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GRAFIS

Textbook for Beginners
Part I

GRAFIS SOFTWARE FOR CLOTHING CONSTRUCTION

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Introduction

The GRAFIS system

Since 1991 the CAD system GRAFIS has been used in education, since 1993 in trade and industry. The package contains first pattern cutting, pattern enlargement and reduction and a basic layplanning system. From version 7 pattern enlargement and reduction can ensue according to the construction system as well as with grade rules. Irrespective of this, GRAFIS records the construction and design steps during first pattern development by imperceptibly writing a protocol. The user can then call this record with other sizes and create a computerised similar construction for these sizes.

Each size is represented by a measurement chart in GRAFIS, incorporating body measures, set up according to measurement systems customary in Germany. Other measurement systems can be implemented. Furthermore, measurement charts with body measurements taken from a person can be generated and applied. If the basic block has been generated according to the construction principle GRAFIS provides for pattern development and pattern generation for individual persons.
GRAFIS can be run on inexpensive PCs as used privately for example for word processing. Nevertheless, it contains an extensive range of organisation, construction and design functions which allow for all common construction and design tasks for pattern cutting, i.e.:

- Open, save and delete collections, styles and patterns.
- Elementary functions for development of basic blocks (construction of points, lines, curves, circle arcs, etc. with the option of processing body measurements and construction parameters).
- Call prepared basic blocks for dresses, trousers, skirts, coats, sleeves and their display on screen applying proportion classes and size related construction parameters.
- Modification of patterns (relocate darts, incorporate ease, lower armhole, construct darts, dart hood generation, spread, pivot, etc.).
- Generation of measurement charts for standard sizes and actual individuals.
- Digitizing of pattern perimeters and graded nests with the option of further processing in the system.
- Measure functions to determine co-ordinates, distances, lengths, areas, angles and outlines.
- Derivation of construction measurement with a calculator function using body measurements as well as size related construction and processing parameters.
- Layplanning considering material types and repeats.

The system also contains interfaces for data exchange with other CAD systems. Thus, GRAFIS data can be processed for layplanning and cutter control, given that the software of the target system is prepared accordingly. The GRAFIS Help contains explanations about the interface.
Every user can create and apply personal basic blocks in GRAFIS. Nevertheless, thorough knowledge is essential which can be obtained in training courses.

Patterns generated exclusively according to the construction principle require no grade rules for grading. However, the grade rules can be derived as a result of the similar construction and applied to digitized pattern contours.
GRAFIS incorporates a hereditary automatic. It captures which parts are derived from other parts; shows these interrelationships and considers them in alterations. This structure is an important precondition for the automatic pattern alteration service.
The generated patterns can be plotted in any scale required. If a plotter is connected plotting ensues immediately. Otherwise, a plot file is generated and saved to disk for plotting to another system.
The application of the system offers new construction technology. First pattern cutting and grading are combined to one development operation in GRAFIS. Patterns and basic blocks tested by a company for years must be implemented into the system first, working with the computer has to be learned. Therefore, GRAFIS cannot be used without preparation.
The Fachhochschule Niederrhein, Hamburg and Berlin offer support to interested clothing companies, especially in form of students' final work.

With the low costs involved, GRAFIS offers a soft approach to computerised pattern development with low risk especially for small companies. It presents considerable performance features for bespoke garments and small series. Private individuals apply the system to create fitting patterns or develop patterns for companies. It also offers an interesting approach to organisation of overseas production. For example, with installation of a GRAFIS workstation abroad and data transmission, a fast and low-cost transfer of construction data could be set up.

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GRAFIS is used for education at colleges and vocational schools. Since 1993 it is increasingly applied in the clothing industry, trade and design studios. Steilmann, Wattenscheid, uses the system for example in their skirt department for first pattern cutting and grading. The data is then processed on GERBER systems for layplanning and cutter control.

Some experts are of the opinion that because of its concept and resulting capacity GRAFIS represents a new system generation for pattern construction and design.

The system is under constant development in conjunction with industry, trade and colleges.

The Textbook

This textbook is designed to allow for an autodidactic introduction to GRAFIS and/or can be used as teaching support material during GRAFIS training courses. The GRAFIS training is structured in three courses with the following content:

GRAFIS I

- Work with collections and styles,
- generation of standard and individual measurement charts,
- calling of basic blocks,
- plotting/drawing of patterns in different sizes,
- modification functions such as seam allowance, relocate darts, spread, turn open and close, dart hood construction, transformation, mirror etc.

GRAFIS II

- Work with construction parameters and calculator functions,
- work with parts,
- hereditary automatic,
- digitizing and grade rule grading,
- style development with all production patterns,
- layplanning.

GRAFIS III

- GRAFIS construction programming language,
- knowledge about system installation and maintenance,
- implementation of own measurement and sizing systems,
- designing call lists.

This textbook contains 10 chapters corresponding with the content of GRAFIS I. For GRAFIS II and III the training courses offered are recommended. As teaching material for GRAFIS II and III the supplementary chapters 11 to 17 are available.

Prerequisites

For autodidactic learning of GRAFIS I basic computer knowledge is a prerequisite. Application of a word-processing programme and basic knowledge of Windows95 are a sufficient base.
GRAFIS is a CAD system for first pattern cutting grading and layplanning. Thorough knowledge in these areas are essential for the application of the system. **GRAFIS replaces the pencil, ruler and scissors of a pattern cutter but not his knowledge about pattern construction !**

Chapter 1 "Basic rules for working with GRAFIS, calling basic blocks"

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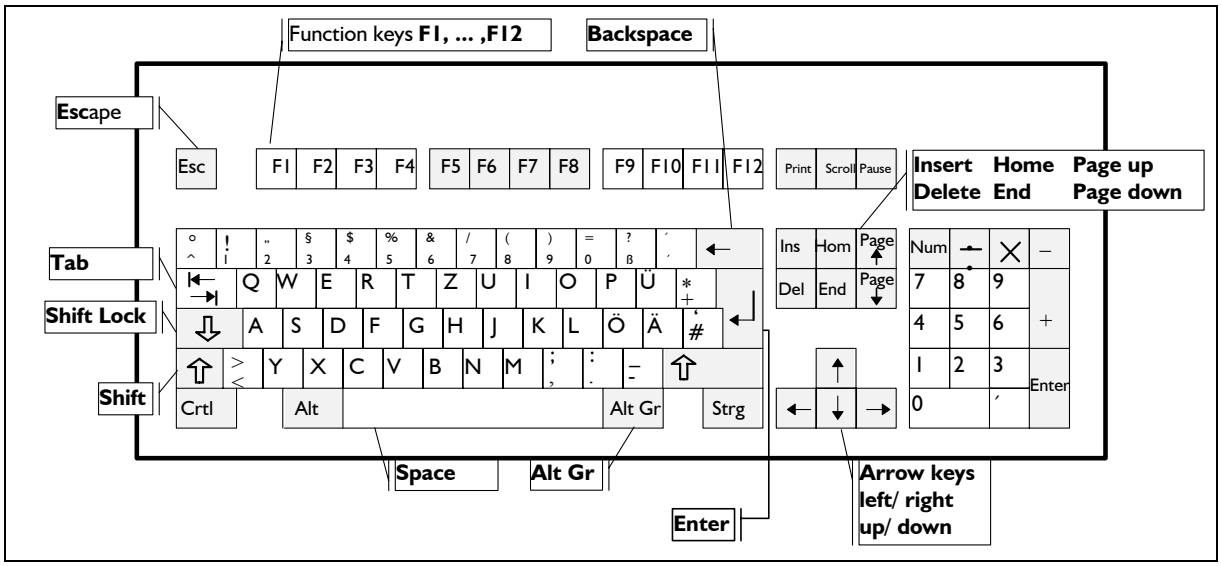
This chapter first explains important rules for work with GRAFIS. Then, you learn how to start and quit the GRAFIS system and the organisation of the GRAFIS screen.
At the beginning of each paragraph, a short step-by-step guide is given to help with later quick reference. When working with the textbook for the first time, please read these guides only briefly and follow the explanations in the text.

1.1 Important rules for work with GRAFIS



Picture 1-1

The GRAFIS keyboard

The keys (picture 1-1) have the following meaning:

Escape	End, step backwards, abort
Tab	Tab, only used during digitising
Shift	Capitalisation/ upper keys
Shift Lock, Caps Lock	Switch on capitalisation/ upper keys (switch off with Shift)
Space(bar)	Space, call Quick menu
Alt Gr. (alternate group)	Activate third key function (bottom right of the key), e.g. for symbol „ \ „ on German keyboard
Enter, Return	Confirmation, selection, start of the program, line feed and new line

Backspace	Delete digits to the left of the cursor position
Function keys F1, ...	Call reserved functions (see paragraph 1.3)
Insert	Toggle between overwrite and insert mode
Delete	Delete digit at insert position
Pos1, Home	Move cursor to home position (mostly beginning of line)
End	Move cursor to end position (mostly end of line)
↑ **Page Up**	Page up
↓ **Page Down**	Page down
Arrow keys ✥	Move screen and entry position

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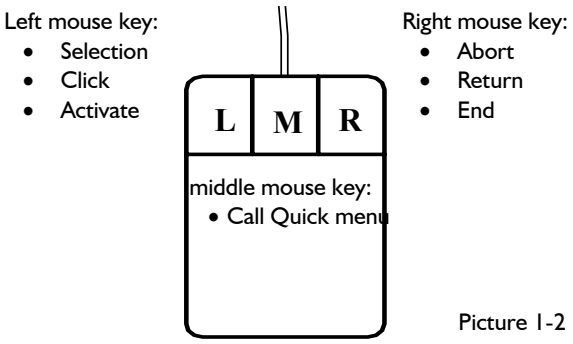
Mouse keys in GRAFIS



Picture 1-2

In all texts of this book the symbols ◧ and ◨ are used for the left and right mouse button.
The **left mouse button** is the "do-key" in GRAFIS and is used for selection, click and activating (picture 1-2). The mouse is moved until the cursor (arrow or crosshair) is on the position required and the left mouse button is clicked.
The **right mouse button** is the "retreat key" and is used for abort / end of a function or return to the next higher level menu. The position of the cursor is of no consequence.
The **middle mouse button** opens the *Extras* pull-down menu containing frequently used functions. If no middle mouse button is available or supported by the mouse driver, the space bar can be used.

GRAFIS measurements

GRAFIS works with the following measurements:

length distance radius	**mm (millimetres)**
body measures	**mm (millimetres)**
angle direction	degrees (right angle =90°)
area	cm^2 (square centimetres)
per cent	0-100%
relative length	0-100%

Please note that all length and distance values are displayed and entered in millimetres.

Further important rules

The decimal symbol is the point (**.**) not the comma (**,**).
e.g.: 10.4 45.2° 67.9% 12.7cm^2
Text and value entries are to be completed with <ENTER>.

To abort a text or value entry press <ESC>.
The data base is explained in detail in chapter 4.1. It is organised in GRAFIS as follows:

drives	according to hard and software A:,...,Z:
collections	saved as directories
styles	saved as files
parts	max. 250 parts per style
objects	points, lines, texts, hatching, construction record, construction parameter etc.

Function key assignment

The function keys F1 to F12 are assigned special functions in GRAFIS. Here, an overview of the functions with reference to the chapter where they are explained in more detail:

	Function	chapter
F1	call on-line help and information	3.2
F2	zoom screen content in / out	3.1
F3	move / rotate / flip parts	13.4
F4	refresh screen	3.1
F5	part positioning	13.1
F6	centre screen content	3.1
F7	Show / hide measurements	7.5
F8	Toggle between pieces in their original position and their position after dragging with <F3>	13.4
F11	calculator function for calculation of z values	12.2

1.2 Starting GRAFIS

Step-by-step guide to starting GRAFIS

⇒ Click the relevant icon on the desktop or use Windows-Explorer and double-click on **grafis.exe** in the folder \GRAFIS
⇒ Select the required construction system from the GRAFIS shell
⇒ Select the drive
⇒ Select the collection
⇒ Enter the name for the new style into the 'Style' dialogue box or double-click on an existing style

Start GRAFIS according to the first step of the guide. The GRAFIS shell appears.

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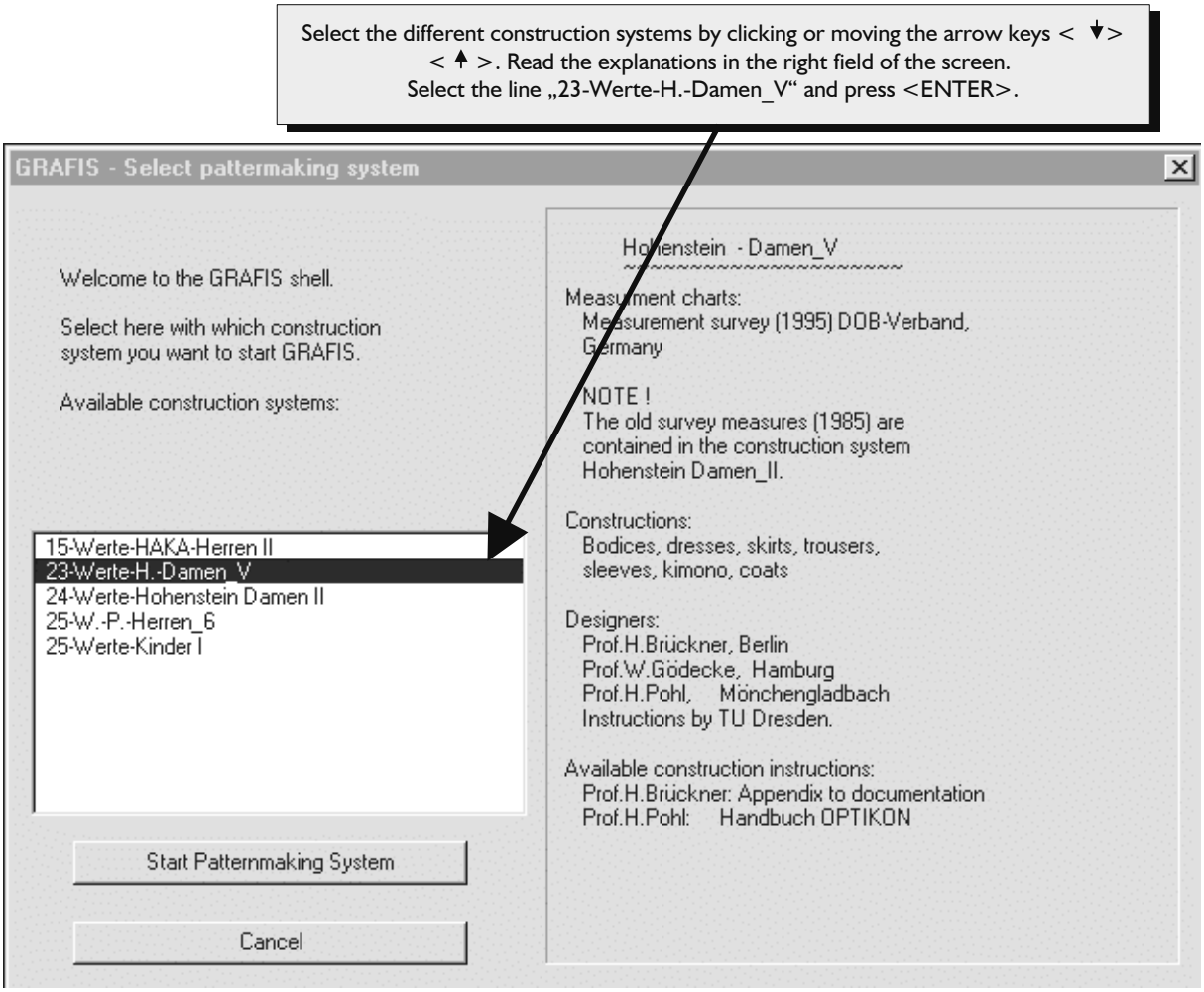

Picture 1-3

The GRAFIS shell

After having started GRAFIS, the GRAFIS shell (Picture 1-3) appears with a list of the installed construction systems. The examples and exercises relate to the system „23-Werte-H.-Damen V". The information also applies to all other construction systems.

As soon as you have selected a construction system, more information about it is displayed in the right part of the screen. The selected construction system is started by pressing <ENTER> or double click with ◘ on the respective line or clicking *Start Patternmaking System*.

Now start the construction system „23-Werte-H.-Damen V".

After having started a construction system a window for work with collections and styles appear (picture 1-4). Read the instructions in picture 1-4.

Naming a new style

The name of a style or collection may contain a maximum of 8 alphanumerical digits. This includes the numbers 0...9, the letters A...Z, "-" [hyphen] and "_" [underline].

The style name A03HGTRD would be correct. Nevertheless, you should apply content relevant and systematic names as it is difficult to keep track of your styles, otherwise.

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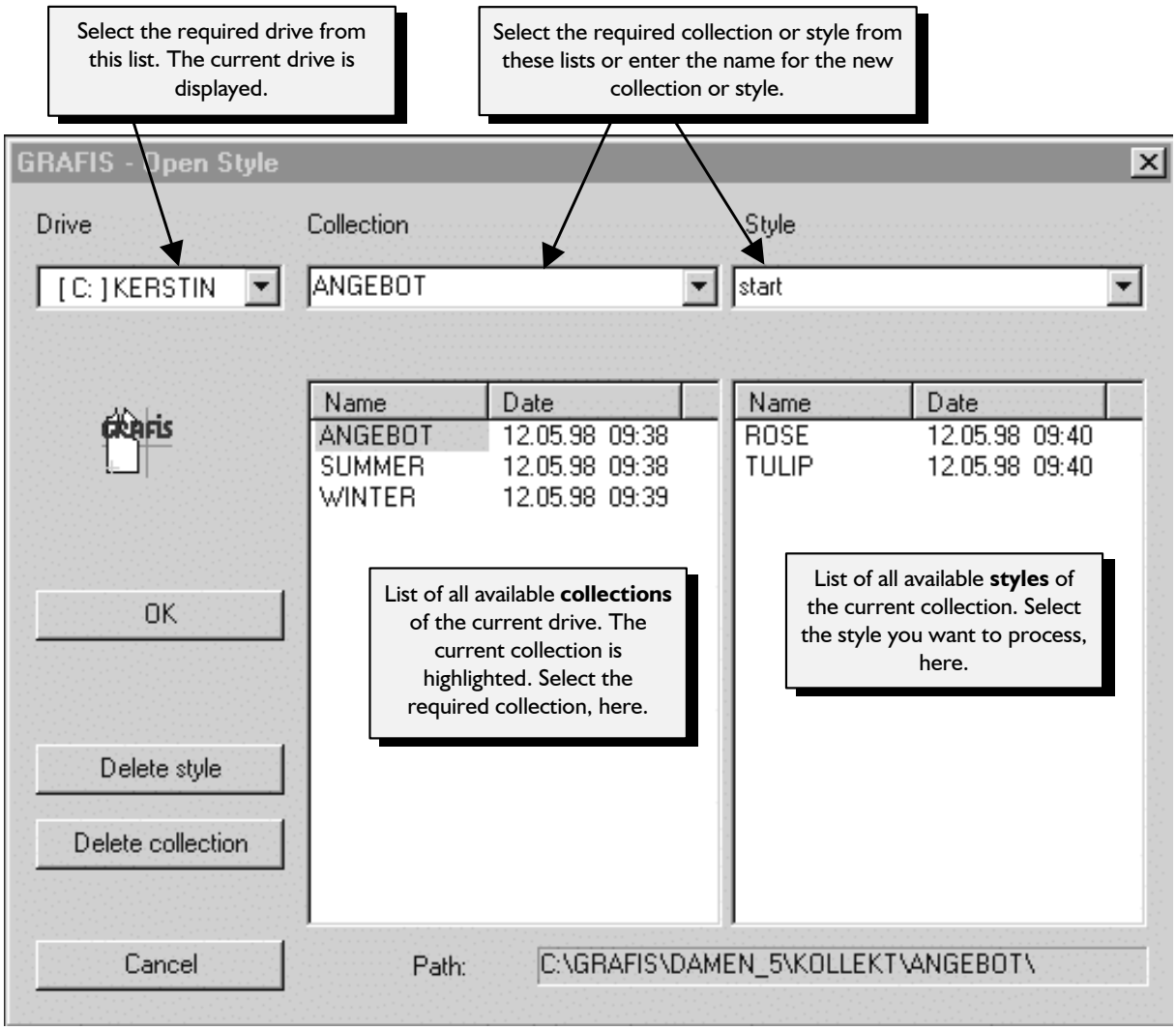

Picture 1-4

Open the new style START in the collection ANGEBOT: Click on ANGEBOT in the list of collections and enter the style name START into the style dialogue box. After having clicked on OK or pressing <ENTER> GRAFIS is started and modification of the style START can begin.

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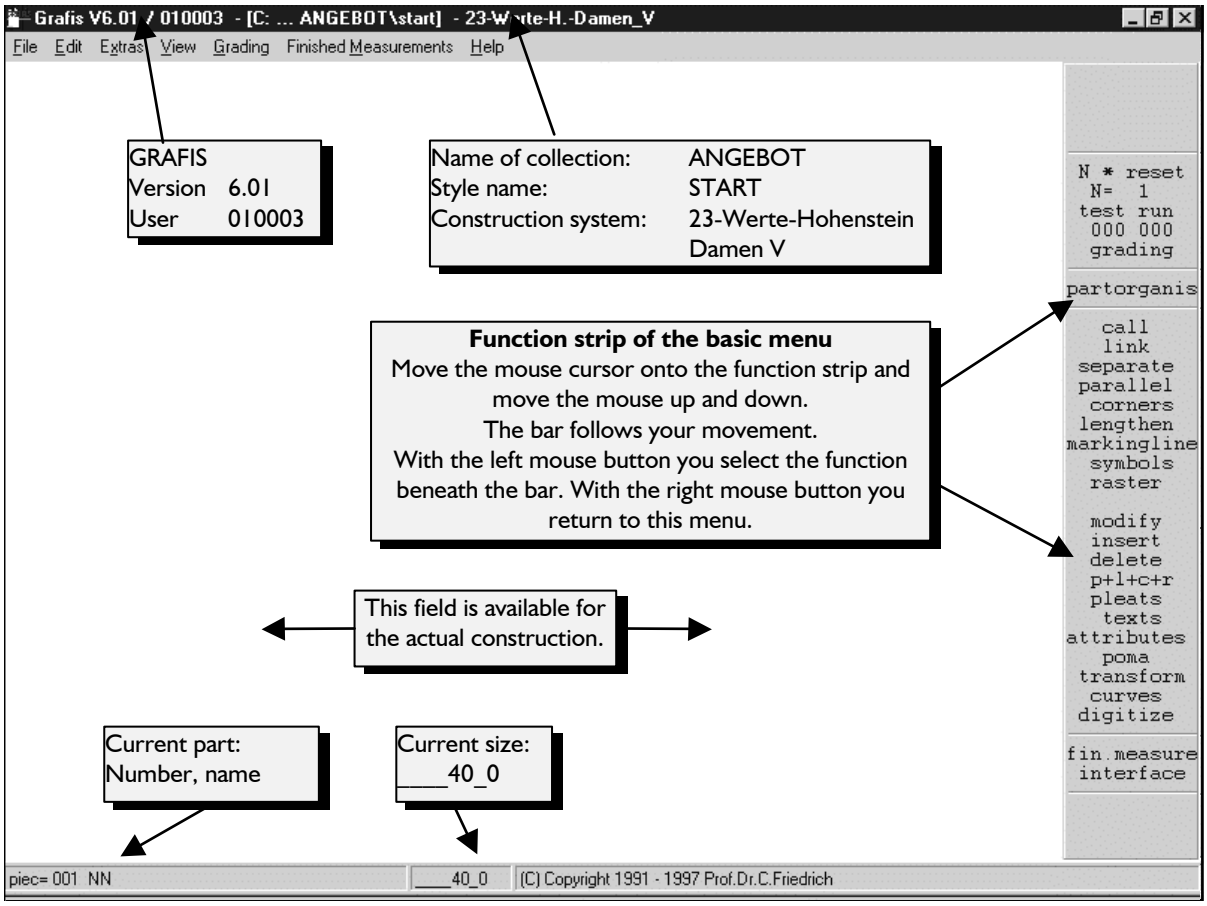
The GRAFIS basic menu

The GRAFIS basic menu appears on screen (picture 1-5). Please look at picture 1-5 closely and compare it with your screen.

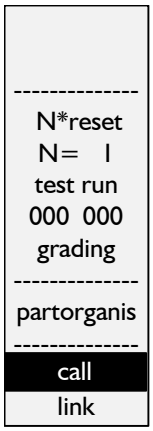


Picture 1-5

1.3 Calling basic blocks

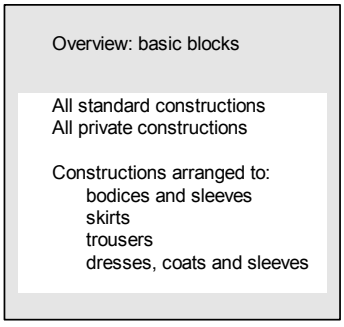
Step-by-step guide

⇒ in the basic menu: click *call*
⇒ selection from the list
⇒ click basic block required
⇒ click *start* in the menu or double-click



The function *call*

All basic blocks available in the selected construction system can be started wit the function *call*.
Start GRAFIS with the construction system „23-Werte-H.-Damen V". Click the function *call* in the basic menu (highlighted in picture 1-5). The overview shown (picture 1-6) appears with the following meaning:



Picture 1-6

- "All standard constructions" lists all standard constructions one after the other.
- "All private constructions" lists the operator generated constructions. At the beginning no private constructions are contained.
- The lines under "constructions arranged to:" list the standard constructions according to product groups.

Now double-click the line "All standard constructions". The list of the available basic blocks (picture 1-7) will be displayed.

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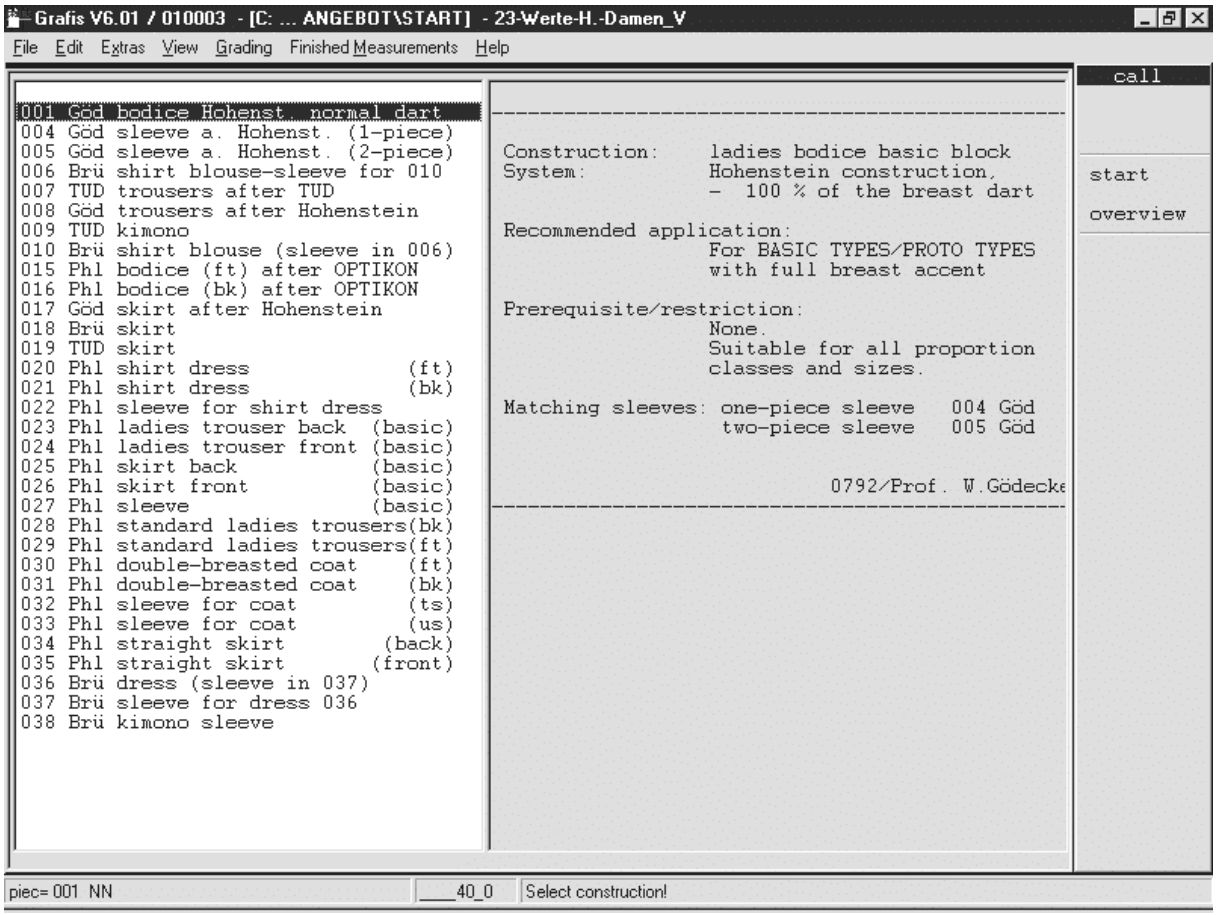

Picture 1-7

The list of basic blocks

The columns have the following meaning:

succ. No.	constructor’s abbreviation	name of construction
001	Göd	bodice a. H. with normal dart

The successive numbers 001 - 499 are reserved for standard constructions. Private constructions start with number 501. The successive numbers appear in the overviews “All standard constructions“ and “All private constructions“ only.

After having selected the basic block by clicking, a mask with further information appears in the right part of the screen. Select various basic blocks and read the constructor’s explanation.

The overview menu (picture 1-6) can be called at any time by clicking *overview*.

Starting a basic block

A selected basic block (picture 1-7) is called by clicking *start* or double-click.

Select the basic block “bodice a. H. with normal dart” from the list “All standard constructions” and click *start*. Your first basic block is displayed on screen. Before calling a different basic block click on *N*reset* in the basic menu and then click on *test run*. The previously called basic block is thus reset.

1.4 Quit GRAFIS

Step-by-step guide

⇒ in the basic menu: open the pull-down menu *File* and click on *Save, Save As...* or *Close*

To quit GRAFIS select between the following in the pull-down menu *File:*

1. save:
   saves the current state of the style under the current name
2. save as:
   saves the current state of the style under a new name and/or a new drive (disk) and/or a new collection.
3. close:
   if the style has not been saved a security question appears.

Click on *File* | *close* and confirm the security question. The style START is saved. You can now close GRAFIS via *File* | *Exit GRAFIS;* work with a new/other style via *File* | *Open* or change the construction system.

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1.5 Exercises

1st Exercise

Start the construction system „23-Werte-H.- Damen_V" and create the style ROSE in the collection ANGEBOT. Quit working on the style ROSE via *File | Close*. Open the menu for work with collections and styles via *File | Open*. When opening a new style GRAFIS creates an "empty" style which remains existent after closing, see style ROSE.
Open the styles TULIP, LILLY and NARCISS in the same way.

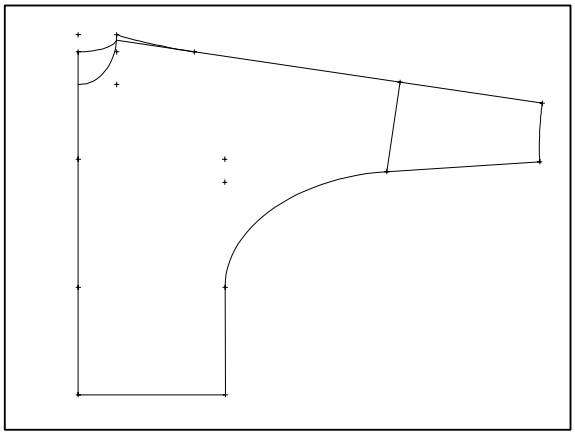
2nd Exercise

Call the style NARCISS from Exercise 1 by selecting the style and clicking OK (picture 1-4). Read the information about the basic blocks by clicking on the function *call* from the basic menu and selecting different basic blocks.

3rd Exercise

Start the construction system „23-Werte-H.-Damen_V" from the GRAFIS shell and create a new style named START_1.
Call the basic block

009 TUD kimono



Save and close the style.

Create a new style named START_2 and call the basic block

018 Brü skirt

in the same way. Save and close the style.

Call the style START_2. The basic block "skirt" is to appear on screen. Save this style under the name START_3: Select *File | Save As*, click the collection required and enter the new style name.

Create a new style called START_4 and call the basic block

020 Phl shirt dress

Finish your work on this style with *File | Close* and do not save the style (click NO).

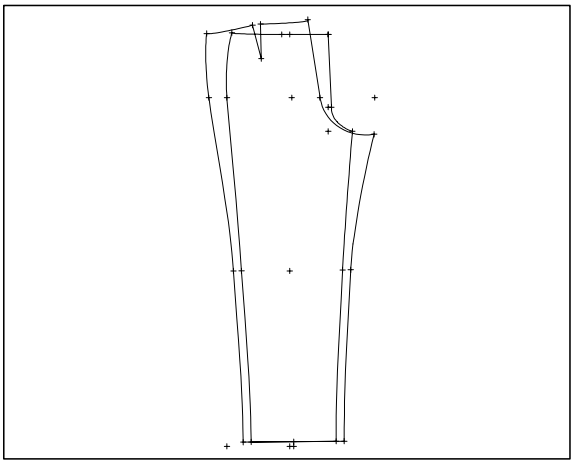
Call the style START_4 with *File | Open*. The style is empty as you have not saved the modifications to the style. Close the style.

Now delete the styles from the 1st exercise by selecting the style ROSE after *File | Open* and clicking on 'Delete style'. Delete the styles TULIP, LILLY and NARCISS from Exercise 1, also. Confirm the security question and quit GRAFIS via *File | Exit GRAFIS*.

4th Exercise

Start the construction system „15-Werte-HAKA-Herren II" and open a new style called START_2 in the collection ANGEBOT. This style is entered under the menswear construction system and can, therefore, not be confused with the style of the same name in the womenswear construction system (3rd exercise).
Read the information about the basic blocks and then call the basic block

01 Bel trousers after Belzig.



Practice the previously learned steps.