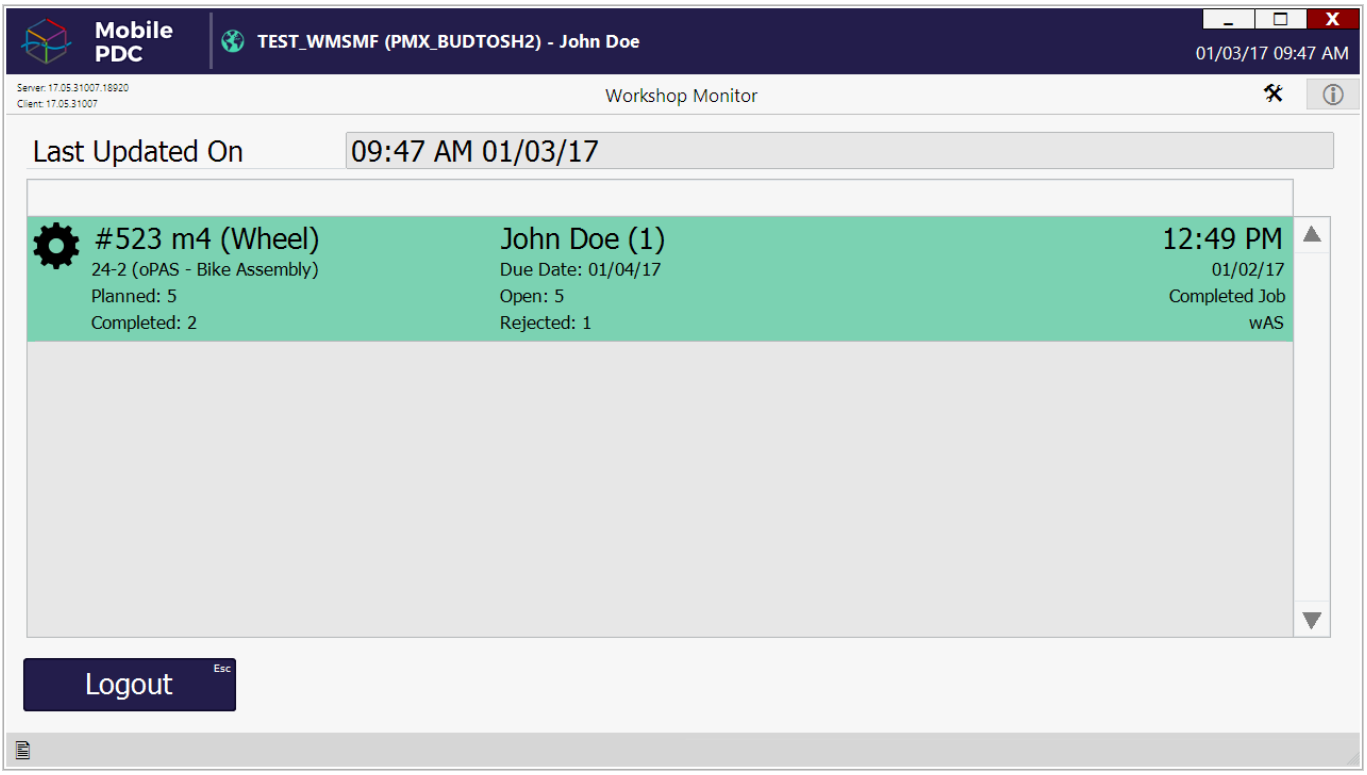
Quality Assurance entries can be seen on: Tools > User Defined Windows > QualityAssuranceJournal

2.4. Workshop Monitor

On the workshop monitor ongoing operations can be overviewed. The workshop monitor will display data supplied by the ***‘bxtc_pdc_workshop_monitor_query’*** user query. Before using the workshop

monitor, create the custom query. See the example query here: Workshop Monitor

Only employees appointed as Workshop Monitor inspector can log in the Workshop Monitor.

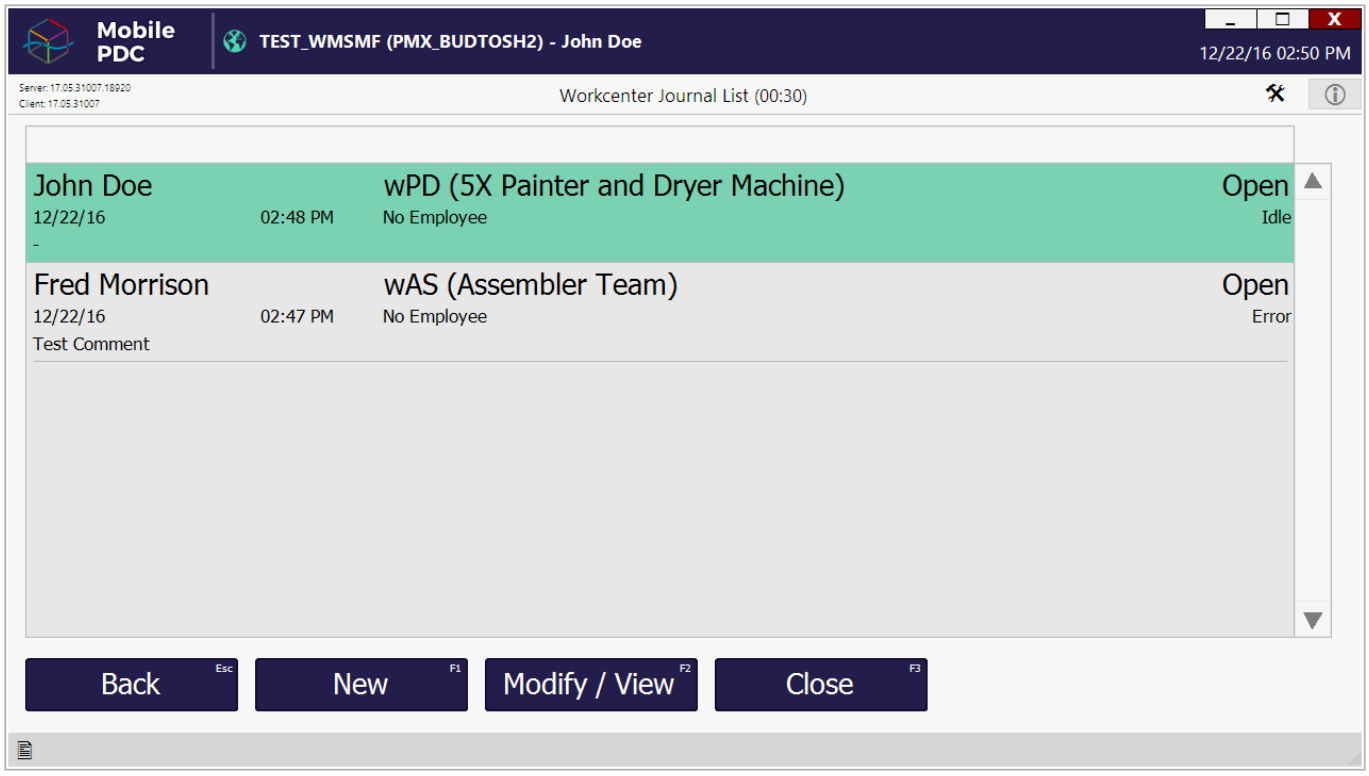


2.5. Work Center Journal

With Work Center Journal tickets work center unavailability reasons can be reported. To create work center journal entries, login the Work Center Journal module. Every employee can create WC journal entries or modify their entries. Only employees appointed as WC admins can close journal entries or modify entries created by other employees.

2.5.1. Work Center Journal List

After the login, the list of open entries are displayed.



Press the ‘Back’ button to go back to the login screen.
Press the ‘Modify/View’ button to review or modify the elected entry. The ‘Work Center Journal Entry’ screen of the selected entry will open up.
If the employee is appointed to the Work Center Admin role, an additional ‘Close’ button is displayed on the screen. Press this button to close the entry.
Press the ‘New’ button to create a new entry. The ‘Workcenter Journal Entry’ screen will be prompted.

2.5.2. Work Center Journal Entry

On the ‘Information’ field the employee name and the date of the creation is displayed. Non modifiable field.

Enter the code of the work center to the work center field or select it from a list after pressing F11.

Select a reason for the work center unavailability. The possible values are: ‘No Employee’, ‘No Material’ or ‘None’. Select an entry type. The possible values are: ‘Idle’, ‘Error’ or ‘None’. It is possible to add remarks to the journal with the ‘Comment’ textbox.

Press the ‘Done’ button to create the entry or press the ‘Cancel’ button to go back to the previous screen.

Work Center Journal entries can be reviewed in the office environment as well. Open the Work Center Journal UDT via: Tools > User Defined Windows. On this form closed journal entries are also displayed.

2.6. Work Center Tickets

With work center tickets machine failures and malfunctions can be reported.

2.6.1. Setup Work Center Ticket types

If you would like to use the Work Center Ticket module, it is recommended to setup ticket types for the work center. Open the Form via: Tools > User Defined Fields > WorkCenterTicketTypes.
Add the ticket code and name then press 'Update'.

2.6.2. Work Center Ticket List

After the login, the list of open tickets are displayed.

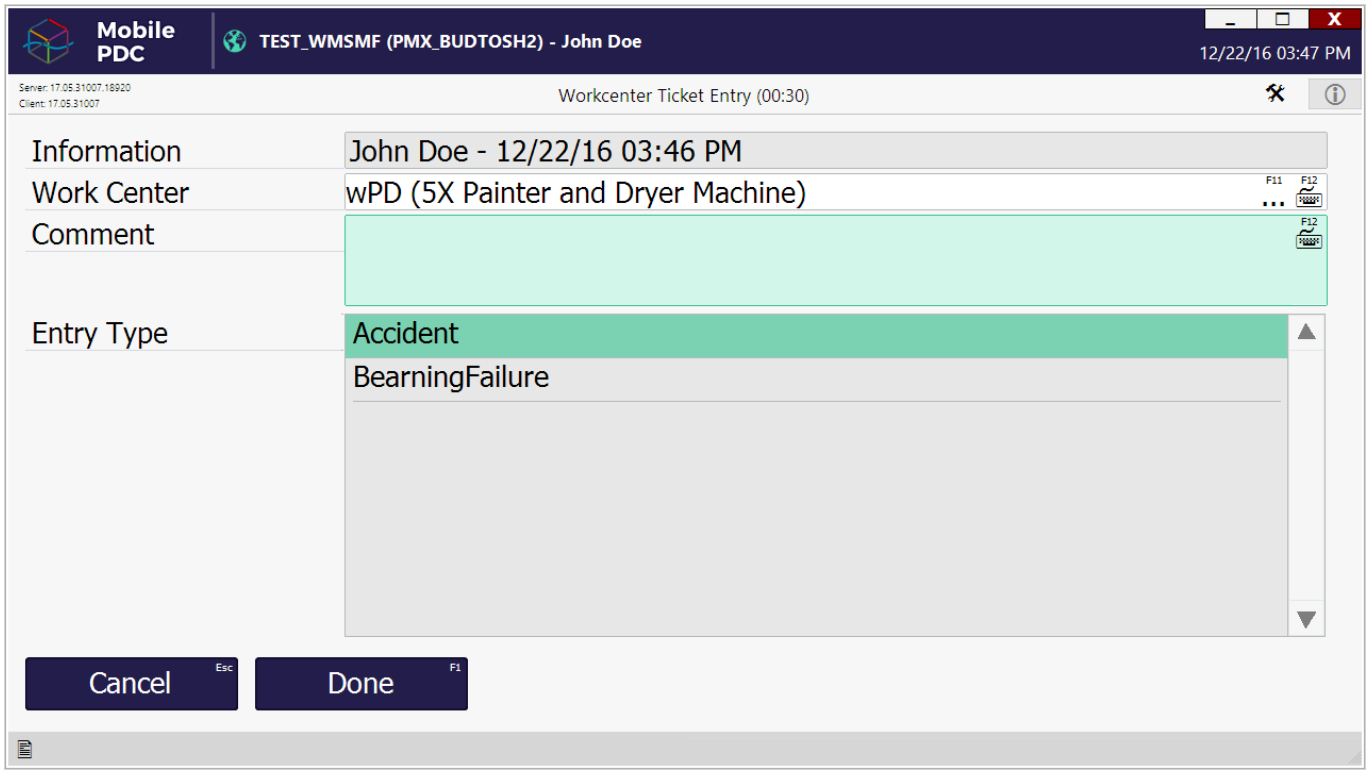
1. Creator name, date and time of the creation
2. Added comment
3. Work center code and description
4. Ticket status
5. Ticket type

Press the 'Back' button to go back to the login screen. Press the 'Modify/View' button to review or modify to selected ticket. The 'Work Center Ticket Entry' screen of the selected entry will open up.

If the employee is appointed to the Work Center Admin role, an additional 'Close' button is displayed on the screen. Press this button to close the ticket.

Press the ‘New’ button to create a new entry. The ‘Workcenter Ticket Entry’ screen will be prompted.

2.6.3. Work Center Ticket Entry



On the ‘Information’ field the employee name and the date of the creation is displayed. Non modifiable field.

Enter the code of the work center to the ‘Work Center’ field or select it from a list after pressing F11. Add a comment to the ‘Comment’ textbox.

Select an entry type. Every ticket type defined on the Work Center Ticket Type UDT can be selected.

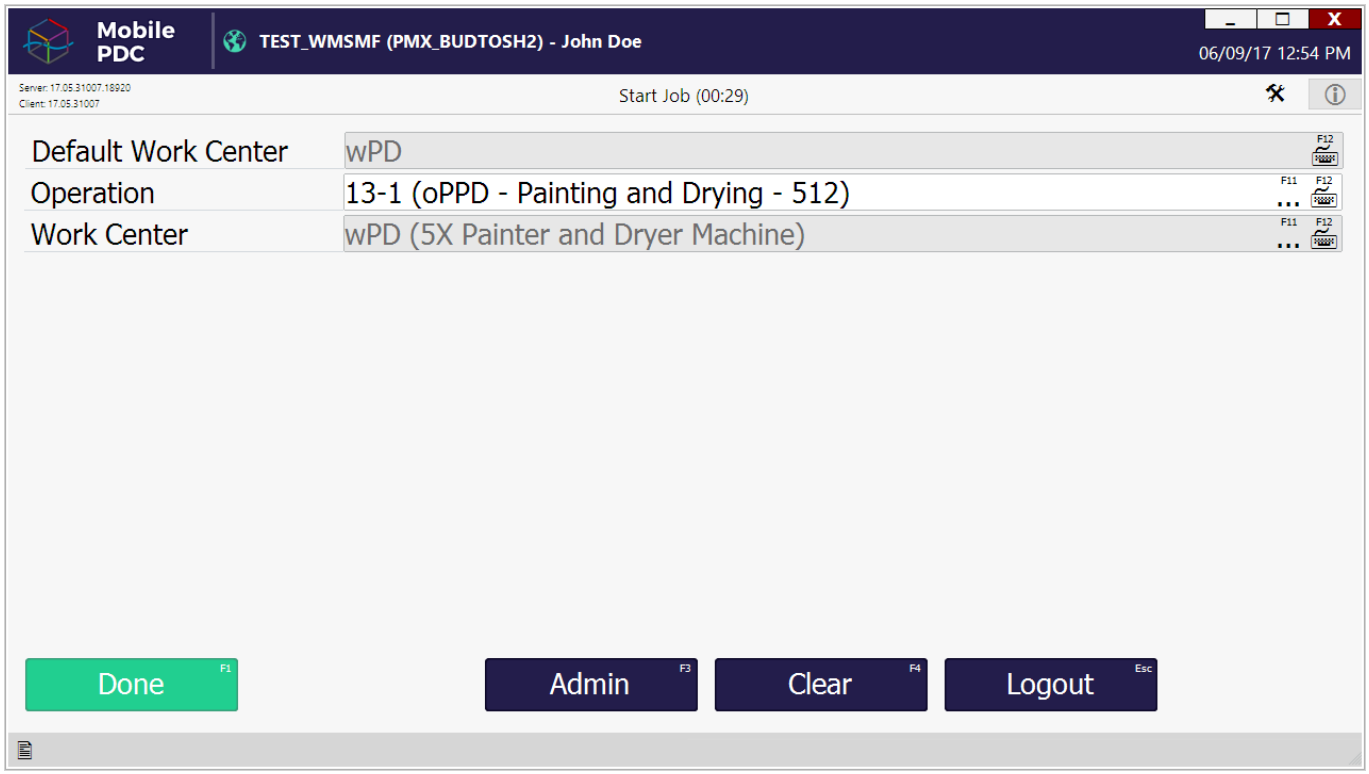
Press the ‘Done’ button to create the entry or press the ‘Cancel’ button to go back to the previous screen.

Work Center Ticket entries can be reviewed in the office environment as well. Open the Work Center Tickets UDT via: Tools > User Defined Windows. On this form closed ticket entries are also displayed.

2.7. Simple Job module

With the Simple Job module, the user can start and complete a job and a setup at one step.

2.7.1. Start Job



The default work center is the work center defined for the terminal on the PDC Terminal Configuration user table. To disable the default work center, set the 'Work Center Ignore' option to 'Yes' for the employee on the PDC Extended Configuration user table]]. When there is a default work center, bookings can be created only for operations with the feature assigned to the default work center.

Add the *DocEntry-LineNumber* identifier to the 'Operation' field.

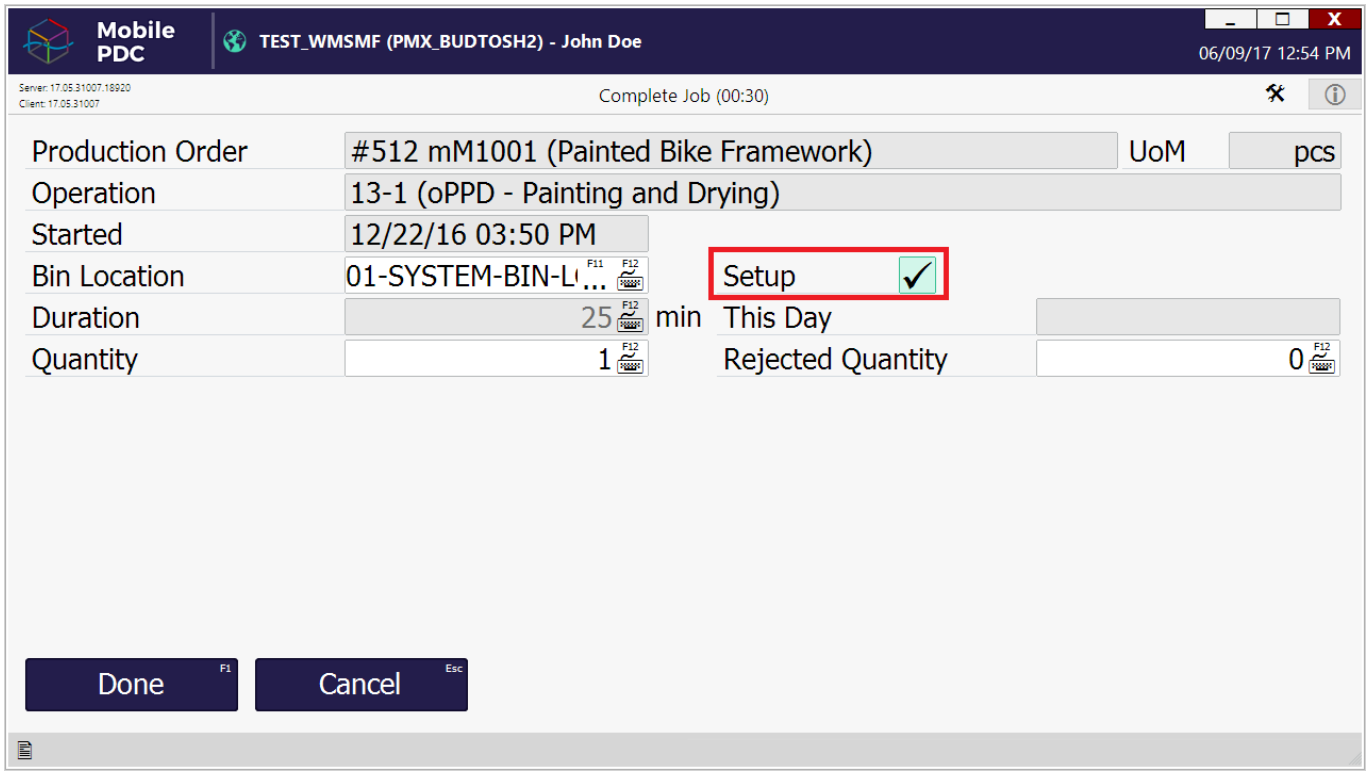
If there is a default work center, the work center field will be populated automatically. The user cannot modify the work center if the default work center is mandatory. The default work center is mandatory in the following cases:

- The employee and/or the work center has no configurations set on the PDC Extended Configuration user table and the 'PDC Modifiable WC for Start' option is disabled on the Thin Client tab of Produmex Manufacturing settings.
- The 'Work Center Modification' option is disabled on the PDC Extended Configuration user table for the employee and/or work center.

Otherwise the work center is not mandatory and the user can select an alternative work center.

To erase the content of the modifiable fields, press the 'Clear' button.
To log out as the current employee, press the 'Logout' button.
To see the Admin screen, press the 'Admin' button. For more information about the Admin function please see: 2.2.9. Admin

Press the 'Done' button to proceed.



2.7.2. Complete Job

Scan the destination Bin Location or enter its code.
The default Bin Location is the Bin Location defined for the employee/work center on the PDC Extended Configuration user table. If there is no default bin location defined for the employee/work center on the PDC Extended Configuration user table, then the default bin location is the bin location defined for the work center.

To create setup bookings too, tick the ‘Setup’ box. The box is only active if there is setup time defined for the operation. Scan the destination Bin Location or enter its code.

Then enter the completed and rejected quantity. When the user enters the completed/rejected quantity, the duration is automatically calculated.

- If setup time is defined for the operation and the ‘Setup’ checkbox is checked, the duration is calculated as {(Setup base quantity + Operation base quantity) * (Completed quantity + Rejected quantity)}.
- If there is no setup time defined for the operation and/or the ‘Setup’ checkbox is not checked, the duration is calculated as {Operation base quantity * (Completed quantity + Rejected quantity)}.

After the Duration field is filled, the system also calculates the Start time as {Current Date/Time – Duration}.

If the *‘Manual Job Duration’* option is enabled on the PDC Extended Configuration user table, the user can enter the duration. When the user enters or modifies the duration, the system recalculates the Start time. Please note: The completed quantity will not be recalculated based on the duration.

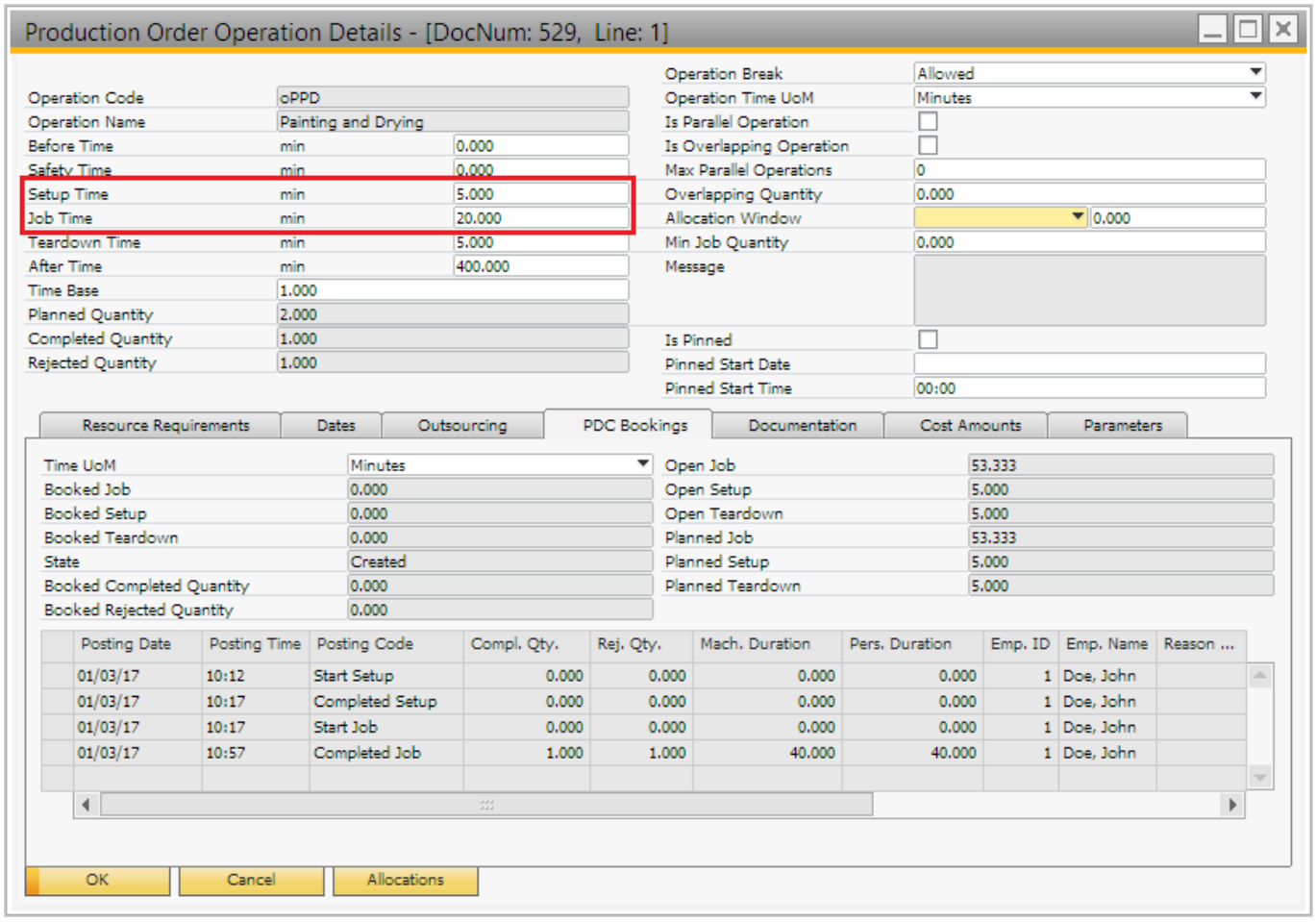
If the *‘Comment Visible’* option is enabled on the PDC Extended Configuration user table, an additional Commend field is displayed on the screen.

Press the ‘Done’ button to proceed.

When there are materials linked to the operation with a milestone, receive the materials. Please see: 2.2.7.Materials

When there is a by-product linked to the operation or the operation is the last one on the production order and there is a milestone set for the product, receive the (by-)products too. Please see: 2.2.6.Products

Operation Details
Because the user does not start the job manually, the booked time cannot be measured. The system will automatically create the ‘Start Setup’, ‘Completed Setup’, ‘Start Job’ and ‘Completed Job’ bookings. The Posting Time of the Complete Job booking is the time when the PDC booking was created. The Posting Time of the ‘Start Setup’, ‘Completed Setup’, ‘Start Job’ bookings is calculated backwards.



3. PDC bookings in SAP B1

3.1. Create PDC bookings

3.1.1. Simplified Production Data Collection

Many manufacturing companies do not need the full-fledged data collection terminal. Instead, they could do very well with the much simpler PDC office terminal. In this scenario, the production data is collected (mostly) on paper, and the data is entered at the end of the day by an office assistant.

3.1.1.1. Print the PDC sheet

Open the sheet generator via: Production > PDC > PDC Sheet Generator.

The *'PDC Sheet Generator Parameters'* screen will open up.

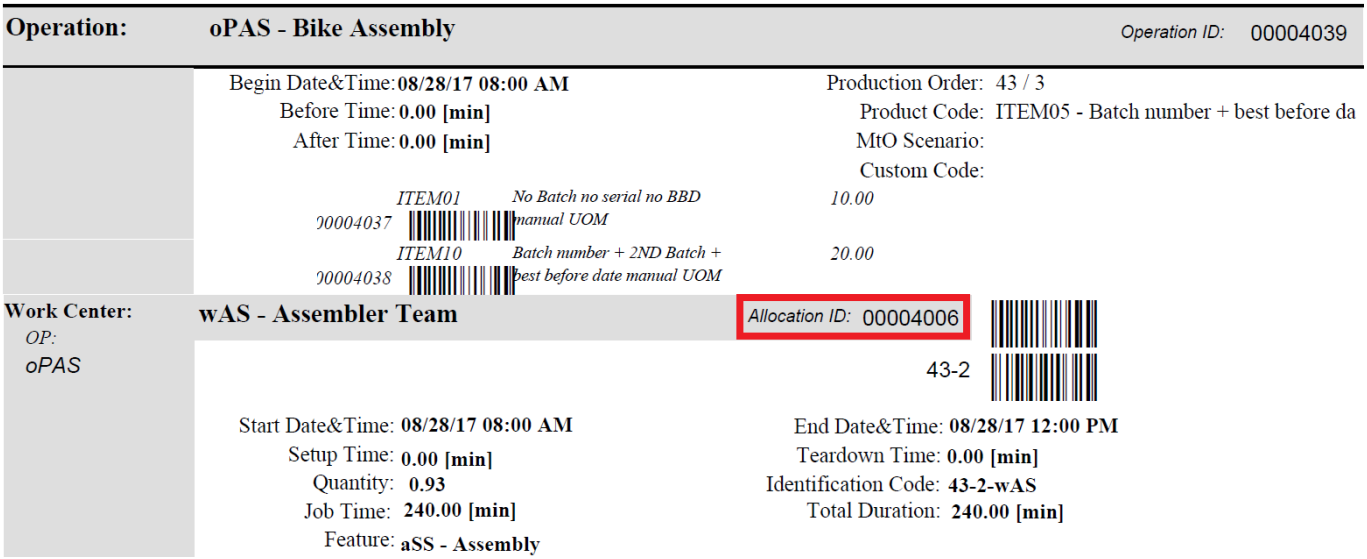
To print a prefilled sheet, tick the 'Prefilled' box then select the data to add to the sheet. The sheet can be prefilled with the following data:

- Employee ID
- Pr. Ord. No
- Operation Code
- Work Center

Enter the number of rows you would like to add for each allocation to the 'Rows per allocation' field.

Click on 'Ok' then set the printing options on the 'Select Report Layout' screen.

The Allocation ID is the identification number of the allocation that can be seen on the Job Requirements Report:



The Posting Code stands for the status of a certain phase in PDC booking. (Eg.: 'Partial setup', 'Completed Job')

3.1.1.2. PDC Bookings office terminal

Enter the data collected on the PDC screen on the PDC Bookings office terminal form. Open the form via: Production > PDC > PDC Bookings office terminal.

With the office terminal it is not mandatory to record all phases (setup, job, shutdown, break, etc.) of the operation; most typically only the job completion is booked.

When the bookings have been inserted and user presses the ‘Update’ button, the appropriate material issue for production or product receipt from production (according to the milestone settings of the operation and material lines) inventory transactions will be committed as well. After a job completion is booked on the office terminal, the status of the operation is set to ‘Finished’.

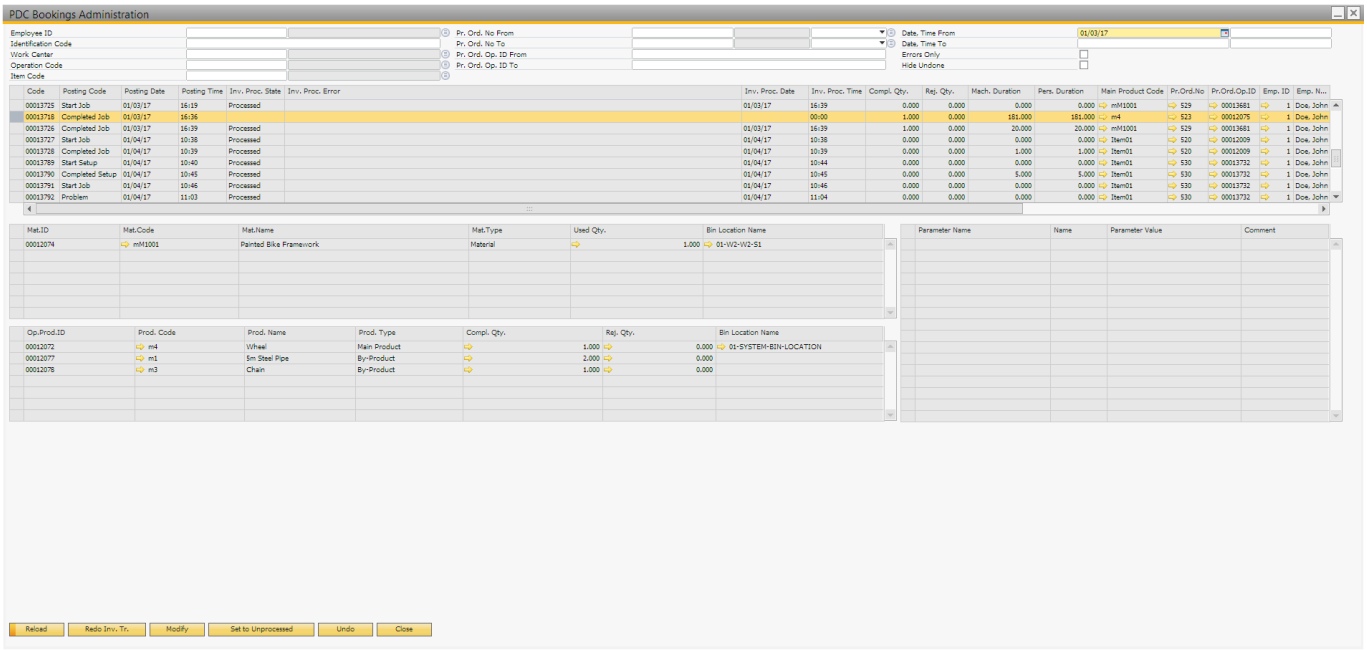
3.1.3. Simple PDC Shop-Floor Wizard

The Simple PDC Shop-Floor Wizard is an obsolete function. It is recommended to use the Mobile PDC instead.

3.2. Manage PDC bookings

3.2.1. PDC Administration

On the PDC Administration form PDC bookings can be reviewed and modified. Open the form via: Production > PDC > PDC Administration.



The upper part of the screen is a filter. Bookings can be filtered with the following:

- Employee
- Work center
- Operation code
- Item code (of the main product)
- Production order number (range)
- Production order operation ID (range)
- Date (range)

Check the ‘Errors only’ box to list only bookings with processing errors. Uncheck the ‘Hide undone bookings’ box to include undone bookings in the list as well.

Click on the ‘Reload’ button to get the list of the bookings with the applied filters. The bookings will be listed on the upper grid.

On the middle of the screen a ‘Material’ grid and a ‘Product’ grid is displayed. When the ’Use Operation Parameters’ option is enabled on the PDC tab of Produmex Manufacturing Settings, an additional ‘Parameter’ grid is shown.

On the ‘Material’ grid the materials issued during the selected booking are listed. On the ‘Product’ grid the products received during the selected booking are listed. On the ‘Parameter’ grid the quality assurance parameters will be displayed.

Click on the ‘Close’ button to close the form.

Modify
To modify a booking, select its row and click on the ‘Modify’ button. The ‘Modify PDC Booking’ form will open up. On this form the following can be modified:

- Posting Date and Time
- Machine and Person Duration
- Completed and Rejected Quantity

If the PDC booking has inventory transactions, the completed and the rejected quantities cannot be modified.

Set to Unprocessed
To reprocess every failed transaction displayed on the screen, click on the ‘Set to Unprocessed’ button. The status of the transaction will be set to ‘Unprocessed’. These transactions will be reprocessed when the PDC Processor runs again.

Redo failed transactions
To individually reprocess bookings with inventory transaction errors, select the row of the booking and press the ‘Redo Inventory Transactions’ button.

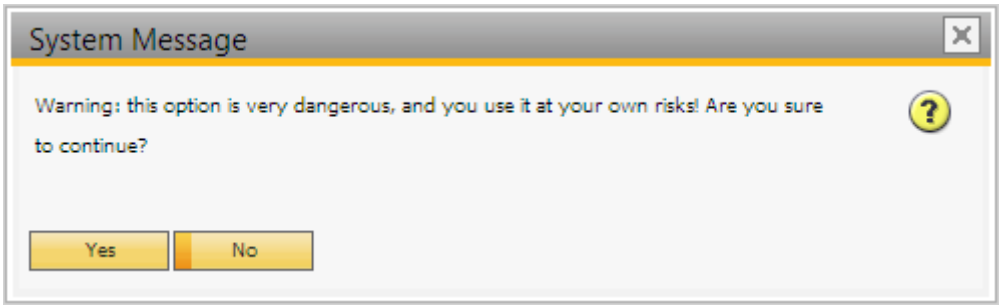
The System Message shows the number of the successful and failed reprocesses.

Undo a booking

When the *'PDC Allow Undo'* option is enabled on the PDC tab of the Produmex Manufacturing Settings, PDC transactions can be undone. An additional 'Undo' button is displayed on the screen.

To undo an erroneous booking, select the row of the transaction and click on this button. Undone bookings are marked with a tick in the box on the 'Is Undone' column. Undoing a *Close* or IsCompleted booking changes the status of the operation back from *Finished* to *Started* or *Created*.

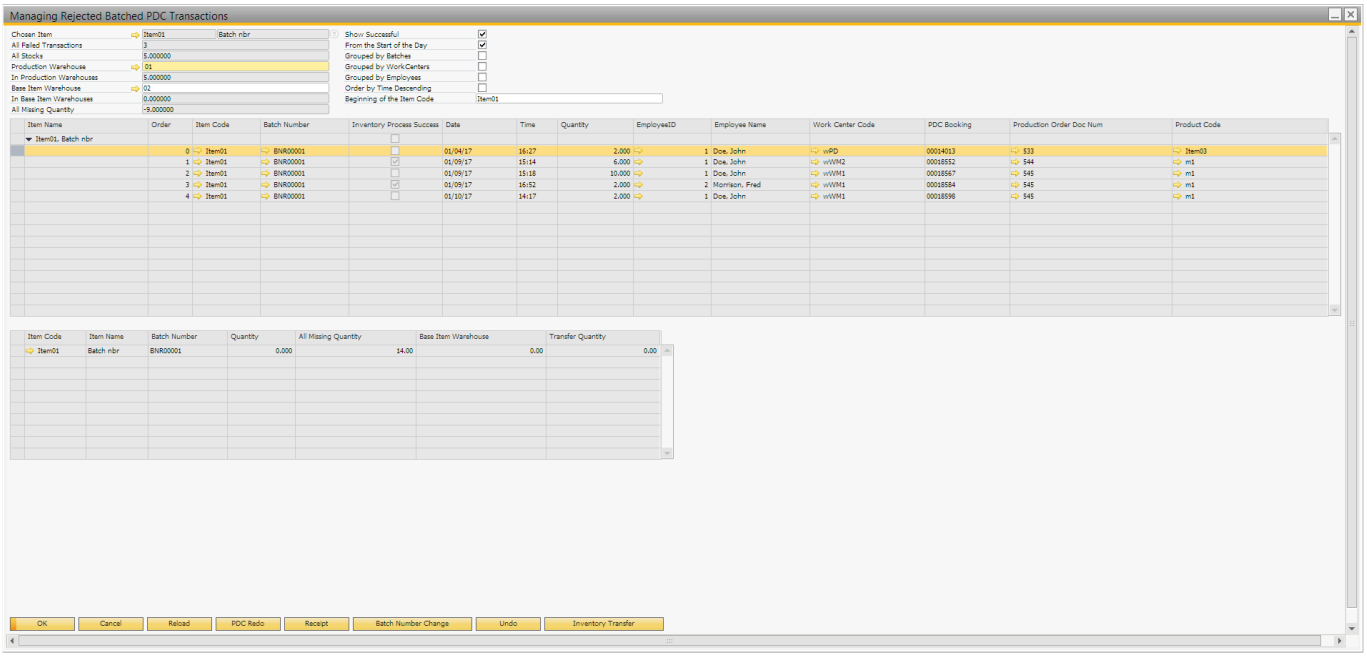
When the *'PDC Undo Only No Transaction'* option is disabled, PDC bookings with inventory transactions can also be undone. Please note that undoing a PDC booking with inventory transaction is strongly discouraged. During the process a system warning will open up. Press the 'Yes' button to proceed with the undoing. The inventory transactions booked for the PDC transaction will be undone too.



PDC bookings containing materials or products managed by serial or batch numbers cannot be undone.

3.2.2. Managing Rejected Batched PDC Transactions

To correct PDC transactions that were unsuccessful due low stock quantity of batch managed materials, enable the *'Managing Rejected Batched PDC Transactions'* option on the PDC tab of Produmex Manufacturing settings. Open the form via: Production > PDC > Managing Rejected Batched PDC Transactions.



On the header transaction details can be overviewed.
The grid can be filtered with the following:

- Show successful: Tick the box to show the successful transactions linked to the rejected batches.
- Beginning of the Item Code: To filter the list based on the item code, start to enter the item code to the textbox.

Displaying options can also be set on the header:

- Grouped by Batches/ Work Centers/ Employees: Enable the grouping options by ticking the box.
- Order by Time Descending: By default the rows are sorted by the batch/ serial numbers. When this option is enabled, the rows are ordered descending by the creation date and time.

Reload

Click on the ‘Reload’ button to get the list of rejected batched transactions with the applied filters.

The transactions are grouped by the item. Click on the black arrow next to the item code to reveal the rows of the failed transactions belonging to the item.

PDC Redo

To reprocess bookings with rejected batches, select the row(s) of the booking(s) and press the ‘PDC Redo’ button.

Batch Number Change

When the transaction is failed because there are insufficient stock from the added batch but there are stock available from other batches, the transaction can be corrected by changing the batch number. Select the transaction row to change then click on the ‘Batch Number Change’ button. The ‘Batch Number Change’ form will be open.

Batches with available quantities are listed on the grid. Add the quantity to change to the ‘Change Quantity’ cell on the row of the new batch. Remarks can be added on the ‘Comment’ textbox.

The transaction will be reprocessed by the PDC processor.

Receipt
When the transaction is failed because there are insufficient stock in the inventory, the transaction can be corrected by receiving the missing quantity. Select the transaction row(s) then click on the 'Receipt' button.

Add the quantity to receive to the 'Receipt Quantity' cell on the opening form then press the 'Ok' button to create a 'Goods Receipt' document and receive the items.

Please note: In order to create the goods receipt document, a *'GoodsReceipt Series Name'* should be set on the PDC tab.

The selected transaction(s) will be reprocessed by the PDC processor.

Inventory Transfer
When the transaction is failed because there are insufficient stock from the batch in the warehouse, the transaction can be corrected by receiving the missing quantity from another warehouse. Select the transaction row(s) then click on the 'Inventory Transfer' button.

The selected transaction(s) will be reprocessed by the PDC processor.

Undo
Rejected batch transactions have no inventory bookings linked therefore can safely undone. To undo rejected batch transactions, press the 'Undo' button then add the quantity to undone to the 'Undone Quantity' field.

Finter

Cost and Price Calculations

Produmex Manufacturing is a legacy product and Boyum IT Solutions no longer sells new installations for it.

Cost and price calculation is an integrated part of Produmex Manufacturing. When calculating the costs and prices of an own manufactured product the prices of the materials are simply added as much quantity is used for the production. Calculating the costs of operations and additional costs including energy, management, amortization, wages and so on is not as straightforward as calculating the material costs.

SAP Business One has basic machinery for manufacturing cost calculations: each item in the component list of a Bill of Material (BoM) or production order may have a price and SAP Business One calculates the total cost of a product by summing the products of item prices and quantities. If more sophisticated cost calculation is needed, instead of adding cost rows in BoMs, the built-in cost calculation facilities of Produmex Manufacturing should be used.

Manufacturing cost calculation starts by defining cost types that are used for any production operation in the company. The cost types are assigned to manufacturing resources (work center groups, work centers, operations, and so on) with their basic cost values. The costs of operations of in BoMs and Production Orders are calculated according to the ratio they use these resources. Manufacturing cost calculation is applicable only for manufactured products and components/parts (with procurement method “Make”). The actual algorithm of calculating the cost of a manufactured product is defined in cost schemas. The cost values calculated with cost schemas may be used to update the prices of the products in the pricelists. For this job price (calculation) schemas and intermediate cost collectors are needed. Costs can be calculated from BoMs and Production Orders. When the costs are calculated from Production Orders, the resource consumption values may come from the (1) planned component list, (2) the released component list where the operations are linked to specific work centers, (3) and the actual resource consumption reported via Production Data Collection (PDC).

> Please note: The cost and price calculation logic of Produmex Manufacturing does not support the '*Remove Unpriced Items from Price List in Database*' setting. Make sure that the '*Remove Unpriced Items from Price List in Database*' setting is not enabled on the Pricing tab of General Settings in SAP Business One.

1. Defining Costs

> Since calculation is sensitive to numerical precision, it’s highly recommended to increase the decimal places for Amounts in the General Settings form.

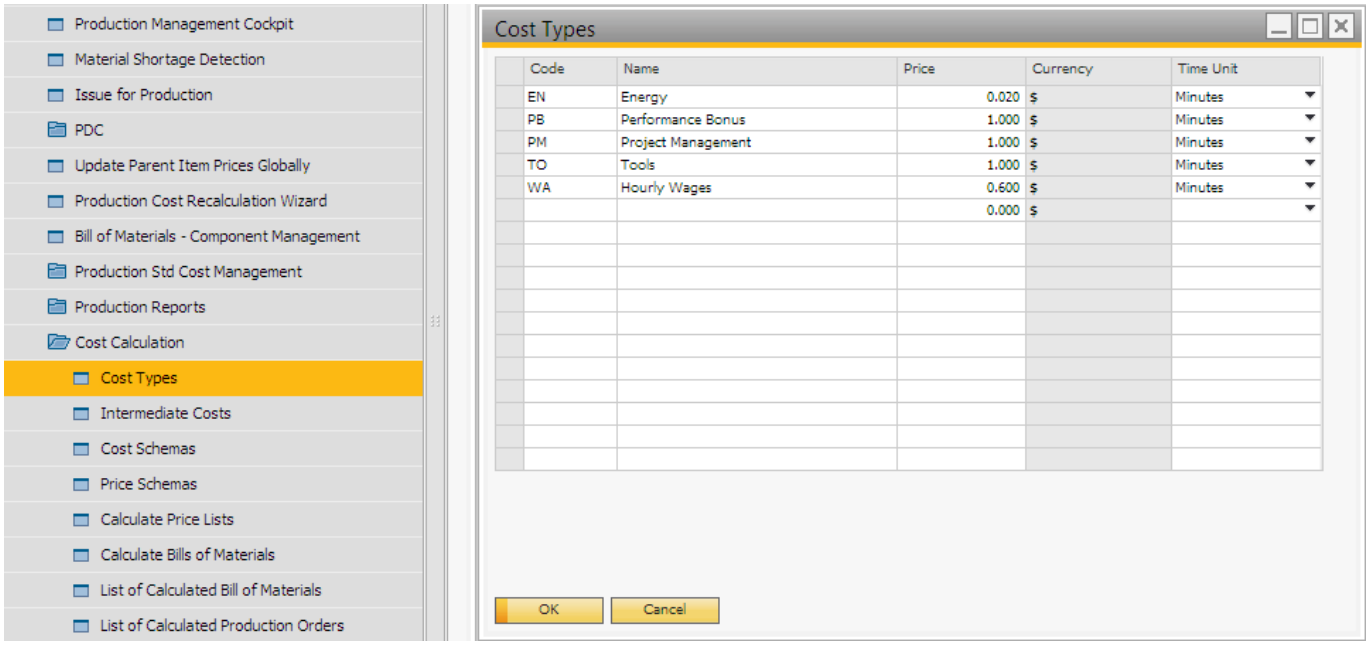
1.1. Defining Cost Types with Base Price

Cost types are the basis for all manufacturing cost and price calculations.

The code is an at most 8 character identifier.

Some costs are dependent on the length of a manufacturing operation (job) or the duration of the using of a resource (machine). For them the time unit can be defined for the base price. This price is a company-wide generic (base) price of the cost type for the selected time unit. The Energy, for example, in our sample company is $0.02 per minute; that is, 1 (kilo)wattminute of electricity costs $0.02 for our company.

The actual unit of measurement can be meant anything: megawatt-minute, kilowatt-minute, watt-minute, etc; what is important is that the price should be a ratio of the selected time unit. Later when the Energy costs are defined for the manufacturing operations or resources, the amount of energy that the operation/resource consumes in the selected time unit (minutes, in our example) should be defined.



Some other costs are not dependent on the duration of job/usage. For these cost types the time unit is not relevant. Most typically the price for them is set to $1 meaning that the actual cost prices will be defined later when the cost type is associated with a manufacturing operation or resource. Never define 0 as the price for a cost type, unless you want to have the system entirely ignore that cost type.

$1 can be defined for time dependent cost types as well, where no appropriate (relevant) company-wide price value is available or can be determined. The Hourly Wages in our example is an overall $0.6 per minute for every type of jobs in the company. If the price of wages a minute were different for each operation, then the price value of the cost type Hourly Wages should be defined as $1, and the actual minute-wages should be defined for each operation. The price value defined for a cost type is always multiplied with the cost amount defined for an operation or resource.

For the sake of understanding the cost types here are defined for minutes. In the example we define a number of cost types:

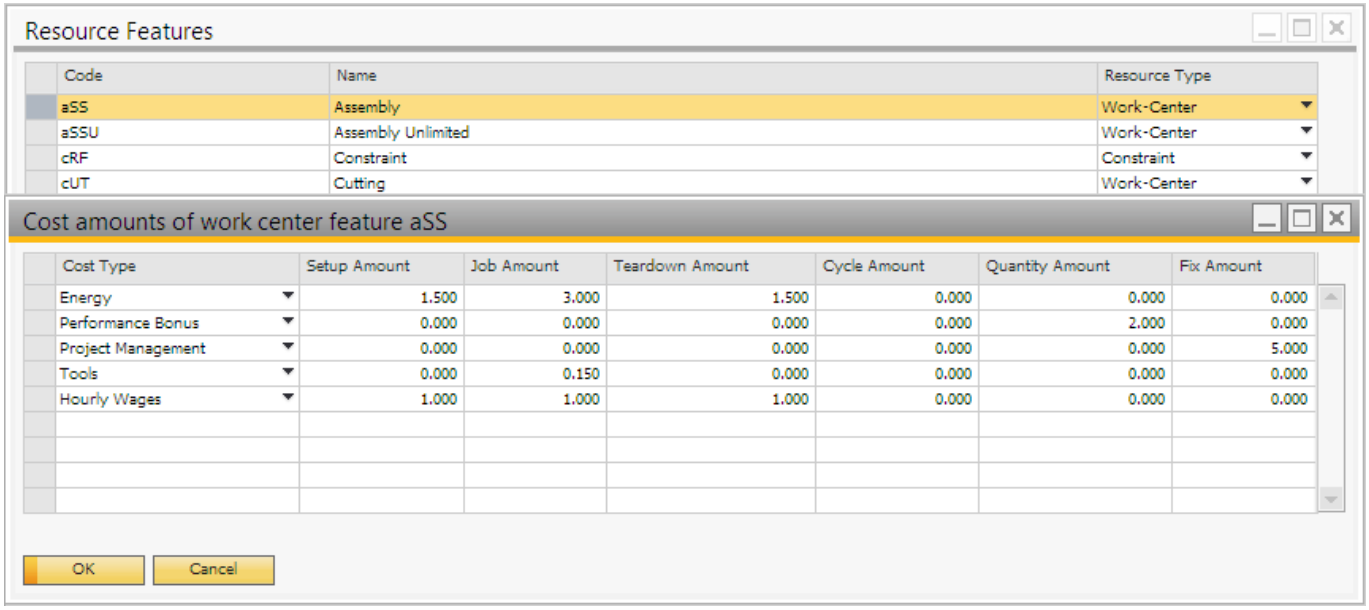
- **Hourly Wages** – the cost of labor per minute.
- **Performance Bonus** – the bonus for a completed unit of work. For this cost type in this example the time unit is not relevant. We'll see later how it is used to define the actual bonuses when the types of jobs are defined. Whenever the price cannot be defined in general for the cost type, the value should be set to 1.
- **Energy** – the price is the minute cost of one unit of energy. This price is the current price of one unit of energy. Since our example company uses only electrical devices, the number is the price of one Watt-minute. Later we'll define the actual energy consumption of the tools.
- **Tools** – this is an estimated cost of the devices used for manufacturing. These costs will be defined later for the types of jobs.
- **Project Management** – each job should be communicated to the workers and instructions should be given. We'll define the management costs for the type of operations as fix costs. The Time Unit is not relevant for these (fix) type of costs.

All the cost types used for any manufacturing operations or resources of the entire company should be defined here. The cost types are not automatically associated to any of the manufacturing operations or resources; they must be explicitly linked to the resources and/or operations as

described in details in the forthcoming sections.

1.2. Defining Resource Cost Amounts for Types of Jobs

A topmost level where manufacturing cost amounts can be defined is when Features are specified. In the Produmex Manufacturing add-on Features is a notion to define types of jobs, groups of machines, workers with the same skills, and so on.



In the example above the number of costs are defined for the Assembly feature:

- **Hourly Wages** – every minute (since we defined this cost type for minutes) of this (Assembly feature) job requires one minute of work from a worker with the minute price defined for the cost type. That is, for example, if 100 minutes (job time) of Assembly feature operation were required for a manufacturing the Hourly Wages cost would be 100 x 1 x 0.6 (from cost type definition above). If 10 minutes of setup is defined for the operation 10 x 1 x 0.6 is calculated.
- **Performance Bonus** – for every completed unit of job 2 x 1 (from cost type definition) money is paid to the workers. Now it's getting clearer why the Price was set to 1 when this cost type was defined: the cost type amounts defined for the resources (features, work centers, operations) are multiplied by the base cost type price.
- **Project Management** - This cost is non-variable: 5 for each job taken. This is the cost of job administration. It is not dependent on the amount of job time. If a BoM had ten operations of this type, the total project management cost for the entire process would be 50 (10 x 5).
- **Energy** – every minutes, when this (Assembly feature) job is done on any work center (machine), 3 units (Watt-minutes) of energy is used. For Setup and shutdown the energy consumption is much less. The cost for 100 minute job would be 100 x 3 (job amount) x 0.02 (base price of cost type defined earlier).
- **Tools** – the cost of tools have been estimated to be 0.15 for each minute of this job. The total tools cost for a 100 minute job would be 100 x 0.15 (job amount) x 1 (base price of cost type defined earlier).

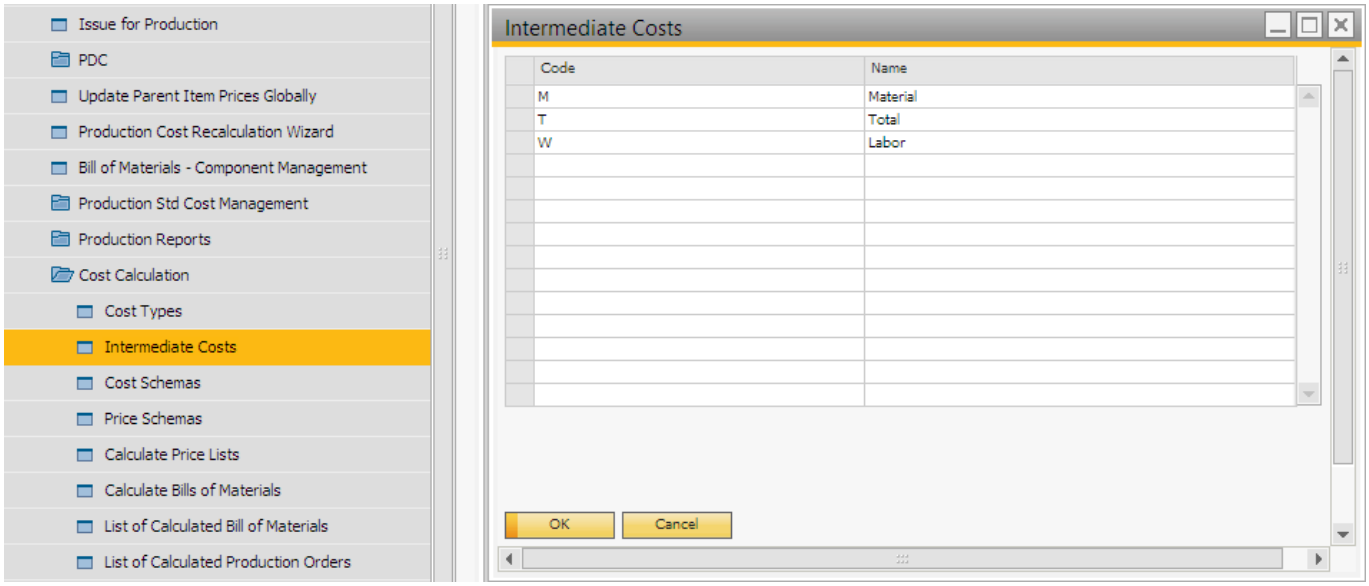
It's not necessary to define all cost types for all Features; for example, Tools and Energy may be insignificant for Quality Inspection.

It is possible to override these cost type amount values for specific work centers, operation master data, operations in bill of materials, operations in production orders.

1.3. Defining Intermediate Costs

An intermediate cost is actually a predefined name (variable) that can be used in calculation schemas. Intermediate costs are necessary for Price Schemas; intermediate costs are the linking machinery between Cost Schemas and Price Schemas. From the perspective of the calculation engine, Intermediate Costs are a kind of variables, when the engine executes/processes a cost schema it calculates the values and stores them in Intermediate Cost variables as defined in the Cost Schema.

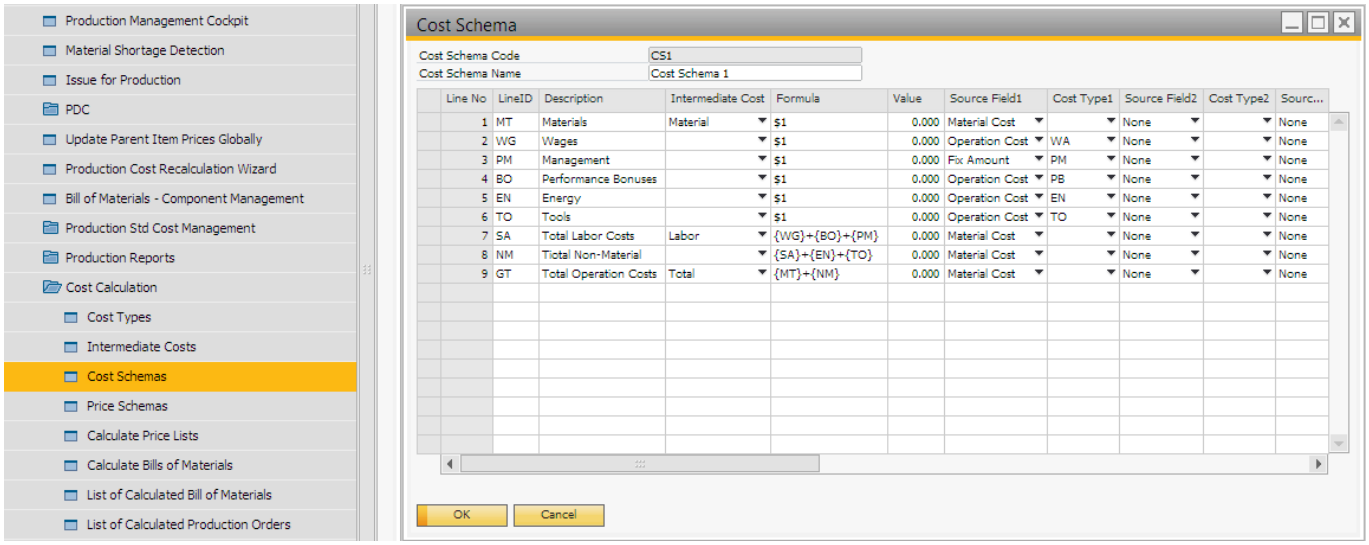
Normally, the calculation of Cost Schemas is followed by the calculation of a Price Schema. Price Schemas contain references to Intermediate Costs, and the values are coming from the calculated results of Cost Schemas.



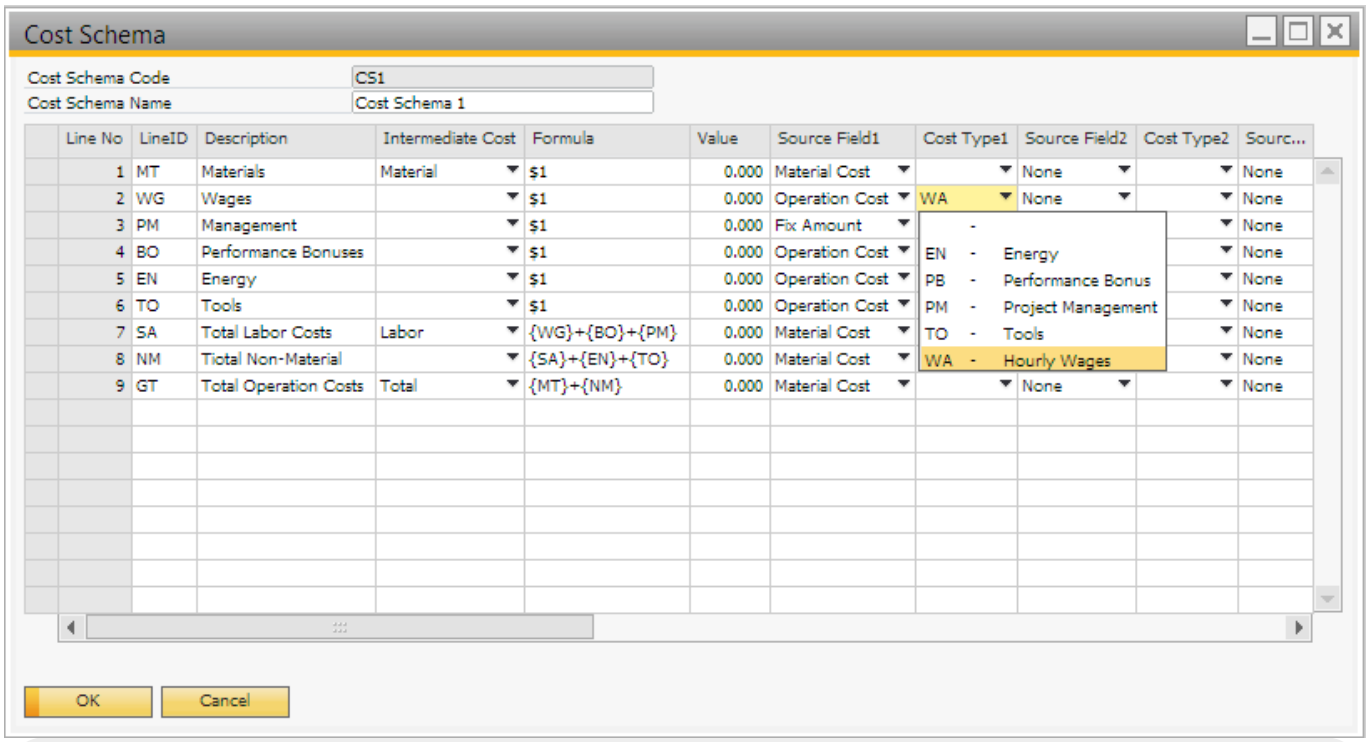
In our example we define only a couple of Intermediate Costs.

1.4. Defining Cost Schemas with Intermediate Costs

A Cost Schema is used to define the calculation of manufacturing costs for products with BoMs. A schema consists of lines; each line will have a value as defined by the Formula field when executed.



In our example we define a line for collecting the costs of purchased materials. The $1 in the Formula cell refers to the value in “Source Field 1”. Up to nine source fields (Source Field 2, Source Field 3, and so on) may be defined for a line and these values can be referenced with the symbols $1, $2, …, $9. The calculation engine has a number of predefined values that can be used as data source.



Material Cost is the price of a purchased material component. The calculated value of this cost schema line is saved in the intermediate cost variable “Material”. We will see later how this variable is used in a price schema.
In our sample we collect the values for each cost types.

The **Operation Cost** is the total amount of the operation lines in BoMs; for purchased material lines this value is 0. The Cost Type1 is a filter for Source Field1. Each source field has a corresponding filter field.

In our sample the **Wages** cost schema line is the sum of the Hourly Wages defined for operations. We have already explained how operations are related to cost types.

In the **Management** line we collect the costs of the cost type Project Management. Since this type of cost does not depend on the volume of the work, the Fix Amount value should be selected as source field.

In the **Total Labor Cost** line we sum the values from lines {WG} + {BO} + {PM}. The calculated value is saved in the intermediate cost (variable) “Labor”. In the Formula fields the previous lines can be referenced either with the line number or with the line ID.

The fields in the cost schema are the following:
Line No
The line number of the calculation row.

LineID.
The ID given by the user with which it is possible to refer to the line.

Description
The textual description of the calculation line.

Intermediate Cost
The type of the intermediate cost can be given here.

Formula
You can here set the formula according which the system should calculate. You can use these symbols:

- $: The value that is referred in the previous column.
- $x: Reference to source field (for example $1, $2, etc.). There are 10 source fields in the window; you can use the numbers 0-9 to refer to them.
- {LineID} = The result of the line with the given ‘Line ID’.
- [LineNo] = The result of the line with the given ‘Line No.’.
- [-x]: the result of the line which is x lines above this one.
- x%: A value in percent.

Please note: The only decimal separator supported is the dot (**.**).

Example:

Description	Formula	Source Field 1
Materials	$1	Material Cost

The material cost is the price of the purchased material components.

Use the DataTable.Compute method to create a more advanced formula. For more information about the method please see:

- Expression

- Compute

Example:

Description	Formula	Source Field 1	Source Field 2
Materials	IIF ($1>2, $2, 1.2*$2)	Quantity Produced	Material Cost

If the produced quantity is greater than 12, the material cost is the price of the purchased material components otherwise the material cost is the price of the purchased material components multiplied by 1.2.

MSSQL TIP
If the desired formula cannot be defined with the DataTable.Compute method, you can use SQL syntax to define the formula as well. Please keep in mind that defining several formulas with SQL syntax can lead to slower performance due the higher number of the SQL queries that the system executes.

Please note: Defining the formula with SQL syntax is not yet supported on HANA. Always use the DataTable.Compute method to define the formula.

Example:

Description	Formula	Source Field 1	Source Field 2
Materials	CASE WHEN $1> = 12 THEN $2 WHEN $1 > = 6 AND 12 > $1 THEN $2*1.25 ELSE $2*1.5 END	Quantity Produced	Material Cost

If the produced quantity is greater than or equal to 12, then the material cost is the price of the purchased material components. If the produced quantity is less than 12 but greater or equal to 6, then the material cost is the price of the purchased material components multiplied by 1.25. If the produced quantity is less than 6, then the material cost is the price of the purchased material components multiplied by 1.5.

Value
A set value which will be used in the formula given in column Formula.

Source Field 0-9
The source fields which can be used by calculation. These can be:

- **Calculation Base Quantity**: the calculation base quantity given in the head of the BoM.
- **Setup Time**: the Setup Time from the BoM lines.
- **Job Time**: the Job Time from the BoM lines.
- **Teardown Time**: the Teardown Time from the BoM lines.
- **Purchasing Price**: the price based on the price list set in the BoM lines.
- **Inhouse Price**: the Inhouse Price is the price of the product calculated recursively based on the BoM. It means in case of produced goods the program calculates the costs of all raw materials

that are in the BoM of the produced good, and the costs of the raw materials will be calculated according to their own calculation schema (for produced goods it will be calculated based on the BoM, for purchased goods the price will be taken from the set price list). The prices of all raw materials are then summed, and if there is an outsourced part of the production, then the in house part will be calculated, and this will be the inhouse price.
- **Outsourcing Price**: The price of the item based on the price list set in the BoM and calculated for the outsourced quantity.
- **By Product Price**: the price of the by-product based on the price list set in the BoM.
- **Quantity Produced**: The Quantity Produced from the BoM.
- **In House Quantity**: The In House Quantity from the BoM.
- **Outsourced Quantity**: The Outsourced Quantity from the BoM.
- **By Product Quantity**: The By Product Quantity from the BoM.
- **Purchased Quantity**: The Purchased Quantity for purchased good from the BoM.
- **Setup Amount**: the Setup Amount for the given resource from the cost amounts.
- **Job Amount**: the Job Amount for the given resource from the cost amounts.
- **Teardown amount**: the Teardown Amount for the given resource from the cost amounts.
- **Quantity Amount**: the Quantity Amount for the given resource from the cost amounts.
- **Fix Amount**: the Fix Amount for the given resource from the cost amounts.
- **Cost Type Price**: the price from the cost amounts (the contents of the Price column in cost amounts).
- **Cycle Amount**: the Cycle Amount for the given resource from the cost amounts.
- **Cycle Count**: the number of setup and teardown cycles (quantity produced/calculation base quantity).

In addition there are calculated fields, the calculation is the following:

- **Setup Cost**: Setup Time * Cycle Count * Setup Amount * Unit Price
- **Job Cost**: Job Time * Quantity Produced * Job Amount * Unit Price
- **Teardown Cost**: Teardown time * Cycle Count * Teardown Amount * Unit Price
- **Cycle Cost**: Cycle Count * Cycle Amount * Unit Price
- **Quantity Cost**: Quantity Produced * Quantity Amount * Unit Price
- **Operation Cost**: Setup Cost + Job Cost + Teardown Cost. + Cycle Cost + Quantity Cost.
- **Fix Cost**: Fix Amount * Unit Price *Where the Unit Price is the price from cost amounts.*

These costs are calculated for both the head and all lines.

Other calculated fields:

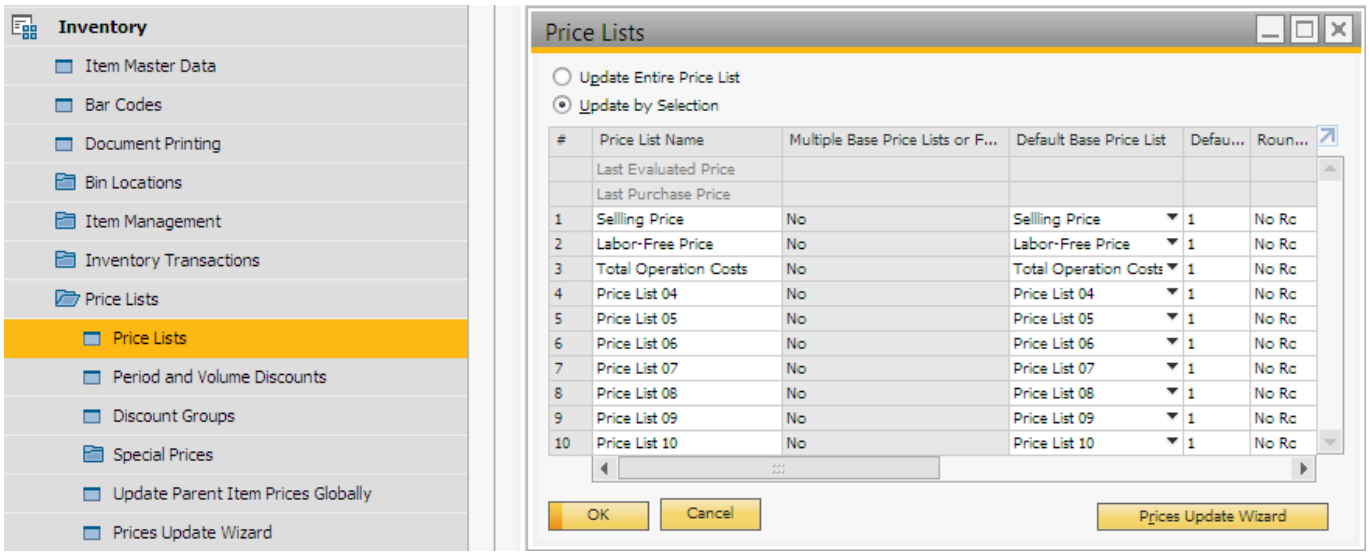
- **Purchasing Cost**: Purchased Quantity * Purchasing Price
- **In House Cost**: Inhouse Price * In House Quantity
- **Outsourced Cost**: Outsourced Quantity * Outsourcing Price
- **By Product Cost**: By Product Quantity * By Product Price
- **Material Cost**: Purchasing Cost + Outsourced Cost + By Product Cost Total Cost: Operation Cost + Fix Cost + Material Cost

These costs are calculated only for the lines and not for the head.

Cost type 0-9
The cost type which is referred by the calculation row.

1.5. Defining Price Lists

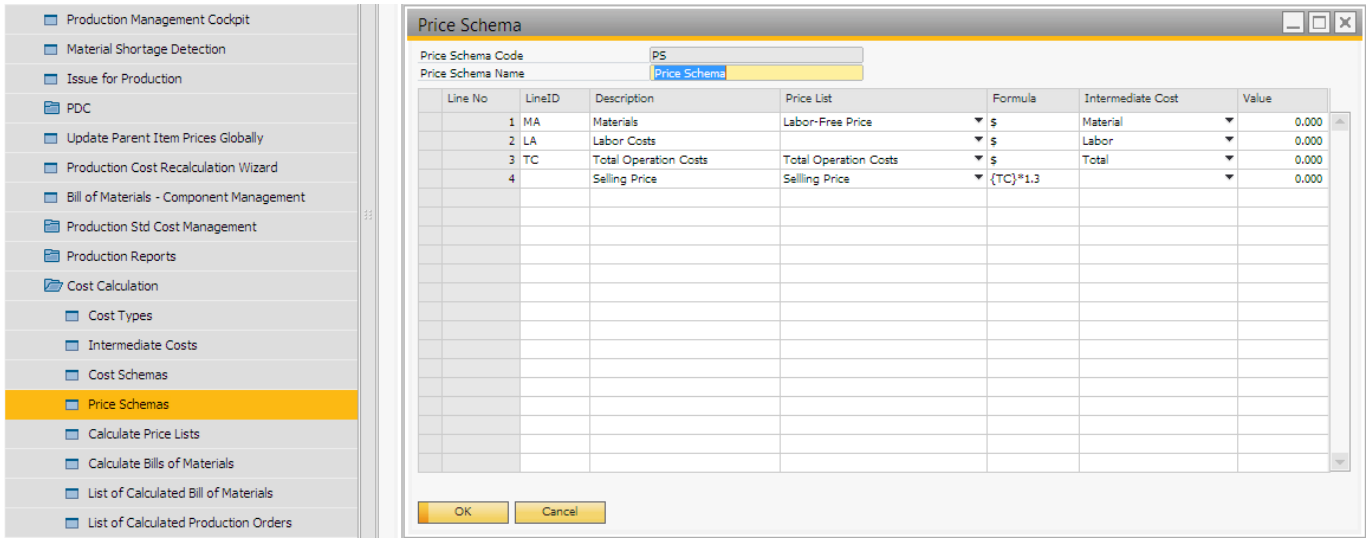
Before defining Price Schemas the user has to decide how to use the price lists in SAP Business One.



In our sample we have renamed the first three price lists. The price lists are referenced in price list schemas.

1.6. Defining Price Schemas

The main goal of Price Schemas is to aggregate cost schemas intermediate results to final results, as well as to define a mapping between cost schemas and price lists. The values are taken from the cost schemas via the Intermediate Cost variables. The calculated values of the lines in a price schema may be linked to price lists.



Formula field values:

- $ = The ‘Intermediate Cost’ value.
- {LineID} = The result of the line with the given ‘Line ID’.

- [LineNo] = The result of the line with the given 'Line No.'.
- [-x] = The result of the line which is x lines above.
- x% = A value in percent.

Example:

Line No	Line ID	Description	Price List	Formula	Intermediate Cost	Value
1	MA	Materials	Labor-free price	$	Material	0.000
2	LA	Labor Cost		$	Labor	0.000
3	TC	Total Operation Cost	Total Operation Costs	$	Total	0.000
4		Selling price	Selling price	{TC}*130%		0.000

In our sample the value of the Materials line is linked to the Labor-Free price. The formula field $ here refers to the selected Intermediate Cost. The Selling Price line is calculated as Total Operation Cost x 1.30.

It is possible to refine the formula by using the DataTableCompute method. For more information about the method please see:

- Expression
- Compute

Example:

Line No	Line ID	Description	Price List	Formula	Intermediate Cost	Value
1	MA	Materials	Labor-free price	$	Material	0.000
2	LA	Labor Cost		$	Labor	0.000
3	TC	Total Operation Cost	Total Operation Costs	$	Total	0.000
4		Selling price	Selling price	IIF({LA}=0, {MA}*150%, {TC}*130%)		0.000

In the second example the Selling Price line is only calculated as the Total Operation Cost multiplied by 1.3 if the Labor Cost is greater than zero. Otherwise the Selling Price is the Material Cost multiplied by 1.5.

MSSQL TIP
If the desired formula cannot be defined with the DataTable.Compute method, you can use SQL syntax to define the formula as well. Please keep in mind that defining several

formulas with SQL syntax can lead to slower performance due the higher number of the SQL queries that the system runs.

Please note: Defining the formula with SQL syntax is not yet supported on HANA. Always use the DataTable.Compute method to define the formula.

Example

Line No	Line ID	Description	Price List	Formula	Intermediate Cost	Value
1	MA	Materials	Labor-free price	$	Material	0.000
2	LA	Labor Cost		$	Labor	0.000
3	TC	Total Operation Cost	Total Operation Costs	$	Total	0.000
4		Selling price	Selling price	CASE WHEN {LA} > {MA}*2 THEN {LA}*1.5 WHEN {MA} > {LA}*2 THEN {MA}*1.5 ELSE {TC} END		0.000

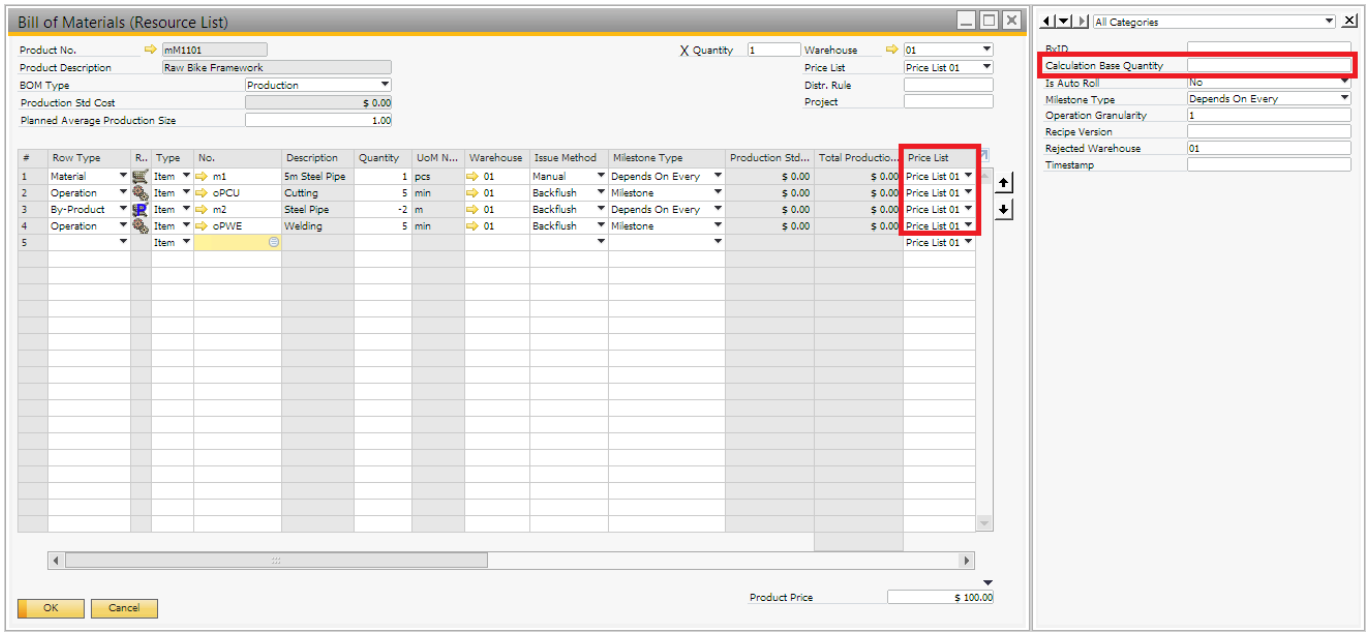
In this example the selling price is calculated with the following method: If the labor cost is greater than the double of the material cost, then the selling price is calculated by multiplying the labor cost by 1.5. If the material cost is greater than the double of the labor cost, then the selling price is the material cost multiplied by 1.5. Otherwise the selling price is the total operation cost.

2. Calculating Costs and Prices

At this point we have defined cost types for resources and calculation algorithms (schemas). The next step is to calculate production costs. Basically there are a number of possibilities for calculating the costs of a product. It is possible to calculate the costs of a product based on:

1. bill of material structure
2. the component list in a specific production order
3. the actual work and used materials reported via PDC

2.1. Reviewing Bill of Materials for Cost Calculations



The Price List in a BoM should be set to an unused price list, if the Produmex Manufacturing cost calculation module is intended to be used for calculating and updating price list prices for the product of the BoM. The reason is that whenever the Update button is pressed, SAP Business One automatically updates the price of the product for the price list defined.

The Price Lists in the component matrix are important; the calculation logic retrieves the prices for purchased material items from the price list defined in the BoM. The price list for operations and own-manufactured materials are calculated and not simply retrieved from price lists.

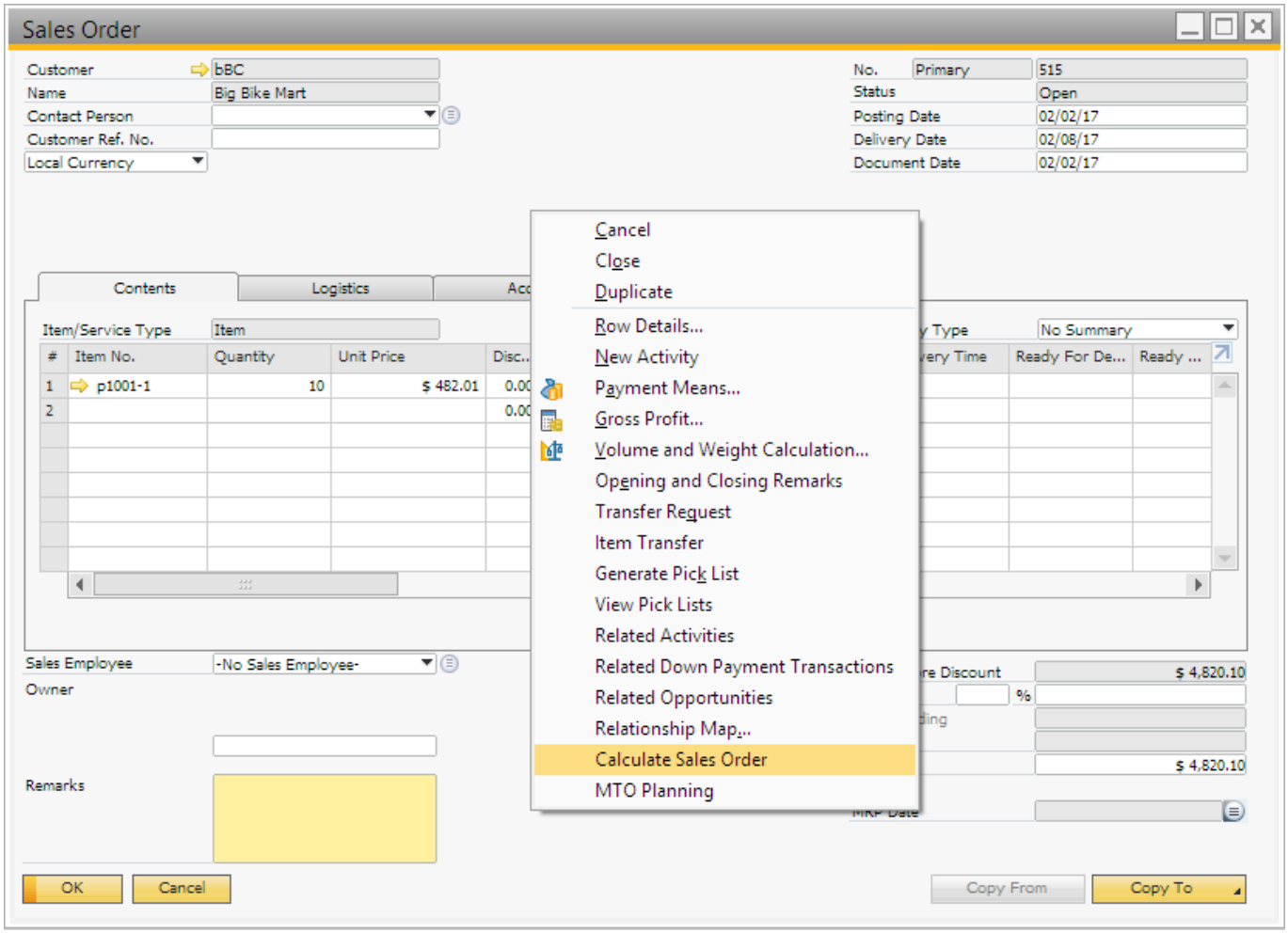
The Calculation Base Quantity is a estimated quantity of a typical production order. This number is used when the setup and shutdown costs are calculated for a single unit of product.

2.2. Reviewing Item Procurement Methods

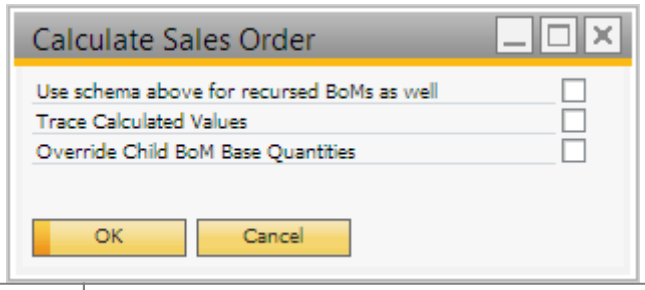
> It’s very important that the procurement method for own-manufactured components be set to “Make”; otherwise, the calculation engine will simply take its cost from a price list when the item is used as a component in another product’s BoM.

2.3. Sales Calculation: Calculating Sales Orders and Quotations

This is a preliminary calculation of costs before producing your product. You can start it from the sales order or the sales quotation with the right click menu:

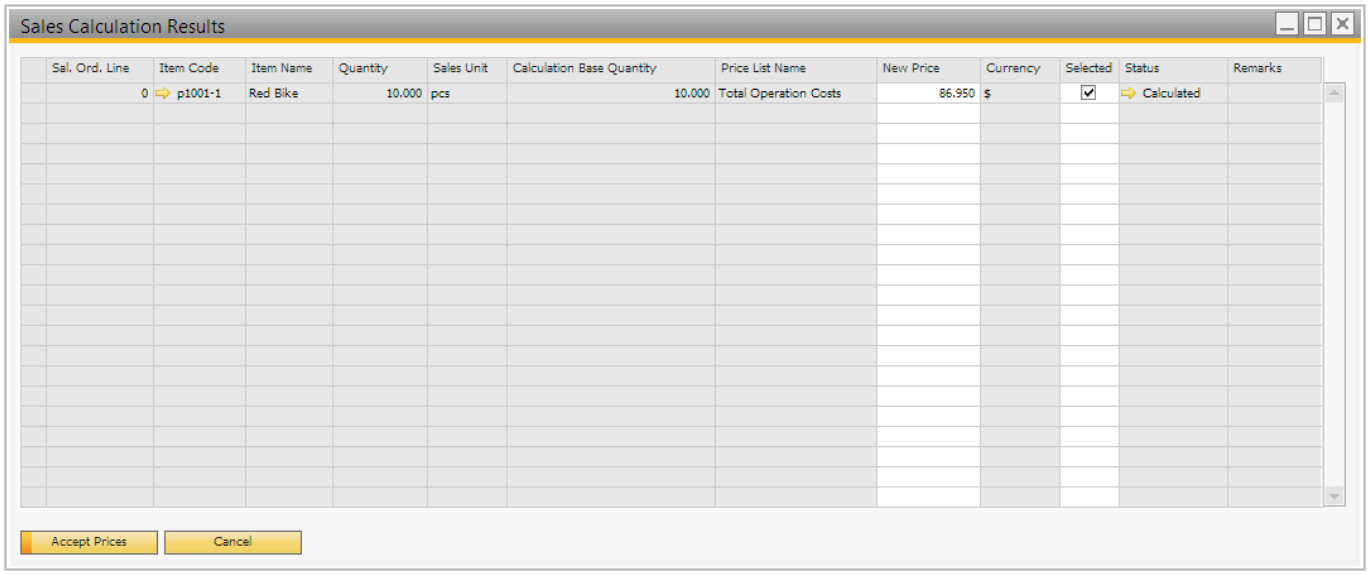


You will get a window with the calculation parameters:



Use schema above for recursed BoMs as well	The calculation schema of the main item will be used in all BoMs in the structure that are part of the main item.
Trace Calculated Values	There will be a golden arrow for calculated values. If you click on them, you will have a small explanation from where the value is coming (if available).
Override Child BoM Base Quantities	Base calculation quantity will be used in all child BoMs as well.

If you click on OK, the calculation will be done for all make items, and you will get a summary window with the calculation results.



You will see a list of all sales order/quotation rows and the items with the ordered/quoted quantity and the calculation base quantity from the BoM of the item. The calculation will take the higher from the Quantity and the Calculation Base Quantity and will use it as calculation base quantity. If the item is purchase item, it will show up in the list, but in the remarks field, you will see a message that is has not been calculated.

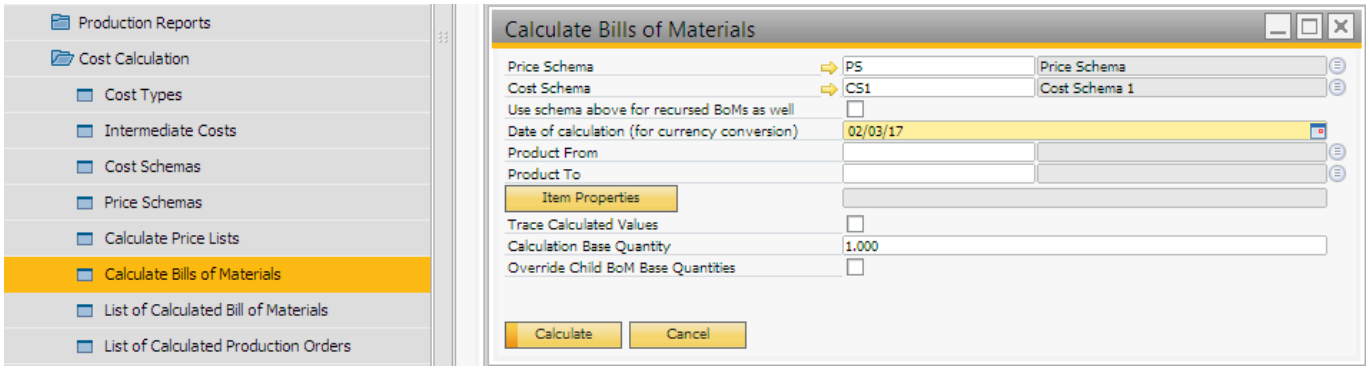
In the price list field you will see the price list that belongs to the item and the customer in the sales order/quotation. The New Price field contains the result of the calculation. It is possible to update the sales order/sales quotation with the calculated price. Check the 'Selected' checkbox on the line of the item(s) and click on the Accept Prices button.

To check the calculation details click on the arrow in the Status column. The arrow will not open up the result form if the calculation finished with an error or if the item is a purchase item.

During the sales order calculation, currency differences are not taken into consideration.

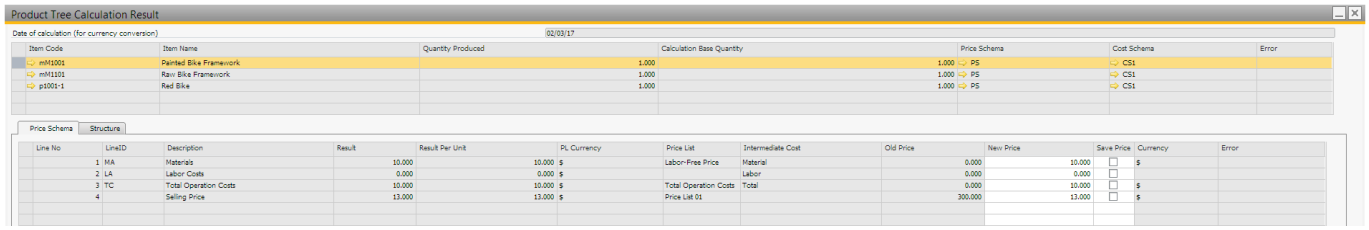
2.4. Calculating Costs from Bill of Materials

The most straightforward and simple way of cost calculation is when the cost of our products are calculated based on their, usually hierarchical, component structure in their BoMs. In the following sample we calculate the costs of all our products using the cost and price schemas shown above.



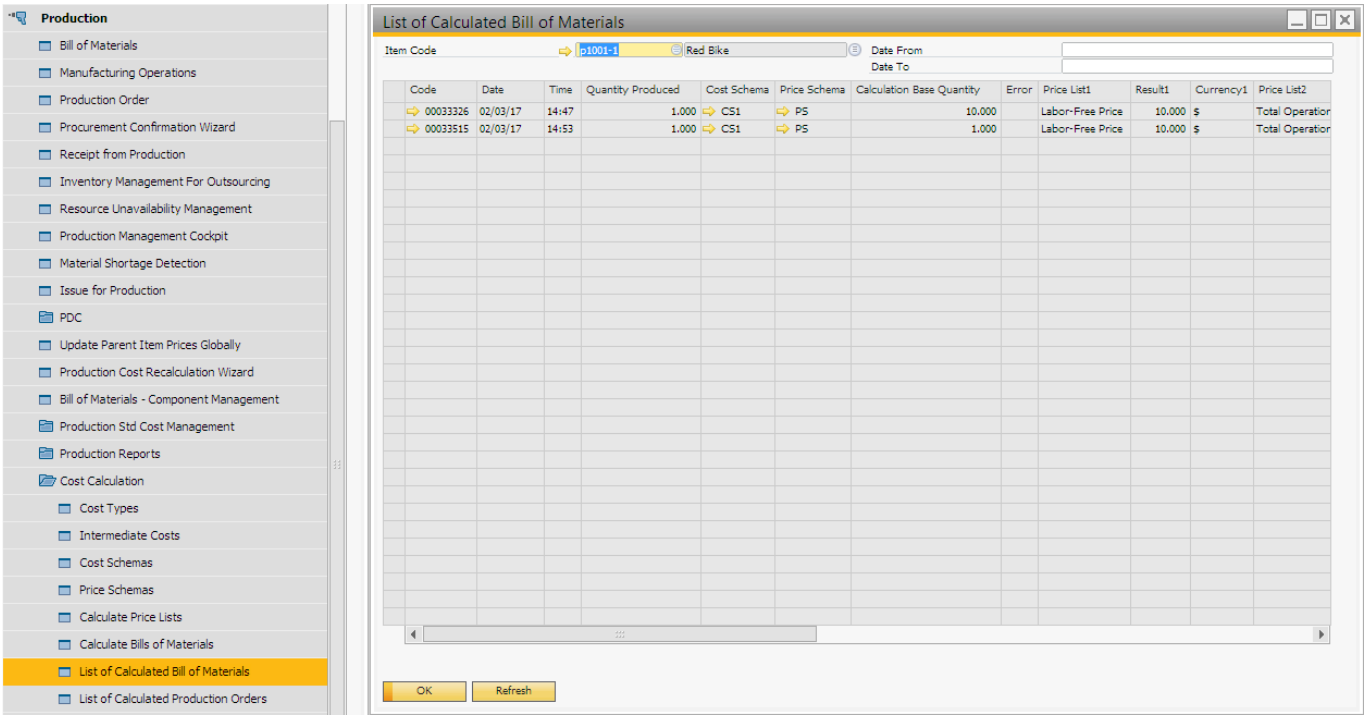
The main grid of the results form contains all our products that have BoM.

This form requires bigger screen resolution than 1024×768 to avoid that the OK button should not overlap the bottom matrix.



An important thing with the way the costs are calculated that the intermediate costs are collected hierarchically from subordinate components as if the primary had a giant BoM. For example, the Labor Costs calculated for the product p1001-1 (Red Bike) contains the labor costs calculated for the subordinate component mM1001 (Raw Bike Framework). The item mM1001 is a material component in the BoM of p1001-1. Since mM1001has its own BoM and its procurement method is set to “Make”, it is not calculated as a simple material with a price list price. With this way the material cost, for example, of p1001-1 is the sum of all the cost of purchased materials (procurement method = Buy) in the BoM tree.

Note: in newer versions of Produmex Manufacturing all calculation results are saved, and you can review them later on. To do this open the List of Calculated Bills of Materials from the right click menu in the BoM.

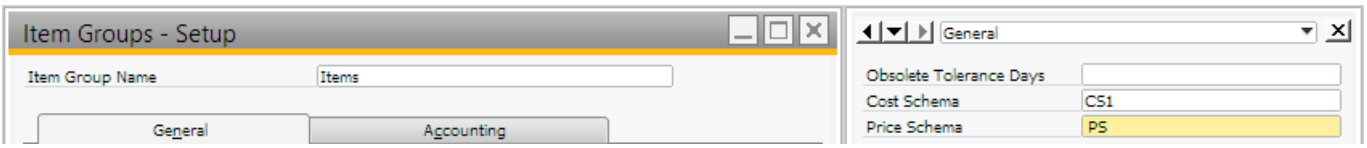


2.5. Price List Recalculations

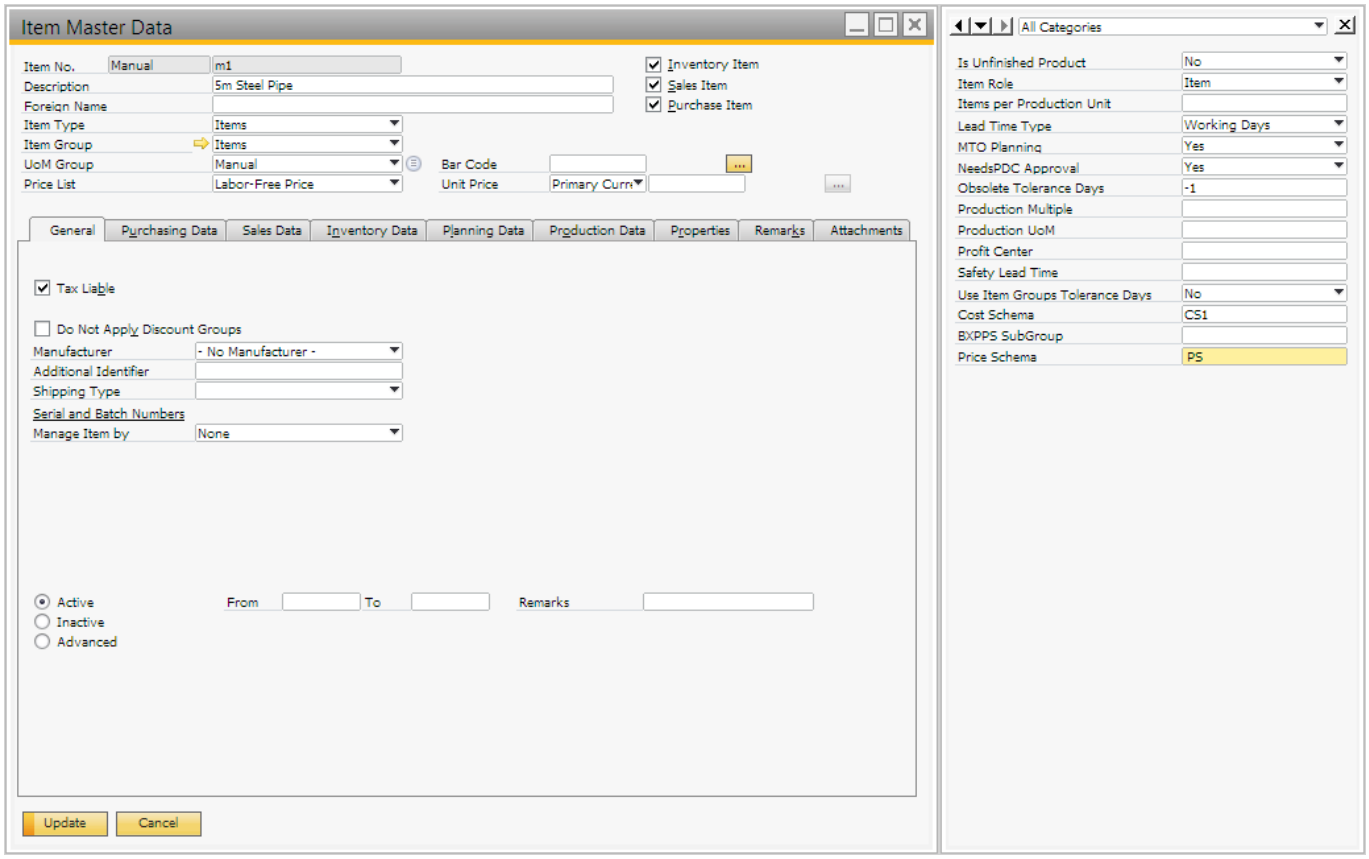
A main objective of the cost calculation module of Produmex Manufacturing is that the standard price lists in SAP Business One can be updated with the calculated prices with a single button click.

2.5.1. Defining Default Schemas for Items and Item Groups

Since Produmex Manufacturing allows the definition of multiple calculation schemas and each item may have different schemas, the simplest way to associate items with calculation schemas is when schemas are defined for the item groups.



The items inherit the schemas defined for their item group, but these can be overridden in the Item Master Data form.



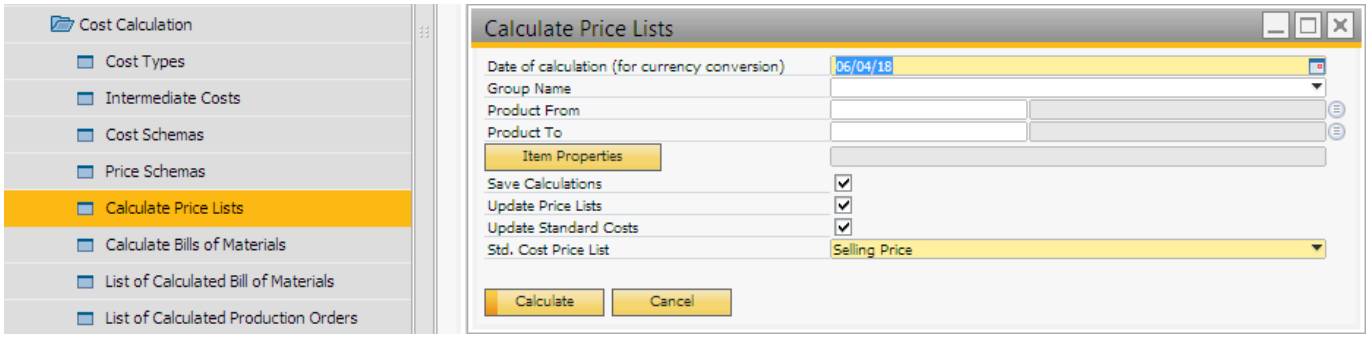
2.5.2. Batch Updating Price Lists with Calculated Prices

When the schemas are in place and all the manufactured products are associated with a price schema and a calculation schema, you can batch calculate the items and update the price lists based on the calculated values.

Select the ’Calculate Price Lists’ option. On the Opening Calculate Price Lists form define the date of the calculation. It is possible to narrow down the calculation to an item group, to selected items or to items with certain properties. Define the filters on the ’Group Name’ and ’Product From-To’ field or click on the Item Properties button to select the filtering item properties.

In order to save the results of the calculation in the database, enable the ’Save Calculations’ button.

Press the ‘Calculate’ button to calculate the price lists.

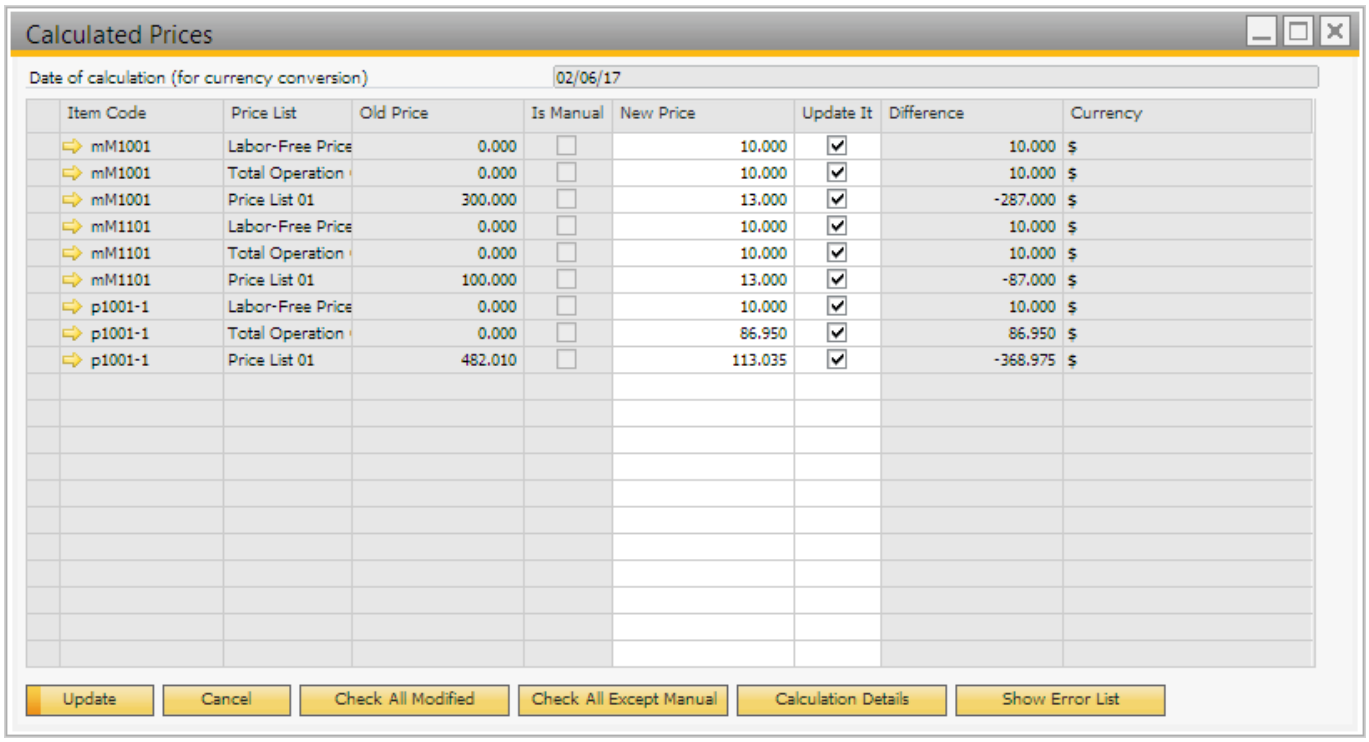


When the calculation process is completed, the Calculated Prices form is opened. On this screen every active inventory item that has a Bill of Materials is listed. Values for different price lists are displayed on separate lines.

By default the ‘Update It’ checkbox is checked if there is a difference between the old and the new price for the item in the given price lists. Press the ‘Update’ button to update the prices to the new prices on every line where the ‘Update It’ checkbox is checked.

If the ‘Update Price Lists’ checkbox was enabled on the Calculate Price Lists form, the prices are automatically updated after the calculation.

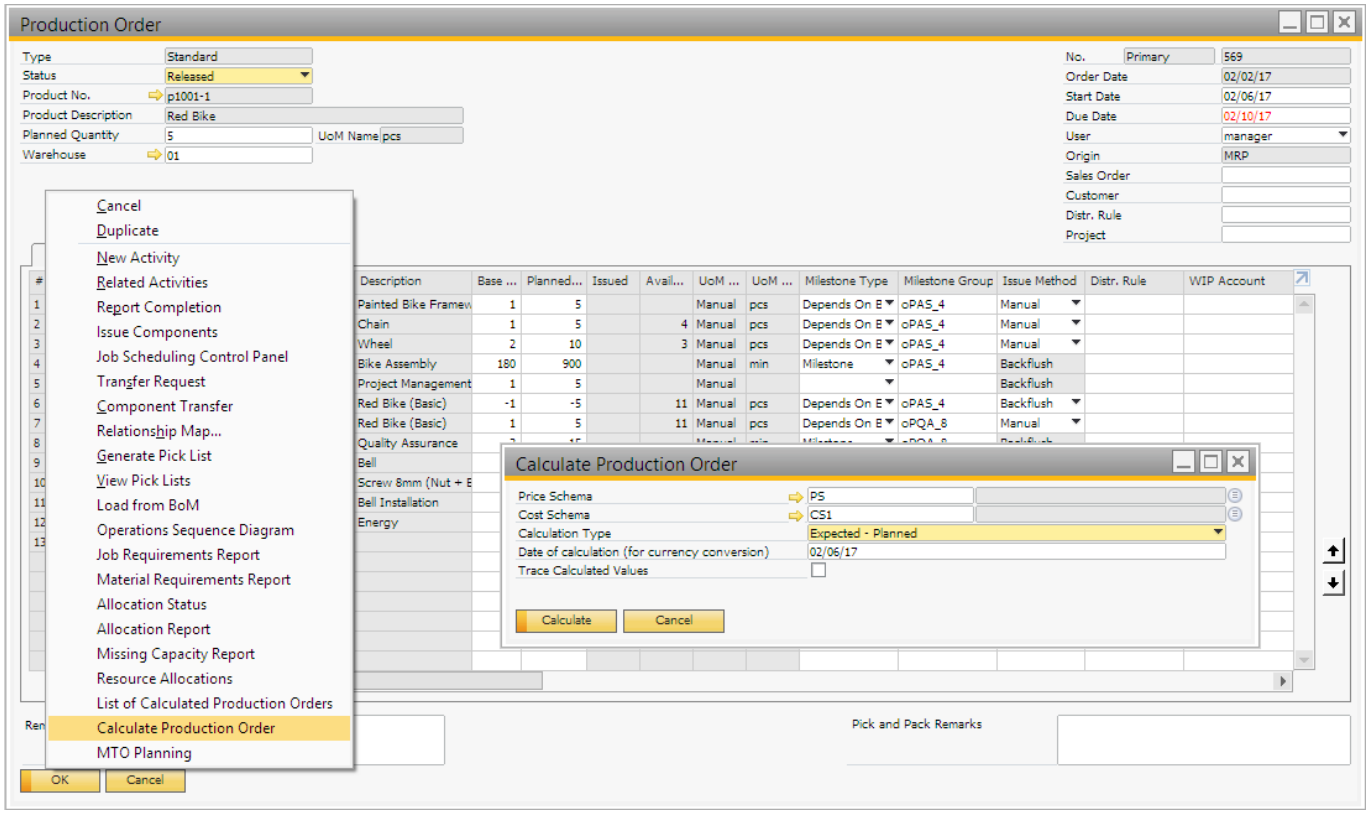
It is also possible to update the standard cost for the items. If the ‘Update Price Lists’ checkbox is enabled, the ‘Update Standard Costs’ checkbox becomes active. In order to update the standard cost as well, check this checkbox and select the source price list from the ‘Std. Cost Price List’ dropdown menu.



Pressing the Calculation Details button will open Product Tree Calculation Results form containing the details of calculations for all the items.

2.6. Calculating Production Orders

When a right-click menu is opened on Production Order form, the user may select the Calculate Production Order menu.



In the parameter form the user selects the Price and Cost Schema for the calculation and the source of the (planned) resource consumption/allocation of the production order. Note: All calculation results are saved just like the BoM calculations, so that you can compare them later on. You can find the saved calculations in the right click menu List of Calculated Production Orders. Some generic information about the calculation method of production order calculation:

- In the production order calculation the structure of calculation is flat. The BoMs of materials (if there is any) is not expanded. Second level rows are for resource allocations under the operations. They contain the real cost of the operation as different work centers can be assigned to the same operation with different costs.
- In planned and released mode the produced quantity is the planned quantity of the product.
- In actual mode the produced quantity is the completed quantity of the production order.
- In planned mode the cycle count is always one, the setup and teardown time is multiplied by the cycle count.
- In released mode the cycle count is the number of allocations and the setup and teardown time is multiplied by it.
- In actual mode the cycle count is the number of start setup bookings created for that operation and the setup and teardown time is multiplied by it.
- The purchase price for the materials comes from the SAP item cost in the item master data except for the actual mode where it comes from the issue for production bookings.

2.6.1. Planned Cost Calculation for Production Orders

In the case of “Expected – Planned”, the source of resource usage is the component list of the production order. When a “standard” production order is first created the component list is copied from the BoM of the item. This component list can be modified for a production order; therefore, the component list with its quantities could be significantly different from the original BoM of the product. When the production order is in “Planned” status the only meaningful calculation type is “Expected –

Planned". Note, that when a production order is in planned mode, no actual work centers are allocated (unless mandatory work centers are manually defined for the operations). Because of the logic, at this time the cost amounts may come from work center features and operations but not from actual work centers.

2.6.2. Released Cost Calculation for Production Orders

When a production order is released, Produmex Manufacturing allocates actual work centers for the operations. If the cost types are more specifically defined for work centers the "Expected – Released" calculation type may be more specific since in this case the cost amounts are coming from the work centers (if they are defined to override the cost amounts from higher levels). Even when no cost amounts are defined for work centers the operation cost for released production orders may be slightly higher because of the multiple setup and shutdown costs of the operations. When a production order is released the required resource capacities are allocated and reserved. During this resource allocation multiple work-centers may be allocated for an operation and if that operation has setup and shutdown costs the operation cost will be slightly higher than calculated for a planned production order.

2.6.3. Actual Cost Calculation for Production Orders

With the Actual calculation type, a precise idea of the cost of every job can be obtained. With these data a commercial analysis of the production process can be carried out. The quantities of materials come from the Issue for Production transactions. The costs of operations come from PDC. The prices for materials, normally, come from the Inventory Master Data (OITM.AvgPrice or OITW.AvgPrice). Remember that in Production Orders there is no possibility to define price lists for the material components. The prices of batch and serial numbered components can come from the same source as the normal components.

20. How to work with both Produmex Manufacturing and Produmex WMS

20.1. Recommended installation steps

First install Produmex Manufacturing.

Then install Produmex WMS. In order to install Produmex WMS in a way that it will be integrated with Produmex Manufacturing, Produmex Manufacturing database elements should be existent in the company database.
Execute the installation as described in the Produmex WMS Installation Guide. Do not forget to enable the stored procedures and the Notification Listener stored procedures. Make sure that the *'Integration with Produmex Manufacturing'* checkbox is checked before you start the database upgrade.

20.2. Prerequisites

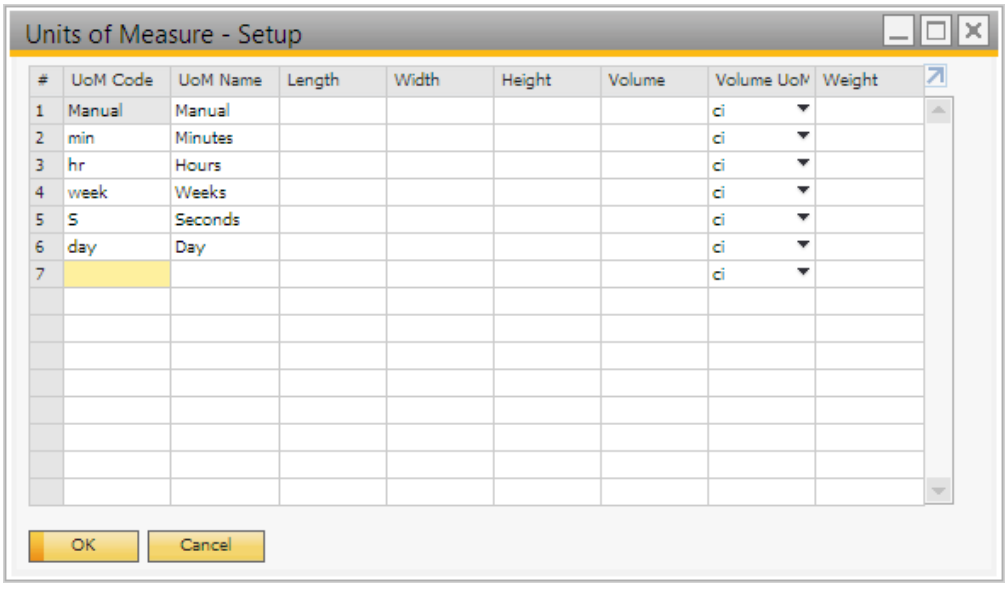
Produmex Manufacturing
Install the initial manufacturing data as described in Setup initial data.

Produmex WMS
Set up the production line(s). For more information about the production line settings please see: Production line. Configure the production settings on the Production controller. In order to execute the production picking based on a pick list, enable the *Create proposal for picking* option on the Picking for production controller.

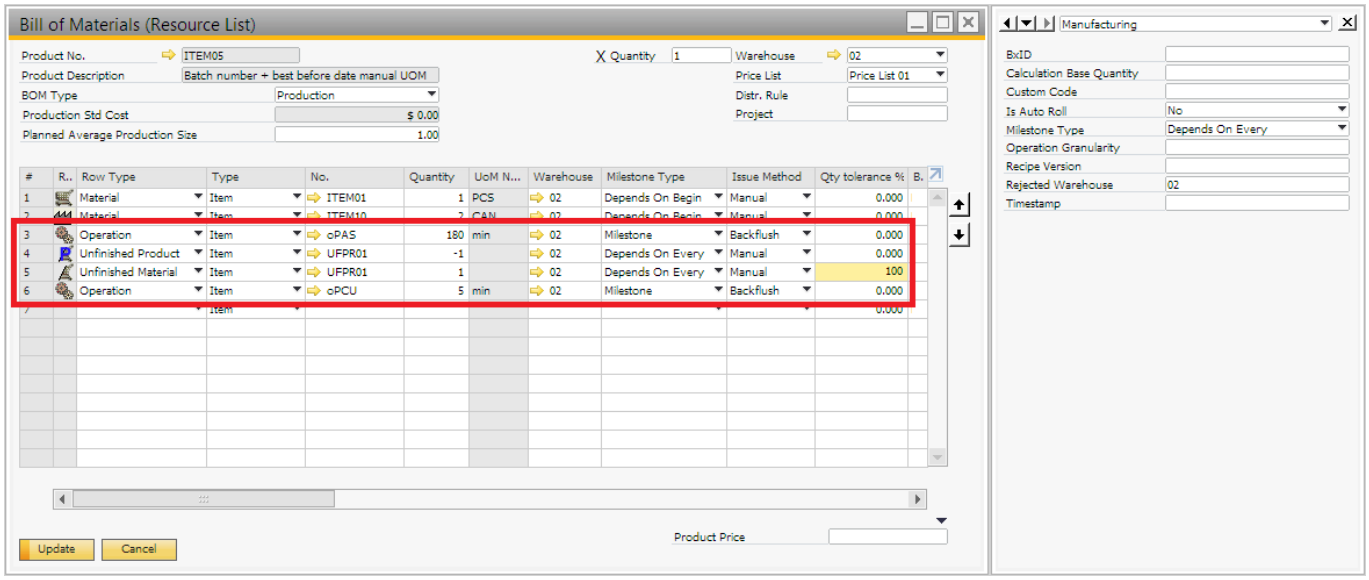
For more information about the Produmex WMS extensions on the Bill of Materials and the Production order please see: Configurations/Production
For more information about other production settings for Produmex WMS please see: Configuration settings for the production

Setup Time UoM
In order to create operations, add the following time units of measure to the Units of Measure - Setup (OUOM) standard table:

- min - Minutes
- hr - Hours
- week - Week
- S - Seconds
- day - Day



BOM Setup with unfinished products
The material flow of the unfinished products can be monitored with the help of the 'Unfinished Product' items. Set the 'Qty tolerance %' to 100 for the unfinished product on the 'Unfinished material' line in order to allow pick list to be created even though no pickable stocks of the unfinished materials are found.



During a production it is possible that not the total produced quantity of the unfinished product is consumed. In order to avoid stock allocation on pick list/pick list proposals for unfinished products only store the remaining unfinished products on a location that verifies one of the following:

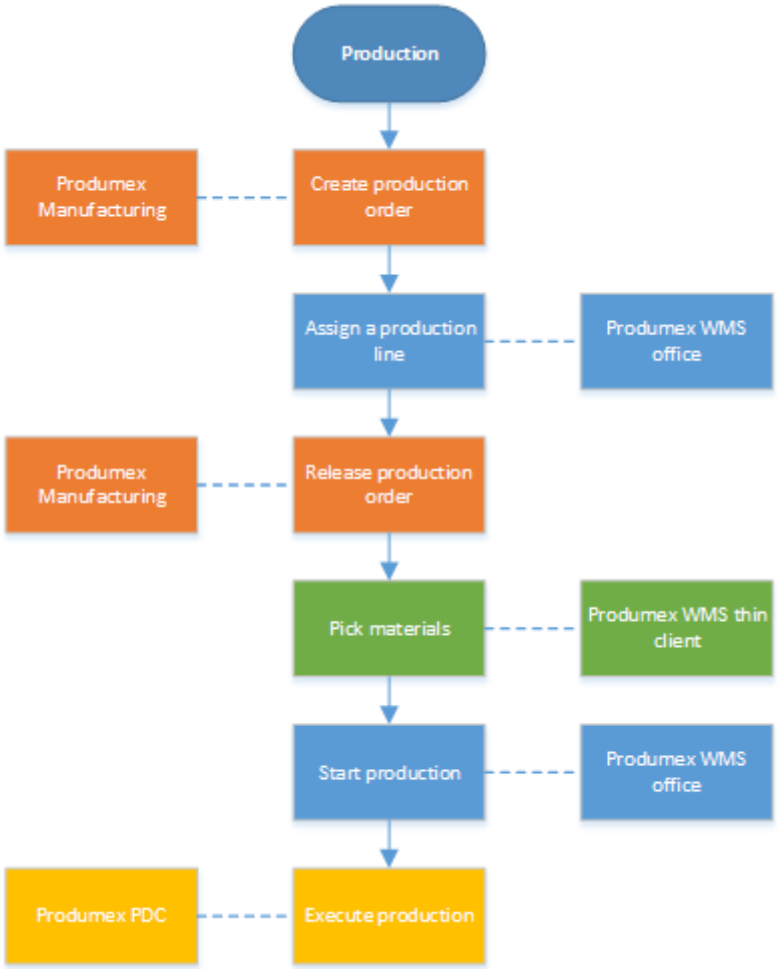
- Disallowed location
- Location where the 'Block stock from being used for the picking process' option is enabled.

20.3. Production steps

In order to work with both Produmex Manufacturing and Produmex WMS you have to create a production order in a WMS managed warehouse. Otherwise the production flow will be the same as described in Produmex Manufacturing Functional Guide.

Make sure that both add-on runs.

Please note: The 'Backflush' issue type is only supported for operation and cost items for production orders in a Produmex WMS warehouse.



20.3.1. Create production order

First create the production order(s). Production orders can be created:

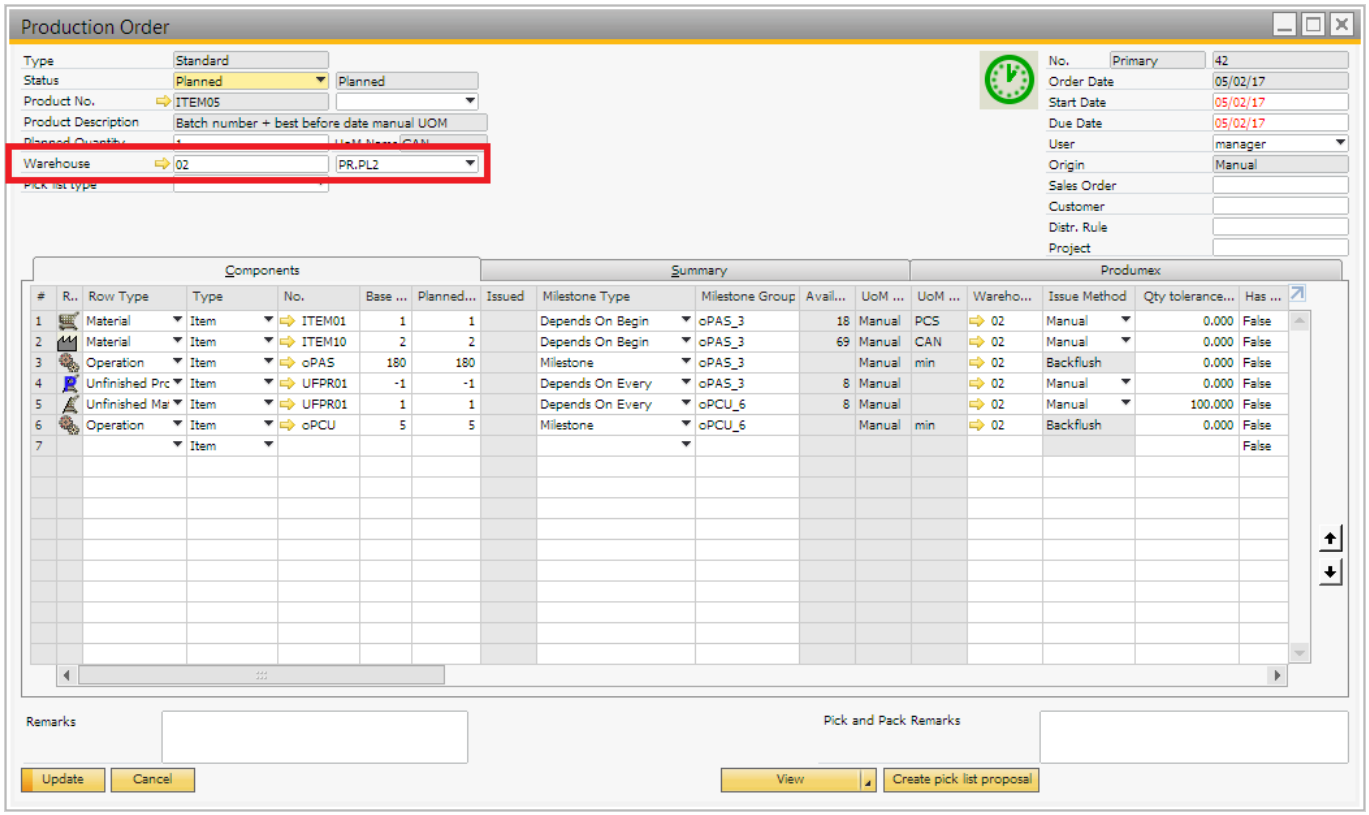
- manually
- from MRP recommendations (For more information please see: Everyday work)
- from MTO recommendations (For more information please see: Make to Order manufacturing)

20.3.2. Assign the production line

20.3.2.1. Assign production line to a single production order

Assign a production line to the production order by selecting a production line from the dropdown menu next to the warehouse field. Every active production line from the warehouse can be selected.

A production line can only be assigned while the production order status is *'Planned'*.



The assigned production line defines the input, output and lined up locations for the production. During the production, materials will be consumed from the input location, lined up location and the production line and the products and by-products will be received into the output location.

20.3.2.2. Assign production line to multiple production orders

Open the Production Management Cockpit from the Production module. Select the production orders and click on the 'Set Production Line' button. On the opening screen select the production line from the dropdown list then press 'Update'.

Please note: The production line can only be set for 'Planned' production orders. The selected production orders must be from the same warehouse.

20.3.3. Release production order

As the next step release the production order. The production order can be released in the following ways:

20.3.3.1. Single order release

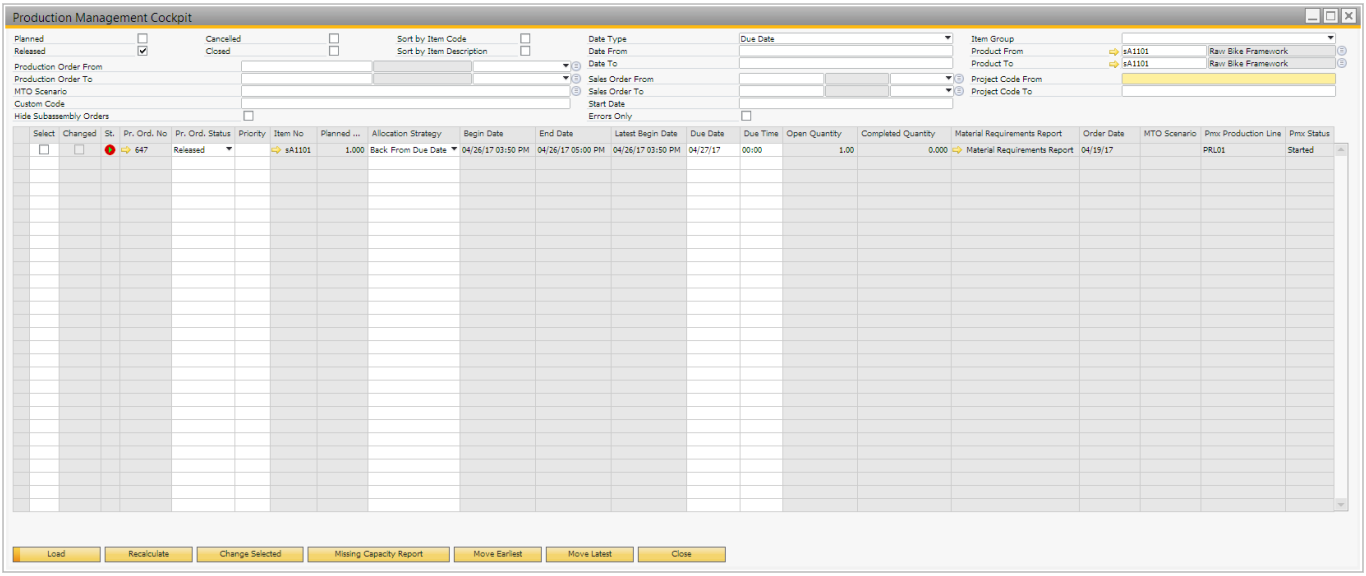
- ***On the production order***
  - Set the status of the production order to 'Released' then click on the 'Update' button.
- ***On the Production Manager***
  - Open the Production Manager from the Produmex Production module. Click on the

'Production orders' button. On the *'Production order'* screen select the production line from the dropdown menu. Select the production order and click on the *'Release order'* button.

- For more information please see: Release the production order

20.3.3.2. Mass order release

Open the Production Management Cockpit from the Production module. Select the production order(s) and click on the 'Change Selected' button. On the opening form select 'Released' as the *Pr.Ord. Status* from the dropdown menu and click on *'OK'*. Recalculate the production orders by clicking on the 'Recalculate' button.



The following additional columns are displayed on the Production Management Cockpit:

- **Pmx Production Line**: The code of the assigned production line.
- **Pmx Status**: The Produmex status of the production order. Possible values: Planned/Started/On hold/Closed

20.3.4. Pick components

The picking can be executed in the following ways:

- Based on the production order. The stock to be picked will not be locked and the system allows overpicking. For more information please see: Picking for production.
- Based on a pick list. The stock to be picked will be locked for the pick list and the system only allows overpicking if the *'Allow continuous picking for production'* option is enabled on the Picking for production controller. For more information please see: Pick list for production.
  When creating a pick list proposal, every item on a material line will be proposed, if there is available stock except for lined up materials with the Allow to pick lined up?' option set to 'False'.
  Please note: *A pick list proposal cannot be created if there is a material with a non-Produmex warehouse set.*

20.3.5. Start the production

> Usually is not required to set the PMX status to start in order to work with Produmex PDC. However we recommend to do so for better visibility: started production orders are marked on the Production Management Cockpit.
>
> Starting the production order with Produmex is only required in the following cases:
>
> - To assign lined-up locations
> - To pre-assign batch based on the batch number generator for production
> - If the batch has a best before date definition

Start the production in the office environment. After the production is started, the Produmex status of the order will be changed to *'Started'*.

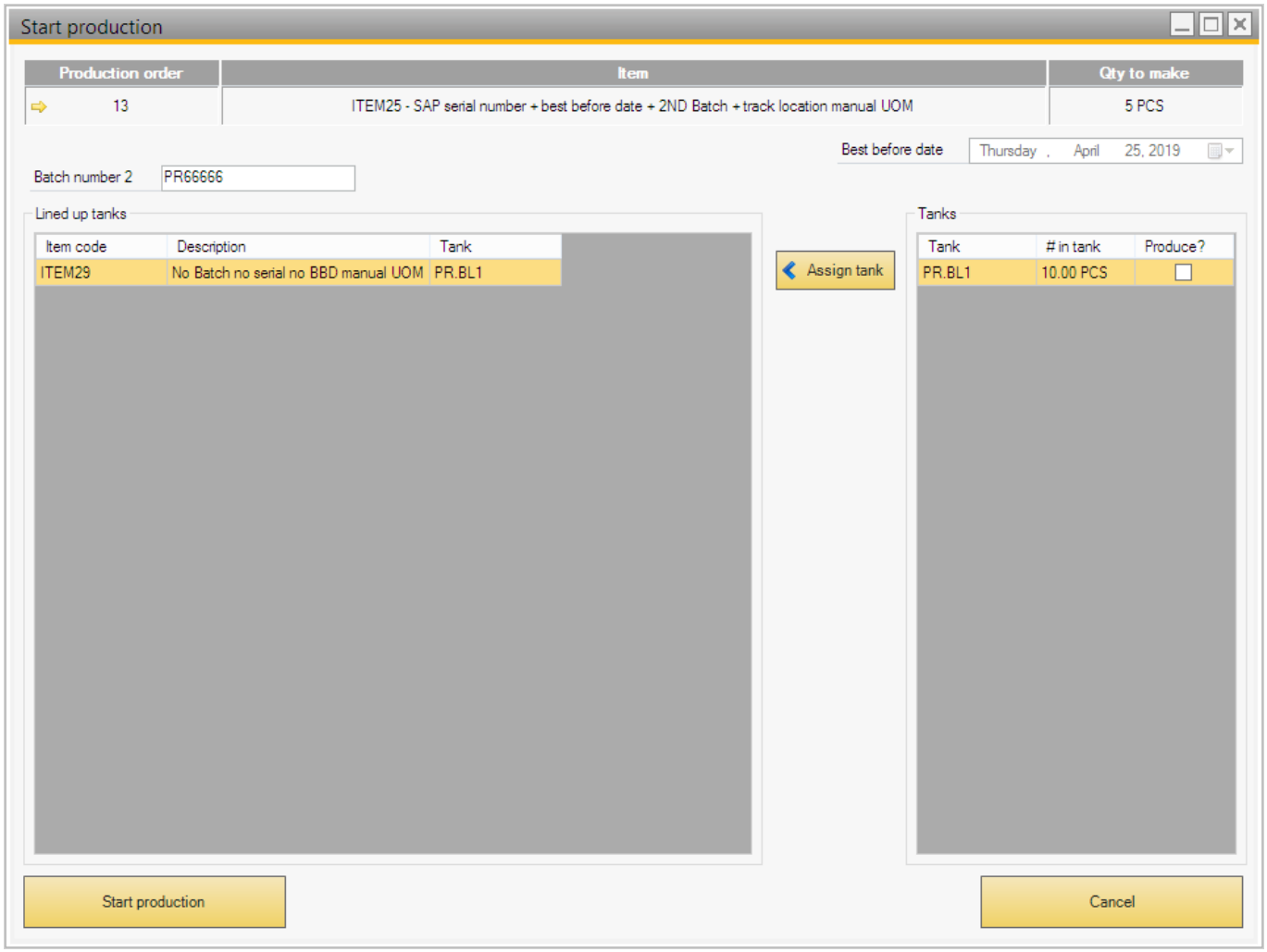
The production order can be started by clicking on the 'Start' button on the production order, or from the Production Manager: Open the Production Manager from the Produmex Production module. Click on the 'Production orders' button. On the opening *Production order* screen select a production line from the dropdown menu. Select the production order and click on the 'Start production' button. Only released production orders can be started. The *Start production* screen will open.

On the Start production screen define the batch number and the best before date for the product and the source locations for the lined up components. For more information please see: Start production order/4.1.Office

Define the batch number and best before date of the product
If the product is managed by batches, a *'Batch number'* field is shown on the screen. For more information about the settings of the second batch number please see: Batchnumber production company
If the product has a second batch number, a *'Batch number 2'* field is shown on the screen. For more information about the settings of the second batch number please see: Batchnumber production company
If the product has a best before date, an additional *'Best before date'* field is shown on the screen. The default best before date depends on the Expiry definition set on the Produmex Production tab of the Item Master Data. The adjustment of the default best before date can be enabled on the Best before for production generator.

Define the batch number and best before date of the product
If there are components on the production order that has to be lined up, assign a lined up location for the component. For more information about assigning a lined up location for an item please see: Start production order/4.1.1. Assign a tank

To start the production, click on the *'Start production'* button. The Produmex status of the production order will be changed to *'Started'*.



20.3.6. Execute the production or the shopfloor

Execute the production on the shopfloor with Produmex PDC as described in Production Data Collector. Because the materials will be issued from the input/lined up location or the production line and the (by-)products will be received to the output location, the steps of the material issue and the product receipt will differ from the standard PDC steps.

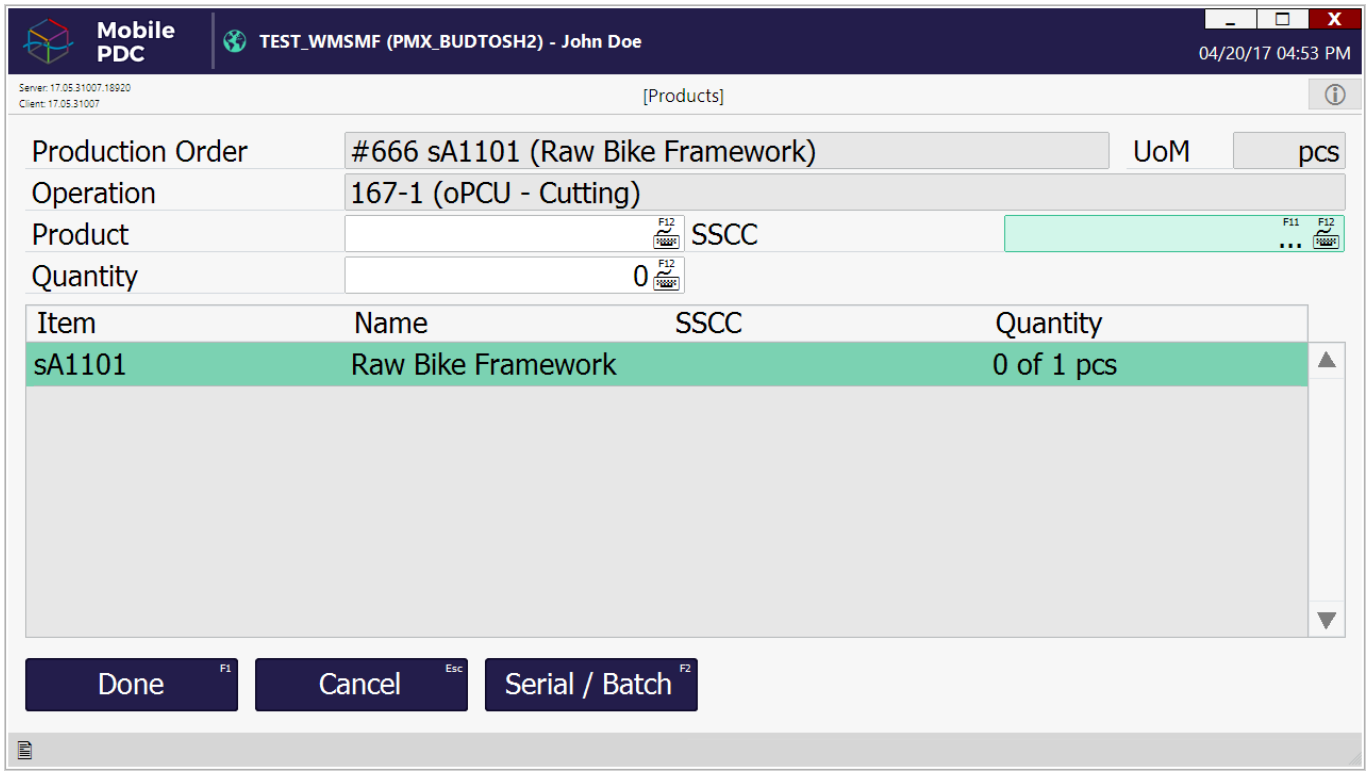
Please note: The integrated production execution will not work when using the PDC legacy mode.

20.3.6.1. Receive main product and by-products

Receive the main product or by-products on the *'Products'* screen. On the grid the main product, the by-products and the unfinished product(s) are listed. The main product is always listed first.

The default quantity of the main product is the produced quantity defined on the partial or complete job/setup screen. The quantity of the main product cannot be adjusted.

The default quantity of the by-product and the unfinished product is calculated based on the quantity received from the main product and the base quantity on the production order. The quantity of the by-product and the unfinished product can be adjusted.



Destination SSCC

Main product and by-product(s)

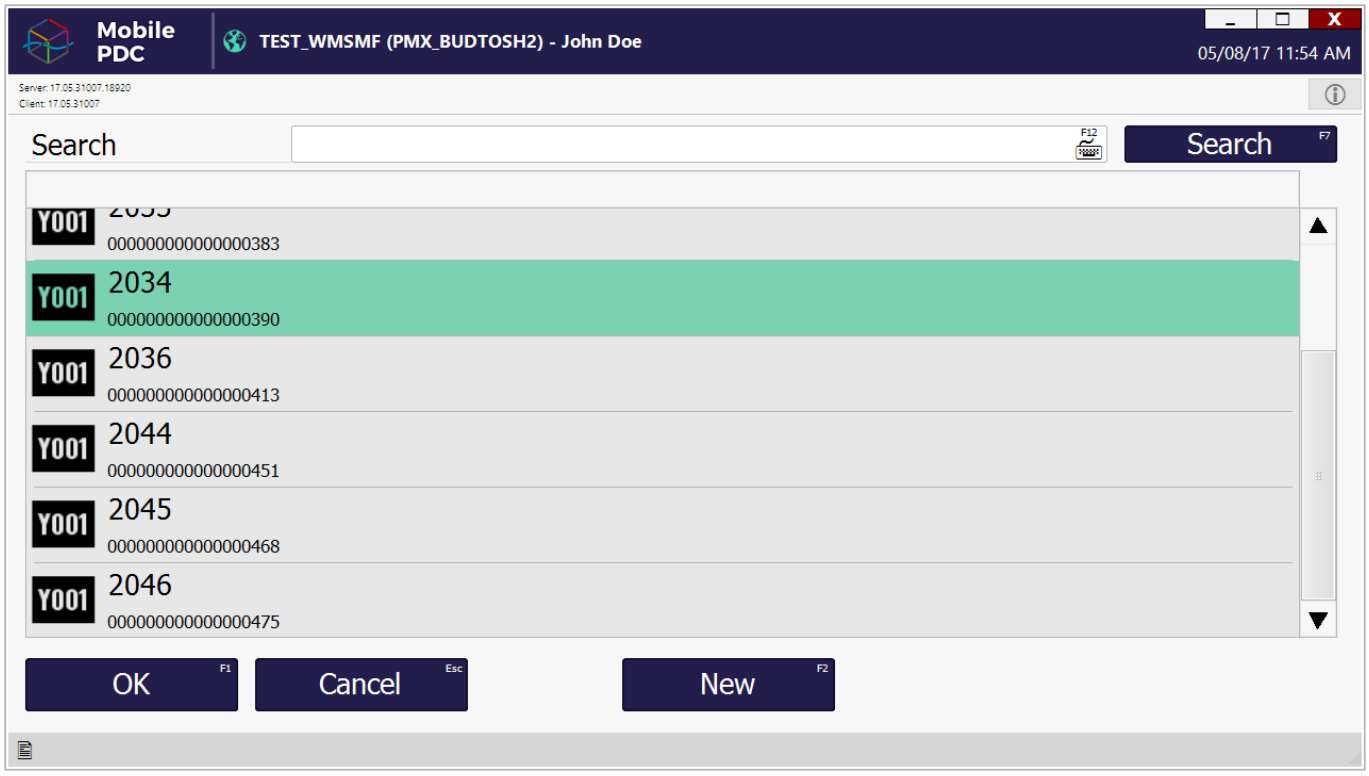
To add the main product/by-product into an existing logistic unit, scan the SSCC or select it from a list after pressing the SSCC field. On the next screen select the SSCC from the list. Only SSCC's stored on the output location of the production line can be scanned or selected. To add the main product/by-product into an SSCC, select the SSCC and press the *'Ok'* button.

It is also possible to add the produced product into a new SSCC. Press the 'New' button. A new SSCC will be added to the list.

The list of SSCC's can be filtered on the Search field. Add the text/numbers to search for then press the 'Search' button. Only the SSCC's containing the entered text/numbers will be listed.

If no SSCC number has been selected, the system will automatically add the main products/by-products onto a new SSCC.

After the product receipt booking has been processed, the main product and the by-product(s) are received to the output location of the production line.



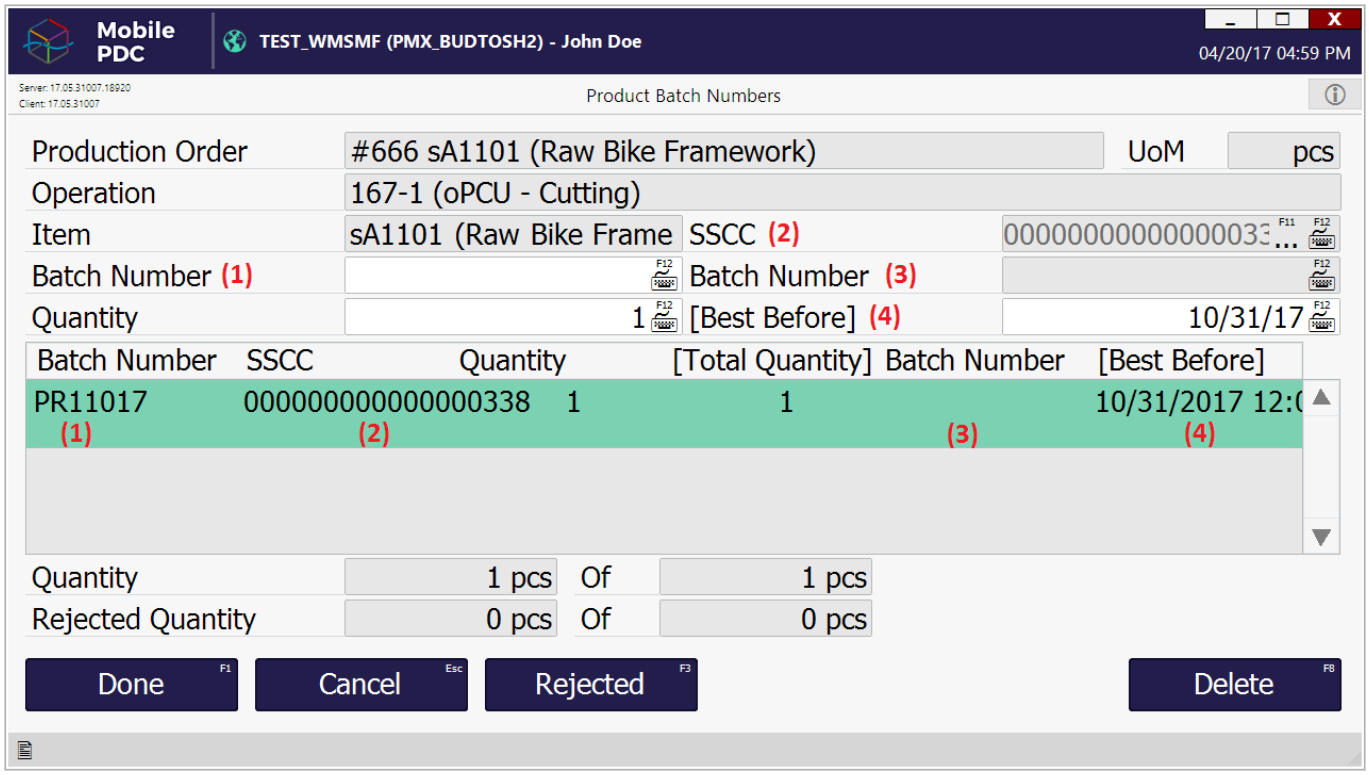
Unfinished product

The produced unfinished product will be received onto the production line from where it can be consumed in the next operation. Unfinished products will not be received onto an SSCC, regardless whether the user defined one or not.

Batch number and best before date

If the main product/by-product is managed by batches and/or has a best before date, press the *'Serial/Batch button'*.

The 'Product Batch Number' screen will open.



1. **Batch number**: The default batch number is the batch number specified on the Start production screen of the Production Manager. The batch number can be modified on this screen regardless of the Batch number production company controller setting.
   Please note: Every product produced during a job has to have the same batch number and best before date.
2. **SSCC number**: The SSCC number of the destination logistic unit. Cannot be modified.
3. **Second batch number**: The default batch number is the batch number specified on the Start production screen of the Production Manager. The batch number can be modified on this screen regardless of the Batch number production company controller setting.
4. **Best before date**: The default date is the best before date set on the Start production screen of the Production Manager. The best before date can be modified on this screen regardless of the Best before for production generator setting.

Serial numbers

If the main product/by-product is managed by SAP serial numbers, press the *'Serial/Batch'* button. The *'Product serial numbers'* screen will open. Add the serial numbers as described in Product Serial numbers.

Please note: Do not select a bin location for the serial numbers.

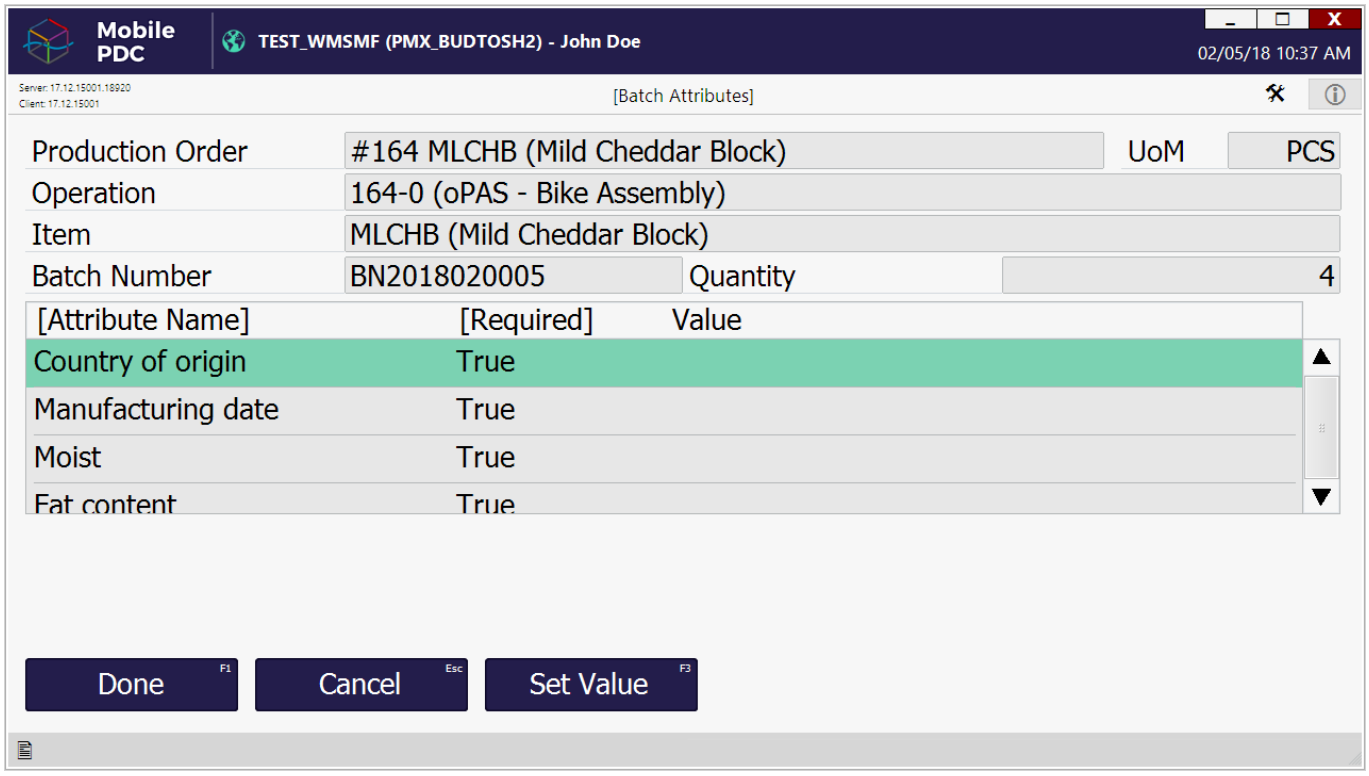
Batch Attributes

If the *Enable batch attributes in PDC* option is enabled on the Thin Client 2 tab of Produmex Manufacturing settings, an additional 'Attributes' button is displayed on the screen.

Press the 'Attributes' button to add the batch attributes of the product.

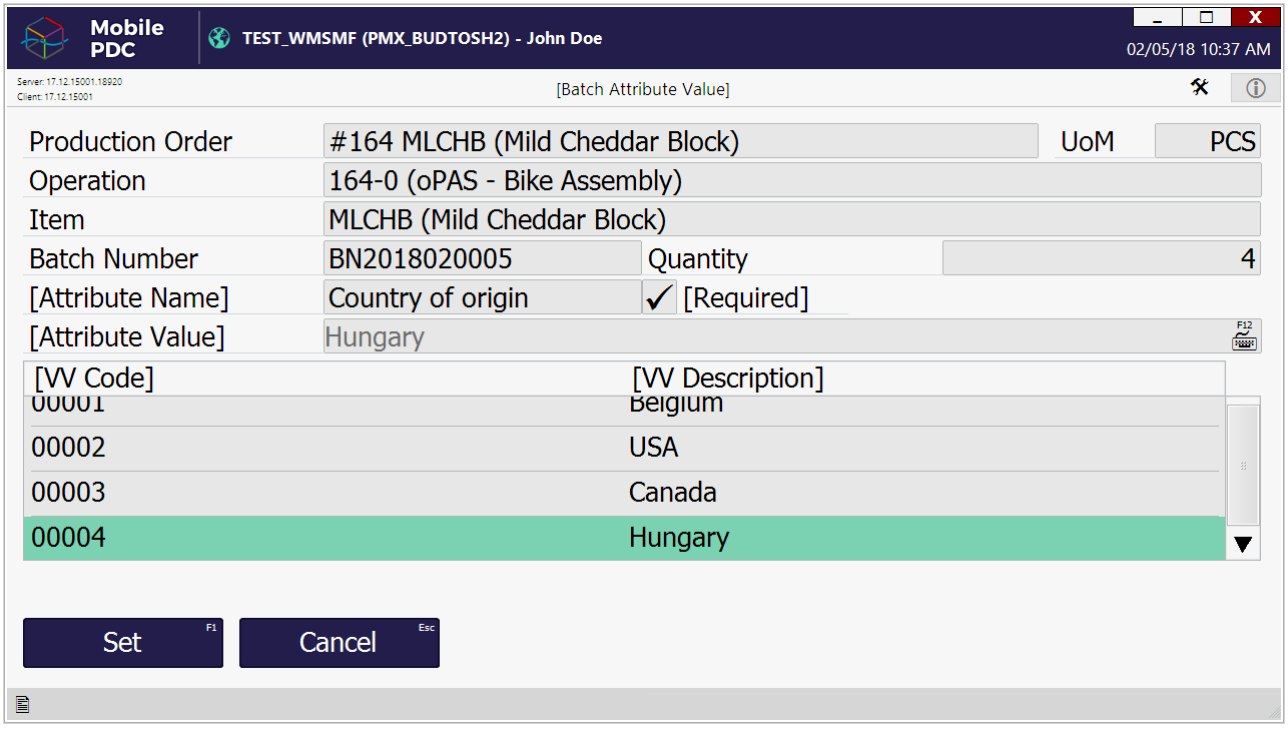
On the next screen every required and optional batch attribute that is defined for the product on the Produmex Attributes tab is listed.

The *Attribute Name* is the name of the batch attribute type. The Required column marks whether the batch attribute is set as required or optional. If a batch attribute is required, the user must set a value in order to proceed. On the value column the current batch attribute value is displayed.

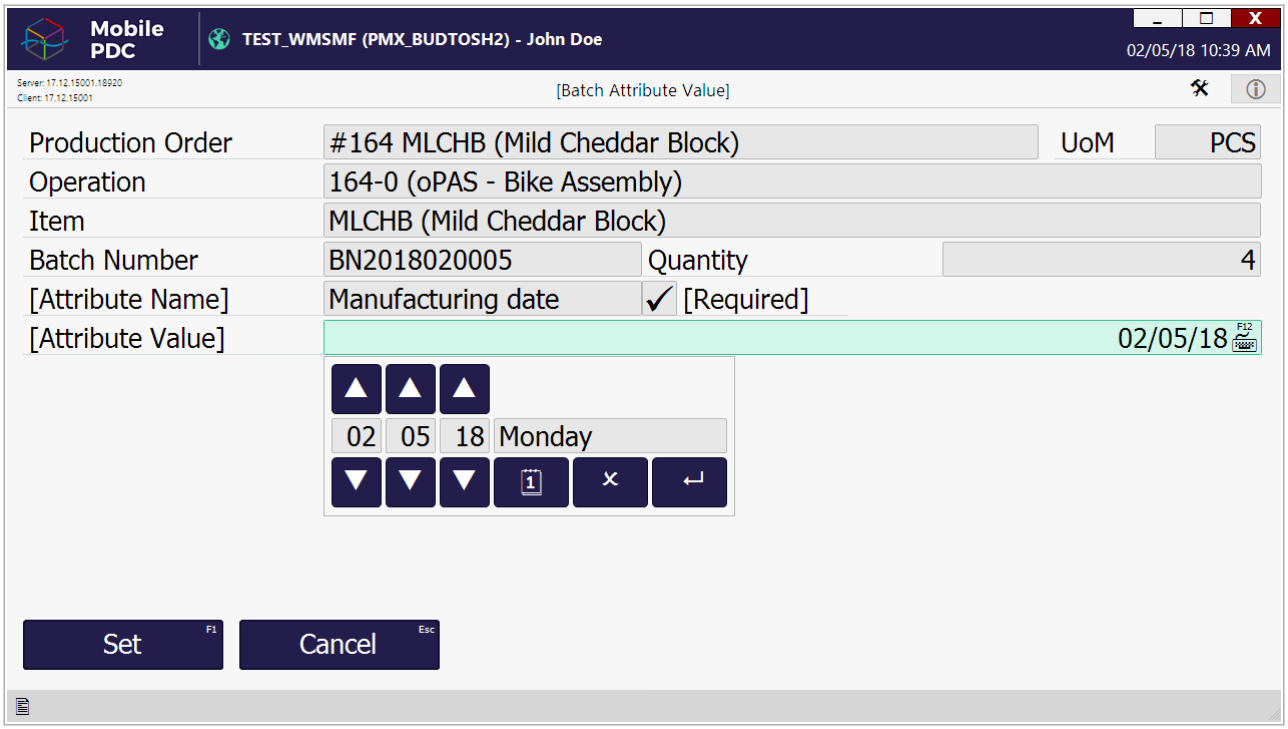


To set a value, select the line of the batch attribute and press the ‘Set value’ button. On the next screen set the value. The method for entering the value varies according to the batch attribute convertor:

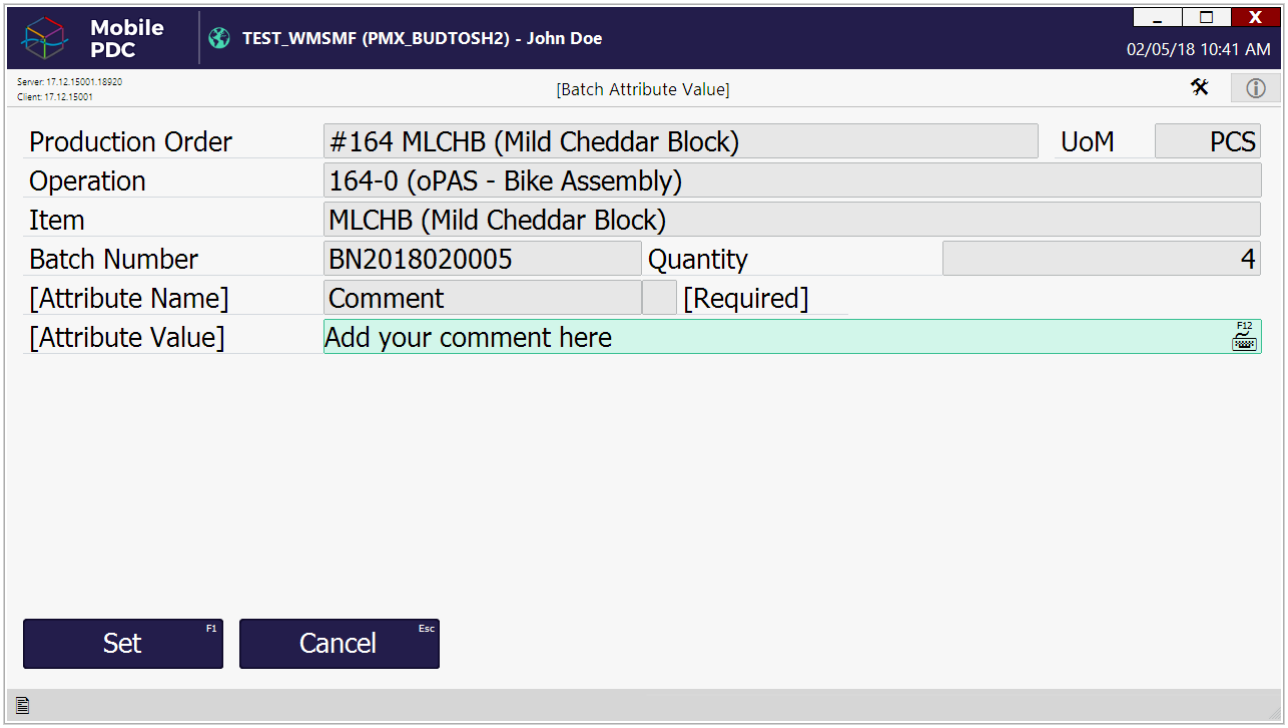
- List: Select the value from the list. Every value that is defined for the batch attribute type on the Batch attribute valid values user table is listed.



- Date: Enter the date in the following format: *mm/dd/yy*. To select the date on a form, press F12 and set the date with the up and down arrows. By default the current date is displayed. Press the icon to set the date back to the current date. Press the icon to close the date selector. Press the icon to set the date.

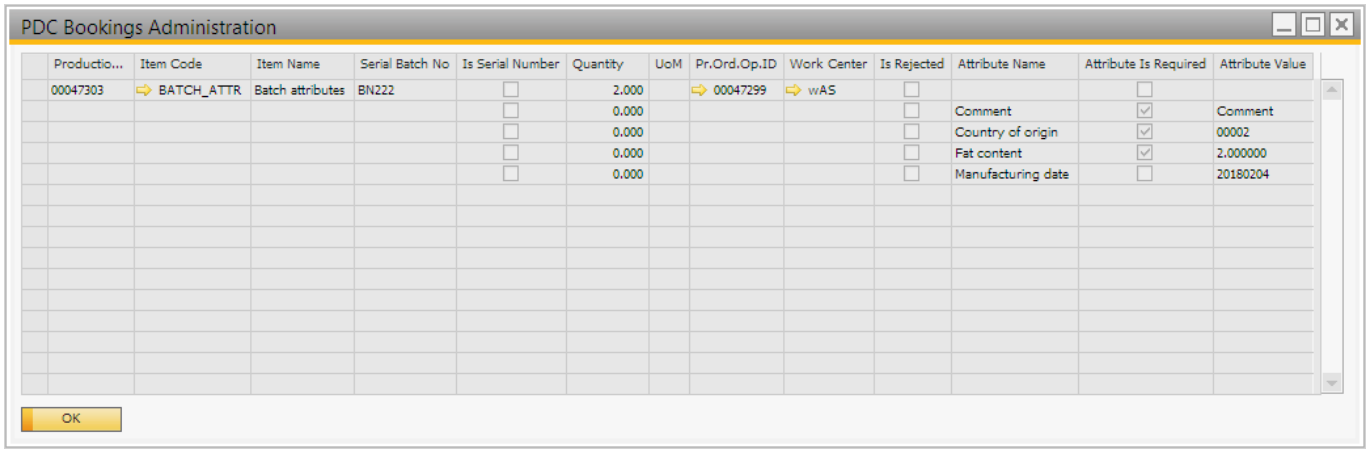


- Int: Enter the value to the *Attribute Value* field. You can add a whole number as the value.
- Double: Enter the value to the *Attribute Value* field. You can add a number with decimals as the value.
- String: Enter the value to the *Attribute Value* field. You can add a sequence of alphanumeric characters as the value.



After the booking is processed, you can see the booked batch attributes on the PDC Bookings Administration form.

Select the line of the booking. On the product grid click on the golden arrow in the *Compl. Qty.* column. On the opening form you can see the batch attribute values.



Modify batch attributes
Batch attributes can be modified after the booking is created. On the Admin screen, press the Modify button and navigate to the Batch Attributes screen.
For more information about the Admin screen please see: Admin

20.3.6.2. Issue Materials

Specify the consumed quantities on the 'Materials' screen. Every material linked to the milestone operation are listed. Add the quantities as described in: 2.2.5. Materials

Materials will be consumed from the input location/lined up location of the production line or from the production line directly therefore no bin locations can be selected.
Stocks to be consumed from a lined up will be sorted based on the consumption algorithm of the lined up location. Other stocks will be sorted by FEFO, then in the order they were moved to the production input line: PMX_ITRI."BestBeforeDate", PMX_INVT."InternalKey".

After the PDCProcessor processed the booking, the material(s) will be issued in SAP Business One with the specified quantities.

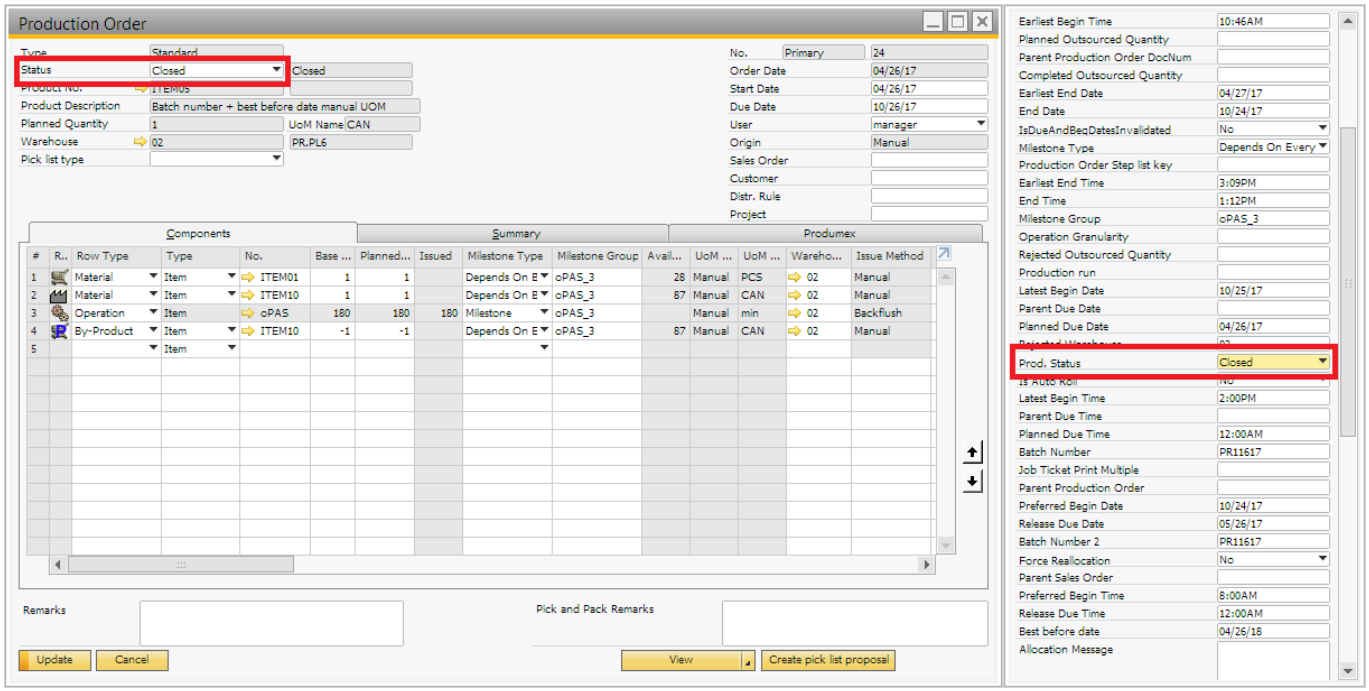
Batch number
Press the 'Serial/Batch' button to identify the batch number. Follow the steps described in: Material Batch Number Picker

Because the materials are issued from the input location/lined up location/production line, no bin locations can be selected and the *'Split'* button is not displayed.

Serial numbers
Press the 'Serial/Batch' button to scan the serial numbers. Follow the steps described in: Material Serial Number Picker

20.3.7. Close production order

After the production has been finished, close the production order. First set the *'Prod.Status'* UDF to *'Closed'* on the production order then change the *'Status'* on the header to *'Closed'*.



20.4.Limitations

- Advanced outsourcing with unfinished products
- Items having a second batch number or a best before date that are not managed by batches are not supported as products or by-products.
- Materials with PMX serial number
- Do not use the *Skip material serial/batch quantities screen* setting

16. Scheduled Reallocator

Produmex Manufacturing is a legacy product and Boyum IT Solutions no longer sells new installations for it.

The Scheduled Reallocator will run on predefined times and reschedules the allocations of certain production orders.

16.1. Set up the Scheduled Reallocator

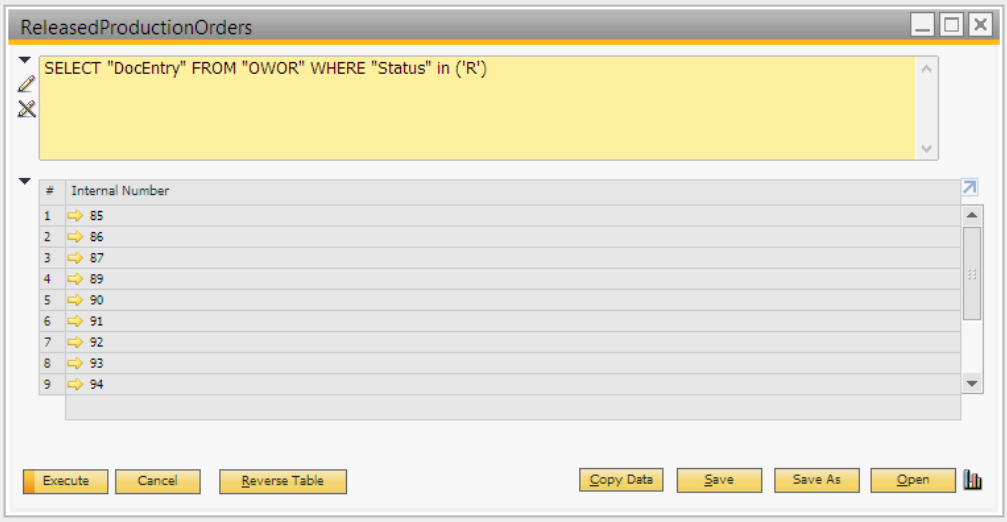
Configure the settings of the Scheduled Reallocator on the Scheduled Reallocator tab of Produmex Manufacturing settings.

Add the query for the Scheduled Reallocator with the Query Manager. Save it as the Query Name defined on the Scheduled Reallocator tab of Produmex Manufacturing settings.

In the example we will add the following query:

```
SELECT "DocEntry" FROM "OWOR" WHERE "Status" in ('R')
```

The query will get every released production order.

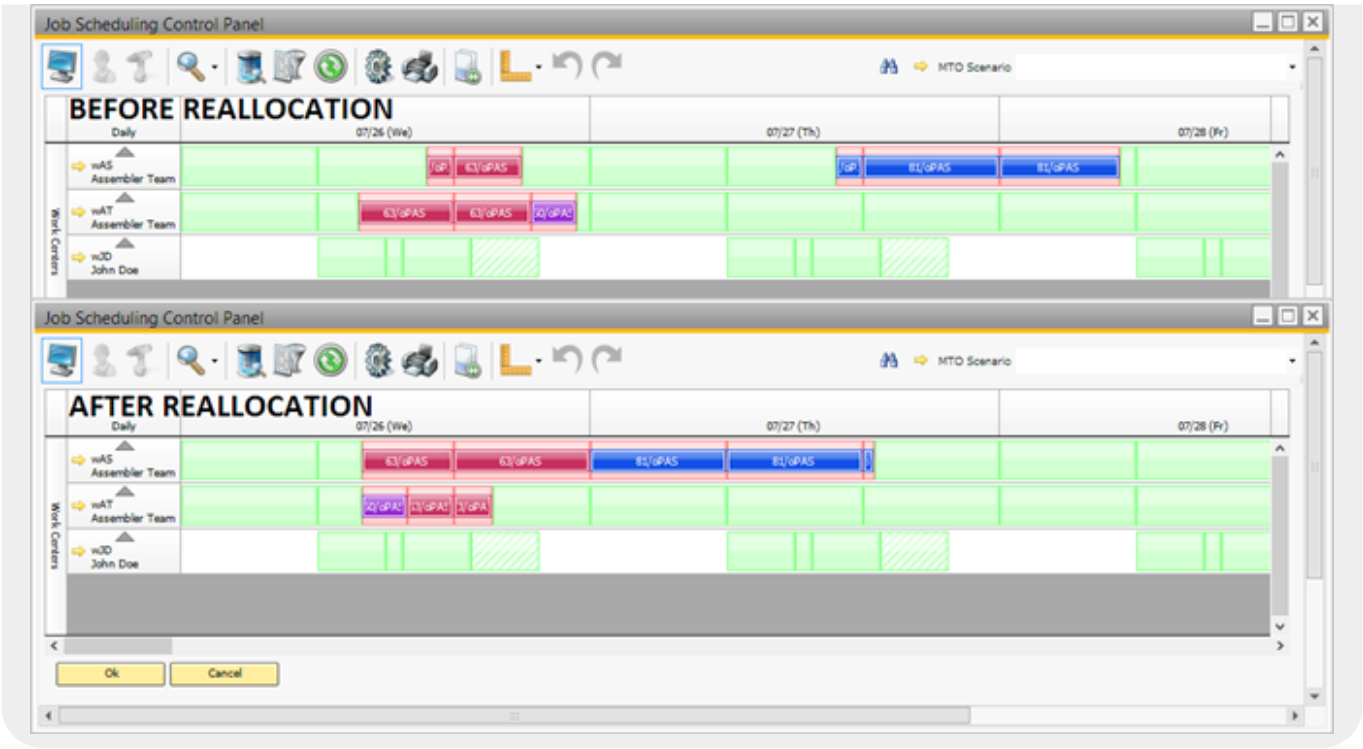


16.2. Reallocation

The Scheduled Reallocator will run on times defined and on the machine defined in the Scheduled Reallocator tab of Produmex Manufacturing settings.
If the add-on is not running at the defined time, the reallocation begins after the add-on is started.

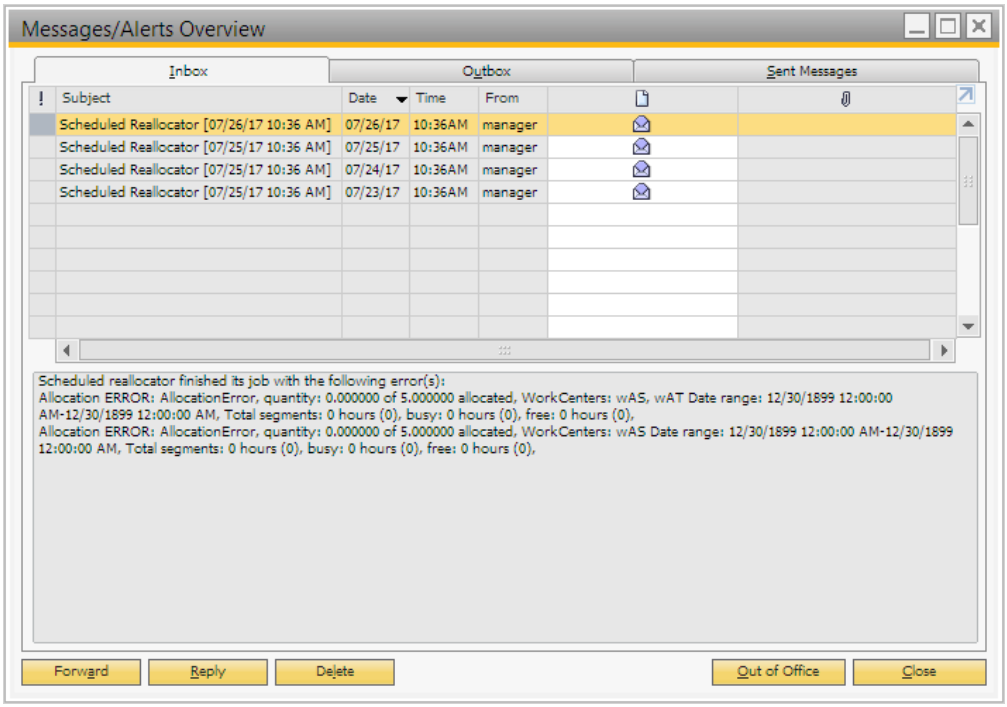
When the scheduled reallocator runs, the system reschedules the production orders that are the result of the scheduled reallocator query.

In the example the allocations of the released production orders will be rescheduled.



16.3. Message

After the reallocation is finished, the SBO user selected as the as the Recipient on the Scheduled Reallocator tab will get a notification. The list of the allocation errors will be also included in the message.



17. Drag & Relate

Produmex Manufacturing is a legacy product and Boyum IT Solutions no longer sells new installations for it.

Produmex Manufacturing extended the standard SAP Business One drag&relate feature with the following reports specialized for manufacturing:

1. BoM Tree
2. BoM Tree without Operations
3. BoM Usage
4. Production Material Requirements
5. Material Account Grid
6. Material Account Diagram
7. Operations Sequence Diagram
8. Job Requirements Report
9. Allocation Status

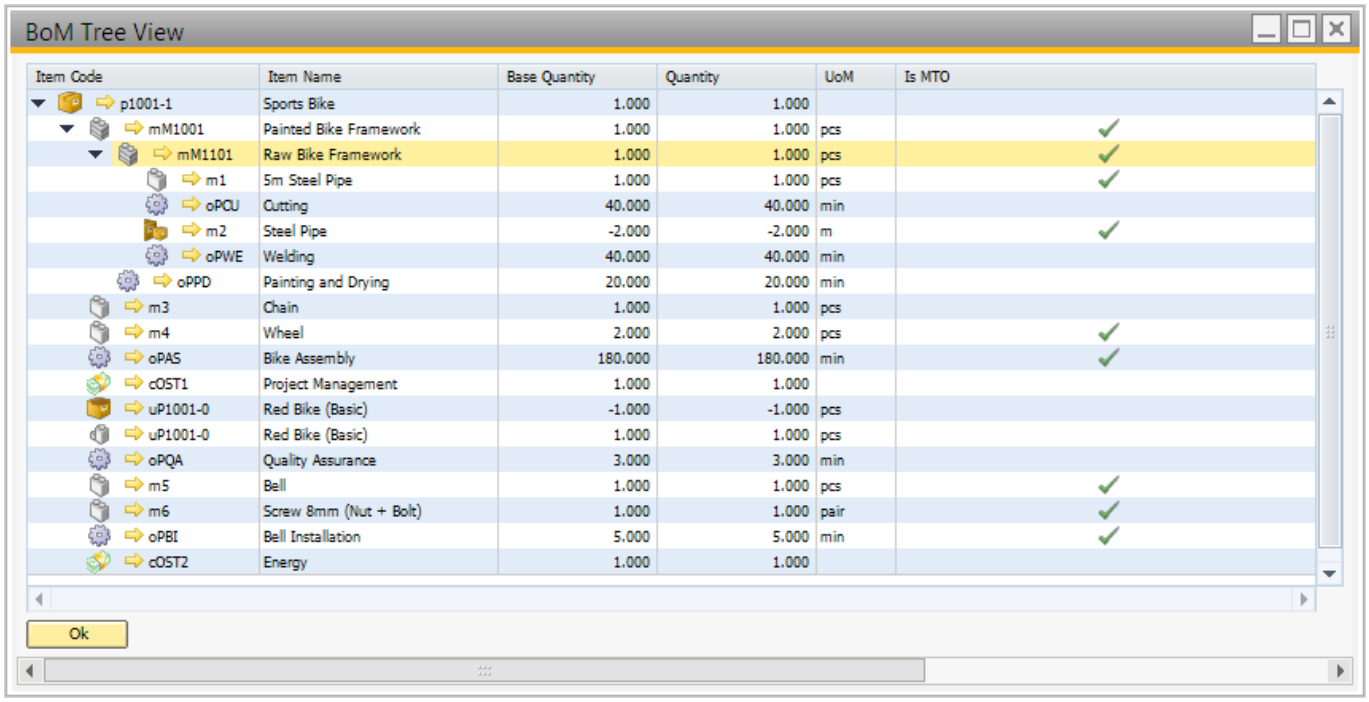
17.1. BoM Tree

To see the complete BoM of a product, grab the item code, place it on the ‘BoM Tree’ line, and then click on ’BoM Tree’. If the grabbed item has a BoM, the BoM Tree View report will open.

The report lists every BoM element of the dropped item. If the Bill of Materials contains an assembly material or a phantom item, the BoM of the assembly material/phantom item will be shown as well. Assembly lines can be collapsed and expanded.

The following information is displayed:

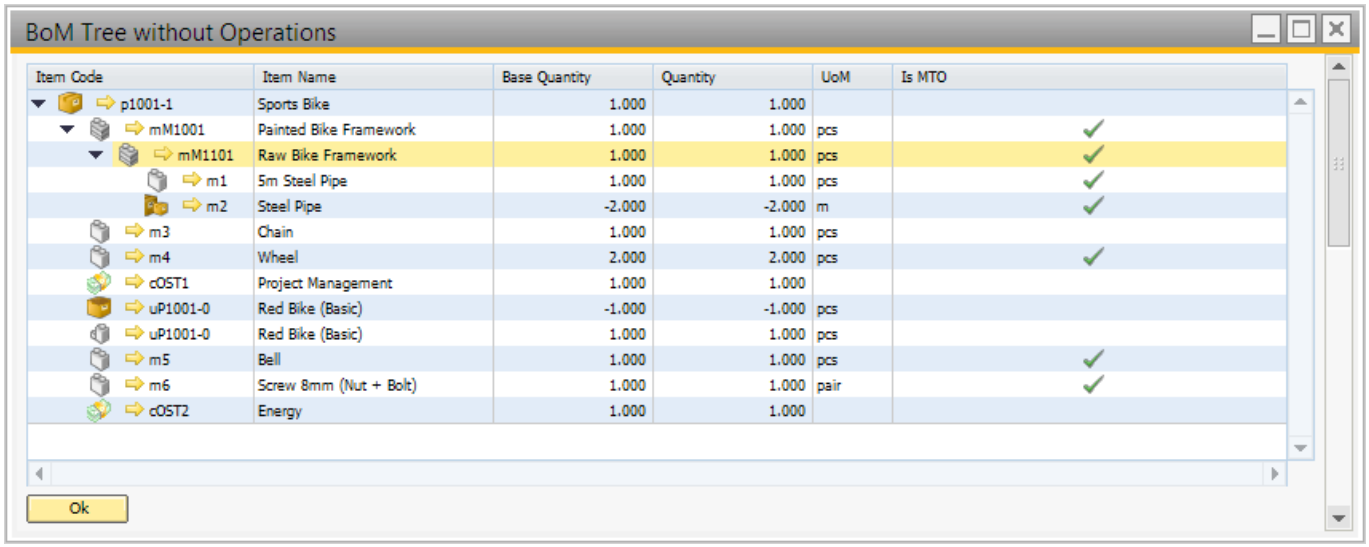
- *Item Code*: This field contains an icon that indicates the role of the item in the BoM and the item code.
- *Item Name*: The description of the item.
- *Base Quantity*
- *Quantity*
- *UoM*
- *Is MTO*: Indicates whether the item will be considered for MTO planning or not.



17.2. BoM Tree without Operations

To see the complete BoM of a product without operations, grab the item and drop it on the ‘BoM Tree without Operations’ line, then click on the line. If the grabbed item has a BoM, the BoM Tree without Operations report will open.

The report lists every element of the item’s Bill of Materials, except the operations. If the Bill of Materials of the dropped item contains an assembly material or a phantom item, the BoM of the assembly material/phantom item will be shown as well. Assembly lines can be collapsed and expanded.



17.3. BoM Usage

To see the products that require the given item as a component, grab the item, place it on the ‘BoM

Usage' line, and then click on the line.

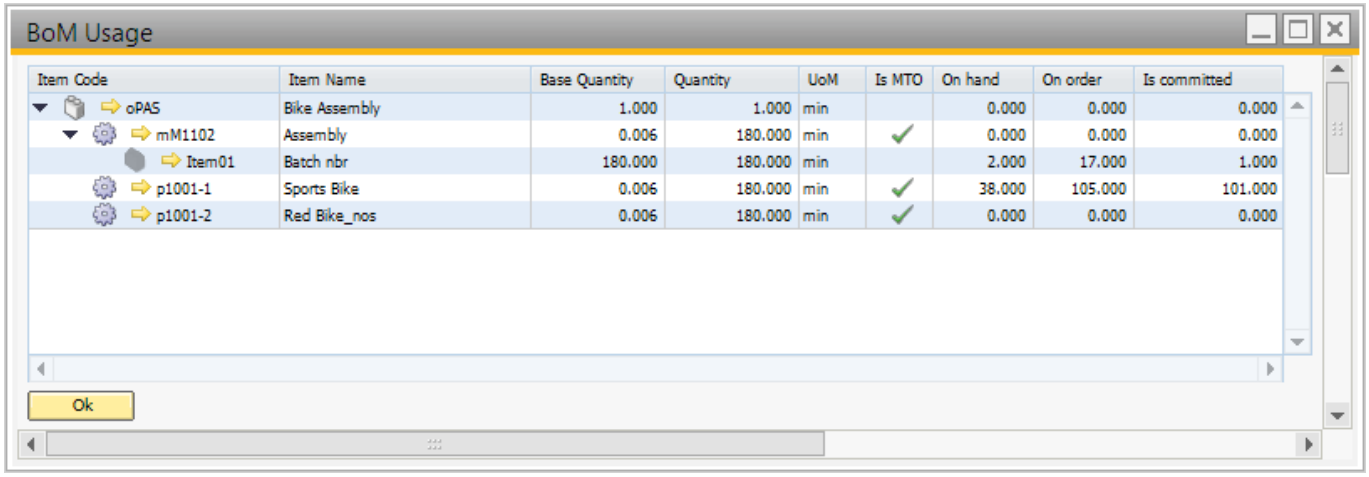
A product is listed on the opening BoM Usage form if its BoM contains the selected item.

If the item is a phantom item, the BoMs that contain the phantom item will be listed under the item.

The report can be used for materials, components, operations, by-products and costs.

The following information is displayed:

- *Item Code*: This field contains an icon that indicates the role of the item in the BoM and the item code.
- *Item Name*: The description of the item.
- *Base Quantity*
- *UoM*
- *Is MTO*: Indicates whether the item will be considered for MTO planning or not.
- *On hand*: The quantity in stock.
- *On order*: The ordered quantity.
- *Is committed*: The committed quantity.



17.4. Production Material Requirements

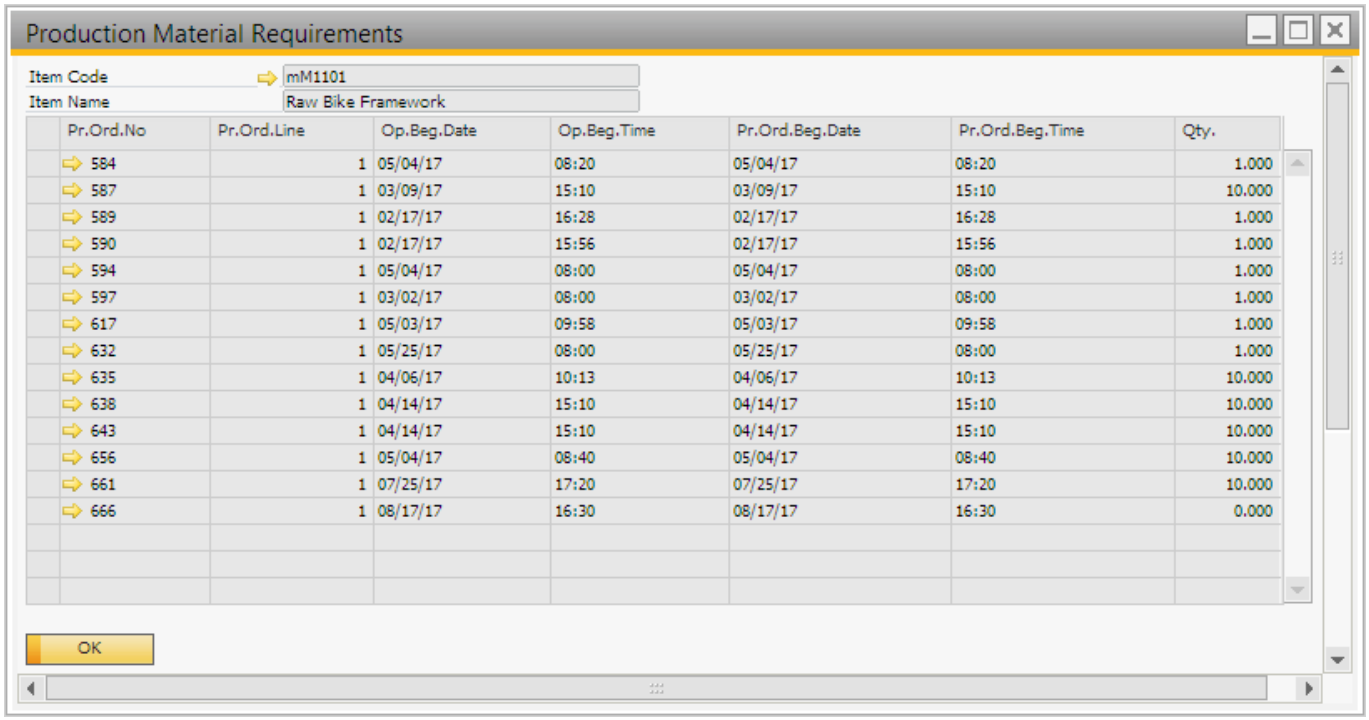
To see the list of production orders that require the given item as a material, open the Production Material Requirements report. Grab a component/material item, drop it on the 'Production Material Requirements' line, and then click on the line.

On the grid every open production order that contains the item as a material will be listed and linked.

Please note: If a material is not linked to an operation, it will not be listed.

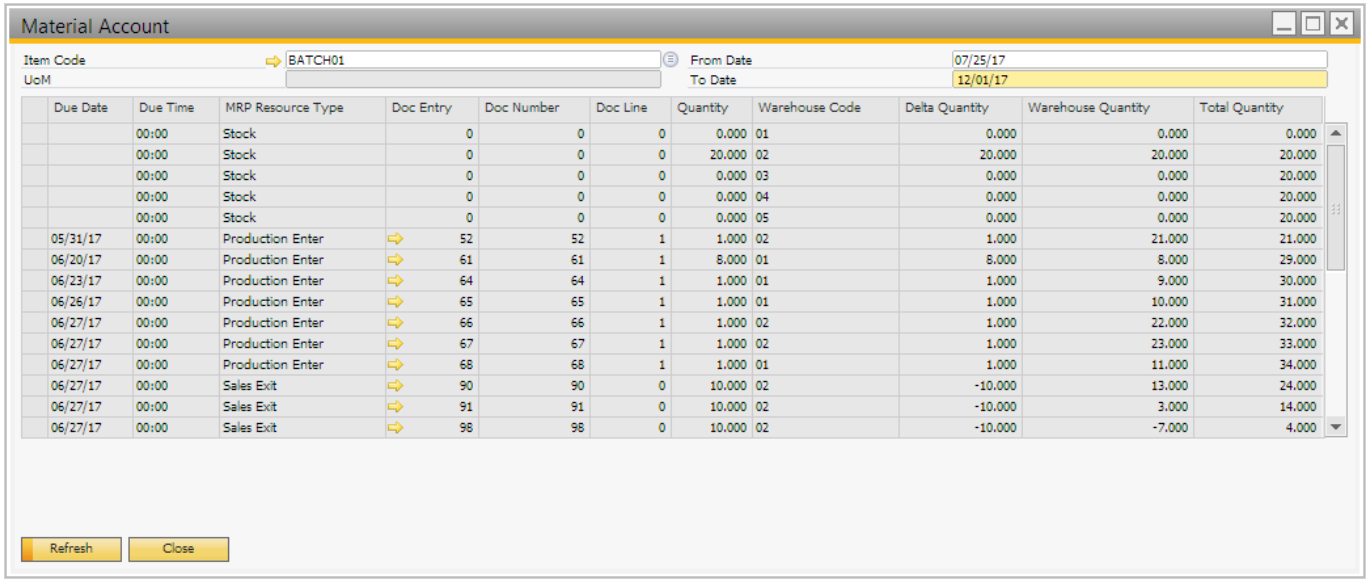
The following information is displayed:

- *Pr.Ord.Line*: The production order line where the material is located.
- *Op.Beg.Date*: The begin date of the linked operation.
- *Op.Beg.Time*: The begin time of the linked operation.
- *Pr.Ord.Beg.Date*: The begin date of the production order.
- *Pr.Ord.Beg.Time*: The begin time of the production order.
- *Qty.*: The required quantity.



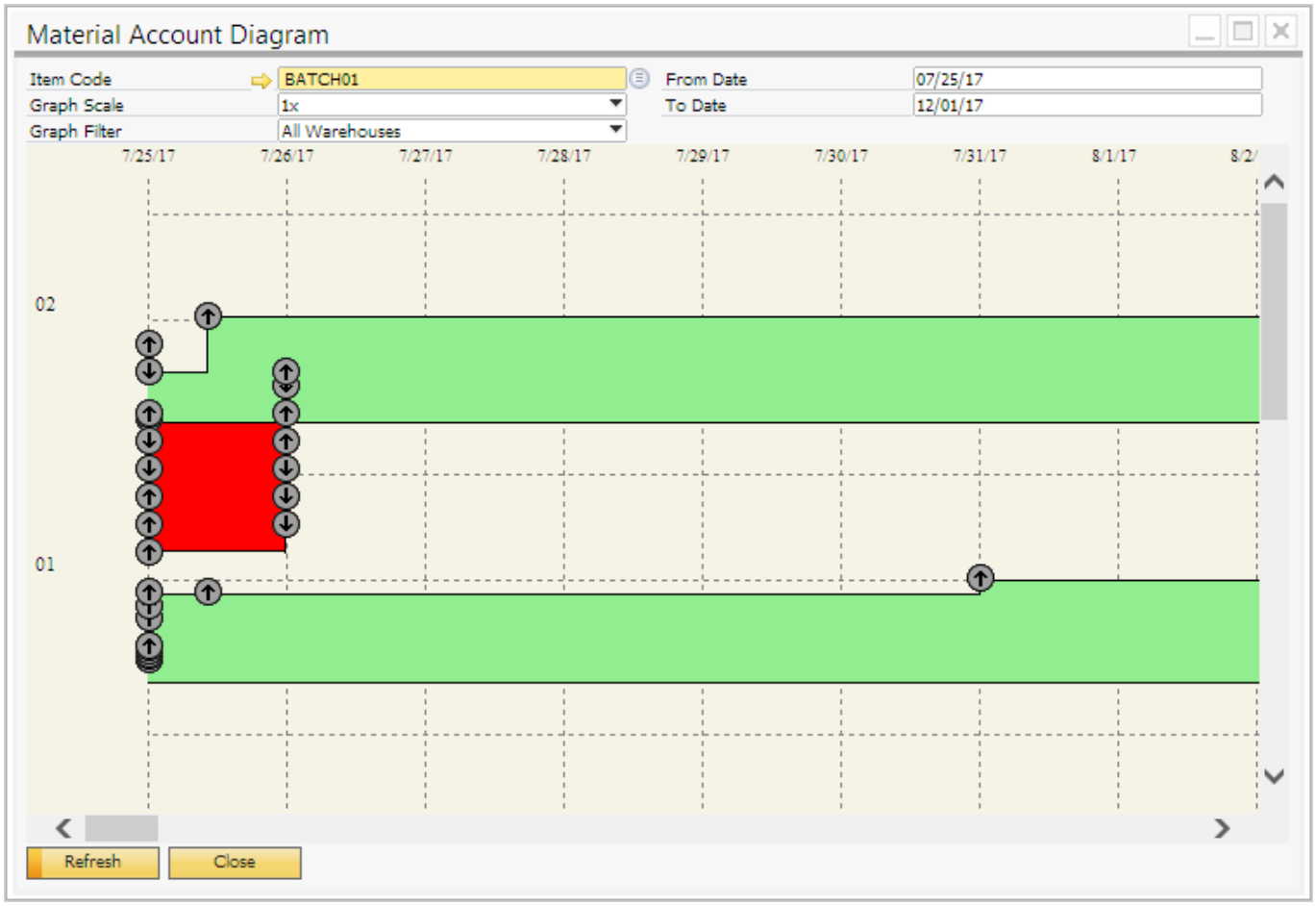
17.5. Material Account Grid

To see the incoming and outgoing inventory transactions of an item, open the Material Account Grid. Drag a non-operation item and drop it on the 'Material Account Grid' line, then click on the line. The 'Material Account Grid' form will open.



17.6. Material Account Diagram

To see the incoming and outgoing inventory transactions of an item on a diagram, open the Material Account Diagram. Drag a non-operation item, drop it on the 'Material Account Diagram' line, and then click on the line. The 'Material Account Diagram' form will open.



17.7. Operations Sequence Diagram

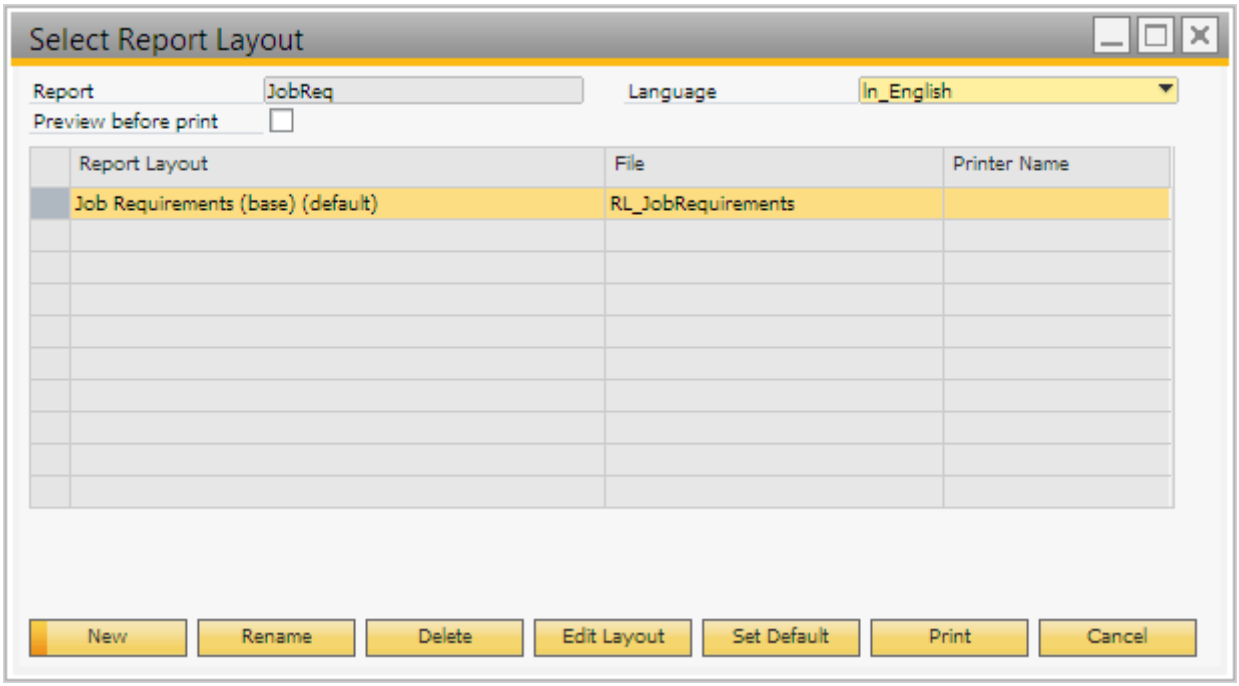
To see the MTO sequence of a production order, drag it, place it on the 'Operations Sequence Diagram' line, and then click on the line. The Operations Sequence Diagram will open.

The operations sequence diagram can only be opened for release production orders that are part of an MTO chain.

17.8. Job Requirements Report

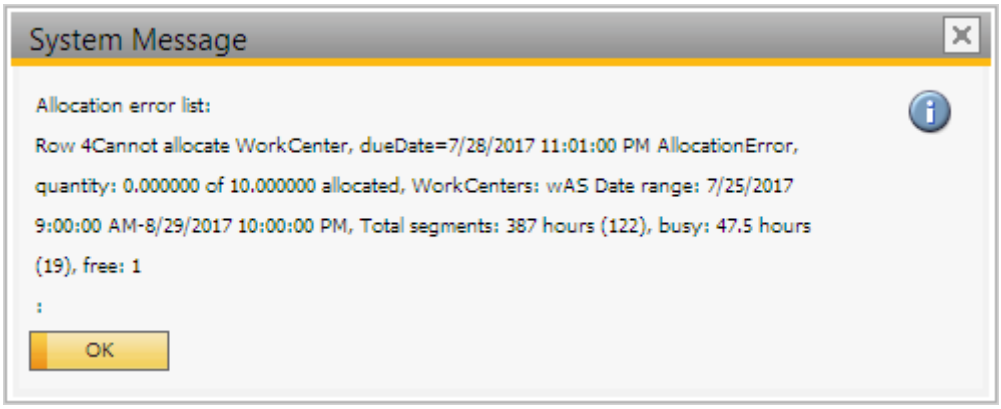
The Job Requirements report can be printed with the drag & relate function as well.

Drag a released production order, drop it on the 'Job Requirements Report' line, and then click on the line. The 'Select Report Layout' window will open up. After the report is selected, the system will print the Job Requirements Report for the production order.

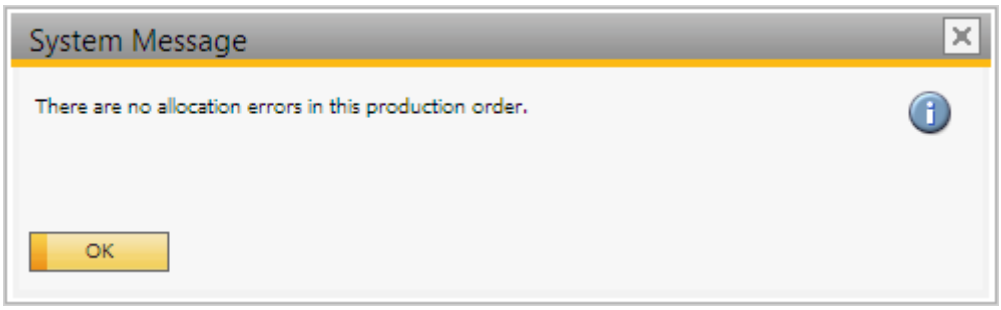


17.9. Allocation Status

To see the allocation status of a released production order, drag the production order, place it on the 'Allocation Status' line, and then click on the line. The Allocation error list window will open.



If there are no allocation errors, the following system message will open:



18. Importer

Produmex Manufacturing is a legacy product and Boyum IT Solutions no longer sells new installations for it.

Produmex Manufacturing offers importers for the following:

- Manufacturing Operation
- Bill of Materials
- Production Order

The importer processes a CSV file and adds a valid element/document to the company database.

18.1. Using the importer

18.1.1. Create import file

Create the CSV file. For more information about the file structure please see:

- Bills of Materials: Bills of Materials import file
- Manufacturing Operations: Manufacturing Operations import file
- Production orders: Production order import file

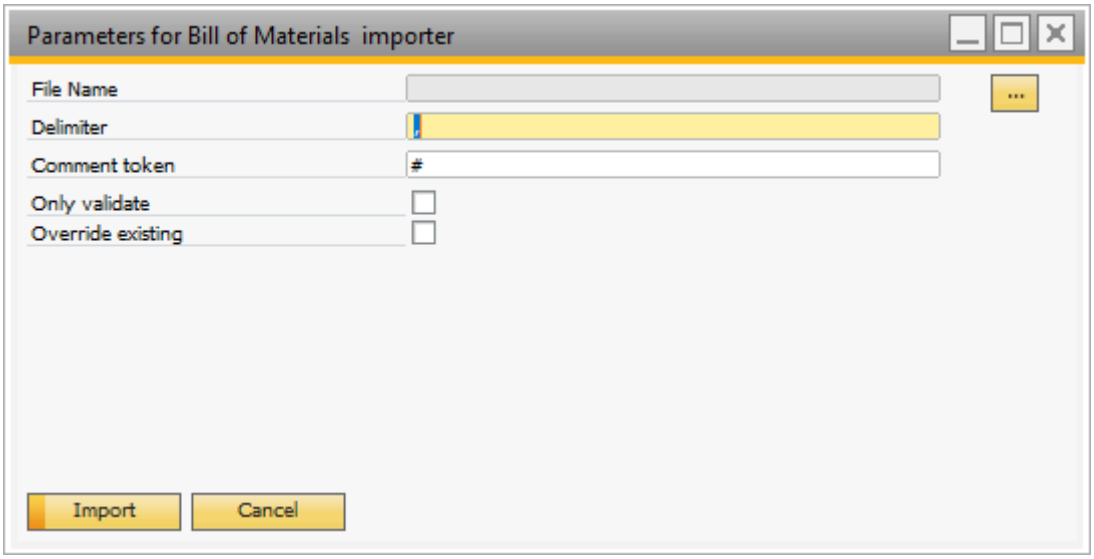
18.1.2. Open importer

Open the importer via the following path: Tools > Produmex Manufacturing > Produmex Data Management >

- To import Bills of Materials, click on: *Import Bills of Materials*
- To import Manufacturing Operations, click on: *Import Manufacturing Operations*
- To import Production orders, click on: *Import Production order*

18.1.3. Specify parameters

On the parameters form click on the '...' button and browse the CSV file.



Specify the importing parameters.

Delimiter
Specify the separator character that was used on the CSV file on the Delimiter field. The default delimiter is ',’.

Comment Token
A Comment Token can be defined. Every row that begins with the comment token will be skipped. By default the comment token is '#'.
Please note: If you leave it empty, each line in the file will be processed.

Override existing
When importing a Bill of Materials or a Manufacturing operation, an additional 'Override existing' checkbox will be displayed. This parameter determines what the importer does when the Bill of Materials/Manufacturing Operation already exists.

- If it is checked, the existing document is deleted and replaced with the new one from CSV file. If there are many BoMs/Manufacturing Operations for the same product in the file, the last valid one will be loaded.
- If it is not checked, the existing documents remain intact, an error message is generated for the one in CSV file. If there are many BoMs/Manufacturing Operations for the same product in the file, the first valid one will be loaded.

Please note: Whenever a production order is imported, a new production order is added. The importer will not override existing production orders.

18.1.4. Validate

Before staring the import, validate the CSV file.
Check the 'Only validate' box. If this box is checked, the document will only be validated but will not be imported to the company database. Click on the 'Import' button to start the validation.
For more information about the validation steps please see: Validation

The results of the validation will be displayed on the result form.

On the header the path to the import file and the importing parameters are displayed.

Elements/documents included in the selected import file will be divided into three tabs:

- Documents/elements proven to be valid are listed on the *'Successfully loaded'* tab.
- Documents/elements proven to be invalid due format errors are listed on the *'Format error'* tab.
- Documents/elements proven to be invalid due content errors are listed on the *'Content error'* tab.

The number of the grid elements is displayed next to the tab title.

When importing Bill of Materials or Production orders, the *Product Number* is the item code of the main product. When importing Manufacturing operations, the Product Number is the item code of the validated manufacturing operation.

The *Line Reference* is the number of the source line in the CSV file.

On the *Message* field further information are displayed about the entry.

18.1.5. Import

After every line of the import file is proven to be valid, start the import. It is recommended to only start the import after every line of the import file is proven to be valid. Make sure that the 'Only validation' checkbox is not checked.

Set the import parameters as described above and click on the 'Import' button to start the import. Please note: The system will always validate the file before the import, regardless of whether it was validated before or not.

The results of the import will be displayed on the results form.

- When importing a Bill of Materials, a link to the imported Bill of Material is added to the *Product Number* field.
- When importing a Manufacturing Operation, a link to the imported Manufacturing Operation is added to the *Product Number* field.
- When importing a Production Order, a link to the Bill of Material of the main product is added on the *Product Number* field. An additional *Document Number* field is displayed. The document number and a link to the generated production order is displayed on the field. All generated production orders will be in 'Planned' status, and their type will be 'Special'. The production order will always be created based on the imported data, regardless whether its main product has a production BoM or not.

18.2. File structure

Element names/codes are case sensitive.

18.2.1. Manufacturing operation

Download an example CSV file from here: Manufacturing operation importer file example

No.	Name	Mandatory	Possible types/values	Description
1	Item Series		Numeric	If left empty, the value will be 'Manual'.
2	Operation Code	✔	Text	The code of the operation. Please note: If it is the code of an existing operation, the following can happen: If the 'override existing' checkbox is checked, the operation will be overridden. If the override existing checkbox is not checked, a content error will be generated and the manufacturing operation will not be imported.
3	Operation Name		Text	
4	Is Outsourceable		Y/N	N - No Y - Yes If left empty, the value will be 'N'.
5	Item Group		Number	The item group code. You can find the Item Group codes in the OITB table. If left empty, the system will use the item group set on the '*Item Group for Operation*' field of the Master Data tab of the Produmex Manufacturing settings.
6	Before Time		Number	Importer converts it to a base time using the *Operation Time UoM* from the row.
7	Safety Time		Number	
8	Setup Time		Number	
9	Job Time	✔	Number	
10	Teardown Time		Number	
11	After Time		Number	
12	Time Base		Number	
13	Operation Break		Integer between 0 and 5	0 - 3 - Allowed 1 - Denied 2 - Allowed WC 4 - Allowed NBP 5 - Allowed WCNBP If left empty, the value will be '3'.
14	Operation Time UoM		Text	The value must be a valid time code defined on the TimeUnits (BXPTIMEUNITS) user table.*
15	Is parallel operation		Y/N	N - No Y - Yes If left empty, the value will be 'N'.
16	Max Parallel Operations		Integer	

No.	Name	Mandatory	Possible types/values	Description
17	Allocation window		Number	The importer converts it to a base time using Allocation Window UoM from actual row.
18	Allocation window UoM		Text	The value must be a valid time code defined on the TimeUnits (BXPTIMEUNITS) user table.*
19	Min. Job Quantity		Number	
20	Feature	✔	Text	Must be an existing work center feature.
21	Is Mandatory Work Center		N/Y	N - No Y - Yes If left empty, the value will be 'N'.
22	Preferred Work Center		Text	Must be an existing work center feature. If the 'Is Mandatory Work Center' value is Y, this field must be filled.

* In order to use Produmex Manufacturing integrated with Produmex WMS. the UoM must exist in the Units of Measure - Setup (OUOM) standard SBO table as well.

If there is a value beyond 21th column, the row is invalid. A format error message is generated, and the manufacturing operation is not processed.

18.2.2. Bills of Materials

The first character of a row defines the row type and drives the processing of the row. If a comment token was defined, all rows beginning with the given character are skipped.

The following row types are supported:

- H - Header row
- I - Item row
- S - Supplier row
- R - Resource row
- T - Text row

Every other first character, except the comment token, generates an error message.

Download an example CSV file from here: Bills of Materials importer file example

Header row type

It represents the header of the Bill of Materials.

No.	Name	Mandatory	Possible types/values	Description
1	Row type	✔	H	

No.	Name	Mandatory	Possible types/values	Description
2	Product No.	✔	Text	Item code of the product/sub-assembly. Must be a valid item code.
3	Planned Average Production Size		Number	
4	Quantity		Number	If left empty, the value will be 1.
5	Warehouse (To)		Text	Must be a valid code of a warehouse.
6	Price List		Integer	Must be a valid code of a price list.
7	Distribution Rule 1		Text	The Distribution rule for Dimension 1. Must be a valid identifier of a distribution rule.
8	Distribution Rule 2		Text	The Distribution rule for Dimension 2. Must be a valid identifier of a distribution rule.
9	Distribution Rule 3		Text	The Distribution rule for Dimension 3. Must be a valid identifier of a distribution rule.
10	Distribution Rule 4		Text	The Distribution rule for Dimension 4. Must be a valid identifier of a distribution rule.
11	Distribution Rule 5		Text	The Distribution rule for Dimension 5. Must be a valid identifier of a distribution rule.
12	Project		Text	Must be a valid identifier of a project.
13	Calculation Base Quantity		Number	
14	Custom Code		Text	
15	Is Auto Roll		N/Y	N - No Y - Yes If left empty, the value will be 'N'.
16	Milestone type		Integer between 0 and 4	0 - 1 - Milestone 2 - Depends on Begin 3 - Depends on Every 4 - Depends on End If left empty, the value will be '0'.
17	Operation Granularity		Number	
18	Recipe Version		Number	*No validation*
19	Rejected Warehouse		Text	Must be a valid code of a warehouse.
20	Timestamp		Text	*No validation*

If there is a value beyond 20th column, the row is invalid. A format error message is generated, and BoM is not processed.

Item row type

It represents a row on the grid of the Bill of Materials. The BoM row type is defined by the row sub type (second column) in the import file.

The first 15 column is the same for every-sub type. If the sub type of the row is operation, operation specific information can be added on the 16-39 columns.

No.	Name	Mandatory	Possible types/values	Description
1	Row type	✔	I	
2	Row sub-type	✔	Integer between 1 and 8	1 - Material 2 - Operation 3 - Unfinished Material 4 - Supplier Material 5 - By-Product 6 - Unfinished Product 7 - Cost 8 - Phantom
3	Item Code	✔	Text	Define an item with the given sub-type. Must be a valid item code. *The row sub-type is not validated.*
4	Quantity	✔	Number	This field should be empty for operations. The importer automatically calculates the quantity and updates this field with the calculated quantity.
5	Warehouse		Text	Must be a valid code of a warehouse.
6	Issue Method		M/B	M - Manual B - Backflush If left empty, the value will be 'B'.
7	Milestone type		Integer between 0 and 4	0 - 1 - Milestone 2 - Depends on Begin 3 - Depends on Every 4 - Depends on End If left empty, the value will be '0'.
8	Price List		Integer	Must be a valid code of a price list.
9	Comments		Text	
10	Distribution Rule 1		Text	The Distribution rule for Dimension 1. Must be a valid identifier of a distribution rule.
11	Distribution Rule 2		Text	The Distribution rule for Dimension 2. Must be a valid identifier of a distribution rule.
12	Distribution Rule 3		Text	The Distribution rule for Dimension 3. Must be a valid identifier of a distribution rule.
13	Distribution Rule 4		Text	The Distribution rule for Dimension 4. Must be a valid identifier of a distribution rule.
14	Distribution Rule 5		Text	The Distribution rule for Dimension 5. Must be a valid identifier of a distribution rule.
15	WIP Account		Text	The internal reference of a WIP Account. The internal reference code can be found in the OACT.ACCTCODE field.
16	Consignation Size		Number	
17	Drawing Position Number		Integer	
18	Profit Center		Text	
19	Rejected Warehouse		Text	Must be a valid code of a warehouse.

If the sub-type of the row is not operation, and there is a value beyond 19th column, the row is invalid. A format error message is generated, and BoM is not processed.

Operation row sub-type

No.	Name	Mandatory	Possible types/values	Description
20	Before Time		Number	The importer converts it to a base time using the Operation Time UoM from actual row of CSV or from Manufacturing Operation.
21	Safety Time		Number	
22	Setup Time		Number	
23	Job Time		Number	
24	Teardown Time		Number	
25	After Time		Number	
26	Time Base		Number	
27	Operation Break		Integer between 0 and 5	0 - 3 - Allowed 1 - Denied 2 - Allowed WC 4 - Allowed NBP 5 - Allowed WCNBP If left empty, the system will copy the value from the manufacturing operation.
28	Operation Time UoM		Text	The value must be a valid time code defined on the TimeUnits (BXPTIMEUNITS) user table.*
29	Is parallel operation		N/Y	N - No Y - Yes If left empty, the system will copy the value from the manufacturing operation.
30	Is overlapping operation		N/Y	N - No Y - Yes If left empty, the system will copy the value from the manufacturing operation.
31	Max Parallel Operations		Integer	
32	Overlapping Quantity		Number	
33	Allocation Window		Number	The importer converts it to a base time using Allocation Window UoM from actual row of CSV or from Manufacturing Operation.
34	Allocation Window UoM		Text	The value must be a valid time code defined on the TimeUnits (BXPTIMEUNITS) user table.*
35	Min Job Quantity		Number	
36	Feature		Text	Must be an existing work center feature.
37	Is Mandatory Work Center		N/Y	N - No Y - Yes If left empty, the system will copy the value from the manufacturing operation.

No.	Name	Mandatory	Possible types/values	Description
38	Preferred Work Center		Text	Must be an existing Work Center which supports selected Work Center Feature (from CSV or from Manufacturing Operation)
39	Outsourced		N/Y	N - No Y - Yes If left empty, the system will copy the value from the manufacturing operation.
40	In House Quantity		Number	
41	Outsourcing Lead Time		Number	If the Outsourced flag is set to Y, the importer converts it to a base time using Outsourcing UoM from actual row of CSV or from Manufacturing Operation. If the Outsourced flag is set to N, this field must be empty.
42	Outsourcing UoM		Number	If the Outsourced flag is set to Y, the value must be a valid time code defined on the TimeUnits (BXPTIMEUNITS) user table.* If the Outsourced flag is set to N, this field must be empty.
43	Items per Outsourcing Unit		Number	If the Outsourced flag is set to N, this field must be empty.

* *In order to use Produmex Manufacturing integrated with Produmex WMS. the UoM must exist in the Units of Measure - Setup (OUOM) standard SBO table as well.*

If the row is an operation row, and there is a value beyond 43th column, the row is invalid. A format error message is generated, and BoM is not processed.

Supplier row type

It represents information about outsourcing partners. It can follow only an operation row or another supplier row, otherwise a format error message is generated and BoM is not processed.

No.	Name	Mandatory	Possible types/values	Description
1	Row type	✔	S	
2	Supplier Code	✔	Text	Must be a valid supplier code.
3	Planned Quantity	✔	Number	

If there is a value beyond 3rd column, the row is invalid. A format error message is generated, and BoM is not processed.

Resource row type

No.	Name	Mandatory	Possible types/values	Description
1	Row type	✔	R	
2	Resource Code	✔	Text	Must be a valid resource code.

No.	Name	Mandatory	Possible types/values	Description
3	Quantity	✔	Number	
4	Warehouse		Text	Must be a valid code of a warehouse.
5	Issue Method		M/B	M - Manual B - Backflush If left empty, the value wiil be 'B'.
6	Unit price		Number	
7	Comments		Text	
8	Distribution Rule 1		Text	The Distribution rule for Dimension 1. Must be a valid identifier of a distribution rule.
9	Distribution Rule 2		Text	The Distribution rule for Dimension 2. Must be a valid identifier of a distribution rule.
10	Distribution Rule 3		Text	The Distribution rule for Dimension 3. Must be a valid identifier of a distribution rule.
11	Distribution Rule 4		Text	The Distribution rule for Dimension 4. Must be a valid identifier of a distribution rule.
12	Distribution Rule 5		Text	The Distribution rule for Dimension 5. Must be a valid identifier of a distribution rule.
13	WIP Account		Text	The internal reference of a WIP Account. The internal reference code can be found in the OACT.ACCTCODE field.

If there is a value beyond 13th column, the row is invalid. A format error message is generated, and the BoM is not processed.

Text row type

No.	Name	Mandatory	Possible types/values
1	Row type	✔	T
2	Text	✔	Text

If there is a value beyond 2th column, the row is invalid. A format error message is generated, and the production order is not processed.

18.2.3. Production order

The first character of a row defines the row type and drives the processing of the row. If a comment token was defined, all rows beginning with the given character are skipped.

The following row types are supported:

- H - Header row
- I - Item row
- S - Supplier row
- R - Resource row

- T - Text row

Every other first character, except the comment token, generates an error message.

Download an example CSV file from here: Production order importer file example

Header row type

No.	Name	Mandatory	Possible types/values	Description
1	Row type	✔	H	
2	Product No.	✔	Text	Item code of the product/sub-assembly. Must be a valid item code.
3	Planned quantity		If left empty, the value will be 1.	
4	Warehouse (To)		Text	Must be a valid code of a warehouse.
5	Series		Integer	
6	Due Date		Date	Format: YYYYMMDD. If left empty, the due date will be the current date.
7	Sales Order		Text	Add the DocEntry of the sales order.
8	Customer		Text	Must be an existing customer.
9	Distribution Rule 1		Text	The Distribution rule for Dimension 1. Must be a valid identifier of a distribution rule.
10	Distribution Rule 2		Text	The Distribution rule for Dimension 2. Must be a valid identifier of a distribution rule.
11	Distribution Rule 3		Text	The Distribution rule for Dimension 3. Must be a valid identifier of a distribution rule.
12	Distribution Rule 4		Text	The Distribution rule for Dimension 4. Must be a valid identifier of a distribution rule.
13	Distribution Rule 5		Text	The Distribution rule for Dimension 5. Must be a valid identifier of a distribution rule.
14	Project		Text	Must be a valid identifier of a project.
15	Allocation Strategy	✔	Integer between 0 and 3	0 - 1 - Back from due date 2 - Forward from earliest date 3 - Forward from preferred date
16	Due Time		Date	Format: hh:mm
17	Milestone Type		Integer between 0 and 4	0 - 1 - Milestone 2 - Depends On Begin 3 - Depends On Every 4 - Depends On End
18	Operation Granularity		Number	
19	Rejected warehouse	✔	Text	Must be a valid code of a warehouse.
20	Is Auto Roll	✔	N/Y	N - No Y - Yes
21	Force Reallocation	✔	N/Y	N - No Y - Yes
22	Custom Code		Text	

If there is a value beyond 22th column, the row is invalid. A format error message is generated, and the production order is not processed.

Item row type

Belongs to the production order defined by the previous header. The Row SubType determines the interpretation of the rest of the row.

No.	Name	Mandatory	Possible types/values	Description
1	Row type	✔	I	
2	Row sub-type	✔	Integer between 1 and 8	1-Material 2-Operation 3-Unfinished Material 4-Supplier Material 5-By-Product 6-Unfinshed Product 7-Cost 8-Phantom
3	Item Code	✔		
4	Quantity	✔	Number	This value will be saved as the Base quantity. The Planned quantity will be calculated based on the Base quantity and the Quantity on the header. Only mandatory for Material rows.
5	Warehouse		Text	Must be a valid code of a warehouse.
6	Distribution Rule 1		Text	The Distribution rule for Dimension 1. Must be a valid identifier of a distribution rule.
7	Distribution Rule 2		Text	The Distribution rule for Dimension 2. Must be a valid identifier of a distribution rule.
8	Distribution Rule 3		Text	The Distribution rule for Dimension 3. Must be a valid identifier of a distribution rule.
9	Distribution Rule 4		Text	The Distribution rule for Dimension 4. Must be a valid identifier of a distribution rule.
10	Distribution Rule 5		Text	The Distribution rule for Dimension 5. Must be a valid identifier of a distribution rule.
11	WIP Account		Text	The internal reference of a WIP Account. The internal reference code can be found in the OACT.ACCTCODE field.
12	Consignation Size		Number	
13	Drawing Position Number		Integer	
14	Due Date		Date	Format: YYYYMMDD. If left empty, the due date will be the current date.
15	Due Time		Date	Format: hh:mm
16	Manual Planning	✔	Y/N	N - No Y - Yes

No.	Name	Mandatory	Possible types/values	Description
17	Issue Method	✔	B/M	M - Manual B - Backflush Mandatory for materials only. If left empty for other row sub-types, the value wiil be 'B'.
18	Milestone Type		Integer between 0 and 4	0 - 1 - Milestone 2 - Depends On Begin 3 - Depends On Every 4 - Depends On End If left empty, the value will be '0'.
19	Profit Center		Text	
20	Rejected Warehouse		Text	Must be a valid code of a warehouse.
21	Comment		Text	

If the sub-type of the row is not operation, and there is a value beyond 21th column, the row is invalid. A format error message is generated, and the production order is not processed.

Operation row sub-type

If the row sub-type is operation, additional operation specific data can be imported as well.

No.	Name	Mandatory	Possible types/values	Description
22	Before Time		Number	The importer converts it to a base time using the Operation Time UoM from actual row.
23	Safety Time		Number	
24	Setup Time		Number	
25	Job Time	✔	Number	
26	Teardown Time		Number	
27	After Time		Number	
28	Time Base		Number	
29	Operation Break		Integer between 0 and 5	0 - 3 - Allowed 1 - Denied 2 - Allowed WC 4 - Allowed NBP 5 - Allowed WCNBP If left empty, the value will be '3'.
30	Operation Time UoM		Text	The value must be a valid time code defined on the TimeUnits (BXPTIMEUNITS) user table.*
31	Is parallel operation		N/Y	N - No Y - Yes If left empty, the value will be 'N'.
32	Is overlapping operation		N/Y	N - No Y - Yes If left empty, the value will be 'N'.

No.	Name	Mandatory	Possible types/values	Description
33	Max Parallel Operations		Integer	
34	Overlapping Quantity		Number	
35	Allocation Window		Number	The importer converts it to a base time using Allocation Window UoM from actual row.
36	Allocation Window UoM		Text	The value must be a valid time code defined on the TimeUnits (BXPTIMEUNITS) user table.*
37	Min Job Quantity		Number	
38	Feature	✔	Text	Must be an existing work center feature.
39	Is Mandatory Work Center		N/Y	N - No Y - Yes If left empty, the system will copy the value from the manufacturing operation.
40	Preferred Work Center		Text	Must be an existing Work Center which supports selected Work Center Feature.
41	Outsourced		N/Y	N - No Y - Yes If left empty, the system will copy the value from the manufacturing operation.
42	In House Quantity		Number	
43	Outsourcing Lead Time		Number	If the Outsourced flag is set to Y, the importer converts it to a base time using Outsourcing UoM from actual row. If the Outsourced flag is set to N, this field must be empty.
44	Outsourcing UoM		Number	If the Outsourced flag is set to Y, the value must be a valid time code defined on the TimeUnits (BXPTIMEUNITS) user table.* If the Outsourced flag is set to N, this field must be empty.
45	Items per Outsourcing Unit		Number	If the Outsourced flag is set to N, this field must be empty.

* *In order to use Produmex Manufacturing integrated with Produmex WMS. the UoM must exist in the Units of Measure - Setup (OUOM) standard SBO table as well.*

If the row is an operation row, and there is a value beyond 45th column, the row is invalid. A format error message is generated, and the production order is not processed.

Supplier row type

No.	Name	Mandatory	Possible types/values	Description
1	Row type	✔	S	
2	Supplier Code	✔	Text	Must be a valid supplier code.

No.	Name	Mandatory	Possible types/values	Description
3	Planned Quantity	✔	Number	

If there is a value beyond 3th column, the row is invalid. A format error message is generated, and the production order is not processed.

Resource row type

Belongs to the previous operation. It can be used only after a row with Operation sub-type, otherwise a content error will be generated.

No.	Name	Mandatory	Possible types/values	Description
1	Row type	✔	R	
2	Resource Code	✔	Text	Must be a valid resource code.
3	Quantity	✔	Number	
4	Warehouse		Text	Must be a valid code of a warehouse.
5	Issue Method		M/B	M - Manual B - Backflush If left empty, the value wiil be 'B'.
6	Comment		Text	
7	Distribution Rule 1		Text	The Distribution rule for Dimension 1. Must be a valid identifier of a distribution rule.
8	Distribution Rule 2		Text	The Distribution rule for Dimension 2. Must be a valid identifier of a distribution rule.
9	Distribution Rule 3		Text	The Distribution rule for Dimension 3. Must be a valid identifier of a distribution rule.
10	Distribution Rule 4		Text	The Distribution rule for Dimension 4. Must be a valid identifier of a distribution rule.
11	Distribution Rule 5		Text	The Distribution rule for Dimension 5. Must be a valid identifier of a distribution rule.
12	WIP Account		Text	The internal reference of a WIP Account. The internal reference code can be found in the OACT.ACCTCODE field.

If there is a value beyond 12th column, the row is invalid. A format error message is generated, and the production order is not processed.

Text row type

No.	Name	Mandatory	Possible types/values
1	Row type	✔	T
2	Text	✔	Text

If there is a value beyond 2th column, the row is invalid. A format error message is generated, and the production order is not processed.

18.3. Validation

Before the import the system validates the import file. The validation is split into two phases.

18.3.1. Format validation

In the first phase the system checks the file for format errors.

Possible issues:

- Row type is not valid
- Row sub-type is not valid
- Mandatory field is not given
- Given value doesn't match to the type of the field (for example alphabetical character in numeric field etc.)
- Surplus value is given
- Invalid row order (for example a header row follows another header row)

18.3.2. Content validation

In the second phase the document/element is validated with the company database in order to detect content errors.

Manufacturing Operations

Possible issues:

- Invalid value when range is defined (Operation Break)
- Code cannot be found in SAP Business One (Item Group Code, Feature, Work Center)
- Invalid UoM (Operation Times, Allocation Window)
- Mandatory value is missing:
    - Mandatory Work Center is required, but Preferred Work Center is missing

Bills of Materials

Possible issues:

- Invalid value when range is defined (Issue Method, Milestone Type, Operation Break Type)
- Code cannot be found in SAP Business One (Item, Feature, Work Center, Supplier, Warehouse etc.)
- Invalid UoM (Operation Times, Allocation Window, Outsourcing)
- Rules of using Issue Method and Milestone Type are violated
- Required correspondences between rows are violated (unfinished product must precede unfinished material etc.)

- Work Center does not support the Work Center Feature
- Mandatory value is missing:
    - Mandatory Work Center is required, but Preferred Work Center is missing
    - Operation is marked as outsourced, but no valid supplier is given
- Operation is not marked as outsourced, but a supplier row is given
- Sum of planned quantities exceeds quantity in header
- SAP Business One validates the following: Distribution Rule, Distribution Rule Dimensions, Price List

Production Order

Possible issues:

- Invalid value when range is defined (Issue Method, Milestone Type, Operation Break Type)
- Code cannot be found in SAP Business One (Item, Feature, Work Center, Supplier, Warehouse, Sales order, etc.)
- Invalid UoM (Operation Times, Allocation Window, Outsourcing)
- Rules of using Issue Method and Milestone Type are violated
- Required correspondences between rows are violated (unfinished product must precede unfinished material etc.)
- Work Center does not support the Work Center Feature
- Mandatory value is missing:
    - Mandatory Work Center is required, but Preferred Work Center is missing
    - Operation is marked as outsourced, but no valid supplier is given
- Operation is not marked as outsourced, but a supplier row is given
- Sum of planned quantities exceeds quantity in header
- SAP Business One validates the following: Distribution Rule, Distribution Rule Dimensions, Price List, WIP Code, Project

19. Using SAP Time-Based Resources in Work Centers and PDC

Produmex Manufacturing is a legacy product and Boyum IT Solutions no longer sells new installations for it.

Produmex Manufacturing supports the cost calculation of SAP time-based resources the Time per Resource Unit of which is set as 1:00:00 (hour) or 00:01:00 (minute) or 00:00:01 (second). The resources can be configured in *Resource Master Data* and they are supported in work centers and in PDC.

19.1. Configuring SAP Time-based Resources

1. Run SAP B1 as administrator and start the Produmex Manufacturing add-on.

2. Make sure that you **remove SRF files** by navigating to:

Tools >Produmex Manufacturing>SRF File Management>Remove SRF Files.

3. Open *Resource Master Data* and fill in the (4) **Unit of Measure Text** and (5) **Time per Resource Units** fields, then (6) configure the **Resource Std Cost** values as follows.

4. The **Unit of Measure Text** is a text field the value of which depends on the value of the **Time per Resource Units** field. Its value can be:

- h (for hour) or
- m (for minute) or
- s (for second).

5. The value of the **Time per Resource Units** field is exactly 1 and needs to be set as follows:

- 1:00:00 (hourly based) or
- 0:01:00 (per-minute) or
- 0:00:01 (per-second).

6. Configure the **Resource Std Cost** values on the *General* tab. This way, when the resource consumption is issued to the production orders, SAP calculates the actual journal entry and its cost values.

19.2. Defining SAP Time-based Resources for Work Centers and Work Center Features

19.2.1. Work Centers

1. To define a time-based resource for a work center, open *Work Centers*.

2. Fill in the **SAP Resource** field. To provide the necessary data, you can enter the code of the resource or click on the circle in the field and you will see the available time-based resources appearing in the *List of Resources* window.

3. The *List of Resources* displays the following data:

- Resource Code
- Resource Name
- Unit of Measure: *h*, *m* or *s* (defined in *Resource Master Data*)
- Number of Resource Units: its value is always 1.
- Time Per Resource Unit: its value is displayed in seconds.

Select a time-based resource and click OK.

4. If you click on the golden arrow in the **SAP Resource** field, the *Resource Master Data* window will pop up so that you can easily check the settings of the selected resource.

19.2.2. Work Center/Resource Features

It is possible to define an SAP time-based resource for a work center feature, which means that **the selected SAP time-based resource will be defined for all the work centers belonging to the selected work center feature**.

1. To define an SAP-time based resource for a work center feature, open *Resource Features*.

2. Enter the code of the resource to the **SAP Resource** column or click on the circle in the field and you will see the available time-based resources appearing in the *List of Resources* window.

3. The *List of Resources* displays the same data as in the case of section *3.1 Work Centers*.

- Resource Code
- Resource Name
- Unit of Measure: *h*, *m* or *s* (defined in *Resource Master Data*)
- Number of Resource Units: its value is always 1.
- Time Per Resource Unit: its value is displayed in seconds.

Select a time-based resource and click OK.

4. The selected time-based resource will appear in the **SAP Resource** column. To save the changes click OK.

19.2.3. Resource Features level vs Work Center level

The selected SAP time-based resource will be the default setting for all the work centers belonging to the selected work center feature, however, it is possible to define a different SAP time-based resource for a work center belonging to this particular work center feature.

Please note that in this case the SAP time-based resource will be defined on the work center level overwriting the

previously defined default feature level.

1. Select a work center feature, then click on `Resources`.

2. In the appearing *List of Work Centers window* click on the golden arrow of the work center for which you want to define a different SAP time-based resource.

At this point the system displays the *Work Center* window where you can define a different SAP time-based resource in the SAP Resource field.

3. Enter the code of the resource or click on the circle in the field and you will see the available time-based resources appearing in the *List of Resources* window.

4. Select the resource, click `Choose` and then save the changes by clicking `Update` on the *Work Center* window.

19.3. SAP Time-based Resources and PDC

19.3.1. Configuration before using PDC

1. Please make sure that you configure SAP time-based resources to the **warehouses** used in the production order operation lines.

Example
When an operation line has B52 as warehouse in the production order line, B52 must be enabled for the resource assigned to the Work Center, which is linked to the PDC booking of the operation.

This way the system works in multi-warehouse and multi-branch systems as well since the Resource inherits the warehouse from the operation line.

If multiple work centers/operations use the same resource in a production order, PDC creates only one resource line in the production order based on the warehouse of the first operation. Any subsequent PDC bookings are applied against this resource line irrespective of the warehouses.

If you want to apply a specific warehouse for a resource, add the resource line manually to the production order upfront, via the BOM, for example, and then the system will use this particular resource line.

2. Likewise, it is very important that the **GL Account Determination** is correctly configured for SAP resources.

19.3.2. PDC Administration

PDC Administration screen can be used to redo inventory transactions to fix the errors in case it may happen during the PDC process. The user can modify the machine duration, but it does not enforce the re-execution of the resource issuing transactions. If you want to change values, it can be easily done directly in the SAP B1 Production Order screen: (partial) revoke or additional resource issue. You do not necessarily need to automate this process, you can simply use the SAP standard tools. What this integration feature does is the regular process. Whenever setup or job times (machine duration) is reported on PDC, the system automatically issues the corresponding resource quantities.

19.3.3. PDC and Production Order

Whenever a PDC booking is done, Produmex PDC Processor issues Resource consumption transaction to the production order, too, if the work center or its feature has any associated SAP resource. A PDC booking is always connected to an operation and a work center. The time value is calculated and converted to hours, minutes or seconds as defined for the resource. If the resource has not been added to the production order, PDC Processor automatically adds a resource line to the end of the production order via DI API.

As a result, the SAP resources do not have to be added to the production order upfront. Instead, **the resources are added automatically by the PDC Processor** as the workers are reporting their work hours. Whenever an issue resource transaction is automatically created by the PDC Processor, the details (work center, employee, PDC booking code, operation, date time of the finished work, duration of the job) of the corresponding PDC booking are entered into the remarks field of the transaction.

19.3.4. Selecting Co-workers in PDC

The *Selecting Co-workers* function makes it possible for employees to select co-workers in PDC to work in the same work center on the same job.

> Please note that there is **no validation** in the function, that is, the users can also select themselves as co-workers in the list and report more work hours than they have actually worked. Using a validation process is possible and recommended in the system, for example by creating customized user queries.

In case an SAP time-based resource is needed for them to perform the job (for example a machine), the cost calculation of the used resource will be based on the **total time** that the employee and the selected co-workers spend working on the job.

The function is optional and it is available in the *Production Data Collector* module where co-workers can be selected with the help of the *Co-workers* field.

In case the necessary resources (for example the co-workers and the machine) are time-based resources, make sure that you configure them in *Resource Master Data*.

Besides, it is important to configure the Maximum number of co-workers for PDC setting, otherwise the *Co-workers field* is disabled.

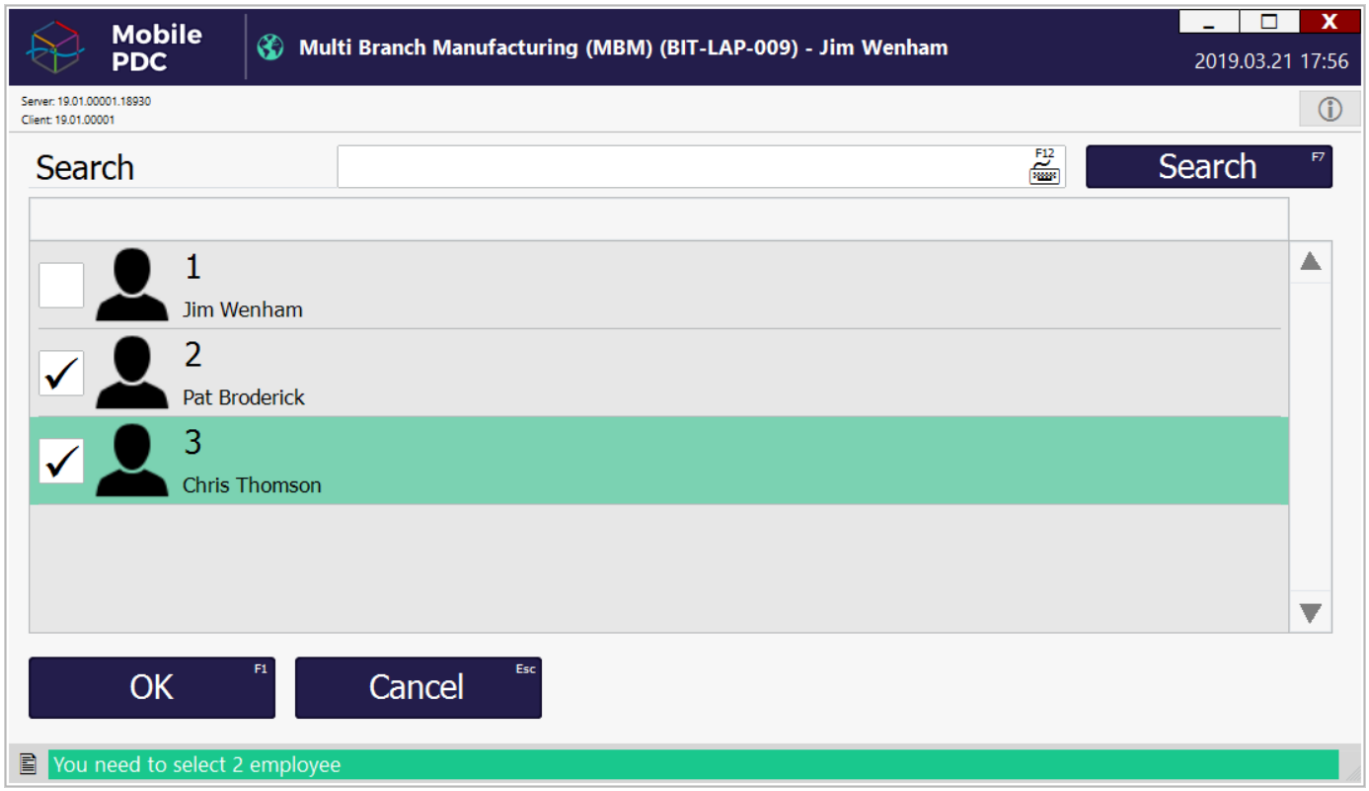
19.3.4.1. Selecting Co-workers in PDC

The following section describes the selection of co-workers step by step:

1. The number of co-workers needs to be provided in the *Co-workers* field of the *Production Data Collector* modul.

In case the provided value is higher than the maximum number of co-workers defined by the *Maximum number of co-workers for PDC* setting, the system displays the maximum number of workers and the selection of the co-workers is not allowed:

2. Upon clicking **…** or pressing F11, a list of employees is displayed and the co-workers can be selected by ticking the boxes.



3. After clicking OK, the job can be started.

Hereinafter, PDC displays the duration of the job while the *Production Order* window lists the Resources and shows the total time the employee and the co-workers have spent working on the same job with the same time-based resource. In this case the cost calculation of the used resource will be based on the total time.

Example
In this example an employee has selected 2 co-workers and now the 3 of them are working on the same job with the same time-based resource, a workbench.
The reported duration in PDC is 4 minutes, which means that so far the 3 workers has worked 12 minutes altogether.
At this point the *Production Order* shows the total time of 12 mins in the *Issued column*. When the workers finish the job, the total time in the *Issued column* will be the cost calculation base for the workbench.

19.3.4.2. Checking Co-workers

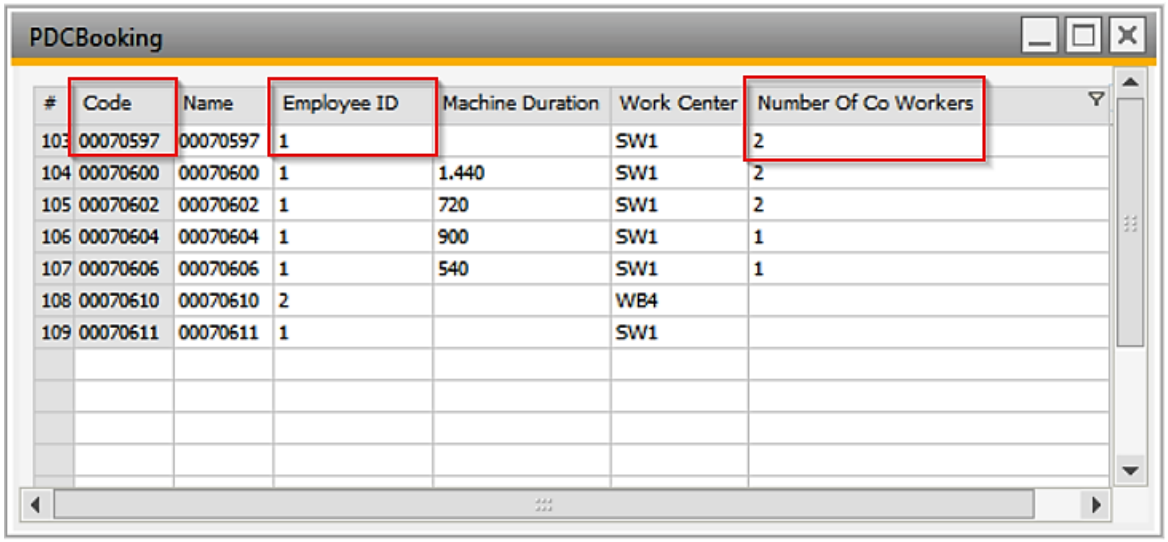
PDC and the *Production Order* window do not provide detailed information about co-workers. If information is needed, open the (1) *PDC Booking* and (2) *PDC Co-Workers* user-defined windows.

(1) **PDC Booking**

Path: Tools > User-Defined Windows > BXPPDCBOOKING / PDCBooking

In the *PDC Booking* window you can check how many employees work with the same booking code.

The *Code* column shows the booking code, the *Employee ID* column shows the employee who has started the job while the *Number of Co-workers* column displays the number of co-workers the employee has selected in PDC.



(2) **PDC Co-Workers**

Path: Tools > User-Defined Windows > BXPPDCCOWORKERS /PDCCoWorkers

In the *Number of Co-workers* window you can check the booking code and the related co-workers in the *Employee ID* column.

Example 1
In this example the *PDC Booking* window shows that altogether 3 employees work with booking code 00070597: the employee with employee ID 1 has started the job and selected 2 co-workers. The *PDC Co-Workers* window shows that the 2 co-workers working with this particular booking code are workers with employee ID 2 and 3.