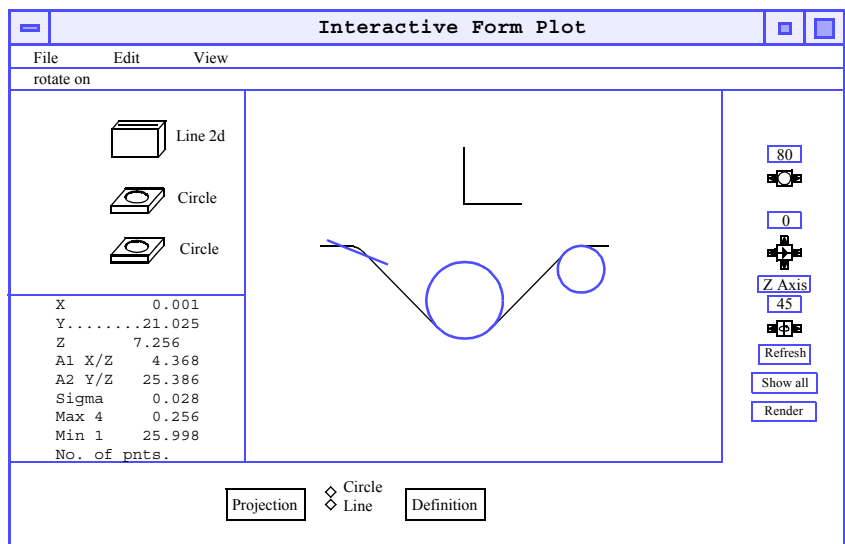


UMESS

UMESS Option 20 Interactive Contour Graphics for UNIX and LINUX



Operating Instructions



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Preface

The following operating instructions describe the function, operation and application possibilities of the **Opt. 20 Interactive Contour Graphics** measuring program.

It is assumed that the user is familiar with and able to start the corresponding basic software. Please read these operating instructions and the general safety information before starting operation of the measuring machine. Always store the pertaining machine documentation included in delivery in a location where it is readily available for use.

All rights pertaining to changes in the version and scope of the CMM, the software and the corresponding machine documentation are 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.



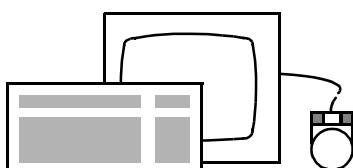
The **Note** symbol is shown next to important text and helpful additional information.

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:



<u>DI</u>	<u>Pull-down menu</u>	<u>Pictogram</u>
1132		

File name

Symbol for softkey

Reference to softkeys in dialogs.

Overview of chapters

This manual describes the function, operation and application possibilities of the UMESS Option 20 measuring program.

The following subjects are described:

- *Chapter 1 "Introduction" on page 1-1 <Default Pa>*
- *Chapter 2 "User interface" on page 2-1 <Default Pa>*
- *Chapter 3 "Operation" on page 3-1 <Default Pa>*

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Chapter



Introduction

This chapter contains:

System Requirements	1-2
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Proper use	1-4

System Requirements

Hardware

The system on which this option is installed should meet the following hardware requirements

RAM capacity at least 32 MB and preferably 64 MB

Hard disk capacity at least 1 GB

Printer

Graphics are output to the printer in a different manner than in UMESS. For this reason, the printer must be reinstalled. Please check the printer selection table (► *"Printer Selection Table" on page 3-11*) to determine which printers are suitable.

Software

Two utility programs are automatically installed along with the Opt. 20 software (VisualWorks, acis2).

User requirements

UMESS

The following operating instructions are designed as a supplement to the UMESS operating instructions. For this reason, it is assumed that the reader already possesses basic knowledge of software operation. If necessary, please consult the UMESS operating instructions for additional information.

The following information should be available:

- Operating levels
- Mouse functions
- How to use and adjust the windows
- Operation of UMESS

Proper use

Opt. 20

The first thing you will require is a data file containing e.g. scanned contours. The measuring points will be projected onto a two-dimensional plane.

These data are displayed in three-dimensional form by Opt. 20 in the graphics window. The 3D display can be modified as wanted by the user. The following monitor control functions are available to the user for this purpose

- Zoom
- Displacement
- Rotation around all three axes

A rectangular lasso can be created with the mouse in the graphics window. The measuring points thus selected serve as a basis for calculating the geometric elements.

The following geometric elements can be generated:

- Circle
- Line

Information on the position of the geometric elements is provided both in graphic and numeric form.

Result, data

Graphic data are displayed in the graphics window. Numeric data are displayed depending on the geometric elements.

Numeric Data

Displayed Symbols	Significance	Circle	Line
X, Y, Z	Coordinates	Two coordinates	Three coordinates
D	Diameter	Yes	
A1 ?/? (? = axis)	Angle from ?/? surface		Yes
A2 ?/? (? = axis)	Angle from ?/? surface		Yes
Sigma	Standard deviation	Yes	Yes
Max ? (? = meas. point)	Maximum deviation of geometric element from a selected point	Yes	Yes
Min ? (? = meas. point)	Minimum deviation of geometric element from a selected point	Yes	Yes
No. of points	Number of measuring points selected for use in calculating the geometric element	Yes	Yes

Several different geometric elements can be displayed simultaneously in the graphics window. The numeric data always refers to the marked element.

Printing

The contents of the graphics window can be printed out on a connected printer.

Data transfer

The geometric element data are available for further processing as soon as Opt. 20 is terminated,

Chapter

2

User interface

This chapter contains:

Dialog and Interactive Form Plot Windows	2-2
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Structure of Interactive Form Plot Window	2-5

Dialog and Interactive Form Plot Windows

Data files are selected for processing in the dialog window. The desired measuring points from each data file and step length can be entered.

The interactive form plot window is the working level, i.e. the level where

- The data file is graphically displayed,
- Measuring points are selected for geometric reconstruction and
- The generated geometric elements are displayed.

Structure of Dialog Window

Dialog				
Recall of point quantities for reconstructing geometric elements				
1	File name	From point No.	To point No.	Step length
	CONTOUR	1	999	1
		1	1	1
		1	1	1
		1	1	1
		1	1	1
2			*	
			COORD	TERMIN
	RETURN			INFO

The dialog window is subdivided into the following areas:

1 File selection field

Input of data file to be used to reconstruct a geometric element.

2 Softkeys

The function assigned to these command input keys can be varied.

File selection field

File name

Used to enter the name of the file you would like to graphically display.

From point number

Enters point number from which you would like the selected file to begin.

To point number

Used to enter the last point number from the selected file you would like to use. The default value is the maximum possible point number.

Step length

Enters step length to be used between the defined point numbers.

NOTE

You may select up to five files simultaneously. The (selected) files will automatically be converted to a continuous scanning path which will then be displayed in the graphics window.
For this reason, please use only one file wherever possible.

Softkeys

RETURN

Press to quit mask without starting function.

COORD

Used to specify the spatial extent of the file in X, Y and Z in the file selection field.

PNT NO

Triggers display of the file name, point numbers and selected step length in the file selection field.

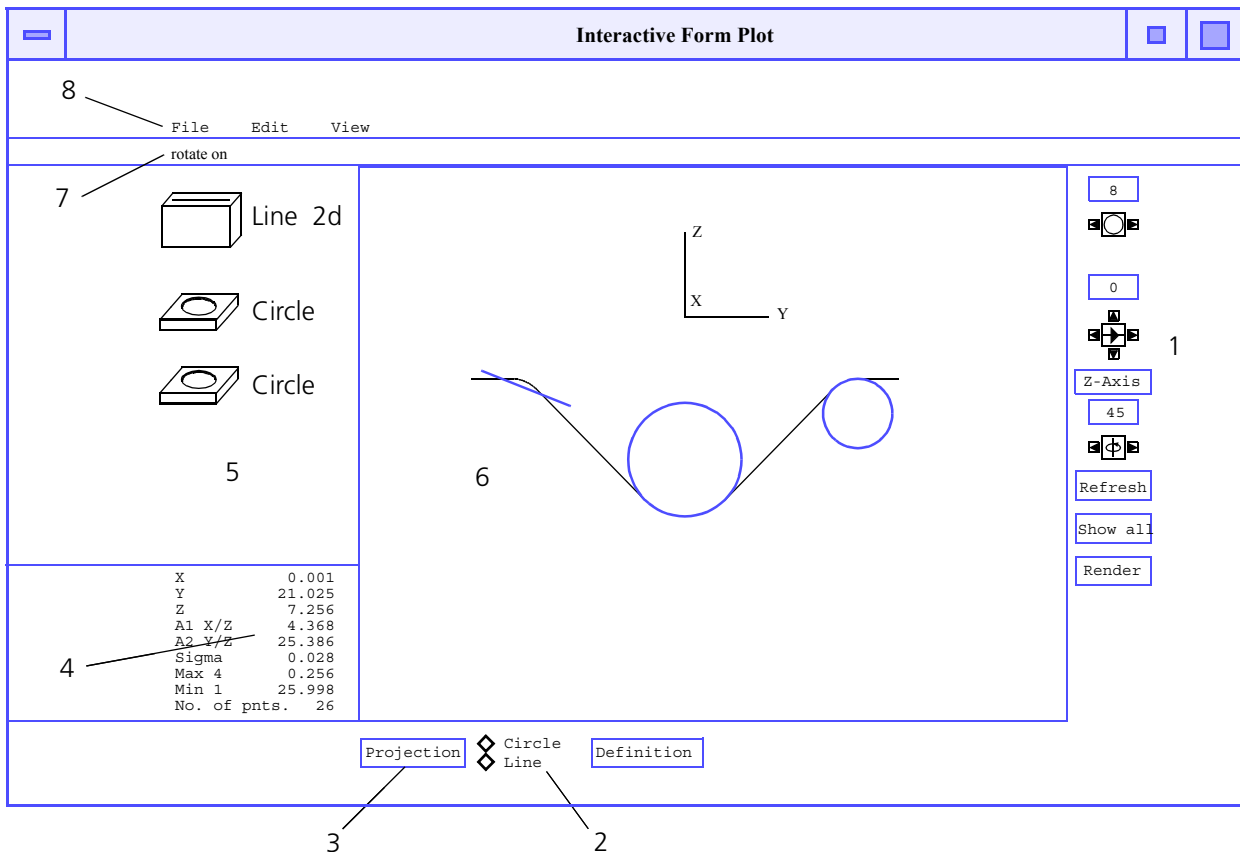
TERMIN

Triggers execution of function with specified values.

INFO

This softkey is unassigned. Return to the dialog window takes place through the **<RETURN>** softkey.

Structure of Interactive Form Plot Window



It contains the following areas:

1 Graphic manipulation routines

Graphic manipulation routines can be used for the contents of the graphics window to be

- rotated,
- moved or
- zoomed.

2 Preselection of geometric elements

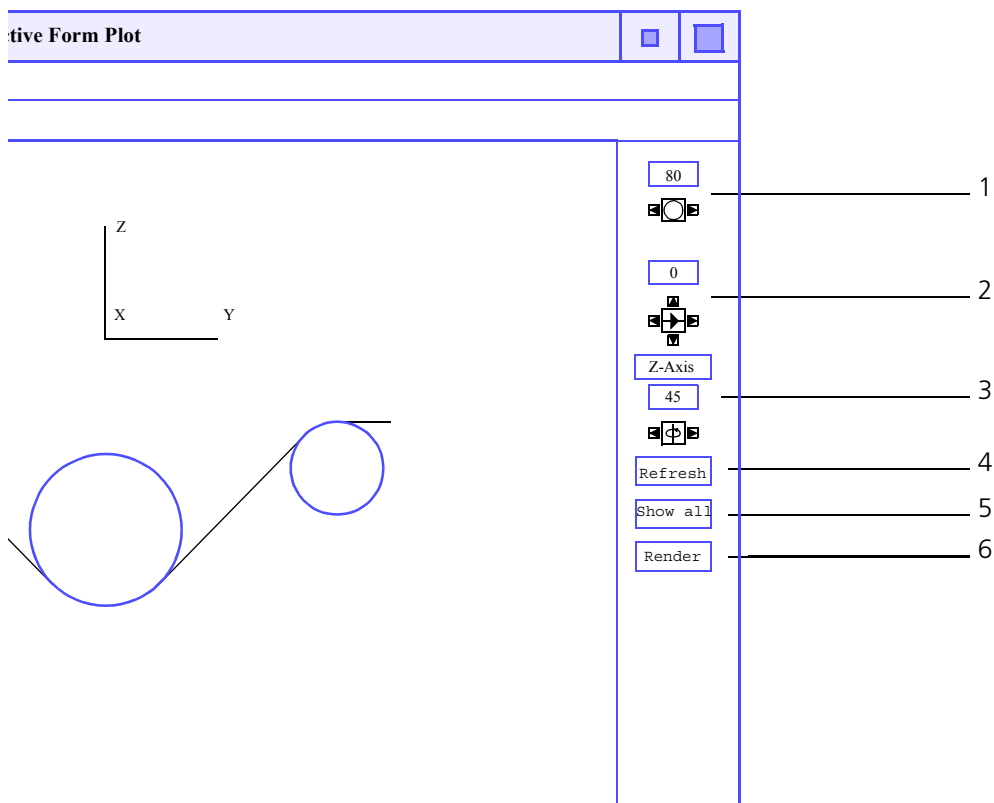
Required to define geometric elements.

3 Projection of perspectives

Required to define perspectives.

- 4** Numeric data of geometric elements
The numeric data of the marked geometric element are displayed here.
- 5** List of geometric elements
Previously defined geometric elements are displayed here.
- 6** Graphics window
The data file and geometric elements are displayed here.
- 7** Information line
Status information is displayed here.
- 8** Menu line
Contains the basic functions of the interactive form plot window.

Graphic Manipulation Routines



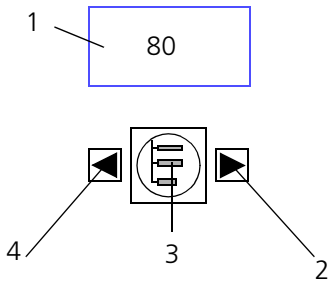
You can use the graphic manipulation routines to:

- 1 Zoom in/out on the geometric model
- 2 Move the geometric model
- 3 Rotate the geometric model around its own axis
- 4 Redraw the geometric model
- 5 Display the surface
- 6 Display the complete geometric model

Zooming the Geometric Model In/Out

You can increase or decrease the zoom factor of the geometric model in steps.

Each time one of the arrows is clicked on, the geometric model will be zoomed in or out one step.



- 1 The zoom steps can be entered as a numeric value in the numeric field.

NOTE

Any number desired may be entered in the numeric field. Only inputs of 10-80 and 120-1000 make sense, since inputs close to 100 alter the display of the workpiece only slightly.

- 2 By actuating the right arrow button (pointing to the right) with a numeric reading of
 - smaller than 100 you zoom out from the geometric model.
 - greater than 100 you zoom in on the geometric model.
- 4 With the left arrow button (pointing to the left) with a numeric reading of
 - smaller than 100 you zoom in on the geometric model.
 - greater than 100 you zoom out from the geometric model.

Magnified Display of Sections

You can use the magnifier or zoom function to magnify sections of the geometric model.

- 3 Click on the button with the magnifier symbol.
 - Then click in the graphics window with the left mouse button near the area you want to magnify and hold the mouse button down. The shape of the cursor changes to a cross.
 - If you then move the mouse, a square “lasso” will result. Move the mouse until the square encloses the area you want to magnify.
 - If you then let go of the mouse button, the area surrounded by the square will appear as a full-format zoom display, i.e. the smaller the square surrounding the area, the larger the automatically resulting zoom factor.

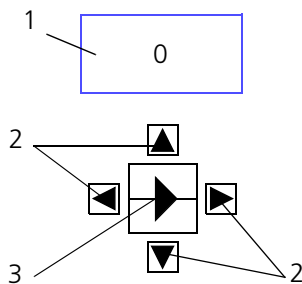
NOTE

The magnifier or zoom function can be used several times in succession by selecting an area for magnification from the section you have just zoomed.

Moving the Geometric Model

You can move the geometric model in the working area:

- Randomly with the mouse



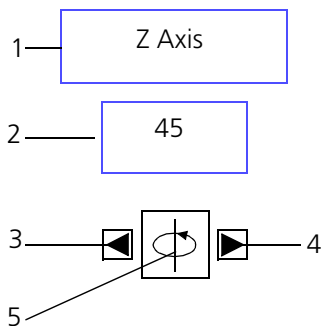
- 1 The numeric field is unassigned.
- 2 The control buttons (arrow symbols) are unassigned.

NOTE

You can enter numbers in the numeric field and actuate the arrow buttons. However these functions will have no effect on the geometric model.

Moving the geometric model with the mouse

- 3 Activate the button with the arrow symbol. Click on any point in the geometric model with the left mouse button and hold the left mouse button down. If you move the mouse, the geometric model will also move in the same direction.



Rotating the Geometric Model Around Axes

You can rotate the geometric model around any 3D axis.

The geometric model can be rotated

- In angular steps
- Randomly with the mouse

Rotating the Geometric Model in Angular Steps

- 1** Select the axis around which the geometric model is to be rotated from the menu.
- 2** Enter the desired angular step (in degrees)
Each time an arrow button is actuated (3 and 4) the geometric model turns one angular step.
- 3** Using the left arrow button (pointing left), you can rotate the geometric model clockwise around the selected axis.
- 4** Using the right arrow button (pointing right), you can rotate the geometric model anti-clockwise around the selected axis.

Rotating the Geometric Model with the Mouse

- 5** Activate the button with the rotation symbol.
Click on any point in the geometric model with the left mouse button and hold the left mouse button down. If you move the mouse, the geometric model will rotate around the selected axis (1) in the same direction.

Refresh

Refreshing the Display of the Geometric Model

You can "refresh" the screen display of the geometric model by activating this button.

Render

Displaying surfaces

This function is not practical.

Its designated purpose is to switch from a line display to a surface display. Since the software can display only two-dimensional data files, no practical use of this option is available.

If you nevertheless activate this button, all lines will be cleared. If you then select **<Refresh>** or **<Show all>** the lines will re-appear.

Show all

Displaying the Entire Geometric Model

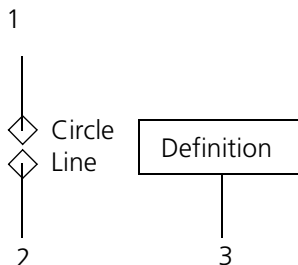
You can display all elements of the selected geometric model including the coordinate axes:

Activate the **<Show all>** button. All elements including the coordinate axes will then appear on a full-format display.

Preselection of Geometric Elements

This function is used to designate the geometric element you would like to reconstruct.

Select the desired element from the menu.



1 Circle (Circle)

2 Line (Line)

Reconstruction of Geometric Elements

The **<Definition>** function can be used to select the measuring points required for reconstruction of geometric elements.

3 Activate the **<Definition>** button.

Definition

Then click in the graphics window with the left mouse button near the area from where you want to select the measuring points and hold the mouse button down.

The shape of the cursor changes to a cross.

If you then move the mouse, a square "lasso" will appear in the direction of mouse travel. Move the mouse in the direction required to "lasso" the measuring points you need for reconstruction.

If you now let go of the mouse button, the measuring points thus selected will be used to reconstruct a geometric element. The reconstructed geometric element will then be displayed in the graphics window in bright blue.

NOTE

The **<Definition>** function can be used several times in succession.

Projection of Perspectives

Projection

You can select the view of the geometric model you want to display. Or the perspective from which it should be displayed.

Perspective

+X persp.

-X persp.

+Y persp.

-Y persp.

+Z persp.

-Z persp.

Numeric Data of Geometric Elements

The numeric data of a marked geometric element are displayed. They cannot be changed or corrected. The following data is available depending on the geometric element marked.

X	0.001
Y	21.025
Z	7.256
A1 X/Z	4.368
A2 Y/Z	25.386
Sigma	0.028
Max 4	0.256
Min 1	25.998
No. of pnts	26

Numeric Data

Displayed Symbols	Meaning	Circle	Line
X, Y, Z	Coordinates	Two coordinates	Three coordinates
D	Diameter	Yes	
A1 ?/? (? = axis)	Angle from ?/? surface		Yes
A2 ?/? (? = axis)	Angle from ?/? surface		Yes
Sigma	Standard deviation	Yes	Yes
Max ? (? = meas. point)	Maximum deviation of geometric element from a selected measuring point	Yes	Yes
Min ? (? = meas. point)	Minimum deviation of geometric element from a selected measuring point	Yes	Yes
No. of pnts	Number of measuring points selected to reconstruct geometric element	Yes	Yes

Display of Numeric Data

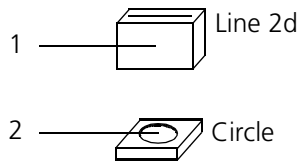
- Mark a geometric element in the list of geometric elements .
- The selected geometric element is highlighted in gray.

NOTE

– The numeric data are displayed.

The numeric data can be output in a UMESS protocol.

List of Geometric Elements



All reconstructed geometric elements are displayed as a symbol in the list.

- 1 Line (Line)
- 2 Circle (Circle)

Marking Geometric Elements

- Click on the geometric element you want to mark.
- The marked geometric element is highlighted in gray.

NOTE

Only one geometric element can be marked at a time.

Information Line

The information line provides information on current menus or input fields and a status display.

Menu Line

The menu line contains functions which can be executed immediately.

File

Terminate

You can use this button to quit the program. The data of the geometric elements will be output in a UMESS protocol.



ATTENTION!

No confirmation query appears.

Cancel

You can use this button to quit the program. The data from the geometric elements will not be saved.



ATTENTION!

No confirmation query appears.

Print

Option 20 is programmed as a Smalltalk application. The Shared Print software is required for printing. The software must be installed prior to initial use (➤ *"Installing a Printer" on page 3-9*).

You can use this button to print the contents of the graphics window.

Edit

Delete

You can delete individual geometric elements.

- Mark a geometric element in the list of geometric elements.



ATTENTION!

- Activate the **<Delete>** button.
- The marked geometric element is deleted. No confirmation query appears.

View

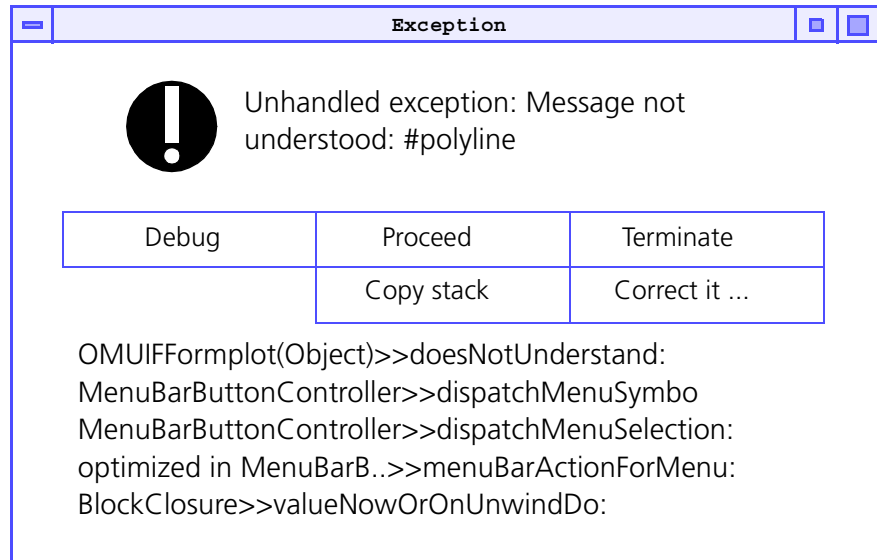
Full Circle

This button is unassigned, e.g. has no function.

Polyline

This button is unassigned.

If it is nevertheless actuated, the following error message may appear:



- Activate the **<Terminate>** button.
- The error message is then cleared.

Used points

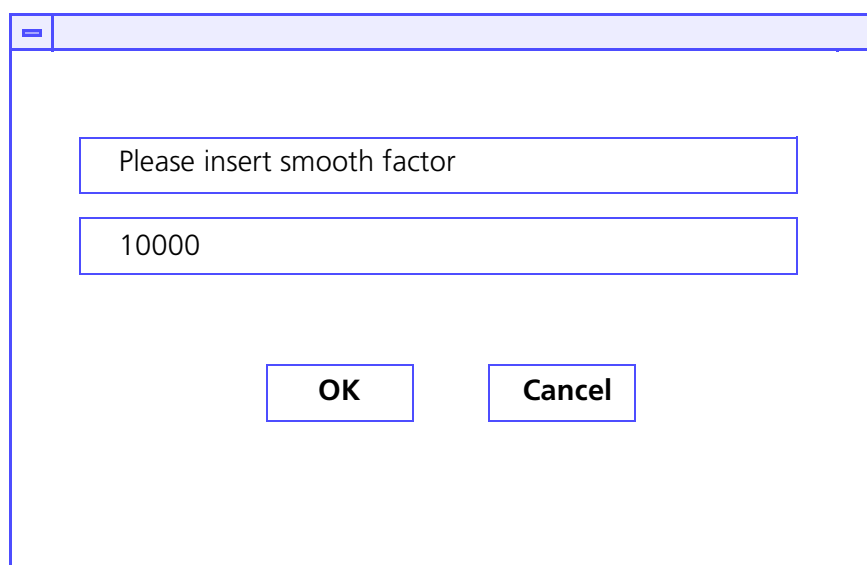
This button is unassigned.

If it is nevertheless actuated, the **Exception** error message may appear. The error can then be eliminated in the same manner as after pressing the **<Polyline>** button.

Smooth factor

The smooth factor is used to smooth the data file. The smaller the value entered, the smoother the data file will be, i.e. the more it will deviate from the actual points.

- Activate the **<Smooth factor>** button.
- The following window then opens:



A screenshot of a software dialog box. The dialog box has a title bar with a minus sign. Inside, there is a text input field with the placeholder text "Please insert smooth factor". Below this, the value "10000" is entered. At the bottom of the dialog box, there are two buttons: "OK" and "Cancel".

- Enter value of smooth factor.
 - Activate the **<OK>** button.
- The data file is then converted accordingly.

NOTE

You can interrupt this procedure by activating the **<Cancel>** button. The smooth factor is automatically reset to "0". The data file will then be smoothed strongly.

Chapter 3

Operation

This chapter contains:

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Starting Opt. 20.	3-4
Data Input	3-5
Creating a Geometric Element	3-6
Data output and program termination	3-8
Printing	3-9

Requirements for Operation of Opt. 20

Data file

A data file with a continuous scanning path is required. The data can be collected with **<DI 1100>**. The measuring points are projected onto a two-dimensional plane.

NOTE

Several scanning paths can be displayed if necessary. However the program automatically connects multiple scanning paths to form a single continuous one. The junctions connecting the individual paths are created by the program and cannot be influenced.

Utility programs

Two utility programs are required to operate Opt. 20 interactive contour graphics, i.e.:

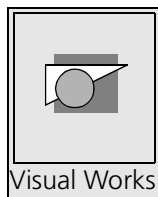
- Visual Works
- acis 2

When UNIX/LINUX is started, the two utility programs are also automatically started and go into standby.

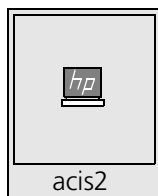
Callup of Opt. 20 then automatically establishes a link to the other programs.

In the root menu (open blue screen background) you can see from the icons whether the utilities have been started.

Visual Works icon



acis 2 icon



NOTE

The constant standby condition of the two utility programs ties up a great deal of system resources. This reduces the operating speed of the other programs.

For this reason, it makes sense to quit the utility programs if you do not wish to work with Opt.20 interactive contour graphics.

Terminating utility programs**NOTE**

Visual Works runs independently. For this reason, the window cannot be closed in the usual manner (double click at top left).

- Mark the Visual Works icon by clicking on it once with the mouse. A pull-down menu then appears.
- Select **<Restore>**.
The Visual Works menu is displayed.
- In the pull-down menu, select **<File/Exit VisualWorks>**.
A query then appears to confirm that you really want to close the window.
- Click on **<Exit>** to quit Visual Works. acis 2 will also be terminated automatically.

Starting utility programs

Once the utility programs have been terminated, they cannot be restarted in the program.

- Quit the application(s).
- Restart UNIX/LINUX.

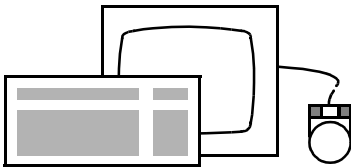
UMESS

UMESS must be started. It provides the basis for Opt.20.

Starting Opt. 20

Starting Opt. 20

Start program with the DI number.



<u>DI</u>	<u>Pull-down menu</u>	<u>Pictogram</u>
1132		

Direct input

✉

1132

Return

Help

- Activate function key **<F12>**.
The direct input (DI) window then appears.
- Enter the number **<1132>** in the window.
- Activate **<Enter>**.
The dialog window then appears.

Data Input

Dialog				
Recall of point quantities for reconstructing geometric elements				
1	File name	From point No.	To point No.	Step length
	CONTOUR	1	999	1
		1	1	1
		1	1	1
		1	1	1
		1	1	1
2			*	COORD
	RETURN			TERMIN
				INFO

Enter file name in dialog window. Select the point numbers and the desired step length.

Define any additional files

NOTE

You may select up to five files simultaneously. The files are then automatically joined to form a continuous scanning path which is displayed in the graphics window.

For this reason it is preferable to use only a single file.

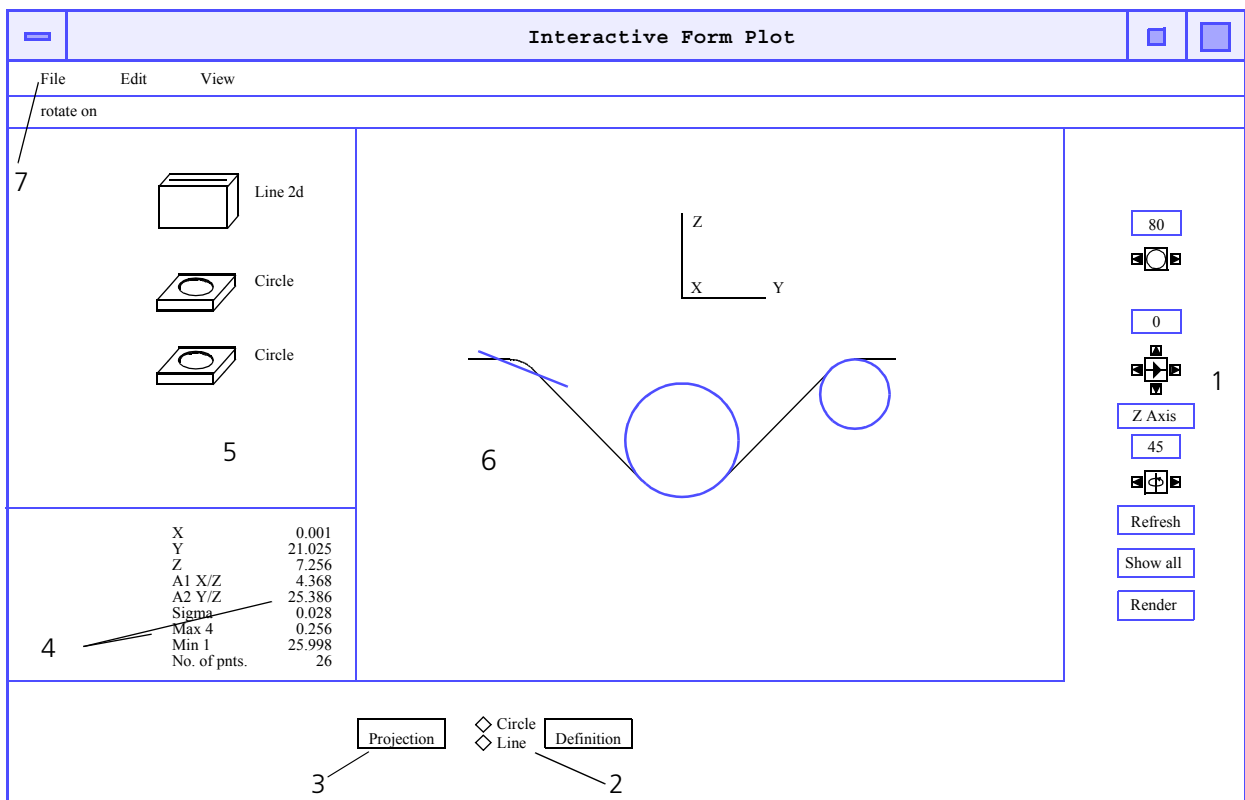
Use **<TERMIN>** to quit the data input mode. The program then changes to the interactive form plot window.

NOTE

If the interactive form plot window does not appear and the dialog window is closed, the program has not been started.
In this case, one or both of the utility programs is not in the standby mode. Start the utility programs (► *“Requirements for Operation of Opt. 20”* on page 3-2) and repeat data entry.

Creating a Geometric Element

The data file is graphically displayed in the interactive form plot window. You can set the data file to the desired position and size using the various graphic manipulation routines. Graphic selection of the measuring points provides the basis for reconstructing geometric elements.



NOTE

If no measuring points were selected, no geometric elements are displayed. No error message appears.

The function remains active and can be used repeatedly.

The reconstructed geometric elements are then displayed one below the other in the list of geometric elements.

- You can alter the display of the data file (6) via the graphics manipulation routines (1) (▶ *“Graphic Manipulation Routines” on page 2-6*) and the projection of the axes (3) (▶ *“Projection of Perspectives” on page 2-11*).
- If necessary, smooth the curve using the smooth factor from the menu line (7) **<View/Smooth factor>** (▶ *“Menu Line” on page 2-13*).
- Define which geometric element you wish to reconstruct (2). Draw a lasso (rectangular window) around the measuring points you would like to use for the reconstruction. (▶ *“Preselection of Geometric Elements” on page 2-10*).

The reconstructed geometric element is displayed in the graphics window in light blue.

The corresponding geometric element is displayed in the list of geometric elements (5) (▶ *“List of Geometric Elements” on page 2-13*).

- Click on the geometric element in the list of geometric elements. The marked geometric element is highlighted in gray. The numeric data are displayed (4) (▶ *“Numeric Data of Geometric Elements” on page 2-12*).
- The marked geometric element can be deleted. Use the command from the menu line (7) **<Edit/Delete>** (▶ *“Menu Line” on page 2-13*).

Data output and program termination

You can quit the program in two different ways, i.e.

- Without saving the geometric elements.
- With an output of the geometric elements to a UMESS protocol.

Without save

The program is terminated without saving the data for the geometric elements.



ATTENTION!

No confirmation query appears.

- Use the command in the menu line **<File/Cancel>** (► *"Menu Line" on page 2-13*).

With save

The program is terminated and the data for the geometric elements is stored to the UMESS protocol.



ATTENTION!

No confirmation query appears.

NOTE

All geometric elements from the list of geometric elements are output to the UMESS protocol. The marking of a geometric element has no effect.

Use the command from the menu line **<File/Terminate>** (► *"Menu Line" on page 2-13*).

The geometric data are stored in the UMESS protocol and displayed in the protocol window, which is open.

The name of the file can be obtained from the protocol.

Printing

Option 20 is programmed as a Smalltalk application. The Shared Print software is required for printing. The printer must be installed as a Shared Print/UX printer prior to its initial use (► *"Installing a Printer" on page 3-9*).

Output to Printer

Use the command from the menu line **<File/print>** (► *"Menu Line" on page 2-13*).

NOTE

The contents of the graphics window can be printed via this command. The entire interactive form plot window is not printed.

Installing a Printer

Printer installation is a special procedure which requires detailed *knowledge of the operating system*.

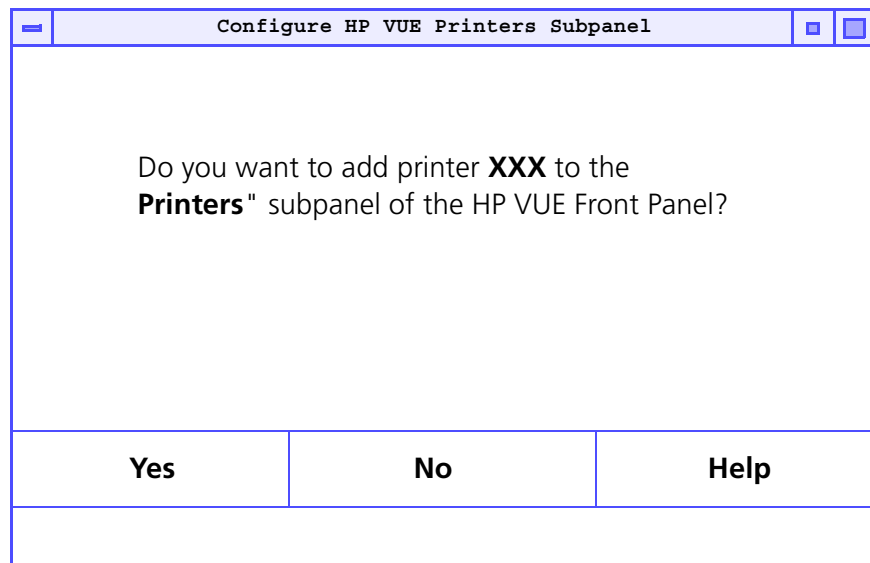
The installation of the printer in a **network** must be performed only by a **system administrator**. Please call our hotline Tel.: 0180/333-6337

NOTE

The software is programmed as a Smalltalk application. Visual Works can produce graphical outputs only in postscript form. Since most printers do not have postscript capability, it was decided to use the HP program SharedPrint/UX. This program can process postscript files for HP printers.

The printers must be *additionally* installed as SharedPrint/UX printers (even if they already function in UMESS/UX) .

Since Visual Works currently provides no possibility for selecting printers, the SharedPrint/UX printer must be designated as the **system default printer**.



Procedure for Installing a Local Printer

- Quit UMESS
- Click on the blue background with the mouse and select **<New Window>** from the pull-down menu. A CZ terminal window then appears.
- Enter the password, if applicable.
- Enter the following command: **su**
Press the **<Return>** key.
- Enter the following command: **sam**
Confirm with the **<Return>** key.
- Printers and Plotters **<Open>**
- Printers/Plotters **<Open>**
- Pull-down menu:
Add local printer/plotter
Add parallel printer/plotter
Parallel interface <ok>
- The **printer name** is freely selectable: e.g. DeskJet 1600C
- **<Printer Model / Interface ...>**
- Select printer with **Shared Print** (e.g. for a Deskjet 1600C the DJ 1200C must be selected (➤ *"Printer Selection Table" on page 3-11*). **<ok>**
- Select Make this the System Default Printer.
- **<ok>**

RETURN

RETURN

- Answer the question **Configure HP VUE Printers Subpanel?** with **<No>**.
- Answer confirmation query with **<ok>**.
- Pull-down menu **File: Exit**
- **<ok>**
- **<Exit SAM>**
- Restart UNIX.

Printer Selection Table

Printer Type	Shared Print model	Special Features
DeskJet 1600C	DJ 1200C	If PHSS-9798 is installed, SharedPrint model D1600C
DeskJet 1200C	DJ 1200C	Not tested
LaserJet 3	LJIII	In file /usr/sharedprint/configs/active/<druckername>.sh replace papersize = letter with papersize = a4.
LaserJet 4/5/6	LJ4	Not tested; the same modification may be required as for LaserJet3.
DesignJet 750C PS	DSNJ650Cp	The model script "dumbplot" must be edited as follows to ensure safe operation from UMESS. The line echo "\033%- 12345X@PJL ENTER LANGUAGE = HPGL2" must be inserted in front of the line echo "IN; \n".
PaintJet XL 300	PJXL300	Not tested
LaserJet Color LaserJet Color/PS	???	Not tested
Other postscript printers	???	Not tested/Compatibility with UMESS not known.

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