



# Version 5.9

## Document Control

Manual

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## 1 General

### 1.1 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

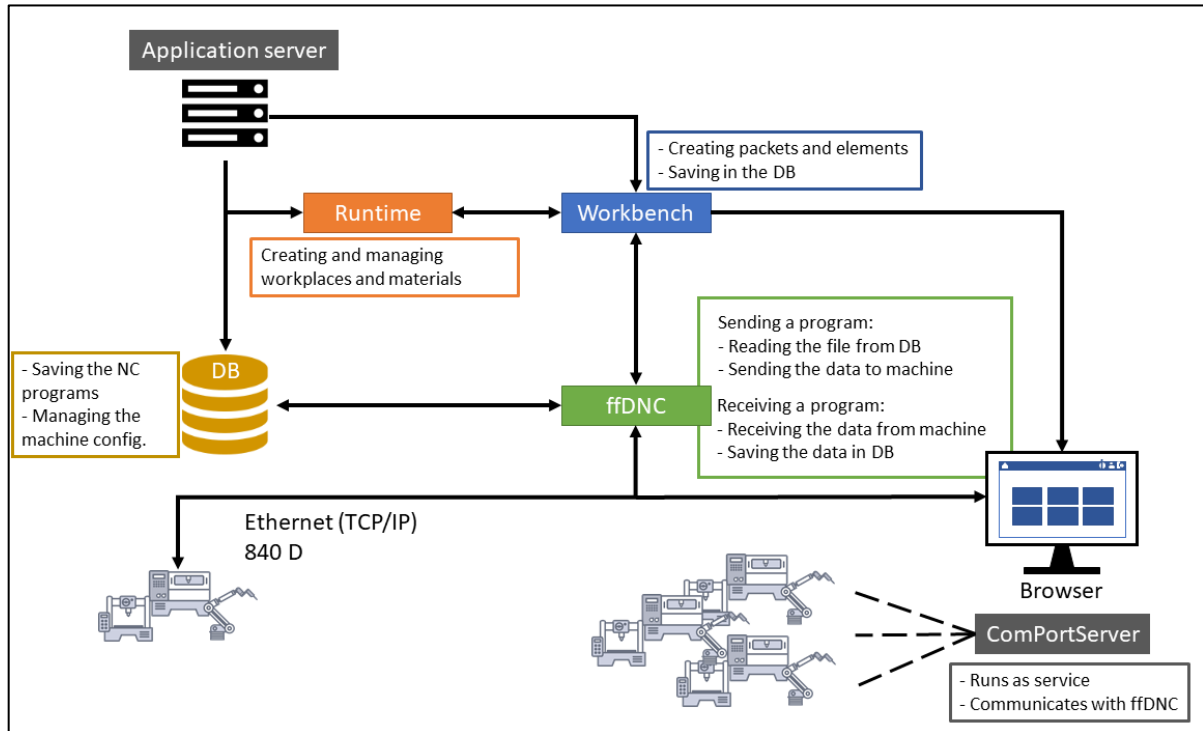
The comprehensive search functions enable the user to find documents quickly and reliably. Communication between NC programming and workshop can be substantially improved by using comments for each individual element, by graphic views and the possibility of showing differences in the NC programs optimized 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. You can use the **Import Elements** function to read files of any type (images, drawings, texts, spreadsheets).

## 1.2 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
<b>Workbench</b>	<p>Browser-based configuration of the overall system. Direct access to all relevant functions:</p> <ul style="list-style-type: none"> <li>— Finding elements and packets</li> <li>— Managing elements and packets (create, delete, etc.)</li> <li>— Creating workplaces and materials</li> <li>— Viewing transmission logs</li> <li>— Displaying the machine status</li> <li>— Monitoring the ffdnc application</li> </ul>
<b>Runtime</b>	<p>Processing the commands for master data management (persistence and cache management).</p> <p>This would not be required for plain PDM functions. However, it is still necessary to use it in order to maintain consistency with the other modules.</p>
<b>ffdnc</b>	<p>Allows you to read a file from the database and send data to a machine. Can also receive files directly from a machine and store them in the database.</p>

### 1.3 PDM Definitions



**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	<p>Defines the source of the NC element:</p> <ul style="list-style-type: none"> <li>— PLM: Elements was imported after having been created externally (ID = PDM).</li> <li>— PDM: Element was created in the PDM (ID = NEW) and imported into PDM by the user (ID = NEW).</li> <li>— OPT: The element was based on a PDM element and optimized in the machine controller.</li> <li>— WEP: The element was created in the machine controller. A PDM element does not exist in the Production Data Management module.</li> </ul>
Type	<p>Defines the function type of the element.</p> <p>The type safeguards that only NC program files are transferred (if configured). Example: <b>NCP</b> type for NC program. However, several file name extensions may exist on each NC controller, e.g. .ncw, .mpf, .spf, .h, etc.</p>
File Extension	<p>The extension of the file stored in the element.</p> <p>In the Workbench client, this is interpreted as the MIME type. When activating <b>Show Element</b>, the browser instructs the associated program accordingly (<b>Open File With...</b>).</p> <p>In the worker client, the file extension and the type together are used as the selection criteria for the viewer.</p>
Status	Status of the element

### 1.3.1 NC Types

**Path:** Production Data Management > NC Types

NC types are file groupings that can be freely created. You can define and describe file extensions for an NC type. For example, you may configure file extensions 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	<input type="checkbox"/>	JGANDHI	Oct 2, 2018 2:25 PM		
NCP	NC	🔍	<input type="checkbox"/>	JGANDHI	Oct 2, 2018 2:27 PM		
PDF	PDF	🔍 PDF	<input type="checkbox"/>	JGANDHI	Oct 2, 2018 2:27 PM		
ALL	png;jpg;jpeg;txt;pdf	🔍 ALL FILES	<input type="checkbox"/>	SYSTEM	Nov 14, 2018 2:59 PM	May 16, 2019 12:32 PM	
RCP	XML	🔍 Recipe File	<input checked="" type="checkbox"/>	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. You can edit these fields directly.
2. Enter the name of the NC type in **NC Type**.
3. Enter the relevant **File Extensions**.  
 Delimit the entries by commas. Use capitals for NC types.
4. Enter a **Description**.
5. Save.

### 1.3.2 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
<b>Released</b>	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.
<b>Locked</b>	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.
<b>Inactive</b>	The package is no longer used and only serves to trace the data.

### 1.3.3 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
<b>Released</b>	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.
<b>Locked</b>	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.
<b>In Progress</b>	You can check out an element for editing. In this case it is assigned <b>In Progress</b> status. ⓘ In order to avoid version conflicts, an element checked out should only be edited by the user who checked it out.
<b>New</b>	A new file imported into the system is automatically assigned <b>New</b> status. However, the status can be defined in the FDM configuration.

## 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.

### 2.1 Packets

#### 2.1.1 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

 You can customize the standard packet header according to your requirements (see section 2.1.3).

Edit Packet			
Packet State	Released	Packet Name	JG04
Material Number		Workplace	90270
		Material Text	
		Creator	JGANDHI
Packet Annotation			
Create Timestamp	Nov 9, 2018 11:08 AM	Responsible	
Change Timestamp	Apr 2, 2019 7:06 AM	User Field 01	0010
		Editor	SYSTEM

**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
<b>STATUS</b>	Paketstatus	Packet state
<b>WORKPLACE_ID</b>	Arbeitsplatz	Workplace
<b>MATERIAL_ID</b>	Materialnummer	Material number
<b>PACKET_KEY3</b>	AVO	Operation
<b>ORIGINATOR</b>	Ersteller	Created by
<b>CREATE_TS</b>	Erstellt	Created
<b>EDITOR</b>	Letzter Bearbeiter	Last changed by
<b>CHANGE_TS</b>	Letzte Bearbeitung	Last change

## 2.1.2 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).

**Create Packet**

Packet State

Locked

Packet Name

Material Number

Material Text

Packet Annotation

Create Timestamp
May 16, 2019 1:45 PM

Responsible

Change Timestamp

User Field 01

**Elements**


Show max. Version

Element State	Linked Packets Cou	Element-ID	Version	File Name	File Extensi	Source	NC Type

**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 you can create an element.

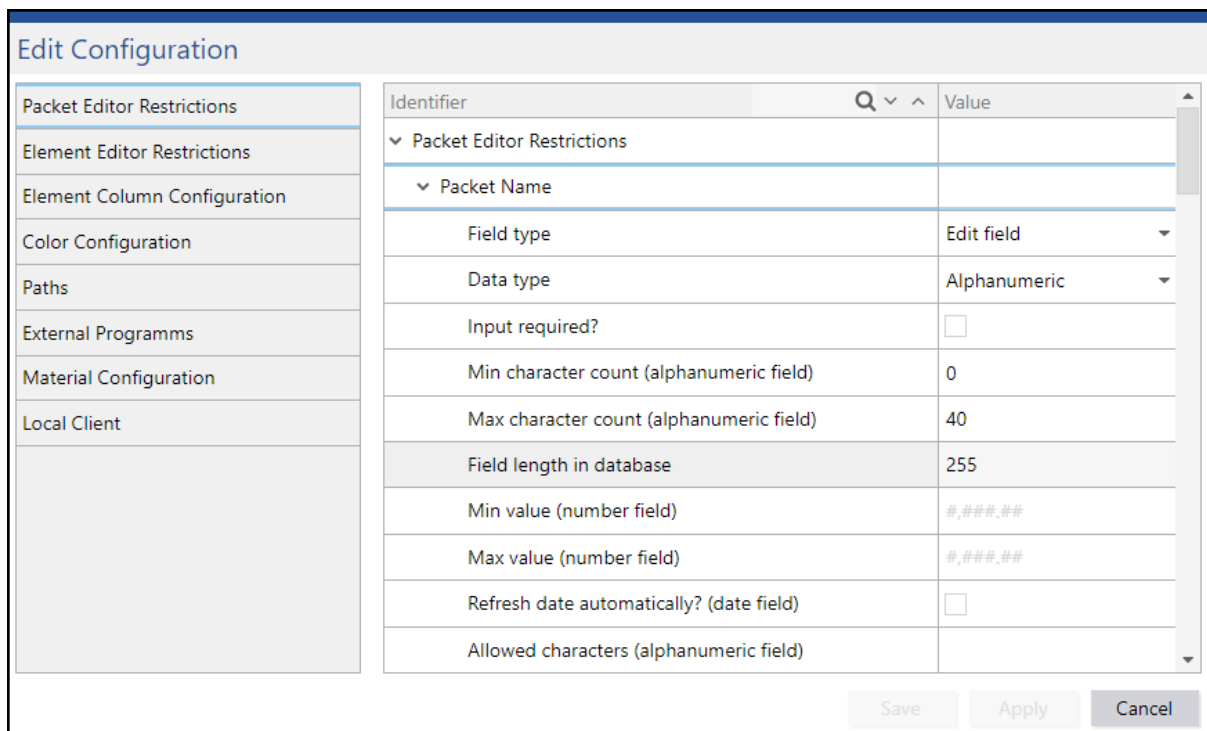
## 2.1.3 Configure Packet

### 2.1.3.1 Configuring Packet Header Properties

**Path:** Production Data Management > Create Packet

You can configure the appearance and behavior of the packet header parameters 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.



Identifier	Value
▼ Packet Editor Restrictions	
▼ Packet Name	
Field type	Edit field ▼
Data type	Alphanumeric ▼
Input required?	<input type="checkbox"/>
Min character count (alphanumeric field)	0
Max character count (alphanumeric field)	40
Field length in database	255
Min value (number field)	#,###,##
Max value (number field)	#,###,##
Refresh date automatically? (date field)	<input type="checkbox"/>
Allowed characters (alphanumeric field)	

Save Apply Cancel

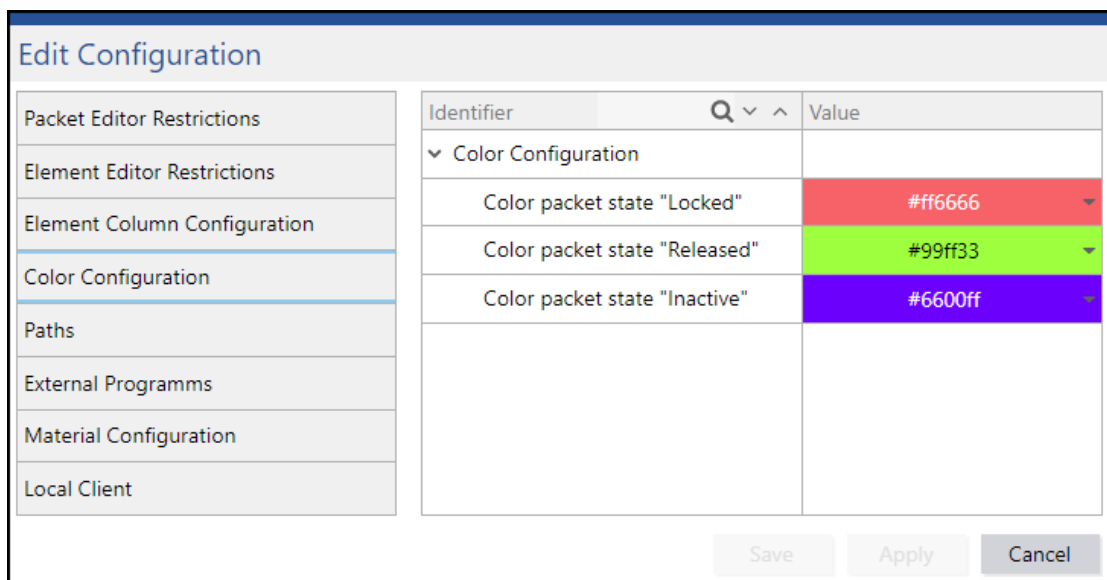
**Fig. 6: Packet editor restrictions**

**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 you set a check mark, 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.



Identifier	Value
Color packet state "Locked"	#ff6666
Color packet state "Released"	#99ff33
Color packet state "Inactive"	#6600ff

**Fig. 7: Status color configuration**

### 2.1.3.2 Editing Packet/Parameter Options

You can configure packets and elements 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
<b>Packet status when creating manually</b>	The status of a packet after it has been created
<b>Element status when creating manually</b>	The status of an element after it has been created
<b>Element source when creating manually</b>	The source of an element created
<b>Element status at check in</b>	The status of an element after check-in
<b>Element status on OPT program conversion</b>	The status of an element after the PDM program conversion
<b>Element type list dependent on current type</b>	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.
<b>Max. file size for import in KB</b>	The maximum file size of an element that can be imported.
<b>Observe upper/lower case on sorting file names</b>	If a check mark is set, the system distinguishes upper and lower case of file names.
<b>Initial Element Table View Mode</b>	Select the element versions displayed (see section 2.3.1)
<b>Lock all element versions if one element is released</b>	If an element is released, all previous versions are automatically set to the status "Locked".
<b>Block element data in status "Released"</b>	If a check mark is set, an element cannot be edited in 'Released' status
<b>Block element data in status "Locked"</b>	If a check mark is set, an element cannot be edited in 'Locked' status
<b>Change of transferred elements possible?</b>	If a check mark is set, elements that have already been transferred to the machine can still be edited.
<b>Check unique element file names?</b>	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.
<b>Packet uniqueness fields</b>	Fields that make a packet unique in the overall system by information/parameters specified. To add a parameter: <ol style="list-style-type: none"> <li>1. Click on the field below <b>Value</b>.</li> <li>2. Select the desired parameter in the column on the right and click on the <b>Move to the left</b> icon.</li> <li>3. Click on a free area outside of the columns.</li> </ol> ➔ The <b>Selected</b> value is incremented by 1, the <b>Available</b> value is decremented by 1.

Option	Description
<b>Maximum (packet/element) result rows</b>	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.

### 2.1.3.3 Path Settings

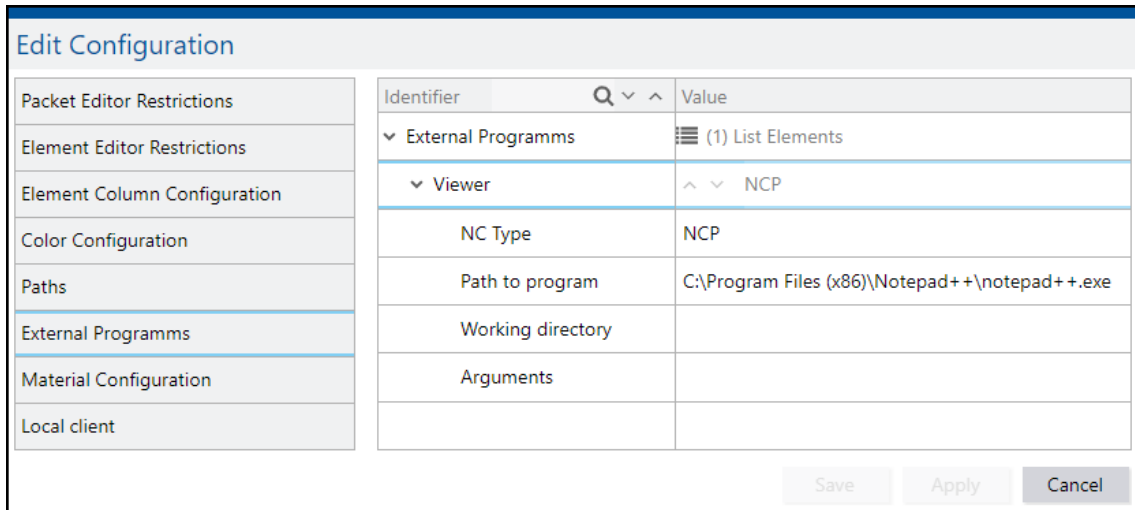
You can specify **Paths** manually, for example, to set target locations for exporting or storage locations of external programs. Table 7 summarizes all options available for path specifications.

**Table 7: Path specifications**

Option	Description
<b>Paths</b>	Specifies the position of files and programs on the user's local disk.
<b>Export path for program operations</b>	The client path is specified in the client configuration (it may have to be added to the Navigator using the <b>Change Configuration</b> 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.
<b>Element export path</b>	The path to the target directory into which elements are exported
<b>Element import path</b>	The path to the source directory from which elements are imported
<b>Element check in path</b>	The path to the directory into which an element is copied after checking in
<b>Element check out path</b>	The path to the directory into which an element is copied after checking out for editing
<b>Comparison program</b>	A program which allows you to compare files to highlight differences between the files (see section –)
<b>Use external comparison program?</b>	If a check mark is set, the configured external program is used instead of the default program included in the software.
<b>Path to comparison program</b>	The path to the directory where the external comparison program is stored
<b>Working directory</b>	The working directory of the external comparison program
<b>Arguments</b>	Arguments specified when calling the external comparison program
<b>Post-processor program</b>	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.
<b>Path to post processor program</b>	The path to the directory where the post-processor program is stored
<b>Working directory</b>	The working directory of the post-processor program
<b>Arguments</b>	Arguments specified when calling the post-processor program

### 2.1.3.4 Adding External Programs

You can include external programs so that you can display files in an external viewer (see section 4). For example, you can select a suitable program to be used for viewing graphics.



The screenshot shows the 'Edit Configuration' dialog box. On the left is a sidebar with a list of configuration categories: Packet Editor Restrictions, Element Editor Restrictions, Element Column Configuration, Color Configuration, Paths, External Programms (highlighted), Material Configuration, and Local client. The main area is a table with two columns: 'Identifier' and 'Value'. The table is expanded to show the 'External Programms' section, which contains a sub-section 'Viewer'. Under 'Viewer', there are four rows: 'NC Type' with value 'NCP', 'Path to program' with value 'C:\Program Files (x86)\Notepad++\notepad++.exe', 'Working directory' (empty), and 'Arguments' (empty). At the bottom right of the dialog are three buttons: 'Save', 'Apply', and 'Cancel'.

Identifier	Value
External Programms	(1) List Elements
Viewer	NCP
NC Type	NCP
Path to program	C:\Program Files (x86)\Notepad++\notepad++.exe
Working directory	
Arguments	

**Fig. 8: Adding external programs**

**To add an external program:**

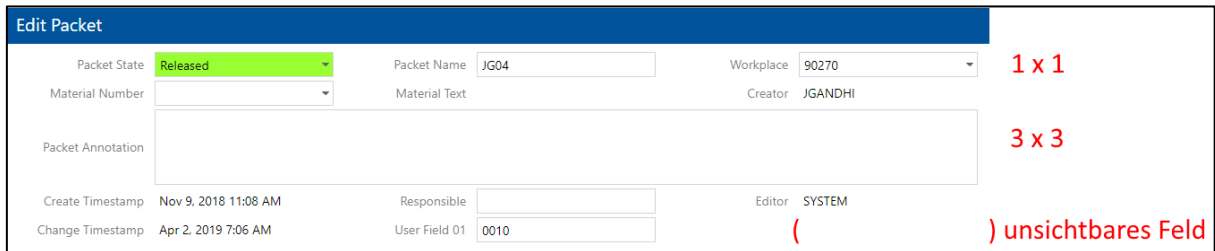
1. Click the **Change Configuration** icon.
2. Click on **External Programms**.
3. Right-click on **List Elements** and then click on **Add New List Element** in the context menu.
4. Open the dropdown menu of **External Programms**.
5. Open the dropdown menu of **Viewer**.
6. Enter the **NC Type**.  
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.



### 2.1.3.5 Adding or Removing Parameters

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

You can 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. You may also insert invisible columns as placeholders which cause a line wrap in a parameter line.



The screenshot shows the 'Edit Packet' form with the following fields and dimensions:

- Packet State:** Released (dropdown) - 1 x 1
- Packet Name:** JG04 (text field) - 1 x 1
- Workplace:** 90270 (dropdown) - 1 x 1
- Material Number:** (dropdown) - 1 x 1
- Material Text:** (text field) - 1 x 1
- Creator:** JGANDHI (text field) - 1 x 1
- Packet Annotation:** (text area) - 3 x 3
- Create Timestamp:** Nov 9, 2018 11:08 AM (text field) - 1 x 1
- Responsible:** (text field) - 1 x 1
- Editor:** SYSTEM (text field) - 1 x 1
- Change Timestamp:** Apr 2, 2019 7:06 AM (text field) - 1 x 1
- User Field 01:** 0010 (text field) - 1 x 1
- ( ) unsichtbares Feld:** (invisible field) - 1 x 1

**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.

**i** If you want 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.

## 2.1.4 Packet Search

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

### 2.1.4.1 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

Packet Search		Search Results		
Search Pattern	Simple search	Packet Name	Packet State	Material Number
Workplace Group		MIXED_PACK_GRP_1230_100000139	Released	100000139
Material Number		NC_PACK_GRP_1230_100000138	Released	100000138
		QA_JG03	Inactive	100000001
		QA_JG04	Released	100000001
		QA_JG05	Inactive	100000001

**Fig. 11: Finding a packet**
**To find a packet:**

1. Select the suitable search pattern.
2. Enter the search parameters.
3. Run search.

You can create new search patterns to specify parameters per your 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. Keep the CTRL key pressed to select several elements.
7. Set the default configuration.  
If a check mark is set for **Default Configuration**, the corresponding pattern is displayed by default when the package search is opened.
8. Save.

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

 You can configure the **Search Results** table in more detail (see section 2.1.2).

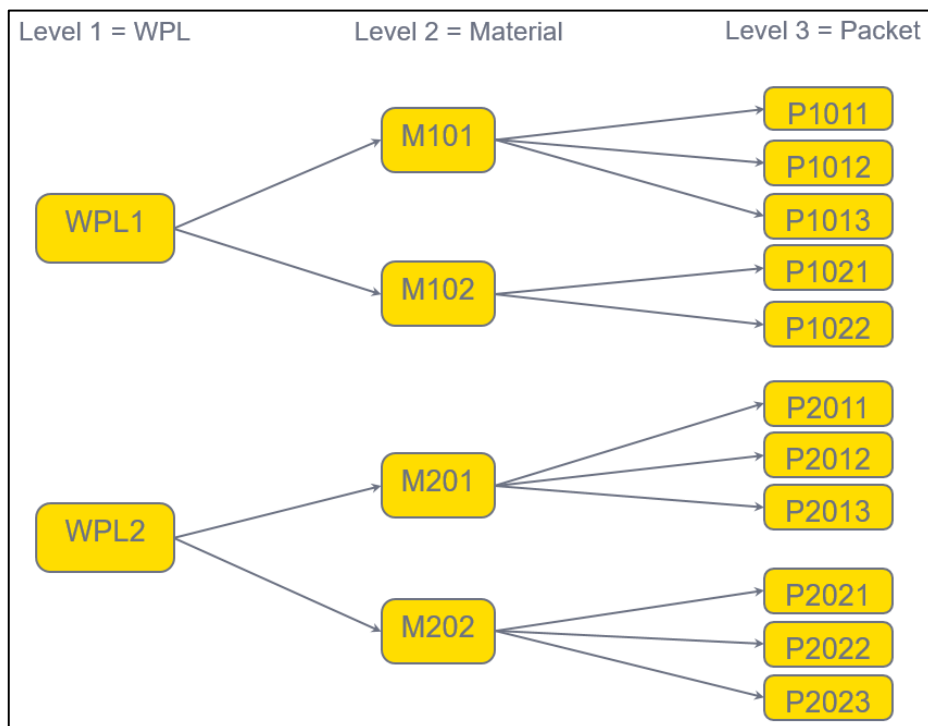
### 2.1.4.2 Packet Tree Search

**Path:** Production Data Management > Packet Tree Search

You can display packets 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**

### Packet Tree Search

Default-Tree

Packets

- Undefiniert-
- Freigegeben
  - 90270
  - WPL\_STD\_NC\_001
  - WPL\_STD\_NC\_002
  - WPL\_STD\_NC\_002
  - WPL\_STD\_NC\_002
  - WPL\_STD\_NC\_002
  - WPL\_STD\_NC\_003
- Gesperrt
  - 100
  - 90640
- Inaktiv

### Packet

Packet State: **Released**      Packet Name: QA\_JG04

Material Number: 100000001      Material Text:

Packet Annotation:

Create Timestamp: Feb 28, 2019 9:28 AM      Responsible:

Change Timestamp: Mar 4, 2019 10:03 AM      User Field 01: 0010

### Elements

Show max. Version

Element State	Linked Packets Cou	Element-ID	Version	File Name	File Extensi	Source	NC Typ
Released	4	4	1	OP Log wpl 2	PDF	FDM	PDF
Locked	4	5	1	OP Log wpl 3	PDF	FDM	PDF
Released	4	6	1	OS Log WPL	TXT	FDM	TXT
Locked	4	1	1	OS Log WPL 2	TXT	FDM	TXT

**Fig. 13: Packet tree search**

The default tree comprises the workplace group and packet status parameters. You can remove or add other parameters (see section 2.1.3.3). It is also possible to create your own tree.

### Edit Configuration

- Tree Configuration
- Packet Editor Restrictions
- Element Editor Restrictions
- Element Column Configuration
- Color Configuration
- Paths
- External Programms
- Material Configuration
- General configuration PDM

#### Configurations

- Default-Tree
- Default-Baum

☒ Default Configuration

Selected

- Workplace Group
- Packet State
- Creator

Available

- Change Timestamp
- Create Timestamp
- Edit State
- Editor

Save
Apply
Cancel

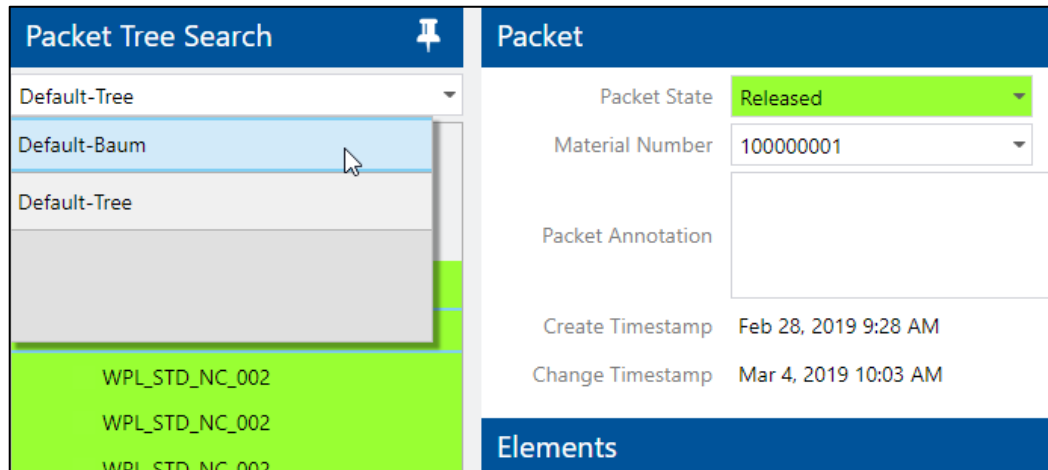
**Fig. 14: Creating a packet tree**

**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. You may want to define the new tree as the default tree by setting a check mark for **Default Configuration**.
7. Save.

**To change to another packet tree:**

1. Open the dropdown menu under **Packet Tree Search**.
  2. Select the appropriate packet tree.
- The change is effective immediately and does not need to be saved.


**Fig. 15: Changing the packet tree**

## 2.2 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.

- ❗ 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.).


- ❗ 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.  
 Select the **Key Identifier**. The following keys are available:
  - Operation with material number and user fields
  - Workplace with machine name and user fields
3. Save.

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

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

Create Packet			
Packet Name <input type="text"/>	Packet State <b>Locked</b>	Packet Key 1 	
User Field 01 <input type="text"/>	Packet Key 2 	User Field 02 <input type="text"/>	
Packet Key 3 <input type="text"/>	User Field 04 <input type="text"/>		
User Field 03 <input type="text"/>	Creator SYSTEM	Create Timestamp May 17, 2019 1:59 PM	
Workplace <input type="text"/>	Editor	Change Timestamp	

**Fig. 17: Connection between packet fields and their links**

## 2.3 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.). You can create any number of elements for a package.

**Edit Packet**

Packet State
Released

Packet Name
QA\_JG04

Material Number
100000001

Material Text

Packet Annotation

Create Timestamp
Feb 28, 2019 9:28 AM

Responsible

Change Timestamp
Mar 4, 2019 10:03 AM

User Field 01
0010

**Elements**

Show max. Version

	Element State	Linked Packets Cou	Element-ID	Version	File Name	File Extensi	Source	NC Type	File S
	Released	4	4	1	OP Log wpl 2	PDF	FDM	PDF	
	Locked	4	5	1	OP Log wpl 3	PDF	FDM	PDF	

**Fig. 18: Example of a packet and its elements**


### 2.3.1 Creating an Element

Elements can be created wherever you can create or select a packet:


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



Elements

Show max. Version 

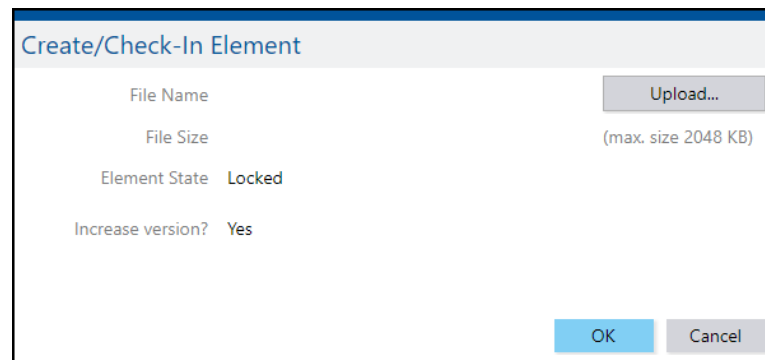
	Element State	Linked Packets Cou	Element-ID	Version	File Name	File Extensi	Source
	Released	4	4	1	OP Log wpl 2	PDF	FDM
	Locked	4	5	1	OP Log wpl 3	PDF	FDM
	Released	4	6	1	OS Log WPL	TXT	FDM
	Locked	4	1	1	OS Log WPL 2	TXT	FDM
	Released	4	2	1	OS Log WPL 3	TXT	FDM
	Released	4	3	2	rcv	TXT	FDM



Create/Check-In Element  
Create Multiple Elements  
Receive MCP from NC Controller

**Fig. 19: Creating elements**
**To create an element:**

- 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**.
- In the **Create/Check-In Element** dialog (see Fig. 20), click **Upload....**
- Select file(s) and confirm.  
Keep the CTRL key pressed to select several files.
- Change the **Element Status** as necessary.
- Specify whether to increment the version.  
If you reload the same file or another file with the same name, the version number is incremented if you select **Yes**. The previous version remains.
- Click **OK**.
- The new element created appears at the bottom position in the table.
- Select the **Source**.
- Select the **NC Type**.
- Save.



**Create/Check-In Element**

File Name Upload...

File Size (max. size 2048 KB)

Element State **Locked**

Increase version? **Yes**

**OK** Cancel

**Fig. 20: Dialog for creating an element**

**i** You can 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.

### 2.3.2 Linking a Packet with an Element

In configuration pages where packages are created or selected, they can also be linked to elements:

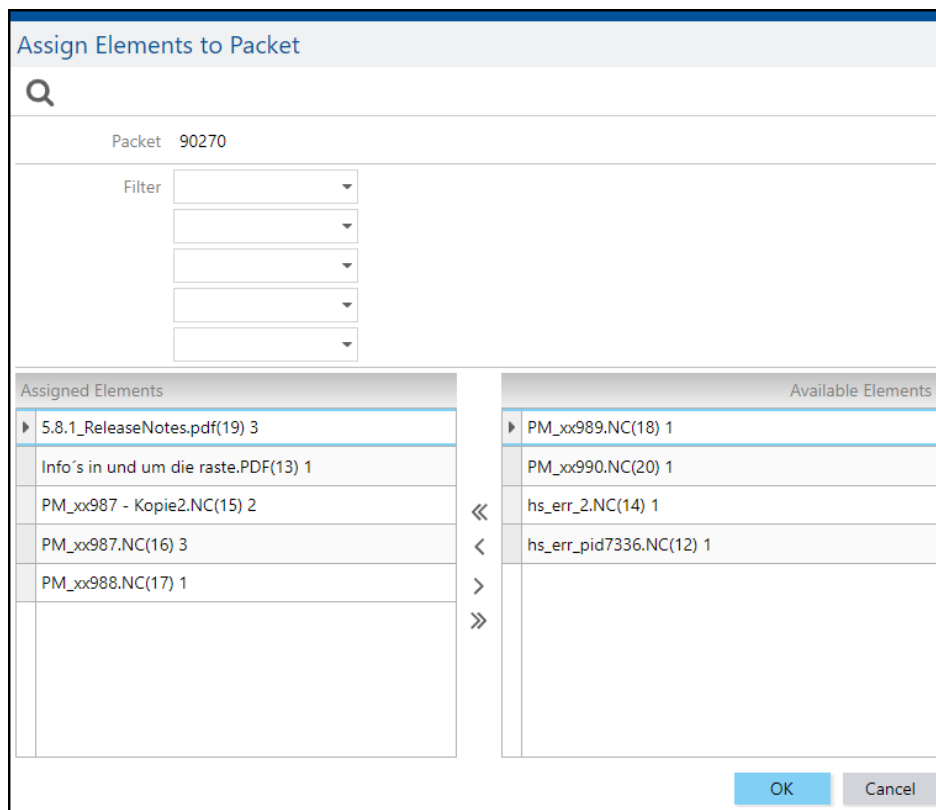
- Creating a packet (see section 2.1.2)
- Searching for a packet (see section 2.1.4)

Packet Search		Search Results			
Search Pattern	Einfache Suche	Packet Name	Packet Stat	Material Nr	Material Tex
Workplace Group		-	Locked		
Material Number		JG02	Inactive	5	FORCAM Fe
		JG03	Inactive		
		JG04			
		MIXED_		100000139	
		NC_PAC		100000138	
		QA_JG0		100000001	
		QA_JG04	Released	100000001	

**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**

### 2.3.3 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
<b>Create/Check-In Element</b>	Opens a pop-up dialog in which an element can be selected and uploaded. It will be checked in afterwards.
<b>Create Multiple Elements</b>	Opens a pop-up dialog in which several elements can be selected and added to the package.
<b>Show Element File</b>	Opens the uploaded file in an external editor.
<b>Edit Element Information</b>	Allows editing of various element information such as status, source, comment, etc.
<b>Copy Element</b>	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.
<b>Multi Checkout</b>	<p>✓ Multiple elements are selected. The selected elements are checked out. They form a logical group.</p> <p>→ The processing of the files is finished. During check-in, the version number is increased by 1.</p> <p>❗ To avoid version conflicts, an element checked out should only be edited by the user who checked it out.</p>
<b>Release group</b>	Resolves the logical group that is formed over multiple elements during a multicheckout. Prerequisite: All elements must be in status <b>Waiting for release</b> .
<b>Compare Element File</b>	Compares element files using an external comparison tool (see Table 7)
<b>Compare Element Files Internally</b>	<p>✓ Two elements are selected. Opens the system-internal comparison tool. Compare both files and highlight differences.</p>
<b>Assign to Packets</b>	Opens a pop-up dialog in which an element can be linked to a packet.
<b>Delete Element</b>	Deletes the selected element. Deletion takes effect only after clicking on the <b>Save</b> icon and can be undone by clicking on the <b>Cancel Change</b> icon.
<b>Check Out Element File for Editing</b>	<p>The element is checked out. A dialog specifies the storage location of the file. You can edit the file.</p> <p>When you want to check in an element again, right-click on the element and then click on <b>Create Element</b>.</p> <p>→ File editing is finished. If a change was made to the file, the version number is increased by 1.</p> <p>❗ To avoid version conflicts, an element checked out should only be edited by the user who checked it out.</p>
<b>Cancel Check-Out</b>	Stops checking out the file. Any changes are discarded.
<b>Send to NC Controller</b>	The element is sent to the NC controller. The transfer monitor indicates the status.
<b>Send to NC Controller (With Sequences)</b>	Sends the element with a configured sequence to an NC controller. Signal values can be selected in a dialog that are

Option	Description
	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.
<b>Receive from NC Controller</b>	Receives an element from the NC controller. The transfer monitor indicates the status.
<b>Start Post Processor</b>	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.
<b>Receive MCP from NC Controller</b>	Receives a machine-created program from the NC controller.
<b>Send Recipe to Controller</b>	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.

### 2.3.4 Element Search

**Path:** Production Data Management > Element Search

You can 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.

You can edit the default search and add or remove parameters.

Element Search		Search Results				
Search Pattern	Default-Suche	Element State	Linked Packets	Element-ID	Version	File
File Name		Locked	1	14	1	hs_e
File Extension		Inactive	1	22	1	hs_e
Element State		Locked	1	12	1	hs_e
Source		Locked	0	8	1	PM
NC Type	NCP	Released	1	16	3	PM
Version		Locked	1	16	2	PM
Program No.		Locked	1	16	1	PM
User Field 01		Released	1	44	1	PM
User Field 02		Released	1	52	1	PM
User Field 03		Locked	0	11	1	PM
		Locked	1	15	2	PM

**Fig. 23: Finding elements**

**To find an element:**

1. Enter the search parameters.
2. Save.

You can create new search patterns to specify parameters per your 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. Keep the CTRL key pressed to select several elements.
7. 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.
8. Save.

You can 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.

 You can configure the **Search Results** table in more detail (see section 2.1.2).

## 2.4 Logs

**Path:** Production Data Management > PDM Logs

The PDM module can create logs to record detailed information.

FDM User Log		Search Results			
User	<input type="text"/>	User	User Action	Time	Packet
User Action	<input type="text"/>	879164366	DNC send finished su	Jun 14, 2019 11:11 AI	QAJGLINE1A
Time	06/07/19 00:00 <input type="text"/> 06/14/19 23:59 <input type="text"/>	879164366	DNC send started	Jun 14, 2019 11:11 AI	QAJGLINE1A
Workplace	<input type="text"/>	879164366	DNC send finished su	Jun 14, 2019 11:11 AI	QAJGLINE1A
Program Name	<input type="text"/>	879164366	DNC send started	Jun 14, 2019 11:11 AI	QAJGLINE1A
		879164366	DNC send finished su	Jun 14, 2019 11:11 AI	QAJGLINE1A
		879164366	DNC send started	Jun 14, 2019 11:11 AI	QAJGLINE1A

**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 any.
- **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.

FDM User Log X

NC Controller-Log X

NC-Log X

State Monitor NC Controllers X

State Monitor NC Controllers

NC Controller	State	Connection Stat	Element File Name	Transmission Dire	Bytes	Transr
WPL_STD_NC_003	Active	Connected				No
WPL_STD_NC_002	Active	Connected				No
WPL_STD_NC_001	Active	Connected				No
mWPL_STD_NC_1	Active	Connected	PM			No
mWPL_STD_NC_1	Active	Connected	PM			No
M100	Inactive	Disconnected			0	No

Start NC Controller communication

Restart NC Controller communication

Stop NC Controller communication

Set Log Level

Send Auxiliary Data to NC Controller

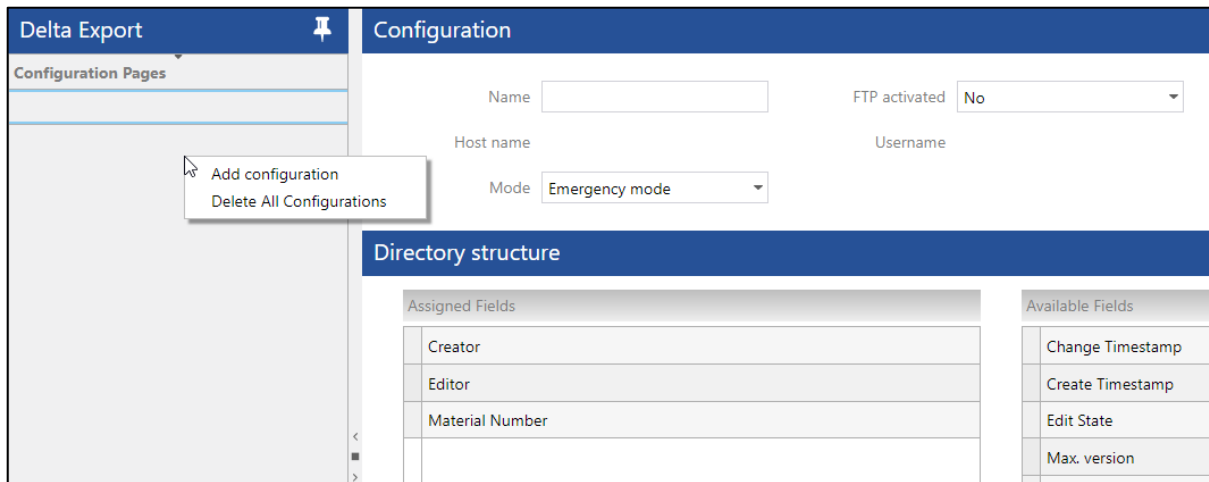
Receive Auxiliary Data from NC Controller

**Fig. 25: NC controller status monitor**

## 2.5 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.



Directory structure	
Assigned Fields	Available Fields
Creator	Change Timestamp
Editor	Create Timestamp
Material Number	Edit State
	Max. version

**Fig. 26: Delta Export configuration**

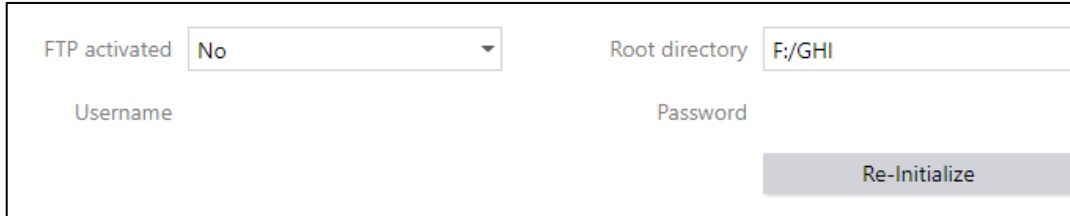
### To create a new configuration page:

1. Right-click below **Delta Export** in the left area and click on **Add Configuration** in the context menu.
2. Enter a name for the configuration.
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.
4. Enter the root directory.  
The directory to be used for saving the data.
5. Enter the host name, user name and password, if applicable.
6. Select the mode:
  - Standard mode:  
You can export all files.
  - Emergency mode:  
Only released elements of released packets are exported.
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.
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.



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You can 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.



The screenshot shows a configuration form for Delta Export. It includes a dropdown menu for 'FTP activated' set to 'No', a text field for 'Root directory' containing 'F:/GHI', and empty text fields for 'Username' and 'Password'. A grey button labeled 'Re-Initialize' is positioned at the bottom right of the form.

**Fig. 27: Reinitializing a Delta Export operation**

**To restart a Delta Export operation:**


- ✓ A configuration page must have been configured and be available.
  1. Select the appropriate configuration page in the **Delta Export** area.
  2. Click **Re-Initialize** in the **Configuration** area.
- ➔ All already exported data is deleted and the current data status is exported from the data-base.

## 2.6 PDM Configuration

### 2.6.1 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.

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

Dnc machine configuration		
NC Controller Selection <span>m90390</span> <span>+</span> <span>-</span>		
Dnc machine configuration	Identifier	Value
Plugin for NC Controller Communication	▼ Dnc machine configuration	
General configuration of a serial interface	DNC Instance	Default ▼
Extended configuration of the serial communic	Machine log level	INFO ▼
Configuration for the receive of request progra	Upload timeout for data	50
Configuration of the response program for a re	Download timeout for data	50
	Activating/deactivating machine	<input type="checkbox"/>
	Activating/deactivating auto receive-mode	<input type="checkbox"/>
	Activate/deactivate auto delete mode	<input type="checkbox"/>
	Plug in for communication with machine	▼
	Configuration for the receive of request programs	<input type="checkbox"/>
	Configuration of the response program for a request program	<input type="checkbox"/>
	► Configuration of the database parameter	

**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 <b>request program configuration</b> 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 <b>configuration of the response program for a request program</b> 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 <b>request program configuration</b> 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 autoreceive 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.

### 2.6.1.1 Plug-in for NC Controller Communication

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

Dnc machine configuration		
NC Controller Selection <span>m90390</span> <span>+</span> <span>-</span>		
<i>Dnc machine configuration</i>	Identifier	Value
Plugin for NC Controller Communication	▼ ComPortServer for redirection of TCP-Communication to a local serial port.	
General configuration of a serial interface	IP-Address of the server	
Extended configuration of the serial communic	Port of the server	##
Configuration for the receive of request progra	COM-Port to be used	
Configuration of the response program for a re		

**Fig. 29: Plugin 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 FORCAM FORCE™ 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 a check mark is not set, files are transferred without extension.
  - Path extensions:
 

Dynamic extension of directories based on NC type and some package and element properties
- FTP Plugin:
  - FTP server ports:
 

FTP port with a TCP/IP link
  - Local port:
 

TCP/IP port on which the DNC tries to send

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- 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

### 2.6.1.2 General Serial Configuration

Dnc machine configuration		
NC Controller Selection <span>m90390</span> <span>+</span> <span>-</span>		
<i>Dnc machine configuration</i>	Identifier <span>Q</span> <span>∨</span> <span>^</span>	Value
Plugin for NC Controller Communication	∨ General configuration of a serial interface	
General configuration of a serial interface	Baud rate of the serial interface	9,600
Extended configuration of the serial communic	Number of data bits	7 <span>∨</span>
Configuration for the receive of request progra	Number of stop bits	2.0 <span>∨</span>
Configuration of the response program for a re	Parity	Even <span>∨</span>
	Handshake-Method	RTS/CTS <span>∨</span>
	Timeout when sending of data is aborted	10,000
	Timeout when receiving of data is aborted	60,000

**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.


### 2.6.1.3 Extended Serial Configuration

Dnc machine configuration	
NC Controller Selection	m90390
Dnc machine configuration	Identifier
Plugin for NC Controller Communication	Value
General configuration of a serial interface	▼ Extended configuration of the serial communication
Extended configuration of the serial communic	▼ Upload configuration NC -> PC
Configuration for the receive of request progra	Timeout between two read cycles (only request prog ##
Configuration of the response program for a re	Activating/deactivating the use of the XON-Symbol <input type="checkbox"/>
	Timeout when using XON-Symbol ##
	XON-Symbol
	End symbol for upload
	Activate/deactivate attach of end symbol <input type="checkbox"/>
	Start symbol for upload
	Newline-Sign #10
	Save the control characters <input type="checkbox"/>
	► Download configuration PC -> NC

**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).

#### **2.6.1.4 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.).

Dnc machine configuration		
NC Controller Selection <span>M-Standard-04</span> <span>+</span> <span>-</span>		
Dnc machine configuration	Identifier	Value
Plugin for NC Controller Communication	▼ Configuration for the receive of request programs	
General configuration of a serial interface	Type of the machine	Standard ▼
Extended configuration of the serial communic	Maximum lines to be read	##
Configuration for the receive of request program	▼ List of the request program variables (1) List Elements	
Configuration of the response program for a re	▼ Configuration of a request program variable ^ ▼	
	Name of the variable	
	First line to be searched for the variable	##
	Maximum line to be searched for the variable	##
	Regular expression for the extraction of the variable	

**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.  
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.
4. Enter a regular expression.  
A syntactic rule describing a quantity.
5. 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
<b>NCANR</b>	Packet name
<b>TYP</b>	<p>The following types of request programs are supported:</p> <p>Type 1 &amp; 4 (Send to Machine)</p> <ul style="list-style-type: none"> <li>— All NC files with the file extension NCP</li> <li>— Status must be <b>Released</b> or <b>New</b></li> <li>— Version according to request program, 0 = maximum version</li> <li>— File name must correspond to FILENAME from request program (if given), otherwise no filtering to file name</li> </ul> <p>Type 5 (Send to Machine)</p> <ul style="list-style-type: none"> <li>— All NC files with the file extension NCU</li> <li>— Status must be <b>Released</b> or <b>New</b></li> <li>— Version according to request program, 0 = maximum version</li> <li>— File name must correspond to FILENAME from request program (if given), otherwise no filtering to file name</li> </ul>








Variable Name	Description
	<p>Type 6 (Send to Machine)</p> <ul style="list-style-type: none"> <li>— All NC files with the file extension NCP or NCU</li> <li>— Status must be <b>Released</b></li> <li>— Always highest element version</li> </ul> <p>Type D: (Send to Machine)</p> <ul style="list-style-type: none"> <li>— File extensions separated by a comma after the colon (e.g. D:NCP,NCU)</li> <li>— Checks for file extensions passed and FILENAME (if defined), otherwise only for file extensions</li> <li>— Status must be <b>Released</b> or <b>New</b></li> <li>— Version according to request program, 0 = maximum version</li> </ul> <p>Type 2 &amp; 3 (Receive from Machine)</p> <ul style="list-style-type: none"> <li>— The status of the elements must correspond to the configured status in the DNC machine configuration.</li> <li>— If no PRGNAME is assigned: <ul style="list-style-type: none"> <li>○ Reads file with the file extension JOB if one exists in the package</li> <li>○ Otherwise reads all files that have the value of the variable FILE-NAME as program number</li> </ul> </li> <li>— If PRGNAME is assigned: <ul style="list-style-type: none"> <li>○ Check for PRGNAME = element file name</li> </ul> </li> <li>— Only the highest version is used for receiving.</li> </ul> <p>Type U: (Receive from Machine)</p> <ul style="list-style-type: none"> <li>— File extensions separated by a comma after the colon (e.g. U:NCP,NCU)</li> <li>— The status of the elements must correspond to the configured status in the DNC machine configuration.</li> <li>— Filters to PRGNAME if given</li> <li>— If PRGNAME contains a dot, the entire file name will be filtered with file extension, otherwise only the file name.</li> <li>— Only the highest version is used for receiving.</li> </ul>
<b>FILENAME</b>	Program number of the file (Row PROG NR)
<b>WPLNAME</b>	Workplace group
<b>PRGNAME</b>	File name with file extension
<b>VERSION</b>	Version of file. 0 = max. version

### 2.6.1.5 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.

You can 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.

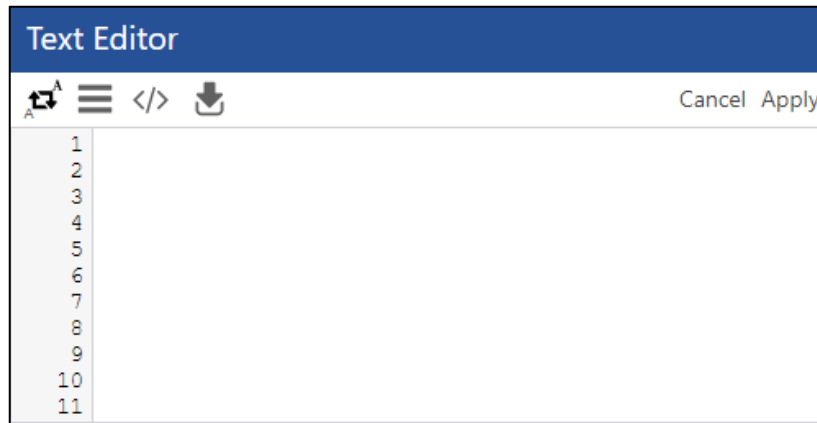
Dnc machine configuration		
NC Controller Selection <input type="text" value="m90390"/>  		
<i>Dnc machine configuration</i>	Identifier  ^	Value
Plugin for NC Controller Communication	▼ Configuration of the response program for a request program	
General configuration of a serial interface	Name of the response file	
Extended configuration of the serial communic	Template for the creation of the response file 	
Configuration for the receive of request progra	▼ List of the configured variables  (1) List Elements	
Configuration of the response program for a req	▼ Configuration of a variable in a response program ^ ▼	
	Type of the variable	
	Placeholder in the template	

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

#### To configure a response file:

- Enter a name for the response file.
- 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 curly brackets. Example: "Error! Reported: {{date}}"
  - Click **Apply**.  
→ The template text is shown next to the **Edit Entry** icon.
- 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:
    - **ERRORTTEXT**  
System error message
    - **DATE**  
Current date
    - **PAKETNAME**  
Packet name
    - **PROGNR**  
Program number
    - **PROGNAME**  
Program name

- c. 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.



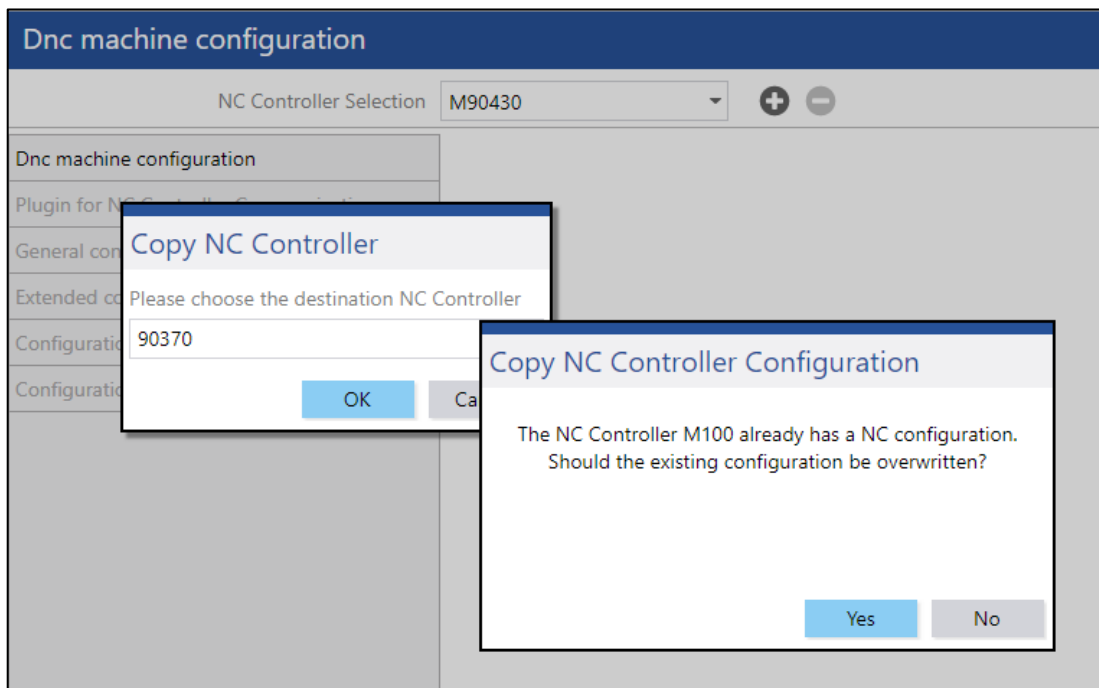
**Fig. 34: Response file template**

#### 2.6.1.6 Copy Configuration

You can 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**

## 2.6.2 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 you can execute ffDNC. 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	<input type="checkbox"/>
Only elements in transferable status	<input checked="" type="checkbox"/>
Only in progress (only MCO) or elements in a transferable status	<input type="checkbox"/>
Only released packets	<input checked="" type="checkbox"/>
Transferable element sources	Selected (4), Available (0)
Transfer monitor	<input checked="" type="checkbox"/>

**Fig. 36: General configuration ffDNC**

## Production Data Management

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- 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. Delimit 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, you can only 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, you can only 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:

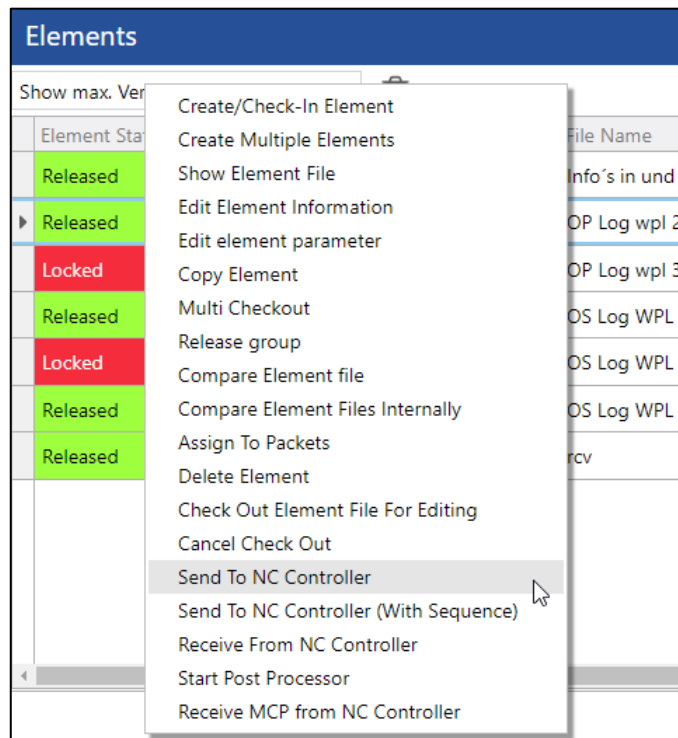
1. Click into the line next to **Transferable element sources**.
2. Select the desired sources in the **Available** area and click on the **Move to the left** icon.
3. Save.

### 3 ffdnc

You can use ffdnc 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, you can also send and receive files directly via the Shop Floor Terminal (see section 4.2).

#### 3.1 Sending Files

When you want to send a file, you must select it first. You can do this 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).

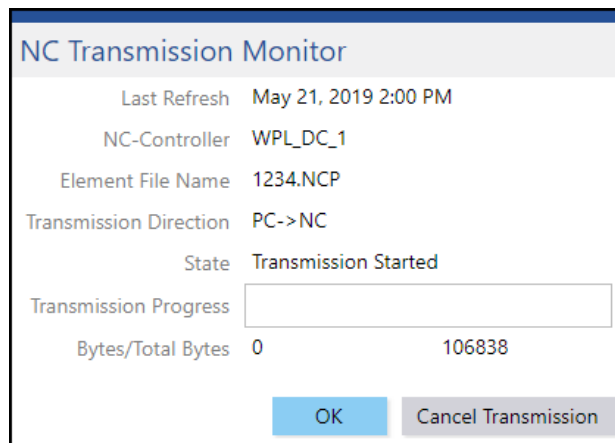


**Fig. 37: Sending a file from the Workbench to an NC controller**

##### 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.

**i** You can 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**

## 3.2 Receiving Files


When you want to receive a file, you must select it first. You can do this 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.
- ❗ You can 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.

## 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 2.1.3.4). It is also possible to use buttons to send files to a machine or receive them from there.

-  You can configure and label buttons freely per your requirements. For general information on how to configure buttons in the Shop Floor Terminal, refer to the Master Data and System Configuration manual.

**FORCAM FORCE™ Document Control**

United States
FORCE

Packet Name: QA\_JG04
Packet State: Released
Creator: JGANDHI

Workplace: WPL\_STD\_NC\_001
Material Number: 100000001
Material Text:

Create Timestamp: 2/28/19 10:28:39 AM
Change Timestamp: 3/4/19 11:03:46 AM

Packet Annotation:

Show max. Version
Transfer mode: Max. version

File name	Extension	Version	State	Annotation	Cri
OS Log WPL 2	TXT	1	Locked		JG4
OS Log WPL 3	TXT	1	Released		JG4
rcv	TXT	2	Released		SY
OP Log wpl 2	PDF	1	Released		JG4
OP Log wpl 3	PDF	1	Locked		JG4
OS Log WPL	TXT	1	Released		JG4

View Element File
Send to machine
Receive from machine
Send NC program with sequence

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



## 4.1 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:

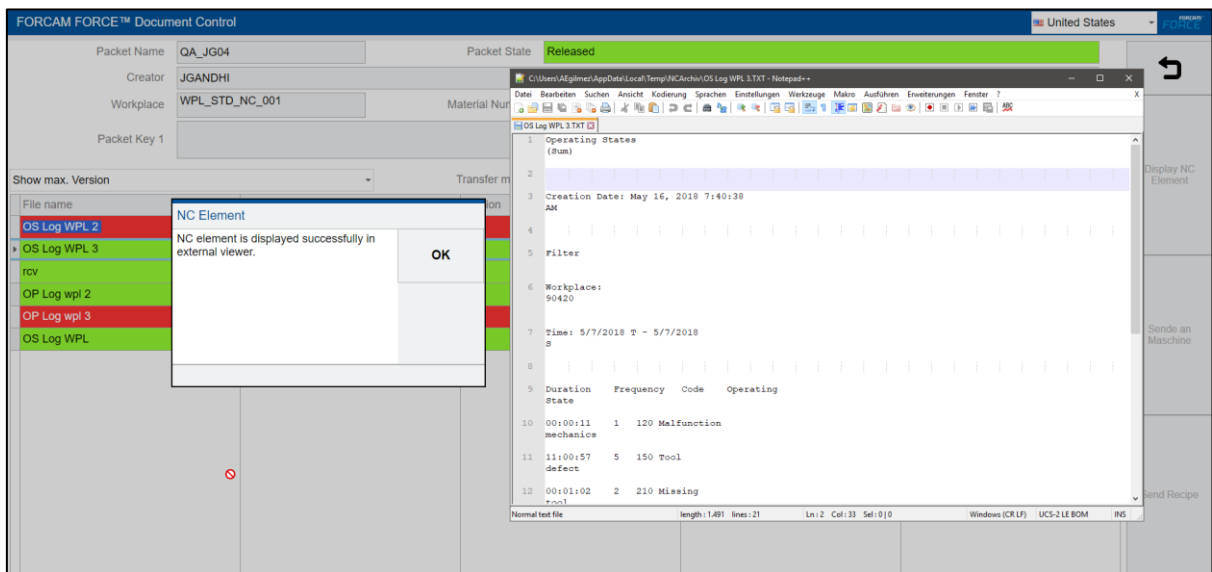
**Table 11: Configuration of the "Display NC element in external viewer" step**

Configuration	Value
<b>Name of step</b>	Display element in external viewer
<b>Input parameters</b>	Parameters (EVERY), NC elements (EVERY)
<b>External viewer</b>	Example for JPG files: <ul style="list-style-type: none"> <li>— NC type: JPG</li> <li>— Path to external viewer: C:\Windows\system32\mspaint.exe</li> <li>— Download path: NCElements</li> </ul>

### 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.

## Document Control in the Shop Floor Terminal



**Fig. 40: File displayed in an external dialog**

## 4.2 Sending and Receiving Files


You can 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
<b>Name of button</b>	Any (e.g. <b>Send to machine</b> or <b>Receive from machine</b> )
<b>Input parameters</b>	<ul style="list-style-type: none"> <li>Selected workplace from the basic dialog "NC View" (WP), Workplace (WP)</li> <li>Selected NC packets from the basic dialog "NC View" (EVERY), Parameter (EVERY)</li> <li>Selected NC element from the basic dialog "NC View" (EVERY), Parameter 2 (EVERY)</li> </ul>

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

 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
<b>Name of step</b>	Transfer of NC elements
<b>Input parameters</b>	<ul style="list-style-type: none"> <li>— Workplace (WP), Workplace ID (workplace)</li> <li>— Parameter (EVERY), NC packets (EVERY)</li> <li>— Parameter 2 (EVERY), NC elements (EVERY)</li> </ul>
<b>Transfer mode</b>	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.

## 5 Appendix

### 5.1 History of Changes

**Table 14: List of all changes between release version 5.8.2 and 5.9**

Date	Description	Chapter
2019-07-02	Replaced all screenshots	
2019-07-02	Current formats used for path specification and alternative action instruction	
2019-07-02	Abbreviations, terms, conventions and navigation moved to Appendix	1/5
2019-07-02	System short description removed	(1.1)
2019-07-02	Graphic "Application overview" updated, text and table updated	1.2
2019-07-02	Graphic "FDM Types" updated	1.3
2019-07-02	Text and table updated	1.3
2019-07-02	Explanatory text added	1.4.1
2019-07-02	Note removed, table updated	2.1.2
2019-07-02	Table updated	2.1.3.2
2019-07-02	Table updated	2.1.3.3
2019-07-02	Explanatory text and note updated	2.2
2019-07-02	Moved chapter "Link Package to Element"	2.3/2.3.2
2019-07-02	Configuration parameters updated in step 2, list added under note	2.3.1
2019-07-02	Explanatory text updated	2.3.2
2019-07-02	Table updated	2.3.3
2019-07-02	Explanation for "Status Monitor NC Control" added	2.4
2019-07-02	Explanation for step 4 shortened	2.5
2019-07-02	Explanatory text updated, note added, table updated	2.6
2019-07-02	Moved list of plug-ins to Appendix	2.6.1/5.2
2019-07-02	Note removed, list under plug-ins updated	2.6.1.1

## Appendix

<b>2019-07-02</b>	Note added	2.6.1.3
<b>2019-07-02</b>	4. list item added, step 2 added, table added	2.6.1.4
<b>2019-07-02</b>	Explanatory text updated	2.6.1.5
<b>2019-07-02</b>	Screenshot removed	2.6.1.6
<b>2019-07-02</b>	List updated	2.6.2
<b>2019-07-02</b>	Explanation added to step 2, note added	3
<b>2019-07-02</b>	Explanation added to step 2, note added	3.2
<b>2019-07-02</b>	Explanatory text added, list in step 4 updated	4.1
<b>2019-07-02</b>	Screenshot removed	4.2
<b>2019-07-02</b>	List of icons removed	5

## 5.2 Plug-ins

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

Plug-in	Description
<b>ComPortServer</b>	Runs on a PC and communicates with FORCAM FORCE™ via TCP/IP and with the NC control via a serial port
<b>FANUC</b>	Enables file exchange with FANUC controls via File-Copy
<b>FileHandler (on file basis)</b>	NC data exchange via a file system (network folder) to which both FORCAM FORCE™ and the NC control have access. The standard Microsoft Windows file exchange protocol can be used.
<b>FileHandlerServer</b>	Runs on a PC and communicates with FORCAM FORCE™ 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.
<b>FTP-Plug-in</b>	Like FileHandler. Uses an FTP protocol instead of a file exchange protocol.
<b>Legacy Plug-in</b>	Offers the possibility to start the DNC service of version 4. This plug-in is outdated and not recommended.
<b>MOXA-Plug-in</b>	Communicates with a MOXA box that allows Ethernet to serial to connect older machines to the network
<b>Mazak Communication Server</b>	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.
<b>RPC Sinumerik</b>	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.

## 5.3 Abbreviations and Terms

**Table 16: Abbreviations used**

Abbreviation	Description
<b>ASCII</b>	American Standard Code for Information Interchange
<b>BDE</b>	Plant Data Collection
<b>CR</b>	Carriage return
<b>DNC</b>	Direct Numerical Control: NC systems connected to a computer. The individual systems can be supplied with NC programs and coordinated from a central location.
<b>FTP</b>	File Transfer Protocol: Network protocol for data transfer between computers
<b>IP</b>	Internet Protocol: Network protocol that can be used for grouping computers within a network according to logical units
<b>KB</b>	Kilobytes
<b>LAN</b>	Local Area Network
<b>LF</b>	Line feed
<b>ms</b>	Milliseconds
<b>NCP</b>	NC program
<b>Operation</b>	Operation
<b>OPT</b>	Optimized: An identifier for a file which is stored under the same file name after an optimization process
<b>PDM</b>	Production Data Management
<b>RTS/CTS</b>	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.
<b>SFM</b>	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.
<b>SFT</b>	Shop Floor Terminal
<b>TCP</b>	Transmission Control Protocol
<b>WP (APL)</b>	Workplace

Table 17: Terms used

Term	Description
<b>Arguments</b>	Parameters causing a program to start specific functions directly when it is called
<b>Button</b>	A control element
<b>Check in</b>	A file previously checked out is checked in again, editing is finished and any changes are adopted
<b>Check out</b>	A file is checked out for processing and opened for editing
<b>Client/server principle</b>	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.
<b>Delta</b>	Used to denote a difference
<b>Dialog</b>	A screen, window or page: An element of the graphical user interface
<b>Display area</b>	The central viewing area of the display screen
<b>Element</b>	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.).
<b>Host</b>	The main computer within a network; it controls and monitors the network and the computers connected (server).
<b>ISO 9000</b>	A standard which specifies basic principles and concepts of quality management systems
<b>Log</b>	A record of events
<b>Mandatory field</b>	A field which must be filled in properly; otherwise the input/change is not saved.
<b>MIME type</b>	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
<b>Navigator</b>	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.
<b>NC element</b>	An element in a numerical control program
<b>NC program</b>	A program designed to control NC equipment. An NC program is transferred on a data storage medium to the NC equipment for execution.
<b>NC type</b>	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.
<b>Packet</b>	A packet consists of a header with a fixed number of parameters and any number of elements.
<b>Packet key</b>	Parameters establishing the link to the Production Data Management (PDM) module.
<b>Request program</b>	A numerical control (NC) program with meta-information that may initiate (re)transfer of one or more files.

## Appendix

<b>Serial data transmission</b>	The transmission of digital data on one line or pair of lines (in contrast with parallel data transmission)
<b>Shop Floor Terminal</b>	Central source of information and operating state acquisition unit for the production personnel. Can be executed on devices with browser capability.
<b>Step</b>	An activity step with a specific function (command) which can be assigned to a button in the Shop Floor Terminal
<b>Superuser</b>	A user who has all permissions for viewing and editing
<b>User field</b>	A blank field made available to enter additional information of any kind
<b>Viewer</b>	A file viewer is used to display the digital data stored in files.
<b>XON symbol</b>	A specific symbol which is required for transmission on some machines with serial communication.

## 5.4 Conventions and Navigation

**Table 18: Document conventions**

Convention	Description
<b>Bold type</b>	Button names and table and field titles are printed in bold type.
<b>Icons</b>	A function shown as an icon involves a reference to the icon as an object.
<b>Path</b>	All paths specified relate to the Navigator.
<b>Action step</b>	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 <b>Or</b> .
<b>Prerequisite</b>	Prerequisites for an action are identified by <b>✓</b> .
<b>Action result</b>	Results of an action are identified by <b>→</b> .
<b>Note</b>	Notes are identified by <b>i</b> .
<b>Substeps of an action</b>	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
<b>Close icon</b>	You can close any content opened in the Navigator by clicking on the close icon on the right of the screen.
<b>Breadcrumb bar</b>	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.
<b>Direct editing</b>	You can edit most of the cells displayed in tables either directly or via the context menu (right-click or dropdown menu).
<b>Disabled columns</b>	Columns with a grey background (viewing fields) cannot be edited.
<b>Refresh</b>	Since the Workbench is a web-based application, refreshing in the browser will cause the Workbench to log off.
<b>Error message</b>	Error messages appear at the bottom left of the screen.

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