

Documentation

## Data Set Format for Window Production

For the fields of cutting and parts processing

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**BECKHOFF**



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# 1 Foreword

## 1.1 Notes on the documentation

### Intended audience

This description is only intended for the use of trained specialists in control and automation engineering who are familiar with the applicable national standards.

It is essential that the documentation and the following notes and explanations are followed when installing and commissioning these components.

It is the duty of the technical personnel to use the documentation published at the respective time of each installation and commissioning.

The responsible staff must ensure that the application or use of the products described satisfy all the requirements for safety, including all the relevant laws, regulations, guidelines and standards.

### Disclaimer

The documentation has been prepared with care. The products described are, however, constantly under development.

We reserve the right to revise and change the documentation at any time and without prior announcement.

No claims for the modification of products that have already been supplied may be made on the basis of the data, diagrams and descriptions in this documentation.

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## 1.2 Safety instructions

### Safety regulations

Please note the following safety instructions and explanations!

Product-specific safety instructions can be found on following pages or in the areas mounting, wiring, commissioning etc.

### Exclusion of liability

All the components are supplied in particular hardware and software configurations appropriate for the application. Modifications to hardware or software configurations other than those described in the documentation are not permitted, and nullify the liability of Beckhoff Automation GmbH & Co. KG.

### Personnel qualification

This description is only intended for trained specialists in control, automation and drive engineering who are familiar with the applicable national standards.

### Description of instructions

In this documentation the following instructions are used.

These instructions must be read carefully and followed without fail!

#### **DANGER**

##### **Serious risk of injury!**

Failure to follow this safety instruction directly endangers the life and health of persons.

#### **WARNING**

##### **Risk of injury!**

Failure to follow this safety instruction endangers the life and health of persons.

#### **CAUTION**

##### **Personal injuries!**

Failure to follow this safety instruction can lead to injuries to persons.

#### **NOTE**

##### **Damage to environment/equipment or data loss**

Failure to follow this instruction can lead to environmental damage, equipment damage or data loss.



#### **Tip or pointer**

This symbol indicates information that contributes to better understanding.

## 1.3 Documentation issue status

Version	Comment
2.0.1	<ul style="list-style-type: none"><li>• Small internal corrections without affecting the content</li></ul>
2.0.0	<ul style="list-style-type: none"><li>• Publication for data set description, as of 1 January 2019</li></ul>
0.1	<ul style="list-style-type: none"><li>• Migration and update based on previous version 1.4.30</li></ul>

## 2 XML production data

### 2.1 General

The XML format described below can be used for transferring basic information for processing machines used in window production. Extensions can be implemented at any time in consultation with your machine manufacturer.

The abbreviation XML stands for **EX**tensible **M**arkup **L**anguage. XML is particularly suitable for storing structured data in a text file. XML extends SGML (Standard Generalized Markup Language in accordance with ISO) by adding a facility for individual extensions.

The use of this format is based on the following reasons:

- It is particularly easy for humans and machines to read.
- Structured data can be particularly well stored, represented and transmitted in this form.
- Standard mechanisms for searching, filtering and display are available.
- Individual extensions to the data structure can be made at any time.
- Support for display in a web browser.
- Support and further development of XML technology across the whole company (Microsoft, SUN, IBM).
- Simple cross-platform, system-independent data exchange (business to business communication).
- Availability of working XML parsers for various development sectors.

Information regarding document type definitions and other notations will not initially be given here.

#### Number formats

It is possible that when figures for position or velocity are given, resolution in mm or m/min is inadequately precise. In such cases, and depending on the regional settings, the corresponding number formats from the operating system can be used.

Under Windows, the number format must be specified as follows in the system settings:

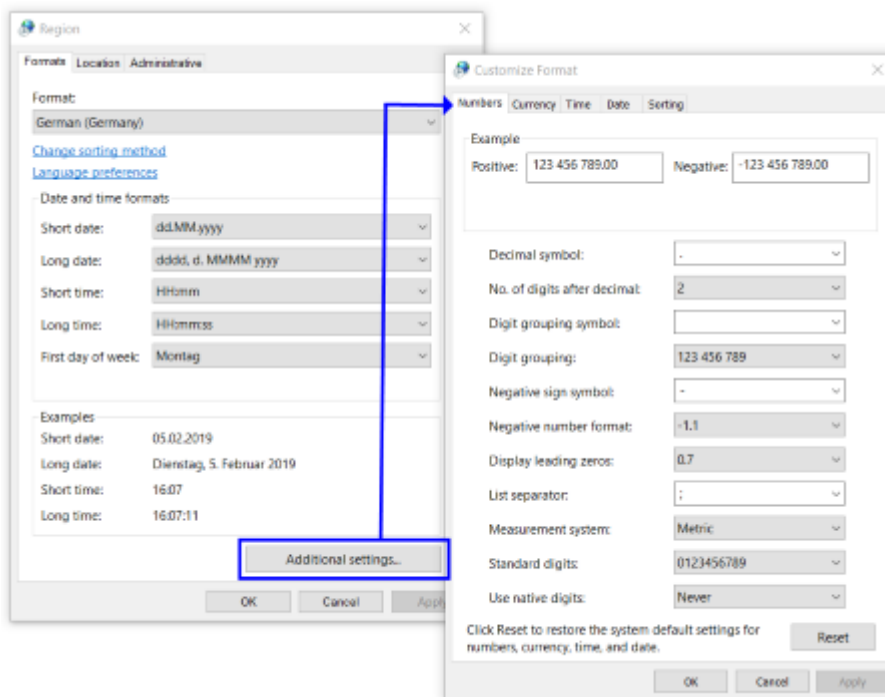


Fig. 1: Number format in system settings



## Units

Unless additional or varying specifications are made, the following dimensional information applies:

- Velocities in mm/min
- Position values are in mm
- Angle in degrees
- Times in seconds

Decimal places can be transferred without problems. Use of the separator set for your language.

The format described above represents the basic information for window production machines. Extensions can be implemented at any time in consultation with the machine manufacturer.

## Text formats

When text characters are entered, it must be borne in mind that umlauts and characters from other languages can only be correctly read if data coding is set to Unicode or to UTF-8. This must be done when the file is saved. If it is not possible to save the file UTF-8 coded, it should be saved ANSI-coded, and the language area selection can be done via the "ISO-8859-x" encoding option. Further information can be found in section: **Specifications - Coding of data transfers**.

Only literals may be used as attribute values for the XML elements. Within a literal the markup characters »<«, »>« and the »&« sign may not be used. They must be masked through so-called entity references: &lt; and &gt; and &amp;. Further information can be found in section: **Specifications - Special character transfers**.

If the text field contains further special characters that belong to the parser control characters, then the data of the element should additionally be enclosed in a CDATA block.

```
<![CDATA[...]]>
```

For instance, in association with the element <Designation> (data content=Transom ^):

```
<Designation><![CDATA[Transom ^]]></Designation>
```

For the sake of simplicity, this information can generally be enclosed in CDATA blocks.

## Optionalities

The transfer of fields designated as **Optional** in the description is discretionary. If such fields are not transferred, the machine operates with the corresponding default settings. Usually this means that the functions specified in these fields are not enabled.

If an optional field is transferred despite the fact that it was not specifically set, then please pass an empty date (="") or the value "0", depending on the data type of the field.

Please note that certain machine modules require optional fields to be specified. Please consult your machine manufacturer.

## 2.2 Main level

The main level is the starting point for all data in the XML file. Imagine the data in the form of a tree. Starting from the main level, the branches spread out as required, up to the individual machining operations in the part.

### Syntactic structure of the main level

The main level of XML data is called: <File>.

Main element: <File>

```
Data line    <File Name="ExampleProDat.xml">
              ... (file content)
              </File>
```

Element attributes

*File* Data type: Text

The file name should only contain digits from 0-9 and letters from a - z, A - Z, without spaces, and be no longer than 40 characters.

Value: Original file name

Note: This specification serves only as a designation for the main element of the following data transfers. The file name itself is not stored in the production database on the machine and becomes irrelevant after loading. The order designation has to be specified via the production data <OptiData Name="xyz"...>.

The different file levels have to be specified from the main level.

Currently only one sublevel for window manufacturing machines is available, in this special case for the cutting and part processing section. Theoretically, however, further levels are possible on which data for other machines could be specified.

### Structure of the main level

```
<File Name="ExampleProdDat.xml">
  <OptiCuttingData>
    ...
  </OptiCuttingData>
</Datei>
```

## 2.3 File levels

At the file level there is only one further sublevel on which all data for the cutting and the processing of parts must be transferred.

### Syntactic structure at the file level

The element at the file level is named as: <OptiCuttingData>

File element: <OptiCuttingData>

```
Data line    <OptiCuttingData>
              ... (optimized cutting data)
              </OptiCuttingData>
```

Element attributes

<i>none</i>	Data type:	none
	Value:	none

Starting from this level, the different cutting and processing data are to be transferred.

### Structure at the file level

```
<OptiCuttingData>
  <OptiData Name="Mayer" ...>
    ...
  </OptiData>
  <SteelOptiData Name="Mayer" ...>
    ...
  </SteelOptiData>
</OptiCuttingData>
```

## 2.4 Cutting data level

Two sublevels are defined at the cutting data level. The general cutting data, which are defined independently of the machine type, and steel cutting data, which only have to be transferred to machines that deal with steel cutting.

### Data specifications for general cutting data

At this level, the loading information, part data, processing data, NC parameters and print data are to be transferred. This data is regarded as basic data for any additional production data.

### Syntactic structure of the general cutting data

The level for the optimized cutting data is named as: <OptiData>

Element: <OptiData>

```
Data line  <OptiData Name="Mayer">
            ... (optimized general cut data)
            </OptiData>
```

#### Element attributes

**Name** Data type: Text

The batch name should only contain digits from 0-9 and letters from a - z, A - Z, without spaces, and be no longer than 40 characters.

**Value:** The designation of the production order (batch name) under which it is stored on the controller, and under which it can be called up.

**Note:** When choosing this name, make sure that it is also used as a file name for any exchange files created for other machines or machine parts. Therefore, the use of special characters should be avoided.

In addition, the batch name should be unique. If a batch name is transferred that is already stored on the machine, a query is issued. If this is confirmed positively, the order on the machine is overwritten by the new order to be loaded.

Depending on the structure of the production, it may be desirable to transfer several orders within one XML file. This is possible in a number of ways:

- Multiple Optidata elements with the different **name** attributes of the orders
- An Optidata element with order information about the **Commission...** parts data fields

The following two optional attributes are only used for the internal designation of an optimization run or the assigned machine. By default, this information is not uploaded to the machine.

**Run** Data type: Text

Maximum 255 characters.

**Value:** The optimization run description with any explanatory text

**Machine** Data type: Text

The machine name should only contain digits from 0-9 and letters from a - z, A - Z, without spaces, and be no longer than 40 characters.

**Value:** The machine designation as a distinguishing criterion.

Starting from this level, a wide variety of data must be transferred.

## Structure of the cutting data

```
<OptiData Name="Example_10" Run="Job example 10" Machine="XY-1">
  <BarData BarNo="1" ...>
    ...
  </BarData>
  ...
</OptiData>
```

## Data specifications for steel cutting

This data level must only be transferred if a steel cutting facility is present at the machine. At this level, the steel loading data and steel part data are to be transferred with any processing specifications. Note that the part data must always be specified with reference to the part specifications under the general cutting data.

## Syntactic structure of the steel cutting data

The level for the steel cutting data is named `<SteelOptiData>`

Element: `<SteelOptiData>`

Data line `<SteelOptiData Name="Example_10">`  
 ... (Steel cutting data)  
`</SteelOptiData>`

Element attributes

**Name** Data type: Text

The batch name should only contain digits from 0-9 and letters from a - z, A - Z, without spaces, and be no longer than 40 characters.

**Value:** The designation of the production order for the steel cut under which it is stored on the controller, and under which it can be called up.

**Note:** Please note that the batch name of the steel data must always be related to the batch name of the general cutting data. This means that both must have the same designation!

The following attribute is only used for the internal designation of the optimization run. By default, this information is not uploaded to the machine.

**Run** Data type: Text

Maximum 255 characters.

**Value:** The optimization run description with any explanatory text

**Optional:** Yes

Starting from this level, the different cutting data for steel parts are to be transferred.

## Structure of the steel cutting data

```
<SteelOptiData Name="Example_10">
  <SteelBarData BarNo="1" ...>
    ...
  </SteelBarData>
  ...
</SteelOptiData>
```

## 2.4.1 Optimized production data

At the level of the optimized production data (optidata), you have to specify all cutting and processing data for general cutting. It is irrelevant for what type of machine the data is transferred. The specification type is the same for PVC, aluminum or woodworking machines. This data is used as basic data for any steel data to be transferred.

The bars with parts are transferred for loading via the optimized production data. Among the individual bars, you have to transfer the part data with processing and print data.

### Structure of the opti data level

```
<File Name="ExampleProdDat.xml">
  <OptiCuttingData>
    <OptiData Name="Example" Run="Example commission :13627 Date:19.8.18">
      <BarData BarNo="1" BarLength="6500" ProfileName="70065" ...>
        <PieceData PieceNo="1" BarNo="1" Length="1574.5" ...>
          <ToolData PieceNo="1">
            <Treatment TNo=.....>
            <Treatment TNo=.....>
            ...
          </ToolData>
        </PieceData>
      </BarData>
      <BarData BarNo="2" BarLength="6500" Designation=...>
        .....
      </BarData>
    </OptiData>
    ...
  </OptiCuttingData>
</File>
```

### **i** Optional specifications

All elements and attributes referred to as **optional** below do not necessarily have to be transferred. If they are transferred anyway, despite the fact that they are not used, they must be transferred as empty fields ("") or with the value "0", depending on the data type.

Please note that any hyphenations in the element names described in this document are a result of word processing.

### 2.4.1.1 Bar data

The information that refers to the bar has to be transferred in the bar data. The bar number must be unique in the entire order.

#### Syntactic structure of the bar data

The level for the bar data is named as: <BarData>

Element: <BarData>

```
Data line    <BarData BarNo="1" BarLength="6000" ProfileName="Tempus" ...>
              ... (Piece data)
              </BarData>
```

#### Element attributes

<i>BarNo</i>	Data type: Number A number between 1 and 9999 Value: A unique bar number relating to the production order in the number range.
<i>BarLength</i>	Data type: Number A value in millimeters, possibly with decimal places. Value: The uncut length of the bar, as it should be used for loading.
<i>Designation</i>	Data type: Text Maximum 255 characters Value: Text for general profile information. The information is displayed in the loading table. Optional: Yes
<i>Comment</i>	Data type: Text Maximum 255 characters Value: Text for any commenting purpose. This information is not displayed by default on the machine. Optional: Yes
<i>ProfileName</i>	Data type: Text The profile name should only contain digits between 0 and 9 and letters between a and z or A and Z. It should have no spaces and have a maximum length of 40 characters. Special characters can also be used, except: '\ / < > * " ? Value: Designation of the profile as it is configured on the machine.
<i>Color</i>	Data type: Text The profile color should only contain digits from 0-9 and letters from a - z, A - Z, without spaces, and be no longer than 80 characters. Special characters can also be used, except: '\ / < > * " ? Value: Color of the profile or bar. Note: The conveying speed (referred to as CS below) of the profile bars / parts in the machine can be controlled via special coding of the color specification. The following definition applies: <i>inside color;outside color;any following text</i>

Note the semicolon as separator! No special characters, spaces or the semicolon itself may be used in the color IDs! Please do not use the maximum length of the field, since the operator has to interpret the color code in the loading table! The shorter, the better.

E.g. color=" *inside color ;outside color; free\_text*"

The code for the outside color determines whether the normal CS or the special CS is used. If the outside color is specified as "white", the normal CS is used. For all other color codes, the special CS is then used. The different notations for "white" or its translations are taken into account.

If the transfer of the outside color is omitted or the color is transferred uncoded, the normal conveying speed is used.

---

<i>RestLength</i>	Data type: Number
	A value in millimeters, possibly with decimal places.
Value:	The previously calculated residual length of the bar.
Optional:	Yes

---

<i>RestCode</i>	Data type: Number
	A number between 1 and 2
Value:	An identifier for the remainder: 1 = rest 2 = waste
Optional:	Yes

---

<i>RestPieaceNo</i>	Data type: Number
	A number between 1 and 9999
Value:	Residual part number for printing a residual part label
Optional:	Yes
Note:	No residual label is printed for residual parts identified with <i>RestCode</i> =2.

---

<i>RestCaseNo</i>	Data type: Text
	The residuals compartment number should only contain digits between 0 and 9 and letters between a and z or A and Z. It should have a maximum length of 40 characters.
Value:	Customer-specific designation of the residuals compartment in which the residual part is to be stored.
Optional:	Yes
Note:	The designation could be displayed in the loading list of the bars. Consult with your machine manufacturer.

---

#### **Additional specifications for the optionally enabled data optimization module at the machine:**

---

<i>NormLength</i>	Data type: Number
	A value in millimeters, possibly with decimal places.
Value:	The standard length of the profile type
Optional:	Yes
Note:	This specification is used by the optimizer or the residual length input whenever new bars have to be created by these functions. If the field is not transferred, they use the standard length specification from the profile data. It should be noted, however, that only one standard length specification can apply within an order for a profile type and color!

---



*SteelName* Data type: Text

The designation should only contain digits between 0 and 9 and letters between a and z or A and Z. It should have no spaces and have a maximum length of 40 characters. Special characters can also be used, except: ' \ / < > \* " ?

Value: The name of the steel type must correspond to the designation that is transferred with the part data as "*Steel/No*".

Optional: Yes

Note: This parameter must always be specified if the steel type used for the PVC profile has to be taken into account when selecting the optimization data. In other words, when different steel types are used in the order for the same PVC profile.

---

**Specifications for additional functions that are not used in the standard functions of the application:**

---

*Barcode* Data type: Text

The barcode should only contain digits between 0 and 9 and letters between a and z or A and Z. It should have no spaces and have a maximum length of 40 characters. Ultimately, however, the type of barcode determines which characters may be used.

Value: Unique barcode information for the bar. This information is used to select and release the bar with a scanner.

Optional: Yes

---

*Storage* Data type: Text

The bar storage location designation should only contain digits from 0 - 9 and letters from a - z, A - Z and be no longer than 40 characters.

Value: The unique designation of the storage location of the profile type.

Optional: Yes

Note: The designation for the storage location could be displayed in the loading list of the bars and serve as an aid for the operator.

---

**Data transfer for external display of the loading table with additional bar information:**

---

*ProfilePicture* Data type: Text

A file name with extension must be specified here. A maximum of 50 characters can be specified.

Value: File name of the profile image for the profile type of the bar

Optional: Yes

---

*FolieInnen* Data type: Text

The foil designation can contain digits from 0 - 9, letters from a - z, A - Z and space, as well as special characters, apart from: " \ < > ". The maximum number of characters is limited to 255.

Value: Text designation for the inner foil

Optional: Yes

---

*FolieInnenPicture* Data type: Text

A file name with extension must be specified here. A maximum of 50 characters can be specified.

Value: File name for the foil color palette

Optional: Yes

*FolieAussen* Data type: Text

The foil designation can contain digits from 0 - 9, letters from a - z, A - Z and space, as well as special characters, apart from: "\ <>". The maximum number of characters is limited to 255.

Value: Text designation for the outer foil

Optional: Yes

*FolieAussenPicture* Data type: Text

A file name with extension must be specified here. A maximum of 50 characters can be specified.

Value: File name for the foil color palette

Optional: Yes

*DichtungInnen* Data type: Text

The seal designation can contain digits between 0 and 9 and letters between a and z or A and Z, as well as spaces and special characters, except: "\ <>". The maximum number of characters is limited to 255.

Value: Text designation for the inner seal

Optional: Yes

*DichtungInnenPicture* Data type: Text

A file name with extension must be specified here. A maximum of 50 characters can be specified.

Value: File name for the seal color palette

Optional: Yes

*DichtungAussen* Data type: Text

The seal designation can contain digits between 0 and 9 and letters between a and z or A and Z, as well as spaces and special characters, except: "\ <>". The maximum number of characters is limited to 255.

Value: Text designation for the outer seal

Optional: Yes

*DichtungAussenPicture* Data type: Text

A file name with extension must be specified here. A maximum of 50 characters can be specified.

Value: File name for the seal color palette

Optional: Yes



**Please note that any hyphenations in the element names are a result of word processing.**

### 2.4.1.2 Piece data

In the piece data you have to transfer all the information related to a part. This can be customer-specific data or any assignment information for steel parts if the steel option is used. The part number must be unique in the entire order.

#### Syntactic structure of the part data

The level for the part data is named as: <PieceData>

Element: <PieceData>

Data line  
 <PieceData PieceNo="1" Length="1230" ...>  
 ... (tool data / treatments)  
 </PieceData>

#### Element attributes

<i>PieceNo</i>	Data type: Number A number between 1 and 9999 Value: A unique part number relating to the production order in the number range.
<i>TeilePos</i>	Data type: Number A number between 1 and 9999 Value: A unique sequential number to define the part sequence in the bar Optional: Yes Note: This running index must always be specified if the part numbers ( <i>PartNo</i> ) in an order are not transferred consecutively, starting with '1', but a mandatory sequence is to be observed!! Based on this index, the cutting sequence of the parts is determined on the machine. This means that if this index is not passed on, the part number determines the part cutting sequence.
<i>Length</i>	Data type: Number A value in millimeters, possibly with decimal places. Value: Part length, measured from tip to tip.
<i>Designation</i>	Data type: Text Maximum 255 characters Value: Text for general part information Optional: Yes
<i>Commission</i>	Data type: Text Maximum 255 characters Value: Customer-specific commission designation / number of the part Optional: Yes
<i>Position</i>	Data type: Text Maximum 255 characters Value: Position designation / number of the part Optional: Yes

<i>Piectype</i>	Data type: Text Maximum 10 characters Value: Text for a type designation of the part Optional: Yes
<i>WindowNo</i>	Data type: Number A number between 1 and 9999 Value: Unique window number in the production order to assign the part to the corresponding window. Optional: Yes
<i>Barcode</i>	Data type: Text The barcode should only contain digits between 0 and 9 and letters between a and z or A and Z. It should have no spaces and have a maximum length of 40 characters. Ultimately, however, the type of barcode used determines which characters can be used. Value: Barcode information for the part Optional: Yes Note: This information serves only for the unambiguous selection of the part for functions that request the part data by means of barcode information. This information can also be used to pass it on from the machining center to downstream machines via other communication channels. Please consult with your machine manufacturer about the type of data exchange, as it is not included in the standard scope and must be set up specifically.
<i>AngleOnCut</i>	Data type: Number Angle in degrees (the vertical cut is the reference angle) Value: Value for the first cut angle Note: Please note that intermediate angles, i.e. angles other than 45° and 90°, can only be specified if the machine is equipped with an infinitely variable saw.
<i>AngleOffCut</i>	Data type: Number Angle in degrees (the vertical cut is the reference angle) Value: Value for the last cut angle Note: Please note that intermediate angles, i.e. angles other than 45° and 90°, can only be specified if the machine is equipped with an infinitely variable saw.
<i>AngleOnCutID</i>	Data type: Number Number 0 - 5 as identifier for the cutting function Value: Number of the cutting function for the first cut angle 0 = cut angle specification via AngleOnCut 1 = 45 degrees 2 = 90 degrees / vertical cut 3 = transom pointing 4 = cross-cut, top 5 = cross-cut, bottom Note: Please note that the predefinable cutting functions depend on the machine equipment. When specifying cross-cuts, the cutting height must be specified using separate attributes
<i>AngleOffCutID</i>	Data type: Number Number 0 - 5 as identifier for the cutting function

Value: Number of the cutting function for the last cut angle  
 0 = cut angle specification via AngleOffCut  
 1 = 45 degrees  
 2 = 90 degrees / vertical cut  
 3 = transom pointing  
 4 = cross-cut, top  
 5 = cross-cut, bottom

Note: Please note that the predefinable cutting functions depend on the machine equipment.  
 When specifying cross-cuts, the cutting height must be specified using separate attributes

---

*CutHeightOn-Cut* Data type: Number  
 A value in millimeters, possibly with decimal places.

Value: Cutting height in millimeters for the first cut (measured from the upper/lower edge of the profile to the miter)

Optional: Yes

---

*CutHeightOff-Cut* Data type: Number  
 A value in millimeters, possibly with decimal places.

Value: Cutting height in millimeters for the last cut (measured from the upper/lower edge of the profile to the miter)

Optional: Yes

---

*CarriageNo* Data type: Number  
 Number between 1 and 999,999.999, may be coded

Value: Number of the compartment trolley into which the part is to be sorted

Optional: Yes

Note: If it is possible for parts to be discharged in the sorting unit section on the machine, the relevant part can be marked for this by specifying *CarriageNo* = 0.  
 If several trolleys can be loaded at the same time, the trolley number applies to an imaginary "large" trolley, which may consist of two subtrolleys, for example. A change of the trolley number in the lot causes a trolley change.

---

*CaseNo* Data type: Number  
 Number between 1 and 999,999.999, may be coded

Value: Number of the compartment in the compartment trolley into which the part is to be sorted.

Optional: Yes

Note: If it is possible to load several compartment trolleys, the individual subtrolley can be identified by the following coding of the compartment number:  
 Default code 4 digits: *u f f f*

<i>u</i>	-	Number of the subtrolley	No. 1 – x	The largest number results from the maximum number of trolleys that can be loaded at the same time
<i>f f f</i>	-	Compartment number for the part	<i>xxx</i>	The definition of your machine manufacturer applies

Example:

The trolley number for the order is set to '5'. The order is sorted into two trolleys.

Part '1' is to be sorted into subrolley '1', main compartment '12' and subcompartment '3'

Part '42' is to be sorted into subrolley '2', main compartment '3' and subcompartment '1'

PartNo="1"  
CarriageNo ="5"  
CaseNo ="1123"

PartNo="42"  
CarriageNo ="5"  
CaseNo ="2031"

For the standard case that only one trolley is used, only one trolley number less than '1000' may be transferred!

---

#### Additional information for the steel assigned to the part:

---

*Steel* Data type: Number

Number between 0 and xx, possibly coded

Value: Coded selection of the steel used

0 = no steel

1 = Steel inserted manually

2 = Steel inserted automatically

3 = Special steel to be inserted manually; the steel part is provided externally, i.e. not produced on the machine.

5 = Special part with special equipment or special treatment on the manual steel insertion (the function must be agreed with the machine manufacturer.)

Optional: Yes

Note: If two steel parts are assigned to the part, the steel selection must be specified with two digits. In this case, the following combination of selection codes applies:

*Steel*=yx : Two steel parts, inserted manually and/or automatically

- x corresponds to *Steel1*

- y corresponds to *Steel2*

---

*SteelNo* Data type: Text

The name of the steel type used should only contain digits between 0 and 9 and letters between a and z or A and Z. It should have no spaces and have a maximum length of 40 characters. Special characters can also be used, except: '\ / < > \* " ?

Value: Selection of the steel profile type of the steel to be used.

Optional: Yes

Note: The designation used here for the steel type must be identical to the *SteelName* in the steel data. In the special case of two steel parts per part, the type selection is the default for an optimization.

---

*SteelLength* Data type: Number

A value in millimeters, possibly with decimal places.

Value: Length of the steel part, measured from tip to tip.

Optional: Yes

---

*Steelnumber* Data type: Text

Maximum 40 characters. Any special characters can be used, except: '\ / < > \* " ?

Value: Note text for the steel part displayed on the manual steel insertion

Optional: Yes

Note: The specified number of text can have different meanings. For example, it can refer to the steel type number or the number of the compartment from which the steel part is to be taken. It may also be used to provide information for special steel inserts, if the steel is not cut on the steel saw that may be present.

---

SteelDepth	Data type:	Number
		A value in millimeters, possibly with decimal places.
	Value:	Steel insertion depth in relation to the reference edge of the part. This must be agreed with the machine manufacturer.
	Optional:	Yes

---

SteelPieceNo	Data type:	Number
		A number between 1 and 9999
	Value:	Steel part number of the steel part assigned to the part
	Optional:	Yes

---

## **i Special feature for steel data specifications**

The steel specifications only need to be specified if the machine has a steel allocation or a steel cut with manual or automatic steel feed.

If the machine only features a manual steel loading unit, only the following fields have to be transferred: **Steel**, **SteelNo**, **Steelnumber**, **SteelLength** and **SteelPieceNo**. By default, only the steel type designation, steel length and *Steelnumber* information is displayed on the manual steel loading station.

Text information can usually be displayed without problems on the display used, although by default only the first ten characters of the steel number can be displayed. However, customer-specific adaptation enables display of longer, additional and other information.

If an automatic steel insertion or an automatic steel lowering unit is available, the **steel insertion depth** must be specified in addition to the steel length.

In some special cases it is necessary to transfer additional steel information or to assign two steel parts to one PVC part. In this case, you can specify the additional information or the data for the two steel parts using additional fields. To this end you can use the steel data transfers with the same designation, but with the index "1" and "2" appended. For further information please refer to Section **Advanced Steel Specifications**.

For details relating to data handling please consult your machine manufacturer!

---

### 2.4.1.3 Tool data

At the tool data level, you must specify the tools or processing numbers with which the part will be machined. Up to 30 machining operations can be transferred to the part. The machining operations can be given a machining position and possibly special machining registers.

Please discuss the definitions of the machining operations with your machine manufacturer, since different data transfers are possible or necessary depending on the machine or material types.

#### Syntactic structure of the tool data

The level for the tool data is named as: <ToolData>

Element: <ToolData>

Data line      <ToolData PieceNo="1">  
                  ... (Treatment data)  
                  </ToolData>

Element attributes

<i>PieceNo</i>	Data type: Number
	A number between 1 and 9999
Value:	A unique part number relating to the production order in the number range.
Note:	The part number must correspond to the part number as specified at the part data level.

Starting from this level, a wide variety of data must be transferred. Two types of transfers are defined here:

1. Profile machining  
It is mandatory that all possible machining operations on the machine are created in the profile database for a profile. As a rule, this default type is regarded as standard.
2. Contour machining  
For contour machining, all machining operations and all machining parameters of the machine can be transferred via a data set.

As a rule, the machine manufacturer only defines one or the other data transfer for a machine.

#### Structure of the tool data

```
<ToolData PieceNo="1">
  <Treatment TNo="100" XPos="75".../>
  <Treatment TNo="100" XPos="1230".../>
  ...
</ToolData>
```

or

```
<ToolData PieceNo="1">
  <Contur Name="100" ToolNo="11100100" XPos="75".../>
  <Contur Name="100" ToolNo="11100100" XPos="1230".../>
  ...
</ToolData>
```



### 2.4.1.3.1 Profile processing

When transferring profile processing (treatment) data, the type of machining is defined using the individual processing numbers specified by the machine manufacturer. Each processing number is stored with all dimension and machining parameters in the profile data on the machine. Optionally, further parameters such as YPos, ZPos etc. can be transferred in addition to the minimum processing number (PNo) and processing position (XPos).

For this type of processing the system profile data is always used. The processing cannot be carried out unless the processing number is defined at the machine. The processing, including the processing numbers, is pre-defined by the machine builder, and can be taken from his detailed documentation.

#### Syntactic structure of the profile processing / treatment data

The level for the profile processing data is named as: <Treatment>

Element: *<Treatment>*

```
Data line    <Treatment>
              TNo="100" XPos="120" YPos="20" ZPos="30"
              />
```

Element attributes

<i>TNo</i>	Data type: Number
	A number between 1 and 9999
	If a converter table is set up on the machine, "Text" may be used as the data type. Please note, however, the maximum field size is 200 characters. Special characters or spaces should only be used in consultation with your machine manufacturer.
Value:	A unique treatment number in the profile. (see detail list for processing provided by your machine manufacturer)
<i>XPos</i>	Data type: Number
	A value in millimeters, possibly with decimal places.
Value:	The X position of the machining operation relative to the center of the machining operation.
<i>Designation</i>	Data type: Text
	Maximum 255 characters
Value:	Text for general processing information.
Optional:	Yes
<i>Comment</i>	Data type: Text
	Maximum 255 characters
Value:	Text for any commenting purpose.
Optional:	Yes

**As additional specifications, the following attributes can be transferred in consultation with your machine manufacturer. Of this reason, the field labels are not translated.**

<i>YPos</i>	Data type: Number
	A value in millimeters, possibly with decimal places.
Value:	Y-position for pre-positioning at the application position of the machining. The machining position in the coordinate system is to be observed.

<i>ZPos</i>	Data type: Number	A value in millimeters, possibly with decimal places.
	Value:	Z-position for pre-positioning at the application position of the machining. The machining position in the coordinate system is to be observed.
<i>Laenge</i>	Data type: Number	A value in millimeters, possibly with decimal places.
	Value:	Total length of machining in X-direction from beginning to end. The diameter of the milling bit is automatically offset.
<i>Breite</i>	Data type: Number	A value in millimeters, possibly with decimal places.
	Value:	Machining width. The diameter of the milling bit is automatically offset.
<i>Radius</i>	Data type: Number	A value in millimeters, possibly with decimal places.
	Value:	Radius for circular processing
<i>Eckenradius</i>	Data type: Number	A value in millimeters, possibly with decimal places.
	Value:	Corner radius for rectangular processing
<i>Tiefe</i>	Data type: Number	A value in millimeters, possibly with decimal places.
	Value:	Depth of the machining in relation to the coordinate zero point
<i>Bearbeitungswinkel</i>	Data type: Number	Degrees between 0° and 360°, possibly with decimal places.
	Value:	Feeding angle of the tool for the machining. (The machine must be equipped for this function in order be able to use it!)



### The following must be observed for special transfers for processing:

The x-coordinate is always related to the direction of transport of the piece.

The limits of the profile are to be observed in the depth specifications.

Circle radius and tool radius are to be observed in the case of circle processing.

Extended processing transfers should only take place in the case of processing operations that have been approved by the machine manufacturer for this.

Please use only the transfer possibilities that have been agreed with your machine manufacturer.

It is not compulsory for the extended processing transfers to always take place. If they are not transferred, the standard parameters stored on the machine are used.

The specification possibilities that you have for each particular processing must always be agreed with the programmer of the NC programs or your machine manufacturer. The same applies to the rules that govern the dimensioning and specification parameters. Further parameters could still be defined if necessary.

### 2.4.1.3.2 Contur machining

When transferring contur machining data, only the NC programs for the possible profile processing operations are stored on the machine. The programs adopt the processing registers from the specification described here. If you have any questions about the NC programs and their transfer options, please contact your machine manufacturer.

#### ● Prerequisites for correct data transfer

**i** The standard programs on which the contour machining operations are based must be stored as NC programs on the machine in the **NC\_Data** directory.

When assigning names, the NC programs must be identified by numbers.

The NC programs must be designed in such a way that they process all transferred parameters and can be used by the various tools.

The standard programs are currently only available for machining operations that are triggered at the G module. Special machining operations with tools that are triggered outside the G module must be transferred as **Treatment** using fixed processing numbers.

### Syntactic structure of the contur machining data

The level for the contour machining data is named as: <Contur>

Element: <Contur>

Data line  
 <Contur  
     Name="100" ToolNo="11100100" XPos="75" ...  
 />

Element attributes

**Name** Data type: Number

A number between 1 and 9999999

**Value:** Here you must specify the number of the standard NC program defined on the machine for the machining operation to be triggered. (See detail list for processing provided by your machine manufacturer)

**ToolNo** Data type: Number

Coded tool number

**Value:**

1	2	3	4	5	6	7
---	---	---	---	---	---	---

Number from tool in ten mechanical arrangement  
 digit 5+6 = Tool number  
 digit 7 = Placement of tool

**G-module number:**  
 0 = Single tool  
 1 = Behind G-module  
 2 = Front G-module (as 6-Axe-G-Module in use)

**Number of machine part:**  
 BAZ = 01..., SBZ = 03...  
 Buffer station 1 = 07  
 Buffer station 2 = 08  
 Real buffer = 10, ...

**Number of the machine controller**

**XPos** Data type: Number

A value in millimeters, possibly with decimal places.

**Value:** The X position of the machining operation relative to the center of the machining operation.

<i>YPos</i>	Data type: Number A value in millimeters, possibly with decimal places. Value: Y-position for pre-positioning at the application position of the machining. The machining position in the coordinate system is to be observed.
<i>ZPos</i>	Data type: Number A value in millimeters, possibly with decimal places. Value: Z-position for pre-positioning at the application position of the machining. The machining position in the coordinate system is to be observed.
<i>Tiefe</i>	Data type: Number A value in millimeters, possibly with decimal places. Value: Depth of the machining in relation to the coordinate zero point. Different values can be specified for different machining depths via Depth1, Depth2 to Depth5.
<i>Designation</i>	Data type: Text Maximum 255 characters Value: Text for general processing information. Optional: Yes
<i>Laenge</i>	Data type: Number A value in millimeters, possibly with decimal places. Value: Total length of machining in X-direction from beginning to end. The diameter of the milling bit is automatically offset.
<i>Breite</i>	Data type: Number A value in millimeters, possibly with decimal places. Value: Machining width. The diameter of the milling bit is automatically offset.
<i>Radius</i>	Data type: Number A value in millimeters, possibly with decimal places. Value: Radius for circular processing
<i>Eckenradius</i>	Data type: Number A value in millimeters, possibly with decimal places. Value: Corner radius for rectangular processing
<i>Gesamt-Laenge</i>	Data type: Number A value in millimeters, possibly with decimal places. Value: Total machining length that describes the maximum extent of the machining.
<i>BohrVorschub</i>	Data type: Number A value for the feed rate, possibly with decimal places. Value: Feed rate for drilling operations. Different speeds can be specified for different machining depths via DrillFeed1, DrillFeed2 to DrillFeed5.
<i>FraesVorschub</i>	Data type: Number A value for the feed rate, possibly with decimal places.

	Value:	Feed rate for milling operations. Different speeds can be specified for different milling positions via MillingFeed1, MillingFeed2 to MillingFeed5.
<i>Laufrichtung</i>	Data type:	Number A number between 0 and 1
	Value:	Setting machining in same/opposite direction for milling processes
<i>Orientierung</i>	Data type:	Number A number between 0 and 1
	Value:	Orientation of the machining. For more detailed information on this requirement please consult your machine manufacturer.
<i>VorposOffset</i>	Data type:	Number A value in millimeters, possibly with decimal places.
	Value:	Offset for preposition relative to the respective starting point, to which the system then positions quickly.
<i>KeineVorpos</i>	Data type:	Number A number between 0 and 1
	Value:	Do not move to the preposition after program execution. (0=start / 1=do not start)
<i>ZweiteKammer</i>	Data type:	Number A number between 0 and xxxx
	Value:	Machining of two compartments. If "1" is specified, the hole is drilled to depth1 with DrillFeed1 and MillingFeed1. Subsequently, the drill is inserted to Depth2, and drilling continues with DrillFeed2 and MillingFeed2. If a value is entered instead of "1" (incremental to the starting point), it is approached at rapid traverse after the first insertion and then drilled to Depth2.
<i>Ausraeumen</i>	Data type:	Number A number between 0 and 1.00, with decimal places
	Value:	A value up to 1 can be entered here. This indicates the use of the milling cutter when clearing out. 0.2 corresponds to 20% with a 10 mm milling cutter, i.e. a 2 mm milling overlap. If "0" is entered, the rectangle is not cleared.
<i>XVerstzAVW- ert</i>	Data type:	Number A value in millimeters, possibly with decimal places.
	Value:	Specifies the offset of the center of the entire machining operation to the starting point of the start machining operation.
<i>Rotation</i>	Data type:	Number Degrees between 0° and 360°, possibly with decimal places.
	Value:	Angle at which the machining is to be done in the plane.
<i>WkzWinkel</i>	Data type:	Number Degrees between 0° and 360°, possibly with decimal places.
	Value:	Feed angle of the tool. This function is only available with the O module.

*ParallelKon-* Data type: Number

*turlIndex*

A number between 0 and xx.

Value: Machining operations from different sides that have the same index number and are in one clamping of machining operations are performed in parallel. The validity of parallel processing must be checked in advance. Only the insertion depth of the two machining programs is checked on the machine. On the Schirmer G module, only two machining operations can take place in parallel! For machining operations consisting of subsequent machining operations, the individual machining operations of the sequences may only be carried out in parallel if the machining sequence is the same on both sides!  
The index must be unique within a bar and, if used, not equal "0" and continuous. Machining operations with index "0" would always be executed as individual machining.  
(Only possible with 6-axis G module machines!)

---

### **i Note on the transferable registers**

In the NC programs used, not all parameters are always necessary. Parameters that are not required do not have to be transferred. Which parameters are necessary for which program, what meaning they have and how they are defined always depends on the complexity of the NC program used. Relevant information can be found in the additional description of the NC standard program. The definitions are determined by your machine manufacturer's service department.

In the interest of readability, parameters that are not required should not be passed on. In addition to the parameters described here, further parameters can be created and transferred if necessary.

For information on any specially defined parameters, please refer to the detailed information on the NC programs provided by your machine manufacturer.

Since the fields described may only be used in consultation with your machine manufacturer, the field designators are not translated.

---

#### 2.4.1.4 Label print data

At the label data level, you must specify the print information for the labels to be generated by the machine. The data protocol for the printer used must be taken into account for the default setting, since the print information is usually transferred to the printer as specified.

Please refer to the printer manual for more detailed specifications on the printer used and its print commands.

At the label data level, up to five sublevels can be specified for the label information.

##### Syntactic structure of the label print data

The level for the label data is named as: <LabelPrintData>

Element: <LabelPrintData>

```
Data line    <LabelPrintData PieceNo="1">
               ... (label data)
               </LabelPrintData>
```

Element attributes

<i>PieceNo</i>	Data type: Number
	A number between 1 and 9999
Value:	A unique part number relating to the production order in the number range.
Note:	The part number must correspond to the part number at the part data level to which the print information is assigned. The request of the print data in the automatic machine cycle is always based on <b>BatchName &amp; PieceNo</b> .

Starting from this level, up to five labels per part can be specified.

The default level is defined as **PrintData** or **InkJetPrintData**. For further print data, the levels **PrintData1**, **PrintData2** and **PrintData3** are defined, for which the meaning and the printer assignment must be agreed with the PLC programmer.

##### Structure of the label print data

```
<LabelPrintData PieceNo="1">
  <PrintData> ... </PrintData>
  <InkJetPrintData> ... </InkJetPrintData>
  <PrintData1> ... </PrintData1>
  <PrintData2> ... </PrintData2>
  <PrintData3> ... </PrintData3>
</LabelPrintData>
```

#### 2.4.1.4.1 Print data levels

As described above, up to five print data levels can be specified under the label data. The type of data specification is the same for each node. They differ only in the naming and any associated assignment to a printer on the machine.

The print data is assigned to a part via the higher label data level.

#### Syntactic structure of the print data levels

The possible elements at the print data level are named as:

```
<PrintData>
<InkPrintData>
<PrintData1>
<PrintData2>
<PrintData3>
```

In the following section, the specification is described using the **PrintData** as an example

File element: *<PrintData>*

```
Data line  <PrintData>
            ... (formatted printing data)
            </PrintData>
```

Element attributes

<i>none</i>	Data type:	Text
	Value:	none

Element data

Data type:	Text
	Up to 3000 characters of text in the form of readable characters. Control characters can be specified starting with a dollar sign (\$) followed by three digits according to their decimal number code. Please also note the special features described in Chapter: <b>Specifications - Special character transfers</b> .
Value:	Print text with format instructions for the used label printer.

#### Structure of the print data level

Example for an Intermec label printer

```
<PrintData>
  DIR4:AN1:FT"SW030RSN.2":MAG2,2
  PP80,80:PT"BLANCO 2236 / \ 1"
  PP130,80:PT"PIECE VERTICAL "
  PP180,80:PT"10578/ 2236/ 6 /1 "
  PP310,80:MAG4,2:PT"Example":MAG2,1
  PP360,80:PT"A / 900 X 2150"
  PF$013
</PrintData>
```



### Example for an inkjet printer from Image

```
<InkPrintData>
$087$000$192$001$192$032$000$001$001$001$000$060$000$060$000$003
$002$152$000$000$010$128$001$056$001
$016025092/001-OVD1 _ RF2 / GTM Batime 2D
$016$001$056$128$001$128$009$052$001$016900019541/2030/9001101902
$016$001$052$128$009$010$128$001$052$001
$016$030$255$030$030$255$030$030$255$030$030$074
$0301000x2024/LYON XYZ BON GOLD BA/ GTM Batime 2D KTN001/0001$030$030$030
$016$001$052$128$001$013
</InkPrintData>
```

### Example for a label printer from Zebra

```
<PrintData>
^XA
^LH50,10^LRN^FWN^PR2^MNY^MTT^MMP^PON^PM
^BY4,2.0,100^FO10,10^B3,,,N,N^FDEExample 1^FS
^BY4,3.0,100^FO10,130^B2,,,N^FD#1234567890123B^FS
^AB^FO5,240^FD1234567890123^FS
^AEN,80,30^FO600,10^FD123^FS
^AEN,60,20^FO750,110^FD#12^FS
^AEN,60,20^FO910,110^FD/123^FS
^AEN,60,20^FO750,180^FD#56^FS
^AEN,60,20^FO860,180^FD#1^FS
^AEN,60,20^FO950,200^FD#2^FS
^AEN,60,20^FO975,170^FD#5^FS
^AEB,30,20^FO1100,20^FD#12345678^FS
^AB^FO270,240^FD3/1^FS
^AB^FO450,240^FD#Profil X^FS
^AB^FO600,200^FD#2007-01-18^FS
^FO730,90^GB320,160,2^FS
^FO730,160^GB320,0,2^FS
^FO840,160^GB0,90,2^FS
^FO930,160^GB0,90,2^FS
^PQ1
^XZ$013
</PrintData>
```

### Example for a label printer from Sato

```
<PrintData>
$002$027A$027*$027Z$027A
$027%0$027H0600$027V0040$027P01$027L0101$027MDT /003 235749/008 F_A 1
$027%0$027H0630$027V0060$027P01$027L0101$027MSSB101 500 w Face
$027%0$027H0630$027V0080$027P01$027L0101$027M BLK Glazing
$027%0$027H0630$027V0120$027P01$027L0101$027M\-----/
$027%0$027H0630$027V0140$027P01$027L0101$027M \ /
$027%0$027H0630$027V0160$027P01$027L0101$027M \*12 SH Std*/
$027%0$027H0010$027V0015$027P01$027B20316000340261001000025700
$027%0$027H0010$027V0190$027P01$027L0101$027M00340261001000025700
$027Q1$027Z$003
</PrintData>
```

## **i** Representation of line breaks

If the XML file is opened using an Explorer or XML-capable text editor, these extra-long text lines automatically break and display the data in a structured manner. However, these breaks are not actually present in the data specifications. If you end the default lines with a line break within your print data specifications, note that these breaks are also transferred to the printer. If this is problematic, the print data must be specified in one line.

If line breaks can be transferred without problems, please note that any command separators used (e.g. ':' as with Intermec printers) must not be transferred at the end of a line.

### 2.4.1.4.2 Special character transfers

#### XML formatting characters

In XML the following applies: You must use alternative notations characters that have special meaning in XML syntax if you want to use them in normal text between tags. The following characters are affected:

<, >, &, ' and "

You can use the following alternative notations for these characters:

Character		Entity reference	Character reference
<	less than	&lt;	&#60;
>	greater than	&gt;	&#62;
&	Ampersand	&amp;	&#38;
'	Apostrophe, single quote	&apos;	&#39;
"	double quote	&quot;	&#34;

#### Examples

```
...
<BarData BarNo="1" ProfileName="30190.W" Designation="Test special characters" ...>
  <PieceData PieceNo="1" Commission="Test &lt; -- 1234 -- &gt;" Length="1051,00" ...>
    <Treatment TNo="165" XPos="605,00"/>
    <LabelPrintData PieceNo="1">
      <PrintData>
        DIR1:AN1:FT"SW030RSN.1":NASC1252
        PP50,205:PT"Example Piece 1 Meier &amp; Miller"
        PF$013
      </PrintData>
    </LabelPrintData>
  </PieceData>
  <PieceData PieceNo="2" Kommission="Test &#60; -- 5678 -- &#62;" Length="1051,00" ...>
    <Treatment TNo="165" XPos="605,00"/>
    <LabelPrintData PieceNo="2">
      <PrintData>
        DIR1:AN1:FT"SW030RSN.1":NASC1252
        PP50,205:PT"Example Piece 2 Mayer &#38; Mayer"
        PF$013
      </PrintData>
    </LabelPrintData>
  </PieceData>
</BarData>
...
```

#### Control character specifications

Some label printers require control characters that cannot be displayed using the normal character set. You can use the following coding to transfer such characters that cannot be displayed in the print data:

Character		ASCII (decimal) entity reference	Character reference
STX	Start of text	2	\$002
ETX	End of text	3	\$003
TAB	Tab	9	\$009
LF	Line feed	10	\$010
CR	Carriage return	13	\$013
ESC	Escape	27	\$027

## Examples

```
<LabelPrintData PieceNo="2">
  <InkPrintData>
    $087$000$192$001$192$032$000$001$001$001
    $000$060$000$060$000$003$002$152$000$000$010$128$001$056$001
    $016025092/001-OVD1 _ RF2 / GTM Batime 2D
    $016$001$056$128$001$128$009$052$001$016900019541/2030/9001101902
    $016$001$052$128$009$010$128$001$052$001
    $016$030$255$030$030$255$030$030$255$030$030$074
    $0301000x2024/LYON ZAC BON LAIT BA/ GTM Batime 2D KTN001/0001$030$030$030
    $016$001$052$128$001$013
  </InkPrintData>
</LabelPrintData>
```



### Control character specifications

In principle, all characters could be transferred with a character reference. This particularly applies to the characters listed in the table.

#### 2.4.1.4.3 Images as labels

Another way of specifying print data is to specify the labels as images. In this case, these image files must be generated and made available by the upstream production planning section. By default, all image formats for which a print command has been created in the operating system are possible. In addition, PDF files can also be specified.

With this type of print data specification, the labels to be printed must be transferred as a file in the appropriate format. The files must contain the fully designed labels. Standard image formats such as wmf, emf, jpg, bmp etc. can be used, also pdf. The image file is transferred directly to the connected printer when the print function is called at the machine. The settings for this function are described below.

Label printing via image files has the advantage that no knowledge of the printer formatting commands is required. The conversion is handled by a printer driver. Before commissioning must the image format and therefore the file extension must be specified.

If possible, the images should be transferred to the machine in their original size and orientation, as scaling or rotation during printing often leads to a deterioration of the image quality. This applies in particular to barcodes that may have to be printed, which may then not be legible.

Two options are defined for transferring image files:

1. Order folder + label file per part
2. Global image folder + label file per part

In both cases the following applies: The print data must be saved for each part in a dedicated file.

Normally, no transfer is required at the XML level of the label data. The label printing is triggered via the print data request with batch name & part number from the machine only for the parts for which the label images were transferred.

#### Order folder + label file per part

With this type of transfer, you must create an order folder in the folder for the label image files, in which all the label images for the order should be stored. The name of the folder must always be the same as the name transferred to the machine in the order XML file via **<Optidata Name="...">**. The print data for each part must be stored in separate files, with the part numbers used as the file name. Only the part number may be used as a number without leading zeros.

The directory is automatically deleted when the machine deletes the associated production order.

You do not necessarily have to transfer print data at the print data level in the XML file, although the file name of the print data file could be transferred in this way. Example:

Print data file: 12.emf

```
<PrintData>
  12.emf
</PrintData>
```

However, this does not mean that the print data request for the print file takes place via this specification. This is always done via **batch name & part number**

In the following example, a directory for the order "Example\_14" was created in the "Images" folder, in which the images of the part labels were then stored. The "Images" folder can be located on the machine or in the network.

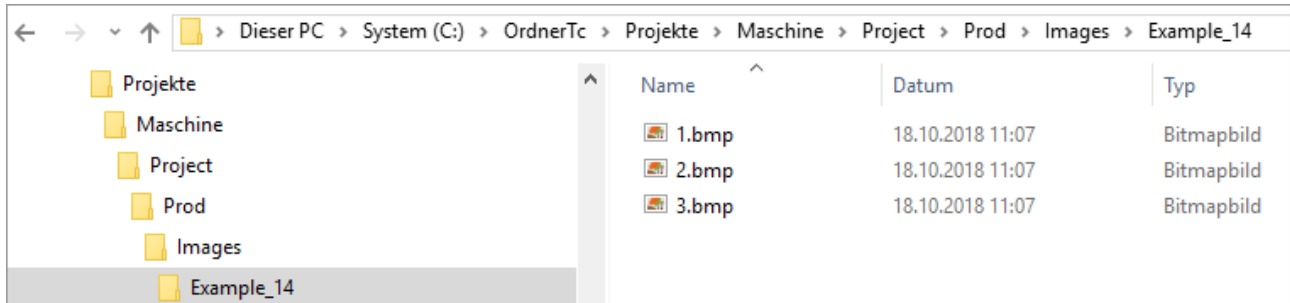


Fig. 2: Label order folder with parts labels

### Global image folder + label file per part

In this case, you have to generate a file name for label images with the format "*batchname#partnumber*" and save the label image in the folder for the label image files. The batch name must always be the same as the designation transferred to the machine in the order XML file via **<Optidata Name="...">**. The piece number may only be inserted in the filename as a number, i.e. without leading zeros.

The label images are automatically deleted when the machine deletes the associated production order.

You do not necessarily have to transfer print data at the print data level in the XML file, although the file name of the print data file could be transferred in this way. Example:

Print data file: BatchTest#12.emf

```
<PrintData>
  losTest#12.emf
</PrintData>
```

However, this does not mean that the print data request for the print file takes place via this specification. This is always done via **batch name & part number**

In the following example, the order label files for order "Example\_14" were saved in the "Images" folder. The folder can be located on the machine or in the network.

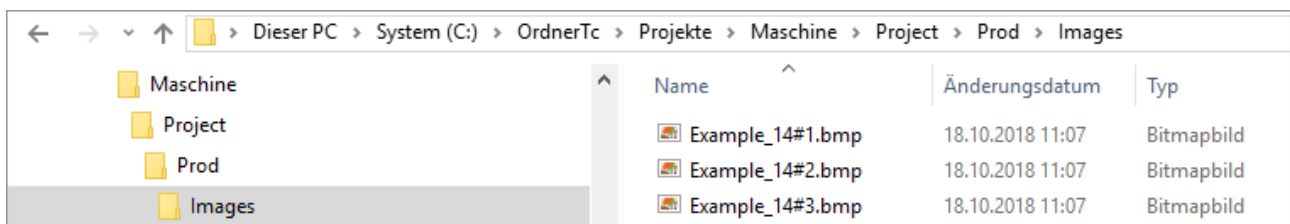


Fig. 3: Label image folder with order part labels

## **i** Barcodes in images

Please note that when barcodes are transferred in images, they must not be too small and must be adequately sharp, without grayscales, because otherwise scanners may be unable to read the barcode. Please ensure that high-quality label material is used. Standard label printers usually have a resolution of 203 dpi. Please refer to the printer documentation for the resolution of the printer you are using.

It should be noted that transferring barcodes in images can generally be problematic, since the exact distance between the bars and blank areas may be distorted and the printer prints "simply" prints the barcode as an image. The correct display of the barcode is then no longer controlled by the printer! It is therefore always necessary to check the legibility of the barcodes created beforehand; scaling may have to be suppressed for printing, or another file format may have to be used. In the current version of the print data server, it is also possible to print PDF files. The only requirement is that a print function for PDF files is installed under Windows. However, please always refer to the information on this topic in the documentation of your printer.

---

## Setting up a network printer

Note the following when setting up label printing using this specification:

1. Setting up the printer driver  
The Windows print function is used for label printing, which means that a suitable printer driver must be installed. The driver can usually be found on the CD that comes with the printer. Follow the instructions in the installation manual.
2. Setting up the printer as default printer for Windows  
You can define the previously configured printer as the default printer for Windows via the printer context menu (right mouse button).  
Alternatively, in the print server you can select one of the printers installed for Windows for the label printing request from the machine.
3. Configuring the print server  
In the print server interface activate the options required for printing image data and specify the path for the image files. A description of the parameters can be found in Chapter: Print server under **Printing via default Windows printer**.
4. Configuring the resources in the production menu  
Specify the data for the image printing in the 'CAD...' parameters in the settings for the reproduction. A description of the parameters can be found in Chapter: Settings for reproduction

## 2.4.2 Optimized steel data

All cutting and processing data for the steel cut must be specified at the optimized steel data level (SteelOptiData). This data is usually only generated and transferred in connection with PVC parts. This means that if no steel cutting facility is available on a machine, this data level can be omitted.

The steel data is used to transfer the bars to which parts have been assigned. Under the individual bars the part data with any processing data. Since the steel saw usually works in conjunction with the general production data, there is always a relationship between these two specifications.

### Structure of the steel opti data level

```
<File Name="ExampleProdDat.xml">
  <OptiCuttingData>
    <OptiData Name="Example_10">
      ...
    </OptiData>
    <SteelOptiData Name="Example_10">
      <SteelBarData BarNo="1" SteelName="V030_25" BarLength="6000.00" >
        <SteelPieceData PieceNo="1" Laengthe="1051,00" AngleOnCut="90" AngleOffCut="90" ...>
          <SteelToolData PieceNo="1">
            <SteelTreatment TNo="280" XPos="605.00" />
            ...
          </SteelToolData>
        </SteelPieceData>
        <SteelPieceData PieceNo="2">
          ...
        </SteelPieceData>
      </SteelBarData>
    </SteelOptiData>
  </OptiCuttingData>
</File>
```



### Optional specifications

All elements and attributes referred to as **optional** below do not necessarily have to be transferred. If they are transferred anyway, despite the fact that they are not used, they must be transferred as empty fields ("") or with the value "0", depending on the data type.

### 2.4.2.1 Steel bar data

The information that refers to the bar has to be transferred in the steel bar data. The bar number must be unique in the entire steel order.

#### Syntactic structure of the steel bar data

The level for the bar data is named as: <SteelBarData>

Element: <SteelBarData>

Data line  
 <SteelBarData BarNo="1" BarLength="6000" SteelName="VA" ...>  
 ... (Steel piece data)  
 </SteelBarData>

#### Element attributes

<i>BarNo</i>	Data type: Number A number between 1 and 9999 Value: A unique bar number relating to the steel order in the number range.
<i>BarLength</i>	Data type: Number A value in millimeters, possibly with decimal places. Value: The uncut length of the bar, as it should be used for loading.
<i>Designation</i>	Data type: Text Maximum 255 characters Value: Text for general steel profile information. The information is displayed in the loading table. Optional: Yes
<i>SteelName</i>	Data type: Text The designation of the steel profile should only contain digits between 0 and 9 and letters between a and z or A and Z. It should have no spaces and have a maximum length of 40 characters. Special characters can also be used, except: '\ / < > * " ? Value: Designation of the steel as it is configured on the machine.
<i>RestLength</i>	Data type: Number A value in millimeters, possibly with decimal places. Value: The previously calculated residual length of the bar. Optional: Yes
<i>RestCode</i>	Data type: Number A number between 1 and 2 Value: An identifier for the remainder: 1 = rest 2 = waste Optional: Yes



### 2.4.2.2 Steel piece data

In the steel piece data, you have to transfer the information related to a part. This can be customer-specific data relating to the part or perhaps assignment information relating to the PVC part. Only parts may be transferred that are to be processed by the steel cutting saw, followed by manual or automatic insertion. The part number must be unique in the entire steel order.

#### Syntactic structure of the steel part data

The level for the part data is named as: <SteelPieceData>

Element: <SteelPieceData>

```
<SteelPieceData PieceNo="1" Length="1230" ...>
... (Tool data / treatments)
</SteelPieceData>
```

Element attributes

<i>PieceNo</i>	Data type: Number A number between 1 and 9999 Value: A unique part number relating to the steel cutting order in the number range.
<i>Length</i>	Data type: Number A value in millimeters, possibly with decimal places. Value: Part length, measured from tip to tip.
<i>Designation</i>	Data type: Text Maximum 255 characters Optional: Yes Value: Text for general part information
<i>Commission</i>	Data type: Text Maximum 255 characters Value: Customer-specific commission designation / number of the part Optional: Yes
<i>Position</i>	Data type: Text Maximum 255 characters Value: Position designation / number of the part Optional: Yes
<i>AngleOnCut</i>	Data type: Number Angle in degrees (the vertical cut is the reference angle) Value: Value for the first cut angle Note: Please note that on standard machines the steel saw is only configured as a 90° saw.

<i>AngleOffCut</i>	Data type: Number Angle in degrees (the vertical cut is the reference angle) Value: Value for the last cut angle Note: Please note that on standard machines the steel saw is only configured as a 90° saw.
<i>AngleOnCutID</i>	Data type: Number Angle position code first cut Value: 0 or 2; 2 corresponds to the 90-degree position Note: This specification option is introduced for compatibility reasons to replace the Gxy specification.
<i>AngleOffCutID</i>	Data type: Number Angle position code last cut Value: 0 or 2; 2 corresponds to the 90-degree position Note: This specification option is introduced for compatibility reasons to replace the Gxy specification.
<i>Steel</i>	Data type: Number Numbers from 1 – 2 Value: Type of steel processing 1 = Steel inserted manually 2 = Steel inserted automatically
<i>PVCPieceNo</i>	Data type: Number Number 1- 9999 Value: PVC part number associated with the steel part
<i>PVCBatch- Name</i>	Data type: Text Maximum 255 characters Value: The PVC batch name should only contain digits from 0-9 and letters from a - z, A - Z, without spaces, and be no longer than 40 characters. Please note that the PVC batch name must match the name specified in the field <b>Name</b> in the PVC OptiData. Please use this field only in consultation with your machine manufacturer! Optional: Yes



### Note the following when specifying the steel data:

The steel **PieceNo** must always be identical to the **SteelPieceNo** in the part data set of the PVC part assigned to it.

The specification in the **PVCPieceNo** field must be identical to the **PieceNo** of the PVC part assigned to the steel part.

If some PVC parts are not furnished with steel, the information stated above applies. This means there are step changes within the part numbering, but this is not a problem.

If a steel part is to be inserted into a special compartment in the PVC part, the insertion compartment must be selected using the specifications for the PVC part in the **SteelDepth** field.

In the production process on the machine, a steel part is only processed via the steel **PartNo**!

### 2.4.2.3 Steel tool data

At the steel tool data level, you must specify the tools or processing numbers with which the steel part will be machined. The machining operations can be given a machining position and possibly special machining registers.

As a rule, no steel processing is possible on the steel saw, so this level only needs to be used if it is actually required. In this case, please discuss the definitions of the machining operations with your machine manufacturer, including which data transfers are possible or necessary.

#### Syntactic structure of the steel tool data

The level for the tool data is named as: <SteelToolData>

Element:       <SteelToolData>

```
Data line       <SteelToolData PieceNo="1">
                 ... (Steel treatments)
                 </SteelToolData>
```

Element attributes

<i>PieceNo</i>	Data type: Number
	A number between 1 and 9999
Value:	A unique part number relating to the steel order in the number range.
Note:	The part number must correspond to the part number as specified at the part data level.

Starting from this level, the various processing data must be transferred. The standard profile processing transfer is defined. It is mandatory that all possible machining operations on the machine are created in the profile database for a steel profile.

#### Structure of the steel tool data

```
<SteelToolData PieceNo="1">
  <SteelTreatment TNo="904" XPos="75".../>
  <SteelTreatment TNo="889" XPos="1230".../>
  ...
</SteelToolData>
```

### 2.4.2.3.1 Steel treatment operations

This is defined as the standard profile processing data transfer for the transfer of steel machining operations. This means that the type of machining is defined by the machine manufacturers specified in detail by the machine manufacturer. Each processing number is stored with the required parameters in the profile data on the machine. Optionally, further parameters such as YPos, ZPos can be transferred in addition to the minimum processing number (PNo) and processing position (XPos).

For this type of processing the system profile data is always used. The processing cannot be carried out unless the processing number is defined at the machine. The processing, including the processing numbers, is pre-defined by the machine builder, and can be taken from his detailed documentation.

#### Syntactic structure of the steel processing data

The level for the profile processing data is named as: <SteelTreatment>

Element: <SteelTreatment>

```
<SteelTreatment
  TNo="100" XPos="120" YPos="20" ZPos="30"
/>
```

Element attributes

<i>TNo</i>	Data type: Number A number between 1 and 9999 Value: A unique processing number in the steel profile. (see detail list for processing provided by your machine manufacturer)
<i>XPos</i>	Data type: Number A value in millimeters, possibly with decimal places. Value: The X position of the machining operation relative to the center of the machining operation.
<i>Designation</i>	Data type: Text Maximum 255 characters Value: Text for general processing information. Optional: Yes
<i>Comment</i>	Data type: Text Maximum 255 characters Value: Text for any commenting purpose. Optional: Yes

The following attributes could be transferred as additional specifications:

<i>YPos</i>	Data type: Number A value in millimeters, possibly with decimal places. Value: Y-position as pre-positioning at the application position of the machining. The machining position in the coordinate system is to be observed.
<i>ZPos</i>	Data type: Number A value in millimeters, possibly with decimal places. Value: Z-position as pre-positioning at the application position of the machining. The machining position in the coordinate system is to be observed.

## 2.4.3 Special data transfers

The following sections contain more details descriptions of special data specifications, since these usually require certain entries in the standard transfer fields. This specifications are only required when explicitly requested. Otherwise they can be omitted.

The specifications are based on the data levels described in the previous chapters, their data fields and their attributes.

### 2.4.3.1 Additional bar information

The following specifications can optionally be used, but they require special functions in the PLC or in the application interface that are enabled only if needed. Speak to your machine manufacturer about this! The functionalities are not included in the standard scope of the application.

Transfer level: <BarData>

#### Bar release by scanner

If all bars are labelled with a unique barcode and the corresponding order has been loaded onto the machine in advance by hand or automatically, you have the option of approving each individual bar for the loading list using a scanner.

---

Requirement	A scanner must be set up in the PLC with the <b>bar approval</b> functionality.
-------------	---

---

<i>Barcode</i>	Data type: Text
----------------	-----------------

The barcode should only contain digits between 0 and 9 and letters between a and z or A and Z. It should have no spaces and have a maximum length of 40 characters. Ultimately, however, the type of barcode determines which characters may be used.

Value:	Unique barcode information for the bar. This information is used to select and release the bar with a scanner.
--------	--

Optional:	Yes
-----------	-----

---

#### Additional bar information for the external loading indicator

As a rule, the information on the profile type and profile color provided in the bar data is sufficient for identification. If, however, profiles with special properties are processed on the machine, such as different exterior and interior colors or special colors for seals, you can enter this information in the following fields.

This additional information is for display purposes only and is shown on a special display.

---

Requirement	An external display unit must be available on the machine.
-------------	--

---

<i>ProfilePicture</i>	Data type: Text
-----------------------	-----------------

A file name with extension must be specified here. A maximum of 50 characters can be specified.

Value:	File name of the profile image for the profile type of the bar
--------	--

Optional:	Yes
-----------	-----

---

<i>FolieInnen</i>	Data type: Text	The foil designation can contain digits from 0 - 9, letters from a - z, A - Z and space, as well as special characters, apart from: "\ <>". The maximum number of characters is limited to 255.
	Value:	Text designation for the inner foil
	Optional:	Yes
<i>FolieInnenPicture</i>	Data type: Text	A file name with extension must be specified here. A maximum of 50 characters can be specified.
	Value:	File name for the foil color palette
	Optional:	Yes
<i>FolieAussen</i>	Data type: Text	The foil designation can contain digits from 0 - 9, letters from a - z, A - Z and space, as well as special characters, apart from: "\ <>". The maximum number of characters is limited to 255.
	Value:	Text designation for the outer foil
	Optional:	Yes
<i>FolieAussenPicture</i>	Data type: Text	A file name with extension must be specified here. A maximum of 50 characters can be specified.
	Value:	File name for the foil color palette
	Optional:	Yes
<i>DichtungInnen</i>	Data type: Text	The seal designation can contain digits between 0 and 9 and letters between a and z or A and Z, as well as spaces and special characters, except: "\ <>". The maximum number of characters is limited to 255.
	Value:	Text designation for the inner seal
	Optional:	Yes
<i>DichtungInnenPicture</i>	Data type: Text	A file name with extension must be specified here. A maximum of 50 characters can be specified.
	Value:	File name for the seal color palette
	Optional:	Yes
<i>DichtungAussen</i>	Data type: Text	The seal designation can contain digits between 0 and 9 and letters between a and z or A and Z, as well as spaces and special characters, except: "\ <>". The maximum number of characters is limited to 255.
	Value:	Text designation for the outer seal
	Optional:	Yes
<i>DichtungAussenPicture</i>	Data type: Text	A file name with extension must be specified here. A maximum of 50 characters can be specified.
	Value:	File name for the seal color palette
	Optional:	Yes

**Additional storage location information for the profile bars**

If the storage location information for the bars required in an order is to be displayed on the machine, it can be transferred to the machine for each bar.

This additional information is for display purposes only and is displayed in the loading table of the machine.

---

Requirement	none
-------------	------

---

<i>Storage</i>	Data type: Text
----------------	-----------------

An exact designation for the storage location of the profile bar must be given here. The designation can contain digits between 0 and 9 and letters between a and z or A and Z, as well as spaces and special characters, except: "\" <>". The maximum number of characters is limited to 40.

Value:	Storage location designation of the profile bar
--------	---

Optional:	Yes
-----------	-----

---

**Additional remaining compartment specification for the profile bars**

If residual bars stored at a defined residual storage location are to be used, this information can be transferred to the machine for each residual bar.

This additional information is for display purposes only and is displayed in the loading table of the machine.

---

Requirement	none
-------------	------

---

<i>RestCaseNo</i>	Data type: Text
-------------------	-----------------

An exact designation for the storage location of a residual bar to be used must be given here. The designation can contain digits between 0 and 9 and letters between a and z or A and Z, as well as spaces and special characters, except: "\" <>". The maximum number of characters is limited to 40.

Value:	Storage location designation of the residual bar
--------	--

Optional:	Yes
-----------	-----

---

### 2.4.3.2 Extended treatment transfers

By default, it is sufficient that only the tool and the machining position have to be transferred in the data set for the machining specifications. Depending on the design of the tools and the definition of the processing macros, it is possible to transfer additional data for machining.

If you have any questions regarding this type of transfer, please contact the service department of your machine manufacturer.

#### NOTE



#### Incorrect specifications

Incorrect or undefined specifications of additional processing data can result in incorrect machining or damage to the processing unit.

Discuss the limits of these requirements with your machine manufacturer.

Transfer level: <OptiData> <PieceData> <ToolData> <Treatment>

Requirement	Consult with your machine manufacturer on options for processing macros.	
<i>YPos</i>	Data type: Number	A value in millimeters, possibly with decimal places.
	Value:	Y-position for pre-positioning at the application position of the machining. The machining position in the coordinate system is to be observed.
<i>ZPos</i>	Data type: Number	A value in millimeters, possibly with decimal places.
	Value:	Z-position for pre-positioning at the application position of the machining. The machining position in the coordinate system is to be observed.
<i>Length</i>	Data type: Number	A value in millimeters, possibly with decimal places.
	Value:	Total length of machining in X-direction from beginning to end. The diameter of the milling bit is automatically offset.
<i>Width</i>	Data type: Number	A value in millimeters, possibly with decimal places.
	Value:	Machining width. The diameter of the milling bit is automatically offset.
<i>Radius</i>	Data type: Number	A value in millimeters, possibly with decimal places.
	Value:	Radius for circular processing
<i>Cornerradius</i>	Data type: Number	A value in millimeters, possibly with decimal places.
	Value:	Corner radius for rectangular processing
<i>Depth</i>	Data type: Number	A value in millimeters, possibly with decimal places.
	Value:	Depth of the machining in relation to the coordinate zero point



*ToolAngle* Data type: Number

Degrees between 0° and 360°, possibly with decimal places.

Value: Feeding angle of the tool for the machining. (The machine must be equipped for this function in order be able to use it!)



The following must be observed for special transfers for processing:

The x-coordinate is always related to the direction of transport of the piece.

The limits of the profile are to be observed in the depth specifications.

Circle radius and tool radius are to be observed in the case of circle processing.

Extended processing transfers should only take place in the case of processing operations that have been approved by the machine manufacturer for this.

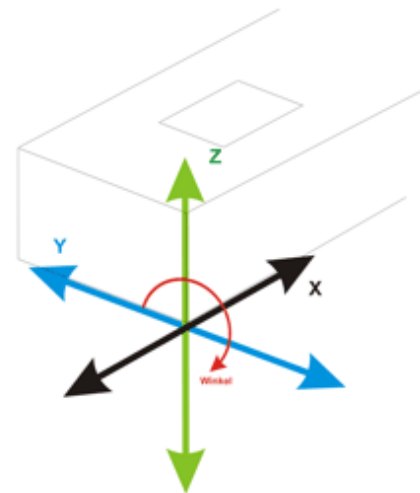
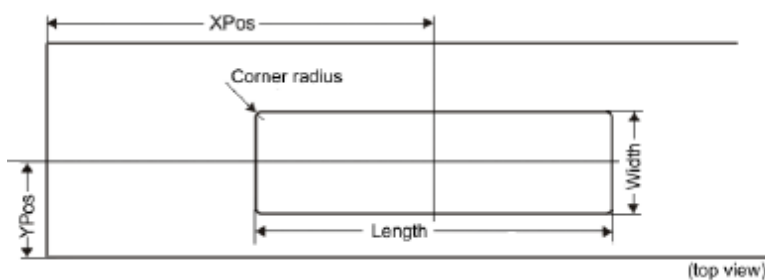
Please use only the transfer possibilities that have been agreed with the machine manufacturer.

It is not compulsory for the extended processing transfers to always take place. If they are not transferred, the standard parameters stored in the machine are used.

The specification possibilities that you have for each particular processing must always be agreed with the programmer of the NC programs or your machine manufacturer. The same applies to the rules that govern the dimensioning and specification parameters. Further parameters could still be defined if necessary.

### Explanatory example

The example describes the specification for rectangular machining on the part:



The number "165" is defined for machining:

```
<Treatment
  TNo="165"
  XPos="120"
  YPos="20"
  Depth="30"
  Width="10"
  Length="42"
  Cornerradius="4"
/>
```

The machining position is usually fixed to the machining center with respect to the start of the part; it must be transferred as **XPos**.

The machining position in relation to the stop edge (blue coordinate arrow (Y)) must be transferred via **YPos**. The length and width of the rectangle must be transferred via the corresponding registers.

The insertion depth must be transferred via the **Depth** register in the Z direction (green coordinate arrow). In addition, the **Cornerradius** could be transferred.

### 2.4.3.3 Special cutting specifications

You can define the standard cutting specifications via the first or last cut angles or via the cutting function numbers. For cross-cuts or pointed cuts, proceed as follows.

The evaluation of these special transfers is possible only if the machine application (PLC) has the corresponding functionalities and they are enabled. They are not included in the standard scope of the machine application! The enablement or extension of the machine application by these properties must be discussed with your machine manufacturer and is chargeable.

Transfer level: <OptiData> <PartData>

#### Standard pointed cuts

Pointed cuts are always made via cut function number "3" in the **AngleOnCutID** or **AngleOffCutID** fields. Normally the point always lies at "profile height / 2". The length dimension is related to point / point.

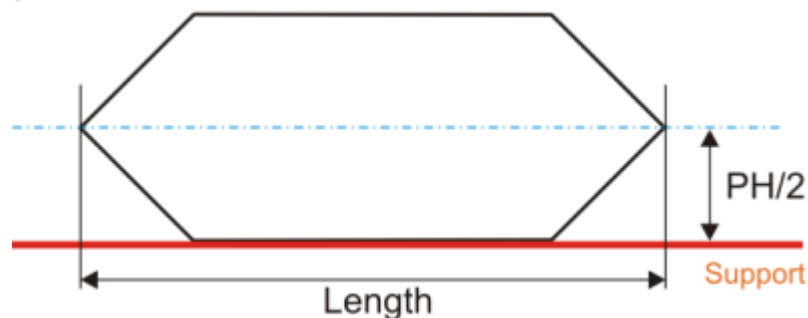
Requirement      The machine must be able to make pointed cuts.

*Length*      Data type:    Number  
                                  A value in millimeters, possibly with decimal places.  
                  Value:        Part length, measured from tip to tip.

*AngleOnCutID*      Data type:    Number  
                                  Number 0 - 5 as identifier for the cutting function  
                  Value:        Number of the cutting function for the first cut angle  
                                  3 = transom pointing

*AngleOffCutID*      Data type:    Number  
                                  Number 0 - 5 as identifier for the cutting function  
                  Value:        Number of the cutting function for the last cut angle  
                                  3 = transom pointing

Example:



Standard pointed cut

Data set:

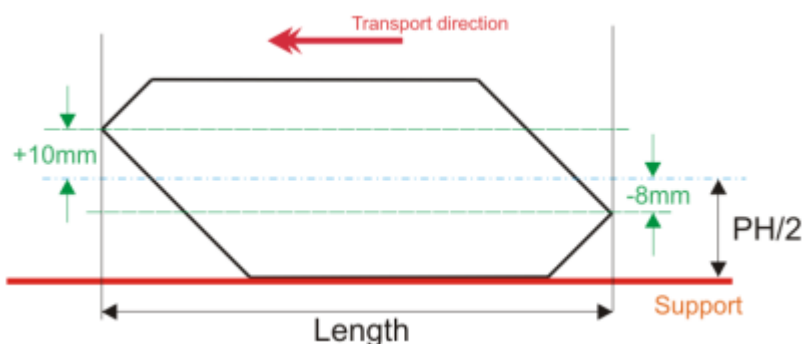
```
<PieceData BarNo="1" PieceNo="14"
  Length="1806" AngleOnCutID="3" AngleOffCutID="3"
  CutHeightOnCut="0" CutHeightOffCut="0" ...>
...
</PieceData>
```

## Offset pointed cuts

Pointed cuts are always made via cut function number "3" in the **AngleOnCutID** or **AngleOffCutID** fields. By means of the special specifications described here it is possible to shift the points in height at the first or last cut side.

Requirement	The machine must be able to make pointed cuts.
<i>Length</i>	Data type: Number A value in millimeters, possibly with decimal places. Value: Part length, measured from tip to tip.
<i>AngleOnCutID</i>	Data type: Number Number 0 - 5 as identifier for the cutting function Value: Number of the cutting function for the first cut angle 3 = transom pointing
<i>AngleOffCutID</i>	Data type: Number Number 0 - 5 as identifier for the cutting function Value: Number of the cutting function for the last cut angle 3 = transom pointing
<i>CutHeightOn-Cut</i>	Data type: Number A value in millimeters, possibly with decimal places. Value: In this special case this specification is taken as the offset of the height of the point in relation to "profile height / 2". The point is shifted upwards with positive values and downwards with negative values.
<i>CutHeightOff-Cut</i>	Data type: Number A value in millimeters, possibly with decimal places. Value: In this special case this specification is taken as the offset of the height of the point in relation to "profile height / 2". The point is shifted upwards with positive values and downwards with negative values.

### Example



Pointed cut with offset points

### Data set:

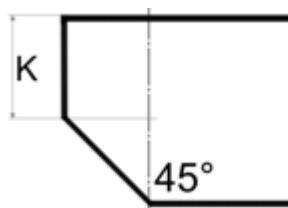
```
<PieceData BarNo="1" PieceNo="14"
  Length="1806" AngleOnCutID="3" AngleOffCutID="3"
  CutHeightOnCut="+10" CutHeightOffCut="-8" ...>
...
</PieceData>
```

**Cross-cut, top**

Upper cross-cuts are always made via cut function number "4" in the **AngleOnCutID** or **AngleOffCutID** fields. The lower miter is always executed at 45°.

Requirement	The machine must be able to make cross-cuts.	
<i>Length</i>	Data type:	Number A value in millimeters, possibly with decimal places.
	Value:	Part length, measured from tip to tip.
<i>AngleOnCutID</i>	Data type:	Number Number 0 - 5 as identifier for the cutting function
	Value:	Number of the cutting function for the first cut angle 4 = cross-cut, top
	Optional	Yes
<i>AngleOffCutID</i>	Data type:	Number Number 0 - 5 as identifier for the cutting function
	Value:	Number of the cutting function for the last cut angle 4 = cross-cut, top
	Optional	Yes
<i>CutHeightOnCut</i>	Data type:	Number A value in millimeters, possibly with decimal places.
	Value:	Cutting height in millimeters for the first cut (measured from the upper edge of the profile to the miter)
	Optional	Yes
<i>CutHeightOffCut</i>	Data type:	Number A value in millimeters, possibly with decimal places.
	Value:	Cutting height in millimeters for the last cut (measured from the upper edge of the profile to the miter)
	Optional	Yes

Example:



The default for the first and last cut can be specified separately, i.e. they do not have to be the same. It is also possible that the first cut is made with 45° and a last cut is executed as a cross-cut.

Data set:

```
<PieceData BarNo="1" PieceNo="14"
  Length="1806" AngleOnCutID="4" AngleOffCutID="4"
  CutHeightOnCut="24" CutHeightOffCut="24" ...>
</PieceData>

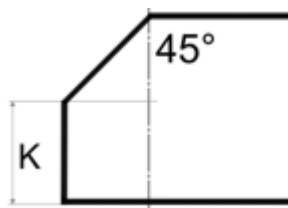
<PieceData BarNo="1" PieceNo="15"
  Length="1806" AngleOnCutID="1" AngleOffCutID="4"
  CutHeightOnCut="0" CutHeightOffCut="24" ...>
</PieceData>
```

**Cross-cut, bottom**

Lower cross-cuts are always made via cut function number "5" in the **AngleOnCutID** or **AngleOffCutID** fields. The upper miter is always executed at 45°.

Requirement	The machine must be able to make cross-cuts.	
<i>Length</i>	Data type: Number	A value in millimeters, possibly with decimal places.
	Value:	Part length, measured from tip to tip.
<i>AngleOnCutID</i>	Data type: Number	Number 0 - 5 as identifier for the cutting function
	Value:	Number of the cutting function for the first cut angle 5 = cross-cut, bottom
	Optional	Yes
<i>AngleOffCutID</i>	Data type: Number	Number 0 - 5 as identifier for the cutting function
	Value:	Number of the cutting function for the last cut angle 5 = cross-cut, bottom
	Optional	Yes
<i>CutHeightOnCut</i>	Data type: Number	A value in millimeters, possibly with decimal places.
	Value:	Cutting height in millimeters for the first cut (measured from the lower edge of the profile to the miter)
	Optional	Yes
<i>CutHeightOffCut</i>	Data type: Number	A value in millimeters, possibly with decimal places.
	Value:	Cutting height in millimeters for the last cut (measured from the lower edge of the profile to the miter)
	Optional	Yes

Example:



The default for the first and last cut can be specified separately, i.e. they do not have to be the same. It is also possible that the first cut is made with 45° and a last cut is executed as a cross-cut.

Data set:

```
<PieceData BarNo="1" PieceNo="14"
  Length="1806" AngleOnCutID="5" AngleOffCutID="5"
  CutHeightOnCut="24" CutHeightOffCut="24" ...>
</PieceData>

<PieceData BarNo="1" PieceNo="15"
  Length="1806" AngleOnCutID="5" AngleOffCutID="1"
  CutHeightOnCut="27" CutHeightOffCut="0" ...>
</PieceData>
```

## Variable first or last cuts

If your machine is equipped with an infinitely variable tilting saw, you can specify variable angles for the first cut and last cut. Such cut positions are always specified in the fields **AngleOnCut** or **AngleOffCut** fields.

**Requirement** The machine must be capable of infinitely settable cutting positions.

**Length** Data type: Number  
A value in millimeters, possibly with decimal places.  
Value: Part length, measured from tip to tip.

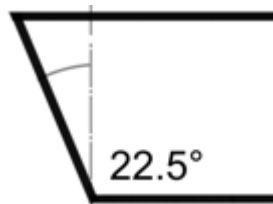
**AngleOnCut** Data type: Number  
Angle in degrees (the vertical cut is the reference angle)  
Value: Value for the first cut angle

**AngleOffCut** Data type: Number  
Angle in degrees (the vertical cut is the reference angle)  
Value: Value for the last cut angle

**AngleOnCutID** Data type: Number  
Number 0 - 5 as identifier for the cutting function  
Value: 0 = no cutting function

**AngleOffCutID** Data type: Number  
Number 0 - 5 as identifier for the cutting function  
Value: 0 = no cutting function

Example:



Variable angle setting for 22.5° at the part  
Other intermediate angles can also be specified if the swivel range of the saw permits this.

Data set:

```
<PieceData BarNo="1" PieceNo="14"
  Length="1806" AngleOnCut="22.5" AngleOffCut="0"
  AngleOnCutID="0" AngleOffCutID="0" ...>
</Teiledaten>

<PieceData BarNo="1" PieceNo="15"
  Length="1806" AngleOnCut="0" AngleOffCut="22.5"
  AngleOnCutID="0" AngleOffCutID="0" ...>
</PieceData>
```

## NOTE



### Incorrect specifications

Incorrect or undefined cutting angle specifications can result in incorrect machining or damage to the processing unit.

#### 2.4.3.4 Advanced steel data specifications

In some cases, it is necessary to be able to specify additional steel information for a PVC part. This is necessary if the corresponding steel is to be inserted into different compartments of the PVC part, or if two steel parts are required for one PVC part.

If you have any questions regarding this type of transfer, please contact the service department of your machine manufacturer.

Transfer level: <OptiData> <PartData>

The transfers in the steel part data do not change. Even if additional information is transferred in the PVC part data, only the steel parts that have been produced by the machine may be transferred.

#### Additional information relating to the steel part

Requirement	Consult with your machine manufacturer about the information that can be displayed or processed at the machine.	
<i>Steel</i>	Data type:	Number
		Number between 1 and x, possibly coded
	Value:	Coded selection of the steel used
		0 = no steel
		1 = Steel inserted manually
		2 = Steel inserted automatically
		3 = Special steel to be inserted manually; the steel part is provided externally, i.e. not produced on the machine.
		5 = Special part with special equipment or special treatment on the manual steel insertion (the function must be agreed with the machine manufacturer.)
<i>Steel/No</i>	Data type:	Text
		The designation of the steel type used should only contain digits between 0 and 9 and letters between a and z or A and Z. It should have no spaces and have a maximum length of 40 characters. Special characters can also be used, except: ' \ / < > * " ?
	Value:	Selection of the steel profile type of the steel to be used.
	Note:	The designation used here for the steel type must be identical to the <i>Steel/Name</i> in the steel data. In the special case of two steel parts per part, the type selection is the default for an optimization.
<i>Steel/Length</i>	Data type:	Number
		A value in millimeters, possibly with decimal places.
	Value:	Length of the steel part, measured from tip to tip.
<i>Steel/number</i>	Data type:	Text
		Maximum 40 characters. Any special characters can be used, except: ' \ / < > * " ?
	Value:	Note text for the steel part displayed on the manual steel insertion
	Optional:	Yes

*SteelDepth* Data type: Number

A value in millimeters, possibly with decimal places.

Value: steel insertion depth in relation to the reference edge of the part. This must be agreed with the machine manufacturer.

Optional: Yes

---

*SteelChamber* Data type: Number

The number of the insertion compartment, numbered from high to low, starting with "1"

Value: Insertion compartment in which the steel has to be inserted into the PVC.

Optional: Yes

---

*SteelPieceNo* Data type: Number

A number between 1 and 9999

Value: Steel part number of the steel part assigned to the part

Optional: Yes

---

#### Example

```
<PieceData BarNo="1" PieceNo="14"  
  Length="1806" AngleOnCut="45" AngelOffCut="45"  
  Steel="1" SteelNo="ST030x20"  
  SteelLength="1656" Steelnumber="ST030x20 K1"  
  SteelChamber="1" ...>  
...  
</PieceData>
```



## Two steel parts in one PVC part

Requirement	Consult with your machine manufacturer about the information that can be displayed or processed at the machine.
-------------	---

### Global transfers for two steel parts:

<i>Steel</i>	Data type: Number	Number xx – yy, steel selection as combination of individual selections
	Value:	Coded selection for two required steel parts 11 = Push in both steel parts by hand 12 or 21 = One steel part must be inserted by hand, that others are inserted automatically 13 or 31 = One steel part is cut on the steel saw, the second is provided externally 22 = Two steel parts that are inserted automatically 33 = Two steel parts supplied externally
<i>Steelnumber</i>	Data type: Text	Maximum 40 characters. Any special characters can be used, except: ' \ / < > * " ?
	Value:	Note text for the steel part displayed on the manual steel insertion
	Optional:	Yes
	Note:	The specified number of text can have different meanings. For example, it can refer to the steel type number or the number of the compartment from which the steel part is to be taken. It may also be used to provide information for special steel inserts, if the steel is not cut on the steel saw that may be present.

### Transfers for the first steel part:

<i>Steel1</i>	Data type: Number	Number between 1 and x, possibly coded
	Value:	Coded selection of the steel used 1 = Steel inserted manually 2 = Steel inserted automatically 3 = Steel to be inserted manually, with the steel part being provided externally.
<i>SteelNo1</i>	Data type: Text	The designation of the steel type used should only contain digits between 0 and 9 and letters between a and z or A and Z. It should have no spaces and have a maximum length of 40 characters. Special characters can also be used, except: ' \ / < > * " ?
	Value:	Selection of steel profile type for the first steel part
	Note:	The designation used here for the steel type must be identical to the <i>SteelName</i> in the steel data.
<i>SteelLength1</i>	Data type: Number	A value in millimeters, possibly with decimal places.
	Value:	Length of the first steel part, measured from tip to tip.

<i>SteelNumber1</i>	Data type: Text	Maximum 40 characters. Any special characters can be used, except: ' \ / < > * " ?
	Value:	Note text for the steel part displayed on the manual steel insertion
	Optional:	Yes
	Note:	The specified number of text can have different meanings. For example, it can refer to the steel type number or the number of the compartment from which the steel part is to be taken. It may also be used to provide information for special steel inserts, if the steel is not cut on the steel saw that may be present.
<i>SteelDepth1</i>	Data type: Number	A value in millimeters, possibly with decimal places.
	Value:	Insertion depth of the first steel part relative to the reference edge of the part. This must be agreed with the machine manufacturer.
	Optional:	Yes
<i>SteelChamber1</i>	Data type: Number	The number of the insertion compartment, numbered from high to low, starting with "1"
	Value:	Insertion compartment in which the first steel part must be inserted into the PVC.
	Optional:	Yes
<i>SteelPieceNo1</i>	Data type: Number	A number between 1 and 9999
	Value:	Steel part number of the first steel part allocated to the PVC part

#### Transfers for the second steel part:

<i>Steel2</i>	Data type: Number	Number between 1 and x, possibly coded
	Value:	Coded selection of the steel used 1 = Steel inserted manually 2 = Steel inserted automatically 3 = Steel to be inserted manually, with the steel part being provided externally.
<i>SteelNo2</i>	Data type: Text	The designation of the steel type used should only contain digits between 0 and 9 and letters between a and z or A and Z. It should have no spaces and have a maximum length of 40 characters. Special characters can also be used, except: ' \ / < > * " ?
	Value:	Selection of steel profile type for the second steel part
	Note:	The designation used here for the steel type must be identical to the <i>SteelName</i> in the steel data.
<i>SteelLength2</i>	Data type: Number	A value in millimeters, possibly with decimal places.
	Value:	Length of the second steel part, measured from tip to tip.

**Steelnumber2** Data type: Text

Maximum 40 characters. Any special characters can be used, except: ' \ / < > \* " ?

Value: Note text for the steel part displayed on the manual steel insertion

Optional: Yes

Note: The specified number of text can have different meanings. For example, it can refer to the steel type number or the number of the compartment from which the steel part is to be taken. It may also be used to provide information for special steel inserts, if the steel is not cut on the steel saw that may be present.

**SteelDepth2** Data type: Number

A value in millimeters, possibly with decimal places.

Value: Insertion depth of the second steel part relative to the reference edge of the part. This must be agreed with the machine manufacturer.

Optional: Yes

**SteelChamber2** Data type: Number

The number of the insertion compartment, numbered from high to low, starting with "1"

Value: Insertion compartment in which the second steel part must be inserted into the PVC.

Optional: Yes

**SteelPieceNo2** Data type: Number

A number between 1 and 9999

Value: Steel part number of the second steel part allocated to the part

**Example:**

```
<File Name="Example.xml">
  <OptiCuttingData>
    <OptiData Name="PVC_double_steel_insertion">
      ...
      <BarData BarNo="11" BarLength="6000" ProfileName="F9001" ...>
        <PieceData PieceNo="16" Length="1806" AngleOnCut="45" AngleOffCut="45"
          Steel="12" SteelNo="S9040"
          Steel1="1" SteelPieceNo1="16" SteelNo1="S9040"
          SteelLength1="400" SteelChamber1="1"
          SteelDepth1="444.0"
          Steel2="2" SteelPieceNo2="116" SteelNo2="S9040"
          SteelLength2="1200" SteelChamber2="2"
          SteelDepth2="44.0">
          ...
        </PieceData>
      </BarData>
    </OptiData>
    <SteelOptiData Name="PVC_double_steel_insertion">
      ...
      <SteelBarData BarNo="12" BarLength="6000" SteelName="S9040" >
        <SteelPieceData PieceNo="16" Length="400"
          AngleOnCut="90" AngleOffCut="90"
          Steel="1" PVCPieceNo="16"/>
        <SteelPieceData PieceNo="116" Length="1200"
          AngleOnCut="90" AngleOffCut="90"
          Steel="2" SteelDepth="44.0"
          PVCPieceNo="16" /
        ...
      </SteelBarData>
    </SteelOptiData>
  </OptiCuttingData>
</File>
```

## 2.5 Specifications

### Machining angles

The following definition applies to the specification of a machining operation at a variable angle:

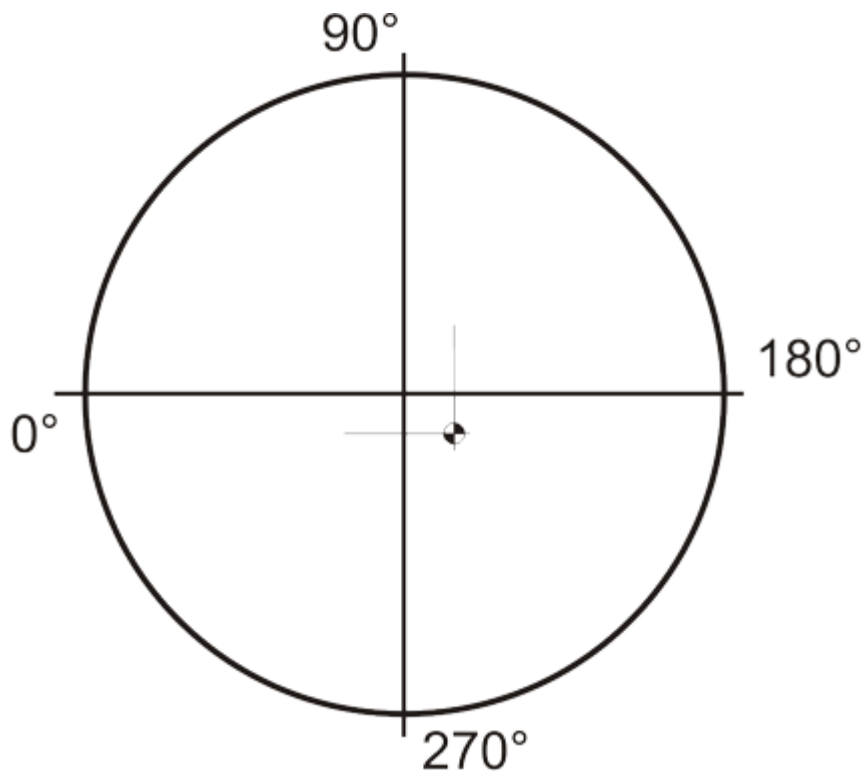


Fig. 4: NC reference point – zero edge

The view from the front into the machine is shown.

### Angle specification for first and last cut

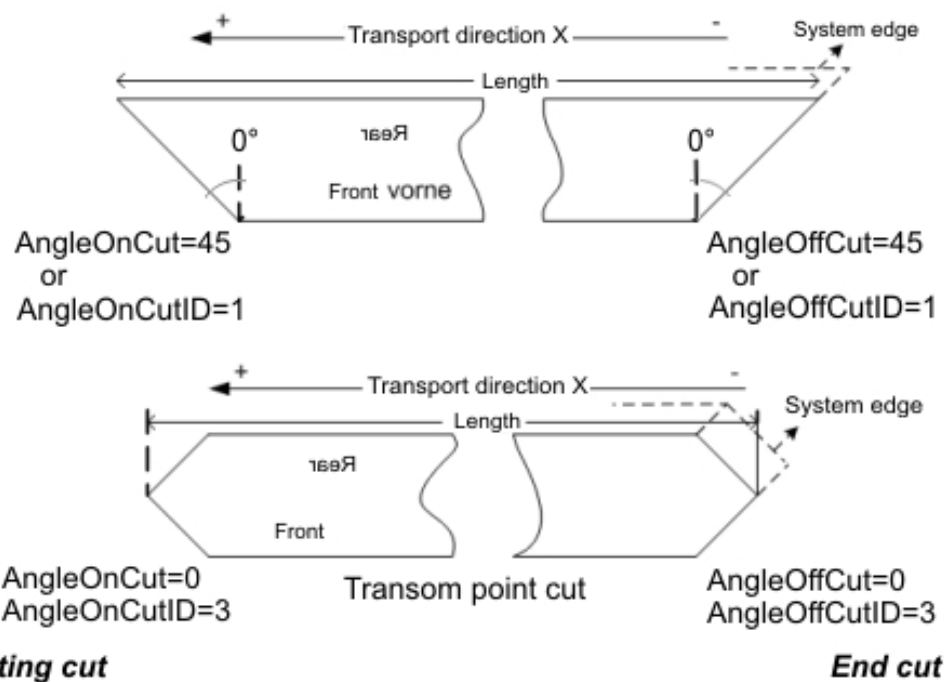


Fig. 5: First / last cut specifications at the part

## **i** Note the following for the cutting specification

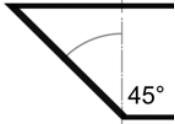

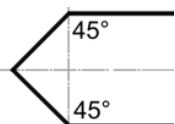



The reference angle for the angle specification is the vertical cut. This should be set to 0°. It is also possible to specify 90°.

Angle specifications in the other direction must be specified as negative numbers. Note that this does not correspond to the machine standard and may only be specified after consulting the machine manufacturer!

Normally the angle should be specified via **AngleOnCut** and **AngleOffCut**. Specification via Angle IDs is possible for compatibility reasons. If an identifier is transferred there, this takes precedence over the angle specifications!

The use of angle IDs is only mandatory when selecting cutting functions such as for first and last transom cuts or cross-cuts.

### Possible cutting specifications

Cut	First cut specification	Last cut specification
	AngleOnCut="45" AngleOnCutID="0" or AngleOnCut="0" AngleOnCutID="1"	AngleOffCut="45" AngleOffCutID="0" or AngleOffCut="0" AngleOffCutID="1"
	AngleOnCut="0" AngleOnCutID="0" or AngleOnCut="0" AngleOnCutID="2"	AngleOffCut="0" AngleOffCutID="0" or AngleOffCut="0" AngleOffCutID="2"
	AngleOnCutID="3" AngleOnCut="0"	AngleOffCutID="3" AngleOffCut="0"
	AngleOnCutID="4" AngleOnCut="0" CuttingHeightFirstCut="K"	AngleOffCutID="4" AngleOffCut="0" CuttingHeightLastCut="K"
	AngleOnCutID="5" AngleOnCut="0" CuttingHeightFirstCut="K"	AngleOffCutID="5" AngleOffCut="0" CuttingHeightLastCut="K"
	AngleOnCut="22.5" AngleOnCutID="0" Angle specifications in the other direction must be negative.	AngleOffCut="22.5" AngleOffCutID="0" Angle specifications in the other direction must be negative.

## **i** Valid cutting specifications

The first cut on the part in the transport direction is always defined as the first cut by the cutting module of the machine.

Please note that the setting options for the first and last cut angle as well as the first and last cut function depend on the design of the saw module on the machine! Please consult your machine manufacturer.

### Special character transfers

As described above, only literals may be used for the attributes of the XML elements. Within a literal the markup characters »<«, »>« and the »&« sign may not be used. The following options are available for transferring them nevertheless in the values, using the entity references or the character reference.

Character	Entity reference	Character reference
< (less than)	&lt;	&#60;
> (greater than)	&gt;	&#62;
' (Apostrophe, single quote)	&apos;	&#39;
„ (double quote)	&quot;	&#34;
& (ampersand)	&amp;	&#38;

### Coding of data transfers

If you cannot save the XML file in UTF-8 coding, you may transfer the coding in the XML file itself. In this case you should specify the coding code in the prologue of the XML file. For Western Europe it is:

```
<?xml version="1.0" encoding="ISO-8859-1" ?>
```

Use the following codes for other languages:

Coding	Language subset
ISO-8859-1	Latin 1, Latin West, for Western European languages: English, German, Icelandic, Italian, Spanish, Portuguese, Swedish, Norwegian, Finnish, Danish
ISO-8859-2	Latin 2, Eastern European languages using the Latin alphabet: Polish, Czech, Slovenian, Slovak, Croatian, Romanian, Sorbian
ISO-8859-4	Latin 4, Baltic languages: Lithuanian, Estonian, Latvian, this can also be used for writing German, English and other languages
ISO-8859-5	Languages using the Cyrillic alphabet: Russian, Bulgarian, Serbian, Macedonian, Belarusian, Ukrainian
ISO-8859-7	Modern Greek; there is no standard for ancient Greek

Please note that **encoding="UTF-8"** can only be transferred if the file is saved in UTF-8-coded format, otherwise umlauts and special characters used in various languages would be interpreted as errors. Further information on coding can be found in the relevant literature or on the Internet.

## 3 Appendix

### 3.1 Support and Service

Beckhoff and their partners around the world offer comprehensive support and service, making available fast and competent assistance with all questions related to Beckhoff products and system solutions.

#### Beckhoff's branch offices and representatives

Please contact your Beckhoff branch office or representative for local support and service on Beckhoff products!

The addresses of Beckhoff's branch offices and representatives round the world can be found on her internet pages:

<http://www.beckhoff.com>

You will also find further documentation for Beckhoff components there.

#### Beckhoff Headquarters

Beckhoff Automation GmbH & Co. KG

Huelshorstweg 20  
33415 Verl  
Germany

Phone:	+49(0)5246/963-0
Fax:	+49(0)5246/963-198
e-mail:	info@beckhoff.com

#### Beckhoff Support

Support offers you comprehensive technical assistance, helping you not only with the application of individual Beckhoff products, but also with other, wide-ranging services:

- support
- design, programming and commissioning of complex automation systems
- and extensive training program for Beckhoff system components

Hotline:	+49(0)5246/963-157
Fax:	+49(0)5246/963-9157
e-mail:	support@beckhoff.com

#### Beckhoff Service

The Beckhoff Service Center supports you in all matters of after-sales service:

- on-site service
- repair service
- spare parts service
- hotline service

Hotline:	+49(0)5246/963-460
Fax:	+49(0)5246/963-479
e-mail:	service@beckhoff.com

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