



Opcenter Execution Electronics 2404

Integration User Guide

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Guidelines

This manual contains notes of varying importance that should be read with care; i.e.:

Important:

Highlights key information on handling the product, the product itself or to a particular part of the documentation.

Note: Provides supplementary information regarding handling the product, the product itself or a specific part of the documentation.

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Summary	This guide contains information about the Siemens Opcenter Execution Electronics (Opcenter EX EL) application. The application extends the Siemens Opcenter Execution Core (Opcenter EX CR) application with features specific to electronics manufacturing.
Audience	This guide is intended for persons who use Opcenter Intelligence to load and analyze data from the Opcenter Execution Electronics data source. The guide is written with the assumption that the audience is also familiar with the Opcenter Execution Core application.
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1 Overview

- ⓘ This manual is a section of the Opcenter Execution Electronics Integration User Guide that was released with Valor Shop Floor suite. The content of the original manual has been split into three versions depending on the application it is pertinent to. Each version is released by the corresponding startup, namely Opcenter Intelligence, Opcenter Intra Plant Logistics and Opcenter Connect Electronics. You can find the complementary versions of this manual in Support Center at <https://support.sw.siemens.com/en-US/> under Opcenter Intra Plant Logistics and Opcenter Connect Electronics documentation sections.

Opcenter Execution Electronics (Opcenter EX EL) is a Manufacturing Execution System (MES) service that enables Manufacturing Operations Management (MOM) capabilities.

Opcenter Intelligence Manufacturing Data Warehouse data model for Opcenter EX EL supports descriptive analysis and KPIs to implement the following use cases business logic in Opcenter Intelligence.

- Work in Progress (WIP) to show the progress of each work order, including the number of completed operations and their average duration.
- Material Traceability to provide information on boards, work orders and material placements.
- Box Build to provide a map of a genealogy of all final product related subassemblies used to build a specific box assembly node.

The instructions described in the following sections are prerequisites to load and analyze correct data from the Opcenter EX EL source. These instructions are relevant for both Opcenter Intelligence for Cloud and Opcenter Intelligence on-premise.

2 Mandatory Modeling

It is important to complete this modeling before starting Opcenter Intelligence installation.

⚠ For more information on **Modeling Configuration**, see *Opcenter™ Intra Plant Logistics (IPL) Integration Guide for Opcenter Execution Electronics (EX EL)* released with *Opcenter Intra Plant Logistics Documentation* and available on **Support Center** at the link <https://support.sw.siemens.com/en-US/>

Opcenter Execution Electronics Items Configuration

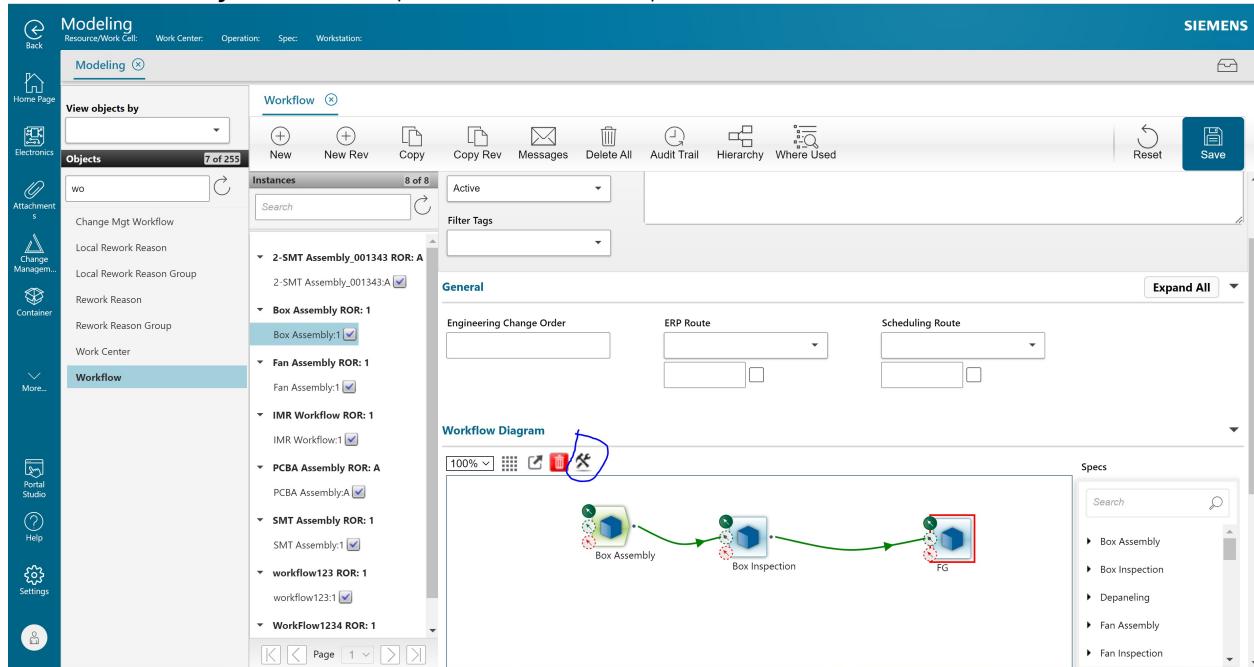
The following items need to be configured in Opcenter Execution Electronics:

- Resources
- Resource type
 - Equipment
 - Line
 - Area
- Parent Resource — (Line)
- Step
- Product
- BOM
- Part number
- Mfg order
- Defect
- Operation
- Workflow

Last Step Configuration in Workflow Modeling

To correctly visualize the WIP Dashboard issued by applying the corresponding Opcenter Intelligence Dashboard Template, you must make sure to execute the following operation in Opcenter Execution Electronics. This setting is required to correctly calculate the completion containers number for a Mfg. Order.

- In Opcenter Execution Electronics **Workflow Modeling** page, select the last operation in the **Workflow Diagram** and click the **Modify Element** icon (outlined in blue below).



- In the **Step Details** panel that opens, select the **Is Last Step** check box and save.

Step Details

Step Name * FG	<input type="checkbox"/> Is First Step	<input checked="" type="checkbox"/> Is Last Step	
Description <input type="text"/>			
Notes <input type="text"/>			
Spec * FG <input type="checkbox"/>	Route Step <input type="text"/>	WIP Msg Label <input type="text"/>	Sequence 3
Scheduling Route Step <input type="text"/>			
PATH SELECTORS 			
<input type="button" value="Close"/>		<input type="button" value="OK"/>	

3 Summary Tables Data Collection

To enable summary tables data collection, please do not uncheck the **Disable Reporting Summaries** field on the **Factory** page. Data will not be written to the summary tables if this field is checked. The default setting is unchecked, meaning summary tables are written to by default.

The screenshot shows the 'General' settings section of the Factory configuration page. On the left, there is a vertical list of locations: Charlotte, Cithrose, KY, Loughborough, MHT, MJP, Northridge, and Westborough. A 'Filter Tags' dropdown is located at the top right. The 'General' section contains several dropdown menus and checkboxes:

- Enterprise:** MDD Technologies
- Mfg Calendar:** 2021
- Dispatch Rule:** (dropdown menu)
- Training Requirement Group:** (dropdown menu)
- Print Queue:** (dropdown menu)
- Container Numbering Rule:** (dropdown menu)
- SMTP Transport:** (dropdown menu)
- Change Mgt Settings:** CM001
- Smart Scan Rule:** (dropdown menu)
- Allow Terminal Line Assignment Override:** (checkbox)
- Disable Reporting Summaries:** (checkbox, highlighted with a red box)
- LOCATIONS:** (dropdown menu)
- Shop Floor Integration Settings:** Carrier Container

4 PCB and Panel Container Types

In order to get an accurate and full report of work-in-progress and material traceability, it is necessary to set the appropriate container level types.

ES_Level_Type

These are the **ES_Level_Types** that need to be defined:

- PCB
- Panel
- Box assembly
- Raw Material

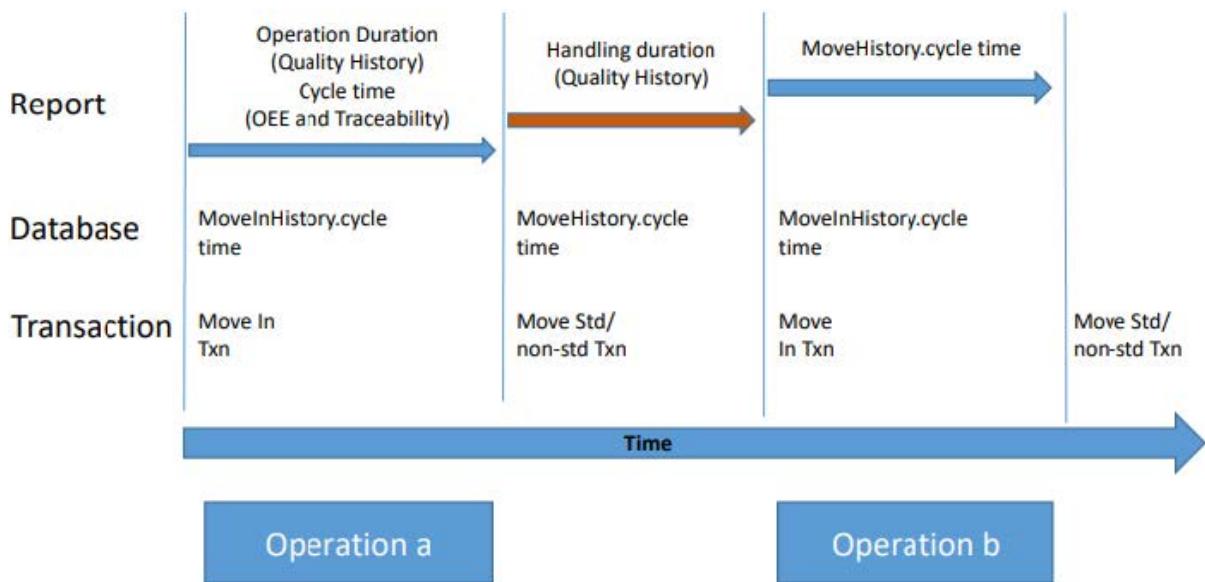
Panels and PCBs

When defining the Panel and PCB relationship:

- Begin by defining the containers as having the **Std Start Child Qty** set to 1. In this case, the container level defined for the container can use a **Level Type** of either 'Panel' or 'PCB'.
- If a **Child Container Level** is set, then the parent uses a **Level Type** of 'Panel', and the child must use a **Level Type** of 'PCB'.

5 Handling Duration

In order to get an accurate handling duration, in Operation level the **Use Queue** check box must be selected. Otherwise, the handling duration will be calculated as the difference between the Move for operation *a* and the Move for the next operation.



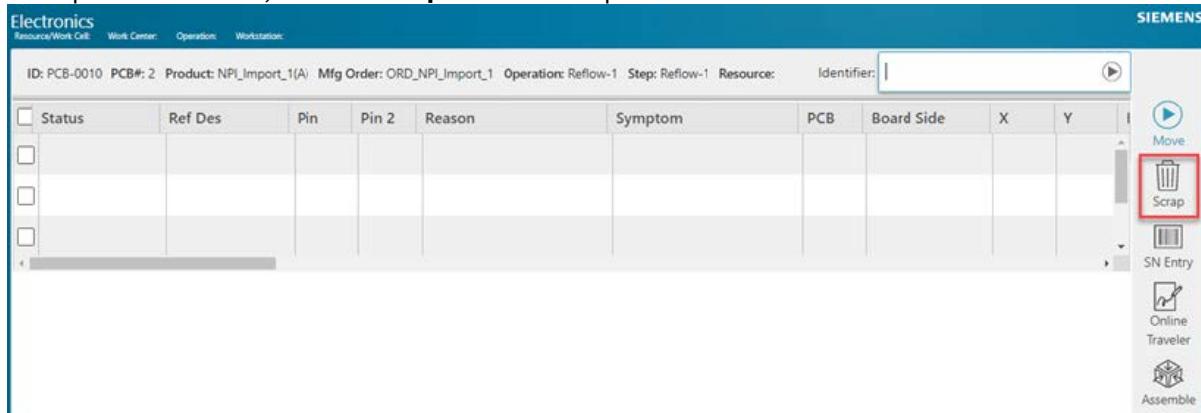
6 Reporting Scrap and Trash

There are two ways to mark boards for scrap in the Opcenter IN EL reports:

- [Using the Production Client](#)
- [On the Container page](#)

Reporting Scrap and Trash using the Production Client

1. To enable the **Scrap** button in the production client, first define the Loss reasons in the specifications or operation modeling.
2. In the production client, click the **Scrap** button to scrap a container.



3. In the next screen, add the reason for scrapping the container.

This is a screenshot of a 'Scrap' dialog box. At the top, it says 'Scrap' and has a close button. Below that, there's a field labeled 'Identifier *' containing 'PCB-0010'. Underneath is a dropdown menu labeled 'Scrap Reason *' with 'SCRAP' selected. There are also small navigation icons at the top of the dialog.

Reporting Scrap and Trash on the Container page

1. On the left menu bar, navigate to **Container > Change Qty**. By default, the **Change Type of Loss** is selected.

2. With this dialog open, either scan the container or manually fill in the values.

The screenshot shows the 'Change Qty' dialog box. At the top, it displays 'Identifier * PCB-0011', 'Product: NPI_Import...', 'Operation: Reflow-1', and 'Mfg Order: ORD_NPI_Import_1'. Below this, the 'Loss Reason *' dropdown is set to 'SCRAP'. A red arrow points to the 'Loss Qty *' input field, which contains '1'. Another red arrow points to the ' Use Current Qty' checkbox, which is unchecked. At the bottom left are 'Current Qty' (set to '1') and 'UOM' (set to 'EACH'). On the right side, there are buttons for 'Submit', 'Reset', 'Container Status', and 'Document'.

3. In the **Loss Reason** field drop-down menu, select **Scrap**.
4. Select the **Use Current Qty** check box. You can also enter the number in the **Loss Qty** field. Make sure that for the panel the number is higher than one.
5. Click **Submit**.

7 Supported Transactions

The table below lists all the transaction types that are supported with Opcenter Intelligence.

Business Domain	Reports	Transaction Type
Quality	<ul style="list-style-type: none"> • Box Build • Quality History • WIP 	<ul style="list-style-type: none"> • Associate • Close • ComponentIssue • ComponentIssueR2 • ComponentRemove • ContainerMaint • Disassociate • ES_AutoComponentIssue • ES_BoardToTestIdTxn • ES_Suspend • ExecuteTask • isDefect • isDefectReopen • isDefectRepair • MoveIn • MoveNonStd • MoveStd • Open • Rework • Start
Traceability	<ul style="list-style-type: none"> • Board Traceability • Material Traceability • WO Material 	<ul style="list-style-type: none"> • Associate • Close • ComponentIssue • ComponentIssueR2 • ComponentRemove • ContainerMaint • Disassociate • ES_AutoComponentIssue • ES_BoardToTestIdTxn • ES_Suspend • ExecuteTask • MoveIn • MoveNonStd • MoveStd • Open • Rework • Start

⚠ Note

Nonstandard transactions can also be supported in some conditions. The custom transactions must be built as a child of one of the standard transactions, and must populate the same table and fields as the standard transaction.

8 DPU, DPO, and DPMO

DPU, DPO, and DPMO are KPI metrics that express how your product or process is performing, based on the number of defects.

Definitions

DPU – Defect per Unit — the number of defects in a sample, divided by the number of units sampled.

$$\text{DPU} = [\text{Number Of Defects}] / [\text{Container Count}]$$

DPO – Defects per Opportunities — the number of defects in a sample, divided by the total number of defect opportunities.

$$\text{DPO} = [\text{Number Of Defects}] / [\text{Number of Opportunities (Latest Upgrade)}]$$

DPMO – Defects Per Million Opportunities — the number of defects in a sample, divided by the total number of defect opportunities, multiplied by one million.

$$\text{DPMO} = [\text{Number Of Defects}] / [\text{Number of Opportunities (Latest Upgrade)}] * 1,000,000$$

DPMO standardizes the number of defects at the opportunity level and is useful because you can compare processes with different complexities.

The sub-metrics used for calculating the DPO, DPMO and PU are as follows:

- **Number of Opportunities** — the number of chances for a defect to occur in a given product or service. The number of opportunities is calculated as the sum of the number of part numbers on a container, the number of pins on the container, plus the container itself.

$$\text{Number of opportunities} = \text{number of parts} + \text{number of pins} + 1$$

Where:

- **Number of parts** is the number of components associated with the container. This is calculated based on the tables **Product** and **ProductMaterialListItem**.
- **Number of pins** is the total number of pins on the container, and is taken from the **ES_PinCount** field in the **Product** table.
- **Number of defects** is the number of defects reported. This number is taken from the **DefectHistoryDetail** table.
- **Container Count** — the number of units counted for the given time period.

Configuration

The number of opportunities for containers needs to be defined in the modeling stage.

- **Number of pins** — The information for the pins is populated automatically during the NPI import, or can be added manually from the product modeling.

The screenshot shows the 'Product' modeling screen in the Opcenter Execution Electronics 2404 software. The left sidebar lists 'Instances' (25 of 72) with various product codes and revision levels. The main panel is divided into sections: 'Product *' (with fields for Product ID, Revision, Status, and Notes), 'General' (Engineering Change Order, Product Type set to 'COMPONENT', Product Family, ERP Product Family, Material Category), 'Material Queues', 'Processing', 'Product Structure', 'Customer', 'Device Information', 'UOM Conversion', 'User Attributes', 'Serial Numbers', 'Defect Opportunity' (Mounting Technology set to 'SMT', Pin Count set to '2', Polarized checkbox), 'Rework Cycle Check', 'User Fields', and 'Last Change Information'. The 'Pin Count' field in the 'Defect Opportunity' section is highlighted with a red rectangular border.

- Number of Parts** — the number of parts specified in the BOM.

The screenshot displays two overlapping software windows from Opcenter Execution Electronics 2404:

- Left Window (Product View):** Shows a tree view of product instances under "FieldPG-MainBoard". A red box highlights the "Count" dropdown menu, which is set to "FieldPG-MainBoard".
- Right Window (PCB BOM View):** Shows a detailed view of a selected PCB BOM instance. A red box highlights the "Materials" grid, which lists various components with columns for Product, Spec, Reference Designator, Issue Control, and Quantity.

Materials Grid Data:

Product	Spec	Reference Designator	Issue Control	Quantity
355-0000U/21	PaceChip	B01	Lot and Stock Point	1
123-00010561	PaceChip	C1	Lot and Stock Point	1
123-00010381	PaceChip	C10	Lot and Stock Point	1
123-00010561	PaceChip	C100	Lot and Stock Point	1
123-00011761	PaceChip	C101	Lot and Stock Point	1
123-00011761	PaceChip	C102	Lot and Stock Point	1

9 Consumption Data Collection Setting

The sending of consumption data to Opcenter Intra Plant Logistics (IPL) is controlled by the **CIO Outbound Msg Def** for the *ComponentIssue/ComponentIssueR2/ComponentReplace* definitions – and by default they use the following condition expression to control whether the message is sent:

Factory && Factory.isMaterialManageEnabled

CIO Outbound Msg Def

		New	Copy	Delete	Audit Trail	Hierarchy	Where Used
Instances	18 of 18						
<input type="text" value="Search"/> <input type="button" value="⟳"/>		* Service Type Name : ComponentIssueR2 <input type="button" value="Filter Tags"/>					
ChangeQty Combine ComponentIssue ComponentIssueR2 ComponentReplace ES_AutoComponentIssue isDefect isDefectRepair isManageInventory isMaterialRequest		Description Notes <div style="border: 1px solid #ccc; height: 100px; width: 100%;"></div>					
General							
OUTBOUND DEFINITION							
<input type="button" value="+"/> <input type="button" value="✎"/> <input type="button" value="Delete"/> <input type="button" value="⟳"/> <input type="button" value="→"/>							
<input type="button" value="List Expression"/>		Condition Expression <input type="text" value="Factory && Factory.isMaterialManageEnabled"/>					

This means that a Factory must be assigned the Employee performing the transaction, and the option must be enabled. You could also remove the Condition Expression and the messages would always be sent.

Defects Management

Removal Reason	Replace Reason	
<input type="text" value="Remove Component"/>	<input type="text" value="Replace Component"/>	<input checked="" type="checkbox"/> Material Management Enabled