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. Configurations

1.1. Configurations on Produmex Manufacturing settings

1.1.1. Allocation dimensions

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

1.1.2. Align allocations

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

1.1.3. Rescheduling

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

1.2. Configurations on the Job Scheduling Control Panel form

1.2.1. Header Buttons

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

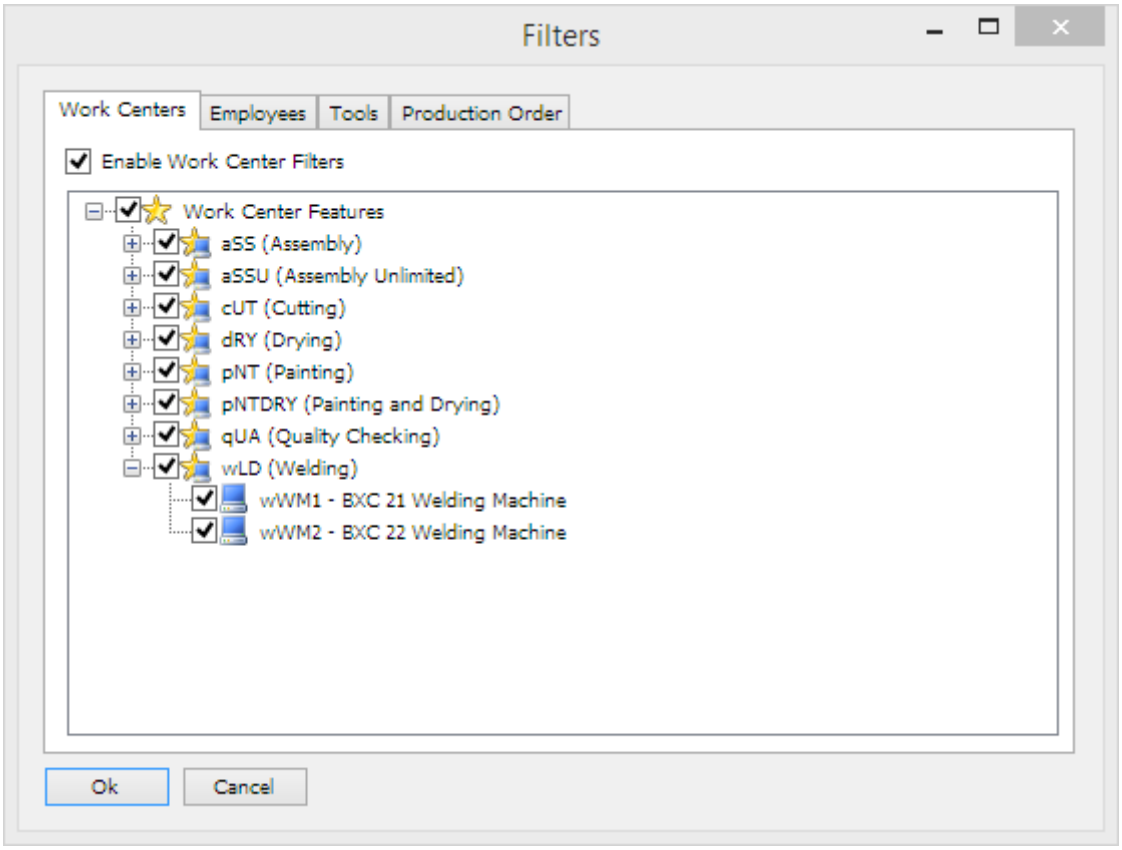
- 'Hourly': Days and hours are displayed on the time bar.
- 'Per shift': Days and shifts are displayed on the time bar.
- 'Daily': Only days are displayed on the time bar.
- On the bottom of the list the zoom percentage can be selected.

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

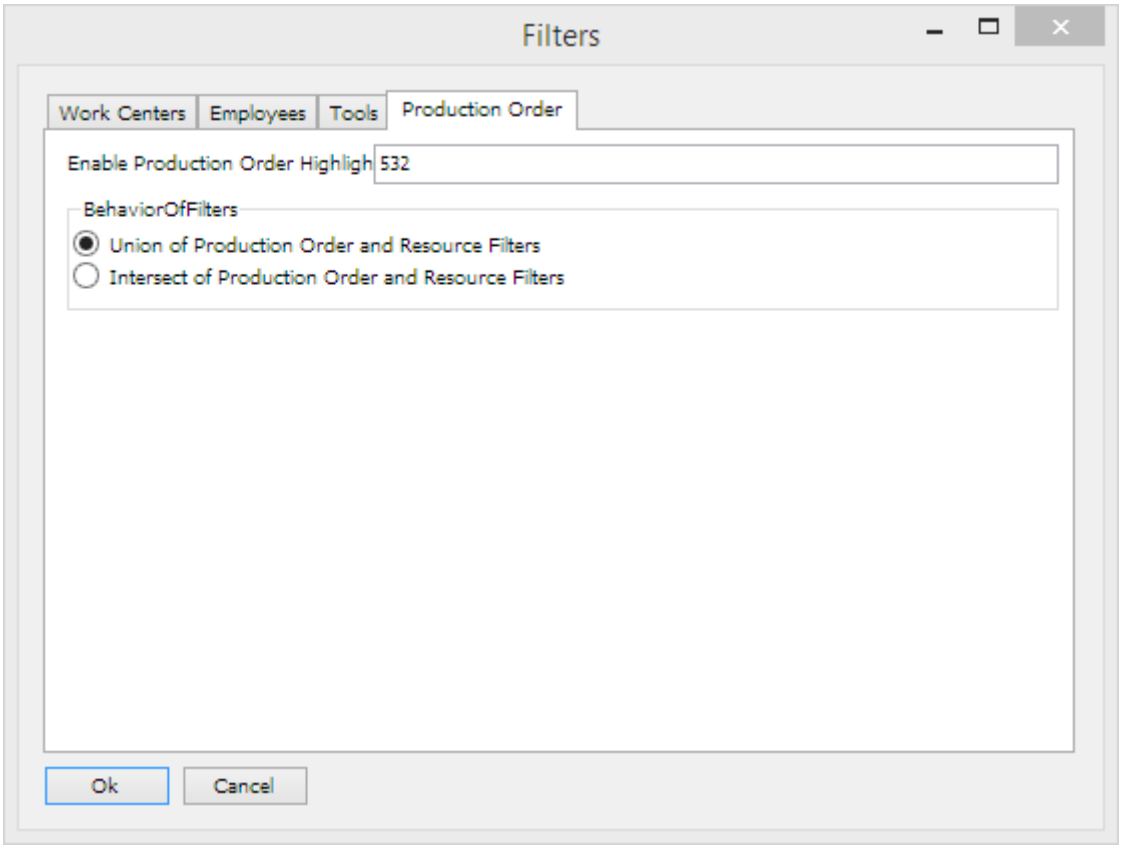
- *Data Source*: Select a data source. Possible values are:
  - Released: Only released production orders are displayed.
  - Released and Planned: Released, planned and recommended production orders are displayed.
  - MRP Recommendations: Select MRP scenario(s) from the list. The system will create and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

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

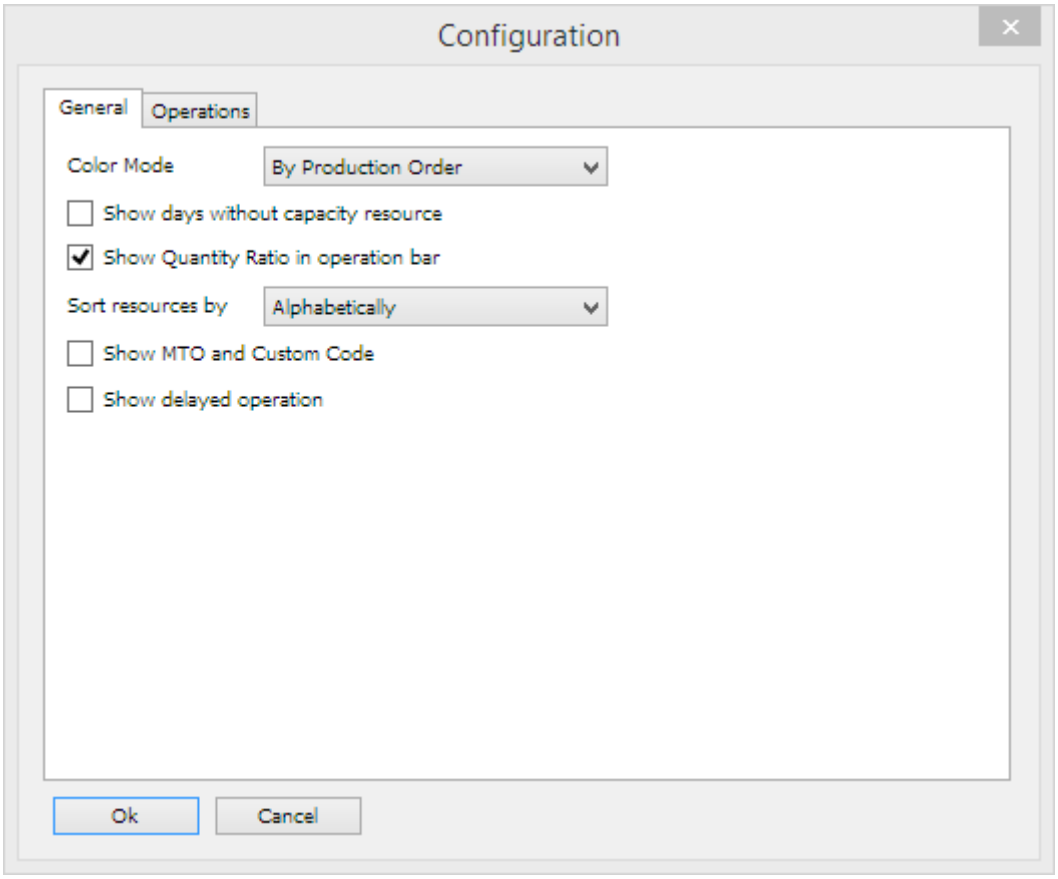
- Enable the filters for resources on the corresponding tab and tick the features or resources to display on the data tree.



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

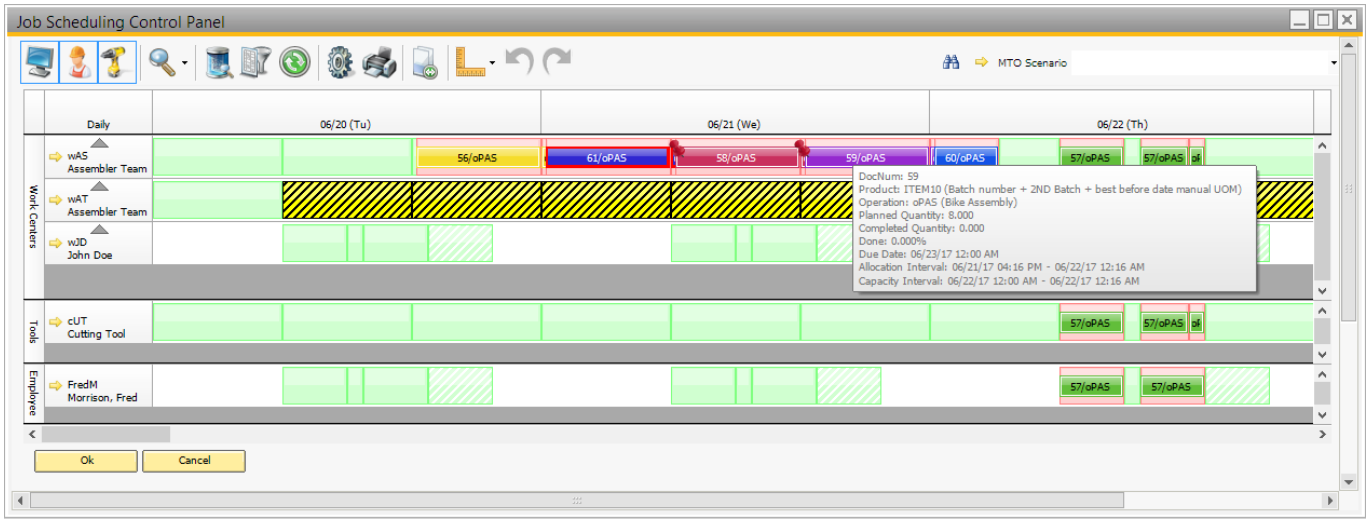


(7) **Refresh**: Click on the button to redraw the panel by reloading data from the database.
(8) **Options**: Click on the button to open the 'Configurations' form.



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

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



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

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

1.2.2. Resources

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

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

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

1.2.3. MTO message

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

2. Review Allocations

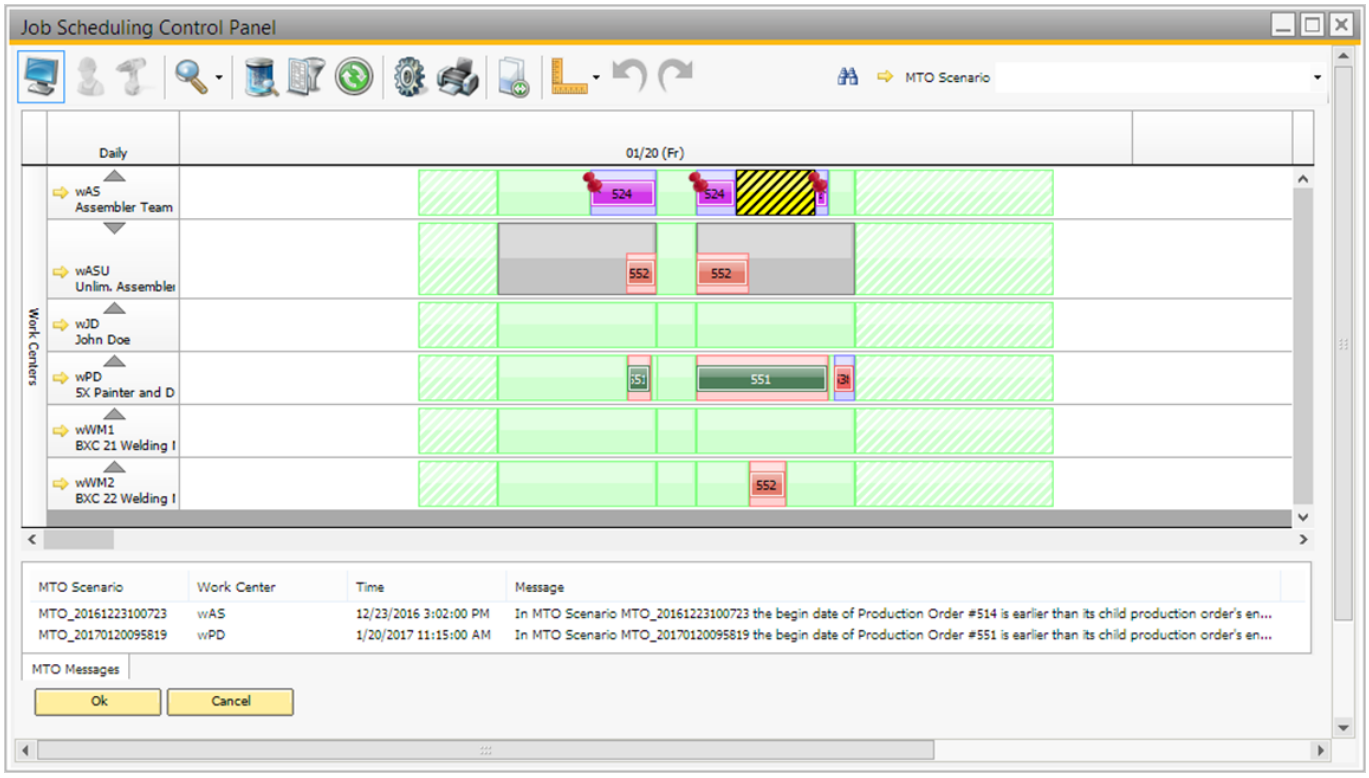
On the Job Scheduling Control Panel the allocations are displayed on resource timelines. Based on the Data Source settings, temporary allocations for planned and recommended production orders might displayed on the board. With default settings only the allocations for released production orders are shown.

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

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

Red boxes indicate permanent allocations for released production orders. Allocations for planned orders are violet and the recommended order allocations are displayed with yellow. Grey boxes indicate allocations on unlimited work centers. The operation that was scheduled for the allocation is

displayed with a bar on the allocation box. The coloring of the operation bars depends on the ‘Color Mode’ setting.



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

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

3. Reschedule

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

3.1. Manual rescheduling

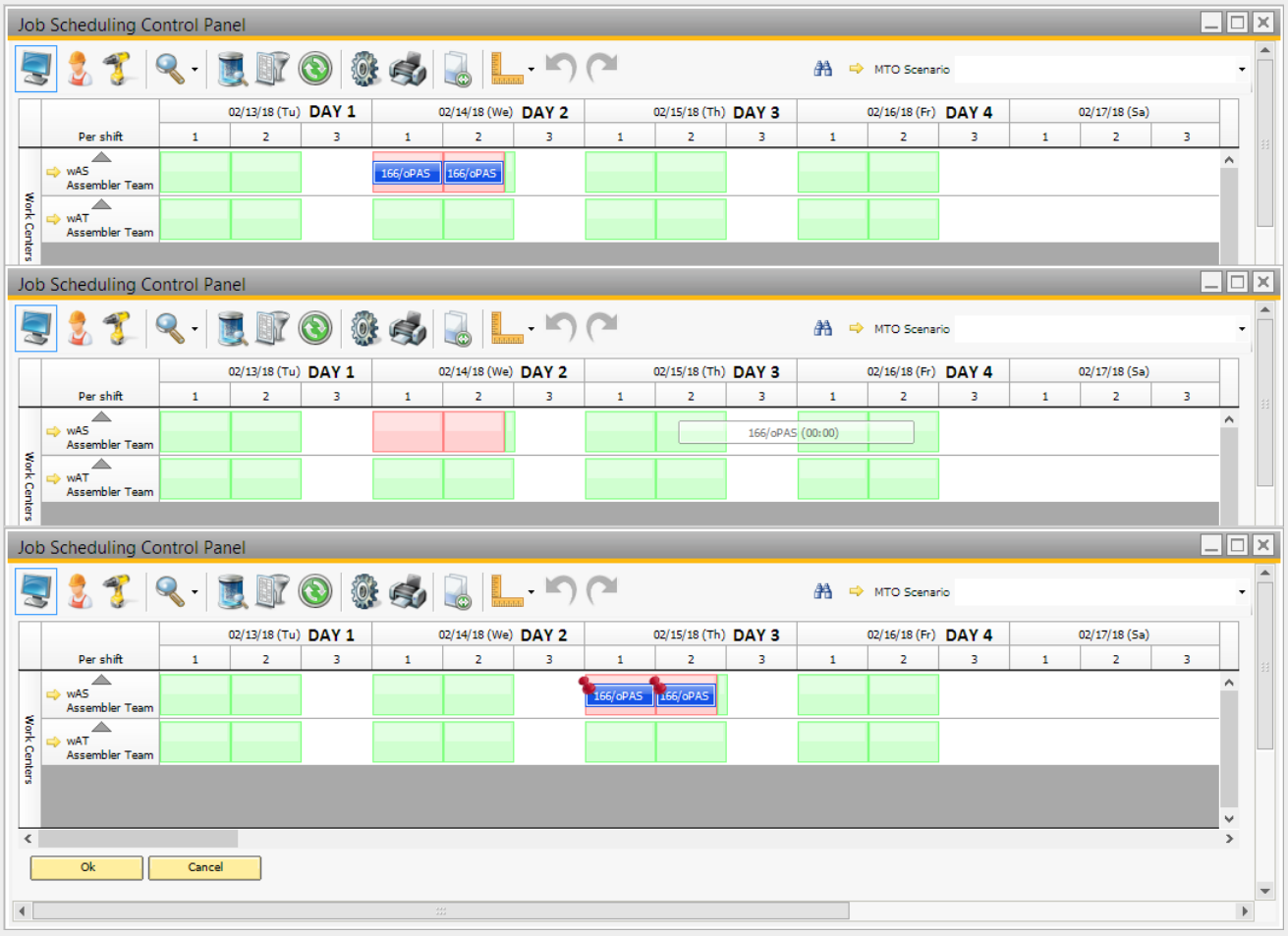
3.1.1. Drag &Drop

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

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

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

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

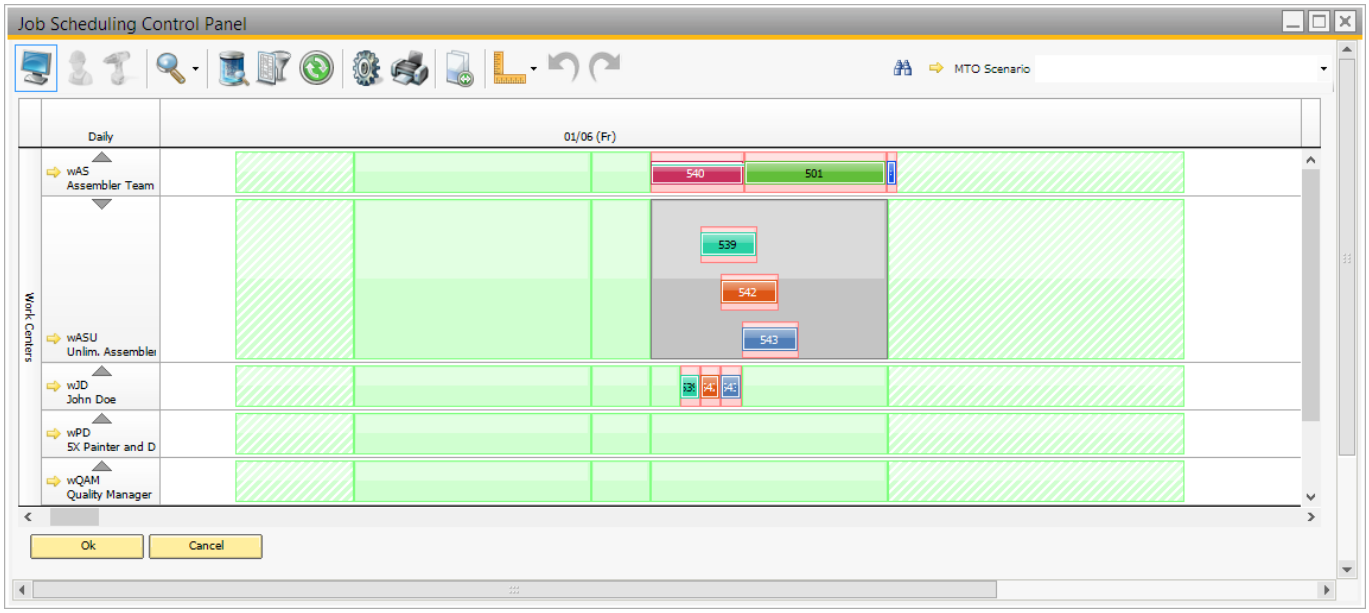


Use the Undo/ Redo arrows to undo or redo the move. To apply the rescheduling, click on the 'Update' button. After an update the action cannot be undone. The system will automatically pin down manually allocated operations for released and planned production orders. Order recommendations will not be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

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

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

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



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

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

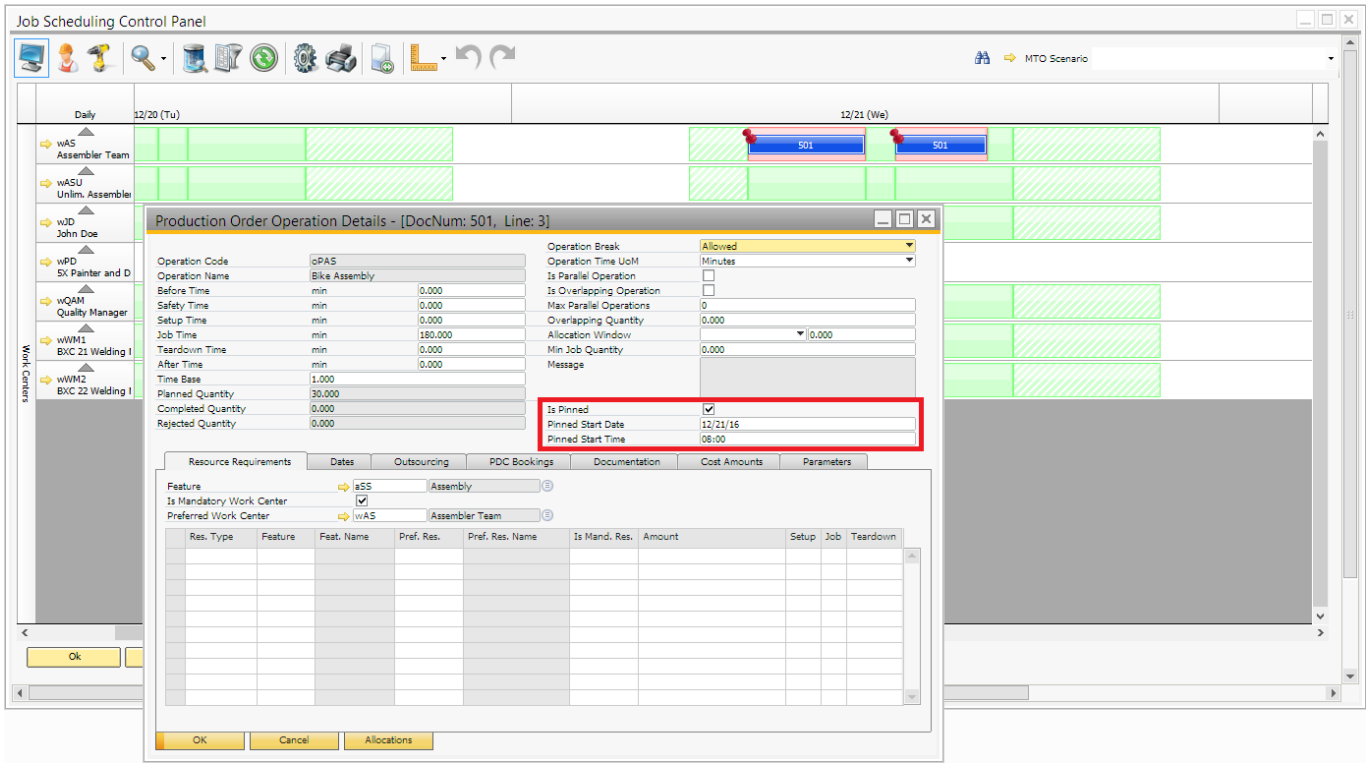
An operation can be shifted later than the subsequent operation but the subsequent operations of the same production order will be automatically shifted later into an available free capacity slot on the timelines of compatible work centers. The overlapping is considered if the subsequent operation can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

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

3.1.2. Pin Down an operation

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

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



3.2. Semiautomatic rescheduling

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

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

3.2.1. Eliminate gaps

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

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

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

3.2.1.1. Align allocations

Select the ***'Align allocations'*** option from the right click menu of the work center line. The system

will optimize the scheduling plan meaning that it aims to eliminate the gaps and to align related operations.

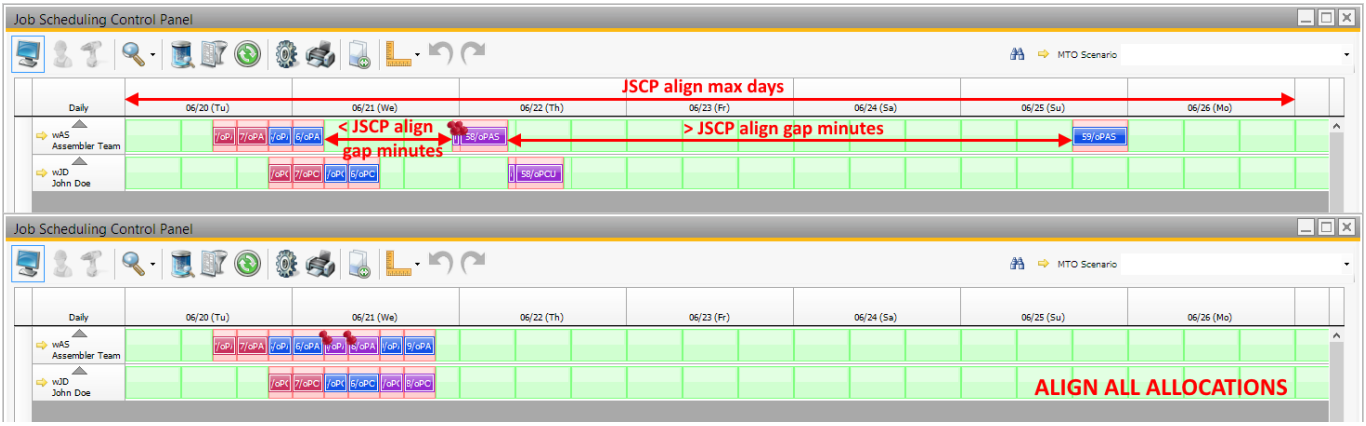
When there is a longer free capacity between two allocations than the defined gap, the aligning process stops, therefore the actual duration of the aligning can be shorter than the '*JSCP align max days*' value.

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

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

3.2.1.2. Align all allocations

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



3.2.2. Reallocate

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

3.2.2.1. Reallocate allocations

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

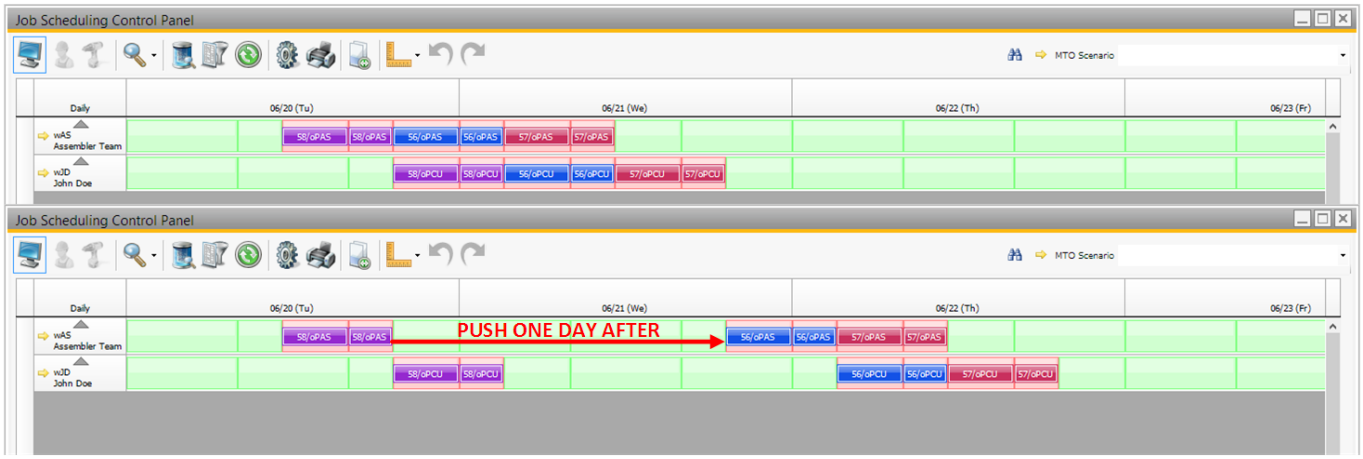
Select the ***'Reallocate Allocations'*** option from the right click menu of a work center. The system will collect every existing allocations for the work center then gather all operations from released production orders assigned to that work center. Then the system will reschedule these operations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

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

3.2.2.2. Push one day before/after

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

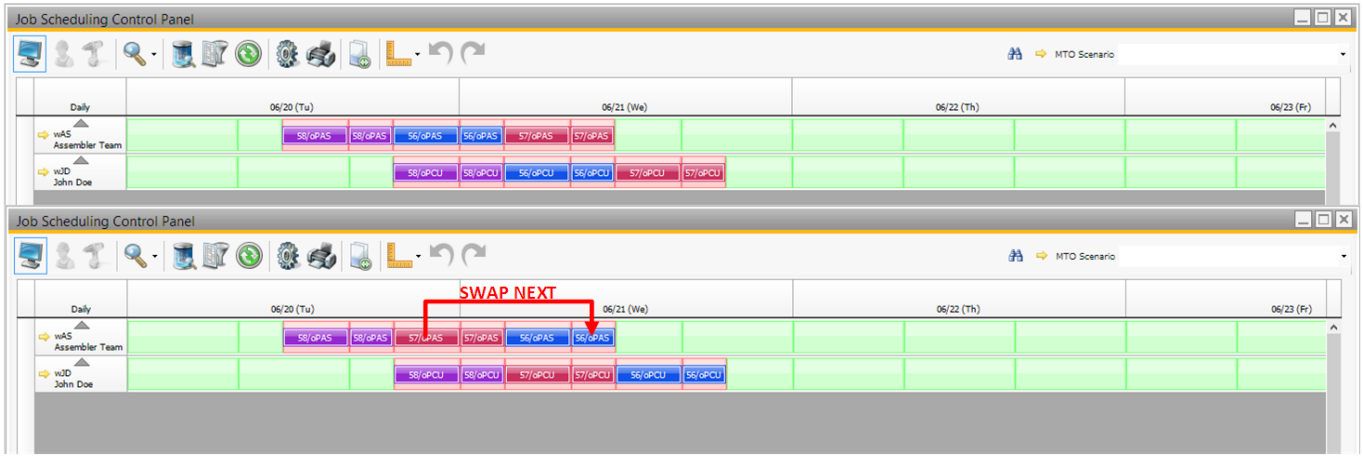
Select the ***'Push one day after'*** option from the right click menu of an allocation to move the allocation to the next day. The allocations following the selected allocation will be rescheduled too.



3.2.2.3. Swap allocation with next/previous allocation

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

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



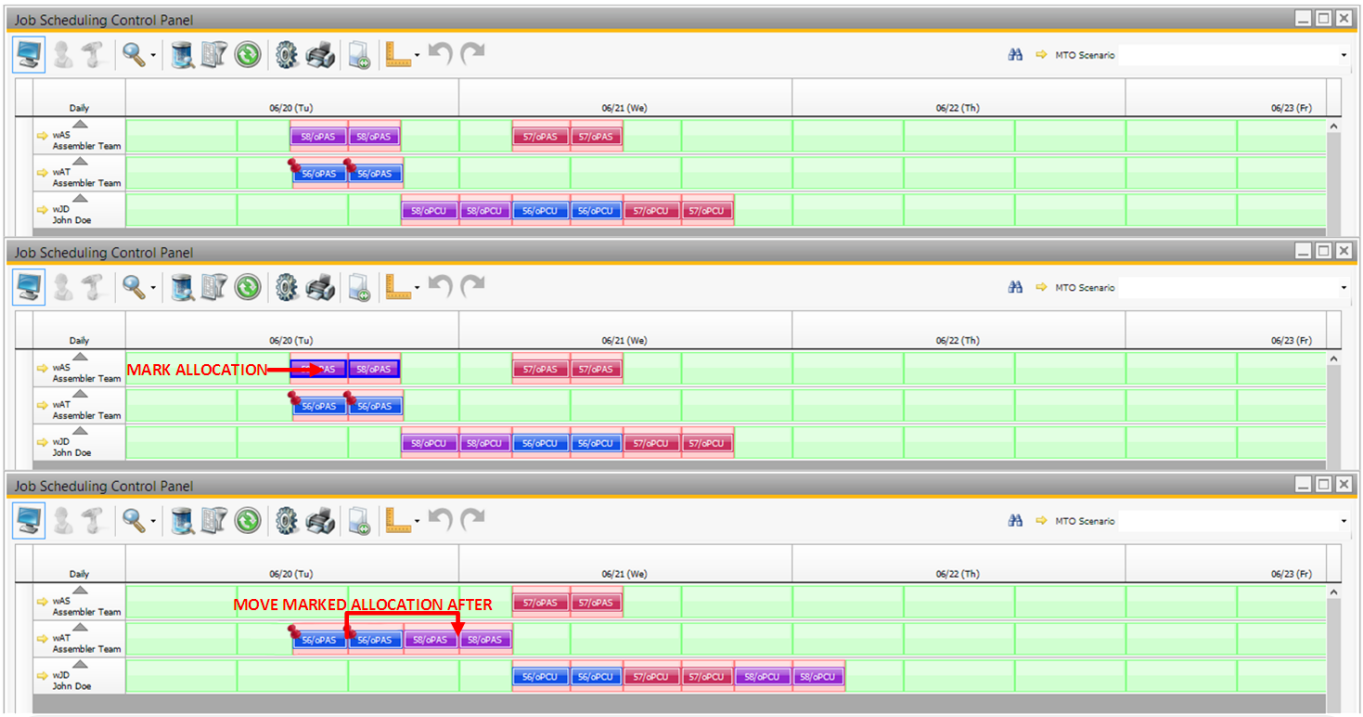
3.2.2.4. Move marked allocation before/after

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

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

Then right click on the allocation to move.

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

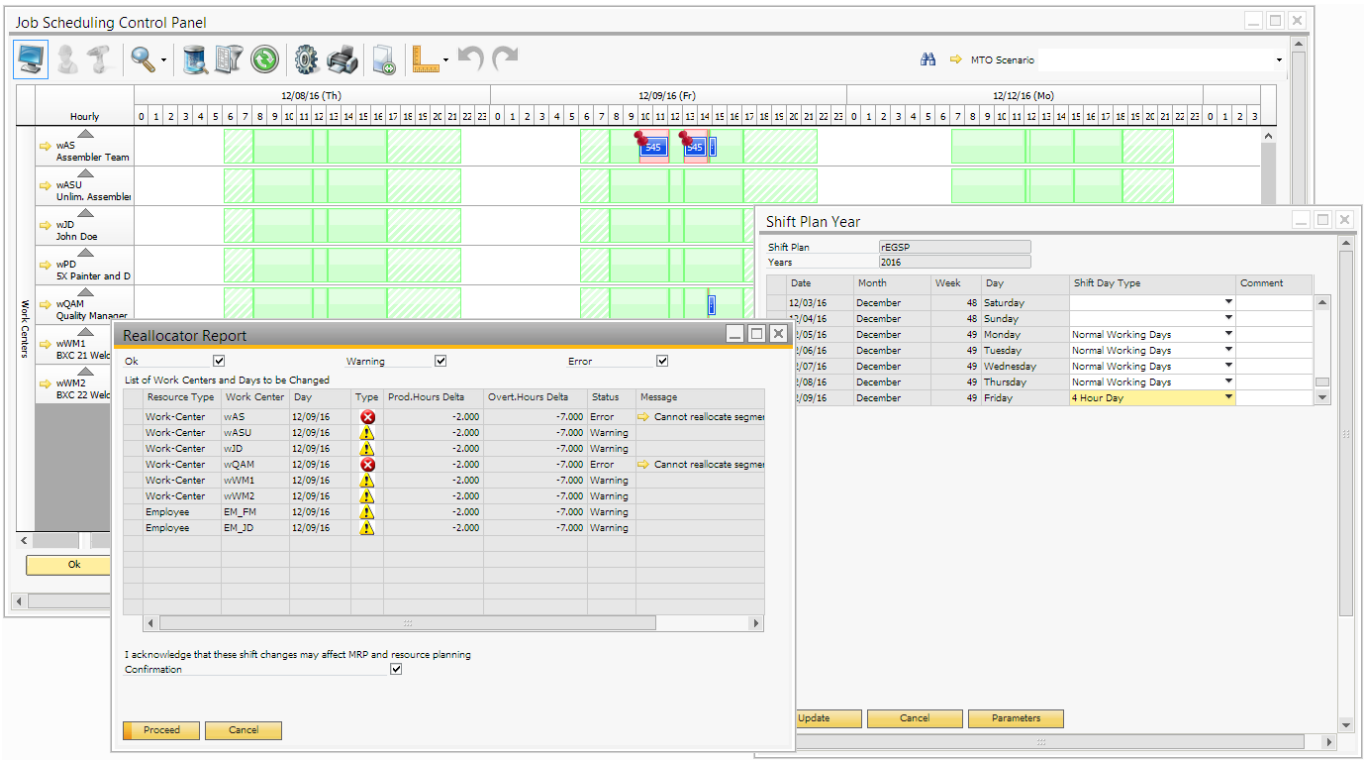


In the example first we marked the *58/oPAS (purple)* allocation. Then we right-clicked on the *56/oPAS (blue)* allocation and selected the ***'Move marked allocation after'*** function. The system moved the *58/oPAS (purple)* allocation after the *56/oPAS (purple)* allocation and also rescheduled the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

3.3. Actions that trigger automatic rescheduling

3.3.1. Shift day capacity decrease

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



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

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