

Produmex Manufacturing Functional Guide

Quick Start Tutorial

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. For more information about the installation process please see: [Installation Guide](#)

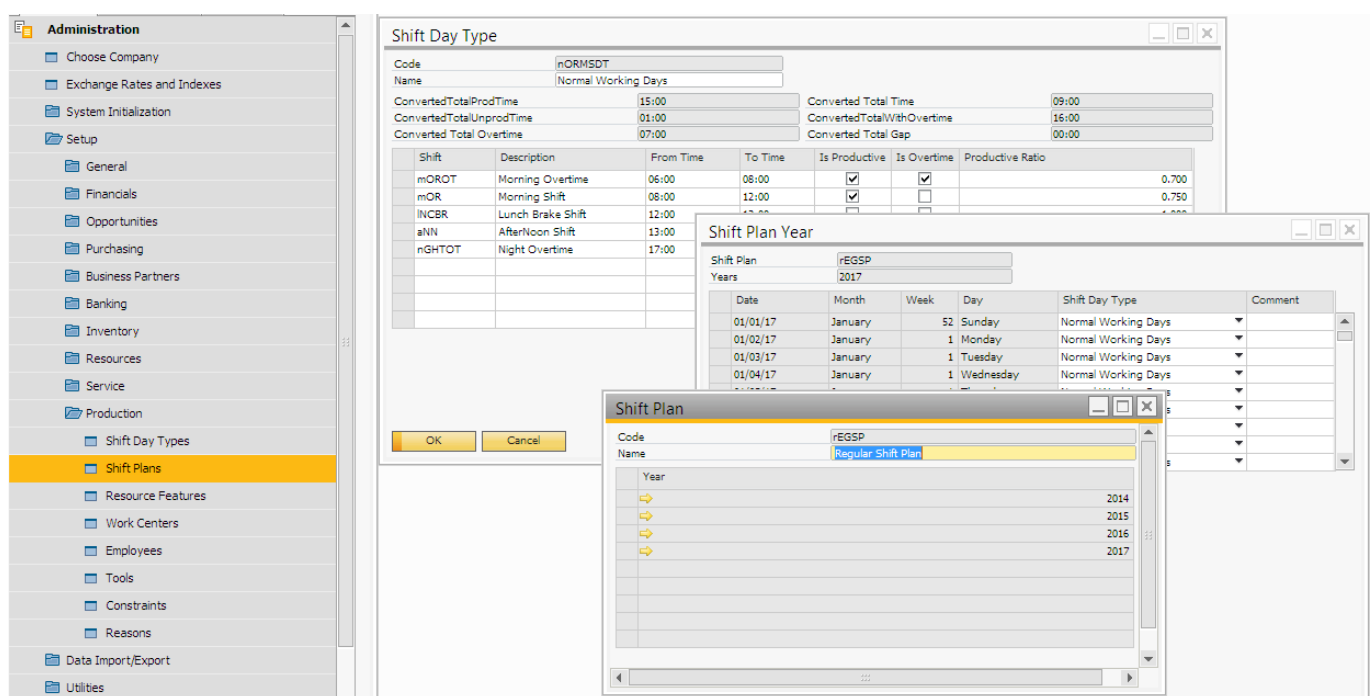
2.2. Setup initial data

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.

Code	Name	Resource Type
aSS	Assembly	Work-Center
aSSU	Assembly Unlimited	Work-Center
cRF	Constraint	Constraint
cUT	Cutting	Work-Center
dRY	Drying	Work-Center
eRF	Employee Resource Feature	Employee
pNT	Painting	Work-Center
pNTDRY	Painting and Drying	Work-Center
qUA	Quality Checking	Work-Center
TRF	Tool Resource Feature	Tool
wLD	Welding	Work-Center

Buttons: OK, Cancel, Resources, Cost Amounts

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.

Code: wPD
Name: SX Painter and Dryer Machine
Active: ☒
Unlimited: ☐

ShiftPlan: pNTSP
Profit Center:
Bin Location: 01-SYSTEM-BIN-LOCATION

Resource Features

Feature	Feature Name	Is Active	Setup Time Scale	Job Time Scale	Teardown Time Scale
dRY	Drying	<input checked="" type="checkbox"/>	1.000	1.000	1.000
pNT	Painting	<input checked="" type="checkbox"/>	1.000	1.000	1.000
pNTDRY	Painting and Drying	<input checked="" type="checkbox"/>	1.000	1.000	1.000

Buttons: OK, Cancel, Allocations

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

Administration

- Choose Company
- Exchange Rates and Indexes
- System Initialization
- Setup
 - General
 - Financials
 - Opportunities
 - Purchasing
 - Business Partners
 - Banking
 - Inventory
 - Resources
 - Service
 - Production
 - Shift Day Types
 - Shift Plans
 - Resource Features
 - Work Centers
 - Employees**
 - Tools
 - Constraints
 - Reasons
 - Data Import/Export
 - Utilities

Employee

Code: 1, Name: Doe, John, Active: ☒ ShiftPlan: rEGSP, Profit Center: , Bin Location: 01-SYSTEM-BIN-LOCATION, Employee ID: 1, Doe, John

Feature	Feature Name	Is Active	Setup Time Scale	Job Time Scale	Teardown Time Scale
eRF	Employee Resource Feature	<input checked="" type="checkbox"/>	1.000	1.000	1.000

Tool

Code: tMH, Name: Machine, Active: ☒ ShiftPlan: rEGSP, Profit Center: , Bin Location: 01-W2-W2-S2, Quantity: 2.000

Feature	Feature Name	Is Active	Setup Time Scale	Job Time Scale	Teardown Time Scale
tRF	Tool Resource Feature	<input checked="" type="checkbox"/>	0.000	0.000	0.000

Constraint

Code: cCO, Name: Constraint, Active: ☒ ShiftPlan: rEGSP, Profit Center: , Bin Location: 01-SYSTEM-BIN-LOCATION, Quantity: 1.000

Feature	Feature Name	Is Active	Setup Time Scale	Job Time Scale	Teardown Time Scale
cRF	Constraint	<input checked="" type="checkbox"/>	1.000	1.000	1.000

OK Cancel Allocations

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.

The screenshot displays two SAP Business One windows. The 'Manufacturing Operations' window shows details for an operation named 'Bike Assembly' (Operation Code: cPAS). It includes fields for time-based parameters (Before Time, Safety Time, Setup Time, Job Time, Teardown Time, After Time, Time Base) and allocation parameters (Is Outsourceable, Item Group, Operation Break, Operation Time UoM, Is Parallel Operation, Max Parallel Operations, Allocation Window, Min Job Quantity). Below this is a table for 'Resource Features' with columns for Res. Type, Feature, Feat. Name, Pref. Res., Pref. Res. Name, Is Mand. Res., Amount, Setup, Job, and Teardown. The table lists resources like Employee (eRF), Tool (tRF), and Employee Resource Feature (tMH). The 'Item Master Data' window is open for the 'Bike Assembly' item (Item No.: Manual, cPAS). It shows the item is a 'Purchased Item' and 'Inventory Item'. The 'Item Role' dropdown is set to 'Operation', which is highlighted with a red box. Other fields include Description, Foreign Name, Item Type, Item Group, UoM Group, Price List, Bar Code, Unit Price, and Primary Currency.

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.

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.

#	Row Type	R...	Type	No.	Description	Quantity	UoM N...	Warehouse	Issue Method	Milestone Type	Production Std...	Total Productio...	Price List
1	Material		Item	mM1001	Painted Bike Frame	1	pcs	01	Manual	Depends On Begin	\$ 0.00	\$ 0.00	Selling Price
2	Material		Item	m3	Chain	1	pcs	01	Manual	Depends On Begin	\$ 0.00	\$ 0.00	Selling Price
3	Material		Item	m4	Wheel	2	pcs	01	Manual	Depends On Begin	\$ 0.00	\$ 0.00	Selling Price
4	Operation		Item	cPAS	Bike Assembly	180	min	01	Backflush	Milestone	\$ 0.00	\$ 0.00	Selling Price
5	Cost		Item	cOST1	Project Manage	1		01	Backflush		\$ 0.00	\$ 0.00	Selling Price
6	Unfinished Pro...		Item	uP1001-0	Red Bike (Basic)	-1	pcs	01	Backflush	Depends On End	\$ 0.00	\$ 0.00	Selling Price
7	Unfinished Ma...		Item	uP1001-0	Red Bike (Basic)	1	pcs	01	Manual	Depends On Begin	\$ 0.00	\$ 0.00	Selling Price
8	Operation		Item	cPQA	Quality Assurance	3	min	01	Backflush	Milestone	\$ 0.00	\$ 0.00	Selling Price
9	Material		Item	m5	Bell	1	pcs	01	Manual	Depends On Begin	\$ 0.00	\$ 0.00	Selling Price
10	Material		Item	m6	Screw 8mm (N...	1	pair	01	Manual	Depends On Begin	\$ 0.00	\$ 0.00	Selling Price
11	Operation		Item	cPBI	Bell Installation	5	min	01	Backflush	Milestone	\$ 0.00	\$ 0.00	Selling Price
12	Cost		Item	cOST2	Energy	1	min	01	Backflush		\$ 0.00	\$ 0.00	Selling Price
13			Item										Price List 01

Product No. ip1001-1 Warehouse 01
 Product Description Red Bike Price List Price List 01
 BOM Type Production Distr. Rule
 Production Std Cost \$ 0.00 Project
 Planned Average Production Size 1.00

Bill of Materials (Resource List)

BiID
 Calculation Base Quantity
 Is Auto Roll No
 Milestone Type Depends On Every
 Operation Granularity 1
 Recipe Version 0
 Rejected Warehouse 01
 Timestamp

OK Cancel Product Price \$ 482.01

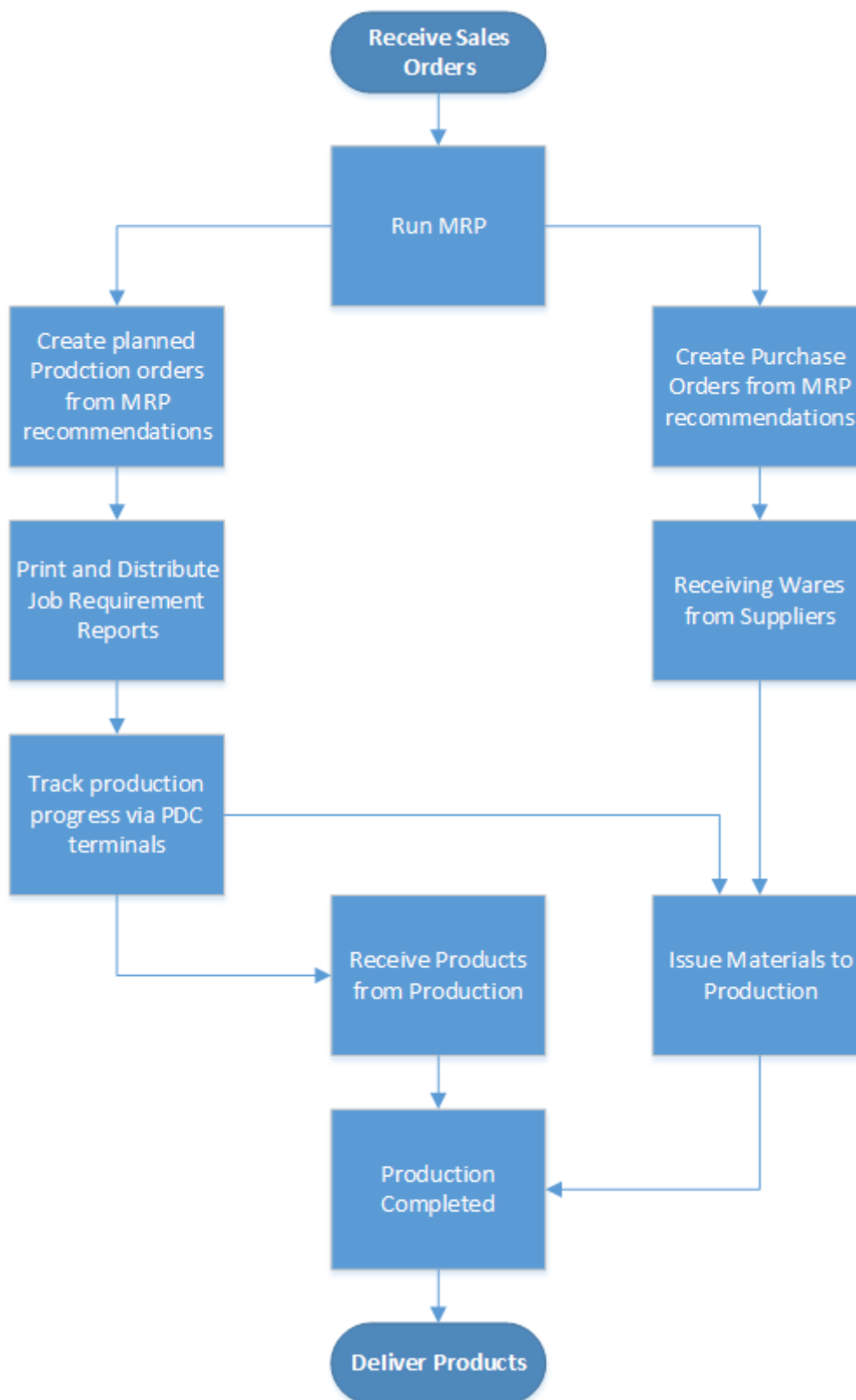
To calculate the estimated price of a product based on the Bill of Materials, configure the [Cost Calculation](#) settings.

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.

Sales Order

Customer

→ BBC

Big Bike Mart

Contact Person

Customer Ref. No.

Local Currency

No. Primary

515

Status

Open

Posting Date

02/02/17

Delivery Date

02/08/17

Document Date

02/02/17

Contents

Logistics

Accounting

Attachments

Item/Service Type

Item

Summary Type

No Summary

#	Item No.	Quantity	Unit Price	Disc...	Total (LC)	Del. Date	Delivery Time	Ready For Deliv...	Ready For De...	Manual Planning
1	→ p1001-1	10	\$ 482.01	0.000	\$ 4,820.10	02/08/17	3:30PM	02/07/17	10:00AM	No
2	→ mM1001	5	\$ 300.00	0.000	\$ 1,500.00	02/08/17	3:30PM	02/07/17	12:15PM	Yes
3				0.000		02/08/17				No

Sales Employee

-No Sales Employee-

Owner

Remarks

Total Before Discount

\$ 6,320.10

Discount

%

☐ Rounding

\$ 0.00

Tax

Total

\$ 6,320.10

MRP Date

Update

Cancel

Copy From

Copy To

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. The planning logic of Produmex Manufacturing will calculate the earliest possible date to fulfill the sales quotation.

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

The screenshot shows the 'Sales Quotation' form with the 'Sales Quotation Simulation Parameters' dialog box open. The dialog box contains the following fields and controls:

- Scenario:** SQ_20171115110405
- Run MRP now:** ☒
- Table:**

Select	MRP Scenario Code	IsMTO	Is Quotation
<input type="checkbox"/>	mrp_01011	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	MTO_20170209114711	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	MTO_20170120095819	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	MTO_20170209114711	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	MTO_20170220131541	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	SQ_20170707121902	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
- Buttons:** Calculate, Show, Cancel
- MRP Date:** A text field with a calendar icon, highlighted with a red rectangle.
- Footer:** OK, Cancel, Copy From, Copy To

The background 'Sales Quotation' form shows the following details:

- Customer:** bBC
- Name:** Big Bike Mart
- Contact Person:** Lauren
- Customer Ref. No.:**
- Local Currency:**
- No.:** Primary, 4
- Status:** Open
- Posting Date:** 11/15/17
- Valid Until:** 12/22/17
- Document Date:** 11/15/17
- Contents Tab:**

#	Item No.	Quantity	Unit Price	Discount %	Tax Code	Total (LC)	BxID	MTO Scenario	MRP Mark	Manual Pla...
1	MGB10	20	\$ 6.00	0.000	TAX	\$ 120.00			No	No
2	WBR05	40	\$ 10.00	0.000	TAX	\$ 400.00		SQ_20171115110405	Yes	No
3										
- Sales Employee:**
- Owner:**
- Remarks:**

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.

MRP Wizard - Red Bike

Documents Data Source
Define the data sources as well as the documents to include in the MRP calculation.

Time Range

☒ Within Planning Horizon
☐ Include Historical Data

Sources of Demand and Supply to Be Included in MRP Calculation

<input type="checkbox"/> Purchase Requests	<input type="checkbox"/> Restrict Purchase Requests	...
<input type="checkbox"/> Purchase Quotations	<input type="checkbox"/> Restrict Purchase Quotations	...
<input checked="" type="checkbox"/> Purchase Orders	<input type="checkbox"/> Restrict Purchase Orders	...
<input checked="" type="checkbox"/> Blanket Purchase Agreements	<input type="checkbox"/> Restrict Purchase Agreements	...
<input type="checkbox"/> Sales Quotations	<input type="checkbox"/> Restrict Sales Quotations	...
<input checked="" type="checkbox"/> Sales Orders	<input type="checkbox"/> Restrict Sales Orders	...
<input checked="" type="checkbox"/> Blanket Sales Agreements	<input type="checkbox"/> Restrict Sales Agreements	...
<input checked="" type="checkbox"/> Production Orders	<input type="checkbox"/> Restrict Production Orders	...
<input type="checkbox"/> Inventory Transfer Requests	<input type="checkbox"/> Restrict Transfer Requests	...
<input type="checkbox"/> Recurring Order Transactions		
<input type="checkbox"/> Reserve Invoices	<input type="checkbox"/> Restrict Reserve Invoices	...

Inventory Level:
Forecast:

Recommendations

☒ Purchase
☒ Purchase Requests
☐ Purchase Orders

☒ Production Orders
☐ Inventory Transfer Requests
☐ Show detailed summary report

☒ Use Produmex Manufacturing MRP

Generate to Default Warehouse for Item (selected)
Generate to Warehouse with the Demand

Save Scenario

Step 5 of 6

Cancel Back Next Run

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.

Produmex Manufacturing MRP Results for scenario Red Bike (05/31/17)

MRP Results
This window shows the results of the MRP run. Click on the buttons to see the requirements/recommendations, click on Expand all to show the results of the rows or Collapse all to show only the head rows. Enter a text into Find item field to search for an item number.

Planning horizon: **01/25/17 - 01/31/17** Period: **Day** Calculated at: **01/25/17 12:10**
Find Item: ☒ Display After MRP

Item Code	Item Description	Σ	Historic data	Past Due	1/25	1/26	1/27	1/28	1/29	1/30	1/31	2/1
▶ p1001-1	Red Bike	4					30				30	
	Initial Stock				62	59	49					29
	+ Receipts		69				30					30
	- Gross Requirement...											
	= Final Stock											
▶ mM1001	Pa											
▶ mM1101	Ra											
▶ m1	Sn											
▶ m3	Ch											
▶ m4	Wh											
▶ m5	Be											
▶ m6	Scr											

Pegging Information

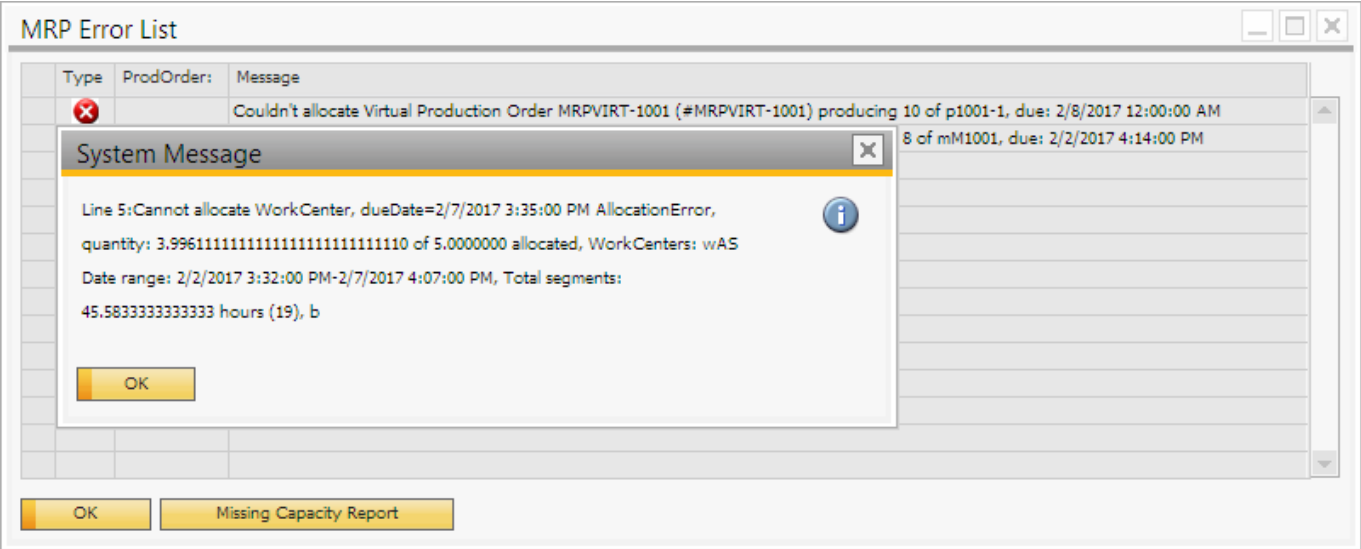
Item Code: p1001-1
Item Name: Red Bike
Period From: 01/02/01
Period To: 01/02/01

Source	Pic	Type	Due Date	Due Time	Quantity	Ware...
▶ 2		Production Order	12/23/16	00:00	30.000	01
▶ 61		Production Order	01/23/17	00:00	1.000	01
		Stock	01/25/17	12:10	38.000	01

Trace Close

Close Expand All Collapse All

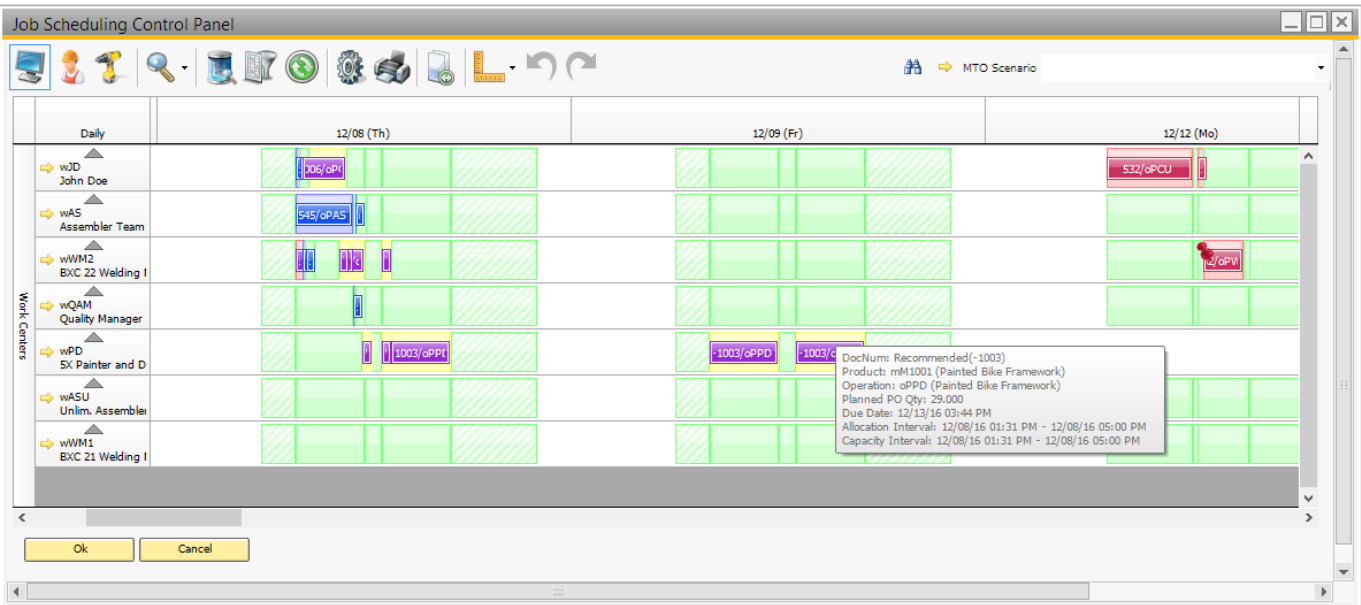
If there are requirements that cannot be fulfilled on time, a list of error is displayed after MRP has completed running. In many cases the reason of the error is that the MRP cannot find available capacity for the operation of a production order recommendation. Click on the red x to see the detailed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

The screenshot shows the 'Sales Order' window with a right-click context menu open over the top order line. The menu includes options like 'Cancel', 'Close', 'Duplicate', 'Row Details...', 'New Activity', 'Payment Means...', 'Calculate Sales Order', 'Gross Profit...', 'Volume and Weight Calculation...', 'Opening and Closing Remarks', 'Transfer Request', 'Item Transfer', 'Generate Pick List', 'View Pick Lists', 'Related Activities', 'Related Down Payment Transactions', 'Related Opportunities', 'Relationship Map...', and 'MTO Planning' (which is highlighted). The background shows the 'General' tab of the Sales Order form with fields for Customer (BBC), Name (Big Bike Mart), No. (515), Status (Open), Posting Date (02/02/17), Delivery Date (02/08/17), and Document Date (02/02/17). A summary table shows a total of \$4,820.10.

Disc...	Tax C...	Total (LC)	Del. Date
01	0.000	\$ 4,820.10	02/08/17
	0.000		02/08/17

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 Order Mu	MRP	MRP Lead Time
<input type="checkbox"/>	Production Order	p1001-1	Red Bike	10	Manual	pcs	Make	10.000	5.000	
<input type="checkbox"/>	Production Order	p1001-1	Red Bike	10	Manual	pcs	Make	10.000	5.000	
<input type="checkbox"/>	Production Order	mM1001	Painted Bike Frame	10	Manual	pcs	Make	1.000	5.000	
<input type="checkbox"/>	Production Order	mM1001	Painted Bike Frame	10	Manual	pcs	Make	1.000	5.000	
<input type="checkbox"/>	Production Order	mM1101	Raw Bike Framework	10	Manual	pcs	Make	1.000	5.000	
<input type="checkbox"/>	Production Order	mM1101	Raw Bike Framework	10	Manual	pcs	Make	1.000	5.000	
<input type="checkbox"/>	Purchase Request	m3	Chain	20	Manual	pcs	Buy	5.000	5.000	2
<input type="checkbox"/>	Purchase Request	m4	Wheel	40	Manual	pcs	Buy	2.000	10.000	2
<input type="checkbox"/>	Purchase Request	m5	Bell	15	Manual	pcs	Buy	5.000	5.000	3
<input type="checkbox"/>	Purchase Request	m5	Bell	5	Manual	pcs	Buy	5.000	5.000	3
<input type="checkbox"/>	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.

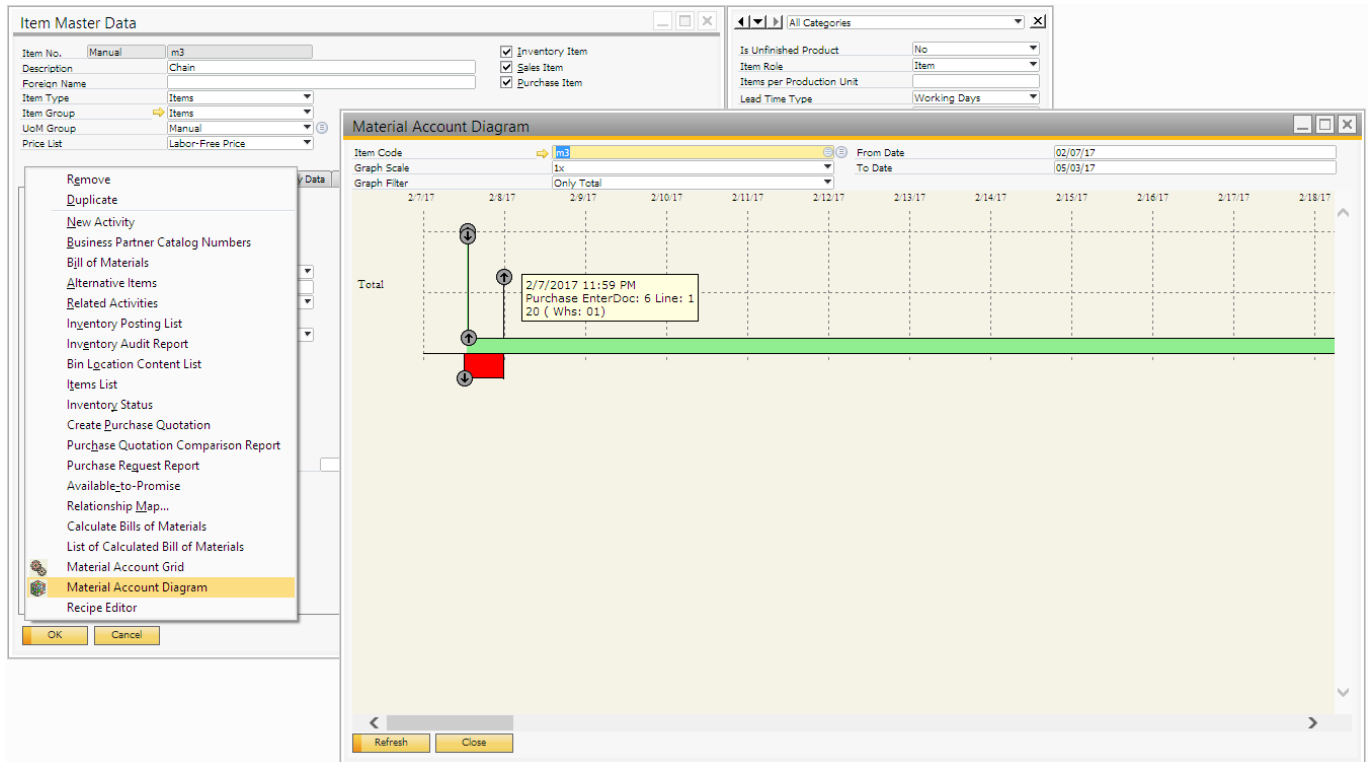
For planned production orders only temporary allocations are made. Permanent allocations will only be created after the production order has been released.

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.



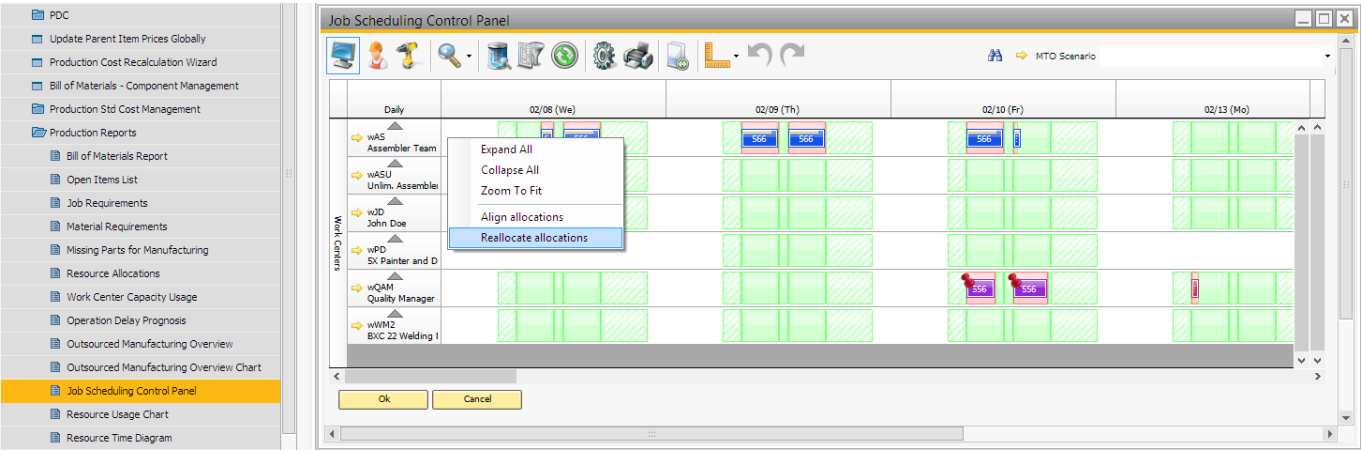
When the mouse cursor is moved over the circled arrow icons, a bubble shows details about that transaction; if the icon is clicked the appropriate production, purchase, etc. order form is opened. The up arrow shows incoming, the down arrow outgoing inventory transactions.

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

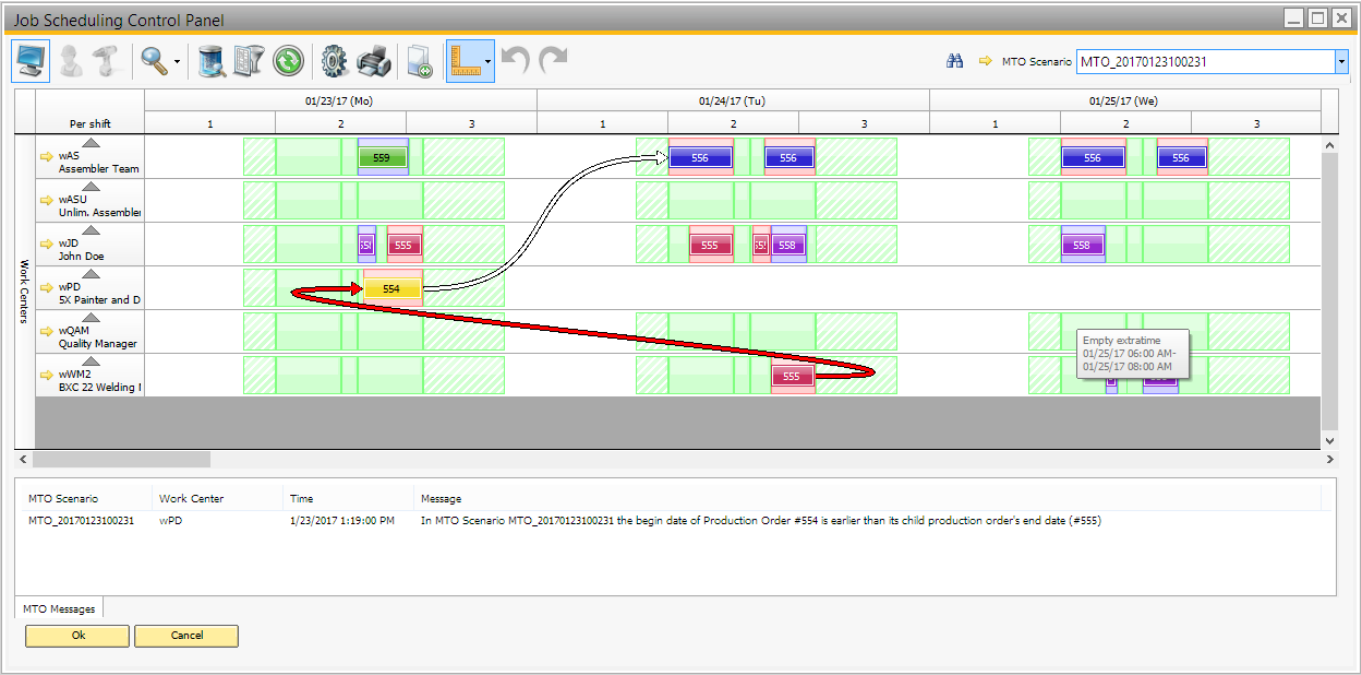
3.5. Manage scheduling

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.

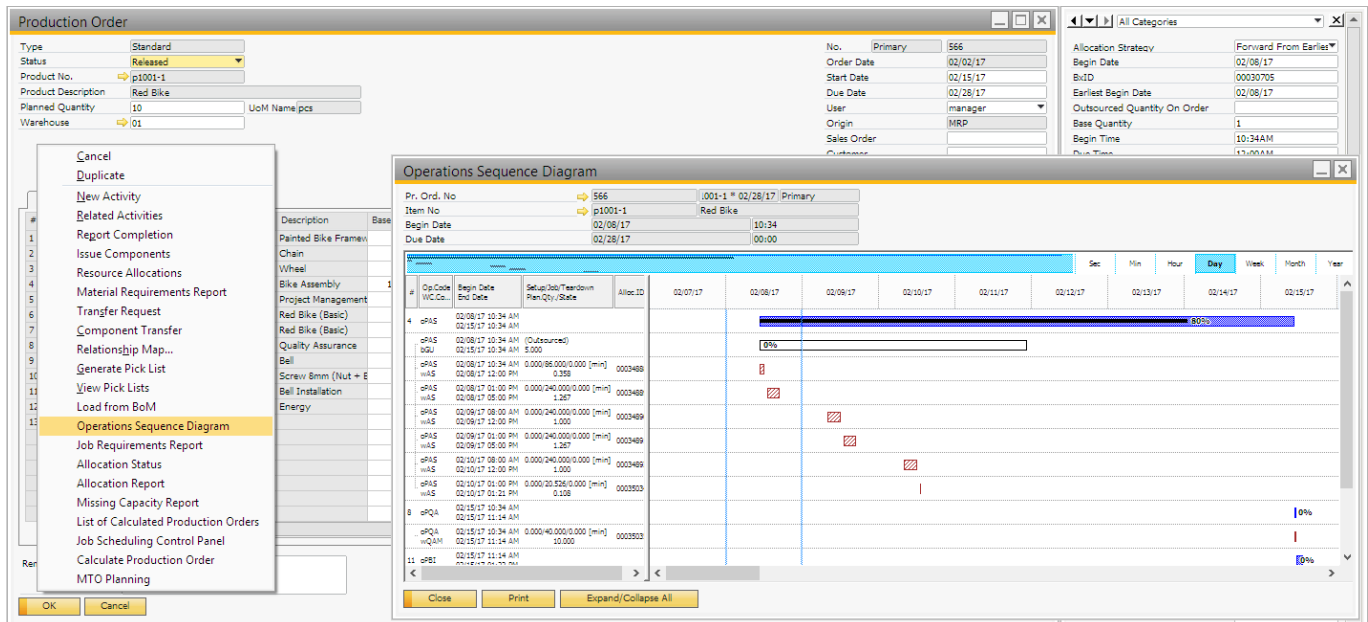
On the [Job Scheduling Control Panel](#) not just the allocations for recommendations but the simulated allocations for planned production orders and the temporarily allocations for released orders can be monitored. To reschedule an operation, simply drag it and replace it on a free slot. To reschedule 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.



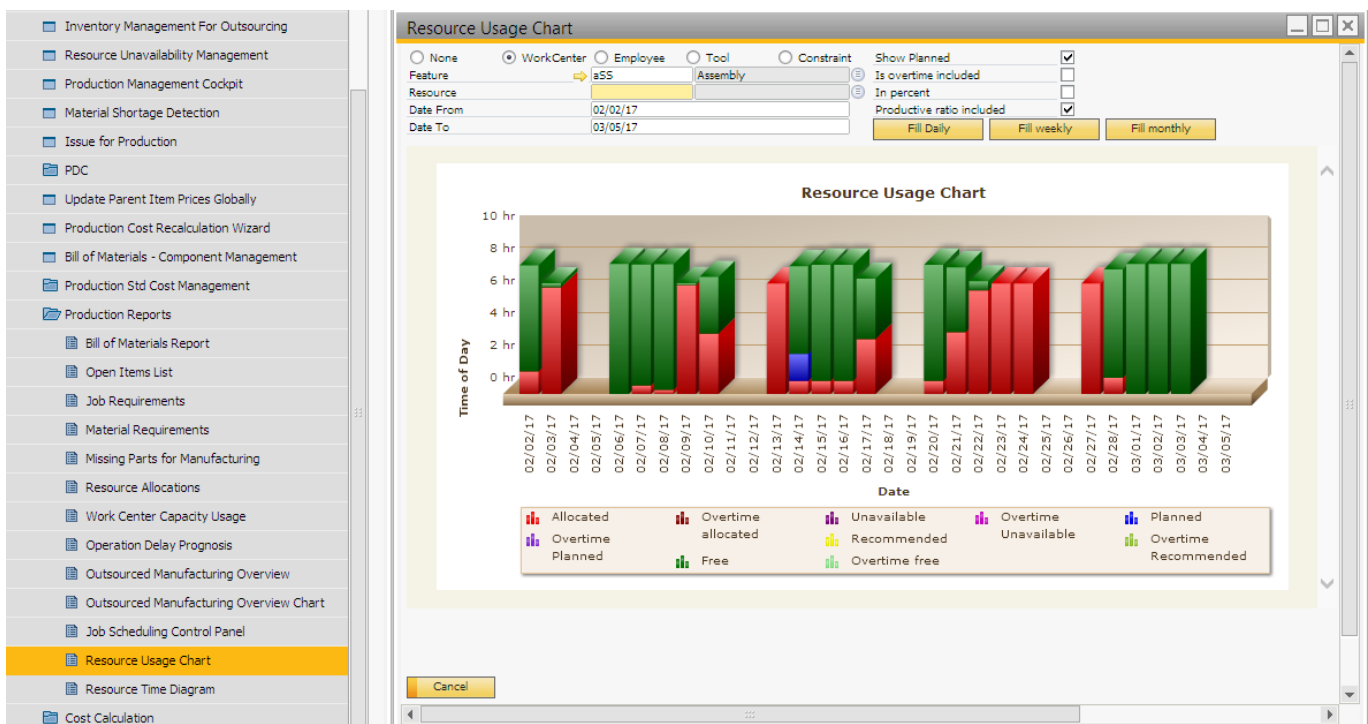
To review the operation sequence of only one production order, open the Operation sequence diagram from the right-click menu of the order. On the diagram resource allocation are displayed in separate lines with the completion percentage.



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.

Work Center Capacity Usage

Work Center: wAS Assembler Team
 Feature:
 Productive: Yes
 Overtime: Both
 Date From: 02/08/17
 Date To: 02/10/17
 Capacity UoM: min
 Period: Day
 Show Shifts: ☒

Resource	Work Center Name	Shift	Shift Description	From Date	To Date	Total Capacity	Allocated Capacity	Productive Ratio	Allo...
wAS	Assembler Team	mOROT	Morning Overtime	02/08/17	02/08/17	120.000	0.000	0.700	
wAS	Assembler Team	mOR	Morning Shift	02/08/17	02/08/17	154.000	0.000	0.750	
wAS	Assembler Team	mOR	Morning Shift	02/08/17	02/08/17	86.000	86.000	0.750	
wAS	Assembler Team	aNN	Afternoon Shift	02/08/17	02/08/17	240.000	240.000	0.950	
wAS	Assembler Team	nGHTOT	Night Overtime	02/08/17	02/08/17	300.000	0.000	0.600	
wAS	Assembler Team	mOROT	Morning Overtime	02/09/17	02/09/17	120.000	0.000	0.700	
wAS	Assembler Team	mOR	Morning Shift	02/09/17	02/09/17	240.000	240.000	0.750	
wAS	Assembler Team	aNN	Afternoon Shift	02/09/17	02/09/17	240.000	240.000	0.950	
wAS	Assembler Team	nGHTOT	Night Overtime	02/09/17	02/09/17	300.000	0.000	0.600	
wAS	Assembler Team	mOROT	Morning Overtime	02/10/17	02/10/17	120.000	0.000	0.700	
wAS	Assembler Team	mOR	Morning Shift	02/10/17	02/10/17	240.000	240.000	0.750	
wAS	Assembler Team	aNN	Afternoon Shift	02/10/17	02/10/17	21.000	21.000	0.950	
wAS	Assembler Team	aNN	Afternoon Shift	02/10/17	02/10/17	219.000	0.000	0.950	
wAS	Assembler Team	nGHTOT	Night Overtime	02/10/17	02/10/17	300.000	0.000	0.600	

Allocation Rate: 39.519
 Refresh Cancel

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](#)

Production Order Operation Details - [DocNum: 569, Line: 9]

Operation Code: cPAS
 Operation Name: Bike Assembly
 Before Time: 0.000 min
 Safety Time: 0.000 min
 Setup Time: 0.000 min
 Job Time: 180.000 min
 Teardown Time: 0.000 min
 After Time: 0.000 min
 Time Base: 1.000
 Planned Quantity: 5.000
 Completed Quantity: 0.000
 Rejected Quantity: 0.000

Operation Break: Allowed
 Operation Time UoM: Minutes
 Is Parallel Operation: ☐
 Is Overlapping Operation: ☐
 Max Parallel Operations: 0
 Overlapping Quantity: 0.000
 Allocation Window: 0.000
 Min Job Quantity: 0.000
 Message:
 Is Pinned: ☐
 Pinned Start Date:
 Pinned Start Time: 00:00

Outsourcing

Is Outsourced: ☒
 Outsourcing Lead Time: 0 Days
 In House Quantity: 2.500
 Outsourcing UoM:
 Items Per Outsourcing Unit: 1.000
 In House Ratio: 0.500

New Purchase Order
New Purchase Quotation

Supplier Code	Supplier Name	Planned Qty.	Supp. Ratio	Quantity To Order	Qty. On Order	Qty. Received	Quantity Quoted
bGU	Bike Gurus	2.500	0.500	0.00	2.500	0.000	0.000

Document Type	Pu.Ord.No	Pu.Ord.ID	Pu.Quot.No	Pu.Quot.ID	Supplier	Supplier Name	Qty. On Order	Qty. Received	Pu.Ord. Due Date	Purchase OrderID	Pu.Ord.Canceled	Pu.Or...
Purchase Order	506	7			bGU	Bike Gurus	2.500	0.000	02/08/17	00034025	<input type="checkbox"/>	Open

OK Cancel Allocations

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](#).

Operation: oPAS - Bike Assembly		Operation ID: 00030709
Work Center: OP: oPAS	Begin Date&Time: 02/08/17 10:34 AM	Production Order: 566 / 4
	Before Time: 0.00 [min]	Product Code: p1001-1 - Red Bike
	After Time: 0.00 [min]	
	mM1001 Painted Bike Framework	10.00
	00030706	
	m3 Chain	10.00
	00030707	
	m4 Wheel	20.00
	00030708	
	Work Center: wAS - Assembler Team	
		67-3
Start Date&Time: 02/08/17 10:34 AM		End Date&Time: 02/08/17 12:00 PM
Setup Time: 0.00 [min]		Teardown Time: 0.00 [min]
Quantity: 0.36		Identification Code: 67-3-wAS
Job Time: 86.00 [min]		Total Duration: 86.00 [min]
Feature: aSS - Assembly		

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.

Mobile PDC TEST_WMSMF 12/20/16 10:18 AM

Server: 17.05.31007.18920 Client: 17.05.31007

Personal Time Management (00:29)

Employee: John Doe

History: Login (, 12/20/16 10:17 AM)

Reason: LB (Lunch Break)

Buttons: Login (F1), Logout (F2), Log (F3), Main Menu (Esc)

On the [office module of PTM](#) monthly and ad-hoc attendance reports can be generated.

Attendance Time Account Report

Employee: 2 Morrison, Fred Date From: 01/01/17

EmployeeID	Employee Name	Attendance Plan	Total Planned	Total Actual	Total Calculated	Total Difference	Day	Date	State	Plan In	Plan Out	Plan Break	Plan Duration
2	Morrison, Fred		135:00	60:16	60:16	-74:44	Su	01/01/17	Weekend				
							Mo	01/02/17					
							Tu	01/03/17					
							We	01/04/17					
		nORMSDT					Th	01/05/17		06:00	22:00	01:00	15:00
		nORMSDT					Fr	01/06/17		06:00	22:00	01:00	15:00
							Sa	01/07/17	Weekend				
							Su	01/08/17	Weekend				
							Mo	01/09/17					
							Tu	01/10/17					
							We	01/11/17					
		nORMSDT					Th	01/12/17		06:00	22:00	01:00	15:00
		nORMSDT					Fr	01/13/17		06:00	22:00	01:00	15:00
							Sa	01/14/17	Weekend				
							Su	01/15/17	Weekend				
							Mo	01/16/17					
							Tu	01/17/17					
							We	01/18/17					
		nORMSDT					Th	01/19/17		06:00	22:00	01:00	15:00
		nORMSDT					Fr	01/20/17		06:00	22:00	01:00	15:00
							Sa	01/21/17	Weekend				
							Su	01/22/17	Weekend				

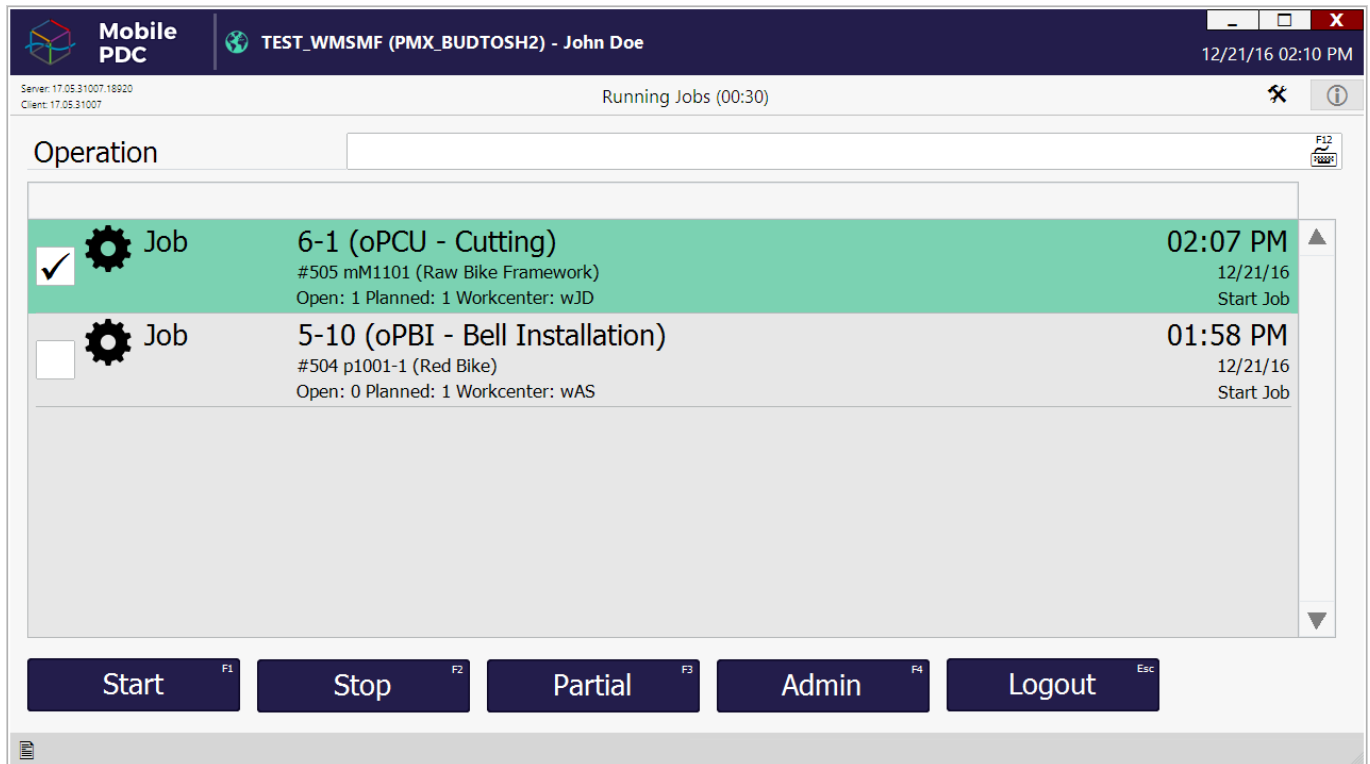
Buttons: Refresh, Cancel

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.

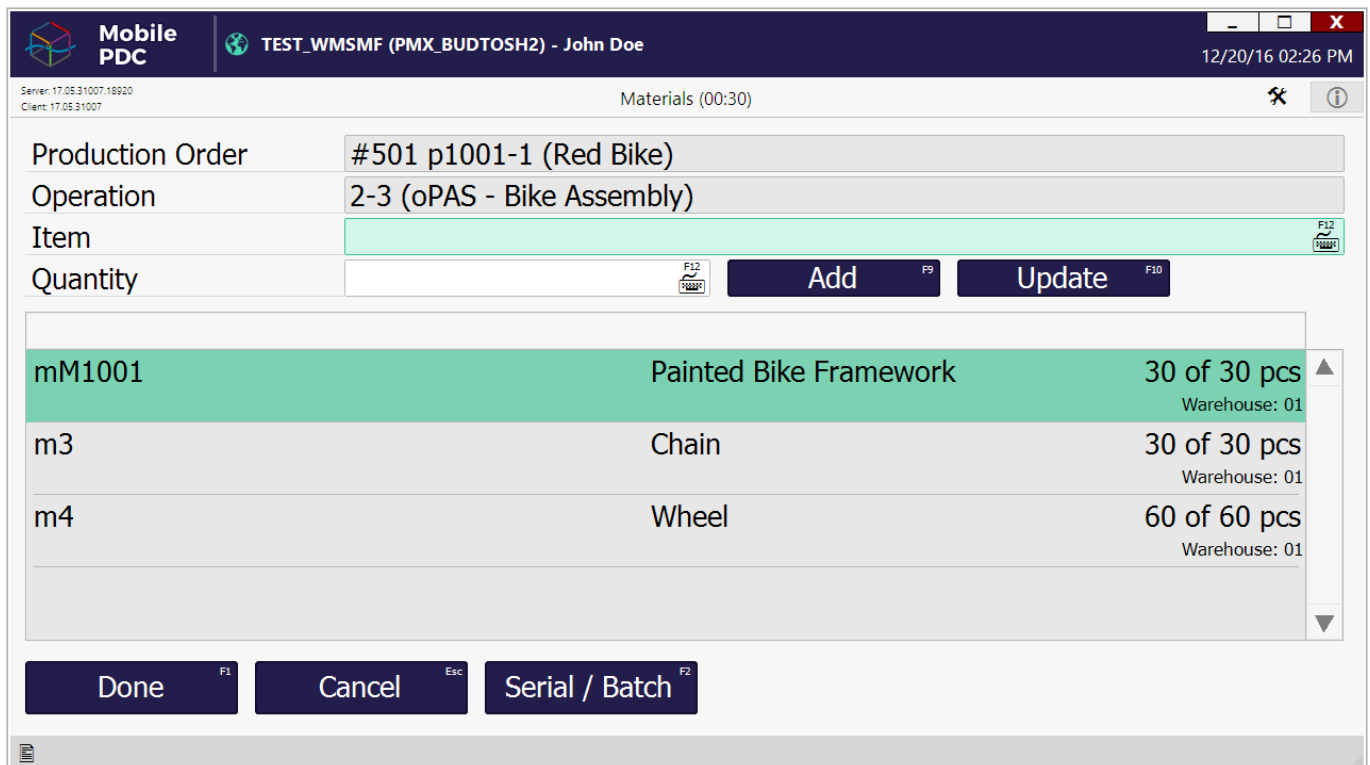


The screenshot shows the 'Running Jobs' screen in the Mobile PDC application. The header includes the Mobile PDC logo, user 'TEST_WMSMF (PMX_BUDTOSH2) - John Doe', and the date '12/21/16 02:10 PM'. The server/client information is 'Server: 17.05.31007.18920' and 'Client: 17.05.31007'. The title bar says 'Running Jobs (00:30)'. Below the title bar is a search bar labeled 'Operation'. The main area displays a list of jobs:

Job	Description	Time
<input checked="" type="checkbox"/> Job	6-1 (oPCU - Cutting) #505 mM1101 (Raw Bike Framework) Open: 1 Planned: 1 Workcenter: wJD	02:07 PM 12/21/16 Start Job
<input type="checkbox"/> Job	5-10 (oPBI - Bell Installation) #504 p1001-1 (Red Bike) Open: 0 Planned: 1 Workcenter: wAS	01:58 PM 12/21/16 Start Job

At the bottom, there are five buttons: 'Start' (F1), 'Stop' (F2), 'Partial' (F3), 'Admin' (F4), and 'Logout' (Esc).

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.



The screenshot shows the 'Materials' screen in the Mobile PDC application. The header includes the Mobile PDC logo, user 'TEST_WMSMF (PMX_BUDTOSH2) - John Doe', and the date '12/20/16 02:26 PM'. The server/client information is 'Server: 17.05.31007.18920' and 'Client: 17.05.31007'. The title bar says 'Materials (00:30)'. Below the title bar is a search bar labeled 'Production Order'. The main area displays a list of materials:

Production Order	Operation	Item	Quantity
#501 p1001-1 (Red Bike)	2-3 (oPAS - Bike Assembly)		
mM1001	Painted Bike Framework	30 of 30 pcs	Warehouse: 01
m3	Chain	30 of 30 pcs	Warehouse: 01
m4	Wheel	60 of 60 pcs	Warehouse: 01

At the bottom, there are three buttons: 'Done' (F1), 'Cancel' (Esc), and 'Serial / Batch' (F2).

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

TEST_WMSMF (PMX_BUDTOSH2) - John Doe

Server: 17.05.31007.18920
Client: 17.05.31007

12/22/16 03:47 PM

Workcenter Ticket Entry (00:30)

Information

John Doe - 12/22/16 03:46 PM

Work Center

wPD (5X Painter and Dryer Machine)

Comment

Entry Type

Accident

BearningFailure

Cancel

Done

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

PDC Bookings Administration

Employee ID

Pr. Ord. No From

Date, Time From

01/03/17

Identification Code

Pr. Ord. No To

Date, Time To

Work Center

Pr. Ord. Op. ID From

Errors Only

Operation Code

Pr. Ord. Op. ID To

Hide Undone

Item Code

Code	Posting Code	Posting Date	Posting Time	Inv. Proc. State	Inv. Proc. Error	Inv. Proc. Date	Inv. Proc. Time	Compl. Qty.	Rej. Qty.	Mach. Duration	Pers. Duration	Main Product Code	Pr-Ord.No	Pr-Ord-Op-ID	Emp. ID	Emp. N...
00013725	Start Job	01/03/17	16:29	Processed		01/03/17	16:29	0.000	0.000	0.000	0.000	mM2001	529	00013681	1	Doe, John
00013726	Completed Job	01/03/17	16:36	Processed		01/03/17	16:39	1.000	0.000	180.000	180.000	mM	529	00013678	1	Doe, John
00013727	Start Job	01/04/17	10:38	Processed		01/04/17	10:38	0.000	0.000	0.000	0.000	Item01	520	00012009	1	Doe, John
00013728	Completed Job	01/04/17	10:39	Processed		01/04/17	10:39	0.000	0.000	1.000	1.000	Item01	520	00012009	1	Doe, John
00013789	Start Setup	01/04/17	10:40	Processed		01/04/17	10:44	0.000	0.000	0.000	0.000	Item01	530	00013732	1	Doe, John
00013790	Completed Setup	01/04/17	10:45	Processed		01/04/17	10:45	0.000	0.000	5.000	5.000	Item01	530	00013732	1	Doe, John
00013791	Start Job	01/04/17	10:46	Processed		01/04/17	10:46	0.000	0.000	0.000	0.000	Item01	530	00013732	1	Doe, John
00013792	Problem	01/04/17	11:03	Processed		01/04/17	11:04	0.000	0.000	0.000	0.000	Item01	530	00013732	1	Doe, John

Mat.ID

Mat.Code

Mat.Name

Mat.Type

Used Qty.

Bin Location Name

00012074	mM2001	Painted Bike Framework	Material	1.000	01-W2-V12-S1
----------	--------	------------------------	----------	-------	--------------

Op-Prod.ID

Prod. Code

Prod. Name

Prod. Type

Compl. Qty.

Rej. Qty.

Bin Location Name

00012072	m4	Wheel	Main Product	1.000	0.000	01-SYSTEM-BIN-LOCATION
00012077	m1	Sm Steel Pipe	By-Product	2.000	0.000	
00012078	m3	Chain	By-Product	1.000	0.000	

Parameter Name

Name

Parameter Value

Comment

Related

Radio Inv. Tr.

Modify

Set to Unprocessed

Undo

Close

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.

PDC Bookings Office Terminal												
Auto-Update Rows												
Insert	Emp. ID	Emp. Name	Alloc. Code	Posting Date	Posting Time	Posting Code	Reason Name	Compl. Qty.	Rej. Qty.	Mach. Duration	Pers. Duration	Time UoM
<input type="checkbox"/>	1	Doe, John	00034888	02/08/17	12:45	Partial Setup		0.000	0.000	10.000	10.000	min
<input type="checkbox"/>	2	Morrison, Fred	00034889	02/08/17	13:01	Completed Job		2.000	0.000	20.000	17.000	min
<input type="checkbox"/>								0.000	0.000	0.000	0.000	

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.

Mobile PDC

TEST_WMSMF (PMX_BUDTOSH2) - John Doe

12/22/16 01:07 PM

Server: 17.05.31007.18920
Client: 17.05.31007

Check Results (00:30)

Operation
12-10 (oPBI - Bell Installation - 511)

Work Center
wAS (Assembler Team)

Employee
2 (Fred Morrison)

Quantity
0/0/0

0 IsApproved	Y (OK)
0 WeldThickness	40
0 SurfaceQuality	5
0 ApprovalComment	Approved

Checked Quantity

Set Value F1

Good F2

Rejected F3

Repairable F4

Cancel Esc

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.

Produmex Manufacturing Settings

General SQL Logs Reports MRP PDC Prod.Order Master Data MTO Thin Client Thin Client 2 Food Scheduled Real

Worker can modify bookings ☐

Approver can modify bookings ☐

Global idle timeout (seconds) 0

Global screen timeout (seconds) 0

Employee approver role Approver

Employee Workshop Monitor Role Workshop Monitor

Employee Quality Control Role QC Inspector

Workcenter Admin Role

Enable PDC

Enable PTM

Enable QC

Enable Workshop Monitor

Enable Workcenter Journal

Enable Workcenter Tickets

Enable Legacy Mode in PDC

Pre-fill planned material quantities

Pre-fill planned by-product quantities

Pre-fill the bin locations quantities with available quantities

Skip material quantities screen

Skip by-product quantities screen

Skip material serial/batch quantities screen

Skip product serial/batch quantities screen

Logout after PDC bookings

Enable Partial Book & Stay

Can insert new materials into production orders

Login Is Password Protected

Only Job Bookings On Running Jobs Screen

Force enter product serial/batch numbers and quantities

Update Cancel

Employee Master Data

First Name John Employee No. 1

Middle Name Ext. Employee No. JD

Surname Doe ☒ Active Employee

Job Title

Position

Department

Branch

Manager

User Code

Sales Employee -No Sales Employ

Cost Centre

Office Phone

Ext.

Mobile Phone

Pager

Home Phone

Fax

E-Mail

Linked Supplier

Address Membership Administration Personal Finance Remarks Attachments

Roles

#	Role
1	Approver
2	QC Inspector
3	Workshop Monitor
4	

Set Role as Default

Teams

#	Team	Team Role
1		Member

Update Cancel

Operations

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.

Res. Type	Feature	Feat. Name	Pref. Res.	Pref. Res. Name	Is Mand. Res.	Amount	Setup	Job	Teardown
Employee	eRF	Employee resource feature			<input type="checkbox"/>	1.000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Tool	tRF	Tool resource feature			<input type="checkbox"/>	1.000	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

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.

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.

Additional fields on the header:

- 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

Please see: 'Manufacturing Operations'

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-outsourcable 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. Enter the card code of the supplier to the supplier code cell. The '*Supplier Name*' will be automatically filled. On the '*Planned Quantity*' cell define 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.

The screenshot shows the 'BoM Operation Details' window with the following fields and tabs:

Operation Code	oPPD	Operation Break	Allowed
Operation Name	Painting and Drying	Operation Time UoM	Minutes
Main Product Code	mM1001	Is Parallel Operation	<input type="checkbox"/>
Main Product Name	Painted Bike Framework	Is Overlapping Operation	<input type="checkbox"/>
Before Time	min 0.000	Max Parallel Operations	0
Safety Time	min 0.000	Overlapping Quantity	0.000
Setup Time	min 5.000	Allocation Window	▼ 0.000
Job Time	min 20.000	Min Job Quantity	0.000
Teardown Time	min 5.000		
After Time	min 400.000		
Time Base	1.000		

Tabs: Resource Requirements, Outsourcing, Documentation, Cost Amounts, Parameters

Buttons: Update, Cancel

Cost Amounts

Please see: 'Manufacturing Operations'

Parameters

Please see: 'Manufacturing Operations'

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.

Additional fields on the 'Production Order Operation Details' form:

- 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

Please see: 'Manufacturing Operations'

Dates

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

Outsourcing

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.

Booked Completed Quantity: The total booked quantity.

Booked Rejected Quantity: The total rejected quantity.

Production Order Operation Details - [DocNum: 529, Line: 1]

Code	00013681	Operation Break	Allowed
Operation Code	oPPD	Operation Time UoM	Minutes
Operation Name	Painting and Drying	Is Parallel Operation	<input type="checkbox"/>
Before Time	min 0.000	Is Overlapping Operation	<input type="checkbox"/>
Safety Time	min 0.000	Max Parallel Operations	0
Setup Time	min 5.000	Overlapping Quantity	0.000
Job Time	min 20.000	Allocation Window	0.000
Teardown Time	min 5.000	Min Job Quantity	0.000
After Time	min 400.000	Message	
Time Base	1.000	Is Pinned	<input type="checkbox"/>
Planned Quantity	2.000	Pinned Start Date	
Completed Quantity	2.000	Pinned Start Time	00:00
Rejected Quantity	2.000		

Resource Requirements | Dates | Outsourcing | PDC Bookings | Documentation | Cost Amounts | Parameters

Time UoM	Minutes	Open Job	13.333
Booked Job	40.000	Open Setup	5.000
Booked Setup	0.000	Open Teardown	5.000
Booked Teardown	0.000	Planned Job	53.333
State	Created	Planned Setup	5.000
Booked Completed Quantity	1.000	Planned Teardown	5.000
Booked Rejected Quantity	1.000		

Posting Date	Posting Time	Posting Code	Compl. Qty.	Rej. Qty.	Mach. Duration	Pers. Duration	Emp. ID	Emp. Name	Reason ...
01/03/17	10:12	Start Setup	0.000	0.000	0.000	0.000	1	Doe, John	
01/03/17	10:17	Completed Setup	0.000	0.000	0.000	0.000	1	Doe, John	
01/03/17	10:17	Start Job	0.000	0.000	0.000	0.000	1	Doe, John	
01/03/17	10:57	Completed Job	1.000	1.000	40.000	40.000	1	Doe, John	

OK Cancel Allocations

On the grid booking entries are listed.

Documentation

Please see: 'BOM Operation Details'

Cost Amounts

Please see: 'Manufacturing Operations'

Parameters tab

Please see: 'Manufacturing Operations'

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 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](#)

Shift	Description	From Time	To Time	Is Productive	Is Overtime	Productive Ratio
mOROT	Morning Overtime	06:00	08:00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0.700
mOR	Morning Shift	08:00	12:00	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0.750
lNCBR	Lunch Brake Shift	12:00	13:00	<input type="checkbox"/>	<input type="checkbox"/>	1.000
aNN	Afternoon Shift	13:00	17:00	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0.950
nGHTOT	Night Overtime	17:00	22:00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0.600

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.

The screenshot displays the 'Shift Plan' and 'Shift Plan Year' forms within the Produmex Manufacturing Functional Guide. The left sidebar shows the 'Administration' menu with 'Shift Plans' highlighted. The main window shows the 'Shift Plan' form with the following data:

Date	Month	Week	Day	Shift Day Type	Comment
01/01/17	January	52	Sunday		
01/02/17	January	1	Monday		
01/03/17	January	1	Tuesday		
01/04/17	January	1	Wednesday		
01/05/17	January	1	Thursday	Normal Working Days	
01/06/17	January	1	Friday	Normal Working Days	
01/07/17	January	1	Saturday		

The 'Shift Plan' form also shows the following data:

Code	Name
pNTSP	Painting Shift Plan

The 'Shift Plan Year' form shows the following data:

Year
2014
2015
2016
2017

The 'Shift Plan' form has buttons for 'OK', 'Cancel', and 'Add New Year'. The 'Shift Plan Year' form has buttons for 'OK', 'Cancel', and 'Parameters'.

3. Work Center/Resource Features

Define the work center features on this form. A feature is a kind of capability a work center has. A feature is used by the resource scheduling logic to find the appropriate resource for a manufacturing operation. Add the feature code and description to the grid.

Code	Name
aSS	Assembly
aSSU	Assembly Unlimited
cRF	Constraint
cUT	Cutting
dRY	Drying
eRF	Employee Resource Feature
pNT	Painting
pNTDRY	Painting and Drying
qUA	Quality Checking
tRF	Tool Resource Feature
wLD	Welding

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.

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 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.

Define the available shifts/capacity slots for the work center by selecting a Shift Plan for it. The selected bin location will be the default bin for material issues and product receipts during PDC bookings. Defining a profit center for the work center is optional.

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.

Feature	Feature Name	Is Active	Setup Time Scale	Job Time Scale	Teardown Time Scale
dRY	Drying	<input checked="" type="checkbox"/>	1.000	1.000	1.000
pNT	Painting	<input checked="" type="checkbox"/>	1.000	1.000	1.000
pNTDRY	Painting and Drying	<input checked="" type="checkbox"/>	1.000	1.000	1.000

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.

Feature	Feature Name	Is Active	Setup Time Scale	Job Time Scale	Teardown Time Scale
eRF	Employee Resource Feature	<input checked="" type="checkbox"/>	1.000	1.000	1.000

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.

Feature	Feature Name	Is Active	Setup Time Scale	Job Time Scale	Teardown Time Scale
tRF	Tool Resource Feature	<input checked="" type="checkbox"/>	0.000	0.000	0.000

4.4. Constraints

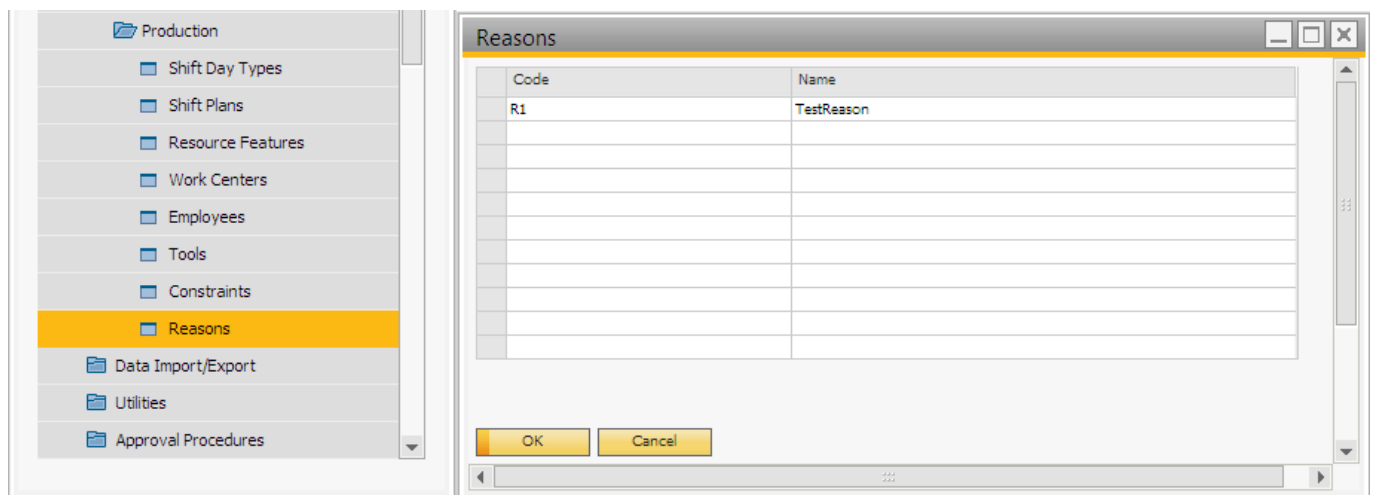
Constraints represent general resources such as electricity that can be a limitation during manufacturing. The settings of a constraint are similar to the work center configurations, but a constraint cannot be unlimited. No cost amounts can be defined for constraints.

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

Feature	Feature Name	Is Active	Setup Time Scale	Job Time Scale	Teardown Time Scale
cRF	Constraint	<input checked="" type="checkbox"/>	1.000	1.000	1.000

5. Reasons

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

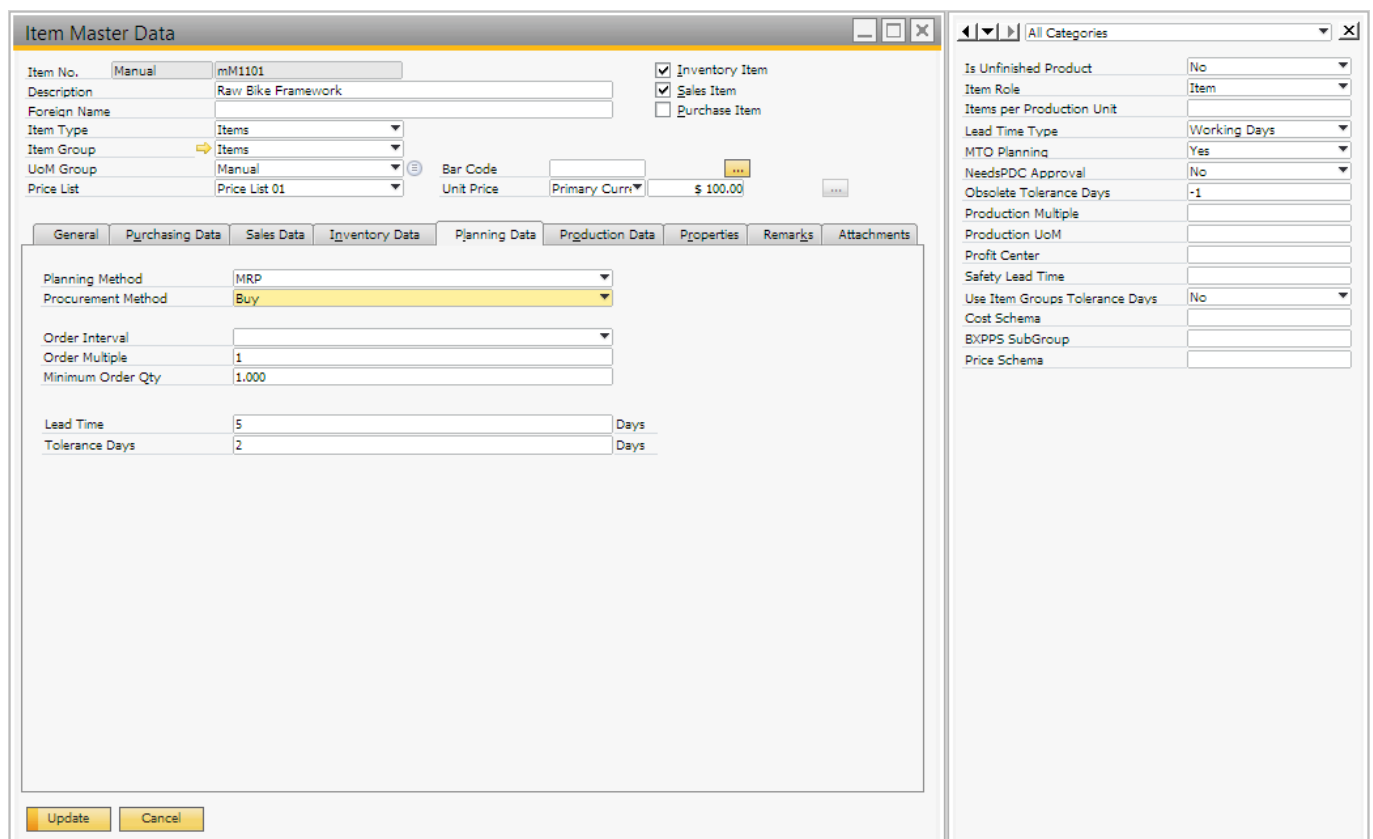


Key Extensions for SAP Business One

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

Item Master Data

Item No. Manual m6

Description Screw 8mm (Nut + Bolt)

Foreign Name

Item Type Items

Item Group Items

UoM Group Manual

Price List Labor-Free Price

☒ Inventory Item
☒ Sales Item
☒ Purchase Item

Bar Code

Unit Price Primary Curr

General

Purchasing Data

Sales Data

Inventory Data

Planning Data

Production Data

Properties

Remarks

Attachments

☒ Tax Liab
☐ Do Not Apply

Manufacturer

Additional Identifi

Shipping Type

Serial and Batch N

Manage Item by

☒ Active
☐ Inactive
☐ Advanced

Remove

Duplicate

New Activity

Business Partner Catalog Numbers

Bill of Materials

Alternative Items

Related Activities

Inventory Posting List

Inventory Audit Report

Bin Location Content List

Items List

Calculate Bills of Materials

Inventory Status

Create Purchase Quotation

Purchase Quotation Comparison Report

Purchase Request Report

Available-to-Promise

Relationship Map...

List of Calculated Bill of Materials

Material Account Grid

Material Account Diagram

Recipe Editor

Is Unfinished Product No

Item Role Item

Items per Production Unit

Lead Time Type Working Days

MTO Planning Yes

NeedsPOC Approval No

Obsolete Tolerance Days -1

Production Multiple

Production UoM

Profit Center

Safety Lead Time

Use Item Groups Tolerance Days No

Cost Schema

BXPPS SubGroup

Price Schema

Remarks

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.

Material Account

Item Code m6

UoM pair

From Date 02/09/17

To Date 05/09/17

Due Date	Due Time	MRP Resource Type	Doc Entry	Doc Number	Doc Line	Quantity	Warehouse Code	Delta Quantity	Warehouse Quantity	Total Quantity
	00:00	Stock		0	0	3,000	01	3,000	3,000	3,000
	00:00	Stock		0	0	0,000	02	0,000	0,000	3,000
01/23/17	23:59	Purchase Enter	⇒	4	503	4	3,000	01	3,000	6,000
02/13/17	09:28	Production Exit	⇒	67	566	10	10,000	01	-10,000	-4,000
02/13/17	23:59	Purchase Enter	⇒	6	505	4	20,000	01	20,000	16,000
02/17/17	08:24	Production Exit	⇒	73	572	10	5,000	01	-5,000	11,000

Refresh

Close

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

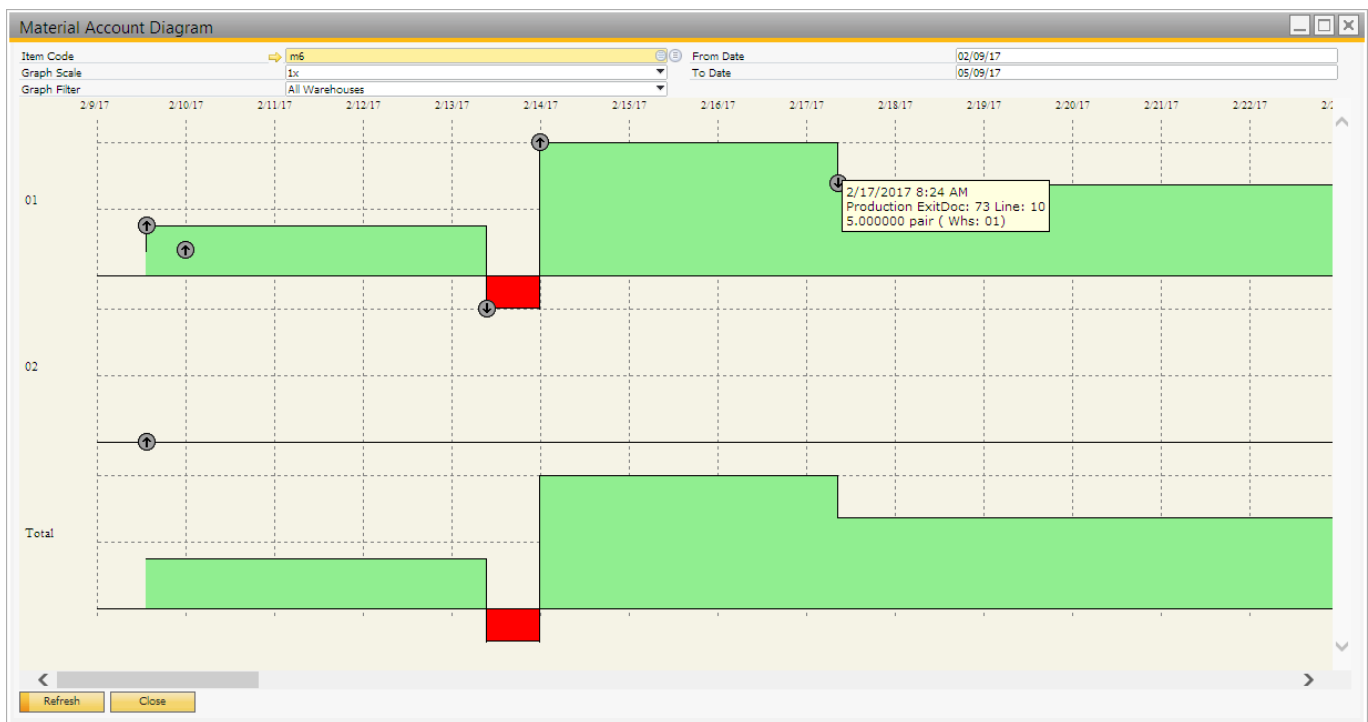
<http://wiki.produemex.name/>

Printed on 2017/11/22 07:01

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.



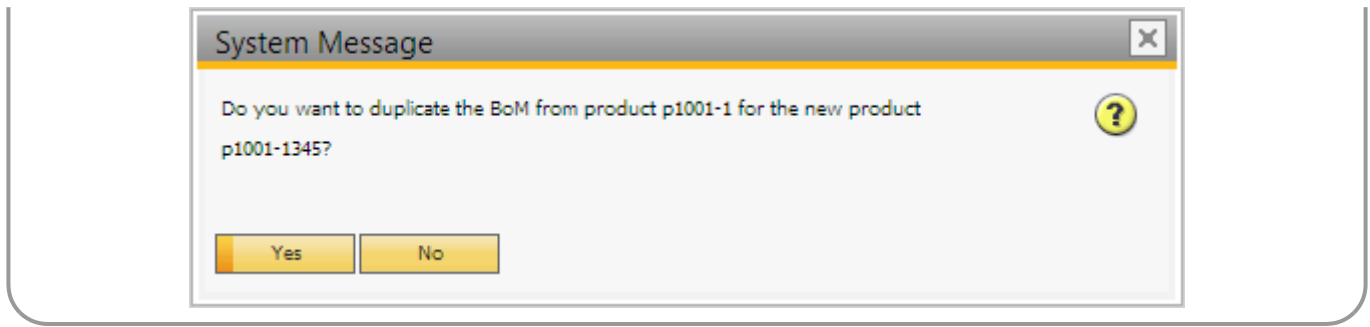
1.2.2. Calculate Bills of Materials

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.

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.

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.

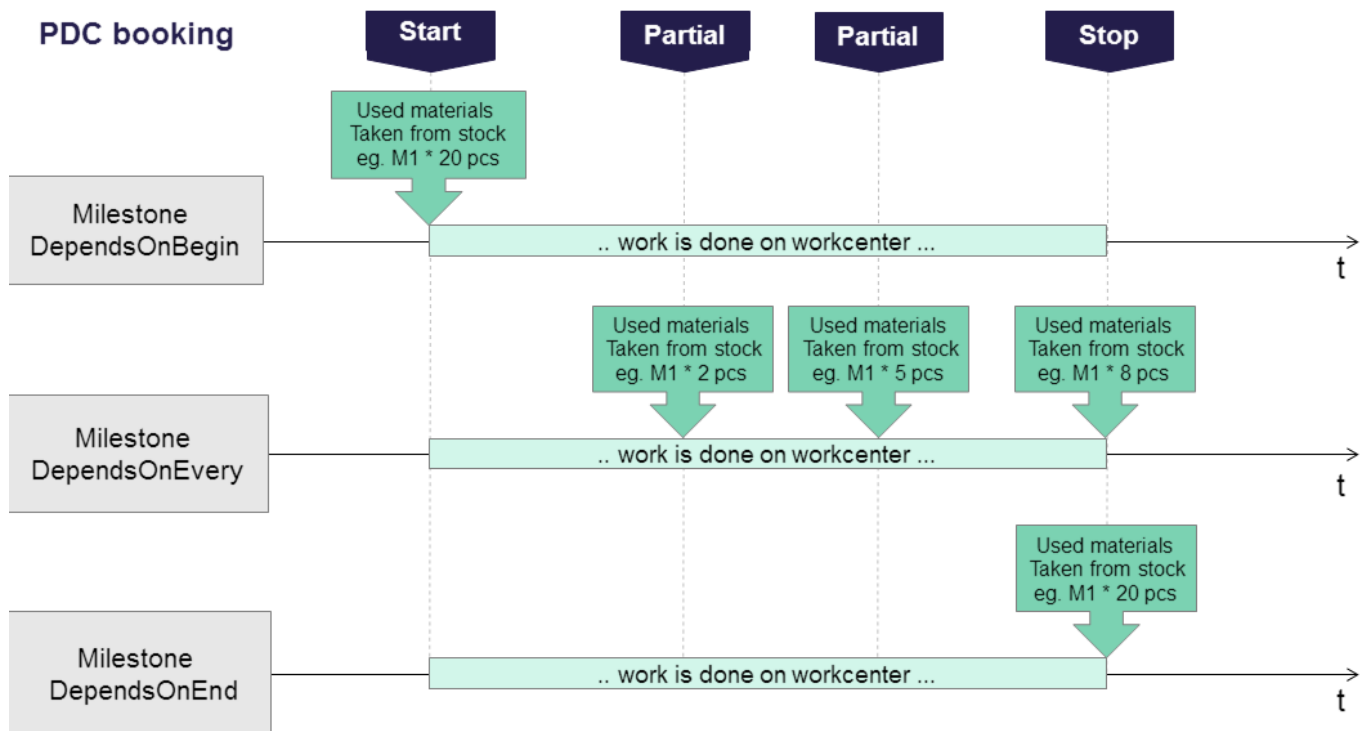
Milestone Type

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.



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.

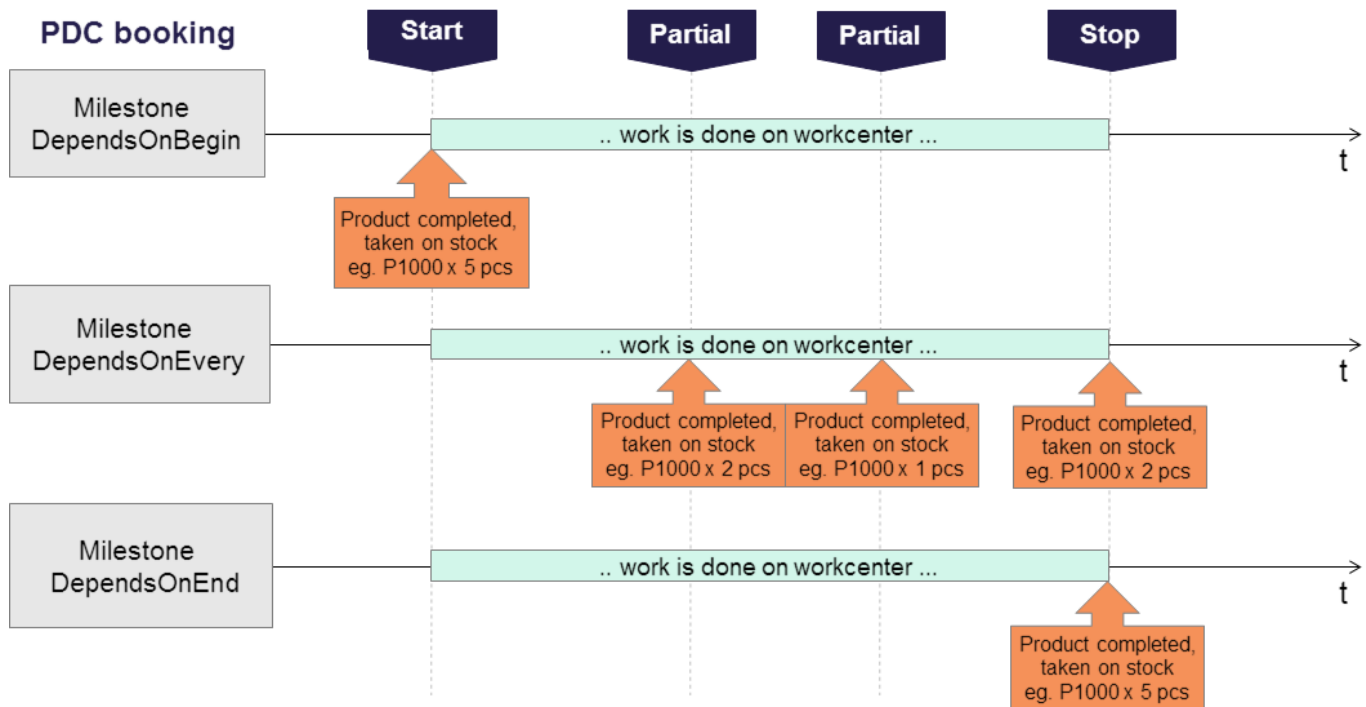
BxID Internal identification value.

Rejected Warehouse Add the warehouse code where the rejected unfinished products or a by-products will be stored to this field to the respective lines.

3.1. Used 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.

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.

[illegible]

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'*.

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.

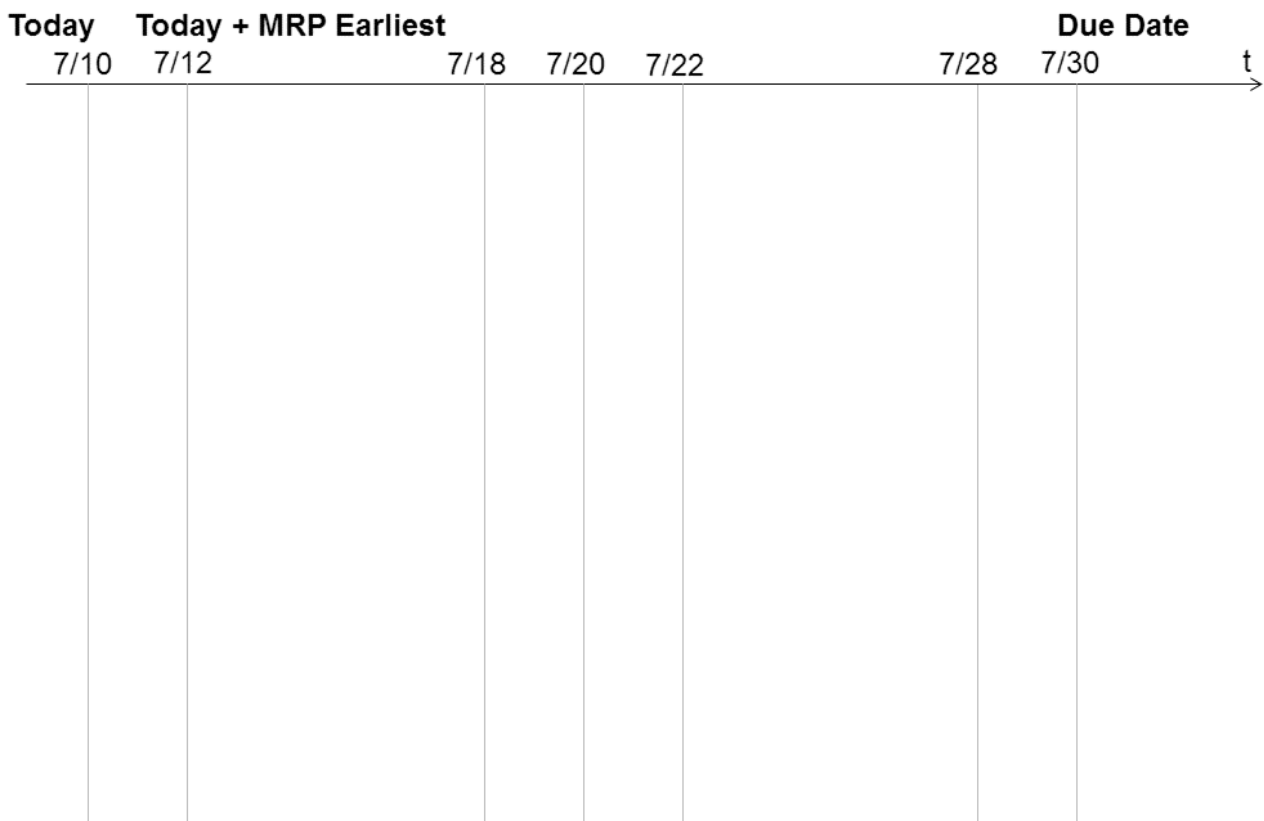
4.1. User Defined Fields

Allocation strategy

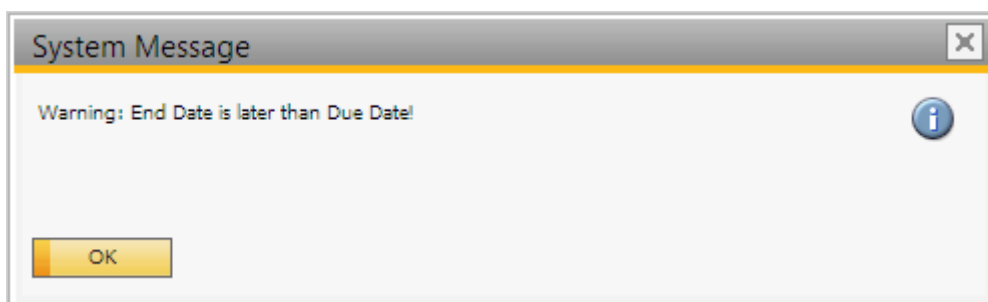
On the 'Allocation Strategy UDF' the scheduling logic for allocations can be defined. The default the allocation strategy depends on the '*Default ProdOrd. Allocation Strategy*' set on the [Production order tab](#) of Produmex Manufacturing settings.

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.

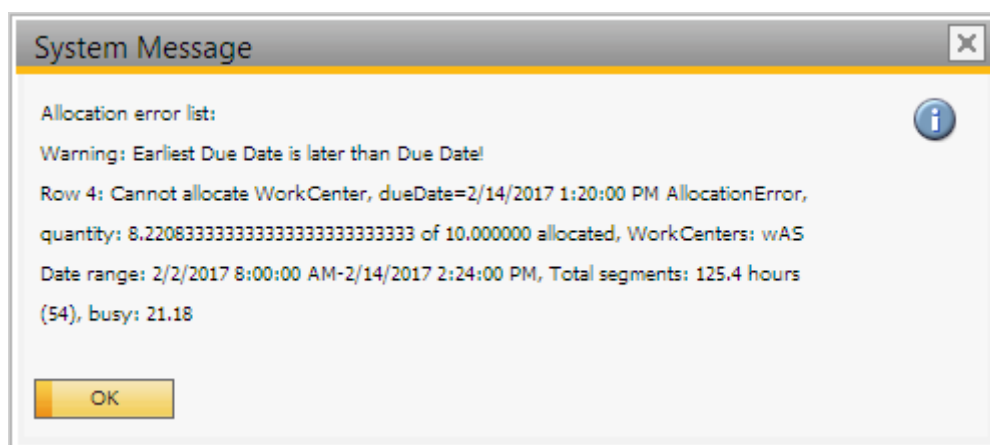
Under the *'Technical'* category information about the parent order (if any) and other technical details can be overviewed.

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

4.2. Right-click menu

4.2.1. 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.



4.2.2. 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.

The screenshot shows two overlapping windows from a manufacturing software interface. The top window is titled 'Production Order' and contains fields for 'Type' (Standard), 'Status' (Released), 'Product No.' (p1001-1), 'Product Description' (Red Bike), 'Planned Quantity' (10), and 'Warehouse' (01). It also has a right-hand section with 'Allocation Strategy' (Forward From Earliest), 'Begin Date' (02/08/17), 'Build' (00030705), 'Earliest Begin Date' (02/08/17), 'Outsourced Quantity On Order' (1), 'Base Quantity' (1), 'Begin Time' (10:34AM), and 'Due Time' (13:00AM). A right-click context menu is open over the 'Operations Sequence Diagram' window, listing options like 'Cancel', 'Duplicate', 'New Activity', 'Related Activities', 'Report Completion', 'Issue Components', 'Resource Allocations', 'Material Requirements Report', 'Transfer Request', 'Component Transfer', 'Relationship Map...', 'Generate Pick List', 'View Pick Lists', 'Load from BoM', 'Operations Sequence Diagram' (highlighted), 'Job Requirements Report', 'Allocation Status', 'Allocation Report', 'Missing Capacity Report', 'List of Calculated Production Orders', 'Job Scheduling Control Panel', 'Calculate Production Order', and 'MTO Planning'. The 'Operations Sequence Diagram' window displays a Gantt chart for a production order. It shows a timeline from 02/07/17 to 02/15/17. The chart includes a table with columns for 'Op Code', 'Begin Date', 'End Date', 'Setup/Job Transf. Min/Qty./Date', and 'Alloc. ID'. The chart shows various operations (e.g., pRAS, wAS, oPAS, oPQA) with their respective durations and allocation IDs. A red cog icon indicates an allocation error for operation oPAS on 02/09/17.

4.2.3. 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.

The screenshot shows the 'Allocation/calculation results' window. It displays a tree view of allocation results. The root node is 'Allocation results'. Under it, there are several nodes representing different allocation calculations. The first node is '#578 Calculating allocations from DueDate 02/13/17 12:00 AM backwards'. This node has several sub-nodes, including '12. Material cOST2 x 1 has to be ordered at (to be ready at 02/13/17 12:00 AM)', '11. Operation oPBI x 1 all inhouse allocated from 02/13/17 10:25 AM to 02/13/17 12:00 AM', '10. Material m6 x 1 has to be ordered at (to be ready at 02/13/17 10:25 AM)', '9. Material m5 x 1 has to be ordered at (to be ready at 02/13/17 10:25 AM)', '8. Operation oPQA x 1 all inhouse allocated from 02/13/17 10:25 AM to 02/13/17 10:25 AM', '5. Material cOST1 x 1 has to be ordered at (to be ready at 02/13/17 10:25 AM)', '4. Operation oPAS x 0.5 inhouseQty, 0.5 outsourced qty allocated/outsourced from 02/13/17 10:25 AM to 02/13/17 10:25 AM', '3. Material m4 x 2 has to be ordered at (to be ready at 02/13/17 10:25 AM)', '2. Material m3 x 1 has to be ordered at (to be ready at 02/13/17 10:25 AM)', and '1. Material mM1001 x 1 has to be ordered at (to be ready at 02/13/17 10:25 AM)'. The '4. Operation oPAS' node has a red cog icon next to it, indicating an allocation error. Below this, there are more nodes for 'Calculated/allocated ToDueDate begin=02/13/17 10:25 AM, end=02/13/17 10:25 AM', '#578 Calculating allocations from earliest possible date, starting from date 02/13/17 11:25 AM', '#578 Calculating allocations from preferred date', and '#578 Allocating from preferred date'. The window has a 'Close' button at the bottom left.

4.2.4. Job Requirements Report

For more information please see: [Requirements Report](#)

4.2.5. Material Requirements Report

For more information please see: [Requirements Report](#)

4.2.6. 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.

[illegible]

4.2.7. 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.

4.2.8. Job Scheduling Control Panel

For more information please see: [Job Scheduling Control Panel](#)

4.2.9. Calculate Production Orders

For more information please see: [Cost calculation](#)

4.2.10. List of Calculated Production Orders

For more information please see: [Cost calculation](#)

4.2.11. MTO Planning

For more information please see: [MTO Planning](#)

Material Resource Planning

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

MRP Wizard - Red Bike

Documents Data Source
Define the data sources as well as the documents to include in the MRP calculation.

Time Range

☒ Within Planning Horizon
☐ Include Historical Data

Sources of Demand and Supply to Be Included in MRP Calculation

<input type="checkbox"/> Purchase Requests	<input type="checkbox"/> Restrict Purchase Requests	...
<input type="checkbox"/> Purchase Quotations	<input type="checkbox"/> Restrict Purchase Quotations	...
<input checked="" type="checkbox"/> Purchase Orders	<input type="checkbox"/> Restrict Purchase Orders	...
<input checked="" type="checkbox"/> Blanket Purchase Agreements	<input type="checkbox"/> Restrict Purchase Agreements	...
<input type="checkbox"/> Sales Quotations	<input type="checkbox"/> Restrict Sales Quotations	...
<input checked="" type="checkbox"/> Sales Orders	<input type="checkbox"/> Restrict Sales Orders	...
<input checked="" type="checkbox"/> Blanket Sales Agreements	<input type="checkbox"/> Restrict Sales Agreements	...
<input checked="" type="checkbox"/> Production Orders	<input type="checkbox"/> Restrict Production Orders	...
<input type="checkbox"/> Inventory Transfer Requests	<input type="checkbox"/> Restrict Transfer Requests	...
<input type="checkbox"/> Recurring Order Transactions		
<input type="checkbox"/> Reserve Invoices	<input type="checkbox"/> Restrict Reserve Invoices	...

Inventory Level

Forecast

Recommendations

☒ Purchase
☒ Purchase Requests
☐ Purchase Orders

☒ Production Orders
☐ Inventory Transfer Requests
☐ Show detailed summary report

☒ Use Produmex Manufacturing MRP

☒ Generate to Default Warehouse for Item
☐ Generate to Warehouse with the Demand

Save Scenario

Cancel Back Next Run

Step 5 of 6

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.

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 depend on the net required quantity and the predefined planning rules such as 'Order multiple', 'Order Interval', 'Minimum Order Quantity'.

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.

Produmex Manufacturing MRP Results for scenario Red Bike (05/31/17)

MRP Results
This window shows the results of the MRP run. Click on the buttons to see the requirements/recommendations, click on Expand all to show the results of the rows or Collapse all to show only the head rows. Enter a text into Find item field to search for an item number.

Planning horizon: **02/02/17 - 02/10/17**
Find Item: Period: Day

Calculated at: 02/02/17 04:14
☒ Display After MRP

Item Code	Item Description	Σ	Historic data	Past Due	2/2	2/3	2/4	2/5	2/6	2/7	2/8	2/9	2/10	2/11
p1001-1	Red Bike	3									10			
mM1001	Painted Bike Fr...	18			8									
mM1101	Raw Bike Fram...	-8												
m3	Chain	23			10									
m4	Wheel	41			20									
m5	Bell	4								10				
m6	Screw 8mm (Nu...	1								10				

MRP Error List

Type	ProdOrder	Message
✖		Couldn't allocate Virtual Production Order MRPVIRT-1001 (#MRPVIRT-1001) producing 10 of p1001-1, due: 2/8/2017 12:00:00 AM
		8 of mM1001, due: 2/2/2017 4:14:00 PM

System Message

Line 5: Cannot allocate WorkCenter, dueDate=2/7/2017 3:35:00 PM AllocationError, quantity: 3.9961111111111111111111111111110 of 5.0000000 allocated, WorkCenters: wAS
Date range: 2/2/2017 3:32:00 PM-2/7/2017 4:07:00 PM, Total segments: 45.583333333333333333333333333333 hours (19), b

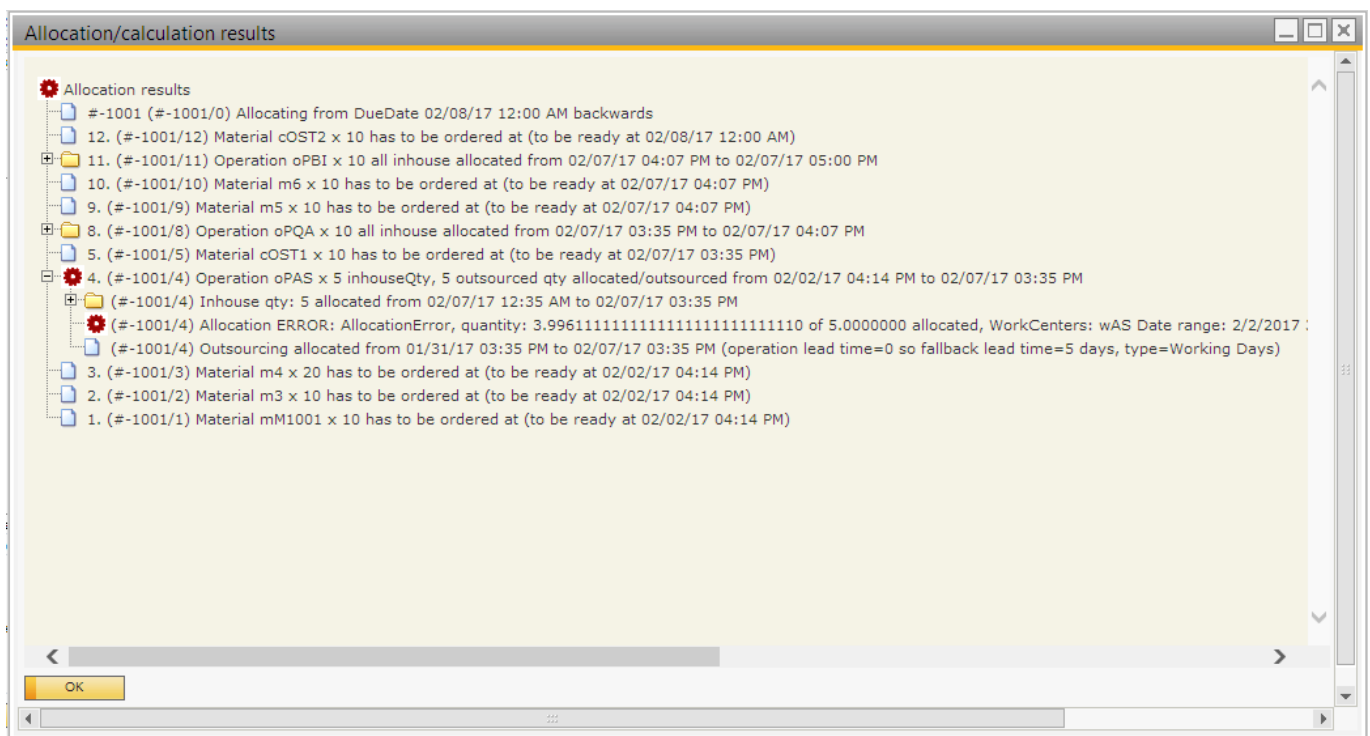
OK

OK Missing Capacity Report

Close Expand All Collapse All

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.

Produmex Manufacturing MRP Results for scenario Red Bike (05/31/17)

MRP Results
This window shows the results of the MRP run. Click on the buttons to see the requirements/recommendations, click on Expand all to show the results of the rows or Collapse all to show only the head rows. Enter a text into Find item field to search for an item number.

Planning horizon: 01/25/17 - 01/31/17
Find Item: Period: Day
Calculated at: 01/25/17 12:10
☒ Display After MRP

Item Code	Item Description	Σ	Historic data	Past Due	1/25	1/26	1/27	1/28	1/29	1/30	1/31	2/1
▶ p1001-1	Red Bike	4					30				30	
	Initial Stock				62	59	49					29
	+ Receipts		69				30					30
	- Gross Requirem...											
	= Final Stock											
▶ mM1001	Pa											
▶ mM1101	Ra											
▶ m1	Sn											
▶ m3	Ch											
▶ m4	Wh											
▶ m5	Be											
▶ m6	Scr											

Pegging Information

Item Code: p1001-1
Item Name: Red Bike
Period From: 01/02/01
Period To: 01/02/01

Source	Pic	Type	Due Date	Due Time	Quantity	Ware...
▶ 2		Production Order	12/23/16	00:00	30.000	01
▶ 61		Production Order	01/23/17	00:00	1.000	01
		Stock	01/25/17	12:10	38.000	01

Trace Close

Close Expand All Collapse All

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

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.

Create	Order Type	Item Number	Item Description	Quantity	UoM Code	UoM	MRP	MRP Order Mu...	MRP Lead Time	MRP Comp...	Release Date	Due Date	Vendor Code	Vendor Name	Unit	Discount	Price After Discount	From Whse	To
<input type="checkbox"/>	Production Order	mm1101	Raw Bike Frame	10	Manual	pcs	Make	1,000	5,000		From Bill of M 02/27/17	02/27/17				0.000			01
<input type="checkbox"/>	Production Order	mm1101	Raw Bike Frame	5	Manual	pcs	Make	1,000	5,000		From Bill of M 02/27/17	02/27/17				0.000			01
<input type="checkbox"/>	Production Order	mm1001	Painted Bike Frame	10	Manual	pcs	Make	1,000	5,000		From Bill of M 03/02/17	03/02/17				0.000			01
<input type="checkbox"/>	Production Order	mm1001	Painted Bike Frame	5	Manual	pcs	Make	1,000	5,000		From Bill of M 03/02/17	03/02/17				0.000			01
<input type="checkbox"/>	Production Order	p1001-1	Red Bike	10	Manual	pcs	Make	10,000	5,000		From Bill of M 03/10/17	03/10/17				0.000			01
<input type="checkbox"/>	Purchase Order	m1	5m Steel Pipe	15	Manual	pcs	Buy	100,000	100,000	5	02/17/17	02/24/17	eBS	Extra Bike Supplies	\$ 30.00	0.000	\$ 30.00		01
<input type="checkbox"/>	Purchase Quotation	m4	Wheel	20	Manual	pcs	Buy	2,000	10,000	3	02/24/17	03/01/17				0.000			01
<input type="checkbox"/>	Purchase Request	m5	Bell	10	Manual	pcs	Buy	5,000	5,000	3	03/06/17	03/09/17	eBS	Extra Bike Supplies	\$ 30.00	0.000	\$ 30.00		01
<input checked="" type="checkbox"/>	Inventory Transfer	m6	Screw 8mm (Nut +	10	Manual	pair	Buy	10,000	10,000	3	03/06/17	03/09/17	eBS	Extra Bike Supplies	\$ 0.01	0.000	\$ 0.01		01

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.

Produmex Manufacturing MRP Results for scenario Red Bike (05/31/17)

MRP Results
This window shows the results of the MRP run. Click on the buttons to see the requirements/recommendations, click on Expand all to show the results of the rows or Collapse all to show only the head rows. Enter a text into Find Item field to search for an item number.

Planning horizon: 02/01/17 - 02/19/17
Find Item: Period: Day

Calculated at: 02/02/17 10:53
☒ Display After MRP

Item Code	Item Description	Z	Historic data	Past Due	1	2/3	2/4	2/5	2/6	2/7	2/8	2/9	2/10	2/11	2/12	2/13	2/14	2/15	2/16	2/17
p1001-1	Red Bike	3							5									10		10
mM1001	Painted Bike Fr...									8		10								
mM1101	Raw Bike Fram...					9														
m1	5m Steel Pipe	54																		
m3	Chain	3								10		10								
m4	Wheel	1								20		20								
m5	Bell	4															10		10	
m6	Screw 8mm (Nu...	1															10		10	

Close Expand All Collapse All

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.

Order Recommendation

Planning Horizon: 02/01/17 - 02/19/17
Find Item No.:

Calculated At: 02/02/17 11:05AM

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
<input type="checkbox"/>	Production Order	p1001-1	Red Bike	5	Manual	pcs	Make		5,000	5,000				From Bl	02/06/17
<input checked="" type="checkbox"/>	Production Order	p1001-1	Red Bike	20,000	Manual	pcs	Make		5,000	5,000				From Bl	02/15/17
<input type="checkbox"/>	Production Order	p1001-1	Red Bike	10	Manual	pcs	Make		5,000	5,000				From Bl	02/17/17
<input type="checkbox"/>	Production Order	mM1001	Painted Bike Frame	8	Manual	pcs	Make		1,000	5,000				From Bl	02/07/17
<input type="checkbox"/>	Production Order	mM1001	Painted Bike Frame	10	Manual	pcs	Make		1,000	5,000				From Bl	02/09/17
<input type="checkbox"/>	Production Order	mM1101	Raw Bike Framewo	9	Manual	pcs	Make		1,000	5,000				From Bl	02/03/17
<input type="checkbox"/>	Purchase Order	m3	Chain	10	Manual	pcs	Buy		5,000	5,000	2			02/02/17	02/06/17
<input type="checkbox"/>	Purchase Order	m3	Chain	10	Manual	pcs	Buy		5,000	5,000	2			02/06/17	02/08/17
<input type="checkbox"/>	Purchase Order	m4	Wheel	20	Manual	pcs	Buy		2,000	10,000	2			02/02/17	02/06/17
<input type="checkbox"/>	Purchase Order	m4	Wheel	20	Manual	pcs	Buy		2,000	10,000	2			02/06/17	02/08/17
<input type="checkbox"/>	Purchase Order	m5	Bell	10	Manual	pcs	Buy		5,000	5,000	3			02/08/17	02/13/17
<input type="checkbox"/>	Purchase Order	m5	Bell	10	Manual	pcs	Buy		5,000	5,000	3			02/10/17	02/15/17
<input type="checkbox"/>	Purchase Order	m6	Screw 8mm (Nut +	10	Manual	pair	Buy		10,000	10,000	3			02/08/17	02/13/17
<input type="checkbox"/>	Purchase Order	m6	Screw 8mm (Nut +	10	Manual	pair	Buy		10,000	10,000	3			02/10/17	02/15/17

Update Cancel

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

Sales Order

Customer: bBC
 Name: Big Bike Mart
 Contact Person:
 Customer Ref. No.:
 Local Currency:
 No.: Primary 519
 Status: Open
 Posting Date: 02/17/17
 Delivery Date: 02/28/17
 Document Date: 02/17/17

Contents Logistics Accounting Attachments

Item/Service Type: Item Summary Type: No Summary

#	Item No.	Quantity	Unit Price	Disc...	Total (LC)	Del. Date	Delivery Time	Ready For Deliv...	Ready For De...	Manual Planning
1	p1001-1	10	\$ 400.00	0.000	\$ 4,000.00	02/28/17				No
2				0.000		02/28/17				No

Sales Employee: -No Sales Employee-
 Owner:
 Remarks:
 Total Before Discount: \$ 4,000.00
 Discount: %
☐ Rounding
 Tax:
 Total: \$ 4,000.00
 MRP Date: 02/28/17
 OK Cancel Copy From Copy To

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

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.

10.2. Sales quotation

It is also possible to calculate the earliest possible fulfillment date for sales quotations. Click on the button next to the 'MRP Date' field then select the simulation parameters on the 'Sales Quotation Simulation Parameters' form.

Sales Quotation

Customer
Name
Contact Person
Customer Ref. No.
Local Currency

bBC
Big Bike Mart

No.
Status
Posting Date
Valid Until
Document Date

Primary
Open
02/17/17
03/21/17
02/17/17

Contents

Logistics

Accounting

Attachments

Item/Service Type

Item

Summary Type

No Summary

#	Item No.	Quantity	Unit Price	Disc...	Tax C...	Total (LC)	Distr. Rule	UoM ...
1	p1001-1	10	\$ 400.00	0.000		\$ 4,000.00		Manual
2				0.000				

Sales Employee

-No Sales Employee-

Owner

Remarks

Total Before Discount

\$ 4,000.00

Discount

%

Rounding

Tax

Total

\$ 4,000.00

MRP Date

OK

Cancel

Sales Quotation Simulation Parameters

Scenario

SQ_20170217143607

Run MRP now

☒

Select	MRP Scenario Code	IsMTO	Is Quotation
<input checked="" type="checkbox"/>	0001	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	m1	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	MTO_20161223100723	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	MTO_20170105153848	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	MTO_20170120095819	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	MTO_20170208105327	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	MTO_20170209114711	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	MTO_20170217113732	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	RedBikes	<input type="checkbox"/>	<input type="checkbox"/>

Calculate

Show

Cancel

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.

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 Produex 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.

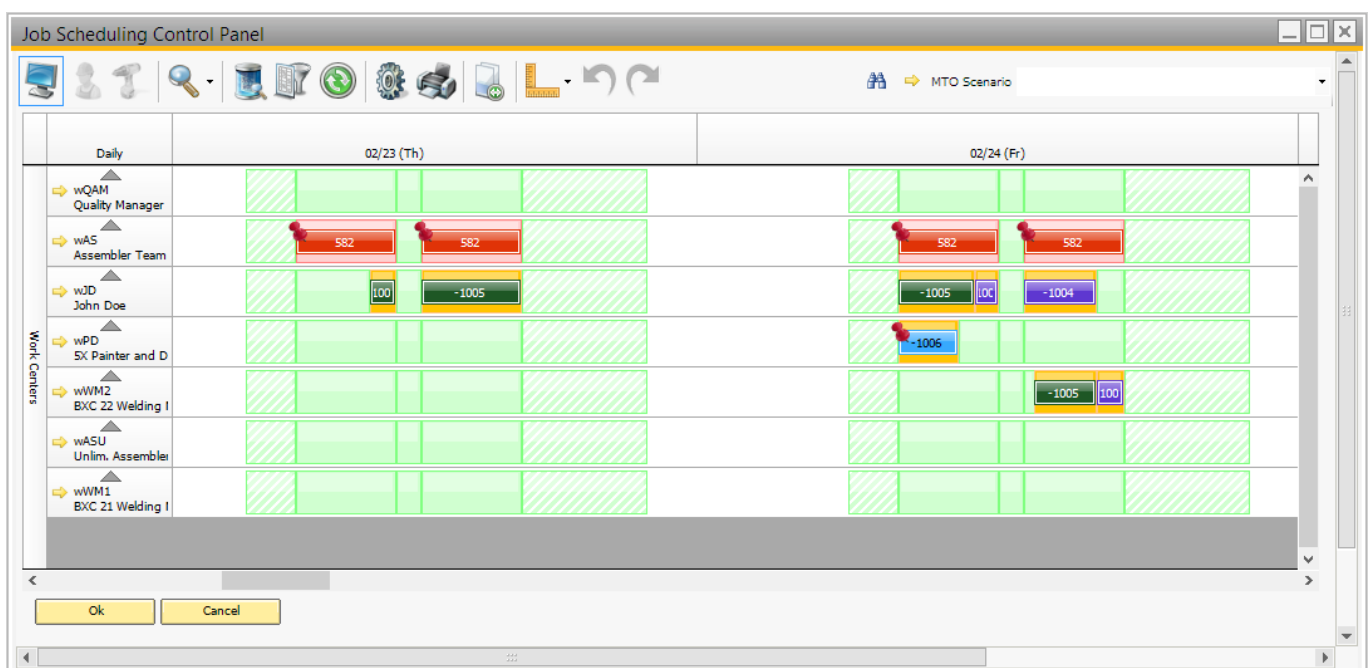
The Order Recommendations form will open. It is possible to group recommendations for the same item. Select the 'Group Recommendations for Scenario ...' option from the right-click menu. For more information about grouping recommendations please see: [Make To Order](#)

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

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.

The screenshot shows the 'Item Master Data' window with the 'Planning Data' tab selected. The 'Planning Method' is set to 'MRP'. The 'MTO Planning' option is highlighted in yellow and set to 'Yes'. Other fields include 'Item No.' (mm1001), 'Description' (Painted Bike Framework), 'Item Type' (Items), 'UoM Group' (Manual), 'Price List' (Price List 01), 'Unit Price' (\$ 300.00), 'Lead Time' (Days), and 'Tolerance Days' (Days).

Field	Value
Item No.	mm1001
Description	Painted Bike Framework
Item Type	Items
UoM Group	Manual
Price List	Price List 01
Unit Price	\$ 300.00
Lead Time	Days
Tolerance Days	Days
Planning Method	MRP
Procurement method	make
Component Warehouse	From Bill of Materials Line
Order Interval	
Order Multiple	1
Minimum Order Qty	
MTO Planning	Yes

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'.

Selected	Item Code	Item Description	Quantity	Due Date	Due Time	Customer	Cust.Name	Cust.Ref.No.	Order Type	Sales Order No	Production Order No	Top O...
<input checked="" type="checkbox"/>	mM1001	Painted Bike Framework	1,000	11/28/16	12:00	bBC	Big Bike Mart		Sales	503		
<input type="checkbox"/>	mM1001	Painted Bike Framework	1,000	12/02/16	12:00	bBC	Big Bike Mart		Sales	504		

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.

Order Recommendation

Planning Horizon

Calculated At

Find Item No.

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	Vendor Code	Vendor Name	Unit ...	Discount...
1	<input type="checkbox"/> Production Order	p1001-1	Red Bike	10	Manual	pcs	Make		10.000	30.000				From Bl	12/29/16	12/29/16			0.000
2	<input type="checkbox"/> Production Order	mM1001	Painted Bike Frame	10	Manual	pcs	Make		1.000	1.000				From Bl	12/21/16	12/21/16			0.000
3	<input type="checkbox"/> Production Order	mM1101	Raw Bike Framevo	10	Manual	pcs	Make		1.000	1.000				From Bl	12/16/16	12/16/16			0.000
4	<input type="checkbox"/> Purchase Order	m1	5m Steel Pipe	10	Manual	pcs	Buy		100.000	100.000	3			12/12/16	12/15/16	eBS	Extra Bike Supplies	\$ 30.00	0.000
5	<input type="checkbox"/> Purchase Order	m4	Wheel	20	Manual	pcs	Buy		2.000	100.000	3			12/15/16	12/20/16	eBS	Extra Bike Supplies	\$ 70.00	0.000
6	<input type="checkbox"/> Purchase Order	m5	Bell	10	Manual	pcs	Buy		100.000	100.000	3			12/22/16	12/27/16	eBS	Extra Bike Supplies	\$ 30.00	0.000
7	<input type="checkbox"/> Purchase Order	m6	Screw 8mm (Nut +	10	Manual	pair	Buy		1.000.000	5.000.00	3			12/22/16	12/27/16	eBS	Extra Bike Supplies	\$ 0.01	0.000

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 Produex 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

Group Recommendations

MTD Scenario: MTO_20161129154454

Primary Order Recommendation: 85 Item: mM1101 Raw Bike Framework

Primary Order Type: Production Order Vendor:

Total Selected: 2 Total Quantity: 10.000 Project: Warehouse: 01

Grouped: ☐ Show Group Members: ☐ Group Days:

Is Selected	Rcm. Number	Order Type	Item Code	Item Description	Quantity	UoM	Vendor	Vendor Name	Due Date	Due Time	R..
<input type="checkbox"/>	87	Purchase	m1	5m Steel Pipe	5.000		eBS	Extra Bike Supplies	12/06/16	23:59	12/0
<input type="checkbox"/>	89	Purchase	m4	Wheel	10.000		eBS	Extra Bike Supplies	12/07/16	23:59	12/0
<input checked="" type="checkbox"/>	85	Production	mM1101	Raw Bike Framework	5.000				12/08/16	08:38	12/0
<input type="checkbox"/>	83	Production	mM1001	Painted Bike Framework	5.000				12/08/16	17:42	12/0
<input type="checkbox"/>	88	Purchase	m1	5m Steel Pipe	5.000		eBS	Extra Bike Supplies	12/14/16	23:59	12/0
<input type="checkbox"/>	90	Purchase	m5	Bell	5.000		eBS	Extra Bike Supplies	12/14/16	23:59	12/0
<input type="checkbox"/>	91	Purchase	m6	Screw 8mm (Nut + Bolt)	5.000		eBS	Extra Bike Supplies	12/14/16	23:59	12/0
<input checked="" type="checkbox"/>	86	Production	mM1101	Raw Bike Framework	5.000				12/15/16	15:04	12/1
<input type="checkbox"/>	84	Production	mM1001	Painted Bike Framework	5.000				12/16/16	00:00	12/1
<input type="checkbox"/>	82	Production	p1001-1	Red Bike	5.000				12/16/16	00:00	12/0

Close Unselect Auto-Group Group Ungroup

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.

Vendor

eBS

Name

Extra Bike Supplies

Contact Person

Vendor Ref. No.

Local Currency

No.

Primary

538

- 0

Status

Open

Posting Date

12/09/16

Delivery Date

12/23/16

Document Date

12/09/16

Contents

Logistics

Accounting

Attachments

#	Item No	Quantity	Unit Price	Disc...	Tax C...	Total (LC)	Manual Planning	UoM Code	MTO Scenario	Top Order D...	Top Order D...	Top Order D...	Top Order T...
1	m1	5	\$ 30.00	0.000		\$ 150.00	Yes	Manual	MTO_20161209121530	15	0	514	Sales
2	m4	10	\$ 70.00	0.000		\$ 700.00	Yes	Manual	MTO_20161209121530	15	0	514	Sales
3	m5	5	\$ 30.00	0.000		\$ 150.00	Yes	Manual	MTO_20161209121530	15	0	514	Sales
4	m6	5	\$ 0.01	0.000		\$ 0.05	Yes	Manual	MTO_20161209121530	15	0	514	Sales
5							No						Sales

Buyer

-No Sales Employee-

Owner

Remarks

Origin: MRP

Total Before Discount

\$ 1,000.05

Discount

%

Rounding

Tax

Total Payment Due

\$ 1,000.05

OK

Cancel

Copy From

Copy To

BiID

State

Initialized

Outsourcing PuO Doc Number

Inv.Trans.Undone

No

PDC Transaction Type

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.

Type

Standard

Status

Released

Product No.

mm1101

Product Description

Raw Bike Framework

Planned Quantity

5

Warehouse

01

UoM Name

pcs

No.

Primary

154

Order Date

12/09/16

Start Date

12/23/16

Due Date

12/23/16

User

manager

Origin

MRP

Sales Order

514

Customer

BBC

Distr. Rule

Project

Components

Summary

#	Row Type	R...	Type	No.	Description	Base ...	Planned...	Issued	Avail...	UoM ...	UoM ...	Wareho...	Issue Method	Manual Plan...
1	Material	Item	m1	5m Steel Pipe	1	5			35	Manual	pcs	01	Manual	No
2	Operation	Item	oPCU	Cutting	5	25				Manual	min	01	Backflush	No
3	By-Product	Item	m2	Steel Pipe	-2	-10			10	Manual	m	01	Backflush	No
4	Operation	Item	oPWE	Welding	5	25				Manual	min	01	Backflush	No
5														No

Remarks

OK

Cancel

Pick and Pack Remarks

General

BK Production Comments

Manual Planning

Yes

Missing Capacity

MTO Scenario

MTO_20161209121530

Ordering Sequence

Ordering TeamID

Recipe Version

Top Order Doc Entry

15

Top Order Doc Line

0

Top Order Doc Number

514

Top Order Type

Sales

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.

Production Order

Type: Standard
Status: Released
Product No.: p1001-1
Product Description: Red Bike
Planned Quantity: 30 UoM Name: pcs
Warehouse: 01

No.: Primary 501
Order Date: 11/23/16
Start Date: 01/04/17
Due Date: 01/04/17
User: manager
Origin: MRP
Sales Order:
Customer:
Distr. Rule:
Project:

Components Summary

#	Type	No.	Description	Base ...	Planned...	Issued	Avail...	UoM ...	UoM ...	Wareho...	Issue Method	Manual Planning	MTO Scenario	Distr. Rule
1	Item	mM1001	Painted Bike Framew	1	30		-72	Manual	pcs	01	Manual	Yes	MTO_2016112910	
2	Item	m3	Chain	1	30		-100	Manual	pcs	01	Manual	No		
3	Item	m4	Wheel	2	60		-140	Manual	pcs	01	Manual	Yes	MTO_2016112910	
4	Item	oPAS	Bike Assembly	180	5,400			Manual	min	01	Backflush	No		
5	Item	cOST1	Project Management	1	30			Manual		01	Backflush	No		
6	Item	uP1001-0	Red Bike (Basic)	-1	-30			Manual	pcs	01	Backflush	No		
7	Item	uP1001-0	Red Bike (Basic)	1	30			Manual	pcs	01	Manual	No		
8	Item	oPQA	Quality Assurance	3	90			Manual	min	01	Backflush	No		
9	Item	m5	Bell	1	30		-70	Manual	pcs	01	Manual	Yes	MTO_2016112910	
10	Item	m6	Screw 8mm (Nut + E	1	30		-70	Manual	pair	01	Manual	Yes	MTO_2016112910	
11	Item	oPBI	Bell Installation	5	150			Manual	min	01	Backflush	No		
12	Item	cOST2	Energy	1	30			Manual		01	Backflush	No		
13	Item										No			

Remarks:

Pick and Pack Remarks:

OK Cancel

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.

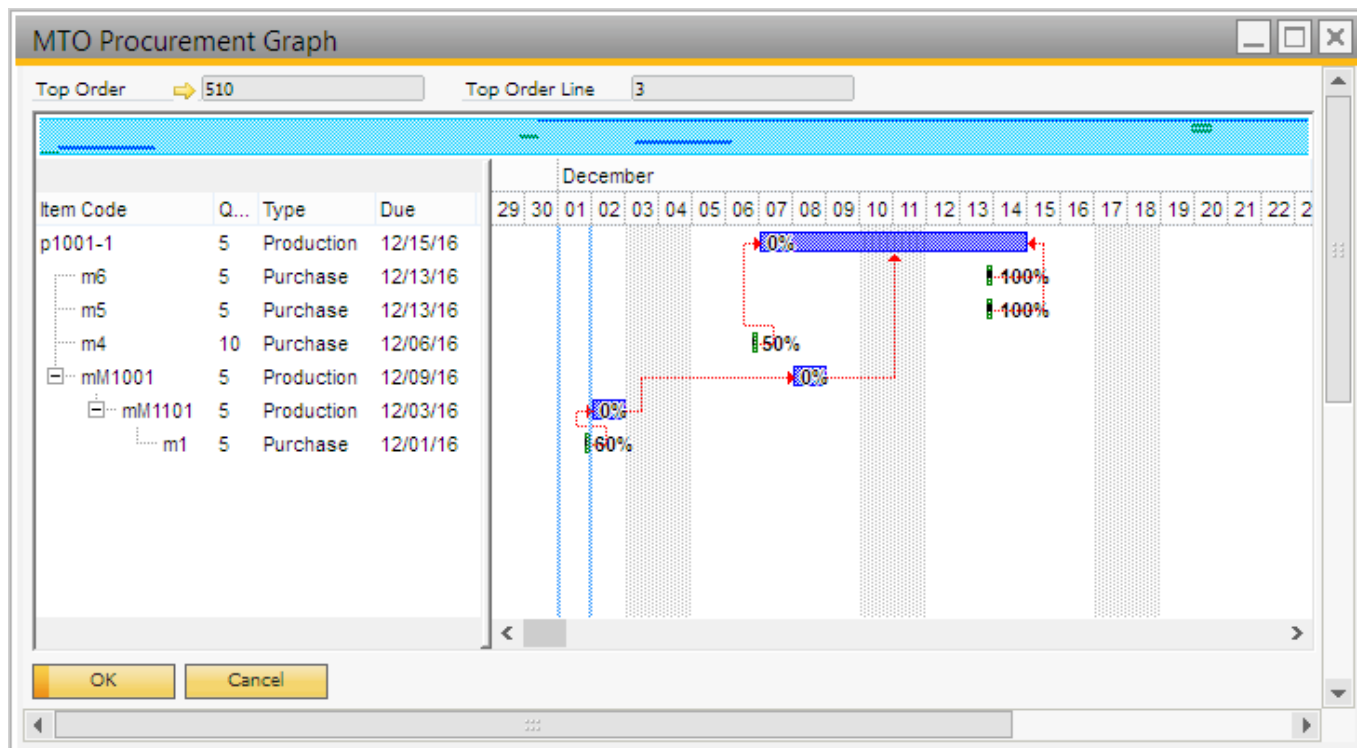
[illegible]

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.

MTO Top Order References

Order Type: Production Order Item: mM1101 Raw Bike Framework

Order Number: 636 Quantity: 10.000

Order Line: 0 UoM: pcs

Due Date: 04/06/17

Top Sa. Ord.	Top Pr. Ord.	Top Ord. Line	Quantity	Scheduled Date	Top Ord. Line Qty.	Top Ord. Line Due Date	Grouped	Status	Open Qty.
530		1	10.000	04/06/17	10.000	04/07/17	<input type="checkbox"/>	Order Created	10.000

OK Cancel

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.

[illegible]

11. Reschedule MTO scenario

11.1. On the Production Management Cockpit

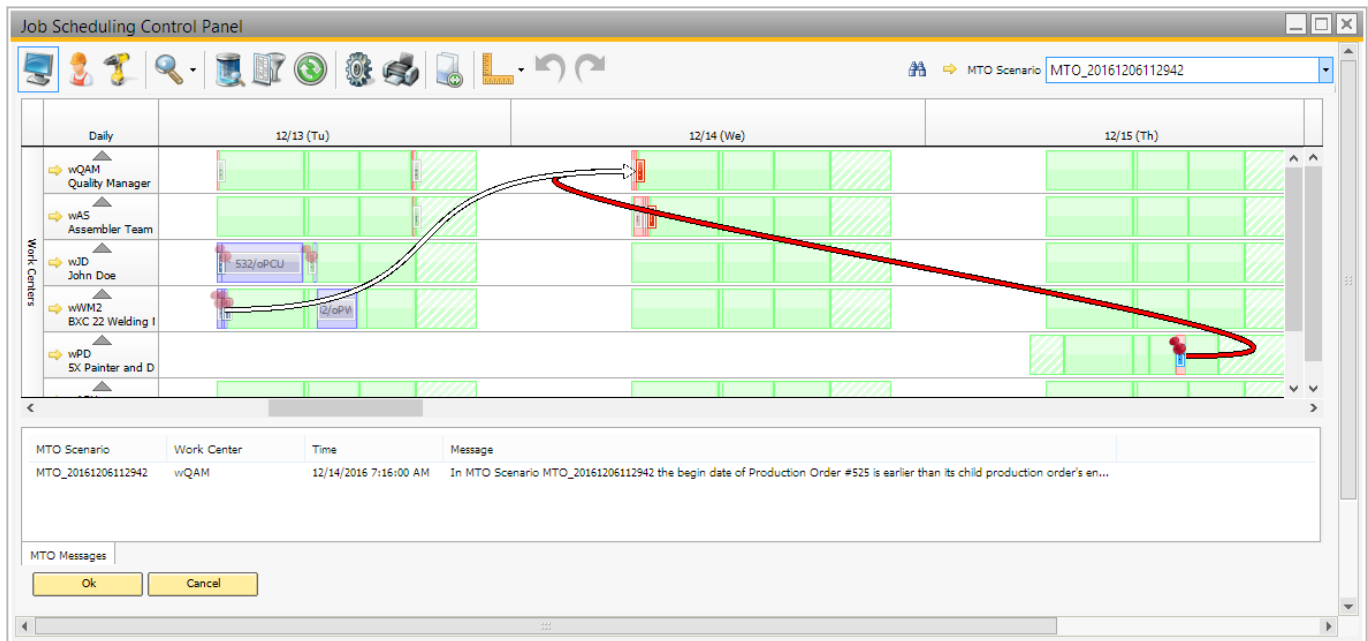
When the 'Move Earliest' and/or the 'Move Latest' setting is enabled on the [MTO Tab](#) of the Produmex Manufacturing Settings, the production orders linked to the MTO chain can be rescheduled based on the earliest or latest start date of the top order on the [Production Management Cockpit](#).

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

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.

Select	Changed	St.	Pr. Ord. No.	Pr. Ord. Status	Priority	Item No.	Item Name	Custom Code	Planned Quantity	Allocation Strategy	Begin Date	End Date	Latest Begin Date	Due Date	Due Time
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	586	Planned		p1001-1	Red Bike	CC4325	15.000	Forward From Preferred Date	02/21/17 11:40 AM	03/01/17 11:04 AM	02/20/17 02:53 PM	02/28/17	00:00
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	587	Planned		mM1001	Painted Bike Framework	CC0123	15.000	Forward From Preferred Date	02/17/17 02:35 PM	02/23/17 04:37 PM	02/17/17 01:50 PM	02/18/17	00:00
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	590	Planned		mM1101	Raw Bike Framework	CC5543	15.000	Forward From Preferred Date	02/17/17 01:00 PM	02/17/17 08:12 PM	02/17/17 04:28 PM	02/18/17	00:00
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	595	Planned		mM1101	Raw Bike Framework	CC0123	15.000	Forward From Preferred Date	02/17/17 02:35 PM	02/17/17 02:49 PM	02/17/17 04:46 PM	02/18/17	00:00

3. Execute the order

Execute the rework order in the shopfloor as described in: [PDC bookings](#).

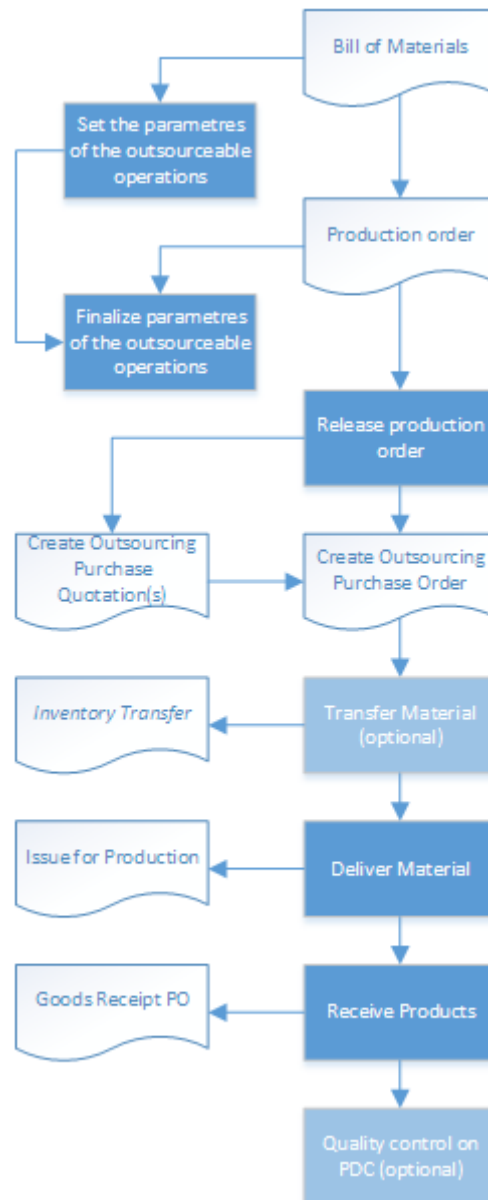
To ensure accurate inventory records, do not receive the product at the end of the job as it has been already received from the job of the child production order.

Outsourced Manufacturing

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.

The image shows two screenshots of the 'Business Partner Master Data' form. The top screenshot is for a 'Vendor' record with Code 'bGU', Name 'Bike Gurus', and Local Currency. The bottom screenshot is for a 'Customer' record with Code 'bGU_O', Name 'Bike Gurus', and Local Currency. Both records show 'Account Balance' and 'Goods Receipt POs' as 0.00.

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.

The image shows a screenshot of the 'Warehouses - Setup' form. The 'Warehouse Code' is '02' and the 'Warehouse Name' is 'Supplier Warehouse'. The 'Outsourcing Partner' is 'eBS' and the 'Partner Name' is 'Extra Bike Supplies'.

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.

Bill of Materials (Resource List)

Product No.

Product Description

BOM Type

Production Std Cost

Planned Average Production Size

#	Row Type	R..	Type	No.	Description	Quantity	Uo...	Warehouse	Issue Method	Production Std...	Total Production...	Price List
1	Material		Item	mM1001	Painted Bike Framework	1	pcs	01	Manual	\$ 0.00	\$ 0.00	Price List 01
2	Material		Item	m3	Chain	1	pcs	01	Manual	\$ 0.00	\$ 0.00	Price List 01
3	Material		Item	m4	Wheel	2	pcs	01	Manual	\$ 0.00	\$ 0.00	Price List 01
4	Operation		Item	oPAS	Bike Assembly	180	min	01	Backflush	\$ 0.00	\$ 0.00	Price List 01

BoM Operation Details

Operation Code

Operation Name

Main Product Code

Main Product Name

Before Time

Safety Time

Setup Time

Job Time

Teardown Time

After Time

Time Base

Operation Break

Operation Time UoM

Is Parallel Operation ☐

Is Overlapping Operation ☐

Max Parallel Operations

Overlapping Quantity

Allocation Window

Min Job Quantity

Resource Requirements ☐ Outsourcing ☐ Documentation ☐ Cost Amounts ☐

Is Outsourced ☒

Outsourcing Lead Time

In House Quantity

Outsourcing UoM

Items Per Outsourcing Unit

Supplier Code	Supplier Name	Planned Qty.
bGU	Bike Gurus	1.000

OK Cancel

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.

#	Row Type	R..	Type	No.	Description	Quantity	UoM Name	Warehouse	Issue Method	Production Std Cost
1	Material	Item	mM1001	Painted Bike Framework	1	pcs	01	Manual		\$ 0.00
2	Material	Item	m3	Chain	1	pcs	01	Manual		\$ 0.00
3	Material	Item	m4	Wheel	2	pcs	01	Manual		\$ 0.00
4	Operation	Item	oPAS	Bike Assembly	180	min	01	Backflush		\$ 0.00
5	Cost	Item	cOST1	Project Management	1		01	Backflush		\$ 0.00
6	Unfinished	Item	uP1001-0	Red Bike (Basic)	-1	pcs	01	Backflush		\$ 0.00
7	Unfinished	Item	uP1001-0	Red Bike (Basic)	1	pcs	01	Manual		\$ 0.00
8	Operation	Item	oPQA	Quality Assurance	3	min	01	Backflush		\$ 0.00
9	Material	Item	m5	Bell	1	pcs	01	Manual		\$ 0.00
10	Material	Item	m6	Screw 8mm (Nut + Bolt)	1	pair	01	Manual		\$ 0.00
11	Operation	Item	oPBI	Bell Installation	5	min	01	Backflush		\$ 0.00
12	Cost	Item	cOST2	Energy	1		01	Backflush		\$ 0.00
13		Item								

Product Price: \$ 482.01

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.

The screenshot shows the SAP Item Master Data configuration for item 'uP1001-0'. The 'Inventory Item' checkbox is checked. The 'Is Unfinished Product' checkbox is also checked. The 'Item Role' is set to 'Item'. The 'Items per Production Unit' is set to 'Working Days'. The 'Lead Time Type' is set to 'Working Days'. The 'MTO Planning' is set to 'No'. The 'Needs PDC Approval' is set to 'No'. The 'Obsolete Tolerance Days' is set to '-1'. The 'Price List' is set to 'Labor-Free Price'. The 'Unit Price' is set to 'Primary Curr'.

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 milestone 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.

Production Order Operation Details - [DocNum: 520, Line: 3]

Operation Code	oPAS		Operation Break	Allowed	
Operation Name	Bike Assembly		Operation Time UoM	Minutes	
Before Time	min	0.000	Is Parallel Operation	<input type="checkbox"/>	
Safety Time	min	0.000	Is Overlapping Operation	<input type="checkbox"/>	
Setup Time	min	0.000	Max Parallel Operations	0	
Job Time	min	180.000	Overlapping Quantity	0.000	
Teardown Time	min	0.000	Allocation Window	0.000	
After Time	min	0.000	Min Job Quantity	0.000	
Time Base	1.000		Message	Cannot allocate WorkCenter, dueDate=12/2/2016 2:50:00 PM AllocationError, quantity: 0.000000 of 2.500000 allocated, WorkCenters: wAS Date range: 12/2/2016	
Planned Quantity	5.000		Is Pinned	<input type="checkbox"/>	
Completed Quantity	0.000		Pinned Start Date		
Rejected Quantity	0.000		Pinned Start Time	00:00	

Resource Requirements | Dates | Outsourcing | PDC Bookings | Documentation | Cost Amounts

Is Outsourced ☒ Outsourcing Lead Time Days 0

In House Quantity 2.500
Outsourcing UoM
Items Per Outsourcing Unit 1.000
In House Ratio 0.500

New Purchase Order
New Purchase Quotation

Supplier Code	Supplier Name	Planned Qty.	Supp. Ratio	Quantity To Order	Qty. On Order	Qty. Received	Quantity Quoted
bGU	Bike Gurus	2.500	0.500	1.00	1.500	0.000	1.000
eBS	Extra Bike Supplies	0.000	0.000	0.00	0.000	0.000	0.000

Document Type	Pu.Ord.No	Pu.Ord.ID	Pu.Quot.No	Pu.Quot.ID	Supplier	Supplier Name	Qty. On Order	Qty. Received	Pu.Ord. Due Date
Purchase Quotation			500	1	bGU	Bike Gurus	0.000	0.000	
Purchase Order	509	10			bGU	Bike Gurus	1.500	0.000	12/02/16

OK Cancel Allocations

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.

Purchase Order - Split

Vendor: eBS
 Name: Extra Bike Supplies
 Contact Person:
 Vendor Ref. No.:
 Local Currency:
 No.: Primary 532 - 0
 Status: Open
 Posting Date: 12/09/16
 Delivery Date: 12/09/16
 Document Date: 12/09/16

Item/Service Type	Item	Quantity	Unit Price	Disc...	Tax C...	Total (LC)	Manual Planning	UoM Code	MTD Scenario
1	ePAS	5		0.000			No	Manual	
Customer Material: mM1001: Painted Bike Framework Quantity: 5.00									
Customer Material: m3: Chain Quantity: 5.00									
Customer Material: m4: Wheel Quantity: 10.00									
Unfinished Product: uP1001-0: Red Bike (Basic) Quantity: 5.00									
6				0.000			No		

Buyer: -No Sales Employee-
 Owner:
 Total Before Discount:
 Discount: %
☐ Rounding
 Tax:
 Total Payment Due: \$ 0.00

Remarks: Based on Production Order 558
 Based On Purchase Quotation 507.

OK Cancel Copy From Copy To

Purchase Quotation

Vendor: eBS
 Name: Extra Bike Supplies
 Contact Person:
 Vendor Ref. No.:
 Local Currency:
 Group No.: Primary 507
 No.: Primary 507
 Status: Closed
 Posting Date: 12/09/16
 Valid Until: 12/16/16
 Document Date: 12/09/16
 Required Date: 12/16/16

Item/Service Type	Item	Required Date	Quoted Date	Required Qty.	Quoted Qty.	Unit Price
1	ePAS	12/16/16			5	
Customer Material: mM1001: Painted Bike Framework Quantity: 5.00						
Customer Material: m3: Chain Quantity: 5.00						
Customer Material: m4: Wheel Quantity: 10.00						
Unfinished Product: uP1001-0: Red Bike (Basic) Quantity: 5.00						

Buyer: -No Sales Employee-
 Owner:
 Total Before Discount:
 Discount: %
☐ Rounding
 Tax:
 Total Payment Due: \$ 0.00

Remarks: Based on Production Order 558

OK Cancel Copy From Copy To

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.

Inventory Management For Outsourcing

Supplier: eBS Extra Bike Supplies
Supplier Warehouse: 02 - Supplier Warehouse
Pu. Ord. No: 521 eBS * 12/23/16 Primary
Pu. Ord. Due Date: 12/23/16
Document Date: 12/06/16
Ref 2: 521
Journal Remark:
Vendor Ref. No.:

Pr. Ord. No: 525 p1001-1 * 12/27/1 Primary
Pr. Ord. Line: 4
Pr. Ord. Operation ID: 00010370
Item No: oPAS
Item Name: Bike Assembly
Remarks: Outsourcing Order 521 for Production Order 525 from Outsourcing Supplier eBS

Transfer Material: ☒
Deliver Material: ☐

Print Delivery Note: ☐

Row Type	Backfl.	Mat. Code	Mat. Name	Pr.Ord. Mat.ID	Whse	Available Qty.	Qty.	Planned Qty. to Deliver	Qty. Transferred	Qty. Delivered
Material	<input type="checkbox"/>	mM1001	Painted Bike Framework	00010367		0.00	1.000	1.000	0.000	0.000
Material	<input type="checkbox"/>	m3	Chain	00010368		0.00	1.000	1.000	0.000	0.000
Material	<input type="checkbox"/>	m4	Wheel	00010369		0.00	2.000	2.000	0.000	0.000

Operation Quantity: 1.000
Products Received: ☒
Goods Receipt PO: ☒

Quantity On Order: 1.000
Quantity Received: 0.000
Outsourcing UoM:
Items Per Outsourcing UoM: 1.000

Prod. Type	Prod. Code	Prod. Name	Whse	Completed Qty.	Expected Qty.	Total Received Qty.
Unfinished Product	uP1001-0	Red Bike (Basic)	01	1.000	1.000	0.000

OK Cancel

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.

Transfer Material: ☒
Deliver Material: ☐

Print Delivery Note: ☒

Row Type	Backfl.	Mat. Code	Mat. Name	Pr.Ord. Mat.ID	Whse	Available Qty.	Qty.	Planned Qty. to Deliver	Qty. Transferred	Qty. Delivered
Material	<input type="checkbox"/>	mM1001	Painted Bike Framework	00010367	01	0.00	1.000	1.000	0.000	0.000
Material	<input type="checkbox"/>	m3	Chain	00010368	01	0.00	1.000	1.000	0.000	0.000
Material	<input type="checkbox"/>	m4	Wheel	00010369	01	65.00	0.000	2.000	2.000	0.000

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'.

Inventory Transfer

Business Partner → eBS_O
 Name → Extra Bike Supplies_Outsourcin
 Contact Person
 Ship To → USA

Number → 503
 Series → Primary
 Posting Date → 12/09/16
 Document Date → 12/09/16

From Warehouse → 01
 To Warehouse → 01
 To Bin Location
 Price List → Price List 01

#	Item No.	Item Description	Fro...	From Bin Loc...	To Ware...	To Bin Location:	First To-Bin-L...
1	→ m1	5m Steel Pipe	→ 01	→ 5	→ 02		

Sales Employee → -No Sales Employee-

Journal Remarks → Inventory Transfers - eBS_O
 Remarks → BXIMSTR: Outsourcing Order 530 for Production

OK Cancel Copy From

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)

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.

Production Order

Type: Standard
Status: Released
Product No.: p2002-2
Product Description: Green Bike
Planned Quantity: 1
Warehouse: 01

No.: Primary 522
Order Date: 12/05/16
Start Date: 12/05/16
Due Date: 12/19/16
User: manager
Origin: Manual
Sales Order:
Customer:
Distr. Rule:
Project:

#	Row Type	R..	Type	No.	Description	Base ...	Planned...	Issued	Avail...	UoM ...	UoM ...	Wareho...	Issue Method	Manual Planning	MTO Scenario	D...
1	Material	Item	m4	Wheel	1	1				Manual	pcs	02	Backflush	No		
2	Material	Item	m3	Chain	1	1				Manual	pcs	02	Backflush	No		
3	Material	Item	mM1101	Raw Bike Framework	1	1				Manual	pcs	02	Backflush	No		
4	Operation	Item	oPAS	Bike Assembly	180	180				Manual	min	01	Backflush	No		

Inventory Management For Outsourcing

Supplier: eBS
Supplier Warehouse: 02 - Supplier Warehouse
Pr. Ord. No: 522
Pr. Ord. Line: 4
Pr. Ord. Operation ID: 00009282
Item No: oPAS
Item Name: Bike Assembly
Remarks: Outsourcing Order 517 for Production Order 522 from Outsourcing Supplier eBS

Document Date: 12/05/16
Ref 2: 517
Journal Remark:
Vendor Ref. No.:

Transfer Material: ☒
Deliver Material: ☐

Print Delivery Note: ☒

Row Type	Backfl.	Mat. Code	Mat. Name	Pr.Ord. Mat.ID	Whse	Available Qty.	Qty.	Planned Qty. to Deliver	Qty. Transferred	Qty. Delivered
Material	<input checked="" type="checkbox"/>	m4	Wheel	00009279	01	67.00	1.000	1.000	0.000	0.000
Material	<input checked="" type="checkbox"/>	m3	Chain	00009280	01	0.00	1.000	1.000	0.000	0.000
Material	<input checked="" type="checkbox"/>	mM1101	Raw Bike Framework	00009281	01	0.00	1.000	1.000	0.000	0.000

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.

[illegible]

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.

[illegible]

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.

Operation Quantity	5,000	Quantity On Order	5,000
Products Received	<input checked="" type="checkbox"/>	Quantity Received	0,000
Goods Receipt PO	<input checked="" type="checkbox"/>	Outsourcing UoM	
		Items Per Outsourcing UoM	1,000

Prod. Type	Prod. Code	Prod. Name	Whse	Completed Qty.	Expected Qty.	Total Received Qty.
By-Product	m2	Steel Pipe	01	10,000	10,000	0,000

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](#).

The screenshot displays the 'Goods Receipt PO' window. At the top, there are fields for Vendor (eBS), Name (Extra Bike Supplies), Contact Person, Vendor Ref. No., and Local Currency. To the right, there are fields for No. (Primary), Status (Open), Posting Date (12/09/16), Due Date (12/09/16), and Document Date (12/09/16). Below these are tabs for Contents, Logistics, Accounting, and Attachments. The main area contains a table with columns: Item/Service Type, Item, #, Item No., Quantity, Unit Price, Disc..., Tax C..., Total (LC), Whse, Bin L..., Distr. Rule, UoM Code, Blan..., and BxID. The table shows three items: 1. oPCU (Quantity 5, Unit Price \$10.00, Total \$50.00), 2. Customer Material: m1: 5m Steel Pipe Quantity: 5.00, and 3. By-Product: m2: Steel Pipe Quantity: 10.00. At the bottom, there are fields for Buyer (-No Sales Employee-), Owner, and Remarks (BxIMGRPO: Outsourcing Order 530 for Production Order 554 from Outsourcing Supplier eBS). A summary section on the right shows Total Before Discount (\$50.00), Discount (%), Rounding, Tax, and Total Payment Due (\$50.00). Buttons for OK, Cancel, Copy From, and Copy To are at the bottom.

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.

[illegible]

3. Overview the outsourced operations

3.1. Outsourcing Manufacturing Overview

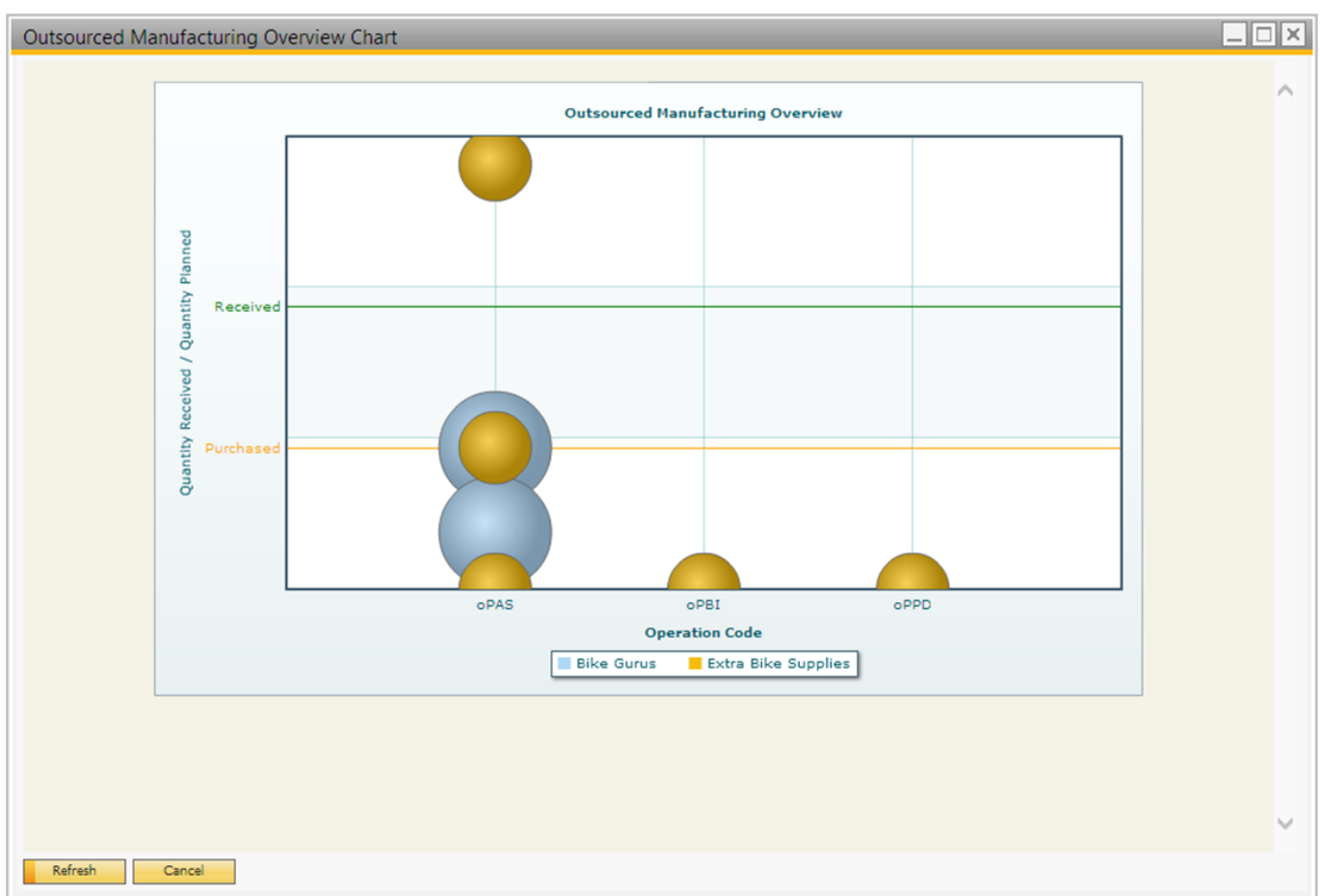
Open the form via the following path: Production > Production Reports > Outsourcing Manufacturing Overview. On this form the user can review the status and the details of outsourced manufacturing operations. Operations are grouped by the main product.

Outsourced Manufacturing Overview																				
Main Prod. Code	Main Prod. Name	Main Prod. Qty.	Pr-Ord. Due Date	Pr-Ord.No.	Pr-Ord.Line	Pu-Ord.No.	Op. Code	Op. Name	Pr-Ord.Op.ID	Op. Due Date	Op. Due Time	Op. Qty.	In House Qty.	Supplier	Supplier Name	Planned Qty.	Qty. On Order	Qty. Received	Pu-Ord. Due Date	Purchase Order Doc Date
▼ p1001-1																				
	Red Bike	5,000	12/17/16	518	4	508	gPAS	Bike Assembly	00008285	12/16/16	17:42	900,000	2,500	gDU	Bike Gurus	2,500	1,000	0.000	12/16/16	11/29/16
	Red Bike	5,000	12/17/16	518	4	507	gPAS	Bike Assembly	00008285	12/16/16	17:42	900,000	2,500	gDU	Bike Gurus	2,500	2,500	0.000	12/16/16	12/16/16
	Red Bike	5,000	12/17/16	518	4	508	gPAS	Bike Assembly	00008285	12/16/16	17:42	900,000	2,500	eB5	Extra Bike Supplies	0.000	1,000	0.000	12/16/16	11/29/16
	Red Bike	5,000	12/17/16	518	4	507	gPAS	Bike Assembly	00008285	12/16/16	17:42	900,000	2,500	eB5	Extra Bike Supplies	0.000	2,500	0.000	12/16/16	11/29/16
	Red Bike	1,000	12/09/16	521	4	514	gPAS	Bike Assembly	00009147	12/14/16	10:44	180,000	0.000	eB5	Extra Bike Supplies	1,000	1,000	0.000	12/14/16	12/05/16
	Red Bike	1,000	12/09/16	521	4	515	gPAS	Bike Assembly	00009147	12/14/16	10:44	180,000	0.000	eB5	Extra Bike Supplies	1,000	1,000	0.000	12/14/16	12/05/16
▼ p2002-2																				
	Green Bike	1,000	12/19/16	522	4		gPAS	Bike Assembly	00009282	12/07/16	14:37	180,000	0.000	eB5	Extra Bike Supplies	1,000	0.000	0.000	12/07/16	12/05/16
	Green Bike	1,000	12/19/16	522	7		gPEI	Bell Installation	00009285	12/12/16	14:41	5,000	0.000	eB5	Extra Bike Supplies	1,000	0.000	0.000	12/12/16	12/05/16
	Green Bike	1,000	12/19/16	522	9		gPPD	Painting and Drying	00009287	12/11/16	14:41	20,000	0.000	eB5	Extra Bike Supplies	1,000	0.000	0.000	12/11/16	12/05/16

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

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.

Several filtering options are available on the header:

- **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.

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](#).

By default loaded production orders will be sorted based on the production order number. When the option '*Sort by Item Code*' is ticked, production orders will be sorted based on the item code. When the option '*Sort by Item Description*' is ticked, production orders will be sorted based on the item description.

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](#).)
- **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 based on the priority number. Production orders with bigger priority number will be allocated first.

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

The screenshot shows the 'Production Management Cockpit' window. It features a top section with various filters and checkboxes, including 'Planned', 'Released', 'Cancelled', 'Closed', 'Sort by Item Code', 'Sort by Item Description', 'Date Type', 'Date From', 'Date To', 'Sales Order From', 'Sales Order To', 'Start Date', 'Item Group', 'Product From', 'Product To', 'Project Code From', and 'Project Code To'. Below these filters is a table with columns: Select, Changed, St., Pr. Ord. No., Pr. Ord. Status, Priority, Item No., Item Name, Planned Quantity, Allocation Strategy, Begin Date, End Date, Latest Begin Date, Due Date, Due Time, and O. The table contains five rows of data for different production orders. At the bottom of the window, there are several buttons: Load, Recalculate, Change Selected, Missing Capacity Report, Move Earliest, Move Latest, and Close.

Select	Changed	St.	Pr. Ord. No.	Pr. Ord. Status	Priority	Item No.	Item Name	Planned Quantity	Allocation Strategy	Begin Date	End Date	Latest Begin Date	Due Date	Due Time	O.
<input type="checkbox"/>	<input type="checkbox"/>	573	Planned	mM1001	Painted Bike Framework	5.000	Forward From Preferred Date	02/09/17 08:00 AM	02/09/17 05:04 PM	02/10/17 03:04 PM	02/12/17	00:00			
<input type="checkbox"/>	<input type="checkbox"/>	571	Released	mM1101	Raw Bike Framework	5.000	Forward From Preferred Date	03/01/17 08:00 AM	03/01/17 09:01 AM	02/22/17 04:11 PM	02/23/17	00:00			
<input type="checkbox"/>	<input type="checkbox"/>	574	Planned	mM1101	Raw Bike Framework	5.000	Forward From Preferred Date	02/08/17 01:00 PM	02/08/17 01:51 PM	02/09/17 04:09 PM	02/10/17	00:00			
<input type="checkbox"/>	<input type="checkbox"/>	566	Released	p1001-1	Red Bike	10.000	Forward From Earliest Date	02/08/17 01:00 PM	02/13/17 10:35 AM	02/08/17 01:37 PM	02/08/17	00:00			
<input type="checkbox"/>	<input type="checkbox"/>	572	Planned	p1001-1	Red Bike	5.000	Forward From Preferred Date	02/12/17 12:00 AM	02/20/17 04:20 PM	02/14/17 11:40 AM	02/22/17	00:00			

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.

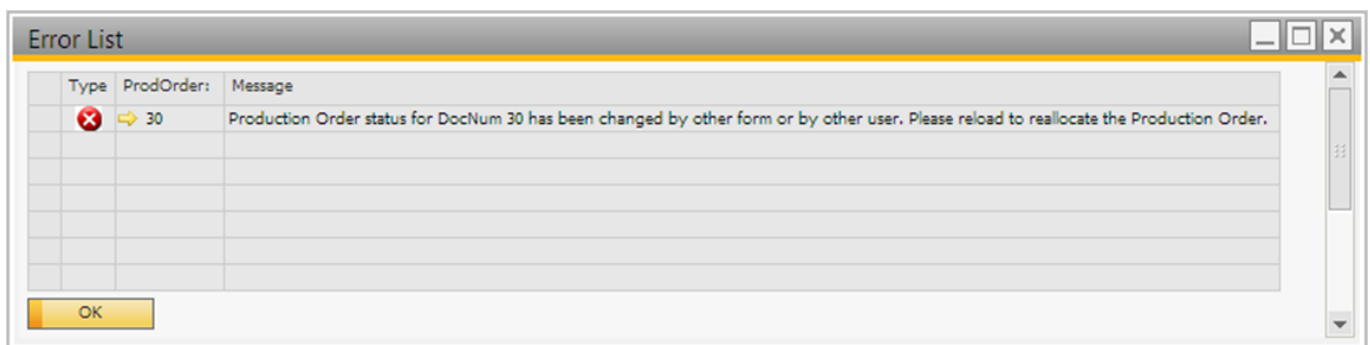
Grid:

- *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: Blue - Planned, Red - Released, Black - Cancelled, Grey - Closed.
- *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.
- *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.
- *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.
- *Recalc. 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.

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

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. Settings

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.

1.2. Align allocations

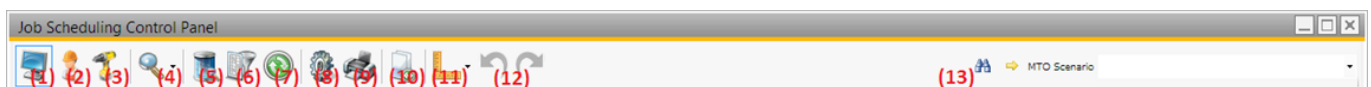
To use the 'Align allocations' function for work centers, adjust the *'JSCP align max days'* and *'JSCP align gap minutes'* options on the [Prod. Order tab of Produmex Manufacturing Settings](#).

1.3. 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 *'Auto Roll child MTOs'* option in the [MTO tab of Produmex Manufacturing Settings](#).

2. Configurations

2.1. Header Buttons



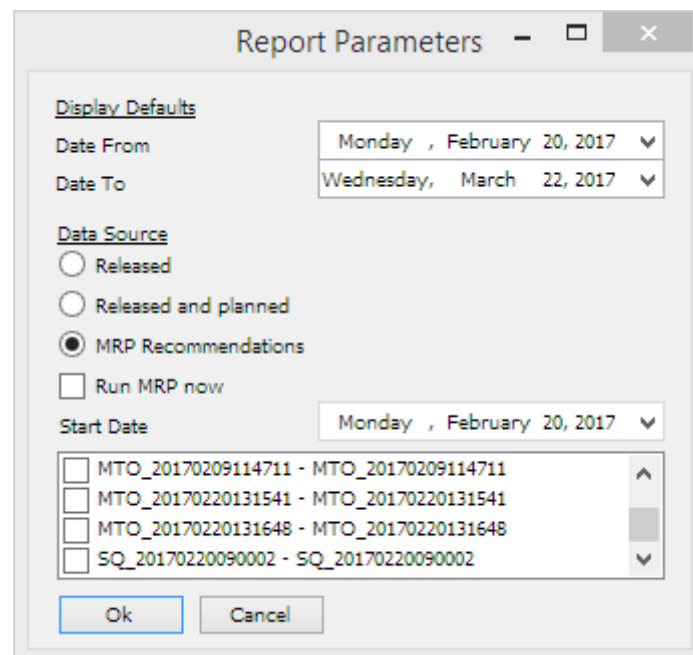
- (1) **Work Centers:** Use this button to show or hide work centers on the panel.
- (2) **Employees:** Use this button to show or hide employees on the panel.
- (3) **Tools:** Use this button to show or hide tools on the panel.
- (4) **Period:** Select the time scale on the dropdown list. The possible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

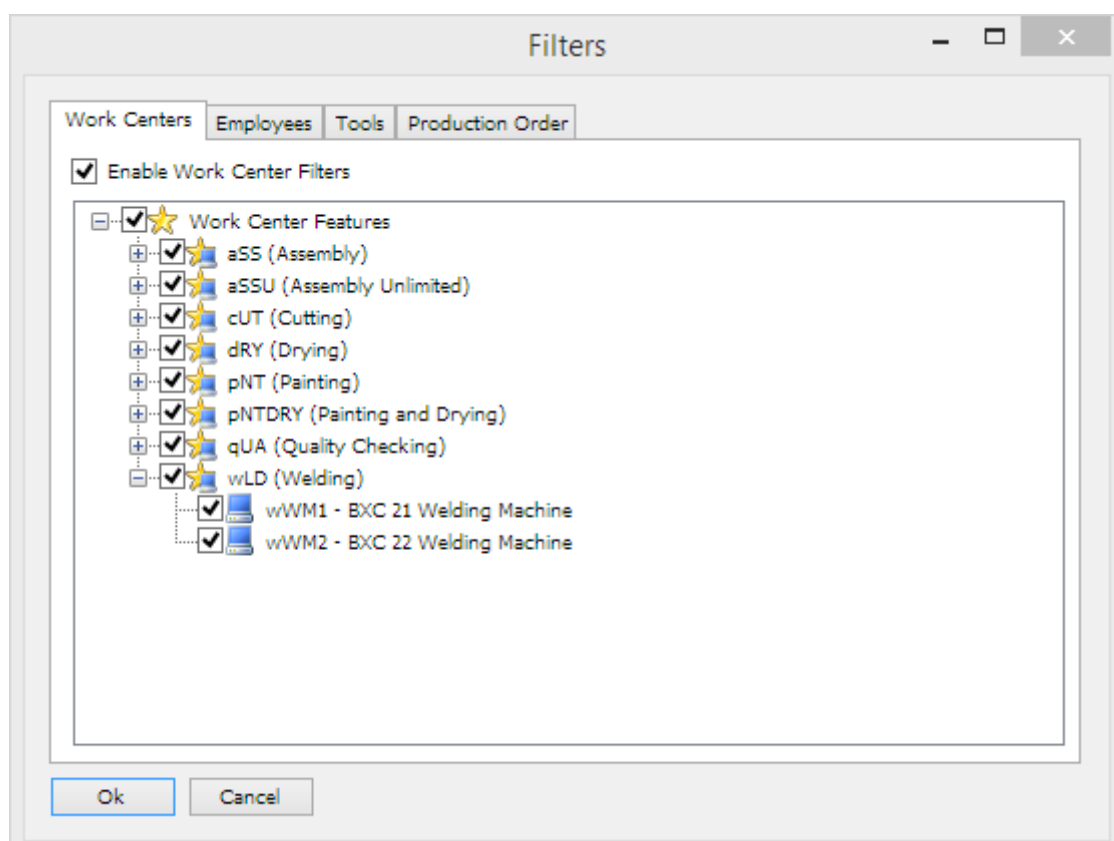


The 'Report Parameters' dialog box contains the following sections:

- Display Defaults**:
 - Date From: Monday, February 20, 2017
 - Date To: Wednesday, March 22, 2017
- Data Source**:
 - ☐ Released
 - ☐ Released and planned
 - ☒ MRP Recommendations
 - ☐ Run MRP now
 - Start Date: Monday, February 20, 2017
- Scenario List**:
 - ☐ MTO_20170209114711 - MTO_20170209114711
 - ☐ MTO_20170220131541 - MTO_20170220131541
 - ☐ MTO_20170220131648 - MTO_20170220131648
 - ☐ SQ_20170220090002 - SQ_20170220090002
- Buttons**: Ok, Cancel

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

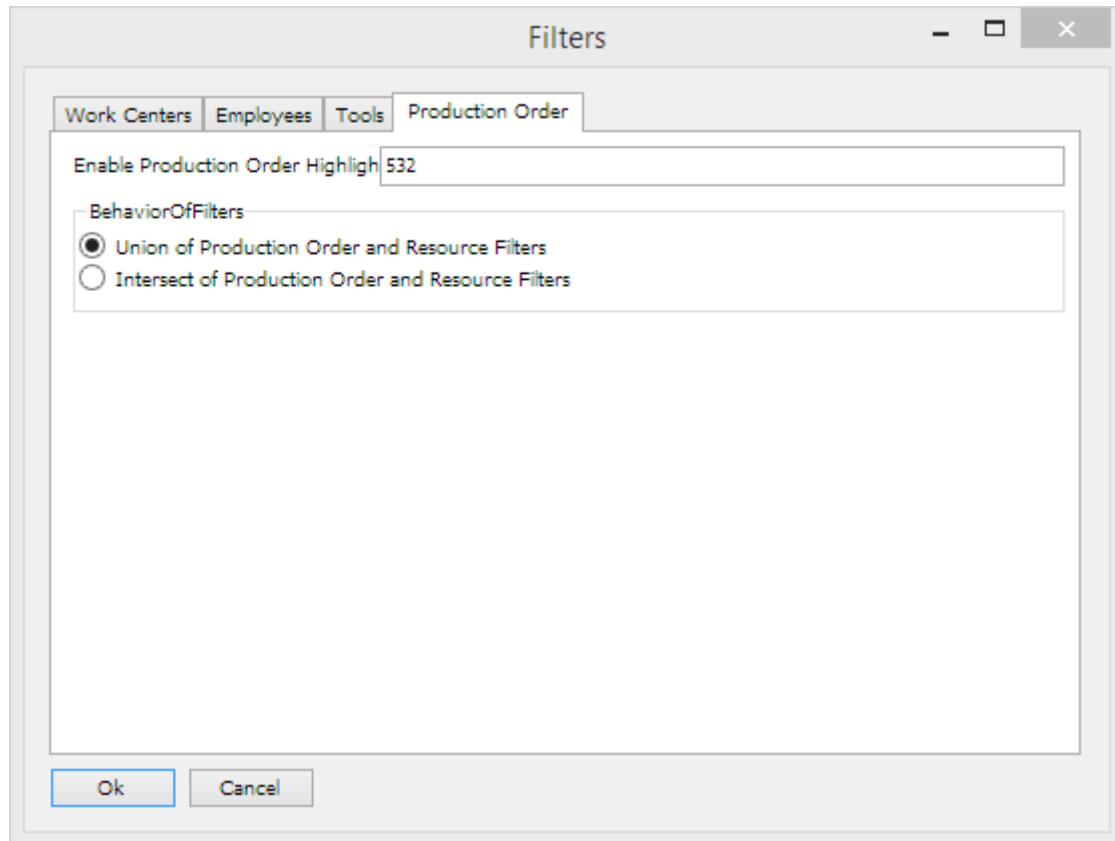
- Enable the filters for resources on the corresponding tab and tick the features or resources to display on the data tree.



The 'Filters' dialog box has the following structure:

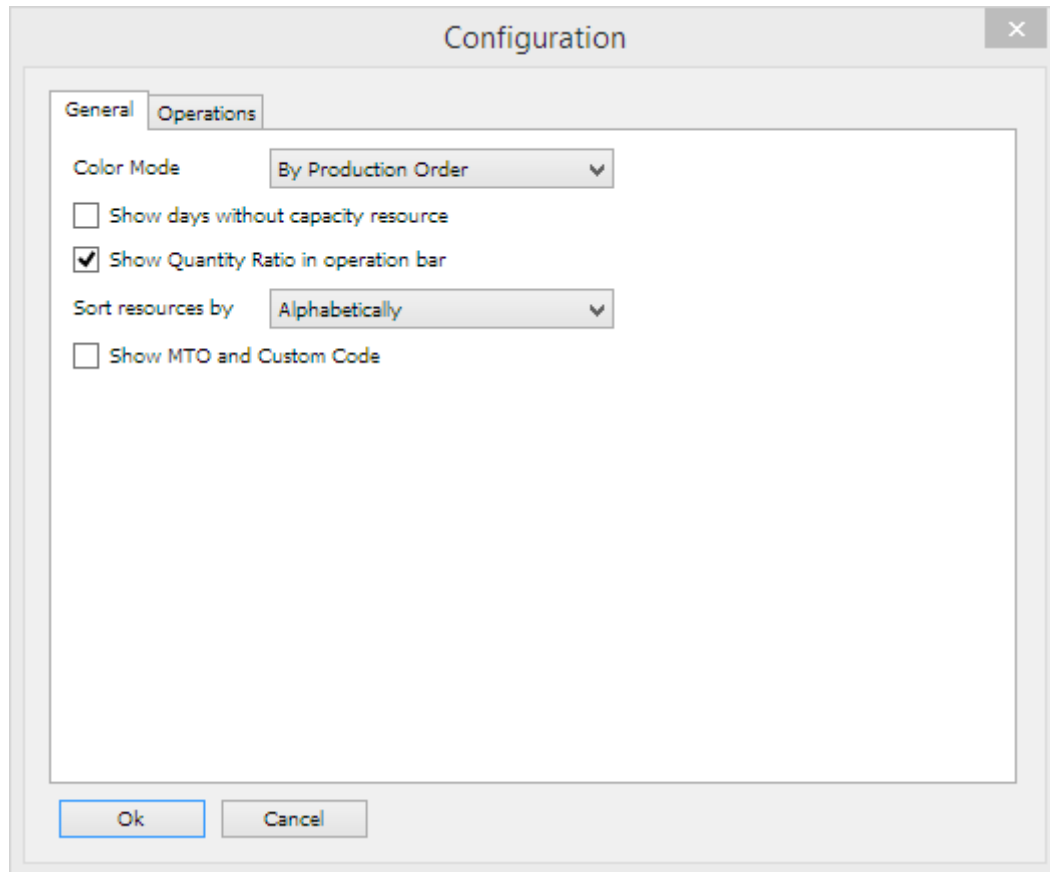
- Tabs**: Work Centers (selected), Employees, Tools, Production Order
- Enable Work Center Filters**: ☒
- Work Center Features** (Tree View):
 - ☒ aSS (Assembly)
 - ☒ aSSU (Assembly Unlimited)
 - ☒ cUT (Cutting)
 - ☒ dRY (Drying)
 - ☒ pNT (Painting)
 - ☒ pNTDRY (Painting and Drying)
 - ☒ qUA (Quality Checking)
 - ☒ wLD (Welding)
 - ☒ wWM1 - BXC 21 Welding Machine
 - ☒ wWM2 - BXC 22 Welding Machine
- Buttons**: Ok, Cancel

- 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.

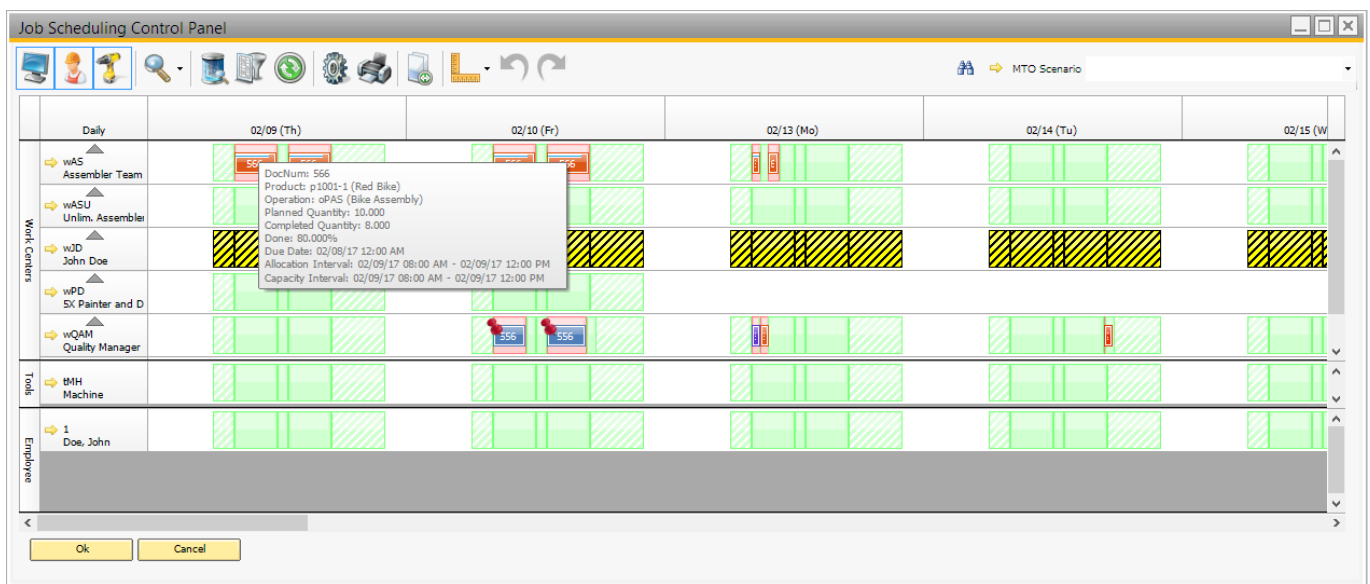


The screenshot shows a window titled "Filters" with a tabbed interface. The tabs are "Work Centers", "Employees", "Tools", and "Production Order". The "Production Order" tab is active. Inside the tab, there is a text input field labeled "Enable Production Order Highlight" containing the number "532". Below this, there is a section titled "BehaviorOfFilters" with two radio button options: "Union of Production Order and Resource Filters" (which is selected) and "Intersect of Production Order and Resource Filters". At the bottom of the window are "Ok" and "Cancel" buttons.

- (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.
- 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.
- (12) **Undo/ Redo:** Click on the left arrow to undo an action. Click on the right arrow to redo an undone action. These buttons are only available while drag and dropping. After updating, the action cannot be undone.
- (13) **MTO Scenario:** Choose MTO Scenario from a list. The selected scenario will be highlighted.

2.2. Resources

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

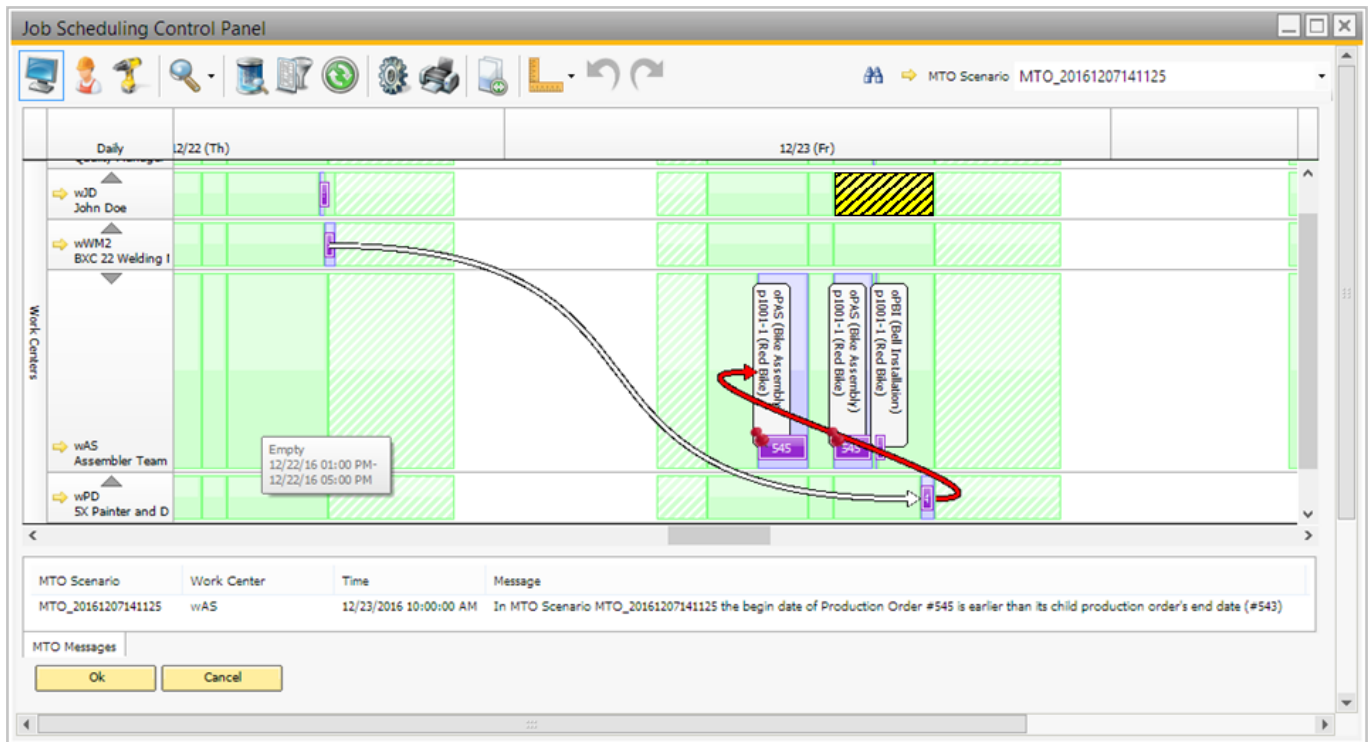
From the right-click menu on work center row the following displaying options can be selected:

- 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.

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.



3. Working with the Job Scheduling Control Panel

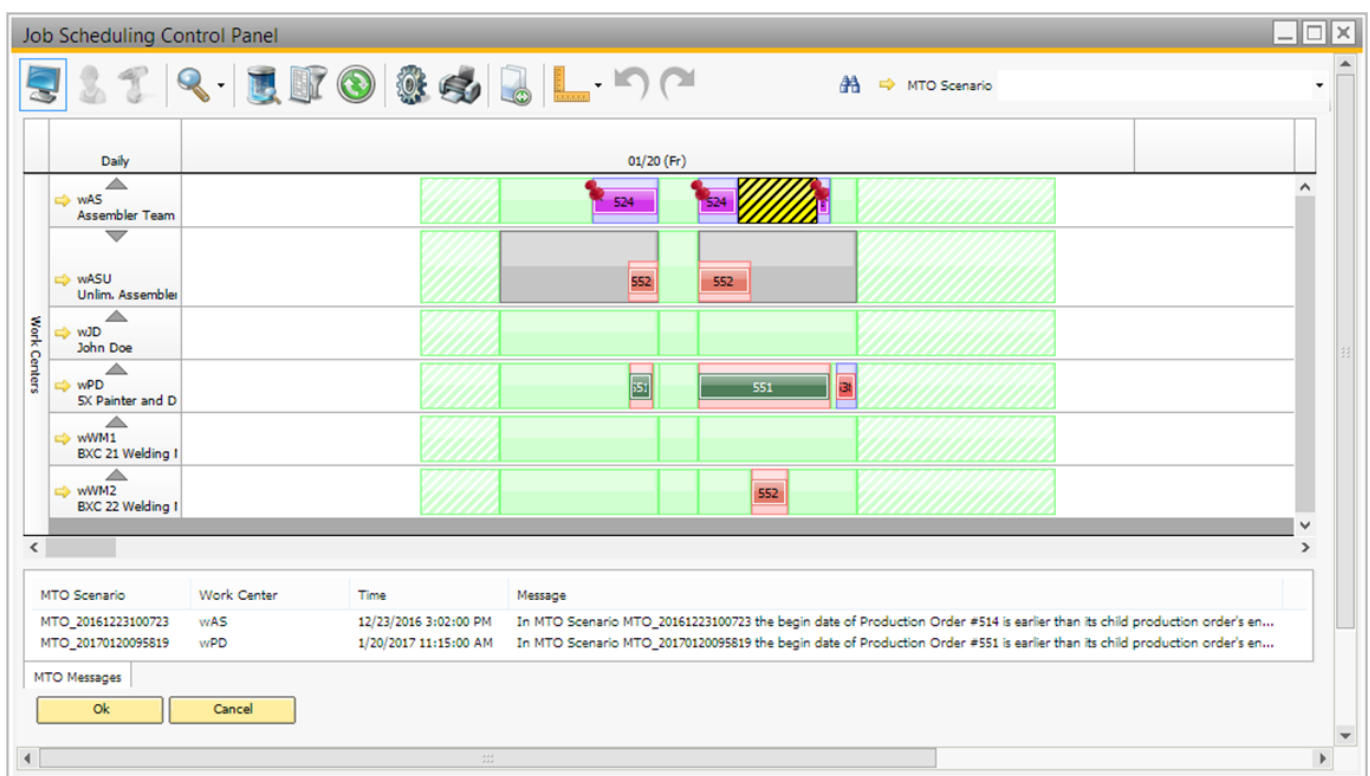
3.1. Review

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)

3.2. Reschedule

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

3.2.1. Manual rescheduling

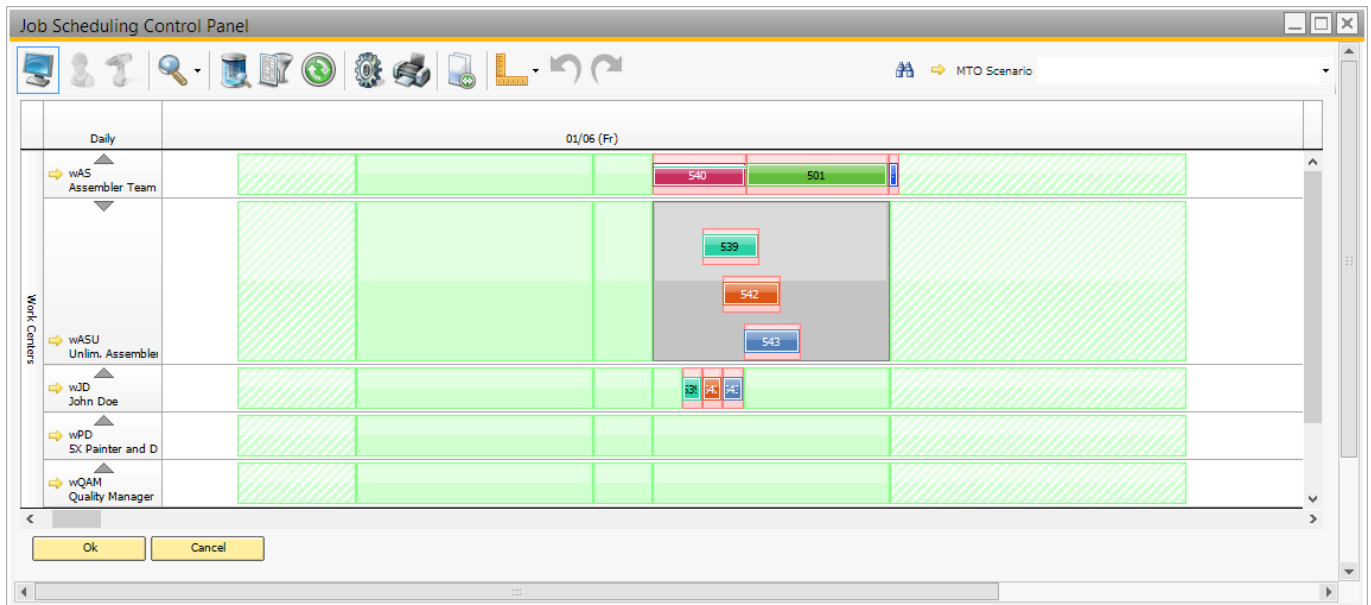
3.2.1.1. Drag &Drop

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

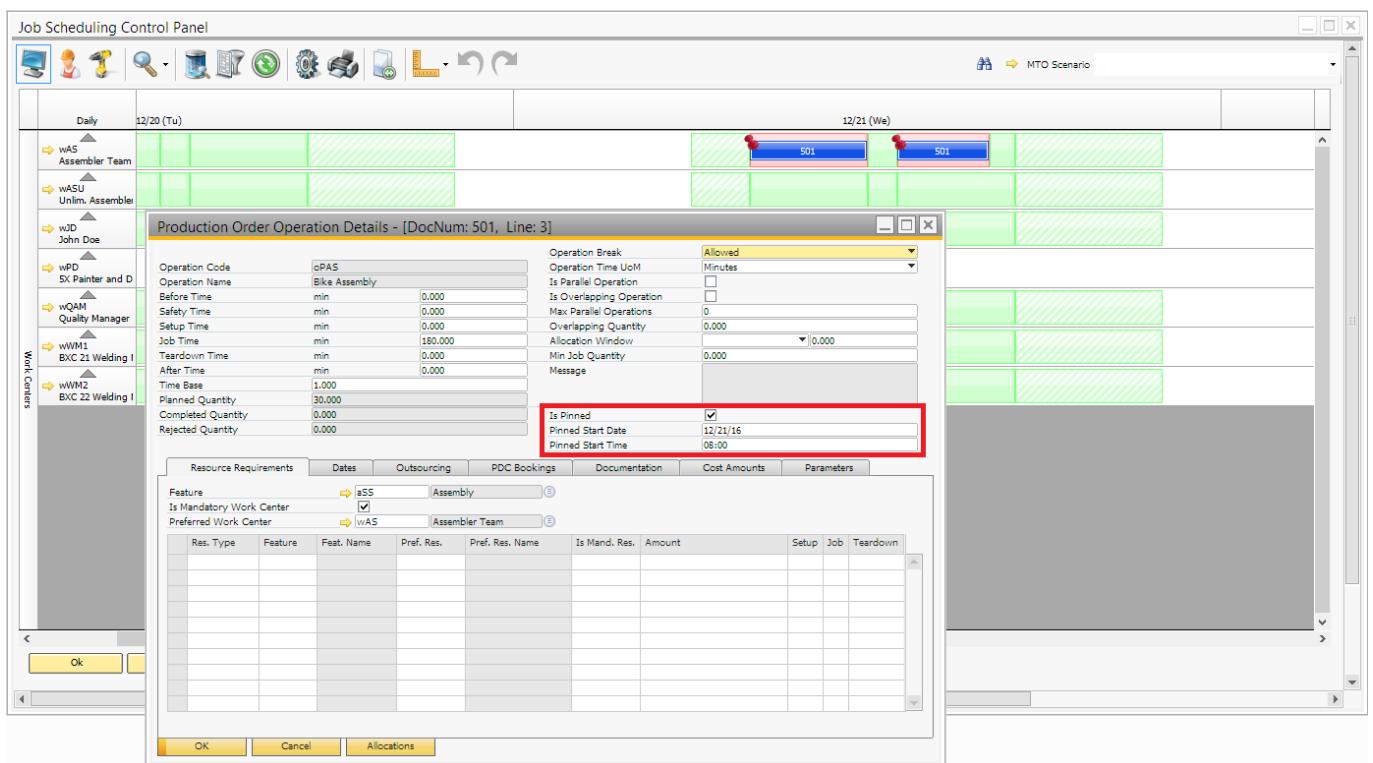
An operation can be shifted later than the subsequent operation but the subsequent operations of the same production order will be automatically shifted later into an available free capacity slot on the timelines of compatible work centers. The overlapping is considered if the subsequent operation can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

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

3.2.1.2. 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.



3.2.2. Semiautomatic rescheduling

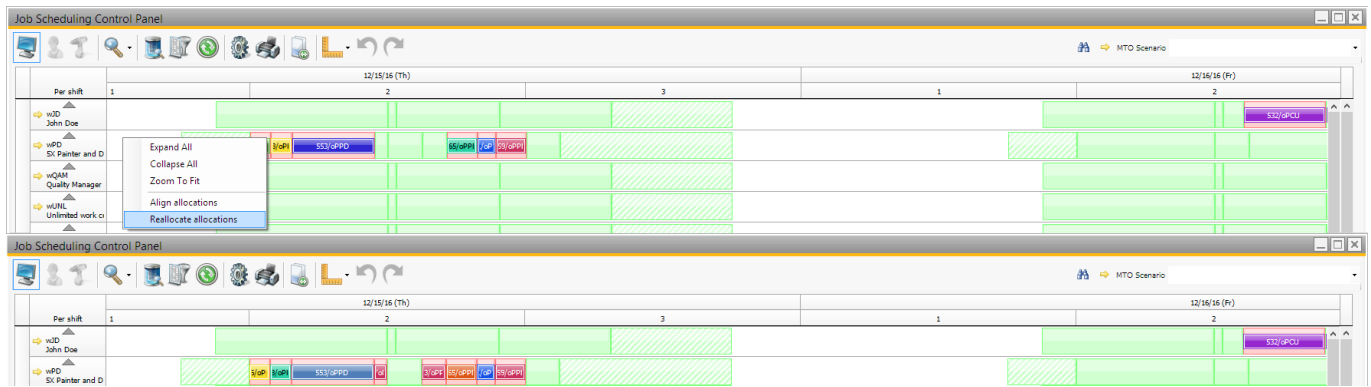
Initiate the rescheduling from the right-click menu of a work center row.

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.

3.2.2.1. 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.



3.2.2.1. Align Allocations

Use this function to optimize the scheduling of a critically important work center (key resource). The function works best for 7×24 manufacturing.

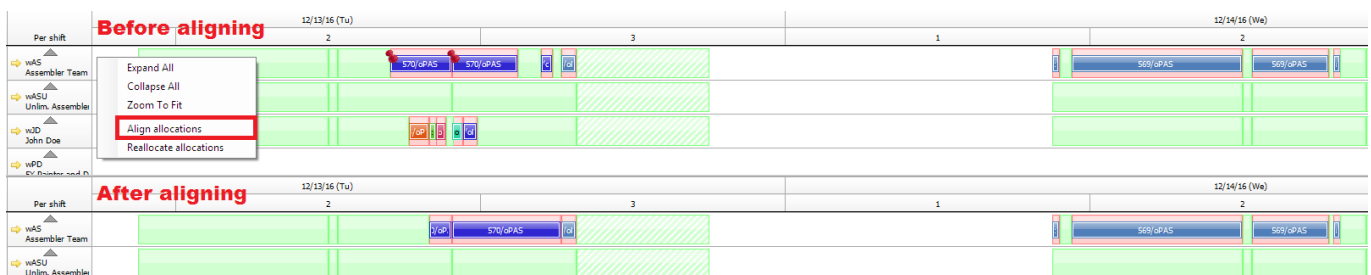
Before initiating the aligning process, set its parameters on the [Prod. Order tab of Produmex Manufacturing Settings](#).

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.

After the aligning is initiated, the system starts to optimize the scheduling plan meaning that it aims to eliminate the gaps and to align related operations.

When there is a longer empty allocation between two allocations than the defined gap, the aligning process stops. This means that the actual duration of the aligning is might shorter than set in the '*JSCP align max days parameter*'. This way the rescheduling of production orders with further due dates can be prevented.

Inactive periods are included to the gap between the two allocations. The process might reschedule pinned allocations too.



3.2.3. Actions that trigger automatic rescheduling

3.2.3.1. 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.

The screenshot displays the 'Job Scheduling Control Panel' interface. At the top, there's a toolbar with various icons and a dropdown menu set to 'MTO Scenario'. Below this, a grid shows the shift plan for three dates: 12/08/16 (Th), 12/09/16 (Fr), and 12/12/16 (Mo). The grid lists resources like 'wAS Assembler Team', 'wASU Unim. Assembler', 'wJD John Doe', 'wPD SK Painter and D', 'wQAM Quality Manager', 'wWM1 BVC 21 Welc', and 'wWM2 BVC 22 Welc'. A 'Reallocation Report' dialog is open in the foreground, showing a table of work centers and days to be changed. The table includes columns for Resource Type, Work Center, Day, Type, Prod.Hours Delta, Overt.Hours Delta, Status, and Message. The report shows several errors and warnings related to reallocating segments. A 'Shift Plan Year' dialog is also visible in the background, showing a table of dates, months, weeks, days, shift day types, and comments.

Resource Type	Work Center	Day	Type	Prod.Hours Delta	Overt.Hours Delta	Status	Message
Work-Center	wAS	12/09/16	✖	-2.000	-7.000	Error	Cannot reallocate segment
Work-Center	wASU	12/09/16	⚠	-2.000	-7.000	Warning	
Work-Center	wJD	12/09/16	⚠	-2.000	-7.000	Warning	
Work-Center	wQAM	12/09/16	✖	-2.000	-7.000	Error	Cannot reallocate segment
Work-Center	wWM1	12/09/16	⚠	-2.000	-7.000	Warning	
Work-Center	wWM2	12/09/16	⚠	-2.000	-7.000	Warning	
Employee	EM_FM	12/09/16	⚠	-2.000	-7.000	Warning	
Employee	EM_ID	12/09/16	⚠	-2.000	-7.000	Warning	

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

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:

Employee Master Data

First Name

John

Employee No.

1

Middle Name

Ext. Employee No.

JD

Last Name

Doe

☒ Active Employee

Job Title

Linked Vendor

Position

Office Phone

Department

Ext.

Branch

Mobile Phone

Manager

Pager

User Code

Home Phone

Sales Employee

→ -No Sales Employ

Fax

Cost Center

E-Mail

Address

Membership

Administration

Personal

Finance

Remarks

Attachments

Work Address

Street

Street No.

Block

Building/Floor/Room

Zip Code

City

County

State

Country

Home Address

Street

Street No.

Block

Building/Floor/Room

Zip Code

City

County

State

Country

OK

Cancel

All Categories

AT Class

None

Maximum Parallel Operations

0 - None

Shift Plan

10 - Ten Minutes

PDC Password

15 - Fifteen Minutes

20 - Twenty Minutes

30 - Thirty Minutes

5 - Five Minutes

With the 'AT Class' UDF field you can set the "rounding" for the booked time to the nearest 5, 10, 15, 20 or 30 minutes. If this setting is not 0, the booked time will be corrected (for example if the booking happened at 15:40 and the rounding is set to 15 minutes, the calculated time will be 15:45), and the corrected times will be shown on the forms together with the actual booked time.

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](#)

Employee Master Data

First Name: John
Middle Name:
Last Name: Doe

Employee No.: 1
Ext. Employee No.: JD
☒ Active Employee

Job Title:
Position:
Department:
Branch:
Manager:
User Code:
Sales Employee: -No Sales Employ
Cost Center:

Linked Vendor:
Office Phone:
Ext.:
Mobile Phone:
Pager:
Home Phone:
Fax:
E-Mail:

AT Class: None
Maximum Parallel Operations: 5
Shift Plan: rEGSP
PDC Password:

Address

Membership

Administration

Personal

F

Work Address

Home Address

Street:

Street No.:
Block:
Building/Floor/Room:
Zip Code:
City:
County:
State:
Country:

Shift Plan

Code: rEGSP
Name: Regular Shift Plan

Year

2014
2015
2016
2017

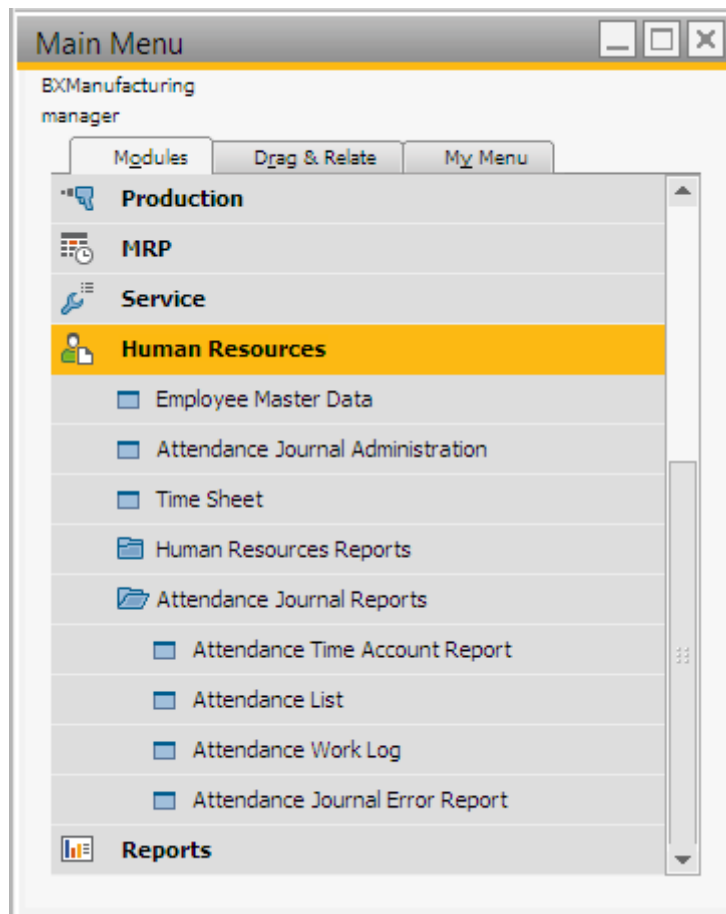
Shift Plan Year

Shift Plan: rEGSP
Years: 2017

Date	Month	Week	Day	Shift Day Type	Comment
01/01/17	January	52	Sunday	Normal Working Days	
01/02/17	January	1	Monday	Normal Working Days	
01/03/17	January	1	Tuesday	Normal Working Days	
01/04/17	January	1	Wednesday	Normal Working Days	
01/05/17	January	1	Thursday	Normal Working Days	
01/06/17	January	1	Friday	Normal Working Days	
01/07/17	January	1	Saturday		
01/08/17	January	1	Sunday		
01/09/17	January	2	Monday	Normal Working Days	
01/10/17	January	2	Tuesday	Normal Working Days	

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.

Canceled	EmployeeID	Employee Name	Department Name	Posting Date	Posting Time	Original Posting Date	Original Posting Time	In	Reason Name	Error Code	Error Text	Administrator User	Added By Administrator	Admin Date	Admin Time
<input checked="" type="checkbox"/>	1	Doe, John		12/20/16	10:03:29	12/20/16	10:03:29	<input checked="" type="checkbox"/>				manager	<input type="checkbox"/>	01/11/17	16:19
<input checked="" type="checkbox"/>	2	Morrison, Fred		12/20/16	10:04:03	12/20/16	10:04:03	<input checked="" type="checkbox"/>				manager	<input type="checkbox"/>	01/11/17	16:19
<input checked="" type="checkbox"/>	1	Doe, John		12/20/16	10:04:10	12/20/16	10:04:10	<input checked="" type="checkbox"/>				manager	<input type="checkbox"/>	01/11/17	16:19
<input checked="" type="checkbox"/>	2	Morrison, Fred		12/20/16	10:04:14	12/20/16	10:04:14	<input checked="" type="checkbox"/>					<input type="checkbox"/>		
<input checked="" type="checkbox"/>	1	Doe, John		12/20/16	10:09:22	12/20/16	10:09:22	<input checked="" type="checkbox"/>					<input type="checkbox"/>		
<input checked="" type="checkbox"/>	1	Doe, John		12/20/16	10:09:29	12/20/16	10:09:29	<input checked="" type="checkbox"/>					<input type="checkbox"/>		
<input checked="" type="checkbox"/>	1	Doe, John		12/20/16	10:17:56	12/20/16	10:17:56	<input checked="" type="checkbox"/>	Lunch Break				<input type="checkbox"/>		
<input checked="" type="checkbox"/>	1	Doe, John		12/20/16	10:18:54	12/20/16	10:18:54	<input checked="" type="checkbox"/>	Lunch Break				<input type="checkbox"/>		
<input checked="" type="checkbox"/>	1	Doe, John		12/20/16	10:22:54	12/20/16	10:22:54	<input checked="" type="checkbox"/>					<input type="checkbox"/>		
<input checked="" type="checkbox"/>	1	Doe, John		12/20/16	10:24:31	12/20/16	10:24:31	<input checked="" type="checkbox"/>					<input type="checkbox"/>		
<input checked="" type="checkbox"/>	2	Morrison, Fred		12/20/16	10:24:43	12/20/16	10:24:43	<input checked="" type="checkbox"/>					<input type="checkbox"/>		
<input checked="" type="checkbox"/>	1	Doe, John		12/20/16	11:43:04	12/20/16	11:43:04	<input checked="" type="checkbox"/>					<input type="checkbox"/>		
<input checked="" type="checkbox"/>	1	Doe, John		12/20/16	11:43:36	12/20/16	11:43:36	<input checked="" type="checkbox"/>					<input type="checkbox"/>		
<input checked="" type="checkbox"/>	1	Doe, John		12/20/16	11:43:38	12/20/16	11:43:38	<input checked="" type="checkbox"/>					<input type="checkbox"/>		
<input checked="" type="checkbox"/>	2	Morrison, Fred		12/20/16	12:08:06	12/20/16	12:08:06	<input checked="" type="checkbox"/>					<input type="checkbox"/>		

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

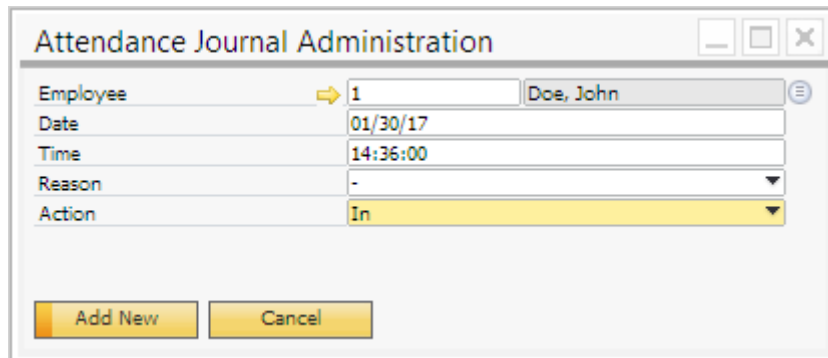
(he is late). Reasons can be defined on the Absence Reasons UDW.

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, although without any effect in calculating work time. 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:



The screenshot shows a web-based form titled "Attendance Journal Administration". It has a header bar with a title and window controls. Below the header, there are several input fields: "Employee" with a dropdown arrow, "Date", "Time", "Reason" with a dropdown arrow, and "Action" with a dropdown arrow. The "Employee" field shows "1" and "Doe, John". The "Date" field shows "01/30/17". The "Time" field shows "14:36:00". The "Reason" field shows "-". The "Action" field shows "In". At the bottom of the form, there are two buttons: "Add New" and "Cancel".

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

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.

EmployeeID	Employee Name	Attendance Plan	Total Planned	Total Actual	Total Calculated	Total Difference	Day	Date	State	Plan In	Plan Out	Plan Break	Plan Duration	Actual In	Actual Out	Actual Break	Actual Duration	Calculated In	Calculated Out	Calculated Break	Calculated Duration	Difference
2	Morrison, Fred		135:00	60:16	60:16	-74:44	Su	01/01/17	Weekend													
		HORMSDT					Mo	01/02/17														
		HORMSDT					Tu	01/03/17														
		HORMSDT					We	01/04/17														
		HORMSDT					Th	01/05/17		06:00	22:00	01:00	15:00	06:00	22:00	01:00	15:00	06:00	22:00	01:00	15:00	00:00
		HORMSDT					Fr	01/06/17		06:00	22:00	01:00	15:00	06:10	22:03	00:58	14:55	06:10	22:00	01:00	14:50	-00:10
							Sa	01/07/17	Weekend													
							Su	01/08/17	Weekend													
							Mo	01/09/17														
							Tu	01/10/17														
		HORMSDT					We	01/11/17														
		HORMSDT					Th	01/12/17		06:00	22:00	01:00	15:00	05:55	21:59	00:56	15:08	06:00	21:59	01:00	14:59	-00:01
		HORMSDT					Fr	01/13/17		06:00	22:00	01:00	15:00	05:59	21:52	00:20	15:13	06:00	21:52	01:00	14:32	-00:28
							Sa	01/14/17	Weekend													
							Su	01/15/17	Weekend													
							Mo	01/16/17														
							Tu	01/17/17														
		HORMSDT					We	01/18/17														
		HORMSDT					Th	01/19/17		06:00	22:00	01:00	15:00									-15:00
							Fr	01/20/17		06:00	22:00	01:00	15:00									-15:00
							Sa	01/21/17	Weekend													
							Su	01/22/17	Weekend													

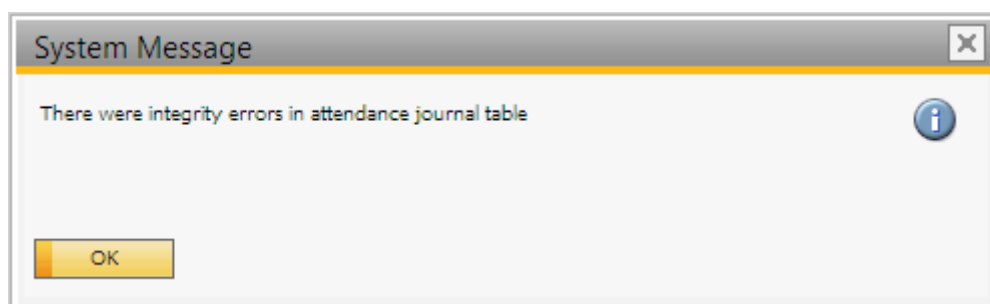
In the first line for the 1st of the month the report shows the employee name, the total planned and the total booked time, and the difference between them (**Total Difference = Total Planned - Total Calculated**). If it is not yet the end of the month, the total difference will show negative numbers.

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). Columns with "Calculated" show the rounded time (see Master Data Settings).

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](#)

Please note: If the shift starts at 7:00 (Plan In), and the employee comes in earlier, he loses this time, as the working time is only calculated from the beginning of the shift.

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.

Op. Code	Pr.Ord.No	Posting Code	%	Start	End	Duration
oPCU	509	Start Job	0.000	11:39	11:39	0.000
oPCU	509	Completed Job	100.000	11:38	11:39	60.000

2.2.4. Attendance Journal Error Report

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

EmployeeID	Employee Name	In	Posting Date	Posting Time	Reason Name	Error Kind
1	Doe, John	<input checked="" type="checkbox"/>	01/30/17	08:00:00		Duplicated bookings in identical direction
1	Doe, John	<input checked="" type="checkbox"/>	01/30/17	12:00:00		Duplicated bookings in identical direction

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

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.

The screenshot shows the 'Shift Day Type' dialog box. The 'Code' field is 'nORMSDT' and the 'Name' field is 'Normal Working Days'. A right-click menu is open over the table, showing options: 'Remove', 'Duplicate' (highlighted), 'Add Row', and 'Delete Row'. The table has columns: Shift, Description, From Time, To Time, Is Productive, Is Overtime, and Productive Ratio.

Shift	Description	From Time	To Time	Is Productive	Is Overtime	Productive Ratio
mOROT	Morning Overtime	06:00	08:00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0.700
mOR	Morning Shift	08:00	12:00	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0.750
INCBR	Lunch Brake Shift	12:00	13:00	<input type="checkbox"/>	<input type="checkbox"/>	1.000
aNN	Afternoon Shift	13:00	17:00	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0.950
nGHTOT	Night Overtime	17:00	22:00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0.600

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.

The screenshot shows the 'Shift Day Type' dialog box with the new shift day type. The 'Code' field is 'nORMSDT_O' and the 'Name' field is 'Normal Working Days with overtime'. The table has columns: Shift, Description, From Time, To Time, Is Productive, Is Overtime, and Productive Ratio.

Shift	Description	From Time	To Time	Is Productive	Is Overtime	Productive Ratio
mOROT	Morning Overtime	06:00	08:00	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	0.700
mOR	Morning Shift	08:00	12:00	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0.750
INCBR	Lunch Brake Shift	12:00	13:00	<input type="checkbox"/>	<input type="checkbox"/>	1.000
aNN	Afternoon Shift	13:00	17:00	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0.950
nGHTOT	Night Overtime	17:00	22:00	<input checked="" type="checkbox"/>	<input type="checkbox"/>	0.600

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

Reallocator Report

Ok ☐ Warning ☒ Error ☒

List of Work Centers and Days to be Changed

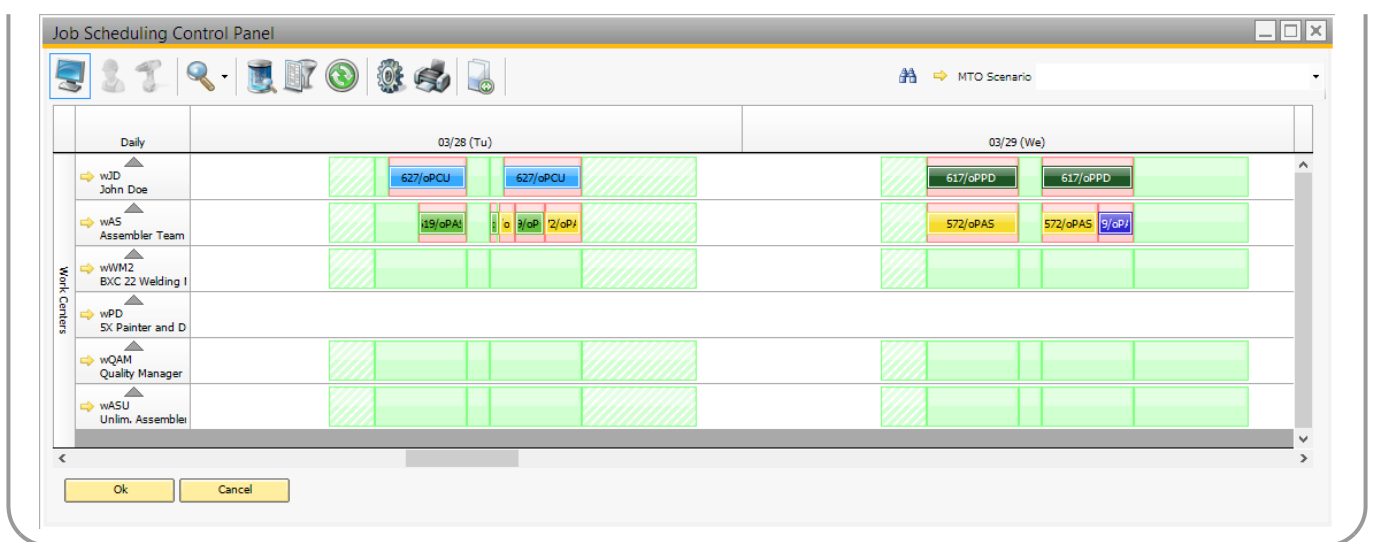
Resource Type	Work Center	Day	Type	Prod.Hours Delta	Overt.Hours Delta	Status	Message
Work-Center	wAS	03/20/17	⚠	5,000	-5,000	Warning	
Work-Center	wASU	03/20/17	⚠	5,000	-5,000	Warning	
Work-Center	wJD	03/20/17	⚠	5,000	-5,000	Warning	
Work-Center	wQAM	03/20/17	⚠	5,000	-5,000	Warning	
Work-Center	wWM1	03/20/17	⚠	5,000	-5,000	Warning	
Work-Center	wWM2	03/20/17	⚠	5,000	-5,000	Warning	
Constraint	cCO	03/20/17	⚠	5,000	-5,000	Warning	
Constraint	cEL	03/20/17	⚠	5,000	-5,000	Warning	
Employee	1	03/20/17	⚠	5,000	-5,000	Warning	
Tool	tMH	03/20/17	⚠	5,000	-5,000	Warning	

I acknowledge that these shift changes may affect MRP and resource planning Confirmation ☒

Proceed Cancel

In order to proceed, acknowledge the message by ticking the 'Confirm' checkbox under the grid. The 'Proceed' button will become 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.

The screenshot shows the 'Reallocator Report' window. It has three tabs: 'Ok', 'Warning', and 'Error'. The 'Error' tab is selected, showing a table with columns: Resource Type, Work Center, Day, Type, Prod.Hours Delta, Overt.Hours Delta, Status, and Message. Two rows are visible, both with 'Error' status and messages: 'Cannot reallocate segment! 3/27/2017 1:00:00 PM' and 'Cannot reallocate segment! 3/28/2017 1:00:00 PM'. A 'Reallocator Report Details' dialog box is open in the foreground, showing fields for Resource Type (Work-Center), Resource (wJD), and Date (03/28/17). It also contains a table with columns: Pr.Ord.No, Pr.Ord.Line, From Time, To Time, and Type. The table shows two rows for Pr.Ord.No 627, both with 'Released' type.

Resource Type	Work Center	Day	Type	Prod.Hours Delta	Overt.Hours Delta	Status	Message
Work-Center	wJD	03/27/17	✗	-4,000	-5,000	Error	Cannot reallocate segment! 3/27/2017 1:00:00 PM
Work-Center	wJD	03/28/17	✗	-4,000	-5,000	Error	Cannot reallocate segment! 3/28/2017 1:00:00 PM

Pr.Ord.No	Pr.Ord.Line	From Time	To Time	Type
627	1	08:00	11:25	Released
627	1	13:00	16:25	Released

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 Manufacturing Settings

General | SQL | Logs | Reports | MRP | PDC | Prod.Order | Master Data | MTO | Thin Client | Thin Client 2 | Food | Scheduled Real

Worker can modify bookings ☐
 Approver can modify bookings ☐
 Global idle timeout (seconds) 0
 Global screen timeout (seconds) 0
 Employee approver role Approver
 Employee Workshop Monitor Role Workshop Monitor
 Employee Quality Control Role QC Inspector
 Workcenter Admin Role
 Enable PDC ☒
 Enable PTM ☒
 Enable QC ☒
 Enable Workshop Monitor ☒
 Enable Workcenter Journal ☒
 Enable Workcenter Tickets ☒
 Enable Legacy Mode in PDC ☐
 Pre-fill planned material quantities ☒
 Pre-fill planned by-product quantities ☒
 Pre-fill the bin locations quantities with available quantities ☐
 Skip material quantities screen ☐
 Skip by-product quantities screen ☐
 Skip material serial/batch quantities screen ☐
 Skip product serial/batch quantities screen ☒
 Logout after PDC bookings ☐
 Enable Partial Book & Stay ☐
 Can insert new materials into production orders ☒
 Login Is Password Protected ☐
 Only Job Bookings On Running Jobs Screen ☐
 Force enter product serial/batch numbers and quantities ☐

Update Cancel

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.

PDCExtendedConfiguration

#	Material Select From List	Outsourced Operations	Rejected Quantity	Work Center Ignore	Work Center Modification	Work Center	Last Modif.	Comment Visible	Zero By Product Quantity
1		Yes	Yes	Yes	No	wPD		No	No
2		No	No	No	No			No	No

PDCTerminalConfiguration

#	Code	Name	Simple Job Completion	TerminalID	Work Center	Last Modif.	Simple Job Completion Only
1	1	1	Yes	PMX_BUDTOSH	wPD		No
2			No				No

OK Cancel

1.2. Setup employee roles

Produmex Manufacturing Settings

General SQL Logs Reports MRP PDC Prod.Order Master Data MTO Thin Client Thin Client 2 Food Scheduled Real

Worker can modify bookings ☐

Approver can modify bookings ☐

Global idle timeout (seconds) 0

Global session timeout (seconds) 0

Employee approver role Approver

Employee Workshop Monitor Role Workshop Monitor

Employee Quality Control Role QC Inspector

Workcenter Admin Role

Enable PDC ☒

Enable PTM ☒

Enable QC ☒

Enable Workshop Monitor ☒

Enable Workcenter Journal ☒

Enable Workcenter Tickets ☒

Enable Legacy Mode in PDC ☐

Pre-fill planned material quantities ☒

Pre-fill planned by-product quantities ☒

Pre-fill the bin locations quantities with available quantities ☐

Skip material quantities screen ☐

Skip by-product quantities screen ☐

Skip material serial/batch quantities screen ☐

Skip product serial/batch quantities screen ☒

Logout after PDC bookings ☐

Enable Partial Book & Stay ☐

Can insert new materials into production orders ☒

Login Is Password Protected ☐

Only Job Bookings On Running Jobs Screen ☐

Force enter product serial/batch numbers and quantities ☐

Update Cancel

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](#)

2. Mobile Device

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

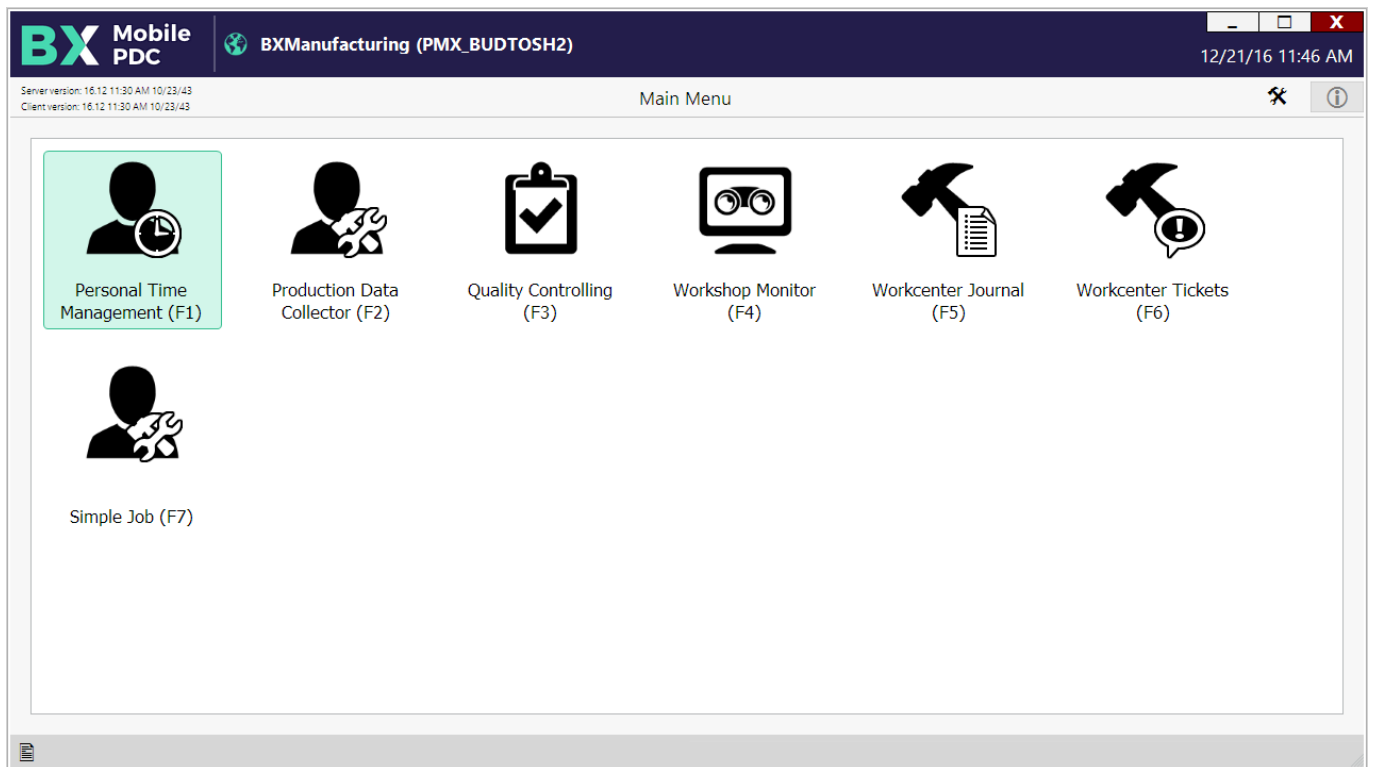
The user interface was primarily designed for industrial PCs and mobile devices. It means that the windows are not 'normal' windows as in any other applications. You can only move the windows with the blue frame around the window and it will not store the form settings so it always starts maximized.


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.

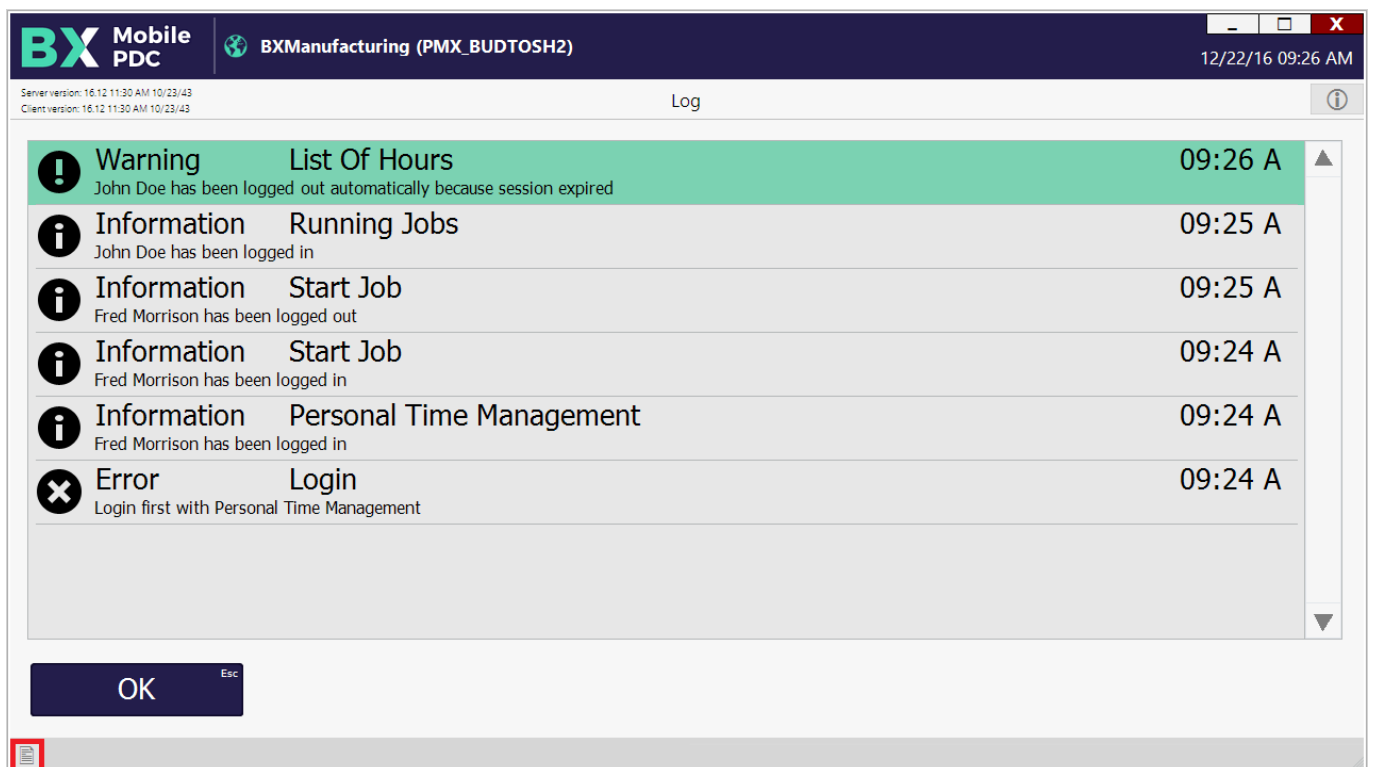
If you press tab after adding the code of an employee or operation, the system automatically populates the respective fields. If you have a scanner attached, any data can be added by scanning the barcode.

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.

[illegible]


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](#)



Mobile

PDC



TEST_WMSMF (PMX_BUDTOSH2)

01/03/17 10:16 AM

Log (00:30)

✕

?

Employee

John Doe

Tuesday, 12/20/16	10:03 AM - 10:04 AM	▲
Tuesday, 12/20/16	10:09 AM - 10:09 AM	
Tuesday, 12/20/16	10:17 AM - 10:18 AM	
Tuesday, 12/20/16	10:22 AM - 10:24 AM	
Tuesday, 12/20/16	11:43 AM - 11:43 AM	
Tuesday, 12/20/16	11:43 AM - 12:08 PM	▼

OK

Esc

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.



Operation	Doc Entry	Line Number	Production order number	Main product code	Open quantity	Planned Quantity	Assigned work center	Time of the last PDC booking
Setup 6-3 (oPWE - Welding)	#505 mM1101 (Raw Bike Framework)	Open: 1 Planned: 1	Workcenter: wWM2	02:22 PM				
Job 5-10 (oPBI - Bell Installation)	#504 p1001-1 (Red Bike)	Open: 0 Planned: 1	Workcenter: wAS	01:58 PM				

Displayed information:

- Operation phase
- Doc Entry - Line Number (Operation code - name)
- Production order number, Main product code (name)
- Open quantity, Planned Quantity, Assigned work center
- Time of the last PDC booking for the operation
- Date of the last PDC booking for the operation
- 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 DocEntry- LineNum identifier can be found on the Job Requirements report.

Operation:		oPAS - Bike Assembly		<i>Operation ID:</i> 00004039	
	Begin Date&Time: 08/28/17 08:00 AM		Production Order: 43 / 3		
	Before Time: 0.00 [min]		Product Code: ITEM05 - Batch number + best before da		
	After Time: 0.00 [min]		MtO Scenario:		
			Custom Code:		
	ITEM01	No Batch no serial no BBD	10.00		
	00004037	manual UOM			
	ITEM10	Batch number + 2ND Batch +	20.00		
	00004038	best before date manual UOM			
Work Center:	wAS - Assembler Team		<i>Allocation ID:</i> 00004006		
<i>OP:</i>					
<i>oPAS</i>					
	Doc Entry – Line Number Identifier 43-2 				
	Start Date&Time: 08/28/17 08:00 AM		End Date&Time: 08/28/17 12:00 PM		
	Setup Time: 0.00 [min]		Teardown Time: 0.00 [min]		
	Quantity: 0.93		Identification Code: 43-2-wAS		
	Job Time: 240.00 [min]		Total Duration: 240.00 [min]		
	Feature: aSS - Assembly				

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.

Employee Master Data

First Name: John, Middle Name: , Last Name: Doe, Employee No.: 1, Ext. Employee No.: JD, ☒ Active Employee

Job Title: , Position: , Department: , Branch: , Manager: , User Code: , Sales Employee: -No Sales Employ, Cost Center: , Linked Vendor: , Office Phone: , Ext.: , Mobile Phone: , Pager: , Home Phone: , Fax: , E-Mail:

Address | Membership | Administration | Personal | Finance | Remarks | Attachments

Work Address | Home Address

Street: , Street No.: , Block: , Building/Floor/Room: , Zip Code: , City: , County: , State: , Country:

OK Cancel

General

AT Class: None

Maximum Parallel Operations: 1

Shift Plan:

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.

Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison 06/09/17 12:54 PM

Server: 17.05.31007.18920 Client: 17.05.31007 Start Job (00:30)

Default Work Center		F12
Operation	6-1 (oPCU - Cutting - 505)	F11 F12
Work Center	wJD (John Doe)	F11 F12

Start Setup F1 Start Job F2 Admin F3 Clear F4 Cancel Esc

When there is a default work center set for the terminal on the *PDC Extended Configuration* UDT, an additional Default Work Center field is displayed on the top of the operation field. The default work center is prefilled if the work center is mandatory. In this case bookings can only be created for operations with features supported by the default work center.

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

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. Otherwise the user has to enter the work center or he can choose from the list of available work centers by pressing F11.

When the 'PDC Modifiable WC for Start' option is disabled on the [Thin Client tab](#) of Prodimex Manufacturing Settings or the '*Work Center Modification*' option is set to 'No' on the PDC Extended Configurations form, the work center cannot be modified when starting the operation phase.

Mobile PDC

TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison

06/09/17 12:54 PM

Server: 17.05.31007.18920
Client: 17.05.31007

(00:28)

Search

Search

wWM1
BXC 21 Welding Machine

wWM2
BXC 22 Welding Machine

OK Cancel

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.

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.

Mobile PDC

TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison

06/09/17 12:54 PM

Server: 17.05.31007.18920
Client: 17.05.31007

Start Job Confirmation (00:30)

PDC Booking	#N/A
Production Order	#501 p1001-1 (Red Bike)
Operation	2-3 (oPAS - Bike Assembly)
Summary	0 completed quantity 0 rejected quantity
Serial / Batch Numbers	0 serial numbers and 0 batch numbers
By-Products	0 by-products
Materials	2 materials
Error	

Done Cancel

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.

Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison 06/09/17 12:54 PM

Server: 17.05.31007.18920 Client: 17.05.31007

Partial Job (00:30)

Production Order	#596 p1001-1 (Red Bike)	UoM	pcs
Operation	97-3 (oPAS - Bike Assembly)		
Started	02/22/17 11:51 AM	<input checked="" type="checkbox"/> Completed	
Bin Location			
Duration	6 min	This Day	
Quantity	4	Rejected Quantity	1

Done Done & Stay Cancel

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.

With the 'Completed' checkbox the user can control whether to continue on working on this job or not. If the checkbox is checked, the operation will be omitted from the list of running jobs after a job completion booking. The field is unchecked by default. 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.

Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison 06/09/17 12:54 PM

Server: 17.05.31007.18920 Client: 17.05.31007 [Products] (00:30)

Production Order #599 mM1101 (Raw Bike Framework) UoM pcs

Operation 100-1 (oPCU - Cutting)

Product Bin Location 01-SYSTEM-BIN-LOC...

Quantity 5

Item	Name	Bin Location	Quantity
mM1101	Raw Bike Framework	01-SYSTEM-BIN-LOCA	5 of 5 pcs
m2	Steel Pipe	01-SYSTEM-BIN-LOCA	10 of 10 m

Done Cancel Serial / Batch Bin Location

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.

Mobile PDC | TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison | 06/09/17 12:54 PM

Series: 17.05.31007.18920 | Client: 17.05.31007 | Product Batch Numbers (00:29)

Production Order: #600 Item01 (Batch nbr) | UoM: |

Operation: 101-1 (oPCU - Cutting)

Item: Item01 (Batch nbr) | Bin Location: 01-W2-W2-S2 | F11 ... F12

Batch Number: [User 1] | F12

Quantity: 2 [User 2] | F12

Batch Number	Bin Location	Quantity	[Total Quantity]	[User Field 1]	[User Field 2]
PR0001	01-W2-W2-S1	2	4		
PR0001	01-W2-W2-S2	2	4		
Rejected					

Quantity: 2 Of 6

Rejected Quantity: 2 Of 0

Buttons: Done (F1), Cancel (Esc), Rejected (F3), [Split] (F7), Delete (F8)

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.

Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison 06/09/17 12:54 PM

Server: 17.05.31007.18920 Client: 17.05.31007 Product Serial Numbers (00:30)

Production Order #601 Item03 (Serial nbr) UoM

Operation 102-1 (oPCU - Cutting)

Item Item03 (Serial nbr) Bin Location 01-W2-W2-S2

Serial Number SN2003 [User 1] [User 2]

Serial Number	Bin Location	[User Field 1]	[User Field 2]	Rejected
SN2001	01-W2-W2-S1			
SN2002	01-W2-W2-S2			Rejected

Quantity 1 Of 2

Rejected Quantity 1 Of 0

Done Cancel Rejected Delete

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.

Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison 06/09/17 12:54 PM

Server: 17.05.31007.18920 Client: 17.05.31007 [Product Bin Location Picker] (00:29)

Production Order #595 mM1101 (Raw Bike Framework) UoM pcs

Operation 96-1 (oPWE -)

Item mM1101 (Raw Bike Framework)

Bin Location

Quantity 1

Bin Location	Quantity
01-W2-W2-S1	0
01-SYSTEM-BIN-LOCATION	1

Quantity 1 pcs Of 1 pcs

Done Cancel Delete

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.

The screenshot shows the 'Materials' screen in the Mobile PDC application. At the top, the header bar displays 'Mobile PDC', 'TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison', and the date/time '06/09/17 12:54 PM'. Below the header, the screen is titled 'Materials (00:29)'. The main form contains the following fields:

- Production Order:** #596 p1001-1 (Red Bike)
- Operation:** 97-3 (oPAS - Bike Assembly)
- Item:** (empty)
- Bin Location:** 01-W2-W2-S1
- Quantity:** 1

Below these fields is a table with the following columns: Item, Name, Bin Location, and Quantity. The table contains three rows of material data:

Item	Name	Bin Location	Quantity
mM1001	Painted Bike Framewor	01-W2-W2-S1	1 of 1 pcs Warehouse: 01
m3	Chain	01-W2-W2-S1	1 of 1 pcs Warehouse: 01
m4	Wheel	01-W2-W2-S1	2 of 2 pcs Warehouse: 01

At the bottom of the screen, there are four buttons: 'Done' (F1), 'Cancel' (Esc), 'Serial / Batch' (F2), and 'Bin Location' (F3).

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 [Thin 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.

Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison 06/09/17 12:54 PM

Server: 17.05.31007.18920 Client: 17.05.31007 Material Batch Number Picker (00:29)

Production Order #602 p1001-1 (Red Bike) UoM

Operation 103-2 (oPWE - Welding)

Item Item01 (Batch nbr)

Batch Number Bin Location 01-SYSTEM-BIN-LOC...

Quantity 1

[Batch]	Bin Location	Quantity	[Avail BL Qty]	[Avail WH Qty]	[Total Qty]
BNR4321 (1)	01-SYSTEM (3)	1 (4)	5 (5)	5 (6)	1 (7)
01 (2)					

Quantity (8) 1 Of (9) 1

Done Cancel [Split] Delete

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

Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison 06/09/17 12:54 PM

Serial: 17.05.31007.18920 Client: 17.05.31007 Material Serial Number Picker (00:30)

Production Order #602 p1001-1 (Red Bike) UoM

Operation 103-2 (oPWE - Welding)

Item Item03 (Serial nbr)

Serial Number

Serial Number	Bin Location
SNR0008	01-SYSTEM-BIN-LOCATION
01	

Quantity 1 Of 1

Done Cancel Delete

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.

Mobile PDC

TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison

06/09/17 12:54 PM

Server: 17.05.31007.18920
Client: 17.05.31007

[Material Bin Location Picker] (00:29)

Production Order

#596 p1001-1 (Red Bike)

UoM

pcs

Operation

97-3 (oPAS - Bike Assembly)

Item

mM1001 (Painted Bike Framework)

Bin Location

Quantity

1

Bin Location	Quantity	[Available Qty]
01-W2-W2-S1	0	0
01-SYSTEM-BIN-LOCATION	1	9

Quantity

1 pcs

Of

1 pcs

Done

Cancel

Delete

2.2.6. Confirmation

Mobile PDC

TEST_WMSMF (PMX_BUDTOSH2)

12/21/16 02:11 PM

Server: 17.05.31007.18920
Client: 17.05.31007

Partial Job Confirmation (00:25)

PDC Booking

#N/A

Production Order

#505 mM1101 (Raw Bike Framework)

Operation

6-1 (oPCU - Cutting)

Summary

0 completed quantity 0 rejected quantity

Serial / Batch Numbers

0 serial numbers and 0 batch numbers

By-Products

0 by-products

Materials

0 materials

Error

Done

Cancel

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. The steps of the job completion are identical to the partial completion, except after a job was completed, it will not be 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.

The screenshot shows the 'Mobile PDC' application interface. At the top, there's a header bar with the application name, user 'TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison', and the date/time '06/09/17 12:54 PM'. Below the header, there's a section for filters: 'List Of Hours (00:29)' and checkboxes for 'Unapproved', 'Approved', 'Rejected', 'Processed', and 'Error'. Below the filters are input fields for 'Operation', 'Employee', 'Work Center', 'From' (12/21/16), 'To' (12/21/16), and 'Production Order'. A 'Refresh' button is next to the 'To' field. The main area displays a list of bookings. The first entry is highlighted in green and shows details: '00009193 (1) 6-3 (oPWE - Welding) (2) (7) Start Job (8) 0 / 0 12/21/16 04:30 PM (4) wWM2 (5) John Doe (6) (9) Processed'. The second entry is '00009191 6-3 (oPWE - Welding) Completed Set 1 / 0 12/21/16 04:29 PM wWM2 John Doe Processed'. The third entry is partially visible: '00009189 5-10 (oPWE - Ball Installation) Completed Job'. At the bottom, there are four buttons: 'Cancel', 'Modify', 'Details', and 'Complete'.

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.

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.

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 booked times, press the 'Modify' button. 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

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:

Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison 06/09/17 12:54 PM

Server: 17.05.31007.18920 Client: 17.05.31007 List Of Hours (00:29)

☒ Unapproved ☐ Approved ☐ Rejected ☐ Processed ☐ Error

Operation

Employee

Work Center

From 12/22/16 To 12/22/16

Production Order Refresh

00009305 10-1 (oPCU - Cutting) Completed Job

#509 mM1101 (Raw Bike Framework) 1 / 0

12/22/16 11:39 AM wJD Fred Morrison Unapproved

Cancel Modify Details Complete

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'.

Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison 06/09/17 12:54 PM

Server: 17.05.31007.18920 Client: 17.05.31007 Job Confirmation (00:29)

PDC Booking #00009305

Production Order #509 mM1101 (Raw Bike Framework)

Operation 10-1 (oPCU - Cutting)

Summary 1 completed quantity 0 rejected quantity

Serial / Batch Numbers 0 serial numbers and 0 batch numbers

By-Products 1 by-products

Materials 1 materials

Error

Done Cancel Approve Reject

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.

Please note: If the '[Sticky Job Quantities Page](#)' setting is enabled, 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.

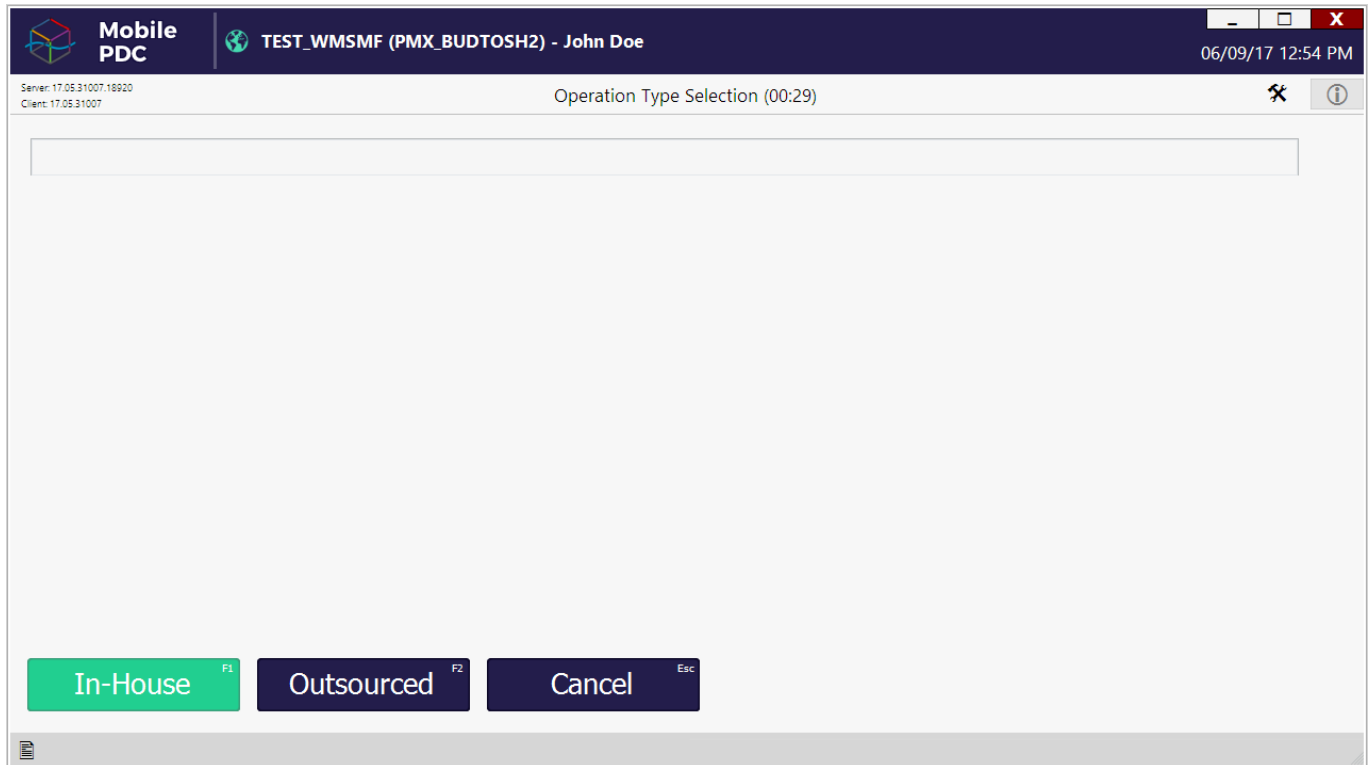
[illegible]

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.



Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - John Doe 06/09/17 12:54 PM

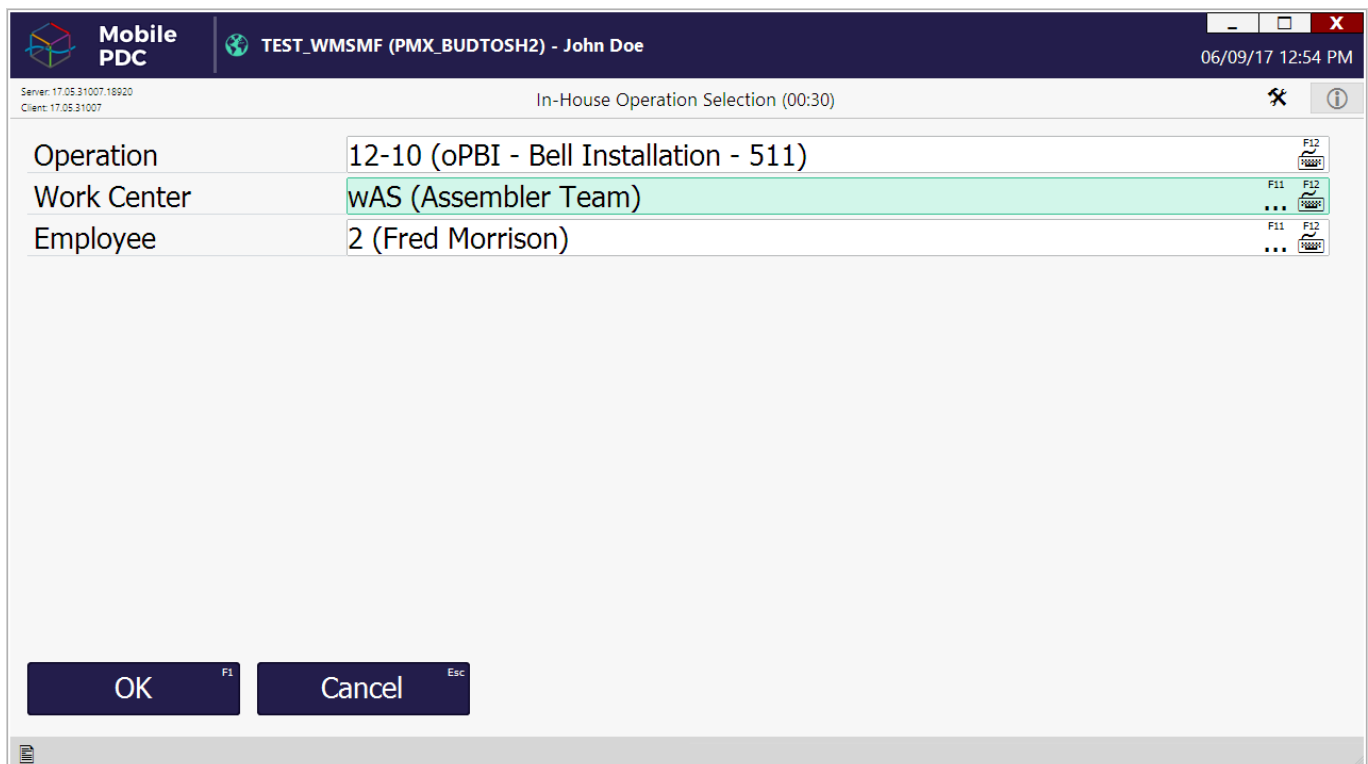
Server: 17.05.31007.18920 Client: 17.05.31007

Operation Type Selection (00:29)

In-House F1 Outsourced F2 Cancel Esc

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.



Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - John Doe 06/09/17 12:54 PM

Server: 17.05.31007.18920 Client: 17.05.31007

In-House Operation Selection (00:30)

Operation	12-10 (oPBI - Bell Installation - 511)	F12
Work Center	wAS (Assembler Team)	F11 F12
Employee	2 (Fred Morrison)	F11 F12

OK F1 Cancel Esc

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.

Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - John Doe 06/09/17 12:54 PM

Server: 17.05.31007.18920 Client: 17.05.31007 Check Results (00:30)

Operation: 12-10 (oPBI - Bell Installation - 511)
Work Center: wAS (Assembler Team)
Employee: 2 (Fred Morrison)
Quantity: 0/0/0

0 IsApproved	Y (OK)
0 WeldThickness	40
0 SurfaceQuality	5
0 ApprovalComment	Approved

Checked Quantity: 1

Buttons: Set Value (F1), Good (F2), Rejected (F3), Repairable (F4), Cancel (Esc)

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.

Outsourced Operation Selection (00:29)	
Operation	5-3 (oPAS - Bike Assembly - 504)
Supplier	bGU (Bike Gurus)
Delivery	500 (Quantity: 1.000000 Due date: 12/21/2016 12:00:00 AM)

OK Cancel

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.

**Mobile PDC**

TEST_WMSMF (PMX_BUDTOSH2) - John Doe

01/03/17 09:47 AM

Server: 17.05.31007.18920
Client: 17.05.31007

Workshop Monitor

Last Updated On 09:47 AM 01/03/17

	#523 m4 (Wheel) 24-2 (oPAS - Bike Assembly) Planned: 5 Completed: 2	John Doe (1) Due Date: 01/04/17 Open: 5 Rejected: 1	12:49 PM 01/02/17 Completed Job wAS
---	---	---	---

Logout Esc

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.

Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - John Doe 12/22/16 02:50 PM

Server: 17.05.31007.18920 Client: 17.05.31007 Workcenter Journal List (00:30)

Employee	Time	Reason	Status
John Doe	12/22/16 02:48 PM	wPD (5X Painter and Dryer Machine) No Employee	Open Idle
Fred Morrison	12/22/16 02:47 PM	wAS (Assembler Team) No Employee	Open Error

Back New Modify / View Close

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

Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison 12/22/16 02:47 PM

Server: 17.05.31007.18920 Client: 17.05.31007 Workcenter Journal Entry (00:30)

Field	Value
Information	Fred Morrison - 12/22/16 02:46 PM
Work Center	wAS (Assembler Team)
Reason	No Employee No Material
Entry Type	Idle Error
Comment	Test Comment

Cancel Done

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.

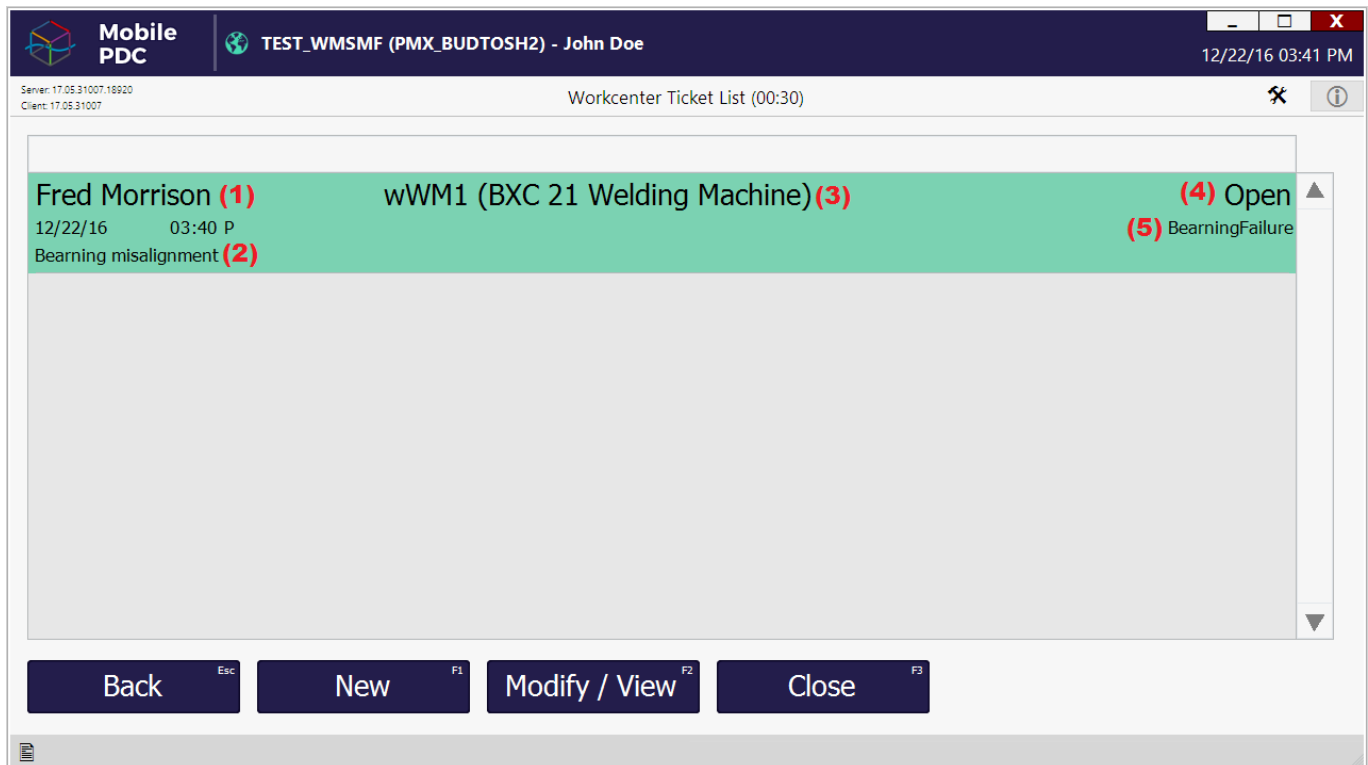
2.6.1. Setup Work Center Ticket types

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'.

[illegible]

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

The screenshot shows a mobile application interface for 'Mobile PDC'. The title bar indicates the user is 'John Doe' and the session is 'TEST_WMSMF (PMX_BUDTOSH2)'. The date and time are '12/22/16 03:47 PM'. The main form is titled 'Workcenter Ticket Entry (00:30)'. It contains several fields: 'Information' with the value 'John Doe - 12/22/16 03:46 PM', 'Work Center' with 'wPD (5X Painter and Dryer Machine)', and 'Comment' with a large empty text area. The 'Entry Type' field is a dropdown menu currently showing 'Accident' and 'BearingFailure'. At the bottom, there are 'Cancel' and 'Done' buttons. The interface also shows server and client IP addresses in the top left corner.

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.

The screenshot shows the Mobile PDC interface. At the top, there's a header bar with the Mobile PDC logo, a user profile 'TEST_WMSMF (PMX_BUDTOSH2) - John Doe', and a date/time stamp '06/09/17 12:54 PM'. Below the header, a status bar shows 'Start Job (00:29)'. The main area contains three input fields: 'Default Work Center' with value 'wPD', 'Operation' with value '13-1 (oPPD - Painting and Drying - 512)', and 'Work Center' with value 'wPD (5X Painter and Dryer Machine)'. Each field has a dropdown arrow icon on the right. At the bottom, there are four buttons: 'Done' (green), 'Admin' (dark blue), 'Clear' (dark blue), and 'Logout' (dark blue). Each button has a function key label (F1, F3, F4, Esc) above it.

Default Work Center	wPD	F12
Operation	13-1 (oPPD - Painting and Drying - 512)	F11 F12
Work Center	wPD (5X Painter and Dryer Machine)	F11 F12

Done F1 Admin F3 Clear F4 Logout Esc

The default work center is the work center defined for the terminal on the 'PDC Extended Configuration' form. To disable the default work center, set the 'Work Center Ignore' option to 'Yes'. 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. The default work center is not mandatory. If there is more than one work center with the same feature as the default, the user can complete the operation on any of those work centers.

To erase the content of the 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](#)

To complete the operation, press the 'Done' button.

Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - John Doe 06/09/17 12:54 PM

Server: 17.05.31007.18920 Client: 17.05.31007 Complete Job (00:30)

Production Order	#512 mM1001 (Painted Bike Framework)	UoM	pcs
Operation	13-1 (oPPD - Painting and Drying)		
Started	12/22/16 03:50 PM		
Bin Location	01-SYSTEM-BIN-L...	Setup	<input checked="" type="checkbox"/>
Duration	25 min	This Day	
Quantity	1	Rejected Quantity	0

Done Cancel

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. 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](#)

Because the user does not start the job manually, the booked time cannot be measured. Therefore the system creates the booking based on the following:

- completed quantity and rejected quantity
- setup (if booked) and job time defined on the Production Order Operation Details form.

Production Order Operation Details - [DocNum: 529, Line: 1]

Operation Code	oPPD	Operation Break	Allowed
Operation Name	Painting and Drying	Operation Time UoM	Minutes
Before Time	min 0.000	Is Parallel Operation	<input type="checkbox"/>
Safety Time	min 0.000	Is Overlapping Operation	<input type="checkbox"/>
Setup Time	min 5.000	Max Parallel Operations	0
Job Time	min 20.000	Overlapping Quantity	0.000
Teardown Time	min 5.000	Allocation Window	0.000
After Time	min 400.000	Min Job Quantity	0.000
Time Base	1.000	Message	
Planned Quantity	2.000	Is Pinned	<input type="checkbox"/>
Completed Quantity	1.000	Pinned Start Date	
Rejected Quantity	1.000	Pinned Start Time	00:00

Time UoM	Minutes	Open Job	53.333
Booked Job	0.000	Open Setup	5.000
Booked Setup	0.000	Open Teardown	5.000
Booked Teardown	0.000	Planned Job	53.333
State	Created	Planned Setup	5.000
Booked Completed Quantity	0.000	Planned Teardown	5.000
Booked Rejected Quantity	0.000		

Posting Date	Posting Time	Posting Code	Compl. Qty.	Rej. Qty.	Mach. Duration	Pers. Duration	Emp. ID	Emp. Name	Reason ...
01/03/17	10:12	Start Setup	0.000	0.000	0.000	0.000	1	Doe, John	
01/03/17	10:17	Completed Setup	0.000	0.000	0.000	0.000	1	Doe, John	
01/03/17	10:17	Start Job	0.000	0.000	0.000	0.000	1	Doe, John	
01/03/17	10:57	Completed Job	1.000	1.000	40.000	40.000	1	Doe, John	

OK Cancel Allocations

The system will automatically create the 'Start Setup', 'Completed Setup', 'Start Job' and 'Completed Job' bookings. The posting time will be 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.

PDC Sheet

Production Order Number: 514 Operation: oPAS Bike Assembly WC: wAS Assembler Team

#	Employee ID	Allocation ID	Posting Date	Posting Time	Posting Code	Compl Qty	Rej Qty	Mach. Duration	Pers. Duration
1	1	00010342							
2	1	00010342							
3	1	00010372							
4	1	00010372							

The Allocation ID is the identification number of the allocation that can be seen on the Job Requirements Report:

Operation: oPAS - Bike Assembly		Operation ID: 00004039	
	Begin Date&Time: 08/28/17 08:00 AM		Production Order: 43 / 3
	Before Time: 0.00 [min]		Product Code: ITEM05 - Batch number + best before da
	After Time: 0.00 [min]		MtO Scenario:
			Custom Code:
	ITEM01 No Batch no serial no BBD	10.00	
	00004037 manual UOM		
	ITEM10 Batch number + 2ND Batch +	20.00	
	00004038 best before date manual UOM		
Work Center: OP: oPAS	wAS - Assembler Team		Allocation ID: 00004006
			43-2
Start Date&Time: 08/28/17 08:00 AM		End Date&Time: 08/28/17 12:00 PM	
Setup Time: 0.00 [min]		Teardown Time: 0.00 [min]	
Quantity: 0.93		Identification Code: 43-2-wAS	
Job Time: 240.00 [min]		Total Duration: 240.00 [min]	
Feature: aSS - Assembly			

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.

Inserted	Emp. ID	Emp. Name	Alloc. Code	Posting Date	Posting Time	Posting Code	Reason Name	Compl. Qty.	Rej. Qty.	Mach. Duration	P.
<input checked="" type="checkbox"/>	1	Doe, John	00010342	12/23/16	13:04	Start Teardown		0.000	0.000	0.000	
<input checked="" type="checkbox"/>	1	Doe, John	00010342	12/23/16	13:10	Completed Teardown		0.000	0.000	0.000	

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.

3.1.1.3. 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.

Code	Posting Code	Posting Date	Posting Time	Inv. Proc. State	Inv. Proc. Error	Inv. Proc. Date	Inv. Proc. Time	Compl. Qty.	Reg. Qty.	Mach. Duration	Pers. Duration	Main Product Code	Pr. Ord. No.	Pr. Ord. Op. ID	Emp. ID	Emp. Name
0001735	Start Job	01/03/17	16:19	Processed		01/03/17	16:39	0.000	0.000	0.000	0.000	m41001	529	00013681	1	Doe, John
0001718	Completed Job	01/03/17	16:36	Processed		01/03/17	16:39	1.000	0.000	161.000	161.000	m4	529	00013681	1	Doe, John
0001726	Completed Job	01/03/17	16:39	Processed		01/03/17	16:39	1.000	0.000	20.000	20.000	m41001	529	00013681	1	Doe, John
0001727	Start Job	01/04/17	10:38	Processed		01/04/17	10:39	0.000	0.000	0.000	0.000	Item01	530	00013681	1	Doe, John
0001738	Completed Job	01/04/17	10:39	Processed		01/04/17	10:39	0.000	0.000	0.000	0.000	Item01	530	00013681	1	Doe, John
0001789	Start Setup	01/04/17	10:40	Processed		01/04/17	10:44	0.000	0.000	0.000	0.000	Item01	530	00013732	1	Doe, John
0001790	Completed Setup	01/04/17	10:45	Processed		01/04/17	10:45	0.000	0.000	5.000	5.000	Item01	530	00013732	1	Doe, John
0001791	Start Job	01/04/17	10:46	Processed		01/04/17	10:46	0.000	0.000	0.000	0.000	Item01	530	00013732	1	Doe, John
0001792	Problem	01/04/17	11:03	Processed		01/04/17	11:04	0.000	0.000	0.000	0.000	Item01	530	00013732	1	Doe, John

Mat.ID	Mat.Code	Mat.Name	Mat.Type	Used Qty.	Bin Location Name
00012074	m41001	Painted Bike Framework	Material	1.000	01-W2-V02-S1

Op-Prod.ID	Prod. Code	Prod. Name	Prod. Type	Compl. Qty.	Reg. Qty.	Bin Location Name
00012072	m4	Wheel	Main Product	1.000	0.000	01-SYSTEM-BIN-LOCATION
00012077	m1	Bin Steel Pipe	By-Product	2.000	0.000	
00012078	m3	Chain	By-Product	1.000	0.000	

Parameter Name	Name	Parameter Value	Comment
----------------	------	-----------------	---------

Reload Radio Inv. Tr. Modify Set to Unprocessed Undo Close

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 Produumex Manufacturing Settings, an additional 'Parameter' grid is shown.

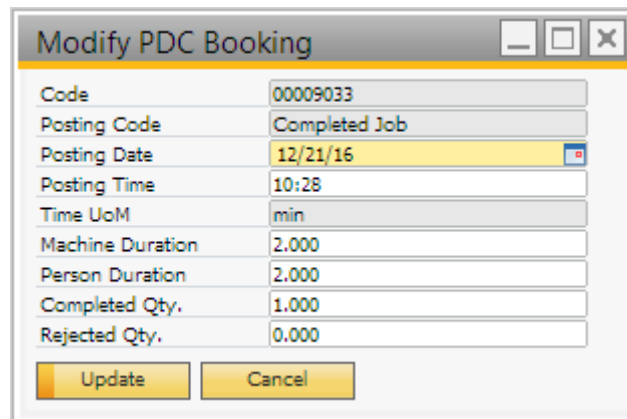
On the 'Material' grid the materials issued during the selected booking are listed. On the 'Product' grid the products received during the selected booking are listed. On the 'Parameter' grid the quality assurance parameters will be displayed.

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



Code	00009033
Posting Code	Completed Job
Posting Date	12/21/16
Posting Time	10:28
Time UoM	min
Machine Duration	2.000
Person Duration	2.000
Completed Qty.	1.000
Rejected Qty.	0.000

Update Cancel

If the PDC booking has inventory transactions, the completed and the rejected quantities cannot be modified.

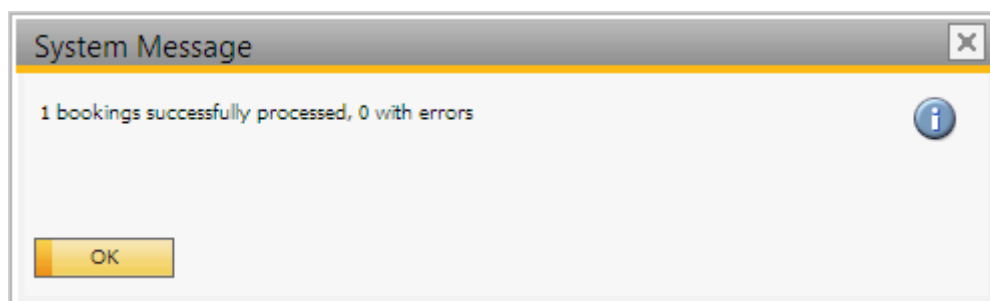
Set to Unprocessed

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.

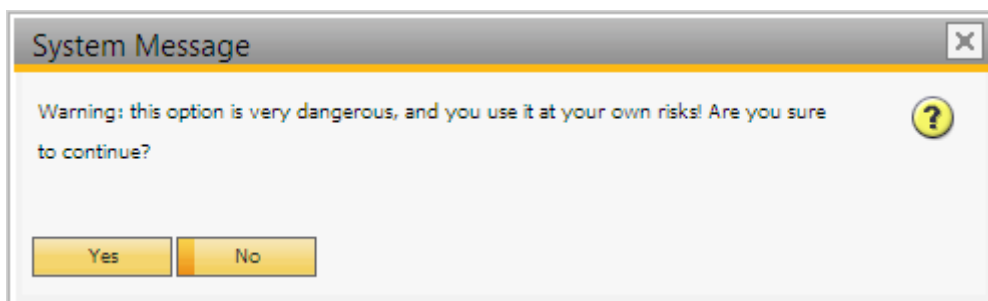


Undo a booking

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.

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.

A screenshot of the 'Managing Rejected Batched PDC Transactions' form. The form has a header section with filters and a main grid. The filters include 'Chosen Item' (Item01), 'Batch nbr' (Batch nbr), 'Show Successful' (checked), 'From the Start of the Day' (checked), 'Grouped by Batches' (checked), 'Grouped by WorkCenters' (checked), 'Grouped by Employees' (checked), 'Order by Time Descending' (checked), and 'Beginning of the Item Code' (Item01). The main grid has columns: Item Name, Order, Item Code, Batch Number, Inventory Process Success, Date, Time, Quantity, EmployeeID, Employee Name, Work Center Code, PDC Booking, Production Order Doc Num, and Product Code. The grid shows several rows of data. Below the grid is a summary table with columns: Item Code, Item Name, Batch Number, Quantity, All Missing Quantity, Base Item Warehouse, and Transfer Quantity. The summary table shows one row for Item01, Batch nbr, BNR00001, with a quantity of 0.000, all missing quantity of 14.00, base item warehouse of 0.00, and transfer quantity of 0.00. At the bottom of the form are buttons: OK, Cancel, Reload, PDC Radio, Receipt, Batch Number Change, Undo, and Inventory Transfer.

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.

Batch Number	Quantity	Change Quantity
BNR00001	10.000	0.00
BNR4321	5.000	0.00

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.

Item Code	Item Name	Batch Number	Quantity	Failed Quantity	Receipt Quantity	New Stock Quantity
⇒ Item03	Serial nbr	SNR0004	0.000	-1.00	1.00	1.00

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.

Item Code	Item Name	Batch Number	Issued Quantity	Undone Quantity	Quantity	New Stock Quantity
⇒ Serial nbr	Serial nbr	SNR0004	1.00	1	0.000	0.00

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.

Setting	Value/Status
Worker can modify bookings	<input type="checkbox"/>
Approver can modify bookings	<input type="checkbox"/>
Global idle timeout (seconds)	0
Global screen timeout (seconds)	0
Employee approver role	Approver
Employee Workshop Monitor Role	Workshop Monitor
Employee Quality Control Role	QC Inspector
Workcenter Admin Role	
Enable PDC	<input checked="" type="checkbox"/>
Enable PTM	<input checked="" type="checkbox"/>
Enable QC	<input checked="" type="checkbox"/>
Enable Workshop Monitor	<input checked="" type="checkbox"/>
Enable Workcenter Journal	<input checked="" type="checkbox"/>
Enable Workcenter Tickets	<input checked="" type="checkbox"/>
Enable Legacy Mode in PDC	<input type="checkbox"/>
Pre-fill planned material quantities	<input type="checkbox"/>
Pre-fill planned by-product quantities	<input checked="" type="checkbox"/>
Pre-fill the bin locations quantities with available quantities	<input type="checkbox"/>
Skip material quantities screen	<input type="checkbox"/>
Skip by-product quantities screen	<input type="checkbox"/>
Skip material serial/batch quantities screen	<input type="checkbox"/>
Skip product serial/batch quantities screen	<input checked="" type="checkbox"/>
Logout after PDC bookings	<input type="checkbox"/>
Enable Partial Book & Stay	<input type="checkbox"/>
Can insert new materials into production orders	<input checked="" type="checkbox"/>
Login Is Password Protected	<input type="checkbox"/>
Only Job Bookings On Running Jobs Screen	<input type="checkbox"/>
Force enter product serial/batch numbers and quantities	<input type="checkbox"/>

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.

PDCExtendedConfiguration

#	ration Select From List	Outsourced Operations	Rejected Quantity	Work Center Ignore	Work Center Modification	Work Center	Last Modif.	Comment Visible	Zero By Product Quantity
1		Yes	Yes	Yes	No	wrPD		No	No
2		No	No	No	No			No	No

PDCTerminalConfiguration

#	Code	Name	Simple Job Completion	TerminalID	Work Center	Last Modif.	Simple Job Completion Only
1	1	1	Yes	PMX_BUDTOSH	wrPD		No
2			No				No

OK

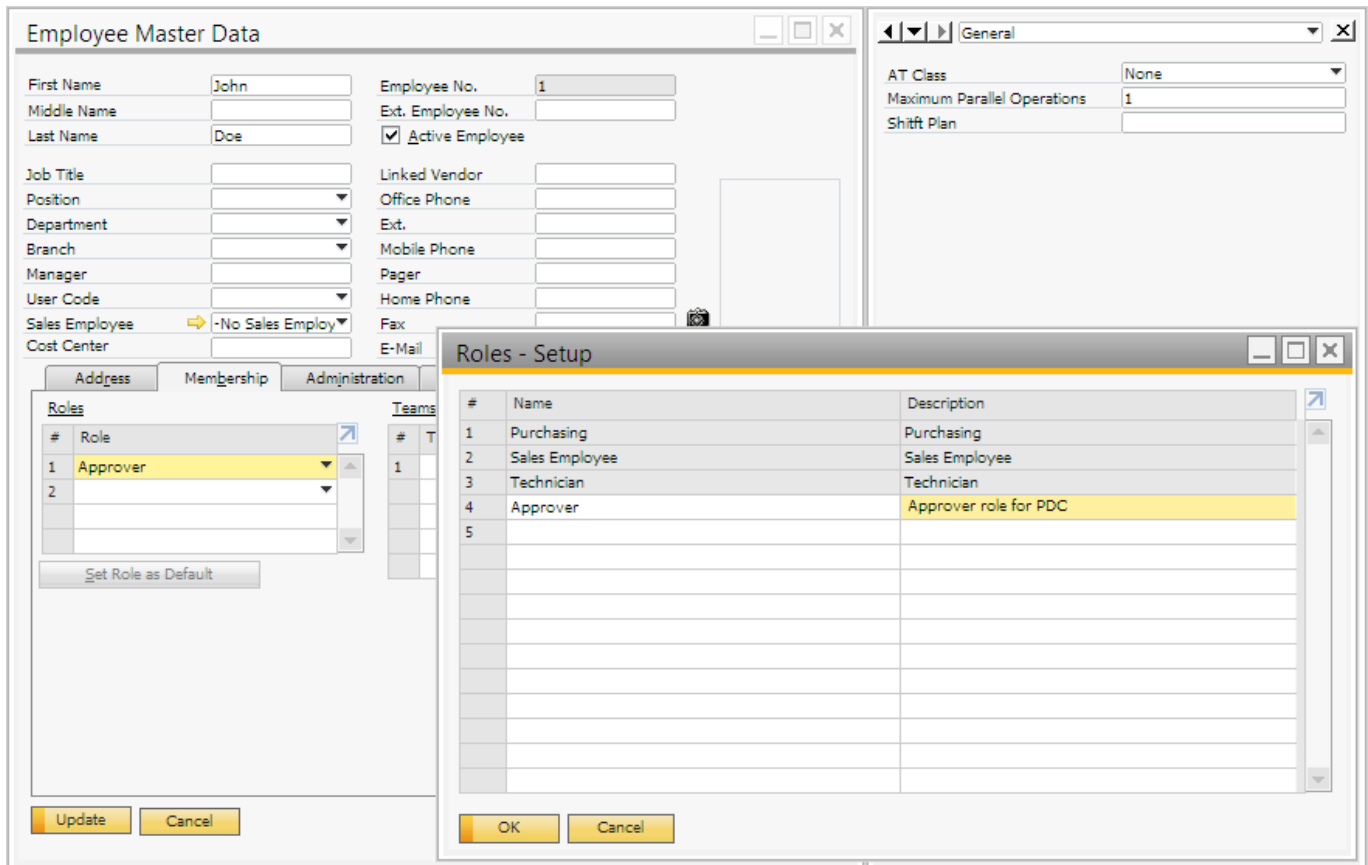
Cancel

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.



The image shows two overlapping windows from the Produmex Manufacturing software. The background window is 'Employee Master Data' with tabs for Address, Membership, and Administration. The foreground window is 'Roles - Setup'.

Employee Master Data - Administration Tab:

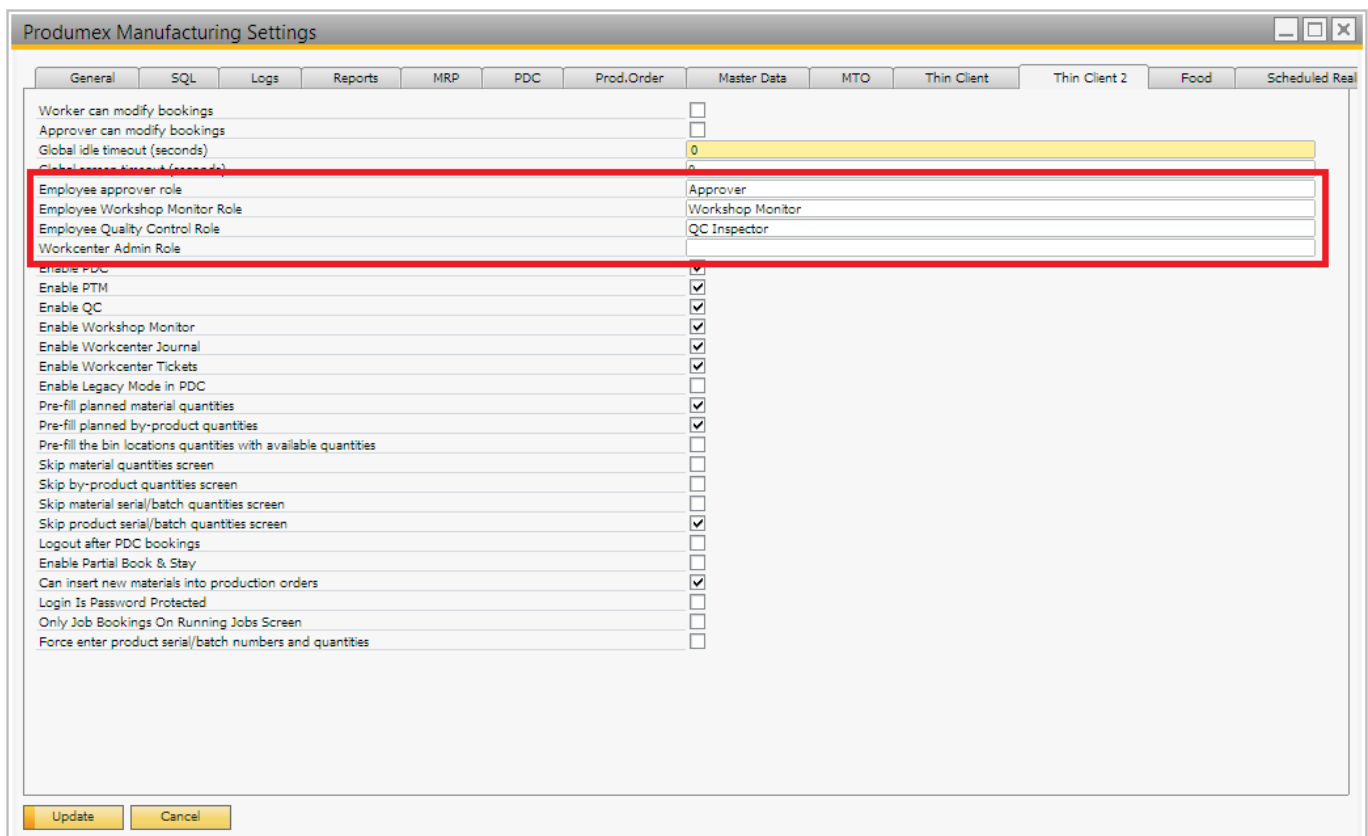
- First Name: John
- Middle Name:
- Last Name: Doe
- Employee No.: 1
- Ext. Employee No.:
- ☒ Active Employee
- Job Title:
- Position:
- Department:
- Branch:
- Manager:
- User Code:
- Sales Employee: -No Sales Employ
- Cost Center:
- Linked Vendor:
- Office Phone:
- Ext.:
- Mobile Phone:
- Pager:
- Home Phone:
- Fax:
- E-Mail:

Roles - Setup Window:

#	Name	Description
1	Purchasing	Purchasing
2	Sales Employee	Sales Employee
3	Technician	Technician
4	Approver	Approver role for PDC
5		

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.



The image shows the 'Produmex Manufacturing Settings' window with the 'Thin Client 2' tab selected. A red box highlights the 'Employee approver role' and 'Employee Workshop Monitor Role' settings.

Produmex Manufacturing Settings - Thin Client 2 Tab:

- Worker can modify bookings: ☐
- Approver can modify bookings: ☐
- Global idle timeout (seconds): 0
- Global session timeout (seconds): 10
- Employee approver role: Approver
- Employee Workshop Monitor Role: Workshop Monitor
- Employee Quality Control Role: QC Inspector
- Workcenter Admin Role:
- Enable PDC: ☒
- Enable PTM: ☒
- Enable QC: ☒
- Enable Workshop Monitor: ☒
- Enable Workcenter Journal: ☒
- Enable Workcenter Tickets: ☒
- Enable Legacy Mode in PDC: ☐
- Pre-fill planned material quantities: ☒
- Pre-fill planned by-product quantities: ☒
- Pre-fill the bin locations quantities with available quantities: ☐
- Skip material quantities screen: ☐
- Skip by-product quantities screen: ☐
- Skip material serial/batch quantities screen: ☐
- Skip product serial/batch quantities screen: ☒
- Logout after PDC bookings: ☐
- Enable Partial Book & Stay: ☐
- Can insert new materials into production orders: ☒
- Login Is Password Protected: ☐
- Only Job Bookings On Running Jobs Screen: ☐
- Force enter product serial/batch numbers and quantities: ☐

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](#)

The screenshot displays the 'Item Master Data' form. The 'General' tab is active, showing fields for Item No. (m1), Description (5m Steel Pipe), Foreign Name, Item Type (Items), Item Group (Items), UoM Group (Manual), Price List (Price List 01), Bar Code, Unit Price (Primary Curr), and \$ 30.00. The 'NeedsPDC Approval' field is highlighted with a red box and set to 'Yes'. The 'Properties' tab is also visible, showing fields for Is Unfinished Product (No), Item Role (Item), Items per Production Unit, Lead Time Type (Working Days), MTO Planning (Yes), Obsolete Tolerance Days (1), Production Multiple, Production UoM, Profit Center, Safety Lead Time, Use Item Groups Tolerance Days (No), Cost Schema, BXPSS SubGroup, and Price Schema. The 'General' tab includes checkboxes for Tax Liabilities, Do Not Apply Discount Groups, and a section for Manufacturer, Additional Identifier, Shipping Type, and Manage Item by. The 'Properties' tab includes a section for Active, Inactive, and Advanced status.

2. Mobile Device

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

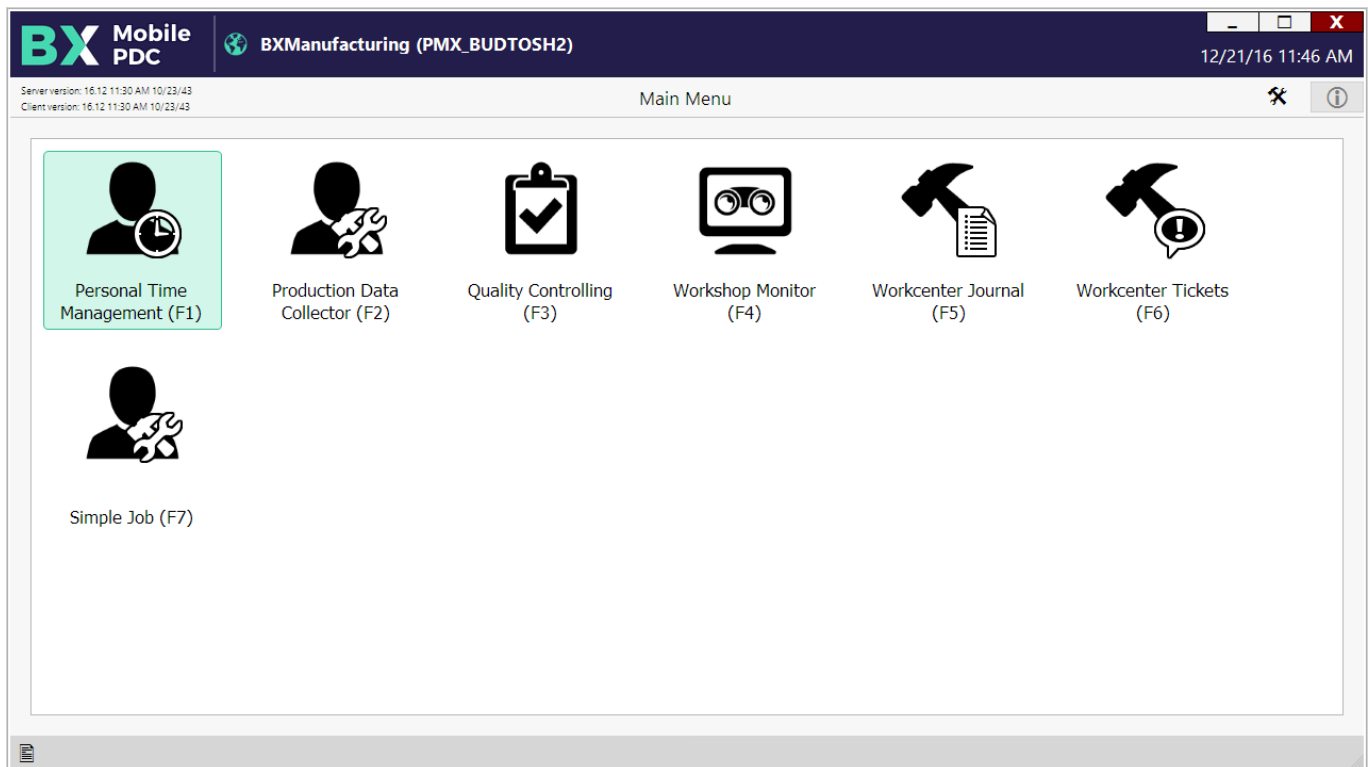
The user interface was primarily designed for industrial PCs and mobile devices. It means that the windows are not 'normal' windows as in any other applications. You can only move the windows with the blue frame around the window and it will not store the form settings so it always starts maximized.


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.

Mobile PDC TEST_WMSMF 12/20/16 10:18 AM

Server: 17.05.31007.18920 Client: 17.05.31007

Personal Time Management (00:29)

Employee	●	F12	John Doe
History	Login (, 12/20/16 10:17 AM)		
Reason	LB (Lunch Break) F11 F12		

Login F1 Logout F2 Log F3 Main Menu Esc

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.

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.

The screenshot displays the 'Running Jobs' window in the Mobile PDC application. The window title is 'Running Jobs (00:30)'. The top bar shows 'Mobile PDC' and 'TEST_WMSMF (PMX_BUDTOSH2)'. The date and time are '12/21/16 02:22 PM'. The server and client information are 'Server: 17.05.31007.18920' and 'Client: 17.05.31007'. The main content area lists operations with the following details:

Operation	Doc Entry	Line Number	Production order number	Main product code	Open quantity	Planned Quantity	Assigned work center	Time of the last PDC booking	Date of the last PDC booking	Type of the last PDC booking
Setup	6-3	(oPWE - Welding)	(1)	(2)	(5)	02:22 PM				
	#505	mM1101	(Raw Bike Framework)	(3)	(6)	12/21/16				
	Open: 1	Planned: 1	Workcenter: wWM2	(4)	(7)	Start Setup				
Job	5-10	(oPBI - Bell Installation)				01:58 PM				
	#504	p1001-1	(Red Bike)			12/21/16				
	Open: 0	Planned: 1	Workcenter: wAS			Start Job				

The bottom of the screen features five buttons: Start (F1), Stop (F2), Partial (F3), Admin (F4), and Logout (Esc).

Displayed information:

- Operation phase
- Doc Entry - Line Number (Operation code - name)
- Production order number, Main product code (name)
- Open quantity, Planned Quantity, Assigned work center
- Time of the last PDC booking for the operation
- Date of the last PDC booking for the operation
- 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 DocEntry- LineNum identifier can be found on the Job Requirements report.

Operation: oPAS - Bike Assembly		Operation ID: 00004039	
Begin Date&Time: 08/28/17 08:00 AM Before Time: 0.00 [min] After Time: 0.00 [min]		Production Order: 43 / 3 Product Code: ITEM05 - Batch number + best before da MtO Scenario: Custom Code:	
ITEM01 No Batch no serial no BBD 00004037 manual UOM		10.00	
ITEM10 Batch number + 2ND Batch + 00004038 best before date manual UOM		20.00	
Work Center: wAS - Assembler Team OP: oPAS	Allocation ID: 00004006		Doc Entry – Line Number Identifier 43-2
Start Date&Time: 08/28/17 08:00 AM Setup Time: 0.00 [min] Quantity: 0.93 Job Time: 240.00 [min] Feature: aSS - Assembly		End Date&Time: 08/28/17 12:00 PM Teardown Time: 0.00 [min] Identification Code: 43-2-wAS Total Duration: 240.00 [min]	

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.

Employee Master Data

First Name	John	Employee No.	1
Middle Name		Ext. Employee No.	JD
Last Name	Doe	<input checked="" type="checkbox"/> Active Employee	
Job Title		Linked Vendor	
Position		Office Phone	
Department		Ext.	
Branch		Mobile Phone	
Manager		Pager	
User Code		Home Phone	
Sales Employee	→ -No Sales Employ	Fax	
Cost Center		E-Mail	

Address

Membership

Administration

Personal

Finance

Remarks

Attachments

Work Address

Home Address

Street

Street No.

Block

Building/Floor/Room

Zip Code

City

County

State

Country

Street

Street No.

Block

Building/Floor/Room

Zip Code

City

County

State

Country

OK

Cancel

General

AT Class

Maximum Parallel Operations

Shift Plan

None

1

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.

When there is a default work center set for the terminal on the *PDC Extended Configuration* UDT, an additional Default Work Center field is displayed on the top of the operation field. The default work center is prefilled if the work center is mandatory. In this case bookings can only be created for operations with features supported by the default work center.

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

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. Otherwise the user has to enter the work center or he can choose from the list of available work centers by pressing F11.

When the 'PDC Modifiable WC for Start' option is disabled on the [Thin Client tab](#) of Produex Manufacturing Settings or the 'Work Center Modification' option is set to 'No' on the PDC Extended Configurations form, the work center cannot be modified when starting the operation phase.

Mobile PDC

TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison

06/09/17 12:54 PM

Server: 17.05.31007.18920
Client: 17.05.31007

(00:28)

Search

Search

wWM1
BXC 21 Welding Machine

wWM2
BXC 22 Welding Machine

OK Cancel

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.

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.

Mobile PDC

TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison

06/09/17 12:54 PM

Server: 17.05.31007.18920
Client: 17.05.31007

Start Job Confirmation (00:30)

PDC Booking	#N/A
Production Order	#501 p1001-1 (Red Bike)
Operation	2-3 (oPAS - Bike Assembly)
Summary	0 completed quantity 0 rejected quantity
Serial / Batch Numbers	0 serial numbers and 0 batch numbers
By-Products	0 by-products
Materials	2 materials
Error	

Done Cancel

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.

Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison 06/09/17 12:54 PM

Server: 17.05.31007.18920 Client: 17.05.31007 Partial Job (00:30)

Production Order	#596 p1001-1 (Red Bike)	UoM	pcs
Operation	97-3 (oPAS - Bike Assembly)		
Started	02/22/17 11:51 AM	<input checked="" type="checkbox"/> Completed	
Bin Location	...		
Duration	6 min	This Day	
Quantity	4	Rejected Quantity	1

Done Done & Stay Cancel

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.

With the 'Completed' checkbox the user can control whether to continue on working on this job or not. If the checkbox is checked, the operation will be omitted from the list of running jobs after a job completion booking. The field is unchecked by default. 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.

Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison 06/09/17 12:54 PM

Server: 17.05.31007.18920 Client: 17.05.31007 [Products] (00:30)

Production Order #599 mM1101 (Raw Bike Framework) UoM pcs

Operation 100-1 (oPCU - Cutting)

Product Bin Location 01-SYSTEM-BIN-LOC...

Quantity 5

Item	Name	Bin Location	Quantity
mM1101	Raw Bike Framework	01-SYSTEM-BIN-LOCA	5 of 5 pcs
m2	Steel Pipe	01-SYSTEM-BIN-LOCA	10 of 10 m

Done Cancel Serial / Batch Bin Location

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.

Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison 06/09/17 12:54 PM

Series: 17.05.31007.18920 Client: 17.05.31007 Product Batch Numbers (00:29)

Production Order: #600 Item01 (Batch nbr) UoM: []

Operation: 101-1 (oPCU - Cutting)

Item: Item01 (Batch nbr) Bin Location: 01-W2-W2-S2

Batch Number: [] [User 1]

Quantity: 2 [User 2]

Batch Number	Bin Location	Quantity	[Total Quantity]	[User Field 1]	[User Field 2]
PR0001	01-W2-W2-S1	2	4		
PR0001	01-W2-W2-S2	2	4		

Quantity: 2 Of 6

Rejected Quantity: 2 Of 0

Buttons: Done (F1), Cancel (Esc), Rejected (F3), [Split] (F7), Delete (F8)

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.

Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison 06/09/17 12:54 PM

Server: 17.05.31007.18920 Client: 17.05.31007 Product Serial Numbers (00:30)

Production Order #601 Item03 (Serial nbr) UoM

Operation 102-1 (oPCU - Cutting)

Item Item03 (Serial nbr) Bin Location 01-W2-W2-S2

Serial Number SN2003 [User 1] [User 2]

Serial Number	Bin Location	[User Field 1]	[User Field 2]	Rejected
SN2001	01-W2-W2-S1			
SN2002	01-W2-W2-S2			Rejected

Quantity 1 Of 2

Rejected Quantity 1 Of 0

Done Cancel Rejected Delete

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.

Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison 06/09/17 12:54 PM

Server: 17.05.31007.18920 Client: 17.05.31007 [Product Bin Location Picker] (00:29)

Production Order #595 mM1101 (Raw Bike Framework) UoM pcs

Operation 96-1 (oPWE -)

Item mM1101 (Raw Bike Framework)

Bin Location

Quantity 1

Bin Location	Quantity
01-W2-W2-S1	0
01-SYSTEM-BIN-LOCATION	1

Quantity 1 pcs Of 1 pcs

Done Cancel Delete

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.

The screenshot shows the 'Materials' screen in the Mobile PDC application. At the top, the header bar displays 'Mobile PDC', 'TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison', and the date/time '06/09/17 12:54 PM'. Below the header, the screen is titled 'Materials (00:29)'. The main form contains the following fields:

- Production Order:** #596 p1001-1 (Red Bike)
- Operation:** 97-3 (oPAS - Bike Assembly)
- Item:** (empty)
- Bin Location:** 01-W2-W2-S1
- Quantity:** 1

Below the form is a table with the following columns: Item, Name, Bin Location, and Quantity. The table contains three rows of material data:

Item	Name	Bin Location	Quantity
mM1001	Painted Bike Framewor	01-W2-W2-S1	1 of 1 pcs Warehouse: 01
m3	Chain	01-W2-W2-S1	1 of 1 pcs Warehouse: 01
m4	Wheel	01-W2-W2-S1	2 of 2 pcs Warehouse: 01

At the bottom of the screen are four buttons: 'Done' (F1), 'Cancel' (Esc), 'Serial / Batch' (F2), and 'Bin Location' (F3).

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 [Thin 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.

Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison 06/09/17 12:54 PM

Server: 17.05.31007.18920 Client: 17.05.31007 Material Batch Number Picker (00:29)

Production Order #602 p1001-1 (Red Bike) UoM

Operation 103-2 (oPWE - Welding)

Item Item01 (Batch nbr)

Batch Number Bin Location 01-SYSTEM-BIN-LOC...

Quantity 1

[Batch]	Bin Location	Quantity	[Avail BL Qty]	[Avail WH Qty]	[Total Qty]
BNR4321 (1)	01-SYSTEM (3)	1 (4)	5 (5)	5 (6)	1 (7)

Quantity (8) 1 Of (9) 1

Done Cancel [Split] Delete

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

Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison 06/09/17 12:54 PM

Serial: 17.05.31007.18920 Client: 17.05.31007 Material Serial Number Picker (00:30)

Production Order #602 p1001-1 (Red Bike) UoM

Operation 103-2 (oPWE - Welding)

Item Item03 (Serial nbr)

Serial Number

Serial Number	Bin Location
SNR0008	01-SYSTEM-BIN-LOCATION
01	

Quantity 1 Of 1

Done Cancel Delete

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.

Mobile PDC

TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison

06/09/17 12:54 PM

Server: 17.05.31007.18920
Client: 17.05.31007

[Material Bin Location Picker] (00:29)

Production Order

#596 p1001-1 (Red Bike)

UoM

pcs

Operation

97-3 (oPAS - Bike Assembly)

Item

mM1001 (Painted Bike Framework)

Bin Location

Quantity

1

Bin Location	Quantity	[Available Qty]
01-W2-W2-S1	0	0
01-SYSTEM-BIN-LOCATION	1	9

Quantity

1 pcs

Of

1 pcs

Done

Cancel

Delete

2.2.6. Confirmation

Mobile PDC

TEST_WMSMF (PMX_BUDTOSH2)

12/21/16 02:11 PM

Server: 17.05.31007.18920
Client: 17.05.31007

Partial Job Confirmation (00:25)

PDC Booking

#N/A

Production Order

#505 mM1101 (Raw Bike Framework)

Operation

6-1 (oPCU - Cutting)

Summary

0 completed quantity 0 rejected quantity

Serial / Batch Numbers

0 serial numbers and 0 batch numbers

By-Products

0 by-products

Materials

0 materials

Error

Done

Cancel

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. The steps of the job completion are identical to the partial completion, except after a job was completed, it will not be 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.

The screenshot shows the 'Mobile PDC' interface for user 'Fred Morrison'. The title bar indicates 'TEST_WMSMF (PMX_BUDTOSH2)'. The main area is titled 'List Of Hours (00:29)'. Below the title bar are five filter checkboxes: 'Unapproved', 'Approved', 'Rejected', 'Processed', and 'Error', all of which are checked. Below the filters are input fields for 'Operation', 'Employee', and 'Work Center'. There are also date pickers for 'From' (12/21/16) and 'To' (12/21/16), and a 'Production Order' field. A green 'Refresh' button is located to the right of the date pickers. Below these fields is a table of bookings. The first row is highlighted in green and contains the following information: Allocation Code (00009193), DocEntry-LineNumber (6-3), Production order number (oPWE - Welding), Booking date and time (12/21/16 04:30 PM), Work center (wWM2), Employee (John Doe), and State/Phase (Start Job). The second row is highlighted in light blue and contains: Allocation Code (00009191), DocEntry-LineNumber (6-3), Production order number (oPWE - Welding), Booking date and time (12/21/16 04:29 PM), Work center (wWM2), Employee (John Doe), and State/Phase (Completed Set). The third row is partially visible and contains: Allocation Code (00009189), DocEntry-LineNumber (5-10), Production order number (oPWE - Ball Installation), and State/Phase (Completed Job). At the bottom of the screen are four buttons: 'Cancel', 'Modify', 'Details', and 'Complete'.

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.

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.

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 booked times, press the 'Modify' button. 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

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:

Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison 06/09/17 12:54 PM

Server: 17.05.31007.18920 Client: 17.05.31007 List Of Hours (00:29)

☒ Unapproved ☐ Approved ☐ Rejected ☐ Processed ☐ Error

Operation

Employee

Work Center

From 12/22/16 To 12/22/16

Production Order Refresh

00009305 10-1 (oPCU - Cutting) Completed Job

#509 mM1101 (Raw Bike Framework) 1 / 0

12/22/16 11:39 AM wJD Fred Morrison Unapproved

Cancel Modify Details Complete

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'.

Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison 06/09/17 12:54 PM

Server: 17.05.31007.18920 Client: 17.05.31007 Job Confirmation (00:29)

PDC Booking #00009305

Production Order #509 mM1101 (Raw Bike Framework)

Operation 10-1 (oPCU - Cutting)

Summary 1 completed quantity 0 rejected quantity

Serial / Batch Numbers 0 serial numbers and 0 batch numbers

By-Products 1 by-products

Materials 1 materials

Error

Done Cancel Approve Reject

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.

Please note: If the '[Sticky Job Quantities Page](#)' setting is enabled, 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.

#	Code	Name	Default Value Default	Is Deleted	Maximum Value Default	Minimum Value Default	UoM	Valid Values	Value Type	Last Modif.
1	COMM	Comment		No					String	
2	DD	DueDate		No					Date	
3	Q	Quantity		No					Float	
4	QUAL	Quality		No					Integer	
5	Y/N	Approval		No				Y:OK N:Defective	Valid Valu	
6				No					String	

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.

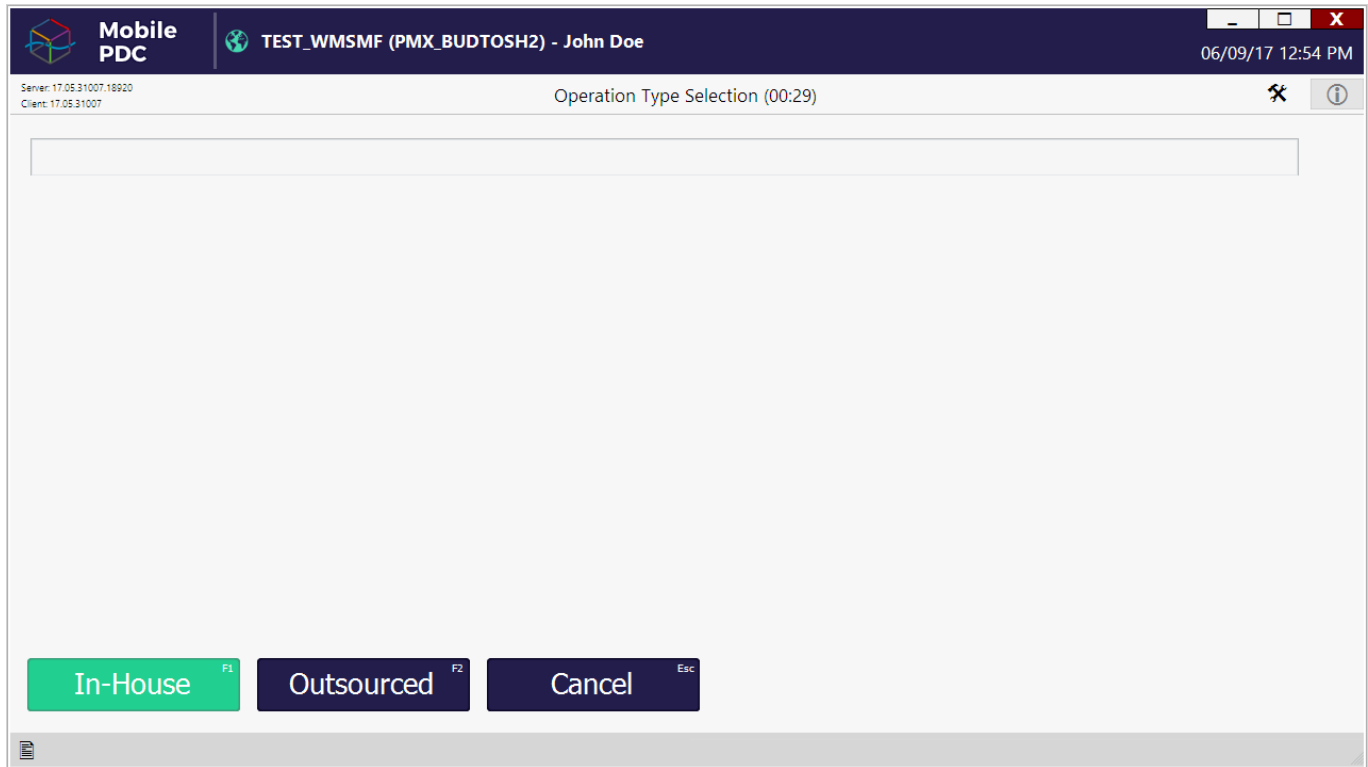
[illegible]

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.



Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - John Doe 06/09/17 12:54 PM

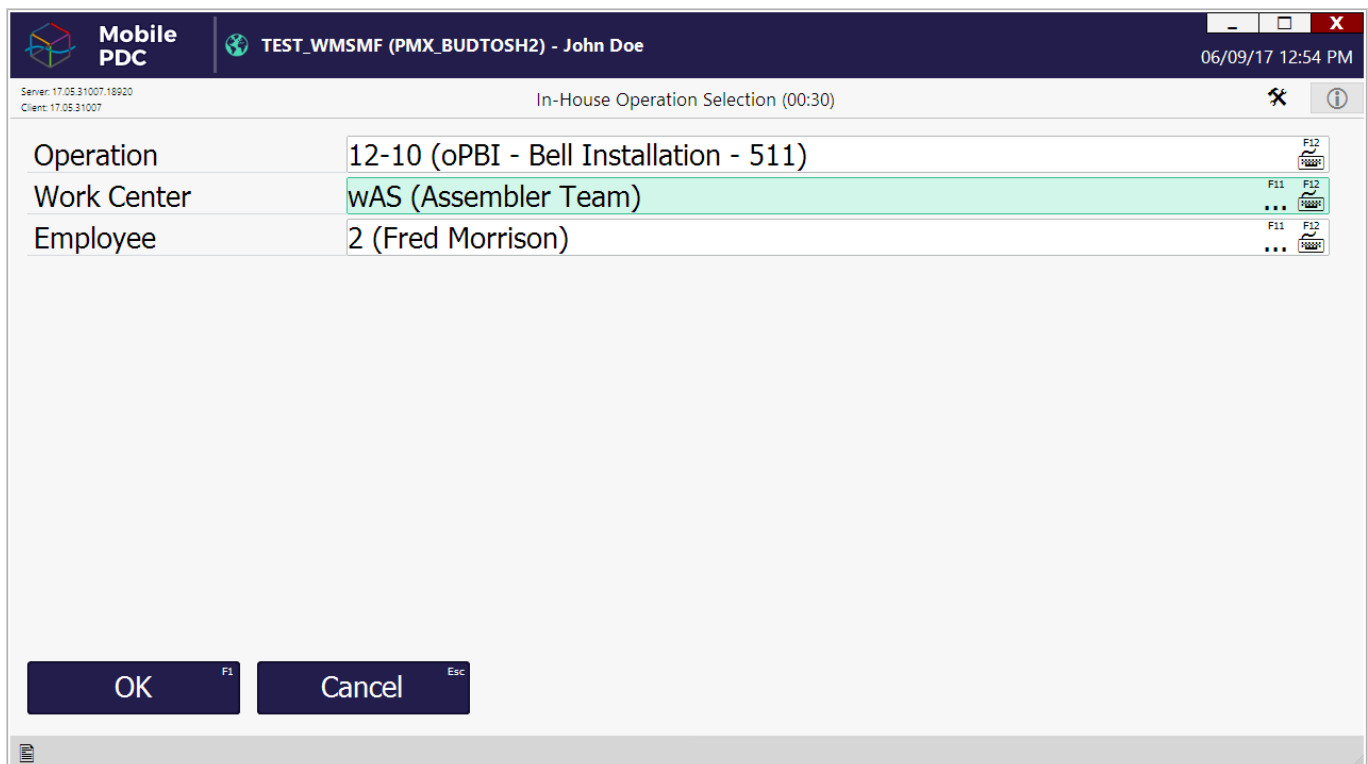
Server: 17.05.31007.18920 Client: 17.05.31007

Operation Type Selection (00:29)

In-House F1 Outsourced F2 Cancel Esc

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.



Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - John Doe 06/09/17 12:54 PM

Server: 17.05.31007.18920 Client: 17.05.31007

In-House Operation Selection (00:30)

Operation	12-10 (oPBI - Bell Installation - 511)	F12
Work Center	wAS (Assembler Team)	F11 F12
Employee	2 (Fred Morrison)	F11 F12

OK F1 Cancel Esc

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.

Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - John Doe 06/09/17 12:54 PM

Server: 17.05.31007.18920 Client: 17.05.31007 Check Results (00:30)

Operation	12-10 (oPBI - Bell Installation - 511)
Work Center	wAS (Assembler Team)
Employee	2 (Fred Morrison)
Quantity	0/0/0

0 IsApproved	Y (OK)
0 WeldThickness	40
0 SurfaceQuality	5
0 ApprovalComment	Approved

Checked Quantity 1

Set Value F1 Good F2 Rejected F3 Repairable F4 Cancel Esc

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.

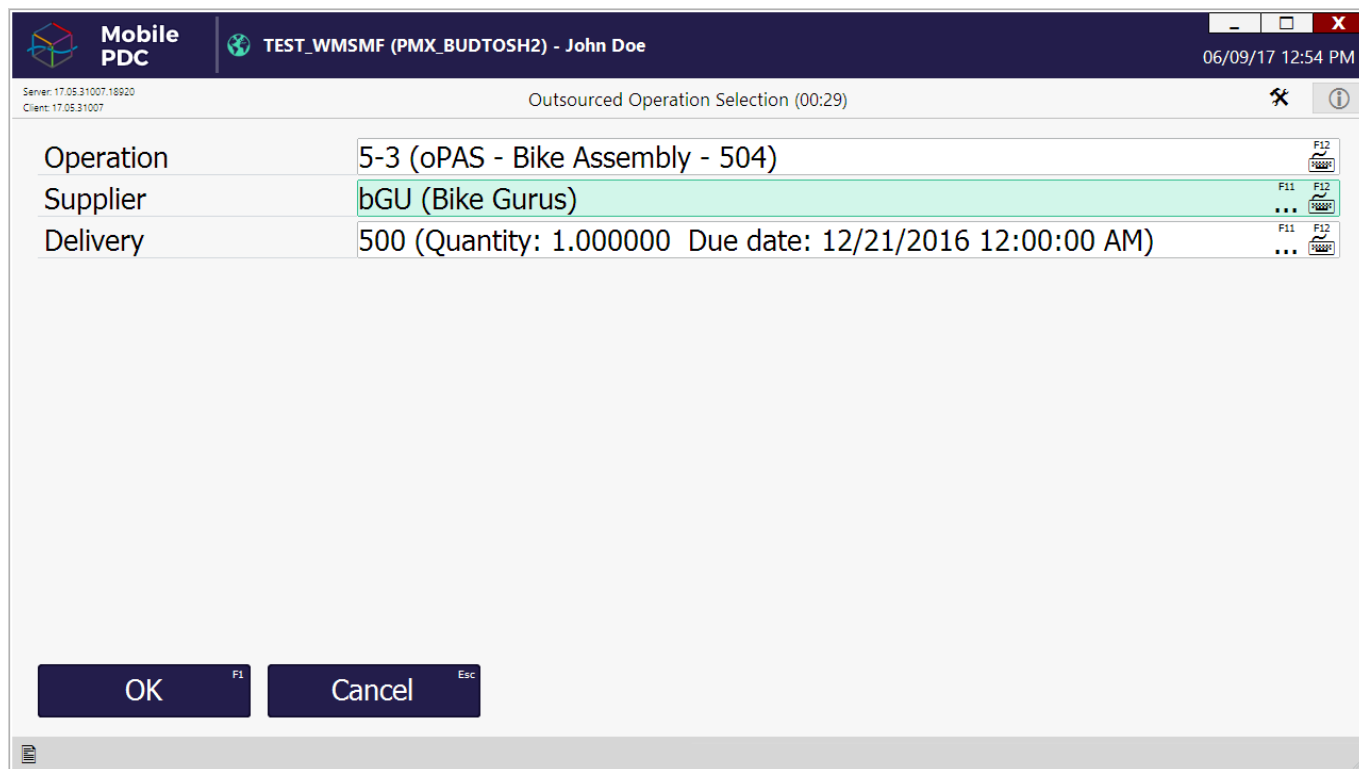
To register the operation as repairable, press the 'Repairable' button.

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.



Field	Value
Operation	5-3 (oPAS - Bike Assembly - 504)
Supplier	bGU (Bike Gurus)
Delivery	500 (Quantity: 1.000000 Due date: 12/21/2016 12:00:00 AM)


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.

 **Mobile PDC**


TEST_WMSMF (PMX_BUDTOSH2) - John Doe

01/03/17 09:47 AM

Server: 17.05.31007.18920
Client: 17.05.31007

Workshop Monitor

Last Updated On 09:47 AM 01/03/17

	#523 m4 (Wheel) 24-2 (oPAS - Bike Assembly) Planned: 5 Completed: 2	John Doe (1) Due Date: 01/04/17 Open: 5 Rejected: 1	12:49 PM 01/02/17 Completed Job wAS
---	---	---	---

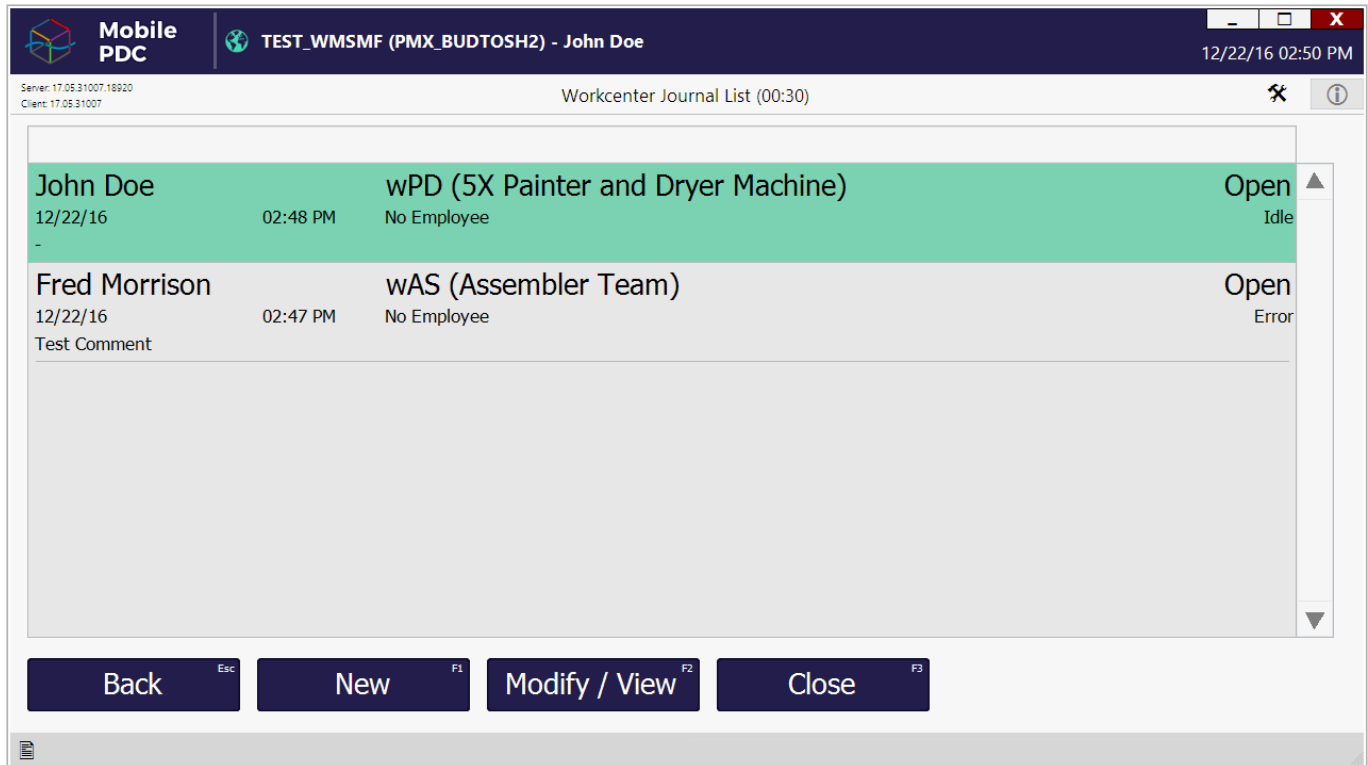
Logout Esc

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.



Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - John Doe 12/22/16 02:50 PM

Server: 17.05.31007.18920 Client: 17.05.31007 Workcenter Journal List (00:30)

Employee	Date	Time	Reason	Status
John Doe	12/22/16	02:48 PM	wPD (5X Painter and Dryer Machine)	Open Idle
Fred Morrison	12/22/16	02:47 PM	wAS (Assembler Team)	Open Error

Test Comment

Back (Esc) New (F1) Modify / View (F2) Close (F3)

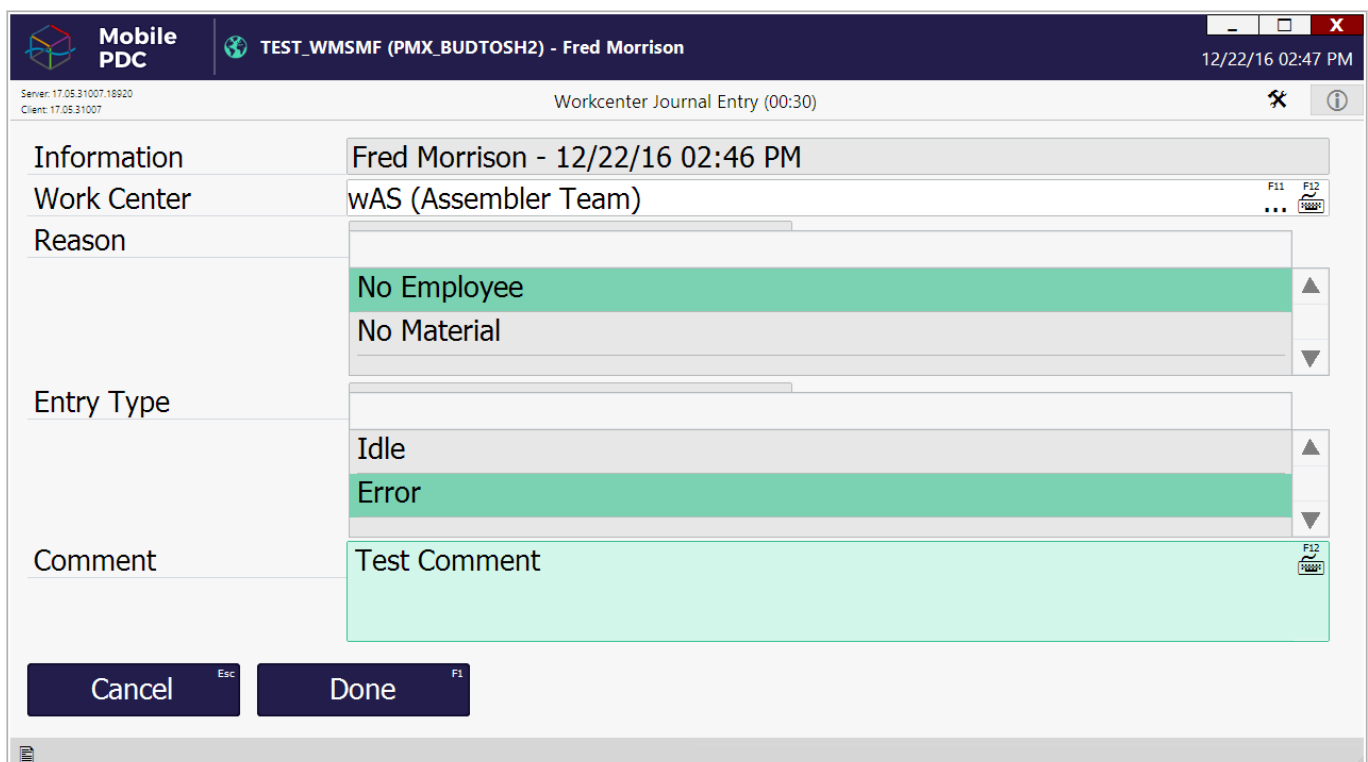
Press the 'Back' button to go back to the login screen.

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



Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - Fred Morrison 12/22/16 02:47 PM

Server: 17.05.31007.18920 Client: 17.05.31007 Workcenter Journal Entry (00:30)

Information Fred Morrison - 12/22/16 02:46 PM

Work Center wAS (Assembler Team)

Reason

No Employee

No Material

Entry Type

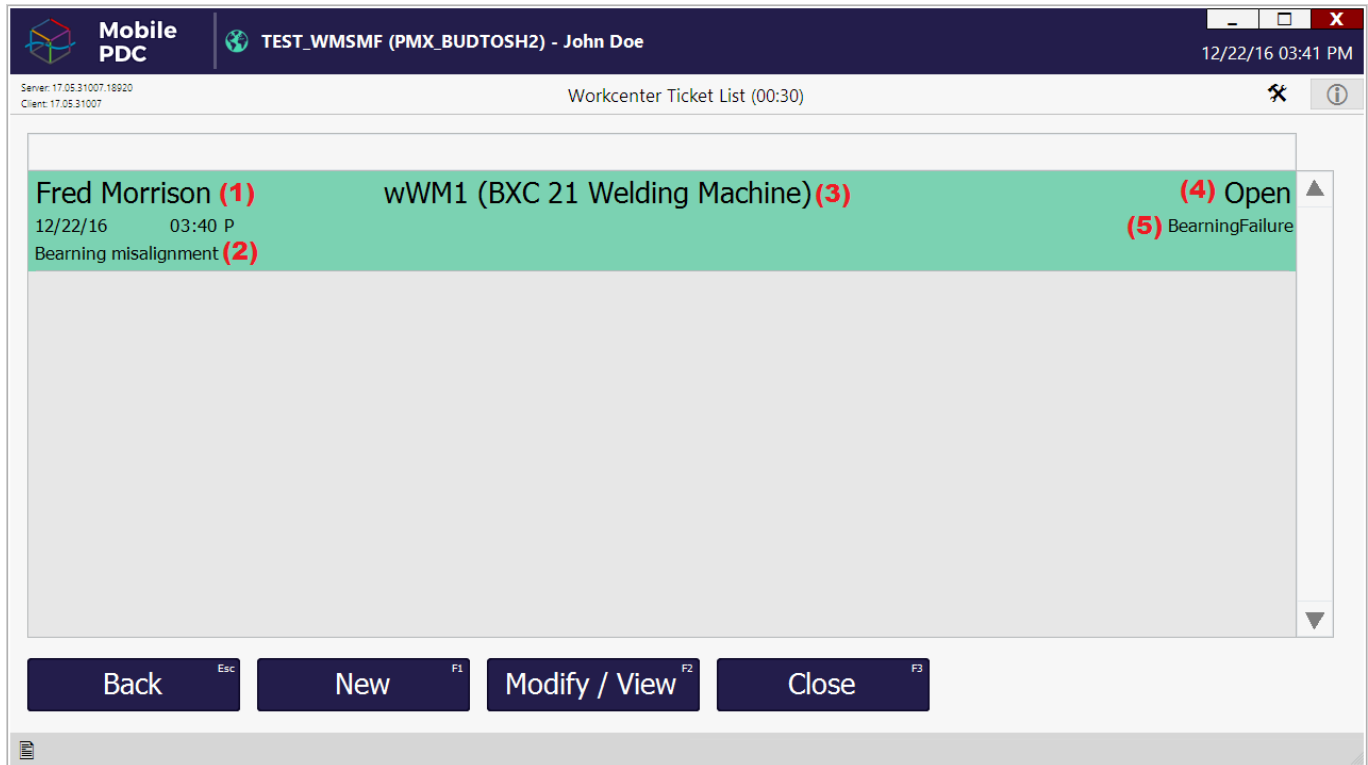
Idle

Error

Comment Test Comment

Cancel (Esc) Done (F1)

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

The screenshot shows a mobile application interface for 'Mobile PDC'. The title bar includes the application name, a user identifier 'TEST_WMSMF (PMX_BUDTOSH2) - John Doe', and the date/time '12/22/16 03:47 PM'. Below the title bar, the form is titled 'Workcenter Ticket Entry (00:30)'. The form contains several fields: 'Information' with the value 'John Doe - 12/22/16 03:46 PM', 'Work Center' with the value 'wPD (5X Painter and Dryer Machine)', and 'Comment' which is an empty text area. The 'Entry Type' field is a dropdown menu currently showing 'Accident' and 'BearingFailure'. At the bottom of the form are two buttons: 'Cancel' (with an 'Esc' key icon) and 'Done' (with an 'F1' key icon). The interface also shows server and client IP addresses in the top left corner.

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.

The screenshot shows the 'Mobile PDC' application interface. At the top, there's a header bar with the logo, user information 'TEST_WMSMF (PMX_BUDTOSH2) - John Doe', and the date/time '06/09/17 12:54 PM'. Below the header, a status bar shows 'Start Job (00:29)'. The main area contains three input fields: 'Default Work Center' with value 'wPD', 'Operation' with value '13-1 (oPPD - Painting and Drying - 512)', and 'Work Center' with value 'wPD (5X Painter and Dryer Machine)'. Each field has a dropdown arrow icon on the right. At the bottom, there are four buttons: 'Done' (green), 'Admin' (dark blue), 'Clear' (dark blue), and 'Logout' (dark blue). Each button has a function key label (F1, F3, F4, Esc) above it.

Default Work Center	wPD	F12
Operation	13-1 (oPPD - Painting and Drying - 512)	F11 F12
Work Center	wPD (5X Painter and Dryer Machine)	F11 F12

Done F1 Admin F3 Clear F4 Logout Esc

The default work center is the work center defined for the terminal on the 'PDC Extended Configuration' form. To disable the default work center, set the 'Work Center Ignore' option to 'Yes'. 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. The default work center is not mandatory. If there is more than one work center with the same feature as the default, the user can complete the operation on any of those work centers.

To erase the content of the 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](#)

To complete the operation, press the 'Done' button.

Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - John Doe 06/09/17 12:54 PM

Server: 17.05.31007.18920 Client: 17.05.31007 Complete Job (00:30)

Production Order	#512 mM1001 (Painted Bike Framework)	UoM	pcs
Operation	13-1 (oPPD - Painting and Drying)		
Started	12/22/16 03:50 PM		
Bin Location	01-SYSTEM-BIN-L...	Setup	<input checked="" type="checkbox"/>
Duration	25 min	This Day	
Quantity	1	Rejected Quantity	0

Done Cancel

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. 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](#)

Because the user does not start the job manually, the booked time cannot be measured. Therefore the system creates the booking based on the following:

- completed quantity and rejected quantity
- setup (if booked) and job time defined on the Production Order Operation Details form.

Production Order Operation Details - [DocNum: 529, Line: 1]

Operation Code	oPPD		Operation Break	Allowed
Operation Name	Painting and Drying		Operation Time UoM	Minutes
Before Time	min	0.000	Is Parallel Operation	<input type="checkbox"/>
Safety Time	min	0.000	Is Overlapping Operation	<input type="checkbox"/>
Setup Time	min	5.000	Max Parallel Operations	0
Job Time	min	20.000	Overlapping Quantity	0.000
Teardown Time	min	5.000	Allocation Window	0.000
After Time	min	400.000	Min Job Quantity	0.000
Time Base	1.000		Message	
Planned Quantity	2.000		Is Pinned	<input type="checkbox"/>
Completed Quantity	1.000		Pinned Start Date	
Rejected Quantity	1.000		Pinned Start Time	00:00

Resource Requirements	Dates	Outsourcing	PDC Bookings	Documentation	Cost Amounts	Parameters
Time UoM	Minutes		Open Job	53.333		
Booked Job	0.000		Open Setup	5.000		
Booked Setup	0.000		Open Teardown	5.000		
Booked Teardown	0.000		Planned Job	53.333		
State	Created		Planned Setup	5.000		
Booked Completed Quantity	0.000		Planned Teardown	5.000		
Booked Rejected Quantity	0.000					

Posting Date	Posting Time	Posting Code	Compl. Qty.	Rej. Qty.	Mach. Duration	Pers. Duration	Emp. ID	Emp. Name	Reason ...
01/03/17	10:12	Start Setup	0.000	0.000	0.000	0.000	1	Doe, John	
01/03/17	10:17	Completed Setup	0.000	0.000	0.000	0.000	1	Doe, John	
01/03/17	10:17	Start Job	0.000	0.000	0.000	0.000	1	Doe, John	
01/03/17	10:57	Completed Job	1.000	1.000	40.000	40.000	1	Doe, John	

OK Cancel Allocations

The system will automatically create the 'Start Setup', 'Completed Setup', 'Start Job' and 'Completed Job' bookings. The posting time will be 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.

PDC Sheet

Production Order Number: 514 Operation: oPAS Bike Assembly WC: wAS Assembler Team

#	Employee ID	Allocation ID	Posting Date	Posting Time	Posting Code	Compl Qty	Rej Qty	Mach. Duration	Pers. Duration
1	1	00010342							
2	1	00010342							
3	1	00010372							
4	1	00010372							

The Allocation ID is the identification number of the allocation that can be seen on the Job Requirements Report:

Operation: oPAS - Bike Assembly		Operation ID: 00004039	
	Begin Date&Time: 08/28/17 08:00 AM		Production Order: 43 / 3
	Before Time: 0.00 [min]		Product Code: ITEM05 - Batch number + best before da
	After Time: 0.00 [min]		MtO Scenario:
			Custom Code:
	ITEM01 No Batch no serial no BBD 10.00		
	00004037 manual UOM		
	ITEM10 Batch number + 2ND Batch + 20.00		
	00004038 best before date manual UOM		
Work Center: OP: oPAS	wAS - Assembler Team		Allocation ID: 00004006
			43-2
Start Date&Time: 08/28/17 08:00 AM		End Date&Time: 08/28/17 12:00 PM	
Setup Time: 0.00 [min]		Teardown Time: 0.00 [min]	
Quantity: 0.93		Identification Code: 43-2-wAS	
Job Time: 240.00 [min]		Total Duration: 240.00 [min]	
Feature: aSS - Assembly			

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.

Inserted	Emp. ID	Emp. Name	Alloc. Code	Posting Date	Posting Time	Posting Code	Reason Name	Compl. Qty.	Rej. Qty.	Mach. Duration	P.
<input checked="" type="checkbox"/>	1	Doe, John	00010342	12/23/16	13:04	Start Teardown		0.000	0.000	0.000	
<input checked="" type="checkbox"/>	1	Doe, John	00010342	12/23/16	13:10	Completed Teardown		0.000	0.000	0.000	

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.

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 Produex Manufacturing Settings, an additional 'Parameter' grid is shown.

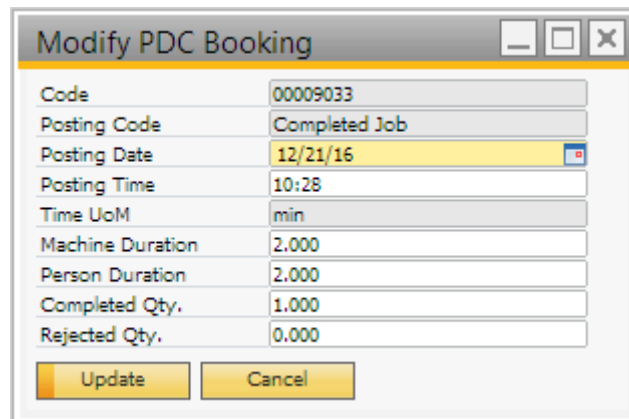
On the 'Material' grid the materials issued during the selected booking are listed. On the 'Product' grid the products received during the selected booking are listed. On the 'Parameter' grid the quality assurance parameters will be displayed.

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



Code	00009033
Posting Code	Completed Job
Posting Date	12/21/16
Posting Time	10:28
Time UoM	min
Machine Duration	2.000
Person Duration	2.000
Completed Qty.	1.000
Rejected Qty.	0.000

Update Cancel

If the PDC booking has inventory transactions, the completed and the rejected quantities cannot be modified.

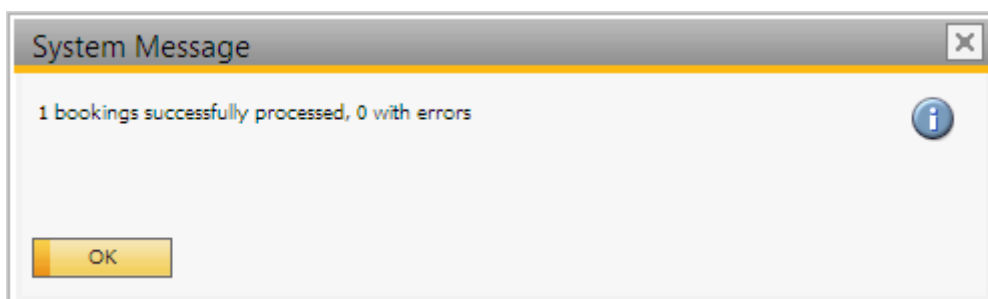
Set to Unprocessed

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.

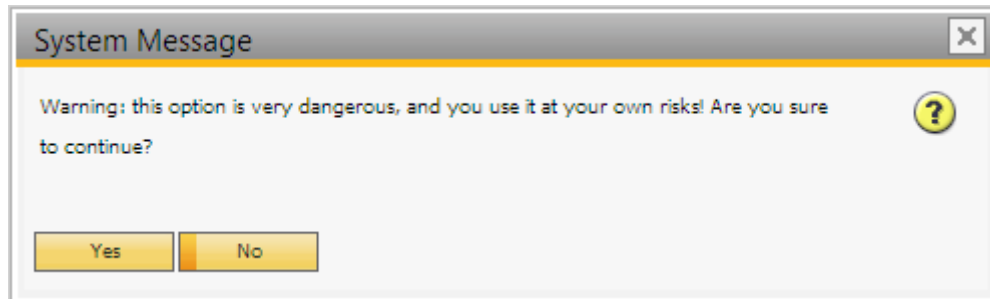


Undo a booking

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.

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.

Batch Number	Quantity	Change Quantity
BNR00001	10.000	0.00
BNR4321	5.000	0.00

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.

Item Code	Item Name	Batch Number	Quantity	Failed Quantity	Receipt Quantity	New Stock Quantity
⇒ Item03	Serial nbr	SNR0004	0.000	-1.00	1.00	1.00

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.

Item Code	Item Name	Batch Number	Issued Quantity	Undone Quantity	Quantity	New Stock Quantity
⇒ Serial nbr	Serial nbr	SNR0004	1.00	1	0.000	0.00

Cost and Price Calculations

Produmex Manufacturing is an add-on for SAP Business One, a leading enterprise information system

for small and mid-sized businesses.

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 is 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.

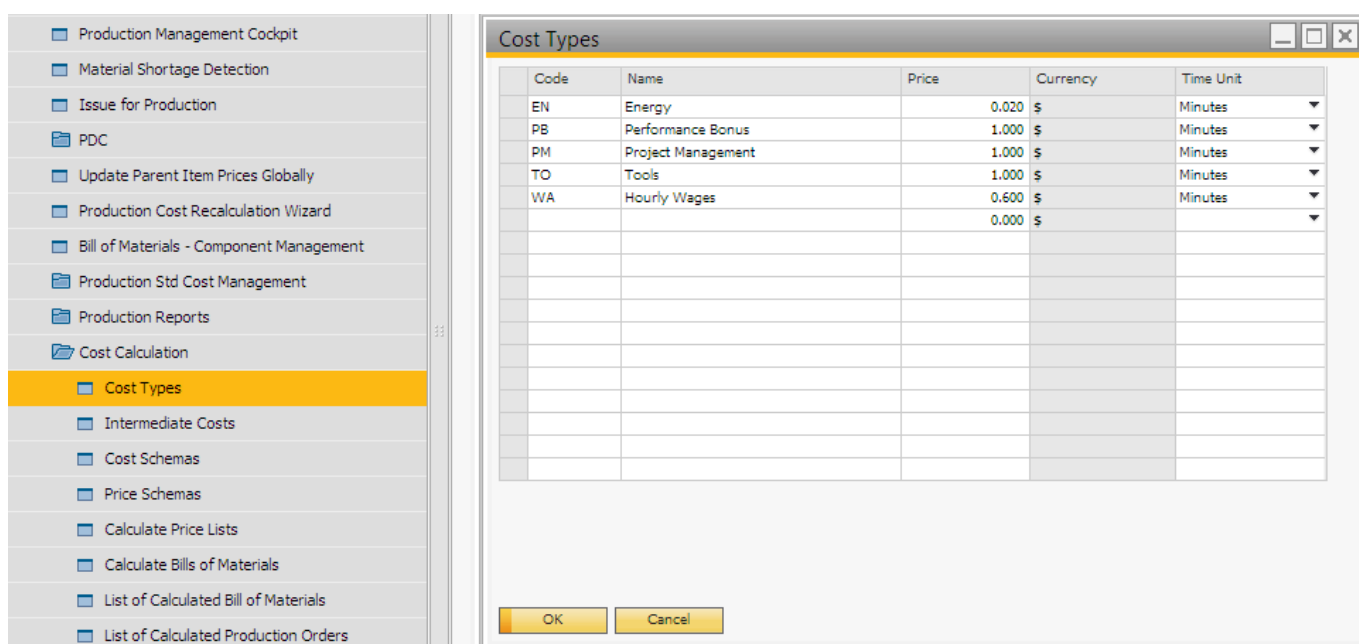
Manufacturing cost calculation starts by defining cost types that are used for any production operation in the company. The cost types are assigned to manufacturing resources (work center groups, work centers, operations, and so on) with their basic cost values. The costs of operations of in BoMs and 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).

1. Defining Costs

In our sample we use the same database as described in the tutorial "Applying Manufacturing Resources for SAP Business One". The reader should be familiar with the basic concepts and processes described in this tutorial. 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.

Resource Features

Code	Name	Resource Type
aSS	Assembly	Work-Center
aSSU	Assembly Unlimited	Work-Center
cRF	Constraint	Constraint
cUT	Cutting	Work-Center

Cost amounts of work center feature aSS

Cost Type	Setup Amount	Job Amount	Teardown Amount	Cycle Amount	Quantity Amount	Fix Amount
Energy	1.500	3.000	1.500	0.000	0.000	0.000
Performance Bonus	0.000	0.000	0.000	0.000	2.000	0.000
Project Management	0.000	0.000	0.000	0.000	0.000	5.000
Tools	0.000	0.150	0.000	0.000	0.000	0.000
Hourly Wages	1.000	1.000	1.000	0.000	0.000	0.000

OK Cancel

In the example above the number of costs are defined for the Tube Machine:

- Hourly Wages – every minute (since we defined this cost type for minutes) of this (Tube Machinery) 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 Tube Machinery operation were required for a manufacturing the Hourly Wages cost would be $100 \times 1 \times 0.6$ (from cost type definition above). If 10 minutes of setup is defined for the operation $10 \times 1 \times 0.6$ is calculated.
- Performance Bonus – for every completed unit of job 2×1 (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 (10×5).
- Energy – every minutes, when this (Tube Machinery) 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 100×3 (job amount) $\times 0.02$ (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 100×0.15 (job amount) $\times 1$ (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, but for now we do not override the costs/prices defined here. Later in this tutorial we'll show how to do this.

- Production Management Cockpit
- Material Shortage Detection
- Issue for Production
- PDC
- Update Parent Item Prices Globally
- Production Cost Recalculation Wizard
- Bill of Materials - Component Management
- Production Std Cost Management
- Production Reports
- Cost Calculation
 - Cost Types
 - Intermediate Costs
 - Cost Schemas**
 - Price Schemas
 - Calculate Price Lists
 - Calculate Bills of Materials
 - List of Calculated Bill of Materials
 - List of Calculated Production Orders

Cost Schema

Cost Schema Code: CS1
Cost Schema Name: Cost Schema 1

Line No	LineID	Description	Intermediate Cost	Formula	Value	Source Field1	Cost Type1	Source Field2	Cost Type2	Sourc...
1	MT	Materials	Material	\$1	0.000	Material Cost		None		None
2	WG	Wages		\$1	0.000	Operation Cost	WA	None		None
3	PM	Management		\$1	0.000	Fix Amount	PM	None		None
4	BO	Performance Bonuses		\$1	0.000	Operation Cost	PB	None		None
5	EN	Energy		\$1	0.000	Operation Cost	EN	None		None
6	TO	Tools		\$1	0.000	Operation Cost	TO	None		None
7	SA	Total Labor Costs	Labor	{WG}+{BO}+{PM}	0.000	Material Cost		None		None
8	NM	Total Non-Material		{SA}+{EN}+{TO}	0.000	Material Cost		None		None
9	GT	Total Operation Costs	Total	{MT}+{NM}	0.000	Material Cost		None		None

OK Cancel

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, see the picture below.

Cost Schema

Cost Schema Code: CS1
Cost Schema Name: Cost Schema 1

Line No	LineID	Description	Intermediate Cost	Formula	Value	Source Field1	Cost Type1	Source Field2	Cost Type2	Sourc...
1	MT	Materials	Material	\$1	0.000	Material Cost		None		None
2	WG	Wages		\$1	0.000	0 - None		None		None
3	PM	Management		\$1	0.000	1 - Calculation Base Quantity		None		None
4	BO	Performance Bonuses		\$1	0.000	10 - Setup Time		None		None
5	EN	Energy		\$1	0.000	11 - Job Time		None		None
6	TO	Tools		\$1	0.000	12 - Teardown Time		None		None
7	SA	Total Labor Costs	Labor	{WG}+{BO}+{PM}	0.000	13 - Quantity Produced		None		None
8	NM	Total Non-Material		{SA}+{EN}+{TO}	0.000	15 - Purchased Quantity		None		None
9	GT	Total Operation Costs	Total	{MT}+{NM}	0.000	16 - In House Quantity		None		None

OK Cancel

25 - Purchasing Price
26 - In House Price
27 - Outsourcing Price
28 - By Product Price
29 - Cycle Amount
30 - Setup Cost
31 - Job Cost
32 - Teardown Cost
33 - Quantity Cost
34 - Fix Cost
35 - Purchasing Cost
36 - In House Cost
37 - Outsourcing Cost
38 - By Product Cost
39 - Cycle Cost
41 - Operation Cost
42 - **Material Cost**
50 - Total Cost
8 - Cost Type Price

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.

Line No	LineID	Description	Intermediate Cost	Formula	Value	Source Field1	Cost Type1	Source Field2	Cost Type2	Source...
1	MT	Materials	Material	\$1	0.000	Material Cost		None		None
2	WG	Wages		\$1	0.000	Operation Cost	WA	None		None
3	PM	Management		\$1	0.000	Fix Amount	-			None
4	BO	Performance Bonuses		\$1	0.000	Operation Cost	EN	- Energy		None
5	EN	Energy		\$1	0.000	Operation Cost	PB	- Performance Bonus		None
6	TO	Tools		\$1	0.000	Operation Cost	PM	- Project Management		None
7	SA	Total Labor Costs	Labor	{WG}+{BO}+{PM}	0.000	Material Cost	TO	- Tools		None
8	NM	Total Non-Material		{SA}+{EN}+{TO}	0.000	Material Cost	WA	- Hourly Wages		None
9	GT	Total Operation Costs	Total	{MT}+{NM}	0.000	Material Cost		None		None

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.

{Name}: The result of the column called Name, where Name is an identifier from the values defined in column LineID.

[x]: the result of row x from the schema (column Line No).

[-x]: the result of the line which is x lines above this one.

%: A value in percent.

Please note: The only decimal separator supported is the dot '.'.

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: $\text{Teardown time} * \text{Cycle Count} * \text{Teardown Amount} * \text{Unit Price}$
- Cycle Cost: $\text{Cycle Count} * \text{Cycle Amount} * \text{Unit Price}$
- Quantity Cost: $\text{Quantity Produced} * \text{Quantity Amount} * \text{Unit Price}$
- Operation Cost: $\text{Setup Cost} + \text{Job Cost} + \text{Teardown Cost} + \text{Cycle Cost} + \text{Quantity Cost}$.
- Fix Cost: $\text{Fix Amount} * \text{Unit Price}$ *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: $\text{Purchased Quantity} * \text{Purchasing Price}$
- In House Cost: $\text{Inhouse Price} * \text{In House Quantity}$
- Outsourced Cost: $\text{Outsourced Quantity} * \text{Outsourcing Price}$
- By Product Cost: $\text{By Product Quantity} * \text{By Product Price}$
- Material Cost: $\text{Purchasing Cost} + \text{Outsourced Cost} + \text{By Product Cost}$
- Total Cost: $\text{Operation Cost} + \text{Fix Cost} + \text{Material Cost}$

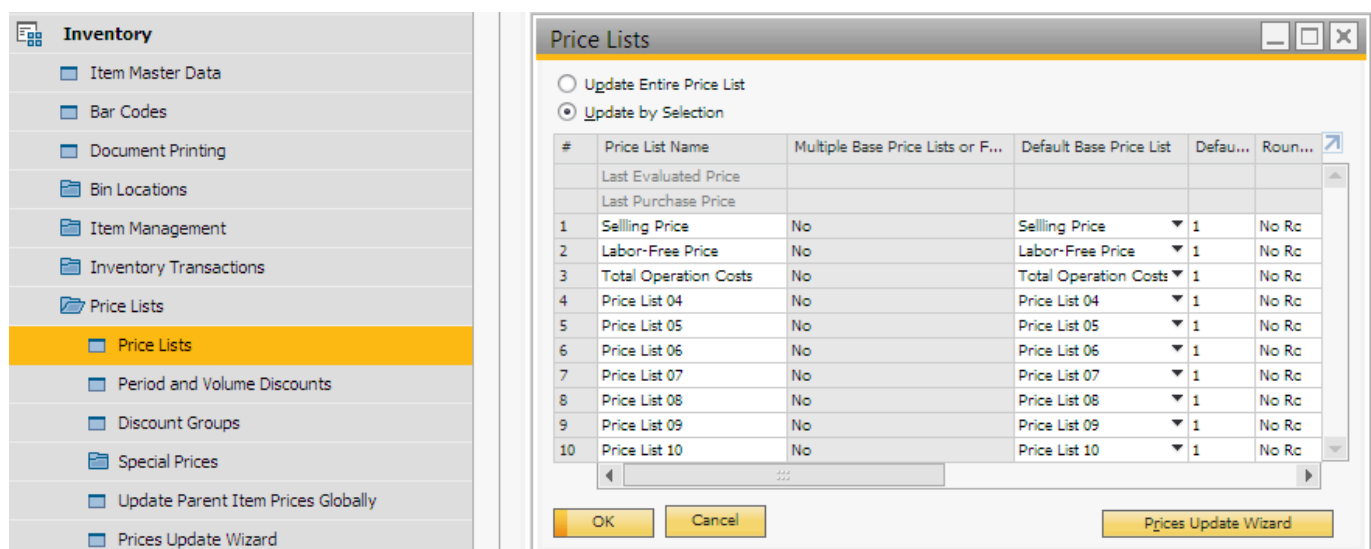
These costs are calculated only for the lines and not for the head.

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 define a mapping between cost schemas and price lists. The values are taken from the cost schemas via the Intermediate Cost variables. And the calculated values of the lines in a price schema may be linked to price lists.

Line No	LineID	Description	Price List	Formula	Intermediate Cost	Value
1	MA	Materials	Labor-Free Price	\$	Material	0.000
2	LA	Labor Costs	Labor Costs	\$	Labor	0.000
3	TC	Total Operation Costs	Total Operation Costs	\$	Total	0.000
4		Selling Price	Selling Price	{TC}*1.3		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 (a hefty 30%).

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 its (1) bill of material structure, (2) the component list in a specific production order, and (3) the actual work and used materials reported via PDC.

2.1. Reviewing Bill of Materials for Cost Calculations

Bill of Materials (Resource List)

Product No. m1101 X Quantity 1 Warehouse 01

Product Description Raw Bike Framework Price List Price List 01

BOM Type Production Distr. Rule

Production Std Cost \$ 0.00 Project

Planned Average Production Size 1.00

#	Row Type	R... Type	No.	Description	Quantity	UoM N...	Warehouse	Issue Method	Milestone Type	Production Std...	Total Production...	Price List
1	Material	Item	m1	5m Steel Pipe	1	pcs	01	Manual	Depends On Every	\$ 0.00	\$ 0.00	Price List 01
2	Operation	Item	oPCU	Cutting	5	min	01	Backflush	Milestone	\$ 0.00	\$ 0.00	Price List 01
3	By-Product	Item	m2	Steel Pipe	-2	m	01	Backflush	Depends On Every	\$ 0.00	\$ 0.00	Price List 01
4	Operation	Item	oPWE	Welding	5	min	01	Backflush	Milestone	\$ 0.00	\$ 0.00	Price List 01

Calculation Base Quantity No

Is Auto Roll No

Milestone Type Depends On Every

Operation Granularity 1

Recipe Version

Rejected Warehouse 01

Timestamp

Product Price \$ 100.00

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 takes its cost from a price list when the item is used as a component in another product's BoM.

In our database the only subordinate component is the Bike Frame. It has a BoM, but this fact is not enough, the Procurement method must be set to "Make".

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:

Sales Order

Customer: bBC
 Name: Big Bike Mart
 Contact Person:
 Customer Ref. No.:
 Local Currency:
 No.: Primary 515
 Status: Open
 Posting Date: 02/02/17
 Delivery Date: 02/08/17
 Document Date: 02/02/17

#	Item No.	Quantity	Unit Price	Disc...
1	p1001-1	10	\$ 482.01	0.00
2				0.00

Sales Employee: -No Sales Employee-
 Owner:
 Remarks:
 OK Cancel

You will get a window with the calculation parameters:

Calculate Sales Order

Use schema above for recursed BoMs as well ☐
 Trace Calculated Values ☐
 Override Child BoM Base Quantities ☐
 OK Cancel

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.

[illegible]

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 it 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. You can change this price at will, together with the Selected checkbox. If the checkbox is turned on, and you click on Accept Prices, the set prices from the grid will be updated back to the sales order/quotation.

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.

Production Reports

Cost Calculation

Cost Types

Intermediate Costs

Cost Schemas

Price Schemas

Calculate Price Lists

Calculate Bills of Materials

List of Calculated Bill of Materials

List of Calculated Production Orders

Calculate Bills of Materials

Price Schema

⇒ P5

Price Schema

Cost Schema

⇒ CS1

Cost Schema 1

Use schema above for recursed BoMs as well

☐

Date of calculation (for currency conversion)

02/03/17

Product From

Product To

Item Properties

Trace Calculated Values

☐

Calculation Base Quantity

1.000

Override Child BoM Base Quantities

☐

Calculate

Cancel

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.

Product Tree Calculation Result									
Date of calculation (for currency conversion): 02/03/17									
Item Code	Item Name	Quantity Produced	Calculation Base Quantity	Price Schema	Cost Schema	Error			
mm1001	Painted Bike Framework	1.000	1.000	PS	CS1				
mm1001	Raw Bike Framework	1.000	1.000	PS	CS1				
ps001-1	Red Bike	1.000	1.000	PS	CS1				

Line No	LineID	Description	Result	Result Per Unit	PL Currency	Price List	Intermediate Cost	Old Price	New Price	Save Price	Currency	Error
1	MA	Materials	10.000		10.000 \$	Labor-Free Price	Material		0.000	10.000	\$	
2	LA	Labor Costs	0.000		0.000 \$		Labor		0.000	0.000	\$	
3	TC	Total Operation Costs	10.000		10.000 \$	Total Operation Costs	Total		0.000	10.000	\$	
4		Selling Price	13.000		13.000 \$	Price List 01		300.000		13.000	\$	

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 PRB1 (Red Sports Bike) contains the labor costs calculated for the subordinate component C03 (Bike Frame). The item C03 is a material component in the BoM of PRB1. Since C03 has 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 PRB1 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.

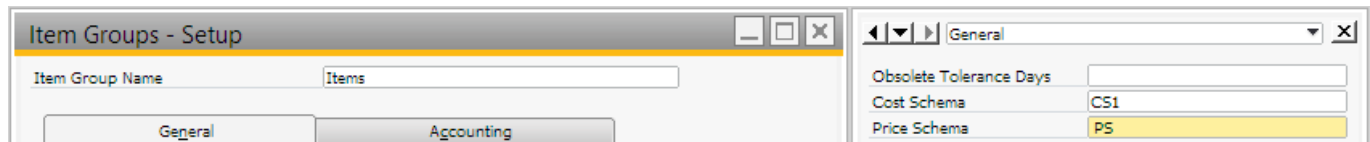
List of Calculated Bill of Materials												
Item Code		Red Bike		Date From		Date To						
Code	Date	Time	Quantity Produced	Cost Schema	Price Schema	Calculation Base Quantity	Error	Price List1	Result1	Currency1	Price List2	
00033326	02/03/17	14:47	1.000	CS1	PS	10.000		Labor-Free Price	10.000	\$	Total Operation	
00033515	02/03/17	14:53	1.000	CS1	PS	1.000		Labor-Free Price	10.000	\$	Total Operation	

2.5. Price List Recalculations

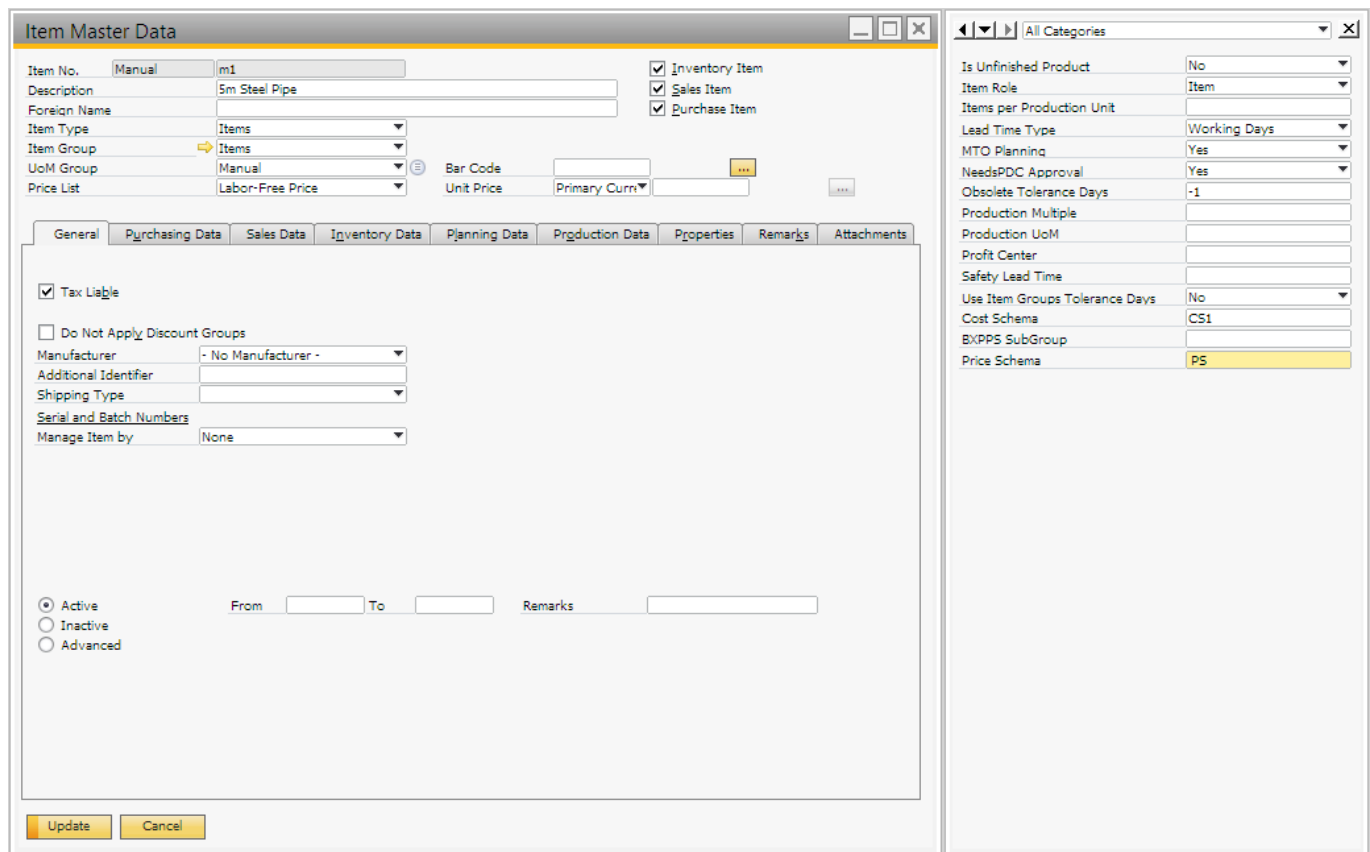
A main objective of the cost calculation module of Produmex Manufacturing is that the standard price lists in SAP Business One can be updated with the calculated prices with a single button click.

2.5.1. Defining Default Schemas for Items and Item Groups

Since Produex 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.

Cost Calculation

Cost Types

Intermediate Costs

Cost Schemas

Price Schemas

Calculate Price Lists

Calculate Bills of Materials

Calculate Price Lists

Date of calculation (for currency conversion)
Group Name
Product From
Product To

Item Properties

Save Calculations ☐

Calculate

Cancel

In case default calculation schemas are not defined for any of the items to be calculated, an error message is displayed. When the calculation process is completed, the Calculated Prices form is opened. Pressing the Update button will update the prices of the items in the specified price list.

[illegible]

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, but can also be the actual purchase price of the batch or serial numbered actually issued for the production order. There is a parameter in Produmex Manufacturing Settings, “Use Purchase Prices for Batch/Serial Numbered Components for Actual Cost Calculation of Production Orders” that when checked determines the source and way the prices are retrieved. The general costs defined in the schemas are added to the actual total costs of the production order the usual way.

4. Automating the Creation of the Tutorial Demo Data

Using the tools and techniques described in details in the document [Quick Start Tutorial](#) the demo data for this tutorial can also be created.

The tools to create this kind of test/generator/installer scripts can be downloaded from: | <http://builds.produmex.name/BXUtils/TxTestScriptCreator.zip>

4.1. Creating the VerySimpleMACC.csv File

The VerySimpleMACC.csv contains the sections for the demo data used in this tutorial. These MACC templates are available free from the Produmex product distributors and could be extremely helpful

when installing the cost calculation functions for a company.

The CSV file has the following sections:

- CheckAddOnsRunning - tests if the Produmex Manufacturing add-on is running
- MACC_CostTypes - creates the cost types
- MACC_WCFeatures - sets the cost amounts for the specified work-center features
- MACC_IntermediateCosts - creates the intermediate cost types (variables)
- MACC_CostSchemas - creates cost schemas with their algorithms
- MACC_RenamingPriceLists - renames pricelist as required by the company
- MACC_PriceSchemas - creates price schemas with their algorithms
- MACC_BoMReview - changes the price list for the main product and sets the Calculation Base Quantity in BoM's, then sets the Cost and Price Schemas in the Item master Data forms. The script verifies if the procurement method is set to "Make" in these manufactured products.

4.2. Running the Generated Scripts

The generated test/installation scripts can be run with the Test Runner as described in another document referred to above.

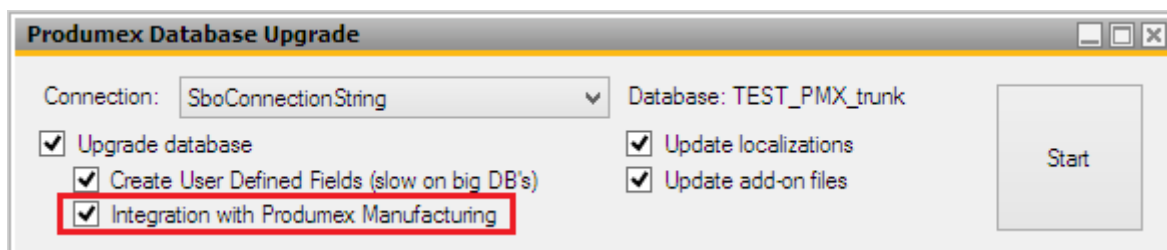
How to work with both Produmex Manufacturing and Produmex WMS

1. Recommended installation steps

First install Produmex Manufacturing. For more information regarding the installation process of Produmex Manufacturing please see: [Produmex Manufacturing Installation Guide](#)

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.



Bill of Materials (Resource List)

Product No. X Quantity Warehouse

Product Description Price List

BOM Type Distr. Rule

Production Std Cost Project

Planned Average Production Size

#	R..	Row Type	Type	No.	Quantity	UoM N...	Warehouse	Milestone Type	Issue Method	Qty tolerance %	B.
1		Material	Item	ITEM01	1	PCS	02	Depends On Begin	Manual	0.000	
2		Material	Item	ITEM10	2	CAN	02	Depends On Begin	Manual	0.000	
3		Operation	Item	oPAS	180	min	02	Milestone	Backflush	0.000	
4		Unfinished Product	Item	UFPR01	-1		02	Depends On Every	Manual	0.000	
5		Unfinished Material	Item	UFPR01	1		02	Depends On Every	Manual	100	
6		Operation	Item	oPCU	5	min	02	Milestone	Backflush	0.000	

Product Price

Manufacturing

BxID
Calculation Base Quantity
Custom Code
Is Auto Roll
Milestone Type
Operation Granularity
Recipe Version
Rejected Warehouse
Timestamp

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:

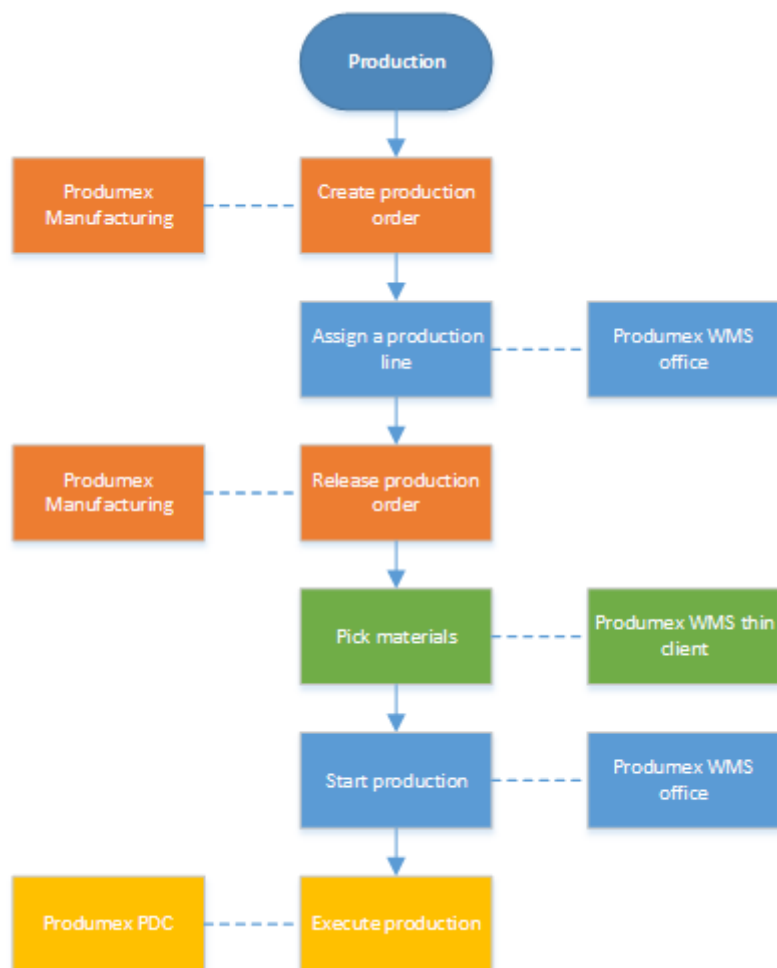
- [Disallowed location](#)
- Location where the 'Block stock from being used for the picking process' option is enabled.

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.



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](#))

3.2. Assign the production line

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'.

Production Order

Type: Standard
Status: Planned
Product No.: ITEM05
Product Description: Batch number + best before date manual UOM
Planned Quantity: 180
Warehouse: 02
Pick list type: PR,PL2

No.: 42
Primary: 42
Order Date: 05/02/17
Start Date: 05/02/17
Due Date: 05/02/17
User: manager
Origin: Manual
Sales Order:
Customer:
Distr. Rule:
Project:

Components				Summary				Produmex								
#	R..	Row Type	Type	No.	Base ...	Planned...	Issued	Milestone Type	Milestone Group	Avail...	UoM ...	UoM ...	Wareho...	Issue Method	Qty tolerance...	Has ...
1		Material	Item	ITEM01	1	1		Depends On Begin	cPAS_3	18	Manual	PCS	02	Manual	0.000	False
2		Material	Item	ITEM10	2	2		Depends On Begin	cPAS_3	69	Manual	CAN	02	Manual	0.000	False
3		Operation	Item	cPAS	180	180		Milestone			Manual	min	02	Backflush	0.000	False
4		Unfinished Prc	Item	UFPR01	-1	-1		Depends On Every	cPAS_3	8	Manual		02	Manual	0.000	False
5		Unfinished Ma	Item	UFPR01	1	1		Depends On Every	cPCU_6	8	Manual		02	Manual	100.000	False
6		Operation	Item	cPCU	5	5		Milestone	cPCU_6		Manual	min	02	Backflush	0.000	False
7			Item													False

Remarks:

Pick and Pack Remarks:

Update Cancel View Create pick list proposal

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.

3.3. Release production order

As the next step release the production order. The production order can be released in the following ways:

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](#)

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.

Select	Changed	St	Pr	Ord	No	Pr	Ord	Status	Priority	Item No	Planned	Allocation Strategy	Begin Date	End Date	Latest Begin Date	Due Date	Due Time	Open Quantity	Completed Quantity	Material Requirements Report	Order Date	MTO Scenario	Pmx Production Line	Pmx Status
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="radio"/>	647			Released				SA1101	1,000	Back From Due Date	04/26/17 03:50 PM	04/26/17 05:00 PM	04/26/17 03:50 PM	04/27/17	00:00	1.00	0.000	Material Requirements Report	04/19/17		PRL01	Started

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

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.

3.5. Start the production

Start the production in the office environment. After the production is started, the Produmex status of the order will be changed to 'Started'.

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'.

Start production

Production order	Item	Qty to make
13	ITEM25 - SAP serial number + best before date + 2ND Batch + track location manual UOM	5 PCS

Best before date: Thursday, April 25, 2019

Batch number 2: PR66666

Lined up tanks

Item code	Description	Tank
ITEM29	No Batch no serial no BBD manual UOM	PR.BL1

Tanks

Tank	# in tank	Produce?
PR.BL1	10.00 PCS	<input type="checkbox"/>

[Assign tank](#)

[Start production](#) [Cancel](#)

3.6. Execute the production on 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](#).

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.

Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - John Doe 04/20/17 04:53 PM

Server: 17.05.31007.18920 Client: 17.05.31007

[Products]

Production Order #666 sA1101 (Raw Bike Framework) UoM pcs

Operation 167-1 (oPCU - Cutting)

Product SSCC

Quantity 0

Item	Name	SSCC	Quantity
sA1101	Raw Bike Framework		0 of 1 pcs

Done Cancel Serial / Batch

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.

The screenshot shows the Mobile PDC interface. At the top, there is a header bar with the Mobile PDC logo, the user name 'TEST_WMSMF (PMX_BUDTOSH2) - John Doe', and the date/time '05/08/17 11:54 AM'. Below the header, there is a search bar with the text 'Search' and a 'Search' button. The search results are displayed in a list with the following items:

SSCC Number	Product Code
000000000000000000383	2033
000000000000000000390	2034
000000000000000000413	2036
000000000000000000451	2044
000000000000000000468	2045
000000000000000000475	2046

At the bottom of the list, there are three buttons: 'OK', 'Cancel', and 'New'.

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.

Mobile PDC TEST_WMSMF (PMX_BUDTOSH2) - John Doe 04/20/17 04:59 PM

Server: 17.05.31007.18920 Client: 17.05.31007

Product Batch Numbers

Production Order #666 sA1101 (Raw Bike Framework) UoM pcs

Operation 167-1 (oPCU - Cutting)

Item sA1101 (Raw Bike Frame) SSCC (2) 000000000000000338

Batch Number (1) Batch Number (3)

Quantity 1 [Best Before] (4) 10/31/17

Batch Number	SSCC	Quantity	[Total Quantity]	Batch Number	[Best Before]
PR11017 (1)	000000000000000338 (2)	1	1	(3)	10/31/2017 12:00 (4)

Quantity 1 pcs Of 1 pcs

Rejected Quantity 0 pcs Of 0 pcs

Done Cancel Rejected Delete

- 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.
- SSCC number:** The SSCC number of the destination logistic unit. Cannot be modified.
- 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.
- 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.

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.

Please note: Stocks to be consumed will be sorted by FEFO and do not take consumption algorithms into account.

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](#)

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'.

The screenshot displays the SAP Production Order form. The 'Status' field in the header is set to 'Closed'. The 'Prod. Status' field in the right-hand pane is also set to 'Closed'. The 'Components' table shows the following data:

#	R...	Row Type	Type	No.	Base ...	Planned...	Issued	Milestone Type	Milestone Group	Avail...	UoM ...	UoM ...	Wareho...	Issue Method
1		Material	Item	ITEM01	1	1		Depends On B	cPAS_3	28	Manual	PCS	02	Manual
2		Material	Item	ITEM10	1	1		Depends On B	cPAS_3	87	Manual	CAN	02	Manual
3		Operation	Item	cPAS	180	180	180	Milestone	cPAS_3		Manual	min	02	Backflush
4		By-Product	Item	ITEM10	-1	-1		Depends On B	cPAS_3	87	Manual	CAN	02	Manual
5			Item											

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

The Scheduled Reallocator will run on predefined times and reschedules the allocations of certain production orders.

16.1. Set up the Scheduled Reallocator

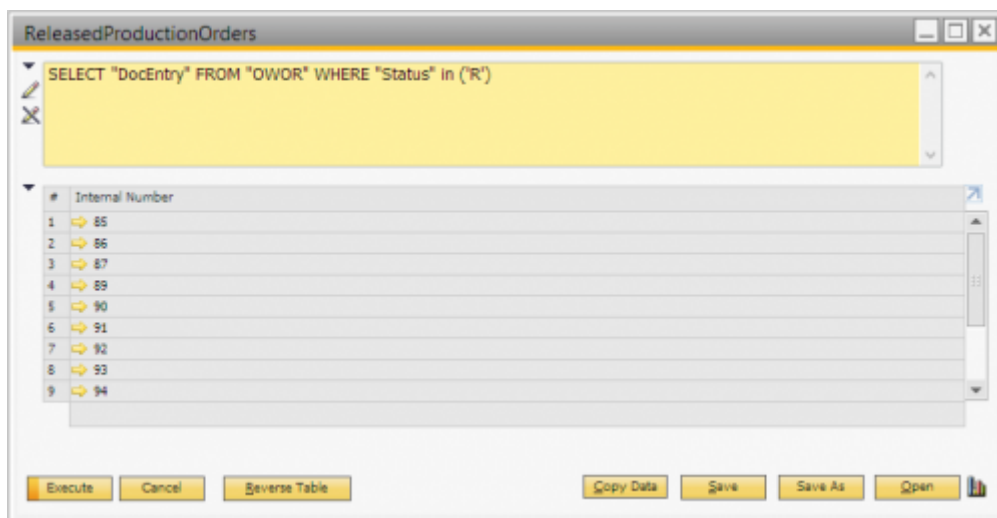
Configure the settings of the Scheduled Reallocator on the [Scheduled Reallocator tab](#) of Produmex Manufacturing settings.

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.

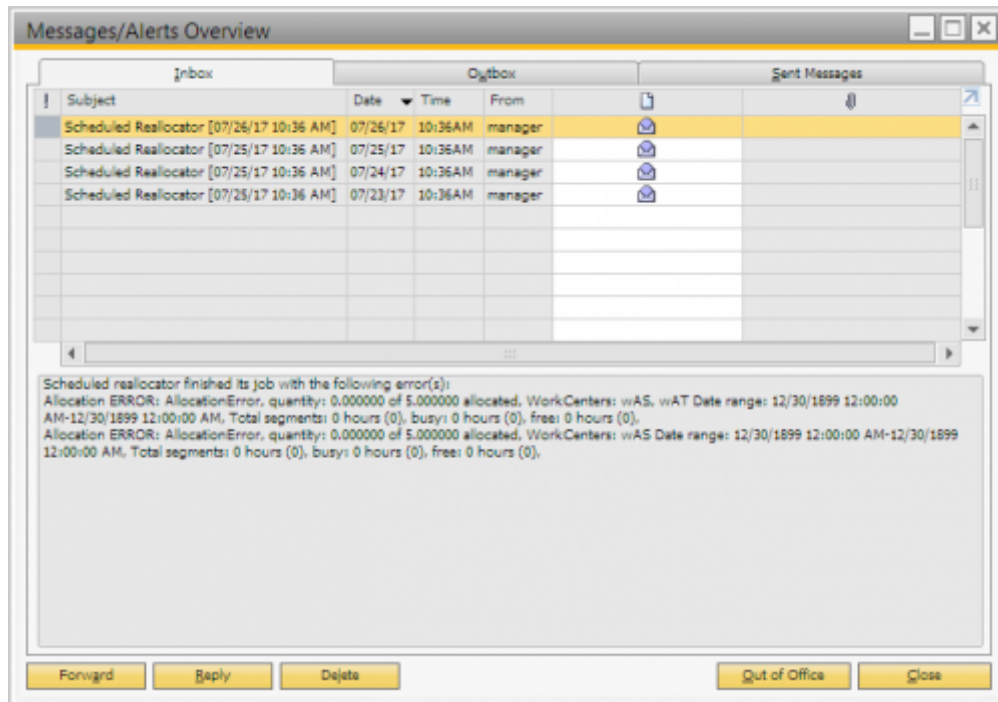
The image displays two screenshots of the 'Job Scheduling Control Panel' interface, illustrating the state of job allocations before and after a reallocation process.

BEFORE REALLOCATION: The top screenshot shows a Gantt chart for three work centers: wAS Assembler Team, wAT Assembler Team, and wJD John Doe. The timeline spans from 07/26 (We) to 07/28 (Fr). wAS has a green block on 07/26 and a red block labeled 'E3/GPAS' on 07/27. wAT has a green block on 07/26 and a red block labeled 'E3/GPAS' on 07/27. wJD has a green block on 07/26 and a red block labeled 'E3/GPAS' on 07/27. A blue block labeled 'E1/GPAS' is shown on 07/28.

AFTER REALLOCATION: The bottom screenshot shows the same Gantt chart after the reallocation. wAS now has a green block on 07/26 and a red block labeled 'E3/GPAS' on 07/27. wAT now has a green block on 07/26 and a red block labeled 'E3/GPAS' on 07/27. wJD now has a green block on 07/26 and a red block labeled 'E3/GPAS' on 07/27. The blue block labeled 'E1/GPAS' is now on 07/28. The interface includes a toolbar with icons for various functions and a status bar at the bottom with 'Ok' and 'Cancel' buttons.

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 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.

BoM Tree View					
Item Code	Item Name	Base Quantity	Quantity	UoM	Is MTO
▼ p1001-1	Sports Bike	1.000	1.000		
▼ mM1001	Painted Bike Framework	1.000	1.000	pcs	✓
▼ mM1101	Raw Bike Framework	1.000	1.000	pcs	✓
m1	5m Steel Pipe	1.000	1.000	pcs	✓
oPCU	Cutting	40.000	40.000	min	
m2	Steel Pipe	-2.000	-2.000	m	✓
oPWE	Welding	40.000	40.000	min	
oPPD	Painting and Drying	20.000	20.000	min	
m3	Chain	1.000	1.000	pcs	
m4	Wheel	2.000	2.000	pcs	✓
oPAS	Bike Assembly	180.000	180.000	min	✓
cOST1	Project Management	1.000	1.000		
uP1001-0	Red Bike (Basic)	-1.000	-1.000	pcs	
uP1001-0	Red Bike (Basic)	1.000	1.000	pcs	
oPQA	Quality Assurance	3.000	3.000	min	
m5	Bell	1.000	1.000	pcs	✓
m6	Screw 8mm (Nut + Bolt)	1.000	1.000	pair	✓
oPBI	Bell Installation	5.000	5.000	min	✓
cOST2	Energy	1.000	1.000		

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.

Item Code	Item Name	Base Quantity	Quantity	UoM	Is MTO
p1001-1	Sports Bike	1.000	1.000		
mM1001	Painted Bike Framework	1.000	1.000	pcs	✓
mM1101	Raw Bike Framework	1.000	1.000	pcs	✓
m1	5m Steel Pipe	1.000	1.000	pcs	✓
m2	Steel Pipe	-2.000	-2.000	m	✓
m3	Chain	1.000	1.000	pcs	
m4	Wheel	2.000	2.000	pcs	✓
cOST1	Project Management	1.000	1.000		
uP1001-0	Red Bike (Basic)	-1.000	-1.000	pcs	
uP1001-0	Red Bike (Basic)	1.000	1.000	pcs	
m5	Ball	1.000	1.000	pcs	✓
m6	Screw 8mm (Nut + Bolt)	1.000	1.000	pair	✓
cOST2	Energy	1.000	1.000		

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.

Item Code	Item Name	Base Quantity	Quantity	UoM	Is MTO	On hand	On order	Is committed
oPAS	Bike Assembly	1.000	1.000	min		0.000	0.000	0.000
mM1102	Assembly	0.006	180.000	min	✓	0.000	0.000	0.000
Item01	Batch nbr	180.000	180.000	min		2.000	17.000	1.000
p1001-1	Sports Bike	0.006	180.000	min	✓	38.000	105.000	101.000
p1001-2	Red Bike_nos	0.006	180.000	min	✓	0.000	0.000	0.000

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.

Production Material Requirements							
Item Code		mM1101					
Item Name		Raw Bike Framework					
Pr.Ord.No	Pr.Ord.Line	Op.Beg.Date	Op.Beg.Time	Pr.Ord.Beg.Date	Pr.Ord.Beg.Time	Qty.	
584	1	05/04/17	08:20	05/04/17	08:20	1.000	
587	1	03/09/17	15:10	03/09/17	15:10	10.000	
589	1	02/17/17	16:28	02/17/17	16:28	1.000	
590	1	02/17/17	15:56	02/17/17	15:56	1.000	
594	1	05/04/17	08:00	05/04/17	08:00	1.000	
597	1	03/02/17	08:00	03/02/17	08:00	1.000	
617	1	05/03/17	09:58	05/03/17	09:58	1.000	
632	1	05/25/17	08:00	05/25/17	08:00	1.000	
635	1	04/06/17	10:13	04/06/17	10:13	10.000	
638	1	04/14/17	15:10	04/14/17	15:10	10.000	
643	1	04/14/17	15:10	04/14/17	15:10	10.000	
656	1	05/04/17	08:40	05/04/17	08:40	10.000	
661	1	07/25/17	17:20	07/25/17	17:20	10.000	
666	1	08/17/17	16:30	08/17/17	16:30	0.000	

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.

Material Account

Item Code

UoM

BATCH01

From Date

To Date

07/25/17

12/01/17

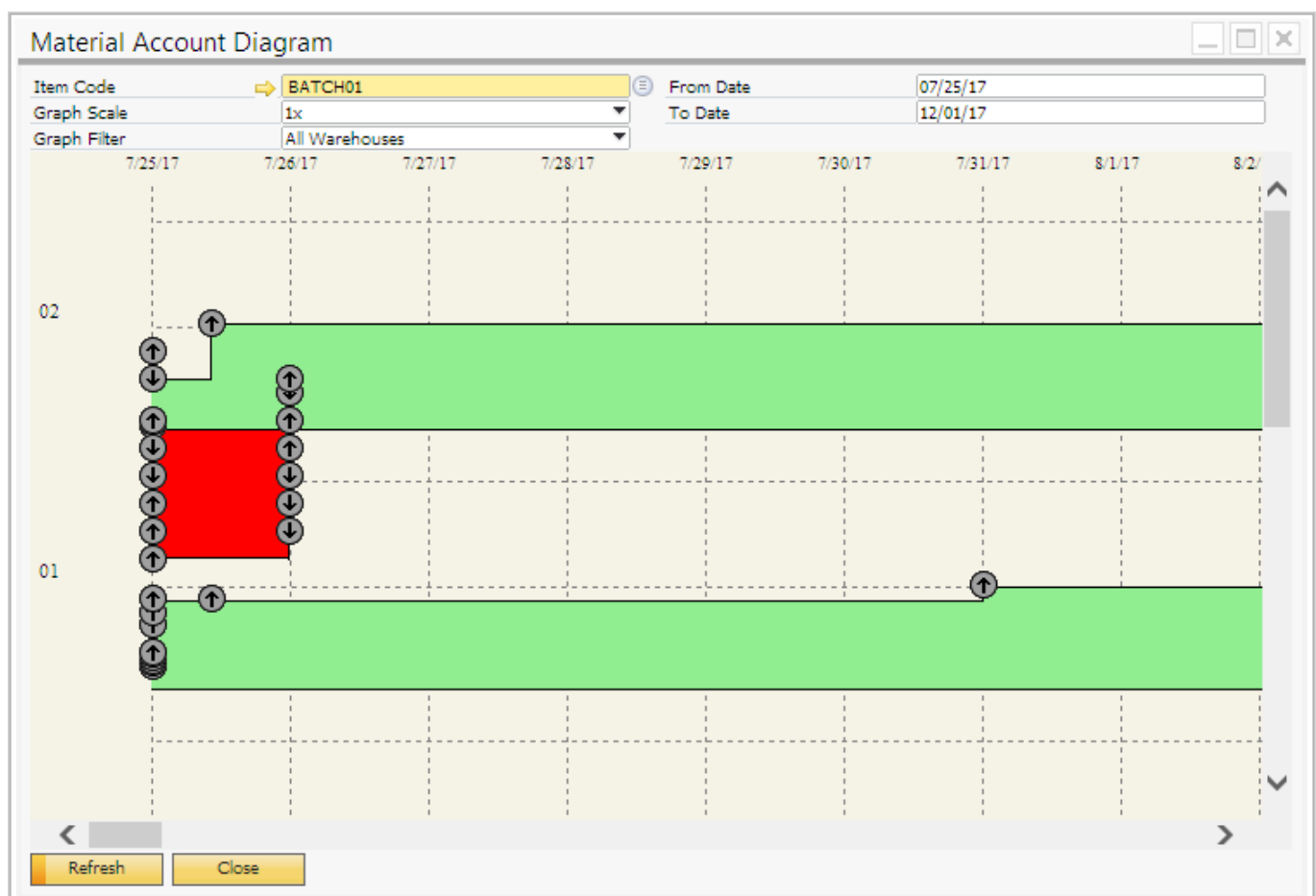
Due Date	Due Time	MRP Resource Type	Doc Entry	Doc Number	Doc Line	Quantity	Warehouse Code	Delta Quantity	Warehouse Quantity	Total Quantity
	00:00	Stock	0	0	0	0.000	01	0.000	0.000	0.000
	00:00	Stock	0	0	0	20.000	02	20.000	20.000	20.000
	00:00	Stock	0	0	0	0.000	03	0.000	0.000	20.000
	00:00	Stock	0	0	0	0.000	04	0.000	0.000	20.000
	00:00	Stock	0	0	0	0.000	05	0.000	0.000	20.000
05/31/17	00:00	Production Enter	52	52	1	1.000	02	1.000	21.000	21.000
06/20/17	00:00	Production Enter	61	61	1	8.000	01	8.000	8.000	29.000
06/23/17	00:00	Production Enter	64	64	1	1.000	01	1.000	9.000	30.000
06/26/17	00:00	Production Enter	65	65	1	1.000	01	1.000	10.000	31.000
06/27/17	00:00	Production Enter	66	66	1	1.000	02	1.000	22.000	32.000
06/27/17	00:00	Production Enter	67	67	1	1.000	02	1.000	23.000	33.000
06/27/17	00:00	Production Enter	68	68	1	1.000	01	1.000	11.000	34.000
06/27/17	00:00	Sales Exit	90	90	0	10.000	02	-10.000	13.000	24.000
06/27/17	00:00	Sales Exit	91	91	0	10.000	02	-10.000	3.000	14.000
06/27/17	00:00	Sales Exit	98	98	0	10.000	02	-10.000	-7.000	4.000

Refresh

Close

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.

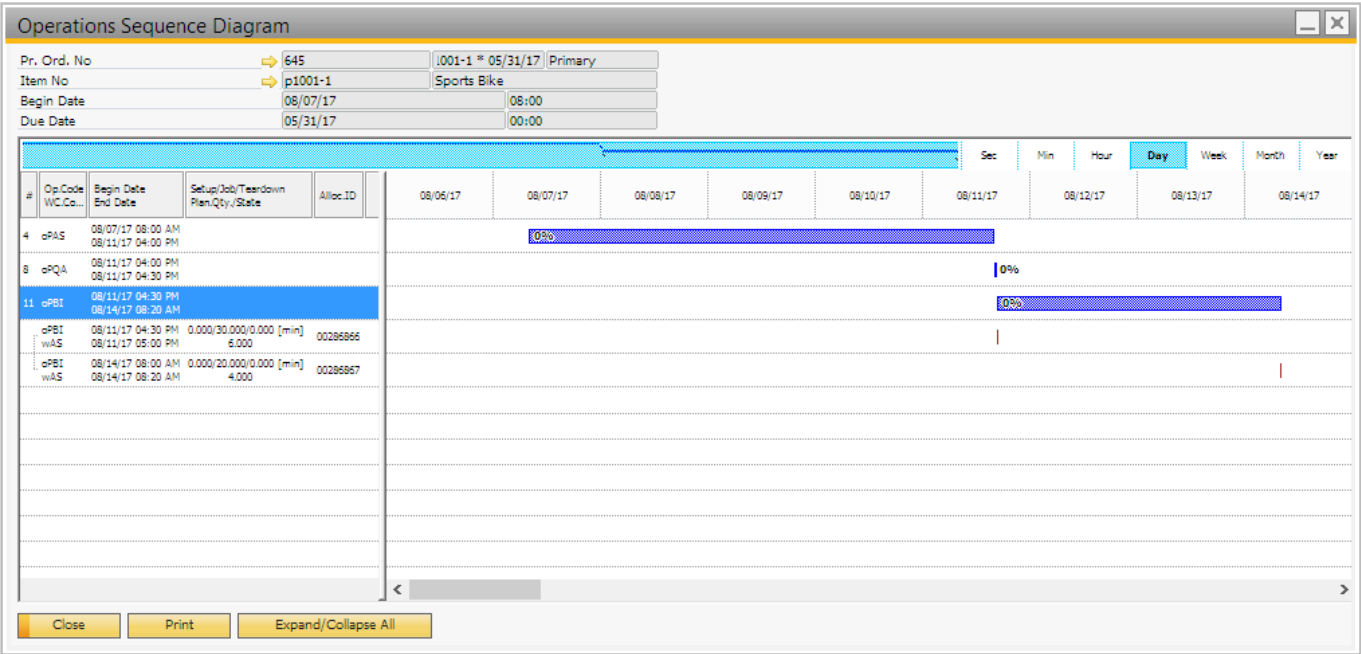


17.7. Operations Sequence Diagram

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.

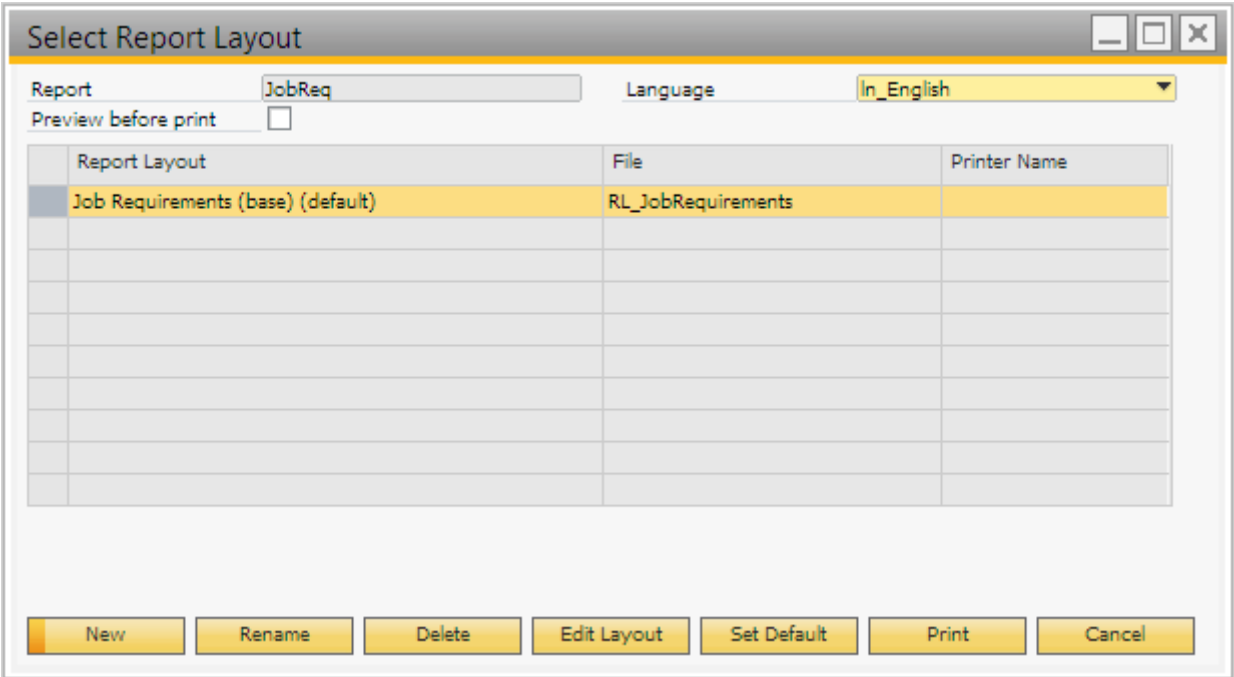
The operations sequence diagram can only be opened for release production orders that are part of an MTO chain.



17.8. Job Requirements Report

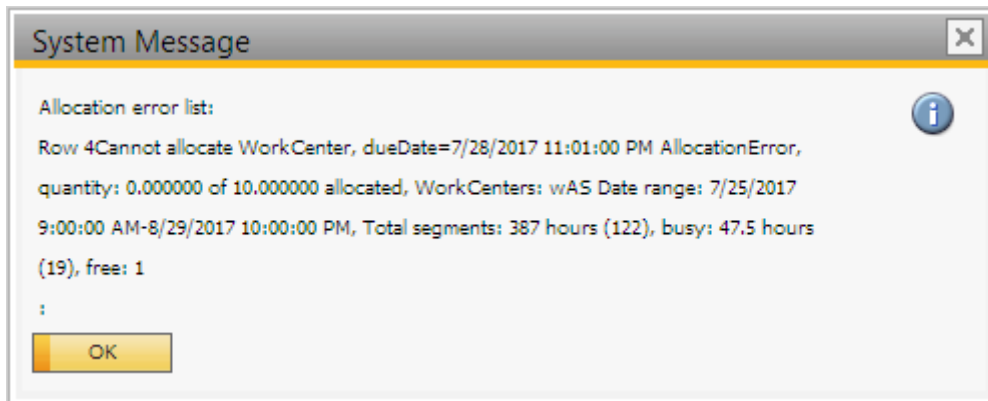
The Job Requirements report can be printed with the drag & relate function as well.

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.

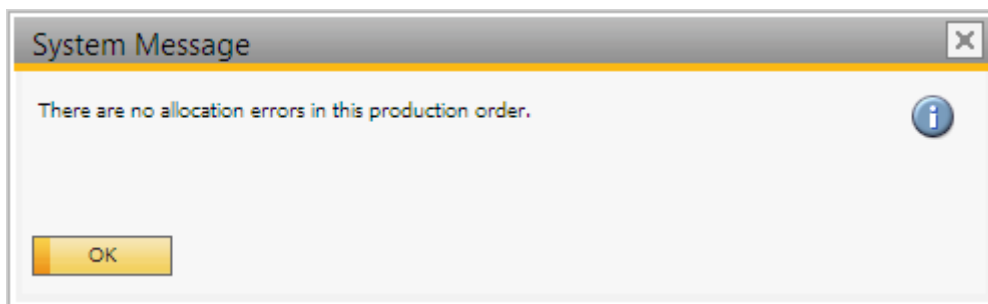


17.9. Allocation Status

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:

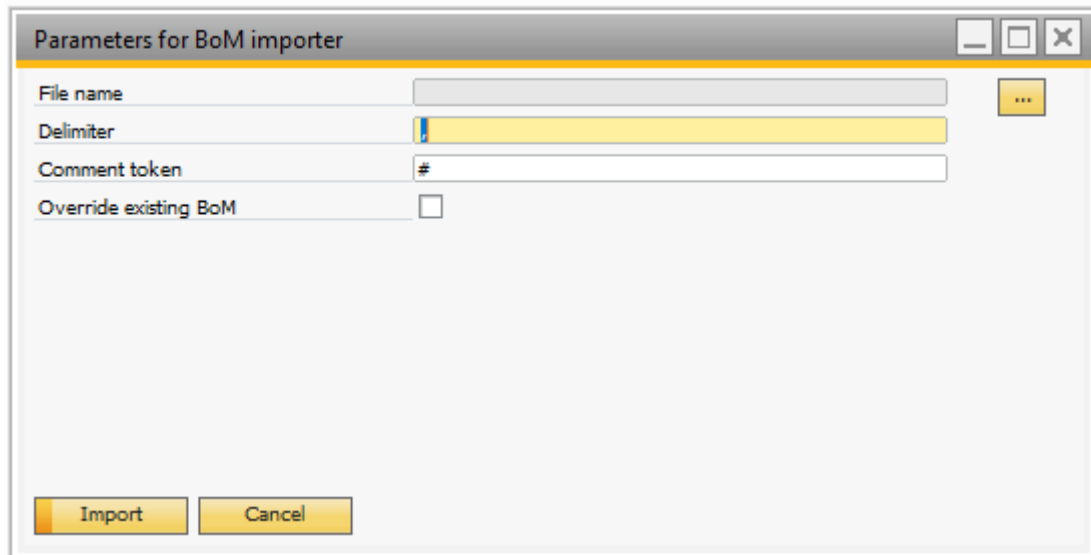


18. Importing Bills of Materials

Produmex Manufacturing BoM Importer can process a CSV file and add valid Bills of Materials to the company database. All items (products, materials, operations, manufacturing operations, warehouses etc.) must exist in the company database before starting the importer. If a BoM is proved to be invalid, it is dropped. All problems are reported in the log file.

18.1. Parameters

Open the importer via the following path: Tools > Produmex Manufacturing > Produmex Data Management > Import Bills of Materials



The image shows a dialog box titled "Parameters for BoM importer". It contains four input fields: "File name" with a browse button (three dots), "Delimiter" with a dropdown menu showing a vertical bar, "Comment token" with a text field containing "#", and "Override existing BoM" with an unchecked checkbox. At the bottom are "Import" and "Cancel" buttons.

Browse the CSV file, and specify the separator character that was used in the CSV file on the *Delimiter* field.

It is possible to define a comment token. Every row that begins with the comment token will be skipped. *Please note: If you leave it empty, each line in the file will be processed.*

The *Override existing BoM* parameter drives the importer what to do when a Bill of Material already exists.

- If it is checked, the existing BoM is deleted and replaced with the new one from CSV file. If there are many Bills of Materials for the same product in the file, the last valid one will be loaded.
- If it is not checked, the existing Bills of Materials remain intact, an error message is generated for the one in CSV file. If there are many Bills of Materials for the same product in the file, the first valid one will be loaded.

Error messages are added to the log file.

18.2. Structure of CSV file

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

Every other first character, except the comment token, generates an error message. Empty rows also generate an error message.

Download an example CSV file for two BoMs from here: [BoM Importer Example](#)

18.2.1. Header row type

It represents the common section of a Bill of Materials including fields defined by Produmex Manufacturing.

No.	Name	Mandatory	Possible types/Values	Description
1	Row type	✓	H	
2	Product No.	✓	Text	Item code of the product or sub-assembly. Must be a valid item code.
3	Planned Average Production Size		Number	
4	Quantity		Number	
5	Warehouse		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		Text	Must be a valid identifier of a distribution rule.
8	Project		Text	Must be a valid identifier of a project.
9	Calculation Base Quantity		Number	
10	Is Auto Roll		N/Y	N - No Y - Yes
11	Milestone type		Integer between 0 and 4	0 - 1 - Milestone 2 - Depends On Begin 3 - Depends On Every 4 - Depends On End
12	Operation Granularity		Number	
13	Recipe Version		Number	<i>No validation</i>
14	Rejected Warehouse		Text	Must be a valid code of a warehouse.
15	Recipe Version		Text	<i>No validation</i>

If there is a value beyond 15th column ("P"), the row became invalid, an error message generated, and BoM isn't processed.

18.2.2. Item row type

It represents a row in the table of a Bill of Materials. The exact type of the BoM's row is defined by the second column (row sub-type in CSV file).

The first 15 column is the same for every sub-type. You can give extra information for operations.

No.	Name	Mandatory	Possible types/Values	Description
1	Row type	✓	I	

No.	Name	Mandatory	Possible types/Values	Description
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. <i>Row sub-type is not validated.</i>
4	Quantity	✓	Number	Leave this field 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
7	Milestone type		Integer between 0 and 4	0 - 1 - Milestone 2 - Depends On Begin 3 - Depends On Every 4 - Depends On End
8	Price List		Integer	Must be a valid code of a price list.
9	Comment		Text	
10	Distribution Rule		Text	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	Profit center		Text	
15	Rejected Warehouse		Text	Must be a valid code of a warehouse.

If the row is not an operation row, and there is a value beyond 15th column ("P"), the row became invalid, an error message generated, and BoM isn't processed.

18.2.2.1. Operation-specific fields

In the operation row you can give every information used by Produmex Manufacturing. The matching Manufacturing Operation must exist. If a field is empty the value is copied from the matching Manufacturing Operation field.

No.	Name	Mandatory	Possible types/Values	Description
16	Before Time		Number	Importer converts it to a base time using the Operation Time UoM from actual row of CSV or from Manufacturing Operation.
17	Safety Time		Number	
18	Setup Time		Number	
19	Job Time		Number	
20	Tear Down Time		Number	
21	After Time		Number	
22	Time Base		Number	
23	Operation Break		Integer between 0 and 5	0 - 1 - Denied 2 - Allowed WC 3 - Allowed 4 - Allowed NBP 5 - Allowed WCNBP
24	Operation Time UoM		Text	Must be valid time code (for example day, hr, min, s, week in a standard configuration).
25	Is Parallel Operation		N/Y	N - No Y - Yes
26	Is Overlapping Operation		N/Y	N - No Y - Yes
27	Max Parallel Operation		Integer	
28	Overlapping Quantity		Number	
29	Allocation Window		Number	Importer converts it to a base time using Allocation Window UoM from actual row of CSV or from Manufacturing Operation.
30	Allocation Window UoM		Text	Must be a valid time code (for example day, hr, min, s, week in a standard configuration).
31	Min Job Quantity		Number	
32	Feature		Text	Must be an existing Work Center Feature
33	Is Mandatory Work Center		N/Y	N - No Y - Yes
34	Preferred Work Center		Text	Must be an existing Work Center which supports selected Work Center Feature (from CSV or from Manufacturing Operation)
35	Outsourced		N/Y	N - No Y - Yes
37	In House Quantity		Number	If the Outsourced flag is set to Y, this field is mandatory. If the Outsourced flag is set to N, this field must be empty.
36	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.

No.	Name	Mandatory	Possible types/Values	Description
38	Outsourcing UoM		Number	If the Outsourced flag is set to Y, the value must be a valid time code (for example day, hr, min, s, week in a standard configuration). If the Outsourced flag is set to N, this field must be empty.
39	Items per Outsourcing Unit		Number	If the Outsourced flag is set to N, this field must be empty.

If the row is an operation row, and there is a value beyond 39th column ("AM"), the row became invalid, an error message is generated, and BoM isn't processed.

18.2.3. Supplier row type

It represents information about outsourcing partners. It can follow only an operation row or another supplier row, otherwise an error message is generated and BoM isn't 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 ("C"), the row became invalid, an error message generated, and BoM isn't processed.

18.3. Validations

18.3.1. First phase

In the first phase of processing all format error is discovered and reported in the log file. Line reference is included in the message. Last line means last row, which is not comment.

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
- BoM is empty (no valid item row can be found)

18.3.2. Second phase

Every BoM is validated with SAP Business One. Valid BoMs are saved. Invalid BoM generate an error message in the log.

Validations:

- Invalid value when range is defined
 - Issue Method
 - Milestone Type
 - Operation Break Type
- Rules of using Issue Method and Milestone Type are violated
- Required correspondences between rows are violated (unfinished product must precede unfinished material etc)
- Code can't be found in SAP Business One
 - Product
 - Item (material, operation etc.)
 - Feature
 - Work Center
 - Supplier
 - Warehouse (normal and rejected)
- Given Work Center does not support the given 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 is given
- Sum of planned quantities exceeds quantity in header.
- Invalid UoM for
 - Operation Times
 - Allocation Window
 - Outsourcing

SAP Business One validates the following:

- Distribution Rule
- Price List

Currently not validated:

- Custom Code – UI doesn't validate
- Recipe Version – UI doesn't validate

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