Infor Forcam MES Document Control

Version 5.11

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Contents

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Intended audience

Organization

This table shows the chapters of the guide:

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Related documents

You can find the documents in the product documentation section of the Infor Support Portal, as described in "Contacting Infor" on page 7.

Contacting Infor

If you have questions about Infor products, go to Infor Concierge at https://concierge.infor.com/ and create a support incident.

The latest documentation is available from docs.infor.com or from the Infor Support Portal. To access documentation on the Infor Support Portal, select **Search > Browse Documentation**. We recommend that you check this portal periodically for updated documentation.

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Chapter 1 General

Overview

The **Production Data Management** module is a tool designed for managing documents of all kinds. The production database provides the basis for the PDM module. The objective is to achieve concise management of individual production resources/tools and to facilitate finding them.

Documents are stored in packets (folders) containing freely configurable key fields which typically are **Workplace**, **Material number** and possibly **Operation**. Some examples of documents are:

- NC programs
- Job-related instructions
- Inspection instructions
- Packaging data sheets
- Setup procedures
- Drawings
- Graphics
- Safety instructions

Overview of functions

- Comprehensive search functions
- Configurable viewers for individual resources
- Release and block functions
- Automatic versioning
- Graphic comparison of different versions
- All advantages of an SQL database (data queries, reporting, data backup)
- Cross-reference with documentation of program history
- Systematic administration
- Management of resources of any format
- Configurable access control

The comprehensive search functions enable the user to find documents quickly and reliably.

Communication between NC programming and workshop can be substantially improved by using comments for each individual element, by graphic depictions and the possibility of showing differences in the NC programs optimized and sent back from the workshop.

With the documentation archiving functions and the tracing option, this module supports the traceability requirement of the ISO 9000 quality management standard.

The **Show Element File** function allows viewing NC programs as well as views of various graphics.

The **Import Elements** function can be used to read files of any type (images, drawings, texts, spreadsheets).

Data Flow

The data flow is illustrated in Fig. 1 below.

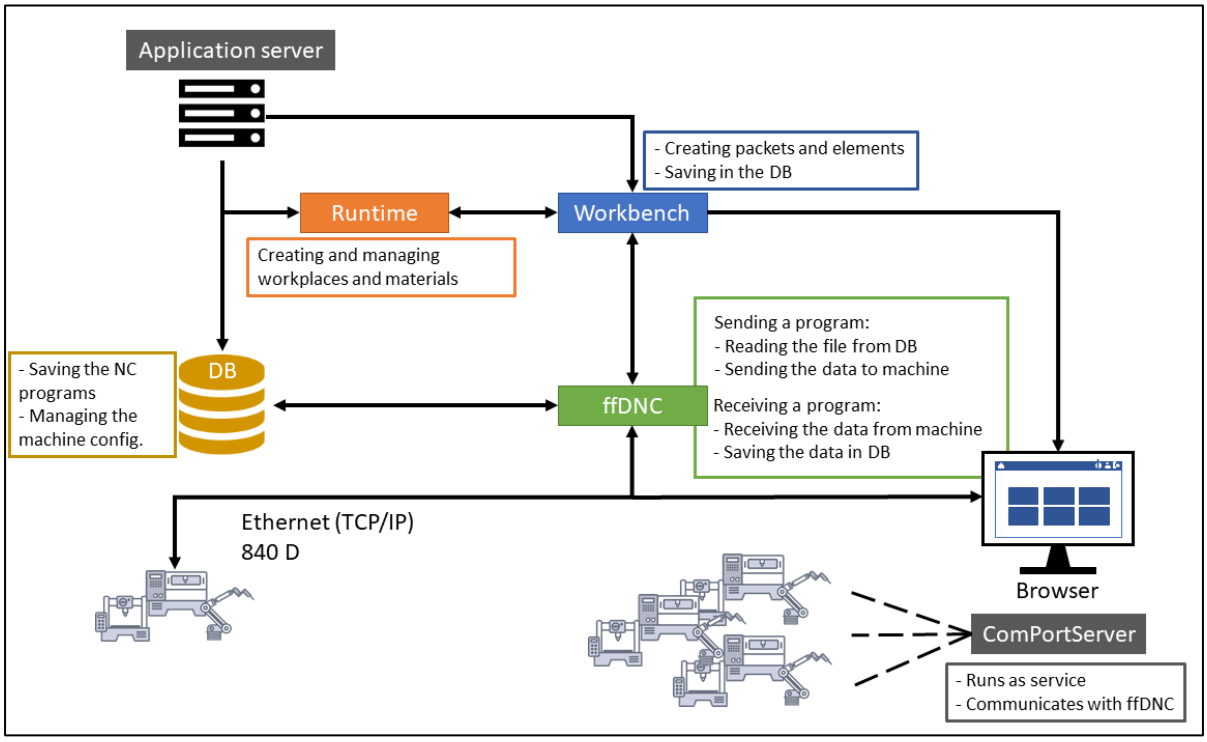


Fig. 1: Overview of the application and data flows

Table 1 below describes individual items from Fig. 1.

Table 1: Individual data flow items

Module	Description
Workbench	Browser-based configuration of the overall system. Direct access to all relevant functions: – Finding elements and packets – Managing elements and packets (create, delete, etc.) – Creating workplaces and materials – Viewing transmission logs – Displaying the machine status – Monitoring the ffDNC application
Runtime	Processing the commands for master data management (persistence and cache management). This would not be required for plain PDM functions. However, it is still necessary to use it for maintaining consistency with the other modules.
ffDNC	Allows reading a file from the database and sending data to a machine. Can also receive files directly from a machine and store them in the database.

PDM Definitions

Term	Literal	Description
Source of NC elements	EXT	Element was imported after external creation (old ID = PDM) Import by WIT-Import
	PDM	Element was created in PDM (old ID = NEW) Locally created file was imported
	OPT	Based on an PDM element, the element in the machine control was revised
	WEP	The element was created in the machine control. There is no PDM version in the management

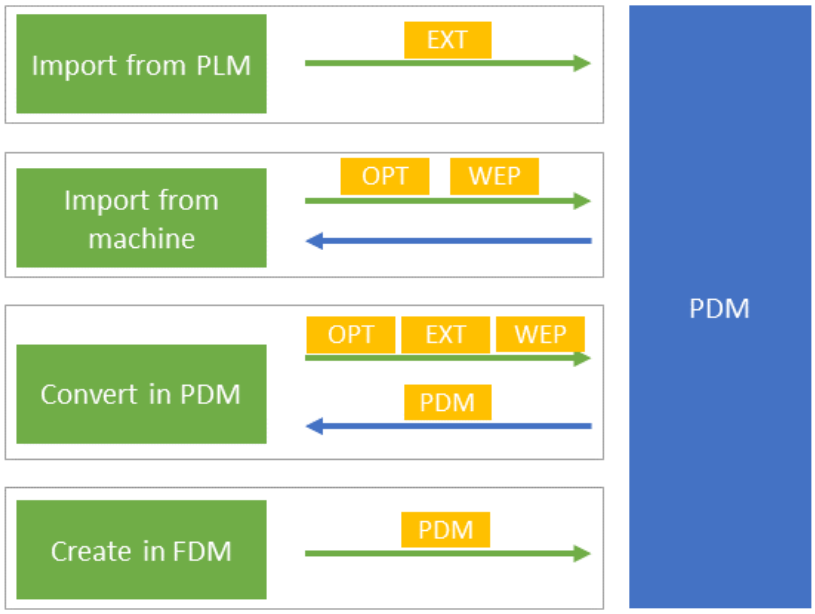


Fig. 2: PDM types and their characteristics

Table 2 below explains the concepts of Fig. 2.

Table 2: Description of PDM definition terms

Term	Description
Source	Defines the source of the NC element: – PLM: Elements was imported after having been created externally (ID = PDM). – PDM: Element was created in the PDM (ID = NEW) and imported into PDM by the user (ID = NEW). – OPT: The element was based on a PDM element and optimized in the machine controller. – WEP: The element was created in the machine controller. A PDM element does not exist in the Production Data Management module.
Type	Defines the function type of the element. The type safeguards that only NC program files are transferred (if configured). Example: **NCP** type for NC program. However, several file name extensions may exist on each NC controller, e.g. .ncw, .mpf, .spf, .h, etc.
File Extension	The extension of the file stored in the element. In the Workbench client, this is interpreted as the MIME type. When activating **Show Element**, the browser instructs the associated program accordingly (**Open File With...**). In the worker client, the file extension and the type together are used as the selection criteria for the viewer.
Status	Status of the element

NC Types

Path: Production Data Management > NC Types

NC types are file groupings that can be freely created. It is possible to define and describe file extensions for an NC type. For example, file extensions may be configured to be used for main programs. If these extensions occur later, they will be recognized and associated with the main programs accordingly. Existing file types can be assigned file extensions. Hence, an NC type is equivalent to a collective file extension object.

Defined NC types play an important role in the NC configuration when defining elements that can be transferred to a machine. A file grouping can be declared as a recipe and is relevant for recipe management that is integrated in the PDM. Elements declared as recipes cannot be transferred to the controller as NC elements.

Search Results

NC type	File Extensions	Description	Recipe	Editor	Create Date	Last Change
TXT	TXT	Text	☐	JGANDHI	Oct 2, 2018 2:25 PM	
NCP	NC		☐	JGANDHI	Oct 2, 2018 2:27 PM	
PDF	PDF	PDF	☐	JGANDHI	Oct 2, 2018 2:27 PM	
ALL	png;jpg;jpeg;txt;pdf	ALL FILES	☐	SYSTEM	Nov 14, 2018 2:59 PM	May 16, 2019 12:32 PM
RCP	XML	Recipe File	☑	SYSTEM	Mar 21, 2019 8:01 AM	May 16, 2019 12:32 PM

Fig. 3: NC types

To create an NC type:

1 Right-click on a free space in the **Search Results** area and then click on **Create NC Type** in the context menu.

➔ A new entry is created in the **Search Results** area with information about the editor and current time stamp. These fields can be edited directly.

2 Enter the name of the NC type in **NC Type**.

3 Enter the relevant **File Extensions**.

Define the entries by commas. Use capitals for NC types.

4 Enter a Description.

5 Save.

Packet Status

The packet status reflects the current status of a packet. Table 3 describes the various status options.

Table 3: Packet status descriptions

Text	Description
Released	The content of the packet has been released by the person in charge. When a packet is released, it is available for use in production.
Locked	A locked packet contains data not yet verified. Locked packets can also be transferred. However, it is recommended to refrain from using a locked packet for production.
Inactive	The package is no longer used and only serves to trace the data.

Element Status

The element status reflects the current status of an element. Table 4 describes the various status options. The statuses can be extended by further, individually definable statuses at any time.

Table 4: Element status descriptions

Text	Description
Released	The content of the element has been released by the person in charge. When an element is released, it is available for use in production.
Locked	A locked element contains data not yet verified. Locked elements can also be transferred. However, it is recommended to refrain from using a locked element for production.
In Progress	When an element is checked out for editing, it is assigned **In Progress** status. ⓘ To avoid version conflicts, an element checked out should only be edited by the user who checked it out.
New	A new file imported into the system is automatically assigned **New** status. However, the status can be defined in the FDM configuration.

Chapter 2 Production Data Management

A packet consists of a header with a fixed number of parameters and any number of elements. The header is not fixed but can be individualized via the package header configuration.

Packets

Packet Standard Header

The PDM module is supplied with a standard configuration which meets common customer requirements. Key fields are provided which can be used for linking workplaces/operations and packets.

The following key fields are used:

- Workplace (or Workplace Group)
- Material
- Operation

ⓘ Standard packet headers can be customized according to client requirements (see section 2.1.3).

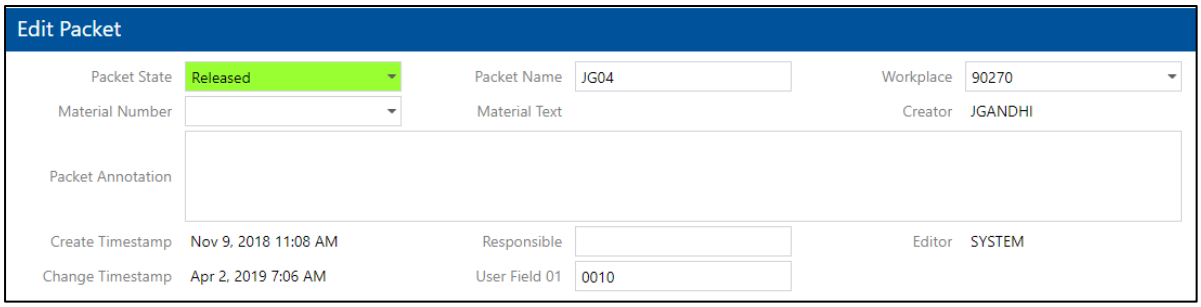


Fig. 4: Standard packet header

Table 5: Table attributes

ⓘ There is no explicit column for operations. PACKET_KEY3 is default but can be freely configured.

Table attribute	German	English
STATUS	Paketstatus	Packet state
WORKPLACE_ID	Arbeitsplatz	Workplace
MATERIAL_ID	Materialnummer	Material number
PACKET_KEY3	AVO	Operation
ORIGINATOR	Ersteller	Created by
CREATE_TS	Erstellt	Created
EDITOR	Letzter Bearbeiter	Last changed by
CHANGE_TS	Letzte Bearbeitung	Last change

Create Packet

Path: Production Data Management > Create Packet

A blank packet consists of the input dialog for the header parameters and a blank list of elements. If any parameters were configured as mandatory fields, they appear with a red background. The following instructions relate to the previously defined standard packet header (see Fig. 5).

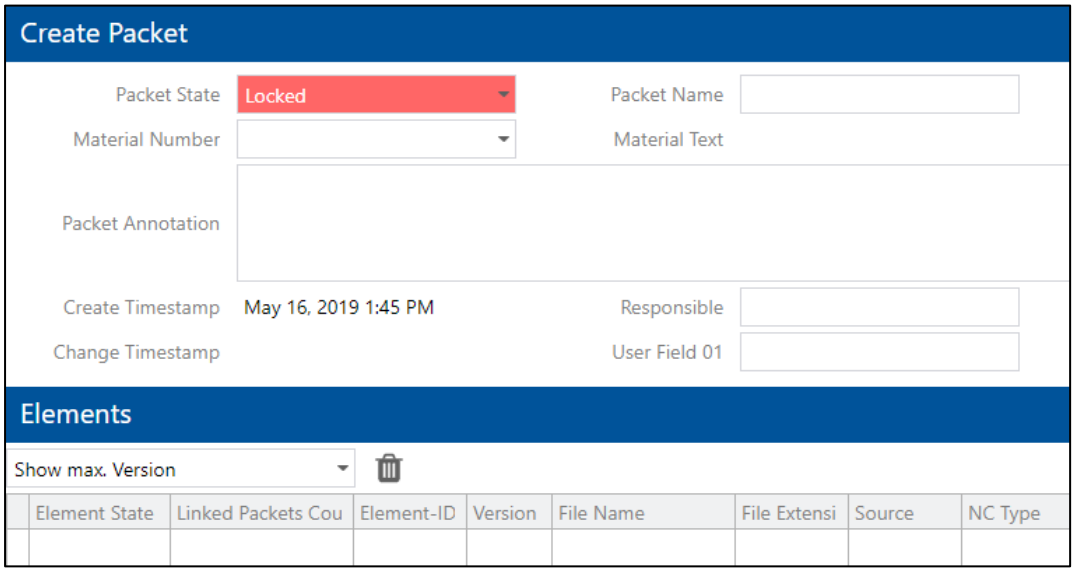


Fig. 5: Creating a new packet

To create a new packet:

1 Select **Workplace**.

2 Select **Material number**.

Find the material in the **Material Search** by entering parameters and confirming.

3 Enter an operation, if appropriate.

4 Enter a packet annotation, if appropriate.

5 Save.

ⓘ For instructions on how to create elements, refer to section 2.3.1. The packet must be saved before an element can be created.

Configure Packet

Configuring Packet Header Properties

Path: Production Data Management > Create Packet

The appearance and behavior of the packet header parameters can be configured in the **Packet Editor Restrictions** area. Some of the restrictions are, for example, maximum field length, valid characters, or setting a parameter as a mandatory field.

ⓘ To configure the length or width of an input field, refer to section 2.1.3.3.

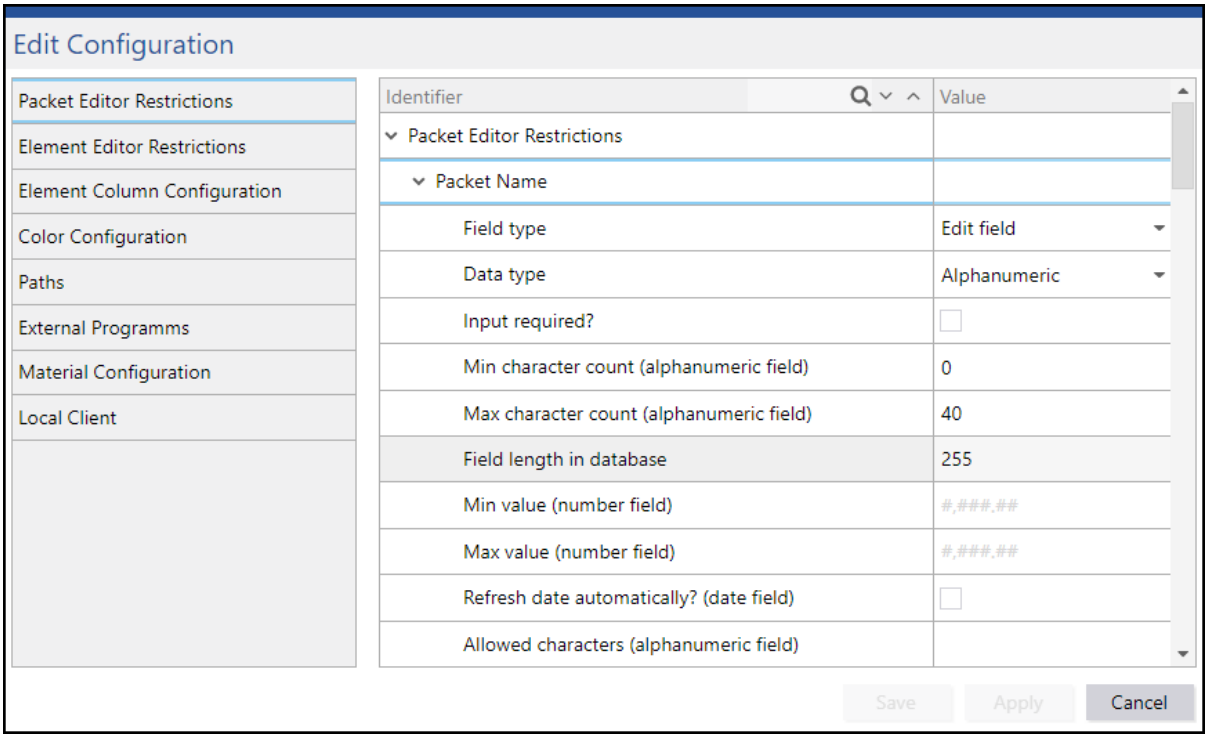


Fig. 6: Packet editor restrictions

To configure packet header parameters:

1 Click the Change Configuration icon.

2 Click Packet Editor Restrictions.

3 Open the relevant parameter.

4 Set the Field type.

Edit fields allow manual input into the field. Display fields cannot be edited manually.

5 Set the **Data type**.

6 Set as **mandatory field**, if appropriate.

7 Enter the minimum number of characters (for alphanumeric fields).

8 Enter the maximum number of characters (for alphanumeric fields).

9 Enter the minimum value (for numeric fields).

10 Enter the maximum value (for numeric fields).

11 Set automatic date refresh (for date fields only).

If a check mark is set, the current time stamp is automatically entered into the date field.

12 Define valid characters (for alphanumeric fields only).

Only the characters entered here are valid input for the corresponding field. Enter characters one after the other not separated by commas. Case sensitive.

13 Save.

To change the color of a packet status:

1 Click the Change Configuration icon.

2 Click Color Configuration.

3 Open the dropdown menu for the appropriate status.

4 Select the desired color and confirm.

5 Save.

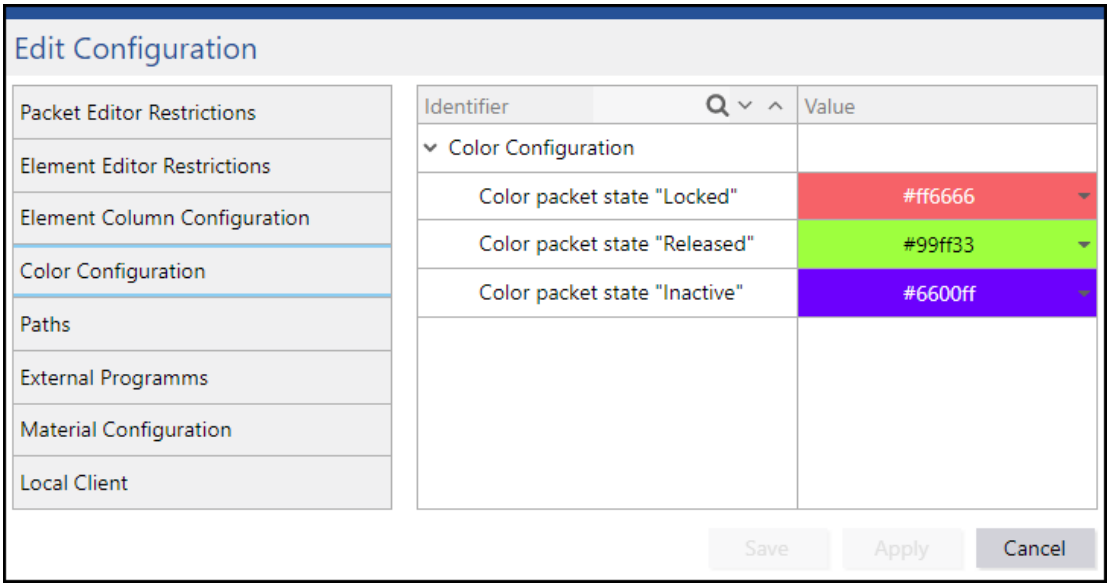


Fig. 7: Status color configuration

Editing Packet/Parameter Options

Packets and elements can be configured using various options. Table 6 below summarizes all options currently available. Other options not listed here will be included in later versions.

Table 6: Packet/element options

Option	Description
Packet status when creating manually	The status of a packet after it has been created
Element status when creating manually	The status of an element after it has been created
Element source when creating manually	The source of an element created
Element status at check in	The status of an element after check-in
Element status on OPT program conversion	The status of an element after the PDM program conversion
Element type list dependent on current type	Actions (e.g. creating/receiving an element) may cause a new element to be generated. If a check mark is set, the current element type is added to the element type list.
Max. file size for import in KB	The maximum file size of an element that can be imported.
Observe upper/lower case on sorting file names	If a check mark is set, the system distinguishes upper and lower case of file names.
Initial Element Table View Mode	Select the element versions displayed (see section 2.3.1)
Lock all element versions if one element is released	If an element is released, all previous versions are automatically set to the status “Locked”.
Block element data in status “Released”	If a check mark is set, an element cannot be edited in 'Released' status
Block element data in status “Locked”	If a check mark is set, an element cannot be edited in 'Locked' status
Change of transferred elements possible?	If a check mark is set, elements that have already been transferred to the machine can still be edited.
Check unique element file names?	If a check mark is set, the system compares the file names of elements globally in order to avoid creating several files with the same name.
Packet uniqueness fields	Fields that make a packet unique in the overall system by information/parameters specified. To add a parameter: 1. Click on the field below **Value**. 2. Select the desired parameter in the column on the right and click on the **Move to the left** icon. 3. Click on a free area outside of the columns. ➔ The **Selected** value is incremented by 1, the **Available** value is decremented by 1.
Maximum (packet/element) result rows	The value entered here specifies the maximum number of search result items. If a search produces more than the acceptable number of result lines, a message is output without displaying the search results.

Path Settings

Paths can be specified manually, for example, to set target locations for exporting or storage locations of external programs. Table 7 summarizes all options available for path specifications.

Table 7: Path specifications

Option	Description
Paths	Specifies the position of files and programs on the user's local disk.
Export path for program operations	The client path is specified in the client configuration (it may have to be added to the Navigator using the **Change Configuration** icon). The export path for program operations determines the directory to which a file is copied when it is checked out. The path specified here supplements the client path.
Element export path	The path to the target directory into which elements are exported
Element import path	The path to the source directory from which elements are imported
Element check in path	The path to the directory into which an element is copied after checking in
Element check out path	The path to the directory into which an element is copied after checking out for editing
Comparison program	A program which allows for comparing files to highlight differences between the files
Use external comparison program?	If a check mark is set, the configured external program is used instead of the default program included in the software.
Path to comparison program	The path to the directory where the external comparison program is stored
Working directory	The working directory of the external comparison program
Arguments	Arguments specified when calling the external comparison program
Post-processor program	A post-processor program adjusts an element to the syntax supported by the machine so that it can be interpreted correctly by the machine. A post-processor program is not included in the standard application.
Path to post processor program	The path to the directory where the post-processor program is stored
Working directory	The working directory of the post-processor program
Arguments	Arguments specified when calling the post-processor program

Adding External Programs

External programs can be included for displaying files in an external viewer (see section 4). For example, a suitable program for viewing graphics can be selected.

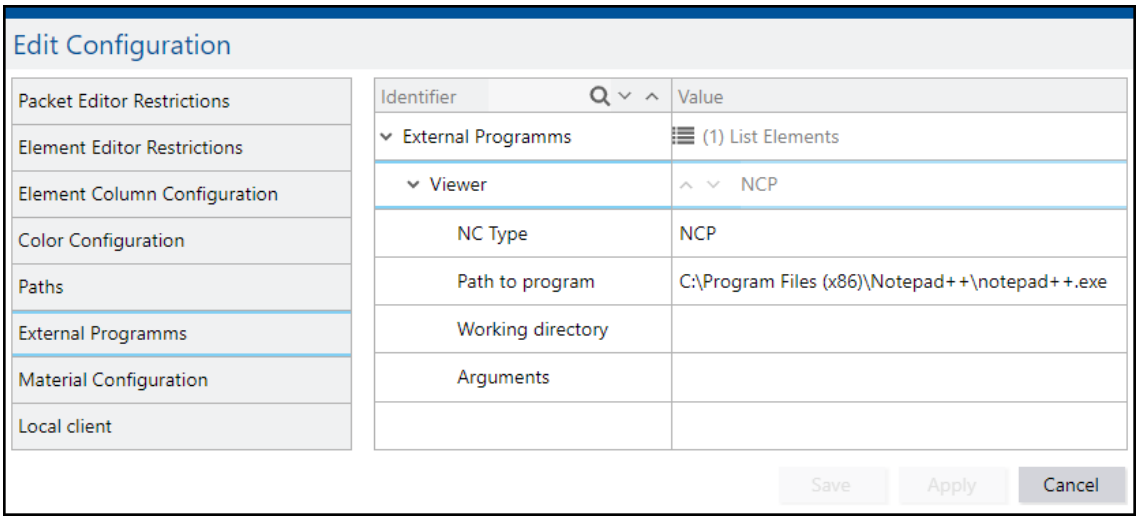


Fig. 8: Adding external programs

To add an external program:

1 Click the Change Configuration icon.

2 Click on External Programs.

3 Right-click on List Elements and then click on Add New List Element in the context menu.

4 Open the dropdown menu of External Programs.

5 Open the dropdown menu of Viewer.

6 Enter the NC Type.

The program will be used for the NC type(s) specified.

7 Enter the Path to program.

8 Enter the Working directory.

9 Enter the required Arguments.

10 Save.

Adding or Removing Parameters

Path: Production Data Management > PDM Configurations > Packet Header Configuration

It is possible to add or remove any parameter in a packet header. The length and width of the input fields can be freely defined. It is useful to leave more space for input fields intended to hold descriptions comprising (several) sentences. Invisible fields may be inserted as placeholders which cause a line wrap in a parameter line.

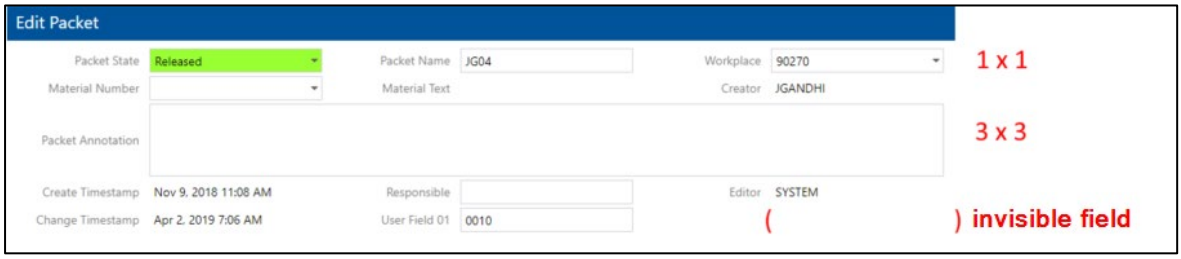


Fig. 9: Types and sizes of fields

To add parameters to a packet header and adjust the fields:

1 Right-click on **List Elements** and then click on **Add New List Element** in the context menu.

Or

Right-click on an existing header item and then click on **Insert New List Element Before/Below** in the context menu.

➔ The new header item is inserted as an invisible field (_EMPTY_Space_) by default.

2 Open the dropdown menu of the new header item.

3 Select a type for the field from **Packet field**.

4 Open the dropdown menu of **Layout**.

5 Enter the **Column span** and **Row span** according to your requirements.

6 Save.

Note: To move a header item, click on the **Move List Element One Up** or **Move List Element One Down** arrow or right-click on the header item and then click **Move List Element One Up/Down** in the context menu.

Packet Header Configuration	
Identifier	Value
Packet header	
Column count	3
Header items	(12) List Elements
Header item	PACKETSTATUS
Packet field	Packet State
Layout	
Column span	1
Row span	1
Header item	PACKETNAME

Fig. 10: Configuring header items

To remove a parameter:

1 Right-click on the appropriate parameter and then click on **Delete List Element** in the context menu.

2 Save.

➔ The next field advances by one position in the packet header.

Packet Search

Packets can be found by entering search parameters. It is also possible to find packets displayed in a tree structure.

Finding Packets by Entering Search Parameters

Path: Production Data Management > Packet Search

Search parameters may be hidden or shown depending on the search pattern selected. The following two search patterns are available by default:

- Complete Search
  Search by packet name, packet status, material number, workplace group and user field(s)
- Simple Search
  Search by workplace group and material number

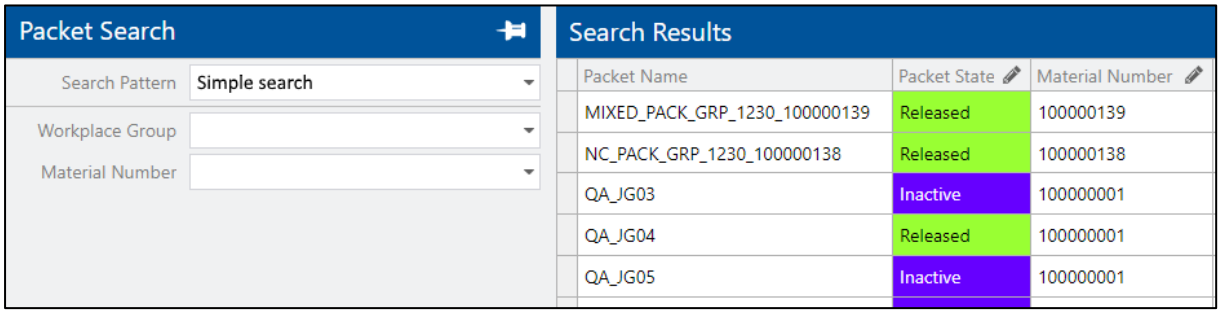


Fig. 11: Finding a packet

To find a packet:

1 Select the suitable search pattern.

2 Enter the search parameters.

3 Run search.

New search patterns can be created to specify parameters as per individual requirements.

To create a new search pattern:

1 Click the Change Configuration icon.

2 Click on Packet Search.

3 Right-click on a free area in the Configurations field and click on Add Configuration in the context menu.

4 Enter the name of the configuration (search pattern).

5 Select the new pattern created.

6 Select the desired parameter in the Available column and click on the Move to the left icon.

7 Keep the CTRL key pressed to select several elements.

8 Set the default configuration.

9 If a check mark is set for Default Configuration, the corresponding pattern is displayed by default when the package search is opened.

10 Save.

Any parameter in a search pattern can be added or removed.

To add or remove parameters in a search pattern:

1 Click the Change Configuration icon.

2 Click on Packet Search.

3 Select a search pattern from Configurations.

4 Select the desired parameter in the Available column and click on the Move to the left icon.

Or

Select the desired parameter in the Selected column and click on the Move to the right icon.

5 Set the default configuration.

6 If a check mark is set for Default Configuration, the corresponding pattern is displayed by default when the package search is opened.

7 Save.

Note: It is possible to configure the **Search Results** table in more detail (see section 2.1.2).

Packet Tree Search

Path: Production Data Management > Packet Tree Search

Packets can be displayed in a freely configurable tree structure. Various levels provide a more detailed structure and overview. The search results are arranged in accordance with the defined structure. The packets are at the outside tree level (leaves) (see Fig. 12). When a packet is selected, its header and elements are displayed (see Fig. 13).

The following sample tree structure may be useful:

- Level 1: Workplaces
- Level 2: Material numbers relating to these workplaces
- Level 3, if appropriate: Restriction to operations

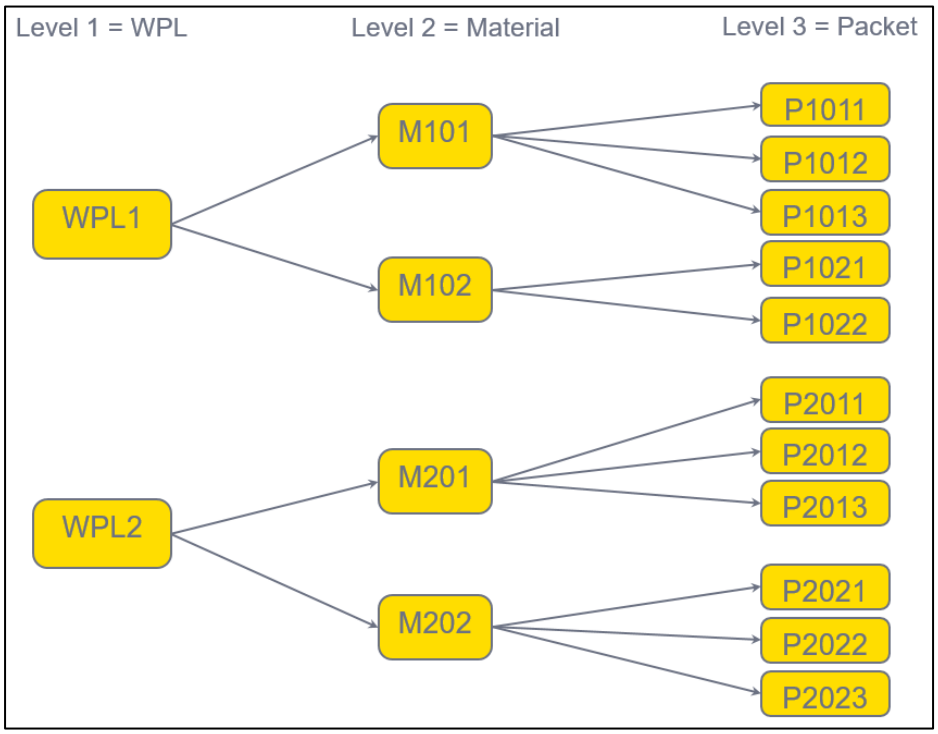


Fig. 12: Sample structure of a packet tree

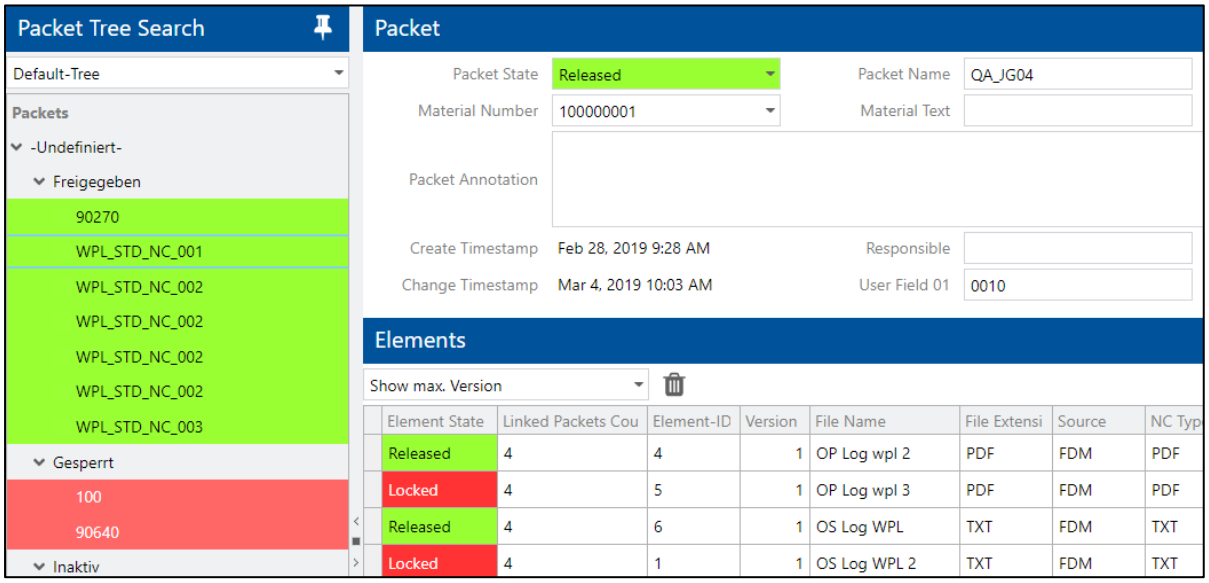


Fig. 13: Packet tree search

The default tree comprises the workplace group and packet status parameters. Other parameters can be removed or added (see section 2.1.3.3). It is also possible to create a custom tree.

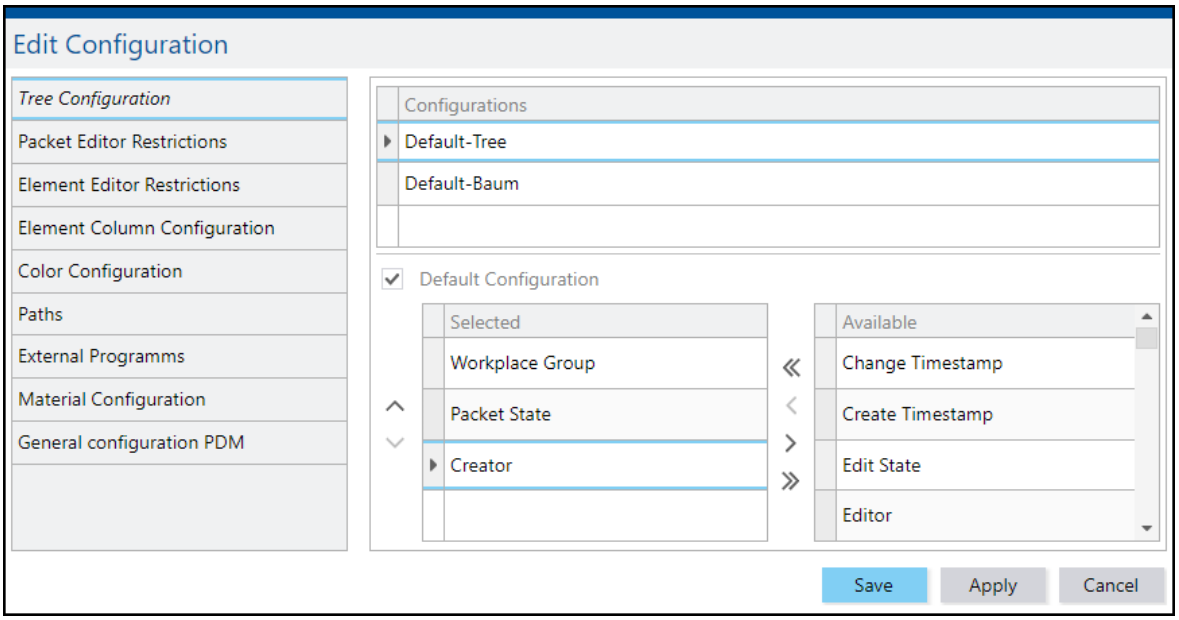


Fig. 14: Creating a packet tree

To create a packet tree:

1 Click the Change Configuration icon.

2 Click on Tree Configuration.

3 Right-click on a free area in the Configurations field and click on Add Configuration in the context menu.

4 Enter the name of the configuration and confirm.

5 Add parameters as appropriate.

6 Optionally define the new tree as the default tree by setting a check mark for Default Configuration.

7 Save.

To change to another packet tree:

Note: Open the dropdown menu under **Packet Tree Search**.

1 Select the appropriate packet tree.

➔ The change is effective immediately and does not need to be saved.

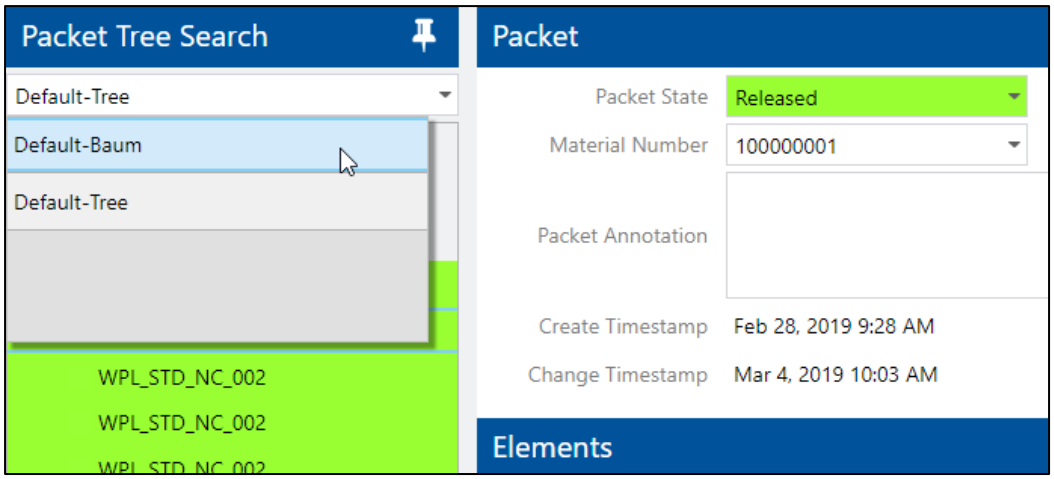


Fig. 15: Changing the packet tree

Linking Packet Fields

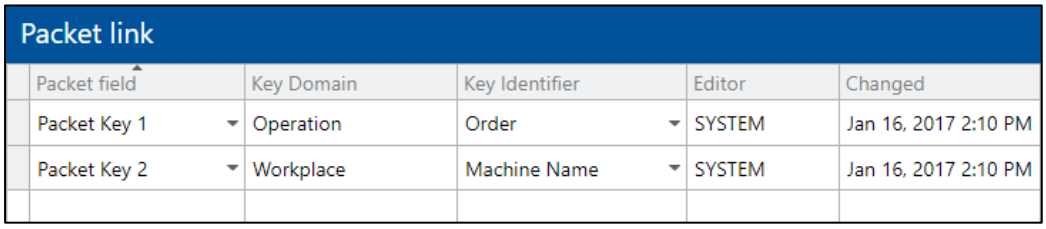
Path: Production Data Management > PDM Configurations > Packet Link

A package link defines a search key with different parameters for the search (resolution) of a PDM package. All fields available for the package header can be used for this.

Note: On an application server, only one package link can be defined for the FDM. It applies system-wide.

A package search most often takes place in the shop floor at the machine and most search values are determined dynamically at running time (WPL, operation, material number, etc.).

Note: To find a packet, the system analyses the packet by the data and/or parameters specified. A 1:1 relationship is required. Exactly one packet must result from the identification so that the result is unique.



Packet link

Packet field	Key Domain	Key Identifier	Editor	Changed
Packet Key 1	Operation	Order	SYSTEM	Jan 16, 2017 2:10 PM
Packet Key 2	Workplace	Machine Name	SYSTEM	Jan 16, 2017 2:10 PM

Fig. 16: Packet linking

To link a packet field:

1 Right-click on a free area and click on **Create New Packet Link** in the context menu.

2 Select the **Packet Field** to be linked.

3 Select the **Key Identifier**. The following keys are available:

- Operation with material number and user fields
- Workplace with machine name and user fields

4 Save.

Note: The key domain specifies the domain of the key identifier selected (operation or workplace).

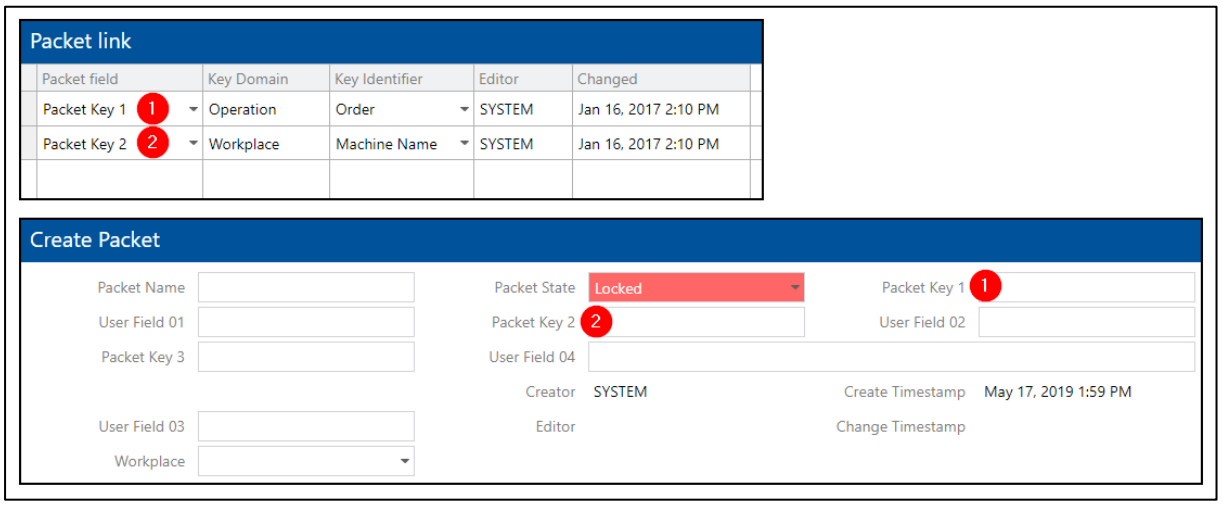


Fig. 17: Connection between packet fields and their links

Elements

Elements are components of packets. An element is a logical image of a file that comprises its content and other additional information (e.g. created by, last modified, etc.).

It is possible to create any number of elements for a package.

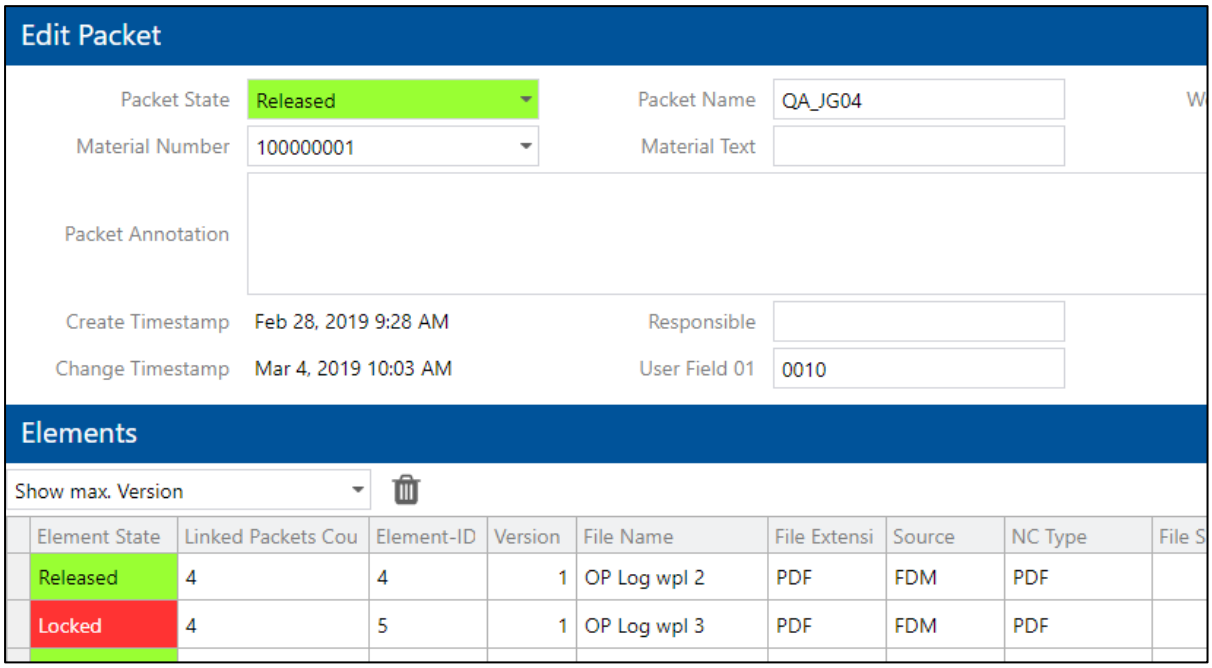


Fig. 18: Example of a packet and its elements

Creating an Element

Elements can be created wherever a packet can also be created or selected:

- Creating a packet (see section 2.1.2)
  The packet created must be saved before an element can be created.
- Searching for a packet (see section 2.1.4)
  A packet must be selected before an element can be created.

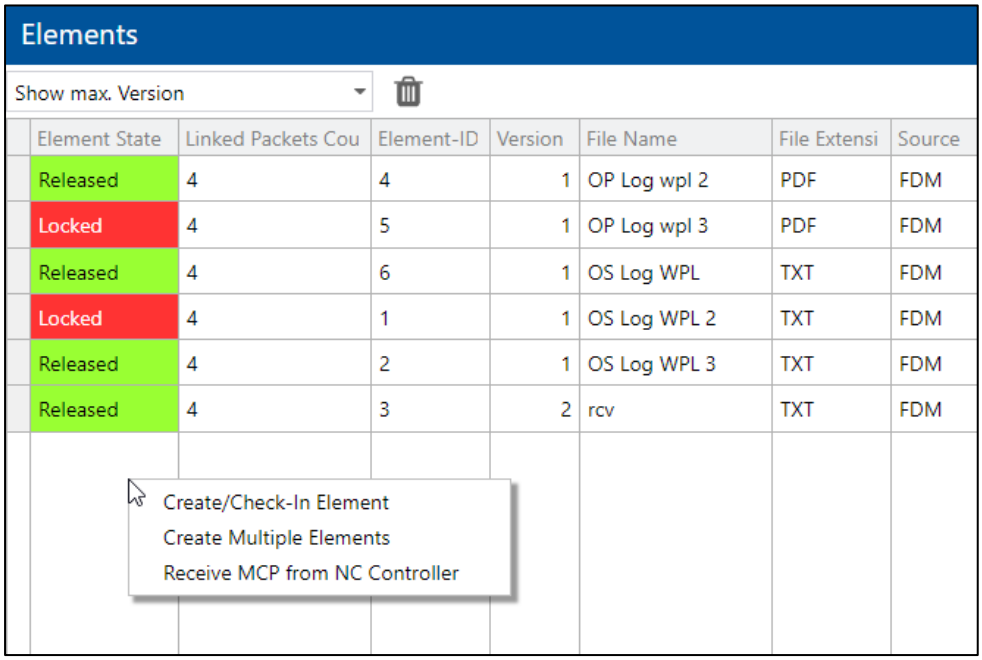


Fig. 19: Creating elements

To create an element:

1 Right-click on a free area in the **Elements** field and then click on **Create Element** in the context menu.

Or

Click on **Create Multiple Elements**.

2 In the **Create/Check-In Element** dialog (see Fig. 20), click **Upload…**.

3 Select file(s) and confirm.

Keep the CTRL key pressed to select several files.

4 Change the **Element Status** as necessary.

5 Specify whether to increment the version.

If the same file or another file with the same name is reloaded, selecting **Yes** will increment the version number. The previous version remains.

6 Click **OK**.

➔ The new element created appears at the bottom position in the table.

7 Select the **Source**.

8 Select the **NC Type**.

9 Save.

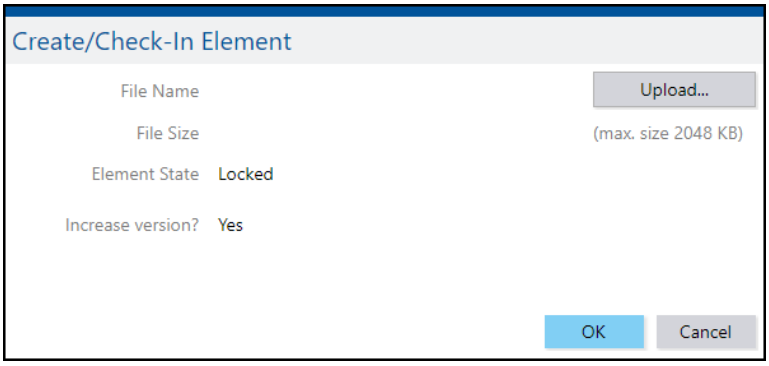


Fig. 20: Dialog for creating an element

Note: Filter elements according to versions in the dropdown menu above the table:

- Show max. version:
  Only the highest version is displayed.
- Version history:
  All versions are displayed.
- Show only released versions:
  Only versions with the status **Released** are displayed.
- Show only released and transferable versions:
  Only transferable versions with the status **Released** are displayed.
- Show transferable versions only:
  Only transferable versions are displayed.
- Show only highest released and transferable versions:
  Only transferable, highest versions are displayed.

Editing an Element

The configuration of elements is like the configuration of packets (see section 2.1.3).

Right-clicking on an existing element offers several editing options. Table 8 lists all options:

Table 8: Options available for element editing

Option	Description
Create/Check-In Element	Opens a pop-up dialog in which an element can be selected and uploaded. It will be checked in afterwards.
Create Multiple Elements	Opens a pop-up dialog in which several elements can be selected and added to the package.
Show Element File	Opens the uploaded file in an external editor.
Edit Element Information	Allows editing of various element information such as status, source, comment, etc.

Option	Description
Copy Element	Copies the element and adds it to the bottom of the table. The version number of the new element is 1 higher than the source element.
Multi Checkout	✓ Multiple elements are selected. The selected elements are checked out and form a logical group. ➔ The processing of the files is finished. During check-in, the version number is increased by 1. ⓘ To avoid version conflicts, an element checked out should only be edited by the user who checked it out.
Release group	Resolves the logical group that is formed over multiple elements during a multi-checkout. Prerequisite: All elements must be in status **Waiting for release**.
Compare Element File	Compares element files using an external comparison tool (see Table 7)
Compare Element Files Internally	✓ Two elements are selected. Opens the system-internal comparison tool. Compare both files and highlight differences.
Assign to Packets	Opens a pop-up dialog in which an element can be linked to a packet.
Delete Element	Deletes the selected element. Deletion takes effect only after clicking on the **Save** icon and can be undone by clicking on the **Cancel Change** icon.
Check Out Element File for Editing	The element is checked out. A dialog specifies the storage location of the file. The file can be edited. If the element is to be checked-in again, right-click on the element and then click on **Create Element**. ➔ File editing is finished. If a change was made to the file, the version number is increased by 1. ⓘ To avoid version conflicts, an element checked out should only be edited by the user who checked it out.
Cancel Check-Out	Stops checking out the file. Any changes are discarded.
Send to NC Controller	The element is sent to the NC controller. The transfer monitor indicates the status.
Send to NC Controller (With Sequences)	Sends the element with a configured sequence to an NC controller. Signal values can be selected in a dialog that are written to the control before or after transmission. A reset sequence specifies to which value the value is to be reset if the transmission fails.
Receive from NC Controller	Receives an element from the NC controller. The transfer monitor indicates the status.
Start Post Processor	The element is formatted to conform to the syntax supported by the machine. It can then be interpreted by the machine. ⓘ By default, a postprocessor is not predefined.

Option	Description
Receive MCP from NC Controller	Receives a machine-created program from the NC controller.
Send Recipe to Controller	A recipe is an assignment of a symbolic name to a specific value of the controller. This makes it possible, for example, to send configuration data for the machine to the machine before production starts.

Linking a Packet with an Element

Packages can also be linked to elements in configuration pages where packages are created or selected:

- Creating a packet (see section 2.1.2)
- Searching for a packet (see section 2.1.4)

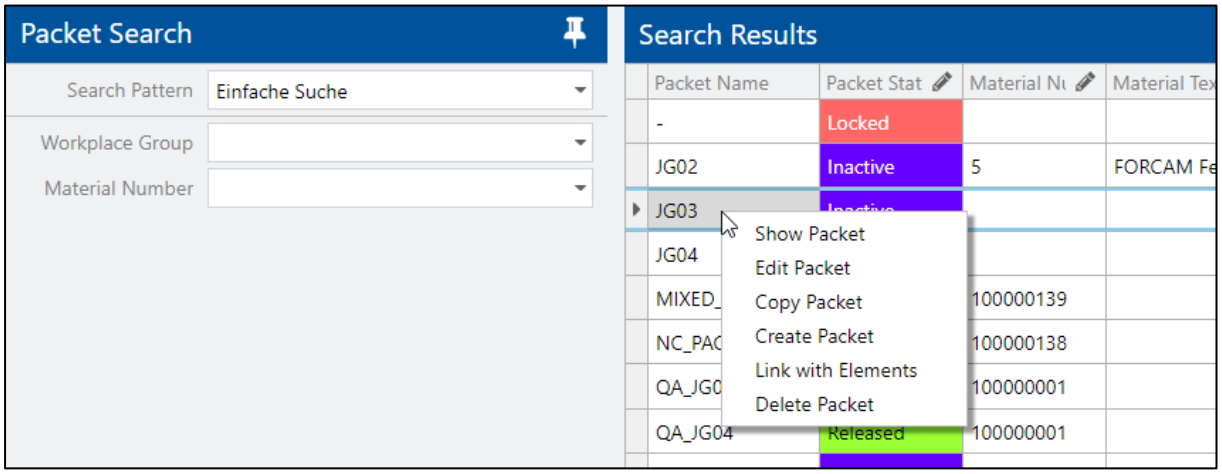


Fig. 21: Linking a packet with an element

To link a packet with an element or remove the link:

1 Right-click on the appropriate packet and then click on **Link with Elements** in the context menu.

➔ The **Assign Elements to Packet** dialog opens. The **Assigned Elements** area lists elements that are already linked with the packet.

2 Select appropriate filter(s) and click on the **Search** icon.

➔ Only the elements matching the filter are displayed in **Available Elements**.

3 Select the desired element in the **Available Elements** area and click on the **Move to the left** icon.

Or

Select the desired element in the **Assigned Elements** area and click on the **Move to the right** icon.

4 Confirm.

➔ The packet is now linked with the elements and the change has been adopted. It is not necessary to save.

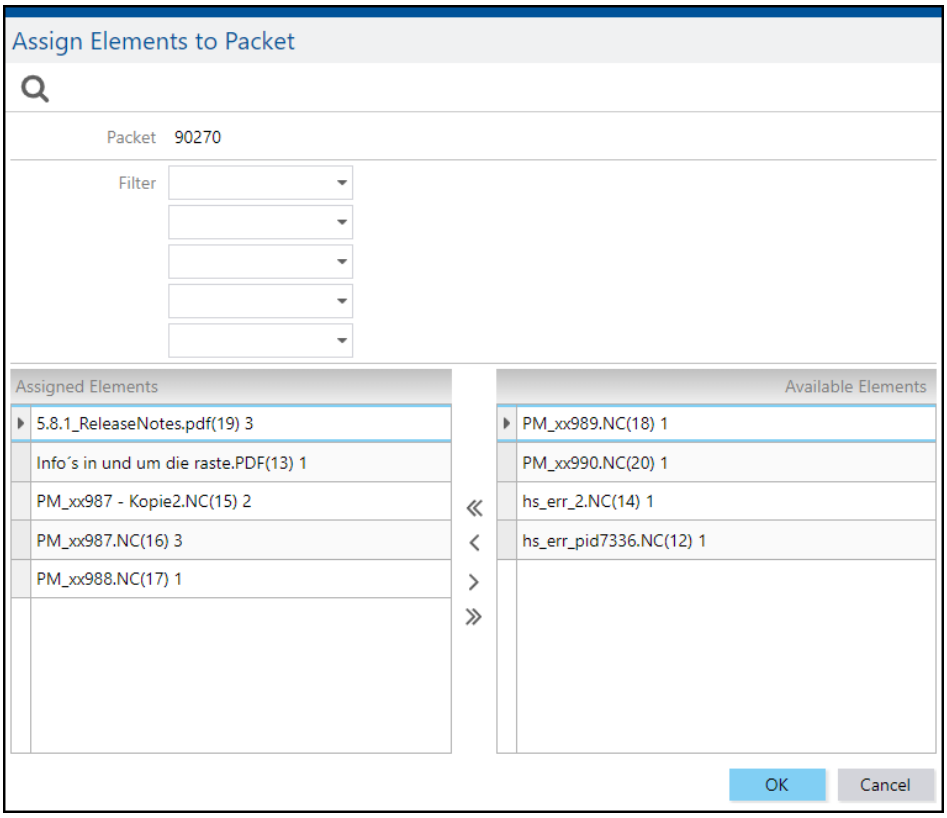


Fig. 22: Dialog for linking a packet with an element

Element Search

Path: Production Data Management > Element Search

It is possible to search for individual elements regardless of their inclusion into a packet.

Elements do not have a direct reference to a workplace. To ensure that permission management is also effective for an element search, the workplace dependence is verified in the background via packet assignment.

The default search can be edited, parameters can be added or removed.

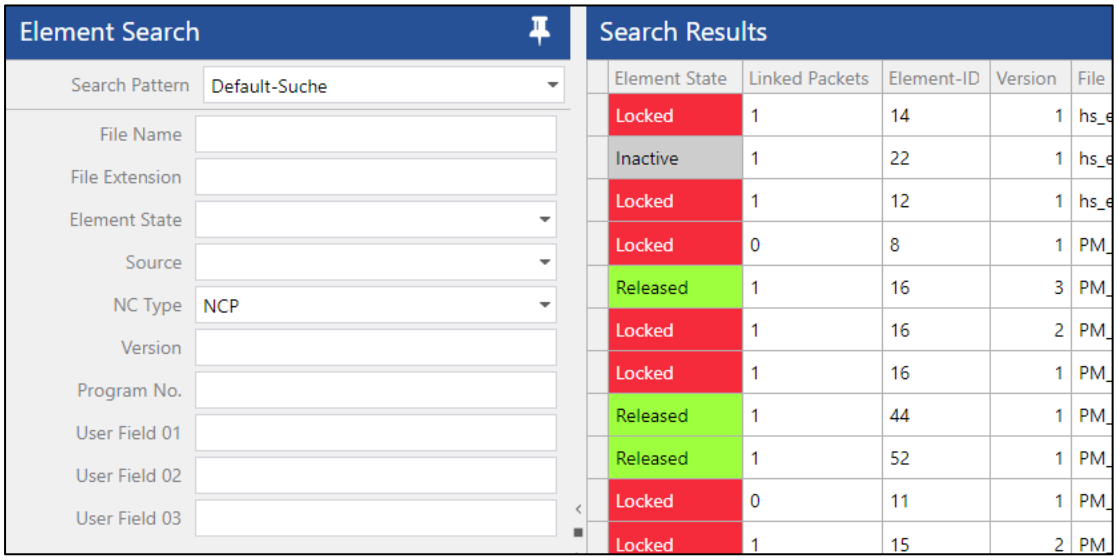


Fig. 23: Finding elements

To find an element:

1 Enter the search parameters.

2 Save.

It is possible to create new search patterns to specify parameters per individual requirements.

To create a new search pattern:

1 Click the Change Configuration icon.

2 Click on Element Search.

3 Right-click on a free area in the Configurations field and click on Add Configuration in the context menu.

4 Enter the name of the configuration (search pattern).

5 Select the new pattern created.

6 Select the desired parameter in the Available column and click on the Move to the left icon.

7 Keep the CTRL key pressed to select several elements.

8 Set the default configuration.

9 If a check mark is set for Default Configuration, the corresponding pattern is displayed by default when the element search is opened.

10 Save.

It is possible to add or remove any parameter in a search pattern.

To add or remove parameters in a search pattern:

1 Click the Change Configuration icon.

2 Click on Element Search.

3 Select a search pattern from Configurations.

4 Select the desired parameter in the Available column and click on the Move to the left icon.

Or

Select the desired parameter in the Selected column and click on the Move to the right icon.

5 Set the default configuration.

If a check mark is set for Default Configuration, the corresponding pattern is displayed by default when the element search is opened.

6 Save.

Note: The **Search Results** table can be configured in more detail (see section 2.1.2).

Logs

Path: Production Data Management > PDM Logs

The PDM module can create logs to record detailed information.

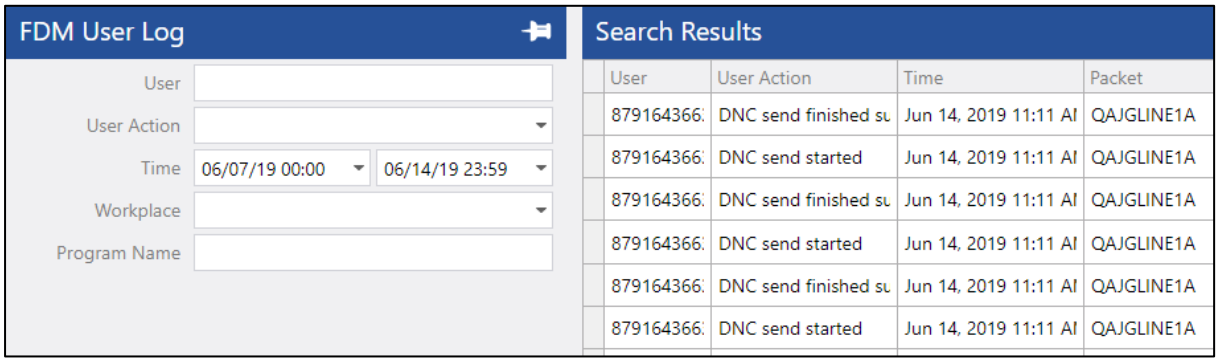


Fig. 24: PDM User Log

The following logs are available:

- PDM User Log:
  A record of all changes to packets/elements for a user within the specified period. The information includes: User, time of processing and text of the activity recorded.
  Superusers can view all logs. Users without superuser permissions can only view their own logs. In these cases, the user cannot be selected.
- NC Log and NC Controller Log:
  A record of all DNC file transfers from/to NC controllers within the specified period. The information includes: NC controller, transfer time, file information and error description, if applicable.
- NC Controller Status Monitor:
  Shows the status of file transfers and communication to NC controllers. The information

includes: NC controller, status, transfer direction, activity, any errors, and log level. Right-click in a line to start, restart or stop NC controller communication. You may also change the log level (see section 2.6.1). It is also possible to send or receive an auxiliary file to or from the NC controller without having to store it in the PDM.

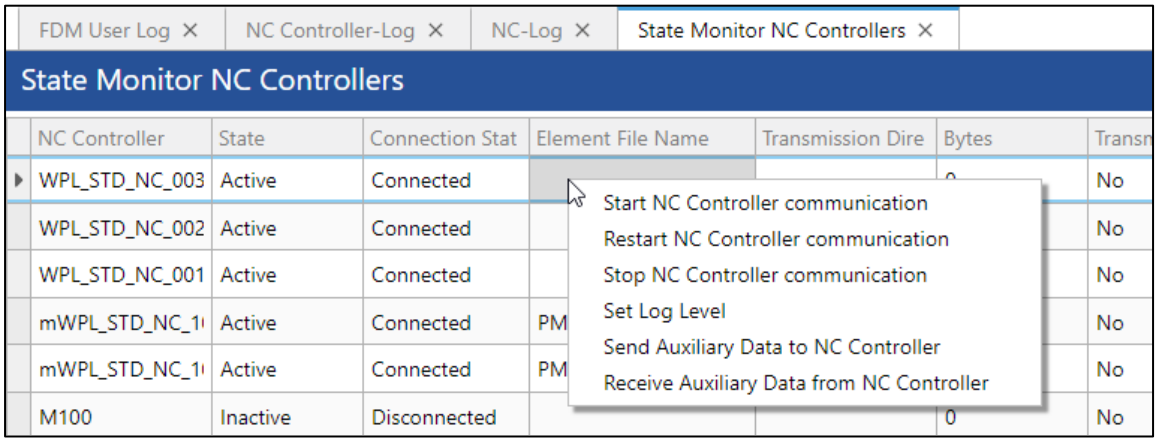


Fig. 25: NC controller status monitor

Delta Export

Path: Production Data Management > Delta Export

The Delta Export function is provided to store files on an external system in a defined structure. The files are exported first after completing the configuration and later automatically whenever the packet is changed. All the required settings are defined in configuration pages.

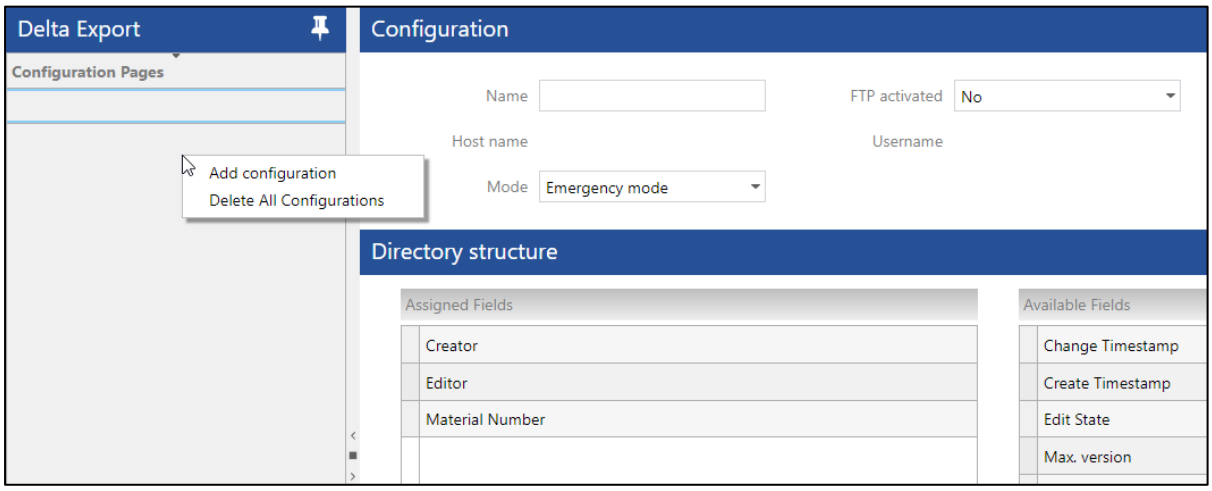


Fig. 26: Delta Export configuration

To create a new configuration page:

Chapter 1 Right-click below **Delta Export** in the left area and click on **Add Configuration** in the context menu.
Chapter 2 Enter a name for the configuration.
Chapter 3 Activate FTP (optional).

➔ The **Host Name**, **User Name** and **Password** input fields are activated.
If FTP is not activated, file sharing without user authentication is used.

Chapter 4 Enter the root directory.
The directory to be used for saving the data.
Chapter 5 Enter the host name, user name and password, if applicable.
Chapter 6 Select the mode:

- Standard mode:
  All files can be exported.
- Emergency mode:
  Only released elements of released packets are exported.

Chapter 7 Select the appropriate packet fields in the **Directory Structure** area and click on the **Move to the left** icon.
The order of fields in the directory structure determines the structure of the target directory.
Chapter 8 Save.

➔ The existing packets and elements are exported into the directory configured. Whenever a change is made to the packet or element, the data will be reexported automatically and the existing data will be overwritten.

It is possible to restart exporting files at any time. The Delta Export configuration and the automatic export process remain unchanged. Restarting the export deletes all existing exported data and exports the current data status from the database to the file system.

Fig. 27: Reinitializing a Delta Export operation

To restart a Delta Export operation:

✓ A configuration page must have been configured and be available.

ⓣ Select the appropriate configuration page in the **Delta Export** area.

4. Click **Re-Initialize** in the **Configuration** area.

➔ All previously exported data is deleted and the current data status is exported from the database.

PDM Configuration

DNC Machine Configuration

Path: Production Data Management > PDM Configuration > DNC Machine Configuration

The DNC Machine Configuration provides several options for configuring communication with a machine. In addition, serial and other connections and ordering programs can be configured. The configuration of the NC controller becomes available after selecting a controller in the pop-up menu in the upper bar.

Note: Any change made to these settings will only take effect after restarting ffDNC. Alternatively, machine communication can also be stopped and restarted via the status monitor.

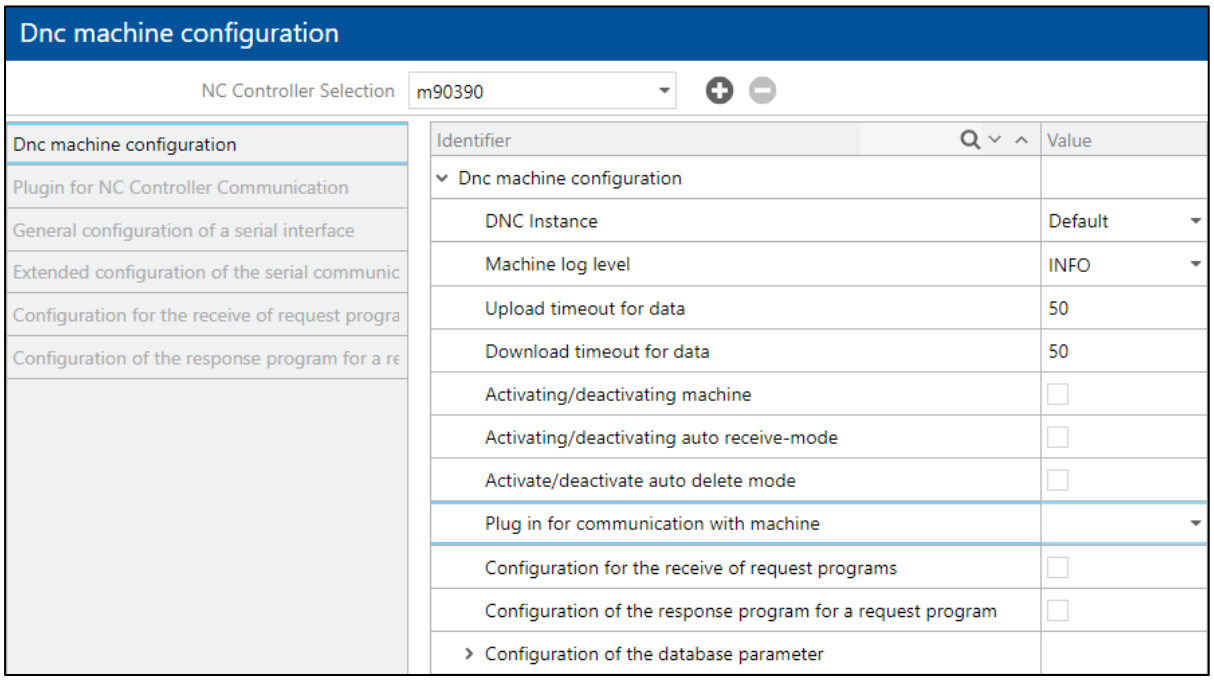


Fig. 28: DNC machine configuration

Table 9: DNC machine configuration options

Option	Description
Machine log level	Degree of detailing of log information
Upload timeout for data	Maximum time in ms before an upload is aborted. Freely editable.
Download timeout for data	Maximum time in ms before a download is aborted. Freely editable.
Activate/deactivate machine	If a check mark is set, the connection to the machine is activated/deactivated as soon as ffDNC starts.
Activate/deactivate auto-receive mode	If a check mark is set, the request program is permanently polled for any changes. If you use a serial link, the port is permanently monitored for any incoming data.
Activate/deactivate auto-delete mode	If a check mark is set, the NC file is automatically deleted from the machine controller once it has been read successfully from the machine. This works only with an Ethernet link.
Plug-in for communication with machine	For a description of the individual plug-ins, see Table 14 in section 5.2. Depending on the plug-in selected, additional configurations are available (see below in this section).
Configuration for the receipt of request programs	If a check mark is set, the **request program configuration** becomes available. A request program can be used to request an NC program without SFT. The request program contains information about the packet (see section 2.6.1.4).
Configuration of the response program for a request program	If a check mark is set, the **configuration of the response program for a request program** becomes available. The user will receive an NC file with the system response. The response includes a feedback about successful or failed request via request program and can be freely defined (see below in this section). It is recommended to set a check mark here if the **request program configuration** is active.
Configuration of Database Parameters	
Element status of retransfer	This status is initially assigned to all elements received.
Element source of retransfer	This source is initially assigned to all elements received.
Element type of retransfer	This type is initially assigned to all elements received.
Increment version	If a check mark is set, the version increments by 1 upon each editing/saving operation.
Element upload packet	If auto-receive mode (see above) is used for elements, a standard packet is required. If an automatically received element cannot be assigned to an existing packet, the element is assigned to the packet defined here.

Keep packet creator	If a check mark is set, the packet creator is not overwritten. The original packet creator is displayed.

Plug-in for NC Controller Communication

The available settings change depending on the selected plug-in for machine communication (see Fig. 28):

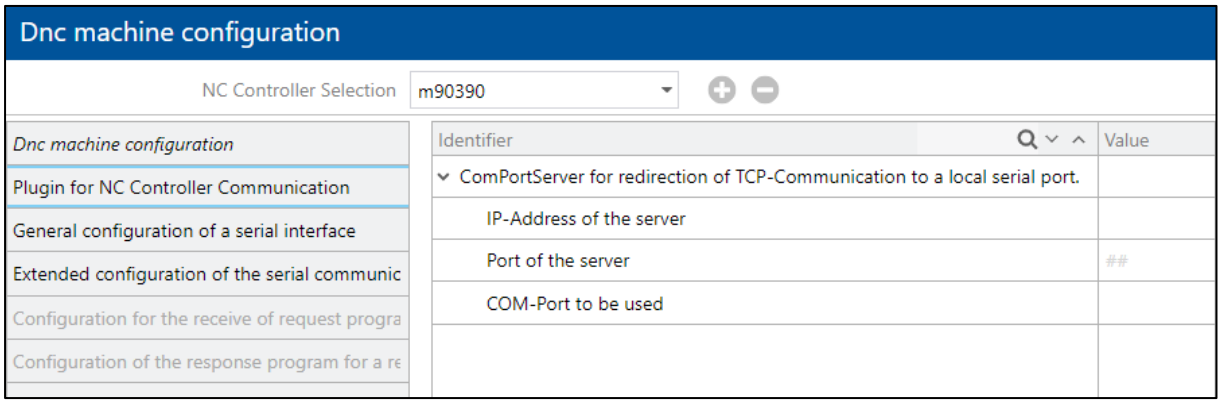


Fig. 29: Plug-in for NC controller communication

- ComPortServer:
  - Server IP address and port
  - COM Port:
    The local serial port used by the ComPortServer for communication and data exchange control (serial port).
- FileHandlerServer:
  - Server IP address and port
  - Paths for elements:
    Optional subdirectories for elements sent/received.
  - Path for temporary files:
    Files downloaded from the Infor Forcam MES database are sent by ffDNC to the FileHandlerServer. The FileHandlerServer stores them on the local system in this directory.
  - Path and name of the request program:
    Only required if a request program is used. The request program name must contain the file extension.
  - Server network name:
    The path to the shared folder in the system to which NC files are sent or from which they are received. Entered here with the following syntax: \\<server host name>\<share name>
  - Copy with file extension:
    Some programmable logic controllers cannot process file extensions. If no check mark is set, files are transferred without extension.

    - Path extensions:
      Dynamic extension of directories based on NC type and some package and element properties
- FTP Plug-in:
    - FTP server ports:
      FTP port with a TCP/IP link
    - Local port:
      TCP/IP port on which the DNC tries to send
    - Paths of files:
      Optional subdirectories for elements sent/received.
    - Path and name of the request program:
      Only required if a request program is used.
    - Server network address:
      FTP server IP address
    - FTP server login data
    - Path extensions:
      Additions of directories
- FileHandler (on file basis):
    - Paths of files:
      Optional subdirectories for elements sent/received.
    - Path and name of the request program:
      Only required if a request program is used.
    - Server network name:
      The path to the shared folder in the system to which NC files are sent or from which they are received. Entered here with the following syntax: \\<server host name>\<share name>
    - Server login data:
      Users need read/write permissions for the shared folder.
    - Path extensions:
      Additions of directories

General Serial Configuration

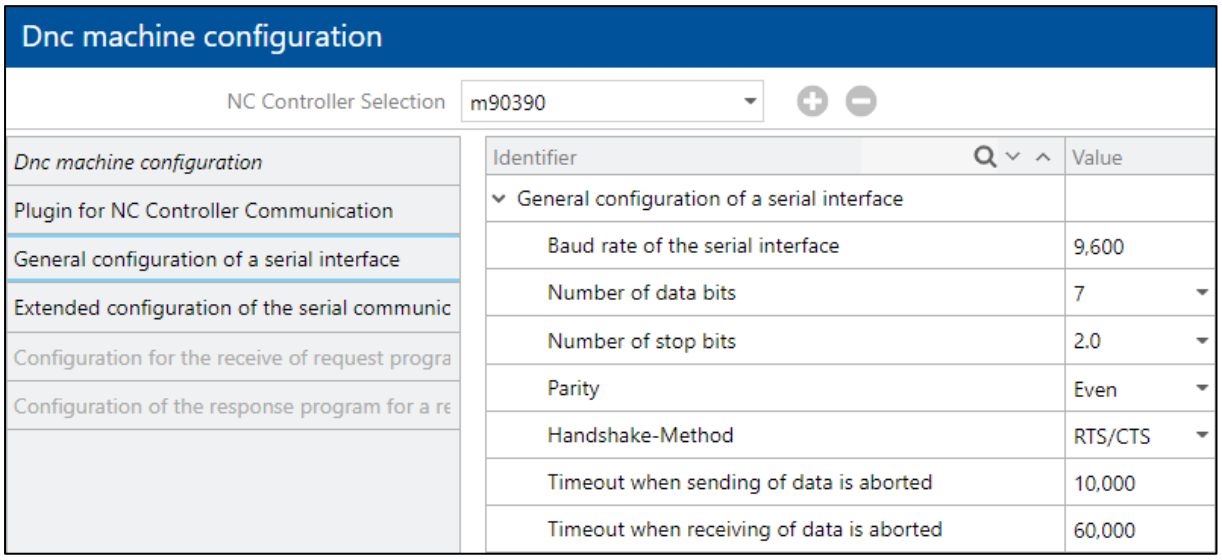


Fig. 30: General serial configuration

- Baud rate:
  Symbol rate: Number of symbols transmitted per time unit
- Data (5-8) and stop bits (1.0, 1.5 or 2.0)
- Parity:
  Numeric parity (Even, None, Mark, Space or Odd)
- Handshake method:
  Method to synchronize stations in a data transmission process (None, RTS/CTS or XON/XOFF)
- Send and receive timeouts:
  The time in ms after which a timeout is reported and the transmission aborted.

Extended Serial Configuration

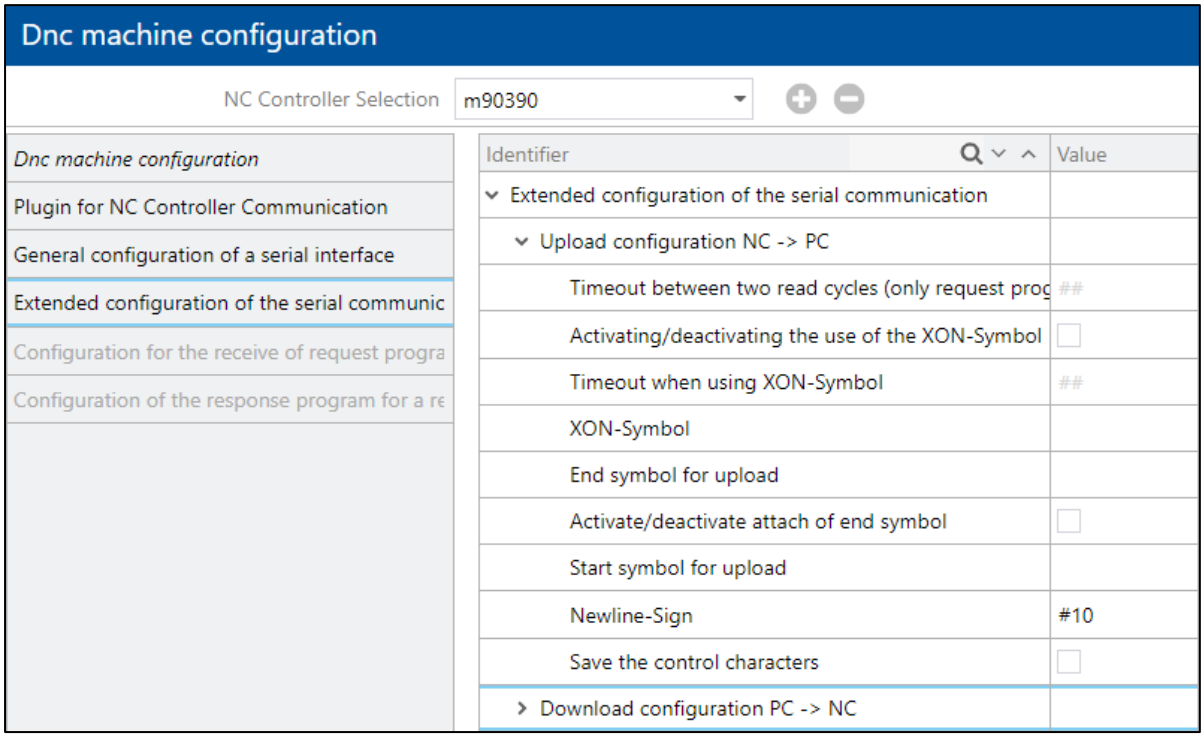


Fig. 31: Extended serial configuration

- Upload configuration
  - XON symbol:
    Specific and freely definable symbol (ASCII code less than 32) that is required for some machines with serial communication to indicate start or end of upload or download.
  - Start and end symbol:
    Freely definable character (string) (ASCII code less than 32) indicating start or end of upload or download.
  - New line character:
    Freely definable character (string) (ASCII code less than 32) indicating the beginning of a new line.
  - Save control characters:
    If a check mark is set, the control characters used (e.g. start and end symbol) are saved.
- Download configuration
  - Start and end symbol:
    Freely definable character (string) indicating start or end of upload or download.
  - New line character:
    Freely definable character (string) indicating the beginning of a new line.
  - Prefix and trailer for download:
    Freely definable character (string) that can precede or follow a download, respectively.
  - Download type of transfer:

        - Char:
          Each character is transmitted as a single packet.
        - Line:
          Each line is transmitted as a single packet.
        - Package:
          A character packet of 1024 characters is transmitted.
    - Download delay:
      Freely definable delay in ms between individual download packets.

ⓘ For ASCII characters, CR and LF must be preceded by # (e.g. #10#13 for CR/LF).

Request Program Configuration

A request program can be used to request an NC program without SFT. For this purpose, a request file (text file) is created with a defined structure and information for the appropriate program. The request file is placed into a directory and called by ffDNC.

The process runs as follows:

- ffDNC scans a defined directory permanently for a request file with a specified title.
- As soon as the file is available in this directory, ffDNC reads the information contained in it.
- If the file contains a request for an NC program, ffDNC gets the program from the database and sends it to the NC controller. If the file requests receiving an NC program, ffDNC gets the program from the machine and stores it in the database.
- After the transfer, ffDNC deletes the request file and creates a defined response file in the same directory. This is created for both an erroneous and a successful transfer.

The request file contains configurable variables. A variable is a placeholder and contains information that can be freely defined (e.g. type, name, version, etc.).

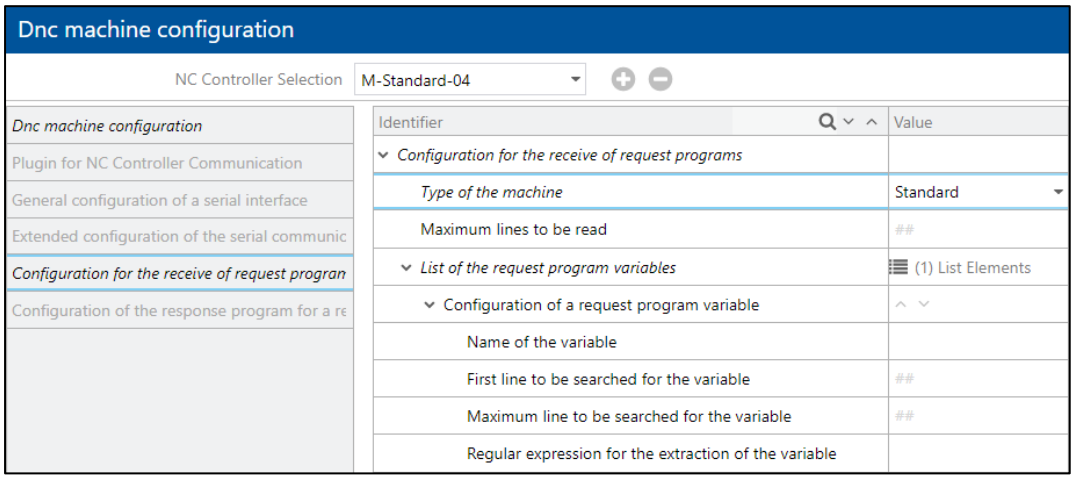


Fig. 32: Request program configuration

To create a request program variable:

1 Right-click on **List Elements** and then click on **Add New List Element** in the context menu.

2 Enter a name for the variable (see below).

3 Enter the start and end lines of the variable.

4 Specify the line containing the appropriate information. Example: Start line 2 and end line 2 limits the information to the second line of the request file.

5 Enter a regular expression.

6 A syntactic rule describing a quantity.

7 Save.

The following table describes all variable names that can be processed by the system:

Table 10: Variable names that can be processed by the system

Variable Name	Description
NCANR	Packet name
TYP	The following types of request programs are supported: Type 1 & 4 (Send to Machine) – All NC files with the file extension NCP – Status must be **Released** or **New** – Version according to request program, 0 = maximum version – File name must correspond to FILENAME from request program (if given), otherwise no filtering to file name Type 5 (Send to Machine) – All NC files with the file extension NCU – Status must be **Released** or **New** – Version according to request program, 0 = maximum version – File name must correspond to FILENAME from request program (if given), otherwise no filtering to file name Type 6 (Send to Machine) – All NC files with the file extension NCP or NCU – Status must be **Released** – Always highest element version Type D: (Send to Machine) – File extensions separated by a comma after the colon (e.g. D:NCP,NCU) – Checks for file extensions passed and FILENAME (if defined), otherwise only for file extensions – Status must be **Released** or **New**

Variable Name	Description
	– Version according to request program, 0 = maximum version Type 2 & 3 (Receive from Machine) – The status of the elements must correspond to the configured status in the DNC machine configuration. – If no PRGNAME is assigned: Chapter 1 Reads file with the file extension JOB if one exists in the package Chapter 2 Otherwise reads all files that have the value of the variable FILE-NAME as program number – If PRGNAME is assigned: Chapter 3 Check for PRGNAME = element file name – Only the highest version is used for receiving. Type U: (Receive from Machine) – File extensions separated by a comma after the colon (e.g. U:NCP,NCU) – The status of the elements must correspond to the configured status in the DNC machine configuration. – Filters to PRGNAME if given – If PRGNAME contains a dot, the entire file name will be filtered with file extension, otherwise only the file name. – Only the highest version is used for receiving.
FILENAME	Program number of the file (Row PROGNR)
WPLNAME	Workplace group
PRGNAME	File name with file extension
VERSION	Version of file. 0 = max. version

Configuration of the Response Program for a Request Program

It is possible to create a response file in the configuration of the response program for a request program. It is sent to the user in positive as well as negative result. The response file can be freely defined.

It is possible to include specific data into response texts, such as system error messages, the current date, etc. These data are embedded by means of placeholders in the text and automatically retrieved when using the response file.

ⓘ It is recommended to configure a response file if a request program is used.

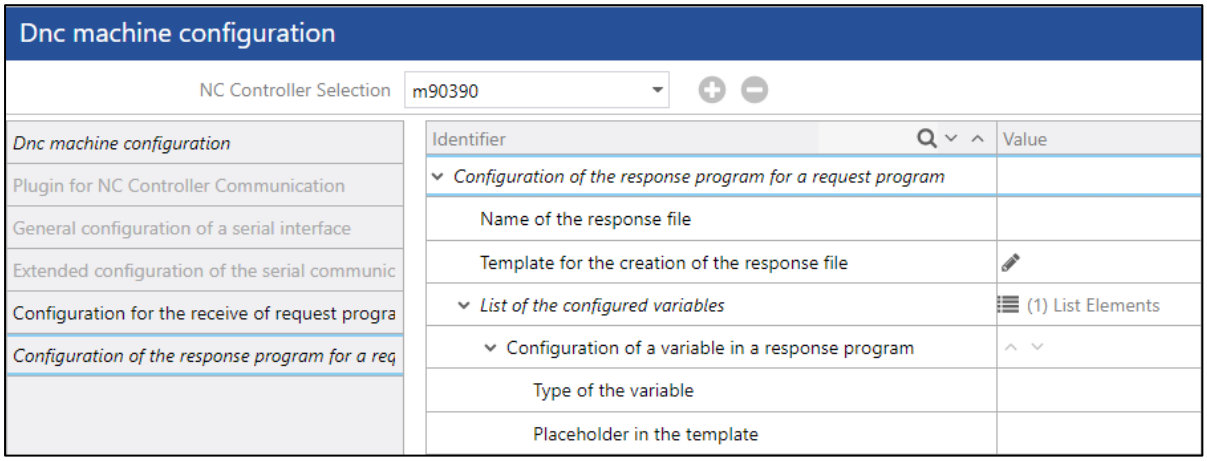


Fig. 33: Configuration of the response program for a request program

To configure a response file:

1 Enter a name for the response file.

2 Open the response file template by double-clicking on the **Edit Entry** icon.

- Enter the text to be shown in the response file.
- Enter placeholders as appropriate (see step 3).
  Specify placeholders in open and close braces. Example: "Error! Reported: {{date}}"
- Click **Apply**.

➔ The template text is shown next to the **Edit Entry** icon.

3 Configure placeholders (optional).

- Right-click on **List Elements** and then click on **Add New List Element** in the context menu.
- Enter the placeholder type.
  The following types are available:
  - ERRORTEXT
    System error message
  - DATE
    Current date
  - PAKETNAME
    Packet name
  - PROGNR
    Program number
  - PROGNAME
    Program name
- Enter the placeholder into the template.
  This is the word or character in the template text that will be replaced by the content of the placeholder.

4 Save.

Fig. 34: Response file template

Copy Configuration

It is possible to transfer the complete configuration of an NC controller to any other NC controller. The configuration of the destination controller will be overwritten in this process.

To copy a controller configuration:

1 Select the NC controller from the dropdown menu in the top menu bar, the configuration of which you want to transfer.

2 Click on the **Add** icon.

3 Select the destination NC controller and confirm.

➔ The configuration of the destination controller is overwritten. The destination controller appears in the dropdown menu in the top menu bar. All other configuration actions now relate to this controller.

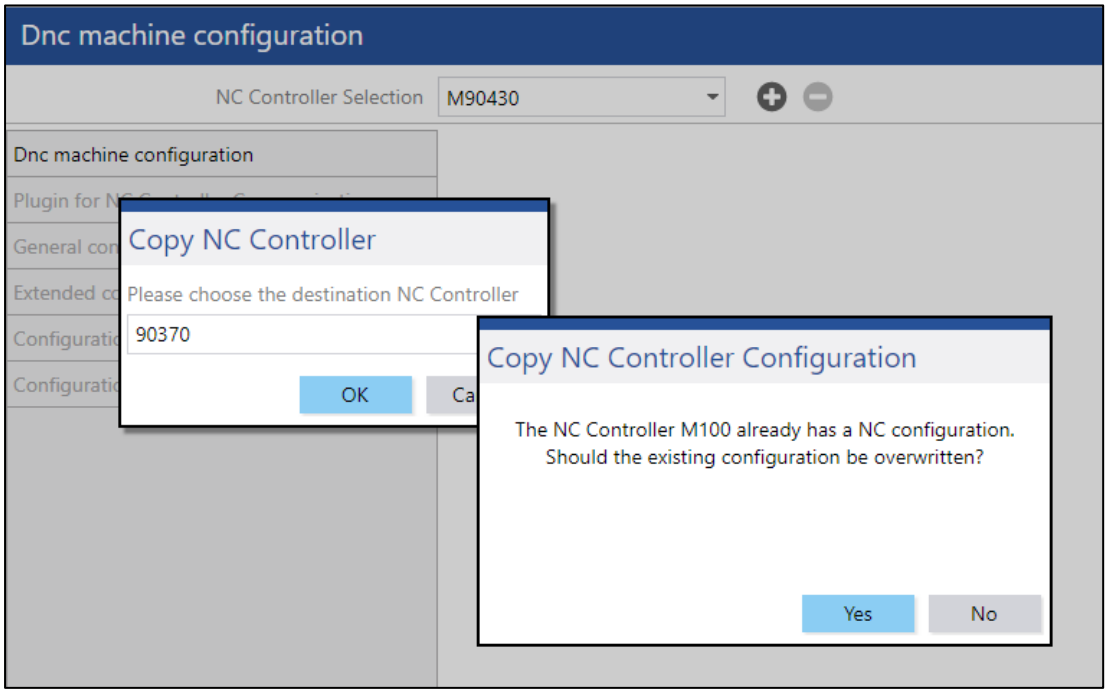


Fig. 35: Copying an NC controller configuration

General Configuration ffDNC

Path: Production Data Management > PDM Configurations > General Configuration ffDNC

This area is provided to define general configurations of the ffDNC. The general configuration must be made before executing ffDNC is enabled. Some values are predefined by default after installation.

General configuration ffDNC	
Identifier	Value
General configuration ffDNC	
Receiver port ffDNC (Workbench)	14,085
Receiver port ffDNC (Terminal)	14,086
DNC Types	TXT;NCP;RCP
Only latest version	☐
Only elements in transferable status	☑
Only in progress (only MCO) or elements in a transferable status	☐
Only released packets	☑
Transferable element sources	Selected (4), Available (0)
Transfer monitor	☑

Fig. 36: General configuration ffDNC

- Receiver port ffDNC (Workbench and Terminal):
  Port for requests from ffDNC to the Workbench and the Shop Floor Terminal (asynchronous communication). Standard: 14085 (Workbench) and 14086 (Terminal).
- DNC Types:
  Specifies the NC types that may be sent. Divide several types by semicolon (;) without any blanks. If this field is left blank, there is no restriction to a type and any type can be sent.
- Only latest version:
  If a check mark is set, it is only possible to transfer the file with the highest version number.
- Only elements in “Transferable” status:
  If a check mark is set, only elements whose status is configured as transferable can be transferred.
- Only elements with a transferable status or status “In progress” (MCO only) transferable:
  If a check mark is set, only elements whose status is configured as transferable can be transferred, or only elements with the status **In progress**.
- Only released packets:
  If a check mark is set, it is only possible to transfer packets with **Released** status.
- Transferable element sources:
  Definition of element sources to be transferred to the Shop Floor Terminal, i.e. the workplace (see below). Element sources may be original/optimized NC programs or NC programs created at the workplace.

- Transfer monitor:
  If a check mark is set, the transfer monitor is displayed when sending and receiving elements. Otherwise, the transfer is performed in the background and there is no feedback to the user.

To add transferable element sources:

1. Click into the line next to **Transferable element sources**.
2. Select the desired sources in the **Available** area and click on the **Move to the left** icon.
3. Save.

Chapter 3 ffDNC

ffDNC is used to send/receive files to/from a machine (or NC controller), respectively. In addition to the method using the Workbench as described in this section, it is also possible to send and receive files directly via the Shop Floor Terminal (see section 4.2).

Sending Files

To send a file, it must be selected first. This can be done in those areas where files are listed: **Packet Search** (see section 2.1.4.1) and **Packet Tree Search** (see section 2.1.4.2).

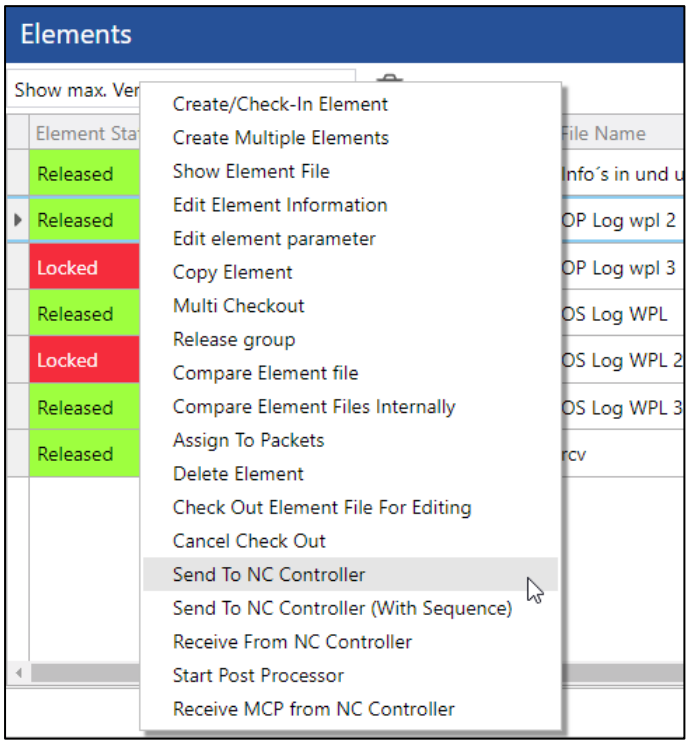


Fig. 37: Sending a file from the Workbench to an NC controller

To send a file:

✓ The file is configured and available.

1 Right-click on the appropriate file and then click on **Send to NC Controller** in the context menu.

2 Select the target NC controller and confirm.
Only necessary if the package is defined on a workplace group. If the package is assigned to a unique workplace, this step is not necessary.

➔ The file is sent to the selected NC controller. A dialog shows the sending status and disappears automatically when the send operation is completed successfully.

Note: It is possible to abort the send operation at any time by clicking **Cancel Transfer** in the status dialog. Data already transferred will then remain on the machine.

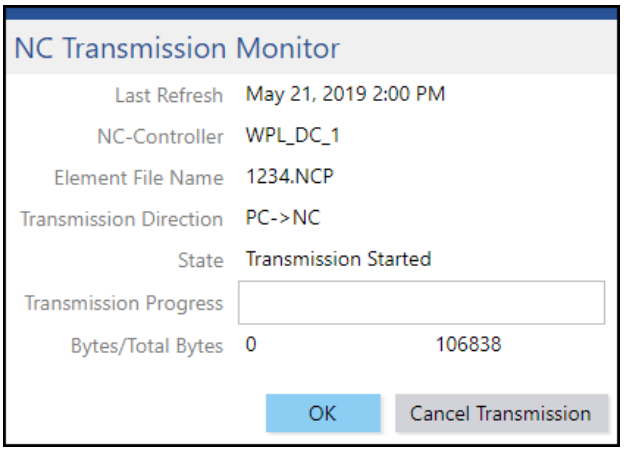


Fig. 38: Status dialog when transferring a file from the Workbench

Receiving Files

To receive a file, it must be selected it first. This is possible in those areas where files are listed: **Packet Search** (see section 2.1.4.1) and **Packet Tree Search** (see section 2.1.4.2).

To receive a file:

✓ The file is configured and available.

1 Right-click on the appropriate file and then click on **Receive from NC Controller** in the context menu (see Fig. 37).

2 Select the source NC controller and confirm.
Only necessary if the package is defined on a workplace group. If the package is assigned to a unique workplace, this step is not necessary

➔ The file is received from the selected NC controller. A dialog shows the receiving status and disappears automatically when the receive operation is completed successfully.

Note: It is possible to abort the receive operation at any time by clicking **Cancel Transfer** in the status dialog (see Fig. 38). All data received so far will be discarded by ffDNC.

Chapter 4 Document Control in the Shop Floor Terminal

Files can be displayed in the Shop Floor Terminal in an external viewer after defining appropriate buttons (see section 0). It is also possible to use buttons to send files to a machine or receive them from there.

Note: Label buttons can be configured freely per individual requirements. For general information on how to configure buttons in the Shop Floor Terminal, refer to the Master Data and System Configuration manual.

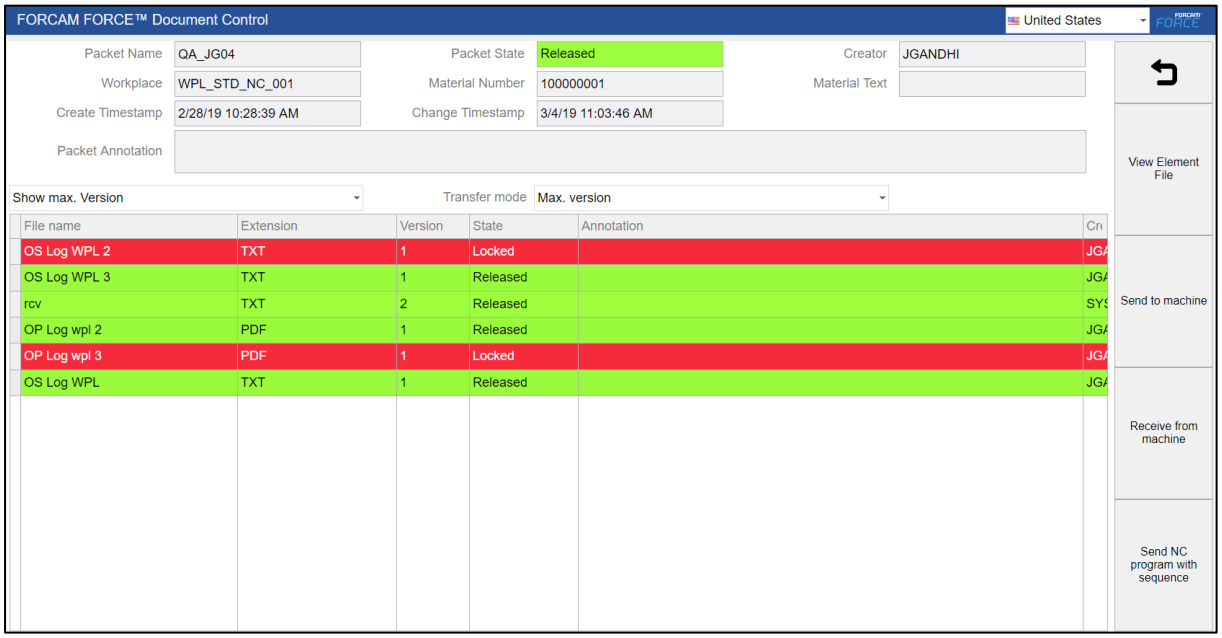


Fig. 39: NC view in Shop Floor Terminal (example)

Viewing Files

The files displayed can be plain document files (drawings, clamping sketches, etc.) or NC programs.

The header parameters used for finding the appropriate packet are determined from selected operations. This involves extracting the packet key fields from the operation data and using them to find the appropriate packet.

As of release version 5.9, it is also possible to determine the parameters by configuring a Groovy step.

A button to display a file requires the following configuration:

Table 11: Configuration of the "Display NC element in external viewer" step

Configuration	Value
Name of step	Display element in external viewer
Input parameters	Parameters (EVERY), NC elements (EVERY)
External viewer	Example for JPG files: – NC type: JPG – Path to external viewer: C:\Windows\system32\mspaint.exe – Download path: NCElements

To display a file in the Shop Floor Terminal:

1 Select the workplace.

2 Select the order.

3 Press the **NC** button on the right of the initial dialog.

➔ The NC dialog appears in the display. Packet keys are displayed in the upper area (display fields). The files available are listed in the lower area (see Fig. 40).

4 Select the version to be displayed from the dropdown menu below the packet keys:

- Show max. version:
  If several versions of an element exist (see section –), only the highest one is displayed.
- Show only highest release and transferable versions:
  Only the highest version with the status **Released** that is also marked as transferable is displayed.
- Show only released and transferable versions:
  Only versions with the status **Released** are displayed that are also marked as transferable.
- Show only released versions:
  Only the versions with status **Released** are displayed.
- Show only transferable versions:
  Only versions that are marked as transferable are displayed.
- Version history:
  All versions of all elements are displayed.

5 Select the appropriate file.

6 Press the **SHOW** button on the right of the screen.

➔ The file is displayed in an external dialog. It is opened in the standard program selected for the file.

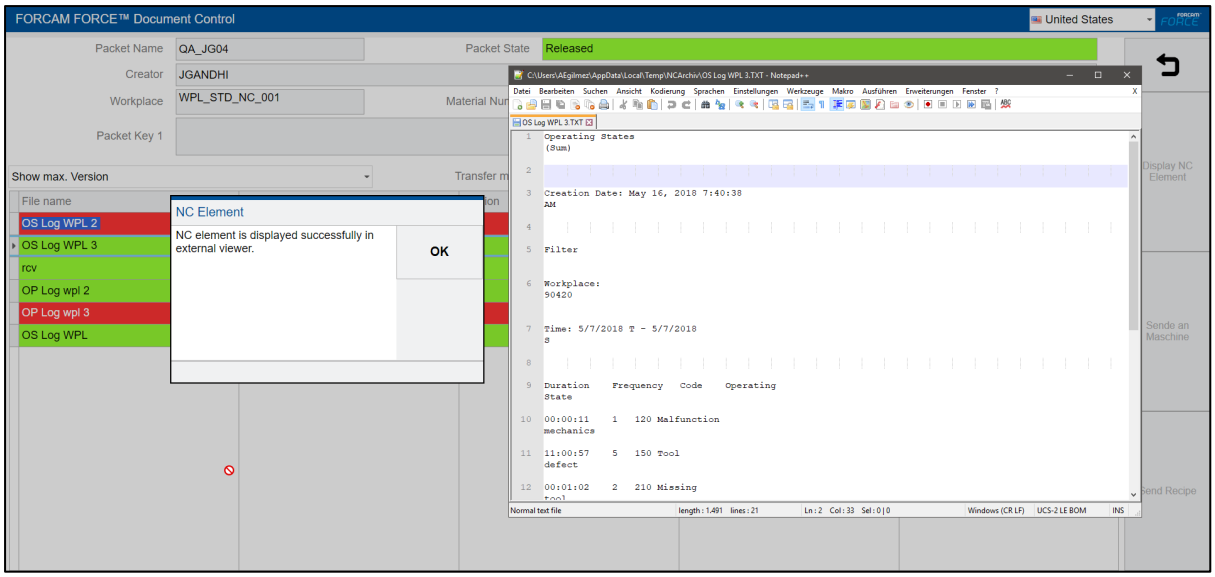


Fig. 40: File displayed in an external dialog

Sending and Receiving Files

It is possible to use a previously configured button in the Shop Floor Terminal to send/receive files to/from a machine or NC controller.

A button for sending/receiving a file requires the following configuration at button level:

Table 12: Configuration of a button for sending/receiving a file

Configuration	Value
Name of button	Any (e.g. **Send to machine** or **Receive from machine**)
Input parameters	– Selected workplace from the basic dialog "NC View" (WP), Workplace (WP) – Selected NC packets from the basic dialog "NC View" (EVERY), Parameter (EVERY) – Selected NC element from the basic dialog "NC View" (EVERY), Parameter 2 (EVERY)

A button for sending/receiving a file requires the following configuration at step level:

Note: The only difference between the configurations for sending and receiving is the transfer mode:

Table 13: Configuration of the “Transfer of NC elements” step

Configuration	Value
Name of step	Transfer of NC elements
Input parameters	– Workplace (WP), Workplace ID (workplace) – Parameter (EVERY), NC packets (EVERY) – Parameter 2 (EVERY), NC elements (EVERY)
Transfer mode	SEND or RECEIVE

To send/receive a file:

1 Select the appropriate file from the table (see Fig. 39).

2 Click the button configured for sending/receiving.

➔ The file is sent to the NC controller. A dialog shows the status of the send/receive process.

Appendix A

History of Changes

Table 14: List of all changes in release version 5.10

Date	Description	Chapter

Plug-ins

Table 15: List of plug-ins that can be used in Document Control

Plug-in	Description
ComPortServer	Runs on a PC and communicates with Infor ForcamMES via TCP/IP and with the NC control via a serial port
FANUC	Enables file exchange with FANUC controls via File-Copy
FileHandler (on file basis)	NC data exchange via a file system (network folder) to which both Infor Forcam MES and the NC control have access. The standard Microsoft Windows file exchange protocol can be used.
FileHandlerServer	Runs on a PC and communicates with Infor Forcam MES via TCP/IP and with NC data exchange via a file system (network folder) to which the NC control has access. Supports older operating systems such as Windows 3.11, NT, XP, etc.
FTP-Plug-in	Like FileHandler. Uses an FTP protocol instead of a file exchange protocol.
Legacy Plug-in	Offers the possibility to start the DNC service of version 4. This plug-in is outdated and not recommended.
MOXA-Plug-in	Communicates with a MOXA box that allows Ethernet to serial to connect older machines to the network

Plug-in	Description
Mazak Communication Server	Communicates with MAZAK machines using the MAZAK Ethernet Library Server. This plug-in is a prototype and is continuously improved. Error-free operation cannot always be guaranteed.
RPC Sinumerik	File exchange with machines that support the RPC protocol. This plug-in is a prototype and is continuously improved. An error-free function cannot always be guaranteed.

Abbreviations and Terms

Table 16: Abbreviations used

Abbreviation	Description
ASCII	American Standard Code for Information Interchange
BDE	Plant Data Collection
CR	Carriage return
DNC	Direct Numerical Control: NC systems connected to a computer. The individual systems can be supplied with NC programs and coordinated from a central location.
FTP	File Transfer Protocol: Network protocol for data transfer between computers
IP	Internet Protocol: Network protocol that can be used for grouping computers within a network according to logical units
KB	Kilobytes
LAN	Local Area Network
LF	Line feed
ms	Milliseconds
NCP	NC program
Operation	Operation
OPT	Optimized: An identifier for a file which is stored under the same file name after an optimization process
PDM	Production Data Management
RTS/CTS	Request to Send/Clear to Send: A handshake protocol for data flow control between computer and modem. The computer activates RTS and communicates the request to send to the modem before beginning with data transmission. Subsequently it checks for CTS and determines whether the modem can accept data. The computer must not send

	data before the modem activates CTS.
SFM	Shop Floor Management: A procedural approach aiming at continuous process improvement at the place of value creation generated by the teamwork between employees and managers.
SFT	Shop Floor Terminal
TCP	Transmission Control Protocol
WP (APL)	Workplace

Table 17: Terms used

Term	Description
Arguments	Parameters causing a program to start specific functions directly when it is called
Button	A control element
Check in	A file previously checked out is checked in again, editing is finished and any changes are adopted
Check out	A file is checked out for processing and opened for editing
Client/server principle	Distribution of tasks and services within a network. The tasks are completed by programs distributed according to clients and servers. The client can request a service from the server as necessary. The server may be located on the same or another computer within the network and responds to the request.
Delta	Used to denote a difference
Dialog	A screen, window or page: An element of the graphical user interface
Display area	The central viewing area of the display screen
Element	Elements are components of packets. An element is a logical image of a file that comprises its content and other additional information (e.g. created by, last modified, etc.).
Host	The main computer within a network; it controls and monitors the network and the computers connected (server).
ISO 9000	A standard which specifies basic principles and concepts of quality management systems
Log	A record of events
Mandatory field	A field which must be filled in properly; otherwise the input/change is not saved.
MIME type	Multipurpose Internet Mail Extensions: Specify the various definitions in which file contents and file formats are referenced in order to enable or facilitate identification of a file by the software
Navigator	Main user control area on the left of the screen arranged in a tree structure. For information on how to configure the Navigator, refer to the Master Data and System Administration User Manual.

Term	Description
NC element	An element in a numerical control program
NC program	A program designed to control NC equipment. An NC program is transferred on a data storage medium to the NC equipment for execution.
NC type	NC types can be freely created. An NC type can define and describe file extensions. For example, you may create file extensions to be used for main programs. If these extensions occur later on, they will be recognized and associated with the main programs accordingly. Hence, an NC type is equivalent to a collective file extension object.
Packet	A packet consists of a header with a fixed number of parameters and any number of elements.
Packet key	Parameters establishing the link to the Production Data Management (PDM) module.
Request program	A numerical control (NC) program with meta-information that may initiate (re)transfer of one or more files.
Serial data transmission	The transmission of digital data on one line or pair of lines (in contrast with parallel data transmission)
Shop Floor Terminal	Central source of information and operating state acquisition unit for the production personnel. Can be executed on devices with browser capability.
Step	An activity step with a specific function (command) which can be assigned to a button in the Shop Floor Terminal
Superuser	A user who has all permissions for viewing and editing
User field	A blank field made available to enter additional information of any kind
Viewer	A file viewer is used to display the digital data stored in files.
XON symbol	A specific symbol which is required for transmission on some machines with serial communication.

Conventions and Navigation

Table 18: Document conventions

Convention	Description
Bold type	Button names and table and field titles are printed in bold type.
Icons	A function shown as an icon involves a reference to the icon as an object.
Path	All paths specified relate to the Navigator.

Action step	Action steps are indicated by numbers at the beginning of the sentence. The sequence of the numbers specifies the order of actions. Alternative actions are identified by Or.
Prerequisite	Prerequisites for an action are identified by ✓.
Action result	Results of an action are identified by ➔.
Note	Notes are identified by ⓘ.
Substeps of an action	Substeps of an action are indented and provided with unique symbols on each action level. The order of levels is as follows: 1. a. i.

Table 19: System navigation

Navigation	Description
Close icon	Any content opened in the Navigator is closed by clicking on the close icon on the right of the screen.
Breadcrumb bar	If subpages or additional screens are available, a breadcrumb bar appears at the top edge of the screen. Clicking on the first element will close all subpages.
Direct editing	Editing most of the cells displayed in tables is enabled either directly or via the context menu (right-click or dropdown menu).
Disabled columns	Columns with a grey background (viewing fields) cannot be edited.
Refresh	Since the Workbench is a web-based application, refreshing in the browser will cause the Workbench to log off.
Error message	Error messages appear at the bottom left of the screen.

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