



Opcenter Execution Electronics 2404

Integration User Guide

04/2024

PL20240130632793919

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.

Trademarks

All names identified by ® are registered trademarks of Siemens AG.

The remaining trademarks in this publication may be trademarks whose use by third parties for their own purposes could violate the rights of the owner.

Disclaimer of Liability

We have reviewed the contents of this publication to ensure consistency with the hardware and software described. Since variance cannot be precluded entirely, we cannot guarantee full consistency. However, the information in this publication is reviewed regularly and any necessary corrections are included in subsequent editions.

Cybersecurity Information

Siemens provides products and solutions with industrial cybersecurity functions that support the secure operation of plants, systems, machines and networks.

In order to protect plants, systems, machines and networks against cyber threats, it is necessary to implement - and continuously maintain - a holistic, state-of-the-art industrial cybersecurity concept. Siemens products and solutions constitute one element of such a concept.

Customers are responsible for preventing unauthorized access to their plants, systems, machines and networks. Such systems, machines and components should only be connected to an enterprise network or the internet if and to the extent such a connection is necessary and only when appropriate security measures (e.g. firewalls and/or network segmentation) are in place.

For additional information on industrial cybersecurity measures that may be implemented, please visit <https://www.siemens.com/cybersecurity-industry>.

Siemens products and solutions undergo continuous development to make them more secure. Siemens strongly recommends that product updates are applied as soon as they are available and that the latest product versions are used. Use of product versions that are no longer supported, and failure to apply the latest updates may increase customer's exposure to cyber threats.


To stay informed about product updates, subscribe to the Siemens Industrial Cybersecurity RSS feed under <https://www.siemens.com/cert>.

Table of Contents

- 1 Overview5
- 2 Mandatory Modeling6
- 3 Summary Tables Data Collection9
- 4 PCB and Panel Container Types10
- 5 Handling Duration.....11
- 6 Reporting Scrap and Trash12
- 7 Supported Transactions14
- 8 DPU, DPO, and DPMO15
- 9 Consumption Data Collection Setting18

ID	Opcenter_EX_EL_Integration_User_Guide
Title	Integration User Guide
Product Title	Opcenter Execution Electronics
Version Title	2404
Product Version	Opcenter_EX_EL_Integration_User_Guide_2404
Category	Configuration, Usage, Support
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.
Revision	PL20240130632793919
State	Published
Author	Siemens AG
Language	en-US

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.

1. 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).

The screenshot shows the Siemens Opcenter Execution Electronics Workflow Modeling interface. The left sidebar contains navigation options like 'Home Page', 'Electronics', 'Attachments', 'Change Management', 'Container', 'More...', 'Portal Studio', 'Help', 'Settings', and 'User'. The main area is divided into 'General' and 'Workflow Diagram' sections. The 'Workflow Diagram' section displays a flowchart with three steps: 'Box Assembly', 'Box Inspection', and 'FG'. The 'FG' step is highlighted with a red box, and the 'Modify Element' icon (a square with a diagonal line) is circled in blue.

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

The screenshot shows the 'Step Details' panel. The 'Step Name' field is set to 'FG'. The 'Is Last Step' checkbox is checked and circled in blue. The 'Sequence' field is set to 3. The 'Description' and 'Notes' fields are empty. The 'Spec' field is set to 'FG'. The 'Route Step' field is empty. The 'WIP Msg Label' field is empty. The 'Scheduling Route Step' field is empty. The 'PATH SELECTORS' section shows icons for adding, deleting, and moving steps.

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 'Factory' page settings interface. On the left is a sidebar with location names: Charlotte, Citrus, KOT, Loughborough, MDT, MSP, Northridge, and Westborough. The main area has a 'Filter Tags' dropdown at the top. Below it is the 'General' section with various settings:

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

At the bottom left of the settings area is the label 'LOCATIONS'.

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

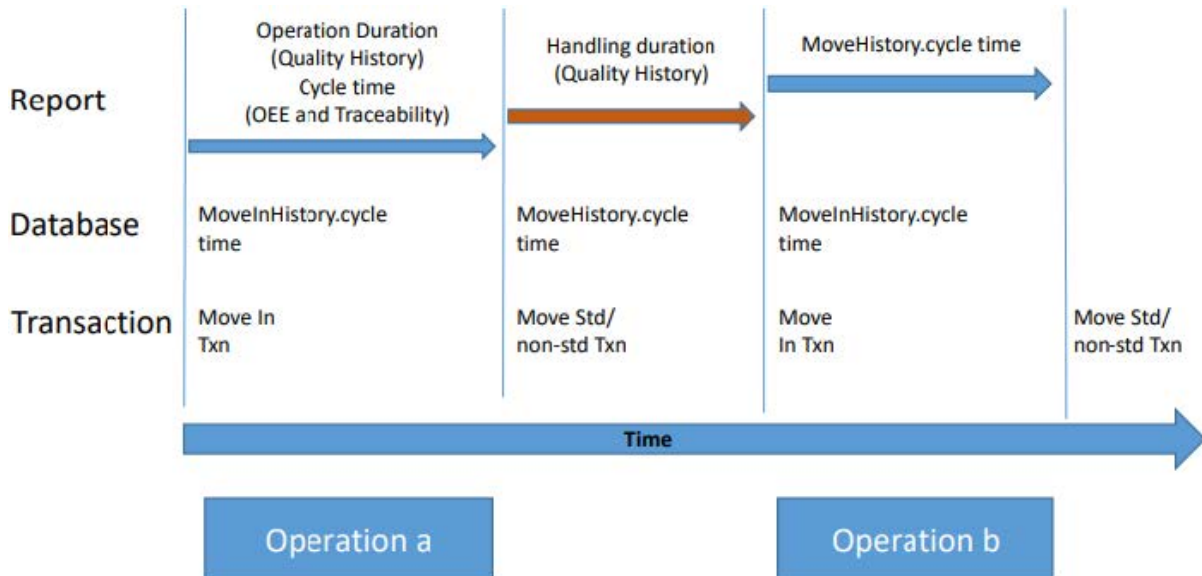
Panels and PCBs

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.



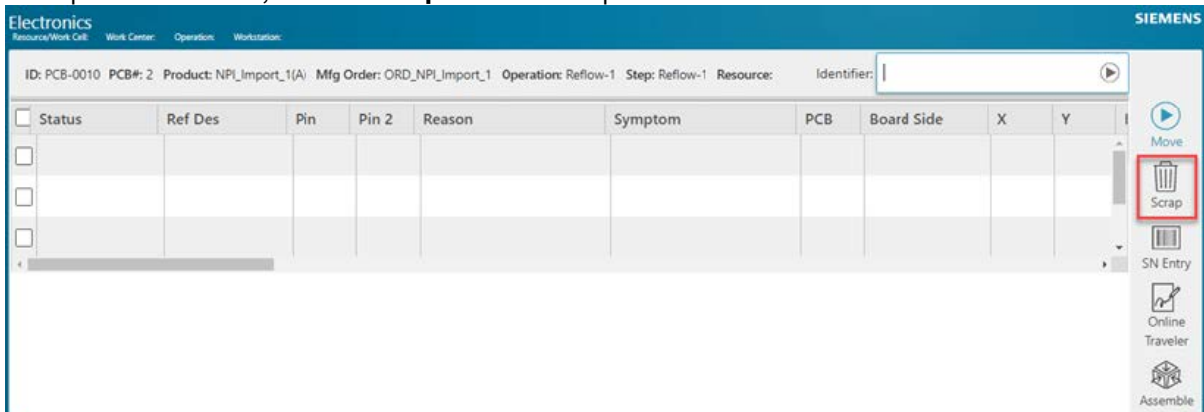
6 Reporting Scrap and Trash

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.

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 'Container' dialog box in Siemens software. The 'Identifier' field contains 'PCB-0011'. The 'Qty' field shows '1 [EACH]'. The 'Mfg Order' field shows 'ORD_NPI_Import_1'. The 'Change Qty Type' section has 'Loss' selected. The 'Loss Reason' dropdown menu is set to 'SCRAP'. The 'Loss Qty' field is empty, and the 'Use Current Qty' checkbox is unchecked. Red arrows point to the 'Loss Qty' field and the 'Use Current Qty' checkbox. The 'Current Qty' field shows '1' and the 'UOM' is 'EACH'. On the right, 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 displays the 'Product *' form in the Opcenter Execution Electronics 2404 - Integration User Guide. The form is divided into several sections, including 'General', 'Material Queues', 'Processing', 'Product Structure', 'Customer', 'Device Information', 'UOM Conversion', 'User Attributes', 'Serial Numbers', 'Defect Opportunity', 'Rework Cycle Check', 'User Fields', and 'Last Change Information'. The 'Pin Count' field is highlighted with a red box, indicating it is a key field for manual input.

Product *

Product: 110-0001941

Status: Active

Filter Tags:

General

Engineering Change Order:

Product Type: 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: SMT

Pin Count: 2

☐ Polarized

Rework Cycle Check

User Fields

Last Change Information

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

The screenshot displays the Opcenter Execution Electronics 2404 - Integration User Guide interface. The main panel shows the BOM (Bill of Materials) view for a product. The left sidebar contains a tree view of the product structure, with the 'FieldPG-MainBoard' component selected. The main panel has tabs for 'Product', 'BOM', and 'PCB BOM'. The 'BOM' tab is active, showing a list of components. The right panel displays the 'Materials' list, which is highlighted with a red box. The Materials list contains a table with the following data:

Product	Spec	Reference Designator	Issue Control	Quantity
33-000000/21	PaceChip	BH1	Lot and Stock Point	1
123-0001056:1	PaceChip	C1	Lot and Stock Point	1
123-0001038:1	PaceChip	C10	Lot and Stock Point	1
123-0001056:1	PaceChip	C100	Lot and Stock Point	1
123-0001176:1	PaceChip	C101	Lot and Stock Point	1
123-0001176:1	PaceChip	C102	Lot and Stock Point	1

The Materials list also includes a 'Showing 1 to 20 of 951 entries' indicator and navigation controls. Below the Materials list, there are sections for 'User Fields' and 'Last Change Information'.

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

NewCopyDeleteAudit TrailHierarchyWhere Used

Instances18 of 18

Search

ChangeQtyCombineComponentIssueComponentIssueR2ComponentReplaceES_AutoComponentIssueisDefectisDefectRepairisManageInventoryisMaterialRequest

* Service Type Name

ComponentIssueR2

Filter Tags

DescriptionNotes

General

OUTBOUND DEFINITION

+EditDeleteRefreshExport

List Expression	Condition Expression
	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

Remove Component

Replace Reason

Replace Component

☒ Material Management Enabled