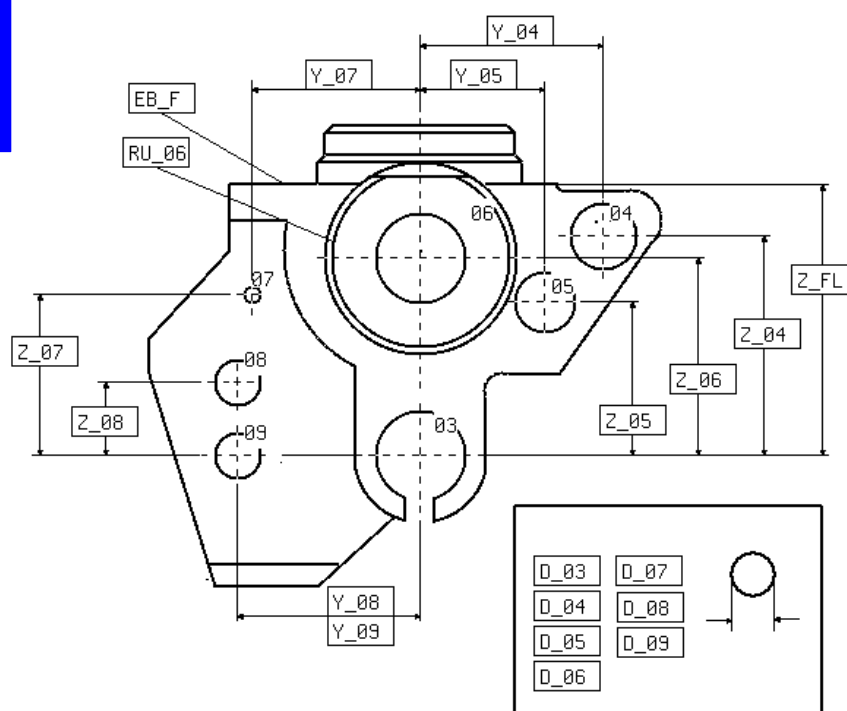


UMESS

Option 17

Focus

for UNIX and LINUX



Operating Instructions



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Preface

This manual describes the function, operation and application possibilities of the **UMESS Option 17** measuring program.

It is here assumed that the user is familiar with the coordinate measuring machine and the **UMESS** basic software. Please keep all printed materials delivered with the measuring machine ready to hand at all times.

All rights pertaining to changes in the measuring machine version, scope of delivery, the software packages and the pertaining documentation reserved.

Principles in this operating manual

Before starting to work with this manual, the user has to familiarize himself with the applied principles.

In the following, you will find information on the used font types, signs and symbols.

Typographic principles

The font types and font schemes used in this manual have the following meaning:

- **bold face**
 - Dialog element on the screen
Example: "... the button **<TERMIN>**"
 - Term
Example: "During calculation the location of a **measuring element** in relation to a **reference element** is determined."
 - File and directory names
Example: **/home/zeiss/UB**
- *italic*
 - Highlighted text of which the contents are very important
Example: "Click with the *right* mouse button ..."
 - Cross reference
Example: "..., see also ► *"signs and symbols" on page -4*"

- **Courier bold face**
Text in dialog windows and records

Signs and symbols

Special signs and symbols are used in this manual.

Symbols for warnings and information



Danger!

In this case, special care is called for. The warning triangle indicates risk of injury. Non-observance of this warning may cause personal injury.



Note!

This symbol warns against situations which may lead to loss of data, measuring errors, errors in the measuring run, collisions or damage to the machine and workpiece.



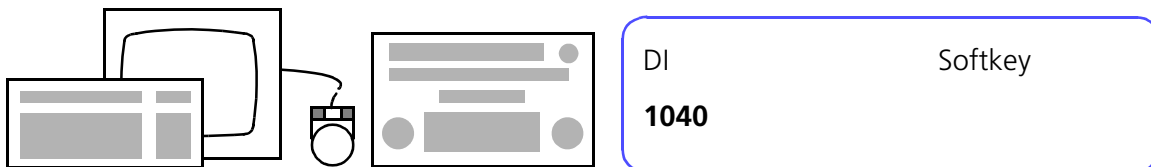
The **Note** symbol is shown next to important text and helpful additional information.

Symbol for function call

There are several possibilities:

- Direct input by means of the DI number
- Function selection by means of the pull-down menu
- Selection by means of icons

Example:



Symbol for softkey

Reference to softkeys in dialogs.

Overview of chapters

This manual describes the function, operation and application possibilities of the UMESS Opt. 17 measuring program.

The following subjects are described:

Chapter 1: General

Chapter 2: Structure of a Focus CNC program

Chapter 3: Programming the FOCUS-header (DI 1040)

Chapter 4: Travel routes

Chapter 5: Procedure when using a rotary table (FC)

Chapter 6: Prerun

Chapter 7: Feature selection

Chapter 8: Focus functions

Chapter 9: Focus for twin columns

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Chapter

1

General

When using statistical inspection methods, measuring runs can be restricted to those features whose process is not under control. In this way measuring times can be drastically reduced. Conventional CNC programs for this procedure require changes to be made in the control data in order to mask individual elements or in order to avoid collisions.

With the **FOCUS** option, partial runs can be comprised from a complete run very simply: before each CNC start, the user specifies the features to be inspected. The program itself recognizes recalls required for an element and the necessary alignments. Unnecessary travel routes are avoided.

Selection of the features can take place directly using a feature table and/or using scanned graphics (technical drawing, photo). The features can also be specified using a file which originates from a remote computer.

A feature is *one* value of an address (coordinate, symbol). Unambiguous assignment takes place *only* using the nominal identification (e.g. address: 5 Symbol: X SW identification = Feat.idf.: AB542). Therefore a feature identification can only be used once within a CNC run.

The individual measuring elements of a FOCUS CNC program can either be learn programmed conventionally or they can be generated with PCM measurement modules. All the control information for a collision-free measurement mode is contained between the call of the N-point program and the N-point Termin, (if created manually, particular attention must be paid that the clearance plane can be reached collision-free with the first and last intermediate position of a measurement module). In exceptional cases, intermediate positions within an alignment block or within a group may be necessary.

During CNC operation, the travel paths between the individual measurement modules are generated automatically. They ensure a measuring run which is collision-free and optimized in terms of travel route. The basis for this is an enveloping parallelepiped defined by 6 clearance planes. When the clearance plane is changed, the probes are moved back behind these clearance planes (CP).

The following table explains the sequence of steps from generation to run of a FOCUS CNC program:

Step	Explanations
Create CNC program <DI 1639>	Creation of a CNC program in which the steps required for FOCUS are taken into consideration. ➤ <i>"Structure of a Focus CNC program" on page 2-1</i> to ➤ <i>"Procedure when using a rotary table (FC)" on page 5-1</i>
Start leader routine <DI 1672>	This step is required with CNC programs which have been created new or modified in order to generate or modify special files for the control. ➤ <i>"Prerun" on page 6-1</i>
Include graphics <DI 1673>	This step can be optionally executed for clarification. In this case, the leader routine must have preceded directly beforehand with <DI 1672>. See Appendix
CNC measuring run <DI 1640>	Prior to each measuring run, the features to be inspected must be defined during the program start or the program accesses a file which contains the features to be inspected. ➤ <i>"Feature selection" on page 7-1</i> , ➤ <i>"Focus functions" on page 8-17</i>
<DI 1699>	Result display

Chapter

2

Structure of a Focus CNC program

The following overview shows the arrangement of direct inputs in a FOCUS CNC program as an example:

Step	Explanation
<DI 1040>	Header of the FOCUS program. Causes the feature selection, the output mode and the address correction to be called (► <i>"Programming the FOCUS-header (DI 1040)" on page 3-1</i>).
Record header	Initial status (<DI 1610>)
Alignment routines	Until the 1st W-position is called, the geometric elements intended must be travelled to as usual via intermediate positions.
<DI 1041>	Selection/change of the clearance plane. The preselected clearance plane applies until the next call of <DI 1041> (► <i>"Travel routes" on page 4-1</i>).
W-position	Up to here, the current W-position applies for the enveloping parallelepiped, when the 1st W-position (<DI 1708/1710>) is called within the CNC program, this is reference for the enveloping parallelepiped during the entire further measuring run.
Measure elements of plane . .	Intermediate positions are only set within the N-point program called. A clear identification must be specified during the nominal input for each feature which can be called. Features (nominal identifications) must not have a "*" or ",".
<DI 1041>	Selection/change of the clearance plane. The preselected clearance plane applies until the next call of <DI 1041> (► <i>"Travel routes" on page 4-1</i>).
<DI 1042>	Group start (► <i>"Travel routes" on page 4-1</i>)

Step	Explanation
Measure group elements	<p>If required: Elements can be combined to form groups within a clearance plane. This may be necessary if</p> <ul style="list-style-type: none"> – Unnecessary return to the clearance plane is to be avoided. – Additional travel paths (I-POS, DSE-POS, RT-POS) are to be programmed. – Program steps are to be carried out independently of the FOCUS selection (► <i>“Procedure when using a rotary table (FC)” on page 5-1</i>).
<DI 1043>	End of group (► <i>“Travel routes” on page 4-1</i>)
. W-position .	If the control coordinate system has to be changed within a FOCUS CNC program, proceed as follows: First call <DI 1301>, then <DI 1708> or <DI 1710>.
END P END	

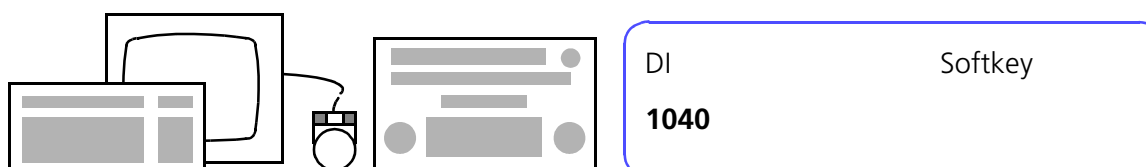
Chapter

3

Programming the FOCUS-header (DI 1040)

Each FOCUS CNC program must be provided with special control data at the start which are entered by calling **<DI 1040>**.

Function call



These are in detail:

- Identification as FOCUS program
- Branching to the feature selection during the CNC start (► *“Feature selection” on page 7-1*)
- Activating the program for address correction (see Option 9/10)
- Set the record to **Lines with nominals** (<DI 1665>)

Chapter

4

Travel routes

This chapter contains:

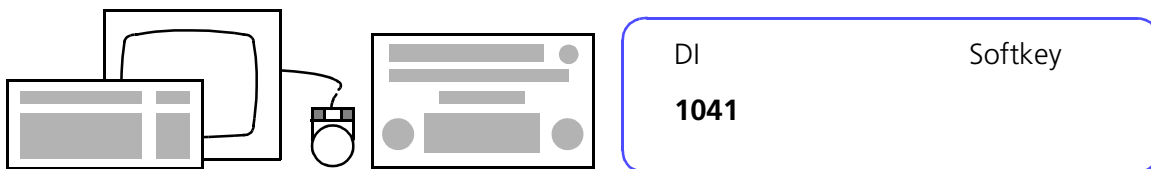
Travel routes between geometric elements.	4-2
Travel routes when changing the clearance plane.	4-5
Forming groups	4-6

Travel routes between geometric elements

Between starting the CNC run and calling the 1st W-position (DI 1708, 1710), you can work as usual with intermediate positions for mathematical alignment of the workpiece. Afterwards, the travel movements of the probes between the geometric elements are generated automatically (arrange first and last intermediate position of a geometric element so that the clearance plane can be reached without a collision). The basis for this is an enveloping parallelepiped which is defined by 6 clearance planes (CP) around the workpiece.

Before measurement can be made in one of the 6 planes, the respective clearance plane must be defined.

Function call

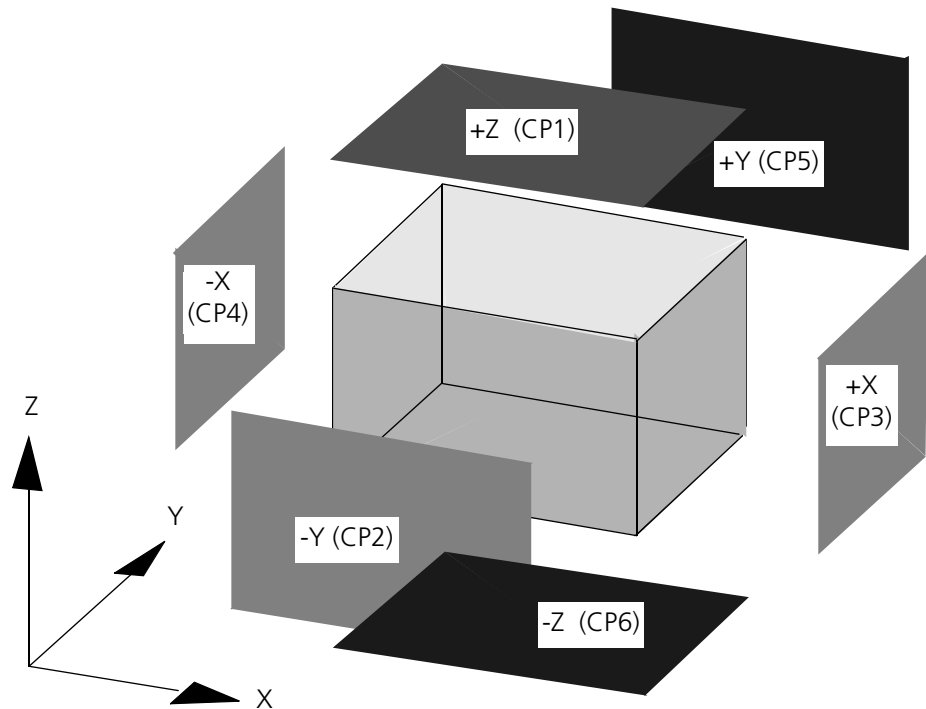


Dialog window

FOCUS - CLEARANCE PLANE				DESIGNATE
Clearance plane				+X (+X, -X, +Y, -Y, +Z, -Z)
				*
				TERMIN
BACK				INFO

Input fields**Clearance plane**

Input of the clearance plane

**NOTE**

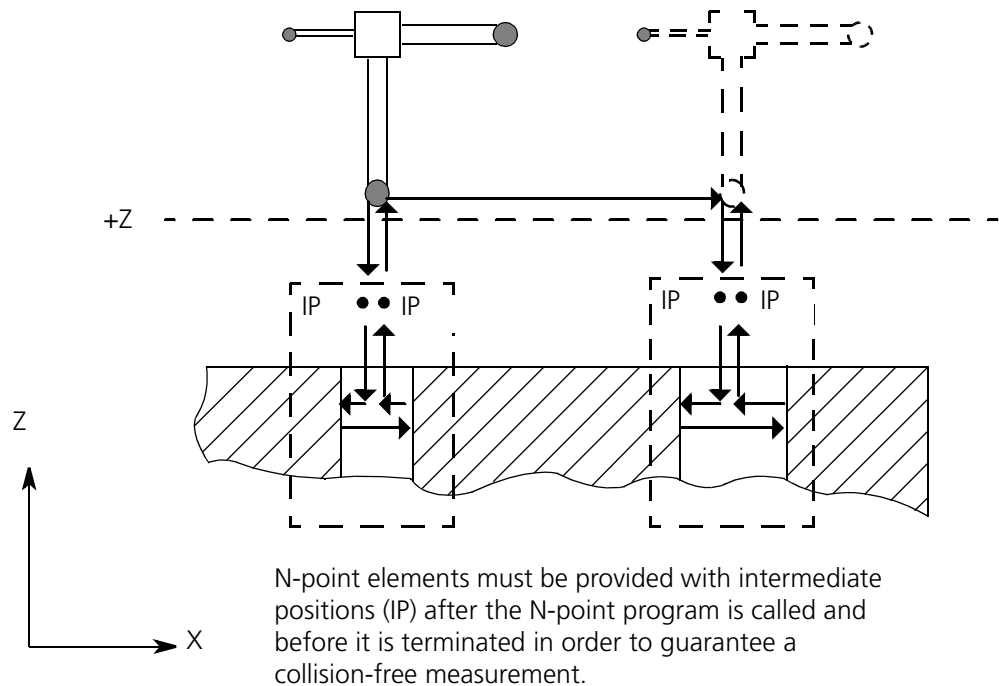
The position of the clearance planes refers first to the current W-position, then, when they are called, to the 1st W-position within the measuring run. The position of the clearance planes in relation to the 1st W-position of the workpiece is displayed in the prerun (► "Prerun" on page 6-1). It can be changed there.

The clearance plane applies until it is changed by renewed call of **<DAW 1041>**.

The travel route is calculated using the probes which are stored in the current configuration. Therefore only probes which really exist may be contained in the probe data. The PCM function **PRB_CONF_MOD** should be used for taking all combinations of a configuration for the travel routes into consideration.

During a prerun the enveloping parallelepiped of the clearance planes is enlarged if necessary as compared with the enveloping parallelepiped specified hitherto. To keep the enveloping parallelepiped as small as possible, -9999 must be entered as the maximum value during the 1st prerun for the coordinates for all the elements and 9999 as the minimum value. The prerun is repeated with this data, the smallest possible enveloping parallelepiped possible is calculated and displayed.

After probing a geometric element, the probe combination is moved back behind the clearance plane if backmove to clearance plane has been answered with **<YES>** (➤ *"Prerun" on page 6-1*). The center coordinates of the following geometric element are then travelled to.



NOTE

Intermediate positions are only allowed between the call and termination of a geometric element.

The **POSITION** function must not be used as travel route between elements and must not be used as the first travel route of an N-point element. No recalls are determined for position.

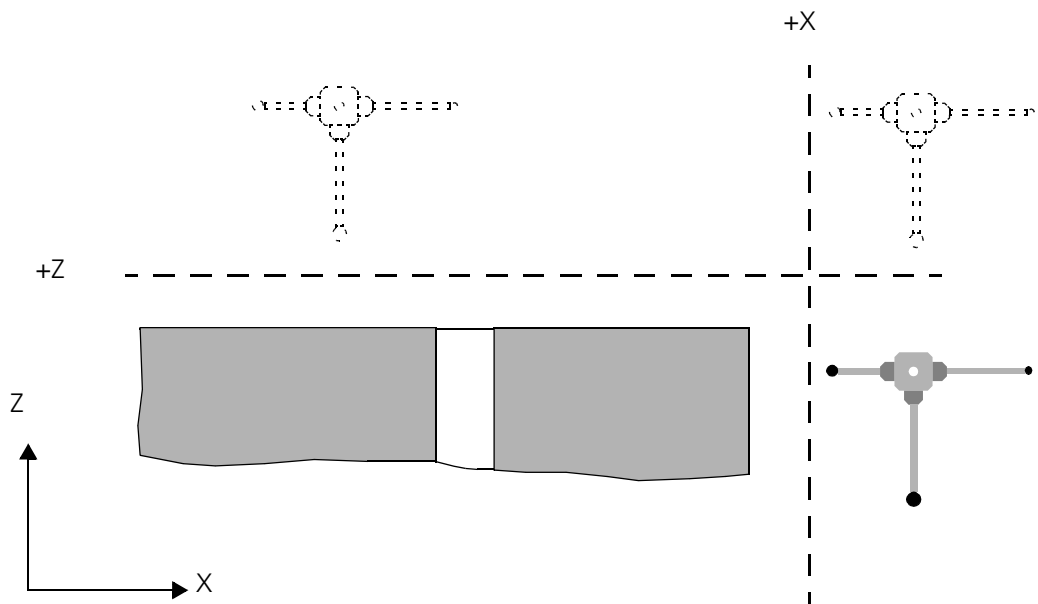
If the measuring plane of a workpiece does not contain any collision obstacles, the probe does not have to be moved back to the clearance plane (➤ *"Prerun" on page 6-1*).

Outside N-point elements, intermediate positions are only allowed within a group (➤ *"Travel routes" on page 4-1*).

If a clearance plane cannot be travelled to due to lack of space (e.g. because of a chuck), then a neighboring clearance plane must be selected. If several geometric elements are to be measured in this measuring plane, it is advantageous to form a group in order to optimize the travel routes (➤ *"Travel routes" on page 4-1*).

Travel routes when changing the clearance plane

When the measuring plane is changed, the clearance plane has to be changed too, to ensure the probe can move back without collision.



If space is restricted, an edge can be blocked in order to avoid collision (➤ "Prerun" on page 6-1).

If a clearance plane (CP) cannot be traversed with all probe configurations due to lack of space, the CP must be locked by a PCM command. **NO_CONF** ([Probe config.], [CP], [CP], [CP], ...).

Example: **NO_CONF** (12,2,3,5) = The probe configuration 12 must not travel through clearance planes 2, 3 and 5 (see Appendix).

For the FC the following applies:

The blocked CPs always refer to the unrotated enveloping parallelepiped. Only CP 1 and CP 3 can be blocked.

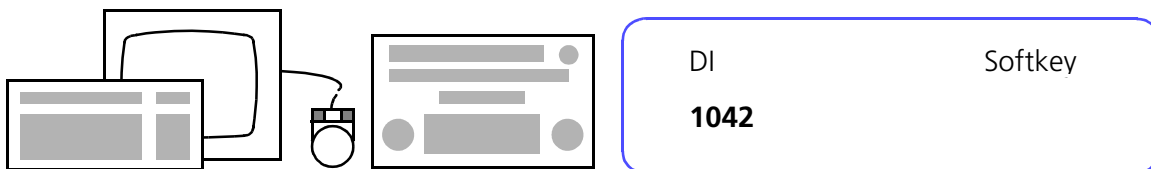
Forming groups

Within a clearance plane, program lines of a FOCUS CNC program can be collected to form a group for various purposes:

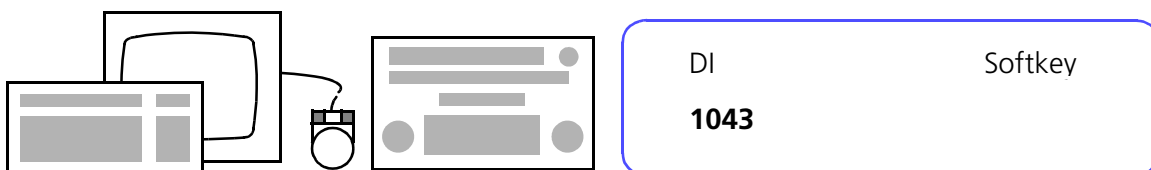
- If measuring times are to be optimized by avoiding unnecessary travel routes within a clearance plane with large workpieces.
- If additional travel routes are required (**I-POS, RT-POS, DSE-POS**). Example: the first intermediate position of an element cannot be reached from the clearance plane without collision.
- If all functions (elements, travel routes,...) are to be measured or executed independently of the FOCUS selection (see Appendix).
- If all functions of the group are to be measured or executed, provided at least one element (address) in the group has been activated (see Appendix).

In groups with I-POS outside elements, the W-position must not be changed, because the I-POS does not create a recall. Remedy using GRP (-2) or creating a recall elsewhere.

Function call at start of group



Function call at end of group



The following overview shows when individual functions can be executed:

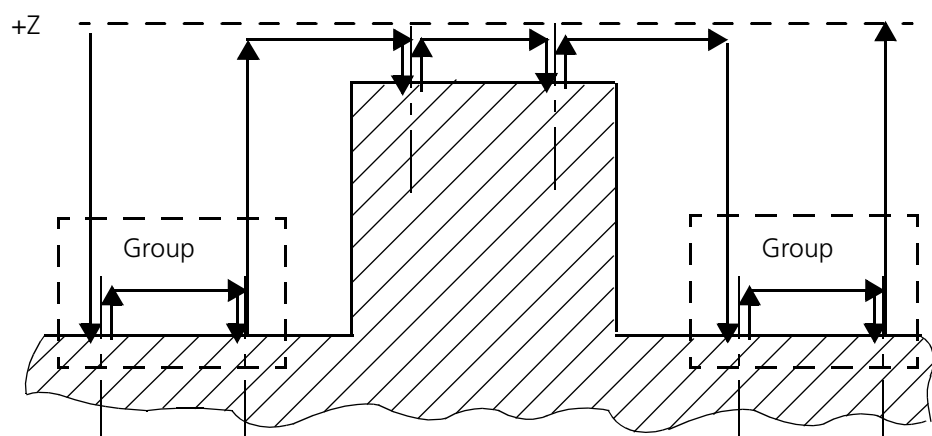
Function	Before 1st W-position (DI 1708, DI 1710)	Outside a group	Within a group GRP(0) ¹⁾
N-point element	YES	If activated via FOCUS	If activated via FOCUS
Travel commands outside N-point element	YES	NO ²⁾	YES
Generation of travel paths	NO ⁴⁾	YES ³⁾	NO ⁴⁾

- 1) ➤ "Focus functions" on page 8-1
- 2) is filtered
- 3) If not changed by travel path generating mode (PCM function **ROUT_GEN** (0/1))
- 4) Only to 1st I-POS of the group

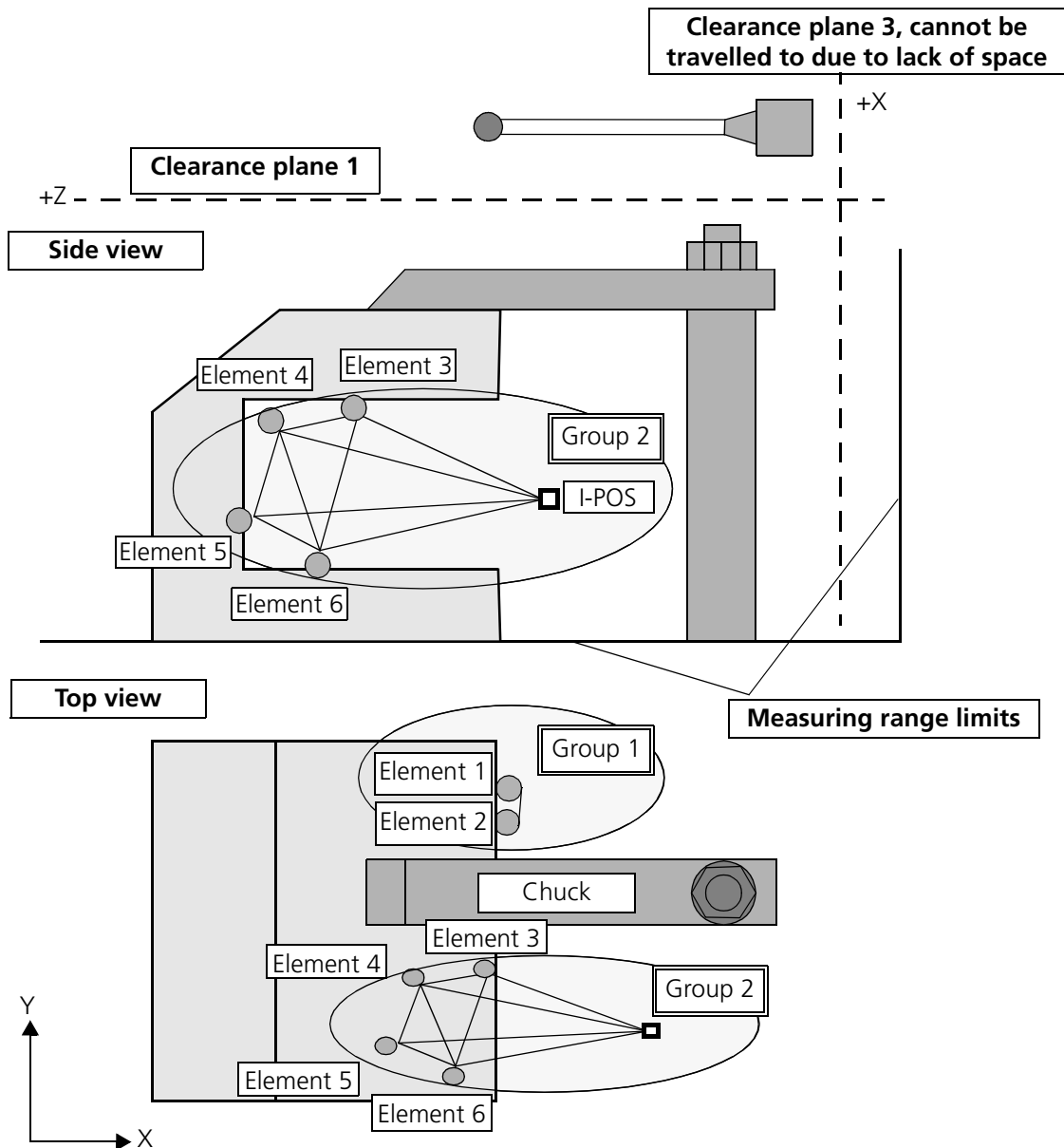
All elements/travel paths are executed up to the formation of the enveloping parallelepiped W-position (1st W-position).

Examples

Group formation for optimizing measuring times for large workpieces:



A group must be formed if the geometric elements cannot be reached without a collision being caused. Here the first and last intermediate position of the group must ensure that the geometric elements can be reached without a collision being caused:



Example

Travel to defined I-POS with defined probe configuration at the end of the program run:

Clearance plane +Z (or other)

Configuration change **DI 1553**

IF GRP (-1)

I-POS

ENDIF

Chapter

5

Procedure when using a rotary table (FC)

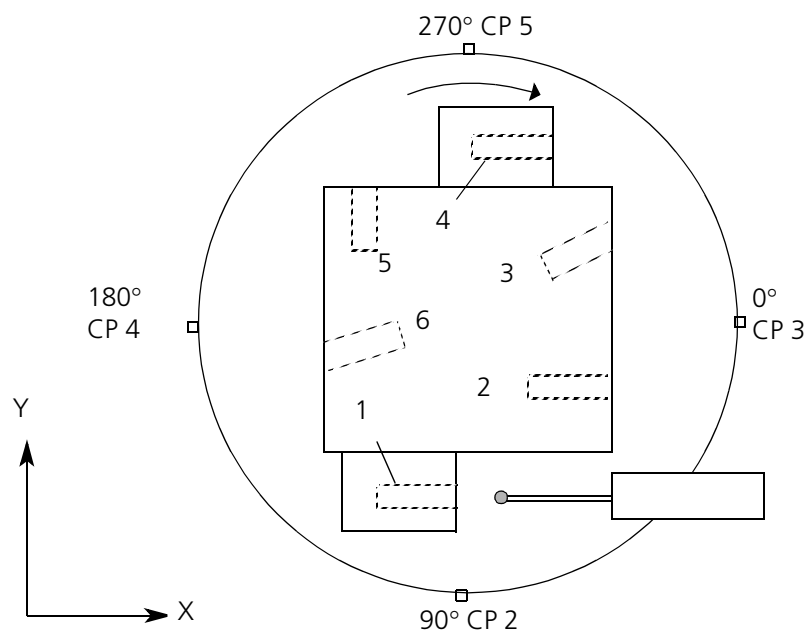
The rotary table is always programmed before the geometric elements with **RT-POS**.

(**RT-STEP** is not allowed)

The rotary table position travelled to with **RT-POS** applies for all subsequent geometric elements up to the renewed call of **RT-POS**.

The clearance plane is programmed as usual.

Programming example



Programming example – alternative options

RT-POS 0° CP 2 Measure element 1 CP 3 Measure element 2 RT-POS -30° Measure element 3 RT-POS 0° Measure element 4 RT-POS 270° CP 5 Measure element 5 RT-POS 190° CP 4 Measure element 6	<p>Element 1 can also be assigned to clearance plane (CP) 3. The backmove must be activated for CP 3.</p> <p>or</p> <p>the first and last intermediate position of element 1 must lie in CP 3 so that element 2 can be reached without a collision being caused.</p>	RT-POS 0° CP 3 Measure element 1 Measure element 2 RT-POS -30° Measure element 3 RT-POS 0° Measure element 4 RT-POS 270° CP 5 Measure element 5 RT-POS 190° CP 4 Measure element 6
--	--	---

NOTE

The travel behaviour of the FC can be influenced by the PCM functions **RT_MOD** (rotary table mode) and **NO_CONF** (locking a clearance plane for certain probe configurations) in order to avoid collisions when space is restricted.

RT_MOD

Travel behavior during rotation of rotary table

RT_MOD (XZ90)

X: Before each rotation, the probe is positioned in +X/to the right into the clearance plane (the enveloping parallelepiped coordinates do not rotate).

Z: Before each rotation, the probe is positioned in +Z/upwards into the clearance plane.

90: If the position deviates from 90 degrees, a right angle is first rotated to.

This example explains the default setting with the parameters possible.

NO_CONF Explanation ► "Travel routes when changing the clearance plane" on page 4-5

Before generating a CNC run using ACE, the probe changer (5/18) must be preselected with **<DI 15107>** because different control data are generated.

Chapter 6

Prerun

This chapter contains:

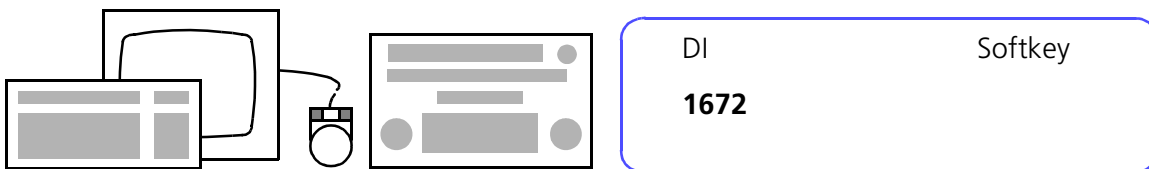
<DI 1672>	6-2
Backmove to clearance plane (CP)	6-4
Edge for by-pass	6-5
Tables which are generated by the FOCUS prerun	6-6

<DI 1672>

Newly generated programs or programs whose features or recalls have changed must first pass through the prerun. You then have to check and if necessary change the enveloping parallelepiped with the clearance planes.

A feature table is created from the control data which contains each feature with appertaining address and symbol. All addresses with corresponding coordinate system and recall addresses are contained in a recall table. Using both tables, the program determines which elements have to be measured and which elements have to be output.

Function call

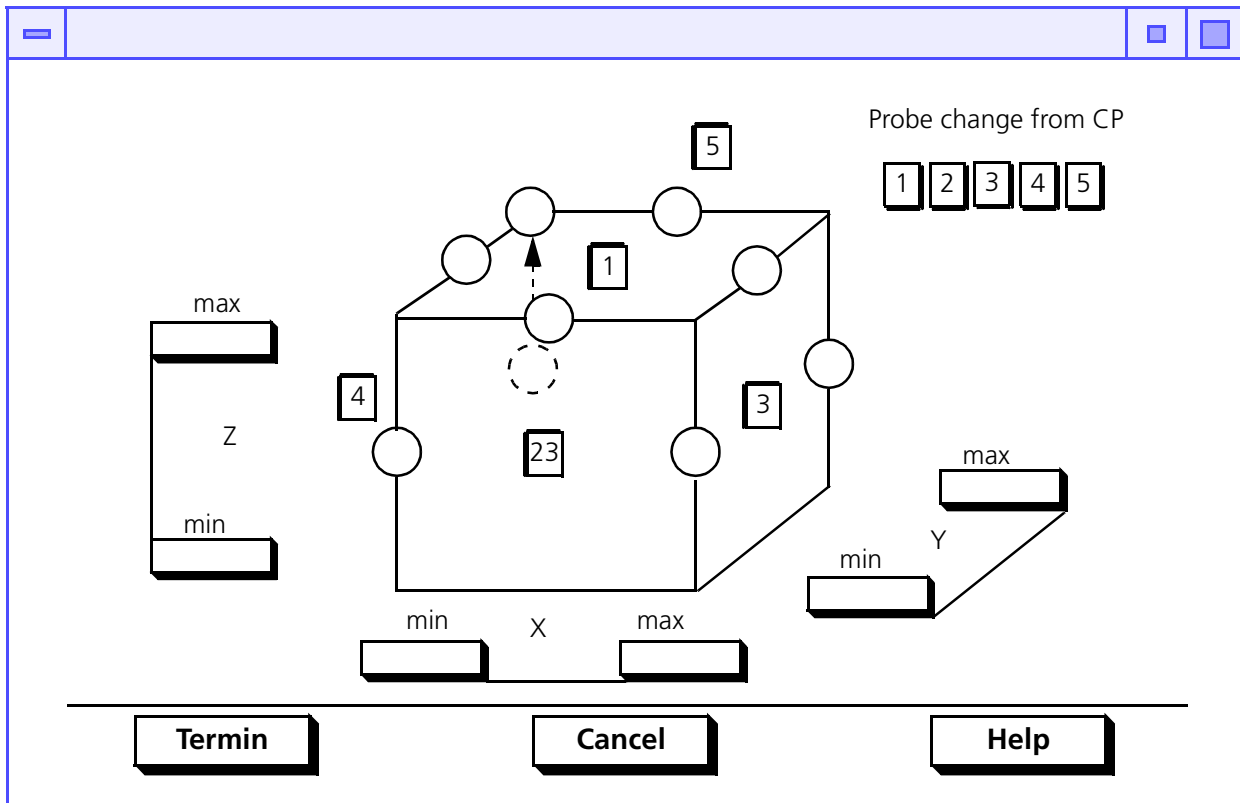


Dialog

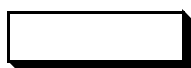
See UMESS operating instructions, CNC start

Dialog window

at the end of the prerun



Input fields



Current value for position of clearance plane for the 1st W-position.
A change can be made by clicking with the mouse.



Edge for by-pass released.



Edge for by-pass locked.



Backmove to clearance plane <YES>



Backmove to clearance plane <NO>

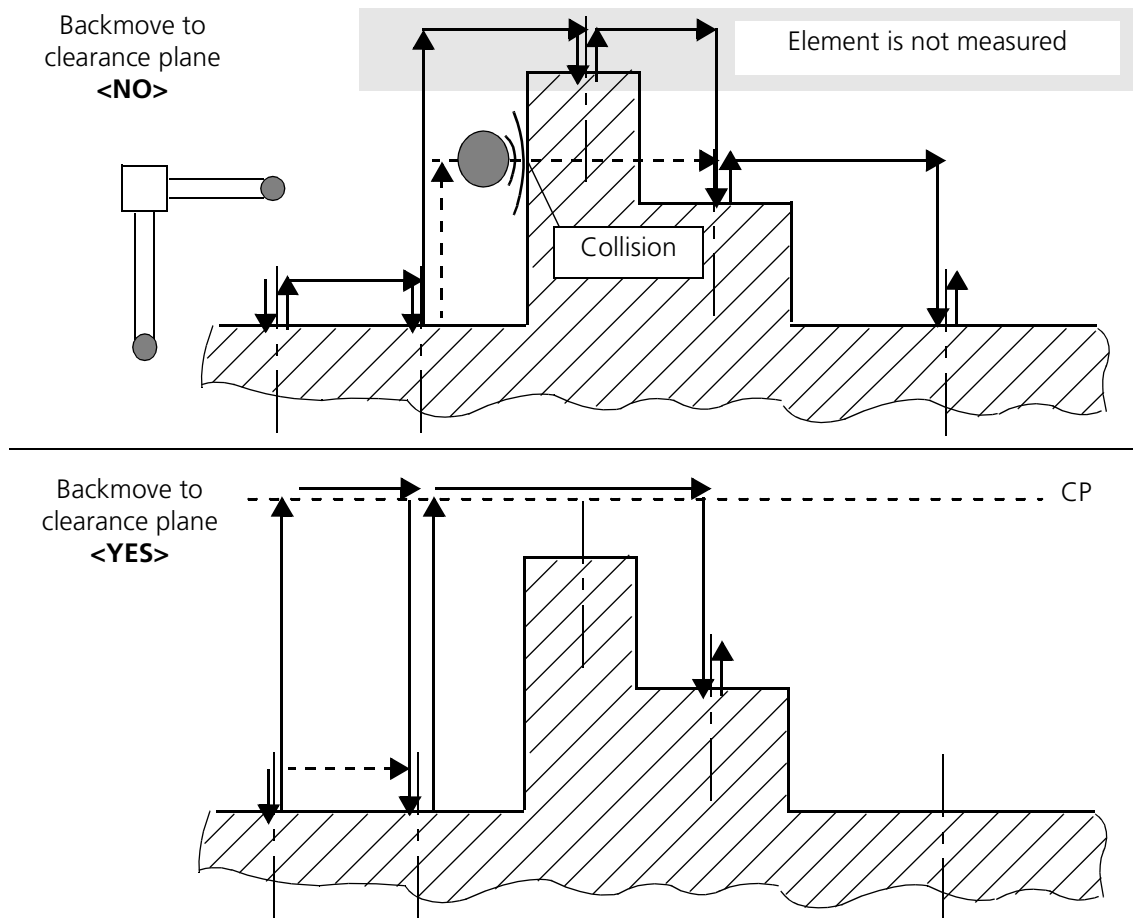
Status changes by clicking
symbol with mouse.

Probe change from CP:

The probe changer is approached from the
released clearance plane.

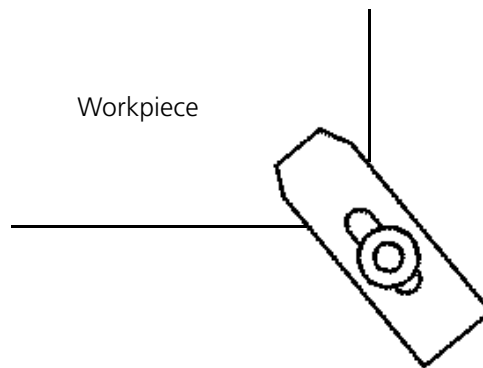
Backmove to clearance plane (CP)

The probe is first moved back before approaching the next element if it protrudes from the workpiece. If individual elements are not travelled to, these can represent a collision obstacle. Here the probe must be moved back to the clearance plane.



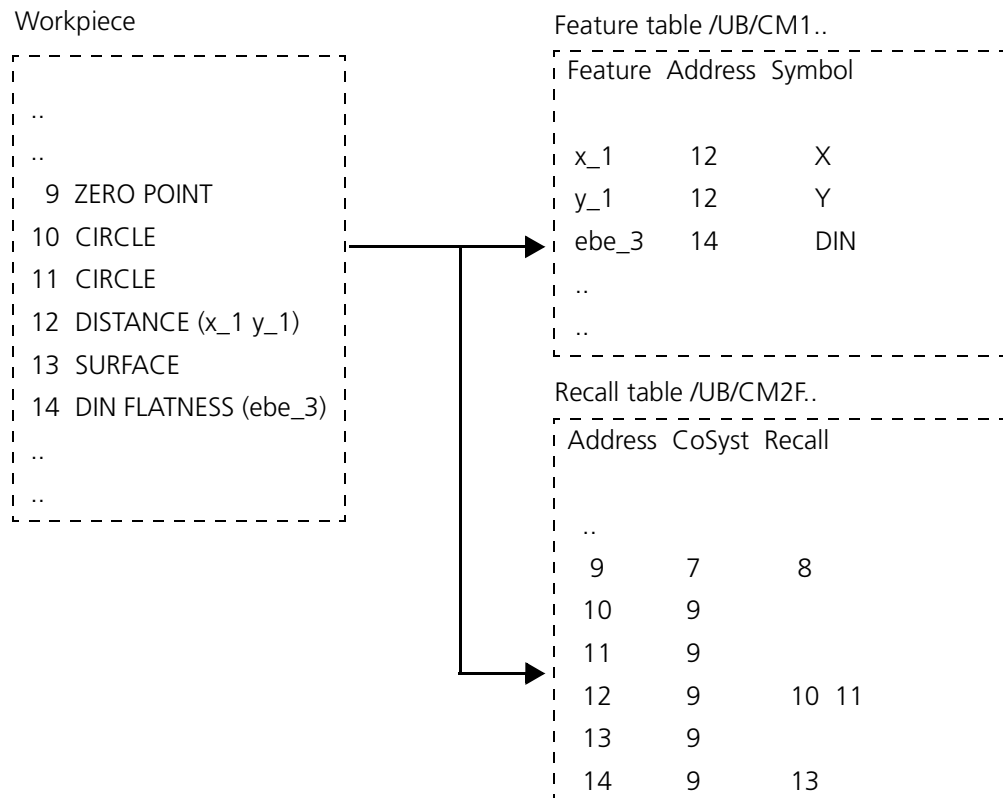
Edge for by-pass

The edge must be blocked if, for example, a chuck makes collision-free by-pass impossible.



Tables which are generated by the FOCUS prerun

The FOCUS prerun produces a feature and recall table. The elements to be recorded during the measuring run are determined using these tables:



Chapter



Feature selection

This chapter contains:

Preparation for the graphics feature selection.	7-2
CNC start with feature selection	7-6
Control of the FOCUS-CNC run	7-11
Feature + address selection using ASCII file (of remote computer)	7-12

Preparation for the graphics feature selection

Creating the graphics

Graphics can be created by scanning, using a drawing program or using CAD with all texts, labels and auxiliary lines as subsequent editing within the measuring software is not possible.

For each workpiece, several graphics can be created and stored for displaying the entire features to be measured.

Format of the graphics files

Graphics can be used in TIFF or X-image format. Conversions in both directions are possible. To differentiate the formats, the file names must have the extension .tif or .xwd.

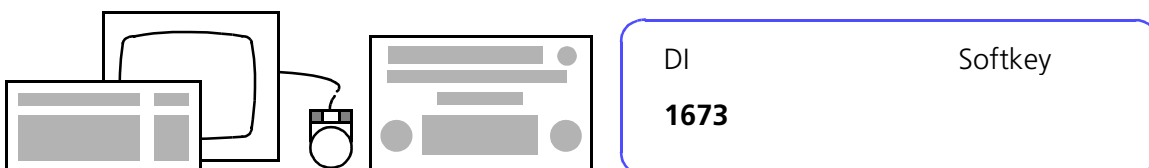
Calling the input mask

After having prepared the graphics required, it can be assigned to the workpiece and its features.

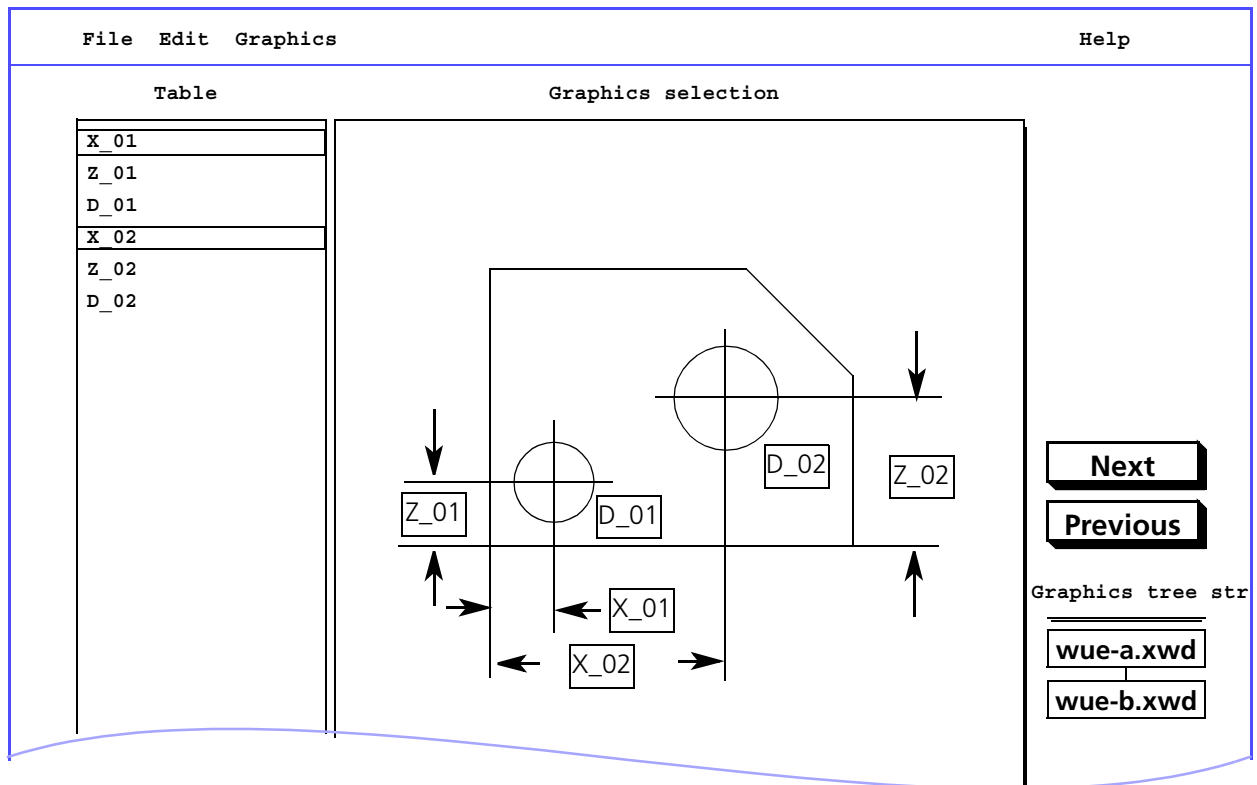
Prerequisite

<DI 1672> must be called directly before assigning the graphics.

Function call



Dialog window



Explanations

File	
Load file	^L
Write file	^S
Termin	F8
Cancel	^A

File/Load file

If files already exist for a workpiece (graphics, assignments, comments,---) these are loaded. Select the desired file by clicking and transfer by clicking **<Termin>**.

File/Write file

If graphics, assignments, comments,...being edited for the current workpiece are to be stored temporarily. To do this, enter the file name in the input field in the mask which opens and transfer by clicking **<Termin>**.

File/Termin

To conclude the input.

File/Cancel To cancel the input.

Edit	
Group	^G
Delete	^L

Edit/Group

Edit/Delete Assignment of the selected features within the graphics is deleted.

Graphics	
Next	^V
Previous	^Z
Read in graphics	^E
Delete graphics	^L

Graphics/Next

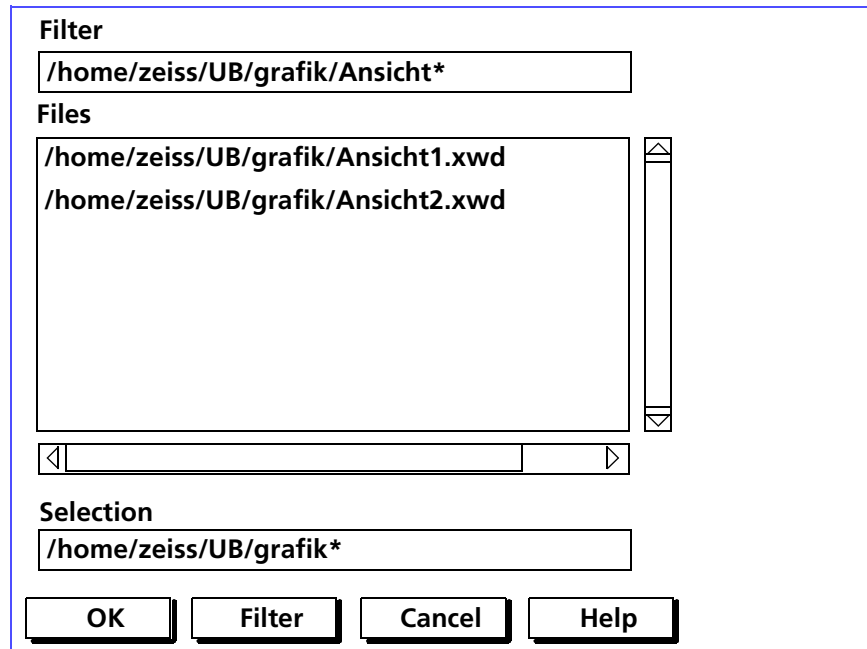
Graphics/Previous or

Next
Previous

To page forwards/backwards in the graphics pages. You can also page by clicking the graphics files in the Graphics tree structure directory.

Graphics/read in

To branch to the directory where all the graphics files are stored.



Preselection of the file using the filter function, transfer of a file by clicking the file designation and the OK softkey.

Graphics/Delete

Assignment of the preselected graphics to the workpiece is cancelled.

Table

List of the features belonging to the preselected workpiece.

Graphics selection

Graphics field for displaying the workpiece and its features.

FILE

If graphics or assignments already exist for the workpiece, these are loaded by clicking **File**.

The buttons described below are activated/deactivated by clicking the box. Box highlighted = activated. Only one button may be activated at a time:

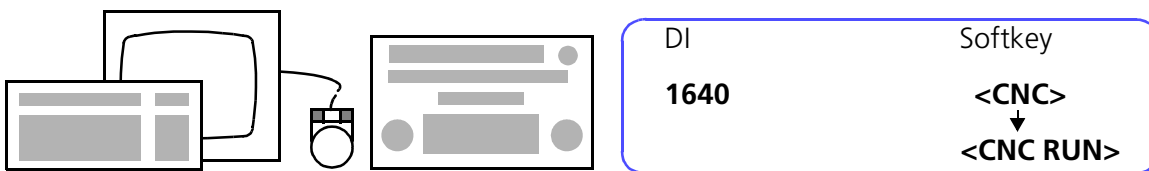
- ☐ **Comm** To define comments for the features. These are displayed in the Table column.
- ☐ **Lines** If feature identifications cannot be placed near the feature, the assignment can be shown by a line. To do this, click the feature identification and keeping the mouse button pressed move to the target position, release the mouse button.
- ☐ **Shift** If the feature identifications are to be moved within the graphics: click the feature identification and keeping the mouse button pressed move to the target position, release the mouse button.
- ☐ **Assign** To transfer the feature identification to the graphics: click the feature in the table, position at target position by clicking with the mouse.

CNC start with feature selection

The features to be inspected must be selected before each CNC measuring run. A FOCUS input mask appears for this during the CNC start which contains all features which can be inspected in a table.

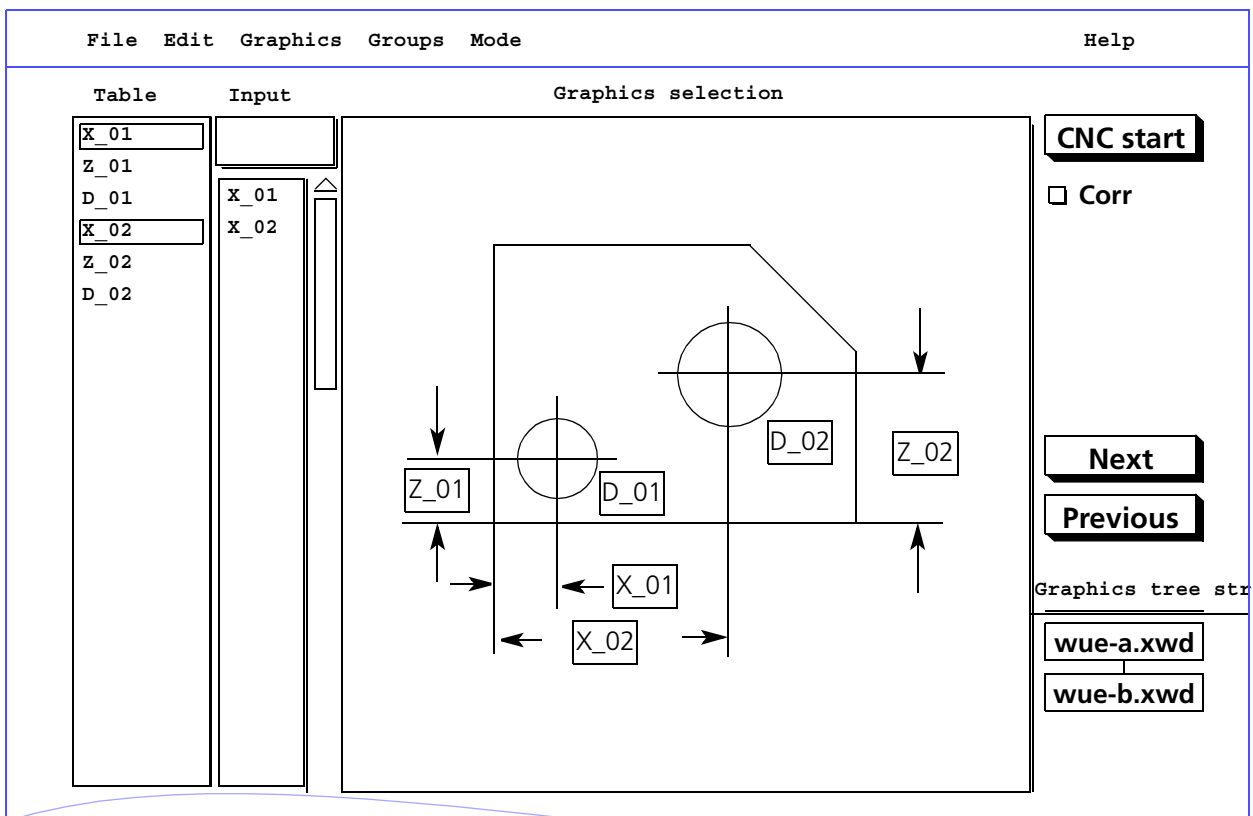
If required, the features can also be depicted in one or several views in a graphics to facilitate their spatial assignment. Details on this can be found in the Appendix.

Function call



Procedure

- Click the feature to be inspected
- End input



Clicking the feature to be inspected

The features to be inspected must be selected before starting the CNC measuring run. There are several ways of doing this:

Table

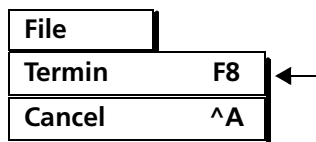
By clicking the feature desired, the respective entry is highlighted and transferred to the Input column. If there is a graphics available, the feature selected is highlighted in color. Multi-selection by clicking and dragging the mouse with button pressed. Delete by repeated clicking

Graphics selection

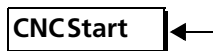
If there is a graphics available, the features desired can also be clicked in this. The respective entry is highlighted in color and transferred to the **Input** column. The corresponding entry in the **Table** is highlighted.

Ending the input

When the input is terminated, the CNC measuring run starts. The following options are available:



or



NOTE

Features (nominal identifications) must not have a "*" or ", " .
 The features are transferred to the table after the prerun (<DI 1672>).
 The feature can also be selected using an ASCII file which has to be stored in the computer (► "Focus functions" on page 8-1).
 Preparation of the field Graphics selection, see Appendix.

Explanations

File	
Termin	F8
Cancel	^A

- File/Termin

Start of CNC measuring run
- File/Cancel

Cancellation of the CNC measuring run

Edit	
Select everything	^G
Select nothing	^N

- Edit/Select everything

Select all features in the table
- Edit/Select nothing

Undo selection of features

Graphics	
Next	^V
Previous	^Z

or

Next
Previous

To page forwards/backwards in the existing graphics pages. You can also page through the graphics by clicking the graphics files in the **Graphics tree structure** directory.

Groups	
Load file	^L
Write file	^S
Read group	
Store group	

Groups/Load file

To read a stored feature combination. It is possible, for example, to store or read in again initial samples, series start or series as different runs.

Groups/Write file

To store a generated feature combination by specifying a file name.

Groups/Read group

To read features which have been stored within a group.

Groups/Store group

To store features which are to be stored within a group under a file name.

This input mask appears with the functions mentioned above.

Load or read:

Click file from directory and terminate mask by clicking **Termin**.

Write or store:

Enter file identification in the lower field and conclude by clicking **Termin**.

MODE

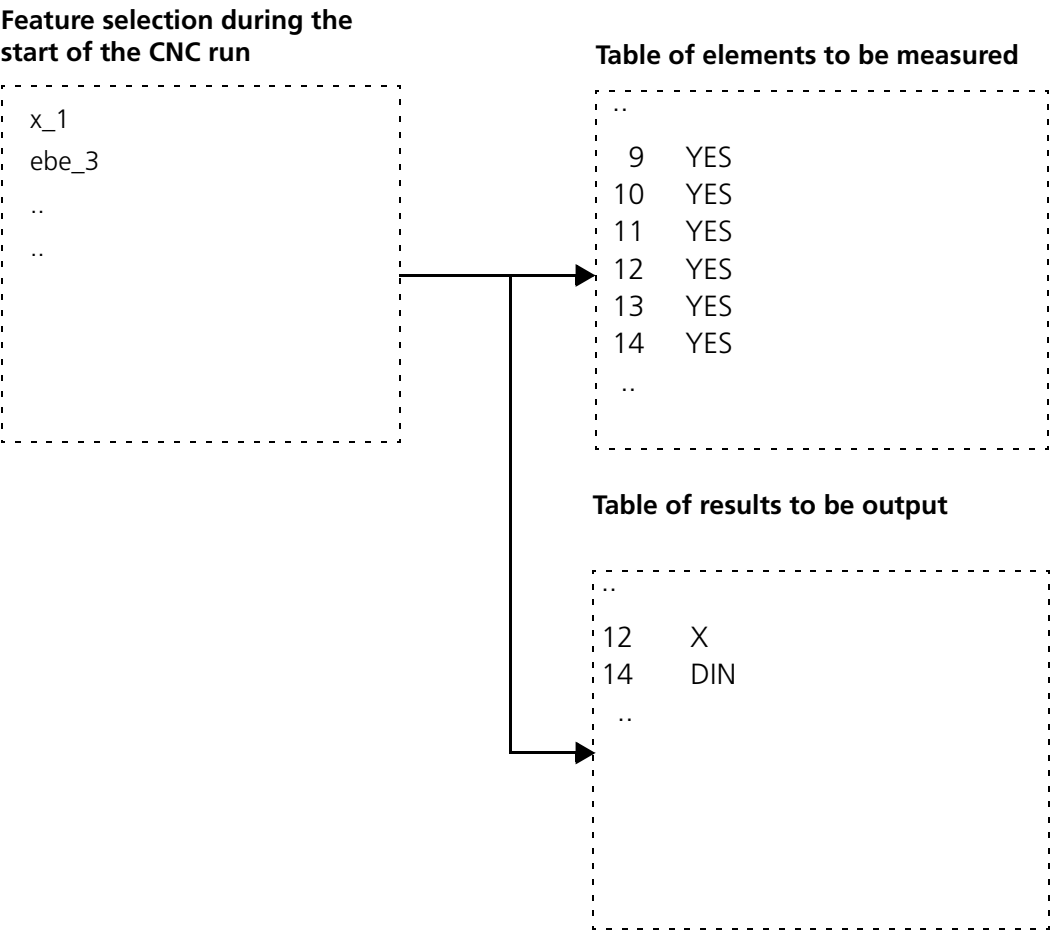
LAYOUT

Branching to a button mask. The buttons described below are activated/deactivated by clicking the box. Box highlighted = activated.

- ☐ **Symbol display** Display of a column which displays the symbol and address for every feature.
- ☐ **Comment display** Display of comments which have been entered on the features during **<DI 1673>**.
- ☐ **List button** Where a correction is made, the list of elements is displayed for a better overview.
- ☐ **Input** Input of a single feature name or part name with wildcard, e.g. X_* for feature selection.
- ☐ **Corr** As soon as a feature is clicked in the table, a mask opens for changing the macro parameters.

Control of the FOCUS-CNC run

Control of the CNC run by fields which are generated dependent on the features and recall table.



Feature + address selection using ASCII file (of remote computer)

The FOCUS programming first provides the feature selection automatically using the input mask during the CNC start when **<DI 1040>** is called. As an alternative the features can be specified using an ASCII file. The ASCII file can be stored in any directory of the computer using the PATH function.

NOTE

If the computers are networked, it is possible to load this ASCII file from a remote computer.

The control data line:

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
..	DIA INP ()	PCM	0	1	9972	0	

must be changed by the entry:

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
..	READF (XXX)	PCM	0	1	9972	0	

XXX = File name of the ASCII file in the directory **/home/zeiss/udir**

UB/XXX = File name of the ASCII file in the directory
/home/zeiss/UB

Example: ASCII file with features, 1 feature per line

```
x_01
z_01
d_01
x_02
z_02
d_02
```

Feature + address selection using ASCII file (of remote computer)

If addresses are to be selected instead of features:

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
3	READFADR (XXX)	PCM	0	1	9972	0	

Example: ASCII file with addresses, 1 address per line

12
15
17
20
25

NOTE

The functions **READF** and **READADR** can be combined with each other and with the **DIA INP** function.
The path for the file to be read can also be specified by a PCM function for the **READ**, **READF** and **READADR** functions:
Features/addresses from selection files and from manual selection can overlap.
Addresses activated with the first function called remain active.

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
..	/home/zeiss/FOC/	ASSIGN TEXT	5	1	9972	0	
..	PATH (@5)	PCM	0	1	9972	0	
..	READF(FILE_X)	PCM	0	1	9972	0	

In this example, the feature file **FILE_X** is read from the **/home/zeiss/FOC** directory.

Chapter 8

Focus functions

This chapter contains:

Focus - PCM functions	8-2
FOCUS - IF functions	8-5

Focus - PCM functions

Manual feature selection during CNC start.

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
..	DIA INP	PCM	0	1	9972	0	

To read features selected as ASCII file:

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
..	READF (XXX)	PCM	0	1	9972	0	

To read addresses selected as ASCII file:

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
..	READADR (XXX)	PCM	0	1	9972	0	

Specification of the path (directory) for **READ**, **READF**, **READFADR**:

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
..	PATH (XXX)	PCM	0	1	9972	0	

Identification as FOCUS program (with new travel route definition):

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
..	FOC_NEW	PCM	0	1	9972	0	

Assignment of system variables for FOCUS during ACE:

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
..	KMG_TYP	PCM	0	1	9972	0	

Activation of control output of travel routes generated:

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
..	LISTI (1)	PCM	0	1	9972	0	

Display of addresses activated by feature selection and recall (display after feature selection):

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
..	LISTI (4)	PCM	0	1	9972	0	

Display of internal FOCUS variables:

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
..	LISTI (6)	PCM	0	1	9972	0	

Display of EXCALL jumps:

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
..	LISTI (7)	PCM	0	1	9972	0	

Manual activation of addresses so that they are measured and output :

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
..	FSET_OUT (ADR) oder (VON,BIS)	PCM	0	1	9972	0	

Manual activation of addresses so that they are measured:

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
..	FSET_MES (ADR) oder (VON,BIS)	PCM	0	1	9972	0	

Locking clearance planes (CP) for certain probe configurations:

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
..	NO_CONF (KONF, SE, SE, SE, ...)	PCM	0	1	9972	0	

Setting of rotary table behavior on the FC:

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
..	RT_MOD (XZ90)	PCM	0	1	9972	0	

Probe change due to lack of space only for certain angles:

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
..	PRB_CHG_ANG (W1, W2, ...)	PCM	0	1	9972	0	

To deactivate probe route generation (1 = activate):

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
..	ROUT_GEN (0)	PCM	0	1	9972	0	

To delete an address range (we recommend that this line is inserted at the start of the run to ensure a **defined initial status**):

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
..	ACLEAR (VON,BIS)	PCM	0	1	9972	0	

Filters following texts from the control data:

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
..	TEXT_FILT (MODUS, ANZ_ADR)	PCM	0	1	9972	0	

if the following addresses (**ANZ_ADR**)

are not measured (MODUS = 1) or

are not output (MODUS = 2).

Sets PCM parameters by activated features:

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
..	F_INP (MERKMAL, ZUWEISUNG)	PCM	0	1	9972	0	

By clicking the feature, the corresponding PCM assignment is executed in order to control various modes.

Example:

F_INP (Modus_A, P20 = 1)

F_INP (MODUS_B,P20 = 2)

FOCUS - IF functions

Possible interrogations (variable part) with IF branchings.

Execute the following IF bracket if the next address has been activated (directly by feature selection or by recall):

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
..	MES (0) = 1	IF	1	1	9951	1951	

Execute the following IF bracket if the specified address (X) has been activated:

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
..	MES (X) = 1	IF	1	1	9951	1951	

Execute the following IF bracket if at least 1 address of the address range has been activated (**X = from ADR, Y = to ADR**):

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
..	MES (X, Y) = 1	IF	1	1	9951	1951	

Application: To activate non-automatic recalls (e.g. to collect points in a file).

Execute the following function if the output of the next address has been activated (by feature selection):

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
..	OUT (0) > 1	IF	1	1	9951	1951	

Application: Output of a corresponding text.

Bracketing a group:

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
..	GRP (0) = 1	IF	1	1	9951	1951	

Bracketing a group which is always processed (even without feature selection):

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
..	GRP (-1) = 1	IF	1	1	9951	1951	

Example

To travel to a defined I-POS with defined probe configuration at the end of the program run:

Clearance plane +Z (or other)

Configuration change <DI 1553>

IF GRP(-1)

I-POS

ENDIF

Bracketing a group which is always processed completely if at least 1 element in the group has been activated by feature selection or recall:

No.	Dialog	Function	SC2	SC1	PCN	CCN	ADR
..	GRP (-2) = 1	IF	1	1	9951	1951	

NOTE

With GRP(-1) and GRP(-2) no additional recalls are determined. A nesting of several GRP brackets or several MES brackets is not allowed. A MES bracket within a GRP bracket is allowed.

Application

Borehole best fit is to be processed completely if it has been selected.

Interrogation of system parameters for run control:

P980	CMM not active (if prerun is P980 = 1)
P981	ACE active (active = 1, not active = 0)
P982	FOCUS prerun active
P983	FOCUS run active
P984	New FOCUS active
P985	DSE/RDS - FOCUS active
P986	FC - FOCUS active
P987	PCM test run active = 1 (<DI 1646>)
	PCM generating run active = 2 (<DI 1647>)

Chapter 9

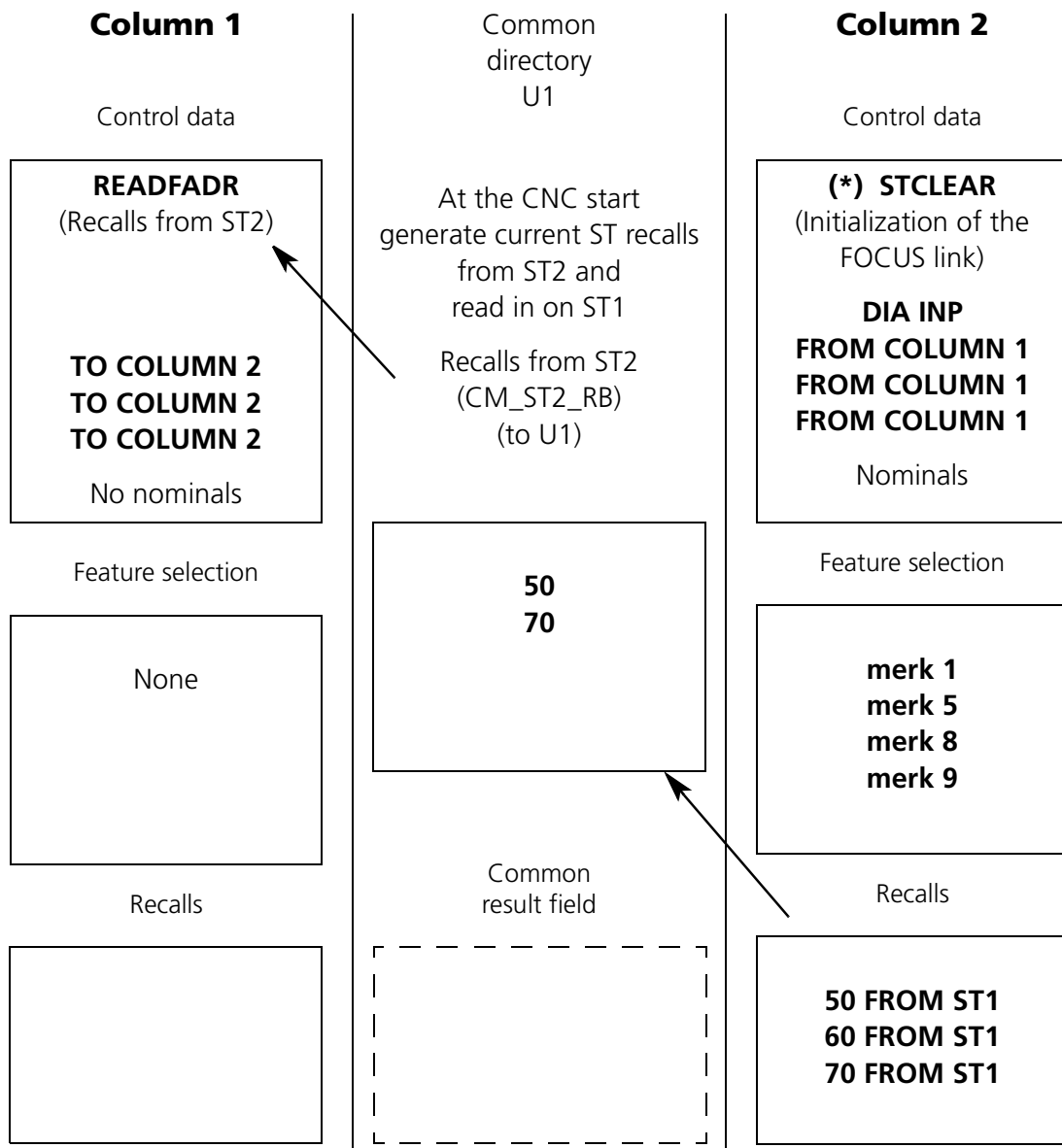
Focus for twin columns

This chapter contains:

FOCUS data structure for twin columns	9-2
FOCUS function description for twin columns, differences to "Standard FOCUS"	9-3
How to proceed when programming, differences to "Standard FOCUS"	9-4
Possible application errors during programming	9-6
Group formation on the workpiece	9-7
Rough structure of control data	9-8
Example, Control data for columns 1 and 2	9-9

FOCUS data structure for twin columns

Always start the column by deleting the recall files (*).



This structure is also possible with common column recalls. A simple recall has been displayed for clarification.

FOCUS function description for twin columns, differences to "Standard FOCUS"

- 1 One FOCUS control data run exists for each column.
- 2 A FOCUS prerun must be executed for each column. If the runs are interlaced, then the preruns must be started parallel as for normal twin column runs on 2 UMESS systems.
- 3 In this example the evaluation of both runs is made on **ST2**. The run on **ST1** does not have any nominals.

Thus the feature selection is made during the CNC start for both columns on **ST2**.

- 4 During a CNC run, one column must always be started first (here **ST2**) in order to delete old recall files (**CM_STX_RB**). (With the PCM function **STCLEAR**)
- 5 After the feature selection, the addresses required (**FROM COLUMN** function) of the other column are determined from both columns (here only **ST2**) and written as file **CM_ST1_RB** and **CM_ST2_RB** to the directory **/home/zeiss/U1**. **/home/zeiss/U1** is mounted by one computer)
The read in function (**READFADR (CM_STX_RB)**)waits until these column recalls of the other column are available.
- 6 The read-in column recalls now determine in addition the *normal* recalls required for this run (linkings, coordinate systems, ...)
- 7 The run continues as a normal twin column run with mutual exchange of those addresses required (**TO COLUMN , FROM COLUMN**) and normal FOCUS run (filtering of elements not required).

How to proceed when programming, differences to "Standard FOCUS"

1 Run control with FOCUS header

Individual functions required ➤ "Example, Control data for columns 1 and 2" on page 9-9 **Control data-examples** and

➤ "Programming the FOCUS-header (DI 1040)" on page 3-1

Generation of travel paths during FOCUS twin column mode should be deactivated with **ROUT_GEN(0)**.

2 3D combination of elements by forming groups, ➤ "Group formation on the workpiece" on page 9-7 **Forming groups on the workpiece.**

To optimize travel paths, the long side of the car body is to be considered as the clearance plane from which the individual groups are traveled to.

An intermediate position (I-POS) must be programmed at the start (after group bracket start) and at the end (before group bracket end) of each group for travelling in and out.

It must be possible to reach this travel in/out I-POS of the various groups without collision.

A defined DSE position is also recommended if space is scarce.

Each element (1st and last I-POS) of a group must be reachable without collision by any other element of the same group,

➤ "Group formation on the workpiece" on page 9-7 **Forming groups on the workpiece.**

3 Formation of measuring tasks by bracketing measuring elements belonging together (where necessary)

To select functions with no address outside N-PT (**DSE-POS, POSITION , PRB-COMB-CHANGE ...**) measuring tasks belonging together can be bracketed with **IF MES**, e.g. borehole measurements on sheet metal.

Programming can be continued as usual within the **IF MES** bracketing.

If these CNC functions can be packed between **N-PT** start and **N-PT** end, then an **IF MES** bracketing is not necessary.

- 4 Pay attention to maximum decoupling of the elements/measuring tasks (element blocks) in coordinate systems (by way of **RECALL WPSYS**), **DSE-POS**, **PRB-COM-CHAN STEP**, **POSITION**

The more independently a measuring program is programmed, the shorter the time the FOCUS run selected takes.

Functions with no address which cause a switchover (**DSE-POS**, **PRB-COM-CHAN** on shaft combination) and are not critical as regards time, should be packed as far as necessary to a measuring task or group so that the measuring task/group can also run correctly individually (without previous block).

Possible application errors during programming

Simplified example of a bore measurement

5 Coordinate systems are not decoupled

Two circles (Adr 14 and Adr 24) should be selectable independently of each another.

When programming without **RECALL WPSYS** (Adr 20), if Adr 24 is selected, , Adr 11 is measured unnecessarily due to the recall chain (23 is recall for 24,..... **13 is coordinate system for 21, ...**)

```

10    WPOS_N_WPSYS
11    SURFACE
12    ROTATE SPACE
13    ZERO POINT
14    CIRCLE
(20    RECALL WPSYS 10)
21    SURFACE
22    ROTATE SPACE
23    ZERO POINT
24    CIRCLE

```

6 **DSE-POS, PRB-COM-CHAN** (shaft switchover) are not decoupled. By omitting Adr 11, Adr 12 is wrongly measured with **DSE-POS A**.

```

DSE POS A
IF MES(0) = 1
DSE-POS B
11 SURFACE
ENDIF
IF MES(0) = 1
12 SURFACE
ENDIF

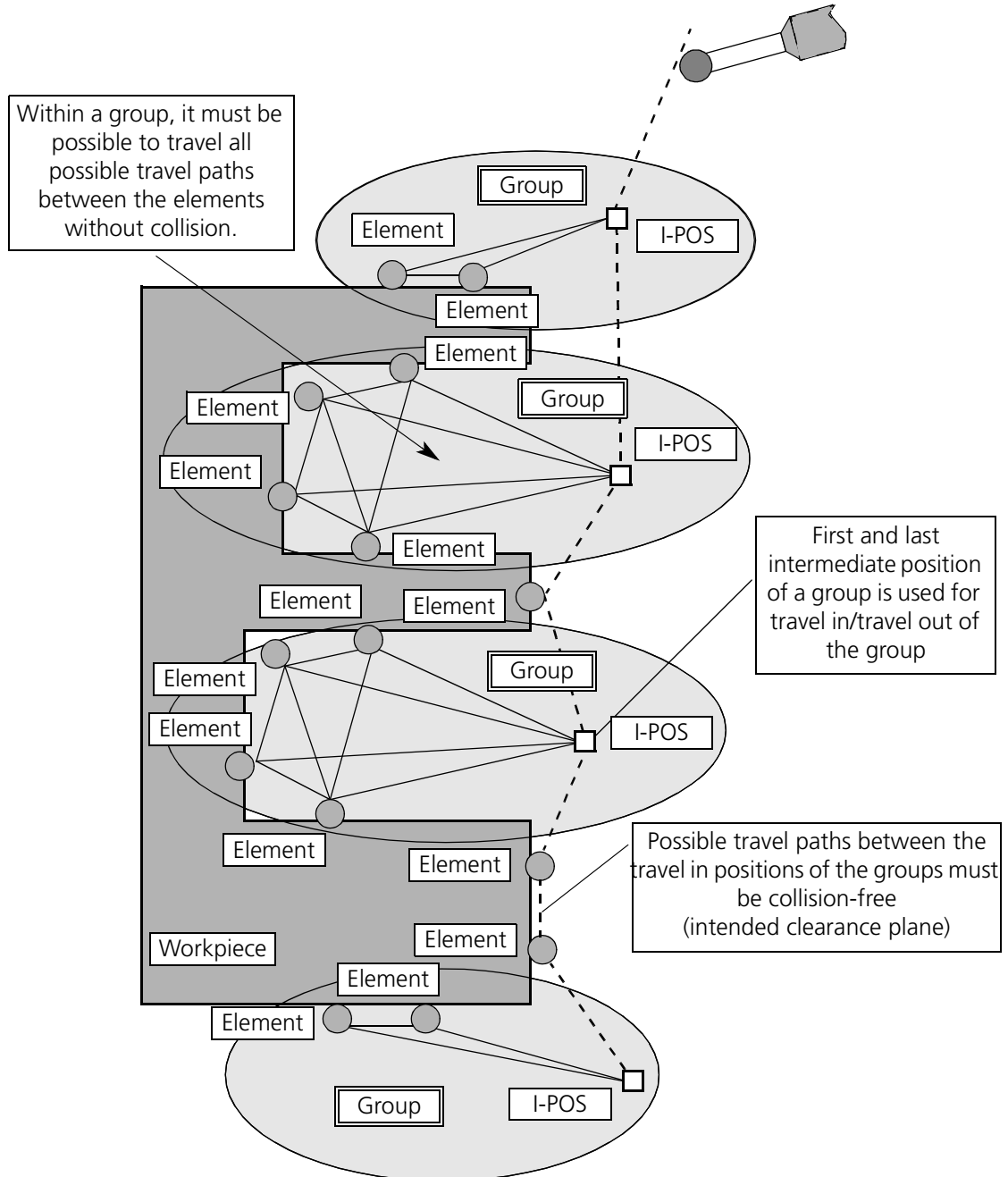
```

Remedy

7 Reset to **DSE-POS A** after Adr 11 or

8 Set to **DSE-POS B** before Adr 12

Group formation on the workpiece



Rough structure of control data

FOCUS header

Group start

```

IPOS      (Travel in)
DSE-POS
IPOS
EL
EL
IPOS
DSE-POS
IPOS      (Travel out)

```

Group end

Group start

```

IPOS      (Travel in)
DSE-POS
IPOS
EL
IF MES(0) = 1      (Measuring task M start)
RECALL WPSYS      (Decoupling of coordinate systems)
    DSE-POS          (Independence of DSE-POS)
    PRB COM-CHAN    (Independent of whether shaft
                        combination or normal combination)
EL
    ROTATE SPACE
    ZERO POINT
EL
ENDIF
(Measuring task M end)
IF MES(0) = 1      (Measuring task N start)
RECALL WPSYS      (Decoupling of coordinate systems)
....
EL
ENDIF              (Measuring task N end)
IPOS
DSE-POS
IPOS              (Travel out)

```

Group end

Example, Control data for columns 1 and 2

Control data column 2

1 Ford Demo Fiesta	RECORD HEADER	0	8	1610	1650
2 5943.0000/1-0	DL R-HEADER	0	0	9911	0
3 123.123.123	DL R-HEADER	0	0	9911	0
4 ZEISS /	DL R-HEADER	0	0	9911	0
5 Car body	DL R-HEADER	0	0	9911	0
6	DL R-HEADER	0	0	9911	0
7	LDL R-HEADER	0	0	9919	0
8 *****	CTEXT	0	1	1679	0
9 During prerun no SPC	CTEXT	0	1	1679	0
10 P(982)=0	IF	1	1	9951	1951
11 **** SAM SPC *****	CTEXT	0	1	1679	0
12	SPC-PCM	0	0	MMMM	
13 **** READ SPC FILE *****	CTEXT	0	1	1679	
14 READ(SPCPCM)	PCM	0	1	9972	
15 SAMPLE FREQUENCY	CTEXT	0	1	1679	
16 7	ASSIGNMENT	6	0	9979	
17 MOD(P2,P6)	ASSIGNMENT	44	0	9979	
18 *****	TEXT	0	1	1676	
19 Run STR(P2)	TEXT	0	1	1676	
20 Frequency STR(P6)	TEXT	0	1	1676	
21 *****	TEXT	0	1	1676	
22	ELSE	1	1	9953	1953
23 1 % for prerun - assign	ASSIGNMENT	44	0	9979	0
24	ENDIF	1	1	9959	1959
25 *****	CTEXT	0	1	1679	0
26	WPOS N WSYS	0	0	1713	1640
27 1 1 1 YES	TO COLUMN	0	1	1303	0
28 *****	CTEXT	0	1	1679	0
29 FOCUS-KOPF	CTEXT	0	1	1679	0
30 -----	CTEXT	0	1	1679	0
31 FOC_NEW	PCM	0	1	9972	0
32 - Control output -	CTEXT	0	1	1679	0
33 LISTI(1)	PCM	0	1	9972	0
34 LISTI(1)	PCM	0	1	9972	0
35 - FOCUS-link. init. -	CTEXT	0	1	1679	0
36 STCLEAR	PCM	0	1	9972	0
37 #####	CTEXT	0	1	1679	0
38 P(44)=0	IF	1	1	9951	1951
39 *****	TEXT	0	1	1676	0
40 - Run all -	TEXT	0	1	1676	0
41 *****	TEXT	0	1	1676	0
42 READF(ALL_FEAT)	PCM	0	1	9972	0
43	ELSE	1	1	9953	1953
44 *****	TEXT	0	1	1676	0
45 -Feature selection -	TEXT	0	1	1676	0
46 *****	TEXT	0	1	1676	0
47 DIA INP	PCM	0	1	9972	0
48	ENDIF	1	1	9959	1959
49 #####	CTEXT	0	1	1679	0
50 - Travel path gen. off -	CTEXT	0	1	1679	0
51 ROUT_GEN(0)	PCM	0	1	9972	0
52 *****	CTEXT	0	1	1679	0
53 1001 3 0 0.0000 0.5000	P_PARAM	2	6	0	1500
54 2001 3 0 0.0000 0.0000	DL P_PARAM	2	0	0	1911
55 1020 3 0 0.0000 0.0200	DL F_PARAM	1	0	0	1911
56 2000 3 0 0.0000 0.0000	MEAS FORCE	3	0	0	1911
57 1004 3 0 0.0000 15.0000	DL F_PARAM	1	0	0	1911
58 1001 3 0 0.0000 150.000	LDL F_PARAM	1	0	0	1919
59 *****	CTEXT	0	1	1679	0

For explanations on
READ (SPCPCM) see
 UMESS
 operating instructions

Control data column 1

60	11			W-POS V DIS	0	1	1712	1610	
61				WPOS_N_WSYS	0	0	1713	1640	1
62				W-POS	0	0	1708	1610	
63	1	1	11	0 PRB-COM-CHAN	0	1	1552	1520	
64	0.0156	0.0044	0.9999	DSE-POSITION	0	2	0	1260	
65	-90.0005	-90.0002	0.0000	LDL DSE-POS	0	0	0	1919	
66	#####			CTEXT	0	1	1679	0	
67	GROUP			CTEXT	0	1	1679	0	
68	GRP(0)=1			IF	1	1	9951	1951	
69	#####			CTEXT	0	1	1679	0	
70	GROUP ENGINE COMPART.			TEXT	0	1	1676	0	
71	1600.0000	1029.5385	1418.6651	ZW-POS	0	11110	0	1101	
72	++ Feature 2_spa ++++++			CTEXT	0	1	1679	0	
73	MEAS(0)=1			IF	1	1	9951	1951	
74	0.0156	0.0044	0.9999	DSE-POSITION	0	2	0	1260	
75	-90.0005	-90.0002	0.0000	LDL DSE-POS	0	0	0	1919	
76	1	1	11	0 PRB-COM-CHAN	0	1	1552	1520	
77	1588.7391	250.2626	1266.9098	I-POS	0	11110	0	1101	
78	1408.2506	257.9423	853.0921	I-POS	0	11110	0	1101	
79				SURFACE	0	0	1103	1410	
80	1346.4184	256.5210	915.8883	I-POS	0	11310	0	1101	
81	1341.7154	256.4666	915.9530	PROBING -X	0	11309	0	1103	
82	1346.0085	271.7704	909.3576	I-POS	0	11310	0	1101	
83	1341.4366	271.7162	909.4219	PROBING -X	0	11309	0	1103	
84	1346.8979	262.1788	897.8375	I-POS	0	11310	0	1101	
85	1340.6676	262.1067	897.9233	PROBING -X	0	11309	0	1103	
86	1350.0959	263.8421	905.7602	I-POS	0	11310	0	1101	
87				N-POINT TERM	1	0	1191	1420	2
88				ROTATE SPACE	0	0	1706	1640	3
89				ZERO POINT	0	0	1701	1640	4
90	1346.9064	265.5335	907.3282	I-POS	0	11310	0	1101	
91	0.0000	266.8209	992.6856	POSITION IP	4	11310	1511	1111	
92				CIRCLE	0	0	1104	1410	
93	0.0000	5.0000	0.0000	STEP TO+Y	4	11312	1515	1153	
94	0.0000	-10.0000	0.0000	STEP TO-Y	4	11308	1515	1153	
95	0.0000	5.0000	0.0000	STEP IP	4	11310	1515	1151	
96	0.0000	0.0000	-5.0000	STEP TO-Z	4	11307	1515	1153	
97	0.0000	0.0000	10.0000	STEP TO+Z	4	11313	1515	1153	
98				N-POINT TERM	1	0	1191	1420	5
99	0			RES-POS IP	4	11310	1513	1131	
100	1348.3862	263.1198	906.8654	I-POS	0	11310	0	1101	
101	2 YES			RECALL 1 ADR	0	1	1301	0	6
102				PERP	1	0	1285	0	7
103	XY 110	0.0000	0.0000	SECTION	3	1	1218	0	8
104				ENDIF	1	1	9959	1959	
105	MEAS(0)=1			IF	1	1	9951	1951	
106	1758.0999	462.2719	1098.8096	I-POS	0	11310	0	1101	
107	1 YES			RECALL WPSYS	0	1	1301	1640	9
108				SURFACE	0	0	1103	1410	
109	1820.4007	475.2952	991.4937	PROBING -Z	0	11107	0	1103	
110	1848.0182	519.8815	1010.2856	I-POS	0	11110	0	1101	
111	1847.8661	519.7966	998.5446	PROBING -Z	0	11107	0	1103	
112	1784.8505	519.1284	1008.1653	I-POS	0	11110	0	1101	
113	1784.7330	519.0683	999.8655	PROBING -Z	0	11107	0	1103	
114	1785.1526	519.2906	1030.5845	I-POS	0	11110	0	1101	
115				N-POINT TERM	3	0	1191	1420	10
116				ROTATE SPACE	0	0	1706	1640	11
117				ZERO POINT	0	0	1701	1640	12
118	1810.4571	450.9920	1055.6517	I-POS	0	11110	0	1101	
119	-90.3256	-100.0446	0.0000	DSE-ERG-POS	0	1	1528	1280	
120	1	2	11	0 PRB-COM-CHAN	0	1	1552	1520	
121	1814.4206	504.5792	1020.7038	I-POS	0	12110	0	1101	
122	1799.1671	661.0378	0.0000	POSITION IP	12	12110	1511	1111	
123				GAP	0	0	MMMM	MMMM	
124				GAP	0	0	MMMM	MMMM	
125				GAP	0	0	MMMM	MMMM	
126				CIRCLE	0	0	1104	1410	
127	20.0000	0.0000	0.0000	STEP TO+X	12	12111	1515	1153	
128	-60.0000	0.0000	0.0000	STEP TO-X	12	12109	1515	1153	
129	1815.5454	511.2824	996.4211	I-POS	0	12110	0	1101	
130	0.0000	30.0000	0.0000	STEP TO+Y	12	12112	1515	1153	
131	0.0000	-60.0000	0.0000	STEP TO-Y	12	12108	1515	1153	

Example, Control data for columns 1 and 2

```

133 0 RES-POS IP 12 12110 1513 1131
134 1816.0270 508.5768 1035.5571 I-POS 0 12110 0 1101
135 10 YES RECALL 1 ADR 0 1 1301 0 14
136 PERP 3 0 1285 0 15
137 XY 110 0.0000 0.0000 SECTION 3 1 1218 0 16
138 -0.0056 0.1744 0.9847 DSE-POSITION 0 2 0 1260
139 -90.0001 -90.0008 0.0000 LDL DSE-POS 0 0 0 1919
140 GROUP ENGINE COMPART. END TEXT 0 2 MMMM MMMM
141 E LDL TEXT 0 0 MMMM MMMM
142 1 1 11 0 PRB-COM-CHAN 0 1 1552 1520
143 ENDIF 1 1 9959 1959
144 1600.0000 500.0000 1400.0000 I-POS 0 12110 0 1101
145 1600.0000 1000.0000 1400.0000 I-POS 0 12110 0 1101
146 ##### CTEXT 0 1 1679 0
147 ENDIF 1 1 9959 1959
148 ##### CTEXT 0 1 1679 0
149 GROUP CTEXT 0 1 1679 0
150 GRP(0)=1 IF 1 1 9951 1951
151 ##### CTEXT 0 1 1679 0
152 GROUP FRONT WHEEL TEXT 0 2 1676 0
153 ASTEN LDL TEXT 0 0 9919 0
154 1 1 11 0 PRB-COM-CHAN 0 1 1552 1520
155 1700.5365 990.9701 197.9888 I-POS 0 12110 0 1101

1 FORD Demo Fiesta RECORD HEADER 0 8 1610 1650
2 5943.0000/1-0 DL R-HEADER 0 0 9911 0
3 123.123.123 DL R-HEADER 0 0 9911 0
4 ZEISS /Car body DL R-HEADER 0 0 9911 0
5 Column 1 DL R-HEADER 0 0 9911 0
6 DL R-HEADER 0 0 9911 0
7 LDL R-HEADER 0 0 9919 0
8 1001 3 0 0.0000 0.5000 P_PARAM 2 6 0 1500
9 2001 3 0 0.0000 0.0000 DL P_PARAM 2 0 0 1911
10 1020 3 0 0.0000 0.0200 DL F_PARAM 1 0 0 1911
11 2000 3 0 0.0000 0.0000 MEAS FORCE 3 0 0 1911
12 1004 3 0 0.0000 15.0000 DL F_PARAM 1 0 0 1911
13 1001 3 0 0.0000 150.000 LDL F_PARAM 1 0 0 1919
14 GAP 0 0 MMMM MMMM
15 ##### CTEXT 0 1 1679 0
16 FOCUS-HEADER CTEXT 0 1 1679 0
17 ----- CTEXT 0 1 1679 0
18 FOC_NEW PCM 0 1 9972 0
19 - Control outputs - CTEXT 0 1 1679 0
20 LISTI(1) PCM 0 1 9972 0
21 LISTI(4) PCM 0 1 9972 0
22 - Read recall CTEXT 0 1 1679 0
23 from column 2 - CTEXT 0 1 1679 0
24 READFADR(CM_ST2_RB) PCM 0 1 9972 0
25 - Travel path gen. off - CTEXT 0 1 1679 0
26 ROUT_GEN(0) PCM 0 1 9972 0
27 ##### CTEXT 0 1 1679 0
28 12 W-POS V DIS 0 1 1712 1610
29 WPOS_N_WSYS 0 0 1713 1640 1
30 1 1 10 0 PRB-COM-CHAN 0 1 1552 1520
31 0.0156 -0.0044 0.9999 DSE-POSITION 0 2 0 1260
32 90.0005 90.0002 0.0000 LDL DSE-POS 0 0 0 1919
33 ##### CTEXT 0 1 1679 0
34 GROUP CTEXT 0 1 1679 0
35 GRP(0)=1 IF 1 1 9951 1951
36 ##### CTEXT 0 1 1679 0
37 GROUP ENGINE COMPART. TEXT 0 1 1676 0
38 1600.0000 -1029.5385 1418.6651 I-POS 0 11110 0 1101
39 MEAS(0)=1 IF 1 1 9951 1951
40 0.0156 -0.0044 0.9999 DSE-POSITION 0 2 0 1260
41 90.0005 90.0002 0.0000 LDL DSE-POS 0 0 0 1919
42 1 1 10 0 PRB-COM-CHAN 0 1 1552 1520
43 1588.7391 -250.2626 1266.9098 I-POS 0 11110 0 1101

.....
.....
.....
.....
424 ***** CTEXT 0 1 1679 0
425 SEND ADDRESSES TO ST 2 CTEXT 0 1 1679 0
426 ***** CTEXT 0 1 1679 0
427 66 80 1 NO TO COLUMN 0 1 1303 0
428 P END 0 0 9999 1999

```


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