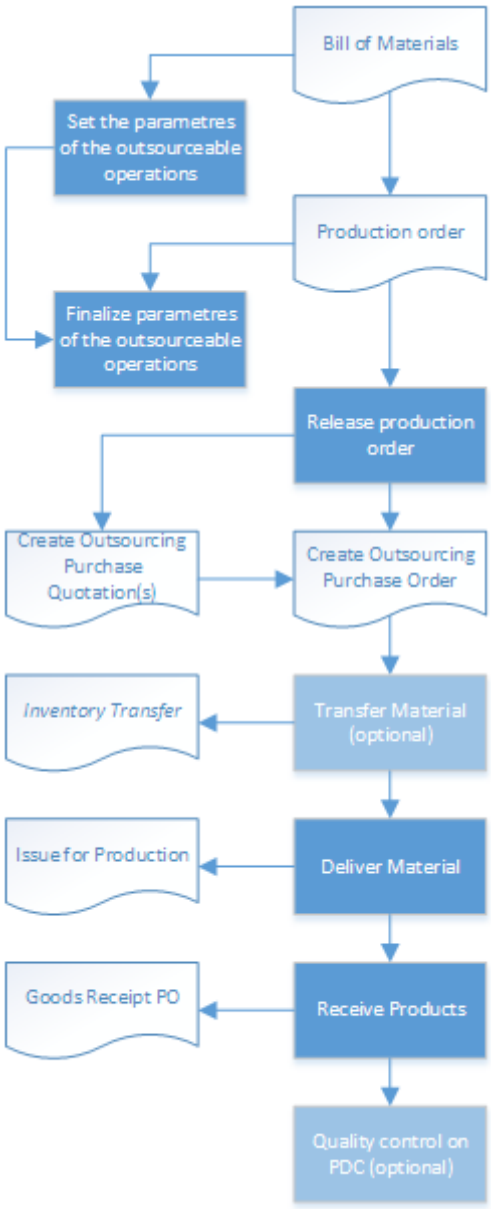
Outsourced Manufacturing

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

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

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

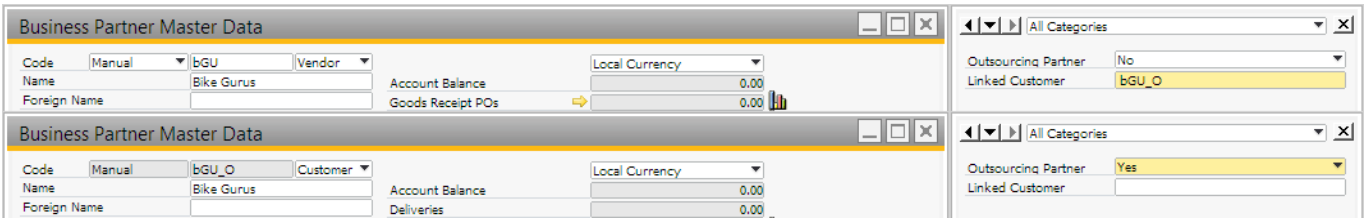


1. Configurations

1.1. Define Outsourcing Partners and Supplier Warehouse

Every ‘Vendor’ type business partner can be selected as an outsourcing partner. When the materials are not delivered directly from the main warehouse to the supplier and inter-warehouse stock transfer transactions are applied, an outsourcing warehouse and a customer type business partner should be added for the outsourcing supplier in order to create Stock/Inventory Transfer documents.

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



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

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

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

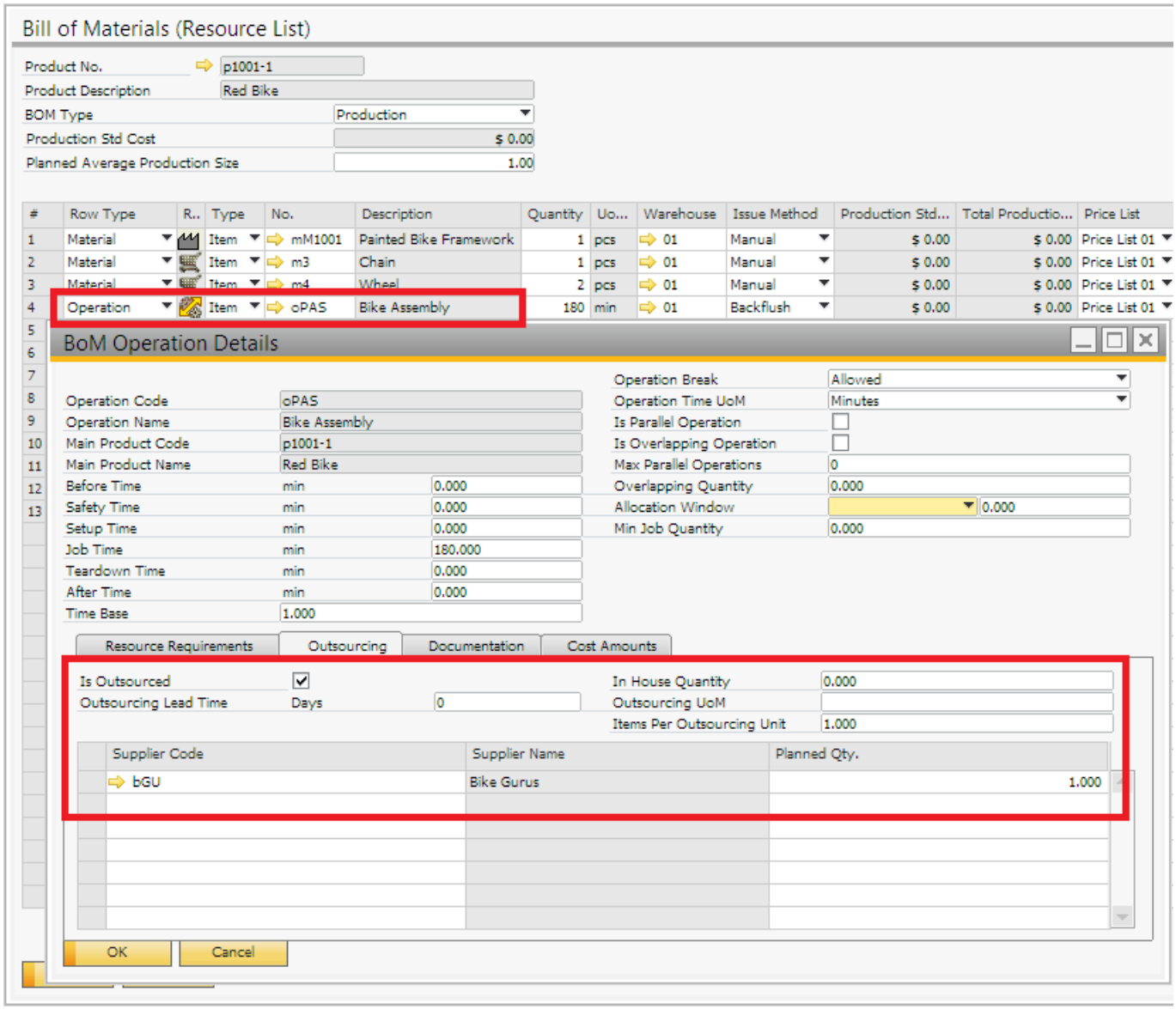


1.2. Bill of Materials with Outsourced Operations

1.2.1. Defining Outsourced Operations in BoMs

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

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



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

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

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

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

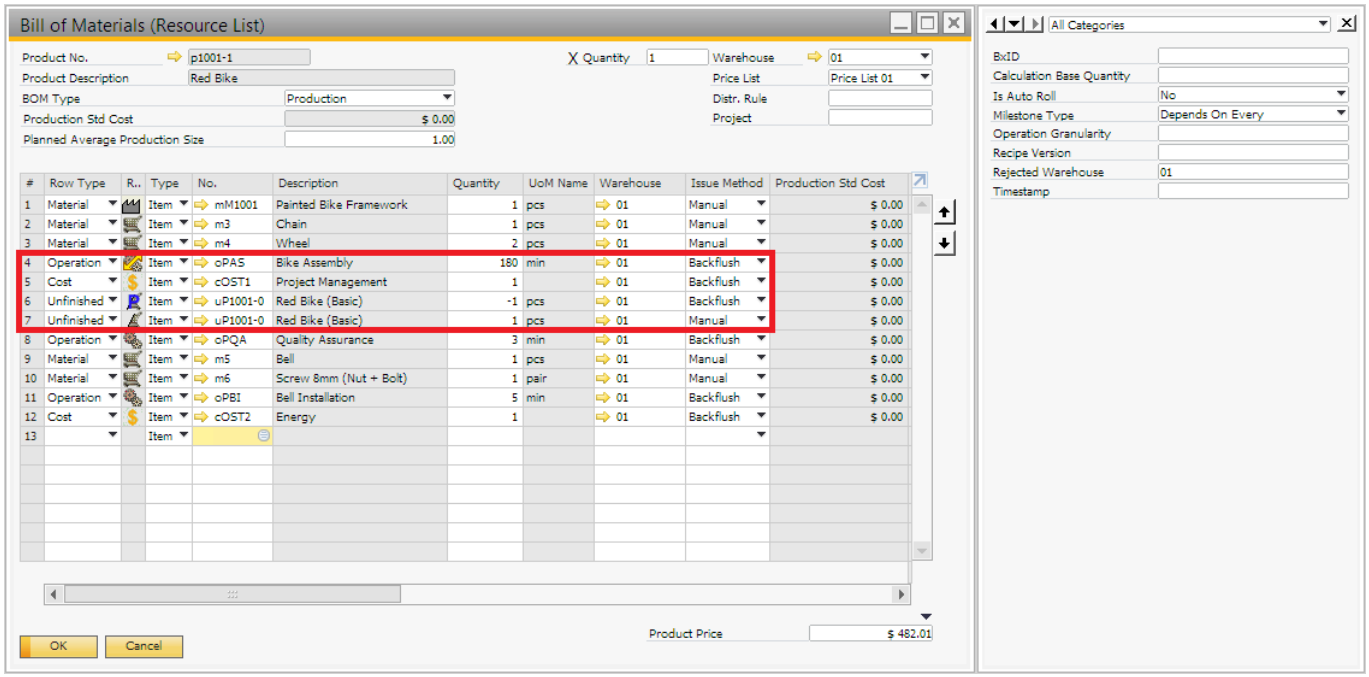
Master Data of the operation.

The lead time can be set:

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

1.2.2. Defining Materials for Outsourced Operations

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



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

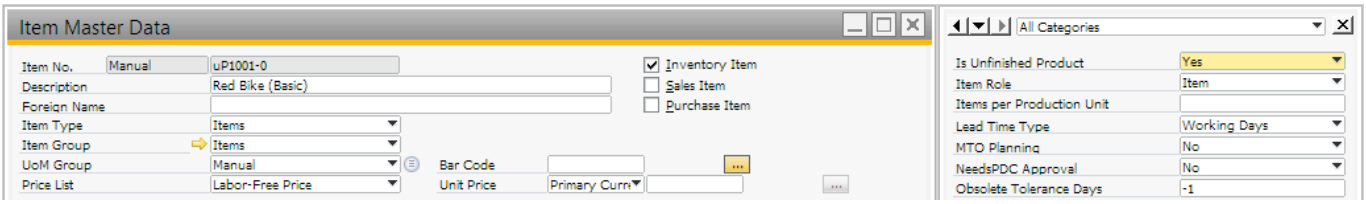
1.2.3.1. Define ‘Unfinished product’ items

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

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

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

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



1.2.3.1. Add ‘Unfinished product’ items to the BoM

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

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

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

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

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

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

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

2. Outsourcing process

2.1. Outsourced Operations in Production Orders

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

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

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

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

2.2. Creating Outsourcing (Purchase) Orders

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

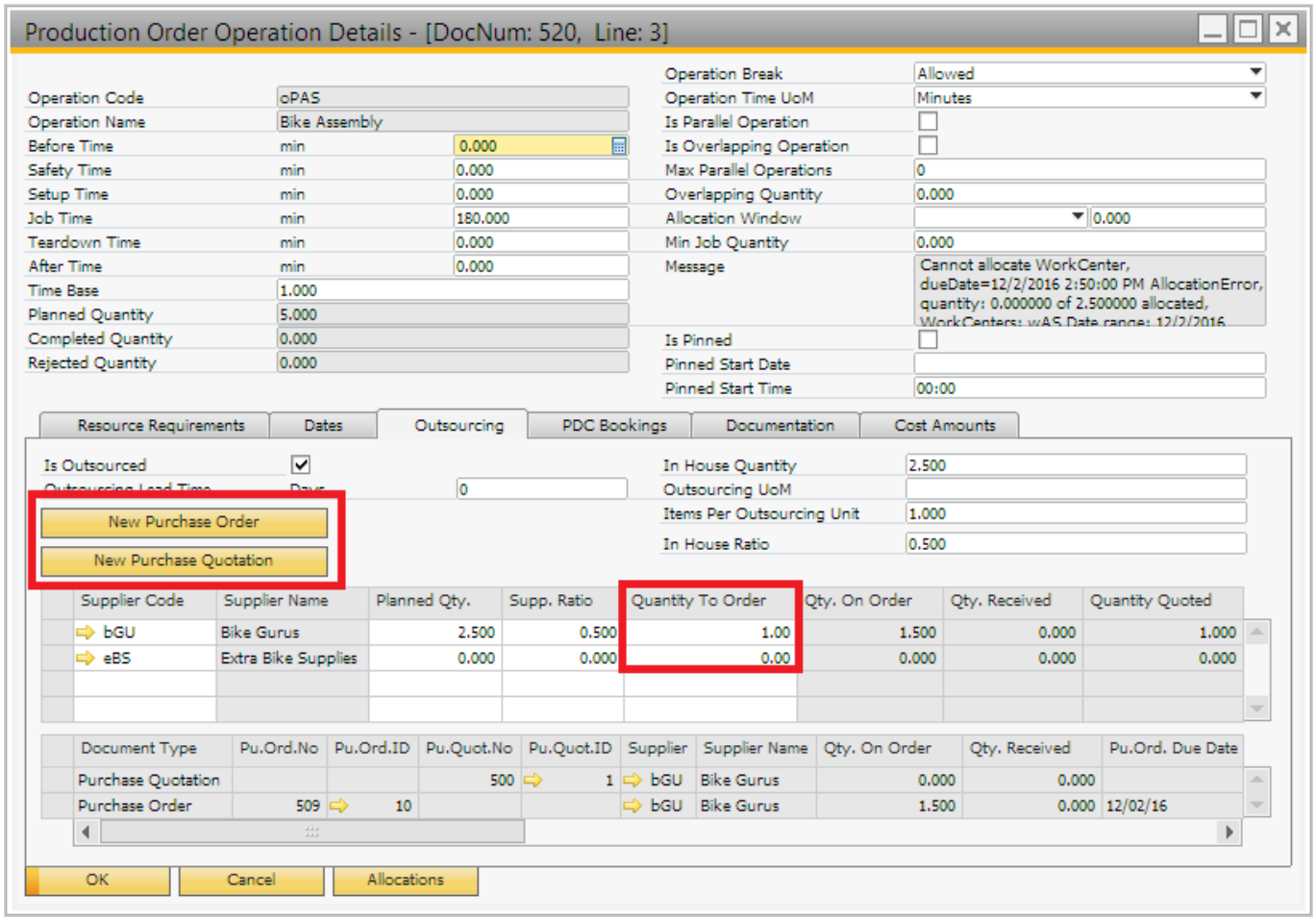
When using this setting with an enabled ‘Immediate Release after Add’ option, the production order will be released and outsourcing orders will be created automatically after the production order was added or created by MRP.

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

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

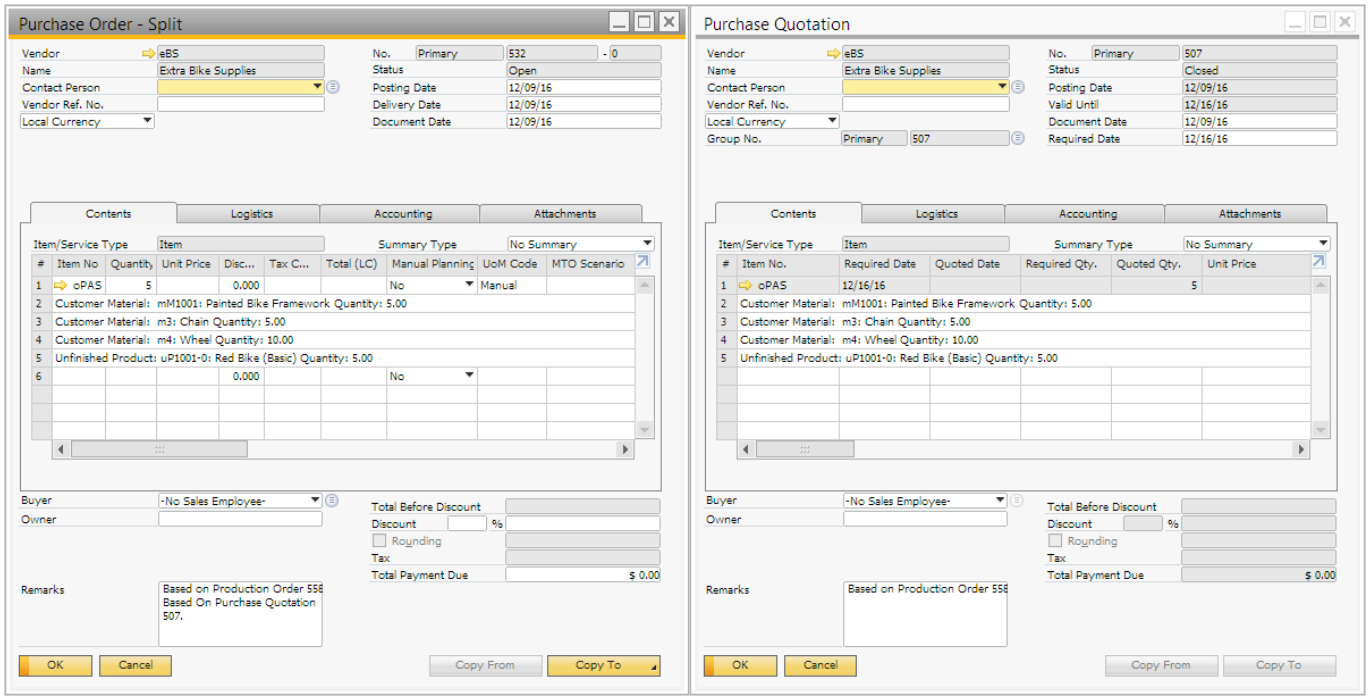
To create a purchase quotation, press the ‘New Purchase Quotation’ button. When creating a Purchase Order based on a Purchase Quotation, references for the production order will be copied.

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



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

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



2.3. Inventory Management for Outsourced Operations

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

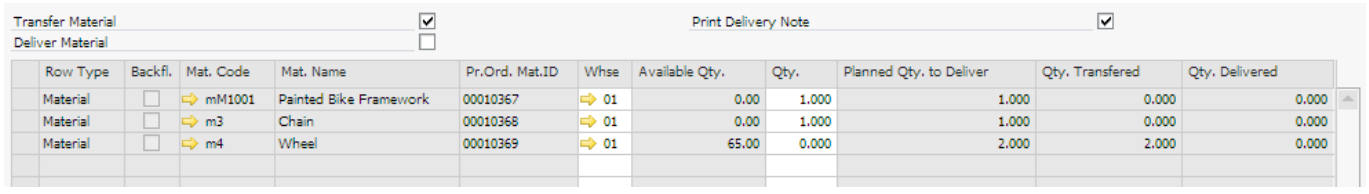
Then select the purchase order. The production order details will be automatically filled.

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

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

2.3.1. Transfer materials to the supplier warehouse

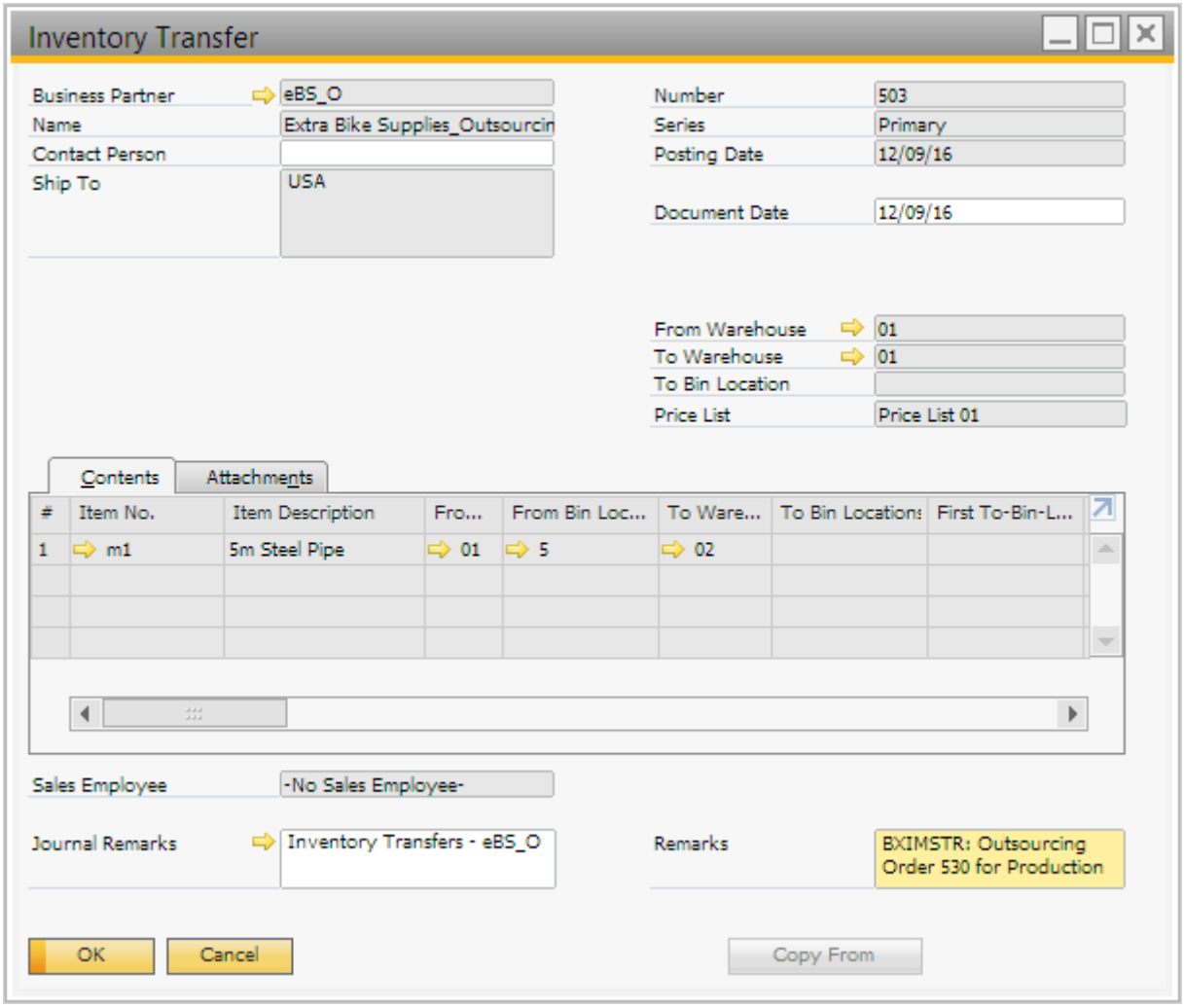
In most outsourcing situation the materials are provided for the outsourcing partner by the company. When precise inventory tracking is required, materials should be transferred for the duration of the outsourced operation to a warehouse dedicated to the supplier.



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

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

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



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

Outsourcing Delivery Not

Ship To: Extra Bike Supplies

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

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

Remarks: Inventory Transfers - eBS_O

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

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

2.3.1.1. Inventory Transfer for Backflush Materials

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

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

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

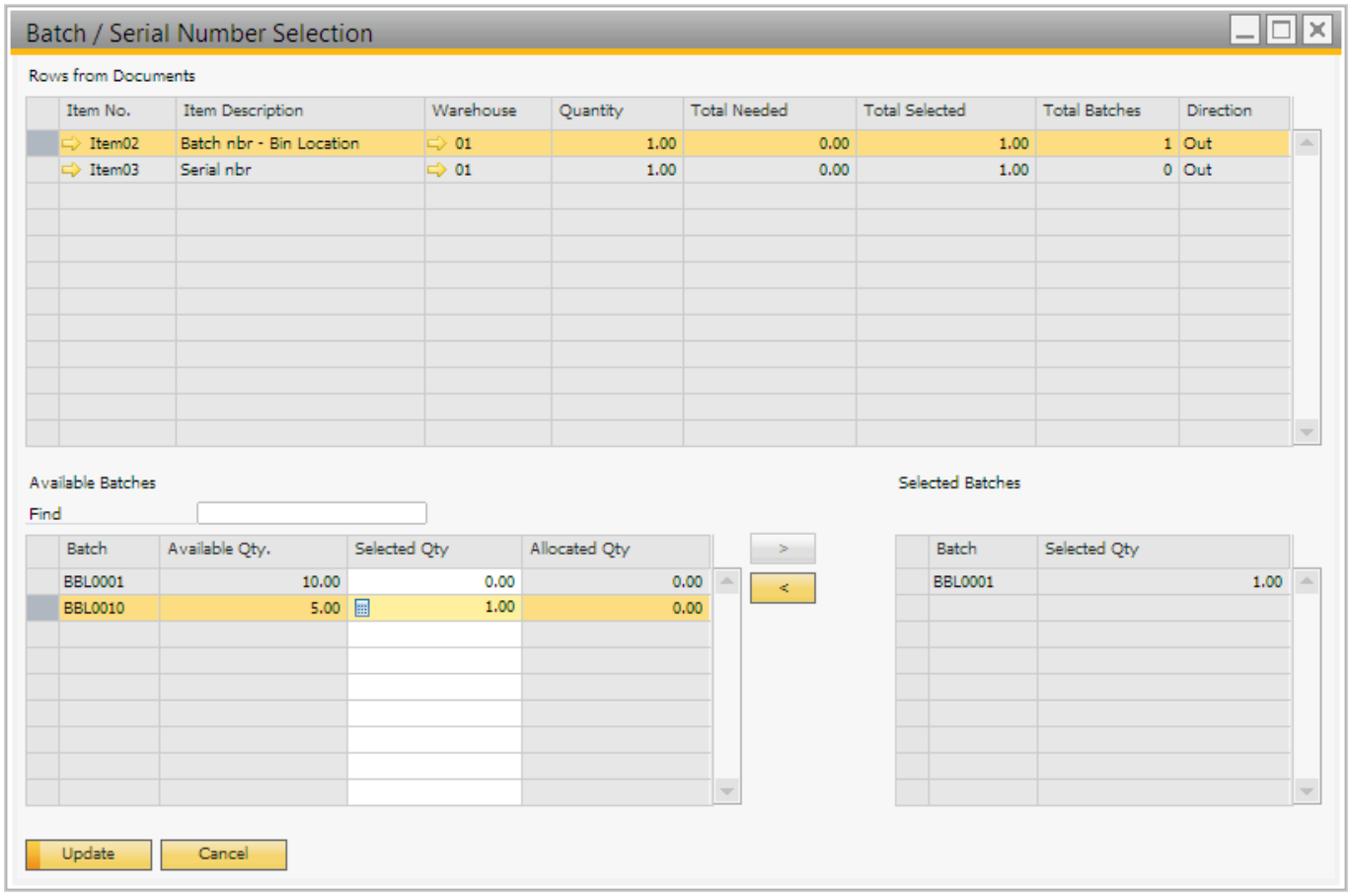
On the 'Rows from Documents' grid every serial or batch numbered item to transfer is listed. On the 'Quantity' field the total quantity to transfer is displayed. On the 'Total Needed' field the open quantity and on the 'Total Selected' field the selected quantity is shown. The number of the selected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

Batch number

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

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

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

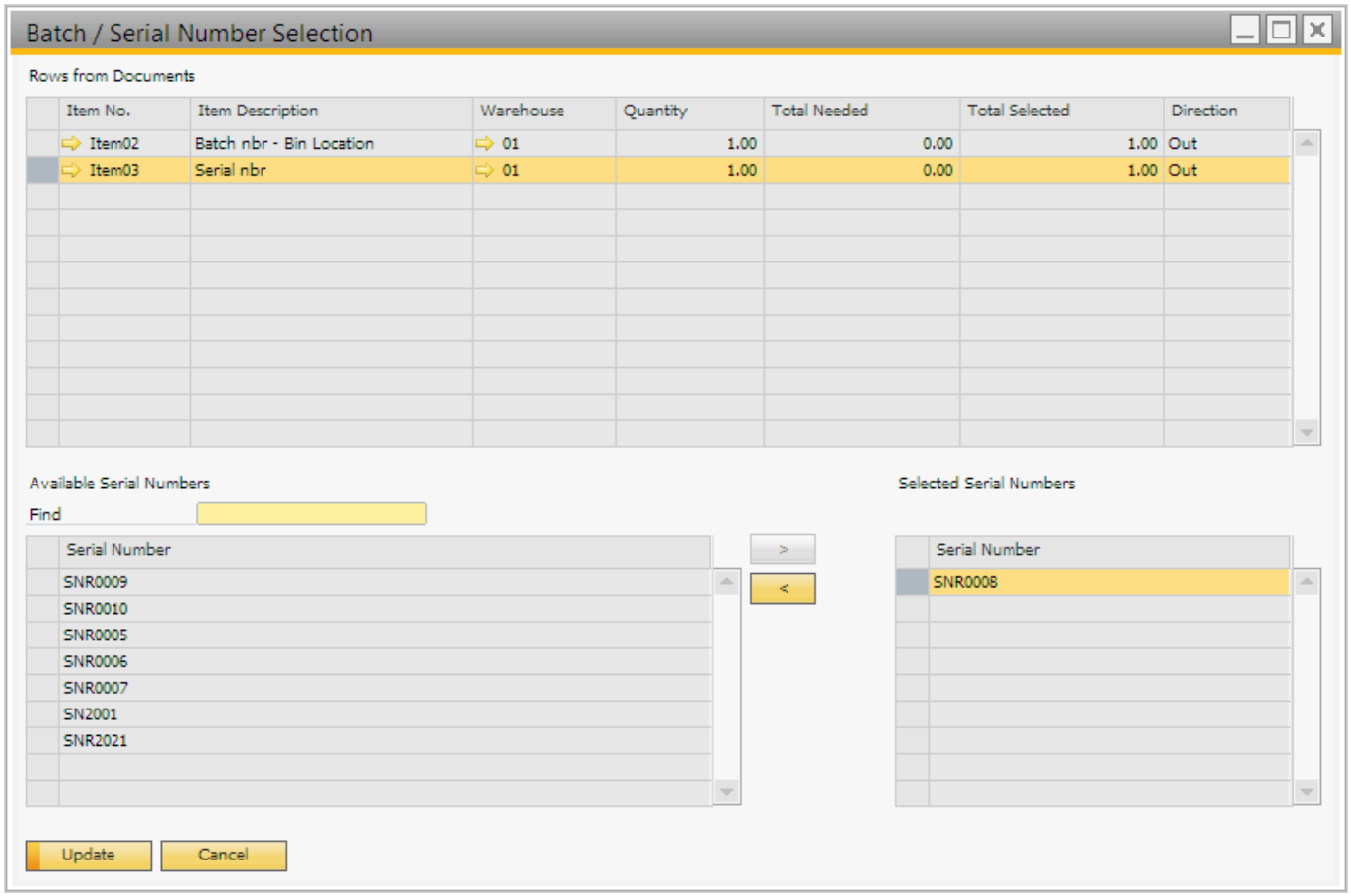


Serial number
To find a serial number, type the serial number to the ‘Find’ field then press TAB.

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

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

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



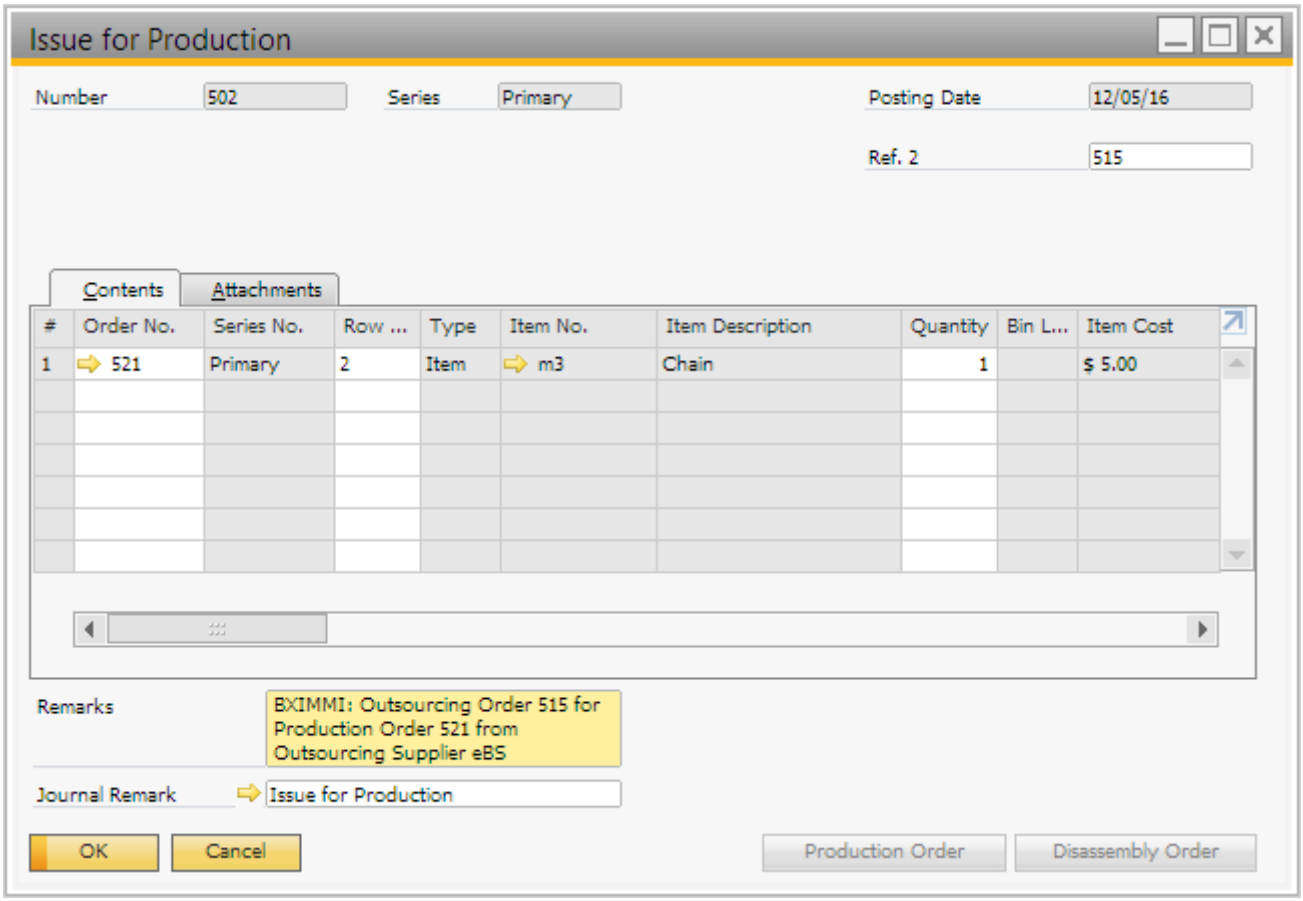
2.3.2. Deliver materials from the company's inventory

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

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

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

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



2.3.2.1. Deliver materials managed by serial/batch numbers

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

2.3.3. Receiving the Products from the Outsourcing Supplier

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

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

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

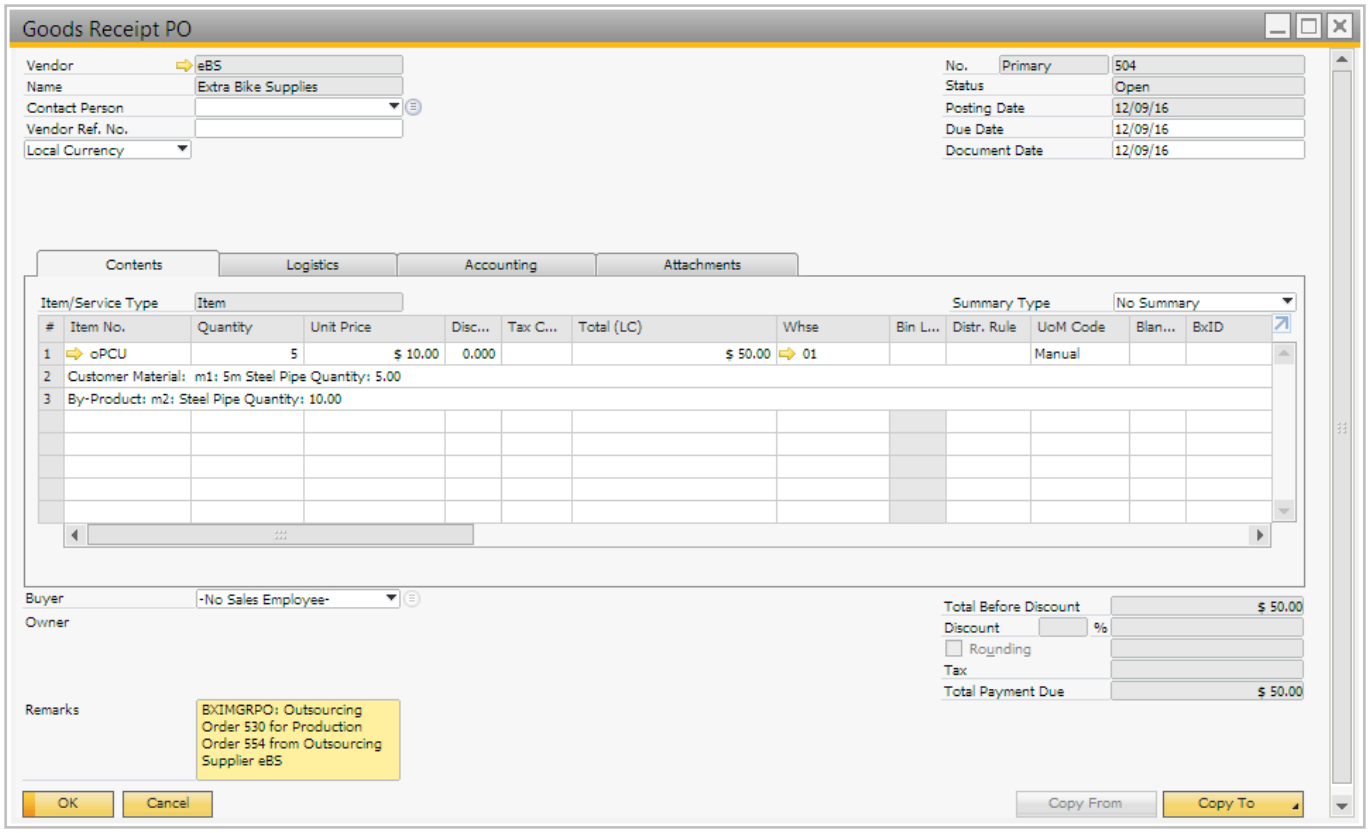
After all products have been received the purchase order is closed automatically.

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

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

2.3.3.1. Quality controlling on the shopfloor

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



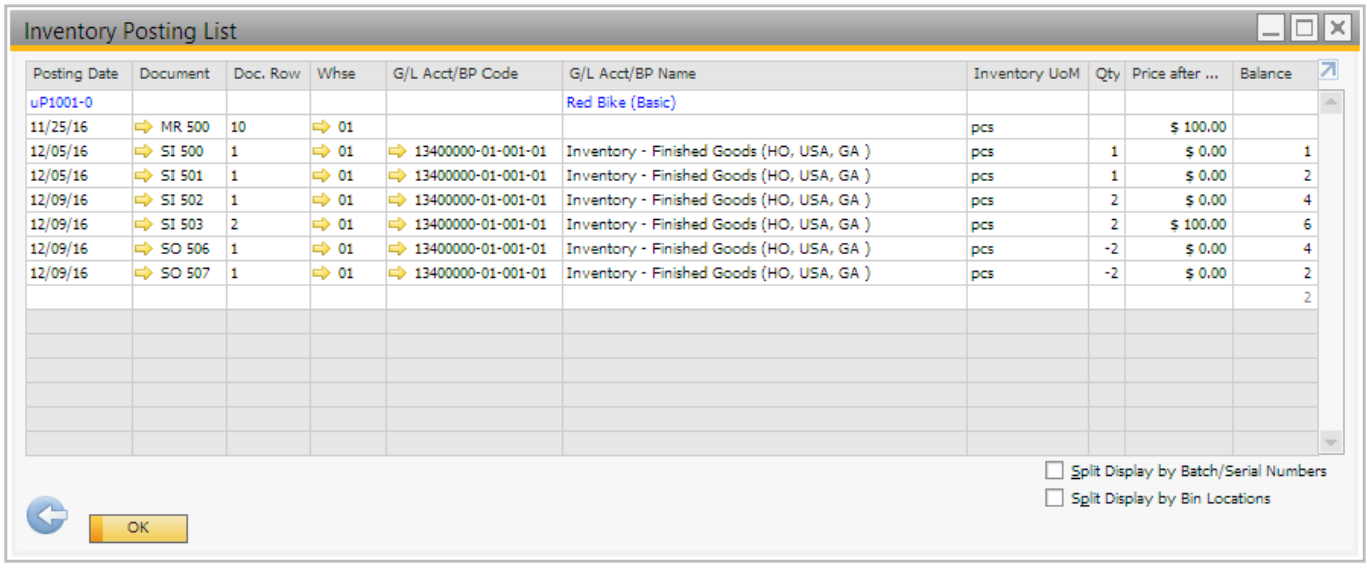
2.4. Completing the production order

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

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

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

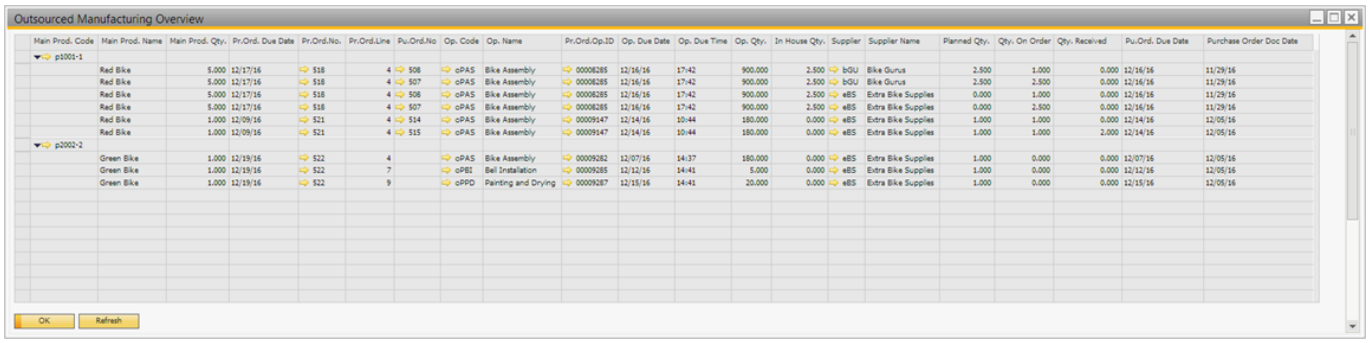
To see the stock flow of the unfinished products, open the Inventory Posting List.



3. Overview the outsourced operations

3.1. Outsourcing Manufacturing Overview

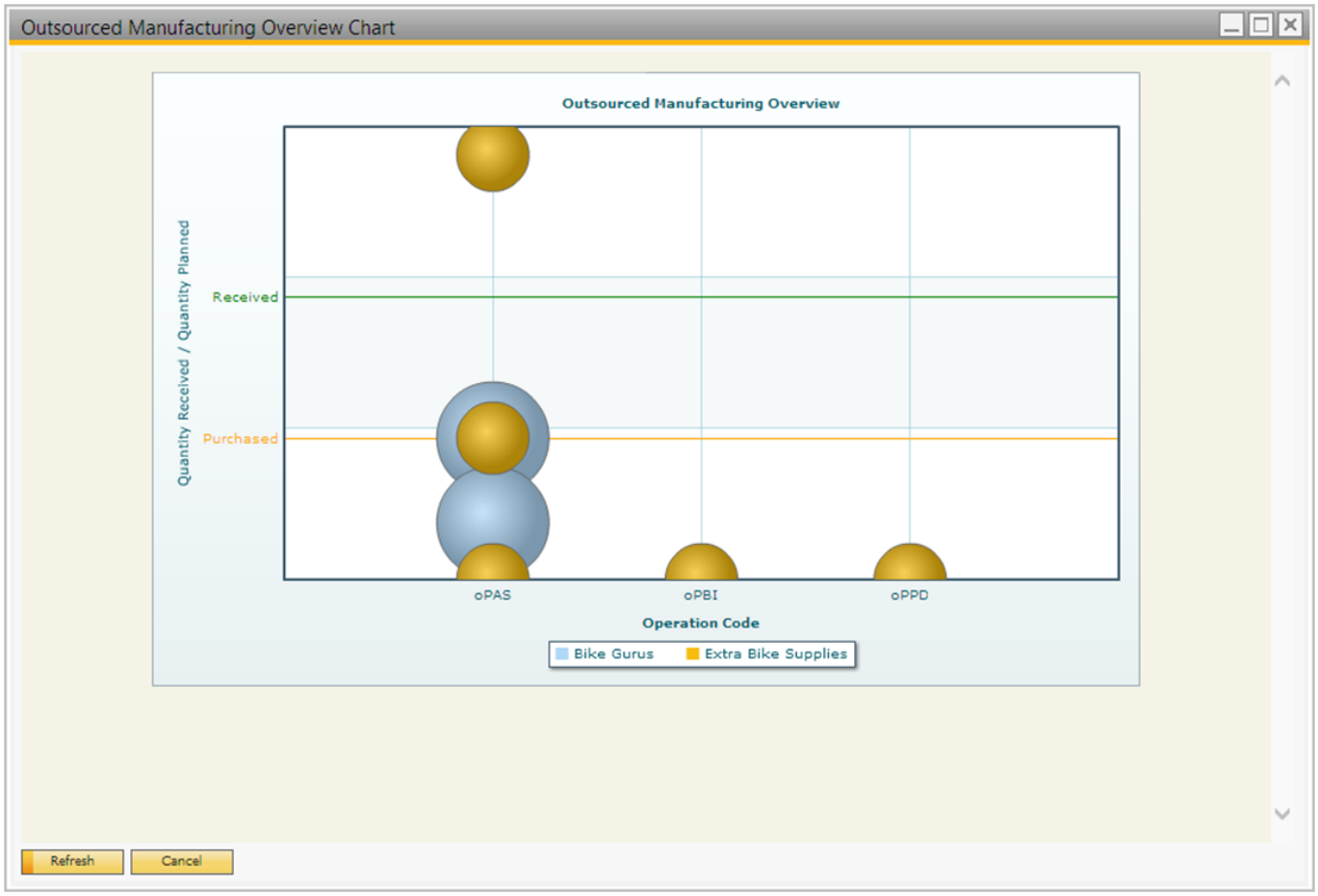
Open the form via the following path: Production > Production Reports > Outsourcing Manufacturing Overview. On this form the user can review the status and the details of outsourced manufacturing operations. Operations are grouped by the main product.



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

3.2. Outsourcing Manufacturing Overview Chart

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



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