UMESS

DMIS Postprocessor for UNIX and LINUX

Operating Instructions

ZEISS

Carl Zeiss
Unternehmensbereich
Industrielle Meßtechnik
D-73446 Oberkochen

Document type: . . .Operating Instructions
Version: 8.x
Date: 11/01
Order No.: 61212-1660102

Preface

These operating instructions describe the function and operation of the **DMIS postprocessor** 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.

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/...**
- *italic*
  - Highlighted text of which the contents are very important
    Example: "Click with the *right* mouse button ..."
  - Cross reference
    Example: "..., see also ➤*"DMIS File name" on page 4-3*"

– **`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.

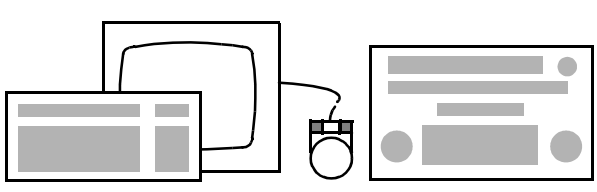
The **Note** symbol is shown next to important text and helpful additional information.

Symbol for function call

There are several possibilities:

– Direct input by means of the DI number
– Selection of function by way of a softkey

Example:



```
$ cd /home/zeiss/dmis
$ DMIS    <RETURN>
```

Symbol for softkey

Reference to softkeys in dialogs.

Overview of chapters

This manual describes the function, operation and application possibilities of the DMIS postprocessor program.

The following subjects are described:

Table of contents

Chapter 1

Introduction

The DMIS postprocessor **DMIS-POPST** can convert DMIS input files, e.g. those produced by a CAD system, to binary control data files for the UMESS measuring software. The DMIS statements which can be processed are listed in the characterization file (➤ *Page 12-1* Appendix A).

The system parameters must be defined once before the postprocessor is called. The DMIS input file number and the name of the control data file are entered each time the processor is called.

The postprocessor produces control data for the UMESS Revision 8.x. This control data, except for a few functions, can also be run on earlier revisions up to Revision 5.12.03.

If errors occur during the conversion, the current revision numbers of the postprocessor and control files can be taken from the error file.

During the conversion the following files are produced apart from the control data binary files:

- If errors occur, an error file in which any errors during the conversion are documented.
- A control data file in legible form.

All files can be output on the screen or printer using dialog selection.

Chapter 2

Installation instructions

The postprocessor is supplied on magnetic tape or DAT. The installation of the postprocessor takes place on the **/home/zeiss/dmis** directory.

The postprocessor is installed with the UPDATE routine analogous to the basic software with the command **update -s/dev/dat '*'**. The fileset is called **DMIS**.

The following directories are created:

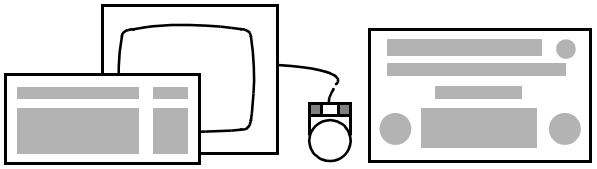
- **/home/zeiss/dmis/dmisfile** Storage of input files
- **/home/zeiss/dmis/tab** Storage of control files
- **/home/zeiss/dmis/dmisdok** Storage of error files
- **/home/zeiss/dmis/dokument** Storage of operating instructions and characterization file

Chapter 3

Program call

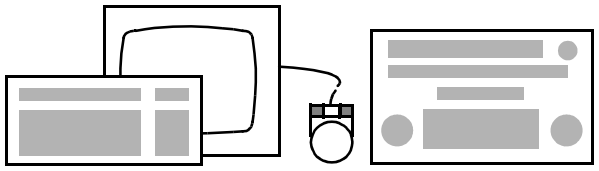
The DMIS postprocessor is called from the shell surface as follows:

Function call



```
$ cd /home/zeiss/dmis
$ DMIS    <RETURN>
```

Function call with transfer parameters



```
$ DMIS "<DMIS-Filename>"
"<control data file 1>"
["<control data file 2>"]
```

If the program is called with transfer parameters, the DMIS file starts being processed directly. In this case no further inputs are necessary, (no menu is offered); the data required for the processing is taken from the longterm file. A dialog is only offered if an error occurs (e.g. incorrect file name). The program is terminated after the DMIS input files have been processed.

The quotation marks (") are not required for the parameter identification; they must however be used for a blank parameter transfer. With a blank parameter transfer (" "), the corresponding entry in the longterm file is transferred as default.

If only the DMIS file name and a control data file name (2 transfer parameters) are transferred, the processing for single column mode starts. If there are more than two transfer parameters (at the moment the number of transfer parameters is limited to three), the DMIS file is processed for multi-column or twin column mode.

The following description refers in general to a menu-driven processor run.

The last system data valid, machine parameters and storage data for the automatic probe configuration change are transferred to the postprocessor during the start. The DMIS file name used last and the control data name also appear in the main menu.

The following main menu appears on the screen depending on the type of measuring mode used (single or multi column mode):

Single column mode

```
*******************************************************************************
**                        DMIS POSTPROCESSOR REV. 2.x                        **
*******************************************************************************


0 - TERMINATE
1 - DMIS PROCESS
     DMIS FILENAME:              xxxxxxxxx.zzzz
     UMESS FILENAME:             CNCyyyyyyyyyyB
2 - DIRECTORY LIST
3 - EDIT DMIS FILE
4 - # PRINT/LIST FILES
5 - # SYSTEM DATA
6 - # DME DATA
7 - # SENSOR DEPOSITION

TASK NO = _
```

Multi column mode

```
*******************************************************************************
**                          DMIS POSTPROCESSOR REV. 2.x                      **
*******************************************************************************

0 - TERMINATE
1 - DMIS PROCESS
     DMIS FILENAME:                          xxxxxxxxx.zzzz
     UMESS FILENAME CARRIAGE 1:              CNCyyyyyyyyyyB
     UMESS FILENAME CARRIAGE 2:              CNCyyyyyyyyyyB
2 - DIRECTORY LIST
3 - EDIT DMIS FILE
4 - # PRINT/LIST FILES
5 - # SYSTEM DATA
6 - # DME DATA
7 - # SENSOR DEPOSITION

TASK NO = _
```

NOTE Task no. 7 is only offered if the automatic probe configuration change is activated in the system data field.

Chapter 4

Main menu

A task selection must be made in the main menu (**TASK NO =**).

This chapter contains:

Task 0 (Exit postprocessor)

If task 0 is selected or the **<RETURN>**key pressed, the work of the processor is stopped and the DMIS package exited.

Task 1 (Start postprocessor run)

Selecting task no.1 in the main menu starts the DMIS cycle

```
*******************************************************************************
**                          DMIS POSTPROCESSOR REV. 2.x                      **
*******************************************************************************

0 - TERMINATE
1 - DMIS PROCESS
     DMIS FILENAME:              xxxxxxxxx.zzzz
     UMESS FILENAME:             CNCyyyyyyyyyyB
2 - DIRECTORY LIST
3 - EDIT DMIS FILE
4 - # PRINT/LIST FILES
5 - # SYSTEM DATA
6 - # DME DATA
7 - # SENSOR DEPOSITION

TASK NO = _

DMIS FILENAME:
UMESS FILENAME:

INPUT O.K. (Y/N): _
```

Name inputs for the DMIS file and the control data files are requested in succession. If the file names are confirmed with the **<RETURN>**-key, the existing file names are accepted.. If in this case no names exist, a corresponding error message appears on the screen and the dialog is repeated. If the multi-column mode is being used, then a corresponding number of name inputs is offered for the control data files.

DMIS File name

The input of the DMIS file name is subject to the following restrictions:

- Characters allowed for the file name are alphanumeric characters and the special character"_" (underscore).
- The file name must start with a letter.
- The maximum length amounts to 14 characters without extension. The extension may contain up to 4 characters and is separated from the rest of the file name by a fullstop "**.**".
- If the input of the DMIS file name does not contain the **.dmis** extension, this is generated by the processor.

  Equally, the name for the error documentation (DMIS file name with **.err** extension) is generated automatically.

Name of the control data file

The input of the name for the control data file is subject to the following restrictions:

- The name to be entered is only part of the control data file name with 10 characters. If not all 10 characters are used the name of the file is filled up with underscores "_".
- All alphanumeric characters and the special character "_" (underscore) are permitted.
- The actual file name is then composed of a fixed and variable part (UMESS):

  CNCyyyyyyyyyyB : yyyyyyyyyy = variable part which is requested by dialog

After answering the dialog, confirmation is requested with **INPUT O.K. ? (Y/N)**.

If '**NO**' is answered, the main menu is offered again with the file names entered.

If '**YES**' is answered, the DMIS file processing is started. (cf. 7. DMIS cycle).

NOTE

Usually the directory structure of the control data storage coincides with that of UMESS. A newly generated control data file however has not yet been entered in the UMESS workpiece catalog. The user must make this entry under UMESS (entry in the workpiece catalog **<DI 1634>**) so that UMESS can access the workpiece.

Task 2 (File list)

By selecting task no.2 in the main menu, all file names of a defined group (DMIS files, label files, error documentation or control data files) can be displayed.

The following dialog is offered:

```
*******************************************************************************
**                        DMIS POSTPROCESSOR REV. 2.x                        **
*******************************************************************************
0 - TERMINATE
1 - DMIS PROCESS
          DMIS FILENAME:              xxxxxxxxx.zzzz
          UMESS FILENAME:             CNCyyyyyyyyyyB
2 - DIRECTORY LIST
3 - EDIT DMIS FILE
4 - # PRINT/LIST FILES
5 - # SYSTEM DATA
6 - # DME DATA
7 - # SENSOR DEPOSITION

TASK NO = 2_
****   DIRECTORY    LIST   ****
(1=DMIS,2=ERROR,3=UMESS)
FILETYPE NO = _
```

With the dialog **FILETYPE NO =** input of the file groups offered is requested. A task combination can also be selected here. Up to 5 criteria , separated by a comma“**,**”, can be selected with the task combination.

Example:

FILETYPE NO = 1,2,3
All existing DMIS files, error documentation and control data files are displayed on the screen.

After the file names have been displayed, the dialog **TASK NO =** from the main menu appears again.

The entire main menu is displayed if a **help** character (**?**,**H** or **h**) is entered.

NOTE

Task selection 2 is recommended before entering the file names at the start of the DMIS cycle (task selection 1) if, for example, the overwriting of an existing control data file is to be prevented..

Task 3 (Editor)

By selecting task no.3 in the main menu it is possible to change or to edit a DMIS file.

```
*******************************************************************************
**                        DMIS POSTPROCESSOR REV. 2.x                        **
*******************************************************************************

0 - TERMINATE
1 - DMIS PROCESS
     DMIS FILENAME:                xxxxxxxxx.zzzz
     UMESS FILENAME:               CNCyyyyyyyyyyB
2 - DIRECTORY LIST
3 - EDIT DMIS FILE
4 - # PRINT/LIST FILES
5 - # SYSTEM DATA
6 - # DME DATA
7 - # SENSOR DEPOSITION

TASK NO = 3_
EDIT DMIS FILE
DMIS FILENAME: ____________
```

The input of the DMIS file name is subject to the same restriction as task selection no.1 (cf. ➤*"DMIS File name" on page 4-3*). When selecting the vi editor is activated. The vi editor can be used with all permissible edit commands. The main menu is branched to on exiting the editor.

Task 4 (Branching to List and Print-menu)

The output menu (cf. ➤*"Task 3 (Editor)" on page 4-5*) is branched to by selecting task 4.

Task 5 (Branching to the system data menu)

The system data field (cf. ➤*"Task 4 (Branching to List and Print-menu)" on page 4-6*) is branched to by selecting task 5.

Task 6 (Branching to machine data menu)

The data field for probing and machine parameters (cf. ➤*"Task 5 (Branching to the system data menu)" on page 4-6*) is branched to by selecting task 6.

Task 7 (Branching to probe change menu)

The data field for the automatic probe configuration change (cf. ➤*"Task 6 (Branching to machine data menu)" on page 4-6*) is branched to by selecting task 7.

This selection of task is only offered if the automatic probe configuration change is activated in the system data field.

Chapter 5

Output menu

This chapter contains:

The following menu appears on the screen if task no.4 was selected in the main menu:

```
*******************************************************************************
**                    P R I N T  /  L I S T  F I L E S                       **
*******************************************************************************

0 - RETURN TO MAIN MENU
1 - PRINT DMIS FILE    xxxxxxxxxx.zzzz
2 - PRINT ERROR FILE   xxxxxxxxxx.err
3 - PRINT UMESS CD-FILE   ACTUAL LISTING
4 - PRINT CHARACTERIZATION-FILE
5 - LIST DMIS FILE    xxxxxxxxxx.zzzz
6 - LIST ERROR FILE   xxxxxxxxxx.zzzz
7 - LIST UMESS CD-FILE   ACTUAL LISTING
8 - LIST CHARACTERIZATION-FILE


TASK NO = _
```

NOTE

Task no. 3 and 7 are only offered if the online generation of a control data list is activated in the system data field.

Task 0 (Return to main menu)

If task 0 is selected or the **<RETURN>**key is pressed, the output menu is left and the main menu branched to.

Tasks 1 to 4 (Printing files)

By this task selection the files displayed are printed. If task no. 1 is selected the DMIS file is printed with line numbering. Selection no.3 is only permitted if the generation of a control data list is activated. The print jobs are managed by the operating system.

Task 5 to 8 (Listing files)

If this task is selected the files selected are displayed on the screen. The display is supported by the operating system. Then it is possible to page forwards with the space bar or to cancel the display of the file with "**q**" (UNIX more-statements).

If the file end has been reached, the following message appears:

>>> PRESS KEY "RETURN" TO CONTINUE

By confirming this message with the **<RETURN>**key the output menu is branched to or if a task combination has been selected the next file is displayed.

Task combination

Apart from a single selection a task combination is also permitted. A preselection of up to 5 criteria, separated by a comma, is possible with the task combination.

Example:

TASK NO = 1,2,3,0

The DMIS file, the error documentation and the current control data list are output on the printer is succession. The main menu is then branched to (task = 0).

Chapter 6

System data field

This chapter contains:

In the system data field, the control parameters required for a DMIS cycle are defined. All inputs in the system data field are stored in a longterm file and are valid until they are changed.

The following menu is offered by selecting task no. 5 in the main menu:

```
*******************************************************************************
**                        S Y S T E M   D A T A                              **
*******************************************************************************

0 - RETURN TO MAIN MENU
1 - # DIRECTORY STRUCTURE OF FILES
2 - SENSOR LABEL  1=S(x_y),2=S(label): v
3 - SWITCH ON LINE UMESS CONTROL
    DATA DOCUMENTATION    (0=OFF,1=ON): w
4 - DUAL CARRIAGE SYSTEM (0=OFF,1=ON): z
5 - SWITCH AUTOMATIC SENSOR CHANGING
    (0=OFF,1-26=NUMBER OF DEP.PLACES): yy
6 - INTERMEDIATE POSITION GENERATION
    BY SNSET/APPRCH       (0=OFF,1=ON): u
7 - NEW COORDINATE SYSTEM AFTER EVERY
    TRANSFORMATION        (0=OFF,1=ON): t

TASK NO = _
```

Task 0 (Return to main menu)

By selecting task 0 or by confirming with the **<RETURN>**key, the system data field is exited and the main menu branched to.

Task 1 (Branching to directory menu)

Task selection 1 in the system data field defines the directory structure of the DMIS files, the label files, the error documentation and the control data files.

A menu page is offered depending on the type of measuring mode (single or multi-column mode).

Single column mode

```
*******************************************************************************
**                      DIRECTORY STRUCTURE OF FILES                         **
*******************************************************************************

0 - RETURN
1 - DIRECTORY DMIS FILE:          /zzzzzz/uuuuu
2 - DIRECTORY LABEL FILE:         /zzzzzz/uuuuu
3 - DIRECTORY ERROR FILE:         /zzzzzz/uuuuu
4 - DIRECTORY UMESS FILE:         /zzzzzz/uuuuu

TASK NO = _
```

Multi column mode

```
*******************************************************************************
**                      DIRECTORY STRUCTURE OF FILES                         **
*******************************************************************************

0 - RETURN
1 - DIRECTORY DMIS FILE :                          /zzzzzz/uuuuu
2 - DIRECTORY LABEL FILE:                          /zzzzzz/uuuuu
3 - DIRECTORY ERROR FILE:                          /zzzzzz/uuuuu
4 - DIRECTORY UMESS FILE CARRIAGE 1:               /zzzzzz/uuuuu
5 - HOST NAME OF CARRIAGE 1:                       /asterix
6 - DIRECTORY UMESS FILE CARRIAGE 2:               /zzzzzz/uuuuu
7 - HOST NAME OF CARRIAGE 2:                       /obelix

TASK NO = _
```

Directories for DMIS file, label file, error documentation, control files and computer names can be transferred here.

Return to previous menu.

By selecting task 0 or by confirming with the **<RETURN>**key, the current menu page is left and the system data field branched to.

Directory inputs

By selecting task no. 1 to 4 (and 6 with multi-column mode), the directory inputs take place for DMIS file, label file, error documentation and control files.

If a blank directory structure is transferred, the corresponding files are on the working directory. The directory structure entered must not exceed 22 characters and is subject to the following restrictions:

The individual directory name may contain up to a maximum of 16 characters. Characters allowed for the directory name are alphanumeric characters and the special character "_" (underscore).

The directory name must start with a letter.

The directory name must be specified without extension.

If subdirectories are specified, the individual directory names are separated by a slash "**/**".

Example:

DIRECTORY UMESS FILE : /home/zeiss/UB

The control file is found with the specified directory path (absolute input of directory structure).

DIRECTORY DMIS FILE : dmisfile

The DMIS file is found depending on the working directory in the subdirectory **dmisfile** (relative input of the directory structure).

Input of computer name

The input of the computer names is only possible with multi-column mode and defines the computer for the storage of control data. By selecting task number 5 or 7 the computer names are requested depending on the column. If a blank computer name is transferred, the control files are stored on the working computer.

The computer name entered must not exceed 10 characters and is subject to the following restrictions: The computer name must be prefixed by a (slash) "**/**".

Characters allowed for the directory name are alphanumeric characters and the special character "_" (underscore).

Example:

HOST NAME OF CARRIAGE 2: /obelix

The control file generated for column 2 is stored on the **obelix** computer.

Task 2 (Probe identification)

By selecting task no. 2 in the system data field, the probe identification is specified.

```
*******************************************************************************
**                        S Y S T E M   D A T A                              **
*******************************************************************************

0 - RETURN TO MAIN MENU
1 - # DIRECTORY STRUCTURE OF FILES
2 - SENSOR LABEL  1=S(x_y),2=S(label): v
3 - SWITCH ON LINE UMESS CONTROL
    DATA DOCUMENTATION    (0=OFF,1=ON): w
4 - DUAL CARRIAGE SYSTEM (0=OFF,1=ON): z
5 - SWITCH AUTOMATIC SENSOR CHANGING
    (0=OFF,1-26=NUMBER OF DEP.PLACES): yy
6 - INTERMEDIATE POSITION GENERATION
    BY SNSET/APPRCH       (0=OFF,1=ON): u
7 - NEW COORDINATE SYSTEM AFTER EVERY
    TRANSFORMATION        (0=OFF,1=ON): t

TASK NO = 2
SENSOR LABEL  1=S(x_y),2=S(label): _
```

The selection of a probe identification is offered.

Input 1 By selecting **S** (x_y) the probe number is determined from the label name. The label name is subject here to defined conventions.

Input 2 With **S** (label) any label name is possible, the probe number is incremented automatically.

Task 3 (Control data as ASCII file)

With this selection it is defined whether a control data list should be kept at the same time as the control data generation. The UMESS control data is edited in a legible ASCII format in this control data list.

```
*******************************************************************************
**                        S Y S T E M   D A T A                              **
*******************************************************************************

      0 - RETURN TO MAIN MENU
      1 - # DIRECTORY STRUCTURE OF FILES
      2 - SENSOR LABEL  1=S(x_y),2=S(label):      v
      3 - SWITCH ON LINE UMESS CONTROL
      DATA DOCUMENTATION    (0=OFF,1=ON):         w
      4 - DUAL CARRIAGE SYSTEM (0=OFF,1=ON):      z
      5 - SWITCH AUTOMATIC SENSOR CHANGING
      (0=OFF,1-26=NUMBER OF DEP.PLACES):          yy
      6 - INTERMEDIATE POSITION GENERATION
      BY SNSET/APPRCH       (0=OFF,1=ON):         u
      7 - NEW COORDINATE SYSTEM AFTER EVERY
      TRANSFORMATION        (0=OFF,1=ON):         t

      TASK NO = 3

      SWITCH ON LINE UMESS CONTROL
      DATA DOCUMENTATION    (0=OFF,1=ON):          _
```

If 0 is entered no control data list is kept.

If 1 is entered, a control data list is created automatically with every DMIS cycle together with the binary control data file.

The control data list is always overwritten, i.e. it always refers to the current (last) DMIS cycle.

NOTE

The control data list should be used to help check the converted control data.
The list only contains the data necessary for controlling the coordinate measuring machine; nominals are not included (reserved nominal line). In the multi-column mode recall addresses entered subsequently from other columns are not taken into consideration.

Task 4 (Twin column mode)

If task no.4 is selected the twin column mode can be activated.

```
*****************************************************************************
**                        S Y S T E M   D A T A                            **
*****************************************************************************

0 - RETURN TO MAIN MENU
1 - # DIRECTORY STRUCTURE OF FILES
2 - SENSOR LABEL  1=S(x_y),2=S(label): v
3 - SWITCH ON LINE UMESS CONTROL
    DATA DOCUMENTATION    (0=OFF,1=ON): w
4 - DUAL CARRIAGE SYSTEM (0=OFF,1=ON): z
5 - SWITCH AUTOMATIC SENSOR CHANGING
    (0=OFF,1-26=NUMBER OF DEP.PLACES): yy
6 - INTERMEDIATE POSITION GENERATION
    BY SNSET/APPRCH       (0=OFF,1=ON): u
7 - NEW COORDINATE SYSTEM AFTER EVERY
    TRANSFORMATION        (0=OFF,1=ON): t

TASK NO = 4

DUAL CARRIAGE SYSTEM (0=OFF,1=ON): _
```

Input of 0 activates single column mode, input of 1 twin column mode. This input does not only affect the format of the menu pages, but mainly the generation process of the control data.

Task 5 (Automatic probe change)

By selecting task no. 5 in the system data field, an automatic probe configuration change is specified.

```
*******************************************************************************
**                        S Y S T E M   D A T A                                **
*******************************************************************************

0 - RETURN TO MAIN MENU
1 - # DIRECTORY STRUCTURE OF FILES
2 - SENSOR LABEL  1=S(x_y),2=S(label): v
3 - SWITCH ON LINE UMESS CONTROL
    DATA DOCUMENTATION   (0=OFF,1=ON): w
4 - DUAL CARRIAGE SYSTEM (0=OFF,1=ON): z
5 - SWITCH AUTOMATIC SENSOR CHANGING
    (0=OFF,1-26=NUMBER OF DEP.PLACES): yy
6 - INTERMEDIATE POSITION GENERATION
    BY SNSET/APPRCH      (0=OFF,1=ON): u
7 - NEW COORDINATE SYSTEM AFTER EVERY
    TRANSFORMATION       (0=OFF,1=ON): t
TASK NO = 5

SWITCH AUTOMATIC SENSOR CHANGING
(0=OFF,1-26=NUMBER OF DEP.PLACES): __
```

The automatic probe configuration change is deactivated by entering 0.

If no probe changer is available, 0 must be entered here.

If a probe changer is available, but is not to be used, e.g. to be able to change the probe manually, 0 must also be entered.

If a zero is entered during the probe configuration change, the post processor produces a corresponding message prompting a manual change. During a CNC run the following text appears on the screen:

> CHANGE SENSOR CONFIGURATION MANUALLY!
INSERT SENSOR CONFIGURATION .

The CNC run is stopped at this point. The operator must remove the old configuration (**<DI 1554>**) and insert the new configuration offered and enter the corresponding configuration number (**<DI 1555>**). The CNC run must then be continued.

An input value between 1 and 26 either activates the automatic probe configuration change, or defines the number of storage positions according to the input value.

Task 6 (Generation of an intermediate position)

By selecting task 6 in the system data field, an automatic generation of an intermediate position in connection with the probing search path before the nominal position (**SNSET/APPRCH**) is specified.

```
*******************************************************************************
**                        S Y S T E M   D A T A                              **
*******************************************************************************

0 - RETURN TO MAIN MENU
1 - # DIRECTORY STRUCTURE OF FILES
2 - SENSOR LABEL  1=S(x_y),2=S(label): v
3 - SWITCH ON LINE UMESS CONTROL
    DATA DOCUMENTATION    (0=OFF,1=ON): w
4 - DUAL CARRIAGE SYSTEM (0=OFF,1=ON): z
5 - SWITCH AUTOMATIC SENSOR CHANGING
    (0=OFF,1-26=NUMBER OF DEP.PLACES): yy
6 - INTERMEDIATE POSITION GENERATION
    BY SNSET/APPRCH       (0=OFF,1=ON): u
7 - NEW COORDINATE SYSTEM AFTER EVERY
    TRANSFORMATION        (0=OFF,1=ON): t

TASK NO = 6

INTERMEDIATE POSITION GENERATION
BY SNSET/APPRCH      (0=OFF,1=ON): _
```

If the probing search path before the nominal position is activated, the automatic intermediate position generation is switched on or off by entering 0 or 1. An intermediate position is only generated automatically in the case of a preceding **SNSET/APPRCH** command.

The corresponding intermediate position is located in the direction of the normal at the distance of the probing search path before the nominal position of the probing.

Task 7 (W-position generation)

By selecting task no.7 in the system data field, the automatic generation of a W-position in connection with the **TRANS** and **ROTATE** statements is activated/deactivated.

```
*******************************************************************************
**                        S Y S T E M   D A T A                                **
*******************************************************************************

0 - RETURN TO MAIN MENU
1 - # DIRECTORY STRUCTURE OF FILES
2 - SENSOR LABEL  1=S(x_y),2=S(label):       v
3 - SWITCH ON LINE UMESS CONTROL
DATA DOCUMENTATION    (0=OFF,1=ON):          w
4 - DUAL CARRIAGE SYSTEM (0=OFF,1=ON):       z
5 - SWITCH AUTOMATIC SENSOR CHANGING
(0=OFF,1-26=NUMBER OF DEP.PLACES):           yy
6 - INTERMEDIATE POSITION GENERATION
BY SNSET/APPRCH       (0=OFF,1=ON):          u
7 - NEW COORDINATE SYSTEM AFTER EVERY
TRANSFORMATION        (0=OFF,1=ON):          t

TASK NO = 7

NEW COORDINATE SYSTEM AFTER EVERY
TRANSFORMATION        (0=OFF,1=ON):           _
```

Chapter 7

Machine parameters

This chapter contains:

Important machine parameters for the DMIS cycle are defined here. All inputs in the machine parameter field are stored in a longterm file and are valid until they are changed.

The following menu is offered by selecting task code no. 6 in the main menu:

```
*******************************************************************************
**                          D  M  E  -  D  A  T  A                           **
*******************************************************************************

0 - RETURN TO MAIN MENU
1 - POSITIONAL VELOCITY  [mm/s]  MIN:___ MAX:___ STANDARD:___
2 - DSE-CONTROL
    ( 0 = VECTOR , 1 = ANGLE )       _
3 - TOLERANCE-NAME
    ( COLUMN OF FIRST CHARACTER )    _
4 - OUTPUT-OPTIONS
    (1=STANDARD , 2=D(...) , 3=ALL)  _
5 - NOMINAL-ACTUAL-MODE (1-6)        _

TASK NO = _
```

Task 0 (Return to main menu)

By selecting task 0 or by simply pressing the **<RETURN>** key, the menu for machine parameters is exited and the main menu branched to.

Task 1 (Travel speeds)

With this task selection, minimum, maximum and standard values of the travel speed can be defined for the DMIS cycle.

You can specify travel speeds for special machines, e.g. for UMC or Prismo.

The minimum, maximum and standard value are requested in succession for the corresponding task selection:

```
*******************************************************************************
**                          D  M  E  -  D  A  T  A                           **
*******************************************************************************

0 - RETURN TO MAIN MENU
1 - POSITIONAL VELOCITY  [mm/s]  MIN:___ MAX:___ STANDARD:___
2 - DSE-CONTROL
    ( 0 = VECTOR , 1 = ANGLE )       _
3 - TOLERANCE-NAME
    ( COLUMN OF FIRST CHARACTER )    _
4 - OUTPUT-OPTIONS
    (1=STANDARD , 2=D(...) , 3=ALL)  _

5 - NOMINAL-ACTUAL-MODE (1-6)        _

TASK NO = 1

POSITIONAL VELOCITY [mm/s]
MIN: _
MAX: _
STANDARD: _
```

Task 2 (DSE control)

The control mode for DSE movements can be defined with this task selection.

If 0 is entered, the control is made via vectors, if 1 is entered via angles:

```
*******************************************************************************
**                          D  M  E  -  D  A  T  A                           **
*******************************************************************************

0 - RETURN TO MAIN MENU
1 - POSITIONAL VELOCITY  [mm/s]  MIN:___ MAX:___ STANDARD:___
2 - DSE-CONTROL
    ( 0 = VECTOR , 1 = ANGLE )        _
3 - TOLERANCE-NAME
    ( COLUMN OF FIRST CHARACTER )     _
4 - OUTPUT-OPTIONS
    (1=STANDARD , 2=D(...) , 3=ALL)   _

5 - NOMINAL-ACTUAL-MODE (1-6)         _

TASK NO = 2

   DSE-CONTROL
   ( 0 = VECTOR , 1 = ANGLE )         _
```

Task 3 (Tolerance name)

With this task selection, you can define which range of a tolerance label is to be transferred as tolerance identification to UMESS. The column number of the start of the range is specified.

The next 5 characters in the identification starting from the column specified are transferred:

```
*******************************************************************************
**                          D  M  E  -  D  A  T  A                           **
*******************************************************************************

0 - RETURN TO MAIN MENU
1 - POSITIONAL VELOCITY  [mm/s]  MIN:___ MAX:___ STANDARD:___
2 - DSE-CONTROL
    ( 0 = VECTOR , 1 = ANGLE )       _
3 - TOLERANCE-NAME
    ( COLUMN OF FIRST CHARACTER )    _
4 - OUTPUT-OPTIONS
    (1=STANDARD , 2=D(...) , 3=ALL)  _

5 - NOMINAL-ACTUAL-MODE (1-6)        _

TASK NO = 3

TOLERANCE-NAME
( COLUMN OF FIRST CHARACTER )    _
```

Task 4 (OUTPUT mode)

This output controls the output format for an OUTPUT file. This function is optional and only runs together with the **DMISOUT** software.

The generation of the OUTPUT file is activated by **DISPLY/...STOR**,**DMIS...** This means:

1 All features and tolerances are output in addition

2 All transformation matrixes are output in addition

3 All features, tolerances and coordinate systems are output in addition

If you require further information, please refer to the **DMISOUT** operating instructions.

```
*******************************************************************************
**                          D  M  E  -  D  A  T  A                           **
*******************************************************************************

0 - RETURN TO MAIN MENU
1 - POSITIONAL VELOCITY  [mm/s]  MIN:___ MAX:___ STANDARD:___
2 - DSE-CONTROL
     ( 0 = VECTOR , 1 = ANGLE )       _
3 - TOLERANCE-NAME
    ( COLUMN OF FIRST CHARACTER )     _
4 - OUTPUT-OPTIONS
    (1=STANDARD , 2=D(...) , 3=ALL)   _

5 - NOMINAL-ACTUAL-MODE (1-6)         _

TASK NO = 4

OUTPUT-OPTIONS
(1=STANDARD , 2=D(...) , 3=ALL)   _
```

Task 5 (Nominal-actual mode)

This function controls the output mode for the nominal-actual comparison. The user can work with performance modes, number scales and carbody mode. In addition to each mode, he can activate/deactivate whether the +/- sign should be taken in consideration.

Exaplanation:

1 Performance mode taking +/- sign into consideration

2 Performance mode without taking +/- sign into consideration

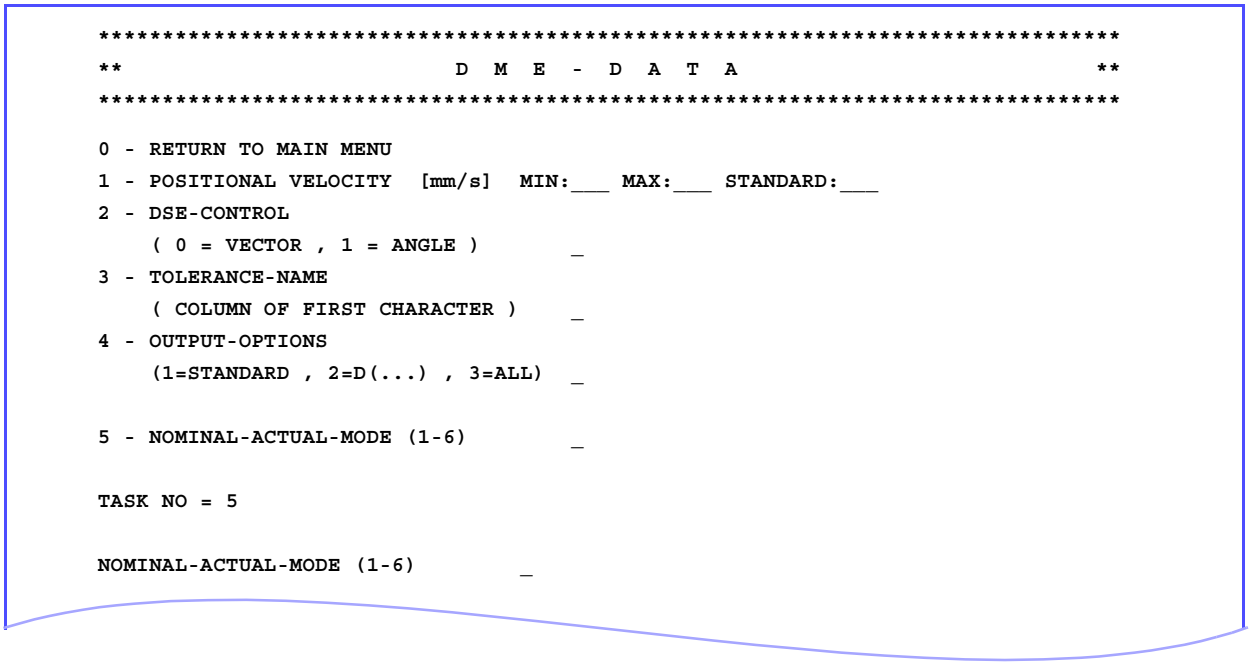
3 Number scale taking +/- sign into consideration

4 Number scale without taking +/- sign into consideration

5 Carbody mode taking +/- sign into consideration

6 Carbody mode without taking +/- sign into consideration

For further information, please refer to the UMESS operating instructions.



Chapter 8

Storage position for automatic change of probe configuration

With this selection, the configuration number and the distance in front of the rack to the respective storage position are defined. All the data on storage positions for the automatic probe configuration change is stored in a longterm file and is valid till it is entered.

The following menu is offered by selecting task no. 7 in the main menu:

```
*****************************************************************************
**                          SENSOR   DEPOSITION                            **
*****************************************************************************


0 - RETURN TO MAIN MENU

    CONF  DISTANCE         CONF  DISTANCE         CONF  DISTANCE
  A ____  _________      B ____  _________      C ____  _________
  D ____  _________      E ____  _________      F ____  _________
  G ____  _________      H ____  _________      I ____  _________
  J ____  _________      K ____  _________      L ____  _________
  M ____  _________      N ____  _________      O ____  _________

    ..........
    ..........

SENSOR DEPOSITION     (A...Z): _
SENSOR CONFIGURATION (1-9999): ____
DISTANCE BEFORE DEPOSITION   : ___________
```

NOTE

The number of storage positions offered depends on the input in the system data field.
First the selection of a storage position offered is requested by entering the corresponding letter (code letter of the magazine) (**SENSOR DEPOSITION (A...Z):**). If a zero is entered instead of a letter, or the input is simply confirmed with **<RETURN>**, the current menu is left and the main menu branched to (exit of menu offered).
If a storage position is offered (corresponding letter), the applicable probe configuration and distance before the magazine is requested:
SENSOR CONFIGURATION (1-9999):
DISTANCE BEFORE DEPOSITION:

Chapter 9

DMIS cycle

In the main menu the DMIS cycle is started by selecting task 1.

This chapter contains:

Loading the tables

The control tables required for the post processor are loaded with the first start.

```
*******************************************************************************
**                      D M I S   T A B L E S                                **
*******************************************************************************

 D M I S   T A B L E S
  SAVING SYMBOL TABLES ....
  SAVING TRANSFORMATION TABLES ....
  SAVING UMESS-FTN TABLES ....
```

The tables for the lexical and syntactical analysis of the DMIS file, conversion tables and tables for the generation of UMESS FTN control data are loaded in succession.

This loading procedure is only executed at the start of the first DMIS cycle and remains valid while the DMIS postprocessor is loaded in the computer. The processing of the DMIS file starts after the tables have been loaded.

Processing the DMIS File

Errors, warnings or messages during the conversion are displayed on the screen.

At the end of the processing of the DMIS file, the number of registered errors and warnings are output. If no error or warning has been discovered, no error documentation is created. The DMIS input file is run through twice for the twin column mode.

The DMIS cycle is concluded when the label file is created.

Chapter 10

Twin column mode

In the twin column mode, both columns work on the same object in a *common* coordinate system.

This chapter contains:

Preconditions for CNC run

- Rotational alignment of both columns when put into operation for the first time, then with decreasing alignment accuracy
- Translational alignment of both columns after each reference point travel of one or both columns

Conditions for DMIS postprocessor

Column 1 is generally the reference column. All evaluations and calculations such as coordinate system determination, linkings, nominal-actual comparisons, etc. take place here.

Both columns work in a common coordinate system.

Workpiece coordinates and control coordinates are adapted in this coordinate system.

Each coordinate system calibration shows a synchronisation point, i.e. the workpiece system determined with adaptation to the control coordinate system is transferred from column 1 to column 2. Measurements and evaluations are therefore realized in a common workpiece system with recall from the other column.

Synchronization points with a DMIS input file show the statements **SAVE** and **RECALL** with the determination or recall of a coordinate system.

ATTENTION!
In contrast to single column mode, **SAVE** is necessary here for the correct W-position determination, as otherwise the coordinate system is not transferred to column 2.

CNC run

The CNC run must be started with the column which contains the initialization of the intermediate file. The reference column is column 1.

The initialization of the intermediate file takes place on column 1 after the generation of the record header.

The run on column 2 can be started manually or via **<DI 3470>** (remote start) within the CNC run on column 1.

The postprocessor generates the control data line for the autostart of column 2 as default. If this is not desired, the corresponding control data lines must be masked or deleted. The user has to adapt these lines for his special environment (name allocation).

Preparations for the program start of the columns should be carried out analogous to the UMESS operating instructions for 2 column mode or remote control.

NOTE

The control commands for the remote start of column 2 are stored in a total of 10 control data lines, and can be recognized by the following texts: **DCLAN CMDRC**, **FDL DCLAN** and **LDL DCLAN**.

The following rule applies:

Individual information is stored consecutively and separated from one another by blank.

The following entries are stored:

Host computer name	14	Characters
User name	14	Characters
Password	14	Characters (encoded, or blank if does not exist)
Workpiece name + CatCode	50	Characters
Session number	14	Characters
Target directory	50	Characters (is ignored)
Target file name	14	Characters (is ignored)
Network services	2	Characters
Command	50	Characters (is ignored)
Remaining lines	10	Character (Blanks)

Chapter 11

Error documentation

This chapter contains:

General description

During the processing of the DMIS file, error messages, warnings and information may occur. Usually a plain text message appears immediately on the screen. All messages can be comprised in an error documentation.

An entry in the error documentation consists in general of three parts:

1 DMIS statement

2 Plain text message

3 Additional information

The DMIS statement to which the message refers is shown with line numbering for easier orientation.

The plain text message can be an error message, a warning or information.

With the error message (e.g. syntax error) the statement is usually not processed; otherwise the processing is displayed or the steps shown which the postprocessor has made to check or remove the error (e.g. cancellation of a **MEAS-ENDMES** block, if a new **MEAS** statement follows, but the old **MEAS** block has not yet been concluded with the **ENDMES** statement).

With warnings and information, an abnormal condition is only indicated; the processing of the statement is not interrupted.
The use of additional information is optional. It is composed of the error number, the control data address, the number of the control data line and the nesting depth.

The error number is only used internally (it does not have any meaning for the operator).

The address and number of the control data line are useful when looking for and eliminating an error in the measuring record and in control data correction. The last address and control data line since the message are displayed. The nesting depth limits the error location.

Depth 0 =	DMIS basic block
Depth 1 =	MEAS-ENDMES-block
Depth 2 =	GOTARG-ENDGO block
Depth 3 =	GOTARG-ENDGO block within a MEAS-ENDMES block

Example of an error documentation

```
*******************************************************************************
**                 E R R O R  -  D O C U M E N T A T I O N                   **
**                      U  M  E  S  S   -    F  T  N                         **
**                        DMIS POSTPROCESSOR REV. 2.13                       **
**                         (Version 2.13) 01.03.01                           **
*******************************************************************************

 Name of source:   WUERFEL.dmis
                   Workpiece name:  TESTWUERFEL1
                   Control data name: CNCdummy_____B
                   Date:  01.03.01        Time:    11:51:24
 +-----------------------------------------------------------------------+
        SCANNER-FILE:    Revision 2.13 01.03.01
        CONTROL-FILE:    Revision 2.13 01.03.01
 +-----------------------------------------------------------------------+
        (  54)  FROMM/ -40.0000,30.0000, 100.0000
        SYNTAXERROR Unknown syntax expression
        << No corresponding code number found when scanning >>
        ERROR NO.: 1183 CNC LINE:    Address 10:     1 Depth:     0
 -------------------------------------------------------------------------
        ( 254)  CONST/POINT,F(SPKT_KG_2),INTOF,FA(KREIS_1),FA(GERADE_2)
 Note: Section not clear (two intersection points possible)
        << Select 2nd intersection point with control data correction -> CNC
 CORR >>
        ERROR NO.: 1238 CNC LINE:   129  ADDRESS:    23 DEPTH:     0
```

Chapter 12

Appendix A

You will find the current CHARACTERIZATION FILE under
/home/zeiss/dmis/dokument/dmis_a.char

```
$$
$$                          CHARACTERIZATION FILE
$$                                  FOR
$$                              DMIS-POST
$$
$$                 Rev 2.13/05.94  for UMESS Rev 8.x
$$
$$    Reference:   DIMENSIONAL MEASURING INTERFACE STANDARD
$$                         DMIS Version 03/01
$$                     Specification CAM-I Standard 101
$$                              R-87-DMIS-01.1
$$
$$   Note:  The CHFILE represents the DMIS Statements supported by the DME, $$
and Information pertinent to the DME's capabilities. The syntax $$          rules that
apply in the CHFILE are specific.
$$           See DMIS 2.1 Section 14.0
$$
$$    (c) Copyright CARL ZEISS IMT Division 2001.
$$
$$    All  information  contained herein is the sole property  of  ZEISS. $$
Reproduction  of this  matter in  whole  or in  part  is  forbidden $$   without    the
express     written    consent    of     ZEISS. $$
$$
$$
CHFILE/INPUT
CHFIL1
ACLRAT/NONE
ALGDEF/NONE
BOUND/NONE
CALIB/[RTAB],RT(),FA(),[FA()]
$$ See Appendix A (Calibrate the rotary table)
CALL/NONE
CLMPID/NONE
CLMPSN/NONE
$$ The following format is currently being proposed by Zeiss as an enhancement $$
to DMIS. CONST/[POINT,CIRCLE,ARC,CONE,CYLNDR,LINE,PLANE,SPHERE,ELLIPS],F(),TR,FA()
CONST/FORMA,[CIRCLE,ARC,CONE,CYLNDR,LINE,PLANE,SPHERE,ELLIPS],F(),BF,FA(), $
[F(),FA()]
CONST/FORMB,LINE,F(),[PROJLI],FA() CONST/FORMB,LINE,F(),[MIDLI],FA(),[F(),FA()]
CONST/FORMC,PLANE,F(),MIDPL,FA(),[F(),FA()]
CONST/FORMD,POINT,F(),MIDPT,FA(),[F(),FA()]
CONST/FORMD,POINT,F(),PROJPT,FA(),[F(),FA()]
$$ [F(),FA()] must be a PLANE
CONST/FORMD,POINT,F(),VERTEX,FA()
CONST/FORMD,POINT,F(),MOVEPT,FA()
CONST/FORME,CIRCLE,F(),PROJCT,FA(),[F(),FA()]
$$ First FA() must be an ARC or CIRCLE second FA() must be a PLANE
CONST/FORMF,[CIRCLE,LINE,POINT],F(),INTOF,FA(),[F(),FA()]
CRGDEF/FULL
```

```
$$ See Appendix B (Use of CONST/FORMF)
CONST/FORMG,[LINE],F(),[PERPTO],FA(),THRU,[F(),FA()]
CUTCOM/NONE
DATDEF/FULL
DATSET/MCS
DATSET/DAT(),[XDIR,-XDIR,NDIR,YDIR,-YDIR,NYDIR,ZDIR,-ZDIR,NZDIR],      $
[XORIG,YORIG,ZORIG],NS
$$ See Appendix C (Establishing Coordinate Systems using DATSET)
DECL/NONE
DELETE/NONE
DISPLY/[OFF,PRINT,TERM,STOR],[DMIS,V()]
$$ Not all posibilities are supported (Restrictions by Measuring Software)
DMEHW/NONE
DMEID/NONE
DMESW/[COMAND]
DMESWI/NONE
DMESWV/NONE
DMIS/FULL
DMISMN/FULL
ELSE/NONE
ENDFIL/FULL
ENDGO/FULL
ENDIF/NONE
ENDMAC/NONE
ENDMES/FULL
ERROR/NONE
EVAL/FULL
$$ used like OUTPUT
FEAT/ARC,[INNER,OUTER],REAL,REAL,REAL,REAL,REAL,REAL,REAL,REAL,REAL,REAL,$
REAL,REAL
$$ reduced to a CIRCLE
FEAT/[CIRCLE,CONE,CYLNDR],[INNER,OUTER],[CART]
FEAT/ELLIPS,[INNER,OUTER],[CART],REAL,REAL,REAL,REAL,REAL,REAL,[MAJOR,MINOR],$
REAL,REAL,REAL,REAL
FEAT/GCURVE,[CART]
FEAT/GSURF,FULL
FEAT/LINE,[BND,UNBND],[CART]
FEAT/PARPLN,NONE
FEAT/PATERN,NONE
FEAT/[POINT,PLANE],[CART]
FEAT/RAWDAT,NONE
FEAT/RCTNGL,NONE
FEAT/SPHERE,[INNER,OUTER],[CART]
FEDRAT/[MESVEL,POSVEL],[MPM,IPM,PCENT,HIGH,SLOW],[REAL]
$$ The MESVEL and POSVEL are not supported on all CMM-Types.
$$ The maximum velocity is a CMM system parameter.
FILDEF/NONE
FILNAM/NONE
FINPOS/FULL
FIXTID/NONE
FIXTSN/NONE
FROM/FULL
GOHOME/FULL
GOTARG/FULL
GOTO/FULL
$$ The following command is currently being proposed by Zeiss as an enhancem$$ ent to
DMIS.
GOTO/[REAL,FA()],[SNVECT,SNROT,SNTILT],[REAL,FA()]
IF/NONE
JUMPTO/NONE
LITDEF/NONE
```

```
LOTID/NONE
MACRO/NONE
MEAS/[CIRCLE,CONE,CYLNDR,ELLIPS,GSURF,GCURVE,LINE,PLANE,POINT,SPHERE],$
,F(),[INTGR]
$$ See Appendix E ( Indicate the modes )
$$ The following command is currently being proposed by Zeiss as an enhancem$$ ent
to DMIS.
MEAS/[POINT,GSURF,GCURVE],F(),[INTGR],[GRIDPT,VECACT]
MFGDEV/NONE
MODE/FULL
OBTAIN/NONE
OPERID/NONE
OUTPUT/FA(),FA(),TA(),ENDSPT
OUTPUT/F(),F(),T(),ENDSPT OUTPUT/FA(),TA(),[TA()],[TA()],[TA()],[TA()],ENDSPT
OUTPUT/F(),T(),[T()],[T()],[T()],[T()],ENDSPT
PARTID/NONE
PARTRV/NONE
PARTSN/NONE
PLANID/NONE
PRCOMP/NONE                                          !!! always activated PREVOP/NONE
PROCID/NONE
PSTHRU/NONE
PTMEAS/[CART],REAL,REAL,REAL,[REAL,REAL,REAL]
RAPID/NONE
RECALL/FULL
REPORT/NONE
ROTAB/RT(),ABSL,SHORT,[ROTTOT,ROTORG,ROTNUL],REAL
ROTAB/RT(),INCR,[CW,CCW],[ROTTOT,ROTORG,ROTNUL],REAL
ROTATE/[XAXIS,YAXIS,ZAXIS],[REAL,FA(),F(),DAT()],[XDIR,YDIR,ZDIR],NS
ROTDEF/REAL,REAL,REAL,REAL,REAL,REAL,NS
ROTSET/FULL
SAVE/[D()]                  !!! all other entities are stored automatic SCNDEF/NONE
SCNGRF/NONE
SCNPOS/NONE
SNSDEF/PROBE,FIXED,CART,REAL,REAL,REAL,REAL,REAL,REAL,REAL,REAL
SNSDEF/PROBE,INDEX,POL,REAL,REAL,REAL,REAL,REAL,REAL,REAL,REAL
$$ where the last REAL is currently being proposed as an enhancement
$$ to DMIS.
$$ For more informations see appendix C2 and D
SNSET/[APPRCH,FORCE,RETRCT,SEARCH],REAL
SNSET/[CLRSRF,DEPTH],REAL
$$ The following SNSET formats are currently being proposed as an enhancement $$ to
DMIS.
SNSET/FORCE,REAL
SNSET/SETPNT,[REAL,REAL,REAL,REAL]
SNSLCT/S(),[CR()]
$$ see Appendix E (The statements between MEAS and ENDMES ) TECOMP/NONE
TEXT/[OPER,OUTFIL,MAN],FULL
THLDEF/NONE
TOL/[ANGL,DIAM],FULL

TOL/[CIRLTY,CYLCTY,FLAT],FULL
TOL/STRGHT,REAL,[RFS]
$$ Used for feature LINE
TOL/[PROFL,PROFS],REAL,REAL
$$ PROFL is used for feature GCURVE
$$ PROFS is used for features GSURF, GCURVE and POINT
TOL/CRNOUT,REAL,DAT()
TOL/TRNOUT,NONE
TOL/ANGLB,FULL
TOL/ANGLR,REAL,REAL,RFS,[F(),FA()] TOL/ANGLR,REAL,REAL,RFS,DAT(),RFS
```

```
TOL/DISTB,[NOMINL],REAL,REAL,REAL,[XAXIS,YAXIS,ZAXIS,PT2PT]
TOL/DISTB,[LIMIT],REAL,REAL,[XAXIS,YAXIS,ZAXIS,PT2PT]
$$ see Appendix D (Use of TOL/DISTB in the PT2PT specification)
TOL/PARLEL,REAL,RFS,[F(),FA()]
TOL/PARLEL,REAL,RFS,DAT(),RFS
TOL/PERP,REAL,RFS,[F(),FA()]
TOL/PERP,REAL,RFS,DAT(),RFS
TOL/COMPOS,NONE
TOL/CONCEN,FULL
TOL/CORTOL,[XAXIS,YAXIS,ZAXIS] TOL/POS,[2D,TWOD],REAL,RFS,DAT(),RFS
TOOLDF/NONE
TRANS/[XORIG,YORIG,ZORIG],[REAL,FA(),F(),DAT()],[CR()]
UNITS/[MM,INCH],[ANGDEC,ANGDMS]
VALUE/NONE
VFORM/ ALL
$$ only ALL is full supported
WINDEF/NONE
WKPLAN/[XYPLAN,YZPLAN,ZXPLAN]
$$ Appendix A:  Calibrate the rotary table
$$
$$ The Calibrate statement is used by ZEISS to define and activate the $$ location and
the orientation of the rotary table. The actual feature $$ specified in the statement
is directly in effect of the calibration, $$ without any more measurements.
$$
$$ By a statement with two features the location and the orientation  is $$ evaluated.
The following list of CALIB statements represents  all  of $$ possible ways in which
ZEISS supports this command.
$$ CALIB/RTAB,RT(),FA([cylndr,cone,line])
$$ CALIB/RTAB,RT(),FA([cylndr,cone,line]), FA([cylndr,cone,line)
$$ CALIB/RTAB,RT(),FA([circle,ellips]),FA(plane)
$$ CALIB/RTAB,RT(),FA(plane),FA([circle,ellips])
$$ Appendix B:  Use of CONST/FORMF
$$
$$ The following list of CONST statements represents the ways in which ZEISS $$
supports this command as it pertains to FORM F.
$$ CONST/CIRCLE,F(),INTOF,FA(plane),[FA(cylndr),F(cylndr)]
$$ CONST/CIRCLE,F(),INTOF,FA(plane),[FA(cone),F(cone)]
$$ CONST/CIRCLE,F(),INTOF,FA(plane),[FA(sphere),F(sphere)]
$$ CONST/LINE,F(),INTOF,FA(plane1),[FA(plane2),F(plane2)]
$$ CONST/LINE,F(),INTOF,FA(plane),[FA(cylndr),F(cylndr)]
$$ CONST/POINT,F(),INTOF,FA(line),[FA(plane),F(plane)]
$$ CONST/POINT,F(),INTOF,FA(line),[FA(circle),F(circle)]
$$ CONST/POINT,F(),INTOF,FA(circle),[FA(circle),F(circle)]
$$ CONST/POINT,F(),INTOF,FA(line1),[FA(line2),F(line2)]
$$ CONST/POINT,F(),INTOF,FA(line),[FA(cylndr),F(cylndr)]
$$ CONST/POINT,F(),INTOF,FA(line),[FA(cone),F(cone)]
$$ CONST/POINT,F(),INTOF,FA(line),[FA(sphere),F(sphere)]
$$ The first feature, FA(cylndr) or FA(cone), is interpreted as an axis line $$ in
following commands:
$$ CONST/POINT,F(),INTOF,FA(cylndr1),[FA(cylndr2),F(cylndr2)]
$$ CONST/POINT,F(),INTOF,FA(cylndr),[FA(plane),F(plane)]
$$ CONST/POINT,F(),INTOF,FA(cylndr),[FA(sphere),F(sphere)]
$$ CONST/POINT,F(),INTOF,FA(cone1),[FA(cone2),F(cone2)]
$$ CONST/POINT,F(),INTOF,FA(cone1),[FA(cylndr),F(cylndr)]
$$ CONST/POINT,F(),INTOF,FA(cone),[FA(sphere),F(sphere)]
$$ CONST/POINT,F(),INTOF,FA(cone),[FA(plane),F(plane)]
$$ The following command is currently being proposed by Zeiss to evaluate $$ a corner
point. The two actual points are interpreted similar as planes $$ with the coordinates
and the direction vector.
```

```
$$ The result is a point situated on the intersection line between the two $$ virtual
planes. The position on this line is defined by the position from $$ the nominal point
to FA(point1) and FA(point2).
$$ CONST/POINT,F(conerpt),INTOF,FA(point1),FA(point2)

$$ Appendix C:  Establishing Coordinate Systems using DATSET
$$ The following list of DATSET statements represents all of possible ways in $$ which
ZEISS supports this command.
$$ D() =DATSET/MCS
$$ D() =DATSET/DAT(),[XDIR,-XDIR,NXDIR]
$$ D() =DATSET/DAT(),[YDIR,-YDIR,NYDIR]
$$ D() =DATSET/DAT(),[ZDIR,-ZDIR,NZDIR]
$$ D() =DATSET/DAT(),XDIR,XORIG
$$ D() =DATSET/DAT(),XDIR,YORIG,ZORIG
$$ D() =DATSET/DAT(),YDIR,YORIG
$$ D() =DATSET/DAT(),YDIR,XORIG,ZORIG
$$ D() =DATSET/DAT(),ZDIR,ZORIG
$$ D() =DATSET/DAT(),ZDIR,XORIG,YORIG
$$ D() =DATSET/DAT(),ZDIR,DAT(),XDIR,DAT(),XORIG,DAT(),YORIG,DAT(),ZORIG $$ D()
=DATSET/DAT(),ZDIR,DAT(),YDIR,DAT(),XORIG,DAT(),YORIG,DAT(),ZORIG $$ D()
=DATSET/DAT(),ZDIR,ZORIG,DAT(),XDIR,DAT(),XORIG,DAT(),YORIG
$$ D() =DATSET/DAT(),ZDIR,ZORIG,DAT(),YDIR,DAT(),XORIG,DAT(),YORIG $$ D()
=DATSET/DAT(),ZDIR,XORIG,YORIG,DAT(),XDIR,DAT(),ZORIG
$$ D() =DATSET/DAT(),ZDIR,XORIG,YORIG,DAT(),YDIR,DAT(),ZORIG $$ D()
=DATSET/DAT(),ZDIR,ZORIG,DAT(),XDIR,YORIG,DAT(),XORIG $$ D()
=DATSET/DAT(),ZDIR,ZORIG,DAT(),YDIR,XORIG,DAT(),YORIG
$$ D() =DATSET/DAT(),YDIR,DAT(),XDIR,DAT(),XORIG,DAT(),YORIG,DAT(),ZORIG $$ D()
=DATSET/DAT(),YDIR,DAT(),ZDIR,DAT(),XORIG,DAT(),YORIG,DAT(),ZORIG $$ D()
=DATSET/DAT(),YDIR,YORIG,DAT(),XDIR,DAT(),XORIG,DAT(),ZORIG
$$ D() =DATSET/DAT(),YDIR,YORIG,DAT(),ZDIR,DAT(),XORIG,DAT(),ZORIG $$ D()
=DATSET/DAT(),YDIR,XORIG,ZORIG,DAT(),XDIR,DAT(),YORIG
$$ D() =DATSET/DAT(),YDIR,XORIG,ZORIG,DAT(),ZDIR,DAT(),YORIG $$ D()
=DATSET/DAT(),YDIR,YORIG,DAT(),XDIR,ZORIG,DAT(),XORIG $$ D()
=DATSET/DAT(),YDIR,YORIG,DAT(),ZDIR,XORIG,DAT(),ZORIG
$$ D() =DATSET/DAT(),XDIR,DAT(),YDIR,DAT(),YORIG,DAT(),ZORIG,DAT(),XORIG $$ D()
=DATSET/DAT(),XDIR,DAT(),ZDIR,DAT(),YORIG,DAT(),ZORIG,DAT(),XORIG $$ D()
=DATSET/DAT(),XDIR,XORIG,DAT(),YDIR,DAT(),YORIG,DAT(),ZORIG
$$ D() =DATSET/DAT(),XDIR,XORIG,DAT(),ZDIR,DAT(),YORIG,DAT(),ZORIG $$ D()
=DATSET/DAT(),XDIR,YORIG,ZORIG,DAT(),YDIR,DAT(),XORIG
$$ D() =DATSET/DAT(),XDIR,YORIG,ZORIG,DAT(),ZDIR,DAT(),XORIG $$ D()
=DATSET/DAT(),XDIR,XORIG,DAT(),YDIR,ZORIG,DAT(),YORIG $$ D()
=DATSET/DAT(),XDIR,XORIG,DAT(),ZDIR,YORIG,DAT(),ZORIG
$$ Appendix D : Use of TOL/DISTB in the PT2PT specification.
$$ The following list of EVAL statements represents the feature combinations $$ which
ZEISS supports.
$$ EVAL/FA([point,circle,arc,sphere]), FA([point,circle,arc,sphere]), T() $$
EVAL/FA([point,circle,arc,sphere]), FA([line,plane,cylndr,cone]), T() $$
EVAL/FA(line), FA([line,cone,cylndr]), T()
$$ EVAL/FA(plane), FA([plane]), T()
ENDCH1
CHFIL2
$$ Appendix E : Machine Dependent Parameters
$$
DMESWL/'UMESS-UX Rev 6.0'
DMETYP/CMM,1
          /RTAXIS,1
DMEAXS/XAXIS,1
          /YAXIS,1
          /ZAXIS,1
$$ The modes available for each supported MEAS option and the maximum
$$ number of points that can be used.
```

```
MEAS/FEAT,
            POINT,[AUTO,PROG,MAN],1
            CIRCLE,INNER,[AUTO],4
            CIRCLE,[PROG,MAN],10000
            CONE,[PROG,MAN],10000
            CYLNDR,[PROG,MAN],10000
            GSURF,[PROG],10000
            GCURVE,[PROG],10000
            LINE,[PROG,MAN],10000
            PLANE,[PROG,MAN],10000
            SPHERE,[PROG,MAN],10000
ENDAT
$$ The following statements may be issued between the MEAS and ENDMES
$$ statements:
$$
$$ GOTO,  PTMEAS, SCNSTA, SCNEND  and SNSLCT/S()
$$
$$ Note : This SNSLCT can be used in a measuring sequence, i.q. between MEAS $$ and
ENDMES, only if the new sensor has the same radius as the previous , $$ moreover, no
configuration can be changed in a measuring sequence.
ENDCH2
ENDCH
```

Chapter 13

Appendix B

This chapter contains:

B1 AUDIMESS ex. with central probe head

```
                    AUDIMESS-EXAMPLE WITH CENTRAL PROBE HEAD

DMISMN / 'ZF1'
V(PROT)= VFORM/ALL
DISPLY / PRINT, V(PROT)
FILNAM / 'ZF1.DMO'
UNITS  / MM,ANGDEC
MODE       / MAN
$$        +------------------------------------------------------------+
$$        I EXAMPLE  FOR THE MEASURING PROGRAMMING OF A MILLING TIME     I
$$        I USING CADMES; AUDIMEAS AND POSTPROCESSOR.                    I
$$        I                                                              I
$$        I                                                              I
$$        I KOMEG PUETTLINGEN, 01.03.2001                                I
$$        +------------------------------------------------------------+

$$ DEFINITION OF THE PROBE USED FOR TOOL ZFKOMBI
S(1_1          ) = SNSDEF / PROBE, FIXED, CART,    0.0000,    0.0000,     $
         -118.7500,    0.0000,    0.0000,   -1.0000,    1.5000,   25.7500
SNSET  / APPRCH,    7.00000
MODE       / PROG, MAN
SNSLCT / S(1_1       )
$$ DEFINITION OF CLEARING PLANE (*PLN4           )
GOTO       /    0.00000,    0.00000,50.00000
$$ DEFINITION OF CLEARING PLANE (*PLN3           )
GOTO       /    0.00000,    0.00000,10.00000
TEXT       / OUTFIL,'UPPER SURFACE AS REFERENCE SURFACE'
$$ COMMAND SEQUENCE FOR PLANE MEASUREMENT
F(F9           )= FEAT/ PLANE, CART, -104.00000,  -25.80385,    0.00000,  $
                  0.00000,    0.00000,    1.00000
MEAS       / PLANE , F(F9        ),   4
PTMEAS/CART,   11.40363,  -17.89034,    0.00000, 0.0000, 0.0000, 1.0000 PTMEAS/CART,
-3.71512,  -55.41236,    0.00000, 0.0000, 0.0000, 1.0000 PTMEAS/CART,  -95.67662,  -
32.15201,    0.00000, 0.0000, 0.0000, 1.0000 PTMEAS/CART,  -36.46397,   20.64034,
0.00000, 0.0000, 0.0000, 1.0000
ENDMES
$$ DEFINITION OF CLEARING PLANE (*PLN8           )
GOTO       /   -70.70000,  -70.00000,10.00000
GOTO       /   -70.70000,  -70.00000,   -9.00000
TEXT      / OUTFIL,'LOWER EDGE AS REFERENCE LINE'
$$ COMMAND SEQUENCE FOR LINE MEASUREMENT
F(L689      )= FEAT/ LINE,BND,CART,  -70.70000,  -60.20000,   -9.00000,$ -5.50000,  -
60.20000, -9.00000, 0.0000,-1.0000, 0.0000
MEAS       / LINE  , F(L689   ),   2
          PTMEAS/CART,  -70.70000,  -60.20000,   -9.00000,0.0000,-1.0000,0.0000
          PTMEAS/CART,   -5.50000,  -60.20000,   -9.00000,0.0000,-1.0000,0.0000
ENDMES
$$ DEFINITION OF CLEARING PLANE (*PLN3      )
GOTO       /    -5.50000,  -67.95000,10.00000
GOTO       /0.00000,    0.00000,10.00000
TEXT       / OUTFIL,'BORE AS XY-ZERO POINT'
$$ COMMAND SEQUENCE FOR  INNER CIRCLE MEASUREMENT
F(K520      )= FEAT/ CIRCLE, INNER, CART,    0.00000,    0.00000,      $ -2.00000,
0.00000,    0.00000,-1.00000,    6.00000
MEAS       / CIRCLE, F(K520   ),   4
SNSET  / APPRCH,    2.25000
```

```
    PTMEAS/CART,    3.00000,    0.00000,    -2.00000,    -1.0000,     0.0000,     0.0000
    PTMEAS/CART,    0.00000,   -3.00000,    -2.00000,     0.0000,     1.0000,     0.0000
    PTMEAS/CART,   -3.00000,    0.00000,    -2.00000,     1.0000,     0.0000,     0.0000
    PTMEAS/CART,    0.00000,    3.00000,    -2.00000,     0.0000,    -1.0000,     0.0000
ENDMES
GOTO      /0.00000,    0.00000,5.00000
TEXT      / OUTFIL,'W-POSITION DETERMINATION'
$$ 3D-FINE ALIGNMENT OF WORKPIECE
DATDEF / FA(F9    ), DAT(B)
DATDEF / FA(L689      ), DAT(C)
DATDEF / FA(K520      ), DAT(E)
D(M11       )= DATSET / DAT(B),  ZDIR, ZORIG,    $
                        DAT(C),  XDIR,     $
DAT(E)       , XORIG, YORIG
SAVE      / D(M11   )
GOTO      /   -24.00000,  -28.50000,5.00000
TEXT      / OUTFIL,'MEASUREMENT OF REMAINING BOREHOLES'
$$ COMMAND SEQUENCE FOR  INNER CIRCLE MEASUREMENT
F(K521      )= FEAT/ CIRCLE, INNER, CART,  -24.00000,  -28.50000,      $ -2.00000,
0.00000,    0.00000,-1.00000,    6.00000
MEAS      / CIRCLE, F(K521   ),   4
GOTO      /   -24.00000,  -28.50000,   -2.00000
    PTMEAS/CART,  -21.00000, -28.50000,    -2.00000,    -1.0000,     0.0000,     0.0000
    PTMEAS/CART,  -24.00000, -31.50000,    -2.00000,     0.0000,     1.0000,     0.0000
    PTMEAS/CART,  -27.00000, -28.50000,    -2.00000,     1.0000,     0.0000,     0.0000
    PTMEAS/CART,  -24.00000, -25.50000,    -2.00000,     0.0000,    -1.0000,     0.0000
ENDMES
GOTO      /   -24.00000,  -28.50000,  5.00000
GOTO      /   -72.20000,  -54.20000,  5.00000
GOTO/   -95.18287,     9.58526, 5.00000
SNSET / APPRCH,    5.00000


TEXT      / OUTFIL,'EVALUATION OF CIRCLE DIAMETER'
T(Q1        )= TOL / DIAM   , -0.0500,0.3000
OUTPUT / FA(K520), TA(Q1)
T(Q2        )= TOL / DIAM   , -0.0500,0.3000
OUTPUT / FA(K521), TA(Q2)
TEXT      / OUTFIL,'EVALUATION OF CIRCLE POSITIONS'
$$ EVALUATION OF CORTOL (ALONG THE AXES)
T(Q5        )= TOL / CORTOL, XAXIS, -0.2000,  0.2000
OUTPUT / FA(K521), TA(Q5)
T(Q6        )= TOL / CORTOL, YAXIS, -0.2000,  0.2000
OUTPUT / FA(K521), TA(Q6)
$$ POSITION TOLERANCE POSITION
DATDEF / FA(K520), DAT(AA)
DATDEF / FA(K520), DAT(B)
T(Q11       )= TOL / POS    ,2D,    0.20000,RFS,DAT(AA),RFS,DAT(B),RFS,
OUTPUT / FA(K521), TA(Q11)
TEXT      / OUTFIL,'MEASUREMENT OF SURFACES'
$$ COMMAND SEQUENCE FOR PLANE MEASUREMENT
F(F10       )= FEAT/ PLANE, CART,  -92.50000,   -1.00000,   -7.00000,  $
                  0.00000,    0.00000,1.00000
MEAS      / PLANE , F(F10        ),   4
    PTMEAS/CART,  -94.70982,    9.18541,    -7.00000,     0.0000,     0.0000,     1.0000
    PTMEAS/CART,  -94.74538,   -1.10491,    -7.00000,     0.0000,     0.0000,     1.0000
    PTMEAS/CART,  -92.09828,   -1.10441,    -7.00000,     0.0000,     0.0000,     1.0000
    PTMEAS/CART,  -92.35745,   11.25395,    -7.00000,     0.0000,     0.0000,     1.0000
ENDMES
```

```
GOTO  /   -92.35745,   11.25395,    5.00000
GOTO  /   -24.15647,   19.38464,    5.00000
$$ COMMAND SEQUENCE FOR PLANE MEASUREMENT
F(F11)= FEAT/ PLANE, CART,  -24.37743,   15.26333,   -7.00000,  $
            0.00000,    0.00000,1.00000
MEAS/ PLANE , F(F11       ),   4
PTMEAS/CART,  -24.61129,   19.32301,   -7.00000,    0.0000,    0.0000,    1.0000
PTMEAS/CART,  -23.93591,   14.42407,   -7.00000,    0.0000,    0.0000,    1.0000
PTMEAS/CART,   -8.84528,    5.11588,   -7.00000,    0.0000,    0.0000,    1.0000
PTMEAS/CART,   -5.75241,    8.41719,   -7.00000,    0.0000,    0.0000,    1.0000
ENDMES
GOTO/-5.75241,    8.41719,5.00000
TEXT/ OUTFIL,'EVALUATION OF SURFACE DEPTHS'


$$ EVALUATION OF DISTB (DISTANCE ALONG Z AXIS)
T(Q12 )= TOL / DISTB , NOMINL,7.00000, -0.1000,  0.1000, ZAXIS
OUTPUT / FA(F10    ), FA(F9), TA(Q12   )
$$ EVALUATION OF DISTB (DISTANCE ALONG Z AXIS)
T(Q13 )= TOL / DISTB , NOMINL,7.00000, -0.1000,  0.1000, ZAXIS
OUTPUT / FA(F11    ), FA(F9), TA(Q13   )
GOTO/-25.09491,  -53.61621,5.00000
$$ DEFINITION OF CLEARING PLANE (*PLN7           )
GOTO/-25.09491,40.00000,10.00000
GOTO/-25.09491,40.00000,   -9.00000
TEXT/ OUTFIL,'MEASUREMENT OF INCLINED EDGES'
$$ COMMAND SEQUENCE FOR LINE MEASUREMENT
F(L691 )= FEAT/ LINE,BND,CART,6.28286,2.24179,   -9.00000,$
20.00731,  -19.19251,-9.00000, 0.8422, 0.5392, 0.0000
MEAS/ LINE  , F(L691   ),   2
PTMEAS/CART,    6.28286,    2.24179,   -9.00000,    0.8422,    0.5392,    0.0000
PTMEAS/CART,   20.00731,   -19.19251,   -9.00000,    0.8422,    0.5392,    0.0000
ENDMES
TEXT/ OUTFIL,'EVALUATION OF ANGLES'
T(Q19 )= TOL / ANGLB ,   57.36843, -0.3000,  0.3000
OUTPUT / FA(L691      ), FA(L689), TA(Q19   )
$$ DEFINITION OF CLEARING PLANE (*PLN3           )
GOTO/24.84971,  -16.09191,10.00000
$$ DEFINITION OF CLEARING PLANE (*PLN3           )
GOTO/-14.66671,  -12.16654,5.00000
SNSET  / APPRCH,    3.00000
TEXT/ OUTFIL,'MEASUREMENT OF A GROOVE BASIC SURFACE'
$$ COMMAND SEQUENCE FOR PLANE MEASUREMENT
F(F13 )= FEAT/ PLANE, CART,  -65.35168,   -4.00000,   -9.00000,  $
 0.00000,    0.00000,1.00000
MEAS/ PLANE , F(F13   ),   5
PTMEAS/CART,  -14.48143,  -12.84376,   -9.00000,    0.0000,    0.0000,    1.0000
PTMEAS/CART,  -14.66384,   -1.37798,   -9.00000,    0.0000,    0.0000,    1.0000
PTMEAS/CART,  -33.37437,   10.13605,   -9.00000,    0.0000,    0.0000,    1.0000
PTMEAS/CART,  -56.07198,   10.03006,   -9.00000,    0.0000,    0.0000,    1.0000
PTMEAS/CART,  -63.20402,    0.92243,   -9.00000,    0.0000,    0.0000,    1.0000
ENDMES
GOTO  /       -63.20402,    0.92243,    5.00000
GOTO  /       -14.66671,  -12.16654,    5.00000
SNSET  / APPRCH,    1.00000
TEXT/ OUTFIL,'EVALUATION OF GROOVE DEPTH'
```

```
$$ EVALUATION OF DISTB (DISTANCE ALONG Z AXIS)
T(Q15       )= TOL / DISTB , NOMINL,    9.00000, -0.1000,  0.1000, ZAXIS OUTPUT /
FA(F13    ), FA(F9), TA(Q15   )
SNSET  / APPRCH,    3.00000
TEXT/ OUTFIL,'FLATNESS MEASUREMENT'
$$ COMMAND SEQUENCE FOR PLANE MEASUREMENT
F(F16       )= FEAT/ PLANE, CART,     14.50000,   -24.50000,    0.00000,  $
               0.00000,    0.00000,    1.00000
MEAS/ PLANE , F(F16  ),  12
PTMEAS/CART,  -19.60837,  -25.00284,    0.00000,    0.0000,    0.0000,    1.0000
PTMEAS/CART,  -23.71166,   -1.59764,    0.00000,    0.0000,    0.0000,    1.0000
PTMEAS/CART,  -48.69338,    5.42307,    0.00000,    0.0000,    0.0000,    1.0000
PTMEAS/CART,  -61.67181,  -25.23734,    0.00000,    0.0000,    0.0000,    1.0000
PTMEAS/CART,  -34.76340,  -37.82181,    0.00000,    0.0000,    0.0000,    1.0000
PTMEAS/CART,  -16.52786,  -42.87483,    0.00000,    0.0000,    0.0000,    1.0000
PTMEAS/CART,   12.10457,  -17.87906,    0.00000,    0.0000,    0.0000,    1.0000
PTMEAS/CART,  -35.66712,   15.89291,    0.00000,    0.0000,    0.0000,    1.0000
PTMEAS/CART,  -63.94331,   12.12459,    0.00000,    0.0000,    0.0000,    1.0000
PTMEAS/CART,  -86.79459,    3.31734,    0.00000,    0.0000,    0.0000,    1.0000
PTMEAS/CART,  -97.84792,  -31.02977,    0.00000,    0.0000,    0.0000,    1.0000
PTMEAS/CART,  -63.99293,  -47.90304,    0.00000,    0.0000,    0.0000,    1.0000
ENDMES
$$ DEFINITION OF CLEARING PLANE (*PLN4          )
GOTO  /       -63.99293,  -47.90304,   50.00000
$$ FORM TOLERANCE FLATNESS
T(Q21       )= TOL / FLAT  ,    0.05000
OUTPUT / FA(F16    ), TA(Q21)
ENDFIL
```

B2 Measurement example with DSE

```
                    MEASUREMENT EXAMPLE WITH DSE

DMISMN / 'TEST_DSE_INDEX'
V(PROT)= VFORM/ALL
DISPLY / PRINT, V(PROT), STORE, DMIS, COMM, DMIS
FILNAM / 'TECHNOMATIX.DMO'
UNITS  / MM,ANGDEC
MODE   / MAN


$$
$$                        | TILT-AXIS           Z |
$$                        .                       |  / X
$$     ------+            .                       | /
$$    SMC1   |                              Y     |/
$$           |_______/     .     |                -------*
$$           |       |     .     |
$$           |       |     .     |     ROT-AXIS
$$     --- - - - - - | - - - - | - ---
$$           |       |     .     |
$$           |       |     .     |
$$           |_______|     .     |
$$           |       |     .     |
$$           |        \__  .     |_________________
$$     -------            \_____________________|-----------o
$$                        .
$$                        .
$$                        |
$$
$$ PROBE DEFINITION
S(1_1)  = SNSDEF / PROBE, INDEX, POL,   90.0000,   90.0000,    0.0000, $
           0.0000,   -1.0000,  150.0000,    2.5000,   30.0000
S(1_3)  = SNSDEF / PROBE, INDEX, POL,  -90.0000,    0.0000,    1.0000, $
           0.0000,0.0000,  150.0000,    2.5000,   30.0000
S(1_4)  = SNSDEF / PROBE, INDEX, POL, 0.0000,    0.0000,    0.0000, $
          -1.0000,0.0000,  150.0000,    2.5000,   30.0000
S(1_5)  = SNSDEF / PROBE, INDEX, POL,  90.0000,    0.0000,   -1.0000, $
           0.0000,   0.0000,  150.0000,    2.5000,   30.0000
$$
$$                                    o 1_3
$$                                   /
$$          z ^   ^x                /
$$            |  /                 /
$$            | /                 *--------o 1_4
$$       y    |/                 /|
$$      <-----*                 / |
$$                             /  |
$$                        1_5  o  |
$$                               o 1_1
$$
$$
$$  used sensor positions (sensor 1_2 ist not possible) $$
$$ S(1_4) is identical with the sensor reference point $$

TEXT      / OPER  ,'START POINT:   X =0.0;   Y =   0.0;   Z = 100.0'
FROM      /    0.00000,0.00000,100.00000
MODE      / PROG, MAN
SNSLCT / S(1_3)
```

```
GOTO  /       0.00000,     0.00000,   50.00000
GOTO  /     -15.00000,    -3.00000,   50.00000
GOTO  /     -15.00000,    -3.00000,  -10.00000
F(F50 )= FEAT/ PLANE, CART,3.00000,  -13.00000,    0.00000,  $
              0.00000, 0.00000,   -1.00000
MEAS/ PLANE , F(F50  ),   4



GOTO           3.00000,   -13.00000,   -5.00000
PTMEAS/CART,   3.00000,   -13.00000,    0.00000,    0.0000,    0.0000,    -1.0000
GOTO  /        3.00000,   -13.00000,   -5.00000
GOTO  /        3.00000,    13.00000,   -5.00000
PTMEAS/CART,   3.00000,    13.00000,    0.00000,    0.0000,    0.0000,    -1.0000
GOTO  /        3.00000,    13.00000,   -5.00000
GOTO  /       -3.00000,    13.00000,   -5.00000
PTMEAS/CART,  -3.00000,    13.00000,    0.00000,    0.0000,    0.0000,    -1.0000
GOTO  /       -3.00000,    13.00000,   -5.00000
GOTO  /       -3.00000,  -13.00000,   -5.00000
PTMEAS/CART,  -3.00000,  -13.00000,0.00000, 0.0000,0.0000,-1.0000
GOTO  /       -3.00000,  -13.00000,   -5.00000
ENDMES
GOTO  /       -3.00000,  -13.00000,  -10.00000
GOTO  /      -15.00000,12.50000,0.90000
F(L328 )=  FEAT/  LINE,BND,   CART,  -5.00000,   12.50000,    0.90000,$
       -5.00000,  -12.50000,0.90000,  -1.0000,     0.0000,    0.0000
MEAS/ LINE  , F(L328  ),   2
GOTO  /      -10.00000,    12.50000,    0.90000
PTMEAS/CART,  -5.00000,    12.50000,    0.90000,   -1.0000,   0.0000,    0.0000
GOTO  /      -10.00000,    12.50000,    0.90000
GOTO  /      -10.00000,   -12.50000,    0.90000
PTMEAS/CART,  -5.00000,   -12.50000,    0.90000,   -1.0000,    0.0000,    0.0000
GOTO  /      -10.00000,   -12.50000,    0.90000
ENDMES
GOTO/        -15.00000,    -12.50000,    0.90000
GOTO/        -15.00000,    -12.50000,   15.00000
SNSLCT / S(1_1)
GOTO  /      -15.00000,     0.00000,    4.80000
F(P130 )= FEAT/ POINT, CART,4.50000,    0.00000,    4.80000,  $
-1.0000, 0.0000, 0.0000
MEAS/ POINT , F(P130  ),   1
PTMEAS/CART,4.50000,0.00000,4.80000,-1.0000,0.0000, 0.0000
ENDMES
GOTO  /     1.00000,    -30.00000,    4.80000
GOTO  /     8.00000,    -30.00000,    4.80000
F(P131      )= FEAT/ POINT, CART,8.00000,   -4.00000,    4.80000,  $
     0.0000,-1.0000,0.0000
MEAS/ POINT , F(P131),   1
GOTO  /       8.00000,    -9.00000,     4.80000
PTMEAS/CART,  8.00000,    -4.00000,     4.80000,    0.0000,    -1.0000,     0.0000
GOTO  /       8.00000,    -9.00000,     4.80000
ENDMES
$$ DEFINITION FOR COORDINATE SYSTEM:  SPACE AXIS
DATDEF / FA(F50    ), DAT(A)
$$ DEFINITION FOR COORDINATE SYSTEM:  PLANE ROTATION
DATDEF / FA(L328      ), DAT(B)
$$ DEFINITION FOR COORDINATE SYSTEM: ZERO POINT
DATDEF / FA(P130      ), DAT(C)
DATDEF / FA(P131      ), DAT(D)
D(M21       )= DATSET / DAT(A), -ZDIR, ZORIG,$
DAT(B), -YDIR,$
DAT(C), XORIG,$
DAT(D), YORIG
```

```
$$ DEFINITION FOR COORDINATE SYSTEM: ZERO POINT TRANSLATION
D(M22       )= TRANS  / XORIG,    -4.50000,$
YORIG,     4.00000,$
ZORIG,     0.00000
SAVE/ D(M22   )
GOTO  /      8.00000,   -30.00000,    4.80000
GOTO  /     35.00000,   -30.00000,    4.80000
GOTO  /     35.00000,     3.40000,    5.30000
F(P135      )= FEAT/ POINT, CART,15.90000,    3.40000,    5.30000,  $
                1.0000, 0.0000,0.0000
MEAS/ POINT , F(P135),   1
GOTO  /20.00000,3.40000,5.30000
PTMEAS/CART, 15.90000,     3.40000,    5.30000,    1.0000,    0.0000,    0.0000
GOTO  /      20.00000,     3.40000,    5.30000
ENDMES
GOTO  /      19.40000,    30.00000,    5.30000
GOTO  /      12.00000,    30.00000,    3.80000
F(P132      )= FEAT/ POINT, CART,12.00000,    4.00000,    3.80000,  $
     0.0000, 1.0000,0.0000
MEAS/ POINT , F(P132),   1
GOTO  /      12.00000,     9.00000,     3.80000
PTMEAS/CART, 12.00000,     4.00000,     3.80000,    0.0000,    1.0000,    0.0000
GOTO  /      12.00000,     9.00000,     3.80000
ENDMES
GOTO  /      12.00000,     7.50000,    15.00000
GOTO  /       6.50000,     2.00000,    15.00000


F(F51       )= FEAT/ PLANE, CART, 8.00000,    2.50000,    5.70000,  $
                0.00000,    0.00000,    1.00000
MEAS/ PLANE , F(F51 ),   6
GOTO  /         8.00000,    2.50000,   11.00000
PTMEAS/CART,    8.00000,    2.50000,    5.70000,    0.0000,    0.0000,    1.0000
GOTO  /         8.00000,    2.50000,   11.00000
GOTO  /        14.40000,    2.50000,   11.00000
PTMEAS/CART,   14.40000,    2.50000,    5.70000,    0.0000,    0.0000,    1.0000
GOTO  /        14.40000,    2.50000,   11.00000
GOTO  /        14.40000,    0.00000,   11.00000
PTMEAS/CART,   14.40000,    0.00000,    5.70000,    0.0000,    0.0000,    1.0000
GOTO  /        14.40000,    0.00000,   11.00000
GOTO  /         8.00000,    0.00000,   11.00000
PTMEAS/CART,    8.00000,    0.00000,    5.70000,    0.0000,    0.0000,    1.0000
GOTO  /         8.00000,    0.00000,   11.00000
GOTO  /         8.00000,   -2.50000,   11.00000
PTMEAS/CART,    8.00000,   -2.50000,    5.70000,     0.0000,    0.0000,    1.0000
GOTO  /         8.00000,   -2.50000,   11.00000
GOTO  /        14.40000,   -2.50000,   11.00000
PTMEAS/CART,   14.40000,   -2.50000,    5.70000,    0.0000,    0.0000,    1.0000
GOTO  /        14.40000,   -2.50000,   11.00000
ENDMES
GOTO  /        14.40000,   -2.50000,   15.00000
GOTO  /        -2.00000,   -8.40000,   15.00000
F(P136      )= FEAT/ POINT, CART,   -2.00000,   -8.40000,    1.80000,  $
                0.0000, 0.0000, 1.0000
MEAS/ POINT , F(P136 ),   1
GOTO  /        -2.00000,   -8.40000,    5.00000
PTMEAS/CART,   -2.00000,   -8.40000,    1.80000,    0.0000,    0.0000,    1.0000
GOTO  /        -2.00000,   -8.40000,    5.00000
ENDMES
```

```
GOTO  /     -2.00000,    -8.40000,    15.00000
GOTO  /      2.00000,   -15.00000,    15.00000
F(K952      )= FEAT/ CIRCLE, INNER, CART,    0.00000,  -15.00000,      $
               0.90000,    0.00000,    0.00000,    -1.00000,    5.00000
MEAS  / CIRCLE, F(K952 ),   4
GOTO  /      0.00000,    -15.00000,    0.90000
PTMEAS/CART, 2.50000,    -15.00000,    0.90000,    -1.0000,    0.0000,    0.0000
PTMEAS/CART,-2.50000,    -15.00000,    0.90000,     1.0000,    0.0000,    0.0000
GOTO  /      0.00000,    -15.00000,    0.90000
PTMEAS/CART, 0.00000,    -17.50000,    0.90000,     0.0000,    1.0000,    0.0000
PTMEAS/CART, 0.00000,    -12.50000,    0.90000,     0.0000,   -1.0000,    0.0000
GOTO  /      0.00000,    -15.00000,    0.90000
ENDMES
GOTO/        0.00000,    -15.00000,    15.00000
GOTO/        0.00000,     15.00000,    15.00000


F(K953)= FEAT/ CIRCLE, INNER, CART,     0.00000,    15.00000,      $
    0.90000,    0.00000,    0.00000,    -1.00000,    5.00000
MEAS/ CIRCLE, F(K953      ),   4
GOTO  /     0.00000,15.00000,0.90000
PTMEAS/CART,   2.50000,   15.00000,     0.90000,   -1.0000,    0.0000,    0.0000
PTMEAS/CART,  -2.50000,   15.00000,     0.90000,    1.0000,    0.0000,    0.0000
GOTO  /        0.00000,   15.00000,     0.90000
PTMEAS/CART,   0.00000,   12.50000,     0.90000,     0.0000,    1.0000,   0.0000
PTMEAS/CART,   0.00000,   17.50000,     0.90000,     0.0000,   -1.0000,   0.0000
GOTO  /        0.00000,   15.00000,     0.90000
ENDMES
GOTO/          0.00000,   15.00000,    15.00000
$$ FEATURE CONSTRUCTION
F(P137)= FEAT/ POINT, CART,0.00000,   0.00000,   0.90000,    $
0.00000,    0.00000,   -1.00000
CONST  / POINT, F(P137      ), MIDPT, FA(K952), FA(K953      )
$$ TOLERANCE COORDINATES
T(QX1)= TOL / CORTOL, XAXIS, -0.1000,  0.1000
T(QY1)= TOL / CORTOL, YAXIS, -0.1000,  0.1000
OUTPUT / FA(P137), TA(QX1), TA(QY1   )
$$ TOLERANCE DISTANCE EVALUATION
T(Q1)= TOL / DISTB , NOMINL,    0.00000, -0.1000,  0.1000, PT2PT
OUTPUT / FA(K952), FA(K953), TA(Q1   )
T(Q2)= TOL / DISTB , NOMINL,    9.00000, -0.1000,  0.1000, PT2PT
OUTPUT / FA(P131), FA(P132), TA(Q2   )
T(Q3)= TOL / DISTB , NOMINL,   12.00000, -0.1000,  0.1000, PT2PT
OUTPUT / FA(P135), FA(P130), TA(Q3   )
$$ TOLERANCE DIAMETER
T(Q4)= TOL / DIAM  , -0.1000,  0.1000
OUTPUT / FA(K953), TA(Q4)
$$ TOLERANCE FLATNESS
T(Q5)= TOL/FLAT  ,0.01000
OUTPUT / FA(F51),TA(Q5        )
$$  END OF PROGRAM
ENDFIL
_&l0S
```

Index