FORCAM™ FORCE

Functional Release Notes

Version 5.12.6

Release Information

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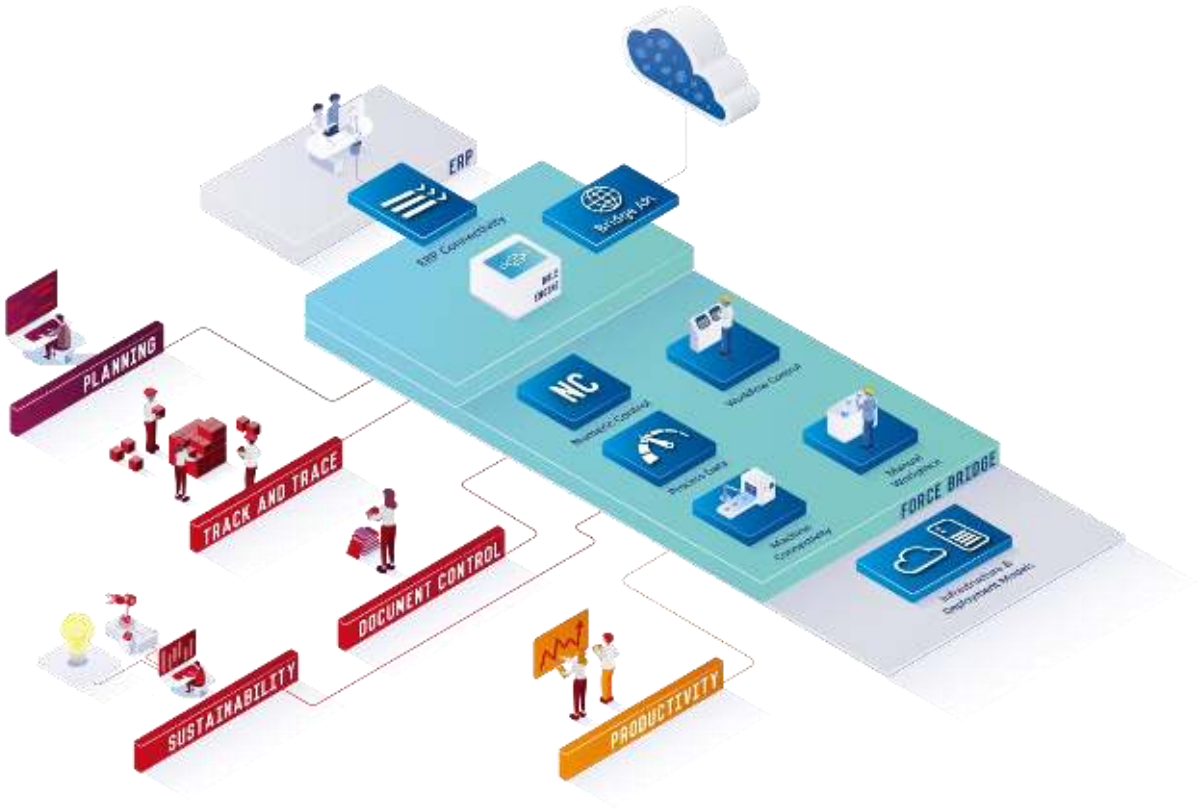
1 Overview

FORCAM provides companies with all the information they need to control and optimize their production. The modular IIoT solution FORCAM FORCE IIOT is as flexible as the needs of customers. With a variety of production apps, FORCAM helps companies to make their processes more transparent and improve their workflows. In this way, companies create the basis for optimization measures and sustainable success, thereby ensuring their competitiveness.

FORCAM is always endeavored to optimize the solution FORCAM FORCE IIOT further, to enrich it with functions, offering customers consistent growth and greatest possible use. For this purpose, several releases are published throughout the year.

This document lists functions that have been added or changed during the **5.12.6** release. It serves as an overview of the most important features to use FORCAM FORCE IIOT in the best possible way.

Detailed descriptions of the individual functions can be found in the respective product documentation.



2 FORCAM FORCE IIOT COMMON

2.1 Low-Code Platform - Node-RED

Affected module	Affected area	Status
FF Distribution	Node-RED	Changed

The current **node-red-contrib-forcebridge-1.0.1.tgz** need not be downloaded manually from the nexus repository anymore. Instead, it is included in the FORCAM FORCE IIOT distribution **zip.7**.

2.2 SSL Configuration in FFSetup

Affected module	Affected area	Status
FFSetup	FFAuth	Changed

From now onwards the keystore file will be present in the config directory. It was previously present in FFAuth-tomcat application directory.
In addition, the supported keystore format is now **PKCS12** and FFSetup will not allow the configuration to proceed when a keystore file with an unsupported type is being provided. The user will be informed about the wrong keystore type on the overview page but cannot continue the installation any further before providing a keystore with the correct type **PKCS12**.

2.3 Third-Party Libraries related to Spring and Hibernate updated

Affected module	Affected area	Status
Third Party Libraries	Spring/Hibernate	Changed

Outdated third party libraries related to Spring and Hibernate together with other related dependencies are updated.
Update to the following versions:

- Spring 5.3.x
- Spring Boot 2.6
- Spring Security 5.6.x
- Apereo CAS 6.5.x
- Hibernate 5.6.x
- ojdbc8 21.5.x.x
- mssql-jdbc 10.2.x
- Ignite 2.13.x

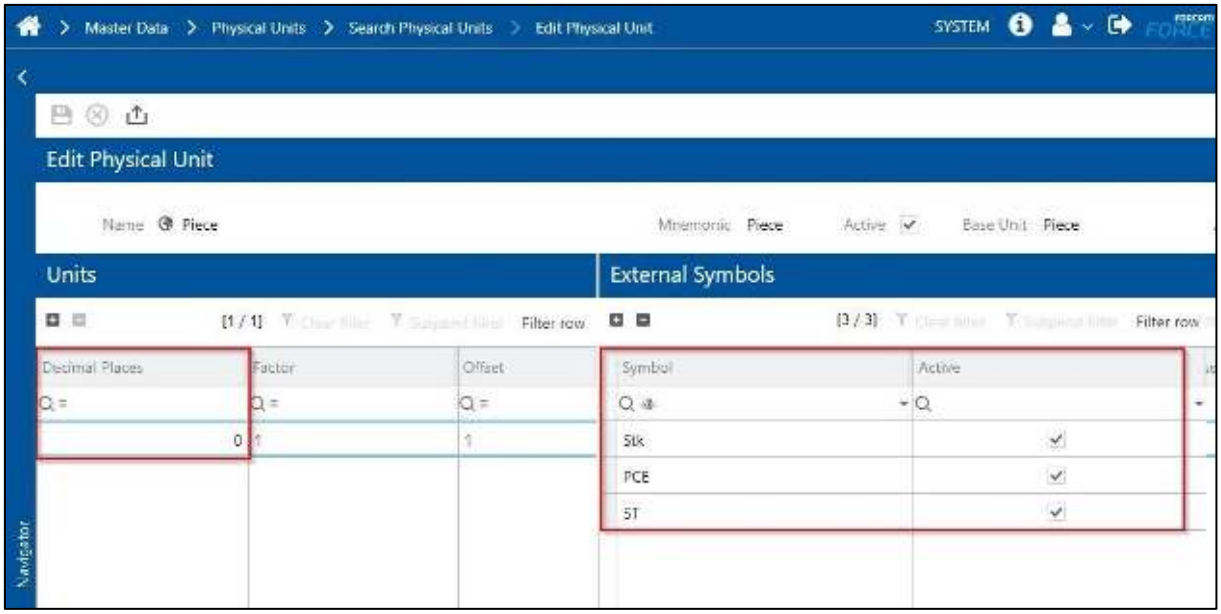
2.4 Quantity and Physical Units based on ERP as leading system (BaseUnit)

Affected module	Affected area	Status
Master Data/FFWorker/Shopfloor Terminal/Corrections/Digital Planning Board/Office-Client/FFRuntime/FFERP	Physical Units/Operation Details/Single Quantities/Rule Engine/Reporting/Pivot Tables/Dispatch and Schedule/Order Management	New

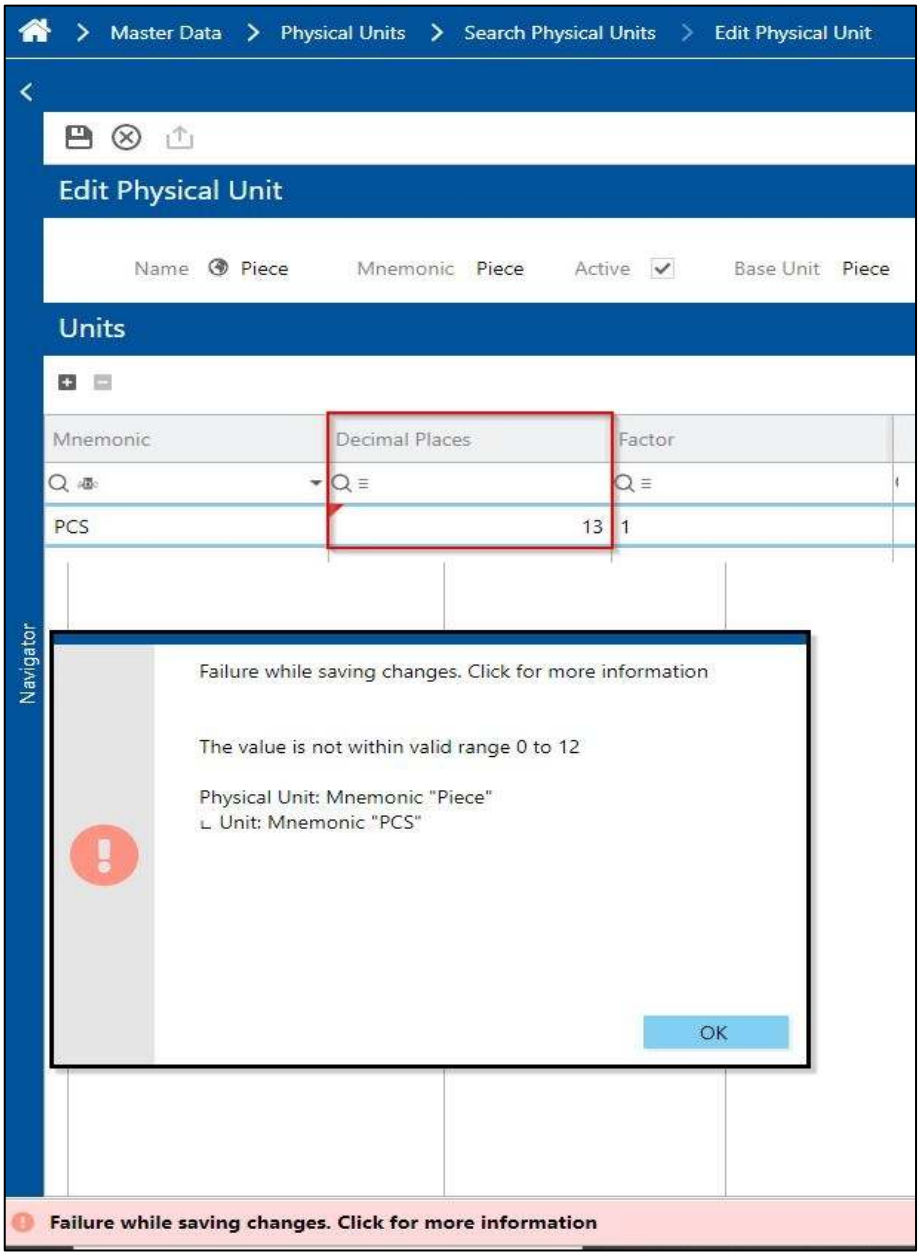
Master Data

Path: Master Data > Physical Units > Add Physical Units

New column **Decimal Place** has been added inside the Unit table. In addition to it, **edit** functionality is available for already existing units except for mnemonic column. Mnemonic column is now removed from **External Symbols** table.



The allowed value range for decimal place is between 0 to 12. If user provides more or less than those values, then corresponding validation message will be shown.



Path: Master Data > Physical Units > Search Physical Units

Export

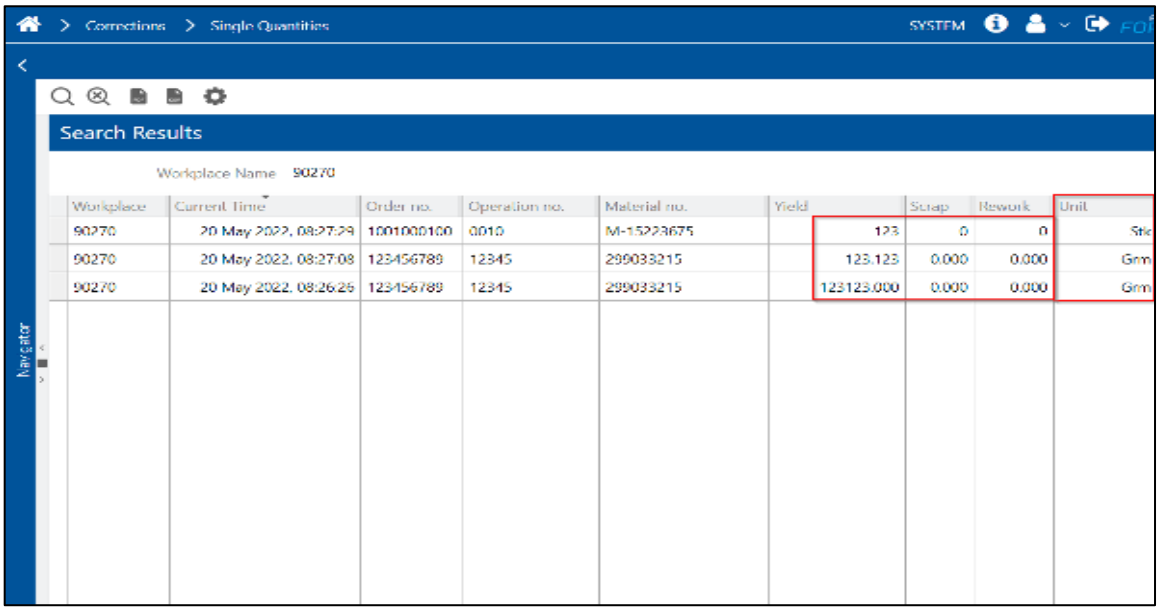
The decimal places are available inside the exported XML file.

Import

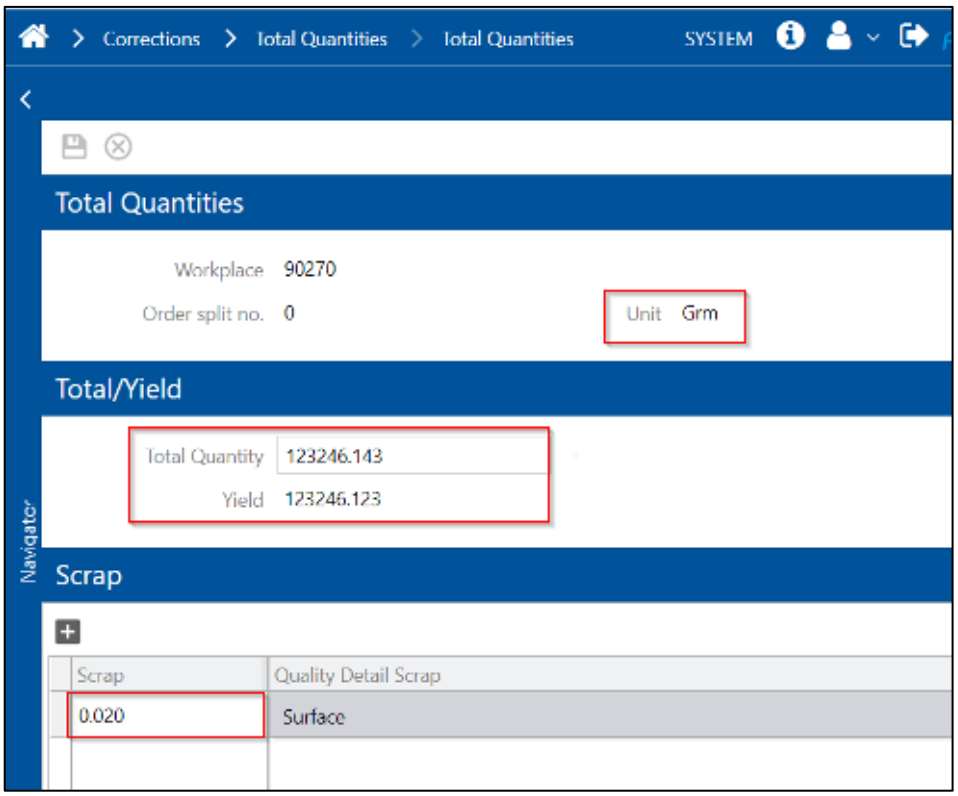
An XML File is provided to import the default unit values with external symbols. The file is located in the workbench tomcat folder: “ffworkbench-omcat/webapps/ffworkbench/WEB-INF/classes/StandardPieceUnit.xml”

Path: Corrections > Single Quantities

Column - **Unit** displays the used physical unit external symbol of the operation. All quantities in this search page get displayed in its own physical unit configured precision.



While correcting quantities the physical unit external symbol is shown too. And all the quantities are displayed in the physical unit defined precision. When entering numbers with a higher precision the value is cut.



Example:

Physical Unit Precision: 3

Entered Value	Cut Value
3.141592	3.141~~592~~
3.120	3.120
4.3211	4.321~~1~~

Shopfloor Terminal Configurator

Path: Grid Control Configuration > Renderer configuration

- Property **Format definition for numbers** adapted to accept only valid format configuration.

Grid Control Views

- Configuration **Use global decimal format** now respect the decimal precision configured at Physical Unit master data.
- If **Use global decimal format** is enabled, the decimal format is taken from Physical Unit master data and else format is taken from the local renderer.
- If **Use global decimal format** is disabled and local renderer is not defined then the decimal format is taken from Physical Unit master data.

Shopfloor Terminal

When Physical Unit configuration is enabled, the grids having quantity present decimal precision according to Physical Unit master data.

Workplace	Text	Order	Operation	Material No.	Target Quantity	Yield Quantity
90270	B07	123456789	0001	299033216	100,000.000	3.000
		1001000100	0010	M-15223675	2,000	5
		1001000101	0010	M-15223675	2,000	0
		1001000102	0010	M-15223675	2,000	0
		1001000103	0010	M-15223675	2,000	0
		1001000104	0010	M-15223675	2,000	0
		1001000105	0010	M-15223675	2,000	0

Digital Planning Board

All quantities in the Digital Planning Board are modified to display the decimal formats according to what is specified per unit in the master data:

- All quantity fields of the operation table, operation bar (Gantt-chart) and operation tooltip (Gantt-chart) use the settings per unit in the master data for displaying quantities.
- The operation split functionally also uses the settings per unit in the master data.
- In addition the sub-masks showing orders, operations, editing and changing operations use the settings per unit in the master data.
- The search field target quantity uses the maximal decimal places of all units from the master data.
- The default value for “Time per unit” data field is defined in the “Settings per unit” in the master data.

Detailed Order Scheduling (DOS/FLS)

Starting situation:
The physical units in DOS serve only visualization purposes and are displayed in a sub-mask in which are displayed single operations.
DOS interprets and uses the following units:

- Piece: “St”, “HU”, “PC”
- Weight: “KG”, “GR”, “T”, “Tone”, “LB”
- Volume: “ML”
- Length: “M”

Lower case or upper case is insignificant. For all other units’ information is accepted piece, for e.g.: for the unit “mg” it would be displayed “piece” by DOS. DOS can deal with comma values.
From 5.12.6: DOS will continue to use the above logic. No changes will be made

FFRuntime

Rule Engine:
The decimal format of the physical units is used in the ffruntime to format quantities (those formats can be configured at ffworkbench > Master Data > Physical Units).

To determine the physical unit, the external symbols of a physical unit are used. If the unit of the active Operation matches with an external symbol, the decimal precision of this physical unit will be used to cut-off the precision in case of higher precision Amount/Value/Quantity is provided in the Command/Event.

For the “thousand” separator, there is no configuration in the physical units. Whether the “thousand” separator should be displayed for quantities or not is still configured in the global decimal format.

ⓘ All quantity related events are stored in the DB with validated quantity precision but not in MachineQuantityEvent. MachineQuantityEvents are handled in the logic for the precision validation and that is why MachineQuantityEvent is stored in the DB with raw/provided precision.

FFERP

ERP Download Interfaces

External symbols:
The listed fields below will be interpreted as external symbols and validated accordingly:

- the external symbol has to exist
- the external symbol has to be unique
- the unit and the external symbol have to be active

Order:

- DisplayQuantityUnit - The External Symbol of the order Unit

Operation:

- DisplayQuantityUnit - The External Symbol of the operation Unit

Operation Component:

- BaseUnitOfMeasure - The External Symbol of the operation component Unit

Production Resource Tool:

- Unit - The External Symbol of the production resource tool Unit

Stock:

- QuantityUnit- The External Symbol of the stock quantity Unit

Warehouse Feedback:

- Unit- The External Symbol of the warehouse feedback Unit

Precision:
The following fields will be interpreted as quantities and validated in respect to the unit defined by the external symbol:

- The quantity is allowed to have at most the configured number of decimal places.

Order:

- TargetQuantity - The amount of the order target quantity in respect to the order Unit

Operation:

- TargetQuantity - The amount of the operation target quantity in respect to the operation Unit
- OverDeliveryQuantity - The OverDeliveryQuantity in respect to the operation Unit
- UnderDeliveryQuantity - The UnderDeliveryQuantity in respect to the operation Unit
- DefaultTransportQuantity - The DefaultTransportQuantity in respect to the operation Unit
- StandardPackSize - The StandardPackSize in respect to the operation Unit
- ERPYieldQuantity - The ERPYieldQuantity in respect to the operation Unit
- ERPScrapQuantity - The ERPScrapQuantity in respect to the operation Unit

- ERPPlannedScrapQuantity - The ERPPlannedScrapQuantity in respect to the operation Unit
- ERPReworkQuantity - The ERPReworkQuantity in respect to the operation Unit

Operation Component:

- RequirementQuantity - The amount of the operation component requirement quantity in respect to the Unit

Production Resource Tool:

- Quantity - The amount of the production resource tool quantity in respect to the Unit

Stock:

- Quantity- The amount of the production stock quantity in respect to the Unit

WarehouseFeedback

- Amount- The amount of the warehouse feedback in respect to the Unit
- Detailed Order Scheduling (DOS/FLS)

Office-Client

Reporting:
Instead of using the global decimal format, the decimal format of the physical units is used in the ffnewoffice to format quantities (those formats can be configured at ffworkbench > Master Data > Physical Units). To determine the physical unit, the external symbols of a physical unit are used. If the value of the unit column in a report matches with an external symbol, the decimal format of this physical unit will be used to display the quantity. For the **thousand** separator, there is no configuration for the physical units. If the “thousand” separator should be displayed for quantities or not is still configured in the global decimal format.

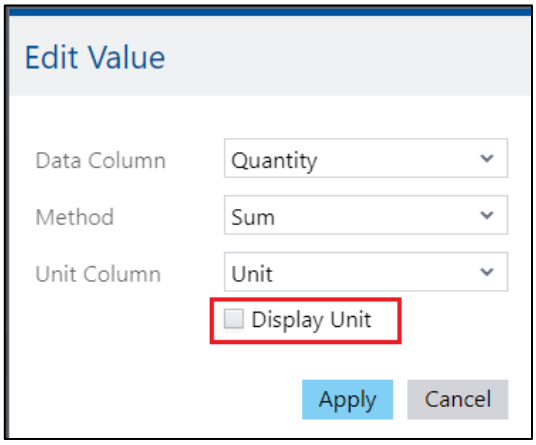
ⓘ The maximum precision of the numeric value will be used as a fallback, if the value of a unit column does not match to the external symbol of any physical unit. This is also the case when quantities of different units are aggregated.

Pivot tables

Quantity related pivot tables have an additional row field to group the data by the unit.

		90270
Quality Type	Unit	Quantity
Yield	cm	555.2313
Yield	kg	5.56
Scrap	cm	25.1133
Scrap	kg	5.31
Rework	cm	25.1133
Rework	kg	5.31

As the unit is displayed in that additional column, it is not required to append the unit to the numeric quantity value. To hide the unit the **display unit** checkbox can be unchecked for **Value Field** and **Row Total** columns:



ⓘ The **Unit** column cannot be simply unset, as the unit is still required to fetch the decimal format for the quantity.

List of changed reports:

- Quality Report (Workplace) [Table] (ID: 3d79c0c6-0976-4d98-a383-8dab7070684e)
- Quality Details (Workplace) [Table] (ID: d5423d04-f3d0-40df-86bf-9c3321fbeca0)
- Quality Development (Workplace) [Table] (ID: 258404e6-201d-480f-8c2d-f6e2e53e8b84)
- Quality Details (Development per Workplace) [Table] (ID: b9a5ebe5-61a9-47ee-a4f5-d032b3aab1f8)
- Quality Report (Material) [Table] (ID: 1e3aa058-4e69-47b2-b365-d34715b6d97d)
- Quality Details (Material) [Table] (ID: 3c3b38ea-3272-477f-b858-7b175426b112)
- Quality Development (Material) [Table] (ID: 43290486-9170-495e-ba46-de8eab514c59)
- Quality Details (Development per Material) [Table] (ID: 0a348bae-0449-41ff-8487-50ee8fd5a901)
- Quality Report (Operation) [Table] (ID: 41232752-ea81-4fb5-8fa0-001463a28584)
- Quality Details (Operation) [Table] (ID: bc924d83-9ffb-41ad-a457-06deda9d28e2)
- Quality Detail Class Report (Workplace) [Table] (ID: b65dad6c-3538-4316-ab14-17d27383f5c2)
- Quality Detail Class Report (Operation) [Table] (ID: 154155db-0593-4501-a6bc-d16dc83627a0)
- Quality Detail Class Report (Material) [Table] (ID: 76a77ef6-9a5f-4def-a81d-ee02c43da283)
- Quality Detail Class Development (Workplace) [Table] (ID: d352d2c6-010d-4684-8af7-1de912d71473)
- Quality Detail Class Development (Material) [Table] (ID: 89775df1-03b4-427b-8531-2cf38b37ce6b)

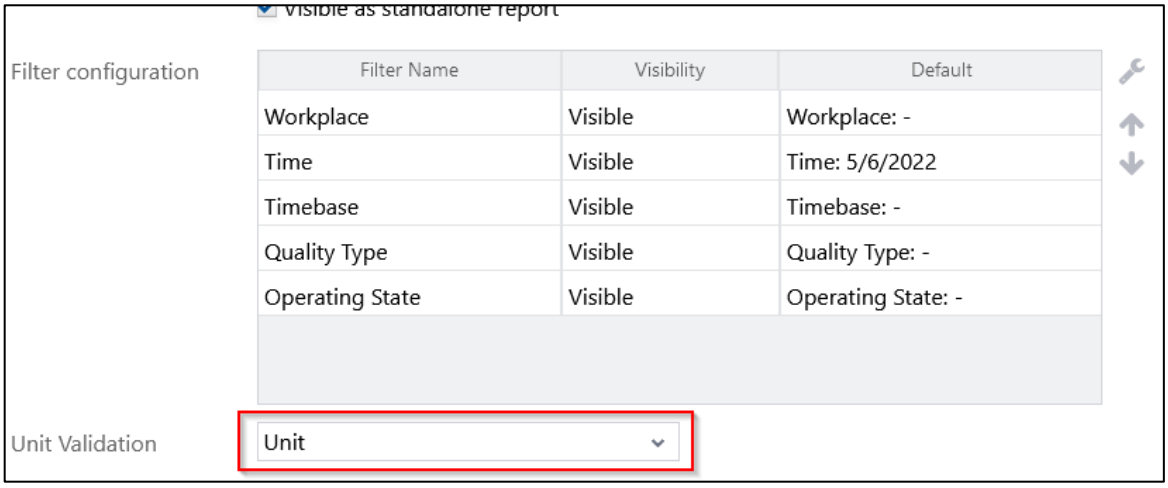
List of changed data sources:

- Quality Report (Workplace) (ID: 3074babb-b906-49d5-9c70-859435d6f09b)
- Quality Report (Material) (ID: 81aab62c-75c2-4e50-8232-21ac3f6350b9)
- Quality Report (Operation) (ID: 3e89b9d9-1a38-4604-9bd5-906428fabbfa)
- Quality Development (Workplace) (ID: b017ef72-522e-4b49-bbb0-69182aee59d2)
- Quality Development (Material) (ID: 02a05ec0-8a3f-4a35-a5dc-5383c833a701)
- Quality Detail Class Report (Workplace) (ID: 5f675fcf-6cc6-4c3a-a9aa-81c7e4a708a7)
- Quality Detail Class Report (Material) (ID: cc4390bc-40cd-46f9-912b-165fd41aba6e)
- Quality Detail Class Report (Operation) (ID: ddbc7683-05e5-4acc-8464-4ce156e67343)
- Quality Detail Class Development (Workplace) (ID: 735c407f-480b-45f9-a7db-5b6e64958b45)
- Quality Detail Class Development (Material) (ID: 528924ff-f8ae-4fb8-81bd-2874dceb2255)

Validation of Units

Now reports can have a unit validation column, to notify the use if a report with its filter configuration results in different physical units are being aggregated. This is achieved by selecting the column that contains the actual unit symbol. The validation will be performed once the report has been queried.

ⓘ It is important to know that we do not perform any validation on the units themself. So, unit symbols such as **pce**, **STK**, **Stk** and so on will be treated as different units, even though they might be the same. The unit symbols are case sensitive in the reporting.



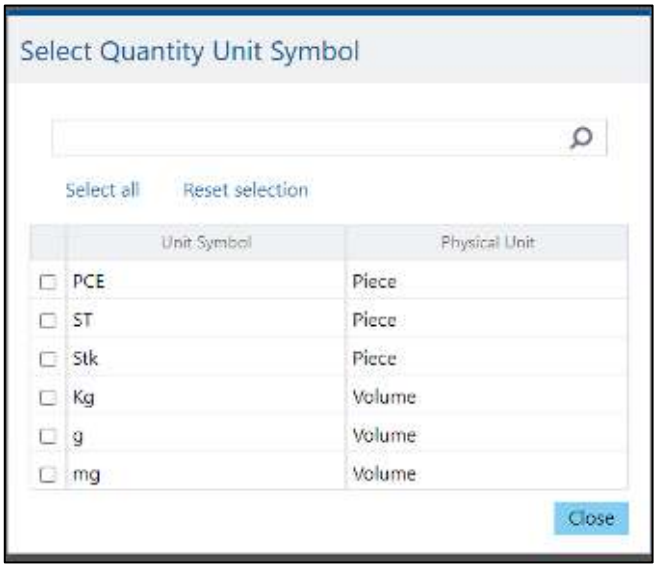
List of changed reports that will display a warning, if the filter combination result in different unit symbols being aggregated, which may not be comparable.

- Quality Report (Workplace) [Column Chart] (ID: 2d06cbbf-8b57-43ba-a668-28f2f1d4549b)
- Quality Details (Workplace) [Column Chart] (ID: 64bcbc99-2569-4460-aac2-817e80682ebc)
- Quality Development (Workplace) [Column Chart] (ID: 8cac1064-20c5-466f-a067-6df30b41bc15)
- Quality Details (Development per Workplace) [Column Chart] (ID: 56d72d53-9554-493f-b3a8-143d4e83dc9c)
- Quality Report (Material) [Bar Chart] (ID: 7c7f711f-d297-452d-91a7-5a8f29fb7e44)
- Quality Details (Material) [Column Chart] (ID: c92f6775-b625-4296-9654-873c47da807c)
- Quality Development (Material) [Column Chart] (ID: 60a9e08b-567a-43c8-a415-723df0939470)
- Quality Details (Development per Material) [Column Chart] (ID: 979c90fe-119a-4def-aa6b-ab8479741af3)
- Quality Report (Operation) [Column Chart] (ID: e7300667-e4ab-4d3c-b8bd-edabfc06bc3d)
- Quality Details (Operation) [Column Chart] (ID: 9197052e-840a-4570-a6c1-d855a2c725d5)
- Quality Detail Class Report (Workplace) [Column Chart] (ID: c27e3169-5b34-4f17-847b-e246db8173e1)

- Quality Detail Class Report (Operation) [Column Chart] (ID: 01b976f4-4918-45fe-8e65-738a9785bd95)
- Quality Detail Class Report (Material) [Column Chart] (ID: e04ff28b-d9a3-4f08-a67c-7a5b14083d3f)
- Quality Detail Class Development (Workplace) [Column Chart] (ID: be2486a7-869c-4f68-a33d-ad72e4e3848a)
- Quality Detail Class Development (Material) [Column Chart] (ID: 5c206edc-5922-4a82-ac5e-9e7c87f19514)
- Hitlist Quality Details / Scrap Reasons (Workplace) [Bar Chart] (ID: 3c8e91f7-cdf0-44b0-a5e6-15d9588bde18)
- Hitlist Quality Details / Scrap Reasons (Material) [Bar Chart] (ID: 8bbce7db-fbd0-4b75-b716-238f298d1d43)
- Hitlist Quality Details / Scrap Reasons (Operation) [Bar Chart] (ID: 26ba7880-435b-4a8c-94b0-1ad816ab2470)
- Shift Totals of Quantities (ID: 78879766-d02d-4621-ab81-4878d9d0f7bb)
- Quantity Status Diagram (Workplace) (ID: c00bbaf5-0f00-46cb-bfd2-03dd79ff08ea)
- Quantity Status Diagram (Workplace) (Online) (ID: 47eeafdd-c45f-4986-99c5-251ef60d8ec6)
- Quantity Status Diagram (Operation) (ID: a68110f0-d674-420e-8653-fa0a94fe974e)
- Quantity Status Diagram (Operation) (Online) (ID: de2db468-650a-4484-b468-f13e09529a6c)
- Personnel Development Quantities (Online) (ID: 0ed96350-4baa-4759-9ba7-35e199f1425d)

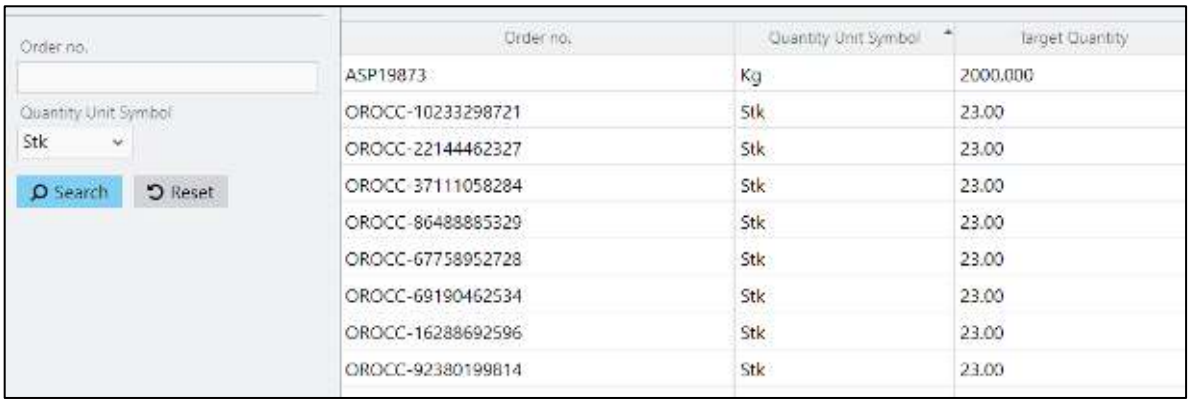
Dispatch and schedule

Quantity unit filter popup dialog:
The Quantity unit field in the filter section is modified from a simple text field to a filter popup dialog. The filter is either single or multiple select. This filter displays the external symbol unit value (which are configured at ffworkbench → Master Data→ Physical Units). This filter is used in the Order and Operation search section and display the results accordingly. The Quantity unit column is replaced with the “Quantity Unit Symbol” field. The column displays the external unit symbol instead of the Physical unit.



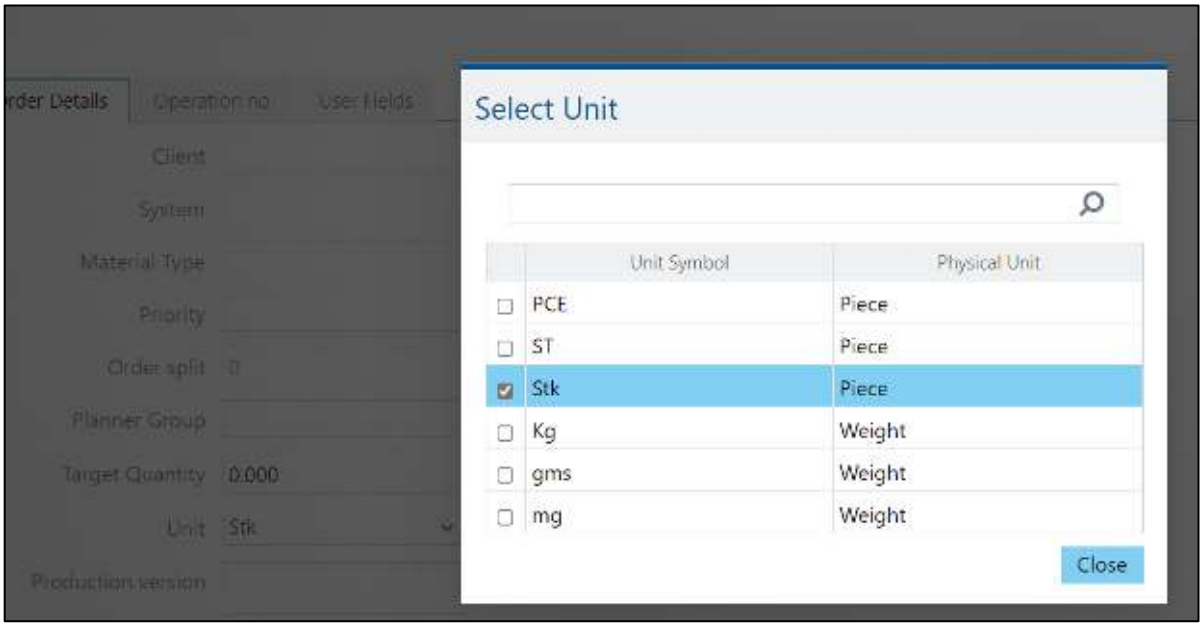
Order Management

In the search result of Order and Operation tables, the quantities related columns are formatted with the decimal precision defined for Quantity unit symbol. The global decimal format is not considered here. However, the thousand separator is still considered from the global configuration page.



Create, Copy and Edit

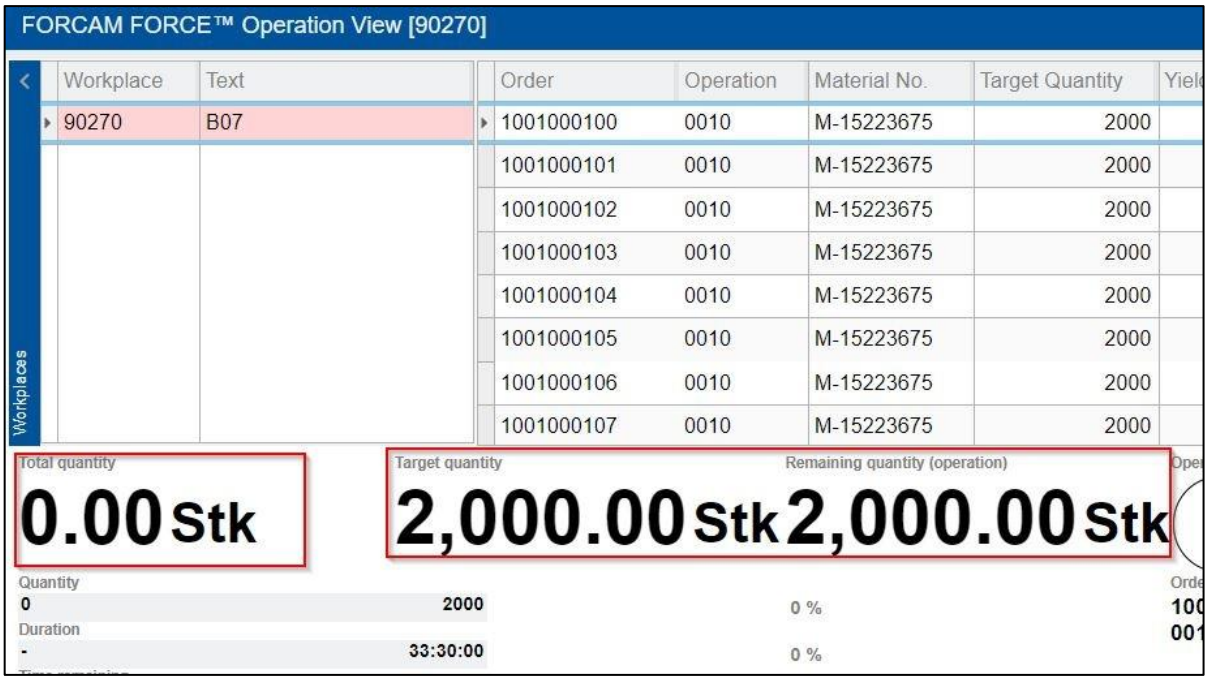
The Quantity unit symbol popup is used instead of plain text in the create, edit and copy pages of the order management. The pages included the order, operation, component and production tools. Depending on the selection of the unit, the quantity fields are updated with the corresponding decimal precision that is done in Workbench > Master Data > Physical Unit.

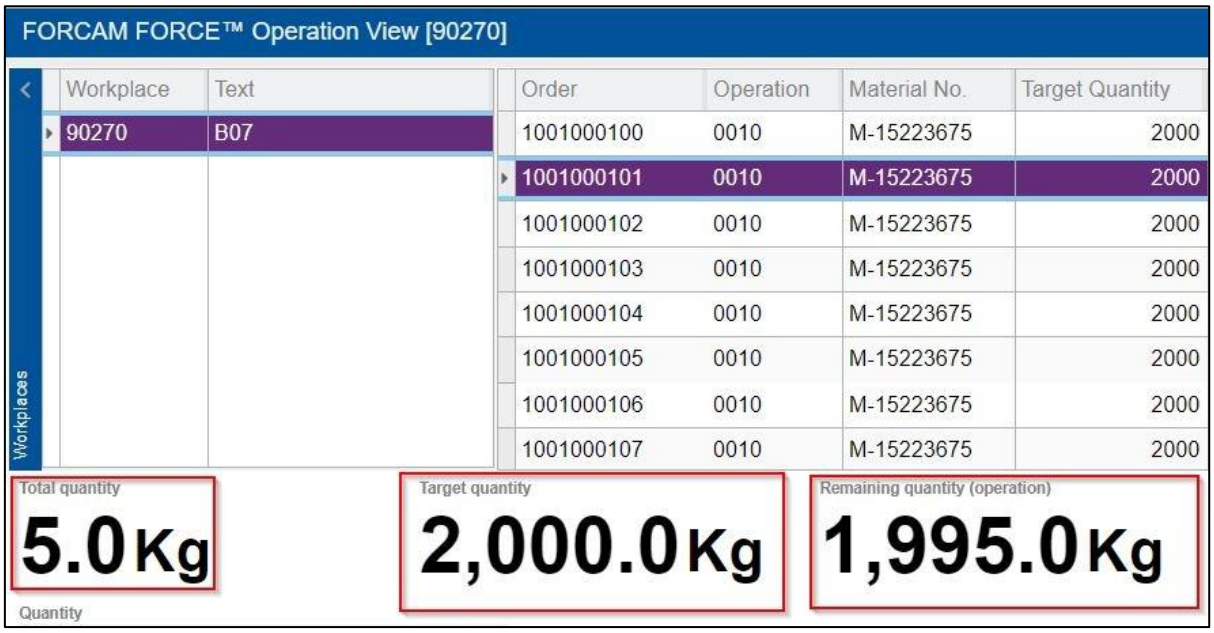


The display grid will display the unit symbol value. The Quantity unit column is being deprecated for all the grids of order management. It is being replaced with the unit symbol field as **Unit**. The thousand separator will be configured as previously done in Workbench → Configuration → Decimal Format page.

FFWorker

Operation Details:
Operation detail view is now showing quantity unit together with quantity value. The number of decimal places for the quantities are showing according to the configuration of quantity unit decimal place which is configured inside workbench > Master Data > Physical Units.





Virtual Production Environment (VPE)

Starting situation: VPE cannot handle decimal values and no other units than piece.

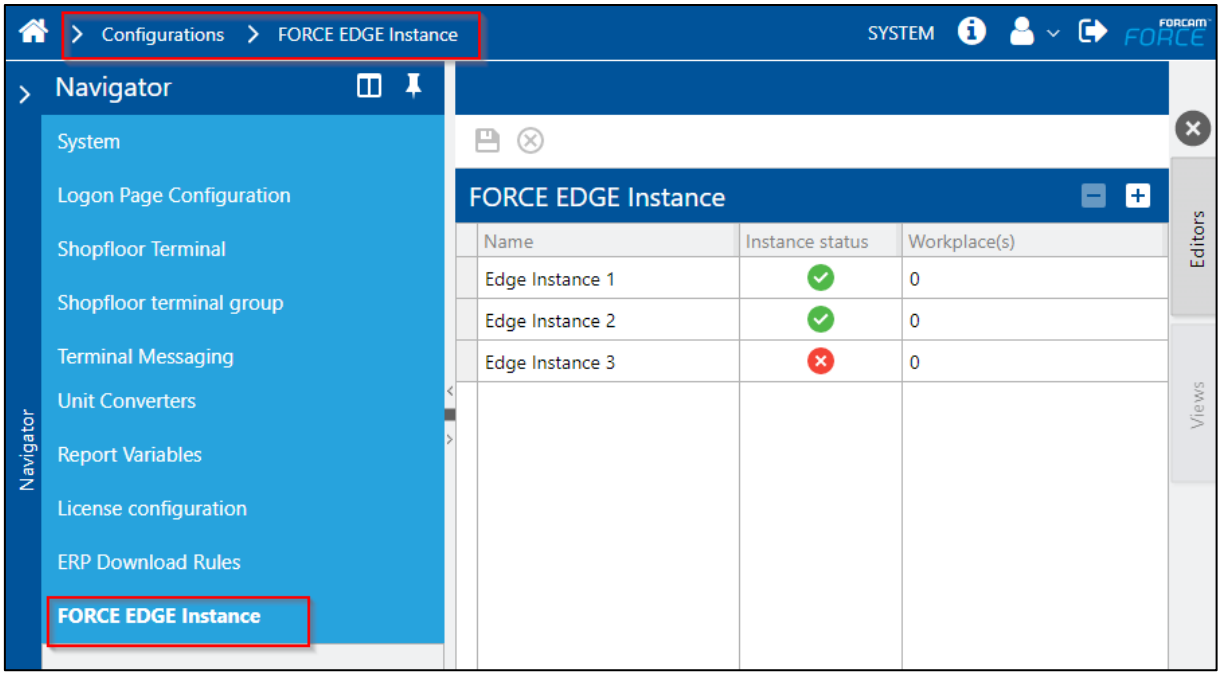
From 5.12.6: It is ensured that VPE can work also when importing decimal values. Nevertheless, VPE won't be able to process any decimal values or units.

3 SFT Configuration

3.1 Full Connectivity between EDGE and IIoT

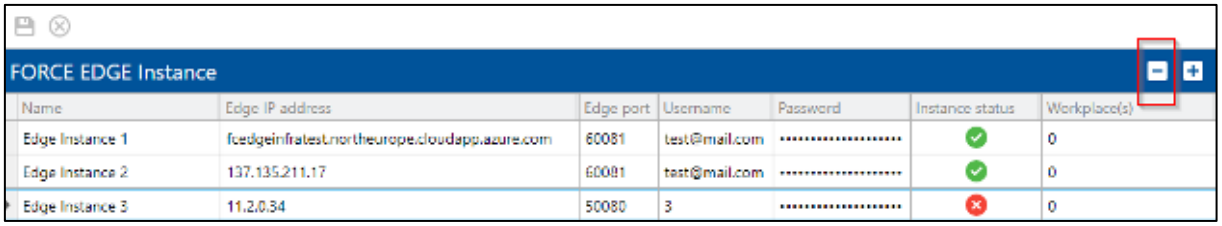
Affected module	Affected area	Status
Workbench	Shopfloor Terminal	New

New configuration has been added to configure FORCAM FORCE EDGE instances. They can be found under Configurations > FORCE EDGE Instance.

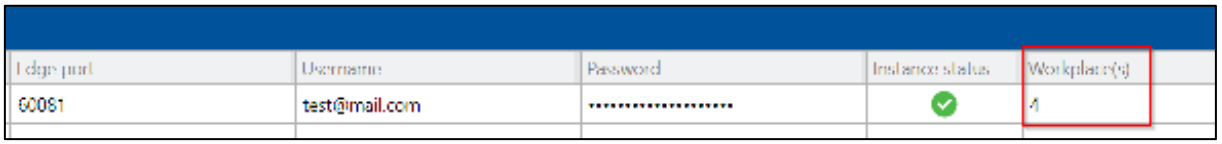


The user can add new EDGE instance by pressing the **+** button. After adding/editing/deleting the new EDGE instance the user must press the Save Button in order to save all changes.

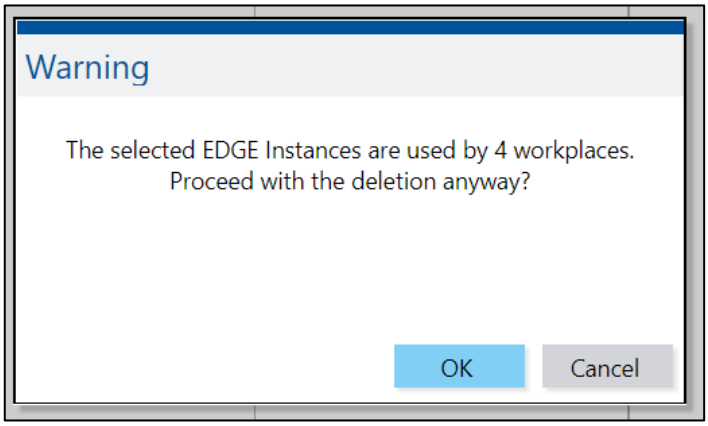
User can delete the new EDGE instance by pressing **-** button.



The EDGE Instance Editor also shows in how much workplaces this instance is referenced.

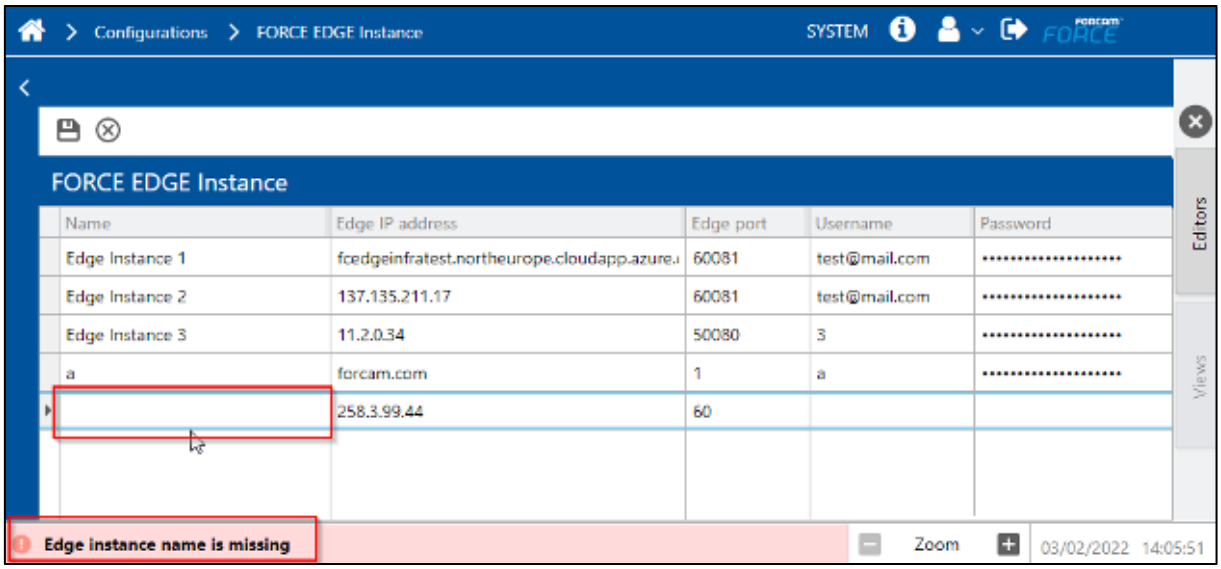


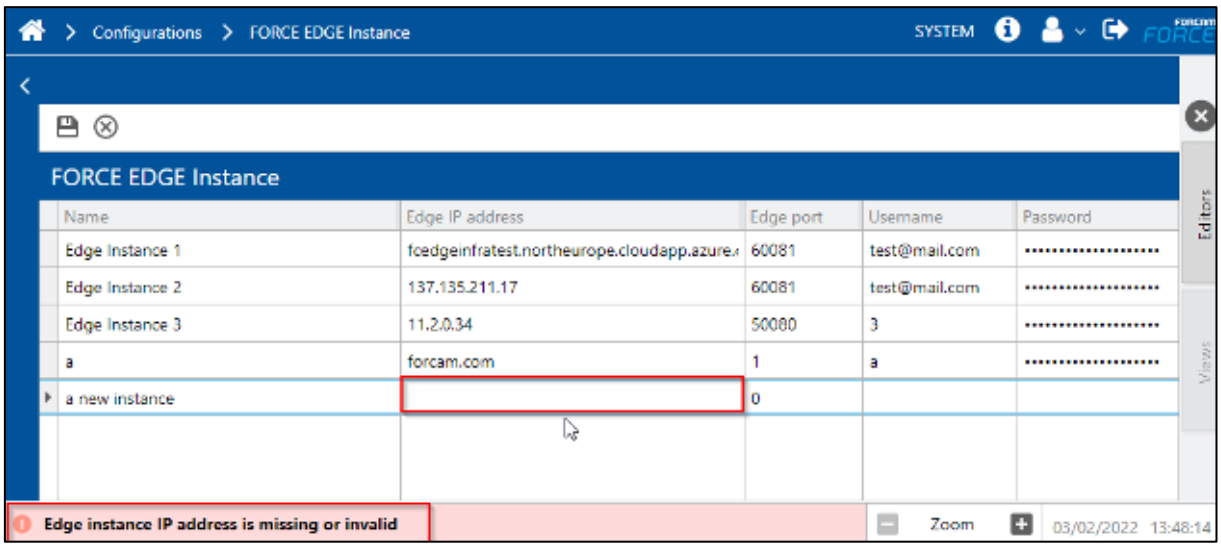
If an EDGE instance is marked as deleted that is referenced by some workplaces, a warning is displayed. The deletion can now be proceeded or canceled.



Editing can be done directly by selecting the row and change according to the desire of the user. If the EDGE instance is available, then the **Open EDGE Instance** context menu action is on hand and the user can open the EDGE instance in different tabs by clicking **Open EDGE Instance** context menu action.

There are some corresponding validations that may include i.e. if the IP address or the port number are missing/invalid or if the EDGE instance name is missing. Some of them are shown below:

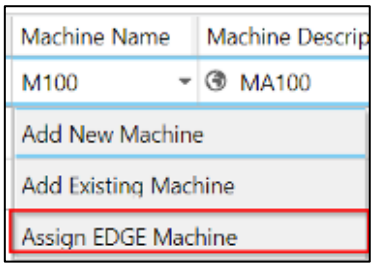




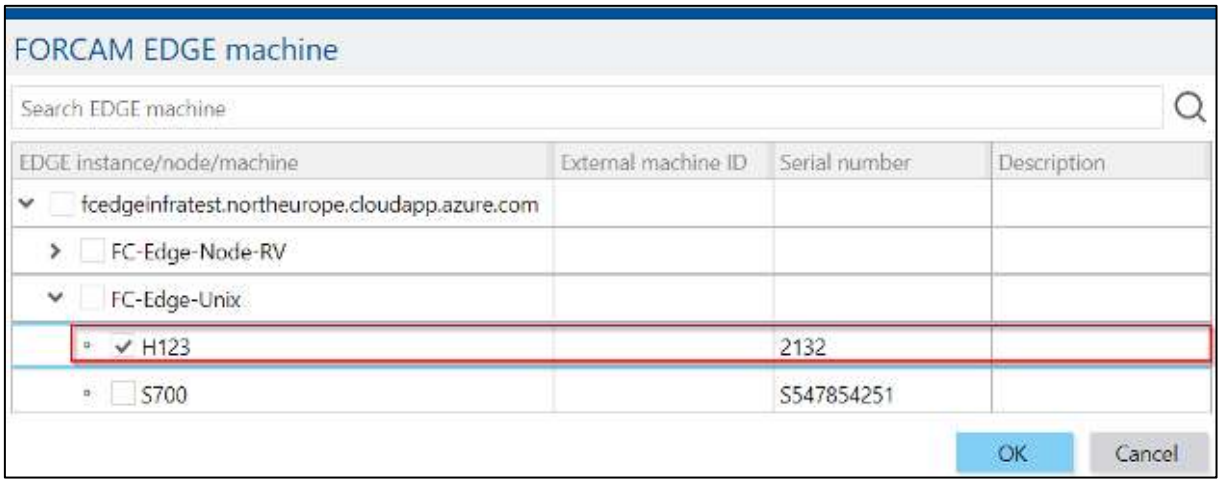
Only the instances with an established connection can be saved. If the status changes later, i.e., EDGE instance maintenance, the user can see this swap in the **Instance Status** column.

Workplace Configuration

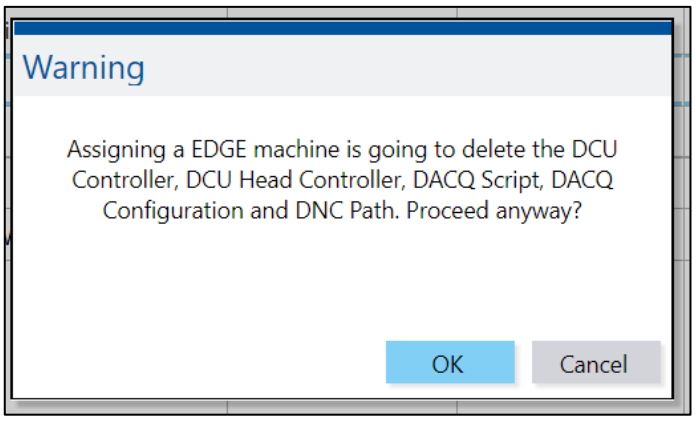
A new option to assign EDGE Machines has been added in Master Data > Workplace Configuration. The column **Machine Name** has a new option called **Assign Edge Machine**.



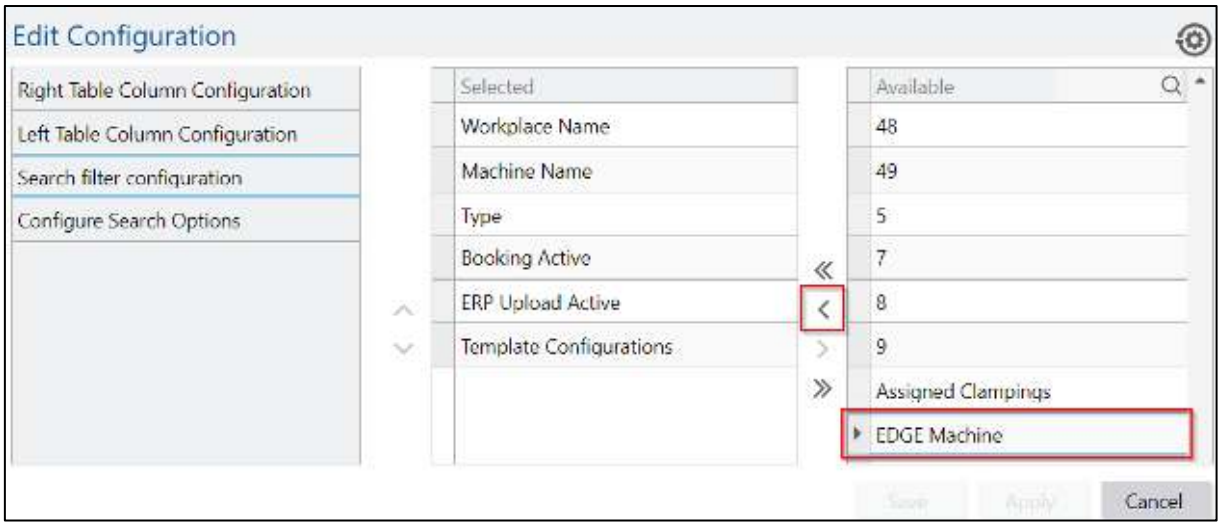
The dialog for selecting an EDGE Machine is a tree dialog where only a single select is possible.



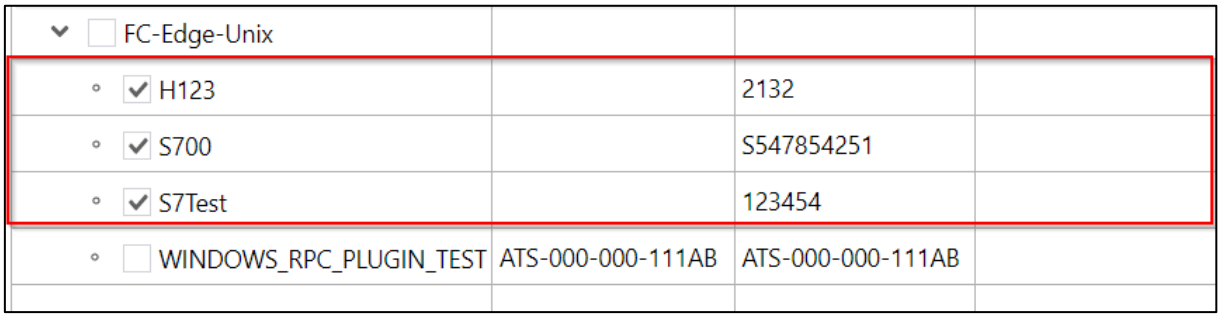
If an unknown EDGE Machine is selected, a name and a description are generated. The name is written in the structure **Edge Node - Machine Name** (i.e. FC-Edge-Unix - H123), the description is a standard description (**EDGE Machine**) that can be changed afterwards if needed. If an EDGE Machine is assigned, some configurations are deleted. If any of those configurations have values, a warning message is displayed to get a confirmation that some configurations will be removed from the workplace.



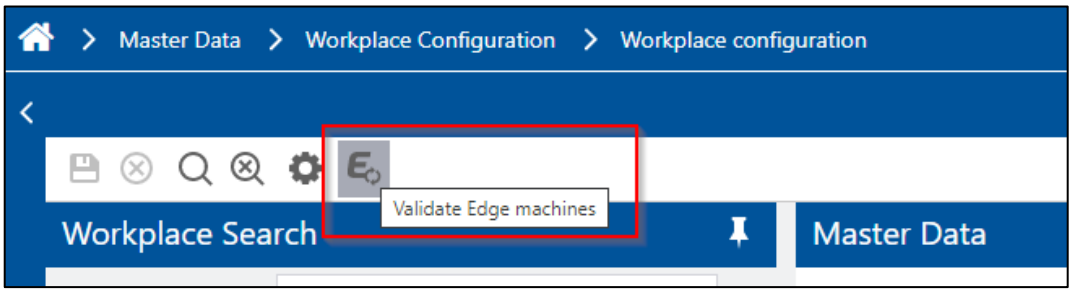
The similar **Assign EDGE Machine** option with the same behavior is available within the **Create Workplace**-UI while adding a new workplace.
The configuration for **DCU Controller**, **DCU Head Controller**, **DACQ Script**, **DACQ Configuration** and **DNC Path** are also disabled after the EDGE Machine has been assigned. Though, in the **Workplace Configuration** the context menu for this activity is not available. Also, in the **Create Workplace** UI the tabs with these configurations are not visible.
In order to filter the EDGE Machines, a new search filter option has been added. This filter option is not activated in the default configuration. It needs to be configured in the **Search Filter Configuration** for activation.



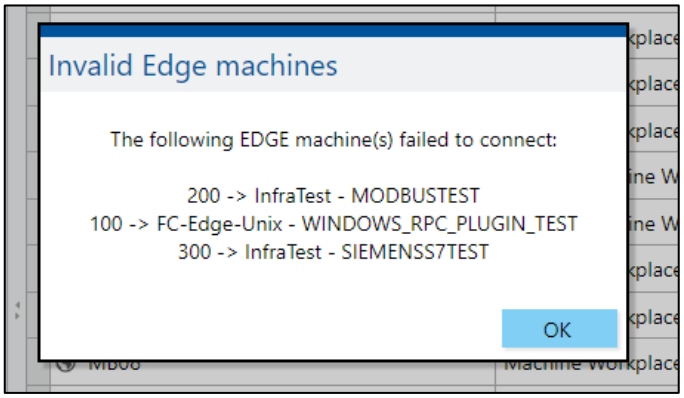
When opening the filter, the same tree dialog box is displayed as when assigning an EDGE Machine. To select the EDGE Machines/Nodes/Instances for filtering, a multi-selection is possible.



The validity of the assigned EDGE Machine to the workplace can be checked via button **Validate EDGE Machines**.



If all assigned machines are validated successfully, a user acknowledgement is displayed in the message bar. Otherwise, a popup containing the workplace name and the assigned EDGE Machine name (which are not validated successfully) is displayed.



4 Platform & Connectivity

4.1 New Activity Step for Domain Object Reference

Affected module	Affected area	Status
Workbench	Shopfloor Terminal	New

FFWorkbench

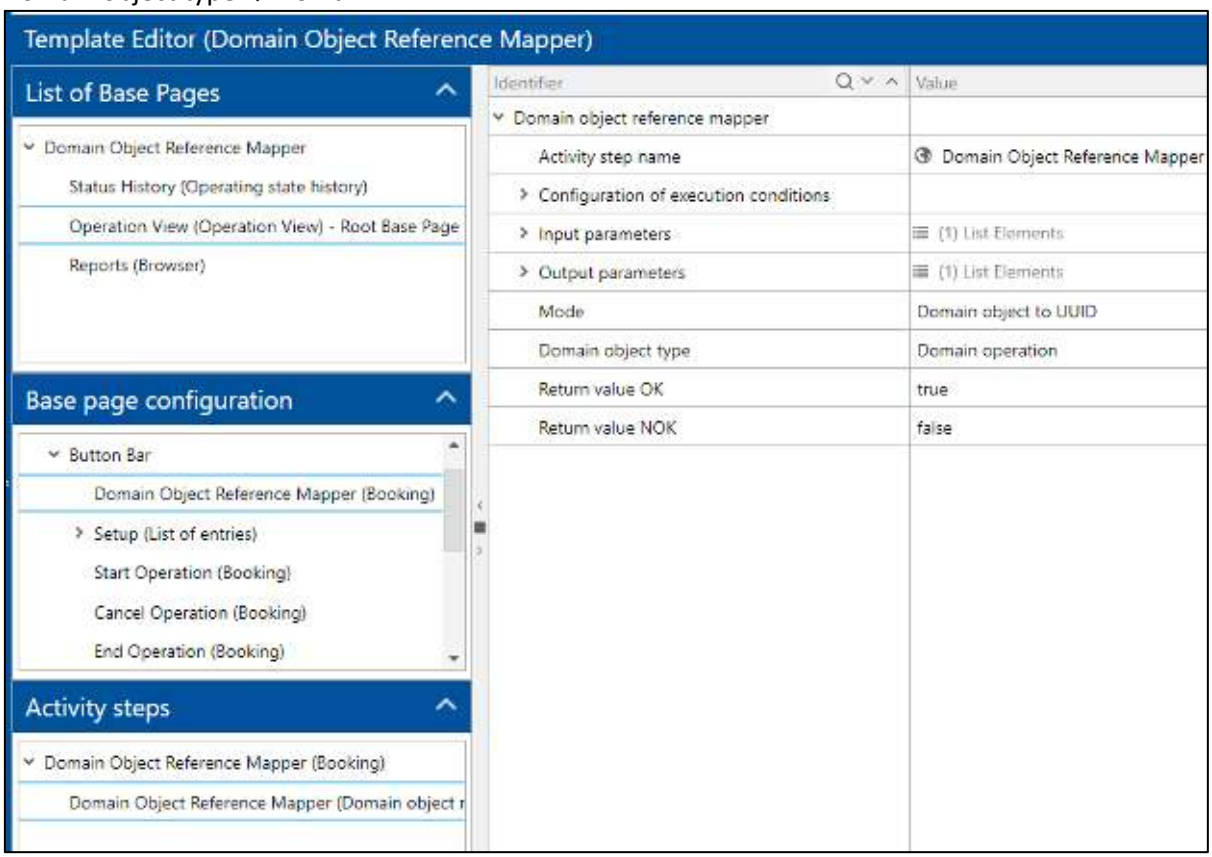
Shop Floor Terminal Configurator**:** Domain object reference mapper

New activity step **Domain object reference mapper** has been created which is responsible for:

- Fetching domain reference object from given UUID.
- Fetching UUID from given domain reference object.
- Fetching UUID from given hibernate id (as long or as string) of a domain reference object.

Step configuration:

Mode → The configuration to decide conversion direction, i.e. **Domain object to UUID** or **UUID to domain object**.
Domain object type → Domain



4.2 Automatic Logout in Swagger UI if Token expires

Affected module	Affected area	Status
FFWebServices	Swagger UI	Changed

Previously a new logout/login must be performed every day in FFWebServices. Now the issue is fixed. After a successful authentication in Swagger UI, an automatic logout will be performed when JSON Web Token Expires.

4.3 Addition of a Field **Duration** to recordedOperationPhases APIs

Affected module	Affected area	Status
BridgeAPI	Operation Phases	New

A new field **duration** has been added to GET operations/{operationId}/recordedOperationPhases and GET workplaces/{workplaceId}/recordedOperationPhases APIs which contains the duration of the phase in milliseconds.


```
{
  {
    "properties": {
      "startDate": "2022-02-17T07:47:12.120+00:00",
      "endDate": "2022-02-17T09:42:57.709+00:00",
      "setupPhaseDuration": 0,
      "processingPhaseDuration": 6945589,
      "executionTime": 6945589,
      "elements": [
        {
          "workplaceId": "3BCA6EA3C6F34716BA3C69337E7577B6",
          "operationId": "ECD51FFD969A49F8915CFF890477EE12",
          "operationPhaseId": "PROCESSING",
          "startDate": "2022-02-17T07:47:12.120+00:00",
          "endDate": "2022-02-17T09:42:57.709+00:00",
          "duration": 6945589
        }
      ]
    },
    "pagination": {
      "offset": null,
```

```
{
  "properties": {
    "startDate": "2022-03-06T00:00:00.000+00:00",
    "endDate": null,
    "setupPhaseDuration": 0,
    "processingPhaseDuration": 0,
    "occupancyTime": 0,
    "elements": [
      {
        "workplaceId": "82E3551BE65C4BFDA0C19AF7252EFB26",
        "operationId": "948A28BAC33541F7860F62BFB4BADAD3",
        "operationPhaseId": "RELEASED",
        "startDate": "2022-03-06T00:00:00.000+00:00",
        "endDate": null,
        "duration": 291962903
      }
    ]
  },
  "pagination": {
    "offset": null,
```

4.4 Advance ERP Integration using the FORCAM FORCE BridgeAPI

Affected module	Affected area	Status
BridgeAPI/Connectivity	ERP integration/BridgeAPI	New

BridgeAPI

New APIs have been introduced to create/update/delete staff members.

```
POST /staffMembers

PUT /staffMembers/{staffMemberId}

DELETE /staffMembers/{staffMemberId}

PUT /staffMembers/{staffMemberId}/customFields/{customFieldId}
```

Connectivity

New APIs have been introduced to create/update/delete shifts.

```
POST /workplaces/shifts

PUT /workplaces/shifts/{shiftId}

DELETE /workplaces/shifts/{shiftId}
```

New APIs have been introduced to create/update/delete operation production resource tools.

```
POST /operations/{operationId}/productionResourcesAndTools

PUT /operations/{operationId}/productionResourcesAndTools/{productionResourcesAndToolsId}

DELETE /operations/{operationId}/productionResourcesAndTools/{productionResourcesAndToolsId}
```

Further information is available at the Command API swagger documentation online.

5 Productivity

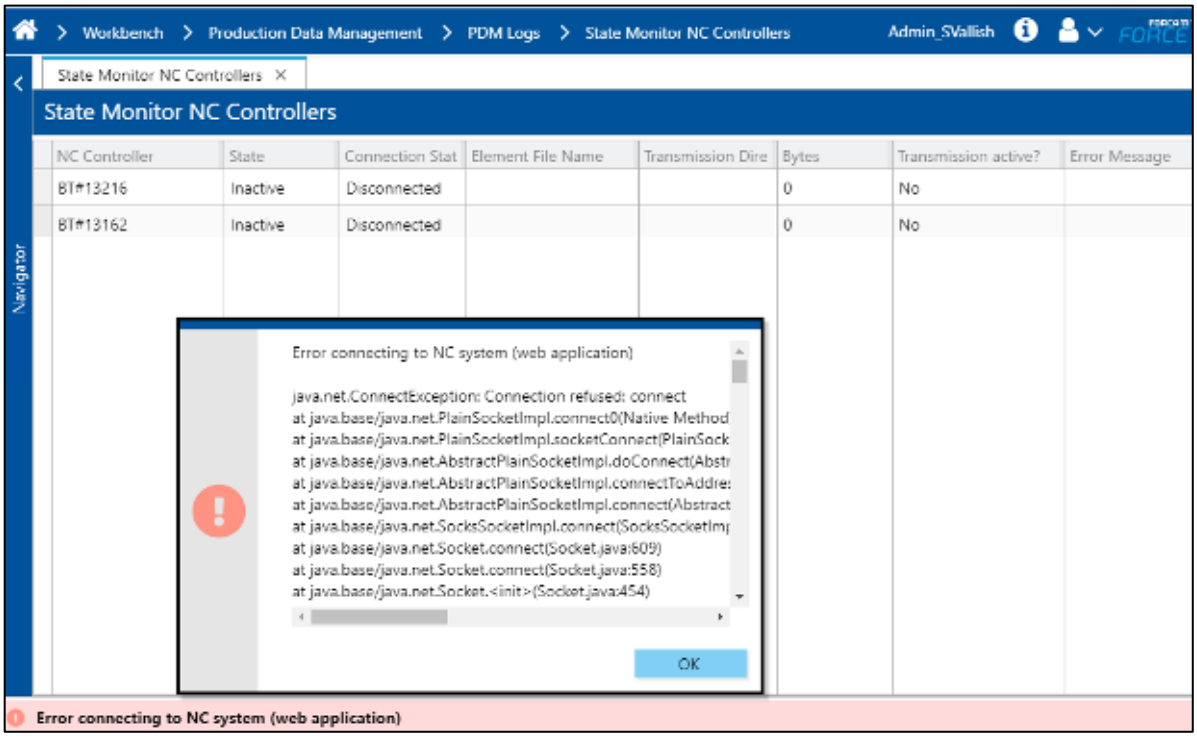
5.1 Generation of Proper Error Message when Multiple FFDNC Instances Defined

Affected module	Affected area	Status
PDM	State Monitor NC Controllers	Change

FFWorkbench

Path: Production Data Management > PDM logs > State Monitor NC Controllers

Previously when more than one FFDNC instances (on 2 different Servers – multi-site) were defined under PDM configuration; when DNC machines were configured for them and when the page “State Monitor NC- Controller” was opened; the system showed the exception instead of showing a proper error message if there was an issue regarding instances.



Now this issue is fixed with some changes. A proper error message along with list of the DNC instances which are not reachable/connected is shown instead of an exception. A DNC-Instance column at the end of this list-table is added to have a better view of the machine and DNC instance link.

6 Appendix

Abbreviation/Term	Meaning
API	Application Programming Interface
DACQ	Data Acquisition
DCU	Data Colltection Unit
DNC	Distributed Numerical Control
DOS	Detailed Order Scheduling
ERP	Entreprise Resource Planning
FFAuth	FORCAM FORCE IIOT Authentication (single sign-on solution from FORCAM FORCE IIOT)
JSON	JavaScript Object Notation
NC	Numerical Control
PDM	Product Data Management
SFT	Shopfloor Terminal (terminal at the shopfloor for data colleciton, operating and interaction with ERP systems)
UI	User Interface
UUID	Universally Unique Identifier
XML	Extensible Markup Language